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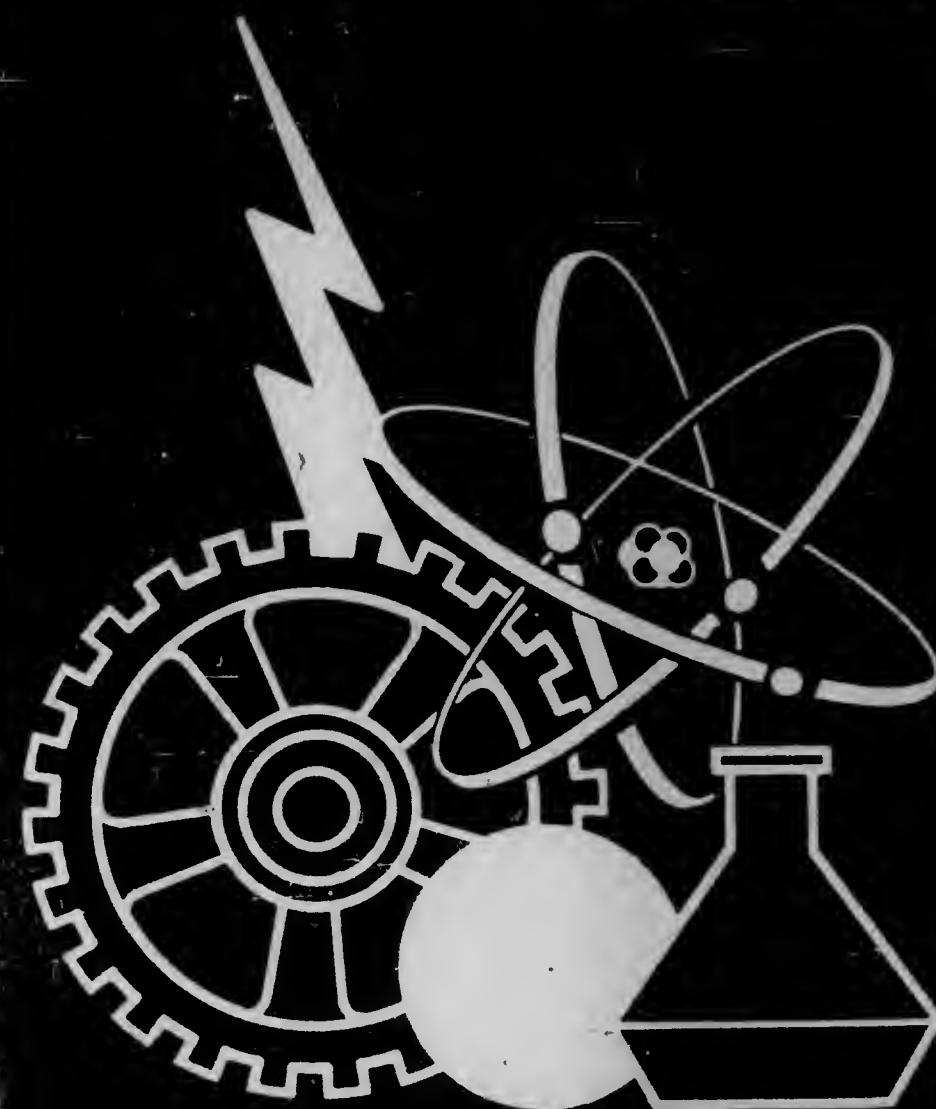
Patent  
and  
Trademark  
Office

Vol. 1097 Number 1

# OFFICIAL GAZETTE

of the  
UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS  
December 6, 1988



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OFFICIAL GAZETTE of the  
UNITED STATES PATENT AND TRADEMARK OFFICE  
December 6, 1988 Volume 1097 Number 1

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## PATENT AND TRADEMARK OFFICE NOTICES

### Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Oct. 1, 1988, and was announced in the *Official Gazette* at 1094 O.G. 2 on Sept. 6, 1988.

Domestic PCT fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date when Japan is elected under PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Danish declaration under PCT Article 64 (1)(a), that Denmark shall not be bound by PCT Chapter II, as from Nov. 1, 1988, was announced at 1095 O.G. 2 on Oct. 4, 1988.

The withdrawal of the Norwegian declaration under PCT Article 64(1)(a), that Norway shall not be bound by PCT Chapter II, as from Jan. 1, 1989, was announced at 1096 O.G. 34 on Nov. 22, 1988.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

Transmittal fee: . . . . .	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed: . . . . .	520.00
—Corresponding prior U.S. national application filed: . . . . .	350.00
—Supplemental search fee, per additional invention . . . . .	140.00
European Patent Office as Searching Authority . . . . .	1160.00

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Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority . . . . .	370.00
—Additional examination fee, per additional invention . . . . .	125.00
—Searching Authority not the USPTO . . . . .	570.00
—Additional examination fee, per additional invention . . . . .	190.00
International fees	
Basic fee: . . . . .	485.00
Basic Supplemental fee (for each page over 30): . . . . .	10.00
Designation fee per country or region for the first 10 national or regional offices: . . . . .	120.00
Designation fee for 11th and subsequent designations: . . . . .	No Charge
Handling fee: . . . . .	150.00

U.S. National Stage fees	Small Entity	Non-small Entity
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA . . . . .	170.00	340.00
USPTO was neither ISA nor IPEA . . . . .	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) . . . . .	25.00	50.00
—For each independent claim in excess of 3 . . . . .	17.00	34.00
—For each claim in excess of 20 . . . . .	6.00	12.00
—For each application containing a multiple dependent claim . . . . .	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 . . . . .	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 . . . . .	26.00	26.00

Oct. 26, 1988.  
DONALD J. QUIGG,  
Assistant Secretary and  
Commissioner of Patents  
and Trademarks.

### Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct.

DECEMBER 6, 1988

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5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on December 3, 1985, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,555,811 through 4,556,990  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . \$ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . \$ 225.00  
By other than a small entity . . . . . \$ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . \$ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . \$ 55.00  
By other than a small entity . . . . . \$ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . \$ 500.00"

### Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anni-

versary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

### PATENTS WHICH EXPIRED SEPTEMBER 18, 1988, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,471,497	06/409,969	9/18/84
4,471,498	06/338,156	9/18/84
4,471,509	06/404,824	9/18/84
4,471,518	06/437,566	9/18/84
4,471,526	06/412,026	9/18/84
4,471,529	06/412,989	9/18/84
4,471,542	06/400,057	9/18/84
4,471,550	06/388,541	9/18/84
4,471,553	06/393,682	9/18/84
4,471,554	06/383,766	9/18/84
4,471,560	06/259,771	9/18/84
4,471,561	06/401,139	9/18/84
4,471,565	06/461,970	9/18/84
4,471,568	06/315,652	9/18/84
4,471,572	06/406,090	9/18/84
4,471,588	06/369,019	9/18/84
4,471,590	06/545,822	9/18/84
4,471,591	06/521,030	9/18/84
4,471,595	06/476,246	9/18/84
4,471,597	06/288,908	9/18/84
4,471,608	06/400,647	9/18/84
4,471,612	06/386,211	9/18/84
4,471,613	06/452,023	9/18/84
4,471,614	06/385,736	9/18/84
4,471,623	06/434,647	9/18/84
4,471,629	06/499,560	9/18/84
4,471,636	06/335,963	9/18/84
4,471,640	06/396,765	9/18/84
4,471,641	06/441,444	9/18/84
4,471,655	06/312,983	9/18/84
4,471,660	06/352,968	9/18/84
4,471,661	06/374,933	9/18/84
4,471,669	06/341,414	9/18/84
4,471,675	06/511,267	9/18/84
4,471,678	06/469,385	9/18/84
4,471,683	06/411,946	9/18/84
4,471,696	06/440,787	9/18/84
4,471,709	06/345,568	9/18/84
4,471,719	06/381,933	9/18/84
4,471,720	06/409,708	9/18/84
4,471,725	06/515,100	9/18/84
4,471,733	06/343,823	9/18/84
4,471,734	06/407,492	9/18/84
4,471,736	06/352,456	9/18/84
4,471,744	06/311,215	9/18/84
4,471,747	06/331,659	9/18/84
4,471,748	06/463,957	9/18/84
4,471,758	06/407,998	9/18/84
4,471,761	06/362,477	9/18/84
4,471,762	06/412,122	9/18/84
4,471,772	06/410,482	9/18/84
4,471,775	06/415,225	9/18/84
4,471,776	06/360,026	9/18/84
4,471,788	06/351,539	9/18/84
4,471,789	06/329,217	9/18/84
4,471,793	06/443,298	9/18/84
4,471,794	06/404,040	9/18/84
4,471,795	06/241,096	9/18/84
4,471,798	06/390,652	9/18/84
4,471,799	06/338,280	9/18/84
4,471,800	06/390,651	9/18/84
4,471,802	06/484,307	9/18/84
4,471,812	06/353,805	9/18/84
4,471,832	06/488,848	9/18/84
4,471,834	06/502,534	9/18/84
4,471,841	06/420,870	9/18/84
4,471,842	06/460,128	9/18/84
4,471,843	06/371,098	9/18/84



Patent Number	Serial Number	Issue Date	Patent Number	Serial Number	Issue Date
4,471,850	06/478,659	9/18/84	4,472,372	06/425,274	9/18/84
4,471,864	06/338,895	9/18/84	4,472,396	06/432,480	9/18/84
4,471,867	06/395,509	9/18/84	4,472,406	06/441,246	9/18/84
4,471,886	06/473,562	9/18/84	4,472,407	06/476,423	9/18/84
4,471,889	06/445,704	9/18/84	4,472,409	06/437,883	9/18/84
4,471,890	06/372,966	9/18/84	4,472,413	06/432,028	9/18/84
4,471,894	06/517,431	9/18/84	4,472,425	06/529,398	9/18/84
4,471,895	06/418,263	9/18/84	4,472,429	06/437,584	9/18/84
4,471,900	06/430,383	9/18/84	4,472,432	06/377,407	9/18/84
4,471,902	06/469,645	9/18/84	4,472,433	06/291,498	9/18/84
4,471,921	06/423,513	9/18/84	4,472,434	06/325,842	9/18/84
4,471,925	06/444,861	9/18/84	4,472,435	06/283,579	9/18/84
4,471,944	06/348,047	9/18/84	4,472,436	06/447,125	9/18/84
4,471,945	06/537,690	9/18/84	4,472,445	06/533,746	9/18/84
4,471,954	06/368,687	9/18/84	4,472,446	06/533,777	9/18/84
4,471,956	06/412,967	9/18/84	4,472,457	06/525,270	9/18/84
4,471,958	06/449,062	9/18/84	4,472,469	06/466,727	9/18/84
4,471,967	06/499,476	9/18/84	4,472,471	06/343,113	9/18/84
4,471,969	06/361,297	9/18/84	4,472,495	06/459,457	9/18/84
4,471,971	06/366,366	9/18/84	4,472,499	06/341,872	9/18/84
4,471,972	06/370,277	9/18/84	4,472,506	06/425,360	9/18/84
4,471,980	06/459,105	9/18/84	4,472,513	06/433,296	9/18/84
4,471,981	06/342,714	9/18/84	4,472,528	06/438,002	9/18/84
4,471,985	06/505,403	9/18/84	4,472,544	06/515,641	9/18/84
4,471,986	06/370,827	9/18/84	4,472,549	06/407,747	9/18/84
4,471,993	06/321,236	9/18/84	4,472,552	06/553,510	9/18/84
4,471,997	06/354,911	9/18/84	4,472,561	06/495,029	9/18/84
4,471,999	06/384,789	9/18/84	4,472,567	06/525,156	9/18/84
4,472,008	06/444,415	9/18/84	4,472,571	06/509,473	9/18/84
4,472,013	06/432,618	9/18/84	4,472,572	06/344,790	9/18/84
4,472,016	06/419,269	9/18/84	4,472,573	06/358,818	9/18/84
4,472,033	06/389,938	9/18/84	4,472,577	06/398,725	9/18/84
4,472,034	06/390,965	9/18/84	4,472,587	06/379,396	9/18/84
4,472,061	06/442,470	9/18/84	4,472,588	06/441,262	9/18/84
4,472,067	06/410,398	9/18/84	4,472,599	06/416,932	9/18/84
4,472,076	06/295,862	9/18/84	4,472,601	06/398,382	9/18/84
4,472,082	06/380,721	9/18/84	4,472,606	06/400,797	9/18/84
4,472,083	06/450,909	9/18/84	4,472,608	06/285,658	9/18/84
4,472,084	06/298,803	9/18/84	4,472,609	06/425,300	9/18/84
4,472,087	06/367,582	9/18/84	4,472,611	06/438,295	9/18/84
4,472,089	06/400,248	9/18/84	4,472,614	06/459,169	9/18/84
4,472,101	06/382,160	9/18/84	4,472,618	06/359,113	9/18/84
4,472,109	06/388,215	9/18/84	4,472,621	06/264,231	9/18/84
4,472,115	06/415,474	9/18/84	4,472,632	06/388,812	9/18/84
4,472,129	06/365,258	9/18/84	4,472,640	06/466,858	9/18/84
4,472,130	06/396,343	9/18/84	4,472,661	06/431,471	9/18/84
4,472,131	06/483,711	9/18/84	4,472,664	06/481,121	9/18/84
4,472,137	06/465,600	9/18/84	4,472,670	06/326,992	9/18/84
4,472,142	06/424,865	9/18/84	4,472,672	06/449,034	9/18/84
4,472,146	06/318,866	9/18/84	4,472,677	06/287,403	9/18/84
4,472,147	06/448,610	9/18/84	4,472,679	06/324,907	9/18/84
4,472,151	06/515,539	9/18/84	4,472,682	06/284,945	9/18/84
4,472,155	06/493,341	9/18/84	4,472,695	06/406,233	9/18/84
4,472,159	06/329,329	9/18/84	4,472,702	06/367,389	9/18/84
4,472,160	06/414,016	9/18/84	4,472,706	06/325,968	9/18/84
4,472,171	06/499,614	9/18/84	4,472,709	06/525,952	9/18/84
4,472,179	06/331,465	9/18/84	4,472,716	06/315,583	9/18/84
4,472,180	06/470,570	9/18/84	4,472,717	06/359,646	9/18/84
4,472,184	06/495,817	9/18/84	4,472,726	06/260,878	9/18/84
4,472,190	06/409,182	9/18/84	4,472,744	06/318,370	9/18/84
4,472,202	06/392,388	9/18/84	4,472,746	06/306,357	9/18/84
4,472,205	06/481,246	9/18/84	4,472,751	06/324,524	9/18/84
4,472,207	06/478,874	9/18/84	4,472,759	06/530,500	9/18/84
4,472,229	06/282,951	9/18/84	4,472,760	06/536,284	9/18/84
4,472,232	06/310,970	9/18/84	4,472,778	06/448,021	9/18/84
4,472,235	06/426,176	9/18/84	4,472,793	06/381,969	9/18/84
4,472,242	06/356,154	9/18/84	4,472,799	06/300,969	9/18/84
4,472,245	06/491,163	9/18/84	4,472,807	06/289,660	9/18/84
4,472,254	06/490,811	9/18/84	4,472,810	06/236,129	9/18/84
4,472,269	06/399,786	9/18/84	4,472,811	06/377,219	9/18/84
4,472,283	06/571,641	9/18/84	4,472,816	06/418,580	9/18/84
4,472,296	06/390,355	9/18/84	4,472,817	06/406,149	9/18/84
4,472,305	06/495,383	9/18/84	4,472,819	06/380,278	9/18/84
4,472,306	06/448,469	9/18/84			
4,472,313	06/419,962	9/18/84			
4,472,347	06/381,875	9/18/84			
4,472,352	06/423,847	9/18/84			

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,594,145, Re. S.N. 204,754, Filed June 10, 1988, Cl. 208/79, REFORMING PROCESS FOR ENHANCED BENZENE YIELD, John C. Roarty, Owner of Record: Exxon Research & Engineering Co., Florham Park, N.J., Attorney or Agent: Stephen H. Markowitz, Ex. Gp.: 116

4,598,632, Re. S.N. 216,952, Filed July 8, 1988, Cl. 98/40.05, AIR DRIVEN CEILING FAN, Johnny Johnson, III, Owner of Record: Inventor, Attorney or Agent: Charles C. Garvey, Jr., Ex. Gp.: 344

4,618,077, Re. S.N. 258,878, Filed Oct. 17, 1988, Cl. 222/383, LIQUID DISPENSING PUMP, Douglas F. Corsette, Owner of Record: Inventor, Attorney or Agent: Lawrence R. Radnovic, Ex. Gp.: 311

4,672,556, Re. S.N. 176,497, Filed Mar. 31, 1988, Cl. 364/474, COMPUTER CONTROLLED MACHINE TOOL, Robert J. H. Winterbottom, et al., Owner of Record: AE Plc., Warwickshire, England, Attorney or Agent: William R. Hinds, Ex. Gp.: 236

4,695,592, Re. S.N. 224,770, Filed July 27, 1988, Cl. 521/54, HYDROPHILIZED POROUS MEMBRANE AND PRODUCTION PROCESS THEREOF, Hajime Itoh, et al., Owner of Record: Mitsubishi Rayon Co., Ltd., Tokyo, Japan, Attorney or Agent: Norman F. Oblon, Ex. Gp.: 153

## Erratum

In Reissue Applications Filed on 1094 OG 39, (Sept. 27, 1988), the Patent Number 4,312,853 should be Re. 30,042 which is a reissue of 3,944,265.

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

3,986,261, Reexam. No. 90/001,629, Requested: Oct. 31, 1988, Cl. 433/217.1, METHOD AND APPARATUS FOR RESTORING BADLY DISCOLORED, FRACTURED OR CARIOUSLY INVOLVED TEETH, Frank R. Faunce, Owner of Record: Frank R. Faunce, et al., Houston, Tex., Attorney or Agent: James L. Jackson, Ex. Gp.: 330, Requester: Maus & Elam Dental Laboratories, Indianapolis, Ind.

4,559,258, Reexam. No. 90/001,630, Requested: Oct. 31, 1988, Cl. 428/156, PRESSURE BELT FOR USE WITH EXTENDED NIP PRESS IN PAPER MAKING MACHINE, Masao Kiuchi, Owner of Record: Ichikawa Woolen Textile Co., Tokyo, Japan, Attorney or Agent: Lane, Aitken, et al., Ex. Gp.: 150, Requester: Birch, Stewart, et al., Falls Church, Va.

4,733,998, Reexam. No. 90/001,628, Requested: Oct. 27, 1988, Cl. 409/132, METHOD AND APPARATUS OF MACHINING THE SIDE EDGE SURFACE OF A WEB PLATE, Shingo Kurisu, et al., Owner of Record: Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan,

Attorney or Agent: Wenderoth, Lind, et al., Ex. Gp.: 320, Requester: Owner

## Errata

"All reference to Patent No. 4,782,789 to J. J. Harrington of Id. for 'AMPHIBIOUS AQUACULTURE FEED DISTRIBUTION MACHINE' appearing in the Official Gazette of Nov. 8, 1988 should be deleted since no patent was granted."

"All reference to Patent No. 4,782,902 to William R. Trujillo of Utah for 'LARGE COMPACT CUTTER ROTARY DRILL BIT UTILIZING DIRECTED HYDRAULICS FOR EACH CUTTER' appearing in the Official Gazette of Nov. 8, 1988 should be deleted since no patent was granted."

## Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by certified mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in case of default.

Great Games, Inc., Seattle, Wash., Reg. 1,465,071 for the mark "NATIONAL FOOSBALL LEAGUE AND DESIGN," Canc.No. 16,881.

Capro Inc., Garden Grove, Calif., Reg. No. 1,280,595 for the mark "PCPRO", Canc. No. 16,981.

American Exhaust Company of Rock Hill, Inc., Rock Hill, S.C., Reg. No. 1,119,202 for the mark "MUFFLER MAN", Canc. No. 17,290.

Chas. W. Priddy & Co., Inc., Norfolk, Va., Reg. No. 264,059 for the mark "VELVET", Canc. No. 17,333.

Agua-Mates Enterprises, Inc., Topmost, Ky., Reg. No. 1,248,872, for the mark "AQUA-MATES", Canc. No. 16,594.

Fluorescent Lamp Energy Control Systems, Inc., dba Flec Systems Inc., Wayne Pa., Reg. No. 1,230,934, for the mark "FLEC", Canc. No. 16,613.

American Video Productions, Inc., Brooklyn, N.Y., Reg. No. 1,281,128, for the mark "AMERICAN VIDEO PRODUCTIONS", Canc. No. 16,655.

Monitrol Corp., Hopkins, Minn., Reg. No. 1,204,962, for the mark "MONITROL", Canc. No. 16,793.

Homefinders U.S.A., Inc., Schamburg, Ill., Reg. No. 878,921, for the mark "HOMEFINDERS", Canc. No. 17,226.

Lilly Dache, Pound Ridge, N.Y., Reg. No. 577,342, for the mark "DACHETTE", Canc. No. 17,339.

Ultraslim A.C.C., Phoenix, Ariz., Reg. Nos. 1,233,125 and 1,275,537 for the marks "ULTRASLIM" and design and "ULTRASLIM THE SLIMMING STUDIO" and design, Canc. No. 17,382.

ERMA S. BROWN,

Administrator

of the Trademark Trial

and Appeal Board.

For JEFFREY M. SAMUELS,

Assistant Commissioner

for Trademarks.

Notice of Examination for Registration  
Wed., Apr. 12, 1989

Pursuant to the provisions of 37 CFR §§10.5, 10.6 and 10.7, an examination for persons seeking registration before the United States Patent and Trademark Office as patent attorneys and agents will be held on Wed., Apr.

12, 1989. The deadline for filing applications along with the \$250 fee and all necessary showings required by 37 CFR §§10.7(a) and (b) is Jan. 31, 1989.

With the exception of those persons who actively served four years or more in the examining corps of the United States Patent and Trademark Office for whom the examination may be waived, all persons recognized for practice before the Patent and Trademark Office in patent cases must, pursuant to the above noted rules, pass the examination. Note that passing the examination does not qualify one for recognition for practice before the Patent and Trademark Office in trademark cases. Such recognition is governed by 37 CFR §§10.14 which does not require the passing of an examination.

There is no limit on the number of times the registration examination may be taken. The examination consists of two parts, a morning section and an afternoon section. To pass the examination, an applicant must pass both sections. An applicant who passes one section of any examination given on or after Apr. 7, 1987, but who fails the other section, will not be required to retake the section passed, provided the applicant takes and passes the section failed in one of the next three examinations regularly scheduled by the Patent and Trademark Office. If the applicant does not pass the section failed within 18 months after failing the section, the applicant must retake both sections of the examination. No extensions of time will be granted except in extraordinary circumstances, e.g. an accident or hospitalization just prior to the examination which prevented the applicant from taking the examination.

Under 37 CFR §10.7(b), persons seeking registration must submit "satisfactory proof of . . . sufficient basic training in scientific and technical matters . . ." The initial submissions of persons not having degrees in recognized subject areas, e.g. physics, chemistry, biology or engineering, are sometimes inadequate, and must be supplemented before such persons can be approved to take an examination. To afford adequate time to present any supplemental showing, it is recommended that such persons file their applications early, preferably at least two months before the Jan. 31, 1989 deadline. Supplemental showings of qualifications and applications received after Jan. 31, 1989 will be considered only in connection with admission to the Oct. 1989 examination.

The examination is administered under the supervision of the Office of Personnel Management and is given at specific locations throughout the United States where the Office of Personnel Management conducts examination.

Application forms may be obtained from the Office of Enrollment and Discipline, Suite 810, Crystal Park 1,

2011 Crystal Dr., Arlington, Va. or by mail addressed to Box OED, U.S. Patent and Trademark Office, Washington, D.C. 20231.

Nov. 7, 1988. CAMERON WEIFFENBACH,  
Director, Office of Enrollment  
and Discipline.

U.S. Department of Commerce  
Public Advisory Committee for Trademark Affairs

Notice of Open Meeting

Agency: Patent and Trademark Office.

Action: Notice.

Summary: In accordance with Section 10(a)(2) of the Federal Advisory Committee Act (Public Law 92-463), announcement is made of the open meeting of the Public Advisory Committee for Trademark Affairs.

Date: The Public Advisory Committee for Trademark Affairs will meet from 10:00 a.m. until 4:00 p.m. on Jan. 10, 1989.

Place: U.S. Patent and Trademark Office, 2121 Crystal Dr., Crystal Park 2, Room 912, Arlington, Va.

Status: The meeting will be open to public observation; approximately twelve (12) seats will be available for the public on a first-come-first-served basis. Members of the public will be permitted to make oral comments of three (3) minutes each. Written comments and suggestions will be accepted before or after the meeting on any of the matters discussed. Copies of the minutes will be available upon request.

Matters To Be Considered: The agenda for the meeting is as follows:

- (1) Implementation of Trademark Reform Act of 1988
- (2) Public Access to PTO Trademark Automated Systems
- (3) Miscellaneous Issues Regarding Application Examination and Registration Maintenance

Contact Person For More Information: For further information, contact Carlisle E. Walters, Office of the Assistant Commissioner for Trademarks, Room CPK2-910, Patent and Trademark Office, Washington, D.C. Telephone: (703) 557-7464.

DONALD J. QUIGG,  
Assistant Secretary and  
Commissioner of Patents  
and Trademarks.

PATENT NOTICES

Certificates of Correction for the Week of Dec. 6, 1988

B1 Re. 31,873	4,724,434	4,748,440	4,756,712
B1 4,338,199	4,726,904	4,749,343	4,756,762
B1 4,385,899	4,726,947	4,749,702	4,756,843
B1 4,528,261	4,726,963	4,749,991	4,756,916
Re. 32,625	4,727,501	4,750,004	4,757,325
4,450,212	4,728,062	4,750,324	4,757,572
4,604,469	4,730,763	4,750,510	4,757,581
4,605,602	4,731,685	4,750,562	4,757,596
4,606,026	4,731,760	4,750,878	4,757,714
4,614,122	4,732,070	4,751,084	4,757,715
4,615,401	4,734,545	4,751,101	4,757,763
4,644,668	4,735,067	4,751,478	4,757,826
4,649,441	4,735,515	4,751,775	4,757,853
4,655,005	4,736,317	4,751,777	4,757,866
4,656,023	4,736,402	4,751,824	4,757,868
4,657,805	4,736,781	4,752,120	4,758,052
4,660,632	4,736,803	4,752,190	4,758,211
4,680,027	4,736,814	4,752,276	4,758,481
4,680,486	4,736,887	4,752,644	4,758,523
4,681,490	4,737,132	4,752,711	4,758,569
4,682,711	4,737,579	4,753,061	4,758,572
4,684,369	4,738,740	4,753,068	4,758,647
4,686,129	4,739,270	4,753,178	4,758,653
4,686,802	4,739,465	4,753,305	4,759,369
4,689,219	4,739,912	4,753,419	4,759,622
4,690,710	4,740,193	4,753,663	4,759,844
4,692,433	4,740,451	4,753,887	4,759,982
4,699,442	4,740,581	4,754,039	4,760,539
4,699,476	4,741,128	4,754,773	4,760,697
4,700,414	4,741,153	4,754,921	4,761,219
4,702,279	4,741,586	4,754,940	4,761,677
4,702,870	4,742,003	4,754,945	4,761,948
4,704,062	4,742,457	4,754,982	4,761,914
4,704,629	4,742,612	4,755,006	4,762,316
4,706,518	4,743,289	4,755,272	4,762,345
4,706,856	4,743,767	4,755,307	4,763,170
4,707,313	4,743,771	4,755,316	4,763,176
4,708,226	4,745,810	4,755,501	4,763,384
4,709,489	4,746,108	4,755,645	4,764,053
4,709,519	4,746,354	4,755,794	4,764,373
4,709,936	4,746,380	4,756,379	4,764,427
4,720,807	4,746,383	4,756,403	4,770,654
4,721,754	4,747,193	4,756,609	
4,723,552	4,747,454	4,756,669	
4,723,809	4,748,151	4,756,682	



## SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these special boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

The following special boxes should be used only for their specified purpose. Address mail as follows:

Box  
Commissioner of Patents and Trademarks  
Washington, D.C. 20231

Box 3	Mail for the Office of Personnel from NFC.
Box 4	Mail for the Assistant Commissioner for External Affairs and the Office of Legislation and International Affairs.
Box 5	"No fee" mail related to trademarks.
Box 6	Mail for the Office of Procurement.
Box 7	Reissue applications for patents involved in litigation and subsequently filed related papers.
Box 8	All papers for the Office of the Solicitor except communications relating to pending litigation.
Box 9	Coupon orders for U.S. patent and trademark copies.
Box 10	Orders for certified copies of patent and trademark applications.
Box 11	Electronic Ordering Service (EOS).
Box 12	Contributions to the Examiner Education Program.
Box 13	Mail for the Employee and Labor Relations Division.
Box AF	Expedited procedure for processing amendments and other responses after final rejection.
Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	Issue Fee Transmittals (PTOL Form 85) and associated fees and corrected drawings.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection).
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications prior to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	
TRADEMARK APPLICATION	New trademark application and associated papers and fees.

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification*, *Index to the U.S. Patent Classification*, *Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effective access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	Name of Library	Telephone Contact
Alabama	Auburn University Libraries	(205) 826-4500 Ext. 21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 261-2907
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7140
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3200
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami-Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
Kentucky	Louisville Free Public Library	(502) 561-8617
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library and Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4281
Nebraska	Lincoln: Engineering Library, University of Nebraska—Lincoln	(402) 472-3411
Nevada	Reno: University of Nevada—Reno Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-7040
	Buffalo and Erie County Public Library	(716) 846-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, North Carolina State University	(919) 737-3280
Ohio	Cincinnati and Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Philadelphia: The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2371
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 367-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin—Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

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PATENT EXAMINING CORPS  
RENE D. TEGTMEYER, Assistant Commissioner  
JAMES E. DENNY, Deputy Assistant Commissioner  
CONDITION OF PATENT APPLICATIONS AS OF November 5, 1988

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
<b>CHEMICAL EXAMINING GROUPS</b>	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	2-10-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	9-3-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-4-87
BIOTECHNOLOGY, GROUP 180—S. N. ZAHARNA, Acting Director	1-17-86
<b>ELECTRICAL EXAMINING GROUPS</b>	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	1-20-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	7-31-86
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	2-15-85
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	6-8-87
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	2-27-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	1-28-87
DESIGN, GROUP 290—K. L. CAGE, Director	1-3-86
<b>MECHANICAL EXAMINING GROUPS</b>	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	11-10-87
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—VACANT, Director	5-13-87
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—VACANT, Director	1-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	4-16-87
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-4-88

Expiration of patents: The patents within the range of numbers indicated below expire during November 1988, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

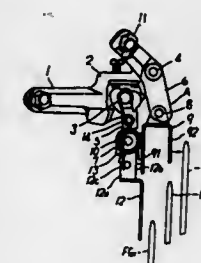
Patents . . . . . Numbers 3,616,463 to 3,624,838, inclusive  
Plant Patents . . . . . None

REEXAMINATIONS

DECEMBER 6, 1988

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,604,078 (956th)  
**THREE-STAGE SPEED CHANGE FRONT DERAILEUR**  
Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan  
Reexamination Request No. 90/001,519, May 24, 1988.  
Reexamination Certificate for Patent No. 4,604,078, issued Aug. 5, 1986, Ser. No. 714,914, Mar. 22, 1985.  
Claims priority, application Japan, Mar. 29, 1984, 59-63013  
Int. Cl.<sup>4</sup> F16H 7/00  
U.S. Cl. 474—80



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-5 is confirmed.

1. A three-stage speed change front derailleur for shifting a driving chain to one of three speed change stages respectively corresponding to three front chain gears of different diameter comprising:

a fixing member, a pair of linkage members, and a movable member provided with an inner guide plate, an outer guide plate and a shift plate, said shift plate functioning with said inner guide plate to shift said driving chain to a middle speed change stage and being positioned below said inner guide plate so as to serve to shift said driving chain from a smaller diameter front chain gear to a middle diameter front chain gear, said shift plate being pivoted to said movable member in relation of being swingable between a speed change operating position where said chain

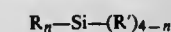
can be shifted by said shift plate to said middle diameter chain gear and a position where said shift plate moves away from said speed change operating position as said movable member moves from a position corresponding to said middle speed change stage toward a position of shifting a chain to a larger diameter front chain gear, said front derailleur having biasing means for biasing said shift plate toward said speed change operating position.

B1 4,648,904 (957th)  
**AQUEOUS SYSTEMS CONTAINING SILANES FOR RENDERING MASONRY SURFACES WATER REPELLANT**  
Ralph J. DePasquale, and Michael E. Wilson, both of Jacksonville, Fla., assignors to SCM Corporation, New York, N.Y.  
Reexamination Request No. 90/001,492, Apr. 5, 1988.  
Reexamination Certificate for Patent No. 4,648,904, issued Mar. 10, 1987, Ser. No. 829,530, Feb. 14, 1986.  
Int. Cl.<sup>4</sup> C09D 5/20  
U.S. Cl. 106—2

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-15 is confirmed.

1. An aqueous silane emulsion composition useful to render a porous ceramic material water repellant which consists essentially of (a) from 1% to 40% by weight of hydrolyzable silane having a molecular weight up to about 500 and the general formula:



wherein R is a C<sub>1</sub>-C<sub>20</sub> hydrocarbyl or halogenated hydrocarbyl group, R' is C<sub>1</sub>-C<sub>3</sub> alkoxy or halide or amino or carboxyl group, and n is 1 or 2, or oligomers thereof, (b) from 0.5 to 50% by weight of the silane component of an emulsifier having an HLB value of from 4-15, and (c) water.



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## STATUTORY INVENTION REGISTRATIONS

PUBLISHED DECEMBER 6, 1988

A statutory invention registration is not a patent. It has the defensive attributes of a patent but does not have the enforceable attributes of a patent. No article or advertisement or the like may use the term patent, or any term suggestive of a patent, when referring to a statutory invention registration. For more specific information on the rights associated with a statutory invention registration see 35 U.S.C. 157.

H549

### APPARATUS AND METHOD FOR LOCATING TOWED SEISMIC APPARATUS

Joseph P. Lloyd, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 22, 1985, Ser. No. 725,469  
Int. Cl.<sup>4</sup> G01V 1/38

U.S. Cl. 367—19 8 Claims

3. Apparatus for locating a plurality of towed objects relative to a towing vessel, comprising:

separate acoustic source means adjacent and attached to each of said towed objects and each responsive to an individual preselected signal for generating an acoustic signal;

controller means for generating said preselected signals and for individually determining a range and bearing to said towed objects from a preselected location on said vessel; and

a phased array located on said vessel at said preselected location for receiving said acoustic signals from said acoustic source means and interconnected with said controller means.

ment as said filament is drawn off said spool at a rate of speed comparable to that experienced during the flight of a missile, to which said spool is adapted to be attached, comprising:

(a) a mount for supporting said spool, centrally disposed on the end of an elongated shaft, said shaft having a longitudinal axis extending generally transversely of said mount;

(b) a plurality of elongated supporting members, symmetrically spaced about said elongated shaft, each having one end attached to said elongated shaft and its other end affixed to a base plate, to provide the sole support for said elongated shaft and said mount, each of said elongated members having a first flex portion of a reduced thickness for permitting flex along its longitudinal axis whenever a force is applied along the longitudinal axis of said shaft and a second flex portion of reduced thickness for permitting flex at an angle to its longitudinal axis when a torsional force is applied to said mount for supporting said spool;

(c) first sensing means disposed on each of said supporting members, in said first flex portion, for sensing the deflection of said members in a direction along the longitudinal axis of said shaft;

(d) a second sensing means disposed on each of said supporting members, in said second flex portion, for sensing the deflection of said member in a direction at an angle to the longitudinal axis of said shaft;

(e) means for receiving signals from said first and second sensing means, and for indicating the forces exerted on said members as said filament is drawn off said spool; and

(f) means for drawing said filament off said spool at a rate of speed comparable to that experienced during the flight of a missile to which a said spool may be attached.

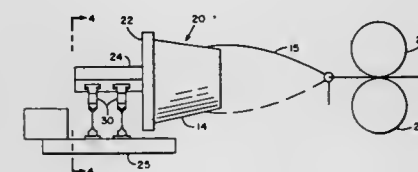
H550

### APPARATUS FOR SENSING AXIAL AND TANGENTIAL FORCES EXERTED ON A SPOOL OF DATALINK FILAMENT

Troy L. Hester, Huntsville, and C. Denise Overstreet, Decatur, both of Ala., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 20, 1988, Ser. No. 208,932  
Int. Cl.<sup>4</sup> G01L 5/14, 1/22

U.S. Cl. 73—167 10 Claims



1. Apparatus for sensing and measuring axial force and torsional force exerted on a spool of fiber optic datalink fila-

H551

### OPTICAL PACKAGE WITH IMPROVED FIBER ALIGNMENT FIXTURE

Ghazi M. Chaoui; Charles R. Fegley, both of Muhlenberg Township, Berks County; Jan Lipson, Upper Macungie Township, Lehigh County; Ralph S. Moyer, Cumru Township, Berks County, and Thomas S. Stakelon, South Whitehall Township, Lehigh County, all of Pa., assignors to American Telephone and Telegraph Company, New York, N.Y.; Bell Telephone Laboratories, Incorporated, Murray Hill and AT&T Technologies, Incorporated, Berkeley Heights, both of, N.J.

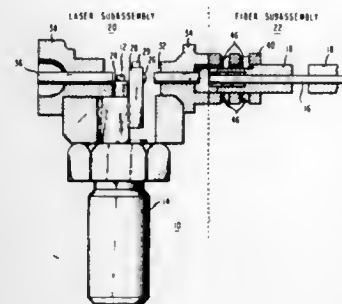
Filed Jun. 15, 1987, Ser. No. 62,026  
Int. Cl.<sup>4</sup> G02B 6/36, 6/32

U.S. Cl. 350—96.20 17 Claims

1. An optical package comprising:  
an optical subassembly including an active optical device located on a mounting structure, and focusing means located between the optical device and the exterior of the package; and

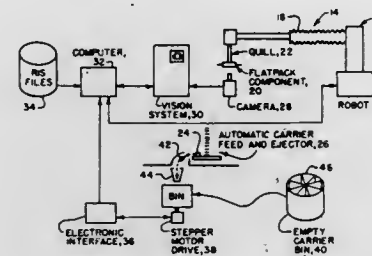
a fiber subassembly including an optical fiber encased in a ferrule, the ferrule being located within a cylindrical sleeve and capable of axial motion within said sleeve to

achieve optimum axial alignment between the optical subassembly and the fiber subassembly, said sleeve includ-



ing at least one opening therethrough to expose said ferrule to allow attachment of said ferrule to said sleeve.

outputting a position signal indicative of a storage location in a bin where that empty carrier is to be deposited; an electronic interface means, for converting said position signal into a drive signal; means for controllably moving a bin to a particular position, said means for controllably moving receiving said drive signal from said electronic interface;



said bin, said bin having a plurality of storage locations, said means for controllably moving attached to said bin, said means moving said bin such that a selected storage location is positioned under a feed funnel so that an empty carrier falls into said selected storage location; and a feedback means for indicating to said computer where said bin is positioned.

**H552**  
**AUTOMATIC EMPTY FLATPACK CARRIER SORTER**  
Arthur T. Jones, Jr., College Station, Tex., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.  
Filed Aug. 5, 1987, Ser. No. 82,006  
Int. Cl.<sup>4</sup> B07C 5/00

**U.S. Cl. 209—587** **1 Claim**  
1. An empty flatpack carrier sorting system, said empty flatpack carrier sorting system comprising:

- a) an automatic carrier feed and ejection means for positioning a loaded carrier having flatpacks therein at a pickup point and for removing an empty carrier from the pickup point;
- a) a robot means for selectively transporting said flatpacks from the pickup point to an assembly point, said robot means having a movable arm with pickup means attached thereto that removably attach to the flatpack in the loaded carrier;
- a) a camera means for observing the physical configuration of the flatpack after said robot means removes said flatpack from said loaded carrier;
- a) a vision system means for determining the shape of the flatpack and the number of leads therefrom, said camera means inputting an image into said vision system, said computer outputting configuration information as to the flatpack
- a) computer, said computer receiving the configuration information from said vision system means and determining the type of carrier associated with the flatpack, said computer

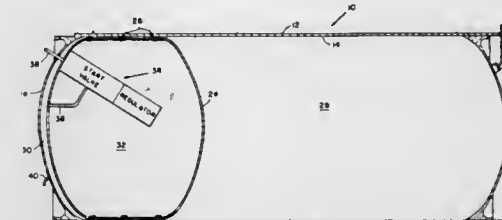
**H553**  
**PRESSURIZED PISTON EXPULSION SYSTEM**  
Ben F. Wilson, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.  
Filed Dec. 28, 1987, Ser. No. 138,903  
Int. Cl.<sup>4</sup> B65D 47/10; B67D 5/42

**U.S. Cl. 222—389** **2 Claims**

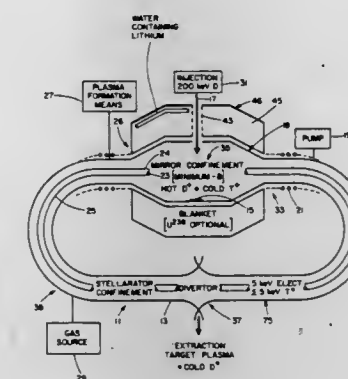
- 1. A pressurized piston expulsion system comprising an elongated cylindrical tank having a cylindrical inner surface, a combination small tank and piston mounted inside said elongated cylindrical tank and sealably and slidably mounted relative to said inner cylindrical surface to define chambers on opposite sides of said small tank and piston, said small tank and

piston having a chamber therein for containing high pressure gas therein, and valve means for controlling the flow of gas

an energetic deuteron population within said bulk plasma, said deuteron population being produced by injection of



from said chamber of said small tank and piston and into one of the chambers of said elongated cylindrical tank.



deuterium having an initial energy of at least 120 keV into said bulk plasma.

**H554**  
**TOROIDAL REACTOR**  
John M. Dawson, Pacific Palisades, Calif.; Harold P. Furth, and Fred H. Tenney, both of Princeton, N.J., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Continuation of Ser. No. 150,395, May 16, 1980, abandoned, which is a continuation of Ser. No. 904,673, May 10, 1978, abandoned, which is a continuation-in-part of Ser. No. 649,949, Jan. 27, 1976, abandoned, which is a continuation of Ser. No. 411,503, Oct. 13, 1973, abandoned, which is a continuation of Ser. No. 231,324, Mar. 2, 1972, abandoned. This application Mar. 3, 1982, Ser. No. 354,418  
Int. Cl.<sup>4</sup> G21B 1/00

**U.S. Cl. 376—107** **7 Claims**

- 1. A two-component plasma for producing energy from fusion reactions within the plasma comprising: a bulk plasma of tritium ions and electrons having a substantially Maxwellian energy distribution, said electrons having a temperature of at least 4 keV; and

**H555**  
**MOISTURE ABSORBING ANTI-ARCING COATING AND METHOD FOR APPLYING SAME**  
Catharine A. Ritter, Cockeysville, and Robert W. Kreps, Glen Burnie, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Apr. 4, 1984, Ser. No. 596,786  
Int. Cl.<sup>4</sup> C08J 3/02

**U.S. Cl. 524—507** **14 Claims**

- 1. An improved coating composition for ceramic electrical insulators, the coating composition being of the type having an acrylic resin dissolved in a solvent, wherein the improvement comprises: isocyanate containing material selected from the group consisting of isocyanate-terminated prepolymers and

monomeric isocyanates intermixed with the acrylic resin solution in a proportion sufficient to provide maximum moisture absorbability without degrading the dielectric strength of the electrical insulating coating below a selected limit.

H557

## EPITAXIAL STRENGTHENING OF CRYSTALS

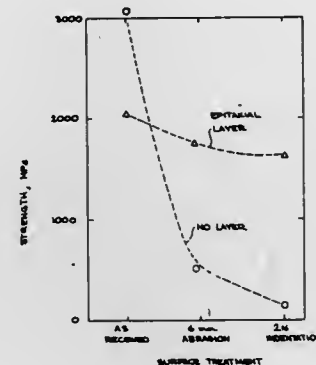
Robert C. Morris, Ledgewood, N.J.; John E. Marion, II, Livermore, Calif., and Devlin M. Gaultieri, Ledgewood, N.J., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Nov. 7, 1986, Ser. No. 927,993

Int. Cl.<sup>4</sup> C04B 35/40

U.S. Cl. 252-62.57

7 Claims



1. A method for strengthening single crystal laser media, the method comprising:
  - providing a single crystal laser media to be strengthened;
  - choosing an epitaxial layer material which will produce a strain of 0.01 to 0.3% when applied to the crystal; and
  - applying the epitaxial layer to the crystal.

H556  
METHOD OF MANUFACTURE AND MACHINE FOR  
MANUFACTURING SUBTERRANEAN WALL DRAIN

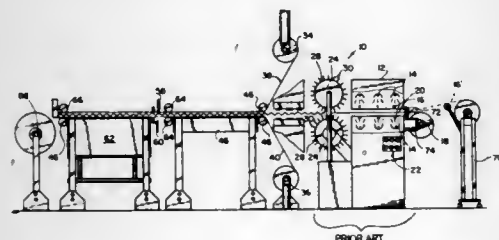
Paul L. Tarko, 383 S. Main St., Windsor Locks, Conn. 06096

Filed Dec. 2, 1985, Ser. No. 803,340

Int. Cl.<sup>4</sup> B27G 11/02; B31F 5/04, 1/20; B32B 31/24

U.S. Cl. 156-379.8

15 Claims



1. An apparatus for manufacturing subterranean drainage material comprising:
  - means for continuously delivering plastic sheet material to a heating means;
  - means for sensing the thickness of said plastic sheet material being delivered to said heating means;
  - means for increasing or decreasing the temperature in said heating means in accordance with said sensed thickness;
  - heating means for heating said plastic sheet material delivered from said delivery means;
  - means for forming a plurality of hills and valleys in said heated plastic sheet material to define a plastic core having opposed upper and lower surfaces;
  - means for cooling said formed plastic core;
  - means for continuously feeding permeable fabric cloth to said opposed upper and lower surfaces of said plastic core, the fabric cloth having opposed longitudinal edges; and
  - means for sealing said opposed longitudinal edges of said fabric cloth to enclose said plastic core and define a sealed fabric/core assembly.

H558

## RADATION SHIELDING PELLETS

Edmund P. Coomes, Richland, and Andrzej T. Luksic, Pasco, both of Wash., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Feb. 27, 1987, Ser. No. 20,070

Int. Cl.<sup>4</sup> G21C 11/02; G21F 3/00; B32B 15/04

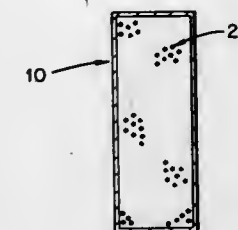
U.S. Cl. 252-478

6 Claims

1. Radiation shielding pellets comprising:
  - an outer shell of radiation shielding material having a first melting point; and

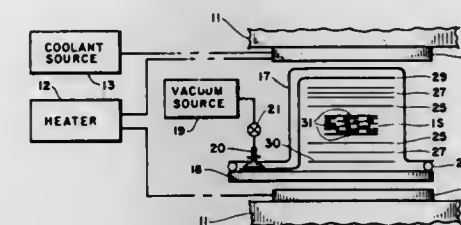
an inner filling of radiation shielding material having a second melting point,

temperature differential is selected sufficiently large to promote cure of said resin progressively across the thickness of



wherein said first melting point is greater than said second melting point.

said composite material including resin toward the other platen heated to the lower of said first and second temperatures.



H560  
METHOD OF MANUFACTURING DISLOCATION AND  
ETCH CHANNEL FREE QUARTZ RESONATOR BLANKS

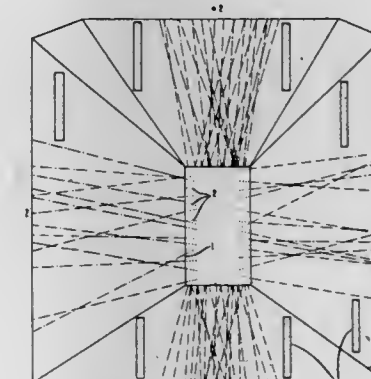
John Gaultieri, Oceanport, N.J., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 31, 1987, Ser. No. 91,686

Int. Cl.<sup>4</sup> C03C 10/14

U.S. Cl. 156-601

7 Claims



1 GROWTH SECTION AND SEED BOUNDARIES  
2 DISLOCATION-ETCHED CAVITIES  
3 DISLOCATIONS  
4 POSSIBLE 2-PLATE SEED LOCATIONS

1. Method of manufacturing dislocation and etch channel-

H559

## ADVANCING GELATION FRONT CURE TECHNIQUE

Scott C. Brown, Sacramento, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 12, 1987, Ser. No. 48,856

Int. Cl.<sup>4</sup> B29C 45/00, 47/00, 35/02, 43/02

U.S. Cl. 264-102

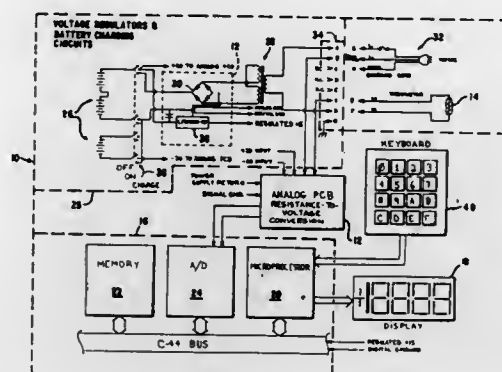
6 Claims

1. A method for curing resin in the fabrication of a composite material, comprising the steps of:
    - (a) enclosing composite material including resin to be cured within a flexible vacuum enclosure;
    - (b) providing a press having a first platen and a second platen and including means to selectively heat said first platen and said second platen; and
    - (c) substantially simultaneously:
      - (i) pressing said composite material including resin within said enclosure between said first platen and said second platen of said press to preselected pressure,
      - (ii) evacuating said enclosure containing said composite material including resin,
      - (iii) selectively heating said first platen and said second platen according to a preselected scheme to respective preselected first and second temperatures to establish a preselected temperature differential across the thickness of said composite material including resin,
- the higher of said first and second temperatures being selected sufficiently high to cure said resin first at the surface of said composite material including resin adjacent the platen heated to said higher of said first and second temperatures and said



free quartz resonator blanks from a non dislocation-free quartz stone, comprising locating dislocation and etch channel-free areas in the x and z regions of the non dislocation-free quartz stone that are outside of  $\pm 15^\circ$  from the normals to the original seed boundary using y-test plates, cutting seed plates for the next generation of crystal growth from the dislocation-free areas of the non disclosure-free quartz stone, and growing dislocation free quartz from said seed plates using conventional cultured quartz growth techniques.

the electrical resistance characteristic of a thermal sensor is measured and used to determine temperature, comprising:



a resistance-type thermal sensor having a temperature-resistance relationship given by

$$T = \frac{1}{A + B \cdot \ln R + C \cdot (\ln R)^2} - 273.15$$

where: T is temperature, in degrees Celsius; R is the sensor's electrical resistance, in Ohms; and A, B and C are calibration constants for the sensor;

means for providing a substantially constant electrical current to said sensor;

means for measuring the voltage produced across said sensor at said constant current, said voltage varying according to changes in the temperature of said sensor;

means for determining the resistance of said sensor from said voltage in accordance with Ohm's law, and for determining the sensor's temperature from said temperature-resistance relationship;

means for displaying said determined temperature; and means for providing said sensor calibration constants A, B, C to said determining means for the determination of said temperature.

**H561**  
**COLD PROCESS FRUIT FILLING**  
Cheryl C. Brown, and John H. Woerman, both of Decatur, Ill., assigns to A. E. Staley Manufacturing Division of Staley Continental, Inc., Decatur, Ill.  
Filed Jun. 28, 1988, Ser. No. 212,543  
Int. Cl.<sup>4</sup> A23L 1/195

U.S. Cl. 426-661 2 Claims

1. An edible fruit filling composition for incorporation within a pastry dough sheath comprising:

- (a) about 1 to about 7 percent cold water swelling granular starch;
- (b) about 3 to about 8 percent pregelatinized starch; and
- (c) about 40 to about 70 percent sweetener component selected from the group comprising sucrose, dextrose, corn syrup, fructose and high fructose corn syrup.

**H562**  
**ACCURATE ELECTRONIC THERMOMETER**  
Gary M. Trachler, R.F.D. #1 Box 252, Hartland, Vt. 05048-9740, and James S. Morse, Kidder Rd., Bradford, Vt. 05033

Filed Nov. 28, 1986, Ser. No. 935,993

Int. Cl.<sup>4</sup> G01K 7/00; G06F 15/32

U.S. Cl. 364-557 15 Claims

1. A temperature measuring apparatus of the type wherein

## REISSUES

DECEMBER 6, 1988

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

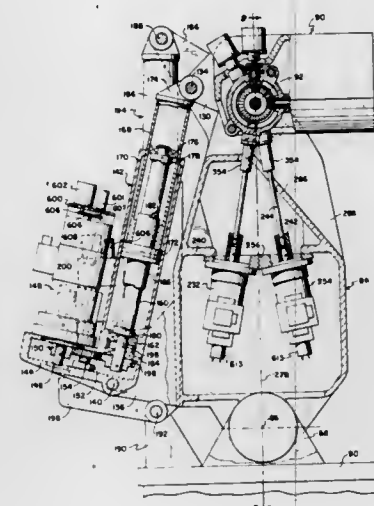
**Re. 32,794**  
**PROGRAMMABLE AUTOMATIC ASSEMBLY SYSTEM**  
Joseph F. Engelberger, Newtown; Torsten H. Lindbom, Brookfield; Maurice J. Dunne, Newtown; William Perzley, Weston; Wilbur N. Roberts, Newtown, and Horace L. Gardener, deceased, late of Ridgefield, all of Conn. by Mrs. Horace L. Gardener, administratrix, assigns to Unimation, Inc., Danbury, Conn.

Original No. 4,275,986, dated Jun. 30, 1981, Ser. No. 31,463, Apr. 19, 1979. Application for reissue Jun. 24, 1983, Ser. No. 508,076

Int. Cl.<sup>4</sup> B25J 9/00

U.S. Cl. 414-730

12 Claims



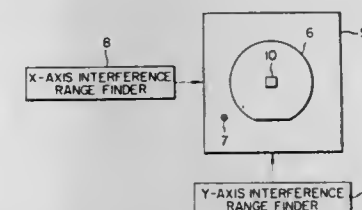
19. In a programmable manipulator, the combination of, a base member mounted for rotation about a vertical axis, a first arm portion pivotally mounted on said base member for rotation about a first horizontal axis, a second arm portion mounted on the upper end of said first arm portion for movement about a second horizontal axis, a manipulator hand mounted on the outer end of said second arm portion and movable about a wrist bend axis which is perpendicular to the longitudinal axis of said second arm portion, said hand having a swivel portion on the outer end thereof which is rotatable about a wrist swivel axis which is perpendicular to said wrist bend axis, means for rotating said first and second arm portions about their respective axes, a first drive motor for said hand, and a second drive motor for said swivel portion, said first and second motors being mounted on and positioned relatively close to the central axis of said first arm portion and having the drive shafts thereof extending generally parallel to said central axis, thereby to limit the rotational inertia of said first arm portion.

**Re. 32,795**  
**EXPOSURE APPARATUS FOR PRODUCTION OF INTEGRATED CIRCUIT**  
Toshio Matsuura, Koshigaya; Kyoichi Suwa, Kawasaki; Hisayuki Shimizu, Tokyo, and Akikazu Tanimoto, Kawasaki, all of Japan, assigns to Nikon Corporation, Tokyo, Japan  
Original No. 4,465,368, dated Aug. 14, 1984, Ser. No. 335,733, Dec. 30, 1981. Application for reissue Aug. 11, 1986, Ser. No. 895,132

Claims priority, application Japan, Jan. 14, 1981, 56-4153  
Int. Cl.<sup>4</sup> G01J 1/42; G03B 27/42

U.S. Cl. 356-121

28 Claims



1. In an exposure apparatus for production of integrated circuits including a stage on which a semiconductor wafer is placed for exposure by illumination light projecting means and means for two-dimensionally displacing said stage in a plane intersecting the illumination light at substantially right angles, an improvement comprising:

- illumination detecting means having a photo reception surface; and
- means for fixedly mounting said illumination detecting means on said stage in such manner that said photo reception surface lies substantially at the same level as the exposed surface of said semiconductor wafer on said stage relative to said stage.

**Re. 32,796**  
**BENZYL-PYRIMIDINYLALKYL-ETHERS AS PLANT GROWTH REGULATORS AND FUNGICIDES, AND CORRESPONDING PYRIMIDINYL-CARBINOOLS**  
Graham Holmwood, Wuppertal; Klaus Lürssen, Berg-Gladbach, and Paul-Ernst Frohberger, Leverkusen, all of Fed. Rep. of Germany, assigns to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Original No. 4,436,907, dated Mar. 13, 1984, Ser. No. 344,261, Jan. 28, 1982. Application for reissue Aug. 1, 1984, Ser. No. 636,644

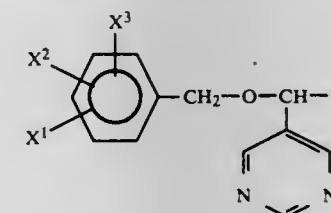
Claims priority, application Fed. Rep. of Germany, Feb. 14, 1981, 3105374

Int. Cl.<sup>4</sup> C07D 239/26

U.S. Cl. 544-335

14 Claims

1. A benzyl-pyrimidinylalkyl-ether of the formula



in which

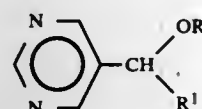
R is alkyl having 1 to 8 carbon atoms; cycloalkyl which has 3 to 7 carbon atoms and which is optionally substituted by alkyl having 1 to 4 carbon atoms; or phenyl which is optionally substituted by halogen, alkyl having 1 to 4 carbon atoms, alkoxy having 1 to 4 carbon atoms and/or halogenoalkyl having 1 [to] or 2 carbon atoms and 1 to 5 halogen atoms, [having 1 to 2 carbon atoms and 1 to 5 halogen atoms],

X<sup>1</sup> is hydrogen, halogen, alkyl having 1 to 4 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, alkoxy having 1 to 4 carbon atoms, alkylthio having 1 to 4 carbon atoms, halogenoalkyl having 1 to 4 carbon atoms and 1 to 5 halogen atoms, halogenoalkoxy having 1 to 4 carbon atoms and 1 to 5 halogen atoms, phenyl which is optionally substituted by halogen and/or by alkyl having 1 to 4 carbon atoms, phenoxy which is optionally substituted by halogen and/or by alkyl having 1 to 4 carbon atoms, phenylalkyl which has 1 to 4 carbon atoms in the alkyl part and which is optionally substituted in the phenyl part by halogen and/or by alkyl having 1 to 4 carbon atoms, or phenylalkoxy which has 1 to 4 carbon atoms in the alkoxy part and which is optionally substituted in the phenyl part by halogen and/or by alkyl having 1 to 4 carbon atoms, and

X<sup>2</sup> and X<sup>3</sup> each independently is hydrogen, halogen, alkyl having 1 to 4 carbon atoms, cycloalkyl having 3 to 7 carbon atoms, alkoxy having 1 to 4 carbon atoms, alkylthio having 1 to 4 carbon atoms or halogenoalkyl, halogenoalkoxy or halogenoalkylthio each having 1 to 4 carbon atoms and 1 to 5 halogen atoms,

or an acid addition salt or metal salt complex thereof.

9. A compound of the formula



wherein

R is benzyl; benzyl substituted on the aryl ring with 1 to 3 of the same or different halo, lower alkoxy, lower alkyl, or lower alkyl substituted with 1 to 5 of the same or different halogens; phenylbenzyl; or phenylbenzyl substituted in the benzene rings with halo or lower alkyl;

R<sup>1</sup> is alkyl having 1 to 8 carbon atoms, phenyl or phenyl substituted with substituents selected from halo, C<sub>1-4</sub>-alkoxy or C<sub>1-2</sub>-alkyl substituted with the same or different halogens.

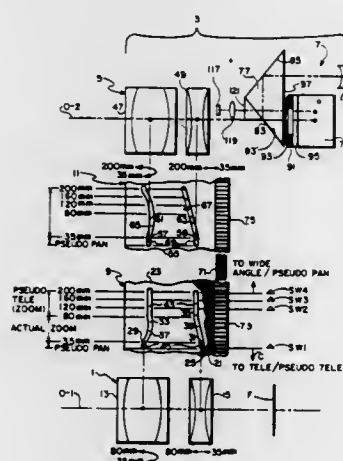
# Re. 32,797 PSEUDO FORMAT CAMERA WITH EXPOSURE CONTROL

Donald M. Harvey, Webster, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
Original No. 4,639,111, dated Jan. 27, 1987, Ser. No. 747,515, Jun. 21, 1985. Application for reissue Sep. 21, 1987, Ser. No. 99,436

Int. Cl.<sup>4</sup> G03B 7/099

U.S. Cl. 354—481

17 Claims



14. A photographic camera for exposing a film frame for use in producing a pseudo format print made from a predetermined portion of the film frame, said camera comprising:

an objective lens;

means for selecting a pseudo field of view reduced from the actual field of view of said objective lens; and

means, responsive to the selection of a pseudo field of view, for providing an exposure related input in accordance with the amount of light available to the pseudo field of view rather than to the actual field of view of said objective lens, whereby said predetermined portion of the film frame will be more accurately exposed.

## PLANT PATENTS

GRANTED DECEMBER 6, 1988

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,437

AFRICAN VIOLET PLANT NAMED BARBADOS  
Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg, Fed. Rep. of Germany

Filed Mar. 4, 1987, Ser. No. 21,736

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—69

1 Claim

1. A new and distinct cultivar of African violet named Barbados, as described and illustrated, and particularly characterized by its single blue violet flower and white edges; strong, upright flower stems that curve toward the center to form a bouquet above the leaves; profuse flowering, vigorous growth habit, flowering 9–10 weeks after potting, and its long-lasting and non-dropping flowers.

6,438

AFRICAN VIOLET PLANT NAMED SAGITARIUS  
Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg, Fed. Rep. of Germany

Filed Mar. 4, 1987, Ser. No. 21,738

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—69

1 Claim

1. A new and distinct cultivar of African violet named Sagitarius, as described and illustrated, and particularly characterized by its single deep blue flower with white wavy edges; strong, upright flower stems that curve toward the center to form a bouquet above the leaves; girl-type leaves; profuse flowering, vigorous growth habit, flowering 9–10 weeks after potting, and its long-lasting and non-dropping flowers.

6,439

AFRICAN VIOLET PLANT NAMED MISSISSIPPI  
Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg, Fed. Rep. of Germany

Filed Mar. 4, 1987, Ser. No. 21,739

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—69

1 Claim

1. A new and distinct cultivar of African violet named Mississippi, as described and illustrated, and particularly characterized by its large, single mainly white flowers with pink frilled edges and tinged with pink in the centers; strong, upright flower stems that curve toward the center to form a bouquet above the leaves; profuse flowering, vigorous growth habit, flowering 9–10 weeks after potting, and its long-lasting and non-dropping flowers.

6,440

LILIUM COMPASS  
Peter Schenk, Wieringerwerf, Netherlands, assignor to Bischoff Tulleken Leliecultuur B.V., Wieringerwerf, Netherlands

Filed Dec. 29, 1986, Ser. No. 947,440

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinctive variety of Asiatic hybrid lily plant, substantially as herein shown and described characterized by: its rapid natural propagation under field conditions; its vigorous and healthy growth without leaf scorch, when forced under glass; its regular and attractive inflorescence; the greenish orange color of its buds; the very big size of the buds; the very large size of its flowers; the great width of its tepals; the typical character of its tepal spotting; the brilliant orange color of its flowers; and the long life of its flowers.

6,441

CARNATION NAMED KLEGOFAS  
Siegfried Klemm, Hanfacker 8, D 7000 Stuttgart 50, Fed. Rep. of Germany

Filed Dec. 5, 1986, Ser. No. 938,559

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—70

1 Claim

1. A new and distinct carnation variety, substantially as herein shown and described, characterized by its continuous production of light yellow flowers of medium size having petals which have a ruffled margin of a darker color, approximating orient red.

6,442

CARNATION NAMED KLETOUWI  
Siegfried Klemm, Hanfacker 8, D 7000 Stuttgart 50, Fed. Rep. of Germany

Filed Dec. 3, 1986, Ser. No. 939,361

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—70

1 Claim

1. A new and distinct carnation cultivar, substantially as herein shown and described, characterized by its high productivity of bright white flowers borne singly on rigid, erect pedicels carried on a very long, sturdy and upright peduncle.

6,443

ROSE PLANT JACYO  
William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Co., Medford, Oreg.

Filed Oct. 24, 1986, Ser. No. 922,631

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—11

1 Claim

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of thick, high substance petals of unusual orange-red color with a pale yellow and orange reverse combined with mildew resistance, outstanding vigor and continual blooming.

6,444

CARNATION NAMED KLEKOPI  
Siegfried Klemm, Hanfacker 8, D 7000 Stuttgart 50, Fed. Rep. of Germany

Filed Dec. 3, 1986, Ser. No. 939,362

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—70

1 Claim

1. A new and distinct carnation cultivar, substantially as herein shown and described, characterized by its high productivity of light peach colored flowers having fan-shaped petals, the flowers being borne singly on rigid and erect pedicels carried on a very long, sturdy upright peduncle.

6,445

ROSE PLANT JACHY  
William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Co., Medford, Oreg.

Filed Nov. 28, 1986, Ser. No. 936,008

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—15

1 Claim

1. A new and distinct variety of rose plant and parts thereof of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of shiny, dark green foliage; large, bright yellow flowers; golden yellow buds; vigorous, upright growth; long vase life; and susceptibility to powdery mildew in Irvine, Calif.

6,446

## ROSE PLANT JACPLUM

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Co., Medford, Oreg.

Filed Dec. 22, 1986, Ser. No. 945,251

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—11

1 Claim

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its photosensitivity, its unusual blend of dark and medium lavender colors, its pleasant fragrance, its vigor and profuse display of flowers, and its upright habit of growth.

6,447

## CARNATION NAMED KLEMAXI

Siegfried Klemm, Hanfacker 8, D 7000 Stuttgart 50, Fed. Rep. of Germany

Filed Dec. 3, 1986, Ser. No. 939,363

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—70

1 Claim

1. A new and distinct carnation cultivar, substantially as herein shown and described, characterized by its high productivity of brilliant sulphur yellow colored flowers, the flowers being borne singly on rigid and erect pedicels carried on sturdy, upright peduncles about 80 cm. long.

6,448

## LILIUM 'PARISIENNE'

Peter Schenk, Wieringerwerf, Netherlands, assignor to Bischoff Tulleken Leliecultuur B.V., Wieringerwerf, Netherlands

Filed Feb. 2, 1987, Ser. No. 10,008

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinctive variety of Asiatic hybrid lily plant, substantially as herein shown and described, characterized by its rapid natural propagation under field conditions; its vigorous healthy growth without leaf scorch, when forced under glass; its regular and attractive inflorescence; the green pinkish color of its buds; the big size of the buds; the large size of its flower; the great width of its tepals; the typical character of its tepal spotting; the brilliant salmon pink color of its flowers with an apricot yellow throat and the long life of its flowers.

6,449

## PITTOSPORUM PLANT 'SHIMAMOTO'

George Shimamoto, and Alan Shimamoto, both of 932 Beach St., Montebello, Calif. 90640

Filed Nov. 17, 1986, Ser. No. 929,010

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—54

1 Claim

1. A distinct, new and improved variety of *Pittosporum tobira*

named Shimamoto *Pittosporum*, substantially as herein shown and described and which is principally distinguishable by:

- (a) its ability to asexually reproduce and maintain its unique characteristics through succeeding propagations;
- (b) a dwarf size which makes it appropriate for use as a border plant, a small hedge, in planter boxes and as a pot plant;
- (c) a slow rate of growth resulting in minimal maintenance by eliminating frequent pruning and longer retention of an aesthetically pleasing shape;
- (d) a shrub possessing several colors due to its variegated nature of elongated evergreen leaves;
- (e) leaves consisting of a medium green color with irregular variegated margins separating its creamy white tips; and
- (f) leaves that grow in a whorl on the branches due to an alternate pattern of growth.

6,450

## ELSTAR APPLE TREE

Tijs Visser, Wageningen, Netherlands, assignor to Instituut voor de Veredeling van Tuinbouwgewassen, Wageningen, Netherlands

Filed Jan. 30, 1987, Ser. No. 8,765

Int. Cl.<sup>4</sup> A01H 5/03

U.S. Cl. Plt.—34

1 Claim

1. A new variety of apple tree substantially as shown and described herein characterized by its high quality dessert type fruit which possesses an appealing, rich, fruity aroma, solid juicy, creamy-white flesh, and a unique and distinctive taste embracing the best high qualities of both of its parent varieties, its ability to bear regular and annual crops, its bushy dense foliage, its ability to bear attractive overall reddish fruits on golden-yellow ground and the keeping ability of its fruits.

6,451

## SALTGRASS PLANT NAMED YENSEN 3

Nicholas P. Yensen, Tucson, Ariz., assignor to Salt Weeds, Tucson, Ariz.

Filed Aug. 28, 1986, Ser. No. 901,204

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—89

1 Claim

1. A new and distinct plant variety of *Distichlis palmeri* as shown and described, which is principally characterized by vigorous growth, high pollen production and ideal height for pollination.

6,452

## PEAR TREE—'ELLIOT'

Kay Ryugo, Davis, Calif., assignor to Regents of the University of California, Berkeley, Calif.

Filed Mar. 2, 1987, Ser. No. 20,911

Int. Cl.<sup>4</sup> A01H 5/03

U.S. Cl. Plt.—36

1 Claim

1. The new and distinct variety of pear tree herein described and illustrated and identified by the characteristics enumerated above together with the parts thereof.

## PATENTS

GRANTED DEC. 6, 1988

## ERRATA

For CLASS	See PATENT NO.
134-056	4,788,786
100-088	4,788,900
100-188	4,788,901
177-016	4,788,930
600-022	4,788,965
493-232	4,789,350
209-166	4,789,392
071-090	4,789,465
252-299	4,789,508
514-252	4,789,587
514-002	4,789,658
530-324	4,789,702
341-050	4,789,852
342-152	4,789,861
341-155	4,789,862
350-096	4,799,989



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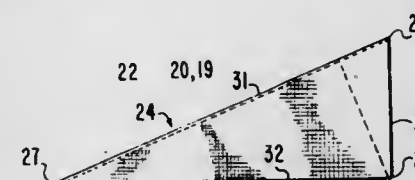
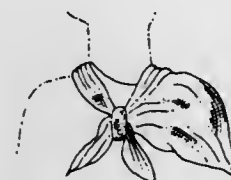
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## PATENTS

GRANTED DECEMBER 6, 1988

### GENERAL AND MECHANICAL

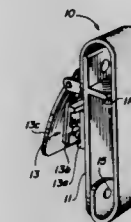
4,788,722  
FABRIC FASHION ACCESSORY  
Betty H. Oliver, 211 Pointer Dr., Manning, S.C. 29102  
Filed Mar. 7, 1988, Ser. No. 164,953  
Int. Cl.<sup>4</sup> A41D 23/00  
U.S. Cl. 2—207 7 Claims



1. A method for making the fabric fashion accessory for use as a scarf or sash, comprising the steps of:  
First: cutting a trapezoidal piece of material having  
an upper portion,  
a lower portion,  
a top side,  
a base side,  
a vertical side having a vertical midpoint,  
a first diagonal side having a diagonal midpoint,  
wherein  
said top side and said vertical side meet at right angles to each other, forming a top corner,  
said vertical side and said base side meet at right angles to each other, forming a base corner,  
said base side and said first diagonal side meet at an angle of less than 90 degrees in relation to said base side, forming a lower corner,  
said top side meets said first diagonal side at an angle of greater than 90 degrees in relation to said top side, forming an upper corner,  
the length of said top side is given in terms of the relative lengths of said first diagonal side and said base side by the formula: length of said top side equals the length of said first diagonal side minus the length of said base side; Second: folding said lower portion of said trapezoidal piece of material, forwardly and upwardly, along an imaginary line drawn between said diagonal midpoint and said vertical midpoint, so that said base corner and said top corner are aligned, said top corner being behind said base corner and the upper one-half of said vertical side is behind and aligned with the lower one-half of said vertical side;  
Third: sewing the edges of said upper one-half and said lower one-half of said vertical side to each other;  
Fourth: creating a second diagonal side by folding said trapezoidal piece of material so that said top corner and said base corner, sewn together in the preceding step, lie along said first diagonal side and parallel thereto, thus forming a two-ply triangle of said material which triangle has a right angle corner of 90 degrees, an acute corner of more than 45 degrees but less than 90 degrees and a tapered corner of less than 45 degrees but greater than 0 degrees;  
Fifth: sewing the edge of said first diagonal side to the

edge of said second diagonal side from said tapered corner to said acute corner, leaving an opening approximately one-inch in length in said sewing, said opening to be located about five inches from said tapered corner;  
Sixth: turning said two-ply triangle of material inside out by pulling the interior of said fabric fashion accessory through said opening, to conceal the sewn edges of said first diagonal side and said second diagonal side and of said lower one-half and said upper one-half of said vertical side;  
Seventh: stitching closed said opening previously left in said sewing;  
Eighth: pressing said two-ply triangle of material at a pressing iron temperature suitable for the particular fabric being used to make said fabric fashion accessory.

4,788,723  
CLIP ON BELT LOOPS FOR CLOTHING  
John G. Doelfel, 103 Kirtland Dr., Naples, Fla. 33942  
Filed Oct. 13, 1987, Ser. No. 107,055  
Int. Cl.<sup>4</sup> A41F 17/02  
U.S. Cl. 2—271 4 Claims



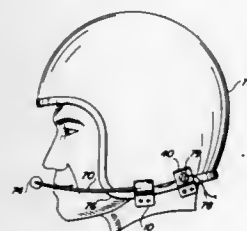
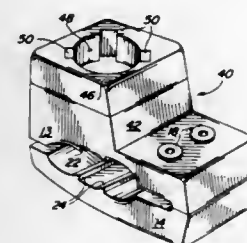
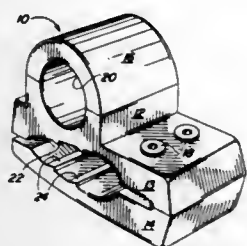
1. A belt loop assembly for engaging a belt encircling the waistband of a garment comprising  
a rigid elongated generally rectangular base plate whose length is several times its width, said base plate having front and back faces and upper and lower ends,  
an elongated strip of flexible material having a width at least equal to that of the base plate and a length greater than the base plate whose opposite ends are securely fastened respectively to the upper and lower ends of the base plate to form an elongated belt loop,  
the uppermost portion of the elongated belt loop extending above any other portion of the assembly, and  
self-contained means securely attached to the rear face of the base plate for removably fastening the base plate and flexible belt loop to the waistband of a garment.

4,788,724  
MOTORCYCLE HELMET MICROPHONE MOUNT AND PLUG MOUNT  
John J. Lazzaroni, and Melinda K. Lazzaroni, both of 7322 E. Stella Rd., Tucson, Ariz. 85730  
Filed Jun. 24, 1987, Ser. No. 66,130  
Int. Cl.<sup>4</sup> A42B 1/24 14 Claims

1. Helmet accessories for helmets of the type having an opening for viewing and receiving the head of a wearer, the helmet opening having a lower side edge with adjacent inside and outside helmet surfaces above the lower side edge, said helmet accessories placing a microphone attached at the end of a boom proximate the helmet wearer's mouth, the accessories comprising:  
a microphone mount for attachment to an associated helmet, said microphone mount adapted to receive and secure an

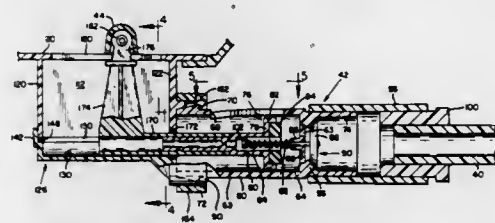


associated microphone boom for placing the microphone proximate the wearer's mouth; and  
a plug mount for attachment to the associated helmet proximate said microphone mount, said plug mount adapted to receive and secure an associated electrical plug and provide for electrical connection from the electrical plug to the microphone secured by said microphone mount, to associated earphones located in the helmet, and to associated audio instruments located distal to the helmet;  
both said microphone mount and said plug mount each including an attached clamp portion engaging the lower side edge of the associated helmet, said clamp portion comprising an outside elongated jaw and an inside elongated jaw, each said jaws having opposite first and second ends, each said outside jaw and inside jaw second ends



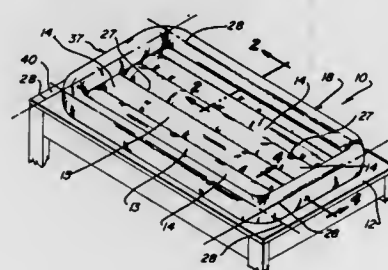
forcibly engaging the outside surface and the inside surface of the helmet above the lower side edge of the helmet respectively with each said outside jaw and inside jaw first end below the side edge of the helmet, each said jaw defining an arcuate shaped concavity situated between said first and second end and a pair of gripping ridges in each of said concavity, and tightening means situated at said first end of each said jaws to force said jaws together, said tightening means comprising at least one machine bolt and nut, said machine bolt passing through said first ends of both said outside and inside jaw, said machine bolt and nut operably tightening said jaws forcibly together, said gripping ridges together with said second ends engaging and holding said clamp portion and thus said microphone mount and said plug mount to the helmet by tightening said jaws together whereby said microphone mount and plug mount secure the microphone in position and provide for electrical connections in order that the wearer may utilize the associated microphone, earphones, and audio instruments.

**4,788,725**  
**SPA WITH SLIDE VALVE**  
Melvin C. Ediger, Dallas, and R. M. Skip Fox, Estacada, both of Oreg., assignors to Marquis Corp., Independence, Oreg.  
Filed Feb. 12, 1987, Ser. No. 14,698  
Int. Cl.<sup>4</sup> F16K 15/00; A61H 33/02  
U.S. Cl. 4-542 8 Claims



1. In a spa, which includes a tub portion for holding a volume of water receiving the occupant of the spa, and power-operated pump means having an intake and discharge for circulating water in the tub:
  - a return conduit connecting the discharge of the pump and said tub;
  - an air conduit connecting with said return conduit for supplying air to water flowing through said return conduit; and
  - a slide valve controlling air flow into said air conduit, said slide valve including an elongate chamber circumscribed by a housing wall extending the length of the chamber, an air intake opening extending along the length of the chamber, a valve closure element movable along the length of the chamber operable to vary the extent of the opening communicating with one end of the chamber, and a passage connecting said one end of the chamber with said air conduit.

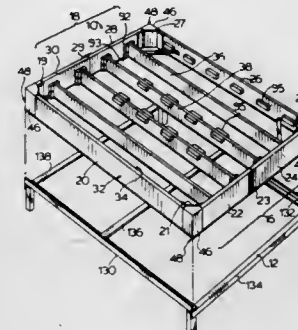
**4,788,726**  
**PORTABLE INFANT PROTECTIVE PAD**  
John S. Rafalko, Arvada, Colo., assignor to Gold, Inc., Denver, Colo.  
Filed Oct. 28, 1987, Ser. No. 114,337  
Int. Cl.<sup>4</sup> A47D 5/00, 21/08, 7/00  
U.S. Cl. 5-93 R 7 Claims



1. A protective pad for an infant, which comprises:
  - a panel having opposite sides spaced to provide a flat support surface large enough for receiving the infant, said panel having a continuous edge that is defined by the terminus of said sides and that extends away from said support surface;
  - an endless roll having a relatively uniform cross-section and extending around said edge to completely enclose said flat support surface, said roll including an elongated pad having a serpentine cross-sectional configuration and an enclosure, said enclosure surrounding and holding said elongated pad in said configuration and having overlapping elongated ends; and
  - binding means for securing said roll to said panel with said

roll surrounding said flat support surface, said binding means joining said ends of said enclosure of said roll and said edge of said panel in overlapping relationship with said surrounded serpentine cross-sectional configured portion of said roll extending upwardly from said edge of said panel to enclose said flat support surface, said pad being invertible to render said roll effective to support said edge of said panel while allowing said flat support surface to hang therefrom to form a depressed area that is lower than said edge.

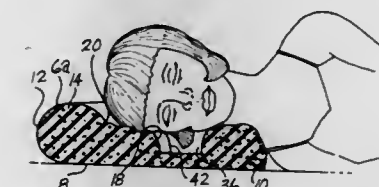
**4,788,727**  
**COLLAPSIBLE BASE FOR BEDS**  
Dean S. Liu, Agincourt, Canada, assignor to Halcyon Waterbed Inc., Downsview, Canada  
Filed Dec. 21, 1987, Ser. No. 135,681  
Claims priority, application Canada, Jul. 9, 1987, 541677  
Int. Cl.<sup>4</sup> A47C 19/12  
U.S. Cl. 5-174 12 Claims



1. A collapsible base for a bed comprising:
    - (a) a foldable peripheral frame for a collapsible base, said peripheral frame assuming a rectangular configuration in an open position,
    - said peripheral frame comprising:
      - (i) two horizontal elongate continuous frame members forming two opposite sides of the frame, each having two ends,
      - (ii) two horizontal elongate split frame members forming two other opposite sides of the frame, each split frame member comprising (A) two elongate segments of equal length, each having a central end and an outer end, and (B) center hinge means hingedly coupling together the central ends of the segments for pivoting about a vertical axis,
      - (iii) four corner hinge means, each hingedly coupling an outer end of one of the segments of the split frame members to an end of one of the continuous frame members for pivoting about a vertical axis,
- wherein with said frame in an open position movement of the center hinge means towards each other with pivoting of the segments about the center hinge means and complementary pivoting of the segments about the corner hinge means will move the continuous frame members towards each other to a collapsed position in which segments of each split frame member are folded upon each other to both lie substantially parallel to the continuous frame members,

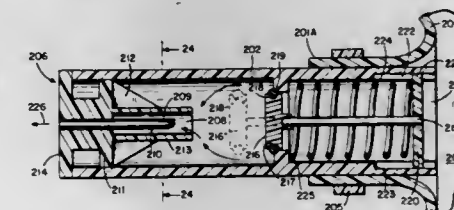
- (b) a plurality of removable elongate joist members extending when the frame is in an open position between the split frame members spaced from each other, the joist members coupled at each of their ends to the split frame members,
- (c) support block means on inside surfaces of the continuous frame members, and
- (d) a plurality of removable support decking means supported within the frame in side by side abutting relation resting on the support blocks and joist members to provide a continuous horizontal support surface.

**4,788,728**  
**CONTOURED PILLOW WITH CENTRAL APERTURE**  
Kerry L. Lake, 511 Fifth Ave., W., Kirkland, Wash. 98033  
Continuation-in-part of Ser. No. 892,847, Aug. 4, 1986, abandoned. This application May 26, 1987, Ser. No. 54,876  
Int. Cl.<sup>4</sup> A47C 20/02 31 Claims



1. A pillow comprising a generally rectangular body having a top surface, a bottom surface, an oblong hollow formed in the body and opening onto the top surface, a forward portion, and a rear portion; said hollow, said forward portion, and said rear portion being dimensioned and positioned so that, when a user is lying in a first supine position, a top portion of the back of the user's head is supported by said rear portion, the back of the user's head below said top portion is adjacent to the hollow, and the user's neck is supported by said forward portion, and when the user turns from said supine position to a second side position, the user's neck and a top portion of the user's head continue to be supported by said forward portion and said rear portion, respectively, and a lower portion of the user's face below the user's temple moves into a position adjacent to the hollow to prevent the pillow from exerting pressure on said lower portion of the user's face; and said rear portion having a laterally central portion with means for forming a laterally central depression in said rear portion when a user is in said supine position or said side position and when a user turns from one of said positions to the other, to provide a resting place for the top of a user's head at the lateral center of the pillow and to encourage the user to maintain the head near said lateral center.

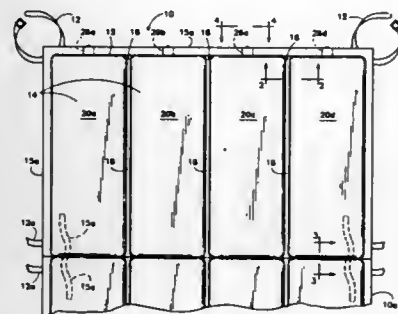
**4,788,729**  
**AIR MATTRESS WITH AUDIBLE PRESSURE RELIEF VALVE**  
Robert A. Walker, 108A Commerce Dr., Greer, S.C. 29641  
Continuation-in-part of Ser. No. 726,608, Apr. 14, 1985, Pat. No. 4,644,597, and a continuation-in-part of Ser. No. 492,954, May 9, 1983, abandoned. This application Jan. 9, 1987, Ser. No. 1,898  
Int. Cl.<sup>4</sup> A47C 27/08; E03B 7/07  
U.S. Cl. 5-449 23 Claims



1. An air mattress accommodating air under pressure for providing a body support comprising: a top wall, a bottom wall spaced from and located below the top wall, side walls and end walls secured to said top and bottom walls, all of said walls comprising flexible air impervious sheet members sealed together along the edge portions thereof to form a chamber for accommodating air under pressure, seam means securing adjacent portions of the sheet means together, a plurality of support means located in said chamber extended between said side

walls and secured to said top and bottom walls providing transverse passages accommodating air and limiting outward expansion of the top and bottom walls when air under pressure is stored in said chamber, each of said side walls secured to end portions of said support means to limit outward expansion of the side walls when air pressure is stored in said chamber, each of said end portions having at least one opening allowing air communication between said transverse passages, tube means mounted on one of said walls to facilitate supplying air under pressure into said chamber, and audible air pressure relief valve means mounted in the seam means open to said chamber and the atmosphere, said valve means operable to vent air from said chamber when the pressure of air in said chamber exceeds a selected maximum limit, said valve means having an audio device to signal when air is vented from said chamber, said audible pressure relief valve means having a cylindrical tube, said tube having an outer end and a passage open to said chamber and atmosphere, said audio device mounted on the outer end of said tube and projected into the outer end of said passage, said audio device having a generally flat head that engages the outer end of said tube to retain the audio device with the passage, a valving member located within the tube inwardly of the audio device, said valving member being selectively movable between open and closed positions, and spring means within the tube to bias the valving member to a closed position, said spring means having a biasing force that allows the valving member to move to an open position when the pressure of the air within the chamber exceeds the selected maximum limit thereby venting air from the chamber through the passage and the audio device which creates an audible sound.

**4,788,730**  
**GEL-FILLED, VARIABLY-ADJUSTABLE CUSHIONING SYSTEM FOR SUPPORTING A PERSON**  
Robert A. Bexton, 3030 Saratoga St., Bakersfield, Calif. 93306  
Filed Dec. 2, 1987, Ser. No. 127,776  
Int. Cl.<sup>4</sup> A47C 27/10  
U.S. Cl. 5—454 3 Claims

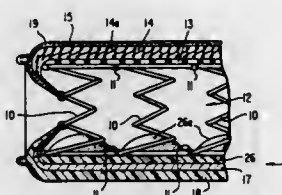


1. A cushioning device for supporting a person's weight by distributing force over a support area of the person's body in a variably-adjustable manner to prevent pressure concentration points in predetermined portions of said support area, said cushioning device comprising:

- (a) a flexible enclosure assembly for containing a flowable gel, said enclosure assembly having a major flexible surface for distributing supportive force over a support area of a person's body; compartments, each underlying a different portion of said major flexible surface, and preventing the transfer of said gel within said enclosure from one of said compartments to another;
- (b) means defining a plurality of selectively openable and closable ports, each communicating between the interior of a respective one of said compartments and the exterior of said enclosure, for enabling the flow of said gel into and out of the respective interiors of said compartments; and
- (c) gel container means, having means defining an aperture

for mating and sealingly coupling with said ports, for selectively delivering said gel to or receiving said gel from the respective interiors of said compartments so as to variably adjust the distribution of said supportive force, said gel container means including means for forcing said gel to flow through said aperture and ports into the respective interiors of said compartments wherein each of said ports includes one-way check valve means for normally permitting said gel to flow through the respective port into the interior of a respective compartment while normally preventing said gel to flow through the respective port out of the interior of the respective compartment, and means associated with said aperture of said gel container means for selectively engaging and opening said one-way check valve means so as to permit said gel to flow through the respective port out of the interior of the respective compartment.

**4,788,731**  
**MATRESS**  
Shinji Yokoi, Okazaki, Kimitaka Naitoh, Toyohashi, and Masami Ohta, Okazaki, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya City, Japan  
Filed Mar. 2, 1987, Ser. No. 20,904  
Claims priority, application Japan, Feb. 28, 1986, 61-029783[U]; Apr. 15, 1986, 61-056557[U] Apr. 23, 1986, 61-061353[U]  
Int. Cl.<sup>4</sup> A47C 27/04  
U.S. Cl. 5—478 5 Claims



1. A mattress comprising:

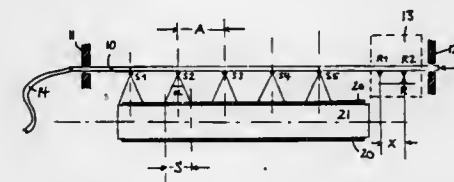
- (a) a central core formed by arranging plural coiled compression springs into a rectangular shape;
- (b) a first wadding provided on one surface of said central core, said first wadding having numerous air gaps therein;
- (c) a second wadding provided on the other surface of said central core, said second wadding having good heat insulating properties and having plural convex portions each one of which projects into a corresponding one of said plural coiled compression springs, each one of said plural convex portions containing numerous dead air portions, said second wadding comprising a second insulator located near said central core, said second insulator containing therein numerous closed air gaps, and a second pad located exteriorly of said second insulator; and
- (d) an air permeable cover cloth wrapped around said first and second waddings.

**4,788,732**  
**CLEANING DEVICE FOR AN ENDLESS WEB AND METHOD OF CLEANING**  
Ulrich Kollmar, Auf dem Berg 17, D-7520 Pforzheim-Würm, Fed. Rep. of Germany  
Filed Jan. 30, 1986, Ser. No. 824,200  
Claims priority, application Fed. Rep. of Germany, Feb. 1, 1985, 8502656[U]  
Int. Cl.<sup>4</sup> D06B 1/02  
U.S. Cl. 8—158 1 Claim

1. A method of cleaning a surface with a cleaning device including a spray pipe having a plurality of spray nozzles being

at a predetermined spacing from one another along the spray pipe; comprising the steps of

- (a) situating the spray pipe generally parallel to said surface and at a distance therefrom for obtaining a predetermined spray width for each spray nozzle on the surface such that the predetermined spacing between spray nozzles is a multiple of the spray width;



- (b) longitudinally displacing said spray pipe along an operational displacement path; and
- (c) repeatedly interrupting step (b) a number of times along the displacement path to effect spraying of the surface while the spray pipe is at a standstill; said number equaling the ratio of said spacing to said width, and the distance between standstill positions equalling approximately said spray width at the most.

**4,788,733**  
**COMBINED CLEANING GLOVE AND DISPOSAL BAG**  
Ross E. Lerner, 13536 Christian Barrett Dr., Moorpark, Calif. 93021  
Filed Mar. 14, 1988, Ser. No. 167,689  
Int. Cl.<sup>4</sup> A47L 13/19  
U.S. Cl. 15—104.94 2 Claims

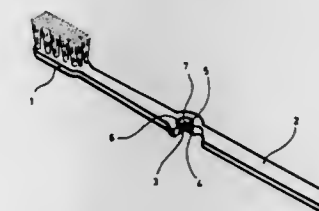


1. A combined cleaning glove and disposal bag for cleaning and disposing of waste comprising:

- a single thin plastic glove adapted to be located about a hand of a human being, said glove having a frontal surface to be juxtapositioned against the palm area of the hand, said glove including an access opening through which the hand is to be inserted when putting on said glove;
- a towel layer attached to said glove substantially covering said frontal surface, said towel layer to be usable to clean an object, whereby said glove is to be movable to an inside-out position to thereby enclose a soiled article grasped by the user;
- tie means permanently incorporated with said glove directly adjacent said access opening, said tie means to be usable to tightly shut said access opening when used as said disposable bag;
- said glove assuming an outwardly flared configuration in the area of said access opening, whereby said outwardly flared configuration facilitating moving said glove to said inside-out position to assume said disposal bag configuration; and
- said glove defining three different compartments, one of said compartments to connect with the thumb of the hand of

the user and another of the compartments to connect with the little finger of the hand of the user with the remaining compartment to accommodate the other three fingers of the hand of the user, whereby said three different compartments greatly enhance the stability of said glove during usage.

**4,788,734**  
**TOOTHBRUSH HAVING SIGNAL PRODUCING MEANS**  
Gerfried Bauer, Säntiastrasse 21, 8905 Richterswil, Switzerland  
Filed Apr. 11, 1986, Ser. No. 850,562  
Claims priority, application Switzerland, Apr. 20, 1985, 01686/85  
Int. Cl.<sup>4</sup> A46B 9/04  
U.S. Cl. 15—105 3 Claims



1. A tooth brushing apparatus comprising:

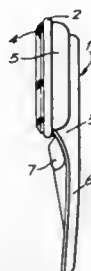
- a bristle part,
- a handle,
- signal producing means in said handle for producing acoustic signals within the audible range of the human ear, said signal producing means being held in a structural module and including a circuit formed by an integrated circuit chip, a battery, and a switch, said battery being replaceable and having a life of approximately three months when said tooth brushing apparatus is employed for a predetermined length of time twice a day so as to signal the end of the recommended life of said bristle part, said predetermined length of time being substantially two minutes to coincide with the optimum time for which teeth should be brushed, said chip being programmed to emit pulses when the circuit is closed and having timing means for keeping said circuit closed for said predetermined length of time after activation of the switch, said length of time being based upon an optimum time for which teeth should be brushed upon actuation of said switch,
- a sound generator connected with said chip and formed of a piezoelectric resonator which converts the electrical pulses delivered from said chip into acoustic energy, and a sound amplifier for amplifying said acoustic energy outside of said apparatus.

**4,788,735**  
**CLEANING BRUSH**  
Max C. Fuk Fan, Kowloon, Hong Kong, assignor to Cheong P., Chan Chan, Chaiwan, Hong Kong  
Filed Nov. 3, 1987, Ser. No. 116,521  
Claims priority, application United Kingdom, May 5, 1987, 8710607  
Int. Cl.<sup>4</sup> A46B 9/10  
U.S. Cl. 15—172 14 Claims

- 1. A cleaning brush comprising:
- a brush body having a post fixed thereto and extending substantially perpendicularly therefrom;
- a brush holder;
- means mounting said brush body on said brush holder for rotation with respect thereto around the axis of said post, said mounting means including means for resiliently biasing said brush body toward said brush holder;



a sleeve mounted on the post for rotation relative thereto and non-rotatable relative to the brush holder; actuation means for displacing the sleeve axially away from the brush holder; the post and the sleeve being in camming engagement such



that operation of the actuation means to move the sleeve axially away from the brush holder causes rotation of the brush body; and the engagement between the post and the sleeve being such that return of the sleeve towards the brush holder is permitted without rotation of the sleeve relative thereto.

4,788,736

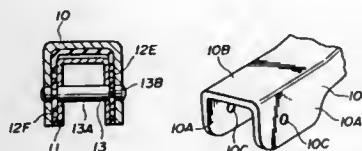
#### YOKE MEMBER CONNECTING DEVICE IN WINDSHIELD WIPER

Masaru Arai, and Itsuro Saita, both of Saitama, Japan, assignors to Nippon Wiper Blade Co., Ltd., Saitama, Japan  
PCT No. PCT/JP87/00423, § 371 Date Jan. 22, 1988, § 102(e)  
Date Jan. 22, 1988, PCT Pub. No. WO88/00147, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 25, 1987, Ser. No. 150,430  
Claims priority, application Japan, Jun. 30, 1986, 61-99928[U]  
Int. Cl.<sup>4</sup> B60S 1/38

U.S. Cl. 15—250.42

7 Claims



1. A yoke member connecting device for pivotally connecting a first and a second yoke members of a windshield wiper, each of said yoke members having generally channel shaped cross section consisting of vertical side walls and a top wall connecting the upper ends of the side walls respectively, the connecting device comprises a spacer member having opposing side walls engaging with the inside surfaces of the side walls of the first yoke member and with the outside surfaces of the side walls of the second yoke member and a top wall connecting the side walls of the spacer member, and a pivot pin extending through the side walls of the first and second yoke members and of the spacer member, said pivot pin having a small diameter portion at the location passing through at least one of the side walls of the spacer member, said at least one side wall of the spacer member having a bore corresponding to the small diameter portion of the pivot pin, and a first cutout extending radially outward from said bore in one direction, said at least one side wall of the spacer member further having a second cutout spaced from the first cutout in the direction generally perpendicular to the first direction, and said second cutout extending generally parallel to the first cutout.

4,788,737

#### ADJUSTABLE BRUSH GLIDER

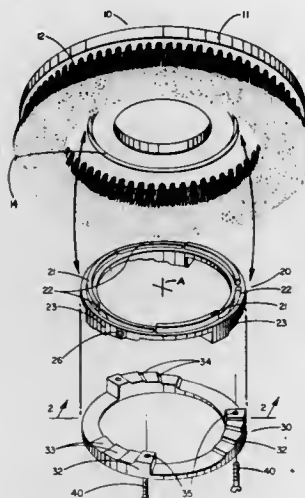
Eugene F. Kraus, Monticello, Minn., assignor to Flo-Pac Corporation, Minneapolis, Minn.

Filed Mar. 30, 1988, Ser. No. 175,147

Int. Cl.<sup>4</sup> A47L 11/164

U.S. Cl. 15—257 R

9 Claims



1. An adjustable brush glider for attachment to a rotary scrubbing brush of the type having tufts depending from a brush block, comprising:  
a glide member having a gliding surface;  
adjustment means for mounting the glide member to the brush block and enabling adjustment of the glide member to selectively space the glide surface from the brush block, the adjustment means including complimentary inclined spacers carried respectively by the glide member and the brush, one of the spacers being rotatable with respect to the other to selectively alter the spacing of the glide surface from the brush block; and  
attachment means for removably coupling the glide member to the brush block.

4,788,738

#### COMPACT SELF-CONTAINED HAND HELD EXTRACTION CLEANER

Clifford L. Monson; Danny C. Perry; Theodor Domay, all of Honolulu, and Henry A. Wilks, Kailua, all of Hi.

Continuation-in-part of Ser. No. 755,796, Jul. 17, 1985. This application Jan. 9, 1986, Ser. No. 817,509

Int. Cl.<sup>4</sup> A47L 5/24, 7/00, 9/18

U.S. Cl. 15—320

12 Claims

1. A compact, self-contained cleaner and liquid extraction unit of a size and weight for enabling the cleaner to be held, without external support, in one hand of a user and operative for applying fluid to a surface to be cleaned and for picking up fluid and other material by vacuum action, comprising:  
a two piece body member formed by a separate handle section and a discharge head section removably connectable at a first end to said handle section, said discharge head section having a closed second end opposite to said first end and having wall means extending between said first and second ends and formed to define fluid chamber means open only at said first end, said fluid chamber means including fluid receiving means and a plenum portion, said plenum portion being adjacent said first end, the fluid chamber means being opened for the discharge of dirty cleaning fluid and the receipt of clean cleaning fluid through said open first end of said discharge head section by the removal of said discharge head section from said

handle section, nozzle means mounted at said second end of said discharge head section, means mounted on said discharge head section for providing cleaning fluid from said fluid receiving means to said nozzle means, a vacuum intake head mounted adjacent to said second end of said discharge head section in spaced relationship to said nozzle means, and vacuum conduit means mounted on said discharge head section for connecting said vacuum head to said plenum portion, said handle section including a blower chamber, a lower end connectable to the first end of said discharge head section, an upper end having a handle extending therefrom, and a lower wall means extending across the lower end of said handle section to

tion with the circumferential water conduit to spray water from the conduit inwardly at the area of the bung for cleaning thereof;  
(c) water inlet means in fluid communication with the water conduit to introduce water into the conduit to supply the water to the nozzle for cleaning of the area of the bung; and  
(d) a pipe passing through an opening in the central portion of the cover adapted to be connected to a vacuum source to remove water from the area of the bung when that area has been cleaned by water supplied from the nozzle.

4,788,740

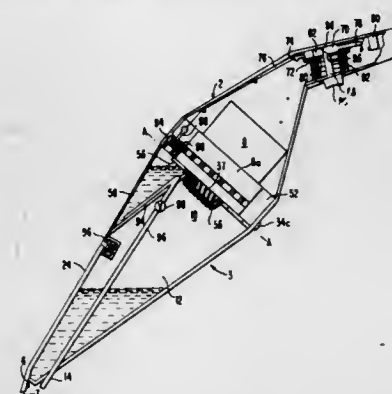
#### HAND VACUUM CLEANER

John F. Sovis, Coldwater, Mich.; Robert M. Smith, Copley, Ohio, and George H. Bramhall, Boulder, Colo., assignors to Royal Appliance Mfg. Co., Cleveland, Ohio  
Division of Ser. No. 670,553, Nov. 9, 1984, Pat. No. 4,633,542, and Ser. No. 878,050, Jun. 24, 1986. This application Jul. 28, 1987, Ser. No. 78,559

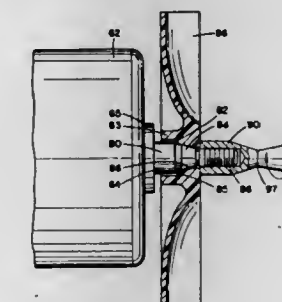
Int. Cl.<sup>4</sup> A47L 5/24

U.S. Cl. 15—339

2 Claims



define one end of said blower chamber, said lower wall means operating to close the open end of said fluid chamber means when said discharge head section is connected to said handle section while providing a vacuum opening between said blower chamber and said plenum portion, vacuum means mounted in said blower chamber and operative through said vacuum opening to create a vacuum in said plenum portion, said vacuum means discharging into said blower chamber to raise the pressure thereof, and means positioned between said blower chamber and said fluid chamber means on said lower wall means within said handle section for selectively placing said blower chamber in fluid communication with said fluid chamber means.



1. A hand-held vacuum cleaner having a housing, revolving brush and selectively separable bag assembly, said housing containing a motor, a motor shaft, a motor shaft locking surface, a fan mounted on the motor shaft for drawing in air from a housing nozzle, and a shaft extension threadably mounted to the motor shaft; said fan being mounted to said motor at the motor shaft locking surface which includes a wall portion tapering away from the motor, said shaft being in locking cooperation with a mating fan bore locking surface including a wall portion tapered for close reception of said motor shaft locking surface; the motor shaft having a support shoulder disposed opposite of a fan counterbore shoulder, the support shoulder being spaced from the counterbore shoulder at assembly to allow urging of the fan towards the motor.

4,788,739

#### WASHING APPARATUS FOR BUNG OF A DRUM

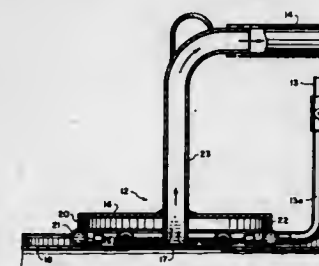
Jackie D. Brewer, Modesto; Maynard H. Gartin, Patterson, and Frank T. Yoneshige, Stockton, all of Calif., assignors to Chesebrough-Pond's Inc., Greenwich, Conn.

Filed Jun. 8, 1987, Ser. No. 59,447

Int. Cl.<sup>4</sup> B08B 3/04, 5/04

U.S. Cl. 15—322

7 Claims



1. A washing apparatus for the area of the bung of a drum which comprises:  
(a) a cover, adapted to cover the bung of the drum, having a peripheral skirt portion comprising a circumferential water conduit;  
(b) at least one inwardly directed nozzle in fluid commu-

4,788,741

#### KEYED MOUNTING ASSEMBLY FOR LOCKABLE SWIVEL CASTER

Robert R. Hilborn, 870 Whittier Cres., Mississauga, Ontario, Canada (L5H 2X3)

Filed Aug. 27, 1987, Ser. No. 90,010

Claims priority, application Canada, Jul. 17, 1987, 542431

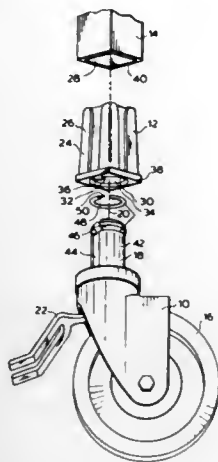
Int. Cl.<sup>4</sup> B60B 33/00

U.S. Cl. 16—35 R

8 Claims

1. An improved rotatable support assembly for mounting on the bottom of a generally vertical hollow leg comprising:  
(a) a caster having an upwardly projecting elongated generally cylindrical stem with an upper end and a wheel which rotates and swivels relative to the stem, the stem having an outer surface with a groove extending longitudinally from its upper end, the caster including brake means which are

- lockable to prevent the wheel swiveling relative to the stem and
- (b) a socket having a body with an outer surface and an inner surface which defines a generally cylindrical central hole with a downwardly open mouth, the body having a key which projects into the hole, the body being receivable in the hollow leg wherein the outer surface frictionally en-



gages the hollow leg to secure the socket in place, the stem of the caster being removably receivable by a force fit in the hole in the socket with the key received in the longitudinal groove in the stem whereby the stem is prevented from rotating in the hole, the stem of the caster being easily removable by only applying a downward force on the caster to disengage the force fit.

**4,788,742**  
**TORQUE MODIFICATION APPARATUS FOR USE WITH A DOOR CLOSER**

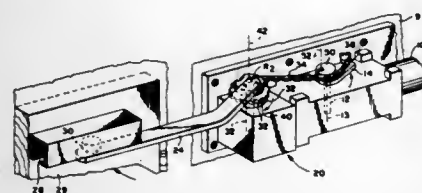
David B. Edgett, San Jose, and Richard L. Zunkel, Foster City, both of Calif., assignors to Door Control Specialties Co., San Francisco, Calif.

Filed Dec. 17, 1987, Ser. No. 134,377

Int. Cl.<sup>4</sup> E05F 1/10

U.S. Cl. 16—79

4 Claims



1. A torque modification apparatus for use with a doorcloser having an operating shaft which applies a closing torque to normally bias a door from its opened position towards its closed position for modifying the closing torque applied to the door by the operating shaft of the doorcloser comprising a closer arm connectable to the door for applying a closing force thereto and eccentric means for interconnecting the operating shaft or the doorcloser with said closer arm for modifying the closing torque applied to the door by said closer arm from the doorcloser,

said eccentric means for interconnecting the operating shaft of the doorcloser with said closer arm includes a first eccentric member having teeth thereon and being rotatable about an axis of rotation, said closer arm being connected to said eccentric member for rotation therewith and being connectable to the door to effect movement

thereof from the open to the closed position under the influence of the doorcloser,

a crank member connectable to the operating shaft of the doorcloser for rotation therewith and means for connecting said crank member to said eccentric member, said crank member applying the closing torque from the operating shaft of the doorcloser to said eccentric member, said eccentric member acting to modify the torque applied to the door by varying the distance from the axis of rotation of said eccentric member at which the crank member is adapted to apply said closing torque from the doorcloser to said eccentric member, wherein said means for connecting said crank member to said eccentric member further includes a roller chain for connecting said crank member and said eccentric member and for engaging the teeth on said eccentric member,

further including a second eccentric member mounted on the upper surface of said crank member and having an annular surface which engages with said roller chain to adjust the tension between said crank member and said eccentric member when the door is in said closed position.

**4,788,743**  
**DOOR CHECK FOR AUTOMOBILES**  
Junji Okumura, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

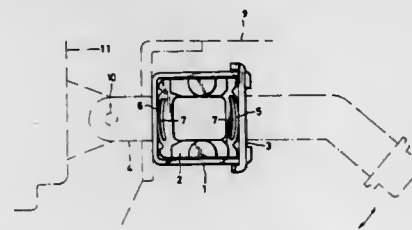
Filed Sep. 23, 1987, Ser. No. 100,306

Claims priority, application Japan, Sep. 30, 1986, 61-150545

Int. Cl.<sup>4</sup> E05C 17/28

U.S. Cl. 16—82

3 Claims



1. A door check for automobiles comprising;
- a lever means one end thereof to be secured to a vehicle body;
- a casing to be secured to a vehicle door to be rotatable therewith with respect to the vehicle body;
- a roller holder accommodated in the casing and having roller means therein to be in contact with and relatively movable with the lever means; and the roller holder further including a hollow portion at one side thereof, the hollow portion extending in the direction crossing the lever longitudinal direction, whereby the hollow portion serves to have resilient force between the casing and the roller holder upon door opening or closing operation.

**4,788,744**  
**STOP IN PARTICULAR FOR THE SLIDE BLOCK IN A GUIDE TRACK**

Hermann Warner, Trebur, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 28, 1987, Ser. No. 138,579

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1987, 3708575

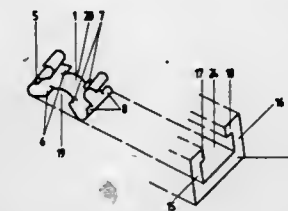
Int. Cl.<sup>4</sup> E05F 5/08

U.S. Cl. 16—85

5 Claims

1. A stop, especially for the sliding piece that is displaceable in a guide rail having a C-shaped cross section and is connected to the window pane of a motor vehicle, characterized in that the said stop is designed as a spring clip, which can be pushed into the said rail having the C-shaped cross section, can be

displaced and fixed in the said rail and absorbs a high impact force said spring clip is bent in a wave-shaped pattern and is symmetrical, said spring clip has claws for fixing the said spring clip inside said rail having the C-shaped cross section,



said spring clip has two legs which reach out of the said rail having the C-shaped cross section, and the claws are released upon compression of said legs to permit displacement of the said spring clip in the longitudinal direction of the said rail having the C-shaped cross section.

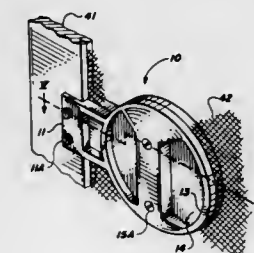
**4,788,745**  
**APPARATUS AND METHOD FOR ATTACHMENT OF A HANDLE TO SCREEN DOORS AND THE LIKE**  
James R. Wallis, and Christina M. Trowbridge, both of 11002 N. 81st Ave., both of Peoria, Ariz. 85345

Filed Jun. 8, 1987, Ser. No. 59,500

Int. Cl.<sup>4</sup> E05B 1/00

U.S. Cl. 16—114 R

9 Claims



1. An attachable handle for attaching to a screen door or window, said attachable handle comprising:
- a first and a second component, each of said components including;
- an attachment portion for coupling to a frame of said screen door, and
- a handle portion extending from said attachment portion and having a base plate for contacting said screen when said attachment handle is operably attached to said screen door or window, said handle portion having a vertical ridge suitable for being manually gripped when said attachable handle is operably attached, said handle portion having a surrounding ridge generally enclosing said vertical ridge, said first and second components extending out from said frame and over opposite sides of a screen of said screen door or window when said attachable handle is operably attached to said screen door or window, wherein said handle portion has apertures fabricated therein, and at least one insert, said first and said second components having substantially identical structures with at least one aperture fabricated therethrough, said inserts are positioned in said second component apertures, said apertures located so that a screw passing through a first component aperture engages an insert positioned in a second component aperture, said first component base plate and said second component base plate securing an area of said screen therebetween when said screw is fastened to said insert.

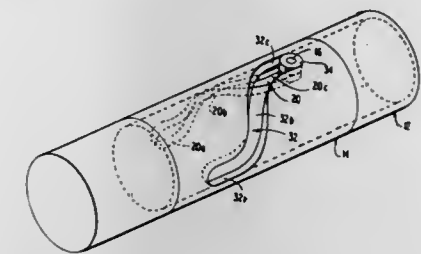
**4,788,746**  
**CAM ACTUATED SELF-LOCKING HINGE**  
Richard L. Idler, Denver, Colo., assignor to Martin Marietta Corporation, Bethesda, Md.

Filed Jun. 27, 1985, Ser. No. 749,250

Int. Cl.<sup>4</sup> E05F 1/08

U.S. Cl. 16—297

4 Claims



1. A cam actuated self-locking hinge for use in deploying a solar panel from retracted to extended position on a space vehicle, said hinge comprising:
- concentric inner and outer tubes mounted to each other for rotation about a common axis and restrained against axial movement,
- each of said tubes having at least one radially projecting hinge plate for coupling to a pair of space vehicle solar panels, respectively,
- distinctively opposed pairs of contra-rotational cam slots provided within respective tubes at common longitudinal locations,
- a cylindrical cross-roller bearing block slidably mounted internally of said inner tube for axial movement therein,
- a cross-shaft connected to said cross-roller bearing block having ends extending through the cam slots of the tubes, means for biasing said block towards one end of said inner tube thereby tending to effect a stroke for said block to rotate the tubes relative to each other and the hinge members between one of hinge open and hinge closed positions,
- and means for shifting said block axially against said biasing means to load said hinge,
- the improvement wherein:
- said pairs of contra-rotational cam slots each include unitary, offset straight slot end portions in line with the axis of the concentric tubes and an intermediate portion at some angle to said straight slot end portions and joining the same;
- whereby, the intermediate portion controls the acceleration, the displacement, velocity, acceleration and deceleration of the hinge plates relative to each other and the straight end portions in line with the axis of the tubes control locking of said inner and outer tubes together at the beginning and the end of the stroke, and said self-locking hinge further comprising an energy absorber within said inner tube operatively engaging the slidable cross-roller bearing block to absorb the energy of the cross-shaft movement within at least one of said cam slot straight end portions.

**4,788,747**  
**COUNTERBALANCE APPARATUS WITH TRANSVERSE PNEUMATIC SPRING AND BELLCRANK LINKAGE**  
George C. Ludwig, Marion, S.C., assignor to AVM, Inc., Marion, S.C.

Filed Dec. 19, 1986, Ser. No. 946,203

Int. Cl.<sup>4</sup> E05F 1/10

U.S. Cl. 16—306

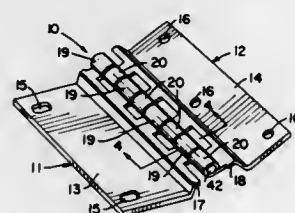
20 Claims

1. A counterbalance assembly in combination with a compartment and a compartment closure member, wherein said

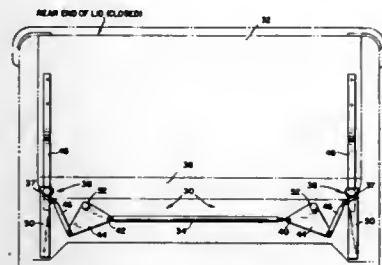


compartment includes frame structure mounting said counterbalance assembly within said compartment and hingedly mounting said closure member on a hinge axis adjacent said counterbalance assembly; said counterbalance including a single elongate pneumatic spring link comprising a cylinder having one closed end and a reciprocating shaft with one end projecting from the other end of said cylinder, an attachment connector link means on each of the closed cylinder end and the projected end of said shaft, bushing means surrounding said shaft and disposed in and adjacent the other end of said cylinder, and annular seal means within said cylinder, engaging the interior of the cylinder wall, the shaft and said bushing and providing a seal between said shaft and said cylinder wall; said cylinder containing gas under pressure; two bellcranks, each with an intermediate support pivot means and angled arms with each arm carrying a connector means, mounted within said compartment at opposed sides of said compartment, each of the intermediate support pivot means comprise a pivot

said knuckles, wherein all of said knuckles are individually and separately crimped around said pin to thereby deform said



deformable surface to obtain a distribution of torque over the entire length of said assembly.



journal unit rigidly secured on said frame structure; the two bellcranks being disposed in opposed relationship to each other with a first arm of each bellcrank projecting toward and pivotally connected to an associated end connector link means of said pneumatic counterbalance; and elongate connector links, with universal joint connecting means on both ends, each one of said elongate connector links swivelly connected to an associated pivot connector on a second arm of an associated said bellcrank and to said closure member at spaced apart locations on said closure member, a line between said spaced apart locations being offset from the hinge axis of said closure member; whereby closing movement of said closure member to a closed position on said compartment will, via the elongate connector links and associated bellcranks, force said counterbalance shaft to a retracted position in said cylinder; and when the closure member is in said closed position, the output force of said pneumatic counterbalance will, via the bellcranks and elongate connector links, apply a biasing force to the closure member.

**4,788,748**  
**TORQUE HINGE HAVING ITS KNUCKLES INDIVIDUALLY CRIMPED AROUND THE HINGE PIN**  
Donald R. Bizak, Woodridge, Ill., assignor to Stocker Hinge Manufacture Co., Brookfield, Ill.

Filed Feb. 2, 1987, Ser. No. 9,942  
Int. Cl.<sup>4</sup> E05F 1/08

U.S. Cl. 16—308

10 Claims

1. A permanently adjusted torque hinge assembly comprising a hinge having at least one hinge leaf with at least one circular through hole knuckle wherein at least one knuckle is crimped around a circular pin of hard, slightly compressible material which retains a resulting expansive memory and provides frictional torque resistance between said pin and said hinge leaf, wherein said pin has a deformable surface, said deformable surface being made of plastic, said hinge having opposing hinge leaves, said hinge leaves having spaced interfitting knuckles whereby said leaves are joined through the spaced interfitting knuckles by said pin being inserted through

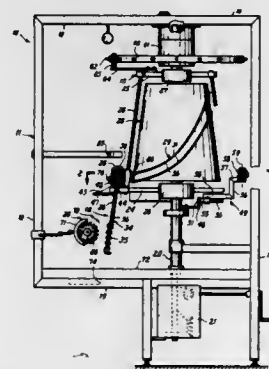
1. Apparatus for removing the lungs, crop and other viscera from partially eviscerated birds suspended by their legs from an overhead conveyor and moving in series through a poultry processing path, said apparatus including a support frame, a turret rotatable about said support frame in response to the movement of said conveyor, a plurality of rotatable probe assemblies mounted about said turret and movable with said turret, cam means mounted on said support frame for raising and lowering said probe assemblies in response to the rotation of said turret, the improvement therein comprising each of said probe assemblies including an elongated probe and a driving sheave mounted to said probe for rotating the probe about its longitudinal axis, a driving belt surrounding said turret at the level of said driving sheaves and arranged to engage and rotate said driving sheaves and probes, and means for engaging said driving belt and interrupting the rotating engagement between said driving belt and said probes so as to interrupt the rotation of the probes about their longitudinal axis.

**4,788,749**  
**CROP REMOVAL SYSTEM**  
Jacobus E. Hazenbroek, and Bastiaan Verrijp, both of Burg de Zeeuwstraat 52, Numansdorp, Netherlands

Filed Jul. 17, 1987, Ser. No. 74,557  
Int. Cl.<sup>4</sup> A22C 21/06

U.S. Cl. 17—11

5 Claims



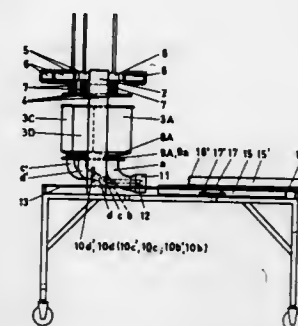
**4,788,750**  
**APPARATUS FOR THE PREPARATION OF MEAT PRODUCTS DISPLAYING A PATTERN WHEN CUT**  
Walter Büchold, Silstighof, CH-8226 Schleithelm, Switzerland  
PCT No. PCT/CH86/00138, § 371 Date Jun. 30, 1987, § 102(e)  
Date Jan. 30, 1987, PCT Pub. No. WO87/02549, PCT Pub. Date May 7, 1987

PCT Filed Oct. 2, 1986, Ser. No. 75,812  
Claims priority, application Switzerland, Oct. 31, 1985, 04691/85

U.S. Cl. 17—35

Int. Cl.<sup>4</sup> A22C 7/00

10 Claims



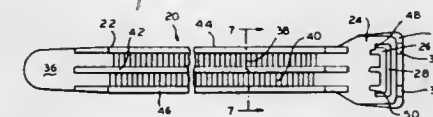
1. An apparatus for use in producing meat products displaying cross-sectional patterns, the apparatus comprising: a plurality of containers for holding filling and insertion materials, each of the containers including a container outlet and material feeding means for feeding the material in the container to the container outlet; a filling fitting common to the outlets of all of the plurality of containers, the filling fitting including a pattern die defining a fitting outlet having a fitting outlet area through which the materials from the containers are delivered; and a box mold positionable adjacent the fitting outlet for receiving the materials after they have been delivered from the filling fitting, the box mold having a cross-sectional area substantially equal to the fitting outlet area.

**4,788,751**  
**CABLE TIE**  
William W. Shely, and Peter M. Wells, both of Chicago, Ill., assignors to All-States Inc., Chicago, Ill.

Filed Oct. 9, 1987, Ser. No. 107,295  
Int. Cl.<sup>4</sup> B65D 63/00

U.S. Cl. 24—16 PB

9 Claims



1. A cable tie comprising a unitary strap and head, said strap having a spaced parallel pair of racks of teeth extending along the length thereof, said racks being separated by a median strip having a full strap thickness, the teeth in one of said racks being transversely offset relative to the teeth in the other of said racks whereby the areas of minimum strap thinness do not coincide in the two racks and a pair of pawls positioned side-by-side in said head to confront individually associated ones of said racks of teeth, the space between said pawls being approximately equal to the width of said median strip so that each pawl ratches over its individually associated one of said rack of teeth.

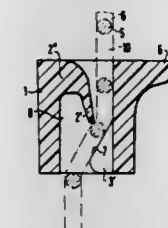
**4,788,752**  
**MOLDED PLASTIC BINDING STRAP**  
Willibald Kraus, Grünstadt; Marita Kloster, Enkenbach, and Jürgen Hofmann, Eisenberg, all of Fed. Rep. of Germany, assignors to TRW United-Carr GmbH, Aalen, Fed. Rep. of Germany

Filed Dec. 17, 1987, Ser. No. 134,379  
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1986, 3643641

Int. Cl.<sup>4</sup> B65D 63/00

U.S. Cl. 24—16 PB

3 Claims



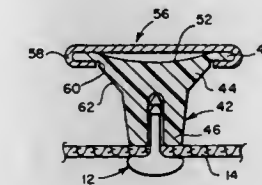
1. In a self-locking cable tie including a ladder-like band part (6) and a head part (1) having a passage opening (8) carrying a holding projection (2) adapted to engage in an opening (4) in the band part (6) and at least one guide element (7) lying on the side of the opening opposite the projection (2) and provided with a guide track for the band part (6) the improvement wherein said holding projection (2) comprises a rigid holding base portion (2') and a resilient outer free end portion (2'') which extends outwardly from the base portion toward the guide track and wherein the guide track includes spaced rigid knobs (3', 3'') which extend into said passage opening and which are displaced laterally on opposite sides of the resilient free end portion (2'') at a location inwardly of the holding portion 2'' relative to the entrance end of the passage opening (8), the relationship between said resilient outer free end portion and said rigid knobs being such as to direct said ladder-like band part into engagement with said rigid holding base portion when an attempt is made to withdraw said band part from said opening.

**4,788,753**  
**EXPANSION COMPENSATING TWO PIECE BUTTON**  
Timothy H. Sparrow, Harrodsburg, and Richard L. Harlow, Lexington, both of Ky., assignors to Universal Fasteners Inc., Lawrenceburg, Ky.

Filed Sep. 29, 1987, Ser. No. 102,553  
Int. Cl.<sup>4</sup> A44B 1/16

U.S. Cl. 24—113 MP

5 Claims



1. A button for attachment to a sheet of compliant material subject to heating and cooling cycles comprising: a unitary plastic collet that expands in volume when subjected to heat and includes an upwardly extending shank member, an outwardly extending plate-like flange member surrounding said shank member at one end thereof and a peripheral outer ring of reduced thickness circumventing said flange member; and, a cap of malleable material engaging the upper surface of said flange member and secured to said peripheral outer

ring by turning the outer peripheral portion of said cap inwardly about said ring of said flange to capture and retain said ring of said flange therein, wherein expansion in the volume of said ring of said flange upon exposure to heat does not cam open the peripheral portion of said cap turned inwardly about said outer ring of said flange and said cap is retained in position on said flange member of said collet.

4,788,754

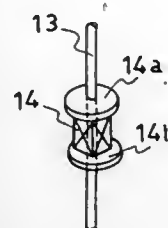
**HOOK FOR A WIRE-TYPE WINDOW REGULATOR**  
Ryoichi Fukumoto, Nagoya, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Japan

Continuation of Ser. No. 741,480, Jun. 5, 1985, abandoned. This application Jul. 21, 1987, Ser. No. 77,037

Claims priority, application Japan, Jun. 6, 1984, 59-84815[U]  
Int. Cl.<sup>4</sup> F16G 11/00

U.S. Cl. 24—114.5

3 Claims



1. A hook assembly for a wire-type window regulator, comprising:

- a. a wire; and
- b. a hook body having:
  - a normally cylindrical intermediate portion,
  - two circular flange portions, one at each axial end of said intermediate portion, each of said flange portions having a diameter greater than the diameter of said intermediate portion and a planar end surface, and
  - an axially positioned hole extending through said hook body, said wire being inserted through said hole, wherein said intermediate portion is crimped substantially evenly along its axial length to secure said hook body to said wire, said intermediate portion being substantially rectangular in cross section after being crimped and said flange portions remaining uncrimped.

4,788,755

**CORD TIGHTENING DEVICE**

Kazumi Kasai, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Dec. 24, 1986, Ser. No. 946,714

Claims priority, application Japan, Dec. 25, 1985, 60-201839; Dec. 28, 1985, 60-204493

Int. Cl.<sup>4</sup> F16G 11/00

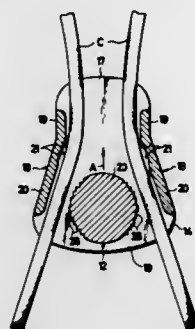
U.S. Cl. 24—136 R

7 Claims

1. A cord tightening device molded from synthetic resin comprising:

- a body having a pair of spaced face and back plates and a pair of spaced side walls interconnecting said face and back plates defining first and second openings permitting cord to pass therethrough, said face plate having a guide groove defined therein said guide groove defining a straight groove line down a center of the groove; and
- a slider movably disposed in said body and slidable in a slide direction along said guide groove, said slider having a retainer for pressing cord portions against said side walls, and a knob integral with said retainer and projecting through said guide groove above said face plate, said retainer having step-like teeth on opposite peripheral surfaces thereof for biting engagement with the cord portions, each of said step-like teeth being defined by a

surface substantially parallel to said slide direction and another surface substantially perpendicular to said slide direction said step-like teeth serving as means for monotonically increasing the distance from each side wall to the groove line from adjacent the first opening toward the second opening, said side walls having respective series of teeth on inner surfaces thereof defined by a surface substantially parallel to said direction and another surface substantially perpendicular to said direction for biting



engagement with the cord portions, said retainer teeth being located on opposite sides of a central line of said retainer extending substantially perpendicularly to the direction in which said slider is slidable along said guide groove said retainer teeth serving as means for monotonically decreasing the distance from each of the peripheral surfaces to the groove line from the central line to nearly the end of the slider adjacent either the first or second opening.

4,788,756

**APPARATUS FOR STRAIGHTENING BOW IN FABRIC IN A TENTER FRAME**

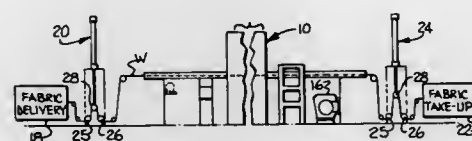
Frank W. Leitner, Sr., 5700 Providence Lake Ln., Matthews, N.C. 28105

Filed Jan. 22, 1987, Ser. No. 5,963

Int. Cl.<sup>4</sup> D06H 3/12

U.S. Cl. 26—51.4

9 Claims



1. In a tenter frame comprising a pair of laterally spaced, elongate and longitudinally movable first and second fabric engaging means for advancing a fabric web forwardly while applying lateral tension thereto, the combination therewith of means of correcting a laterally extending bow in the advancing fabric web and which comprises

- entry and exit tension applying means positioned at respective entry and exit ends of the tenter frame for applying a variable longitudinal tension to the advancing web at each of said ends of the tenter frame, and with the applied tensions being applied in opposite directions and so as to act against each other,
- means for sensing a laterally extending bow in the advancing fabric, and
- control means operatively connected to said sensing means and to both of said entry and exit tension applying means for selectively adjusting the tension applied by one or both of said entry and exit tension applying means in response to a signal from said sensing means and so as to automati-

cally eliminate any laterally extending bow in the advancing sheet.

4,788,757

**CASKET ASSEMBLY**

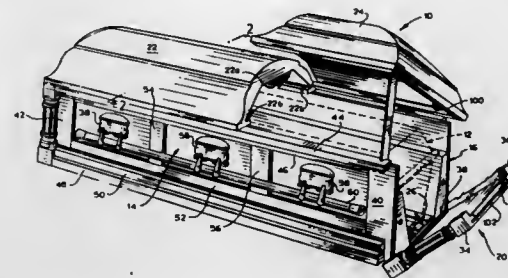
William Bethune, 32945 N. River Rd., Mt. Clemens, Mich. 48045; Steven J. Pikor, 3059 Serra Dr., Sterling Heights, Mich. 48077; Peter C. Bertleson, 30325 Ponds View Dr., Franklin, Mich. 48025, and Bernard E. LePage, 1201 Creek View Ct., Rochester, Mich. 48063

Continuation-in-part of Ser. No. 702,549, Feb. 19, 1985, abandoned. This application Jan. 27, 1986, Ser. No. 821,167

Int. Cl.<sup>4</sup> A61G 17/00

U.S. Cl. 27—2

6 Claims



1. A casket for a corpse comprising:

- (A) sidewalls;
- (B) end walls;
- (C) a lid;
- (D) means mounting one of said end walls for movement between a closed position and an open position allowing lengthwise movement of a vault into and out of said casket;
- (E) a floor;
- (F) fixed rail means extending along said floor between an outboard end positioned adjacent said one end wall to an inboard end positioned at an intermediate location along said floor;
- (G) movable rail means extending along said floor between an inboard end adjacent the inboard end of said fixed rail means and an outboard end adjacent said other end wall; and
- (H) actuator means engaging the outboard end of said movable rail means and operative to raise said outboard end to pivot said movable rail means upwardly about its inboard end.

4,788,758

**METHOD OF MAKING AXIALLY HARDENED BEARINGS**

Keith M. Gordon, Munsonville, and Michael L. Blair, Keene, both of N.H., assignors to MPB Corporation, Keene, N.H.

Filed Sep. 24, 1987, Ser. No. 100,596

Int. Cl.<sup>4</sup> B21H 1/14

U.S. Cl. 29—148.4 R

3 Claims

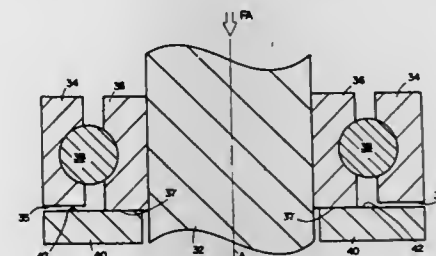
1. A method of forming a ball bearing assembly capable of withstanding, in a non-operating mode, an axial load exceeding a predetermined axial load at which bearing damage would otherwise occur, said method comprising:

- a. assembling a bearing assembly comprising at least one set of first and second annular bearing races and, disposed therebetween, a multiplicity of balls, each said race having a face surface aligned transversely to the axis of rotation of said bearing assembly,
- b. mounting the bearing with the first said race fixed axially,
- c. applying an axially directed load against the second said race, said axially directed load being of a predetermined

magnitude selected to the greater than the intended operating preload and less than a bearing damaging load, d. grinding the face surfaces of said first and second bearing races flush,

e. releasing said force, and

f. providing a stop ring having a stop face surface opposed to the face surfaces of said bearing races, the face surface of said first bearing race disposed in engagement with said



stop face surface and the face surface of said second bearing race, under normal axial load, spaced therefrom, application of an axial load upon said bearing assembly causing the face surface of the second said race to move toward said stop face surface and, at axial loading above said predetermined magnitude, to bear thereupon, whereby axial load in excess of said predetermined magnitude is carried by said stop ring.

4,788,759

**METHOD AND APPARATUS FOR MANUFACTURING STEERING WHEEL**

Isamu Yano, Sagami-hara; Kiyoshi Hani; Shu Yamashita, both of Amagasaki; Kazuo Kawabata, and Naoyuki Kogure, both of Sagami-hara, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

PCT No. PCT/JP86/00132, § 371 Date Nov. 14, 1986, § 102(e) Date Nov. 14, 1986, PCT Pub. No. WO86/05454, PCT Pub. Date Sep. 25, 1986

PCT Filed Mar. 18, 1986, Ser. No. 935,229

Claims priority, application Japan, Mar. 18, 1985, 60-53602; Mar. 19, 1985, 60-55071; Mar. 19, 1985, 60-55072; Mar. 19, 1985, 60-39378

Int. Cl.<sup>4</sup> B21D 53/26

U.S. Cl. 29—159 B

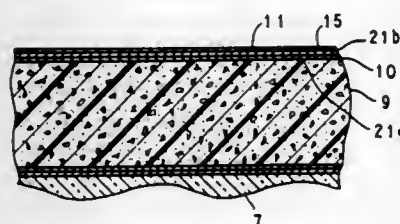
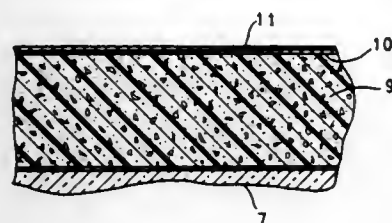
12 Claims

1. A method for manufacturing a vehicle steering wheel having a ring-shaped rim (1) forming a hand grip, a boss (3) for connection to a steering shaft, and a spoke (2) connecting the rim and the boss integrally, said method comprising the steps of:

- (a) forming a braided sleeve (21) by braiding in a sleeve shape a plurality of unidirectional fibers (10);
- (b) inserting a lightweight core (9) of said rim into said braided sleeve;
- (c) cutting said core covered with said braided fiber sleeve into a predetermined length of a ring shape;
- (d) butt joining both ends of said cut length to form a ring-shaped rim;
- (e) joining said ring-shaped rim and said spoke; and



(f) forming an outer molded layer (11), after the joining steps, by placing said joined rim and spoke in a metal



mold, injecting a thermosetting resin into the mold, and curing said thermosetting resin.

4,788,760

#### INSTALLATION TOOL FOR LAYING CARPET (TRIM) STRIPS

Willi Schäfer, Feldafing, and Günther Sepp, Ottobrunn, both of Fed. Rep. of Germany, assignors to Raumausstattung Willi Schäfer, Tatzing, Fed. Rep. of Germany

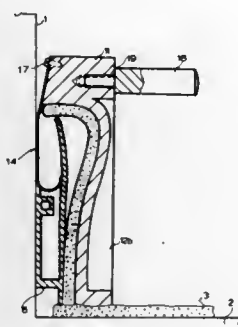
Filed May 26, 1987, Ser. No. 54,266

Claims priority, application Fed. Rep. of Germany, May 26, 1986, 3617661

Int. Cl.<sup>4</sup> B25B 27/14

U.S. Cl. 29—278

10 Claims



1. A tool for the installation of a wall trimming which comprises a molding track extending along a wall and formed with an outer lip spaced from said wall and deflectable to allow a carpeting strip fastened to an outer face of said molding to be folded over said lip, said molding further having a structure limiting depth of insertion between said wall and said lip, said tool comprising:

an elongated folding member slidable along said track and contoured to have a surface which engages said carpeting strip and progressively folds said strip over said lip and into a gap between said lip and said wall as said folding member is moved in a given direction along said track, and a

flank inclined upwardly away from said wall above said surface and confronting said wall; and a capping sheet fastened to said member, extending substantially the length of said member, and formed with an upper portion bent at an angle to an intermediate portion reaching downwardly between said lip and said wall and extending over its breadth away from said wall, said upper portion being affixed to said flank, said capping sheet being provided with a lower portion formed on the bottom of said intermediate portion and shaped as a semicylindrical rounding with a diameter of about one and one-half times the thickness of said strip, riding slightly above said structure and pressing said lip away from said wall to enable insertion of said strip between said lip and said wall by said surface.

4,788,761

#### METHOD OF ASSEMBLING A CORE AND METHOD OF ASSEMBLING A SLOT LINER

Delmar E. Crawford, Holland, Mich., and Harold T. Fields, Ft. Wayne, Ind., assignors to General Electric Company, Fort Wayne, Ind.

Filed Jun. 26, 1987, Ser. No. 66,840

Int. Cl.<sup>4</sup> H02K 15/12

U.S. Cl. 29—596

33 Claims





4,788,765

**METHOD OF MAKING CIRCUIT ASSEMBLY WITH HARDENED DIRECT BOND LEAD FRAME**

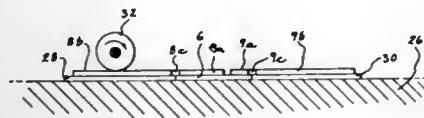
Lance R. Kaufman, Mequon; John A. Dombeck, Glendale, and Herbert O. Frederickson, Milwaukee, all of Wis., assignors to Gentron Corporation, Milwaukee, Wis.

Filed Nov. 13, 1987, Ser. No. 120,626

Int. Cl.<sup>4</sup> H01R 43/00

U.S. Cl. 29—827

7 Claims



1. A method of making an electric circuit assembly comprising:
  - providing an electrically insulating thermally conductive nonmetallic refractory substrate;
  - providing electrically conductive metallic lead frame means; directly bonding said lead frame means to said substrate by placing said lead frame means in contact with said substrate, heating said lead frame means and said substrate to a temperature below the melting point of said metallic lead frame means to form a eutectic with said lead frame means which wets said lead frame means and said substrate, and cooling said lead frame means and said substrate with said lead frame means bonded to said substrate; work hardening said lead frame means to stiffen said lead frame means and enable push-on fastener connection to said lead frame means without collapse thereof.

4,788,766

**METHOD OF FABRICATING A MULTILAYER CIRCUIT BOARD ASSEMBLY**

Henry A. Burger, Tempe, and Harold E. White, Scottsdale, both of Ariz., assignors to Loral Corporation, New York, N.Y.

Filed May 20, 1987, Ser. No. 51,797

Int. Cl.<sup>4</sup> B32B 3/10, 31/00

U.S. Cl. 29—830

12 Claims



1. A method of fabricating a multilayer microwave circuit board assembly comprising the steps of:
  - A. providing a plurality of individual circuit boards wherein each board is prepared by:
    - (1) applying a first conductive layer on a facing surface of a suitable non-conductive substrate material;
    - (2) applying a second conductive layer on an opposite facing surface of the substrate material;
    - (3) forming at least one hole through the substrate material and said first and second conductive layers;
    - (4) depositing a conductive layer over said first and second conductive layers sufficient to also be deposited onto the sidewall surfaces of each said formed hole to establish an electrical interconnection between said first and second conductive layers; and
    - (5) depositing a conductive bonding material onto said previously deposited conductive material;
  - B. stacking said plurality of prepared circuit boards in a predetermined order and orientation to form an assembly, adjacent circuit boards of the assembly being separated by a dielectric bonding layer material having apertures there-

through to insure an electrical interconnection between adjacently oriented boards at the aperture positions; and C. applying heat and pressure to the thusly stacked circuit boards to effect an integrally bonded and interconnected circuit board assembly.

4,788,767

**METHOD FOR MOUNTING A FLEXIBLE FILM SEMICONDUCTOR CHIP CARRIER ON A CIRCUITIZED SUBSTRATE**

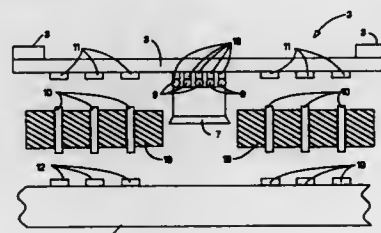
Kishor V. Desai, Vestal, and Kohn Harold, Endwell, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 11, 1987, Ser. No. 24,491

Int. Cl.<sup>4</sup> H05K 3/36

U.S. Cl. 29—830

10 Claims



1. A method for outer lead bonding a circuitized, flexible sheet of polyimide film having a thickness of less than approximately 127.0 micrometers (about 0.005 inch) which is mounted on a frame and which is carrying an electronic device, onto a circuitized substrate having mounting pads thereon in a pattern matching a corresponding pattern of outer lead bonding pads on the circuitized, flexible film, which comprises the steps of:
  - attaching electrically conductive spacers embedded in a removable holder to the outer lead bonding pads on the circuitized, flexible film, said holder having an opening for accommodating the electronic device carried by the flexible film, and said spacers sized and configured to physically support the circuitized, flexible film substantially in a plane above the surface of the circuitized substrate with the electronic device carried by the flexible film in thermal contact with the circuitized substrate, when the circuitized, flexible film is mounted on the circuitized substrate;
  - positioning the circuitized, flexible film having the spacers attached thereto, on the circuitized substrate, with each of the spacers in contact with its corresponding bonding pad on the circuitized substrate; and
  - bonding the spacers to the bonding pads of the circuitized substrate whereby the circuitized, flexible film is mounted on the circuitized substrate.

4,788,768

**NAIL CLIPPER WITH GUARD MEANS**

Hiroshi Ohori, 301 Ashley, Brielle, N.J. 08730

Filed Mar. 11, 1987, Ser. No. 24,776

Int. Cl.<sup>4</sup> A45D 29/00

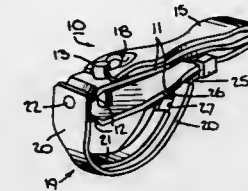
U.S. Cl. 30—28

11 Claims

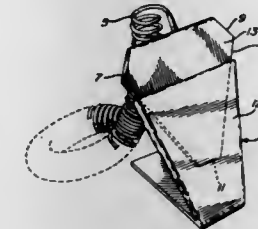
1. A nail clipper comprising
  - a pair of jaws, each said jaw having a clipping edge facing a clipping edge on the other jaw;
  - a post passing through said jaws in rotatably mounted relation;
  - an operating arm mounted on one end of said post for rotation therewith, said arm being pivotally mounted on said post to one side of one jaw to pivot about an axis transverse to said post;
  - cam means on said arm for moving said jaws together in response to pivoting of said arm towards said one jaw in a selected position thereof; and

a guard means pivotally mounted on the other jaw to move between a first position covering over said edges of said jaws and a second position spaced from said edges, said

said blade holder enabling said blade holder to stand with a rearward inclination when placed on a horizontal surface, and



guard means including a pair of curved members pivotally connected to each other for movement between a mating position to cover said edges and an opposed position to form a finger grip for actuation of said jaws.



a coiled cord to attach said blade like member at said holding part to said blade like holder, said cord to retract to original length after having removed the blade like member from said blade holder and returned same therein.

4,788,769

**APPARATUS FOR REMOVING EXTRANEEOUS MATERIAL FROM CLOTHING**

Masato Maruyama, Nagano, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan

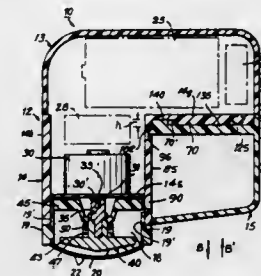
Filed May 8, 1987, Ser. No. 47,347

Claims priority, application Japan, May 12, 1986, 61-70840[U]

Int. Cl.<sup>4</sup> B26B 19/14

U.S. Cl. 30—133

21 Claims



1. An apparatus for removing extraneous material from clothing comprising:
  - a housing having an inner opening and an exterior surface, said inner opening leading to the exterior surface;
  - drive means mounted within the housing and having a rotatable shaft, the axis of rotation of said shaft being laterally spaced from and substantially parallel to said opening;
  - an inner blade operably coupled to the shaft and an outer blade mounted on the housing, said blades operable for separating the extraneous material from the clothing;
  - fan means within the housing for drawing the separated material into the housing and forcing the separated material through the opening; and
  - a container detachably mounted to the exterior surface of the housing and which covers the inner opening for receiving the separated material.

4,788,770

**SCRAPER FOR SCRATCH COUPONS**

Rodrigue Simard, 3361 Bélair, Sherbrooke, Quebec, Canada J1L 1B3

Filed Jun. 19, 1987, Ser. No. 64,247

Int. Cl.<sup>4</sup> B26B 3/00

U.S. Cl. 30—169

2 Claims

1. A scraper for scratch coupons comprising
  - a blade like member having a sharp scraping edge at one end thereof and a holding part at opposite end,
  - a blade holder formed with a slot like chamber to receive and hold said blade like member,
  - said blade holder comprising a base support unitary with

4,788,771

**CORD CUTTER HEAD HAVING A NONCIRCULAR CROSS SECTION**

Toru Baba, Yokosuka, Japan, assignor to Kioritz Corporation, Tokyo, Japan

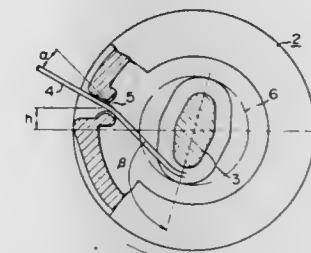
Filed May 20, 1987, Ser. No. 53,024

Claims priority, application Japan, May 24, 1986, 61-78615[U]

Int. Cl.<sup>4</sup> A01G 3/06; A01D 35/26

U.S. Cl. 30—276

3 Claims



1. A cord cutter head comprising:
  - a housing having a downward opening;
  - a spool mounted substantially in the center of the housing and carrying a flexible cutter cord wound thereon; and
  - an aperture formed in the wall of said housing and adapted to allow the portion of said cutter cord unwound from said spool to pass therethrough;
  - wherein the cross-sectional shape of said spool has a longer axis and a shorter axis.

4,788,772

**DIMENSIONING HEAD FOR PLUG GAGE**

Richard G. Van Sickle, Sterling Heights, and George Bour, Holly, both of Mich., assignors to GTE Valeron Corporation, Troy, Mich.

Filed Apr. 17, 1987, Ser. No. 39,409

Int. Cl.<sup>4</sup> G01B 5/12

U.S. Cl. 33—178 R

1 Claim

1. A plug gage of the type comprising a combination dimensioning head and detector, said dimensioning head comprising an elongated cylindrically shaped housing with a longitudinal axis and having an open end and a closed end,
  - a gaging member mounted in said housing for movement along the longitudinal axis,
  - said gaging member being normally biased toward the closed end and having a gage contacting portion projecting toward the open end, a pair of balls adapted to move





said groove being fully enclosed along bottom and sides except for said communicating means.

**4,788,779**  
**METHOD AND APPARATUS FOR THE RAPID**  
**CONSOLIDATION AND/OR DRYING OF MOIST**  
**POROUS WEBS**

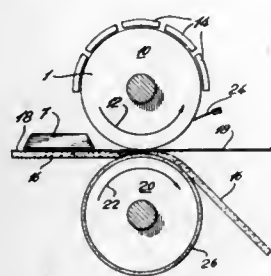
Donald G. Sparkes, Pointe Claire, Canada, assignor to Pulp and Paper Research Institute of Canada, Canada

Filed Jun. 15, 1987, Ser. No. 61,781

Int. Cl.<sup>4</sup> F26B 11/02

U.S. Cl. 34—117

5 Claims



1. A method for the drying of a moist, porous moving web comprising the steps of forming a nip between first and second moving surfaces, the first moving surface comprising a rotating cylinder formed of a relatively hard impermeable material, the second moving surface comprising a moving permeable felt supporting the moist moving web on a second rotating cylinder, maintaining a pressure at said nip, passing the moist moving web between the first and second moving surfaces, heating said first moving surface before the nip to a temperature in excess of 120° C. by induction heating using alternating current induction coils at a frequency of at least one kilohertz, and maintaining the second moving surface at a temperature below 100° C.

**4,788,780**  
**OVERBOOT**  
Ernest R. Boggs, 308 W. 7th, Leadville, Colo. 80461  
Filed Mar. 2, 1987, Ser. No. 20,584  
Int. Cl.<sup>4</sup> A43B 3/16, 3/18, 5/04

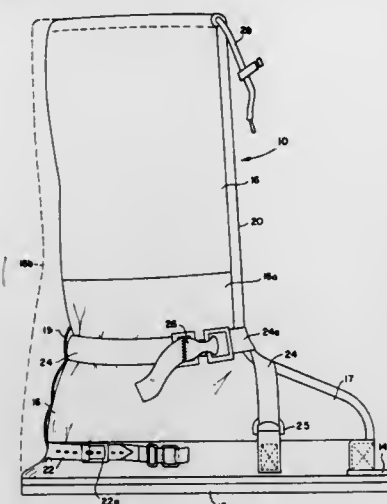
U.S. Cl. 36—7.1 R

24 Claims

1. An overboot adapted to be worn over a conventional boot or shoe and being further adapted to connect to a cross-country ski or to a snowshoe, said overboot comprising:

- (a) an elongated, dimensionally stable, generally flat sole member having a forward end and a rearward end, said forward end including a forwardly projecting connection member which is adapted to connect said overboot to said ski or snowshoe; wherein said sole member is adapted to be flexed between said forward and rearward ends;
- (b) a flexible, water-resistant upper member attached to the periphery of said sole member and extending upwardly therefrom, said upper member including toe and heel portions and further including vertical closure means; wherein said upper member is openable to allow said boot to be inserted therein, and said closure means being adapted to close said upper member around said boot;
- (c) horizontal, adjustable heel strap means carried by said upper member and extending from one side of said upper member to the opposite side thereof around said heel portion, said heel strap means being adapted to urge said boot forward in said overboot; wherein said heel strap means is adapted to collapse said heel portion of said upper member rearwardly of said boot in a manner such

that said heel strap means retains said boot in a forward position in said overboot;  
(d) ankle strap means carried by said upper member and being adapted to tighten said upper member around said boot; and

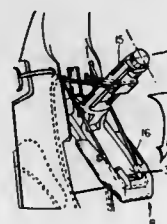


(e) adjustable toe strap means adapted to extend over said toe portion of said upper member and being further adapted to be tightened over the toe of said boot; wherein said heel strap means, ankle strap means, and toe strap means are adapted to secure said boot to said sole member within said overboot.

**4,788,781**  
**MANIPULATION LEVER FOR CLOSING AND**  
**LATCHING OF A REAR-ENTRY SKI BOOT**  
Louis Benoit, Frangy; Bernard Nerrinck, La Balme-De-Sillingy; Joseph Morell, Annecy, and Roland Petrini, Chambéry, all of France, assignors to Salomon S.A., Annecy, France  
Continuation of Ser. No. 700,302, Feb. 11, 1985, Pat. No. 4,698,920. This application May 20, 1987, Ser. No. 51,766  
Claims priority, application France, Feb. 10, 1984, 84 02900; May 18, 1984, 84 08598  
The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> A43C 11/00; A43B 5/04

U.S. Cl. 36—50

20 Claims



1. A manipulation element for closing and latching a rear spoiler of a boot on a leg of a skier, wherein said boot further comprises a cable attached to said boot and said element, wherein one end of said element is journaled on said rear spoiler, wherein the journaled end of said element on said spoiler tensions said cable, wherein tensioning of said cable closes said spoiler on said leg, wherein said element comprises first and second spaced apart arms extending in substantially the same direction and having first and second ends, respectively, and a third arm connecting said first and second ends of said first and second arms, wherein said first and second arms are spaced a

sufficient distance from each other to form a continuous empty space therebetween to permit another manipulation element to be positioned therebetween, and wherein said manipulation element is not secured for movement with said another manipulation element.

**4,788,782**  
**FOOT PRESSER DEVICE, PARTICULARLY FOR SKI**  
**BOOTS**

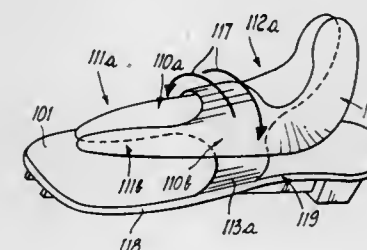
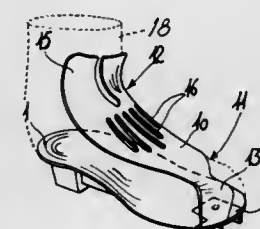
Adolfo Pozzebon, Sala d'Istrana; Renzo Balbinot, Vittorio Veneto, and Riccardo Perotto, Volpago del Montello, all of Italy, assignors to Nordica SPA, Montebelluna, Italy

Filed Jun. 1, 1987, Ser. No. 55,956

Claims priority, application Italy, Jun. 11, 1986, 82544 A/86  
Int. Cl.<sup>4</sup> B43B 5/04, 23/26

U.S. Cl. 36—119

7 Claims



1. In combination, a wedge and a foot presser device, particularly for ski boots, said wedge having a border and a longitudinal extension and being adapted to be inserted into a ski boot, said border including at least one lateral border portion and at least one other lateral border portion, said foot presser device comprising at least one presser and at least one other presser, said one presser and said other presser each having at least one front portion, at least one instep portion, and at least one lateral tab, said lateral tab of said one presser being rigidly associated with said one lateral border portion, said lateral tab of said other presser being rigidly associated with said other lateral border portion, said at least one presser and said at least one other presser at least partially overlapping each other and defining an overlapping zone, said one presser and said other presser engaging each other in mutually sliding engagement relationship at said overlapping zone, said overlapping zone extending in a direction substantially parallel to said longitudinal extension of said wedge.

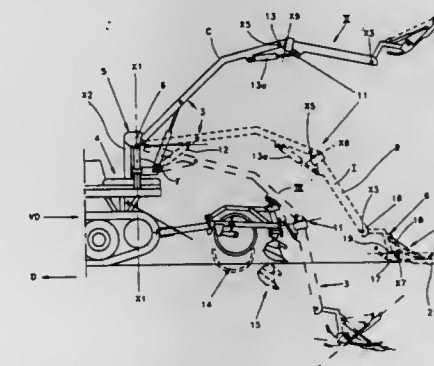
7. In combination, a foot instep presser and a wedge particularly for ski boots, said wedge being adapted for insertion into a ski boot shell to define a foot base plane and comprising: a front section, at least one seat formed on said front section, and, at least one hole formed in said seat, said instep presser comprising: an instep portion, a front portion connected to said instep portion to define together therewith, a substantially anatomic shape adapted to completely cover a foot from toe to instep,

at least one downwardly projecting tab connected to said front portion, at least one rearwardly projecting base plate connected to said tab, extending beneath said front portion of said instep presser and being inserted into said seat formed on said front section of said wedge, a lower side defined by said base plate, and, at least one lug protruding downwardly from said lower side of said base plate and being adapted for snap-together engagement with said at least one hole formed in said seat.

**4,788,783**  
**SKI-TRACK FORMING APPARATUS**  
Anton R. Bachler, Seestrasse 49, Hergiswil, Switzerland  
Filed Mar. 24, 1987, Ser. No. 29,734  
Int. Cl.<sup>4</sup> E01C 19/22

U.S. Cl. 37—220

20 Claims

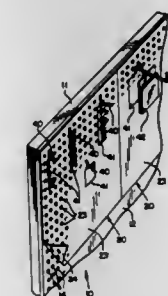


1. A ski-track forming apparatus, with a track-forming unit having two parallel track-forming tools extending in the track direction, with the distinction that the track-forming unit (1) is fastened to the end of an arm (3) the other end of which is supported for horizontal and transverse movement relative to the track direction on a guide rod support means (4), which can be mounted on a vehicle (VD), especially a caterpillar track-laying vehicle suitable for levelling of ski courses.

**4,788,784**  
**NOVEL DISPLAY SYSTEM AND METHOD FOR**  
**PRODUCING SAME**  
Robert W. Templin, 4800 North Lombard, Portland, Oreg. 97203  
Filed Sep. 16, 1987, Ser. No. 97,611  
Int. Cl.<sup>4</sup> G09F 3/18

U.S. Cl. 40—657

20 Claims



1. A readily removable display sheet for use with a perforated board for arranging and displaying salable goods to customers, which comprises: a flexible display covering substrate adapted for mounting

onto said perforated board and having located there-through a plurality of apertures arranged in a plurality of rows and columns, the size and location of the respective apertures being substantially the same as the size and location of the respective apertures in said perforated board, for facilitating the connection within said apertures and to said perforated board of display support members, said covering substrate being readily removable from said perforated board for replacement by another display sheet;

an adhesive composition, disposed on a first surface of said covering substrate, for securedly adhering said covering substrate to said perforated board, said adhesive being capable of permitting said covering substrate to be readily removed from engagement with said perforated board without causing substantial damage to said board; and

a backing sheet, removably attached to said covering sheet by said adhesive composition, for protecting the adherability of said covering sheet for subsequent mounting onto said perforated board.

4,788,785

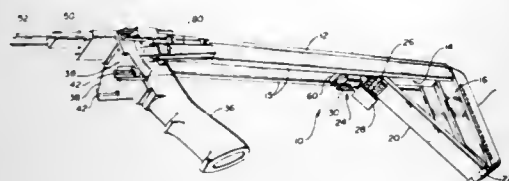
**FOLDABLE STOCK EXTENSION FOR FIREARM**  
Bernard C. White, Robbinsdale, Minn., assignor to Napco Industries, Inc., Hopkins, Minn.

Filed Sep. 29, 1987, Ser. No. 102,226

Int. Cl.<sup>4</sup> F41C 23/00

U.S. Cl. 42-72

5 Claims



1. A foldable stock for a firearm, said stock comprising, in combination:

- (a) a grip portion constructed and arranged for attachment to the firearm adjacent the receiver portion thereof;
- (b) an elongated frame member having a longitudinal channel therein and a butt portion hingedly attached thereto at one end thereof and movable from an extended position generally perpendicular to the frame to a folded position essentially parallel to the frame, the frame member pivotally attached at the other end thereof to the grip portion with a channel opening oriented downwardly and enclosing at least a portion of the top of the grip; said frame member being pivotally movable from an extended position projecting rearwardly from the receiver to a folded position above and essentially parallel to the barrel of the firearm;
- (c) a link attached at one end thereof to the end of the butt portion distal from the pivotal connection to the frame;
- (d) a slide connected to the other end of the link and positioned in the channel of the frame member and movable between a first defined position for supporting the butt portion in the extended position and a second defined position wherein the butt portion is in the folded position parallel to the frame and the link is also aligned with the frame portion; and
- (e) locking means having a tongue, extending from the grip portion into the channel, the tongue being spring loaded and constructed and arranged for being forced against the spring force into the grip when the slide is forced into contact with it as the butt portion is moved to the folded position thereby permitting the locking means to be withdrawn from the channel of the frame member and allowing the frame to be pivoted to the folded position.

4,788,786

# ARTICLE TRANSPORTING AND RAISING AND LOWERING APPARATUS

Hans R. Suter, Wangen, Switzerland, assignor to Roag (AG), Switzerland

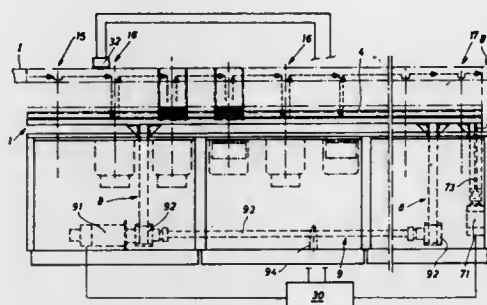
Filed Apr. 27, 1987, Ser. No. 42,931

Claims priority, application Switzerland, Apr. 25, 1986, 1712/86

Int. Cl.<sup>4</sup> B08B 3/04

U.S. Cl. 134-56 R

15 Claims



1. A transport apparatus for automatically feeding articles to a number of consecutive stations for treatment at the stations, the apparatus comprising:

- at least one station, including a treatment station, arranged along a path, an entrance into the path and an exit from the path;
- at least one article transport device for being conveyed from the entrance past the stations to the exit;
- at least one conveyor extending from the entrance past the stations to the exit, the conveyor comprising a pair of substantially parallel, spaced apart rails laterally offset from the stations, each of said rails having an upright portion and a substantially flat portion, the rails providing a track for respective endless belts upon which the transport device is supported, the transport device being moved by the conveyor from the entrance past the stations to the exit; the conveyor and the transport device being shaped and located so that the transport device may be supported above the stations for conveyance past the stations and may be moved downward for the transport devices to be moved into the stations;
- a first driving unit for moving the conveyor for moving the transport devices from the entrance past the stations to the exit, the first driving unit being located below the stations;
- a lifting device connected with the conveyor for moving the conveyor up and down for thereby moving the transport devices then on the conveyor out of the stations and down into the stations; a second driving unit connected with the conveyor for moving the conveyor up and down, the second driving unit being located below the stations; and
- a control unit connected with the first and the second driving units for operating the conveyor to move a transport device from the entrance to each of the stations in turn and then to the exit, for operating the first driving unit to halt the operation of the conveyor when a transport device is at selected station, and for operating the second drive unit for moving the conveyor down to move the transport device down into the station when the transport device is at a selected station and for also moving the conveyor up to move the transport device up out of the station after a predetermined time interval.

4,788,787

# SCENT PROPAGATION DEVICE

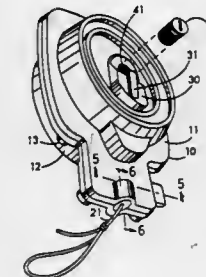
Melvin Konietzki, P.O. Box 13, Nekoosa, Wis. 54457

Filed Sep. 25, 1987, Ser. No. 100,933

Int. Cl.<sup>4</sup> A01M 31/06

U.S. Cl. 43-1

17 Claims



1. A device for propagating a scent which comprises:
  - (a) a line capable of being saturated with a liquid concentrate of a scent that lures animals; and
  - (b) a sealed container in which the line is stored and means from which the line may be reeled out or returned when desired, and liquid scent concentrate in the container for saturating said line.

4,788,788

# CATFISH BAIT HOLDER

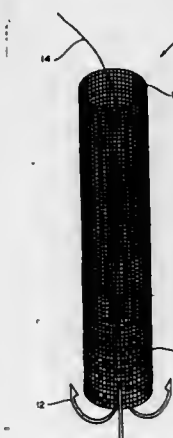
Nickie W. Brockett, 417 Summer St., Burlington, Iowa 52601

Filed Mar. 31, 1988, Ser. No. 176,236

Int. Cl.<sup>4</sup> A01K 97/02

U.S. Cl. 43-44.99

19 Claims



1. A new and improved catfish bait holder, comprising:
  - hook means having elongated shank means;
  - leader means secured to said shank means;
  - sponge means surrounding said shank means;
  - and
  - mesh net means enclosing said sponge means and a lower portion of said leader means.

4,788,789

# COLLAPSIBLE INSECT TRAP

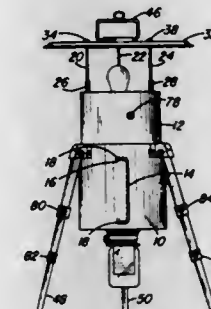
Lewis R. Boobar, Michael R. Sardelis, both of Frederick, and Walter M. Brown, III, Smithsburg, all of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 21, 1987, Ser. No. 135,275

Int. Cl.<sup>4</sup> A01M 1/04

U.S. Cl. 43-113

10 Claims



1. A collapsible insect trap comprising:
  - (a) a lower body section;
  - (b) an upper body section attached to said lower body section, said upper body section's dimensions permitting said upper body section to move slidably in and out of said lower body section;
  - (c) means for slidably connecting said lower body section to said upper body section;
  - (d) a rod sleeve attached to said upper body section;
  - (e) a rod which is contained and slidably moves in said rod sleeve;
  - (f) means for adjusting the length of said rod;
  - (g) a lid attached to said rod;
  - (h) means for supporting said trap attached to said lower body section;
  - (i) means for capturing insects; and
  - (j) means for collecting captured insects.

4,788,790

**METHOD OF MAKING A DARK, UNIFORMLY-COLORED, HARDWOOD MULCH**  
Charles B. Zeager, 40006 E. Harrisburg Pike, Middletown, Pa. 17057

Filed Jun. 6, 1986, Ser. No. 871,326

Int. Cl.<sup>4</sup> A01G 7/00

U.S. Cl. 47-9

5 Claims

1. The method of making a dark, uniformly-colored hardwood mulch comprising:
  - (1) forming a mass of large-fibered, hardwood pulp consisting essentially of 20-100% by weight of large-fibered hardwood bark pulp and 0-80% by weight of large-fibered hardwood wood pulp, most of said large fibers being acicular,
  - (2) passing water through said mass in an amount in excess of that sufficient to saturate said mass; and
  - (3) recycling excess water through said mass until a substantially uniform, dark color is obtained.

4,788,791

**COOLING SYSTEM FOR GREENHOUSE STRUCTURES**  
Philip D. Sprung, c/o 1001, 10th Avenue S.W., Calgary, Alberta, Canada T2R 0B7

Filed Dec. 30, 1986, Ser. No. 947,697

Int. Cl.<sup>4</sup> A01G 9/00

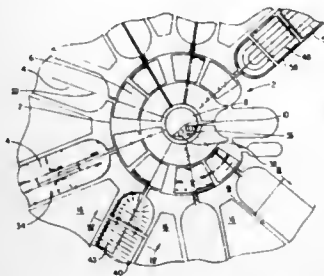
U.S. Cl. 47-17

20 Claims

1. In a stressed fabric structure having fabric held under tension between ribs, the improvement characterized by a

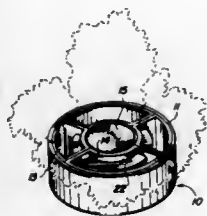


cooling system which comprises a plurality of water pipes mounted over the exterior surface of the structure to carry water from a source, the exterior surface being composed of a plurality of sections, water outlets in the pipes to enable water to spray over the exterior surface, control means associated with the pipes to control and regulate the amount of water and duration of spray received by the exterior surface of the structure, the control means arranged to control and regulate indi-



vidually for each section the amount of water and duration of spray received by the exterior surface of each section, the control means comprising valves in the pipes to control the flow of water through the pipes, temperature sensors in the fabric in each section, and a microprocessor means which is electronically associated with the temperature sensors and the valves to actuate the water flow and spraying when the temperature of a section of the fabric exceeds a predetermined value.

**4,788,792**  
**CONTAINER APPARATUS**  
Michael S. Womick, 2905 Larson St., Kissimmee, Fla. 32741  
Filed Apr. 17, 1987, Ser. No. 39,386  
Int. Cl.<sup>4</sup> A47G 7/02; A01G 9/02  
U.S. Cl. 47—41.12 10 Claims



1. A container for supporting separate containers for floral decoration and live plants comprising:  
an outer container having encircling walls and a bottom;  
a center core of floral decoration supporting material located in the center of said outer container; and  
a plurality of plant containers positioned around said center core of floral decoration support material in said outer container for holding potting soil and plants, therein; each of said plurality of plant containers having a stepped bottom and spaced arcuate inner walls so that an arcuate space is formed beneath the stepped bottom around said center core of floral decoration supporting material, whereby a container can have floral decoration supported in a center core of supporting materials surrounding by live plants growing in separate plant containers.

**4,788,793**  
**METHOD OF INHIBITING PREMATURE BUDDING OF SHORT-DAY FLORAL CROPS**

Prakash G. Kadkade, Marlboro, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.  
Filed Mar. 7, 1983, Ser. No. 472,449  
Int. Cl.<sup>4</sup> A01G 1/00

U.S. Cl. 47—58 3 Claims  
1. A method of inhibiting premature budding and subsequent flowering of a short-day floral crop selected from the group consisting of chrysanthemum and poinsettia comprising the step of illuminating the crop using single, continuous, brief, low intensity night-break treatment for a duration of up to fifteen minutes, near the middle of each long night period, with narrowband red light having a peak emission centered around 660 nm, said night-break treatment being initiated generally six hours after the onset of a night period.

**4,788,794**  
**FOUR SIDED FLUSH GLASS**  
Larry D. Miller, Rochester, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Filed Oct. 13, 1987, Ser. No. 107,009  
Int. Cl.<sup>4</sup> E05D 15/10

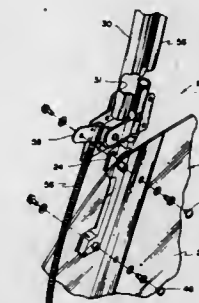
U.S. Cl. 49—214 6 Claims



1. A door assembly for use with a vehicle having body structure defining a door opening comprising:  
a door means having a lower door body including spaced inner and outer panels and fore and aft ends which together define a well having an elongated top opening at its belt line and an upper frame carrying a deformable seal along its sides and top and with the upper frame in conjunction with the belt line of the lower body defining a window opening;  
a window located exteriorly of said upper frame and supported for movement between a closed position in which it engages the seal means on said upper frame and closes off said opening and an open position in which it is disposed within said well, and a window guide arrangement carried by said door means and which is operable to guide the movement of the window between its positions and to position the window so that it is substantially flush with the exterior of the lower body and so that it is adapted to be substantially flush with the body structure of the vehicle surrounding the upper frame, the improvement being that said guide arrangement includes  
a. a pair of guide tracks carried by the door means adjacent its fore and aft ends which face each other; said guide tracks each having a channel shaped lower portion disposed within said well and extending from adja-

cent its bottom to adjacent its top and having its uppermost end section skewed outwardly toward the outer door panel at its belt line and a flanged portion extending along the side of the upper frame and into said well;  
b. a pair of guide means secured to the window at its inner side and adjacent its side edges, each of said guides having a lower guide pin adjacent the lower end of the window which is slidably received within the adjacently located channel shaped lower track portion and an upper guide pin located between the upper and lower ends of the window which is slotted and slidably received on the flanged guide track portion, and  
said guide tracks and guide pins being operable to guide the movement of said window when it is being lowered and raised and said skewed sections of said lower track portions causing said lower guide pins and lower end of said window to be moved outwardly toward the outer door panel while the upper slotted guide pins allow said window to pivot thereabout so that the upper end of the window is caused to move inwardly into sealing engagement with the seal means as the window approaches its fully raised position whereby the window will be substantially flush with the adjacent exterior body structure and belt line of the vehicle, and said skewed section of said lower track portions causing the lower guide pins and lower end of the window to be moved inwardly from the outer door panel while the slotted upper guide pins allow the window to pivot so that its upper end moves outwardly from the seal means as it is being initially lowered from its fully closed position.

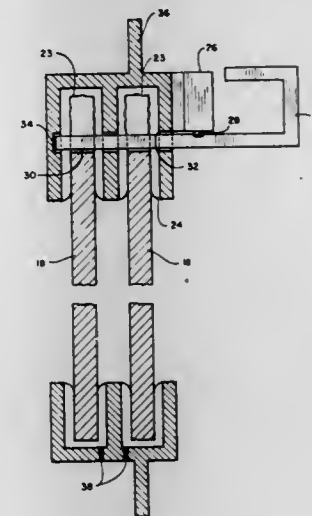
**4,788,795**  
**VEHICLE WINDOW OPERATING SYSTEM**  
Jacques E. Pinsonneault, Mt. Clemens, Mich., assignor to American Motors Corporation, Detroit, Mich.  
Filed Aug. 10, 1987, Ser. No. 86,292  
Int. Cl.<sup>4</sup> E05F 11/48  
U.S. Cl. 49—352 4 Claims



1. In combination with a vehicle body having an outer contour, and an opening in said vehicle contour penetrating the contour and enclosed by a peripheral edge defined at least in part by a body panel, said opening having upper and lower limits, and a window panel shaped to close said opening and having an interior surface and an exterior surface, the improvement comprising:  
an elongated guide member including a track and having a length greater than the distance between said upper limit and the lower limits of said peripheral edge of said window opening;  
a mount for mounting said guide member to said body panel so that said guide member extends across said opening;  
a guide follower being slidably entrained on said guide member;  
a connector for securing said guide follower to said window panel on the interior surface of said window panel; and  
a regulator for displacing said guide follower along said guide member, and said regulator including a control

member secured to said guide follower within said guide member;  
said control member being defined by a flexible elongated drive member connected to said guide follower and being received within said track for longitudinal movement of said guide follower and window panel on said guide member;  
whereby said window panel is stably supported along its path of displacement across said opening when said window panel is in a fixed position and also when said window panel is being displaced.

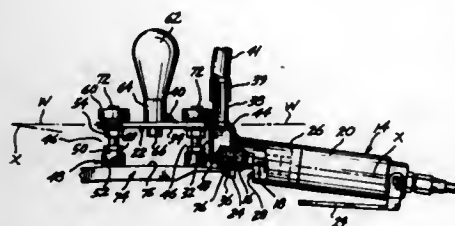
**4,788,796**  
**REMOVABLE REAR TRUCK WINDOW**  
Mark E. Matthews, 102 Woodland Rd., Mauldin, S.C. 29662  
Filed Aug. 19, 1987, Ser. No. 86,778  
Int. Cl.<sup>4</sup> E05D 15/06 10 Claims



1. A removable sliding window for use in motor vehicles and camper shells comprising:  
a generally rectangular frame having upper and lower portions which define a central opening;  
said frame having a plurality of adjacent tracks opening inwardly towards said central opening and extending around said frame;  
a plurality of panels received for overlapping sliding movement in said tracks for selectively opening and closing at least a portion of said central opening;  
at least one aperture extending transversely through said upper portion of said frame;  
said aperture terminating in a recessed notch in an inner wall of said frame;  
at least one retaining pin removably received in said aperture and having one end removably received in said recessed notch for limiting upward movement of said plurality of panels in said track of said upper frame portion;  
a spring urged ball detent mounted adjacent said aperture on said upper frame portion, said spring urged ball mounted for movement transversely to a longitudinal axis of said aperture;  
and  
a recess in said retaining pin for locking engagement with said spring urged ball detent.

4,788,797  
**SELF-SUPPORTING HAND-HELD GRINDING DEVICE**  
 Jeffrey P. Kane, Renton, and Steven E. Franklyn, Redmond,  
 both of Wash., assignors to The Boeing Company, Seattle,  
 Wash.

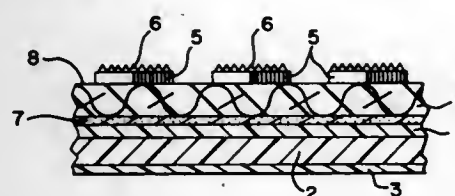
Filed Oct. 9, 1987, Ser. No. 107,254  
 Int. Cl.<sup>4</sup> B24B 9/00  
 U.S. Cl. 51—170 PT



1. A self-supporting hand-held grinding device for beveling the edges of a compound contoured surface, the device comprising:

- a grinding tool including a high speed motor and an abrasive grinding element mounted on the shaft of the motor;
- a tool holding member for holding said grinding tool, said tool holding member having a guide means for guiding said abrasive grinding element along an edge of a part having a compound contoured surface;
- three legs attached to said tool holding member for supporting the tool holding member adjacent to the compound contoured surface of said part, the legs arranged in a triangular configuration and oriented such that one end of the legs is positioned to impinge on the compound contoured surface of a part to be ground, each leg including a foot pivotally attached for sliding over said compound contoured surface.

4,788,798  
**ADHESIVE SYSTEM FOR MAINTAINING FLEXIBLE WORKPIECE TO A RIGID SUBSTRATE**  
 Paul J. DeFranco, Twinsburg; Alan G. King, Macedonia, and Anthony S. Scheibelhoffer, Norton, all of Ohio, assignors to Ferro Corporation, Cleveland, Ohio  
 Continuation-in-part of Ser. No. 843,469, Mar. 24, 1986, abandoned. This application May 7, 1987, Ser. No. 47,749  
 Int. Cl.<sup>4</sup> B24D 11/00; B32B 7/02; C09J 7/02  
 U.S. Cl. 51—406



1. In the combination of a tool having a relatively rigid, unyielding base substrate having a work surface of predetermined non-planar contour and configuration, and a grinding or polishing member adhesively mounted on and conforming to said tool work surface, the improvement comprising an essentially non-strippable, unreactive, smooth, glossy film affixed to and conforming to said work surface, beneath said member and exhibiting virtually no surface adhesive characteristics, and having a root mean square roughness of less than or equal to 0.1 micron, and a layer of adhesive releasably joining together said film and said grinding or polishing member, said adhesive layer having a shear value with respect to said film of at least 0.7 kg./cm<sup>2</sup>, a peel strength from about 10 to about 250 grams

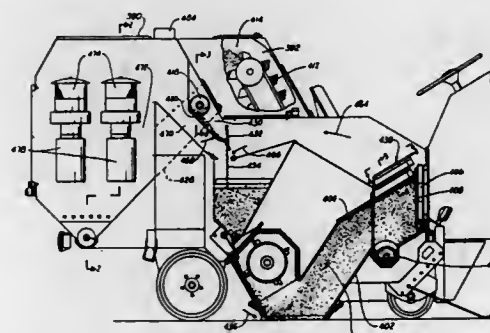
force per inch width, a tack value of about 15 to 30 cm travel, and a surface tension less than, or equal to, the surface energy of said film.

4,788,799  
**SURFACE BLASTING APPARATUS**  
 Wayne E. Dickson, Tecumseh, Okla., assignor to Dickson Industries, Inc., Tecumseh, Okla.  
 Continuation-in-part of Ser. No. 729,466, May 1, 1985, Pat. No. 4,646,481, and a continuation-in-part of Ser. No. 498,846, May 27, 1983, abandoned. This application Dec. 23, 1986, Ser. No. 945,877

The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> B24C 9/00

U.S. Cl. 51—424

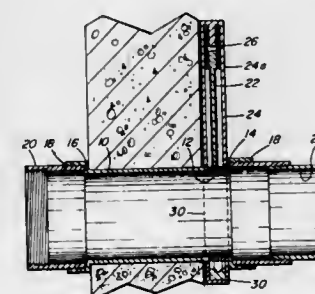
13 Claims



1. A surface blasting apparatus comprising:
- a housing including a pair of opposed vertically extending, substantially parallel side walls;
  - an abrasive blast wheel mounted within said housing for throwing abrasive against a surface to be treated;
  - an abrasive storage hopper above said blast wheel for providing a supply of abrasive to said abrasive blast wheel;
  - an abrasive return chute for receiving wheel-thrown abrasive rebounded from said surface to be treated and for conducting a flow of air therethrough;
  - magnetic receiving means positioned adjacent an exit of said abrasive return chute for receiving and arresting rebounding abrasive exiting said abrasive return chute;
  - baffle assembly means positioned adjacent said magnetic receiving means and above said abrasive exiting said abrasive return chute, said baffle assembly means allowing flow of air and dust upwardly therethrough while preventing upward movement of a major portion of the abrasive therethrough;
  - an upper abrasive compartment above said abrasive storage hopper and disposed between said parallel vertically extending side walls;
  - an abrasive conveyor means for carrying abrasive from said baffle assembly means to said upper abrasive compartment, said conveyor means including:
  - a horizontally extending portion, extending, in part, beneath said baffle assembly means; and
  - a vertically extending portion receiving abrasive from said horizontally extending portion and discharging abrasive into said upper abrasive compartment;
  - a screen for removing large debris from said abrasive and allowing the abrasive to gravitate through the screen, said screen being supported within said housing between said side wall, and disposed below said upper abrasive compartment for receiving abrasive therefrom;
  - an abrasive control valve pivotally mounted in said surface blasting apparatus for rotation about a horizontal axis extending between said vertically extending parallel side walls at a location below said screen and above said abra-

- sive storage hopper and allowing gravitating abrasive originating from said upper abrasive compartment and passing downwardly through said screen after the removal of large debris therefrom to fall downwardly to said abrasive storage hopper after a sufficient amount of abrasive has built up on said valve to cause said valve to open and allow said abrasive to gravitate into said abrasive storage hopper and allowing the abrasive to gravitate downwardly across the flow of air exiting from said baffle assembly means such that air exiting from said baffle assembly means passes through said gravitating abrasive for further removal of dust and debris therefrom;
- a large debris chute having a discharge end and having a receiving end positioned adjacent and beneath one end of said screen for receiving the large debris removed from said abrasive by said screen;
- a first cleaning chamber having the discharge end of said large debris chute opening thereto, and positioned for receiving said air passed through said falling abrasive from said control valve after said air has passed through said falling abrasive to further remove dust and debris from said falling abrasive, said first cleaning chamber having a lower portion;
- a pre-filter positioned in said first cleaning chamber for filtering at least a portion of said dust and debris from said air which has passed through abrasive falling from said upper abrasive compartment toward said abrasive storage hopper via said control valve, such that a filtered portion of said dust and debris falls toward a lower portion of said first cleaning chamber;
- a discharge conduit positioned adjacent said pre-filter for receiving dust and debris from said pre-filter;
- a second cleaning chamber adjacent said discharge conduit for receiving dust and debris passing through said discharge conduit after removal from said air by said pre-filter, said second cleaning chamber having a lower portion, and said first and second cleaning chambers being adjacent each other and defining a common opening at the lower portions thereof;
- a filter positioned in said second cleaning chamber for further filtering dust and debris from said air such that said dust and debris removed by the filter in said second cleaning chamber fall downwardly toward said lower portion of said second cleaning chamber;
- a large debris auger positioned in said first cleaning chamber for transferring said large debris and dust toward said common opening; and
- a dust auger positioned in said second cleaning chamber for transferring said dust toward said common opening.

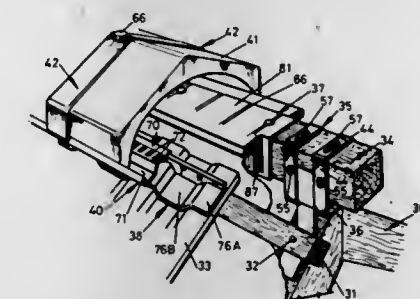
4,788,800  
**FIRE STOP DEVICE**  
 Joseph D. Whiteley, Guelph, Canada, assignor to Monsanto Canada Inc., Mississauga, Canada  
 Filed Jun. 29, 1987, Ser. No. 67,543  
 Claims priority, application Canada, Jul. 17, 1986, 514026  
 Int. Cl.<sup>4</sup> E04B 5/48  
 U.S. Cl. 52—1



1. A fire stop device comprising: (a) a cylindrical tubular

conduit formed of a low-boiling-point, fugitive metal having relatively short melting point, said conduit being adapted to extend completely through a hole in wall, floor or the like, connection means at each end of said conduit for connection to a plastic plate at each side of said wall, floor or the like; (b) a closure housing disposed parallel to said wall, floor or the like with one end thereof being disposed adjacent to one surface of said cylindrical tubular conduit, said closure housing having an aperture therethrough which is of substantially the same diameter as that of said cylindrical tubular conduit, said cylindrical tubular conduit also being disposed in said aperture in said closure housing; and (c) a fire-resistant closure plate slidably mounted within said closure housing for movement from one end to the other end, said closure plate being sprung-biased to be in contact with the said surface of said cylindrical tubular conduit; said closure housing including a guiding channel at each side of said closure plate and a seat at said other end; whereby, in the event of a fire, at least the portion of said cylindrical tubular conduit which is in contact with said fire-resistant closure plate is melted to liquid form and is thus dissipated, thereby allowing said fire-resistant closure plate to be urged completely across said hole in said wall, floor or the like and to be seating engagement with said seat.

4,788,801  
**RIDGE SYSTEM**  
 Graham R. Jones, c/o Design Marketing, Lamberhead Industrial Estate, Wigan, United Kingdom (WN5 8EG)  
 Filed Feb. 13, 1987, Ser. No. 14,458  
 Claims priority, application United Kingdom, Feb. 13, 1986, 8603589; Apr. 19, 1986, 8609622  
 Int. Cl.<sup>4</sup> E04B 7/00  
 U.S. Cl. 52—57



1. An arrangement for weatherproofing joints between ridge tiles and roof tiles incorporated in a roof ridge system of a building and for providing ventilation to a roof space of the building defined by the roof ridge system, the weatherproofing and ventilation arrangement being adapted for location between the ridge tiles and the roof tiles, and comprising a perforated ventilator strip having along one side thereof an upwardly open channel adapted to receive the lower edges of the ridge tiles to secure the ventilator strip in position in the roof ridge system, a filler element adapted for location between the perforated ventilator strip and the roof tiles and profiled to conform with the profile of the roof tiles, the perforated ventilator strip and the filler element defining between them air flow channel means between the underside of the ridge tiles and the atmosphere outside the roof space of the building, and means interconnecting the perforated ventilator strip and the filler element.



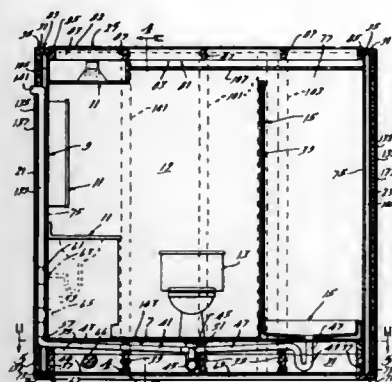
4,788,802

## PREBUILT EXTERIOR ROOM

Albert L. Wokas, 22245 Thorofare, Grosse Ile, Mich. 48138  
Continuation of Ser. No. 393,786, Jun. 30, 1982. This application  
Apr. 17, 1987, Ser. No. 40,745  
Int. Cl.<sup>4</sup> E04H 1/00

U.S. Cl. 52-79.1

15 Claims



1. A prebuilt transportable module providing a room to be secured externally to the wall of an existing building, said room having front and rear walls, left and right sidewalls, a ceiling and a floor, said module comprising a sandwich type floor member, said floor member having a rectangular framework of front and rear joists and transverse joists including end joists extending between the front and rear joists, said floor member having plywood panels covering the top and the bottom of the rectangular frame work and rigidly secured to the joists, said module also comprising vertical front wall and rear wall and sidewall members each including vertical inner wall forming plywood panels having bottom portions overlapping and rigidly secured to sides of said front and rear joists of said floor member and the end transverse joists of said floor member, said module further comprising a roof member having a rectangular framework of front and rear joists and transverse joists including end joists extending between the front and rear joists, said roof member having a plywood panel covering the top of said framework and rigidly secured thereto, said vertical inner wall forming panels having upper portions overlapping and rigidly secured to sides of the front and rear and end transverse joists of said roof member, said vertical inner wall forming panels extending substantially the full height of the module and forming an inner box strengthened at opposite ends by rigid attachment of said bottom portions and said upper portions respectively to said floor member and said roof member, said vertical members including vertical risers rigidly secured to the outside surfaces of said vertical inner wall forming panels, and outer enclosure forming sheets rigidly secured to said risers to form an outer box around and rigidly connected to the inner box, said sheets being structural load carrying elements, means rigidly interconnecting said sheets to said roof member and to said floor member, said boxes and the respective vertical inner wall forming panels and enclosure sheets thereof carrying loads on the module and providing strength and sturdiness with torsional rigidity in all three planes for the module.

4,788,803

## MODULAR INSULATED BUILDING STRUCTURE AND METHOD

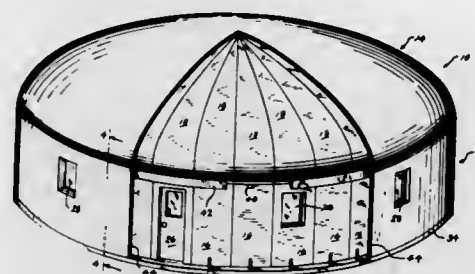
John A. Seitz, N26W30249 Maple Ave., Pewaukee, Wis. 53072  
Filed Jan. 23, 1987, Ser. No. 6,466  
Int. Cl.<sup>4</sup> E04B 1/32

U.S. Cl. 52-82

10 Claims

1. A building structure, comprising:  
an upstanding substantially vertical wall portion constructed from a plurality of interlocking thermally insulating rigid

foam wall sections, said wall portion forming a closed shape;  
a roof portion adapted for placement atop said wall portion for enclosing said building structure, said roof portion being constructed from a plurality of interlocking thermally insulating rigid foam roof sections, said roof sections having a substantially vertical end portion adapted for placement adjacent the upper end of said wall portion so as to form a joint therebetween;



retainer means comprising a band adapted to overlap the joint between said roof sections and said wall sections about the periphery of said building structure, and adapted to be tensioned to maintain said structure in said closed shape; and  
a cementitious weather resistant coating applied to the exterior surface of said wall and roof portions for protecting the rigid foam insulating material thereof.

4,788,804

## SKYLIGHT

Fred Haas, Unionville, Canada, assignor to Viceroy Homes Limited, Scarborough, Canada

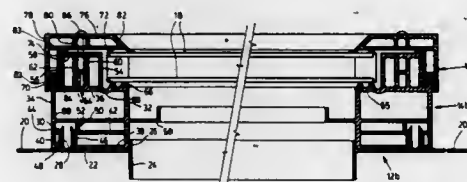
Filed May 8, 1987, Ser. No. 47,322

Claims priority, application Canada, Aug. 28, 1986, 517040

Int. Cl.<sup>4</sup> E04B 7/18

U.S. Cl. 52-200

4 Claims



1. A skylight window comprising:

a four-sided window base frame formed of extruded thermoplastic adapted to be received in a window opening in a building structure;  
roof flashing means formed on said base frame, extending outwardly therefrom around all sides thereof;  
a window housing connected to said base frame and adapted to receive glazing therein;  
said window housing comprising in section a first rectangular four-sided structure formed of extruded thermoplastic and having inner and outer walls and upper and lower walls, and interior supporting walls formed therein along its length, a second rectangular tubular structure formed on said upper wall of said first rectangular tubular structure, said second rectangular structure defining inner and outer walls and a top wall, said inner wall being located in a plane offset outwardly with respect to said inner wall of said first structure, whereby to define a flange means to receive glazing thereon, parallel spaced apart bracing walls located on the interior of said second tubular structure, said bracing walls being spaced apart a distance appropriate to receive fastening means therebetween;

a glazing frame adapted to be attached to said housing for retaining glazing therein; and,  
said glazing frame comprising a generally L-shaped tubular structure in section, defining inner and outer walls adapted to overlie said top wall of said second tubular structure of said window housing, and adapted to overlie said glazing on said flange means, whereby to engage said glazing on said flange means and clamp the same in position, and junction walls extending between said inner and outer walls and registering with said bracing walls in said housing, to receive fastenings therein.

4,788,805

## COVER FOR WALL MOUNTED AIR CONDITIONER

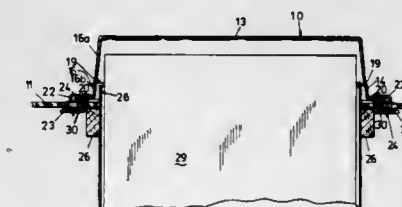
Daniel M. Shaw, 217 S. Hamilton St., P.O. Box 1072, Madison, Wis. 53701

Continuation of Ser. No. 280,905, Jul. 6, 1981, abandoned. This application Apr. 18, 1984, Ser. No. 600,609

Int. Cl.<sup>4</sup> E06B 3/30

U.S. Cl. 52-202

12 Claims



1. A cover for a wall mounted air conditioner which extends into the interior of the room from the wall in which it is mounted, comprising:

(a) a cover body having:

- (1) a flat, rectangular back panel adapted in size to cover the face of the air conditioner;
- (2) top, bottom and end side walls formed integrally with the back panel and extending inwardly therefrom toward the wall in which the air conditioner is mounted, the side walls being integrally connected together to form a continuous side wall about the back panel and flaring out at an angle therefrom;
- (3) a flange formed integrally with and extending outwardly from the side walls in a plane substantially parallel to the back panel;
- (4) a lip formed integrally with and curving inwardly from the outer edges of the flange for a short distance;
- (5) a curved joint section parallel to the back panel which divides each of the top, bottom and end side walls into a first section adjacent to the back panel and a second section adjacent to the room wall, the joint section in each of the side walls curving outwardly from the first side wall section and then inwardly to meet the second side wall section such that the second side wall section is spaced outwardly from the first side wall section, each of the first side wall sections flaring outwardly from the back panel at a greater angle than the angle at which the second side wall section of each of the side walls flares outwardly from the back panel;

(b) a sealing strip of resilient, compressible weatherstripping material secured to the inner side of the flange around the entire periphery of the flange at a position adjacent to the lip on the flange; and

(c) means for removably securing the cover body to the wall over the air conditioner so as to compress the sealing strips about the periphery of the cover body.

4,788,806

## ASSEMBLY OF MOLDING STRIPS ADAPTED TO MOUNT FLEXIBLE COVERINGS ON SUPPORT SURFACES

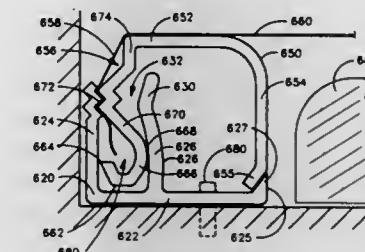
R. Gregg Sease, 6457 S. Heritage Pl. West, Englewood, Colo. 80111

Filed Mar. 20, 1986, Ser. No. 841,593

Int. Cl.<sup>4</sup> A47W 13/00; E04B 1/00

U.S. Cl. 52-222

10 Claims



1. A molding strip assembly adapted to secure an edge of a flexible covering to a surface to which the molding strip assembly is attached, comprising:

a molding element having a relatively flat base wall operative to receive fastening elements for attaching said molding element to the surface, a locking wall extending upwardly from said base wall, and a retaining wall extending upwardly from said base wall, said locking wall and said retaining wall shaped with respect to one another to define a retaining channel; and

a mounting element having a raised support wall, a first side wall extending downwardly from said raised support wall and a latching structure extending downwardly from said raised support wall in spaced relation to said first sidewall, said latching structure sized for mated insertion into said retaining channel to lock said mounting element onto said molding element in a locked position, said latching structure including a first element extending between and contacting the retaining wall and the locking wall in the locked position and means for supporting said first segment above said base wall when the latching structure is in the locked position, said latching structure operative along with said first sidewall to position said support wall above said base wall, said latching structure adapted to receive a peripheral edge portion of said covering to retain said edge portion in a fixed relation with respect to said retaining channel.

4,788,807

## FASTENING PLATE FOR FACILITATING INSTALLATION OF RUBBER ROOF COVERING

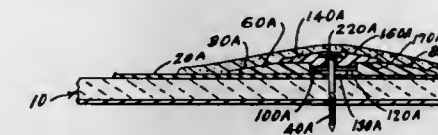
Robert E. Whitman, 1-2143 Sherwood Ln., Swanton, Ohio 43558

Filed May 1, 1986, Ser. No. 858,020

Int. Cl.<sup>4</sup> E04B 1/38

U.S. Cl. 52-410

2 Claims



1. An apparatus facilitating the affixing of rubber roofing sheets to the upper surface of a bonding plate on a roof surface comprising:

(a) a bonding plate member in the form of a truncated cap member having an upper surface and a lower surface, said base bonding plate member having a circular opening



extending from the upper surface to the lower surface, and wherein said base bonding plate member has a circular depression that extends downwardly from the upper surface of said base bonding plate member, and wherein said circular depression is concentric to the circular opening in said base bonding plate member, and wherein said circular depression is larger in diameter than the diameter of said circular opening;

- (b) a caplike member shaped in the form of a truncated cap member having an upper portion and a bottom portion which bottom portion has a circular protrusion on the bottom portion thereof which protrusion fits conformingly into the circular depression in the upper surface of said bonding plate member so as to join the caplike member conformingly to said bonding plate and wherein said caplike member has an opening therein which extends completely through said caplike member from the upper surface thereof to the lower surface thereof, and wherein said opening in said caplike member is concentric to said circular protrusion, said opening in said caplike member receiving a longitudinally extending fastening device which extends completely through the opening in said caplike member and the opening in the bonding plate member securing said base bonding plate member and the caplike member together as a unit and also securing said caplike member and bonding plate to the rubber roof sheet and as a unit to the upper surface of a roof surface, securing thereby the rubber roof sheet to the roof surface, and wherein said caplike member has a circular depression in the upper surface thereof which depression is concentric to the circular opening in said caplike member, and which depression is adapted to conformingly receive the head of a longitudinally extending fastening device;
- (c) longitudinally extending fastening means adapted to fit longitudinally through the opening in said bonding plate member and the opening in said caplike member and to pierce the rubber roof sheet beneath the bonding plate members to secure said bonding plate member and caplike member to the rubber roof sheet and roof surface.

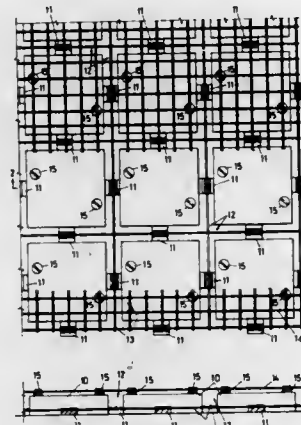
**4,788,808**  
**BUILDING PANEL AND METHOD OF FABRICATION**  
 Donald H. Slocum, 61 Chimney Ridge Rd., Convent Station, N.J. 07961  
 Filed Mar. 30, 1987, Ser. No. 31,571  
 Int. Cl.<sup>4</sup> E04C 1/40; E04D 1/28, 1/34  
 U.S. Cl. 52-521 12 Claims



1. A building panel for exterior use of laminated construction comprising:  
 (a) a flat sheet of hardboard having a four-sided polygonal configuration and first and second planar surfaces;  
 (b) a flat sheet of high temperature thermoplastic material bonded to said first planar surface of the hardboard and

- being substantially coextensive therewith to provide an outer planar surface;  
 (c) said laminated hardboard sheet and thermoplastic sheet having first edge portion and an opposite integral offset portion extending in a plane substantially normal to the outer planar surface of the thermoplastic sheet and terminating in a second end edge portion; and  
 (d) a rigid layer of plastic material having insulating properties bonded to the second planar surface of the hardboard.

**4,788,809**  
**BUILDING FOUNDATION**  
 Peter S. Koukourou, Norwood, Australia, assignor to Koukourou & Partners Pty. Ltd., Norwood, Australia  
 Filed Mar. 19, 1987, Ser. No. 28,166  
 Int. Cl.<sup>4</sup> E04B 1/16  
 U.S. Cl. 52-741 3 Claims

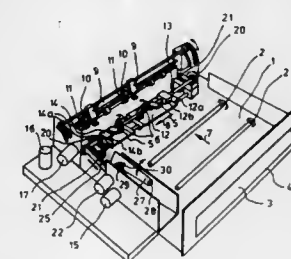


1. A method of forming a building foundation, comprising:  
 leveling the supporting ground;  
 positioning a number of hollow members in rows on the ground;  
 positioning shuttering walls around the hollow members to define the perimeter of the foundation;  
 placing spacers on the ground between adjacent ones of said hollow members and between said shuttering walls and the hollow members to retain the hollow members in place;  
 placing lower reinforcing rods on the spacers in two rows at an angle to each other;  
 placing reinforcing bar support chairs on the hollow members;  
 positioning a mesh of upper reinforcing rods on the support chairs; and  
 pouring concrete to envelop said spacers, said lower reinforcing rods, said hollow members, said support chairs, and said reinforcing mesh, thereby forming a foundation having a reinforced slab and a number of intersecting reinforcing beams.

**4,788,810**  
**DEVICE FOR LOADING AND UNLOADING X-RAY FILM CASSETTES**  
 Walter Bauer, Munich, and Manfred Schmidt, Kirchheim, both of Fed. Rep. of Germany, assignors to Agfa-Gevaert AG, Leverkusen, Fed. Rep. of Germany  
 Filed Jul. 17, 1987, Ser. No. 75,031  
 Claims priority, application Fed. Rep. of Germany, Jul. 25, 1986, 8619938  
 Int. Cl.<sup>4</sup> B65G 65/04  
 U.S. Cl. 53-266 R 9 Claims

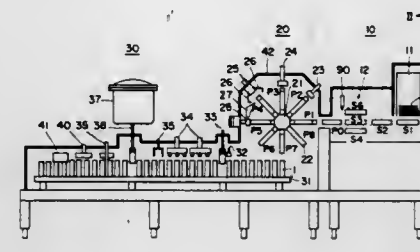
1. In a device for loading and unloading X-ray film cassettes

each having a pivotable closable lid, the device comprising a base having a light-tight closable compartment accommodating a cassette, transporting means for inserting and removing said cassette from said compartment, positioning means for positioning a cassette edge for the cassettes of all formats; a movable support; releasing means coupled to said positioning means for locking the lid and a closing means for the lid which are positioned on said support movable jointly with the cassette in a transport direction from a first position to a second



position; drive means for moving said support; and lid-opening means for opening said lid during the movement of said support with said cassette from the first position to the second position, the improvement comprising said drive means for said support driving said lid opening means and including a motor-driven control disc (24), a shiftable crank rod (25) for shifting said support (13) and being rotatably eccentrically supported on said disc, and a plate (27) forcibly guided on said crank rod and having an opening hook (31) cooperating with the lid to open the lid.

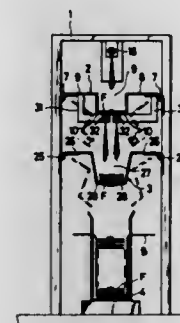
**4,788,811**  
**PROCESS AND APPARATUS FOR ASSEMBLING AND LIQUOR-CHARGING OF PACKAGES OF PAPER AND THE LIKE**  
 Ryoeichi Kawajiri, Kawasaki; Masahiro Honda, Tokyo, and Haruo Furukawa, Omiya, all of Japan, assignors to Dai Nippon Insatsu Kabushiki Kaisha, Tokyo, Japan  
 Filed May 13, 1987, Ser. No. 49,343  
 Claims priority, application Japan, May 17, 1986, 61-73371[U]; May 21, 1986, 61-114686; Jun. 9, 1986, 61-86557[U]  
 Int. Cl.<sup>4</sup> B65B 55/10, 61/18  
 U.S. Cl. 53-426 12 Claims



1. A process for assembling and liquor charging of a series of paper packages, comprising:  
 successively attaching a spout onto a closable top end portion of each of said packages, each of said packages having a hollow, square cylindrical main body, with closable top and bottom end portions, outside and inside surfaces of each of said packages being coated with a sealable, settable agent;  
 introducing a flanged spout into a reception opening formed at a specifically selected position of each of said packages through a wall or flap portion thereof;

sealingly attaching said flanged spout onto the wall or flap portion of each of said packages;  
 successively capping each of said packages onto tip ends of a plurality of radial mandrel arms forming an intermittently rotatable mandrel unit, said capped packages being directed radially outward;  
 assembling and shaping said bottom end of each of said packages in capped position on the related mandrel arm; discharging each of said bottom-assembled packages onto a conveyor means;  
 charging a liquor into each of said bottom-assembled packages mounted on said conveyor means; and  
 assembling and shaping said top end portion of each of said packages.

**4,788,812**  
**METHOD AND APPARATUS FOR STACKING ELONGATED TAPE-LIKE ARTICLES**  
 Toyoo Morita, Uozu, and Hideki Akiyama, Toyama, both of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan  
 Filed Aug. 10, 1987, Ser. No. 83,464  
 Claims priority, application Japan, Aug. 11, 1986, 61-188212  
 Int. Cl.<sup>4</sup> B65B 35/50, 39/02, 39/04  
 U.S. Cl. 53-447 4 Claims



1. A method of stacking elongated tape-like articles in a bundling or packing station, comprising the steps of:  
 (a) receiving the tape-like articles in a horizontal posture one by one at regular intervals at a first position disposed above a tray in the bundling or packing station;  
 (b) releasing the individual tape-like article to fall upon receipt at the first position;  
 (c) spraying air jets uniformly over an upper surface of the individual tape-like article so as to keep the tape-like article in a horizontal posture while the latter is falling;  
 (d) receiving the successive tape-like articles from the first position in a horizontal posture at a second position between the first position and the tray to store the successive tape-like articles in stack;  
 (e) spraying air jets over the stack of the tape-like articles while the stack is being received at the second position;  
 (f) releasing all the stored tape-like articles from the second position to fall in a horizontal posture as a set onto the tray when the number of the stored tape-like articles reaches a first predetermined value; and  
 (g) repeating the last-named receiving and releasing until the number of sets of the tape-like articles stacked on the tray reaches a second predetermined value.

**4,788,813**  
**METAL DETECTION IN THE VICINITY OF FERROUS BOUNDARIES**

Richard P. Strosser, Akron; Carl E. Bohman, New Holland, and Mark K. Chow, Leola, all of Pa., assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Jan. 13, 1988, Ser. No. 143,471

Int. Cl.<sup>4</sup> A01D 75/18

U.S. Cl. 56—10.2

8 Claims



1. In a forage harvester having first and second feed rolls rotatable about first and second axes for feeding crop material through a crop feed path and a metal detector positioned within said first feed roll for detecting the presence of tramp metal passing between said feed rolls, said metal detector including first and second rows of permanent magnets for producing a magnetic field between said feed rolls to detect said tramp metal, the improvement comprising:

first and second additional permanent magnets; and, support means for supporting said additional permanent magnets laterally of said crop feed path at a distance from the axis of said first feed roll which is greater than the radius of said first feed roll.

**4,788,814**  
**TEXTILE WINDER EQUIPPED WITH AIR SPLICER AND ATTENDANT METHOD**

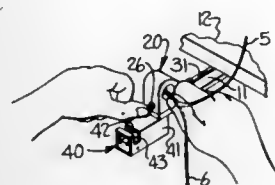
Milton R. Crouch, and Paul A. Czelusniak, Jr., both of Eden, N.C., assignors to Fieldcrest Cannon, Inc., Eden, N.C.

Filed Aug. 26, 1987, Ser. No. 89,743

Int. Cl.<sup>4</sup> D01H 15/00

U.S. Cl. 57—22

19 Claims



1. A method of winding a relatively large package of yarn on a textile winder from a plurality of smaller source packages of yarn such as skeins of yarn, said method comprising air splicing the tail end of the package of yarn being wound to the leading end of a source package of yarn by placing the tail and leading ends of the yarns in an open-ended confined passageway of an air splicer mounted on the winder closely adjacent the path of travel of the source yarn to the package being wound, with the ends of the yarns in the passageway being beside each other and facing in a common direction, and subjecting the ends of the yarns while within the passageway to air turbulences to effect an entanglement of the fiber components of the ends of the yarn with each other and to impart twist to the entangled ends of the yarn so as to form a twisted commingled projection of entangled fiber components extending laterally from the spliced yarns.

**4,788,815**  
**STEEL CORDS FOR THE REINFORCEMENT OF RUBBER ARTICLES**

Yujiro Umezawa, Tokyo, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Continuation of Ser. No. 810,460, Dec. 18, 1985, Pat. No. 4,707,975. This application Apr. 21, 1987, Ser. No. 40,676

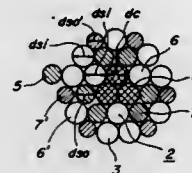
Claims priority, application Japan, Feb. 26, 1985, 60-35215;

Feb. 26, 1985, 60-35216

Int. Cl.<sup>4</sup> D07B 1/06

U.S. Cl. 57—212

7 Claims



1. A steel cord for the reinforcement of rubber articles comprising: a central base structure composed of 2 to 4 steel filaments, and only one coaxial layer composed of plural steel filaments arranged around the central base structure, the steel filaments of said coaxial layer and the central base structure being twisted in the same direction at the same pitch, the steel filaments constituting the central base structure have the same diameter (dc), while steel filaments of the coaxial layer have a diameter (dso) smaller than the diameter (dc) of the steel filament in the central base structure and a ratio of dc/dso is within a range of 1.03 to 1.25.

**4,788,816**  
**TEXTURIZED SYNTHETIC YARNS**

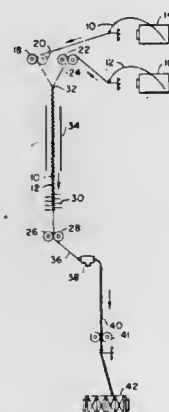
Larry R. Clements, Lyman, and Paul W. Eschenbach, Moore, both of S.C., assignors to Milliken Research Corporation, Spartanburg, S.C.

Continuation of Ser. No. 944,570, Dec. 22, 1986, abandoned, which is a division of Ser. No. 850,160, Apr. 10, 1986, Pat. No. 4,674,273. This application Feb. 23, 1988, Ser. No. 161,308

Int. Cl.<sup>4</sup> D02G 1/16, 3/34

U.S. Cl. 57—208

3 Claims



1. A spun-like composite yarn comprising: a plurality of commingled, drawn and textured yarns, one of said yarns being substantially fully oriented and another of said yarns being partially oriented, said fully oriented and said partially oriented yarn being air entangled with the partially oriented yarn being in loops around the fully oriented yarn, said spun-like composite yarn being nonheat-set after air entanglement.

**4,788,817**  
**AUTOMATIC PIECING OF COMBINATION OPEN END ROTOR SPUN YARN**

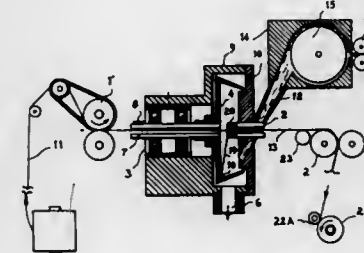
Peter Artzt; Gerhard Egbers, both of Reutlingen; Heinz Muller, Metzinger-Neuhausen, and Ullrich Stark, Stuttgart, all of Fed. Rep. of Germany, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 7, 1988, Ser. No. 164,706

Int. Cl.<sup>4</sup> D01H 15/02; D02G 3/38

U.S. Cl. 57—263

6 Claims



1. A method of piecing together a continuous filament yarn and a rotor spun staple yarn with the broken end of a two-ply combination yarn formed by ply-twisting a continuous filament yarn with a yarn of staple fiber on an open-end spinning machine which includes

a spinning rotor having a hollow spindle and a consolidating groove, a stationary doffing tube having a navel, a pair of cooperating continuous filament yarn feed rolls, a sliver delivery roll, an opening roller, a pair of cooperating take-up rolls, and a winding-up mechanism comprising the steps of: disengaging said rotor, feed rolls, delivery roll, take-up rolls and winding mechanism; removing staple fiber from the rotor; clamping and cutting said continuous filament yarn and preparing the end of said continuous filament yarn by placing said cut end approximately flush with the bottom of the rotor spindle for restarting; cutting the combination yarn through both components and preparing the end of said yarn by removing a portion of the staple component to expose the continuous filament yarn component; returning the rotor to operating speed; engaging the sliver delivery roll to feed a predetermined amount of staple fiber into the rotor; moving the prepared end of the combination yarn into the rotor consolidating groove; moving the end of said continuous filament yarn under controlled conditions into contact with the rotating combination yarn end within the navel without any contact of said continuous filament yarn with the rotor consolidating groove; engaging the take-up rolls, the feed rolls and the winding mechanism in a predetermined timed sequence to begin take-up and wind-up of the combination yarn.

**4,788,818**  
**PROCESS AND APPARATUS FOR REDUCING THE BREAKDOWN QUOTA OR RATE OF STOPPING DEVICES IN A SPINNING OR TWISTING MACHINE**

Werner Meissner, Hattenhofen, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Ebersbach/Fils, Fed. Rep. of Germany

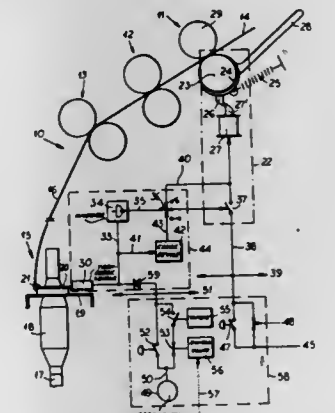
Filed Jul. 2, 1987, Ser. No. 69,455

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1986, 3622407

Int. Cl.<sup>4</sup> D01H 13/16, 13/32

U.S. Cl. 57—264

21 Claims



1. In a process for reducing the breakdown rate of a plurality of stopping devices which are located at a plurality of work stations of a set of drafting rolls or supply rolls of a spinning or twisting machine and which have a plurality of yarn-break sensing devices which can activate said stopping devices, the improvement wherein a simulated signal "yarn running" and/or "yarn break present" is conducted to said yarn-break sensing devices and/or said stopping devices for testing of operation to ascertain at which of said work stations said yarn-break sensing device or said stopping device is not functioning or functioning incorrectly and to overcome any malfunction in said yarn-break sensing device or said stopping device which is not functioning and/or functioning incorrectly.

**4,788,819**  
**APPARATUS FOR REMOVING SOOT FROM THE EXHAUST GASES OF AN INTERNAL COMBUSTION ENGINE, IN PARTICULAR A DIESEL ENGINE**

Dietmar Henkel, Neumarkt, Fed. Rep. of Germany, assignor to MAN Nutzfahrzeuge GmbH, Munich, Fed. Rep. of Germany

Filed Oct. 14, 1987, Ser. No. 108,734

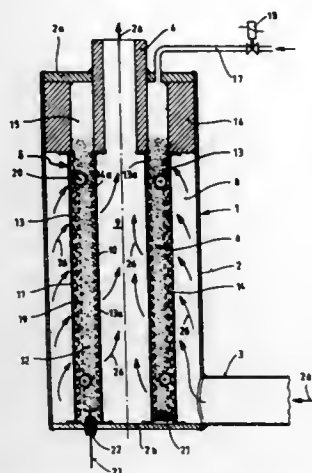
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1986, 3635038

Int. Cl.<sup>4</sup> F01N 3/02

1. In an apparatus for removing soot from the exhaust gases of an internal combustion engine, especially a Diesel engine, said apparatus including a metallic housing having inlet and outlet means for the exhaust gas stream, and a filter insert that is disposed in said housing and contains a non-metallic, high-temperature-resistant filter means in the form of a granulate fill that is disposed in a fixing element, with said filter insert, in said filter housing, separating an untreated-gas chamber, which communicates with said inlet means, from a purified-gas chamber, which communicates with said outlet means, and with an electrical current source being used to burn off, in a controlled manner, the soot deposited on said filter means, the improvement wherein: said fixing element of said filter insert comprises two vertically and coaxially disposed perforated tube members that form between them a first annular chamber for accommo-



dating said granulate fill and receiving untreated gas from said untreated-gas chamber, said first annular chamber also communicating with said purified-gas chamber, with said perforated tube members having surfaces that face said first annular chamber, said surfaces being provided with a respective fine-mesh screen, and inwardly thereof and adjacent thereto, a respective coarse-mesh screen,



said exhaust gas being adapted to flow through said filter insert transverse to the gravitational effect of the particles of said granulate fill; an upper region of said filter housing is provided with a second annular chamber that communicates with said first annular chamber, with means being provided for supplying compressed air to said second annular chamber for being able to compact said granulate fill of said first annular chamber.

4,788,820

## HYDRAULIC CIRCUIT FOR LARGE CRANE

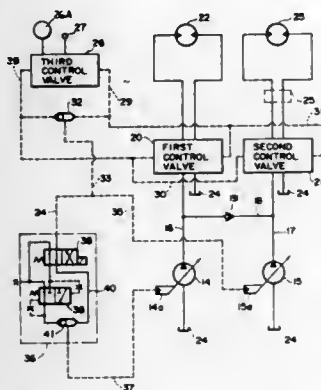
Hiroaki Sakai, Hyogo, and Sachio Hidaka, Kakogawa, both of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed May 15, 1987, Ser. No. 50,025

Int. Cl.<sup>4</sup> F16D 31/02

U.S. Cl. 60—444

2 Claims



1. A hydraulic circuit for a large crane having a counterweight carriage including driving wheels and detachably connectable to the rear end of a swivel unit of the crane thereof, comprising:

- a first variable displacement pump;
- a second variable displacement pump;
- a first hydraulic motor for driving said swivel unit of the crane for swivel motion;
- a first control valve for controlling the flow of working fluid

from said first variable displacement pump to said first hydraulic motor;

- a second control valve for controlling operation of said first control valve and for applying a signal pressure;
- a first flow control circuit for controlling a discharge rate of said first variable displacement pump according to said signal pressure applied thereto from said second control valve;
- a second hydraulic motor for driving said driving wheels of the counterweight carriage;
- a second flow control circuit for controlling a discharge rate of said second variable displacement pump according to said signal pressure from said second control valve;
- a hydraulic circuit for joining the flow of the working fluid discharged from said second variable displacement pump with the flow of working fluid discharged from said first variable displacement pump when the counterweight carriage is disconnected from the swivel unit;
- a controller for controlling the discharge rate of said first variable displacement pump; and
- changeover means provided in said first flow control circuit for selectively changing the state of said first flow control circuit between a state for applying the signal pressure provided by said second control valve to said controller for controlling the discharge rate of said first variable displacement pump and a state for applying a second signal pressure produced by reducing the former signal pressure at a reduction ratio to the said controller for controlling the discharge rate of said first variable displacement pump.

4,788,821

## HYDRAULIC SHIFT FOR MOTOR VEHICLE TRANSMISSION

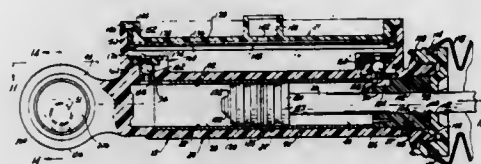
David K. Mienko, Clawson; John G. Vander Poorte, St. Clair Shores, and Keith V. Leigh-Monstevens, Troy, all of Mich., assignors to Automotive Products, plc, Warwickshire, England

Continuation of Ser. No. 755,417, Jul. 16, 1985, abandoned, which is a continuation-in-part of Ser. No. 555,666, Nov. 28, 1983. This application Sep. 24, 1987, Ser. No. 99,645

Int. Cl.<sup>4</sup> B60T 11/26

U.S. Cl. 60—585

21 Claims



1. A hydraulic apparatus comprising a master cylinder including an elongated, axially extending tubular housing, a piston reciprocable axially in said housing and separating said housing into a first chamber on one side of said piston and a second chamber on the other side of said piston, an input rod connected at an end to said piston for reciprocating said piston, a remotely located slave cylinder including means partitioning said slave cylinder into a first chamber on one side thereof and a second chamber on the other side thereof, a first conduit placing said first chamber of said master cylinder in fluid communication with one of said chambers of said slave cylinder, a second conduit placing said second chamber of said master cylinder in fluid communication with the other of said chambers of said slave cylinder, and hydraulic fluid filling said master cylinder first and second chambers, said slave cylinder first and second chambers and said first and second conduits, whereby linear axial displacement of said master cylinder input member causes a corresponding linear axial displacement of said slave cylinder partition means, a reservoir of fluid attached to said master cylinder, a first passageway placing said

reservoir in fluid communication by gravity with said master cylinder first chamber, a second passageway placing said reservoir in fluid communication by gravity with said master cylinder second chamber, and valve means in each of said passageways allowing free unrestricted flow of fluid from said reservoir to said chambers and preventing reverse flow of fluid from one of said chambers to said reservoir upon motion of said master cylinder piston causing a sudden increase of fluid pressure in said one of said chambers, said valve means allowing flow of fluid through each of said passageways from each of said chambers upon increase of volume of fluid in each of said chambers, said passageways being spaced apart axially by a distance greatly exceeding the extent of axial sealing engagement of said master cylinder piston with said master cylinder housing so that said master cylinder piston may reciprocate in said master cylinder housing over a wide range of axial movement without blocking either of said passageways.

4,788,822

## APPARATUS FOR CONTROLLING BOOST PRESSURE IN TURBOCHARGED INTERNAL COMBUSTION ENGINES

Toshiyuki Mieno; Toyohi Nakajima; Akira Tanaka, and Akira Nagao, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

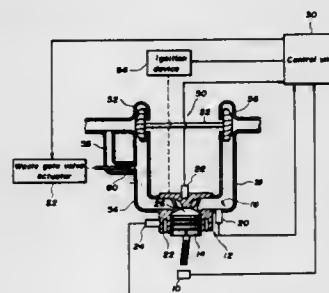
Filed Jul. 17, 1987, Ser. No. 74,604

Claims priority, application Japan, Jul. 22, 1986, 61-170932

Int. Cl.<sup>4</sup> F02B 37/12; F02P 5/15

U.S. Cl. 60—602

2 Claims



1. An apparatus for controlling ignition timing and boost pressure in an internal combustion engine equipped with a turbocharger for applying a boost pressure into a combustion chamber of the engine, comprising:

- a first means for detecting an angular position of an engine crankshaft to generate an output signal indicative of engine speed;
- a second means for detecting a state of engine load to generate an output signal in response thereto;
- a third means for detecting a knock condition of the engine to generate an output signal in response thereto;
- ignition control means for receiving the output signals of the first, second and third means to determine a basic ignition timing of the engine based upon the detected engine speed and when the knock condition is detected, adjusting the basic ignition timing in a retard direction;
- ignition means for receiving an output signal of the ignition control means to ignite an air/fuel mixture in the combustion chamber of the engine;
- boost pressure reduction control means for receiving the output signal of the ignition control means to compare the determined ignition timing with a reference ignition timing and when the determined ignition timing is found to exceed the reference ignition timing in the retard direction, generating an output signal to reduce the boost pressure applied to the engine through the turbocharger, said boost pressure reduction control means further receiving the output signals of the first and second means to deter-

mine said reference ignition timing based upon the detected engine speed and engine load; and actuator means for receiving the output signal of the boost pressure reduction control means to open a waste gate valve provided at an exhaust passage of the engine so as to reduce the boost pressure of the turbocharger.

4,788,823

## VALVE MECHANISM FOR CONTROLLING A RECIPROCATING ENGINE POWER STROKE

Barry W. Johnston, 1622 Q St., Washington, D.C. 20009

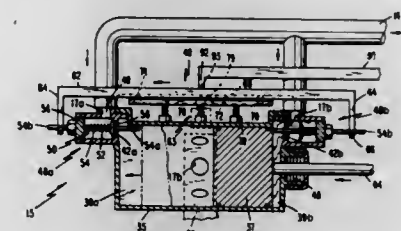
Continuation of Ser. No. 790,644, Oct. 23, 1985, Pat. No.

4,698,973. This application Sep. 22, 1987, Ser. No. 100,551

Int. Cl.<sup>4</sup> F01L 13/00

U.S. Cl. 60—656

8 Claims



1. A valve mechanism, suitable for controlling the flow of a working fluid supplied from a fluid source under a variable source pressure to operate an engine with a piston reciprocating in a cylinder, comprising:

- means for connecting said valve mechanism to said fluid source; and
- inlet valve means operable in a first mode for admitting said working fluid into said cylinder at a first essentially constant inlet pressure during substantially an entire working stroke of said piston when said variable source pressure is lower than a predetermined reference pressure and operable in a second mode for admitting said working fluid at a second essentially constant inlet pressure only during a starting portion of a working stroke so that the admitted fluid thereafter expands during the balance of the corresponding working stroke when said variable source pressure is higher than said predetermined reference pressure.

4,788,824

## ELECTRICAL POWER PLANT AND METHOD OF PRODUCING ELECTRICITY

Charles A. Spurr, 3000 Eighth St., Bay City, Tex. 77414, and

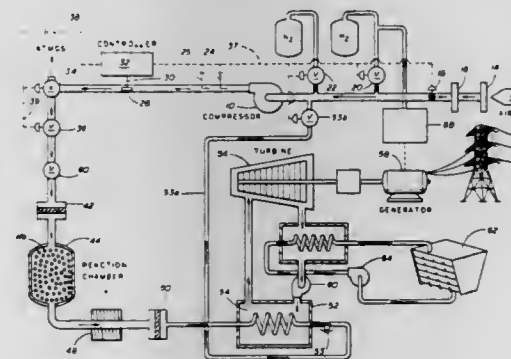
James R. Spurr, 8919 Concho St., Houston, Tex. 77036

Filed Sep. 2, 1986, Ser. No. 902,783

Int. Cl.<sup>4</sup> F01K 25/08, 25/10

U.S. Cl. 60—671

13 Claims



1. An electrical power plant comprising:

a reaction chamber;  
 a reactant in said reaction chamber;  
 a means for producing a pre-chamber air stream capable of undergoing an exothermic chemical reaction with said reactant to produce a post-chamber air stream at an elevated temperature;  
 a means for producing said pre-chamber air stream having a H<sub>2</sub>/air ratio of between zero percent to four percent;  
 a means to monitor said pre-chamber air stream to maintain a H<sub>2</sub>/air ratio of between zero percent and four percent;  
 a means for passing said pre-chamber air stream through said reaction chamber whereby said pre-chamber air stream and said reactant undergo an exothermic chemical reaction;  
 first heat exchange means;  
 means for passing said post-chamber air stream through said first heat exchange means;  
 a first working fluid in heat transfer relationship with said post-chamber air stream by means of said first heat exchange means;  
 a prime mover;  
 a generator means driven by said prime mover;  
 means for passing said working fluid from said first heat exchange means through said prime mover;  
 a generator means driven by said prime mover;  
 a second heat exchange means;  
 means for passing said first working fluid from said prime mover to said second heat exchange means;  
 a second working fluid in heat exchange relationship by means of said second heat exchange means with said first working fluid after said first working fluid passes through the prime mover;  
 means for returning said first working fluid back to said first heat exchange means from said second heat exchange means;  
 means for cooling said second working fluid.

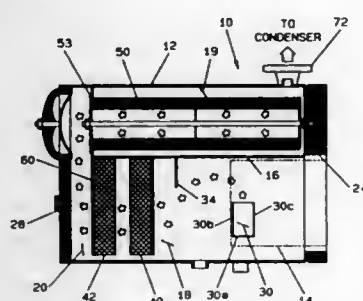
4,788,825

## OIL SEPARATOR

Gary A. Calupca; Lewis L. Crone; William Maxey, III, all of York, and Eckahard K. Rubenic, Mechanicsburg, all of Pa., assignors to FES, Inc., York, Pa.  
 Filed Mar. 2, 1988, Ser. No. 162,837  
 Int. Cl.<sup>4</sup> F25B 43/02

U.S. Cl. 62-84

9 Claims



1. An oil separator for a horizontal screw compressor:  
 a generally cylindrical member having a closed first end and having a second end having an opening therein for receiving the rotor assembly of a screw compressor;  
 baffle seal means spaced from said closed first end and defining therewith a first chamber;  
 generally horizontal divider plate means extending between said baffle seal means and said second end so as to divide said generally cylindrical member to thereby define second and third chambers with said second chamber being beneath and larger than said third chamber;  
 said opening in said second end communicates with said

second chamber whereby said second chamber is adapted to receive the rotor assembly;  
 discharge deflector means in said second chamber for directing compressor discharge upwardly so as to impinge upon said divider plate means and deposit entrained oil thereon;  
 demister means in said second chamber and coacting with said baffle seal means whereby compressor discharge must pass through said demister means to reach said first chamber;  
 coalescer means located in said third chamber and in fluid communication with said first chamber whereby compressor discharge passing from said demister means is diverted approximately 180° in said first chamber and then the entire compressor discharge enters said coalescer means and passes therethrough into said third chamber in a nearly oil-free state.

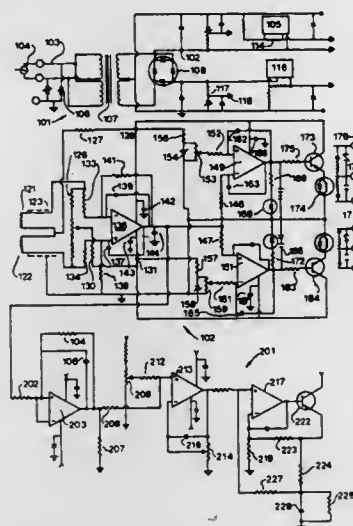
4,788,826

## METHOD AND APPARATUS FOR PREVENTING FLOODBACK IN COOLING APPARATUS

Scott Higdon, 5409 Morningside Dr., Yakima, Wash. 98901  
 Continuation-in-part of Ser. No. 927,323, Nov. 4, 1986, abandoned. This application Apr. 3, 1987, Ser. No. 34,427  
 Int. Cl.<sup>4</sup> F25B 41/00

U.S. Cl. 62-126

1 Claim



1. An apparatus for detecting differential temperatures in a refrigeration system which includes at least one evaporator comprising:

a power supply connectable to a source of electric current for providing appropriate voltages for all components; and,  
 a first sensor connected to one side of the evaporator of the said refrigeration system; and,  
 a second sensor connected to the other side of the evaporator of the said refrigeration system; and,  
 a bridge circuit connected to said first sensor and said second sensor and said power supply for producing an electrical current when there is a temperature differential between said first sensor and said second sensor; and,  
 a differential amplifier connected to said bridge circuit and said power supply for increasing the current produced by said bridge circuit; and,  
 further amplification means connected to said differential amplifier for further increasing the strength of said current produced by said differential amplifier; and,  
 an output connected to said further amplification means including a light emitting device and a relay; and,  
 a transistor connected to said power supply said further

amplification means and said relay for activating said relay; and,  
 additional further amplification means connected to said differential amplifier and said power supply for further increasing the magnitude of the output of said differential amplifier; and,  
 zeroing means connected to said further amplification means for creating a baseline state; and,  
 span adjustment means connected to said further amplification means for adjusting the span of the output of said further amplification means; and,  
 signal forming means connected to said further amplification means to a condition readable by a microprocessor and computer.

4,788,827

## REFRIGERATOR WITH A SYSTEM FOR RESTORING A SET TEMPERATURE AFTER POWER CUTOFF

Nobuhisa Otani, Ibaraki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

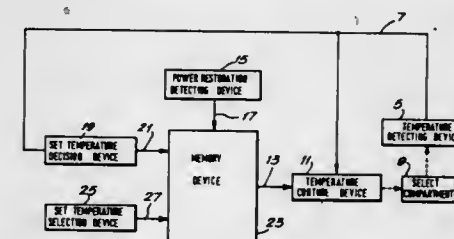
Filed Feb. 23, 1988, Ser. No. 158,719

Claims priority, application Japan, Feb. 27, 1987, 62-46420

Int. Cl.<sup>4</sup> F25B 49/00; G05B 9/02

U.S. Cl. 62-126

12 Claims



1. A refrigerator including a compartment for which plural set temperatures can be selected comprising:

temperature detecting means for detecting an interior temperature of the compartment and generating a temperature detection signal corresponding to the detected interior temperature;  
 power restoration detecting means for detecting power restoration after a power cutoff has occurred and generating a power restoration signal;  
 set temperature decision means for deciding, when the power restoration signal is generated upon restoration of power after a cutoff, the set temperature for the compartment based upon the temperature detection signal received from the temperature detecting means and generating a temperature decision signal indicating the set temperature decided upon;  
 memory means for storing a temperature set value corresponding to the temperature decision signal and generating a setting signal corresponding to the temperature set value; and  
 temperature control means for controlling the interior temperature of the compartment in accordance with the setting signal and the temperature detection signal.

4,788,828

## CONTROL DEVICE FOR USE IN A REFRIGERATION CIRCUIT

Motoharu Sato, Honjo, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Jan. 22, 1988, Ser. No. 147,304

Claims priority, application Japan, Feb. 16, 1987, 62-9889[U]

Int. Cl.<sup>4</sup> F25B 41/04

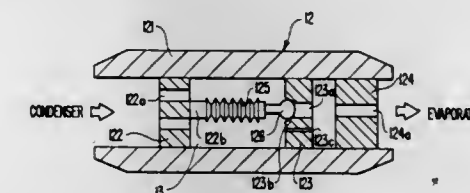
U.S. Cl. 62-214

4 Claims

1. A refrigeration circuit comprising a compressor, a condenser, a control device, an evaporator, and an accumulator

serially arranged to form a closed refrigerant circulation path, said control device comprising:

a tubular casing;  
 a first, second and third wall disposed on an interior surface of said tubular casing, said first wall having a plurality of holes therethrough, said second wall spaced from said first wall and having a longitudinal bore and a parallel bypass



hole therethrough, and said third wall spaced from said second wall and having an orifice therethrough;  
 and a bellows connected to said first wall and disposed in the region between said first wall and said second wall and having an operating valve at its opposite end for controlling the flow of refrigerant through said longitudinal bore in said second wall in response to movement of said bellows.

4,788,829

## LOW-TEMPERATURE REFRIGERATION SYSTEM

Kazuo Takemasa, Ota; Fukuji Yoshida, Nitta, and Kenji Iwasa, Chiyoda, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan

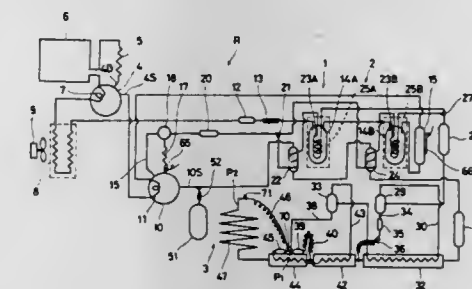
Filed Sep. 24, 1986, Ser. No. 910,881

Claims priority, application Japan, Sep. 25, 1985, 60-211872; Apr. 21, 1986, 61-91598

Int. Cl.<sup>4</sup> F25B 7/00

U.S. Cl. 62-335

11 Claims



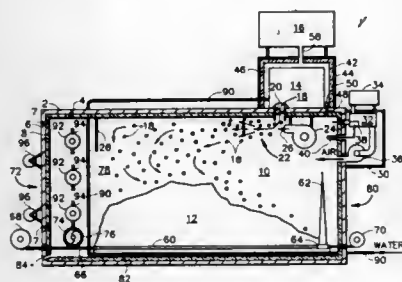
1. A refrigeration system comprising:

first and second refrigerant circuits each having a compressor, a condenser and an evaporator, the outlet of the compressor being connected to the inlet of the condenser by a line, the outlet of the condenser being connected to the inlet of the evaporator by another line, the outlet of the evaporator being connected to the inlet of the compressor by another line, each of the refrigerant circuits being charged with an organic refrigerant,  
 the evaporator of the first refrigerant circuit being divided into a plurality of evaporator portions connected together in series with respect to the flow of the refrigerant, the refrigerant of the first refrigerant circuit flowing successively into the evaporator portions,  
 the condenser of the second refrigerant circuit being divided into condenser portions equal in number to the number of the evaporator portions of the first refrigerant circuit, the condenser portions being connected together in parallel with respect to the flow of the refrigerant, the refrigerant



of the second refrigerant circuit being divided into volumes equal in number to the condenser portions to flow into each of them, the condenser portions of the second refrigerant circuit being paired with the evaporator portions of the first refrigerant circuit to provide heat exchangers, the refrigerant of the second refrigerant circuit being a mixture of refrigerants different in kind and in boiling point, whereby the evaporator of the second refrigerant circuit is cooled to cool the storage chamber to a cryogenic temperature, mixture of refrigerants different in kind and in boiling point, whereby the evaporator of the second refrigerant circuit is cooled to a cryogenic temperature.

**4,788,830**  
**APPARATUS FOR BULK ICE MAKING AND DISPENSING**  
R. Alan Schreiner, and Michael S. Schreiner, both of 43895 DeLuz Rd., Rancho California, Calif. 92390  
Filed Mar. 13, 1987, Ser. No. 25,665  
Int. Cl.<sup>4</sup> F25C 5/18  
U.S. Cl. 62—344 41 Claims

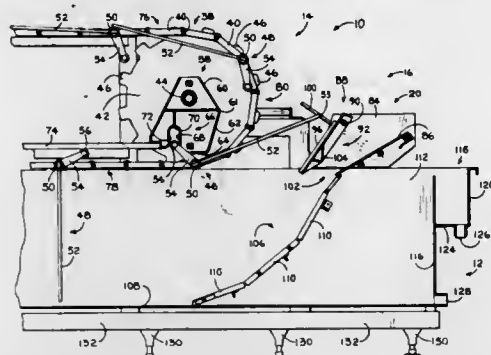


1. Apparatus for bulk ice making and dispensing, which comprises:
  - a. a container enclosing a thermally insulated chamber having sufficient volume to store a commercial quantity of bulk ice;
  - b. ice making means above and adjacent to said container, with an ice passage from said ice making means discharging into the top of said chamber;
  - c. blower means disposed beneath the discharge end of said passage adjacent the ceiling of said chamber and oriented to blow discharged ice generally horizontally within said chamber, said blower means producing sufficient air flow to cause said blown ice to be distributed and settled substantially throughout said chamber;
  - d. conveying means to move at least a portion of said settled ice to means to discharge said ice to the exterior of said container; and
  - e. said exterior discharge means within said chamber and adjacent the floor thereof and communicating with the exterior of said container.

**4,788,831**  
**METHOD AND APPARATUS FOR LOADING POULTRY CARCASSES INTO DRAG TYPE POSITIVE CONTROL CHILLER**  
David R. Crawford, Blue Springs, and Frank J. Criscione, II, Kansas City, both of Mo., assignors to Simon-Johnson, Inc., Kansas City, Mo.  
Filed Sep. 8, 1987, Ser. No. 94,131  
Int. Cl.<sup>4</sup> F25D 17/02

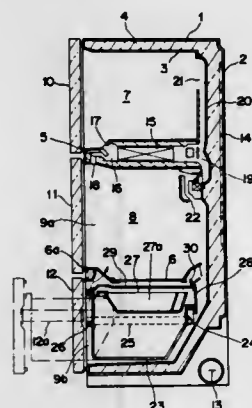
- U.S. Cl. 62—374 13 Claims
1. In apparatus for use in chilling poultry carcasses, the improvement comprising:
    - a chilling tank adapted to contain a body of chilling liquid;
    - a conveyor disposed for engaging carcasses delivered to the

tank and for advancing the same through the body of liquid to lower the muscle temperature of the carcasses, said conveyor including a series of spaced rakes movable in succession down into the tank from above the latter at a loading end of the tank prior to sweeping through the body of liquid toward a discharge end of the tank; and



a loader at said loading end of the tank generally above the latter and having an inlet adjacent the conveyor for admitting carcasses into the tank in such a manner that the carcasses are intercepted by the moving rakes and advanced toward the opposite end of the tank, said loader including a gate operable to temporarily close said inlet as each rake moves into the vicinity of the inlet and to reopen the inlet as the rake moves beyond the inlet.

**4,788,832**  
**REFRIGERATOR**  
Takashi Aoki, Kusatsu, and Tatsuo Miyachi, Shiga, both of Japan, assignors to Matsushita Refrigeration Company, Osaka, Japan  
Filed Jun. 1, 1987, Ser. No. 59,853  
Claims priority, application Japan, Jun. 2, 1986, 61-127535  
Int. Cl.<sup>4</sup> F25D 25/02  
U.S. Cl. 62—382 15 Claims



1. A refrigerator comprising:
  - a refrigerating chamber;
  - a partition plate in said refrigerating chamber for dividing said refrigerating chamber into an upper cooling chamber and a lower cooling chamber;
  - a vegetable storing container including a container main body having an upper opening at the upper surface thereof, a lid member covering said upper opening of said container main body, said lid member being a synthetic resin flat plate having a plurality of through-holes, a gas-permeable humidity-permeable film attached to said flat

plate for covering said through-holes, and said vegetable storing container being accommodated within said lower cooling chamber; and  
a cold air convection path defined between said lid member and said partition plate for fluidly communicating said container main body of said vegetable storing container with said upper cooling chamber.

**4,788,833**  
**DRIER FOR AIR CONDITIONING SYSTEM**  
Luther R. Steele, Fort Worth, Tex., assignor to Frigette Corporation, Fort Worth, Tex.  
Filed Feb. 18, 1988, Ser. No. 157,269  
Int. Cl.<sup>4</sup> F25B 43/00  
U.S. Cl. 62—474 6 Claims

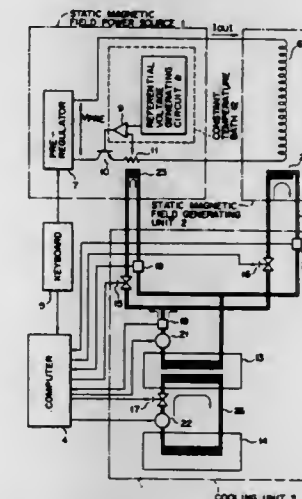


1. A drier for an air conditioning system, comprising a cylinder formed by a cylindrical side wall, a bottom wall and a top wall, inlet and outlet fittings connected to said walls, said walls forming an interior refrigerant flow passage connected to said inlet and outlet fittings, said side wall including a top part and a bottom part, a plurality of first ribs formed on and extending radially inwardly from said side wall of said top part, a plurality of second ribs extending radially inwardly from said side wall of said bottom part, said top and bottom parts having adjoining annular edge portions and a joint connecting said edge portions to form an essentially single piece side wall, said first ribs being spaced from said second ribs and the space therebetween being adjacent said joint, and a desiccant in said space and supported by said ribs.

**4,788,834**  
**METHOD AND SYSTEM FOR CONTROLLING MAGNETIC FIELD GENERATING UNIT IN MAGNETIC RESONANCE IMAGING APPARATUS**  
Yoshiyuki Usui, Kuroiso, and Koji Kitamura, Tochigi, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Nov. 10, 1987, Ser. No. 119,066  
Claims priority, application Japan, Nov. 11, 1986, 61-266561; May 7, 1987, 62-111839  
Int. Cl.<sup>4</sup> F25B 19/00

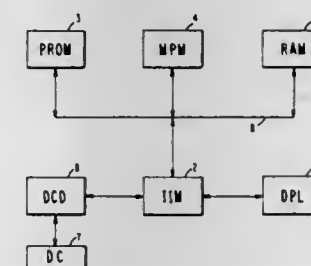
- U.S. Cl. 62—514 R 12 Claims
1. A method for controlling a magnetic field generating unit in a magnetic resonance imaging apparatus comprising the steps of:
    - inputting selectively a signal to specify one of a scanning mode and an idling mode in the magnetic resonance imaging apparatus;
    - supplying a power to a normal conductive coil for generating a static magnetic field in the scanning mode;
    - detecting temperatures of a shunt resistor and the normal conductive coil that are heated by the supplied power;
    - controlling the temperatures of the normal conductive coil and the shunt resistor by operating a flow rate of a cooling medium in accordance with the detected temperatures;
    - reducing the power supplied to the normal conductive coil in the idling mode;

detecting temperatures of the normal conductive coil and the shunt resistor due to reduction in the power; and



controlling the temperatures of the normal conductive coil and the shunt resistor by operating the flow rate of the cooling medium in accordance with the detected temperatures.

**4,788,835**  
**FLATBED KNITTING MACHINE WITH ELECTRONIC CONTROL**  
Albin Weingartner, and David Retallick, both of Munich, Fed. Rep. of Germany, assignors to Universal Maschinenfabrik, Westhausen, Fed. Rep. of Germany and Dr. Rudolf Schieber GmbH & Co., KG, Westhausen, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 190,771, Sep. 25, 1980. This application Feb. 4, 1981, Ser. No. 231,560  
Claims priority, application Fed. Rep. of Germany, Oct. 1, 1979, 2939819  
Int. Cl.<sup>4</sup> D04B 7/00  
U.S. Cl. 66—75.2 10 Claims



1. In an electronic control system for a flatbed knitting machine with electronic control, and control system being of the type having memory means for storing a first division of data containing motif pattern draft data, a second division of data containing needle set-up data, a third division of data containing knitting plan data, a fourth division of data containing function number schedule data and a fifth division of data containing plan run data, said knitting machine further comprising data entry means for entering data into said memory means, said knitting machine being of the type wherein a pattern is knitted in accordance with selected data retrieved from said memory means according to a knitting program, said knitted pattern employing at least one of a predetermined number of special knitting techniques corresponding to data

sub-groups from said second division, the improvement comprising:

said memory means comprising a programmable fixed word memory, e.g. a programmable read only memory (PROM), for storing said data sub-groups from said second division together with associated special function numbers for call-up, whereby said at least one special knitting technique can be employed by merely designating its corresponding a special function number;

said memory means further comprising a freely accessible memory, e.g. a random access memory (RAM), for storing said second and fifth divisions of data as received from said data entry means, said freely accessible memory also storing an altered version of at least a portion of said second and fifth divisions of data, whereby a pattern portion corresponding to an altered version of at least a portion of said second and fifth data divisions can be knitted by merely retrieving said altered data version from said freely accessible memory; and

said electronic control system further including a plurality of switches for selectively inhibiting portions of the pattern to be knitted by said program.

4,788,836

### CONSTRAINING TAMPER PROOF PADLOCK HASP APPARATUS

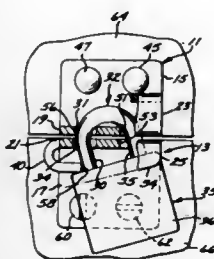
Lloyd R. Poe, 7341 S. Marina Pacifica, Long Beach, Calif. 90803

Continuation-in-part of Ser. No. 67,538, Jun. 29, 1987, Pat. No. 4,745,783. This application Feb. 16, 1988, Ser. No. 155,967

Int. Cl.<sup>4</sup> E05B 67/38

U.S. Cl. 70—2

13 Claims



1. Padlock hasp apparatus for receiving a padlock to lock first and second parts together and including a padlock body formed with a top surface and mounting an inverted U-shaped padlock shackle of a predetermined cross sectional diameter and formed on its closed end with a loop of a selected inside radius leading to respective oppositely disposed, generally straight, pivot and capture legs which cooperate to, when such shackle is in its locked position, from a predetermined configuration, said apparatus comprising:

first and second hasps for mounting on the respective first and second parts and formed with respective first and second mounting flanges and first and second hasp plates arranged to, when mounted on such parts, project coextensive to one another, said first and second hasp plates being formed with aligned first and second capture leg-receiving bores, respectively, each bore being larger than such predetermined cross sectional diameter, said first and second hasp plates being further formed with respective first and second pivot leg-receiving slots for receiving such pivot leg when said capture leg is received in said capture leg-receiving bores such that said mounting flanges of said first and second hasps may be mounted on said respective first and second parts with the opposed surfaces of said plates spaced a specified distance apart for receipt of such padlock capture leg and pivot legs in such bores and slots, respectively, to engage the inside of such loop on the top surface of such first hasp plate;

one of said hasps including a spacer disposed adjacent said

capture leg receiving bore and formed with an abutment surface spaced in one direction from said second hasp plate for engaging the body of said padlock to, when said pivot and capture legs are received in said respective bores and slots and said shackle is in its locked position, engage one side of said padlock body to maintain said body tilted sufficiently relative to said hasp plate, and spaced a sufficient distance from said first hasp plate to substantially block travel of said body in a direction toward said first hasp plate to thereby substantially prevent movement of said first hasp plate away from said second hasp plate; and

guard plate means mounted on said first or second hasps and projecting in a direction opposite said one direction, at least, to the extended plane of such top surface of such padlock body, when said shackle is in such locked position.

4,788,837

### HASP-TYPE LATCH WITH COMBINATION LOCK

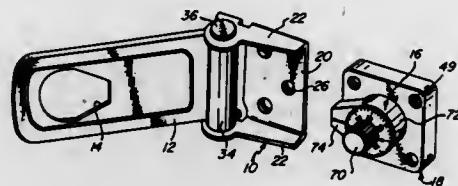
Walter J. MacFarlane, Kensington, Conn., assignor to The Stanley Works, New Britain, Conn.

Continuation-in-part of Ser. No. 16,273, Feb. 19, 1987. This application Mar. 4, 1988, Ser. No. 164,439

Int. Cl.<sup>4</sup> E05B 65/48

U.S. Cl. 70—3

6 Claims



1. A hasp-type latch comprising:

- (a) a hasp member having: a pad and an elongated leaf having one end portion pivotally mounted on said pad and having an aperture therethrough adjacent its other end;
- (b) a staple member having:
  - (i) a base with a top wall and a depending sidewall defining a cavity thereunder, said top wall having an opening therethrough; and
  - (ii) a post member with a pedestal portion extending through said opening into said cavity and a post portion extending above said top wall and through said aperture in said leaf in said closed position thereof, said pedestal portion having securing means thereon in said cavity extending beyond said opening to prevent it from being pulled through said opening in said top wall, said post member being rotatable on said base, said aperture in said leaf being elongated, said post portion being elongated and dimensioned and configured to extend through said aperture in said leaf in a first position wherein its elongate axis extends parallel to that of said aperture in said leaf and to overlie a portion of said leaf about said aperture when rotated into a second position;
  - (iii) releasable latch means on said post portion engageable with said base to prevent rotation of said post portion from its second position to said first position; and
  - (iv) combination lock means on said post member releasably engageable with said latch means to preclude its release from engagement with said base in said second position.

4,788,838

### GUARDIAN LOCKBOX FOR PISTOLS

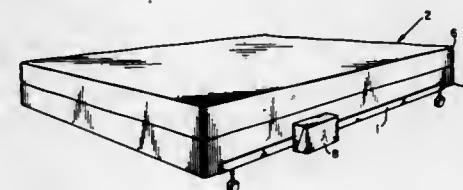
Daniel M. Cialo, 10507 Tennessee Ave., Los Angeles, Calif. 90064

Filed Feb. 26, 1987, Ser. No. 19,518

Int. Cl.<sup>4</sup> E05B 65/52

U.S. Cl. 70—63

11 Claims



1. A handgun lockbox to prohibit unauthorized access to a handgun contained therein, the lockbox comprising:

- first hinge means;
- complementary housings having complementary sides joined together by said first hinge means, wherein said housing form a chamber therebetween sufficient to hold the handgun within when said housings are in a closed position to prevent the handgun's removal;
- first latch means for locking adjacent sides of said complementary housings to lock said complementary housings together preventing access to said chamber therebetween, wherein said first latch means is adapted to prevent unauthorized access to said chamber;
- second latch means for releasably securing said housing to a stationary object adapted to prevent unauthorized removal of said housings from said object, and wherein said second latch means retains one of said complementary housings in an upright position to readily expose the handgun within said housings when said housings are in an open position.

4,788,839

### TAMPER RESISTANT LOCK BOLT ASSEMBLY

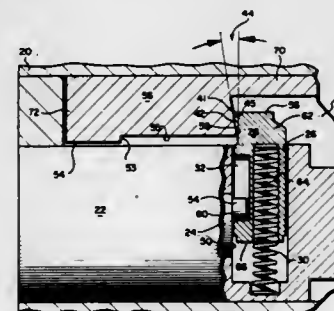
Eugene L. Shuler, Mount Prospect, Ill., assignor to Chapman Industries Corp., Elk Grove Village, Ill.

Filed Feb. 16, 1983, Ser. No. 466,975

Int. Cl.<sup>4</sup> E05B 55/00

U.S. Cl. 70—143

2 Claims



- 1. A reciprocating cylinder lock mechanism comprising: a tubular sleeve having inner and outer ends and a cavity therein extending transverse to the axis of said sleeve; means mounting said sleeve for axial movement between a retracted, locked position and an extended, unlocked position; means normally urging said sleeve toward said extended position;
- a bolt;
- means mounting said bolt for movement through said cavity

along a linear path transverse to the axis of said sleeve, between a retracted, unlocked position and an extended, locked position;

said bolt having a surface inclined toward said outer end of said sleeve in non-parallel relation to the linear path of movement of said bolt;

means normally urging said bolt toward said extended, locked position;

a bolt keeper comprising means for engaging said bolt when the bolt is in its extended, locked position;

a rotatable locking shaft within said sleeve;

means responsive to the rotation of said shaft for retracting said bolt from its extended, locked position; and

a surface on said keeper inclined parallel to and engageable with said surface on said bolt for providing underlapping support to said bolt to impart to said bolt resistance to dislodgement from its extended, locked position by physical tampering with said lock mechanism.

4,788,840

### BUNG PLUG LOCKING DEVICE

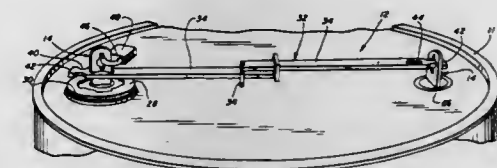
Donald J. Wilson, Jr., 2206 Wheeler St., Woodridge, Ill. 60517

Filed Sep. 24, 1987, Ser. No. 100,424

Int. Cl.<sup>4</sup> B65D 55/14

U.S. Cl. 70—164

14 Claims



1. A locking device for a container having a pair of threaded openings comprising:

- a pair of closure means, each being threaded to be received in one of said threaded openings;
- each closure means having an upstanding lug with an opening therethrough;
- a pair of interfitting bar members, each having an end and a portion of a different width closely adjacent to said end and an opening therethrough adjacent said end, the different width portion of one member being received in the opening of one of said lugs, and the opening of said other member fitting over the other of said lugs; and
- locking means engaging the opening of said other of said lugs.

4,788,841

### METHOD AND APPARATUS FOR MAKING STEP WALL TUBING

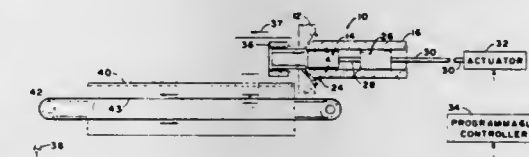
Jeffrey D. Calhoun, and David A. Davis, both of Lafayette, Ind., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Nov. 18, 1987, Ser. No. 122,071

Int. Cl.<sup>4</sup> B21C 1/24

U.S. Cl. 72—22

2 Claims



- 1. Apparatus for providing the wall of an elongated tube with a plurality of precisely located thick and thin wall portions lengthwise of the tube comprising:



a drawing die having a relatively wide mouth for receiving an end of a tube,  
 a drawing bulb for insertion into the tube, said bulb having a constant cross-section and a relatively square nose for entering into the die mouth while being located within the tube,  
 means for inserting the nose of the bulb with required precision and quickness into the mouth of the die to provide each thin wall portion and for withdrawing the nose from the die mouth to provide each thick wall portion while drawing the tube,  
 a controller for controlling the means for inserting and withdrawing the bulb,  
 means for pulling the tube through the die, and  
 a rotary encoder for measuring distance increments of tube travel as the tube is pulled through the die, and for outputting signals that are representative of such increments said rotary encoder being connected to the controller such that the signals are directed to the controller, the controller, in response to the signals, being effective to precisely control the occurrence of bulb insertion and withdrawal.

4,788,842

## OPEN-DIE FORGING METHOD

Reimer Kopp, Klaus-Rainer Baldner, and Paul-Josef Nieschwitz, all of Aachen, Fed. Rep. of Germany, assignors to SMS Hansclever Maschinenfabrik GmbH, Dusseldorf, Fed. Rep. of Germany

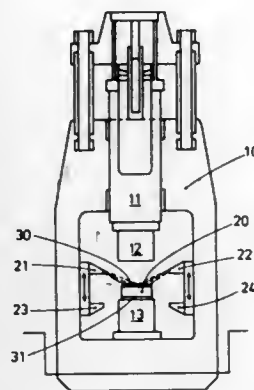
Filed Dec. 5, 1986, Ser. No. 938,238

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1985, 3542966

Int. Cl.<sup>4</sup> B21J 3/00

U.S. Cl. 72-45

24 Claims



1. A method of forging a workpiece in an open-die forging press, comprising the steps of:  
 heating the workpiece to a forging temperature;  
 applying a glass lubricant to said heated workpiece to cover said heated workpiece so as to form thereon a uniform glass film coating providing effective lubrication at said forging temperature; and  
 forging said heated workpiece having said glass film coating thereon in said open-die forging press.

4,788,843

## METHOD AND APPARATUS FOR HYDRAULICALLY FORMING A TUBULAR BODY

Roy C. Seaman, and Ronald M. McCaul, both of Tucson, Ariz., assignors to R. Seaman Company, Tucson, Ariz.

Filed Aug. 14, 1987, Ser. No. 85,380

Int. Cl.<sup>4</sup> B21D 26/02, 39/08

U.S. Cl. 72-58

9 Claims

1. A method for hydraulically forming a metallic tubular body, comprising the steps of:

providing a forming die defining an interior configured to receive said tubular body therein;  
 positioning said tubular body within the interior of said forming die;  
 filling said tubular body with a liquid by providing end seal means having a liquid inlet, and positioning said end seal means in operative association with at least one open end of said tubular body so that said liquid flows through said liquid inlet of said end seal means for filling said tubular body; and



inserting plunger means through said end seal means and into said open end of said tubular body so that said plunger means closes said liquid inlet, and thereafter pressurizes said liquid within said tubular body to thereby deform said tubular body outwardly toward the interior of said forming die, including sealing the interior of said tubular body with annular seal means on said end seal means, said annular seal means receiving said plunger means therethrough as said plunger means pressurizes the liquid in said tubular body, said pressurized liquid acting against said seal means for effecting sealing engagement with said plunger means.

4,788,844

## APPARATUS FOR STRAIGHTENING SLENDER SHAFTS

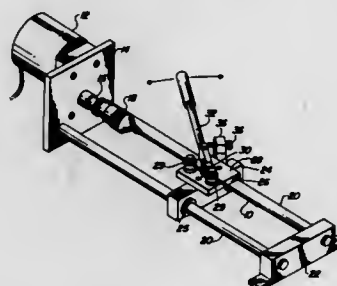
Donald L. Summers, Glendale Heights; David J. Summers, Hanover Park, and John G. Tolomei, Coal Valley, all of Ill., assignors to Inventive Enterprises Inc., West Chicago, Ill.

Filed May 1, 1987, Ser. No. 44,766

Int. Cl.<sup>4</sup> B21D 3/02

U.S. Cl. 72-110

14 Claims



1. An apparatus for straightening a slender cylindrical member, said apparatus comprising:  
 (a) means for rotating said cylindrical member about its longitudinal axis;  
 (b) at least two opposing contact points located on opposite sides of said member and separated along the length of the member;  
 (c) a movable base for supporting said contact points; and  
 (d) means for moving said base and contact points along the axis of said cylindrical member and urging at least one of said contact points against said cylindrical member to create a force couple about said member by the application of a single force, said force having at least a component in a direction parallel to the longitudinal axis of said shaft.

4,788,845

## PIPE BENDING MACHINE

Rigobert Schwarze, Olpener Strasse 460-474, 5000 Cologne 91, Fed. Rep. of Germany

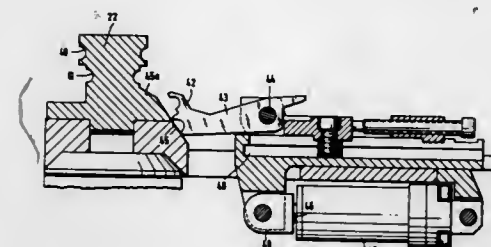
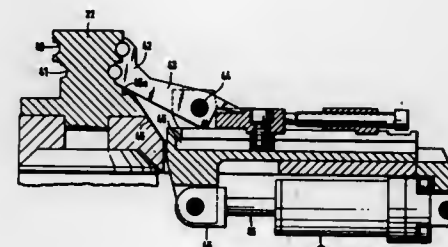
Filed Jul. 15, 1987, Ser. No. 73,961

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1986, 3627502

Int. Cl.<sup>4</sup> B21D 7/04

U.S. Cl. 72-157

12 Claims



1. A pipe bending machine, comprising a longitudinally extending machine frame having an upper side; a feeding carriage movable at an upper side of the machine frame and carrying means for clamping a pipe; a bending head provided on one end of said machine frame and rotatable about a vertical axis; a bending template mounted on said bending head and formed as multi-level template having a plurality of bending grooves provided with different bending diameters and arranged at different levels, said bending template having also a clamping surface; means cooperating with said bending template for bending a pipe therebetween, said cooperating means having a turning arm provided with a clamping jaw which has a clamping surface corresponding to said clamping surface of said bending template and provided with several clamping grooves arranged at different levels, said bending head and said feeding carriage with said clamping means being movable relative to one another in a vertical direction and transversely to a longitudinal direction of said machine frame for using one or another of said bending grooves, so that said bending template is liftable and lowerable in the vertical direction for exchanging said bending grooves and not movable transversely to the longitudinal direction of the machine frame, while said feeding carriage is movable transversely to the longitudinal direction of the machine frame and not liftable and lowerable in the vertical direction, said clamping jaw having a supporting lever, said bending template having an inclined sliding surface formed so that said supporting lever slides upwardly along said sliding surface during movement of said clamping jaw toward said bending template so that said sliding surface elevates said clamping jaw into a clamping position adjacent the bending grooves of said bending template.

4,788,846

## PROCESS FOR THE CORRECTION OF CURLS OF FLEXIBLE METAL CLAD LAMINATE AND FOR THE IMPROVEMENT OF ITS DIMENSIONAL STABILITY

Moritsugu Morita, Yokosuka, and Kazuo Miyazaki, Bibai, both of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

PCT No. PCT/JP87/00184, § 371 Date Oct. 27, 1987, § 102(c) Date Oct. 27, 1987, PCT Pub. No. WO87/05859, PCT Pub. Date Oct. 8, 1987

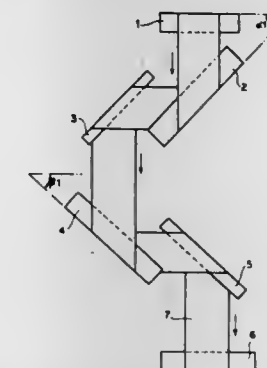
PCT Filed Mar. 26, 1987, Ser. No. 127,299

Claims priority, application Japan, Mar. 26, 1986, 61-66049

Int. Cl.<sup>4</sup> B21D 1/02; B31F 1/00; H05K 3/00

U.S. Cl. 72-160

8 Claims



1. A process for the correction of curls of a long flexible metal clad laminate, which has a thin aromatic polyimide film formed directly on a long metal foil without any adhesive interposed therebetween, and for the improvement of the dimensional stability thereof, characterized in that said process comprises the steps, performed at least once per step in any arbitrary order, of (1) causing the laminate to slide under tension, along the length thereof, on a curved surface of a first bar arranged at an angle of 30-60 degrees relative to the width of the laminate with the metal foil inside so that the metal foil faces said first bar; (2) causing the laminate to slide under tension, along the length thereof, with the metal foil inside, on a curved surface of a second bar arranged at an angle of 60-120 degrees relative to the first bar; (3) causing the laminate to slide under tension, along the length thereof, with the polyimide film inside, on a curved surface of a third bar or first rotating roll arranged at an angle of 30-60 degrees relative to the width of the laminate; and (4) causing the laminate to slide under tension, along the length thereof, with the polyimide film inside, on a curved surface of a fourth bar or second rotating roll arranged at an angle of 60-120 degrees relative to the third bar or first rotating roll.

4,788,847

## ROD BENDING APPARATUS

Peter M. Sterghos, St. Petersburg, Fla., assignor to Rodbuster, Inc., St. Petersburg, Fla.

Filed Oct. 5, 1987, Ser. No. 104,355

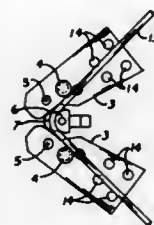
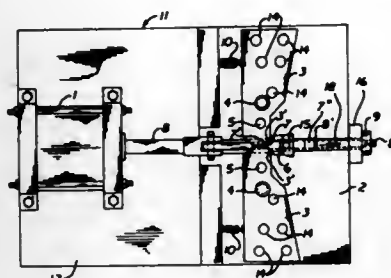
Int. Cl.<sup>4</sup> B21D 9/05

U.S. Cl. 72-213

11 Claims

1. Rod bending apparatus comprising:  
 (a) a rod supporting means against which the bar to be bent may be positioned;  
 (b) a movable mandrel positioned on one side of said rod supporting means, said mandrel having a lower actuator portion extending forward and beyond the said mandrel; said lower actuator portion having an opening extending through a lower portion thereof;  
 (c) a power means supported adjacent to said rod supporting means and said movable mandrel, said power means hav-

- ing a power thrust bar extending therefrom adapted to extend through the said opening in said lower actuator portion of said mandrel, said thrust bar having a threaded portion extending from the end most remote from said power means and extending toward said mandrel;
- (d) an adjusting means having a threaded opening therein which threads fit the threads on said thrust bar, said adjusting means being capable of adjusting and controlling the position of said mandrel on said thrust bar;
- (e) two pivotal arms supported on said rod supporting means and pivotal on pins projecting upward from said bar sup-



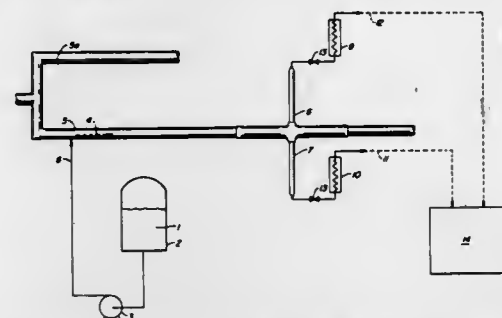
porting means, each of said arms having a rotatable roller extending from said arm and capable of pressing against a rod positioned on said rod supporting means between said mandrel and said rollers; whereby the same power stroke of the power thrust bar is capable of moving the mandrel against the rod positioned on said rod supporting means between the mandrel and the rollers and with the movement of the mandrel the lower extended portion of the mandrel is capable of pressing the end of each said arm thereby causing the arms to pivot on said pins and press said rollers against the opposite side of said rod from said mandrel.

**4,788,848**  
**CHEMICAL TRACER DETERMINATION OF STEAM QUALITY**  
Liming Hsueh, Buena Park, Calif., assignor to Chevron Research Company, San Francisco, Calif.  
Continuation-in-part of Ser. No. 850,203, Apr. 10, 1986, abandoned. This application Dec. 18, 1987, Ser. No. 135,116  
Int. Cl.<sup>4</sup> G01N 31/00; E21B 47/00

- U.S. Cl. 73—29 12 Claims
1. Apparatus for determining the quality of saturated steam in a steam line of a multiple-line system served by a single steam generation, said apparatus comprising:
- means for injecting a tracer solution into said steam line at an injection point, said steam line operating at a pressure and temperature and containing a liquid and vapor phase of steam, said tracer solution containing an input concentration of a liquid tracer and an input concentration of a vapor tracer;
- means for gathering a vapor sample downstream of said injection point;

means for gathering a liquid sample downstream of said injection point;

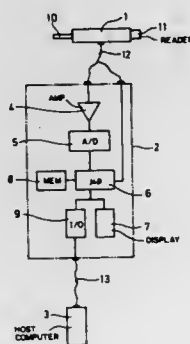
means for measuring a concentration of vapor tracer in said vapor sample;



means for measuring a concentration of liquid tracer in said liquid sample.

**4,788,849**  
**STEAM TRAP OPERATION MONITORING DEVICE**  
Masao Yonemura, and Takeshi Yokoyama, both of Hyogo, Japan, assignors to TLV Co., Ltd., Hyogo, Japan  
Filed Mar. 18, 1987, Ser. No. 27,517  
Claims priority, application Japan, Apr. 15, 1986, 61-87432  
Int. Cl.<sup>4</sup> G01M 3/24

U.S. Cl. 73—40.5 3 Claims

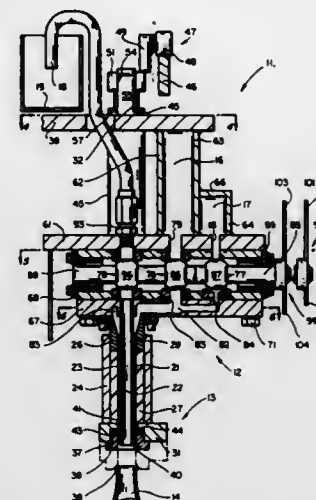


1. A steam trap operation sensing device comprising: steam leakage detector means for measuring and storing data representing the operation of steam traps, and host computer means to which said data are transferred for storing said data, said host computer means operating to record and display the summation of leakage in a plurality of steam traps, the totalization and analysis of leakage in terms of at least one of monetary cost and a rejection rate; and changes in each of said steam traps with time, said steam leakage detector means comprising an operation detecting section for sensing parameters of a plurality of steam traps to generate analog signals, an analog-to-digital converter connected to said operation detecting section for converting the analog signals to digital signals, a microcomputer connected to analog-to-digital converter for receiving the digital signals and for analyzing the digital signals to detect the presence of steam leaks in each steam trap based on the parameters sensed for each steam trap, steam trap reader means for identifying a unique code for each steam trap, said reader means being connected to said microcomputer for correlating the digital signals for each steam trap with a code representing that steam trap, and storage means connected to said microcomputer for storing data concerning the condition and change in condition of each steam trap with regard to steam leakage.

**4,788,850**  
**BOTTLE TESTING APPARATUS**  
Josef J. Buschor, and James C. Long, both of San Jose, Calif., assignors to Five X Corporation, San Jose, Calif.  
Filed Apr. 6, 1987, Ser. No. 34,549  
Int. Cl.<sup>4</sup> G01M 3/02

U.S. Cl. 73—49.2

22 Claims



1. In apparatus for testing a container with pressurized liquid: a seal member movable axially between sealing and retracted positions relative to the container and having an opening through which the pressurized liquid can be introduced into the container, a passageway communicating with the opening in the seal member for carrying the pressurized liquid to the container, and a resilient sleeve forming the outer wall of the passageway and being adapted to be compressed radially and elongated axially by the pressurized liquid to urge the seal member into sealing engagement with the container.

**4,788,851**  
**PRESSURE VESSEL INCORPORATING A SENSOR FOR DETECTING LIQUID IN A GAS CHAMBER**  
Francois Brault, Vanves, France, assignor to Oler Industries, France  
Filed Sep. 1, 1987, Ser. No. 91,670  
Claims priority, application France, Sep. 15, 1986, 86 12843  
Int. Cl.<sup>4</sup> G01M 3/16

U.S. Cl. 73—49.2

28 Claims



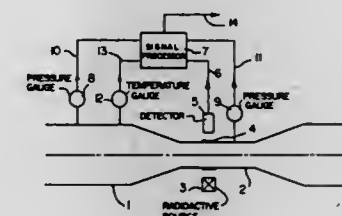
1. Pressure vessel comprising an enclosure, a liquid orifice in

said enclosure, a gas orifice in said enclosure, spaced from said liquid orifice, a separator dividing said enclosure into a variable volume liquid chamber communicating with said liquid orifice and a variable volume gas chamber communicating with said gas orifice, a transverse wall of said separator spaced from said gas and liquid orifices and movable within said enclosure, an optical sensor means extending through said envelope at a predetermined location into said gas chamber and having an end responsive to the presence of liquid in said gas chamber, said responsive end being nearer to said transverse wall than to said predetermined location, said optical sensor means being of flexible construction and elastically deformable in response to the movements of said transverse wall without damage to said wall.

**4,788,852**  
**METERING CHOKE**  
Wallace W. Martin; Douglas I. Exall, both of Calgary, Canada; Toshimasa Tomoda, and Shinji Badono, both of Tokyo, Japan, assignors to Petro-Canada Inc., Calgary, Canada and Mitsubishi Electric Corp., Tokyo, Japan, a part interest  
Filed Nov. 28, 1986, Ser. No. 935,677  
Claims priority, application Canada, Nov. 27, 1985, 496346  
Int. Cl.<sup>4</sup> G01N 11/00

U.S. Cl. 73—61.1 R

8 Claims



1. A method of measuring the proportions of various components in a crude oil mixture flowing through a pipeline comprising the steps of irradiating said mixtures with gamma rays or x-rays of at least three distinct energy levels; detecting the gamma rays or x-rays of at least three distinct energy levels passing through a known volume of the mixture to generate at least three signals proportional to said components in the mixture; processing said signals to obtain a mass ratio of the components; measuring the temperature of the mixture; measuring the pressure drop of the mixture through a flow restriction; and correlating the mass ratio, temperature and pressure drop values and standard calibration correlations previously prepared to obtain a mass flow rate of each of the components present in the mixture.

**4,788,853**  
**MOISTURE METER**  
John F. M. Bell, Musselburgh, Scotland, assignor to Coal Industry (Patents) Limited, United Kingdom  
Filed Oct. 7, 1986, Ser. No. 916,239  
Claims priority, application United Kingdom, Oct. 25, 1985, 8526346

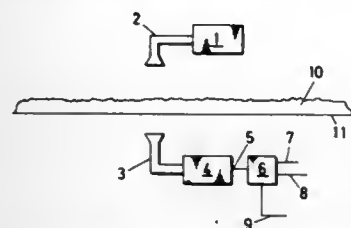
U.S. Cl. 73—73

9 Claims

1. A moisture meter for a mass of material, comprising: a source of microwave radiation for selectively producing radiation at a plurality of different frequencies and for directing said radiation into said mass of material, a support for the mass of material, which is substantially transparent to said radiation, detector means for determining an intensity of emergent radiation at each frequency traversing the mass of material and the support, and



signal processing means, responsive to (i) intensity of incident radiation directed into said mass of material (ii) said intensity of said emergent radiation and (iii) said selectively produced radiation frequencies, for determining a



value characteristic of moisture content based upon a slope of a plot of attenuation representing a difference between intensity levels of said incident radiation and said emergent radiation at each of said plurality of different frequencies.

4,788,854

# METHOD OF ESTIMATING THE FUEL/AIR RATIO OF AN INTERNAL COMBUSTION ENGINE

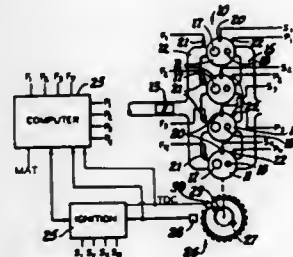
Hossein Javaherian, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 7, 1987, Ser. No. 130,945

Int. Cl.<sup>4</sup> G01M 15/00

U.S. Cl. 73—117.3

3 Claims



1. A method of estimating the ratio of the air and fuel mixture supplied to a cylinder of an internal combustion engine through an intake valve that is closed upon completion of the intake phase of the cylinder to trap an air-fuel charge in the cylinder at a predetermined crank angle during rotation of an output crankshaft of the engine, the intake phase being followed by a compression phase and a combustion phase as the engine crank angle increases, the method comprising the steps of:

- determining the trapped charge mass  $m$  in the cylinder;
- setting an initial estimated fuel/air ratio value;
- for the estimated fuel/air ratio, determining the gas pressure in the cylinder and the engine crank angle corresponding thereto at which the mass fraction burned  $\mu_b$  during combustion represents substantially complete combustion;
- determining the mass burned  $m_f$  based on the pressure and crank angle at which the mass fraction burned  $\mu_b$  during combustion represented substantially complete combustion;
- computing the total fuel mass burned  $m_f$  during combustion from the value of  $m_f$ ;
- estimating the fuel/air ratio of the mixture supplied to the cylinder from the values of  $m$  and  $m_f$ ; and
- repeating steps (c) through (f) for each value of pressure and engine angle stored in the history table until consecutive values of the estimated fuel/air ratio are substantially equal, the last estimated value of the fuel/air ratio being a

measure of the fuel/air ratio of the mixture supplied to the cylinder.

4,788,855

# TEST APPARATUS FOR MEASURING JET ENGINE THRUST

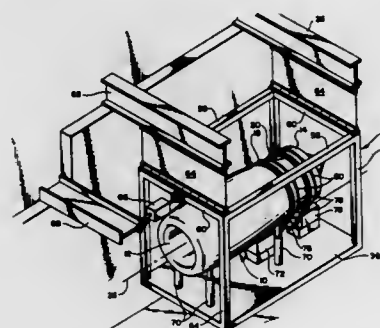
Jerome R. Laskody, Carnation, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 3, 1987, Ser. No. 21,225

Int. Cl.<sup>4</sup> G01M 15/00

U.S. Cl. 73—117.4

7 Claims



1. Apparatus for simultaneously measuring variables to calculate total thrust generated from a turbofan jet engine having a lengthwise axis and which is characterized by (1) a section for generating drive gases, (2) a fan section which rotates about the lengthwise axis in response to the drive gases and which includes (i) exterior blades which rotate with the fan section for generating a propelling force, and (ii) an outer cowl, and (3) an outlet section for exhausting the drive gases to the atmosphere to provide a further propelling force, the apparatus comprising:

- a cradle for supporting the engine;
- means for suspending the cradle from a support structure so as to permit movement of the cradle in the lengthwise direction;
- means for measuring a forward force generated by the drive gases which are exhausted to the atmosphere for calculating the nozzle gas thrust, said measuring means including load cell means which are connected between said support structure and said cradle;
- dynamometer means including a rotatable portion, for measuring a torque generated by the engine fan section for calculating the thrust output of the fan section; and
- drive gear means for connecting said dynamometer means to the engine fan section, said drive gear means including belt means which are removably connected to the fan section and to the rotatable portion of said dynamometer means so as to transmit a rotational force between said fan section and said dynamometer means.

4,788,856

# METHOD AND APPARATUS FOR CHECKING DIFFERENTIAL GEAR ASSEMBLIES

Ned D. Felger, Fort Wayne, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Oct. 13, 1987, Ser. No. 107,664

Int. Cl.<sup>4</sup> G01M 13/02

U.S. Cl. 73—118.1

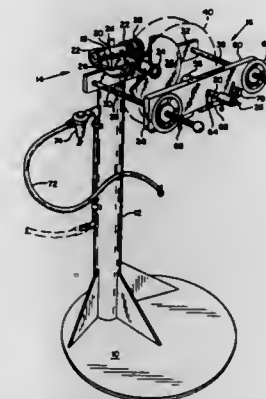
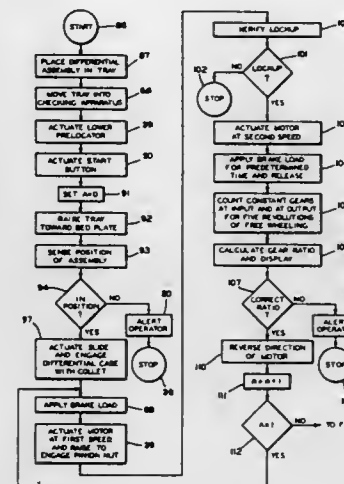
25 Claims

1. An apparatus for checking a gear assembly, comprising: means for retaining a gear assembly in a predetermined orientation with respect to a plane referenced to said means for retaining; means responsive to said gear assembly in a predetermined position with respect to said plane for generating a position signal;

brake means responsive to said position signal for applying a brake load to said gear assembly to prevent rotation of at least one gear in said gear assembly; and

when the pressure inside said torque converter exceeds the pressure outside of said torque converter;

- bearing means operatively interposed between said support means and said frame means for permitting said frame means to rotate with respect to said support means; and



- pivot means operatively interposed between said support means and said bearing means for permitting said bearing means and said frame means to pivot approximately 90 degrees with respect to said support means.

4,788,858

# FUEL INJECTOR TESTING DEVICE AND METHOD

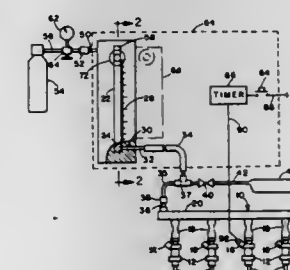
Leonard N. Liebermann, La Jolla, Calif., assignor to TIF Instruments, Inc., Miami, Fla.

Filed Aug. 4, 1987, Ser. No. 81,990

Int. Cl.<sup>4</sup> G01M 15/00

U.S. Cl. 73—119 A

35 Claims



drive means responsive to said position signal for engaging an input of said gear assembly at a first predetermined speed of rotation of said drive means.

4,788,857

# TEST STAND APPARATUS AND METHOD FOR TESTING A REBUILT TORQUE CONVERTER

John E. Myers, Sparks, Nev., assignor to Torque Converter Rebuilding Systems, Reno, Nev.

Filed Aug. 4, 1987, Ser. No. 82,081

Int. Cl.<sup>4</sup> G01M 19/00

U.S. Cl. 73—118.1

3 Claims

1. A test stand for pressure testing fluid couplings such as a torque converter of the type having a central aperture comprising:

- frame means for supportably receiving said torque converter;
- support means associated with said frame means for supporting said frame above a supporting surface;
- plug means for sealing said central aperture of said torque converter, said plug means including passage means for permitting the interior of said torque converter to be pressurized while said plug means is securely received in said aperture;
- said frame means including retainer means for retaining said plug means in said aperture of said torque converter

1. A device for determining the fuel flow condition of a fuel injector while the injector is in its operating position in an engine, which comprises:

- a measuring chamber;
- means to provide a liquid connection between said measuring chamber and the fuel inlet of said fuel injector;
- means to move liquid simultaneously through said measuring chamber and said fuel injector through said connection for a predetermined period of time under substantially constant pressure; and
- means associated with said measuring chamber to measure the quantity of said liquid passing through said fuel injector in said period of time, said quantity, relative to the quantity of like liquid passed in equal time by a reference fuel injector, being indicative of said fuel flow condition of said fuel injector.

**4,788,859**  
**METHOD AND APPARATUS FOR DETERMINING DEFLECTION IN PAVEMENT**

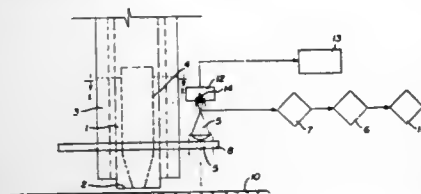
Anwar S. Khattak, 612 S. Lincoln, Spokane, Wash. 99204

Filed Nov. 13, 1987, Ser. No. 120,066

Int. Cl. G01B 5/30

U.S. Cl. 73-146

19 Claims



1. A method of directly measuring vertical displacement of pavement which comprises:

- placing an optical unit having a focusing element in a fixed position above the pavement, wherein said unit is capable of being focused upon the pavement;
- focusing said optical unit on said pavement at a time prior to application of a predetermined load on said pavement, and recording a first position of the focusing element when said optical unit is focused on said pavement;
- focusing said optical unit on said pavement at a time when a predetermined load is applied to said pavement, and recording a second position of the focusing element when said optical unit is focused on said pavement; and
- measuring the difference between the first and second positions of the focusing element, wherein said difference represents the vertical displacement of the pavement.

**4,788,860**  
**HOT-WIRE SENSOR FOR INTEGRALLY MEASURING MATERIAL OR VOLUME FLOWS**

Siegfried Kiske, Gross Grönu, Fed. Rep. of Germany, assignor to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

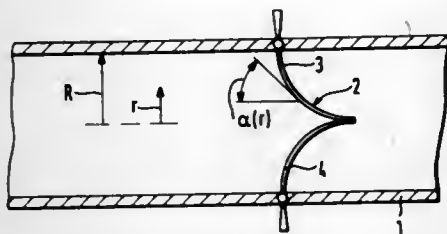
Filed Aug. 24, 1987, Ser. No. 88,690

Claims priority, application Fed. Rep. of Germany, Sep. 6, 1986, 3630427

Int. Cl. G01F 1/68

U.S. Cl. 73-204.27

2 Claims



1. A hot-wire sensor for integrally measuring material or volume of a flow in a conduit having a conduit wall and a predetermined conduit diameter and defining a longitudinal axis, the flow having a maximum velocity at said longitudinal axis and a velocity which approaches zero at the inner surface of the conduit wall, the hot-wire sensor comprising:

- at least one hot wire having a diameter which is small in relationship to said conduit diameter and having a predetermined length with first and second ends; and,
- said hot wire being placed in said conduit so as to have said first end substantially tangent to said axis and to extend outwardly and away from said axis toward said wall in a curve of continuously and ever increasing slope so as to

cause said second end of said hot wire to be at the region of the inner surface of the wall.

**4,788,861**  
**APPARATUS AND CIRCUIT FOR MONITORING THE INK SUPPLY AND INK PRINTER DEVICES**

Reiner Lichtl, Germering, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

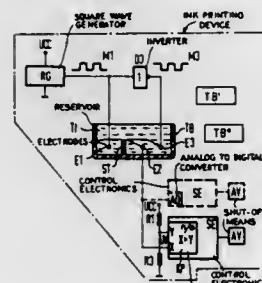
Filed Jan. 30, 1987, Ser. No. 8,756

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1986, 3603333

Int. Cl. G01F 23/24

U.S. Cl. 73-304 R

13 Claims



1. An apparatus for monitoring the supply of electrically conductive writing fluid (I) in a reservoir (TB) for ink printer devices comprising, three electrodes (E1, E2, E3) for resistance measurements, one pair of electrodes (E2, E3) is mounted in a region of said reservoir (TB) which is constantly moistened by said writing fluid (TI) and provides a first signal which indicates a fluid-associated comparison resistance, and a further electrode (E1) together with one of said pair of electrodes (E2, E3) provides a second signal which indicates the change of resistance therein as a function of the fluid level of said fluid (TI), a control electronics means (SE) receiving said first and second signals, a cutoff means (AV) connected to said control electronics means (SE) to indicate when the level of said writing fluid (TI) falls below a minimum level, said first and second signals is produced with DC voltage pulses produced by a generator (RG) and an inverter (I) which produces pulses (M1) and inverted pulses (M3) which have the same amplitude and said further electrode (E1) receives said DC voltage pulses (M1) and one of said pair of electrodes receives said inverted pulses (M3) which are inverted relative to said pulse (M1) and a voltage (U2) indicative of the fluid level in said reservoir (TB) occurs at the other one of said pair of electrode (E2) of said pair electrodes (E2, E3).

**4,788,862**  
**PLASTIC MEASURING SCOOP WITH FOLDABLE HANDLE**

Ronald C. Fuller, Evansville, Ind., assignor to Bristol-Myers Company, New York, N.Y.

Filed Jul. 15, 1987, Ser. No. 72,957

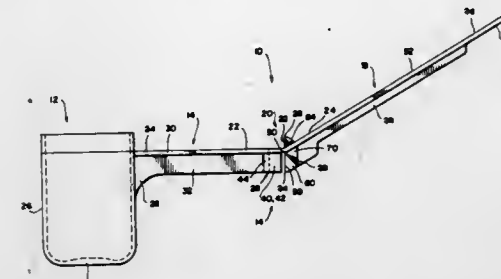
Int. Cl. G01F 19/00; A47J 43/28

U.S. Cl. 73-426

3 Claims

- A plastic measuring scoop and foldable handle assembly comprising:
  - a measuring scoop;
  - an inner fixed handle portion having a securement channel at its outer end and secured at an inner end to said measuring scoop wherein said securement channel is comprised of spaced side walls interconnected by a rear wall and cooperating to define a securement fin receiving chamber;
  - an outer foldable handle portion hingedly attached at an inner end to said fixed handle portion outer end wherein

said outer foldable handle portion inner end includes an upper and a lower securement fin; and means to selectively retain said foldable handle portion in a folded non-use configuration or an unfolded use configuration.



ration with respect to said fixed inner handle portion wherein either of said upper and lower securement fins is relatively receivable in said securement fin receiving chamber to form said means.

**4,788,863**  
**DEVICE FOR DETERMINING SWING SPEED OF ROTATABLE IMPLEMENTS**

Yoshihisa Tanaka, Tokyo, Japan, assignor to Tanaka Manufacturing Co., Ltd., Tokyo, Japan

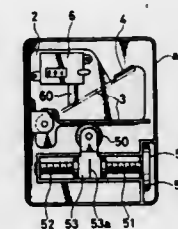
Filed Nov. 23, 1987, Ser. No. 124,205

Claims priority, application Japan, Nov. 29, 1986, 61-184089[U]

Int. Cl. G01P 3/16; A63B 69/36

U.S. Cl. 73-493

2 Claims



1. A device for determining the swing speed of rotatable objects, comprising a mounting base, a magnetically attractable movable plate member, said movable plate member pivotally mounted at one end on said mounting base, a stopper provided in the path of said movable member at one rotational arcuate direction thereof, whereby said movable member may come into contact with the stopper to produce a hitting sound, a transversely movable support member which is set in the path of the other rotational arcuate direction of said movable member, said support member supporting a magnetized disk to which said movable member is detachably attracted, whereby upon presetting the magnetized disk may be moved in a transverse longitudinal direction, relative to the pivot of the movable member, said movable member having an arcuate limit of specific rotation between said stopper and said support member.

**4,788,864**  
**BLEED PATH FOR ELECTRIC CHARGE**

Nicolas F. Pier, Thousand Oaks, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed May 26, 1987, Ser. No. 53,882

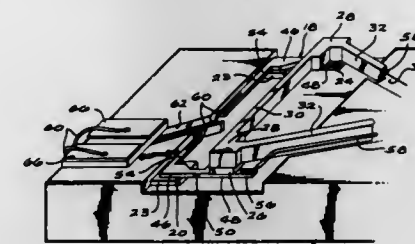
Int. Cl. G01P 15/13

U.S. Cl. 73-517 B

15 Claims

- A sensing device comprising:
  - a base;
  - a sensing element mounted to the base by hinge means hav-

ing at least one conductive portion, for relative movement under the influence of inertial forces; means for substantially insulating the sensing element from a first preselected portion of the hinge means; a conductive coil carried by the sensing element and having electrical leads connection to the conductive portion of



the hinge means for application of an electrical input to the coil; and conductive path means extending from the sensing element to a second preselected portion of the hinge means of the device for bleeding electric charge from the sensing element.

**4,788,865**  
**CONSTRUCTION OF LIQUID CRYSTAL CELL FOR ACOUSTIC IMAGING**

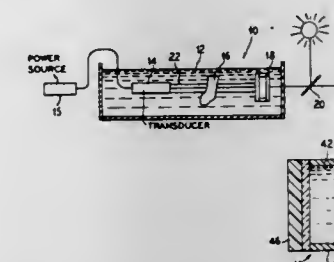
Jaswinder S. Sandhu, Buffalo Grove, Ill., assignor to Raj Technology, Inc., Morton Grove, Ill.

Filed Nov. 26, 1986, Ser. No. 935,013

Int. Cl. G01N 29/04; G02F 1/11

U.S. Cl. 73-603

17 Claims



1. A liquid crystal cell for use in detecting acoustic energy and displaying an image, said cell having a layer of liquid crystal material disposed and encapsulated between a pair of substantially acoustically transparent covers, at least one of which is optically transparent, wherein:

- at least one of said covers is a laminated member and includes at least two plies of different materials, each of said plies having a thickness determined by the relationship  $t = n \lambda / 2$ ;

where:

t is the individual ply thickness, n is an integer greater than or equal to one, and  $\lambda$  is the wavelength of the acoustic energy, in the cover material, used to image the object.



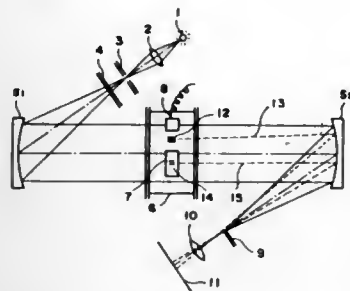
4,788,866

**METHOD AND APPARATUS FOR VISUALIZING ULTRASONIC WAVES IN LIQUID-SOLID SYSTEMS**  
Kenichi Tanimoto, and Kazuhiro Date, both of Higashi, Japan, assignors to Doryokuro Kakuneryo Kaihatsu Jigyodan, Tokyo, Japan

Filed Sep. 29, 1987, Ser. No. 102,230  
Claims priority, application Japan, Oct. 8, 1986, 61-239689  
Int. Cl.<sup>4</sup> G01N 29/04

U.S. Cl. 73-606

10 Claims



2. An apparatus for visualizing ultrasonic waves in a liquid-solid system, comprising:  
a first optical system having a polarizing plate upon which light from a strobe light source is incident;  
opposing second and third optical systems upon one of which polarized light from said first optical source is incident;  
observation means arranged between said second and third optical systems for internally accommodating a liquid and a solid and for being irradiated with ultrasonic pulses from an ultrasonic probe;  
a knife edge comprising a polarizing plate arranged in perpendicular relation to the polarizing plate of said first optical system at a position at which light which has passed through said observation means is imaged by said second or third optical system; and  
a fourth optical system for visualizing light which has passed said knife edge;  
the polarizing plate constituting said knife edge being adapted to block the image of the strobe light source when said observation means is not being irradiated with ultrasonic pulses.

4,788,867

**DIFFERENTIAL PRESSURE DETECTOR**  
Joseph F. Kishel, Clarks Summit, Pa., assignor to Fairchild Weston Systems, Inc., Syosset, N.Y.  
Filed Dec. 30, 1986, Ser. No. 947,640  
Int. Cl.<sup>4</sup> G01L 7/08, 9/10

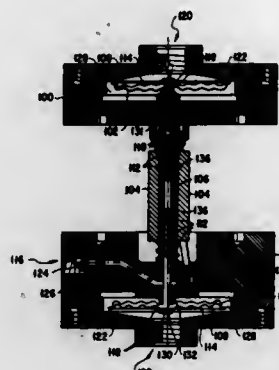
U.S. Cl. 73-722

19 Claims

1. A differential pressure detector comprising:  
first and second pressure sensors, each sensor comprising an inner diaphragm and an outer diaphragm sealed together at respective diaphragm peripheries, wherein both said inner and outer diaphragms are flexible and are contemporaneously manufactured from the same die so that their mutually opposing faces mate perfectly when pressed together;  
a hollow tube connecting said two inner diaphragms;  
first and second pressure chambers which substantially surround respective said first and second sensors;  
an incompressible fluid occupying a single continuous sealed volume defined by said sensors and said tube, said fluid being pre-compressed in an initial filling to a pressure sufficient to separate said inner and outer diaphragms to slightly less than one-half a maximum diaphragm separation distance, said diaphragms having a compliance small

enough so that the pressure caused in said initial filling is sufficient to drive gaseous bubbles into solution.

- a rod assembly extending within said tube between and physically contacting both said outer diaphragms, having a displacement on the difference in pressures in said first and second pressure chambers, said rod assembly having a length sufficient to deflect said outer diaphragms slightly more than a deflection that would be caused by said initial filling alone, said rod assembly being hollow and having side apertures to facilitate free flow of said fluid from one sensor to the other; and



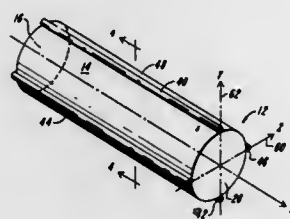
- means for measuring the displacement of said rod assembly and communicating a resulting measurement, wherein when pressure in said first pressure chamber increases said rod assembly is displaced toward said second sensor to cause a change in said communicated measurement; wherein said differential pressure detector is symmetric about a midpoint of said tube so that thermal expansion of said fluid causes no displacement of said rod assembly and no change in said measurement.

4,788,868

**STRAIN MEASUREMENT APPARATUS AND METHOD**  
Leonard S. Wilk, Winchester, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.  
Filed Mar. 27, 1986, Ser. No. 844,622  
Int. Cl.<sup>4</sup> G01N 3/08

U.S. Cl. 73-760

32 Claims



1. Apparatus for measuring the relative rotation of one end of a cylinder member comprising  
a first strain sensitive parametric element,  
a second strain-sensitive parametric element,  
a second strain-sensitive parametric element, means for adhering at least one of said parametric elements along the length of said cylindrical member,  
means for applying an interrogating source signal at at least an interrogation end of each of said first and second elongated parametric elements,  
means for measuring a source signal parameter differentially affected by relative rotation of said one end of said cylindrical member, and  
means for determining from said measured source parameter

said relative rotation of said one end in at least one degree of freedom.

4,788,869

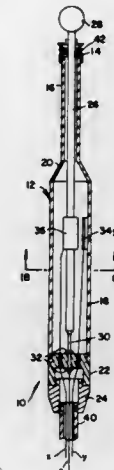
**APPARATUS FOR MEASURING FLUID FLOW**  
Paul Z.-f. Li, Tallahassee, Fla., assignor to Florida State University, Tallahassee, Fla.

Filed Jun. 27, 1986, Ser. No. 879,628

Int. Cl.<sup>4</sup> G01F 1/28

U.S. Cl. 73-861.71

19 Claims



1. Apparatus for measuring fluid flow, comprising an elongated housing having an opening in one end thereof; an elongated stem having an end projecting longitudinally from said housing through said opening; means within the housing at a location remote from said opening for supporting the stem; a probe attached to the projecting end of the stem near said opening for interaction with a flowing fluid and for transmitting to the stem forces exerted on the probe by the flowing fluid; and sensor means within the housing for sensing the forces transmitted to the stem and for producing corresponding electrical signals representative of a measurement of said flowing fluid, and wherein said sensor means comprises a variable capacitor, the capacitance of which varies in response to the forces transmitted to the stem by said probe, and wherein the supporting means supports the stem such that the stem is coaxial with the longitudinal axis of the housing, and the sensor means detects deviation of the stem from said axis, and wherein said stem has a portion which is movable in a direction substantially normal to the longitudinal axis of the housing in response to forces exerted on the probe substantially normal to said longitudinal axis, and the sensor means detects movement of said portion in said direction and, wherein the supporting means supports the stem at an opposite end of the stem from the projecting end and said portion of the stem at which movement is detected by the sensor means comprises an intermediate location of the stem.

4,788,870

**SENSOR WITH A LATERAL RETAINING ARM**  
Dietmar Gath, Schoeffengrund, and Holger Von Hayn, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 2, 1987, Ser. No. 57,421

Claims priority, application Fed. Rep. of Germany, Jun. 2, 1986, 3618528

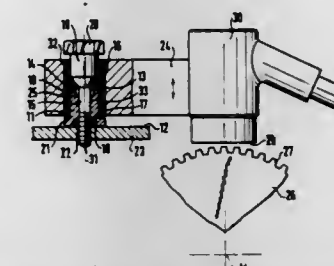
Int. Cl.<sup>4</sup> G01P 13/00; G01B 21/16, 7/14; G01D 21/00

U.S. Cl. 73-866.5

8 Claims

1. A sensor assembly including a measuring head having a measuring surface for sensing the movement of an object, a

lateral retaining arm extending laterally from said measuring head, said lateral retaining arm having a guide bore extending substantially perpendicular to a plane containing said measuring surface, a carrier member slideably received in said guide bore and having a size so that said retaining arm can rotate about said carrier member, said carrier member being formed with a central bore, a fastening bolt received in said central bore for fixing said retaining arm and said measuring head on a base member having a surface extending in a plane substantially parallel to said measuring surface, said carrier member



terminating in an end surface located inside said guide bore, an expandable ring-shaped clamping member located on said end surface of said carrier member, the external diameter of said clamping member being of a size so as to fit inside said guide bore, said fastening bolt being formed with a cone-like enlargement located adjacent the ring-shaped clamping member so that when said fastening bolt is tightened on the base member said cone-like enlargement urges said clamping member against the end surface of said carrier member and expands said clamping member radially outwardly against the guide bore.

4,788,871

**PROBE FOR SENSING TEMPERATURE AND/OR PRESSURE**

Edmund A. Nelson, Timonium; Arthur E. Colvin, Mt. Airy, both of Md.; Matthew W. Hanley, Washington, D.C., and Stephen C. Scott, Frederick, Md., assignors to Steeltin Can Corporation, Baltimore, Md.

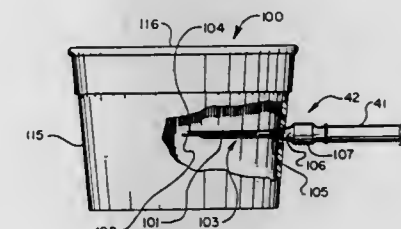
Division of Ser. No. 896,407, Aug. 14, 1986, Pat. No. 4,739,699.

This application Dec. 3, 1987, Ser. No. 128,420

Int. Cl.<sup>4</sup> G01K 1/14, 7/02; G01L 19/00; G01D 21/02

U.S. Cl. 73-866.5

6 Claims



1. A probe adapted to be inserted into a closed thin plastic container for monitoring pressure and temperature therein, the probe comprising temperature sensing means; a hollow member having a forward piercing open end and a rearward open end defining a bore therethrough to provide open space for passage of fluid from within the thin plastic container whereby fluid pressure therein may be monitored, an intermediate portion of said hollow member between said piercing open end and said rearward open end being tapered, the taper thereof converging toward said piercing open end; self tapping threads provided on an exterior surface of the tapered intermediate portion of said hollow member to spread and tap through the closed thin plastic container; the temperature sensing means

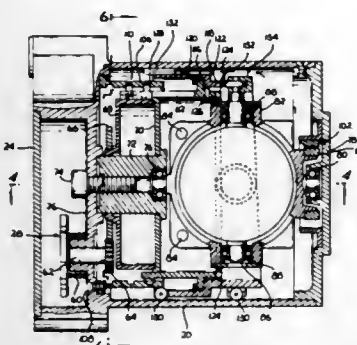
supported by means within the hollow member for sensing temperature within the thin plastic container; and means within said bore for allowing electrical communication with said temperature sensing means.

**4,788,872**  
**REARMABLE SPRING CAGED AND ENERGIZED FREE GYRO**

William E. Bennett, Westlake Village, Calif., assignor to Kirkos Development Partners, Ltd., Newbury Park, Calif.  
Filed Oct. 14, 1986, Ser. No. 917,965  
Int. Cl.<sup>4</sup> G01C 19/26

U.S. Cl. 74-514

11 Claims

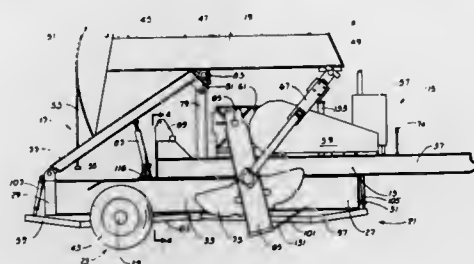


1. A spring energized two axis free gyro comprising a frame assembly; an outer gimbal supported on said frame assembly for rotation about a first outer gimbal axis; an inner gimbal supported on said outer gimbal for rotation about a second axis orthogonal to said first axis; a rotor supported on said inner gimbal for rotation about a spin axis orthogonal to said second axis; spring means supported on said frame assembly for storing energy when moved from a first state to a second state; winding means supported on said frame assembly for manually moving said spring means from said first state to said second state; spring retention means for maintaining said spring means in said second state until released by said release means; caging means coupled to said spring means and moveable in response to movement of said spring means between an uncaged position not interfering with rotation of said outer gimbal, and said inner gimbal through at least a limited angular freedom, and a caged position caging said inner and outer gimbals and retaining the same in a predetermined caged position; drive means supported for rotation about an axis concentric to said outer gimbal axis, said drive means being coupled to said spring means and moveable in response to movement of said spring means between a disengaged position when said spring means is in said first state wherein said drive means will not interfere with the rotation of said inner and outer gimbals and the free spinning of said rotor, and an engaged position when said spring means is in said second state engaging said rotor to spin said rotor responsive to movement of said spring means; whereby upon releasing of the spring retention means, the spring means will spin the motor as said spring means moves toward the first state, will move the drive means to the disengaged position and the caging means to the uncaged position for free gyro operation, with the gyro being recaged and the drive means reengaged upon reenergizing the spring means by moving it from the first state back to the second state.

**4,788,873**  
**PORTABLE WALKING BEAM PUMP JACK**  
Roy N. Laney, 1007 Rebecca Rd., Frederick, Okla. 73542  
Continuation of Ser. No. 832,480, Feb. 20, 1985, abandoned, which is a continuation of Ser. No. 434,725, Oct. 18, 1982, Pat. No. 4,572,012. This application Nov. 21, 1986, Ser. No. 933,181  
The portion of the term of this patent subsequent to Feb. 25, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> F16H 21/32

U.S. Cl. 74-41

6 Claims

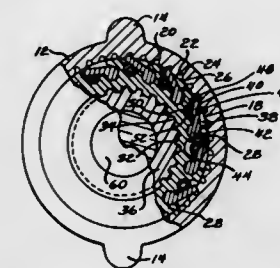


1. A walking beam pump jack comprising: a substantially horizontally extending frame having a front end and a rear end; ground engaging wheel means connected to said frame for supporting said frame during transportation over a ground surface, said ground engaging wheel means including a pair of horizontally spaced wheels; stabilizing means for securing said frame with respect to a ground location, said stabilizing means comprising: a front pad and a rear pad hydraulically extending from said frame to a ground surface location; first and second screw jacks extending between said front and rear pads, respectively, and said frame; and first and second pad arms, said first pad arm extending from said frame to said first pad and having one end pivotally connected to said frame, and said second pad arm extending from said frame to said second pad and having one end pivotally connected to said frame; a walking beam having a first end, a mid-portion and a second end, said second end being adapted for connection to a pumping rod; counterweighted, rotating driving means mounted on said frame and connected to said first end of said walking beam for rocking said walking beam in a pumping motion, said counterweighted, rotating driving means being rotatable between an elevated pumping position and a lowered transport position while remaining connected to said first end of said walking beam and while said walking beam is lowered from a pumping position elevated relative to said frame to a lowered transport position which is relatively lower in relation to said frame than said elevated pumping position, said counterweighted, rotated driving means including a pair of counterweighted drive arms journaled for rotation about a horizontal axis with said drive arms aligned with each other to concurrently occupy a common plane containing said axis of rotation, and said alignment of said drive arms being maintained at all points during the concurrent rotation of said counterweighted drive arms; a support assembly foldably mounted on said frame and upon which said mid-portion of said walking beam is pivotally connected, said support assembly being foldable from a first, fixed position in which said walking beam is pivotally supported in a relatively elevated raised, fixed position above said frame for rocking in a pumping motion while in said raised first, fixed position, to a second, relatively lower fixed position in which said walking beam is held in a lowered position relative to said frame for transportation, the movement of said walking beam between said first and second positions causing a concurrent move-

ment between first and second positions by said counterweighted, rotating driving means which remains connected thereto during said movement; and hydraulic cylinder means connected between said frame and said support assembly for moving said support assembly between said first position and said second position thereof, and concurrently causing movement between its respective first position and said transport position of said counterweighted, rotating driving means connected to said first end of said walking beam.

**4,788,874**  
**DIFFERENTIAL CLUTCH**  
Bertel S. Nelson, 27 W 742 North La., Naperville, Ill. 60540, and William R. Danforth, deceased, late of Yorkville, Ill. (Danforth, executor; by Nelson)  
Filed Feb. 6, 1987, Ser. No. 11,525  
Int. Cl.<sup>4</sup> G05G 1/00; F16D 67/02  
U.S. Cl. 74-142

1 Claim

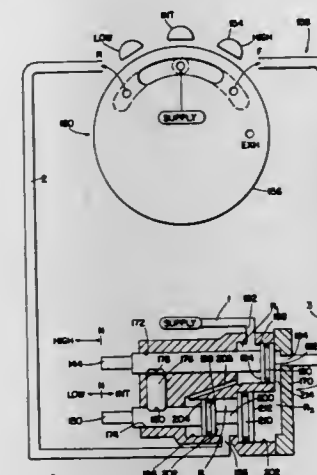


1. A differential clutch for incremental movement of a turnable member in a given direction, comprising in combination with a driven turnable member and a driving member pivotable in a back-and-forth oscillating manner, an annular member connected to said driving member for pivoting therewith, said annular member having a plurality of arcuately disposed clutch teeth, an annular intermediate clutch member, a first set of sprags including a predetermined plurality of sprags on said intermediate member, means resiliently urging said sprags radially into engagement with said clutch teeth, said sprags being substantially less in number than said clutch teeth, said clutch teeth and said sprags turning said intermediate member in one direction upon pivoting of said driving member in one direction but not turning said intermediate member upon pivoting of said driving member in said opposite direction, means acting on said intermediate member to prevent retrograde movement upon pivoting of said driving member in said opposite direction, and means connecting said intermediate member to said turnable member for turning of said turnable member with said intermediate member, said means for preventing retrograde movement of said intermediate member comprising a fixed member having a second set of clutch teeth, a second set of sprags on said intermediate member and comprising a second plurality of sprags equal in number to said predetermined plurality, and means resiliently urging said second set of sprags into engagement with said second set of clutch teeth, each of said sprags including a pivot portion and an arm extending tangentially from said pivot portion, whereby longitudinal thrust from said clutch teeth on said sprag arms augments the force resiliently urging the sprags and clutch teeth into engagement, the pivot portion of each sprag comprising a cylindrical portion, said intermediate member having a plurality of cylindrical recesses respectively receiving said cylindrical portions of both sets of said sprags, said first and said second resilient means comprising a plurality of resilient members equal in number to said predetermined plurality and each thereof resiliently biasing one of said first set of sprags and a respective one of said second set of sprags.

**4,788,875**  
**AUXILIARY TRANSMISSION SECTION SHIFT CONTROL SYSTEM**

Thomas A. Genise, Dearborn Hts., Mich., assignor to Eaton Corporation, Cleveland, Ohio  
Filed Sep. 3, 1987, Ser. No. 92,819  
Int. Cl.<sup>4</sup> F16H 3/08; B60K 20/14  
U.S. Cl. 74-334

2 Claims



1. A control system for a splitter type change gear auxiliary transmission section of a compound vehicular transmission comprising a main transmission section connected in series with said auxiliary transmission section and drivingly connected to a fuel controlled engine by a selectively engaged and disengaged master friction clutch, said auxiliary section having at least three engagable auxiliary speeds, said control system of the type permitting preselection of an auxiliary section gear change to be executed upon achievement of enabling transmission operating conditions, said control system comprising: an operator actuated gear selector valve having a selector switch movable to at least three positions to preselect a desired engaged auxiliary transmission section gear, said selector valve connected to a source of pressurized fluid, a first selectively pressurized and exhausted fluid conduit, a second selectively pressurized and exhausted fluid conduit and an exhaust conduit, in said first position of said selector switch said selector valve establishing communication between said source and said first selectively pressurized and exhausted conduit and exhausting said second selectively pressurized and exhausted conduit, in said second position of said selector switch said selector valve exhausting both of said first and second selectively pressurized and exhausted conduits and blocking said source, and in said third position of said selector switch said selector valve connecting said second selectively pressurized and exhausted conduit to said source of pressurized fluid and exhausting said first selectively pressurized and exhausted conduit; an actuator valve assembly remote from said gear selector valve and having a supply port in constant fluid communication with said source of pressurized fluid, a first pressure line port and a second pressure line port, said actuator valve assembly including piston means having a first position of engagement of a first selected gear, a second position for engagement of a second selected gear and a third position for engagement of a third selected gear, said piston means assuming said first position from one of said other positions only upon the occurrence of said enabling conditions and pressurization of said first pressure line port and exhaust of said second pressure line port, said piston means assuming said second position from one of said other positions only upon the occurrence of said



enabling conditions and exhaust of both said first and second pressure line ports and said piston means assuming said third position from one of said other positions only upon the occurrence of said enabling conditions and pressurization of said second pressure line port and exhaust of said first pressure line port; said control system characterized in that:

said first selectively pressurized and exhausted conduit connecting said selector valve directly to said first pressure line port and said second selectively pressurized and exhausted conduit connecting said selector valve directly to said second pressure line port;

said actuator valve assembly comprises a valve body defining a first enlarged cavity adjacent said supply port, a second enlarged cavity adjacent said first pressure line port and a third enlarged cavity adjacent said second line port, said fluid cavities in fluid communication with working surfaces of said piston means;

the force of said pressurized fluid acting on the working surfaces of said piston means being insufficient to cause said piston means to assume a different position when said engine is fueled substantially above idle speed and said master clutch is engaged; and

said enabling conditions occur upon either disengagement of said master clutch and/or a significant reduction of fuel supply to said engine.

4,788,876

#### DEVICE FOR CONTROLLING TRANSMISSION DOG CLUTCHES

Georges Carton, Corbas; Philippe Bernaud, Lyon; Jean-Louis Ranffer, La Verpilliere, and Yves Drutel, Brignais, all of France, assignors to Renault Vehicules Industriels, Lyon, France

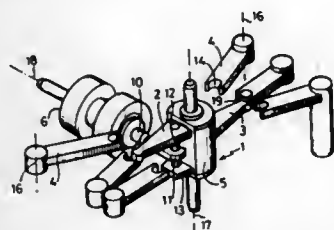
Filed Apr. 28, 1987, Ser. No. 43,447

Claims priority, application France, May 6, 1986, 86 06509

Int. Cl.<sup>4</sup> F16H 5/04; B60K 20/10

U.S. Cl. 74—335

6 Claims



1. In a transmission having dog clutches, each of said dog clutches having a control fork pivotable between a clutching position and a declutching position, a clutch control device comprising:

an actuator having a body;

means for translating said body along an axis parallel to pivoting axes of said control forks, wherein said control forks are in at least two axial positions relative to said axis of translation;

means for rotating said body about said axis of translation; and

at least one pin fixed to said body and having means for cooperating with each of said forks, whereby said at least one pin may translate and rotate to engage one of said control forks and may rotate to pivot said one of said forks between said clutching and declutching positions, wherein said translation means comprise:

a double acting translation cylinder comprising said body; hydraulic feed means for said translation cylinder; and solenoid valve means in said hydraulic feed means.

#### 4,788,877 COMPOSITE HOUSING FOR RACK AND PINION POWER STEERING GEAR

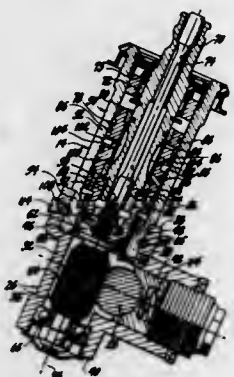
John H. Robinson, and Donald R. Burnham, both of Saginaw, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Mar. 9, 1987, Ser. No. 23,784

Int. Cl.<sup>4</sup> B62D 5/08, 53/06; F16B 11/00

U.S. Cl. 74—388 PS

1 Claim



1. A composite housing for a rotary valve rack and pinion power steering gear comprising:

a pinion housing portion fabricated from a light weight first metal,

means on said pinion housing portion defining a pinion bore aligned on a pinion axis of said pinion housing portion, a right circular cylindrical valve housing portion fabricated from a second metal more dense and abrasion resistant than said first metal,

means defining a counterbore in an end surface of said pinion housing portion around an end of said pinion bore having an inner cylindrical surface aligned on said pinion axis, means defining an injection molding passage in said pinion housing portion,

means defining a first annular groove in said inner cylindrical surface of said counterbore connected to said injection molding passage,

means defining an annular neck on said valve housing portion having an outer cylindrical surface, means on said valve housing portion defining a second annular groove in said outer cylindrical surface,

said annular neck on said valve housing portion being received in said counterbore in said pinion housing portion with an interference press fit between said inner cylindrical surface and said outer cylindrical surface and with said first annular groove overlapping at least a portion of said second annular groove and cooperating therewith in defining an annular ring chamber,

in situ injection molded retaining and seal means in said passage means and in said ring chamber forming a retaining ring redundantly inhibiting withdrawal of said valve housing portion from said pinion housing portion and sealing the interface between said inner and said outer cylindrical surfaces, and

means on said annular neck defining an inner cylindrical surface aligned on said pinion axis when said annular neck is received in said counterbore,

said inner cylindrical surface on said neck defining a bearing support for a pinion shaft of said rack and pinion steering gear in said pinion housing portion.

#### 4,788,878 RACK AND PINION STEERING GEAR

Kouji Morita, Fujisawa, and Masahiro Aihara, Kamakura, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

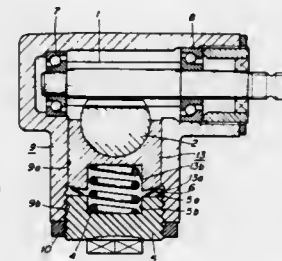
Filed Jun. 15, 1987, Ser. No. 61,513

Claims priority, application Japan, Jun. 16, 1986, 61-90521[U]

Int. Cl.<sup>4</sup> B62D 3/12

U.S. Cl. 74—422

12 Claims



1. A rack and pinion steering gear comprising:

a pinion;

a rack meshing said pinion;

a movable retainer disposed on the side of said rack opposite to said pinion to support thereon said rack;

a stationary adjuster;

a coil spring disposed between said retainer and said adjuster for urging said retainer against said rack;

said adjuster being changeable in position for adjustment of a force which is generated by said spring and with which said rack is urged for contact with said pinion;

said retainer and said adjuster having adjacent end faces; and a resilient member interposed between said adjacent end faces of said retainer and said adjuster;

at least one of said adjacent end faces being so shaped as to allow said resilient member of itself to retain the ability of being compressed further even when said retainer comes nearest possible to said adjuster.

4,788,879

#### APPARATUS FOR HAND OPERATION OF THROTTLE AND BRAKE PEDAL, AND METHODS OF CONSTRUCTING AND UTILIZING SAME

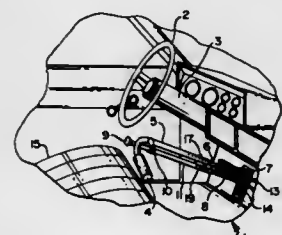
Dana L. Ulrich, 991 SE, Brookedge Ave., Port St. Lucie, Fla. 33452

Filed Sep. 17, 1987, Ser. No. 97,731

Int. Cl.<sup>4</sup> G05G 11/00; B60K 41/20

U.S. Cl. 74—481

7 Claims



1. An apparatus by which the user may operate with one hand the throttle and brake pedal of a conventional automobile, said apparatus is easily transported, transferred and adaptable from one vehicle to another, requires no modification of the automobile, is operable from the conventional driver's seat, and extends out from the throttle and brake pedals to about the end of the driver's seat beneath the steering column, comprising, in combination:

(a) a handle;

(b) a first brake rod having upper and lower ends having said handle fixedly attached to the upper end;

(c) a second brake rod having upper and lower ends telescopically engaged with said lower end of said first brake rod;

(d) first means, operably engaged with said first and second brake rods, for fixing the position of said first brake and second brake rods relative to each other;

(e) second means, operably attached to said lower end of said second brake rod, for operable engagement with said brake pedal of said automobile;

(f) a throttle rod anchor bracket fixedly attached to said first brake rod adjacent to said handle;

(g) a first throttle rod having upper and lower ends which are operably and slidingly engaged with said throttle rod anchor bracket;

(h) a second handle having a flat surface thereon for operable engagement with the thumb of the user fixedly attached to said upper end of said first throttle control rod;

(i) a second throttle rod telescopically engaged with said lower inner end of said first throttle rod;

(j) third means, operably engaged with said first and second throttle rod, for fixing the position of said throttle rods relative to each other;

(k) forth means, operably attached to said lower end of said second throttle rod, for operable engagement with said throttle pedal of said automobile;

(l) said first and second brake rods have provided therein a plurality of transverse apertures;

(m) said first and second throttle rods have provided therein a plurality of transverse apertures;

(n) said first means includes a spring clip for traversing an aperture in each of said first and second brake rods at the same time;

(o) said second means further includes a movable bracket attached to said lower end of said brake rod;

(p) said movable bracket is of a configuration for bringing into contact with the top surface of the brake pedal;

(q) said second means further includes pin-like means for movably attaching said lower end of said second brake rod to said movable bracket;

(r) said first and second throttle rods have provided therein a plurality of transverse apertures which may be aligned in pre-determined positions;

(s) said second means include a ball;

(t) a ball joint for receiving said ball; and

(u) a clip for attaching said second means to said brake pedal.

4,788,880

#### CLAMPING MECHANISM FOR FIXING A STEERING COLUMN HOUSING

Wilhelmus L. M. Kester, Eersel, Netherlands, assignor to Volvo Car B.V., Helmond, Netherlands

Filed Apr. 23, 1987, Ser. No. 41,797

Claims priority, application Netherlands, Apr. 23, 1986, 8601035

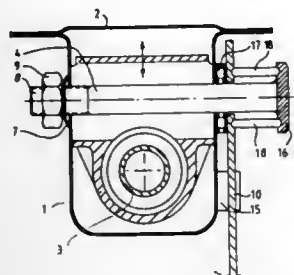
Int. Cl.<sup>4</sup> B62D 1/18

U.S. Cl. 74—493

3 Claims

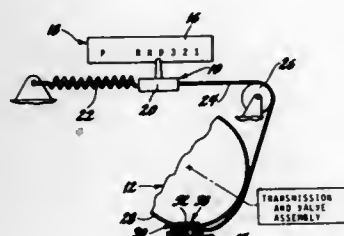
1. Clamping mechanism for fixing a steering column housing of a motor vehicle, which is adjustable in a direction which is substantially perpendicular to the longitudinal direction of the steering column, said mechanism comprising a clamping bolt which is provided in the steering column housing, a lever with which the bolt can be tensioned and the column housing fixed, and at least one spring-loaded element provided between housing and bolt, the lever (10) and the bolt (4) are coupled by one or more pins (18) whose center lines are not parallel to that of the bolt (4) when the clamping mechanism is in a released condition, said pins being held by cups formed in the bolt and the lever, the pins being longer than the distance, measured along the length of the bolt, between said cups when said lever is in the released condition, and said pins exhibit a certain

degree of tilting such that when the lever moves toward a clamping position the pins pass a position in which the center



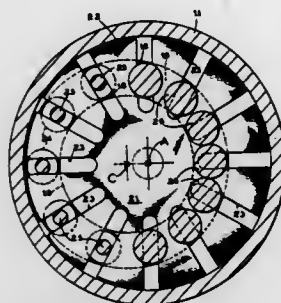
line of at least one of the pins is parallel with the center line of the bolt.

**4,788,881**  
**ADJUSTMENT MECHANISM FOR A TRANSMISSION INDICATOR**  
Marvin L. Owen, Grand Blanc, and Robert C. Swain, Davison, both of Mich., assignors to General Motors Corporation, Detroit, Mich.  
Filed Mar. 4, 1988, Ser. No. 164,192  
Int. Cl.<sup>4</sup> F16C 1/10  
U.S. Cl. 74—500.5 2 Claims



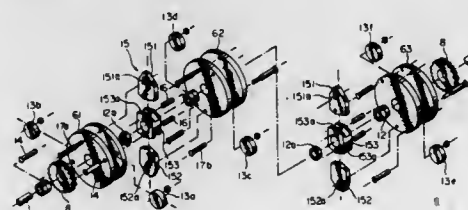
1. An adjustment mechanism for a transmission indicator having an indicia plate, an indicator selectively alignable with indicia on said plate, a cable connected to said indicator, an operator controlled member and said adjustment mechanism connected between said cable and said operator controlled member; said adjustment mechanism comprising: clip means for securing said adjustment mechanism to said operator member in a predetermined position and including a pair of upstanding attachment means; female threaded means secured on said attachment means having a threaded opening means; slide means for securing said cable to said adjustment mechanism including a base slidably disposed between said female threaded means and said clip means and a pair of upstanding leg means disposed on opposite sides of said female threaded means and each leg means having an opening coaxial with said thread opening; and male thread means being captured but freely rotatable in said openings in said leg means and threadably engaging said threaded opening means in said female threaded means and including manual control means for permitting manual rotation of said male threaded means for causing linear motion of said base and said cable relative to said clip and said female threaded means for positioning said indicator relative to said indicia to ensure proper alignment thereof.

**4,788,882**  
**FLYWHEEL**  
Charles Fulop, 14736 Hideaway Lake Ln., Delray Beach, Fla. 33446  
Filed Mar. 14, 1988, Ser. No. 167,581  
Int. Cl.<sup>4</sup> F16H 27/04  
U.S. Cl. 74—572 10 Claims



1. A flywheel comprising:  
a rotatable structure having a predetermined axis of rotation, said rotatable structure including cam means having an annular cam surface extending eccentrically around said axis;  
means for driving said rotatable structure for rotation on said axis;  
guide means inside said rotatable structure presenting a plurality of slideways which extend out from said axis;  
and a plurality of rollers operatively coupled to said guide means to slide along said slideways, said rollers being engageable with said cam surface to be displaced toward and away from said axis during the rotation of said rotatable structure;  
said guide means being rotatably mounted with respect to said rotatable structure at the inside of said rotatable structure and being coupled to said rotatable structure only through said rollers.

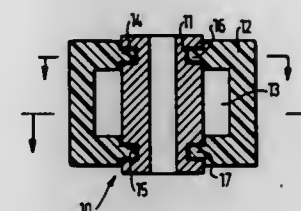
**4,788,883**  
**ROTOR FOR A DRIVING DEVICE**  
Akio Hashizume, Tokyo, Japan, assignor to Yasuyoshi Hashizume, Tokyo, Japan, a part interest  
Filed Nov. 12, 1987, Ser. No. 119,442  
Int. Cl.<sup>4</sup> G05G 1/00, 3/00  
U.S. Cl. 74—572 9 Claims



1. A driving device comprising an output shaft having a first transmission gear, a plurality of rotor bodies each having a second transmission gear engaged with said first transmission gear, each of said rotor bodies comprising a support shaft, each of said rotor bodies further comprising a plurality of axially spaced rotating body parts rotatably mounted on said support shaft, balance pieces each having an eccentrically located pin, said pin being rotatably mounted on an outer peripheral portion of said rotating body parts such that said balance pieces are rotatable relative to said rotating body parts, crank means rotatably mounted on said support shaft between two axially spaced rotating body parts, said crank means comprising a

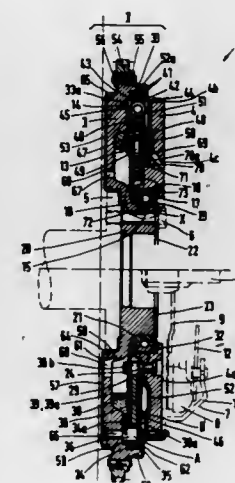
crank body and two diametrically opposed crank plates pivotally mounted on said crank body, said crank plates having elongated holes, a first connecting pin connected to a rotating body part disposed on one axial side of said crank means and extending into the elongated hole of one crank plate, and a second crank pin connected to a rotating body part located on the other axial side of said crank means and extending into the elongated hole of the other diametrically opposed crank plate.

**4,788,885**  
**HOUSING CONSISTING OF AT LEAST TWO PARTS**  
Romain Fries, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 897,784, Jul. 15, 1986, abandoned. This application Jan. 12, 1988, Ser. No. 143,446  
Claims priority, application Fed. Rep. of Germany, Feb. 2, 1985, 3503558  
Int. Cl.<sup>4</sup> F16H 57/02; H01J 5/00; H05K 15/06  
U.S. Cl. 74—606 R 7 Claims



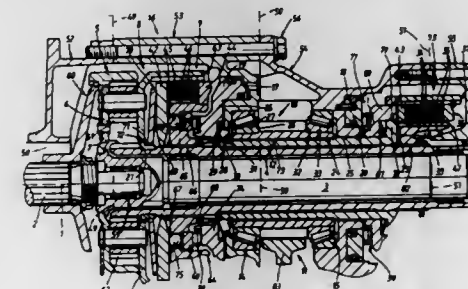
1. A housing, comprising:  
an inner and an outer part, said inner part being arranged radially inside of said outer part so as to form an enclosed space radially therebetween, said parts having different heat expansion coefficients and a plurality of interengaging projections and grooves, said interengaging projections and grooves being formed to thermally expand at different rates against each other because of said different heat expansion coefficients so as to effect a moisture-tight seal of said space wherein said parts have two end portions extending radially from at least one of said parts toward the other of said parts, said end portions being formed with at least one of said projections and grooves thereon facing the other of said parts.

**4,788,884**  
**APPARATUS FOR COUNTERACTING TORSIONAL STRESSES**  
Wolfgang Reik, Bühl, and Hans-Dieter Ellison, Offenburg, both of Fed. Rep. of Germany, assignors to Luk Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 901,775, Aug. 28, 1986, abandoned. This application Sep. 8, 1986, Ser. No. 904,873  
Claims priority, application Fed. Rep. of Germany, Sep. 7, 1985, 3532018; Jul. 5, 1986, 3622697; Aug. 25, 1986, 3628770; Sep. 6, 1986, 8623931[U]  
Int. Cl.<sup>4</sup> F16F 15/12  
U.S. Cl. 74—574 39 Claims



1. A torsional vibration damping apparatus, particularly for use in motor vehicles, comprising a first flywheel connectable to the output element of the engine in a motor vehicle and a second flywheel coaxial with and rotatable relative to the first flywheel and connectable to the input element of the change-speed transmission of a motor vehicle, particularly by way of a friction clutch; antifriction bearing means interposed between said flywheels; a chamber containing a supply of viscous fluid medium; and at least one damper operating between said flywheels, disposed in said chamber and comprising at least one energy storing element, a first component rotatable with said first flywheel and having a first window for said at least one energy storing element, and a second component rotatable with said second flywheel and having a second window for said at least one energy storing element.

**4,788,886**  
**PLANETARY TRANSMISSION FOR TWO AXLES OF A MOTOR VEHICLE**  
Erwin Nussbaumer, Waiblingen; Rainer Gross, Stuttgart; Herbert Botzelmann, Remshalden; Hans Haller, Hattenhofen, and Franz Buchwald, Lauffen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany  
Filed Jan. 15, 1987, Ser. No. 3,388  
Claims priority, application Fed. Rep. of Germany, Jan. 15, 1986, 3600875  
Int. Cl.<sup>4</sup> F16H 37/06  
U.S. Cl. 74—665 T 7 Claims



1. A planetary wheel transfer transmission for the drive of two vehicle axles of a motor vehicle having an input shaft that can be driven by a driving machine and is central with respect to a main axis of a gearbox, a coaxial central output shaft, and a concentric output shaft, that is concentric with respect to one of the input shaft and the central output shaft connected in a



tionally stable way with one transmission element respectively of a planetary wheel gear having a locking multi-disk clutch connecting two of the planetary wheel gear elements with one another, and having an input wheel of an axle offset gear that can be driven by the concentric output shaft, and where the planetary wheel gear and the locking multi-disk clutch are located in line with respect to one another along the main axis of the gearbox, the improvement comprising:

- a concentric outer hollow shaft rotatable on the concentric output shaft;
- an input wheel means disposed on the side of the locking multi-disk clutch that is opposite the planetary wheel gear and held in a torsionally fixed way on the concentric outer hollow shaft;
- an axle-connecting multi-disk clutch arranged on the side of the input wheel means that is opposite the locking multi-disk clutch for bringing the concentric outer hollow shaft into driving connection with the concentric output shaft, each end of said input wheel means being supported in a transmission housing by a respective bearing means, and a ring-shaped working pressure chamber means with a respective axial ring position means arranged centrally to the main axis of the gearbox at each end of said input wheel means and axially between a respective bearing means and the adjacent multi-disk clutches so that the axial ring position are actuated in the direction away from the input wheel means along the main shaft axis of the gearbox.

4,788,887

#### ADAPTABLE LAYSHAFT TYPE GEARBOX USING A PLANETARY GEARSET, IN PARTICULAR FOR AUTOMOBILE VEHICLES

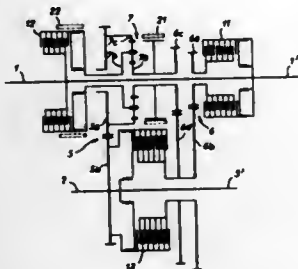
Pierre A. G. Lepelletier, Chatou, France, assignor to Valeo, Paris, France

Filed Nov. 7, 1986, Ser. No. 928,099

Claims priority, application France, Nov. 8, 1985, 8516585  
Int. Cl.<sup>4</sup> F16H 37/06

U.S. Cl. 74—674

22 Claims



1. Gearbox comprising a casing, parallel primary or input and secondary or output shafts in said casing, a single output gear train of constant-mesh gearwheels including a gearwheel fastened to said secondary shaft, an independent input gear train of constant-mesh gearwheels, a first control clutch and a second control clutch located on said primary shaft, a third control clutch located on said secondary shaft, said first and third control clutches respectively coupling said input train to said primary shaft and said secondary shaft, and a three-element planetary gearset concentric with said primary shaft and comprising a sun gear fastened to said input train, a planet carrier coupled to said primary shaft by said second clutch and a ring gear fastened to said output train, said control clutches being selectively operable in pairs to define three forward gear ratios.

4,788,888

#### TWO-AND-FOUR-WHEEL DRIVE SHIFTING SYSTEM

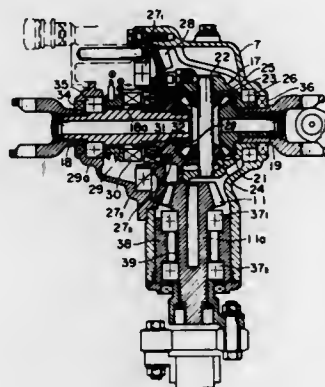
Shinobu Tsutsumikoshi, Hamamatsu, Japan, assignor to Suzuki Motor Company Limited, Shizuoka, Japan

Continuation of Ser. No. 764,580, Aug. 12, 1985, abandoned.  
This application Dec. 17, 1987, Ser. No. 135,526

Claims priority, application Japan, Jan. 30, 1985, 60-16060  
Int. Cl.<sup>4</sup> F16H 1/44

U.S. Cl. 74—710.5

2 Claims



1. A two-and-four wheel drive shifting system, wherein there is provided, in combination, a pair of output shaft means extending oppositely from each other and mounted rotatably independently of each other about an axis, a differential gear means disposed intermediate said pair of output shaft means, an input gear means mounted rotatably on a gear casing means of said differential gear means, first claw means provided on a part of an outer surface of said differential gear casing means, said first claw means being secured to said outer surface by first securing means extending in the direction of said axis, second claw means provided on a part of an inner surface of said input gear means, said second claw means being secured to said inner surface by second securing means extending in the direction of said axis, said second claw means being spaced outwardly from said first claw means and being concentric therewith, and a sliding clutch means mounted slidably on one of said pair of output shaft means, said sliding clutch means having engagement claw means adapted to commonly engage with said first and second claw means provided on said differential gear casing means and on said input gear means, said sliding clutch means and output shaft means having spline means located in the inner circumference of said sliding clutch means and located on a portion of the outer circumference of said output shaft means so that said sliding clutch means and said output shaft means may engage slidably with each other, and wherein there are provided three shifting stages which may be selected by the shifting motion of said sliding clutch means, namely, an operating stage wherein said sliding clutch means is out of engagement with said first and second claw means of said differential gear casing means and said input gear means which is rotating freely, another operating stage wherein said sliding clutch means is selectively shifting into operative engagement with said first and second claw means of said differential gear casing means and said input gear means only, and a further operating stage wherein said sliding clutch means is shifted into operative engagement with said first and second claw means of said differential gear casing means and said input gear means and also the spline means in said sliding clutch means is operatively connected with the spline means on said output shaft means by sliding said sliding clutch means further after said engagement claw means is engaged with said first and second claw means of said differential gear casing means and said input gear means, said first claw means and second claw means being made to have the length thereof in a direction along said axis larger than that in a radial direction.

4,788,889

#### MECHANICAL TRANSMISSION AND CONTROL METHOD THEREFOR

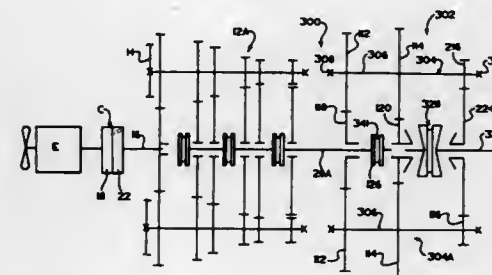
Alan R. Davis, Plainwell, and John R. Vandervoort, Richland, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Mar. 19, 1987, Ser. No. 27,987

Int. Cl.<sup>4</sup> F16H 3/08, 5/40

U.S. Cl. 74—745

19 Claims



1. A change gear mechanical transmission comprising: an input component comprising an input shaft, an input gear adapted to be rotationally fixed to said input shaft, at least one countershaft carrying a plurality of countershaft gears thereon, one of said countershaft gears constantly meshed with said input gear and a plurality of mainshaft gears constantly meshed with other of said countershaft gears; a connecting component comprising a mainshaft and a plurality of first mainshaft clutch members and a second mainshaft clutch member rotationally fixed to said mainshaft, said connecting component independently rotatable of said input component; an output component comprising an output shaft, said output component independently rotatable of said connecting component; said mainshaft gears selectively clutchable one at a time to said mainshaft by first clutch means including said first clutch members; said output component drivably engagable and disengagable to said mainshaft by second clutch means including said second clutch members; control means allowing manual selection of engaged and disengaged positions for said first clutch means and for positioning said second clutch means in an engaged or a disengaged position, said transmission characterized by: said control means including means for sensing the positioning of all of said first clutch means in the disengaged positions thereof, and for automatically positioning said second clutch means in the disengaged position thereof in response thereto.

4,788,890

#### PERFORMANCE CONTROL OF A MOTOR VEHICLE ENGINE FOR CONSISTENT HIGH QUALITY TRANSMISSION SHIFTING

Charles E. Anderson, Fenton, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 29, 1987, Ser. No. 67,454

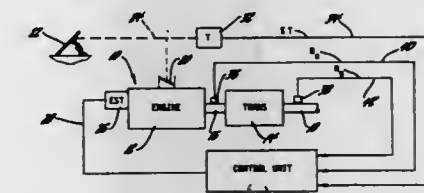
Int. Cl.<sup>4</sup> B60K 41/04

U.S. Cl. 74—851

6 Claims

4. In a motor vehicle including a spark ignition internal combustion engine adapted to drive the vehicle through an automatic shift transmission calibratable to provide acceptable shift quality at a specified engine performance level, and an engine control normally effective to schedule the engine spark timing for producing substantially optimum engine performance, a method of operation which avoids degradation of transmission shift quality due to variations in the engine performance level, the method comprising the steps of: calibrating the transmission to provide acceptable shift qual-

ity at a less than optimum specified engine performance level; predefining engine acceleration levels that would occur during shifting of the transmission at an engine performance level corresponding to said less than optimum specified level; measuring an actual engine acceleration level in the course of transmission shifting; and



during shifting of the transmission, retarding the engine spark timing from the value normally scheduled by said engine control so as to bring the actual engine acceleration level into correspondence with the predefined engine acceleration level, thereby bringing the actual engine performance level into correspondence with the less than optimum specified engine performance level for which the transmission is calibrated.

4,788,891

#### PLANETARY GEAR HAVING NON-CIRCULAR GEARS

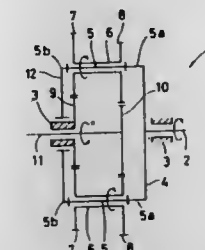
Hideo Katori, Hidaka, Japan, assignor to Japan Society for the Promotion of Machine Industry, Tokyo and Hikari Kosaku-sho Co., Ltd., Kawanishi, both of Japan

Filed Dec. 5, 1986, Ser. No. 938,381

Int. Cl.<sup>4</sup> F16H 3/54, 3/56

U.S. Cl. 74—781 R

9 Claims



1. A planetary gear device, comprising a non-rotatable casing, an input shaft driven for rotation by a drive source, means rotatably supporting said input shaft inside and on said non-rotatable casing, a carrier fixed on said input shaft and extending radially from said input shaft, an output shaft rotatably supported in said non-rotatable casing, a plurality of planetary shafts connected at one of the respective ends thereof to said carrier and equispaced from each other on a circle concentric with the rotational axis of said input shaft, a plurality of planetary gear units each integrally comprising a main driving gear and a driven gear and each being rotatably supported on the respective planetary shaft of said plurality of planetary shafts, an output gear fixed on said output shaft and meshing with said driven gears, and a fixed gear fixed to said non-rotatable casing and meshing with said main driving gears, wherein at least either the combination of said main driving gears and said fixed gear or the combination of said driven gears and said output gear forms pairs of non-circular gears whose pitch curves are configured in rotational symmetries, wherein said plurality of planetary shafts corresponds in number to said rotational symmetries, and wherein said planetary shafts are arranged symmetrically with respect to said input shaft.

4,788,892

**CONTROLLER FOR AUTOMATIC TRANSMISSION**  
Norio Komoda, Nagoya, and Atsumu Otake, Toyota, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

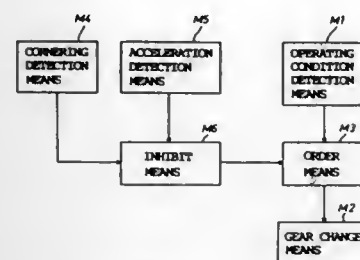
Filed May 12, 1986, Ser. No. 861,856

Claims priority, application Japan, May 11, 1985, 60-100150;  
Jun. 26, 1985, 60-142095

Int. Cl.<sup>4</sup> B60K 41/06

U.S. Cl. 74-866

10 Claims



4. A controller for an automatic transmission comprising: a sensor for detecting a vehicle operating condition; a transmission for transmitting driving power to wheels; ordering means for ordering a shift change of said transmission to drive said transmission based on the detected operating condition; cornering detection means for detecting a degree of vehicle cornering; throttle opening detection means for detecting the degree of throttle opening; inhibiting means for inhibiting a shift down order of said transmission when said detected vehicle cornering degree and said detected throttle opening degree are above first and second preset values, respectively; first release means for releasing inhibition of said shift down order when said detected degree of throttle opening is below the second preset value during inhibition of said shift down order; and second release means for releasing said inhibition of said shift down order when said detected vehicle cornering degree and a cornering speed responsive thereto are below third and fourth preset values, respectively, and when the detected throttle opening degree increases more than the throttle opening degree sufficient to generate the inhibition of the shift down order.

4,788,893

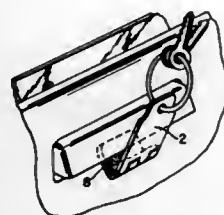
**AUTOMOBILE DOOR HANDLE OPENER**  
Gary C. Sutton, 7335 Carroll Ave., Takoma Pk., Md. 20912

Filed Apr. 9, 1987, Ser. No. 36,469

Int. Cl.<sup>4</sup> B25B 9/00

U.S. Cl. 81-15.9

13 Claims



1. A tool comprising:  
a hook means for engaging an opener handle operatively attached to a mechanically actuable mechanism, and

a body for holding said tool and applying force to operate said opener handle to actuate said mechanism.

4,788,894

**HAND TOOL FOR REMOVING SPRINKLER HEADS FROM UNDERGROUND WATERING SYSTEMS**  
Mark A. Mitschele, 4052 E. Sbeana Dr., Phoenix, Ariz. 85032

Filed Apr. 20, 1987, Ser. No. 40,134

Int. Cl.<sup>4</sup> B25B 27/00

U.S. Cl. 81-488

3 Claims



1. A hand held tool for penetrating the turf and ground over and around a sprinkler head of an underground watering system for removing and repair or replacement of said sprinkler head comprising:

a hollow conical-shaped member, the narrow end of which is serrated around the edge of its periphery for penetrating the turf and ground, and the wider end of which is provided with a handle means extending axially therefrom, and means forming a ridge extending inwardly of and fully around the inside periphery of said member at a point substantially midway of its length for aiding in compressing and trapping the ground inside of said member for holding firmly said sprinkler head within said member when the tool is rotated to remove said sprinkler head from the watering system.

4,788,895

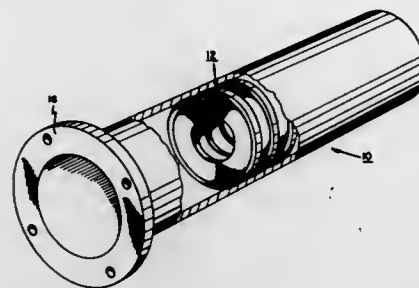
**SELF-ADJUSTING RESILIENT BAR STOCK SUPPORT**  
Richard C. Spooner, Guilford Rd., Durham, Conn. 06422

Filed Jul. 24, 1987, Ser. No. 77,684

Int. Cl.<sup>4</sup> B23B 25/00

U.S. Cl. 82-38 A

9 Claims



1. A bar stock support, comprising:  
(a) a tubular member;  
(b) resilient means extending radially inwardly from the inner wall of said tubular member toward the major axis of said tubular member to define a generally cylindrical channel having a diameter smaller than at least the largest crosssectional dimension of the smallest said bar stock to

be supported, so that at least some of said resilient means is deformed by said bar stock; and  
(c) said resilient means having sufficient resistance when deformed to support said bar stock generally concentrically within said tubular member and to resist movement of said bar stock radially within said bar stock support, said resilient means comprises at least one bristle structure, said bristle structure comprises bristles fixed in a channel structure in the form of a helix fixed to the inside surface of said tubular member.

4,788,896

**TONE GENERATOR HAVING A VARIABLE NUMBER OF CHANNELS WITH A VARIABLE NUMBER OF OPERATING UNITS**

Yasuji Uchiyama, and Shigeru Suzuki, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

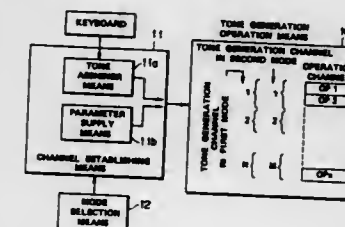
Filed Jun. 18, 1986, Ser. No. 875,479

Claims priority, application Japan, Jun. 21, 1985, 60-135793

Int. Cl.<sup>4</sup> G10H 1/06, 7/00

U.S. Cl. 84-1.01

10 Claims



10. A plural channel tone generation device comprising: an operation unit means having a predetermined number of operation units each adapted for performing a specific tone generation operation; and a channel establishing means for assigning each operation unit to one of a plurality of specific groups, the number of operation units in each specific group defining a tone generation channel, wherein the channel establishing means includes an operation unit number changing means for changing the number of operation units in at least one of the specific groups in accordance with a preselected operation mode thereby to change the number of operation units in the corresponding tone generation channel.

4,788,897

**MULTIBEAT DRUM PEDAL**

Eric J. Kirby, 132 Jefferson St., NW., and Lawrence C. Smith, 119 Ingraham St., both of Washington, D.C. 20011

Continuation-in-part of Ser. No. 29,963, Mar. 25, 1987, abandoned. This application Oct. 30, 1987, Ser. No. 114,517

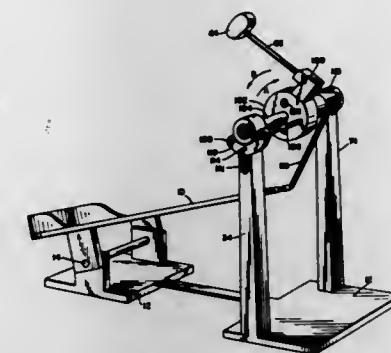
Int. Cl.<sup>4</sup> G10D 13/02

U.S. Cl. 84-422 R

9 Claims

3. A drum hammer drive assembly, comprising: an actuating lever arm adapted for operative connection to a foot pedal, first drive means rotationally driven in a first direction by movement of said actuating lever in said first direction, first spring means for biasing said actuating lever against movement in said first direction, second drive means rotationally driven in a first direction by rotation of said first drive means in said first direction, second spring means for biasing said second drive means against rotation in said first direction, and striking means attached to said second drive means and driven in a first direction by rotation of said second drive means in said first direction, said second drive means being driven by said first drive means through a releasable engagement linkage, wherein upon rotation of said striking means through a drum strik-

ing arc of predetermined length, said releasable engagement linkage disengages said first and second drive means and said second spring means causes said second drive



means to return rotate in a rotational direction opposite to said first rotational direction upon disengagement of said releasable linkage.

4,788,898

**CONTROL FOR A BOBBIN CARRIER**

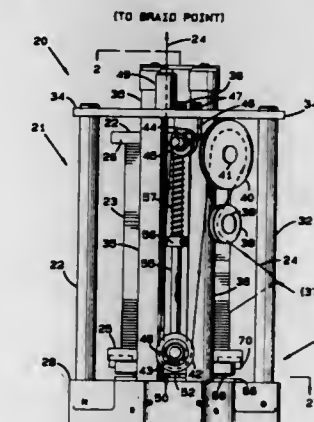
Jeffrey F. Bull, Akron, Ohio, assignor to Karg Corporation, Tallmadge, Ohio

Filed Dec. 18, 1987, Ser. No. 134,840

Int. Cl.<sup>4</sup> D04C 3/18; B65H 59/02

U.S. Cl. 87-57

8 Claims



1. A bobbin carrier having a base member for operational mounting before a braid point on a strand fabricating machine; said bobbin comprising a spool, a package of wound strand material and a letoff length or free end of strand material extending in a movement path from said bobbin to said braid point, said bobbin spool having a hub and a control flange and an opposed side flange carried by said hub, said carrier base member having an axial post for rotatable mounting of said bobbin, said carrier further having post means located radially around said axial post, said post means supporting means for guiding said strand along said movement path, means for tensioning a moving strand in contact with said guide means, a reciprocating rod movable in response to said strand tensioning means and projecting into said base member, and a means to control bobbin rotation around said axial post during said strand path movement, said bobbin control means being carried by and mounted within said base member, said base member having cavities, said control means having movable components housed in said cavities in said base member and including: a finger cam connected to said reciprocating rod; a free



cam movable by said finger cam; a ratchet gear rotatable around the base of said axial post; a first pawl cam normally biased to prevent rotation of said ratchet gear in one direction (e.g. clockwise); and, a second pawl cam normally biased to prevent rotation of said ratchet gear in a second direction (e.g. counter-clockwise).

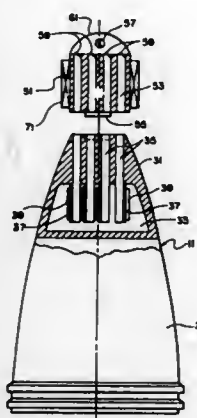
**4,788,899**  
**AMMUNITION WITH INTERNAL LIGHT-SETTABLE PICKUP ARRANGEMENT FOR DIGITAL MEMORY STORAGE**

Charles E. Chandler, Cockeysville, Md., assignor to AAI Corporation, Hunt Valley, Md.

Filed Aug. 19, 1981, Ser. No. 294,254  
Int. Cl. F42C 17/00

U.S. Cl. 89—6

12 Claims



1. A projectile having a light-settable photodetector and signal storage arrangement, comprising a projectile body section having a plurality of light passageways formed therein and communicating with an interior section of said projectile, a photovoltaic cell disposed adjacent each of said light passageways at said interior section, and a discrete electrical storage medium connected to each of said photovoltaic cells for compositely registering a composite digital signal transmitted by light through said passageways to said photovoltaic cells.

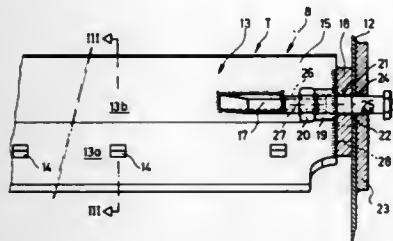
**4,788,900**  
**ADJUSTABLE BLADE SUPPORT FOR ROUND BALE PRESS STRIPPER**

Ansvar Berkens, Heeze, Netherlands, assignor to P. J. Zweegers En Zonen Landbouwmachinefabriek BV, Netherlands

Filed Mar. 26, 1987, Ser. No. 31,238  
Claims priority, application Fed. Rep. of Germany, Apr. 2, 1986, 3610970

Int. Cl. B30B 9/30; A01F 15/00  
U.S. Cl. 100—88

14 Claims



1. A round bale press for agricultural stalk material compris-

ing a pressing chamber with variable volume which is defined by a housing and by at least one continuous belt, said housing comprising two opposed housing side walls, said belt is guided by a plurality of cylindrical rollers, at least one stripping device connected to said housing adjacent to one of said rollers, said stripping device consisting of a support containing a rail having a central section and first and second end sections carrying supporting plates, a long spring steel knife blade fastened to the rail, said supporting plates being pivotally mounted between said housing side walls about an axis lying parallel to the longitudinal axis of the support, said support plates being adjustably connected to an adjusting means for adjustment of their angular position in order to have a contact between the knife blade and the surface of the roller, wherein the contact pressure of the blade edge on the roller surface can be made uniform over the longitudinal extension of the knife blade by the convex bending of the rail with its knife blade towards the surface of the roller, characterized in that for the bending of the rail there is provided at least one clamping device which can be actuated from outside the housing side walls and that by means of said clamping device the central section of the rail can be bent relatively to the end sections of the rail towards the surface of the roller.

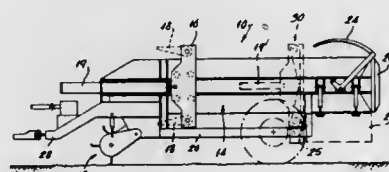
**4,788,901**  
**DEAD ENDED SQUARE BALER**

Wilfred E. Klinner, Milton Keynes, and Anthony J. Goff, Essex, both of England, assignors to National Research Development Corporation, London, England

Filed Dec. 26, 1986, Ser. No. 844,162  
Claims priority, application United Kingdom, Mar. 27, 1985, 8508004

Int. Cl. B65B 13/20  
U.S. Cl. 100—188 R

7 Claims



1. A mobile dead-ended crop baler comprising: means defining a bale chamber through which crop flows in one direction, said chamber including a downstream section having opposed side walls and opposed top and bottom walls, all of said walls extending generally parallel to said one direction, said bottom wall being split in said one direction into two base plates and said side walls being longitudinally hinged to said top wall and to adjacent ones of said two base plates; means for compressing crop to be baled in said downstream section in said one direction; and means mounted at least one of said side walls and said bottom wall for movement outward of said section to expose a side and bottom surface of a compressed bale made in said section to facilitate the release of the bale from said section.

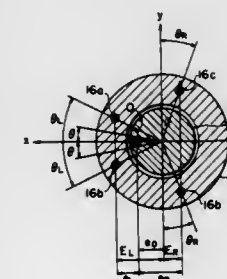
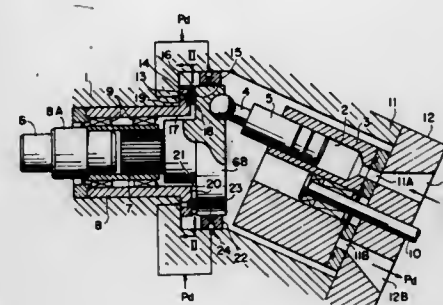
**4,788,902**  
**THRUST HYDROSTATIC BEARING DEVICE FOR USE IN AXIAL PISTON MACHINE**

Yoshimichi Akasaka, Tsuchiura; Ichiro Nakamura, Katsuta; Ken Ichirya, Ibaraki; Elji Komatsu, Abiko, and Yasuharu Gotoh, Tsuchiura, all of Japan, assignors to Hitachi Ltd. and Hitachi Construction Machinery, both of Tokyo, Japan

Filed Aug. 24, 1987, Ser. No. 88,415  
Claims priority, application Japan, Aug. 25, 1986, 61-197157; Jan. 16, 1987, 62-6016

Int. Cl. F01B 13/04; F16C 32/06  
U.S. Cl. 91—486

8 Claims



1. A thrust hydrostatic bearing device for use in an axial piston machine including a housing cover, a cylinder block having a plurality of cylinder holes, and pistons movable back and forth in corresponding cylinder holes and fixed to piston rods rotatably engaged with a disc portion of a drive shaft of said axial piston machine, said pistons being mounted such that they are inclined with respect to said drive shaft, hydrostatic pads disposed at locations at which the equation  $e_L \cdot \theta_L = e_R \cdot \theta_R$  is satisfied, where axes each other and to the axis of a bearing sleeve fixed into said housing cover for rotatably supporting said drive shaft through a bearing are called the x-axis and y-axis,  $e_L$  is the difference between the x-coordinate  $e_O$  of the mean point of application of the piston reaction forces and the x-coordinate  $E_L$  of the centers of a number of said hydrostatic pads disposed on the side of points of application of said reaction forces,  $e_R$  is the sum of the x-coordinate  $e_O$  of the mean point of application of the piston reaction forces and the x-coordinates  $E_R$  of the centers of a number of said hydrostatic pads disposed on the side at which said reaction forces are not applied,  $\theta_L$  is the angle between the center of each of said hydrostatic pads disposed on said side of points of application of said reaction forces and the x-axis, and  $\theta_R$  is the angle between the center of each of said hydrostatic pads disposed on said side at which said reaction forces are not applied and the y-axis.

6. A thrust hydrostatic bearing device for use in an axial piston machine including a casing, a cylinder block having a plurality of cylinder holes, and pistons movable back and forth in corresponding cylinder holes and fixed to piston rods rotatably engaged with a disc portion of a drive shaft of said axial piston machine, said pistons being mounted such that they are

inclined with respect to said drive shaft, means for adjusting in synchronism with the angle of inclination of said cylinder block a restricted area formed by an oil groove communicating with a discharge port of a port plate having one end surface in slidable contact with said cylinder block and another end surface in slidable contact with said casing, as well as an oil groove provided in a seal land for a discharge port in an arcuate, inclined sliding surface of said casing, said bearing device further including an oil passage for communicating an adjusted discharge pressure of said axial piston machine to an end face of a hydrostatic pad at a side of a rod provided in a thick wall portion of said casing thereby rotatably supporting said disc portion of said drive shaft.

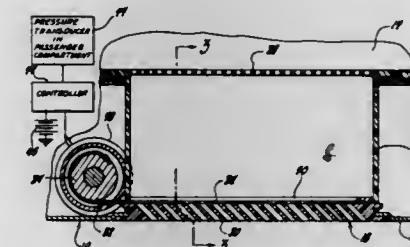
**4,788,903**  
**MOTOR VEHICLE AIR MANAGEMENT SYSTEM**

George H. Johnson, Newfane, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Sep. 29, 1986, Ser. No. 912,416  
Int. Cl. B60H 1/26

U.S. Cl. 98—1.5

2 Claims



1. In a motor vehicle having a passenger compartment with an air inlet at a positive pressure area on the vehicle and an air outlet at a negative pressure area on the vehicle wherein there occurs a pressure differential during vehicle movement that forces air to flow into the inlet through the passenger compartment and out the outlet and that can also force air to flow into the compartment through a leakage path on the vehicle, the improvement comprising valve means for varying the area of said outlet, and pressure responsive control means responsive to the pressure in said compartment for controlling said valve means so as to maintain the pressure in said compartment above ambient pressure to prevent entry of ambient air into said compartment through said leakage path.

**4,788,904**  
**ASSEMBLY FOR COOLING VEHICLE PARTS**

Wolfgang Radtke, Steinenbrück, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

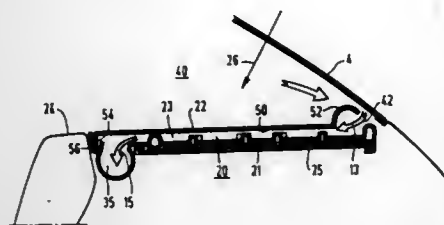
Filed Jul. 16, 1987, Ser. No. 74,288  
Claims priority, application Fed. Rep. of Germany, Jul. 17, 1986, 3624222

Int. Cl. B60H 1/26  
U.S. Cl. 98—2.18

18 Claims

14. A method for cooling portions of a motor vehicle exposed to incident solar radiation, said method comprising the steps of: transmitting incident solar radiation through a cover panel essentially transparent to optical wavelengths of electromagnetic radiation and impervious to infrared wavelengths; heating an absorber panel with the solar radiation transmitted through said cover panel; channeling air from a passenger compartment of the vehicle through an air space between said absorber panel and said cover panel;

transferring heat from said absorber panel to the air channeled through said air space; and

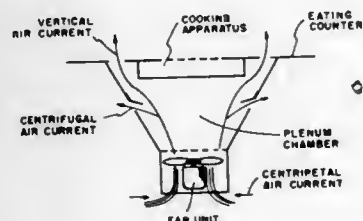


exhausting the heated air to the ambient atmosphere surrounding the vehicle.

**4,788,905**  
**COMBINATION COOKING, EATING AND VENTILATING SYSTEM**  
Henry Von Kohorn, 215 Rocky Rapids Rd., Stamford, Conn. 06903

Filed Jun. 10, 1987, Ser. No. 60,768  
Int. Cl.<sup>4</sup> A47J 37/07  
U.S. Cl. 99—357

2 Claims



1. A barbeque cooking, eating and ventilating system intended for use by a plurality of persons seated in close proximity to and on all sides of said system, comprising:

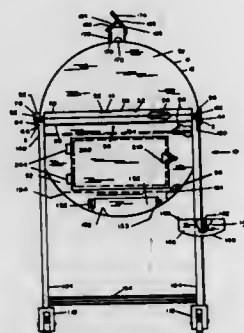
- a cooking apparatus having a central perforated grill, a substantially unperforated griddle surrounding said grill, heat generating means disposed below and extending under said grill and at least part of said griddle, and shelf means disposed below said heat generating means,
- an eating counter substantially surrounding said cooking apparatus,
- a spacing between said griddle and said eating counter, support means for said cooking apparatus and said eating counter, and
- an apparatus for providing threefold ventilation and comfort cooling to persons seated around said system, comprising: an electrically driven fan centrally disposed below said cooking apparatus,
- a plenum chamber centrally disposed between said seated persons and between said fan and said cooking apparatus, said plenum chamber being formed by vertically extending walls having upper ends terminating below said eating counter, said plenum chamber being adapted to receive air blow upwardly by said fan,
- an intake means connected to said fan and adapted to centrifugally draw air into said system from all sides at a level so as to cause said air to flow in a cooling manner past the torsos of the persons seated on all sides of said barbeque system,
- openings in the wall of said plenum chamber having means for the regulated lateral escape and centrifugal flow of air in a cooling manner below the eating counter past the torsos of the persons seated on all sides of said barbeque system, and
- means for deflecting said upwardly blow air toward and rising from said spacing on all sides of said cooking appa-

ratus, said air curtain drawing heat and smoke generated by the cooking upwardly and insulating the persons seated at said eating counter and surrounding said barbeque system from heat and smoke.

**4,788,906**  
**GRILL**  
Jimmie Starks, 5510 N. 50th St., Omaha, Nebr. 68104  
Filed Oct. 8, 1987, Ser. No. 105,863  
Int. Cl.<sup>4</sup> A47J 37/00

U.S. Cl. 99—450

5 Claims

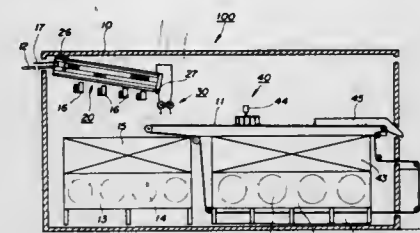


1. A grill comprising a firechamber having a pair of firechamber sections comprising a bottom section and a top section, said firechamber sections each having sidewall and end wall portions, said bottom firechamber section being concave on its upper side, said top firechamber section being concave on its underside, said top firechamber section being raisable with respect to said bottom firechamber section, said firechamber sections each being of the shape of a portion of a cylinder so as to be formable from a metallic liquid-container drum of a type having a substantially cylindrical outer surface by cutting said drum into two parts along a plane parallel to the axis of such cylindrical outer surface, said firechamber sections each having a generally straight jagged edge, each jagged edge being opposite a jagged edge of the opposite firechamber section, opposed jagged edges comprising a pair of jagged edges, protective sealing members arranged in pairs, the sealing members of a pair being attached to the top and bottom firechamber sections respectively, each sealing member of a pair having a covering surface disposed adjacent a different one of said jagged edges and disposed extending horizontally, each sealing member also having a horizontal straight sealing surface disposed on the opposite side of the respective sealing member from the respective said covering surface, front ones of said sealing members being on said top and bottom sections respectively and having their sealing surfaces parallel to and substantially sealing against the sealing surface of an opposite sealing member to substantially restrain hot gases from escaping therebetween out of said firechamber, two of said sealing members being supporting sealing members disposed on said bottom section on opposite sides thereof, the ends of said two supporting sealing members providing four post-supportable points, said grill having four spaced posts, each of said posts having an upper end supporting and attached to one of said supporting sealing members at one of said post-supportable points, a pair of wheels supporting the lower ends of two respective ones of said posts at one side of said grill, said two supportive sealing members, having portions of one piece therewith and projecting to a certain side of said firechamber housing sections, a handle means useful for assisting a lifting of the respective end of said grill and for the pushing of said grill, said handle means being on the opposite side of said grill from said wheels, said projecting portions serving as parts of said handle means.

**4,788,907**  
**APPARATUS FOR LOOSENING AND FREEZING HEAT PROCESSED CEREALS**

Junichi Mizutani, Sayama, and Hiroyuki Arita, Hachioji, both of Japan, assignors to Nichirei Corporation, Tokyo, Japan  
Filed Aug. 3, 1987, Ser. No. 81,290  
Claims priority, application Japan, Aug. 11, 1986, 61-188304  
Int. Cl.<sup>4</sup> A23B 4/06, 7/04, 9/00  
U.S. Cl. 99—517

12 Claims



1. An apparatus for loosening and freezing heat processed cereals into individual grains, said cereals being in the form of separate grains in a raw state and exhibiting agglutinating properties when heat processed, said cereals being selected from the group consisting of rice and rice with additives, said apparatus comprising in combination:

- a cylindrical rotary drum for receiving said cereals previously heat processed and this exhibiting agglutinating properties, and for loosening said cereals so as not to form lumps or blocks, while the cereals are frozen, said drum including a netted wall having a mesh size to prevent the cereals from passing through said drum,
- means for rotating said drum,
- means provided in the inside of said drum for carrying up and subsequently dropping said cereals in said drum for loosening said cereals in said drum, and
- means for blowing a chilling fluid into the inside of said drum through said netted wall to blow up and simultaneously freeze said cereals.

**4,788,908**  
**AUTOMATIC RELEASE TIMING CONTROL SYSTEM**  
Yoshio Sugiyama, and Yoshimi Kozuka, both of Nagoya, Japan, assignors to Kabushiki Kaisha Sugiyama Denki Seisakusho, Nagoya, Japan

Filed May 18, 1987, Ser. No. 50,577  
Claims priority, application Japan, May 21, 1986, 61-117973  
Int. Cl.<sup>4</sup> B30B 15/14, 3/04

U.S. Cl. 100—47

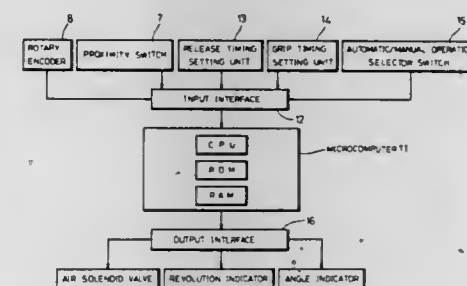
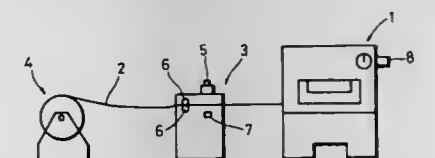
2 Claims

1. For use with a press having pilot pins and a feeder adapted to feed a web of sheet material to said press and having a part that revolves and a sheet release mechanism, said sheet material having pilot holes in which said pilot pins of said press are engageable, an automatic release timing control system for automatically controlling the timing at which, when said pilot pins of said press are inserted into said pilot holes of said sheet material, said feeder is activated to temporarily release its gripping of said sheet material at a time that is dependent on the revolution speed of said part of said press and the response times of said feeder, said automatic release timing control system comprising:

- (a) a rotary encoder for detecting the revolution of said press in operation and for producing a signal indicative of the detected revolution;
  - (b) a sensor for detecting the operating position of said release mechanism of said feeder and for producing signals indicative of a sheet releasing position and a sheet gripping position of said release mechanism; and
  - (c) a control circuit for controlling the timing at which said release mechanism of said feeder temporarily releases said sheet material, said control circuit including
- (1) first means for receiving a signal from said rotary

encoder and for calculating the rotational angle of said press in operation;

- (2) second means for receiving a signal from said rotary encoder and for calculating the revolution speed of said part of said press in operation;
- (3) third means for outputting a sheet release signal and a sheet grip signal to said release mechanism when the rotational angle of said press matches a predetermined rotational angle corresponding to the sheet release timing of said release mechanism and a predetermined rotational angle corresponding to the sheet grip timing of said release mechanism, respectively;
- (4) fourth means for receiving, from said sensor for detecting the operating position of said release mechanism, signals indicative of the releasing position and the gripping position of said release mechanism, and for calculating response times of said release mechanism during



the releasing operation and the gripping operation, respectively;

- (5) fifth means for correcting the sheet release timing and the sheet grip timing based upon the present revolution speed value calculated by said second means and upon the response times calculated by said fourth means;
- (6) sixth means for setting a sheet release timing and a sheet grip timing for the next cycle of said press based upon the sheet release timing and the sheet grip timing corrected by said fifth means; and
- (7) seventh means for outputting a sheet release signal and a sheet grip signal to said release mechanism when the rotational angle of said press matches a predetermined rotational angle corresponding to the sheet release timing set by said sixth means and a predetermined rotational angle corresponding to the sheet grip timing set by said sixth means.

**4,788,909**  
**PAPER TOWEL DISPENSING AND SOILED TOWEL STOWING EQUIPMENT**  
Kelso Stewart, 69 Shandon Park, Belfast, Ireland (BT5 6NZ)  
Filed Jul. 9, 1986, Ser. No. 884,209  
Claims priority, application United Kingdom, Jul. 10, 1985, 8517494

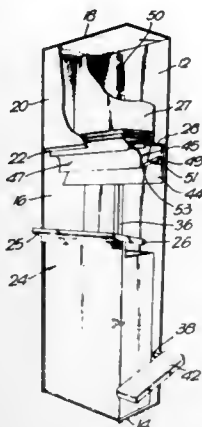
Int. Cl.<sup>4</sup> B30B 1/04  
U.S. Cl. 100—102

19 Claims

1. Paper towel dispensing and soiled paper stowing equipment comprising a receptacle for soiled towel material, a dis-



penser positioned above said receptacle and adapted to receive a supply of towel material, tamping means associated with said receptacle and movable between a first, uppermost, position and a second, lowermost, position wherein said tamping



means serves to compress soiled towel material within said receptacle, the tamping means being biased towards said first, uppermost, position, and towel engaging means associated with said dispenser for controlling the availability of the towel material in response to movement of said tamping means.

4,788,910

#### PRESS FOR EXTRACTING JUICE FROM COMESTIBLE SOLIDS AND SEMI-SOLIDS SUCH AS FRUITS AND VEGETABLES

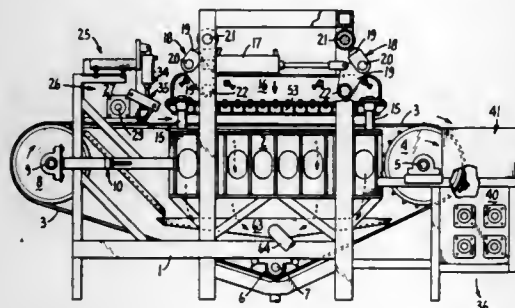
Oldrich J. Tichy, Concord, and Konrad E. Meissner, Lafayette, both of Calif., assignors to Atlas Pacific Engineering Company, Pueblo, Colo.

Continuation-in-part of Ser. No. 509,865, Jun. 30, 1983, abandoned. This application Jul. 15, 1983, Ser. No. 514,099

Int. Cl.<sup>4</sup> B30B 9/24

U.S. Cl. 100—120

4 Claims



1. In a press for extracting juice from comestible solids and semi-solids such as fruits and vegetables having a stationary perforated platen, a pressing platen moveable into pressing relation to the stationary platen, a juice pervious belt for carrying comestible, feeder means for feeding and depositing a non-continuous bed of comestible upon said belt for pressing, and means for moving the belt incrementally to position one segment of the bed of comestible over the stationary platen, the improvement comprising: said pressing platen having mounted thereto and movable therewith a flexible membrane and a depending sealing flange for circumscribing one segment of the bed of comestible positioned over said stationary platen, said flexi-

ble membrane overlying the one segment of said bed and being expandable into pressing engagement with the bed; means for moving said pressing platen to place said sealing flange into sealing engagement with the belt and circumscribing the bed of comestible; and pressure means for expanding said flexible membrane into pressing engagement with said bed to press the juice from the comestible for drainage through the perforated stationary platen and juice pervious belt.

4,788,911

#### PREPRESS APPARATUS FOR AN ASSEMBLY OF STACKED SHEETS

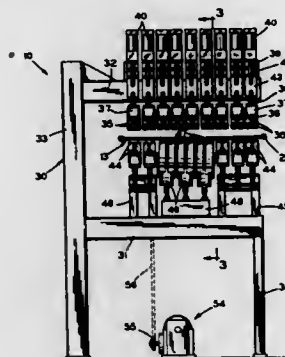
Roger B. Bishop, Toledo; Charles E. Ash, Perrysburg, both of Ohio, and Siegfried H. Herliczek, Petersburg, Mich., assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Division of Ser. No. 816,901, Jan. 7, 1986. This application Jun. 24, 1987, Ser. No. 65,906

Int. Cl.<sup>4</sup> B30B 3/04

U.S. Cl. 100—155 G

17 Claims



1. An apparatus for prepressing assemblies of stacked sheets for subsequent lamination thereof, comprising:

a frame;  
a delivery conveyor for supporting and advancing a horizontally disposed assembly in a generally horizontal path to one side of said frame;  
means for aligning said assembly for entry into said frame including a pair of spaced apart aligning arms positioned adjacent said one side of said frame for engaging a leading edge of said assembly;  
means mounted on said frame for applying pressure to said assembly; and  
means for moving said assembly through said frame and said means for applying pressure, said means for moving including a plurality of rollers of different diameter, said rollers being rotatably mounted along an axis of rotation tilted with respect to said horizontal path such that each of said rollers engages a surface of said assembly and means for driving said rollers in rotation to move said assembly through said frame and said means for applying pressure.

4,788,912

#### VERSATILE PRINTING MACHINE SYSTEM PERMITTING PLATE CHANGE DURING MACHINE OPERATION

Hermann Flacher, Augsburg, Fed. Rep. of Germany, assignor to M.A.N. Roland Druckmaschinen AG, Offenbach am Main, Fed. Rep. of Germany

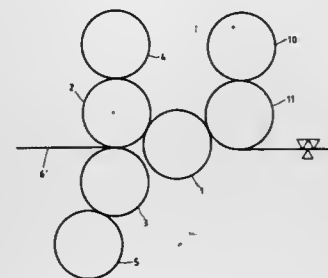
Filed Mar. 27, 1987, Ser. No. 31,700

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3614030

Int. Cl.<sup>4</sup> B41F 5/16, 7/04

U.S. Cl. 101—177

12 Claims



1. Versatile printing machine system comprising the combination of

an impression cylinder (1) having a fixed axis of rotation, about which impression cylinder a paper web (6, 6', 6'a, 6'b) is guided;

with at least two blanket cylinder - plate cylinder couples (2, 4; 3, 5) including

a first blanket cylinder (2), a second blanket cylinder (3); a first plate cylinder (4) and a second plate cylinder (5); wherein

the first blanket cylinder (2) has two axial locations (2', 2''), selectively alterable for engagement (2') of said first blanket cylinder against the impression cylinder (1) or removed (2'') from the impression cylinder; and

the second blanket cylinder (3) has three axial locations (3', 3'', 3'''), selectively positioning said second blanket cylinder,

(a) in engagement (3') with the impression cylinder (1); (b) in engagement (3'') with the first blanket cylinder (2); or

(c) removed (3''') from both the impression cylinder (1) and the first blanket cylinder (2),

wherein the paper web is guided, selectively,

(A) for prime-and-verso printing between the first and second blanket cylinders (2, 3) and about the impression cylinder (1) for guiding the web;

(B) for two-color prime printing about the impression cylinder (1) with both the first and second blanket cylinders engaged against the impression cylinder; and

(C) for single prime printing (1/0) between one of said blanket cylinders (2, 3) and the impression cylinder (1), the other (2, 3) of the blanket cylinders being in removed position (3'', 2'') out of engagement with the impression cylinder (1) and said one blanket cylinder to permit change of a printing plate on the plate cylinder (5, 4) associated with said other blanket cylinder while said one printing cylinder is printing on the web;

and wherein the axial locations of the first blanket cylinder (2) and of the second blanket cylinder (3) are independently selectable.

4,788,913

#### FLYING-PLATE DETONATOR USING A HIGH-DENSITY HIGH EXPLOSIVE

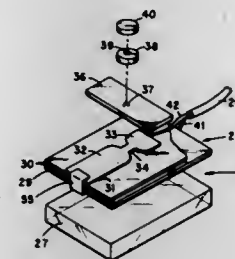
John R. Stroud, and Donald L. Ornellas, both of Livermore, Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 2, 1971, Ser. No. 150,950

Int. Cl.<sup>4</sup> F42C 19/12

U.S. Cl. 102—202.5

13 Claims



1. A flying-plate detonator comprising: a backing member, electrode means operatively positioned on opposite sides of an insulator means, said electrode means on one side of said insulator means being adjacent said backing member, means for directing electrical current through said electrode means, conductive film means mounted against and electrically connected to said electrode means, a flyer film means operatively positioned against said conductive film means, standoff means having a bore therein mounted at one end thereof against said flyer film means, and a high-density high explosive material positioned adjacent said standoff means at the opposite end thereof, whereby a large current pulse through said electrode means explosively vaporizes at least a portion of said conductive film means driving a flyer member from said flyer film means and through said bore of said standoff means striking said explosive material causing detonation thereof.

4,788,914

#### MISSILE NOSEPIECE

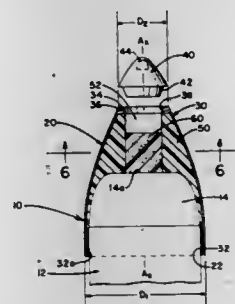
James T. Frater, Fairlawn, Ohio, assignor to Loral Corporation, New York, N.Y.

Filed Feb. 8, 1988, Ser. No. 153,110

Int. Cl.<sup>4</sup> F42B 15/22, 17/00

U.S. Cl. 102—399

16 Claims



1. A nosepiece for the forward end of a missile that is launched into the atmosphere for a ballistic trajectory and a water entry impact comprising in combination:

a frangible, ogive-shaped base having a forward tip end and a rearward base end, the base end adapted for mounting to the forward end of the missile and the tip end truncated to expose an axial bore opening into the base; at least two segments of a rigid, cellular foam within the

interior of the ogive-shaped base and defining an axial extension of the bore opening for a substantial portion of the length of the base from the tip end to the base end; a volume of a soft, open-celled foam within the axial bore; and a nosecap adapted to fit into the bore opening at the forward tip end of the base and having an exterior surface shape which is an extension of the ogive-shaped base, said nosecap being in seated relationship on the tip end of the base during airborne flight of the missile and separable therefrom to expose the axial bore opening prior to water entry impact such that upon impact the ogive-shaped base is fractured by the force of water entering the exposed axial bore opening and is thus separated from the missile to completely expose the forward end of the missile.

4,788,915

# HUNTING AMMUNITION COMPRISING A BULLET OF INCREASED EFFECTIVENESS

Jean-Claude Sauvestre, 11, rue de Veauce, 18230 Saint Doulchard, France

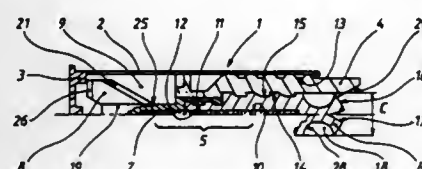
Filed May 29, 1987, Ser. No. 55,907

Claims priority, application France, Jun. 5, 1986, 8608093

Int. Cl.<sup>4</sup> F42B 11/00

U.S. Cl. 102-439

10 Claims



1. Ammunition for small or medium caliber hunting fire-arm, including

- a case secured to a base carrying a primer;
- a projectile contained in the case and constituted by a sub-caliber bullet having at least a head forward of the ammunition and a feathering rearwards thereof fixed to said head and a sabot having the caliber of the hunting fire-arm;
- a chamber disposed between the sabot and the base and filled with a propellant charge for propelling the projectile when the propellant charge is fired;
- said feathering including at least a leading edge facing forwards of the subcaliber bullet which is driven at supersonic speed at the fire-arm outlet and which has a center of gravity located on its centreline axis and an aerodynamic center of pressure located on the centreline axis rearwards of the center of gravity;
- said ammunition further comprising means for destabilizing said subcaliber bullet on its trajectory beyond a distance travelled outside of the fire-arm and comprising the aerodynamic center of pressure of the subcaliber bullet being arranged at the point of meeting of the leading edge of the feathering with the centreline axis of the subcaliber bullet and at a distance from the center of gravity of the bullet lying between one half of and twice maximum diameter of the subcaliber bullet without the feathering.

4,788,916

# CUSHION POUCH TRAY

Nancy Saxton, 1201 E. North Shore Dr., Tempe, Ariz. 85283

Filed Jul. 23, 1987, Ser. No. 76,913

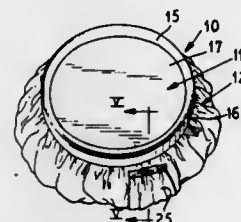
Int. Cl.<sup>4</sup> A47B 23/00

U.S. Cl. 108-43

8 Claims

1. A light weight washable sanitary contour conforming tray assembly adapted to be supported on the lap or abdomen of a user which comprises a rigid planar top tray having a peripheral depending sidewall, a limp open top pouch depending from said sidewall, a pair of mating hook and loop fabric tapes

respectively secured around said sidewall and around the open top of the pouch to detachably suspend the pouch from the sidewall of the tray, a removable and replaceable limp closed bag in said pouch, light weight flowable granules partially filling said closed bag, and said bag being easily removed and



replaced with a different sized granule containing bag to selectively provide a cushion having a desired height and resistance to deformation to accommodate a user for causing the pouch to drape over the lap or abdomen of the user and conform therewith without tilting the planar tray.

4,788,917

# SHAFT FURNACE BYPASS SYSTEM

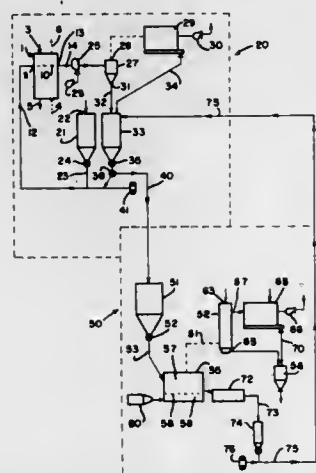
David J. Hogue, Allentown, Pa., assignor to Fuller Company, Bethlehem, Pa.

Filed Oct. 26, 1987, Ser. No. 112,166

Int. Cl.<sup>4</sup> F23J 15/00

U.S. Cl. 110-203

21 Claims



1. A method for removing undesirable condensable materials such as alkali compounds which may be contained in the material charge or the fuel burned in a shaft furnace wherein fresh material charge is supplied near the top of the furnace and product is discharged near the bottom of the furnace and hot gases rise upwardly through the furnace toward the top in counter-current contact with the material charge, the method comprising the steps of separating a portion of the rising furnace gas containing volatilized undesirable material from the remaining hot gas at a location intermediate the top and bottom of the furnace where the temperature within the furnace is higher than the temperature at which the undesirable material condenses on the fresh material charge, condensing the volatilized undesirable material contained in the separated portion of the rising hot gases and allowing the remaining furnace gases to continue to rise upwardly through the furnace.

4,788,918

# SOLIDS INCINERATION PROCESS AND SYSTEM

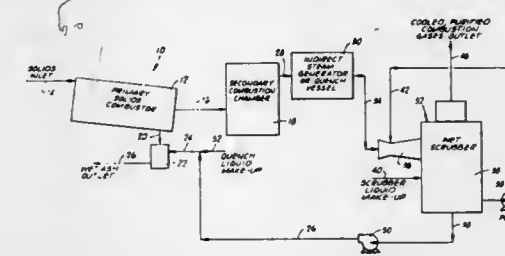
Michael R. Keller, Tulsa, Okla., assignor to John Zink Company, Tulsa, Okla.

Filed Nov. 20, 1987, Ser. No. 123,561

Int. Cl.<sup>4</sup> F23J 15/00

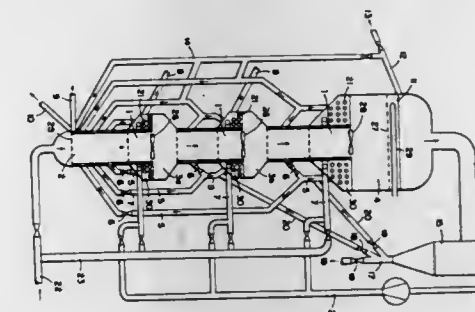
U.S. Cl. 110-215

10 Claims



1. A solids incineration system comprised of: solids combustor means having a solids inlet, a combustion gases outlet and an ash outlet; ash quench means connected to receive ash from the ash outlet of said combustor means having a quench liquid inlet and a wet ash outlet; heat removal means for removing heat from combustion gases having an inlet and an outlet; first conduit means connected between the combustion gases outlet of said combustor and the inlet of said heat removal means; wet scrubber means for removing fly ash from combustion gases having a combustion gases inlet, a clean combustion gases outlet, a scrubber liquid inlet and a spent scrubber liquid outlet; second conduit means connected between the outlet of said heat removal means and the combustion gases inlet of said wet scrubber means; third conduit means connected between the spent scrubber liquid outlet of said wet scrubber means and the quench liquid inlet of said ash quench means; and spent scrubber liquid pump means disposed in said third conduit means.

forming an integral part of the reactor, and said predetermined fraction including any unreacted solid particle material is then



directly recirculated by continuous free gravitational fall to at least one lower positioned site of the reactor.

4,788,920

# SPATIAL TRANSPLANTER MECHANISM

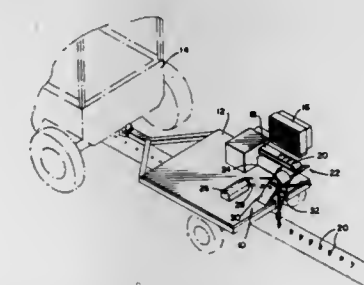
Lawrence N. Shaw, Gainesville, Fla., assignor to University of Florida, Gainesville, Fla.

Filed Feb. 26, 1987, Ser. No. 19,515

Int. Cl.<sup>4</sup> A01C 11/02

U.S. Cl. 111-2

17 Claims



1. A transplanter system comprising: (a) a support assembly; (b) a plurality of holders, each holder supported by said support assembly, each holder including means to releasably and automatically hold a plant; (c) drive means to move each of said holders from an upper, loading position whereat a plant may be placed in the holder to a lower, unloading position whereat the holder automatically releases any plant held in it; and (d) varying means to automatically vary the velocity of each holder as it moves between its loading position and its unloading position such that the holder moves at a first velocity when the holder is in its loading position and the holder moves at a second velocity when the holder is in its unloading position, said second velocity greater than said first velocity; and wherein said drive means moves each holder at a constant angular velocity about a rotation axis and wherein said varying means varies a radius from each holder to said rotation axis in order to vary the velocity of each holder.

4,788,919

# FLUIDIZED BED REACTOR AND PROCESS FOR THE OPERATION OF A FLUIDIZED BED REACTOR

Ejler L. Holm, Gistrup, and Jens C. Clausen, Storvorde, both of Denmark, assignors to Aalborg Værft A/S, Aalborg, Denmark

Filed Jun. 5, 1986, Ser. No. 870,977

Claims priority, application Denmark, Jun. 13, 1985, 2688/85; May 23, 1986, 2425/86

Int. Cl.<sup>4</sup> F23D 1/00

U.S. Cl. 110-347

12 Claims

1. In a continuous process for the operation of a circulating, fluidized bed reactor, by which a solid particle material including a solid reactant material is introduced into a lower part of the reactor and is formed into a fast bed by means of a fluidization gas containing a gaseous reactant material introduced into the lower part of the reactor, while any non-reacted particles of said solid reactant material are continuously discharged from an upper part of the reactor and recirculated to the bed, a predetermined fraction of said solid particle material being present in the reactor is removed from at least one site of the bed positioned below said upper part of the reactor, is first subjected to substantial thermal treatment by being brought into heat-exchanging contact with heat-exchanging means in a space peripheral to the reactor, said space having confinements



4,788,921

## SEWING MACHINE HAVING ROTATABLE AND AXIALLY MOVABLE FRAME

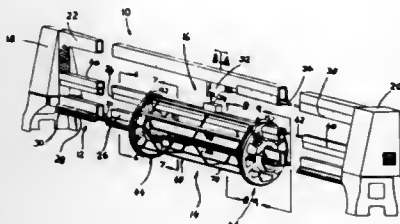
Richard N. Codos, Warren, N.J., assignor to Pathe Computer Systems, Inc., Irvington, N.J.

Continuation-in-part of Ser. No. 881,846, Jul. 3, 1986, Pat. No. 4,716,845. This application Jun. 3, 1987, Ser. No. 57,252

Int. Cl.<sup>4</sup> D05B 11/00

U.S. Cl. 112-118

26 Claims



## 1. A quilting machine comprising:

- (a) base;
- (b) a substantially cylindrically shaped frame slidably and rotatably mounted on said base, said frame including:
  - (i) a first end assembly;
  - (ii) a second end assembly;
  - (iii) each end assembly having a support member slidably mounted on said base and a ring rotatably mounted on the respective support member, each ring having a plurality of gear teeth spaced therearound;
- (iv) said first and second end assemblies spaced from each other on said base;
- (v) a plurality of first telescoping rods secured to said first end assembly and extending toward said second end assembly;
- (vi) a plurality of second telescoping rods secured to said second end assembly and extending toward said first end assembly;
- (vii) each first telescoping rod telescopically receiving a respective second telescoping rod;
- (viii) at least one first telescoping rod screw-threadedly receiving at least one respective second telescoping rod;
- (ix) at least one first and second telescoping rod rotatably fixed and axially movable with respect to each other; and
- (x) a gear on each of said first and second rotatably fixed and axially movable telescoping rods in mating engagement with said gear teeth of said rings;
- (c) rotation means for rotating said rings with respect to said support members and including first rod rotation means for rotating said first and second rotatably fixed and axially movable telescoping rods;
- (d) elongation means for changing the length of said frame, including second rod rotation means for rotating at least one screw-threaded rod; and
- (e) frame moving means for axially moving the frame along said base, said frame moving means including a lead screw having a helical thread secured to said base, drive means mounted on said frame in rotatable engagement with said lead screw for movement therealong, and control means for controlling rotation of one of said drive means and said lead screw to move said frame along said base.

## 18. A quilting machine comprising:

- (a) a base;
- (b) a substantially cylindrically shaped frame slidably and rotatably mounted on said base, said frame including:
  - (i) a first end assembly;
  - (ii) a second end assembly;
  - (iii) each end assembly having a support member slidably mounted on said base and a ring rotatably mounted on the respective support member, each ring having a plurality of gear teeth spaced therearound;

- (iv) said first and second end assemblies spaced from each other on said base;
- (v) a plurality of first telescoping rods secured to said first end assembly and extending toward said second end assembly;
- (vi) a plurality of second telescoping rods secured to said second end assembly and extending toward said first end assembly;
- (vii) each first telescoping rod telescopically receiving a respective second telescoping rod;
- (viii) at least one first telescoping rod screw-threadedly receiving at least one respective second telescoping rod;
- (ix) at least one first and second telescoping rod rotatably fixed and axially movable with respect to each other; and
- (x) a gear on each of said first and second rotatably fixed and axially movable telescoping rods in mating engagement with said gear teeth of said rings;
- (c) rotation means for rotating said rings with respect to said support members and including first rod rotation means for rotating said first and second rotatably fixed and axially movable telescoping rods;
- (d) elongation means for changing the length of said frame, including second rod rotation means for rotating at least one screw-threaded rod; and
- (e) clamp means extending axially of said frame for clamping a free end of a fabric tensioned on said frame.

## 21. A quilting machine comprising:

- (a) a base;
- (b) a substantially cylindrically shaped frame slidably and rotatably mounted on said base, said frame including:
  - (i) a first end assembly;
  - (ii) a second end assembly;
  - (iii) each end assembly having a support member slidably mounted on said base and a ring rotatably mounted on the respective support member, each ring having a plurality of gear teeth spaced therearound;
- (iv) said first and second end assemblies spaced from each other on said base;
- (v) a plurality of first telescoping rods secured to said first end assembly and extending toward said second end assembly;
- (vi) a plurality of second telescoping rods secured to said second end assembly and extending toward said first end assembly;
- (vii) each first telescoping rod telescopically receiving a respective second telescoping rod;
- (viii) at least one first telescoping rod screw-threadedly receiving at least one respective second telescoping rod;
- (ix) at least one first and second telescoping rod rotatably fixed and axially movable with respect to each other; and
- (x) a gear on each of said first and second rotatably fixed and axially movable telescoping rods in mating engagement with said gear teeth of said rings;
- (c) rotation means for rotating said rings with respect to said support members and including first rod rotation means for rotating said first and second rotatably fixed and axially movable telescoping rods;
- (d) elongation means for changing the length of said frame, including second rod rotation means for rotating at least one screw-threaded rod;
- (e) sewing head means having a needle positioned above a fabric stretched on said frame for sewing a pattern on said fabric; and
- (f) paint head means positioned above said fabric and adjacent said sewing head means for painting a pattern on said fabric.

4,788,922

## ADHESIVELY APPLIED SCHIFFLI EMBROIDERY

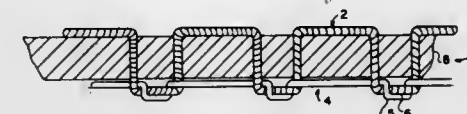
H. William Clariss, New Park, Pa., assignor to Lion Brothers, Co., Inc., Owings Mills, Md.

Filed Aug. 6, 1987, Ser. No. 82,426

Int. Cl.<sup>4</sup> B32B 7/08; D05C 17/00

U.S. Cl. 112-403

20 Claims



- 1. A embroidered design adapted to be heat sealed to another article, comprising:
  - a bobbin yarn forming a top surface of said embroidered design;
  - a needle yarn forming a bottom surface of said embroidered design;
  - said needle yarn comprising first and second coextensive strands, said first strand being fusible at a predetermined temperature, said second strand being non-fusible at said predetermined temperature, and
  - at least one backing layer disposed between said top surface and said bottom surface, said backing layer being degraded at said predetermined temperature.

4,788,923

## SAILING CRAFT

Jean P. Bareand, 16 rue des 4 Diablos, 17220 La Jarne, France

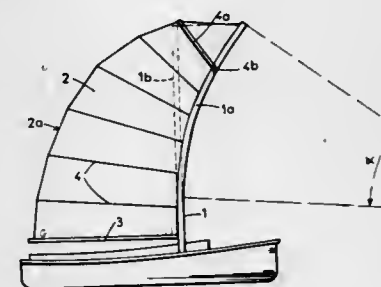
Filed Oct. 30, 1987, Ser. No. 114,864

Claims priority, application European Pat. Off., Nov. 4, 1986, 86402457.5

Int. Cl.<sup>4</sup> B63B 35/00

U.S. Cl. 114-39.1

8 Claims



- 1. Sailing craft having a mast which is curved on its top part and whose concavity faces towards the prow of the craft, and a mainsail attached to the mast along the convex side of said mast.

4,788,924

## SAILING SYSTEM

Renald Hamel, 3320 Lacoste, Quebec, Canada (G2E 4P8)

Filed Oct. 8, 1987, Ser. No. 105,616

Claims priority, application United Kingdom, Oct. 13, 1986, 8624460

Int. Cl.<sup>4</sup> B63H 9/04

U.S. Cl. 114-39.1

15 Claims

- 1. A sail assembly for use with a hull, said assembly comprising:
  - a mast base;
  - a mast;
  - means for mounting said mast on said base for rotation of said mast about a vertical axis, said mast being so mounted as to extend at a mast tilt angle with respect to said vertical

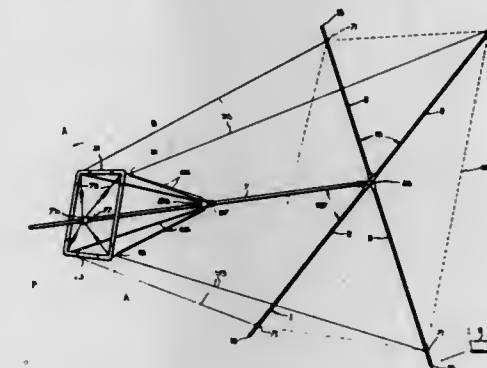
axis and having a tip at the end thereof away from said base;

a sail structure including a sail frame and a sail fixed to said frame at predetermined points of attachment thereon;

a universal joint mounting said sail frame on said mast tip for said mast tip to be at, or close to, the center of gravity of said sail;

manually operable steering means on said mast, adjacent said base; and

rope means including ropes operatively joining said steering means and said sail frame at points of connection on said sail frame adjacent said points of attachment for moving said frame and sail in unison about said universal joint when said steering means are operated



wherein said points of connection of said ropes on said sail frame are at corners of a geometrical figure;

wherein said steering means comprise:

a manually operable steering frame; and

means for mounting said steering frame on said mast for free rotation and tilting about said mast axis;

said steering frame having junction points located at corners of another geometrical figure similar to said geometrical figure, each junction point being associated to one of said points of connection; and

wherein said rope means comprises rope lengths each joining said points of connection on said sail frame and their associated points of connection on said steering frame.

4,788,925

## HOLLOW BODY WITH FLEXIBLE ENVELOPE

Jochen Simon, Bayernallee 42a, D-1000 Berlin 19, and Hans-Joachim Stracke, Fichtestraße 27, D-1000 Berlin 61, both of Fed. Rep. of Germany

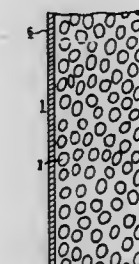
Filed Jan. 20, 1987, Ser. No. 4,618

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1986, 3601691

Int. Cl.<sup>4</sup> B63B 43/10

U.S. Cl. 114-69

4 Claims



- 1. A hollow inflatable body comprising an envelope of a flexible resiliently compressible foam material defining the

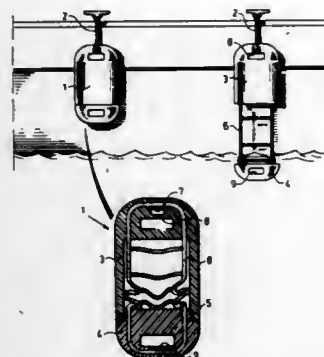
outer wall of an enclosed inflation chamber, a flexible inextensible outer coating in contact with and enclosing said envelope, said foam material having a plurality of closed cavities therein, deformable upon substantial external localized pressure in response to variations in external contacting surfaces, and deformable upon an increase of pressure within the inflation chamber acting to compress the foam material against said flexible inextensible outer coating, whereby the thermal conductivity of said envelope may be varied in response to variations in pressure in said inflation chamber, and means for varying the pressure within the inflation chamber.

**4,788,926**  
**COMBINED BOAT FENDER AND EMERGENCY LADDER**

Johan M. Ullman, Barnhemsgatan 23, Linköping, and Fredrik Aust, Västra Frölunda, both of Sweden, assignors to Johan Ullman, Linköping, Sweden  
PCT No. PCT/SE86/00286, § 371 Date Feb. 9, 1987, § 102(e) Date Feb. 9, 1987, PCT Pub. No. WO87/00139, PCT Pub. Date Jan. 15, 1987  
PCT Filed Jun. 13, 1986, Ser. No. 31,066  
Claims priority, application Sweden, Jun. 28, 1985, 8503242-3  
Int. Cl.<sup>4</sup> B63B 59/02

U.S. Cl. 114-219

4 Claims



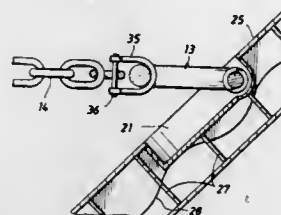
1. A combined marine fender and emergency ladder device, comprising:

- (a) an elongate body member (1) having a vertical cross-section greater than a horizontal cross-section,
- (b) means (7) at an upper end of the body member for securing one end of a line (2) such that the body member may be suspended from a rail of a boat and hang down over the side of the boat hull to cushion impacts against other boats, pilings, and the like, and
- (c) a pair of horizontally elongate apertures (8,9) individually defined in opposite, upper and lower ends of the body member sufficiently large to serve as footsteps and/or handgrips to assist a person in the water, wherein:
- (d) the body member comprises readily separable upper and lower portions (3,4),
- (e) one of said portions defines an internal cavity, and further comprising:
- (f) a collapsible ladder (6) stored in said cavity and having opposite ends individually connected to said upper and lower portions such that upon the separation of said portion, as by a person in the water grasping and pulling on a lower one (9) of said apertures, the ladder becomes fully extended.

**4,788,927**  
**RETRACTABLE TOWING SHACKLE**  
James M. Casey, Houston, Tex., assignor to Shell Western E&P, Inc., Houston, Tex.  
Continuation of Ser. No. 901,351, Aug. 28, 1986, abandoned.  
This application Jan. 29, 1988, Ser. No. 150,470  
Int. Cl.<sup>4</sup> B63B 21/20

U.S. Cl. 114-249

7 Claims

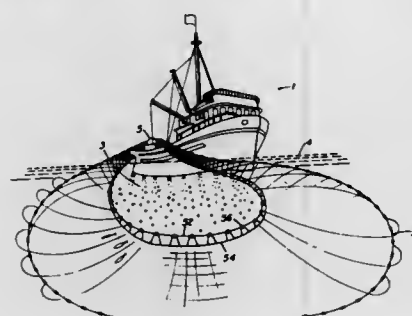


6. A method of towing an offshore structure comprising: avoiding impingement of ice on a retractable shackle assembly by positioning said retractable shackle assembly within a recess in an outer wall of said structure; securing towing means to said shackle assembly; extending said shackle assembly from said recess to a towing position; and towing said structure with said towing means.

**4,788,928**  
**PNEUMATIC PLUNGER SYSTEM**  
David Tauber, and William Philippon, both of 2386 Grant Avenue, Courtenay, B.C., Canada (V6N 7M3)  
Filed Jul. 16, 1987, Ser. No. 74,361  
Int. Cl.<sup>4</sup> B63B 35/14

U.S. Cl. 114-255

12 Claims



1. In a fishing vessel having a keel, and provided with a net which is cast into surrounding water for catching fish, a method for repelling fish into said net, comprising expelling a substantially vertical wall of bubbles from said keel downwardly into said surrounding water, whereby fish swimming between said net and said wall of bubbles are startled and thereby repelled from said wall of bubbles into said net.

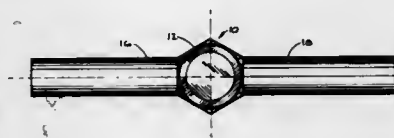
**4,788,929**  
**FLUID INDICATOR FOR REFRIGERATION SYSTEM**  
Walter O. Krause, and Peter J. Davis, Newark, both of N.Y., assignors to Parker-Hannafin Corporation, Cleveland, Ohio  
Filed Jun. 14, 1988, Ser. No. 206,641  
Int. Cl.<sup>4</sup> G01F 15/04

U.S. Cl. 116-276

1 Claim

1. A refrigeration fluid indicator for viewing the condition of refrigerant fluid flowing therethrough, said indicator being fluid tight and suitable for connection to an inlet tube and outlet tube by a brazing process without use of a cooling block, wet rag or other cooling device, comprising:

a brass body including:  
first and second brazeable tube coupling means;  
an internal cavity in said body, said cavity in fluid communication with said first and second brazeable tube coupling means;  
a cylindrical extending portion positioned above said cavity, said cylindrical extending portion including a cylindrical recess, said recess bounded circumferentially by a deflectable wall, said wall deflectable in response to application of a deflection force, and by a ledge adjacent said cavity, said ledge tapered radially inward and toward said cavity;  
an opening in said body generally coaxial with said recess and extending between said cavity and said recess; an aperture portion in said recess, said aperture portion including:  
a generally circular glass pane having a cylindrical outer surface;

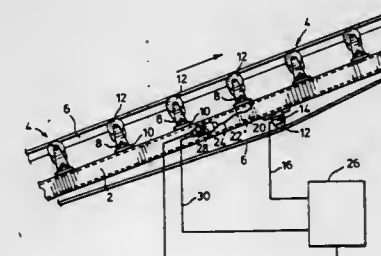


a steel ring having an inner circumferential surface and an outer circumferential surface, said outer circumferential surface proximate said deflectable wall of said body;  
holding means for holding said cylindrical outer surface of said pane to said inner circumferential surface of said ring in fluid tight relation, said glass pane of said aperture portion being fractureable when a fracture force is applied to said aperture portion, said fracture force being greater than said deflection force;  
braze means for holding said deflectable wall and said outer circumferential surface of said aperture in fluid tight relation;  
whereby said inlet and outlet tubes are enabled to be fixed in said tube coupling means of said fluid indicator by said brazing process without fracture of said glass pane or loss of said fluid tight character of said indicator

**4,788,930**  
**WEIGH BRIDGE FOR VARIABLE INCLINATION CONVEYOR**  
Luc C. Matteau, and Ralph D. Cloos, both of Peterborough, Canada, assignors to Canadian Corporate Management Company Limited, Peterborough, Canada  
Filed Oct. 26, 1987, Ser. No. 112,445  
Int. Cl.<sup>4</sup> G01G 11/14, 13/02

U.S. Cl. 177-16

4 Claims



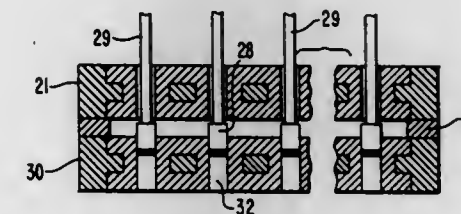
1. A conveyor weigh scale comprising a weigh bridge supporting a portion of the run of moving conveyor belt and secured to structure for supporting same at a range of different inclinations, said weigh bridge providing an output signal proportional to that component of said belt portion which is perpendicular to its direction of movement, a clinometer secured to said supporting structure and providing an output related to the inclination to the horizontal of said structure and

thus said belt portion, and computing means receiving said clinometer signals and modulating said weigh bridge output signal therewith to maintain said weigh bridge output signal in constant proportion to the weight of said material.

**4,788,931**  
**TOOL FOR FORMING EXTERNAL ELECTRODES OF CHIP PARTS**  
Koichi Nitta; Kazuma Kabeta; Masami Yamaguchi; Tadahi Nakagawa, all of Fukui, and Katsuyuki Moriyasu, Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Nagaokakyo, Japan  
Division of Ser. No. 671,585, Nov. 15, 1984, Pat. No. 4,664,943.  
This application Feb. 19, 1987, Ser. No. 16,714  
Claims priority, application Japan, Nov. 17, 1983, 58-217177  
Int. Cl.<sup>4</sup> B05C 13/02

U.S. Cl. 118-503

9 Claims



1. A tool for forming external electrodes at both ends of chip parts, comprising:  
first and second holding plates each having elastic material provided with a plurality of chip receiving holes passing therethrough from a front side to a reverse side of said holding plate;  
a guide plate against the front side of said first holding plate and having guide holes aligned with said receiving holes of said holding plates; and  
a spacer between said first holding plate and said second holding plate spacing the front side of said second holding plate from the reverse side of said first holding plate, the receiving holes in said second holding plate being aligned with the receiving holes in said first holding plate.

**4,788,932**  
**DEVICE FOR COATING THE GROOVE OF A BALL BEARING WITH A POWDER-TYPE SOLID LUBRICATING MATERIAL**  
Werner Kullman, deceased, late of Munich; Ursula Spang, heir, Saarbrücken, and Volker Buck, Hattingen, all of Fed. Rep. of Germany, assignors to Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt e.V., Cologne, Fed. Rep. of Germany  
Filed Feb. 19, 1987, Ser. No. 16,241  
Claims priority, application Fed. Rep. of Germany, Feb. 25, 1986, 3605968  
Int. Cl.<sup>4</sup> B05C 1/02

U.S. Cl. 118-211

3 Claims

1. Device for coating the groove of a ball bearing with a powder-type solid lubricant, in particular molybdenum sulfide, comprising  
an O-ring polisher which enters the groove, means for moving said O-ring relative to the groove, said O-ring having a diameter that is at most equal to the diameter of the groove so that it touches the groove only in the area over which the balls of the ball bearing roll, and  
a feeding device for the powder-type solid lubricant which applies the lubricant to the O-ring at a region located





blower inlet and a second pathway from said blower outlet to said second filter medium;  
 enclosing means cooperating with said housing to define an enclosed work area on a side of said housing in air flow communication with said first opening;  
 air directing means for defining an air flow pathway from said second opening to said work area, said air directing means including an air inlet disposed at an upper portion of said work area and duct means for directing air from said second opening to said air inlet, with said air flowing downwardly in said work area and past said first opening, air passage means disposed near a bottom of said work area and in air flow communication with said blower inlet to draw said air downwardly  
 whereby a portion of air flow into said work area is drawn downward an entire height of said area and a portion of said downward flowing air is drawn through said first opening so that items to be segregated can be placed in said area between said downward flowing air and said first opening with air flow protecting an operator in said work area from contamination from said items and segregating said work area from a surrounding environment.

4,788,940

## MECHANISM FOR FEEDING ANIMALS WITH LIQUID FEED

Martin Förster, Gerwigstrasse 27, D7707 Engen, Fed. Rep. of Germany

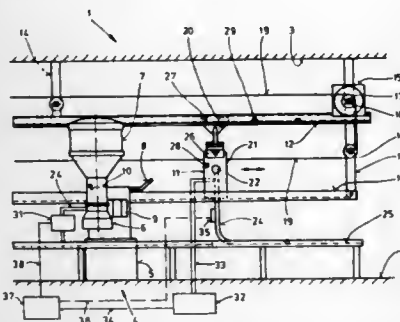
Filed Apr. 24, 1987, Ser. No. 42,301

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1986, 3613887

Int. Cl.<sup>4</sup> A01K 9/00

U.S. Cl. 119—71

11 Claims



1. A mechanism for feeding animals with liquid feed that can be withdrawn from a supply unit and can be supplied to a suction unit via a conduit, with said mechanism further comprising:

- a feed pump disposed in said conduit for conveying a variable volume of said feed; and
- means for regulating the conveying capacity of said feed pump so that conveyed volume of said liquid feed is controlled and variable as dependent upon and as a function of any vacuum prevailing in said conduit.

4,788,941

## SAFETY BELT

Gerald P. Villeneuve, 125 Avenue Road, Kapuskasing, Ontario P5N 3A4, Canada

Filed May 20, 1987, Ser. No. 53,028

Int. Cl.<sup>4</sup> A62B 35/00

U.S. Cl. 119—96

3 Claims

1. A safety device for use in the care of children, said device comprising a single flexible belt, a pair of fastening means, each of said fastening means comprising two elements, one of said elements being secured to an end of the flexible belt, the other of said elements being movable towards or away from the said

end of the flexible belt so that when the two elements of each fastening means are connected, a pair of belts are formed with



a connecting portion therebetween, one belt being secured about an adult and the other about a child.

4,788,942

## INTERNAL COMBUSTION ENGINE USING DYNAMIC RESONATING AIR CHAMBER

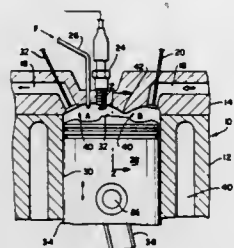
Andrew A. Pouring, Edgewater, and Daniel G. Frer, Harwood, both of Md., assignors to Sonex Research, Inc., Annapolis, Md.

Filed Jun. 30, 1986, Ser. No. 880,293

Int. Cl.<sup>4</sup> F02B 17/00, 23/08

U.S. Cl. 123—26

45 Claims



1. In an internal combustion engine including a movable piston in a variable volume combustion chamber having an effective diametrical dimension D and defined in part by fixed walls and in part by a working force of the piston, intake and exhaust valve means for controlling flow of charge and exhaust products to and from the combustion chamber; and fuel and air supply means for preparing and supplying a charge to the combustion chamber; the improvement comprising, said combustion chamber is configured such that, at and closely proximate the minimum combustion chamber volume position of the piston, the combustion chamber is effectively temporarily divided into an ignition chamber having a volume  $V_A$  and a resonating chamber having a volume  $V_B$  with a temporary restricted connecting passageway means between said chambers, said temporary passageway being effectively removed as the piston moves away from its minimum volume position, said passageway means having a length L measured along a line connecting  $V_A$  and  $V_B$ , an average transverse dimension g measured across its width approximately perpendicular to the length L, a cross-sectional area S at its transverse dimension g, and a volume  $V_P$  of  $S \times L$ ; the ignition of each charge producing periodic combustion wave energy of frequency  $F_A$  which travels near the speed of sound  $C_A$  within said ignition chamber at approximately the autoignition temperature of the charge in said ignition chamber; said passageway dimensions g and L being arranged to quench flame propagation between  $V_A$  and  $V_B$  during substantially the time the piston is at and closely proximate its minimum volume position; said resonating chamber and passageway means arranged to constitute a Helmholtz resonator having a resonant frequency  $F_B$  at the temperature extant in  $V_B$  while combustion is occurring in  $V_A$ , with  $F_A$  and  $F_B$  being approximately equal to each other; the maximum linear dimensions of  $V_B$  and  $V_P$  being generally less than  $\frac{1}{4}$  wavelength of  $F_B$  at the temperature extant in  $V_B$  during combustion in  $V_A$ ; said intake and exhaust valve means and said fuel and air supply means being arranged to establish a

charge distribution in the combustion chamber such that, at the moment of ignition thereof, substantially all the fuel of the charge is in the ignition chamber and substantially only air with an insufficient amount of fuel to support work-producing combustion is in the resonating chamber; and the relationships between S,  $V_B$  and L being defined as:

$$V_B = \frac{SC_A^2}{(L + kg)(2\pi F_B)^2} \text{ cm}^3$$

where (using metric units):

k is a Helmholtz correction factor numerically between 0.6 and 0.85;

L has a minimum dimension not exceeding the minimum dimension of g;

g is nominally initially determined by assuming that the transverse dimension g of the passageway is uniform along its width and is related to D in accordance with the formula:

$$g = 0.1072D + 0.1143$$

within the tolerance range of +0.050 cm. and -0.25 cm.; and

$F_B$  equals  $K/D$  Hz, where K has a numerical value between 43,000 and 51,000.

4,788,943

## COOLING SYSTEM FOR AUTOMOTIVE ENGINE OR THE LIKE

Yoshimasa Hayashi, Kamakura, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 15, 1986, Ser. No. 852,239

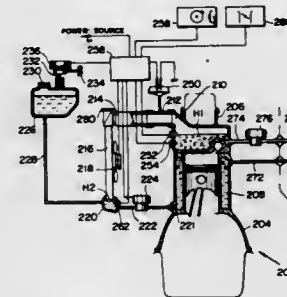
Claims priority, application Japan, May 30, 1985, 60-117386

The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> F01P 3/22

U.S. Cl. 123—41.27

13 Claims



1. In an internal combustion engine having a structure subject to high heat flux,

a cooling system comprising:

a coolant jacket disposed about said structure and into which coolant is introduced in liquid form and discharged in gaseous form;

a radiator in fluid communication with said coolant jacket and in which coolant vapor is condensed to its liquid state; means for returning the liquid coolant formed in said radiator to said coolant jacket in a manner which maintains the level of liquid coolant in said coolant jacket at a first predetermined level, said first predetermined level being selected to maintain said structure immersed in a predetermined depth of liquid coolant, said coolant jacket, radiator and said liquid coolant returning means defining a cooling circuit;

a reservoir in constant fluid communication with said cooling circuit; and

a valve which controls the communication between the

interior of said reservoir and the ambient atmosphere, said valve being operable to selectively control the pressure in said reservoir and said cooling circuit.

4,788,944

## INTERNAL COMBUSTION ENGINE

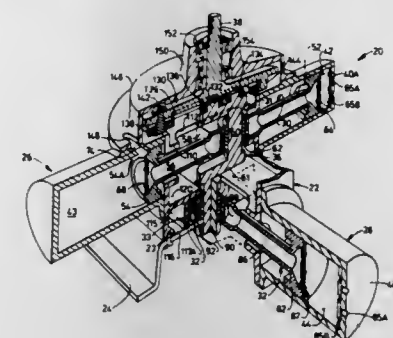
Anthony J. Rasco, 4303 Tobacco Rd., Cincinnati, Ohio 45244

Filed Jun. 22, 1987, Ser. No. 64,955

Int. Cl.<sup>4</sup> F02B 75/24

U.S. Cl. 123—56 AC

11 Claims



1. An internal combustion engine, comprising:

- (a) a housing
- (b) a first cylinder chamber associated with the housing;
- (c) a first piston assembly fitted in the first cylinder chamber, comprising a first piston head and a second piston head joined by a first tube, the first tube including a central portion;
- (d) a first piston chamber constructed in the first cylinder chamber wherein the longitudinal axes of the first piston chamber and the first cylinder chamber are colinear, the first piston chamber bounded by a top plate, a bottom plate and side walls;
- (e) a second cylinder chamber associated with the housing wherein the longitudinal axis of the second cylinder chamber is perpendicular to the longitudinal axis of the first cylinder chamber;
- (f) a second piston assembly fitted in the second cylinder chamber, comprising a third piston head and a fourth piston head joined by a second tube, the second tube including a central portion;
- (g) a second piston chamber constructed in the second cylinder chamber wherein the longitudinal axes of the second piston chamber and second cylinder chamber are colinear, the second piston chamber bounded by a top plate, a bottom plate and side walls;
- (h) a crankshaft having first and second crankpins and first and second crank elements, wherein the first crankpin is journaled in the central portion of the first tube, the second crankpin is journaled in the central portion of the second tube, and the first crank element is freely rotatable in an internal chamber provided between the first and second piston chambers; and
- (i) a power transfer means for transferring the rotary motion of the crankshaft to an output shaft.



4,788,945

# PROCESS AND APPARATUS FOR CONTROLLING A GAS EVACUATION CIRCUIT OF A ROTATIONAL DISTRIBUTION MOTOR

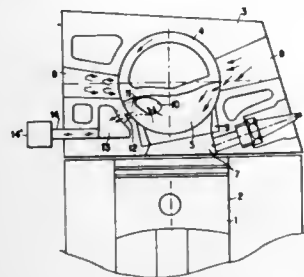
Guy Negre, Les Adrechs, Vison sur Verdon, France (83560)  
PCT No. PCT/FR86/00323, § 371 Date May 21, 1987, § 102(c)  
Date May 21, 1987, PCT Pub. No. WO87/01762, PCT Pub.  
Date Mar. 26, 1987

PCT Filed Sep. 24, 1986, Ser. No. 61,433

Claims priority, application France, Sep. 24, 1985, 85 14231;  
Aug. 27, 1986, 86 12198

Int. Cl.<sup>4</sup> F01L 7/00

U.S. Cl. 123—80 BA



1. An engine comprising at least one cylinder and means for both supplying a working fluid to said at least one cylinder and allowing it to escape from said at least one cylinder, said means comprising a cylinder head having, for each of said at least one cylinder, an intake circuit, a first escape circuit, a second escape circuit, and a rotary valve for successively opening communication between said cylinder and each of said intake circuit, said first escape circuit, and said second escape circuit, said second escape circuit being in communication with said cylinder after said first escape circuit has closed and remaining open for a period of time allowing said intake circuit to begin simultaneous communication with said cylinder.

4,788,946

# VALVE OPERATING MECHANISM FOR INTERNAL COMBUSTION ENGINE

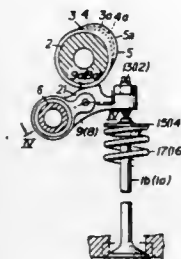
Kazuo Inoue, Kenichi Nagahiro, Yoshio Ajiki, and Masaaki Katoh, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 30, 1987, Ser. No. 8,740

Int. Cl.<sup>4</sup> F01L 1/34, 1/08, 1/18

U.S. Cl. 123—90.16

17 Claims



1. A valve operating mechanism for operating a plurality of valves of an internal combustion engine, comprising:  
a camshaft rotatable in synchronism with rotation of the internal combustion engine and having an array of three cams each having a different cam profile and including a high-speed cam position at one end of said array;  
three cam followers held in sliding contact with said cams,

respectively, for operating the valves according to the cam profiles of said cams; and  
means for selectively interconnecting and disconnecting said cam followers to operate the valves at different valve timings in different speed ranges of the internal combustion engine, said speed ranges including a high-speed range in which all of the valves are controlled by the cam profile of said high-speed cam.

4,788,947

# CAP RETAINER FOR HYDRAULIC LASH ADJUSTER

Thomas C. Edelmayer, Ceresco, Mich., assignor to Eaton Corporation, Cleveland, Ohio

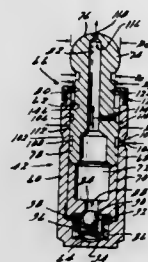
Continuation of Ser. No. 490,102, Apr. 29, 1983, abandoned.

This application Jan. 2, 1985, Ser. No. 688,211

Int. Cl.<sup>4</sup> F01L 1/24

U.S. Cl. 123—90.55

5 Claims



1. A hydraulic lash adjuster of the valve gear of an internal combustion engine comprising:

a generally cylindrical body defining an outwardly opening blind bore oriented along the longitudinal axis thereof;  
a plunger assembly including a rod portion slidable received in said bore, an end portion extending outwardly from said body, and a shank portion disposed intermediate said rod and end portions, said rod and shank portions having characteristic nominal diameters of  $D_1$  and  $D_2$ , respectively, said end portion defining a bulbous tipped pivot surface adapted to contact associated engine valve gear components and, having a maximum diameter of  $D_3$ , wherein  $D_1$  and  $D_2$  substantially exceed  $D_3$ , said plunger assembly defining, in cooperation with the blind end of said bore, a cavity, said plunger assembly including means defining a fluid reservoir and one-way valve means permitting fluid flow from said reservoir to said cavity, said body including port means adapted for receiving fluid under pressure therein, said body and plunger assembly coating to define a fluid passage communicating with said port means and providing exclusive fluid communication therefrom with said reservoir, said passage defining means including a fluid metering means defining a substantially constant length annular metering orifice between said rod portion and said body bore for continuously metering said fluid flow into said fluid reservoir, said annular metering orifice being effective for causing a substantial pressure drop thereacross, said plunger assembly further including means defining a second fluid passage and providing exclusive fluid communication from said reservoir means to said pivot surface, said second passage defining means including second fluid metering means comprising a metering orifice, said metering orifice providing continuous fluid communication to said pivot surface being sized for maintaining said fluid pressure in said fluid reservoir above atmospheric pressure; and

means integrally formed of an elastically yieldable nylon material having a characteristic tensile modulus to yield strength ratio not exceeding twenty-two for retaining said plunger assembly within said body prior to installation within said valve gear, said retainer means including a circumferentially continuous skirt portion embracing said

body through complementary conforming surfaces at a location adjacent said bore opening to apply substantially uniform, equally distributed, radially directed clamping forces thereupon to restrain said retainer and body form relative axial displacement, and end wall defining a through bore having a characteristic nominal diameter  $D_4$  disposed concentrically with said body bore and in nominal axial alignment with said shank portion, wherein  $D_4$  is less than  $D_1$  and  $D_2$ , said skirt including a radially inwardly directed circumferentially continuous flange defining at least one of said complementarily conforming surfaces, said skirt and adjacent body portions coacting to define a tool receiving recess therebetween, and said retainer means being formed of a material characterized by preselectably optically sensible indicia.

ing oppositely directed forces exerted on the body via the first chamber.

4,788,950

# QUICK RELEASE VALVE COVER

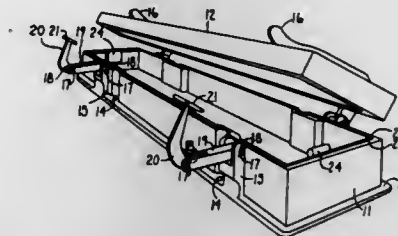
Ron Finley, 191 Fourth Ave., Wendell, Id. 83355

Filed Nov. 20, 1987, Ser. No. 123,241

Int. Cl.<sup>4</sup> F02F 7/00

U.S. Cl. 123—195 C

3 Claims



# METHOD OF WARMING COLD ENGINES IN COLD CLIMATES

Alex Forschirm, Parsippany, N.J., assignor to Hoechst Celanese Corporation, Chatham, N.J.

Filed Nov. 5, 1987, Ser. No. 116,993

Int. Cl.<sup>4</sup> F02N 17/02

U.S. Cl. 123—142.5 R

6 Claims

1. A method of warming cold engines in low temperature conditions comprising the steps of: (a) placing a flammable compound inside a nonflammable fabric bag; (b) placing the bag on an engine; and (c) igniting the flammable compound.

4,788,949

# MOUNTING ARRANGEMENT FOR VEHICLE ENGINES

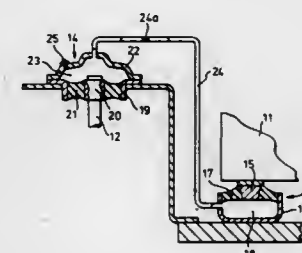
Anthony Best, Westbury; Kenneth V. Hunt, Melksham, and Raymond Hoole, Trowbridge, all of England, assignors to BTR PLC a British Company, United Kingdom

Filed Apr. 4, 1986, Ser. No. 848,277

Int. Cl.<sup>4</sup> F02B 75/06; F02F 9/04

U.S. Cl. 123—192 R

18 Claims



1. A mounting arrangement for a vehicle engine of the kind comprising means for mounting the engine of a vehicle to a body of the vehicle, which mounting means comprises a first fluid-tight chamber of variable volume which contains gas and which is arranged between the engine and the body so that weight of the engine tends to reduce a volume of the chamber, means for supporting the body on a suspension system of the vehicle, which supporting means includes a second fluid-tight chamber of variable volume which contains gas and is arranged so that a load of the body on the suspension system tends to reduce the volume of the second chamber, the means for mounting the engine being physically separated from the means for supporting the body, conduit means interconnecting the first and second fluid-tight chambers with one another so that relative movement between the engine and body and between the body and the suspension system alters pressure of gas within the respective chambers and the change in gas pressure in one chamber is communicated to the other of the chambers whereby dynamic forces exerted on the body via the second chamber tend to be counteracted by correspond-

1. A quick release valve cover for the cylinder head of an internal combustion engine which comprises:

a cylinder head housing means, having openings at the top and bottom for circumferentially enclosing the upper perimeter of a cylinder head, said housing being sealably and removably attached to and extending upwardly from the perimeter of said cylinder head a distance only sufficient to prevent leakage of entrapped oil and low enough to allow lateral access to valves adjusting mechanisms located atop the cylinder head;  
an upper cap operably attached to said cylinder head housing means for covering the valve adjusting mechanism located atop of the cylinder head, and whose external contiguous surfaces conform dimensionally with those of said cylinder head housing means;  
housing sealing means operably disposed between said cylinder head housing means and the upper cap for sealing the joint between the housing means and upper cap to prevent the leakage of oil;  
upper cap holding and locking means for securing said upper cap to the housing means.

4,788,951

# MEANS FOR MOUNTING CARBURETOR ON WORKING MACHINE WITH INTERNAL COMBUSTION ENGINE

Akira Nagashima, Kawasaki, Japan, assignor to Kioritz Corporation, Tokyo, Japan

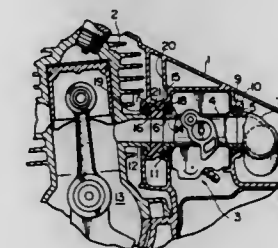
Filed Aug. 31, 1987, Ser. No. 93,095

Claims priority, application Japan, Sep. 11, 1986, 61-139616[U]

Int. Cl.<sup>4</sup> F02B 77/00

U.S. Cl. 123—198 E

1 Claim



1. Mounting means for mounting a carburetor in a casing of a working machine with an internal combustion engine comprising:

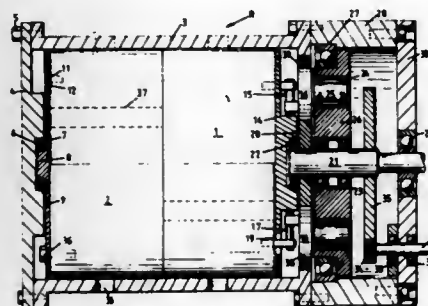
a joint member, which is made of a flexible and heat insulating material and defines a passage therethrough; connecting portions formed integrally with said joint member and defining recesses on inner peripheral walls at the respective opposite ends of the joint member; a flange portion provided on an air-fuel mixture discharging port of the carburetor which is fit on and held by the recess on one of the connecting portions; a flange portion at an intake port of the internal combustion engine which is fit on and held by the recess on the other connecting portion; and wherein the outer periphery of the joint member and the carburetor are sustained with fixed wall portions of the casing.

**4,788,952**  
**ROTARY PISTON INTERNAL COMBUSTION ENGINE**  
Arthur Schönbolzer, Trottenstrasse 62, Zürich, Switzerland  
PCT No. PCT/CH86/00029, § 371 Date Nov. 14, 1986, § 102(e)  
Date Nov. 14, 1986, PCT Pub. No. WO86/05545, PCT Pub. Date Sep. 25, 1986

PCT Filed Mar. 6, 1986, Ser. No. 939,120  
Claims priority, application Switzerland, Mar. 18, 1986, 1195/85

Int. Cl.<sup>4</sup> F02B 53/00  
U.S. Cl. 123—245

15 Claims



1. A rotary piston engine wherein two rotating pistons rotate around one axis within a cylindrical case, the pistons being connected with a motor shaft by means of a crank gear and a planetary gear system, the pistons forming together four variable combustion chambers, each piston being provided with at least one segmented cylinder cutout (41) and at least one axially spaced segmented cylinder section (42), the segmented cylinder cutout (41) having a greater angle than the segmented cylinder section (42), so that the segmented cylinder section (42) of one piston is arranged within the segmented cylinder cutout (41) of the other piston.

**4,788,953**  
**DEVICE FOR INJECTING FUEL INTO A COMBUSTION CHAMBER OF AN INTERNAL COMBUSTION ENGINE**  
Bernhard Kaczynski, Waiblingen, and Iwan Komaroff, Regensburg, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/DE87/00011, § 371 Date Jan. 7, 1988, § 102(e)  
Date Jan. 7, 1988, PCT Pub. No. WO87/06977, PCT Pub. Date Nov. 19, 1987

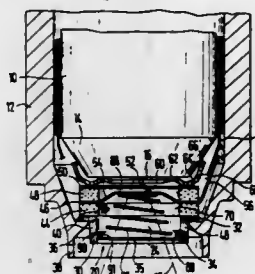
PCT Filed Jan. 14, 1987, Ser. No. 159,522  
Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615634

Int. Cl.<sup>4</sup> F02M 53/06  
U.S. Cl. 123—297

4 Claims

1. A device for injecting fuel into a combustion chamber of an internal combustion engine, comprising an injection nozzle; a glow element connected to an outlet side of an injection opening of the injection nozzle, the glow element forming passageway for injection streams; means defining an annular

chamber that communicates with the combustion chamber of the internal combustion engine and surrounding said glow element and from which passages lead into the path of the injection streams, said passages causing the injection streams to aspirate air from the combustion chamber by injector action,



said glow element being formed as a helix, which has an outside diameter which decreases continuously toward the injection nozzle, said glow element being formed from a flat strip (72), which is cut in the form of a spiral from a flat sheet-metal element (4) and is then pulled apart in the axial direction of the glow element so as to form a conical helix.

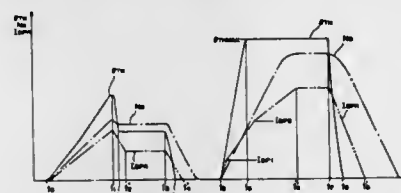
**4,788,954**  
**METHOD FOR CONTROLLING BY-PASS AIR FLOW ON DECELERATION OF INTERNAL COMBUSTION ENGINE**

Yutaka Otake; Sachito Fujimoto, and Akira Katoh, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 10, 1987, Ser. No. 71,780  
Claims priority, application Japan, Jul. 10, 1986, 61-162812  
Int. Cl.<sup>4</sup> F02M 23/06

U.S. Cl. 123—327

1 Claim



1. A method for controlling the by-pass air flow on deceleration of an internal combustion engine by driving a control valve to open a throttle by-pass passage to supply auxiliary air to the engine, said method comprising:  
detecting the throttle open angle;  
setting a valve opening rate of said control valve according to said throttle open angle;  
setting an upper limit on said valve opening rate when said valve opening rate as determined by the throttle open angle is greater than an upper limit value determined in relation with the engine speed;  
driving said control valve to open said throttle by-pass passage according to said valve opening rate; and  
upon deceleration of said internal combustion engine, gradually reducing the valve opening rate established prior to said deceleration.

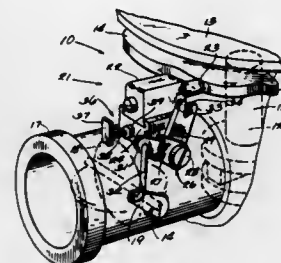
**4,788,955**  
**APPARATUS FOR SPARK ADVANCE THROTTLE CONTROL**

Le Roy T. Wood, Racine, Wis., assignor to Outboard Marine Corporation, Waukegan, Ill.

Continuation of Ser. No. 946,759, Dec. 29, 1986, abandoned.  
This application Sep. 16, 1987, Ser. No. 98,729

Int. Cl.<sup>4</sup> F02P 5/02  
U.S. Cl. 123—413

21 Claims



1. An engine apparatus comprising an internal combustion engine, a cam movable in response to desired engine speed changes, a throttle valve movable between a closed position and an open position for regulating the flow of combustion air to said engine, and a throttle control assembly responsive to movement of said cam for controlling the position of said throttle valve in accordance with said desired engine speed changes, said throttle control assembly comprising a cam follower for engaging the cam, a cam follower slide supporting said cam follower, a cam follower slide ramp having means on said slide ramp for supporting said cam follower slide in position for engagement of said cam follower with said cam and for movement of said cam follower slide along a predetermined path in response to movement of said cam follower incident to movement of said cam, a linkage assembly coupling said cam follower slide with said throttle valve so as to vary the position of said throttle valve in accordance with the position of said cam follower slide along said predetermined path, a throttle stop for preventing movement of said cam follower slide in one direction along said predetermined path beyond a position corresponding to said open position of said throttle valve, and means for providing relative movement between said cam follower and said cam follower slide when said cam follower slide is in said position and said cam causes continued movement in said one direction of said cam follower, whereby movement of said throttle valve beyond said open position is prevented despite continued movement of said cam in accordance with further desired change in engine speed.

**4,788,956**  
**METHOD OF DETECTING ABNORMALITY IN CRANK ANGLE SIGNAL OF INTERNAL COMBUSTION ENGINES**

Yoshio Suzuki, Wakoh, and Shigehiro Kimura, Niiza, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 23, 1986, Ser. No. 866,603  
Claims priority, application Japan, May 31, 1985, 60-117971  
Int. Cl.<sup>4</sup> F02P 5/15, 11/00

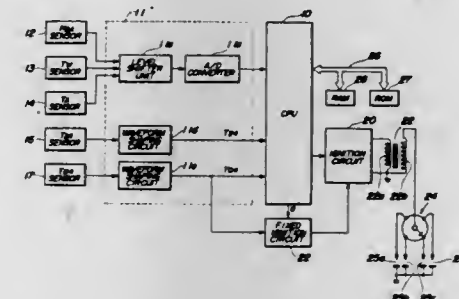
U.S. Cl. 123—414

17 Claims

1. A method of detecting an abnormality in a crank angle signal of an internal combustion engine having a crankshaft, said abnormality being such that a pulse of the crank angle signal is missing or that a redundant pulse is superimposed on the crank angle signal, comprising the steps of:  
monitoring the condition of a first reference position signal generated at a predetermined crank angle position of the crankshaft and the condition of a second position signal generated whenever the crankshaft rotates through a predetermined rotational angle;  
setting a first flag to a predetermined logical state if the first

reference position signal is generated before the second position signal is generated a predetermined number of times after generation of the first reference position signal; setting a second flag to a predetermined logical state if the first reference position signal is not generated after the second position signal has been generated said predetermined number of times after generation of the first reference position signal and before an immediately succeeding generation of the second position signal;  
determining which of a plurality of predetermined combinations of logical states corresponds to a combination of logical states exhibited by the first and second flags;  
detecting an abnormality in one of the first reference position signal and second position signal based on the determined combination of logical states, the abnormality being such that a pulse of the first reference signal or the second position signal is missing or that a redundant pulse is superimposed on the first reference position signal or the second position signal;  
counting the number of times the predetermined combination occurs consecutively; and  
detecting the abnormality if the value of the count exceeds a set value.

9. A method of detecting an abnormality in a crank angle signal of an internal combustion engine having a crankshaft, said abnormality being such that a pulse of the crank angle signal is missing or that a redundant pulse is superimposed on the crank angle signal, comprising the steps of:  
monitoring the condition of a first reference position signal



generated at a predetermined crank angle position of the crankshaft and the condition of a second position signal generated whenever the crankshaft rotates through a predetermined rotational angle;  
setting a first flag to a predetermined logical state if the first reference position signal is generated before the second position signal is generated a predetermined number of times after generation of the first reference position signal; setting a second flag to a predetermined number of times after generation of the first reference position signal and before an immediately succeeding generation of the second position signal;  
determining which of a plurality of predetermined combinations of logical states corresponds to a combination of logical states exhibited by the first and second flags;  
detecting an abnormality in one of the first reference position signal and second position signal based on the determined combination of logical states, the abnormality being such that a pulse of the first reference signal or the second position signal is missing or that a redundant pulse is superimposed on the first reference position signal or the second position signal;  
wherein an electronic control unit for controlling the engine comprises:  
first ignition control means for setting ignition timing at an optimum value in dependence upon engine operating parameters; and  
second ignition control means for effecting ignition control dependent solely upon the first reference position signal;



said method including the step of effecting a changeover from said first ignition control means to said second ignition control means when an abnormality is detected in the crank angle signal.

#### 4,788,957 IGNITION TIMING CONTROL DEVICE FOR INTERNAL-COMBUSTION ENGINES

Satosi Komurasaki, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

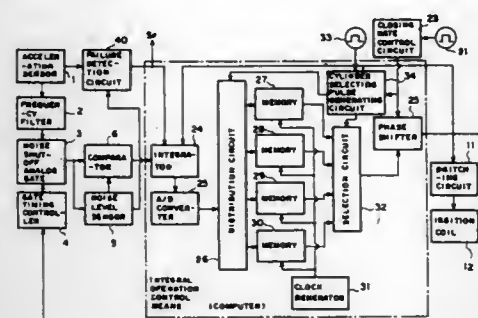
Filed Dec. 21, 1987, Ser. No. 135,366

Claims priority, application Japan, Dec. 22, 1986, 61-307387; Jan. 20, 1987, 62-10779

Int. Cl.<sup>4</sup> F02P 5/04

U.S. Cl. 123—425

6 Claims



1. An ignition timing control device for internal-combustion engines comprising a knocking sensor which senses knocking information which is abnormal sound or abnormal vibration resulting from abnormal combustion in each cylinder of a internal-combustion engine, a knocking discriminator which discriminates said knocking information; an operation control device which calculates the amount of occurrence of knocking on the basis of an output of said discriminator, calculates an instruction output corresponding to ignition operation, and controls the phase of an ignition signal to a desired angle on the basis of a result of these calculations; and a switching circuit which closes and opens an ignition coil in accordance with this phase output; said operation control device, comprising: an integral operation control means which outputs integral voltage on the basis of the output of said knocking discriminator, resets this integral corresponding to said ignition operation, calculates the amount of occurrence of knocking in each of said cylinders on the basis of this reset integral voltage, and when said amount of occurrence of knocking in the whole body of said engine has reached a specific value, sends out the phase shift output of said ignition signal to said switching circuit.

#### 4,788,958 METHOD OF AIR/FUEL RATIO CONTROL FOR INTERNAL COMBUSTION ENGINE

Toyohel Nakajima; Yasushi Okada; Tohiyuki Mieno, and Nobuyuki Oono, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 24, 1987, Ser. No. 42,213

Claims priority, application Japan, Apr. 24, 1986, 61-096032

Int. Cl.<sup>4</sup> F02M 51/00

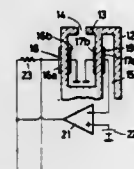
U.S. Cl. 123—489

8 Claims

1. A method for controlling an air/fuel ratio of a mixture supplied to an internal combustion engine equipped with an oxygen concentration sensor disposed in an exhaust system by producing an output varying substantially in proportion to an oxygen concentration in an exhaust gas of the engine, the method comprising:

setting a basic value to control the air/fuel ratio, in response

to a plurality of engine operating parameters relating to engine load; detecting the actual air/fuel ratio of the mixture based upon the oxygen concentration sensor output; compensating said basic value by an air/fuel ratio feedback compensation value which is derived in response to a deviation of the detected air/fuel ratio from a target air/fuel ratio and by a learning control compensation value



which compensates for an error of the oxygen concentration sensor occurring due to infrequent changes in values of said sensor's characteristics, thereby determining an output value with respect to said target air/fuel ratio; controlling the air/fuel ratio of said mixture in response to said output value; and computing and updating said learning control compensation value when an absolute value of said deviation is lower than a predetermined value.

#### 4,788,959 FUEL INJECTION PUMP

Akihiro Iiyama, and Toshifumi Nishimura, both of Yokosuka, Japan, assignors to Nissan Motor Company, Limited, Kanagawa, Japan

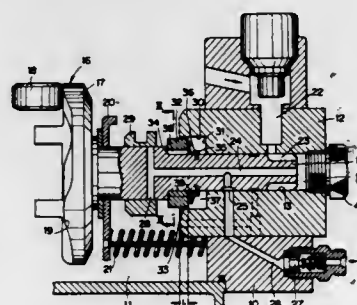
Filed Nov. 4, 1985, Ser. No. 794,850

Claims priority, application Japan, Nov. 6, 1984, 59-233838

Int. Cl.<sup>4</sup> E02M 39/00

U.S. Cl. 123—503

14 Claims



1. A fuel injection pump comprising:

- (a) engageable first and second cam members, the first cam member reciprocating axially as the first cam member moves angularly relative to the second cam member when the first and second cam members are in engagement;
- (b) means for urging the first cam member toward the second cam member to engage the first and second cam members;
- (c) a plunger connected to the first cam member for reciprocation with the first cam member, the plunger defining at least a part of a pumping chamber, the pumping chamber contracting and expanding as the plunger reciprocates;
- (d) means for allowing fuel to move into the pumping chamber as the pumping chamber expands in a fuel intake stroke;
- (e) means for allowing the fuel to move out of the pumping chamber as the pumping chamber contracts in a fuel compression stroke; and
- (f) means for resisting movement of the plunger in at least part of the fuel compression stroke and relieving resis-

tance to movement of the plunger in the fuel intake stroke wherein the resisting means comprises a piston slidably mounted on the plunger, a spring urging the piston to seat the piston on a shoulder on the plunger so that the piston reciprocates as the plunger reciprocates, wherein the piston is seated on the shoulder in the fuel compression stroke and separates from the shoulder against the force of the spring in the fuel intake stroke, a second fluid chamber at least partially defined by the piston, the second fluid chamber contracting and expanding as the piston reciprocates, a reservoir filled with fuel, a first passage connecting the second fluid chamber to the reservoir, and a second passage extending from the second fluid chamber through the piston, the second passage being disconnected from the reservoir when the piston is seated on the shoulder and being connected to the reservoir when the piston separates from the shoulder.

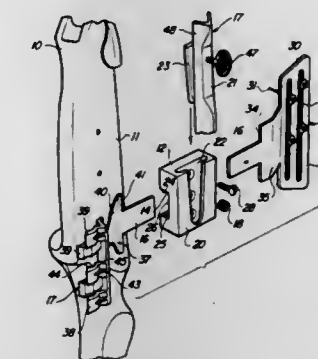
detected by said valve opening delay time detecting means when said rotational speed is determined to be in said rotational speed range by said determining means, whereby a drive pulse having a pulse duration determined in view of the valve opening delay time averaged by said averaging means is applied to said solenoid valve.

#### 4,788,961 UNIVERSAL BRACKET FOR ARCHERY BOW ACCESSORIES

Dennis M. Toth, 1362 Liberty, Lincoln Park, Mich. 48146  
Continuation-in-part of Ser. No. 613,976, May 25, 1984, Pat. No. 4,621,606. This application Nov. 10, 1986, Ser. No. 929,251  
Int. Cl.<sup>4</sup> F41B 5/00

U.S. Cl. 124—24 A

19 Claims



1. In combination, an archery bow and an accessory attached to the bow comprising:

a support block having an internal opening including top and bottom sides extending through the block in one direction corresponding to the direction an arrow is shot, said internal opening having an inwardly facing side facing toward the bow and extending between said top and bottom sides of the block, said inwardly facing side being intermediate an inboard side of the block, which is attached to the bow and an outboard side of the block which faces away from the bow;

fastener means for securing said block to said bow;

an accessory;

tang means extending from said accessory and having top and bottom surfaces adapted to fit within said top and bottom sides of the opening of the support block, said tang being slideably received in said opening for securing said accessory to said bow; and

locking means interconnecting said support block and said tang for detachably securing said tang within said support block.

#### 4,788,962 CANTILEVERED GAS BARBECUE

James S. Mashburn, and Jerry P. Mashburn, both of 1201 E. Hill St., Long Beach, Calif. 90806

Filed Oct. 5, 1987, Ser. No. 104,294

Int. Cl.<sup>4</sup> A47J 37/00

U.S. Cl. 126—25 R

1 Claim

1. A barbecue apparatus adapted to be cantilevered outwardly from a support comprising:

a flanged base;  
a support member;  
an elongated rod;  
a brace, anchoring said base with said support member via said rod so that said base is cantilevered outwardly laterally with respect to said support member;

#### 4,788,960 SOLENOID-VALVE-CONTROLLED FUEL INJECTION DEVICE

Hidekazu Oshizawa, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

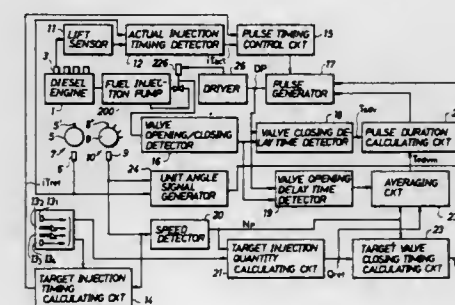
Filed Mar. 30, 1988, Ser. No. 175,242

Claims priority, application Japan, Apr. 6, 1987, 62-082892

Int. Cl.<sup>4</sup> F02M 39/00

U.S. Cl. 123—506

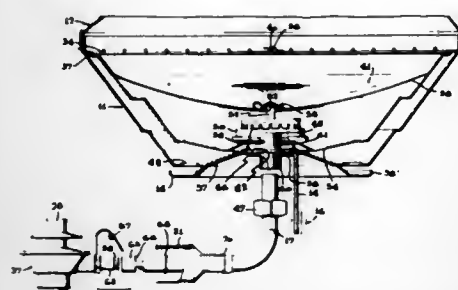
6 Claims



1. A solenoid-valve-controlled fuel injection device comprising:

- a fuel injection pump having a pump cylinder, a plunger rotatably and reciprocally disposed in said pump cylinder in a fluid-tight manner and defining a fuel pressurization chamber between a distal end of the plunger and the pump cylinder, a drive shaft rotatable in synchronism with an output shaft of an internal combustion engine, means responsive to rotation of said drive shaft for reciprocally displacing said plunger to pressurize fuel in said pressurization chamber, and a fuel chamber for being supplied with fuel from a fuel tank in response to rotation of said drive shaft, whereby the pressurized fuel can be fed into cylinders of said internal combustion engine;
- a solenoid valve for selectively opening and closing a communication passage by which said pressurization chamber and said fuel chamber communicate with each other;
- valve opening delay time detecting means for detecting a valve opening delay time of said solenoid valve;
- valve closing delay time detecting means for detecting a valve closing delay time of said solenoid valve;
- valve closing period calculating means for calculating a valve closing time of said solenoid valve according to operating conditions of said internal combustion engine;
- target fuel injection time calculating means for calculating a target fuel injection time according to the operating conditions of said internal combustion engine;
- determining means for determining whether at least a rotational speed of said internal combustion engine is in a predetermined rotational speed range; and
- averaging means for averaging valve opening delay times

a circular walled bowl carried on said base having vent apertures and a peripheral edge marginal region;  
 a grease screen carried on said walled bowl;  
 a gas burner mounted on a selected end of said base supporting said apertured liner thereon;  
 a cooking grill removably carried on said peripheral edge marginal region;  
 a detachable coupler joining said burner to said base;  
 a source of pressurized gas including controls therefor;  
 a hollow feeder tube interconnecting said gas source to said burner;



a vented lid including a retention member engageable with said edge marginal region of said bowl for shielding said grill from wind;  
 a baffle carried on said base immediately adjacent to said walled bowl in fixed spaced-apart relationship defining a limited annular passageway therebetween; and  
 said baffle constituting a wind deflector to limit wind gusts via said passageway from entering said walled bowl via said vent openings.

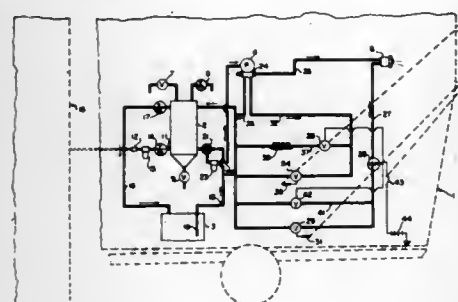
4,788,963

## FUEL SUPPLY SYSTEM FOR HEATER

Paul A. Mutchler, University City, Mo., assignor to Engineered Air Systems, Inc., St. Louis, Mo.  
 Continuation of Ser. No. 887,228, Jul. 21, 1986, abandoned. This application Nov. 20, 1987, Ser. No. 123,422  
 Int. Cl.<sup>4</sup> F24H 3/00

U.S. Cl. 126—116 A

13 Claims



1. An improved fuel supply system for a fuel spray combustor nozzle of a portable heater comprising:  
 a fuel pump having a low and high pressure side mounted on-board said portable heater, said pump being connected on said high pressure side thereof to said fuel spray combustor nozzle;  
 fuel chamber supply means mounted on-board said portable heater including a fuel storage main chamber and a fuel storage auxiliary chamber connected thereto, said fuel chamber supply means being connected to said low pressure side of said fuel pump to allow for on-board delivery of fuel from said fuel chamber supply means mounted on board said portable heater to said fuel pump;  
 separate external off-board fuel supply means communicat-

ing with said fuel pump through said auxiliary chamber to allow fuel to be readily delivered from an off-board fuel storage source to said portable heater through said auxiliary chamber and to said pump to said fuel spray combustor nozzle, said auxiliary chamber providing through a vacuum created therein by spent fuel a negative pressure to said external off-board fuel supply; and,  
 valve means to selectively control introduction of fuel to said pump from either said main chamber independently from said auxiliary chamber or from said auxiliary chamber independently from said main chamber on said on-board fuel chamber supply means or from said separate external fuel supply means through said auxiliary chamber independently from said main chamber.

4,788,964

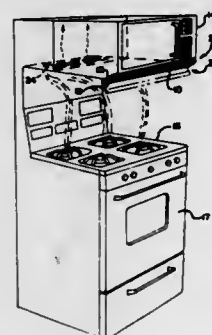
## MAGNETICALLY HINGED SMOKE SHIELD ASSEMBLY FOR AN OVER-THE-RANGE OVEN

Paul S. Dorsey, Johnson Township, Champaign County, and Edward F. Ponikwia, Harrison Township, Montgomery County, both of Ohio, assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Apr. 13, 1988, Ser. No. 181,161  
 Int. Cl.<sup>4</sup> F24C 15/20

U.S. Cl. 126—299 R

13 Claims



1. A smoke shield assembly attachable to a magnetically attractable member spaced above a cook top comprising:  
 a base made of a magnetically attractable material;  
 magnet means for securing said base to said member; and  
 deflecting means for deflecting smoke from said cook top away from a user, said deflecting means having a pivot end made of a magnetically attractable material pivotally secured to said base by said magnet means for movement between a stored position and an in use position.

4,788,965

## INCUBATOR

Francesco Milani, Glubiasco, Switzerland; Wolfgang Franz; Michael Geier, both of Lübeck, Fed. Rep. of Germany, and Joachim Koch, Hollenbek, Fed. Rep. of Germany, assignors to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany

Filed Mar. 5, 1987, Ser. No. 22,260

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1986, 3609147

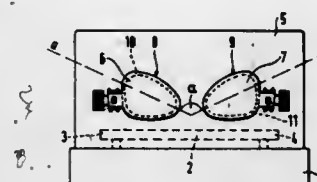
Int. Cl.<sup>4</sup> A61G 11/00

U.S. Cl. 600—22

5 Claims

1. An incubator comprising:  
 a base;  
 a transparent hood mounted on said base and having a side wall;  
 said side wall defining a horizontal axis extending parallel to said base and said side wall having two access openings forming therein;

each of said access openings having a longitudinal axis defining an acute angle with said horizontal axis and being elongated along said axis thereof, said openings being unsymmetrical with respect to the longitudinal axis corresponding thereto and being disposed in said side wall so as to cause said axes to intersect at a point to conjointly define an obtuse angle opening upwardly;  
 two flaps corresponding to respective ones of said access openings;



hinge means for pivotally mounting each of said flaps to said side wall so as to enable the flap to pivot between a first position whereat the flap covers and closes off the access opening and a second position whereat the flap is away from said opening; and,  
 latching means for latching each of said flaps in the first position.

4,788,966

## PLUG FOR USE IN A REVERSIBLE STERILIZATION PROCEDURE

InBae Yoon, 2101 Highland Ridge Dr., Phoenix, Md. 21131  
 Filed May 14, 1987, Ser. No. 49,503

Int. Cl.<sup>4</sup> A61B 19/00

U.S. Cl. 128—831

2 Claims



1. An anatomical tubular structure plug in a form of an integral one-piece member, comprising: a base means, a plurality of elongated finger means connected to said base means, said base means being made of a material having sufficient elastic memory such that said finger means are in a normally closed position with respect to each other, said finger means being opened by forcing them apart against the closing force of said base means by the insertion of a supporting member within said base means and said finger means.

4,788,967

## ENDOSCOPE

Yasuhiro Ueda, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Japan

Filed Nov. 5, 1986, Ser. No. 927,082

Claims priority, application Japan, Nov. 13, 1985, 60-254109

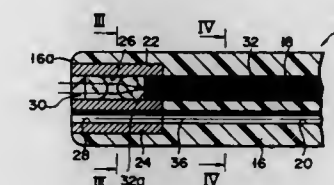
Int. Cl.<sup>4</sup> A61B 1/06

U.S. Cl. 128—6

6 Claims

1. An endoscope comprising:  
 an operating section;  
 an insertion section extending from the operating section and adapted to be inserted into a body cavity, said insertion section including a bendable tube, formed of a bendable synthetic resin, and having a distal end face, a recess formed in the distal end face, and a plurality of insertion channels extending in an axial direction of the tube and opening to a bottom surface of the recess;  
 a non-bendable portion including a non-bendable member

which corresponds in shape to the recess and fitted in the recess, the member having at least one through hole, communicating with one of the channels of the insertion section;  
 an objective optical system arranged in the through hole of the non-bendable portion; and



an image guide fiber inserted in the channel communicating with the through hole, said fiber having a distal end portion inserted fixedly in the through hole and connected optically to the objective optical system.

4,788,968

## ELECTROMAGNETIC VIBRATOR

German E. Rudashevsky; Alexandr G. Krichavsky; Olga G. Blokhina, and Alexandr S. Mirkina, all of Moscow, U.S.S.R., assignors to Institut Mashinovedeniya imeni Blagonravova A.A. AN USSR, Moscow, U.S.S.R.

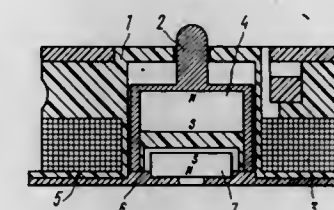
PCT No. PCT/SU86/00058, § 371 Date Mar. 11, 1987, § 102(e) Date Mar. 11, 1987, PCT Pub. No. WO87/00426, PCT Pub. Date Jan. 29, 1987

PCT Filed Jun. 20, 1986, Ser. No. 41,145

Claims priority, application U.S.S.R., Jul. 24, 1985, 3938113  
 Int. Cl.<sup>4</sup> A61H 1/00

U.S. Cl. 128—41

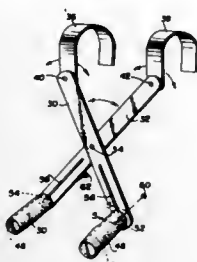
2 Claims



1. An electromagnetic vibrator comprising:  
 a housing having a cover;  
 a striker mounted within said housing for reciprocable movement therein; and  
 an excitation coil fixedly mounted in said housing, said excitation coil having a base and a central, longitudinal axis and said excitation coil producing an alternating magnetic field to cause the striker to reciprocate along the central, longitudinal axis of the excitation coil;  
 the improvement being that:  
 the striker is arranged to freely reciprocate within the housing and includes a permanent magnet having an end surface in a plane parallel to said base of said excitation coil, said end surface being located at a distance within the range of 0.6 to 0.7 of the height of the excitation coil with respect to said base of the excitation coil.



**4,788,969**  
**STATIONARY SEAT CRUTCH**  
 Marion E. Thompson, 2807 N. Prospect St., Colorado Springs, Colo. 80907  
 Filed Jun. 20, 1986, Ser. No. 876,934  
 Int. Cl.<sup>4</sup> A61F 5/02  
 U.S. Cl. 128—78 3 Claims



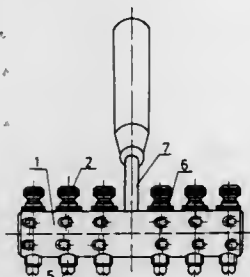
1. An adjustable seat crutch for relieving stress on the lower spine and buttocks of a user when in a sitting position on a seat having a generally upright back portion, said seat crutch including a pair of elongated seat crutch components pivotally interconnected intermediate their respective ends, said components comprising:

- (a) attachment means for securing each of said seat crutch components to the generally upright back portion of the seat, said attachment means comprising a pair of curved hook-like members of generally inverted j-shape, each adapted to be hung over the generally upright back portion of the seat, and each secured to an upper end of a respective crutch component by means of a swivel joint;
- (b) padded support means associated with said attachment means for engagement with at least one underarm of the user when in a sitting position to support at least a portion of the upper body weight wherein said padded support means comprises at least one elongated support member connected at one end to said adjustment means, said support member use extending outwardly from a front face of the generally upright back portion of the seat in a direction substantially perpendicular thereto; and
- (c) adjustment means mounting the padded support means to the elongated crutch component for vertical and horizontal adjustment relative to the generally upright back portion to accommodate users of varying physical characteristics and to adjust the degree of support provided by the crutch.

**4,788,970**  
**DRILL SETTING GUIDE FOR DRILLING HOLES IN BONES**  
 Włodzimierz Kara, Dąbrowa Górnicza; Robert Granowski; Witold Ramotowski, both of Warsaw; Aleksander Tuziemski, Sosnowiec; Jerzy Cieplak, Dąbrowa Górnicza; and Kazimierz Pilawski, Warsaw, all of Poland, assignors to Huta Baildon, Katowice, Poland  
 Filed Apr. 1, 1987, Ser. No. 33,410  
 Claims priority, application Poland, Apr. 1, 1986, 76944[U]; Apr. 1, 1986, 258787; Apr. 1, 1986, 76943[U]; Apr. 1, 1986, 258786; Dec. 19, 1986, 263197  
 Int. Cl.<sup>4</sup> A61M 37/00  
 U.S. Cl. 128—92 ND 8 Claims

1. A drill setting guide used for drilling holes in a bone to which an associated bone fastening plate can be secured, comprising a body having a set of bushings, said bushings being provided with suitable blade edges in the portions which are adapted to contact the bone, the improvements which are

characterized in that the drill bushings are mounted in the guide body and in that there are securing nuts threaded on said



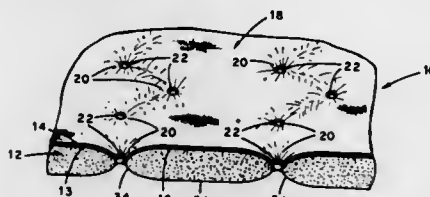
bushings in such a way that said nuts are situated close to the guide body.

**4,788,971**  
**PATCH SYSTEM FOR USE ON THE SKIN**  
 Robert A. Quisano, Monroe, Ohio, assignor to Hill Top Research, Inc., Cincinnati, Ohio  
 Filed Jul. 13, 1987, Ser. No. 72,626  
 Int. Cl.<sup>4</sup> A61B 10/00  
 U.S. Cl. 128—743 16 Claims



1. A patch system for use on the skin of a human or animal subject for predictive testing, diagnostic testing and to serve as a dermal delivery system for drugs, said patch system comprising an open, one-piece, inverted dish-shaped housing of non-toxic, inert, soft and flexible material, said housing terminating about its periphery in at least one continuous skin-contacting edge, a substantially planar flange extending outwardly from the exterior of said housing and being spaced slightly upwardly from said at least one continuous skin-contacting edge, said outwardly extending flange having a bottom surface, a layer of pressure-sensitive adhesive on said flange bottom surface, whereby said adhesive-coated flange affixes said housing to the skin.

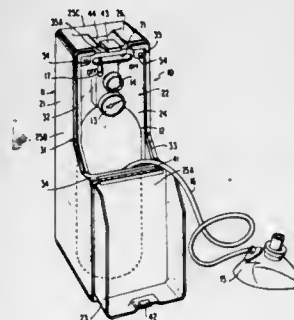
**4,788,972**  
**PADDING FOR AN ORTHOPEDIC SUPPORT DEVICE**  
 Autrey O. V. DeBusk, Knoxville, Tenn., assignor to DeRoyal Industries, Inc., Powell, Tenn.  
 Filed Jun. 26, 1987, Ser. No. 67,801  
 Int. Cl.<sup>4</sup> A61F 5/04  
 U.S. Cl. 128—89 R 13 Claims



1. Padding for an orthopedic body member support comprising a resiliently deformable non-clickable foam layer having first and second surfaces separated by the thickness of said

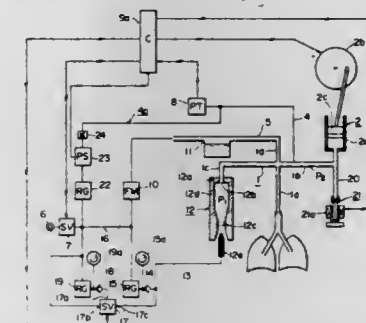
foam layer, a fabric layer conformingly adhered to said first surface of said foam layer to define an inner surface of the padding for being disposed against the body member, a plurality of dimples in said inner surface of the padding to provide air spaces in each of said dimples adjacent the body member, and a plurality of openings located in said dimples and extending completely through the padding to communicate with an outer surface of the padding adjacent said second surface, said openings having a length substantially less than the thickness of the padding surrounding said dimples and being substantially unobstructed to provide substantially nontortuous air passages between said dimples and the ambient atmosphere adjacent the outer surface of the padding, whereby ventilation is promoted in the area between the padding and the body member.

**4,788,973**  
**GAS DISPENSING SYSTEM AND CASE THEREFOR**  
 John Kirchgeorg, 1919 N. Summit Ave., Milwaukee, Wis. 53202, and Michael G. Hermann, West Bend, Wis., assignors to John Kirchgeorg, Milwaukee, Wis.  
 Filed May 13, 1986, Ser. No. 862,685  
 Int. Cl.<sup>4</sup> A61M 16/00  
 U.S. Cl. 128—214.18 19 Claims



- 1. A gas dispensing system, comprising:
  - a housing having an access opening therein;
  - a transparent cover removably mounted on said housing over said access opening;
  - a transparent partition secured to said housing proximal to said access opening for partitioning the interior of said housing into an inner chamber located between the interior surface of said housing and said partition, and an outer chamber located between said transparent partition and said transparent cover, a portion of said inner chamber being visible through said transparent cover and said transparent partition;
  - a pressurized gas tank disposed within said inner chamber of said housing;
  - outlet means disposed within said inner chamber for releasing pressurized gas from said tank;
  - indicator means for indicating the supply of pressurized gas in said tank, said indicator means being visible through said partition and said cover;
  - valve means disposed within said inner chamber for regulating the flow of gas from said outlet means;
  - switch means connected to said valve means for opening and closing said valve means to start and stop the flow of pressurized gas from said tank, said switch means extending through an opening in said transparent partition into said outer chamber, and said switch means being visible through said cover; and
  - means for conducting gas from said outlet means and terminating in a mask, said mask being housed within said outer chamber and being visible through said cover.

**4,788,974**  
**HIGH-FREQUENCY ARTIFICIAL RESPIRATOR**  
 Tran N. Phuc, Ohmiya, Japan, assignor to Senko Medical Instrument Mfg. Co., Ltd., Tokyo, Japan  
 PCT No. PCT/JP85/00646, § 371 Date Jul. 14, 1986, § 102(e) Date Jul. 14, 1986, PCT Pub. No. WO86/03128, PCT Pub. Date Jun. 5, 1986  
 Continuation of Ser. No. 890,020, Jul. 14, 1986, abandoned. This PCT application Nov. 21, 1985, Ser. No. 145,633  
 Claims priority, application Japan, Nov. 22, 1984, 59-177474; Apr. 5, 1985, 60-50807  
 Int. Cl.<sup>4</sup> A61M 16/00  
 U.S. Cl. 128—204.21 10 Claims

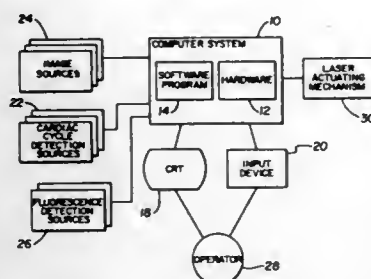


- 1. A high-frequency artificial respirator comprising:
  - a patient circuit for delivering a first respiration gas to an air passage of a patient, the first respiration gas being supplied from a respiration gas source;
  - oscillation generation means connected to said patient circuit for imparting a high-frequency oscillation to said first respiration gas in said patient circuit;
  - means for low-pass filtering slowly varying gas components, said means for low-pass filtering including an essentially closed chamber having one input opening for connection with said patient circuit and having one circuit in communication with ambient atmosphere; and
  - means for positive pressure generation being interfaced and communicating with said means for low-pass filtering slowly varying gas components, said means for positive pressure generation including a nozzle disposed in the vicinity of said one output opening in said chamber, for injecting a second gas through said output opening into said chamber to thereby generate a positive pressure within said chamber.

**4,788,975**  
**CONTROL SYSTEM AND METHOD FOR IMPROVED LASER ANGIOPLASTY**  
 Leonid Shturman, Minnetonka, and Steven L. Jensen, Coon Rapids, both of Minn., assignors to Medilase, Inc., Minneapolis, Minn.  
 Filed Nov. 5, 1987, Ser. No. 117,666  
 Int. Cl.<sup>4</sup> A61B 17/36  
 U.S. Cl. 128—303.1 28 Claims

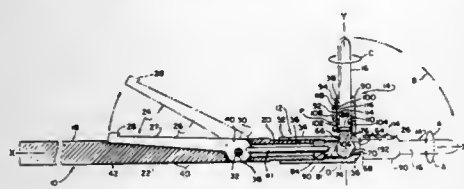
- 1. In combination with a laser angioplasty system in which a laser catheter is positioned within a moving vessel and oriented to impinge radiation upon a selected target site within the vessel, the improvement comprising:
  - means for defining a cycle representative of repetitive vessel movement;
  - means for defining the position of the laser catheter relative

to the selected target site during various times of the cycle, and



means for activating the laser catheter at a selected time or times to impinge laser radiation on the target site during an upcoming cycle or cycles.

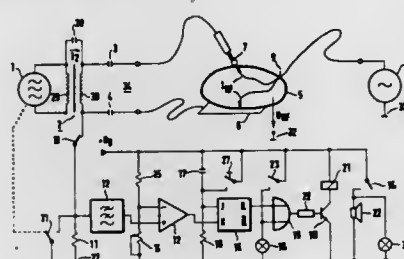
**4,788,976**  
**UNIVERSALLY ADJUSTABLE BLADE**  
 Robert N. Dee, P.O. Box 512, Tuckahoe, N.Y. 10707  
 Continuation-in-part of Ser. No. 831,801, Feb. 21, 1986, Pat. No. 4,672,964. This application Jun. 12, 1987, Ser. No. 62,113  
 Int. Cl.<sup>4</sup> A61B 17/32  
 U.S. Cl. 128—305 6 Claims



1. A scalpel comprising an elongated cylindrical handle closed at its proximal end and having a hollow sleeve portion formed with a spherical socket and cleft at its distal end adapted to receive a chuck in which a blade is fixedly secured, said chuck including a spherical base slideably seated in said socket for rotation of said chuck in an arc of at least 360 degrees therein and a shank extending through said cleft for swinging said chuck in an arc of at least 90 degrees, means for releasably locking said chuck in a selected position of rotation and swing comprising a stop plate slidable axially within the sleeve portion in opposition to the spherical base of said chuck and an over-the-center crank mechanism to alternately effect proximal movement of said stop plate into an inoperative position free of said spherical base thereby permitting rotation of said chuck or distal movement of said stop plate into an operative position pressed against said spherical base to lock said chuck against rotation, said crank mechanism being located in a slot having parallel sidewalls and comprising a crank head mounted within said slot between the proximal and distal ends thereof, said crank head being rotatably journaled about a pin having a transverse extending perpendicular to the center axis of said handle and passing through the center axis of said handle, said crank head having a circular surface centered about an offset axis parallel to the transverse axis of said pin and offset therefrom to revolve in an eccentric path about said transverse axis, a rod interposed between said stop plate and said crank head so that when said crank head is revolved in one direction, said rod biases said head to move said stop plate into the operative locking position and when said crank head is revolved in the other direction said rod moves to release said stop plate from the operative locking position, and a lever integrally connected to said crank head and extending radially outward from said handle when said crank head is in its inoper-

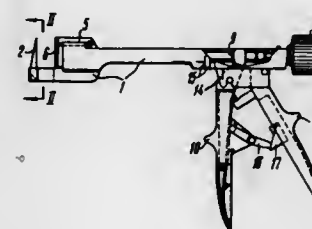
ative position and lying flat against said handle when said crank head is in its operative position.

**4,788,977**  
**HIGH-FREQUENCY SURGICAL INSTRUMENT**  
 Günter Faria, Tübingen-Hirschau, and Peter Patz, Tübingen, both of Fed. Rep. of Germany, assignors to Erbe Elektromedizin GmbH, Tübingen, Fed. Rep. of Germany  
 Continuation of Ser. No. 879,997, Jun. 30, 1986, abandoned.  
 This application Nov. 16, 1987, Ser. No. 122,609  
 Claims priority, application Fed. Rep. of Germany, Jul. 4, 1985, 3523871  
 Int. Cl.<sup>4</sup> A61B 17/39  
 U.S. Cl. 128—303.13 17 Claims



1. A high-frequency electrosurgical apparatus, said apparatus for producing a high-frequency current for the monopolar cutting or coagulating of biological tissue, said tissue being capable of conducting a low-frequency current which may be produced by one or more low-frequency current sources connected to said tissue or by said electrosurgical apparatus, said apparatus comprising:  
 A. transformer means having a primary winding and a secondary winding, each of said primary and secondary windings having first and second terminals;  
 B. high-frequency generator means coupled to the first and second terminals of said primary winding;  
 C. active electrode means coupled to the first terminal of said secondary winding;  
 D. neutral electrode means coupled to the second terminal of said secondary winding, at least one of said active electrode means and said neutral electrode means being coupled by a capacitor to its respective terminal;  
 E. current sensing means, said sensing means being connected to provide a conductive path between said second terminal of said secondary winding and ground potential, said sensing means for monitoring said low-frequency current and producing a signal indicative of the magnitude thereof;  
 F. first switch means, connected in said conductive path, said first switch means operating to alternately open and close said conductive path in response to a control signal; and  
 G. control means, coupled to said sensing means, said control means for comparing the signal produced by the sensing means to a preselected reference signal and producing said control signal in response to the difference therebetween.

**4,788,978**  
**SURGICAL INSTRUMENT FOR APPLYING LINEAR STAPLE SUTURES AND INTERSECTING THE TISSUE THEREBETWEEN**  
 Alexei A. Strekopytov, ulitsa Vsevoloda Vishnevskogo, 10 kv. 67; Boris A. Smirnov, ulitsa Borisa Galushkina, 17, kv. 26; Mikhail V. Danilov, ulitsa Bolshaya Cherkizovskaya, 10, korpus 2, kv. 145, and Zaribhai Yangibaev, I Baltiyskiy pereulok, 3/25, kv. 225, all of Moscow, U.S.S.R.  
 Continuation of Ser. No. 894,653, Aug. 8, 1986, abandoned, which is a continuation of Ser. No. 201,282, Oct. 27, 1980, abandoned. This application Mar. 23, 1988, Ser. No. 172,947  
 Claims priority, application U.S.S.R., Nov. 23, 1979, 2842286  
 Int. Cl.<sup>4</sup> A61B 17/10, 17/32  
 U.S. Cl. 128—334 R 4 Claims

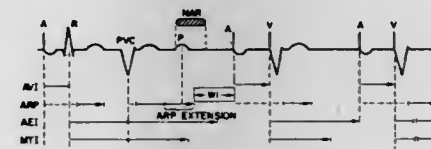


1. A surgical instrument for applying linear staple sutures comprising:  
 an elongated supporting body extending in a first direction;  
 a supporting jaw formed as a one-piece monolithic structure, said supporting jaw being mounted at one of its ends to said supporting body so as to extend substantially transversely with respect thereto, said supporting jaw having a plurality of staple bending depressions provided therein formed in a pair of substantially linear rows, and wherein a blind or non-through groove is formed in said supporting jaw extending parallel to and between said rows of staple bending depressions;  
 said supporting body having an elongated through opening arranged therein adjacent said supporting jaw;  
 a staple body accommodated in said supporting body and adapted to traverse the same;  
 means for moving said staple body toward and away from said supporting jaw;  
 a staple magazine accommodated on said staple body and having a plurality of staple receiving slots provided therein formed in a pair of substantially linear rows corresponding to said staple bending depressions, said magazine having a longitudinal recess formed therethrough extending between said rows of staple receiving slots, said longitudinal recess having an end opening externally of said staple magazine into open communication with said elongated through opening and being substantially symmetrical therewith, said longitudinal recess extending the entire width of said staple magazine in said first direction to enable an external knife blade to be inserted through said through opening and into said longitudinal recess, regardless of the distance between said staple magazine and said supporting jaw, after a suturing operation, to permit traverse of said knife blade along said groove formed in said supporting jaw between said rows of staple bending depressions to sever the tissue between the two rows of applied sutures; and  
 means for ejecting said staples from said staple magazine.

**4,788,979**  
**BIOABSORBABLE COATING FOR A SURGICAL ARTICLE**  
 Peter K. Jarrett, Trumbull; Donald J. Casey, Ridgefield, and Leonard T. Lehmann, Danbury, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.  
 Continuation-in-part of Ser. No. 910,598, Sep. 23, 1986, abandoned. This application Mar. 24, 1988, Ser. No. 172,608  
 Int. Cl.<sup>4</sup> A61L 17/00  
 U.S. Cl. 128—335.5 26 Claims

1. A surgical article having improved knot repositioning characteristics, the article comprising a multifilamentary strand, the strand having a bioabsorbable coating, the coating comprising a block copolymer having one or more A blocks solely manufactured from the monomer caprolactone, and one or more B blocks manufactured from the monomer caprolactone randomly copolymerized with one or more monomers selected from the group consisting of lactides, carbonates and a lactone other than caprolactone, the total caprolactone linkages in the copolymer being more than 50 to about 80 percent by weight of said copolymer.

**4,788,980**  
**PACEMAKER HAVING PVC RESPONSE AND PMT TERMINATING FEATURES**  
 Brian M. Mann, and Stuart W. Bachmann, both of Los Angeles, Calif., assignors to Siemens-Pacesetter, Inc., Sylmar, Calif.  
 Filed Jul. 18, 1986, Ser. No. 887,297  
 Int. Cl.<sup>4</sup> A61N 1/36  
 U.S. Cl. 128—419 PG 56 Claims



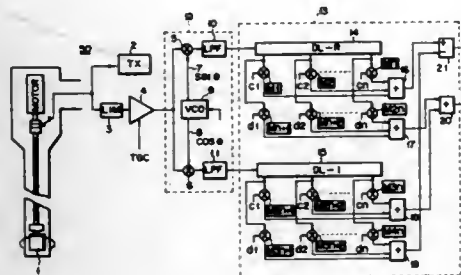
25. In a pacemaker having means for detecting the occurrence of a premature ventricular contraction (PVC), and means for sensing first and second cardiac events associated with the operation of said pacemaker, a system for responding to a PVC comprising:  
 means for generating a first time period that begins upon the sensing of a PVC by said PVC detection means;  
 means for generating a second time period that is initiated upon the occurrence of said first prescribed cardiac event occurring during said first period;  
 means for generating a third time period that is initiated upon the occurrence of said second prescribed cardiac event; and  
 delivery means for selectively delivering a stimulation pulse to a ventricle of a heart being paced by said pacemaker at the end of said third time period.

**4,788,981**  
**PULSE COMPRESSION APPARATUS FOR ULTRASONIC IMAGE PROCESSING**  
 Tatsuo Nagasaki, Koji Taguchi, Shinichi Imada, Eishi Ikuta, and Kazunori Shiono, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan  
 Filed Oct. 9, 1987, Ser. No. 107,497  
 Claims priority, application Japan, Oct. 16, 1986, 61-245777  
 Int. Cl.<sup>4</sup> A61B 10/00  
 U.S. Cl. 128—660.07 12 Claims

1. A pulse compression apparatus for ultrasonic image processing, comprising:  
 quadrature detection means for converting an echo signal obtained from an ultrasonic transducer means into a complex signal;



reference output means for producing a reference wave signal; and



correlation means for deriving a correlation between said complex signal and said reference wave signal to compress said echo signal.

4,788,982

# DEVICE FOR DETERMINING DEPTH OF ANAESTHESIA

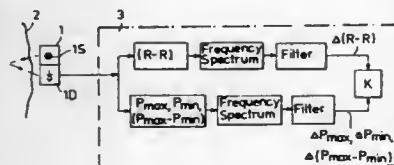
Andras Gedeon, Täby, and Lars-Erik Lindblad, Sollentuna, both of Sweden, assignors to ICOR AB, Bromma, Sweden

Filed Jan. 13, 1987, Ser. No. 3,035

Claims priority, application Sweden, Jan. 23, 1986, 8600289  
Int. Cl.<sup>4</sup> A61B 5/02

U.S. Cl. 128—670

6 Claims



1. A device for determining the depth of anaesthesia of a patient, comprising:

- a measuring means for measuring, on a part of the patient's body, a periodically varying optical parameter of blood circulating through said part, said optical parameter having a frequency corresponding to the R-R interval of said patient and said optical parameter having an amplitude corresponding to the blood pressure of the patient, said measuring means including means for generating an electric signal which varies in accord with this parameter;
- signal processing circuit means for receiving said signal generated by said measuring means, said circuit means including means for deriving from said signal a first value representative of variation in the length of successive R-R intervals, as well as means for deriving from said signal a second value representative of variation in the amplitude of said electric signal at a given point during each of said successive intervals, said circuit means also including means for obtaining a ratio of said first and second values; whereby said ratio is taken as a measurement of the depth to which the patient is anesthetized.

## 4,788,983 PULSE RATE CONTROLLED ENTERTAINMENT DEVICE

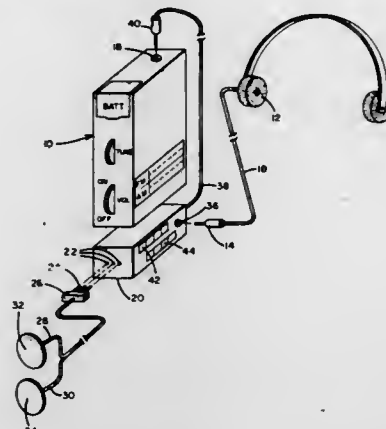
Loren S. Brink, 3031 Lakeshore Dr., Minneapolis, Minn. 44516, and James R. Newton, 5262 Sixth St., NE., Columbia Heights, Minn. 55421

Continuation of Ser. No. 760,932, Jul. 31, 1985, abandoned. This application Nov. 19, 1986, Ser. No. 932,304

Int. Cl.<sup>4</sup> A61B 5/02

U.S. Cl. 128—734

9 Claims



1. Apparatus for controlling the on/off state of a portable audio entertainment device carried by a person during the course of an exercise program, in response to achieving a predetermined level of physical activity, comprising:

- (a) means for sensing a physiologic parameter of a human body which changes with level of physical exercise;
- (b) signal processing means coupled to said sensing means for producing an electrical control signal when said physiologic parameter being sensed falls above a first threshold value corresponding to a level of exercise beneficial to the body and below a second threshold value greater than said first value where exceeding said second threshold can be injurious; and
- (c) circuit means for applying said electrical control signal to said portable entertainment device such that said device plays an audio program only when said physiologic parameter falls between said first threshold value and said second threshold value whereby said person is rewarded by the playing of said portable audio entertainment device so long as said person's level of exercise is both safe and effective.

4,788,984

## METHOD AND KIT FOR USE IN CONCEIVING A CHILD OF A DESIRED GENDER

Robert W. Marsik, Englewood, Colo., assignor to ProCare Industries Ltd., Englewood, Colo.

Filed Jan. 30, 1987, Ser. No. 9,206

Int. Cl.<sup>4</sup> A61B 10/00

U.S. Cl. 128—738

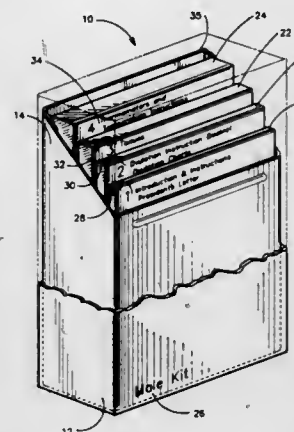
5 Claims

1. A method used in the home for use in attempting to conceive a child of a selected gender, comprising: accessing a single kit having a number of products, including:

- instructional literature means explaining the method including (a) means for providing information for use in predicting ovulation, (b) means for providing information relating to the placement of the sperm during intercourse wherein said information is directed to attempting to conceive a child of the selected gender, and (c) means for providing information associated with the timing of intercourse wherein said information is di-

rected to attempting to conceive a child of the selected gender, and at least one of the following:  
mucus chart means for monitoring the state of the mucus of a woman attempting to conceive a child of the selected gender, and  
temperature means including temperature chart means and means for sensing body temperature for use in monitoring the body temperature of the woman; conducting at least one of the following two steps:  
monitoring the state of mucus of the woman by sight observation and using said mucus chart means, and  
keeping track of body temperature of the woman using said temperature chart means after obtaining the

an elongated absorbent carrier sized to be substantially completely inserted into the body cavity;  
sterile fluid containing means located in said absorbent carrier to store a predetermined amount of sterile fluid, said containing means having at least a rupturable component; protective means associated with said absorbent carrier to prevent said rupturable component from being inadvertently ruptured by radial compression of said absorbent carrier;  
actuating means located at the back end of said absorbent carrier to be operated by the user for causing said rupturable component to be ruptured while said absorbent carrier is substantially completely positioned in the body cavity of the user; and  
an absorbent outer covering on said absorbent carrier for dislodging and retaining cells from the surface of the body cavity of the user, rupture of said containing means releasing sterile fluid to moisten said absorbent outer covering to aid in collecting and preserving a cell sample.



4,788,986

## HOLDER FOR BLOOD COLLECTING NEEDLE

Jim C. Harris, P.O. Box 391, New Albany, Ind. 47150

Filed Mar. 16, 1987, Ser. No. 26,201

Int. Cl.<sup>4</sup> A61B 5/00

U.S. Cl. 128—763

4 Claims

temperature of the body of the woman using said means for sensing body temperature; and  
attempting to conceive a child of the selected gender by having intercourse within a predetermined period of time relating to ovulation using at least one of information previously provided on said mucus chart means and information previously provided on said temperature chart means wherein, when attempting to conceive a female child, having intercourse days before ovulation and, when attempting to conceive a male child, having intercourse at about the time of ovulation, and by placing sperm during intercourse near the cervix of the woman when attempting to conceive a male child and placing sperm at shallow penetration when attempting to conceive a female child.

4,788,985

## DEVICE FOR CELL SAMPLING IN A BODY CAVITY

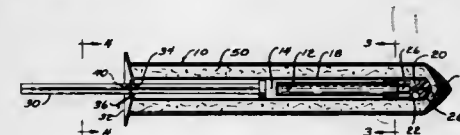
Patrick R. Manning, Oakbrook, and Donald W. West, Lake Forest, both of Ill., assignors to Medtest Corporation, Lake Forest, Ill.

Continuation of Ser. No. 640,591, Aug. 14, 1984, abandoned, which is a continuation-in-part of Ser. No. 429,689, Sep. 30, 1982, Pat. No. 4,465,078. This application Nov. 10, 1987, Ser. No. 121,343

Int. Cl.<sup>4</sup> A61B 10/00

U.S. Cl. 128—759

16 Claims

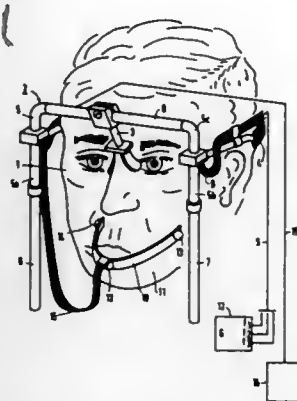


1. Single use apparatus for collecting cells from a body cavity for cytodiagnosis, the apparatus being self-administrable by a user and disposable after analysis of the collected cells, comprising:

1. A needle holder for use with: a blood collection needle having a first sharpened end and a second sharpened end and a hub intermediate the first and second ends of the needle, and an evacuated blood collection tube stoppered at one end by a rubber-like stopper; comprising:

- a main body including a hollow tube open at the first end and sized and configured to receive the stoppered end of said blood collection tube therein, said main body being partially closed at the second end by an end wall, the end wall defining an aperture for receiving therethrough the first end of the blood collection needle;
- a sleeve received about the second end of said main body; means for retaining said sleeve to said main body while permitting rotation of said sleeve with respect to said main body;
- said sleeve and said main body including cooperative means for engaging and securing said needle hub to said main body in an orientation such that the first end of said needle is received through the aperture of the end wall of said main body, by rotating said sleeve with respect to said body, and also for disengaging and releasing said needle hub from said main body by rotating said sleeve with respect to said main body.

4,788,987  
**APPARATUS FOR MEASURING THE LOCATIONAL AND ATTITUDINAL CHANGE OF A RIGID BODY IN SPACE**  
 Bernd Nickel, Lorach, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Filed Feb. 25, 1987, Ser. No. 18,427  
 Claims priority, application Fed. Rep. of Germany, Feb. 27, 1986, 3606446  
 Int. Cl.<sup>4</sup> A61B 5/05, 5/10  
 U.S. Cl. 128—777 12 Claims



1. An apparatus for measuring the location and attitude, as well as, locational and attitudinal changes of a jaw of a patient, comprising:

transmission system means for generating three different magnetic fields comprising three current-permeated elements arranged relative to one another in a U-shaped configuration in one plane and supplied respectively with three different respective operating frequencies by an alternating current generator, each of said current-permeated elements having at least one conductor which is surrounded by an enveloping tube which is attached to means for securing the current-permeated elements in a predetermined fixed position with respect to a patient's head;

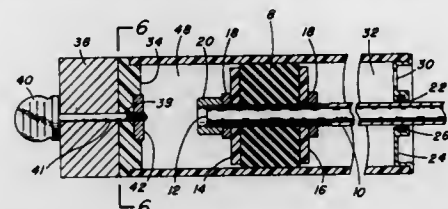
reception system means having three reception elements for receiving said magnetic fields generated by the transmission system means, said reception elements being arranged in one plane on a retaining part shaped to correspond to a dental arch at a predetermined, fixed spacing from one another, said reception elements including coils capable of generating signals in response to the three different operating frequencies; and

evaluation electronics means connected to said reception elements for receiving said signals from each coil representative of said three different alternating fields and for separating the signals into individual components; wherein said evaluation electronics means further includes means for converting said components into signal quantities corresponding to the position of at least one reception element with respect to the location of the current-permeated elements.

4,788,988  
**SMOKING DEVICE**  
 Matthew G. Titus, 4604 Woodduck Ln., Salt Lake City, Utah 84117  
 Filed Jan. 30, 1987, Ser. No. 9,230  
 Int. Cl.<sup>4</sup> A24F 1/28, 1/30

U.S. Cl. 131—198.2 13 Claims  
 1. A smoking device comprising:  
 (a) a cylindrical housing having an outlet end and an inlet end,  
 (b) a reciprocating pump-like plunger carried within said

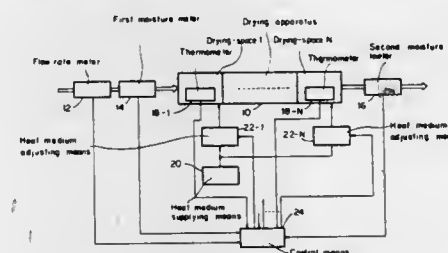
cylindrical housing and thereby to provide a smoke dilution chamber near said cylindrical housing's inlet end and an air chamber near said cylindrical housing's outlet end,  
 (c) a combustion bowl having a burning chamber fixed to said cylindrical housing,  
 (d) a passageway connecting said combustion bowl to said inlet end,  
 (e) an on-off valve means operatively positioned between said burning chamber and said inlet end to permit smoke to pass from said burning chamber to said smoke dilution chamber when said valve is in an open position,  
 (f) a cap means having at least one vent hole and a central



opening for covering said outlet end of said cylindrical housing and

(g) a slidable hollow carbureting tube extending through said central opening and into said smoke dilution chamber said carbureting tube having an inlet section and an outlet section, said inlet section having said pump-like plunger fixed thereto and said outlet section being extended beyond said cylindrical housing to permit pre-determined amounts of ambient air to be drawn into said smoke dilution chamber as said plunger is moved toward said outlet end of said cylindrical housing by regulating the degree to blockage imposed on said outlet section of said hollow carbureting tube.

4,788,989  
**PROCESS FOR THE TEMPERATURE CONTROL OF A DRYING APPARATUS FOR TOBACCO LEAVES**  
 Yutaka Nambu, Hitoshi Sugawara, and Yasuo Saitoh, all of Hiratsuka, Japan, assignors to Japan Tobacco, Inc., Tokyo, Japan  
 Continuation-in-part of Ser. No. 742,858, Jun. 10, 1985, abandoned. This application Mar. 23, 1987, Ser. No. 28,941  
 Claims priority, application Japan, Jun. 21, 1984, 59-126406  
 Int. Cl.<sup>4</sup> A24B 3/10, 3/12  
 U.S. Cl. 131—303 1 Claim



1. In a cut tobacco leaves drying apparatus having a rotary hollow cylinder around which a plurality of heater means are mounted and in which the cut tobacco leaves are dried while they are carried along the rotational axis of said cylinder toward the exit of said cylinder during the rotation of the cylinder, the process for the temperature control of the drying apparatus comprises the steps of

(A)  
 (a) disposing the heater means along the direction of

movement of said cut tobacco leaves, in order beginning with a first heater means at a position closest to the exit of the cylinder, each heater means heating said cylinder at a position around which said each heater means is mounted thereby defining a drying-space in which the cut tobacco leaves are dried while they are carried and the amount of heat medium supplied to each heater means being adjusted individually by a heat medium adjusting means;  
 (b) mounting, at a place forward to the entrance of said cylinder, a flow rate meter for measuring the flow rate (Fo) of the cut tobacco leaves and a first moisture meter for measuring the moisture rate ( $\omega_1$ ) of the cut tobacco leaves before drying;  
 (c) mounting a second moisture meter at the exit of said cylinder for measuring the moisture rate ( $\omega_2$ ) of the cut tobacco leaves after they are dried;  
 (d) mounting a thermometer in each one of said drying-spaces for measuring the temperature therein;  
 (E) heating said drying-spaces to a first predetermined temperature (To), when operating the drying apparatus, prior to the drying process of the cut tobacco leaves;  
 (C) defining said process for the temperature control of each one of said drying-space by three consecutive states, state I, state II, and state III;

said state I being a period between the detection of the cut tobacco leaves flowing toward the first drying-space and a start of heating each drying-space to second predetermined temperatures (Tci), said state II being a period between said start of heating each drying-space to said second predetermined temperature and change in temperature in response to it, and said state III being a period during which the cut tobacco leaves are dried in each drying-space;

said state III being further subdivided into two consecutive periods, an unsteady period during which the flow rate of the cut tobacco leaves at the exit of the drying apparatus has not reached its steady value yet, and a steady period during which the flow rate of the tobacco leaves at the exit of the drying apparatus has reached its steady value; and said state II starting in order beginning from the first drying-space followed by succeeding drying-spaces with a predetermined waiting time allowed before subsequent drying-space is started.

(D) heating each one of said drying-spaces toward its corresponding said second predetermined temperatures (Tci) by allowing said heater means to begin heating at the end of said state I;

(E) determining temperatures (Tao) of each one of said drying-spaces in said steady period on the basis of

(a) the measured flow rate (Fo) and the moisture rate ( $\omega_1$ ) of the cut tobacco leaves flowing into a first drying-space of said drying-spaces; and

(b) a temperature ( $\alpha$ ) required per unit flow rate and a temperature ( $\beta$ ) required per unit moisture rate, both of which being proper to the cut tobacco leaves to be dried; said temperature (Tao) being selected such that said temperature (Tao) decreases in discrete steps toward the exit of said hollow cylinder;

(F) determining target temperatures (Tseti) of each one of said drying-spaces required at time t in said unsteady period on the basis of

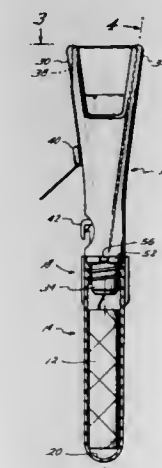
(a) said Tao;  
 (b) the time constant (Tfi) of flow rate characteristics of each one of said drying-spaces; and

(c) the time constant (Thi) of heat transfer characteristics of each one of said drying-spaces; said target temperature being a temperature toward which actual temperature (Ti) of each drying-space at said time t will rise;

(G) outputting first temperature-adjusting signals (Mfi) to the corresponding heat medium adjusting means after computing said first temperature-adjusting signals (Mfi) through proportional, integral and derivative (PID) operation on the basis of

(a) said target temperatures (Tseti); and  
 (b) said actual temperatures (Ti) of each one of said drying-spaces at said time t measured by said thermometers;  
 (H) applying, during said state III, a feed-forward control in which the temperature is controlled by adjusting the amount of heat medium supplied to each one of said heater means with said first temperature-adjusting signal (Mfi) corresponding to each one of said drying-spaces;  
 (I) applying, beginning at a predetermined time (t8) during said unsteady period, a feed-back control in which the temperature is controlled by adjusting the amount of heat medium supplied to said heater means with second temperature-adjusting signals (Mbi) determined through proportional, integral and derivative (PID) operation on the basis of the measured moisture rate ( $\omega_2$ ) of the dried cut tobacco leaves coming out of said cylinder and a predetermined target moisture rate ( $\omega^*$ ); and said feed-back control being applied to at least final drying-space subsequently to said feed forward control.

4,788,990  
**FLOSSER LOCKING MECHANISM**  
 Lester R. Wisegerber, 38 Brown Ln., Dayton, Tex. 77535  
 Filed Apr. 9, 1987, Ser. No. 36,063  
 Int. Cl.<sup>4</sup> A61C 15/00  
 U.S. Cl. 132—324 12 Claims



1. A dental flosser for dispensing and holding a string of floss comprising:

a handle including means for receiving floss; an elongated body including a pair of spaced-apart prongs at one end, a shoulder at the other end, and an enclosed floss-receiving passageway extending within one of the prongs in operable communication with the floss receiving means;

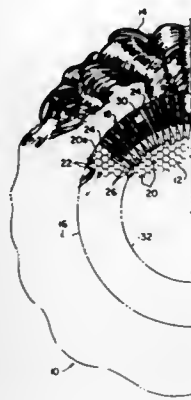
means for coupling the other end of the body to the handle adapted for longitudinally extending the floss from the handle to the floss-receiving passageway; and

locking means for preventing the floss from slipping in the region of the coupling means, including a washer disposed between said shoulder and handle and adapted for receiving floss looped therearound, the locking means being configured such that the floss can pass from the handle, loop around the washer, and pass into the floss-receiving passageway without being exposed outside the flosser, the coupling means being operable for compressing the washer such that with the floss looped around the washer, the floss is compressed between the washer and the handle and between the washer and the shoulder, preventing slipping movement of the floss in the region of the washer.



# 4,788,991 HAIR PIECE

Paula K. Nocera, 104 E. 37th St., New York, N.Y. 10016, and  
Bernad P. Hopp, 21 Oak Rd., Saddle River, N.J. 07458  
Continuation-in-part of Ser. No. 834,584, Feb. 28, 1986,  
abandoned. This application Sep. 8, 1987, Ser. No. 93,774  
Int. Cl.<sup>4</sup> A45D 24/00; A41G 3/00  
U.S. Cl. 132-156 1 Claim



1. A wig comprising a semi-spherical stretchable fabric net body formed of a plurality of interconnected loops having hair attached thereto and having a circumferential edge formed of reinforced loops stretchable with respect to each other, and a flat serpentine comb in a closed loop configuration having an outer circumference and an inner circumference and an expandable body between said outer and inner circumferences having a direction of expansion lengthwise of said comb body, said comb having teeth formed along said inner circumference and interconnecting bases along said outer circumference, said flat comb in said closed loop configuration attached at its bases to selectively spaced peripheral loops of said fabric body so as to be circumferentially tensioned to project said teeth radially inwardly toward the center of said fabric body and be stretchable conjointly with the circumferential edge of said fabric body, whereby preparatory to use, said comb is stretched lengthwise of its expendable body and said unattached inner circumference thereof is inserted into the hair of the user so as to permit corresponding insertion of said teeth into the user's hair, and then said stretched comb is released such that the circumferential tension therein urges the engagement of the teeth of said comb into the user's hair to thereby secure the wig in place

# 4,788,992

## ULTRASONIC STRIP CLEANING APPARATUS

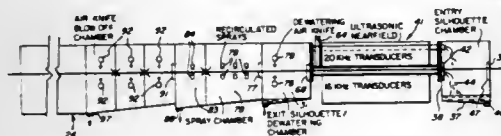
Hugh B. Swainbank; Christopher A. Swainbank, both of Woodbury, and Kenneth R. Allen, Jr., Roxbury, all of Conn., assignors to Lewis Corporation, Oxford, Conn.

Filed Apr. 28, 1987, Ser. No. 43,434

Int. Cl.<sup>4</sup> B08B 3/02, 3/04

U.S. Cl. 134-64 R

20 Claims



1. Ultrasonic apparatus for cleaning elongated unflexed straight strip material advancing along a straight travel path through the apparatus, comprising:  
a cleaning liquid chamber having substantial depth beneath a free liquid surface of a cleaning liquid and bounded by a

lower vibratory diaphragm plate, having a first plurality of ultrasonic transducers anchored to its under surface energized at a first ultrasonic frequency, and having elongated side edges and end edges respectively joined to elongated side walls, extending upwardly above the free liquid surface, and to upwardly extending end walls secured to said side walls to form a cleaning liquid tank enclosing said cleaning liquid chamber, said side walls having upper edges incorporating supporting means, positioned above said free liquid surface, said first plurality of ultrasonic transducers being vibrationally coupled to said liquid through said lower vibratory plate with means physically isolating said first plurality of transducers from said liquid,

a separate, upper vibratory diaphragm plate independently suspended in said tank beneath said free liquid surface adjacent to and upwardly spaced from said lower diaphragm plate, for free vibratory movement independent of said lower vibratory diaphragm plate, and having a second plurality of ultrasonic transducers anchored to its upper surface and being vibrationally coupled through said upper vibratory plate to said liquid with means physically isolating said second plurality of ultrasonic transducers from said liquid, thus forming between the facing surfaces of said independent vibratory plates an elongated ultrasonic treatment passageway immersed beneath said free liquid surface and encompassing the straight travel path of said elongated strip;

with the end walls of said tank being provided with aperture means forming respective entry and exit portals for the passage of said straight strip therethrough, each provided with a silhouette panel spanning the portal and having an opening therethrough positioned on said travel path with an outline substantially matching the cross-section of said elongated strip but having dimensions exceeding the dimensions of said strip,

means forming an entry chamber adjacent to the entry portal and equipped with a drain,  
means forming a dewatering chamber adjacent to the exit portal and equipped with a drain,  
a recirculating pump having an intake and an outlet, return conduit means joining both said drains to the intake of said pump, and delivery conduit means connecting the outlet of said pump to said passageway adjacent to said exit portal,

whereby strip material advancing along the travel path enters said entry portal silhouette opening, travels along said ultrasonic treatment passageway between said vibratory diaphragm plates and exits through said exit portal silhouette opening, while cleaning liquid from said recirculating pump counterflows along the passageway between said diaphragm plates in the direction opposite to the direction of advance of the strip, and flows out of said tank past said entering strip through said entry portal silhouette opening.

# 4,788,993

## VEHICLE RECIPROCATING SPRAY WASHING APPARATUS

Carl C. Beer, Philadelphia; C. Lee Hewitt, Feasterville, both of Pa., and Sherman Larson, Palmyra, N.J.; assignors to Sherman Industries, Incorporated, Palmyra, N.J.

Filed Jan. 23, 1986; Ser. No. 877,243

Int. Cl.<sup>4</sup> B08B 3/02

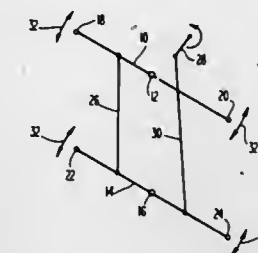
U.S. Cl. 134-123

18 Claims

1. Vehicle washing apparatus for washing a moving vehicle comprising:

- a support frame;
- a first member longitudinally elongated and mounted on said support frame for pivotal movement about a first transverse axis;
- first and second nozzles secured to said first elongated member at spaced apart points;

a second member longitudinally elongated and mounted on said support frame for pivotal movement about a second transverse axis;  
third and fourth nozzles secured to said second elongated member at spaced apart points;  
drive means for reciprocating said first and second elongated members about said first and second transverse axes, re-



spectively, to move each entire nozzle vertically along a path defined by an arc;

a fluid source;

and means for conducting fluid from said fluid source to said nozzles whereby the nozzles are positioned on the respective first and second members and the first and second members are pivoted so that the fluid substantially covers a portion of the vehicle's three dimensional surface.

# 4,788,994

## WAFER HOLDING MECHANISM

Kaoru Shinbara, Kusatsu, Japan, assignor to Daiippon Screen Mfg. Co., Japan

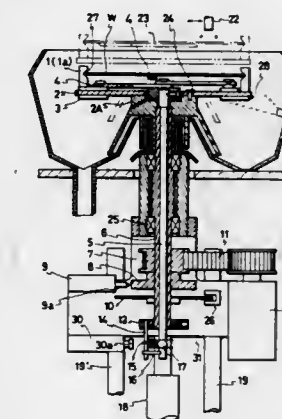
Filed Aug. 11, 1987, Ser. No. 84,336

Claims priority, application Japan, Aug. 13, 1986, 61-190246; Nov. 29, 1986, 61-285752

Int. Cl.<sup>4</sup> C23F 1/02; B05C 11/00; B08B 3/00

U.S. Cl. 134-157

20 Claims



20. A wafer holding mechanism in an apparatus for surface treating wafers while rotating the same, said mechanism comprising:

- a housing defining a treating chamber in said apparatus;
- a hollow rotary shaft extending into said housing;
- a rotary plate member located in said housing and horizontally mounted on said rotary shaft;
- chuck members moveable between a gripping position wherein they contact an outer peripheral edge of a wafer and hold the wafer within the housing and a release position wherein the wafer may be removed from the housing, at least one of said chuck members being horizontally movable along said plate member;

a driving shaft located within said rotary shaft and movable relative thereto;

a link member coupling said driving shaft to said movable chuck members, said chuck members moving between said gripping and release positions in response to the relative movement of said rotary and driving shafts between first and second positions;

means for urging said rotary and/or driving shafts into said first position, thereby causing said chuck members to move into said gripping position; and

means located outside of said housing for moving said rotary and/or driving shafts into said second position relative to one another, and thereby moving said chuck members into said release position, when said wafer is to be placed onto or removed from said housing.

# 4,788,995

## UMBRELLA ASSEMBLY

Ronald A. Rushing, 6305 S. 145th St., Omaha, Nebr.

Continuation of Ser. No. 888,945, Jul. 24, 1986, abandoned. This application Oct. 7, 1987, Ser. No. 105,333

Int. Cl.<sup>4</sup> A45B 3/00

U.S. Cl. 135-16

2 Claims



1. In an umbrella assembly, a shaft with a collapsible umbrella canopy at one end and a handle at the other, a cavity in the handle, a unitary flashlight assembly in the cavity and having a depressible activator element on the exterior thereof, an axial slot on the inside of the cavity for receiving the depressible activator element of the flashlight assembly when it is inserted, as a unit, into the cavity, an opening in the end of the handle aligned with the light of the flashlight assembly, an elongated slot on the outside of the handle opening through the inside into the cavity in longitudinal alignment with the inside axial slot, a depressible element in the elongated slot conforming generally thereto in its peripheral outline and being disposed therein, one end of the depressible element being integrally connected to the handle so that it cantilevers when depressed on the outside in a direction lateral to the handle so that, upon depression of the depressible element, the depressible activator element will be depressed and the flashlight assembly will be energized, and a mounting for the flashlight assembly that centers the activator element under the depressible element when the flashlight assembly is fully inserted.

# 4,788,996

## FOLDABLE GOLF BAG UMBRELLA-LIKE COVER

David J. Forshee, 19138 Faith, Sterling Heights, Mich. 48077

Filed Nov. 30, 1987, Ser. No. 126,713

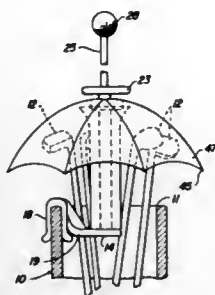
Int. Cl.<sup>4</sup> A45B 3/00; A63B 55/00; A47G 25/12

U.S. Cl. 135-16

13 Claims

1. A foldable golf bag umbrella comprising:  
a normally vertically arranged, elongated, open upper end, outer tube adapted to fit within a golf bag along with the golf clubs, and clamp means for releasably securing the

tube to the wall of the bag with the upper end of the tube opening above the upper end of the bag;  
 the upper end of the tube is formed as an upper edge rim;  
 a central guide tube arranged coaxially with, and extending along the length of the outer tube;  
 a disk fixed upon the upper end of the guide tube a short distance above said rim and generally overlapping the rim to form a space between the disk and rim;  
 an elongated rod coaxially, slidably extending through the disk and guide tube and within the outer tube, with the rod having an upper end portion extending above the disk;  
 a ring-like collar surrounding the guide tube and slidable upwardly and downwardly along the length of the guide tube, with the rod being connected to the collar so that upward and downward sliding movement of the rod correspondingly moves the collar upwardly and downwardly within the outer tube;  
 a number of elongated, resilient, normally curved umbrella ribs having inner ends pivotally connected to the collar and having free outer ends normally arranged adjacent the open upper end of the outer tube for radially outwards extension through said space, and with a flexible, cloth-like umbrella cover attached to and extending between the ribs;



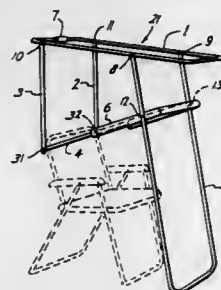
said ribs being characterized by having an elastic memory so that they may be substantially flattened under pressure, but will return to their normal curved shape upon release of the pressure;

whereby the rod may be slid downwardly, through the disk and guide tube, deeply into the outer tube for moving the collar into close proximity with the bottom of the outer tube for thereby pulling the pivoted inner ends of the ribs downwardly into the tube for substantially flattening the ribs and locating the ribs and cover within the outer tube and around the guide tube to retract the umbrella, but the rod may be pulled upwardly so that the collar is moved to the outer tube rim and the ribs are guided outwardly of the outer tube and upwardly around the disk, and after the ribs are substantially fully extended, a further, short upward movement of the rod causes the collar to press the ribs against the underside of the disk to reverse the ribs so that they bend downwardly and outwardly into their curved shapes for opening the umbrella above the top of the outer tube and the top of the golf bag, and a short downward thrust of the rod causes the pressure of the rim against the ribs to reverse the ribs back into their upwardly and outwardly extending position.

**4,788,997**  
**PORTABLE BLIND**  
 Lancelot M. Clopton, Rte. 8, Box 493, Leander, Tex. 78641  
 Filed Dec. 1, 1986, Ser. No. 936,637  
 Int. Cl.<sup>4</sup> E04H 15/58, 15/20; A47C 7/10  
 U.S. Cl. 135-117 12 Claims

1. A portable folding blind for use with a flexible slipcover and a chair, the blind comprising:  
 (a) a roof frame adapted to support a flexible slipcover;  
 (b) means rotatably attached to and extending downward from the roof frame for rotatably connecting the roof

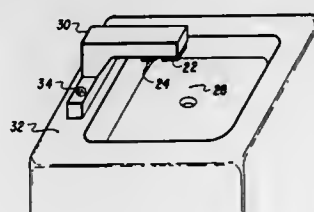
frame to a chair and for supporting the roof frame above such a chair; and  
 (c) rest means positioned below the roof frame and in front of such a chair which may be attached to the chair connecting means for providing a supporting surface in front of such a chair, the rest means being rotatably attached to the connecting means, wherein rotatable attachment of the roof frame, rest means and connecting means accommodates folding of the blind for carrying.



necting means for providing a supporting surface in front of such a chair, the rest means being rotatably attached to the connecting means, wherein rotatable attachment of the roof frame, rest means and connecting means accommodates folding of the blind for carrying.

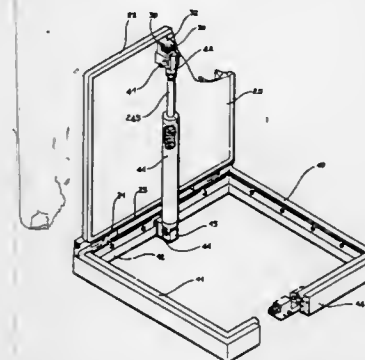
**4,788,998**  
**ULTRASONICALLY OPERATED WATER FAUCET**  
 Robert B. Pepper, deceased, late of Thermal, Calif., and by Jayme P. Ginsburg, executrix, 1539 McAllister St., San Francisco, Calif. 94115  
 Continuation-in-part of Ser. No. 856,699, Apr. 28, 1986, abandoned, which is a division of Ser. No. 658,051, Oct. 3, 1984, Pat. No. 4,598,726, which is a continuation of Ser. No. 486,789, Apr. 20, 1983, abandoned, which is a division of Ser. No. 247,997, Mar. 26, 1981, Pat. No. 4,402,095. This application Jan. 22, 1988, Ser. No. 146,956  
 Int. Cl.<sup>4</sup> E03C 1/00 14 Claims

U.S. Cl. 137-1



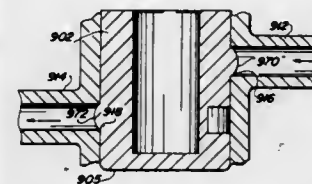
1. A method of controlling the flow of fluid from a faucet having a fluid outlet comprising:  
 measuring the distance of an object from the faucet fluid outlet and detecting whether the object is in a position where the fluid will flow onto the object from the fluid outlet;  
 causing the fluid to flow when the distance is equal to or less than a first predetermined limit but equal to or greater than a second predetermined limit and the object is in a position where the fluid will flow onto the object from the fluid outlet; and  
 preventing the fluid from flowing when the distance is greater than the first predetermined limit or less than the second predetermined limit or the object is not in a position where the fluid will flow onto the object from the fluid outlet.

**4,788,999**  
**AUTOMATIC SERVO-CONTROLLED VALVE WITH HIGH-SPEED OPENING**  
 Luigi Dalpane, Chiavari, Italy, assignor to Ansaldo S.p.A., Genoa and ENEA Comitato Nazionale per la Ricerca e lo Sviluppo dell'Energia Nucleare e delle Energie Alternative, Rome, both of, Italy  
 Filed Jul. 9, 1987, Ser. No. 72,273  
 Claims priority, application Italy, Jul. 14, 1986, 12512 A/86  
 Int. Cl.<sup>4</sup> B65D 51/16  
 U.S. Cl. 137-514 8 Claims



1. An automatic quick-release vent and pressure-relief valve structure comprising, a frame secured in use around an opening through which gases under pressure are vented to relieve the pressure thereof, a cover pivotally mounted on the frame movable to a closed position on the frame for closing the opening and movable to an open position in which said opening is opened, a lock mechanism comprising a locking pin fixed to an underside of the cover to which said gases apply pressure in a direction toward opening the cover, said lock mechanism further including a lock device having a slide bolt overlying the locking pin holding the cover on the frame in a closed position, said lock device having variably adjustable biasing means for variably biasing the slide bolt to an extracted position overlying said locking pin to hold the cover closed, said locking pin and slide bolt having surfaces coactive and effectively in response to pressure of gases on said cover developing a force component axially of the slide bolt against biasing pressure of said biasing means for effecting release in response to said pressure on the underside of the cover, and an automatic actuator biasing the closed cover to an open position automatically opening the cover when said slide bolt is retracted.

**4,789,000**  
**FLOW CONTROL DEVICE FOR ADMINISTRATION**  
 Jerry L. Aslanian, 4247 E. Hazelwood, Phoenix, Ariz. 85018  
 Continuation-in-part of Ser. No. 39,946, Apr. 20, 1987, which is a continuation-in-part of Ser. No. 630,632, Jul. 13, 1984. This application Nov. 9, 1987, Ser. No. 118,438  
 Int. Cl.<sup>4</sup> F16K 5/10, 37/00  
 U.S. Cl. 137-556 5 Claims

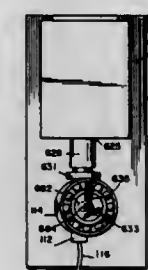


1. A valve for establishing and maintaining predetermined

administration flow rates in IV systems having a source of fluid connected to an administration needle via tubing, said valve comprising:

(a) a housing of a first relatively hard plastic material defining a cylindrical valving chamber, said housing defining an inlet port and an outlet port communicating with said chamber;  
 (b) a valving member rotatable within said valving chamber and having a valving surface defining a flow path, said valving member having an off position in which at least said inlet port is out of registry with said flow path, said valving member being of a second relatively softer plastic material, said valving member further having a node on the said valving surface conforming to the configuration of the inlet port and being in registry therewith in the off position whereby predetermined rotation of said valving member will displace said node from registry with said port establishing an ultra-low flow condition.

**4,789,001**  
**OPERATING SYSTEM FOR A VALVE**  
 Bengt S. Backe, Dundee, and Lamoyne W. Durham, Bartlett, both of Ill., assignors to South Bend Lathe, Inc., South Bend, Ind.  
 Continuation-in-part of Ser. No. 647,158, Sep. 4, 1984, Pat. No. 4,706,456. This application Oct. 7, 1986, Ser. No. 916,230  
 Int. Cl.<sup>4</sup> F16K 37/00  
 U.S. Cl. 137-554 30 Claims



1. A precise actuating system for a valve comprising:  
 a valve element;  
 an eccentric cam assembly;  
 said eccentric cam assembly including a cam cylinder and a bearing arrangement rotatably mounted about said cam cylinder;  
 a connection linkage operably associating said valve element and said cam assembly such that rotational motion of said cam assembly causes translational positioning of said valve element; and  
 said connection linkage means including biasing means connected to said valve element and said cam assembly for preventing separation of said valve element and said cam assembly.

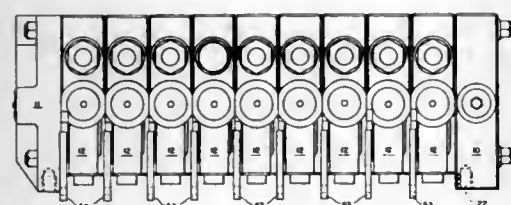
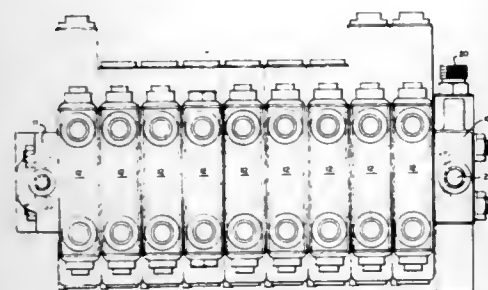
**4,789,002**  
**FLUID VALVE STRUCTURES**  
 Arthur Williams, Masury, Ohio, assignor to Commercial Shearing, Inc., Youngstown, Ohio  
 Continuation of Ser. No. 820,262, Jan. 17, 1986, Pat. No. 4,709,724. This application Mar. 26, 1987, Ser. No. 31,231  
 The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> F15B 13/08 44 Claims

U.S. Cl. 137-596  
 1. A fluid valve structure comprising a first inlet section separately connected to a source of pressure fluid and to a reservoir, a second inlet section spaced from said first inlet



section, a plurality of side by side valve sections between said first inlet and second inlet sections each having a housing with at least one inlet chamber, a work chamber and a tank chamber intersected by a passage open at opposite ends to a control chamber intersected by a passage open at opposite ends to a control chamber and a tank chamber at a common pressure, a valve spool having both ends in said chamber at a common pressure and being movable in said passage, said spool having spaced grooves adapted in one position to connect said work chamber to the inlet chamber and in a second position to connect the work chamber with a tank chamber, lever means in said control chamber engaging one end of the valve spool, said lever means being rotatable about a shaft whose axis is trans-

a spigot which is rotatable within a seat to bring a bore into communication with a section of tapered groove whereby the relative position of said bore along the length of said groove determines the amount of additive passing through said unit and a clamp which in use embraces the conduit and includes

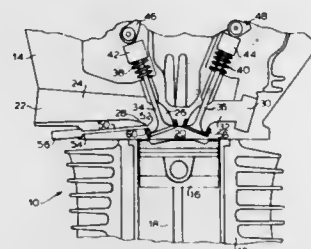


verse to and spaced from the axis of spool valve, seals and bearings in said housing through which both ends of said shaft pass to the outside of the valve housing, handle means external of the housing acting on the shaft means to rotate the lever means whereby the valve spool moves axially in the passage, said shaft, lever means and valve spool being fully enclosed within the valve housing in all operative positions, said lever means being threadably removably engaged in said shaft, stop means on the lever means fixing the operative position of the lever means in said shaft, and wherein said housing is provided with an opening and closure therefor through which the lever means may be removed from the shaft and from the housing leaving the valve spool free in said passage.

**4,789,003**  
**WATER TREATMENT APPARATUS**  
Norman J. Costa, 73A Saunders Bay Road, Caringbah, New South Wales 2229, Australia  
PCT No. PCT/AU86/00335, § 371 Date Jul. 2, 1987, § 102(e) Date Jul. 2, 1987, PCT Pub. No. WO87/03111, PCT Pub. Date May 21, 1987  
PCT Filed Oct. 31, 1986, Ser. No. 86,095  
Claims priority, application Australia, Nov. 7, 1985, PH3281  
Int. Cl.<sup>4</sup> G05D 11/03  
U.S. Cl. 137—605 7 Claims  
1. Apparatus for introducing an additive into a conduit fluid system without the requirement of any additional external power, said apparatus including an intake means for drawing the additive from a supply thereof, a metering unit comprising

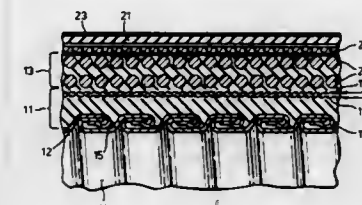
means for dispensing the additive through said conduit wall, said means comprising a pipe extendible through an aperture in said conduit wall and a concentric ridge formed around said pipe which in use bites into the outside of said conduit adjacent said aperture to prevent leakage at this point.

**4,789,004**  
**APPARATUS AND METHOD FOR INCREASING FLUID FLOW RATE IN A FLOW PATH INCLUDING A CURVED FLOW PATH SECTION**  
Laurence W. McCracken, Rte. 1, Box 298, Chapel Hill, N.C. 27514  
Division of Ser. No. 25,617, Mar. 13, 1987, Pat. No. 4,708,098.  
This application Sep. 24, 1987, Ser. No. 88,800  
Int. Cl.<sup>4</sup> F15C 1/04  
U.S. Cl. 137—827 8 Claims



1. In a fluid flow system comprising a flow path having an intermediate curved portion comprising an outer radius concave bounding surface and an inner radius convex bounding surface, wherein the inner and outer radius surfaces are similarly curved, the improvement comprising:  
(a) a fluid withdrawal passage having an inlet in the curved portion of the flow path at its inner radius convex bounding surface and an outlet external to the flow path; and  
(b) means for applying suction to the outlet of the fluid withdrawal passage during the flow of the fluid through the flow path, to withdraw a minor portion of the fluid and increase the rate of said flow of fluid through the flow path.

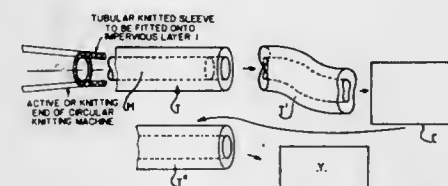
**4,789,005**  
**MARINE GROWTH RETARDING HOSE**  
Alan D. Griffiths, New Waltham, England, assignor to Dunlop Limited, United Kingdom  
Continuation of Ser. No. 94,096, Sep. 4, 1987, abandoned, which is a continuation of Ser. No. 861,343, May 9, 1986, abandoned.  
This application Mar. 14, 1988, Ser. No. 170,704  
Claims priority, application United Kingdom, May 17, 1985, 8512575  
Int. Cl.<sup>4</sup> B63B 59/04; F16L 58/04  
U.S. Cl. 138—103 11 Claims



1. A flexible reinforced hose for use in seawater and having a bore of at least one inch wherein said hose includes a reinforcement layer and a protective outer layer of a water impermeable elastomeric composition surrounding said reinforcement layer to inhibit marine growth on the hose and to inhibit marine boring into the hose, said protective outer layer including to a radial depth of at least 0.5 mm a substantially even distribution of particulate copper of a size equivalent of BS 100 mesh or smaller in an amount of from 0.1% to 10% by weight with the particulate copper containing elastomer having an elongation at break of at least 200%.

**4,789,006**  
**CELLULOSE AMINOMETHANATE SAUSAGE CASINGS**  
Douglas J. Bridgeford, and Matir Rahman, both of Champaign, Ill., assignors to Teepak, Inc., Oak Brook, Ill.  
Filed Mar. 13, 1987, Ser. No. 25,454  
Int. Cl.<sup>4</sup> A22C 13/00  
U.S. Cl. 138—118.1 29 Claims  
1. A tubular film sausage casing comprising a polymeric film of cellulose aminomethanate which is cellulose substituted with aminomethanate groups wherein from 0.5 to 30 numerical percent of hydroxy groups in the cellulose have been substituted with aminomethanate groups.

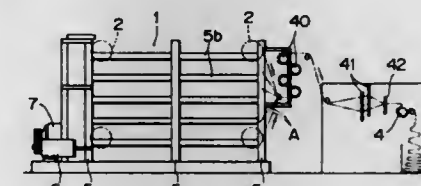
**4,789,007**  
**METHOD OF MAKING COMPOUND PIPES FOR CONVEYING VARIOUS FLUIDS AND PIPE OBTAINED BY THIS METHOD**  
Jacques L. Cretel, 2 rue de la Solette Raray, 60810 Barbary, France  
Filed Oct. 8, 1987, Ser. No. 106,408  
Claims priority, application France, Oct. 9, 1986, 86 14069  
Int. Cl.<sup>4</sup> F16L 09/04  
U.S. Cl. 138—174 1 Claim



1. A tube for carrying any fluid and comprising from the inside towards the outside thereof;  
a layer of impervious plastics material;

a first tubular layer of continuously circularly woven glass fibers connected to the aforesaid layer;  
a metal wire conductor spirally wound about said first layer;  
a second tubular layer of continuously circularly woven glass fibers about said conductor and said first layer;  
said conductor and said first and second tubular layers being impregnated with resin so as to be connected together with said impervious layer; and  
said glass fibers of said first and second tubular layers are orthogonally bound or interlaced in skew relationship or along the grain with respect to a centerline axis of said tube

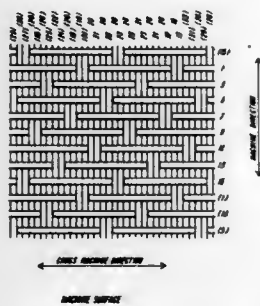
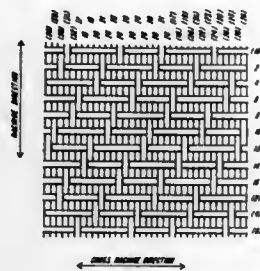
**4,789,008**  
**CREEL FOR LOOM**  
Koichi Kikuchi, Shimada, Japan, assignor to Kikuchi Kogyo Co., Ltd., Tokyo, Japan  
Filed Apr. 16, 1987, Ser. No. 39,068  
Claims priority, application Japan, Aug. 30, 1985, 60-189847  
Int. Cl.<sup>4</sup> D02H 1/00; B65H 49/32; D01H 7/52; D03J 1/00  
U.S. Cl. 139—97 8 Claims



1. A creel arrangement for unwinding and twisting yarns supplied from a plurality of bobbins each containing untwisted yarn, comprising:  
(a) frame means for defining a creel body;  
(b) a plurality of spindles mounted for rotation on the frame means to support said bobbins co-rotatable thereon;  
(c) a ring frame and a ring concentrically mounted on a spindle surrounding the bobbin and a traveler mounted for movement on each ring; and  
(d) driving means and means driven by the driving means for rotating each said spindle, ring frame, ring, and bobbin and traveler on the ring such that the untwisted yarn is unwound from the rotating bobbin by the associated traveler, a twist is simultaneously applied to the yarn.

**4,789,009**  
**SIXTEEN HARNESS DUAL LAYER WEAVE**  
Brian H. P. Troughton, Herne Bay, Great Britain, assignor to Hayck Corporation, Wake Forest, N.C.  
Continuation-in-part of Ser. No. 817,017, Jan. 8, 1986, abandoned. This application Dec. 3, 1986, Ser. No. 937,549  
Int. Cl.<sup>4</sup> D03D 1/00  
U.S. Cl. 139—383 A 12 Claims  
1. A dual-layer papermakers' fabric comprising an endless belt formed of machine direction and cross-machine direction yarn systems interwoven on sixteen harnesses, having a paper stock-contacting layer of cross-machine direction yarns;  
a machine-contacting layer of cross-machine direction yarns positioned with respect to the paper stock-contacting layer of cross-machine direction yarns so as to be on top of one another;  
machine direction yarns, said machine directions yarns being interwoven with the cross-machine direction yarns in such a way to interconnect the cross-machine direction yarns so that said machine-contacting layer of cross-machine direction yarns has a fourteen float, said paper stock-contacting layer of cross-machine direction yarns has alternate six float and eight float sections and two adjacent

machine direction yarns pass over the machine-contacting cross-machine direction yarns directly over the six float



section of the paper stock-contacting cross-machine direction yarns.

#### 4,789,010 APPARATUS FOR MANUFACTURING REINFORCEMENTS

Wolfgang Reymann, Karlweg 7, D-6832 Hockenheim, and Wilhelm Orth, Brunnenweg 1, D-6747 Annweiler-Bindersbach, both of Fed. Rep. of Germany, assignors to Manfred Lösch, Germersheim and Wolfgang Reymann, Hockenheim, both of, Fed. Rep. of Germany

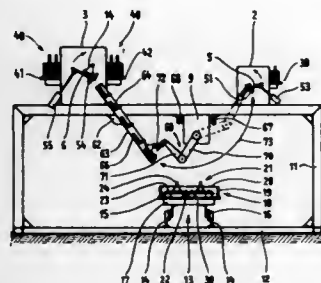
Filed May 7, 1987, Ser. No. 46,897

Claims priority, application Fed. Rep. of Germany, May 7, 1986, 3615460

Int. Cl.<sup>4</sup> B21F 15/00

U.S. Cl. 140—111

15 Claims



1. An apparatus for producing reinforcements, intended for construction purposes, of reinforced concrete plates for pre-fabricated ceilings, using forms, serving to receive the reinforcements as well as the poured concrete, that can be set up on pallets that are movable along a travel path, having a straightening and cutting device for preparing the transverse rods, a straightening, cutting and bending device for the longitudinal rods, and a combination device for preparing the lattice girder, which devices have outlet paths for the transverse rods, longitudinal rods and lattice girders and are supplied with round wires and bands of structural steel, wound into rings,

characterized in that,

- (a) the transverse rod outlet path (4) is located above the travel path and at right angles to it,
- (b) the longitudinal rod outlet path (5) and the lattice girder outlet path (6) are located opposite each other and parallel to, on opposite sides of and above the travel path (13),
- (c) a lattice girder magazine (8) is provided between the lattice girder outlet path (6) and the travel path (13), and
- (d) two insertion robots (9 and 10) are disposed between the lattice girder magazine (6) and the longitudinal rod outlet path (5).

#### 4,789,011 PIN GRID ARRAY STRAIGHTENING METHOD AND APPARATUS

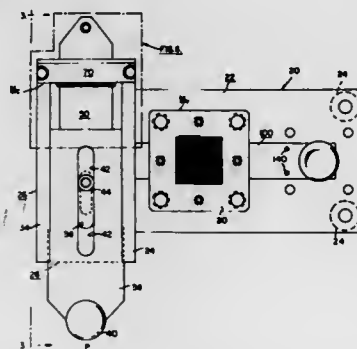
Richard Moloney, Delanco, N.J., assignor to American Tech Manufacturing, Inc., Glenolden, Pa.

Filed Mar. 13, 1987, Ser. No. 25,354

Int. Cl.<sup>4</sup> B21F 1/02

U.S. Cl. 140—147

13 Claims



1. In apparatus for aligning pins of PGA devices in a predetermined array of parallel rows, a first support surface for the devices so that they can be moved in a predetermined plane, a comb assembly including a plurality of tines disposed in side-by-side spaced parallel array at a predetermined fixed angle to said plane, adjacent tines being spaced apart a distance greater than the maximum cross section of a pin of the PGA device and a slide mechanism for actuating the PGA device through the comb assembly whereby the comb tines engage between the rows of pins in the PGA device and straighten the same by a combing action, said comb tines being oriented relative to the PGA device to engage the pins along substantially their entire length.

#### 4,789,012 INJECTION HEAD FOR FILLING DISPENSER THAT METERS PROPORTIONATE INCREMENTS OF DISSIMILAR MATERIALS

Duane H. Hart, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Mar. 23, 1987, Ser. No. 29,431

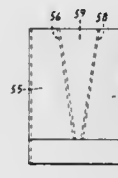
Int. Cl.<sup>4</sup> B65B 3/04

U.S. Cl. 141—18

7 Claims

1. Apparatus useful for filling a dispenser having a body formed with a tubular cavity of substantially uniform cross section, said apparatus comprising:  
an injection head that fits loosely into said tubular cavity and

includes at its outlet end a honeycomb formed with a plurality of axial channels of substantially equal size, said



honeycomb being divided into two or more sets of said channels.

#### 4,789,013 MACHINE FOR FILLING CONTAINERS SUCH AS BOTTLES

Hermann Kronseder, Regensburger Strabe 42, 8404 Würth/Donau, Fed. Rep. of Germany

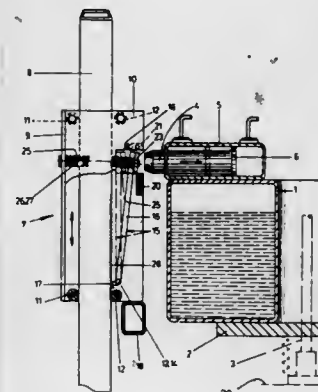
Filed Dec. 8, 1987, Ser. No. 129,833

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1986, 3642722

Int. Cl.<sup>4</sup> B65B 3/00; B67C 3/22

U.S. Cl. 141—177

14 Claims



1. A container filling machine comprising:  
a height adjustable rotor and devices for filling containers supported on said rotor,  
at least one stationary column arranged radially outwardly of said rotor,

a support device mounted on the column, for moving vertically,  
a carrier member mounted on the support device for supporting devices that cooperate with at least one device on the rotor,  
a latch member mounted movably on said support device, said latch member when in one position engaging the support device to said column to prevent movement of said support device and when in another position disengaging said support device from said column,  
an interlock element mounted on said rotor, said element being actuatable to advance in one direction to engage said support device for said support device to be supported on said interlock element so when the height of said rotor is adjusted said support device will follow corresponding, and said interlock element being alternatively actuatable in an opposite direction to disengage said support device and permit said rotor to rotate,  
a coupling element mounted to said support device, actuation of said interlock element a predetermined amount in said one direction causing said interlock element to be in a position to support said support device on said coupling element and further actuation of said interlock element in said one direction causing said latch member to disengage said latch member from said column.

#### 4,789,014 AUTOMATED SYSTEM FOR ADDING MULTIPLE FLUIDS TO A SINGLE CONTAINER

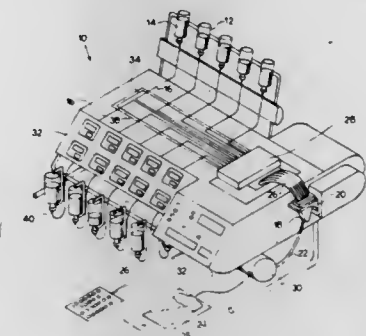
Aleandro DiGianfilippo, Crystal Lake; James R. Hitchcock, Barrington; Robert E. Lewis, Waukegan; Randall A. Zielsdorf, Mundelein, all of Ill.; James P. Vos, Burlington, Wis.; Rodolph Starai, Arlington Heights, Ill.; Michael J. Becker, Palatine, Ill.; Donald W. Warner, Gurnee, Ill., and Leon Huang, Hoffman Estates, Ill., assignors to Baxter International Inc., Deerfield, Ill.

Continuation of Ser. No. 938,676, Dec. 5, 1986, abandoned. This application Jan. 12, 1988, Ser. No. 144,673

Int. Cl.<sup>4</sup> B65B 3/28

U.S. Cl. 141—83

53 Claims



1. A device for accurately transferring multiple individual fluids from multiple source containers to a single receiving container, in which fluid flows from said multiple source containers through individual fluid conduits to a chamber having a chamber fluid outlet conduit in fluid communication with the single receiving container, the chamber also having a pressure conduit, the invention comprising:  
first occlusion means for selectively preventing fluid flow from each of said individual fluid conduits to said chamber;  
pressure means for selectively creating positive and negative pressures in said chamber to control the rate of fluid flow through said chamber;  
second occlusion means for selectively occluding fluid flow



from said chamber outlet fluid conduit to said receiving container; and control means for controlling said first and second occlusion means and said pressure means, said control means causing said first occlusion means to allow fluid to flow through at least one of said individual fluid conduits while causing said second occlusion means to prevent fluid flow into said receiving container and simultaneously p1 causing said pressure means to create a negative pressure in said chamber, said control means further causing said first occlusion means to prevent fluid flow through all of said individual fluid conduits after a predetermined amount of fluid has been delivered to said chamber, said control means then further causing said second occlusion means to allow fluid to flow from said chamber through said outlet conduit while simultaneously causing said pressure means to create a positive pressure in said chamber to force fluid from said chamber into said receiving container.

**4,789,015**  
**MINI-TIRE TO WHEEL ORIENTING SYSTEM**  
Daniel M. Flinn, Westland, Mich., assignor to Allied Automation Systems, Inc., Detroit, Mich.  
Filed Feb. 6, 1987, Ser. No. 11,543  
Int. Cl.<sup>4</sup> B60C 25/00  
U.S. Cl. 141—98 5 Claims



1. In a tire-wheel assembly line including a mounting station cyclically operable to mount an uninflated tire upon a wheel to repeatedly produce individual tire wheel units and conveying means for conveying said units in succession, in a horizontal position, along a fixed path from said mounting station to an inflation station cyclically operable to inflate the tire of each successive unit upon its wheel;

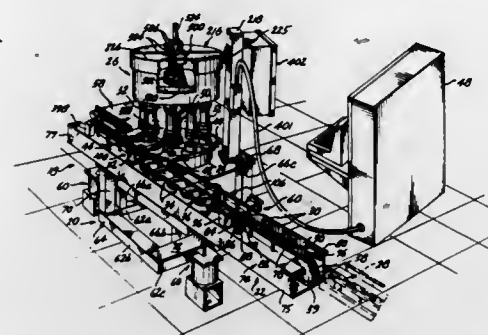
the improvement comprising centering means for coaxially centering the mounted and uninflated tire upon its wheel prior to its arrival at said inflation station, said centering means comprising a first station having a first means on said fixed path actuable to strike a hammer blow, directed generally radially of the axis of a tire wheel unit at said first station, at a preselected location against the tread of the tire of said unit, circumferentially of the tire, and a second station having a second means on said fixed path actuable to engage one side wall of the tire of a unit being conveyed past said second station at locations on said tire symmetrically disposed adjacent opposite sides of said fixed path to vertically shift said sidewall relative to its wheel as the tire and wheel are conveyed past said second station.

**4,789,016**  
**CONTAINER FILLING APPARATUS**  
Stavros Mihail, Renton, Wash., assignor to Promotion Incorporated, Seattle, Wash.  
Continuation-in-part of Ser. No. 791,226, Oct. 25, 1985, abandoned. This application Oct. 9, 1986, Ser. No. 915,646  
Int. Cl.<sup>4</sup> B65B 3/34  
U.S. Cl. 141—143 12 Claims

1. In a container filling apparatus wherein filler material is directed from a hopper into individual containers that are consecutively conveyed past the hopper, a dispenser con-

nected to the hopper for dispensing the filler material in discrete portions, comprising:

- a housing having an inlet end and an outlet end, the housing also having a chamber formed therein, the housing also having an inlet passage and an outlet passage, the inlet passage extending through the inlet end and into the chamber, the inlet passage providing a passage between the hopper and the chamber, the outlet passage extending from the chamber and through the outlet end of the housing and providing a passage from the chamber out of the dispenser;
- an elongate, expandable pump member disposed within the housing, the pump member being positioned within the housing to extend from within the inlet passage and into the chamber to a point near the outlet passage, the expandable pump member, when expanded, closing the inlet passage and substantially compressing the contents of the chamber;

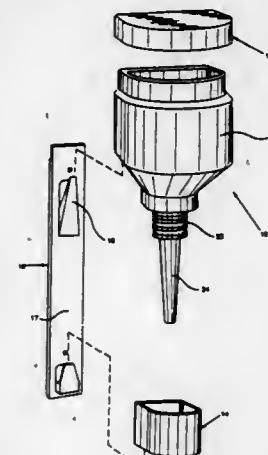


- an expandable valve member disposed within the outlet passage, the expandable valve member, when expanded, closing the outlet passage; and,
- dispenser actuation means connected to the expandable pump member and the expandable valve member, the dispenser actuation means selectively expanding the expandable pump member and permitting the expandable pump member to contract to alternately create within the chamber a plenum and a partial vacuum for pressurizing the contents of the chamber and for drawing the filler material through the inlet passage into the chamber respectively, the dispenser actuation means further selectively expanding the expandable valve member and permitting the expandable valve member to contract for expelling discrete portions of the material through the outlet passage.

**4,789,017**  
**FUNNEL WITH STORAGE SYSTEM**  
Anton Panasewicz, 6428 Westlaster Dr., Parma, Ohio 44129, and Dale Panasewicz, 11600 Johnson Dr., Parma, Ohio 44130  
Filed Oct. 19, 1987, Ser. No. 109,735  
Int. Cl.<sup>4</sup> B67B 7/28; B67C 11/00  
U.S. Cl. 141—342 6 Claims

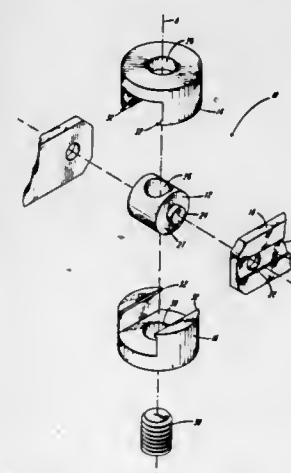
1. A liquid transfer system of a type principally designed for containerized liquids; said system comprising a funnel, comprising a receiving chamber having an open end and sidewalls capable of receiving a liquid container, said funnel also comprising a pouring spout connected to said receiving chamber; said system also comprising a dust cover to keep dust and dirt from entering the receiving chamber of said funnel during storage thereof; wherein the improvement is that said dust

cover includes on its internal surface a piercing tool capable of puncturing the lids of containers for said containerized liquids,



such containers as cans of motor oil or cans of automatic transmission fluid, for examples.

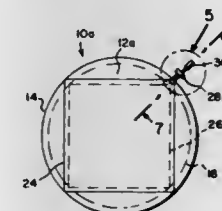
**4,789,018**  
**SHAPER CUTTERHEAD ASSEMBLY WITH ABSOLUTELY CAPTIVE BITS**  
James M. Denker, 711 First Parish Rd., Scituate, Mass. 02066  
Filed Jan. 7, 1988, Ser. No. 141,583  
Int. Cl.<sup>4</sup> B27G 13/00  
U.S. Cl. 144—231 7 Claims



1. A cutterhead assembly for performing woodworking operations, said assembly including at least one cutter bit having a longitudinal groove in one face thereof and an opening through the cutter bit located within the groove, said assembly comprising:

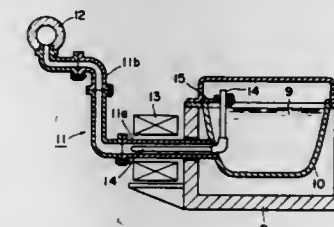
- a hub having a central opening therethrough and a lug extending from each of two opposite ends of said hub, said lug having dimensions that enable said lug to fit within the opening in the groove of the bit;
- an upper collar and a lower collar each having a central opening alignable with said central opening of said hub when said collars are placed around said hub, each of said collars having two lips with each lip being engageable with one side wall of the groove of the bit.

**4,789,019**  
**WIND PROOF TABLE COVERING ADAPTED FOR DIFFERENT SHAPED TABLES**  
Jackie A. Sweetner, 2700 Malvern Rd., 12 Cedar Cir., Hot Springs, Ark. 71901, and George Spector, 233 Broadway Rm. 3815, New York, N.Y. 10007  
Filed May 18, 1987, Ser. No. 50,906  
Int. Cl.<sup>4</sup> A47G 11/00  
U.S. Cl. 150—52 R 2 Claims



1. A wind proof table cover which comprises:
  - (a) a sheet of material having an outer looped flange around a perimeter thereof, and an inner looped flange, said sheet adapted to be mounted upon a table with a peripheral edge;
  - (b) a first drawstring placed through said outer looped flange for manually pulling the looped flange of said sheet inwardly to grip sides of said table;
  - (c) a second drawstring mounted in said inner looped flange so that said sheet can be mounted on different tables conforming to one of said looped flanges; and
  - (d) actuating caps each affixed to each of said drawstrings wherein said caps have means for releasably coupling said caps for joint or individual actuation.

**4,789,020**  
**APPARATUS FOR SUPPLYING MOLTEN METAL TO DIE CAST MACHINES**  
Noriyuki Motomura, Zama, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan  
Filed Mar. 4, 1987, Ser. No. 21,509  
Claims priority, application Japan, Mar. 5, 1986, 47717; Mar. 6, 1986, 49421  
Int. Cl.<sup>4</sup> B22D 27/02, 17/08  
U.S. Cl. 164—147.1 3 Claims



1. Apparatus for supplying molten metal to a die cast machine comprising:

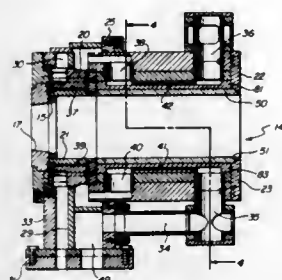
- a furnace having a pot for containing molten metal;
- an injection sleeve of the die cast machine;
- a molten metal supply pipe interconnecting said pot and said injection sleeve;
- an electromagnetic coil surrounding said molten metal supply pipe; and
- a magnetic core inserted into said molten metal supply pipe from inside of said pot, said magnetic core and said electromagnetic coil cooperating to constitute an electromagnetic pump, wherein: said magnetic core comprises a vertical pipe removably mounted on said pot, and a hollow pipe containing a magnetic rod, one end of said hollow pipe being con-

ected to a lower end of said vertical pipe while the other end of said hollow pipe being closed.

**4,789,021**  
**SHORT MOLD FOR CONTINUOUS CASTING**  
Max Ahrens, Irvine, Calif., assignor to Steel Casting Engineering, Ltd., Orange, Calif.  
Filed Sep. 29, 1986, Ser. No. 913,504  
The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.  
Int. Cl.<sup>4</sup> B22D 11/00

U.S. Cl. 164—436

8 Claims



1. A short mold for use in forming and cooling a continuously cast elongated metal casting, said short mold comprising: a cooled casting die defining a taperless internal casting passage and a first plurality of cooling passages; a plurality of interengaging walls, having inwardly facing cooling surfaces, which cooperate to form a passageway through which said metal casting passes and which are arranged to engage the periphery of said metal casting, each of said walls defining a second plurality of cooling passages in a heat transfer relationship with said cooling surfaces of said walls, said walls being supported so as to permit said walls to move relative to each other to adjust the cross-sectional size of said passageway so as to maintain contact between all portions of the periphery of said metal casting and said cooling surfaces of said walls and thereby compensate for shrinkage of said metal casting as it cools;
- each of said interengaging walls defining a first end having a sealing edge configured to sealingly contact the cooling surface of the adjacent wall thereto and a second end wherein said walls are arranged relative to each other such that the sealing edge of each wall contacts the cooling surface of a first adjacent wall on one side through the abutment of its sealing edge with the cooling surface of such first adjacent wall and contacts a second adjacent wall on the other side by the abutment of its cooling surface with the sealing edge of said second adjacent wall; cooling means for circulating a cooling fluid through said first and second plurality of cooling passages; and force means for causing said walls to be moved inwardly to contact said casting and to maintain contact with the entire periphery of said metal casting as it passes through said passageway.

**4,789,022**  
**PROCESS FOR CONTINUOUS CASTING OF METAL RIBBON**

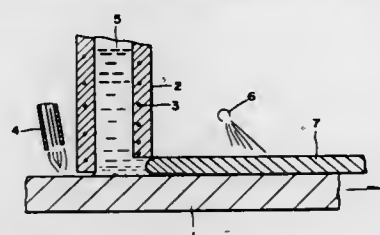
Atsami Ohno, 3-20-3, Jindaiji Moto-machi, Chofu City, Tokyo, Japan  
Continuation of Ser. No. 925,980, Nov. 3, 1986, abandoned. This application Mar. 18, 1988, Ser. No. 171,189  
Claims priority, application Japan, Nov. 15, 1985, 60-254956  
Int. Cl.<sup>4</sup> B22D 11/06, 27/04

U.S. Cl. 164—463

18 Claims

1. A process for the continuous casting of a metal ribbon having unidirectional solidification structure which comprises

the steps of moving slowly and continuously in one direction along a given path, an elongated solidification support having a surface adapted to receive molten metal thereon; flowing a thin stream of molten metal onto said moving support surface at a locus along said support path; heating said surface upstream of said locus so that the temperature of said surface while passing through said locus is above the melting point of

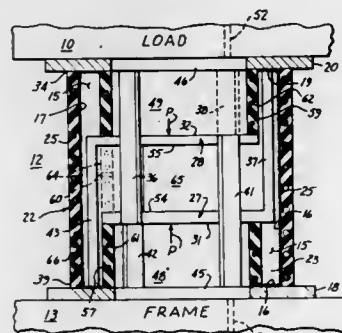


said metal flowed thereon; and while said metal stream is supported on said support, contacting its exposed surface opposite said support downstream of said locus with a cooling medium to cool the metal moving with the surface to solidify the same, whereby the creation of crystalline nuclei in the metal stream upon contact with said support surface is inhibited.

**4,789,023**  
**VIBRATION ISOLATING HEAT SINK**  
Frederic F. Grant, 14505 Eastbrook Ave., Bellflower, Calif. 90706  
Filed Jul. 28, 1987, Ser. No. 78,820  
Int. Cl.<sup>4</sup> F28D 15/02

U.S. Cl. 165—1

50 Claims



1. In a method of transporting a heat-generating load through an environment affected by vibrations and pressure variations, the improvement comprising in combination the steps of: providing a working fluid vaporizable by heat from the load; providing a capillary structure for advancing said working fluid, when in a liquid state, from a condenser section at a heat-conducting supporting structure spaced from said load to an evaporator section at a heat-conducting load support at said load, for converting the advanced fluid to a vapor state with heat drawn from said load in said evaporator section; providing between said supporting structure and said load support a flexible enclosure encompassing around said capillary structure at least part of a space extending from said evaporator section back to said condenser section for returning said working fluid, when in said vapor state, in a heat-transfer cycle to said condenser section for re-conversion to said liquid state upon removal of heat through said supporting structure and for reapplication of said working fluid in said liquid state through said capillary

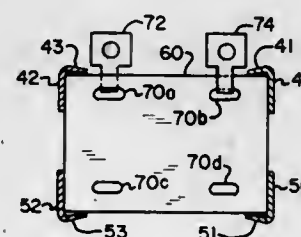
structure from said condenser section to said evaporator section for reevaporation thereof with more heat drawn from said load; providing resilient means extending between said supporting structure and said load support for effecting vibration damping of said load while removing heat therefrom in said evaporator section with said working fluid converting to said vapor state inside said flexible enclosure; and protecting said heat-transfer cycle in said flexible enclosure against pressure variations occurring externally of said flexible enclosure.

**4,789,024**  
**LOW PROFILE ELEMENT BASKET ASSEMBLY WITH INTEGRAL LIFTING MEANS**

Lawrence J. Muscato, Bolivar, N.Y., assignor to The Air Pre-heater Company, Inc., Wellsville, N.Y.  
Filed Mar. 3, 1988, Ser. No. 163,504  
Int. Cl.<sup>4</sup> F28D 19/04

U.S. Cl. 165—10

6 Claims



1. An element basket assembly of the type adapted to be lifted by means of lifting hooks into and out of a heat exchanger, said element basket assembly having a mass centroid, said element basket assembly comprising:
  - a plurality of heat transfer element plates juxtaposed in a stacked array;
  - first and second end plate means disposed at opposite ends of said stacked array of heat transfer element plates in abutting relationship therewith;
  - a pair of spaced upper side straps disposed along opposite sides of said stacked array of heat transfer element plates interconnecting the upper edges of the sides of the first and second end plate means;
  - a pair of spaced lower side straps disposed along opposite sides of said stacked array of heat transfer element plates interconnecting the upper edges of the sides of the first and second end plate means;
  - stiffening member means disposed within said stacked array of heat transfer element plates intermediate the first and second end plate means, said stiffening member means extending transversely across the element basket assembly in a plane through the mass centroid of the assembled element basket assembly to interconnect said pair of spaced upper side straps and to interconnect said pair of spaced lower side straps; and
  - lifting means adapted to receive the lifting hooks for lifting the assembled element basket assembly, said lifting means comprising first and second paired lifting means formed integrally in said stiffening member means, said first pair of lifting means disposed in an upper region of said stiffening member means and said second pair of lifting means disposed in a lower region of said stiffening member means.

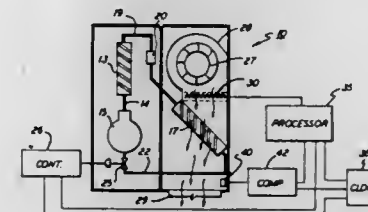
**4,789,025**  
**CONTROL APPARATUS FOR REFRIGERATED CARGO CONTAINER**

Michael J. Brandemuehl, Manlius, and John R. Reason, Liverpool, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Nov. 25, 1987, Ser. No. 125,213  
Int. Cl.<sup>4</sup> G05D 23/00; F25B 41/04

U.S. Cl. 165—30

7 Claims



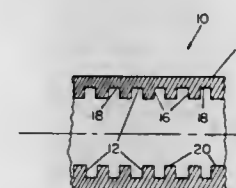
1. A method of controlling the temperature inside a mobile cargo container that is equipped with a refrigeration unit for supplying chilled air to the container, the method including: providing an adjustable control valve in a suction line lead to the refrigeration unit compressor, said valve being adjustable in uniform increments between a fully opened and a fully closed position, periodically sensing the temperature of the supply air being discharged from the refrigeration unit into the container at given intervals, comparing the sensed temperature to a predetermined set point temperature to determine the amount of deviation between the two temperatures, fully opening the control valve when the amount of deviation is greater than a first value whereby the supply air temperature is changed at a fast rate, adjusting the control valve a first number of increments during each sensing interval when the amount of deviation is between said first value and a second lesser value whereby the supply air temperature is changed at an intermediate rate, adjusting the control valve a second lesser number of increments during each sensing interval when the amount of deviation is less than said second value whereby the supply air temperature is changed at a relatively slow rate, and monitoring the valve position and activating a heater in the supply air flow when the valve approaches a fully closed position.

**4,789,026**  
**POLISHED SURFACE CAPILLARY GROOVES**  
Brian E. Shank, Rothsville, and Robert M. Shambach, Lititz, both of Pa., assignors to Thermacore, Inc., Lancaster, Pa.

Filed Jun. 26, 1987, Ser. No. 66,562  
Int. Cl.<sup>4</sup> F28D 15/02

U.S. Cl. 165—104.26

4 Claims



1. An improved heat pipe comprising a heat pipe casing with grooves formed in the inside surface of the heat pipe casing

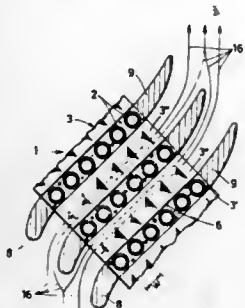


wherein the surfaces in the grooves have roughness measure of no more than 8 microinches R.M.S.

**4,789,027**  
**RIBBED HEAT EXCHANGER**  
Roland Diethelm, Neftenbach, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland  
Filed May 9, 1986, Ser. No. 861,609  
Claims priority, application Switzerland, May 15, 1985, 02076/85

Int. Cl.<sup>4</sup> F28D 1/04; F28F 1/20, 1/30  
U.S. Cl. 165—151

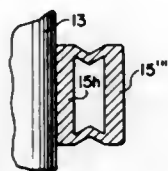
4 Claims



1. A heat exchanger comprising a plurality of parallel tubes for conveying a first medium disposed in parallel rows; a plurality of sheet metal ribs distributed longitudinally and transversely of said tubes and in heat conductive relation therewith, said ribs being disposed in parallel relation to each other to define gaps for conveying a second medium therethrough, each rib having a flat zone extending around and at a right angle to a respective row of said tubes, an uninterrupted corrugated part extending from each side of said zone and a stepped part joining a respective corrugated part to said zone with said respective corrugated part in a spaced parallel plane to said zone; and a streamline-shaped member disposed on at least one of an inflow side and an outflow side of a respective zone for directing a flow of the second medium over or from said corrugated parts of said ribs, said member having boundary surfaces thereof in alignment with said stepped part of a respective rib.

**4,789,028**  
**ANTI-VIBRATION BARS FOR NUCLEAR STEAM GENERATORS**  
Byre V. Gowda, Youngwood; Robert M. Wilson, Plum Boro, and Robert M. Wepfer, Wilkinsburg, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Division of Ser. No. 670,728, Nov. 13, 1984, abandoned. This application May 15, 1987, Ser. No. 51,160  
Int. Cl.<sup>4</sup> F28D 7/16  
U.S. Cl. 165—162

3 Claims



1. Anti-vibrations bars structurally supporting tubes carrying high temperature coolant in a steam generator, said anti-vibration bars being disposed between adjacent rows of tubes and expanded from a rest state to an expanded state as pressure is applied to the interior of said anti-vibration bars, each of said

anti-vibration bars being configured as a hollow member of a rectangular shape, said rectangular shape comprising a pair of opposing wall lengths and a pair of opposing wall widths, each of said wall lengths have a thickness greater than that of said wall widths to facilitate expansion of said opposing wall lengths away from each other and into contact respectively with tubes of adjacent rows, said wall lengths having sufficient rigidity to resist deformation as said bars are expanded to their expanded state so that said wall lengths make a line contact with their respective tubes.

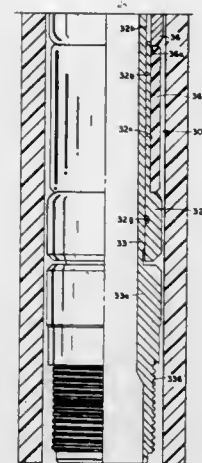
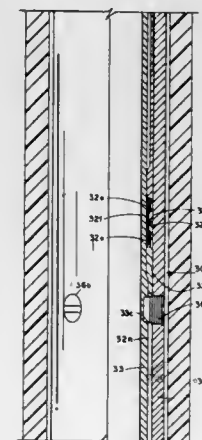
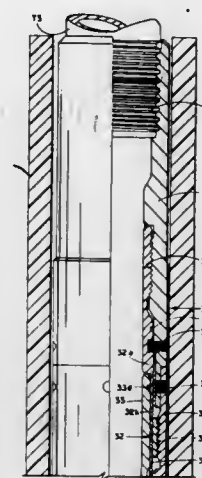
**4,789,029**  
**TENSION SET PACKING APPARATUS FOR SUBTERRANEAN WELLS**  
Patrick C. Stone, Houston; Mike A. Lake, Pasadena, and Gary D. Ingram, Sugarland, all of Tex., assignors to Baker Oil Tools, Inc., Orange, Calif.  
Division of Ser. No. 922,355, Oct. 23, 1986, Pat. No. 4,735,266. This application Nov. 2, 1987, Ser. No. 115,517  
Int. Cl.<sup>4</sup> E21B 23/06  
U.S. Cl. 166—134

10 Claims

1. Apparatus for sealing the annulus between an outer well conduit and a tubular body assembly telescopically inserted within the bore of said outer well conduit; said tubular body assembly comprising an axially split, two-piece hollow mandrel having means on the upper end of the upper piece for securement to a tubing string; shearable means for securing together said two pieces of said mandrel; a radially expandable annular packing element surrounding the lower piece of said two-piece mandrel; said annular packing element having an annular upper and lower face; a radial abutment on said lower mandrel piece engageable with said lower face of said packing element; means connectable to the outer well conduit for opposing upward movement of said upper face of said annular packing element, whereby upward movement of the tubing string elevates said two-piece mandrel and imposes an axial compression on said annular packing element to radially expand said annular packing element to seal annulus; means engaging the upper piece for preventing downward movement of the upper piece of said two-piece mandrel from said elevated position; said shearable means being severable by the application of a larger upward force to said two-piece mandrel than required to expand said packing element to seal said annulus, thereby permitting the lower piece of said two-piece mandrel to move downwardly to permit a radial contraction of said annular packing element from said annulus sealing position.

7. Apparatus for sealing the annulus between an outer well conduit and a tubular body telescopically inserted within the bore of said outer well conduit; said tubular body comprising a first tubular element having means on its upper end for securement to a tubing string; a radially expandable annular packing element slidably surrounding a medial portion of said first tubular element; an annular first abutment surrounding the lower end of the first tubular element and engageable with the bottom end of said annular packing element; shearable means securing said annular first abutment to said first tubular element; a second tubular element inserted in said first tubular element; means for securing said second tubular element to the outer well conduit; an annular second abutment surrounding said first tubular element above said annular packing element; means securing said second annular abutment to said second tubular element, whereby upward movement of the tubing string elevates said first tubular element and imposes an axial compression force on said annular packing element to radially

expand said annular packing element to seal said annulus; means for preventing downward movement of said first tubular element from said elevated position; said shearable means being severable by the application of a greater upward force to



said first tubular element than required to expand said annular packing element to seal said annulus, thereby permitting a radial contraction of said annular packing element from said expanded annulus sealing position.

**4,789,030**  
**PRODUCTION OF HYDROGEN SULPHIDE CONTAINING GAS FROM UNDERGROUND FORMATIONS**

Stephen G. Delode, Oakville, and Edward A. Luinstra, Burlington, both of Canada, assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 7, 1987, Ser. No. 82,454  
Claims priority, application United Kingdom, Aug. 20, 1986, 8620272

Int. Cl.<sup>4</sup> E21B 41/02, 43/24, 43/40

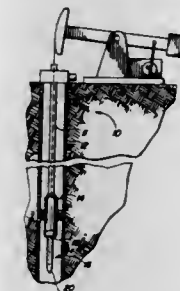
U.S. Cl. 166—267

9 Claims

1. A process for the production of at least a gaseous product containing a substantial amount of hydrogen sulphide via a bore-hole from an underground formation containing besides the hydrogen sulphide at least elemental sulphur, comprising:
  - (a) injection of a liquid substantially consisting of hydrocarbons into the bore-hole or into the underground formation near to the end of the bore-hole;
  - (b) producing a gaseous and a liquid fraction from the underground formation;
  - (c) separating the gaseous fraction from the liquid fraction;
  - (d) if necessary, separating an aqueous fraction of the produced liquid fraction from the hydrocarbons-containing fraction;
  - (e) heating the hydrocarbons-containing fraction in order to remove elemental sulphur by conversion to hydrogen sulphide in the presence of a catalyst comprising sulphides of one or more metals from Group VIB and/or Group VIII of the Periodic Table of Elements deposited on a support of alumina, silica or silica alumina; and
  - (f) reinjection of at least a part of the thus treated hydrocarbons-containing fraction into the bore-hole or into the underground formation near to the end of the bore-hole as described hereinbefore.

**4,789,031**  
**GAS ANCHOR AND TREATING DEVICE**  
Cland W. Walker, Rte. 1, Box 201, Portales, N. Mex. 88130  
Filed May 22, 1987, Ser. No. 52,997  
Int. Cl.<sup>4</sup> E21B 37/06  
U.S. Cl. 166—369

2 Claims



1. A downhole pump for use in a borehole which extends through a formation from which formation fluid flows into the borehole, said pump is located in said borehole and has a suction end for receiving formation fluid and an outlet end through which produced fluid flows into a tubing string and to the surface of the ground; the improvement comprising:

a gas anchor attached to the suction end of the pump through which formation fluid must flow; said gas anchor a perforated housing and a core, said housing has attachment means at an upper end thereof by which it is removably affixed to the suction end of the pump; said housing has a closure means at the lower end thereof through which fluid flow is precluded;

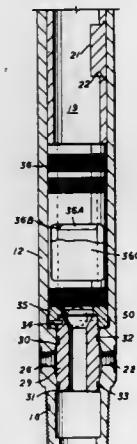
said core is contained within said perforated housing, an annular passage means formed between the core and the

housing through which formation fluid must flow from the housing perforations to the pump suction; said core and said housing are made from an alloy having the following percent composition:

copper: 40-66%;  
zinc: 2-28%;  
nickel: 5-25%;  
lead: 2-12%; and  
tin: 1-5%;

said core is an elongated rod having an outside diameter which is smaller than the housing inside diameter such that an annulus is formed therebetween, thereby forming said annular passage means; the lower marginal end of the housing is perforated while the upper marginal end thereof is imperforate; said core and said housing are cylindrical in cross-section configuration; said perforations are all located at the lower marginal end of the housing, and said rod has a lower marginal end located in the perforated lower marginal end of the housing and an upper marginal end of the rod is located in the upper imperforate marginal end of the housing so that all of the flow to the pump must occur through said perforations, along said annulus, and into the suction of the pump.

one end and connected at the other end to said means supporting said motor at an angle, and including



means to orient angularly the point of connection to said mule shoe keying sub in relation to said means supporting said motor at an angle.

4,789,032

## ORIENTING AND CIRCULATING SUB

William A. Rehm, 12558 Westery Ln., Houston, Tex. 77077; William J. McDonald, 11727 Woodsage, Houston, Tex. 77024; William C. Maurer, 4902 Carls, Houston, Tex. 77091, and Curtis E. Leitko, Jr., 7038 Woodbluff, Houston, Tex. 77040

Filed Sep. 25, 1987, Ser. No. 101,249

Int. Cl. E21B 7/08

U.S. Cl. 175-45

24 Claims

1. An apparatus for angular drilling in the earth comprising a drill string extending into a substantially vertical well bore in the earth, a fluid operated motor and drill bit operated thereby secured on the bottom end of said drill string, means supporting at least a part of said motor and drill bit at a substantial angle to said substantially vertical well bore for continuing the drilling of said well bore at an angle to the substantially vertical portion thereof, a surveying tool connected in said drill string above said motor for determining and controlling the direction of drilling, a mule shoe keying sub connected to said surveying tool for orienting the position of said motor in relation to said surveying tool, and an orienting sub connected to said mule shoe keying sub at

4,789,033

## ONBOARD WEIGHT INDICATOR FOR VEHICLES

David K. Dohrmann, 11 Valley Pride, So. Hutchinson, Kans. 67505

Filed Sep. 28, 1987, Ser. No. 101,744

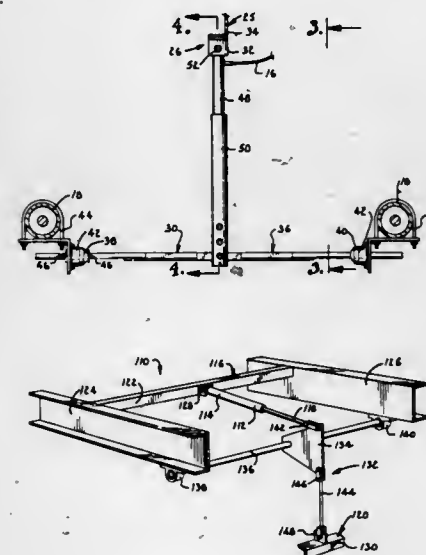
Int. Cl. G01G 19/08, 21/28

U.S. Cl. 177-137

10 Claims

1. An outboard weighing device for measuring the weight of, or a load applied to, a vehicle having dual axles, said device comprising: a vertically oriented transducer coupled at an upper end with a fixed point on said vehicle and at a lower end with said vehicle axles for measuring the distance between said fixed point and said axles and then transmitting an electrical signal corresponding to said distance; a mounting carriage extending between said axles and coupling said transducer lower end with said axles at a position intermediate the axles; and

means for allowing longitudinal movement of said mounting carriage in response to relative movement of said axles to



maintain said transducer in a substantially vertical orientation.

4,789,034

## ANALYTICAL BALANCE

Paul Lichinger, Heinz Rutishauser, both of Uster, and Hanspeter Wachter, Dübendorf, all of Switzerland, assignors to Mettler Instrumente AG, Switzerland

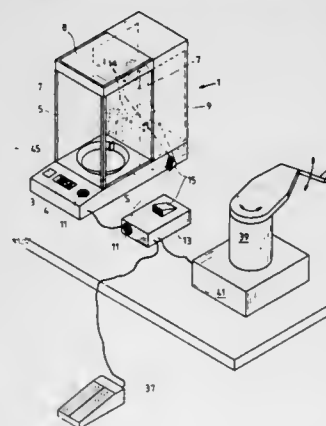
Continuation-in-part of Ser. No. 899,926, Aug. 25, 1986. This application Jan. 26, 1988, Ser. No. 148,128

Claims priority, application Switzerland, Sep. 18, 1985, 4056/85

Int. Cl. G01G 23/18; E05F 15/20, 11/00

U.S. Cl. 177-181

11 Claims



1. In an analytical balance with a weighing space which can be closed by moving housing parts, the improvement comprising that the balance includes a drive and a sensor and that at least one of the moving housing parts is couplable with said drive, wherein the drive can be controlled by said sensor, said sensor operating in a contactless fashion.

4,789,035  
LOAD CELL

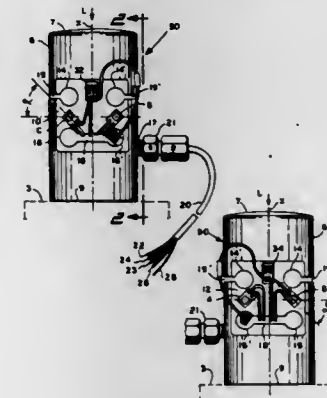
Martin W. Hamilton, Arlington Hts., Ill., and Kish D. Amlani, Troy, Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed Mar. 28, 1988, Ser. No. 173,919

Int. Cl. G01G 3/14; G01L 1/22

U.S. Cl. 177-211

12 Claims



1. A load cell for measuring load applied to an object, said load cell comprising;

a body member having a central longitudinal axis, said body member having a support end adapted to support the body member upon the object and an opposite load receiving end adapted to receive and direct the load axially along the longitudinal axis, and said body member have a reduced section between the load receiving and support ends adapted to enhance measurement of the load upon the body member,

a first pair of bores disposed through the reduced section, said bores substantially symmetrically disposed on opposite sides of the longitudinal axis in substantial transverse relationship thereto,

a second pair of bores disposed through the reduced section between the first pair of bores and the body member support end, said bores substantially symmetrically disposed on opposite sides of the longitudinal axis in substantial parallel alignment with the first pair of bores and axially spaced-apart therefrom for a distance defining a load sensing surface therebetween on opposite sides of the reduced section,

respective slots extending from the outside of the body member and intersecting each of the first pair of bores along the entire length thereof,

a channel disposed through the reduced section and extending between and intersecting the second pair of bores along the entire length thereof, and

sensing means mounted on at least one of the load sensing surfaces for sensing strain induced therein by the load and thereby enabling measurement of the load upon the object.

4,789,036

## HYDRAULIC STEERING DEVICE

Karl H. Haas, Oberelchingen, Fed. Rep. of Germany, assignor to Karl Kassbohrer Fahrzeugwerke GmbH, Fed. Rep. of Germany

Filed Dec. 11, 1986, Ser. No. 940,588

Claims priority, application European Pat. Off., Dec. 12, 1985, 85115821

Int. Cl. B62D 11/18

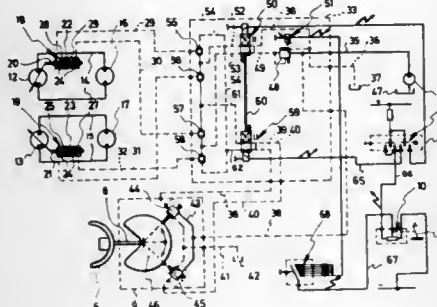
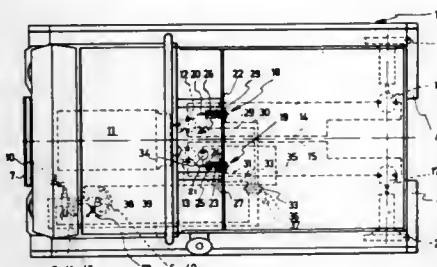
U.S. Cl. 180-6.48

9 Claims

1. A hydraulic control system for changing the speed and direction of a hydraulically operated tracked vehicle (1), with a feed pump (34) for a control fluid and with hydraulic under-



carriage pumps (12,13) having adjustable pump pivoting angles and regulating cylinders (18,19) subjected to said control fluid and operable to adjust said pump pivoting angles, the regulating cylinders (18,19) being equipped respectively with two regulating-cylinder chambers (26,28) and (25,27) separated from one another by a regulating piston (22,23), for effecting speed changes there is provided a proportional valve (48) connected to the regulating-cylinder chambers (25 to 28), and for effecting changes of direction there is provided a mechanically controlled pressure-regulating valve (44,45) connected to



respective two oppositely acting regulating-cylinder chambers (26,27) and (28,25) wherein the regulating-cylinder chambers (25 to 28) are connected via change-over valves (55 to 58) respectively independently to the proportional valve (48) and to the mechanically controlled pressure-regulating valves (44,45), the pressure of the control fluid between the proportional valve (48) and the change-over valves (55-58) for effecting speed changes always being lower than the pressure of the control fluid between the mechanically controlled pressure-regulating valve (44,45) and the change-over valves (55-58) for effecting changes of direction.

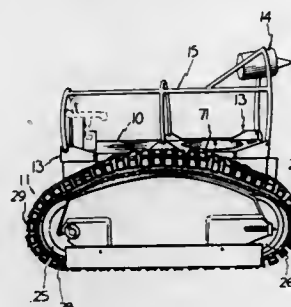
**4,789,037**  
**SELF-PROPELLED VEHICLE**  
Edward W. S. Kneebone, Floreat Park, Australia, assignor to Remotely Operated Vehicles Limited, West Perth, Australia  
Filed Jun. 3, 1987, Ser. No. 57,796  
Claims priority, application Australia, Jul. 4, 1986, PH06237  
Int. Cl.<sup>4</sup> B62D 55/18

U.S. Cl. 180-9.1

8 Claims

1. A self-propelled vehicle for traversing a surface of magnetic material, comprising a body to which equipment is or may be attached, two or more endless tracks supporting said vehicle body and incorporating a plurality of permanent magnets spaced along each track, so that in use sufficient of said magnets are located relative to the surface being traversed to create a magnetic field of a strength to attach the vehicle to the surface, each permanent magnet being mounted for limited pivotal movement relative to the endless track about an axis substantially parallel to the direction of travel of the vehicle, and means to drive said tracks to propel the vehicle over the surface while the vehicle is held on the surface by the magnets, each permanent magnet comprising a bar of magnetised ce-

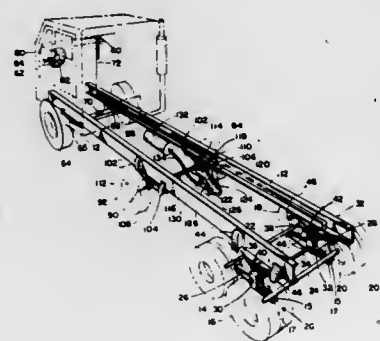
ramic magnetic material extending in a direction transverse of the track, said bar being clamped between and secured to a pair of magnetic metal plates in direct intimate contact with the ceramic bar, said metal plates each extending beyond one face



of the ceramic bar at opposite edges of said one face to provide respective magnetic poles of opposite polarity whereby in use, only said poles contact the surface being traversed and the ceramic bar is spaced from the surface being traversed.

**4,789,038**  
**AXLE WEIGHT DISTRIBUTION CONTROLLER**  
Phong T. Nguyen, Lacey; Charles L. Keith, Seattle, and Jerry L. McCauley, Kent, all of Wash., assignors to Structural Instrumentation, Inc., Tukwila, Wash.  
Filed Mar. 12, 1987, Ser. No. 24,994  
Int. Cl.<sup>4</sup> B62D 61/12  
U.S. Cl. 180-24.02

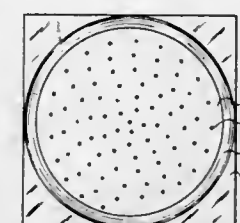
14 Claims



7. A vehicle, comprising:  
a longitudinal frame adapted to carry a load;  
first and second load-bearing axles supporting said frame, said axles being spaced apart in the longitudinal direction;  
a transducer adapted to produce a first signal representing the load borne by said first axle;  
an electrical circuit adapted to receive the first signal and to produce a second signal in response thereto, said second signal having a first value if the load borne by said first axle is greater than a predetermined maximum load, a second value if the load borne by said first axle is less than a predetermined minimum load, and a third value if the load borne by said first axle is between said predetermined minimum and maximum loads; and  
a third axle located between said first and second axles in the longitudinal direction, said third axle being positionable by pneumatic pressure in response to said second signal, so as to vary the load borne by said third axle, in order that the load borne by said first axle is maintained between predetermined minimum and maximum loads.

**4,789,039**  
**AIR-CUSHION ELEMENT FOR AIR-CUSHION TRANSPORT EQUIPMENT**  
Peter Björk, Akerleden 4, 68600 Jakobstad, Finland  
Filed Apr. 24, 1984, Ser. No. 603,326  
Claims priority, application Finland, Apr. 27, 1983, 831433  
Int. Cl.<sup>4</sup> B60V 1/00  
U.S. Cl. 180-124

7 Claims

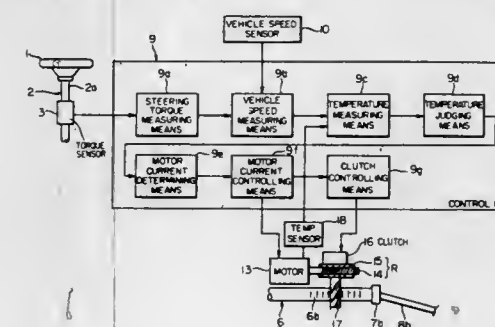


1. Air-cushion element for air-cushion transport equipment, comprising:  
a frame, having a ring-shaped collar portion with a bottom edge, which is arranged in an air-tight manner underneath the frame;  
a membrane with a relatively high number of relatively small perforations, attached to the bottom edge of the collar portion so that the frame, the collar portion, and the membrane define a space for outflowing air, the perforations in the membrane being arranged irregularly relative to orthogonal or polar coordinates; and  
at least one opening for the supply of pressurized air into the space.

**4,789,040**  
**MOTOR-DRIVEN POWER STEERING SYSTEM FOR A VEHICLE**

Mitsuharu Morishita, and Shinichi Kohge, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan  
Filed Jun. 12, 1987, Ser. No. 60,859  
Claims priority, application Japan, Jun. 12, 1986, 61-139025; Jun. 12, 1986, 61-139026; Jul. 14, 1986, 61-166198  
Int. Cl.<sup>4</sup> B62D 5/04  
U.S. Cl. 180-142

10 Claims



1. A motor-driven power steering system for a vehicle having a steering wheel operatively connected to steer steerable road wheels in response to force exerted thereon by an operator, said motor-driven power steering system comprising:  
a torque sensor connected to detect operator-induced steering torque resulting from steering force exerted on said steering wheel by the operator and generating an output signal representative of measured steering torque;  
a vehicle-speed sensor to detect vehicle speed and generating an output signal representative of measured vehicle speed;  
a motor operatively connected with said steerable road

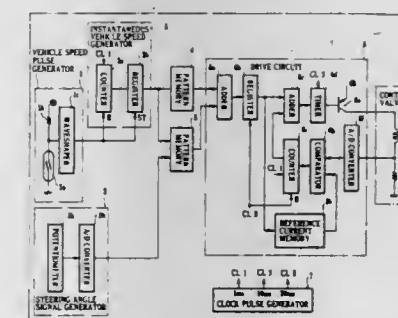
wheels and adapted to be energized by a power source to transmit a force to said steerable road wheels, thereby power assisting steering motion caused by the operator through said steering wheel;

a temperature sensor to detect temperature of a motor-related element and generating an output signal representative of detected temperature;  
a clutch means interposed between said motor and said steerable road wheels for selectively establishing and interrupting the transmission of power assisting force from said motor to said steerable road wheels in accordance with the vehicle speed; and  
a control unit connected to the power source and supplying current to said motor, said control unit being connected to receive output signals from said torque sensor, said vehicle-speed sensor, and said temperature sensor, said control unit being operated by a control program to determine an increase or a decrease in current supplied to said motor to vary the power assisting force on the basis of measured vehicle speed and steering torque when the detected temperature of said motor-related element is equal to or less than a prescribed level and being operated by the control program to determine a decrease in current supplied to said motor on the basis of high detected temperature of said motor-related element only when  
(a) said unit control determines an increase on the basis of measured vehicle speed and steering torque and  
(b) said control unit determines the detected temperature of said motor-related element is higher than the prescribed level  
to lower the temperature of said motor-related element to within an allowable range, thereby preventing damage to said motor due to overheating thereof.

**4,789,041**  
**CONTROL DEVICE FOR POWER STEERING APPARATUS**

Sadao Takeshima, and Hideo Yabe, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 867,834, May 27, 1986, abandoned.  
This application Dec. 11, 1987, Ser. No. 132,729  
Claims priority, application Japan, Jul. 4, 1985, 60-101182[U]  
Int. Cl.<sup>4</sup> B62D 5/06  
U.S. Cl. 180-142

5 Claims



1. A control device for a power steering apparatus comprising:  
a vehicle speed signal generating circuit for generating a vehicle speed signal corresponding to an actual vehicle speed, said vehicle speed signal generating circuit including a vehicle speed pulse generator having a vehicle speed sensor and a waveshaper for generating short vehicle speed pulses at OFF timings of said vehicle speed sensor, and an instantaneous vehicle speed generator including a counter for counting first clock pulses and a register for receiving a count from said counter in response to each vehicle speed pulse from said vehicle speed pulse genera-

tor, said instantaneous vehicle speed generator being adapted to generate an instantaneous vehicle speed signal as the vehicle speed signal;

a steering angle signal generator for detecting a steering angle and generating a steering angle signal, said steering angle signal generator including a potentiometer serving as a steering sensor and an analog-to-digital converter for converting an analog signal from said potentiometer to a digital signal representing the steering angle signal;

means for generating a power steering signal determined in correspondence with the vehicle speed signal, said power steering signal generating means including a pattern memory for storing a signal for determining a power steering signal corresponding to the instantaneous speed signal at the start of steering;

means for generating a correction signal determined in correspondence with the vehicle speed signal and the steering angle signal representing a steering angle with respect to a neutral position of a steering wheel; and

means for outputting a correction result by correcting the power steering signal by the correction signal.

4,789,042

## CONSTANT TENSION DEVICE

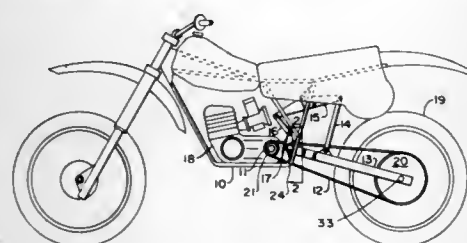
Michael W. Pitts, P.O. Box 552, Adamsville, Tenn. 38310

Filed Mar. 9, 1987, Ser. No. 23,774

Int. Cl.<sup>4</sup> B62M 9/16

U.S. Cl. 180-231

5 Claims



1. In a vehicle having a frame, an engine with a driver sprocket, at least one wheel having a driven sprocket rigidly attached thereto, said at least one wheel being driven by an endless chain engaged around both the driver and driven sprockets, and improved suspension system comprising:

an eccentric cam, with first and second ends, pivotally attached to the vehicle at a location aft of the engine driver sprocket;

means for controlling vertical movement of said at least one wheel by rotating said eccentric cam in the same direction as said at least one wheel such that said at least one wheel remains a constant distance from said driver sprocket regardless of the vertical position of said at least one wheel with respect to said frame; said controlled means including:

a suspension means, with forward and rearward ends, pivotally attached at its forward end to said eccentric cam for rotatably mounting said at least one wheel on an axle at said rearward end,

a cam lever arm, with first and second ends, rigidly connected at its first end to one end of said eccentric cam, a cam connecting rod, with first and second ends, pivotally attached at one end to the second end of said cam lever arm,

a rocker arm, having forward and rearward ends, pivotally attached at a middle point thereof to the vehicle frame and pivotally attached at one end to the second end of said cam connecting rod, and

a swing arm connecting rod pivotally attached at a first end to the other end of said rocker arm and at a second end to a mount on said suspension means.

4,789,043  
LOCKING DEVICE TO PREVENT UNAUTHORIZED USE  
OF AN AUTOMOTIVE VEHICLE

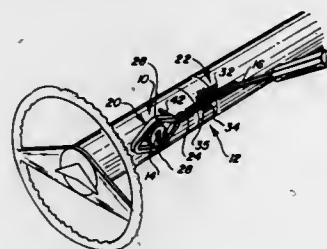
Victor Gamez, 1423 W. 38th Pl., Hialeah, Fla. 33012

Filed Apr. 30, 1987, Ser. No. 44,231

Int. Cl.<sup>4</sup> B65K 79/02; E05B 17/14

U.S. Cl. 180-287

12 Claims



1. A locking device designed to restrict unauthorized use of an automobile or like vehicle when used with an ignition lock and a gear shift lever both mounted on the steering column of the vehicle, said device comprising:

(a) a body having an elongated configuration and formed of a substantially rigid, high strength material,

(b) said body being of sufficient longitudinal dimension to extend at least from the ignition lock, along a length of the steering column, to the gear shift lever,

(c) a retaining portion formed along the length of said body and disposed in engaging relation to the ignition lock and being dimensioned and configured to be undetachable from the ignition lock when in an ignition off position and detachable therefrom when in an ignition on position,

(d) a lever engaging portion mounted on said body in spaced relation to the retaining portion and in removable engagement with the gear shift lever and comprising a stop member positionable in abutting, interruptive disposition relative to displacement of the gear shift lever towards the ignition lock,

(e) connecting means attached to said stop member and movable therewith along the length of said body for selectively adjusting the position of said stop element relative to and between the gear shift lever and the retaining portion,

(f) a stabilizing means for restricting twisting movement of the body and comprising a finger extending outwardly from an inner surface of said retaining portion and in transverse relation to the length of said body and being of sufficient longitudinal dimension to engage the steering column,

(g) said finger disposed adjacent the ignition lock and between the ignition lock and said lever engaging portion and including a free end disposed in engagable relation to the steering column, and

(h) whereby the gear shift lever is restricted from being positioned into an operative gear when said body engages both the ignition lock and the gear shift lever.

4,789,044

## NARROW DIRECTIONAL MICROPHONE

Hiroshi Akino, Sagami-hara, Japan, assignor to Kabushiki Kai-

sha Audio-Technica, Tokyo, Japan

Filed Nov. 17, 1986, Ser. No. 931,649

Claims priority, application Japan, Nov. 19, 1985, 60-259187

Int. Cl.<sup>4</sup> H04R 1/20

U.S. Cl. 181-158

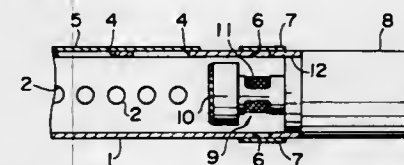
7 Claims

1. A directional microphone comprising a grip portion, an elongated cylindrical interference pipe, and a microphone unit having a forward sound terminal and a rearward sound terminal spaced from said forward sound terminal;

said interference pipe accommodating said microphone unit

wholly within a rear end portion thereof for cooperating with said microphone unit to effect a narrow directional sound orientation of said microphone, said rear end portion being secured to said grip portion;

an inner peripheral surface of said interference pipe being larger than an outer peripheral surface of said microphone



unit thereby forming a gap therebetween, a plurality of sound inlets circumferentially spaced on said interference pipe directly over said rearward sound terminal for direct transmission of sound waves to said rearward sound terminal; and

a plurality of first openings axially spaced on said interference pipe.

4,789,045

## SWING ROPE

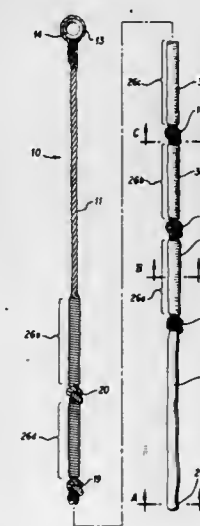
Billy G. Pugh, Corpus Christi, Tex., assignor to Billy Pugh Co., Inc., Corpus Christi, Tex.

Filed May 12, 1987, Ser. No. 48,681

Int. Cl.<sup>4</sup> E06C 1/56

U.S. Cl. 182-190

12 Claims



1. A swing rope comprising:

a bitter end;

a second end;

a first knot located above said bitter end, a last knot located above said first knot and below said second end;

a polyurethane coat about the entirety of said rope;

a first fiberglass resin coat about the rope between said knots and about a section of said rope immediately above said last knot;

a polypropylene rope spirally wound about said first fiberglass resin coat;

a second fiberglass resin coat about said polypropylene rope and an abrasive grit on said second coat of fiberglass resin coat, said swing rope being adapted for use as an all-weather transporting device when said second end is suspended from a fixed structure.

4,789,046

## CEMENT FINISHER'S KNEE BOARD

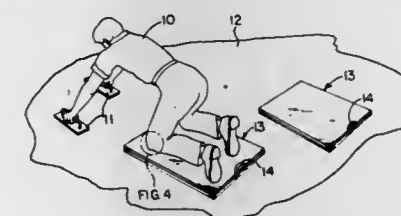
Neil A. McDowall, Moses Lake, Wash., assignor to Pro Board, Inc., Moses Lake, Wash.

Filed Aug. 17, 1987, Ser. No. 86,374

Int. Cl.<sup>4</sup> E04G 1/00

U.S. Cl. 182-230

10 Claims



1. A cement finisher's knee board comprising;

a rigid high density body member comprising extruded closed cell polystyrene foam having a thickness of from 1-2 inches and a weight of from 2-3 pounds per cubic foot,

said body member having at least one flat surface adapted to be supported from a wet cement surface and the opposite surface thereof adapted to accommodate a kneeling workman, said surfaces being visco-elastic and having a vertical compression load capacity of from 25-45 psi, and

a soft pliable water repellant cover layer surrounding said foam body member.

4,789,047

## MOTOR VEHICLE SERVICING SYSTEM

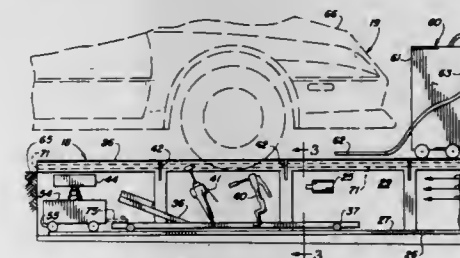
Peter C. Knobloch, 4613 E. Euclid Ave., Phoenix, Ariz. 85044

Filed Jul. 22, 1987, Ser. No. 76,331

Int. Cl.<sup>4</sup> F16N 7/00

U.S. Cl. 184-1.5

9 Claims



1. A vehicle lubrication system including

(a) a building structure;

(b) a motor vehicle servicing bay in said structure and a ground floor;

(c) an elongate trench formed in said floor and having an opposed pair of parallel spaced side walls and a lower floor, said side walls being spaced a distance less than the spacing distance between corresponding wheels of the vehicle, whereby the vehicle can be positioned on said ground floor in straddling relation above the trench, said trench having a depth from said ground floor to said lower floor in the range of fourteen to twenty-eight inches;

(d) a creeper for supporting a mechanic in a reclining position beneath the vehicle straddling said trench, said creeper including ground engaging wheels for moving said creeper over the lower floor;

(e) an oil splash pan positioned in said trench for movement therealong beneath said vehicle;



(f) oil removal means including

- (i) a wand positioned above said ground floor and shaped and dimensioned to be inserted by a mechanic standing on said ground floor through the oil dipstick tube of the vehicle into the oil sump of the vehicle, and
- (ii) suction means for drawing oil upwardly through said wand and out of the oil sump into an oil reservoir.

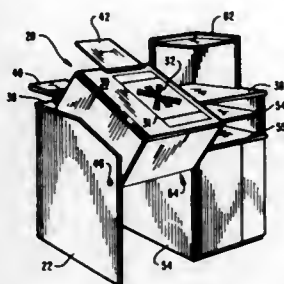
4,789,048

## CHECKOUT COUNTER

Martin L. Cramer, Cambridge, Ohio, and Mark J. Moneypenny, Eastwood, Ky., assignors to NCR Corporation, Dayton, Ohio  
Filed Sep. 28, 1987, Ser. No. 102,451  
Int. Cl.<sup>4</sup> A47F 19/04

U.S. Cl. 186-61

8 Claims



1. In a checkout system including a checkout counter for self-service stores which have movable shopping carts for use by customers in accumulating merchandise items from different locations in the store and for transporting the purchased merchandise items to a checkout station for checking by a checkout operator, said checkout counter comprising:

- a support structure including a pair of sidewall portions supporting a horizontally mounted first support member; an intermediate sidewall portion extending from said member parallel to and between said sidewall portions;
- a supporting surface extending between one of said sidewall portions and said intermediate sidewall portion, said supporting surface being inclined upwardly towards the rear of the support structure and including a front wall portion extending outwardly from the support structure and a rear wall portion engaging said first support member enabling a first shopping cart containing purchased merchandise items to be positioned adjacent one side of the front wall portion and a second shopping cart positioned adjacent the opposite side of the front wall portion for receiving the purchased merchandise items; and
- an optical scanning system mounted within the support structure adjacent said supporting surface including an aperture located in said supporting surface through which scanning light beams from said optical scanning system are directed for scanning a coded label on a merchandise item positioned on said supporting surface.

4,789,049

## SIGNAL TRANSMITTING EQUIPMENT FOR ELEVATOR

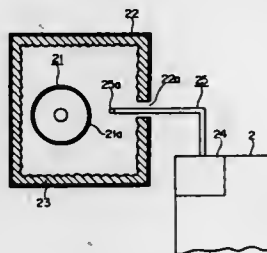
Elki Watanabe, and Takeshi Sakurada, both of Inazawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan  
Filed Mar. 25, 1988, Ser. No. 173,552  
Claims priority, application Japan, Apr. 2, 1987, 62-81711  
Int. Cl.<sup>4</sup> B66B 3/00

U.S. Cl. 187-130

14 Claims

1. An elevator control signal transmitting equipment characterized in that a shielding body of a magnetic shielding material envelops a transmitting line laid along a shaft through which a cage travels and a portion of a coupling device extending toward said transmitting line, the transmission and reception of

signals being realized through the magnetic coupling between said transmitting line and said coupling device to control the



4,789,050

## CONTROL MEANS FOR AN ELECTRIC MOTOR

Jean Evin, Pont A Mareq, France, assignor to Sarl Logilift, Pont A Mareq, France

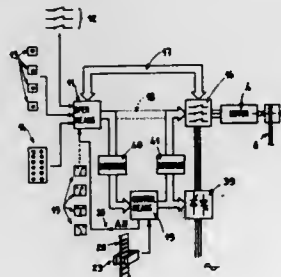
Filed Jan. 30, 1986, Ser. No. 824,118

Claims priority, application France, Feb. 12, 1985, 85 02381

Int. Cl.<sup>4</sup> B66B 1/16

U.S. Cl. 187-134

9 Claims



2. A device for the regulated control of a moving body comprising: a coded means (20) disposed along the path of the moving body and having evenly spaced marks (22) on coded strip (21) which are detected by a reader (23) and are taken into account for deducing the moving speed thereof, this device being characterized by the fact that it comprises in combination:

- on the coded means (20) at least one reference mark (26) corresponding to a reference position (27) of the moving body (2),
- a reader (23) fixed to the moving body for reading the marks (22) of a coded means (20),
- means for algebraically counting the number of marks met by the reader (23) during movement of the moving body (2) and
- by upcounting/downcounting the marks, means (29) for calculating the position index ( $I_p$ ) of the moving body, processing means (31) for sending to the electric motor (4) a progressive braking voltage continuous control inside an interval defined by marks ( $I_{ZR}$ ) corresponding to a slowing down zone, said control being determined according to the difference between the position index ( $I_p$ ) and the level index ( $I_n$ ) and the difference between the speed of the moving body and a reference speed for the position index ( $I_p$ ), and characterized by the fact that it comprises on the coded strip 21 at least two initialization marks (42, 43) which define two endmost slowing down zones (44, 46) and an intermediate zone (45) and permanent memorization means (47, 48) for storing the position of the moving body in one of the three zones (44, 45, 46).

4,789,051

## DAMPER WITH INTERNALLY POWERED SELECTIVE RIDE VALVING

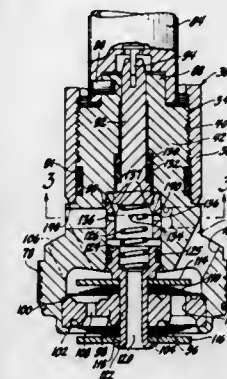
William C. Kruckemeyer, and Wayne V. Fannin, both of Xenia, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 8, 1987, Ser. No. 59,014

Int. Cl.<sup>4</sup> F16F 9/46, 9/18

U.S. Cl. 188-299

5 Claims



1. A double-acting hydraulic damper for controlling the action of vehicle suspension springs comprising an outer tube, a cylinder tube mounted within said outer tube and cooperating therewith to form a reservoir for damper fluid, base valve means hydraulically connecting said reservoir to said cylinder tube, a piston rod guide mounted in the upper end of said cylinder tube, a hollow cylindrical piston rod mounted for reciprocating movement in said cylinder tube and extending through said rod guide and the upper end of said damper, the improvement comprising a piston having a head and having an elongated neck integral with said head, said neck having a major portion fitted within an inner end of said piston rod, fastener means securing said neck within said inner end of said piston rod, an orifice plate operatively mounted within the confines of said head having jounce and rebound valve means associated with said orifice plate for restricting the passage of damper fluid therethrough on jounce and rebound stroke of said damper, connector means for securing said jounce and rebound valve means to said orifice plate and having a bypass fluid passage therethrough and selectively variable orifice valve means in said neck and head of said piston operatively connected to said bypass fluid passage and in hydraulic parallel with said jounce and rebound valve means for selectively changing the damping characteristics of said damper.

4,789,052

## AUTOMATIVE CLUTCH RELEASE BEARING

Christian Gay, Paris, and Philippe Lassiaz, Boulogne, both of France, assignors to Valeo, Paris, France

Continuation of Ser. No. 824,838, Jan. 23, 1986, abandoned. This application Jun. 19, 1987, Ser. No. 63,750

Claims priority, application France, Feb. 1, 1985, 85 01423; Mar. 2, 1985, 85 04376

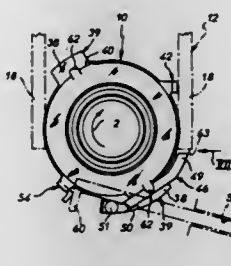
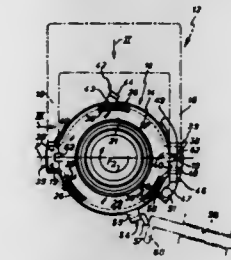
Int. Cl.<sup>4</sup> F16D 23/14

U.S. Cl. 192-98

24 Claims

1. Clutch release bearing, in particular for automotive vehicles, comprising at least two generally radial transverse bearing surfaces located generally diametrically opposite to each other and cooperable with arms of a clutch release control member, abutment means for providing circumferential bearing engagement in a first direction with means provided on the control member upon demounting rotation about the axis of

the clutch release bearing and bracing means for opposing retrograde rotation of the clutch release bearing in a second



4,789,053

## TORSIONAL VIBRATION DAMPER

Matthias Fischer, Euerbach, and Rainer Ziss, Schwanfeld, both of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

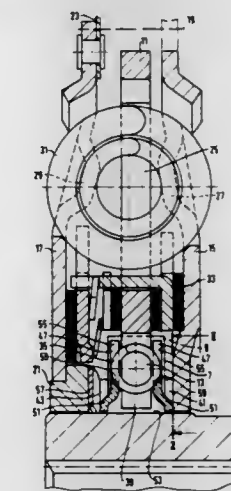
Filed Apr. 30, 1987, Ser. No. 44,791

Claims priority, application Fed. Rep. of Germany, May 2, 1986, 3614824

Int. Cl.<sup>4</sup> F16D 3/14, 3/66

U.S. Cl. 192-106.2

11 Claims



1. A torsional vibration damper, especially for a clutch disc of a motor vehicle friction clutch, comprising:

- (a) a hub having a radially protruding first disc part comprising an external toothing
- (b) a second disc part of annular disc form rotatably enclosing the first disc part concentrically, which second disc part (4) has a second toothing (5) on its outer periphery.

- part comprises an internal toothing engaging with predetermined play in rotation in the external toothing of the first disc part.
- (c) firmly mutually connected side discs arranged on axially opposite sides of the disc parts rotatably in relation to these,
- (d) at least one first spring stressable in the relative rotation of the side discs and of the second disc part,
- (e) at least one second spring stressable in the relative rotation of the first disc part and the second, which second spring is arranged in a first recess, defined in the circumferential direction by teeth, of one of the two disc parts, which recess extends substantially over the whole radial height of the second spring and forms first abutment edges, lying opposite to one another in the circumferential direction, for the abutment on the second spring,
- (f) a retaining device for the second spring, which comprises two separate retaining discs arranged on axially opposite sides of the two disc parts, each of said retaining discs comprises a second recess lying axially opposite to the first recess and forming second abutment edges lying opposite to one another in the circumferential direction for the abutment on the second spring engaging in the second recess, and each of said retaining discs is separately connected non-rotatably with the other of the two disc parts and is axially fixed between the first disc part and a different one of the side discs.

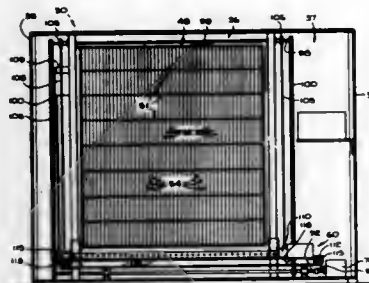
4,789,054

**VENDING MACHINE FOR RETURNABLE CARTRIDGES**  
 Barry Shore, Northbrook, and Michael Schwarzberger, Chicago, both of Ill., assignors to ABM Industries, Inc., Skokie, Ill.  
 Continuation-in-part of Ser. No. 688,308, Jan. 2, 1985, abandoned. This application Jan. 14, 1987, Ser. No. 3,067

Int. Cl.<sup>4</sup> G07F 7/00, 11/16

U.S. Cl. 194—212

4 Claims



1. Apparatus for vending cartridges to a patron and accepting the cartridges in return from the patron in connection with which the patrons are assigned identification numbers individually identifying them, wherein,
- the apparatus includes first means including first sensing elements capable of selectively representing the identification numbers of the patrons,
- the cartridges bearing
- (a) second sensing elements individually identifying the cartridges,
- (b) third sensing elements indicating the presence of the cartridges in the apparatus,
- (c) fourth sensing elements indicating that the cartridges are authorized to be accepted in the apparatus,
- a magazine having a plurality of cubicles adapted to support the respective individual cartridges therein, and being stationary and static, and of which all parts are fixed, and adapted to have cartridges placed therein and removed therefrom by means independent of the magazine,
- the cubicles in the magazine being individually identified by their location in the magazine,
- a carriage movable between a home position in which it is accessible to a patron, and a second position relative to

each of the cubicles selectively, for movement of a cartridge between the carriage and respective cubicle, and including operating means for so moving the cartridge, driving means for moving the carriage between its said positions,

control means,

said first means being operable in response to manipulation by a patron for entering first signals into the apparatus and thereby conditioning said first sensing elements for representing the patron's identification number,

the apparatus also includes second means, third means, and fourth means,

the second means being operable in response to manipulation by a patron for entering second signals into the apparatus representing the elements identifying the cartridges,

the third means being operable in response to a manipulation constituted by insertion of an authorized cartridge into the apparatus for entering third signals into the apparatus representing the presence of an authorized cartridge in the apparatus,

the fourth means being operable in response to manipulation by a patron for entering fourth signals into the apparatus representing movement of the carriage between its said positions,

said manipulations constituting initial manipulations, predetermining a pattern of operation of movements as set out hereinbelow,

the control means including first sensors, second sensors, third sensors, and fourth sensors, respectively operably associated with the first signals, second signals, third signals, and fourth signals,

the second and third sensors being operable for respectively sensing the second and third sensing elements and thereby conditioning the control means,

the control means when so conditioned, being operable, in response to the fourth sensors sensing the fourth sensing elements, for controlling the driving means and operating means, for performing said pattern of operation of movements which are

(a) moving the carriage from its home position to its second position,

(b) transferring a cartridge between the carriage and a respective cubicle,

(c) moving the carriage from its second position to its home position,

the control means, when so conditioned, and the fourth sensors, constituting means sufficient in themselves for producing said pattern of operation of movements set out above and producing those movements, in response to said initial manipulations and consequent sensing function of operable interaction between the fourth sensing elements and the fourth sensors.

4,789,055

#### APPARATUS FOR ARRANGING ARTICLES IN A PREDETERMINED MANNER AND METHOD OF MAKING SAME

Karl H. Steurmer, New Richmond, Ohio, assignor to Planet Products Corporation, Cincinnati, Ohio  
 Continuation of Ser. No. 550,180, Nov. 9, 1983, Pat. No. 4,630,725, which is a continuation-in-part of Ser. No. 292,741, Aug. 19, 1981, Pat. No. 4,421,222. This application Dec. 23, 1986, Ser. No. 945,699

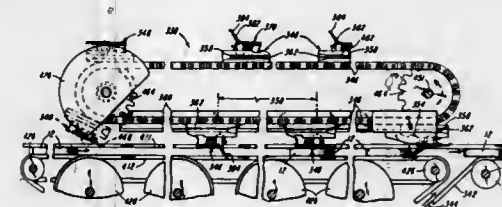
The portion of the term of this patent subsequent to Dec. 23, 2003, has been disclaimed.  
 Int. Cl.<sup>4</sup> B65G 47/26

U.S. Cl. 198—425

9 Claims

1. In an apparatus for arranging randomly oriented articles of roughly equal size in a predetermined pattern comprising, means for receiving said articles and disposing same in at least one substantially rectilinear row and in a single layer thereof, an accumulator for receiving said articles from said row, said

accumulator having driven moving means for moving said articles therethrough and cooperating driven gate means for controlling the articles moved through said accumulator, said moving means and gate means being independently driven, and a collection device for collecting said articles from said accumulator, the improvement wherein said gate means comprises, a mechanism supported for movement in an endless path, said mechanism being disposed above at least a portion of said accumulator, a plurality of gates carried by said mechanism in spaced relation with a particular pitch between immediately adjacent gates establishing a predetermined number of said articles therebetween, means for serially indexing said mecha-



nism a distance equal to said pitch to thereby move a gate disposed immediately adjacent said collection device and thus allow movement of the predetermined number of articles immediately upstream of said immediately adjacent gate out of said accumulator to said collection device, and a fixed non-rotatable means adapted to actuate said gates upon movement of each gate thereagainst, said means for indexing operating to move an exit gate actuated by said fixed nonrotatable means away from said fixed nonrotatable means to thereby allow movement of the predetermined number of articles immediately upstream of said exit gate out of said accumulator to said collection device.

4,789,056

#### SLIDER BED CONVEYOR APPARATUS AND ASSOCIATED METHOD

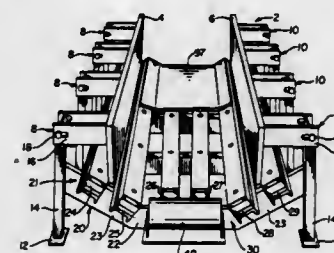
Robert D. Bourbeau, Export, Pa., assignor to Solidur Plastics Co., Pittsburgh, Pa.

Filed Feb. 3, 1987, Ser. No. 10,409

Int. Cl.<sup>4</sup> B65G 15/60

U.S. Cl. 198—823

9 Claims



1. A conveyor belt system comprising a frame, an elongated slider bed secured to said frame, said slider bed having slider bed members including a plurality of spaced elongated generally parallel members, said slider bed members oriented generally longitudinally with respect to said frame, said slider bed having recesses defined by said slider bed members at opposed ends thereof, a head idler roller secured to said frame and disposed in one said recess, a tail idler roller secured to said frame and disposed in the opposite said recess, an endless conveyor belt extending over said idler rollers and said slider bed, said slider bed being treated with polyethylene whereby said

polyethylene is transferred onto said conveyor belt to create a cross-link effect between said conveyor belt material and said slider bed, said idler rollers each being rotatably mounted on a shaft, said shaft extending axially beyond the sides of said idler roller, and said shaft of said idler roller mounted in adjustable idler roller support means which include a generally horizontally oriented base, a generally vertically oriented sidewall, and a pair of generally vertically oriented support plates relatively spaced a distance greater than the axial length of said idler roller and receiving said extending portion of said shaft, whereby impact loads imposed on said conveyor belt can be supported by said idler rollers and said slider bed.

4,789,057

#### TAMPER RESISTANT CONTAINERS

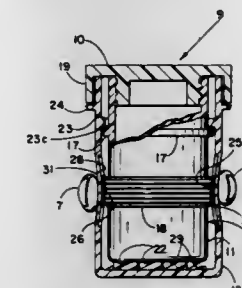
William Fisher, Rte. 1, Box 69, Boyceville, Wis. 54725

Filed Mar. 18, 1988, Ser. No. 170,309

Int. Cl.<sup>4</sup> A45C 13/10

U.S. Cl. 206—1.5

26 Claims

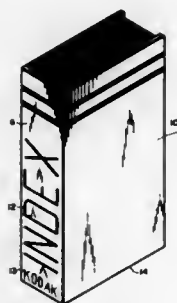


1. A tamper resistant container that can be readily opened by an elderly person but is difficult for a young child to open comprising:
- a first container for holding toxic substances, said first container having an inside and an outside, said first container having a threaded section for engaging a cover and a friction region;
- a cover having a threaded section for engaging said first container to close and seal toxic substances in said first container;
- a second container having an inside and an outside, said second container located outside said first container, said second container including means to permit free rotation of said first container when said cover on said first container is rotated in a direction to unscrew said cover to thereby thwart a young child from opening said tamper resistant container, said second container including means to prevent rotation of said first container with respect to said second container when said cover is rotated in a direction to unscrew said cover, said means activable to engage said friction region on said first container by the user squeezing on a specific region on the outside of said second container so that said friction region on said first container engages said means to prevent rotation of said first container to thereby permit the user to unscrew said cover from said first container.



4,789,058  
**AESTHETIC DISPLAYING DEVICE FOR VIDEO CASSETTE TAPES AND THE LIKE**  
 Lawrence F. Blaney, 2858 Mead St., Yorktown Heights, N.Y. 10598  
 Filed Feb. 9, 1988, Ser. No. 153,988  
 Int. Cl.<sup>4</sup> A65D 85/57, 85/672  
 U.S. Cl. 206—232

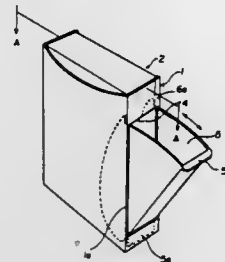
3 Claims



1. Library apparatus for aesthetically displaying signal receiving and storing devices comprising:  
 a casing member having an end wall perpendicularly connected to two parallel side walls and a base wall defining a storage jacket for holding and displaying a signal receiving and storing device, said casing member substantially free of printing matter on said end wall;  
 an area for receiving an assigned code for a program stored on said signal receiving and storing device, said receiving area being positioned on said end wall of said casing member;  
 a plurality of segments attached to said end wall in said receiving area, each segment bearing a single symbol of said assigned code; and  
 index means comprising printed matter indicating said assigned code for said program and a corresponding name for said program, said index means disposed in a booklet defined by an end wall perpendicularly connected to two parallel side walls and a base wall having the same style and shape as said first casing member, said end wall of said booklet having printed matter indicating the index means disposed within the booklet.

4,789,059  
**CIGARETTE CASE HAVING AN ASH TRAY**  
 Hui Kab Kim, San-1 Songdo-Dong, Pohang-Shi, Kyungsangbuk-Do, Rep. of Korea  
 Filed Feb. 16, 1988, Ser. No. 155,888  
 Claims priority, application Rep. of Korea, Sep. 15, 1987, 87-14033[U]  
 Int. Cl.<sup>4</sup> B65D 85/10  
 U.S. Cl. 206—246

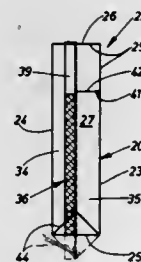
3 Claims



1. A cigarette case comprising:  
 an outer case containing an aperture disposed in one side wall thereof,  
 an inner case for receiving a cigarette package which is insertable into said outer case, and said inner case being formed so as to define a conduit between the lower portion of said inner case and said outer case when said inner case is inserted into said outer case,  
 an ash tray having a handle at the upper end portion which is pivotally mounted to the outer case at the lower end portion thereof for being inserted in the spaces disposed between the outer case, and  
 a container disposed in the bottom portion of the outer case which receives ash and butts introduced into the ash tray through the conduit.

4,789,060  
**CUBOID PACK FOR CIGARETTES WITH TRANSVERSE CUT LINES**  
 Heinz Focke, and Kurt Liedtke, both of Verden, Fed. Rep. of Germany, assignors to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany  
 Continuation of Ser. No. 896,047, Aug. 13, 1986, abandoned.  
 This application Feb. 25, 1988, Ser. No. 163,165  
 Claims priority, application Fed. Rep. of Germany, Aug. 14, 1985, 3529119  
 Int. Cl.<sup>4</sup> B65D 85/10  
 U.S. Cl. 206—274

2 Claims

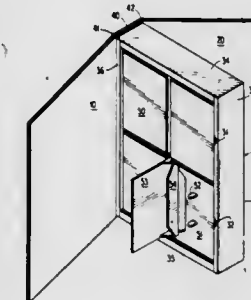


1. Cuboid pack for cigarettes, with an outer wrapping consisting of thin cardboard, and having an inner wrapping surrounding a cigarette group, comprising:  
 (a) an inner wrapping (20) made out of a tinfoil blank;  
 (b) the inner wrapping (20) being provided with a pull-off opening flap (29) which extends in an upper region of a longitudinal front wall (23), in a front sub-region of an

upper end wall (26) and in an upper, front sub-region of narrow side walls (27, 28) of the inner wrapping (20);  
 (c) in the narrow side walls (27, 28) of the inner wrapping (20), each side wall comprising side tabs (34, 35) bonded to one another along overlapping strips (37, 38) of the side tabs only up to an unbonded portion (39) adjacent to the opening flap, to form a sealed bonding strip (36) preventing aroma and moisture losses;  
 (d) the overlapping strips (37, 38) being bonded to one another in a fin-fold along their inner faces turned towards one another;  
 (e) in the region of the opening flap (29), the overlapping strips (37, 38) lying with their inner faces against each other, in the unbonded portion (39);  
 (f) each bonding strip (36), together with its adjacent unbonded portion (39), being folded around until it comes up against a corresponding one of the side walls (27, 28); and  
 (g) a transverse connecting cut (42) in each front side tab adjoining a transverse punching (40) in the front wall (23), each connecting cut delimiting the opening flap (29) in each of the front side tabs (35) in front of the overlapping strips (37, 38), so that the overlapping strips extend uninterrupted over the longitudinal length of the inner wrapping (20) below said opening flap (29).

4,789,061  
**MAGNETIC TAPE CASSETTE CONTAINER**  
 Paul F. Roze, 8 Rue de la Lande Seche, Cesson - Sevigne, France (35-510)  
 Filed Nov. 13, 1987, Ser. No. 119,935  
 Int. Cl.<sup>4</sup> B65D 85/67  
 U.S. Cl. 206—387

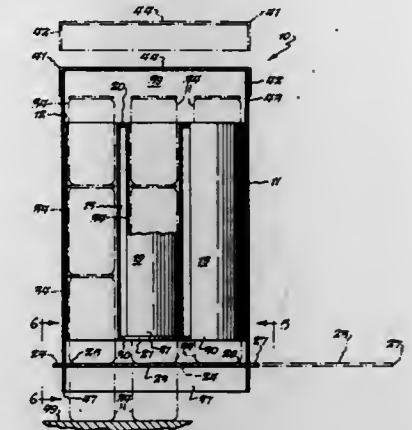
11 Claims



1. A storage container for magnetic tape cassettes comprising:  
 at least one rectangular frame, said rectangular frame having interior and exterior dimensions with an interior length greater than twice a length of a conventional magnetic tape cassette container, an interior width greater than twice a width of a conventional magnetic tape cassette container and a depth greater than a depth of a conventional magnetic tape cassette container,  
 a pair of rigid, generally planar members, each of a length and width greater than exterior length and width of said rectangular frame,  
 hinge means joining said rigid, generally planar members into a book like assembly providing for rotational movement of said rigid, generally planar members relative to each other about a longitudinal axis of said hinge means, at least one rigid magnetic tape cassette container support, said support having a length and a width slightly less than inside dimensions of said rectangular frame so that said support can be manually inserted into said frame including at least four magnetic tape cassette containers secured thereto, and  
 securing means for securing said rectangular frame to said book like assembly.

4,789,062  
**CARRIER FOR EMPTY BEVERAGE CONTAINERS**  
 James F. Walsh, 136 Halwill Dr., Snyder, N.Y. 14226  
 Continuation of Ser. No. 771,636, Sep. 3, 1985, abandoned. This application Jun. 29, 1987, Ser. No. 68,109  
 Int. Cl.<sup>4</sup> B65D 75/00  
 U.S. Cl. 206—427

20 Claims



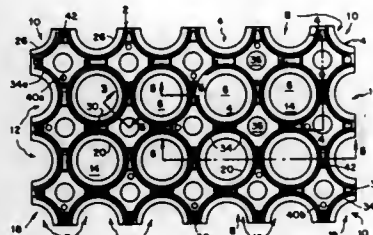
1. A carrier for vertically oriented empty beverage containers, having openings in their upper portions and having first longitudinal axes, comprising a plurality of vertical compartments having second longitudinal axes and having tops and bottoms, each of said compartments being of a length greater than the length of each of said beverage containers so that a plurality of said beverage containers can be received in each of said vertical compartments with said first axes in substantial alignment with said second axes and with their upper portions facing upwardly so that there is no spilling of liquid from their openings, a housing for enclosing said compartments in a lateral direction and having a housing top and a housing bottom proximate said tops and bottoms, respectively, of said compartments for containing said vertical compartments, door means in said housing proximate said bottoms of said compartments for holding said containers in said compartments when said door is closed and for permitting said containers to drop from said vertical compartments when said door is open, and a cover for said housing overlying all of said compartments and spaced from said tops of said compartments to close said housing to confine odors therein while said spacing of said cover from said tops permits ventilation among said tops of said compartments.

4,789,063  
**SPACER TRAY FOR PACKAGING CONTAINERS**  
 Roy Hammett, Tampa, Fla., assignor to International Container Systems, Inc., Tampa, Fla.  
 Continuation-in-part of Ser. No. 925,755, Oct. 30, 1986, abandoned, which is a continuation-in-part of Ser. No. 904,725, Sep. 8, 1986, abandoned. This application Feb. 19, 1987, Ser. No. 16,310  
 Int. Cl.<sup>4</sup> B65D 71/08  
 U.S. Cl. 206—432

18 Claims

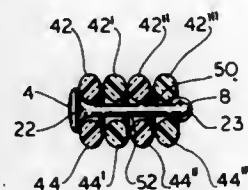
1. A spacer tray or containers, the spacer tray being formed of a plastic sheet material, the spacer tray being shaped to provide a number of container-bottom receptacles equal to (m × n), where m is an integer greater than 2 and n is an integer greater than 2, the container-bottom receptacles being disposed in an array of m columns and n rows, a number of container-bottom receptacles equal to (m - 2) (n - 2) being located interior of container-bottom receptacles located on the perimeter of the spacer tray to define tray-interior container-bottom receptacles, each container-bottom receptacle being shaped to receive at least a part of a bottom portion of a container, each

tray-interior container-bottom receptacle being configured to surround substantially entirely the bottom portion of a container seated in the receptacle, a container-spacer wall being located between each pair of adjacent container-bottom receptacles to maintain the bottom portions of containers seated in the pair of adjacent container-bottom receptacles in a spaced-apart relationship, the spacer tray having a height less than half the height of the containers the spacer tray is adapted to seat, the spacer tray being shaped so that two such spacer trays



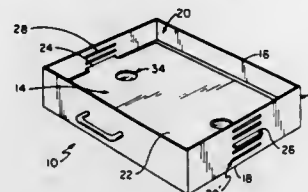
facing in the same direction and placed one atop the other with the container-bottom receptacles of the two spacer trays generally coaxially aligned nest one inside the other container-bottom receptacle within container-bottom receptacle, the spacer tray having a plurality of nesting-binding interference structures shaped and positioned to prevent two spacer trays so nested one inside the other from binding at least when one spacer tray has a predetermined nesting-binding-interference orientation relative to the other in the plane of the spacer trays.

**4,789,064**  
**RETAINER CLIP FOR UTENSILS**  
Paul Segal, 15 Colonial Rd., White Plains, N.Y. 10605  
Filed Sep. 24, 1987, Ser. No. 100,410  
Int. Cl. B65D 73/00  
U.S. Cl. 206—493



1. A utensil retainer clip for storing table utensils in stacked relationship, each of said utensils having a handle comprising a pair of parallel cylindrical spaced apart flexible arms, said clip comprising a vertical wall central body portion, the thickness of said wall being less than the distance between said arms of said utensil handles, a base portion extending outwardly from said central body portion on both sides thereof, the width thereof being greater than the distance between said arms of said utensil handles a top portion bulbous in cross section in the central section thereof and tapered inwardly at each end thereof, said bulbous cross section being greater in thickness than the dimension of the distance between said utensil handle arms when unflexed, and less than the dimension of the distance between said arms when flexed apart from each other.

**4,789,065**  
**COMBINATION CONTAINER AND PRESS FOR FLEXIBLE SHEETING**  
Ray Roy, 120 Chester St., Lawrence, Mass. 01843  
Filed May 4, 1987, Ser. No. 46,240  
Int. Cl. B65D 1/34, 6/04  
U.S. Cl. 206—555 9 Claims

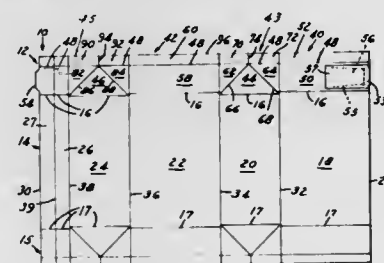


1. A combination container/press for flexible sheet materials that tend to roll-up upon themselves if left unattended, comprising:

a container member having at least two spaced-apart confronting side walls and an included bottom wall defining an open top having a preselected dimension, said side walls having plural pairs of confronting slots being provided on each of the confronting side walls, the side walls extending along a direction defined from the bottom wall to the open top, the plural pairs of confronting slots being in spaced-apart relation on said side walls along said dimension defined from the bottom wall to the open top; and

a substantially rigid cover member having a major portion of a dimension less than the dimension of the open top so that the major portion of the cover member is dimensioned to fit therewithin and having tongues extending diametrically oppositely from opposing edges of the cover member in such a way that the ends of the opposing tongues span a dimension that is greater than the corresponding dimension of the open top, each of said tongues being itself dimensioned to be slidably receivable into corresponding ones of said slots of each of said pairs of confronting slots provided in the side walls.

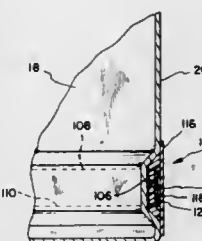
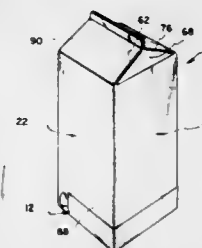
**4,789,066**  
**CONTAINER WITH PROTECTIVE SEAL AND TEAR STRIP**  
Robert E. Lisiecki, Orchard Lake, Mich., assignor to Ex-Cell-O Corporation, Walled Lake, Mich.  
Filed Nov. 25, 1983, Ser. No. 555,247  
Int. Cl. B65D 5/70  
U.S. Cl. 206—611 3 Claims



1. A blank for forming a liquid carrying paperboard carton, said blank comprising first, second, third and fourth side panels and a side seam flap integrally connected to the outermost edge of said fourth side panel and having a score line formed along the full length of the centerline thereof; an end closure arrangement including a triangular panel connected to the end of each of said second and fourth side panels by a first score line and

defined by diagonal score lines separating each triangular panel from a pair of foldout panels and second score lines separating each foldout panel from an outfold lip; a first rectangular panel connected to adjacent foldout panels by score lines and the end of said third side panel by said first score line and defined by a further score line across the width thereof and aligned with said second score lines; a second rectangular panel connected to one edge thereof to the adjacent foldout panel by a score line and to the end of the first side panel by said first horizontal score line and defined by a fourth horizontal score line across the width thereof and aligned with said second and third horizontal score lines, and having a notch formed in the free side edge thereof, spaced linear perforations formed in said second rectangular panel and extending from said notch to approximately the center of said panel to form a tear strip; a tab formed on the free edge of said side seam flap in alignment with said notch; and a separate non-perforated aluminum foil seal strip secured to said fourth end closure panel overlying said spaced linear perforations and said notch.

**4,789,067**  
**CARTON**  
Rocco Silano, 310 Richmond Ave., Paterson, N.J. 07502  
Filed Dec. 7, 1987, Ser. No. 129,595  
Int. Cl. B65D 5/54  
U.S. Cl. 206—615 16 Claims



1. A self-supporting paper carton of a gabled-top type comprising:

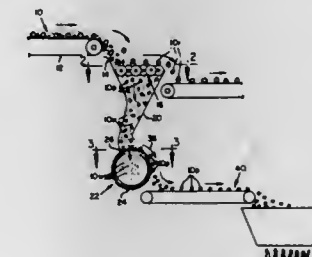
a sheet paper carton blank for forming upon appropriate folding and securing said paper carton, in turn comprising; a body portion for reception of goods having four rectangular side panels arranged side-by-side and having three parallel fold lines therebetween, and body portion, in a formed condition, being substantially square in cross section;

a top seal portion in the formed condition being a sealed extension of said body portion providing, upon operating to an open condition, a pour spout for dispensing goods received by the carton, and, after an initial operation to said open condition, for further operation to a closed condition, to store goods received by the carton; and,

a bottom seal portion in the formed condition, being a substantially square, sealed extension of said side panels; detachment means for frangibly disconnection three of the four side panels of said bottom portion; and, sealing means for securing during carton formation said

body portion, said top seal portion, and said bottom seal portion in a predetermined relative, folded position; and whereby upon emptying said self-supporting paper carton, the top seal portion is fully opened and the detachment means is operated to disconnect the bottom seal portion from three of the four side panels permitting the carton to fold flat for convenient disposal thereof.

**4,789,068**  
**WOOD CHIP CLASSIFYING SYSTEM**  
Larry J. Gilmore, 17555 SE. Braden, Gladstone, Oreg. 97027  
Filed May 14, 1986, Ser. No. 863,053  
Int. Cl. B07B 9/02  
U.S. Cl. 209—44.3 7 Claims



1. Apparatus for separating materials comprising pulp wood chips of a designated range from an intermixture including both larger and smaller sized chips comprising; a first separating screen mechanism for separating out the larger size chips and a second separating screen mechanism for separating out the smaller size chips,

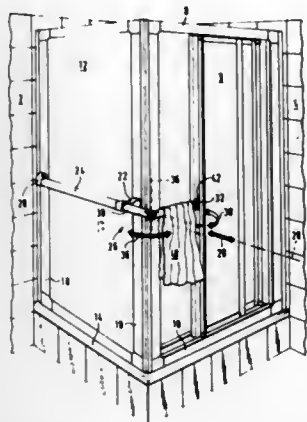
said first separating screen mechanism including a receiving member for receiving the intermixed material, a screen in the member having screen openings that permits passage only of material of the designated size range and smaller, discharge means for discharging the material not passing through the screen out of the receiving member to be separated from the material passing through the screen, and deposit means for depositing the material passing through the screen onto said second separating screen mechanism;

said second separating screen mechanism including a vacuum chamber having a slot like opening, a vacuum source interconnected to the vacuum chamber to draw air from the vacuum chamber and thereby generate flow of atmospheric air through the slot like opening, a cylindrical screen mounted for rotation in a circular path encircling the chamber and the slot like opening therein and being rotatable around the chamber, and air sealing means for sealing off the flow of air through the screen except for the portion of the screen passing over the slot like opening, the screen having screen openings in said cylindrical screen of a size that restricts passage of the wood chips within the designated lower size range and permits passage of smaller size materials, said slot like opening confined to an upper region of the circular path of the screen, said deposit means delivering the admixture of materials onto the screen at a position where the screen begins to traverse the slot like opening whereby the smaller materials are drawn through the screen with the air flow and the larger wood chips are carried with the screen over the top, past the slot like opening and thus out of the air flow where gravity causes the wood chips to fall off the screen.



**4,789,069**  
**TOWEL-HOLDER**  
 Heinz G. Baus, Wartbodenstrasse 35, CH-3626 Hünibach-Thun, Switzerland  
 Filed Oct. 30, 1987, Ser. No. 114,853  
 Claims priority, application Fed. Rep. of Germany, Nov. 11, 1986, 3638490; Dec. 17, 1986, 3643033  
 Int. Cl.<sup>4</sup> A47F 5/08  
 U.S. Cl. 211-105.3

16 Claims

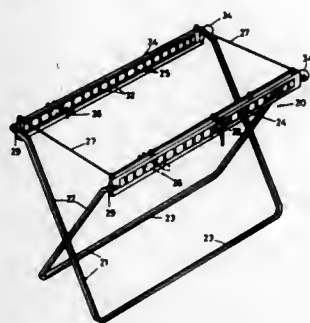


1. A towel-holder, comprising a supporting bar having a longitudinal axis running horizontally and adapted to be secured by means of connecting parts and in a vertical plane of attachment to a wall, and an extension bar having an axis which is aligned with the longitudinal axis of the supporting bar and which is arranged axially displaceably in relation to said supporting bar, wherein:

the extension bar comprises at least two parts, a front part and a rear part, connected together by means of a hinge, said front part and said rear part having the same outer contour as each other and each being formed from a hollow shaped rail having a rectangular cross sectional configuration, said hinge having an axis which is arranged substantially in parallel with said plane of attachment and at right angles to the longitudinal axis of the supporting bar.

**4,789,070**  
**CLOTHES AIRER**  
 Richard Bennett, 36 Wallala Avenue, Park Holme 5043, Australia  
 Filed Jun. 6, 1987, Ser. No. 59,960  
 Int. Cl.<sup>4</sup> A47F 43/00  
 U.S. Cl. 211-200

6 Claims

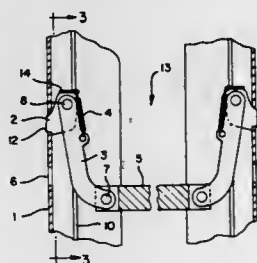


1. A clothes airer comprising a pair of frames, each frame

comprising a pair of legs, a bridge, and a beam joining the upper ends of the legs, pivots between leg upper and lower ends joining the legs of one frame to corresponding legs of the other frame so that the frames can fold or unfold between a retracted position wherein the beams are close to one another, and an in-use position wherein the beams are further apart, a plurality of struts spaced from one another along each said beam, said struts being of such size, shape and spacing as to receive clothes pegs for carrying clothes when stretched between the beams, a respective handle at one end of each beam, each said handle having a threaded stem which extends through a frame leg and threadably engages means on that said beam, said beam being selectably rotatable about said stem, but wherein said handle is rotatable with respect to said beam to clamp its said beam to a relevant said frame leg, and a retracting line with a releasable line lock thereon joining the beams and being operable to adjust the distance between the beams upon said folding or unfolding of said frames.

**4,789,071**  
**DISPLACEMENT AND LOCKING MEANS**  
 Svante Larsson, Pl. 15394, S-905 90 Umeå, Sweden  
 Filed Nov. 21, 1986, Ser. No. 933,612  
 Claims priority, application Sweden, Nov. 21, 1985, 8505502  
 Int. Cl.<sup>4</sup> A47F 57/00  
 U.S. Cl. 211-208

4 Claims

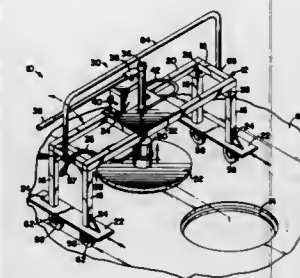


1. In combination with a support having opposite edge portions disposed between two columns having a plurality of holes which lie in a common plane:

means for releasably locking said opposite edge portions to said columns, said means including each of said edge portions having a link having a first end pivoted to each said respective edge portion for rotating toward and away from each said respective column about an axis which is transverse to said common plane, each said link having a second end to which a first end of a hook is pivoted for rotation about an axis parallel to said transverse axis, said hooks having tips at their first ends which upon pivoting of the hooks in a first direction move into locking engagement with said holes and upon pivoting of the hooks in an opposite direction move out of locking engagement with said holes respective columns so as to permit adjustment of the support along said columns, said links upon pivoting movement toward their respective columns making it possible for the hooks to lockingly engage their respective columns when the distance between the columns is increased, and means limiting pivoting movement of said links away from their respective columns when said hooks are in locking engagement with each said respective columns.

**4,789,072**  
**HYDRAULIC MANHOLE COVER LIFTER**  
 Dean R. Quam, 4627 Queen Ave. N., Minneapolis, Minn. 55412, and Robert J. Schmitz, 16183 Flagstaff Ct. S., Rosemount, Minn. 55068  
 Filed Apr. 20, 1987, Ser. No. 40,031  
 Int. Cl.<sup>4</sup> B66C 23/18  
 U.S. Cl. 212-166

9 Claims



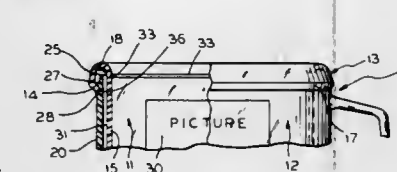
1. A portable device for handling metallic manhole covers, which comprises:

a mobile frame adapted to straddle a manhole, said frame including spaced apart upright portions interconnected by a raised transverse portion;  
 a cylinder mounted on the transverse portion of said frame, said cylinder including a depending movable rod;  
 a magnet secured to the rod of said cylinder and adapted for engaging a cover in the manhole;  
 a clevis coupled between said magnet and the rod of said cylinder; and  
 manually-actuated pump means for selectively supplying pressurized fluid to said cylinder for lifting and lowering said magnet into and out of engagement with the cover.

**4,789,073**  
**INSULATED, DISPLAY BEVERAGE CONTAINER CONSTRUCTION**  
 Neil H. Fine, Northbrook, Ill., assignor to Neil Enterprises, Inc., Chicago, Ill.

Filed Jan. 16, 1987, Ser. No. 3,858  
 Int. Cl.<sup>4</sup> A47J 4/00; B65D 25/54, 8/06  
 U.S. Cl. 215-13.1

4 Claims



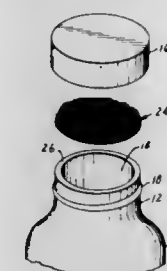
1. An improved insulated beverage container construction having an internal beverage containing chamber and enabling sealed display of internally contained indicia, said improved, insulated beverage container construction comprising:

outer shell means having a substantially open top portion circumscribed by substantially vertical side walls, each said side wall having a top edge, said side walls defining a substantially hollow interior region,  
 a first protruding bead positioned upon an outer surface of said outer shell means and extending circumferentially around and outwardly from said side walls parallel to said top edges,  
 a second protruding bead positioned upon said outer surface and extending circumferentially around and outwardly from said side walls parallel and proximate to said first protruding band, said first and second protruding beads thereby forming a groove;  
 liner means having a substantially open top portion circum-

scribed by substantially vertical side walls defining said beverage containing chamber,  
 said liner means including overhanging lip means operably disposed adjacent said substantially open top portion of said liner means, said overhanging lip means including a collar portion extending from said substantially open top portion outwardly of said side walls of said liner means and curving inwardly toward said side walls,  
 said collar portion having an inwardly protruding bead extending circumferentially along a lower portion thereof; and  
 said liner means being telescopically insertable into and receivable by said outer shell means, whereupon the outer surfaces of said outer shell means describe therebetween an indicia display chamber for the positioning of said internally contained indicia;  
 said overhanging lip means capable of telescopically receiving said top edges of said side walls of said outer shell, said inwardly protruding bead being securely, interlockingly, and detachably engaged between said first and second protruding beads of said outer shell means and received by said groove to provide for the secure releasable retention of said liner means by said outer shell and further providing a shielded, liquid-tight seal against the penetration of moisture into said display chamber when said container is subjected to pressurized water, as in an automatic dishwasher, without the necessity of sonic welding or cementing said inwardly protruding bead into said groove.

**4,789,074**  
**CAP LINER**  
 Hak-Rhim Han, Newport, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
 Filed Jul. 10, 1987, Ser. No. 72,136  
 Int. Cl.<sup>4</sup> B65D 53/04  
 U.S. Cl. 215-347

18 Claims



18. In combination, bottle having an opening;

(a) a  
 (b) a cooperative removable cap secured to said bottle for enclosing said opening; and  
 (c) a cap liner mounted on said cap and interposed between said cap and said bottle, said cap liner including a substantially fluid impervious thermoplastic film having opposing first and second major surfaces, with said second major surface of said film adjacent said bottle, and  
 a resilient compressible foraminous thermoplastic reinforcing web coextensive with said film and bonded to said first major surface of said film, said foraminous web being compressed between said bottle and said cap so as to resiliently urge said film into sealing contact with said bottle circumferentially about said opening.

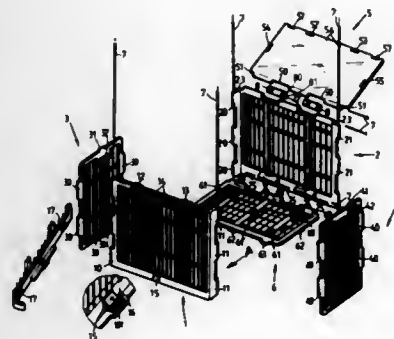
4,789,075

## COLLAPSIBLE PLASTIC CRATE

Ko-Lin Sun, No. 4, Song Bor Lane, Fu Shing Road, Li Shan Tuen, Her Pyng Shiang, Tai Chung Shian, Taiwan  
Filed Jul. 28, 1987, Ser. No. 78,785  
Int. Cl. B65D 6/18, 21/02

U.S. Cl. 220-4 F

3 Claims



1. A collapsible plastic crate, especially one which is recoverable and reusable, characterized by comprising:

- a back side plate ribbed and having forward, upward leftward and forward sockets on the left, top right, and bottom edges, two notches at the top edge between the sockets for two tubular connectors, two indentures at both ends of the top edge, and flat projections at the bottom edge to block and support the bottom plate,
- a bottom plate having rearward sockets to form a hinged joint with those of the back side plate by means of a pin, and flat projections on the front, left and right edges,
- a top lid plate having sockets and notches on the rear edge to form a joint with those on the top edge of the back side plate by means of pins and oval tubular connectors, slots in the front, left and right edges, two small holes in the front edge, and ribs intersecting to form six large squares with thicker angle parts to prevent the stacked crate from slipping off,
- a front side plate having leftward and rearward sockets on the left and right edges, two small holes in the top edge corresponding in size to the small holes in the top lid plate for a wire to tie the top lid plate after being closed, flat projections on the top edge beside the small holes, a hook in the middle of the bottom edge to retain the bottom plate, a lug behind the hook, and slots near both ends of the bottom edge for the flat projections of the bottom plate to fit in for strengthening the binding,
- left and right side plates having sockets on the front and rear edges to form hinged joints with the front and back side plates by means of pins, flat projections on the top edges to fit in the slots in the left and right edges of the top lid plate, hand holes below the flat projections on the top edges, lugs on the insides of the bottom edges with slots for the flat projections on the left and right edges to fit in to strengthen the binding,
- and being constructed in such way that the top lid plate can be turned up and folded upon the back side plate, the bottom plate can be turned up and folded upon the back side plate, and the left side plate and the front side plate can be pushed to be on a straight line and become a flat board for easy shipping and storing.

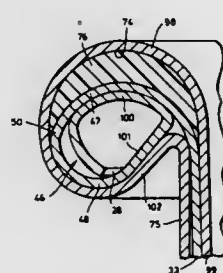
4,789,076

## HEAD SEAM FOR A PAIL

Joseph H. Jewitt, Stanley, and Jack Harley, Coventry, both of United Kingdom, assignors to International Paint PLC, England  
Filed Apr. 14, 1987, Ser. No. 38,004  
Claims priority, application United Kingdom, Apr. 17, 1986, 8609458

Int. Cl. B65D 41/10, 41/12  
U.S. Cl. 220-309

5 Claims



1. A pail having a lid closing the pail, the pail having a side wall and a rim, said rim having a compound curl comprising an upper region extending away from the outside of the pail wall, a lower region extending from the outer periphery of the upper region towards the pail wall and a rim edge part intermediate said upper and lower regions and extending from the inner periphery of said lower region away from the pail wall and said lid having a channel and a plurality of downwardly extending flanges on its periphery, the compound curl of the rim of the pail wall being seated in the channel of the lid and the flanges being deformed around the compound curl to maintain the channel in close contact with part of said lower region and with the wall of the pail body, each flange and the adjacent part of the channel lying at an acute angle to one another and between the compound curl and the pail wall.

4,789,077

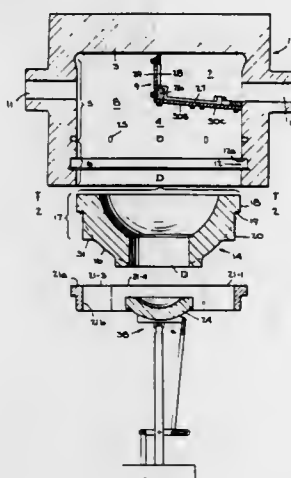
## CLOSURE APPARATUS FOR A HIGH PRESSURE VESSEL

Renato R. Noe, Union City, N.J., assignor to Public Service Electric & Gas Company, Newark, N.J.

Filed Feb. 24, 1988, Ser. No. 159,924  
Int. Cl. B65D 45/32

U.S. Cl. 220-319

12 Claims



1. Closure apparatus for a high pressure vessel having a

cylindrical interior channel wall including a circumferential groove, the closure apparatus comprising:

- a closure member and
- a plurality of flanged sector blocks,
- the closure member having an outer rim adapted to slidably engage the cylindrical interior channel wall of the vessel upon insertion into the vessel, a hemispherically concave interior surface, and a stepped cylindrical exterior portion complementing the flanged sector blocks,
- the plurality of flanged sector blocks each having a flange portion for insertion into the circumferential groove of the cylindrical interior channel wall and for supporting the closure member and a lengthwise portion with an exterior surface for engaging the cylindrical interior channel wall and an interior surface for engaging the stepped cylindrical exterior portion of the closure member, such that the closure member, after insertion and upon lowering into a final position, lockingly engages the flanged sector blocks without any requirement for a locking wedge ring.

4,789,078

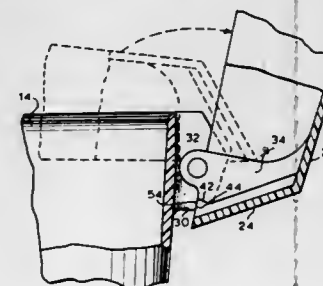
## WASTEBASKET WITH LID CATCH

David C. Miller, Ridgefield, and Thomas J. Pendleton, Danbury, both of Conn., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 19, 1987, Ser. No. 109,877  
Int. Cl. B65D 43/24

U.S. Cl. 220-335

6 Claims



1. A wastebasket, which comprises:
- a container having an upper rim defining an open end;
  - a lid mounted on the container at the upper rim thereof, which lid is positionable to cover and uncover the open end;
  - means for pivotally mounting the lid on the container, the lid being positionable in a first position, wherein it covers the open end of the container, and a second position, wherein it is disposed in a substantially upright position uncovering the open end; and
  - means for latching the lid in the upright second position, the lid latching means including cooperatively engageable portions of the lid and container, one of the portions being resiliently yieldable and the other of the portions having a recess formed therein which is adapted to receive the resiliently yieldable portion to retain the lid in the upright second position, the container portion of the latching means being formed as a rib extending downwardly from the container rim on the outside of the container, the rib having an underside edge in which the recess is formed, the lid portion of the latching means being resiliently yieldable and including a protrusion, the protrusion being adapted to engage the container rib and be received and retained by the rib recess, the rib further including a protruding corner, the protruding corner being disposed in the path of radial movement of the lid protrusion so as to cause the lid protrusion to be displaced outwardly when the protrusion engages the rib corner, the recess being disposed on the underside edge of the rib between the corner and the container whereby pivotal movement of the lid from the first position to the second position causes

the lid protrusion to engage and pass the rib corner and enter the rib recess.

4,789,079

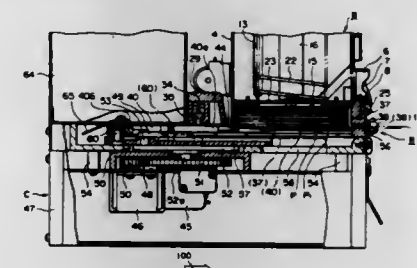
## CARD DISPENSER

Osamu Kobayashi, Saitama; Hiroshi Hayashi, Sakado, and Kenji Nakajima, Saitama, all of Japan, assignors to Nippon Coinco Co., Ltd., Tokyo, Japan

Filed Sep. 18, 1987, Ser. No. 98,608  
Claims priority, application Japan, Sep. 20, 1986, 61-220977; Sep. 20, 1986, 61-220978

Int. Cl. G07F 11/16  
U.S. Cl. 221-232

18 Claims



1. A card dispenser comprising: a housing section for housing cards, a dispensing section for dispensing the lowermost card, one by one, among cards housed in the housing section, by a push-out piece provided on a reciprocally movable sliding rod, and a drive section provided with a driven rod connected to said sliding rod in said dispensing section to reciprocate the sliding rod through said driven rod according to a command signal,

- said housing section comprising
- a card housing box having a main body portion having at least an open cut portion at a front portion thereof and whose lower surface comprises an open end, an opening and closing member for opening and closing said cut portion mounted on said main body portion, and a receiving rib provided internally of said lower opening;
- a push-plate which is present within said housing box to hold a card between it and said receiving rib; and
- a pressing mechanism provided with a resilient member mounted between said push-plate and the upper surface of said housing box;
- said push-plate having a first supporting rod stood upright, said first supporting rod having a second supporting rod movably and pivotally connected thereto so that the upper end thereof may extend through the upper surface of said housing box, said second supporting rod having at the upper end thereof an upper piece provided with a handle;
- said dispensing section comprising
- a cover plate having the size enough to cover the lower surface of said housing box and including a guide hole extending in a direction of dispensing cards, a sliding groove on the side opposed to said guide hole, and inlet and outlets which are downwardly opened at positions before and behind said sliding groove;
- said sliding rod reciprocally fitted in said guide groove, said sliding rod having at a front end a projection which may be engaged with and disengaged from said sliding groove through said inlet and outlets and which engages said sliding groove when moving forward while being disengaged from said sliding groove when returning into sliding contact with the lower surface of said cover plate, and at an intermediate portion a push-out piece so that the surface thereof may be raised; and
- a shaft for connecting said sliding rod to said driven rod in said drive section so that the former may be downwardly



inclined, and means acting on the rear end of said sliding rod when said sliding rod moves forward to restore said sliding rod to its horizontal state.

4,789,080

## UTILITY BLADE DISPENSER

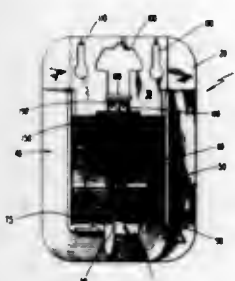
Clemens A. Itea, Staunton, Va., assignor to American Safety Razor Company, Verona, Va.

Filed Apr. 23, 1986, Ser. No. 854,869

Int. Cl.<sup>4</sup> B65D 83/10

U.S. Cl. 221-279

12 Claims



11. For utility blades in the form of a regular trapezoid and having a predetermined thickness, depth, base angle, and base length, a dispenser comprising:

a dispenser body having a front surface at least partially forming a rear wall of a channel for retaining said utility blades;

first and second vertical side wings on said dispenser body, bracketing said front surface and spaced on said dispenser body by a distance substantially equal to said base length, said first and second vertical side wings projecting outward from said dispenser body by a distance less than said depth and toward each other at an angle with said dispenser body substantially equal to said base angle, said first and second vertical side wings at least partially forming angled sides of said channel;

a blade support projecting forwardly from a bottom portion of the rear wall of said dispenser body and at least partially forming a bottom of said channel, said blade support having a first portion projecting forward by a distance less than said depth to form an access aperture permitting application of a sideways force to a utility blade atop said blade support;

said blade support including a second portion projecting forwardly of the rear wall of said dispenser body a distance beyond the distance said side wings project from said dispenser body, said second portion carrying an upwardly projecting lip for engaging the shorter edge of a blade to prevent outward movement of the blade in a direction away from and normal to said base and facilitating sideways sliding movement of the blade through said access aperture; and

a blade follower received in a vertical slot in said front surface between said first and second wings and at least partially forming a movable top of said channel;

a top surface of said blade support being lower than the lower edge of said second wing by a distance greater than said blade thickness to form an exit aperture through which said utility blade atop said blade support may leave said channel through said access aperture upon said application of said sideways force.

4,789,081

## DRINKING STRAW DISPENSERS

Christopher R. Mobbs, 4 Jayne Street, West Ryde, N.S.W., 2114, Australia

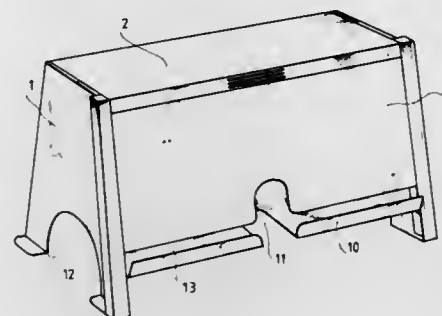
Filed Jun. 11, 1987, Ser. No. 61,704

Claims priority, application Australia, Jun. 11, 1986, PH6353

Int. Cl.<sup>4</sup> B65D 83/02, 85/08

U.S. Cl. 221-281

6 Claims



1. A dispenser for drinking straws including a container adapted to accommodate a plurality of straws in a substantially horizontal disposition, said container comprising a plurality of longitudinal panels, including a bottom panel, a front panel, a back panel and closure panel, attached at the ends thereof to a pair of similar upright side walls, said bottom panel inclined so that straws will roll towards the front of the container, said front panel extending upwardly from the bottom panel and having a bottom edge connected at its ends to the bottom panel, an intermediate portion of the bottom edge of the front panel being spaced from the bottom panel to form an aperture through which a straw may roll out from the container, the bottom panel extending forwardly of the front panel, a rib extending upwardly from the front edge of the bottom panel to provide a rest for a straw so that a straw resting against the rib will block the aperture so that the remainder of the straws are retained in the container, characterized in that the side walls extend below the container to form two supporting legs therefor and position the front of the bottom panel at a height convenient for straw extraction, and characterized in that the panels and the side walls of the container are formed by injection moulding plastics material in a single substantially flat unfolded sheet with a plurality of predetermined fold lines, the dispenser being formed by folding the sheet along said fold lines with ends of the panels positively interengaging with the side walls to form a substantially rigid construction.

4,789,082

## CONTAINER DISCHARGE CONTROL

Renick F. Sampson, 5471 E. Hill St., Long Beach, Calif. 90815

Filed Dec. 22, 1986, Ser. No. 944,954

Int. Cl.<sup>4</sup> B67B 7/00; B65D 37/00

U.S. Cl. 222-1

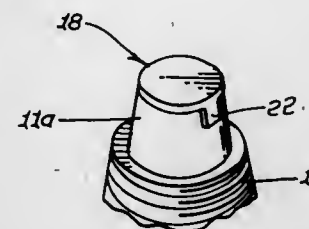
18 Claims

1. A device for controllably retaining liquid in and releasing liquid from a squeeze deflectable hollow container having a tubular neck defining a rim, about a mouth defined by the neck, comprising

(a) a non-frangible seal strip releasably bonded to said rim about said mouth to extend over the mouth and block discharge of liquid from the container via said mouth, said strip characterized as releasing from said rim in response to internal pressurization of said container by manually squeezing the container and its liquid contents when the

container is inverted, causing said contents to increasingly pressure against the strip to sever its bond from the rim, (b) and a holder tab carried by the strip and attached to the neck so as to retain the strip to the neck after it releases from the rim.

12. The method of controllably retaining liquid in and releasing liquid from a squeeze deflectable hollow container having a tubular neck defining a rim, about a neck mouth, and employing a non-frangible seal strip and a holder tab carried by said strip, that includes:



(a) bonding the seal strip to said rim said about mouth to extend over the mouth and block discharge of fluid from the container via said mouth, said strip bond characterized as releasing from said rim in response to internal pressurization of said container by manually squeezing the container and its liquid contents when the container is inverted, causing said contents to increasingly press against the strip to sever its bond with the rim, (b) and also bonding said tab to said neck so as to retain the strip to the neck after it releases from the rim.

4,789,083

## AEROSOL OPERATING DEVICE

Arturo M. Gutierrez, Paseo del Pintor Rosales, 38, 28008 - Madrid, Spain

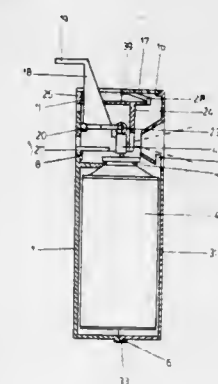
Filed Sep. 26, 1986, Ser. No. 913,570

Claims priority, application Spain, Aug. 23, 1985, 288810

Int. Cl.<sup>4</sup> B65D 83/14

U.S. Cl. 222-108

8 Claims



5. An aerosol system comprising an aerosol container, a housing formed of a back half-body and a front half-body, said back half-body having a back wall, a top wall having an opening therein and a flat internal horizontal wall, a wide semicircular notch in said flat horizontal wall in which the neck of said aerosol container fits, guide bracket means extending forwardly from said back wall between said front half-body and said back wall, aerosol valve actuator means mounted for pivotal movement on said guide bracket means between first and second positions including guide means received in said guide bracket means and aerosol valve body engaging means comprising an elongated spring means extending transversely above said valve body for engaging the upper end of an aerosol

valve body of said aerosol container for depressing said valve body to cause discharge of material from said aerosol container in response to pivotal movement of said pivotable actuator means to its second position.

4,789,084

## TOOL FOR ASSISTING SPRAY WORK AT HIGH POSITION

Shingo Yoshitomi, Ikeda, Japan, assignor to Kabushiki Kaisha Araki Goma, Osaka, Japan

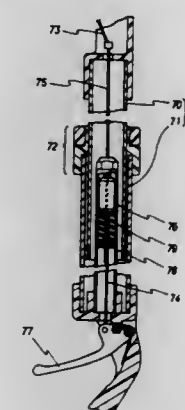
Filed Aug. 4, 1987, Ser. No. 81,425

Claims priority, application Japan, Dec. 19, 1986, 61-304964; May 16, 1987, 62-119326

Int. Cl.<sup>4</sup> B67D 5/64

U.S. Cl. 222-174

5 Claims



1. A tool for assisting spray work at a high position, comprising:

a pole including an upper pole and a lower pole which are combined in a telescopic manner;

a holder for holding a spray device at an upper end portion of said pole;

a valve-opening mechanism for opening an ejecting valve of said spray device; and

an operating means for remotely operating said valve-opening mechanism from a lower end portion of said pole; said operating means comprising a rigid wire rod and a chuck mechanism which catches said wire rod when said operating means is operated and releases said wire rod when said operating means is not operated.

4,789,085

## SLIDE GATE FOR A SLIDING GATE VALVE

Patrick D. King, Rantoul, Ill., assignor to Flo-Con Systems, Inc., Champaign, Ill.

Continuation-in-part of Ser. No. 478,218, Mar. 24, 1983, Pat. No. 4,474,362, and a continuation-in-part of Ser. No. 602,828, Apr. 23, 1984, Pat. No. 4,570,908, said Ser. No. 478,218, is a division of Ser. No. 602,948, Apr. 23, 1984, abandoned, which is a continuation-in-part of Ser. No. 478,218, which is a

continuation-in-part of Ser. No. 734,493, May 16, 1985, Pat. No. 4,603,842, which is a division of Ser. No. 602,948, which is a division of Ser. No. 694,523, Jan. 24, 1985, Pat. No. 4,667,937, which is a division of Ser. No. 478,218, which is a division of Ser. No. 694,605, Jan. 24, 1985, Pat. No. 4,602,729, which is a division of Ser. No. 478,218. This application Mar. 19, 1987, Ser. No. 27,850

The portion of the term of this patent subsequent to Feb. 18, 2003, has been disclaimed.

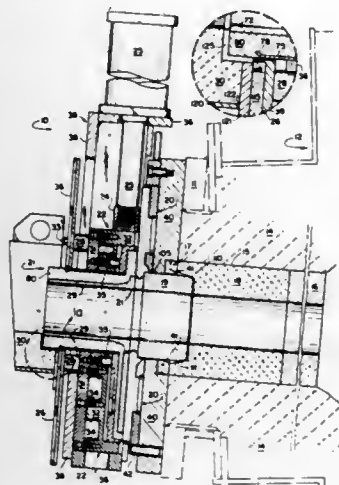
Int. Cl.<sup>4</sup> B22D 37/00

U.S. Cl. 222-600

9 Claims

1. For use in a sliding gate valve, a sliding gate having a pouring orifice, comprising in combination,

a frame for containing refractory, said frame being symmetrical about its transverse axis and symmetrical about its longitudinal axis, said pouring orifice being at a mid-position of the frame both transversely and longitudinally, a circular reinforcing support in the frame to support the pouring orifice of said slide gate, a preformed refractory insert for insertion in said frame, spacer means integral with the frame in surrounding rela-

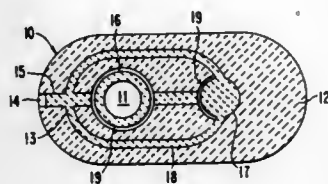


tionship to the pouring orifice for supporting any preformed refractory insert forming the working face of the same, a monolithic castable refractory imbedding the preformed refractory insert in the frame, and knock-out openings in the bottom of the frame in open communication with the monolithic refractory, whereby a spent such valve can be remanufactured by pressing a mandrel against the nozzle portion and knock-out plugs.

**4,789,086**  
**REFRACTORY WEAR PARTS FOR SLIDING CLOSURE UNITS**

Hans Rothfuss, Taunusstein, Fed. Rep. of Germany, assignor to Didier-Werke AG, Wiesbaden, Fed. Rep. of Germany  
Filed Mar. 16, 1988, Ser. No. 167,156  
Claims priority, application Fed. Rep. of Germany, May 2, 1987, 3714680

Int. Cl.<sup>4</sup> B22D 37/00  
U.S. Cl. 222—603



1. In a refractory wear part for use in a sliding closure unit for a metallurgical vessel, said wear part having therethrough at least one flow-through opening, said wear part being formed of a combination of gas permeable material and gas impervious material, and said wear part including at least one gas flushing zone formed of said gas permeable material and opening on a surface of said wear part, and a gas duct connecting said flushing zone with an external gas inlet connection, so that gas may

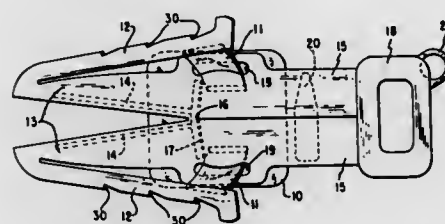
be supplied through said flushing zone to said surface of said wear part, the improvement wherein: said gas duct and said at least one flushing zone are formed as a unitary, homogeneous gas permeable structure from said gas permeable material; and said gas permeable structure is formed within a gas impervious base structure formed of said gas impervious material.

**4,789,087**  
**DEVICE FOR ASSISTING IN PUTTING ON ELASTIC HOSIERY**

Daryl E. Doorenbos, R.R. 2, Le Mars, Iowa 51031  
Filed Feb. 10, 1988, Ser. No. 154,659  
Int. Cl.<sup>4</sup> A47G 25/90

U.S. Cl. 223—111

11 Claims



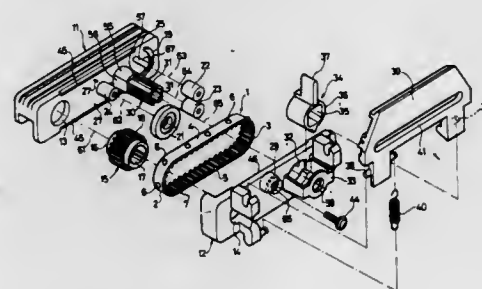
1. A device for assisting in the putting on of elastic hosiery by opening the hosiery for the insertion of a user's foot comprising rail means adapted to be inserted into said hosiery, tongue means resiliently attached to said rail means adapted normally to lie in a nearly planar relationship, said tongue means being divided into two members lying together in a normally closed position, said members being movable apart from each other to provide an open position in which said tongue members force said rail members to move apart laterally, said tongue members also being movable vertically out of said planar relationship with the rail means whereby said hosiery will be opened both laterally by separation of said tongue members and vertically by movement of said tongue members relative to said rail means, and means to hold said tongue members in their position whereby the hosiery disposed over said rail means will be held open for insertion of the user's foot.

**4,789,088**  
**PAPER FEEDING DEVICE**  
Sadao Unuma, Yokonemachi, and Masashi Yamashita, Toyooka, both of Japan, assignors to Tokai Kogyo Kabushiki Kaisha, Japan

Filed Feb. 19, 1988, Ser. No. 157,698  
Claims priority, application Japan, Feb. 20, 1987, 62-24810[U]  
Int. Cl.<sup>4</sup> B41J 11/00; G03B 1/22

U.S. Cl. 226—74

5 Claims



1. A paper feeding device for supplying to a printer a paper formed at both of its side edges with a pair of rows of feed apertures arranged at equal intervals, comprising:

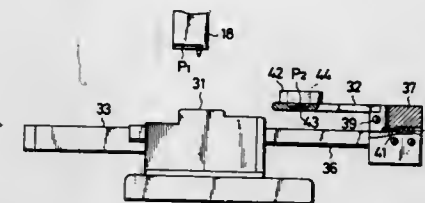
a frame formed by fixing a pair of side frames to each other, said side frames being arranged in parallel spaced relationship to each other;  
a driving sprocket rotatably supported between said side frames at a first end portion of said frame;  
a pair of first supporting rollers rotatably supported between said side frames at a second end portion of said frame in positions spaced from each other in a direction perpendicular to a line connecting said first end portion with said second end portion;  
a pair of arcuate rib-like guiding members projecting from the opposite inner surfaces of said side frames at said second end portion of said frame in a position opposite to said driving sprocket with respect to said first supporting rollers;  
an endless belt encompassing said driving sprocket, said first supporting rollers and said arcuate guiding members, said endless belt being adapted to run along a first arcuate feed path along the outer periphery of said driving sprocket, a second arcuate feed path along the outer periphery of said first supporting rollers and the outer periphery of said arcuate guiding members, and two straight feed paths connecting said first arcuate feed paths with said second arcuate feed path, said endless belt being formed with a plurality of feed pins projecting perpendicularly from the outer peripheral surface thereof and arranged at the same pitch as said feed apertures of said paper;  
a second supporting roller rotatably supported between said side frames in a position between said driving sprocket and said first supporting rollers, said second supporting roller having an outer circumferential surface for supporting the inner peripheral surface of said endless belt running along said two straight feed paths; and  
a driving means for driving said driving sprocket, wherein the outer peripheral surfaces of said driving sprocket and said first supporting rollers have a width substantially equal to that of said endless belt, and said arcuate guiding members have a projection height from the inner surfaces of said side frames smaller than a width from the side edge of said endless belt to the peripheral surface of said feed pin, and the outer peripheral surface of said second supporting roller has a width substantially equal to a diameter of said feed pin of said endless belt.

**4,789,089**  
**AUTOMATIC FASTENER ASSEMBLING MACHINE**  
Sumio Toyota, Toyama, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

Filed Jul. 13, 1987, Ser. No. 72,752  
Claims priority, application Japan, Jul. 16, 1986, 61-109029[U]

Int. Cl.<sup>4</sup> A41H 37/04  
U.S. Cl. 227—15

6 Claims



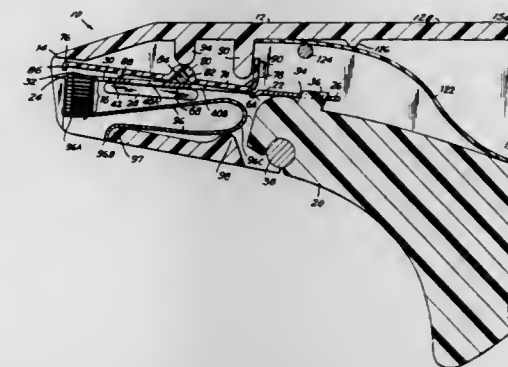
1. A machine for automatically assembling a pair of upper and lower fastener elements of a garment fastener with a garment fabric sandwiched between the upper and lower fastener elements, comprising:  
(a) a frame;  
(b) a pair of first and second chutes for feeding therealong successive upper fastener elements and successive lower fastener elements, respectively;  
(c) an upper unit supported by said frame for receiving the

successive upper fastener elements one at a time from said first chute, said upper unit including a ram reciprocally supported by said frame and a punch mounted on said ram for vertical movement in response to reciprocating movement of said ram;  
(d) a first drive means operatively connected with said ram for reciprocating the latter vertically;  
(e) a fastener holding member disposed contiguous to a lower open end of said second chute for temporarily holding the successive lower fastener elements one at a time from said second chute; and  
(f) a lower unit including  
(1) a support block fixed to said frame,  
(2) a horizontal guide member slidably supported on said support block,  
(3) a second drive means operatively connected with said guide member for reciprocating the latter linearly and horizontally in time relation to the vertical movement of said punch,  
(4) a die supported by said guide member and movable, in response to the reciprocating movement of said guide member, between a fastener transfer position in which said die is vertically aligned with said fastener holding member to receive the lower fastener element therefrom, and a fastener joining position in which said die is vertically aligned with said punch and is spaced from said support block, and  
(5) a die holder fixed to one end of said guide member, said die being pivotally mounted on said die holder and movable between an inclined position and a horizontal position.

**4,789,090**  
**SURGICAL STAPLER**  
Joseph W. Blake, III, 88 Main St., New Canaan, Conn. 06840  
Filed Nov. 3, 1986, Ser. No. 926,631  
Int. Cl.<sup>4</sup> A61B 17/04

U.S. Cl. 227—19

36 Claims



1. A surgical stapler for suturing tissue by at least one staple, comprising:  
frame means adapted to be held by a hand and having a nose, said frame means being for holding the staple and for directing the staple at the tissue site, said frame means having a hand grip,  
pivot means connected to said frame means,  
anvil means mounted in said frame means near said nose pivotally movable about said pivot means between non-engaged and engaged positions,  
driver means movably mounted in said frame means in operative association with said anvil means, said driver means having a crimping recess proximate said nose, the staple being capable of being shaped from an open staple to a crimped staple, said driver means being for forming said crimped staple in association with said anvil means in said



crimping recess, said driver means being movable between activated and deactivated positions, wherein in said activated position said driver means has forced said anvil means from said non-engaged position to said engaged position, and wherein in said deactivated position said driver means has forced said anvil means from said engaged position to said non-engaged position, trigger means movable mounted to said frame means for activating said driver means for movement from said deactivated position to said activated position and simultaneously activating said anvil means for pivotable movement about said pivot means between said non-engaged position and said engaged position, said trigger means being adapted to manual activation, first camming means associated with said anvil means and said driver means for camming said anvil means into operative relationship with said driver means about said pivot means so that said anvil means is moved from said non-engaged position to said engaged position upon activation of said driver means for movement from said deactivated position to said activated position, and second camming means associated with said anvil means and said driver means for camming said anvil means about said pivot means so that said anvil means is moved from said non-engaged position to said engaged position upon activation of said driver means for movement from said deactivated position to said activated position.

4,789,091

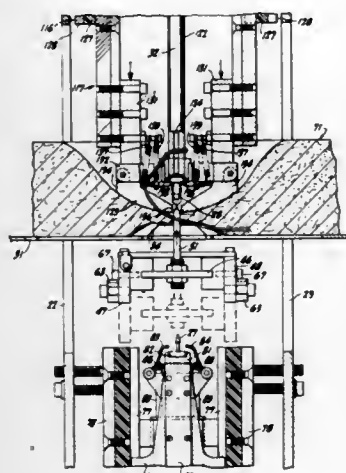
## UPHOLSTERY BUTTON DRIVER

Arthur J. Randolph, 1538 Chanate Rd., Santa Rosa, Calif. 95405  
Filed Oct. 29, 1987, Ser. No. 114,007

Int. Cl. B68G 7/08

U.S. Cl. 227-67

20 Claims



1. A tufting machine for inserting a two part upholstered button with interlocking male and female button parts in a workpiece comprising  
a table for receiving a workpiece to be tufted and having an aperture therethrough about a drive axis of the tufting machine,  
a retractable needle drive mechanism having means to move a needle into alignment with a drive axis which projects through the aperture in said table and said needle being movable through said aperture along said drive axis to create a gap in said workpiece,  
a male button driver having means for holding a male button part on a drive plate and moving said drive plate between a retracted and extended position for driving a shank of said part through said aperture and through the gap in said workpiece,

a male feed mechanism feeding successive male button parts onto said male button driver in a retracted position,  
a jaw mechanism having pivotal jaws and movable to compress a workpiece on said table at the aperture therethrough,  
a female button driver having means for holding a female button part and movable between a retracted and extended position for driving a female button part through said jaws onto a male button part extending through said gap in said workpiece, and  
a female button feed mechanism extending to said female button driver for feeding successive female button parts into said female button driver in a retracted position.

4,789,092

## APPARATUS FOR FASTENING STIRRUP-LINKS ON A CONVEYOR-BELT OR THE LIKE

Jean-Francois Schick, Paris, France, assignor to Goro S.A., Chelles, France

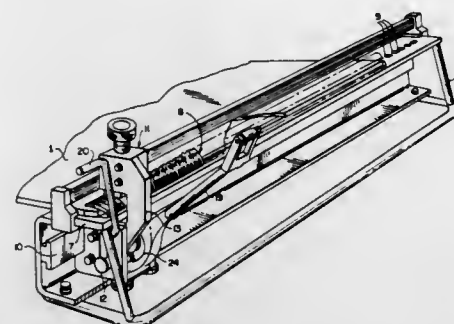
Filed Dec. 4, 1986, Ser. No. 937,860

Claims priority, application France, Dec. 4, 1985, 85 17918

Int. Cl. B25C 7/00

U.S. Cl. 227-111

7 Claims



1. A portable apparatus for fastening on an end of a conveyor belt a row of stirrup-links provided with fastening staples placed in a standby position, each fastening staple having pointed ends and a head, said apparatus comprising:  
an operating head slidably mounted on a plate for guiding said fastening staples;  
a staple-inserting punch and a movable die providing on each side of the row of to be fastened stirrup-links for clinching the pointed ends of the staples;  
a ratchet mechanism for producing step-by-step motion of the operating head opposite to the to be fastened stirrup-links;  
wherein the movable die is made up of two separate and distinct portions, a first portion of said die being placed opposite to the staple-inserting punch and provided with grooves having sloping bottom faces for initial clinching of the ends of the fastening staples of a predetermined stirrup-link and a second portion of said die being provided with grooves for final clinching of the ends of the fastening staples of the following stirrup-link which have already been subjected to initial clinching; and  
wherein provision is made opposite to said second portion of the die for a second punch which is intended to penetrate into the corresponding opening of the staple-guiding plate both in order to arrest the operating head in the exact position desired and in order to serve as an anvil for bearing against the head of each corresponding staple at the time of final clinching of the staple points, said second punch being actuated by a lever which also actuates the stepping-motion ratchet mechanism while another lever controls the operation of the staple-inserting punch and the operation of the die.

4,789,093

## APPARATUS FOR ULTRASONIC WIRE BONDING

Manfred Bansemir, Dresden, German Democratic Rep., assignor to VEB Elektromat Dresden, Dresden, German Democratic Rep.

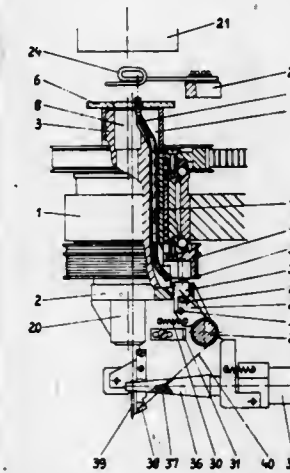
Filed Dec. 8, 1987, Ser. No. 130,052

Claims priority, application German Democratic Rep., Feb. 25, 1987, 3001494

Int. Cl. B23K 20/10

U.S. Cl. 228-1.1

14 Claims



1. An apparatus for ultrasonic wire bonding comprising:  
a sonotrode having an axis and a foot which defines a welding surface;  
a bonding snout having inclined bore means for feeding a bonding wire to said sonotrode;  
pincer means disposed behind the sonotrode for advancing the bonding wire to said sonotrode and for severing the bonding wire;  
an ultrasound generator;  
bonding head means for supporting said sonotrode, ultrasound generator and pincer means;  
bar means for supporting said bonding head means, said bar means including:  
an eccentric longitudinal bore with a lower opening;  
a centrally affixed flange at an upper end face thereof;  
a longitudinal passage extending in a direction toward the ultrasound generator;  
a microscope objective screwed into the lower opening of said longitudinal bore;  
combined axial and radial guiding mount means for mounting said sonotrode axis and for rotational movement about a rotational axis of said guiding mount means, said axis of said guiding mount means passing approximately through the center of the welding surface at the foot of the sonotrode;  
first drive means for moving said guiding mount means in the direction of said sonotrode axis;  
second drive means for rotating said guiding mount means about the axis of the guiding mount means, said second drive means being independent of the first drive means;  
a deflecting rod mounted on the bonding head means, said deflecting rod having a lower circumferential region approximately tangential to the direction of the inclined bore means in the bonding snout, and having an upper circumferential region;  
a guide tube positioned in said longitudinal passage and having an upper end extending vertically upward out of the centrally affixed flange near the rotational axis of said guiding mount means and a lower end which exits said bar means below the guiding mount means at an incline to the

rotational axis thereof in a direction of a tangent to the upper circumferential region of the deflecting rod;  
a deflecting element, which is not rotationally coupled with said bar means, positioned a predetermined distance above the upper end of the guide tube;  
wherein the bonding wire approaches the apparatus in a direction having a horizontal component, passes over the deflecting element, extends through the guide tube, around the deflecting rod, through the bore means in the bonding snout, to the pincer means and to the sonotrode.

4,789,094

## DEVICE FOR ALIGNMENT OF CYLINDRICAL WORKPIECES FOR MAGNETIC-DISCHARGE WELDING

Vyacheslav A. Chudakov, Kiev, U.S.S.R., assignor to Institut elektrosvarki imeni e.o. Patona, Kiev, U.S.S.R.

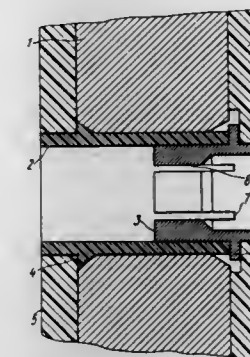
PCT No. PCT/SU86/00021, § 371 Date Nov. 4, 1987, § 102(e)  
Date Nov. 4, 1987, PCT Pub. No. WO87/05245, PCT Pub. Date Sep. 11, 1987

PCT Filed Mar. 6, 1986, Ser. No. 153,267

Int. Cl. B23K 13/00

U.S. Cl. 228-2.5

1 Claim



1. A device for alignment of pipes for magnetic-discharge welding, comprising aligning disks installed on butt faces of an induction heater, characterized in that the device is provided with an external aligning sleeve (2) and an internal aligning sleeve (3) installed in the induction heater (1) coaxially and overlapping each other, the external aligning sleeve (2) being made of a non-polarizable dielectric material and provided with a ledge (4) on the outer surface thereof, to which one of the aligning disks (5) abuts to lock the external aligning sleeve (2), while the internal aligning sleeve (3) is made of a non-magnetic material having low conductivity and provided, on the inner surface thereof, with step-like shaped through slots (7) and, on the outer surface thereof, with another ledge (6) limiting the depth to which the internal aligning sleeve (3) can be introduced into the external aligning sleeve (2); the internal sleeve (3) is locked in relation to the induction heater (1) by means of a second aligning disk (10) contiguous to the another ledge (6).

4,789,095

## METHOD OF CONTROLLING A WIRE BONDING APPARATUS

Hiroaki Kobayashi, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 29, 1988, Ser. No. 150,310

Claims priority, application Japan, Feb. 9, 1987, 62-27659

Int. Cl. B23K 20/10

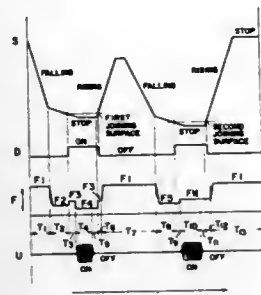
U.S. Cl. 228-102

16 Claims

1. A method of controlling a wire bonding apparatus comprising a drive motor, a main arm fluctuated by said drive motor, a sub-arm coupled to said main arm by coupling force given by a coupling motor, a bonding tool attached to said

sub-arm, and ultrasonic wave application means for applying ultrasonic wave to said bonding tool, thus to apply ultrasonic wave to said bonding tool while bringing one end of a wire held by said bonding tool into contact with a joining portion of a semiconductor chip to thereby join or connect said wire to said joining portion, characterized in that:

said main arm and said sub-arm are coupled by a first coupling force given by said coupling motor for a time period during which the one end of said wire is not in contact with said joining portion of said semiconductor chip;



said main arm and said sub-arm are coupled by a second coupling force given by said coupling motor for a time period during which the one end of said wire is in contact with said joining portion of said semiconductor chip and ultrasonic wave is not applied to said bonding tool; and said main arm and said sub-arm are coupled by a third coupling force given by said coupling motor for a time period during which the one end of said wire is in contact with said joining portion of said semiconductor chip and ultrasonic wave is applied to said bonding tool.

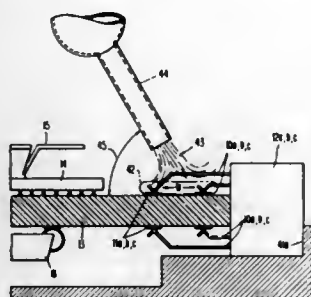
#### 4,789,096 METHOD OF SOLDERING JOINTS BY MOVING THEM THROUGH A TARGET AREA ON WHICH A STREAM OF HOT GAS IS FOCUSED

Gerald R. Dunn, Carlsbad; Kenneth W. Economy, San Marcos, and Thomas A. Snodgrass, Carlsbad, all of Calif., assignors to Unisys Corporation, Detroit, Mich.

Filed May 4, 1987, Ser. No. 45,086  
Int. Cl.<sup>4</sup> B23K 31/02

U.S. Cl. 228—179

7 Claims



1. A method of soldering a number of component leads to a corresponding number of I/O pads along an edge of a printed circuit board, without desoldering any circuit components which were previously soldered to said board near said pads, said method including the steps of:

forming a mechanical assembly in which respective joints of said pads and said leads and respective solder mounds are mechanically held together;

moving said assembly at a predetermined speed on a conveyor such that said joints, but not said previously soldered components, sequentially pass through a target

area which is small relative to the total number of joints; and melting and then hardening said solder mounds, without desoldering said circuit components, by directing a focused stream of hot gas at said target area as said joints move therethrough on said conveyor; said hot gas stream forming an angle with respect to both the plane of said circuit board and said board edge such that a majority of the gas which collides with said joint is deflected off of the edge of said printed circuit board and away from said previously soldered components.

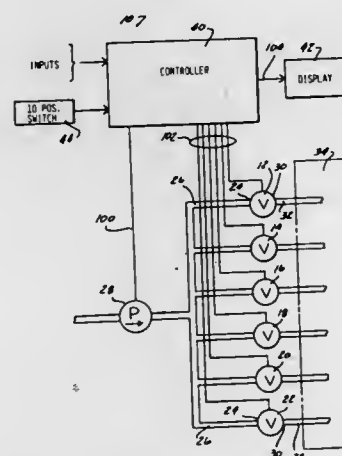
#### 4,789,097 HUMIDITY CONTROL APPARATUS FOR AN AREA

Lawrence M. Anderson, Rochester, and David P. Wixson, Westland, both of Mich., assignors to VTM Industries, Mt. Clemens, Mich.

Filed Sep. 14, 1987, Ser. No. 96,907  
Int. Cl.<sup>4</sup> B01F 3/02

U.S. Cl. 236—1 EB

6 Claims



1. A humidity control apparatus for controlling the humidity within an area comprising: a plurality of fluid flow control means for controlling the injection of fluid into the air within the area; input switch means for establishing a pre-set humidity set point for the area; humidity sensing means, mounted within the area, for sensing the current humidity level in the air within the area; air flow sensing means for sensing the presence of air flow within the area; and control means including a stored program and responsive to the input switch means, the air flow sensing means and the humidity sensing means for automatically activating the fluid flow control means to maintain the humidity level of the air within the area at the preset humidity set point.

#### 4,789,098 SYSTEM FOR HEATING VEHICULAR OPERATOR SPACE AND ENGINE FUEL, AND FOR SEPARATING MOISTURE THEREFROM

David W. Shepherd, and Michelle L. Shepherd, both of 27500 Highway 101, Rockaway, Oreg. 97136

Filed Feb. 25, 1987, Ser. No. 18,991  
Int. Cl.<sup>4</sup> B60H 1/02

U.S. Cl. 237—12.3 R

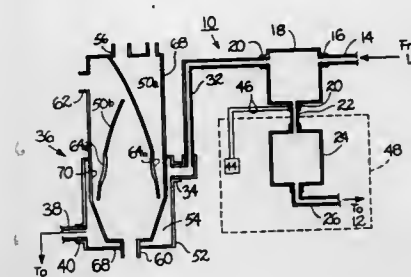
16 Claims

1. In a vehicular heating system having a source of infrared radiation including a heating fluid, the improvement comprising:

a. said heating fluid flowing from and to said source:

1. in a first fluid flow loop including:

- A. diverter means; and
- B. space heater means;
2. in a second fluid flow loop including:
  - A. said diverter means;
  - B. fuel heater means; and
  - C. moisture separator means;
- b. enclosure means including:
  1. said space heater means;
  2. thermostatic control means:
    - A. adjustable to a desired temperature; and



- B. controllably connected to said diverter means whereby said heating fluid is diverted from said fuel heater to said space heater to maintain said desired temperature in said enclosure means; and
- c. said fuel heater means has radiantly adjacent thereto:
  1. said moisture separator means, having a baffle plate therein;
    - A. the surface of said baffle plate having thereon a roughness substantially corresponding to one-quarter wavelength of said infrared radiation.

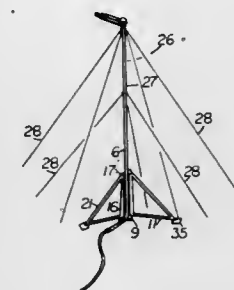
#### 4,789,099 METHOD AND PORTABLE APPARATUS FOR CHEMICAL SPRAYING OF UNWANTED BIRD ROOSTS

G. Brent Hager, Goodlettsville, Tenn., assignor to Metropolitan Government of Nashville and Davidson County, Nashville, Tenn.

Filed Jan. 30, 1987, Ser. No. 9,243  
Int. Cl.<sup>4</sup> B05B 3/16

U.S. Cl. 239—10

3 Claims



1. An improved method of chemical spray treatment of unwanted bird roosts using water, chemical wetting agents, pumping means, means for mixing water and chemical, and spray means, wherein the improvement comprises in combination:

- a. connecting a pumping means to the spray location with flexible water hose and quick-connect hose fittings;
- b. assembling a single stationary rigid vertical riser pipe to elevate the spray means;
- c. erecting a portable vertical riser pipe support base assembly in or adjacent to the bird roost to be sprayed;

- d. adjusting the portable vertical riser pipe support base assembly to match the corresponding ground terrain;
- e. attaching the vertical riser pipe to its support base assembly with a hinge mount;
- f. attaching a rotating spray means to the top of the vertical riser pipe and selecting the desired arc of rotation and spray radius, where said spray means is capable of operating at nozzle pressures in excess of 100 psi;
- g. pulling the vertical riser pipe from horizontal to vertical using guy wires attached to the pipe and temporarily securing the pipe to the support base assembly;
- h. securing the guy wires;
- i. selecting the pumping pressure to correspond to the desired spray radius; and
- j. spraying the bird roost until the birds have been soaked with water and have received the appropriate amount of chemical wetting agent.

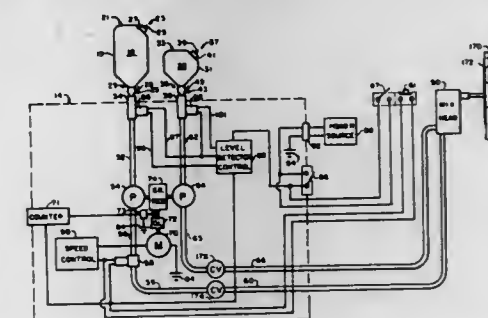
#### 4,789,100 MULTIPLE FLUID PUMPING SYSTEM

John W. Sent, San Carlos, Calif., assignor to Adhesive Engineering Company, San Carlos, Calif.

Continuation-in-part of Ser. No. 203,880, Nov. 4, 1980, abandoned. This application Nov. 30, 1982, Ser. No. 445,840  
Int. Cl.<sup>4</sup> B05B 7/00

U.S. Cl. 239—61

6 Claims



1. An apparatus for mixing and dispensing a fluid comprising: a first fluid reservoir, a second fluid reservoir, a first fluid pump having an inlet port and an outlet port, said inlet port in fluid communication with said first reservoir, a second fluid pump having an inlet port and an outlet port, said inlet port in fluid communication with said second reservoir, means for driving said first and second pumps at a respective speed inversely proportional to the respective viscosity of said fluid being pumped and at a predetermined ratio of fluid flow, said fluids being generally at atmospheric pressure at the inlet port of said first and second pumps, a power source electrically connected to said means for driving said first and second pumps, a mixing head, means for fluidly communicating said mixing head with said outlet port of said first pump, means for fluidly communicating said mixing head with said outlet port of said second pump, means for measuring fluid pressure of said fluid between said first pump and said mixing head, means for electrically disconnecting said means for driving said first and second pumps when said fluid pressure exceeds a predetermined pressure and electrically connecting said power source to said means for driving said first and second pumps when said pressure is less than said predetermined pressure.



4,789,101

## WATER-DRIVEN OSCILLATING MONITOR

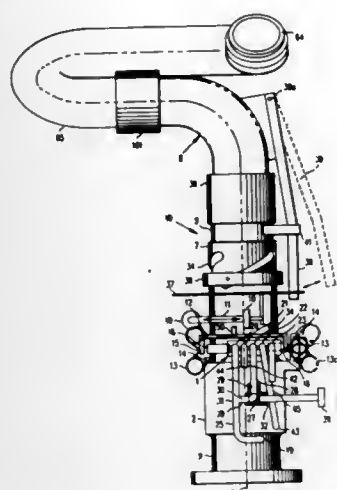
D. Dale Kempf, San Jose, Calif., assignor to Spectrum Manufacturing Company, Inc., Oakland, Calif.

Filed Mar. 4, 1987, Ser. No. 21,841

Int. Cl.<sup>4</sup> B05B 3/16, 15/10, 3/00

U.S. Cl. 239-242

20 Claims



17. A water-driven oscillating monitor comprising a fixed base assembly and an oscillating and reciprocating water discharge assembly in operating assemblage therewith; said base assembly including an annular cylinder, an annular piston head reciprocably slidable in said cylinder, a water flow hollow piston rod connected to said piston head; said discharge assembly including a discharge tube in water flow communication with a central passage within said annular piston head and a central passage within said hollow piston rod; means for converting said reciprocable movement of said piston to oscillatory movement; and wherein said means for converting comprises cam means for interconnecting and oscillating said discharge assembly with respect to said base assembly, said cam means including a cam barrel extending around and interconnected with said hollow piston rod and operable by movement of said piston head in said cylinder responsive to a diversion of a minor flow of water from said central passage to a valve, said valve being operable for reversing the movement of said piston head in said cylinder.

4,789,102

## SQUEEZE SPRAY HEAD

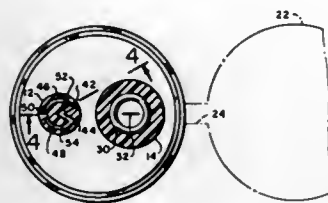
John E. Dolan, 15 New Main St., Haverstraw, N.Y. 10927

Filed May 26, 1987, Ser. No. 53,807

Int. Cl.<sup>4</sup> B05B 11/04

U.S. Cl. 239-327

4 Claims



1. A squeeze spray container comprising: a resiliently deformable container for holding a liquid to be sprayed, the container having a top opening; a spray head adapted to fit said container in liquid sealing relation at said top opening, for producing a liquid spray

in a given direction when the container is squeezed, said spray head including a nozzle part and an air intake part; check valve means associated with said air intake part for preventing, when the container is squeezed, air in said container from escaping and for causing a positive pressure to be applied to liquid in the container, and for allowing outside air to enter the container when the container expands; and

a liquid feed tube fitted at one end to communicate with said nozzle part, said tube extending into said container to direct pressurized liquid at the other end of the tube to said nozzle part when the spray head is fitted to the container;

wherein said nozzle has a generally cylindrical wall with a closed top end and an open bottom end for receiving said one end of the liquid feed tube, including first and second air passages formed in the wall to communicate pressurized air between the bottom end and the top end of the nozzle part when the container is squeezed, said top end having first and second spray passages which communicate respectively between said first and second air passages and a liquid spray opening in said nozzle part; and first and second liquid notches extending in a V-configuration in the inside surface of said top end for directing pressurized liquid developed at said one end of said feed tube to an end point in said first and second spray passages at which pressurized air is directed by said first and second air passages, so that a pressurized mixture of air and liquid is forced through such first and second spray passages and exits the liquid spray opening in a spray pattern when said container is squeezed.

4,789,103

## FAUCET AERATOR

Gottfried Ruhnke, Eduard-Wilhelmi-Strasse 8, D-6204 Taunusstein 4, Fed. Rep. of Germany

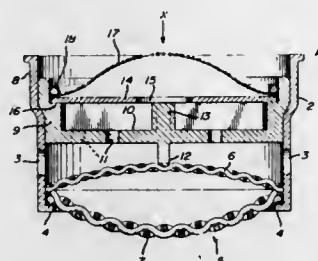
Filed Sep. 24, 1986, Ser. No. 910,976

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1985, 3534113

Int. Cl.<sup>4</sup> E03C 1/084

U.S. Cl. 239-428.5

4 Claims



1. A faucet aerator having: a cylindrical housing with air slots therein; a lenticular screen arrangement in the housing downstream from the air slots, the screen arrangement consisting of two screens comprising an upstream screen dished in the upstream direction and a downstream screen dished in the downstream direction and with the peripheral edges of the screens directly abutting each other and with their central portions spaced apart to form a lenticular-shaped air/water mixing chamber between the screens; support means on the housing to support the screen arrangement on one side by the peripheral edges of the screens; a perforated member mounted on the housing upstream from the air slots, the perforated member having means bearing on the other side of the screen arrangement to hold it against the support means, radially extending ribs on the upstream surface of the perforated member forming radially extending channels leading to the perforations; and a relatively flexible disk, having a single centrally

located flow restricting aperture communicating with the inner ends of the channels.

4,789,104

## HIGH PRESSURE COAXIAL FLOW NOZZLES

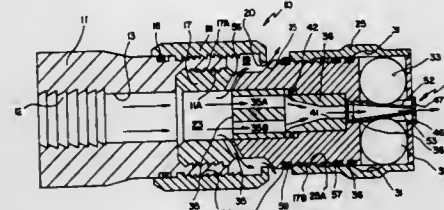
Arthur A. Anderson, St. Paul, Minn., assignor to Specialty Manufacturing Co., St. Paul, Minn.

Filed Feb. 24, 1987, Ser. No. 583,374

Int. Cl.<sup>4</sup> B05B 1/26, 15/04

U.S. Cl. 239-455

1 Claim



1. A high pressure nozzle for varying the flow pattern of a fluid emanating therefrom, wherein said nozzle has a nozzle opening through which fluid flows comprising:

a body member having a passage for fluid to flow there-through;

a resilient member located in said body member, said resilient member having surface means comprising opposed, substantially flat surfaces which are deformable to form an open path that smoothly converges in the direction away from said nozzle opening for shaping the flow pattern of fluid through said nozzle wherein the width of said surface means is wider than the width of said nozzle opening and means for forcing said resilient member into the fluid flowing through said nozzle so that a fluid stream emanating from said passage can be formed into a wider stream.

4,789,105

## PARTICULATE MATERIAL TREATING APPARATUS

Masuo Hosokawa, Toyonaka; Akio Tanaka; Keiichi Kohmatsu, both of Hirakata; Tohei Yokoyama, Kyoto; Kiyoshi Urayama, Yawata; Sadamitsu Matsuo, Izumi, and Masashi Kato, Ibaragi, all of Japan, assignors to Hosokawa Micron Corporation, Osaka, Japan

Filed Apr. 16, 1987, Ser. No. 39,140

Claims priority, application Japan, Apr. 18, 1986, 61-90793; Aug. 7, 1986, 61-186642; Dec. 22, 1986, 61-305982

Int. Cl.<sup>4</sup> B02C 19/00

U.S. Cl. 241-67

15 Claims

1. An apparatus for treating a particulate material comprising:

a casing (4) defining a treating chamber (3) having a discharge opening (11) for permitting overflows of the material under treatment,

drive means (5) for rotating the casing (4) at high speed to produce a centrifugal force for pressing the material in the casing (4) against an inside wall surface (4a) of the casing (4),

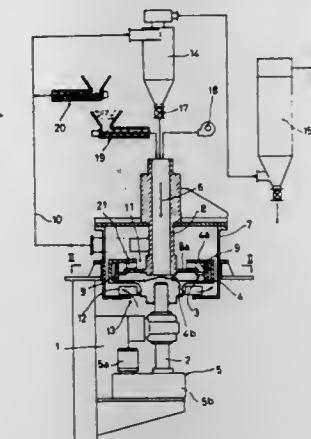
treating means (9, 9a, 9b) disposed in the casing (4) to be rotatable relative to the inside wall surface (4a) of the casing (4),

a classifier (14, 14A) communicating with the discharge opening (11),

a housing (7) which encompasses said casing (4) and which forms an enlarged discharge area for receiving overflows of material, an axially aligned particulate material inlet (6) extending from above said casing (4), and

said discharge opening (11) surrounds said inlet (6), said discharge opening (11) is disposed adjacent a center of rotation of the casing (4) and discharges overflows of material into said enlarged discharge area, and limiting

means (21, 42a, 60) is provided adjacent the discharge opening (11) within said casing (4) radially outwardly of



said inlet and of said discharge opening (11) for limiting the overflows of material under treatment.

4,789,106

## COMBINED COFFEE BEAN WEIGHER AND GRINDER WITH SELECTABLE MEASURED QUANTITIES

Robert L. Weber, New Canaan, Conn., assignor to Grindmaster Corporation, Louisville, Ky.

Filed Sep. 18, 1987, Ser. No. 100,039

Int. Cl.<sup>4</sup> B02C 23/02

U.S. Cl. 241-101.2

40 Claims



1. Apparatus for weighing and grinding selectable predetermined amounts of selectable types of coffee beans, the apparatus comprising:

(a) at least two storage hoppers each respectively receiving and storing a supply of coffee beans, said hoppers each defining a bottom outlet opening through which said coffee beans are gravitationally flowably releasable;

(b) hopper valve means closing the hopper outlet openings and operable to permit flow of coffee beans from a selected one of said storage hoppers;

(c) a bean bucket deployed for receiving coffee beans released from the hoppers through the hopper valve means, said bean bucket having a bottom discharge opening for gravitationally flowably releasing coffee beans;

(d) bean bucket valve means for alternatively preventing or permitting the gravitational flowable release of coffee beans from the bean bucket;

- (e) grinder means for gravitationally receiving and grinding coffee beans released from the bean bucket;
- (f) means for operating the hopper valve means to open a selected one of the hoppers and to close the hopper valve means when substantially all of one of at least two selectable amounts of coffee beans have been received in said bean bucket and for operating the bean bucket valve means to permit flow of the coffee beans released from said selected one of the hoppers into the grinder means; and
- (g) means for selecting the hopper containing the desired coffee beans and for selecting the desired weight thereof.

4,789,107

# PROCESS AND APPARATUS FOR WINDING A THREAD SUPPLIED AT A CONSTANT SPEED ONTO A CROSS WOUND BOBBIN

Hans H. Hauser, Horgen; Arthur Rebsamen, Sellenburen; Walter Slavik, Horgen, all of Switzerland, and Hans Landwehrkamp, Lenting, Fed. Rep. of Germany, assignors to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Fed. Rep. of Germany

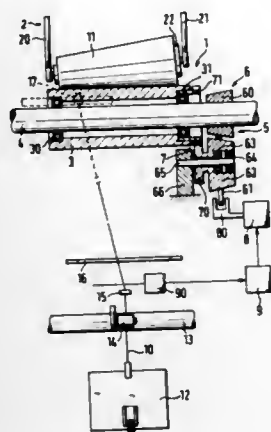
Continuation of Ser. No. 743,230, Jun. 7, 1985, abandoned. This application Feb. 10, 1987, Ser. No. 13,160

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1984, 3422637

Int. Cl.<sup>4</sup> B65H 59/38

U.S. Cl. 242-45

38 Claims



1. Apparatus for winding thread supplied at a constant speed and with a traversing thread guide onto a cross-wound bobbin so that variations in thread tension are automatically compensated for, said apparatus comprising:

- a drive shaft driven at a constant rotational speed;
- a drive roll for driving the bobbin during the winding operation, supported about an axis defined by said drive shaft for free rotation thereabout in a fixed axial position;
- compact variable speed transmission means for controllably transmitting selected amounts of rotational power from said drive shaft to said drive roll, said transmission means including at least a two-stage mechanism with a drive member rotatably supported on the same axis supporting said drive roll so as to minimize space required by said transmission means, an output member receiving rotational power from said drive member and mounted on an axis separate therefrom, rotatable coupling means for drivingly coupling said drive roll to said output member for transmission of rotational power to said drive roll, and an actuable transmission member for effecting changes in said rotational power transmitted to said drive roll through said rotatable coupling means by varying a drive ratio between said drive member and said output member,

actuation of said actuable transmission member being isolated from said rotatable coupling means;

first regulating means for measuring tension in thread being wound on the bobbin and detecting variations therein, for automatically compensating for minor variations in said tension such as periodic fluctuations induced by operation of the transversing thread guide, and for outputting an indication of detected variations outside a predetermined range of thread-tension limiting values;

stabilizing means for biasing said first regulating means relative thread being wound on the bobbin so as to tend to maintain said first regulating means in a fixed position corresponding to a given yarn tension, so that said first regulating means stably reacts to changes in the tension of such thread;

second regulating means, responsive to said indication output by said first regulating means, for actuating said variable speed transmission means actuable transmission member to vary the rotational speed of said drive roll so as to wind thread onto the bobbin at uniform tension throughout the winding process; and

restoring means, operative with said second regulating means, for urging same towards a basic position so as to maintain thread tension by biasing said second regulating means for greatest drive roll rotational speed within a determined range of thread-tension variations, so as to maintain an effective compensation range for said second regulating means; whereby

uniform tension without respect to changes in the weight of the bobbin as thread is wound thereon is achieved with stable operation, which includes compensating for periodic thread-tension fluctuations while tending to prevent thread-tension limiting values from being exceeded due to varying of bobbin drive roll speed.

4,789,108

# MULTI-REEL OPERATIONAL LINES LAYING VESSEL

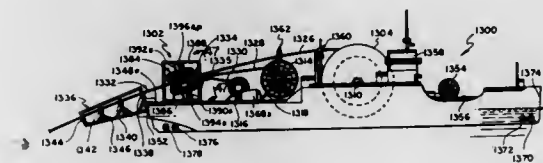
Carlos E. Recalde, Irvine, Calif., assignor to Santa Fe International Corporation, Alhambra, Calif.

Division of Ser. No. 646,112, Aug. 31, 1984, Pat. No. 4,687,376. This application Feb. 2, 1987, Ser. No. 10,163

Int. Cl.<sup>4</sup> B65H 75/48; B63B 35/04

U.S. Cl. 242-54 R

6 Claims



1. The method of spooling a plurality of operational lines onto a vessel having a plurality of storage reels for the operational lines, at least one of which lines is a rigid walled pipeline, and the vessel having a level wind means for the at least one rigid walled pipeline and motive means for each of the storage reels and the vessel having a feeding device for providing moving contact with the plurality of operational lines during spooling; the method comprising the steps of:

- placing the operational lines in contact with the feeding device;
- connecting the plurality of operational lines to the storage reels;
- operating the motive means to cause said reels to spool up the plurality of lines;
- maintaining moving contact between the plurality of operational lines and the feeding device as the operational lines are spooled onto the storage reels;
- during the operation of the motive means causing the feeding device to level wind in a transverse direction with respect to the vessel longitudinal axis; and

causing the level wind means for the rigid walled pipeline to move transversely to the vessel longitudinal axis during the spooling step.

4,789,109

# WEB WINDING METHOD AND WINDER

Markku Kyytönen, Järvenpää; Raimo Pihlajamaa, Helsinki; Kai Fabritius, Hyvinkää; Heikki Niskanen, and Jaakko Uotinen, both of Järvenpää, all of Finland, assignors to Oy Wartsila Ab, Helsinki, Finland

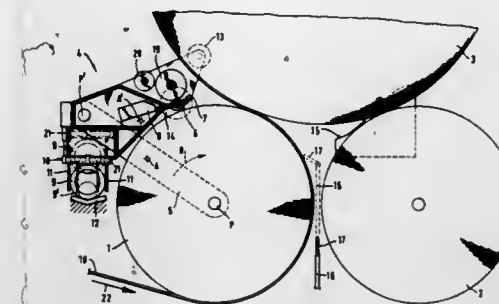
Filed Nov. 24, 1986, Ser. No. 934,552

Claims priority, application Finland, Nov. 28, 1985, 854703

Int. Cl.<sup>4</sup> B65H 19/20, 17/12

U.S. Cl. 242-56 R

21 Claims



1. A support drum winder, comprising: a trailing support drum having a central axis of rotation, a leading support drum having a central axis of rotation and disposed substantially parallel to the trailing support drum, whereby the support drums define a web winding position therebetween,

support arm means mounted for pivotal movement about an axis which substantially coincides with the central axis of the trailing support drum,

core replacement apparatus carried by the support arm means for movement about the periphery of the trailing support drum when the support arm means undergo pivotal movement, said core replacement apparatus comprising pusher means for engaging a roll in a position between the support drums and pushing it over the leading support drum towards a roll receiving position, web cutting means for engaging and cutting the web when the roll has been moved from the winding position, and core supply means for placing a new roll core in the web winding position after the web has been cut,

a retainer device, inserter means for inserting the retainer device between the support drums for holding the web in contact with the trailing support drum, and guide means for engaging the core replacement apparatus and defining a path of movement of the core replacement apparatus such as to ensure that the web cutting means do not strike the leading support drum or the retainer device, the guide means being stationary relative to the central axes of the support drums.

# METHOD AND DEVICE FOR WINDING MAGNETIC TAPE USING MAGNETIC ALIGNMENT

Massaki Sakaguchi, and Kazuo Kubota, both of Kanagawa, Japan, assignors to Fujii Photo Film Co., Ltd., Kanagawa, Japan

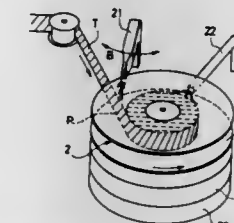
Filed Apr. 3, 1987, Ser. No. 33,698

Claims priority, application Japan, Apr. 4, 1986, 61-76666

Int. Cl.<sup>4</sup> B65H 18/26

U.S. Cl. 242-67.1 R

11 Claims



4. A magnetic tape take-up apparatus, comprising: a tape winding body to which a magnetic tape is attached; means for rotating said tape winding body about its axis, whereby said magnetic tape is wound into said tape winding body in concentric layers;

magnetic means for generating a magnetic field in a vicinity of said tape winding body for application to said wound tape and at least partially in a direction of a width of said wound magnetic tape and for magnetically driving said tape along the direction of said width of said wound magnetic tape; to thereby align the edges of the concentric layers of tape about said tape winding body; and

means for establishing a positive air pressure at a radial inner side of said magnetic tape at a tape entrance portion where said magnetic tape is wound onto said tape winding body with respect to air pressure along an outer circumference of said wound tape at a place apart from said tape entrance portion to create a relatively thick air layer between the tape layer being wound and the layer already wound, whereby the magnetic tape being wound up moves smoothly under the influence of the magnetic field while partially floating due to the air layer, said establishing means operating independently of said rotating means.

4,789,111  
DYE TUBE

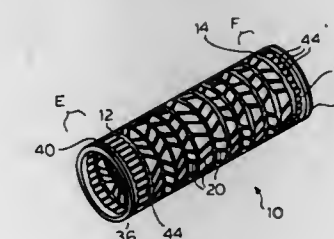
Alvin D. Thomas, Valatie, N.Y., and Garner Pruitt, Greer, S.C., assignors to Crellin, Inc., Chatham, N.Y.

Filed Nov. 5, 1987, Ser. No. 117,676

Int. Cl.<sup>4</sup> B65H 75/20

U.S. Cl. 242-118.1

5 Claims



1. A dye tube comprising: a first and a second annular end member; a plurality of first substantially axial ribs, extending between said first and second annular end members and integrally connected therewith, each having a zig-zag configuration of segments of common length and defining a plurality of apexes;



a plurality of second substantially axial ribs, extending between said first and second annular end members and integrally connected therewith, said second substantially axial ribs differing from said first substantially axial ribs only by having apexes defined by said zig-zag configuration oriented in opposite directions about said dye tube at any given axially determined position on said dye tube;

a plurality of substantially rigid intermediate annular members, each said intermediate annular member integrally connecting said apexes formed by said zig-zag configuration of said first and said second substantially axial ribs at common axially determined positions on said dye tube; and

a non-collapsible, torque- and impact-resistant zone, integrally connected to each said first and second annular end members, said zone including a plurality of highly rigid axial members having first ends integrally connected to said annular end members and a second end integrally connected to a peripheral rim.

4,789,112

**YARN WINDING METHOD AND RESULTING PACKAGE**  
Helmut Schippers, and Siegmund Gerhart, both of Remscheid, Fed. Rep. of Germany, assignors to Barmag AG, Remscheid, Fed. Rep. of Germany

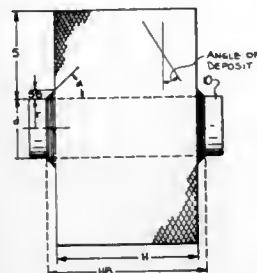
Filed Aug. 10, 1987, Ser. No. 84,408

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1986, 3627082; Aug. 9, 1986, 3627081

Int. Cl.<sup>4</sup> B65H 55/04

U.S. Cl. 242-178

23 Claims



1. In a method of winding a textile yarn onto a rotating core to produce a core supported package and wherein the yarn is wound about the core at a substantially constant rate and while the yarn is guided onto the core by a traversing yarn guide, and so as to produce a finished yarn package having a total yarn thickness (S), the improvement therein comprising the steps of beginning the winding of the yarn onto the core with a traversing speed having a predetermined initial mean value, and increasing the mean value of the traversing speed from said initial mean value to a predetermined maximum mean value, and such that said maximum value is reached when a predetermined base layer is produced adjacent said core and which has a thickness (SB) of no more than about 10% of the total yarn thickness (S) of the finished yarn package.

18. A yarn package comprising a supporting tubular core,

a yarn wound upon said core in crossed helices and so as to form a package composed of a plurality of overlying yarn windings, with said windings defining a base layer disposed immediately adjacent said core and an outer portion positioned radially outwardly of said base layer, and said outer portion having a substantially constant length of yarn deposit, thereby defining substantially flat end face portions at each end of said core and wherein said base layer has a thickness (SB) which comprises no more than about 10% of the total yarn thickness (S) of said package, with the yarn deposit angle on said core being between 2° to 5° and increasing proportional to the thickness of the

base layer by 3° to 7° and with the length of yarn deposit on the core being greater at both ends by about 0.5 to 2 mm than the length of yarn deposit in the outer portion of the package.

4,789,113

**HUB LOCKING MECHANISM IN A MAGNETIC TAPE CASSETTE**

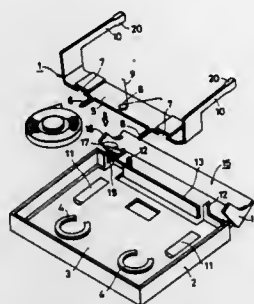
Shingo Katagiri, and Kengo Oishi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Oct. 20, 1987, Ser. No. 110,315

Claims priority, application Japan, Oct. 20, 1986, 61-159479[U]; Oct. 27, 1986, 61-163503[U]

Int. Cl.<sup>4</sup> G11B 23/087

U.S. Cl. 242-198

4 Claims



1. A magnetic tape cassette, comprising:  
a pair of hubs on which a magnetic tape is wound;  
a slidable locking member which is urged rearward of said cassette by a spring to lock said hubs and which has a pair of arms extending forward of said cassette;  
a rotatable guard panel for opening and closing a front opening of said cassette and having two lateral side walls; engagement means provided at free-end tips of both said arms;  
engagement hooks provided inside both of said side walls of said guard panel so that said engagement hooks are engaged with said engagement means by the opening motion of said guard panel to slide said locking member forward of said cassette;  
and wherein said guard panel includes rotation shafts projecting respectively from said lateral side walls of said panel, and wherein said engagement hooks extend from the tips of said rotation shafts along respective lateral side walls of said panel.

4,789,114

**COMPOSITE TAPE GUIDE OF CASSETTE TAPE FOR VTR**

Masamitsu Tanaka, Tokyo, Japan, assignor to Sanwa Needle Bearing Co., Ltd., Tokyo, Japan

Filed Aug. 14, 1987, Ser. No. 85,206

Claims priority, application Japan, Dec. 15, 1986, 61-298367; Dec. 15, 1986, 61-192545; Dec. 15, 1986, 61-192546

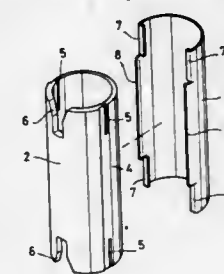
Int. Cl.<sup>4</sup> G11B 23/08

U.S. Cl. 242-199

6 Claims

1. A composite tape guide for a video cassette tape, said tape guide comprising a generally cylindrical tape guide body, said tape guide body having a circumferential exterior surface with a first portion of a predetermined diameter and a second portion of a diameter smaller than said predetermined diameter, said second portion extending over more than half of the circumference of said tape guide body, said second portion being covered with a non-magnetic sheet which is substantially wear-resistant and anti-corrosive, said non-magnetic sheet exhibiting a frictional resistance against said video cassette tape

which is less than the frictional resistance exerted by said first portion of said tape guide body against said tape, said tape guide body being stepped at a junction between said first and second circumferential portions, said tape guide body having four slits of a predetermined length at different locations of



said body, said sheet member being substantially arcuate and including a plurality of bent rims of which are adapted to engage said slits, said sheet having a curvature which is smaller than the curvature of said tape guide body, said sheet comprising elastic material.

4,789,115

**VTOL AIRCRAFT**

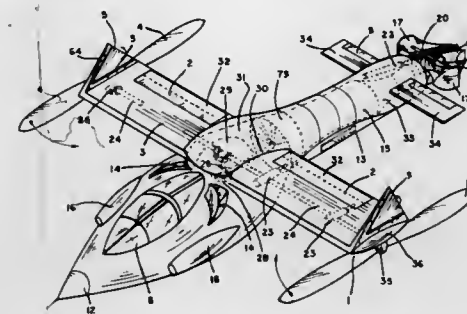
Theodore Koutsoupidis, 12404 Harbor Dr., Woodbridge, Va. 22192

Filed Aug. 29, 1986, Ser. No. 901,634

Int. Cl.<sup>4</sup> B64C 27/26

U.S. Cl. 244-6

14 Claims



1. An aircraft having vertical take-off and landing capability, comprising:

a nozzle-shaped fuselage housing power-generating means and supporting propulsion means at its rear end, said fuselage further supporting a pair of laterally extending wings at a location forwardly of said rear end, each of said wings comprising an aerodynamic composite airfoil having a lower surface possessing a camber curvature, each said wing further comprising  
(a) propeller means supported at the free end of said wing for rotation in a first plane substantially parallel to the wing,

(b) means, selectively cooperable with said propeller means, for altering the camber curvature of said wing lower surface between a first configuration in which said altering means substantially coincides with the camber curvature of said wing lower surface, and a second configuration in which said altering means projects below the camber curvature of said wing lower surface toward said first plane, and

(c) means for moving said altering means between said first and second configurations, said propeller means providing primarily lift when said altering means is in said first configuration, and said altering means, when in said second configuration, cooperating with said propeller means to compress the flow of air therebetween

to generate thrust useful for propelling the aircraft in a forward direction.

4,789,116

**LANDING DECK FOR AIRCRAFT**

Bard Eftestøl, Raufoss, Norway, assignor to A/S Raufoss Ammunisjonsfabrikker, Raufoss, Norway

PCT No. PCT/NO85/00041, § 371 Date Feb. 18, 1986, § 102(c)

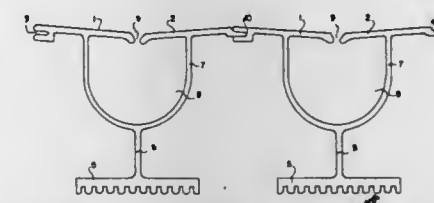
Date Feb. 18, 1986, PCT Pub. No. WO86/00274, PCT Pub. Date Jan. 16, 1986

Continuation-in-part of Ser. No. 835,117, Feb. 18, 1986, abandoned. This PCT application Jun. 27, 1985, Ser. No. 98,700

Claims priority, application Norway, Jun. 27, 1984, 842595  
Int. Cl.<sup>4</sup> B64F 1/00

U.S. Cl. 244-114 R

8 Claims



1. A landing deck for aircraft which provides enhanced removal of liquids deposited thereon, said landing deck comprising a plurality of parallel drainage beams which are situated in side-by-side relationship to one another, said drainage beams being inclined along their longitudinal dimensions, each of said drainage beams including upper flanges which define a longitudinal slit therebetween and channel walls extending below said upper flanges which form a longitudinal drainage channel below said upper flanges, said longitudinal slit communicating with said longitudinal drainage channel to enable liquid located on said upper flanges to flow through said longitudinal slit and into said longitudinal drainage channel, said longitudinal slit having a narrower width than the maximum width of said longitudinal drainage channel.

4,789,117

**BODIES WITH REDUCED BASE DRAG**

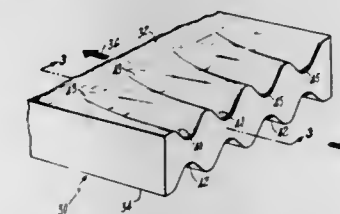
Robert W. Paterson, Simsbury; Michael J. Werle, West Hartford, both of Conn., and Walter M. Presz, Jr., Wilbraham, Mass., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 29, 1986, Ser. No. 947,164

Int. Cl.<sup>4</sup> B64C 1/38

U.S. Cl. 244-130

38 Claims



29. A vehicle adapted to be disposed in a fluid moving downstream relative thereto, said vehicle having a blunt rear end surface and a first surface defining a first plurality of adjacent, downstream extending troughs, each of said troughs terminating at said rear end surface to form a plurality of spaced apart trough outlets in said end surface, the sum of the downstream projected areas of all of said trough outlets being no greater than about 30% of the downstream projected area of said rear end surface, each of said troughs including a pair of downstream extending sidewall surfaces which intersect said rear

3 surfaces to form side edges of said trough outlets, wherein a first portion of the area of said rear end surface extends laterally from each of said side edges to the side edge of an adjacent trough outlet over the full length of each of said side edges, wherein each of said troughs has an inlet and gradually increases from no depth at said inlet to its maximum depth, wherein the contour and dimensions of said troughs and the size of said first area portions are such as to ensure that each trough flows full throughout its length and causes fluid to flow into the space immediately downstream of said rear end surface to reduce base drag.

4,789,118

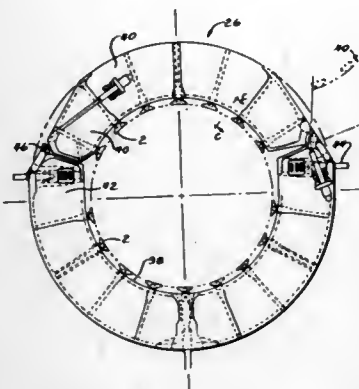
**PAD APPARATUS FOR SUPPORTING A PAYLOAD IN A CRADLE APPARATUS OF A SPACE VEHICLE**  
Frank L. Byers, Littleton, Colo., assignor to Orbital Sciences Corporation II, Fairfax, Va.

Filed Oct. 10, 1985, Ser. No. 786,209

Int. Cl. B64G 1/22

U.S. Cl. 244—158 R

10 Claims



5. An apparatus for providing radial support for a longitudinal flight vehicle payload comprising:  
an annular cradle support member for receiving the flight vehicle payload through the opening therein; and  
a plurality of pad means mounted at intervals around the interior of the opening in said cradle support member, wherein said pad means are stiff in compression and flexible in shear.

4,789,119

**SYSTEM FOR CONTROLLING THE HIGH-LIFT FLAPS OF AN AIRCRAFT**

Roger Bellego, Blagnac, and Etienne Foch, Toulouse, both of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Nov. 6, 1987, Ser. No. 117,586

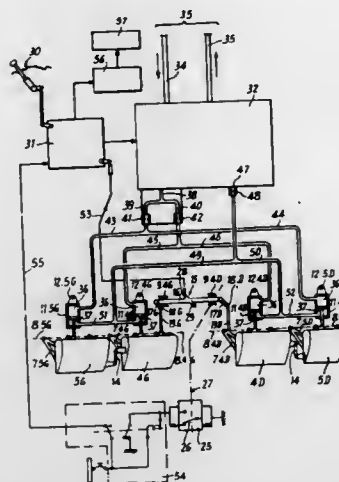
Claims priority, application France, Nov. 7, 1986, 86 15588  
Int. Cl. B64C 13/10, 13/40

U.S. Cl. 244—226

8 Claims

1. In a system for controlling the high-lift flaps of an aircraft comprising two fixed wings, symmetrical to each other with respect to the median horizontal plane of said aircraft and each provided with at least one engine for propulsion and a high-lift flap, each of said flaps being subjected to the blast of at least one engine, said control system comprising:  
a source of hydraulic fluid under pressure;  
a unit for distributing hydraulic fluid connected to said source;  
means for actuating said high-lift flaps controlled by said hydraulic fluid distributing unit;  
a device for controlling said hydraulic fluid distributing unit;  
a voluntary control member, at a pilot's disposal and controlling, via said control device, said hydraulic fluid distributing unit and said actuating means, said high-lift flaps

between a retracted neutral position and at least one extended lift-augmenting position, and vice-versa, said actuating means are reversible hydraulic jacks, arranged so that each flap is actuated by a jack and each of the two chambers of one jack is connected to the corresponding chamber of the other jack, as well as to an orifice in said hydraulic fluid distributing unit, so that the supply and exhaust of the corresponding chambers of said jacks are respectively simultaneous;



said high-lift flaps are connected by a mechanical torsional link allowing a dissymetry of position of said high-lift flaps in extended position; and  
means are provided for blocking said high-lift flaps in position, as soon as the dissymetry of position of said high-lift flaps in extended position attains a predetermined threshold.

4,789,120

**CARRIER TRACK SYSTEM FOR EXTENSIBLE AND RETRACTABLE BOOM MACHINES**

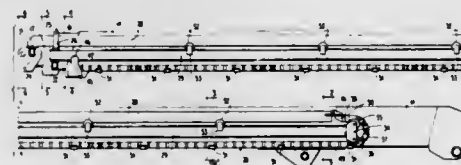
Jeffrey L. Spidel, Chambersburg, Pa., assignor to Kidde, Inc., Saddle Brook, N.J.

Filed Mar. 27, 1986, Ser. No. 844,671

Int. Cl. H02G 11/00; E04H 12/34

U.S. Cl. 248—49

22 Claims



1. In a carrier track system for a multi-section extensible and retractable structure having at least a pair of relatively movable sections separated by intermediate relatively movable section means, comprising:  
a single length of flexible carrier track having its opposite ends connected between the pair of relatively movable sections of the extensible and retractable structure and spanning said intermediate relatively movable section means of the extensible and retractable structure, said flexible carrier track having a rolling portion and spaced substantially parallel top and bottom stretches which vary in their lengths in response to extension and retraction of said structure,  
first support means connected on and movable with the intermediate relatively movable section means engaging

and supporting said top stretch substantially along its entire length in all adjusted positions of the flexible carrier track with said extensible and retractable structure, and second support means connected on one section of the pair of relatively movable sections of said structure, engaging and supporting said bottom parallel stretch substantially along its entire length in all adjusted positions of the flexible carrier track with said extensible and retractable structure.

4,789,121

**SYSTEM FOR SUPPORTING AND ADJUSTING REFRIGERATORS AND THE LIKE**

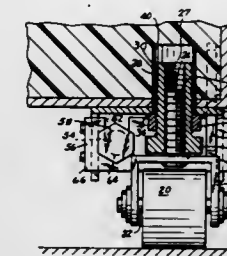
Edward D. Gidseg, 16 Duke of Gloucester, Manhasset, N.Y. 11030, and Jan Ganik, Fresh Meadows, N.Y., assignors to Edward D. Gidseg, Manhasset, N.Y.

Filed May 1, 1987, Ser. No. 45,943

Int. Cl. F16M 11/20

U.S. Cl. 248—188.2

14 Claims



1. A system for supporting and adjusting a cabinet which includes a base portion for support, which comprises:  
a. support means comprising a male threaded member concentrically threaded engaged within a first female threaded member, the outer portion of said female threaded member being in turn threadably engaged in mating engagement within a threaded outer female member, the inner threads of the second mentioned female member being opposite the threads of the male member and the inner portion of the first mentioned female member threadably engaged therewith, said support means mounted to the base portion of the cabinet at a first located closest to a front accessible portion thereof;  
b. support means mounted to the base portion of the cabinet at a second location remote from said first support means;  
c. means for adjusting the dimension between the base portion of the cabinet and said first support means, said adjusting means being located generally at said first mentioned accessible location closest to the front portion; and  
d. means for adjusting the dimension between the base portion of the cabinet and said second support means and having adjustment control means located in said first mentioned accessible location thereby facilitating respective adjustment of said first and second support means to adjust the respective heights of two portions of the cabinet from a common generally accessible location.

4,789,122

**TABLE BASE CONSTRUCTION**

David R. Guttsell, Jasper, Ind., assignor to Ditto Sales, Inc., Jasper, Ind.

Filed Jul. 29, 1987, Ser. No. 79,248

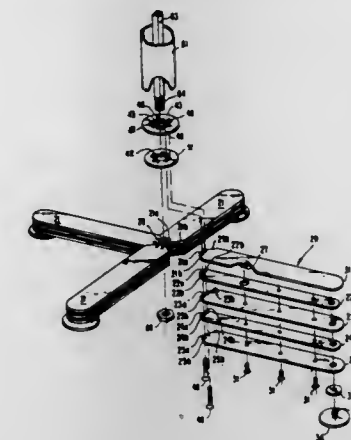
Int. Cl. A47B 91/00

U.S. Cl. 248—188.7

12 Claims

1. A table base comprising:  
a plurality of leg elements, each having an inner end and a free surface at said inner end;  
central attachment means for connecting each of said plurality of leg elements at said inner end in juxtaposed radial

relation relative to each other so that said free surfaces form a non-circular opening when so connected;  
a vertical standard having a portion extending through said non-circular opening, said portion having a complementary non-circular outer surface so that said outer surface acts against said free surfaces forming the non-circular opening to prevent rotation of said vertical standard with respect to said leg elements about a vertical axis passing through said opening; and  
wherein said central attachment means includes:  
each of said leg elements having a number of bores there-through at said inner ends;



an attachment washer having a central opening there-through aligned with said non-circular opening and a plurality of threaded openings therethrough arranged in a pattern to align with said number of bores in each of said plurality of leg elements when said leg elements are in said juxtaposed radial relation; and  
a plurality of screws, each passing through each of said number of bores in each of said plurality of leg elements and engaged in a corresponding one of said plurality of threaded openings to secure said plurality of leg elements to said attachment washer; and wherein:  
said portion of said vertical standard extends through said central opening in said attachment washer.

4,789,123

**TELESCOPIC STAY**

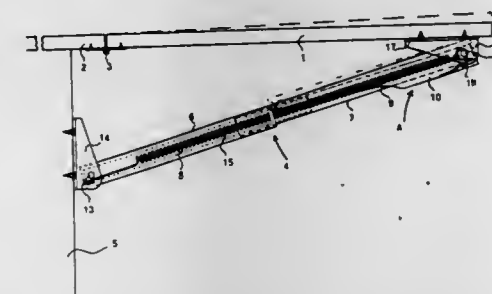
Erik P. Mattsson, Vagnhärad, Sweden, assignor to G H Trading AB, Västerås, Sweden

Continuation-in-part of Ser. No. 915,595, Oct. 6, 1986. This application Oct. 5, 1987, Ser. No. 104,022

Int. Cl. E05C 17/30

U.S. Cl. 248—240.4

10 Claims

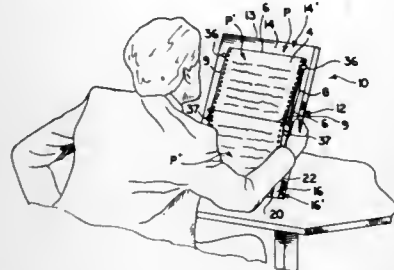


1. A telescopic stay for two objects capable of being folded relative to one another, particularly for supporting a work surface (1) which can be folded relative to a frame structure



(5), the stay including at least two tubes (6,7) which are capable of being telescopically retracted one within the other and the mutually opposite free ends of which are intended to be pivotally connected to a respective one of said objects, and further including an inner guide tube (8) arranged within the telescopic tubes, a tension spring (15) extending axially through all tubes, and a locking means (9) for releasably locking the telescopic tubes in a given working position relative to one another, characterized in that the inner guide tube is fixedly mounted (13) to one of the telescopic tubes (6) such that relative axial movement between said one tube and the guide tube is prevented and the guide tube accompanies movement of said one telescopic tube in relation to the other telescopic tube (7) and remains fully within the telescopic tubes in all positions thereof; and in that opposite ends of the tension spring are individually fixedly attached to remote ends of the telescopic tubes, the unloaded length of the tension spring being less than the distance between said remote ends of the telescopic tubes when fully retracted one within the other such that the spring constantly exerts a force on the telescopic tubes which strives to further retract the tubes one inside the other in all positions to thus damp free swinging motions of the work surface in a folded, retracted position.

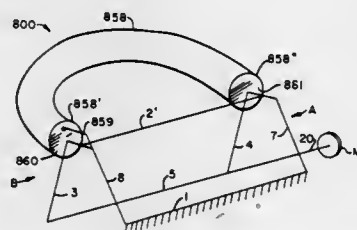
**4,789,124**  
**CONTINUOUS-SHEET PAPER HOLDER**  
Amos D. Wimberley, 3902 Sycamore, Austin, Tex. 78722  
Filed Jul. 29, 1987, Ser. No. 79,035  
Int. Cl.<sup>4</sup> A47B 65/00  
U.S. Cl. 248-463



1. A device for handling continuous-sheet fanfold paper comprising:

- a base including an upper and lower section defining a supporting surface having a top, bottom and opposite sides, stack support means projecting upwardly from said base adjacent said bottom,
- a fixedly mounted fence projecting upwardly from said base intermediate said upper and lower sections,
- a stack of continuous sheets of fanfold paper having transverse tearlines between adjacent pairs of sheets,
- a plurality of said sheets defining a lower stack overlying said lower section supporting surface and supported upon said stack support means,
- said fence spaced from said stack support means a distance selected to closely accommodate said lower stack therebetween with said tearlines at the upper portion thereof juxtaposed said fence,
- and stabilizing means on said base adapted to engage the lateral portions of sheets of paper overlying said base, whereby, pairs of said sheets in said lower stack may be folded upwardly to a position overlying said upper section supporting surface above said fence with the thus displaced sheets defining an upper stack having said tearlines at the lower portion thereof engaging and supported by said fence while said tearline joining the top sheets of said lower and upper stacks overlies said fence.

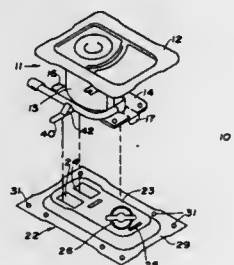
**4,789,125**  
**LINEAR MOVING CARRIAGE**  
James A. Pritchard, and Anton E. Pritchard, both of 52 Needham St., P.O.B. 17, Norfolk, Mass. 02056  
Filed Dec. 11, 1986, Ser. No. 940,749  
Int. Cl.<sup>4</sup> F16C 1/00; F16M 1/00; G02B 7/18; G01B 9/02  
U.S. Cl. 248-479



1. A rotary system for constraining to a rectilinear movement a movement of an element such as a moving mirror of a Michelson interferometer, comprising:

- a support;
- first, second, third and fourth primary sides;
- pivot means interconnecting said primary sides to form a first parallelogram with said first and second primary sides parallel and said third and fourth primary sides parallel and rotatable in-plane with respect to said second primary side;
- means fixing said first primary side to said support;
- first, second, third and fourth secondary sides;
- pivot means interconnecting said secondary sides to form a second parallelogram with said first and second secondary sides parallel and said third and fourth secondary sides parallel and rotatable in-plane with respect to said secondary side; and said second secondary side fixed to said second primary side so as to maintain a fixed relative orientation therebetween;
- a flexible constraining member having a first end connected to said first parallelogram and a second end connected to said second parallelogram, said flexible constraining member adapted to produce one sense of said in-plane rotation of said third and fourth secondary sides in response to an opposite sense of said in-plane rotation of said third and fourth primary sides; and
- drive means for producing said in-plane rotation of said third and fourth legs.

**4,789,126**  
**PEDESTAL SEAT MOUNTING ASSEMBLY**  
Dennis A. Rice, and Jerry A. Thurow, both of Dubuque, Iowa, assigns to Flexsteel Industries, Inc., Dubuque, Iowa  
Filed Aug. 24, 1987, Ser. No. 88,862  
Int. Cl.<sup>4</sup> A47B 97/00  
U.S. Cl. 248-503.1



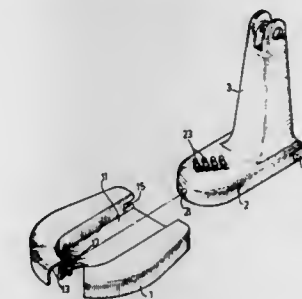
1. A pedestal seat mounting assembly, including in combination:

- a base plate attached to the floor of a vehicle, said base plate

including pocket means therein and a locking ramp and opening therein;

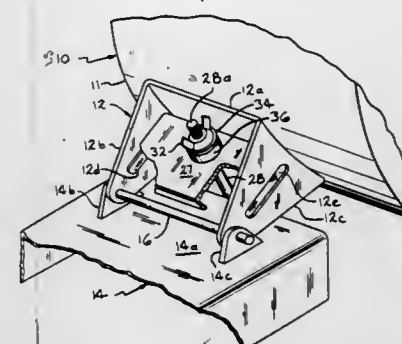
an upper seat pedestal member having anchoring means and a locking means, said anchoring means including a pair of projections extending from one end of said upper seat pedestal, said locking means extending downwardly from said upper seat pedestal member with said upper seat pedestal member being engageable with said base plate such that said projections of said anchoring means engage said pocket means and said locking means is received by said locking ramp and opening, and

said locking means being adapted to rotate from a first position, wherein said locking means is received by said locking ramp and opening, to a second position, wherein said locking means is engaged with said locking ramp to fixedly mount said upper seat pedestal member to the floor of the vehicle.



said respective rails of said inner base, also situated on vertically-extending portions of the same.

**4,789,127**  
**HOLD DOWN MECHANISM FOR A PIVOTABLY MOUNTED MOTOR**  
John T. Gleason, Jr., Rochester Hills, Mich., and James Frost, Jr., Walbridge, Ohio, assigns to The DeVilbiss Company, Toledo, Ohio  
Filed Dec. 3, 1987, Ser. No. 128,258  
Int. Cl.<sup>4</sup> F16M 3/00  
U.S. Cl. 248-666



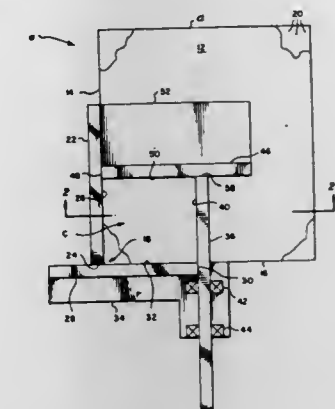
1. A hold down mechanism for pivotably supporting a device on a base comprising:

- a mounting bracket having at least one leg portion extending therefrom, said leg portion including a projection;
- at least one mounting ear formed on the base;
- means for pivotably connecting said leg portion to said mounting ear;
- hold down plate means disposed on said projection; and
- means extending between said hold down plate means and the base for restricting the pivoting movement of the device beyond a predetermined angular position.

**4,789,128**  
**DETACHABLE FAN BASE**  
Pay J. Yang, 9-11, Hai Wai Lane, Chung Yang Rd., Chung Ho Village, Lung Ching Hsiang, Taichung District, Taiwan  
Filed Oct. 20, 1986, Ser. No. 920,745  
Int. Cl.<sup>4</sup> F16M 11/00  
U.S. Cl. 248-616

12 Claims

**4,789,129**  
**ADJUSTABLE MOLD FOR FORMING CONTAINERS**  
Eugene Sisto, Spencerport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
Filed Aug. 14, 1987, Ser. No. 85,447  
Int. Cl.<sup>4</sup> B29C 51/30  
U.S. Cl. 249-102



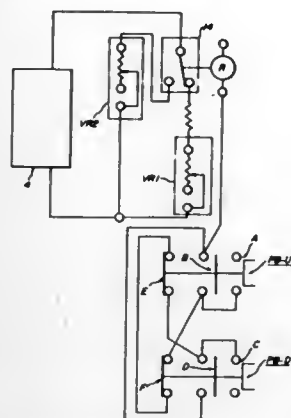
1. An adjustable mold for transforming a heated plastic sheet into a rectangular container, said mold comprising:

- a bottom wall having a substantially horizontal upper surface and first and second substantially vertical side edges perpendicularly intersecting each other to define a right-angle corner;
- a first substantially vertical sidewall having an end at said corner and a side extending therefrom alongside said first side edge, said first sidewall being vertically moveable relative to said bottom wall so that said side thereof is moveable upward and downward relative to said upper surface;
- a second substantially vertical sidewall having an end and a side extending therefrom alongside said second side edge at least to said first sidewall end, said second sidewall being vertically moveable relative to said bottom wall so that said side thereof is moveable upward and downward relative to said upper surface, said second sidewall being horizontally moveable relative to said bottom wall so that said end thereof is moveable toward and away from said first sidewall end;
- a third substantially vertical sidewall having an end and a side extending therefrom parallel with said first sidewall side at least to said second sidewall end, said third sidewall side extending vertically upward from said upper surface, said third sidewall being horizontally moveable relative to





control circuit for controlling the DC motor, said control circuit comprising an operating circuit including raising and lowering relays for the DC motor, respectively, a high and low speed change relay and variable resistors controlled by said knobs and connected in parallel exchangeable with each other by said high and low speed change relay, a phase control



circuit for phase-controlling alternate current from a power source, a full-wave rectifying circuit for full-wave rectifying the phase-controlled alternate current and supplying the rectified direct current to the DC motor, and a normal and reverse rotating circuit including normally opened contact pairs of the raising and lowering relays in the operating circuit.

4,789,136

#### METHOD AND CABLE ANCHOR ASSEMBLY FOR ANCHORING PLASTIC COATED ROPE

Arthur J. Connelly, Farmington, N. Mex., and James B. Throburg, Casper, Wyo., assignors to Quadco, Inc., Farmington, N. Mex.

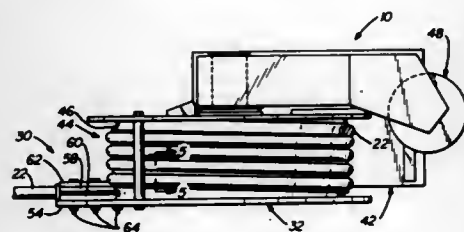
Continuation of Ser. No. 924,756, Oct. 30, 1986, abandoned.

This application Apr. 25, 1988, Ser. No. 186,738

Int. Cl.<sup>4</sup> B66D 3/04

U.S. Cl. 254—391

25 Claims



1. A cable anchor assembly for use in anchoring plastic coated hoisting rope to alternatively carry a load in oil well drilling derricks and the like and also for allowing the plastic coated rope to be selectively slipped or fed through the cable anchor assembly for replacement thereof, comprising

a base,  
a snubbing drum and clamp means mounted on the base, the drum having a spiral groove formed on a cylindrical surface of the drum for receiving the plastic coated rope wound thereabout and for engaging and anchoring the rope, the clamp means being arranged for engaging the rope opposite the drum from the rope load,

the spiral groove being formed with an included angle in the range of about 136 to 165 degrees for developing substantial frictional engagement with the plastic coated rope while still permitting selective slippage of the rope in the

groove when feeding the rope through the cable anchor assembly, and  
the groove being formed with at least three turns on the cylindrical drum surface which are engaged by the plastic coated rope, the number of turns being selected for normally supporting most of the rope load whereby the clamp engages the rope with a force preventing damage to the rope,  
the radius of the plastic coated rope being greater than the radius of the spiral groove whereby a "pinch effect" is produced between the spiral groove and plastic coated rope in order to maintain desired frictional engagement therebetween.

4,789,137

#### KNOCK-DOWN CATTLE GUARD

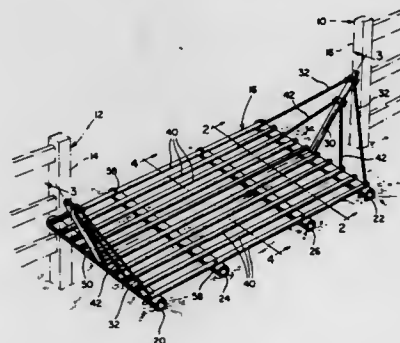
William C. Heldenbrand, HCR 69, Box 62, Gepp, Ark. 72538

Filed Jul. 31, 1987, Ser. No. 79,893

Int. Cl.<sup>4</sup> A01K 3/00

U.S. Cl. 256—17

10 Claims



1. A knock-down elongated cattle guard for lengthwise extension between spaced fence line posts, said cattle guard including a pair of elongated laterally spaced transverse opposite end members including upwardly divergent mid-length shank portions, a pair of upwardly divergent opposite end cattle guard-to-guard post bridging members having lower ends telescopically engaged over said shank portions and upper ends adapted to at least closely oppose mid-height portions of the opposing faces of said fence line posts, a pair of inclined brace members carried by each end of said cattle guard and including lower ends supported from the opposite end portions of the corresponding opposite end members and upper ends anchored relative to the upper end of the corresponding bridging member, a plurality of elongated, laterally spaced apart and longitudinally extending tubular bar members extending between and having opposite ends supported atop corresponding longitudinally spaced portions of said opposite end transverse members at points spaced longitudinally therealong, said longitudinally spaced portions of said opposite end members including upwardly projecting bendable studs supported therefrom, said bar members including opposite end upstanding passages formed therethrough upwardly through and above which said studs project.

4,789,138

#### FENCE GUARD DEVICE

Mary Acton, 2432 St. Rt. 753, SE., Washington Court House, Ohio 43160

Filed Nov. 17, 1987, Ser. No. 121,868

Int. Cl.<sup>4</sup> E04H 17/14

U.S. Cl. 256—59

5 Claims

1. A series of separate segments to protect rails of a fence including an individual segmented protector comprising;  
a top element having a pair of support elements depending

downwardly therefrom; said support elements each forming substantially right angles with said top element;  
a plurality of fastening elements carried by each said support element, and integral therewith, said fastening elements disposed substantially along a longitudinal axis of said support elements, said fastening elements engageable with a fence top rail whereby said protector is retained on top rail of the fence;  
each of said fastening elements include an integral grip element, said grip elements disposed inwardly from said support elements to urge or bias against the fence top rail whereby said grip elements secure said protector to said

said refractory wall, after the construction of said refractory wall, and at a specifically preferred location;  
fixing a tube having therethrough a cylindrical passageway within said bore in a gas tight manner; and  
fitting a gas conducting insert within said passage.

4,789,140

#### CERAMIC POROUS BODIES SUITABLE FOR USE WITH SUPERALLOYS

Nick G. Lirones, North Muskegon, Mich., assignor to Howmet Turbine Components Corporation, Greenwich, Conn.

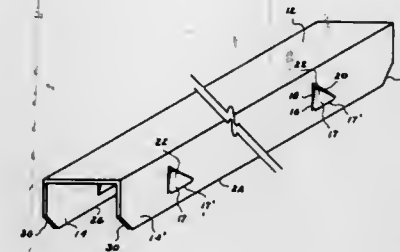
Division of Ser. No. 387,708, Jun. 11, 1982, Pat. No. 4,697,632.

This application Jun. 13, 1986, Ser. No. 874,038

Int. Cl.<sup>4</sup> C22B 9/02

U.S. Cl. 266—238

1 Claim



fence top rail and presents resistance to the removal therefrom;  
said grip elements have a lowermost side in common with said support elements and have sides forming an apex opposed to said common side; said apex disposed inwardly and toward said top element,  
said fastening elements are deployed substantially in opposition on said support element and proximate to a lower longitudinal edge of said support elements and  
said support elements include opposite ends having truncated terminal corners thereon, whereby sharp corners are removed from the terminal edges during deployment and to avoid injury to livestock.

4,789,139

#### METHODS OF AND APPARATUS FOR CONSTRUCTING REFRACTORY BRICK LININGS ON TUYERE PLATES FOR METAL TREATING VESSELS

Hans G. Fassbinder, Sulzbach-Rosenberg, and Paul G. Mantey, Amberg, both of Fed. Rep. of Germany, assignors to Eisenwerk-Gesellschaft Maximilianshütte, Sulzbach-Rosenberg, Fed. Rep. of Germany

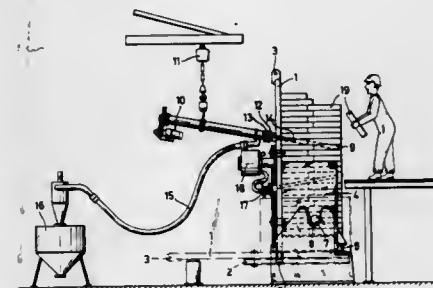
Filed Nov. 29, 1977, Ser. No. 855,590

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1976, 26542325

Int. Cl.<sup>4</sup> C21C 5/48

U.S. Cl. 266—221

11 Claims



1. A method of installing a gas conducting insert in a refractory wall of a vessel such that a gas may be introduced through the insert into the interior of the vessel, said method comprising:  
providing a bore through said wall by drilling said bore in

1. A tundish in combination with a ceramic foam filter said tundish comprising a monolithic body having a bottom pour draining outlet, and means for maintaining a ceramic foam filter in the path of molten metal passing through said tundish to said draining outlet, wherein said ceramic foam filter has the shape of a cylindrical tube and said means for maintaining a ceramic foam filter in the path of molten metal passing through said tundish to said draining outlet includes a perforated wall which divides said monolithic body into a receiving chamber and a filtering/draining chamber with said draining outlet being located in said filtering/draining chamber, and means within said filtering/draining chamber to secure the internal diameter of said ceramic foam filter in place directly over said raining outlet.

4,789,141

#### NOZZLES FOR INJECTING SUBSTANCES INTO LIQUIDS

Kenneth W. Bates, Chesterfield; Joseph W. Cadby, Dore, and Peter R. Dixon, Wadsley, all of England, assignors to Injectall Limited, Sheffield, England

PCT No. PCT/GB87/00462, § 371 Date Feb. 15, 1988, § 102(e)

Date Feb. 15, 1988, PCT Pub. No. WO88/00247, PCT Pub.

Date Jan. 14, 1988

PCT Filed Jul. 2, 1987, Ser. No. 158,290

Claims priority, application United Kingdom, Jul. 5, 1986,

8616455; Oct. 10, 1986, 8624323

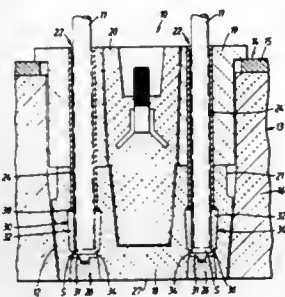
Int. Cl.<sup>4</sup> C21C 5/48

U.S. Cl. 266—270

25 Claims

1. An injection nozzle for the wall of a liquid containment vessel for use when injecting substances into the liquid, comprising a body having at least one injection passage extending to a discharge end of the body, a passage closing means embedded in the body, the closing means comprising a hollow shell closed at one end and resistant to percolation of liquid there-through, a sidewall and end closing portion of the shell being

united by a shell portion of reduced strength permitting a force applied to the closing portion to detach the latter from the



sidewall and create an opening between the passage and the discharge end, for injection via the passage and said opening.

#### 4,789,142 ELECTRONIC MOTOR MOUNT WITH MAGNETIC DECOUPLER

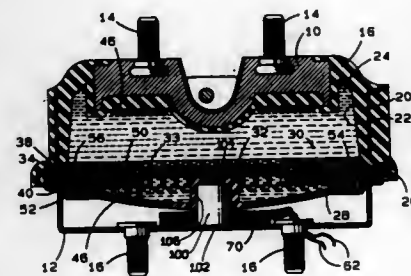
John F. Hoying, Bellbrook, and Stanley E. Smith, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 049,787, May 15, 1987. This application Jun. 29, 1987, Ser. No. 67,559

Int. Cl.<sup>4</sup> F16M 1/00

U.S. Cl. 267—140.1

1 Claim



1. A hydraulic mount assembly providing variable damping characteristics, comprising:
  - a pair of mounting members;
  - a hollow body connected to said mounting members;
  - a resilient diaphragm closing said hollow body forming therewith a closed cavity that is filled with liquid;
  - partitioning means for partitioning said cavity into a primary chamber and a secondary chamber enclosed by said diaphragm;
  - an elongated damping orifice extending about and through said partitioning means between said chambers so as to effect substantial restricted liquid flow between said chambers and thereby damping;
  - a decoupler mounted for limited free floating reciprocal movement in a bypass orifice through said partitioning means between the primary and secondary chambers with a first seated position toward the primary chamber and a secondary seated position toward secondary chamber to restrict and control liquid flow between said chambers in bypass relation to said damping orifice so as to effect damping control;
  - sensing means for sensing vehicle operating conditions and resulting vibrations;
  - external decoupler control force means for applying a variable force across the liquid in said secondary chamber and said diaphragm effective to induce said decoupler toward

one of said seated positions whereby liquid flow around said decoupler is infinitely variable; and means for controlling the variable force in response to said sensing means for sensing vehicle operating conditions so as to allow the damping characteristics of said mount assembly to be tuned;

said external decoupler control force means for applying a variable force including a variable voltage source responsive to said controlling means to produce a control voltage; and

an electrical coil mounted exterior and adjacent to said diaphragm to produce a variable magnetic force in response to the control voltage; and

said decoupler including magnetic material so as to be magnetically responsive across the liquid in said secondary chamber and said diaphragm to the variable magnetic force whereby the mount assembly damping characteristics are actively tuned,

said diaphragm having a cavity in the exterior thereof with a bottom in close proximity to said decoupler,

a core mounted in and extending beyond said coil into said diaphragm cavity to said bottom thereby to be located in close proximity to said decoupler.

#### 4,789,143 ELECTRONIC MOTOR MOUNT WITH ROTARY FLOW CONTROL VALVE

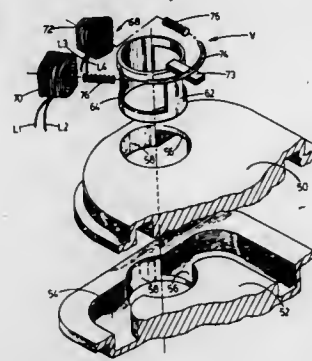
Stanley E. Smith, and John F. Hoying, both of Dayton, Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Sep. 14, 1987, Ser. No. 96,637

Int. Cl.<sup>4</sup> F16F 9/34

U.S. Cl. 267—140.1

3 Claims



1. A hydraulic mount assembly providing variable damping characteristics, comprising:
  - a pair of mounting members;
  - a hollow body connected to said mounting members;
  - a resilient diaphragm closing said hollow body and forming therewith a closed cavity that is filled with liquid;
  - means for partitioning said cavity into a primary chamber and a secondary chamber enclosed by said diaphragm,
  - said partitioning means including at least two distinct damping orifices of substantially different size communicating between said chambers;
  - valve means for selectively directing a variable flow of liquid between said primary chamber and said secondary chamber through said orifices so as to provide the desired damping to said hydraulic mount assembly;
  - means for sensing vehicle operating conditions and resulting vibrations;
  - means for controlling said valve means in response to said means for sensing vehicle operating conditions so as to allow the damping characteristics of said mount assembly to be tuned.

#### 4,789,144 HYDRAULICALLY DAMPED MOTOR MOUNTS OR BEARINGS AND ELASTIC BEARINGS

Heinrich Brenner, Ahrweiler, Fed. Rep. of Germany, assignor to Boge AG, Eitorf, Fed. Rep. of Germany

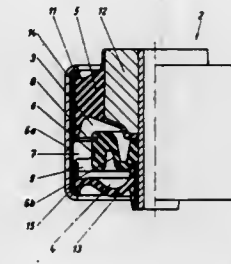
Filed Apr. 9, 1987, Ser. No. 36,306

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1986, 3612436

Int. Cl.<sup>4</sup> F16F 13/00, 15/04

U.S. Cl. 267—140.1

20 Claims



1. A hydraulically damped bearing assembly having at least two chambers for containing hydraulic damping fluid separated by a wall, said hydraulically damped bearing assembly comprising:
  - a first portion for connection to a first element external to the bearing assembly;
  - a second portion for connection to a second element external to the bearing assembly;
  - said first and second portions each having an axis, the axes being substantially aligned one to the other,
  - at least one of said first element and said second element for being damped by said bearing assembly during use;
  - elastomeric means connecting said first portion and said second portion to form at least one wall portion of a first of said at least two chambers;
  - a partition separating two of said at least two chambers and forming a wall of one of said chambers;
  - said at least two chambers being disposed one after the other axially along said axes;
  - said partition being disposed in a substantially radial plane, said plane being substantially perpendicular to said axes;
  - said partition comprising:
    - an elastic portion having a first orifice therein for permitting passage of hydraulic damping fluid from one of said two chambers to the other;
    - a rigid portion having a second orifice therein for permitting passage of hydraulic damping fluid from one of said two chambers to the other;
  - the first orifice being disposed on one side of the partition;
  - the second orifice being disposed on the other side of the partition at one of said at least two chambers;
  - said first orifice in said elastic portion being hydraulically connected in series with said second orifice in said rigid portion whereby a substantial portion of damping fluid flowing through one of said orifices in use also flows through the other orifice;
  - said first and second orifices being disposed away from one another;
  - a passage being disposed between said first and second orifices, said passage being disposed in a planar region, said planar region being substantially at right angles to at least one of said axes.

#### 4,789,145 VANE SPRING FOR AIR MOTOR

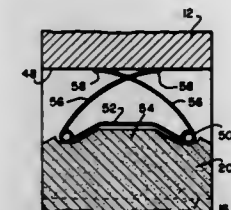
Thomas C. Wearich, Troutville, Va., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Dec. 30, 1986, Ser. No. 947,602

Int. Cl.<sup>4</sup> F16F 1/18, 1/14; F01C 1/00

U.S. Cl. 267—160

4 Claims



1. A spring for biasing a slidable vane in a slot comprising:
  - first and second torsion coils;
  - a base member connecting one end of said first torsion coil with one end of said second torsion coil, said base member having a curved offset portion between said coils; and
  - first and second spring arm members extending respectively from the other ends of each of said first and second torsion coils, said arm members having an arc shape wherein said base member is offset toward said arm members and said arm members are arced away from said base member.

#### 4,789,146 ANGLE VISE

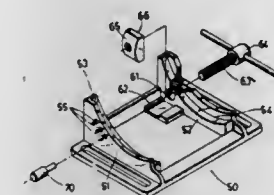
Andrew Kuei, No. 188-5, Kuang Ming Road, Taichung, Taiwan

Filed Apr. 17, 1987, Ser. No. 39,237

Int. Cl.<sup>4</sup> B23Q 1/04

U.S. Cl. 269—69

5 Claims



1. An angle vise apparatus comprising:
  - a body having a rectangular platform portion, a fixed jaw element at one end of the platform portion and a support at another end of the platform portion, two parallel and symmetrical curvilinear guide rails each at a lower surface of the body beneath the platform portion, a predetermined number of graduation holes being defined in an outer surface of each of the curvilinear guide rails in a manner that a line connecting the centers of the graduation holes is a curve with a same center of curvature as the guide rails and the graduation holes are arranged in a first equal interval, a guide groove having an end connected to the fixed jaw element and another end to the support, a moveable jaw element slidably connected to the guide groove, and a guide screw rod having a first end threadedly en-



gaged with the support and a second end turnably connected to the moveable jaw element;  
 a base having a first side wall and a second side wall, two parallel and symmetrical curvilinear guide ways, one being disposed at a top of each side wall, said curvilinear guide ways fitting in a complementary fashion to the curvilinear guide rails, a predetermined number of selector holes being defined in a second equal interval on the front curvilinear guide way in a manner that a line connecting the centers of the selector holes is coincident with the line connecting the centers of graduation holes, and the second interval between any two consecutive selector holes is smaller than the first interval between any two consecutive graduation holes; frictional lock means on the base to hinder relative motion between the base and the body; and a pin means for inserting within a selector hole and a graduation hole simultaneously, to lock said body with respect to said base.

4,789,147

# SYSTEM AND METHOD FOR SELECTIVE ASSEMBLY AND IMAGING OF BOOKS

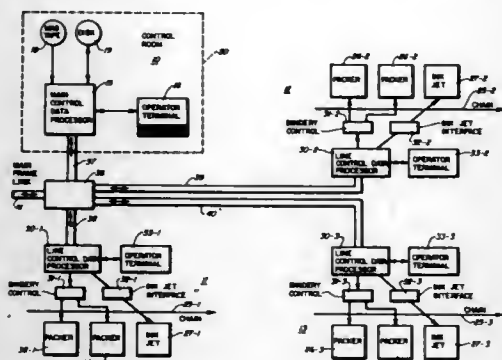
Joseph P. Berger, Winona Lake, Ind.; Mary F. Allsopp, Glasgow; Christopher D. Cook, Cave City, both of Ky.; Jonathan O. Fraleigh, Chicago, Ill.; David Hamilton, Canton, Ohio; John E. Kemberger, Warsaw, Ind.; Helen Maiorano, Cicero, Ill.; Stuart O. Rawlings, North Webster, Ind.; James L. Warmus, Chicago, Ill.; Janet A. Wilczynski, Willowbrook, Ill.; and Did-ban Wong, Elmhurst, Ill., assignors to R. R. Donnelley & Sons Company, Chicago, Ill.

Division of Ser. No. 854,314, Apr. 21, 1986, Pat. No. 4,768,766. This application Feb. 5, 1988, Ser. No. 152,502

Int. Cl. B41F 13/54; B65H 39/02

U.S. Cl. 270-1.1

8 Claims



1. In a bindery line having,

- (1) a moving chain with a plurality of successive signature collecting positions,
- (2) a plurality of signature delivery units each with a delivery mechanism driven in synchronism with the chain for transferring a signature from the unit to the chain, a cycle of bindery line operation moving said chain a distance corresponding with one signature collection position and operating each delivery mechanism through one delivery sequence, the delivery mechanism including a vacuum signature pickup and a vacuum valve, and
- (3) a controller for the vacuum valves of the signature delivery units, vacuum being applied to the signature pickup of selected signature delivery units during a cycle of bindery line operation to transfer selected signatures to the moving chain and being shut off during a cycle of bindery line operation to omit a signature, the controller having an operator input, the method of timing operation of each of the vacuum valves which includes:

moving the chain and the signature delivery mechanisms at a slow speed;  
 observing for each signature delivery unit the time in the bindery line cycle at which the signature pickup engages a signature; and  
 setting the time of operation of the vacuum valve for each unit through the controller operator input in accordance with the observed time.

4,789,148

# ALIGNING-AND-FEEDING APPARATUS FOR FLAT ARTICLES

Masahiko Noguchi, and Kiyoshi Tsuda, both of Tokyo, Japan, assignors to NEC Corporation, Japan

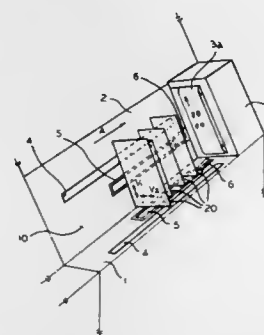
Filed Dec. 5, 1986, Ser. No. 938,267

Claims priority, application Japan, Dec. 6, 1985, 60-188587[U]

Int. Cl. B65H 1/02, 3/62

U.S. Cl. 271-94

3 Claims



1. An aligning-and-feeding apparatus comprising:  
 a stacker means for stacking a plurality of flat articles in a standard state;  
 transfer means for transferring said plurality of flat articles stacked in said stacker means in a first direction toward one end of said stacker means;  
 feeding means coupled to said one end of said stacker means for feeding flat articles, which are transferred thereto, one by one externally; and  
 roller means provided in said stacker means at a location close to said one end of said stacker means and having an inclined surface and at least one flat surface portion in the inclined surface, for applying a moving force to said flat articles in a direction which is opposite to said first direction and for applying a vibration to said flat articles.

4,789,149

# DOCUMENT GUIDE APPARATUS FOR POCKETING DOCUMENTS

Brian E. Ray, Cambridge; Victoria M. Lant, Waterloo, and Robert W. Phillips, Brantford, all of Canada, assignors to NCR Corporation, Dayton, Ohio

Filed Jun. 23, 1987, Ser. No. 65,451

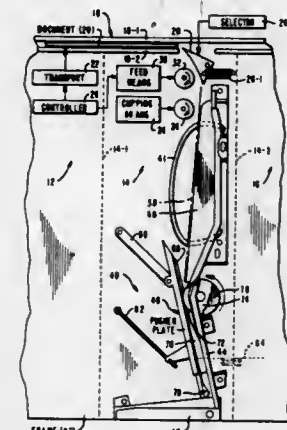
Int. Cl. B65H 31/06

U.S. Cl. 271-215

12 Claims

1. A document pocketing apparatus comprising:  
 an upstream end of said apparatus, a downstream end of said apparatus and a feeding line positioned therebetween;  
 a receiving means located at said downstream end for receiving documents to be pocketed;  
 feeding means for feeding documents from said upstream end along said feeding line to said receiving means;  
 said receiving means comprising:  
 a first stationary member against which the leading edges of documents abut when fed into said receiving means;

a second stationary member which forms one side of a pocket for receiving said documents to be pocketed; and a pusher plate and means for mounting said pusher plate for movement parallel to and away from said second stationary member to accommodate an increasing stack of documents as documents are pocketed in said receiving means; said pusher plate having a rib structure located on a side thereof facing said second stationary member; and



said rib structure having an entry portion and also having a decelerating portion for decelerating the documents being fed into said receiving means prior to the leading edges thereof abutting against said first stationary member and also for moving the documents towards said second stationary member.

4,789,150

# SHEET STACKING APPARATUS WITH TRAIL EDGE CONTROL FLAPS

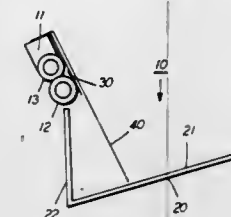
Margaret C. Plain, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Jun. 30, 1986, Ser. No. 880,519

Int. Cl. B65H 31/26

U.S. Cl. 271-220

13 Claims



13. A copy sheet stacking apparatus that provides positive control of sheets being stacked in the apparatus, comprising at least one pair of sheet output rollers, a tray having a surface for receiving sheets from said at least one pair of sheet output rollers and multiple independently acting sheet biasing means positioned downstream of and in interfering relation with sheets exiting said at least one pair of sheet output rollers and overlying and immediately downstream of the entrance to said tray, said multiple independently acting sheet biasing means each includes an elongated flexible member that overlies sheets entering the tray and a short flexible member that is in contact with said at least one pair of sheet output rollers and is adapted to immediately remove the trail edges of sheets exiting said at least one pair of sheet output rollers from the exit path of said at least one pair of sheet output rollers.

4,789,151

# QUICKLY ASSEMBLED APPARATUS FOR MOVING DOCUMENTS

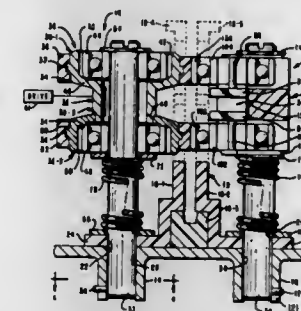
Fredrik L. N. Kallin, Kitchener, Canada, assignor to NCR Corporation, Dayton, Ohio

Filed Dec. 24, 1987, Ser. No. 137,831

Int. Cl. B65H 5/06

U.S. Cl. 271-274

12 Claims



1. An apparatus for moving documents comprising:  
 a base plate having first and second mounting members thereon;  
 a document track having first and second mounting holes therein which are aligned with said first and second mounting members, respectively, when said document track is positioned on said baseplate for assembly thereto;  
 a first shaft having a drive roller assembly rotatably mounted thereon;  
 an idler roller assembly having a second shaft extending therefrom;  
 said first shaft passing through said first mounting hole and being secured with said first mounting member to secure said drive roller assembly and said document track to said base plate;  
 said second shaft passing through said second mounting hole and being secured with said second mounting member to secure said idler roller assembly and said document track to said base plate;  
 said drive roller assembly having at least one drive roller thereon, and also having means for rotating said drive roller;  
 said idler roller assembly having at least one idler roller thereon; and  
 biasing means for resiliently biasing said idler roller into engagement with said drive roller for driving a document therebetween.

4,789,152

# EXERCISE DEVICE

Donato R. Guerra, 2837 Sylvester Dr., Hartland, Wis. 53029

Filed Jul. 14, 1987, Ser. No. 72,874

Int. Cl. A63B 21/00, 69/00, 3/00, 11/00

U.S. Cl. 272-144

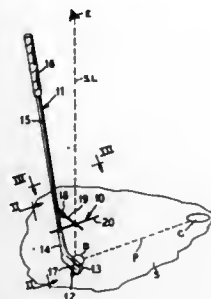
16 Claims

1. An exercise device, comprising:  
 a bench having a substantially planar upper surface supported above and supporting surface;  
 a pair of spaced side rails supported above said upper surface of said bench, each said side rail being supported so as to bear the weight of an exerciser along its length, said side rails extending throughout a major portion of the length of said bench and being closer together at one end than at the other end, said side rails being supported so as to be spaced a substantially equal distance above said upper surface of said bench and being disposed in a plane substantially parallel thereto; and  
 a transverse end rail adapted to bear the weight of an exerciser along its length, said end rail being disposed above said upper surface of said bench and extending between





said rod, means for retracting the rod into and out of the head to finely adjust the position of the pin for overlying the sweet spot



of the putting face, and said rod and pin being free from any visual obstruction other than the pin and rod themselves.

4,789,159

# **APPARATUS FOR ASSISTING A GOLFER TO KEEP THE GOLFER'S HEAD LEVEL WITH THE BALL AND STILL WHILE THE GOLFER IS IN THE PROCESS OF HITTING THE BALL**

Thomas J. Kane, 2168 W. Ridge Rd., Los Angeles, Calif. 90048  
Filed Aug. 12, 1987, Ser. No. 84,455

Int. Cl.<sup>4</sup> A63B 69/36

U.S. Cl. 273-183 B

12 Claims



1. A apparatus for assisting a golfer to keep the golfer's head level with a golf ball and still while the golfer is in the process of hitting the golf ball, comprising:

- a. a first frame member have a rear end and a front end;
- b. a second frame member having a rear end and a front end, and aligned parallel to and spaced apart from said first frame member;
- c. said first and second frame members connected at their rear ends by a rear bridge member set approximately perpendicular to the rear end of the first and second frame members;
- d. said rear bridge member further comprising a pair of sections which are telescopically and movably interconnected;
- e. said first and second frame members connected at their front ends by a front bridge member set approximately perpendicular to the front end of the first and second frame members; and
- f. said front bridge member further comprising a level means at approximately its center;
- g. whereby said first frame member can be placed on one of the golfer's ears and said second frame member can be placed on the second ear of the golfer such that said level means is located just above or just below the line of sight between the golfer's eyes and the golf ball.

4,789,160

# **GOLF SWING POSITION INDICATOR**

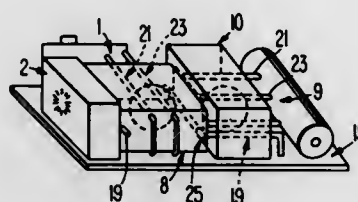
William O. Dollar, Jr., 804 Oakridge Dr., Birmingham, Ala. 35214, and Kenneth D. Smith, 2750 Stickney Point Rd., Sarasota, Fla. 33581

Continuation of Ser. No. 804,418, Dec. 4, 1985, abandoned. This application Jul. 8, 1987, Ser. No. 707,158

Int. Cl.<sup>4</sup> A63B 69/36, 69/38

U.S. Cl. 273-186 A

12 Claims



1. A device for use with a sports implement provided with a striking surface and a shaft for determining the proper orientation of the striking surface at the completion of the backswing of the sports implement, said device comprising:

- a housing adapted to be attached to said shaft of the sports implement; and
- a sensing circuit provided within said housing for sensing the orientation of the striking surface of the sports implement, said sensing circuit comprising:
  - a source of power;
  - a first position sensing means connected to said source of power for sensing the roll position of the striking surface;
  - a second position sensing means connected to said source of power for sensing the pitch position of the striking surface; and
  - signal means connected to said source of power and said first and second position sensing means for emitting a signal when both said first and second position sensing means indicate that the striking surface is in its proper orientation, said signal emitted when the sports implement is at rest after completion of the backswing but prior to the initiation of the swing of the sports implement, wherein the striking surface is repositioned after the completion of the backswing until said signal means emits a signal.

4,789,161

# **PROPEL AND CATCH GAME**

Mark A. Waskelo, 252 Seaside Ave., Stamford, Conn. 06902  
Continuation-in-part of Ser. No. 888,868, Jul. 24, 1986, abandoned. This application Jun. 22, 1987, Ser. No. 65,672

Int. Cl.<sup>4</sup> G09B 59/00, 67/00

U.S. Cl. 273-327

7 Claims

1. A propel and catch game comprising apparatus, in combination:

- at least one hand-held, propel and catch device including:
  - an elongated, flexible handle which is adapted to be gripped by one hand but capable of manipulation with both hands by an individual playing said game; and
  - enlarged catch means provided at an outward end of said handle for catching and propelling a projectile, said catch means including a cushioned inner portion, an outer cover, and fastening means over a substantial portion of at least one side of said outer cover, said fastening means comprising one component of a two component hook and loop fastening system; and
- a projectile adapted to be propelled and caught by said propel and catch device, said projectile including a resilient

ient inner portion, an outer cover, and fastening means over a substantial portion of said outer cover, said fastening

provide said messages to assist said player in resolving said word and message game.

4,789,163

# **INDOOR HORSESHOE PITCHING GAME**

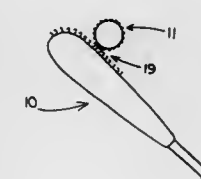
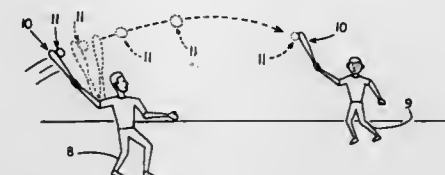
Larry W. Warner, 1007 N. Main, Creve Coeur, Ill. 61611, and Mark S. Neyrinck, 2100 N. Morton Ave., Morton, Ill. 61550

Filed Jun. 11, 1987, Ser. No. 60,602

Int. Cl.<sup>4</sup> A63B 67/06, 71/04; A63F 9/22

U.S. Cl. 273-336

10 Claims



means comprising the second component of said two component hook and loop fastening system.

4,789,162

# **WORD AND MESSAGE FORMING BOARD GAME**

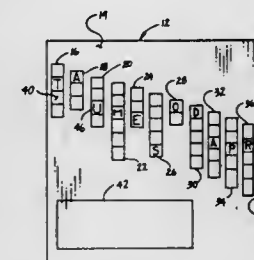
Amos L. Harris, 2532 Ohio St., Paducah, Ky. 42001

Filed May 27, 1987, Ser. No. 54,725

Int. Cl.<sup>4</sup> A63F 3/00

U.S. Cl. 273-272

1 Claim



1. A word and message completion game comprising:

- (a) a game surface; and
- (b) a letter layout on said game surface including a message means comprising a plurality of aligned vertical columns for receiving letters in prescribed blocks thereon, said columns providing a first message to a player when proper letters are positioned within each of said prescribed blocks in said aligned columns, said proper letters defining a word in each column which taken together provide said first message, and further wherein first letters in each of said words are aligned to provide a further message to said player, and
- further including game playing pieces, said playing pieces each having a letter on at least one face thereof, said pieces being of equal surface dimension to said prescribed blocks and positionable within said prescribed blocks to complete said words, and
- a rectangular clue means positioned on said game board in underlying relationship to said columns combining a rectangular block for inclusion therein of a series of clue words including random words and said words which

1. An indoor horseshoe pitching game comprising; at least one horseshoe-shaped projectile adapted to be thrown through the air; a projectile receiving pit having a plurality of peripherally upstanding side walls; a target post centrally located within said pit in substantially upright vertically extended position; and electronic scoring display means located adjacent to said pit indicating the positions of projectiles landing within the pit relative to said target post; said electronic scoring display means including a programmable computer board; a television monitor electrically connected to said computer board; a plurality of electrical sensors mounted in said target post and said pit electrically connected to said computer board; and sensor activating means disposed in said projectile for energizing and appropriate signal to said computer board indicating the precise location of a projectile landing within the pit and its relative position with respect to said target post with a visual display to the scoring being projected on said monitor corresponding to such location of the projectile.

4,789,164

# **SEALING DEVICE**

Josef Winter, Rohrbach/Ilm; Rene Wagner, Bad Aibling, and Klaus-Peter Goetze, Vaterstetten, all of Fed. Rep. of Germany, assignors to Raychem Corporation, Menlo Park, Calif. Continuation of Ser. No. 784,408, Oct. 14, 1985, abandoned. This application Jul. 9, 1987, Ser. No. 71,552

Claims priority, application United Kingdom, Oct. 25, 1984, 8427046

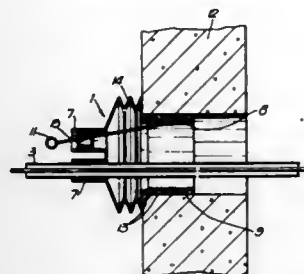
Int. Cl.<sup>4</sup> F16L 5/02; F16J 15/02

U.S. Cl. 277-9

1 Claim

1. A duct seal comprising: a sealing member that can be positioned within a duct to provide a seal between the duct and a substrate carried by the duct, and which can be radially expanded from a first configuration to a second configuration when heated but is not expanded immediately solely by heating, and when

thus expanded to the second configuration is substantially unstressed and engages the duct; and a spring positioned within the sealing member and held in a resiliently biased configuration that corresponds to said first configuration, the bias of the spring being releasable after positioning of the sealing member in the duct to cause radial expansion of the heated sealing member,



release of the bias not being brought about immediately solely by heating the sealing member, said release being caused by release means which is associated with said spring and which is not a part of said sealing member, said release means unlocking said spring from said resiliently biased configuration so that the heated sealing member can expand toward said second configuration.

4,789,165

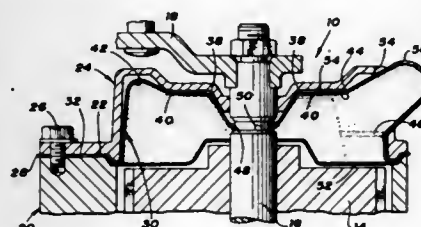
## PRESSURE COMPENSATING SEAL

Bartley A. Hayda, Anderson, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 16, 1987, Ser. No. 121,036  
Int. Cl.<sup>4</sup> F16J 9/00; B60Q 1/06

U.S. Cl. 277-12

2 Claims



1. In a housing having an opening defined by an edge to which a cover that engages said edge is attached, thereby creating a seam that represents a potential entry path from ambient to the internal volume of said housing, and in which the air in said internal volume is subject to temperature differentials relative to ambient, an improved seal for protecting said internal volume from the ambient, said seal comprising,

a peripheral gasket portion adapted to be tightly clamped between said housing edge and cover to substantially block said seam, an expandable and contractible inner portion integral with said gasket portion located generally between said housing and cover and enclosing said internal volume, and, at least one passage through said cover of sufficient size to expose said seal inner portion to ambient pressure and, whereby, when said temperature differentials occur and the air in said enclosed volume consequently expands and contracts, said seal inner portion can simultaneously expand and contract, increasing and decreasing the effective enclosed volume so as to substantially prevent the occurrence of a pressure differential between ambient and said enclosed volume, thereby cooperating with said gasket portion to help prevent air or water from the ambient

from being drawn through said seam boundary and into said enclosed volume.

4,789,166

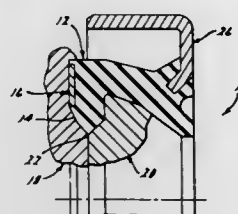
## ROTARY SHAFT WAVE SEAL

Brian F. Rericha, Downers Grove, and Bernard G. Stritzke, Hanover Park, both of Ill., assignors to Microdot Inc., Darien, Conn.

Filed Sep. 14, 1987, Ser. No. 95,955  
Int. Cl.<sup>4</sup> F16J 15/32; B23P 11/00

U.S. Cl. 277-134

8 Claims



1. A method for manufacturing a rotary shaft seal comprising the steps of inserting an annular axially undulating spring element between a pair of relatively movable mold sections; axially compressing said spring element between said mold sections; molding an elastic material about and concentric with said axially compressed, radially expanded spring element; curing said elastic material while said spring element is maintained in axial compression by said mold; and releasing said cured elastic material from said mold, whereby said spring element axially expands and radially contracts so as to distort a portion of said cured elastic material into an axially undulated and radially contracted configuration.

4,789,167

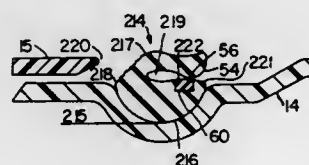
## PIPE GASKET WITH REINFORCING MEANS IN ITS BASE SELF-ENERGIZING

Jim Housas, Stow, Ohio, assignor to Hamilton Kent Manufacturing, Inc., Houston, Tex.

Filed Feb. 20, 1987, Ser. No. 17,067  
Int. Cl.<sup>4</sup> F16J 15/32

U.S. Cl. 277-207 A

11 Claims



1. A gasket for use in sealing a telescopic connection between two pipes, said gasket comprising a compressible base adapted to be received by one of a pair of telescoping pipes, an arm connected with and extending from said base and terminating in a sealing lip which curves away from said base and includes a raised portion which contacts a top surface of said base at an end of said top surface opposite the location on said top surface from which said arm extends, said arm and base forming a void therebetween which is sealed by the contact of said raised portion of said arm and said base, said arm being adapted to engage the other of said pair of telescoping pipes, said base having a surface adapted to engage said arm between said connec-

tion with said base and said lip upon telescoping of the pipes together to press said lip against the other of said pipes; and reinforcing means in said base to reduce the compressibility of said base in the area of said surface.

4,789,168

## SEALING BUSH WITH A SEALING PACKING FOR HIGH PRESSURES AND TEMPERATURES

Achim Daume, Engenser Weg 1, D-3006 Burgwedel 1, Fed. Rep. of Germany

PCT No. PCT/DE86/00093, § 371 Date Jan. 7, 1987, § 102(e)  
Date Jan. 7, 1987, PCT Pub. No. WO86/05565, PCT Pub. Date Sep. 25, 1986

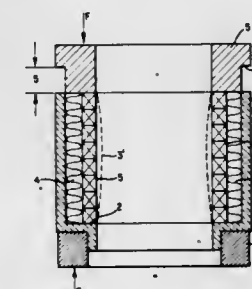
PCT Filed Mar. 8, 1986, Ser. No. 940,763

Claims priority, application Fed. Rep. of Germany, Mar. 11, 1985, 3508592

Int. Cl.<sup>4</sup> F16J 15/10

U.S. Cl. 277-227

16 Claims



1. A sealing device for moving parts, particularly for use at high pressures and temperatures, comprising a packing having two layers, one of said layers surrounding the other of said layers and being more resilient than said other layer, and the coefficient of friction between said other layer and a moving part being lower than the coefficient of friction between said one layer and the moving part, said layers being pressed together so that said one layer resiliently bears upon said other layer.

4,789,169

## ATTACHMENT MEANS FOR A WORK PIECE

Nils Håkansson, Alebäcksgatan 5, Lidköping, Sweden (53141)  
PCT No. PCT/SE86/00499, § 371 Date Jul. 1, 1987, § 102(e)

Date Jul. 1, 1987, PCT Pub. No. WO87/02615, PCT Pub. Date May 7, 1987

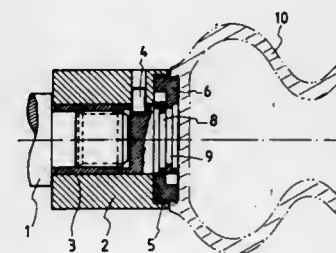
PCT Filed Oct. 30, 1986, Ser. No. 79,772

Claims priority, application Sweden, Nov. 1, 1985, 8505164;  
Jan. 31, 1986, 850164

Int. Cl.<sup>4</sup> B23B 5/22

U.S. Cl. 279-2 R

5 Claims



1. A chuck adapted to clamp a workpiece (7) during wood turning, comprising a rotatable body (3), at one end attachable to a lathe and at the other end having means to clamp the

workpiece (7), characterized in, that the body (3) has two radially opposed excenters (8, 9) located one to each side of the longitudinal axis of said body, said excenters being arranged to cooperate with two clamping jaws (5, 6) each of which is rotatable a limited sector in relation to its excenter (8, 9), said jaws being adapted to clamp the workpiece (7) while turned in one direction and release the workpiece while turned in the opposite direction, and wherein the jaws (5, 6) are recessed together to present a mutual end surface to the workpiece (7).

4,789,170

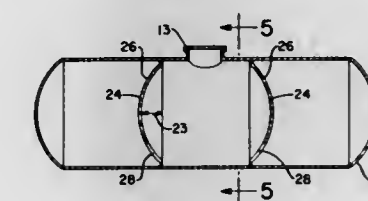
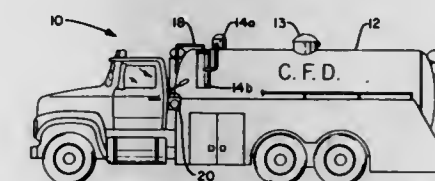
## TANK BAFFLES

Larry F. Reber, Apple Creek, Ohio, assignor to Reberland Equipment, Inc., Apple Creek, Ohio

Filed May 26, 1987, Ser. No. 53,798  
Int. Cl.<sup>4</sup> B60P 3/24

U.S. Cl. 280-5 D

3 Claims



1. A fire tanker truck for transporting water to a fire which has a tank having a cylindrical transverse cross section mounted thereon, positioned so that its longitudinal axis is parallel to the truck's direction of locomotion, said tank containing at least two circularly shaped disched baffle members therein mounted at right angles to, and spaced along said axis, wherein the ratio of the depth of the disched center of said baffles to their diameter is from about 1-6 to about 1-10, and wherein said baffles are equipped with a pressure equalizer port near the top thereof, and a water transfer port adjacent to the bottom thereof, and wherein further, said tank is provided with a vacuum pump connected thereto for charging and discharging water.



4,789,171

## MULTIPURPOSE BARROW VEHICLE

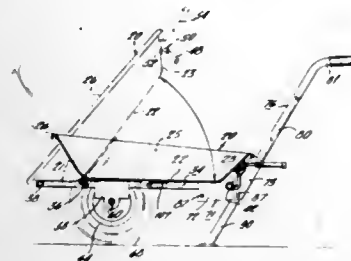
Lynn L. Porter, R.F.D. 1, Box 1802, Bangor, Me. 04401

Filed Jul. 13, 1987, Ser. No. 72,838

Int. Cl.<sup>4</sup> B62B 1/04

U.S. Cl. 280—47.18

8 Claims



1. A vehicle adapted to be selectively used either as a wheelbarrow manually operated, or a trailer adapted to be hitched to a pulling vehicle, comprising

- a pan,
- a frame having the pan secured thereto, supporting wheels journaled on the frame, a pair of angled brackets secured to the frame,
- a pair of bent offset elongated members, each member having a hand grip portion at an offset end thereof adapted to be detachably and interchangeably secured in the said brackets in various positions and,
- a hitch attachment for securing the members at their offset ends to a tow vehicle, wherein

in a first position, the members are secured to the brackets in a substantially horizontal position with the offset portions of the members converging toward one another to provide a tow bar to be secured to a tow vehicle, and in an alternative second position, the members are secured to the brackets in a substantially inclined position with the offset portions of the members diverging to serve as handles in a manually operated wheelbarrow and with the opposite ends of the members extending downwardly to serve as support legs for the wheelbarrow.

4,789,172

## BICYCLE SEAT POST CLAMP MECHANISM

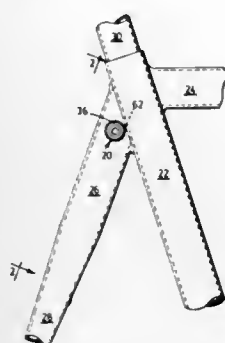
Clifford F. Mueller, Arlington Heights, Ill., assignor to Schwinn Bicycle Company, Chicago, Ill.

Filed Dec. 7, 1987, Ser. No. 129,464

Int. Cl.<sup>4</sup> B62K 19/36

U.S. Cl. 280—281 R

5 Claims



1. In a bicycle having a frame including a seat tube, a second tube connected to the rear upper end portion of the seat tube, a seat post telescopically mounted for up and down adjustable

movement in the seat tube, improved seat post clamp mechanism comprising:

- (a) a locking shoe supported in the second tube for movement to and from a locking position engaging the seat post;
- (b) a pair of clamp members supported in said second tube and aligned for movement relative to one another and to the locking shoe along an axis transverse to the seat post, said clamp members being supported within diametrically opposed openings in the wall of the second tube to thereby absorb clamping reactive forces in a direction tangential to that wall;
- (c) mutually engageable camming surfaces on the clamp members and on the locking shoe for moving the locking shoe into its locking position in response to relative movement of the clamp members; and
- (d) adjustment means for effecting relative movement of the clamp members to selectively engage and disengage the camming surfaces on the clamp members and the locking shoe.

4,789,173

## STEERING METHOD AND MECHANISM FOR THREE-WHEEL VEHICLE

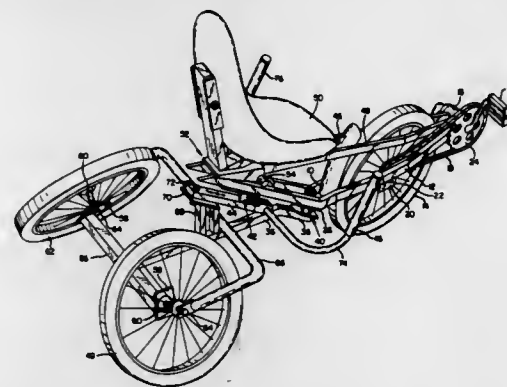
Michael S. Lofgren, and Brian C. Stewart, both of 20589 SW, Elk Horn Ct., Tualatin, Oreg. 97062

Filed Dec. 15, 1987, Ser. No. 132,925

Int. Cl.<sup>4</sup> B62K 5/04

U.S. Cl. 280—281 LP

7 Claims



1. A three-wheel vehicle comprising; a first frame section and a second frame section, a single wheel rotatably supported on the first frame section, a pair of wheels in spaced-apart relationship rotatably mounted on the second frame section, one of said frame sections being a front frame section and the other a rear frame section of the vehicle, a first connection means and a second connection means between the first and second frame sections, said first and second connection means defining an inclined axis in the direction from the first frame section to the second frame section, said first and second connection means including pivotal means for relative pivoting of the first and second frame sections about said inclined axis, said second connection means including a connecting element connected between the first and second frame sections at spaced positions thereon, said connecting element having means for controllable lateral shifting of the interconnected spaced positions for relative angular shifting of the two frame sections, and manual control means for controlling said lateral shifting independent of the relative pivoting of the first and second frame sections about said inclined axis.

4,789,174

## SUSPENSION BICYCLE

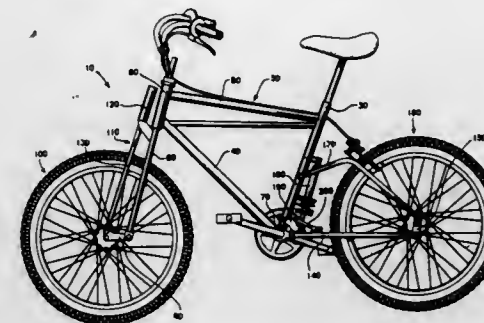
Mert Lawwill, 148 Rock Hill Dr., Tiburon, Calif. 94920

Filed Apr. 27, 1987, Ser. No. 42,792

Int. Cl.<sup>4</sup> B62K 25/04; B60G 15/00

U.S. Cl. 280—284

9 Claims



1. In a bicycle having a frame including a rear wheel with a hub, a seat riser tube and a bottom bracket, the improvement comprising

- hub plate means having upper and lower ends for positioning the rear wheel,
- swing arms means for movably positioning the lower end of the hub plate means, the swing arms means having first and second ends and being pivotally connected at the first end thereof to the rear of the bottom bracket and at the second end thereof to the lower end of a hub plate means, shock absorber means connected between the swing arms means and the frame to absorb shocks, and
- control arm means for movably positioning the upper end of the hub plate means and being pivotally connected at one end to the upper end of the hub plate means and at the other end to the seat riser tube, the swing arm means, hub plate means and control arm means being capable of limiting a range of movement of the rear wheel so as to substantially prevent the shock absorber means from absorbing pedaling energy.

4,789,175

## VEHICLE FOR THE DISABLED

Siegfried K. H. Schramm, Schenkendorfstr. 1, 3208 Giesen, Fed. Rep. of Germany

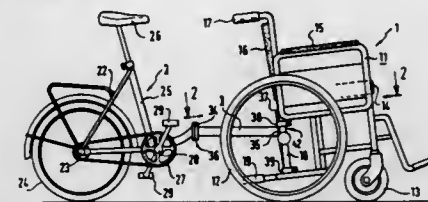
Filed Jul. 28, 1987, Ser. No. 78,920

Claims priority, application Fed. Rep. of Germany, Jul. 31, 1986, 3625955; Sep. 9, 1986, 3630687

Int. Cl.<sup>4</sup> B60D 1/04

U.S. Cl. 280—289 WC

16 Claims



1. A vehicle for the disabled, comprising a wheel-chair with seat and back-rest, on the chassis of which there are mounted two coaxial rear wheels and at least one front wheel, a cycle frame arranged behind the wheel-chair with a drive wheel drivable by means of pedals, a saddle and a coupling device mounted pivotally on a steering bearing of the cycle frame about a substantially vertical pivot axis for the detachable connection of the wheel-chair with the cycle frame, the coupling device having at least one cross-member extending transversely of the longitudinal axis of the cycle frame, which

cross-member is securable to the wheel-chair chassis through two coupling elements spaced from one another in the transverse direction and supports the front end of the cycle frame on the chassis of the wheel-chair, wherein the steering bearing (35) which carries the coupling device is connected with the cycle frame (2) through a joint (42) with substantially horizontal pivot axis but otherwise substantially rigidly in rotation.

4,789,176

## ADJUSTABLE CYCLE-TYPE SEAT POST ASSEMBLY

Timothy Carroll, Chicago, Ill., assignor to Schwinn Bicycle Company, Chicago, Ill.

Filed Dec. 7, 1987, Ser. No. 129,234

Int. Cl.<sup>4</sup> B62J 1/00

U.S. Cl. 280—289 R

14 Claims



5. An adjustable seat post assembly comprising: a tubular seat adapted to fit slidably within a tubular seat mast of a cycle-type apparatus, the seat post having a cylindrical bore with a closed upper end and an open lower end; a mounting shaft having piston means at the upper end telescopically fitted within the cylindrical bore and defining with the closed upper end of the cylindrical bore a variable volume air chamber; air sealing means acting between the piston means and the cylindrical bore; a plurality of axially spaced fastening means at the lower end of the mounting shaft for removably securing it in a selected axial position relative to a securing member carried within a tubular seat mast; and valve means at the upper end of the seat post for introducing pressurized air into the air chamber.

4,789,177

## THREE POINT SUPPORT

Gerard Graillat, Annecy, France, assignor to Salomon S.A., Annecy Cedex, France

Filed Nov. 3, 1986, Ser. No. 925,899

Claims priority, application France, Nov. 15, 1985, 85 16947

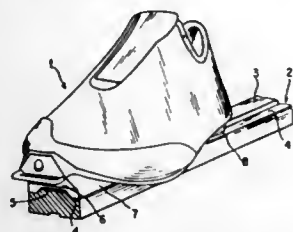
Int. Cl.<sup>4</sup> A63C 9/20

U.S. Cl. 280—607

19 Claims

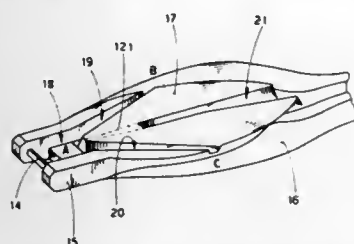
17. An apparatus for laterally guiding and supporting a boot or shoe on a ski, wherein said apparatus comprises: a longitudinally extending guidance element on the upper surface of said ski, wherein said element comprises a front portion and a rear portion; and a support element for supporting said boot, wherein said support element comprises a groove, wherein said support element and said groove comprise a front portion and a

rear portion, wherein said groove has substantially the same cross-sectional configuration as said guidance element, wherein said front portion of said guidance element comprises means for engaging said front portion of said groove, wherein said rear portion of said guidance element



ment comprises means for engaging said rear portion of said groove, wherein the height of said front portion of said guidance element is less than the depth of said front portion of said groove, wherein the height of said rear portion of said guidance element is greater than the depth of said rear portion of said groove.

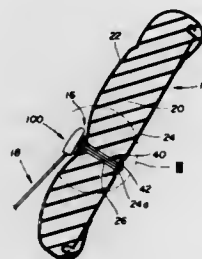
**4,789,178**  
**TREAD FOR THE SOLES OF LONG-DISTANCE SKI BOOTS**  
Oliviero Olivieri, Montebelluna, Italy, assignor to Icaro Olivieri & C. SpA, Montebelluna, Italy  
Filed May 11, 1987, Ser. No. 47,476  
Claims priority, application Italy, May 22, 1986, 83360 A/86  
Int. Cl.<sup>4</sup> A63C 9/20  
U.S. Cl. 280—615 8 Claims



1. A system for binding the soles of a long distance ski boot to a ski so that the lateral thrust during skating steps is efficiently transferred from the boot to the ski, said system comprising:

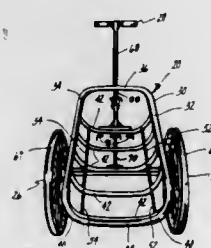
- a long distance ski boot including:
  - a bridge formed laterally across the anterior portion of said ski boot, said bridge being releasably secured to said ski by attachment means;
  - a sole, said sole having at least a first and a second divergent elongated groove formed therein, the vertex of said grooves being located adjacent said bridge;
  - a plate coupled to the long distance ski, said plate having at least a first and a second divergent elongated ridge formed therein for mating with said grooves, thereby securing said ski boot with said plate; and
  - wherein said grooves decrease in depth and said ridges decrease in height from their vertices to their posterior ends.

**4,789,179**  
**ARRANGEMENT FOR HOLDING SEAT BELT ANCHOR BAND**  
Fugio Takahashi, Kanagawa, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan  
Filed Jun. 16, 1987, Ser. No. 62,686  
Claims priority, application Japan, Jul. 31, 1986, 61-118194[U]  
Int. Cl.<sup>4</sup> B60R 21/10  
U.S. Cl. 280—801 6 Claims



1. An arrangement for detachably fixing a buckle-mounted anchor band of a seat belt to a given portion of a seat back of a seat, comprising:
  - a holder tightly connected to said seat back and provided at laterally opposed sides with respectively outwardly protruding flanges; and
  - a cover member housing therein the buckle of the anchor band and fixed thereto to move therewith, said cover member being constructed to a resiliently deformable plastic and formed with a longitudinally extending slot which comprises first, second and third parts arranged to provide said first part having a width which is greater than the distance between the outwardly protruded flanges of said holder, said second part having a width which is so sized as to slidably hold said outwardly protruded flanges by opposed flange portions thereof and said third part having opposed projections and a width which is smaller than the distance between said outwardly protruded flanges and extending to a terminal open end of said slot,
- whereby when, with said holder being coupled with said slot of the cover member, a force greater than a predetermined degree is applied to said holder to move the same in a direction from said second part to said third part, said opposed projections of said third part are resiliently deformed to release said holder from said slot.

**4,789,180**  
**KNOCK-DOWN UTILITY CART**  
Robert R. Bell, 804 Patricia, Ann Arbor, Mich. 48103  
Filed Apr. 3, 1987, Ser. No. 34,338  
Int. Cl.<sup>4</sup> B62B 1/04  
U.S. Cl. 280—652 18 Claims



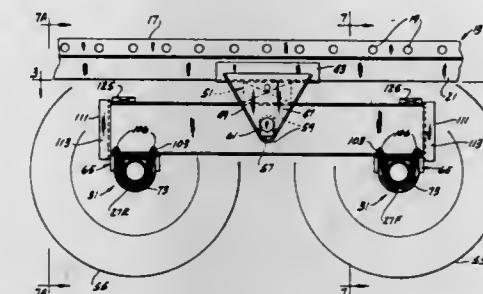
1. A utility cart which is capable of transporting large loads

along the ground, yet can be conveniently knocked down for storage and subsequent re-assembly, comprising a basket for carrying a load which is desired to be transported, said basket comprising a continuous rectangular perimeter frame having a longer dimension that is arranged lengthwise of the cart and a shorter dimension that is arranged transverse to the cart, said perimeter frame comprising a single length of tubular material comprising four integral, rounded 90 degree bends at particular locations along its length thereby forming integral longitudinal sides, integral transverse sides, and four integral, rounded 90 degree corners in the perimeter frame, said single length of tubular material having its opposite ends confronting and joined together, said basket further comprising a series of transverse members, also fabricated of tubular material, and arranged transversely of and at spaced apart locations along the cart's length, said transverse members having their opposite ends cut to generally semi-circular concave shapes to fit closely onto and join with substantially semi-circular shaped portions of the longitudinal sides of said perimeter frame and being shaped to cooperatively define a depression forming the basket, at least one tie extending lengthwise of the cart and joining to said transverse members at a level below that of said perimeter frame, an axle mount arranged transversely of the basket and joining to one of said transverse members such that the basket overlies the axle mount, axled wheels removably mounted on said axle mount and disposed alongside the opposite longer sides of the basket to support the cart for rolling motion along the ground, and a combination operating handle and strut assembly removably mounted on the basket at one lengthwise end thereof so as to be supported on the shorter side of the perimeter frame at said one lengthwise end of the basket and on the immediately adjacent transverse basket member, an operating handle of said assembly being disposed at an inclined angle to the plane of the perimeter frame to extend from said immediately adjacent transverse basket member past the shorter side of the perimeter frame at said one lengthwise end of the basket and terminate at a location which is spaced above the level of the perimeter frame and beyond said one lengthwise end of the basket, said assembly comprising a mounting for a strut providing a stowage position to which the strut is disposed when the cart is rolled along the ground so as to enable said one lengthwise end of the basket to be dropped down about the axled wheels relative to the opposite lengthwise end of the basket and said mounting providing a support position to which the strut is disposed when the cart is at rest for engaging the ground and cooperating with the wheels to provide stable support for the cart, said cart having a knock-down construction by which the cart can be knocked-down into (a) the basket including the axle mount, (b) the wheels, and (c) the combination operating handle and strut assembly.

**4,789,181**  
**WHEELED VEHICLE SUSPENSION**  
Bobby G. Baxter, Warren County, Mo., assignor to The Binkley Company, Warrenton, Mo.  
Filed Feb. 2, 1987, Ser. No. 9,503  
Int. Cl.<sup>4</sup> B60G 5/00  
U.S. Cl. 280—681 25 Claims

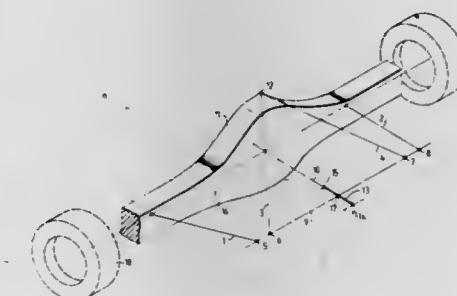
1. A suspension for tandem axles of a vehicle comprising:
  - a pair of walking beams, one for the right side and one for the left side of the vehicle, and a pair of axles, one constituting a forward axle and the other a rearward axle;
  - the forward axle being attached to the beams adjacent their forward ends and the rearward axle being attached to the beams adjacent their rearward ends;
  - means located generally centrally of the beams mounting the beams toward the sides of the body of the vehicle below the bottom of the body with each beam extending longitudinally of the vehicle and with each beam swingable generally about the center of the length of the beam in a generally vertical plane one way or the other from a horizontal position, and also movable up and down relative to the bottom of the body of the vehicle;
  - elastomeric means interposed between the body of the vehi-

cle and each beam resiliently supporting the body on the beams, the elastomeric means bearing the weight of the body and transmitting the weight to the beams generally centrally of the length of the beams; means for restraining each beam from longitudinal movement; and



means for restraining the beams from lateral movement in the horizontal position of the beams and axles and in angular positions of the beams off horizontal while allowing for the swinging of the beams, said means for restraining the beams from lateral movement comprising means fixed with respect to the body of the vehicle slidably engageable by the beams ends throughout their range of swing.

**4,789,182**  
**DEVICE FOR PIVOTING A RIGID AXLE DRIVEN BY A UNIVERSAL SHAFT TO THE FRAME OF AN AUTOMOTIVE VEHICLE**  
Egon Zenglein, Butzbach, Fed. Rep. of Germany, assignor to O&K Orenstein & Koppel Aktiengesellschaft, Dortmund, Fed. Rep. of Germany  
Filed Feb. 16, 1988, Ser. No. 156,276  
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1987, 3705417  
Int. Cl.<sup>4</sup> B60G 11/14  
U.S. Cl. 280—725 9 Claims



1. A device for pivoting a rigid axle, driven by a universal shaft between universal joints of a transmission, to the frame of an automotive vehicle, the device comprising a plurality of linkage elements; a plurality of frame-side supports on an imaginary transverse axis which is common to all supports and perpendicular to a longitudinal axis of the vehicle, said frame-side supports connecting with respective ones of said linkage elements, the vehicle including spring elements, a housing of said axle and wheels at opposite ends of the housing; and wherein the transverse axis intersects the universal shaft perpendicularly at the midpoint between the universal joints of the

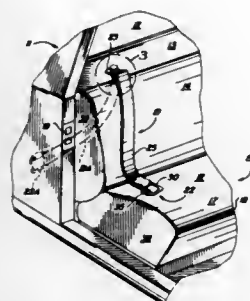


transmission and the rigid axle, the rigid axle being connected by the spring elements to a supported part of the vehicle;

said linkage elements comprising four links, two of said links being side links mounted on respective sides of the vehicle and being pivoted to the axle housing in regions close to the wheels, two other ones of said four links being triangle links intersecting with the transverse axis as base forming a part of a triangle; and wherein said device further comprises

a common spherical support point on the axle housing in the region of the longitudinal axis of the vehicle, the two triangle links extending to the common support.

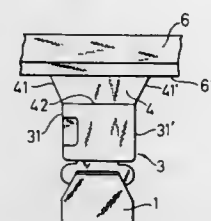
**4,789,183**  
**METHOD AND APPARATUS FOR RESTRAINING AN INDIVIDUAL**  
 Joseph A. Wolfer, 4903 W. Carol Ave., Glendale, Ariz. 86302  
 Filed Mar. 9, 1988, Ser. No. 165,813  
 Int. Cl.<sup>4</sup> B60R 21/00  
 U.S. Cl. 280—801 4 Claims



1. A method for securing an individual in the seat of a vehicle, said seat including an upstanding backing and a horizontally oriented support member having a rear portion and a front portion, said method including the steps of

- attaching handcuffs to the wrists of an individual's hands behind his back;
- attaching to said handcuffs a first pliable control strap having a first end with latching means and a second end with a manually grasped loop, said latching means attaching said strap to said handcuffs, said strap having a length in the range of sixteen to twenty-four inches;
- grasping said loop of said strap and walking with and behind the individual to the vehicle;
- grasping and pulling the free end of a second control strap from within said vehicle, said second control strap having another fixed end secured to said vehicle above and behind said backing, said strap normally extending downwardly over said rear portion of said support member with said free end of said strap normally resting on said seat, said free end including latching means to attach said free end of said second control strap to said handcuffs;
- attaching said latching means to said handcuffs;
- releasing said grasp on said first strap; and,
- seating said individual in said vehicle on said support member with said second control strap extending from above and behind said seat downwardly over said backing to said handcuffs, said strap being sized to prevent said individual while seated in said seat from working his hands underneath his buttocks and legs to the front of the individual's body.

**4,789,184**  
**PASSIVE SEAT BELT SYSTEM**  
 Hiroyuki Saito, Kanagawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan  
 Filed Aug. 14, 1987, Ser. No. 85,356  
 Claims priority, application Japan, Jun. 19, 1987, 62-94270[U]  
 Int. Cl.<sup>4</sup> B60R 21/10  
 U.S. Cl. 280—804 18 Claims



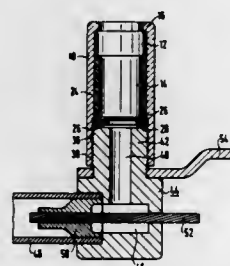
1. A passive seat belt system comprising:

- a guide rail;
- a slide anchor movable along the length of the guide rail and connected to one end of an occupant restraining webbing;
- a drive means for causing the slide anchor to move along the length of the guide rail between an occupant restraining position and an occupant releasing position; and
- a means for connecting the slide anchor and webbing to each other, comprising a first member attached to the slide anchor and a second member engageable with the first member, the webbing being fastened at the one end thereof on the second member;

wherein both end faces of the slide anchor as viewed in both running directions of the slide anchor flare out from the side of the webbing toward the side of the guide rail in the respective running directions; and

wherein at least one of end faces of the first member as viewed in both running directions of the slide anchor is formed without any step between said at least one end face of the first member and the corresponding one of the end faces of the slide anchor.

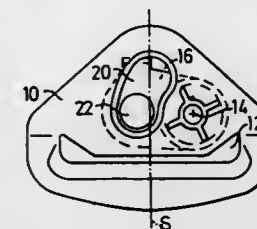
**4,789,185**  
**GAS GENERATOR FOR TIGHTENERS ON SAFETY-BELT RETRACTORS**  
 Artur Föhl, Schorndorf, Fed. Rep. of Germany, assignor to TRW Repa GmbH, Alfdorf, Fed. Rep. of Germany  
 Filed Jul. 30, 1987, Ser. No. 79,815  
 Claims priority, application Fed. Rep. of Germany, Aug. 8, 1986, 8621257[U]  
 Int. Cl.<sup>4</sup> B60R 22/36  
 U.S. Cl. 280—806 9 Claims



1. A gas generator for a tightener in a safety-belt retractor, comprising a cylindrical housing which is secured at one of its two ends to a transition member between the housing of the safety-belt retractor and a piston/cylinder drive of the tightener and at its other end comprises a radial collar and accommodates in its interior a propellant charge with a detonator, a hollow cylindrical sleeve being inserted into a hollow cylindrical

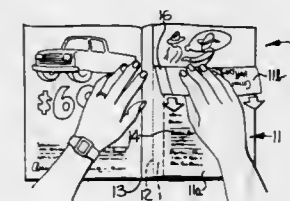
cal chamber formed inside of the housing, said sleeve having an outer diameter adapted to the inner diameter of said chamber and an inner diameter adapted to the outer diameter of a cylindrical capsule housing with a closed bottom which encloses the propellant charge and which is connected to a cylindrical base which is likewise inserted into said chamber of the housing, and which has a radial engagement face bearing on the radial collar of the housing, and the sleeve comprising a radially inwardly directed collar on the inner surface of which the bottom of the capsule housing bears.

**4,789,186**  
**BELT GUIDE FITTING**  
 Bert R. Andersson, Göteborg, Sweden, assignor to AB Volvo, Göteborg, Sweden  
 Filed Sep. 15, 1986, Ser. No. 907,488  
 Claims priority, application Sweden, Sep. 23, 1985, 8504395  
 Int. Cl.<sup>4</sup> B60R 21/10  
 U.S. Cl. 280—808 2 Claims



1. A belt guide fitting, especially for guiding a belt at its upper anchor point in a vehicle safety belt of three-point type, comprising a plate with a through slot for the belt, said plate being pivotally mounted on a pin, which lies forward, relative to the vehicle, of the midpoint of the slot, when said fitting is mounted in a vehicle body, characterized in that the plate is provided with means limiting the pivoting of the plate, said means being arranged, when the belt is subjected to a collision load, to fix the plate in a predetermined angular position for collision, the means limiting the pivoting of the plate consisting of a recess in the plate spaced from the pivot pin into which recess a projection extends which limits the pivoting of the plate when the projection strikes an end of the recess, the pivot pin being journaled in a plate supporting carrier element arranged to be non-rotatably fixed in a mounting, the projection consisting of a fastening screw which securely fixes the carrier element in the mounting.

**4,789,187**  
**REMOVABLE AND REATTACHABLE INDEX FOR BOUND VOLUMES**  
 Robin F. Corlew, and Darryl W. Bolduc, both of Charlotte, N.C., assignors to Quetzel, Inc., Charlotte, N.C.  
 Filed Feb. 6, 1987, Ser. No. 11,625  
 Int. Cl.<sup>4</sup> B42D 1/00; B41L 1/20; B42B 5/00; A61F 13/02  
 U.S. Cl. 281—15 R 16 Claims



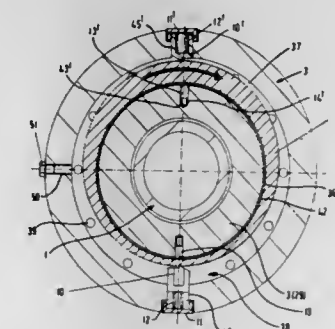
1. A bound volume of printed material such as a magazine or periodical and comprising:

- a plurality of individual printed pages bound together at a

binding and making up a plurality of indexable printed entries in said bound volume, at least one of said pages having an index printed on at least one of the faces thereof which index is related to said indexable printed entries;

- means removably attaching said one page to the others of said pages; and
- a repeatedly releasable self-stick adhesive carried by said one page on the face of said one page opposite to said at least one face having an index printed thereon for removably reattaching said one page to any one of the other of said pages of said bound volume, whereby said one page may be initially removed from its original position and reattached to another desired page in said bound volume and then repeatedly to another desired page in said bound volume and then repeatedly removed and reattached as desired to thereby mark a page or page location for a reader and to provide a readily available index to the reader at the marked page.

**4,789,188**  
**SWIVEL OR ROTATING JOINTS**  
 Colin Seabrook, Skerne, and Simon D. Usher, Braintree, both of England, assignors to J. H. Fenner & Co. Limited, North Humberstone, England  
 Filed Jun. 30, 1986, Ser. No. 880,076  
 Claims priority, application United Kingdom, Jun. 29, 1985, 8516504  
 Int. Cl.<sup>4</sup> F16L 7/00  
 U.S. Cl. 285—94 12 Claims



1. A swivel joint for interconnecting two lengths of pipe, comprising an inner annular member adapted, in use, to be connected to a first length of pipe, an outer annular member co-axial with the inner annular member and adapted, in use, to be connected to a second length of pipe, an annular chamber defined between the inner and outer annular members, bearing means positioned within the annular chamber and locating the inner and outer annular members for rotary movement relative to one another, and pump means located within the annular chamber for circulating lubricant within the annular chamber, said pump means comprising an eccentric ring which is disposed within the annular chamber defined between the inner annular member and the outer annular member and which is rotatably driven within the annular chamber by relative rotary movement between the inner annular member and the outer annular member.

# 4,789,189 PIPE SADDLE

Duane D. Robertson, 2601 Utica St., Denver, Colo. 80212  
Continuation-in-part of Ser. No. 834,960, Feb. 28, 1986,  
abandoned. This application Feb. 9, 1987, Ser. No. 12,291  
Int. Cl.<sup>4</sup> F16L 41/06

U.S. Cl. 285-197

12 Claims



1. A pipe saddle for mounting on a pipe, said pipe saddle including:

first body portion means extending along a first longitudinal axis and having an arcuate inner surface, first and second flange members respectively connected to said first body portion means on substantially opposite sides of said first body portion means relative to said first longitudinal axis,

second body portion means extending along a second longitudinal axis and having an arcuate inner surface, third and fourth flange members respectively connected to said second body portion means on substantially opposite sides of said second body portion means relative to said second longitudinal axis,

first connector means including first retainer means extending along a first retainer axis between said first and third flange members to pivotally mount said first and second body portion means together for pivotal movement about a first pivotal axis, said first pivotal axis being fixed relative to one of said first and third flange members and substantially parallel to and fixed relative to at least one of said first and second longitudinal axes of said first and second body portion means, said first connector means further including means for selectively drawing said first and third flange members toward each other along said first retainer axis, said retainer axis being substantially perpendicular to said one of said first and second longitudinal axes of said first and second body portion means, said first connector means further including means for maintaining said first and second body portion means together as a singletary unit as said first and second body portions are pivotally moved relative to each other about said first pivotal axis, and

second connector means including second retainer means extending along a second retainer axis and means for pivotally mounting said second retainer means to one of said second and fourth flange members for pivotal movement about a second pivotal axis, said second pivotal axis being fixed relative to one of said second and fourth flange members and substantially parallel to and fixed relative to at least one of said first and second longitudinal axes of said first and second body portion means, the other of said second and fourth flange members including an open slot for selectively receiving said second retainer means as said second retainer means is pivoted about said second pivotal axis, said second connector means further including means for selectively drawing said second and fourth toward each other along said second retainer axis when said second retainer means is received in said open slot wherein said first and second body portion means of said pipe saddle can be opened relative to each other and placed about the pipe by being pivotally moved relative to each

other about said first pivotal axis with said second retainer means pivoted about said second pivotal axis and disengaged from receipt in said open slot and whereby said first and second body portion means can be selectively tightened on said pipe by pivoting said second retainer means about said second pivotal axis to be received in said open slot and then said first and second retainer means selectively and individually tightened to respectively draw said first and third flange members toward each other and to draw said second and fourth flange members toward each other.

# 4,789,190 SYSTEM FOR IMPROVING THE GRIPPING POWER OF A VEHICLE WHEEL ON A SUPPORT

Einar Elke, Tvedestrand, and Ragnvald Skarvelen, Drangedal, both of Norway, assignors to UC System A/S, Tvedestrand, Norway

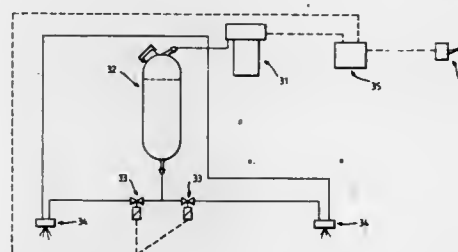
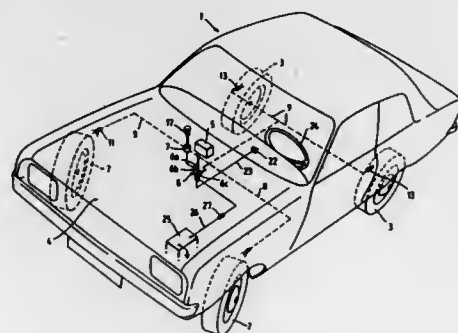
PCT No. PCT/NO86/00042, § 371 Date Apr. 20, 1987, § 102(e) Date Apr. 20, 1987, PCT Pub. No. WO87/00126, PCT Pub. Date Jan. 15, 1987

PCT Filed Jun. 23, 1986, Ser. No. 33,090

Claims priority, application Norway, Jun. 26, 1985, 852575 Int. Cl.<sup>4</sup> B60B 39/02

U.S. Cl. 291-6

6 Claims



1. A system for improving the gripping power of vehicle wheels on a surface, comprising nozzles near the wheels supplied with a liquid from a container and means for controlling the liquid supply, characterized in that:

said container holds a liquid which in the winter enhances the gripping power of the wheels on a winter slippery surface,

said system includes a compressor for using the air therefrom for applying the liquid and for cleaning the nozzles, said container is connected with a dosing means for dosed application of the liquid,

said dosing means comprises a dosing reservoir, said container being connected with a first branch of a three-way valve, said dosing reservoir being connected with a second branch of said valve and said nozzles being connected with a third branch of said valve,

said dosing reservoir is connected with said compressor via a first conduit for forcing the liquid out of said dosing reservoir through said second the third valve branches to said nozzles, and

said compressor is directly connected to said nozzles to clean the same via a second conduit which bypasses said reservoir and said valve.

4. A system for improving the gripping power of vehicle wheels on a surface, comprising nozzles near the wheels supplied with a liquid from a container and means for controlling the liquid supply, characterized in that:

said container holds a liquid which in the winter enhances the gripping power of the wheels on a winter slippery surface,

said system includes a compressor for using the air therefrom for applying the liquid and for cleaning the nozzles, said container is connected with a dosing means for dosed application of the liquid,

said dosing means comprises:

first conduit means connecting said compressor to said container for forcing liquid therefrom to said nozzles, valve means controlling the supply of liquid from said container to said nozzles, second conduit means connecting said compressor directly to said nozzles for cleaning the same, and a timing relay with two different time adjustments, a first timing interval guiding compressed air to said container and opening said valve means to supply said liquid to said nozzles and a second time interval longer than said first time interval guiding compressed air directly to said nozzles to clean the same after the supply of liquid thereto has been shut off by the closing of said valve means.

# 4,789,191 CENTERING DEVICE FOR SECURING AND CENTERING A DOOR HANDLE

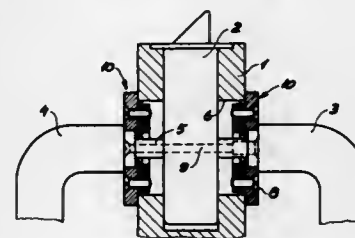
Derek Dennis, Helsingør, Denmark, assignor to Carl F. Petersen A/S & Co. Vaerkøjt, Møbel- og Bygningsbeslag KS, Denmark

Filed Oct. 21, 1986, Ser. No. 921,112

Claims priority, application Denmark, Oct. 25, 1985, 4902/85 Int. Cl.<sup>4</sup> E05B 1/00

U.S. Cl. 292-347

3 Claims



1. A device for centering and securing a pair of door handles on a door having a hole therethrough of circular cross-section and an opening in one edge extending transverse to and communicating with said hole, said opening being adapted to receive a mortise lock having a door handle mandrel, said device comprising two sets of three plate-shaped bodies engaging one another with one set being mounted on each side of the door adjacent the door hole, each set comprising an outer plate having a central hole for receiving the door handle and permitting its connection to one end of the door handle mandrel, said outer plate having an outer dimension greater than the door hole, an inner plate having a diameter smaller than the diameter of the door hole and a central opening for passage of the mandrel, and a central plate having a diameter essentially the same as the door hole and located between said inner and outer plates, said central plate also having an opening for passage of the mandrel, means for clamping the three plates of each set together to fix the central plate relative to the inner and outer

plates and means for clamping the two sets of plates together to hold them to opposite sides of the door hole.

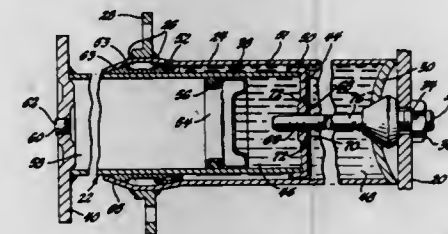
# 4,789,192 TWO-STAGE VARIABLE ORIFICE ENERGY ABSORBER WITH CYLINDER CAP HAVING RADIALLY FIXED BLOW OUT ORIFICE

Harold J. Warner, Kettering, and Abayomi O. Folarin, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Continuation-in-part of Ser. No. 811,444, Dec. 20, 1985, abandoned. This application May 20, 1987, Ser. No. 52,703 Int. Cl.<sup>4</sup> B60R 19/32

U.S. Cl. 293-134

3 Claims



1. A variable orifice impact energy absorbing unit for a vehicle comprising first and second hydraulic cylinders telescopically mounted with respect to each other for stroking movement between extended and retracted positions, said cylinders providing a pair of volume chambers filled with fluid, spring means associated with said cylinders for moving cylinders to an extended position, an orifice element operatively mounted in a cap portion of one of said cylinders, retention means securing said orifice element in said cap portion so that said orifice element is prevented from radial movement with respect thereto during energy absorbing operation of said unit, said orifice element having an internal annular opening to define a radially fixed and centralized fluid flow passage hydraulically interconnecting said chambers, a tapered metering pin substantially concentric with and extending through said fluid flow passage of said fixed orifice element and cooperating directly with said passage when stroking therethrough to gradually reduce the effective flow area of said passage as the cylinders move toward a retracted position in a first stage of energy absorbing operation, said orifice element having a main body, and said retention means comprising frangible means formed by an annular groove directly in said wall of the end around said opening releasably securing said main body to said cap portion so that a predetermined fluid pressure buildup in one of said chambers will exert a force sufficient to displace said main body from said cap to thereby create a large diameter fluid flow opening in said cap allowing pressure fluid to flow from said one of said chambers to the other of said chambers passing said metering pin at an increased rate so that said unit will absorb energy in a second stage of energy absorbing operation.

# 4,789,193 UNIVERSAL SLING FITTING

William D. Meals, Lancaster, Pa., assignor to Lift-All Company, Inc., Manheim, Pa.  
Filed Oct. 19, 1987, Ser. No. 109,907  
Int. Cl.<sup>4</sup> B66C 1/18

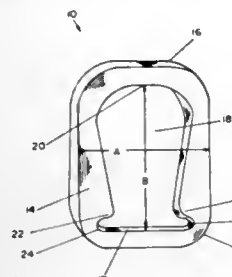
U.S. Cl. 294-74

4 Claims

1. An end fitting for a lifting sling comprising:  
a continuous planar structure, with its length dimension exceeding its width dimension, shaped to enclose an opening, with a first boundary of the opening being a straight surface so that a web will wrap around the straight surface and the adjacent part of the structure, and a second boundary of the opening, which is located opposite from the first



boundary, being curved to accept a crane hook, the opening being dimensioned so that the longest dimension of the opening exceeds the dimension of the width of the planar structure; and



two protrusions from the structure into the opening, the protrusions being located near the first boundary of the opening so as to limit the movement of a web which is wrapped around the first boundary.

4,789,194

## LIFTING DEVICE FOR CONTAINERS

Norman F. Watson, Chipperfield, England, assignor to EKA Limited, Edinburgh, Scotland

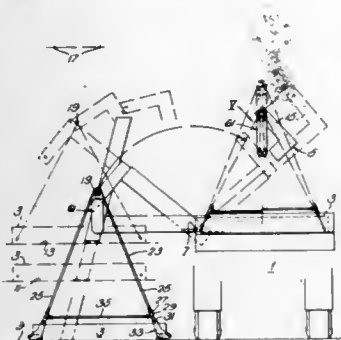
Filed Jun. 16, 1987, Ser. No. 62,895

Claims priority, application United Kingdom, Jun. 20, 1986, 8615149

Int. Cl. B66C 1/36, 1/66

U.S. Cl. 294—82.1

12 Claims



1. A lifting device for handling flat racks or containers fitted with ISO corner castings comprising a first support plate; a lifting pin having a longitudinal axis extending normally to the support plate for engagement in an end aperture in an ISO corner casting on the flat rack; means for connecting said plate to a lift strap; support on said plate; and a locking pin carried by said support means and radially movable along an axis at right angles to the longitudinal axis of the lifting pin for engagement with and disengagement from an aperture in the side of said ISO corner casting.

4,789,195

## TRUCK TOOL BOX

Nevin R. Fletcher, 11286 Roxabel St., Santa Fe Springs, Calif. 90670

Filed Jun. 24, 1987, Ser. No. 66,041

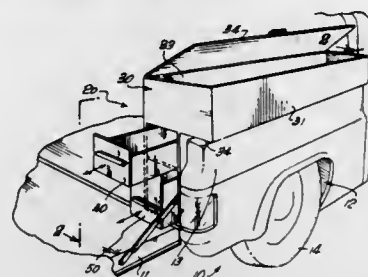
Int. Cl. B60R 5/00

U.S. Cl. 296—37.6

12 Claims

1. The combination with a pickup truck of a storage compartment mountable upon the upper edge of the side of a pickup truck and having an extension parallel with said upper edge and the bed of the said pickup truck for a distance comprising the width of a fender well within the bed of said pickup

truck and having a perpendicular downwardly depending lip extending to the bed of the pickup truck and on the side of said fender well creating a lengthwise compartment between said



fender well and the front of the bed of the pickup truck and the back of the bed of the pickup truck lengthwise over said fender well in such manner that the closed tailgate of pickup truck will prevent access to said compartment

4,789,196

## CONVERTIBLE TOP FOR PICK-UP TRUCKS

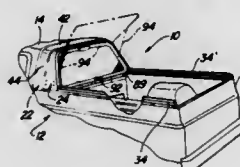
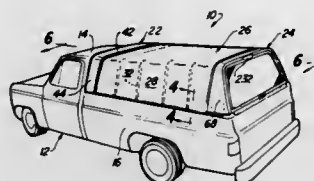
Delmer G. Fields, Waterford, Mich., assignor to Transmatic, Incorporated, Waterford, Mich.

Filed Sep. 2, 1986, Ser. No. 902,761

Int. Cl. B60P 7/02

U.S. Cl. 296—100

10 Claims



1. A convertible top for covering a cargo box of a pick-up truck, said top comprising:

- a rigid front shell having a top, a pair of opposed side walls and a front wall, said top and side walls having free edges surrounding an opening in said shell, said front shell being adapted to be fixedly mounted on said box at the front thereof with said front wall at the forward end of said box,
- a pair of rails adapted to be fixedly mounted on opposite sides of said box and extending from the rear end of said box into said front shell,
- a rigid rear shell having a top, a pair of opposed side walls and a rear wall, said top and side walls of said rigid rear shell having free edges surrounding an opening in said rear shell, said rear shell being movably mounted by carriages on said rails for movement between an extended position adjacent the rear end of said box to a retracted position, the free edges of one of said shells being adapted to fit inside the free edges of the other of said shells in said retracted position, whereby said shells overlap each other in a telescopic arrangement to form a closed capsule,
- a collapsible canopy including a flexible sheet having a front edge secured to the rear end of said front shell and having a rear edge secured to the front end of said rear shell, said canopy also including a plurality of arch-like bows for supporting said sheet, each bow being movably supported

at each end on a bow carrier on one of said rails for movement longitudinally thereof when said rear shell is moved between said extended and retracted positions, whereby said canopy may be collapsed with said sheet folded into festoons inside a first of said shells and with said sheet folded back upon itself over said festoons when said rear shell is moved to said retracted position with said first shell overlapping the other in said telescopic arrangement.

4,789,197

## COVER FOR OPEN BED OF PICKUP TRUCK

Jewell V. Lewis, 4022 Linda Vista Dr., Fallbrook, Calif. 92028

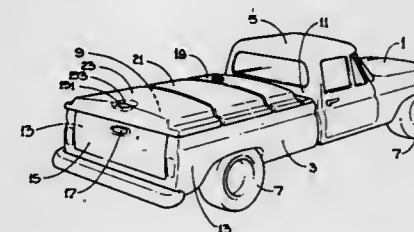
Continuation-in-part of Ser. No. 867,696, May 27, 1986,

abandoned. This application Jun. 10, 1987, Ser. No. 78,274

Int. Cl. B60P 7/02

U.S. Cl. 296—100

12 Claims



1. A removable assembly for covering the opened bed of a pickup truck defined by the cab rear wall, opposed side walls and tail gate, comprising:

- (a) a plurality of rigid cover panels of generally inverted U-shape adapted to straddle the truck side walls across the bed and close together in end-to-end abutting relationship, from a forward-most position adjacent the truck cab to a rearward most position adjacent the tail gate, each panel containing a pair of spaced-apart support rails;
- (b) a pair of straight tracks mounted in spaced-apart parallel relationship atop the truck side walls adapted to receive said cover panel support rail pairs in sliding relationship therewith for fore and aft movement along the length of the truck bed;
- (c) a rain water collecting groove formed in each said panel adapted to span the width thereof, across the truck bed and underlie a portion of one of the other said panels;
- (d) said forward-most panel adapted to pivot upward to allow entry into the front of the truck bed;
- (e) said rearward-most panel adapted to engage the top of the tail gate in locking relationship therewith; and,
- (f) means, engageable with said straight tracks, to lock said assembly and the tail gate in secure position from atop said panels independent of the security mechanism of the tail gate.

4,789,198

## FRONT STRUCTURE OF VEHICLE BODY

Yoshikazu Ide, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 9, 1987, Ser. No. 71,759

Claims priority, application Japan, Jul. 11, 1986, 61-163373

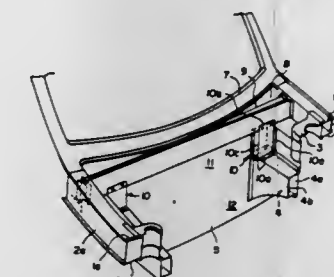
Int. Cl. B62D 27/00

U.S. Cl. 296—192

9 Claims

1. A front structure of a vehicle body having an open cowl structure for supporting the lower edge of a windshield comprising a dashboard panel having an upper dashboard member which defines a part of the open cowl structure and a lower dashboard member, said upper dashboard member includes a vertical wall portion and said lower dashboard member includes an upper vertical wall portion, said vertical wall portions forming a closed cross-section portion extending in the transverse direction of the vehicle body along the open cowl structure, a wheel apron which defines a side wall of an engine

compartment formed on the front side of the dashboard panel, a front frame which has a closed cross-section and is mounted on the wheel apron to extend in the longitudinal direction of the vehicle body in the engine compartment, a wheel apron reinforcement having a closed cross-section which extends in



the longitudinal direction of the vehicle body is mounted outside said front frame with said closed cross-section portion formed by said dashboard members being attached to said wheel apron reinforcement, and a reinforcement connecting the closed cross-section portion with the front frame.

4,789,199

## VEHICLE UNDERBODY STRUCTURE

Nobuhiro Komatsu, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

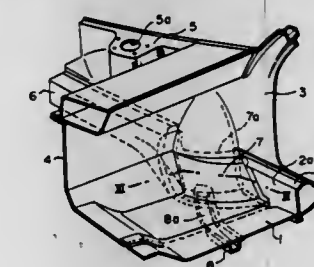
Filed Jul. 2, 1987, Ser. No. 69,180

Claims priority, application Japan, Jul. 4, 1986, 61-157463

Int. Cl. B62D 21/00

U.S. Cl. 296—194

11 Claims



1. An underbody structure for a vehicle comprising a front frame which has a closed cross section and is connected to a front wheel apron to extend in the longitudinal direction of the vehicle body, a side sill which has a closed cross section and extends along an outer side edge of a floor panel in the longitudinal direction of the vehicle body on the outer rear side of the front frame at a height lower than that of the front frame, a torque box having a torque box panel formed integrally with said front frame as a rearward extension of a part of said front frame and which extends along the rear surface of the front wheel apron and connects the rear end of the front frame and the front end of the side sill, and a floor frame which is connected to the lower surface of the floor panel on the inner side of the outer side edge of the floor panel to extend in the longitudinal direction of the vehicle body and the front edge of which is connected to an intermediate portion of the torque box.

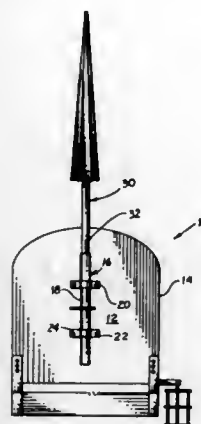
**4,789,200**  
**COMBINED CHAIR AND UMBRELLA SUPPORT**  
**STRUCTURE**

Richard Mangula, 8425 E. Amethyst St., Tucson, Ariz. 85715  
Filed Jul. 27, 1987, Ser. No. 78,582

Int. Cl.<sup>4</sup> A47C 29/00

U.S. Cl. 297—184

1 Claim



1. A new and improved umbrella support structure in combination with a chair, said structure comprising:

a chair;

a clamp means attaching a conduit means to a rear surface of said chair; an umbrella having a shank portion; said conduit means oriented for receiving said shank portion, and umbrella height adjustment means, said adjustment means including a manually removable and insertable clip pin positionable through said conduit means upon which said shank portion is positioned, said clip pin being selectively positionable along an axial length of said conduit means through one of a plurality of through extending apertures positioned along an axial length of said conduit means, and further including shank locking means wherein said locking means comprises hook and loop fasteners wherein a first section of said hook and loop fasteners is attached to an exterior surface of said conduit means and a second section of said hook and loop fasteners is attached to an exterior surface of said shank portion, said first and second sections being engageable together to effect a locking function.

**4,789,201**  
**SEAT TRIM ATTACHMENT STRIP**

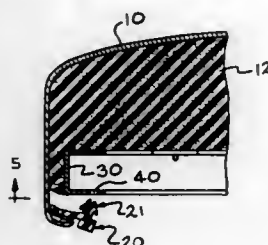
Alan J. Selbert, Tecumseh, Mich., assignor to Hoover Universal, Inc., Ann Arbor, Mich.

Filed Sep. 8, 1987, Ser. No. 94,284

Int. Cl.<sup>4</sup> A47C 27/00

U.S. Cl. 292—218

5 Claims



1. In a vehicle seat assembly which includes a support frame having a plurality of spaced apart apertures of predetermined width provided therein, a seat cover member, and a trim at-

tachment strip fastened to said seat cover member, said strip comprising:

a unitary body having an elongated base portion secured to said seat cover member and a plurality of pairs of side-by-side projections spaced apart lengthwise of said strip, each of said pairs of side-by-side projections extending in a spaced apart relation from said base portion and terminating in retention tabs which extend away from each other in a direction transversely of said projection; said projections being capable of flexing movement toward each other to engaged positions and being biased towards spaced apart positions; each of said tabs being of increasing width in a direction extending from the terminal end of said projection toward said base and terminating in retention shoulders which extend transversely of said projections; and said tabs being dimensioned relative to said aperture width such that in said engaged positions of said projections said tabs can be extended in one direction through said apertures to positions in which said shoulders, in the spaced apart positions of said projections, engage said frame to prevent movement of said tabs through said apertures in an opposite direction.

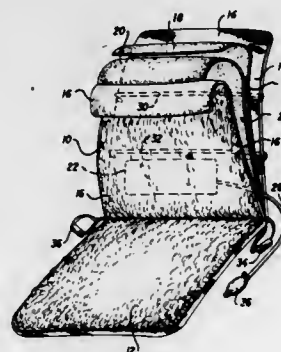
**4,789,202**  
**INFLATABLE SEAT CUSHION**

Roy H. Alter, 127 N. Gardner St., Los Angeles, Calif. 90036  
Filed Jul. 13, 1987, Ser. No. 72,511

Int. Cl.<sup>4</sup> A47C 7/02, 7/40

U.S. Cl. 297—284

7 Claims



1. A portable cushion assembly, adapted to be releasably secured to a seat structure comprising: a seat section and a back section hinged to one another, each of said sections comprising a fabric casing and a pair of generally continuous foam sheets filling said casing and supported thereby; and an inflatable member positioned between said foam sheets and forming an air chamber mounted in said back section whereby its supports the lower lumbar region of an individual seated on the cushion assembly.

**4,789,203**  
**CHAIR WITH MOVABLE SEAT AND BACKREST**  
Eric van Zee, Delft; Harm Boomsma, Hendrik Ido Ambacht; Ronald Lewerissa, and Jeroen Verbrugge, both of Delft, all of Netherlands, assignors to Ahrend Groep N.V., Amsterdam, Netherlands

Filed Feb. 13, 1987, Ser. No. 15,189

Claims priority, application Netherlands, Oct. 6, 1986, 8602506

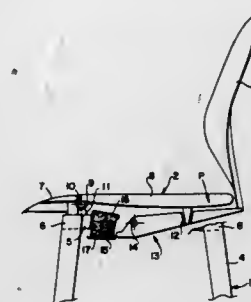
Int. Cl.<sup>4</sup> A47C 1/02

U.S. Cl. 297—316

5 Claims

1. A chair comprising a rigid support element, a seat and a backrest, the seat comprising a foremost portion being rigidly connected to the rigid support element thereby forming a rigid

portion and a rear portion being pivotally connected to the support element adjacent its forward edge, the rear seat portion extending a longer distance between the pivotal connection and the backrest than a distance between the pivotal connection and a forward end of the foremost portion, and the rear seat portion being supported by an arm at a distance from its pivot, the arm being positioned beneath the seat and extending substantially parallel thereto, the arm carrying the backrest



and being pivotally connected to the support element at a point located beneath the seat between the pivot of the rear seat portion and a point where the rear seat portion is supported by the arm, a spring member being formed by a spring element having a progressive non-linear spring characteristic disposed between the arm and the support element to bias the arm together with rear seat portion and the backrest to a position in an unloaded state.

**4,789,204**  
**RECLINING DEVICE FOR AUTOMOTIVE SEAT**  
Yuzo Kanazawa, Gifu Prefecture, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan

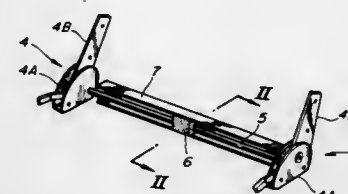
Filed Nov. 20, 1987, Ser. No. 123,320

Claims priority, application Japan, Dec. 29, 1986, 61-199243[U]

Int. Cl.<sup>4</sup> B60N 1/02

U.S. Cl. 297—355

5 Claims



1. In an automotive seat having a seat cushion and a seat-back, a reclining device comprising:  
first and second substantially identical units which are respectively arranged at lateral sides of the seat, each unit including a base portion secured to said seat cushion, essential parts of a reclining mechanism mounted to said base portion, an operation handle extending from the essential parts, and an arm extending from the essential parts and secured to said seatback, so that upon manipulation of the operation handle, the angular position of the seatback relative to said seat cushion can be adjusted;  
an elongate rod having both ends respectively connected to the operation handles of the first and second units thereby to achieve a synchronous pivotal movement of the operation handles about the axis of the elongate rod;  
a channel-like frame provided in a rear part of said seat cushion, said channel-like frame extending along said elongate rod partially covering the same; and  
resilient means mounted to restrain vibration of a longitudinally middle portion of said elongate rod in such a manner

that at least a part of the resilient block is compressed between said elongate rod and said channel-like frame.

**4,789,205**  
**ARTICULATION FOR A SEAT BACK COMPRISING A COMPOSITE BEARING PLATE**  
Yves Pipon, and Georges Droulon, both of Fiers, France, assignors to A. & M. Cousin Etablissements Cousin Freres, Fiers, France

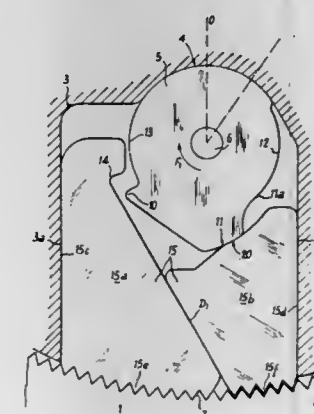
Filed Feb. 6, 1987, Ser. No. 11,822

Claims priority, application France, Feb. 7, 1986, 86 01702

Int. Cl.<sup>4</sup> B60N 1/02

U.S. Cl. 297—367

4 Claims



1. An articulation for a seat back comprising  
a fixed flange (2) having a lower recess, and a mobile flange (1) adjacent said fixed flange,  
a slidable composite bearing plate (15) and a cam (5) moveably mounted within the lower recess (3) and said mobile flange (1) being also provided with a recess (8) in registration with the lower recess (3) and being larger than said lower recess (3),  
said fixed and mobile flanges being mounted on an articulation axis (0) above said movable flange with said fixed and mobile flanges being alternatively movable and fixed with respect to one another by means of said slidable composite bearing plate (15),  
a drive shaft (6) for rotating said cam (5) to control displacement of said slidable composite bearing plate, said cam being provided with a stepped portion (11) and a nose (10),  
said slidable bearing plate (15) being guided by parallel walls (3a, 3b) of the lower recess (3) and being formed of first and second parts (15a, 15b) bearing together along a straight line (D1),  
said first and second parts of said bearing plate having lower toothings (15e, 15f) cooperating with a corresponding tootthing (7) of said mobile flange (1), the lower tootthing (15e) of said first part substantially fully engaging said corresponding tootthing (7) while the lower tootthing (15f) of said second part (15b) extends only partly within said corresponding tootthing (7), whereby a degree of play exists to provide compensation when the stepped portion (11) pushes said second part (15b) of said slidable composite bearing plate (15).



**4,789,206**  
**QUICK-RELEASE TYPE CLAMPING ASSEMBLY FOR BICYCLE HUB**

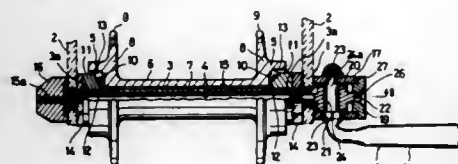
Nobuo Ozaki, Osaka, Japan, assignor to Maeda Industries, Ltd., Osaka, Japan

Filed Apr. 6, 1987, Ser. No. 34,929

Claims priority, application Japan, Apr. 11, 1986, 61-84626  
 Int. Cl.<sup>4</sup> B62K 25/02

U.S. Cl. 301-111

4 Claims



1. A quick-release type clamping assembly for a bicycle hub comprising:

- a tie rod having one end screwed to a nut for engagement with a bicycle fork end;
- an enlarged head being provided at the other end of said tie rod, said enlarged head being formed with a cam hole extending therethrough transversely of said rod as well as with a first threaded portion extending axially of said rod;
- a hollow presser member fitted around said enlarged head for engagement with another bicycle fork end and being movable relative thereto axially of said rod toward and away from said nut for clamping and releasing said fork ends;
- a lever mounted to said presser member and being pivotable about a pivotal axis between a clamping position and a releasing position;
- said lever having a cam portion received within said cam hole and being eccentric relative to said pivotal axis for moving said presser member by said cam portion relative to said enlarged head axially of said rod in response to pivotal movement of said lever;
- a lock member having a second threaded portion adjustably screwed to said first threaded portion; and
- said lock member further having a stopper portion for direct abutment with said presser member to directly limit axial movement thereof away from said nut.

**4,789,207**  
**SLIP-CONTROLLED BRAKE SYSTEM FOR AUTOMOTIVE VEHICLES**

Hans Wapper, Friedrichsdorf, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Jan. 23, 1987, Ser. No. 6,117

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1986, 3602128

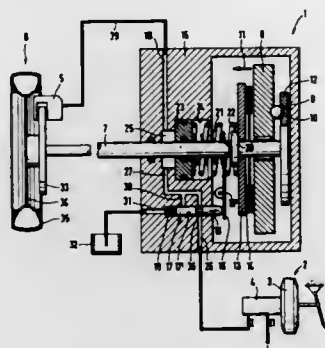
Int. Cl.<sup>4</sup> B60T 8/34, 8/42

U.S. Cl. 303-113

7 Claims

1. Slip-controlled brake system with a deceleration-sensitively actuated brake pressure modulator comprising a shaft rotating at a velocity related to the angular velocity of a controlled vehicle wheel and an inert mass arranged on the shaft and rotating together with said shaft, which inert mass is axially displaceable in opposition to a return force on said shaft when the controlled vehicle wheel is decelerated and a wheel deceleration threshold is exceeded and which thereby acts upon a control element controlling the brake pressure modulation, said return force being provided by a resilient means comprising at least two return springs and mounted adjacent to a pressure chamber coaxially surrounding said shaft and communicating with the brake pressure in the wheel brake (5) of the controlled wheel (6), said brake system further including a clutch and brake mechanism which permits a difference in speed between the shaft and the inert mass (8) when the vehicle wheel is decelerated, and which causes the axial displacement

as well as a deceleration of the inert mass (8) during the control phase, wherein said resilient means are operable to vary the



deceleration of the inert mass (8) as a function of the instantaneous brake pressure in the wheel brake (5) of the controlled wheel (6).

**4,789,208**  
**ANTI-LOCKING BRAKE MODULATOR WITH INDEPENDENT INPUT AND OUTPUT SOLENOID ACTUATED VALVES INCLUDING CHECK VALVE AND PRESSURE RELIEF VALVE**

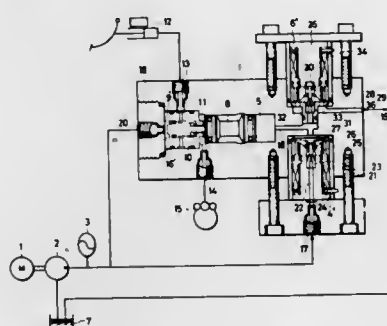
Teruhisa Kohno, Hyogo, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Nov. 26, 1986, Ser. No. 935,492

Claims priority, application Japan, Nov. 26, 1985, 60-265407  
 Int. Cl.<sup>4</sup> B60T 8/42, 13/68, 15/02

U.S. Cl. 303-115

1 Claim



1. An anti-locking modulator, comprising:  
 a pressure source of pressurized fluid;  
 a control chamber receiving said pressurized fluid;  
 a brake pressure cylinder for supplying braking pressure to a brake;  
 pressure reduction means for reducing said braking pressure during an anti-locking operation depending on the pressure level of said pressurized fluid in said control chamber;  
 an input solenoid valve connecting said pressure source and said control chamber and including a fixed first valve seat, a movable first valve element seating on said first valve seat, an armature operatively engaging said first valve element to the side of said first valve element opposite said valve seat, a first spring on the side of said armature and said movable first valve element opening to said control chamber for biasing said first valve element towards said first valve seat, and a first solenoid operatively positioned with respect to said armature such that when electrically powered further forces said first valve element against said first valve seat to prevent said pressurized fluid from

flowing into said control chamber, and wherein when said first solenoid is electrically deenergized, said pressurized fluid from said pressure source is applied against said first spring to unseat said movable first valve element and permits pressurized fluid flow into said control chamber; and said first spring acts on said movable first valve element such that said first solenoid valve functions as a check valve to prevent pressurized fluid from flowing from said control chamber to said pressure source; and an output solenoid valve independent of said input solenoid valve connecting said control chamber to a reduced pressure region and including a fixed second valve seat, a second movable valve element and an armature on the side of said second valve seat proximate to said reduced pressure region, and a second solenoid which when energized moves said second valve element away from said second valve seat, a second spring engaging said armature and biasing said second valve element against said pressurized fluid in said control chamber to maintain said second movable valve element closed against said second valve seat when said second solenoid is electrically deenergized; and wherein said biasing force of said second spring is in excess of that of said first spring so that said second valve element functions as a pressure relief valve with said pressurized fluid maintained in said control chamber at a pressure no higher than a prescribed pressure determined by said second spring, and wherein said second solenoid, when electrically energized, is of sufficient power to move said second valve element out of sealing contact with said second valve seat against the bias of said second spring to drain said pressurized fluid from said control chamber.

**4,789,209**  
**CASING FOR STORING THEREIN A PLURALITY OF CASSETTES**

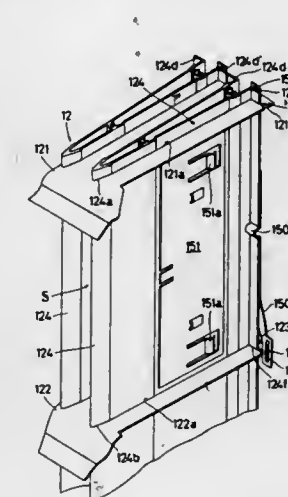
Shunichi Teranishi, Anjo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Aichi, Japan

Filed Jun. 4, 1986, Ser. No. 870,582

Claims priority, application Japan, Jun. 4, 1985, 60-084066[U]  
 Int. Cl.<sup>4</sup> A47B 81/06

U.S. Cl. 312-12

2 Claims



1. A casing for storing therein a plurality of cassettes comprising:  
 a pair of parallel, vertically spaced apart plates having notches therein;  
 a plurality of spaced apart, vertically extending wall panels disposed in said notches and secured between said plates to define a plurality of slots for receiving and storing a cassette in each slot;  
 each of said wall panels having a pair of oppositely extending flanges along a vertical edge thereof in alignment with

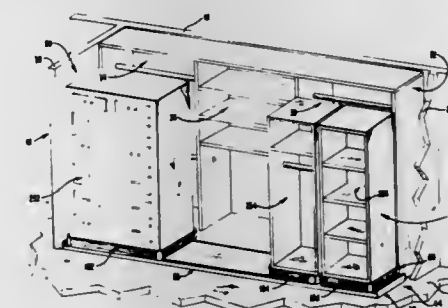
the flanges of adjacent panels to define an end wall for each slot; and  
 an elongated resilient member slidably engaged at opposite ends thereof with each plate respectively and disposed externally of each slot in alignment with each pair of flanges defining each end wall of a slot to hold said panels in said notches;  
 wherein at least one of said flanges defining an end wall of each slot is provided with an aperture located intermediate said plates; and  
 wherein each resilient member has a projection portion intermediate the end thereof extending through each aperture into a respective slot for engagement by a cassette to properly locate a cassette in each slot.

**4,789,210**  
**MOVABLE CABINETRY SYSTEM FOR ENCLOSURES**  
 Morton A. Weiss, West Orange, and Robert F. Weiskopf, Springfield, both of N.J., assignors to White Home Products Inc., Atlanta, Ga.

Filed Jan. 11, 1988, Ser. No. 142,636  
 Int. Cl.<sup>4</sup> A47B 53/00

U.S. Cl. 312-201

10 Claims



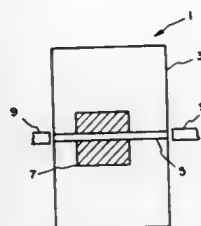
1. In an enclosure having a plurality of walls at least one of which is elongate, a floor, door means for gaining access to said enclosure, and stationary cabinetry having elongate front and back portions, the back portion of which is positioned along and fixed in place relative to said elongate wall, a movable cabinetry system, comprising a track assembly positioned on said floor adjacent to, parallel to and coextensive with at least a major portion of the elongate front portion of said stationary cabinetry, said track assembly including a longitudinally elongate, generally rectangular platform member having transversely spaced side edges and longitudinally spaced end edges, and a pair of transversely spaced track members fastened to said platform member adjacent said corresponding side edges thereof, said track members each including a rail projecting upwardly therefrom above the plane of said platform member; at least one carriage assembly longitudinally movable on said rack assembly and adapted to support a cabinet thereon for longitudinal movement therewith, said carriage assembly being generally rectangular in plan and including a pair of transversely spaced side members, a pair of longitudinally spaced end members, and means for rigidly interconnecting said side members and said end members together, said side members each including a pair of longitudinally spaced wheels rotatably supported therein, said wheels of said carriage assembly being engageable with and rotatable on said rails of said track assembly; and means carried by one of said assemblies and engageable with the other of said assemblies for inhibiting tilting of said carriage assembly with respect to said track assembly.

**4,789,211**  
**HOLOGRAM STABILIZING ASSEMBLY AND METHOD**  
 John E. Wroede, Monrovia, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Feb. 13, 1987, Ser. No. 14,752  
 Int. Cl.<sup>4</sup> G03G 1/78; G03H 1/04  
 U.S. Cl. 350—3.61



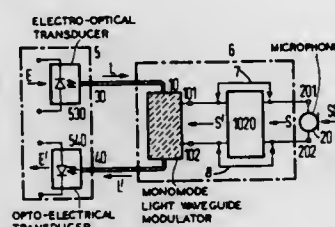
1. A pre-holographic assembly comprising:  
 a first hydrophobic substrate layer;  
 a water absorbent layer positioned on said first hydrophobic substrate layer;  
 a second hydrophobic substrate layer positioned on said water absorbent layer; and  
 a photosensitive holographic emulsion layer positioned on said second hydrophobic substrate layer so that said photosensitive holographic emulsion layer can be exposed and developed to provide a hydrophobic image layer, said first and second substrate layers being sufficiently strong to support said emulsion layer.

**4,789,212**  
**INTEGRATED OPTICAL POLARIZER WITH HIGH EXTINCTION RATIO AND LOW INSERTION LOSS, AND IMPROVED METHOD OF FABRICATION THEREOF**  
 Julian P. G. Bristow, Naperville; Michael Keur, Niles; Gregory J. Lukas, Wheaton; Sriram Sriram, and Albert C. Wey, both of Naperville, Ill., assignors to Amphenol Corporation, Wallingford, Conn.  
 Filed Dec. 22, 1986, Ser. No. 945,736  
 Int. Cl.<sup>4</sup> G02B 6/12  
 U.S. Cl. 350—96.12



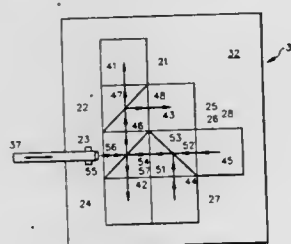
1. An integrated optical circuit device for polarizing light comprising: an in-diffused channel light guiding region in a substrate comprising  $\text{LiNbO}_3$  or  $\text{LiTaO}_3$ , said substrate being a Y-cut or Z-cut  $\text{LiNbO}_3$  or  $\text{LiTaO}_3$  crystal with said light guiding region having been defined by diffusing titanium into the crystal; a dielectric layer of  $\text{ZnO}$  overlying the light guiding region and adhered to the substrate; an aluminum layer overlying the  $\text{ZnO}$  layer and adhered thereto; and said  $\text{ZnO}$  and aluminum layers being of a thickness effective to cause substantial attenuation of TM like modes of light being transmitted through the light guiding region while minimizing attenuation for TE like modes.

**4,789,213**  
**ELECTRO-OPTICAL MODULATOR HAVING A MONOMODE LIGHT WAVEGUIDE MODULATOR**  
 Walter Heywang, Neuweilerhof, and Peter Bause, Kralling, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany  
 Continuation of Ser. No. 799,203, Nov. 19, 1985, abandoned, which is a continuation of Ser. No. 381,378, May 24, 1982, abandoned. This application Apr. 20, 1987, Ser. No. 40,729  
 Claims priority, application Fed. Rep. of Germany, Jul. 10, 1981, 3127406  
 Int. Cl.<sup>4</sup> G02B 6/26; H01J 5/16; G02F 1/00  
 U.S. Cl. 350—96.15



1. An electro-optical light modulator comprising:  
 a pressure-sensitive signal generator including an output and operable in response to the application of pressure to produce an electrical signal at said output, said pressure-sensitive signal generator comprising an acousto-electrical piezo-electric transducer including a wafer of piezomaterial, a plurality of electrodes and counter-electrodes on said wafer forming a plurality of capacitors, and means connecting said capacitors in series so that the voltages derived from the individual capacitors add to provide the electrical signal; and  
 monomode light waveguide modulator means including a light input for receiving a light signal, a light output for emitting a modulated light signal, and an electrical input connected to said output of said signal generator, and operable to modulate the light signal in response to said electrical signal.

**4,789,214**  
**MICRO-OPTICAL BUILDING BLOCK SYSTEM AND METHOD OF MAKING SAME**  
 Kennet J. A. Villhelmsen, Oceanside, and Tomas E. Lock, Carlsbad, both of Calif., assignors to Tacan Corporation, Carlsbad, Calif.  
 Filed Sep. 21, 1987, Ser. No. 98,980  
 Int. Cl.<sup>4</sup> G02B 6/26; B05D 5/06  
 U.S. Cl. 350—96.15

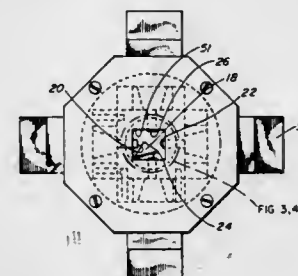


1. A micro-optical building block system comprising:  
 a master substrate having at least one flat surface and being formed of substantially rigid material;  
 a relief pattern on said master substrate flat surface, said relief pattern comprising a plurality of lands and grooves arranged in a first predetermined pattern;  
 at least one building block substrate having at least one flat surface which is no larger than said master substrate flat

surface, said building block substrate being formed of substantially rigid material;  
 a relief pattern on said building block substrate flat surface, said relief pattern comprising a plurality of lands and grooves arranged in a second predetermined pattern, said first and second predetermined patterns being configured to mate in a meshing manner whereby said building block substrate fits on said master substrate in at least one precisely positioned location; and  
 optical signal conducting means being selectively included as part of at least one of said master and building block substrates.

51. A method for making a micro-optical building block system comprising the steps of:  
 forming a master substrate with a flat surface on one side thereof;  
 forming a relief pattern on the master substrate flat surface, said relief pattern comprising a plurality of lands and grooves arranged in a first predetermined pattern;  
 forming at least one building block substrate having at least one flat surface on one side thereof;  
 forming a relief pattern on the building block flat surface, said building block relief pattern comprising a plurality of lands and grooves arranged in a second predetermined pattern;  
 forming optical signal conducting means on at least one of said relief patterns; and  
 mounting said building block to said master substrate with their respective relief patterns engaging in a meshing manner.

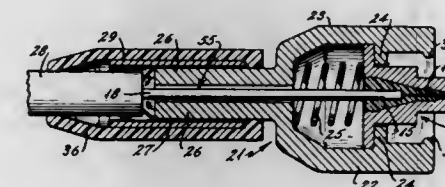
**4,789,215**  
**FIBER OPTIC SWITCH WITH PRISM MOUNTED FOR RECIPROCAL AND ROTATIONAL MOVEMENT**  
 John C. Anderson, Ottawa, and John C. Goodwin, Nepean, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada  
 Filed Apr. 18, 1986, Ser. No. 853,598  
 Int. Cl.<sup>4</sup> G02B 6/34  
 U.S. Cl. 350—96.19



11. An optical switch comprising:  
 a housing;  
 a prism support member movably mounted to the housing for reciprocal movement along an axis of reciprocal movement and for rotational movement about said axis of reciprocal movement, the prism support member having a keyway extending parallel to the axis of reciprocal movement;  
 a cam engaging the keyway;  
 means for moving the cam to adjustably rotate the prism support member about said axis of reciprocal movement;  
 a prism fixed to the prism support member;  
 a plurality of lenses mounted to the housing and distributed around the axis of reciprocal movement, the lenses having coplanar longitudinal axes; and  
 means for moving the prism support member along the axis of reciprocal movement to move the prism between first and second positions wherein in the first position of the prism, light collimated by a first lens passes directly into a

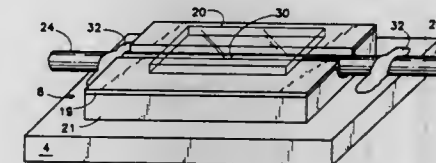
second lens, and in the second position of the prism, light collimated by said first lens is directed into the prism, is deflected thereby and after exiting the prism, enters a third lens.

**4,789,216**  
**GUIDE DEVICE FOR A LIGHT WAVE CONDUCTOR**  
 Werner G. Schrott, Heilbronn, Fed. Rep. of Germany, assignor to Amphenol Corporation, Wallingford, Conn.  
 Filed Sep. 27, 1982, Ser. No. 424,680  
 Claims priority, application Fed. Rep. of Germany, Sep. 25, 1981, 3138290  
 Int. Cl.<sup>4</sup> G02B 6/36, 7/26  
 U.S. Cl. 350—96.20



1. A guide device for mounting a filament of a light wave conductor, said device having an inlet opening extending along its longitudinal axis from an inlet end for mounting the filament with its filament end in front, the filament being adapted to be fastened in the inlet opening by a fastening device, characterized in that the inlet opening is provided with a contact surface forming an installation opening of varying size shaped to receive filaments of different diameters, said contact surface having along its length at a portion thereof a width less than the diameter of the smallest filament to be mounted by said guide device, and having a shape such that said filament will abut said contact surface at some point along the length of said contact surface in precisely centered relationship relative to said inlet opening when said filament is inserted therein.

**4,789,217**  
**METHOD OF AND APPARATUS FOR SECURING ELONGATE MEMBERS OF GENERALLY CYLINDRICAL FORM IN END-TO-END RELATIONSHIP**  
 John H. Mitch, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.  
 Filed May 5, 1987, Ser. No. 46,073  
 Int. Cl.<sup>4</sup> G02B 6/36, 6/38  
 U.S. Cl. 350—96.21



1. A method of placing an end portion of a generally cylindrical elongate member in a predetermined position, said method comprising the steps of:  
 providing a plastically deformable body, which comprises a layer of plastically deformable material and a layer of ductile material, relatively harder than the plastically deformable material;  
 disposing a form, which corresponds in its external cross-sectional shape to the end portion of the elongate member, in contact with the layer of ductile material;  
 applying pressure to the form so as to create a groove in the deformable body,



removing the form from the groove, and placing the end portion of the elongate member in the groove.

4,789,218

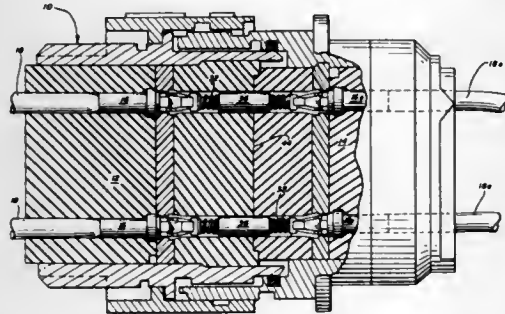
**SPRING-BIASED FIBER OPTIC CONTACT**

Christopher A. Paul, Riverside, and Stephan H. Schramme, Rolling Meadows, both of Ill., assignors to Methode Electronics, Inc., Chicago, Ill.

Filed Mar. 30, 1987, Ser. No. 32,292  
Int. Cl.<sup>4</sup> G02B 6/38

U.S. Cl. 350—96.21

18 Claims



1. In a fiber optic contact which comprises a fiber optic cable having a first free end, and a sleeve member surrounding said first free end and proportioned to support said free end in abutting relation with the free end of another fiber optic cable for optical transmission between them, the improvement comprising, in combination:

a collet slideably mounted on said sleeve member; compression spring means carried on said sleeve member between said collet and said first free end, whereby said contact may be retained in said abutting relation by retention means that engages said collet in a position to bias said free end toward said other fiber optic cable free end through the spring means.

4,789,219

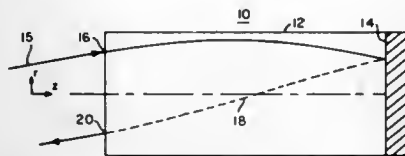
**GRADIENT INDEX RETROREFLECTOR**

Clyde B. Layne, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 6, 1986, Ser. No. 836,882  
Int. Cl.<sup>4</sup> G02B 5/12, 5/13, 17/00

U.S. Cl. 350—97

14 Claims



1. A retroreflective device comprising: graded index lens means having opposed first and second planar surfaces, said first surface arranged for receiving a beam of irradiation in any arbitrary direction, said graded index lens means variably refracting said irradiation transversely during substantially axial passage to said second surface, reflecting means covering entirely said second surface for reflecting said refracted irradiation through said lens means to exit said lens means at said first surface in a direction substantially parallel to said arbitrary direction.

4,789,220

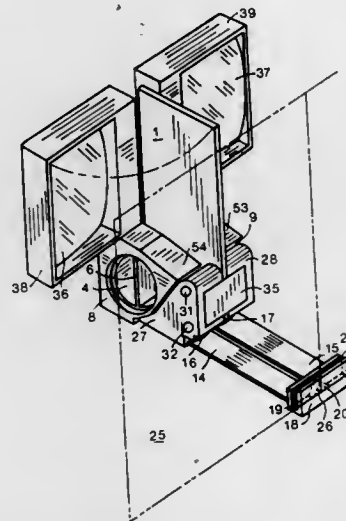
**STEREOSCOPIC PRINT VIEWER**

Wolcott Kinnard, 2564 N. 124th St. Apt. 407, Wauwatosa, Wis. 53226

Filed Apr. 24, 1987, Ser. No. 41,989  
Int. Cl.<sup>4</sup> G02B 27/04, 27/22

U.S. Cl. 350—139

10 Claims



1. In a stereoscopic print viewer, a pair of magnifying lenses moveably mounted to a structure, a center plate positioned between said viewer lenses to hold said structure, a means to move said lenses to fold flat upon said centerplate, a means to unfold said lenses back into viewing position, a means for holding a stereoscopic print pair in position to be viewed through said lenses, and a means to retract into said structure said means for holding said stereoscopic print pairs.

4,789,221

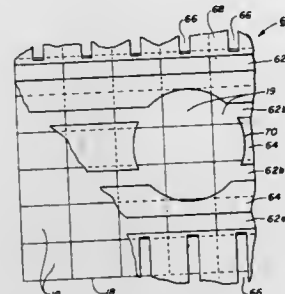
**LIGHT VALVE PROJECTOR APPARATUS HAVING INCREASED LIGHT EFFICIENCY**

Thomas T. True, Camillus, N.Y., assignor to General Electric Company, Philadelphia, Pa.

Filed May 8, 1987, Ser. No. 48,109  
Int. Cl.<sup>4</sup> G02B 27/42, 27/00; H04N 9/31

U.S. Cl. 350—162.12

16 Claims



1. In a light valve projector apparatus including a two color light valve of the Schlieren dark field type having an input mask and a complementary output mask wherein an optical pupil for the two color light valve comprises: a plurality of lenslets arranged in a first and a second direction to form an array of lenslets; said input mask having a plurality of first slots in one region extending in said first direction and a plurality of second

slots in a second region extending in said second direction said slots in each of said regions being separated by opaque bars; and light filtering means for passing a first color through said first slots in said one region and a second color through said second slots in said second region, wherein the improvement comprises said first slots in said first region of said input mask being asymmetrically disposed with respect to said lenslets arranged in said first direction, whereby the light output of said first color is increased substantially.

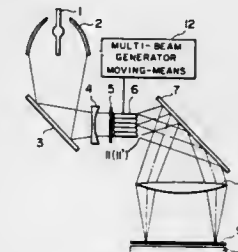
4,789,222

**ILLUMINATING OPTICAL SYSTEM**

Masakatu Ota, Tokyo, and Takashi Omata, Yokosuka, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan Continuation of Ser. No. 929,493, Nov. 12, 1986, abandoned, which is a continuation of Ser. No. 585,245, Mar. 1, 1984, abandoned. This application Jun. 2, 1987, Ser. No. 57,668 Claims priority, application Japan, Mar. 4, 1983, 58-35360 Int. Cl.<sup>4</sup> G02B 27/00, 27/44

U.S. Cl. 350—167

18 Claims



5. An illuminating optical system for illuminating a mask to transfer a pattern thereon to a wafer, comprising: light providing means for providing light; wavelength changing means for changing the wavelength of light provided by said light providing means; multi-beam forming means for forming multiple beams utilizing light provided by said light providing means; optical means for illuminating the mask with light from the multiple beams formed by said multi-beam forming means to transfer the pattern on the mask to the wafer; and position changing means for changing a position of said multi-beam forming means relative to said optical means in accordance with the wavelength of the light provided by said light providing means as determined by said wavelength changing means, so as to minimize the illumination distribution on the mask.

4,789,223

**MATRIX-ADDRESSED LIQUID CRYSTAL DISPLAY DEVICE WITH COMPENSATION FOR POTENTIAL SHIFT OF PIXEL ELECTRODES**

Kolchi Kasahara, Yokohama; Toshio Yanagisawa, Tokyo, and Motoji Kajimura, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 27, 1986, Ser. No. 844,570

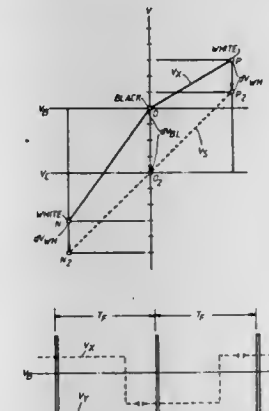
Claims priority, application Japan, Mar. 28, 1985, 60-61858 Int. Cl.<sup>4</sup> G02F 1/13

U.S. Cl. 350—333

9 Claims

1. A matrix-addressed liquid crystal display device for displaying half-tone pictures comprising: a pair of substrates facing each other; switch elements arranged in n rows and m columns on the first of said pair of substrates, each of said switch elements comprising a field effect transistor with a gate, drain and source;

pixel electrodes each connected to said source or drain of each of said field effect transistors; n address lines forming a common connection for said respective gates of said field effect transistors in each row; m signal lines forming a common connection for respective drains or sources of said field effect transistors in each column; a common electrode arranged on the second of said pair of said substrates; a liquid crystal layer interposed between said substrates, molecules in said liquid crystal layer being arranged in a predetermined alignment, the alignment being changed in accordance with the voltage applied to said liquid crystal layer, and the capacitance between said pixel electrode and said common electrode being changed in relation to said change of the alignment; an address line drive circuit supplying sequential scanning signals to said n address lines;



a signal line drive circuit supplying parallel display signals to said m signal lines; polarity inversion circuit means connected to said signal line drive circuit so that said parallel display signals possess a polarity inversion every frame scanning period; wherein the amplitude of the display signals at one polarity constituting the positive potential side with respect to a polarity inversion reference potential and the amplitude of the display signals at the other polarity constituting the negative potential side are set at different values in order to compensate for the potential shift of said pixel electrodes; wherein the potential shift depends on the ratio of parasitic capacitance, between said gate and said source or drain of said transistor and said liquid crystal layer capacitance, and between said pixel electrode and said common electrode, wherein said liquid crystal layer capacitance varies with the molecule alignment change owing to the display signal voltage applied to said liquid crystal layer.

4,789,224

**INSTRUMENT PANEL HAVING LIGHT PIPE HAVING LEGS**

Larry J. Bongsty, Holly, Mich., assignor to General Motors Corporation, Detroit, Mich.

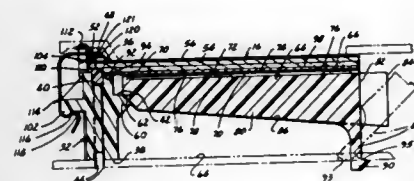
Filed May 4, 1987, Ser. No. 45,463  
Int. Cl.<sup>4</sup> G02F 1/13; F21V 7/04, 1/19

U.S. Cl. 350—345

14 Claims

5. In a visible display having a printed circuit board, with a light source and a light pipe joined thereto operatively associated with juxtaposed liquid crystal display and translector components and wherein the liquid crystal display, translector and light pipe are supported with respect to the printed circuit board the improvement comprising: terminal block means having electrical conductors formed in

situ and including an elastomeric connector supported thereon to be in electrical contact with said in situ conductors;  
subassembled liquid crystal display and translector means; said light pipe having opposite ends, one of said ends including a spacer leg inserted into said printed circuit board to



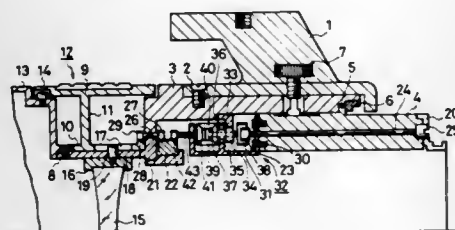
locate the other end thereof in supported engagement with said terminal block means to position an illuminating surface for lighting the subassembled liquid crystal display and translector means prior to final assembly of the visible display to permit adjustment of the translector and liquid crystal display components prior to such final assembly.

4,789,225

#### DEVICE FOR DRIVING A LENS UNIT HAVING A TRIPOD MOUNT

Hiroshi Nomura, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Mar. 27, 1987, Ser. No. 30,517  
Claims priority, application Japan, Mar. 27, 1986, 61-69503  
Int. Cl.<sup>4</sup> G02B 7/02; G03B 1/18  
U.S. Cl. 350—255

8 Claims

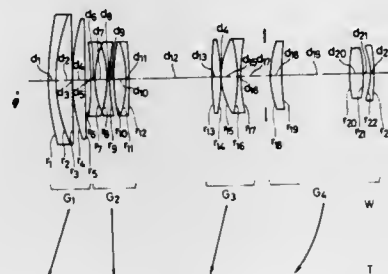


1. A device for driving a lens unit having a tripod mount, comprising:

- a stationary cylinder having said tripod mount;
- a rotatable cylinder with a mount part which is coupled to a camera body rotatably fitted in said stationary cylinder;
- a drive shaft rotatable by a drive source provided on a side of said camera body and rotatably supported in said rotatable cylinder;
- a drive gear which rotates around an optical axis of said lens unit which is supported by said stationary cylinder;
- a lens which is moved in the direction of said optical axis as said drive gear rotates and which is supported by said stationary cylinder; and
- a planet gear mechanism interposed between said drive gear and a gear mounted on said drive shaft, said planet gear mechanism transmitting a first rotation of said drive shaft to said drive gear when said rotatable cylinder is stationary but not transmitting a second rotation of said drive shaft when said drive shaft is revolved by rotation of said rotatable cylinder.

4,789,226  
ZOOM LENS SYSTEM  
Yasuji Ogata, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan  
Filed Jul. 18, 1984, Ser. No. 632,216  
Claims priority, application Japan, Jul. 22, 1983, 58-132730  
Int. Cl.<sup>4</sup> G02B 15/16  
U.S. Cl. 350—427

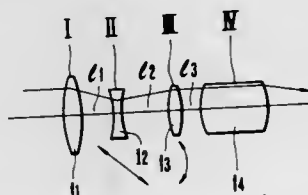
9 Claims



1. A zoom lens system comprising, in the order from the object side, a first lens group having a positive refractive power and comprising a positive cemented doublet, a second lens group having negative refractive power and comprising two negative lens components and a positive lens component, a third lens group having positive refractive power and comprising a cemented doublet, and a fourth lens group having a positive refractive power, and said fourth lens group, which is arranged to be the rearmost lens group, consisting of a positive lens element, a positive lens element and a negative lens element, the airspaces between said lens elements constituting the fourth lens group being constant, and the airspace between said third lens group and fourth lens group being variable at the time of zooming.

4,789,227  
ZOOM LENS  
Tsunefumi Tanaka; Keiji Ikemori, both of Kanagawa; Masatake Kato, and Kazuo Tanaka, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha  
Continuation of Ser. No. 519,688, Aug. 2, 1983, abandoned. This application Oct. 8, 1987, Ser. No. 107,876  
Claims priority, application Japan, Aug. 6, 1982, 57-137059; Oct. 21, 1982, 57-185291  
Int. Cl.<sup>4</sup> G02B 15/00  
U.S. Cl. 350—427

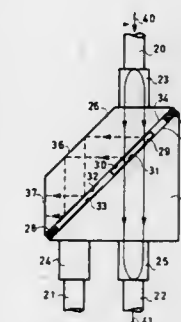
7 Claims



1. A zoom lens comprising:  
a variation lens unit axially movable for varying the focal length of the entire system; and  
a lens unit axially movable in accordance with movement of said variation lens unit to maintain the constant position of an image plane,  
said variation lens unit including a lens component which is movable over the entire zooming range and made movable to effect focusing from an infinity object to a close object, and another lens component which is held stationary during focusing, said two lens components moving in different paths during the zooming.

4,789,228  
ELECTRICALLY CONTROLLED OPTICAL SWITCHING DEVICE  
Jean-Pierre Le Pesant, Gif sur Yvette; Michel Hareng, La Norville, and Bruno Mourey, Boulogne Billancourt, all of France, assignors to Thomson-CSF, Paris, France  
Continuation of Ser. No. 662,154, Oct. 18, 1984, abandoned.  
This application Jan. 5, 1987, Ser. No. 4,222  
Claims priority, application France, Oct. 21, 1983, 83 16793  
Int. Cl.<sup>4</sup> G02B 26/00, 6/26, 6/42; G02F 1/01  
U.S. Cl. 350—355

9 Claims



1. An optical change-over device for commutating at least one incident luminous beam by electrically controlled change-over means, these change-over means operating by having in the path of the said beam either a first fluid provoking the reflection of the beam, or a second fluid provoking its transmission, the device comprising two elements forming total internal reflection prisms placed parallel and opposite each other with reference to their hypotenuses and defining a confinement space containing the said fluids, the fluids not being miscible and possessing distinct dielectric permittivities; inductor means for inducing an electric field gradient causing the fluid having the strongest permittivity to converge toward a selected one of a plurality of zones of a confinement space, which space is exposed to an electric field; wherein one of the said prisms is truncated so as to present a face parallel to said hypotenuses and the other prism extracts the commutated beam through a plurality of outputs;

wherein said incident luminous beam is introduced by said truncated prism and selectively transmitted to a first output when said second fluid is present at a first of said plurality of zones and is selectively reflected to said face parallel to said hypotenuses when said first fluid is present at said first zone and reflected from said parallel face in a direction parallel to said incident beam to a second of said plurality of zones and is selectively transmitted to a second output or reflected to the face parallel to said hypotenuse by the presence of the second or first fluids, respectively, at said second zone and selectively transmitted or reflected at each succeeding zone, any part of said incident luminous beam not being transmitted to an output is substantially completely reflected to a surface of said truncated prism.

4,789,229  
ZOOM LENS SYSTEM  
Takanori Yamashita, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan  
Filed Mar. 10, 1987, Ser. No. 24,082  
Claims priority, application Japan, Mar. 11, 1986, 61-51523  
Int. Cl.<sup>4</sup> G02B 15/163  
U.S. Cl. 350—427

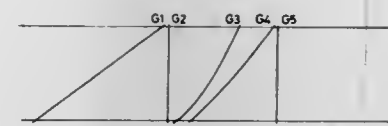
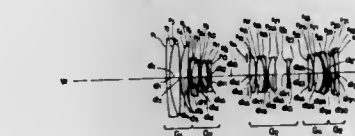
9 Claims

1. A zoom lens system comprising a first lens group having positive refractive power, a second lens group having negative refractive power, a third lens group having positive refractive power, a fourth lens group having positive refractive power,

and a fifth lens group having negative refractive power, in the order from the object side, and arranged to vary the focal length of the lens system as a whole by at least moving said first, third and fourth lens groups in the direction of the optical axis, said zoom lens system being arranged to fulfill the following conditions:

$$0.15 < |f_2/f_1| < 0.3 \quad (1)$$

$$0.5 < |\beta_3 \beta_4 \beta_5| < 2.5 \quad (2)$$



$$1.01 < \beta_5 < 1.3 \quad (3)$$

where, reference symbol  $f_1$  represents the focal length of the first lens group, reference symbol  $f_2$  represents the focal length of the second lens group, reference symbol  $\beta_3$  represents the lateral magnification of the third lens group in the wide position, reference symbol  $\beta_4$  represents the lateral magnification of the fourth lens group in the wide position, and reference symbol  $\beta_5$  represents the lateral magnification of the fifth lens group.

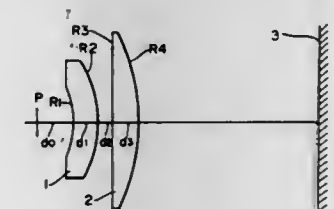
4,789,230

#### F-θ LENS FOR USE IN A LIGHT BEAM SCANNING DEVICE

Akira Ohta, Iwatsuki, Japan, assignor to Fuji Xerox Co., Ltd., Japan

Filed Feb. 17, 1988, Ser. No. 157,296  
Claims priority, application Japan, Feb. 20, 1987, 62-37042  
Int. Cl.<sup>4</sup> G02B 9/04, 9/06, 26/10  
U.S. Cl. 350—480

1 Claim



1. An fθ lens for use in a light beam scanning device for



focusing on a surface to be scanned a light beam which is deflected by deflecting means, said  $\theta$  lens comprising:

a meniscus lens having a small power and located on the side of a deflection point which the light beam is deflected, and a plano-convex lens having a large power and disposed with its convex surface on the side of said surface to be scanned, said lenses being constructed to satisfy the following conditions:

$$-0.3 \leq f_1/f_2 \leq 0.2 \quad (a)$$

$$-0.6/f_1 + 0.85/f_2 \leq 1/f_2$$

$$1/f_2 \leq -0.6/f_1 + 0.95/f_2 \quad (b)$$

where  $f$  represent a focal length of a lens system constituted by said two lenses, and  $f_1$  and  $f_2$  respectively represent focal lengths of the meniscus lens and the plano-convex lens.

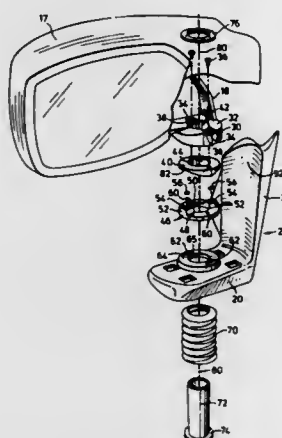
**4,789,231**  
**ARRANGEMENT FOR CORRECTING BALLISTIC TRAJECTORY IN RIFLESCOPE**  
Fumio Shimizu, Nagano, Japan, assignor to Kabushiki Kaisha Light Kohki Seisakusho, Nagano, Japan  
Filed Dec. 29, 1987, Ser. No. 139,260  
Claims priority, application Japan, Dec. 29, 1986, 61-200210[U]  
Int. Cl.<sup>4</sup> G02B 7/10, 27/32, 23/00  
U.S. Cl. 350-560 1 Claim



1. A rifle scope including means for correcting the ballistic trajectory corresponding to the bullets being used, comprising:  
a rifle scope tube;  
an erecting lens tube having one end fixedly mounted in said rifle scope tube and the other end free;  
lens frames for a zoom lens system axially slidably mounted in said rifle scope tube for movement toward and away from each other for altering the magnification of the rifle scope;  
a magnification alteration ring rotatably mounted for rotation around said rifle scope tube;  
a rotatable cam cylinder coaxially with said erecting lens tube and engaged by said magnification alteration ring for being rotated in accordance with the rotation of said magnification alteration ring and in cam engagement with said lens frames for effecting said axial sliding of said lens frames;  
an axially slidable cam member coaxially rotatably mounted on said cam cylinder and in cammed engagement with said magnification alteration ring for effecting axial sliding thereof in accordance with the rotation of said magnification alteration ring;  
means engaged with said cam member for preventing rotation of said cam member during axial sliding thereof;  
said cam member having a plurality of sloped surfaces on the outer face thereof extending in a direction parallel to the axis of said cam member, one sloped surface for each different type of bullet to be used, and said sloped surfaces being adjacent the free end of said lens tube;  
a changeover ring rotatably mounted on the outside of said rifle scope tube for stepwise rotation therearound and engaged with said cam member for effecting stepwise rotation of said cam member;  
a finely adjustable stopper member on said rifle scope tube

and engaged with the respective sloped surfaces as said cam member is rotated; and  
a resilient member engaged with and biasing the free end of said lens tube against said stopper member;  
each of said sloped surfaces having a shape for minutely axially tilting said lens tube, and thus the line of sight of said rifle scope, for correcting the virtual ballistic trajectory for the type of bullet corresponding to the respective sloped surface in accordance with the position of said lens frames in the zoom lens system.

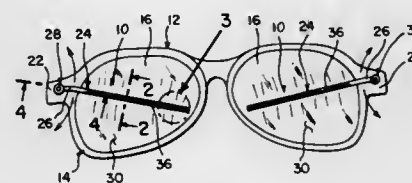
**4,789,232**  
**BREAK-AWAY PIVOT SYSTEM FOR REARVIEW MIRRORS**  
Karel Urbanek, Weston, Canada, assignor to Dominion Automotive Industries Inc., Toronto, Canada  
Filed Aug. 14, 1987, Ser. No. 85,145  
Int. Cl.<sup>4</sup> B60R 1/06; G02B 7/18  
U.S. Cl. 350-632 6 Claims



1. A break-away mounting for vehicle-mounted mirrors, comprising:  
a mounting member adapted to be secured to the side exterior of a vehicle,  
a portion of said mounting member projecting outwardly from the vehicle when the mounting member is secured thereto,  
a mirror support adapted to receive and support a mirror, a pivot boss forming part of said mirror support,  
pivot means pivotally mounting said pivot boss to said portion such that the mirror support can pivot with respect to the portion about an axis which is oriented substantially vertically when the mounting member is secured to the vehicle,  
a guide ring affixed to one of said portion and said pivot boss, the guide ring having a generally planar upper surface including two integral raised portions at diametrically opposed positions - has been inserted, defining two diametrically opposed recesses, a roller bearing in each of the recesses,  
and cam means on the other of said portion and said pivot boss, the cam means operatively interacting with said roller bearings,  
resilient means urging said roller bearings against the cam means,  
the cam means defining detent means for receiving the roller bearings when the mirror support is in that position with respect to the mounting member which corresponds to normal vehicle operation,  
the cam means further defining sloping cam surfaces to either side of each detent means which are such that when the mirror support is deflected either forwardly or rearwardly with respect to the vehicle, it automatically re-

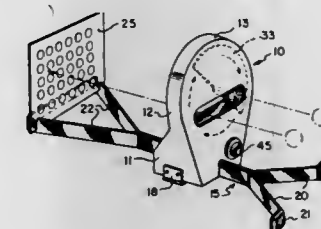
turns to the position which corresponds to normal vehicle operation,  
the said cam surfaces including, for each detent means:  
(a) a first cam surface contacted by the corresponding roller bearing when the mirror support is deflected forwardly,  
(b) and a second cam surface contacted by the corresponding roller bearing when the mirror support is deflected rearwardly,  
the said cam surfaces extending within a common annulus around the said axis,  
all cam surfaces defining with a plane normal to said axis an angle large enough to ensure that friction will not retain the roller bearings at any position along them, whereby when the mirror support is moved to a forward or a rearward position with respect to its normal operating position, it will tend to be returned to its normal operating position by camming action in cooperation with said resilient means.

**4,789,233**  
**EYEGLOSS WIPERS**  
Edna M. Arsenault, Gilbertville Rd., Ware, Mass. 01082, and George Spector, 233 Broadway, Rm. 3815, New York, N.Y. 10007  
Filed May 22, 1987, Ser. No. 53,042  
Int. Cl.<sup>4</sup> G02C 1/00  
U.S. Cl. 351-158 1 Claim



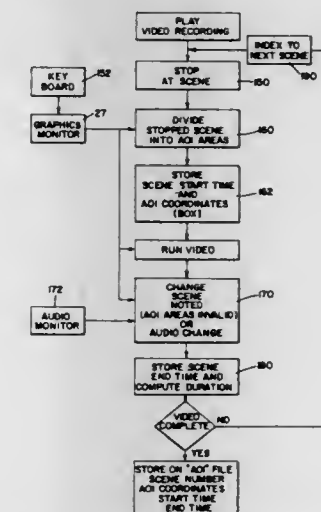
1. Eyeglass wipers for a pair of eyeglasses embodying a frame with a pair of lenses therein, each of said eyeglass wipers comprising:  
(a) a housing pivotally connected to one end of the frame and positioned forwardly of the frame;  
(b) a wiper arm for maintained at least one of the lenses clean, said wiper arm mounted at one end to said housing;  
(c) means for manually swinging said wiper arm across the surface of the lens;  
(d) means for spraying lens cleaning fluid from said wiper arm onto the surface of the lens, wherein said wiper arm comprises:  
(e) an elongated flexible accordion tube having two sets of spaced apart holes, the sets of holes placed in said tube at opposite sides thereof;  
(f) a blade formed on the underside of said tube adjacent the lens surface;  
(g) a pair of wires, each positioned longitudinally within said tube with one wire on top and other wire on bottom to bias the tube downwardly with said blade against the lens; wherein said manually swinging means includes a knurled knob extending outwardly from said housing so that when said knurled knob is manually turned said housing will pivot swinging wiper arm mounted thereto across the surface of the lens, wherein said spraying means comprises:  
(h) said housing including a cap cover threaded onto an open top of said housing for holding the one end of said wiper arm thereto; and  
(i) a spring biased square shafted piston mounted within said cap cover with said knurled knob affixed thereto so that when said knurled knob is manually pushed inwardly said piston will force the lens cleaning fluid from said housing into said wiper arm and outwardly from the two sets of holes for spraying onto the surface of the lens.

**4,789,234**  
**APPARATUS AND METHOD FOR TESTING THE MOTION CONTRAST VISUAL SENSITIVITY OF AN INDIVIDUAL**  
Arthur P. Ginsburg, David A. Ginsburg, and Robert P. Ginsburg, all of Dayton, Ohio, assignors to Vistech Consultants, Inc., Beavercreek, Ohio  
Filed Jan. 2, 1987, Ser. No. 254  
Int. Cl.<sup>4</sup> A61B 3/02  
U.S. Cl. 351-239 12 Claims



4. Apparatus for testing the visual motion contrast sensitivity of an individual, comprising:  
(a) a housing having a viewing opening therethrough,  
(b) means projecting from one side of said housing for holding a target having thereon alternating light and dark areas arranged for testing the visual contrast sensitivity of an observer,  
(c) means projecting from the other side of said housing for establishing a viewing position from which an observer can view said target only through said viewing opening, and  
(d) means for imparting to said target an apparent flickering movement with respect to said viewing position.

**4,789,235**  
**METHOD AND SYSTEM FOR GENERATING A DESCRIPTION OF THE DISTRIBUTION OF LOOKING TIME AS PEOPLE WATCH TELEVISION COMMERCIALS**  
Joshua D. Borah, Winchester, Mass., and Barbara N. Flagg, Bellport, N.Y., assignors to Applied Science Group, Inc., Waltham, Mass.  
Continuation of Ser. No. 848,154, Apr. 4, 1986, abandoned. This application Mar. 7, 1988, Ser. No. 166,776  
Int. Cl.<sup>4</sup> A61B 3/14, 3/00  
U.S. Cl. 351-246 6 Claims



gram containing a video signal and a synchronized audio signal, both signals recorded on a real time basis to form said program, said method comprising the steps of:

- providing a viewing room with a video monitor for display of said television program to a selected one of said individuals at a given general area of said room, a dimly visible near infrared light source shining toward said individual at said given general area in a given direction, thereby producing a reflection from the surface of the cornea of an eye of said individual, a video camera disposed so that its optical axis is coaxial with said direction of said light source and a tracking mirror servo-mechanism for directing said light source and camera towards and eye of said individual at said general area of said room with said individual not being connected to equipment in said room;
- displaying said television program to said individual at said general area in said room by way of said video monitor;
- computing the point of gaze of said eye of said individual at preselected time intervals by way of displacement of said corneal reflection from the pupil of said eye at each of said preselected time intervals while said individual is viewing said television program from said general area in said room;
- recording said point of gaze at each of said intervals;
- producing a series of successive fixation parameters specifying eye fixations including recorded starting time, duration and x, y coordinates for each successive fixation of the eye of said individual while viewing said television program;
- recording said series of fixations in a given first data file;
- previously or afterwards dividing said television program into a series of scenes having a start time and a duration and each made up of known areas of interest with a fixed set of x, y coordinates defining each boundary for each area of interest of each scene, said start times and durations being selected in accordance with the time said areas of interest are generally the same or said audio signal is presenting a given audio concept;
- recording said scenes by starting time, duration and fixed coordinates of areas of interest in said scenes into a second data file;
- comparing said first and second data files for said individual to produce a third data file containing specific fixations in each area of interest in each scene of said combined video and audio television program;
- repeating said steps for a number of individuals; and,
- producing a compilation chart specifying the distribution of looking time in all areas of interest in each scene for said number of individuals.

4,789,236

## STRESS SENSOR

Jim R. Hodor, San Jose; Jesus Barney, Sunnyvale, and Herman J. Decker, Los Altos Hills, all of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Filed Aug. 7, 1986, Ser. No. 894,181

Int. Cl.<sup>4</sup> G01B 11/18

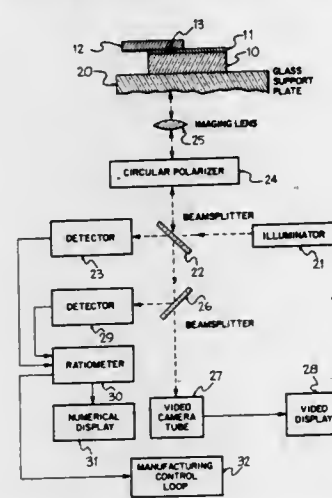
U.S. Cl. 356—33

17 Claims

1. A method for measuring quality of a bond by which a metal connector is secured to metallized surface of a crystal, said method comprising the steps of:

- dividing an illuminating beam of electromagnetic radiation of a wavelength to which said crystal is substantially transparent into a first component and a second component;
- obtaining a measurement of magnitude of power of said first component of said illuminating beam, said measurement of magnitude of power of said first component of said illuminating beam having random temporal variations due to random temporal changes occurring in said illuminating beam;
- circularly polarizing said second component of said

illuminating beam, said second component of said illuminating beam passing into said crystal as a substantially circularly polarized incident beam that travels through said crystal so as to impinge upon said metallized surface, said second component of said illuminating beam being reflected by said metallized surface as a return beam that travels back through said crystal, said second component of said illuminating beam under going a change from circular polarization to elliptical polarization when passing through said crystal, said change in polarization being due to birefringence produced in said crystal by said bond;



- obtaining a measurement of magnitude of power of a linearly polarize component of said return beam, said measurement of magnitude of power of said linearly polarized component of said return beam having random temporal variations that are proportional to said random temporal variations of said measurement of magnitude of power of said first component of said illuminating beam; and
- forming a ratio of the measurement of magnitude of power of said first component of said illuminating beam to the measurement of magnitude of power of said linearly polarized component of said return beam, said ratio being a measurement of the quality of said bond.

4,789,237

## DEVICE FOR SELECTING A LIGHT SOURCE FOR MEASURING THE WAVELENGTH CHARACTERISTICS OF AN OPTICAL ELEMENT

Kouji Inoue, Tokyo, Japan, assignor to Ando Electric Co., Ltd., Tokyo, Japan

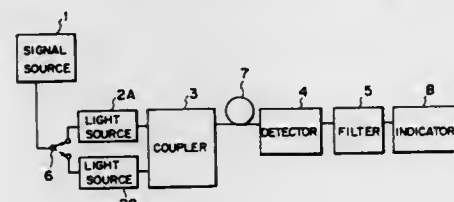
Filed Nov. 7, 1986, Ser. No. 928,501

Claims priority, application Japan, Nov. 29, 1985, 60-268781

Int. Cl.<sup>4</sup> G01N 21/00; G01D 5/34

U.S. Cl. 356—73.1

3 Claims



1. A device for selecting a light source among a plurality of

light sources, for measuring the wavelength characteristics of an optical element, which comprises:

- an electric modulating signal source which generates an electric modulating signal of desired frequency;
- an electric signal change-over switch having an input connected to the output of the electric modulating signal source;
- a plurality of light sources respectively having inputs connected to the outputs of the electric signal change-over switch and capable of providing optical outputs different from each other in wave-length, said electric signal change-over switch having means switchable to one setting for connecting said electric modulating signal source alternately to different ones of said plurality of light sources and therewith modulating the light output of the connected one of said light sources to produce a light output therefrom modulated at said desired frequency while a second said light source produces a continuous light output;
- means defining an optical coupler for combining the respective light outputs of the optical sources and having a light output through which the combined modulated and nonmodulated light outputs of the light sources are applied to a measured optical element;
- a detector for detecting, and producing an electric signal representing, the combined light outputs of the light sources as taken from said measured optical element, said detector having an light signal input connected to the light output of the measured optical element and having an output;
- a filter having an electric signal input connected to the electric signal output of the detector, to pass only the part of the output of the detector corresponding to the modulated optical output while not passing the part of the output of the detector corresponding to the continuous optical output; and
- an indicator for indicating the measured wavelength characteristics of the optical element, said indicator having an input connected to the output of the filter, said electric signal change-over switch means having a second setting in which the optical output of said second light source is modulated by the modulating signal of the modulating signal source while said one light source produces a continuous light output.

4,789,238

## METHOD OF INSPECTING MAGNETIC DISK SURFACE

Fusao Ichikawa, and Kiyoharu Michimoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

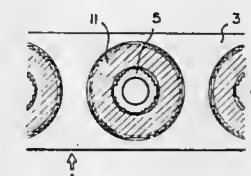
Filed May 4, 1987, Ser. No. 45,993

Claims priority, application Japan, May 2, 1986, 61-102899

Int. Cl.<sup>4</sup> G01N 21/89

U.S. Cl. 356—237

5 Claims



1. A method of inspecting a magnetic disk surface by exposing a magnetic disk web to a light beam, detecting said light beam following exposure to said magnetic disk web, and judging the condition of surface defects of a magnetic disk based on results obtained by the detected information, wherein the improvement comprises the step of carrying out said judgment based on said results at a portion of said

magnetic disk web outside of a non-use region of the magnetic disk.

4,789,239

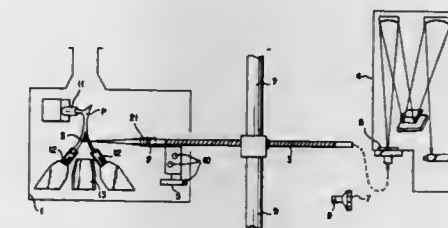
## EMISSION SPECTROSCOPIC ANALYZER

Koichi Onishi, Katsuta; Yoshifusa Ouchi, Ibaraki; Takashi Suganuma, Katsuta; Atsushi Utsumi, Kawanishi, and Takao Kuroiwa, Amagasaki, all of Japan, assignors to Mitsubishi Cable Industries Ltd., Hyogo and Doryokuro Kakunenryo Kaihatsu Jigyosha, Tokyo, both of Japan

Continuation-in-part of Ser. No. 503,017, Jun. 10, 1983, abandoned. This application Aug. 29, 1986, Ser. No. 901,679  
Int. Cl.<sup>4</sup> G01N 21/73; G01J 3/443

U.S. Cl. 356—316

11 Claims

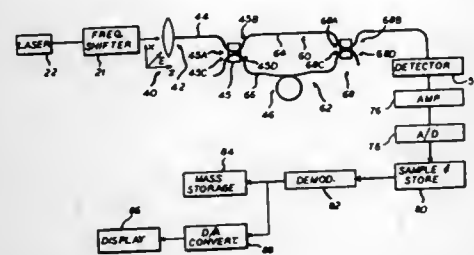


1. An emission spectroscopic analyzer comprising: exciting means for exciting a radioactive material to be analyzed to emit light, said exciting means being enclosed in a radiation shielding wall; detecting means for detecting the emitted light, said detecting means being located outside the radiation shielding wall; light-transmitting means having a first end disposed at the exciting means and having a second end disposed at the detecting means, said light-transmitting means for transmitting the emitted light, impinging on the first end of the light-transmitting means, to the detecting means as light having been transmitted through the light-transmitting means and emitted from the second end of the light-transmitting means, said light-transmitting means penetrating a hole made in the radiation shielding wall having a sealing structure to prevent radiation leakage, the light-transmitting means penetrating the hole with curvature; a lens system for detachable connection to the second end of the light-transmitting means to permit visual observation of the emitted light therethrough; and a fine adjustment device for adjusting the position of the first end of the light-transmitting means in relation to the emitted light from the material to be analyzed; wherein the light-transmitting means is an image guide formed of a bundle of optical fibers in which the position of each optical fiber in relation to other optical fiber at one end of the image guide exactly corresponds to that position of each optical fiber in relation to other optical fibers at another end of the image guide, the bundle of optical fibers being comprised of plural silica glass fibers fused together to form a single unit, each silica glass fiber having a core section of pure silica and a cladding section surrounding the core section and made of silica glass having a refractive index less than the refractive index of the core section, and wherein the second end of the light-transmitting means is arranged to be detachably mounted to the detecting means so that the lens system may be attached to the second end of the light-transmitting means when the second end is detached from the detecting means for viewing of images transmitted through the light-transmitting means, whereby the optimum position of the first end of the light-transmitting means may be adjusted with the fine adjusting device to view a desired image through the lens system and upon viewing of the desired image, the lens system may be



detached from the second end and the second end of the light-transmitting means may be attached to the detecting means for detecting emitted light of the desired image.

**4,789,240**  
**WAVELENGTH SWITCHED PASSIVE INTERFEROMETRIC SENSOR SYSTEM**  
 Ira J. Bush, Los Angeles, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.  
 Filed May 28, 1985, Ser. No. 738,620  
 Int. Cl.<sup>4</sup> G01B 9/02  
 U.S. Cl. 356—345 29 Claims

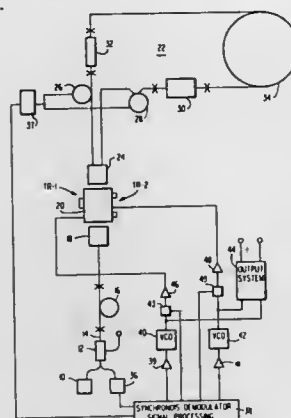


1. A sensor system for sensing changes in a physical parameter, comprising:  
 an interferometer, said interferometer including a reference arm for propagating a reference signal, said reference arm being isolated from the physical parameter, said interferometer including a sensing arm for propagating a sensing signal, said sensing arm being exposed to the physical parameter, said sensing signal having an initial phase relation to said reference signal, said sensing arm producing a phase change in said sensing signal relative to said reference signal in response to changes in the physical parameter;  
 means for supplying a sequence of optical pulses for input to said reference arm and said sensing arm of said interferometer, said means including an input optical fiber;  
 means for shifting the frequency of said optical pulses such that each said sequence includes a first pulse portion having a first optical frequency and a second pulse portion having a second optical frequency, said first and second pulse portions producing first and second phase differences between said sensing signal and said reference signal, said first and second phase differences being in quadrature with one another; and  
 means for processing said first and second pulse portions to determine the change in phase between the sensing signal and the reference signal to measure changes in the physical parameter.

**4,789,241**  
**OPTICAL FIBER SENSING SYSTEMS HAVING ACOUSTICAL OPTICAL DEFLECTION AND; MODULATION DEVICES**  
 Ronald J. Michal, Orange; Eric Udd, Huntington Beach, and Richard F. Cahill, El Toro, all of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.  
 Filed Feb. 24, 1987, Ser. No. 17,691  
 Int. Cl.<sup>4</sup> G01B 9/02  
 U.S. Cl. 356—350 10 Claims

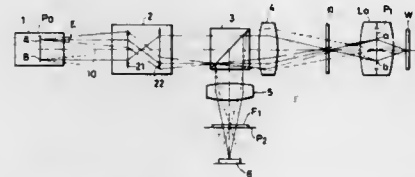
1. A fiber optic sensor, comprising:  
 (a) a light source means for producing a first beam of light;  
 (b) a beam splitting means for receiving the first beam of light having a polarizing means connected to one output for polarizing a portion of the first light beam;  
 (c) an acousto-optic frequency shifting means connected to the polarizing means for frequency shifting and splitting the polarized portion of the first beam of light into second

and third beams of light and recombining the second and third beams into a fourth beam of light;  
 (d) a dual array of acoustic transducers connected to opposite sides of the acousto-optic frequency shifting means each transducer driven with a successive time delay means for directing the acoustic wave such that the direction of the acoustic wave is controllable for acousto-optic interaction between the light beam and the acoustic wave;  
 (e) a polarity means connected to the dual array of acoustic transducers for changing the polarity of the frequency shift between the second and third beams;



(f) counterpropagating means for directing the second and third beams of light received from the frequency shifting means along a light path in counterpropagating directions; and  
 (g) a detection means for detecting the phase modulated frequency contained in the fourth light beam recombined at the frequency shifting means including electrical circuitry means for measuring environmental effects on the counterpropagating light beams by detecting the nonreciprocal phase shift of the counterpropagating beams.

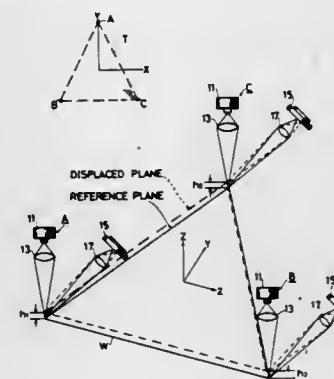
**4,789,242**  
**OPTICAL APPARATUS FOR DETECTING THE POSITION OF AN OBJECT**  
 Shuhei Takagi, Yokohama; Makoto Uehara, and Koichi Matsumoto, both of Tokyo, all of Japan, assignors to Nikon Corporation, Tokyo, Japan  
 Filed Aug. 8, 1986, Ser. No. 894,840  
 Claims priority, application Japan, Aug. 13, 1985, 60-178422  
 Int. Cl.<sup>4</sup> G01B 11/00  
 U.S. Cl. 356—375 4 Claims



1. An optical system for the detection of object position comprising:  
 a laser light source;  
 an objective lens for focusing a laser beam from said laser light source on an object surface;  
 an illumination optical system for guiding said laser beam to said objective lens so as to project the origin of divergence of a divergent angle of said laser beam on an entrance pupil plane of said objective lens with respect to the side of said laser light source; and

a detection optical system for detecting the reflected light from said object surface, said detection optical system including a spatial filter disposed on said entrance pupil plane of said objective lens or on a plane conjugated with said entrance pupil plane.

**4,789,243**  
**ORIENTATION DETERMINING SYSTEM FOR A DEVICE**  
 Prabodh Mathur, Tustin, Calif., assignor to Amada Engineering & Service Co., Inc., La Mirada, Calif.  
 Filed Jul. 30, 1986, Ser. No. 890,563  
 Int. Cl.<sup>4</sup> G01B 11/14  
 U.S. Cl. 356—375 17 Claims

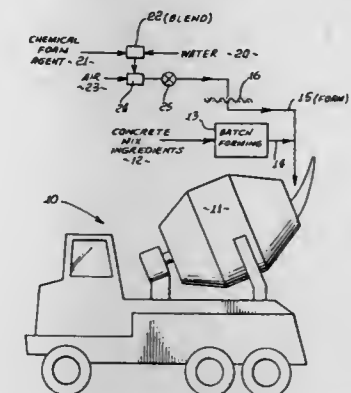


1. In a laser material-processing device including laser generating means and projection lens means for focussing a laser beam from said laser generating means onto a region of an object surface, an orientation determining system for said device comprising:  
 at least three sensing means arranged around an axis of said device for detecting the distances of the sensing means from said object surface, and  
 means for calculating an actual distance of said laser generating means from said surface, and the angular orientation of said laser generating means relative to said surface, from the detected distances using specific computation equations.

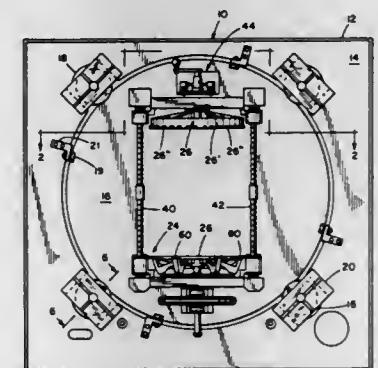
**4,789,244**  
**APPARATUS AND METHOD TO PRODUCE FOAM, AND FOAMED CONCRETE**  
 Harvey R. Dunton, Victorville, and Donald H. Rez, Newport Beach, both of Calif., assignors to Standard Concrete Materials, Inc., Santa Ana, Calif.  
 Continuation-in-part of Ser. No. 3,028, Jan. 12, 1987. This application Apr. 10, 1987, Ser. No. 37,007  
 Int. Cl.<sup>4</sup> B28C 5/06  
 U.S. Cl. 366—12 8 Claims

1. A foam producing system, comprising:  
 (a) first and second means to supply a foaming agent and water, respectively;  
 (b) pump means having an inlet connected to receive a mixture of said foaming agent and water, thereby to pressurize the mixture, the pump means also having an outlet;  
 (c) and sub-dividing means connected with said outlet to receive the pressurized mixture, and to sub-divide same into droplets;  
 (d) whereby the droplets may expand as an aqueous foam;  
 (e) reciprocating metering means operated in volumetric through-put relation to said pumping means for metering a flow of said foaming agent to water to be mixed therewith at the pump means, said pump means and said metering means being positive displacement devices operating in synchronism;  
 (f) and said first means to supply foaming agent comprises a

sight glass reservoir having an inlet and outlet via which a stream of said agent flows from said metering means to



**4,789,245**  
**DISC-TYPE APPARATUS FOR MIXING PAINT CANS**  
 James A. Morbeck, Des Plaines, Ill., assignor to Miller Paint Equipment, Ltd., Addison, Ill.  
 Filed Jan. 28, 1988, Ser. No. 149,536  
 Int. Cl.<sup>4</sup> B01F 9/00  
 U.S. Cl. 366—217 19 Claims



1. An apparatus for mixing paint cans, or the like, comprising:  
 a main housing;  
 a rotatable mounting disc, said main housing having means for rotatably mounting said mounting disc for rotation in a vertical plane;  
 said rotatable mounting disc having a central cut-out portion allowing for the in-feed and out-feed of paint cans to be mixed by the apparatus therethrough from the front toward the rear;  
 a clamping means positioned in said cut-out of said rotatable mounting disc for clamping a paint can to be mixed, said clamping mechanism comprising an upper clamping plate, a lower clamping plate, and means for simultaneously moving said upper and lower clamping plates toward or away from each other for clamping and unclamping a paint can thereby, said clamping means being connected to the said rotatable mounting disc for rotation therewith;  
 said rotatable mounting disc comprising a first rearwardly projecting arcuate track means, and said main housing comprising a second rearwardly mounted arcuate track

means, said second track means being mounted rearwardly of said first track means;  
 a first drive-belt assembly operatively coupled to said first track means for rotatingly driving said mounting disc;  
 a second belt-drive assembly independent of said first drive assembly and operatively coupled to said second track means, said second belt-drive assembly comprising a plurality of direction-changing pulleys mounted to said mounting disc for rotation therewith during the mixing process;  
 said clamping mechanism further comprising a driven shaft connected to said lower clamping plate for rotating said lower clamping plate about the central longitudinal axis of said driven shaft, and a drive pulley mounting said driven shaft therein for rotatingly driving said driven shaft, said drive pulley having a central hub slidably mounting said driven shaft therein to allow for the vertical movement of said lower clamping plate during the clamping and unclamping of a paint can; and  
 motor means for driving said first belt-drive assembly to cause the rotation of said mounting disc.

4,789,246

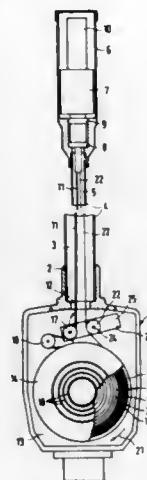
## RADIATION DETECTOR OR THE LIKE

Dieter von der Bräke, Altona, Fed. Rep. of Germany, assignor to Alcatel N.V., Amsterdam, Netherlands  
 Filed Nov. 9, 1981, Ser. No. 319,262  
 Claims priority, application Fed. Rep. of Germany, Nov. 14, 1980, 3042992

Int. Cl.<sup>4</sup> G01K 1/00

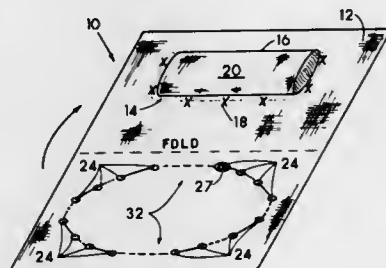
U.S. Cl. 374-208

5 Claims



1. In metering apparatus including a measuring probe mounted inside a head of a telescopic tube assembly, said measuring probe having a mounting arrangement supported axially rotatable inside said head of said telescopic tube, a multi-wire electric cable connected with said measuring probe and extending within said telescopic tube, the combination comprising: a thin ribbon cable; a take-up drum for taking up said cable; a tension spring; and a steel tape parallel to said ribbon cable and positioned to be acted upon by the tension of said tension spring, said steel tape together with said ribbon cable being capable of being wound onto said take-up drum, and being attached to said mounting arrangement of said measuring probe; and a spring-acted tension roller arranged to lead said ribbon cable or said steel tape near the outlet of said take-up drum, towards said telescopic tube.

4,789,247  
**BLANKET CONVERTIBLE TO A TOTE BAG**  
 Halina Schnoor, 37465 Green Dr., Eastlake, Ohio 44094  
 Filed Jun. 1, 1987, Ser. No. 56,221  
 Int. Cl.<sup>4</sup> A47C 17/82; B31B 19/26, 49/04  
 U.S. Cl. 383-4 7 Claims



1. A convertible blanket tote bag assembly comprising:  
 a blanket having a generally rectangular top and bottom surface;  
 a series of spaced eyelets extending through the top and bottom surface of said blanket to form a circle-like pattern on said blanket;  
 a cord being threaded through each of said eyelets from one adjoining eyelet to the other to form a circle-like loop; and  
 said spaced eyelets being formed on only one half of the length of said blanket to allow the converting of said blanket into a tote bag upon folding the blanket half without eyelets unto the eyelet containing half.

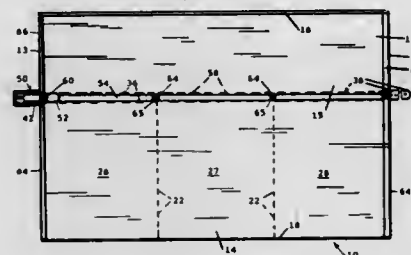
4,789,248

## POCKETED MAIL BAG

Paul J. Penas, 603 S. Kansas St., Hastings, Nebr. 68901  
 Filed Mar. 28, 1988, Ser. No. 174,392  
 Int. Cl.<sup>4</sup> B65D 30/22

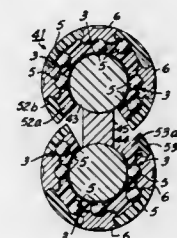
U.S. Cl. 383-38

4 Claims



1. A pocketed mail bag having a back panel elongated from left to right and having top and bottom edges, a forward panel disposed across a lower portion of said back panel and secured thereto in a manner providing a plurality of pockets between said panels, a strap extending across the backside of said back panel and having a buckle-insertable portion extending outwardly at one of said sides of said back panel, said strap having a buckle-carrying portion extending from an opposite side of said back panel, said strap extending through said buckle and having a terminal portion extending back across the forward side of said front panel, a fastening device extending through said terminal portion of said strap and through said forward panel and through said strap portion behind said back panel for providing a strong fastening which impinges said strap portions firmly against the respective panels, said forward and back panels also having inwardly-turned edges through which said fastening device extends, said forward and rearward panels being secured together along upwardly extending lines providing said pockets.

4,789,249  
**LINEAR MOTION BEARING AND SHAFTS**  
 Francis V. Mutolo, Morrisville, Pa., assignor to Thomson Industries, Inc., Mahanassett, N.Y.  
 Continuation of Ser. No. 733,772, May 14, 1985, abandoned.  
 This application Jun. 4, 1987, Ser. No. 58,694  
 Int. Cl.<sup>4</sup> F16C 29/06  
 U.S. Cl. 384-43 23 Claims



1. A linear motion bearing and shaft assembly for axial movement which comprises:  
 a first round support shaft;  
 a second round support shaft with its axis parallel to the axis of said first support shaft, rigidly secured together with said first support shaft, said first and second support shafts being independently end supported to allow unrestricted axial movement along their lengths;  
 a first linear motion open-type recirculating bearing disposed on said first shaft for axial movement thereon; and  
 a second linear motion open-type recirculating bearing disposed on said second shaft for axial movement thereon, the openings of said first and second open-type bearings substantially facing each other and wherein said first and second support shafts are rigidly secured together by means including structure which is disposed between said first and second shafts, said structure contacting both support shafts and laterally symmetrical in shape with regard to a plane passing through the axes of said shafts; and whereby said means maintains the assembly in torsional balance when subject to uneven or opposing forces.

4,789,250

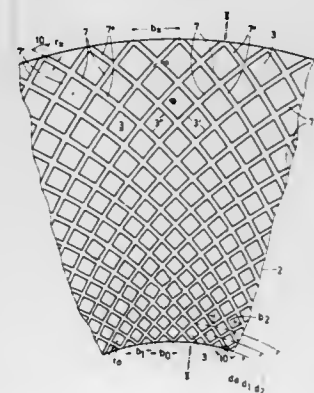
## THRUST BEARING OR AXIAL JOURNAL BEARING, IN PARTICULAR FOR SLOW-RUNNING MACHINES

Siegfried Schlüter, Wenden, Fed. Rep. of Germany, assignor to Apparatebau Rothemühle Brandt & Kritzler GmbH, Rothemühle, Fed. Rep. of Germany  
 Filed Jun. 12, 1987, Ser. No. 62,114  
 Claims priority, application Fed. Rep. of Germany, Jun. 12, 1986, 3619828

Int. Cl.<sup>4</sup> F16C 17/04

U.S. Cl. 384-305

15 Claims



1. In an axial thrust and support bearing for slow-running machines, including a base body (2) having an axis and a pe-

riphery, the base body being rotatable about the axis, a plurality of sliding shoes (3) having running surfaces (4) mounted on the base body (2), a plane bearing surface (9) extending perpendicularly of the axis supported by the sliding shoes (3), the sliding shoes (3) being arranged uniformly distributed in the radial direction and in the direction of rotation of the base body (2), each sliding shoe (3) having approximately the shape of a square having sides (3', 3''), wherein adjacent sliding shoes (3) are separated from each other by grooves (7) defined in the base body (2), the improvement comprising the sliding shoes (3) being arranged uniformly distributed on concentric circles (d<sub>0</sub>, d<sub>1</sub>, d<sub>2</sub> . . . d<sub>x</sub>) extending around the axis in the direction of rotation of the base body (2), the sliding shoes (3) on each of the circles (d<sub>0</sub>, d<sub>1</sub>, d<sub>2</sub> . . . d<sub>x</sub>) being congruent to each other, the lengths of the sides (3', 3'') of the sliding shoes (3) increasing toward the periphery proportionately to the increase of the diameters of the concentric circles (d<sub>0</sub>, d<sub>1</sub>, d<sub>2</sub> . . . d<sub>x</sub>), the grooves (7) extending in the shape of partial spirals, the grooves (7) being provided in two groups (7', 7''), wherein the grooves of the two groups intersect each other with oppositely directed curvatures.

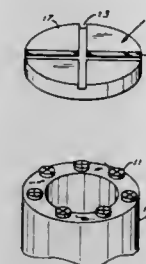
4,789,251

## COOLING NETWORKS FOR PCD BEARING SURFACES

James N. McPherson, Orange, Calif., and David R. Hall, Provo, Utah, assignors to Smith International, Inc., Newport Beach, Calif.  
 Continuation of Ser. No. 864,788, May 19, 1986, abandoned.  
 This application Feb. 22, 1988, Ser. No. 158,771  
 Int. Cl.<sup>4</sup> F16C 37/00, 33/26; E21B 17/10

U.S. Cl. 384-317

36 Claims



1. An improved bearing structure comprising:  
 a continuous polycrystalline diamond bearing surface; and  
 channel means in said surface for preventing thermal degradation of said surface in the presence of high bearing loads in excess of eight million PV (lbs./sq. in.) (ft./min.).

4,789,252

## BEARING SYSTEM WITH WATER EXCLUSION

Peter Dreschmann, Dittlenbrunn, and Wilhelm Walter, Reith, both of Fed. Rep. of Germany, assignors to FAG Kugelfischer George Schafer (KGaA), Fed. Rep. of Germany  
 Filed Aug. 5, 1987, Ser. No. 82,046  
 Claims priority, application Fed. Rep. of Germany, Jun. 3, 1987, 8707880[U]

Int. Cl.<sup>4</sup> F16C 33/76; F16J 15/54

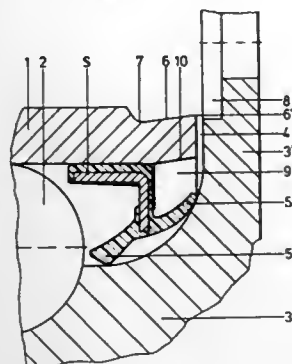
U.S. Cl. 384-486

19 Claims

1. A bearing comprising:  
 an outer ring, an inner ring radially inward of the outer ring, a plurality of rolling elements between the outer and inner rings;  
 the outer ring having an axially outer edge; the inner ring supporting a flange which extends radially outward from the inner ring and past the outward edge of the outer ring and defining a small axial length slot between the flange and the edge of the outer ring;  
 the outer ring having a radially external surface, and toward the axial edge of the outer ring at the external surface, that



surface includes a section that is radially inwardly inclined moving axially away from the axial edge for defining a conically shaped section of the external surface, whereby liquid on the external surface in the vicinity of the slot would tend to move axially away from the slot axially along the inwardly inclined section of the external surface;



said flange extending radially outward of the outer ring, and there are attachment boreholes defined in the portion of the flange extending beyond the outer ring for attachment of the flange;  
said inclined section on the external surface of the outer ring beginning at the outer edge of the outer ring in the region of the attachment boreholes in the flange of the inner ring.

4,789,253

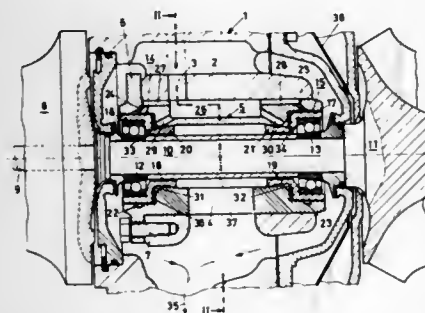
#### AXIALLY PRE-TENSIONED ROLLING CONTACT BEARING ARRANGEMENT

Ambrogio Perego, Wettingen, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland  
Filed Jan. 25, 1988, Ser. No. 147,727  
Claims priority, application Switzerland, Jan. 30, 1987, 329/87

Int. Cl.<sup>4</sup> F16C 27/00, 33/66

U.S. Cl. 384—517

3 Claims



1. Axially pre-tensioned rolling contact bearing arrangement of a shaft (10) in a casing (1), in which arrangement the shaft (10) exhibits at at least one of its two shaft ends a disk-shaped axially symmetric over-hung component (8, 11) and the two rolling contact bearings (12, 13), arranged inwards of the shaft ends, are axially rigidly clamped to the shaft (10) with their inner race and with their outer race are seated in one damping bush (14, 15) each which, in turn, are axially displaceably supported in the interior of a bearing bush (5), mounted in a bearing casing (2), at its two ends, furthermore with ducts (3, 4) for feeding lubricating oil to the rolling contact bearings (12, 13) and away from them back into an oil sump of a lubricating oil circuit, wherein the damping bushes (14, 15) are essentially bodies consisting of two bushes of different outside diameter, with one larger bush part (16, 17) each which accommodates

the outer race of the rolling contact bearing (12, 13) concerned and is seated with radial play in the bearing bush (5) so that the outer surface of this larger bush part (16, 17) delimits, together with the hole of the bearing bush (5), accommodating it, an annular space, and one smaller bush part (18, 19) each which, with a circular cylindrical outer surface, is displaceably seated in a hole of the bearing bush (5) and, with the latter, delimits an annular duct (31, 32), which smaller bush parts (18, 19) each exhibit a hole, which, together with the shaft (10), delimit annular gaps which connect the rolling contact bearing spaces with the duct (4) for lubricant removal, the duct (3) for feeding lubricating oil to the rolling contact bearings (12, 13) communicates via oil feed holes (24, 25) in the bearing bush (5) with the abovementioned annular spaces between the outer surfaces of the larger bush parts (16, 17) and the bearing bush (5), the duct (3) furthermore communicates via oil feed holes (29, 30) in the bearing bush (5) with the annular ducts (31, 32), and these annular ducts (31, 32) are in conductive connection with the rolling contact body space of the rolling contact bearings (12, 13) via oil feed holes (33, 34) in the damping bushes (14, 15), the cross-section of the oil feed holes (33, 34) in the damping bushes (14, 15) being smaller than the cross-section of the oil feed holes (29, 30) in the bearing bush (5).

4,789,254

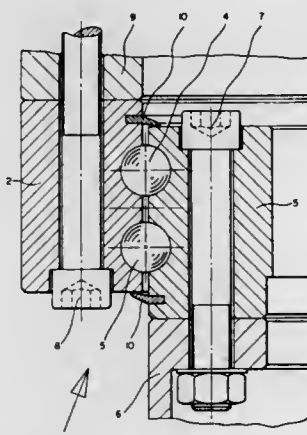
#### LARGE ANTIFRICTION BEARING

Reinhard Marquardt, Lippstadt, and Ernst Priesmeier, Iserlohn, both of Fed. Rep. of Germany, assignors to Hoesch Aktiengesellschaft, Dortmund, Fed. Rep. of Germany  
Filed Mar. 17, 1987, Ser. No. 26,763  
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1986, 3609781

Int. Cl.<sup>4</sup> F16C 19/30

U.S. Cl. 384—611

4 Claims



1. Large antifriction bearing comprising two bearing races and at least two track systems disposed therebetween and each having a rolling element row rolling on associated tracks of the bearing races, characterized in that the one rolling element row (4, 11) is of a material different to the other rolling element row (5, 12), said other rolling element row (5, 12) is equipped with rolling elements of plastic, and said plastic rolling elements are larger than the accommodation space of the associated track system.

4,789,255

#### CORRECTION BUFFER

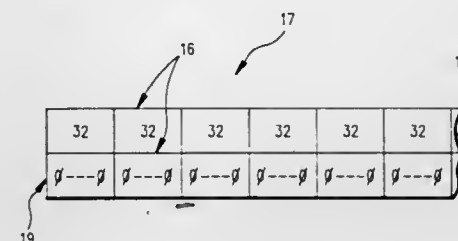
Douglas E. Hays, and James F. Lederer, both of Lexington, Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 26, 1987, Ser. No. 53,890

Int. Cl.<sup>4</sup> B41J 5/31

U.S. Cl. 400—63

7 Claims



1. In a system for printing characters on a print medium in response to the input of character information from an input device, including a correct ion buffer for storing character information from the input device in the form of character codes, the improvement comprising: a correction buffer having a group of records, each record being capable for storing a different character code and each record corresponding to an incremental distance on the print medium such that a character on the print medium spans a distance greater than said incremental distance.

4,789,256

#### RIBBON CARTRIDGE FOR PRINTING MACHINES

Boris Ukmar, Banchette, and Mario Trompetto, Mercesasco, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Division of Ser. No. 582,738, Feb. 23, 1984, Pat. No. 4,669,902.

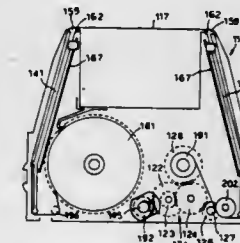
This application Mar. 6, 1987, Ser. No. 22,675

Claims priority, application Italy, Mar. 7, 1983, 67254 A/83

Int. Cl.<sup>4</sup> B41J 32/00

U.S. Cl. 400—208

4 Claims



1. A ribbon cartridge for a typewriter or other printing machine of the type having a single drive shaft, and in which the cartridge comprises a casing; a ribbon; a take-up spool for the ribbon; a drive roller; and a pressure roller, which can be coupled to the single drive shaft for the unidirectional advance movement of the ribbon, and transmission mechanism between one of said drive roller and pressure roller and the take-up spool, wherein said transmission mechanism comprises a toothed wheel and the take-up spool has a hub member coaxial with the toothed wheel, and a friction clutch between the hub member and the toothed wheel, wherein said toothed wheel comprises a sleeve which projects axially from the toothed wheel and two shoulders which are positioned in diametrically opposite relationship to the sleeve, wherein said hub member includes an internal seat which is guided on the sleeve, and an outside circular groove adjacent to the internal seat; wherein said friction clutch comprises a resilient ring which

is mounted between said two shoulders of said toothed wheel and is housed in the outside circular groove of said hub member, and wherein said two shoulders cause the resilient ring to be put in traction and to assume an elongate shape provided with two sections which engage frictionally the outside circular groove of said hub member.

4,789,257

#### LINE FIND FEATURE FOR AN ELECTRONIC TYPEWRITER

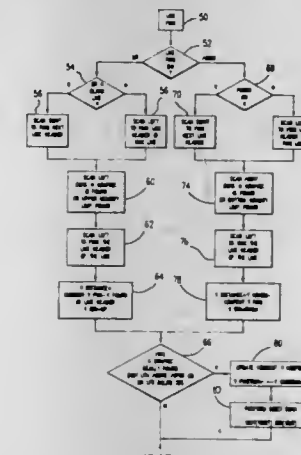
John K. Brown, III, Lexington; Darrell D. Cronch, Georgetown; Patricia A. Graham, and Kevin N. Tucker, both of Lexington, all of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 25, 1987, Ser. No. 101,044

Int. Cl.<sup>4</sup> B41J 11/44

U.S. Cl. 400—582

11 Claims



1. An electronic typewriter comprising: a keyboard for generating signals representative of typewriter functions and symbols; a print means for printing said symbols on a record sheet; record sheet support means; record sheet feed means for driving said record sheet; electronic control means responsive to said keyboard signals, comprising: memory for storing electrical codes which represent said symbols, electrical codes representing said typewriter functions and electrical codes representing the position, relative to said record sheet, occupied by a line of text having said symbols therein; reading and decoding means for reading and decoding said codes representing the position of a line of text on said record sheet; and move control means responsive to said keyboard and said electronic control means for comparing relative positions of said print means and a selected one of said lines having text thereon as determined by said reading and decoding means, relative to said record sheet, and for commanding said record sheet feed means to move said record sheet by the necessary distance to align only said selected line having text thereon with said print means, thereby aligning the print means with the selected line having text thereon, with regard only to the exact distance between the print means and the selected line having text thereon.

# 4,789,258

## PAPER FEEDING AND TRANSPORT THROUGH PRINTERS

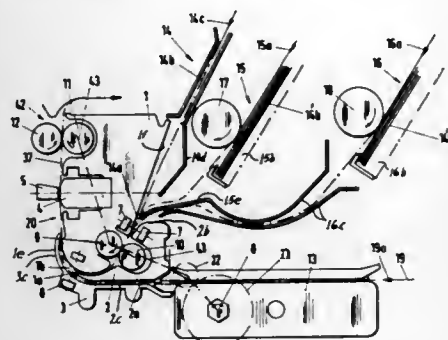
Guenter Gomoll, Nersingen/Leibi, and Wolfgang Haulaib, Langenau, both of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany  
Filed Mar. 4, 1987, Ser. No. 21,453

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1986, 3607080

Int. Cl.<sup>4</sup> B41J 11/50

U.S. Cl. 400—605

19 Claims



1. In a printer having a bar-shaped printing platen with flat printing surface, a device for feeding individual sheets, as well as endless sheets, to a print position adjacent to the platen, comprising in combination:

- a first feeder channel for single sheets, including a first pair of friction rollers for transporting the individual sheets towards said platen;
- a second feeder channel for endless sheets, including a sheet engaging tractor arranged to bypass said first friction roller pair, and also feeding said endless sheet towards said printing platen, there being a common channel and a merger point and area for feeder paths into which, respectively, either a single sheet or an endless sheet are to be fed;
- means for reversibly driving said first pair of friction rollers;
- means for reversibly driving said tractor; and
- means for selectively connecting and disconnecting said tractor from its means for driving said tractor.

4,789,259

# CUT SHEET FEED APPARATUS

Jun Katayanagi, Musashino, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 9, 1987, Ser. No. 1,873

Claims priority, application Japan, Jan. 13, 1986, 61-4866; Jan. 13, 1986, 61-4867; Apr. 17, 1986, 61-8997

Int. Cl.<sup>4</sup> B41J 11/58, 13/10; G03G 15/00; B65H 5/22

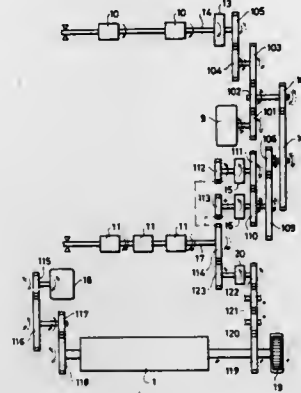
U.S. Cl. 400—624

22 Claims

1. A cut sheet feed apparatus in a recording system having recording means for performing recording at a recording position, including:

- first storing means for storing cut sheets to be fed to the recording position;
- supplying means for supplying the cut sheets from said first storing means to the recording position;
- second storing means for storing cut sheets passing through the recording position;
- discharge means for discharging the cut sheets to said second storing means;
- a reversible drive motor for operating said supplying means and said discharge means; and
- transmitting means for transmitting a forward rotational force of said drive motor to said supplying means and said discharge means to simultaneously perform supply and

discharge operations, and for transmitting a reverse rotational force to said discharge means to release trans-



sion of the rotational force to said supplying means, thereby allowing only the discharge operation.

4,789,260

# THERMAL PRINTER

Hiroshi Kobayashi, Iwate; Yuji Nagahamaya, Takizawa; Kazuo Ueda, Tamayama, and Ikuro Hibino, Takizawa, all of Japan, assignors to Alps Electric Co., Ltd., Japan

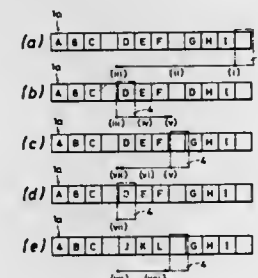
Filed Aug. 13, 1987, Ser. No. 84,907

Claims priority, application Japan, Oct. 8, 1986, 61-239841; Nov. 17, 1986, 61-273778; Dec. 9, 1986, 61-190244[U]

Int. Cl.<sup>4</sup> B41J 3/10, 29/16

U.S. Cl. 400—697.1

4 Claims



1. In a thermal printer having a platen on which a paper is supported, a carriage mounting a thermal head thereon which is movable forwardly and backwardly along a first direction in parallel with the platen, carriage moving means for moving the carriage forwardly and backwardly along the platen in the first direction, said thermal head being movable toward the platen and away from the platen so as to press the thermal head in contact with the paper in a printing position against the platen and to move the thermal head to a standby position away from the paper, respectively, head moving means for moving the thermal head toward and away from the platen, an ink ribbon provided between the thermal head and the paper on the platen, said ink ribbon having a layer of thermally meltable ink facing the paper and being wound in an ink cartridge supported on the carriage, and ribbon winding means for winding the ink ribbon forwardly to bring a fresh portion of the ribbon to the printing position in conjunction with movement of the carriage forwardly along the platen when the thermal head is in the printing position against the platen, the improved method of operating said thermal printer to perform lift-off erasing while reducing consumption of the ink ribbon, comprising the steps of: providing a thermal head having a length extending in the

first direction with an unoccupied end disposed forwardly in the first direction and an occupied end disposed backwardly in the first direction, and thermal heating elements at the occupied end of the thermal head, wherein the ink ribbon has a ribbon portion disposed across the length of the thermal head and is led toward respective parts of the ink cartridge from around the occupied and unoccupied ends of the thermal head;

stopping the forward movement of the thermal head after printing on the paper when it is desired to erase a previously printed ink mark at an erasing position backwardly from the stopped position of the thermal head;

first moving the thermal head backwardly to the erasing position while providing a fresh portion of the ink ribbon in front of the thermal heating elements at the occupied end of the thermal head;

applying heat to the thermal heating elements across the erasing position of the previously printed ink mark, so as to thermally melt the ink layer at the fresh portion of the ink ribbon with the previously printed ink mark;

continuing to move the thermal head backwardly so that the unoccupied portion of the thermal head is moved backwardly of the erasing position without moving the fresh portion relative to the erasing position, during which time the ink layer at the fresh portion is allowed to cool and after which the ink mark becomes adhered to and lifted off from the paper by separation of the ribbon portion from around the unoccupied end of the thermal head; and finally moving the thermal head forwardly to bring the thermal elements at the occupied end of the thermal head to the erasing position, while moving the ink ribbon to bring the fresh portion used for lift-off erasing to the erasing position for reuse in printing a corrected ink mark at the erasing position.

4,789,261

# LIQUID AEROSOL APPLICATOR WITH SPONGE BUFFER TO BRUSH

Yasuyuki Iwase, Fujioke; Yoshiaki Akaishi, Saitama, and Masao Muraishi, Furukawa, all of Japan, assignors to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

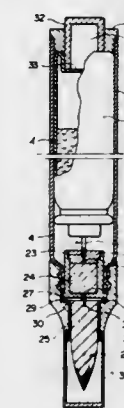
Filed Apr. 2, 1987, Ser. No. 33,288

Claims priority, application Japan, Apr. 3, 1986, 61-77365

Int. Cl.<sup>4</sup> A46B 11/02

U.S. Cl. 401—190

3 Claims



1. A liquid applicator which comprises:
  - (a) a cylindrical stem body having a knocking member at its rear end;
  - (b) a brush point having a plurality of fibers tapering to a point and detachably mounted in said stem body and projecting therefrom;
  - (c) a liquid supply vessel detachably assembled in said stem body, said vessel having a valve capable of being opened

- by said knocking member, said vessel also having a liquid propellant under pressure to force the liquid therefrom;
- (d) said valve being of the type to cause a flow of a metered quantity of liquid therethrough on each operation of said knocking member;
- (e) an adapter to connect said valve to a sponge buffer in a cavity in the stem body; and
- (f) a passage to conduct liquid from said buffer to said brush point, whereby pushing the knocking member causes a measured quantity of liquid to flow to said brush point for application.

4,789,262

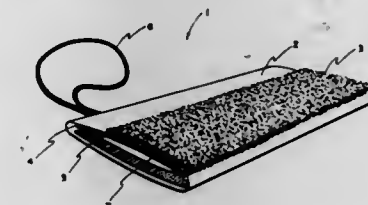
# SOAP HOLDING CLEANING PAD

Theoline Sanchez, 1504 Idaho Ave., Orlando, Fla. 32809  
Filed Jun. 1, 1983, Ser. No. 499,837

Int. Cl.<sup>4</sup> A47K 7/02

U.S. Cl. 401—201

1 Claim



1. A soap holding cleaning pad comprising:
  - a nylon cloth sack having an opening therein, said nylon cloth sack having a hook and loop material mounted along each inside edge thereof to allow said opening in said nylon cloth sack to be closed or opened for removing or holding a material therein;
  - a cord handle attached to said nylon cloth sack;
  - a nylon mesh formed into a portion of said nylon cloth sack;
  - a luffa plant fiber material forming a cleaning surface mounted over said nylon mesh; and
  - a bar of soap located in said nylon cloth sack, whereby a rapidly drying soap holding cleaning pad controllably releases soap.

4,789,263

# PROCESS FOR THE PRODUCTION OF A BALL-POINT PEN TIP SUPPLIED WITH LIQUID INK, AND TIP PRODUCED THEREBY

Werner Germann, Lugano-Cassarate, Switzerland, assignor to Albe S.A., Agno, Switzerland

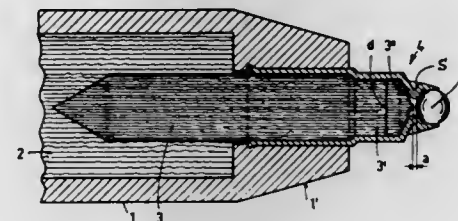
Continuation of Ser. No. 384,082, Jun. 1, 1982, abandoned. This application Jun. 20, 1984, Ser. No. 622,396

Claims priority, application Switzerland, Jun. 1, 1981, 3580/81-5

Int. Cl.<sup>4</sup> B43K 15/00

U.S. Cl. 401—2.09

4 Claims



1. Process for the production of a ball-point pen tip to be supplied with liquid ink by means of a capillary member said tip comprising reservoir means (2) for feeding ink to a ball (5)



by means of a porous, needle-like part (3), that emerges from a tubular section of predetermined length, said process comprising forming coaxially on a slender cylindrical metal tube a forward end zone (A') of reduced diameter relative to the original tube, a rearward end zone (A'') of enlarged diameter relative to the original tube, and a central zone (A''') of substantially the original diameter of the tube, then reducing by simultaneous rolling from inside and outside the wall thickness of said forward end zone (A') by using a plurality of rollers on the outside of said forward end zone, flanging said end zone (A') of reduced thickness inwardly, and snapping said ball (5) into the flanged forward end zone.

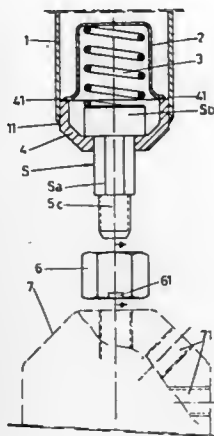
**4,789,264**  
**PIPE SOCKET CONNECTION FOR A SPACIAL STRUCTURE**

Jose M. J. Galan Inchaurre, Estrada Masustegui, 4, Bilbao, Spain

Filed Sep. 22, 1986, Ser. No. 910,202  
Int. Cl.<sup>4</sup> B25G 3/00; F16D 1/00

U.S. Cl. 403—8

4 Claims



1. A pipe and socket connection for spatial structures comprising:

- (a) a pipe termination that is coaxial with and welded to one end of the pipe, said pipe termination having a hole therein;
- (b) a screw that is freely rotatable in said hole of said pipe termination, said screw comprising:
  - (b<sub>1</sub>) a head having a diameter greater than said hole of said pipe termination, said head positioned inside said pipe;
  - (b<sub>2</sub>) a polygonal body connected to said head and extending through said hole to outside said pipe; and
  - (b<sub>3</sub>) a threaded end connected to said polygonal body;
- (c) a nut having an inside polygonal area that mates with said polygonal body of said screw, said nut having an inside recess therein; and
- (d) a spring washer positioned in said inside recess of said nut to restrict axial movement of said screw.

**4,789,265**  
**COURT RESURFACING APPARATUS AND PROCESS**  
Jack H. Wilson, Jackson, and Willis G. Dykes, Vicksburg, both of Miss., assignors to Sport Koter U.S.A., Inc., Jackson, Miss.  
Filed Feb. 5, 1987, Ser. No. 10,936  
Int. Cl.<sup>4</sup> E01C 19/16

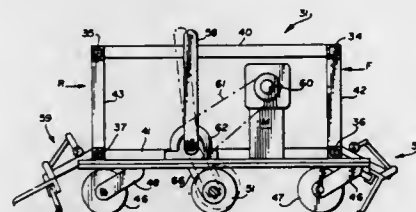
U.S. Cl. 404—75

26 Claims

9. A method of resurfacing a regulation tennis court having prescribed length and width dimensions comprising the steps of:

- (a) applying a mass of resurfacing material along and outside

at least one outer boundary corresponding to the width dimension of said court; and  
(b) spreading and smoothing said material to a substantially

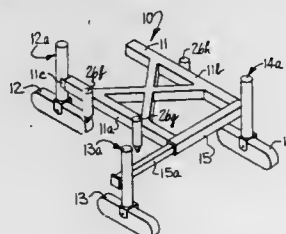


uniform predetermined thickness with a resurfacing device having a length equal to at least the width dimension of said tennis court by moving the device across court in a single pass and in the direction of said length dimension.

**4,789,266**  
**SELF-PROPELLED CONSTRUCTION APPARATUS**  
Samuel Y. Clarke, Jr., Mocksville, and Clifford J. Griffith, Jr., Clemmons, both of N.C., assignors to Power Carbers, Inc., Salisbury, N.C.  
Filed Nov. 27, 1987, Ser. No. 125,999  
Int. Cl.<sup>4</sup> E01C 19/22, 19/46

U.S. Cl. 404—96

14 Claims



1. A self-propelled construction apparatus for continuously forming a paving material onto a suitable surface such as the ground, said apparatus comprising a main frame including a body having a front end and a rear end, a prime mover carried by said body, a molding means connected to said main frame for continuously forming paving material, at least one pair of independently and longitudinally adjustable substantially horizontal beam members directly connected to said body at one of said ends and defining one end of said main frame and wherein each of said beam members of said pair is adjustable independently of the other beam member, front and rear movable ground engaging means, and means connected to said ground engaging means for connecting said ground engaging means to said main frame at respective ends thereof for supporting the main frame and for varying the height of the main frame above the ground.

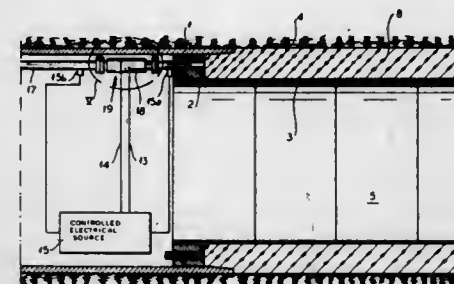
**4,789,267**  
**METHOD OF AND APPARATUS FOR CONCRETE TUNNEL LINING**

Siegmond Babendererde, Bad Vilbel; Bernd Hillemeier, Wiesbaden, and Otto Braach, Hattingen, all of Fed. Rep. of Germany, assignors to Hochtief Aktiengesellschaft Vorm. Gebr. Helfmann, Essen, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 839,791, Mar. 13, 1986, Pat. No. 4,687,374. This application Feb. 19, 1987, Ser. No. 17,189  
Claims priority, application Fed. Rep. of Germany, Mar. 13, 1985, 3508966; United Kingdom, Mar. 10, 1986, 8605861; Fed. Rep. of Germany, Mar. 26, 1986, 3610237; Jul. 2, 1986, 3622203; Dec. 24, 1986, 3644532

The portion of the term of this patent subsequent to Aug. 18, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> E21D 9/06, 11/10

U.S. Cl. 405—146

14 Claims



1. A method of forming a tunnel, comprising the steps of: advancing a tunneling machine through a subterranean structure to excavate material and form a tunnel wall behind the advance of said tunneling machine; behind the advance of said tunneling machine, spacedly juxtaposing with said wall a tunnel-form ring to define with said wall an annular compartment which is formed progressively with the advance of the machine; pumping into said compartment a concrete having a composition selected such that it remains workable for more than two hours at a temperature of about 20° C. but sets to a nonworkable state after 10 to 30 minutes upon heating to a temperature in a range of substantially 40° C. to substantially 70° C.; heating the concrete pumped into said compartment at a location proximal to that at which the concrete enters said compartment by the direct introduction of electrical energy into the pumped flow of concrete to a temperature in said range of substantially 40° C. to substantially 70° C.; and permitting the heated concrete to set in said compartment so as to form a concrete tunnel lining which advances with the advance of said machine.

**4,789,268**  
**DEVICE AND METHOD FOR REMOVING IRREGULARITIES IN OR ENLARGING AN UNDERGROUND DUCT**

Ian R. Yarnell, Haslemere, England, assignor to Internal Pipe Drillings Limited, Midhurst, England  
Continuation of Ser. No. 679,671, Dec. 10, 1984, Pat. No. 4,657,436, which is a continuation-in-part of Ser. No. 504,603, Jun. 15, 1983, Pat. No. 4,487,052. This application Mar. 6, 1987, Ser. No. 22,708

Claims priority, application United Kingdom, Jun. 18, 1981, 8217645; Dec. 16, 1983, 8333567

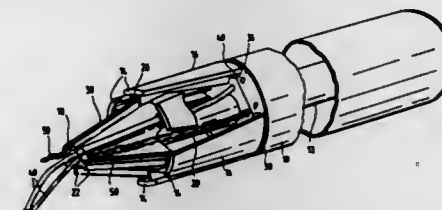
Int. Cl.<sup>4</sup> F16L 1/00

U.S. Cl. 405—154

24 Claims

1. Apparatus for travelling through an underground duct and for enlarging the duct or removing irregularities in the wall of the duct, wherein the apparatus comprises an elongate segmented shell arranged around a longitudinal axis of the

apparatus and having outwardly facing surface portions for engaging the wall of the duct, and a trailing portion extending rearwardly of the shell in a longitudinal direction and having a diameter equal to or approaching the required duct diameter, wherein the shell is expandable laterally with respect to the

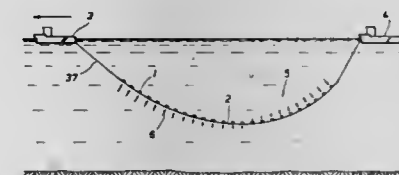


axis from a contracted configuration in which at least a front end portion of the shell lies within a duct penetration diameter, to an expanded configuration for engaging the duct wall over an area thereof and driving the said area of wall away from the axis to create a void within the duct for receiving the trailing portion when the apparatus travels forward in the duct.

**4,789,269**  
**WINGED PIPELAYING**  
Ray R. Ayers, and Frans Kopp, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.  
Continuation of Ser. No. 835,080, Feb. 28, 1986, abandoned.  
This application Apr. 29, 1987, Ser. No. 45,742  
Int. Cl.<sup>4</sup> F16L 1/04

U.S. Cl. 405—158

11 Claims



1. An apparatus for towing at least one submerged pipeline above-seabed comprising: tow means attached to the pipeline; and at least one wing attached to the pipeline and positioned to provide lifting force to the pipeline when the pipeline is being towed, said wing being rotatable from a substantially perpendicular alignment to a substantially lateral alignment with the pipeline in a non-towing mode.

**4,789,270**  
**DIVING WEIGHT**  
Steven L. Selisky, 2109 Gunflint Trail, Brooklyn Park, Minn. 55444

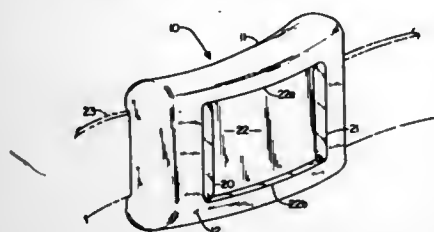
Filed Aug. 19, 1987, Ser. No. 86,883  
Int. Cl.<sup>4</sup> B63C 11/30

U.S. Cl. 405—186

6 Claims

1. A divers weight for use with a belt for holding the weight to the user's body, said weight including:  
a. a longitudinally extending body having an internal and an external surface, a top, bottom and ends;  
b. a pair of belt passing slots formed through said body from said internal to said external surface of said body and spaced a predetermined distance from said ends of said body;  
c. depressed belt receiving and locating areas formed on both said internal and external surfaces of said body, said depressed area on said external surface being formed

between said slots and said depressed areas of said internal surface being formed laterally externally of said slots; and, d. the belt being of a first thickness and the depth of said



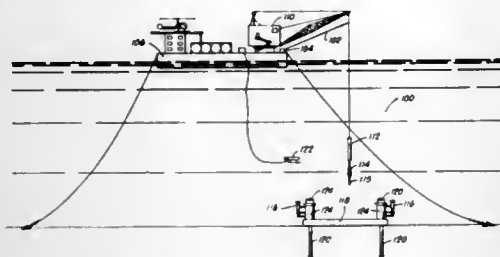
depressed areas being at least equal to the thickness of the belt such that the belt is substantially received into said depressed areas and not extend outwardly or inwardly beyond the undeformed areas of said surfaces.

**4,789,271**  
**REMOTE FLUID TRANSFER SYSTEM AND METHOD FOR SUB-SEA BASEPLATES AND TEMPLATES**  
Bob L. Sullaway, Lloyd C. Knox, both of Duncan, and Gary D. Zunkel, Chickasha, all of Okla., assignors to Halliburton Company, Duncan, Okla.

Continuation-in-part of Ser. No. 892,163, Jul. 29, 1986 abandoned. This application Jul. 29, 1987, Ser. No. 79,313 application Jul. 29, 1987, Ser. No. 79,313  
Int. Cl.<sup>4</sup> E02B 17/00; E02D 29/00

U.S. Cl. 405-225

20 Claims



1. A fluid transfer system for a marine structure located in a body of water for remotely transferring fluid to said marine structure from a vessel located on the surface of said body of water being anchored in position near said marine structure, said fluid transfer system comprising:

- pump means located on said vessel to pump said fluid from said vessel to said marine structure;
- flexible conduit means having one end thereof connected to the pump means located on said vessel,
- substantially rigid conduit means extending from said vessel to said marine structure to provide a flow path for said fluid to be transferred from said vessel to said marine structure, the substantially rigid conduit means having one end thereof connected to the other end of the flexible conduit means;
- independent video camera means for observing the location of the substantially rigid conduit means in said body of water;
- independent manipulation means located on said vessel for manipulating the substantially rigid conduit string over a substantial portion of said marine structure without movement of said vessel from its anchored position over said marine structure, the independent manipulation means having a portion thereof secured to a portion of the substantially rigid conduit string;
- stinger assembly means connected to the other end of the substantially rigid conduit means; and
- a fluid transfer system means including:

at least one sleeve means which releasably receives a portion of the stinger means therein; and  
flow line means interconnecting the sleeve means with another portion of said marine structure transfer said fluid from the conduit means to said marine structure.

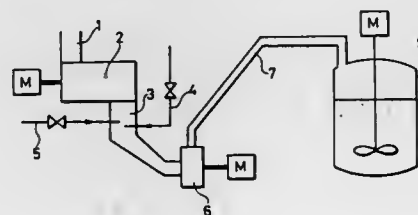
**4,789,272**  
**TRANSPORTATION METHOD OF SYNTHETIC RUBBER CHIPS**

Tetsuyuki Matsubara, Yokohama; Norifumi Ito, Kamakura; Mune Iwamoto, and Toshihiko Ando, both of Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated and Toyo Engineering Corporation, both of Tokyo, Japan  
Filed Mar. 17, 1987, Ser. No. 26,937

Claims priority, application Japan, Mar. 25, 1986, 61-64947  
Int. Cl.<sup>4</sup> B65G 53/00

U.S. Cl. 406-48

6 Claims



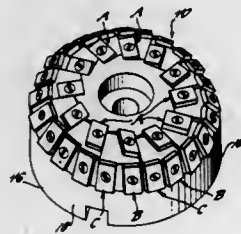
1. In a method for the transportation of chips consisting of synthetic rubber through a piping or by means of a conveyor, the improvement comprising conducting said transportation of synthetic rubber chips through said piping or by means of said conveyor by simultaneously adding steam at 160° C. or lower and water in a total amount of 2 wt. %–50 wt. %, based on the weight of the synthetic rubber chips, wherein tackiness of the synthetic rubber chips is reduced during said transportation.

**4,789,273**  
**MILLING CUTTER**  
Stanley P. Wlasek, and Ernest G. Flinders, both of St. Catharines, Canada, assignors to General Motors of Canada Ltd., Oshawa, Canada

Filed Mar. 2, 1987, Ser. No. 21,042  
Int. Cl.<sup>4</sup> B23C 5/06, 5/08

U.S. Cl. 407-34

4 Claims



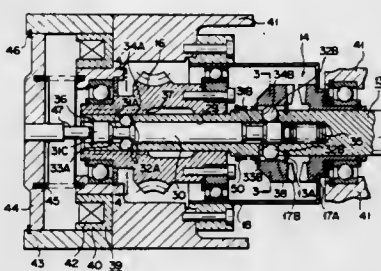
1. A face milling cutter that is adapted to be rotated and driven across an initially rough surface of a workpiece to mill a flat surface, said milling cutter comprising,  
a cutter body rotatable about an axis,  
a plurality of cutting inserts, in an annular array each insert having at least one cutting corner and being mounted to said cutter body so as to present said cutting corner to said workpiece, said inserts further being arranged in a configuration that includes multiple pairs of first and second inserts, with the cutting corner of each first insert being located at the greatest radius and the lowest axial height relative to said cutter body, said first insert further having a substantially neutral axial rake angle, and with the cut-

ting corner of the second insert of each set being located at a radial differential relative to said first insert and at an axial depth differential relative to said first insert, said second insert further having a negative axial rake angle, and with the circumferential spacing measured while moving in one circumferential direction from the cutting corner of each said first insert to the cutting corner of each said second insert comprising a lesser pitch, and with the circumferential spacing measured while continuing to move in said one circumferential direction from the cutting corner of each said second insert to the cutting corner of each said first insert comprising a greater pitch, said lesser and greater pitches alternating around said plurality of inserts with the lesser pitches being substantially equal to each other and the greater pitches being substantially equal to each other.

**4,789,274**  
**BORING APPARATUS**  
Michihiro Shoji, and Toshio Mikiya, both of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Japan  
Filed Aug. 6, 1987, Ser. No. 82,353  
Claims priority, application Japan, Nov. 28, 1986, 61-281644  
Int. Cl.<sup>4</sup> B23B 47/18

U.S. Cl. 408-11

10 Claims



1. A boring apparatus comprising:

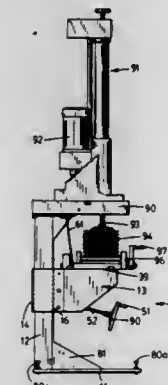
- a frame;
- an electric drill having a cutter spindle and supported by said frame so as to be capable of reciprocal movements in a feed direction along said cutter spindle and a return direction opposite to the feed direction;
- a feed motor provided in said frame;
- a transmission shaft provided in said frame and having an axis around which said transmission shaft rotates;
- rotating means provided between said feed motor and said transmission shaft so as to be rotatably driven by said feed motor;
- a clutch comprising a first toothed half rotatably mounted on said transmission shaft and a second toothed half, said first and second toothed halves being engageable with and disengageable from each other;
- reduction means provided between said rotating means and one of said first and second toothed halves for reducing a speed of said rotating means and transmitting rotation having a direction opposite to that of said rotating means to said one of said first and second toothed halves;
- rotation transmitting means mounted in said frame and driven by said transmission shaft for reciprocating said electric drill along said cutter spindle in accordance with the rotational direction of said transmission shaft;
- engaging means operable to (i) connect said rotating means to said transmission shaft and disengage the other one of said first and second toothed halves therefrom and (ii) connect said other one of said first and second toothed halves to said transmission shaft and disengage said rotating means therefrom;
- selecting means for alternately moving said engaging means so as to (a) disengage said other one of said first and second toothed halves from said transmission shaft and to engage said rotating means with said transmission shaft,

and (b) engage said transmission shaft with said other one of said first and second toothed halves and to disengage said rotating means from said transmission shaft; and  
automatic switching means for automatically setting said selecting means so as to engage said rotating means with said transmission shaft when said selecting means reaches a desired position on said frame while said electric drill moves in the feed direction when said other one of said first and second toothed halves is kept engaged with said transmission shaft.

**4,789,275**  
**BORING STAND**  
James E. Berkeley, Cedar Rapids, Iowa, assignor to Kwik-Way Manufacturing Company, Marion, Iowa  
Filed Mar. 13, 1987, Ser. No. 25,657  
Int. Cl.<sup>4</sup> B23Q 5/34

U.S. Cl. 408-66

6 Claims



1. A boring stand comprising a base member, a vertical upright attached to said base member and an upper support plate attached to said vertical upright, a support platform moveably mounted on said vertical upright and formed with a guide opening through which said vertical upright extends, a reel rotatably supported by said support platform, and a cable with one end attached to said upper support plate and its lower end attached to said reel and means for rotating said reel so as to take up or pay out said cable to raise or lower said support platform, and wherein said vertical upright is rectangular in cross-section and said guide opening is rectangular in shape and at least one wear plate attached to said support platform within said guide opening for engaging a surface of said vertical upright.

**4,789,276**  
**TWIST DRILL FOR TOUGH PLASTICS**  
Roger S. Clarke, Evansville, Ind., assignor to Diversified Electronics, Inc., Evansville, Ind.  
Filed Sep. 4, 1987, Ser. No. 93,375  
Int. Cl.<sup>4</sup> B23B 51/02

U.S. Cl. 408-230

26 Claims



1. A twist drill having a longitudinal axis, a point angle from 75° to 95°, at least two relief surfaces each extending through an arc of at least 30° about said axis, and a lip relief angle for said relief surface from about 2° to about 3°.



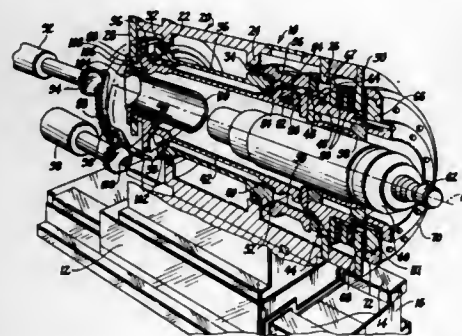
**4,789,277**  
**METHOD OF CUTTING USING SILICON CARBIDE WHISKER REINFORCED CERAMIC CUTTING TOOLS**  
 James F. Rhodes, Greer; Chester J. Dziedzic, Greenville, and Ronald L. Beatty, Greer, all of S.C., assignors to Advanced Composite Materials Corporation, Greer, S.C.  
 Continuation of Ser. No. 830,773, Feb. 18, 1986, abandoned, which is a continuation-in-part of Ser. No. 711,695, Mar. 14, 1985, abandoned. This application Feb. 23, 1988, Ser. No. 161,410

Int. Cl.<sup>4</sup> B23C 1/00; C04B 35/56  
 U.S. Cl. 409—131 5 Claims

1. In a method of cutting metal wherein a cutting tool is brought into contact with a metal workpiece and the cutting tool and metal workpiece move relative to each other whereby metal is removed by the cutting tool from the metal workpiece, the improvement comprising using a sintered composite cutting tool having a matrix consisting essentially of alumina and 2-40 volume percent silicon carbide whiskers distributed therethrough.

**4,789,278**  
**PLANETARY MILLING MACHINE**  
 William R. Dexter, Washington, and Eberhard E. Wasserbaech, Utica, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Oct. 13, 1987, Ser. No. 107,771  
 Int. Cl.<sup>4</sup> B23C 1/12  
 U.S. Cl. 409—200 3 Claims

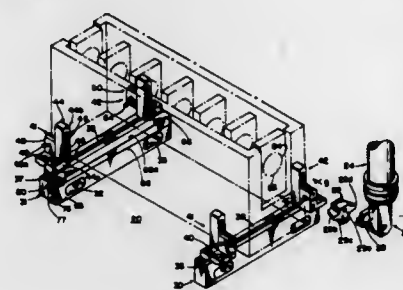


1. A machine tool, comprising, housing means defining a longitudinal central axis, a motorized tool spindle unit including tool holding means defining a tool axis and electric motor means for driving the tool holding means so as to perform the cutting or other tool function of the machine, means mounting said spindle unit on said housing means for generally parallel orientation between said tool axis and said central axis and for movement of said spindle unit in transverse planes of said housing means to any of a variety of selectable positions of said tool axis parallel spaced with respect to said central axis, said mounting means being adapted to orbital movement of said spindle unit about said central axis, a first drive shaft means for rotating said first shaft means on such axis, a second rotatable drive shaft means having its axis aligned on said central axis, second variable speed electric motor means for rotating said second shaft means on such axis in controlled relationship with rotation of said first drive shaft means, means connecting one of said shaft means with said mounting means for unitary rotation with respect to said housing, and cam and cam follower means on the other of said tube means and on either said mounting means or on said spindle unit inter-engaged so that upon relative rotation between said first and said second shaft means said spindle unit is caused to move transversely of said housing means relative to said central axis, and means for

selectively moving said spindle unit in directions parallel to said central axis.

**4,789,279**  
**SYSTEM AND APPARATUS FOR REBORING MAIN BEARINGS**  
 Donald B. Rottler, 101 NE. 58th St., #8, Seattle, Wash. 98107, and David Engnell, 975 Wildwood Blvd. Southwest, Issaquah, Wash. 98027

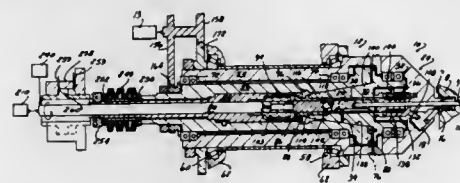
Filed Jun. 18, 1987, Ser. No. 63,553  
 Int. Cl.<sup>4</sup> B23Q 3/06  
 U.S. Cl. 409—227 10 Claims



1. Apparatus for supporting an engine block, comprising: a first rail having a first upper support surface; a second rail arranged in parallel spaced relation to the first rail; a vertically adjustable member carried by the second rail and having a second upper support surface higher than the second rail and parallel to said first upper support surface; adjusting means for adjusting the elevation of said member from a lowermost position whereat said second upper support surface is lower than the first upper support surface to an elevated position higher than the latter; and clamping means adjustably mounted on said rails.

**4,789,280**  
**TOOLING ASSEMBLY FOR AUTOMATIC TOOL CHANGING**  
 Daniel F. Dobat, Sterling Heights, and Michael D. Smith, Troy, both of Mich., assignors to The Cross Company, Fraser, Mich.  
 Filed Apr. 11, 1986, Ser. No. 851,021

The portion of the term of this patent subsequent to Sep. 8, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> B23B 31/26; B23C 5/26  
 U.S. Cl. 409—233 5 Claims

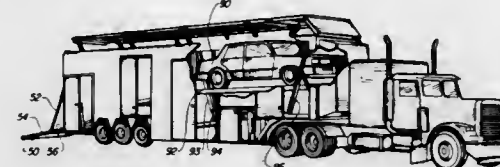


1. A tooling assembly (10) characterized by an inner tool body (30) and a concentric outer tool body (24), said outer tool body (24) rotatably mounted on said inner tool body (30); one of said outer tool body (24) or inner tool body (3) having a coupling feature (76, 80) formed on a portion thereof to be able to automatically couple either said inner tool body (30) or said outer tool body (24) to a spindle assembly (12) upon insertion into a spindle bore to be rotated therewith a first tool holder (20) carried by said inner tool body (30) so as to be rotated therewith and axially moveable therein, and formed with a coupling feature (116) on one end thereof to allow automatic coupling to an inner draw bar (84), a second tool holder (18)

carried by said outer tool body (24) so as to be rotated therewith; means (76, 80, 54, 56, 290) independently rotating both said inner tool body (30) and said outer tool body (24) by said spindle assembly (12); whereby said tooling assembly (10) may be coupled as an assembly to a spindle assembly (12) independently rotated, separate tools and separately advance said first tool holder (20) by a draw bar (84).

**4,789,281**  
**AUTOMOBILE HAULING TRAILER**  
 Norman R. Westerdale, Grand Blanc, Mich., assignor to Auto-haul Industries, Inc., Flint, Mich.

Filed Jul. 30, 1987, Ser. No. 79,567  
 Int. Cl.<sup>4</sup> B60P 3/08  
 U.S. Cl. 410—29.1 21 Claims



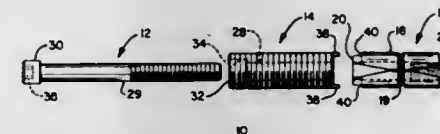
14. A trailer for carrying assembled wheeled vehicles comprising:

- (A) a chassis;
- (B) a metal framework mounted on said chassis;
- (C) a multi-sided enclosure mounted on said chassis and said framework;
- (D) a plurality of openings in at least one side of said enclosure, said openings being disposed to allow direct access to said assembled wheeled vehicles;
- (E) a plurality of doors, each of said doors being movably disposed to cover and uncover a corresponding one of said plurality of openings;
- (F) a plurality of elongated platforms located within said enclosure;
- (G) a plurality of actuators located within said enclosure, each said actuator having both mounting means and output means;
- (H) means for attachment of each said actuator between one of each said platforms and said framework;
- (I) a plurality of axles mounted to the underside of said chassis;
- (J) a plurality of wheels;
- (K) means for mounting one of each of said wheels on opposing ends of each said axle;
- (L) means for attachment of said trailer to a motorized tractor vehicle;
- (M) a liftable roof mounted on said enclosure;
- (N) an opening in the rearmost side of said enclosure of sufficient size to permit ingress and egress of said assembled wheeled vehicles to and from the interior of said enclosure;
- (O) a door pivotably mounted over said opening in said rearmost side of said enclosure, said pivotable mounted door being attached by a hinge at its lower edge to the lower edge of said opening in said rearmost side of said enclosure;
- (P) second actuating means for opening and closing said door in said rearmost side of said enclosure;
- (Q) third actuating means for lifting and lowering said roof;
- (R) means for individually and remotely operating each said actuator and said second and third actuating means;
- (S) locking means interconnecting said roof, said side doors and said rearmost door, and locking said side doors and said rearmost doors in the closed position when said roof is moved to a lowermost position;
- (T) a plurality of hoisting points attached to said framework and accessible from the exterior of said enclosure; and
- (U) a cavity on the underside, forward portion of said trailer

adapted to surround and engage the vertical protrusion of a TTUX rail car.

**4,789,282**  
**EXPANSION ANCHOR STUD**  
 Frederic C. Abraham, 21 W. Parkway, Pequannock, N.J. 07440  
 Filed Feb. 26, 1986, Ser. No. 832,991  
 Int. Cl.<sup>4</sup> F16B 13/04

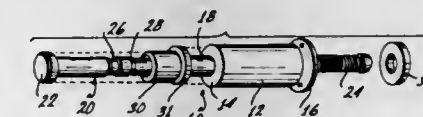
U.S. Cl. 411—24 5 Claims



1. An expansion anchor stud (10) for securing a member with a nut to a surface, said surface having a blind hole extending therein, comprising:  
 a threaded bolt (12) of a first diameter;  
 an externally threaded stud (14) of a second diameter adapted to receive an internally threaded nut, and having an axial hole therethrough for receiving the bolt (12), wherein the bolt (12) has a head (30) on its distal end that is larger than the axial hole in the threaded stud (14), and wherein the bolt (12) is longer than the threaded stud (14) so that the proximal end of the bolt (12) extends past the proximal end of the threaded stud (14); and  
 an expansion shield (16) having an outside diameter substantially equal to the second diameter and threaded to receive the threads on the proximal end of the bolt (12);  
 wherein threading the bolt (12) through the axial hole in the threaded stud and into the expansion shield (16) causes expansion of the expansion shield (16) and consequent setting of the expansion shield within a hole in a surface; and  
 wherein a member is subsequently fastened to the surface when the nut is threaded onto the stud.

**4,789,283**  
**FLUID-TIGHT BLIND RIVET**  
 Fred Crawford, El Segundo, Calif., assignor to Pavco Industries, Inc., Huntington Beach, Calif.  
 Continuation-in-part of Ser. No. 751,274, Jul. 2, 1985, abandoned. This application Sep. 10, 1986, Ser. No. 906,611

Int. Cl.<sup>4</sup> F16B 13/04  
 U.S. Cl. 411—43 6 Claims



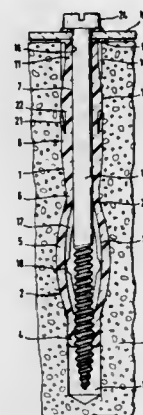
1. A fluid-tight blind rivet comprising in combination:  
 a blind rivet including a tubular rivet body having an inner end and a rivet head at its opposite end, a pull-stem extending through an inner bore in said rivet body, and an axially collapsible barrel on said pull-stem, said rivet body being expandable within a rivet hole bored in a workpiece responsive to pulling force applied to said pullstem relative to said rivet body so as to drive said barrel against said inner end;  
 a radial locking groove on said pull stem within said inner bore such that rivet body material is gathered into said locking groove along a region of said inner bore intermediate said rivet head and said inner end as said stem is pulled through said bore thereby forming a radial flange mechanically interlocking with the pull stem to prevent

subsequent withdrawal of the stem from the expanded rivet body and also sealing the inner bore against fluid leakage; and

a relatively thin outer sleeve on said rivet body, said outer sleeve being of ductile material substantially softer than the material of said rivet body so as to extrude under pressure of said expanding rivet body and form a fluid-tight seal between said sleeve and the workpiece being fastened, said outer sleeve covering said rivet body from said head end to said inner end and further extending partially over said collapsible barrel;

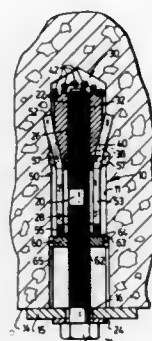
said collapsible barrel being cylindrical and of outer diameter smaller than said rivet body, said barrel lying between an enlarged stem head and said rivet body, said barrel further having a radial flange at its end adjacent the inner end of the rivet body, said radial flange having an outer diameter intermediate the outer diameters of the inner portion of said barrel and said rivet body, said outer sleeve being crimped so as to taper over said flange and terminate in an inner end having a diameter closely fitting about said barrel, the inner end of said sleeve being of smaller diameter than said stem head such that the sleeve is retained against separation from said stem.

4,789,285  
ANCHORING PLUG  
Artur Fischer, Waldachtal, Fed. Rep. of Germany, assignor to Artur Fischer GmbH & Co. KG, Waldachtal, Fed. Rep. of Germany  
Filed Mar. 23, 1987, Ser. No. 29,536  
Claims priority, application Fed. Rep. of Germany, Mar. 29, 1986, 3610655  
Int. Cl.<sup>4</sup> F16B 13/04  
U.S. Cl. 411—32 15 Claims



1. A plastic anchoring plug for anchoring objects in support structures, comprising a body having a longitudinal bore; and a fastening screw which is received in said bore for fastening an object to a support structure, said body including an expandable portion (2) expanded and anchored in a hole of the support structure when said screw is inserted into said bore, a base portion (4) connected to said expandable portion at one end thereof, and an elongated neck (8) connected to said expandable portion at another end thereof and having a head provided with a flange and ribs to secure said neck against rotation in said hole, said elongated neck being formed by two expandable legs spaced from each other and extending from said head toward said expandable portion and merging into a sleeve-shaped shaft portion before said expandable portion, said elongated neck having a cross-section which in a middle region thereof has a shape of an ellipse which merges into circles at said head and said shaft portion, respectively, said legs being separated by a gap and having surfaces which face each other, said gap having a diameter in a direction transverse to an axis of the plug, which corresponds to a difference between a major diameter and a minor diameter of said ellipse whereby said elongated neck is easily inserted into a bore of the object being anchored to the support structure and upon expansion of said legs reliably holds said object even at a distance from said support structure.

4,789,284  
SELF-CUTTING EXPANSION ANCHOR  
Scott A. White, 1636 W. Main, Peoria, Ill. 61606  
Filed Nov. 5, 1987, Ser. No. 116,954  
Int. Cl.<sup>4</sup> F13B 13/06  
U.S. Cl. 411—50 6 Claims

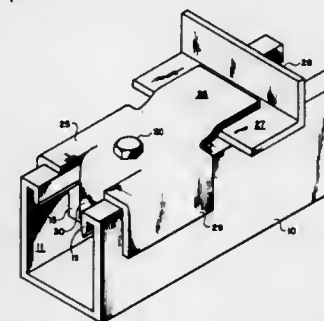


1. A self-cutting expansion anchor, for solid wall installation, comprising:  
an elongated rotatable anchor mounting assembly having separable bolt and ramp portions;  
radially expandable cutter and wall gripping means axially slideably mounted on said ramp portion of said mounting assembly;  
thrust means on said assembly axially engaging said cutter and wall gripping means;  
and a pair of axially spaced opposite-hand screw-threaded portions on said assembly individually screw-threadably mounting said ramp portion on said bolt portion of the assembly, and said thrust means on said assembly in axially spaced relation to said ramp portion.

4,789,286  
FITTING FOR CHANNEL-SHAPED FRAMING MEMBERS  
William Laput, RFD 1, Box 912D, Margaret Lane, Plainfield, Conn. 06374  
Continuation of Ser. No. 825,880, Feb. 4, 1986, abandoned, which is a continuation-in-part of Ser. No. 548,645, Nov. 4, 1983, abandoned. This application May 27, 1987, Ser. No. 58,673  
Int. Cl.<sup>4</sup> F16B 27/00  
U.S. Cl. 411—84 8 Claims

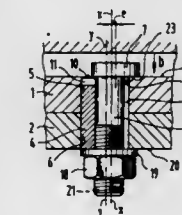
1. A fitting, for removably assembling with and fastening to a channel-shaped framing member of a framework, said framing member having a longitudinal slot in a first side and narrower than said first side, said fitting having a first part externally abutting said first side and being separately and separably fastened thereto by interengaged first and second threaded members having an axis of rotation, said first part being readily

separable from said first and second threaded members when said threaded members are not interengaged, said first threaded member having an elongated cross-section perpendicular to said axis at a location within said framing member, with said cross-section defining a shorter side narrower than said slot and a longer side wider than said slot to pass through said slot and be rotatable about said axis to engage the inside of said slot when said threaded members are interengaged, said fitting having a second part formed as an extension of said first part and adapted to engage, separately and separably, a further structural member of said framework and to transmit structural loads between said framing member and said further structural member, said fitting further comprising:



a tab, borne by said first part and directed inwardly into and through said slot in said first side of said framing member, substantially parallel to said axis or rotation and perpendicular to said slot, at a distance from said axis of rotation of the order of half the width of said shorter side of said first threaded member, and of length sufficient to abut a longer side of said first threaded member when said first part of said fitting is assembled with said framing member and said first threaded member, said tab being readily removable from abutment with said first threaded member when said first and second threaded members are not interengaged.

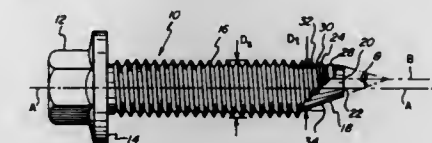
4,789,287  
THROUGH BOLT CONNECTION FOR UNILATERALLY ACCESSIBLE LOCATIONS  
Thanh-Son Le, Berlin, Fed. Rep. of Germany, assignor to Nixdorf Computer AG, Paderborn, Fed. Rep. of Germany  
Filed Jul. 17, 1986, Ser. No. 887,148  
Claims priority, application Fed. Rep. of Germany, Jul. 18, 1985, 3525955  
Int. Cl.<sup>4</sup> F16B 39/00, 21/00  
U.S. Cl. 411—107 14 Claims



1. A connecting device for use in joining parts having aligned passage bores of a predetermined diameter, comprising:  
a screw bolt member having a head portion provided at one end of a shank portion of lesser diameter, the other end of said shank portion member being threaded, the center axis of said head portion being transversely disposed relative to the center axis of said shank portion by an eccentricity distance, the maximum cross sectional dimension of said

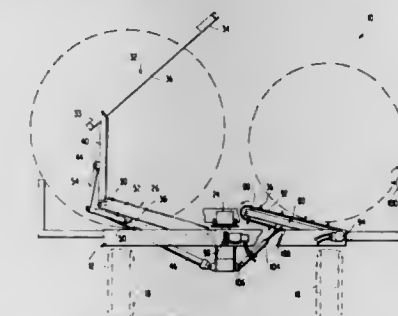
head portion being less than the inner diameter of said passage bores;  
a passage sleeve member having an outer diameter not greater than said head portion diameter and having an eccentric bore therethrough for receipt of said shank portion, said eccentric bore having its center axis transversely disposed relative to the center axis of said passage sleeve member by a distance substantially equal to said eccentricity distance, said passage sleeve member further including a transverse groove provided at one end adjacent said eccentric bore, and said screw bolt member further includes a catch adapted to fit into said groove when said head portion and said passage sleeve member are concentrically aligned; and,  
a threaded locking member removably installed on said threaded end of said shank portion, said threaded locking member being tightenable on said shank portion to draw said parts and said head portion into tight locking relationship to each other.

4,789,288  
ANTI-CROSS THREADING SCREW  
Francis C. Peterson, Woodbury, Conn., assignor to Buell Industries, Inc., Waterbury, Conn.  
Filed Apr. 2, 1987, Ser. No. 34,010  
Int. Cl.<sup>4</sup> F16B 35/00  
U.S. Cl. 411—386 9 Claims



3. A screw for preventing cross-threading, comprising:  
a head; and  
a cylindrical threaded shank projecting from said head, said shank having at its end opposite said head a circular substantially frusto-conical section having a central axis which is offset from the longitudinal axis of said shank.

4,789,289  
BALE LOADER, HANDLER AND FEEDER  
Leon R. Wilson, P.O. Box 1612, Kalispell, Mont. 59901  
Filed Dec. 23, 1986, Ser. No. 945,511  
Int. Cl.<sup>4</sup> B65G 67/02  
U.S. Cl. 414—24.6 7 Claims



1. A bale loading, transporting, feeding and unloading apparatus comprising:  
an elongated chassis mounted on wheels for towing by a prime mover;  
an elongated bale supporting bed structure having an upper surface for supporting bales, said bed structure aligned over and supported by said chassis;



a power operated bale loader mounted upon said chassis adjacent one side of said bed structure for engaging a bale located on the ground and lifting it onto said bed structure;  
said bed structure having a groove extending from front to rear;  
said bed structure having a first tiltable platform at its front end adjacent to said bale loader and on one side of said groove on which a bale is placed by said bale loader;  
said bed structure having a second tiltable platform adjacent said first tiltable platform and on the other side of said groove;  
tilt means to tilt said first tiltable platform toward said second tiltable platform;  
a side rail extending upwardly from said bed;  
a toothed feeding cylinder rotatably mounted on the upper edge of said rail adjacent to said second tiltable platform;  
a feeding conveyor mounted to said second tiltable platform; and  
drive means to rotate said feeding cylinder and said feeding conveyor in opposite directions to unroll and feed material from a bale.

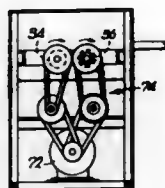
4,789,290  
MACHINE FOR ORIENTING AND STACKING  
RECEPTACLES

Gary A. Barnhart; David E. Carson, and Gerald L. Criss, all of Lawrence, Kans., assignors to Carson/Burger/Weekly, Inc., Lawrence, Kans.

Continuation of Ser. No. 919,609, Oct. 14, 1986, abandoned, which is a continuation of Ser. No. 744,959, Jan. 17, 1985, abandoned. This application Jan. 4, 1988, Ser. No. 142,299  
Int. Cl.<sup>4</sup> B65G 47/24

U.S. Cl. 414—105

2 Claims



1. A device for positively moving a plurality of conical cups from an inlet location to a spaced feeding location, and for delivering plural cups at said feeding location in a nested condition, said device comprising:

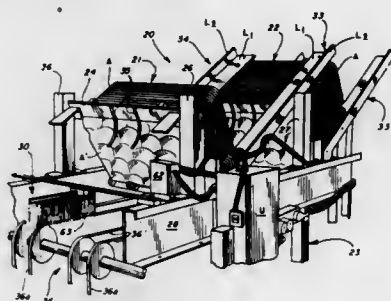
a pair of elongated, cylindrical rolls;  
means mounting said rolls in side-by-side, juxtaposed relationship and extending between said inlet and feeding locations,  
the adjacent, arcuate upper surfaces of said side-by-side rolls cooperatively presenting an elongated, concave, cup-receiving zone along the length of the rolls, and  
motive means operably coupled with said rolls for axial rotation of each of the rolls in the same rotational direction such that the upper surface of one of the rolls moves toward the bottom of said cup-receiving zone,  
said rolls being oriented for normally receiving cups in a substantially separate condition at said inlet location, and for conveying said cups along at least a part of the length of said rolls in said substantially separate condition prior to complete nesting thereof,  
said motive means including structure for rotating said other roll at a rotational speed in excess of the rotational speed of said one roll, for assuring smooth movement of said cups in said zone as the cups traverse the length of said rolls.

4,789,291  
DENESTING APPARATUS  
William W. Allan, Yakima, Wash., assignor to Packaging Corporation of America, Evanston, Ill.

Filed Jun. 17, 1987, Ser. No. 63,171  
Int. Cl.<sup>4</sup> B65H 3/22

U.S. Cl. 414—128

14 Claims



1. An apparatus for successively denesting articles from a stack of nested articles, each article, when disposed at one end of the stack, having an exposed lower peripheral portion; said apparatus comprising an upright frame; first means mounted on said frame for supporting the stack of nested articles in an elevated, downwardly inclined position relative to a predetermined plane with the article at the stack one end facing towards the predetermined plane and having the exposed lower peripheral portion thereof adjacent to but spaced above said plane; second means defining said predetermined plane for conveying a denested article to a predetermined station; carrier means mounted on said frame downstream of the supported stack of nested articles for controlled reciprocatory movement along a path upwardly inclined relative to said predetermined plane towards the supported stack; third means carried by said carrier means and mounted thereon for independent movement between an operative mode wherein the exposed lower peripheral portion of the article to be denested is frictionally engaged by said third means and an inoperative mode wherein the third means is disengaged from the denested article lower peripheral portion; fourth means mounted on said frame for effecting independent movement of the third means from an inoperative mode to an operative mode when the carrier means is at a predetermined location of upward travel along said path and effecting independent movement of said third means from an operative mode to an inoperative mode when the carrier means is at a predetermined location of downward travel along said path, said third means when moving from said operative mode to said inoperative mode releasing the engaged denested article onto said second means whereby the latter conveys the denested article to said predetermined station.

4,789,292  
END EFFECTOR FOR ROBOTIC EQUIPMENT  
Gregory W. Holcomb, 13 Viento, Irvine, Calif. 92714  
Continuation of Ser. No. 597,477, Apr. 6, 1984, abandoned. This application Feb. 17, 1987, Ser. No. 15,593  
Int. Cl.<sup>4</sup> B23P 21/00; B25J 11/00

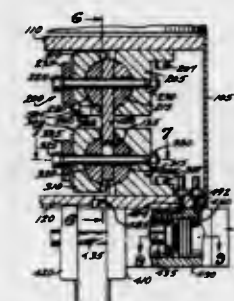
U.S. Cl. 414—226

38 Claims

16. An end effector for use in combination with a robot circuit board insertion of the leads of electrical components characterized by a component body and at least one depending component lead, comprising:

a component gripping mechanism coupled to said robot for gripping said component body, said mechanism comprising first and second jaw members;  
an actuating means for opening and closing the jaw members relative to the body of an electrical component;  
means activated during a complying state for permitting linear and rotational movement of the gripping mechanism

nism relative to a predetermined portion of said robot along or about each of the three orthogonal axes of an X, Y, Z coordinate system within an operating range of movement, said means comprising means for permitting said gripping mechanism to move along or about each of said orthogonal axes during said complying state in response to reaction forces exerted on said gripping mechanism as said jaw members are closed relative to the body



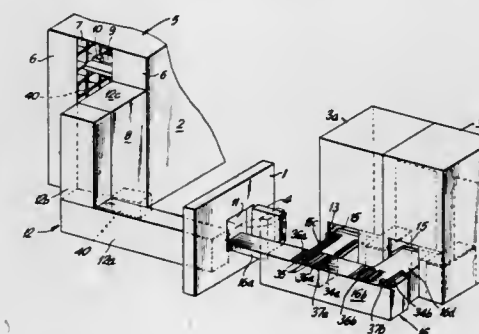
of a component whose position is constrained, from the initial position of the gripping mechanism relative to said robot to any adapted position relative to said robot within said operating range; and

fixing means activated following said complying state for fixing the position of said component gripping mechanism relative to said robot at said adapted position at least with respect to rotation about said orthogonal axes and linear translation with respect to two of said orthogonal axes.

4,789,293  
AUTOMATIC RENTAL SAFE-DEPOSIT BOX SYSTEM  
Junji Hashimoto; Harumi Murata, and Hiroshi Nishio, all of Osaka, Japan, assignors to Itoki Co., Ltd., Osaka, Japan  
Continuation of Ser. No. 563,806, Dec. 21, 1983, abandoned.  
This application Jun. 23, 1986, Ser. No. 879,531  
Int. Cl.<sup>4</sup> B65G 1/00

U.S. Cl. 414—273

6 Claims



1. An automated system for storing and retrieving articles comprising in combination:

- (a) a chamber provided with an opening and door means for sealing said opening;
- (b) a storage unit disposed in said chamber having a plurality of article storage locations arranged in matrix-like form, each of said locations thereby being unique within said system, said storage unit including means for transporting articles between said storage locations and a predetermined position within said chamber;
- (c) at least one article handling table located outside of said chamber;
- (d) motorized means for conveying articles from said predetermined position within said chamber to said article handling table, said conveying means being constructed and

arranged to extend through said opening of said chamber thereby having a portion internal to said chamber and a portion external to said chamber, at least one of said portions of said conveying means being movably secured so that said conveying means may be withdrawn from said opening leaving said opening unobstructed whereby said opening is readily sealable by said door means;

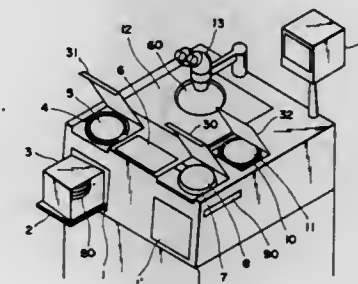
(e) data input terminal means for receiving control information; and

(f) means for electrically controlling said storage unit, conveying means, and door means in accordance with control information provided to said data input terminal, whereby a preselected article is transported from one of said unique storage locations to said article handling table in response to said control information and said system is fully automated between said storage unit and said article handling table.

4,789,294  
WAFER HANDLING APPARATUS AND METHOD  
Mitsuya Sato, Yokohama; Shunzo Inai, Yamato, and Ryoza Hiraga, Kanaga, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Aug. 27, 1986, Ser. No. 900,711  
Claims priority, application Japan, Aug. 30, 1985, 60-189869; Aug. 30, 1985, 60-189870; Aug. 30, 1985, 60-189871; May 9, 1986, 61-104843  
Int. Cl.<sup>4</sup> B65H 5/08

U.S. Cl. 414—416

9 Claims



1. A wafer processing apparatus, comprising:  
a wafer processing station for processing a wafer and having a wafer chuck;  
an x-y stage for moving the wafer chuck in x and y directions which are orthogonal;  
a wafer carrier station for supporting a wafer carrier accommodating a plurality of wafers;  
a wafer prealignment station, disposed substantially in alignment with said wafer carrier station in a z direction which is perpendicular to the x and y directions, for preliminarily aligning the wafer on the basis of an outer periphery thereof;  
a first hand mechanism for conveying the wafer from the wafer carrier supported by said wafer carrier station to said wafer prealignment station; and  
a second hand mechanism for conveying the wafer preliminarily aligned by said prealignment station to the wafer chuck.

4,789,295

## ARTICLE MANIPULATOR FOR ROBOT

Raymond J. Boucher, Jr., Raleigh, and Jack E. Inascoe, Morrisville, both of N.C., assignors to International Business Machines Corp., Armonk, N.Y.

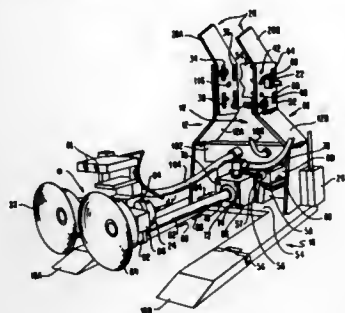
Continuation of Ser. No. 705,777, Feb. 26, 1985, abandoned.

This application Sep. 16, 1986, Ser. No. 909,062

Int. Cl.<sup>4</sup> B60P 1/02

U.S. Cl. 414-497

15 Claims



1. A pneumatic article manipulating device for use with a robot to unload single boxes from a stack of boxes comprising: a frame operable for coupling said device to the robot; a lifting means fixedly connected to said frame and operable for supporting an article thereon; a linear actuator fixedly mounted on the lifting means, said linear actuator including an air cylinder means driving an elongated piston constrained to move in a linear path; a vacuum gripping means fixedly coupled to said piston; said gripping means moving in a linear path substantially parallel to the lifting means to grip the article on one of its sides and placing said article on the lifting means and to maintain the stability of the article as it is transported by the manipulating device.

4,789,296

## INDUSTRIAL ROBOT

Mikael Bergman, Järfälla; Ove Kullborg, and Thord Forsander, both of Västerås, all of Sweden, assignors to ASEA Aktiebolag, Västerås, Sweden

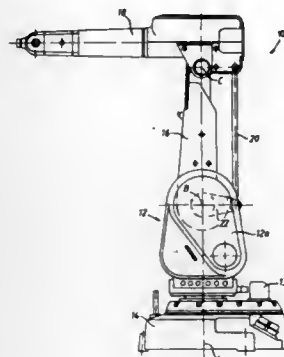
Filed Feb. 17, 1987, Ser. No. 15,299

Claims priority, application Sweden, Feb. 18, 1986, 8600725

Int. Cl.<sup>4</sup> B25J 9/06

U.S. Cl. 414-735

5 Claims



1. An industrial robot comprising a stand which is pivotable about a vertical axis; a first arm having a first end and a second end, said first end being pivotable in the stand about a first horizontal axis; a second arm which is pivotable at the second end of the first arm about a second horizontal axis that is parallel to the first horizontal axis; a link rod arranged in parallel

with the first arm, one end of said link rod being connected to the second arm and the other end being fixed to a crank which is driven by a pivot shaft that is substantially coaxial with the first horizontal axis; a first drive member for pivoting the stand about the vertical axis; a second drive member for pivoting the first arm about the first horizontal axis; a third drive member for pivoting the second arm about the second horizontal axis through the crank and the link rod; said stand comprising two upright stand parts defining an intermediate open space therebetween, the first arm being pivotally arranged in said open space, the third drive member being arranged at least partially in the first of said stand parts and being connected to the pivot shaft of the crank, said pivot shaft extending from said first stand part and through a lead-in opening in the first arm, whereas from the second stand part there extends a drive shaft, which is substantially coaxially opposite to the pivot shaft of the crank and which is connected to the first arm for pivoting the first arm about the first horizontal axis, wherein the first arm is journaled in the second stand part through two bearings which support the drive shaft connected to the first arm, and wherein the first arm is journaled in the first stand part through a bearing which surrounds the pivot shaft of the crank.

4,789,297

## ENCLOSED WIND DEVICE MECHANISM WITH ECCENTRIC ROTOR SHAFT

Wilhelm Mrasek, Hermann-Daur-Weg 21, D-2190, Cuxhaven, Fed. Rep. of Germany

PCT No. PCT/DE85/00559, § 371 Date Oct. 10, 1986, § 102(e) Date Oct. 10, 1986, PCT Pub. No. WO86/03808, PCT Pub. Date Jul. 3, 1986

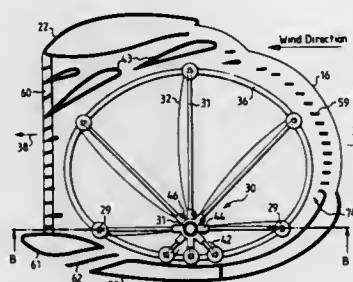
PCT Filed Dec. 23, 1985, Ser. No. 917,090

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1984, 3446694; Jan. 2, 1985, 3500012

Int. Cl.<sup>4</sup> F03D 3/04

U.S. Cl. 415-2 R

12 Claims



1. A wind drive mechanism, comprising: a housing, a vertical rotor therein which is rotatable about an eccentrically located rotor shaft, upper and lower rotor heads provided at each end of said rotor shaft, a plurality of horizontally disposed upper rotor arms slidable through openings in said upper rotor head, a plurality of horizontally disposed lower rotor arms slidable through openings in said lower rotor head, each upper arm being located above a respective lower arm and being slidable in correspondence therewith, each said upper and lower rotor arms being provided with teeth which mesh with gear means carried by said upper and lower rotor heads, a plurality of sails each located between respective upper and lower rotor arms, and each connected between the upper and lower rotor heads and take-up shafts extending between the outer ends of respective upper and lower rotor arms, the magnitude of the sail

area being adjustable by movement of said rotor arms through said rotor heads.

4,789,298

## METHOD AND APPARATUS FOR CONTROLLING THE OPERATION OF A TURBOCOMPRESSOR

Wilfried Blotenberg, Dinslaken, Fed. Rep. of Germany, assignor to Man Gutehoffnungshütte GmbH, Fed. Rep. of Germany

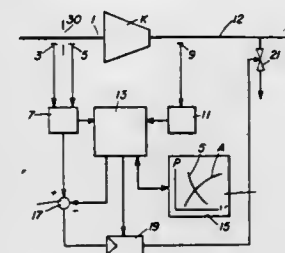
Filed Nov. 10, 1986, Ser. No. 929,405

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1985, 3540285

Int. Cl.<sup>4</sup> F04D 27/02

U.S. Cl. 415-27

8 Claims



1. A method of controlling the operation of a turbocompressor having an intake line and an outlet line with a blow off valve so as to prevent compressor surge, comprising the steps of: sensing the volumetric flow of the intake line upstream of the turbocompressor and forming a signal representative of the volumetric flow sensed; sensing the discharge pressure of the turbocompressor at the outlet and forming a signal representative of the discharge pressure sensed; storing a blow-off curve, defined by the predetermined relationship between the volumetric flow and the discharge pressure, into a memory and also storing a gradient curve representing the gradient of the stored blow-off curve into a memory; comparing said sensed volumetric flow and said sensed discharge pressure with said blow off curve to generate a control signal using a proportional integral controller or a proportional integral differential controller; and, comparing one of said sensed volumetric flow and sensed discharge pressure with a corresponding value on the blow-off curve gradient of said gradient curve to produce an amplification factor and varying the amplification of the controller in accordance with the amplification factor.

4,789,299

## LIQUID AND AIR PUMP B

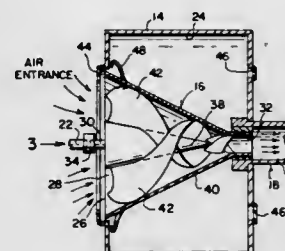
Kris Demetrius, and George Spector, both of 233 Broadway Rm 3815, New York, N.Y. 10007

Filed Oct. 30, 1987, Ser. No. 114,515

Int. Cl.<sup>4</sup> F04D 3/02

U.S. Cl. 415-73

3 Claims



1. A compressor pump for conveying fluids which comprises: (a) an electric motor having a drive shaft;

- (b) a stationary casing having an operating chamber and an inlet port;
- (c) a cone-shaped impeller having a wide inlet configuration with shaft and a narrow outlet configuration, the shaft coupled to the drive shaft of said motor so as to be rotatably mounted within the operating chamber of said casing in which fluids entering said casing and through said impeller are compressed to exit therefrom;
- (d) a stationary stand having a bearing sleeve affixed to said casing and the narrow outlet configuration of said impeller;
- (e) a hose affixed to said stand for carrying the compressed fluids from the narrow outlet configuration of said impeller, wherein said impeller comprises: (a) an inner cone-shaped hub;
- (b) an outer cone-shaped sleeve;
- (c) a pair of helix-shaped blades encircling said hub within said sleeve, each of said blades at an angle which is in the range of 20° to 70° at the wide inlet configuration, further comprising: (a) an outer fluid deflector affixed around outside of the inlet port of said casing;
- (b) at least one flutter valve mounted to said casing opposite said outer fluid deflector; and
- (c) An inner fluid deflector mounted to said outer cone-shaped sleeve adjacent said outer fluid deflector so as to prevent fluid pressure buildup within the operating chamber of said casing.

4,789,300

## VARIABLE FLOW TURBINE EXPANDERS

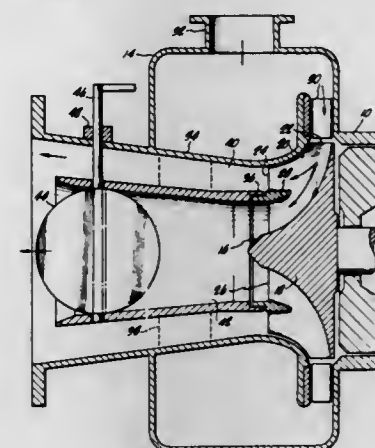
Judson S. Swearingen, Malibu, Calif., assignor to Rotoflow Corporation, Los Angeles, Calif.

Filed Jun. 16, 1983, Ser. No. 505,065

Int. Cl.<sup>4</sup> F01D 17/00

U.S. Cl. 415-148

10 Claims



6. A turbine assembly comprising an inlet; a turbine wheel including a rotor and blades fixed to said rotor and extending to an axial discharge; an exducer having a plurality of concentric passages extending from said axial discharge; and a valve in at least one of said plurality of passages to selectively block flow therethrough.



4,789,301

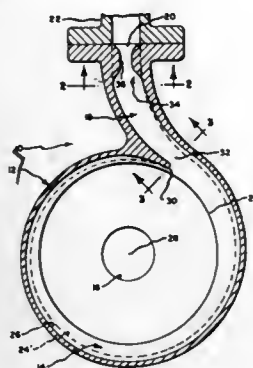
**LOW SPECIFIC SPEED PUMP CASING CONSTRUCTION**  
James C. Osborne, Seneca Falls, and Patrick T. Murphy, Auburn, both of N.Y., assignors to Goulds Pumps, Incorporated, Seneca Falls, N.Y.

Filed Mar. 27, 1986, Ser. No. 844,518

Int. Cl. F04D 1/00

U.S. Cl. 415—206

13 Claims



1. A low specific speed centrifugal pump having a desired discharge flow rate, which comprises in combination:  
a casing of cast metal construction defining a pump chamber, an inlet opening, a discharge passage having an inlet end communicating with said chamber and an outlet end, and a constriction extending across said outlet end, said pump chamber having an outer boundary surface extending away from a cut-water and about said pump chamber to a point at which it cooperates with said cut-water to define said inlet end of said discharge passage, said constriction having a restrictor flow opening extending therethrough in flow communication with said discharge passage; and an impeller supported for rotation about an axis within said chamber for transporting fluid between said inlet opening and said outlet end, said chamber and discharge passage leading to said restriction having a size sufficient to provide an other pump discharge flow rate exceeding said desired flow rate by arranging said outer boundary surface at a radial distance from said axis which is greater than that required to provide said desired flow rate, the radial distance between said cut-water and said axis corresponding to that required to provide said desired discharge flow rate, and said restrictor flow opening throttles said pump to reduce said other flow rate to said desired flow rate.

4,789,302

**PROPELLER SHROUD**

Josep Gruzling, 1065 Heritage Blvd., North Vancouver, B.C., Canada (V7J 3G7)

Filed Feb. 6, 1987, Ser. No. 12,053

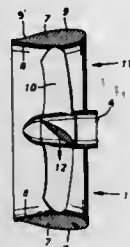
Int. Cl. B63H 5/14

U.S. Cl. 415—213 C

3 Claims

1. In a marine propulsion apparatus including a shaft having a propeller thereon and a shroud surrounding said propeller, the improvement comprising:  
said shroud including a plurality of adjacent segments abutting one another,  
each said segment comprising an outside surface and an inside surface each having a leading and trailing edge, said outside and inside surfaces substantially laterally flat, said inside and outside surface leading and trailing edges respectively connected together to provide an airfoil section with said inside and outside surfaces continuously curved from said connected leading and trailing edges, said inside

and outside surfaces spaced apart between said leading and trailing edges to define a cavity therebetween, each said segment airfoil section having a camber in the range of 0 to 0.025 of the the chord length thereof, said outside surface including a concave area thereon, said section thickness ranging from 0.05 to 0.24 of the chord length and having a maximum thickness located 0.25 to 0.35 of the chord length from said leading edges, each said segment airfoil section having a maximum camber located from 0.25 to 0.35 of the chord length from said connected leading edges,



said segment airfoil section having a chord length between 0.3 and 0.6 of the diameter of the propeller surrounded by said shroud, said segment airfoil sections disposed such that the angle between the chord thereof and the propeller shaft ranges between -6 to +6 degrees,  
at least one ring frame member disposed transversely within said cavities of said segments, said ring frame member connected respectively to said segment inside and outside surfaces and laterally connecting together said plurality of segments to provide said shroud, and  
a longitudinal frame member connected to each said connected inside and outside surfaces and said ring frame member of each said segment.

4,789,303

**MARINE PROPELLER CARRY HANDLE AND EMERGENCY SPARE KIT**

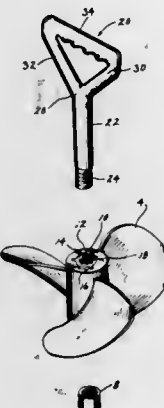
Michael E. Frazzell, Neenah; Roger E. Koepsel, Oshkosh, and William J. Gius, Fond du Lac, all of Wis., assignors to Brunswick Corporation, Skokie, Ill.

Filed Dec. 22, 1987, Ser. No. 136,861

Int. Cl. B63H 1/20, 5/18

U.S. Cl. 416—63

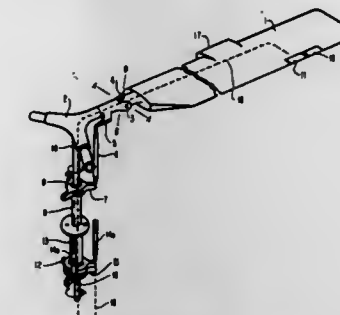
3 Claims



1. A marine emergency spare propeller kit comprising:  
a plastic floating spare propeller having a central hub with a

central axial opening therethrough for mounting to a propeller drive shaft to propel a boat;  
a carry handle having an axial shaft extending through said axial opening through said hub;  
means removably retaining said hub on said shaft, such that said propeller may be transported by the user by means of said carrying handle and stowed in the boat, ready for use, wherein said retaining means is at one end of said axial shaft, and wherein said carry handle includes a user grip portion at the other end of said axial shaft,  
wherein said drive shaft has a threaded end, and wherein said one end of said axial shaft of said carry handle is threaded identically to said drive shaft end, and wherein said retaining means comprises a plastic floating nut tightened on said threaded end of said axial shaft to retain said propeller thereon, said floating nut being removable from said axial shaft and usable to mount said propeller to said drive shaft if the original drive shaft nut sinks during the changing of propellers.

spanwise line in the blade which passes through the centers of gravity of all spanwise blade segments, and each blade has a second spanwise line which passes through the aerodynamic centers of all spanwise blade segments, said aerodynamic center line coinciding with said pitch-change axis except in a spanwise portion of the blade



4,789,304

**INSULATED PROPELLER BLADE**

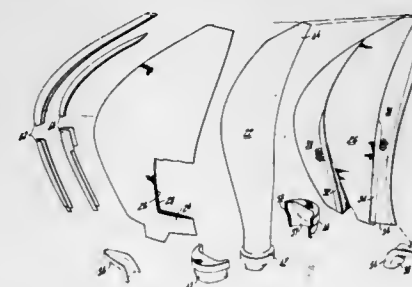
Robert Gustafson, Windsor, and David P. Nagle, Windsor Locks, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 3, 1987, Ser. No. 92,501

Int. Cl. B64C 11/26

U.S. Cl. 416—95

7 Claims



1. A propeller blade having an exterior portion operating within a high temperature exhaust stream of an engine, said blade characterized by:  
a spar approximating a contour of said blade,  
an outer first skin covering said spar and forming a contour of said blade, and  
insulating means disposed between said spar and said first skin along said portion for protecting said spar from said temperature of said exhaust stream such that the temperature of said spar does not exceed 260° F.

between radius  $r_1$  and  $r_2$  where the average chord is  $c_x$  and the aerodynamic center line is located an average distance  $d_x$  forward of the pitch-change axis, and  
moment of inertia of the blade  $I_B$  measured about the blade pitch-change axis is related to the dimensions of said spanwise portion of the blade by the relationship

$$I_B > \frac{\rho}{6} a c_x d_x [r_2^3 - r_1^3] \geq \frac{I_B}{2}$$

Where  $\rho$  is air density at flight altitude and  $a$  is the non-dimensional lift curve slope of the blade airfoil, said combination of parameters producing a lifting rotor blade having natural feathering frequency lower than the speed of rotation of the rotor at all flight conditions, in which cyclic variations of aerodynamic lift produce cyclic feathering moments on the blade and resulting cyclic displacements in blade pitch lag behind said cyclic feathering moments by one half revolution of the rotor.

4,789,306

**MARINE PROPELLER**

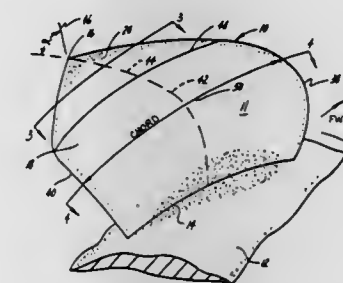
William S. Vorus, Gregory, and Robert F. Kress, Grand Rapids, both of Mich., assignors to Attwood Corporation, Lowell, Mich.

Continuation-in-part of Ser. No. 798,540, Nov. 15, 1985, abandoned. This application Jul. 13, 1987, Ser. No. 72,721

Int. Cl. B63H 1/18

U.S. Cl. 416—223 R

44 Claims



4,789,305

**SELF-FEATHERING ROTARY WING**

Jack F. Vaughn, 26807 Spring Creek Rd., Rancho Palos Verdes, Calif. 90274

Continuation-in-part of Ser. No. 727,785, Apr. 26, 1985, abandoned, which is a continuation-in-part of Ser. No. 919,646, Oct. 16, 1986, abandoned. This application May 4, 1987, Ser. No. 45,893

Int. Cl. B64C 27/46

U.S. Cl. 416—131

42 Claims

1. A lifting rotary wing comprising:  
a hub mounted on a shaft, and  
a number of lifting rotor blades mounted to the radial arms of said hub by bearing means for feathering displacement about a spanwise pitch-change axis,  
Wherein  
said pitch-change axis of each lifting rotor blade is a first

1. A marine propeller having a hub and a plurality of blades attached to the hub, said blades each comprising a body having a radially inner end connected to said hub and a radially outer tip located radially outwardly from said inner end, said blade body having an inner section adjacent said inner end with

means for causing said inner section to subcavitate at substantially all rotational speeds and an outer section adjacent said tip, said outer section having a tapered leading edge portion and a tapered trailing edge portion with means for causing said outer section to subcavitate at slow speeds and supercavitate at high rotational speeds.

4,789,307

## FLOATING PUMP ASSEMBLY

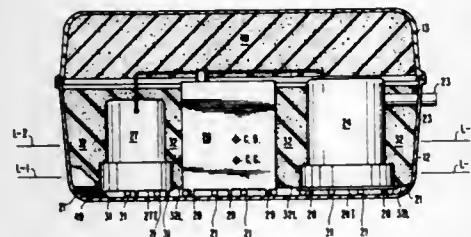
Donald L. Sloan, 4008, No. Wheeling Ave., Muncie, Ind. 47304

Filed Feb. 10, 1988, Ser. No. 154,223

Int. Cl.<sup>4</sup> F04B 49/04, 21/00

U.S. Cl. 417-40

13 Claims



1. A pump assembly comprising:
  - a housing having a bottom and at least one opening through the housing near the bottom;
  - an electrical energy source in said housing;
  - a pump in said housing and having an intake near the bottom of the housing;
  - sensor means in said housing and coupled to said energy source and to said pump to energize and cause said pump to operate in response to detection of water in said housing at a level above said pump intake;
  - floatation means in said housing and arranged to float the pump assembly when the water rises to a level in said housing above the pump intake;
  - whereby said pump assembly is floatable in a pool and can pump from the pool while floating in it.

4,789,308

## SELF-CONTAINED ELECTRIC FUEL PUMP WITH OUTPUT PRESSURE REGULATION

Charles H. Tuckey, Cass City, Mich., assignor to Walbro Corporation, Cass City, Mich.

Continuation-in-part of Ser. No. 917,633, Oct. 10, 1986, Pat. No. 4,728,264. This application Nov. 30, 1987, Ser. No. 126,517

Int. Cl.<sup>4</sup> F04B 49/06, 17/00; H01H 35/38

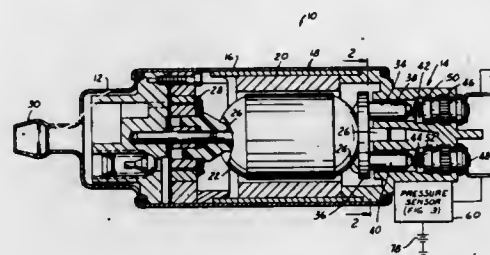
U.S. Cl. 417-44

6 Claims

1. A self-contained electric fuel pump which includes a pair of coaxially spaced end caps and a case joining said end caps to form a pump housing, fuel inlet means in one of said end caps and fuel outlet means in the other of said end caps, a d.c. motor including an armature journaled for rotation within said housing, means coupled to said armature for pumping fuel through said housing from said inlet means to said outlet means such that fuel within said housing surrounding said armature is at substantially outlet pressure, and means for applying electrical power to said armature,

characterized in that said power-applying means comprises a bore in said other end cap having an axial end opening into said housing and an axis parallel to and radially offset from axis of rotation of said armature, a piston of magnetic construction slidable in said bore as a function of pressure of fuel within said housing, a spring base at an end of said bore remote from said armature and a coil spring captured within said bore between said piston and said spring base,

and means responsive to varying magnetic fields as a function of position of said piston within said bore for



applying electrical power to said armature as a function of fuel pressure within said housing.

4,789,309

## REINFORCED INSULATED HEATER GETTER DEVICE

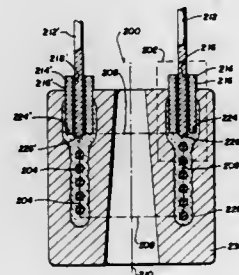
Ettore Giorgi, Milan, Italy, assignor to SAES Getters SpA, Milan, Italy

Filed Dec. 7, 1987, Ser. No. 129,304

Int. Cl.<sup>4</sup> F04B 37/02; C25D 13/00

U.S. Cl. 417-51

14 Claims



1. A non-evaporable getter device comprising:
  - A. a heating wire and;
  - B. two support lead wires, integrally formed with said heating wire, and;
  - C. each support lead wire encircled by a hollow insulating cylinder, having an outer surface and an inner surface whose inner diameter is greater than that of the support lead wire, one end of each insulating cylinder in proximity with the position of integral formation of the support lead wire with the heating wire and;
  - D. an electrophoretically deposited insulating coating comprising:
    - (a) a first zone covering the heating wire and;
    - (b) a second zone, integrally formed with said first zone, covering part of the outer surface of each insulating cylinder and;
    - (c) a third zone, integrally formed with said first zone, extending between the diameter of the lead wire and the inner diameter of each insulating cylinder

tending between the diameter of the support lead wire and the inner diameter of each insulating cylinder and;

- E. a non-evaporable getter material enclosing the first and second zones of electrophoretically deposited insulating coating and covering part of the outer surface of the insulating cylinder.

8. A method for the manufacture of a non-evaporable getter device comprising the steps of;

- I. placing a heater sub-assembly in a bath of coating suspension adapted for the electrophoretic deposition of an insulating coating, said heater sub-assembly comprising

- A. a heating wire and;
- B. two support lead wires, integrally formed with said heating wire and;

- C. each support lead encircled by a hollow insulating cylinder, having an outer surface and an inner surface whose inner diameter is greater than that of the support lead wire, one end of each ceramic cylinder in proximity with the position of integral formation of the support lead wire with the heating wire,

to a depth such that the coating suspension,

- a. covers the heating wire, and
- b. covers part of the outer surface of each ceramic cylinder, and

- c. enters the volume contained between the diameter of the support lead wire and the inner diameter of each ceramic cylinder, then

- II. electrophoretically depositing an insulating coating to produce:

- (a) a first zone covering the heating wire and;
- (b) a second zone, integrally formed with said first zone, covering part of the outer surface of each insulating cylinder and;
- (c) a third zone, integrally formed with said first zone, extending between the diameter of the lead wire and the inner diameter of each insulating cylinder

thus producing a reinforced heater assembly, then,

- III. sintering the reinforced heater assembly to produce a sintered reinforced heater assembly then,

IV. coating the sintered reinforced heater with a non-evaporable getter material, the non-evaporable getter material enclosing the first and second zones of electrophoretically deposited insulating coating and covering part of the outer surface of each insulating cylinder.

4,789,310

## MULTI-FUNCTION IMPLEMENT FOR ILLUMINATION AND AIR-SUPPLY

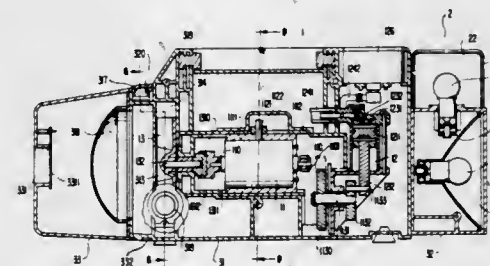
Michael Hung, 11th Fl., 624 Ming Chuan E. Rd., Taipei, Taiwan

Filed Jan. 5, 1987, Ser. No. 631

Int. Cl.<sup>4</sup> F04B 23/10

U.S. Cl. 417-234

14 Claims



1. A multi-function implement useful as a portable automobile accessory, comprising:

- a main casing;
- an air functional portion mounted in said main casing, said air functional portion including a first means for blowing

air outwardly of said main casing and a second means for pumping air under pressure outwardly of said main casing; a motor having an output shaft extending in a longitudinal direction, said motor being mounted in a frame mounted in said main casing, said motor being movable back and forth in said longitudinal direction;

a lever pivotably mounted to said main casing and connected to said motor for moving said motor between a first position at which said motor is engageable with said first means to effect blowing of air outwardly of said main casing and a second position at which said motor is engageable with said second means to effect pumping of air under pressure outwardly of said main casing, said lever extending outwardly of said main casing to allow manual movement of said motor by means of said lever between said first and second positions; and

a light functional portion including an illuminating part and a warning-light part disposed in a light casing connected to said main casing, said light casing being connected to said main casing by two levers, each end of each of said two levers being respectively pivotally connected to said light casing and said main casing.

4,789,311

## SWASH PLATE TYPE COMPRESSOR

Hayato Ikeda; Kazuaki Iwama, and Satoshi Kitahama, all of Kariya, Japan, assignors to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho, Kariya, Japan

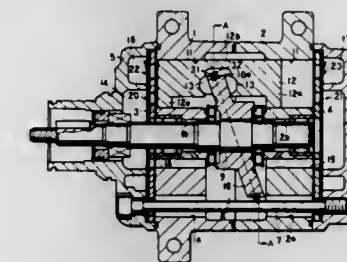
Filed Dec. 17, 1987, Ser. No. 134,003

Claims priority, application Japan, Dec. 26, 1986, 61-203441[U]

Int. Cl.<sup>4</sup> F04B 27/08; F01B 3/00; F16H 23/00

U.S. Cl. 417-269

9 Claims



1. A swash plate type refrigerant compressor comprising:
  - a pair of axially combined front and rear cylinder blocks forming therein a plurality of cylinder bores and a swash plate compartment,
  - a pair of front and rear housings arranged at axial ends of said combined cylinder blocks, each housing having therein a suction chamber and a discharge chamber, valve plates interposed between said front and rear housings and said axial ends of said combined cylinder blocks, respectively,
  - a drive shaft extending axially through said swash plate compartment of said combined cylinder blocks,
  - a swash plate in said swash plate compartment supported on said drive shaft and rotatable therewith,
  - a plurality of double-headed pistons engaged with said swash plate so as to be reciprocated in said cylinder bores, each piston having a pair of head portions at the opposite ends thereof connected together by an intermediate portion of said piston,
  - said swash plate having formed on and throughout its circumferential periphery an annular groove,
  - an annular ring member received in said annular groove, said ring member having an outer diameter larger than the diameter of said swash plate and forming with the bottom annular surface of said groove a substantially annular clearance at least during the operation of the compressor.



**4,789,312**  
**LUBRICATION PUMP WITH IMPROVED PRIMING**  
**HANDLE ASSEMBLY**

Peter D. Moate, and Patrick J. Read, both of Plymouth, England, assignors to Interlube Systems Limited, Devon, England

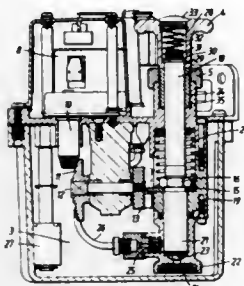
Filed Aug. 5, 1987, Ser. No. 81,866

Claims priority, application United Kingdom, Aug. 7, 1986, 8619327

Int. Cl.<sup>4</sup> F04B 35/00

U.S. Cl. 417—374

11 Claims



1. A lubrication pump including a piston and cylinder pump assembly comprising a piston arranged for reciprocation within and relative to a cylinder and having a charging stroke and a discharging stroke, a motor drivingly connected to the piston and cylinder assembly and a priming means including a priming handle coupled to the piston and cylinder assembly, characterized in that a resilient member is provided in the coupling between the priming handle and the assembly such that movement of the priming handle to move the piston relative to the cylinder through the discharging stroke can take place without corresponding movement of the piston relative to the cylinder by deformation of the resilient member.

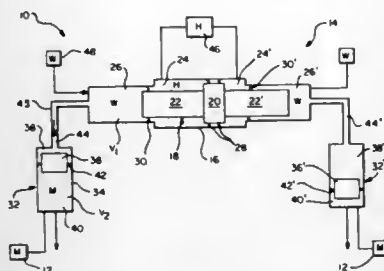
**4,789,313**  
**APPARATUS FOR AND METHOD OF PUMPING**  
**OUTPUT FLUIDS SUCH AS ABRASIVE LIQUIDS**  
 Timothy M. Tower, Seattle; James M. Reichman, Issaquah, and Paul D. Harold, Kent, all of Wash., assignors to FlowDrill Corporation, Kent, Wash.

Filed Apr. 8, 1987, Ser. No. 36,099

Int. Cl.<sup>4</sup> F04B 9/10, 15/02, 23/06

U.S. Cl. 417—388

20 Claims



1. An apparatus for pumping an output fluid, especially a particle-laden liquid material comprising:

- (a) an output pump including an output piston and its own pumping chamber for pumping a discrete amount of said output fluid from its pumping chamber by causing said output piston to move through a complete forward stroke;
- (b) a drive pump including a drive piston and its own pumping chamber connected with said output pump through a common chamber containing intermediate drive fluid, said drive pump having means for moving said drive

piston through its own complete forward stroke in order to pressurize said drive fluid within said common chamber in a way which causes said output piston to move in the forward direction of its stroke; and

- (c) said drive pump and output pump being configured such that the forward stroke of said drive piston defines a greater swept volume than the forward stroke of said output piston for causing the output piston to move through its entire forward stroke before said drive piston completes its forward stroke, whereby said drive piston moves through its entire forward stroke, a predetermined amount of said drive fluid must be removed from said common chamber;
- (d) means for removing said predetermined amount of drive fluid from said common chamber each time said drive piston moves through its entire forward stroke; and
- (e) means for adding the same amount of new drive fluid to said common chamber before the next successive forward stroke of said drive piston, whereby the new fluid can be provided at a colder temperature than the drive fluid already in the one common chamber in order to lower the temperature of all of the drive fluid within the common chamber;
- (f) said output pump including means for causing said output piston to move through a complete rearward stroke after having moved through a complete forward stroke by refilling the pumping chamber of said output pump with the same discrete amount of new output fluid that was previously pumped out of said last-mentioned chamber, and said drive pump including means for causing said drive piston to move through a complete rearward stroke after having moved through a complete forward stroke, said last-mentioned means being synchronized with said means for causing said output piston to move through its rearward stroke such that the two pistons start their rearward strokes at the same time and such that said output piston completes its rearward stroke before said drive piston completes its rearward stroke, whereby during the time said drive piston is completing its rearward stroke after said output piston has stopped, a negative pressure is created in said common chamber.

**4,789,314**  
**MULTI-SECTION ROOTS VACUUM PUMP OF REVERSE**  
**FLOW COOLING TYPE WITH INTERNAL FLOW**  
**DIVISION ARRANGEMENT**

Tsutomu Higuchi, Yokohama, and Shigeharu Kambe, Kawasaki, both of Japan, assignors to Unozawa-Gumi Iron Works, Ltd., Tokyo, Japan

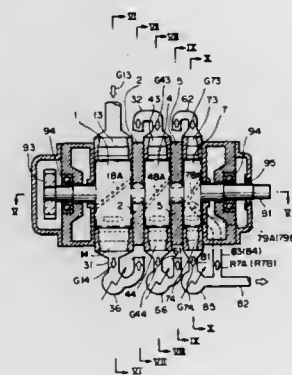
Filed Jun. 23, 1987, Ser. No. 65,409

Claims priority, application Japan, Dec. 18, 1986, 61-300150

Int. Cl.<sup>4</sup> F04C 18/18, 23/00, 25/02, 29/04

U.S. Cl. 418—9

9 Claims



1. A multi-section Roots vacuum pump of the reverse flow

cooling type with internal flow division arrangement, comprising:

- a sequence of pump sections;
- two shafts common to said sequence of pump sections for transmitting driving power;
- said pump sections each having a rotor pair coupled to said shafts;
- castings for said pump sections including housings for accommodating said rotor pairs therein;
- inlet passages and outlet passages of said casings for supplying gas into said casings and discharging gas from said castings;
- upper peripheral gas passages formed around upper portions of said housings and connected to said inlet passages for sending gas to the adjacent pump sections;
- lower peripheral gas passages formed around lower portions of said housing and connected to supply inlets of reverse flow cooling gas for supplying reverse flow cooling gas into said housings;
- partition walls between said upper and lower peripheral gas passages; and
- inter-section walls for separating adjacent pump sections; communicating passages being formed through said inter-section walls for communicating said lower peripheral gas passages of pump sections with said upper peripheral gas passages of the following pump sections;
- connection pipes being provided between outlet passages of said casing of pump sections and inlet passages of said casing of the following pump sections; and
- coolers being provided in said connection pipes.

**4,789,315**  
**POSITIVE DISPLACEMENT MACHINE, MORE**  
**PARTICULARLY PUMP, AND METHOD FOR**  
**FABRICATING SUCH PUMP**

Kurt Guettinger, Murten, Switzerland, assignor to Gutag Innovations AG, Murten, Switzerland

PCT No. PCT/CH86/00023, § 371 Date Dec. 1, 1986, § 102(e)

Date Dec. 1, 1986, PCT Pub. No. WO86/05241, PCT Pub. Date Sep. 12, 1986

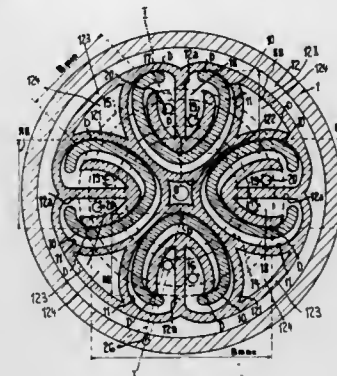
PCT Filed Feb. 21, 1986, Ser. No. 928,177

Claims priority, application Switzerland, Feb. 27, 1985, 894/85

Int. Cl.<sup>4</sup> F04C 2/04, 11/00, 15/00

U.S. Cl. 418—56

21 Claims



- 1. A positive displacement pump, comprising:
- a first support member having mounted thereon a plurality of displacement chambers;
- a second support member having mounted thereon a plurality of displacement vanes, each of said displacement vanes being associated with a corresponding one of said displacement chambers;
- a plurality of inlet and outlet channels for directing a fluid medium into and out of said displacement chambers;
- a common central drive operable to transmit a driving force

having radial and tangential components to one of said first support or said second support, for producing relative circular motion between said displacement chambers and associated displacement vanes, said displacement chambers and displacement vanes being radially spaced from said drive and having inner and outer surface respectively in proximate adjacent relationship; said outer surface defining a path about said inner surface wherein said outer surface encompasses said inner surface substantially 360° therearound, and said inner surface defines a path substantially coextensive with and adjacent to said outer surface path; and wherein said inner and outer surfaces are essentially continuously curved, defining shapes which generally continuously widen in the direction radially outwardly from said central drive.

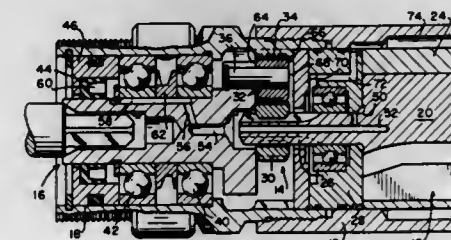
**4,789,316**  
**GEAR LUBRICATION PUMP FOR AN AIR MOTOR**  
 Duane S. Gable, Ulster, Pa., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Dec. 29, 1986, Ser. No. 947,159

Int. Cl.<sup>4</sup> F01C 1/344, 21/04

U.S. Cl. 418—88

4 Claims



1. A fluid lubrication system for a gear assembly coupled to an air motor comprising:

- a fluid source;
- a fluid exhaust;
- first fluid passageways connecting said fluid source with said gear assembly, wherein said first fluid passageways further comprise radially inner passageways and radially outer passageways;
- second fluid passageways connecting said gear assembly with said exhaust; and
- means for providing momentum to said fluid in said first and second passageways wherein said momentum providing means further comprises a fluid pressure differential in the radially inner passageways of said first passageways and a fluid pump in the radially outer passageways of said first passageways.

**4,789,317**  
**ROTARY VANE OIL PUMP AND METHOD OF**  
**OPERATING**

Max P. Waser, Bauma, Switzerland, and Thomas M. Zinsmeyer, Pennellville, N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Filed Apr. 23, 1987, Ser. No. 41,576

Int. Cl.<sup>4</sup> F04C 2/00

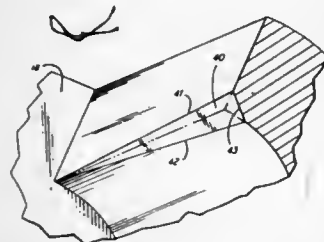
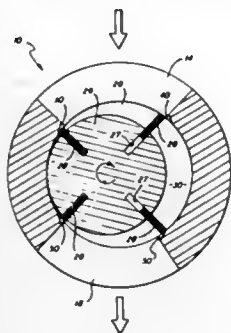
U.S. Cl. 418—189

10 Claims

1. A method of operating a rotary vane device having a single inlet and a single outlet at a reduced noise level wherein a rotor rotates within a chamber and carries a plurality of spaced vanes sequentially sweeping past the inlet and outlet with adjacent vanes together with the wall of the chamber defining a trapped volume which is delivered to the outlet including the step of:

continuing and smoothly transitioning to zero the communi-

cation between the inlet and the trapped volume over approximately 4° of rotation of the rotor beyond when the



vanes start to move past the inlet by use of a beveled chamfer whereby pressure pulsations and their resultant noise are reduced.

4,789,318

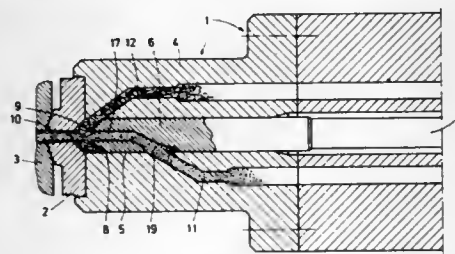
#### DEVICE FOR MANUFACTURING MOLDED ARTICLES OF PLASTICS MATERIAL

Jürgen Ehrhart, Hülchenbach-Müsen, Fed. Rep. of Germany, assignor to Battenfeld GmbH, Meinerzhagen, Fed. Rep. of Germany

Filed Sep. 10, 1987, Ser. No. 95,855  
Claims priority, application Fed. Rep. of Germany, Sep. 23, 1986, 3632185

Int. Cl. B29C 47/06, 47/22  
U.S. Cl. 425—130

11 Claims



1. A device for manufacturing molded articles of plastics material having an outer skin and a core, the device including an extruder head defining a discharge opening and a main duct in communication with the discharge opening, the extruder head further defining two feed ducts for the plastics materials of the outer skin and of the core, the two feed ducts leading angularly offset into the main duct at locations axially spaced from the discharge opening and from each other, a closing needle placed axially movable in the main duct, the two feed ducts capable of being separated from the main duct by means of the closing needle, the closing needle having an end face and a circumference and defining a connecting duct extending essentially in axial direction, the connecting duct being at the

end face of the closing needle and at the circumference of the closing needle radially toward the feed duct located more remote from the discharge opening, the improvement comprising, in a closed axial position of the closing needle as well as in an at least partially open axial position of the closing needle, the radial circumferential opening of the connecting duct being located approximately on the same level as the inner radial outlet opening of the more remote feed ducts, wherein the closing needle and its radial circumferential opening are rotatable by a limited angle about the longitudinal axis of the extruder head relative to the outlet opening in any axial position of the closing needle.

4,789,319

#### ROOF TILES AND WALL TILES AND PROCESS FOR THEIR MANUFACTURE

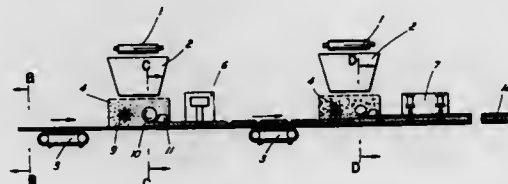
Rafael V. Garcia, Madrid, Spain, assignor to Uralita, S.A., Madrid, Spain

Division of Ser. No. 864,796, May 19, 1986, which is a continuation-in-part of Ser. No. 759,056, Jul. 25, 1985, abandoned. This application Feb. 19, 1987, Ser. No. 16,533  
Claims priority, application Spain, Nov. 20, 1984, 282,723; Dec. 6, 1984, 538,325

Int. Cl. B29C 47/06

U.S. Cl. 425—131.1

4 Claims



1. Apparatus for manufacturing laminated members, such as roof and wall tiles, comprising:

- a molding bench having a plurality of extrusion molding heads in series along a longitudinal dimension thereof, each of said molding heads comprising a hopper, a mortar conveyor means for delivering mortar to said hopper, said molding head being located beneath said hopper for receiving mortar therefrom;
- a pushing train for pushing a series of molds along said longitudinal dimension of said bench;
- longitudinal side limiters located at a first one of said plurality of molding heads for limiting a width of mortar extruded in each of said molds by said first molding head;
- beveling means located between said first and a second molding head for dislodging mortar from a cross strip at a contact area of two consecutive molds; and
- cutting means located along said longitudinal dimension after a last molding head for separating said laminated members; whereby a laminated member is produced having first and second mortar layers, said second layer molded over said first layer and filling unfilled side bands and the emptied cross strip.

4,789,320

#### STAMPER-HOLDING APPARATUS FOR USE IN INJECTION MOLD

Minoru Sasamura, Gifu, and Kazutoshi Takenaka, Oogaki, both of Japan, assignors to Gifu Husky Co., Ltd., Tokyo, Japan  
Filed Oct. 8, 1987, Ser. No. 107,489

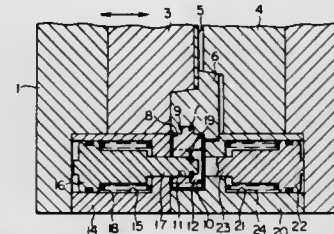
Claims priority, application Japan, Oct. 15, 1986, 61-246179  
Int. Cl. B29C 39/26, 45/26

U.S. Cl. 425—190

7 Claims

1. In a stamper holding apparatus for use in and injection mold comprising a stationary mirror block having a first mirror surface, a movable mirror block having a second mirror surface, said movable mirror block being reciprocable relative

to said stationary mirror block, an annular stamper disposed on one of said first and second mirror surfaces, and a holding structure for supporting the outer circumferential edge portion of said stamper so as to hold said stamper between said one mirror surface and said holding structure, the improvement which comprises: a plurality of first side actuation units arranged around the outer periphery of said stationary mirror block and spaced radially outwardly from said stamper, a plurality of second side actuation units arranged around the outer periphery of said movable mirror block and spaced radially outwardly from said stamper, said first side actuation units having first operating rods and said second side actuation units having second operating rods, said first and second oper-



ating rods being operable in opposing directions relative to said stamper, said holding structure being located between said first and second actuation units and comprising a member movable back and forth in a direction transverse to the direction of movement of said operating rods between two positions, said member being alternately engageable with and disengageable from said first and second operating rods at said two positions so that when said member is in one position with said first operating rods engaging said member, said second operating rods are disengaged from said member, and when said member is at the other position with said second operating rods engaging said member, said first operating rods are disengaged from said member.

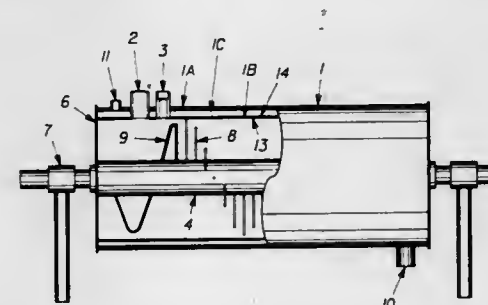
4,789,321

#### CARBON BLACK PELLETIZER

George W. Dingus, 1821 Mary Ellen St., Pampa, Tex. 79065  
Filed Mar. 14, 1988, Ser. No. 167,904

Int. Cl. B29C 67/02  
U.S. Cl. 425—222

4 Claims



1. A carbon black wet-mill pelletizer which comprises: a horizontally mounted cylindrical housing consisting essentially of a first or outer cylindrical wall, a second or inner cylindrical wall spaced apart from and within the first cylindrical wall forming an annulus therebetween, and a housing closure end plate on each end attached in sealed relationship to the cylindrical walls; one or two inlet tubes at one end of the cylindrical walls extending through both cylindrical walls,

an outlet tube extending through both cylindrical walls on the opposite end, and a nipple extending through the outer cylindrical wall and connecting with the annulus; a rotor rotatably mounted in the housing, the ends extending through the housing closure end plates, a rotor drive means, and a plurality of pins rigidly mounted radially at uniformly spaced distances, both longitudinally and angularly, on the rotor to form one or more helical flights; wherein the inner cylindrical housing is fabricated of a flexible material bonded to a rigid metal grating.

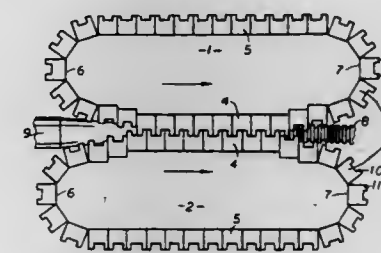
4,789,322

#### CORRUGATOR WITH INTERMESHING OVERLAPPING MOLDBLOCK HALVES

Harry Chan, 89 Larkin Ave., Markham, Ontario L3P 4R1, Canada, and Basilio Yi, 35 Hoover Dr., Thornhill, Ontario L3T 5M6, both of Canada

Filed Nov. 23, 1987, Ser. No. 123,668  
Int. Cl. B29C 55/24, 51/38, 55/28, 53/30  
U.S. Cl. 425—336

1 Claim



1. A corrugator for molding externally ribbed and corrugated thermoplastic pipes, including two trains of moldblock halves circulating respectively in two endless paths containing a straight forward run in which the halves cooperate with each other in the directions of their circulation and perpendicularly to the latter, to form a travelling mold for the thermoplastic pipe, a return run and two semi-circumferential guide tracks for transferring the halves between said runs, the halves having intermeshing elements hooking the halves of the two trains together across the travelling mold, the improvement wherein the halves of one said train are biased in relation to and overlap the halves of the second train along the travelling mold in such a manner that each half of one train bridges and extends into two halves of the second train along the travelling mold, in order to withstand tensile forces of molding acting to make gaps between the halves of the same train along the travelling mold.

4,789,323

#### RING MAKING APPARATUS

William R. Hudson, 713 Robin Rd., Birmingham, Ala. 35214  
Filed Jun. 11, 1987, Ser. No. 60,638

Int. Cl. B29C 43/34

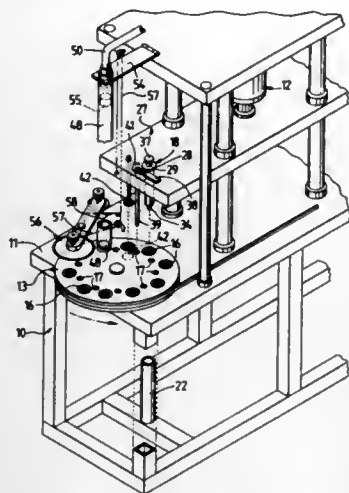
U.S. Cl. 425—352

12 Claims

1. Apparatus for forming graphite into rings comprising: (a) feed means for supplying base graphite in the form of elongated strips, including tubular housing means having a selected inside diameter for holding said elongated strips of base graphite in a preformed coiled condition about a vertical axis; (b) means for separating said base graphite into increments thereof;



- (c) forming means for compressing said increments of said base graphite into rings; and



- (d) transport means receiving said increments of said base graphite from said feed means for moving said increments of said base graphite to said forming means.

4,789,324

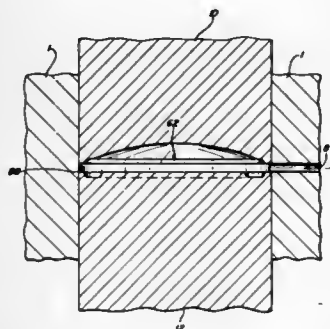
**MOLDED OPTIC FOR AN INTRAOCULAR LENS**  
David S. Akhavi, Westwood, Calif., assignor to Iolab Corporation, Claremont, Calif.

Division of Ser. No. 606,807, May 3, 1984, Pat. No. 4,681,953.  
This application Dec. 15, 1986, Ser. No. 943,416

Int. Cl.<sup>4</sup> A01J 21/00

U.S. Cl. 425—352

6 Claims



1. A mold for a thin, light weight, plastic optic for an intraocular lens comprising:

- I. A mold insert having a bore for receiving first and second molding pins in opposed relationship so that the confronting surfaces of said first and second molding pins and said bore define a molding cavity;

- II. A first molding pin adapted for insertion into said mold bore and which provides a substantially finished molded radius on the edge of the lens which edge needs no degating or deflashing after molding having:

- (a) a generally cylindrical body having a circumferential surface, having an axial length, and having a distal surface extending generally transversely to the axis of said body defining the anterior surface of said optic, said distal surface having a highly polished central portion defining an optical zone for said anterior surface of said optic, said distal surface including a peripheral portion

extending from the edge of said optical zone to the circumference of said body;

- (b) said peripheral portion having an annular groove therein, the radially inward portion of which blends smoothly with the adjoining distal surface of said peripheral portion and said central optical zone;

- (c) the tangent to the radially outward edge of the groove, extending generally parallel to the axis of said body and said radially outward edge of said groove spaced apart from the circumference of said body a small distance;

- (d) a flat portion extending from the radially outward edge of said groove to the circumference of said body; and spaced axially from the surface of said peripheral zone said flat portion providing a space for flash material attached to the peripheral edge of said lens so that flash may be removed from the molded optic without changing the molded radius applied to the edge of said lens; and

- (e) said groove providing a molded radius on the edge of the anterior surface of said optic which edge needs no degating or deflashing after molding;

- III. A second molding pin which provides a substantially finished molded radius on the edge of the lens which edge needs no degating or deflashing after molding, adapted for insertion into said mold bore in opposed relationship to said first molding pin;

said second molding pins including;

- (a) a generally cylindrical body having a circumferential surface, having an axial length and having a distal surface;

- (b) said distal surface of said body defining a posterior surface of said optic and including a highly polished central optical zone; and

- (c) said distal surface of said body including a peripheral portion extending from the edge of said body distal surface central optical zone to the circumference of said body.

4,789,325

**DEVICE SUITABLE FOR LENGTHENING OF LUMPS OF DOUGH**

Claude Garreau, 2, Chemin des Platrières, F-77113 Seine-Port, France

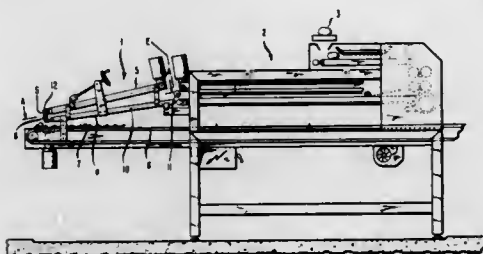
Filed Jun. 22, 1987, Ser. No. 65,309

Claims priority, application France, Jun. 20, 1986, 86 08898

Int. Cl.<sup>4</sup> A21C 3/02

U.S. Cl. 425—372

7 Claims



1. In a device having plural cooperating belt pairs in side by side position suitable for lengthening of previously measured lumps of dough and constituted by two superimposed conveyor belts having an adjustable spacing passage there between for the lumps of dough converging from the input toward the output, each side by side set of belts being mounted in such a way that its lateral edges diverge in its forward sense, upper and lower belts being movable at different speeds the upper belt having a slightly lesser forward speed than the lower belt, the improvement wherein each of the lower belt sets and the upper belt sets are constituted by endless fabric belt strips guided from the input to the output by diverging

grooves cut in an intermediary platform situated longitudinally between the drive roller and the tension roller of the belt strips, which belt strips are covered with fabric strips.

4,789,326

**STABILIZED-CORE INJECTION MOLDING OF HOLLOW THIN-WALLED PLASTIC PRODUCTS**

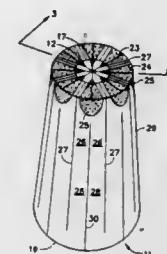
Jens O. Sorensen, Rancho Santa Fe, Calif., assignor to Acebo Company, La Jolla, Calif.

Filed Jan. 28, 1987, Ser. No. 7,462

Int. Cl.<sup>4</sup> B29C 45/04

U.S. Cl. 425—575

9 Claims



1. A mold for injection molding and controlling the dimensions of a hollow plastic product having side walls, comprising a first mold part and a second mold part defining a mold cavity therebetween, encompassed by a parting line, for forming the hollow plastic product, and further defining a gate for admitting molten injected plastic into the cavity; wherein one of the mold parts includes a retractable portion adjacent the gate, with the retractable portion being movable between a protracted position and a retracted position while the mold is closed; and

wherein the mold parts define primary flow channels extending from the gate, which, when the retractable portion of the one mold part is protracted, direct initially injected molten plastic from the gate to create stabilizing regions of stiffened plastic, to thereby impede lateral deflection of the mold parts with respect to each other when additional molten plastic subsequently is injected; characterized by the mold parts further defining secondary flow channels which are significantly thicker than adjacent portions of the mold cavity; which are adjacent to the gate but, when the retractable portion is protracted, are isolated from the gate by the retractable portion; which are interposed between the primary flow channels; and which when the retractable portion is retracted, direct the subsequently injected molten plastic between the stabilizing regions of stiffened plastic and into the side wall defining region of the mold cavity.

4,789,327

**ADJUSTABLE PIPE EXTRUSION DIE WITH INTERNAL COOLING**

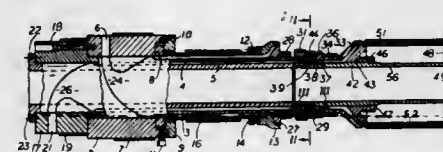
Harry Chan, 89 Larkin Ave., Markham, Ontario, Canada (L3P 4R1), and Basilio Yi, 35 Hoover Dr., Thornhill, Ontario, Canada (L3T 5M6)

Filed Feb. 25, 1988, Ser. No. 160,245

Int. Cl.<sup>4</sup> A21C 3/00

U.S. Cl. 425—133.1

11 Claims



1. An extrusion die for an apparatus producing two-ply

seamless thermoplastic tubing having concentric outer and inner plies, the die including:

- an extrusion head having a central bore with (an) a radial inlet opening for receiving a first extrudate of a first thermoplastic material under pressure therefrom;

- an elongate nozzle attached to said head and carrying a first hollow outer die lip on a free end of the nozzle;

- a first hollow mandrel having (an) a radial inlet opening for receiving a second extrudate of a second thermoplastic material under pressure therefrom, and placed in said bore in a substantially coaxial relation with and spaced from the nozzle to provide between the latter and the first mandrel

- a first thermoplastic conducting passage extending in the longitudinal direction thereof for the delivery of the first extrudate to the delivery end thereof carrying a first hollow inner die lip defining with the first outer die lip the first annular extrusion orifice of diminishing interior dimensions, through which the first extrudate can flow uninterruptedly and form the outer ply, the first mandrel protruding beyond the nozzle and carrying farther a second hollow outer die lip;

- a second hollow mandrel placed within the first mandrel in a substantially coaxial relation with and spaced from the first mandrel to provide between the mandrels a second thermoplastic conducting passage extending in the longitudinal direction thereof for the delivery of the second extrudate to the delivery end thereof carrying a second hollow inner die lip defining with the second outer die lip the second annular extrusion orifice of diminishing interior dimensions, through which the second extrudate can flow uninterruptedly and form the inner ply;

- the improvement wherein the mandrels are inserted into the inner die lips (are) provided with threaded adjusting members to adjust the lips longitudinally, effective to vary the sizes of the extrusion orifices when the lips are axially adjusted.

4,789,328

**HOT/COLD PRESS FORMING APPARATUS FOR THERMOFORMABLE PLASTIC MATERIALS**

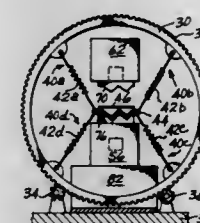
Frederick L. Knoll, Kent, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 20, 1987, Ser. No. 52,622

Int. Cl.<sup>4</sup> B29C 51/08

U.S. Cl. 425—384

19 Claims



1. An apparatus for forming and shaping a workpiece made of thermoplastic material, which comprises:

- (a) a base means;

- (b) a positioning means supported by said base means;

- (c) a tray means for supporting a raw workpiece, said tray means being supported by said positioning means;

- (d) a first pair of dies;

- (e) a first support means for supporting said first pair of dies, said first support means being supported by said base means;

- (f) a first means mounted on said base means for moving said first support means whereby said first pair of dies may be positioned above said raw workpiece and below said tray means;

- (g) a second pair of dies;

- (h) a second support means for supporting said second pair

of dies, said second support means being supported by said base means;

(i) a second means mounted on said base means for moving said second support means whereby said second pair of dies may be positioned above said workpiece and below said tray means;

(j) a press platen means; and

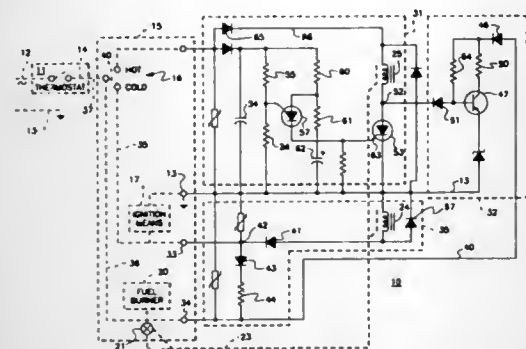
(k) means for moving said press platen means whereby said first pair of dies may be closed against said raw workpiece and said tray means when said first pair of dies is in position above and below said workpiece and said second pair of dies may be closed against said workpiece and said tray means when said second pair of dies is in position above and below said workpiece.

#### 4,789,329 THERMOSTATICALLY OPERATED FUEL VALVE CONTROL CIRCUIT

John E. Bohan, Jr., Minneapolis; John L. Erdman, Eden Prairie; Marvin D. Nelson, Edina, and James W. Ratz, Bloomington, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.  
Filed Feb. 22, 1988, Ser. No. 158,443  
Int. Cl. F23Q 9/08

U.S. Cl. 431-46

7 Claims



1. A control circuit for fuel valve means adapted for use with a heating system having a spark ignition device, a flame responsive switch, and a thermostat requiring an electrical load current, including: fuel valve means having pilot valve operating means and main fuel operating means; pickup and hold circuit means for said pilot valve operating means including connection means connected to a source of power through said thermostat upon a call for system operation and said flame responsive switch when said switch is in a cold position to thereby energize said pilot valve operating means; load current circuit means including connection means connected to draw a first level of said load current through said thermostat upon said call for operation of said system; time delay circuit means including connection means connected to said source of power through said thermostat upon said call for system operation and said flame responsive switch when said flame responsive switch is in a hot position to energize said time delay circuit means; said time delay circuit means including said main valve operating means; and said time delay circuit connection means connected to said load current circuit means and causing said load current circuit means to maintain said load current upon said time delay circuit means timing out a time delay interval.

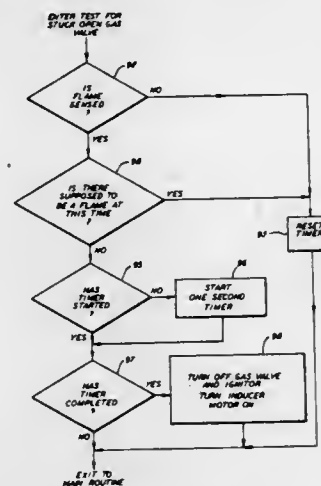
4,789,330  
GAS FURNACE CONTROL SYSTEM  
Gary W. Ballard, Indianapolis, and Daniel J. Dempsey, Carmel, both of Ind., assignors to Carrier Corporation, Syracuse, N.Y.  
Filed Feb. 16, 1988, Ser. No. 156,056  
Int. Cl. F24H 3/00

U.S. Cl. 431-75

9 Claims

1. In an induced draft furnace of the type having a thermostat and a flame sensor for sensing the existence of a flame at a

burner, an improved method of controlling the operation thereof comprising the steps of:  
sensing when the thermostat is not calling for heat;  
sensing whether, at the same time, a flame exists at the burner; and

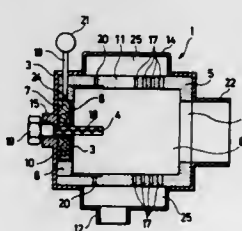


if a flame exists when the thermostat is not calling for heat, turning on the inducer motor to thereby ensure that combustion air is provided to the burner.

4,789,331  
LIQUID FUEL BURNER  
Hideo Kawamura, Fujisawa, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan  
Filed Jul. 8, 1987, Ser. No. 71,107  
Claims priority, application Japan, Jul. 8, 1986, 61-158851  
Int. Cl. F23Q 7/08

U.S. Cl. 431-262

6 Claims



1. A burner comprising  
a combustion cylinder in which a combustion chamber is constituted;  
a ceramic plate which constitutes an atomizing chamber at one end portion of said combustion cylinder and which is mounted on a wall at one end of said combustion cylinder, said ceramic plate having a plurality of holes;  
a combustion gas exhaust port formed in the other end portion of said combustion cylinder;  
a fiber wick contained in said atomizing chamber;  
a heating plug which extends in the axial direction of said combustion cylinder through said atomizing chamber and said ceramic plate from the outside of the wall at one end of said combustion cylinder, a portion of the surface of said heating plug being exposed in said atomizing chamber and being brought into direct contact with said fiber wick contained in said atomizing chamber;  
a fuel feed means for feeding a liquid fuel to said atomizing chamber in which said fiber wick is contained;  
and a plurality of air introducing holes formed to penetrate

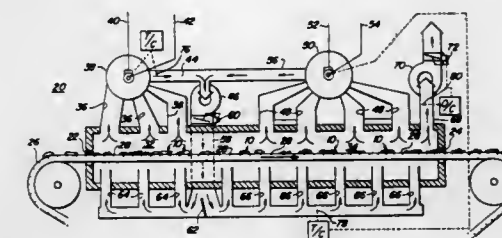
through a wall of said combustion cylinder at a plurality of positions spaced apart from each other in the axial direction of said combustion cylinder.

#### 4,789,332 APPARATUS FOR REMOVING VOLATILES FROM METAL

Everett M. Ramsey, Richland; Bruce A. Gray, and Donald C. Evans, both of Newburgh, all of Ind., assignors to Aluminum Company of America, Pittsburgh, Pa.  
Division of Ser. No. 879,066, Jun. 26, 1986, Pat. No. 4,715,810, which is a continuation-in-part of Ser. No. 750,336, Jun. 28, 1985, abandoned. This application Oct. 13, 1987, Ser. No. 107,201

Int. Cl. F27B 9/28; F26B 5/00  
U.S. Cl. 432-59

10 Claims



1. Apparatus for removing volatiles from the surface of metal, comprising:  
a furnace having a first zone for heating metal to vaporize most of the volatiles from the metal and a second zone for further heating the metal to remove additional material from the metal;  
a conveyor for moving metal sequentially through said first zone and then through said second zone;  
a burner adapted to receive vapors containing volatiles from said first zone and burning them to produce hot gas;  
a fan adapted to receive said hot gas from said burner and cooler gas from said second zone to provide a recirculating gas stream;  
means for distributing said recirculating gas stream to said first and second zones for contacting metal as it is moved through said zones;  
means for controlling the temperature in the furnace in relation to the speed and mass of the metal moved through the furnace to sufficiently vaporize the volatiles on metal moved through the furnace while sufficiently minimizing oxidation of the metal.

4,789,333  
CONVECTIVE HEAT TRANSFER WITHIN AN  
INDUSTRIAL HEAT TREATING FURNACE  
Klaus H. Hemsath, Toledo, Ohio, assignor to Gas Research Institute, Chicago, Ill.  
Filed Dec. 2, 1987, Ser. No. 129,010  
Int. Cl. F27B 3/22

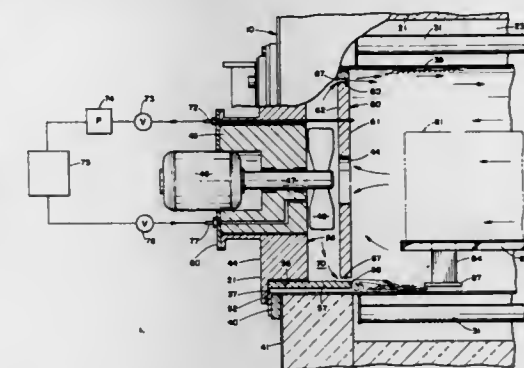
U.S. Cl. 432-176

16 Claims

1. An industrial heat treat furnace comprising:  
(a) an insulated furnace casing defining an enclosure;  
(b) a sealed, impermeate, generally thin walled, shell member having a closed end within said enclosure, said shell member containing an atmospheric gas initially at a first temperature;  
(c) at least one workpiece within said shell member;  
(d) source means remotely situated from said shell member for generating a fluid medium at a second temperature different than said first temperature;  
(e) heat transfer means in communication with said source means and situated within said enclosure relatively close to said shell member to effect heat transfer between said fluid medium at said second temperature and the exterior

of said shell member's thin wall so that the temperature of said shell member's thin wall approaches said second temperature; and

(f) jet pump means within said shell member producing an annular jet of atmosphere gas traveling the length of said shell member, said annular jet having an initial diameter when formed at a position remote from said closed end

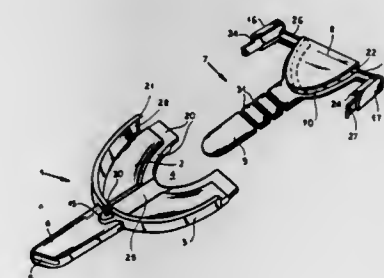


smaller than the inside diameter of said shell member, said jet pump means causing said annular jet to expand into contact with said shell member's thin wall as it travels the length thereof to effect significant heat transfer between said shell member's thin wall and that portion of said atmosphere gas entrained within said jet, and thereafter to impinge said jet against said workpiece to cause heat exchange therebetween.

4,789,334  
DENTAL MOLD FOR UPPER AND LOWER JAW  
Wolfgang Wedenig, and Wilfried Resch, both of Bahnhofstr. 16, A-9300 St. Veit, Austria  
Filed Dec. 16, 1987, Ser. No. 133,557  
Claims priority, application Austria, Dec. 16, 1986, 3346/86  
Int. Cl. A61C 9/00

U.S. Cl. 433-37

6 Claims



1. A mold for taking impressions of an upper or a lower jaws, the mold comprising:  
a main part including  
a U-shaped generally flat base plate having a rearwardly concave and open U-shaped inner periphery and a forwardly convex U-shaped outer periphery;  
a U-shaped rim projecting transversely of the plate from the outer periphery thereof, and  
a handle projecting forward from the outer periphery and formed with a rearwardly open passage; an upper-jaw insert including  
a U-shaped upper-jaw wall generally complementarily fittable in an engaged position with the inner periphery

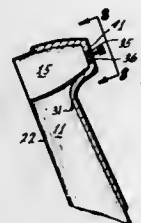


of the base plate to form therewith a transversely open U-shaped recess adapted to receive molding compound, a palate plate bridging the U-shaped upper-jaw wall, and a stem projecting forward from the upper-jaw wall and engageable in the passage when the upper-jaw wall and rim define the recess;

a lower-jaw insert including

- a U-shaped lower-jaw wall generally complementarily fittable in an engaged position with the inner periphery of the base plate to form therewith a transversely open U-shaped recess adapted to receive molding compound, the lower-jaw wall forming a rearwardly open tongue-accommodating cutout, and
  - a stem projecting forward from the lower-jaw wall and engageable in the passage when the lower-jaw wall and rim define the recess; and
- means for arresting either of the stems in the passage in any of several relative positions of the inserts and main part.

said shield can be placed next to and flush against said head and;



a sleeve made of an elastic, pliable and stretchable, rubber-like material with open ends capable of covering said dental instrument and shield.

4,789,337

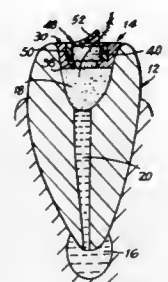
#### DENTAL IMPLANT FOR THE SECUREMENT OF FIXED DENTAL PROSTHESES, ITS TOOL FOR ITS POSITIONING AND ITS INSERTION PROCESS

Gerard Scortecchi, 10 rue du Soleil, 06000 Nice, France  
Division of Ser. No. 810,370, May 23, 1986, Pat. No. 4,722,687.  
This application Dec. 29, 1987, Ser. No. 139,257  
Claims priority, application France, Mar. 29, 1984, 8405129  
Int. Cl.<sup>4</sup> A61C 8/00

U.S. Cl. 433—173

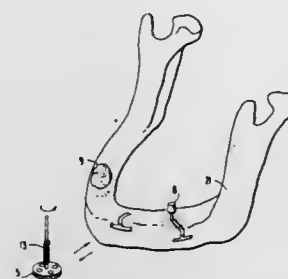
1 Claim

4,789,335  
METHOD AND APPARATUS FOR USE IN ENDODONTIC TREATMENT  
Paul Geller, 4 Holland Ave., Elmont, N.Y. 11003, and Steven Berkowitz, 102-10 66th Rd., Forest Hills, N.Y. 11375  
Filed Jun. 4, 1987, Ser. No. 58,159  
Int. Cl.<sup>4</sup> A61C 5/02  
U.S. Cl. 433—81 12 Claims



1. Apparatus for use in endodontic treatment of a tooth with an unobstructed root canal system including a pulp chamber from which the pulp has been removed and at least one root canal, comprising:

- one-way valve means adapted to be situated in a region of the pulp chamber of the root canal system of the tooth for venting pressure built-up in the root canal system and tooth drainage and at the same time for preventing substantial introduction of food debris and other foreign matter into the root canal system; and
- means for holding said one-way valve means in the region of the pulp chamber of the tooth root canal system.



1. A method of positioning a dental implant, comprising cutting a slot in a tooth with a tool comprising a shaft having a cutter wheel at one end of relatively large diameter and a plurality of relatively small cutter wheels spaced apart from said relatively large wheel and from each other along said shaft, removing said tool from said slot, and emplacing in the slot an implant comprising a shaft having at one end a relatively large diameter wheel and a plurality of relatively small wheels spaced apart along said shaft from said relatively large wheel and from each other, said relatively large wheel of said implant having a thickness slightly greater than that of said large wheel of said cutter wheel thereby to wedge said implant in the tooth.

4,789,338

#### DENTAL PROSTHESIS

ART OF PROTECTING A DENTAL INSTRUMENT  
Cheri Lewis, 240 S. La Cienega Blvd., Beverly Hills, Calif. 90211  
Filed Jun. 25, 1987, Ser. No. 66,694  
Int. Cl.<sup>4</sup> A61C 1/16

U.S. Cl. 433—116 4 Claims

1. In combination:

- a dental instrument having a handle, a head attached to the end of the handle, and means for attaching a tooth treating tool to said head,
- a shield made of a warped rigid-like sheet material having a shape that is congruent to said dental instrument so that

Friedrich Eisenmann, Geislingen Steige, Fed. Rep. of Germany, assignor to Implantec GmbH, Fed. Rep. of Germany  
Filed Jan. 27, 1987, Ser. No. 7,348  
Int. Cl.<sup>4</sup> A61C 13/225

U.S. Cl. 433—181

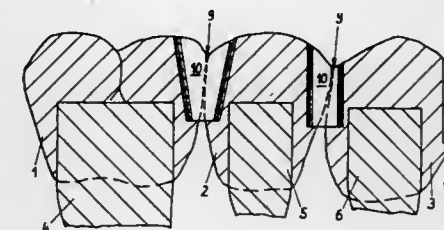
11 Claims

1. A connector for flexible removable interconnection of dental units such as crowns and bridges, each dental unit including a biting surface and an axis that is substantially perpendicular to the biting surface, the connector comprising:

- (a) a slot in each of the dental units parallel to the axis, said slot open at a first end that is closer to said biting surface and closed with a stop at an end opposite to said first end,

said slots opposite each other in adjacent dental units, each of said slots undercut to form a dovetail cross-section;

(b) a sleeve sized to fit in each of said slots; and



(c) a flexible buffer means having dovetail cross-sections on opposite sides removably and slidably inserted into said sleeves in said slots in adjacent dental units to hold the dental units in side-by-side engagement.

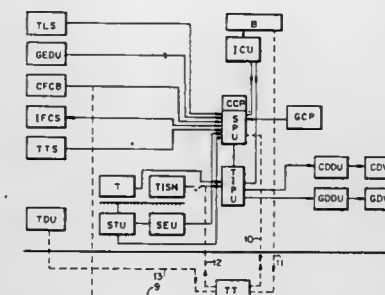
4,789,339

#### GUNNERY TRAINING SYSTEM

Ralph H. Bagnall-Wild, Helensburgh, and Neil F. Grant, Glasgow, both of Scotland, assignors to Barr & Stroud Limited, Glasgow, Scotland  
Filed Jan. 27, 1987, Ser. No. 7,141  
Int. Cl.<sup>4</sup> F41F 27/00

U.S. Cl. 434—20

4 Claims



1. A gunnery training and trainee-reaction measuring system having an actual armoured vehicle having a gun and a conventional fire control system, the fire control system having a laser rangefinder, a gun trigger switch, means for determining a ballistic and environmental parameters, means for determining gun orientation, a thermal image viewing arrangement, a video display device for displaying a video version of the thermal image captured by the viewing arrangement, and a fire control computer arranged for electronically injecting into the video display device an aiming mark representative of projectile position, which position is calculated by the fire control computer from known target range, known ballistic and environmental parameters and known gun orientation, the improvement comprising the provision of portable training equipment capable of being releasably connected to the fire control system and comprising means for inhibiting emission of laser radiation from the laser rangefinder, means for inhibiting operation of the thermal image viewing arrangement, a video image data store and means for providing on the video display device images selected from the data store, one or more of the selected images incorporating a simulated target at a simulated range, means for extracting gun orientation signals from the fire control system, and means for selecting from the data store the displayed video images according to the extracted gun orientation signals, means for signalling the simulated range to the fire control system during the appearance of the pertaining simulated target on the video display device by initiation of the laser rangefinder, whereby the fire control computer is enabled to generate an aiming mark, and the training equipment further

comprising means for capturing the location of the aiming mark when the gun trigger switch is operated and means for computing the displacement between the simulated target position and the captured aiming mark position as a measure of training efficiency.

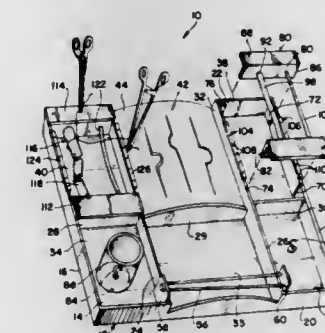
4,789,340

#### SURGICAL STUDENT TEACHING AID

Bashir A. Zikria, 196 Millbrook Cir., Norwood, N.J. 07648  
Filed Aug. 18, 1987, Ser. No. 86,533  
Int. Cl.<sup>4</sup> G09B 23/26

U.S. Cl. 434—272

22 Claims



1. A teaching aid for teaching surgical techniques, said teaching aid comprising a tray having a plurality of walls forming a plurality of separate compartments therein, at least one said compartment including simulated tissue removably mounted therein, at least one flexible tube replaceably mounted in said tray, said tube being formed from a material that can be severed and sutured, whereby said tube simulates a tubular tissue of a patient, and wherein said plurality of walls includes a pair of walls removably mounted in at least one said compartment, the walls in said pair of walls comprising at least one aperture extending therethrough, said apertures being dimensioned to receive said tube.

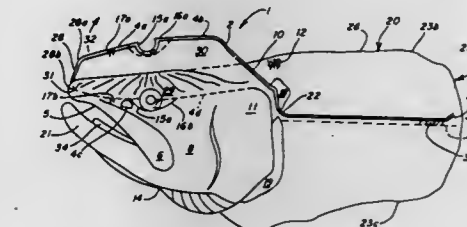
4,789,341

#### MOUNTING FISH HEADS USING THE NATURAL SKIN AND JAWS

Donald C. Czerwinski, 5024 W. 24th Pl., Cicero, Ill. 60650  
Filed Feb. 2, 1987, Ser. No. 20,573  
Int. Cl.<sup>4</sup> G09B 23/00

U.S. Cl. 434—296

23 Claims



1. A method of mounting a fish head comprising:  
(A) removing the headskin from the skull of said fish without substantially altering the structure of said skull;  
(B) placing the removed headskin in a solution composed of a solute dissolved in a solvent that will dissolve and remove the oil in said skin; and  
(C) replacing the headskin from which said oil has been removed upon said substantially unaltered skull.

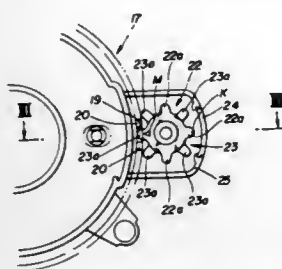
4,789,342

# NEUTRAL POSITION INDICATOR FOR ELECTRICALLY CONDUCTIVE CABLE IN STEERING WHEEL

Kazuaki Shitanoki, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Apr. 7, 1987, Ser. No. 35,603  
 Claims priority, application Japan, Apr. 7, 1986, 61-79563  
 Int. Cl.<sup>4</sup> H01R 3/00

U.S. Cl. 439-15

4 Claims



1. A neutral position indicator for an electrically conductive cable coiled in an automotive steering wheel, comprising:
  - a fixed storage case for storing the electrically conductive cable therein, said storage case including a rotatable member rotatable with the steering wheel;
  - a position indicator unit rotatably mounted in said fixed storage case and angularly movable for a first angular interval each time said rotatable member rotates through a second angular interval in response to completion of the rotation of said rotatable member through said second angular interval, said position indicator unit being indicative of a neutral position of the electrically conductive cable when the position indicator unit reaches a prescribed angular position;
  - a cover disposed in covering relation to said storage case; and
  - a window defined in said cover for allowing visual observation of said position indicator unit.

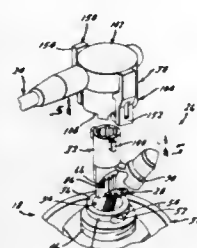
4,789,343

# ELECTRICAL CONNECTOR SYSTEM FOR ADJUSTABLE AUTOMOTIVE SUSPENSION COMPONENTS

Michael J. Dougherty, Lansdale, and Robert E. MacMullin, Exton, both of Pa., assignors to Microdot Inc., Darien, Conn.  
 Filed Oct. 6, 1987, Ser. No. 105,040  
 Int. Cl.<sup>4</sup> H01R 13/639

U.S. Cl. 439-34

34 Claims



1. In an electrical control system for an adjustable automobile suspension component, said suspension component comprising:
  - a housing with cylindrical projection extending outwardly therefrom, the projection having a central bore coaxial therewith; and

a first set of control wires extending from within said housing;

said electrical control system comprising electrical control means for said suspension component having a second set of control wires extending therefrom, the improvement comprising an electrical connector system for releasably connecting said first and second sets of control wires comprising

an axially elongated female connector comprising an electrically insulative female connector housing having a plurality of axially extending electrically conductive contact elements radially outwardly supported by an internal surface thereof and a keying surface located thereon, said first set of control wires being connected to said female connector contact elements, with said female connector being removably secured in the bore of the cylindrical projection of said suspension component housing;

an annular, axially elongated male connector comprising an electrically insulative male connector housing having an axially extending projection, a plurality of axially extending electrically conductive contact elements radially inwardly supported by the axially extending projection, said second set of control wires being connected to said male connector contact elements, said male connector housing having a keying surface thereon engageable with the keying surface of said female connector housing, whereby the orientation between the contact elements of said male and female connectors is prescribed, and a moisture boot encompassing a portion of said male connector housing and interlockingly engaged with an outwardly projecting surface thereof, whereby said moisture boot is retained thereabout;

sealing means radially disposed between said male connector housing and said suspension component housing, whereby a first moisture-proof seal is obtained between said male connector and said suspension component housing; and

latch means on said male connector for removably attaching said male connector to said suspension component housing.

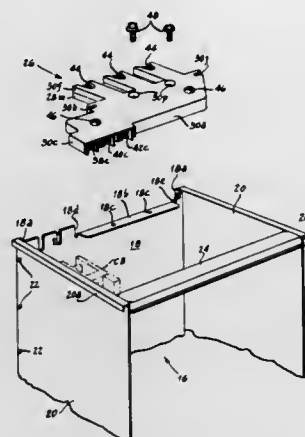
4,789,344

# PLUG-IN CONNECTOR MODULE FOR A REMOVABLE CONTROL UNIT OF A MOTOR CONTROL CENTER

Ronald J. Fritsch, Sussex, and Allan E. Grams, Elm Grove, both of Wis., assignors to Eaton Corporation, Cleveland, Ohio  
 Filed Jan. 26, 1987, Ser. No. 66,573  
 Int. Cl.<sup>4</sup> H01R 29/00

U.S. Cl. 439-43

11 Claims



1. A plug-in connector module carried by a removable control unit of a motor control center electrically connecting

control apparatus of said control unit to vertical bus bars of said motor control center, said bus bars being stationarily mounted in said motor control center and said control unit with said connector module carried thereon being movable inwardly and outwardly of said motor control center relative to said bus bars, comprising, in combination:

an insulating housing attached to a rear wall of said control unit, said housing having front and rear portions extending on respective opposite sides of said wall and openings in said front and rear portions;

a plurality of solid bus members disposed within said insulating housing, opposite ends of each bus member terminating within said housing adjacent a respective front and rear opening in said housing, each said bus member comprising plug-in connector means at one end adjacent a respective rear opening of said housing for plug-in connection with said vertical bus bars and means for providing bolted connection at an opposite end adjacent a respective, from opening for bolted connection with said control apparatus.

4,789,346

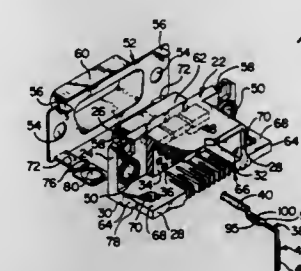
# SOLDER POST ALIGNMENT AND RETENTION SYSTEM

Robert H. Frantz, Newville, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Mar. 27, 1987, Ser. No. 31,483  
 Int. Cl.<sup>4</sup> H01R 9/09

U.S. Cl. 439-80

21 Claims



1. An electrical connector assembly, comprising:
  - a dielectric housing defining a mating face and a mounting face, said housing having a plurality of terminal receiving passages extending from the mating face;
  - a locator plate terminating in a rear face, said locator plate having first and second profiled channels opening onto said rear face and having an end remote therefrom, said locator plate between said first and second channels defining a deflectable beam having an effective beam length, a first channel comprising a region having a width narrower than a solder post adapted to be inserted therein, a detent adjacent said region in the direction of insertion of a solder post, said detent adapted to receive a solder post from said region;
  - a second channel comprising, in the direction of insertion of a solder post: a first region having a width narrower than a solder post adapted to be inserted therein; a transition region adjacent said first region, said transition region widening in the direction of insertion of a solder post to substantially the width of a solder post proximate the end of said first channel; a second region adjacent the transition region, said second region substantially the width of a solder post; a restrictive neck adjacent the second region; and a detent at the end thereof, said detent adapted to receive and secure a solder post therein, whereby when a solder post is inserted into said region of said first channel said beam deflects toward said second channel and when a solder post is inserted into said first region of said second channel said beam deflects toward said first channel and as the solder post passes through the transition region the beam returns to an undeflected position with the beam remaining in an undeflected position as the solder post passes through the second region.

4,789,347

# MEMORY CARD

Toshinobu Banjo, Yasuhiro Murasawa, and Shigeo Onoda, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Feb. 10, 1988, Ser. No. 154,322

Claims priority, application Japan, Mar. 31, 1987, 62-79918  
 Int. Cl.<sup>4</sup> H01R 13/44

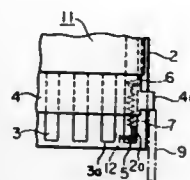
U.S. Cl. 439-140

5 Claims

1. A memory card comprising:
  - a card-shaped package;
  - a semiconductor module disposed within said package;
  - a plurality of electrode terminals mounted on said package for allowing an external electrical connection of said semiconductor module in said package to an external circuit, said electrode terminals including an earth electrode terminal;



a metallic shutter disposed on said package and movable between an open position in which said electrode terminals are exposed for said electrical connection and a closed position in which said electrode terminals are covered;



an electrically conductive spring having one end electrically connected to said shutter and the other end secured to said package for biasing said shutter toward said closed position; and  
connecting means for electrically connecting said other end of said spring to said earth electrode terminal.

4,789,348

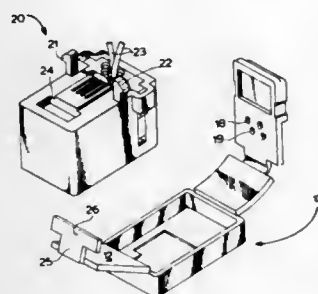
#### MODULAR CONNECTOR WITH UNITARY DUST COVER

Clifton G. Hampton, Bedford, Tex., assignor to Siecor Corporation, Hickory, N.C.

Filed Sep. 30, 1987, Ser. No. 102,590  
Int. Cl.<sup>4</sup> H01R 13/44

U.S. Cl. 439-142

6 Claims



2. Apparatus comprising:

- (a) a connector comprising a first side having a first opening therein, and a second side opposing the first side, the second side having two posts mounted thereon; and
- (b) a unitary cover for the connector, comprising:
  - (i) a cap placed on the connector first side, the cap having a hole therein in communication with the first opening; and
  - (ii) first and second flaps mounted on the cap, the first flap having at least one perforation, the first and second flaps each covering a portion of the connector second side, at least one flap being between the posts.

4,789,349

**THERMAL CONTRACTION CONDUCTOR JOINT**  
Jerome F. Farmer, San Diego, Calif., assignor to General Dynamics Corp./Space Systems Division, San Diego, Calif.

Filed Feb. 4, 1987, Ser. No. 10,662  
Int. Cl.<sup>4</sup> H01R 43/04

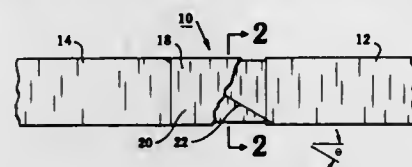
U.S. Cl. 439-161

7 Claims

1. A connector for holding together a plurality of electrical conductors comprising:

means on said connector for placing said conductors into electrical contact with a predetermined orientation, said connector and said conductors having sufficiently differ-

ent coefficients of thermal expansion to cause differential shrinkage for creating a clamping engagement therebetween when said connector and said conductor are subjected to extremely low temperatures.



#### 4,789,350 METHOD AND APPARATUS FOR MANUFACTURING MAILING ENVELOPES OR BAGS

Karl-Heinz Honsel, Heidelberger Weg 15, 4800 Bielefeld 1, Fed. Rep. of Germany

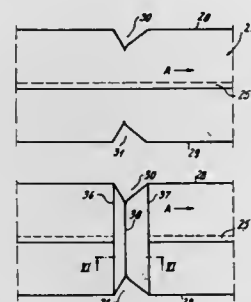
Filed Apr. 15, 1987, Ser. No. 38,550

Claims priority, application Fed. Rep. of Germany, Apr. 19, 1986, 3613243

Int. Cl.<sup>4</sup> B31B 23/16, 23/22, 1/25

U.S. Cl. 493-232

4 Claims



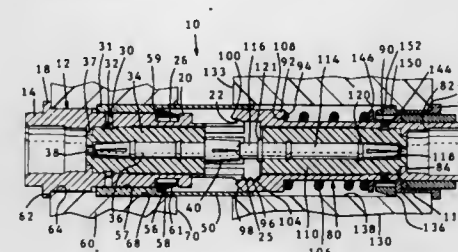
#### 4,789,351 BLIND MATING CONNECTOR WITH SNAP RING INSERTION

Robert L. Fisher, Jr., Hummelstown, and George W. Michael, III, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Apr. 29, 1988, Ser. No. 187,717  
Int. Cl.<sup>4</sup> H01R 13/64

U.S. Cl. 439-248

9 Claims



7. A coaxial connector of a type utilized in plural to interconnect high frequency signal paths requiring precise impedance matching between connector halves, said connector comprising intermating plug and jack connector halves each carried in a housing, a resilient means on one of said connector halves to axially bias said one half into engagement with the other said half, each said connector half including flange means to limit axial movement of the said halves in the said housing in one direction, and each connector half having snap ring means to limit axial movement in an opposite direction and sleeve means fitted over one of said connector halves including a recess housing said snap ring to assure free radial movement thereof during insertion of said half in said housing.

4,789,352

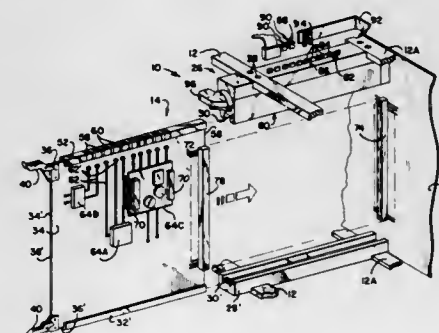
#### POWER CONNECTOR HAVING LINEARLY MOVING CAM FOR DAUGHTER CARD

Earl R. Kreinberg, Phoenix, and Paul Vinson, Carefree, both of Ariz., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 2, 1987, Ser. No. 127,748  
Int. Cl.<sup>4</sup> H01R 13/62

U.S. Cl. 439-260

9 Claims



1. An electrical connector for distributing power current to a circuit panel along an active edge thereof, the connector having means for electrical connection to a plurality of power buses and at least one return path bus of the circuit panel, the connector being mountable to a frame opposed from cooperating card-receiving means of the frame, and the electrical connection means of the connector being electrically connectable to power conductor means or return path conductor means associated therewith, comprising:

housing means securable to the frame, said housing means including surfaces defining a channel open at one end into which an edge portion of a rigid panel is insertable longi-

tudinally from said end thereof, a cam-receiving aperture parallel to said channel, and a plurality of terminal-receiving passageways each including at least a first portion in communication with said channel and further including a second portion in communication with said cam-receiving aperture;

a plurality of terminal members secured within respective said terminal-receiving passageways of said housing means associated with corresponding panel terminal means, each of said terminal members having a movable portion including a first contact section proximate said channel and disposed along a said channel-defining surface thereof for electrical engagement with a corresponding contact section of a said associated panel circuit path means exposed for such engagement upon mating, and further having a second contact section remote from said channel and electrically connectable to a corresponding contact means of an electrical power conductor means or a return path conductor means; and

camming means secured within said cam-receiving aperture of said housing means, said camming means includes a cam shaft secured in said cam-receiving aperture of said housing means in a manner permitting linear movement therealong between an unactuated position and an actuated position, said camming means further including actuating means at an end of said housing means exposed for actuation;

said cam shaft including camming sections associated with respective said terminal members and engageable with cam-engaging sections of said terminal members through said second passageway portions upon actuation of said camming means, whereby said cam shaft upon actuation urges said movable terminal portions of said plurality of terminal members toward and into said channel from at least one said channel-defining surface to electrically engage corresponding contact sections of respective said panel circuit path means under appropriate contact normal force.

4,789,353

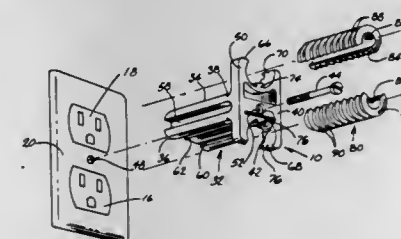
#### ELECTRIC PLUG RETAINER

Jeffrey A. Busta, 3610 Valhalla Way, Glendale, Calif. 91208, and Vincent A. Vinceri, 1825 N. Whitley St., #511, Hollywood, Calif. 90028

Filed Jun. 15, 1987, Ser. No. 61,555  
Int. Cl.<sup>4</sup> H01R 13/639

U.S. Cl. 439-373

7 Claims



1. An electric plug retainer means to releasably maintain an electric plug with an electric wire extending therefrom in electrical contact with a wall outlet socket covered with an electrical wall plate and prevent inadvertent dislodgment of said plug from said wall outlet socket, said combination including: a unitary plug bias bracket adapted to be attached to said electrical wall plate and extend outwardly of said wall plate, said unitary bracket being T-shaped with the leg of said T secured to said electrical wall plate and a bias member forming the top of said T extending on both sides of said leg generally normal to the axis of said leg, said top forming a pair of bias plates and said bias plates each including a cutout wherein at least one of said cutouts is axially aligned with said outlet socket; and

plug biasing insert means removably inserted within said cutout of at least one of said bias plates extending to and bearing against said electric plug, said plug biasing insert being elongated having a longitudinal bore with said electric wire from said electric plug extending through said bore and said bore, said electric plug and said cutout being axially aligned, and said elongated plug biasing insert is laterally shiftable and lockable within said cutout to maintain contact with said electric plug and bias the same against said electric socket.

4,789,354

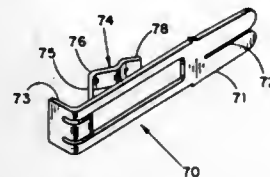
## VOICE/DATA COMMUNICATION TERMINATION CONNECTOR

Philip M. Smith; Elmont E. Hollingsworth, both of Austin; Robert A. Wandmacher, Cedar Park; Thomas W. Rosckes, Georgetown, all of Tex.; Russell A. Roiko, Rogers, and Dennis M. Cheesebrow, Roseville, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn. Filed Sep. 14, 1987, Ser. No. 96,891

Int. Cl.<sup>4</sup> H01R 4/24

U.S. Cl. 439—395

20 Claims



1. A conductive metal contact element comprising an elongate strip having generally parallel sides and ends, a leg formed adjacent one end and said one end having a slot extending longitudinally of the strip to define a U-contact element to receive a wire therein, and said strip having an inverted U-shaped cut between said sides, said U-shaped cut forming a spring contact bendable from said strip and diverging from the plane of said strip and in the direction of said one end.

4,789,355

## ELECTRICAL COMPRESSION CONNECTOR

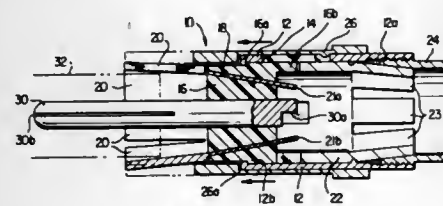
Noel Lee, 47 West Park Dr., Daly City, Calif. 94015

Filed Apr. 24, 1987, Ser. No. 42,322

Int. Cl.<sup>4</sup> H01R 17/18

U.S. Cl. 439—584

7 Claims



1. A connector for connecting to a jack having a socket and a rim, said connector comprising a cylindrical hollow body member; a pin projecting from one end of said body member for engaging said socket upon advancement of said connector in a direction towards said jack; a plurality of flared leaves projecting from said end of said body member and having a generally frustoconical shape with the maximum inner diameter of the frustocone being formed at free ends of said leaves and being greater than the outer diameter of said rim, so that, upon said advancement of said connector in said direction, said rim extends within said flared leaves, the minimum inner diam-

eter of said frustocone being less than the outer diameter of said rim so that said flared leaves engage said rim; and an outer sleeve having a first portion slidably mounted on said body member and adapted for slidable movement relative to said body member, and a second portion extending around said frustocone in engagement therewith, said second portion having a constant inner diameter along its length which is less than the maximum outer diameter of said frustocone so as to compress said contact member into engagement with said rim upon said advancement of said outer sleeve in said direction.

4,789,356

## COAXIAL CABLE CONNECTOR

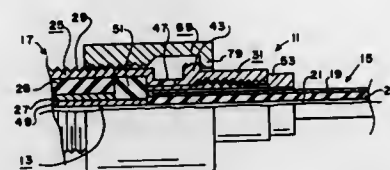
Terry R. Taylor, 7303 Goodman Rd., Walls, Miss. 38680

Filed Feb. 29, 1988, Ser. No. 161,738

Int. Cl.<sup>4</sup> H01R 17/04

U.S. Cl. 439—584

6 Claims



1. A coaxial cable connector for electrically connecting one end of a coaxial cable to a mating coaxial cable port, said connector comprising:

- (a) a first connector means for being electrically coupled to said coaxial cable port, said first connector means including a body having first end for engaging said coaxial cable port and having a second end and having a bore extending completely therethrough between said first and second ends thereof, at least a portion of said body of said first connector means having internal threads in said bore thereof adjacent said first end of said body thereof; and
- (b) a second connector means for securing said coaxial cable to said first connector means, said second connector means including a body having a first end for being inserted into said bore of said body of said first connector means and having a second end, said body of said second connector means having a bore extending between said first and second ends thereof for receiving said coaxial cable, at least a portion of said body of said second connector means having external threads adjacent said second end thereof for screwably engaging said internal threads of said first connector means, said body of said second connector means having at least one slot extending from said first end thereof toward said second end thereof through at least a portion of said external threads thereof, said external threads of said body of said second connector means being sized with respect to said internal threads of said body of said first connector means so as to cause said body of said second connector means to be compressed adjacent said at least one slot and to clamp said coaxial cable thereto when said body of said second connector means is screwed into said body of said first connector means.

4,789,357

## ELECTRICAL CONNECTOR SHIELD CASE

Masao Yamaguchi, and Kimio Teramura, both of Tokyo, Japan, assignors to Hirose Electric Co., Ltd., Tokyo, Japan

Filed Jul. 2, 1987, Ser. No. 69,402

Claims priority, application Japan, Jul. 15, 1986, 61-164574

Int. Cl.<sup>4</sup> H01R 13/658

U.S. Cl. 439—607

6 Claims

1. An electrical connection shield case for enclosing an insulation housing having a vertical side wall surrounding a plurality of contacts, a horizontal flange integral with said

vertical side wall, and first fastener means provided in said horizontal flange of said insulation housing, which comprises: a cylindrical member made of a metal sheet, opposite free ends of which abut each other at a seam of said cylindrical member which fits over said vertical side wall of said insulation housing;

the metal part has been shaped onto said unit, interlocks with a corresponding catch element of the unit; said legs producing an electrical connection to a grounded potential carrier.

4,789,359

## FIXED-TERMINAL STRUCTURE

Kenji Sawada, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan

Continuation of Ser. No. 864,712, May 19, 1986, abandoned.

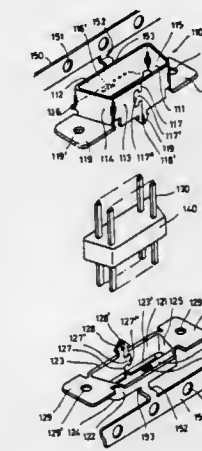
This application Jul. 27, 1987, Ser. No. 77,979

Claims priority, application Japan, May 17, 1985, 60-73133[U]

Int. Cl.<sup>4</sup> H01R 13/70

U.S. Cl. 439—620

2 Claims



locking means provided on said opposite free ends to prevent opening of said cylindrical member; and second fastener means provided on a rear edge of said cylindrical member across said seam for engagement with said first fastener means, thereby preventing any offsetting, overlapping and separation of said opposite free ends.

4,789,358

## CABLE PLUG

Karl Zell, Niederpoecking; Peter Seldel, Grobenzell, and Leo Pelzl, Holzkirchen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

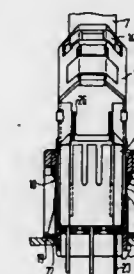
Filed Aug. 17, 1987, Ser. No. 86,270

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1986, 3632600

Int. Cl.<sup>4</sup> H01R 13/658

U.S. Cl. 439—607

12 Claims



1. A cable plug for accepting an end of a shielded cable comprising a unit equipped with contact elements and a housing co-utilized for shielding and rigidly connected to said unit comprising:

- said housing being formed by a single-piece metal part bent U-shaped comprising two legs and a web surface, said metal part, under spring tension, pressing against the unit equipped with contact elements, surrounding said unit such that said legs of the metal part extend at least close to the edge of the unit such that a space serving for the acceptance of the cable end arises between the web surface of the metal part and a back end face of the unit;
- said metal part comprising a catch element which, after

1. A fixed terminal structure for connecting lead wires to contacts mounted on an outer planar surface of a switch casing, comprising fixed terminals, all of which have a mounting portion mounted flat on the casing and an end portion formed in an L-shape extending upright from the mounting portion and ending in a curved tip spaced above said surface, wherein the curve of each said curved tip faces in a laterally outward direction from said surface of said casing and the end of each said curved tip extends in a laterally inward direction substantially parallel to the plane of said surface of said casing, whereby a lead wire external to said casing is protected from being cut by said curve and said parallel extending end of said curved tip.

4,789,360

## ELECTRICAL CONNECTOR WITH REAR REMOVABLE CONTACTS

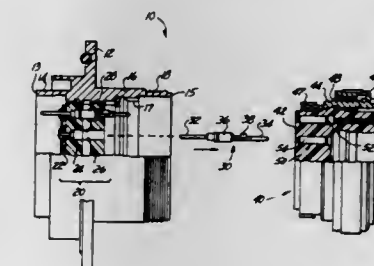
Richard L. Paul, and Ronald W. Morse, both of Sidaey, N.Y., assignors to Amphenol Corporation, Wallingford, Conn.

Continuation of Ser. No. 926,479, Nov. 3, 1986, abandoned. This application Jan. 19, 1988, Ser. No. 153,731

Int. Cl.<sup>4</sup> H01R 13/66

U.S. Cl. 439—620

5 Claims



1. An electrical connector assembly for receiving and transmitting an electrical signal comprising a hollow cylindrical metal shell having a mating forward end portion, a dielectric insert having an array of first passages extending therethrough, each first passage receiving an electrical first contact, said first contact comprising a mating forward and rearward end portion and a medial portion having circuit protection means electrically connected thereto for preventing

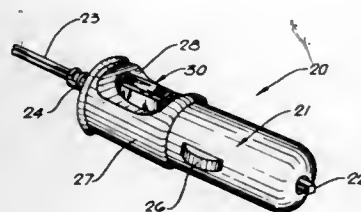


transmission of signals from the assembly which exceed a predetermined value, grounding means electrically connected to each first contact for grounding the contacts to the shell, and mounting means for releasably mounting the first contacts in the shell, the mounting means comprising a removable insert assembly having a like array of second passages extending therethrough and carrying an electrical contact in each respective second passage thereof, each second contact being non-removably mounted in the insert assembly and having a forward end portion for mating with the rearward end portion of a first contact and a rearward end portion for further interconnection to transmit a protection signal, means for removably securing the insert assembly to the rearward end portion of the shell and means for aligning the dielectric insert and insert assembly so that the arrays of first and second passages are aligned with one another, said first contacts being individually removable from the rearward end portion of the shell upon removal of the insert assembly.

**4,789,361**  
**FUSED CIGARETTE LIGHTER RECEPTACLE AND ADAPTOR PLUG ASSEMBLIES**  
Richard L. Kinzalow, and Richard M. Kinzalow, both of Park Ridge, Ill., assignors to Kinzalow Properties - Leasing, Wheaton, Ill.

Filed Aug. 17, 1987, Ser. No. 86,284  
Int. Cl. H01R 13/68  
U.S. Cl. 439-622

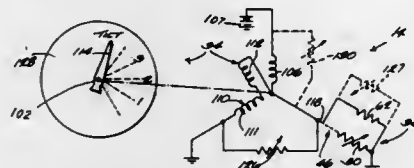
10 Claims



1. An electrical connector assembly comprising: positive circuit contact means, negative circuit contact means, a pair of electrical conductors of an electrical card, coupling means associated with each of said contact means for connecting each thereof in circuit with a respective one of said conductors; said coupling means associated with said positive contact means comprising a pair of separated, electrically isolated coplanar blade receptive terminal connector means, one of which is connected to said positive contact means and the other of which is connected to said one of said conductors associate with said positive contact means; one-piece insert-type fuse means having a pair of laterally coplanar spaced blade contacts interconnected by a visibly encapsulated, electrically insulated fuse link, said blade contacts being insertable into said spaced terminal connector means to establish fused circuit connection between said positive contact means and its associated said one of said conductors; said coupling means associated with said negative contact means directly joining the same to its associated one of said conductors; integral cylindrical housing means for enclosing said contact means, conductors, coupling means and terminal connector means to provide a unitary assembly; said housing means being formed with a finger receptive exterior depression having an opening in the bottom thereof communicating with said terminal connector means and adapted to receive the blade contacts of said fuse means whereby the latter may be manually mounted in said terminal connector means so that said fuse link is visibly exposed on the exterior of said housing means.

**4,789,362**  
**MARINE PROPULSION DEVICE INCLUDING GAUGE WITH ADJUSTABLE SENSITIVITY**  
James L. Holt, Bristol, Wis., and Jeffrey A. Olson, Waukegan, Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.  
Continuation of Ser. No. 744,479, Jun. 13, 1985, abandoned.  
This application Jan. 27, 1987, Ser. No. 9,082  
Int. Cl. B63H 5/12  
U.S. Cl. 440-2

9 Claims



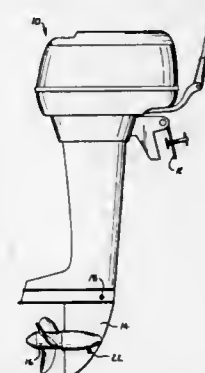
1. A marine propulsion device adapted for mounting on a variety of boats having transom angles which vary relative to one another, said marine propulsion device including a propulsion unit adapted to be mounted on the transom of a boat so as to be tiltable about a generally horizontal axis and movable through a trim range wherein the angle of the propulsion unit relative to the transom is less than a predetermined angle and through a tilt range wherein the angle of the propulsion unit relative to the transom is greater than the predetermined angle, a trim sending device including a first variable resistance mechanically coupled to said propulsion unit and responsive to movement of said propulsion unit about said horizontal axis and operable to provide a variable electrical effect indicative of the degree of rotation of said propulsion unit about said horizontal axis, a trim gauge responsive to said variable electrical effect and including first and second coils operable to develop a magnetic field having direction and magnitude related to the ratio of currents through said first and second coils, said trim gauge further including a face having thereon marked a trim segment including an end and a tilt segment extending from said end, said trim gauge further including a pointer movable relative to said face response to said variable electrical effect, said marine propulsion device further including adjustable means for locating said pointer substantially at said end of said trim segment when said propulsion unit is substantially at said predetermined angle so as to enable accommodation by the gauge to variation in transom angles and so that said pointer moves from said trim segment to said tilt segment when said propulsion unit moves about said horizontal axis from said trim range to said tilt range, said adjustable means including a second variable resistance connected to vary the ratio of currents through said first and second coils independently of said first variable resistance.

**4,789,363**  
**VISUAL INDICATING PLUG FOR OUTBOARD MARINE ENGINES**  
Roger Wicklein, P.O. Box 688, Rockaway Beach, Mo. 65740  
Filed Sep. 25, 1987, Ser. No. 100,968  
Int. Cl. B63H 21/38  
U.S. Cl. 440-2

20 Claims

1. In an outboard marine engine having a submersible transmission case carrying lubricating oil and presenting a threaded drain opening at a location below the normal oil level for draining oil from the transmission case, an improved drain plug comprising a shank having exterior threads sized to mate with the threads of the drain opening to permit the shank to be threaded into the drain opening to close same and an enlarged head on said shank for engagement with the outside of the transmission case when said shank is threaded into the drain opening, said shank and head being transparent to provide

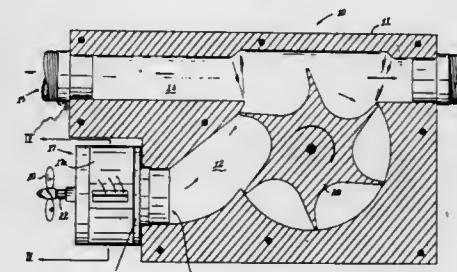
visibility of the oil in the interior of the transmission case therethrough for visibly indicating the presence or absence of



water seepage into the transmission case while the drain plug remaining in place in the drain opening.

**4,789,364**  
**DISPLACEMENT APPARATUS FOR SUBMERGED CLEANER**  
Daniel J. V. D. Chauvier, and Peter Woodman, both of 57 Miller Road., Nuffield Springs, South Africa  
Filed Mar. 26, 1987, Ser. No. 30,132  
Claims priority, application South Africa, Mar. 27, 1986, 86/2317  
Int. Cl. B63H 21/165  
U.S. Cl. 440-5

7 Claims

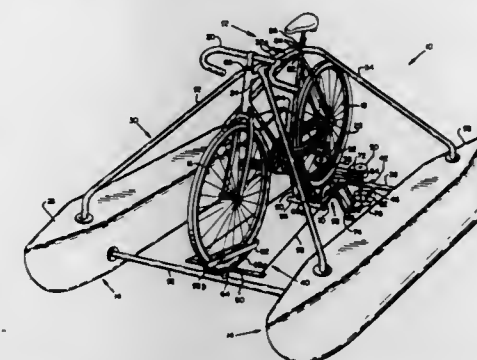


1. Apparatus for intermittently displacing a device submersible in a liquid, comprising: a body adapted to be connected directly or indirectly to the device; the body defining first and second flow passages therethrough; the first flow passage extending between a first inlet to the body and an outlet therefrom; the second flow passage extending between a second inlet to the body and the said outlet; the second inlet being adapted to communicate with the device and the outlet being adapted to be connected to a suction source so that suction is transmitted via the body and the second inlet to the device; drive means adapted to exert a displacement force on the body and therefore on the device in response to liquid flow through the first flow passage; a valve assembly for the first flow passage for intermittently opening and closing the first flow passage to intermittently allow and interrupt liquid flow through the first flow passage; and actuating means for operating the valve assembly which actuating means is driven by liquid flow through the body;

the arrangement being such that, in use, when liquid is flowing through the first flow passage, the drive means is operative to exert a displacement force on the body and therefore on the device, and, when liquid flow through the first flow passage is interrupted, the drive means is rendered completely inoperative and no displacement force is then exerted on the body.

**4,789,365**  
**AQUACYCLE**  
Jeffrey K. Jones, 1861 SE. 148th Ave., Portland, Oreg. 97233  
Filed Apr. 20, 1987, Ser. No. 40,036  
Int. Cl. B60F 0/3; B63H 6/12  
U.S. Cl. 440-21

7 Claims



3. An improved pedal-operable aquacycle including a bicycle having handlebars and a front wheel pivotable therewith, a pedal-operable rear wheel, and a frame including a generally horizontal high frame member, and including a buoyant hull assembly, and having a rudder control system associated with the front wheel, and a propulsion system associated with the rear wheel, an improvement comprising:

a bicycle support framework mounted on the hull assembly and extending upwardly and laterally inwardly therefrom for supporting and vertically stabilizing the bicycle, the framework including a generally horizontal portion for clampingly embracing the generally horizontal high frame member of the bicycle, whereby the substantial weight of the bicycle is borne at the frame member by the framework and the hull assembly;

the propulsion system being mounted on the hull assembly and including a friction wheel rotatable with the rear wheel of the bicycle by pedal action, dual flexible axles operatively connected to the friction wheel, extending laterally and rearwardly on either side thereof and being rotatable therewith, and a pair of laterally spaced, oppositely pitched propellers, each being substantially rigidly positionable relative to the hull assembly and each being mounted for rotation with the friction wheel on a corresponding one of the axles, the friction wheel, the dual flexible axles and the oppositely pitched propellers cooperating to provide dual propeller substantially horizontal forward thrust in response to pedal operated forward rotation of the rear wheel of the bicycle; and the rudder control system being mounted on the hull assembly and including a pair of laterally spaced rudders located rearwardly of and generally in line with the propeller pair, each of the rudders being mounted on and pivotable with a generally vertical shaft having a pulley fixedly mounted thereon, a rudder control arm pivotable with the front wheel of the bicycle, the arm including a concave wheel well cradling the front wheel of the bicycle, and a rudder control cable extending rearwardly from one of the opposite ends of the arm, around and operatively engaging the pulleys and extending therefrom forwardly to the other of the opposite ends of the arm, the cable imparting generally

equal, same-direction pivotal movement of the pulleys in response to and in the opposite direction of pivotal movement of the handlebars of the bicycle.

4,789,366

### MARINE PROPULSION DEVICE BALL CLUTCH TRANSMISSION

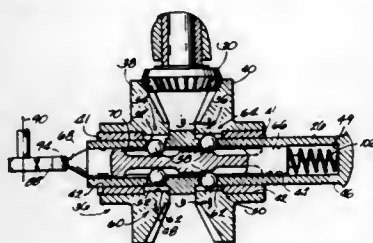
Gordon B. Hale, Waukegan; Donald J. Friddle, Kenosha, and Edward D. McBride, Waukegan, all of Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed Jan. 24, 1987, Ser. No. 63,941

Int. Cl.<sup>4</sup> B63H 5/12

U.S. Cl. 440—75

39 Claims



1. A marine propulsion device comprising a lower unit including a propeller shaft supported for rotary movement, said propeller shaft including an axial bore defining an annular wall having therethrough a radially extending aperture communicating with said bore, a bevel gear mounted in said lower unit generally coaxially with said propeller shaft for rotation relative to said propeller shaft, said gear including an axial passage through which said shaft extends and which has an inner surface axially overlapping said aperture and having thereon a surface portion extending radially inwardly, a ball which is located in said aperture and which is movable radially outwardly to be engaged by said surface portion, an actuator extending in said axial bore in said shaft and being movable relative to a drive position, said actuator including means for selectively engaging said ball to establish a drive condition, said means comprising, in said actuator, an actuator portion located such that, when said actuator is in said drive position, said actuator portion is axially aligned with said aperture and engages said ball to force said ball radially outwardly relative to said aperture so that said ball is engaged by said surface portion to establish rotary drive of said shaft by said gear, and means for assisting movement of said actuator out of said drive position.

4,789,367

### MARINE ENGINE FLUSHING AND EMERGENCY BILGE PUMPING ASSEMBLY

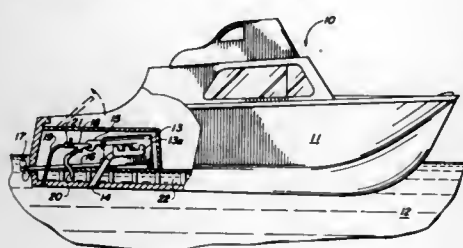
Jack Fulks, 4300 Catliss La., Naples, Fla. 33940

Filed Dec. 7, 1987, Ser. No. 130,095

Int. Cl.<sup>4</sup> B63B 13/00

U.S. Cl. 440—88

1 Claim



1. An assembly for a boat having a bilge and an internal combustion engine which has a water pump using sea water as its coolant comprising

a Y-shaped pipe having a tail and two arms, the tail of which is connected to the engine's water pump, a first manually operable on-off valve located in one arm of the Y-shaped pipe, said valve being opened and closed by a hand-operated lever, for controlling the flow of sea water into the engine's water pump, a second manually operable on-off valve located in the other arm of the Y-shaped pipe, said valve being opened and closed by a hand-operated lever, for controlling the flow of fresh water and water from the bilge into the engine's water pump, a flexible hose connected to the open end of the second arm of the Y-shaped pipe for flushing the engine with fresh water and for removing water from the bilge, and an on-off electrical switch mounted on the first arm of the Y-shaped pipe adjacent to the first on-off valve, said switch having a spring loaded arm which is moved from off to on position by movement of the valve's lever from open to closed position.

4,789,368

### RESCUE FIN

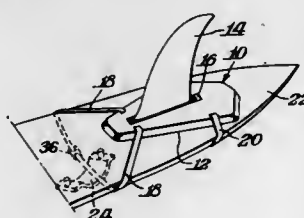
Vincent G. D'Onofrio, P.O. Box 986, Paia Maui, Hi. 96779

Filed Sep. 30, 1987, Ser. No. 103,065

Int. Cl.<sup>4</sup> B63H 9/06

U.S. Cl. 441—79

5 Claims



1. A rescue fin which is carried on a sailboard, wherein attachment of the rescue fin enables a sailboard operator to resume windsurfing when the existing fin system is damaged, consisting of a replacement fin; a base having a top which has non-slip means thereon and a bottom which has a skeg box adapted to receive the replacement fin; attachment means for attaching the base to the sailboard whereby the non-slip means is placed against the bottom of the sailboard and the replacement fin is inserted into the skeg box so that the replacement fin is positioned down in the water when the rescue fin is in use on the sailboard.

4,789,369

### TOY BUILDING BLOCKS WITH MULTIPLE PIVOTING INTERCONNECTIONS

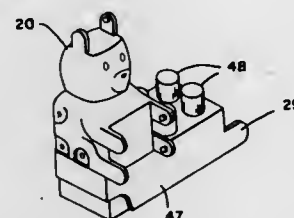
Ronald L. Lyman, Rancho Cordova, Calif., assignor to Fantasy Toys, Inc., Fair Oaks, Calif.

Filed Mar. 20, 1987, Ser. No. 28,441

Int. Cl.<sup>4</sup> A63H 33/08

U.S. Cl. 446—101

15 Claims



1. A toy building block construction, comprising: a lower body portion having a generally rectangular conformation, an upper body portion integrally formed therewith and having a generally oblate conformation, first and

second pairs of detent arms extending from said lower body portion in parallel opposition, a third pair of detent arms extending from said upper body portion in parallel opposition, each of said detent arms including a detent knob formed on an interior surface thereof in confronting relationship with the respective paired detent arm.

4,789,370

### APPARATUS FOR INTERLOCKING STRUCTURAL ELEMENTS OF TOY DISKS

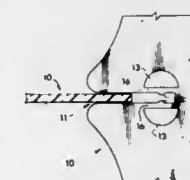
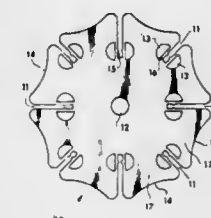
Jerome K. Ellefson, Lakewood, Colo., assignor to Go Images, Inc., Englewood, Colo.

Filed Feb. 11, 1987, Ser. No. 13,287

Int. Cl.<sup>4</sup> A63H 33/00

U.S. Cl. 446—113

12 Claims



10. A method for interlocking together two substantially flat and thin and flexible disk members of essentially the same thickness, said method comprising the steps of:

forming an elongated notch in at least a first one of said disk members with said notch being of a width approximately equal to the thickness of said members and with said notch extending inwardly from an outer periphery of said member towards a center portion of said member, forming a boss on a side of said notch, forming in said first member a void spaced apart from said boss so that the portion of said member intermediate said boss and said void forms an elongated thin flexible spring, said void being positioned within said element so that an imaginary straight line substantially perpendicular to said side of said notch passes through a center of said void and a center of said boss, said void comprising a half circle with the diameter of said half circle being substantially parallel to the side of said notch on which said boss is positioned, said spring having substantially parallel sides with one of said sides being said diameter and with the other of said sides of said spring being said side of said notch on which said boss is positioned, and inserting said other member into said notch to engage said boss and deflect said boss and said flexible spring towards said void, the pressure exerted on said other member by said boss and said flexible spring being effective to maintain said members in an interlocked state.

4,789,371

### SIMULATED TOY FLASH CAMERA

Robert J. Boggs, and Janet E. Saell-Kelly, both of E. Aurora, N.Y., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Sep. 29, 1987, Ser. No. 101,989

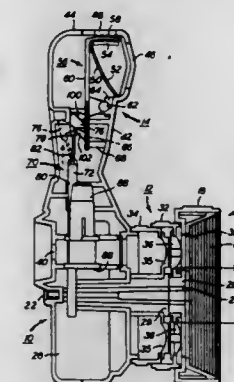
Int. Cl.<sup>4</sup> A63H 33/30, 33/22

U.S. Cl. 446—219

10 Claims

1. A toy simulated flash camera comprising:

a camera body having a flash housing with a front wall and a top wall; a light reflecting member in the flash housing having an outer light reflecting surface; a front opening in the front wall through which the light reflecting surface of the light reflecting member is visible; a top opening in the top wall; a shutter mechanism in the flash housing movable between a normal shutter closed position for preventing the passage of ambient light through the top opening into engagement with the outer surface of the light reflecting member, and



a shutter open position for allowing the passage of ambient light through the top opening into engagement with the outer surface of the light reflecting member where it is reflected outwardly through the front opening in the form of a flash; and

shutter actuating means for momentarily moving the shutter mechanism from its normal shutter closed position to its shutter open position causing the momentary ambient light reflected from the outer surface of the light reflecting member through the front opening to simulate a flash lamp exposure.

4,789,372

### MATERNITY GARMENT

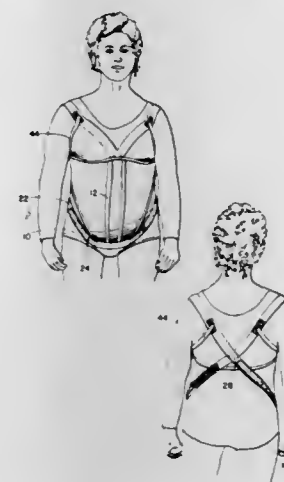
Trenna R. Wicks, 2040 43rd East, Seattle, Wash. 98122

Filed Apr. 14, 1987, Ser. No. 38,209

Int. Cl.<sup>4</sup> A41C 1/08

U.S. Cl. 450—155

20 Claims



1. A garment for supporting the abdomen of a wearer, comprising: a panty; a first support strap having a first end and a second end, said



first end being attached to a center front portion of the panty, said first support strap being adapted to extend over a shoulder of the wearer, across the lower back of the wearer, and over a hip of the wearer;

a second support strap having a first end and a second end, said first end being attached to a center front portion of the panty, said second support strap being adapted to extend over a shoulder of the wearer, across the lower back of the wearer, over a hip of the wearer, and under the abdomen of the wearer, said first and second support straps being adapted to crisscross each other at the back of the wearer and said second ends of the support straps being adapted to overlap each other under the wearer's abdomen; and

means for adjustably connecting the first and second support straps to each other near their second ends.

4,789,373

**HYDRAULIC TORQUE IMPULSE GENERATOR**

Nils G. Adman, Huddinge, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

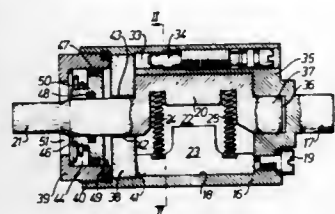
Continuation of Ser. No. 2,117, Jan. 12, 1987, abandoned. This application Apr. 13, 1988, Ser. No. 183,379

Claims priority, application Sweden, Jan. 23, 1986, 8600281

Int. Cl.<sup>4</sup> B25D 15/00

U.S. Cl. 464—25

4 Claims



1. Hydraulic torque impulse generator, comprising:

a motor-rotated drive member (16) including a hydraulic fluid chamber (18) of a generally cylindrical shape;

an output spindle (21) having an impulse receiving rear portion (20) extending into said fluid chamber (18) through an opening (42) in the forward end wall (38) of said fluid chamber (18);

seal means (23, 32, 27, 31) associated with said drive member (16) and said impulse receiving portion (20) of said output spindle (21) and arranged to divide said fluid chamber (18) into at least one high pressure compartment (28) and at least one low pressure compartment (29) during a limited portion of a relative rotation between said drive member (16) and said output spindle (21), thereby producing transient torque impulse generating pressure peaks in said at least one high pressure compartment (28); and

a seal barrier between said output spindle (21) and said drive member (16) for sealing off said fluid chamber (18) from the atmosphere;

said seal barrier comprising:

a substantially nonresilient clearance seal means (43) defined by said output spindle (21) and said fluid chamber end wall (38) for preventing said transient pressure peaks from propagating outside said fluid chamber (18);

a low pressure area (49; 61, 62, 67) defined outside of said fluid chamber (18) and communicating with said fluid chamber (18) through said clearance seal means (43); and

a yieldable partition means (46, 64) partly defining said low pressure area (49; 61, 62, 67) and communicating on one side thereof with said low pressure area (49; 61, 62, 67) and on the other side thereof with the atmosphere, said partition means (46, 64) being arranged to produce volume charges of said low pressure area (49; 61, 62, 67) in relation to occurring volume changes in the hydraulic fluid during operation of the hydraulic torque impulse generator.

4,789,374

**TORSIONAL VIBRATION ABSORBER**

Hiroshi Suzuki, Anjo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

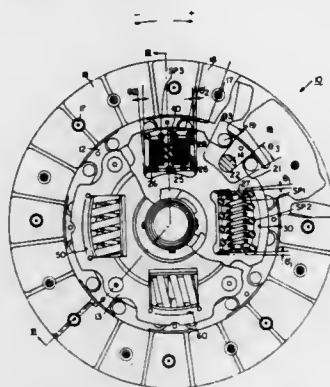
Filed Oct. 14, 1987, Ser. No. 108,090

Claims priority, application Japan, Oct. 15, 1986, 61-157759[U]

Int. Cl.<sup>4</sup> F16D 3/12, 13/64

U.S. Cl. 464—64

9 Claims



1. A torsional vibration absorber comprising:

a drive plate connected to a drive source, a driven plate connected to a driven member, and a resilient means disposed between the two plates, the two plates being rotatable relative to each other by resiliently compressing the resilient means,

wherein said resilient means includes a coil spring disposed along a relative rotational direction thereof and a compressive rubber elastic member loosely disposed within an inner cavity of said coil spring;

a resin sheet at each end of the compressive rubber elastic member having a diameter larger than an external diameter of the compressive rubber elastic member and a thickness which permits smooth sliding movement axially of the coil spring while avoiding interference therewith each, said resin sheet is fixed by strong bonding to a respective end of said compressive rubber elastic member and disposed within said inner cavity of said coil spring; and

a metallic seat disposed at one end of said coil spring so as to be brought into contact with one of said resin sheets to compress said compressive rubber elastic member only in one of the relative rotational directions along which said two plates rotate.

4,789,375

**SPRING DAMPER DRIVE FOR A CLUTCH DRIVEN DISC ASSEMBLY**

Michael L. Bassett, Auburn, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Dec. 16, 1986, Ser. No. 942,482

Int. Cl.<sup>4</sup> F16D 3/14

U.S. Cl. 464—68

22 Claims

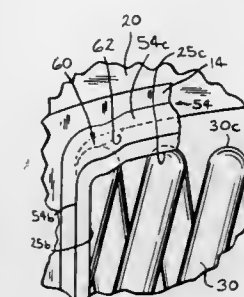
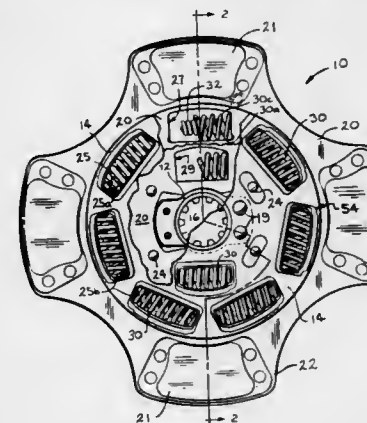
21. A torque transmitting element for a driven disc assembly in a clutch comprising:

a cover having a central aperture and at least one opening formed therethrough, said opening adapted to receive a spring means therein and including an inner wall, a pair of end walls extending outwardly from said inner wall, and an outer wall extending between said end walls; and

a flange including an end portion extending along one of said end walls and an outer portion extending along said outer wall.

wall, said flange further including a projecting shoulder formed at the junction of said outer portion with said end

torque between the gear sets on the hubs, wherein said ring means is disposed internally with respect to said sleeves and the gear sets on said hubs are disposed on a radially extending annular rib on the periphery of said hubs.



portion, said shoulder adapted to selectively engage an end of said spring means when received in said opening.

4,789,376

**GEAR TYPE SHAFT COUPLING**

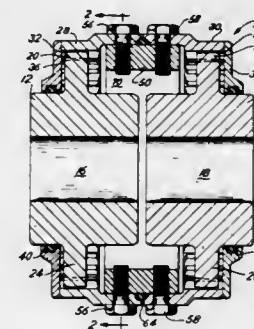
George G. Grant, Greer, S.C., assignor to Reliance Electric Company, Greenville, S.C.

Filed May 26, 1982, Ser. No. 382,148

Int. Cl.<sup>4</sup> F16D 3/18

U.S. Cl. 464—154

15 Claims



1. A gear coupling for connecting two shafts in end-to-end relation, comprising hubs adapted to be mounted on the shafts and each having a peripheral set of gear teeth thereon, a sleeve disposed on each of said hubs and having an internal set of gear teeth meshing with the gear set on the respective hub, and ring means overlapping the adjacent edges of both of said sleeves, and radially extending securing means in the overlapping portions of said ring means and said sleeves, forming a rigid assembly of said two sleeves and said ring means for transmitting

4,789,377

**UNIVERSAL JOINT**

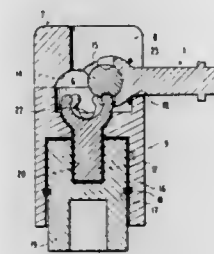
Nathan D. Hoskins, 6 Maywood Dr., Jackson, Tenn. 38301

Filed Jul. 30, 1987, Ser. No. 80,557

Int. Cl.<sup>4</sup> F16D 3/16

U.S. Cl. 464—157

5 Claims



1. A universal joint comprising: a drive shaft and a driven shaft movable relative to said drive shaft over an angular range of 0°-90°; each of said drive and driven shafts comprising a hemispherical crown gear cluster at one end thereof, and a distal end; each said gear cluster comprising a circular array of hemispherical gear teeth; each adjacent pair of said gear teeth defining a ball-like socket between said each adjacent pair; each said circular array of said gear teeth defining a central hemispherical seat formed in the corresponding said gear cluster; a bearing means fixed in the said hemispherical seat of one of said drive and driven shafts receiving said gear teeth of said other of said drive and driven shafts and providing a bearing surface therefor when said shafts are angularly offset; and a closed casing enclosing said gear clusters of said drive and driven shafts, said gear clusters being maintained in meshing engagement within said casing; said casing maintaining said drive shaft rotatably and non-displaceably mounted therein and exposing said distal end of said drive shaft for connection to a driving means; said casing comprising a slot defining a 90° range of angular movement of said driven shaft relative to said drive shaft, said distal end of said driven shaft extending outside said casing through said slot; said gear cluster of said driven shaft being rotatably and axially displaceably confined within said casing; said casing further comprising differentiated spherical bearing surfaces coextensive with said slot, said bearing surfaces supporting said gear cluster of said driven shaft and providing clearance for said driven shaft to move over all of said angular range.

4,789,378

**VARIABLE SPEED PULLEY**

Hiroshi Takano, and Yasuhiro Hashimoto, both of Miki, Japan, assignors to Mitsubishi Belting Limited, Nagata, Japan

Filed Jun. 29, 1987, Ser. No. 67,691

Claims priority, application Japan, Jun. 30, 1986, 61-153666

Int. Cl.<sup>4</sup> F16H 11/02

U.S. Cl. 474—13

23 Claims

1. A variable speed pulley comprising:

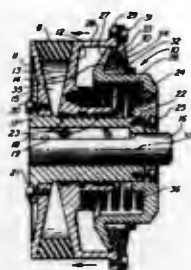
a first sheave half;

means for fixedly mounting the first sheave half on a rotatable shaft defining an axis of rotation;

a second sheave half;

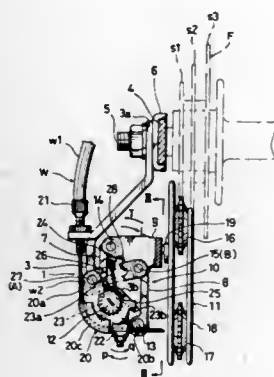
means for coaxially movably mounting said second sheave half on said shaft adjacent said first sheave half to define a belt receiving groove therebetween;

biasing means for biasing said second sheave half axially of the shaft to vary the width of said belt receiving groove; and  
 urging means for urging said second sheave half axially of the shaft against the biasing force of said biasing means with a force proportional to the speed of rotation of said shaft to vary the width of said belt receiving groove, said urging means comprising means movable with said second sheave half defining a fixed surface.



means fixedly associated with said shaft defining a fixed surface,  
 force applying means extending between said movable surface and said movable surface and having a variable extension parallel to said shaft axis proportional to the centrifugal force acting thereon as a result of said speed of rotation of the shaft, and  
 rearrangement means for varying the arrangement of said force applying means as an incident of a relative movement between said first and second sheave halves angularly about said axis of rotation.

**4,789,379**  
**BICYCLE DERAILEUR**  
 Nobuo Ozaki, and Tsukasa Wanke, both of Osaka, Japan, assignors to Maeda Industries, Ltd., Osaka, Japan  
 Filed Oct. 6, 1987, Ser. No. 105,020  
 Int. Cl.<sup>4</sup> F16H 9/06  
 U.S. Cl. 474—82 7 Claims



1. A bicycle derailleur comprising:  
 a parallelogram linkage mechanism including a base

member, a pair of parallel links each pivotally connected at one end thereof to said base member by means of a pin, and a movable member pivotally connected to the other end of said each link by means of a pin;  
 a chain guide mechanism carried by said movable member; an operating member mounted on said linkage mechanism and operable by a cable to pivot about an axis parallel to said pins;  
 a torsion spring arranged to engage with said operating member and one of said links, said spring elastically urging said operating member to counteract a tension applied to said cable; and  
 restraining means connecting between a first connecting point on said operating member and a second connecting point on said linkage mechanism to convert pivotal movement of said operating member into smaller pivotal movement of said links, said restraining means allowing said first and second connecting points to move toward each other to torsion said spring.

**4,789,380**  
**CLUTCH ROTOR FOR AN ELECTROMAGNETIC CLUTCH AND METHOD OF PRODUCTION THEREOF**  
 Nishimura Kazuo, Iseaki, Japan, assignor to Sanden Corporation, Gunma, Japan  
 Filed Jul. 8, 1987, Ser. No. 71,195  
 Claims priority, application Japan, Jul. 8, 1986, 61-158681  
 Int. Cl.<sup>4</sup> F16H 55/36  
 U.S. Cl. 474—174 2 Claims



1. A clutch rotor for an electromagnetic clutch comprising a rotor member including an outer cylindrical portion, an inner cylindrical portion, a circular end plate connected between said cylindrical portions, and a cylindrical V-shaped pulley having an annular base portion, said outer cylindrical portion having a groove formed on an outer surface thereof, said groove being provided with knurling on a bottom surface thereof, said annular base portion of said V-shaped pulley fixedly interfitted in said groove to fasten said V-shaped pulley on said rotor member.

## CHEMICAL

**4,789,381**  
**FIBER TREATING PROCESS AND COMPOSITION USED THEREFOR**

Shigeki Oshiyama; Koji Kishimoto; Takeshi Hirota; Shigetoshi Suzue; Hiroyoshi Hiramatsu; Kiyosaki Yoshikawa, and Nobuyuki Suzuki, all of Wakayama, Japan, assignors to Kao Corporation, Tokyo, Japan  
 Filed Apr. 23, 1987, Ser. No. 41,404  
 Int. Cl.<sup>4</sup> D06M 13/10

**U.S. Cl. 8—115.6 5 Claims**  
 1. A fiber treating process comprising treating fibers with an ester formed from a polybasic carboxylic acid and a compound having the formula



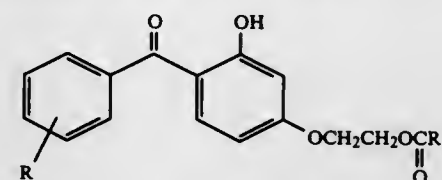
wherein R<sub>1</sub> and R<sub>2</sub> represents C<sub>4</sub>—C<sub>18</sub> alkyl groups; AO represents a C<sub>2</sub>—C<sub>4</sub> alkyleneoxide group; and n represents an integer of 0 to 30.

**4,789,382**  
**BENZOPHENONE ETHER ESTERS AND USE THEREOF TO IMPROVE THE LIGHT FASTNESS OF POLYESTER DYEINGS**

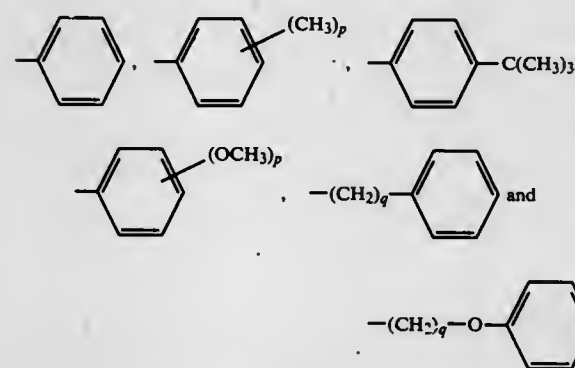
Peter Neumann, Wiesloch; Dieter Wegerle, Mannheim, and Reinhold Krallmann, Weisenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Fed. Rep. of Germany  
 Filed Jul. 10, 1987, Ser. No. 72,032  
 Claims priority, application Fed. Rep. of Germany, Jul. 26, 1986, 3625355

**Int. Cl.<sup>4</sup> C07C 69/92; C07D 213/79, 307/68; D06P 5/02**  
**U.S. Cl. 8—442 6 Claims**

1. A process for dyeing textile polyester material with disperse dyes in the presence of a benzophenone derivative to improve light fastness, which comprises adding to the dye bath a benzophenone derivative of the formula (II):



wherein R is hydrogen, C<sub>1</sub>—C<sub>4</sub> alkyl, fluorine, chlorine or bromine; and R<sup>2</sup> is a radical selected from the group consisting of:



wherein p and q are each 1 or 2, in an amount of from about 0.1 to 10% by weight, based on the weight of the fiber.

**4,789,383**  
**RAPID DISSOLVING POLYMER COMPOSITIONS AND USES THEREFOR**

Dion P. O'Mara, Vienna, Va.; Albert F. Hadermann, Ijamsville, Md., and Jerry C. Trippe, Fairfax Station, Va., assignors to General Technology Applications, Inc., Manassas, Va.  
 Division of Ser. No. 807,947, Dec. 12, 1985, Pat. No. 4,720,397.  
 This application Nov. 16, 1987, Ser. No. 121,276

**Int. Cl.<sup>4</sup> C10L 1/02**

**U.S. Cl. 44—55 6 Claims**  
 1. A method for imparting anti-misting properties to a fuel suitable for use on turbine and diesel engines comprising: adding to said fuel a rapid dissolving, particulate polymer composition in an amount sufficient to substantially eliminate that population of fuel droplets having a diameter of less than about 50 micrometers normally produced when pure fuel is subjected to wind shear, the particles of said polymer composition having a central core consisting of a high molecular weight thermoplastic polymer which imparts viscoelastic properties to a solution of said polymer in said fuel, said central core having clean surfaces and being surrounded by a multi-layered shell of an adherent, particulate, coating agent selected from the group consisting of tricalcium phosphate and graphite having a particle size much smaller than that of the central core and having the interstices between the coating agent particles and around the core filled with an inert gas.

**4,789,384**  
**PROCESS FOR PARTIAL OXIDATION OF A HYDROCARBON-CONTAINING FUEL**

Franciscus J. A. Martens, and Hendrikus J. A. Hasenack, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

**Filed Aug. 4, 1987, Ser. No. 81,504**  
**Claims priority, application United Kingdom, Aug. 5, 1986, 8619076**

**Int. Cl.<sup>4</sup> C10J 3/46**

**U.S. Cl. 48—197 R 7 Claims**  
 1. A process for partial oxidation of a hydrocarbon-containing fuel comprising supplying an oxygen-containing gas and a hydrocarbon-containing fuel to a gasification zone through a concentric arrangement of three oxygen channels and one fuel channel, and oxidizing said fuel and producing auto-thermically a gaseous stream containing synthesis gas, the oxygen-containing gas being supplied through the central channel of the concentric arrangement at a velocity of 21–42 m/sec and through the first concentric channel encircling the central channel at a velocity of 60–120 m/sec, fuel being supplied through the second concentric channel encircling the first channel at a velocity of 3.0–3.8 m/sec, and oxygen-containing gas being supplied through the third concentric channel encircling the second channel at a velocity of 60–120 m/sec.

**4,789,385**  
**THERMALLY STABLE DIAMOND ABRASIVE COMPACT BODY**

Henry B. Dyer, 28 George Street, Bryanston; Cornelius Phaal, 34 Rutland Avenue, Craighall Park, and Richard P. Brunand, 39 Constantia Avenue, Alan Manor, all of Transvaal, South Africa

**Continuation of Ser. No. 871,103, Jun. 5, 1986, abandoned. This application May 4, 1987, Ser. No. 47,531**

**Claims priority, application South Africa, Jun. 7, 1985, 85/4339; May 1, 1986, 86/3275**

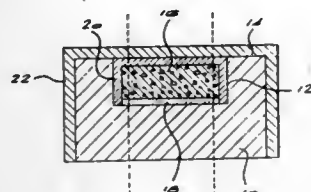
**Int. Cl.<sup>4</sup> B24D 3/00**

**U.S. Cl. 51—293 13 Claims**

1. A method of producing a composite diamond abrasive compact which includes a diamond compact directly bonded to a cemented carbide substrate, said diamond compact containing bonded diamond forming a coherent skeletal mass and a second phase consisting essentially of a refractory carbide forming metal, alone or in combination with another metal,



each such metal being in the form of the metal, a carbide, and intermetallic compound or a combination of two or more thereof, comprising the steps of loading diamond particles and component(s) utilized to produce the second phase in a recess formed in a cemented carbide body such that the second phase component(s) lie(s) on the base of the recess and the diamond



particles on top of the said component(s), providing means between the diamond and the side walls of the recess to prevent sideways infiltration of binder phase from the cemented carbide into the diamond mass, and subjecting the whole to controlled elevated temperature and pressure conditions to produce the diamond compact which is directly bonded to the carbide body.

#### 4,789,386 METAL IONOMER MEMBRANES FOR GAS SEPARATION

Walter L. Vaughn, Lake Jackson, Tex., and Marinda L. Wu, San Ramon, Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Sep. 18, 1986, Ser. No. 908,555  
Int. Cl. B01D 59/10

U.S. Cl. 55-16

13 Claims

1. A method of separating gases comprising
  - (a) contacting with a feed gas mixture under pressure one side of a semipermeable membrane fabricated from a polymer containing a hydrocarbon backbone and pendant metal ionomer groups, wherein the pendant metal ionomer groups are comprised of cations of alkali metals, alkaline earth metals, or transition metals bound to pendant  $\text{CO}_2^-$ ;
  - (b) maintaining a pressure differential across the membrane under conditions such that at least one of the component(s) of the feed gas mixture selectively permeates through the membrane from the high pressure side to the low pressure side of the membrane;
  - (c) removing the permeated gas which is enriched in the faster permeating component(s) from the low pressure side of the membrane; and
  - (d) removing the nonpermeated gas which is depleted in the faster permeating component(s) from the high pressure side of the membrane.

#### 4,789,387 DUST COLLECTOR

Stephen A. Nemesi, Lebanon, Ind., and William J. Klimczak, Racine, Wis., assignors to Venturedyne, Ltd., Milwaukee, Wis.

Continuation-in-part of Ser. No. 281,962, Jul. 10, 1981, abandoned, which is a continuation of Ser. No. 140,697, Apr. 16, 1980, abandoned. This application Nov. 14, 1983, Ser. No. 550,940

The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.

Int. Cl. B01D 46/02

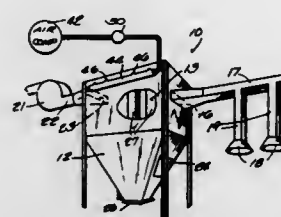
U.S. Cl. 55-96

5 Claims

1. In the process of cleaning filter media in a filter apparatus wherein air is passed from an inlet through generally tubular filter media to a clean air exhaust chamber with contaminants in said air being filtered from the air by said filter media and accumulating on said filter media, said filter media having a

closed end and being open to said exhaust chamber but closed to said inlet, and wherein the contaminants on said filter media are cleaned from said filter media by periodically directing air through said filter media from the exhaust chamber said thereof, the improvement of

controlling the speed of the air as it enters side filter media from the exhaust chamber side thereof such that the air



flowing into said filter media does not impinge on said filter media but flows to the closed end of said filter media without said impingement and after impinging on said closed end said air proceeds to occupy the interior of said filter media and produce airflow through said filter media from the exhaust chamber side to remove said contaminants from said filter media.

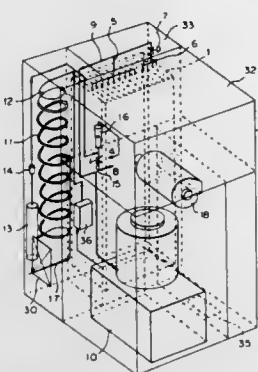
#### 4,789,388 OXYGEN ENRICHING APPARATUS

Katsuji Nishibata, Iwakuni; Hiroshi Takano, Suita; Masaru Itai, Hino, and Tsugutaka Shimote, Yamaguchi, all of Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 63,760, Jun. 23, 1987, abandoned, which is a continuation of Ser. No. 801,092, Nov. 22, 1985, abandoned. This application Feb. 17, 1988, Ser. No. 163,124  
Claims priority, application Japan, Dec. 27, 1984, 59-273940; Dec. 28, 1984, 59-274654; Dec. 28, 1984, 59-274655; Dec. 28, 1984, 59-274652; Dec. 28, 1984, 59-274653  
Int. Cl. B01D 53/22

U.S. Cl. 55-158

37 Claims



1. A low-noise apparatus for providing oxygen-enriched air to a medical patient, the apparatus comprising:

an outer casing means having an intake opening for intaking into said casing a flow of atmospheric air, to exhaust opening for exhausting a first part of the flow of atmospheric air, and a first outlet port for delivering a second oxygen-enriched part of the flow of atmospheric air to a patient;

an oxygen enriching system accommodated in said outer casing means for supplying said second oxygen-enriched part of the flow of atmospheric air to said first outlet port, said oxygen enriching system including oxygen enriching means operable to enrich said second part of said flow of atmospheric air with oxygen, a motor-driven pumping

means for causing said second flow of atmospheric air to pass through said oxygen enriching means, piping means for carrying said second part of the flow of air via said pumping means and said oxygen enriching means to said first outlet port, and fan means for causing said flow of atmospheric air generally directed from said intake opening of said outer casing means toward said exhaust opening;

soundproof box means defining an impervious-to-sound chamber, said motor-driven pumping means and said fan means being completely accommodated within said chamber, the box means having an inlet port communicating with said intake opening for permitting said atmospheric air to flow into said chamber and a separate outlet port communicating with said exhaust opening for permitting said first part of the flow of atmospheric air to exit from the outer casing means after cooling said motor-driven pumping means and said fan means;

elongated air intake passage means formed within said outer casing means for restrictively guiding said flow of atmospheric air from said intake opening to said inlet port, said intake passage means having bends at at least five positions, each of said positions being lined with sound absorbing material; and

elongated air exhaust passage means formed within said outer casing means for restrictively guiding said first part of the flow of atmospheric air from said separate outlet port of said soundproof box means to said exhaust opening, said air exhaust passage means having a plurality of partition plates such that the exhaust passage means includes bends at at least five positions, each of said partition plates being lined with sound absorbing material.

#### 4,789,389 METHOD FOR PRODUCING ULTRA-HIGH PURITY, OPTICAL QUALITY, GLASS ARTICLES

Paul M. Schermerhorn, Painted Post; Michael P. Teter, and Robert V. Vandewoestine, both of Corning, all of N.Y., assignors to Corning Glass Works, Corning, N.Y.

Filed May 20, 1987, Ser. No. 52,619  
Int. Cl. C03B 37/023, 37/016, 19/06

U.S. Cl. 65-3.12

33 Claims



1. A method for producing a fused silica glass article comprising the steps of:

- (a) preparing a solution which contains at least one silicon-containing organic compound having the formula  $\text{Si}(\text{OR})_4$  or  $\text{SiR}(\text{OR})_3$ , where R is an alkyl group;
- (b) polymerizing the silicon in the solution to form a  $\text{SiO}_2$  gel;
- (c) drying the gel at a rate which causes the gel to fragment into granules having a mean particle size less than about one millimeter;
- (d) sintering the granules at a temperature less than about  $1150^\circ\text{C}$ ., the density of the granules after sintering being approximately equal to their maximum theoretical density;
- (e) forming a green body from the sintered granules;
- (f) drying and partially sintering the green body in a chamber by (i) raising the temperature of the chamber to above about  $1000^\circ\text{C}$ ., and (ii) introducing chlorine gas into the

chamber and/or subjecting the chamber to a vacuum and/or purging the chamber with an inert gas; and (g) fully sintering the green body in a chamber by raising the temperature of the chamber to a temperature above about  $1720^\circ\text{C}$  while purging the chamber with helium or applying a vacuum to the chamber.

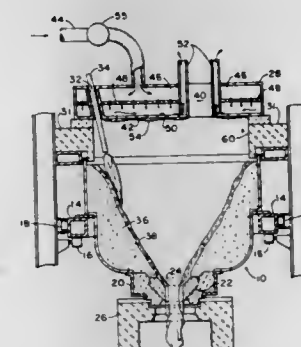
#### 4,789,390 BATCH MELTING VESSEL LID COOLING CONSTRUCTION

Gerald E. Kunkle, New Kensington; George A. Pecoraro, Lower Burrell, and Henry M. Demarest, Jr., Natrona Heights, all of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 927,567, Nov. 6, 1986, abandoned. This application Jul. 1, 1987, Ser. No. 68,375  
Int. Cl. C03B 5/10

U.S. Cl. 65-27

14 Claims



1. In a method of liquefying pulverulent batch material including the steps of depositing said material into an enclosed heating vessel along a sloped surface substantially encircling a cavity in said vessel, raising the temperature within said vessel with a high velocity combustion type heating means to liquefy said material wherein said heating means is positioned to direct heat along said sloped surface and exhaust gas from said heating means circulates within said vessel, and removing said exhaust gas from said heating vessel, wherein said circulating exhaust gas includes entrained particulate and molten material resulting from liquefying said batch material having corrosive properties which degrades selected exposed lid surface portions of said vessel as said exhaust gas circulates within said vessel prior to exiting said vessel, the improvement comprising:

cooling said exposed surface to a temperature such that said entrained, circulating particulate and molten materials contacting said cooled surface adhere to said surface and form a protective layer on said surface; and

controlling the cooling of said surface during said cooling step so as to adhere additional materials entrained in said circulating exhaust gas to said materials previously adhered to said surface and adjust the thickness of said layer.

8. In an apparatus for melting material of the type having a heating vessel with a lid, means to deposit said material along a sloped surface substantially encircling a cavity in said vessel, a high velocity combustion type heating means to direct heat along said sloped surface and melt said material wherein exhaust gas from said heating means circulates within said vessel, and means to remove said exhaust gas from said vessel wherein said circulating exhaust gas includes entrained particulate and molten materials resulting from the melting of said material having corrosive properties which degrades selected exposed surface portions of said lid as said exhaust gas circulates within said vessel prior to exiting said vessel, the improvement comprising:

means to cool said exposed lid surface portions such that

entrained circulating particulate and molten materials adhere to said surface forming a protective layer; and means to control said cooling means to adjust the thickness of said protective layer.

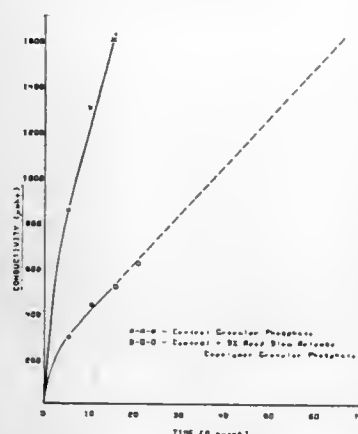
#### 4,789,391 CONTROLLED RELEASE FORMULATION FOR FERTILIZERS

William J. Detroit, Schofield, Wis., assignor to Reed Lignin Inc., Rothschild, Wis.  
Continuation-in-part of Ser. No. 933,765, Nov. 21, 1986, Pat. No. 4,756,738, which is a continuation-in-part of Ser. No. 752,893, Jul. 8, 1985, Pat. No. 4,752,317. This application Apr. 13, 1987, Ser. No. 37,582

The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> C05G 3/00; C05C 9/00, 5/02, 11/00  
U.S. Cl. 71-27 22 Claims

Fig. 1  
SOLUBILITY OF AMMONIUM PHOSPHATE ESTERIS - CONDUCTIVITY  
SOLUTION CONDUCTIVITY MEASUREMENTS



1. A composition of matter, comprising a fertilizer selected from the group consisting of urea, ammonium nitrate, ammonium phosphate, potassium nitrate, potassium sulfate, potassium chloride and mixtures thereof, and a hydrolyzed lignosulfonate-acrylonitrile copolymer matrix capable of providing slow release solubility for the fertilizer, wherein the copolymer matrix is hydrolyzed with an alkali selected from the group consisting of lithium, potassium, ammonium, calcium and sodium hydroxide, said copolymer matrix having a loading of acrylonitrile to lignosulfonate of about 5% to about 200%, and a loading of said hydrolyzed copolymer to said fertilizer of about 2% to about 20%.

#### 4,789,392 FROTH FLOTATION METHOD

Richard R. Klimpel, and Robert D. Hansen, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

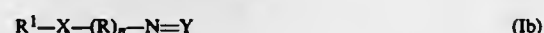
Continuation-in-part of Ser. No. 856,728, Apr. 28, 1986, Pat. No. 4,684,459, which is a continuation-in-part of Ser. No. 803,026, Nov. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 787,199, Oct. 15, 1985, abandoned, which is a

continuation-in-part of Ser. No. 649,890, Sep. 13, 1984, abandoned. This application Feb. 26, 1987, Ser. No. 19,464  
Int. Cl.<sup>4</sup> B03D 1/02

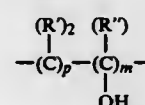
U.S. Cl. 209-166 13 Claims

1. A method of recovering metal-containing mineral values from a metal ore which comprises subjecting the metal ore, in the form of an aqueous pulp, to a froth flotation process in the presence of a floating amount of a flotation collector under conditions such that the metal-containing mineral values are

recovered in the froth, wherein the collector comprises a compound corresponding to the formula:



wherein  $-(R)_n$  is



each  $R'$  and  $R''$  is independently hydrogen, methyl, or ethyl;  $p+m=n$ ;  $n$  is an integer from 1 to 6;  $m$  is 0 or 1 and  $p$  is an integer from 1 to 6 and each moiety can occur in random sequence;  $R^1$  is a  $C_{1-22}$  hydrocarbyl or a  $C_{1-22}$  hydrocarbyl substituted with one or more hydroxy, amino, phosphonyl, alkoxy, imino, carbamyl, carbonyl, cyano, carboxyl, hydrocarbylthio, hydrocarbyloxy, hydrocarbylamino or hydrocarbylimino groups; each  $R^2$  is independently hydrogen, a  $C_{1-22}$  hydrocarbyl or a  $C_{1-22}$  hydrocarbyl substituted with one or more hydroxy, amino, phosphonyl, alkoxy, imino, carbamyl, carbonyl, cyano, carboxyl, hydrocarbylthio, hydrocarbyloxy, hydrocarbylamino or hydrocarbylimino groups;  $-X-$  is  $-S-$  or  $-C(=S)-$ ; and recovering said metal-containing mineral values from said froth.

#### 4,789,393

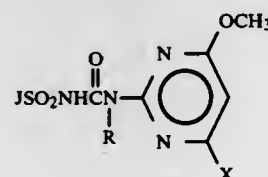
##### HERBICIDAL PYRIDINE SULFONAMIDES

Mary A. Hanagan, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

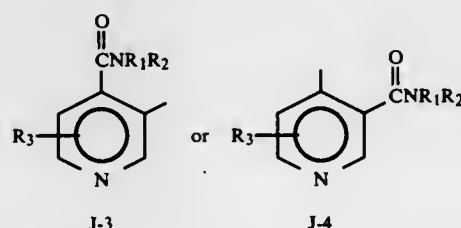
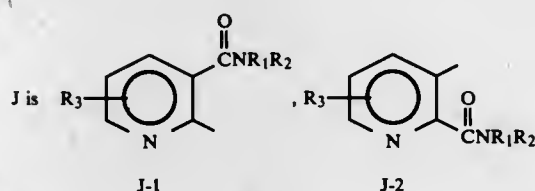
Continuation-in-part of Ser. No. 837,392, Mar. 7, 1986, abandoned. This application Nov. 28, 1986, Ser. No. 936,105  
Int. Cl.<sup>4</sup> C07D 401/12; A01N 43/54

U.S. Cl. 71-92 36 Claims

1. A compound of the formula:



wherein



$R$  is H or  $CH_3$ ;  
 $R_1$  is H or  $C_{1-3}$  alkyl;  
 $R_2$  is  $C_{1-3}$  alkyl or  $C_{1-2}$  alkoxy;  
 $R_3$  is H, Cl, F, Br,  $CH_3$ ,  $CF_3$ ,  $OCH_3$  or  $OCF_2H$ ; and

$X$  is  $CH_3$ ,  $CH_2F$ ,  $CH_2CH_3$ ,  $OCH_3$ ,  $OCH_2CH_3$ , Cl, or  $CH_2OCH_3$ .

28. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of a compound of claim 1.

#### 4,789,394

##### ANNULARLY-LINKED TRIAZOLE COMPOUNDS

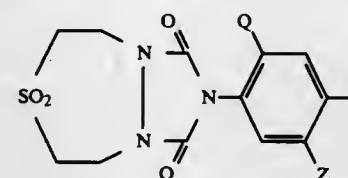
Beat Böhner, Binningen, Switzerland; Georg Pissiotas, Lörrach, Fed. Rep. of Germany, and Hans Moser, Magden, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.  
Filed Jul. 17, 1986, Ser. No. 886,501

Claims priority, application Switzerland, Jul. 24, 1985, 3222/85; Aug. 30, 1985, 3743/85

Int. Cl.<sup>4</sup> A01N 43/90; C07D 513/04

U.S. Cl. 71-76 6 Claims

1. An annularly-linked triazole compound of the formula I



wherein  
 $Q$  is fluorine,  
 $T$  is chlorine or bromine,  
 $Z$  is a radical  $-X-R$ , wherein  
 $X$  is oxygen and  
 $R$  is hydrogen or  $C_{1-6}$  alkyl which is unsubstituted or substituted by halogen.

#### 4,789,395

##### 5-SULFUR SUBSTITUTED PYRIDINE MONOCARBOXYLIC HERBICIDES

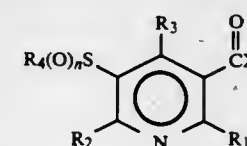
Len F. Lee, St. Charles; Kerry L. Spear, St. Louis, both of Mo., and Mark G. Dolson, San Pablo, Calif., assignors to Monsanto Company, St. Louis, Mo.

Filed May 12, 1986, Ser. No. 862,340

Int. Cl.<sup>4</sup> A01N 43/40; C07D 213/55

U.S. Cl. 71-94 24 Claims

1. A compound represented by the generic formula



wherein:

$n$  is from 0 to 2 inclusive;  $X$  is selected from the group consisting of a halogen, hydroxy, lower alkoxy, lower alkenoxy, lower alkynoxy, haloalkoxy, haloalkenoxo, and alkylthio;

$R_1$  and  $R_2$  are independently selected from fluorinated methyl and chlorofluorinated methyl radicals, provided that one of  $R_1$  and  $R_2$  must be fluorinated methyl;

$R_4$  is selected from lower alkyl, hydrogen,  $C_{4-6}$  cycloalkyl, phenyl, benzyl, cyano, amino, and lower alkylamino;

$R_3$  is selected from hydroxy, lower alkoxy, lower alkylthio, lower alkylsulfonyl, lower alkyl,  $C_{4-6}$  cycloalkyl,  $C_{4-6}$  cycloalkyl lower alkyl;

provided that when  $n$  is 0 or 2,  $R_4$  is not phenyl, and further provided that when  $R_3$  is methyl and  $R_4$  is methyl, ethyl, or  $t$ -butyl,  $n$  is not 1 or 2.

#### 4,789,396

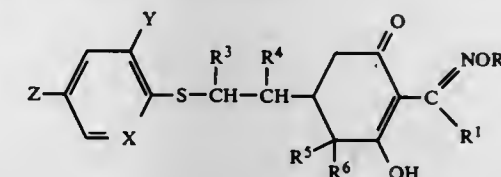
##### CERTAIN PYRIDYL THIO OR PHENYL THIO-ETHANE-1,3-CYCLOHEXANE DIONE-OXIMINO ESTHER HERBICIDES

Kenji Arai; Nobuaki Mito, both of Takarazuka; Kouichi Morita, Toyonaka, and Naonori Hirata, Sakai, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan  
Filed Jul. 9, 1987, Ser. No. 71,662

Claims priority, application Japan, Jul. 9, 1986, 61-161582; Dec. 19, 1986, 61-304821; Dec. 24, 1986, 61-310456  
Int. Cl.<sup>4</sup> A01N 43/40, 33/02; C07D 213/62; C07C 131/00

U.S. Cl. 71-94 21 Claims

1. A compound of the formula



wherein  $R^1$  is a methyl group;  $R^2$  is an ethyl or propyl group;  $R^3$  is a hydrogen atom or a methyl group;  $R^4$  is a hydrogen atom or a methyl group;  $R^5$  is a hydrogen atom or a methyl group;  $R^6$  is a hydrogen atom;  $X$  is a CH group;  $Y$  is a hydrogen atom;  $Z$  is a trifluoromethyl, trifluoromethoxy or 1,1,2,2-tetrafluoroethoxy group; or its alkali, alkaline earth and transition metal, ammonium, tetraalkylammonium or benzyltrialkylammonium salt.

15. A method for controlling weeds, which comprises applying a herbicidally effective amount of the compound according to any one of claims 1-6 and an inert carrier and/or diluent to the area where weeds grow.

#### 4,789,397

##### METHODS OF INDUCING PLANT GROWTH RESPONSES

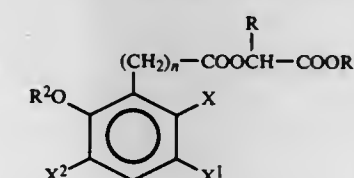
Fred R. Taylor, Wexford, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 28, 1987, Ser. No. 7,552

Int. Cl.<sup>4</sup> A01N 37/10

U.S. Cl. 71-107 10 Claims

1. A method of inducing growth response, other than inhibition of meristematic activity, in fruit bearing plants by applying to the fruit or to the plant prior to harvest a growth response inducing amount of a compound of the formula:



wherein

$X$ ,  $X^1$  and  $X^2$  are hydrogen or halogen provided that  $X$  and  $X^2$  or  $X^1$  and  $X^2$  must be halogen;

$R$  is hydrogen or  $C_1$  to  $C_6$  alkyl;

$R^1$  is hydrogen or  $C_1$  to  $C_{10}$  alkyl, haloalkyl or alkoxyalkyl, alkali metal or ammonium;

$n$  is 0 or 1; and  
 $R^2$  is  $C_1$  to  $C_4$  alkyl.



4,789,398

**FLOWER-THINNING AGENT FOR FRUIT TREES**

Toshihiko Yamazaki; Shoji Murase, both of Ibaragi, and Tatsuro Motoshiki, Tokyo, all of Japan, assignors to The Director, Fruit Tree Research Station, Ministry of Agriculture, Forestry and Fisheries Government of Japan, Ibaragi and Ajinomoto Co., Inc., Tokyo, both of Japan

Filed Mar. 25, 1986, Ser. No. 843,679

Claims priority, application Japan, Apr. 2, 1985, 60-68429

Int. Cl.<sup>4</sup> A01N 31/00

U.S. Cl. 71-122

4 Claims

1. A method for thinning flowers of cultivated fruit trees, which comprises applying to the flowers and/or to the body of the fruit trees an effective amount of a flower-thinning composition comprising cholesterol.

4,789,401

**SOLUBLE COLLAGEN SPONGE**

Jürgen Ebinger, Eppstein; Rolf-Dieter Beutler, Frankfurt am Main, and Helmut Lindner, Grasellenbach, all of Fed. Rep. of Germany, assignors to Merz+Co. GmbH & Co., Frankfurt am Main, Fed. Rep. of Germany

Filed Jun. 20, 1986, Ser. No. 876,824

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1985, 3522626

Int. Cl.<sup>4</sup> C08L 89/06; A61F 13/16

U.S. Cl. 106-122

9 Claims

1. A collagen sponge, characterized by the fact that it has a denaturation temperature of at least 37° C., is not cross-linked and has a density of 15 to 35 mg/cm<sup>3</sup>.

4,789,402

**MANNICH REACTION PRODUCT AS ASPHALT ANTISTRIPPING AGENT**

Joseph L. Kostusyk, Euclid, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Apr. 10, 1987, Ser. No. 36,636

Int. Cl.<sup>4</sup> C08L 95/00; C10C 3/02

U.S. Cl. 106-273.1

21 Claims

1. A method for improving antistripping properties of an asphalt comprising adding to the asphalt in an amount in the range of about 0.1% to about 5% by weight based on the weight of the asphalt, a compound produced by reacting (A) an amine, (B) an aldehyde or aldehyde reaction synthon, and (C) an alkylated phenol wherein the molar ratio of (A):(B):(C) is in the range of (1):(1-8):(1-30).

4,789,403

**SURFACE MODIFIED LAYERED LATTICE SILICATE PIGMENTS**

Camilla A. Rice, Sandersville, Ga., assignor to E.C.C. America Inc., Atlanta, Ga.

Continuation-in-part of Ser. No. 887,320, Jul. 22, 1986, abandoned. This application Dec. 17, 1986, Ser. No. 943,669

Int. Cl.<sup>4</sup> C09C 3/08, 1/28; C04B 14/04

U.S. Cl. 106-417

7 Claims

1. A method of producing a layered lattice silicate which is surface modified with an organic material, wherein the silicate is substantially dry, particulate form is contacted with an organic monomer, co-monomers, or a prepolymer, in the presence of gaseous hydrogen.

4,789,404

**SOFT TEXTURED HIGH STRENGTH ALKALI BLUE PIGMENT AND PROCESS FOR PREPARING THE SAME**

Doreswamy R. Iyengar, Ann Arbor, and James J. Krikke, Hudsonville, both of Mich., assignors to BASF Corporation, Parsippany, N.J.

Filed Sep. 17, 1986, Ser. No. 908,217

Int. Cl.<sup>4</sup> C04B 14/00

U.S. Cl. 106-408

13 Claims

1. A process for preparing a soft textured high strength Alkali Blue pigment toner comprising preparing an initial mixture from an alkali metal hydroxide, Alkali Blue pigment, resin, oil or varnish, free fatty acid and water, so that a spontaneous emulsion forms, and subsequently adding a mineral acid to said emulsion to precipitate the pigment product.

4,789,399

**PRESSURIZED ROLLER PENS AND INKS FOR SUCH PENS**

Raymond S. Williams, Boulder City, and Paul C. Fisher, 711 Yucca St., Boulder City, Nev. 89005, assignors to Paul C. Fisher, Boulder City, Nev.

Continuation-in-part of Ser. No. 701,509, Feb. 14, 1985, abandoned, which is a continuation-in-part of Ser. No. 548,554, Nov. 3, 1983, abandoned, which is a continuation of Ser. No. 240,187, Mar. 3, 1981, abandoned. This application Oct. 20, 1986, Ser. No. 920,429

Int. Cl.<sup>4</sup> C09D 11/00, 11/02, 11/16

U.S. Cl. 106-20

10 Claims

1. A ball-point marking instrument including a sealed marking fluid reservoir having a socket located at one end thereof; a ball rotatably mounted within said socket so as to extend into the interior of and to the exterior of said reservoir; a marking fluid within said fluid reservoir in contact with said ball; a charge of pressurized gas within said reservoir at the extremity remote from the socket, said pressurized gas serving to force said marking fluid against said ball, said marking fluid comprising from about 1% to about 6% by weight of a polyacrylic resin polymer, at least about 5% by weight of at least one solvent of high polarity, at least one solvent of low or medium polarity, about 1% to about 10% colloidal silica, and at least one coloring agent, said marking fluid having a thixotropic ratio in the range of about 25:1 to about 150:1 measured on a Brookfield HBT viscometer at 25° C., using either a No. 6 or No. 7 spindle, and a viscosity less than about 40,000 cps measured with a Brookfield HBT viscometer using a No. 6 spindle at 25° C. at 100 rpm.

4,789,400

**WATERFAST INK JET COMPOSITIONS AND PROCESS**

Warren E. Solodar, Rochester; Henry R. Kang, Fairport, and Joseph R. Weber, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jul. 10, 1987, Ser. No. 71,827

Int. Cl.<sup>4</sup> C09D 11/02

U.S. Cl. 106-22

25 Claims

1. A waterfast ink jet composition comprised of a major amount of water, a hydroxypropylated polyethyleneimine with a weight average molecular weight of from about 1,000 to about 10,000, and a dye component, and wherein the ink has a viscosity of from about 1 to about 5 centipoise.

4,789,405

**METHOD OF AND ARRANGEMENT FOR CLEANING, ACTIVATING AND METALLIZING OF BORE HOLES IN CONDUCTOR BOARDS**

Horst Bläsing, and Walter Meyer, both of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

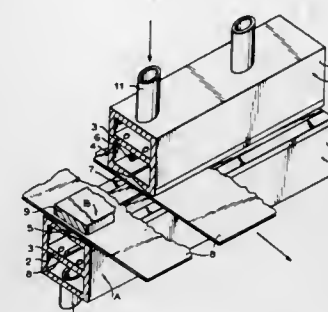
Filed Aug. 4, 1986, Ser. No. 893,563

Claims priority, application Fed. Rep. of Germany, Aug. 6, 1985, 3528575

Int. Cl.<sup>4</sup> B08B 3/12

U.S. Cl. 134-1

22 Claims



1. A method of cleaning, activating and metallizing of bore holes in conductor boards, comprising the steps of moving a conductor board only horizontally along a transporting path in a transporting direction; and supplying a treatment medium in form of a standing wave onto a lower side of the conductor board through a surge line formed as a nozzle located under the transporting path and substantially normal to the transporting direction of the conductor board.

5. An arrangement for cleaning, activating and metallizing of bore holes in conductor boards, comprising means for moving a conductor board only horizontally along a transporting path; and a surge line which is formed as a nozzle located under said transporting path and substantially normal to the transporting direction, and which is arranged for supplying a liquid treatment medium in form of a standing wave onto a lower side of the conductor board.

4,789,406

**METHOD AND COMPOSITIONS FOR PENETRATING AND REMOVING ACCUMULATED CORROSION PRODUCTS AND DEPOSITS FROM METAL SURFACES**

E. Paul Holder, Spring, Tex.; Frederick C. Klaessig, Doylestown, Pa.; Pamela J. Pearce-Landers, Pottstown, Pa., and David W. Reichgott, Richboro, Pa., assignors to Betz Laboratories, Inc., Trevose, Pa.

Continuation of Ser. No. 898,961, Aug. 20, 1986, abandoned.

This application Jan. 13, 1988, Ser. No. 145,658

Int. Cl.<sup>4</sup> B08B 3/08; C23G 5/032

U.S. Cl. 134-3

2 Claims

1. A method of removing accumulated iron oxide deposits from the metal surfaces in contact with the water of a cooling water system while leaving a protective metal layer intact, said method occurring without shutting the cooling water system down and comprising the steps of:

- maintaining the pH of said water within the range of from about 6.5 to about 7.5 throughout the entire method;
- pretreating said surfaces by adding from about 25-500 ppm of an organic reductant/chelant selected from the group consisting of pyrogallol and methyl gallate to said cooling water, based upon one million parts of said cooling water, for a time sufficient to reduce or complex the iron in said deposits, thereby softening and converting said deposits into a water soluble form;
- subsequently contacting said surfaces with from about 100-2000 ppm of an inorganic reducing agent adapted to

reduce any remaining iron ions and, at the same time, regenerate said organic reductant/chelant;

- maintaining from about 1 to 20 ppm of a surfactant in said water during both said steps (b) and (c) to reduce losses of said organic reductant/chelant and said inorganic reducing agent, and
- blowing down said cooling water to remove said soluble deposits.

4,789,407

**METHOD TO DISSOLVE HYDRATED ALUMINUM HYDROXIDE GEL IN POTABLE HOT WATER HEATERS**

Robert S. Bolko, Glenview, Ill., assignor to Tri-Brothers Chemical Corporation, Northbrook, Ill.

Filed Sep. 10, 1987, Ser. No. 94,845

Int. Cl.<sup>4</sup> B08B 3/08

U.S. Cl. 134-22.1

2 Claims

1. A method of dissolving aluminum hydroxide gel formed in situ in water heaters having aluminum anode rods therein, comprising contacting the aluminum hydroxide gel with phosphoric acid, said phosphoric acid being present in the range of from about 9% to about 35% by volume at a temperature in the range of from about 138° F. to about 160° F.

4,789,408

**SOLAR COLLECTOR**

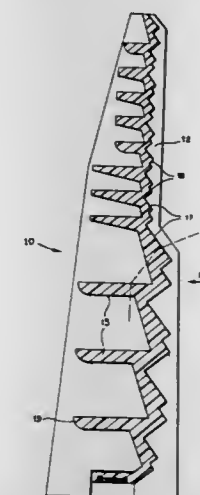
James W. Fitzsimmons, 4 Bainbridge Ave., Melville, N.Y. 11747

Filed Nov. 25, 1986, Ser. No. 934,857

Int. Cl.<sup>4</sup> H02N 6/00

U.S. Cl. 136-246

20 Claims



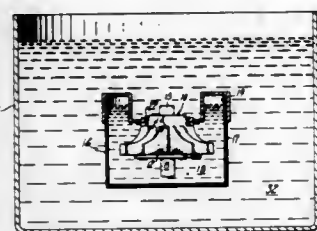
1. A photovoltaic device for converting solar radiation to electrical energy, comprising a collector member having two side edges, a top end, a bottom end, a front side which comprises a corrugated surface that refracts radiation, a rear side which comprises a plurality of fins protruding outwardly from said collector member, said front and rear sides acting in cooperation to refract and concentrate radiation, and at least one photovoltaic cell being adapted to receive and convert solar radiation to electrical energy mounted at one end of said collector member in a position such that at least some of the radiation refracted and concentrated by said collector member will impinge on said photovoltaic cell.

**4,789,409**  
**BLACK CONVERSION COATING**  
 Paul R. Jarvi, Orange, Conn., assignor to Mitchell Bradford International Corp., Milford, Conn.  
 Filed Dec. 5, 1986, Ser. No. 938,552  
 Int. Cl.<sup>4</sup> C23C 22/58

U.S. Cl. 148—6.24 14 Claims  
 1. A non electrolytic conversion coating composition which forms a black surface comprising sodium thiosulfate, a nickel-containing compound, zinc sulfate (monohydrate) and a fluoride compound.

**4,789,410**  
**METHOD FOR HEAT TREATING AND QUENCHING COMPLEX METAL COMPONENTS USING SALT BATHS**  
 Robert J. Parizek, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.  
 Filed Mar. 3, 1987, Ser. No. 21,084  
 Int. Cl.<sup>4</sup> C21D 1/46

U.S. Cl. 148—20 6 Claims



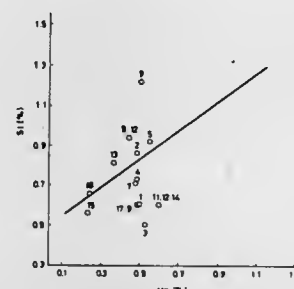
1. A method for heating and cooling a metal component, comprising the steps of disposing the component in a first salt bath within a first container; heating the first container to a temperature  $T_1$ , wherein the first salt bath and component therein are raised to the temperature  $T_1$ ; and cooling the first container and the first salt bath and component therewithin by immersing the first container in a second salt bath within a second container such that a portion of the component is in direct contact with the second salt bath, wherein the second salt bath is at a temperature  $T_2$  less than  $T_1$ , and wherein the first salt bath and component therein are cooled to temperature  $T_2$ .

**4,789,411**  
**CONDUCTIVE COPPER PASTE COMPOSITION**  
 Kazumasa Eguchi, Nara; Fumio Nakatani, Yamatokoriyama; Shinichi Wakita, Akashi; Hisatoshi Murakami, Higashiosaka, and Tanechiko Terada, Ikeda, all of Japan, assignors to Tatsuta Electric Wire and Cable Co., Ltd., Osaka, Japan  
 Filed Mar. 24, 1987, Ser. No. 29,830  
 Claims priority, application Japan, Mar. 31, 1986, 61-75302; Mar. 31, 1986, 61-75303; Apr. 24, 1986, 61-95809; May 17, 1986, 61-113197; May 17, 1986, 61-113198  
 Int. Cl.<sup>4</sup> B23K 35/34

U.S. Cl. 148—24 26 Claims  
 1. A conductive copper paste composition for application to an insulation substrate to form conductive circuit comprising a copper metal powder, a resin component including a thermosetting resin, a fatty acid or a metal salt thereof assisting in the uniform dispersion of said copper metal powder into said resin component, a metal chelating agent and a soldering accelerator.

**4,789,412**  
**COBALT-BASE ALLOY HAVING HIGH STRENGTH AND HIGH TOUGHNESS, PRODUCTION PROCESS OF THE SAME, AND GAS TURBINE NOZZLE**  
 Shigeoaki Nakamura, Katsuta; Tetsuo Kashimura, Hitachi; Nobuyuki Iizuka, Hitachi; Yutaka Fukui, Hitachi; Minoru Morikawa, Katsuta, and Soichi Kuroawa, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Mar. 19, 1987, Ser. No. 28,085  
 Claims priority, application Japan, Mar. 20, 1986, 61-60577  
 Int. Cl.<sup>4</sup> C22C 19/07

U.S. Cl. 148—408 11 Claims



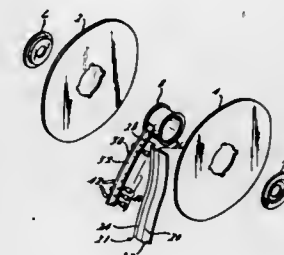
1. A cobalt-base alloy having a high strength and a high toughness in the form of a casting, said alloy consisting essentially of 0.2 to 1% by weight of carboxy 0.4 to 2% by weight of silicon, 0.2 to 1.5% by weight of manganese, 5 to 15% by weight of nickel, 20 to 35% by weight of chromium, 3 to 15% by weight of tungsten, 0.003 to 0.1% by weight of boron, 0.05 to 1% by weight of niobium, 0.01 to 1% by weight of titanium, 2% by weight or lower of iron, 30 ppm or lower of oxygen and 100 ppm or lower of nitrogen with the balance being 45% by weight or higher of cobalt, wherein the content of the silicon is larger than a value of a silicon content (Si) obtained from a manganese content (Mn) by the following equation:  $Si (wt \%) = 0.7 \times Mn (wt \%) + 0.48$ , and said alloy has a structure containing a eutectic carbide and a secondary carbide dispersed therein.

**4,789,413**  
**PROCESS FOR PREPARING A GAS PERMEABLE ADHESIVE TAPE**  
 Naoyuki Tani, Hiranomiyu; Motomu Ueno, Chihayaakasaki; Kusutaro Yoshida, Sakai, and Yuki Mizukami, Hirakata, all of Japan, assignors to Sankyo Chemical Co., Ltd., Kashihara, Japan  
 Filed Jun. 10, 1986, Ser. No. 872,603  
 Claims priority, application Japan, Jun. 12, 1985, 60-127851  
 Int. Cl.<sup>4</sup> B32B 5/18, 31/00; B29D 1/00; C09J 7/02

U.S. Cl. 156—77 18 Claims  
 1. A process for preparing permeable adhesive tapes comprising applying an homogeneous dispersion of water and a water absorptive high-molecular weight compound in a solution comprising an acrylic pressure sensitive adhesive agent in an organic solvent onto a sheet having a surface provided with a releasing agent, wherein said dispersion comprises water in an amount within the range of 5–40 parts by total weight of said solution, drying said sheet, and laminating a porous backing material on said surface of said sheet to obtain a permeable adhesive tape.

**4,789,414**  
**METHOD AND APPARATUS FOR MAINTAINING WIRE LEAD PROTECTION OF COMPONENTS ON A STORAGE REEL**  
 Rodney L. Ritter, Woodhaven, Mich.; John F. Crake, Ajax, and Tony Lacza, Agincourt, both of Canada, assignors to Ford Motor Company, Dearborn, Mich.  
 Filed Feb. 11, 1987, Ser. No. 13,492  
 Int. Cl.<sup>4</sup> B65D 73/02

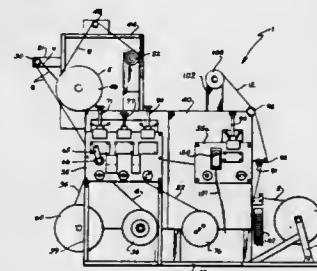
U.S. Cl. 156—184 11 Claims



1. A method of protecting the predetermined lead wire orientation of electrical components having known thickness dimensions wound onto a reel including the steps of: providing a tape reel with a pair of opposing planar rigid wheels separated by a predetermined distance and a central axle joining the wheels; attaching the lead wires of each component in a predetermined orientation to a first flexible tape material having a width dimension that is less than said predetermined distance; providing a second flexible tape having a spacer portion in which the spacer portion runs in the length direction of the tape and has a thickness dimension that is at least equal to the thickness dimension of the components attached to the first tape; attaching said component bearing first tape to said central axle; aligning said spacer portion of said second tape to overlay only the lead wires of said components; and winding said first tape bearing said components, and said overlaying second tape onto said reel to thereby provide each wound layer of components separated each from the other by said second tape.

**4,789,415**  
**PHARMACEUTICAL PACKAGING MACHINE**  
 Adrian L. Faasse, Jr., 4908 Stauffer Ave., S.E., Kentwood, Mich. 49508  
 Division of Ser. No. 743,419, Jun. 11, 1985, Pat. No. 4,664,736, which is a continuation of Ser. No. 460,582, Jan. 24, 1983, Pat. No. 4,556,441. This application Feb. 9, 1987, Ser. No. 12,429  
 Int. Cl.<sup>4</sup> B32B 31/18

U.S. Cl. 156—519 24 Claims

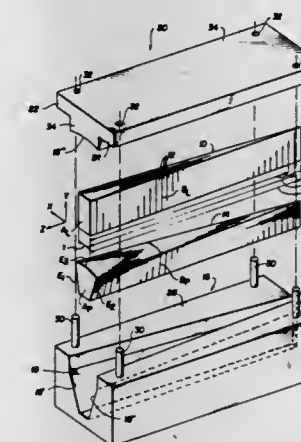


1. An apparatus for making base assemblies for medicine dispensing compresses, comprising:

means for feeding a web of impermeate material into said apparatus;  
 means for feeding a web of backing material into said apparatus, the backing material having a base layer with one adhesive side, and a cover layer normally overlying the adhesive side of the base layer;  
 means for separating the cover layer from the base layer of the backing material;  
 means for continuously cutting a plurality of individual dam patches from the web of impermeate material as the impermeate material is fed through said apparatus;  
 means for continuously applying the dam patches to the adhesive side of the base layer as the base layer is fed through said apparatus;  
 means for applying a length of the cover layer to the remaining exposed portion of the adhesive side of the base layer, such that the dam patches are sandwiched between the base layer and the cover layer;  
 means for cutting a plurality of individual base units in the base layer, with one of the dam patches positioned within each of the base units, and wherein that portion of the base layer disposed outside of the base units defines an offal portion of the base layer;  
 means for cutting a plurality of apertures in the cover layer to selectively access a portion of the interior surface of each of the dam patches, said cutting means locating said apertures at each of those areas of the cover layer overlying the dam patches, and positioning the apertures wholly within the marginal edge of the associated adjacent dam patch to facilitate centering medicine-filled pads on the interior of the dam patches; and  
 means for removing the offal portion of the base layer from the cover layer, thereby forming a plurality of base assemblies for the compresses, which are carried together on the cover layer for final assembly.

**4,789,416**  
**METHOD OF MANUFACTURING A PREFORM FROM FIBER REINFORCED COMPOSITE MATERIAL**  
 Robert J. Ford, Bromall, Pa., assignor to The Boeing Company, Seattle, Wash.  
 Continuation of Ser. No. 278,925, Jun. 30, 1981, abandoned.  
 This application Jan. 19, 1983, Ser. No. 459,176  
 Int. Cl.<sup>4</sup> B32B 31/00, 31/04

U.S. Cl. 156—222 14 Claims



1. A method of manufacturing a preform with a tool and from uncured multiple laminates of resin impregnated fiber reinforced composite material, said preform having an irregular shape such that at least one edge of any transverse cross-section thereof varies along its length with respect to a reference co-ordinate set of axes, and further such that the cross-sectional area of every cross section of the preform along the



length of the preform, and therefore its volume, is predetermined, said tool including a part having a cavity which defines at least part of the shape of the preform, comprising the steps of:

- forming a layup to a length substantially equal to that of the preform from uncured multiple laminates of resin impregnated fiber reinforced composite material, said uncured multiple laminate layup when formed having a regular shape such that no edge of any transverse cross-section of the layup varies along its length with respect to said reference co-ordinate set of axes, such that the cross-sectional area of every cross-section of the layup along the length of the layup is substantially equal to a cross-sectional area of a corresponding cross section of the preform, and further such that the volume of the layup is substantially equal to the volume of the preform;
- placing the layup in the cavity of said tool; and
- applying pressure to the tool to cold compact or coin the layup to fill the cavity thereby transforming the layup into the shape of the preform.

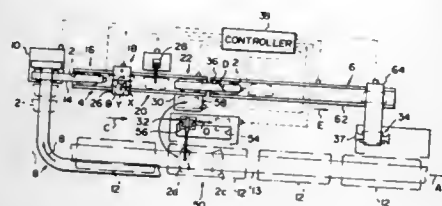
4,789,417

**VEHICLE WINDOWPANE MOUNTING SYSTEM**  
Masao Kobayashi, Takashi Senba, Hisao Miyahara, Kunzi Kimura, and Shunji Sakamoto, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan  
Filed Oct. 27, 1986, Ser. No. 923,228  
Claims priority, application Japan, Oct. 29, 1985, 60-242503; Oct. 30, 1985, 60-243625

Int. Cl. B05B 15/10

U.S. Cl. 156—356

6 Claims



1. A windowpane mounting system for mounting windowpanes on a vehicle body comprising a vehicle body conveyor means for intermittently feeding the vehicle body, and a windowpane mounting robot for mounting a windowpane on the vehicle body stopped at a windowpane mounting station, said windowpane mounting robot being movable between (a) a first mounting position for mounting one of the windowpanes for the windshield and the rear window and (b) a second mounting position for mounting the other windowpane, the first mounting position being further than the second mounting position from a windowpane supply station at which the windowpane mounting robot receives the windowpanes, and is arranged to perform a mounting operation at the first mounting position in response to the feeding of the vehicle body to said windowpane mounting station by the vehicle body conveyor means; said one of the windowpanes and said other windowpane being fed to the windowpane mounting station mingled with each other by a first windowpane conveyor means, an adhesive application means for applying adhesive on one side of the bonding type windowpane being disposed upstream of said windowpane mounting station, said windowpane mounting robot being adapted to mount only a bonding type windowpane, and a second windowpane conveyor means which is connected to the downstream end of the first windowpane conveyor to normally receive seal rubber type windowpanes from the first windowpane conveyor means and to feed them to a seal-rubber-type-windowpane mounting station, and is adapted to receive the bonding type windowpanes in addition to the seal rubber type windowpanes from the first window-

pane conveyor means and feed them to the seal-rubber-type windowpane mounting station.

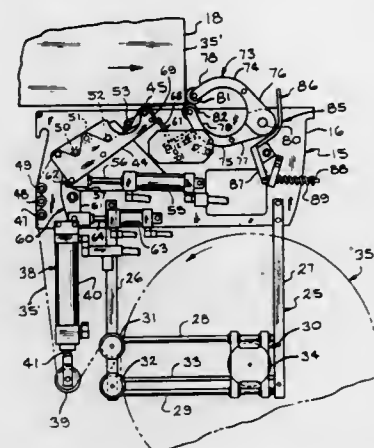
4,789,418

**TAPE MACHINE**

Waldo G. Rayl, Ada, Ohio, assignor to Gasdorf Tool & Machine Co., Inc., Lima, Ohio  
Filed Nov. 19, 1987, Ser. No. 122,793  
Int. Cl. B32B 31/00

U.S. Cl. 156—468

16 Claims



1. A tape machine for applying tape to a carton assembly moving along a predetermined path, including at least one sidewall, a tape assembly depending from said sidewall, a stripper assembly mounted adjacent said tape assembly, a tape head pivotally mounted adjacent such predetermined path, a trigger assembly operatively connected to said tape head, said trigger assembly including a trigger member operatively connected to said tape head for retarding pivoting of said tape head in one position and releasing said tape head for pivoting when in a second position, means operatively connected to said trigger member for moving said trigger member between such first and second positions, a knife means mounted adjacent said tape head for severing the tape and a wipe down assembly adjacent said path for pressing tape against such carton assembly.

4,789,419

**APPARATUS FOR APPLYING DECORATIVE ELEMENTS**

Walter Hermann, Hard, Austria, assignor to Oehler AG, Au, Switzerland  
PCT No. PCT/EP86/00410, § 371 Date Mar. 16, 1987, § 102(e) Date Mar. 16, 1987, PCT Pub. No. WO87/00403, PCT Pub. Date Jan. 29, 1987

PCT Filed Jul. 10, 1986, Ser. No. 34,158

Claims priority, application Switzerland, Jul. 17, 1985, 3103/85

Int. Cl. B65B 27/08

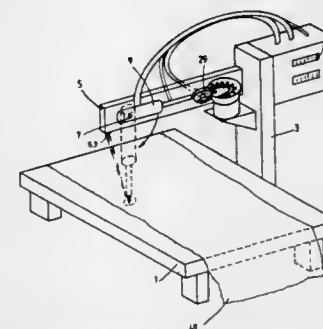
U.S. Cl. 156—499

3 Claims

1. Apparatus for applying decorative elements which are covered with a hot adhesive on one side to a flat article lying on a table, comprising a heating element for heating the hot adhesive and a means for pressing the decorative element on the flat article characterized by the combination of the following features:

- (a) a gripper (9) with a punch member (15), the gripper being arranged above the table (1) on a horizontal axis (7) and being pivotable by means of drive member (21) into an upper and a lower limit position,
- (b) a shaker device (23) for isolating the individual decorative elements,

(c) a rotatable disc (29) which is arranged between the tip of the punch member in the upper limit position of the gripper and the shaker device and which engages into the shaker device and which has a bore (31) terminating at its periphery and communicating with a suction source for sucking thereagainst and holding thereat a decorative element (47) which is isolated in the shaker device (23),



- (d) wherein a decorative element can be guided from the shaker device to the tip of the punch member (15) by a rotary movement of the disc (29) and from there can be guided on to the flat article by pivotal movement of the gripper into the lower limit position, and
- (e) a heating element (44) with a heating plate (45) arranged under the gripper (9) in an opening (43) in the table (1).

4,789,420

**CREDIT CARD EMBOSSING SYSTEM**

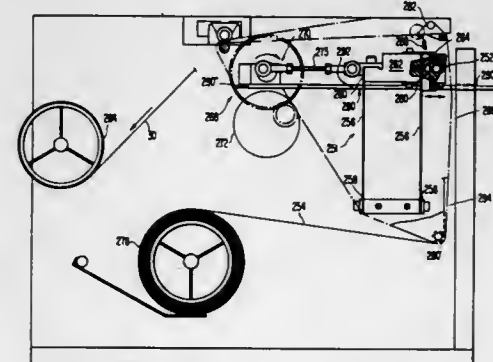
Richard J. LaManna, Whippany, James L. Hinton, Short Hills, both of N.J., and Edward L. Cucksey, Upper Nyack, N.Y., assignors to National Business Systems, Inc., Ontario, Canada  
Division of Ser. No. 820,705, Jan. 21, 1986, Pat. No. 4,686,898.  
This application Apr. 24, 1987, Ser. No. 42,427

Int. Cl. E05G 15/00

U.S. Cl. 156—540

26 Claims

**MICROFICHE APPENDIX INCLUDED**  
(2 Microfiche, 153 Pages)



1. A topper for applying a topping to embossed cards comprising:

- (a) a card transporting means for moving cards from a wait station to a topping station where topping is applied to characters on embossed cards;
- (b) a support surface having a first end and a second end, the support surface being rigid with respect to force applied between the first and second ends in a direction which is orthogonal to a surface of the card having the embossed characters;
- (c) a flat surface for rigidly supporting a back surface of an

embossed card located at the topping station and connected to the first end of the support surface, the back surface being the surface of the embossed card to which topping is not applied;

- (d) a heated platen which is movable from a first position remote from the surface of the card which has the embossed characters to be topped to a second position at which a surface of the platen forces a topping bearing foil into contact with the embossed characters to heat fuse the topping to the embossed characters, the platen having a face which contacts the topping bearing foil in the second position and which is substantially parallel to the flat surface in moving from the first position to the second position;
- (e) a suspension for supporting the platen including a base having first and second ends, first and second parallel flexible members which have a cross section with an elongated dimension being orthogonal to the direction of motion between the first and second positions and which have first and second ends, the first ends of the first and second flexible members being connected respectively to the first and second ends of the base;
- (f) an attachment plate carried by the platen having first and second parallel ends, the first and second ends of the attachment plate being respectively connected to the second ends of the first and second flexible members;
- (g) means for moving the platen from the first position to the second position which causes the flexible members to bend while maintaining a substantially parallel relationship with each other and the surface of the platen substantially parallel to the support surface during movement from the first position to the second position, the means for moving the platen having a movable member which is connected to the platen and being connected to the second end of the support surface; and
- (h) a source for providing the topping bearing foil between the surface of the platen and the support surface.

4,789,421

**GALLIUM ARSENIDE SUPERLATTICE CRYSTAL GROWN ON SILICON SUBSTRATE AND METHOD OF GROWING SUCH CRYSTAL**

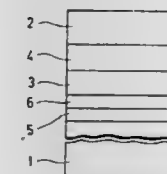
Masayoshi Umeno; Shiro Sakai, both of Nagoya, and Tetsuo Soga, Nakatsugawa, all of Japan, assignors to Daidotokushuko Kabushikikaisha, Japan

Filed Sep. 27, 1985, Ser. No. 780,910

Claims priority, application Japan, Oct. 9, 1984, 59-213188  
Int. Cl. C30B 29/40

U.S. Cl. 156—610

11 Claims



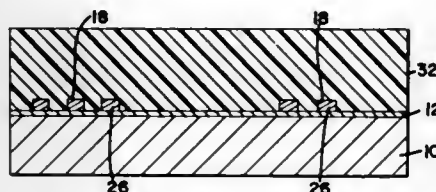
1. A superlattice crystal comprising a Si substrate layer, a GaAs layer and intermediate layer to absorb lattice mismatching between the Si substrate layer and the GaAs layer, the intermediate layer means comprising at least two differently-constituted superlattices, the constituent super lattice layers being those of sequentially-disposed and differently constituted superlattices which in combination absorb said lattice mismatching.

4,789,422  
**ALUMINUM BORATE FIBERS**  
 Chankya Misra, Pittsburgh, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.  
 Filed Sep. 26, 1986, Ser. No. 912,388  
 Int. Cl.<sup>4</sup> C30B 7/10  
 U.S. Cl. 156—623 R



19. The method of making aluminum borate single crystal fibers having a length in the range of 20 to 2000 microns and a diameter of 1 to 10 microns and having a composition  $x\text{Al}_2\text{O}_3 \cdot y\text{B}_2\text{O}_3$  where  $x$  is in the range of 4 to 9 and  $y$  is in the range of 2 to 5, the method comprising the steps of preparing an aluminum borate gel by reacting an aluminum salt selected from aluminum sulfate, aluminum nitrate and aluminum chloride in solution with ammonium diborate, the reaction carried out at a temperature in the range of 20° to 100° C. and the aluminum salt being present in the solution in the range of 5 to 25 wt. % and the ammonium diborate being present in solution in the range of 5 to 25 wt. %, heating the gel to a temperature in the range of 350° to 500° C. at a pressure in the range of 2,000 to 10,000 psig to form aluminum borate fibers.

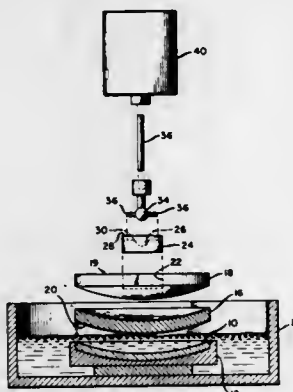
4,789,423  
**METHOD FOR MANUFACTURING MULTI-LAYER PRINTED CIRCUIT BOARDS**  
 Peter P. Pelligrino, Apple Valley, Minn., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
 Continuation of Ser. No. 778,318, Sep. 20, 1985, abandoned, which is a division of Ser. No. 571,139, Jan. 13, 1984, Pat. No. 4,606,787, which is a continuation of Ser. No. 354,736, Mar. 4, 1982, abandoned. This application Apr. 27, 1987, Ser. No. 45,251  
 Int. Cl.<sup>4</sup> B44C 1/22; C23F 1/02; C03C 15/00, 25/06  
 U.S. Cl. 156—631 11 Claims



1. A method for fabricating multiple layer printed circuit board packages, comprising the steps of:
- (a) fabricating a plurality of printed circuit board layers, wherein each layer is formed by embedding a conductive circuit pattern in an insulator material base such that the exposed surface of the pattern lies flush and coplanar with the surface of the base, and wherein said conductive circuit patterns are treated with a chemical conversion coating to provide an enhanced bond between said conductive circuit patterns and the insulator material bases in which they are embedded;
  - (b) stacking a plurality of said circuit board layers on top of each other;
  - (c) placing a layer of insulator material between each of said stacked printed circuit board layers;
  - (d) bonding the stack of circuit boards and interposed layers

of insulator material together to form a multiple layer printed circuit board package.

4,789,424  
**APPARATUS AND PROCESS FOR OPTIC POLISHING**  
 Frank Fornadel, 407 Nixon Ave., Bayville, N.J. 08721, and George Clement, 4 Paderewski Dr., Oak Ridge, N.J. 07438  
 Filed Dec. 11, 1987, Ser. No. 131,727  
 Int. Cl.<sup>4</sup> B44C 1/22; B24B 1/00, 7/19, 7/30  
 U.S. Cl. 156—637 9 Claims



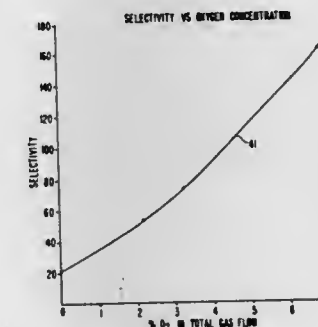
1. A method of polishing spherical and flat optics to better than one/ten wave surface comprising:
- forming a pitch lap to the configuration of said optic;
  - positioning a cross hatched nonabrasive screen between said pitch lap and said optic;
  - compressing said pitch lap onto said optic to impart cross hatched indentations on said pitch lap;
  - removing said cross hatched plastic screen;
  - cutting said pitch lap radially from the center to the edge with a plurality of cuts;
  - positioning said cross hatched surface of said pitch lap against said optic;
  - submerging said optic and said pitch lap in a polishing compound;
  - securing said pitch lap to a stroke spindle;
  - displacing said pitch lap laterally across said optic by means of said stroke spindle;
  - simultaneously rotating said pitch lap;
  - simultaneously rotating said optic in a direction opposite to rotation of said pitch lap.

4,789,425  
**THERMAL INK JET PRINTHEAD FABRICATING PROCESS**  
 Donald J. Drake, Rochester; William G. Hawkins, Webster; Stephen F. Pond, Pittsford; Michael R. Campanelli, Webster; Pamela J. Hartman, Hilton, and Raymond E. Bailey, Webster, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.  
 Filed Aug. 6, 1987, Ser. No. 82,417  
 Int. Cl.<sup>4</sup> B23P 15/00; G01D 15/16  
 U.S. Cl. 156—644 7 Claims

1. A method for fabricating a roofshooter type thermal ink jet printhead for use in a drop-on-demand, ink jet printing device, comprising the steps of:
- (a) cleaning a silicon substrate having first and second parallel surfaces, the substrate surfaces being {100} planes;
  - (b) depositing a layer of substantially transparent insulating material on the substrate surfaces;
  - (c) patterning the insulative layer on one of the surfaces of the substrate to produce a predetermined number of alignment means thereon;

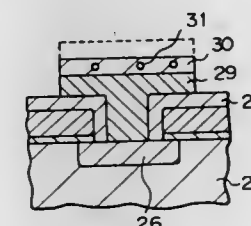
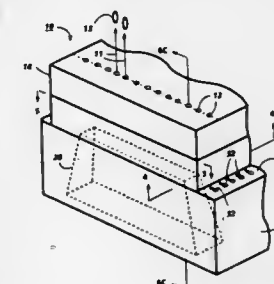
- (d) producing the predetermined number of alignment means on said one of the substrate surfaces;
- (e) forming a plurality of equally spaced, linear arrays or resistive material on the insulative layer of the first surface of the substrate for subsequent use as arrays of heating elements;
- (f) depositing a pattern of electrodes on the insulative layer of the substrate first surface to enable individual addressing of each heating element with electrical pulses;
- (g) applying a passivation layer over the insulative layer of the first surface of the substrate, including the electrode and the heating elements thereon;
- (h) patterning the insulative layer on the second surface of the substrate using the alignment means to produce a plurality of elongated vias therein;
- (i) placing the substrate in an anisotropic etchant for orientation dependent etching (ODE) thereof to produce elongated openings therethrough bounded by {111} planes which open against and are covered by the passivation layer and insulative layer on the substrate first surface, the elongated openings each being longitudinally aligned adjacent a respective one of the arrays of heating elements in a precise predetermined location;

prescribed chlorine chemistry-based etch system, comprising the step of controllably modifying the composition of said



chlorine chemistry-based etch system by controllably introducing thereto an adjustable amount of oxygen.

4,789,427  
**METHOD FOR REMOVING RESIST FROM SEMICONDUCTOR DEVICE**  
 Shuzo Fujimura, Tokyo; Yoshikazu Kato, and Syouzi Mochizuki, both of Mizusawa, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
 Filed May 19, 1987, Ser. No. 51,396  
 Claims priority, application Japan, May 20, 1986, 61-113602  
 Int. Cl.<sup>4</sup> B44C 1/22; C03C 15/00, 25/06  
 U.S. Cl. 156—643 5 Claims



- (j) patterning and etching the passivation layer to expose ends of the electrodes that are to serve subsequently as electrical contact pads, to open windows over the heating elements, and to produce an elongated openings through the substrate by removing the insulative material and passivation layer over the etched elongated openings, so that the elongated openings may serve subsequently as both ink fill inlets and as ink reservoirs;
- (k) aligning and attaching a structural member to the first surface of the substrate, the structural member containing a plurality of recessed cavities, each having a plurality of parallel walls therein and each having a plurality of nozzles communicating with a respective cavity, the nozzles being located such that one nozzle is located between each pair of walls and above a respective heating element, each cavity being in communication with a respective elongated opening in the substrate, so that each combination of cavity and elongated opening form a complete ink reservoir, with the elongated opening portion of the reservoir capable of containing more ink than the cavity portion of the reservoir; and
- (l) dicing the substrate and attached structural member into a plurality of individual printheads.

1. A method for removing a resist of a semiconductor device, comprising the steps of:
- removing said resist on a layer formed on a semiconductor substrate having a functional region, in a direction of the thickness thereof by a predetermined thickness by applying plasma processing; and
  - removing the remaining resist by applying a chemical process.

4,789,428  
**METHOD FOR EVAPORATION OF SPENT LIQUOR**  
 Rolf Ryham, Sollentuna, Sweden, assignor to Ahlströmforetagen Svenska AB, Norrköping, Sweden  
 Filed Jun. 3, 1986, Ser. No. 870,125  
 Claims priority, application Sweden, Jul. 11, 1985, 8503450  
 Int. Cl.<sup>4</sup> B01D 1/26, 3/06 5 Claims

2. In a method for evaporating spent liquor wherein blow steam from a pulp cooker is condensed in a direct condenser connected to a hot water accumulator, wherein the improvement comprises:
- concentrating spent liquor by evaporation in at least one evaporation stage;
  - passing the concentrated spent liquor through a heat exchanger for indirect heating with the hot water from the accumulator;
  - expanding the heated concentrated spent liquor in a flash

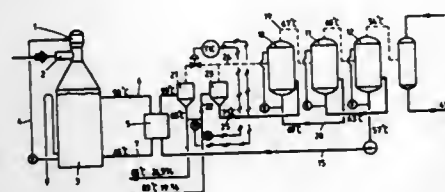
4,789,426  
**PROCESS FOR PERFORMING VARIABLE SELECTIVITY POLYSILICON ETCH**  
 Mark A. Pipkin, Melbourne, Fla., assignor to Harris Corp., Melbourne, Fla.  
 Filed Jan. 6, 1987, Ser. No. 778  
 Int. Cl.<sup>4</sup> H01L 21/302 14 Claims

1. A method of controllably enhancing the etch rate of a layer of polysilicon relative to the etch rate of an oxide layer each of which layers is to be simultaneously exposed to a



tank to release expansion spent liquor vapor and to leave remaining spent liquor;  
supplying the released expansion spent liquor vapor to the evaporation stage for use as a heating medium for heating the evaporation stage;  
supplying the remaining spent liquid from the flash tank to the evaporation stage to form the concentrated spent liquor for heating in the heat exchanger; and  
adding weak spent liquor to the concentrated spent liquor to form a mixture for expansion in the flash tank.

4. In an apparatus for evaporation of spent liquor wherein blow steam from a pulp cooker is condensed in a direct con-



denser (1) connected with a hot water accumulator (3), wherein the improvement comprises: a heat exchanger (5), at least one flash tank (9) and at least one evaporation unit (10), the heat exchanger (5) is connected so as to receive hot water from the upper part of the accumulator (3) and to return cooled water to the lower part of said accumulator and thus heat the spent liquor, the flash tank is connected so as to receive spent liquor heated in the heat exchanger and to release expansion spent liquor vapor to the connecting evaporation unit, the evaporation unit having an outlet (15) connected to the heat exchanger for returning a concentrated spent liquor to the heat exchanger for further heating.

4,789,429

**METHOD OF MAKING MECHANICAL PULP**  
Michael Jackson, North Vancouver, Canada; Knut O. Danielsson, Stockholm, and Bo G. S. Falk, Järfälla, both of Sweden, assignors to Sands Defibrator Aktiebolag, Sweden  
PCT No. PCT/SE86/00454, § 371 Date May 28, 1987, § 102(e) Date May 28, 1987, PCT Pub. No. WO87/03022, PCT Pub. Date May 21, 1987

PCT Filed Oct. 7, 1986, Ser. No. 78,180  
Claims priority, application Sweden, Nov. 6, 1985, 8505229  
Int. Cl. D21B 1/16; D21D 1/30; D21K 3/26

U.S. Cl. 162-241 7 Claims  
1. A method for producing a mechanical pulp product from lignocellulose-containing material comprising pretreating said lignocellulose-containing material in the presence of impregnation chemicals so as to produce a pretreated lignocellulose-containing material, refining said

pretreated lignocellulose-containing material in a first refining step employing a pair of counter-rotating refining discs under pressure so as to produce a partially refined lignocellulose-containing material having a freeness value measured by CSF of between about 150 and 300 so as to maximize the light-scattering coefficient of said lignocellulose-containing material, bleaching said partially refined lignocellulose-containing material in the presence of bleaching chemicals at a pulp concentration of between about 30 and 45 percent so as to produce a bleached lignocellulose-containing material having an ISO-brightness above about 70, and refining said bleached lignocellulose-containing material in a second refining step utilizing a pair of refining discs in which one of said pair of refining discs is stationary and the other of said pair of refining discs is rotating under pressure so as to produce a refined lignocellulose-containing material having a freeness value measured by CSF of between about 50 and 150 so as to minimize the shives content of said refined lignocellulose-containing material.

4,789,430  
**PAPER SHEET, PROCESS FOR PREPARING SAME AND APPLICATIONS THEREOF PARTICULARLY AS PRODUCT FOR SUBSTITUTING IMPREGNATED GLASS WEBS**

Pierre Fredenucci, Charavines, France, assignor to Arjomari-Prioux, Paris, France  
Continuation of Ser. No. 658,142, Oct. 5, 1984, abandoned. This application Jan. 16, 1987, Ser. No. 4,182  
Claims priority, application France, Oct. 6, 1983, 83 15926  
Int. Cl. D21H 5/18

U.S. Cl. 162-145 19 Claims  
1. A paper sheet which contains, in parts by dry weight, 40 to 105 parts of latex and 100 parts of a basic mixture comprising 60 to 40 parts of cellulosic fibers having an SR of 15-35 and non-cellulosic fibers including short inorganic fibers, said short inorganic fibers being glass fibers and representing 40 to 90% by dry weight of said cellulosic fibers, and said sheet having a dimensional stability of not more than 0.13%, and a resistance to delamination of greater than 350 g/cm, and wherein the fillers or flocculant are not calcium hydroxide.

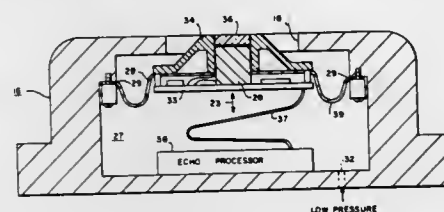
4,789,431  
**APPARATUS FOR SENSING THE THICKNESS OF A PULP SUSPENSION ON THE FORMING WIRE OF A PAPER MACHINE**

Pekka Typpo, Cupertino, Calif., assignor to Impact Systems, Inc., San Jose, Calif.

Filed Jul. 31, 1987, Ser. No. 80,327

Int. Cl. D21F 7/06; G01N 29/00

U.S. Cl. 162-263 7 Claims



1. Apparatus for sensing the thickness of a pulp suspension, having zones on the forming wire of a papermaking machine during operation of the machine comprising:  
an elongated hollow structural member having a length corresponding to the cross-directional (CD) width of said suspension and having a top face with a plurality of apertures, mounted in said cross-direction in proximity to the side of said forming wire opposite said pulp suspension, each of said apertures of said top face corresponding to one of said zones on the forming wire;  
ultrasonic transducer means for transmitting and receiving ultrasonic pulses located at each said aperture;  
a flexible sheet mounted across each aperture and carrying a window for said ultrasonic transducer means and forming a substantially airtight chamber with said hollow structural member;  
and air pressure means having a source of compressed air and fluidly connected to said air tight chamber for moving said sheet and said window into close proximity to said wire.

4,789,432

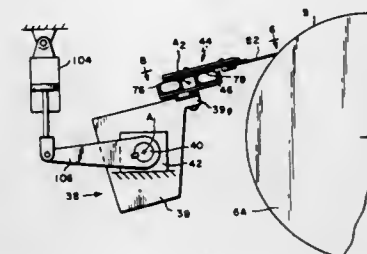
**DOCTORING APPARATUS**

Ronald F. Goodnow, Leicester; Robert A. Reid, Charlton City, and Robert Austin, Northborough, all of Mass., assignors to Thermo Electron Web Systems, Inc., Auburn, Mass.

Filed Jun. 8, 1987, Ser. No. 59,508

Int. Cl. D21G 3/00

U.S. Cl. 162-281 15 Claims



1. Apparatus for doctoring a cylindrical rotating surface, said apparatus comprising:  
a doctor back;  
means for mounting said doctor back for rotational movement about a first axis parallel to the rotational axis of said surface;  
a blade carrier assembly;  
means for mounting said blade carrier assembly on said doctor back for rotational movement about a second axis parallel to said first axis;  
a doctor blade removably supported on said blade carrier assembly, said doctor blade having a working edge adapted to be applied to said surface;  
a flexible-walled tube extending along one side of said second axis at a location interposed between and in contact with said blade carrier assembly and said doctor back;  
a supply of liquid contained in said tube;  
first actuating means for loading the working edge of said doctor blade against said surface by rotatably urging said doctor back in one direction about said first axis, with said blade carrier assembly thus being rotatably urged in the opposite direction about said second axis and against said tube; and  
second actuating means for expanding and contracting said tube by varying the supply of liquid contained therein, said first and second actuating means being coactively operable to effect rotation of said doctor back and said blade carrier in opposite directions about their respective first and second axes, with an accompanying change in the angle of application of said blade to said surface.

4,789,433

**SKIMMING BLADE WITH WAVE SHAPED TROUGHS FOR A PAPERMAKING MACHINE**

Karl-Dieter Fuchs, Ebersbach/Fils, Fed. Rep. of Germany, assignor to Feldmühle Aktiengesellschaft, Duesseldorf, Fed. Rep. of Germany

PCT No. PCT/DE86/00158, § 371 Date Oct. 31, 1986, § 102(e) Date Oct. 31, 1986, PCT Pub. No. WO86/06117, PCT Pub. Date Oct. 23, 1986

PCT Filed Apr. 11, 1986, Ser. No. 7,909

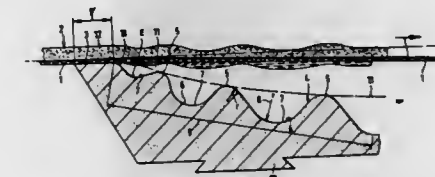
Claims priority, application Fed. Rep. of Germany, Apr. 13, 1985, 3513320

Int. Cl. D21F 1/54, 1/48

U.S. Cl. 162-352 13 Claims

1. A skimming blade for removing water from a fiber slurry on a moving wire, having a direction of travel, of a papermaking machine, comprising a blade having a supporting surface to support the wire and run substantially parallel to the wire, which is adjoined by at least one dewatering surface serving for vacuum dewatering, said dewatering surface being inclined with respect to the supporting surface by an angle of 5 to 360

minutes and having a plurality of troughs which extend at an angle of 90 to 5 degrees to an imaginary extension line of the



supporting surface at a level of an envelope line of the dewatering surface without passing downward through the skimming blade.

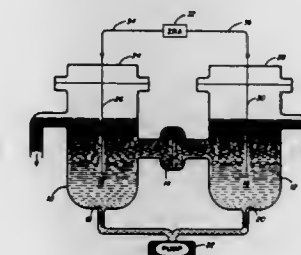
4,789,434

**METHOD AND APPARATUS FOR MEASURING CORROSION CURRENT INDUCED BY MICROBIOLOGICAL ACTIVITIES**

Brenda J. Little, Piquette, Miss., and Sol M. Gerchakov, deceased, late of Coral Gables, Fla. (by Barbara J. Gerchakov, executrix), assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
Filed Oct. 9, 1987, Ser. No. 106,281

Int. Cl. C12Q 1/02

U.S. Cl. 204-1 T 10 Claims



1. A corrosion measuring apparatus including in combination:  
a vessel containing an electrolyte,  
means within said vessel to divide said vessel into two cells which are in electrolyte and chemical communication with one another and biologically separated from one another,  
each of said cells having support means for supporting a sample metal in said electrolyte,  
a microorganism in one of said cells, each of said cells having an inlet port and outlet port for providing a continuous and measured flow of the electrolyte through the two cells,  
means being connected between said support means for measuring current flow which is proportional to corrosion of a metal sample induced by said microorganism.  
9. A method of evaluating the electrochemical impact of microbiological species on metal electrodes comprising the steps of:  
providing a first cell of electrolyte,  
providing a second cell of electrolyte in electrolytic communication and biologically isolated from said first cell,  
providing a continuous and measured flow of the electrolyte through the two cells,  
disposing a metal electrode in each of said cells, electrically connecting said electrodes to provide for the flow of current therebetween,  
inoculating one of said electrodes with a microorganism, and observing the current flow between said electrodes as an

indication of the corrosion induced by said specimen microorganism on said inoculated electrode.

4,789,435

# METHOD AND DEVICE OF MEASURING ION ACTIVITY

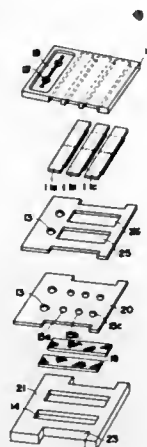
Osamu Seashimoto, and Yoshio Saito, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Aug. 14, 1986, Ser. No. 896,888

Claims priority, application Japan, Aug. 15, 1985, 60-180358; Aug. 15, 1985, 60-180359; Aug. 15, 1985, 60-180360  
The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> G01N 27/30

U.S. Cl. 204-1 T

22 Claims



1. In a method of measuring ion activity of a liquid sample comprising the steps of contacting a reference liquid and the liquid sample with surfaces of ion-selective membranes, respectively, of at least a pair of ion-selective electrode sheets which are electrically insulated from each other, said ion-selective membranes being arranged on one side of said ion-selective electrode sheets; and measuring a potential difference between said both ion-selective electrodes under the condition that said both liquid are electrically connected to each other by a bridge, the improvement which comprises each electrode sheet being positioned so as to have upward and downward-facing sides and the ion-selective membrane being arranged on the downward-facing side of the electrode sheet; and the contact being effected by spotting each liquid at a location proximate an area adjacent the upward-facing side; conveying the spotted liquid to a position below the surface of the ion-selective membrane and conveying the liquid upward to the surface of the membrane through an upward-oriented passage defined by a sidewall having upper and lower ends, said passage having an opening at the upper end, the opening being positioned to deliver the liquid to the surface of the membrane and said upper end being spaced apart from the surface of the membrane to provide a clearance therebetween, said clearance being sufficient to avoid capillary movement between the surface of the membrane and the upper end of the side wall.

4,789,436

# METHOD AND APPARATUS FOR NONDESTRUCTIVE IN VIVO MEASUREMENT OF PHOTOSYNTHESIS

Elias Greenbaum, Oak Ridge, Tenn., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 22, 1988, Ser. No. 158,500

Int. Cl.<sup>4</sup> G01N 27/30, 27/54

U.S. Cl. 204-1 T

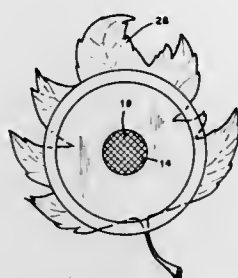
7 Claims

1. A device for nondestructive measurement of photosynthesis in living organisms comprising:  
a Clark-type oxygen electrode having a substantially trans-

parent cathode comprised of an optically transparent member having a metallic grid on its sides and front face, an anode, a substantially transparent electrolyte film in contact with the front face of said cathode, and a substantially transparent oxygen permeable membrane in contact with said electrolyte film, so that the oxygen produced by the photosynthetic system of a living photosynthetic organism in response to light directed onto said organism from said cathode will diffuse through said membrane and said electrolyte film so as to be measurable polarographically by said Clark-type oxygen electrode.

7. A method of nondestructively measuring photosynthesis in living organisms which comprises the steps of:

(a) positioning a Clark-type oxygen electrode having a sub-



stantially transparent cathode comprised of an optically transparent member with a metallic grid on its sides and front face, a substantially transparent electrolyte film in contact with the cathode, and a substantially transparent oxygen permeable membrane next to a living photosynthetic organism so that oxygen produced by the organism in response to light will diffuse through the oxygen permeable membrane;

(b) causing light to be conducted through the optically transparent member of the cathode so that the light travels through the electrolyte film and oxygen permeable membrane and impinges upon the photosynthetic organism so that oxygen is produced by the organism; and  
(c) measuring polarographically the oxygen produced by the photosynthetic organism.

4,789,437

# PULSE ELECTROPLATING PROCESS

Miu W. Sing, Kowloon, and Fung Y. Sing, Aberdeen, both of Hong Kong, assignors to University of Hong Kong, Hong Kong, Hong Kong

Filed Jul. 11, 1986, Ser. No. 884,706

Int. Cl.<sup>4</sup> C25D 1/04, 3/50

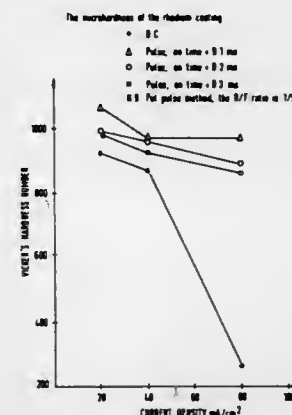
U.S. Cl. 204-12

23 Claims

1. A process of producing a rhodium electrodeposit by pulse current electroplating in which the electrolyte comprises rhodium sulfate and sulfuric acid with a rhodium metal concentration of from 1 to 20 g/L and a sulfuric acid concentration of from 25 to 200 mL concentrated (95-98%) sulfuric acid per liter, and on/off pulse time ratio of from 1:20 to 1:4.5, with an on-time of from 0.05 to 0.8 ms and an off-time of from 0.45 to 7.2 ms and a peak current density of from 5 to 3,200 mA/cm<sup>2</sup>.

23. A process of producing a rhodium-sheet or foil by pulse current electroplating in which the electrolyte comprises rhodium sulfate and sulfuric acid with a rhodium metal concentration of from 1 to 20 g/L and a sulfuric acid concentration of from 25 to 200 mL concentrated (95-98%) sulfuric acid per liter, and on/off pulse time ratio of from 1:20 to 1:4.5, with an on-time of from 0.05 to 0.8 ms and an off-time of from 0.45 to 7.2 ms and a peak current density of from 5 to 3,200 mA/cm<sup>2</sup>,

and the process includes the steps of plating the rhodium onto a brass substrate and when the rhodium has been deposited to



the desired thickness dissolving away the brass using nitric acid.

4,789,438

# CATHODE SURFACE TREATMENT FOR ELECTROFORMING METALLIC FOIL OR STRIP

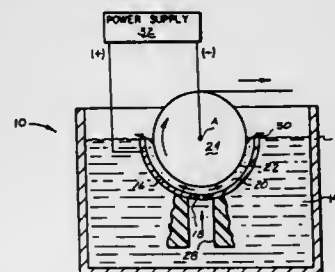
Ned W. Polan, Madison, Conn., assignor to Olin Corporation, New Haven, Conn.

Continuation of Ser. No. 65,452, Jun. 23, 1987. This application Feb. 29, 1988, Ser. No. 161,819

Int. Cl.<sup>4</sup> C25D 1/04, 17/00

U.S. Cl. 204-13

24 Claims



1. An electrodeposited metal foil suitable for use in electronic and electrical applications being characterized by substantially isotropic tensile elongation properties, said foil having a first major surface whose surface roughness in a longitudinal direction is within about 20% of its surface roughness in a transverse direction.

4,789,439

# METHOD OF ELECTROLYTIC TINNING USING AN INSOLUBLE ANODE

Huig Bunk; Gijbertus C. Van Haastrecht, both of Beverwijk, and Joop N. Mooij, Castricum, all of Netherlands, assignors to Hoogovens Groep B.V., IJmuiden, Netherlands  
Filed Oct. 26, 1987, Ser. No. 112,069

Claims priority, application Netherlands, Oct. 30, 1986, 8602730

Int. Cl.<sup>4</sup> C25D 7/06

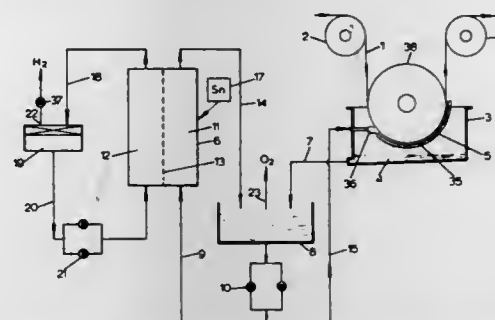
U.S. Cl. 204-28

5 Claims

1. Method of electrolytic tinning using an insoluble anode, comprising the steps of:

(a) passing metal to be tinned in strip form through an electrolytic tinning bath having an insoluble anode and containing an acidic liquid electrolyte including tin ions, with

the strip forming the cathode and causing current to flow so as to deposit tin from the electrolyte onto the strip, and  
(b) circulating said electrolyte through an electrolytic replenishing cell having a bed of granular tin material outside said tinning bath for an addition of tin ions to the electrolyte in order to maintain the desired concentration of tin ions in the electrolyte in the tinning bath, said replenishment cell comprising



(i) a tin anode chamber having a tin anode system comprising an insoluble tin anode and a bed of granular tin material,  
(ii) a cathode chamber having an insoluble cathode, and  
(iii) a membrane system between the anode chamber and the cathode chamber which is substantially impermeable to tin ions,  
said electrolyte being passed through the anode chamber of the replenishing cell so as to contact the tin anode system and there being electrolytically enriched with tin ions.

4,789,440

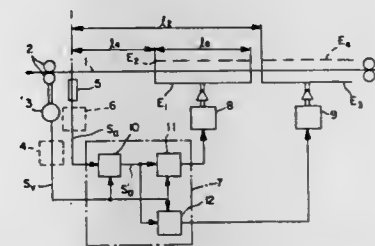
# PROCESS AND APPARATUS FOR THE CONTINUOUS ELECTROLYTIC TREATMENT AND/OR COATING OF A MOVING METALLIC STRIP WHILE CHANGING THE SPACING BETWEEN THE STRIP AND AT LEAST ONE ELECTRODE

Erich Mahr, Furkerdorf, and Wilhelm Hofkirchner, Galtitz, both of Austria, assignors to Maschinenfabrik Andritz Aktiengesellschaft, Graz-Andritz, Fed. Rep. of Germany  
Division of Ser. No. 24,616, Mar. 11, 1987. This application Mar. 7, 1988, Ser. No. 142,005

Claims priority, application Austria, Mar. 24, 1986, 776/86  
Int. Cl.<sup>4</sup> C25D 7/06

U.S. Cl. 204-28

1 Claim



1. Process for the continuous electrolytic treatment and/or coating of a moving metallic strip whilst changing the spacing between the strip and at least one electrode as a function of deviations (distortions) of the strip normal to the direction of movement of the strip, comprising the steps of  
(a) determining a deviation as a function of its magnitude over a period,  
(b) determining the period from the moment of detecting the deviation to the moment of the arrival of the deviation at



the electrode, reduced by the period needed for changing the spacing,  
 (c) determining the period needed for passing the electrode and  
 (d) adjusting the spacing between the strip and the electrode as a function of the data determined in the foregoing steps.

**4,789,441**  
**METALLIC PROTECTIVE COATINGS AND METHOD OF MAKING**

John Foster, 3 Collingwood Close, Worle, Avon; Eric C. Kedward, 2 Littlefields Rd., Banwell, Avon; Francis J. Honey, Elmide, 26 Kingway Rd., Burnham on Sea, Somerset TA8 1ET, and James E. Restall, 18 Aphington Ave., Frimley, Camberley Surrey, all of United Kingdom

Filed Oct. 4, 1985, Ser. No. 784,349  
 Claims priority, application United Kingdom, Oct. 5, 1984, 8425262

Int. Cl.<sup>4</sup> C25D 3/12, 5/50  
 U.S. Cl. 204—37.1

23 Claims



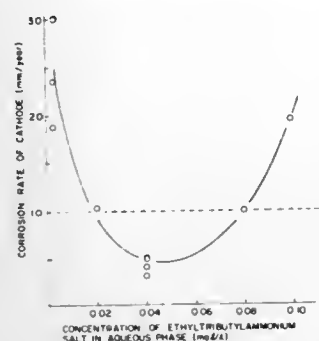
1. A coated substrate produced by composite electrolytic deposition, on a substrate of a coating, consisting of a metal matrix M<sub>1</sub> containing particles comprising CrAlM<sub>2</sub>, where M<sub>1</sub> is Ni or Co or Fe or two or all of these metals and M<sub>2</sub> is Y, Si, Ti, a rare earth element or two or more of these elements.

**4,789,442**  
**METHOD FOR PRODUCING ADIPONITRILE**  
 Koji Nakagawa, Kurashiki, and Yukito Nagamori, Nobeoka, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Oct. 9, 1987, Ser. No. 106,353  
 Claims priority, application Japan, Oct. 30, 1986, 61-256883  
 Int. Cl.<sup>4</sup> C25G 3/00

U.S. Cl. 204—73 A

6 Claims



1. In a method for producing adiponitrile which comprises electrolyzing an emulsion of an aqueous phase and an organic phase, said emulsion containing acrylonitrile and a combination of an alkali metal salt and a quaternary ammonium salt as an electrolysis supporting salt, in at least one undivided cell having a cathode of lead or a lead alloy and an anode and having an inlet and an outlet, while feeding said emulsion into

said cell at its inlet and circulating said emulsion through said cell from said inlet to said outlet, thereby forming adiponitrile while evolving oxygen gas, the improvement which comprises including in said aqueous phase an ethyltributylammonium salt as the quaternary ammonium salt in a concentration of from 0.02 to 0.08 mol/liter, and wherein said electrolysis is conducted in said undivided cell with evolution of oxygen gas at a volume ratio of at least 0.05 in terms of a ratio of V<sub>g</sub>/V<sub>l</sub> wherein V<sub>g</sub> represents an evolution rate of the oxygen gas (std. liter/hr) as measured at said outlet of the cell and V<sub>l</sub> represents a flow rate of the emulsion (std. liter/hr) as measured at said inlet of the cell.

**4,789,443**  
**NOVEL ELECTROLYSIS CELL**  
 Oronzio deNora, Milan, Italy, and Placido M. Spaziante, Lugano, Switzerland, assignors to Oronzio deNora Impianti Elettrochimici S.p.A., Milan, Italy

Continuation of Ser. No. 382,670, May 27, 1982, abandoned, which is a division of Ser. No. 151,695, May 20, 1980, Pat. No. 4,341,604, which is a continuation-in-part of Ser. No. 57,255, Jul. 12, 1979, Pat. No. 4,343,689. This application Nov. 20, 1986, Ser. No. 933,037

Claims priority, application Italy, Jul. 27, 1978, 26171 A/78  
 Int. Cl.<sup>4</sup> C25B 1/00

U.S. Cl. 204—98

20 Claims



1. An electrolytic cell having a pair of oppositely charged electrodes extending along and separated by an ion exchange membrane capable of transporting cations and minimizing passage of anions therethrough, wherein one of said electrodes bearing against one side of the membrane is flexible and comprises resilient means; a restraint means supporting the other electrode is provided on the other side of the membrane, and pressure means are provided to compress said resilient means to press together at a plurality of spaced points the electrodes and the membrane substantially over the entire surface of the membrane.

**4,789,444**  
**PROCESS FOR ELECTROLYTICALLY PRODUCING METALS OF NI, CO, ZN, CU, MN, AND CR FROM A SOLUTION THEREOF**

Morio Watanabe, Hyogo; Sanji Nishimura, and Nobutsu Watanabe, both of Kyoto, all of Japan, assignors to Solex Research Corporation of Japan, Tokyo, Japan

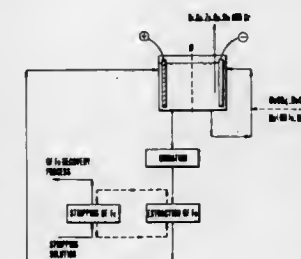
Filed Feb. 12, 1987, Ser. No. 14,260  
 Claims priority, application Japan, Feb. 15, 1986, 61-31544  
 Int. Cl.<sup>4</sup> C25C 1/12

U.S. Cl. 204—107

5 Claims

1. Process for electrolytically producing metals of Ni, Co, Zn, Cu, Mn, and Cr, comprising:  
 electrolyzing an aqueous solution of an acid selected from the group consisting of sulfuric acid, hydrochloric acid and nitric acid and containing ions of a metal as a main component selected from Ni, Co, Zn, Cu, Mn, and Cr in a cathode compartment to deposit the metal electrolytically on a cathode,  
 the cathode compartment being separated by one or more diaphragms from the remainder of the solution where iron or a metal containing iron is used for the material of a corrosible anode, and  
 maintaining the concentration of iron ion in the solution circulating in the anode compartment at a low level by bringing the whole or a part of the circulating solution into contact with an organic solvent which is prepared by

adding petroleum hydrocarbon for dilution of one or more extracting agents selected from the group consisting of carboxylic acids, alkylaryl phosphoric acids, hydrox-



yoximes, alkyl phosphoric acids, alkylamines, ketones, alkylamides, and neutral phosphoric acid esters, to extract and remove the iron.

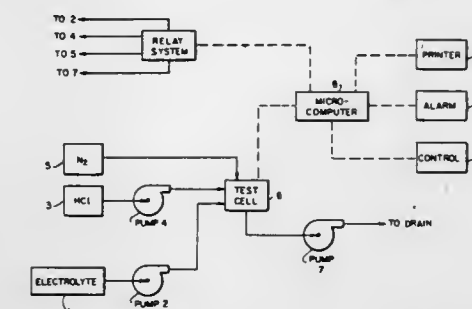
**4,789,445**  
**METHOD FOR THE ELECTRODEPOSITION OF METALS**

Martin Goffman, Edison, and Val Kodryk, Closter, both of N.J., assignors to ASARCO Incorporated, New York, N.Y.

Continuation of Ser. No. 495,312, May 16, 1983. This application Nov. 19, 1986, Ser. No. 933,284  
 Int. Cl.<sup>4</sup> C25C 1/16; G01N 27/26

U.S. Cl. 204—114

8 Claims



1. A method for the electrodeposition of zinc containing a measurable concentration of a plurality of impurities including antimony in its electrolyte solution wherein the concentrations of the impurities are maintained below deleterious levels by the control of only the antimony impurity concentration, said method characterized by the following steps  
 sampling a sufficient amount of electrolyte from the electrolyte solution;  
 measuring the concentration level of antimony impurity in the electrolyte sample by means of an effective measuring technique;  
 readjusting the antimony impurity level of the electrolyte solution below 0.02 ppm by the addition of zinc dust to the electrolyte;  
 continually repeating at predetermined intervals the above sequence of steps throughout the duration of the electrodeposition process.

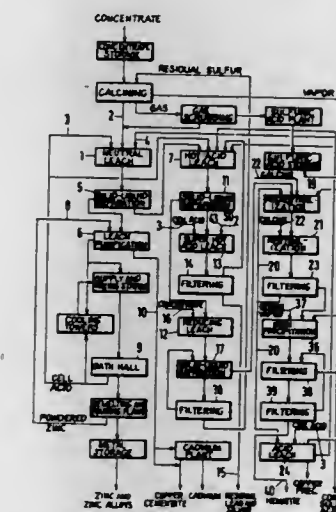
**4,789,446**  
**METHOD OF PROCESSING RESIDUES FROM THE HYDROMETALLURGICAL PRODUCTION OF ZINC**  
 Adolf Von Röpenack; Winfried Böhmer, both of Datteln; Günter Smykalla, Haltern, and Volker Wiegand, Datteln, all of Fed. Rep. of Germany, assignors to Ruhr-Zink GmbH, Datteln, Fed. Rep. of Germany

Filed Sep. 28, 1987, Ser. No. 101,714  
 Claims priority, application Fed. Rep. of Germany, Oct. 9, 1986, 3634359

Int. Cl.<sup>4</sup> C25C 1/14

U.S. Cl. 204—119

19 Claims



1. A process of treating residues from the hydrometallurgical production of zinc, comprising the steps of:

- electrolytically producing zinc comprising leaching a zinc containing material with a hot sulfuric acid to obtain a zinc sulfate solution, purifying the zinc sulfate solution by precipitating out iron and electrolyzing the purified solution resulting in a zinc deposition and a spent cell acid,
- leaching copper containing residue from a hydrometallurgical production of zinc with spent cell acid from step (a) at a temperature from 50° to 100° C. to obtain a concentration of free acid between 10 and 100 g/l at the end of the leaching,
- separating undissolved matter from the suspension to obtain solution;
- feeding the separated matter to the hot acid leaching in step (a),
- precipitating copper by an addition of fine-grained iron metal to the solution obtained in step (c),
- separating the precipitated copper to leave a liquid phase, and
- feeding the liquid phase obtained in step (f) to step (a) prior to the precipitation of iron.

4,789,447

**APPARATUS FOR WORKING ELECTRICALLY CONDUCTIVE MATERIALS BY ELECTRIC EROSION**

Mohamed S. Ahmed, and Geoffrey Robinson, both of Birmingham, United Kingdom, assigns to Transfer Technology Limited, Birmingham, United Kingdom

PCT No. PCT/GB86/00603, § 371 Date Jul. 13, 1987, § 102(e) Date Jul. 13, 1987, PCT Pub. No. WO87/01961, PCT Pub. Date Apr. 9, 1987

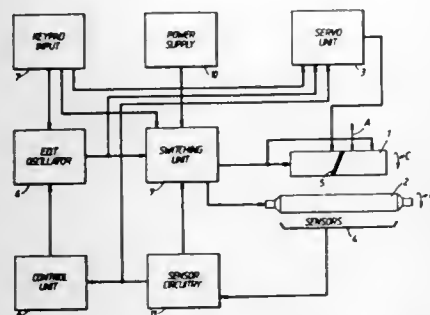
PCT Filed Oct. 6, 1986, Ser. No. 57,527

Claims priority, application United Kingdom, Oct. 4, 1985, 8524600

Int. Cl.<sup>4</sup> B23H 7/18, 7/32

U.S. Cl. 204—224 M

13 Claims



1. Apparatus for working electrically conductive materials by electrical erosion, comprising an electrode adapted to be placed next to an electrically conductive workpiece to be machined, leaving a gap across which electrical discharges may occur, means for applying a voltage between the electrode and workpiece to cause electrical discharges to occur, and sensor means for detecting the positions at which electrical discharges are occurring along the gap to give an indication of the relative orientation of the electrode and workpiece with respect to each other.

4,789,448

**DEVICE FOR CONTROL OF SCALE FORMATION**

Derek A. Woodhouse, 48 Mounthouse Drive, Houghton, Stafford, England

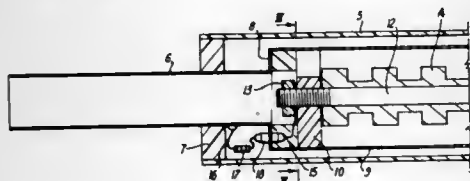
Filed Jan. 24, 1986, Ser. No. 822,025

Claims priority, application United Kingdom, Jan. 28, 1985, 8502078

Int. Cl.<sup>4</sup> C25B 9/04, 15/08, 11/04

U.S. Cl. 204—228

16 Claims



1. A device for treating hard water to counter the deposition of scale comprising an anode and a cathode spaced apart to define a passage through which water to be treated passes during operation of the device, said anode and cathode being connected in an electrical circuit externally of the water and including the water as an electrolyte, the anode being formed from zinc and the cathode from copper whereby in operation electrolytic action takes place releasing electrically charged ions into the water which affect the stability of scale-forming particles contained in the water and particles of amphoteric zinc oxide and hydroxide are released from the anode forming sites in the water for formation of crystals of scale forming impurities which remain in suspension in the water thereby

reducing deposition of scale on the surfaces of vessels, pipes or the like into or through which the water subsequently flows.

4,789,449

**NICKEL ALLOY ANODES FOR ELECTROCHEMICAL CELL**

Charles K. Bon, Concord; Donald N. Brattesani, Oakland, and Kevin S. Meldrum, San Francisco, all of Calif., assigns to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 891,814, Jul. 31, 1986. This application Jan. 5, 1988, Ser. No. 141,021

Int. Cl.<sup>4</sup> C25B 11/06, 9/00

U.S. Cl. 204—242

8 Claims

1. An electrolytic cell useful in the selective replacement of chlorine in organochlorine compounds with hydrogen, which cell comprises an anode having as its surface an alloy comprising essentially about 40 to about 70 percent nickel, about 5 to about 30 percent chromium, and about 3 to about 25 percent molybdenum and a cathode having a silver surface.

4,789,450

**ELECTROLYTIC CELL**

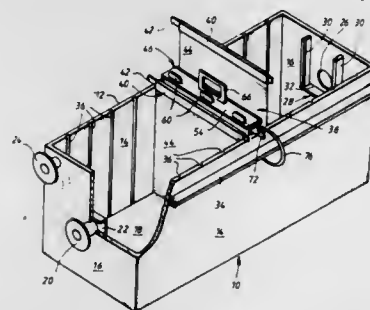
Malcolm R. Paterson, Nedlands, Australia, assignor to Bateman Engineering (International) Limited, Boksburg North, South Africa

Filed Dec. 16, 1986, Ser. No. 942,287

Int. Cl.<sup>4</sup> C25C 7/02; C25D 17/06, 17/10

U.S. Cl. 204—269

11 Claims



1. An electrolytic cell for use in electroplating metal values from solutions containing same, which comprises a housing arranged to contain a predetermined level of solution to be subjected to electrolysis, anode means, cathode means, inlet means for feeding fresh solution into the housing and outlet means for removing treated solution from the cell, wherein the cathode means comprises a cathode assembly which contains material upon which electroplated metal values are deposited and which cathode assembly is arranged to be removed from the cell for removal of the material bearing deposited metal values and replacement by fresh material, and subsequent return of the cathode assembly to the cell, said cathode assembly further comprising a liquid pervious box with a detachable wall which when detached enables removal and replacement of cathode material, a cathode comprising an electrically conductive bar located above said predetermined level, from which is suspended a loop of electrically conductive material on which, in use, the metal values are deposited, and a pair of opposed recesses arranged to receive said electrically conductive bar, said detachable wall being provided with a batten which engages with the recesses when the detachable wall is secured in place in the box so as to press the electrically conductive cathode material into engagement with the electrically conductive bar.

5. An electrolytic cell according to claim 1, in which the cell has side walls with internal faces formed with parallel, spaced substantially vertical grooves, wherein each groove in a side has a corresponding opposed groove in the other side, each

pair of opposed grooves being arranged to receive slidably an anodic sheet of an anode assembly such that, in use, the cell comprises a plurality of spaced anode assemblies with spaces between them arranged to receive cathode assemblies.

4,789,451

**MEANS FOR REDUCING OXALIC ACID TO A PRODUCT**

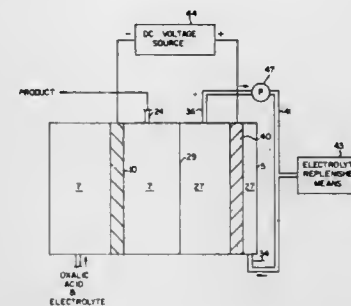
Abraham Mordachowitz, Monsey, N.Y., and Anthony F. Samuels, Naperville, Ill., assigns to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 724,707, Apr. 18, 1985. This application Sep. 3, 1985, Ser. No. 771,958

Int. Cl.<sup>4</sup> C25B 9/00

U.S. Cl. 204—275

8 Claims



1. Apparatus for reducing oxalic acid to a product comprising:

- a cell including
- a separator for separating the cell into two chambers, a catholyte chamber and an anolyte chamber, each chamber having an inlet and an outlet;
- a porous anode arranged within the anolyte section in a manner so that an electrolyte entering through the inlet of the anolyte section will pass through the anode and exit through the outlet of the anolyte section;
- means for providing an electrolyte to the inlet of the anolyte chamber in a manner so that it will exit through the outlet of the anolyte chamber;
- means for providing a mixture of oxalic acid and an electrolyte to the inlet of the catholyte chamber;
- porous cathode means located in the catholyte chamber for reducing the oxalic acid in the oxalic acid-electrolyte mixture to the product within said cathode means when a d.c. voltage provided across the anode and the cathode means, said product exiting the cell by way of the catholyte chamber's outlet; and
- means for providing a d.c. voltage across the cathode means and the anode so as to cooperate in the reduction of the oxalic acid; and
- in which the cathode means includes a porous cathode having discrete sites of platinum and mercury as catalysts and the product is ethylene glycol.

4,789,452

**HIGHLY DURABLE CATHODE OF LOW HYDROGEN OVERVOLTAGE AND METHOD FOR MANUFACTURING THE SAME**

Takeshi Morimoto, and Eiji Endoh, both of Yokohama, Japan, assigns to Asahi Glass Company Ltd., Tokyo, Japan

PCT No. PCT/JP85/00183, § 371 Date Feb. 4, 1986, § 102(e) Date Feb. 4, 1986, PCT Pub. No. WO86/06107, PCT Pub. Date Oct. 23, 1986

PCT Filed Apr. 10, 1985, Ser. No. 834,332

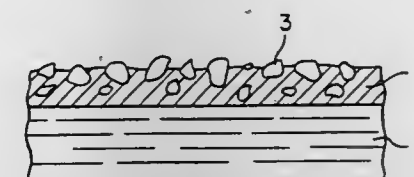
Int. Cl.<sup>4</sup> C25B 11/04

U.S. Cl. 204—290 R

12 Claims

1. A highly durable cathode of low hydrogen overvoltage, which comprises an electrode core material having on the surface thereof a metal layer containing electrode active metal

particles at least a portion of which particles comprises a hydrogen absorbing metal capable of electrochemically absorbing and desorbing hydrogen, wherein said metal layer has a porosity of about 20 to 90%, and further wherein a portion of



said electrode active metal particles comprises Raney nickel or Raney cobalt or a mixture thereof, and said hydrogen absorbing metal is a lanthanum/nickel system alloy, and titanium/nickel system alloys.

4,789,453

**ELECTRODES FOR THE COMBINED MEASUREMENT OF OXYGEN AND CARBON DIOXIDE**

Patrick Eberhard, Allschwil; Wolfgang Mindt, Münchenstein, and Jean-Pierre Palma, Pratteln, all of Switzerland, assigns to Kontron Holding A.G., Zurich, Switzerland

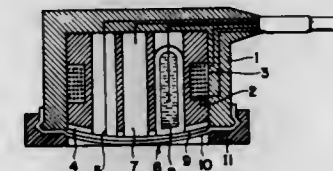
Continuation of Ser. No. 55,959, Jan. 1, 1987, abandoned. This application Jan. 25, 1988, Ser. No. 147,632

Claims priority, application Switzerland, Jan. 6, 1986, 2308/86

Int. Cl.<sup>4</sup> G01N 27/30

U.S. Cl. 204—412

5 Claims



1. An electrode arrangement for the combined measurement of the partial O<sub>2</sub> and CO<sub>2</sub> pressures of a medium, the arrangement comprising measuring electrodes, one of which applies for PO<sub>2</sub> and the other applies for PCO<sub>2</sub>, a reference electrode, a diaphragm covering the electrodes and an electrolyte layer between the electrodes and the diaphragm, the reference electrode has disposed thereon a layer of gold which is at the same potential as the reference electrode and the electrolyte contains a predetermined concentration of a soluble silver compound or of a silver complex.

4,789,454

**LOW TEMPERATURE SOLID ELECTROLYTE OXYGEN SENSOR**

Sukhvinder P. S. Badwal, Mulgrave, and Michael J. Bannister, Glen Waverley, both of Australia, assigns to Commonwealth Scientific and Industrial Research Organization, Australia

Continuation of Ser. No. 666,960, Oct. 2, 1984, abandoned. This application Feb. 17, 1987, Ser. No. 15,199

Claims priority, application Australia, Feb. 2, 1983, PF7857

Int. Cl.<sup>4</sup> G01N 27/58

U.S. Cl. 204—424

5 Claims

1. An oxygen sensor comprising an oxygen ion-conducting solid electrolyte member and at least one electrode comprising a surface layer on the solid electrolyte, wherein said surface layer contains: (1) at least one noble metal selected from the group consisting of platinum, gold, palladium, silver and alloys



of any two or more of these elements, and (2) a solid solution in uranium oxide of one or more other metal oxides with an



oxygen/metal atom ratio equal to or less than two, provided that at least one of said other metal oxides has an oxygen/metal atom ratio less than two.

4,789,455

#### PROCESS FOR PRODUCING PITCH USED AS STARTING MATERIAL FOR THE MAKING OF CARBON MATERIALS

Isso Mochida, Fukuoka; Susumu Fujiyama, Okayama; Yukio Sakai, Kayama, and Hiroyuki Otsuka, Okayama, all of Japan, assignors to Mitsubishi Gas Chemical Co. Inc., Tokyo, Japan

Filed Jul. 24, 1987, Ser. No. 77,211

Claims priority, application Japan, Jul. 29, 1986, 61-176704; Jun. 11, 1987, 62-144160

Int. Cl.<sup>4</sup> C10C 3/00

U.S. Cl. 208—39

17 Claims

1. A process for producing pitch capable of being converted to a mesophase by heat treatment, both the pitch and mesophase being useful as a starting material for the manufacture of carbon material, said process comprising

polymerizing a condensed nuclear aromatic compound or a material containing a condensed nuclear aromatic compound in the presence of a hydrogen fluoride/boron trifluoride catalyst system,

wherein said condensed nuclear aromatic compound is selected from the group consisting of naphthalene, anthracene, phenanthrene, acenaphthene, acenaphthylene, pyrene and mixtures thereof,

wherein said material containing a condensed nuclear aromatic compound is selected from the group consisting of a petroleum fraction, a residual oil originating from petroleum processing steps, and a coal tar fraction,

wherein said hydrogen fluoride is used in an amount of from about 3 to about 20 moles and said boron trifluoride in an amount of from about 0.1 to about 1.0 mole per mole of the condensed nuclear aromatic compound.

4,789,456

#### PROCESS FOR PREPARING MESOPHASE PITCHES

Masatoshi Tsuchitani, Ichihara; Sakae Naito, Chiba, and Ryochi Nakajima, Ichihara, all of Japan, assignors to Agency of Industrial Science and Technology and Maruzen Petrochemical Co., Ltd., both of Tokyo, Japan

Filed May 11, 1987, Ser. No. 48,415

Claims priority, application Japan, May 26, 1986, 61-119299

Int. Cl.<sup>4</sup> C10C 3/02, 3/00

U.S. Cl. 208—39

6 Claims

1. A process for the preparation of a mesophase pitch, comprising

a first step of subjecting a heavy oil of petroleum or coal origin or a heavy component obtainable by a distillation, a heat treatment or a hydro-treatment of said heavy oil, said heavy oil or said heavy component having no quinoline insoluble fraction, to a continuous heat treatment in a tubular heater at a temperature of 400°–600° C. under a

pressure of 1 to 100 kg/cm<sup>2</sup>.G for 10 to 2000 sec and subsequently transferring the thermally treated product to a first distillation or flash distillation column, distilling or flashing it therein under a pressure of 0–3 kg/cm<sup>2</sup>.A at a temperature of 300°–530° C. and recovering a high softening point isotropic pitch having a softening starting temperature of 100°–200° C., a quinoline insoluble content of less than 2 wt% and a xylene insoluble content of more than 30 wt%, from the bottom of said column;

a second step of subjecting said high softening point pitch to a second continuous thermal treatment in a second tubular heater in the presence of 1–5 times amount of a hydrogen-donating solvent selected from the group consisting of tetrahydroquinoline, 9,10-dihydroanthracene, hydrogenated anthracene oil, hydrogenated wash oil, hydrogenated lighter fraction of naphtha tar, hydrogenated lighter fraction of pyrolysis tar and hydrogenated lighter fraction of decant oil, at a temperature of 400°–460° C. under a pressure of 20–100 Kg/cm<sup>2</sup>.G for 10–120 min, so as to hydrogenate said high softening point isotropic pitch, subsequently transferring the thermally treated product to the second distillation or flash distillation column, distilling or flashing it therein at a temperature of 300° C. to 530° C. under a pressure of 0–3 kg/cm<sup>2</sup>.A and recovering the substantially isotropic hydrogenated pitch having a softening starting temperature of 100°–200° C., a quinoline insoluble content of less than 2 wt% and a xylene insoluble content of more than 30 wt%, from the bottom of said second distillation or flash distillation column; and

a third step of subjecting said substantially isotropic hydrogenated pitch to a heat treatment at a temperature of 380°–500° C. under a reduced or atmospheric pressure to convert said substantially isotropic hydrogenated pitch to a mesophase pitch.

4,789,457

#### PRODUCTION OF HIGH OCTANE GASOLINE BY HYDROCRACKING CATALYTIC CRACKING PRODUCTS

Ronald H. Fischer, Cherry Hill; Yun-Yang Huang, Voorhees; Rene B. LaPierre, Medford, and Philip Varghese, Voorhees, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 940,382, Dec. 10, 1986, Pat. No. 4,738,766, and Ser. No. 825,294, Feb. 3, 1986, Pat. No. 4,676,887, which is a continuation-in-part of Ser. No. 740,677, Jan. 3, 1985, abandoned. This application Jun. 22, 1987, Ser. No. 64,737

The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> C10G 69/10

U.S. Cl. 208—68

21 Claims

1. A process for producing a high octane gasoline having an octane number of at least 87 (RON +0), which comprises hydrocracking a highly aromatic, substantially dealkylated hydrocarbon feed produced by the catalytic cracking of a hydrocarbon fraction, the feed having an initial boiling point of at least 300° F., an aromatic content of at least 50 weight percent, and a hydrogen content not more than 12.5 weight percent at a hydrogen partial pressure of not more than 1000 psig and a conversion to a hydrocarbon fraction which has a boiling range which extends from the boiling point of a C<sub>5</sub> hydrocarbon to 385° F., of not more than 50 vol. percent and numerically equal to not more than 0.05 times the hydrogen pressure (psig) to gasoline boiling range products, and recycling the fraction which is not converted during the hydrocracking to the catalytic cracking step.

4,789,458

#### FLUID CATALYTIC CRACKING WITH PLURALITY OF CATALYST STRIPPING ZONES

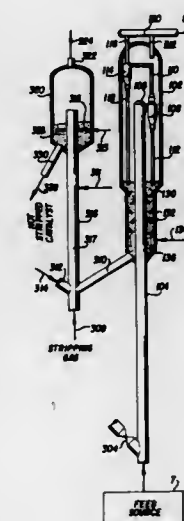
James H. Haddad, Princeton Junction; Hartley Owen, Belle Mead, and Klaus W. Schatz, Skillman, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 818,625, Jan. 14, 1986, abandoned, which is a continuation-in-part of Ser. No. 686,800, Dec. 27, 1984, abandoned. This application Jan. 15, 1987, Ser. No. 63,713

Int. Cl.<sup>4</sup> C10G 11/18

U.S. Cl. 208—151

28 Claims



1. A process for fluid catalytic cracking of a hydrocarbon feedstock, comprising:

passing a cracking catalyst and feedstock upwardly through a riser conversion zone under fluid catalytic cracking conditions to crack the feedstock and form a mixture of cracking products and catalyst,

discharging said mixture at a discharge temperature from the riser;

centrifugally separating catalyst from the mixture of cracking products and catalyst,

stripping the separated catalyst by contacting it with a stream of stripping gas in a confined preliminary stripping zone,

combining the stripping gas from the preliminary stripping zone with the cracking products and passing them to an exit of the preliminary stripping zone,

heating the stripped catalyst from the preliminary stripping zone by combining it with regenerated catalyst from a fluid catalytic cracking catalyst regenerator vessel to form combined catalyst,

hot stripping the combined catalyst by contact with a stream of stripping gas in a hot stripping zone at a hot stripping temperature between 100° F. above said discharge temperature and 1500° F., the regenerated catalyst having a temperature between 100° F. above the hot stripping temperature and 1600° F., to form hot stripped catalyst and a stream of stripping gas and stripped hydrocarbons,

combining the stream of stripping gas and stripped hydrocarbons from the hot stripping zone with the combined stream from the preliminary stripping zone outside the preliminary stripping zone, and

regenerating the hot stripped catalyst in a regenerator by contact with an oxygen-containing stream at regeneration conditions including a temperature in the range from 100° F. above that of the hot stripping temperature to 1600° F.

4,789,459

#### PROCESS FOR RECOVERING POWER FROM A FLUID CATALYTIC CRACKING UNIT USED PARTICULARLY FOR THE TREATMENT OF HEAVY CHARGES

Daniel Lambroso, Ruell-Malmaison, and Jean-Paul LePage, Le Vesinet, both of France, assignors to Institut Français du Pétrole, Ruell-Malmaison, France

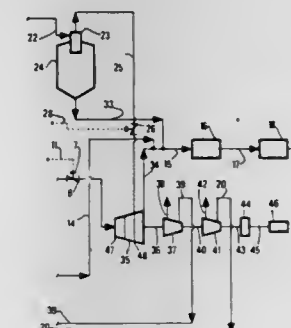
Filed Oct. 17, 1986, Ser. No. 920,342

Claims priority, application France, Oct. 17, 1985, 85 15551; Feb. 7, 1986, 86 01807

Int. Cl.<sup>4</sup> B01D 47/00

U.S. Cl. 208—155

7 Claims



1. A process for fluid catalytic cracking of a hydrocarbon charge in a reaction zone, whereafter the catalyst is withdrawn from the reaction zone and then partially regenerated in a first regeneration zone, withdrawn from said first regeneration zone and fed to a second regeneration zone whose pressure is lower than the pressure prevailing in said first regeneration zone, said process being characterized in that the fumes withdrawn from the first regeneration zone, after removal therefrom of the catalyst fine particles eventually contained therein, are supplied to a turbine comprising several stages, the pressures in each stage decreasing in the direction of flow of the fumes passing therethrough, said fumes being thus introduced in the stage of higher pressure of the turbine, said process being also characterized in that the fumes withdrawn from the second regeneration zone, after removal therefrom of the fine catalyst particles eventually contained therein, are conveyed to said turbine in a stage thereof other than that to which are supplied the fumes withdrawn from the first regeneration zone, the stage at which are supplied the fumes from the second regeneration zone being at a pressure lower than or equal to the pressure of said fumes in the second regeneration zone.

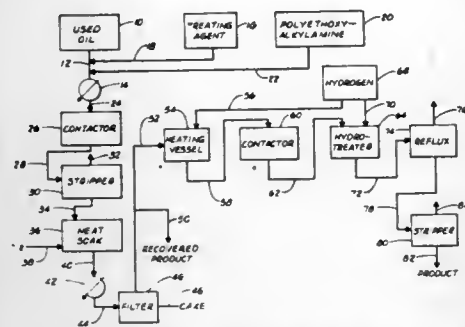
4,789,460  
PROCESS FOR FACILITATING FILTRATION OF USED LUBRICATING OIL

Donald C. Tabler, Fort Collins, Colo., and Marvin M. Johnson, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 10, 1987, Ser. No. 83,262  
Int. Cl.<sup>4</sup> C10M 11/00

U.S. Cl. 208—180

30 Claims



1. In a process for filtering contaminants from oil, the improvement comprising admixing a polyalkoxyalkylamine with said oil in an amount sufficient to coagulate at least a portion of said contaminants and to improve the filtration rate of said oil.

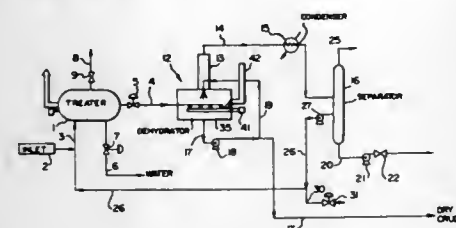
4,789,461  
METHOD FOR REMOVING WATER FROM CRUDE OIL CONTAINING SAME

Ronald T. Clare, and Wayne J. N. Egan, both of Calgary, Canada, assignors to Colt Engineering Corporation, Calgary, Canada

Continuation-in-part of Ser. No. 554,471, Nov. 22, 1983, abandoned. This application Aug. 4, 1986, Ser. No. 892,380  
Int. Cl.<sup>4</sup> C10G 33/00

U.S. Cl. 208—187

7 Claims



1. A method for dehydrating crude oil containing water, comprising providing a casing containing a quantity of liquid crude oil and having a liquid surface in said casing, and heating said liquid crude oil in said casing for maintaining said liquid crude oil above a distillation temperature, spraying crude oil containing water onto the surface of the heated liquid crude oil in the casing so as to cause distillation of water and light hydrocarbons from the sprayed crude oil, removing the distilled water and light hydrocarbon vapors from an upper portion of said casing above said liquid surface, and withdrawing dehydrated crude oil from a lower portion of said casing below said liquid surface.

4,789,462  
REVERSE-GRADED CATALYST SYSTEMS FOR HYDRODEMETHALATION AND HYDRODESULFURIZATION

Donald F. Byrne, Concord; David R. Johnson, San Francisco, and John V. Heyse, Crockett, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Filed Sep. 29, 1986, Ser. No. 913,837  
Int. Cl.<sup>4</sup> C10G 45/04

U.S. Cl. 208—213

27 Claims

1. A process for hydrodemetalating and hydrodesulfurizing a hydrocarbon feedstock using a reverse-graded catalyst system, capable of removing metals and sulfur from a hydrocarbon feedstock, which comprises:

passing said feedstock, in the presence of hydrogen, through said system at hydrodemetalating and hydrodesulfurizing conditions, wherein said system comprises at least two successive catalyst layers characterized as follows:

- (a) said first layer comprises a fixed bed of catalyst particles having less than 45 vol. % of their pore volume in the form of macropores above 1000 Å in diameter, having an average mesopore diameter ranging from about 50 Å to about 300 Å, having a surface area ranging from about 100 m<sup>2</sup>/g to about 300 m<sup>2</sup>/g, having at least 0.5 wt. % of a Group VIII metal, and having at least 3.0 wt. % of a Group VIB metal, and
- (b) said second layer comprises a fixed bed of catalyst particles having at least 25 vol. % of their pore volume in the form of macropores above 5000 Å in diameter, having at least 25 vol. % of their pore volume above 1000 Å in diameter, having a surface area ranging from about 100 m<sup>2</sup>/g to about 300 m<sup>2</sup>/g, having less than 10 wt. % of a Group VIII metal, and having less than 15 wt. % of a Group VIB metal.

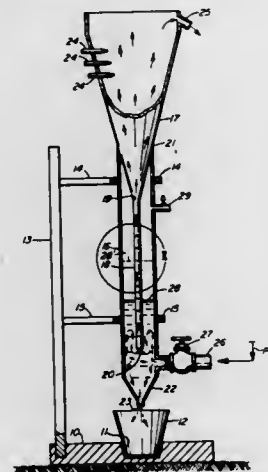
4,789,463  
DEMETHALATION OF HYDROCARBONACEOUS FEEDSTOCKS USING HYDROXO-CARBOXYLIC ACIDS AND SALTS THEREOF

John G. Reynolds, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Aug. 28, 1986, Ser. No. 901,343  
Int. Cl.<sup>4</sup> C10G 17/00

U.S. Cl. 208—252

13 Claims



1. An aqueous extraction method for demetalizing Group VIII metals from hydrocarbonaceous feedstock, said process comprising: mixing said hydrocarbonaceous feedstock with an aqueous solution of a metals sequestering agent comprising hydroxycarboxylic acids, salts thereof, or mixtures thereof; and separating the substantially demetalated hydrocarbonaceous feedstock from the aqueous solution; wherein the feed-

stock to be demetalated is selected from the group consisting of crude petroleum, atmospheric or vacuum residua, solvent deasphalted oil derived from these crudes or residua, shale oil, liquefied coal, and tar sand effluent.

4,789,464  
MINERAL SEPARATOR  
Michael H. Kuryluk, Comp 109 Lakeview Ave., Lr. Sackville, Halifax, N.S. B4C 3B1, Canada  
Filed Aug. 20, 1987, Ser. No. 87,301  
Int. Cl.<sup>4</sup> B03B 5/68

U.S. Cl. 209—161

3 Claims

1. Apparatus for gravity separation of small solid particles having a generally uniform grain size and surface roughness but different specific weight, said apparatus comprising, in combination:

- (a) a generally upright inner conduit means comprised of (i) a transparent pipe open at both ends, and (ii) a funnel, said funnel being connected with the pipe at the upper end of the latter and forming an upwardly and outwardly directed extension thereof;
- (b) a generally upright, transparent housing, the housing having a lower portion surrounding the lower end of the pipe and provided with a discharge opening disposed at a level below that of the lower end of said pipe, and the housing having an upper portion which is extended to contact the inner conduit means such that the housing upper portion encloses the inner conduit means at a point intermediate the upper end of the inner conduit means and the lower end of said pipe;
- (c) pipe securement means for maintaining said pipe within said housing;
- (d) an overflow discharge operatively associated with said funnel;
- (e) stirring means for maintaining a mixture of the particles contained in the funnel in a suspended state;
- (f) water supply means for supplying a controlled flow of water into said lower portion of said housing;
- (g) the cross-sectional area of said discharge opening being smaller than that of the opening at the lower end of said pipe;
- (h) said housing having air valve means disposed at a level above a predetermined uppermost operational level of water in said housing.

4,789,465  
HERBICIDAL PYRIDINE N-OXIDE SULFONYLUREAS  
William E. Barnette, West Chester; Thomas R. Dean, Wilmington; Wallace C. Petersen, Hockessin, and Barry A. Wexler, Wilmington, all of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 929,980, Nov. 12, 1986, abandoned.  
This application Aug. 31, 1987, Ser. No. 91,497  
Int. Cl.<sup>4</sup> C07D 401/12, 401/14; A01N 43/54

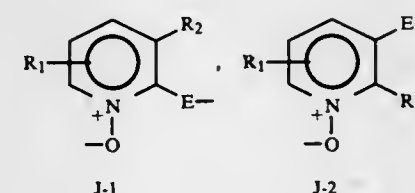
U.S. Cl. 71—90

25 Claims

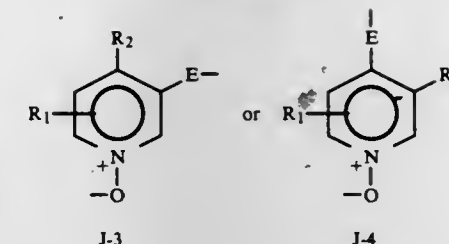
1. A compound of the formula:



wherein  
J is

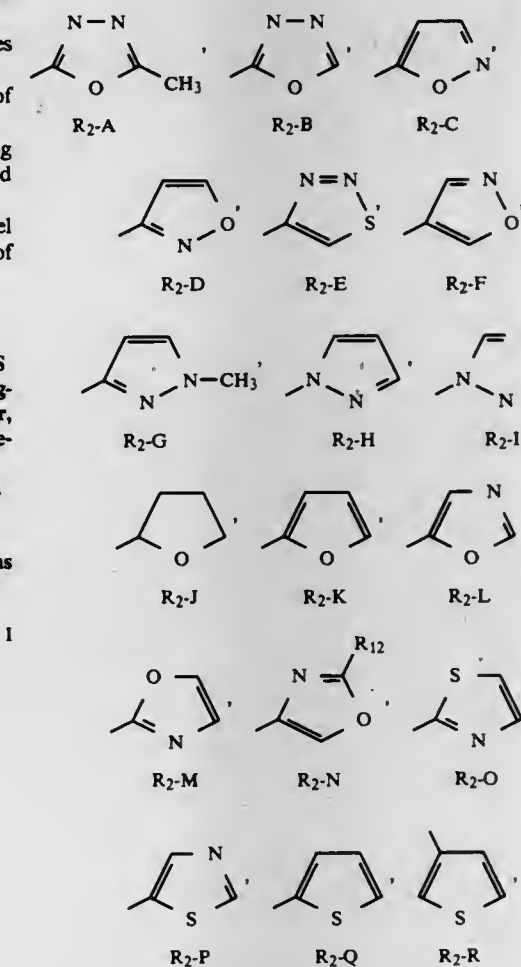


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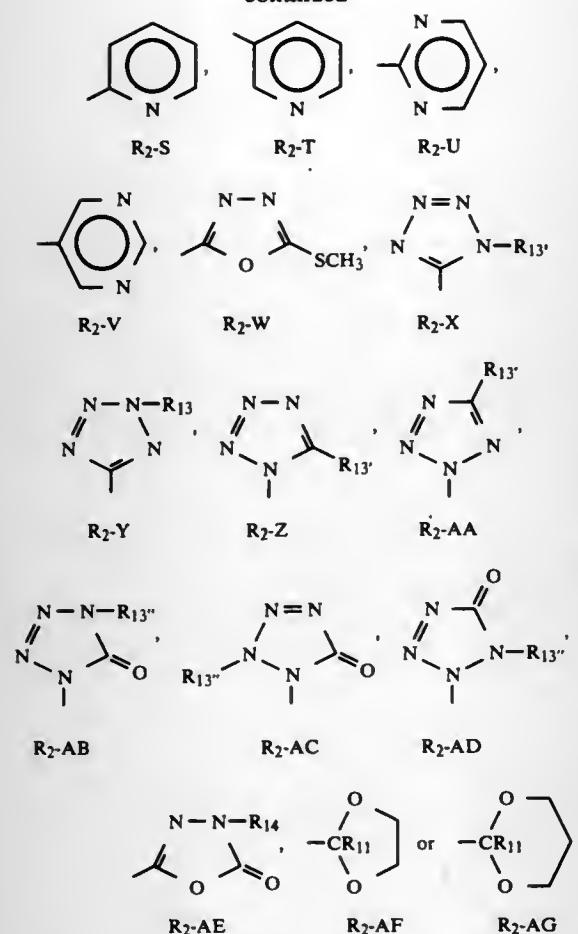
wherein

R is H or CH<sub>3</sub>;  
E is a single bond or CH<sub>2</sub>;  
W is O, S or NR<sub>x</sub>;  
R<sub>x</sub> is H, C<sub>1</sub>-C<sub>3</sub> alkyl or C<sub>1</sub>-C<sub>3</sub> alkoxy;  
R<sub>1</sub> is H, F, Cl, Br, C<sub>1</sub>-C<sub>3</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> haloalkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy, C<sub>1</sub>-C<sub>3</sub> haloalkoxy or C<sub>1</sub>-C<sub>3</sub> thioalkyl;  
R<sub>2</sub> is H, Cl, Br, F, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, cyclopropyl optionally substituted by 1-4 halogen, cyclobutyl optionally substituted by 1-4 halogen, C<sub>2</sub>-C<sub>4</sub> alkenyl optionally substituted by halogen, C<sub>2</sub>-C<sub>4</sub> alkynyl optionally substituted by halogen, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkoxy, C<sub>3</sub>-C<sub>4</sub> alkenyloxy, C<sub>3</sub>-C<sub>4</sub> alkynyloxy, NO<sub>2</sub>, CO<sub>2</sub>R<sub>3</sub>, NR<sub>4</sub>R<sub>5</sub>, S(O)<sub>n</sub>R<sub>6</sub>, SO<sub>2</sub>NR<sub>7</sub>R<sub>8</sub>, C(O)NR<sub>9</sub>R<sub>10</sub>,

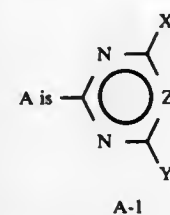
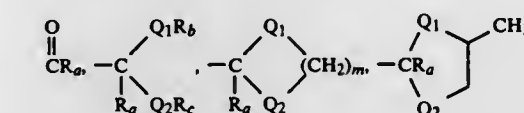




-continued



n is 0, 1 or 2;

R<sub>3</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl, C<sub>2</sub>-C<sub>3</sub> haloalkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy, C<sub>3</sub>-C<sub>4</sub> alkenyl, CH<sub>2</sub>(C<sub>3</sub>-C<sub>5</sub> cycloalkyl) or C<sub>3</sub>-C<sub>4</sub> alkynyl;R<sub>4</sub> is H or C<sub>1</sub>-C<sub>3</sub> alkyl;R<sub>5</sub> is C<sub>1</sub>-C<sub>2</sub> alkyl;R<sub>6</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>4</sub> alkenyl, C<sub>2</sub>-C<sub>4</sub> alkoxyalkyl or C<sub>1</sub>-C<sub>3</sub> haloalkyl;R<sub>7</sub> is H or C<sub>1</sub>-C<sub>2</sub> alkyl;R<sub>8</sub> is C<sub>1</sub>-C<sub>2</sub> alkyl or C<sub>1</sub>-C<sub>2</sub> alkoxy;R<sub>9</sub> is H or C<sub>1</sub>-C<sub>3</sub> alkyl;R<sub>10</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl;R<sub>11</sub> is H or CH<sub>3</sub>;R<sub>12</sub> is H or CH<sub>3</sub>;R<sub>13</sub> is H, C<sub>1</sub>-C<sub>3</sub> alkyl, allyl, C<sub>1</sub>-C<sub>3</sub> haloalkyl or C<sub>1</sub>-C<sub>3</sub> alkyl substituted with C<sub>1</sub>-C<sub>2</sub> alkoxy;R<sub>13'</sub> is H, C<sub>1</sub>-C<sub>3</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> haloalkyl, allyl, C<sub>1</sub>-C<sub>2</sub> alkoxy, C<sub>1</sub>-C<sub>2</sub> haloalkoxy or C<sub>1</sub>-C<sub>2</sub> alkylthio;R<sub>13''</sub> is H, C<sub>1</sub>-C<sub>3</sub> alkyl, allyl or C<sub>1</sub>-C<sub>3</sub> haloalkyl;R<sub>14</sub> is C<sub>1</sub>-C<sub>3</sub> alkyl, CH<sub>2</sub>OCH<sub>3</sub> or CH<sub>2</sub>CN;X is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>1</sub>-C<sub>4</sub> haloalkylthio, C<sub>1</sub>-C<sub>4</sub> alkylthio,halogen, C<sub>2</sub>-C<sub>5</sub> alkoxyalkyl, C<sub>2</sub>-C<sub>5</sub> alkoxyalkoxy, amino, C<sub>1</sub>-C<sub>3</sub> alkylamino or di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino;Y is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkoxy, C<sub>1</sub>-C<sub>4</sub> haloalkylthio, C<sub>1</sub>-C<sub>4</sub> alkylthio, C<sub>2</sub>-C<sub>5</sub> alkoxyalkyl, C<sub>2</sub>-C<sub>5</sub> alkoxyalkoxy, amino, C<sub>1</sub>-C<sub>3</sub> alkylamino, di(C<sub>1</sub>-C<sub>3</sub> alkyl)amino, C<sub>3</sub>-C<sub>4</sub> alkenyloxy, C<sub>3</sub>-C<sub>4</sub> alkynyloxy, C<sub>2</sub>-C<sub>5</sub> alkylthioalkyl, C<sub>2</sub>-C<sub>5</sub> alkylsulfinylalkyl, C<sub>2</sub>-C<sub>5</sub> alkylsulfonylalkyl, C<sub>1</sub>-C<sub>4</sub> haloalkyl, C<sub>2</sub>-C<sub>4</sub> alkynyl, C<sub>3</sub>-C<sub>5</sub> cycloalkyl, azido, cyano,

or

N(OCH<sub>3</sub>)CH<sub>3</sub>;

m is 2 or 3;

Q<sub>1</sub> and Q<sub>2</sub> are independently O or S;R<sub>6</sub> is H or C<sub>1</sub>-C<sub>3</sub> alkyl;R<sub>6</sub> and R<sub>7</sub> are independently C<sub>1</sub>-C<sub>3</sub> alkyl; andZ is CH, CCH<sub>3</sub>, CC<sub>2</sub>H<sub>5</sub>, CCl or CBr;

and their agriculturally suitable salts; provided that

(1) when X is halogen, then Z is CH and Y is OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, NH<sub>2</sub>, NHCH<sub>3</sub>, N(CH<sub>3</sub>)<sub>2</sub>, OCF<sub>2</sub>H, OCF<sub>2</sub>Br or N(OCH<sub>3</sub>)CH<sub>3</sub>;(2) when W is S, then R is H, E is a single bond, Z is CH and Y is CH<sub>3</sub>, OCH<sub>3</sub>, OC<sub>2</sub>H<sub>5</sub>, CHHd 2OCH<sub>3</sub>, C<sub>2</sub>H<sub>5</sub>, CF<sub>3</sub>, SCH<sub>3</sub>, OCH<sub>2</sub>CH=CH<sub>2</sub>, OCH<sub>2</sub>=CH, OCH<sub>2</sub>CH<sub>2</sub>OCH<sub>3</sub>, CH(OCH<sub>3</sub>)<sub>2</sub> or

nd

(3) when the total number of carbon atoms of X and Y is greater than four, then the combined number of carbons of R<sub>1</sub> and R<sub>2</sub> is less than or equal to six and(4) when X or Y is C<sub>1</sub> haloalkoxy, then Z is CH.

19. A method for controlling the growth of undesired vegetation which comprises applying to the locus to be protected an effective amount of the compound of claim 1.

4,789,466

## METHOD OF SEPARATING NON-SULFIDIC MINERALS BY FLOTATION

Wolfgang von Rybinski, Duesseldorf, and Rita Koester, Neuss, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany  
Filed May 9, 1986, Ser. No. 861,672

Claims priority, application Fed. Rep. of Germany, May 11, 1985, 3517154

Int. Cl.<sup>4</sup> B03D 1/02

U.S. Cl. 209-166

16 Claims

1. A process for separating non sulfidic minerals from an ore by flotation which comprises the steps of

A. contacting the ore with a mineral collector-active quantity of a mixture of

(a) at least one reaction adduct of ethylene oxide and propylene oxide with a C<sub>8</sub>-C<sub>22</sub> fatty alcohol; and

(b) at least one anionic, cationic or amphoteric surfactant, in the presence of water; and

B. aerating the aqueous mixture from step A. to produce a foam containing the non-sulfidic mineral; and

C. separating the foam from the aqueous mixture.

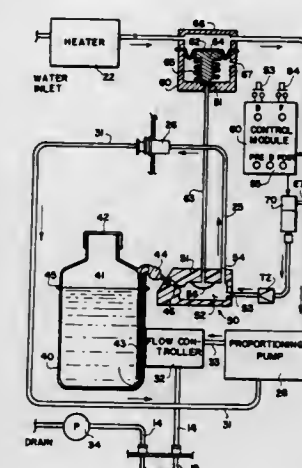
4,789,467

## AUTOMATED DISINFECTION SYSTEM

Edward R. Lindsay, Clearwater, Robert C. Kasmierczyk, and Norman F. Cameron, both of St. Petersburg, all of Fla., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.  
Filed Apr. 30, 1986, Ser. No. 858,437Int. Cl.<sup>4</sup> B01D 13/00

U.S. Cl. 210-103

12 Claims



1. An automated disinfection system for installation in a hemodialysis machine, said machine having a proportioning pump with a water inlet means, a suction inlet means and an outlet means connected to a dialysate system, said disinfection system comprising:

a vent valve having a flow path between means defining a water source and said water inlet of said proportioning pump, said vent valve including a housing having a vent chamber and means defining a vent opening to atmospheric pressure and a valve seat, said valve seat having a biased valve body associated therewith, said valve body attached to a diaphragm disposed in said housing, said diaphragm defining said flow path and said vent chamber, said valve body closing said valve seat only when water under pressure is present in said flow path;

a remote operated valve having an inlet means connected to said water inlet of said proportioning pump and a water outlet means;

a manifold block having means defining a chamber, a vent line communicating with said manifold chamber and connected to said valve seat of said vent valve, a disinfectant output line from said manifold chamber connected to said suction inlet of said proportioning pump, and a disinfectant input connection communicating with said manifold chamber;

a check valve disposed in said disinfectant input connection of said manifold block, said check valve permitting flow of disinfectant only into said manifold chamber;

a container for a disinfectant concentrate solution, said container having an output connector inserted into said disinfectant input connection of said manifold block; and control means operatively connected to said remote operated valve for sequentially opening same to water rinse said dialysate system, and closing said remote operated valve to disinfect said dialysate system.

2. In a hemodialysis machine having means defining a source of water under pressure, a proportioning pump having an inlet means connected to said source and an outlet means connected to a dialysate line system, and a suction line, wherein the improvement comprises:

a manifold block having an outlet means connected to said suction line, a first inlet means and a second inlet means; a check valve connected to said first inlet and having an input connection to means defining a source of disinfection solution, said check valve opening under negative

pressure in said manifold block and closing under positive pressure in said manifold block;  
a remote controlled valve connected between said water source and said second inlet; and  
control and timing means connected to said remote controlled valve for selectively opening said remote controlled valve, said proportioning pump drawing water via said suction line into said dialysate line system, and said control and timing means selectively closing said remote controlled valve, such that said proportioning pump draws a disinfection solution via said suction line to disinfect said dialysate line system.

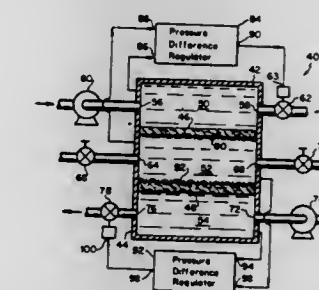
4,789,468

## IMMOBILIZED-INTERFACE SOLUTE-TRANSFER APPARATUS

Kamalesh K. Sirkar, Scotch Plains, N.J., assignor to The Trustees of the Stevens Institute of Technology, Hoboken, N.J.  
Filed Aug. 28, 1984, Ser. No. 644,895Int. Cl.<sup>4</sup> B01D 13/00

U.S. Cl. 210-137

19 Claims



1. An immobilized-interface solute-transfer unit for transferring a solute from a feed solution to an extractant liquid, the solute-transfer unit comprising:

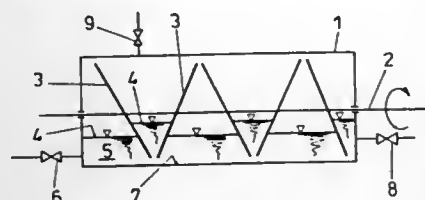
(a) a fluid-tight housing;

(b) a porous membrane located in and connected to the housing, the porous membrane including pores having effective pore diameters in the range of from about 7 nm to about 10 μm, the porous membrane being preferentially wettable by one of the feed-solution and liquid extractant, the porous membrane dividing the housing into a feed solution chamber and an extractant chamber, the housing having a feed solution inlet port and a feed solution outlet port which communicate with the feed solution chamber and an extractant inlet port and an extractant outlet port which communicate with the extractant chamber;

(c) pressure difference control means for maintaining a difference between a liquid pressure of a feed solution in the feed solution chamber and a liquid pressure of an extractant in the extractant chamber substantially within a predetermined pressure range so that an interface between the feed solution and the extractant is substantially immobilized at the membrane, to effectively prevent the formation of a dispersion of feed solution and extractant in either chamber on opposing sides of the membrane.

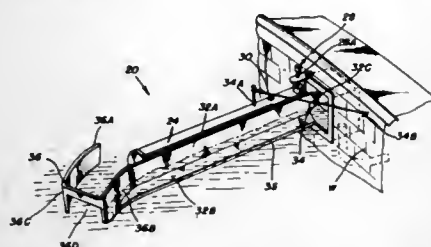
**4,789,469**  
**APPARATUS FOR CONTINUOUSLY INTRODUCING OR REMOVING GASES INTO AND/OR FROM LIQUIDS**  
 Vilim Cvitan; Karl Faltejsch, both of Linz; Gottfried Klnar, and Reinhard Hanke, both of Leoben, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria  
 PCT No. PCT/AT86/00029, § 371 Date Dec. 4, 1986, § 102(e) Date Dec. 4, 1986, PCT Pub. No. WO86/06060, PCT Pub. Date Oct. 23, 1986

PCT Filed Apr. 9, 1986, Ser. No. 1,641  
 Claims priority, application Austria, Apr. 9, 1985, 1067/85  
 Int. Cl. C02F 3/18; B01F 3/04  
 U.S. Cl. 210—150 12 Claims



1. Apparatus for introducing or removing gases into liquids or from liquids, in particular substrates being subject to a biological conversion, comprising a rotor rotatably supported within a horizontal tubular receptacle for rotation around a rotation axis extending in essentially parallel relation to the surface of a liquid in the receptacle, the rotor having plates non-rotatably connected with the rotor and arranged in transverse direction to said rotation axis and at axially adjacent locations, said plates being partially but not wholly immersed in the liquid in the tubular receptacle, the surface of said plates being rough, and axially adjacent plates having in at least one section comprising the rotation axis alternately an angle of more and less than 90°, the circumference of the plates being shaped relative to and spaced from the inner surface of the receptacle a small distance such that the space throttles liquid flow therethrough with the result that, upon rotation of the rotor about said rotation axis, the liquid level between adjacent plates is alternately lifted and lowered, the receptacle having connected thereto at least one liquid inlet, one liquid outlet, and at least one gas inlet and gas outlet.

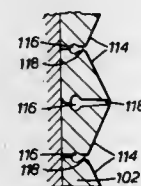
**4,789,470**  
**SKIMMER-DIVERter ASSEMBLY FOR REMOVING DEBRIS FROM SWIMMING POOLS AND THE LIKE**  
 John F. Wards, 402 Bunker Hill Dr., Pensacola, Fla. 32506  
 Filed Aug. 18, 1987, Ser. No. 86,508  
 Int. Cl. E04H 3/20  
 U.S. Cl. 210—169 22 Claims



1. A skimmer-diverter assembly for swimming pools and the like having a water circulation and filtration system and a skimmer intake at a side wall thereof and having an established flow direction of circulation, said assembly comprising:  
 an elongated floating arm portion having one end thereof adapted to be positioned adjacent the downstream side of a said skimmer intake and an opposite end;  
 mounting means on said one end for pivotally mounting said assembly adjacent a said skimmer intake to permit said

opposite end to be positioned, selectively, away from and adjacent to a said side wall;  
 first flow diverting means on said floating arm portion extending from a position above the water surface in said pool to a position below said water surface and constraining water circulating in said established direction of circulation to flow both upwardly and inwardly along the upstream side of said arm portion and into a said skimmer intake when the opposite end of said arm portion is away from said side wall and said arm is angled acutely with respect to said wall into the said direction of circulation to effect an operative position thereof;  
 second flow diverting means on said other end of said arm portion extending from a position above to a position below the said water surface for enhancing the flow inward along said arm and including means for constraining an enhanced flow inwardly along the downstream side of said arm when said arm is in said operative position; and  
 retaining means for selectively retaining said arm portion in said operative position.

**4,789,471**  
**PRESSURE FILTERS**  
 George W. Wall, Rest Easy, St. Blazey Road, Par, Cornwall, and Glyn T. Jones, 14, Cooperage Road, Trewoon, St. Austell, Cornwall, both of United Kingdom  
 Continuation-in-part of Ser. No. 572,643, Jan. 20, 1984, abandoned. This application Dec. 20, 1985, Ser. No. 811,803  
 Claims priority, application United Kingdom, Jan. 23, 1983, 8304723; Jan. 24, 1983, 8301927  
 Int. Cl. B01D 25/12, 29/16  
 U.S. Cl. 210—231 19 Claims

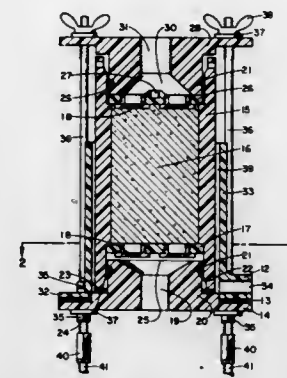


1. A supporting assembly for a pressure filter, comprising:  
 (a) a supporting member having an outer surface;  
 (b) a facing having an inner surface supported over substantially the whole of its area by the outer surface of the supporting member, and an outer surface means for supporting a filter medium in use of the pressure filter;  
 (c) the facing formed by a plurality of facing elements comprising laths which are applied to the outer surface of the supporting member in abutment with one another;  
 (d) adjacent ones of the facing elements defining between them:  
 (i) a duct disposed inwardly of the outer surface for conveying liquid generally parallel to the outer surface, and  
 (ii) an aperture which is narrower than the duct, for providing communication between the duct and the region between the outer surface of the facing and the filter medium.

**4,789,472**  
**ADSORPTION APPARATUS**  
 Isadore Turetsky, 23940 Welby Way, Conoga Park, Calif. 91307  
 Filed Mar. 27, 1987, Ser. No. 30,972  
 Int. Cl. B01D 27/02  
 U.S. Cl. 210—248 2 Claims

1. An adsorption apparatus for treating liquids, said apparatus comprising: an adsorbent element having inlet and outlet means for flow of fluid therethrough, said element including a hollow cylinder, adsorbent medium disposed intermediate

foraminous members within said hollow cylinder, separable top and bottom end wall members disposed in the upper and lower end sections respectively, of said element, a passage through each of said wall members; a normally drained, dry



housing which is lesser in height than said element, and having a drain passage, a bottom wall member, and a passage through said housing bottom wall members; said element disposed in said housing, and means to keep sidewalls of said element and said housing in fixed spaced relationship.

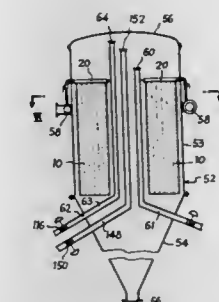
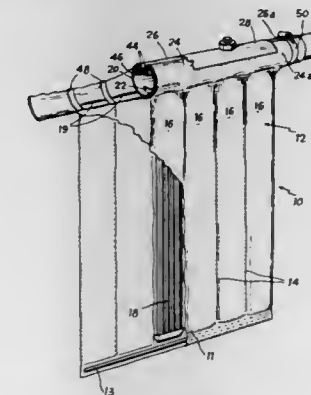
**4,789,473**  
**FILTER FOR OBTAINING PLASMA OR PLASMA WATER**  
 Bernd Mathieu; Wolfram Weber, both of Spiesen-Elversberg, and Wolfgang Schulz, St. Wendel, all of Fed. Rep. of Germany, assignors to Fresenius AG, Bad Hamburg v.d.H., Fed. Rep. of Germany  
 Filed Jan. 8, 1987, Ser. No. 1,815  
 Claims priority, application Fed. Rep. of Germany, Jan. 10, 1986, 3600527  
 Int. Cl. B01D 13/01  
 U.S. Cl. 210—321.8 3 Claims



1. A hollow fiber filter for obtaining plasma or plasma water, comprising:  
 (a) a hollow, tubular housing having an interior chamber, a longitudinal axis and open ends;  
 (b) a plurality of elongated hollow fibers, disposed within said housing and being substantially parallel to said longitudinal axis of said housing and extending the length of said housing;  
 (c) two casting compound members disposed within said open ends of said housing, effectively sealing both ends of said housing, while permitting the passage of said hollow fibers therethrough, thereby defining a free flow space within said housing, said free flow space having a cross-sectional area equal to the cross-sectional area of said interior chamber less the combined cross-sectional area of said hollow fibers, and said casting compound members each having a planar face adjacent to said free flow space, said planar face being disposed in a plane non-perpendicular to said longitudinal axis of said housing;  
 (d) at least two hollow fluid flow connectors, each having a longitudinal axis, said fluid flow connectors sealingly affixed to, and forming an intersection with said housing in close proximity to said casting compound members and in flow communication with said free flow space, said connectors being disposed in a manner in which said longitudi-

dinal axis of each fluid flow connector forms an acute angle with respect to said longitudinal axis of said housing, the cross-sectional area of said housing being approximately equal to the cross-sectional area of said free flow space, forming means to improve fluid flow through said connectors and housing, and reducing turbulent or stagnant flow characteristics; and  
 (e) at least one plasma outlet, said outlet being connected to, and in communication with said hollow fibers external to said casting compound members and said free flow space.

**4,789,474**  
**FILTER FOR LIQUIDS LADEN WITH SOLID PARTICLES, AND A FILTER INSTALLATION INCLUDING SUCH A FILTER**  
 Guy Gaudfrin, Allée du bec de Canard, Golf., 78860 Saint-Nom-la-Breteche, France  
 Filed Oct. 10, 1986, Ser. No. 917,489  
 Claims priority, application France, Oct. 17, 1985, 85 15428  
 Int. Cl. B01D 29/16, 29/38  
 U.S. Cl. 210—333.01 27 Claims



1. A filter for liquids laden with solid particles, the filter comprising a filter vat provided with an inlet orifice for the liquid to be filtered, an outlet orifice for the filtered liquid or filtrate, and an evacuation orifice for solid particle sludge, together with a plurality of filter elements in the form of filter medium cloths disposed around filter leaves formed as rigid plates and arranged substantially vertically in said filter vat between said inlet and outlet orifices, said filter medium cloths being shaped as elongate pockets which are fitted substantially freely over said leaves, each of said filter leaves formed as rigid plates being provided with longitudinally-extending drainage channels, said pockets having openings directed upwardly and in communication with said outlet orifice, and suspension means attached to each of said filter leaves and to support members for suspending said leaves directly from and beneath said support members fixed in said vat and said suspension means being formed for rendering said leaves free to rock sideways.



4,789,475

# WATER PURIFICATION MATERIAL, PROCESS THEREFOR, AND DEVICE FOR THE REMOVAL OF HEAVY METAL TOXINS

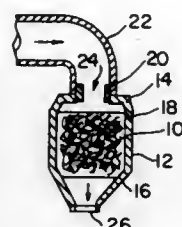
Richard A. Harte, Redwood City, and David B. Wilson, Sunnyvale, both of Calif., assignors to Environmental Concerns, Inc., Belmont, Calif.

Filed Jun. 23, 1987, Ser. No. 65,829

Int. Cl.<sup>4</sup> B01D 23/14; B01J 20/32

U.S. Cl. 210—502.1

10 Claims



1. A process for the manufacture of a filter bed material including the following steps: bathing a bed material in a solution of 0.01% to 1.5% polymer solution, said polymer solution containing a chelating agent; agitating said solution; removing said bed material from the solution; drying said bed material; treating said bed material with an acidic solution; removing said bed material from the acidic solution; and drying said bed material.

4,789,476

# CYCLONE SEPARATOR WITH TWO SEPARATING ZONES AND STATIC GUIDE MECHANISMS

Siebert Schulz, Kirchweg 27, D-3101 Lachendorf, Fed. Rep. of Germany

PCT No. PCT/DE86/00119, § 371 Date Mar. 6, 1987, § 102(e) Date Mar. 6, 1987, PCT Pub. No. WO86/05417, PCT Pub. Date Sep. 25, 1986

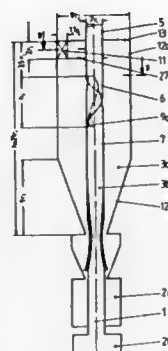
PCT Filed Mar. 19, 1986, Ser. No. 3,381

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 3509789; Mar. 4, 1986, 3607023

Int. Cl.<sup>4</sup> E01D 17/038

U.S. Cl. 210—512.1

8 Claims



1. Cyclone separator comprising two separating zones (3a, 3b) and static guide mechanisms for improving the separating capacity with respect to very finely dispersed particles from flowing gases and reducing the pressure drop or for influencing the field of flow of a centrifugal force separator with a

tangential, spiral or helical intake channel (11), including an upper cylindrical (12a) and a lower conical (12b) cyclone casing, a solids collecting container (2a) located below it, whilst in the cylindrical separating zone, a cylindrical immersion tube (5) for removing the pure gas flow projects centrally from above into the cyclone casing, including an immersion tube column comprising a series connection of the immersion tube (5), a slotted slit immersion tube (6) with a helical or straight slit channel and a central immersion tube (7), by which the cyclone axis (1) is surrounded over the entire separating zone height h, is located in the cylindrical interface of the cyclone separator, passes through the solid collecting container (2a) and is connected in gas tight manner to a second solids collecting container (2b) located below the first container, means for enabling the three partial immersion tubes (5, 6, 7) to be connected in reciprocally open manner and the slit immersion tube (6) is the sole sucking partial immersion tube.

4,789,477

# ARRANGEMENT FOR CHARGING GRANULAR OR PULP-LIKE MATERIAL TO A CONTAINER IN WHICH THE MATERIAL IS PROCESSED

Tore H. Nordlund, Torshälla, Sweden, assignor to Purac AB, Lund, Sweden

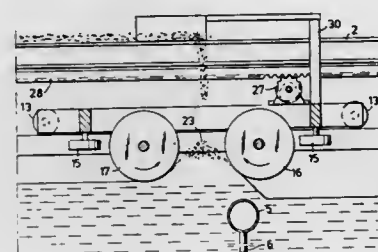
Filed Apr. 23, 1986, Ser. No. 854,804

Claims priority, application Sweden, Apr. 29, 1985, 8502088

Int. Cl.<sup>4</sup> B01D 21/24

U.S. Cl. 210—520

3 Claims



1. In an enclosure for laterally confining a large mass of granular or pulp-like material together with first conveyor means to introduce material into the upper portion of said enclosure, second conveyor means to remove material from the lower portion of said enclosure, and distribution means to distribute introduced material over the upper surface of said large mass, the improvement comprising that said distribution means includes:

- a carriage positioned in the upper portion of said enclosure,
- means to move said carriage over the upper surface of the mass in said enclosure,
- at least one pair of juxtaposed feed screws supported by said carriage, said feed screws:
  - being disposed side-by-side in a horizontal plane and in a generally parallel relationship with each other,
  - having an infeed section located adjacent one end portion of said feed screws which is adapted to receive material from said first conveyor means,
  - having means to rotate adjacent feed screws in opposite directions so that the material contacted by the helices of said feed screws will impart to the material a component of movement directed inwardly towards the space between adjacent screws and also a component of movement directed longitudinally away from said infeed section along the space between adjacent feed screws,

whereby the material introduced into said enclosure at one location by said first conveyor means will be spread out laterally from its point of introduction so as to achieve

a large mass within the enclosure that has a smoother and more level upper surface.

4,789,478

# CONVERSION OF INORGANIC IONS TO METAL SULFIDES BY MICROORGANISMS

Nathaniel W. Revis, 1060 W. Outer Dr.; Tanya R. Osborne, 108 Lynwood La., and Charles T. Hadden, 165 Waddell Cir., all of Oak Ridge, Tenn. 37830

Continuation-in-part of Ser. No. 918,767, Oct. 14, 1986, abandoned. This application Jan. 17, 1987, Ser. No. 63,579

Int. Cl.<sup>4</sup> C02F 1/62, 3/34

U.S. Cl. 210—611

23 Claims

1. A process for reducing the concentration of heavy metal ions in an aqueous waste solution, comprising the steps of:

- contacting the aqueous waste solution with a mixed culture of *Citrobacter freundii* and a dissimilatory sulfate reducer in the presence of nutrient sufficient to satisfy the nutritional requirements of the mixed culture for a time sufficient to produce sulfide ions from sulfide-ion precursors in the aqueous waste solution or the nutrient and to precipitate the heavy metal ions in the form of corresponding sulfides and
- removing the thus-precipitated sulfides from the waste solution.

21. A process for removing heavy metal, sulfur dioxide or sulfur trioxide contaminants from stack gases comprising the steps of

- passing the stack gases into a mixed culture of *Citrobacter freundii* and a dissimilatory sulfate reducer, in the presence of nutrients sufficient to satisfy the nutritional requirements of the mixed culture;
- contacting the thus-produced mixture of culture and dissolved or entrained stack gas components for a time sufficient to convert sulfur dioxide, sulfur trioxide or other sulfide precursors in the stack gases or the nutrient to sulfide;
- precipitating heavy metals as corresponding sulfides; and
- removing the thus-precipitated metal sulfides from the mixture of culture and dissolved or entrained stack gas components.

4,789,479

# PACKING FOR CHROMATOGRAPHY

Hatsuki Onitsuka, Nobeoka, and Nobuyoshi Karasawa, Hyuga, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

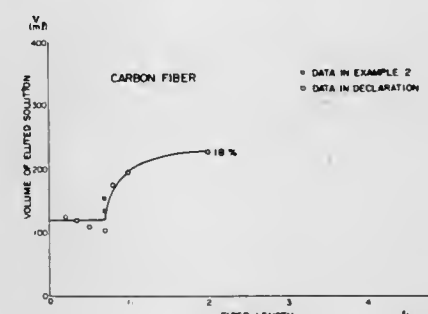
Continuation of Ser. No. 810,103, Dec. 17, 1985, abandoned, which is a continuation of Ser. No. 663,782, Oct. 23, 1984, abandoned, which is a division of Ser. No. 553,720, Sep. 19, 1983, abandoned. This application Aug. 17, 1987, Ser. No. 87,987

Claims priority, application Japan, Sep. 21, 1982, 57-163143

Int. Cl.<sup>4</sup> B01D 15/08

U.S. Cl. 210—635

18 Claims



1. In a chromatographic separation of materials in a liquid specimen wherein the specimen is passed through a column containing an adsorbent packing, thereby differentially to

adsorb materials in the specimen, and thereafter eluting the adsorbed material, the improvement which comprises employing as the packing a substantially homogeneous mixture of a granular adsorbent and a fiber, the fiber being present in about 0.5 to 60% by weight of dry fiber plus granular adsorbent, the fiber having a length up to about 0.7 mm and a ratio of length to diameter of at least about 5.

4,789,480

# MEMBRANE MODULE AND THE USE THEREOF FOR THE SEPARATION OF LIQUIDS ACCORDING TO THE PERVAPORATION PROCESS

Hartmut Brischke, Kurpfalzstr. 64, 6907 Nussloch, Fed. Rep. of Germany

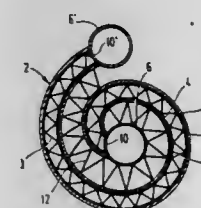
Continuation of Ser. No. 499,846, Jun. 1, 1983, abandoned. This application Jul. 8, 1985, Ser. No. 753,796

Claims priority, application Fed. Rep. of Germany, Jun. 1, 1982, 3220613

Int. Cl.<sup>4</sup> B01D 53/22

U.S. Cl. 210—640

11 Claims



1. A pervaporation membrane module for separating constituents of a mixture comprising a first substance and a second substance different from said first substance, comprised of

- at least one elongated membrane element having a first end and a second end, said membrane element comprising a first membrane disposed oppositely from a second membrane to define a cavity which is sealed along its longitudinal borders, said first membrane having an active separating surface (i) and said second membrane having an active separating surface (ii), such that active separating surface (i) faces active separating surface (ii) and both active separating surfaces (i) and (ii) face into said cavity;
- a first conduit and a second conduit, each in communication with said cavity and each sealingly joined, respectively, to said first end and said second end of said membrane element, wherein said membrane element is spirally wound around at least one of said first and second conduits; and
- means for providing that (a) feed flow of said mixture from one of said first conduit and said second conduit to the other conduit through said cavity is radial relative to said membrane element, (b) permeate flow through said membrane element is axial, (c) a pressure gradient is directed outwardly from said cavity, and (d) said permeate flow is from the inside to the outside of said cavity by pervaporation.

10. A pervaporation process for separating constituents of a mixture comprising a vaporizable first substance and a second substance different from said first substance, comprising (a) introducing said mixture into a membrane module comprised of

- at least one elongated membrane element having a first end and a second end, said membrane element comprising a first membrane disposed oppositely from a second membrane to define a cavity which is sealed long its longitudinal borders, said first membrane having an active separating surface (i) and said second membrane having an active separating surface (ii), such that active separating surface (i) faces active separating surface (ii) and both active separating surfaces (i) and (ii) face into said cavity, and

- (2) a first conduit and a second conduit, each in communication with said cavity and each sealingly joined, respectively, to said first end and said second end of said membrane element, wherein said membrane element is spirally wound around at least one of said first and second conduits;
- (b) conducting (i) feed flow of said mixture from one of said first conduit and said second conduit to the other conduit through said cavity radially relative to said membrane element and (ii) permeate flow through said membrane element axially;
- (c) imposing a pressure gradient directed outwardly from said cavity whereby said permeate flow is from the inside to the outside of said cavity; and
- (d) causing said first substance to vaporize upon passing from each cavity through said first and second membranes to produce a gaseous permeate.

4,789,481

## METAL RECOVERY

James A. Brierley; Corale L. Brierley, both of Socorro, N. Mex.; Raymond F. Decker, Houghton, Mich., and George M. Goyak, Harmony, Pa., assignors to Advanced Mineral Technologies, Inc., Golden, Colo.

Division of Ser. No. 777,061, Sep. 20, 1985, Pat. No. 4,690,894, which is a continuation-in-part of Ser. No. 661,917, Oct. 17, 1984, abandoned. This application Apr. 19, 1987, Ser. No. 51,290

Int. Cl.<sup>4</sup> C02F 1/28

U.S. Cl. 210-661

24 Claims

1. A process for treating an aqueous solution containing at least one heavy metal cation to remove said cation by sorption and recover said metal which comprises:

providing a biomass of the bacterium *Bacillus subtilis* characterized by cell walls and which is selective to the sorption of said at least one heavy metal cation, which bacterium has been treated with an amount of a caustic solution maintained at an elevated temperature above ambient and ranging up to boiling at a pH in excess of 9 sufficient to form a causticized biomass reaction product consisting essentially of material derived from the cell walls thereof having enhanced metal uptake properties following which said biomass reaction product is washed to remove excess alkaline solution therefrom,

contacting said solution with an amount of said biomass reaction product in granular form sufficient to sorb said cation into said biomass product, and thereafter separating the resulting metal-containing biomass from said solution.

4,789,482

## METHOD FOR SEPARATING LIQUID COMPOSITIONS ON THE BASIS OF MOLECULAR WEIGHT

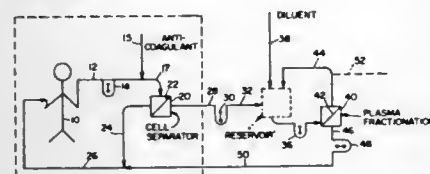
Anthony J. DiLeo, Westford, and Gastón de los Reyes, Framingham, both of Mass., assignors to Millipore Corporation, Bedford, Mass.

Filed Feb. 10, 1986, Ser. No. 828,106

Int. Cl.<sup>4</sup> B01D 13/00

U.S. Cl. 210-651

3 Claims



EXTRACORPOREAL CIRCUIT

1. A process for separating a blood plasma into a high molecular weight stream and a low molecular weight permeate stream utilizing a separation module having separation means comprising a plurality of thin channels or hollow fibers having walls through which ultrafiltration is effected, said separation

module having substantially an aspect ratio between about 50 and 5,000 and, defined by Equation 1

$$\frac{L}{h} = \left[ \frac{K}{12 \rho \mu} \frac{h}{L_p} \right]^{\frac{1}{2}} \quad \text{Equation 1}$$

said process comprising the steps of introducing said blood plasma into an inlet portion of said separation module at substantially a shear rate defined by Equation 2,

$$\gamma = \frac{\rho^2 D^2 \mu^{\frac{1}{2}}}{L_p^{\frac{1}{2}} h^{\frac{3}{2}}} \frac{1}{(1 + K)^2} \quad \text{Equation 2}$$

removing said high molecular weight stream and said low molecular weight stream from said separation module, recirculating at least a portion of said high molecular weight stream to an inlet portion of said separation module thereby to form a recirculation stream, and controlling the ratio of the recirculation stream flow rate to the permeate stream flow rate to between about 5 and 100 and so that the ratio of the transmembrane pressure at the outlet to said separation means to the transmembrane pressure at the inlet of said separation means to be between about 0.0 and 0.85 wherein the total membrane area in said module is defined by Equation 3

$$A = \frac{0.25 Q_p L (1 + K)^2}{D^2 K} \left[ \frac{\mu L_p}{h} \right]^{\frac{1}{2}} \quad \text{Equation 3}$$

4,789,483

## PROCESS FOR CONTROLLING THE BREAKING OF OIL-IN-WATER EMULSIONS

Brigitte Spei, Duesseldorf, and Volker Wehle, Haan, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

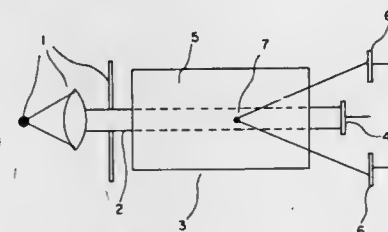
Filed Aug. 11, 1987, Ser. No. 84,660

Claims priority, application Fed. Rep. of Germany, Aug. 11, 1986, 3627199

Int. Cl.<sup>4</sup> B01D 17/05

U.S. Cl. 210-708

8 Claims



1. A process for controlling the breaking of an oil-in-water emulsion using an organic emulsion breaker comprising the steps of: providing an optimal dosage range for said breaker sufficient to produce reproducible results in minimal time, by, A. adding the organic emulsion breaker to the emulsion by slow intermittent or continuous addition to produce a broken water phase; B. continuously passing a beam of light through the broken water phase; C. continuing the slow addition of the organic emulsion breaker to the broken water phase; D. continuously or intermittently measuring both the unadsorbed light passing through the broken water phase and

the light scattered forward by oil droplets in the broken water phase;

E. determining from the measurements in step D. the turbidity of the broken water phase; and

F. discontinuing the addition of organic breaker when the turbidity reaches a first minimum value following a maximum value.

4,789,484

## TREATMENT OF ELECTROLESS NICKEL PLATING BATHS

Wei-chi Ying, Grand Island, and Robert R. Bonk, Tonawanda, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Feb. 22, 1988, Ser. No. 158,952

Int. Cl.<sup>4</sup> C02F 1/72

U.S. Cl. 210-721

7 Claims

1. A process for removing nickel and phosphorus values including hypophosphite and phosphite species from spent electroless nickel plating solutions comprises the steps of:

- contacting the spent plating solution with an effective amount of lime or calcium hydroxide to precipitate said phosphite species,
- removing the precipitated phosphite species from the plating solution, wherein a major portion of the total phosphite species present in the spent plating solution are removed,
- contacting the treated plating solution of step (b) with an effective amount of potassium permanganate to convert said hypophosphite and phosphite species to phosphate species,
- contacting the oxidized plating solution with an effective amount of lime or calcium hydroxide to precipitate said phosphate species and said nickel values, and
- separating the precipitated phosphate species and nickel values from the treated solution of step (d) to produce an environmentally acceptable spent plating solution which is suitable for disposal.

4,789,485

## CLARIFICATION OF BAYER PROCESS LIQUORS

John R. Field, Halifax; Gillian M. Moody, Brighouse, and Trevor K. Hunter, Ilkley, all of Great Britain, assignors to Allied Colloids Ltd., Great Britain

PCT No. PCT/GB86/00417, § 371 Date Mar. 25, 1987, § 102(e) Date Mar. 25, 1987, PCT Pub. No. WO87/00825, PCT Pub. Date Feb. 12, 1987

PCT Filed Jul. 17, 1986, Ser. No. 47,009

Claims priority, application United Kingdom, Jul. 29, 1985, 8519107

Int. Cl.<sup>4</sup> B01D 21/01

U.S. Cl. 210-727

21 Claims

1. A process for separating inorganic suspended solids in a sodium aluminate liquor obtained in a Bayer Process wherein an effective amount of a flocculating agent is added to the liquor containing suspended solids, the flocculating agent comprising a quaternised polymer having an intrinsic viscosity (IV) above 1 dl/g and having at least about 25% by weight quaternised recurring units derived from monomers of the formula



wherein R<sup>1</sup> is hydrogen or methyl, R<sup>2</sup> is straight or branched chain C<sub>2-8</sub> alkylene having at least 2 carbon atoms in the backbone and R<sup>3</sup> and R<sup>4</sup> are independently selected from C<sub>1-4</sub> alkyl, and the flocculated suspended solids are separated from the liquor.

4,789,486

## WATER DESALINIZATION PROCESS

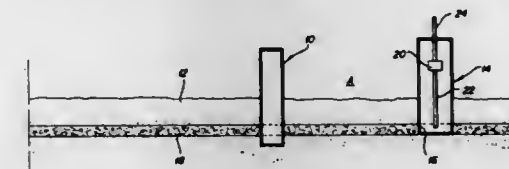
Ernesto Ritter, Reforma Ixtachuatli, Mexico, assignor to MCM Incorporated, Fairfax, Va.

Filed Sep. 30, 1987, Ser. No. 102,733

Int. Cl.<sup>4</sup> B01D 37/00

U.S. Cl. 210-747

4 Claims



1. In a process for the desalinization of salt water, which is used in a sandy beach adjacent to a body of salt water, the process including the steps of embedding a barrier in the beach at a depth corresponding to the changing levels of salt water in the beach, installing a well in the beach behind the barrier, the well having an opening to receive water which is passed through the barrier, providing selected filter materials in the barrier, and positioning a selected water purifying material between the well and the barrier; the improvement wherein the barrier is extended into the through a layer of fossilized shells naturally occurring beneath the beach, and the well opening is located in the shell layer to receive water flowing there-through from the barrier.

4,789,487

## SEPTIC TANK WITH INTEGRAL DIRECT DISTRIBUTION SYSTEM

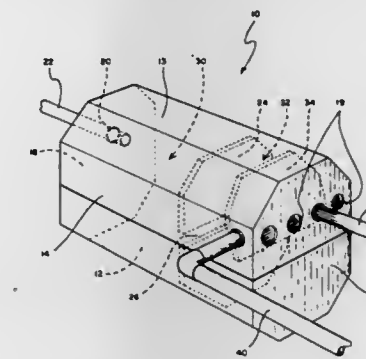
Leland J. Wallace, Rte. 2, Box 293, Mount Olive, N.C. 28365

Filed Oct. 8, 1987, Ser. No. 106,223

Int. Cl.<sup>4</sup> B01D 21/24

U.S. Cl. 210-747

8 Claims



1. A single tank septic system having an integral distribution section with a plurality of outlet lines that obviates the requirements of a distribution box comprising: a single tank structure having a bottom, side wall structure, and a top that forms an enclosure therein with the tank being adapted to contain a waste solution having an upper surface level and typically including an intermediate zone of relatively pure liquid and some solid waste material floating about the upper surface; a central baffle disposed within the enclosure that divides the enclosure into two sections, an inlet section and an outlet section; inlet means formed in the inlet section for directing waste into the tank; an integral sewage distribution sub-system formed in the outlet section of the tank and including a distribution baffle extending downwardly from the top of the tank and through the surface level of liquid typically contained within the tank with the baffle being angled towards a distribu-



tion wall forming a part of the wall structure of the tank, and wherein the lower end of the baffle terminates relatively close to the distribution wall and forms a distribution opening therebetween that allows liquid from the intermediate zone to pass therebetween; a series of outlet ports formed in the distribution wall at a level above the lower terminal edge of the distribution baffle; said distribution baffle and the distribution wall forming a distribution area within the septic tank itself as the distribution baffle prevents solid waste material from reaching the outlet ports but allows relatively pure liquid from the intermediate zone to pass between the distribution baffle and the distribution wall into the formed distribution area; said distribution wall and distribution area having a plurality of outlet ports spaced about the distribution wall and wherein selected outlet ports are each connected to a drain line which extends outwardly therefrom through a drain field for distributing liquid directly from the tank structure into the drain field.

8. A method of containerizing and disposing of sewage comprising the steps of: directing waste material into a septic tank; forming a series of horizontally spaced outlet ports in a distribution wall forming a part of the septic tank; providing a distribution baffle adjacent said distribution wall and extending the lower terminal edge thereof to a level below the outlet ports so as to form a distribution area between the distribution baffle and the distribution wall; blocking floating solid material from passing the distribution baffle to the distribution area and then directing that material out the outlet ports; and directly channeling waste material from the distribution area of the septic tank into a drain field by channeling the waste material through a series of drain lines extending from the series of outlet ports in the septic tank, thereby eliminating the need and expense of a separate distribution box.

4,789,488

# CATALYZED OXYGEN REMOVAL WITH HYDROGEN FOR STEAM GENERATOR SYSTEMS

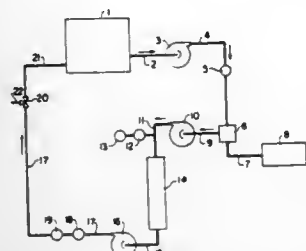
Sam G. deSilva, Turtle Creek, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 550,660, Nov. 10, 1983, abandoned. This application Aug. 21, 1987, Ser. No. 88,991

Int. Cl.<sup>4</sup> C23F 11/08

U.S. Cl. 210—750

13 Claims



1. A method for removing dissolved oxygen from a supply of aqueous medium comprising: discharging a stream of aqueous medium containing dissolved oxygen from said supply thereof; injecting hydrogen gas into said discharged stream of aqueous medium; intimately mixing said hydrogen with said aqueous medium; pressurizing the intimately mixed stream to a pressure of between 60–150 psig; and contacting said pressurized, intimately mixed stream, for a period of time of 0.5 to 2 minutes, at a temperature of between 15°–40° C., with an effective amount of a noble metal selected from the group consisting of palladium and platinum, dispersed on a stable carrier material, for a period of time effective to react the hydrogen and dissolved oxygen to produce a deoxygenated aqueous me-

dium stream having a dissolved oxygen content of below about 2 parts per billion by weight.

4,789,489

# METHOD FOR THE CONTROL OF MOLLUSKS

C. George Hollis, Germantown, and Richard W. Lutey, Memphis, both of Tenn., assignors to Buckman Laboratories International, Inc., Memphis, Tenn.

Filed Feb. 26, 1988, Ser. No. 160,997

Int. Cl.<sup>4</sup> C02F 1/50

U.S. Cl. 210—755

22 Claims

1. A method for the control of fouling by mollusks in an aqueous system comprising the step of adding to said aqueous system an amount of an ionene polymer effective for controlling fouling by mollusks.

4,789,490

# IMMERSION OIL COMPOSITION HAVING LOW FLUORESCENCE EMISSIONS FOR MICROSCOPE

Tohichi Tanaka, Kadamatsu, Japan, assignor to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 796,278, Nov. 8, 1985, abandoned. This application Apr. 8, 1987, Ser. No. 35,750

Claims priority, application Japan, Jul. 15, 1985, 60-154335

Int. Cl.<sup>4</sup> C09K 3/00

U.S. Cl. 252—1

13 Claims

1. An immersion oil composition having low fluorescence emissions for microscope which comprises 100 parts by weight of a first component which is a liquid dienic polymer and 3 to 200 parts by weight of a second component which is one or a combination of compounds selected from the groups consisting of:

- (a) chlorinated paraffins;
- (b) polybutene;
- (c) carboxylic acid esters;
- (d) liquid paraffins;
- (e) saturated aliphatic alcohols; and
- (f) alicyclic alcohols,

wherein the carboxylic acid ester belonging to the group (c) is selected from the class consisting of methyl acetate, ethyl acetate, dicyclopentyl acetate, dimethyl maleate, diethyl maleate, dimethyl fumarate, diethyl fumarate and dioctyl sebacate; the saturated aliphatic alcohol belonging to the group (e) is selected from the class consisting of hexyl alcohol, heptyl alcohol and octyl alcohol; and the alicyclic alcohol belonging to the group (f) is selected from the class consisting of tricyclodecanol, tricyclododecanol, tricyclodecenol and tricyclododecenol; said composition having a refractive index in the range from 1.501 to 1.519 and an Abbe's number in the range from 30 to 46.

4,789,491

# METHOD FOR PREPARING BIODEGRADABLE FABRIC SOFTENING COMPOSITIONS

Nienyuan J. Chang, and Darlene R. Walley, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Aug. 7, 1987, Ser. No. 83,602

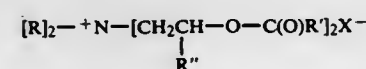
Int. Cl.<sup>4</sup> D06M 13/46

U.S. Cl. 252—8.75

26 Claims

1. A method for preparing aqueous biodegradable shelf-stable fabric softening compositions comprising the steps of:

- (a) combining a C<sub>1</sub>–C<sub>4</sub> monohydric alcohol with a biodegradable quaternary ammonium softening compound of the formula:



wherein each R is a C<sub>1</sub>–C<sub>6</sub> alkyl or hydroxyalkyl group,

or mixtures thereof; each R' is a C<sub>13</sub>–C<sub>19</sub> hydrocarbyl group, or mixtures thereof; R'' is a C<sub>1</sub>–C<sub>4</sub> hydrocarbyl group; and X<sup>-</sup> is a softener-compatible anion; to form a mixture wherein the amount of the C<sub>1</sub>–C<sub>4</sub> monohydric alcohol comprises from about 5% to about 50% by weight of the biodegradable quaternary ammonium softening compound;

- (b) heating said mixture to a temperature of from about 60° C. to about 90° C. to form a fluidized melt;
- (c) diluting said melt with water, heated to a temperature of from about 50° C. to about 85° C., to a concentration of from about 1% to about 25% by weight of the biodegradable quaternary ammonium softening compound to form a dilute mixture;
- (d) mixing said dilute mixture with a high shear mixer to form a homogeneous mixture with the softener compound having a particle size of from about 0.1 to about 0.5 microns; and
- (e) adjusting the pH of said homogeneous mixture to from about 2.0 to about 5.0 by adding a sufficient amount of a Bronsted acid to the homogeneous mixture to thereby form said fabric softening compositions wherein said compositions are maintained substantially free of free amines.

4,789,493

# LUBRICANTS CONTAINING

## N-ALKYLALKYLENEDIAMINE AMIDES

Andrew G. Horodysky, Cherry Hill, N.J., assignor to Mobil Oil Co., New York, N.Y.

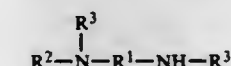
Continuation-in-part of Ser. No. 827,228, Feb. 5, 1986, abandoned, which is a continuation of Ser. No. 705,403, Feb. 25, 1985, abandoned, which is a continuation of Ser. No. 493,463, May 11, 1983, abandoned. This application Apr. 2, 1987, Ser. No. 33,985

Int. Cl.<sup>4</sup> C10M 133/16

U.S. Cl. 252—51.5 A

18 Claims

1. A lubricant composition comprising a major proportion of a lubricating oil or grease therefrom, and a friction reducing or antioxidant amount of a product of the formula:



wherein R<sup>1</sup> is a C<sub>2</sub> to C<sub>4</sub> alkylene group, R<sup>2</sup> must be a C<sub>12</sub> to C<sub>30</sub> hydrocarbyl group and R<sup>3</sup> is (1) hydrogen, (2) a



group wherein R<sup>4</sup> is hydrogen or a C<sub>1</sub> to C<sub>3</sub> alkyl group or (3) a C<sub>1</sub> to C<sub>3</sub> aliphatic group at least one of the R<sup>3</sup> groups being selected from (2).

4,789,494

# HYDROTHERMAL PROCESS FOR PRODUCING MAGNETOPLUMBITIC FERRITE

Katsuo Aoki, and Toshio Ueda, both of Okayama, Japan, assignors to Dowa Mining Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 743,168, Jun. 10, 1985, abandoned. This application Jan. 9, 1987, Ser. No. 5,390

Claims priority, application Japan, Jul. 31, 1984, 59-161410

Int. Cl.<sup>4</sup> C04B 35/26; C01G 49/08, 49/06

U.S. Cl. 252—62.59

8 Claims

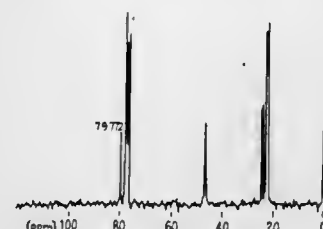
1. A process for producing a magnetoplumbitic ferrite of the formula:



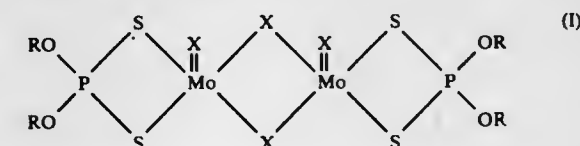
wherein M is one or more metals selected from the group consisting of Ba, Sr, Ca and Pb; n is a number of 3 to 6; M' is at least one component selected from the group consisting of Si, Ta, Sb, Nb, Zr and Ti, or a combination of that component with at least one other component selected from the group consisting of Ni, Co, Cu, Mg, Mn and Zn; x is a number from 0.01 to 0.7; having a saturation magnetization of not less than 50 emu/g and a coercivity in the range of 200–2000 Oe;

by a hydrothermal reaction, comprising the steps of: preparing a uniform mixture of the metallic components that provide the ferrite of the formula (1), said mixture being in the form of an aqueous solution containing metal ions, an aqueous slurry containing metal hydroxides, or an aqueous slurry containing both metal ions and metal hydroxides, from the salt of the metallic components that is selected from the group consisting of halides, nitrates and hydroxides;

bringing said mixture into contact with an alkali in the form of an aqueous solution containing an alkali substance and form therefrom an alkaline slurry containing precipitated solid particles, wherein the alkali is used in such an amount that the ratio of the equivalent weight of alkali to that of an acid residue contained in the slurry is greater than 1.0 or when an acid residue is absent in the slurry, the alkali is used in such an amount that the alkaline slurry has a pH of 11.0 or more;



1. A lubrication composition which comprises a base oil and a sulfidoxymolybdenum dialkylphosphorodithioate represented by the following general formula (I):



wherein R stands for a secondary alkyl group having 4 to 30 carbon atoms and the four R's may be the same or different, and X stands for O or S and the four X's may be the same or different.

placing the resulting slurry in an autoclave and reacting the slurry components to form a ferrite composition, at a temperature higher than 100° C. but not exceeding 400° C., in the presence of 1-70 weight percent, based on the amount of the ferrite composition produced, of at least one organic compound selected from the group consisting of sodium lignosulfonate, sodium dodecylbenzenesulfonate, sodium dodecylsulfonate, laurylamine acetate, oleic acid, sorbitan monooleate, tallowdiamine, formalin sodium benthanaphthalene sulfonate, steary trimethylammonium chloride, sodium tricarallylate, and ligninsulfonic acid;

removing the resulting reaction mixture from the autoclave; washing the ferrite composition to remove any impurities; and subsequently, drying and disintegrating to produce the magnetoplumbitic ferrite of the formula (1).

4,789,495

# HYPOCHLORITE COMPOSITIONS CONTAINING A TERTIARY ALCOHOL

James L. Cahall, Cincinnati, and Harold L. Dimond, Evendale, both of Ohio, assignors to The Drackett Company, Cincinnati, Ohio

Filed May 18, 1987, Ser. No. 51,547  
Int. Cl.<sup>4</sup> C11D 7/54

U.S. Cl. 252-95

11 Claims

1. A phase stable aqueous cleaning composition comprising on a weight basis from about 1 to about 10% alkali metal hypochlorite; a thickening amount of a surfactant blend effective to provide a composition viscosity of from about 10 to about 150 cps; from about 0.1 to about 3.0% 2-methyl-2-propanol, and water.

4,789,496

# BUILT NONAQUEOUS LIQUID NONIONIC LAUNDRY DETERGENT COMPOSITION CONTAINING

Guy Broze, Grace-Hollogne; Danielle Bastin, Soumagne, and Leo Laitem, Orp-Jauche, all of Belgium, assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation of Ser. No. 767,568, Aug. 20, 1985, abandoned.  
This application Sep. 2, 1987, Ser. No. 94,066

Int. Cl.<sup>4</sup> C11D 3/395, 1/62, 3/075

U.S. Cl. 252-99

22 Claims

1. A non-aqueous, liquid, heavy-duty, built laundry detergent composition comprising of:

10-70% by weight of at least one liquid nonionic surfactant, said liquid nonionic surfactant consisting of a polyloweralkoxylated higher alkanol, wherein said alkanol is of 9 to 18 carbon atoms and the number of moles of said lower alkylene oxide is from 3 to 12 per mole of said alkanol; 10-60% by weight of at least one particulate detergent builder salt suspended in said at least one liquid nonionic surfactant;

0.1-5% by weight of a cationic quaternary ammonium salt surface active anti-settling agent selected from the group consisting of (I) mono-higher alkyl tri-lower alkyl quaternary ammonium salt, (II) di-higher alkyl di-lower alkyl quaternary ammonium salt, (III) mono-higher alkyl mono-lower alkyl diethoxylated quaternary ammonium salt and (IV) di-higher alkyl diethoxylated quaternary ammonium salt;

0-2.0% by weight of a phosphoric acid alkanol ester stabilizing agent;

0-5.0% by weight of an aluminum salt of a fatty acid stabilizing agent;

0-30% by weight of a bleaching agent;

0-15% by weight of a bleach activator;

0-3.0 by weight of a sequestering agent for metal ions;

0-5.0% by weight of an anti-redeposition agent;

0-2.0% of an optical brightener;

0-3.0% of enzymes;

0-3.0% of perfume;  
0-0.10% of dye.

4,789,497

# PROCESS OF USING A DEHYDRATION REAGENT FOR WASHED FISH HEAT

Ryuzo Ueno, Nishinomiya; Tatsuo Kanayama, Takarazuka; Toshitaka Nakashima; Itami; Kunihiro Tomiyasu, Takarazuka, and Toshio Matsuda, Itami, all of Japan, assignors to 501 Ueno Selyaku Kabushiki Kaisha, Osaka, Japan  
Division of Ser. No. 819,622, Jan. 17, 1986. This application Sep. 8, 1987, Ser. No. 97,360

Claims priority, application Japan, Jan. 21, 1985, 60-7421; Aug. 7, 1985, 60-172379

Int. Cl.<sup>4</sup> C09K 3/00

U.S. Cl. 252-194

14 Claims

1. A method for dehydrating fish comprising: washing the fish one or more times in an aqueous solution, said solution containing from about 0.05 to 1.0% by weight of a dehydrating reagent, said dehydrating reagent comprising:

(A) an alkaline earth metal salt selected from the group consisting of magnesium chloride, calcium chloride, magnesium sulfate and calcium sulfate; and

(B) sodium chloride in the proportion of 1 part by weight to 0.5 to 40 parts by weight of (A) to (B).

4,789,498

# POLYMER WELDING PROCESS AND COMPOSITION

Harold D. Boultinghouse, Key West, Fla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 770,488, Aug. 29, 1985, Pat. No. 4,666,549.  
This application Mar. 2, 1987, Ser. No. 20,971

The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B01F 1/00; C09J 3/00; C08K 5/05, 5/07

U.S. Cl. 252-364

22 Claims

1. A composition for welding polymers comprising a welding solvent selected from the group consisting of hydroxyethers and keto-ethers and a sufficient amount of a resinous conjugated diene/monovinyl-substituted aromatic block copolymer containing an antiblocking agent, to raise viscosity and lower after welding drying time of said solvent.

4,789,499

# PROCESS AND APPARATUS FOR SAPONIFICATION REACTIONS

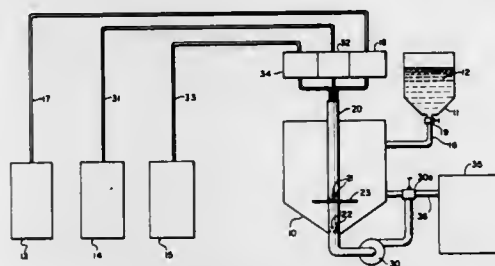
Bruce A. Bereliter, Corona, Calif., assignor to Henkel Corporation, Ambler, Pa.

Continuation-in-part of Ser. No. 825,390, Feb. 3, 1986, Pat. No. 4,671,892. This application Jan. 22, 1987, Ser. No. 2,822

Int. Cl.<sup>4</sup> C11D 13/00; B01D 3/08

U.S. Cl. 252-369

20 Claims



1. Apparatus for carrying out mixing or chemical reactions in the liquid state comprising:

(a) a reactor or mixing vessel having sidewalls and a cone-shaped bottom section;

(b) a conduit extending vertically through said vessel, wherein said conduit is provided with a first set of openings and a second set of openings therein, said first set of openings being positioned near said bottom section of said vessel, and said second set of openings being positioned above said first set of openings, said first set of openings and said second set of openings having means positioned therebetween to direct a flow of liquid exiting said conduit toward said sidewalls of said vessel;

(c) a recirculating system connected to said vessel, said recirculating system having outlet means and inlet means adapted to mix and recirculate the liquid contents of said vessel out of said vessel through a recirculating valve and back into said vessel;

(d) supply means for introducing liquid materials into said vessel; and

(e) means for diverting the liquid contents of said recirculating system out of said recirculating system.

4,789,500

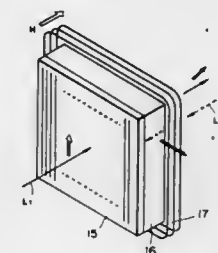
# OPTICAL CONTROL ELEMENT

Kiyoshi Morimoto, Mobara; Toshinori Takagi, Nagaokakyo, and Kakuei Matsubara, Hirakata, all of Japan, assignors to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara, Japan  
Filed Mar. 28, 1986, Ser. No. 845,531

Claims priority, application Japan, Mar. 28, 1985, 60-064851  
Int. Cl.<sup>4</sup> G02B 5/20

U.S. Cl. 252-584

6 Claims



1. An optical control element comprising a substrate and a Cd<sub>1-x</sub>Mn<sub>x</sub>Te (0.01 ≤ x ≤ 0.99) film directly formed on said substrate and having a (111) axis preferentially oriented in a direction perpendicular to the substrate.

4,789,501

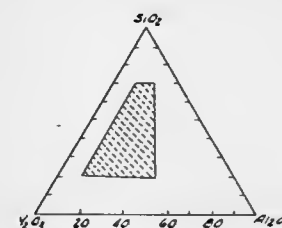
# GLASS MICROSPHERES

Delbert E. Day, Rolla, and Gary J. Ehrhardt, Columbia, both of Mo., assignors to The Curators of the University of Missouri, Columbia, Mo.

Filed Nov. 19, 1984, Ser. No. 673,123

Int. Cl.<sup>4</sup> A61N 5/10; C03C 3/083, 3/095; G21G 4/08  
U.S. Cl. 252-645

8 Claims



1. A glass microsphere having a diameter of about 75 micrometers or less and adapted for radiation therapy of a mammal, said glass consisting essentially of an yttrium oxide-aluminosilicate glass composition lying substantially within a quadrilateral region of the ternary composition diagram of the yttria-alumina-silica system, the quadrilateral region being

defined by its four corners having the following combination of weight proportions of the components: 20% silica, 10% alumina, 70% yttria; 70% silica, 10% alumina, 20% yttria; 70% silica, 20% alumina, 10% yttria; and 20% silica, 45% alumina, 35% yttria, the glass having a chemical durability such that subsequent to irradiation and administration of the microsphere to the mammal, the microsphere will not release a significant amount of yttrium-90 into the mammal's system.

4,789,502

# CARBOXYLIC ACID PRODUCTION

Lynn H. Slauch, Cypress, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 24, 1986, Ser. No. 934,296

Int. Cl.<sup>4</sup> C11C 1/00; C07C 51/16

U.S. Cl. 260-413

12 Claims

1. A process for converting alcohols to carboxylic acids which process comprises contacting in the vapor phase said alcohols, water and added hydrogen at a temperature ranging from about 200° C. to about 500° C. with a catalyst comprising catalytically effective amounts of copper, zinc, chromium and a promoter selected from the group consisting of alkali metals, alkaline earth metals, rare earth metals and mixtures thereof supported on a porous refractory support.

4,789,503

# AIR REMOVAL SNORKEL DEVICE

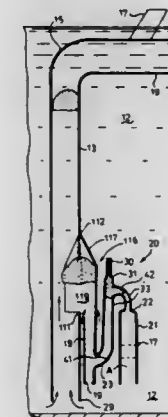
Declan Murphy, Quebec, Canada, assignor to Atara Corporation, Quebec, Canada

Filed Jun. 15, 1987, Ser. No. 62,094

Int. Cl.<sup>4</sup> B01F 3/04

U.S. Cl. 261-77

15 Claims



1. In apparatus for creating vertical circulation within a standing body of liquid, the apparatus comprising a substantially linearly extending stackpipe having a substantially constant nominal diameter ("D") and designed to be fully submerged in a longitudinally vertical orientation, within the standing body of liquid, the stackpipe having an upper discharge opening and a lower inlet opening; flow-generating means comprising a gas bubble generator in fluid-flow connection with the interior of the stackpipe and means for delivering gas under pressure to the bubble generator for passage into the stackpipe at a location and entraining in the liquid therein; the improvement comprising upper diversion means, in fluid-flow connection with the upper discharge opening of the stackpipe and designed to laterally divert a flow of liquid and entrained gas bubbles from the stackpipe into a substantially horizontal direction adjacent the upper surface of the liquid; flow-limiting means designed to prevent the vertically moving liquid-and-gas bubble flow from reaching the surface of the body of liquid and extending horizontally outwardly from the stackpipe; and gas discharging and collecting means, in fluid-flow connection



with the flow-limiting means and designed to collect and discharge entrained gas bubbles to a space above the top surface of the body of liquid, the collecting means comprising a conduit having an inlet opening located below the surface of the body of liquid and in direct fluid-flow contact with the flow-limiting means, and having a discharge opening located above the surface of the body of liquid, the space between the inlet opening and the discharge opening being otherwise completely enclosed.

4,789,504

**ELECTRETIZED MATERIAL FOR A DUST FILTER**  
Susumu Ohmori, Okayama; Akira Yagi, and Satoshi Takase, both of Otsu, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Japan

Continuation of Ser. No. 712,488, Mar. 18, 1985, Pat. No. 4,652,282. This application Oct. 1, 1986, Ser. No. 914,043. Claims priority, application Japan, Mar. 19, 1984, 59-53270; Mar. 19, 1984, 59-53271

The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B29C 35/02

U.S. Cl. 264—22

14 Claims



1. An electretized material for a filter to be used for elimination of dust from a dust-containing gas comprising a uniform mixture of an insulating polymer and a fatty acid metal salt of aluminum or magnesium.

4,789,505

**PROCESS FOR THE POLYMERIZATION AND/OR CROSSLINKING OF A RESIN USED IN THE COMPOSITION OF A COMPOSITE MATERIAL PART BY MEANS OF IONIZING RADIATION**

Daniel Beziers, Saint Medard en Julles, France, assignor to Societe Nationale Industrielle Aerospatiale et, Paris, France. Division of Ser. No. 733,499, May 10, 1985, Pat. No. 4,689,488.

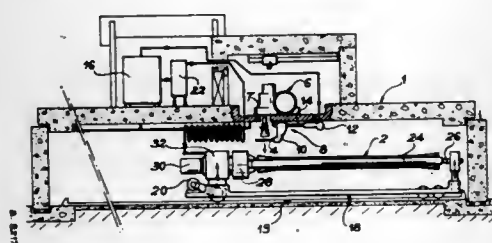
This application Apr. 21, 1987, Ser. No. 40,589

Claims priority, application France, May 11, 1984, 84 07333

Int. Cl.<sup>4</sup> B29C 35/08

U.S. Cl. 264—22

8 Claims



1. An industrial polymerization and/or cross-linking process for a hardening resin by ionizing radiation, said resin being used in the composition of a part having a variable surface mass and having a reinforcement embedded in said resin, also having at least one insert of a different nature from said resin and said reinforcement, said process comprising the steps of supplying to said part an electron beam having an energy at least equal to 10 MeV in order to polymerize by said electron beam the resin in zones thereof having a surface mass at the most equal to 4 g/cm<sup>2</sup> and automatically arranging a target between the part and said electron beam, in order to polymerize the resin in zones of the part having a surface mass above 4 g/cm<sup>2</sup> by

X-radiation at doses up to 10 Mrad, said target being able to produce the X-radiation under the action of said electron beam.

4,789,506  
**METHOD OF PRODUCING TUBULAR CERAMIC ARTICLES**

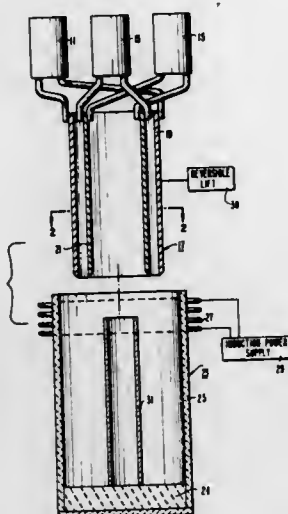
Martin R. Kasprzyk, Ransomville, N.Y., assignor to Gas Research Institute, Chicago, Ill.

Filed Nov. 7, 1986, Ser. No. 928,204

Int. Cl.<sup>4</sup> C04B 35/56

U.S. Cl. 264—25

13 Claims



1. A method of making a ceramic tube comprised of silicon and silicon carbide which comprises the steps of:

- dry casting a first hollow, vertical tubular column of a particulate material,
- dry casting a second hollow, vertical tubular column of a particulate material contiguous to, and in concentric relation to, said first column, the particulate material of one column comprised of silicon, and the particulate material of the other column comprised of material selected from the group of silicon carbide, carbon or mixtures thereof,
- heating said columns to a siliciding temperature to infiltrate substantially entirely all of said silicon from said first column into said second column, and
- cooling said infiltrated column to form a hollow, dimensionally stable ceramic tube.

4,789,507

**PRODUCTION OF PRECERAMIC AND CERAMIC FIBERS FROM FRIABLE, THERMALLY SENSITIVE ORGANOSILICON PRECERAMIC POLYMERS**

John L. Wesley, Wayne, and Henry H. George, Jr., Westfield, both of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Oct. 28, 1985, Ser. No. 791,877

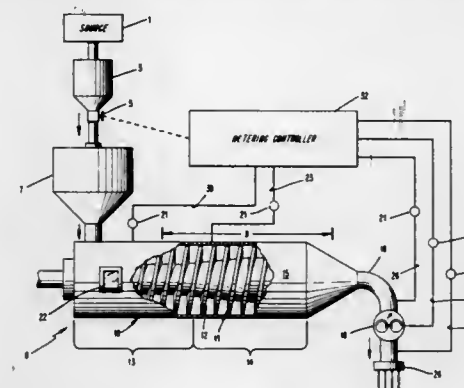
Int. Cl.<sup>4</sup> D01F 6/96, 9/10; B29C 47/10, 47/92

U.S. Cl. 264—29.2

19 Claims

13. A process for producing preceramic fibers from an organosilicon preceramic polymer which process comprises melt spinning a spinning composition comprising said organosilicon preceramic polymer in a spinning apparatus comprising an extruder feed means, a screw-type extruder having screw flights and a metering pump means, said organosilicon preceramic polymer having a molecular weight ( $M_n$ ) of from about 500 to 20,000 and said spinning composition being provided to said extruder from said feed means in the form of friable parti-

cles, wherein said feed means are externally metered to provide a feed rate of said spinning composition which is substan-



tially less than that required to fill all the screw flights of said screw-type extruder.

4,789,508

**MIXTURES COMPRISING A NEMATIC LIQUID CRYSTAL AND A NON-MESOMORPHIC COMPOUND**  
Francoise Vinet, and Claude Vauchier, both of Grenoble, France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Sep. 24, 1986; Ser. No. 911,080

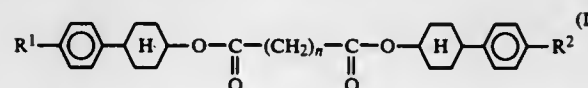
Claims priority, application France, Oct. 2, 1985, 85 14622

Int. Cl.<sup>4</sup> C09K 19/54, 19/32, 19/30; G02F 1/13

U.S. Cl. 252—299.5

6 Claims

1. A mixture having the properties of a nematic liquid crystal comprising at least one nematic liquid crystal with negative dielectric anisotropy and at least one non-mesomorphic compound able to improve the elastic behaviour of the nematic liquid crystal by increasing the value of the ratio  $K_{33}/K_{11}$ , in which  $K_{33}$  represents the elastic bending constant and  $K_{11}$  the elastic fanning constant of the liquid crystal, said non-mesomorphic compound being of formula:



in which  $R^1$  and  $R^2$ , which can be the same or different, represent a hydrogen atom or an alkyl radical having 1 to 12 carbon atoms and  $n$  is an integer between 2 and 16, said non-mesomorphic compound comprising 0.5 to 10% by weight of the mixture.

4,789,509

**METHOD FOR FIBRILLATING CARBONACEOUS FIBERS**

Takeshi Ikeda; Hideo Handa, and Keisuke Nakano, all of Kitakyushu, Japan, assignors to Mitsubishi Chemical Industries Ltd., Tokyo, Japan

Continuation of Ser. No. 800,388, Nov. 21, 1985, abandoned.

This application Dec. 10, 1987, Ser. No. 132,651

Claims priority, application Japan, Nov. 21, 1984, 59-246912; Dec. 11, 1984, 59-261533

Int. Cl.<sup>4</sup> D01D 5/42; D01F 9/12

U.S. Cl. 264—29.2

12 Claims

1. A method for fibrillating carbonaceous fibers, which are inflexible or which are fused to each other, said method thereby producing a flexible and fusion-free product which does not exhibit fluffing, which comprises:

contacting an advancing tow of said carbonaceous fibers with at least two spaced apart rollers which rotate and which are so positioned relative to each other that their

center axes intersect the direction of said advancing tow of said carbonaceous fibers, the rollers having substantially alternately, rotating surfaces which are inclined in oppo-



site directions to each other, the result of which contact is an exertion of a shearing force on said advancing tow in an alternately opposite direction transverse to said direction of said advancing tow of said carbonaceous fibers.

4,789,510

**PROCESS FOR PRODUCING A SHAPED, SINTERED MAGNESIA ARTICLE HAVING AN ENHANCED RESISTANCE TO HYDRATION AND AN IMPROVED MECHANICAL STRENGTH**

Yasuhiko Toda, Ube, Japan, assignor to Ube Industries, Ltd., Yamaguchi, Japan

Filed May 28, 1987, Ser. No. 55,169

Claims priority, application Japan, Jun. 3, 1986, 61-127373

Int. Cl.<sup>4</sup> C04B 35/04

U.S. Cl. 264—60

10 Claims

1. A process for producing a shaped, sintered magnesia article having an enhanced resistance to hydration and an improved mechanical strength, comprising the steps of:

- contacting fine magnesia particles with a vapor of an organic silicate compound at an elevated temperature to uniformly coat the surface of the fine magnesia particles with a silica coating layer containing organic substances in an amount not greater than about 0.01% in terms of carbon therein, based on the molar amount of silicon in the silica coating layer;
- shaping the silica-coated fine magnesia particles into a predetermined shape of a precursory magnesia article; and
- sintering the resultant precursory magnesia article at an elevated temperature to an extent such that the silica coating layer is converted to a corresponding forsterite coating layer.

4,789,511

**MATERIAL PROCESSING**

Sitki Bilgin, Bradford, United Kingdom, assignor to University of Manchester Institute of Science and Technology, Manchester, England

PCT No. PCT/GB86/00314, § 371 Date Mar. 30, 1987, § 102(e) Date Mar. 30, 1987, PCT Pub. No. WO86/07285, PCT Pub. Date Dec. 18, 1986

PCT Filed Jun. 4, 1986, Ser. No. 14,765

Claims priority, application United Kingdom, Jun. 4, 1985, 8514043

Int. Cl.<sup>4</sup> B29C 47/12

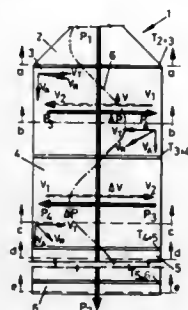
U.S. Cl. 264—108

24 Claims

1. A method of materials processing in which the material flows along an axially extending passageway with successive upstream and downstream sections wherein the cross-section (as viewed in the plane transverse to the flow direction) of the inlet to the downstream section has first and second end regions between which the length (as viewed in said cross-section) of the channel extends and this cross-section increases progressively in depth from the first end region to the second end region thereof, and said first and second end regions are respectively of lesser and greater depth than the adjacent end region of the outlet of the upstream section, whereby a pressure differential is established in said sections so as to create therein a flow of material having a velocity component transverse to the flow direction.

11. Material processing apparatus having an axially extend-

ing flow passageway with successive upstream and downstream sections wherein the cross-section (as viewed in the plane transverse to the flow direction) of the inlet to the downstream section has first and second end regions between which the length (as viewed in said cross-section) of the channel extends and this cross-section increases progressively in depth from the first end region thereof to the second end region



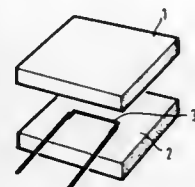
thereof, and said first and second end regions are respectively of lesser and greater depth than the adjacent end regions of the outlet of the upstream section whereby, in use of the apparatus, there is established in the downstream section a pressure differential transverse to the axial flow direction so as to create a material with a velocity component transverse to the flow direction.

**4,789,512**  
**METHOD OF ENCLOSING AN OBJECT WITHIN A HOMOGENEOUS BLOCK**  
John T. Hughes, Cromwell Crescent, United Kingdom, assignor to Micropore International Limited, Droltwich, United Kingdom

Filed Apr. 15, 1987, Ser. No. 41,432  
Claims priority, application United Kingdom, Apr. 16, 1986, 8609323; Jun. 5, 1986, 8613684  
Int. Cl.<sup>4</sup> B29C 43/18

U.S. Cl. 264—120

9 Claims



1. A method of enclosing an object within a homogeneous block of microporous thermal insulation material, which method comprises the steps of:

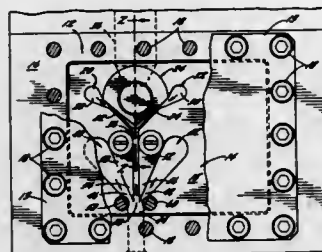
forming independent first and second blocks of dry particulate microporous thermal insulation material, the first and second blocks having a first density;  
arranging an object to be insulated between cooperating faces of the first and second blocks; and  
compacting the first and second blocks around the object so as to cause the first and second blocks to merge and to form a homogeneous block of microporous thermal insulation material having a second density higher than said first density.

**4,789,513**  
**COEXTRUSION APPARATUS AND PROCESS**  
Peter F. Cloeren, Orange, Tex., assignor to P.C.E. Corp., Orange, Tex.

Filed Jun. 5, 1987, Ser. No. 59,102  
Int. Cl.<sup>4</sup> B29C 47/70

U.S. Cl. 264—171

17 Claims



1. A coextrusion apparatus comprising  
(a) a main body comprising a first flow channel and a second flow channel, each of which comprises a land channel;  
(b) a die body disposed between said first flow channel and second flow channel, said die body comprising a transverse flow-providing chamber and, in fluid communication therewith, an exit channel; wherein said main body has a first wall which cooperates with a first face of said die body to form the land channel of said first flow channel, and has a second wall which cooperates with a second face of said die body to form the land channel of said second flow channel; and wherein each land channel has a width less than that of its respective flow channel; and  
(c) at each edge of, and in fluid communication with, each of said land channels, an edge seam-forming channel, pairs of which each converge at a locus of convergence located upstream of a place of convergence of said land channels and said exit channel of said die.

14. A coextrusion process for sandwiching a core stream between a first stream and a second stream, said process comprising transversely spreading a core stream to a certain width, and a first stream and a second stream each to a width greater than said certain width; thereafter converging edges of said first stream with edges of said second stream, to form seamed edges that prevent lateral leakage of said core stream; and then converging said core stream, said first stream and said second stream to form a melt-laminate sandwich.

**4,789,514**  
**METHODS OF PRODUCING BIAXIALLY ORIENTED POLYMER SHEET**  
Ying-Cheng Lo, Bethlehem, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Dec. 9, 1985, Ser. No. 806,994  
Int. Cl.<sup>4</sup> B29C 42/22

U.S. Cl. 264—280

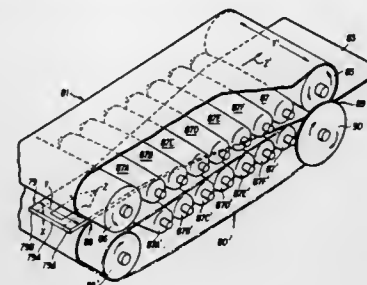
9 Claims

1. A process for producing biaxially oriented polymer sheet from a solid-state workpiece of semicrystalline polymer material having inboard and outboard portions, wherein the workpiece has a first lateral dimension extending in a first lateral direction; a second lateral dimension oriented in a direction normal to the first lateral dimension and extending in a second lateral direction, and a longitudinal dimension extending in a longitudinal direction normal to both first and second lateral dimensions, the method comprising the step of:

working the workpiece while advancing the workpiece in the longitudinal direction through the confines of continuous, opposed working surface which converge toward one another while extending from an upstream location to a downstream location, the working surfaces being in closer proximity over inboard portions thereof than outboard portions over a substantial portion of the length

thereof and defining an exit portion for the workpiece at the downstream location which is substantially rectangular in cross section;

wherein as the workpiece is advanced, the material of the workpiece flows in the longitudinal direction while simultaneously decreasing in dimension in the first lateral direction



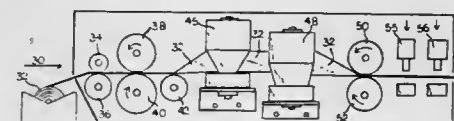
tion and simultaneously expanding in dimension in the second lateral direction so that friction between the semicrystalline polymer material and the working surfaces is compensated for by squeezing the material continuously more at inboard portions thereof than outboard portions thereof, so as to flow the workpiece bidirectionally to produce the biaxially oriented polymer sheet.

**4,789,515**  
**METHOD FOR FABRICATING STIFF POLYMERIC PLASTIC SLATS FOR VENETIAN BLINDS**  
Simon S. Chi Yn, 4090 Whittle Ave., Oakland, Calif. 94602

Filed Jan. 11, 1988, Ser. No. 142,431  
Int. Cl.<sup>4</sup> B29C 53/04, 53/18

U.S. Cl. 264—285

9 Claims



1. A method of fabricating stiff polymeric plastic slats for use in venetian blinds, comprising the steps of:

feeding a reel of planar polymeric plastic film into a roller system which includes at least one pair of rotatable entrance guide rollers;  
guiding said polymeric plastic film through at least one pair of rotatable line marker rollers to produce a higher local stress concentration along a center line;  
passing said film through at least one pair of truncated rollers to produce a bend in said film;  
passing said film through a pair of nipping rollers to convert said bend to a fold of approximately 180 degrees to thereby produce tension and compression in a ridge region; and  
flattening said film out by drawings through a pair of soft, rotatable wheels.

**4,789,516**  
**PRODUCTION OF SUSTAINED RELEASED SYSTEM**  
Franklin Lim, Richmond, Va., assignor to Damon Biotech, Inc., Needham Heights, Mass.

Division of Ser. No. 819,979, Jan. 14, 1986, Pat. No. 4,690,682, which is a continuation of Ser. No. 485,471, Apr. 15, 1983, abandoned. This application May 14, 1987, Ser. No. 50,222

Int. Cl.<sup>4</sup> A61K 9/62, 9/64; B01J 13/02

U.S. Cl. 264—432

12 Claims

1. A process for producing a dispensing system capable of releasing a substance at a substantially constant rate in an

environment that depletes said substance, said process comprising the steps of:

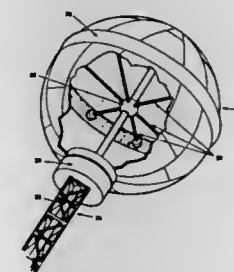
A. forming a capsule which defines an intracapsular volume and comprises a membrane defining a multiplicity of pores of a size sufficient to permit passage of molecules of said substance, said capsule being formed by first preparing a shape-retaining sphere comprising a water-soluble polymer comprising plural cationic or anionic groups and subsequently contacting said sphere with a first polymer comprising plural groups having a charge opposite that of said water-soluble polymer;  
B. placing said capsule in a solution containing a concentration of said substance for a time sufficient to permit said solution and said substance to diffuse into said intracapsular volume to produce a capsule loaded with said substance; and  
C. reducing the dimensions of the pores defined by the membrane of said loaded capsule to a degree sufficient to limit the rate at which molecules of said substance pass therethrough by exposing the capsule to a second polymer comprising a multiplicity of groups having a charge opposite that of said water-soluble polymer.

**4,789,517**  
**ROTATING BUBBLE MEMBRANE RADIATOR**  
Brent J. Webb, and Edmund P. Coomes, both of West Richland, Wash., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jun. 15, 1987, Ser. No. 62,876  
Int. Cl.<sup>4</sup> G21C 15/18

U.S. Cl. 376—299

6 Claims



4. A method for removing waste heat from two phase fluids in space comprising the steps of: rotating a membrane which encloses a volume, said membrane having an outer surface and an inner surface; spraying two phase fluid which condenses upon the inner surface of a said membrane; collecting condensed liquid from the inner surface of said membrane; and radiating heat under isothermal conditions from said membrane surface.

**4,789,518**  
**LIQUID-COOLED NUCLEAR REACTOR ESPECIALLY A BOILING-WATER REACTOR**

Pramod Batheja; Claus Goetzmann, both of Erlangen; Hermann Kumpf, Wendelstein, and Peter Rau, Leutenbach, all of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim am Rhein, Fed. Rep. of Germany

Continuation of Ser. No. 722,306, Apr. 11, 1985, abandoned. This application Jan. 16, 1987, Ser. No. 5,289

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1983, 3345099.4

Int. Cl.<sup>4</sup> G21C 1/04

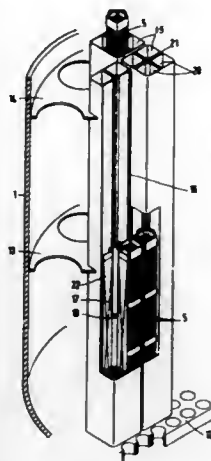
U.S. Cl. 376—353

5 Claims

1. Boiling-water reactor having a reactor pressure vessel and a reactor core of fuel assemblies received therein, the fuel assemblies being grouped into core cells each having a control



rod containing absorber material and connected to a drive mechanism, comprising a plurality of sheetmetal shafts respectively associated with the core cells, each of said sheetmetal shafts extending beyond the length of the reactor core by a length at least equal to that of the respective control rod and having a cross section substantially equal to that of the respective core cell, intermediate metal sheets subdividing said sheetmetal shaft into longitudinal channels through which the fuel assemblies are loadable and unloadable, said channels having



respective cross-sections each substantially equal in size to the cross section of a respective fuel assembly, each of said sheet metal shafts enclosing and carrying the drive mechanism for the respective control rod, and the respective control rod being guidable on and along said intermediate metal sheets, and said sheetmetal shafts having mutually adjacent sides, and means attached to the outside of said sheetmetal shafts through which said sheetmetal shafts are braced against one another and against a core enclosure.

4,789,519

## NUCLEAR REACTOR PLANT

Josef Schoening, Hambroeken, and Hubert Handel, Rimbach, both of Fed. Rep. of Germany, assignors to Hochtemperatur-Reaktorbau GmbH, Fed. Rep. of Germany  
Continuation of Ser. No. 655,650, Sep. 28, 1984, abandoned. This application Oct. 1, 1986, Ser. No. 914,536  
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1983, 3335451

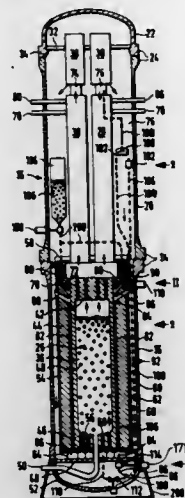
Int. Cl. G210 1/00

U.S. Cl. 376—381

23 Claims

1. A nuclear reactor power plant comprising:
  - a high temperature reactor with at least one discharge means for the removal of fuel elements;
  - a plurality of heat exchangers;
  - a multiple part, standing cylindrical pressure vessel wherein said heat exchangers are positioned above said reactor and housed together with said reactor within said pressure vessel;
  - cooling gas blower means located above said heat exchangers and entirely within said pressure vessel for aiding the flow of cooling gas heated by the reactor from the bottom through the top of said heat exchangers;
  - a plurality of absorber channels extending vertically through a side reflector of said reactor wherein each absorber channel comprises an upper terminal area, a lower terminal area and an absorber tube joining said upper and lower areas;
  - a first means for operational control and shutdown located entirely within said pressure vessel including means for insertion of first absorber elements at said upper terminal area and removal of said elements at said lower terminal area and an absorber loop for circulating said first ab-

sorber elements from said lower terminal area to said upper terminal area;  
a second means for shutdown located entirely within said pressure vessel including second absorber elements, at least one absorber element container means for storing said second elements located above said absorber channels



and means for connecting said container means to said plurality of absorber channels at said upper terminal area in parallel with said means for insertion of first absorber elements;  
said second shutdown means is further for controlling insertion of said second absorber elements into said absorber channels.

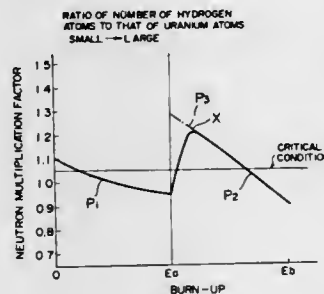
4,789,520

## FUEL ASSEMBLY AND NUCLEAR REACTOR

Yuichi Morimoto, Hitachi; Hiromi Maruyama, Katsuta; Motoo Aoyama, Hitachi; Atsushi Zakeran; Yasunori Beasho, both of Mito; Tomoyuki Matsumoto, Katsuta; Yoshihiko Ishii; Kouji Fujimura, both of Hitachi, and Sadao Uchikawa, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jul. 24, 1987, Ser. No. 77,513  
Claims priority, application Japan, Aug. 1, 1986, 61-179970  
Int. Cl. G21C 3/00

U.S. Cl. 376—419

17 Claims



1. A fuel assembly for being charged in a high conversion area of a reactor core, comprising a plurality of fuel rods each filled with nuclear fuel material and arranged in rows, an upper tie plate and a lower tie plate for holding opposite ends of each of said fuel rods, and coolant flow paths defined between said fuel rods, coolant flowing from a lower portion to an upper portion of said fuel assembly and voids being generated in the upper portion, wherein a ratio  $V_C/V_F$  is not greater than 1.5 within said fuel assembly, where  $V_C$  is a volume occupied by

the coolant flow paths and  $V_F$  is a volume occupied by the nuclear fuel material per unit length in an axial direction of the fuel assembly, and a part of the fuel rods includes a burnable poison material composed of neutron absorption nuclides having at least one resonant energy in a neutron energy region of one electron volt or less, the fuel rods including the burnable poison material being disposed inwardly from an outermost row of other fuel rods of said fuel assembly which do not include a burnable poison material and being surrounded by the other fuel rods.

4,789,521

## PERMANENT MAGNET ALLOY

Kalathur S. V. L. Narasimhan, Monroeville, and Bao-Min Ma, Pittsburgh, both of Pa., assignors to Crucible Materials Corporation, Pittsburgh, Pa.  
Division of Ser. No. 629,384, Jul. 10, 1984, abandoned. This application Jun. 20, 1986, Ser. No. 876,480  
Int. Cl. C22C 38/00

U.S. Cl. 420—83

1 Claim

1. A permanent magnet alloy consisting essentially of, in atomic percent, neodymium 8 to 15, thorium 6 to 10 with the total neodymium and thorium being within the range of 14 to 20, boron 4 to 14 and balance iron.

4,789,522

## CASTABLE ZINC-ALUMINUM ALLOYS

Reginald W. Smith, and Mansor Ghoresly, both of Kingston, Canada, assignors to Queen's University at Kingston, Kingston, Canada  
Continuation-in-part of Ser. No. 879,572, Jun. 27, 1986, abandoned. This application Nov. 24, 1987, Ser. No. 133,832  
Int. Cl. C22C 38/04

U.S. Cl. 420—514

8 Claims

1. A method for controlling underside shrinkage in a cast hypereutectic zinc-aluminum alloy containing at least about 20 wt% aluminum comprising melting said alloy and adding thereto at least one rare earth metal in an amount between 0.25 wt% and 2.0 wt% and sufficient to substantially eliminate underside shrinkage when said alloy is cast into a sand mould having a cross section of at least one inch, and subsequently casting said rare earth metal containing alloy into a mould.

4,789,523

CATIONIC AND ANIONIC LIGNIN AMINES  
CORROSION INHIBITORS

Peter Schilling, Charleston, and Patti E. Brown, Goose Creek, both of S.C., assignors to Westvaco Corporation, New York, N.Y.  
Division of Ser. No. 76,948, Jul. 23, 1987. This application Mar. 28, 1988, Ser. No. 173,886  
Int. Cl. C23F 11/04

U.S. Cl. 422—12

13 Claims

1. A method for inhibiting corrosion of mild steel in mineral acid comprising adding to the acid a lignin derivative prepared by reacting lignin with an aldehyde, or an aldehyde producing substance, and a polyamine.

4,789,524

DEVICE FOR MEASUREMENT OF CORROSIVENESS  
OF SMOKE

Pierre Rio, 8 rue Noël; Jacky Gautier, AD 222, rue d'Aijon, Ker Uhel, both of 22300 Lannion, and Hubert Ubertal, Kernu, Louannec, 22700 Perros-Guirec, all of France  
Filed Jul. 20, 1987, Ser. No. 75,171  
Claims priority, application France, Jul. 22, 1986, 86 10607  
Int. Cl. G01N 17/00; B01L 11/00, 3/00

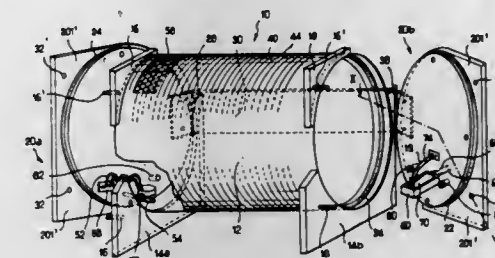
U.S. Cl. 422—53

3 Claims

1. In a device for measurement of corrosiveness of smoke, comprising a chamber having walls, means for creating inside said chamber an atmosphere of air of predetermined humidity, heating means for heating said atmosphere and said walls of

said chamber to a predetermined temperature, means for causing combustion of a sample of material in said chamber, water circulation cooling means for condensing smoke and products of pyrolysis generated by said combustion onto an electrically resistive metallic element exposed inside said chamber, measurement of corrosiveness of said smoke being carried out by measuring variation in electrical resistance of said element, the improvement comprising:

said chamber walls being a methyl polymethacrylate cylin-



der having first and second open ends and having external periphery;  
a thermally insulating end door for each of the first and second open ends, constituted by an assembly of methyl polymethacrylate panels separated by interstitial air, and thermally-insulating and gas-tight means between said doors and said cylinder;  
said heating means comprising a first electrically resistive metallic wire helically wound on the external periphery of said cylinder.

4,789,525

ANALYTICAL METHOD AND MULTILAYER ELEMENT  
FOR TOTAL IONIC IRON DETERMINATION

Harold C. Warren, III, Rush, and John C. Mauck, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

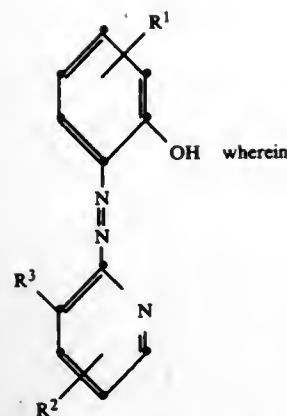
Filed Jun. 22, 1987, Ser. No. 64,639

Int. Cl. G01N 21/75, 33/20

U.S. Cl. 422—56

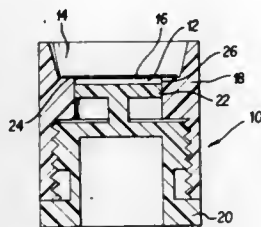
5 Claims

1. A multilayer analytical element for quantitative determination of total ionic iron in an aqueous fluid comprising in the following order;
  - (a) a spreading layer; and
  - (b) a reducing layer comprising a reducing agent for  $Fe^{+3}$ ; and
  - (c) a reagent layer for complexing  $Fe^{+2}$  iron comprising
    - (i) a coupler solvent selected from the group consisting of dioctyl phenyl phosphonate and diethyl lauramide;
    - (ii) a buffering composition of sufficient concentration to maintain a pH in the range of 4 to 5 when the reagent layer is contacted with an aqueous fluid and
    - (iii) a dye having the structure



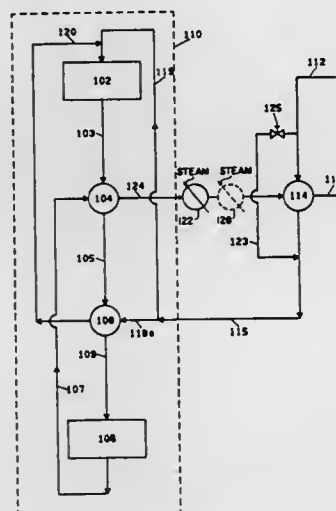
$R^1$  represents an electron donating group; or  $R^1$ , together with the carbon to which it is attached, represents sufficient atoms to form a cyclic electron donating group fused to the phenyl group to which  $R^1$  is attached;  $R^2$  represents an electron withdrawing group; and  $R^3$  represents H, Cl, F, Br or  $OR^4$  wherein  $R^4$  represents a hydrocarbon having from 1 to 20 carbon atoms.

**4,789,526**  
**VACUUM DIAGNOSTIC DEVICE**  
Vlado I. Matkovich, Glen Cove, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.  
Filed Dec. 15, 1986, Ser. No. 941,356  
Int. Cl.<sup>4</sup> B01L 11/00  
U.S. Cl. 422-101



1. A diagnostic device for testing at least one analyte in a liquid, the diagnostic device comprising:  
a housing having an exterior and including a chamber having one portion open to the exterior of the housing and another portion closed from the exterior of the housing;  
a porous structure disposed across the open portion of the chamber and hermetically sealed to the housing, the porous structure having a first surface communicating with the exterior of the housing, a second surface communicating with the closed portion of the chamber, and at least one layer which is wettable by a liquid; and  
means for increasing the volume of the closed portion of the chamber to thereby decrease the pressure within the closed portion of the chamber, the at least one wettable layer of the porous structure having a bubble point such that when the at least one wettable layer has been wetted by a liquid, the diagnostic device is capable of maintaining a pressure differential across the porous structure after the volume of the closed portion of the chamber has been increased by said volume increasing means to create a pressure differential across the porous structure.

**4,789,527**  
**CATALYTIC GAS SYNTHESIS APPARATUS**  
Robert M. Osman, Parsippany, and Larry J. Shulik, Morris-town, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.  
Division of Ser. No. 691,398, Jan. 14, 1985, Pat. No. 4,637,918, which is a division of Ser. No. 472,998, Mar. 7, 1983, Pat. No. 4,518,574. This application Jan. 21, 1987, Ser. No. 5,730  
The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> B01J 8/04  
U.S. Cl. 422-148

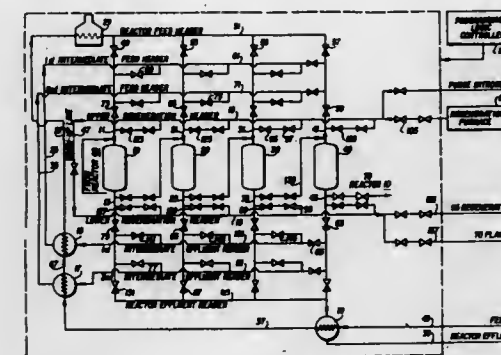


1. In an exothermic catalytic reactor having at least two catalytic beds arranged for sequential gas flow therethrough; gas supply means for introducing a gas feedstream to the first of said catalyst beds for partial reaction of said gas feedstream therein; interbed gas cooling means for cooling the gas effluent from each catalyst bed to remove heat therefrom prior to passing said gas effluent to the next of said sequentially arranged catalyst beds and means for removing a gaseous effluent from the last of such catalyst reactor beds as said gas product, the improvement wherein said reactor additionally comprises reheat exchange means constructed and arranged for heating at least a portion of said last catalyst bed effluent gas by indirect heat exchange with a heating fluid comprising at least a portion of the gaseous effluent from at least one other of said reactor beds prior to withdrawal of said product gas from said reactor.

**4,789,528**  
**TECHNIQUE FOR SEQUENTIAL ROTATION OF REACTORS IN A MULTI-REACTOR CATALYTIC CONVERSION SYSTEM**  
Hartley Owen, Belle Mead; Nicholas Daviduk, Pennington; Susan K. Marsh, East Brunswick, and Bernard S. Wright, East Windsor, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.  
Continuation-in-part of Ser. No. 686,855, Dec. 27, 1984, abandoned, and a continuation-in-part of Ser. No. 619,528, Jun. 11, 1984, which is a continuation-in-part of Ser. No. 488,834, Apr. 26, 1983, Pat. No. 4,456,779, and a continuation-in-part of Ser. No. 838,849, Mar. 12, 1986, abandoned, which is a division of Ser. No. 488,845, Apr. 26, 1983, abandoned. This application Sep. 22, 1986, Ser. No. 909,529  
Int. Cl.<sup>4</sup> B01J 4/00  
U.S. Cl. 422-190

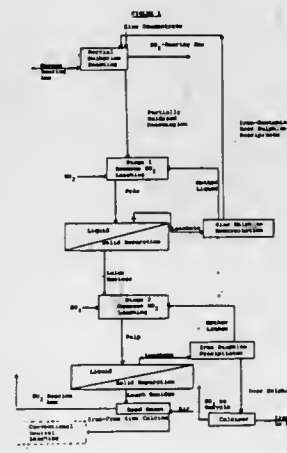
1. In a process for the continuous conversion of an organic feedstock in a reactor system comprising serially connected

fixed bed catalytic reactors, an improved method for advancing a reactor to a preceding serial position comprising:  
(a) bringing an advancing reactor into a parallel flow arrangement with either a freshly regenerated catalytic reactor if the advancing reactor is in a terminal position of the reactor system or a reactor in a subsequent serial position if the advancing reactor is not in a terminal position in the system;



(b) isolating the advancing reactor from the reactor system;  
(c) bringing the advancing reactor into a parallel flow arrangement with a preceding reactor in the system; and  
(d) isolating the preceding reactor to obtain a reactor system containing a reactor advanced to a preceding serial position.

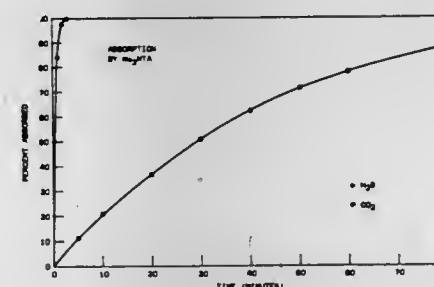
**4,789,529**  
**RECOVERY OF ZINC FROM ZINC BEARING SULPHIDIC ORES AND CONCENTRATES BY CONTROLLED OXIDATION ROASTING**  
Murry C. Robinson, Don Mills; Donald W. Kirk, Oakville, and Bruce Jne, Don Mills, all of Canada, assignors to Materials-Concepts-Research Limited, Don Mills, Canada  
Filed Mar. 18, 1986, Ser. No. 840,796  
Claims priority, application United Kingdom, Mar. 21, 1985, 8507302; Jun. 20, 1985, 8515615  
Int. Cl.<sup>4</sup> C01G 9/00  
U.S. Cl. 423-109



1. A process for the recovery of zinc from sulphidic zinc bearing ores and concentrates, comprising the steps of:  
(a) roasting a sulphidic zinc concentrate in contact with an oxygen bearing gas in the temperature range of 805°-1050° C. to obtain a calcine with a sulphur retention is said calcine between 50-75 wt. % of the sulphur initially present in said sulphidic concentrate;  
(b) subjecting said calcine to a physical separation process by

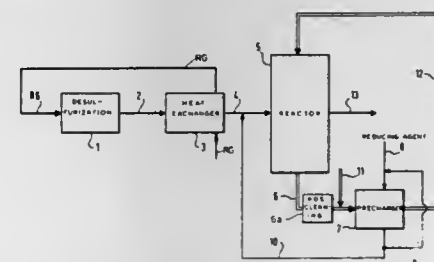
at least one of the steps of magnetic separation and froth flotation to obtain an iron-rich fraction and a zinc fraction; and  
(c) roasting said zinc fraction in stoichiometric excess oxygen to obtain zinc-rich calcine for zinc recovery.

**4,789,530**  
**ABSORPTION OF HYDROGEN SULFIDE WITH AN ALKALI METAL ETHYLENEDIAMINETETRAACETATE AND/OR ALKALI METAL NITRILOTRIACETATE**  
Marvin M. Johnson; Ted H. Cymbalak, and Gerhard P. Nowack, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.  
Filed Dec. 9, 1987, Ser. No. 130,765  
Int. Cl.<sup>4</sup> G01B 17/16; C01B 31/20  
U.S. Cl. 423-226



1. A process for absorbing hydrogen sulfide comprising the step of contacting a gas feed comprising hydrogen sulfide and carbon dioxide with  
a solution comprising at least one dissolved sorbent selected from the group consisting of alkali metal ethylenediaminetetraacetate and alkali metal nitrilotriacetate, in the substantial absence of oxidizing agents which can oxidize hydrogen sulfide, under such contacting conditions as to absorb a greater portion per unit time of  $H_2S$  than  $CO_2$  from said gas feed.

**4,789,531**  
**METHOD OF REMOVING NITROGEN OXIDES ( $NO_x$ ) FROM GASES, ESPECIALLY FLUE GASES**  
Andreas Eichholtz, Recklinghausen, and Helmut Weiler, Velt, both of Fed. Rep. of Germany, assignors to Steag Aktiengesellschaft, Essen, Fed. Rep. of Germany  
Continuation of Ser. No. 875,983, Jun. 18, 1986, abandoned.  
This application Oct. 2, 1987, Ser. No. 105,511  
Claims priority, application Fed. Rep. of Germany, Jun. 29, 1985, 3523326  
Int. Cl.<sup>4</sup> C01B 21/00; C01C 3/00  
U.S. Cl. 423-235



1. A method of removing  $NO_x$  from a flue gas, comprising the steps of:



forming a traveling bed of solid, carbon-containing adsorbent in an adsorption reactor; feeding said NO<sub>x</sub> containing gas into said adsorption reactor and treating the gas in said reactor with a reducing agent so as to remove NO<sub>x</sub> from said gas; passing a stream of said carbon-containing adsorbent through a precharging unit and precharging said stream with the reducing agent such that the reducing agent permeates substantially throughout the adsorbent; feeding said adsorbent precharged with reducing agent into said adsorption reactor so that 50% to 100% of the reducing agent required for the removal of NO<sub>x</sub> in the gas is precharged in the adsorbent; and contacting and reacting the gas in the reactor with the reducing agent of the traveling bed of precharged adsorbent so as to catalytically extract NO<sub>x</sub> from the gas.

4,789,532

# METHOD FOR CLEANING OF A HOT FLUE GAS STREAM FROM WASTE INCINERATION

Ebbe S. Jons, Vaerloese; Jens T. Moller, Allerod, and Kirsten K. Nielsen, Holte, all of Denmark, assignors to A/S Niro Atomizer, Sborg, Denmark

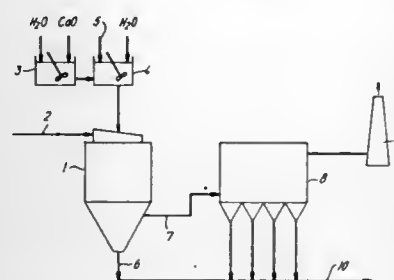
Filed Jan. 12, 1987, Ser. No. 2,250

Claims priority, application Denmark, Jan. 17, 1986, 235/86

Int. Cl.<sup>4</sup> B01D 47/06; B01J 8/00

U.S. Cl. 423-240

7 Claims



1. A method of cleaning a stream of hot flue gas derived from waste incineration to provide an end-product which may be disposed of with a minimum risk of environmental pollution, comprising:

- spray drying an aqueous slaked lime slurry containing ground blast-furnace slag in said hot flue gas containing acidic components to produce a particulate end-product which contains the reaction products between said lime and the acidic components removed from the flue gas together with non-reacted lime and any fly ash present in said hot flue gas, wherein said slurry contains an amount of potentially active lime which is from about 1.5 to about 2.5 times larger than the amount of lime necessary to react with said acidic components of said hot flue gas and wherein said ground blast-furnace slag is present in said slurry in an amount equivalent to from about 30 to about 100% by weight of the amount of calcium salts generated by the reaction between said acidic components of said hot flue gas and said lime; and
- removing said particulate end-product from said gas.

4,789,533

# CATALYST FOR REDUCTIVE CONVERSION OF NITROGEN OXIDES IN WASTE GASES

Alfons Baiker, Opflikon; Peter Dollemeyer, Wallisellen, both of Switzerland, and Marek Gliniski, Warsaw, Poland, assignors to Lonza Ltd., Gampel, Switzerland

Division of Ser. No. 27,395, Mar. 18, 1987, Pat. No. 4,742,037.

This application Jun. 3, 1987, Ser. No. 56,909

Claims priority, application Switzerland, Apr. 17, 1986, 1556/86

Int. Cl.<sup>4</sup> B01J 8/00; C01B 17/00

U.S. Cl. 423-239

15 Claims

1. Process comprising reductively converting nitrogen oxides in a gas mixture in the presence of ammonia and oxygen by bringing the gas mixture into contact with a catalyst at 150° to 350° C. with a space velocity of 7,000 to 50,000 h<sup>-1</sup>, said catalyst being produced by the process comprising conducting, at least once, the sequence of impregnating a support, containing TiO<sub>2</sub>, SiO<sub>2</sub>, ZrO, Cr<sub>2</sub>O<sub>3</sub> and/or SnO<sub>2</sub>, with a vanadium alkoxide dissolved in an apolar, water-free solvent in an inert atmosphere, and calcining the impregnated support at a temperature of 300° to 600° C. for 3 to 6 hours in the dry gas current with 15 to 25 percent by volume of oxygen to achieve a surface deposit of the active parts in the form of vanadium oxide on the support, said impregnating step and said calcining step being performed in absolutely water-free conditions and environment.

4,789,534

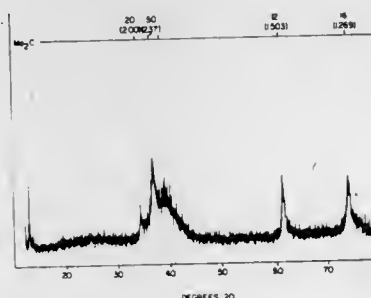
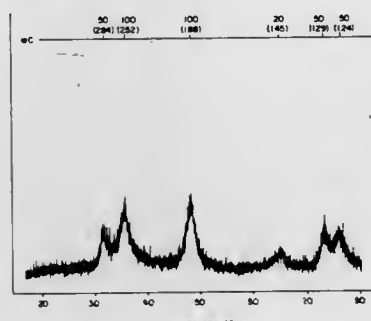
# TRANSITION METAL CARBIDES AND PROCESS FOR MAKING SAME

Richard M. Laine, Palo Alto, Calif., assignor to SRI International, Menlo Park, Calif.

Continuation of Ser. No. 900,592, Aug. 26, 1986, abandoned, which is a continuation-in-part of PCT US86/00058 filed Jan. 1, 1986, which is a continuation-in-part of Ser. No. 727,524, Apr. 26, 1985, abandoned. This application Nov. 6, 1987, Ser. No. 119,303

Int. Cl.<sup>4</sup> C01F 15/00, 17/00; C01G 43/00, 39/00, 41/00  
U.S. Cl. 423-241

9 Claims



1. A process for making a transition metal carbide comprising pyrolyzing a tractable transition metal amide of the formula

M<sub>x</sub>(NR<sup>1</sup>R<sup>2</sup>)<sub>y</sub>

where M is a transition metal selected from the group consisting of Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Hf, Ta, W, Re, Os, Ir, Pt, and all elements from atomic number 89 on, x is an integer and is equal to or greater than 2, R<sup>1</sup> and R<sup>2</sup> are the same or different and are hydrogen, lower alkyl, trimethylsilyl, or ethylene, with the proviso that both R<sup>1</sup> and R<sup>2</sup> are not hydrogen, and y is an integer equal to the valence of the M<sub>x</sub> unit, under nonoxidizing conditions at a temperature at which a carbon-containing group of the amido group of the amide undergoes chemical reaction with a metal atom of the amide to form at least one covalent carbon-to-metal bond.

4,789,535

# LITHIUM-ALUMINUM-PHOSPHORUS-OXIDE MOLECULAR SIEVE COMPOSITIONS

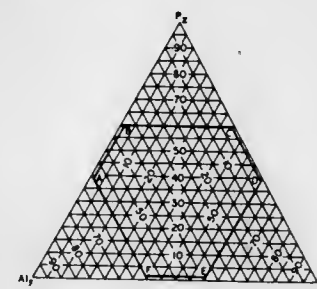
Edith M. Flanigen, White Plains; David A. Leach, Ossining; Brent M. T. Lok, New City; Robert L. Patton, Katonah, and Stephen T. Wilson, Shrub Oak, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 599,811, Apr. 13, 1984, abandoned. This application Feb. 28, 1986, Ser. No. 834,921

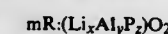
Int. Cl.<sup>4</sup> C01B 25/26

U.S. Cl. 423-306

62 Claims



1. Crystalline molecular sieves having three-dimensional microporous framework structures of LiO<sub>2</sub>, AlO<sub>2</sub> and PO<sub>2</sub> tetrahedral units having an empirical chemical composition on an anhydrous basis expressed by the formula:



wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of (Li<sub>x</sub>Al<sub>y</sub>P<sub>z</sub>)<sub>2</sub>O<sub>2</sub> and has a value of zero to about 0.3; and "x", "y" and "z" represent the mole fractions of lithium, aluminum and phosphorus, respectively, present as tetrahedral oxides, said mole fractions being such that they are within the hexagonal compositional area defined by points A, B, C, D, E and F of FIG. 1, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables A to V:

TABLE A

(LiAPO-5)		
2θ	d(Å)	Relative Intensity
7.3-7.65	12.1-11.56	m-vs
19.5-19.95	4.55-4.46	m-s
20.9-21.3	4.25-4.17	m-vs
22.2-22.6	4.00-3.93	w-vs
25.7-26.15	3.47-3.40	w-m

TABLE B

(LiAPO-11)		
2θ	d(Å)	Relative Intensity
9.3-9.65	9.51-9.17	m-s
20.2-20.6	4.40-4.31	m-s
20.9-21.3	4.25-4.17	s-vs
22.0-22.5	4.04-3.95	m-s
22.5-22.9	3.95-3.92	m-s
23.0-23.4	3.87-3.80	m-vs

TABLE C

(LiAPO-14)		
2θ	d(Å)	Relative Intensity
8.6-8.9	10.3-9.93	vs
13.0	6.81	w
21.9-22.2	4.06-4.00	w
25.4	3.51	w
27.5	3.24	w
29.7	3.01	w

TABLE D

(LiAPO-16)		
2θ	d(Å)	Relative Intensity
11.3-11.6	7.83-7.63	m-vs
18.7-18.9	4.75-4.70	w-s
21.9-22.3	4.06-3.99	m-vs
26.5-27.0	3.363-3.302	w-m
29.7-30.05	3.008-2.974	w-m

TABLE E

(LiAPO-17)		
2θ	d(Å)	Relative Intensity
7.7-7.75	11.5-11.4	vs
13.4	6.61	s-vs
15.5-15.55	5.72-5.70	s
19.65-19.7	4.52-4.51	w-s
20.5-20.6	4.33-4.31	vs
31.8-32.00	2.812-2.797	w-s

TABLE F

(LiAPO-18)		
2θ	d(Å)	Relative Intensity
9.6-9.65	9.21-9.16	vs
15.5-15.55	5.72-5.70	m
16.9-17.1	5.25-5.19	m
20.15-20.25	4.41-4.39	m
20.95-21.05	4.24-4.22	m
31.8-32.5	2.814-2.755	m

TABLE G

(LiAPO-20)		
2θ	d(Å)	Relative Intensity
13.7-14.25	6.46-6.22	m-vs
19.55-20.0	4.54-4.44	w-s
24.05-24.5	3.70-3.63	m-vs
34.3-35.0	2.614-2.564	vw-w
42.5-43.0	2.127-2.103	vw-w

TABLE H

(LiAPO-31)		
2θ	d(Å)	Relative Intensity
8.5-8.6	10.40-10.28	m-s
20.2-20.3	4.40-4.37	m
21.9-22.1	4.06-4.02	w-m
22.6-22.7	3.93-3.92	vs

TABLE H-continued

(LiAPO-31)		
2θ	d(Å)	Relative Intensity
31.7-31.8	2.823-2.814	w-m

TABLE J\*

(LiAPO-33)		
2θ	d(Å)	Relative Intensity
9.25-9.55	9.56-9.26	w-m
12.5-12.9	7.08-6.86	vs
16.9-17.3	5.25-5.13	w-m
20.45-20.9	4.34-4.25	w-m
23.85-24.25	3.73-3.67	w-m
26.05-26.35	3.42-3.38	w-m
27.3-27.6	3.27-3.23	vs

\*as-synthesized form

TABLE K\*

(LiAPO-33)		
2θ	d(Å)	Relative Intensity
13.15-13.4	6.73-6.61	vs
18.05-18.35	4.91-4.83	m
18.4-18.6	4.82-4.77	m
26.55-26.7	3.36-3.34	m
32.0-32.1	2.80-2.79	m

\*calcined form

TABLE L1\*

(LiAPO-34)		
2θ	d(Å)	Relative Intensity
9.4-9.65	9.41-9.17	s-vs
15.9-16.2	5.57-5.47	vw-m
17.85-18.4	4.97-4.82	w-s
20.3-20.9	4.37-4.25	m-vs
24.95-25.4	3.57-3.51	vw-s
30.3-30.8	2.95-2.90	w-s

\*as-synthesized form

TABLE L2\*

(LiAPO-34)		
2θ	d(Å)	Relative Intensity
9.77-9.71	9.06-9.10	vs
16.3-16.4	5.43-5.42	w
18.2-18.3	4.89-4.86	w
20.9-21.0	4.25-4.22	m
25.4-25.6	3.51-3.48	w
31.0-31.2	2.89-2.86	w

\*calcined form

TABLE M

(LiAPO-35)		
2θ	d(Å)	Relative Intensity
10.8-11.1	8.19-7.97	m
17.2-17.4	5.16-5.10	s-vs
21.0-21.25	4.23-4.18	m-s
21.8-22.0	4.08-4.04	vs
31.8-32.2	2.814-2.788	m

TABLE N

(LiAPO-36)		
2θ	d(Å)	Relative Intensity
7.7-7.9	11.5-11.2	vs
16.2-16.6	5.47-5.34	w-m
18.9-19.3	4.70-4.60	m-s
20.6-20.8	4.31-4.27	w-s

TABLE N-continued

(LiAPO-36)		
2θ	d(Å)	Relative Intensity
21.8-22.0	4.08-4.04	m
22.2-22.5	4.00-3.95	w-m

TABLE O

(LiAPO-37)		
2θ	d(Å)	Relative Intensity
6.1-6.3	14.49-14.03	vs
15.5-15.7	5.72-5.64	w-m
18.5-18.8	4.80-4.72	w-m
23.5-23.7	3.79-3.75	w-m
26.9-27.1	3.31-3.29	w-m

TABLE P

(LiAPO-39)		
2θ	d(Å)	Relative Intensity
9.4-9.6	9.41-9.21	w-m
13.3-13.6	6.66-6.51	m-vs
18.0-18.4	4.93-4.82	m
21.2-21.5	4.19-4.13	m-s
22.5-23.0	3.95-3.87	s-vs
30.2-30.5	2.96-2.93	w-m

TABLE Q

(LiAPO-40)		
2θ	d(Å)	Relative Intensity
7.5-7.7	11.79-11.48	vw-m
8.0-8.1	11.05-10.94	s-vs
12.4-12.5	7.14-7.08	w-vs
13.6-13.8	6.51-6.42	m-s
14.0-14.1	6.33-6.28	w-m
27.8-28.0	3.209-3.187	w-m

TABLE R

(LiAPO-41)		
2θ	d(Å)	Relative Intensity
13.6-13.8	6.51-6.42	w-m
20.5-20.6	4.33-4.31	w-m
21.1-21.3	4.21-4.17	vs
22.1-22.3	4.02-3.99	m-s
22.8-23.0	3.90-3.86	m
23.1-23.4	3.82-3.80	w-m
25.5-25.9	3.493-3.440	w-m

TABLE S

(LiAPO-42)		
2θ	d(Å)	Relative Intensity
7.15-7.4	12.36-11.95	m-vs
12.5-12.7	7.08-6.97	m-s
21.75-21.9	4.09-4.06	m-s
24.1-24.25	3.69-3.67	vs
27.25-27.4	3.273-3.255	s
30.05-30.25	2.974-2.955	m-s

TABLE T

(LiAPO-44)		
2θ	d(Å)	Relative Intensity
9.4-9.55	9.41-9.26	vs
13.0-13.1	6.81-6.76	w-m
16.0-16.2	5.54-5.47	w-m
20.6-20.85	4.31-4.26	s-vs
24.3-24.4	3.66-3.65	w-vs

TABLE T-continued

(LiAPO-44)		
2θ	d(Å)	Relative Intensity
30.7-30.95	2.912-2.889	w-s

TABLE U

(LiAPO-46)		
2θ	d(Å)	Relative Intensity
7.2-8.1	12.3-10.9	vs
21.2-21.8	4.19-4.08	w-m
22.5-23.0	3.95-3.87	vw-m
26.6-27.2	3.351-3.278	vw-w
28.5-29.0	3.132-3.079	vw-w

TABLE V

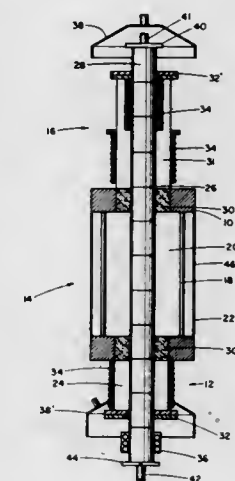
(LiAPO-47)		
2θ	d(Å)	Relative Intensity
9.4	9.41	vs
15.9-16.0	5.57-5.54	w-m
20.5-20.6	4.33-4.31	s
24.5-24.7	3.63-3.60	w
25.8-25.9	3.45-3.44	w
30.4-30.5	2.940-2.931	w

#### 4,789,536 PROCESS FOR PRODUCING SILICON CARBIDE WHISKERS

Dale E. Schramm, and Donald W. Birtell, both of Borger, Tex., assignors to J. M. Huber Corporation, Rumson, N.J.  
Filed Jan. 20, 1987, Ser. No. 4,505  
Int. Cl.<sup>4</sup> C01B 31/36

U.S. Cl. 423-345

9 Claims



1. A method of manufacturing silicon carbide whiskers in a furnace including a sleeve-like core having a central axis for receiving a porous silic and carbon feedstock, the core extending from a preheat zone having a temperature less than 1300° C., to a reaction zone having a temperature between substantially 1500° C. and 1700° C., and thence to a cooling zone having a temperature less than 1300° C., the furnace further including a plurality of heating elements disposed in a heating chamber defined by an annulus between an outer reactor shell of the furnace and a portion of the core within the reaction zone, the method comprising:

(a) providing a plurality of heat-resistant tray assemblies each including a planar tray plate and a spacer, said tray

plate defining a lower surface of a reaction cavity and having a circular periphery formed about an axis, said spacer positioned on and extending axially from a surface of said tray plate and having a substantially uniformly sized through channel aligned with said plate axis, and each of the tray plates having at least one bore hole adjoining said spacer channel;

(b) providing a first flow path for fluid communication between at least one of the reaction cavities and at least one of said spacer channels;

(c) placing the feedstock on each of said tray plates;

(d) stacking said plurality of tray assemblies serially within said core such that each of said tray plate axes is substantially aligned with said core central axis;

(e) providing a second flow path axially aligned within said core and passing through said spacer channels and the boreholes in the tray plates;

(f) providing a third flow path for maintaining fluid communication of oxide offgases between reaction cavities defined by tray plates of stacked tray assemblies;

(g) moving said tray assemblies axially through the preheat, reaction and cooling zones for reacting said feedstock to produce silicon carbide whiskers and oxide offgases;

(h) maintaining greater than atmospheric pressure within said heating chamber during step (g) to minimize flow of oxide offgases from the reaction cavities radially outward through said core; and

(i) withdrawing oxide offgases through said axially aligned second flow path during steps (g) and (h) to uniformly relieve pressure within said core.

#### 4,789,537 PREALLOYED CATALYST FOR GROWING SILICON CARBIDE WHISKERS

Peter D. Shalek, Los Alamos, N. Mex.; Joel D. Katz, Niagara Falls, N.Y., and George F. Hurley, Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Continuation of Ser. No. 814,866, Dec. 30, 1985, abandoned.  
This application Jun. 25, 1987, Ser. No. 68,796  
Int. Cl.<sup>4</sup> C01B 31/36

U.S. Cl. 423-346

4 Claims



1. A method for manufacturing silicon carbide whiskers wherein manufacturing time is reduced comprising:

a. providing a growth substrate having a coating comprised of metallic catalyst particles alloyed with silicon, where the particles contain from about 1 to about 45 weight % silicon;

b. heating the coated growth substrate in a gaseous environment comprised of a reducing gas;

c. adding to the gaseous environment a gas comprised of silicon and a gas comprised of carbon;

d. maintaining for a time period the coated growth substrate and gaseous environment at a temperature above a minimum temperature at which silicon carbide whiskers will form, where said minimum temperature is from about 1200° to about 1600° C.; and

e. removing the gas comprised of silicon and the gas comprised of carbon from the gaseous environment, cooling



the coated growth substrate, and recovering silicon carbide whiskers from the coated growth substrate.

**4,789,538**  
**METHOD OF PREPARING AMMONIA AND AMMONIA SYNTHESIS CATALYSTS**

Larry M. Cirjak, Burton, and Richard P. Schmidt, Jr., Lima, both of Ohio, assignors to Standard Oil, Cleveland, Ohio  
Filed Jul. 17, 1987, Ser. No. 74,736  
Int. Cl.<sup>4</sup> C01C 1/04

**U.S. Cl. 423—362** **6 Claims**  
1. A process for producing ammonia comprising (1) selecting a catalyst precursor characterized by having the formula:



where

y=0 to 4;  
a=0.1 to 4;  
c=4 to 6;  
b=0.1 to 4;  
n=0 to 30;

A=alkali or alkaline earth metals or mixtures thereof;

M=La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Sc, Lu and Y or mixtures thereof;

M'=Group VIII metals or mixtures thereof;

wherein said precursor is substantially free of Al and the combination of Al and U, (2) slowly heating said catalyst precursor in a nonoxidizing atmosphere to a temperature of between 275° to 450° C. to activate said precursor and (3) passing N<sub>2</sub> and H<sub>2</sub> over said activated catalyst at an elevated temperature and pressure to produce ammonia.

**4,789,539**  
**PROCESS FOR THE PREPARATION OF CHLORAMINE**  
Hans Osborg, P.O. Box 152, 80 Long View Rd., Port Washington, N.Y. 11050

Division of Ser. No. 691,506, Jan. 14, 1985, Pat. No. 4,677,227, which is a division of Ser. No. 370,980, Apr. 22, 1982, Pat. No. 4,508,695. This application Jan. 26, 1987, Ser. No. 67,608  
Int. Cl.<sup>4</sup> C01B 21/00

**U.S. Cl. 423—413** **3 Claims**  
1. Process for the preparation of chloramine, NH<sub>2</sub>Cl, by reacting chlorine with an amide selected from the group of an alkali metal amide, an alkaline earth metal amide or a combination thereof.

**4,789,540**  
**CATALYTIC HYDROGEN GENERATOR FOR USE WITH METHANOL**

John W. Jenkins, Chalkhouse Green, United Kingdom, assignor to Johnson Matthey Public Limited Co., London, England  
Filed Sep. 4, 1986, Ser. No. 903,644

Claims priority, application United Kingdom, Sep. 3, 1985, 8521953

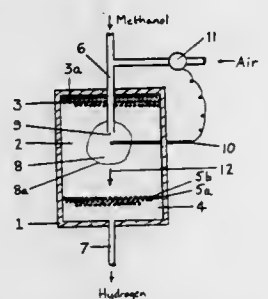
Int. Cl.<sup>4</sup> C01B 1/13

**U.S. Cl. 423—648.1** **6 Claims**  
1. A process for the catalytic generation of hydrogen from a mixture of methanol and oxygen which does not require the application of external heat using a gas permeable catalyst system comprising

- (a) an upstream zone (2) comprising a catalyst consisting essentially of copper moieties supported on a refractory support (3) and
- (b) a downstream zone (4) containing a catalyst comprising copper moieties supported on a refractory support (5a) and mixed with a catalyst comprising moieties of one or more metals chosen from platinum and palladium supported on a refractory support (5b)

wherein the mixture is fed into the upstream zone through which it permeates into the downstream zone where oxidation of methanol initiates spontaneously causing a rise in tempera-

ture to a temperature at which partial oxidation of methanol in the presence of a copper catalyst in the upstream zone can



occur whereupon partial oxidation of methanol in the upstream zone commences and produces hydrogen.

**4,789,541**  
**METHOD AND COMPOSITION FOR IN VIVO RADIOLABELING OF RED BLOOD CELLS WITH <sup>99m</sup>Tc**  
Michael H. Davis, 3020 E. Inglewood Ct., Springfield, Mo. 65804

Continuation-in-part of Ser. No. 784,020, Oct. 4, 1985, Pat. No. 4,692,324. This application Jan. 16, 1987, Ser. No. 62,597  
The portion of the term of this patent subsequent to Sep. 8, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> A61K 43/00, 49/02, 49/00; G01N 33/15  
**U.S. Cl. 424—1.1** **26 Claims**

1. A pill in the form of a tablet or capsule suitable for oral administration to a patient for tinning red blood cells of the patient in vivo in preparation for radiolabeling the red blood cells with <sup>99m</sup>Tc, wherein said pill comprises a composition consisting essentially of

- (1) about 10 mg to about 200 mg stannous chloride, and
- (2) about 250 mg to about 1000 mg potassium perchlorate.

21. A method of carrying out equilibrium blood pool imaging in a patient, said method comprising orally administering to the patient about 8.9 mg/kg body weight to about 42 mg/kg body weight of a composition consisting essentially of

- (1) about 10 to about 200 mg stannous chloride, and
- (2) about 250 mg to about 1000 mg potassium perchlorate;

incubating red blood cells in vivo in the presence of Sn<sup>2+</sup> for a time sufficient for tin to be absorbed by the red blood cells in the patient;

contacting the resulting tinned red blood cells with <sup>99m</sup>Tc; and

incubating the tinned red blood cells with the <sup>99m</sup>Tc for a time sufficient to radiolabel the cells; and

imaging a blood pool of the patient with means for detecting and reporting radioactivity emitted by the <sup>99m</sup>Tc.

**4,789,542**  
**RADIOIODINATED GLUCOSE ANALOGUES FOR USE AS IMAGING AGENTS**

Mark M. Goodman, Knoxville, and Furr F. Knapp, Jr., Oak Ridge, both of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Apr. 29, 1986, Ser. No. 857,230  
Int. Cl.<sup>4</sup> A61K 43/00, 49/00

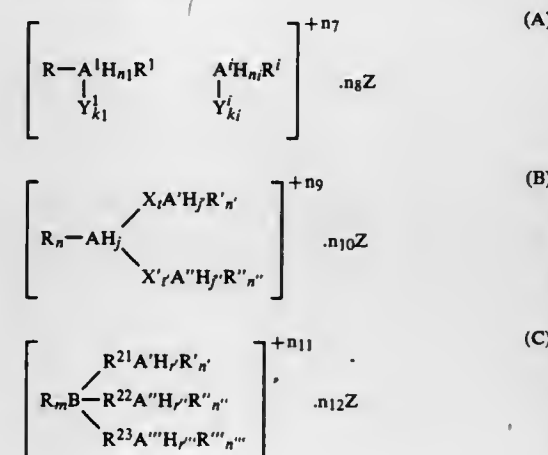
**U.S. Cl. 424—1.1** **7 Claims**  
1. An imaging agent comprising: an administering medium suitable for intravenous injection and a compound comprising a glucose analogue to which is covalently attached a vinyl functional group to which is covalently attached the radioisotope I-123, said compound being present in an amount sufficient to produce a radioimage of tissue using radioimaging techniques.

**4,789,543**  
**NEUTRAL TECHNETIUM 99-M COMPLEXES USEFUL AS RADIODIAGNOSTIC AGENTS**

Karen E. Linder, Somerville, Mass., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 30, 1984, Ser. No. 676,932  
Int. Cl.<sup>4</sup> A61K 49/02; C07F 13/00

**U.S. Cl. 424—1.1** **2 Claims**  
1. A neutral radiodiagnostic agent comprising a complex of (i) Tc-99m, (ii) a complexing ion selected from Cl, Br, I and SCN, (iii) SO<sub>2</sub> and (iv) a mono- or polydentate organic ligand having a formula selected from:



wherein:

R, R', R'', R''', R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>21</sup>, R<sup>22</sup> and R<sup>23</sup> are each independently selected from hydrogen; or substituted or unsubstituted alkyl, alkylene, aryl, alkylaryl, arylalkyl, monocycloalkyl, polycycloalkyl, heterocyclic and carbocyclic group, and R plus R' in formula (A) may be taken together to form a cyclic compound;

A, A', A'', A<sup>1</sup>, A<sup>2</sup>, A<sup>3</sup>, A<sup>4</sup>, A<sup>5</sup> and A<sup>6</sup> are independently selected donor atoms, each having a free electron pair available for accepting a proton to provide a charged ligand and having the capability of complexing with Tc-99m to form a neutral complex;

B is an atom selected from the group of donor atoms having a pair of electrons for complexing with Tc-99m or Tc-99, boron or from the elements listed in Group IVA of the periodic table;

Y<sup>1</sup>, Y<sup>2</sup>, Y<sup>3</sup>, Y<sup>4</sup>, Y<sup>5</sup> and Y<sup>6</sup> are independently selected from hydrogen; or substituted or unsubstituted alkyl, alkylene, aryl, alkylaryl, arylalkyl, monocycloalkyl, polycycloalkyl, heterocyclic and carbocyclic groups; X and X' are saturated or unsaturated alkyl groups; Z is an anion; i is an integer from 1 to 6, j, j' and j'' are each independently 0 or 1; k<sup>1</sup>, k<sup>2</sup>, k<sup>3</sup>, k<sup>4</sup>, k<sup>5</sup> and k<sup>6</sup> are each independently 0 or 1; n, n' and n'' are each independently the integer 1 or 2; n<sub>1</sub>, n<sub>2</sub>, n<sub>3</sub>, n<sub>4</sub>, n<sub>5</sub>, n<sub>6</sub> are independently 0 or 1; n<sub>7</sub> and n<sub>8</sub> are each an integer from 1 to 6; n<sub>9</sub>, n<sub>10</sub> and n<sub>12</sub> are each an integer from 1 to 3; m is 0 or 1; r, r' and r'' are independently 0 or 1; and t and t' are independently 0 or 1.

**4,789,544**  
**CO-VACCINATION USING NON-O-CARBOHYDRATE SIDE-CHAIN GRAM-NEGATIVE BACTERIA PREPARATION**

Ralph Nelson, Shawnee, Kans., and Gerald Schlink, Irwin, Mo., assignors to Midcon Labs, Inc., Lamar, Mo.

Continuation-in-part of Ser. No. 866,451, May 23, 1986, abandoned. This application Dec. 1, 1987, Ser. No. 127,492  
Int. Cl.<sup>4</sup> A61K 39/02, 39/10, 39/108, 39/104

**U.S. Cl. 424—92** **17 Claims**  
1. A composition effective for co-injection of an animal to enhance the immune response to said animal against a gram-

negative pathogen which comprises an effective immune response enhancing dose of

- (a) bacterial lipopolysaccharide devoid of O-carbohydrate side-chains; and
- (b) a whole cell bacterin derived from said pathogen.

**4,789,545**  
**REMOVAL OF LIPID SOLUBLE PROCESS CHEMICALS FROM BIOLOGICAL MATERIALS BY EXTRACTION WITH NATURALLY OCCURRING OILS OR SYNTHETIC SUBSTITUTES THEREOF**

Kenneth R. Woods, Sea Cliff, and Thomas W. Orme, Huntington Station, both of N.Y., assignors to New York Blood Center, Inc., New York, N.Y.

Filed Mar. 31, 1986, Ser. No. 846,374  
Int. Cl.<sup>4</sup> A61K 35/14, 39/12; A01N 1/02; C12N 7/06  
**U.S. Cl. 424—101** **14 Claims**

1. A method of removing lipid soluble process chemicals from biological materials comprising blood plasma and fractions thereof containing said lipid soluble process chemicals, said lipid soluble process chemical being a virus attenuating solvent having a high flash point, a detergent, or a mixture thereof, comprising bringing said biological materials containing said lipid soluble process chemicals into contact with an effective amount of a naturally occurring oil extracted from a plant or an animal or a synthetic compound of similar chemical structure so as to remove 80% or more of said lipid soluble process chemicals, the oil being nonflammable, nonexplosive, compatible with parenterally administered biologics and blood derivatives and pharmaceutically and physiologically tolerable by a human, agitating the resultant mixture, separating out an upper-phase and a lower-phase by sedimentation or centrifugation and decanting the upper-phase.

11. A method of removing lymphokine inducing phorbol esters from lymphokine-containing biological materials selected from the group consisting of mammalian blood, platelet concentrates, white cell concentrates, concentrates of granulocytes, concentrates of monocytes, suspension of cells capable of producing interferon, suspension of cells capable of producing tissue necrosis factor, suspension of cells capable of producing other immune modulators and lymphokines, media separated from said concentrates and suspensions, exudate from cancer cells, exudate from normal cells grown in culture, hydridomas, products from gene splicing, plant cell concentrates, plant cell suspensions, extract of animal tissues, extracts of plant tissues and microorganisms, comprising bringing said biological materials containing said phorbol esters into contact with an effective amount of a naturally occurring oil extracted from a plant or an animal or a synthetic compound of similar chemical structure so as to remove 80% or more of the phorbol esters, the oil being nonflammable, non explosive, compatible with parenterally administered biologics and blood derivatives and pharmaceutically and physiologically tolerable by a human, agitating the resultant mixture, separating out an upper-phase and a lower-phase by sedimentation or centrifugation and decanting the upper-phase.

**4,789,546**  
**MULTIPLE-LAYER TABLET WITH CONTRASTING ORGANOLEPTIC CHARACTERISTICS**

Mario W. Medri, Millburn, N.J., assignor to Consumer Products Corp., New York, N.Y.

Filed Feb. 19, 1987, Ser. No. 16,243  
Int. Cl.<sup>4</sup> A61K 9/24, 9/30

**U.S. Cl. 424—441** **18 Claims**  
1. A multiple-layer edible tablet containing a combination of ingredients which comprises:  
a non-chewable tablet having at least two separate layers including  
a first outer layer containing an ingredient A which when dissolving on the tongue of a user is perceived as cooling; and

a second outer layer opposite side first layer containing an ingredient B which when dissolving on the tongue of a user is perceived, in contrast to the ingredient A, as not cooling;  
wherein said different ingredients in distinct layers are identifiable while said tablet is being consumed.

4,789,547

## TRANSDERMAL MATRIX SYSTEM

Sak-Zu Song, Flanders; Surendra C. Mehta, Randolph; Zahra A. Rashidbaigi, Nutley; Russell U. Neabitt, Somerville, and Mahdi B. Fawzi, Flanders, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Jan. 17, 1987, Ser. No. 63,204

Int. Cl.<sup>4</sup> A61F 13/00

U.S. Cl. 424-449

23 Claims

1. A composition for the transdermal administration of a pharmaceutical preparation comprising cross-linked carboxymethylcellulose, an alcohol soluble poly (2-hydroxyethyl methacrylate), at least one permeation enhancer, and a biologically active material.

4,789,548

## MEDICATION AND METHOD FOR TREATING HEARTWORMS IN DOGS

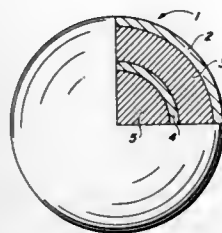
John W. Tisdale, 935 S. 3 Notch St., Andalusia, Ala. 36420

Filed Apr. 24, 1986, Ser. No. 855,471

Int. Cl.<sup>4</sup> A61J 3/06

U.S. Cl. 424-472

13 Claims



1. A solid dosage structure for treating filariasis in animals comprising a diethylcarbamazine core, a first layer of time-release material encapsulating said core and a second layer comprising at least one vasoconstricting medication and at least one bronchial dilating medication covering said first layer of time-release material, said vasoconstricting and bronchial dilating medications are ephedrine and dextroamphetamine sulfate respectively.

4,789,549

## SUSTAINED RELEASE DOSAGE FORMS

Sadath U. Khan, Mine Hill; Pijush K. Chakraborty, Maplewood; Albert T. Grabowski, Dover, all of N.J., and Reginald Phillips, Coral Spring, Fla., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Mar. 9, 1987, Ser. No. 23,424

Int. Cl.<sup>4</sup> A61K 9/36, 9/14

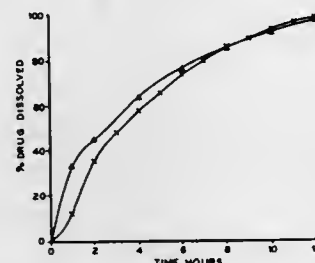
U.S. Cl. 424-480

7 Claims

1. A sustained release dosage form comprising an effective amount of a water-soluble therapeutically active medicament in a water soluble polymer matrix which matrix is coated with a semipermeable membrane said coating consisting of effective amounts of

- hydroxypropyl cellulose polymer and
- cellulose acetate phthalate with polyoxpropylene poly-

oxyethylene block copolymer and acetylated monoglycerides,



and said coating being water soluble at pHs between about 5.5 and about 6.5.

4,789,550

## MICROCAPSULE COMPOSITION SUITABLE FOR CARDIOVASCULAR INJECTION

Martin Hommel, Toronto; Anthony Mein-Fang Sun, Willowdale, and Matthews F. A. Goosen, Toronto, all of Canada, assignors to Connaught Laboratories Limited, Willowdale, Canada

Filed Jul. 16, 1984, Ser. No. 631,471

Int. Cl.<sup>4</sup> A61K 9/22, 9/24

U.S. Cl. 424-493

18 Claims

1. A composition of spherical, smooth and uniform microcapsules suitable for cardiovascular injection into an animal body, said microcapsules comprising:

- a core comprising one or more viable, healthy, physiologically-active tissue cells capable of on going metabolism and an aqueous medium of nutrients sufficient to maintain said tissue cells and allow normal metabolism thereof, and
  - a biocompatible semi-permeable membrane surrounding and enclosing said core, said semi-permeable membrane being permeable to tissue nutrients and metabolic products produced by the tissue but impermeable to immune system proteins,
- said membrane comprising ionically-interacted biocompatible materials and having a negatively-charged outer surface, said microcapsules having a diameter consisting essentially of about 150 to about 500 microns.

4,789,551

## SILAGE ADDITIVE

Alan Sayle, Gisburn, England, assignor to B. Dugdale & Son Limited, Lancashire, England

Filed Jun. 22, 1987, Ser. No. 64,602

Int. Cl.<sup>4</sup> A23K 1/00

U.S. Cl. 426-54

11 Claims

9. A method of making silage comprising ensiling cut grass and an effective amount of a blend of 70-85% unmolassed sugar beet pulp, 10-20% cereal and 5-10% molasses all percentages being by weight based on the weight of the blend and fermenting the resulting mass.

4,789,552

## FROZEN EDIBLE PRODUCT AND METHOD FOR MAKING THE SAME

David Speakman, 3755 Mary Cliff La., Brookfield, Wis. 53005, and Robert L. Macy, Jr., 6426 Upper Parkway North, Wauwatosa, Wis. 53213

Continuation of Ser. No. 708,677, Mar. 6, 1985, abandoned. This application May 7, 1987, Ser. No. 48,456

Int. Cl.<sup>4</sup> A23G 9/00; B65D 29/08; B65D 85/78

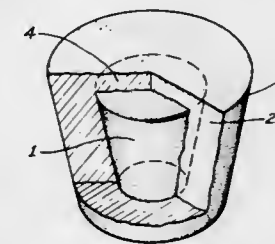
U.S. Cl. 426-107

6 Claims

1. A sundae-type frozen dessert product comprising: a cup-shaped storage and serving container made of a mate-

rial that is substantially transparent to microwave heating energy;  
a frozen sundae-type topping completely lining the inside of the container to a thickness of between about one quarter inch and about one half inch; and  
a frozen core of a flavored dessert composition disposed within and contiguous to the lining of sundae-type topping, the topping also covering the top of the core so that the core is completely enclosed by a coating of topping of between about one quarter inch and one half inch in thickness,  
the density and solids content of the topping being preselected relative to the density and solids content of the dessert composition such that when the container of the frozen product is subjected to microwave heating energy of a predetermined power and duration, the coating will be softened without melting the core.

6. A process for preparing a sundae-type frozen dessert product in a storage and serving container made of a material



that is substantially transparent to microwave heating energy, the process comprising the steps of:

- lining the inside surface of the container with a sundae-type topping to a thickness of between about one quarter inch and about one half inch;
- filling the remaining space in the lined container with a flavored dessert composition core;
- applying a top layer of the sundae-type topping to cover the exposed surface of the core to a thickness of between about one quarter inch and about one half inch, such that the core is completely surrounded by a coating of the topping; and
- placing the filled container in a frigid environment for sufficient time to freeze the core and the coating, the density and solids content of the topping being preselected relative to the density and solids content of the dessert composition such that when the container of the frozen product is subjected to microwave heating energy of a predetermined power and duration, the coating will be softened without melting the core.

4,789,553

## METHOD OF THERMALLY PROCESSING LOW-ACID FOODSTUFFS IN HERMETICALLY SEALED CONTAINERS AND THE CONTAINERS HAVING THE FOODSTUFFS THEREIN

Deborah J. McIntyre, Palatine, and Dwight E. Reed, Barrington, both of Ill., assignors to American National Can Company, Chicago, Ill.

Continuation-in-part of Ser. No. 778,648, Sep. 23, 1985, Pat. No. 4,741,911, which is a continuation-in-part of Ser. No. 748,114, Jun. 24, 1985, abandoned, which is a continuation-in-part of Ser. No. 695,530, Jan. 28, 1985, abandoned. This application Dec. 12, 1985, Ser. No. 808,142

The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> A23L 3/00

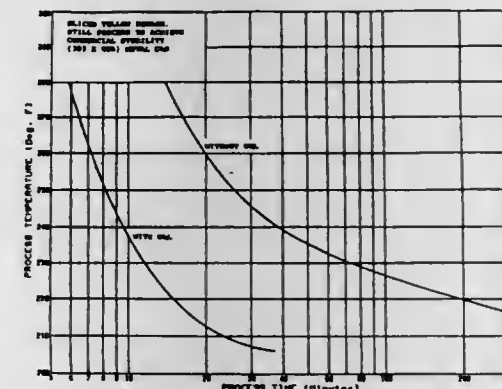
U.S. Cl. 426-325

25 Claims

1. In a method of thermally processing a low acid, heat sensitive foodstuff susceptible to degradation when thermally processed, which comprises:

combining the foodstuff with an hydrolysis mixture of an

aldonic acid and its lactones or a precursor thereof in an amount sufficient to lower the equilibrium pH to 4.6 or less and subjecting the combined foodstuff to a thermal process at a reduced time temperature parameter sufficient to achieve commercial sterilization; said parameter being lower than the higher commercial sterilization parameter needed when said hydrolysis mixture of an aldonic acid and its lactones or a precursor thereof is not employed, the improvement which comprises:



in said step of combining, combining the foodstuff with a first portion of said hydrolysis mixture or a precursor thereof in an amount sufficient to control discoloration of said foodstuff prior to thermal processing but insufficient to lower the pH to 4.6 and thereafter; but, prior to thermally processing, combining the foodstuff with a second portion of said hydrolysis mixture of a precursor thereof in an amount sufficient to lower the equilibrium pH to 4.6 or less.

4,789,554

## HIGH TEMPERATURE VACUUM STEAM DISTILLATION PROCESS TO PURIFY AND INCREASE THE FRYLIFE OF EDIBLE OILS

Timothy A. Scavone, Maineville, Ohio, and James L. Braun, deceased, late of Cincinnati, Ohio (by Pauletta Mary Braun, legal representative), assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 804,718, Dec. 5, 1985, abandoned. This application Nov. 14, 1986, Ser. No. 927,586

Int. Cl.<sup>4</sup> C11B 3/00

U.S. Cl. 426-417

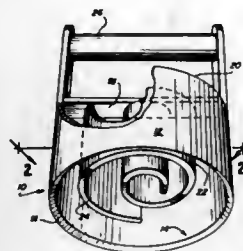
23 Claims

1. A process for removing compounds selected from the group consisting of tocopherols, tocotrienols, sterols, cholesterol, trace pesticides, and quinone-type structures which are deleterious to frylife from edible oil comprising:

- deacrating the oil to a level of less than about 0.1% by volume of dissolved oxygen;
- heating the deacrated oil to a temperature between 550° F. (288° C.) and 650° F. (343° C.), at an absolute pressure of between 0.5 mm of mercury and 20 mm mercury, for a time period of between 5 seconds and 15 minutes, while stripping the oil with a stripping medium with a molar ratio of stripping medium to oil of between 0.05 and 9.7; wherein the combination of stripping parameters is selected so that the stripping factor "f" is greater than 0.6, where  $f = KP_s/PO$ ; and wherein K is between about 1 about 200, and  $P_s$  (the vapor pressure of the component to be stripped) is not more than about 0.1 mm mercury at 500° F. (260° C.) and not more than 2 mm of mercury at 600° F. (316° C.); wherein the product of the process contains less than 2% high molecular weight materials and more than 37½% of said compounds deleterious to frylife have been removed.



**4,789,555**  
**APPARATUS AND METHOD FOR PREPARING**  
**PATTERNED BAKED GOODS**  
 Virginia L. Judd, Glendale Heights, Ill., assignor to Griffith Laboratories U.S.A., Inc., Alsip, Ill.  
 Filed May 6, 1987, Ser. No. 46,660  
 Int. Cl.<sup>4</sup> A21C 5/00; B26B 3/00  
 U.S. Cl. 426—503 15 Claims



10. A method for preparing a patterned baked good from sheeted dough comprising:  
 preparing a dough mass and forming a sheeted dough therefrom;  
 cutting a dough piece from said sheeted dough and impressing a spiral pattern through the surface of said dough piece; and  
 baking said impressed dough piece to form a spiral domed patterned baked good.

**4,789,556**  
**METHOD FOR MANUFACTURING A PACKAGED**  
**ASEPTIC HARD SOYBEAN CURD**  
 Shigeo Okonogi, Tokyo; Kunisuke Kawahara, Yokohama; Saburo Otsumi, Yokosuka; Kenji Mizuguchi, Kawasaki; Osamu Kolde, Kawasaki, and Hiroshi Shimada, Tokyo, all of Japan, assignors to Morinaga Milk Industry Company Limited, Tokyo, Japan  
 Filed Feb. 24, 1987, Ser. No. 17,396  
 Claims priority, application Japan, Feb. 24, 1986, 61-37253  
 Int. Cl.<sup>4</sup> A23L 1/20 3 Claims

U.S. Cl. 426—573 3 Claims  
 1. A method for manufacturing a packaged, aseptic, firm soybean curd comprising the steps of:  
 (A) warming soybean juice, wherein said soybean juice is obtained by a process comprising the steps of:  
 (1) soaking soybeans in water,  
 (2) grinding the soybeans to obtain a crude juice,  
 (3) heating the juice, and  
 (4) filtering the juice;  
 (B) adding 1-4% by weight of a soybean protein isolate, having a coagulation ability of at least 80 in terms of the coagulation index as measured by a curd tension meter, to said soybean juice;  
 (C) homogenizing the resulting soybean juice at a pressure of at least 50 kg/cm<sup>2</sup>;  
 (D) sterilizing the resulting homogenized soybean juice by a direct steam heating method;  
 (E) continuously adding, at a constant rate, a germ-free coagulant solution to the resulting sterilized soybean juice and uniformly mixing the resulting solution to form a mixture;  
 (F) filling a container with the resulting mixture in an aseptic atmosphere;  
 (G) sealing the container; and  
 (H) heating the container to coagulate the mixture therein so as to obtain a packaged, aseptic, firm soybean curd having a firmness of at least 130 as measured by a curd tension meter.

**4,789,557**  
**FOODSTUFFS CONTAINING STARCH OF A DULL**  
**WAXY GENOTYPE**  
 Robert B. Friedman, Chicago, Ill.; David J. Gottneid, Griffith, Ind.; Eugene J. Faron, Schererville, Ind.; Frank J. Pastek, Munster, Ind., and Frances R. Katz, Crown Point, Ind., assignors to American Maize-Products Company, Stamford, Conn.  
 Filed Apr. 10, 1987, Ser. No. 36,571  
 Int. Cl.<sup>4</sup> A23L 1/04, 1/195 12 Claims

U.S. Cl. 426—578 12 Claims  
 1. A thickened foodstuff comprising a foodstuff, water and having as an essential thickening ingredient an effective amount of a natural chemically modified starch, said natural chemically modified starch being a starch extracted from a starch bearing plant having a dull waxy genotype, said starch having a rounded heating peak not exceeding about 500 Brabender Units, said starch not having been chemically modified.

**4,789,558**  
**METHOD FOR PRODUCING SWEET PICKLES**  
 Gary A. Winkler, Cottage Grove, and Gerald O. Hustad, McFarland, both of Wis., assignors to Oscar Mayer Foods Corporation, Madison, Wis.  
 Filed Feb. 27, 1986, Ser. No. 834,089  
 Int. Cl.<sup>4</sup> A23L 1/218, 1/212 20 Claims

U.S. Cl. 426—639 20 Claims  
 1. A method for reducing shrinkage in sweet pickle stock comprising:  
 (a) covering pickle stock with a CaCl<sub>2</sub> vacuum/pressure brine in a sealable vessel, said pickle stock being perforated through the outer membrane of said pickle stock, and said vacuum/pressure brine containing from about 1.0% to about 2.0% calcium chloride;  
 (b) sealing said vessel and applying from about 18 inches to about 29 inches Hg of vacuum and holding said vacuum for about 2 to about 10 minutes;  
 (c) releasing said vacuum and applying from about 45 to about 75 psig pressure and holding said pressure for about 2 to about 10 minutes;  
 (d) repeating said vacuum and pressure steps at least one additional time;  
 (e) separating said pickle stock from said vacuum/pressure brine;  
 (f) covering said pickle stock with a second CaCl<sub>2</sub> treatment brine said treatment brine containing from about 1.0% to about 2.0% calcium chloride;  
 (g) holding said pickle stock in said treatment brine until a predetermined CaCl<sub>2</sub> pickup percentage is achieved;  
 (h) separating said pickle stock from said treatment brine;  
 (i) submerging said pickle stock in a high sugar, sugar syrup, said syrup being from about 50° to about 90° Brix; and  
 (j) holding said submerged pickle stock in said sugar syrup until Brix readings equilibrate to a predetermined level.

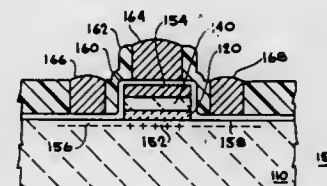
**4,789,559**  
**ANHYDROUS CRYSTALS OF MALITOL AND THE**  
**WHOLE CRYSTALLINE HYDROGENATED STARCH**  
**HYDROLYSATE MIXTURE SOLID CONTAINING THE**  
**CRYSTALS, AND PROCESS FOR THE PRODUCTION**  
**AND USES THEREOF**

Mamoru Hirao; Hiromi Hijlya, and Toshio Miyaka, all of Okayama, Japan, assignors to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo, Okayama, Japan  
 Division of Ser. No. 696,584, Jan. 30, 1985, Pat. No. 4,725,387, which is a division of Ser. No. 511,762, Jul. 7, 1983, abandoned, which is a division of Ser. No. 321,311, Nov. 13, 1981, Pat. No. 4,408,041. This application Aug. 25, 1987, Ser. No. 89,418  
 Int. Cl.<sup>4</sup> B29B 9/08; C07G 15/04; A23L 1/226 6 Claims

U.S. Cl. 426—658 6 Claims  
 1. A shaped body containing ingredients including solid maltitol produced by molding the ingredients into the desired

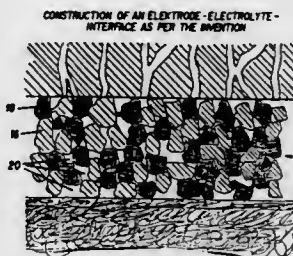
shape, the improvement whereby the shaped body has no hygroscopicity attributable to the maltitol, wherein said solid maltitol is selected from a group consisting of anhydrous crystals of maltitol and a whole crystalline hydrogenated starch hydrolyzate mixture solid containing anhydrous crystals of maltitol.

**4,789,560**  
**DIFFUSION STOP METHOD FOR FORMING SILICON**  
**OXIDE DURING THE FABRICATION OF IC DEVICES**  
 Yung-Chau Yen, San Jose, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.  
 Filed Jan. 8, 1986, Ser. No. 817,233  
 Int. Cl.<sup>4</sup> B05D 5/12; C23C 16/40 45 Claims



1. A method of forming high quality silicon oxide, comprising the steps of:  
 providing a host support;  
 forming silicon nitride on the host support;  
 forming silicon material on the silicon nitride; and  
 oxidizing the silicon material in an atmosphere comprising dry oxygen gas to form a silicon oxide, comprising the sub-steps of:  
 continuing the oxidation process until the oxide-silicon interface reaches the silicon nitride, and  
 saturating the oxidation reaction within the silicon oxide to perfect loose chemical bonds between the silicon and the oxygen in the silicon oxide.

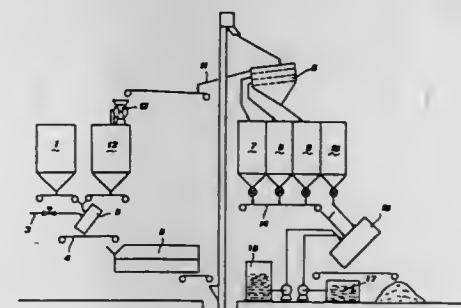
**4,789,561**  
**OXYGEN ELECTRODE WITH LAYER COMPRISING**  
**ELECTRODE AND ELECTROLYTE MATERIALS**  
 Wolfgang Schaefer, Friedrichshafen, and Rainer Schmidberger, Markdorf, both of Fed. Rep. of Germany, assignors to Dornier System GmbH, Friedrichshafen, Fed. Rep. of Germany  
 Filed Apr. 1, 1987, Ser. No. 33,172  
 Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611291  
 Int. Cl.<sup>4</sup> B05D 5/12; G01N 27/26; H01M 8/10, 4/58  
 U.S. Cl. 427—126.1 8 Claims



1. Method of making oxygen electrodes for use in electrolysis cell in conjunction with a solid electrolyte and having a long use life, comprising the steps of:  
 providing a powder of a ceramic electronic conductor;  
 providing a powder of a ceramic ionic conductor being of the same kind as the electrolyte;

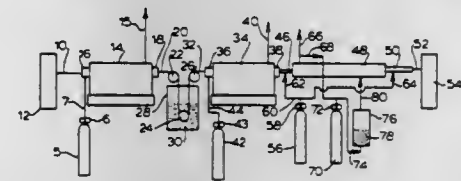
blending said powders in a first slurry;  
 forming a first layer by spray coating or dipping a solid electrolyte with or in said first slurry to obtain the first layer on the solid electrolyte;  
 providing a second slurry of said ceramic electronic conductor powder;  
 providing on said spray coated or dipped, first slurry layer, the second slurry of powder to obtain a second layer also by spray coating or diffusing; and  
 firing the first and second layers.

**4,789,562**  
**PROCESS FOR MANUFACTURING HYDRATE**  
**SALTS-BASE GRANULE-SHAPED THERMAL ENERGY**  
**ACCUMULATORS WITH AN ADHERENT HERMETIC**  
**COATING, AND ACCUMULATORS OBTAINED BY SAID**  
**PROCESS**  
 Mario Stiffler, Via Al Ronchi, 6936 Cademario, Switzerland  
 Filed Aug. 11, 1986, Ser. No. 895,486  
 Int. Cl.<sup>4</sup> B05D 7/00; B32B 5/16; F28D 15/00  
 U.S. Cl. 427—221 14 Claims



1. In a process for manufacturing hydrate salt-based granular thermal energy accumulators, comprising the steps of forming granules of hydrated salt and forming an adherent hermetic coating directly on said granules; the improvement in which said granules are formed by feeding powdered anhydrous salt to an inclined rotating drum and spraying water onto said anhydrous salt contained in said drum in a stoichiometric amount effective to convert said anhydrous salt to said granules of hydrated salt, said drum having an angle of inclination and a rotational speed effective to form said granules of a desired size.

**4,789,563**  
**SOL GEL FORMATION OF POLYSILICATE, TITANIA,**  
**AND ALUMINA INTERLAYERS FOR ENHANCED**  
**ADHESION OF METAL FILMS ON SUBSTRATES**  
 Ward C. Stevens, New Fairfield, Conn., assignor to Advanced Technology Materials, Inc., New Milford, Conn.  
 Division of Ser. No. 912,964, Sep. 26, 1986, Pat. No. 4,738,896.  
 This application Feb. 11, 1988, Ser. No. 154,982  
 Int. Cl.<sup>4</sup> B05D 3/02, 1/36, 7/00; C23C 16/00  
 U.S. Cl. 427—252 16 Claims



1. A method of forming a metal coating on a substrate, comprising the steps of:

- (a) applying to said substrate a sol gel dispersion of a material selected from the group consisting of polysilicate, titania, and alumina;
- (b) drying the applied sol gel dispersion to form a porous microstructure interlayer on the substrate, under selected temperature and drying conditions to partially collapse the pores of the microstructure and provide the interlayer with an average pore size of between about 20 and about 300 Angstrom and render it adherent to the substrate and scratch resistant in character, with the interlayer having a thickness of from about 30 to about 2500 Angstroms; and
- (c) applying to the interlayer formed on the substrate a metal coating of from about 0.01 to about 3.0 microns thickness.
4. A method according to claim 1, wherein the metal coating is applied by chemical vapor deposition from a thermally decomposable compound comprising the metal.

4,789,564

## HYDRIDOAMINOSILANE TREATMENT FOR RENDERING SURFACES WATER-REPELLENT

Bernard Kanner, West Nyack; Roswell E. King, III, Pleasantville, both of N.Y., and Steven P. Hopper, Glen Ellyn, Ill., assignors to Union Carbide Corporation, Danbury, Conn.

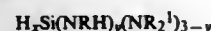
Filed Mar. 31, 1987, Ser. No. 32,377

Int. Cl.<sup>4</sup> B05D 3/02; C23C 16/00

U.S. Cl. 427—255.6

32 Claims

1. A method for rendering substrates containing surface hydroxyl groups water repellent which method comprises contacting said surfaces with a hydridoaminosilane of the formula:



wherein R is an alkyl group of the formula  $C_nH_{2n+1}$  wherein n has a value of 1 to 18,  $R^1$  is an alkyl group of from 1 to 6 carbon atoms, x has a value of 0 to 3 and the sum of x + y = 4.

4,789,565

## METHOD FOR THE PRODUCTION OF A THERMAL FIXING ROLLER

Shuji Kon, Sagami-hara; Yuji Suzuki, Yokosuka; Toshimitsu Iwata, Sagami-hara, and Junichi Fukahori, Yokohama, all of Japan, assignors to Showa Electric Wire & Cable Co., Ltd., Kanagawa, Japan

Filed Oct. 21, 1987, Ser. No. 110,736

Claims priority, application Japan, Oct. 30, 1986, 61-259172; Oct. 31, 1986, 61-260164; Oct. 31, 1986, 61-260165; Oct. 31, 1986, 61-261486

Int. Cl.<sup>4</sup> B05D 3/02

U.S. Cl. 427—375

12 Claims



1. A method for the production of a thermal fixing roller comprising the steps of:
- (a) applying a silicone rubber layer to the surface of a shaft, thereby forming a silicone rubber roller;
- (b) applying a polytetrafluoroethylene coating to the surface of the silicone rubber roller by immersing the roller in a polytetrafluoroethylene resin dispersion and rotating the silicone rubber roller in a plane inclined with respect to a horizontal plane;
- (c) removing the silicone rubber roller from the polytetrafluoroethylene resin dispersion;
- (d) drying the coating on the outside of the silicone rubber roller at a temperature of at least 500° C. for 10 to 120 seconds;

- (e) preheating the coating from inside the silicone rubber roller, thereby elevating the temperature of the coating to a temperature which is less than that of the melting point of the polytetrafluoroethylene resin; and
- (f) baking the coating to a temperature which is at least that of the melting point of the polytetrafluoroethylene resin.

4,789,566

## PROCESS FOR COATING A METALLIC SUBSTRATE

Tadayoshi Tatsuno, Hiratsuka; Seiji Kashiwada, Yokohama; Komaji Matsui, Hiratsuka; Mituo Wakimoto, Isehara, and Ichiro Tabuchi, Atsugi, all of Japan, assignors to Kansai Paint Co., Ltd., Hyogo, Japan

Filed May 7, 1987, Ser. No. 46,942

Claims priority, application Japan, May 9, 1986, 61-106418

Int. Cl.<sup>4</sup> B05D 3/02

U.S. Cl. 427—388.2

23 Claims

1. A process for coating a metallic substrate which comprises:
- applying an electrocoating paint to a metallic substrate, said electrocoating paint selected from the group consisting of a cationic electrocoating paint comprising as a main component a basic amino group-containing resin neutralized with an acid, the resin before neutralization having a base value of about 20 to about 200,
- then applying a barrier coating to the electrocoated surface, said barrier coating comprising a crosslinkable hardenable resin and being capable of forming a barrier coat film having an elongation at break of 180 to 1500% and a stress at break of 30 to 700 kg/cm<sup>2</sup>,
- and applying a top coating paint as the final paint coating.

4,789,567

## ABRASION RESISTANT COATING AND METHOD OF APPLICATION

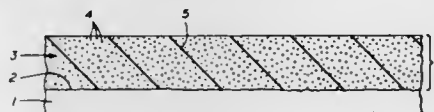
John E. Freeman, P.O. Box 2119, Big Spring, Tex. 79271, and Ronald L. Clanton, Big Spring, Tex., assignors to John E. Freeman, Big Spring, Tex.

Filed Jan. 14, 1987, Ser. No. 3,298

Int. Cl.<sup>4</sup> B05D 1/10

U.S. Cl. 427—410

6 Claims



1. A method for protecting metal surfaces, metal plates and pipes, said method comprising the steps of:
- (a) sand blasting said surface to provide a prepared surface having a desired anchor pattern;
- (b) removing substantially all dust particulate material from said prepared surface;
- (c) mixing a corrosion resistant resin containing finely divided abrasion resistant particles with the appropriate hardening catalyst for said resin to form a coating mixture;
- (d) diluting said coating mixture with a selected solvent to allow even application of said coating mixture;
- (e) applying said coating mixture to said prepared surface to obtain a desired thickness; and,
- (f) curing said coating as applied at room temperature (72° F.) for eight to twelve hours to obtain a coating on said surface having a first layer of concentrated abrasion resistant particles proximate said surface and a second layer of corrosion resistant resin over said first layer, wherein said corrosion resistant resin comprises 90% by weight finely divided ceramic particles in 10% by weight Bisphenol A epoxy resin including a polyamide elastomer in the ration of about one elastomer polymer molecule for every forty-second ceramic particle.

4,789,568

## COATING COMPOSITION

Takao Matoba; Osamu Iwase; Tuguo Nezu, and Shinji Sugiura, all of Hiratsuka, Japan, assignors to Kansai Paint Co., Ltd., a Japanese Corp., Hyogo, Japan

Filed Apr. 13, 1987, Ser. No. 37,782

Claims priority, application Japan, Apr. 18, 1986, 61-89821

Int. Cl.<sup>4</sup> C08L 51/00; B32B 9/04; C03F 26/04

U.S. Cl. 427—412.1

15 Claims

1. A coating composition obtained by dissolving or dispersing in an organic solvent a composition comprising as a main film-forming component, a modified polyolefin composed of an adduct of a monoepoxy compound with a graft polyolefin selected from (a) graft polymers of polyolefins, as a trunk, with maleic acid and (b) ring-opened products obtained by half-esterifying with monohydroxy compounds, graft polymers of polyolefins, as a trunk, with maleic anhydride.

4,789,569

## PROCESS AND DEVICE FOR METERING PULVERULENT MATERIALS

Jean-Pierre Douche, Thourrotte; Jean-Claude Coulon, Mercurey, and Pierre Bouttier, Sarcelles, all of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

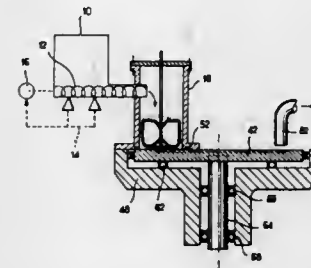
Filed Jan. 3, 1986, Ser. No. 815,972

Claims priority, application France, Jan. 4, 1985, 85 00052

Int. Cl.<sup>4</sup> B05D 1/12

U.S. Cl. 427—421

13 Claims



1. A process for metering a pulverulent material at a first position into a confined disposition and removing a constant and precise quantity of said pulverulent material from said confined disposition at a second position, said pulverulent material being maintained under atmospheric pressure, wherein said process comprises continuously supplying a receptacle with a constant flow of said pulverulent material in said receptacle at a substantially constant level, continuously stirring said pulverulent material within said receptacle to maintain said material in a substantially disagglomerated and homogenized condition, metering substantially constantly a predetermined, reproducible quantity of said pulverulent material from said receptacle into said confined disposition, wherein said confined disposition forms the bottom of said receptacle and compacting of said pulverulent material within said confined disposition is prevented, moving said confined pulverulent material to said second position, vibrating said confined disposition to prevent agglomerations of said pulverulent material, and removing a constant and precise quantity of the uncompacted pulverulent material from said confined disposition at said second position for subsequent distribution at a constant flow upon a substrate.

2. The process according to claim 1 wherein the receptacle is fed at a constant level chosen sufficiently low to prevent compacting of the pulverulent material in the confined disposition.

4,789,570

## ARTIFICIAL SHRUB

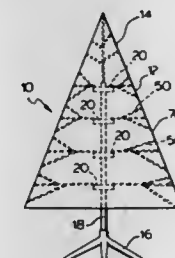
William H. Maddock, Markham, Canada, assignor to Noma Inc., Scarborough, Canada

Filed Apr. 29, 1986, Ser. No. 857,229

Int. Cl.<sup>4</sup> A47G 33/06

U.S. Cl. 428—8

17 Claims



1. In an artificial shrub comprising a plurality of spaced apart branch holders and a plurality of branches supported thereby, the improvement wherein a said branch holder comprises:
- a hub;
- a disk-like flange radiating outwardly from said hub, and
- a plurality of adjacent equi-spaced radial walls upstanding from said flange, each said wall having a transverse aperture therethrough to form a bearing, and a passageway connecting said bearing aperture to a free edge of said radial wall to provide an entrance to said passageway, said passageway having an inscribed circular dimension adjacent the juncture thereof with said bearing aperture less than that of said bearing aperture to form a trap; and wherein a said branch is hooked at the inward end thereof to form a stem portion, a bight portion and an outwardly directed tip portion; said bight portion being outwardly movable from the entrance to said passageway therealong to be captured in said bearing aperture by said trap, whereby said bight portion is rotatable in said bearing aperture to permit said branch to move between an upright, stored position and an outstretched position, and where in said outstretched position, said stem portion and said tip portion are in proximity to opposed sides of a radial wall and to said flange, thereby reducing the degree of undesired movement of said branch when in said outstretched position.

4,789,571

## DECORATIVE GARLAND

Abraham S. Kinderman, Gladwyne, Pa., and Fred Maas, Bedford, N.Y., assignors to J. Kinderman & Sons, Philadelphia, Pa.

Filed Sep. 16, 1987, Ser. No. 97,236

Int. Cl.<sup>4</sup> A41G 1/04

U.S. Cl. 428—10

24 Claims

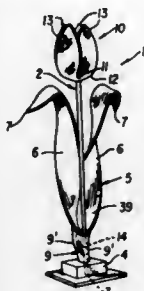


1. A garland comprising an elongated core portion and a decorative portion surrounding the core portion, the decorative portion including a first component comprising a non-fibrous material and a second component comprising a fibrous material, both the first and second components being inter-



twined around and along substantially the entire length of the core.

**4,789,572**  
**ARTIFICIAL FLOWER**  
 Ronald A. Weaver, 2024 Chestnut St., Emmaus, Pa. 18049  
 Filed Apr. 24, 1987, Ser. No. 42,039  
 Int. Cl.<sup>4</sup> A41G 1/00  
 U.S. Cl. 428—26 14 Claims



1. A method of making an artificial flower element with stem and leaves from thermoplastic material and assembling said artificial flower element, said stem, and said leaves on a base member comprising:

selecting in elongated form said material for a stem, cutting a plurality of radial disposed petal elements and symmetrical leaf elements each having main body portions and flaps on a base from a planar sheet of said material providing an aperture centrally of said petal elements, heating said petal elements and said leaf elements until softened, forming said petal elements while still softened into a three-dimensional configuration having a base portion, forming said leaves from said leaf elements by twisting or curling the main body portions and by pinching said symmetrical leaf elements at said flaps to form axially extending cavities in said leaves, cooling said formed petal elements and said leaf elements, attaching said petal elements to said stem adjacent one end thereof, substantially embracing said stem with said leaves by slipping the leaf cavities about the stems and fixing the other end of said stem to said leaf base member.

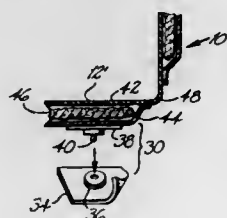
**4,789,573**  
**DEVICE FOR PRODUCING VARIABLE MOIRE PATTERNS**  
 Anthony N. Jenkinson, 138 Calvert Ct., Piedmont, Calif. 94611-3438  
 Filed Oct. 13, 1987, Ser. No. 107,003  
 Int. Cl.<sup>4</sup> A47G 29/10  
 U.S. Cl. 428—28 9 Claims



1. A device comprising, in combination:  
 a plurality of substantially planar sheets, each said sheet being of a predetermined size and carrying a pattern of lines, at least one of said sheets being transparent whereby

the other of said sheets may be observed therethrough; and  
 a housing defining an interior and maintaining said sheets in continuous contact and in face-to-face relationship within said interior and permitting relative planar movement between said sheets whereby variable moire patterns are produced by the patterns of lines on said sheets, said housing including a pair of side walls disposed in spaced planes generally parallel to the planes of movement of said sheets and permitting observation of the variable moire patterns, said side walls restricting relative movement of said sheets to said planar movement, and auxiliary walls interconnecting said side walls and confining said sheets to said interior.

**4,789,574**  
**REMOVABLE PROTECTIVE LINER FOR VEHICLES**  
 Timothy C. Selvey, 316 Campground Pond Rd., Tallahassee, Fla. 32304  
 Continuation-in-part of Ser. No. 847,617, Apr. 2, 1986, abandoned. This application Jun. 15, 1987, Ser. No. 62,249  
 Int. Cl.<sup>4</sup> B60R 13/00; B32B 3/26  
 U.S. Cl. 428—31 5 Claims

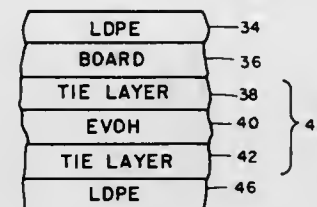


1. A removable protective enclosed truck bed liner adapted to protectively cover a vehicle's enclosed rear cargo area bed, the enclosed cargo area convertible in use for both pleasure and utility, said lining comprising:  
 a panel formed of a continuous inner sheet of flexible, pliable material having front, back and side margins, an outer sheet and a padding layer;  
 said panel sized to protectively cover substantially all of the vehicle's generally horizontal rear cargo area bed;  
 said panel also having a contour adjacent said front margin adapted to fit over the vehicle's rear seat in its folded down position;  
 said panel also having a contour adjacent each said side margin adapted to fit over the vehicle's rear raised wheel wells;  
 said margins having no padding and outer sheet, whereby said panel is readily folded at said margins to form said contours;  
 said panel also including means for releasably attaching said panel atop the rear cargo area bed and folded-down rear seat of the vehicle.

**4,789,575**  
**NON-FOIL COMPOSITE STRUCTURES FOR PACKAGING JUICE**  
 Charles E. Gibbons, Cynthia L. Tanner, and Allan A. Whillock, all of Mobile, Ala., assignors to International Paper Company, Chase, N.Y.  
 Filed May 29, 1987, Ser. No. 55,629  
 Int. Cl.<sup>4</sup> B65D 85/00; B32B 27/08  
 U.S. Cl. 428—34.2 14 Claims

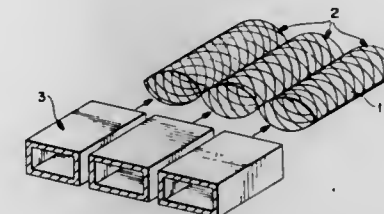
1. A container for liquids containing essential oils and/or flavors, said container constructed from a laminate comprising:  
 (a) a paperboard substrate;  
 (b) a 12 lb outer layer of a heat-sealable low density polyeth-

ylene polymer coated on said outer surface of said paperboard substrate;  
 (c) an inner sandwich layer comprising a 4.5 lb tie layer, a 4.0 lb heat-sealable ethylene vinyl alcohol copolymer layer and a 4.5 lb tie layer coextruded on said inner surface of said paperboard substrate; and



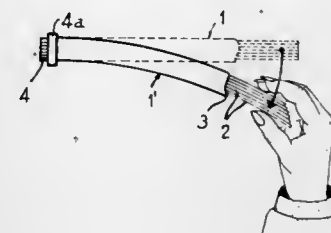
(d) a product-contact layer of a 10 lb heat-sealable low density polyethylene polymer coextruded onto said outer surface of said inner sandwich layer of tie layer-ethylene vinyl alcohol copolymer layer-tie layer whereby said laminate can be heat-sealed on conventional equipment at temperatures ranging from 250° F.-500° F.

**4,789,577**  
**MULTICHANNEL STRUCTURES MADE OF COMPOSITES, PROCESSES AND SEMIFINISHED PRODUCTS FOR THE MANUFACTURE THEREOF**  
 Michel Leose, La Crau, and Robert Carbone, La Garde, both of France, assignors to Etat Francais, Paris, France  
 Filed Aug. 12, 1986, Ser. No. 895,865  
 Claims priority, application France, Sep. 11, 1985, 85 13452  
 Int. Cl.<sup>4</sup> D03D 13/00; B32B 31/00  
 U.S. Cl. 428—34.5 8 Claims



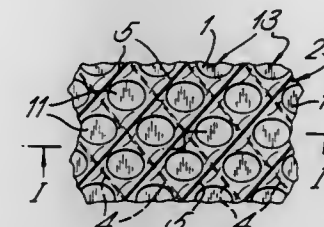
5. A low density composite multichannel structure comprising:  
 a cellular fabric comprising two crossed layers which define a plurality of parallel juxtaposed ducts;  
 a plurality of tubular extrusions with high mechanical strength, one of said tubular extrusions being axially fitted in each of said ducts of the cellular fabric;  
 at least one external reinforcement layer located on each outer surface of the cellular fabric; and  
 a cured resin surrounding said tubular extrusions, said cured resin having said cellular fabric and said reinforcement layers embedded therein.

**4,789,576**  
**SUPPORTING BAR**  
 José M. Sant-Pont, Maria Auxiliadora 23, and Ramón Bigas-Balcells, Plaza Gironella 1, both of 08017 Barcelona, Spain  
 Filed Nov. 14, 1986, Ser. No. 930,569  
 Int. Cl.<sup>4</sup> A47F 5/12  
 U.S. Cl. 428—34.1 11 Claims



8. An elongated bar suitable for use as a support which can undergo plastic deformation when subjected to a bending force, said bar comprising a plurality of elongated bar elements arranged side-by-side, said bar elements being elastically deformable by bending forces applied thereto and an external cover surrounding said bar elements and applying thereto an inward force which places said bar elements in frictional contact with each other whereby the friction forces between the bar elements impart stiffness to said bar, the relationship between the frictional forces acting between contiguous bar elements and the elasticity of said bar elements being such that application of a bending force to said bar causes sliding movement between contiguous bar elements thus permitting said bar to flex, said frictional forces being stronger than the forces of elastic recovery of said bar elements whereby said bar remains flexed upon release of said bending force.

**4,789,578**  
**PROTECTION MEMBRANE**  
 David R. Twyford, Dunstable, and Edward E. Hankins, Ashford, both of England, assignors to Premier Coatings Limited, Ashford, England  
 Filed May 14, 1987, Ser. No. 50,054  
 Claims priority, application United Kingdom, May 16, 1986, 8611941  
 Int. Cl.<sup>4</sup> B32B 3/06, 3/10, 3/14, 3/30, 5/02  
 U.S. Cl. 428—40 12 Claims



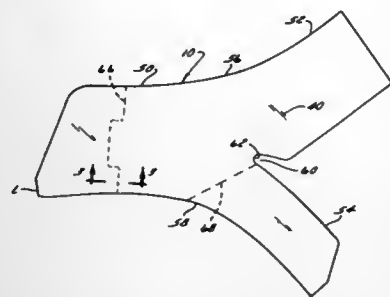
1. A protection membrane comprising a bituminous adhesive waterproof sheet; a flexible polymeric protection grid adhered to an upper face of said sheet, a plurality of strands of polymeric material projecting from said upper face to define grid apertures, said strands extending transverse to each other so as to reinforce said waterproof sheet in two directions transverse to each other and to protect said waterproof sheet from puncturing due to impact, with at least some of said strands being at least partially embedded in said waterproof sheet.

4,789,579

**DIE-CUT PAINT MASKING PART**

Edward P. Tutas, Kenosha, and Donald J. Passchl, Waterford, both of Wis., assignors to Kranz Incorporated, Racine, Wis.  
Filed Mar. 9, 1988, Ser. No. 165,923  
Int. Cl.<sup>4</sup> B32B 3/14, 7/06, 7/12  
U.S. Cl. 428—41

7 Claims



1. A die-cut flexible paint masking part (10) for use in masking a curved surface (12) of an object (16) to be painted comprising:

- a flat flexible paint-impervious mask (40);
- a layer (42) of pressure sensitive adhesive material permanently adhering to the underside of said mask (40);
- and a flat flexible removable protective liner (44) releasably adhering to the layer (42) of adhesive material;
- said masking part (10), prior to use and while flat, having a generally Y-shaped configuration and including a base leg (50) from which diverge a first branch (52) and a second branch (54);
- each of said base leg (50), said first branch (52) and said second branch (54) having an attached end and a free end; said base leg (50) and said first branch (52) having a common curved first edge (56);
- said base leg (50) and said second branch (54) having a common curved second edge (58);
- said masking part (10) having a notch (60) to facilitate folding at a location where said first branch (52) and said second branch (54) converge;
- said protective liner (44) being provided with at least one score line (66, 68) defining a plurality of independently removable liner portions (70, 72, 74).

4,789,580

**PROCESS OF REDUCING HIGHER METAL OXIDES TO LOWER METAL OXIDES**

Martin Hirsch, Friedrichsdorf; Hermann Lommert, New Isenburg, and Harry Serbent, Hanau am Main, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany  
Filed Nov. 13, 1986, Ser. No. 930,351  
Claims priority, application Fed. Rep. of Germany, Nov. 15, 1985, 3540541

Int. Cl.<sup>4</sup> C01G 45/02, 49/04

U.S. Cl. 423—49

7 Claims

1. A process of reducing the higher valencies of a metal oxide to lower valencies of the metal oxide comprising:

- (a) calcining in a circulating fluidized bed reactor fine-grained solids which contain metal oxides of higher valency at a temperature of 800° to 1100° C. under oxidizing conditions with hot gases, in which the solids are suspended;
- (b) reducing the calcined solids at a reduction temperature in a range of from 800° to 1100° C. in a stationary fluidized bed which is supplied with a carbonaceous reducing agent and oxygen-containing gases to reduce the higher metal oxides to lower metal oxides;
- (c) supplying the carbonaceous reducing agent to the stationary fluidized bed and removing discharge matter from said bed, the carbonaceous reducing agent being supplied

at a rate effective to reduce the higher valency metal oxide to a lower valency metal oxide, to maintain the reduction temperature, and to maintain a carbon content in the discharged matter;

- (d) removing exhaust gas from the stationary fluidized bed and introducing the exhaust gas as a secondary gas in the circulating fluidized bed in the calcining step; and
- (e) supplying fuel to the calcining step (a) and substantially completely combusting the fuel and the exhaust gas, the fuel being supplied at such a rate that the total of the heat generated by the substantially complete combustion of said fuel and of the heat supplied to the calcining step by the combustion of the exhaust gas from step (d) is sufficient to effect the calcination.

4,789,581

**MAGNETIC RECORDING MEDIUM**

Hajime Fukke, Tama; Motoo Akagi; Yoshiaki Kato, both of Tokyo, and Waichi Nagashiro, Kanagawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

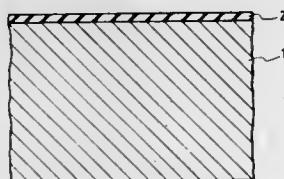
Filed Aug. 6, 1987, Ser. No. 82,213

Claims priority, application Japan, Aug. 15, 1986, 61-190518

Int. Cl.<sup>4</sup> G11B 5/70

U.S. Cl. 428—65

15 Claims



1. A magnetic recording medium comprising a hard disk as a nonmagnetic substrate and a coating film, the coating film containing magnetic powder and a binder including an epoxy resin, a phenolic resin and a vinyl resin, the coating film having a thickness of less than 0.5  $\mu\text{m}$  and being formed on said substrate, the content of said magnetic powder in said coating film being 66 to 90% by weight based on the total weight of the coating film.

4,789,582

**HEAT RETENTION DEVICE FOR WINDOWS, DOORS AND THE LIKE**

Klaus Brill, Korntal, and Wolfgang Grothe, Tiefenbrunn, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
Continuation of Ser. No. 474,591, Mar. 11, 1983, abandoned.

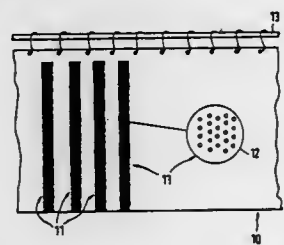
This application Nov. 8, 1984, Ser. No. 670,114

Claims priority, application Fed. Rep. of Germany, Jul. 18, 1981, 3128487

Int. Cl.<sup>4</sup> B32B 15/08

U.S. Cl. 428—136

13 Claims



1. A heat retention device, comprising a plastic foil carrier transparent to visible light and subdi-

4,789,585

**HEAT TRANSFER BLOCK FOR CROSS FLOW HEAT EXCHANGER**

Naohide Saito, Niigata; Janichi Tamura, Yokohama; Masaji Kurosawa, Inba, and Isao Terada, Yokohama, all of Japan, assignors to Nippon Oil Co. Ltd., Tokyo, Japan

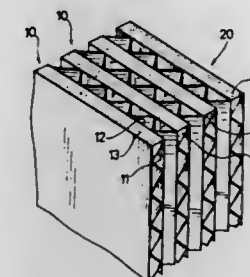
Filed Jun. 15, 1987, Ser. No. 62,725

Claims priority, application Japan, Jun. 19, 1986, 61-1414196

Int. Cl.<sup>4</sup> B32B 3/28; F28F 19/00

U.S. Cl. 428—185

2 Claims



1. A corrugated ceramic heat transfer block for a linear cross flow heat exchanger, in which a plurality of heat transfer elements each composed of a ceramic corrugated plate member and a ceramic flat plate member is stacked in such a manner that the direction of corrugation in adjacent elements intersects at right angles, characterized in that concave portions of said corrugation of said heat transfer block, which confront a blowing fluid stream for removing soot deposited onto the heat transfer surfaces of said heat transfer block, are filled with ceramic solids, said concave portions being formed between said ceramic corrugated plate member and said ceramic flat plate member and extending at right angle to the soot-removing fluid stream flow direction, said ceramic solids being water-proof, acid-resistant, heat-resistant, resistant to impacts by said fluid stream, resistant to thermal shocks, adhesive to said heat transfer block when filled in small spaces and resistant to shrinkage upon heating.

4,789,583

**MAGNETIC RECORDING MEDIUM**

Shigeru Akutsu, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 686,306, Dec. 26, 1984, abandoned.

This application Jul. 8, 1987, Ser. No. 71,539

Claims priority, application Japan, Dec. 26, 1983, 58-244184

Int. Cl.<sup>4</sup> G11B 5/72

U.S. Cl. 428—143

15 Claims

1. A magnetic recording medium comprising a support, a magnetic layer provided on one side of said support, and a backcoat provided on the other side of said support, wherein said backcoat comprises a binder resin and a non-magnetic powder, said binder resin being selected from the group consisting of polyurethane resin and nitrocellulose, said non-magnetic powder contained in an amount from 4–60% by weight of the total amount of components of said backcoat and having an average grain size of range of from 0.5  $\mu\text{m}$  to 2  $\mu\text{m}$  and a maximum grain size of not more than 5  $\mu\text{m}$  and wherein the amount of non-magnetic powder having a grain size of more than 3  $\mu\text{m}$  is less than 20% by weight of the total amount of said non-magnetic powder, said backcoat further containing an isocyanate as a hardener and said non-magnetic powder grains have an average center-line-average roughness ( $R_a$ ) of 0.015  $\mu\text{m}$  to 0.04  $\mu\text{m}$ .

4,789,584

**SYNTHETIC SUBSTRATE FOR USE IN THE ROOTING OF CUTTINGS AND THE RAISING OF SEEDLINGS AND PLANTS**

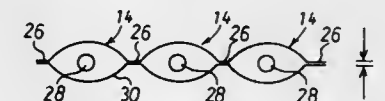
Alan P. Perrin, Clwyd, Wales, assignor to Synthetic Substrates Limited, Altrincham, England

Filed Jul. 14, 1986, Ser. No. 885,181

Int. Cl.<sup>4</sup> B32B 3/10

U.S. Cl. 428—159

16 Claims



5. A synthetic substrate for use in the rooting of cuttings and the raising of seedlings, comprising an expanded, low density, semi-rigid, substantially hetero-cellular plastics material having a plurality of regions of relatively low density which are adapted to receive, in use, cuttings or seedlings to be propagated, the regions of low density being separated by regions of relatively high density which exhibit higher capillarity, water absorbency and retention capacity than said regions of low density, said substrate being in the form of a bandolier wherein the plurality of low density regions are separated in the longitudinal direction of the bandolier by narrow strip regions of high density, said lower density regions containing at least one blind bore for receiving cutting or seedlings.

4,789,586

**VIBRATION DAMPING METAL PANELS**

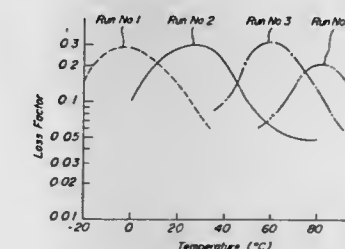
Yasuhiro Morimura, Tokyo; Yukio Fukunura, Kawagoe; Hikaru Ishikawa, Tokyo; Itsuo Tanuma, Sayama, and Toshio Hozda, Tokyo, all of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Continuation of Ser. No. 734,217, May 15, 1985, Pat. No. 4,707,397. This application Jun. 16, 1987, Ser. No. 62,662  
Claims priority, application Japan, May 21, 1984, 59-100600; May 31, 1984, 59-109721

Int. Cl.<sup>4</sup> B32B 7/02

U.S. Cl. 428—216

3 Claims



1. A vibration damping metal panel comprising two metal plates and an intermediate layer interposed therebetween, wherein said intermediate layer is composed of:



(A) 100 parts by weight of a thermosetting epoxy resin, and  
(B) 20-200 parts by weight of an acrylonitrile-butadiene copolymer rubber or an acrylonitrile-butadiene copolymer rubber having a carboxyl group, amino group or hydroxyl group in its terminal or main chain, wherein said intermediate layer is cured by heating and has a thickness of 0.05 to 0.5 mm.

4,789,587

**(1,3-DIOXOLAN-2-YL-METHYL)-1H-IMIDAZOLES AS BACTERICIDAL AND/OR FUNGICIDAL AGENTS**

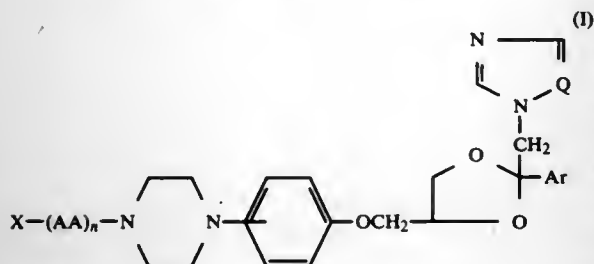
Brigitte A. L. G. M. J. Le Clef, Louvain-la-Neuve; Ruth Lamb, Bruxelles, and Yves-Jacques E. Schneider, Overijse, all of Belgium, assignors to IRE-Celtarg, S.A., Fleurus, Belgium  
Filed Feb. 3, 1987, Ser. No. 10,438

Claims priority, application France, Feb. 4, 1986, 86 01496  
Int. Cl.<sup>4</sup> A61K 31/495, 31/41, 31/415; C07D 405/14

U.S. Cl. 514-252

5 Claims

1. Compounds of the formula:



in which

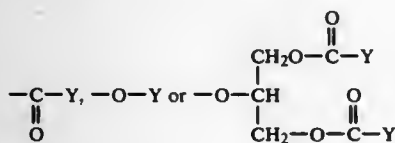
Q is N or CH;

Ar is a member selected from the group consisting of phenyl and substituted phenyls having from one to three substituents, each substituent being independently selected from the group consisting of halo, lower alkyl and lower alkoxy groups;

—AA— is a divalent radical of a natural amino acid forming part of the structure of proteins or a diacyl radical originating from a substituted or unsubstituted alkanedioic or alkenedioic diacid containing from 3 to 10 carbon atoms wherein when —AA— is a divalent radical of a natural amino acid having an additional functional group selected from the group consisting of —OH, —NH<sub>2</sub> and —COOH, said additional functional group may be protected or unprotected, and wherein when —AA— is a divalent radical of an amino acid, the divalent radical —AA— is attached to the piperazine radical



at its C-terminal end;  
n is an integer from 0 to 4 inclusive; and  
X is H, OH, Y,



in which

when n is equal to 1, 2, 3 or 4, Y is then a hydrocarbon radical selected from the group consisting of alkyl, alkenyl and alkynyl groups having from 1 to 20 carbon atoms, and when n is equal to 0, Y is then a hydrocarbon radical selected

from the group consisting of alkyl, alkenyl and alkynyl groups having from 7 to 20 carbon atoms; and pharmaceutically acceptable salts and isomers of these compounds.

5. Bactericidal and/or fungicidal and/or anti-cancer compositions containing at least a bactericidal and/or fungicidal and/or anti-cancer effective amount of a compound as claimed in claim 1 or an acid addition salt or one of their stereoisomers, and an acceptable carrier.

4,789,588

**SURFACE MATERIALS FOR ABSORPTIVE PRODUCTS**  
Masayasu Suzuki; Masahiko Taniguchi, both of Moriyama, and Taizo Sugihara, Omihachiman, all of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Jul. 29, 1987, Ser. No. 79,014

Claims priority, application Japan, Aug. 1, 1986, 61-181548; Aug. 18, 1986, 61-192515

Int. Cl.<sup>4</sup> D21H 5/20

U.S. Cl. 428-288

6 Claims

1. A surface material for absorptive products comprising a succession of fluid permeable surface layers comprising a nonwoven fabric, an absorptive layer and a backing layer unpervious to fluid, wherein said nonwoven fabric is a nonwoven fabric comprising fibers of which surface of 50% or more are occupied by a hydrophobic resin, and a 0.1 to 1.0 weight % of a finishing agent is deposited onto the surface of said fibers, said finishing agent comprising a mixture of a sorbitan monooleate with a polyoxyethylene sorbitan monooleate in a weight ratio of 1:1 to 9:1.

4,789,589

**INSULATED ELECTRICAL CONDUCTOR WIRE AND METHOD FOR MAKING SAME**

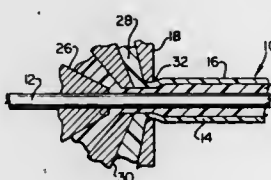
Gordon D. Baxter, Kingston, Canada, assignor to Northern Telecom Limited, Montreal, Canada

Filed Jan. 19, 1988, Ser. No. 145,003

Int. Cl.<sup>4</sup> B32B 1/08, 3/26; B29C 47/06; H01B 7/00

U.S. Cl. 428-317.5

4 Claims



1. An insulated conductor wire comprising a conductor wire and a surrounding insulation comprising an inner layer of a polyolefin compound and of cellular construction and an outer layer with a maximum thickness of 0.005 inches and of a non-cured and non-curable polyvinylchloride compound which includes a material compatible with the polyolefin of the inner layer, the inner layer having a substantially continuous skin which is bonded to the compatible material to bond the two layers together.

4,789,590

**ABRASIVE TAPE**

Masami Sato; Masaaki Fujiyama; Masami Suzuki, and Yasuyuki Yamada, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 25, 1988, Ser. No. 172,821

Claims priority, application Japan, Mar. 25, 1987, 62-70883  
Int. Cl.<sup>4</sup> G11B 5/627, 5/78; B32B 5/16

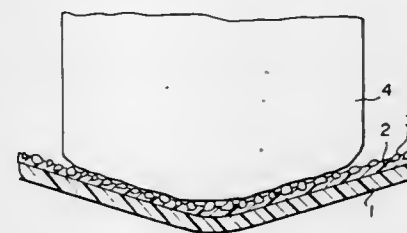
U.S. Cl. 428-323

29 Claims

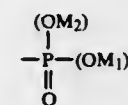
1. An abrasive tape comprising a flexible substrate, and an

abrasive layer overlaid on said flexible substrate by applying an abrasive coating composition prepared by use of abrasive grains and a binder onto said flexible substrate and drying the applied abrasive coating composition,

wherein the improvement comprises the use of, as said binder:



- (i) a vinyl chloride resin having a —SO<sub>3</sub>M group, where M represents Li, Na or K, and an epoxy group,  
(ii) a resin having, at a side chain thereof, at least one polar group selected from the group consisting of —SO<sub>3</sub>M, —OSO<sub>2</sub>M, —OSO<sub>3</sub>M, —COOM, and



where M represents H, Li, Na or K, M<sub>1</sub> represents H, Li, Na, K or an alkyl group, and M<sub>2</sub> represents H, Li, Na, K or an alkyl group, and  
(iii) a polyisocyanate.

4,789,591

**MAGNETIC RECORDING MEDIUM**

Issei Nakamura, and Kenji Itozawa, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 740,509, Jun. 3, 1985, abandoned, which is a division of Ser. No. 545,662, Oct. 26, 1983, Pat. No. 4,572,866. This application Mar. 10, 1987, Ser. No. 23,976

Claims priority, application Japan, Oct. 29, 1982, 57-190275  
Int. Cl.<sup>4</sup> G11B 5/70

U.S. Cl. 428-328

19 Claims

1. A magnetic recording medium having improved thermal stability comprising a support and a magnetic layer on said support,

said magnetic layer being a unitary magnetic layer comprising iron oxide powder having cobalt adsorbed on the surface thereof, the average grain size of said iron oxide powder being not more than 0.5μ, the ratio of the major axis to the minor axis (acicular ratio) of said iron oxide powder being from 1.3 to 4.5 and the coercive force of said iron oxide powder being from 550 to 800 Oe.

4,789,592

**HOT-MELT-ADHESIVE COMPOSITE FIBER**

Masahiko Taniguchi, and Shigeru Gol, both of Moriyama, Japan, assignors to Chisso Corporation, Japan

Filed Sep. 17, 1986, Ser. No. 908,159

Claims priority, application Japan, Sep. 19, 1985, 60-207249  
Int. Cl.<sup>4</sup> D02G 3/00

U.S. Cl. 428-373

13 Claims

1. A hot-melt-adhesive composite fiber comprising a fiber-forming component and an adhesive component, said fiber-forming component comprising 0.5 to 30% by weight of a copolymer of a carboxyl group-containing modified polyolefin with a polyamide and 70 to 99.5% by weight of a polyester, the proportion of said carboxyl group-containing modified polyolefin in said copolymer is in the range of 0.5 to 60% by

weight, and said adhesive component comprising a carboxyl group-containing modified polyolefin, an unmodified polyolefin or a mixture thereof.

4,789,593

**GLASS FIBERS WITH FAST WETTABILITY AND METHOD OF PRODUCING SAME**

Balbhadra Das, Allison Park, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Division of Ser. No. 748,388, Jun. 25, 1985, abandoned. This application Apr. 13, 1987, Ser. No. 39,812

The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> B32B 9/00; D02G 3/00

U.S. Cl. 428-391

10 Claims

1. A method of controlling the wettability of glass fibers in polyester matrices, wherein the glass fibers have a dried residue of an aqueous chemical treating composition having an aqueous emulsion of a thermoplastic film forming polymer having polar functionality, lubricant and coupling agent, comprising:

- formulating the aqueous chemical treating composition with nonaqueous components that have an amount of unsaturation of less than an average of 1.5 aliphatic double bonds per mole of each nonaqueous component and that result in a ratio of aliphatic unsaturation to aromatic unsaturation of not greater than around 0.1 as measured by IR absorptivity in film dried at room temperature where each component has less than an average of 1.5 aliphatic double bonds per mole for faster wetting of the glass fibers in the polymeric matrix and with higher values of the amount of unsaturation and of the ratio for progressively decreasing degrees of wettability, and to have less than one weight percent based on the aqueous composition of any chain extension inducing or condensation inducing reagents,
- treating glass fibers with the aqueous chemical treating composition,
- collecting the glass fibers as strands, drying the glass fiber strands at a temperature to discourage any crosslinking reactions.

4,789,594

**METHOD OF FORMING COMPOSITE RADIUS FILLERS**

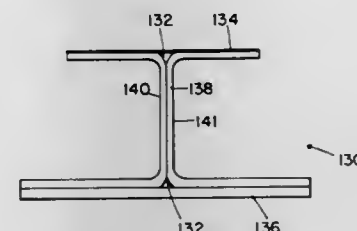
Stanley W. Stawski, Pierce, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 15, 1987, Ser. No. 39,003

Int. Cl.<sup>4</sup> B32B 1/04

U.S. Cl. 428-397

15 Claims



11. Composite radius fillers for use in construction of composite structural joints, made by the process comprising the following steps:

- building an elongated rectangular board having two ends from a plurality of layers of composite material, wherein each layer has a plurality of elongated fibers substantially aligned so as to be substantially parallel and wherein substantially all of the fibers in the board define a fiber direction aligned with the board length;
- separating elongated strips from the board in the fiber direction so that the strips have an intermediate cross-sectional

shape which approximates the desired composite radius filler cross-sectional shape; and forming the elongated strips in a forming device to the desired cross-sectional shape.

4,789,595

**PROCESS FOR SURFACE TREATING LAYERED LATTICE SILICATES AND RESULTANT PRODUCTS**  
Jorge E. Salinas, Weyman H. Dunaway, and Camilla A. Rice, all of Sandersville, Ga., assignors to E.C.C. America Inc., Atlanta, Ga.

Continuation-in-part of Ser. No. 493,358, May 10, 1983, abandoned. This application May 6, 1985, Ser. No. 731,056  
Int. Cl.<sup>4</sup> B32B 5/16; C04B 33/04; C08K 3/34

U.S. Cl. 428—402 14 Claims

1. A method for modifying the surface of a layered lattice silicate comprising:

reacting said layered lattice silicate in substantially dry particulate form with a reactant system capable of forming bound chloride moieties at said silicate surface, to form the chloride thereof, said reactant system comprising a gas containing Cl<sub>2</sub>, said reaction being conducted at temperatures below about 300° C.; and reacting the chloride product with a reactive organic compound comprising a functional group.

4,789,596

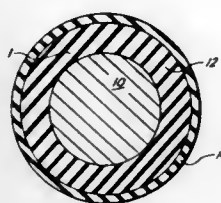
**DOPANT COATED BEAD-LIKE SILICON PARTICLES**  
Robert H. Allen, and Jameel Ibrahim, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Nov. 27, 1987, Ser. No. 126,203

Int. Cl.<sup>4</sup> B32B 1/00

U.S. Cl. 428—404

11 Claims



4. A dopant alloy composition in free flowing particulate form consisting essentially of spherical or substantially spherical particles of a narrow size distribution and characterized by:

- being comprised of,
  - an inner nucleus of essentially pure silicon, and
  - a relatively thin layer around said nucleus, and composed of high purity silicon alloyed with a p or n carrier type element selected from B, P, As, or Sb,
- said dopant alloy being suitable for batch or continuous Czochralski processes for preparing doped, single crystalline silicon.

5. A silicon composition in bead or bead-like form and characterized by having (i) a center portion of high purity silicon encapsulated within (ii) a relatively thin layer of an alloy of silicon with a p or n carrier element, and (iii) an outer coat of essentially pure silicon, said outer coat being substantially thinner than said thin layer of silicon alloy, said composition being further characterized by being suitable for use as a dopant alloy for batch or continuous Czochralski processes for preparing doped, single crystalline silicon.

4,789,597

**INCORPORATION OF CHEMICALLY REACTIVE AGENTS ON RESIN PARTICLES**

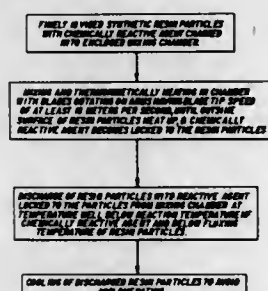
Ved Gupta, Ville LaSalle, Canada; Jerome E. Hager, Pompano Beach, Fla., and Ralph A. Noble, Ontario, Canada, assignors to Fetherstonhaugh & Co., Dorval, Canada

Filed Jan. 12, 1987, Ser. No. 2,207

Int. Cl.<sup>4</sup> B05D 7/00; B29D 27/04; B32B 5/16

U.S. Cl. 428—467

9 Claims



1. A process for incorporating chemically reactive agents on suitable synthetic resins comprising the steps of:

- introducing a batch of finely divided resin particles and chemically reactive agent into an enclosed mixing chamber having a plurality of blades attached to arms rotatable about a central axis within the chamber, the blades having enlarged surfaces relative to the arms to provide paddles for mixing of the resin particles and the reactive agent, rotating the blades in the mixing chamber at a blade tip speed of at least 18 meters per second to intensively mix and thermokinetically heat the batch of resin particles and chemically reactive agent,
- continuously monitoring the batch of resin particles and chemically reactive agent so as to maintain the temperature of the batch well below decomposition temperature of the reactive agent and below fluxing temperature of the resin particles,
- continuing the mixing cycle until the chemically reactive agent is locked to the resin particles,
- discharging the batch from the mixing chamber and cooling the discharged batch to avoid agglomeration of the resin particles to provide a product of unagglomerated particles of resin having reactive agent locked to the surface thereof.

9. Finely divided synthetic resin particles having a chemically reactive agent locked to the surface of the resin particles, produced according to the process of claim 1.

4,789,598

**THIN FILM MEDIUM FOR HORIZONTAL MAGNETIC RECORDING HAVING AN IMPROVED COBALT-BASED ALLOY MAGNETIC LAYER**

James K. Howard, Morgan Hill, and Run-Han Wang, San Jose, both of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 20, 1987, Ser. No. 5,190

The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> G11B 5/64

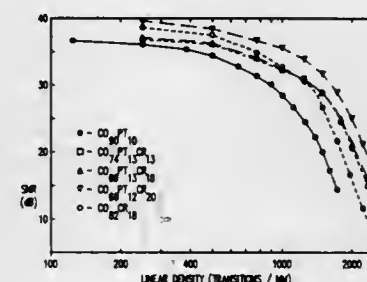
U.S. Cl. 428—408

3 Claims

1. A magnetic recording disk for horizontal recording comprising:

- a substrate of an aluminum alloy having a nickel-phosphorous (NiP) surface film formed thereon;
- a magnetic layer formed directly on and adhered directly to the NiP film of the substrate and comprising an alloy of

cobalt, platinum and chromium with chromium present in the alloy in an amount greater than 17 atomic percent, the



magnetic layer having horizontal magnetic anisotropy; and a protective overcoat formed over the magnetic layer.

4,789,599

**MAGNETIC RECORDING MEDIUM**

Eitaro Nakamura, Tokyo, and Kotaro Hata, Ichikawa, both of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan  
Filed Jul. 2, 1987, Ser. No. 69,152

Claims priority, application Japan, Jul. 7, 1986, 61-159965; Jul. 7, 1986, 61-159966

Int. Cl.<sup>4</sup> G11B 5/702, 5/71

U.S. Cl. 428—411.1

19 Claims

1. A magnetic recording medium consisting of a substrate and a magnetic layer formed thereon, said magnetic layer comprising an epoxy group-containing vinyl chloride resin, a perfluoroalkyl group-containing carboxylic or sulfonic acid and a magnetic powder,

wherein the vinyl chloride content of said epoxy group-containing vinyl chloride resin is at least 20% by weight, wherein said epoxy group-containing vinyl chloride resin has an average degree of polymerization of 100 to 1,000, and wherein said epoxy group-containing vinyl chloride resin is present in an amount of 5 to 50 parts by weight for each 100 parts by weight of said magnetic powder.

11. A magnetic recording medium comprising a substrate and a magnetic layer formed thereon, said magnetic layer comprising a vinyl chloride resin, an epoxy group-containing resin, a perfluoroalkyl group-containing carboxylic or sulfonic acid and a magnetic powder, wherein said vinyl chloride resin has a vinyl chloride content of at least 20% by weight, wherein said vinyl chloride resin has an average degree of polymerization of 100 to 1,000, and wherein said epoxy group-containing resin and said vinyl chloride resin are present in a total amount of 5 to 50 parts by weight of said magnetic powder.

4,789,600

**METHOD FOR MANUFACTURING LAMINATED GLASSES**

Friedrich Trieb, Helmer Raedisch, both of Aachen, Fed. Rep. of Germany; Jean-Louis Bravet, Thourrotte; Jean-Claude Abel, Chenneviere, and Noël Crux, Margny Les Compiègne, all of France, assignors to Saint-Gobain Vitrage, Courbevoie, France

Filed Mar. 24, 1987, Ser. No. 29,650

Claims priority, application France, Mar. 24, 1986, 86 04155  
Int. Cl.<sup>4</sup> B32B 17/10, 27/40

U.S. Cl. 428—425.6

23 Claims

20. A laminated glass assembly comprising (1) a monolithic glass or a laminated glass or a plastic support having a glazed edge on one of its surfaces, and (2) a sheet of plastic comprising at least one layer of polyurethane disposed thereon, said layer of polyurethane being in contact with the said surface having

the glazed edge, said laminated glass assembly being prepared by treating at least one surface of the said glazed edge with the polyurethane layer with a primer before assembly of the support with the said sheet of plastic and on an area corresponding essentially to the said glazed edge, said primer comprising a reactive mixture having free NCO groups and free OH groups, wherein the said free NCO groups are capable of reacting with the glazed support and with the said sheet of plastic and of forming cross-linking bonds with the other components of the primer during heat cycle of the subsequent assembly, and wherein said reactive mixture is prepared with a ratio of free NCO groups to free OH groups of at least 1.10 to 1.0; assembling the glass assembly to a heat cycle causing the reaction of the said primer and a definitive adhesion on the periphery of the said laminated glass.

4,789,601

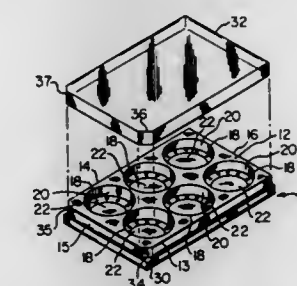
**BIOCOMPATIBLE POLYORGANOSILOXANE COMPOSITION FOR CELL CULTURE APPARATUS**  
Albert J. Banes, 2021 Bivins Rd., Durham, N.C. 27712

Filed May 4, 1987, Ser. No. 46,440

Int. Cl.<sup>4</sup> C08G 77/04

U.S. Cl. 428—447

25 Claims



1. A biocompatible resin, comprising: a polyorganosiloxane composition having incorporated at the surface thereof a substance selected from the group consisting of an amine, a carboxylic acid, or elemental carbon.

4,789,602

**HYDROXYETHYLNORBORNENE COMPOUNDS AND A PROCESS FOR THEIR PREPARATION**

Jerome L. Stavino, and Anthony W. McCollum, both of Longview, Tex., assignors to Eastman Kodak Company, Rochester, N.Y.

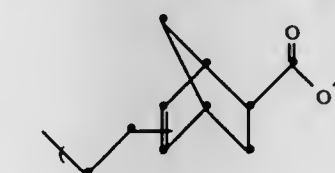
Filed Sep. 28, 1987, Ser. No. 101,472

Int. Cl.<sup>4</sup> B05D 3/02; B32B 27/06, 27/36; C08G 63/02

U.S. Cl. 428—480

6 Claims

1. A process for coating an article, which comprises: (a) dissolving in a suitable solvent the polyester comprising an effective amount of recurring units of the formula:



said polyester having a molecular weight of 1,000 to 4,000, to obtain a mixture;

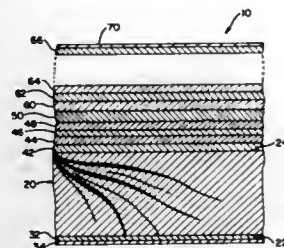
- applying the mixture onto the article; and
- curing at a temperature of 150° to 200° C.

2. An article coated by the process of claim 1.



4,789,603

**VIOLIN FINISH AND FINISHING METHOD**  
 Eugene A. Wahl, 460 Ridgewood Ave., Glen Ridge, N.J. 07028  
 Filed Oct. 29, 1987, Ser. No. 114,573  
 Int. Cl.<sup>4</sup> G10D 1/02; B05D 3/12  
 U.S. Cl. 428—498



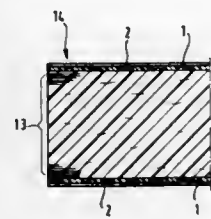
1. A wood violin having a multi-layer finish comprising as the first layer at least one coat of shellac, as the second layer at least one color coat comprising a dye dissolved in a spirit base, and as a third layer a plurality of said shellac coats being disposed over said color coat.

4,789,604

**DECORATIVE PANEL HAVING IMPROVED SURFACE PROPERTIES**  
 Johannes C. W. van der Hoeven, Horn, Netherlands, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany  
 Filed Sep. 22, 1986, Ser. No. 909,551  
 Claims priority, application Fed. Rep. of Germany, Sep. 21, 1985, 3533737

Int. Cl.<sup>4</sup> B32B 27/08

U.S. Cl. 428—503



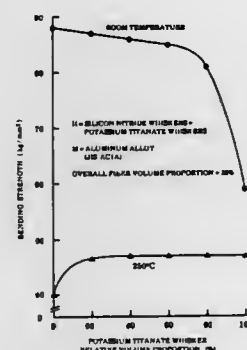
1. A decorative panel, comprising:  
 a core layer;  
 an outermost layer applied over said core layer, wherein said outermost layer comprises a synthetic resin polymer, which polymer is comprised of at least one unsaturated acrylate or unsaturated methacrylate group; and wherein said outermost layer is scratch resistant at a scratch loading of at least about 1.5 Newtons as defined by DIN 53,799 part 10 and has a reflectometer value no greater than about 50 at an angle of incidence of 85° as defined by DIN 67,530; and decoration means for forming a decoration covering said core layer.

4,789,605

**COMPOSITE MATERIAL WITH LIGHT MATRIX METAL AND WITH REINFORCING FIBER MATERIAL BEING SHORT FIBER MATERIAL MIXED WITH POTASSIUM TITANATE WHISKERS**  
 Masahiro Kato; Tadashi Dohmomo; Atsuo Tanaka, all of Toyota, and Hidetoshi Hirai, Kariya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
 Filed Mar. 31, 1987, Ser. No. 32,710  
 Claims priority, application Japan, Apr. 11, 1986, 61-083750  
 Int. Cl.<sup>4</sup> B32B 15/14

U.S. Cl. 428—614

9 Claims



1. In a composite material comprising a matrix of a light metal and a reinforcing fiber material selected from the group consisting of silicon carbide whiskers, silicon nitride whiskers, alumina short fibers, crystalline alumina-silica short fibers, amorphous alumina-silica short fibers and mixtures thereof, the improvement for substantially increasing the bending strength of the composite material at an elevated temperature without substantially affecting bending strength of the composite material at room temperature, comprising mixing potassium titanate whiskers with said reinforcing fiber material at a volumetric ratio relative to said reinforcing fiber material of about 10–80% and limiting the volumetric ratio of the total reinforcing fiber material in the composite material to between about 5 and 50%.

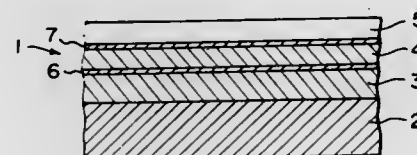
4,789,606

**MAGNETO-OPTICAL RECORDING MEDIUM**  
 Takashi Yamada; Masaaki Nomura; Ryolchi Yamamoto, and Akira Nahara, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan  
 Filed Apr. 13, 1987, Ser. No. 37,884  
 Claims priority, application Japan, Apr. 17, 1986, 61-88764; Apr. 24, 1986, 61-95180

Int. Cl.<sup>4</sup> G11B 5/64

U.S. Cl. 428—694

8 Claims

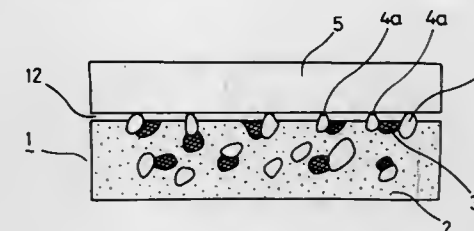


1. A magneto-optical recording medium comprising a transparent substrate, and a magneto-optical recording layer formed on said transparent substrate, said magneto-optical recording layer including a plurality of alternating thin first and second layers, each of said first layers containing a rare earth metal-transition metal alloy, and each of said second layers containing at least either one of platinum and palladium.

4,789,607

**ALUMINUM BEARING ALLOY AND TWO-LAYER BEARING MATERIAL HAVING BEARING LAYER OF ALUMINUM BEARING ALLOY THEREIN**  
 Masahito Fujita; Akira Ohgawara; Takeshi Sakai; Toshinaga Ohgaki, and Tsuyoshi Ohsaki, all of Chiba, Japan, assignors to NDC Company, Ltd., Chiba, Japan  
 Filed Sep. 11, 1986, Ser. No. 906,009  
 Claims priority, application Japan, Sep. 13, 1985, 60-202942; Mar. 18, 1986, 61-61096  
 Int. Cl.<sup>4</sup> C22C 21/00, 21/02; B32B 15/20  
 U.S. Cl. 428—653

4 Claims

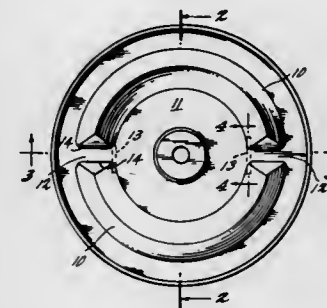


1. An aluminum alloy bearing material being constructed to have an aluminum alloy matrix consisting essentially of 3 to 35% of Sn, 0.5 to 10% of Si, 0.1 to 10% of Pb, 0.01 to 0.3% of Sr and 0.01 to 0.3% of Sb, the balance being substantially Al, said Si being dispersedly precipitated as silicon precipitate particles in the aluminum alloy matrix, characterized in that each of said silicon precipitate particles is precipitated in a spherical or oval shape, and provided with a rounded upper end portion projecting from a surface of said aluminum alloy matrix, and that in the neighborhood of said silicon precipitate particle there exists a Sn-Pb alloy precipitate particle, which is at least partly melted to form a liquid phase supplied onto a surface of said rounded upper end portion.

4,789,608

**PRESSURE VENTING DEVICE**  
 John A. Oswald, Baldwin, Md., assignor to Saft America, Inc., Baldwin, Md.  
 Filed Mar. 26, 1987, Ser. No. 30,138  
 Int. Cl.<sup>4</sup> H01M 2/12; B65D 51/16  
 U.S. Cl. 429—56

6 Claims



1. A vent pressure device for a substantially cylindrical container, said device comprising:  
 at least two arcuate concavities formed in one end of the container, said concavities extending upwardly into the interior of the container;  
 at least two diametrically opposed bridges formed in the one end of the container which interrupt said at least two arcuate concavities; and  
 at least two diametrically opposed score lines formed in the one end of the container, said score lines being disposed

laterally and interiorly offset relative to each of said at least two bridges and being disposed to span across an area so as to contact two of said at least two arcuate concavities.

4,789,609

**BATTERY SEPARATOR**  
 Geneva Ambrose-Ritchey; Felek Jachimowicz, both of Columbia, and Joseph T. Lundquist, Jessup, all of Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.  
 Filed Dec. 14, 1987, Ser. No. 133,592  
 Int. Cl.<sup>4</sup> H01M 2/16

U.S. Cl. 429—144

23 Claims

1. A sheet product comprising  
 (a) at least one ply formed of a cationic, water insoluble polymer membrane of less than 10 mils (0.025 cm) thickness and having at least about 4 weight percent based on the total weight of the polymer of cationic groups in the form of quaternary ammonium groups and said polymer is substantially free of hydrolyzable groups; and  
 (b) at least one ply formed of a microporous polyolefin polymer sheet of less than about 10 mils (0.025 cm) thickness which is substantially free of filler and stable to alkaline conditions, said plies (a) and (b) being coextensive and bonded to each other to form a multi-ply product.

4,789,610

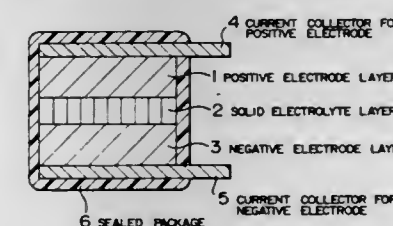
**SOLID-ELECTROLYTE SECONDARY CELL**  
 Shigeo Kondo, Hirakata; Tadashi Sotomura, Kashiwara; Teruhisa Kanbara, Ikeda, and Satoshi Sekido, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Sep. 11, 1987, Ser. No. 95,146

Claims priority, application Japan, Nov. 6, 1986, 61-264592

Int. Cl.<sup>4</sup> H01M 6/18

U.S. Cl. 429—191

19 Claims



1. A solid-electrolyte secondary cell comprising a positive electrode and a negative electrode both of which are mainly composed of a copper chevreol compound, and a copper ion conductive solid electrolyte.

4,789,611

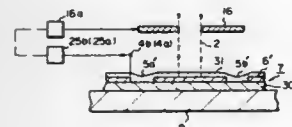
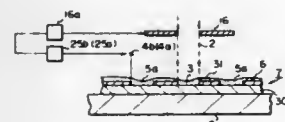
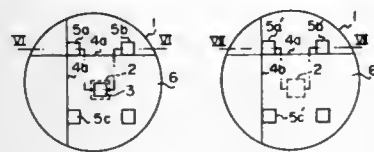
**METHOD FOR AMENDING A PHOTOMASK**  
 Yutaka Miyahara, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan  
 Continuation of Ser. No. 756,579, Jul. 19, 1985, abandoned, which is a continuation of Ser. No. 628,115, Jul. 5, 1984, abandoned, which is a continuation of Ser. No. 501,543, Jun. 6, 1983, abandoned, which is a continuation of Ser. No. 243,542, Mar. 13, 1981, abandoned. This application Dec. 11, 1986, Ser. No. 941,551  
 Claims priority, application Japan, Mar. 14, 1980, 55-32200  
 Int. Cl.<sup>4</sup> G03F 9/00

U.S. Cl. 430—5

8 Claims

1. A method for amending a defective mask pattern of a photomask which comprises a plurality of same mask patterns each of which comprises a plurality of pattern components, this method comprising the steps of:

- (a) representing an enlarged image of a normal mask pattern having the same pattern layout as that of the defective mask pattern to be amended in a view field;
- (b) irradiating a pattern component of said normal mask pattern by a spotlight;
- (c) aligning said spotlight with one of the pattern components of said normal mask pattern, said one of the pattern components corresponding to the pattern component of the defective mask pattern to be amended, so that the shape of said spotlight coincides with that of the one of the pattern components of said normal mask pattern;
- (d) representing at least one base mark optically in said view field said base mark including first and second independently movable base lines;
- (e) aligning at least one base mark with at least one pattern component near the irradiated portion while said normal mask pattern is irradiated by the spotlight;



- (f) fixing the position of said base mark relative to the position of said irradiated portion in the condition that said spotlight is aligned with the pattern component of said normal mask pattern and said base mark is aligned with said one pattern component near the irradiated portion;
- (g) representing the defective mask pattern formed on the same photomask on which said normal mask pattern is formed in said view field by shifting said photomask so as to replace the normal mask pattern with said defective mask pattern;
- (h) aligning said base mark with a pattern component near the defective pattern component in the same manner as the alignment of the normal mask pattern, with the base mark being kept fixed with respect to the spotlight in the state of step (f); and
- (i) irradiating the defective mask pattern with an exposure light having the same shape as that of said spotlight, thereby amending the defective pattern component.

**4,789,612**  
**METHOD FOR FORMING COLOR IMAGE**  
 Satoshi Haseda, and Kunihiro Yoshino, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Feb. 24, 1987, Ser. No. 18,490  
 Claims priority, application Japan, Mar. 6, 1986, 61-49086; Mar. 6, 1986, 61-49091

Int. Cl.<sup>4</sup> G03G 13/24, 13/01

U.S. Cl. 430—42 4 Claims

1. A method for forming a color image comprising steps of
- uniformly applying a primary charge to a photoreceptor comprised thereon of a conductive substrate, a photoconductive layer and an electrically insulating layer, wherein one of said layers is provided with plural kinds of color separating means being finely divided into units,
  - exposing said photoreceptor to light given from a color original and simultaneously applying a secondary charge, said secondary charge being one of an alternating current and a direct current with a polarity opposite to that of said primary charge,
  - uniformly exposing said photoreceptor to a color light capable of passing through at least one kind of said color separating means to form an electrically charged image pattern,
  - developing said electrically charged pattern with a developer comprising a color toner by developing means to form a toner pattern and applying a charge which is one of an alternating current and a direct current with a polarity opposite to that of said primary charge,
  - repeating steps (c) and (d) at least once more, provided that the color light and the color toner each different from these in the every previous steps are used,
  - transferring said toner pattern onto an image pattern receiving materials, and
  - fixing said image patterns transferred on said image pattern receiving material,

wherein an area of said toner image pattern formed on an individual unit of said color separating means is larger than an area of said individual unit in a ratio within the range of 1.1 to 10.0.

**4,789,613**  
**ELECTROSTATIC IMAGE DEVELOPING TONER WITH HIGH DIELECTRIC MATERIAL**

Shoji Ohtani, Osaka; Kazunari Takemura, Wakayama; Yukiya Sato, Wakayama, and Rikio Tsuchida, Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jul. 7, 1987, Ser. No. 70,699  
 Claims priority, application Japan, Jul. 9, 1986, 61-161199  
 Int. Cl.<sup>4</sup> G03G 9/08

U.S. Cl. 430—110 20 Claims

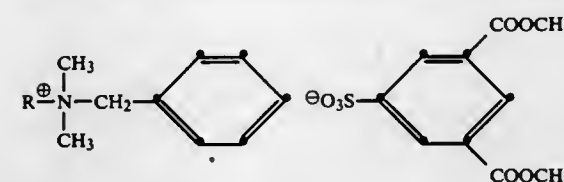
1. A developing toner composition for an electrostatically charged image, which comprises
- a coloring agent, and
  - a resin binder comprising a polymer, a charge controller and an effective amount of a highly dielectric material for maintaining suspension stability which is selected from the group consisting of a titanate, a niobate, a tartrate, a zirconate, a stannate, potassium dihydrogen phosphate and sodium nitrate, wherein said highly dielectric material has a dielectric constant of at least 10 at room temperature and a volume resistivity of at least  $1 \times 10^{10}$  ohm.cm, said toner composition having a surface substantially free of said dielectric material.

**4,789,614**  
**TONERS AND DEVELOPERS CONTAINING BENZYL DIMETHYLALKYLAMMONIUM CHARGE-CONTROL AGENTS**  
 Douglas E. Bugner, and Peter S. Alexandrovich, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 17, 1987, Ser. No. 134,400  
 Int. Cl.<sup>4</sup> G03G 9/08, 9/10

U.S. Cl. 430—110 4 Claims

1. A dry, particulate, electrostatic toner composition comprising a polymeric binder and a charge-control agent comprising a quaternary ammonium salt having the structure

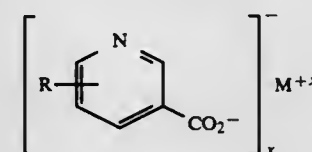


wherein R is alkyl having 12 to 18 carbon atoms.

**4,789,615**  
**TONER COMPOSITIONS WITH NICOTINATE CHARGE ENHANCING ADDITIVES**  
 Roger N. Ciccarelli, Rochester, and Jacques C. Bertrand, Ontario, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Jun. 2, 1987, Ser. No. 56,913  
 Int. Cl.<sup>4</sup> G03G 13/22, 9/08, 9/10  
 U.S. Cl. 430—126 53 Claims

1. A negatively charged toner composition comprised of resin particles, pigment particles, and as a charge enhancing additive metal salts of the following formula:



wherein R is selected from the group consisting of hydrogen and aliphatic substituents; each x is of equal value and represents the number 1, 2, or 3; and M is aluminum.

33. A method of imaging which comprises formulating an electrostatic latent image on a positively or negatively charged photoreceptor, affecting development thereof with the toner composition of claim 1, and thereafter transferring the developed image to a suitable substrate.

**4,789,616**  
**PROCESSES FOR LIQUID DEVELOPER COMPOSITIONS WITH HIGH TRANSFER EFFICIENCIES**

Melvin D. Croucher, Oakville; Raymond W. Wong, Mississauga, both of Canada; Christopher K. Ober, Ithaca, N.Y., and Michael L. Hair, Oakville, Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 9, 1987, Ser. No. 118,904  
 Int. Cl.<sup>4</sup> G03G 9/12

U.S. Cl. 430—137 16 Claims

1. A process for the preparation of liquid developer compositions containing dyed polymer particles with an average diameter of from about 2 to about 6 microns, which particles are dispersed in an oil base, charge control additives, and stabilizers thereby permitting image transfer efficiencies exceeding 80 percent, which comprises formulating polymer particles by dispersion polymerization in a mixture comprised

of a first oil base solvent having an amphipathic steric stabilizer dissolved therein and a second solvent with a higher volatility than said first solvent having monomer(s) dissolved therein; thereafter dyeing the product resulting; followed by removal of the more volatile second solvent; and subsequently adding to the dyed product a charge control additive.

**4,789,617**  
**PRODUCTION OF TONER THROUGH POLYMERIZATION**

Kozo Arahara; Toshikazu Ohnishi, both of Tokyo, and Hiroshi Fukumoto, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 29, 1986, Ser. No. 947,094  
 Claims priority, application Japan, Dec. 28, 1985, 60-298821; Feb. 6, 1986, 61-024651

Int. Cl.<sup>4</sup> G03G 9/08; C08F 2/00

U.S. Cl. 430—137 22 Claims

1. A process for producing a toner, comprising the steps of: dispersing a monomer composition comprising 100 wt. parts of a polymerizable monomer, from 50-3000 wt. parts of a low-softening point compound and a colorant in an aqueous medium heated to a temperature which is higher than a polymerization temperature adapted for providing the polymerization of the polymerizable monomer so as to form particles of the monomer composition; lowering the temperature of the aqueous medium to the polymerization temperature; and adding 0.1-20 wt. parts of a substantially water-insoluble polymerization initiator per 100 wt. parts of the polymerizable monomer to the aqueous medium containing the particles of the monomer composition dispersed therein which is adjusted to the polymerization temperature in order to polymerize the polymerizable monomer.

**4,789,618**  
**SILVER HALIDE PHOTOGRAPHIC MATERIAL AND VERY HIGH CONTRAST NEGATIVE IMAGE-FORMING PROCESS USING SAME**

Nobuaki Inoue; Senzo Sasaoka, and Toshiro Takahashi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 7, 1986, Ser. No. 860,402  
 Claims priority, application Japan, May 9, 1985, 60-098720  
 Int. Cl.<sup>4</sup> G03C 1/06, 1/08, 5/26

U.S. Cl. 430—264 17 Claims

1. A silver halide photographic material which yields a gamma of 10 or higher having on a support at least one silver halide emulsion layer, wherein the silver halide emulsion layer comprises a silver halide emulsion containing an oxidizing agent for the at least one silver halide emulsion added thereto before chemical ripening of the emulsion, and the silver halide emulsion layer or a hydrophilic colloid layer contains a hydrazine derivative added after chemical sensitization and represented by general formula (I):



wherein  $R_1$  represents an aliphatic group or an aromatic group, wherein the oxidizing agent is added to the silver halide emulsion after physical ripening which is then subjected to oxidation, and water-washing followed by chemical sensitization.



4,789,619

**POSITIVE-WORKING RADIATION-SENSITIVE MIXTURE COMPRISING A SENSITIZING POLYMETHINE DYE**

Hans Ruckert, Wiesbaden-Naurod, and Joachim Knaul, Gehrden, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 24, 1986, Ser. No. 934,091

Claims priority, application Fed. Rep. of Germany, Nov. 25, 1985, 3541534

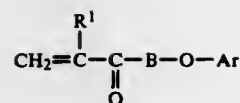
Int. Cl.<sup>4</sup> G03C 7/26, 7/00, 1/95

U.S. Cl. 430—270

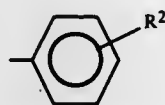
12 Claims

1. A positive-working radiation-sensitive mixture containing,

- a radiation-sensitive compound which forms a strong acid under the action of actinic radiation,
- a compound with at least one C—O—C bond cleavable by acid,
- a binder which is insoluble in water but soluble in aqueous-alkaline solutions, and
- a sensitizing polymethine dye, wherein said polymethine dye is a hemioxonol dye or a symmetrical cyanine dye.



wherein R<sup>1</sup> is H— or CH<sub>3</sub>—, B is —OCH<sub>2</sub>CHOHCH<sub>2</sub>— or —OCH<sub>2</sub>CH<sub>2</sub>—<sub>n</sub> in which n is a whole number of 1 to 4, and Ar is



in which R<sup>2</sup> is H— or an alkyl group having not more than 12 carbon atoms.

4,789,620

**LIQUID PHOTOSENSITIVE RESIN COMPOSITION CONTAINING CARBOXYLATED EPOXY ACRYLATES OR METHACRYLATES**

Isao Sasaki, Saito, Kenji Kushi, and Ken-ichi Inukai, both of Ohtake, all of Japan, assignors to Mitsubishi Rayon Co. Ltd., Tokyo, Japan

Filed Jul. 1, 1986, Ser. No. 880,738

Claims priority, application Japan, Mar. 3, 1986, 61-45779; Mar. 4, 1986, 61-46768; Mar. 5, 1986, 61-47889

Int. Cl.<sup>4</sup> G03C 1/68

U.S. Cl. 430—280

9 Claims

1. A liquid photosensitive resin composition consisting essentially of

- 10 to 55% by weight of an at least partially carboxylated compound selected from the group consisting of at least partially carboxylated multifunctional epoxy acrylates and at least partially carboxylated multifunctional epoxy methacrylates wherein said at least partially carboxylated compound is obtained by the reaction of a dibasic acid or anhydride and the addition product of an acid selected from the group consisting of acrylic acid and methacrylic acid to the epoxy groups of a polyepoxy compound; wherein said partially carboxylated compound has an average acid value of 4 to 150 and a number average molecular weight of not greater than 5,000;
  - 10 to 55% by weight of a cross-linking monomer having at least two monoethylenically unsaturated bonds;
  - 5 to 55% by weight of a vinyl monomer having one monoethylenically unsaturated bond;
  - 4 to 35% by weight of an inorganic filler; and
  - 0.05 to 20% by weight of at least one photopolymerization catalyst selected from the group consisting of photoinitiators and photosensitizers wherein at least one of the cross-linking monomer (b) or at least one of the vinyl monomer (c) satisfy at least one of the following requirements (i) and (ii):
- at least 50% by weight of said cross-linking monomer (b) consists of a monomer containing ester linkages not associated with (meth)acrylate in the molecule and having a number average molecular weight of 200 to 800 and a number average molecular weight per polymerizable double bond of 200 to 250;
  - at least 50% by weight of said vinyl monomer (c) consists of a compound of the general formula

4,789,621

**SCREEN EMULSIONS COMPRISED OF DIACETONE ACRYLAMIDE**

Dale W. Knoch, Mundelein, Ill., assignor to Advance Process Supply Company, Chicago, Ill.

Continuation of Ser. No. 708,089, Mar. 5, 1985, abandoned. This application Nov. 5, 1986, Ser. No. 927,326

Int. Cl.<sup>4</sup> G03C 1/70; C08F 2/16

U.S. Cl. 430—283

10 Claims

1. A high solids content, low viscosity water-based emulsion for application to a screen for silk screen imaging comprising an emulsion in water of

- polyvinyl alcohol at a level of between about 5 and about 15 weight percent of said emulsion,
- polyvinyl acetate and/or a polyvinyl acetate copolymer at a level of between about 15 and about 30 weight percent of said emulsion, the total polymer content of components (a) and (b) being in the range of from about 25 to about 35 weight percent of said emulsion,
- diacetone acrylamide at a level of between about 4 and about 16 weight percent of said emulsion, and
- an acrylic monomer at a level of between about 4 and about 8 weight percent of said emulsion, said emulsion having a solids content of between about 40 and about 50 weight percent, and having a viscosity of between about 20,000 and about 30,000 cps. at 25° C., a thixotropic index of between about 1 and about 2 at 25° C., and a specific gravity of between about 1 and about 1.25 at 25° C.

10. An emulsion in accordance with claim 1 wherein said acrylic monomer is selected from the group consisting of: 2 ethyl-hexyl acrylate, ethylene diacrylate; diethylene glycol diacrylate; glycerol diacrylate; glycerol triacrylate; ethylene dimethacrylate; 1,3-propylene dimethacrylate; 1,2,4-butanetrioltriorylate; 1,3-propylene dimethacrylate; 1,2,4-butanetrioltriethacrylate; 1,4-benzenediol dimethacrylate pentaerythritol tetramethacrylate; 1,3-propanediol diacrylate; 1,6-hexanediol diacrylate; the bis-acrylates and methacrylates of polyethylene glycols of molecular weight 200–500; trimethylolpropane triacrylate; pentaerythritol triacrylate and mixtures thereof.

4,789,622

**PRODUCTION OF RESIST IMAGES, AND A SUITABLE DRY FILM RESIST**

Reinhold J. Leyrer, Ludwigshafen; Gerhard Wegner, Denzlingen, and Michael Mueller, Waldkirch, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 675,428, Nov. 27, 1984, Pat. No. 4,649,100.

This application Jul. 16, 1986, Ser. No. 886,177

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1983, 3342829; Dec. 23, 1983, 3346716

Int. Cl.<sup>4</sup> G03C 1/495

U.S. Cl. 430—286

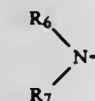
10 Claims

1. A dry film resist comprising a dimensionally stable temporary base and a solid laminatable radiation-sensitive positive-working resist layer applied on the base, the said radiation-sensitive resist layer containing as the main constituent at least one soluble poly (diacetylene) and a sensitizer which can be activated by heat radiation.

2. A dry film resist as defined in claim 1, wherein the radiation-sensitive resist layer contains a plasticizer.

9. A dry film resist as defined in claim 2, wherein the resist layer contains sensitizers which can be activated by actinic light as well as sensitizers which can be activated by heat radiation.

and R<sub>7</sub> are connected together to form a heterocyclic group, or when A represents the group



at least one combination of R<sub>1</sub> and R<sub>6</sub> and R<sub>3</sub> and R<sub>7</sub> is connected together to form a heterocyclic group; and R<sub>3</sub> represents a substituted or unsubstituted aryl group or a substituted or unsubstituted heterocyclic group.

4,789,624

**SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL**

Kel Sakanoue, Shigeo Hirano, Takehiko Ueda, and Keiichi Adachi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 696,544, Jan. 30, 1985, abandoned, which is a continuation-in-part of Ser. No. 572,471, Jan. 20, 1984, abandoned. This application Apr. 21, 1987, Ser. No. 42,612

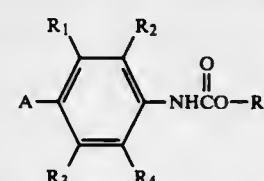
Claims priority, application Japan, Jan. 20, 1983, 58-7692

Int. Cl.<sup>4</sup> G03C 7/34, 7/36, 7/38

U.S. Cl. 430—372

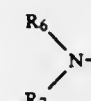
32 Claims

32. A method of producing an image in a silver halide color photographic light-sensitive material, comprising imagewise exposing and developing a silver halide color photographic light-sensitive material comprising a support having thereon a red-sensitive silver halide emulsion layer containing a cyan color forming coupler, a green-sensitive silver halide emulsion layer containing a magenta forming coupler and a blue-sensitive silver halide emulsion layer containing a yellow color forming coupler, at least one of the red-sensitive silver halide emulsion layer or blue-sensitive silver halide emulsion layer containing a high speed reactive coupler possessing a relative coupling speed of 0.6 to 1.0 represented by the following formulae (II), (III) or (IV) as the yellow color forming coupler for the blue sensitive layer or represented by the formula (VI) as the cyan color forming coupler for the red sensitive layer:

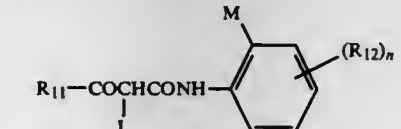


[Z]

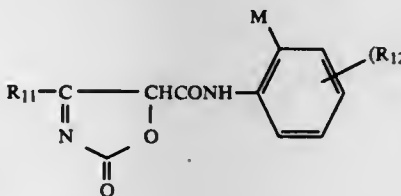
wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> each represents a hydrogen atom, a halogen atom, an alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group, a hydroxy group, an amino group, a substituted amino group, an alkoxy group, an acylamino group, an alkylsulfonylamino group, an arylsulfonylamino group, an aryl group, a carbamoyl group, a substituted carbamoyl group, a sulfamoyl group, a substituted sulfamoyl group, an acyl group, an acyloxy group, or an alkoxy carbonyl group, or R<sub>1</sub> and R<sub>2</sub>, or R<sub>3</sub> and R<sub>4</sub> are connected together to form a ring structure; A represents a hydroxy group, a group capable of providing a hydroxy group upon reaction with a nucleophilic reagent, or the group



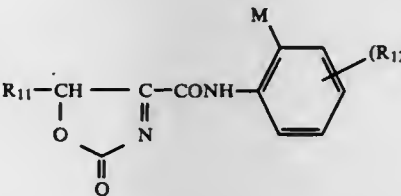
wherein R<sub>6</sub> and R<sub>7</sub> each represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted cycloalkyl group, or a substituted or unsubstituted aralkyl group, or R<sub>6</sub>



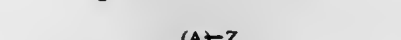
(II)



(III)



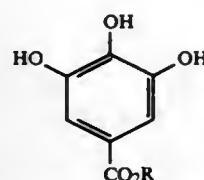
(IV)



(VI)

wherein R<sub>11</sub> represents an alkyl group or an aryl group, each of which may be substituted; R<sub>12</sub> represents a substituent which can be substituted for a hydrogen atom attached to the benzene ring; n represents an integer of 1 or 2, and when n is 2, two

substituents represented by  $R_{12}$  may be the same or different; M represents a halogen atom, an alkoxy group or an aryloxy group; L represents a group capable of being released from the coupler upon the formation of a dye through oxidative coupling with an aromatic primary amine developing agent; A represents an image forming coupler residue which has a naphthol nucleus or a phenol nucleus; m represents 1 or 2; and Z represents a group which is attached to the coupling position of the above-described coupler residue A and is capable of being released from coupler (VI) upon the formation of a dye through oxidative coupling with an aromatic primary developing agent; and a compound represented by the following general formula (I):



wherein R represents a hydrogen atom, a substituted or unsubstituted aliphatic group, a substituted or unsubstituted aromatic group, or a substituted or unsubstituted heterocyclic group; wherein said silver halide color photographic light-sensitive material exhibits improved graininess in both high density areas and low density areas after imagewise exposure and development.

#### 4,789,625 RADIATION CURABLE COATING FOR PHOTOGRAPHIC LAMINATE, AND DEVELOPMENT PROCESS

Stuart M. Ellerstein, Princeton, N.J., and San A. Lee, Yardley, Pa., assignors to Morton Thiokol, Inc., Chicago, Ill.  
Continuation of Ser. No. 419,676, Sep. 20, 1982, abandoned. This application May 5, 1986, Ser. No. 877,420

Int. Cl. 4 C08F 2/50, 20/36, 20/18; G03C 7/14  
U.S. Cl. 430-372 24 Claims

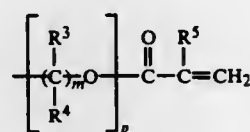
1. Unexposed photographic color print material comprising a laminate of a photoemulsion layer having front and back sides and an optically clear coating layer having front and back sides, wherein:

- said photoemulsion layer is adapted to be exposed to the image of a color print negative projected through said coating layer, developed by an immersion development process, and viewed through said coating layer following said development process;
- the front side of said coating layer is the front outside surface of said color print material, and is adapted to be in contact with immersion development process chemicals during development of said print material;
- the back side of said coating layer faces the front side of said photoemulsion layer;
- said coating layer has the property of being essentially non-yellowing during and after immersion of said color print material in immersion development process chemicals with said coating layer in direct contact with said chemicals; and
- said coating layer consists essentially of the cured reaction product of:
  - from 45 to 90 weight percent, based upon total composition weight, of an oligomer of the formula:



wherein  
 $R^1$  and  $R^2$  are independently selected from linear,

branched, or cyclic saturated alkylene radicals including from six to twenty carbon atoms, n is a whole number from zero to three, Q and X are independently selected from:  
(a) radicals of the formula



wherein  $R^3$ ,  $R^4$ , and  $R^5$  are independently selected from hydrogen, methyl, ethyl, or propyl, m is an integer of from 1 to 10, and p is zero or one, and  
(b) a saturated alkyl radical of from nine to twenty carbon atoms, with the proviso that said oligomer must possess at least one acrylate or methacrylate group;

- from 9 to 50 weight percent, based upon total composition weight, of a reactive diluent selected from the group consisting of lauryl acrylate, lauryl methacrylate, stearyl acrylate, stearyl methacrylate, ethylhexylacrylate, isodecyl acrylate, and mixtures thereof; and
- from 0.5 to 5 weight percent, based upon the total composition weight, of a photoinitiator selected from the group consisting of 2-hydroxycyclohexylphenone, 2-hydroxy-2-methyl-1-phenyl-propan-1-one, and diethoxyacetophenone.

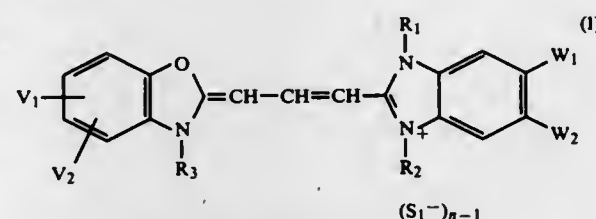
#### 4,789,626 METHOD FOR PROCESSING SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS CONTAINING SENSITIZING DYES AND TWO-EQUIVALENT MAGENTA POLYMER COUPLERS

Kel Sakanoue, Shinzo Kishimoto, and Tadashi Ikeda, all of Kanagawa, Japan, assignors to Fujii Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 12, 1986, Ser. No. 940,839  
Claims priority, application Japan, Dec. 13, 1985, 60-280375  
Int. Cl. 4 G03C 7/00, 7/40, 1/08, 7/32

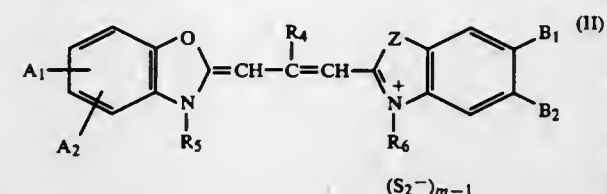
U.S. Cl. 430-393 15 Claims

1. A method for processing a silver halide color photographic material by fixing or bleach-fixing the material and immediately thereafter subjecting it to washing or stabilization, wherein (A) the silver halide color photographic material contains at least one of sensitizing dyes represented by the following formulae (I) and (II) and at least one two-equivalent magenta polymer coupler which is derived from a monomer coupler of the following formula (III) and which has a repeating unit represented by the following formula (IV), and (B) the amount of a replenisher in the washing step and/or the stabilization step falls within the range of 3 to 50 times, based on unit area of the material after being processed, the amount of each processing solution having been carried over from the preceding bath:

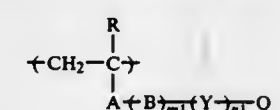
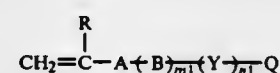


wherein  $V_1$  and  $V_2$  each represents a hydrogen atom, an alkyl group, an alkoxy group, a chlorine atom, a phenyl group, a substituted phenyl group, or a hydroxyl group, or  $V_1$  and  $V_2$  may together form a condensed benzene ring,  $W_1$  represents a

hydrogen atom, a fluorine atom, or chlorine atom;  $W_2$  represents a hydrogen atom, a fluorine atom, an acyl group, an alkoxy-carbonyl group, a sulfamoyl group, a cyano group, a fluorine-substituted alkyl group, or an alkylsulfonyl group,  $R_1$ ,  $R_2$  and  $R_3$ , which may be the same or different, each represents an alkyl group or a substituted alkyl group, with the proviso that at least one of  $R^2$  and  $R^3$  represents a substituted alkyl group having a sulfo group or a carboxyl group;  $X_1$  represents an acid anion; and n is 1 or 2;



wherein Z represents a sulfur atom or a selenium atom;  $A_1$  and  $A_2$ , which may be the same or different, each has the same meanings as in  $V_1$  or  $V_2$  in the formula (I);  $B_1$  represents a hydrogen atom, a lower alkyl group having 5 or less carbon atoms, a lower acylamino group having 5 or less carbon atoms, or a lower alkoxy group having 4 or less carbon atoms; when  $B_1$  is a hydrogen atom,  $B_2$  represents a lower acylamino group having 5 or less carbon atoms, a lower alkoxy-carbonyl group having 5 or less carbon atoms, or a carboxyl group, when  $B_1$  is a lower alkoxy group,  $B_2$  additionally represents a lower alkyl group having 5 or less carbon atoms, a chlorine atom, a substituted or unsubstituted phenyl group, a hydroxyl group, a lower alkoxy-carbonyl group having 5 or less carbon atoms, or a carboxyl group, and when  $B_1$  is a lower alkyl group or a lower acylamino group,  $B_2$  additionally represents a lower alkoxy group having 5 or less carbon atoms;  $R_4$  represents a hydrogen atom, a lower alkyl group having 4 or less carbon atoms, or an aralkyl group,  $R_5$  and  $R_6$  each has the same meanings as in  $R_1$ ,  $R_2$ , or  $R_3$  in the formula (I), provided that at least one of  $R_5$  and  $R_6$  represents an alkyl group containing a sulfo group or a carboxyl group;  $X_2$  represents an acid anion residue; and M is 1 or 2;



wherein R represents a hydrogen atom, a lower alkyl group having 1 to 4 carbon atoms, or a chlorine atom; A represents  $-\text{CONH}-$ ,  $-\text{COO}-$ ,  $-\text{O}-$ , or a phenylene group; B represents a substituted or unsubstituted alkylene group which may be straight or branched chain, a substituted or unsubstituted aralkylene group, or a substituted or unsubstituted phenylene group; Y represents  $-\text{CONR}'-$ ,  $-\text{NR}'\text{CONR}'-$ ,  $-\text{NR}'\text{CO}_2-$ ,  $-\text{NR}'\text{CO}-$ ,  $-\text{OCONR}'-$ ,  $-\text{NR}'-$ ,  $-\text{CO}_2-$ ,  $-\text{OCO}-$ ,  $-\text{CO}-$ ,  $-\text{O}-$ ,  $-\text{SO}_2-$ ,  $-\text{NR}'\text{SO}_2-$ ,  $-\text{SO}_2\text{NR}'-$ , or  $-\text{S}-$ , wherein  $R'$  represents a hydrogen atom, a substituted or unsubstituted aliphatic group, or a substituted or unsubstituted aryl group, provided that wherein two or more of  $R'$  are present in the molecule, they may be the same or different;  $n_1$  is 0 or 1; when  $n_1$  is 0,  $m_1$  is 1, when  $n_1$  is 1,  $m_1$  is 1; and Q represents a two-equivalent magenta coupler residue capable of forming a dye upon coupling with an oxidation product of an aromatic primary amine developing agent, wherein the at least one of sensitizing dyes is present in an amount of from  $1 \times 10^{-6}$  to  $5 \times 10^{-3}$  mole per mole of the silver halide.

#### 4,789,627 METHOD FOR FORMING DIRECT POSITIVE COLOR IMAGES

Noriyuki Inoue, Tatsuo Heki, and Shinji Ueda, all of Minami-ashigara, Japan, assignors to Fujii Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jun. 23, 1987, Ser. No. 66,049  
Claims priority, application Japan, Jul. 2, 1986, 61-154156; Jun. 25, 1986, 61-149085

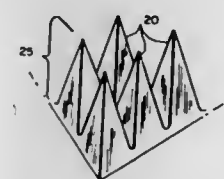
Int. Cl. 4 G03C 5/24 15 Claims

1. A method for forming a direct positive color image which comprises (i) image-wise exposing to light a light-sensitive material comprising a support having provided thereon at least one photographic emulsion layer containing unfogged internal latent image type silver halide grains and a color image-forming coupler; (ii) developing the light-sensitive material with a surface developing solution containing an aromatic primary amine type color developing agent in the presence of a nucleating agent and/or fogging exposure; and (iii) bleaching and fixing the resulting material to form the direct positive color image, wherein the pH of the developing solution is 11.5 or less; the color coupler itself is a substantially non-diffusible compound which forms or releases a substantially non-diffusible dye by oxidation coupling with an aromatic primary amine type color developing agent; and the internal latent image type silver halide grains have a core/shell built-up structure wherein the core is composed of silver bromide, silver bromide, silver bromochloride or silver bromochloriodide, which contains 90 mol% or more of silver bromide and 10 mol% or less of silver iodide, and the shell is composed of silver bromochloride or silver chloride, which contains 20 mol% or more of silver chloride.

#### 4,789,628 DEVICES FOR CARRYING OUT LIGAND/ANTI-LIGAND ASSAYS, METHODS OF USING SUCH DEVICES AND DIAGNOSTIC REAGENTS AND KITS INCORPORATING SUCH DEVICES

P. N. Nayak, Yarmouth, Me., assignor to VXR, Inc., Portland, Me.

Filed Jun. 16, 1986, Ser. No. 874,541  
Int. Cl. 4 B01N 33/549; B65D 69/00; B01L 3/00; G01N 1/10  
U.S. Cl. 435-7 26 Claims



14. A method for assaying one or more samples for the presence of at least one ligand with the aid of a device for assaying one or more samples for the presence of a ligand by forming within the device a detectable reaction product of the ligand with at least one anti-ligand therefor and detecting the reaction product, the device comprising:

- a plastic member defining at least one well having a bottom, the well comprising at least one immobilized anti-ligand; and
- a plurality of spaced projections extending upward from the well bottom to increase the surface area thereof, the projections being spaced to define interconnecting channels therebetween;

the method comprising:  
(1) introducing the sample into the well; (2) forming in the well a ligand/anti-ligand reaction product; and (3) detect-



ing the ligand/anti-ligand reaction product capable of detection.

4,789,629

# METHOD AND DEVICE FOR COLLECTING AND TESTING FOR FECAL OCCULT BLOOD

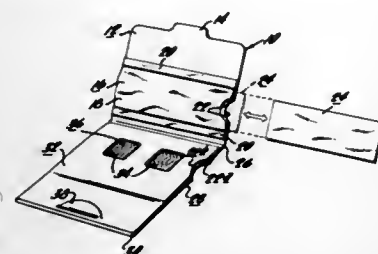
Josefina T. Baker, Cupertino, Calif.; Joseph F. Pagano, Paoli, Pa., and Ronald J. Schoengold, San Jose, Calif., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Filed Nov. 24, 1986, Ser. No. 934,035

Int. Cl.<sup>4</sup> G01N 33/53, 33/72

U.S. Cl. 435—7

6 Claims



1. In an occult blood specimen test slide having a front panel, a rear panel, said front panel having one or more openings, sheet means carrying a test reagent between the front and rear panels underlying each of said openings a hinged cover configured to overlie a portion of the front panel and said openings and flap means in the rear panel opposite said openings and pivotable to expose the underside of the sheet, the improvement comprising a pocket-like member attached to a portion of the inside of said hinged cover and an absorbent insert disposed in said pocket whereby when the cover is in a closed mode, the pocket is positioned to overlie the openings of the front panel and the insert which has a portion exposed beyond the closure line of the cover can be slidably removed from the pocket, said pocket-like member having a consistency which permits filtration of a specimen fluid onto said insert.

4,789,630

# IONIC COMPOUNDS CONTAINING THE CATIONIC MERQUINONE OF A BENZIDINE

Will Bloch, El Cerrito; Patrick J. Sheridan, San Leandro, and Robert J. Goodson, Albany, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 784,329, Oct. 4, 1985, abandoned. This application Aug. 20, 1986, Ser. No. 896,677

Int. Cl.<sup>4</sup> G01N 33/53

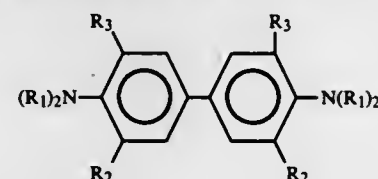
U.S. Cl. 435—7

67 Claims

31. A process for visualizing an analyte selected from the group consisting of an antigen, an antibody and a nucleic acid, contained in or on a solid phase using a Southern blot, a Northern blot, a DNA or RNA dot blot, a Western blot, an antigen dot blot or an antibody dot blot, which process comprises:

- (a) contacting the solid phase with a detecting compound selected from the group consisting of (i) an antibody capable of binding to the antigen, (ii) an antigen or anti-antibody capable of binding to the antibody, or (iii) a nucleic acid hybridization probe containing a single-stranded nucleotide sequence which is complementary to a sequence contained in the nucleic acid;
- (b) contacting the solid phase from step (a) with a peroxidase attached to a moiety capable of binding to the detecting compound;
- (c) incubating the solid phase from step (b) under conditions whereby the detecting compound will bind to the peroxidase and to the antigen, antibody or nucleic acid if it is present in the solid phase;

- (d) washing the solid phase from step (c) to remove unbound detecting compound and peroxidase;
- (e) adding to the washed solid phase from step (d) a benzidine compound given by the structure



in which R<sub>1</sub> is H and R<sub>2</sub> and R<sub>3</sub> are independently selected from the group consisting of —H, —F, —Cl, —Br, —CH<sub>3</sub>, —OCH<sub>3</sub>, —(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub>, and —O—(CH<sub>2</sub>)<sub>n</sub>CH<sub>3</sub>, where n is an integer of from 1 to 10, and wherein the concentration of dissolved merquinone in equilibrium with said salt or complex ion is less than about 10<sup>-5</sup>M;

- (f) subjecting the solid phase to conditions under which the benzidine compound will oxidize to the merquinone thereof if the peroxidase is present, said conditions comprising a reaction temperature of 0° to 60° C. and an aqueous medium of pH 3 to 7 containing an amount of a hydroperoxide effective to oxidize the benzidine compound; wherein an amount of an anion or polymeric anion effective to cause formation of a solid salt or immobilized complex of the anion or polymeric anion with the merquinone is added during one or more of steps (a)–(f); and
- (g) detecting the formation of a solid salt or immobilized complex of said anion or polymeric anion and said cationic merquinone, wherein said formation indicates the presence of the antigen, antibody or nucleic acid.

4,789,631

# IMMUNOASSAY FOR ANTI-DIROFILARIA IMMITIS ANTIBODY

Edward T. Maggio, San Diego, Calif., assignor to Synbiotics Corporation, San Diego, Calif.

Filed Feb. 17, 1984, Ser. No. 581,347

Int. Cl.<sup>4</sup> G01N 33/53, 33/545, 33/569

U.S. Cl. 435—7

8 Claims

1. In an assay for detecting anti-Dirofilaria immitis antibody in a serum sample, the assay including the following steps: step (a): contacting the serum sample with an immunoassay reagent having soluble antigenic components of Dirofilaria immitis attached thereto for binding the anti-Dirofilaria immitis antibody, and then step (b): detecting the anti-Dirofilaria immitis antibody bound to the immunoassay reagent, wherein an improvement enables the antibody assay to discriminate between the detection of anti-Dirofilaria immitis antibody and the detection of anti-Toxocara canis antibody, the improvement comprising:

in said contact step (a) and said detection step (b), the soluble antigenic components of Dirofilaria immitis which are attached to the immunoassay reagent consist essentially of non-cross-reactive antigenic subcomponents which are reactive with anti-Dirofilaria immitis antibody and are non-cross-reactive with anti-Toxocara canis antibody, and said detection step (b) being insensitive to the presence or absence of anti-Toxocara canis antibody.

4,789,632

# PROCESS FOR GROWING GRANULOSIS VIRUSES

Albrecht Gröner, Seeheim-Jagenheim, and Werner Knauf, Eppstein/Tannus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Aug. 11, 1987, Ser. No. 84,284

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1986, 3627396

Int. Cl.<sup>4</sup> C12N 7/00

U.S. Cl. 435—235

5 Claims

1. A process for growing *Cydia pomonella* granulosus virus (CpGV), which comprises propagating the virus in larvae of Tortricidae species which have a LD<sub>50</sub> for this virus which is a factor of 5 to 100,000 higher than that of codling moth larvae.

4,789,633

# FUSED LIPOSOME AND ACID INDUCED METHOD FOR LIPOSOME FUSION

Leaf Huang, and Jerome Connor, both of Knoxville, Tenn., assignors to University of Tennessee Research Corporation, Knoxville, Tenn.

Filed Apr. 19, 1984, Ser. No. 602,177

Int. Cl.<sup>4</sup> C12N 5/00, 5/02; B32B 5/16; A61J 5/00

U.S. Cl. 435—240.2

9 Claims

1. A method of fusing liposomes which comprises: (a) preparing a suspension of liposomes containing at least one lipid which has a tendency to form the inverted hexagonal phase and at least 20 mol percent of palmitoyl-homocysteine; and (b) in the absence of externally added divalent cations, proteins or other macromolecules, acidifying the liposome suspension to reduce the pH of the liposomes to below pH 7, such that at least about 20% of said liposomes fuse to one another.

4,789,634

# CARRIER FOR THE CULTIVATION OF HUMAN AND/OR ANIMAL CELLS IN A FERMENTER

Wolfgang G. K. Müller-Lierheim, Gräfelfing, and Andreas H. Beiter, Munich, both of Fed. Rep. of Germany, assignors to Dr. Müller-Lierheim KG Biologische Laboratorien, Planegg, Fed. Rep. of Germany

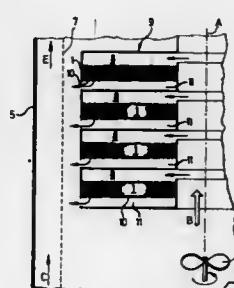
Filed Jun. 18, 1986, Ser. No. 875,545

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1985, 3521684; Aug. 26, 1985, 3530440; Apr. 10, 1986, 86104889

Int. Cl.<sup>4</sup> C12M 1/40

U.S. Cl. 435—288

10 Claims



1. A carrier for the cultivation of animal cells in a fermenter, comprising a plurality of porous polymer beads, said beads having a diameter of from 50 to 300 μm and said pores having a diameter from 0.1 to 3.0 μm, transmissive for liquid cell culture medium and in which no cell growth occurs, formed into a pressure-resistant matrix with interstices within which cell growth takes place, growth factors for the cells being attached to the boundaries defined by said interstices, wherein said beads are arranged on a sieve means in the

fermenter, such that cell culture medium flows downwardly therethrough, wherein said fermenter is of a hollow cylindrical configuration and a plurality of said beads is arranged in a plurality of horizontal layers in superposed relationship in the fermenter, and wherein said fermenter comprises means for transporting the cell culture medium through the fermenter centrally along the axis of the cylindrical configuration thereof, then radially outwardly over said horizontal layers and then downwardly through said layers due to flow pressure of said medium.

4,789,635

# APPARATUS FOR DETECTING MICRO-ORGANISMS

Martin R. Ackland, and Roderick M. De'Ath, both of Wantage, England, assignors to Metal Box p.l.c., United Kingdom

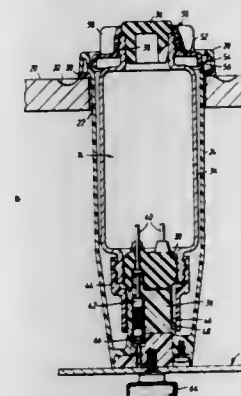
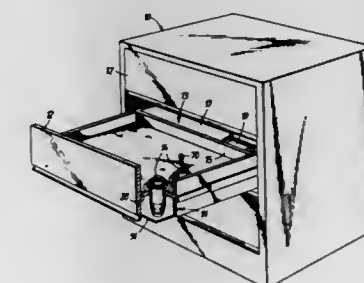
Filed Jan. 20, 1987, Ser. No. 4,895

Claims priority, application United Kingdom, Feb. 6, 1986, 8602980

Int. Cl.<sup>4</sup> C12M 1/36

U.S. Cl. 435—291

12 Claims



1. Apparatus for use in detecting micro-organisms in any one of a plurality of samples, comprising a plurality of containers for the samples, each container having a top end and a base, each container having in its base at least one electrode contactable with the sample therein; a container-mounting rack having means for receiving and for locating each of said containers at a respective one of an array of stations, the container-mounting rack having a base and upper support means spaced upwardly from said base, electrical contact means being provided on the base at each said station for electrical connection with the electrode of a container received at the respective station; and releasable retention means adapted to engage the top end of a container and co-operate with the upper support means of the container-mounting rack to retain said container and which are operable from above said upper support means.

4,789,636

# DOUBLE-STRANDED DNA HAVING SEQUENCES COMPLEMENTARY TO A SINGLE-STRANDED DNA AND DERIVED FROM MUNGBEAN YELLOW MOSAIC VIRUS

Tsuto Morinaga, Sagami-hara; Kin-ichiro Miura; Kunitada Shimotohno, both of Tokyo; Masato Ikegami, Funabashi, and Yataro Ichikawa, Tokorozawa, all of Japan, assignors to Teljin Limited, Osaka, Japan

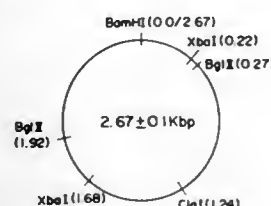
Filed Sep. 5, 1984, Ser. No. 647,829

Claims priority, application Japan, Sep. 5, 1983, 58-161945

Int. Cl.<sup>4</sup> C12N 15/00; C12P 21/00, 19/34; C07H 21/04

U.S. Cl. 435-320

14 Claims



1. An isolated, substantially pure double-stranded DNA which is not digestible with restriction endonuclease Dpn I, having sequences complementary to a single-stranded DNA which has a molecular size of about 2.67 Kb and is derived from mungbean yellow mosaic virus, and giving the restriction endonuclease cleavage map shown in FIG. 1 of the accompanying drawings.

4,789,637

# ACID COMPLEXED ACETYLENIC COMPOUNDS USEFUL AS ENVIRONMENTAL INDICATING MATERIALS

Anthony F. Preziosi, Ledgewood, and Thaddeus Prusik, Roosevelt, both of N.J., assignors to LifeLines Technology, Inc., Morris Plains, N.J.

Filed Sep. 29, 1986, Ser. No. 912,713

The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> G01N 31/22; G01K 11/14; C07C 127/15

U.S. Cl. 436-2

20 Claims

1. An acetylenic complex comprising at least one complexing agent and at least one acetylenic compound of the general formula:



Wherein:

a is 1 or 2, b is a whole number from 0 to 5, c is 0 or 1, and d is a whole number from 0 to 2; with the proviso that when a is 1, b and c are 0; and R is  $-(CH_2)_n-NH-C(O)NHR'$

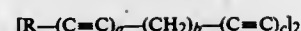
wherein:

- (1) n is an integer of about 1 to 10; and
- (2) R' is selected from the group consisting of:

- (a) hydrogen;
- (b) cycloalkyl;
- (c) alkenyl;
- (d) cycloalkenyl;
- (e) alkyl;
- (f) phenyl;
- (g) alkoxy;
- (h) alkoxyalkyl;
- (i) alkoxyalkylalkyl;

and HX is an effective complexing acid; said acetylenic complex capable of demonstrating reactivity by undergoing one or more color changes upon exposure to stimuli.

18. A method of controlling the reactivity of acetylenic compounds of the general formula:



Wherein:

a is 1 or 2, b is a whole number from 0 to 5, c is 0 or 1; with the proviso that when a is 1, b and c are 0; and R is  $-(CH_2)_n-NHC(O)NHR'$

Wherein:

- (1) n is an integer of about 1 to 10; and
- (2) R' is selected from the group consisting of:

- (a) hydrogen;
- (b) cycloalkyl;
- (c) alkenyl;
- (d) cycloalkenyl;
- (e) alkyl;
- (f) phenyl;
- (g) alkoxy;
- (h) alkoxyalkyl; and
- (i) alkoxyalkylalkyl;

said method comprising the step of contacting the compound with an effective complexing acid for a time sufficient to produce an acetylenic complex having a reactivity to environmental stimuli which differs from the reactivity of said acetylenic compound to said stimuli.

4,789,638

# PROCESS AND APPARATUS FOR THE DETECTION OF HYDRAZINE AND HYDRAZINE DERIVATIVES

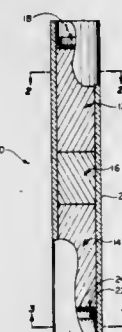
David N. Kramer, 2119 Wiltonwood Rd., Stevenson, Md. 21153, and Philip A. Snow, Box 53, Bee Tree Rd., Henderson, Md. 21640

Filed May 6, 1987, Ser. No. 46,385

Int. Cl.<sup>4</sup> G01N 22/00, 1/48, 33/00, 21/77

U.S. Cl. 436-111

44 Claims



1. A process for the colorimetric detection of hydrazine and hydrazine derivatives in an air sample comprising the step of contacting the sample containing said hydrazine or hydrazine derivative with an ion selected from the group consisting of iodate ion and periodate ion, an oxidizing metal ion and a colorimetric indicator for iodine selected from the group consisting of addition-complex type indicators and iodination type dye precursors.

14. A device for the detection of hydrazine and volatile hydrazine derivatives in air comprising (1) a housing adapted to be worn on a belt and, disposed within said housing; (2) a detector tube comprising a reactor zone and an indicator zone, said reactor zone being open to the atmosphere and wherein said reactor zone contains reagents comprising an ion selected from the group consisting of iodate ion and periodate ion and said indicator zone is at least partially transparent and contains a colorimetric indicator for iodine; (3) an exhaust pump having an intake and an exhaust; (4) a conduit connecting the indicator zone of the detector tube to the intake of said exhaust pump; (5) an electric motor adapted to drive said exhaust pump; and (6) a battery for providing power to said electric motor, and

wherein further said housing has a transparent window to permit observation of said detector tube, the indicator zone of said detector tube further comprising an oxidizing metal ion.

4,789,639

# LIQUID RECOVERY DEVICE

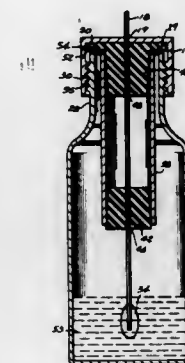
Beverly M. Fleming, Raleigh, N.C., assignor to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Jan. 2, 1987, Ser. No. 58

Int. Cl.<sup>4</sup> C12M 1/30; B01L 3/00; A61M 35/00

U.S. Cl. 436-178

14 Claims



1. A method for recovering liquid from an absorbent material using a receptacle having therein a reservoir of liquid, a sleeve spaced from the liquid and a swab which includes a shaft and an absorbent pad affixed to said shaft, said pad being immersed in the liquid, said swab being constructed and arranged to be removably positioned inside of said receptacle, said sleeve having top and bottom closures within open upper and lower ends of said sleeve, respectively, said top closure having a flange which rests on an upper lip of said receptacle thereby immobilizing said sleeve in said receptacle, said closures having passageways therethrough, said shaft extending through said passageways, said method comprising the steps of:

- (a) applying movement to said shaft whereby said absorbent pad having liquid absorbed therein emerges from the liquid and enters said passageway through said bottom closure;
- (b) causing said pad to be compressed in the passageway through said bottom closure;
- (c) removing the absorbed liquid from said pad by compressing; and
- (d) collecting liquid removed from said pad in said reservoir.

4,789,640

# ASSAYS FOR MYASTHENIA GRAVIS

Jon M. Lindstrom, Del Mar, Calif., assignor to The Salk Institute for Biological Studies, San Diego, Calif.

Filed Jan. 6, 1986, Ser. No. 816,383

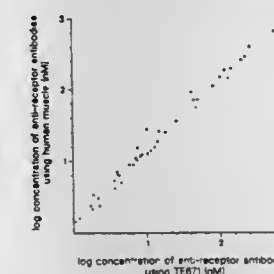
Int. Cl.<sup>4</sup> G01N 33/567, 33/536; A61K 43/00

U.S. Cl. 436-504

5 Claims

1. In a process for diagnosing myasthenia gravis which comprises the steps of preparing a complex of acetylcholine receptor protein, toxin and a radioactive isotope, incubating said complex with a serum sample from a patient so as to join antibodies engendered in connection with myasthenia gravis to said complex, precipitating said complex joined with antibody

with anti-immunoglobulin and measuring radioactivity, from said radioactive isotope, of the precipitated complex, the improvement wherein the acetylcholine receptor protein is derived from cells of the TE671 Line.



4,789,641

# METHOD OF MANUFACTURING AMORPHOUS PHOTOVOLTAIC-CELL MODULE

Takahiko Inuzuka, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

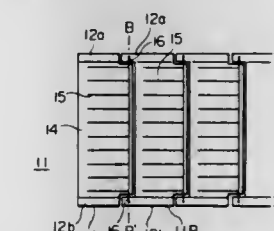
Filed Jan. 30, 1987, Ser. No. 9,225

Claims priority, application Japan, Mar. 4, 1986, 61-45391

Int. Cl.<sup>4</sup> H01L 31/18

U.S. Cl. 437-4

9 Claims



1. A method of manufacturing an amorphous photovoltaic-cell module, said method comprising the step of preparing an elongated unitary amorphous photovoltaic cell by first forming an amorphous film having a PIN-junction on an elongate lower electrode except for narrow parts on both longitudinally extending sides thereof which provide exposed narrow lower electrode parts, subsequently forming a film of a transparent upper electrode on the amorphous film, and thereafter forming a large number of spaced apart digitated current collectors on the transparent upper electrode successively in the lengthwise direction of the elongate lower electrode at predetermined intervals, the step of cutting the elongated unitary amorphous photovoltaic cell into shorter sections, each said section including at least one of the large number of digitated collectors, to form a succession of individual amorphous photovoltaic cells, each having a central portion carrying at least one of the current collectors nested between opposite end portions of the exposed narrow parts of the lower electrode of an adjacent cell, and the step of connecting adjacent cells in electrical series by connecting in the crosswise direction of the lower electrode both exposed narrow parts of each individual cell and the current collector on the central portion of an adjacent cell nested therebetween.



**4,789,642**  
**METHOD FOR FABRICATING LOW LOSS**  
**CRYSTALLINE SILICON WAVEGUIDES BY**  
**DIELECTRIC IMPLANTATION**

Joseph P. Lorenzo, Stow, and Richard A. Soref, Newton Centre, both of Mass., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 26, 1987, Ser. No. 32,810  
 Int. Cl.<sup>4</sup> H01L 21/425; G02B 6/10  
 U.S. Cl. 437—24

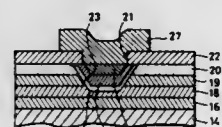
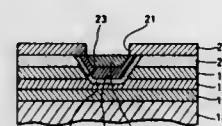
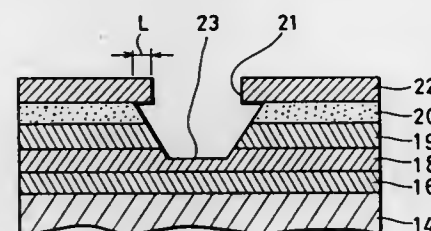
22 Claims



1. A method of fabricating a silicon optical waveguide comprising the steps of:

- preparing a crystalline silicon substrate with suitable doping for optical propagation;
- subjecting a surface of said silicon substrate to ion implantation to form a dielectric layer below the silicon substrate surface;
- etching said silicon substrate at a surface to provide an exposed waveguide rib bounded by said dielectric layer; and
- forming a passivating layer on top of said waveguide rib.

ity type emitter layer in said cavity by utilizing said insulation film as a mask; and



a fourth step of forming an emitter electrode in a self-aligned manner through said opening of said insulation film.

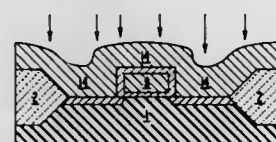
**4,789,644**  
**PROCESS FOR FABRICATION, BY MEANS OF**  
**EPITAXIAL RECRYSTALLIZATION, OF**  
**INSULATED-GATE FIELD-EFFECT TRANSISTORS**  
**WITH JUNCTIONS OF MINIMUM DEPTH**

Laura Meda, Milan, Italy, assignor to SGS Microelettronica SpA, Milan, Italy

Filed Dec. 22, 1986, Ser. No. 946,187  
 Claims priority, application Italy, Dec. 23, 1985, 23356 A/85  
 Int. Cl.<sup>4</sup> H01L 21/36

U.S. Cl. 437—41

4 Claims



1. A process for producing an insulated gate field effect transistor on a first region of a monocrystalline silicon substrate of a first type of conductivity, comprising the steps of: forming a first insulating layer on a second region of the substrate contained within the first region thereof; forming a conducting layer on the first insulating layer and then forming a second insulating layer on the conducting layer, the first insulating layer and the conducting layer respectively forming a gate dielectric and a gate electrode of the field effect transistor;

**4,789,643**  
**METHOD OF MANUFACTURING A HETEROJUNCTION**  
**BIPOLAR TRANSISTOR INVOLVING ETCH AND**  
**REFILL**

Yasutomo Kajikawa, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 16, 1987, Ser. No. 97,165  
 Claims priority, application Japan, Sep. 25, 1986, 61-228724  
 Int. Cl.<sup>4</sup> H01L 21/302

U.S. Cl. 437—31

5 Claims

1. A method of manufacturing a heterojunction bipolar transistor, said method comprising:

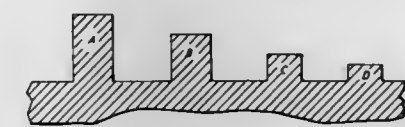
- a first step of sequentially epitaxially growing a first conductivity type collector layer, a semi-insulating layer and a second conductivity type external base layer on the upper part of a semi-insulating substrate;
- a second step of performing selective mesa etching from said external base layer to said collector layer by utilizing an insulation film having a selectively formed opening as a mask to form a cavity exposing said external base layer, said semi-insulating layer and said collector layer;
- a third step of sequentially epitaxially growing a second conductivity type internal base layer and a first conductiv-

**4,789,646**  
**METHOD FOR SELECTIVE SURFACE TREATMENT OF**  
**SEMICONDUCTOR STRUCTURES**

Mark A. Davis, Linden, Utah, assignor to North American Philips Corporation, Signetics Division Company, Sunnyvale, Calif.

Filed Jul. 20, 1987, Ser. No. 75,365  
 Int. Cl.<sup>4</sup> H01L 21/38, 21/47  
 U.S. Cl. 437—141

21 Claims



forming insulating walls on at least uncovered portions of edges of the conducting layer; forming a polycrystalline silicon layer overlaying at least the first region and implanting the polycrystalline silicon layer with impurities for causing it to have a second type of conductivity which is opposite to the first type of conductivity, wherein the atomic species of such impurities, the concentration thereof and the implantation energy are selected so as to inject the impurities into the substrate where the substrate is in direct contact with the polycrystalline silicon layer and so as to cause the conversion of polycrystalline silicon to amorphous silicon; and including a low temperature heat treatment step for causing an epitaxial recrystallization into monocrystalline silicon of at least parts of the polycrystalline silicon layer which have been previously converted into amorphous silicon, the recrystallized monocrystalline silicon parts forming drain and source regions of the field effect transistor.

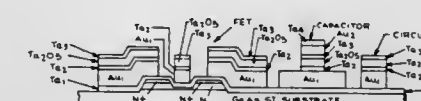
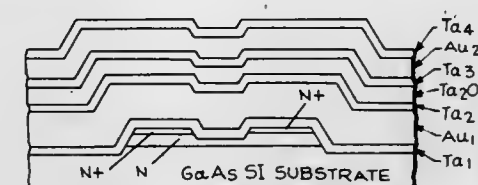
**4,789,645**  
**METHOD FOR FABRICATION OF MONOLITHIC**  
**INTEGRATED CIRCUITS**

Joseph A. Calviello, Kings Park; Paul R. Ble, Commack, and Ronald J. Pomian, Dix Hills, all of N.Y., assignors to Eaton Corporation, Cleveland, Ohio

Filed Apr. 20, 1987, Ser. No. 40,418  
 Int. Cl.<sup>4</sup> H01L 29/48, 21/283

U.S. Cl. 437—51

39 Claims



1. A method for producing a monolithic integrated circuit comprising the steps of:

- providing a substrate having a doped layer followed by a highly doped layer on at least a selected area of the substrate intended for siting an active device;
- enclosing the substrate in an environmentally isolated chamber;
- providing over a substantial portion of a surface of the substrate at least five superimposed layers of metals and compounds, wherein said metals include at least one from the group tantalum, molybdenum, tungsten, and gold, and wherein said compounds include at least one from the group of oxides of tantalum, molybdenum, and tungsten and silicon nitride, wherein all of said at least five superimposed layers are formed in situ in the same said chamber without removal from said chamber;
- removing the circuit from said chamber; and
- by processing including photolithography, sequentially processing patterned areas of said layers substantially from the exposed top layer downward, to define circuit elements forming a substantially complete integrated circuit including the active device.

**4,789,647**  
**METHOD OF MANUFACTURING A SEMICONDUCTOR**  
**DEVICE, IN WHICH A METALLIZATION WITH A**  
**THICK CONNECTION ELECTRODE IS PROVIDED ON A**  
**SEMICONDUCTOR BODY**

Johannes S. Peters, Nijmegen, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 7, 1987, Ser. No. 1,067  
 Claims priority, application Netherlands, Jan. 8, 1986, 8600021

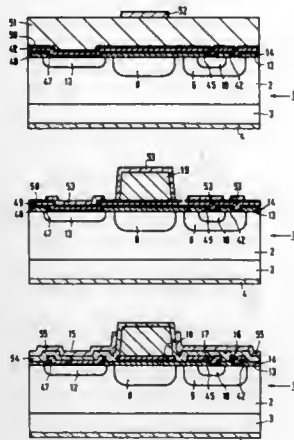
Int. Cl.<sup>4</sup> H01L 21/283

U.S. Cl. 437—190

5 Claims

1. A method of manufacturing a semiconductor device comprising the steps of forming a semiconductor body having respective transistor zones, forming an insulating layer on said semiconductor body, said insulating layer having openings to at least some of said transistor zones, successively forming at least three metal layers on said insulating layer, said at least three metal layers including a first thin metal layer, a second thick metal layer, and a third thin metal layer formed between said first thin metal layer and said second thick metal layer, wherein said second thick metal layer is formed with a thickness ranging from about 30 to 60  $\mu\text{m}$ , said first thin

metal layer is formed with a thickness ranging from about 3-6  $\mu\text{m}$ , and said third thin metal layer is formed with a thickness ranging from about 0.1-0.3  $\mu\text{m}$ , forming a masking layer on parts of said second thick metal layer, etching said second thick metal layer at unmarked parts to said third thin metal layer, said third thin metal layer acting on an etching stopper,



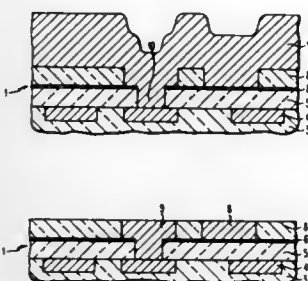
forming a second masking layer on parts of said third thin metal layer and remaining parts of said second thick metal layer, etching exposed parts of said third thin metal layer and underlying parts of said first thin metal layer, forming a second insulating layer over the entire structure, and etching at least a part of said second insulating layer on said second thick metal layer to form a thick connection electrode.

**4,789,648**  
**METHOD FOR PRODUCING COPLANAR MULTI-LEVEL METAL/INSULATOR FILMS ON A SUBSTRATE AND FOR FORMING PATTERNED CONDUCTIVE LINES SIMULTANEOUSLY WITH STUD VIAS**

Melanie M. Chow, Poughquag, N.Y.; John E. Cronin, Milton, Vt.; William L. Guthrie, Hopewell Junction, N.Y.; Carter W. Kaanta, Essex Junction, Vt.; Barbara Luther, Devon, Pa.; William J. Patrick, Newburgh, N.Y.; Kathleen A. Perry, Lagrangeville, N.Y., and Charles L. Standley, Wappingers Falls, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 28, 1985, Ser. No. 791,887  
Int. Cl. H01L 21/304, 21/306  
U.S. Cl. 437-225

6 Claims



1. A method for producing multi-level coplanar metal/insulator films characterized by the formation of an overlying

metallization and the simultaneous formation of a stud via connection through an intervening insulator which comprises a first insulator layer, an etch stop layer, and a second insulator layer to an underlying patterned metallization, said method comprising the steps of:

providing a substrate having said underlying metallization therein;  
placing said insulator on said substrate;  
selectively removing first portions on said insulator at first locations where said overlying metallization is desired, said first portions partially penetrating through said insulator;  
selectively removing second portions of said insulator at second locations where each said stud via connection is desired, said second portions penetrating fully through the remainder of said insulator;  
said second portions being in alignment with some of said first portions;  
simultaneously depositing metal over said insulator to form said overlying metallization in said first locations and stud via connections in said second locations, and removing any of said metal which overlies said insulator at locations other than said first locations by a chemical-mechanical polishing technique to coplanarize the surfaces of said stud via connection, said overlying metallization, and said insulator.

**4,789,649**  
**MICACEOUS-CORDIERITE-GLASS CERAMIC**  
Christine Abert, Berlin; Eggert Beileites, Maun; Gunter Carl, Jena-Lobeda; Steffen Grosse, Berlin; Hilmar Gudziol, Jena; Wolfram Hoeland, Jena-Lobeda; Michael Hopp, Binz; Ralf Jacobi, Goerlitz; Harry Jungto, Jena; Guenther Knak, Berlin; Lutz Kreisel, Jena; Rudolf Musil, Jena; Karin Naumann, Jena; Frank Vogel, Brandenburg, and Werner Vogel, Jena, all of German Democratic Rep., assignors to Veb Jenaer Glaswerk, Jena, German Democratic Rep.  
Filed Aug. 8, 1986, Ser. No. 894,976  
Claims priority, application German Democratic Rep., Nov. 4, 1985, 2824047; Nov. 4, 1985, 2824006; Nov. 4, 1985, 2824014; Nov. 4, 1985, 2824022; Nov. 4, 1985, 2824030  
Int. Cl. C03C 10/16, 13/08; C09K 3/00  
U.S. Cl. 501-3

48 Claims



1. Micaceous-cordierite-glass ceramic having a fracture toughness  $K_{IC}$  of up to 2.0  $\text{MPa m}^{1/2}$ , a hardness  $\text{HV}_{0.07}$  of 300-1000, a compressive strength of up to 450  $\text{N/mm}^2$ , a linear thermal expansion coefficient of  $75-125 \times 10^{-6} \text{K}^{-1}$ , good chemical stability and excellent machineability as well as a high resistance to abrasion, comprising a composition of said micaceous-cordierite-glass ceramic consisting essentially in weight percentages of

$\text{SiO}_2$  43-50

## -continued

$\text{Al}_2\text{O}_3$	26-30
$\text{MgO}$	11-15
$\text{R}_2\text{O}$	7-10.5
$\text{F}^-$	3.3-4.8
$\text{Cl}^-$	0.01-0.6
$\text{CaO}$	0.1-3
$\text{P}_2\text{O}_5$	0.1-5

wherein  $\text{R}_2\text{O}$  is the sum of 3 to 5.5 wt-%  $\text{Na}_2\text{O}$  and 4 to 6 wt-%  $\text{K}_2\text{O}$ , a first crystal phase of mica, and a second crystal phase of 5 to 30 volume-% cordierite, wherein relatively large mica crystals of 10 to 200  $\mu\text{m}$  are embedded in the glass ceramic and cordierite crystals of 0.5 to 5  $\mu\text{m}$  are arranged in the glass ceramic.

**4,789,650**  
**CUTTING TOOL INSERT**  
Kilian Friederich, Plochingen, and Ulf Dworak, Baltmannsweller, both of Fed. Rep. of Germany, assignors to Feldmuehle Aktiengesellschaft, Dueseldorf, Fed. Rep. of Germany  
Filed Jan. 29, 1987, Ser. No. 8,204  
Claims priority, application Fed. Rep. of Germany, Feb. 3, 1986, 3603191

Int. Cl. C04B 35/56, 35/58  
U.S. Cl. 501-87

13 Claims

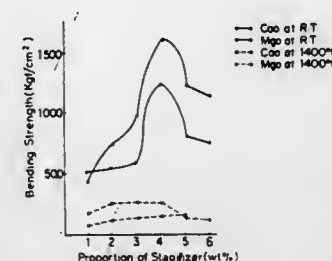
1. A cutting tool insert of a sintered ceramic material for machining ferrous materials, said ceramic material consisting essentially of: at least 70% by volume of aluminum nitride, in which a hard substance selected from the group consisting of carbides, nitrides and borides of titanium, tungsten and niobium or mixtures thereof, and a metal oxide compound as additional component, are uniformly distributed, the hard substance being present in an amount of 7 to 29% by volume, the metal oxide compound being present in an amount of 1 to 15% by volume, and together with aluminum nitride make up at least 99.7% by volume; the ceramic material having no more than 0.3% by volume of impurities therein.

**4,789,651**  
**PROCESS FOR PRODUCING A ZIRCONIA REFRACTORY BODY AND A PRODUCT PRODUCED BY THE PROCESS**

Sugie, Masuo, Tokoname; Kurihara, Koji, Yamagata; Aiba, Yoshiro, Anjo, and Maeda, Toshiaki, Yamagata, all of Japan, assignors to Toshiba Ceramics Co., Ltd., Tokyo, Japan  
Continuation-in-part of Ser. No. 631,903, Jul. 18, 1984, abandoned. This application Aug. 25, 1986, Ser. No. 899,638  
Claims priority, application Japan, Aug. 11, 1983, 58-147076  
Int. Cl. C04B 35/48

U.S. Cl. 501-103

28 Claims



1. A refractory body made of at least partially stabilized zirconia and having a predetermined shape, produced by a process comprising the steps of:

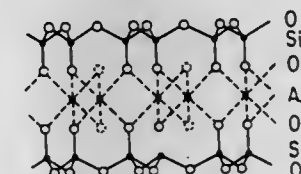
(1) mixing particles consisting of fine particles of zirconia having a monoclinic crystal structure and fine particles of a stabilizer composed of at least one substance selected from the group consisting of  $\text{MgO}$ ,  $\text{CaO}$  and  $\text{Y}_2\text{O}_3$  with a

binder, said zirconia particles having an average size of 0.5 to 5  $\mu\text{m}$  comprising 30 to 70% by weight of particles of a diameter of 5 to 10  $\mu\text{m}$  and said stabilizer particles being of a size small enough to pass through a Tyler standard sieve of 325 mesh (44  $\mu\text{m}$ ), and an amount of the fine particles of the stabilizer mixed being not less than 2% by weight based on a total weight of the zirconia and stabilizer particles,

(2) granulating the resulting mixture to form granulated particles comprising 30 to 70% by weight of particles of a diameter of 1 to 70  $\mu\text{m}$  and 70 to 30% by weight of particles of a diameter of 70 to 170  $\mu\text{m}$ ,  
(3) shaping the granulated mixture into a predetermined form and  
(4) firing the shaped mass thus formed at a temperature of 1,600° to 1,850° C. to promote sintering and stabilization of the zirconia particles simultaneously.

**4,789,652**  
**BASIC REFRACTORY COMPOSITION**  
Kenji Ichikawa; Hiroyuki Sugimoto; Ryosuke Nakamura, and Akihiro Morita, all of Bizen, Japan, assignors to Shinagawa Refractories Co., Ltd., Tokyo, Japan  
PCT No. PCT/JP86/00123, § 371 Date Oct. 20, 1986, § 102(e) Date Oct. 20, 1986, PCT Pub. No. WO87/05288, PCT Pub. Date Sep. 11, 1987  
PCT Filed Mar. 10, 1986, Ser. No. 928,281  
Int. Cl. C04B 35/02  
U.S. Cl. 501-127

2 Claims



1. A basic refractory composition comprising 100 parts by weight of at least one basic aggregate selected from the group consisting of magnesia clinker, dolomite clinker, lime clinker, limestone, dolomite stone, calcium hydroxide, and brick scraps, and 0.1-30 parts by weight of modified sodium silicate made from acidic china clay calculated as a powder, or 0.1-30 parts by weight of said modified sodium silicate calculated as a powder and 0.01-10 parts by weight of a curing agent for said modified sodium silicate, the resulting basic refractory containing at least 1%  $\text{CaO}$ , and

$\frac{\text{CaO content of basic refractory composition (weight \%)} }{\text{SiO}_2 \text{ content of basic refractory composition (weight \%)} } \geq 1.5$

**4,789,653**  
**METHOD FOR PRODUCTION OF CERAMIC COMPOSITION**  
Yasuyuki Ogata; Hidetsugu Ono, and Seiji Yamanaka, all of Saitama, Japan, assignors to Mitsubishi Mining and Cement Co., Ltd., Tokyo, Japan  
Filed Dec. 2, 1986, Ser. No. 937,173  
Claims priority, application Japan, Mar. 18, 1986, 61-60332  
Int. Cl. C04B 35/46

U.S. Cl. 501-134

8 Claims

1. A method for the production of a ceramic composition represented by the following general formula:



(wherein  $0 < x < 1$ ,  $0 < y < 1$ ), comprising the steps of adding a



mixed solution of a titanium alkoxide and a zirconium alkoxide in amounts to satisfy the ratio of the general formula to an aqueous solution containing at least one of lead nitrate and lead acetate and at least one of lanthanum nitrate and lanthanum acetate in amounts to satisfy the ratio of the general formula thereby simultaneously effecting hydrolysis of said alkoxides and coprecipitation of lead and lanthanum components, further adding an alkaline substance to the resultant system to adjust pH thereby effecting substantially thorough precipitation of lead and lanthanum components, and heating the produced precipitate at a temperature of not lower than 500 degrees centigrade and not higher than the decomposition temperature of said ceramic composition.

4,789,654

## HYDROTREATING CATALYSTS

Tetsuji Hirano; Goro Sato; Hidehiro Higashi; Teruo Migita, and Yoshio Eto, all of Kitakyushu, Japan, assignors to Catalysts & Chemicals Industries Co., Ltd., Tokyo, Japan  
PCT No. PCT/JP86/00143, § 371 Date Oct. 31, 1986, § 102(e) Date Oct. 31, 1986, PCT Pub. No. WO86/05715, PCT Pub. Date Oct. 9, 1986

PCT Filed Mar. 27, 1986, Ser. No. 928,219

Claims priority, application Japan, Mar. 29, 1985, 60-66267  
Int. Cl.<sup>4</sup> B01J 29/10

U.S. Cl. 502—66

10 Claims

1. A hydrotreating catalyst comprising a hydrogenation component supported on a carrier, said hydrogenation component being composed of metals selected from Group VIA and Group VIII of the Periodic Table, said carrier consisting essentially of a blend of an alumina-containing inorganic oxide and a faujasite Y zeolite, said carrier having been prepared by mixing (1) a precursor of said alumina-containing inorganic oxide and (2) particles of said faujasite Y zeolite having a unit lattice constant of 24.25 to 24.50 Å and a particle size distribution consisting of

- up to 20 wt.% of particles having particle diameters of 3 microns or smaller,
- from 50 to 70 wt.% of particles having particle diameters of from 3 to 12 microns,
- and from 10 to 40 wt.% of particles having particle diameters of from 12 to 30 microns,
- and forming the mixtures into particles having desired shape and dimensions, and then drying and calcining the particles, said catalyst having at least 0.1 ml/g of pore volume of pores having a pore diameter of 600 Angstrom units or larger.

4,789,655

## CATALYST OF HIGH MORDENITE CONTENT FOR ISOMERIZING NORMAL PARAFFINS AND PROCESS FOR PRODUCING THE CATALYST

Christine Travers, Rueli Malmanson; Jean-Paul Bournonville, Cergy Pontoise, and Jean-Pierre Franck, Bougival, all of France, assignors to Institut Français Du Pétrole, Rueli-Malmanson, France

Filed Aug. 13, 1987, Ser. No. 84,944

Claims priority, application France, Aug. 13, 1986, 86 11795  
Int. Cl.<sup>4</sup> B01J 29/22, 29/24

U.S. Cl. 502—66

13 Claims

1. A mordenite and group VIII metal containing catalyst, obtained by a process consisting essentially of gas phase oxychlorination of a solid containing at least one group VIII metal of the periodic classification of elements, supported by a mordenite in acid form, said mordenite having a content of alkali metal and alkaline-earth metal cations, expressed in sodium weight equivalent, lower than 0.2% by weight with respect to the dry mordenite weight, adsorbing molecules of kinetic diameter higher than about 6.6 Angstroms, having a mesh volume V of the elementary mesh from 2.73 to 2.78 nm<sup>3</sup> and a benzene adsorption capacity higher than 5% by weight, in proportion to the dry mordenite weight, said oxychlorination being conducted at a temperature from about 200 to 500° C. by

feeding of a gas mixture containing oxygen, 0.03–4% by weight of water, and chlorine and/or at least one chlorinated compound, the chlorine or chlorinated compound being fed amounting to a total of 0.5–10% by weight, calculated as chlorine weight in proportion to the mordenite weight.

4,789,656

## CRYSTALLINE SILICATE ZEOLITE BETA OF IMPROVED STABILITY

Nai Y. Chen, Titusville, N.J., and Sharon B. McCullen, Newtown, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 835,828, Mar. 3, 1986, abandoned. This application Jul. 2, 1987, Ser. No. 70,170  
Int. Cl.<sup>4</sup> B01J 29/32

U.S. Cl. 502—74

6 Claims

5. A process for preparing a highly dispersed platinum-containing binder-free Zeolite Beta crystalline zeolite having a silica-to-alumina mole ratio between 100 and 500, said process comprising:

- (a) contacting an as-synthesized Zeolite Beta in the absence of a binder with an inert gas at a temperature of about 1000° F. at about atmospheric pressure for approximately 2 hours;
- (b) calcining the product of step (a) in an oxygen environment at a temperature of about 1000° F. for approximately 2 hours;
- (c) steaming the product of step (b) at a temperature of about 1000° F. for approximately 2 to 16 hours;
- (d) ammonium-exchanging the product of step (c) to reduce the content of alumina;
- (e) incorporating said platinum onto the product of step (d); and
- (f) calcining the product of step (e) in the presence of oxygen.

4,789,657

## PROCESS FOR PREPARING IRON-BASED CATALYSTS FOR THE SYNTHESIS OF AMMONIA AND CATALYSTS SO OBTAINED

Nicola Peralcone, Novara; Francesco Ferrero, Pernate, and Antonio Gennaro, Cameri, all of Italy, assignors to Fertimont S.p.A., Milan, Italy

Continuation of Ser. No. 855,376, Apr. 24, 1986, abandoned, which is a continuation of Ser. No. 745,202, Jun. 17, 1985, abandoned. This application Oct. 23, 1987, Ser. No. 112,051  
Claims priority, application Italy, Jun. 19, 1984, 21482 A/84  
Int. Cl.<sup>4</sup> B01J 21/04, 21/08, 23/78

U.S. Cl. 502—243

10 Claims

1. A process for preparing an ammonia synthesis catalyst based on iron by melting magnetite or a mixture of iron oxides having the composition of magnetite, together with 1 to 10% by weight of a mixture of Al<sub>2</sub>O<sub>3</sub>, K<sub>2</sub>O, CaO, MgO, and SiO<sub>2</sub> as promoter, subsequently cooling the melt, and reducing same to the desired size, characterized in that the cooling of the melt is accomplished by quenching at a rate higher than 25° C./minute.

4,789,658

## IMMUNOPROPHYLACTIC AND IMMUNOTHERAPEUTIC AGENTS

Ryota Yoshimoto, Kawasaki; Nobukazu Kashima, Kanagawa; Junji Hamuro, Kanagawa, and Koji Mitsugi, Kanagawa, all of Japan, assignors to Ajinomoto Company, Incorporated, Tokyo, Japan

Continuation of Ser. No. 475,180, Mar. 14, 1983, abandoned. This application Jan. 9, 1986, Ser. No. 873,302

Claims priority, application Japan, Mar. 15, 1982, 57-40369  
Int. Cl.<sup>4</sup> C12P 21/00; A61K 37/00

U.S. Cl. 514—12

1 Claim

1. An immunoprophylactic and immunotherapeutic agent, composition comprising grade E human interleukin 2 of human

T-lymphocyte cell origin, which is substantially free from endotoxins and pyrogens and is wholly or partially in the oxidized state, having a specific activity of at least 2×10<sup>5</sup> units/mg protein, said interleukin 2 showing no cytotoxic activity against human lymphocytes in vitro at a concentration of 10<sup>5</sup> units/ml and having substantially no other lymphokine or monokine activity, in combination with an amount of lentinan sufficient to exert synergistic immunological activity.

4,789,659

## CATALYST OF A SINTERED IRON OXIDE-CONTAINING ARTICLE

Johan H. H. T. Maat, Stockton-on-Tees, England, assignor to Imperial Chemical Industries PLC, Millbank, England

Continuation-in-part of Ser. No. 924,037, Oct. 28, 1986, Pat. No. 4,729,982. This application Jun. 11, 1987, Ser. No. 60,444

Claims priority, application United Kingdom, Jun. 12, 1986, 8614297; European Pat. Off., Oct. 24, 1986, 86308277.2; United Kingdom, Jan. 26, 1987, 8701665

Int. Cl.<sup>4</sup> B01J 21/04, 21/10, 23/78

U.S. Cl. 502—328

8 Claims

1. A sintered iron oxide-containing article having a density in the range 4.0 to 4.2 g.cm<sup>-3</sup> and containing at least 50% by weight of iron oxide (expressed as Fe<sub>2</sub>O<sub>3</sub>) and optionally cobalt oxide (expressed as CoO), the total of iron oxide and cobalt oxide being at least 85% by weight of the article, and a minor proportion of calcium oxide, said article also containing a minor proportion of magnesium aluminate spinel such that any tendency of the article to crack on reduction of the iron oxide to iron in the absence of the spinel is reduced by the spinel.

4,789,660

## INSULIN ADMINISTRATION USING METHYL AND PROPYL PARABEN

Robin P. Enever, Rouses Point; Thomas W. Leonard, Plattsburgh, and Karol K. Mikula, Morrisville, all of N.Y., assignors to American Home Products Corporation, New York, N.Y.

Filed Sep. 10, 1987, Ser. No. 95,292

Int. Cl.<sup>4</sup> C07K 7/40; A61K 37/26

U.S. Cl. 514—4

9 Claims

1. A method for enhancing the permeation of insulin through the nasal mucosal membrane which comprises incorporating a nasal mucosal membrane permeability enhancing amount of a mixture of methylparaben and propylparaben in a composition containing insulin and a water soluble alkali salt of fusidic acid or a derivative thereof.

4,789,661

## DE-(ACETYLGLUCOSAMINYL)-DI(DEHYDRO)-DEOXY TEICOPLANIN DERIVATIVES

Adriano Malabarba, Binasco Milan; Aldo Trani, Milan; Pietro Ferrari, Ferriere, and Giorgio Tarzia, Saronno, all of Italy, assignors to Gruppo Lepetit S.p.A., Gerezano, Italy

Filed Jul. 17, 1987, Ser. No. 102,198

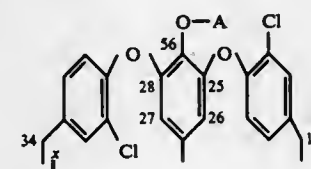
Claims priority, application United Kingdom, Nov. 28, 1985, 8529272

Int. Cl.<sup>4</sup> A61K 37/02; C07K 7/50, 9/00

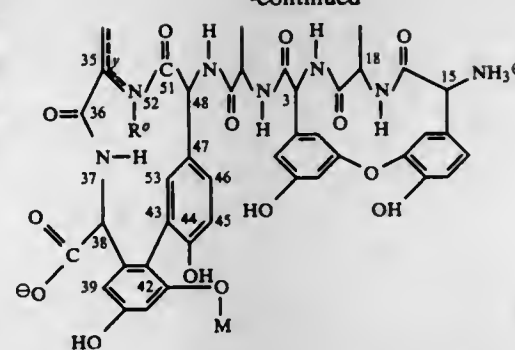
U.S. Cl. 514—8

4 Claims

1. A de-(acetylglucosaminyl)-di(dehydro)-deoxy teicoplanin derivative of formula I



-continued



wherein, x and y each represents nil or an additional bond, A represents hydrogen or N[(C<sub>10</sub>–C<sub>11</sub>)aliphatic acyl]-β-D-2-deoxy-2-aminoglucopyranosyl, M represents hydrogen or α-D-mannopyranosyl, R<sup>o</sup> represents nil when y represents an additional bond, and hydrogen when y represents nil, with the proviso that when x represents an additional bond y must represent nil, and when x represent nil y must represent an additional bond and that when M represents hydrogen also A must represent hydrogen, and the addition salts thereof.

4,789,662

## METHOD FOR THE TREATMENT OF PERIODONTAL POCKETS WITH A COMPOSITION COMPRISING COLLAGEN AND AN ANTISEPTIC OR ANTI-INFLAMMATORY SUBSTANCE

Geneviève Thomas-Laurquin; Anne Gayot, both of Lille Cedex; Pierre Polton, and Serge Basquin, both of Castres, all of France, assignors to Pierre Fabre Medicament, Paris, France  
Filed Dec. 19, 1986, Ser. No. 944,541

Claims priority, application France, Dec. 23, 1985, 85 19035  
Int. Cl.<sup>4</sup> A61K 37/02, 31/155

U.S. Cl. 514—21

10 Claims

1. The method of treating a patient having at least one periodontal pocket which comprises introducing into said pocket a pharmaceutical composition comprising collagen as the vehicle and at least one antiseptic or anti-inflammatory substance as the active principle and maintaining said pharmaceutical composition in said pocket until said collagen is absorbed therefrom, said composite being in a flexible form.

4,789,663

## METHODS OF BONE REPAIR USING COLLAGEN

Donald G. Wallace, Menlo Park; Thomas L. Smeestad, Palo Alto; John M. McPherson, Sunnyvale; Karl A. Piez, Menlo Park; Saied Seyedin, Sunnyvale, and Rosa Armstrong, Palo Alto, all of Calif., assignors to Collagen Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 628,335, Jul. 6, 1984, abandoned, Ser. No. 628,404, Jul. 6, 1984, abandoned, Ser. No. 628,328, Jul. 6, 1984, abandoned, and Ser. No. 628,409, Jul. 6, 1984, abandoned. This application Jul. 5, 1985, Ser. No. 752,447

Int. Cl.<sup>4</sup> A61K 37/12, 35/32; C07K 15/20; C12P 21/00

U.S. Cl. 514—21

10 Claims

1. A method of effecting conductive repair of a bone defect in a mammal, which method comprises:

- (a) exposing fresh bone surface comprising living osteoprogenitor cells to the defect;
- (b) placing into the defect and into contact with the fresh bone surface a preparation of collagen selected from the group consisting of:
  - (1) a composition consisting essentially of Type I collagen derived from demineralized, protease-treated, delipidized bone;
  - (2) a lyophilized gel of purified atelopeptide reconstituted fibrillar skin collagen; and
  - (3) mixtures of (1) and purified atelopeptide reconstituted fibrillar skin collagen.

4,789,664

# FOOD COMPOSITIONS WITH SUPERIOR BLOOD CHOLESTEROL LOWERING PROPERTIES

Frances H. Seligson, Fairfield; John E. Hunter, Cincinnati, and Albert H. St. Clair, Blue Ash, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio  
Continuation-in-part of Ser. No. 944,148, Dec. 19, 1986, abandoned. This application Nov. 13, 1987, Ser. No. 120,459  
Int. Cl.<sup>4</sup> A01N 9/00; A61K 31/70

U.S. Cl. 514-23

24 Claims

1. A fat-containing and protein-containing food composition comprising fat ingredients, protein ingredients, and non-fat and non-protein ingredients; wherein at least 1 gram per serving of the total fat consists essentially of a substantially non-digestible, non-absorbable sucrose fatty acid ester having at least 4 fatty acid ester groups, each fatty acid having from about 8 to about 22 carbon atoms; wherein at least 1.5 grams per serving (by protein content) of the total protein comprises vegetable protein; and wherein the ratio of vegetable protein to sucrose fatty acid ester is at least 1.25 to 1.

20. A method for lowering plasma cholesterol levels comprising administering to a human susceptible to or afflicted with hypercholesterolemia food compositions comprising fat ingredients, protein ingredients, and non-fat and non-protein ingredients; wherein at least 1 gram per serving of the total fat consists essentially of a substantially non-digestible, non-absorbable sucrose-fatty acid ester having at least 4 fatty acid ester groups, each fatty acid having from about 8 to about 22 carbon atoms; wherein at least 1.5 grams per serving (by protein content) of the total protein comprises vegetable protein; wherein the ratio of vegetable protein to sucrose fatty acid ester is at least 1.25 to 1; and wherein the compositions are administered to provide at least about 0.5% sucrose fatty acid ester in the daily diet (dry weight basis) and a daily dietary ratio of vegetable protein to animal protein of at least about 50:50.

4,789,665

# ANTHRACYCLINES AND DRUGS CONTAINING THEM

Jean-Pierre Gesson, Chasseneuil du Poitou; Martine Mondon, Poitiers; Jean-Claude Jacquery, Bruxelles, all of France, and Hans P. Kraemer, Marburg, Fed. Rep. of Germany, assignors to Laboratoires Hoechst S. A., Puteaux, France and Behringwerke Aktiengesellschaft, Marburg, Fed. Rep. of Germany

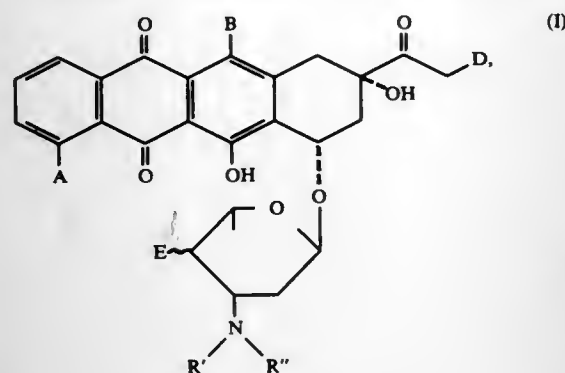
Filed Dec. 15, 1986, Ser. No. 941,604

Claims priority, application France, Dec. 17, 1985, 85-18661  
Int. Cl.<sup>4</sup> A61K 31/70; C07H 15/24

U.S. Cl. 514-34

13 Claims

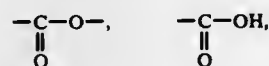
1. A anthracycline represented by the formula 1 below:



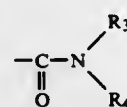
in which:

A denotes OCH<sub>3</sub> or OH or H groups,

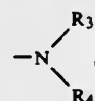
B denotes an OH group or a hydrogen atom,  
D denotes a hydrogen atom or an OH group,  
E denotes an OH group or a hydrogen atom,  
and R' and R'', which may be identical or different, denote a hydrogen atom, and in this case R' is different from R'', or the group —(CH<sub>2</sub>)<sub>n</sub>—R<sub>1</sub>—(CH<sub>2</sub>)<sub>m</sub>—R<sub>2</sub> where  
n is between 1 and 6,  
m is between 0 and 4, that if m=0, R<sub>2</sub> is nonexistent,  
R<sub>1</sub> denotes one of the following groups:



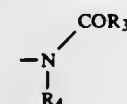
in this case, m=0



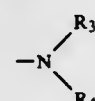
in this case m=0 where R<sub>3</sub> and R<sub>4</sub>, which may be identical or different, denote a hydrogen atom or an alkyl group,



m=0 and R<sub>3</sub> and R<sub>4</sub> have the same meaning as above,



m=0 and R<sub>3</sub> and R<sub>4</sub> have the same meaning as above, and R<sub>2</sub> denotes, in the case where m is other than 0, a hydrogen atom or lower alkyl or lower alkoxy groups or



where R<sub>3</sub> and R<sub>4</sub> having the same meaning as above.

13. A pharmaceutical composition comprising an effective amount of a compound of formula (I) of claim 1 and a pharmaceutically acceptable carrier.

4,789,666

# CYTIDINE-DIPHOSPHOCHOLINE SALTS, PARTICULARLY SUITABLE FOR ORAL USE

Federico Gennari, Truccazzano, Italy, assignor to Bioresearch Spa, Liscate, Italy

Filed Jun. 26, 1986, Ser. No. 878,697

Claims priority, application Italy, Jul. 5, 1985, 21447 A/85  
Int. Cl.<sup>4</sup> C02H 19/10; A61K 27/00; C07D 51/52

U.S. Cl. 514-51

2 Claims

1. Cytidine-diphosphocholine (CDP-choline) salts with long-alkyl chain sulphonic acids, of the formula:

4,789,669

# VAGINAL SUPPOSITORY

Isao Sugimoto, Nara, and Hiroyuki Tsuta, Nakanikawa, both of Japan, assignors to Kanebo, Ltd., Tokyo, Japan  
Filed Mar. 10, 1987, Ser. No. 24,204

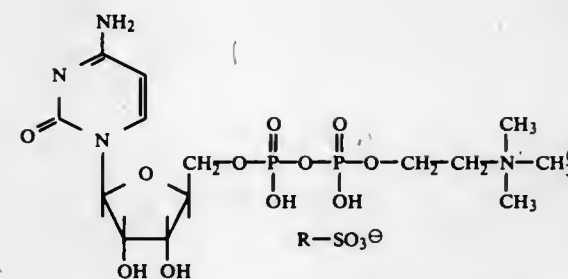
Claims priority, application Japan, Oct. 20, 1986, 61-250157

Int. Cl.<sup>4</sup> A61K 31/56

U.S. Cl. 514-178

8 Claims

1. A storage stable vaginal suppository comprising a pharmaceutically acceptable salt of dehydroepiandrosterone sulfate in admixture with a hydrophobic base consisting essentially of 1 to 20 parts by weight of said salt of a hard fat with a hydroxyl value not exceeding 50.



in which R is a linear or branched alkyl radical containing 8 to 18 carbon atoms.

2. Pharmaceutical compositions particularly suitable for oral administration in the treatment of disturbances of consciousness deriving from cranial traumas or from pathological situations including cerebral hemorrhages, cerebral thromboses, arteriosclerotic cerebropathies, Parkinson's disease and Parkinson-like syndromes, comprising at least one compound of general formula (I) as defined in claim 1 as active principle, and a pharmaceutically acceptable carrier.

4,789,667

# EXTERNAL PHARMACEUTICAL COMPOSITION AND METHODS OF USE

Yuji Makino; Hideo Matagi, and Yoshiki Suzuki, all of Hino, Japan, assignors to Teijin Limited, Tokyo, Japan

Filed Sep. 3, 1985, Ser. No. 771,764

Claims priority, application Japan, Sep. 3, 1984, 59-182724  
Int. Cl.<sup>4</sup> A61K 31/40, 31/56, 31/60, 31/62

U.S. Cl. 514-161

14 Claims

14. The method of claim 6 wherein the pharmacologically active agent is an anti-inflammatory agent.

4,789,668

# 1α,7α-DITHIO-SUBSTITUTED SPIROLACTONES, PROCESSES FOR THEIR PREPARATION, AND THEIR USE AS MEDICINES

Klaus Nickisch; Henry Laurent; Dieter Bittler; Rudolf Wiechert, and Wolfgang Losert, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

PCT No. PCT/DE86/00055, § 371 Date Oct. 17, 1986, § 102(e)  
Date Oct. 17, 1986, PCT Pub. No. WO86/04900, PCT Pub. Date Aug. 28, 1986

PCT Filed Feb. 13, 1986, Ser. No. 929,292

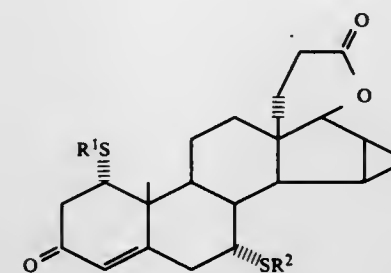
Claims priority, application Fed. Rep. of Germany, Feb. 18, 1985, 3506100

Int. Cl.<sup>4</sup> A61K 31/585; C07J 53/00

U.S. Cl. 514-173

14 Claims

1. 1α,7α-Dithio-substituted spirolactone of general Formula I



wherein

R<sup>1</sup> is C<sub>1-3</sub>-alkyl or C<sub>1-3</sub>-acyl and  
R<sup>2</sup> is hydrogen or C<sub>1-3</sub>-alkyl.

4,789,670

# METHOD AND COMPOSITIONS FOR SUPPRESSION OF ATHEROGENESIS UTILIZING CHOLESTEROL HYDROPEROXIDES

Carl L. Tipton, and Donald C. Beitz, both of Ames, Iowa, assignors to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Feb. 18, 1987, Ser. No. 15,947

Int. Cl.<sup>4</sup> A61K 31/56

U.S. Cl. 514-182

14 Claims

1. The method of suppressing atherogenesis in a human patient, comprising administering to the patient an amount of a cholesterol hydroperoxide effective for reducing aortal deposit of cholesterol, said amount administered being in the dosage range from 0.5 to 25 milligrams of cholesterol hydroperoxide per kilogram of body weight per 24 hours.

4,789,671

# 14,17β-ETHANO-14β-ESTRATRIENES AND ESTRATETRAENES, PROCESS FOR THEIR PRODUCTION, AND PHARMACEUTICAL PREPARATIONS CONTAINING THEM

James R. Bull; Russell I. Thomson, both of Pretoria, South Africa; Henry Laurent, Berlin; Helmut Schroeder, Berlin, and Rudolf Wiechert, Berlin, all of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Feb. 27, 1987, Ser. No. 20,009

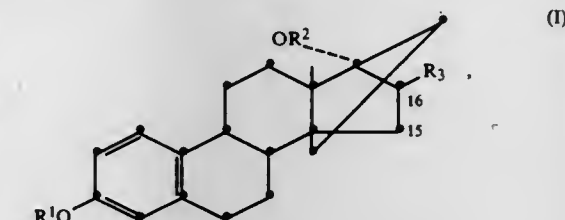
Claims priority, application Fed. Rep. of Germany, Aug. 20, 1986, 3628189

Int. Cl.<sup>4</sup> A61K 31/56; C07J 1/00

U.S. Cl. 514-182

27 Claims

1. A 14,17β-ethano-14β-estratriene and estratetraene of Formula I



wherein

R<sup>1</sup> is a hydrogen atom, a methyl or an acyl group of a monocarboxylic acid of 1-12 carbon atoms,  
R<sup>2</sup> is a hydrogen atom or an acyl group of a monocarboxylic acid of 1-12 carbon atoms,  
R<sup>3</sup> is a hydrogen atom or a methyl group, and

16  
15

is a single or double C—C-bond,



with the proviso that  
(a) when R<sup>1</sup> is methyl,



is a double bond and R<sup>3</sup> is H, then R<sup>2</sup> is not acetyl or H;  
(b) when R is acyl,



is a double bond and R<sup>3</sup> is H, then R<sup>2</sup> is not acetyl; and  
(c) when R<sup>1</sup> is H,



is a double bond and R<sup>3</sup> is H, then R<sup>2</sup> is not H.

#### 4,789,672 1-HYDROXYETHYL-AZOLE COMPOUNDS AND AGRICULTURAL COMPOSITIONS

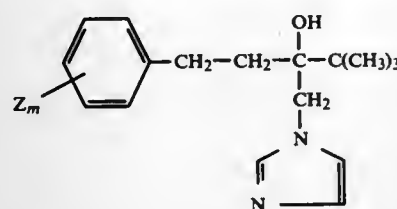
Graham Holmwood, Wuppertal; Karl H. Büchel, Burscheid; Klaus Lürsen, Berg-Gladbach; Paul-Ernst Frohberger, Leverkusen, and Wilhelm Brandes, Leichlingen, all of Fed. Rep. of Germany, assigns to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Division of Ser. No. 549,867, Nov. 8, 1983, abandoned, which is a continuation of Ser. No. 260,479, May 4, 1981, abandoned.  
This application May 8, 1985, Ser. No. 732,194

Claims priority, application Fed. Rep. of Germany, May 16, 1980, 3018866; Feb. 19, 1981, 3106076  
The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> A01N 43/50; C07D 233/60  
U.S. Cl. 514-184

3 Claims

1. A 1-hydroxyethyl-azole compound of the formula



wherein

Z in fluorine, chlorine or methyl, and  
m is 0, 1 or 2,

or an addition product thereof with an acid or metal salt.

3. A method of combating fungi which comprises applying to such fungi or to a fungus habitat a fungicidally effective amount of a compound or addition product according to claim 1.

#### 4,789,673 HETEROCYCLIC CARBOXYLIC ACID AMIDES AND ESTERS

Peter Donatsch, 34 Herrenweg, CH-4123 Allschwil, Switzerland; Günter Engel, 11 Im Hasengarten, D-7858 Weil, Fed. Rep. of Germany; Bruno Hügli, 86A Hauptstrasse, CH-4148 Pfeffingen, Switzerland; Brian P. Richardson, 8 Im Hofacker, CH-4312 Magden, Switzerland; Hildegard R. Stadler, Jakobsweg 9, CH-4105 Biel-Benken, Switzerland; Brigitte M. Stadler, Jakobsweg 9, CH-4105 Biel-Benken, Switzerland; Sigrid A. Stadler, Jakobsweg 9, CH-4105 Biel-Benken, Switzerland, and Gerald Breuleux, Im Glockenacker 53, CH-8053 Witikon, Zürich, Switzerland

Continuation of Ser. No. 892,981, Aug. 4, 1986, abandoned, which is a continuation of Ser. No. 637,951, Aug. 6, 1984, abandoned, which is a continuation of Ser. No. 508,903, Jun. 28, 1983, abandoned. This application Nov. 10, 1987, Ser. No. 119,360

Claims priority, application Switzerland, Jul. 13, 1982, 4267/82; Nov. 30, 1982, 6950/82; Nov. 30, 1982, 6951/82  
Int. Cl.<sup>4</sup> A61K 31/46; C07D 45/12, 451/04  
U.S. Cl. 514-214

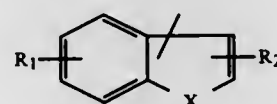
34 Claims

1. A compound of formula I:



wherein

A is a group of formula II



wherein the free valence is attached to the fused ring X;

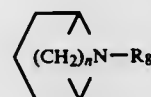
X is  $-CH_2-$ ,  $-NR_3-$ ,  $-O-$  or  $-S-$ ;

R<sub>1</sub> and R<sub>2</sub>, independently, are hydrogen, halogen, (C<sub>1-4</sub>)alkyl, (C<sub>1-4</sub>)alkoxy, hydroxy, amino, (C<sub>1-4</sub>)alkylamino, di-(C<sub>1-4</sub>)alkylamino, mercapto or (C<sub>1-4</sub>)alkylthio;

R<sub>3</sub> is hydrogen or (C<sub>1-4</sub>)alkyl;

B is  $-O-$  or  $-NH-$ ; and

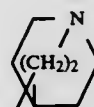
D is a group of formula IV



wherein

n is 2, 3, or 4, and

R<sub>8</sub> is hydrogen, (C<sub>1-7</sub>)alkyl, (C<sub>3-5</sub>)alkenyl or unsubstituted phenyl (C<sub>1-4</sub>)alkyl;  
or D is a group of formula V



or a pharmaceutically acceptable acid addition or quaternary ammonium salt thereof.

#### 4,789,674 BI-2H-PYRROLID(D)NEDIONES

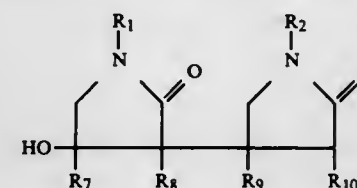
Romeo Paion, Riehen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.  
Division of Ser. No. 832,096, Feb. 20, 1986, abandoned. This application Jun. 24, 1987, Ser. No. 65,800

Claims priority, application Switzerland, Feb. 22, 1985, 828/85

Int. Cl.<sup>4</sup> A61K 31/40; C07D 295/18, 207/26  
U.S. Cl. 514-227.8

12 Claims

1. A compound selected from the group consisting of (3,4'-bi-2H-pyrrole)-2,2'-diones of the formula



wherein R<sub>1</sub> and R<sub>2</sub> are identical and each represents Y-C(O)-C<sub>1-4</sub>-alkyl wherein Y is

(1) pyrrolidino or piperidino which is unsubstituted or 3-substituted by C<sub>1-4</sub>-alkoxy carbonyl and 4-substituted by hydroxy or oxo;

(2) 2,5-dihydropyrrolo or 1,2,3,6-tetrahydropyridino which is (a) 3-substituted by C<sub>1-4</sub>-alkoxycarbonyl and (b) 4-unsubstituted or 4-substituted by hydroxy; or

(3) piperazino which is unsubstituted or N'-substituted by C<sub>1-4</sub>alkanoyl or C<sub>1-4</sub>alkyl, or is morpholino or is thiomorpholino; and R<sub>7</sub> to R<sub>10</sub> are all hydrogen or R<sub>7</sub> together with R<sub>8</sub> and R<sub>9</sub> together with R<sub>10</sub> represent an additional bond, or a pharmaceutically acceptable salt thereof.

6. A method of treatment of cerebral insufficiencies characterized in that a therapeutically effective amount of a compound as claimed in claim 1 is administered to a warm-blooded organism in need of such treatment.

#### 4,789,675 1,4-BENZOXAZINE DERIVATIVES AND PHARMACEUTICAL USE

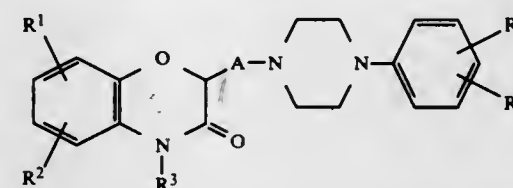
Kanji Meguro, Nishinomiya, and Kohel Nishikawa, Kyoto, both of Japan, assigns to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Feb. 10, 1987, Ser. No. 13,441  
Claims priority, application Japan, Feb. 11, 1986, 61-28720; Apr. 15, 1986, 61-87503

Int. Cl.<sup>4</sup> A61K 31/535; C07D 413/06  
U.S. Cl. 514-229.8

19 Claims

1. A compound of the formula:



wherein

R<sup>1</sup> and R<sup>2</sup> independently represent (1) hydrogen, (2) halogen, (3) nitro, (4) lower alkyl which is unsubstituted or is substituted by 1 to 3 substituents selected from halogen, hydroxyl and lower alkoxy, (5) amino which is unsubstituted or is substituted by (a) 1 or 2 β-hydroxyethyl groups, (b) 1 or 2 lower alkyl groups, (c) alkanoyl of 2 to 4 carbon atoms or (d) sulfonyl, (6) hydroxyl which is unsubstituted or is substituted by alkyl of 1 to 6 carbon atoms, phenyl-C<sub>1-4</sub> alkyl, or alkanoyl of 2 to 4 carbon atoms or (7) lower alkoxy carbonyl, or

when R<sup>1</sup> and R<sup>2</sup> are adjacent to each other, R<sup>1</sup> and R<sup>2</sup> together may represent a ring represented by  $-(CH_2)_m-$  wherein m denotes an integer of 3 to 5 or  $-O-(CH_2)_n-O-$  wherein n denotes an integer of 1 to 3, R<sup>3</sup> represents hydrogen or lower alkyl,

R<sup>4</sup> and R<sup>5</sup> independently represent (1) hydrogen, (2) halogen, (3) lower alkyl which is unsubstituted or is substituted by 1 to 3 substituents selected from halogen, hydroxyl and lower alkoxy, or (4) hydroxyl which is unsubstituted or is substituted by alkyl of 1 to 6 carbon atoms, phenyl-C<sub>1-4</sub> alkyl, alkanoyl of 2 to 4 carbon atoms, or R<sup>4</sup> and R<sup>5</sup> combine to form methylenedioxy, and

A represents an alkylene group or an acid addition salt thereof.

19. A method for the prophylaxis or treatment of hypertension or ischemic disease which comprises administering to a mammal an effective amount of a compound according to claim 1 or a pharmacologically acceptable acid addition salt thereof.

#### 4,789,676 AROMATIC

#### 2-AMINOALKYL-1,2-BENZOISOTHIAZOL-3(2H)ONE-1,1-DIOXIDE DERIVATIVES, USEFUL AS ANXIOLYTIC AGENTS

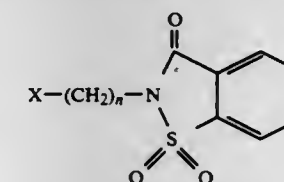
Marcel Hibert, Strasbourg, and Maurice W. Gittos, Ploasheim, both of France, assigns to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Division of Ser. No. 836,276, Mar. 5, 1986, Pat. No. 4,748,182. This application Feb. 22, 1988, Ser. No. 158,432

Int. Cl.<sup>4</sup> A61K 31/38; C07D 471/04  
U.S. Cl. 514-292

6 Claims

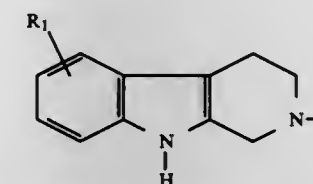
1. An aromatic 2-amino-alkyl-1,2-benzoisothiazol-3(2H)one-1,1-dioxide derivative having the formula



wherein

n is an integer of from 2 to 5;

X is



R<sub>1</sub> is hydrogen, hydroxy or methoxy; and the pharmaceutically acceptable acid addition salts thereof.

3. A method for relieving the symptoms of anxiety in a patient in need thereof, which comprises the administration to said patient of an anxiolytic effective amount of a compound of one of claims 1 or 2.

4,789,677  
N-ALKYL-[N-[N-ALKYL-N-[4-(4-QUINOLINYLAMINO)-  
BENZOYL]AMINO]ALKYL]BENZENESULPHONA-  
MIDES

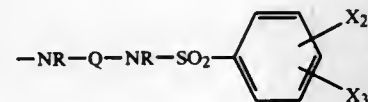
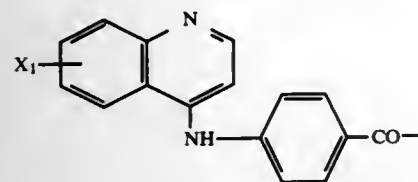
John T. A. Boyle, Cookham, and Richard S. Todd, Burnham, Nr. Slough, both of England, assignors to John Wyeth and Brothers Limited, Maidenhead, England  
Continuation of Ser. No. 831,220, Feb. 20, 1986, abandoned.  
This application Sep. 2, 1987, Ser. No. 94,063  
Claims priority, application United Kingdom, Mar. 2, 1985, 8505430

Int. Cl. C07D 215/44; A61K 31/47

U.S. Cl. 514-313

6 Claims

1. A compound selected from those having the formula I



and their pharmaceutically acceptable acid addition salts, wherein Q is a straight or branched alkyl group of 1 to 6 carbon atoms; R is an alkyl group of 1 to 6 carbon atoms; X1 is selected from halogen and trifluoromethyl; and X2 and X3 are independently selected from hydrogen, halogen, trifluoromethyl, alkyl of 1 to 6 carbon atoms and alkoxy of 1 to 6 carbon atoms.

4,789,678  
MEMORY ENHANCING  
α-ALKYL-4-AMINO-3-QUINOLINEMETHANOLS AND  
1-(4-ARALKYLAMINO-3-QUINOLINYL)ALKANONES  
AND RELATED COMPOUNDS

Richard C. Effland, and Joseph T. Klein, both of Bridgewater, N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

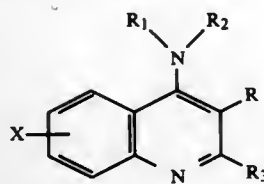
Filed Aug. 25, 1986, Ser. No. 899,584

Int. Cl. C07D 215/14; A61K 31/47

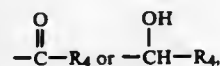
U.S. Cl. 514-313

18 Claims

1. A compound having the formula



where X is hydrogen, halogen, loweralkyl, loweralkoxy or trifluoromethyl; R is



R4 being loweralkyl; R1 is hydrogen, loweralkyl or phenyl; loweralkyl in which the phenyl group may be substituted with 1,2 or 3 substituents consisting of the following: loweralkyl, halogen, loweralkoxy, or trifluoromethyl; R2 is hydrogen, loweralkyl or phenyl; loweralkyl in which the phenyl group may be substituted with 1,2 or 3 substituents consisting of the following: loweralkyl, halogen, loweralkoxy, or trifluoromethyl; and

R3 is loweralkyl, with the proviso that when R is acetyl, R3 is methyl and X is hydrogen, R1 and R2 are not both hydrogen, or a pharmaceutically acceptable acid addition salt thereof.

4,789,679  
METHOD FOR TREATING INCONTINENCE  
Thomas C. Hamilton, and Robin E. Buckingham, both of Harlow, England, assignors to Beecham Group p.l.c., England  
Filed Jul. 17, 1987, Ser. No. 74,943  
Claims priority, application United Kingdom, Jul. 18, 1986, 8617623

U.S. Cl. 514-353

Int. Cl. A61K 31/44

1 Claim

1. A method of treatment and/or prophylaxis of incontinence in mammals which comprises administering to the mammal in need of such treatment an effective amount of the compound pinacidil or a pharmaceutically acceptable salt or solvate thereof.

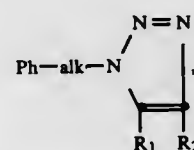
4,789,680  
ARALKYLTRIAZOLE COMPOUNDS  
René Meier, Baus, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.  
Continuation-in-part of Ser. No. 733,347, May 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 562,257, Dec. 16, 1983, abandoned. This application Oct. 20, 1986, Ser. No. 920,623

Claims priority, application Switzerland, Dec. 23, 1982, 7526/82; Oct. 29, 1983, 5860/83; Apr. 18, 1985, 1663/85  
Int. Cl. C07D 249/04; A61K 31/41

U.S. Cl. 514-359

21 Claims

1. A 1-phenyl-lower alkyl-1H-1,2,3-triazole compound of the formula



in which

Ph represents phenyl substituted by up to and including 3 substituents selected from lower alkyl, halogen and trifluoromethyl, alk represents lower alkylidene, and wherein either

R1 represents hydrogen, lower alkyl, lower alkoxy amino, N-lower alkylamino, N,N-di-lower alkylamino, N-lower alkanoylamino, carbamoyl, N-lower alkanoylcarbamoyl, N-lower alkylcarbamoyl or N,N-di-lower alkylcarbamoyl and

R2 represents carbamoyl, N-lower alkanoylcarbamoyl, N-lower alkylcarbamoyl or N,N-di-lower alkylcarbamoyl, or

R1 represents carbamoyl, N-lower alkanoylcarbamoyl, N-lower alkylcarbamoyl or N,N-di-lower alkylcarbamoyl and

R2 represents hydrogen or lower alkyl.

4,789,681  
CYTOPROTECTIVE GUANIDINE DERIVATIVES  
USEFUL IN ISCHEMIC DISEASES  
Giancarlo Sportoletti, Pietro Cremonesi, and Monique Sarret, all of Milan, Italy, assignors to Italfarmaco S.p.A., Milan, Italy

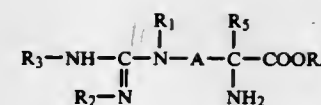
Filed Dec. 22, 1986, Ser. No. 944,949

Claims priority, application Italy, Dec. 23, 1985, 23373/85  
Int. Cl. A61K 31/415; C07D 233/88

U.S. Cl. 514-392

10 Claims

1. A compound of formula I



wherein

R1 is hydrogen or methyl;

R2 and R3, which are the same or different, represent hydrogen or methyl, or taken together with the amidine system form an imidazole or imidazoline ring;

R4 is a linear or branched C1-C10 alkyl group;

R5 is hydrogen or methyl;

A is a chain of formula —HN—CH2—CH2— or of formula —N=CH—CH2—; a 1,4-cyclohexylene group optionally substituted by one or more methyl groups; or a 1,4-phenylene group optionally substituted by one or more halogen atoms, C1-C4 alkyl groups or C1-C4 alkoxy groups, a stereoisomer or a pharmaceutically acceptable salt thereof.

5. A pharmaceutical composition having cytoprotective activity in ischemic or hypoxic conditions and cardioprotective activity containing as the principal active ingredient an effective amount of a compound according to any of claims 1-4 in admixture with a pharmaceutically acceptable carrier.

4,789,682  
ANTIHYPERCHOLESTEROLEMIC COMPOUNDS  
Gerald E. Stokker, Gwynedd Valley, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

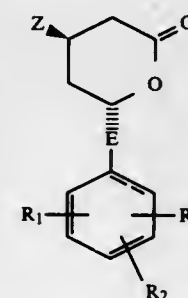
Filed Mar. 17, 1987, Ser. No. 26,512

Int. Cl. C61K 31/40; C07D 405/04

U.S. Cl. 514-422

8 Claims

1. A compound of structural formula (I) or (II):



wherein

Z is phenyl, naphthyl, thiophenyl, pyrrol, or phenyl, naphthyl, thiophenyl, pyrrol substituted with a group A;

A is selected from a group consisting of:

Cl, F, OH,  
C1-alkyl,  
C1-alkoxy,  
C2-alkanoyloxy,  
C2-alkanoylamino,  
C1-alkyloxycarbonyl,  
phenyl,  
hydroxy-C1-alkyl,  
trifluoromethyl-C2-alkanoylamino;  
E is a direct bond, —CH2—, —CH2CH2—

R1, R2, R3 are each selected from:

H, Cl, or F,  
C1-alkyl,  
C1-4chloroalkyl or C1-4fluoroalkyl,  
phenyl,  
phenyl substituted by Cl or F,  
C1-alkyloxy,  
C2-alkanoyloxy,  
C2-alkanoyloxy-C1-5 alkyl, and  
OR4 in which R4 is

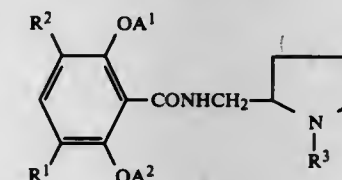
H,  
C2-alkanoyl,  
benzoyl,  
phenyl,  
chlorophenyl or fluorophenyl,  
phenyl-C1-3alkyl,  
C1-8alkyl,  
C1-4chloroalkyl or C1-4fluoroalkyl,  
cycloalkyl-C1-3alkyl,  
adamantyl-C1-3alkyl, or  
substituted phenyl-C1-3alkyl  
in which the substituents are selected from:  
chlorine or fluorine,  
C1-alkyloxy,  
C1-alkyl,  
C1-4chloroalkyl or  
C1-4fluoroalkyl.

4,789,683  
BENZAMIDO-DERIVATIVES  
Gösta L. Florvall, Södertälje; Jan O. G. Lundström, Sollentuna; Sten I. Rämby, Södertälje, and Svea O. Ögren, Nykvarn, all of Sweden, assignors to Astra Lakemedel Aktiebolag, Södertälje, Sweden  
Continuation of Ser. No. 350,816, Feb. 22, 1982, abandoned.  
This application Jan. 8, 1985, Ser. No. 689,502  
Claims priority, application Sweden, Mar. 11, 1981, 8101536  
Int. Cl. A61K 31/40; C07D 207/09

U.S. Cl. 514-428

16 Claims

1. A compound of formula



wherein R1 and R2 are the same or different and each represents a hydrogen atom, a halogen atom, a cyano group, a lower alkyl group which may be straight or branched and has from 1 to 5 carbon atoms or an acyl group having the formula alkyl-CO— wherein the alkyl moiety is straight or branched and has from 1 to 5 carbon atoms, R3 is a lower alkyl group which may be straight or branched and has from 1 to 5 carbon atoms; and alkenyl group which may be straight or branched and has from 2 to 5 carbon atoms and has at least one double bond; or a benzyl group, wherein said benzyl group is optionally substituted with fluorine, chlorine, bromine, trifluoromethyl, lower alkyl which may be straight or branched and has from 1 to 5 carbon atoms or lower alkoxy having the formula alkyl-O wherein the alkyl moiety is straight or branched and has from 1 to 5 carbon atoms or any combination thereof, one of A1 and A2 is a lower alkyl group which may be straight or branched and has from 1 to 5 carbon atoms, and the other of A1 and A2 is a hydrogen atom; or a physiologically acceptable salt or optical isomer thereof.

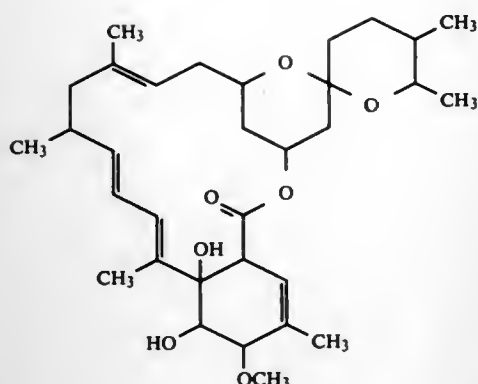
4,789,684  
ANTHELMINTIC FERMENTATION PRODUCTS OF  
MICROORGANISMS  
Robert T. Goegelman, Linden, N.J., assignor to Merck & Co., Inc., Rahway, N.J.  
Filed May 2, 1985, Ser. No. 729,520  
Int. Cl. A61K 31/365; C07D 493/20

U.S. Cl. 514-450

3 Claims

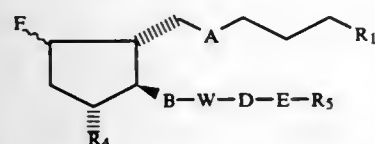
1. A compound having the formula:



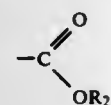


2. A method for the treatment of parasitic diseases in animals which comprises administering to an animal infected with parasites, an effective amount of a compound of claim 1.

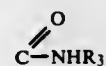
**4,789,685**  
**9-FLUOROPROSTAGLANDIN DERIVATIVES, THEIR PREPARATION AND USE AS MEDICINAL AGENTS**  
 Werner Skuballa; Bernd Raduechel; Norbert Schwarz; Helmut Vorbruegge; Walter Elger; Olaf Loge, and Michael-Harold Town, all of Berlin, Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany  
 Continuation of Ser. No. 615,427, May 30, 1984, abandoned, which is a division of Ser. No. 395,448, Sep. 6, 1982, abandoned.  
 This application Jan. 20, 1987, Ser. No. 4,733  
 Claims priority, application Fed. Rep. of Germany, Jul. 3, 1981, 3126924  
 Int. Cl.<sup>4</sup> C07C 177/00; A61K 31/557  
 U.S. Cl. 514—530 39 Claims  
 1. A (9-Fluoroprostane derivative of the formula



wherein  
 $R_1$  is  $CH_2OH$  or



wherein  $R_2$  is (a) hydrogen, (b)  $C_{1-10}$  alkyl, (c)  $C_{1-10}$  alkyl substituted by halogen;  $C_{1-4}$  alkoxy;  $C_{6-10}$ -aryl or aroyl  $C_{6-10}$ -aryl or aroyl each substituted by 1-3 halogen atoms, a phenyl group, 1-3  $C_{1-4}$  alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or  $C_{1-4}$  alkoxy group; di-  $C_{1-4}$ -alkylamino; or tri- $C_{1-4}$ -alkylammonium; (d)  $C_{3-10}$ -cycloalkyl, (e)  $C_{3-10}$  cycloalkyl substituted by  $C_{1-4}$  alkyl, (f)  $C_{6-10}$  aryl, (g)  $C_{6-10}$  aryl substituted by 1-3 halogen atoms, a phenyl group, 1-3  $C_{1-4}$  alkyl groups or a chloromethyl, fluoromethyl, trifluoromethyl, carboxy, hydroxy or  $C_{1-4}$  alkoxy group or (h) an aromatic heterocycle of 5 or 6 ring atoms, one or two of which are O, N or S, the remainder being carbon atoms;  
 or  $R_1$  is



wherein  $R_3$  is an acyl group of a hydrocarbon  $C_{1-15}$  carboxylic or sulfonic acid or is one of the  $R_2$  groups;  
 A is  $-CH_2-CH_2-$  or  $cis-CH=CH-$ ;  
 B is  $-CH_2-CH_2-$ ,  $trans-CH=CH-$  or  $C=C-$ ;  
 W is hydroxymethylene or RO-methylene, wherein the OR or OH group is in a  $\alpha$ - or  $\beta$ -position;  
 R is tetrahydropyranyl, tetrahydrofuranyl,  $\alpha$ -ethoxyethyl, trimethylsilyl, dimethyl-tert-butylsilyl, tribenzylsilyl or an acyl group of a  $C_{1-15}$ -hydrocarbon carboxylic or sulfonic acid;  
 D and E jointly are a direct bond or  
 D is straight-chain or branched alkylene or alkenylene of 1-10 carbon atoms, optionally substituted by 1-2 fluorine atoms and E is a direct bond, or  $-CR_6=CR_7-$  wherein  $R_6$  and  $R_7$  differ from each other and each is hydrogen, chlorine or  $C_{1-6}$ -alkyl;  
 $R_4$  is OH or OR;  
 $R_5$  is (a) hydrogen, (b) a  $C_{1-10}$  hydrocarbon aliphatic radical, or (c) a  $C_{6-10}$  hydrocarbon aliphatic radical substituted by halogen,  
 or when  $R_2$  is hydrogen a physiologically compatible salt thereof with a base,  
 and wherein the 16-position (prostanic acid nomenclature) is substituted by an alkyl group.

**4,789,686**  
**PROCESS FOR THE PREPARATION OF AN AQUEOUS SOLUTION OF THE SODIUM SALT OF METHIONINE**  
 Jean Giraud, Neris-les-Bains, France, assignor to AEC-Société de Chimie Organique et Biologique, Commeny, France  
 Filed Jul. 14, 1987, Ser. No. 73,159  
 Claims priority, application France, Jul. 17, 1986, 86 10399  
 Int. Cl.<sup>4</sup> A01K 13/00  
 U.S. Cl. 514—562 3 Claims  
 1. A process for the preparation of a concentrated aqueous solution of the sodium salt of methionine, practically free from inorganic salts, from an aqueous solution containing the sodium salt of methionine and a substantially equivalent quantity of sodium carbonate obtained by hydrolysis of 5-( $\beta$ -methyl-mercaptoethyl)hydantoin with sodium hydroxide, which comprises adding to the said solution a quantity of sulphuric acid sufficient to neutralize all the sodium carbonate and, optionally, the sodium methionate, recovering the carbon dioxide formed, concentrating the reaction medium after adding, if required, a quantity of sodium hydroxide to salify the methionine 46 to 52%, so as to provide a sufficient concentration of the sodium salt of methionine, separating the sodium sulphate precipitated by filtration, and isolating a filtrate containing the sodium salt of methionine practically free from inorganic salts which can be used directly in animal feeding-stuffs.

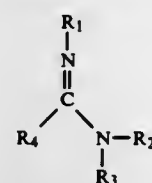
**4,789,687**  
**FOOD CONTAINING VANILLYLAMINE AND DERIVATIVES USEFUL FOR ACCELERATING LIPID METABOLISM**  
 Kazuo Iwai, Kyoto, Japan, assignor to Ajinomoto Co., Inc., Tokyo, Japan  
 Continuation of Ser. No. 834,102, Feb. 24, 1986, Pat. No. 4,680,313, which is a continuation of Ser. No. 742,317, Jun. 7, 1985, abandoned. This application Jan. 13, 1987, Ser. No. 2,942  
 Claims priority, application Japan, Jun. 11, 1984, 59-119460; Jun. 11, 1984, 59-119461; Dec. 26, 1984, 59-281691  
 The portion of the term of this patent subsequent to Jul. 14, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> A61K 31/16, 31/35  
 U.S. Cl. 514—627 2 Claims  
 1. A method of accelerating lipid metabolism for reduction

or prevention of accumulation of body fat in a subject, comprising:

administering to said subject a lipid metabolism accelerating amount of a vanillylamine derivative selected from the group consisting of vanillylamine, a vanillylamine derived from an unsaturated carboxylic acid wherein said acid has from 8 to 18 carbon atoms, or a vanillylamine derived from a saturated carboxylic acid wherein said saturated carboxylic acid has from 2 to 22 carbon atoms, in a food substance,  
 wherein said food substance is a substance selected from the group consisting of seasonings, meat tenderizers and beverages which contain no fat.

**4,789,688**  
**RIM POLYURETHANE COMPOSITIONS CONTAINING INTERNAL MOLD RELEASE AGENTS**  
 John E. Dewhurst, Oakdale, and Stephen J. Harasin, Bethel Park, both of Pa., assignors to Mobay Corporation, Pittsburgh, Pa.  
 Continuation-in-part of Ser. No. 6,529, Jan. 23, 1987. This application Jan. 20, 1988, Ser. No. 146,075  
 Int. Cl.<sup>4</sup> C08G 18/30  
 U.S. Cl. 521—110 11 Claims  
 1. A process for the production of an optionally cellular, polyurethane elastomer or an optionally cellular, rigid structural polyurethane by reacting a reaction mixture comprising

(i) a polyisocyanate,  
 (ii) a high molecular weight polymer having at least two hydroxy groups and a molecular weight of 400 to about 10,000,  
 (iii) up to about 150% by weight, based on the weight of component (ii) of a chain extender having at least two hydroxy groups and  
 (iv) about 0.05 to 10% by weight, based on the weight of components (ii) and (iii), of a salt based on a carboxy functional siloxane and an amidine group-containing compound of the formula



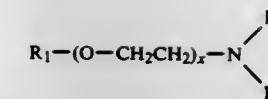
wherein

$R_1$ ,  $R_2$  and  $R_3$  are straight or branched, saturated or unsaturated hydrocarbon chains having up to 30 carbon atoms which may optionally be substituted by ether groups, ester groups, amide groups or amidine groups and may also optionally be terminated by isocyanate-reactive groups.

$R_4$  corresponds to the definition of  $R_1$ ,  $R_2$  and  $R_3$ , but may additionally represent an aromatic substituent having 6 to 15 carbon atoms or may represent the group  $-NR_2R_3$  and

$R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  may, with one or both of the amidine nitrogens, also form a heterocyclic ring.

**4,789,689**  
**AMINE CATALYST FOR URETHANES**  
 Robert L. Zimmerman, and Terry L. Renken, both of Austin, Tex., assignors to Texaco Inc., White Plains, N.Y.  
 Filed Oct. 29, 1987, Ser. No. 113,854  
 Int. Cl.<sup>4</sup> C08J 9/00; C08K 9/00  
 U.S. Cl. 521—115 4 Claims  
 1. A method for producing a polyurethane foam which comprises reacting an organic polyisocyanate with a polyester polyol or polyether polyol in the presence of a catalytic amount of an amine of the following formula:



where  $R_1$  and  $R$  are lower alkyl and  $x$  is 2-4.

**4,789,690**  
**POLYURETHANE FOAM AND PROCESS FOR ITS PREPARATION**  
 Olga Milovanovic-Lerik, Kilchberg; Hanno R. van der Wal, MA Hulst, and Ulrich Tribelhorn, Eblkon, all of Switzerland, assignors to The Dow Chemical Company, Midland, Mich.  
 Filed Mar. 30, 1987, Ser. No. 31,350  
 Int. Cl.<sup>4</sup> C08G 18/58  
 U.S. Cl. 521—137 14 Claims  
 1. A polyurethane foam which is the reaction product of at least one polyol and at least one polyisocyanate in the presence of at least one blowing agent wherein the polyol is at least partially a polymer polyol dispersion prepared by reacting an epoxy resin with from about 0.3 to about 2.5 moles of an epoxy hardener per mole of epoxy resin, in the presence of a liquid polyol.

**4,789,691**  
**ELASTOMERS CONTAINING POLYAMIDE GROUPS AND POLYUREA GROUPS IN BONDED FORM, AS WELL AS A PROCESS FOR THE PREPARATION OF ELASTIC, NON-CELLULAR MOLDED ARTICLES FROM THESE ELASTOMERS**  
 Guenter Matzke; Peter Horn, both of Heidelberg, and Hans U. Schmidt, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
 Filed Mar. 15, 1988, Ser. No. 168,422  
 Claims priority, application Fed. Rep. of Germany, Mar. 28, 1987, 3710432  
 Int. Cl.<sup>4</sup> C08G 18/14  
 U.S. Cl. 521—159 22 Claims  
 1. An elastomer containing polyamide groups and polyurea groups in bonded form prepared by reacting

(a) at least one organic polyisocyanate and/or a modified polyisocyanate mixture having an NCO content of from 8 to 33.6 weight percent, based on the weight of the polyisocyanate mixture,  
 (b) at least one polyazomethine and  
 (c) at least one alkyl-substituted aromatic polyamine having a molecular weight up to 500, and optionally in the presence of  
 (d) catalysts, wherein the reaction product of a polyoxyalkylenepolyamine, having a functionality of from 2 to 4 and an average molecular weight of from 180 to 10,000 and at least one organic aldehyde and/or ketone, are used as the polyazomethine (b).

**4,789,692**  
**RESIN-IMMOBILIZED BIOCIDES**  
 Nuno M. Rel, Boxford, and Joel A. Gribens, Framingham, both of Mass., assignors to Morton Thiokol, Inc., Chicago, Ill.  
 Filed Aug. 12, 1986, Ser. No. 895,760  
 Int. Cl.<sup>4</sup> C08J 3/22; C08K 5/15  
 U.S. Cl. 523—122 19 Claims  
 1. A solid biocide resin concentrate for supplying to an end use resin composition of which a primary thermoplastic resin comprises a major proportion, comprising a biocide in an amount which is effective to protect the end use resin composition from microorganism attack, the solid biocide resin concentrate comprising (1) a first thermoplastic resin identical to or substantially identical to said primary thermoplastic resin, said first thermoplastic resin being incompatible with stable incor-

poration of said biocide at 20 times end use concentration, (2) an alloyed second thermoplastic resin and (3) a biocide, selected from the group consisting of 10,10'-oxybisphenoxarsine and its derivatives, N(2-methyl-1-naphthyl) maleimide and 2-octyl, 4-isothiazolin-3-one, stably incorporated and immobilized in said alloyed resins at a concentration of at least about 20 times end use concentration; said first thermoplastic resin being selected from the group consisting of polyethylene, nylon, polystyrene, polyvinyl chloride, polycarbonate, polypropylene, polyvinylchloride/polyvinyl acetate copolymer, polyvinyl acetate and polymethyl methacrylate, and providing that when said first thermoplastic resin is polyethylene, said second thermoplastic resin is selected from the group consisting of ethylene/acrylic acid copolymer, polypropylene, polystyrene, polyvinyl chloride/polyvinyl acetate copolymer, polyacrylic acid and ethylene/vinyl acetate/carbon monoxide terpolymer; and providing that when said first thermoplastic resin is selected from the group consisting of nylon, polystyrene, polyvinyl chloride, polycarbonate, polypropylene, polyvinylchloride/polyvinyl acetate copolymer, polyvinyl acetate and polymethyl methacrylate, said second thermoplastic resin is selected from the group consisting of ethylene/acrylic acid copolymer and ethylene/vinyl acetate/carbon monoxide terpolymer.

4,789,693

# HEAT CURABLE FOUNDRY MIXES AND BINDER COMPOSITIONS

Satish S. Jhaveri, Oakville, Canada; William R. Dunnivant, and Helmo J. Langer, both of Columbus, Ohio, assignors to Ashland Oil, Inc., Russell, Ky.

Filed Aug. 28, 1987, Ser. No. 90,803  
Int. Cl.<sup>4</sup> C08K 3/36

- U.S. Cl. 523—145 33 Claims
1. A heat curable foundry mix comprising:
    - a. a foundry aggregate;
    - b. an effective binding amount of a binder comprising an aqueous basic solution of a phenolic resole resin wherein said aqueous basic solution has
      - i. a viscosity of less than about 850 centipoise at 25° C.;
      - ii. a solids content of about 35 to about 75 percent by weight, said weight based upon the total weight of the basic solution; and
      - iii. an equivalent ratio of base to phenolic compound of about 0.2:1.0 to 1.1:1.0; and
    - c. an inorganic salt in an amount effective to increase the tensile strength of the foundry shapes prepared with said foundry mix.

4,789,694

# AMBIENT CURE LATEX PAINT

Kenneth G. Hahn, Jr., Hinckley, Ohio, assignor to The Glidden Company, Cleveland, Ohio  
Continuation-in-part of Ser. No. 824,241, Jan. 30, 1986, abandoned, and a continuation-in-part of Ser. No. 943,794, Dec. 19, 1986. This application Sep. 24, 1987, Ser. No. 100,537  
The portion of the term of this patent subsequent to Mar. 1, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> C08J 3/08; C08L 61/00

- U.S. Cl. 523—310 14 Claims
1. In a process for producing an ambient dry paint coating composition, including the step of producing an emulsion polymer binder by copolymerizing ethylenically unsaturated monomers in an aqueous polymerization medium, and in the presence of surfactants and initiators, the improvement comprising:
    - copolymerizing ethylenically unsaturated monomers, including carboxyl or hydroxyl functional monomers, but excluding amine monomers, to produce a functionally reactive emulsion polymer adapted to be coreactive with a glycoluril derivative;
    - treating the functional emulsion polymer by contact with an ion exchange resin to remove cations from the functional

emulsion polymer and produce a pH of less than 2.5, where said functionally reactive emulsion polymer is coreactive and adapted to crosslink with glycoluril derivative at ambient temperatures upon application to a substrate to produce a thermoset paint coating film.

4,789,695

# BLENDS OF ACRYLAMIDE POLYMERS AND MANNICH BASES

David Farrar, and Peter Fleisher, both of West Yorkshire, England, assignors to Allied Colloids Ltd., Great Britain  
Filed Jul. 24, 1986, Ser. No. 889,948

Claims priority, application United Kingdom, Jul. 26, 1985, 8518900

- Int. Cl.<sup>4</sup> C08K 3/30; C08J 3/00; C08F 220/56  
U.S. Cl. 523—336 16 Claims
1. A composition that is substantially non-aqueous and is a heterogeneous blend of (a) particulate, water soluble, high molecular weight acrylamide polymer and (b) water soluble Mannich base of a low molecular weight, Mannich base-forming compound selected from phenols, ketones and amides and having molecular weight below 1,000.

4,789,696

# CATALYZED CATIONIC PAINT BINDERS

Willibald Paar, and Johann Gmoser, both of Graz, Austria, assignors to Vianova Kunstharz, A.G., Werndorf, Austria  
Filed Sep. 21, 1987, Ser. No. 98,892

Claims priority, application Austria, Sep. 19, 1986, 2511/86  
Int. Cl.<sup>4</sup> C09D 3/58, 5/44; C08L 63/10

- U.S. Cl. 523—414 17 Claims
1. Process for catalyzing cationic paint binders crosslinkable through at least one of transesterification, transamidation, transurethanization, or reaction of chain end double bonds comprising adding to said binder, as a catalyst, a condensation product of a dialkyltin oxide and a compound carrying at least one hydroxyl group.

4,789,697

# MATERIAL BASED ON A CAOUTCHOUC-TYPE MIXTURE FOR PRODUCING HARD RUBBER, METHOD OF USING SUCH MATERIAL FOR PRODUCING ENGINE COMPONENTS, AND ENGINE COMPONENTS MANUFACTURED FROM SUCH MATERIAL

Josef Affenzeller, Graz, and Wolf-Dieter Jost, Leonding-Doppl, both of Austria, assignors to Semperit AG, Vienna, Austria  
Filed Sep. 9, 1985, Ser. No. 774,003

Claims priority, application European Pat. Off., Sep. 14, 1984, 84890171.6

- Int. Cl.<sup>4</sup> C08J 5/06; C08K 3/24; C08L 7/00, 9/02  
U.S. Cl. 523—437 15 Claims
1. A material based on a rubber mixture for producing hard rubber and comprising:
    - a rubber mixture comprising a preselected synthetic nitrile rubber, another synthetic diene rubber or natural rubber conjointly with vulcanizing adjuvants and a pre-mix;
    - said pre-mix containing a mixture of high-strength organic fibers and a liquid hardenable plastic material;
    - said high-strength organic fibers being selected from high-strength organic fibers which withstand, to a large extent, the shearing stresses occurring during the rubber mixing operations;
    - said high-strength organic fibers being present in an amount resulting in a proportion in the range of about 10 to about 100 parts per 100 parts of said preselected rubber in said rubber mixture;
    - said liquid hardenable plastic material containing a cross-linking agent for hardening said liquid hardenable plastic material;
    - said liquid hardenable plastic material being selected from the group consisting of liquid phenolic resin, liquid poly-

ester resin, liquid epoxide resin and a mixture of at least two of the aforementioned resins; and said liquid hardenable plastic resin being present in an amount resulting in a proportion in the range of about 20 to about 200 parts per 100 parts of said preselected rubber in said rubber mixture.

13. The material as defined in claim 1, further including:
  - at least one filler; and
  - said at least one filler is admixed to said rubber mixture in an amount in the range of about 200 to about 1,000 parts per 100 parts by weight of said pre-selected rubber.

4,789,698

# FLAME-PROOF, GLASS FIBRE-REINFORCED POLYAMIDE MOULDING MATERIALS

Heinz Bonten; Werner Niesinger; Dietrich Michael; Harald Selbeck, and Rolf-Volker Meyer, all of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 9, 1987, Ser. No. 23,726

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1986, 3609341

- Int. Cl.<sup>4</sup> C08K 5/34, 3/40 8 Claims  
U.S. Cl. 524—100
1. A reinforced polyamide moulding material with flame-retardant properties comprising polyamide 6 or polyamide 66 containing 3 to 25% by weight of melamine, melamine cyanurate or a mixture thereof and 5 to 45% by weight of unsized glass fibres.

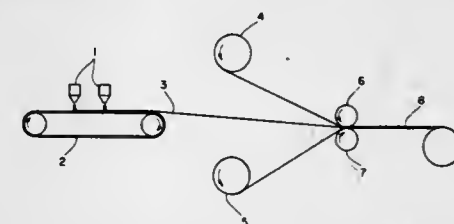
4,789,699

# AMBIENT TEMPERATURE BONDABLE ELASTOMERIC NONWOVEN WEB

John S. Kieffer, Appleton, and Tony J. Wisneski, Kimberly, both of Wis., assignors to Kimberly-Clark Corporation, Roswell, Ga.

Filed Oct. 15, 1986, Ser. No. 919,901

Int. Cl.<sup>4</sup> C08L 53/02; B32B 25/14  
U.S. Cl. 524—271 36 Claims



1. A nonwoven elastomeric web comprising fibers formed from a blend including a thermoplastic elastomeric polymer and a tackifying resin, wherein said web is adapted to form a bond to a sheet of spunbonded polypropylene in the temperature range of from about 60 degrees F. to about 180 degrees F., said bond having an internal cohesion of at least about 3.9 kilograms.

4. The nonwoven elastomeric web according to claim 3, wherein said blend further includes a polyolefin.

4,789,700

# CITRATE ESTERS AND METHOD

Ezekiel H. Hull, Greensboro, and Edward P. Frappier, Kernersville, both of N.C., assignors to Morflex Chemical Company, Inc., Greensboro, N.C.

Continuation of Ser. No. 865,874, May 21, 1986, Pat. No. 4,711,922, which is a continuation of Ser. No. 735,149, May 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 619,583, Jun. 11, 1984, abandoned. This application Nov. 4, 1987, Ser. No. 117,080  
Int. Cl.<sup>4</sup> C08K 5/11

- U.S. Cl. 524—310 23 Claims
1. A polyvinyl chloride composition comprising a polyvinyl chloride resin and a plasticizing amount of acetyltri-n-hexyl citrate, said acetyltri-n-hexyl citrate having heat stability characteristics, after heating at 150° C. for two hours, of a color not greater than 50-60 APHA and a mild odor at 25° C.

4,789,701

# PLASTICS OR RUBBER MATERIALS MODIFIED BY CRYSTALLINE GLYCERATO-ZINC COMPLEX

Reginald M. Taylor, Hawthorn, Australia, assignor to Glyzinic Pharmaceuticals Limited, Perth, Australia

PCT No. PCT/AU86/00249, § 371 Date Apr. 23, 1987, § 102(e) Date Apr. 23, 1987, PCT Pub. No. WO87/01379, PCT Pub. Date Mar. 12, 1987

PCT Filed Aug. 26, 1986, Ser. No. 61,345  
Claims priority, application Australia, Aug. 27, 1985, PH2159  
Int. Cl.<sup>4</sup> C08K 5/05

- U.S. Cl. 524—382 11 Claims
1. A method of modifying an organic material selected from diene rubber and plastic comprising the steps of (a) embodying in said organic material, during manufacture thereof, an ultraviolet light ray shielding and bonding agent comprising a glycerato-zinc complex (C<sub>3</sub>H<sub>5</sub>O<sub>3</sub>Zn) prepared by heating a zinc compound and glycerol to a temperature below the boiling point of said glycerol and continuing said heating to form crystals of generally hexagonal morphology having substantial two-dimensional extension but low thickness and (b) selectively arranging the crystals of said glycerato-zinc complex in said organic material, whereby to improve tensile strength of thus modified organic material and to reduce deterioration of said organic material by light in the ultraviolet wave length.

4,789,702

# FELINE LEUKEMIA VIRUS VACCINE

Jack H. Nanberg, Oakland, Calif., assignor to Cetus Corporation, Emeryville, Calif.

Division of Ser. No. 612,003, May 18, 1984, Pat. No. 4,701,416, which is a continuation-in-part of Ser. No. 559,903, Dec. 9, 1983, abandoned. This application Jun. 12, 1986, Ser. No. 873,681

- Int. Cl.<sup>4</sup> C07K 7/08; A61K 39/12 13 Claims  
U.S. Cl. 530—324
1. A microbially produced polypeptide comprising an amino acid sequence that is homologous to at least a portion of the amino acid sequence of gp85 envelope protein of feline leukemia virus subgroup B that occurs in the 210-250 region and the 415-450 region of the FeLV gp85 protein, and is an immunogen that primes or elicits a humoral response in cats and is useful for immunizing cats against feline leukemia virus infection.

4,789,703

# ABRASION RESISTANT COATINGS

Hubert J. Fabris, Akron; Earl G. Melby, Uniontown; Kohji Y. Chihara, and Harry W. Cocain, both of Cuyahoga Falls, all of Ohio, assignors to GenCorp Inc., Akron, Ohio

Division of Ser. No. 832,281, Feb. 24, 1986, Pat. No. 4,676,995. This application May 22, 1987, Ser. No. 52,944  
Int. Cl.<sup>4</sup> C08K 5/02; C08L 75/00, 77/00, 77/02

- U.S. Cl. 524—464 6 Claims
1. The method which comprises dispersing pellets of a solid

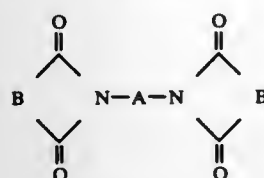


thermoplastic polymer having (—CONH—) groups selected from the group consisting of a polyacrylamides, polyamide-imides, polysulfonamides, polyurethanes, polyureas, polyurethane-ureas, polyamides and mixtures thereof in a blend of an aqueous solution of a halogenating agent and an organic solvent that is immiscible with water and inert under the reaction conditions and that readily dissolves the reaction product but not the original (—CONH—) polymer and brominating or chlorinating said polymer with a brominating agent or chlorinating agent for a period of time and at a temperature sufficient to form (—NX—) units, where X is a bromine or chlorine, to form a one to 50% solution of N-brominated or N-chlorinated thermoplastic polymer in said organic solvent.

**4,789,704**  
**CURABLE RESIN FROM BIS MALEIMIDE AND ALKENYL PHENYL HYDROXY ETHER**  
Horst Stenzenberger, and Peter Koenig, both of Schriesheim, Fed. Rep. of Germany, assignors to Technochemie GmbH, Fed. Rep. of Germany  
Filed Dec. 17, 1986, Ser. No. 942,696

Claims priority, application United Kingdom, Jan. 18, 1986, 8601201; Sep. 12, 1986, 8622083  
Int. Cl.<sup>4</sup> C08F 26/00, 22/40

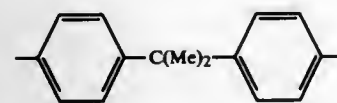
U.S. Cl. 524—548 12 Claims  
1. Curable resin comprising a mixture of  
(a) at least one bisimide of the general formula I



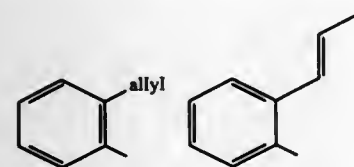
in which B represents a divalent radical containing a carbon-carbon double bond and A is a divalent radical containing at least two carbon atoms and  
(b) at least one alkenyl compound of formula IIg



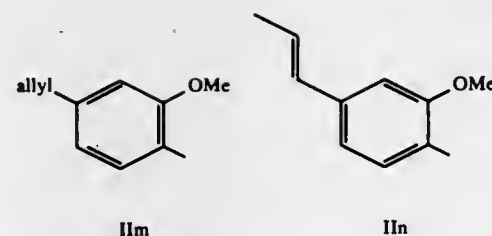
in which E is a m-phenylene group or a group of formula IIh



and G represents a group of formula IIj or IIk



IIj  
IIk  
or of formula IIm or IIn



**4,789,705**  
**RESIN COMPOSITION COMPRISING AN ISOCYANATE HAVING AN ISOCYANURATE RING IN A NONPOLAR PETROLEUM HYDROCARBON SOLVENT**  
Mitsuo Kase, Chiba; Noboru Okoshi, Sodegaura, and Kazue Tsuyuzaki, Chiba, all of Japan, assignors to Dainippon Ink and Chemicals, Inc., Tokyo, Japan  
Filed Mar. 4, 1987, Ser. No. 21,790

Claims priority, application Japan, Mar. 10, 1986, 61-50525  
Int. Cl.<sup>4</sup> C08G 18/34, 18/42, 18/70; C08J 83/00

U.S. Cl. 524—590 19 Claims  
1. A resin composition comprising  
(A) a polyisocyanate having an isocyanurate ring obtained by reacting at least one diisocyanate compound selected from alkylene diisocyanates, cycloalkylene diisocyanates and aralkylene diisocyanates with a diol having 10 to 40 carbon atoms or with a polyester polyol containing 12-hydroxystearic acid as an essential component in the presence of an isocyanurating catalyst, and  
(B) a nonpolar petroleum hydrocarbon organic solvent having an aniline point of 10° to 70° C.

**4,789,706**  
**NARROW MOLECULAR WEIGHT POLYESTER OLIGOMERS AND METHOD OF PREPARATION**  
Roy C. Williams, Orchard Park, N.Y., assignor to NL Chemicals, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 041,045, Apr. 20, 1987, Pat. No. 4,743,655, which is a continuation-in-part of Ser. No. 854,105, Apr. 21, 1986, Pat. No. 4,659,778. This application Mar. 23, 1988, Ser. No. 171,947

Int. Cl.<sup>4</sup> C08F 8/00; C08L 63/00, 67/00; C08G 63/12  
U.S. Cl. 525—107 1 Claim

1. A polyester composition having an average molecular weight of greater than 500 comprising a most prevalent compound having a main polyester chain containing at least 17 and fewer than 52 carbon atoms and at least 6 and fewer than 18 oxygen atoms, at least 52 weight percent of the molecules of said composition having a molecular weight within 50% of the average molecular weight of the composition; less than 36 weight percent of the molecules of the composition having a molecular weight greater than 150% of the average molecular weight of the composition and less than 12 weight percent of the molecules of the composition having a molecular weight less than 50% of the average molecular weight of the composition, said polyester composition containing at least 1.6 equivalents of unreacted hydroxy groups or at least 1.6 equivalents of unreacted carboxy groups per mole and said composition containing at least four equivalents of ester links in the main chains of the molecules per mole of composition, said composition containing side groups selected from hydrogen and halogenated and unhalogenated groups attached to the main chain through a carbon atom, each of said unhalogenated side groups containing no more than six carbon atoms and no more than one oxygen atom and each of said halogenated side groups containing no more than nine carbon atoms provided that, the main chains of the molecules of such compositions having an average molecular weight of 620 or less, pass through at least 1.2 equivalents of aromatic groups per mole of composition.

**4,789,707**  
**COATING RESIN COMPOSITION WITH HIGH NUMBER OF IMINO GROUPS**  
Tsutomu Nishimura, Chiba; Yasuo Saito, Kanagawa; Kenji Shindo, and Kazutoshi Abe, both of Tokyo, all of Japan, assignors to Mitsui-Cyanamid Ltd., Tokyo and Nippon Paint Co., Ltd., Osaka, both of Japan  
Filed Mar. 2, 1987, Ser. No. 20,705  
Claims priority, application Japan, Mar. 7, 1986, 61-48244  
Int. Cl.<sup>4</sup> C08L 61/00

U.S. Cl. 525—157 3 Claims  
1. A coating resin composition which comprises 5 to 50 parts by weight of mixed alkyl etherified methylol melamine resin having less than 5 bound formaldehyde molecules, 1.0 to 3.5 methyl ether groups, 0.5 to 3.0 butyl ether groups, 0.5 to 3.0 imino groups, and less than 0.5 methylol groups per melamine nucleus on an average, and having an average degree of polymerization for the melamine nuclei in the range of 1.5 to 3.5, and 50 to 95 parts by weight of a copolymer resin composed of a vinyl monomer containing one or more than one kind of hydroxyl group, carboxyl group, glycidyl group, methylolamide group, alkoxymethylolamide group, or thiol group and the other vinyl monomer, or an alkyd resin or polyester resin containing one or two kinds of hydroxyl group or carboxyl group, or a mixture thereof, which is reactive with said melamine resin to bring about crosslinking and curing upon heating.

**4,789,708**  
**SYNTHETIC ELASTOMER WITH IMPROVED CHEMICAL, AGING AND OIL RESISTANCE**  
Raymond L. Guzy, Tulsa, Okla., assignor to Hughes Tool Company, Houston, Tex.

Continuation-in-part of Ser. No. 885,986, Jul. 15, 1986, abandoned. This application Dec. 14, 1987, Ser. No. 132,460  
Int. Cl.<sup>4</sup> C08F 279/00; C08L 23/16, 23/26, 9/00

U.S. Cl. 525—263 6 Claims  
1. A method of manufacturing a peroxide curable synthetic elastomer with improved chemical aging and oil resistance properties, comprising the steps of:  
reacting ethylene, propylene and a diene monomer in a solvent solution in the presence of a suitable catalyst; forming a water slurry product of the resulting ethylene-propylene-nonconjugated diene monomer terpolymer; and  
solution blending a liquid, high vinyl 1,2-polybutadiene resin with the terpolymer product by adding the 1,2-polybutadiene to the slurry prior to separating and drying the terpolymer elastomer, the 1,2-polybutadiene having at least about 80 mole % 1,2 vinyl structure with a pendant vinyl group for every other chain carbon.

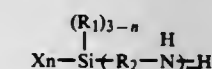
**4,789,709**  
**PROCESS FOR THE PRODUCTION OF HEAT RESISTANT THERMOPLASTIC COPOLYMER**  
Yasuyuki Kato; Masahiro Yuyama; Masahiko Moritani; Hideaki Matsura; Susumu Iijima, and Tsuyoshi Hashimoto, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan  
Filed Oct. 30, 1986, Ser. No. 924,752  
Claims priority, application Japan, May 2, 1985, 60-095104; May 15, 1985, 60-103342  
Int. Cl.<sup>4</sup> C08F 8/48

U.S. Cl. 525—366 9 Claims  
1. A process for the production of a copolymer, which comprises heat-treating a raw copolymer comprising units of a vinyl monomer and 5 to 50% by weight of a methacrylic and/or acrylic acid unit in the presence of 0.01 to 0.5% by weight of a basic compound, thereby converting the methacrylic and/or acrylic acid unit into a six-membered cyclic anhydride unit, wherein the vinyl monomer is a member selected from the group consisting of methacrylic esters, acrylic esters and aromatic vinyl compounds, and the basic compound is a member selected from the group consisting of alkali metal

hydroxides or carbonates, alkaline earth metal hydroxides, organic carboxylic acid alkali metal salts and alkali metal alkoxides.

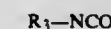
**4,789,710**  
**PROCESS FOR PREPARATION OF A ROOM-TEMPERATURE CURABLE RESIN**  
Hisao Furukawa, and Jo Kawamura, both of Hyogo, Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan  
Filed Dec. 21, 1987, Ser. No. 135,408  
Claims priority, application Japan, Dec. 22, 1986, 61-306049  
Int. Cl.<sup>4</sup> C08G 18/61

U.S. Cl. 525—440 9 Claims  
1. A process for the preparation of a room-temperature curable resin which comprises reacting a compound (A) containing at least two acryloyl groups and/or methacryloyl groups in a molecule, and having from 100 to 100,000 of number-average molecular weight, with an aminosilane compound (B) represented by formula,



(wherein X is a hydrolyzable group selected from the group consisting of halogen, alkoxy, acryloxy, ketoxymate, amino, acid amide, aminoxy, mercapto, alkenyloxy groups; R<sub>1</sub> is a C<sub>1</sub>-C<sub>10</sub> alkyl group, aryl group, or aralkyl group; R<sub>2</sub> is a C<sub>1</sub>-C<sub>10</sub> bivalent alkyl group, aryl group, or aralkyl group; n is an integer of from 1 to 3, and m is an integer of from 1 to 10),

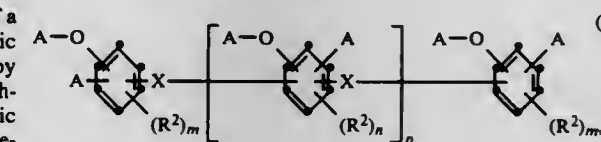
at the ratio of at least 0.2 equivalents of primary amino groups contained in the compound (B) to equivalent of acryloyl groups and/or methacryloyl groups contained in the compound (A), under substantially water-free condition, subsequently reacting the reaction product of aminosilane-modified resin and, further with a monofunctional isocyanate compound (C) represented by formula,



(wherein R<sub>3</sub> is a C<sub>1</sub>-C<sub>25</sub> alkyl group, aryl group, aralkyl group, (C<sub>2</sub>H<sub>5</sub>O)<sub>3</sub>Si—CH<sub>2</sub>)<sub>3</sub> or (CH<sub>3</sub>O)<sub>3</sub>Si—CH<sub>2</sub>)<sub>3</sub> at the ratio of from 0.9 to 1.5 equivalents to equivalent of active hydrogen of amino groups contained in the aminosilane-modified resin, and under substantially water-free condition to obtain a room-temperature curable resin having 2 mg KOH or lower of an amine value.

**4,789,711**  
**MULTIFUNCTIONAL EPOXIDE RESINS**  
Charles E. Monnier, Villars-sur-Glâne; Sameer H. Eldin, Fribourg, and Peter Flury, Himmelfried, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.  
Filed Nov. 23, 1987, Ser. No. 124,200  
Claims priority, application Switzerland, Dec. 2, 1986, 4801/86  
Int. Cl.<sup>4</sup> C08G 59/32

U.S. Cl. 525—507 11 Claims  
1. A compound of the formula I



in which  
A is a group





- of said chain lengthening agent is 2,2,4-trimethylpentane-1,3,5-triol (1,3),
- (iii) optionally about 0.01 to 1 mol of a chain breaking compound which is monofunctional in the isocyanate polyaddition reaction and
- (iv) about 1.5 to 16.5 mol of an organic polyisocyanate which consists essentially of an aromatic diisocyanate.

4,789,719

**MANUFACTURE OF BLOCK POLYESTER POLYOLS, AND POLYURETHANES DERIVED THEREFROM**  
 Georges N. Altounian, Cap Rouge, Canada, assignor to Neochem Polymers Inc., Ste-Foy, Canada

Filed Mar. 15, 1988, Ser. No. 168,497

Int. Cl.<sup>4</sup> C08G 18/42

U.S. Cl. 528—73

20 Claims

1. A method for the manufacture of polyester polyols comprising:

- (a) feeding to a reactor (i) at least one aliphatic dicarboxylic acid having 4 to 10 carbon atoms, or ester thereof, (ii) at least one secondary dihydric alcohol having 4 to 8 carbon atoms, and (iii) at least one primary trihydric alcohol having 4 to 14 carbon atoms, the range of molecular weights of said acid, dihydric alcohol and trihydric alcohol being not more than 100;
- (b) heating the mixture obtained in (a) in said reactor in the substantial absence of oxygen and removing water formed in the resultant esterification reaction;
- (c) when the amount of water removed from the reaction mixture of (b) is at least 95% of the stoichiometric amount for the formation of the polyol, cooling the resultant reaction mixture to a temperature of less than 140° C. and adding at least one N-phenyl dialkanolamine and additional amounts of at least one primary trihydric alcohol having 4 to 14 carbon atoms such that the total amount of secondary dihydric alcohol, trihydric alcohol and dialkanolamine is greater than the amount of acid on a molar basis, the range of the molecular weights of said alkanolamine and trihydric alcohol and of the acid, dihydric alcohol and trihydric alcohol of (a) being not more than 100; and
- (d) further heating the reaction mixture and removing water to obtain a polyester polyol, said polyol having a hydroxyl number of less than 650, an acid value of less than 3.5 and a hydroxyl functionality of at least 2.0.

4,789,720

**HYDROPHILIC POLYURETHANES PREPARED FROM MIXED OXYALKYLENE GLYCOLS**

John M. Teffenhart, Neshanic Station, N.J., assignor to Tyndale Plains-Hunter, Ltd., Princeton, N.J.

Filed Mar. 9, 1988, Ser. No. 166,091

Int. Cl.<sup>4</sup> C08G 18/48

U.S. Cl. 528—76

45 Claims

1. A hydrophilic, thermoplastic polyurethane polymer, of improved dimensional stability and mechanical strength, said polymer having an average molecular weight of from about 10,000 to about 200,000 and comprising the reaction product of:

- A. a diol blend comprising
- (i) from about 2 to about 15 parts by weight of an alkylene glycol selected from ethylene glycol and diethylene glycol,
- (ii) from about 10 to about 80 parts by weight of a polyoxyethylene glycol having an average molecular weight of from about 400 to about 20,000, and
- (iii) from about 10 to about 60 parts by weight of a polyoxypropylene glycol having an average molecular weight of from about 200 to about 2500;
- B. an organic diisocyanate, the ratio of NCO to OH being from about 0.95:1 to about 0.98:1; and
- C. water in an amount of no more than about 0.5 parts by

weight, the sum of A, B and C being on a 100 parts by weight basis.

4,789,721

**CURATIVES OF EPOXY RESINS FROM DICARBOXYLIC ACIDS, INCLUDING (1) INDANE OR (2) TERT-BUTYLISOPHTHALIC DERIVED ACIDS, REACTED WITH POLYETHERDIAMINES**

Harold G. Waddill, Austin, Texas; Jiang-Jen Lin, Round Rock, and George P. Speranza, Austin, all of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Jul. 27, 1987, Ser. No. 78,310

Int. Cl.<sup>4</sup> C08G 59/44, 59/54

U.S. Cl. 528—111

3 Claims

1. An epoxy resin composition which demonstrates rapid curing even at ambient temperatures to provide materials useful in development of adhesive, coatings, encapsulants, laminates and composite fabrications, said composition comprising an amidoamine prepared from:

- (1) an alkyl substituted aromatic dicarboxylic acid selected from the group consisting of phenylindane dicarboxylic acid and t-butyl isophthalic acid; and
- (2) a polyetherpolyamine from the group consisting of polyoxyethyleneamine and polyoxypropyleneamine; and
- (3) an epoxy resin where said amidoamine is the curing agent for the epoxy resin and is present in said mixture in an amount sufficient to provide about 0.8 to 1.2 amino groups per oxirane group.

4,789,722

**POLYARYLENE POLYETHER MADE USING MIXED BASE SYSTEM**

Harold Jabloner, New Castle, and Tuyen T. Nguyen, Wilmington, both of Del., assignors to Hercules Incorporated, Wilmington, Del.

Continuation of Ser. No. 823,912, Jan. 30, 1986, abandoned. This application Jul. 29, 1987, Ser. No. 80,144

Int. Cl.<sup>4</sup> C08G 65/40, 65/48, 75/23

U.S. Cl. 528—172

33 Claims

1. In a process of processing polyarylene polyethers by reacting the double salt of a dihydroxy phenol with a molar excess of dihalobenzenoid compound in which the halogen is attached directly to ring carbon atoms at a temperature in a range between 100° C. and 200° C. in a liquid medium comprising a polar solvent and an azeotrope former and then reacting the resultant oligomer with the salt of a hydroxy aromatic amine to provide an amine terminated polyarylene polyether, an improvement which provides an amine terminated polyarylene polyether with a select degree of polymerization, between 6 and 15, and a ratio between weight average and number average molecular weight between about 2 and 4, said improvement comprising:

- (a) providing a dihydroxy phenol, a strong alkali metal base, a weak alkali metal base comprising a carbonate or bicarbonate, a polar solvent, and an azeotrope former in a first reactor, said dihydroxy phenol and said strong alkali metal base being at a molar ratio between 1:1.50 and 1:1.98 and there being sufficient alkali metal weak base to provide a total of at least one equivalent of alkali metal in the combination of said strong and weak bases for each equivalent of hydroxyl in said dihydroxy phenol, the molar amount of said weak alkali metal base being not greater than about 50% of the molar amount of said strong alkali metal base;
- (b) maintaining the contents of said first reactor at a temperature in a range sufficient for dehydration of said dihydroxy phenol and formation of a double salt of said dihydroxy phenol, said dehydration continuing with water removal until there is less than about 1% by weight water in said first reactor;
- (c) combining said dihalobenzenoid compound and said double salt of (b) in said first or a different reactor at a molar ratio between 1.1.67:1 and 1.067:1 dihalobenzenoid

- compound to double salt, the combination of this step (c) being in the presence of a polar solvent;
- (d) maintaining the contents of the reactor in step (c) at a temperature sufficient to provide a halogen-terminated polyarylene polyether with a select degree of polymerization and ratio between weight average and number average molecular weight;
- (e) providing a hydroxy aromatic amine, a strong alkali metal base, a weak alkali metal base, a polar solvent and an azeotrope former in a reactor, said hydroxy aromatic amine and said strong base being at a molar ratio between 1:0.50 and 1:0.98 hydroxy aromatic amine to strong base and there being sufficient weak alkali metal base to provide a total of at least one equivalent of alkali metal in the combination of said strong and weak bases for each equivalent of hydroxy in said hydroxy aromatic amine;
- (f) maintaining the contents of said reactor of (e) at a temperature in a range sufficient for dehydration of said hydroxy aromatic amine and formation of an alkali metal salt of said hydroxy aromatic amine, said dehydration continuing with water removal until there is less than about 3% water remaining in the contents of said reactor of this step (f);
- (g) combining said alkali metal salt of (f) and said halogen-terminated polyarylene polyether of (d) in said reactor of (f) or (d) or a different reactor either in an equivalent ratio of 1:1 between halogen of said halogen-terminated polyether and said alkali metal salt of (f) or a slight excess of said alkali metal salt of (f) in the event a molecular weight reduction is desired;
- (h) maintaining the contents of said reactor of (g) at a temperature sufficient to cause displacement of halogen in said halogen-terminated polyarylene polyether and provide said amine-terminated polyarylene polyether with said select degree of polymerization and ratio between weight average and number average molecular weight;
- (i) separating said amine-terminated polyarylene polyether from the remainder of the contents of said reactor of (h).

4,789,724

**PREPARATION OF ANHYDRIDE COPOLYMERS**  
 Abraham J. Domb, Brookline, and Robert S. Langer, Somerville, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

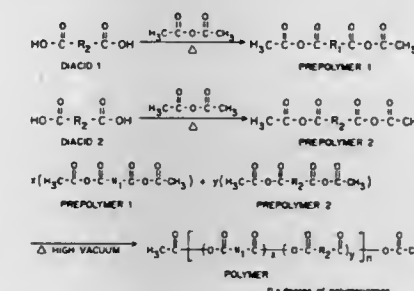
Filed Oct. 17, 1986, Ser. No. 920,724

The portion of the term of this patent subsequent to Jul. 12, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> C08G 67/04

U.S. Cl. 528—176

5 Claims



1. A method for preparing highly pure anhydride copolymers comprising:
- providing at least two individually synthesized and purified diacids,
- reacting the individual diacids and acetic anhydride separately to form mixed anhydrides of the individual diacids, separately removing the unreacted acetic anhydride and diacids from the individual mixed anhydrides formed by the reaction of the acetic anhydride with said diacids, combining said individual mixed anhydrides, and polymerizing said mixture of the purified mixed anhydrides of the individual diacids to form copolymers.

4,789,725

**PHENYLENE ETHER-CARBONATE COPOLYMER CONTAINING SPIROINDANE GROUP**

Thomas L. Guggenheim, Scotia, N.Y., and Joseph W. Guiles, Ft. Collins, Colo., assignors to General Electric Company, Schenectady, N.Y.

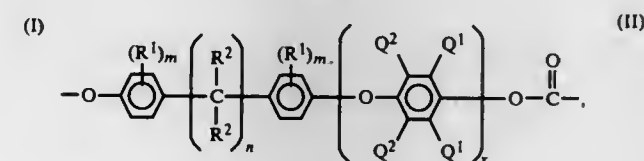
Filed Mar. 17, 1987, Ser. No. 26,517

Int. Cl.<sup>4</sup> C08G 63/62

U.S. Cl. 528—201

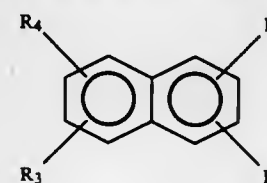
7 Claims

1. A linear copolycarbonate comprising structural units of the formulas

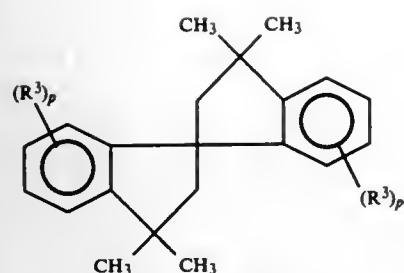


wherein:

A is a divalent spirobiindane radical of the formula



wherein R<sub>1</sub> is H and R<sub>2</sub>—R<sub>4</sub> are —SO<sub>2</sub>Cl.



each Q<sup>1</sup> is independently halogen, primary or secondary lower alkyl, phenyl or hydrocarboxy;  
each Q<sup>2</sup> is independently hydrogen, halogen, primary or secondary lower alkyl, phenyl or hydrocarboxy;  
each R<sup>1</sup> is independently C<sub>1-8</sub> primary or secondary alkyl, phenyl or halo;  
each R<sup>2</sup> is independently hydrogen, methyl, ethyl or phenyl;  
each R<sup>3</sup> is independently C<sub>1-4</sub> primary or secondary alkyl or halo;  
m is from 0 to 4;  
n is 0 or 1;  
p is from 0 to 3; and  
x is from 1 to about 5.

4,789,726

## MANUFACTURE OF POLYESTERS

Francis G. Hutchinson, Lymington, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Apr. 2, 1987, Ser. No. 33,196

Claims priority, application United Kingdom, Apr. 18, 1986, 8609537

Int. Cl.<sup>4</sup> C08G 63/76, 63/02

U.S. Cl. 528—354

7 Claims

1. A process for the manufacture of a polyester, of any desired number average molecular weight,  $M_n$ , less than about 20,000 as measured by size exclusion chromatography relative to polystyrene standards, characterised by the hydrolysis in homogeneous solution, with an aqueous acid, of a polyester of the same chemical composition as the desired polyester but having a higher number average molecular weight,  $M_n^0$ , measured as defined above, than the desired polyester product, for a period of time,  $t$ , determined from the equation:

$$\frac{1}{M_n} - \frac{1}{M_n^0} = Kt$$

wherein K is a constant which has been predetermined by a calibration experiment using the particular polyester, the particular water, acid and polyester concentrations, and the particular hydrolysis temperature desired.

4,789,727

REDUCTION OF CATALYST USAGE IN EPOXIDE/CO<sub>2</sub> POLYMERIZATION

Hsiang-Ning Sun, Media, Pa., assignor to Arco Chemical Company, Newtown Square, Pa.

Filed Dec. 18, 1987, Ser. No. 134,647

Int. Cl.<sup>4</sup> C08G 63/42

U.S. Cl. 528—405

6 Claims

1. In a process for preparing polyalkylene carbonates by the reaction of alkylene oxides with carbon dioxide in the presence of a catalyst comprising zinc carboxylate, the improvement comprising adding from about 0.1 to 5. part per part of catalyst of a diepoxide to increase the yield of polycarbonate formed.

4,789,728

## POLYARYLOXYPHOSPHAZENE CAUSTIC WASH

J. Robert Adams, Jr., Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed Apr. 27, 1987, Ser. No. 42,989

Int. Cl.<sup>4</sup> C08G 73/00

U.S. Cl. 528—489

12 Claims

1. A process for removing phenolic impurities from a crude polyphosphazene gum having aryloxy substituents and containing phenolic impurities said process comprising:

- (A) forming a solution of said polyphosphazene in a solvent for said crude polyphosphazene;
- (B) extracting said crude polyphosphazene solution at least once with an aqueous lower alcohol solution of an alkali metal base to extract said phenolic impurities into the aqueous lower alcohol phase;
- (C) separating the organic phase containing the extracted purified polyphosphazene from the aqueous lower alcohol phase and
- (D) recovering purified polyaryloxyphosphazene gum from said organic phase.

4,789,729

## PROCESS FOR RECOVERING A POLYARYLENE SULFIDE

Nobuo Nagira, Shinnanyo; Toshikazu Kato, and Hiroshi Inoue, both of Yokkaichi, all of Japan, assignors to Toso Corporation and Toso Sustain Co., Ltd., both of Japan

Filed Nov. 25, 1987, Ser. No. 125,667

Claims priority, application Japan, Nov. 25, 1986, 61-278785

Int. Cl.<sup>4</sup> C08G 75/16

U.S. Cl. 528—496

5 Claims

1. A process for recovering a polyarylene sulfide from a mixture consisting mainly of polyarylene sulfide and an alkali metal halide which mixture is obtained by reacting a polyhalogenated aromatic compound and an alkali metal sulfide containing water in an organic polar solvent, said process comprising the steps of: dehydrating said mixture by distillation; mixing the dehydrated mixture with a solvent which is a poor solvent for both polyarylene sulfide and alkali metal halide and which is soluble in the organic polar solvent to prepare a slurry consisting essentially of the polyarylene sulfide and the alkali metal halide; subjecting said slurry to solid-liquid separation; washing the resultant cake with said poor solvent; drying said cake; adding water to said cake to wash away the alkali metal halide through dissolution; and subjecting the slurry to solid-liquid separation to recover polyarylene sulfide.

4,789,730

## PREPARATION OF POLYCARBONATE HAVING REDUCED CYCLIC CARBONATE OLIGOMER CONTENT

Duane B. Priddy, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jun. 5, 1986, Ser. No. 871,024

Int. Cl.<sup>4</sup> C08G 63/62

U.S. Cl. 528—498

21 Claims

1. A process for producing a polycarbonate mixture product that contains less than one (1) percent cyclic carbonate oligomers, comprising the steps of:

- reacting in the presence of an inert organic solvent a carbonyl halide and a comonomer which together with the carbonyl halide is capable of producing a polycarbonate to obtain a polycarbonate mixture that contains the polycarbonate and more than one (1) percent of cyclic carbonate oligomers;
- separating the cyclic carbonate oligomers from the polycarbonate by mixing the polycarbonate mixture with an extraction solvent having a cohesive density of less than 90 and being immiscible with water and inert to a strong base; and
- hydrolyzing the separated cyclic carbonate oligomers to

form the comonomer that is suitable for reacting with the carbonyl halide to form the polycarbonate.

4,789,731

## SEMI-SYNTHETIC PEPTIDE ANTIBIOTICS

Masahisa Oka, Yokohama; Keiichi Numata, Tokyo, and Masataka Konishi, Kawasaki, all of Japan, assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 917,575, Oct. 10, 1986. This application

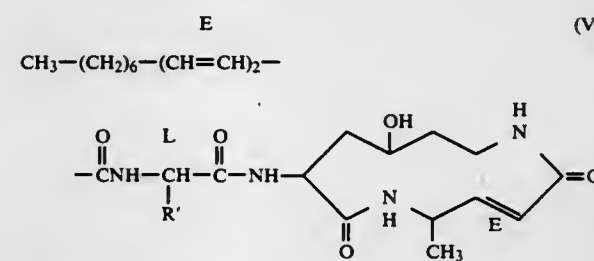
Oct. 30, 1987, Ser. No. 115,072

Int. Cl.<sup>4</sup> C07K 5/12

U.S. Cl. 530—317

4 Claims

1. A compound of the formula



wherein R' is selected from the group consisting of ethyl,



4,789,732

## BONE MORPHOGENETIC PROTEIN COMPOSITION

Marshall R. Urist, Pacific Palisades, Calif., assignor to Regents of the University of California, Berkeley, Calif.

Division of Ser. No. 899,020, Aug. 22, 1987, Pat. No. 4,761,471, which is a division of Ser. No. 523,606, Aug. 22, 1983, Pat. No. 4,619,989, which is a continuation-in-part of Ser. No. 260,726, May 5, 1981, Pat. No. 4,455,256, which is a continuation of Ser. No. 174,906, Aug. 4, 1980, Pat. No. 4,294,753. This application

Mar. 9, 1988, Ser. No. 165,811

Int. Cl.<sup>4</sup> C07E 7/00

U.S. Cl. 530—350

3 Claims

1. The process of inducing bone formation in animals comprising the steps of implanting into said animals substantially pure BMP compositions comprising BMP factor and at least one BMP associated protein selected from a group consisting of BMP associated proteins having molecular weights in the range of between about 24 kDa and about 34 kDa, said BMP factor being capable of inducing bone formation independent of the presence of said BMP associated proteins, and said BMP associated proteins being incapable of inducing bone formation independent of the presence of said BMP factor.

4,789,733

## PURIFICATION OF BLOOD COAGULATION FACTOR VIII BY PRECIPITATION WITH SULFATED POLYSACCHARIDES

Lowell Winkelman, Oxford, England, assignor to The Central Blood Laboratories Authority, Borehamwood, England

PCT No. PCT/GB86/00121, § 371 Date Nov. 17, 1986, § 102(e) Date Nov. 17, 1986, PCT Pub. No. WO86/05190, PCT Pub. Date Sep. 12, 1986

PCT Filed Mar. 6, 1986, Ser. No. 928,178

Claims priority, application United Kingdom, Mar. 7, 1985, 8505882

Int. Cl.<sup>4</sup> A61K 35/14, 35/16; C07K 3/28

U.S. Cl. 530—383

23 Claims

1. A method of preparing a FVIII-containing preparation which includes the steps of precipitating fibrinogen and fibro-

nectin from a buffered solution of FVIII-containing blood plasma fraction by the dissolution of a SPS, and removing the precipitate from the FVIII-containing supernatant, characterised in that the amount of SPS added to the plasma fraction is at least 0.15 mg of SPS per ml of the buffered solution and further characterised in that the temperature of the buffered solution during the precipitation and removal of the fibrinogen and fibronectin is maintained at more than 15° C.

4,789,734

## VITRONECTIN SPECIFIC CELL RECEPTOR DERIVED FROM MAMMALIAN MESENCHYMAL TISSUE

Michael D. Pierschbacher, San Diego, Calif., assignor to La Jolla Cancer Research Foundation, La Jolla, Calif.

Filed Aug. 6, 1985, Ser. No. 763,046

Int. Cl.<sup>4</sup> C07K 15/14

U.S. Cl. 530—395

1 Claim

1. A substantially purified cell surface receptor derived from mesenchymal tissue and capable of binding to a peptide containing the amino acid sequence Arg-Gly-Asp, comprising a glycoprotein composed of at least two polypeptides of about 115 and 125 kD, respectively, as determined by SDS-PAGE under reducing conditions which selectively binds to vitronectin, but not to fibronectin.

4,789,735

## CONJUGATE CONSTITUTED FROM A WALL ADHESIN OF S. MUTANS OF PROTEINIC NATURE AND FROM A POLYSACCHARIDE OF S. MUTANS. ITS PREPARATION AND ITS USE PARTICULARLY IN ANTI-CARIES VACCINES

Robert Frank, Strasbourg; Jean P. Klein, Breuschwickersheim, both of France; Fabienne Ackermans, and Hervé Bazin, both of Brussels, Belgium, assignors to Université Catholique de Louvain, Louvain La Neuve, Belgium and Institut National de la Santé et de la Recherche Médicale, Paris, France

Filed May 13, 1986, Ser. No. 862,919

Claims priority, application France, May 14, 1985, 85 07315

Int. Cl.<sup>4</sup> C07K 15/04; A61K 39/09

U.S. Cl. 530—395

12 Claims

1. A conjugate comprising a proteinic *Streptococcus mutans* wall adhesin covalently coupled to an *S. mutans* polysaccharide, said wall adhesin being capable of binding the components of saliva and consisting of a single polypeptide chain, common to the different *S. mutans* serotypes, with a molecular weight of about 74,000.

4,789,736

## COMPLEXES OF TECHNETIUM-99M WITH PROPYLENE AMINE OXIMES

Lewis R. Canning, Herts; David P. Nowotnik; Rudi D. Nelrinckx, both of Bucks, and Ian M. Piper, Herts, all of England, assignors to Amersham International plc, Bucks, England

Filed Mar. 11, 1986, Ser. No. 838,558

Claims priority, application United Kingdom, Mar. 11, 1985, 8506249; Apr. 12, 1985, 8509368

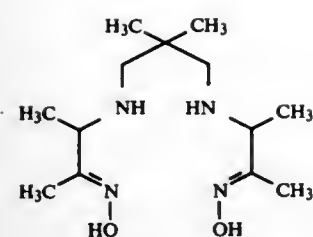
Int. Cl.<sup>4</sup> C07C 131/14, 131/08; C07F 17/00; A61K 49/02

U.S. Cl. 534—14

9 Claims

1. A lipophilic macrocyclic complex, useful as a diagnostic radiopharmaceutical, of technetium-99m with a propylene amine oxime ligand having the formula:





said complex being in the form of a single stereoisomer or a mixture of stereoisomers.

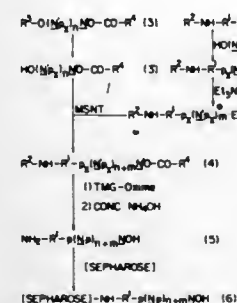
#### 4,789,737 OLIGONUCLEOTIDE DERIVATIVES AND PRODUCTION THEREOF

Kenichi Miyoshi, and Toru Fawa, both of Hiroshima, Japan, assignors to Wakunaga Seiyaku Kabushiki Kaisha, Osaka, Japan

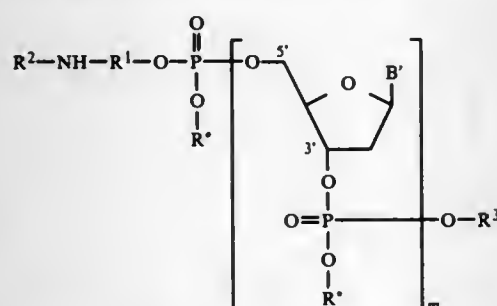
Continuation of Ser. No. 790,658, Oct. 24, 1985, Pat. No. 4,667,025. This application Feb. 20, 1987, Ser. No. 16,835  
Claims priority, application Japan, Aug. 9, 1982, 57-138136  
The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> C07H 21/04

U.S. Cl. 536—27



1. An oligonucleotide derivative of the formula:



wherein

R<sup>0</sup> is selected from the group consisting of o-chlorophenyl and p-chlorophenyl;  
R<sup>1</sup> is C<sub>2-20</sub> straight or branched alkylene;  
R<sup>2</sup> is selected from the group consisting of trifluoroacetyl and o-nitrophenyl sulphenyl;  
R<sup>3</sup> is cyanoethyl;  
B' may be the same or different and is selected from the group consisting of N<sup>6</sup>-benzoyladenine-9-yl, N<sup>4</sup>-benzoylcytosine-1-yl, N<sup>2</sup>-isobutyrylguanin-9-yl, and thymine-1-yl; and  
m is 2 to 6.

#### 4,789,738 STARCH OF WXFL1 GENOTYPE AND PRODUCTS PRODUCED THEREFROM

Robert B. Friedman, Chicago, Ill.; David J. Gottneid, Griffith, Ind.; Eugene J. Faron, Schererville, Ind.; Frank J. Pustek, Munster, Ind., and Frances R. Katz, Crown Point, Ind., assignors to American Maize-Products Company, Stamford, Conn.

Filed Jul. 2, 1987, Ser. No. 69,261  
Int. Cl.<sup>4</sup> A23L 1/195, 1/187

U.S. Cl. 536—102

15 Claims

1. A substantially pure starch extracted from a starch bearing plant having a waxy floury-1 genotype.

#### 4,789,739 PREPARATION OF POLYHALOCOPPER PHTHALOCYANINE PIGMENTS OF HIGH COLOR STRENGTH

Joachim Kranz, and Karl Schmiedl, both of Ludwigshafen, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Oct. 23, 1987, Ser. No. 111,615

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1986, 3636428

Int. Cl.<sup>4</sup> C09B 47/04, 47/08

U.S. Cl. 540—137

15 Claims

1. A process for the preparation of a polyhalocopper phthalocyanine pigment of high color strength by recrystallizing the finely divided agglomerated crude pigment in a heterogeneous aqueous organic phase, which is a mixture of an aliphatic ketone having a total of 3 to 9 carbon atoms and water, at elevated temperatures and isolating the pigment.

#### 4,789,740 HALOGENATION PROCESS FOR PREPARING 2-(OXOAZETIDINYL)-3-CHLOROMETHYL-3-BUTENO- ATE

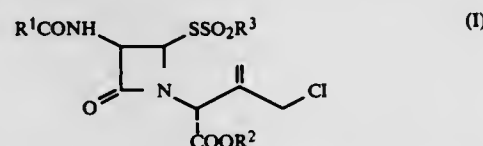
Sigero Torii; Hideo Tanaka, both of Okayama; Yuzuru Ogata, Tokushima; Michio Sasaoka, Tokushima; Norio Saito, Tokushima, and Shigemitsu Nagao, Tokushima, all of Japan, assignors to Otsuka Kagaku Yakuhin Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 861,626, May 7, 1986, abandoned, which is a continuation of Ser. No. 582,885, Feb. 23, 1984, abandoned. This application Mar. 9, 1987, Ser. No. 23,970  
Claims priority, application Japan, Mar. 10, 1983, 58-40179  
Int. Cl.<sup>4</sup> C07B 39/00; C07D 205/08

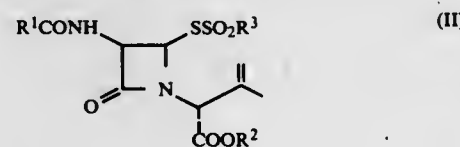
U.S. Cl. 540—358

12 Claims

1. A process for preparing an azetidinone derivative represented by the formula (I)



wherein R<sup>1</sup> represents an aryl group, arylmethyl group or aryloxymethyl group, R<sup>2</sup> represents hydrogen atom or a carboxyl-protecting group and R<sup>3</sup> represents an alkyl group or aryl group, the process comprising reacting an azetidinone derivative represented by the formula (II)



Wherein R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are as defined above with a chlorinat-

ing agent selected from the group Cl<sub>2</sub>, R<sup>4</sup>OCl wherein R<sup>4</sup> represents an alkyl group, HOCl and Cl<sub>2</sub>O.

#### 4,789,741 PROCESS FOR THE SYNTHESIS OF EPSILON-CAPROLACTAM

Francesco Cellini, Spinea; Vittorio Gervasutti, Mestre; Raffaele Tancorra, Venezia, and Sergio Tonti, Mestre, all of Italy, assignors to Montedipe S.p.A., Milan, Italy

Filed Mar. 7, 1988, Ser. No. 165,234

Claims priority, application Italy, Mar. 11, 1987, 19647 A/87  
Int. Cl.<sup>4</sup> C07D 201/04

U.S. Cl. 540—535

6 Claims

1. A process for the synthesis of caprolactam by reaction of cyclohexanone-oxime with an excess of oleum, achieved in a first step with a first portion of oxime and in the presence of liquid SO<sub>2</sub>, according to the usual "cold" technique, where the amount of free SO<sub>2</sub> in the oleum is equal to or greater than 50% b.w., characterized in that the "cold" step is completed by a second "hot" step, by adding a second portion of oxime, and in that the ratio between said second portion and said first portion of oxime ranges from 0.5 to 1.2.

#### 4,789,742 ISOMALEIMIDE AND ISOPHTHALIMIDE DERIVATIVES OF CHROMOPHORS

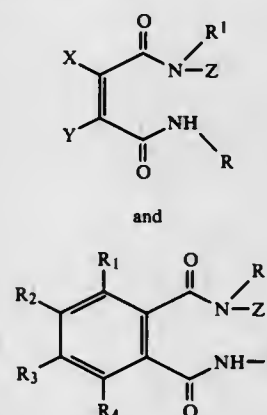
Spyros Theodoropoulos, 2964 Hickory St., Yorktown Heights, N.Y. 10598

Continuation-in-part of Ser. No. 644,564, Aug. 27, 1984, Pat. No. 4,600,775. This application Jul. 14, 1986, Ser. No. 885,079  
Int. Cl.<sup>4</sup> C07C 103/153, 103/24; C07D 265/38

U.S. Cl. 544—69

11 Claims

1. A compound selected from the group consisting of:



wherein R represents an organic chromophoric group exhibiting fluorescence, luminescence chemoluminescence or absorption properties; R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> individually represent hydrogen or halogen, or alkyl, aryl, hydroxyl, carboxyl, alkyl, or aryl-substituted or unsubstituted amino groups, nitro or sulfonic groups; X and Y represent hydrogen or halogen, or alkyl, aryl, alkoxy, aryloxy, carboxyl, hydroxyl, alkyl or aryl-substituted or unsubstituted amino groups, nitro or sulfonic groups, and Z represents an organic substrate free of chromophoric groups, and wherein



is derived from a primary or secondary amine.

#### 4,789,743 PROCESS FOR THE PREPARATION OF 2,4-DIAMINO-5-BENZYLPIRIMIDINES

Abram Becker, Raanana, Israel, assignor to Societe Anonyme: Sanofi Pharma S.A. - Succursale de Carouge, Geneva, Switzerland

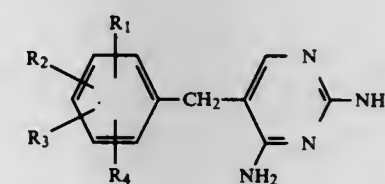
Filed Jul. 31, 1987, Ser. No. 80,083

Claims priority, application France, Aug. 8, 1986, 86 11533  
Int. Cl.<sup>4</sup> C07D 239/28

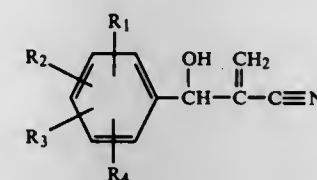
U.S. Cl. 544—325

18 Claims

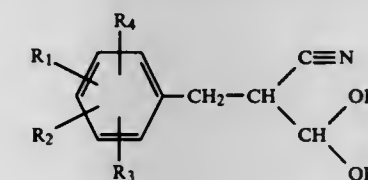
1. A process for the preparation of 2,4 diamino-5-benzylpyrimidines derivatives of formula I:



in which R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub>, which are identical or different, represent hydrogen, a C<sub>1</sub>—C<sub>4</sub> alkyl group, a C<sub>1</sub>—C<sub>4</sub> alkoxy-group, dialkylamino group in which the alkyl group is C<sub>1</sub>—C<sub>3</sub> or a halogen atom, or R<sub>1</sub> and R<sub>2</sub> together represent a methylenedioxy group, which comprises: (a) reacting, in a liquid phase, at a temperature between about 0° C. and about 80° C., a 3-hydroxy-2-methylenephylpropionitrile derivative of formula II:



in which each of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is defined as above, with 1 to 2.5 molar equivalents of an alkali metal alcoholate of formula ROM, in which M represents an alkali metal cation and R is a C<sub>1</sub>—C<sub>4</sub> alkyl group, in the presence of an ester of an aliphatic alcohol to give the compound of formula III:



in which each of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, and R<sub>4</sub> is defined as above; and (b) reacting the compound of formula III with guanidine at a temperature between about 80° C. and about 120° C.

#### 4,789,744 PROCESS FOR THE RESOLUTION OF ENANTIOMERIC ARYLOXYPHENOXY PROPIONATES

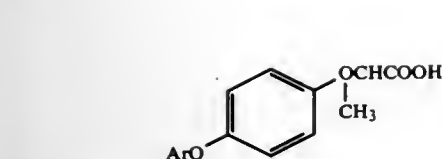
John W. Russell, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 5, 1987, Ser. No. 81,518

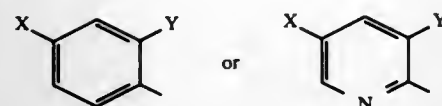
Int. Cl.<sup>4</sup> C07D 211/72; C07B 57/00; C07C 67/60  
U.S. Cl. 546—295

3 Claims

1. A process for the resolution of the enantiomers of a 2-(4-aryloxyphenoxy)propionic acid of the formula



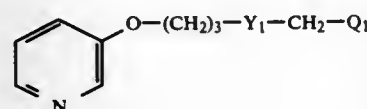
wherein  
Ar is



and X is CF<sub>3</sub>, F, Cl, Br or I  
and Y is H, F, Cl, Br or I  
or a C<sub>1</sub>-C<sub>4</sub> alkyl ester thereof which comprises converting a racemic or partially resolved mixture of said 2-(4-aryloxyphenoxy)propionic acid or C<sub>1</sub>-C<sub>4</sub> alkyl ester thereof to a pair of diastereomeric terpene esters by reaction with an optically active terpene alcohol and separating the diastereomers of the terpene esters by elution from a silica column with an eluent selected from the group consisting of hydrocarbons, halogenated hydrocarbons, water-saturated halogenated hydrocarbons and mixtures thereof.

**4,789,745**  
**CERTAIN 3-[3-(3-PYRIDINYLOXY)PROPOXY OR PROPYLTHIO]-ACETIC ACID DERIVATIVES WHICH ARE USEFUL AS SYNTHETASE INHIBITORS**  
Chia-Hong Lin, Portage, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.  
Continuation of Ser. No. 774,374, Sep. 9, 1985, abandoned, which is a continuation of Ser. No. 399,141, Jul. 16, 1982, abandoned. This application Oct. 16, 1987, Ser. No. 110,632  
Int. Cl.<sup>4</sup> C07D 213/65

U.S. Cl. 546—301 4 Claims  
1. A compound represented by the structural formula:

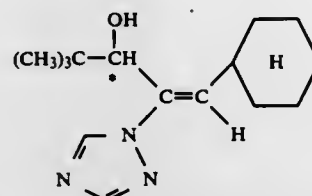


wherein Y<sub>1</sub> is  
(a) —O— or  
(b) —S—; and  
wherein Q<sub>1</sub> is  
(a) —CH<sub>2</sub>CH<sub>3</sub>, or  
(b) —CO<sub>2</sub>CH<sub>2</sub>CH<sub>3</sub>; and  
pharmacologically acceptable salts thereof.

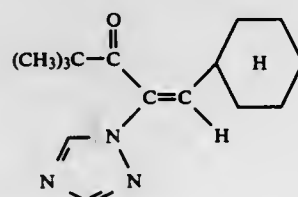
**4,789,746**  
**PROCESS FOR THE PREPARATION OF THE (+)-ANTIPODE OF (E)-1-CYCLOHEXYL-4,4-DIMETHYL-3-HYDROXY-2-(1,2,4-TRIAZOL-1-YL)-PENT-1-ENE**  
Udo Krantz, Leverkusen, and Peter Feyen, Mettmann, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Filed Mar. 3, 1986, Ser. No. 835,843  
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 3509824  
Int. Cl.<sup>4</sup> C07D 24/08

U.S. Cl. 548—262 5 Claims  
1. A process for the preparation of the (+)-antipode of

(E)-1-cyclohexyl-4,4-dimethyl-3-hydroxy-2-(1,2,4-triazol-1-yl)-pent-1-ene of the formula



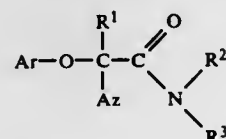
which comprises reacting the (E)-isomer of 1-cyclohexyl-4,4-dimethyl-2-(1,2,4-triazol-1-yl)-pent-1-en-3-one of the formula



with lithium aluminum hydride in the presence of an inert organic diluent and in the presence of the (+)-antipode of N-methyl-ephedrine and in the presence of N-ethyl-aniline at a temperature between -80° C. and +50° C.

**4,789,747**  
**CONTROL OF UNWANTED PLANT GROWTH WITH 2-ARYLOXY-2-AZOLYLALKANECARBOXAMIDES, HERBICIDES CONTAINING THEM, AND THE MANUFACTURE THEREOF**  
Gerd Husslein, Bad Dürkheim; Eberhard Ammermann, Ludwigshafen; Gerhard Hampprecht, Weinheim, and Bruno Wuerzer, Otterstadt, all, Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Continuation of Ser. No. 321,640, Nov. 16, 1981, abandoned, and a continuation-in-part of Ser. No. 310,402, Oct. 9, 1981, Pat. No. 4,515,623. This application Dec. 8, 1986, Ser. No. 940,222  
Claims priority, application Fed. Rep. of Germany, Nov. 5, 1980, 3041702  
Int. Cl.<sup>4</sup> C07D 249/04

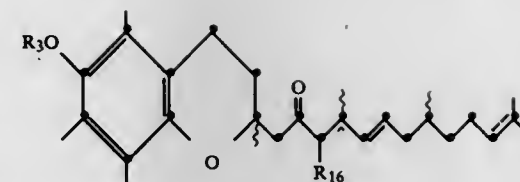
U.S. Cl. 548—262 2 Claims  
1. A compound of the formula



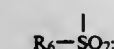
where Ar is 3,5-dichlorophenyl or 3,5-dimethylphenyl, R<sup>1</sup> is hydrogen or methyl, R<sup>2</sup> is hydrogen or C<sub>1</sub>-C<sub>10</sub>-alkyl, R<sup>3</sup> is C<sub>3</sub>-C<sub>10</sub> alkyl and Az is triazole which is unsubstituted or substituted by halogen or methyl.

**4,789,748**  
**PROCESS FOR PREPARING ELECTRICALLY CONDUCTIVE POLY(ISOETHIANAPHTHENE) FROM 1,3-DIHYDROISOETHIANAPHTHENE**  
Kwan-Yue A. Jen, Flanders, and Ronald L. Eisenbaumer, Morristown, both of N.J., assignors to Allied-Signal, Inc., Morris Township, Morris County, N.J.  
Filed Oct. 17, 1985, Ser. No. 788,372  
Int. Cl.<sup>4</sup> C07D 409/00

U.S. Cl. 549—58 9 Claims  
1. A process for preparing conductive poly(isoethianaphthene) which comprises exposing 1,3-poly(isoethianaphthene) to an oxidizing/doping agent selected from the group consisting of oxygen and oxidant/dopants.



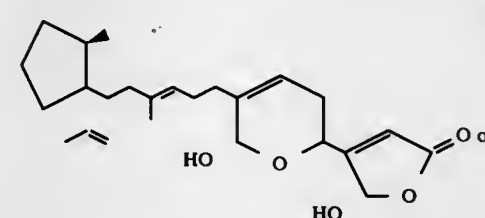
wherein R<sub>16</sub> is hydrogen, —COOR<sub>4</sub> or



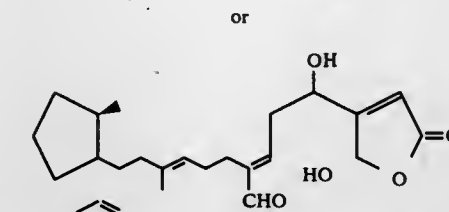
the dotted line forms either a saturated single or an unsaturated double bond; R<sub>3</sub> taken together with its attached oxygen forms an ether hydroxy protecting group; R<sub>4</sub> is lower alkyl and R<sub>6</sub> is lower alkyl or aryl.

**4,789,749**  
**MANOALIDE ANALOGS**  
Robert S. Jacobs, Santa Barbara, and D. John Faulkner, La Jolla, both of Calif., assignors to The Regents of the University of California, Calif.  
Continuation-in-part of Ser. No. 621,879, Jun. 18, 1984, Pat. No. 4,616,089, which is a continuation-in-part of Ser. No. 519,853, Aug. 3, 1983, abandoned. This application Feb. 19, 1986, Ser. No. 830,994  
Int. Cl.<sup>4</sup> C07D 407/04, 307/60

U.S. Cl. 549—313 1 Claim  
1. An isolated compound of the formula



Luffariellin A



Luffariellin B

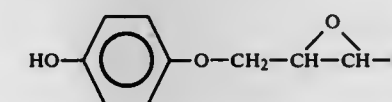
and the pharmaceutically acceptable 1-6C alkanoyl and 3-6C alkenoyl esters thereof.

**4,789,750**  
**2-(TRIMETHYL-TRIDECENYL)-TETRAMETHYLCHROMAN INTERMEDIATES FOR VITAMIN E**  
David L. Coffen, Glen Ridge, N.J.; Rudolf Schmid, Munchenstein, Switzerland, and Mark J. Sebastian, Plainfield, N.J., assignors to Hoffman-La Roche Inc., Nutley, N.J.  
Filed Mar. 27, 1987, Ser. No. 30,798  
Int. Cl.<sup>4</sup> C07D 311/72

U.S. Cl. 549—407 16 Claims  
1. A compound of the formula:

**4,789,751**  
**SYNTHESIS OF NEW LIQUID CRYSTAL MATERIALS POSSESSING PHENYLBENZOATE OR BIPHENYL CORE UNITS AND (2,3-EPOALKYLOXIRANE METHANOL CHIRAL TAILS**  
David M. Walba, and Rohini Vohra, both of Boulder, Colo., assignors to University Patents, Inc., Westport, Conn.  
Division of Ser. No. 925,937, Oct. 31, 1986, Pat. No. 4,705,874, which is a division of Ser. No. 782,348, Oct. 1, 1985, Pat. No. 4,638,073. This application Nov. 2, 1987, Ser. No. 115,482  
Int. Cl.<sup>4</sup> C07D 303/18; C09K 19/52

U.S. Cl. 549—560 13 Claims  
1. An optically active compound of the formula:



wherein R is an alkyl containing one to twelve carbon atoms.

**4,789,752**  
**METHOD FOR THE PREPARATION OF ORTHOESTERS OF TITANIUM, ZIRCONIUM OR HAFNIUM**  
Hans-Joachim Kötzsch, Rheinfelden; Hans-Günther Srebnay, Stolzeau, and Hans-Joachim Vahlensieck, Weir, all of Fed. Rep. of Germany, assignors to Huels Troisdorf Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany  
Filed Jun. 25, 1986, Ser. No. 878,198  
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1985, 3522904  
Int. Cl.<sup>4</sup> C07F 7/00, 7/28

U.S. Cl. 556—54 16 Claims  
1. A method for the preparation of alkyl orthoesters of titanium, zirconium or hafnium in two esterification steps, wherein, in the first esterification step, titanium, zirconium or hafnium tetrahalides are partially esterified with alcohols in the absence of acid acceptors, in the presence of a solvent, with the splitting off of hydrogen halide, and then the esterification is completed with the aid of acid acceptors, said first esterification step comprising introducing the alcohol into boiling solvent containing the tetrahalides in a manner such that no appreciable contact with the gas phase above the boiling solvent takes place, and in a molar ratio of tetrahalide to alcohol of between 1:2 to 1:4, and the second esterification step comprises completing the esterification by adding acid acceptors to the solvent mixture after the hydrogen halide has been split off.



4,789,753

## PHOSPHITE LIGANDS

Ernst Billig; Anthony G. Abatjoglo, both of Charleston; David R. Bryant, South Charleston; Rex E. Murray, and John M. Maher, both of Charleston, all of W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

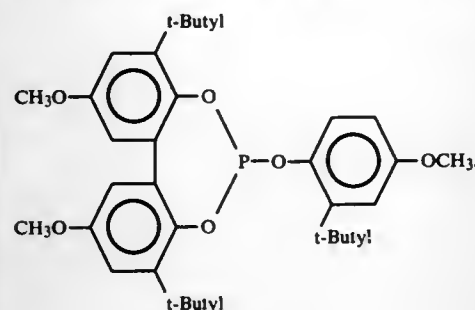
Division of Ser. No. 865,061, May 20, 1986, Pat. No. 4,717,775, which is a continuation-in-part of Ser. No. 685,025, Dec. 28, 1984, Pat. No. 4,599,206, which is a continuation-in-part of Ser. No. 581,352, Feb. 17, 1984, abandoned. This application Oct. 13, 1987, Ser. No. 107,455

Int. Cl.<sup>4</sup> C07F 9/15

U.S. Cl. 558—85

1 Claim

1. A diorganophosphite ligand having the formula



4,789,754

## PESTICIDE INTERMEDIATES

Michael Elliott, Stevenage; Norman F. Jones, Luton; Richard L. Elliott, Great Bookham; Bhupinder P. S. Khambay, Harrow Weald, and David A. Pulman, Caddington, all of England, assignors to National Research Development Corporation, London, England

Division of Ser. No. 517,393, Jul. 26, 1983, Pat. No. 4,594,355.

This application Apr. 7, 1986, Ser. No. 849,070

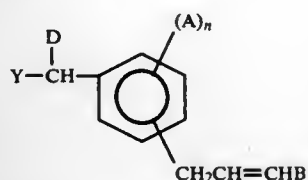
Claims priority, application United Kingdom, Jul. 29, 1982, 8221860

Int. Cl.<sup>4</sup> C07C 121/52

U.S. Cl. 558—388

6 Claims

1. A compound of the formula:



wherein

Y represents OH;

D represents hydrogen or a cyano group;

B represents hydrogen or a methyl, ethyl or vinyl group;

A represents methyl;

n is 0, 1 or 2;

with the proviso that

- (1) when the  $\text{CH}_2\text{CH}=\text{CHB}$  group is in the 4-position with respect to the  $\text{CHDY}$  group, the D must be hydrogen and B must be methyl, ethyl or vinyl and the configuration about the double bond in the  $\text{CH}=\text{CHB}$  group must be Z and
- (2) when the group  $\text{CH}_2\text{CH}=\text{CHB}$  is in the 3-position with respect to the  $\text{CHDY}$  group and D is CN, then n must be 0 and
- (3) when the group  $\text{CH}_2\text{CH}=\text{CHB}$  is in the 2 or 3-position with respect to the  $\text{CHDY}$  group, then D is CN.

4,789,755

## PROCESS FOR THE PREPARATION OF STILBENEDICARBOXYLATE DERIVATIVES

Dale E. Van Sickle; John C. Morris, both of Kingsport, Tenn.; Marvin A. McCall, Cape Coral, Fla.; Jean C. Fleischer, and Ted R. Walker, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

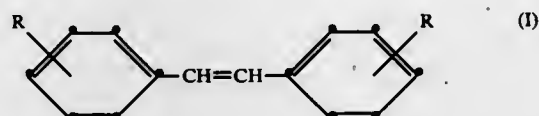
Filed Oct. 7, 1987, Ser. No. 105,416

Int. Cl.<sup>4</sup> C07C 67/52, 67/39

U.S. Cl. 560—78

25 Claims

1. A process for preparation of an ester compound of the formula:



wherein R is bonded at the meta or para positions, and is a group of the formula  $-\text{COOR}'$  wherein  $\text{R}'$  is methyl or phenyl,

comprising reacting a compound of the formula:



wherein R is as defined hereinabove, with elemental sulfur, wherein Compound II is initially present at a molar excess relative to sulphur of at least about 5:1, and hydrogen sulfide produced during the reaction is removed from the reaction zone, said process occurring under an inert atmosphere and under reaction conditions such that Compound I is formed.

24. A process for purifying a para or meta diphenyl ester derivative of stilbenedicarboxylic acid from a reaction product containing a dimethyl ester stilbene derivative starting material, diphenyl acetate, a catalyst and reaction by-products comprising recrystallizing said reaction product using an appropriate solvent containing dimethylformamide.

4,789,756

## PROCESS FOR THE PREPARATION OF AN ESTER OF A 3-ARYL-SUBSTITUTED ACRYLIC ACID

Elt Drent, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Jan. 6, 1988, Ser. No. 141,181

Claims priority, application United Kingdom, Jan. 20, 1987, 8701198

Int. Cl.<sup>4</sup> C07C 69/76

U.S. Cl. 560—104

30 Claims

1. A process for the preparation of an ester of a 3-aryl-substituted acrylic acid which comprises reacting (a) an aromatic hydrocarbon containing a 1-alkenyl group with at least one hydrogen atom in beta-position, (b) carbon monoxide and (c) an alcohol, at a partial pressure of carbon monoxide below about 10 bar, in the presence of:

4,789,758

## PROCESS FOR THE PRODUCTION OF AN

N-PROTECTED-L- $\alpha$ -ASPARTYL-L-PHENYLALANINE

Tadashi Takemoto; Toshihide Yukawa, and Kunio Hisamitsu, all of Kawasaki, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Division of Ser. No. 883,354, Jul. 1, 1986, Pat. No. 4,740,616, which is a continuation-in-part of Ser. No. 872,020, Jun. 9, 1986, abandoned. This application Oct. 13, 1987, Ser. No. 106,801

Claims priority, application Japan, Jan. 7, 1985, 60-144137

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> C07C 99/00

## N-FORMYLATION OF AMINO CARBOXYLIC COMPOUNDS WITH FORMAMIDE

Charles G. Carter, Columbia, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Jan. 17, 1987, Ser. No. 74,751

Int. Cl.<sup>4</sup> C07C 99/00

U.S. Cl. 562—445

11 Claims

1. A process for N-formylating an amino carboxylic acid consisting of reacting a slurry of said amino carboxylic acid in formamide at temperatures from above about 50° C. to below 100° C.

U.S. Cl. 562—448

20 Claims

1. A process for producing a N-protected-L- $\alpha$ -aspartyl-L-phenylalanine compound, comprising:

reacting a N-protected-L-aspartic anhydride and a L-phenylalanine salt in an aqueous medium, wherein said L-phenylalanine salt is an alkali metal salt, an alkaline earth metal salt, an organic amine salt, or an ammonium salt; and obtaining a N-protected-L- $\alpha$ -aspartyl-L-phenylalanine salt.

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## ELECTRICAL

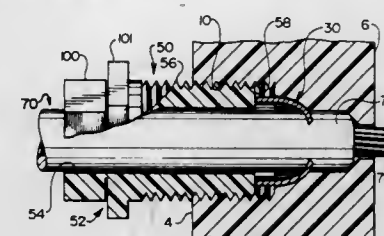
### 4,789,759 ASSEMBLY FOR AN ELECTRICAL CABLE PROVIDING STRAIN RELIEF AND A WATER-TIGHT SEAL

Marvin H. Jones, Dillsburg, Pa., assignor to AMP Incorporated,  
Harrisburg, Pa.

Continuation-in-part of Ser. No. 843,908, Mar. 25, 1986,  
abandoned. This application Nov. 23, 1987, Ser. No. 123,680  
Int. Cl. F16B 31/02; H02G 15/007

U.S. Cl. 174—65 SS

20 Claims



1. An assembly for establishing a sealed interconnection for an insulated electrical cable, the assembly comprising:
  - a bulkhead, having a through-hole extending from an outside to an inside surface and having three concentric bores, a first bore being internally threaded and extending from the outside surface into the bulkhead, a second bore spaced apart from the first bore by a camming surface, and a third bore in transition with the second bore by means of a shoulder, the third bore extending to the inside surface;
  - a nut portion having an axial bore extending therethrough, said bore having a diameter greater than the diameter of said insulated cable, and an externally threaded portion mateable with said internal threads on said first bore; and
  - a ferrule of cylindrical shape having a band portion and a plurality of radially disposed tines extending from said band portion in an axial direction, said ferrule being slidably receivable over said insulated cable; whereby
 when said cable is prepared by removing a portion of the insulation therefrom exposing a length of the conductor, the nut portion and the ferrule are slid over the prepared end of the cable, and the cable inserted into the through-hole until the insulation abuts the shoulder and the conductor extends through the third bore, bringing the threads of said nut into registry with the threads of the first bore and screwing the nut forward into the through-hole causes the tines of said ferrule to contact the camming surface and forces the tines radially inward and into the insulation of the cable, and drives the insulation axially forward against the shoulder, thereby establishing a sealed interconnection.

11. An assembly for assuring a proper strain relief for interconnection of an insulated electrical cable in a bulkhead such that the cable will withstand a desired minimum axial pull-out force, comprising:
  - a nut having an externally-threaded portion and further having an axial bore formed therethrough for receiving an electrical cable;
  - a bore in the bulkhead having a first portion provided with internal threads adapted to receive the externally-threaded portion of the nut, the bulkhead bore further having a forward portion;
  - a member adapted for receiving the electrical cable therethrough and to be disposed in the bore of the bulkhead between the nut and the forward bore portion, wherein the member has at least a portion thereof adapted to be compressed radially inwardly thereof to engage the cable received therethrough and to prevent the cable from being pulled out of the bulkhead upon the application of a desired minimum axial pull-out force on the cable, thereby providing a proper strain relief for the cable;

- the nut having a first wrench-engaging portion formed integrally therewith for facilitating rotation of the nut in a first direction into the threaded portion of the bore in the bulkhead, wherein the first wrench-engaging portion of

the nut is adapted to fracture at a predetermined torque level corresponding at least to the desired minimum axial pull-out force on the cable, thereby preventing further rotation of the nut in the first direction while still maintaining the structural integrity of the nut; and  
the nut further having a second wrench-engaging portion formed integrally therewith for facilitating rotation of the nut in a second and opposite direction for removing the nut from the bulkhead.

### 4,789,760 VIA IN A PLANARIZED DIELECTRIC AND PROCESS FOR PRODUCING SAME

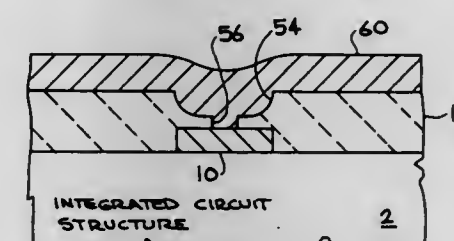
Linda J. Koyama, Sunnyvale; Mammeu Thomas, and Harry J. Levinson, both of San Jose, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Apr. 30, 1985, Ser. No. 728,962

Int. Cl. H05K 1/00

U.S. Cl. 174—68.5

7 Claims



1. An improved integrated circuit structure having an interconnection of adjacent metal layers wherein a first metal layer is coated with a dielectric material and another metal layer is applied over the dielectric layer, said interconnection comprising a filled via electrically interconnecting at least a portion of said first metal layer with at least a portion of said second metal layer and having a first segment of constant width dimension adjacent said first metal layer and an enlarged generally hemispherical shaped second segment adjacent said second metal layer formed by masking said dielectric with a mask having an opening conforming to said first segment and isotropically etching a portion of the dielectric through the mask to provide said generally hemispherical shaped enlarged second segment adjacent the upper surface of the dielectric.

### 4,789,761 APPLIANCE TIMER

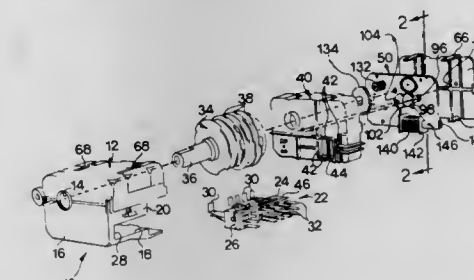
Charles F. Malone, Franklin, and Larry M. Durham, Nashville, both of Tenn., assignors to Scott Fetzer Company, Westlake, Ohio

Filed Jun. 22, 1987, Ser. No. 64,618

Int. Cl. H01H 7/08

U.S. Cl. 200—38 C

13 Claims

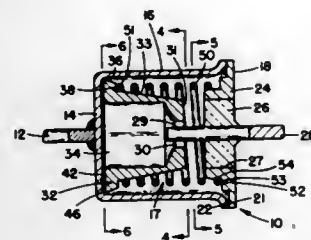


1. A motor assembly comprising a substantially planar field plate having means defining a first aperture therethrough and



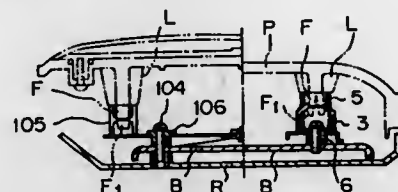
defining a plurality of salient field poles, a permanently magnetic disc rotor mounted for rotation within said aperture, said rotor having an axially projecting drive shaft, first gear means mounted on said rotor, second gear means rotatably mounted on said field plate and being in driving engagement with said first gear means.

**4,789,762**  
**MINIATURE MULTIPLANAR ACCELERATION SWITCH**  
James R. Miller, Center Moriches, and Leonard P. Tetrault, Northport, both of N.Y., assignors to Aerodyne Controls Corporation, Ronkonkoma, N.Y.  
Filed Feb. 9, 1988, Ser. No. 159,531  
Int. Cl.<sup>4</sup> H01H 35/14  
U.S. Cl. 200—61.45 R 9 Claims



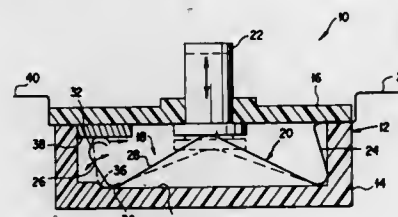
1. A miniature multiplanar acceleration switch, comprising:
  - a hollow cylindrical electrically conductive metal shell closed at one end and open at its other end to define a cylindrical chamber therein;
  - an electrically conductive metal mass movable in said chamber, said mass having a generally cylindrical body axially aligned with that of said chamber, said body having a radially extending annular flange at one end thereof disposed at said closed end of said shell and arranged to permit said body to tilt to dispose its axis at an angle to said axis of said shell, said flange defining a continuous annular shoulder facing the other end of said shell, and a bore in the other end of said body defining a circular hole whose center registers with said axis of said body and whose rim is equally spaced radially at all points from said axis of said body;
  - a header closing said chamber at the other end of said shell, said header having an electrically conductive metal ring secured to said shell, and a central insulator bonded to and inside of said ring;
  - said body having a frustoconical wall extending from said shoulder and tapering inwardly radially toward said header;
  - a circuit lead extending axially through said insulator and bonded thereto, said lead having a pin-like tip end projecting axially into said bore centrally thereof; and
  - a cylindrical, electrically conductive coil spring in said chamber extending axially thereof and surrounding a major portion of said mass, opposite end turns of said spring being disposed respectively at said shoulder of said annular flange and at said ring of said header, said spring biasing said body against said closed end of said shell, all intermediate turns of said spring being spaced radially from said body at all positions of tilt of said mass in said chamber;
- whereby said mass tilts angularly to said axis of said chamber when a force of acceleration is directed laterally to said mass in a direction other than one parallel to said axis of said body, to cause direct contact between said tip of said circuit lead and the rim of said hole in said body before any of said intermediate turns of said spring can contact said body.

**4,789,763**  
**HORN SWITCH SYSTEM OF STEERING WHEEL**  
Atsushi Nagata, Nagoya, and Takahiro Hashiba, Ama, both of Japan, assignors to Toyota Gosei Co., Ltd., Nishikasugai, Japan  
Filed Jul. 17, 1987, Ser. No. 75,069  
Claims priority, application Japan, Aug. 21, 1986, 61-194059; Aug. 28, 1986, 61-200108  
Int. Cl.<sup>4</sup> H01H 9/00  
U.S. Cl. 200—61.54 10 Claims



1. A steering wheel horn switch system comprising:
  - a pad mounted in a steering wheel and having a pad leg;
  - an electrode plate mounted in the steering wheel;
  - a contact plate mounted in the steering wheel and having a terminal;
  - a pad leg receiver for said pad leg, said pad leg receiver being cylindrical and having a projecting engagement portion on an inner circumference thereof for engaging a projecting portion of the pad leg, said pad leg receiver being fixed at a lower end thereof and supporting at an upper end thereof a portion of said pad;
  - a push up spring mounted concentrically with said pad leg receiver, intermediate said pad leg receiver and said electrode plate whereby said pad leg receiver is pushed down against the force of said push up spring;
  - whereby said terminal of said contact plate comes into electrical contact with said electrode plate when the pad is depressed and the pad leg receiver is pushed down.

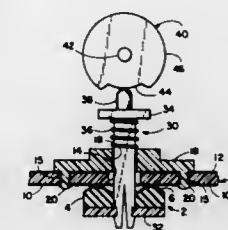
**4,789,764**  
**PUSHBUTTON SWITCH WITH RESILIENT EXTENSIBLE PIVOTABLE CONTACT ELEMENT**  
Jacek P. Doros, Chicago, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.  
Filed Dec. 21, 1987, Ser. No. 136,013  
Int. Cl.<sup>4</sup> H01H 13/52  
U.S. Cl. 200—159 A 5 Claims



1. A switch comprising:
  - a housing including a ramp;
  - actuator means mounted in said housing for movement between an unactuated position and an actuated position;
  - at least one stationary contact terminal mounted in said housing;
  - a resilient concavo-convex contact element mounted in said housing contacted substantially at the center of its convex surface by said actuator means, said contact element being generally extensible upon actuation by said actuator means and including a contact portion extending from one end of said contact element having a free end spaced from said stationary contact terminal in the unactuated position,

said contact element contacts said ramp upon extension and said contact portion pivots upon contact of said contact element with said ramp whereby said free end of said contact portion wipingly contacts said stationary contact terminal.

**4,789,765**  
**SWITCH DEVICE**  
William E. Berg, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.  
Continuation of Ser. No. 854,442, Apr. 21, 1986, abandoned.  
This application Aug. 20, 1987, Ser. No. 88,545  
Int. Cl.<sup>4</sup> H01H 1/24  
U.S. Cl. 200—245 6 Claims

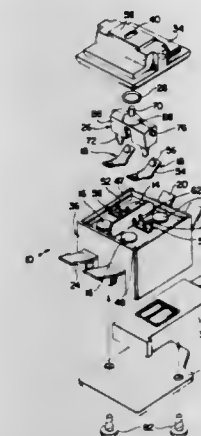


1. A switch assembly comprising a circuit board having two conductor runs on one main surface thereof, and a switch device for providing electrical connection between said conductor runs, said switch device comprising:
  - a block of resilient dielectric material having one surface presented towards said one main surface of the circuit board and having at said one surface two ridges which project towards the conductor runs respectively,
  - a strip of conductive material adhered to said one surface of the block and extending across said ridges,
  - a support member carrying the block of resilient material, the support member being movable relative to the circuit board between a first position in which the block of resilient material is compressed and the strip of conductive material is held in electrically-conductive pressure contact with the conductor runs by the block of resilient material, and a second position in which the strip of conductive material is spaced from at least one of the conductor runs, and
  - a resilient member urging the support member in the direction from its second position towards its first position.

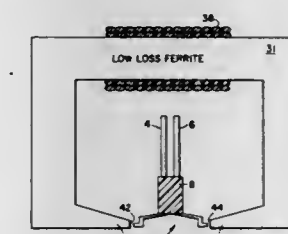
**4,789,766**  
**WATER-RESISTANT SWITCH CONSTRUCTION**  
W. Barry Krause, Spotsylvania, Va., assignor to Tower Manufacturing Corporation, Providence, R.I.  
Filed Nov. 24, 1987, Ser. No. 124,881  
Int. Cl.<sup>4</sup> H01H 27/08  
U.S. Cl. 200—302.3 5 Claims

1. In a switch construction of a type comprising a housing including first and second molded, plastic housing sections, said first housing section having an aperture therethrough, fixed and movable contacts in said housing, first and second electrical terminals on the exterior of said housing electrically connected to said fixed and movable contacts, respectively, and an actuator pivotably mounted in said housing, said actuator including an actuator arm which passes through said aperture in said first housing section, said actuator arm being manipulatable from the exterior of said housing for pivoting said actuator to move said movable contact between a first position wherein it is in engagement with said fixed contact and a second position wherein it is in spaced disengagement therefrom, the improvement comprising an O-ring mounted in the interior of said first housing section and extending around said aperture, said actuator further comprising an elongated body portion, a pair of aligned pivot pins, one of said pivot pins extending outwardly from each end of said body portion, said

pivot pins being rotatably received in said first housing section for pivotably mounting said actuator therein, a substantially hemispherical portion on said actuator body portion, said O-ring engaging said substantially hemispherical portion to effect a seal between said actuator and said first housing section

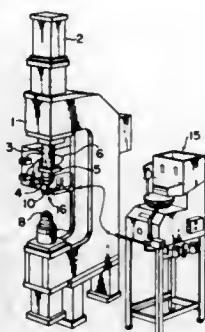


**4,789,767**  
**AUTOREGULATING MULTI CONTACT INDUCTION HEATER**  
Frank A. Doljack, Pleasanton, Calif., assignor to Metcal, Inc., Menlo Park, Calif.  
Filed Jun. 8, 1987, Ser. No. 59,767  
Int. Cl.<sup>4</sup> H05B 6/40; B23K 1/00  
U.S. Cl. 219—9.5 6 Claims



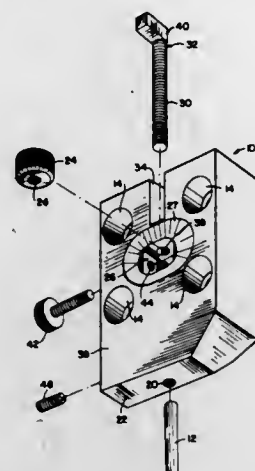
1. In a device for soldering a multipin connector to a support wherein the multipin connector has a plurality of contacts for establishing electrical contact between pins of the connector and conductors on a support, each contact having a ferromagnetic material thereon with an effective Curie temperature above the melting point of a fusible material employed to secure each contact to a conductor of a support, an energizer comprising
  - a core of a high electrical impedance, high permeability material,
  - said core having opposed poles defining an air gap of approximately the size of said contacts of said multipin connector to be heated,
  - each said pole having pole pieces spaced apart by said distance equal to the spacing between contacts of a multipin connector, and
  - a coil wound to establish flux across said air gap, said coil being adapted to be connected across a source of alternating current.

**4,789,768**  
**PROJECTION WELDER**  
 Hideaki Tobita, Toyota; Kazuo Naruse, Okazaki, and Shigeru Yajima, Nagoya, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan and Yajima Kogyo, Inc., Aichi, Japan  
 Filed Dec. 9, 1986, Ser. No. 939,730  
 Int. Cl.<sup>4</sup> B23K 11/14  
 U.S. Cl. 219—78.01 9 Claims



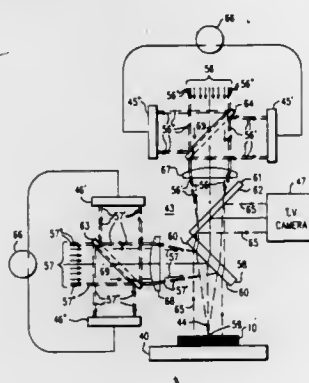
1. A projection welder, comprising:  
 a main body;  
 a pair of welding members connected to said main body, each of said members having a welding surface opposing each other;  
 at least one of said pair of members being movable relative to the other in opposite directions into and out of welding position, one of said pair of members having a central bore opening into the welding surface thereof, and the other of said pair of members being disposed to engage on the welding surface thereof a first metallic workpiece;  
 a guide pin, slidably mounted in said central bore, said guide pin being movable in said central bore in one direction for projecting out of said central bore beyond the welding surface of said one member without engaging the other welding member, and movable in a second direction opposite said one direction of withdrawing into the bore;  
 guide pin moving means, when operated to a first condition, moving said guide pin in said one direction, and when operated to a second condition, moving said guide pin in said second direction;  
 workpiece feeding means, when activated, for feeding a second workpiece having a central opening into engagement with the welding surface of said one member having the central bore;  
 welding member moving means, when operated to a first condition, moving at least one member for bringing said positioned second workpiece and said first workpiece into welding engagement with each other, and when operated to a second condition, moving said at least one member out of welding engagement;  
 welding current applying means, when operated to a first condition, for applying welding current to said first and second workpieces, and when operated to a second condition, for stopping the application of the welding current; and  
 control means, including:  
 first circuit means for activating said workpiece feeding means at times when said guide pin moving means is operated to the first condition for positioning said second workpiece relative to the projected guide pin; and  
 second circuit means for operating said guide pin moving means to the second condition at times when said welding current means is operated to the first condition for avoiding shunting of the welding current through said guide pin.

**4,789,769**  
**ADJUSTABLE ELECTRODE HOLDER**  
 Allan Warner, 50 Haliday St., Clark, N.J. 07066  
 Continuation of Ser. No. 808,523, Dec. 13, 1985, abandoned.  
 This application Jul. 21, 1987, Ser. No. 77,033  
 Int. Cl.<sup>4</sup> B23K 9/32  
 U.S. Cl. 219—86.25 19 Claims



1. A combination comprising a fusing machine and an electrode holder secured to said fusing machine in an operative position thereon, said electrode holder having a first hole for receiving an electrode, positioning means extending into said first hole for positioning said electrode in said first hole, and adjusting means for adjusting the extent to which said positioning means extends into said first hole while said electrode holder is in operative position on said fusing machine, whereby said adjusting means cooperates with said positioning means to permit the adjustment of the position of said electrode relative to said electrode holder while said electrode holder is mounted in said operative position on said fusing machine.

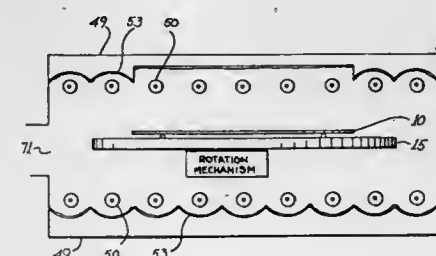
**4,789,770**  
**CONTROLLED DEPTH LASER DRILLING SYSTEM**  
 William H. Kasner, Penn Hills; James F. Roach, Oakmont, and Vincent A. Toth, Penn Township, Westmoreland County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
 Filed Jul. 15, 1987, Ser. No. 73,610  
 Int. Cl.<sup>4</sup> B23K 26/00  
 U.S. Cl. 219—121.7 18 Claims



1. A controlled depth laser drilling system for a workpiece which contains metallic conductors and a substrate, the laser drilling system comprising:

(1) a first laser transmitting means for emitting an original laser beam capable of penetrating metal and substrate material, where the substrate comprises organic resin impregnated fibrous material, and a second laser transmitting means for emitting an original laser beam capable of penetrating substrate material but substantially reflective from metal where a portion of said laser beams will be reflected from the workpiece;  
 (2) drilling depth monitoring means comprising optical means capable of: (a) focusing each laser beam on the workpiece, (b) reflecting a portion of both original laser beams into a first set of radiation detector means, and (c) reflecting a portion of both laser beams reflected from the workpiece into a second set of radiation detector means, where both sets of detector means are capable of converting received radiation into an electrical signal; and  
 (3) means to measure said electrical signals.

**4,789,771**  
**METHOD AND APPARATUS FOR SUBSTRATE HEATING IN AN AXIALLY SYMMETRIC EPITAXIAL DEPOSITION APPARATUS**  
 McDonald Robinson, Paradise Valley; Ronald D. Behee, Tempe, both of Ariz.; Wiebe B. deBoer, Amersfoort, Netherlands, and Wayne L. Johnson, Phoenix, Ariz., assignors to Epsilon Limited Partnership, Tempe, Ariz.  
 Division of Ser. No. 784,739, Oct. 7, 1985, Pat. No. 4,654,509.  
 This application Mar. 27, 1987, Ser. No. 31,519  
 Int. Cl.<sup>4</sup> F27B 5/14; F27D 11/02  
 U.S. Cl. 219—405 20 Claims

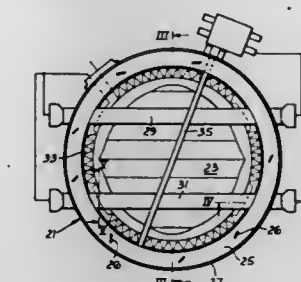


1. An apparatus for heating a substantially circular substrate, comprising:  
 a chamber positioned generally along an axis of a substrate and substantially on one side of said substrate;  
 a plurality of heating lamps extending through said chamber;  
 a coating for reflecting radiation from said heating lamps into said chamber;  
 a single-substrate susceptor disposed within said chamber and supporting the substantially circular substrate; and  
 rotation means for rotating said single-substrate susceptor and the substantially circular substrate about their central axis.

**4,789,772**  
**INFRA-RED HEATERS**  
 Joseph A. McWilliams, Droitwich, United Kingdom, assignor to Micropore International Limited, Droitwich, United Kingdom  
 PCT No. PCT/GB86/00322, § 371 Date Dec. 29, 1986, § 102(e) Date Dec. 29, 1986, PCT Pub. No. WO86/07519, PCT Pub. Date Dec. 18, 1986  
 PCT Filed Jun. 6, 1986, Ser. No. 2,795  
 Claims priority, application United Kingdom, Jun. 11, 1985, 8514785  
 Int. Cl.<sup>4</sup> H05B 3/74 29 Claims

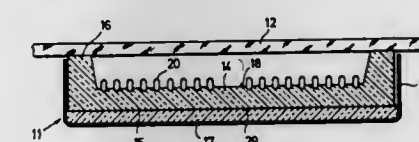
1. An infra-red heater for a glass ceramic top cooker, which heater comprises:  
 a dish;  
 a base layer of microporous thermal insulating material sup-

ported in the dish and having an upper surface and two generally concave depressions extending below said surface;  
 a peripheral wall of thermal insulating material extending around the periphery of the base layer;  
 two-infra-red lamps each extending across the base layer above one of said depressions;  
 said lamps having filaments which together have a first electrical resistance when the lamps are at ambient temperature and a second electrical resistance higher than said first resistance when the lamps are at operating temperature;



a ballast device comprising a coil of electrical resistance wire extending around said heater adjacent said peripheral wall;  
 means coupling said ballast device in series with said infra-red lamps;  
 said ballast device having an electrical resistance approximately half said second electrical resistance of said filaments, whereby said ballast device limits inrush current upon energization of said lamps when said filaments are in their first electrical resistance condition; and  
 a thermal output device connected to said lamps for controlling energization thereof in accordance with temperature.

**4,789,773**  
**ELECTRICAL RADIANT HEATER FOR HEATING HEATING SURFACES**  
 Bernhard Mikschl, Sulzfeld, Fed. Rep. of Germany, assignor to E.G.O. Elektro-Geräte Blanc u. Fischer, Fed. Rep. of Germany  
 Filed Jul. 18, 1986, Ser. No. 887,255  
 Claims priority, application Fed. Rep. of Germany, Jul. 31, 1985, 3527413  
 Int. Cl.<sup>4</sup> H05B 3/96 15 Claims



1. Electric radiant heater for heating heating surfaces, comprising an insulator made from electrically and thermally insulating material, at least one heater coil having numerous spaced turns of electrical resistance wire being partly embedded in a surface of said insulator, the heater coil having a substantially oval coil cross-section having a cross-sectional major and a minor axis and with two facing sides each having a respective cross-sectional major and minor curvature, a portion of the heater coil being embedded at the heater coil side of major curvature whereby major axis of the coil cross-section is directed away from said surface of the insulator.



4,789,774

## ELECTRONIC DISPLAY DEVICE

Siegfried Koch, Villingen-Schwenningen, and Hans-Peter Scholl, Mundelsheim, both of Fed. Rep. of Germany, assignors to Mannesmann Kleinle GmbH, VS-Villingen, Fed. Rep. of Germany

PCT No. PCT/EP85/00300, § 371 Date Feb. 25, 1986, § 102(e) Date Feb. 25, 1986, PCT Pub. No. WO86/00449, PCT Pub. Date Jan. 16, 1986

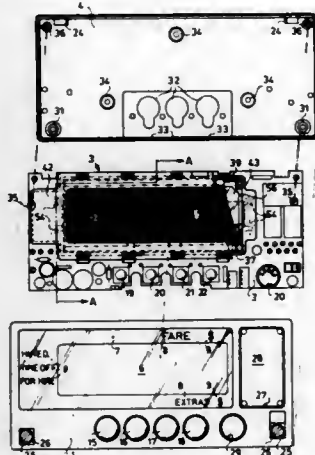
PCT Filed Jun. 20, 1985, Ser. No. 841,535

Claims priority, application Fed. Rep. of Germany, Jun. 30, 1984, 3424239

Int. Cl.<sup>4</sup> G07B 13/00

U.S. Cl. 235—30 R

9 Claims



1. Multi digit electronic display device illuminatable by means of light sources, for instance for a taximeter for display of a fare to be paid and possibly occurring surcharge, as well as for superimposition of stored and tariff data, comprising a display device (3) having front and rear sides and composed of a liquid crystal display (37) (LCD), the liquid crystal display including a semi-transparent mirror located on a rear side of a liquid crystal cell, the semi-transparent mirror having reflective properties for reflecting ambient light and being transparent for light, a printed circuit board (2) including actuation lines, a frame (38) as a receptacle of the liquid crystal display (37), a light conducting plate (43) mounted on the frame (38) and contact elements (39) attached to the frame (38) for electrical connection of the liquid crystal display (37) with actuation lines (40) on the printed circuit board (2) and a hood (42) surrounding the frame (38); the hood (42) equipped with detent elements (41) for locking the display device (3) to the printed circuit board (2), whereby the display device (3) is mounted in correct position on the printed circuit board with simultaneous completion of all line connections.

4,789,775

## OPTICAL SCANNER

Herbert D. McClain, Quaker, and Ronald A. Ferrante, Seneca-ville, both of Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Oct. 20, 1986, Ser. No. 921,019

Int. Cl.<sup>4</sup> G06K 7/10

U.S. Cl. 235—470

1 Claim

1. A system for controlling the operation of an optical scanning mechanism for reading encoded indicia on a record member upon movement of the record member past the scanning mechanism comprising:

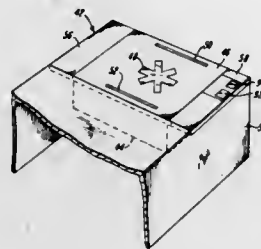
a checkout counter having a horizontal supporting surface including an aperture for supporting a merchandise item having a record member located thereon;

an optical scanning mechanism mounted within said check-

out counter adjacent the aperture for projecting scanning light beams through the aperture when operated;

a fluorescent lamp member positioned above the supporting surface of the checkout counter for directing radiant energy perpendicular to the supporting surface;

a first silicon photodiode mounted in the supporting surface of the counter upstream of the aperture and in the path of movement of the merchandise item, said photodiode receiving the radiant energy from said fluorescent lamp member for generating a first control signal in response to the positioning of the merchandise item over said photodiode;



circuit means coupled to said first silicon photodiode and said scanning mechanism for initiating the operation of said scanning mechanism in response to the generation of said first control signal; and

a second silicon photodiode mounted in the supporting surface of the counter downstream of the aperture and in the path of movement of the merchandise item, said second photodiode coupled to said circuit means and receiving the radiant energy from said fluorescent lamp member for generating a second control signal in response to the positioning of the merchandise item over said second photodiode whereby said circuit means disables the operation of the scanning mechanism in response to the generation of said second control signal.

4,789,776

## IC CARD

Takeshi Inoue, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

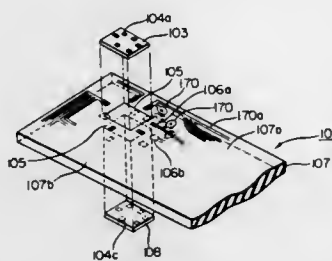
Filed Nov. 24, 1987, Ser. No. 124,556

Claims priority, application Japan, Nov. 27, 1986, 61-182191

Int. Cl.<sup>4</sup> G06K 19/06

U.S. Cl. 235—492

4 Claims



1. An IC card having a card main body and an IC module embedded in said card main body, said IC module comprising:

a circuit board having an obverse side and a reverse side;

at least one pair of IC chips performing similar functions with inverted operating circuit patterns and mounted back-to-back on the obverse and reverse sides of said circuit board at a desired position such that the inverted operating circuit pattern of one chip coincides with that of the other as seen through the circuit board;

at least one circuit board pattern corresponding to one of the operating circuit patterns and printed on one of the obverse and reverse sides of said circuit board, said circuit board pattern being used in common for said pair of IC chips;

wire-bonding pads formed around peripheries of said pair of IC chips to connect said circuit board pattern to terminals of said pair of IC chips;

at least one board through hole connecting said wire-bonding pads on one side of said circuit board to the other; and

a pair of IC chip selecting signal lines provided for said pair of IC chips.

4,789,777

## PHOTOELECTRIC AMPLIFIER HAVING PLURAL ACTUABLE FEEDBACK PATHS

Satoshi Takami, and Yutaka Ohsawa, both of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

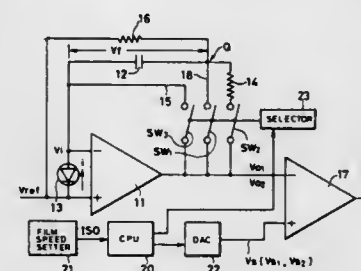
Filed Jun. 24, 1987, Ser. No. 65,753

Claims priority, application Japan, Jun. 24, 1986, 61-146075

Int. Cl.<sup>4</sup> H01J 40/14

U.S. Cl. 250—214 A

5 Claims



1. A photoelectric amplifier comprising:

a photosensitive element;

an operational amplifier receiving an output of said photosensitive element;

integrating means having a first terminal connected to said photosensitive element and being charged by said photosensitive element;

a first electrical path connecting a second terminal of said integrating means to a non-inverting input terminal of said operational amplifier through a first resistance;

an actuatable second electrical path connecting an output terminal of said operational amplifier to said second terminal of said integrating means;

an actuatable third electrical path connecting said output terminal of said operational amplifier to an inverting input terminal of said operational amplifier;

selecting means for selectively actuating said second and third paths, an integration voltage based on an input offset voltage of said operational amplifier being stored in said integrating means as an output of said operational amplifier when said third path is actuated.

4,789,778

## TWO TERMINAL LIGHT BARRIER SYSTEM

Hans-Dieter Layh, Zachersweg 17, D-7121 Gemmrigheim, Fed. Rep. of Germany

Filed Jun. 15, 1987, Ser. No. 61,496

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1986, 3620012

Int. Cl.<sup>4</sup> G01V 9/04

U.S. Cl. 250—221

5 Claims

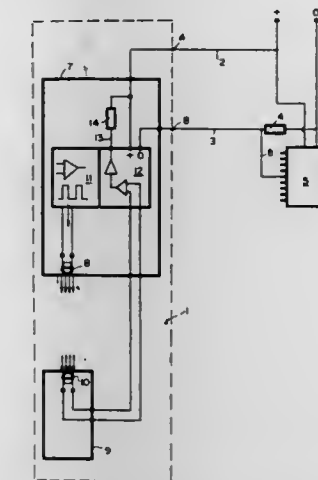
1. A radiant energy barrier system, particularly for automatic doors, having radiant energy emitter means as well as radiant energy receiver means that interacts with said radiant energy emitter means and generates an electric signal when an

energy path between said emitter means and said receiver means is interrupted or cleared, comprising:

a power source for providing power to said barrier system;

a two-terminal network in which said emitter means and said receiver means are interconnected, said network having two terminals;

an output circuit means in said two-terminal network having an input connected to said receiver means and an output connected by a series resistor to one of said two terminals, said output circuit means producing an output at different



voltage levels in response to said energy path being interrupted or cleared to changing the potential difference between said two terminals;

a first and second power supply line connecting said power source to said two terminals of said two-terminal network;

a precision resistor connected in series with said first power supply line remote from said two-terminal network; and

monitoring means for sensing a voltage drop across said precision resistor as an indication of the potential difference between said two terminals.

4,789,779

## HEAT PIPE OVEN MOLECULAR BEAM SOURCE

Robert E. Drullinger, Boulder, Colo., assignor to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Continuation of Ser. No. 802,875, Nov. 29, 1985, abandoned, which is a continuation-in-part of Ser. No. 636,769, Aug. 1, 1984, Pat. No. 4,558,218. This application Apr. 9, 1987, Ser. No. 35,211

Int. Cl.<sup>4</sup> H05H 3/02

U.S. Cl. 250—251

20 Claims



1. A molecular beam machine source comprising:

a porous wicking oven substrate nearly saturated with a working material and having at least one cavity formed therein, said substrate surrounding said cavity having a source region, a collimating region, and an orifice communicating with the exterior of the substrate; and

means maintaining a temperature gradient along said source and collimating regions for providing evaporated working material molecules in line of sight with said orifice, said collimating region of said substrate collimating evaporated working material molecules to form a molecular

beam and recirculating working material condensate to said source region.

#### 4,789,780 APPARATUS FOR ENERGY-SELECTIVE VISUALIZATION

Jan B. Le Poole, Tucson, Ariz., and Karel D. Van der Mast, Pijnacker, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

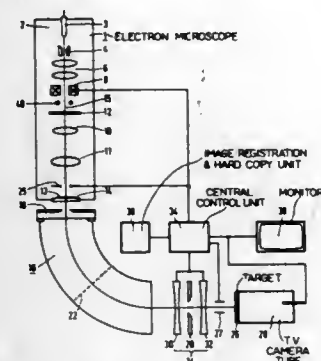
Filed Mar. 17, 1987, Ser. No. 26,716

Claims priority, application Netherlands, Mar. 18, 1986, 9600685

Int. Cl.<sup>4</sup> H01J 37/00

U.S. Cl. 250—305

13 Claims



1. An apparatus for forming energy-selective viewing of images of objects comprising:
  - first means for forming with a beam of charged particles an image of an object,
  - image field enlarging means for dividing said image into partial images in two directions, said image field enlarging means including second means for deflecting said beam in two dimensions,
  - energy analyzing means for analyzing energy or velocity spectrums of said partial images, said energy analyzing means including entrance diaphragm means for selecting said partial images to be viewed in said two directions, and third means for projecting geometrically correct images from said energy analyzing means,
  - fourth means following said energy analyzing means for again deflecting said partial images into said two directions, and detection means for detecting and monitoring signals provided from said partial images.

#### 4,789,781 SCANNING ELECTRON MICROSCOPE

Masaki Kitagawa, Chiba; Akira Ohtomo, Kanagawa, and Tetsuo Fujimoto, Kawasaki, all of Japan, assignors to Director-General of Agency of Industrial Science and Technology, Tokyo, Japan

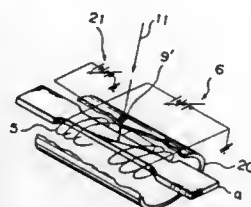
Filed Mar. 16, 1987, Ser. No. 26,315

Claims priority, application Japan, Aug. 29, 1986, 61-201348

Int. Cl.<sup>4</sup> G01N 23/22

U.S. Cl. 250—310

5 Claims



1. An electron microscope comprising:
  - a heater coil arranged around a sample for heating said sample,
  - an electron source for radiating an electron beam when said sample is heated,

a photo multiplier tube to which secondary electrons generated from said sample are attracted, a power source for supplying a variable voltage, and a shield member having an extracting hole for extracting said secondary electrons outside of said heater coil in such a manner that said extracting hole is aligned with a light axis of said electron beam, said shield member being connected to said power source which supplies a variable voltage so as to apply a desired voltage to said shield member,

wherein said heater coil is wound in such a manner that a heater coil on the left of the axis of said electron beam and a heater coil on the right of the axis of said electron beam are wound in an inverse direction.

#### 4,789,782 RADIATION IMAGE RECORDING AND REPRODUCING SYSTEM

Yuji Ohara, Kanagawa, Japan, assignor to Fujii Photo Film Co., Ltd., Kanagawa, Japan

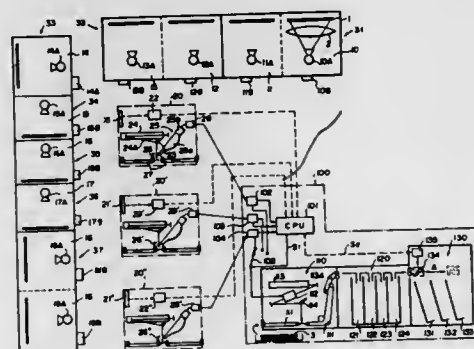
Filed Aug. 14, 1987, Ser. No. 85,494

Claims priority, application Japan, Aug. 15, 1986, 61-191267; Aug. 15, 1986, 61-191268; Aug. 15, 1986, 61-191269

Int. Cl.<sup>4</sup> G01N 23/04

U.S. Cl. 250—327.2

15 Claims



8. A radiation image recording and reproducing system for exposing a stimulative phosphor sheet to a radiation carrying image information to have the image information stored on the stimulative phosphor sheet in an image recording apparatus, thereafter scanning the stimulative phosphor sheet by stimulating rays, which cause the stimulative phosphor sheet to emit light in proportion to the stored radiation energy, in a read-out apparatus, photoelectrically detecting the emitted light, and scanning a recording sheet by recording light modulated on the basis of the image information thus read out to reproduce the image information on the recording sheet and developing the reproduced image information in an image reproducing apparatus,

wherein the improvement comprises providing said image reproducing apparatus with a plurality of trays, distributing and feeding said recording sheet, on which the development has been finished, into any one of said trays, and carrying out said distribution of said recording sheet in accordance with predetermined classifying conditions with respect to said image information reproduced and developed on said recording sheet.

#### 4,789,783 DISCHARGE IONIZATION DETECTOR

Robert D. Cook, 1137 Hill Slope Pl., Los Altos, Calif. 94022

Filed Apr. 2, 1987, Ser. No. 33,256

Int. Cl.<sup>4</sup> H01J 7/24

U.S. Cl. 250—379

4 Claims

1. A discharge ionization detector, comprising:
  - a detector body of an electrically-conductive material defining first and second chamber wells coaxially disposed and

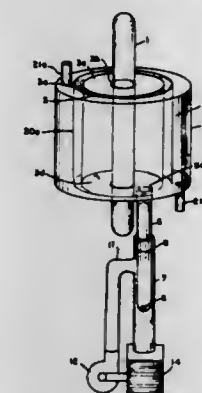
having a common internal wall with an aperture therein; said body including an inlet to the first chamber well for admitting an emission gas, and an inlet to the second chamber well for admitting the column effluent of a chromatograph;

said body having a single vent opening from the second chamber well in substantial coaxial alignment with the column effluent inlet;

a first demountable electrode assembly including a flange and gasket seal to be mounted to the detector body to close the first chamber well, and having a pair of electrodes for generating an exposed glow discharge emission directed through the aperture into the second chamber well to cause ionization of species in the column effluent;

a second demountable electrode assembly including a flange and gasket seal to be mounted to the detector body to close the second chamber well, and having a collector electrode, to be coupled to an electrometer providing an indication of ionized species in the column effluent, and a

a reactor arranged around said filter such that radiation passes from said low pressure electric discharge lamp



through said filter and into said reactor, said reactor being transparent to ultraviolet light.

#### 4,789,785 RADIATION IMAGE CONVERTING MATERIAL

Kikuo Yamazaki, and Akira Kitada, both of Kanagawa, Japan, assignors to Fujii Photo Film Co., Ltd., Japan

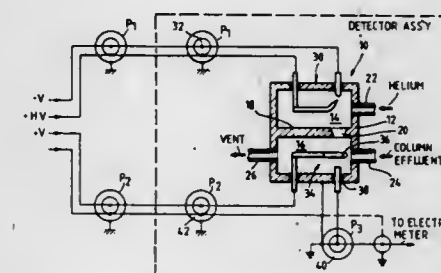
Filed Dec. 11, 1986, Ser. No. 940,416

Claims priority, application Japan, Dec. 11, 1985, 60-278664; Dec. 11, 1985, 60-278665

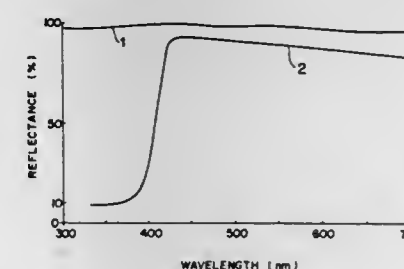
Int. Cl.<sup>4</sup> G01J 1/58

U.S. Cl. 250—487.1

11 Claims



1. A radiation image converting material comprising a support, a light-reflecting layer which comprises a binder and a light-reflecting material dispersed therein, and a phosphor layer which comprises a binder and a phosphor dispersed therein, superposed in this order, which is characterized in that said light-reflecting layer contains polymer particles of hollow structure as the light-reflecting material.



1. A radiation image converting material comprising a support, a light-reflecting layer which comprises a binder and a light-reflecting material dispersed therein, and a phosphor layer which comprises a binder and a phosphor dispersed therein, superposed in this order, which is characterized in that said light-reflecting layer contains polymer particles of hollow structure as the light-reflecting material.

#### 4,789,784 APPARATUS FOR ISOTOPIC ALTERATION OF MERCURY VAPOR

Mark W. Grossman, Belmont; William A. George, Gloucester, and Rudolph V. Marcucci, Danvers, all of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Dec. 29, 1986, Ser. No. 947,217

Int. Cl.<sup>4</sup> G01N 21/00

U.S. Cl. 250—436

9 Claims

1. An apparatus for enriching the isotopic content of mercury, said apparatus comprising:
  - a low pressure electric discharge lamp, said lamp comprising an envelope transparent to ultraviolet radiation and containing a fill comprising mercury and an inert gas;
  - a filter concentrically arranged around said low pressure electric discharge lamp, said filter being transparent to ultraviolet radiation and containing mercury including <sup>196</sup>Hg isotope;
  - means for controlling mercury pressure in said filter; and

#### 4,789,786 METHOD OF PROJECTING PHOTOELECTRON IMAGE

Hiroshi Yasuda, Yokohama, and Ichiro Honjo, Ibaragi, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Continuation of Ser. No. 799,321, Nov. 18, 1985, abandoned.

This application Jan. 15, 1988, Ser. No. 144,275

Claims priority, application Japan, Nov. 20, 1984, 59-243342; Nov. 20, 1984, 59-243343; Nov. 29, 1984, 59-252151

Int. Cl.<sup>4</sup> H01L 21/30; G03F 7/27

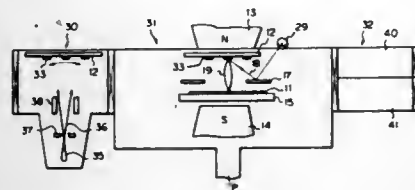
U.S. Cl. 250—492.2

6 Claims

1. A method for projecting a photoelectron image comprising the steps of:
  - (a) providing a mask substrate;
  - (b) selectively forming a patterned layer on the mask substrate so as to define two types of areas including an exposed portion of the mask substrate;
  - (c) forming a metal layer selected from the group consisting



of Cs, Ba and Cs treated —Sb, —Te and —Ag<sub>2</sub>O on the exposed portion of the mask substrate and the patterned layer in order to lower the work function of the two types of areas in a vacuum, the two types of areas having different quantum efficiencies;



- (d) irradiating the surface of the metal layer formed in said step (c) to cause photoelectrons to be emitted from one side thereof, while applying an electric field and a magnetic field; and  
(e) projecting a photoelectron image based on the emitted photoelectrons.

4,789,787

## WIEN FILTER DESIGN

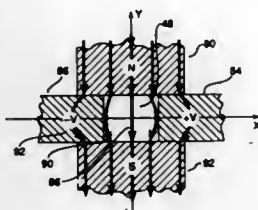
Norman W. Parker, Westlake Village, Calif., assignor to Micro-Beam Inc., Newbury Park, Calif.

Filed May 27, 1987, Ser. No. 55,414

Int. Cl.<sup>4</sup> H01J 3/14; G21K 1/08; B01D 59/44

U.S. Cl. 250—396 ML

15 Claims



1. A wien filter, including:  
two spaced-apart electric pole pieces having generally parallel opposing faces,  
two spaced-apart opposed magnetic pole pieces in physical contact with said electric pole pieces such that said magnetic pole pieces and said electric pole pieces form interfaces and define a generally rectangular physical aperture, said magnetic pole pieces having a resistivity such that a current will flow through them between said electric pole pieces sufficient to establish a uniform electric field across said physical aperture,  
two excitation coils, one associated with each of said magnetic pole pieces, each of said excitation coils separated from its respective magnetic pole piece by a layer of electrically insulating material.

4,789,788

## OPTICALLY PUMPED RADIATION SOURCE

Philip R. Cox, Manchester, Tenn., assignor to The Boeing Company, Seattle, Wash.

Filed Jan. 15, 1987, Ser. No. 3,552

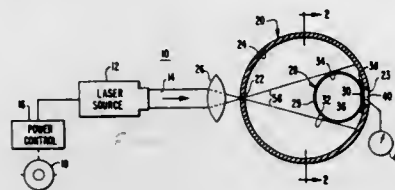
Int. Cl.<sup>4</sup> G01N 21/24

U.S. Cl. 250—504 R

14 Claims

1. An apparatus for generating infrared and near infrared radiation, comprising a hollow member having entrance aperture means, output aperture means, for emitting a source of infrared and near-infrared radiation and an internal reflective surface portion for specularly integrating monochromatic laser radiation entering said hollow member through said entrance aperture means; radiation absorptive means mounted within said member for forming a cavity surrounding said output

aperture means and for absorbing laser energy from said hollow member, said absorptive means having a total absorption of said laser radiation substantially greater than said reflective



internal surface and having a surface area dimensioned relative to said output aperture means to provide infrared and near-infrared radiation having a selected emissivity upon the absorption of integrated laser radiation in said cavity.

4,789,789

## EVENT DISTRIBUTION AND COMBINATION SYSTEM

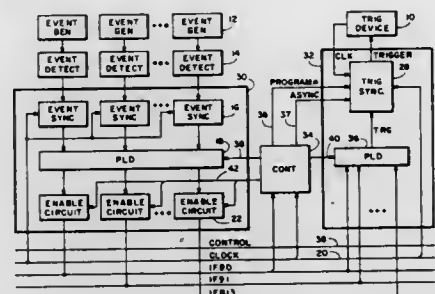
Michael D. Kersenbrock; David A. Lowry, both of Aloha; Gregory D. Harris, Hillsboro; Michael D. Henry, and Francis D. Kohlmeier, both of Portland, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Filed Feb. 17, 1986, Ser. No. 830,596

Int. Cl.<sup>4</sup> H02J 1/00

U.S. Cl. 307—40

16 Claims



1. An apparatus for generating a trigger signal in response to a set of event indication signals, a state of each of said set of event indication signals indicating a state of occurrence of an event, the apparatus comprising:  
a programmable encoding circuit for receiving said set of event indication signals and for generating a set of parallel event encoding signals, each event encoding signal being of a state representing a logical combination of states of a programmably determined subset of said set of event indication signals;  
a plurality of conductors for carrying said set of event encoding signals; and  
a programmable decoding circuit for generating said trigger signal on detection of a predetermined pattern of states of said event encoding signals carried on a programmably determined subset of said conductors.

4,789,790

## DIGITAL EQUIPMENT

Torao Yamanaka, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 23, 1986, Ser. No. 888,417

Claims priority, application Japan, Oct. 3, 1985, 60-220524; Mar. 3, 1986, 61-44004

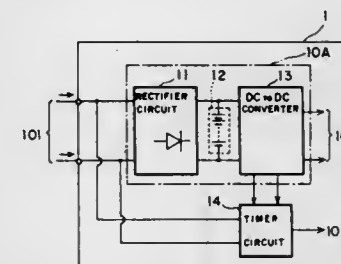
Int. Cl.<sup>4</sup> H02J 7/00

U.S. Cl. 307—66

7 Claims

1. Digital equipment comprising a power conversion device wherein a commercial AC power source is converted to a DC

power voltage by the power conversion device, and the DC power voltage is used as a power source for operation of the digital equipment, said power conversion device comprising:  
a rectifier circuit for rectifying the commercial power source voltage to produce a rectified voltage on an output of the rectifier circuit;  
a battery connected across the output of the rectifier circuit as a short-time service interruption compensation means for being charged by rectified current from the rectifier circuit and for supplying DC voltage based on the charging so as to overcome short-time interruption of the commercial AC power source; and



- a DC to DC conversion circuit connected across the output of the rectifier circuit and across the battery for converting DC current from the rectifier circuit or from the battery into the DC power voltage used as the power source for operation of the digital equipment;  
said digital equipment further comprising a timer circuit connected to the commercial AC power source for halting operation of at least part of the digital equipment based on detecting continuing interruption of the commercial AC power source for a predetermined short-time period which is less than a service interruption compensation discharge time of the battery.

4,789,791

## ROTARY DRIVE MECHANISM

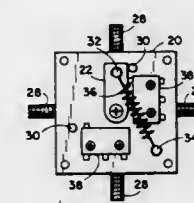
H. Erwin Grellmann, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Sep. 26, 1986, Ser. No. 911,701

Int. Cl.<sup>4</sup> H01H 35/00, 3/00, 21/04

U.S. Cl. 307—119

5 Claims



1. A rotary drive mechanism comprising:  
a crank connected to a device to be rotated;  
means for positively engaging the crank to start movement of the crank;  
means for driving the engaging means such that the crank moves from a first position to a position past top dead center; and  
means for moving the crank from the position past top dead center to a second position independent of the driving means.

4,789,792

## FEEDING OR MATCHING CIRCUIT

Beat Rüedi, Villigen, Switzerland, assignor to BBC Brown, Boveri Ltd., Baden, Switzerland

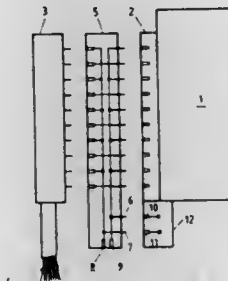
Filed Jan. 6, 1987, Ser. No. 842

Claims priority, application Switzerland, Jan. 16, 1986, 140/86

Int. Cl.<sup>4</sup> H01H 7/00; H02K 13/00

U.S. Cl. 307—141

16 Claims



1. An interconnection circuit for feeding signal circuits, conducted via a multi-pin plug-in connection having a first multi-pin socket strip and a first multi-pin connector of one of a freely programmable control unit and a control and instrumentation system comprising at least one electronic module which carries one of said first multi-pin socket strip and said first multi-pin connector of said plug-in connection, wherein a connection to a supply source of said feeding circuit is a multi-pin intermediate connector having a second multi-pin connector and a second multi-pin socket strip and adapted to be plugged between said first multi-pin socket strip and said first multi-pin connector of said multi-pin plug-in connection.

4,789,793

## INTEGRATED FET CIRCUIT TO REDUCE SWITCHING NOISE

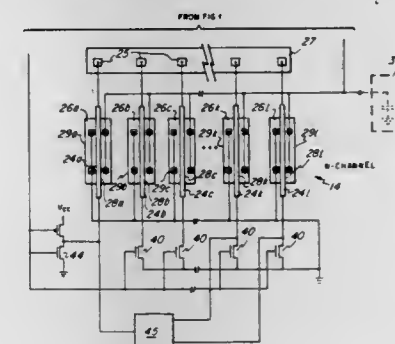
George J. Ehni, Dallas; Jy-Der Tai, Plano; Edison H. Chiu, Richardson, all of Tex., and Thomas A. Carroll, Boulder, Colo., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 24, 1987, Ser. No. 18,871

Int. Cl.<sup>4</sup> H03K 17/687; H01L 5/13

U.S. Cl. 307—303

23 Claims



1. An integrated circuit structure comprising:  
a substrate having semiconductor areas forming a plurality of sub-transistors, each of said sub-transistors having a discrete gate, and  
at least one pair of said sub-transistors having the gates of the two sub-transistors of the pair coupled through a source-to-drain current path of a coupling transistor to form a series circuit so that a gate signal applied to the gate of a

first sub-transistor of said series circuit propagates to the gate of a subsequent sub-transistor in said circuit in a predetermined time interval, the propagation of said gate signal along said series circuit causing sequential conduction of ones of said sub-transistors.

4,789,794

## TIME DOMAIN REFLECTOMETER

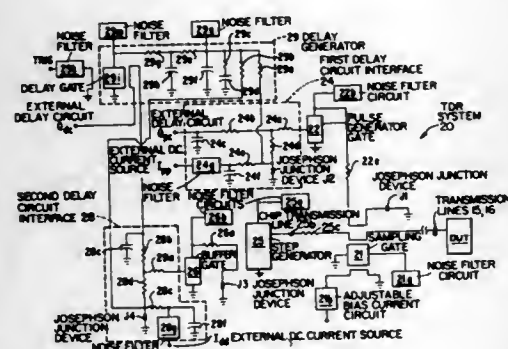
Stephen R. Whiteley, Shrub Oak, and Sadeq M. Faris, Yorktown Heights, both of N.Y., assignors to Hypres Incorporated, Elmsford, N.Y.

Filed Sep. 26, 1986, Ser. No. 912,785

Int. Cl.<sup>4</sup> H03K 5/135, 17/92, 19/195

U.S. Cl. 307-352

35 Claims



1. A system for high resolution sampling of the waveform of an output signal generated by a signal source, comprising:
  - a. means for generating and transmitting a trigger signal to the signal source to initiate a transmission of the output signal to the sampling system;
  - b. means for generating and introducing sampling pulses with the transmission of the output signal to the sampling system;
  - c. means for sampling the output signal comprising an adjustable bias signal source and a superconducting sampling gate having at least two distinguishable states to which the output signal, said sampling pulses and a bias signal provided by said adjustable bias signal source is applied for switching the state of said gate in sampling the output signal;
  - d. at least one superconducting switch, having at least two distinguishable states, that triggers the means for generating and transmitting a trigger signal to initiate a trigger signal transmission and the means for generating and introducing sampling pulses to initiate a sampling pulse transmission; and
  - e. means for changing the switching point of the at least one superconducting switch so that the triggering of the trigger signal and sampling pulse transmissions can be adjustably delayed with respect to one another.

4,789,795

## LOGIC VOTING-CIRCUIT

Steinz H. Christiaan, Hattem, Netherlands, assignor to HCS Industrial Safeguarding B.V., Hattem, Netherlands

Filed Oct. 19, 1987, Ser. No. 109,537

Claims priority, application Netherlands, Oct. 21, 1986, 8602636

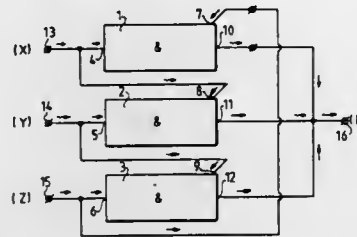
Int. Cl.<sup>4</sup> H03K 19/08

U.S. Cl. 307-401

4 Claims

1. A logic majority voting circuit comprising the combination of a plurality  $n, n+1, \dots, N$  of at least three magnetic AND gates, each comprising a magnetizable core having a writing winding, a reading winding and a detection winding; a plurality  $n, n+1, \dots, N$  of inputs for the logic circuit, each connected to a different one of the writing windings; an output for the logic circuit connected in common with all

of the detection windings so that the AND gates are in parallel; and the reading winding of each AND gate being connected to



the writing winding of a different AND gate so that each AND gate has two inputs, one of which is one of the  $n, n+1, \dots, N$  inputs and the other of which is a different one of such inputs.

4,789,796

## OUTPUT BUFFER HAVING SEQUENTIALLY-SWITCHED OUTPUT

Richard C. Foss, Ontario, Canada, assignor to U.S. Philips Corporation, New York, N.Y.

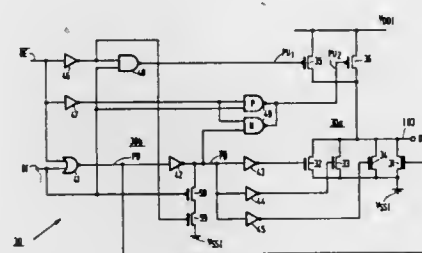
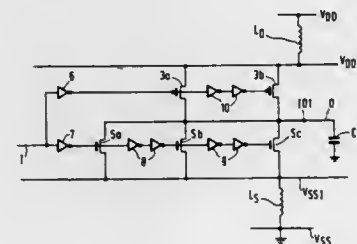
Filed Dec. 8, 1986, Ser. No. 939,339

Claims priority, application United Kingdom, Dec. 23, 1985, 8531622

Int. Cl.<sup>4</sup> H03K 17/04, 17/12, 17/284, 17/687

U.S. Cl. 307-443

14 Claims



1. An integrated semiconductor circuit comprising a control circuit, an output stage, an input and an output, the output stage comprising pull-up means connected between a first supply terminal and the output and pull-down means connected between a second supply terminal and the output, said control circuit controlling at least one of said pull-up and pull-down means for limiting the time rate of change of current at the output upon receiving an input signal change at the input, at least one of said pull-up and pull-down means comprising at least two semiconductor devices each having a control electrode and first and second main electrodes, the semiconductor devices being connected in parallel except for their control electrodes, said control electrodes receiving control

signals from the control circuit for sequentially changing the state of said semiconductor devices upon receiving a change of the input signal.

4,789,798

## ECL TO GAAS LOGIC CONVERSION CIRCUIT WITH POSITIVE FEEDBACK

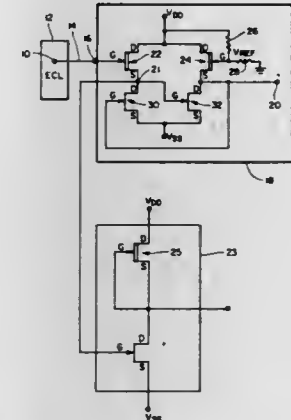
Lawrence E. Lach, Chicago, Ill., assignor to Gould Inc., Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 785,298, Oct. 7, 1985. This application Oct. 27, 1986, Ser. No. 923,539

Int. Cl.<sup>4</sup> H03K 19/092, 19/094, 3/29

U.S. Cl. 307-475

7 Claims



4,789,797

## TEMPERATURE-COMPENSATED INTERFACE CIRCUIT BETWEEN "OR-TIED" CONNECTION OF A PLA DEVICE AND A TTL OUTPUT BUFFER

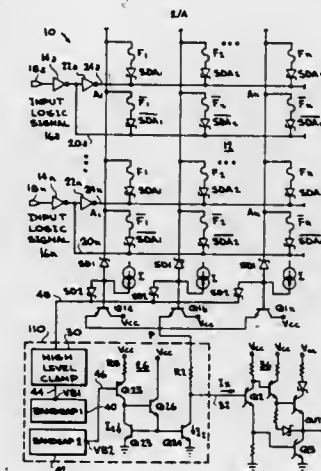
Nader Vasseghi, Sunnyvale, Calif., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jun. 25, 1987, Ser. No. 66,915

Int. Cl.<sup>4</sup> H03K 19/003

U.S. Cl. 307-475

16 Claims



1. An interface circuit (110) for interfacing between an "OR-tied" connection (P) of a programmable logic array device (10) and a TTL output buffer (36) so as to provide a high speed of operation over a wide range of temperature variations, said interface circuit comprising:

first generator means (40) for generating a first reference voltage (VB1) having a positive temperature coefficient; high level clamp means (30) responsive to the first reference voltage (VB1) for producing a first current (I<sub>1</sub>) which decreases with rising temperatures; second generator means for generating a second reference voltage (VB2) having a negative temperature coefficient; sensing means (26) having an input connected to the "OR-tied" connection (P) of the programmable logic array device (10) to receive a voltage corresponding to the first current (I<sub>1</sub>) and being responsive to the second reference voltage (VB2) for producing a second current (I<sub>2</sub>) which increases with rising temperatures, said sensing means (26) combining said first and second currents (I<sub>1</sub>, I<sub>2</sub>) to generate a resultant base drive current (I<sub>x</sub>) which is higher at low temperatures and is smaller at high temperatures; and the output buffer (36) having a phase splitter transistor (Q2) whose base is connected to receive the resultant base drive current (I<sub>x</sub>), whereby the switching speed of the phase splitter transistor (Q2) remains substantially constant over a wide range of temperature variations.

1. A MESFET device for converting an ECL voltage signal to a predetermined voltage signal, comprising:
  - a pair of load element means for transforming an ECL voltage signal and a predetermined reference voltage into a corresponding signal current and a corresponding reference current to provide pull up;
  - a pair of driver element means connected to said pair of load element means for outputting a predetermined voltage signal representation of the ECL voltage signal at a first output node;
  - positive feedback means connected to said first output node and to one of said pair of driver element means for increasing a gain of said pair of driver element means;
  - a third load element means having an input connected to said first output node of said pair of load element means;
  - wherein said third load element means and said third driver element means have a substantially similar structure and topology to said pair of load element means and driver element means and wherein said predetermined reference voltage is derived from a signal source which supplies an ECL logical one level signal, said signal source being associated with a circuit supplying the ECL voltage signal such that said predetermined reference voltage tracks any voltage level changes in said ECL logical one level signal.

4,789,799

## LIMITING CIRCUIT

Stewart S. Taylor, Beaverton, and Bruce E. Miller, Portland, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.

Continuation of Ser. No. 482,120, Apr. 5, 1983, abandoned. This application Jun. 17, 1985, Ser. No. 745,387

Int. Cl.<sup>4</sup> H03K 5/08

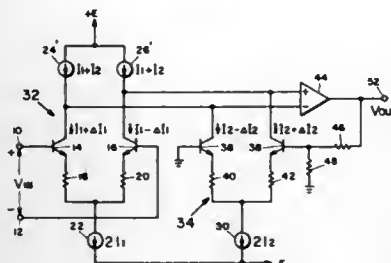
U.S. Cl. 307-540

4 Claims

1. A limiter circuit, comprising:
  - a first differential transistor amplifier having two output terminals and providing at said output terminals an output current limited between two predetermined levels, said first differential amplifier having a first current source for providing a constant current;
  - a second differential transistor amplifier having collectors for receiving the output current of said first differential amplifier, said second differential amplifier having a transfer function similar to that of said first differential ampli-



fier and having a second current source for providing a constant current larger than that of the first current source; and a high gain amplifier having inverting and non-inverting input terminals connected respectively to the output terminals of said first differential amplifier and also having an output terminal connected to the base of



one of the transistors of said second differential amplifier through a feedback network consisting of a first resistive element connected between the output terminal of the high gain amplifier and the base of said one transistor of the second differential amplifier and a second resistive element connected between the base of said one transistor and a reference potential level.

4,789,800

**FUSE, IN PARTICULAR FOR ELECTRIC MOTORS**  
Walter Zimmermann, Barcelona, Spain, assignor to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany

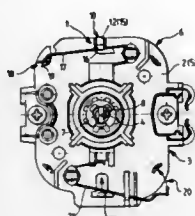
Filed Aug. 5, 1987, Ser. No. 82,055

Claims priority, application Fed. Rep. of Germany, Aug. 7, 1986, 3626770

Int. Cl.<sup>4</sup> H02K 11/00; H01H 37/36

U.S. Cl. 310—68 C

7 Claims



1. In an electric motor having a housing, a stator in said housing, and a rotor mounted in said housing for rotation about a motor axis,

thermal protection structure mounted in said housing comprising a switching device in a supply circuit of said motor, said switching device including a fixed terminal member and a resilient control member, lever structure pivotally mounted in said housing structure, said lever structure having a control portion at one end and a sensor portion at its opposite end, said sensor portion being made of fusible material and being seated against said stator, said control portion being in engagement with said resilient control member such that said control member is biased into engagement with said terminal member of said switching device to close said supply circuit of said motor,

said sensor portion melting upon undue heating of said stator such that said lever structure moves and allows said resilient

control member to move from a position in engagement with said switching device terminal member to open said supply circuit of said motor.

4,789,801

# **ELECTROKINETIC TRANSDUCING METHODS AND APPARATUS AND SYSTEMS COMPRISING OR UTILIZING THE SAME**

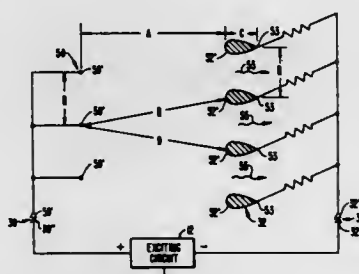
Jimmy L. Lee, Santa Rosa, Calif., assignor to Zenion Industries, Inc., Rohnert Park, Calif.

Continuation-in-part of Ser. No. 838,400, Mar. 6, 1986, abandoned, which is a continuation of Ser. No. 127,646, Mar. 6, 1980, abandoned. This application Apr. 3, 1987, Ser. No. 34,291

Int. Cl.<sup>4</sup> H02N 1/04; B03C 3/06, 3/12

U.S. Cl. 310—308

21 Claims



19. An apparatus for moving air comprising:

a first array of electrodes;  
a second array of electrodes, the electrodes of said second array having a cross-sectional area larger than the cross-sectional area of the electrodes in said first array;  
the distance between any two adjacent electrodes in said first array being substantially equal to the distance between any two adjacent electrodes in said second array;  
said electrode arrays confronting each other across a space containing air such that any electrode in said first array is substantially equidistant from the closest two electrodes in the second array; and  
generating means coupled between said first array and said second array, for generating a signal comprising voltage pulses of a single polarity, said generating means including means for biasing said signal so that the absolute value of the voltage of said signal stays above a predetermined minimum value.

4,789,802

# **HIGH VOLTAGE, MULTI-STAGE ELECTROSTATIC GENERATOR**

Yosinobu Miyake, Tokyo, Japan, assignor to Japan Physitex Co., Ltd., Tokyo, Japan

Filed Jan. 21, 1988, Ser. No. 146,297

Claims priority, application Japan, Jan. 24, 1987, 62-13335

Int. Cl.<sup>4</sup> H02N 1/00

U.S. Cl. 310—309

11 Claims

1. A high electrostatic voltage generator comprising:  
(a) plural stages of charge carrier modules, each module including an insulated disc and a plurality of metal pellets arranged on the outer circumferential rim of said disc to carry positive or negative charges;  
(b) a charge supply means including positive or negative charges collecting and conductive pulleys contacted with the metal pellets at least on the lowest and uppermost stages of charge carrier modules so as to charge the metal pellets positive or negative on these charge carrier modules;  
(c) a driving source means comprising a rotating shaft on which the plural stages of charge carrier modules are

arranged with a certain interval interposed between the modules, and a motor for rotating the plural stages of charge carrier modules as a whole through the rotating shaft;

(d) a charge carrier transfer means for transferring charges between the adjacent charge carrier modules, and including a first positive collecting and conductive transfer pulley contacted with the metal pellets on the insulated disc in one of the charge carrier modules, a first negative charge collecting and conductive transfer pulley for collecting negative charges from the other of the charge carrier modules, a second conductive transfer pulley contacted with the metal pellets on the insulated disc in the other of the charge carrier modules and for collecting positive charges transferred from the first positive charge collecting and conductive transfer pulley on one of the charge carrier modules, a second negative charge collecting and conductive transfer pulley for transferring negative charges to the first negative charge collecting and conductive transfer pulley on one of the charge carrier modules, a first electrostatic shielding body for enclosing the first positive and negative charge collecting and conductive transfer pulleys on one of the charge carrier modules and also enclosing the metal pellets arranged between these first pulleys on the outer circumferential rim of this insulated disc, a second electrostatic shielding body for

negative charges transferred from the first negative collecting and conductive transfer pulley;

(h) a fourth electrostatic shielding body for enclosing the positive collecting and conductive pulley on the one of the charge carrier modules, the negative charge collecting and conductive pulley, and the metal pellets arranged between these pulleys on the outer circumferential rim of this insulated disc;

(i) a grounded electrode arranged adjacent to the one of the charge carrier modules and connected to the negative charge collecting and conductive pulleys to condense collected negative charges therein;

(j) a high voltage electrode arranged adjacent to the other of the charge carrier modules and contacted with the positive charge collecting and conductive pulleys to condense collected positive charges therein and generate a high voltage; and

(k) a discharger circuit means including a first discharger circuit connected, at one end thereof, to the electrostatic shielding body positioned most adjacent to the grounded electrode and formed connecting high potential portions to automatically adjust the change of potential difference between the electrostatic, shielding body arranged most adjacent to the grounded electrode and the electrostatic shielding body arranged most adjacent to the high voltage electrode, said change of potential difference being caused, by the negative charges condensed in the grounded electrode, and a second discharger circuit connected, at one end thereof, to the electrostatic shielding body arranged most adjacent to the high voltage electrode and formed connecting low potential portions to automatically adjust the change of potential difference between the electrostatic shielding body arranged most adjacent to the high voltage electrode and the electrostatic shielding body arranged most adjacent to the grounded electrode said change of potential difference being caused by the positive charges condensed in the high voltage electrode.

4,789,803

**MICROPOSITIONER SYSTEMS AND METHODS**  
Stephen C. Jacobsen, John E. Wood, and Richard H. Price, all of Salt Lake City, Utah, assignors to Sarco, Inc., Salt Lake City, Utah

Filed Aug. 4, 1987, Ser. No. 81,822

Int. Cl.<sup>4</sup> H02N 1/00

U.S. Cl. 310—309

37 Claims

enclosing the second positive and negative charge collecting and conductive transfer pulleys on the other of the charge carrier modules and also enclosing the metal pellets arranged between these second pulleys on the outer circumferential rim of this insulated disc, and means for connecting the first positive charge collecting and conductive transfer pulley, the first electrostatic shielding body, and the second positive charge collecting and conductive transfer pulley, and also connecting the second negative charge collecting and conductive transfer pulley, the second electrostatic shielding body, and the first negative charge collecting and conductive transfer pulley;

(e) a conductive pulley contacted with the metal pellets on the outer circumferential rim of the insulated disc in the other of the charge carrier modules, to collect positive charges transferred from the second positive charge collecting and conductive transfer pulley on one of the charge carrier modules;

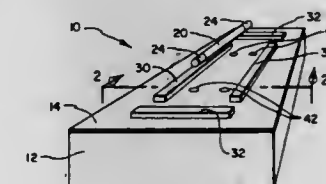
(f) a third electrostatic shielding body for enclosing the negative charge collecting and conductive pulley on the other of the charge carrier modules, the positive charge collecting and conductive pulley, and the metal pellets arranged between these pulleys on the outer circumferential rim of this insulated disc;

(g) a conductive pulley contacted with the metal pellets arranged on the outer circumferential rim of the insulated disc in the one of the charge carrier modules, to collect

1. A system for controlling the position and movement of an object, at least a portion of which is comprised of either a bounded region having a non-zero net electrical charge, or a bounded region having a non-zero net electric polarization, said system comprising:

a substantially planar base member having an upper surface; first and second field-producing elements formed on the upper surface of said base member, said elements having a shape that is substantially the same as the bounded region of said object, and said elements being positioned on said base member such that the bounded region of said objects is both between said elements and above the upper surface of said base member; and

means for producing at said elements an electric field that is



selectively variable as to its field strength, whereby the position and movement of said object can be selectively controlled both between and above said elements.

4,789,804

# ANALYTICAL DEVICE AND METHOD UTILIZING A PIEZOELECTRIC CRYSTAL BIOSENSOR

Isao Karube, Tachikawa, and Hiroshi Muramatsu, Tokyo, both of Japan, assignors to Seiko Instruments & Electronics Ltd., Tokyo, Japan

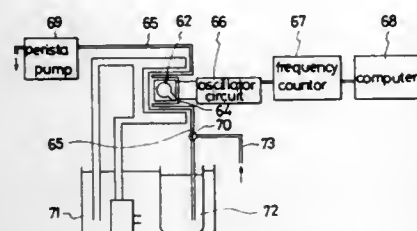
Filed Sep. 17, 1986, Ser. No. 908,371

Claims priority, application Japan, Sep. 17, 1985, 60-204949; Mar. 10, 1986, 61-51657; Mar. 10, 1986, 61-51658; May 21, 1986, 61-116626; Jun. 6, 1986, 61-131481; Jun. 6, 1986, 61-131482

Int. Cl.<sup>4</sup> H01L 41/08

U.S. Cl. 310-311

52 Claims



1. A device for analyzing biochemicals, microbes and cells in a sample liquid comprising: a flow type cell for containing therein a sample liquid; a piezoelectric crystal sensor incorporated in the flow type cell, the piezoelectric crystal sensor having a piezoelectric crystal and receptor material immobilized or chemically treated on a surface of the piezoelectric crystal, the receptor material being operative to attach thereto a biochemical, microbe or cell specific for the receptor material; measuring means for measuring the resonant frequency of the piezoelectric crystal to analyze the biochemical, microbe or cell attached to the receptor material; and replacing means for replacing the sample liquid in the flow type cell by water held at a substantially constant temperature so that the resonant frequency is measured while the piezoelectric crystal is exposed to the water.

4,789,805

# SUSPENSION MEANS FOR SHADOW MASK IN A CATHODE RAY TUBE

Antonius W. H. M. Baselmans, and Adrianus J. C. van de Ven, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

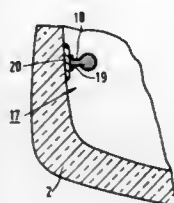
Filed Aug. 27, 1986, Ser. No. 900,862

Claims priority, application Netherlands, Sep. 3, 1985, 8502404

Int. Cl.<sup>4</sup> H01J 29/07

U.S. Cl. 313-404

10 Claims



1. A cathode ray tube for displaying colour images having an envelope which is partly formed by a glass display window having metal suspension means connected thereto for suspending a colour selection electrode in the tube, characterized in

that the metal suspension means comprise at least one mounting pad, and in that the mounting pads are connected directly to the display window by respective plastically deformed metal connectors, which connectors are in contact with the suspension means and the glass.

4,789,806

# CATHODE RAY TUBE DEFLECTION UNIT COMPRISING MEANS FOR COMPENSATING FOR MISALIGNMENT OF THE LINE AND FIELD DEFLECTION COIL SYSTEMS

Hans Meershoek, Eindhoven, Netherlands, assignor to U.S. Philips Corp., New York, N.Y.

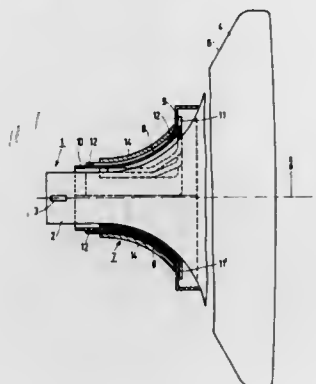
Filed Mar. 24, 1987, Ser. No. 29,842

Claims priority, application Netherlands, Apr. 2, 1986, 8600833

Int. Cl.<sup>4</sup> H01J 29/76

U.S. Cl. 313-440

2 Claims



1. An improved deflection unit for a cathode ray tube having a longitudinal axis, a neck portion at one end of such axis and a display screen at the other end thereof, and a flared portion connecting the neck portion with the display screen; such deflection unit being adapted to be arranged around said flared portion concentrically with said longitudinal axis and comprising a field coil system and a line coil system for deflecting an electron beam in said tube in mutually orthogonal directions; the field coil system comprising a pair of diametrically opposite saddle-type field deflection coils located on either side of a vertical axis of said deflection unit and the line deflection coil system comprising a pair of diametrically opposite saddle-type line deflection coils located on either side of a horizontal axis of said deflection unit; each of said coils having a front end segment, a rear end segment and conductors extending between such segments; such improvement being characterized in that: said deflection unit comprises a pair of plate-shaped parts of soft magnetic material respectively extending across the front end segment of respective ones of said pair of line deflection coils in positions coinciding with diametrically opposite vertices of a rectangle whose diagonals intersect substantially on the longitudinal axis of the deflection unit, and at each of which positions a portion of a front end segment of a line deflection coil overlaps a portion of a front end segment of a field deflection coil.

4,789,807

# ELECTRON GUN ASSEMBLY HAVING A REINFORCED HEATER TAB

John R. Hale, East Hempfield Township, Lancaster County, Pa., assignor to RCA Licensing Corp., Princeton, N.J.

Filed Aug. 31, 1987, Ser. No. 91,168

Int. Cl.<sup>4</sup> H01J 29/46, 1/94

U.S. Cl. 313-446

4 Claims

1. In an electron gun assembly for use in a cathode-ray tube,

said gun assembly including a pair of insulating support rods, at least one indirectly heated cathode for generating an electron beam, said cathode being disposed between said support rods, a heater for said cathode, said heater having a pair of heater legs, a heater tab, strap means for attaching said heater tab to said support rods, and a plurality of electrodes for focusing and accelerating said electron beam, the improvement wherein said heater tab comprises

a main body portion including a first and a second part, each of said parts being attached to a respective leg of said pair of legs of said heater, said heater tab having a pair of outwardly directed feet each of which is connected to a

gyrotron and to a higher level after starting to increase oscillation efficiency.

4,789,809

# HIGH FREQUENCY DISCHARGE APPARATUS WITH IMPEDANCE MATCHING

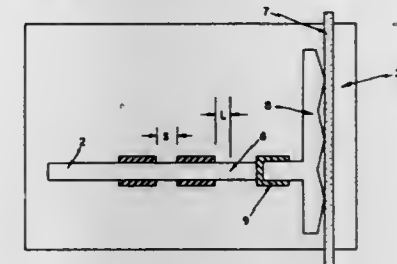
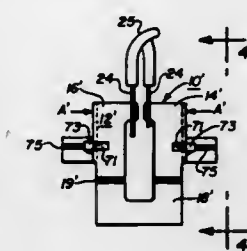
C. Paul Christensen, Washington, D.C., assignor to Potomac Photonics, Inc., College Park, Md.

Filed Mar. 19, 1987, Ser. No. 28,111

Int. Cl.<sup>4</sup> H01J 15/04; H03H 7/38

U.S. Cl. 315-39

14 Claims



respective part of the parts of said main body portion by a pair of substantially orthogonal legs extending therebetween, said heater tab including primary reinforcing means comprising gussets formed therein, said gussets extending between said parts of said main body portion and said orthogonal legs, and also between said orthogonal legs and said feet to maintain the rigidity of said heater tab, wherein each of said feet of said heater tab includes secondary reinforcing means comprising a stamped portion formed into a surface thereof to flatten said feet to facilitate connection to said strap means and to provide stability to said heater tab.

1. A microwave discharge apparatus, comprising: a ground plane, a discharge electrode having a longitudinal axis substantially parallel to the ground plane, a dielectric discharge tube positioned between said electrode and said ground plane, a conductive strip electrically contacting said electrode and positioned parallel to said ground plane, thus forming a transmission line conductor, and two dielectric slugs of approximately one quarter wave electrical length each, positioned between said transmission line conductor and said ground plane.

4,789,808

# GYROTRON DEVICE WITH ADJUSTABLE PITCH FACTOR

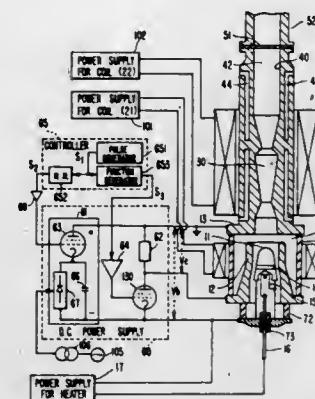
Kenichi Hayashi, Yokohama, Japan, assignor to Toshiba Kasei Kaisha, Tokyo, Japan

Filed May 23, 1986, Ser. No. 866,253

Int. Cl.<sup>4</sup> H01J 25/00

U.S. Cl. 315-4

6 Claims



1. A gyrotron device comprising: an electron gun for producing a beam of electrons traveling along an axis; an electromagnetic field generator for generating an electromagnetic field which interacts with said beam and causes said beam to rotate about said axis; and adjusting means for adjusting the pitch factor of said beam of electrons to a low level to effectuate easy starting of the

4,789,810

# PHOTOCELL TEMPERATURE SWITCH FOR HIGH INTENSITY DISCHARGE LAMP FIXTURE

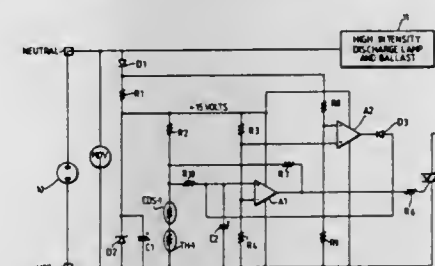
Sidney A. Ottenstein, Spring, Tex., assignor to Innovative Controls, Inc., Houston, Tex.

Filed Jun. 22, 1987, Ser. No. 65,269

Int. Cl.<sup>4</sup> H01J 29/07

U.S. Cl. 315-308

4 Claims



1. A switch circuit for high intensity discharge lamps, comprising: a high intensity discharge lamp; a first sensing means for sensing the ambient light and for outputting a first signal representative of the sensed ambient light; a second sensing means for sensing the ambient temperature and for outputting a second signal representative of the sensed ambient temperature; a first comparator means for comparing said first signal with a first reference value and for outputting a third signal; a second comparator means for comparing said second sig-

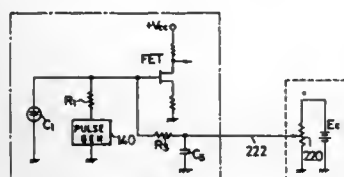








tor and said first electrostatic sensing capacitor, characterized by a second series resistor having one end connected to said junction, a ground capacitor for filtering noise connected to the other end of said second resistor, and a variable resistor



connected to a d.c. power source for adjusting a voltage from said power source and applying said adjusted voltage through said second resistor to said junction to adjust a pulse phase at said FET control terminal, whereby said threshold sensitivity is controlled.

4,789,823

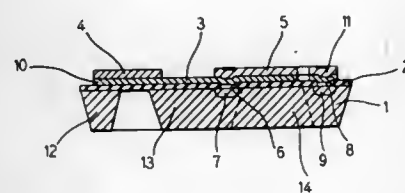
**POWER SENSOR FOR RF POWER MEASUREMENTS**  
Hans Delfs, Ottobrunn, and Tilman Betz, Gröbenzell, both of Fed. Rep. of Germany, assignors to Rohde & Schwarz GmbH & Co. KG, Fed. Rep. of Germany  
Continuation of Ser. No. 923,438, Oct. 27, 1986. This application Feb. 19, 1988, Ser. No. 159,520

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1985, 3539402

Int. Cl. G01R 21/02, 21/00

U.S. Cl. 324-95

6 Claims



1. A power sensor for RF-power measurements comprising: a silicon support member, an insulating film formed on a surface portion of said support member, a power absorbing resistor formed over said insulating film, an island portion formed beneath said power absorbing resistor, a heat sink portion in spaced relation to said island, a narrow bridge portion between said island and said heat sink portion, said island portion, heat sink portion and bridge portion all being integral with said silicon support member, a thermocouple electrically isolated from said resistor, said thermocouple being formed by said bridge portion, and contact zones on said bridge portion electrically connected to said thermocouple in spaced relation.

#### 4,789,824 DIGITAL MEASURING INSTRUMENT FOR DISPLAYING A MEASURED VALUE THAT VARIES OVER TIME

Dieter Henkelmann, Mannheim, Fed. Rep. of Germany, assignor to Brown, Boveri & Cie AG, Mannheim, Fed. Rep. of Germany

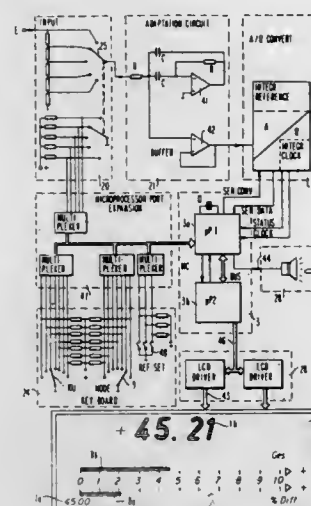
Filed Jun. 19, 1987, Ser. No. 65,020

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1986, 3620723

Int. Cl. G01R 1/00, 19/26, 15/08

U.S. Cl. 324-114

20 Claims



1. Digital measuring instrument for displaying a measured value (E) varying over time, comprising sequence control means (3) for ascertaining at least one instantaneous value in each of a plurality of measuring cycles by sensing a measured value (E) and for forming a cycle value from the instantaneous values occurring per measuring cycle, said sequence control means (3) including a memory (3b) storing the most recent cycle value until a new cycle value is present that replaces an old cycle, a digital display (1a) connected to said sequence control means (3) for displaying a digital display value derived from the most recent cycle value in response to a control signal, said sequence control means (3) retaining the digital display value until it forms a current digital display value from a new cycle value in response to a new control signal, said sequence control means (3) forming differential values between a given digital display value and the continuously occurring cycle values, an analog differential value scale (7a) connected to said sequence control means (3) for displaying various differential values, and means (4) connected to said sequence control means (3) containing at least one switching element (5) emitting a control signal after the expiration of a predetermined holding time for switching said digital display (1a) to the instantaneous current display value.

#### 4,789,825 INTEGRATED CIRCUIT WITH CHANNEL LENGTH INDICATOR

John A. Carelli, Allentown; Richard A. Pedersen, New Tripoli, and Robert L. Pritchett, Bath, all of Pa., assignors to American Telephone and Telegraph Co., AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 863,094, May 14, 1986, abandoned.

This application Feb. 25, 1988, Ser. No. 161,304

Int. Cl. G01R 31/26

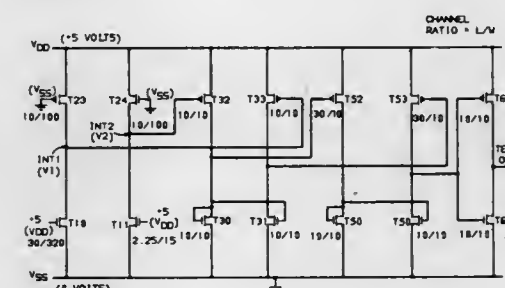
U.S. Cl. 324-158 T

9 Claims

1. An integrated circuit comprising a plurality of field effect

transistors, characterized in that said integrated circuit comprises:

a test field effect transistor (T1) having a test channel length (L1) and a reference field effect transistor (T2) having a reference channel length (L2) that is large compared to said test channel length, whereby fabrication variations that cause a change in the channel lengths produce a relatively large change in the gain of said test transistor as compared to the change in the gain of said reference transistor;



means adapted to cause a current to flow through the channels of said test and said reference transistors; and a comparator having first and second inputs coupled to said test and reference transistors, respectively, whereby said comparator produces a test signal having a first output voltage state when said test channel length is less than a given amount, and a second output voltage state when said test channel length is greater than said given amount, whereby the output voltage state of said comparator is determined by the fabrication of said integrated circuit.

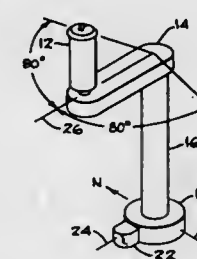
4,789,826

#### SYSTEM FOR SENSING THE ANGULAR POSITION OF A ROTATABLE MEMBER USING A HALL EFFECT TRANSDUCER

Michael D. Willett, Colorado Springs, Colo., assignor to Ampex Corporation, Redwood City, Calif.

Filed Mar. 19, 1987, Ser. No. 27,753

Int. Cl. G01B 7/14; G01N 27/72; G01R 33/02; H01L 43/06  
U.S. Cl. 324-208 10 Claims



1. Apparatus for sensing the angular position of a shaft of a tension arm supported by a housing for rotation through a preselected angle of less than 360° comprising: a circular magnet of selected circumference having a pair of north-south magnetic poles selectively induced therein for generating an arcuate magnetic field thereabout, the magnet being coaxially secured for rotation with the tension arm through the preselected angle of less than 360°; magnetic field transducing means selectively secured to the housing in close and constant proximity to the circumference of the circular magnet, and at a preselected position in the magnetic field between the north-south magnetic

poles corresponding to a preselected center angular position of the tension arm; and circuit means including offset adjusting amplifier means responsive to the magnetic field transducing means for supplying a preselected null voltage when the tension arm is at the preselected center angular position, and a linearly varying voltage indicative of the degree of rotation of the tension arm within said preselected angle of less than 360° when the arm is angularly displaced from the preselected center angular position.

4,789,827

#### MAGNETIC FLUX LEAKAGE PROBE WITH RADIALLY OFFSET COILS FOR USE IN NONDESTRUCTIVE TESTING OF PIPES AND TUBES

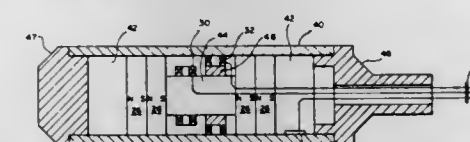
Mark J. Bergander, Madison, Conn., assignor to Electric Power Research Institute, Palo Alto, Calif.

Filed Oct. 31, 1986, Ser. No. 927,616

Int. Cl. G01N 27/87

U.S. Cl. 324-220

3 Claims



1. A magnetic flux detection probe for use in nondestructive testing of tubes and the like, comprising: a generally cylindrical housing having a central axis; magnetic means positioned within said housing for establishing a magnetic flux pattern passing through the wall of a tube undergoing test, said magnetic means including first and second pole pieces, first and second magnets between said first and second pole pieces, and a magnetic connector between said first and second magnets, all axially aligned in said housing whereby magnetic flux from said first and second magnets leaves said first pole piece, travels through a tube undergoing test and re-enters the housing through said second pole piece; a first coil positioned on and around said connector within said housing and a second coil positioned on a spacer on said connector and around said connector and radially offset within said housing from said first coil, said first and second coils generating two signals for use in detecting the location and magnitude of defects by detecting magnetic leakage flux from a tube undergoing test due to cracks and pits; electrical conductor means connected to said first coil and said second coil and extending from said probe for transmitting separate electrical signals from said first coil and said second coil; a Hall effect sensing device positioned within said housing for sensing changes in magnetic flux patterns in a tube undergoing test and thereby sensing variations in tube wall thickness; and electrical conductor means connected to said Hall effect sensing device and extending from said probe for transmitting electrical signals from said Hall effect sensing device.

4,789,828

#### COOLANT STRUCTURE FOR A DEVICE FOR DETERMINING THE QUALITY OF HOT TEST OBJECTS

Bengt H. Törnblom, Västerås, Sweden, assignor to Törnbloms Kvalitetskontroll AB, Sweden

Filed Apr. 13, 1987, Ser. No. 37,683

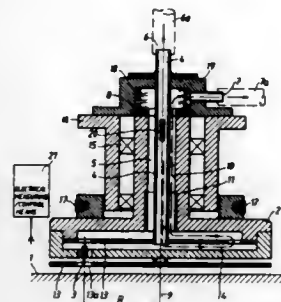
Claims priority, application Sweden, Apr. 16, 1986, 8601723  
Int. Cl. G01N 27/72; G01R 33/12

U.S. Cl. 324-224

7 Claims

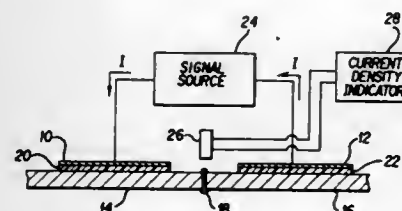
1. A device for determining the quality of a hot test object, comprising a body mounted for rotation about an axis and at

least one transducer eccentrically mounted on the body and thus adapted to move along a closed path adjacent to a surface of the test object and an associated sensing means;  
a coolant flow within the body takes place via an inlet channel and an outlet channel each adjacent to the axis of



rotation of the body and, connecting said channels, at least one further channel which conveys coolant past the vicinity of the at least one transducer; and  
the coolant flow in one of the inlet and outlet channels flows past a packing seal surrounding the axis of rotation of the body.

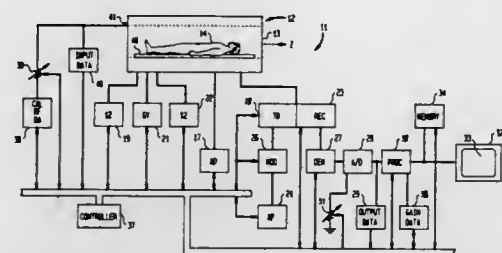
**4,789,829**  
**METHOD AND APPARATUS FOR DETERMINING REGASKET SHIELDING EFFECTIVENESS**  
Donald Stribling, Colorado Springs, Colo., assignor to Science Application International Corporation, La Jolla, Calif.  
Filed Jul. 18, 1986, Ser. No. 886,723  
Int. Cl.<sup>4</sup> G01N 27/82; G01R 27/14  
U.S. Cl. 324-263 12 Claims



1. A method for determining, in situ, the shielding effectiveness of RF gaskets mounted between mating metallic surfaces of equipment or structures comprising the steps of:

- positioning a first electrode adjacent one of the metallic surfaces generally parallel thereto and spaced therefrom and a second electrode adjacent the other of the metallic surfaces generally parallel thereto and spaced therefrom, the first and second electrodes being positioned with a space between the electrodes such that the RF gasket is in the space between the two electrodes and the electrodes are capacitively coupled to the respective surfaces;
- applying a time varying electrical signal between said first and second electrodes;
- moving the electrodes along the surfaces with the gasket between the electrodes; and
- sensing the current density across the surfaces at a predetermined position between the electrodes as a measure of gasket shielding effectiveness.

**4,789,830**  
**DETERMINING ABSOLUTE IMAGE INTENSITY IN MAGNETIC RESONANCE SYSTEMS**  
Saul Stokar, Raanana, Israel, assignor to Elscint Ltd., Haifa, Israel  
Filed Mar. 6, 1987, Ser. No. 22,829  
Claims priority, application Israel, Mar. 10, 1986, 78096  
Int. Cl.<sup>4</sup> G01R 33/20  
U.S. Cl. 324-308 17 Claims

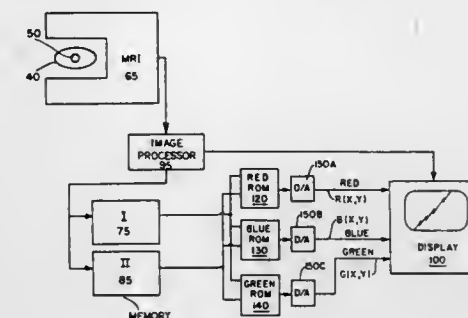


- A magnetic resonance data acquisition system comprising: magnet means for generating a relatively large static magnetic field for aligning spins in a subject in said system, means for transmitting Rf pulses for nutating said aligned spins, receiver means for receiving Rf signals generated by the nutated spins of the subject in the magnet means and of a phantom separately in the magnet means in the same location as the subject as the nutated spins return to the aligned position after termination of the Rf pulses, said receiver means having an output providing said received Rf signals, means for adjusting the output of said receiver means to provide received Rf signals from said phantom which conform to the phantom proton density, means for processing said Rf signals received from said subject to provide relative MR numbers as a function of location but uncorrected to absolute proton density and for subject loading, and means for determining an absolute gain of the receiver means to obtain absolute MR numbers from the relative MR numbers, said absolute MR numbers being normalized to absolute proton density and subject loading.

**4,789,831**  
**PRODUCING PSEUDOCOLOR MAGNETIC RESONANCE IMAGES**  
William T. Mayo, Jr., Seal Beach, Calif., assignor to North American Philips Corporation, New York, N.Y.  
Continuation-in-part of Ser. No. 767,457, Aug. 20, 1985, Pat. No. 4,690,150. This application Jan. 23, 1987, Ser. No. 6,534. The portion of the term of this patent subsequent to Sep. 1, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> G01R 33/20 5 Claims

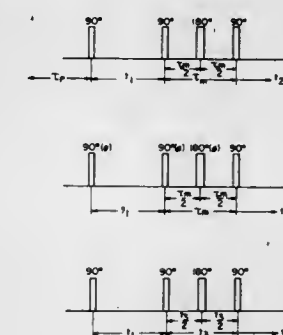
- A method for producing a magnetic resonance image for simultaneously visualizing independent first and second parameters in a field of data comprising the steps of: modulating the intensity of pixels of an image in accordance with the value of said first parameter at a corresponding location in the field; modulating the hue of said pixel to a first color when the value of said second parameter at the corresponding location in the field is greater than a reference value and modulating the hue of said pixel to a second color when said value of the second parameter is less than the reference value; and modulating the saturation of the color of the pixel in proportion to the absolute value of the deviation of the second

parameter from the reference value at the corresponding location in the field;



wherein the first parameter is located magnetic resonance spin echo intensity and the second parameter is local magnetic resonance relaxation time.

**4,789,832**  
**THREE-DIMENSIONAL NMR SPECTROSCOPY**  
Kuniaki Nagayama, Akishima, Japan, assignor to Jeol Ltd., Tokyo, Japan  
Filed Jan. 12, 1988, Ser. No. 143,576  
Claims priority, application Japan, Jan. 14, 1987, 62-7779; Jan. 14, 1987, 62-7780  
Int. Cl.<sup>4</sup> G61R 33/20 3 Claims

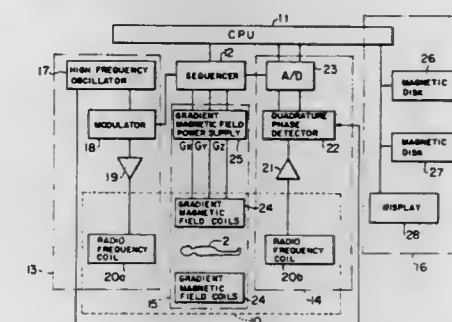


1. A three-dimensional nuclear magnetic resonance spectroscopy comprising the steps of:

- applying a first 90°-pulse to a sample containing gyromagnetic resonators after the lapse of a given preparation period;
- applying a second 90°-pulse to the sample after the lapse of an evolution period of  $t_1$  that follows the application of the first 90°-pulse;
- applying a 180°-pulse to the sample at the middle of a mixing period of  $T_m$  that follows the application of the second 90°-pulse and applying a third 90°-pulse to the sample after the mixing period of  $T_m$ ;
- detecting the free induction decay signal emanating from the resonators during a detection period of  $t_2$  that follows the application of the third 90°-pulse and storing the obtained data in a memory;
- carrying out the steps (a)-(d) while systematically varying the length  $t_1$  of the evolution period and a second pulse train parameter  $X$ , obtaining the sum  $S(t_1, t_2, X)$  of the resulting free induction decay signals, and storing the data in the memory;
- taking the complex Fourier transform of the data  $S(t_1, t_2, X)$  with respect to  $t_2$ ;

- taking the complex Fourier transform of the transformed data  $S(t_1, \omega_2, X)$  with respect to  $t_1$ ; and
- taking the cosine Fourier transform of the transformed data  $S(\omega_1, \omega_2, X)$  with respect to  $X$  to obtain a spectrum  $S(\omega_1, \omega_2, Y)$ .

**4,789,833**  
**METHOD FOR CORRECTING POSITION DEVIATION DUE TO STATIC MAGNETIC FIELD CHANGE IN NMR IMAGING DEVICE**  
Hiroshi Nishimura, Kashiwa, Japan, assignor to Hitachi Medical Corp., Tokyo, Japan  
Filed Oct. 28, 1987, Ser. No. 113,604  
Claims priority, application Japan, Oct. 29, 1986, 61-255666  
Int. Cl.<sup>4</sup> G01R 33/20 6 Claims



1. In an NMR imaging device comprising means for applying a static magnetic field to an object to be examined, means for applying to the object a gradient magnetic field in a slice direction, a gradient magnetic field in a phase encode direction and a magnetic field in a frequency encode direction, means for applying radio frequency pulses to the object to cause nuclear magnetic resonance (NMR) in atomic nuclei of atoms constituting tissues of the object, means for detecting the NMR signals thus generated, and means for Fourier-transforming the NMR signals to reconstruct an NMR image, a method for correcting deviation of a static magnetic field intensity comprising the steps of:

- a first step of placing the object in the static magnetic field;
- a second step of applying the gradient magnetic field in the slice direction and also applying a 90 degree radio frequency pulse at a preset center frequency of  $\omega_0$  corresponding to a slice position, which is decided by said static magnetic field and said gradient magnetic field in the slice direction;
- a third step of, after the application of said gradient magnetic field in the slice direction and said 90 degree radio frequency pulse have been cancelled during a predetermined period, applying the gradient magnetic field in the slice direction and a 180 degree radio frequency pulse at a center frequency of  $\omega_0$ ;
- a fourth step of detecting an NMR signal thus produced;
- a fifth step of Fourier-transforming said NMR signal to provide a peak frequency  $\omega_1$  of the resultant frequency spectrum; and
- a sixth step of obtaining the frequency difference between  $\omega_0$  and  $\omega_1$  and adding it to the frequency  $\omega_0$ .



# 4,789,834

## METHOD AND APPARATUS FOR TESTING OF INDUCTION MOTOR OVERLOAD PROTECTION DEVICE

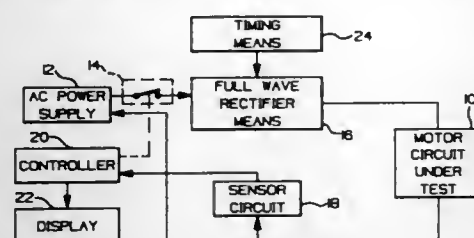
Lawrence J. Koopman, Floyd Knobs, Ind., assignor to General Electric Company, Louisville, Ky.

Filed Dec. 22, 1986, Ser. No. 944,757

Int. Cl.<sup>4</sup> G01R 31/02

U.S. Cl. 524-417

8 Claims



1. A method of testing the operability of an overload protection device incorporated in a power circuit for an AC induction motor having motor power terminals and motor windings adapted for energization by a power signal applied across the power terminals, which device is of the type having contacts in the motor power circuit operative to open thereby de-energizing the motor windings when the device temperature exceeds a predetermined temperature limit, said method comprising the steps of:

- applying an unfiltered full wave rectified AC power signal across the motor power terminals to rapidly raise the temperature of the device above the temperature limit;
- periodically decoupling the power signal from the motor terminals for a relatively brief interrupt period of sufficient duration to extinguish any arcing occasioned by the opening of the contacts of the overload device, the period between successive interrupt periods being short enough to prevent arc damage to the contacts;
- monitoring the motor circuit to detect opening of the overload device contacts;
- measuring the time from application of power to the motor terminals; and
- generating a signal indicating that the overload device has failed the test if the contacts fails to open within a predetermined time interval.

# 4,789,835

## CONTROL OF SIGNAL TIMING APPARATUS IN AUTOMATIC TEST SYSTEMS USING MINIMAL MEMORY

Richard F. Herlein, San Jose, Calif., assignor to Fairchild Camera & Instrument Corporation, Mountain View, Calif.

Continuation of Ser. No. 611,453, May 17, 1984, abandoned, which is a continuation-in-part of Ser. No. 518,499, Aug. 1, 1983, abandoned. This application Jul. 2, 1987, Ser. No. 70,130

Int. Cl.<sup>4</sup> H03K 17/00; G06K 5/04

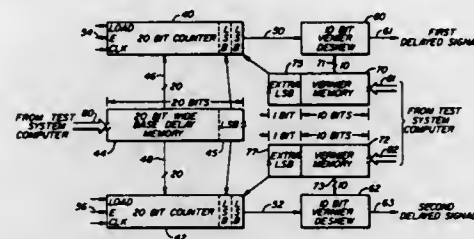
U.S. Cl. 328-72

8 Claims

1. Apparatus for supplying a signal after a predetermined time delay comprising:

- a base delay storage means for storing at least one first sequence of bits extending from a most significant bit to include a lesser significant bit, the at least one first sequence of bits being a digital representation of the value of higher order bits of a time delay;
- a first vernier delay storage means for storing at least one second sequence of bits extending from a first bit of equal significance to the lesser significant bit to a first least significant bit, the at least one second sequence of bits being a digital representation of the value of lower order bits of the time delay;
- first generating means coupled to the base delay storage means and to the first vernier delay storage means for

receiving the digital representation of the value of the time delay therefrom, and also connected to receive a start signal, the first generating means for supplying a first signal an amount of time after receiving the start signal as represented by the first bit and the first sequence of bits; and



first delay means connected to receive the first signal from the first generating means and connected to the first vernier delay storage means, the first delay means for supplying a first delayed signal an amount of time after receiving the first signal as represented by all of the second sequence of bits except the first bit.

# 4,789,836

## CIRCUIT FOR USE WITH A LIGHT PEN TO REDUCE JITTER

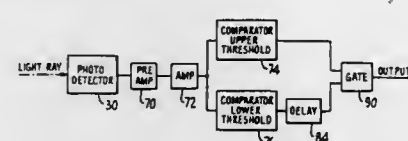
George A. May, R.R. 1, East Sooke Road, Sooke, British Columbia, Canada (V0S 1N0)

Division of Ser. No. 346,368, Feb. 5, 1982, Pat. No. 4,454,417. This application Nov. 18, 1983, Ser. No. 537,954

Int. Cl.<sup>4</sup> H03K 5/153; G01R 19/165, 29/027

U.S. Cl. 328-117

9 Claims



1. A discrimination circuit for determining whether input pulses from a photodetector are valid signals and for generating an output signal at a substantially predetermined time after the rise of a valid signal, said input pulses each having a rising edge, said circuit comprising:

- first comparator means for receiving said input pulses and for generating a first signal at substantially a first threshold crossing time whenever the instantaneous magnitude of an input pulse at its rising edge exceeds a first threshold level, wherein the generation of a first signal by the first comparator indicates that the input pulse is valid;
- second comparator means for receiving said input pulses and for generating a second signal when the instantaneous magnitude of an input pulse at its rising edge exceeds a second selected threshold level at substantially a second threshold crossing time, said second selected threshold level being lower than said first threshold level, so that the second threshold crossing times of any two valid pulses differ by an amount less than the difference between the first threshold crossing times of the two valid pulses;
- delay means connected to said second comparator means for delaying said second signal by a fixed time delay;
- gate means operatively connected to said first comparator means and said delay means, said time delay being such that when the first comparator generates a first signal, the gate means receives the delayed second signal after the first threshold crossing time, said gate means generating an output pulse upon receiving the first signal and the

delayed second signal, said output pulse being generated at substantially the arrival time of the delayed second signal, said second threshold level being selected such that the time of generation of the output signal is substantially the same for all valid signals and substantially independent of the slope of said valid signals.

# 4,789,837

## SWITCHED CAPACITOR MIXER/MULTIPLIER

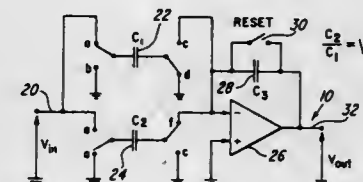
Timothy J. Ridgers, Alpharetta, Ga., assignor to Sangamo Weston, Inc., Norcross, Ga.

Filed Apr. 22, 1987, Ser. No. 41,273

Int. Cl.<sup>4</sup> H03K 3/02; H03C 1/00; G06G 7/16

U.S. Cl. 328-142

20 Claims



1. Signal sampling apparatus comprising: input means for providing an input signal to be sampled; multiplying means for multiplying sequential values of the input signal by predetermined respective multiplicands at predetermined sample times; and summing means for summing the multiplied values of the signal; and for providing an output signal corresponding to a sum of respective products of the input signal values and the respective multiplicands wherein said multiplying means comprises a plurality of switched capacitor means, including plural capacitors having predetermined capacitance values and controlled switch means connected to said plural capacitors for providing controllably variable interconnections of capacitors between said input means and said summing means, said controlled switch means comprising, for each of said capacitors, an input and an output switch respectively connected to an input terminal and an output terminal of each said capacitor and connected to be controlled by different control signals for providing two-phase operation thereof, wherein in a first phase an input switch of a predetermined capacitor connects said capacitor to said input means for receiving said input signal and an output switch of said predetermined capacitor connects said predetermined capacitor to complete a loop with said input means, and in a second phase said output switch of said predetermined capacitor connects said predetermined capacitor to said summing means and said input switch of said predetermined capacitor connects said predetermined capacitor to complete a loop with said summing means, thereby providing controllable ratios of said plural capacitors as multipliers for said input signal provided at said predetermined sample times to said summing means.

# 4,789,838

## PULSE DETECTION CIRCUIT USING AMPLITUDE AND TIME QUALIFICATION

Jyi-Min Cheng, 6997 Blue Hill Dr., San Jose, Calif. 95129

Filed Mar. 23, 1987, Ser. No. 28,926

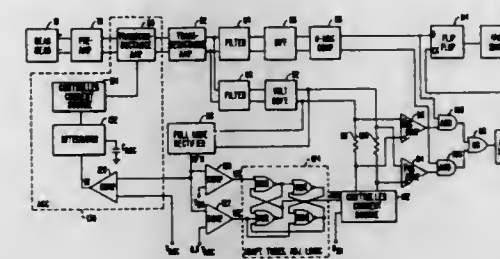
Int. Cl.<sup>4</sup> H03K 5/153

U.S. Cl. 328-150

10 Claims

1. A pulse detection circuit comprising: means for detecting peaks in an input signal and producing a peak detect signal when a peak is detected; means for comparing said input signal to a threshold level; means, coupled to said means for detecting and said means

for comparing, for producing an amplitude qualified peak output signal when a peak is detected above said threshold level; and means, having an input coupled to said means for producing an amplitude qualified peak output signal, and said means



for detecting peaks, for producing a time qualified peak signal at an output after a predetermined delay from said amplitude qualified output signal if said peak detect signal is still present after said delay, said means for producing a time qualified peak signal being nonresponsive to signals at said input during said delay.

# 4,789,839

## METHOD AND APPARATUS FOR INJECTING CHARGED PARTICLES ACROSS A MAGNETIC FIELD

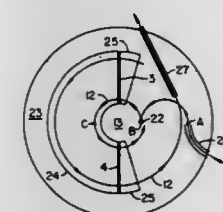
Donald E. Morris, 44 Marguerite Rd., Kensington, Calif. 94707

Filed Jan. 24, 1986, Ser. No. 877,915

Int. Cl.<sup>4</sup> H05H 13/00

U.S. Cl. 328-234

5 Claims



1. The improvement in a particle injector for a cyclotron wherein the cyclotron has a magnetic field extending normal to circular paths about a central point for accelerating particles within said cyclotron and includes along said paths first and second opposed means for receiving charge for accelerating charged particles in circles about said central point in said cyclotron, the improvement comprising: a particle injector having an output substantially normal to said magnetic field along an injection path, said injection path being circular within said magnetic field, said injection path being nonconcentric about said central point and disposed within said magnetic field of said cyclotron, said injection path being focused to a point of reflection within said cyclotron; and means of reflecting particles within said cyclotron disposed at said point of reflection within said magnetic field of said cyclotron for causing said reflected particles from said injection path to pass along a reflected path concentric to said central point for acceleration along the circular paths about said central point of said cyclotron.

4,789,840

## INTEGRATED CAPACITANCE STRUCTURES IN MICROWAVE FINLINE DEVICES

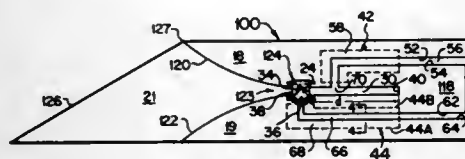
Robert D. Albin, Santa Rosa, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 16, 1986, Ser. No. 852,861

Int. Cl.<sup>4</sup> H03D 9/02

U.S. Cl. 329-161

54 Claims



1. In an apparatus for processing microwave energy in a waveguide, said apparatus including a dielectric substrate disposed within said waveguide and extending between opposing first and second interior walls of said waveguide, said dielectric substrate having thereon metallization on a first substantially planar surface, said metallization including at least a first metallization layer forming a first margin on a first side of a channel region of exposed dielectric surface, a second metallization layer forming a second margin on a second side of said channel region opposing said first margin, the improvement comprising:

- at least a third margin of said second metallization layer on said second side of said channel region;
- at least a third metallization layer forming a fourth margin adjacent and opposing said third margin, said third metallization layer being d.c. isolated from said second metallization layer; and
- distributed capacitance means comprising at least one metallization layer and at least one thin-film dielectric stratum, said distributed capacitance means being disposed on said dielectric substrate and bridging said third margin and said fourth margin adjacent said channel region, said capacitance means having at least sufficient capacitance value for r.f. continuity between said second metallization layer and said third metallization layer.

4,789,841

## CIRCUIT ARRANGEMENT FOR NOISE REDUCTION AT THE MINIMUM VOLUME SETTING OF AN AMPLIFIER

Rainer Würz, Ehrlinghausen, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

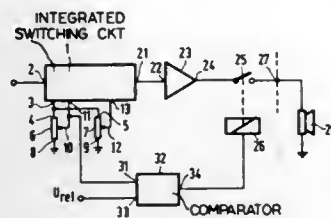
Filed Oct. 21, 1986, Ser. No. 921,710

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1985, 3537837

Int. Cl.<sup>4</sup> H03F 1/00, 1/02

U.S. Cl. 330-149

7 Claims



1. A circuit arrangement for noise reduction at the minimum volume setting of a low-frequency amplifier which includes a switching circuit for varying the volume dependent on a direct control voltage, and a volume control means for varying the direct control voltage, the low-frequency amplifier having a last stage, the circuit arrangement including an electrically controlled switch disposed in a signal path coupled to the

output of the last stage for selectively opening the signal path dependent on the direct control voltage, the electrically controlled switch opening the signal path at the direct control voltage value which is available when the volume is set at minimum by the voltage control means.

4,789,842

## COMPOSITE TRANSISTOR DEVICE WITH OVER-CURRENT PROTECTION

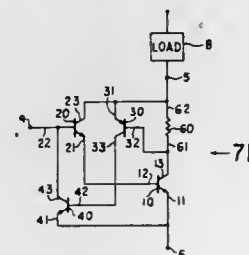
Jiri Naxera, 263 Ridge Rd., Lyndhurst, N.J. 07071

Filed Nov. 23, 1987, Ser. No. 124,173

Int. Cl.<sup>4</sup> H02H 7/20

U.S. Cl. 330-298

11 Claims



6. A composite transistor device having over-current protection comprising:

- (a) a sensing resistor having a first resistor electrode and a second resistor electrode;
- (b) a power output transistor means having an emitter electrode, a base electrode and a collector electrode;
- (c) an exciter transistor being of same conductivity type to said power output transistor means and having an emitter electrode, a base electrode and a collector electrode;
- (d) an auxiliary transistor being of opposite conductivity type to that of said power output transistor means and having an emitter electrode, a base electrode and a collector electrode, said auxiliary transistor being connected so that when said emitter and base electrodes detect an over-current condition in the collector current flow of said power output transistor means, characterized in the current flowing through said sensing resistor exceeding a predetermined value, said collector electrode provides for a signal means indicative of said over-current condition; and
- (e) a clamping transistor means for clamping the base-emitter potential of said exciter transistor in response to said signal means indicative of said over-current condition, said clamping transistor being of the same conductivity type to said power output transistor means.

4,789,843

## LASER DIODE OPTICAL MODULATING DEVICES

John W. Hicks, 312 Howard St., Northboro, Mass. 01532

Filed Jul. 28, 1987, Ser. No. 78,599

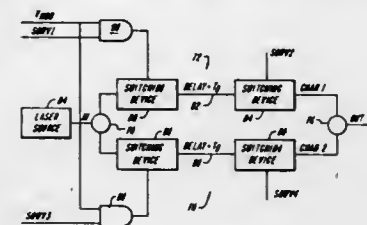
Int. Cl.<sup>4</sup> H01L 31/02

U.S. Cl. 332-7.51

14 Claims

1. An optical isolator for transmitting a forward light beam from an input to an output and for blocking a reverse light beam from passing from the output to the input, comprising: first electronically controllable optical switching means coupled to said isolator input; second electronically controllable optical switching means coupled to said isolator output; means for optical coupling between said first switching means and said second switching means and having an associated delay  $T_0$ ; and means for providing a first square wave actuation signal to said first switching means and for providing a second

square wave actuation signal to said second switching means, said first and second square wave signals each



having a cycle time  $T_p = 4T_0$  and said second square wave signal being delayed relative to said first square wave signal by a time  $T_0$ .

4,789,844

## BROAD-BAND NON-RECIPROCAL MICROWAVE DEVICES

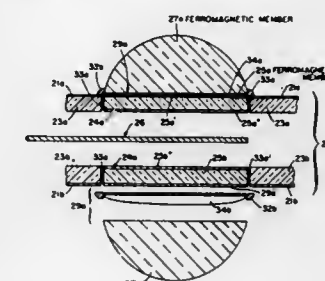
Ernst F. R. A. Schloemann, Weston, Mass., assignor to Raytheon Company, Lexington, Mass.

Filed May 29, 1987, Ser. No. 56,938

Int. Cl.<sup>4</sup> H01P 1/387

U.S. Cl. 333-1.1

31 Claims



1. In combination: a propagation medium; first means, including a disc comprised of a ferromagnetic material having a saturation magnetization characteristic, said disc being disposed within said propagation medium, for providing non-reciprocal ferromagnetic action having a predetermined low limit frequency of operation relative to the magnetization frequency of the ferromagnetic material; and second means, disposed outside of said propagation medium, for providing nonreciprocal ferromagnetic action at frequencies substantially below the magnetization frequency  $f_M$  of the ferromagnetic material, said means including a pair of members comprised of a ferromagnetic material having the same saturation magnetization as that of the ferromagnetic material of the disc disposed in said propagation medium.

4,789,845

## BROAD BAND HYBRID SIGNAL SPLITTER

Prabhakara Reddy, 302 Mott Rd., Fayetteville, N.Y. 13066

Filed Jan. 20, 1988, Ser. No. 145,890

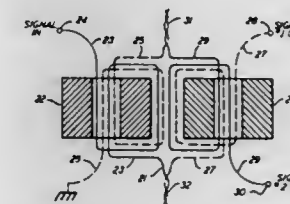
Int. Cl.<sup>4</sup> H03H 7/48

U.S. Cl. 333-100

5 Claims

1. A signal-splitter for coupling an hf, vhf or uhf source to a pair of loads that have a predetermined impedance, comprising: first and second tubular cores disposed radially side by side; first and second wire toroidal windings formed on the first core each including at least one turn and having a first end and a second end; third and fourth wire toroidal windings wound on the sec-

ond core each including at least one turn and having a first end and a second end; the second end of the first winding being twisted together with the second end of the third winding to form a first twisted connection; the first end of the second winding being twisted together with the first end of the fourth winding to form a second twisted connection; a signal input terminal for connecting the first end of the first winding to a signal input source; a signal ground coupled to the second end of the second winding;



first and second signal outputs for respectively coupling the first end of the third and second end of the fourth winding to respective output loads; and a printed circuit board that includes a pair of spaced through holes and a printed conductor thereon extending between them; said first and second twisted connections passing through said holes to secure the cores and windings to the board and being electrically connected with said printed conductor.

4,789,846

## MICROWAVE SEMICONDUCTOR SWITCH

Makoto Matsunaga, Yoshitada Iyama, and Fumio Takeda, all of Kanagawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

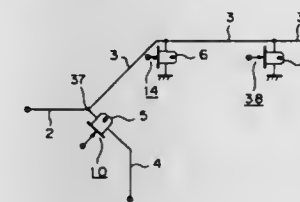
Filed May 1, 1987, Ser. No. 45,627

Claims priority, application Japan, Nov. 28, 1986, 61-183456(U); Feb. 12, 1987, 62-30105

Int. Cl.<sup>4</sup> H01P 1/15

U.S. Cl. 333-104

9 Claims



1. A microwave semiconductor switch for switching microwave energy of a predetermined bandwidth about a center frequency, said switch comprising, a semiconductor substrate having microstrip lines and field effect transistors formed thereon on one side and a ground plane on another side, including: first, second and third microstrip lines, each of said first, second and third microstrip lines having a first and a second end, the first ends of said first, second and third microstrip lines being connected together at a common junction point; a first field effect transistor having a source, a drain and a gate, said first field effect transistor gate having a first gate width, and said first field effect transistor source and drain



being connected in series between said common junction point and said second end of said third microstrip line;

a second field effect transistor having a source, a drain and a gate, said second field effect transistor gate having a second gate width, and said second field effect transistor source and drain being connected in series between said second microstrip line and said ground plane at a first position on said second microstrip line spaced substantially one quarter wavelength of said center frequency from said common junction point;

a third field effect transistor having a source, a drain and a gate, said third field effect transistor gate having a third gate width narrower than said first and second gate widths, and said third field effect transistor source and drain being connected between said second microstrip line and said ground plane at a second position on said second microstrip line spaced substantially one half wavelength of said center frequency from said common junction; and circuit means connected to the gates of said first, second and third field effect transistors for simultaneously turning said first, second and third field effect transistors on and off, whereby a microwave transmission path is switched between said first microstrip line and said second and third microstrip lines.

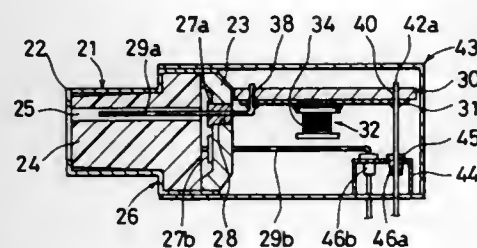
4,789,847

## FILTER CONNECTOR

Yukio Sakamoto, Takeshi Tanabe, Toshio Hori, Masashi Takeda, and Mitsuhiro Iida, all of Nagakakyō, Japan, assignors to Murata Manufacturing Co., Ltd., Japan  
Filed Mar. 3, 1987, Ser. No. 21,155  
Claims priority, application Japan, Mar. 5, 1986, 61-49266  
Int. Cl.<sup>4</sup> H03H 7/01

U.S. Cl. 333—185

17 Claims



## 1. A filter connector comprising:

- a conductive shell defining opposite front and rear directions, and defining opposite upper and lower directions;
- an insulating insert provided in a front portion of said conductive shell and having a plurality of through holes, said insulating insert forming a connector body in association with said conductive shell;
- a plurality of first terminal pins having first ends inserted in through holes of said insert at least in an upper portion of said insert, and second ends which pass rearwardly from said connector body;
- a printed circuit board supported by at least one of said first terminal pins;
- at least one conductive pattern formed on said printed circuit board and electrically connected with said at least one of said first terminal pins which supports said printed circuit board;
- at least one second terminal pin connected to a rearward portion of said conductive pattern on said printed circuit board and thereby electrically connected with said at least one first terminal pin through said conductive pattern; said printed circuit board being completely supported by at least one of said first and second terminal pins and out of contact with said connector body;
- filter means inserted in a current path between said at least one first terminal pin and said at least one second terminal pin, said filter means being provided on said printed cir-

cuit board and inserted into said current path by being electrically connected to said conductive pattern; and further comprising a conductive case enclosing said printed circuit board but out of contact with said printed circuit board, said conductive case being electrically connected to said conductive shell of said connector body.

4,789,848

## MOLDED CASE CIRCUIT BREAKER LATCH AND OPERATING MECHANISM ASSEMBLY

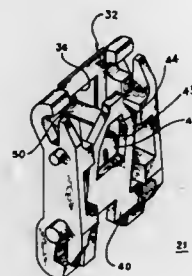
Roger N. Castonguay, Terryville, and David J. Meiners, Southington, both of Conn., assignors to General Electric Company, New York, N.Y.

Filed Sep. 3, 1987, Ser. No. 92,962

Int. Cl.<sup>4</sup> H01H 9/20

U.S. Cl. 335—167

13 Claims



## 1. A latch arrangement for molded case circuit breakers comprising:

- a support frame having a pair of side pieces joined by a back plate, each of said side pieces having a slot formed in a top part thereof;
- a secondary latch having a primary latch latching surface formed on a bottom part, a first pair of posts extending outboard from said bottom part for insertion within corresponding receptacles formed within said side pieces and a second pair of posts extending from a top part of said secondary latch for interacting with a circuit breaker trip bar to rotate said secondary latch counterclockwise about said first pair of posts;
- a reset spring intermediate said back plate and said secondary latch, said reset spring including a top member extending from a central body member over said back plate, said central body member including a reset surface lanced therein;
- a primary latch pivotally mounted on said support frame under said secondary latch and consisting of an apertured body member defining a cradle latching surface within said aperture with a secondary latch latching surface formed on a top part of said body member; and
- a secondary latch return spring on a side of said back plate opposite said reset spring and having a U-shaped surface interfacing with said secondary latch to rotate said secondary latch clockwise about said first pair of posts and a lanced central surface interfacing with said top member for preventing said secondary latch from rotating about said first pair of posts.

4,789,849

## AMORPHOUS METAL TRANSFORMER CORE AND COIL ASSEMBLY

Donald E. Ballard, Conover, and Willi Klappert, Hickory, both of N.C., assignors to General Electric Company, King of Prussia, Pa.

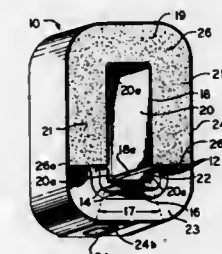
Division of Ser. No. 804,412, Dec. 4, 1985, Pat. No. 4,734,975.

This application Jan. 19, 1988, Ser. No. 159,371

Int. Cl.<sup>4</sup> H01F 27/24

U.S. Cl. 336—210

13 Claims



## 1. In an electric transformer,

- A. a preformed coil structure;
- B. a wound core of closed-loop configuration extending about a window and having joints in a localized region thereof that allow said core to be opened at said joints to permit insertion into said window of said preformed coil structure, whereupon said coil structure surrounds a portion of said core, said core comprising superposed laminations of thin amorphous ferromagnetic strip material which extend continuously around said core from said localized joint region;
- C. said amorphous ferromagnetic laminations including predetermined portions adjacent said joints which are displaced a relatively large distance from said localized joint region to provide a wide opening into said core window for said insertion of said preformed coil structure; and
- D. A coating of an adhesive bonding agent applied before said displacement to the exposed lateral edges of said laminations in regions of said core not including said predetermined portions, thereby holding said laminations in correct assembled relationship when said core is opened, yet with interfering with displacement of said predetermined portions while said predetermined portions are being moved to open or reclose said joints,
- E. said predetermined portions of said core adjacent said joints being substantially free of said adhesive bonding agent during said displacement incident to opening and reclosing said joints, thereby allowing relative movement of the laminations in each of said predetermined core portions during said displacement.

4,789,850

## TEMPERATURE SENSOR CONSTRUCTION AND METHOD OF MAKING THE SAME

Roger P. Sepso, Stratford, and Charles J. Everett, Killingworth, both of Conn., assignors to Robertshaw Controls Company, Richmond, Va.

Filed Dec. 7, 1987, Ser. No. 129,786

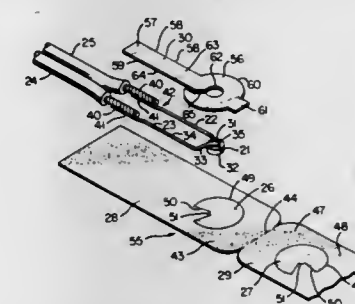
Int. Cl.<sup>4</sup> H01C 3/04

U.S. Cl. 338—25

20 Claims

- 1. In a temperature sensor construction comprising a thermistor having opposed sides, a pair of conductors respectively secured to said opposed sides of said thermistor and having portions thereof extending away from said thermistor, an electrically insulating member having an opening means there-through and telescopically receiving said thermistor in said opening means thereof, said insulating member having an outer peripheral edge means, a pair of metallic foil members disposed on said opposed sides of said thermistor and being insulated

from each other by said insulating member, and two outer layers of electrically insulating material secured to each other and encapsulating said foil members and said conductors and said insulating member and said thermistor therebetween, the



improvement wherein said opening means in said insulating member has a portion thereof that extends to and interrupts said peripheral edge means thereof, one of said conductors having a portion thereof disposed within said portion of said opening means.

4,789,851

## POWER DOOR LOCK INTERLOCK CIRCUIT

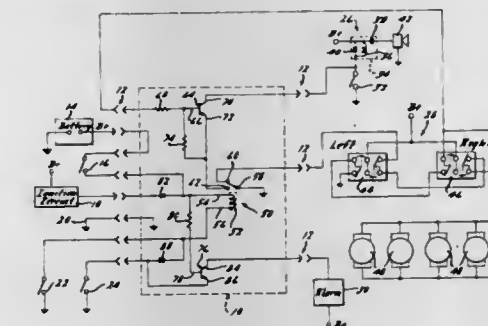
Darryl A. Hock, Harper Woods, and David L. Kaleita, Hamtramck, both of Mich., assignors to Jabil Circuit Company, Madison Heights, Mich.

Filed Feb. 2, 1987, Ser. No. 10,418

Int. Cl.<sup>4</sup> B60Q 5/00

U.S. Cl. 340—52 D

22 Claims



- 1. A power door lock interlock circuit for use in a vehicle having a power door lock actuator with mechanism responsive to said actuator, a horn, an ignition key sensing means for providing an indication when the ignition key is in the ignition and at least one vehicle door sensing means for providing an indication of the open and closed status of said door, comprising:

a single pole double throw relay having a pair of energizing terminals coupled to a coil and having a common terminal and first and second selectively contactable terminals, when said coil is deenergized said first contactable terminal being electrically coupled to said common terminal and when said coil is energized said second contactable terminal being electrically coupled to said common terminal;

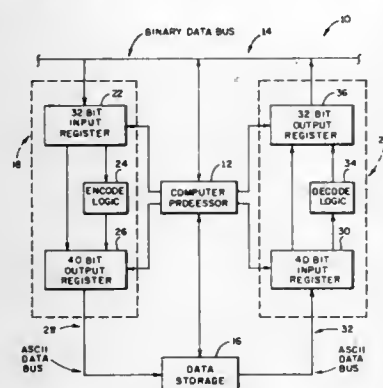
said common terminal being coupleable to the vehicle ground;

said first contactable terminal being coupleable to said power door lock mechanism for supplying a grounding path for current flow in said mechanism;

one of said energizing terminals of said relay being coupleable to said key sensing means for receiving electrical current therefrom;  
the other of said energizing terminals of said relay being coupleable to said door sensing means for providing a grounding path for current flow through said relay coil when said vehicle door is open;  
a first transistor having its base coupleable to said door lock actuator and having a first lead coupleable to said horn for providing a grounding path for sounding said horn, and having a second lead coupled to said second contactable terminal of said relay;  
whereby the presence of the key in the ignition and a vehicle door being open places said circuit in an interlock condition in which actuation of said power door lock actuator causes said horn to sound and in which said lock mechanism is simultaneously inhibited from being actuated.

**4,789,852**  
**METHOD AND APPARATUS FOR CONVERTING DATA IN A BINARY FORMAT**  
Gay R. Bailey, and Angel F. Bailey, both of 602 Twin Brook Pkwy., Rockville, Md. 20851

Filed Jun. 5, 1987, Ser. No. 58,823  
Int. Cl.<sup>4</sup> H03M 7/00  
U.S. Cl. 341-50 16 Claims

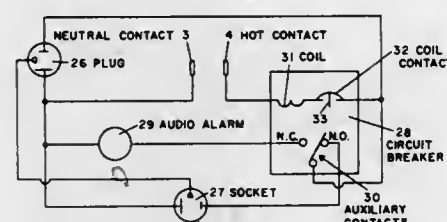


1. An automatic method for encoding an input word of binary data into an output word, the input word comprised of at least two multibit input bytes comprised in turn of a predetermined number of input bits, the output word comprised of at least the same number of multibit regular output bytes as in said input word, plus an additional multibit output byte, each regular output byte comprised in turn of a predetermined number of output bits arranged into a first group and a second group, said method comprising:

- storing an input word into an input register having a parallel output;
- automatically transferring unchanged in parallel the information of a first group of predetermined input bits in a predetermined order from each byte to a first group of predetermined output bits of each byte of an output word in an output register having a parallel input;
- testing the information of a second group of predetermined input bits that are different from said first group and if said information is of a predetermined value, converting said information to a different value;
- transferring either said second group of input bits or if a conversion has been done transferring the converted value of said second group of input bits in a predetermined order to a second group of predetermined output bits of the output word in said output register; and
- transferring data indicative of whether a conversion has been done into said additional byte of said output word in said output register.

**4,789,853**  
**DETECTION DEVICE FOR ELECTRICALLY CONDUCTIVE FLUIDS**  
Joseph A. Gentilomo, 1456 Belmont Ave., Schenectady, N.Y. 12308

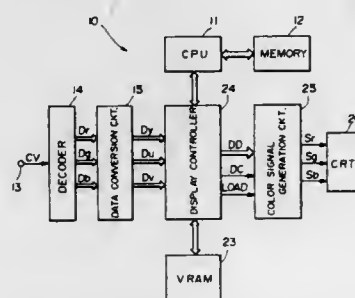
Filed Jun. 15, 1987, Ser. No. 61,585  
Int. Cl.<sup>4</sup> G01B 21/00  
U.S. Cl. 340-604 17 Claims



1. A fluid detection device, comprising:
  - (a) a fluid sensing unit having a body made of dielectric material; enclosed within said body are fixedly mounted neutral and hot contacts having (substantially vertical adjacent surfaces whose) surface areas (are) substantially equidistantly disposed from each other, throughout; said fluid sensing unit having means for admitting fluid to said neutral and hot contacts; and
  - (b) a control unit operatively associated with said fluid sensing unit for monitoring fluid leakage; said control unit including a manually resettable low current tripping (alternating current) circuit breaker having an "on position" and a maintained "off position"; said circuit breaker being further characterized as having a current limiting coil for limiting the magnitude of current flow between said neutral and hot contacts, circuit breaker contacts, and a lever switchable between an "on position" and an "off position"; said circuit breaker contacts being operatively interconnected to said lever such that when a conductive fluid bridges said neutral and hot contacts, said coil is energized such as to instantaneously switch said circuit breaker from said "on position" to said "off position".

**4,789,854**  
**COLOR VIDEO DISPLAY APPARATUS**  
Takatoshi Ishii, Tokyo, Japan, assignor to ASCII Corporation, Tokyo, Japan

Filed Jan. 5, 1987, Ser. No. 526  
Claims priority, application Japan, Jan. 14, 1986, 61-5800  
Int. Cl.<sup>4</sup> G09G 1/28  
U.S. Cl. 340-703 9 Claims

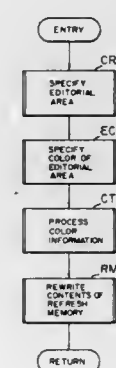


1. A color display apparatus for displaying a color image composed of a plurality of display dots on a screen of a display unit comprising:
  - (a) video information storage means having a plurality of memory locations each corresponding to a respective one

- of the plurality of display dots; each of said memory locations storing first display information or second display information each relating to a respective one of the display dots, and attribute information representing whether said first or second display information is stored in said memory locations; said plurality of memory locations being divided into a plurality of groups each composed of a predetermined number of memory locations for storing third display information relating to a corresponding number of said plurality of display dots;
- (b) reading means for sequentially accessing said plurality of memory locations in synchronism with display timings of said display dots to read from each of the plurality of memory locations information stored therein;
- (c) color data generating means responsive to each information read by said reading means for generating color data representative of a color of the corresponding display dot based on said first and third display information contained in said read information when the attribute information of said read information represents said first display information, said color data generating means generating said color data based on said second display information contained in said read information when the attribute information of said read information represents said second display information; and
- (d) signal feeding means for feeding a signal corresponding to said color data to the display unit.

**4,789,855**  
**DEVICE FOR EDITING DOCUMENT IN COLORS**  
Masayoshi Ozeki, Chiba, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 19, 1985, Ser. No. 702,831  
Claims priority, application Japan, Oct. 11, 1984, 59-211302  
Int. Cl.<sup>4</sup> G09G 1/16  
U.S. Cl. 340-703 11 Claims

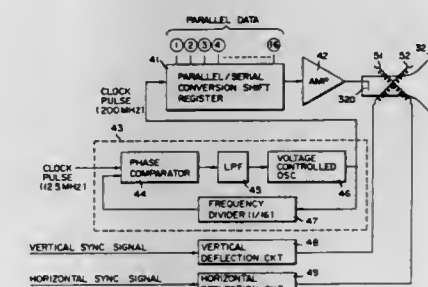


1. A device for editing a document in colors, comprising:
  - character information storing means for storing character identification information as to each of a number of characters included in a document which is to be displayed on a display screen;
  - color information storing means associated with said character information storing means for storing color information as to at least one of the display color and background color of each of said characters;
  - display means for displaying a document on said display screen in a predetermined color, including dot pattern refresh memory means for storing dot pattern data based on information stored in said character information storing means and said color information storing means;
  - editorial area specifying means for selectively specifying a desired character or character string in the document displayed on said display screen, as an editorial area, by

referring to said desired character or character string on the display screen;  
editorial area storing means for storing positional information corresponding to the editorial area specified by said editorial area specifying means;  
color specifying means for specifying and storing at least one of the display color and background color of characters in said specified editorial area of said document in the form of color specifying information in response to an operator command; and  
color information processing means coupled between said editorial area storing means and said color specifying means for updating the contents of a portion of said color information storing means which corresponds to said editorial area, on the basis of color specifying information from said color specifying means, whereby dot pattern data stored in said dot pattern refresh memory means is modified in response to said updating of said color information storing means.

**4,789,856**  
**DISPLAY APPARATUS WITH INTERFACE CABLE FOR TRANSFERING IMAGE DATA TO CRT IN PARALLEL FORMAT**

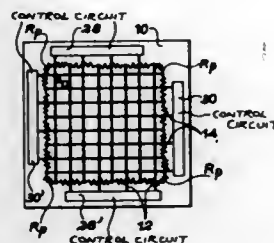
Isuneshi Yokota, Kawasaki, and Osamu Kondo, Yokohama, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Dec. 20, 1985, Ser. No. 811,739  
Claims priority, application Japan, Dec. 25, 1984, 59-278431  
Int. Cl.<sup>4</sup> G09G 1/00  
U.S. Cl. 340-720 6 Claims



1. An image filing apparatus, comprising:
  - image data output means for outputting image data corresponding to an image as a plurality of parallel bits of data;
  - display means for displaying the image data as an image having a high resolution, the display means being disposed separate from the image data output means;
  - an interface cable having a plurality of transmission lines for coupling said image data output means to said display means to transfer the plurality of parallel bits of image data to said display means; and
  - said display means including a multiplier circuit for frequency-multiplying clock pulses at a predetermined frequency, means for receiving the plurality of parallel bits of image data through said plurality of transmission lines of the interface cable and for converting the parallel bits of image data into serial data in synchronism with the multiplied clock pulses from said multiplier circuit, and cathode-ray tube means for displaying the serial data obtained from said conversion means as the image.

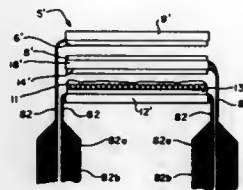


**4,789,857**  
**ACTIVE MATRIX DISPLAY SCREEN WITH LINE AND COLUMN REDUNDANCY**  
 Francois Maurice, 125 Boulevard de la Corniche, 22700 Perros Guirec, France  
 Filed Jan. 27, 1987, Ser. No. 7,193  
 Claims priority, application France, Jan. 27, 1986, 86 01081  
 Int. Cl.<sup>4</sup> G09G 3/36  
 U.S. Cl. 340—784 4 Claims



1. Active matrix display screen comprising a first (10) and a second (24) transparent plate between which is inserted liquid crystal material, the first plate (10) comprising conductive blocks (22) defining display elements (32) and lines of addressing electrodes organized in rows (14) and in columns (12), these lines being connected to circuits for controlling the display, the second plate (24) comprising a counterelectrode (26), the screen being characterized by the fact that the lines of electrodes are connected together at their ends by resistances and that said circuits for controlling the display place addressing signals on lines of electrodes, the addressing signal for a given line of electrodes overlapping in time the addressing signals of at least two lines on each side of said given line so that if said given line is broken, an addressing signal for the given line is produced from the overlapping portions of addressing signals of adjacent lines passing through said resistances.

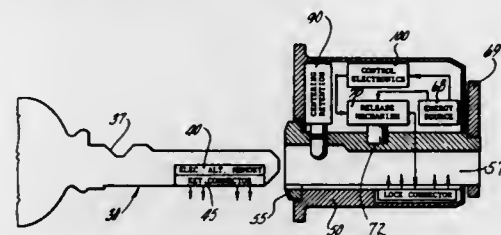
**4,789,858**  
**MULTIFUNCTION SWITCH INCORPORATING NCAP LIQUID CRYSTAL**  
 James L. Ferguson, Atherton, and Charles W. McLaughlin, Portola Valley, both of Calif., assignors to Taliq Corporation, Sunnyvale, Calif.  
 Filed Jun. 12, 1984, Ser. No. 620,378  
 Int. Cl.<sup>4</sup> G09G 3/36  
 U.S. Cl. 340—784 33 Claims



1. A switch apparatus comprising a switch means having a flexible portion for inputting information and for causing a display, said switch means incorporating a liquid crystal apparatus including the combination of a liquid crystal material and containment means for inducing a distorted alignment of said liquid crystal material which in response to such alignment at least one of scatters and absorbs light and which in response to a prescribed input reduces the amount of such scattering or absorption, the combination of the liquid crystal material and containment means being supported by a flexible substrate in spaced substantially parallel relation to said flexible portion, wherein a change in the display is effected by application of said prescribed input by deflection of said flexible portion with at least a part of said flexible substrate also being deflected, the

combination of the liquid crystal material and containment means substantially resistant to flow away from the area of deflection of said part of said flexible substrate such that the capability of said liquid crystal apparatus to induce said distorted alignment and to reduce the amount of such scattering or absorption remains substantially unaffected by the deflection.

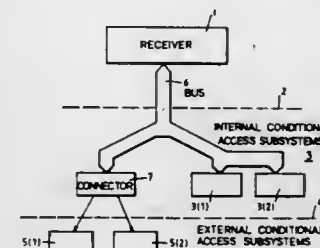
**4,789,859**  
**ELECTRONIC LOCKING SYSTEM AND KEY THEREFOR**  
 Bruce A. Clarkson, Beverly; Ronald J. Frere, Southampton, both of Mass.; Thomas G. Loughlin, Rocky Hill, Conn.; William W. Taylor, Jr., Golden, Colo., and Peter Mongeau, Needham, Mass., assignors to Emhart Industries, Inc., Farmington, Conn.  
 Filed Mar. 21, 1986, Ser. No. 842,681  
 Int. Cl.<sup>4</sup> H04Q 1/00; G06K 19/06; E05B 47/06  
 U.S. Cl. 340—825.31 9 Claims



1. A key for an electronic lock comprising a cylinder shell and a cylinder plug rotatable within said cylinder shell, said cylinder plug including a keyway for receiving said key, an electronically actuatable release assembly within the cylinder shell, said release assembly having a locking member which selectively engages the plug to prevent the rotation thereof and disengages the plug in response to an actuating signal to allow the rotation thereof, control logic for generating said actuating signal in response to a match between electronically coded key information on said key and electronic cylinder codes contained within said control logic, and first ohmic contact means within said lock for communicating with said control logic; said key comprising:

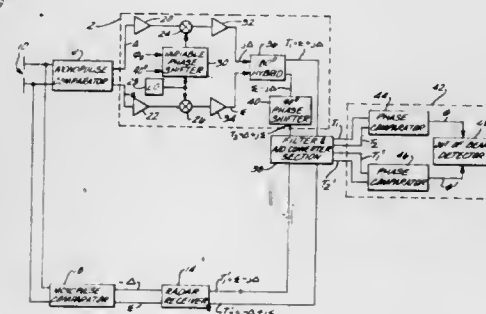
means defining a cavity substantially surrounded by metal, an electronic memory device supported within said cavity means and having leads for communicating with said memory device, a metal key blade insertable through said keyway, second ohmic contact means located on said blade but electrically insulated from said blade, and electrically connected to said leads of said memory device for mating with said first ohmic contact means upon insertion of said key in said keyway whereby said control logic is able to communicate with said memory device, and electro-static discharge protection means connected between memory cells within said memory device and said second ohmic contact means for protecting said memory cells against static charge entering said cavity means via said second ohmic contact means.

**4,789,860**  
**INTERFACE BETWEEN A RECEIVER AND A SUB-SYSTEM**  
 Peter R. Brennand, London, and Bruce Murray, Slough, both of England, assignors to U.S. Philips Corp., New York, N.Y.  
 Filed Mar. 4, 1986, Ser. No. 836,027  
 Claims priority, application United Kingdom, Mar. 12, 1985, 8506324; Nov. 25, 1985, 8529002  
 Int. Cl.<sup>4</sup> H04Q 9/04; H04N 7/08  
 U.S. Cl. 340—825.510 5 Claims



1. An interface arrangement between a television receiver and a conditional access sub-system comprising: a bus having a first line conveying clock signals at television line frequency rate from said receiver to said sub-system, a second line conveying data with a bit rate corresponding to that of the clock signal rate from said receiver to said sub-system during a first part of a bus cycle period and from said sub-system to said receiver during the remaining part of said bus cycle period, and a third line conveying a direction signal indicating to said sub-system the direction of data travel on said second line, the bus cycle period having a duration equal to four television frame periods, the data on said second line during the first part of each bus cycle period including the unique address of the sub-system with which the receiver is in communication together with data received by said television receiver.

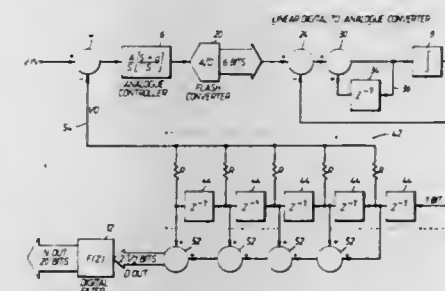
**4,789,861**  
**METHOD AND APPARATUS FOR DETECTING AN OUT OF BEAM CONDITION IN A MONOPULSE RADAR RECEIVER**  
 Don W. Baggett, Torrance, Calif.; Jay G. Herther, Nashua, N.H., and Deborah E. Bassham, San Diego, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Feb. 9, 1987, Ser. No. 12,412  
 Int. Cl.<sup>4</sup> G01S 13/44  
 U.S. Cl. 342—152 23 Claims



1. A method for detecting an out of beam condition in a monopulse radar receiver comprising the steps of: forming sum and difference signals from a target return signal; combining the sum and difference signals to form a first vector signature signal; combining the sum and difference signals to form a second

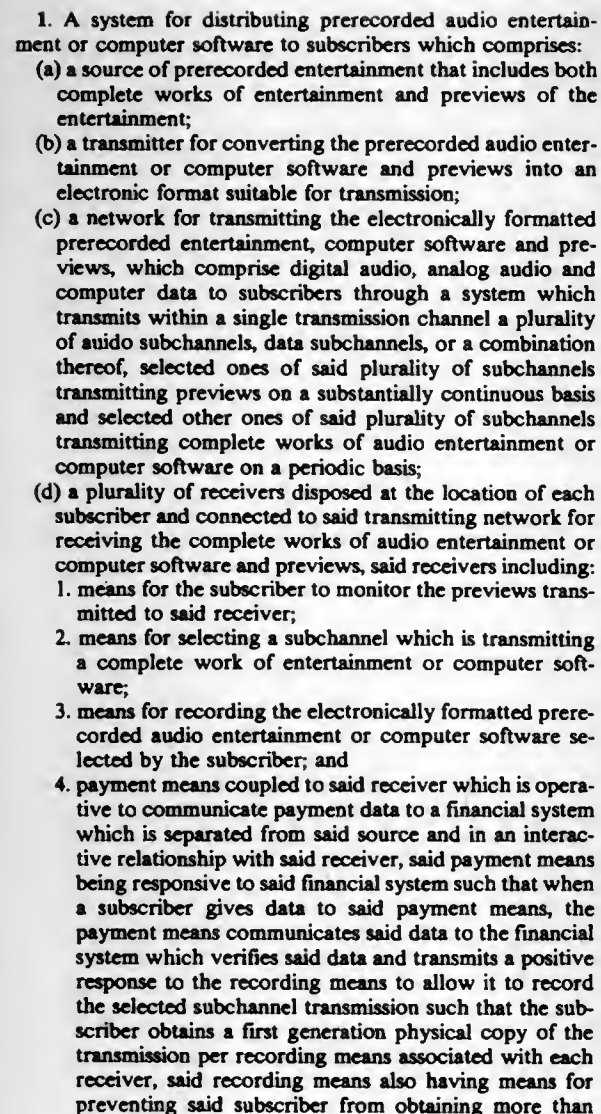
vector signature signal so that the phase difference between the first and second signature signals varies with the amplitude of the difference signal; comparing the first and second signature signals to detect the phase difference therebetween; combining the sum and difference signals to form a third vector signature signal in which the difference signal is of opposite phase to the difference signal of the first signature signal; combining the sum and difference signals to form a fourth vector signature signal in which the difference signal is of opposite phase to the difference signal of the second signature signal, the phase difference between the third and fourth signature signals varying with the amplitude of the difference signal; and comparing the third and fourth signature signals to detect the phase difference therebetween.

**4,789,862**  
**ANALOGUE TO DIGITAL CONVERTERS**  
 Thomas Jackson, Hanwell, England, assignor to Plessey Overseas, Limited, Ilford, England  
 PCT No. PCT/GB86/00093, § 371 Date Nov. 24, 1986, § 102(e) Date Nov. 24, 1986, PCT Pub. No. WO86/05048, PCT Pub. Date Aug. 28, 1986  
 PCT Filed Feb. 21, 1986, Ser. No. 925,633  
 Claims priority, application United Kingdom, Feb. 23, 1985, 8504711  
 Int. Cl.<sup>4</sup> H03M 1/34  
 U.S. Cl. 341—155 4 Claims

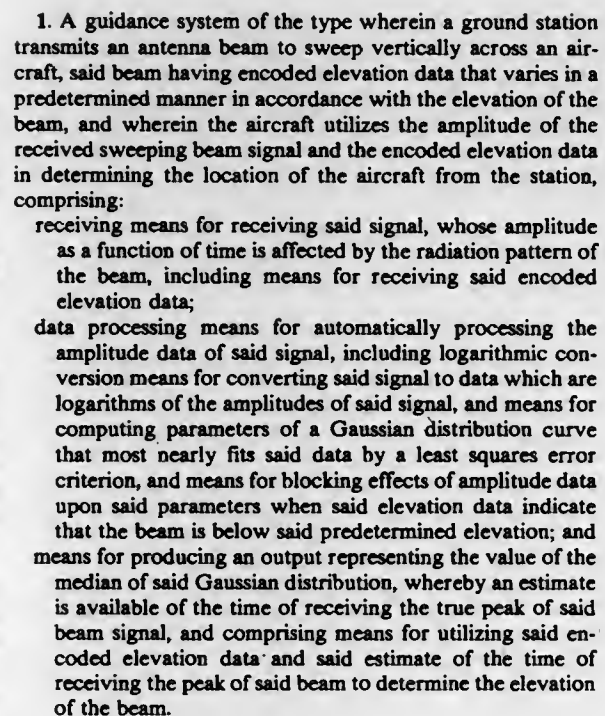


1. An analogue to digital converter comprising first combiner means for receiving an analogue input signal, an analogue controller means for receiving an output from the first combiner means, a low resolution analogue to digital converter for receiving an output from the analogue controller means, a digital to analogue converter arranged in a feedback loop to the first combiner means, the digital to analogue converter comprising second combiner means for receiving a digital input from the low resolution analogue to digital converter, digital controller means for receiving an output from the digital controller means, feedback means for affording the output of the digital slicer means to the second combiner means and a finite impulse response filter connected to be driven by the output of the digital slicer means, the finite impulse response filter having a plurality of serially coupled delay elements, output signals from which are summed to provide the digital output signal and which serves also to provide the analogue feedback signal which is fed to the first combiner means.

## 18 Claims



**4,789,864**  
**LOW ELEVATION GUIDANCE SYSTEM**  
**Craig T. Aarseth, Massapequa, N.Y., assignor to Eaton Corpora-**  
**tion, Cleveland, Ohio**  
**Filed Apr. 22, 1987, Ser. No. 41,166**  
**Int. Cl.<sup>4</sup> G01S 1/16**  
**U.S. Cl. 342—408**  
**6 Claims**



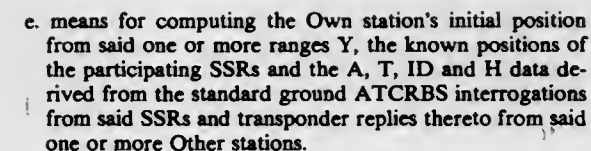
4,789,865  
COLLISION AVOIDANCE SYSTEM  
George B. Litchford, Northport, N.Y., assignor to Litchstreet  
Co., Northport, N.Y.  
Filed Oct. 21, 1987, Ser. No. 111,812  
Int. Cl.<sup>7</sup> G01S 3/02; G08G 7/02

**U.S. Cl. 342—455** **14 Claims**

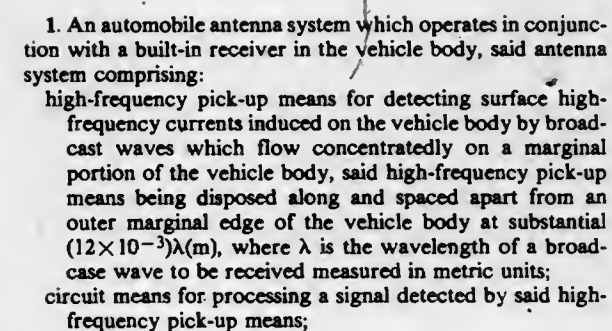
1. In a position-finding collision avoidance system at an Own station that passively derives differential azimuth (A), differential time of arrival (T), identity (ID) and altitude (H) data regarding transponder equipped Other stations utilizing standard ground ATCRBS interrogations and transponder replies thereto, and updates the positions of Own and Other stations for display at Own station, apparatus for initially establishing Own station's position, comprising:

a. means for transmitting a brief burst of interrogations in standard ATCRBS format utilizing a signature and repetition rate substantially different from that of any SSR.

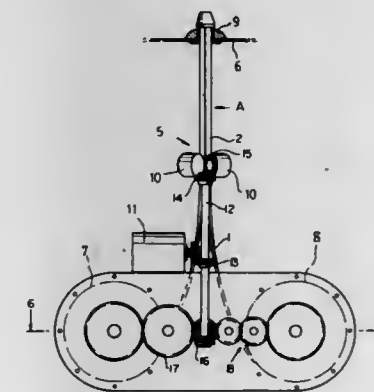
a casing housing said high-frequency pick-up means and said circuit means; and  
varactor diode means connected between said high-frequency pick-up means and said circuit means and being controlled by the built-in receiver for setting the resonance frequency of said antenna system to coincide with a tuned frequency selected by the built-in receiver.



**4,789,866**  
**AUTOMOBILE ANTENNA SYSTEM**  
 Junzo Ohe, and Hiroshi Kondo, both of Aichi, Japan, assignors  
 to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
 Filed Nov. 7, 1985, Ser. No. 795,836  
 Claims priority, application Japan, Nov. 8, 1984, 59-236332;  
 Nov. 15, 1984, 59-242100; Nov. 27, 1984, 59-251241  
 Int. Cl.<sup>4</sup> H01Q 1/32, 7/00  
 U.S. Cl. 343—712 8 Claims



4,789,867  
WINDING-TYPE ANTENNA AND ITS WINDING  
MECHANISM  
Jang-Woo Lee, Seoul, Rep. of Korea  
Filed Aug. 12, 1967, Ser. No. 84,148  
Claims priority, application Rep. of Korea, Feb. 25, 1967,  
1628/1967  
Int. Cl.<sup>4</sup> H01Q 1/08  
U.S. Cl. 343—877  
9 Claims



1. An extensible antenna, comprising:  
a plurality of elongated antenna elements, each having at least two joining surfaces, one joining surface having a longitudinally extending groove and the other joining surface having a longitudinally extending projection;  
reel means for storing each of said antenna elements when the antenna is retracted; and  
an assembly mechanism engaging and withdrawing said antenna elements from said reel means and interconnecting said antenna elements to extend the antenna, said assembly mechanism including means pressing an elongated projecting on a joining surface of one of said plurality of antenna elements into a corresponding groove on a joining surface of a next adjacent antenna element whereby adjacent antenna elements are interconnected to produce a unitary extended antenna.

4,789,868

**MANUFACTURE OF PARABOLIC ANTENNAS**

Suzuma Oono, Toyonaka, and Mitsuru Kawata, Takasago, both of Japan, assignors to Toyo Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 650,735, Sep. 14, 1984, Pat. No. 4,647,329.

This application Nov. 6, 1986, Ser. No. 927,484

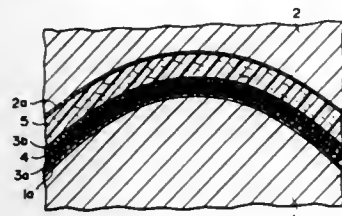
Int. Cl.<sup>4</sup> H01Q 15/14

U.S. Cl. 343—912 7 Claims

1. A plastic-made parabolic antenna formed as a molded laminated article having a concave parabolic front surface, said article comprising a front surface layer of thermosetting gel, a

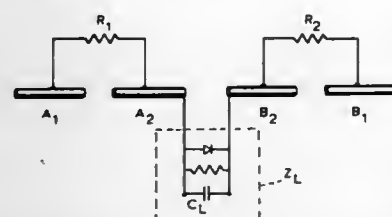


reflective layer of metal-coated chopped glass fiber material embedded in a thermosetting resin, and a support portion, said



reflective layer being formed closely adjacent said parabolic front surface.

**4,789,869**  
**DIPOLE ANTENNA FOR MONITORING ELECTROMAGNETIC WAVES OVER AN EXTENDED FREQUENCY RANGE**  
Edward E. Aslan, Plainview, N.Y., assignor to The Narda Microwave Corporation, Hauppauge, N.Y.  
Filed Jun. 8, 1987, Ser. No. 59,130  
Int. Cl.<sup>4</sup> H01Q 9/16  
U.S. Cl. 343-801 10 Claims

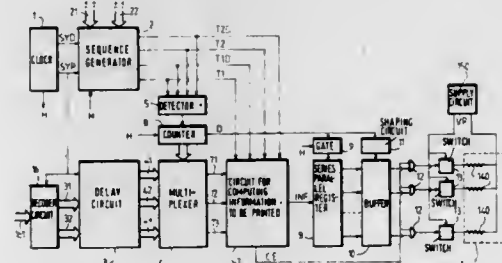
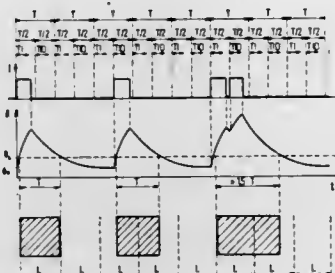


1. A dipole antenna for monitoring electromagnetic radiation fields over an extended frequency range below the resonant frequency of the dipole antenna and having essentially flat response characteristics, comprising:  
dipole in which each of the two arms is divided into two or more conducting segments:  
a relatively low resistance connecting the segments in series in one arm; and  
a relatively high resistance connecting the segments series in the other arm.

**4,789,870**  
**METHOD AND DEVICE FOR CONTROLLING A THERMAL PRINTING HEAD**  
Maurice Lacord, Eragny; Christian Lavergne, Herblay, and Patrick Vegeais, St. Germain en Laye, all of France, assignors to Societe d'Applications Generales d'Electricite, Paris, France  
Filed May 28, 1987, Ser. No. 55,120  
Claims priority, application France, Jun. 5, 1986, 86 08125  
Int. Cl.<sup>4</sup> G01D 9/00  
U.S. Cl. 346-1.1 8 Claims

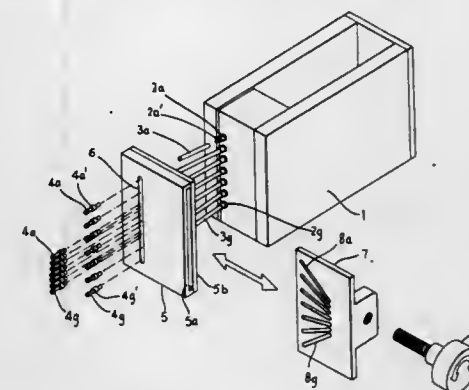
1. A method of controlling a series-type thermal writing head for a printing system, the head having at least one transfer strip of heating elements for printing dots on a recording medium, said method comprising:  
(a) driving said head longitudinally along a line at a given speed;  
(b) subjecting each of the heating elements to a succession of thermal cycles, each of said cycles having a time duration less than or equal to a time required for the heating element to print a dot on the recording medium;  
(c) during a first half cycle of each of said cycles subjecting each of the heating elements respectively to one of a non-zero and a zero initial heating time in accordance

with whether a dot is to be printed or not printed by the respective heating element during said first half cycle;  
(d) during a second half cycle of at least one of said cycles subjecting at least one of the heating elements subjected to a non-zero initial heating time during said first half cycle to a second non-zero heating time to print an extended dot; and  
(e) during a second half cycle of at least one of said cycles subjecting at least one of the heating elements subjected to a zero initial heating time during said first half cycle to a second non-zero heating time to print an offset dot.  
5. A device for controlling a series-type thermal printing head for a printing system having at least one transfer strip of heating elements for printing dots on a recording medium, said device comprising:  
(a) driving means for driving said head longitudinally at a given speed;  
(b) heating means for heating said heating elements; and



(c) computer-controller means for calculating heating times for each of the heating elements and controlling said heating times to subject the heating elements to a succession of thermal cycles, each cycle having a time duration less than or equal to a time required for the heating elements to print a dot on the recording medium, wherein (i) during a first half cycle of each of said cycles, each of the heating elements is subjected respectively to one of a non-zero and a zero initial heating time in accordance with whether a dot is to be printed or not printed by the respective heating element during said first half cycle of the thermal cycle, (ii) during a second half cycle of at least one of said cycles, at least one of the heating elements subjected to a non-zero initial heating time during said first half cycle is subjected to a second non-zero heating time to print an extended dot, and (iii) during a second half cycle of at least one of said cycles, at least one of the heating elements subjected to a zero initial heating time during said first half cycle is subjected to a second non-zero heating time to print an offset dot.

**4,789,871**  
**FLUID SPRAYING HEAD**  
Lars E. Uddgren, Lerum, Sweden, assignor to Swedot Jet Mark AB, Goeteborg, Sweden  
Continuation of Ser. No. 57,123 Filed as PCT EP86/00554 on Sep. 22, 1986, published as W087/01657 on Mar. 26, 1987, abandoned.  
This application Feb. 17, 1988, Ser. No. 161,264  
Claims priority, application Sweden, Sep. 20, 1985, 8504377  
Int. Cl.<sup>4</sup> G01D 15/18  
U.S. Cl. 346-75 5 Claims

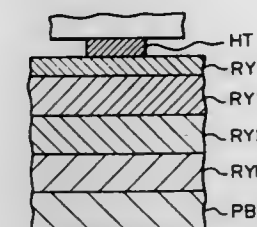


1. Fluid spraying head (1), for an ink jet printer adapted for ink jet printing of characters or information patterns of variable height onto an object movable relative to said head (1), said head (1) including a plurality of drop generating elements and a plurality of nozzles (4a-4g), characterized in that  
said head (1) comprises a plurality of flexible ducts (3a-3g) connected at one end thereof to respective said drop generating elements of said head (1) and connected at the other end thereof to respective said nozzles (4a-4g);  
that said nozzles (4a-4g) are displaceably arranged in first slot means (6) of a first guiding member (5) adapted for guiding said nozzles (4a-4g) in a first direction essentially perpendicular to the direction of relative movement of the object with respect to said head (1);  
that each said nozzle (4a-4g) is further displaceably arranged in a respective slot (8a-8g) of a group of second slots (8a-8g) of a second guiding member (7);  
that said second guiding member (7) is movable in a direction essentially perpendicular to said first direction; and  
that the respective directions of extension of said second slots (8a-8g) are angularly offset with respect to each other.

**4,789,872**  
**MULTI-COLOR ENERGY TRANSFER IMAGE RECORDING SYSTEM**  
Masatoshi Hosoi, Okazaki, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan  
Filed May 20, 1987, Ser. No. 51,716  
Claims priority, application Japan, May 22, 1986, 61-116229  
Int. Cl.<sup>4</sup> G01D 15/10  
U.S. Cl. 346-76 PH 4 Claims

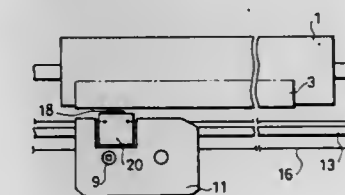
1. An apparatus for recording multi-colored composite images on an energy sensitive recording medium, wherein said image is defined by a pixel by pixel basis and wherein the multi-color image requires one energy level to produce one color and a higher energy level to produce a second color wherein said apparatus comprises:  
a means for holding and advancing said recording medium; record data combining means for combining a plurality of kinds of image data to produce an image which is a composite image, in which some image fragments are produced in which the amount of energy necessary to produce said image fragments is an amount of energy of the

low level for recording one color and which is lower than said high level necessary for recording said second color; a recording head for applying energy to said recording medium;  
energy applying means for applying to the record head, when said image fragment is to be recorded at said lower



energy level, an amount of energy corresponding to said lower level and for applying to the record head, when said image fragment is to be recorded at the higher level needed to record a second color the difference between said low level of energy necessary to record said first color and said higher level.

**4,789,873**  
**THERMAL TRANSFER PRINTER**  
Takao Matsuura, Takizawa, Japan, assignor to Alps Electric Co., Ltd., Japan  
Filed Dec. 18, 1986, Ser. No. 943,603  
Claims priority, application Japan, Feb. 3, 1986, 61-14255[U]  
Int. Cl.<sup>4</sup> G01D 15/10, 15/24; B41J 3/20  
U.S. Cl. 346-76 PH 5 Claims



1. In a printer of the type in which a thermal printing head carrying a plurality of heating elements is movable between its printing position in which it brings an ink ribbon into contact with paper on a platen and melts ink on said ribbon to transfer the molten ink onto said paper in accordance with a specific printing pattern and its non-printing position in which said printing head is retracted away from said ink ribbon and the paper, said head being also movable along said platen with a carriage supporting a cassette containing said ribbon, the improvement which comprises:

a head supporting member supporting said head and supported slidably on a shaft which extends in parallel to said platen;  
said carriage being also slidably supported on said shaft for parallel movement in tandem with said head supporting member along said platen;  
said head supporting member being rotatable about said shaft for moving said head between said printing and non-printing positions, said head supporting member being rotatable about and slidably supported on said shaft independently of said carriage;  
head rotating means connected to said head supporting member for rotating it about said shaft; and  
driving means associated with a pulley mechanism and a motor, extending along said shaft and directly fastened to said head supporting member for directly driving said

head supporting member and thereby said head in tandem with said carriage along said platen.

4,789,874

## SINGLE CHANNEL ENCODER SYSTEM

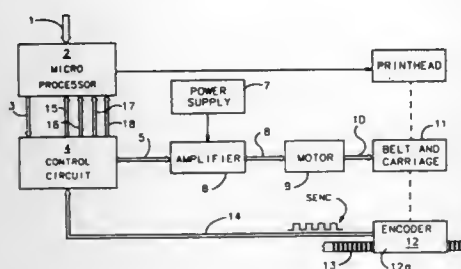
Mark W. Majette; William J. Walsh, both of San Diego, and John A. Wickernad, Loomis, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 23, 1987, Ser. No. 77,575

Int. Cl.<sup>4</sup> G01D 15/24

U.S. Cl. 346—140 R

17 Claims



1. In a device having work element means movable along a path in an axis for performing a work function within predetermined limits of movement in said axis, motor means for driving said work element means and a control system for operating said motor means in response to work commands, the improvement comprising:

- a stationary scale paralleling said axis;
- equally spaced marks on said scale defining equal scale divisions along said scale;
- a pair of work limit bands on said scale spaced from each other on said scale, each having a dimension along said scale greater than that of each of said marks;
- a scale detector connected to and movable with said work element means adjacent said scale for detecting said marks and said work limit bands;
- said detector producing a time varying voltage in traversing each mark and the space adjacent thereto along said scale;
- said detector producing a work limit voltage different from said time varying voltage upon detection of a work limit band, said work limit voltage existing while said detector remains in said work limit band;
- means connecting said scale detector to said control system to supply said time varying voltage and said work limit voltage thereto;
- means in said control system responsive to said work commands for operating said motor means to move said work element means in said axis and said detector along said scale;
- means in said control system responsive to a first work limit voltage of said detector while crossing a first of said work limit bands, to initiate a work function of said work element means upon the occurrence thereafter of a time varying voltage of said detector, and for terminating said work function of said work element means upon a second occurrence of said work limit voltage off said detector when said detector detects the other of said work limit bands; a pair of sweep limit bands on said scale, each sweep limit band being disposed between a work limit band and the adjacent end of said scale and each having a dimension along said scale greater than that of each of said marks;
- equally spaced marks on said scale between each work limit band and each sweep limit band, defining equal scale divisions therebetween;
- said detector producing a sweep limit voltage different from said time varying voltage upon entering a sweep limit band; and
- means in said control system responsive to said second occurrence of said work limit voltage for operating said

motor means to decelerate said work element means and to stop said work element means in said sweep limit band in response to the occurrence and existence of said sweep limit voltage when said detector detects said sweep limit band.

4,789,875

## VARIABLE FOCUS CAMERA

Hiroshi Wakabayashi, Yokohama; Daiki Tsukahara, Kawasaki; Akira Katayama, Koganei; Kiyosada Machida, Yokohama; Kazuyuki Kazami, Tokyo; Yuji Katano, Kawasaki; Hiroshi Terunuma, Ichikawa, and Mitsuru Higuchi, Tokyo, all of Japan, assignors to Nikon Corporation, Tokyo, Japan

Continuation of Ser. No. 811,165, Dec. 19, 1985, abandoned, which is a continuation-in-part of Ser. No. 772,710, Sep. 5, 1985, Pat. No. 4,643,555. This application Jun. 10, 1987, Ser. No. 60,987

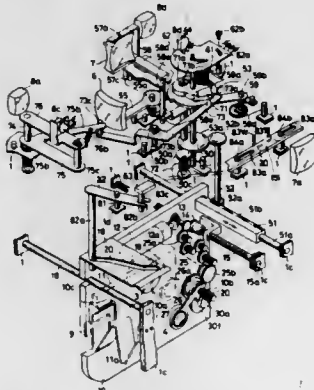
Claims priority, application Japan, Dec. 21, 1984, 59-269815;

Feb. 27, 1985, 60-38185; Mar. 1, 1985, 60-41475; Mar. 11, 1985, 60-34372[U]; Mar. 22, 1985, 60-41837[U]; Mar. 22, 1985, 60-41838[U]; Apr. 5, 1985, 60-50698[U]; Apr. 8, 1985, 60-51865[U]; Apr. 12, 1985, 60-77669

Int. Cl.<sup>4</sup> G03B 3/00

U.S. Cl. 354—195.1

26 Claims



1. A camera comprising:

- a photo-taking optical system having an optical axis, a primary lens system including an imaging lens and a secondary lens system including an optical converter;
- drive means for moving said primary lens system along said optical axis, said drive means being adapted to reciprocate said primary lens system from a first position through second and third positions to a fourth position, said positions being arranged in sequence along said optical axis;
- means for changing the focal length of said photo-taking optical system by adjusting the relative position between said primary and secondary lens systems during movement of said primary lens system between said second and third positions, said photo-taking optical system having a first focal length when said primary lens system is between said first and second positions and a second focal length when said primary lens system is between said third and fourth positions, said changing means being adapted to change said photo-taking optical system from the first focal length to the second focal length as said primary lens system is moved from said second position to said third position and to change said photo-taking optical system from the second focal length to the first focal length as said primary lens system is moved from said third position to said second position; and
- position detecting means generating an electric signal corresponding to the position of said primary lens system, said position detecting means having first, second, third and fourth positions respectively corresponding to said first, second, third and fourth positions of said primary lens system.

4,789,876

## PORTABLE TYPE IMAGE FORMING APPARATUS

Kiyoshi Miyai; Shuhei Uotani, both of Himeji, and Toyohiko Tsunemine, Hyogo, all of Japan, assignors to Sanyo Electric Co., Ltd., Japan

Filed Sep. 11, 1986, Ser. No. 906,453

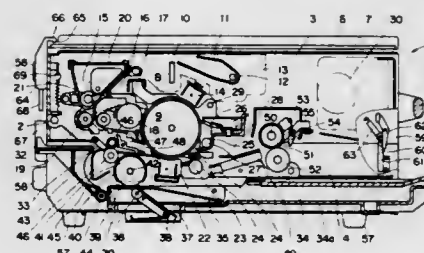
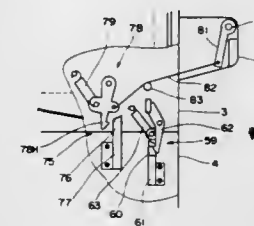
Claims priority, application Japan, Oct. 11, 1985, 60-155823[U]; Oct. 14, 1985, 60-229323; Oct. 14, 1985, 60-229324; Oct. 18, 1985, 60-160128[U]; Oct. 18, 1985, 60-160129[U]; Oct. 23, 1985, 60-162251[U]

The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> G03G 21/00

U.S. Cl. 355—3 R

11 Claims



- 1. A portable type image forming apparatus comprising a main body with an upper body and a lower body, said upper and lower bodies being coupled by hinge means mounted at one side face of said main body,
- a locking mechanism for locking said upper body and lower body is provided at one side face of said upper body and lower body opposite to said hinge means,
- at one side face of said main body at least one handle is located for transporting of said apparatus,
- said handle positioned at the side face of said body opposite to the side face receiving said hinge means, and
- an auxiliary locking mechanism which operates by holding said handle to lock said upper body and lower body is provided at said side face of the upper and lower body opposite to said hinge means.

4,789,877

## PRESSING DEVICE

Takeshi Izaki, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 9, 1987, Ser. No. 107,296

Claims priority, application Japan, Oct. 9, 1986, 61-155459

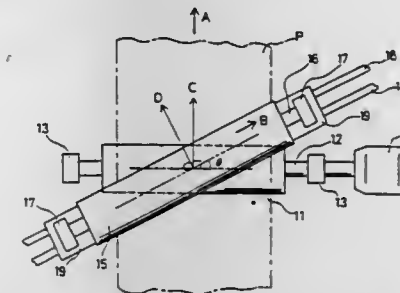
Int. Cl.<sup>4</sup> G03G 15/20

U.S. Cl. 355—3 FU

11 Claims

- 1. A pressing device for pressing a sheet-shaped subject comprising:
- a pair of pressing rollers, between which said sheet-shaped subject is passed, one of said pressing rollers being arranged such that a rotary axis thereof crosses a feeding direction of said sheet-shaped subject at right angles while the other one of said pressing rollers being arranged such that a rotary axis thereof crosses said rotary axis of said one of the rollers at a certain angle; and

means for supporting said other one of the rollers to be moved in the axial direction thereof when it is driven to



rotate in contact with said one of the rollers being rotating.

4,789,878

## ELECTROPHOTOGRAPHIC APPARATUS

Makoto Endo, Tokyo, and Yoshihiro Saito, Hachiohji, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

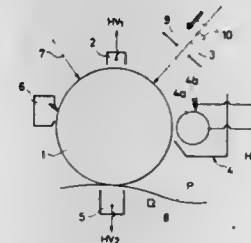
Continuation of Ser. No. 716,808; Mar. 27, 1985, abandoned. This application May 8, 1987, Ser. No. 47,572

Claims priority, application Japan, Mar. 4, 1984, 59-66500; Mar. 4, 1984, 59-66501; Mar. 4, 1984, 59-66502; Mar. 4, 1984, 59-66503; Apr. 3, 1984, 59-66504

Int. Cl.<sup>4</sup> G03G 15/08

U.S. Cl. 355—14 D

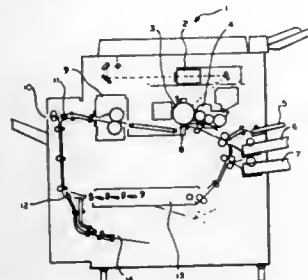
18 Claims



- 1. An electrophotographic apparatus comprising:
- means for forming an electrostatic latent image on a photosensitive member by image exposure thereonto;
- development means for developing said latent image on said photosensitive member with toners;
- developing bias voltage generating means for applying a bias voltage to said development means;
- exposing means for exposing a non-image-exposed area on said photosensitive member to substantially uniform light;
- detecting means for detecting an image-exposed area and the uniformly-exposed area on said photosensitive member; and
- means for controlling said bias voltage generating means based on an output of said detecting means, said controlling means controlling said bias voltage generating means so that the bias voltages are different from each other when only an image-area on said photosensitive member is exposed to said development means, when only a uniformly-exposed area on said photosensitive member is exposed to said development means, and when both an image-area and a uniformly-exposed area are exposed to said development means by said exposure means.

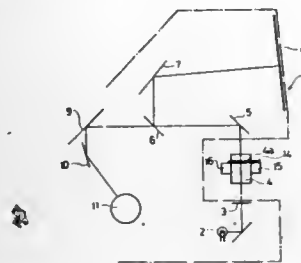


**4,789,879**  
**COPIER FOR COMPOSITE COPYING WITH**  
**AUTOMATIC MAGNIFICATION ADJUSTING MEANS**  
 Susumu Murakami, Osaka, Japan, assignor to Sharp Kabushiki  
 Kaisha, Osaka, Japan  
 Filed Feb. 12, 1987, Ser. No. 13,907  
 Claims priority, application Japan, Feb. 20, 1986, 61-36037  
 Int. Cl.<sup>4</sup> G03G 15/00  
 U.S. Cl. 355-14 R 5 Claims



1. In a copier adapted for composite copying, the improvement comprising means for effecting fine adjustments of magnification and means for automatically controlling said adjustment effecting means according to the change in size of copy paper caused by preceding copying process effected on said copy paper whereby non-uniformity in image size can be prevented when copying is effected twice or more on a single copy paper.

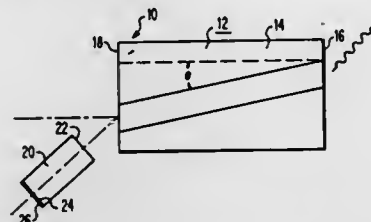
**4,789,880**  
**FOCUSING DEVICE FOR USE IN OPTICAL**  
**APPARATUSES**  
 Shinichi Mori; Keijiro Sakamoto; Hiroaki Nakauchi; Akiyoshi Hamada, all of Toyokawa, and Kazuyuki Yoshida, Toyohashi, all of Japan, assignors to Mito Camera Kabushiki Kaisha, Osaka, Japan  
 Filed Jul. 16, 1987, Ser. No. 74,052  
 Claims priority, application Japan, Jul. 16, 1986, 61-167380;  
 Sep. 1, 1986, 61-205575  
 Int. Cl.<sup>4</sup> G03B 27/52  
 U.S. Cl. 355-55 21 Claims



1. A focusing device for use in an optical apparatus which projects an image of an original to a fixed projective surface with a projective lens, the device comprising:  
 drive means for shifting the projective lens along the optical axis;  
 measurement means, adapted to shift together with the projective lens, for measuring a distance between the original and the projective lens and for generating a distance signal representing the measured distance;  
 memory means for storing distance data according to the distance signal generated from the measurement means when the projective lens is shifted to an in-focus position by a manual focusing operation; and  
 control means for generating a drive signal to the drive means in order to shift the projective lens toward the in-focus position when a distance represented by the distance signal which is generated from the measurement

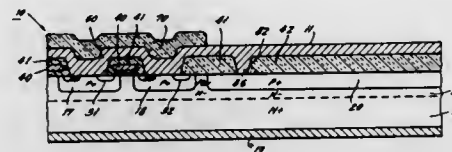
means is different from a distance represented by the distance data which is stored in the memory means.

**4,789,881**  
**LOW COHERENCE OPTICAL SYSTEM HAVING**  
**REFLECTIVE MEANS**  
 Gerard A. Alphonse, Mercer County, N.J., assignor to General Electric Company, Schenectady, N.Y.  
 Filed Apr. 20, 1987, Ser. No. 40,978  
 Int. Cl.<sup>4</sup> H01L 33/00; H01S 3/19  
 U.S. Cl. 357-17 7 Claims



1. In a low coherence optical system having a low coherence light-emitting device which includes a semiconductor body with an optical path therein and first and second end faces, the improvement comprising:  
 means for redirecting radiation positioned adjacent said second end face such that at least a portion of the radiation emitted from said device is redirected so as to reenter the device, said redirecting means being also positioned such that a resonant cavity is not formed between said means for redirecting radiation and said first end face.

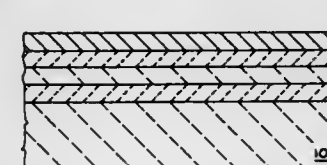
**4,789,882**  
**HIGH POWER MOSFET WITH DIRECT CONNECTION**  
**FROM CONNECTION PADS TO UNDERLYING SILICON**  
 Alexander Lidow, Hermosa Beach, Calif., assignor to International Rectifier Corporation, Los Angeles, Calif.  
 Filed Mar. 21, 1983, Ser. No. 477,012  
 Int. Cl.<sup>4</sup> H21L 24/78  
 U.S. Cl. 357-23.4 7 Claims



1. A metal oxide semiconductor field effect transistor comprising a semiconductor wafer, a plurality of base regions of one conductivity type symmetrically and laterally distributed over at least a portion of the area of one surface of said wafer; at least the portion of said wafer receiving said plurality of base regions being of the other conductivity type; a respective source region of said other conductivity type in each of said base regions, each of said source regions being laterally spaced from the periphery of their said respective base regions to define respective annular channel regions capable of inversion within their said respective base region; an enlarged area base region of said one conductivity type; said enlarged area base region laterally displaced from said plurality of base regions and extending to said one surface of said wafer; an insulation layer overlying each of said channel regions and extending over said enlarged area base region; conductive gate electrode means disposed atop said insulation layer and over each of said channel regions; a source electrode means in contact with each of said source regions and in contact with each of said plurality of base regions; a drain electrode connected to the opposite surface of said wafer; an enlarged area source electrode pad

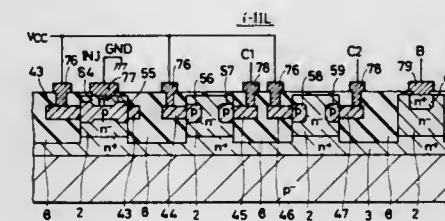
continuous with said source electrode means and overlying said insulation layer which extends over said enlarged base region; said source electrode pad having a peripheral region disposed adjacent said source electrode means; and a plurality of spaced connection means electrically connecting respective portions of said source electrode pad adjacent to said periphery to said enlarged base region beneath said pad whereby said enlarged base region can efficiently collect minority carriers when said base regions are forward biased relative to said portion of said wafer which receives said plurality of base regions.

**4,789,883**  
**INTEGRATED CIRCUIT STRUCTURE HAVING GATE**  
**ELECTRODE AND UNDERLYING OXIDE AND**  
**METHOD OF MAKING SAME**  
 William P. Cox, Santa Clara, and Mong-Song Liang, Milpitas, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.  
 Filed Dec. 17, 1985, Ser. No. 811,057  
 Int. Cl.<sup>4</sup> H01L 29/78  
 U.S. Cl. 357-23.7 36 Claims



1. An improved MOS type integrated circuit structure, having a gate electrode over a gate oxide, wherein said gate electrode comprises an amorphous silicon material.

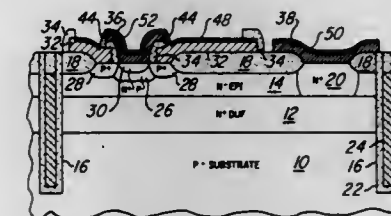
**4,789,884**  
**IIL CIRCUIT WITH PNP INJECTOR**  
 Shigeaki Minamihata, Takasaki, and Kazuyuki Kamegaki, Tamamura, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Apr. 14, 1986, Ser. No. 851,826  
 Claims priority, application Japan, Apr. 12, 1985, 60-76554;  
 Apr. 24, 1985, 60-86384; Apr. 24, 1985, 60-86385  
 Int. Cl.<sup>4</sup> H01L 29/72  
 U.S. Cl. 357-34 9 Claims



1. An integrated injection logic (IIL) circuit comprising:  
 first IIL elements, each including a PNP transistor coupled to operate as an injector for the IIL element and an NPN transistor coupled to said PNP transistor to operate as an inverter; and  
 second IIL elements, each including an NPN transistor coupled to operate as an injector for the IIL element and a PNP transistor coupled to said NPN transistor to operate as an inverter,  
 wherein an output inverter formed by one of said NPN transistors of one of said first IIL elements is coupled to an input of one of said second IIL elements, and further wherein said one of said NPN transistors forming said output inverter has a plurality of outputs, one of which

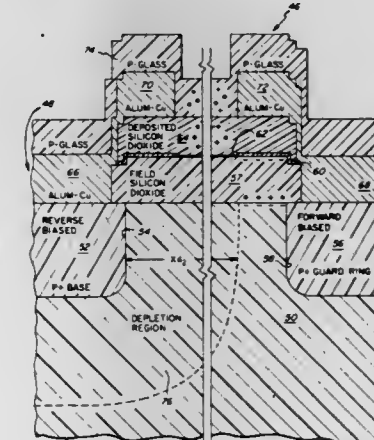
outputs is coupled to the input of said one of said second IIL elements and one of which is coupled to an input terminal of said output inverter.

**4,789,885**  
**SELF-ALIGNED SILICIDE IN A POLYSILICON**  
**SELF-ALIGNED BIPOLAR TRANSISTOR**  
 Jeffrey E. Brighton, Katy; Deems R. Hollingsworth, Missouri City; Michael Welch, Sugar Land; Ronald E. McMann, Rosenberg; Manuel L. Torreno, Jr., Houston, and Charles W. Sullivan, Plano, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.  
 Filed Feb. 10, 1987, Ser. No. 12,977  
 Int. Cl.<sup>4</sup> H01L 29/70  
 U.S. Cl. 357-34 3 Claims



1. A bipolar transistor device having base and emitter diffused regions formed in a body thereof, comprising:  
 a first level of electrically conductive silicon contacting a diffused base region thereof;  
 a second level of electrically conductive silicon contacting a diffused emitter region thereof self-aligned with and nested within said diffused base region, said second level partially overlapping said first level of silicon;  
 silicide layers formed over top surfaces of said first and second level of silicon such that the silicide over said first level is aligned with an outer edge of said second level of silicon.

**4,789,886**  
**METHOD AND APPARATUS FOR INSULATING HIGH**  
**VOLTAGE SEMICONDUCTOR STRUCTURES**  
 Douglas A. Pike, Jr., Cupertino, Calif., assignor to General Instrument Corporation, New York, N.Y.  
 Filed Jan. 20, 1987, Ser. No. 5,412  
 Int. Cl.<sup>4</sup> H01L 29/78, 27/04, 29/40  
 U.S. Cl. 357-53 7 Claims



1. A semiconductor structure having an enhanced region comprising:

field insulating means, formed on a surface of a semiconductor material and extending between first and second spaced P-N junctions formed in said semiconductor material, for providing electrical insulation;  
 conductive layer means adjacent said field insulating means for dissipating charge accumulated in said field insulating means by remaining at a floating electrical potential within said semiconductor structure;  
 an insulating layer overlaying said conductive layer means and field insulating means; and  
 first and second conductive contact means arranged to overlay respective portions of said insulating layer, conductive layer, and field insulating means for providing external electrical coupling with said first and second spaced P-N junctions; and wherein  
 said conductive layer means is positioned adjacent said field insulating means to be substantially non-registered and simultaneously fractionally registered with said first and second conductive contact means; and  
 each of said first and second conductive contact means and said conductive layer means extends approximately one-third the distance between said first and second P-N junctions.

4,789,887

## CONTROLLING OSCILLATOR

Ian Crossley, Andover; Daniel Donoghue, Tewksbury; Robert Goldwasser, Andover, all of Mass.; John Miley, Hollis, N.H., and Frank Spooner, Concord, Mass., assignors to Alpha Industries, Inc., Woburn, Mass.

Division of Ser. No. 726,091, Apr. 23, 1985, Pat. No. 4,644,296. This application Sep. 29, 1986, Ser. No. 912,975

Int. Cl.<sup>4</sup> H01L 29/06, 27/12, 27/26

U.S. Cl. 357-55

2 Claims



1. A monolithic circuit comprising,
  - a semi-insulating substrate having a device side through which semiconductor devices may be diffused separated by said substrate from a circuit side carrying conducting material forming circuits.
  - said substrate having at least a first via opening extending between said device side and said circuit side of said substrate,
  - said first via opening being filled with n+ material,
  - a first n- layer on said device side covering said first via opening,
  - a first ohmic contact on said n- layer coating therewith to form a semiconductor device,
  - and a portion of said conducting material on the circuit side of said device in contact with said n+ material in said first via opening for establishing contact with said first semiconductor device through said n+ material in said first via opening.

4,789,888

## SOLID-STATE IMAGE SENSOR

Yutaka Miyata, Osaka; Takao Chikamura, Kyoto; Takao Shibata, Kanagawa, and Shinji Fujiwara, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

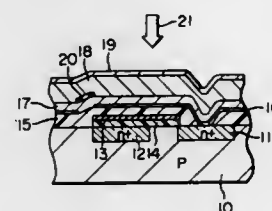
Filed Mar. 31, 1981, Ser. No. 249,498

Claims priority, application Japan, Apr. 2, 1980, 65-43950; Jul. 28, 1980, 65-103934

Int. Cl.<sup>4</sup> H01L 27/14

U.S. Cl. 357-30

2 Claims



1. A solid-state image sensor comprising:
  - (a) a semiconductor circuit substrate with diode regions and one of charge-transfer and switching elements for deriving a signal corresponding to electrons stored in the diode regions,
  - (b) an insulating layer formed over said semiconductor circuit substrate and formed with contact holes for connection to said diode regions,
  - (c) a pattern of unit cell electrodes formed over said insulating layer, each unit cell electrode being partially in contact with a corresponding diode region through a corresponding contact hole,
  - (d) a photoconductive layer formed over said electrodes and said insulating layer,
  - (e) a transparent electrode formed over said photoconductive layer, and
  - (f) a pattern of light-shielding checks disposed between the surface of said semiconductor circuit substrate and said photoconductive layer to optically shield gaps formed between said unit cell electrodes.

4,789,889

## INTEGRATED CIRCUIT DEVICE HAVING SLANTED PERIPHERAL CIRCUITS

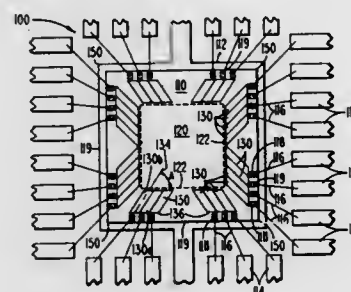
Stephen W. Morris, Stillwater Township, Sussex County, and Richard P. Lydick, Readington Township, Hunterdon County, both of N.J., assignors to GE Solid State Patents, Inc., Somerville, N.J.

Filed Nov. 20, 1985, Ser. No. 799,825

Int. Cl.<sup>4</sup> H01L 23/48

U.S. Cl. 357-68

6 Claims



1. An integrated circuit chip of substantially rectangular shape having peripheral edges, a substantially rectangular area within said chip containing an integrated circuit spaced from

said peripheral edges, a plurality of terminal bond pads disposed adjacent said peripheral edges of said chip, a plurality of peripheral circuits which interconnect said terminal bond pads to active elements of said integrated circuit, each of which is arranged in a generally elongated shape having a longitudinal axis and being disposed within said chip between a side of said rectangular area and a respective each of said terminal bond pads, at least one of said terminal bond pads being adjacent a corner of said chip, wherein each said longitudinal axis forms an angle with said side which is other than 90 degrees.

4,789,890

## JUDGEMENT CIRCUIT AND ADAPTIVE FILTER INCORPORATING THE SAME

Hiroshi Itoh; Tadashi Kasezawa, and Yoshiaki Mizutani, all of Nagakakyō, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

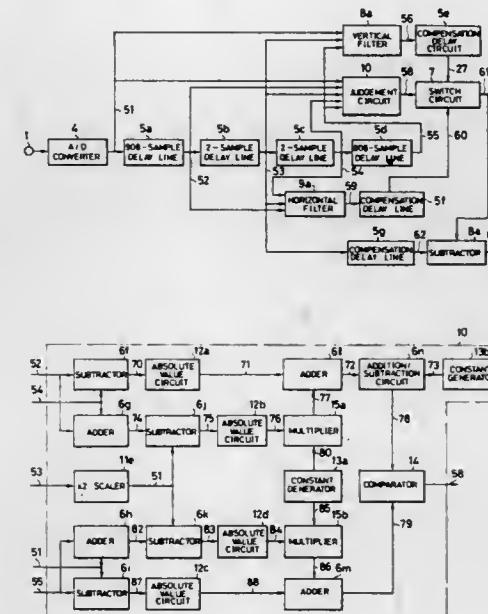
Filed Dec. 2, 1986, Ser. No. 937,045

Claims priority, application Japan, Dec. 5, 1985, 60-274737; Mar. 7, 1986, 61-50807

Int. Cl.<sup>4</sup> H04N 9/78

U.S. Cl. 358-31

8 Claims



1. An adaptive luminance signal/chrominance signal separation filter receiving sample values obtained by sampling a composite video signal at a predetermined sampling frequency in synchronism with a horizontal scanning frequency in such a manner that the corresponding sample points are arranged in a grating on the screen, and digitally separating the luminance signal component and the chrominance signal component, and comprising:

delay means for delaying the sample values for concurrently producing a sample value corresponding to a first sample point which is being subjected to the separation of the luminance signal and the chrominance signal, sample values corresponding to a second and a third sample points positioned on the same scanning line and at the left of and at the right of the first sample point and being identical in the phase of the color subcarrier and sample values corresponding to a fourth and a fifth sample points positioned over and under the first sample point and being identical in the phase of the color subcarrier,

a separation horizontal direction filter for the separation of the luminance signal and the chrominance signal receiving the sample values corresponding to the first sample point

and the second and the third sample points, and extracting the frequency component corresponding to the color subcarrier component from the series of the signal values in the horizontal direction on the screen,

a separation vertical direction filter for the separation of the luminance signal and the chrominance signal receiving the sample values corresponding to the first sample point and the fourth and fifth sample points, and extracting the frequency component corresponding to the color subcarrier component from the series of the signal values in the vertical direction on the screen,

a first judgement horizontal direction filter for receiving the sample values corresponding to the first sample point and the sample values corresponding to the second and third sample points and extracting the frequency component corresponding to the color subcarrier component from the series of the signal values along the horizontal direction on the screen,

a first judgement vertical direction filter for receiving the sample value corresponding to the first sample point and the sample values corresponding to the fourth and the fifth sample points and extracting the frequency component corresponding to the color subcarrier component from the series of the signal values along the vertical direction on the screen,

a second judgement horizontal direction filter for receiving the sample values corresponding to the second and the third sample points and extracting the frequency component corresponding to  $\frac{1}{2}$  of the color subcarrier component from the series of the signal values along the horizontal direction on the screen,

a second judgement vertical direction filter for receiving the sample values corresponding to the fourth and the fifth sample points and extracting the frequency component corresponding to  $\frac{1}{2}$  of the color subcarrier component from the series of the signal values along the vertical direction on the screen,

horizontal direction high band energy detecting means for adding, in a predetermined ratio, the outputs of the first and the second judgement horizontal direction filters, thereby to extract a high frequency component along the horizontal direction on the screen,

vertical direction high band energy detection means for adding, in a predetermined ratio, the outputs of the first and the second judgement vertical direction filters, thereby to extract a frequency component along the vertical direction on the screen,

comparison means for comparing the results of the separation detection by the energy detecting means,

a switch circuit for selecting the output of the separation horizontal direction filter, when the comparison means finds that the high frequency component as detected by the horizontal direction high band energy detecting means is smaller than the high frequency component as detected by the vertical direction high band energy detecting means, and for selecting the output of the separation vertical direction filter, when the comparison means finds that the high frequency component as detected by the horizontal direction high band energy detecting means is not smaller than the high frequency component as detected by the vertical direction high band energy detecting means, the selected one of the outputs constituting the chrominance signal component, and

an operation circuit for subtracting the output of the switch circuit from the composite video signal to produce the luminance signal component.



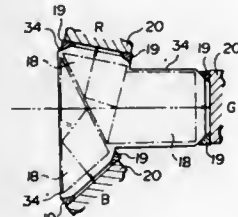
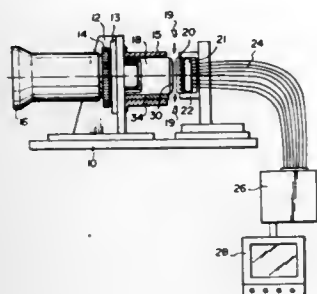
**4,789,891**  
**SPACER WITH AN INCLINED SURFACE FOR MOUNTING A SOLID IMAGE PICKUP ELEMENT TO A COLOR SEPARATION PRISM**

Shigehiro Kanayama, Kazuto Tanaka, and Masaki Ito, all of Oomiya, Japan, assignors to Fuji Photo Optical Co., Ltd., Saitama, Japan

Filed Sep. 2, 1986, Ser. No. 902,879  
 Claims priority, application Japan, Sep. 11, 1985, 60-139384; Sep. 11, 1985, 60-139385

Int. Cl.<sup>4</sup> H04N 9/097  
 U.S. Cl. 358—55

12 Claims



1. A structure for mounting a solid image pickup element to the light leaving end of a color separation prism for separating the light of an object from an optical lens system into a plurality of wavelength band components, said structure comprising at least one spacer interposed between and attached to said color separation prism and said solid image pickup element, said spacer having at least one surface obliquely inclined with respect to the light leaving axis of said color separation prism and being capable of maintaining, between said solid image pickup element and said color separation prism, a required clearance selectable from a range of possible clearances varying in width in a stepless manner.

**4,789,892**  
**COLOR ADJUSTING DEVICE INCLUDING MATRIX-MASKING CIRCUITRY**

Toshiyuki Tsuzuki, and Masato Toho, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Dec. 23, 1986, Ser. No. 945,547  
 Claims priority, application Japan, Dec. 23, 1985, 60-290127; Dec. 23, 1985, 60-290128

Int. Cl.<sup>4</sup> H04N 1/46, 1/40

U.S. Cl. 358—80

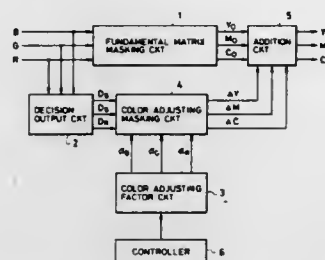
5 Claims

1. A color adjusting device, for adjusting the colors in an original picture, said colors of said original picture being separated to obtain input color separation signals, said device comprising:

matrix masking circuit means for performing matrix masking on said input color separation signals to obtain non-color-adjusted output density signals of said colors of said original picture;  
 decision output circuit means for performing an addition operation on said input color separation signals and for

performing a subtraction operation on said color separation signals to output a plurality of color decisions representing the presence of regions of color in said original picture;

color adjusting factor circuit means for outputting, for each of said colors, a first adjustment to increase the density of a predetermined color and a second adjustment to decrease the density of a predetermined color, respectively;



a color adjusting masking circuit means, for performing a mathematical calculation in response to signals from said color adjusting factor circuit means and said decision output circuit means to obtain a color adjustment change for each of said colors; and  
 adder circuit means for adding the outputs of said matrix masking circuit to the outputs of said color adjusting masking circuit means to provide output density signals of said colors of a color-adjusted picture.

**4,789,893**  
**INTERPOLATING LINES OF VIDEO SIGNALS**

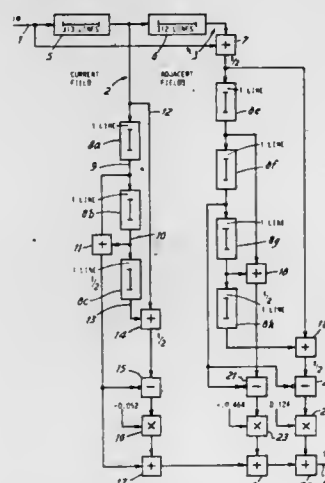
Martin Weston, Banstead, United Kingdom, assignor to British Broadcasting Corporation, London, England

Filed Oct. 28, 1987, Ser. No. 114,649  
 Claims priority, application United Kingdom, Oct. 31, 1986, 8626066; May 11, 1987, 8711084

Int. Cl.<sup>4</sup> H04N 7/12, 7/01, 5/14

U.S. Cl. 358—136

9 Claims



1. A method of interpolating missing lines of a line scanned video signal using lines from more than one field, comprising the steps of:

deriving the low vertical frequency components of a missing line substantially from the current field;  
 deriving higher vertical frequency components of a missing line partly from the current field and partly from one or more adjacent fields; and

combining the said high and low vertical frequency components to produce the said missing line.

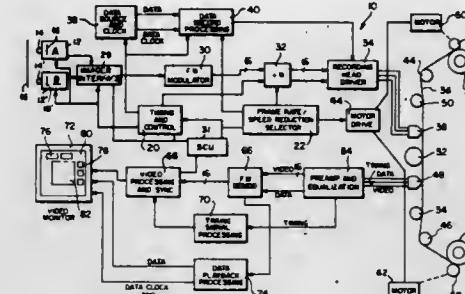
**4,789,894**  
**MOTION ANALYZER WITH INTERLEAVED IMAGE REPRODUCTION**

Todd H. Cooper, San Diego, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 16, 1987, Ser. No. 26,078  
 Int. Cl.<sup>4</sup> H04N 7/18, 7/01, 7/12

U.S. Cl. 358—105

3 Claims



1. A motion analysis system comprising:  
 a first motion video imager;  
 a second motion video imager;  
 means for continuously reading out each of said video imagers simultaneously at the same frame rate of F frames per second, where F is selectively variable, in a block format in which a frame of video information comprises a sequence of blocks of parallel lines of video information which have been read out simultaneously; and  
 means for recording every other frame from each of said first and second imagers in interleaved fashion on the same magnetic tape, each of said frames on magnetic tape being recorded in a plurality of parallel recording tracks in a sequence of blocks of parallel lines of video information.

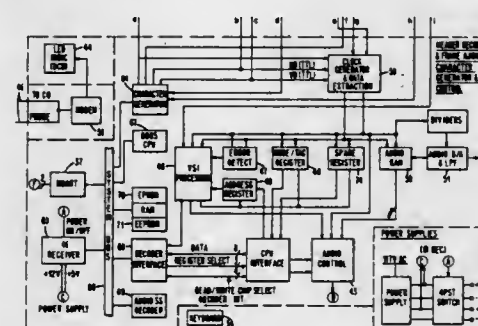
**4,789,895**  
**SYSTEM FOR SYNCHRONIZING DIGITAL BIT STREAM FOR TELECOMMUNICATION SYSTEM**

Mehmet Mustafa, Waltham; Ernest P. Tweedy, Lexington; James C. Stoddard, Wayland, and Walter J. Berliout, Natick, all of Mass., assignors to GTE Government Systems Corporation, Waltham, Mass.

Filed Apr. 30, 1987, Ser. No. 44,387  
 Int. Cl.<sup>4</sup> H04N 7/04

U.S. Cl. 358—147

2 Claims



1. A system for identifying the position, within a time window, of a flag bit included in a digital bit stream sent from a central facility to a terminal on lines of television frames,

wherein each line starts with a horizontal sync pulse and a color burst, comprising:

a first data clock at the central facility for providing first data clock pulses synchronized with said color burst;  
 means at said central facility for providing on one of said lines a digital data stream headed by said flag bit which is one of said clock pulses wide and is delayed by a first constant number of said clock pulses from the start of the horizontal sync pulse;  
 a second data clock at said terminal for providing second data clock pulses synchronized with said color burst;  
 means at said terminal for providing said time window delayed by a second constant number of said second clock pulses from the start of the horizontal sync pulse and bracketing said flag bit but not said horizontal sync pulse or said color burst;  
 means at said terminal for providing a plurality of second data clock pulses during said time window; and  
 means at said terminal for determining which of said plurality of second data clock pulses coincide in time with said flag bit to identify the position of the flag bit with respect to said plurality of second data clock pulses.

**4,789,896**  
**VERTICAL SYNCHRONIZING PULSE GENERATING CIRCUIT**

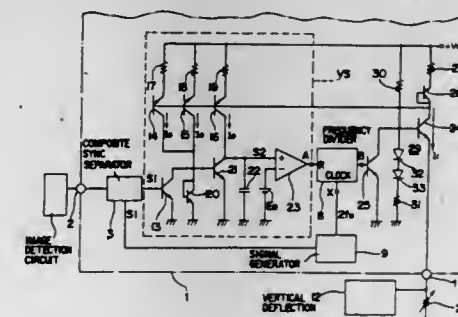
Hiroyasu Kishi, Nitta, and Hiromi Arai, Kitasaitama, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan  
 PCT No. PCT/JP87/00230, § 371 Date Dec. 11, 1987, § 102(e)  
 Date Dec. 11, 1987, PCT Pub. No. WO87/06414, PCT Pub. Date Oct. 22, 1987

PCT Filed Apr. 13, 1987, Ser. No. 141,359  
 Claims priority, application Japan, Apr. 14, 1986, 61-55516[U]; Apr. 18, 1986, 61-58947[U]; Apr. 18, 1986, 61-90584; May 19, 1986, 61-114142

Int. Cl.<sup>4</sup> H04N 5/10, 5/08

U.S. Cl. 358—154

5 Claims



1. A vertical synchronizing pulse generator comprising:  
 a first vertical synchronizing signal separation means (VS) for separating a vertical synchronizing signal included in a composite video signal;  
 a signal generating means (9) for generating a signal having a frequency which is a predetermined number times as many as the frequency of a horizontal synchronizing signal included in the composite video signal;  
 a frequency dividing means (8), which receives an output signal from said first vertical synchronizing signal separation means as a reset signal and also receives said signal from said signal generating means as a clock signal, for dividing said clock signal;  
 an output means (25, 24, and 29) for supplying an output signal to a load according to an output from said frequency dividing means; and  
 a sensitivity controlling means (26, 27, and 14 to 19) for controlling a separation sensitivity of said first vertical synchronizing signal separation means according to the electric current flowing through the load.

4,789,897

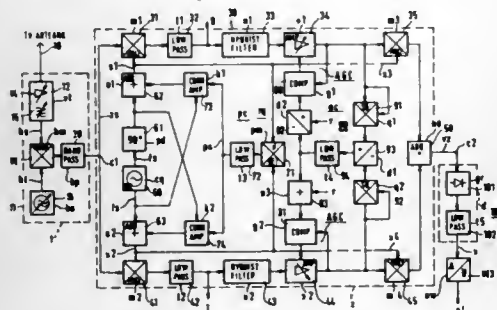
**FREQUENCY CONVERTING APPARATUS FOR  
CONVERTING AN RF TELEVISION SIGNAL TO A  
VIDEO SIGNAL EMPLOYING LOW IF TECHNIQUES**

Otmar Kappeler, Neuenburg, and Dietmar Ehrhardt, Freiburg-  
Hochdorf, both of Fed. Rep. of Germany, assignors to Deut-  
sche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

Filed Mar. 8, 1988, Ser. No. 165,660

Claims priority, application European Pat. Off., Mar. 14,  
1987, 87103740.4

Int. Cl.<sup>4</sup> H04N 5/14, 5/44  
U.S. Cl. 358—188 15 Claims



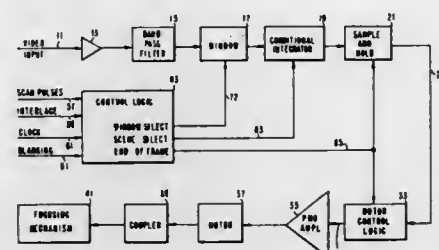
1. Frequency converting apparatus for converting an RF television signal to a video signal by employing a low IF processing apparatus which apparatus includes first and second signal paths each path containing a first multiplier for receiving at an input a television signal with each multiplier followed by a low pass filter having an output coupled to an input of a second multiplier in each path, with the first and second multiplier in each path receiving at other inputs respective quadrature sinusoidal signals as generated by a quadrature signal generator whereby said first path provides a first low IF quadrature signal at the output of said associated second multiplier and said second path provides a second low IF quadrature signal at the output of said associated second multiplier with the outputs of said second multipliers coupled to an adding circuit to provide said video signal at its output and including a phase and amplitude correcting means operative to provide properly phased quadrature signals of proper amplitude to assure the quadrature relationship in said first and second signal paths, in combination therewith of apparatus for improving said conversion to said video signal, comprising:

a Nyquist filter positioned in each signal path so that the output of said low pass filter in said first path is coupled to the input of a first Nyquist filter, with the output of said low pass filter in said second path coupled to the input of a second Nyquist filter, with the output of said first Nyquist filter coupled to the input of a first variable gain amplifier having a control terminal in said first path having the output coupled to the input of said second multiplier in said first path and with the output of said second Nyquist filter coupled to the input of a second variable gain amplifier having a control terminal in said second path whose output is coupled to the input of said second multiplier in said second path, with the output of each variable gain amplifier in each path also coupled to the input of an associated comparator in each path, for comparing the output of said associated variable gain amplifier with a derived correction signal at another input, with each control terminal of said variable gain amplifier coupled to the output of said associated comparator to vary the inputs to said associated second multipliers according to said derived correction signal and means coupled to the outputs of said first and second variable amplifiers for providing said derived correction signal.

**4,789,898**  
**DEMAND AUTO FOCUS DRIVEN BY SCENE**  
**INFORMATION ONLY**  
**Robert Zwirn, Los Angeles, and Michael Thomas, Inglewood,**  
**both of Calif., assignors to Hughes Aircraft Company, Los**  
**Angeles, Calif.**

U.S. Cl. 358-227 15 Claims

U.S. Cl. 358-227 15 Claims



1. A scene driven demand auto focus system for tuning a bidirectional focusing mechanism controlling the focus of a video image of a scene, said system comprising:

deriving means for receiving sequential video images of a scene and for deriving therefrom corresponding sequential indications of the high frequency content of the video images received;

comparing means receiving the derived indications for comparing the derived indication most recently derived with the derived indication previously derived and for generating a first drive signal if the derived indication previously derived is lower than the derived indication most recently derived by at least a certain amount and for generating a second drive signal if the derived indication previously derived is not lower than the derived indication most recently received by at least a certain amount;

means receiving the first and second drive signal for accelerating the bidirectional focusing mechanism whenever the first drive signal is received and for reversing the direction of travel, establishing a minimum velocity and accelerating the bidirectional focusing mechanism each time the second drive signal is received whereby the bidirectional focusing mechanism is toggled and driven in the direction indicated to increase the derived indication of the high frequency content the video images received which is the direction of increased focus; and

direction of increased focus, and demand means for detecting when the bidirectional focusing mechanism is being toggled back and forth in a manner symptomatic of hunting around optimum focus and for stopping the toggling when such occurs, said demand means including restart means for comparing the derived indication of high frequency content received as the toggling is stopped with subsequently derived indications of high frequency content and for restarting the toggling whenever a subsequently derived indication differs by more than a fixed amount.

4,789,899

**LIQUID CRYSTAL MATRIX DISPLAY DEVICE**

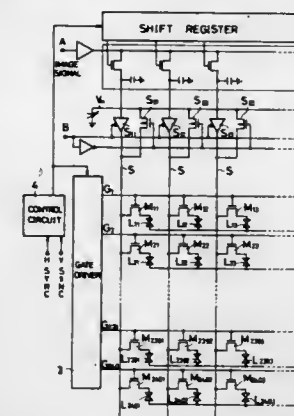
Shingo Takahashi; Seiji Sanada; Sakae Tanaka, and Kazuya Umeyama, all of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Jan. 13, 1987, Ser. No. 2,816  
Claims priority, application Japan, Jan. 28, 1986, 61-16520  
Int. Cl.<sup>4</sup> H04N 5/70; G09G 3/36

U.S. Cl. 358-236 13 Claims

1. In a liquid crystal display panel for performing a display during each field scanning period by sequentially supplying image signals to picture elements which are arranged in a matrix on said display panel, the improvement comprising

scanning means for scanning said picture elements twice during one field scanning period; and a control circuit for selec-



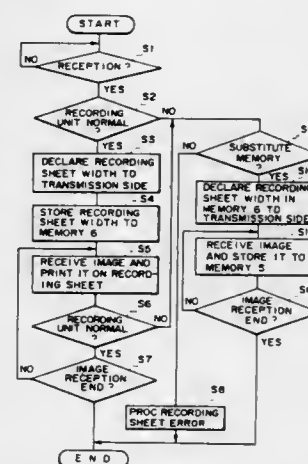
tively supplying said image signals and a desired direct current potential to said picture elements to drive said picture elements twice during each field scanning period.

4,789,900

IMAGE COMMUNICATION APPARATUS PERMITTING  
BOTH IMMEDIATE RECORDING AND STORING OF A  
RECEIVED IMAGE TRANSMITTED WITH A  
MAGNIFICATION CHOSEN ACCORDING TO A  
CURRENT OR RECENTLY-USED RECORDING SHEET  
SIZE AT THE RECEIVING SIDE

**Masatomo Takahashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

Filed Mar. 11, 1987, Ser. No. 24,521  
Claims priority, application Japan, Mar. 18, 1986, 61-58082  
Int. Cl.<sup>4</sup> H04N 1/32, 1/393, 1/40  
U.S. Cl. 358—257



1. An image communication apparatus comprising:  
receiving means for receiving an image signal;  
recording means for recording the received image signal  
received by said receiving means;  
an image memory for storing the received image signal if  
said recording means does not record the received image  
signal; and  
declaring means for declaring a dimension of a recording  
sheet set in said recording means to a transmission side  
transmitting the image signal to said receiving means  
when the received image signal is to be stored in said  
image memory.

8. An image communication apparatus comprising:  
receiving means for receiving an image signal;  
recording means for recording the received image signal  
received by said receiving means;  
an image memory for storing the received image signal if  
said recording means does not record the received image  
signal;  
detecting means for detecting a dimension of a recording  
sheet having the one size of a plurality of different record-  
ing sheet sizes which has been set most often for recording  
by said recording means; and  
means for declaring the recording sheet dimension detected  
by said detecting means to a transmission side transmitting  
the image signal to said receiving means when the re-  
ceived image signal is to be stored in the image memory.

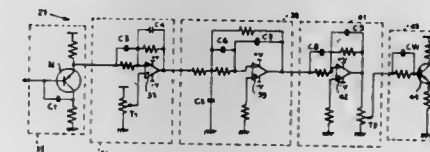
4,789,901

**DIGITAL READING DEVICE FOR FACSIMILE  
APPARATUS**

**Ferdinando Augusti, Turin; Luigi Bonatto, Ivrea, and Anna M. Puglisi, Naples, all of Italy, assignors to Ing. C. Olivetti & Co., S.p.A., Turin, Italy**

Filed May 2, 1986, Ser. No. 858,743  
Claims priority, application Italy, May 5, 1985, 67406 A/85  
Int. Cl.<sup>4</sup> H04N 1/40  
U.S. Cl. 358—284 4 Claims

U.S. Cl. 358-284 4 Claims



1. A digital reading device for facsimile apparatus, comprising an objective for focusing an image of a line of a document formed of a plurality of points on to a series of reading elements which generate a series of analog signals in response to the points read on the line, said points having various spatial frequencies, an A/D converter, and a circuit for amplification and filtering of said analog signals arranged between said reading elements and said converter, wherein said circuit is operable to compensate for response of the objective and of the reading elements at the various spatial frequencies of the said points, and wherein said circuit is a multistage circuit comprising an amplification and filtering stage having such a modulation transfer function as to effect the compensation by emphasizing the analog signals due to the response of said objective and said reading elements at the high spatial frequencies of said points within a predetermined range of frequencies, whereby the fall-off in amplitude of said analog signal at such high spatial frequency is compensated as to supply to said converter output analog signals with an amplitude independent of said spatial frequency.

4,789,902  
IMAGE SIGNAL PROCESSING METHOD  
Kazuo Shimura, Kanagawa, Japan, assignor to Fuji Photo Film  
Co., Ltd., Kanagawa, Japan

Filed Feb. 5, 1987, Ser. No. 12,905  
Claims priority, application Japan, Feb. 5, 1986, 61-23476  
Int. Cl.<sup>4</sup> H04N 1/21

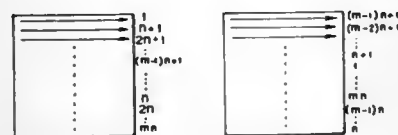
U.S. Cl. 358—284 3 Claims

1. An image signal processing method for storing a series of image signals on a recording medium and reproducing the image from the stored image signals, wherein the improvement comprises the steps of:

- (i) dividing said series of image signals into a plurality of predetermined units;
- (ii) storing the image signals by dividing said series of image



signals into a plurality of blocks, and changing the sequence of respective units within each of said blocks so that predetermined units which were adjacent to each other do not adjoin each other; and



(iii) reproducing the image by rearranging the predetermined units in the original sequence in the course of image reproduction.

4,789,903

## INTEGRATED READER/RECORDER

Takeshi Kamada, Atsugi, and Shuichi Takahashi, Sagamihara, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

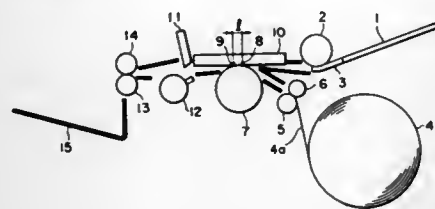
Filed Oct. 21, 1986, Ser. No. 921,263

Claims priority, application Japan, Oct. 21, 1985, 60-233460; Oct. 21, 1985, 60-233461; Oct. 31, 1985, 60-242830; Oct. 31, 1985, 60-242831; Oct. 31, 1985, 60-242832; Nov. 12, 1985, 60-251915; Nov. 12, 1985, 60-251916; Nov. 27, 1985, 60-265060; Nov. 27, 1985, 60-265061

Int. Cl.<sup>4</sup> H04N 1/21

U.S. Cl. 358—296

30 Claims



1. A reading/recording device comprising:

a common path defined in said device for transporting an original document when said device is set in a reading mode or a recording medium when said device is set in a recording mode, selectively;

transporting means for transporting said original document or recording medium through said common path;

reading means disposed in said common path for optically reading said original document during said reading mode and also for detecting a condition of said recording medium being transported during said recording mode; and recording means disposed downstream of said reading means for recording said recording medium.

4,789,904

## VEHICLE MOUNTED SURVEILLANCE AND VIDEOTAPING SYSTEM

Roger D. Peterson, Rte. 1, Box 316, Sweeny, Tex. 77480

Filed Feb. 13, 1987, Ser. No. 14,793

Int. Cl.<sup>4</sup> H04N 5/782

U.S. Cl. 358—310

15 Claims

1. A vehicle mounted surveillance system, comprising:

(a) a camera;

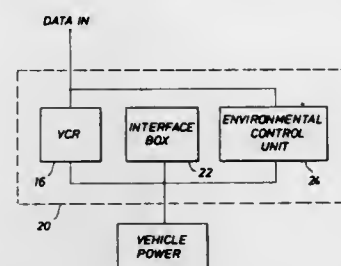
(b) a video recorder;

(c) a control head for operator control by a person in the vehicle;

(d) a vault for housing said video recorder;

(e) power supply for providing power for operating said camera, said video recorder and said control head; and

(f) connector means for interconnecting said camera, said video recorder and said control head to form a surveillance system operatively connected to said power supply to enable on/off operation thereof.



lance system operatively connected to said power supply to enable on/off operation thereof.

4,789,905

## OUTPUT SIGNAL SWITCHING CIRCUIT FOR A VIDEO TAPE RECORDER

Tadaaki Ezaki, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

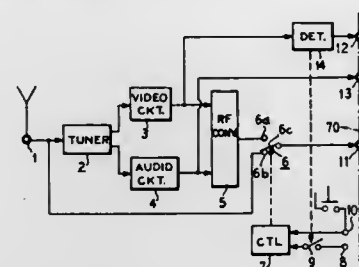
Filed Mar. 20, 1987, Ser. No. 28,703

Claims priority, application Japan, Apr. 15, 1986, 61-86726

Int. Cl.<sup>4</sup> A04N 5/91

U.S. Cl. 358—335

7 Claims



1. An output signal switching circuit for a video recorder comprising:

(a) a switching means for selectively supplying a first RF signal from an antenna or a second RF signal produced by an RF converter to an RF output terminal;

(b) a control means for detecting when said video recorder is in the reproduction mode and connected to control said switching means so as to select said second RF signal;

(c) means for supplying a signal from a stage before said RF converter to a line output terminal;

(d) detecting means for detecting when a connection line is connected to said line output terminal; and

(e) inhibiting means for inhibiting the switching of said switching means upon detection of the reproduction mode by said detecting means.

4,789,906

## VIDEO SIGNAL RECORDING APPARATUS

Kaoru Urata, and Sentaro Tsuji, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 21, 1987, Ser. No. 75,897

Claims priority, application Japan, Aug. 2, 1986, 61-182346

Int. Cl.<sup>4</sup> H04N 5/78

U.S. Cl. 360—33.1

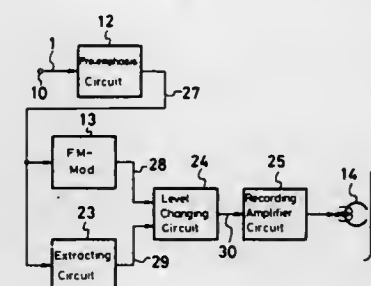
10 Claims

1. Apparatus for processing a video signal to be recorded, comprising:

(a) pre-emphasis means for pre-emphasizing a signal component with a first predetermined frequency band in said video signal and producing a pre-emphasized video signal therefrom;

(b) modulating means for frequency modulating a carrier signal with the pre-emphasized video signal and producing an output therefrom;

(c) extracting means for producing an output by extracting from the video signal a signal component with a second frequency band within said first predetermined frequency band that has a level higher than a predetermined threshold level;



(d) multiplier means for multiplying the outputs of said modulating means and said extracting means whereby the output signal produced has the amplitude of the frequency modulated output signal from said modulating means increased at a location when said extracted signal is obtained; and

(e) recording amplifying means for amplifying the output signal produced by said multiplier means.

4,789,907

## VIDEO CASSETTE RECORDING AND/OR VIEWING VENDING SYSTEM

Peter Fischetti, 569 Congress St., and John E. Swantek, III, 611 Pawling Ave., both of Troy, N.Y. 12180

Continuation-in-part of Ser. No. 717,835, Mar. 29, 1985, abandoned. This application Oct. 15, 1986, Ser. No. 919,188

Int. Cl.<sup>4</sup> H04N 5/78

U.S. Cl. 360—33.1

15 Claims

1. An automated video center for visual and audio recording of a customer's personal message on video cassette tape, said automated video center comprising:

computer control means for sequencing and regulating video center operation;

payment detection means for verifying payment of a prescribed amount;

a rotatable drum for storing a plurality of blank video cassette tapes;

a video cassette recorder/player;

a video camera electronically connected to said video cassette recorder/player for visual and audio recording of said personal customer message on blank tape;

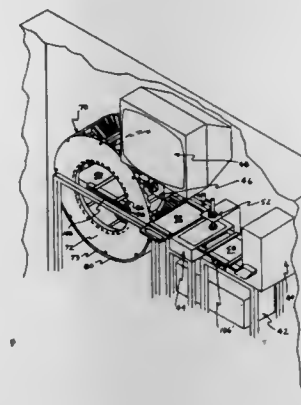
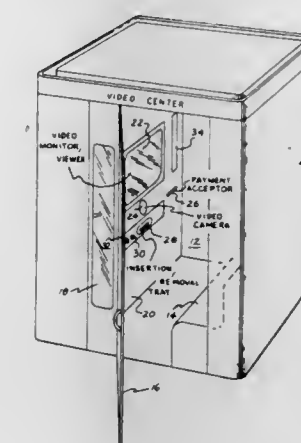
a video monitor/viewer electronically connected to said video cassette recorder/player for customer monitoring of his appearance while recording said personal message;

a tape insertion/removal tray, said tray being positioned between said rotatable drum and said video cassette recorder/player;

a loading mechanism for moving a blank video cassette tape from said rotatable storage drum, across said tray, and into said video cassette recorder/player in response to payment of a prescribed amount, said loading mechanism being positioned within said rotatable storage drum when said mechanism is in a retracted position;

an unloading mechanism for moving the recorded video cassette tape from said video cassette recorder/player upon completion of a recording operation onto said tape

insertion/removal tray for removal and retention by the customer; and



a booth defining a space for customer privacy when recording a personal message on a blank tape.

4,789,908

## DISTORTION REDUCTION CIRCUIT FOR VIDEO PLAYBACK

Berthold Elberger, Darmstadt, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 5, 1987, Ser. No. 46,997

Claims priority, application Fed. Rep. of Germany, May 7, 1986, 3615467

Int. Cl.<sup>4</sup> G11B 15/14, 5/02

U.S. Cl. 360—65

6 Claims

1. Apparatus for removal of distortion from broadband signals reproduced from a magnetic tape record by a playback apparatus including a magnetic head signal pick-up means and a preamplifier for amplifying the output of said pick-up means, said distortion removal apparatus including:

a first stage having an input connected to said preamplifier for compensatory removal of distortion of said signals which was caused by distortion of group propagation signal time of signal components passing through said pick-up means and said preamplifier, and for providing a first partially distortion-corrected signal at an output of said first stage;

a second stage, having an input connected to said output of said first stage, for providing reduction of signal amplitude distortion and at the same time providing 90° phase rota-





nected to external control circuitry, the improvement to said suspension arm and head/slider assembly comprising:

- (a) a head/slider combination having solder contact pads and an electrically conductive path formed on a top surface opposite to the surface intended to face a disk of said head/slider, the electrically conductive path providing electrical connection between the head and at least one of the solder contact pads, and
- (b) a cable wiring harness attached in a laminate relationship to said suspension arm said wiring harness being contact solder connected to said head/slider to thereby provide both mechanical support and electrical interconnection between the top surface of said head/slider and said cable wiring harness and suspension arm.

4,789,915

## TAPE CARTRIDGE BRAKE

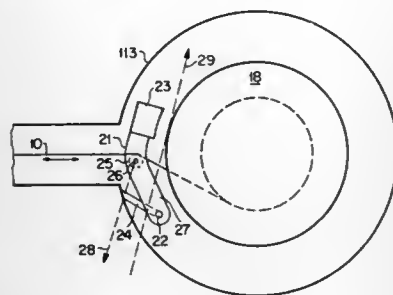
George M. Clifford, Jr., Los Altos Hills, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed May 27, 1986, Ser. No. 866,819

Int. Cl.<sup>4</sup> G11B 23/02

U.S. Cl. 360—132

7 Claims



1. A tape cartridge comprising:

a tape;  
a pair of storage spools between which the tape is fed;  
a brake for preventing rotation of both spools; and  
means for releasing the brake at a first of said spools when power is applied to a second of said spools to feed the tape from the first spool to the second spool and for releasing the brake at the second spool when power is applied to the first spool to feed the tape from the second spool to the first spool, whereby said brake keeps the tape taut for tape feed in both the direction from the first spool to the second spool and in the direction from the second spool to the first spool.

4,789,916

## MAGNETIC DISK CARTRIDGE

Kengo Oishi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 25, 1987, Ser. No. 100,866

Claims priority, application Japan, Sep. 25, 1986, 61-147016[U]

Int. Cl.<sup>4</sup> G11B 23/033

U.S. Cl. 360—133

2 Claims

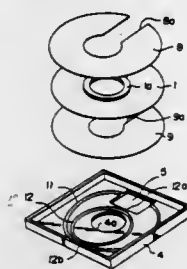
1. A magnetic disk cartridge comprising a disk case, a magnetic disk rotatably disposed in said disk case, and liner members secured to inner surfaces of said disk case to face circular surfaces of said magnetic disk so that said liner members rotatably support said magnetic disk,

wherein the improvement comprises the provision of, formed at least on said inner surface of said disk case facing the circular surface of said magnetic disk on the magnetic recording side:

- (i) a concentric rib constituted by a ring-shaped protrusion facing at least either one of a inner circumference and an

outer circumference of said circular surface of said magnetic disk, and

- (ii) an eccentric rib constituted by a ring-shaped protrusion eccentric with respect to the center of rotation of said



magnetic disk and passing through positions facing the vicinity of said outer circumference and the vicinity of said inner circumference of said circular surface of said magnetic disk.

4,789,917

## MOS I/O PROTECTION USING SWITCHED BODY CIRCUIT DESIGN

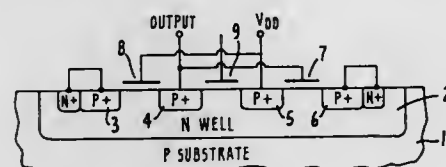
William E. Miller, Los Gatos, Calif., assignor to National Semiconductor Corp., Santa Clara, Calif.

Filed Aug. 31, 1987, Ser. No. 91,265

Int. Cl.<sup>4</sup> H02H 3/24

U.S. Cl. 361—56

3 Claims



1. A MOS integrated circuit including switched body circuitry that protects a system data line connected to an input/output pad, the circuit comprising:

- (a) a semiconductor substrate of a first conductivity type;
- (b) a well region of a second conductivity type opposite to that of the first conductivity type formed in a surface of the substrate;
- (c) first, second, third and fourth spaced-apart shallow diffusion regions of the first conductivity type formed in a surface of the well region, the first and fourth of these regions being electrically connected to the well region through ohmic contacts;
- (d) a first gate electrode overlying a first channel region between the second diffusion region and the third diffusion region, the first gate electrode and the second and third diffusion regions combining to define a MOS transistor, the first gate electrode being connected to receive a logic signal;
- (e) an input/output pad connected to the second diffusion region and to a second gate electrode overlying a second channel region between the third diffusion region and the fourth diffusion region, the second gate electrode and the third and fourth diffusion regions combining to define a first switched body MOS transistor; and
- (f) a power supply pad connected to the third diffusion region and to a third gate electrode overlying a third channel region between the first diffusion region and the second diffusion region, the third gate electrode and the first and second diffusion regions combining to define a second switched body MOS transistor.

4,789,918

## FASTENED LIGHTNING PROTECTION REPAIR SYSTEM AND METHOD FOR ITS USE

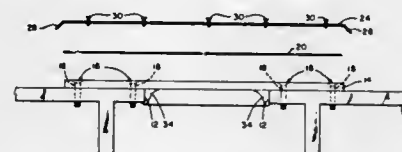
Engbert T. Bannink, Jr., Auburn, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Nov. 3, 1986, Ser. No. 927,042

Int. Cl.<sup>4</sup> H05F 1/02

U.S. Cl. 361—218

9 Claims



3. A lightning protection repair system in an aircraft graphite epoxy structure, said structure including an outer layer of metal-plated graphite fiber fabric and having a hole defined by an edge therein, said repair system comprising:

- a repair plate placed over the hole in the aircraft graphite epoxy structure, said repair plate completely covering the hole and being attached to the aircraft graphite epoxy structure by fasteners;
- a dielectric sheet covering the entire outer surface of the repair plate; and
- an electrically conducting lightning diversion plate placed over the dielectric sheet and being attached to the repair plate by fasteners, the edge of the diversion plate extending beyond the edge of the repair plate and being bent to be adjacent the outer layer of metal-plated graphite fiber fabric.

4,789,919

## ADVANCEABLE AND RETRACTABLE PLUG-ON UNIT ASSEMBLY FOR A MOTOR CONTROL CENTER

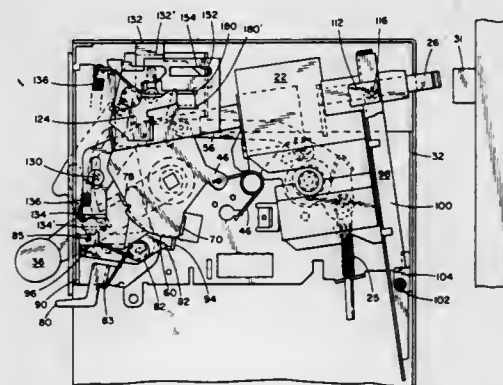
Russell Cox, Frankfort, and Stephen M. Ledbetter, Lexington, both of Ky., assignors to Square D Company, Palatine, Ill.

Filed Aug. 20, 1986, Ser. No. 898,474

Int. Cl.<sup>4</sup> H02B 11/12

U.S. Cl. 361—339

9 Claims



1. An assembly supporting a plug-on unit, having a plurality of plug-on jaws, within a unit enclosure of an electrical control center having a plurality of bus bars extending along the rear portion of the control center comprising:

- a housing fixedly secured to said unit enclosure;
- a mounting pan pivotally connected to said housing, said pan including an upper portion and a lower portion, said upper portion provided with a cutout section, a pin pivotally connecting the lower portion of said pan to said housing; said plug-on unit fixedly mounted to said mounting pan, said plug-on jaws extending outward from said plug-on unit

and through said cutout section toward said rear portion of the control center; and

handle means connected to said upper portion of said pan for pivotally moving said mounting pan between a first position in which said plurality of plug-on jaws are respectively engaged with said plurality of said bus bars and a second position in which said plurality of plug-on jaws are spaced away from said plurality of bus bars.

4,789,920

## LAMP AND BASE ASSEMBLY, PARTICULARLY FOR ASSOCIATION WITH AN AUTOMOTIVE HEAD LAMP REFLECTOR

Peter Helbig, Sontheim, and Walter Schönberr, Giengen, both of Fed. Rep. of Germany, assignors to Patent-Treuhand Gesellschaft für Elektrische Glühlampen m.b.H., Munich, Fed. Rep. of Germany

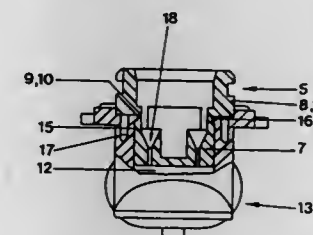
Filed May 27, 1987, Ser. No. 54,536

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1986, 8615923[U]

Int. Cl.<sup>4</sup> B60Q 1/04

U.S. Cl. 362—61

20 Claims

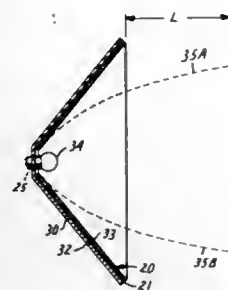


1. Lamp and base assembly combination, particularly for association with an automotive reflector (R), wherein the lamp comprises

a bulb (1) closed off at one end by a pinch or press seal;  
at least one light generating means (2) within said bulb; and  
wherein the base assembly comprises  
a base cup (5);  
means (3) for securing the bulb (1) to the base cup (5) at a region thereof facing the bulb,  
said base cup (5) being formed with a retaining portion (7) remote from the bulb;  
an attachment element (13) separate from said base cup (5) and formed with a receiving portion (12), and receiving the retaining portion (7) of the base cup in form-fitting engagement,  
and comprising, in accordance with the invention, resiliently interengaging projection (16)-and-recess (9, 10) means formed, on and unitary with portions of the base cup (5) and the attachment element (13) to permit resilient engagement of the projection means with the recess means;  
and a flange-like cover means (8, 11) formed on one of said portions and positioned to cover the region of engagement and resilient deflection of the interengaging projection-and-recess means, and positioned to inhibit access thereto to prevent release effected by the interengaged projection-and-recess means after engagement thereof and locking of the base cup (5) to the attachment element (13) for retention in said form-fitting engagement.

**4,789,921**  
**CONE SHAPED FRESNEL REFLECTOR**  
 Kenneth A. Aho, Chicago City, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
 Filed Feb. 20, 1987, Ser. No. 16,858  
 Int. Cl.<sup>4</sup> F21V 7/00; G02B 5/08  
 U.S. Cl. 362-348

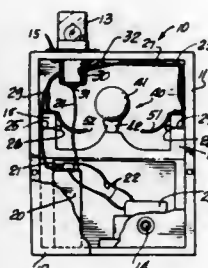
32 Claims



1. A reflector apparatus comprising a reflector having a major surface, said major surface being reflective and having coaxial Fresnel-type structures thereon, said reflector being formed into the shape of a cone having a base.

**4,789,922**  
**EARTHQUAKE SAFETY LIGHT**  
 Thomas Cheshire, Rte. 2, Box 86A, Bishop, Calif. 93514, assignor to Thomas Cheshire and Douglas A. Stanek, both of Bishop, Calif.  
 Filed May 27, 1987, Ser. No. 54,485  
 Int. Cl.<sup>4</sup> H01H 35/02  
 U.S. Cl. 362-158

6 Claims



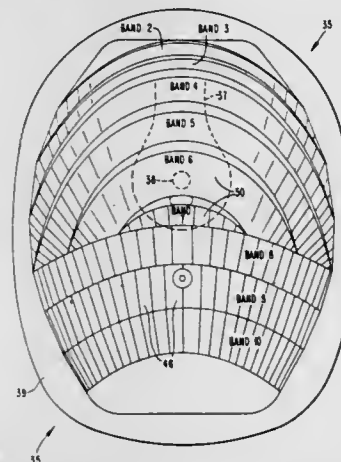
1. Apparatus for lighting an emergency light for guidance purposes upon the occurrence of an earthquake comprising in combination: a generally rectangular casing comprising a top, bottom, two sides, back, and removable front; a bridge running transversely across the width of said case and fastened therein approximately midway between the top and the bottom of said case; a battery operated light located in and extending above the top of said case; a battery located beneath said bridge in the lower portion of said case; an electrical conducting element connected to a first terminal of said battery and to a first terminal of said light; a second connecting element connected to a second terminal of said light and connected to two conductive elements, each isolated from said battery at the end not connected to said second terminal of said light, so that no contact is existent between a second terminal of said battery and said two isolated conductive elements; a conductive element connected to a second terminal of said battery and terminating in a contact point adjacent, but not in contact with, each of the two isolated conductive elements; a movable electrical conducting element attached to each of said isolated contact points connected to said second terminal of said light, but not in contact therewith, each of said movable electrical conducting elements being connected to said bridge adjacent a pedestal located in its center portion; a weight located upon said pedestal

tal suitable to be displaced from its place upon said pedestal by an earthquake of a given magnitude in such manner that will cause one of said flexible electrical contact means to contact said electrical contact means connected to the second terminal of said battery in such means as to force said electrical contact means into contact with said contact means connected to said second battery terminal means so as to complete the circuit and cause the light to be ignited.

**4,789,923**  
**REFLECTOR FOR ROADWAY LIGHTING LUMINAIRE**  
 Kenneth B. Sales, Radford, Va., assignor to Hubbell Incorporated, Orange, Conn.  
 Continuation of Ser. No. 945,528, Dec. 23, 1986, Pat. No. 4,694,382. This application Sep. 11, 1987, Ser. No. 95,311  
 The portion of the term of this patent subsequent to Sep. 15, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> F21V 7/00

U.S. Cl. 362-346

11 Claims



1. A luminaire for illuminating a predetermined surface area of a roadway having a substantially central longitudinal roadway axis, the roadway having first and second edges defining side edges of the surface area which are substantially equidistant from the roadway axis, the luminaire being elevated above a point adjacent the first one of the side edges of the surface area, the luminaire comprising

a reflector having a bottom edge defining an elongated bottom opening having a central longitudinal luminaire axis and a generally concave interior reflective surface bisected by a central, generally vertical, plane containing said longitudinal luminaire axis, said plane and luminaire axis lying substantially perpendicular to said roadway axis opposite said point; and

means for mounting a light source within said reflective surface substantially symmetrically with respect to said vertical plane, said interior surface having proximal and distal ends relative to said light source;

said reflective surface being shaped to form a plurality of reflective facets arranged in first and second groups of arcuate bands, each band of each said group having arcuate portions symmetrically disposed on opposite sides of said light source, the bands of said first group of bands (1-7) being adjacent said proximal end and the bands of said second group of bands (8-10) being between said first group and said distal end,

the facets of said first group of bands (1-7) having surfaces which are inclined relative to said vertical bisecting plane and to a plane transverse to said bisecting plane so as to direct substantially all of the light received from said light source by the facets of said first group to a

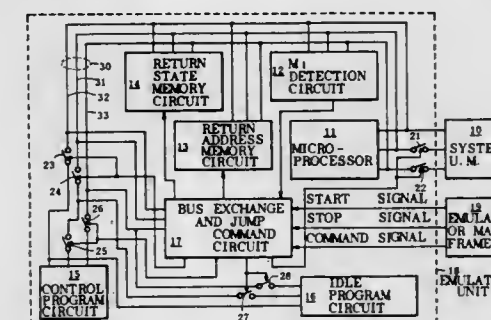
first roadway surface area between said longitudinal roadway axis and said second roadway edge, and the facets of said second group of bands (8-10) being inclined relative to the vertical bisecting plane and the transverse plane bisecting said vertical transverse plane to direct substantially all of the light received from said light source by the facets of said second group to a second roadway surface area between said longitudinal roadway axis and said first roadway edge.

**4,789,924**  
**MICROPROCESSOR EMULATION APPARATUS FOR DEBUGGING A MICROPROCESSOR OF AN ELECTRONIC SYSTEM WITHOUT UTILIZING AN INTERRUPT SIGNAL AND A STOP SIGNAL TO TEMPORARILY STOP AN OPERATION OF THE SYSTEM**

Minoru Fukuta, Higashikurume, Japan, assignor to Iwatsu Electric Co. Ltd., Tokyo, Japan  
 Continuation-in-part of Ser. No. 731,474, May 7, 1985, abandoned. This application Sep. 8, 1987, Ser. No. 96,201  
 Claims priority, application Japan, Jul. 7, 1984, 59-141169  
 Int. Cl.<sup>4</sup> G06F 11/00

U.S. Cl. 364-200

7 Claims



1. A microprocessor emulation apparatus comprising: emulator main frame means for sending out a stop signal, a start signal and a command signal;

emulator unit means comprising;

bus exchange means connected to said emulator main frame means for operating upon receipt of said stop signal, said start signal or said command signal from said emulator main frame means;

microprocessor means for executing upon receipt of a command from said bus exchange means;

control program means for memorizing an analysis program to analyze an operation of a system under measurement; and

bus means which includes switch means controlled by said bus exchange means for connecting between said bus exchange means, said microprocessor means, said control program means, and said system under measurement to be transmitted said stop signal, said start signal and said command signal from said emulator main frame means via said bus change means; wherein

said emulator unit means comprises;

M1 detection means for detecting a 1st byte of a command of a program which is transmitted on said bus means from said system and for sending out a detection signal;

return address memory means for memorizing an address indicated in a 1st byte of said program included in said system under measurement upon receipt of said stop signal to stop executing said program by indications of said microprocessor means and for sending out said address to said system via said bus means to return to said address by indications of said microprocessor means when said start signal is fed thereafter;

return state memory means for memorizing a value regis-

tered in a register included in said microprocessor means upon receipt of said stop signal to make said microprocessor means stop executing said program and for sending out said value registered in said register to said bus means to make said microprocessor means return to a state upon receipt of said stop signal when said start signal is, thereafter, fed; and

idle program means for memorizing a pseudo stopping program to produce a pseudo stopping state in which said microprocessor means does not execute said program included in said system upon receipt of said stop signal; whereby

said bus exchange means exchanges said bus means including said switch means upon receipt of said detection signal from said M1 detection means,

said pseudo stopping state is produced by said stop signal, an analysis state for executing said analysis program memorized in said control program means is produced upon receipt of said command signal and said start signal, and a jump command is sent out to produce said pseudo stopping state when said stop signal is fed thereafter,

so as to read contents memorized in said system and to modify said contents.

**4,789,925**  
**VECTOR DATA LOGICAL USAGE CONFLICT DETECTION**

Archib E. Lahti, Fridley, Minn., assignor to Unisys Corporation, Blue Bell, Pa.

Filed Jul. 31, 1985, Ser. No. 761,140  
 Int. Cl.<sup>4</sup> G06F 9/38, 11/28

U.S. Cl. 364-200

17 Claims

1. In a multiple pipelined vector digital data processing system having an instruction repertoire including a plurality of instructions which can be simultaneously programmed and executed in a desired sequence in its multiple pipelines, each pipeline having associated therewith, one or more conflict detection and resolution mechanisms comprising:

a first result register means for storing a first file number; a second source register means for storing a second file number;

a first comparator means separately coupled to said first and said second register means to receive and compare the separate contents respectively contained therein;

a third register means for storing a first element pair count;

a fourth register means for storing a second element count;

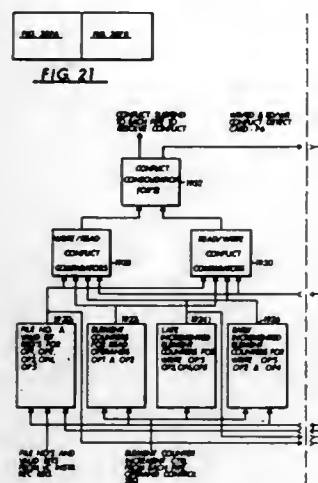
a second comparator means separately coupled to said third register means and to said fourth register means to receive and compare the separate element pair count contents respectively contained therein;

a separate pipeline activity snapshot register means, associated with each of said pipelines, coupled to each of the other of said multiple pipelines to receive and store an active or non-active condition signal of each of the other of said multiple pipelines; and

an AND gate means separately coupled to said first comparator means, to said second comparator means and to the separate pipeline activity snapshot register means, said AND means indicating the detection of a conflict when it



is activated by the simultaneous presence of active signals from said first comparator means, said second comparator

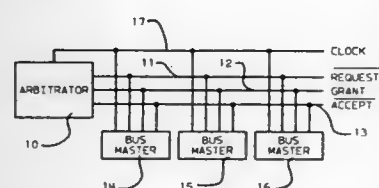


means and said separate pipeline activity snapshot register.

**4,789,926**  
DIGITAL DATA PROCESSING ARBITRATION SYSTEM  
David A. Clarke, Eastleigh, England, assignor to International Business Machines Corporation, Armonk, N.Y.  
Filed Jul. 21, 1986, Ser. No. 888,291  
Claims priority, application European Pat. Off., Aug. 6, 1985, 85305594.5

Int. Cl. G06F 13/14  
U.S. Cl. 364-200

3 Claims



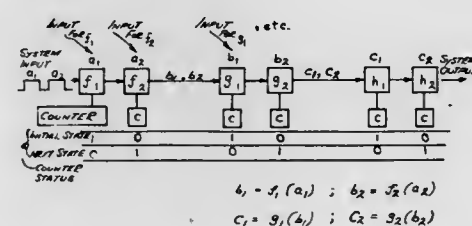
1. In a digital data processing system having a resource which is shared between a plurality of users, an arbitration system comprising a plurality of resource requestors each

associated with a respective user, and a resource grantor to which the requestors are connected in parallel via a set of common lines, each resource requestor being adapted to apply a request signal on a predetermined first one of the lines when the associated user requests the resource, and the resource grantor being responsive to the presence of a request signal on the first line to subsequently apply a grant signal on a predetermined second one of the lines to grant the resource, each resource requestor requesting the resource being responsive to the receipt of the grant signal to apply an accept signal on a predetermined third one of the lines after a delay from receipt which is different for each resource requestor and which determines the priority of the user associated with the resource requestor, a first accept signal so applied giving the resource to the associated user and preventing any other resource requestor from applying an accept signal on the third line until the resource is relinquished by the current user.

**4,789,927**  
INTERLEAVED PIPELINE PARALLEL PROCESSING ARCHITECTURE  
Marc Hannah, Menlo Park, Calif., assignor to Silicon Graphics, Inc., Mountain View, Calif.  
Filed Apr. 7, 1986, Ser. No. 849,004  
Int. Cl. G06F 9/38

U.S. Cl. 364-200

1 Claim



1. A system for processing of data, said data being inputted in a serial pipeline in a predetermined order into said system such that a second packet of data is inputted into said system before a first packet of data, said system comprising:

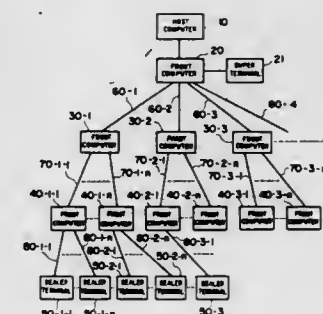
- a system input in said serial pipeline;
- a system output in said serial pipeline;
- a first processor in said serial pipeline coupled to said system input for receiving said first and said second packets of data, said first processor receiving said second packet of data and passing said second packet of data to a second processor in said serial pipeline coupled to said first processor, said first processor receiving said first packet of data and performing a computational operation on said first packet of data, said first processor outputting the result of its operation on said first packet of data to said second processor, said first processor having a first means for assuring that said first processor operates on only said first packet of data and a means for assuring that said second packet of data is passed to said second processor before the result of the operation on said first packet of data is outputted to said second processor;

said second processor coupled to said system output, said second processor receiving said second packet of data and performing a computational operation on said second packet of data, said second processor outputting to said system output the result of its operation on said second packet of data, said second processor receiving the result of the operation of said first processor on said first packet of data, said second processor passing the result of the operation of said first processor on said first packet of data to said system output, said second processor having a second means for assuring that said second processor operates on only said second packet of data and means for assuring that the result on said second packet of data is

outputted in time from said system before the result on said first packet of data is outputted from said system, wherein said data is a stream of data having a repeating pattern of at least a first packet of data and a second packet of data and wherein said first means for assuring is a first modulo-N counter and said second means for assuring is a second modulo-N counter, where N is equal to the number of packets of data in said repeating pattern wherein said first processor only processes data when said first modulo-N counter is at a first specific predetermined value and said second processor only processes data when said second modulo-N counter is at a second specific predetermined value, whereby both said first and second packets of data in the serial pipeline proceed through said first and said second processors and said first processor operates on only said first packet of data and said second processor operates on only said second packet of data.

**4,789,928**  
AUCTION INFORMATION TRANSMISSION PROCESSING  
Masataka Fujisaki, Machida, Japan, assignor to Flex Japan Inc. and Aucnet Inc., both of Tokyo, Japan  
Filed Jan. 30, 1987, Ser. No. 8,886  
Claims priority, application Japan, Feb. 17, 1986, 61-033469  
Int. Cl. G06F 7/38, 3/14  
U.S. Cl. 364-401

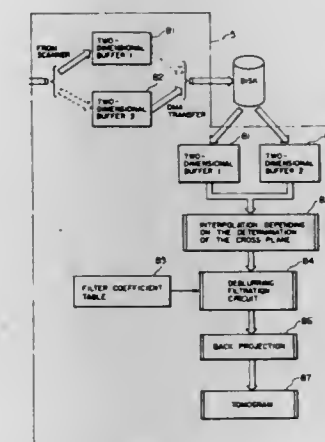
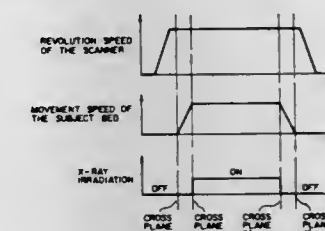
5 Claims



1. In an auction information transmission processing system constructed by connecting a most significant front computer to a host computer, arranging at least one stage of a plurality of intermediate front computers and a plurality of least significant front computers so as to be connectable to said most significant front computer in a tree-like configuration via communication lines, and arranging a plurality of dealer terminals so as to be connectable to each of said least significant front computers via communication lines, an information transmission processing system characterized in that each of said dealer terminals has basic pattern data storage means storing pattern data indicative of basic display screen pictures and exhibit data storage means storing data peculiar to articles on exhibit at an auction, and wherein when the system is started up, said host computer transmits a line connection signal to said front computers, wherein said host computer is connected to each of said front computers, said host computer then transmits auction data such as member registration data to said least significant front computers and said auction data are stored in these least significant front computers, said dealer terminals and said least significant front computers are connected, and data are extracted from said basic pattern storage means and said exhibit data storage means of said dealer terminals, and said extracted data are displayed on corresponding display screens, in response to a command from said host computer.

**4,789,929**  
CT SYSTEM FOR SPIRALLY SCANNING SUBJECT ON A MOVABLE BED SYNCHRONIZED TO X-RAY TUBE REVOLUTION  
Hiroshi Nishimura, and Osamu Miyazaki, both of Chiba, Japan, assignors to Hitachi Medical Corporation, Japan  
Filed May 14, 1987, Ser. No. 49,802  
Int. Cl. A61B 6/03; G01N 23/04  
U.S. Cl. 364-413.15

20 Claims



1. A computerized tomography system which includes an X-ray generator for producing X-rays, an X-ray detector array for detecting the X-rays transmitted through a subject, and a subject bed, said X-ray tube and said X-ray detectors being opposed to each other, X-ray beams being irradiated upon said subject in a sectorial manner at a large number of angles to scan said subject while said X-ray tube and said X-ray detectors are being revolved around said subject, said X-ray tube and said X-ray detectors remaining opposed to each other during the revolution, said system comprising:

- means for rapidly and continuously revolving a frame bearing said X-ray tube;
- means for moving said subject bed perpendicularly to a plane of revolution of said X-ray tube and for moving said subject bed synchronously with the revolution of said X-ray tube;
- means for scanning said subject along with the movement of said subject bed in a spiral with respect to a coordinate system positioned about an imaginary axis passing through said subject; and
- means for obtaining a reconstructed tomogram of an arbitrary cross-section within a range from a position corresponding to a beginning of the spiral scanning to a position corresponding to an end of the spiral scanning.

2. The computerized tomography system according to claim 1 further comprising means for performing an adjustment so that the locus of said X-ray tube in forward movement of said subject bed and that of said X-ray tube in backward movement of said subject bed do not intersect with one another and data obtained during said backward movement comes in between two mutually adjacent data previously obtained during said forward movement and juxtaposed in the direction of the

movement wherein data obtained during the backward movement serves to enhance accuracy of the data obtained during the forward movement and juxtaposed in the direction of the movement, so that accuracy of interpolation performed in a direction of juxtaposition of imaginary cross-sectional slices of said subject on the basis of the data obtained in both the forward movement and the backward movement is increased two-fold from that of interpolation performed in a direction of juxtaposition of imaginary cross-sectional slices of said subject on the basis of the data obtained only during the forward movement.

5. A computerized tomography system comprising an X-ray tube for generating X-rays, X-ray detectors opposed to said X-ray tube to detect X-rays transmitted through a subject, a frame which is continuously rotated while bearing said X-ray tube and said X-ray detectors, a bed which is moved while bearing said subject, means for moving said bed perpendicularly to a plane of revolution of said X-ray tube and synchronously with said revolution, and means for irradiating X-rays upon said subject from said X-ray tube during the movement of said bed to spirally scan said subject.

9. A computerized tomography system including an X-ray tube for generating X-rays, X-ray detectors opposed to said X-ray tube to detect X-rays transmitted through a subject, a frame which is continuously rotated while bearing said X-ray tube and said X-ray detectors, and a bed which is moved while bearing said subject, said system comprising:

- means for moving said bed perpendicularly to a plane of revolution of said X-ray tube and synchronously with said revolution;
- means for irradiating said X-ray upon said subject from said X-ray tube during movement of said bed to spirally scan said subject;
- buffer means for storing spiral data obtained by the means for irradiating said X-rays to spirally scan, said spiral data being stored in an address determined by a projection position number and a scanner rotation number;
- an interpolation circuit for performing interpolation on said spiral data to obtain projection data; and
- an inverse projection calculating circuit for subjecting said projection data to inverse projection to recompose a tomogram.

4,789,930

#### ENERGY DEPENDENT GAIN CORRECTION FOR RADIATION DETECTION

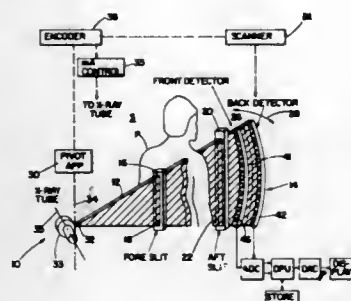
Richard A. Sones, Cleveland Heights, and Karen L. Lauro, South Euclid, both of Ohio, assignors to Picker International, Inc., Cleveland, Ohio

Filed Nov. 15, 1985, Ser. No. 798,428

Int. Cl. G01T 1/20

U.S. Cl. 364—413.13

21 Claims



1. A method of calibrating a dual energy digital radiography system, utilizing a radiation source, a detector array responsive to radiation of at least two different energies spaced from the source to accommodate the placement of an object in a space between the source and detector array, scanning means for effecting relative scanning motion between the detector array

and an object when said object is located in said object space, said calibration method comprising the steps of;

- (a) scanning a multiplicity of thicknesses of basis materials to create a matrix of low and high energy pixel data;
- (b) performing a regression on said matrix of low and high energy pixel data to derive at least one low energy coefficient vector and at least one high energy coefficient vector;
- (c) transforming said at least one low energy and at least one high energy coefficient vectors to low and high energy gain functions;
- (d) scanning an examination object to create low and high energy image data;
- (e) combining said low and high energy image data with said low and high energy gain functions to create corrected low and high energy image data.

4,789,931

#### SYSTEM FOR AUTOMATICALLY GENERATING TOOL PATH DATA FOR AUTOMATIC MACHINING CENTER

Tetsuzo Kuragano, Tokyn, and Nobuo Sasaki, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

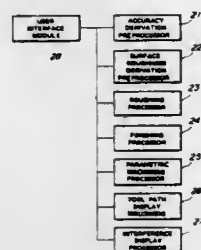
Filed Sep. 1, 1987, Ser. No. 91,983

Claims priority, application Japan, Sep. 4, 1986, 61-208548

Int. Cl. G06F 15/46; G05B 19/18

U.S. Cl. 364—474.18

21 Claims



1. A system for establishing data defining a tool path for a numerically controlled machine of the type having a machining tool of a known configuration from data describing a three-dimensionally curved surface, comprising:

- means for forming data representing a polyhedral surface offset from said three-dimensionally curved surface by a distance determined according to the configuration of the machining tool, said polyhedral offset surface being constituted by a plurality of surface elements;
- means for deriving the sizes of said surface elements in view of a given dimensional tolerance so as to define an error distance between the polyhedral surface to be machined and said three-dimensionally curved surface described by said data which error distance is smaller than said dimensional tolerance;
- means for deriving a feed pitch of said machining tool in view of a given surface roughness tolerance so that said polyhedral surface to be machined will have a surface roughness in conformance with said surface roughness tolerance relative to said three-dimensionally curved surface; and
- means for sampling coordinate data of said surface elements, and deriving data defining said machining tool path on the basis of said sampled coordinate data and said machining tool feed pitch.

4,789,932

#### APPARATUS AND METHOD FOR AUTOMATICALLY SCORING A DART GAME

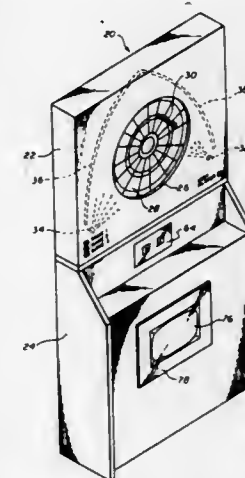
Royce L. Cutler, Austin, and Edward A. Hohmann, Houston, both of Tex., assignors to Austin T. Musselman, Houston, Tex.

Filed Sep. 21, 1984, Ser. No. 652,846

Int. Cl. G06F 15/44

U.S. Cl. 364—411

26 Claims



1. An apparatus for locating a dart embedded in a dart board comprising:

- a housing for supporting the dart board;
- means within said housing for illuminating a space adjacent a surface of the dart board supported within said housing;
- means within said housing for detecting the presence of at least two shadows created by the presence of the dart within said illuminated space when said dart is embedded in said surface of the dart board supported within said housing;
- means for utilizing the location of said shadows created by the presence of said dart within said illuminated space to calculate the location of said dart embedded in said dart board;
- said means within said housing for detecting the presence of at least two shadows comprising a plurality of light detecting elements for monitoring the intensity of the illumination within said illuminated space, said plurality of light detecting elements being located along a side of said dart board opposite from said means within said housing for illuminating said illuminated space; and
- each of said plurality of light detecting elements being capable of detecting a reduced level of illumination incident on said light detecting element when said light detecting element is within a shadow created by the presence of said dart within said illuminated space adjacent said surface of said dart board.

4,789,933

#### FRACTAL MODEL BASED IMAGE PROCESSING

Victor C. Chen, Richmond Hts., Ohio, and Mike M. Tesic, Los Altos, Calif., assignors to Picker International, Inc., Highland Hts., Ohio

Filed Feb. 27, 1987, Ser. No. 19,568

Int. Cl. G06F 15/42

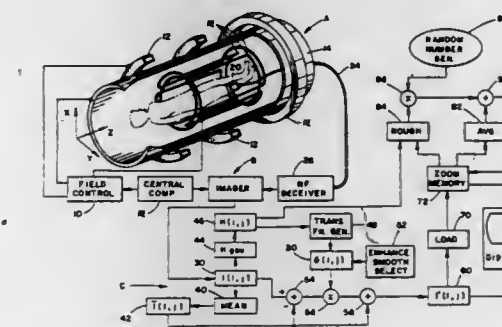
U.S. Cl. 364—413.13

20 Claims

1. An apparatus for generating medical diagnostic image representations, the apparatus comprising: a medical diagnostic apparatus for generating diagnostic data indicative of a preselected image region of a patient; an imager for generating an electronic image representation from the diagnostic data, the electronic image representation including a pixel value corresponding to each pixel of

a pixel array, each pixel value is indicative of an image property of a corresponding subregion of the image region of the patient;

a self-similarity value generating means for generating a self-similarity value corresponding to each pixel, the self-similarity value generating means being operatively connected with the imager to receive pixel values therefrom, each self-similarity value varying in accordance with a ratio of (i) a difference between the corresponding pixel value and a first set of pixel values contiguous to and



surrounding the corresponding pixel value and (ii) the corresponding pixel value and a second set of pixel values contiguous to and surrounding the first set of pixel values; an image improvement means for replacing each pixel value by a combination of the replaced pixel value and an average of surrounding pixel values, the combination being weighted in accordance with the corresponding self-similarity value, the image improvement means being operatively connected with the imager and the self-similarity value generating means.

4,789,934

#### SIGNATURE VERIFICATION ALGORITHM

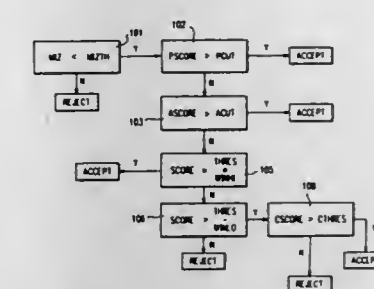
Steven C. Gundersen, Carmel, and Thomas K. Worthington, New York, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 21, 1986, Ser. No. 820,846

Int. Cl. G06K 9/00

U.S. Cl. 364—419

6 Claims

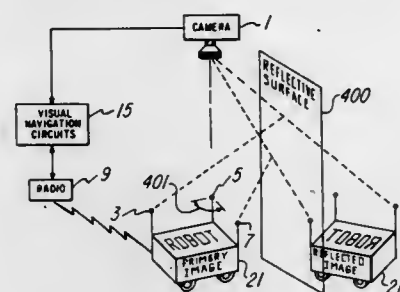






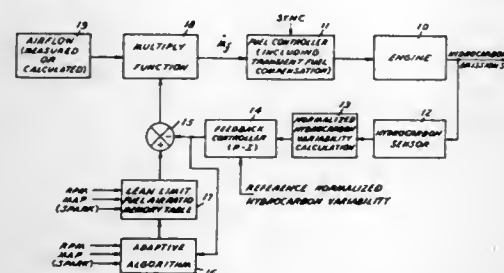
second control signals indicative of a specific valve-operating mode being successively supplied to said second control means for a predetermined time period, said second control means generating a third control signal in response to the abnormal condition of at least one of said hydraulic pressure control valves to command said single directional control valve to be switched to the passage-opening condition.

reflected from surfaces in view of the manufacturing apparatus, to obtain a true image thereby; and



means for obtaining the spatial position of the manufacturing apparatus from the true image thereof.

**4,789,939**  
**ADAPTIVE AIR FUEL CONTROL USING**  
**HYDROCARBON VARIABILITY FEEDBACK**  
Douglas R. Hamburg, Birmingham, Mich., assignor to Ford  
Motor Company, Dearborn, Mich.  
Filed Nov. 4, 1966, Ser. No. 926,755  
Int. Cl.<sup>4</sup> F02M 25/06  
U.S. Cl. 364—431.05 2 Claims



1. A method for controlling engine operation at a lean fuel air ratio including the steps of:
  - applying a fuel injector control signal to fuel injectors of the engine as a function of a stored schedule of fuel air ratio command signals;
  - observing the normalized variability in engine hydrocarbon emissions;
  - establishing a reference normalized hydrocarbon variability;
  - generating a feedback signal as a function of the difference between the observed normalized variability in engine hydrocarbon emissions and a reference normalized hydrocarbon variability;
  - generating a signal indicative of the airflow into the engine; and
  - modifying the fuel injector control signal as a function of the feedback signal and the airflow signal.

4,789,940

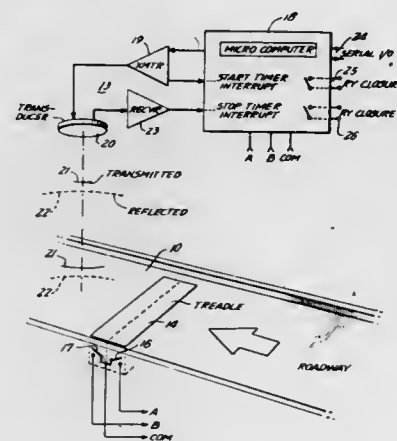
**METHOD AND APPARATUS FOR FILTERING  
REFLECTIONS FROM DIRECT IMAGES FOR MOBILE  
ROBOT NAVIGATION**

**Donald J. Christian, Richardson, Tex., assignor to Texas Instru-  
ments Incorporated, Dallas, Tex.**

**Filed Aug. 30, 1985, Ser. No. 771,380**  
**Int. Cl.<sup>4</sup> H04N 7/18**

**U.S. Cl. 364—468** **Int. Cl. H04N 7/16** **22 Claims**  
**1.** A visual navigation system with a reflection filter for obtaining a spatial position of a manufacturing apparatus, comprising:  
 means for obtaining a visual image of the manufacturing apparatus;  
 means for filtering of images of the manufacturing apparatus

**4,789,941**  
**COMPUTERIZED VEHICLE CLASSIFICATION SYSTEM**  
**Bennett Nunberg, 24 Grist Mill Dr., Kings Park, N.Y. 11754**  
**Filed Jul. 18, 1986, Ser. No. 887,899**  
**Int. Cl. G01S 15/06**



**1. A computerized vehicular measurement and classification system for moving vehicular traffic within a traffic lane, which comprises:**

- (a) an ultrasonic ranging unit for transmitting and receiving an ultrasonic ranging signal,
- (b) means for mounting said ranging unit above the surface of said traffic lane, at a level above the maximum height of vehicles transiting said traffic lane,
- (c) said ranging unit being mounted to transmit ultrasonic ranging signals directly downward toward said traffic lane,
- (d) first circuit means measuring the time interval between the transmission of a signal and the reception of its echo from a passing vehicle,
- (e) second circuit means for comparing individual time interval data with other time interval data taken at a different instant for the same passing vehicle,
- (f) third circuit means for determining maximum vehicular height from successive interval data, said means being operative to compare successive individual interval data and to reject individual data, indicative of vehicle maximum height, that differs excessively from prior time-adjacent interval data and is not verified by subsequent repetition,
- (g) fourth circuit means for accumulating successive interval data for determination of average vehicle height, and

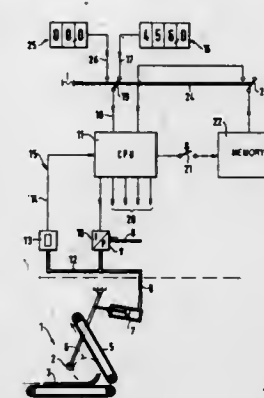
(h) memory storage for retaining maximum height and average height data for known vehicle classes, to enable classification by comparison.

4,789,942  
**INSTALLATION FOR MANUFACTURING DIFFERING  
 MINERAL FIBRE PRODUCTS INCLUDING MANUAL  
 CONTROLS FOR VARYING STORED CONTROL  
 SIGNALS**

**Hans Gaertner, Dannstadt-Schauernheim; Friedrich Kaufmann, Limburgerhof; Horst W. Schlossherr, Dudenhofen, and Dietrich Schulz, Ludwigshafen, all of Fed. Rep. of Germany, assigns to Isover Saint-Gobain, Courbevoie, France**  
Continuation of Ser. No. 663,167, Oct. 22, 1984, abandoned.

This application May 20, 1987, Ser. No. 52,168  
Claims priority, application Fed. Rep. of Germany, Oct. 21,  
1983, 3338359

U.S. Cl. 364—470      Int. Cl.<sup>4</sup> G06F 15/46      4 Claims



1. An installation for the continuous manufacture of differing mineral fiber products, comprising:

plural control elements each for controlling a parameter of a product;

plurality of reference value adjusting devices each for producing a control signal to be applied to one of said control elements associated with the adjusting devices;

a memory for commonly storing control signals associated with each product, wherein the control signals associated

with each product, wherein the control signals associated with each product and stored in said memory are accessed by means of a common address for common retrieval of the control signals associated with each product; and

plural manually operable correcting devices for making fine adjustments within pre-established limits to the control signals retrieved from said memory without modification

signals retrieved from said memory without modification of the stored control signals, thereby to control the quality of each product primarily based on the stored control signals, as finely adjusted by the manually operable correcting devices:

a central processing unit for controlling application of retrieved control signals to said control elements; and switching means disposed between said central processing unit and said memory and said reference value adjusting devices for switching over from a manual operation mode to an automatic operation mode wherein control signals applied to said control elements are derived from said memory instead of said reference value adjusting devices, comprising

means for switching an input line to said central processing unit from one of said reference value adjusting devices to one of said correcting devices when said switching means switches over to said automatic operation mode such that said central processing unit receives a correcting signal from said correcting device, modifies a corresponding retrieved control signal received from said memory based on the received correcting signal, and applies the modified

control signal to a control element associated with the modified control signal.

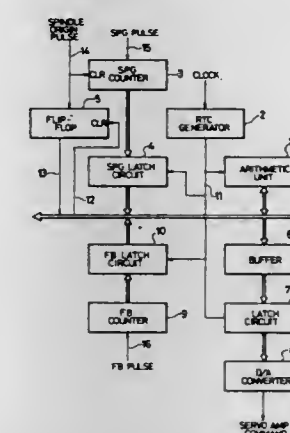
4,789,943

**THREAD CUTTING CONTROL METHOD**

Mamoru Yamanaka, and Masahiko Sugimura, both of Iruma,  
Japan, assignors to Yaskawa Electric Mfg. Co. Ltd., Kitakyu-  
shu, Japan

Filed Oct. 20, 1986, Ser. No. 921,340  
Claims priority, application Japan, Oct. 21, 1985, 60-233503  
Int. Cl.<sup>4</sup> G06F 15/46

U.S. Cl. 364—474.28 **4 Claims**



1. A thread cutting control method in an NC apparatus having a CPU in an arithmetic unit, whereby real time clocks which are generated for every constant time are received as an interruption signal and a sampling operation is performed in response to said interruption signal, thereby controlling a feed system of a machine tool having a thread cutting function, said control method comprising the steps of:

measuring the rotational speed of a spindle which is rotating asynchronously with said real time clocks;

measuring the rotational amount of the spindle from a predetermined position on the rotational position of the spindle

until the real time clock is just generated; and  
generating a feed command to command the feed system,

after the feed system has moved a predetermined distance from a predetermined position, such that the distance the feed system moves is constant to the position of the spin-

and a predetermined ratio is held between the feed speed of the feed system and the rotational speed of the spindle.

4,789,944  
DESIGN SUPPORT METHOD AND APPARATUS  
THEREFOR

**Yutaka Wada, Hitachi; Takashi Kiguchi, Mito; Yasuhiro Kobayashi, Katsuta, and Toru Mitsuwa, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

Filed Mar. 12, 1986, Ser. No. 838,957  
Claims priority, application Japan, Mar. 18, 1985, 60-53764  
Int. Cl.<sup>4</sup> G06F 15/006

**U.S. Cl. 364—488** **31 Claims**

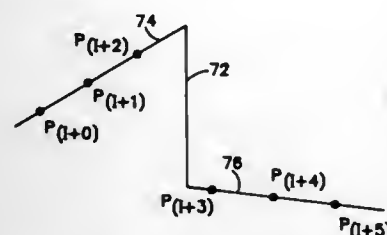
**14.** A design support apparatus comprising:  
a console panel for designating a design object;  
a first memory for storing therein design data;  
a second memory for storing therein design reference data;  
a third memory for storing therein a procedure for selecting design data from said first memory based on the design object entered from said console panel, generating first information for graphically representing a structure of said design object based on said selected design data,





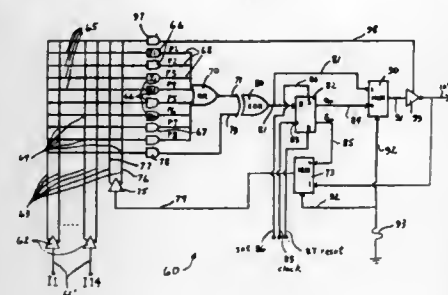
causing the printing of a number of text spaces which are equivalent to said number of graphic nulls divided by said character width.

**4,789,950**  
**PRE-INTERPOLATION ADAPTIVE FILTER**  
Charles L. Saxe, and Daniel E. Milliron, both of Beaverton, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.  
Filed Sep. 11, 1986, Ser. No. 907,282  
Int. Cl. G06F 15/20; G01R 29/02  
U.S. Cl. 364-577 9 Claims



1. In a digital oscilloscope having means for sampling an input signal and providing sample related values for presentation by graphic display, a method of altering said samples comprising:  
detecting a series of said samples that correspond to a rapid change in the value of said input signal,  
altering the values of ones of said samples to reduce said rapid change, and  
interpolating between said series of altered samples.

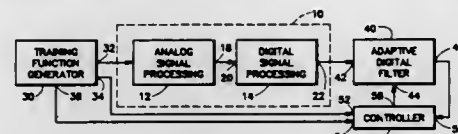
**4,789,951**  
**PROGRAMMABLE ARRAY LOGIC CELL**  
John M. Birkaer, Sunnyvale; Danesh M. Tavana, San Jose; Andrew K. Chan, Milpitas, and Sing Y. Wong, Sunnyvale, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.  
Filed May 16, 1986, Ser. No. 864,185  
Int. Cl. G06F 7/38; H03K 19/173  
U.S. Cl. 364-716 5 Claims



1. A programmable logic cell comprising:  
a plurality of logical AND gates, each gate having a plurality of input terminals and an output line;  
a plurality of cell input lines, selectively connectable to the input terminals of selected AND gates;  
a single logic OR gate having input terminals connected to selected AND gate output lines, and having an output line;  
a logical XOR gate having a first input terminal connected to the OR gate output line, having a second input terminal connected to an AND gate output line, and having an XOR output line on which the XOR gate provides a state signal;  
memory means to store the XOR output state signal;

a cell output line coupled to the OR gate output line for providing a cell output signal; and  
feedback means selectively connectable to apply the state signal to selected AND gate input terminals.

**4,789,952**  
**METHOD AND APPARATUS FOR DIGITAL COMPENSATION AND DIGITAL EQUALIZATION**  
Pei-hwa Lo, Ramsey, N.J., and Tran Thong, Beaverton, Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.  
Filed Dec. 29, 1986, Ser. No. 947,158  
Int. Cl. G06F 15/31  
U.S. Cl. 364-724.2 16 Claims

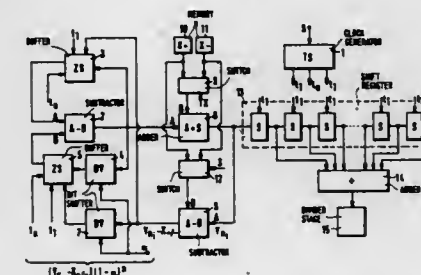


1. Time domain apparatus for compensating a digital output signal from a signal processing system, said apparatus having a training phase and an operational phase, said apparatus comprising:  
training function generator means for generating a training signal for coupling to the signal processing system and to a controller means, and a trigger signal responsive to the training signal both during said training phase;  
adaptive digital filter means to be coupled to receive the digital output signal from the signal processing system for producing the compensated digital output signal during both the training and operational phases according to control information received from said controller means during said training phase; and  
time domain controller means responsive to the training signal, the trigger signal and the compensated digital output signal for producing control information according to a time domain compensation criteria to couple multiplier coefficients to said adaptive digital filter means during said training phase, said control information being revised until said training signal and said compensated digital output signal are sufficiently similar one to the other to satisfy said compensation criteria.

**4,789,953**  
**CIRCUIT ARRANGEMENT FOR AVERAGING**  
Karl-Heinz Gerrath, Griesheim, Fed. Rep. of Germany, assignor to Battelle-Institut e.V., Frankfurt am Main, Fed. Rep. of Germany  
PCT No. PCT/EP85/00729, § 371 Date Sep. 4, 1986, § 102(e) Date Sep. 4, 1986, PCT Pub. No. WO86/05594, PCT Pub. Date Sep. 25, 1986  
PCT Filed Dec. 20, 1985, Ser. No. 912,606  
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1985, 3509762  
Int. Cl. G06F 15/36  
U.S. Cl. 364-724.01 5 Claims

1. Circuit arrangement for averaging with an input signal consisting of square-wave pulses with a maximum level, which is the signal level when a pulse is applied, and a minimum level, which is the signal level during the pulse gap, based on a discrete time and value filter, with a clock pulse generator (1) by which clock pulses ( $t_n$ ) are continuously generated according to a sampling rate and that at least one multiplier (7, 4) is placed upstream in a branch of a subtractor (2), which subtracts two signals from each other and generates an output signal, as well as an adder (8), which adds two signals and generates an output signal, as well as with at least one latch (3, 5), characterized in that the output signal of first subtractor (2) is carried, by a first latch (3), which delays this output signal by one clock pulse ( $t_n$ ) of clock pulse generator (1), to the one

input of the subtractor and by a first multiplier (4), which multiplies the output signal of first subtractor (2) by a factor, and by a latch (5), which delays the output signal of multiplier (4) by one clock pulse ( $t_n$ ) of clock pulse generator (1), and is carried to the other input of subtractor (2), in which this signal is subtracted from the output signal of first latch (3), and in that the output signal of first subtractor (2) is carried to the one input of adder (8), and in that signal values of different magnitudes from a first and a second additional latch (10, 11) are carried to the other input of adder (8) depending on input signal (X) and, with a selector module (9), the first signal value is further evaluated only if the maximum level is present at the input signal and the second signal is added if the minimum level is present at the input signal, and in that a second subtractor (6) is provided, to whose one input the output signal of adder (8) is carried and to whose other input, depending on input signal (X), the other signal in each case from additional latches (10,



11) is carried, and with selector module (12), the second signal value is carried further only if the maximum level is present at the input signal and the first signal value is added if the minimum level is present at the input signal, and output signal (B) of second selector module (12) is subtracted from the output signal of subtractor (6) and in that the output signal of second subtractor (6) is carried to first latch (3) and to second latch (5) by a second multiplier (7), and clock pulse generator (1) additionally generates, at each edge of input signal (X), a synchronous pulse ( $t_1$ ), and in that when the synchronous pulse is applied, the output signal of second subtractor (6) instead of the output signal of first subtractor (2) is accepted in second latch (3), and the output signal of second multiplier (7) instead of the output signal of first multiplier (4) is accepted in second latch (5), and the signal applied at the output of adder (8) represents a measurement for the variable average of the input signal.

**4,789,954**  
**METHOD FOR GENERATING QUADRATIC CURVE SIGNAL**  
Hideaki Iida, Fujisawa; Johji Mamiya, Kunitachi, and Yutaka Morimoto, Fujisawa, all of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed May 13, 1986, Ser. No. 862,901  
Claims priority, application Japan, May 14, 1985, 60/100672  
Int. Cl. G06F 1/02  
U.S. Cl. 364-720 7 Claims

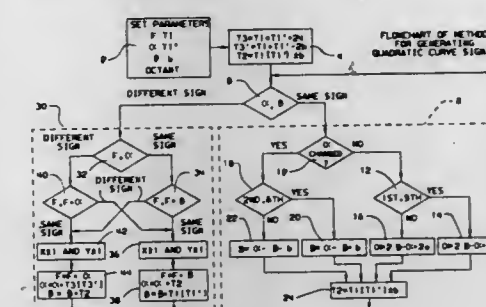
1. A method for generating signals representing a line approximate to a quadratic curve

$$F(x, y) = ax^2 + bxy + cy^2 + dx + ey + f = 0$$

by repeating a step selecting a new point close to  $F(x, y) = 0$  from among eight points  $(x+1, y+1)$ ,  $(x+1, y)$ ,  $(x+1, y-1)$ ,  $(x, y-1)$ ,  $(x-1, y-1)$ ,  $(x-1, y)$ ,  $(x-1, y+1)$  and  $(x, y+1)$  adjacent to a current point  $(x, y)$  in a Cartesian coordinates system, characterized in that said step selecting one of said eight points consists of a step selecting a new point close to  $F(x, y) = 0$  in only one of either the region of  $F(x, y) \geq 0$  or the

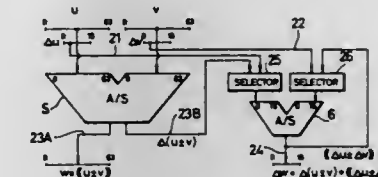
region  $F(x, y) < 0$ , said step selecting a new point close to  $F(x, y) = 0$  comprising:

an octant selecting step selecting one octant from among the first octant in which point  $(x+1, y+1)$  or  $(x+1, y)$  can be selected, the second octant in which point  $(x+1, y)$  or  $(x+1, y-1)$  can be selected, the third octant in which point  $(x+1, y-1)$  or  $(x, y-1)$  can be selected, the fourth octant in which point  $(x, y-1)$  or  $(x-1, y-1)$  can be



selected, the fifth octant in which point  $(x-1, y-1)$  or  $(x-1, y)$  can be selected, the sixth octant in which point  $(x-1, y)$  or  $(x-1, y+1)$  can be selected, the seventh octant in which point  $(x-1, y+1)$  or  $(x, y+1)$  can be selected, the eighth octant in which point  $(x, y+1)$  or  $(x+1, y+1)$  can be selected, and  
selecting a point close to  $F(x, y) = 0$  in either one region of  $F(x, y) \geq 0$  or  $F(x, y) < 0$  from two selectable points in the octant selected by said octant selecting step.

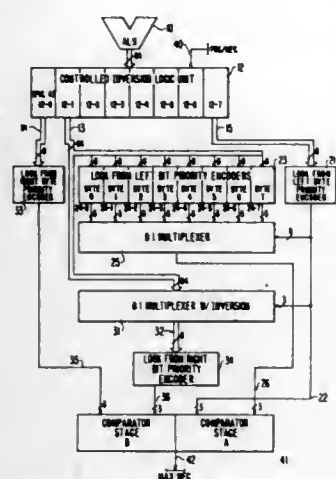
**4,789,955**  
**OPERATION UNIT WITH AN ERROR AMOUNT CALCULATING CIRCUIT FOR OUTPUT DATA THEREOF**  
Yukio Umetani, Hachioji, Japan, assignor to Hitachi, Ltd., Tokyo, Japan  
Filed May 7, 1986, Ser. No. 860,510  
Claims priority, application Japan, May 10, 1985, 60-97768  
Int. Cl. G06F 7/38  
U.S. Cl. 364-745 7 Claims



1. An operation unit comprising:  
first means for executing a first calculation for operand data of floating point indication inputted to generate arithmetic result data having a mantissa part of first bit length and arithmetic error data having a mantissa part of second bit length and indicating an error generated by said calculation; and  
second means connected with said first means for performing a second calculation on both said arithmetic error data and an input error data indicating an error accompanying said input operand data to calculate final error data accompanying said arithmetic result data.



**4,789,956**  
**MAXIMUM NEGATIVE NUMBER DETECTOR**  
 Eric A. Hildebrandt, Santa Clara, Calif., assignor to Harris Corp., Melbourne, Fla.  
 Filed Oct. 16, 1985, Ser. No. 788,054  
 Int. Cl. G06F 7/38  
 U.S. Cl. 364—736.5 35 Claims



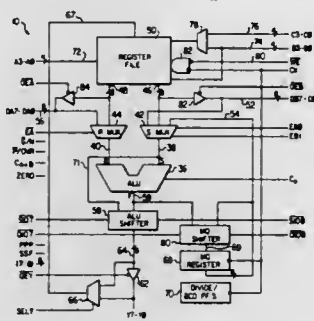
1. For use in a data processing apparatus wherein respective sequences of digital data signals representative of numerical values are to be subjected to prescribed arithmetic signal processing operations, an arrangement for analyzing said sequences of digital data signals to detect whether a sequence corresponds to a maximum negative number, wherein said maximum negative number is defined as a number having one or more of a first prescribed digital data signal, followed by one or more of a second prescribed digital data signal, comprising:

first means for examining the contents of a sequence of digital data signals to locate the first occurrence therein of a first prescribed digital data signal relative to one end of said sequence;  
 second means for examining the contents of said sequence of digital data signals to locate the first occurrence therein of a second prescribed digital data signal relative to the opposite end of said sequence; and  
 third means, coupled to said first and second means, for producing an output signal identifying said sequence as corresponding to a maximum negative number in response to the location in said sequence of said first occurrence of said first prescribed digital data signal having a prescribed relationship with respect to the location in said sequence of said first occurrence of said second prescribed digital data signal.

**4,789,957**  
**STATUS OUTPUT FOR A BIT SLICE ALU**  
 Jeffrey A. Niehaus, Dallas, and Jesse O. Engle, Plano, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.  
 Filed Mar. 28, 1986, Ser. No. 845,726  
 Int. Cl. G06F 7/38 12 Claims

1. An expandable bit slice processor comprising:  
 plurality of bit slice arithmetic logic units for processing data in accordance with one of a plurality of predetermined processing functions, each of said arithmetic logic units being n-bits in length;  
 means for cascading said bit slice arithmetic logic units to provide an expanded arithmetic logic unit nXm bits in length to provide processing for an expanded length word where m is the number of said cascaded bit slice arithmetic logic units;

first interface means for interfacing status information between said cascaded bit slice arithmetic logic units; and  
 second interface means for interfacing control information between said cascaded bit slice arithmetic logic units;  
 said first and second interface means operable to simultaneously interface control and status information, respectively;  
 each of said bit slice arithmetic logic units having:  
 status means for determining status information for the processed data in accordance with one of the predetermined processing functions by which the data is being processed and generating a status signal containing the status information;

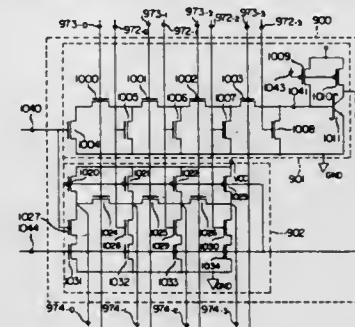


third interface means for interfacing said status information with said first interface means to transmit the predetermined status to all of said cascaded bit slice arithmetic logic units;  
 control means for determining control information for the processed data and generating a control signal containing the control information, said control information determined in accordance with a predetermined control logic function that is a function of one of the predetermined processing functions by which the data is processed; and  
 fourth interface means for interfacing the control signal with said second interface means such that the control signal is transmitted to all of the cascaded bit slice arithmetic units simultaneously with said status signal.

**4,789,958**  
**CARRY-LOOK-AHEAD ADDER INCLUDING BIPOLAR AND MOS TRANSISTORS**  
 Hideo Maejima, Takashi Hotta, Ikuro Masuda, Masahiro Iwamura, Kouzaburo Kurita, and Masahiro Ueno, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Feb. 19, 1985, Ser. No. 703,171  
 Claims priority, application Japan, Feb. 20, 1984, 59-31257; Jan. 11, 1985, 60-2020  
 Int. Cl. G06F 7/50 8 Claims

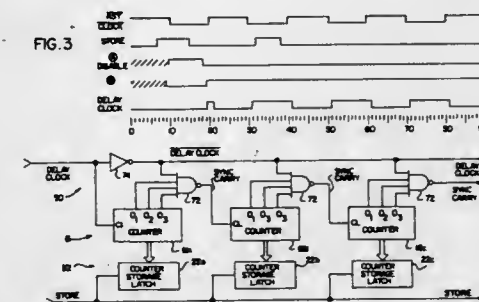
1. An arithmetic operation circuit comprising:  
 (i) first means for outputting an AND signal of corresponding bits of the plurality of digital signals to be subjected to an arithmetic operation;  
 (ii) second means for outputting an exclusive OR signal of corresponding bits of the plurality of digital signals to be subjected to an arithmetic operation; and  
 (iii) a carry propagation circuit including:  
 (a) an output node,  
 (b) first and second potential nodes,  
 (c) a bipolar transistor having its collector-emitter path connected between said output node and said first potential node,  
 (d) a first impedance element connected between said second potential node and a base electrode of said bipolar transistor, for forming a current path between said second potential node and said base electrode at least

during said arithmetic operation carried out by said arithmetic operation circuit,  
 (e) a second impedance element connected between said second potential node and said output node, for forming a current path between said second potential node and said output node at least during said arithmetic operation, and  
 (f) an FET circuit for controlling the on/off state of said bipolar transistor by controlling a formation of a current path between said second potential node and said first potential node, said FET circuit including:



a first FET having its gate electrode connected with an output of said first means,  
 a second FET having its gate electrode connected with an output of said second means, and  
 a third FET having its gate electrode connected with a carry-in input,  
 source-drain paths of said first, second and third FETs being connected between said first potential node and said base electrode of said bipolar transistor.

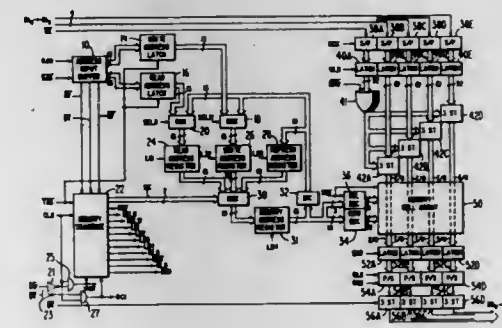
**4,789,959**  
**DELAY CIRCUIT FOR A REAL TIME CLOCK**  
 Chuan-Yung Hung, and Everett L. Bird, both of San Jose, Calif., assignors to Intel, Inc., Santa Clara, Calif.  
 Filed Mar. 5, 1985, Ser. No. 708,351  
 Int. Cl. G06F 1/04; G06M 3/12 8 Claims



3. A timing circuit comprising:  
 a source of regularly occurring input pulses to be counted;  
 a plurality of counters for counting said regularly occurring input pulses, each counter having a toggle input to which is applied a counting pulse and a counter output;  
 synchronization and clocking means interconnecting and operating said plurality of counters in series and coupling the counter output of each preceding counter to the toggle input of the next succeeding counter in the series;  
 read-out means coupled to said counters responsive to a read-out command for selectively reading out their contents;  
 control means responsive to said read-out command and to said regularly occurring input pulses for:

(a) normally applying said regularly occurring input pulses with little, if any, delay to the toggle input of the first counter of said counters connected in series in the absence of a read-out command; and  
 (b) delaying the application of said regularly occurring input pulses to the toggle input of said first counter when said read-out command is present; and  
 said synchronization and clocking means being responsive to selected counter outputs of each preceding counter and to a timing pulse derived from said control means for applying a counting pulse to the toggle input of the counter succeeding said preceding counter in synchronism with said derived timing pulse.

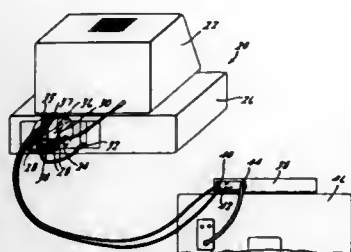
**4,789,960**  
**DUAL PORT VIDEO MEMORY SYSTEM HAVING SEMI-SYNCHRONOUS DATA INPUT AND DATA OUTPUT**  
 Donald H. Willis, Indianapolis, Ind., assignor to RCA Licensing Corporation, Princeton, N.J. and Hitachi Ltd., Tokyo, Japan  
 Filed Jan. 30, 1987, Ser. No. 8,729  
 Int. Cl. G11C 7/00; G06F 12/00 9 Claims



1. A digital data memory system realized as a single integrated circuit comprising:  
 block oriented data storage means wherein each block has a unique address and includes D data storage elements for storing D data values;  
 means for applying a system clock signal;  
 means for applying an output clock signal;  
 means for combining said system clock signal and said output clock gate signal to generate an output clock signal, wherein transitions in said output clock signal are synchronized to transitions in said system clock signal;  
 output buffer means, including:  
 data latching means, coupled to said data storage means for holding D data values provided by said data storage means; and  
 shift register means, having a parallel input port and a serial output port, for receiving said D data values, in parallel, from said data latching means synchronous with said output clock signal, and for providing said received D data values sequentially, in synchronism with D successive pulses of said output clock signal, via said serial output port; and  
 control means, coupled to said data storage means and to said output buffer means and responsive to said system clock signal for conditioning said data storage means to provide said D data values, in parallel to said data latching means.

# 4,789,961 COMPUTER MEMORY BACK-UP WITH AUTOMATIC TAPE POSITIONING

Robert J. Tindall, Romeo, Mich., assignor to Kirsch Technologies, Inc., St. Clair, Mich.  
Continuation-in-part of Ser. No. 624,034, Jun. 25, 1984, Pat. No. 4,652,944. This application Apr. 22, 1986, Ser. No. 855,010  
Int. Cl.<sup>4</sup> H04N 5/782; G06F 3/06, 5/00, 7/10  
U.S. Cl. 364—900 8 Claims



8. A method of using a computer system to retrieve information stored at a predetermined position on a tape in a tape storage device, the tape storage device having a tape drive mechanism for moving the tape to a plurality of positions and having a tape counter which is mechanically indexed by the tape drive mechanism as the tape is moved to indicate the relative tape position, the tape storage device further having an encoder responsive to the tape counter for providing a counter data signal indicative of the relative tape position, the tape storage device further having a remote control port for receiving command signals for controlling the tape drive mechanism, one of said command signals being for placing the tape storage device in a search mode and another of said command signals being for placing the tape storage device in a playback mode, comprising:

coupling said computer system to said tape storage device through said remote control port;  
causing the computer system to store said predetermined position in memory;  
causing the computer system to generate a search command signal and to communicate said search command signal through said remote control port to cause said tape drive mechanism to enter the search mode and to cause the mechanical indexing of said tape counter;  
causing said computer system to read said counter data signal through said remote control port and to determine from said counter data signal the relative position of said tape;  
causing said computer system to monitor said relative position and to compare said relative position with said predetermined position;  
in response to said comparison, causing said computer system to generate a playback command signal and to communicate said playback command signal through said remote control port to cause said tape drive mechanism to enter the playback mode, whereby said stored information may be retrieved.

# 4,789,962 METHODS OF DISPLAYING HELP INFORMATION NEAREST TO AN OPERATION POINT AT WHICH THE HELP INFORMATION IS REQUESTED

Richard E. Berry, Georgetown; Steven E. Johnson, and Thomas M. Ruiz, both of Austin, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.  
Continuation of Ser. No. 666,794, Oct. 31, 1984, abandoned.  
This application Jul. 30, 1987, Ser. No. 80,180  
Int. Cl.<sup>4</sup> G06F 3/14

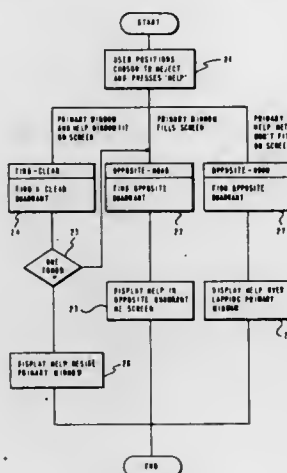
U.S. Cl. 364—900

5 Claims

1. In a keyboard/display computer system, a method of improving user friendliness in displaying help information to

said user of a keyboard/display computer system, said method comprising the steps of:

activating a help routine stored within said computer system to display help information related to an operation point at which said help routine is activated;  
searching for an unused portion of a display screen of said system;  
displaying help information related to said operation point,



in response to said step of searching wherein said unused portion was found, in a window within said unused portion nearest the operating point on said display screen so that existing information displayed on said screen is not overlapped or, alternately wherein said unused portion was not found, in said window on said display screen nearest said operating point wherein said help information is positioned over existing information displayed on said screen which is unrelated to said operating point.

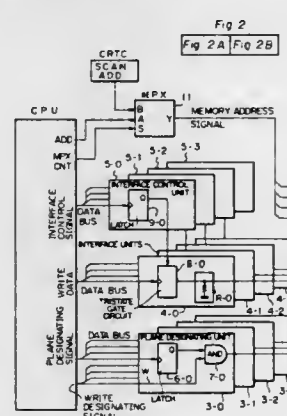
# 4,789,963 DISPLAY CONTROL APPARATUS FOR CONTROLLING TO WRITE IMAGE DATA TO A PLURALITY OF MEMORY PLANES

Hitoshi Takahashi, and Kiminori Fujisaku, both of Tokyo, Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
Continuation of Ser. No. 650,547, Sep. 14, 1984. This application Jan. 16, 1987, Ser. No. 63,754

Claims priority, application Japan, Sep. 21, 1983, 58-174486  
Int. Cl.<sup>4</sup> G06F 15/66

U.S. Cl. 364—900

9 Claims



1. An apparatus for controlling a plurality of memory planes

during a writing operation for a display control apparatus of a graphic system having a common data bus carrying data from a central processing unit producing a write designating signal and a plane designating signal, said apparatus comprising:

a plurality of memory planes for storing color image data using a single address signal transmitted from the central processing unit;  
a plurality of plane designating units, corresponding and connected to said memory planes, for selectively applying a write enable signal to all said memory planes in dependence on the write designating signal and the plane designating signal, each plane designating unit comprising gate means for receiving the plane designating signal and the write designating signal and when both the plane designating signal and the write designating signal are received said gate means outputs the write enable signal;  
a plurality of interface units, corresponding and connected to said memory planes and the common data bus, for selectively connecting said memory planes to the common data bus to write said color image data therein;  
a plurality of interface control units, corresponding and connected to said interface units, for controlling the turning on or off of the corresponding interface units;  
predetermined data means, connected to at least one memory plane disconnected from said common data bus, for applying, to the at least one memory plane disconnected from said common data bus, predetermined data which is inverted compared to said color image data written into said memory plane connected to said common data bus; and

the at least one memory plane connected to said common data bus and the at least one memory plane disconnected from said common data bus being set to a write enable state by the write enable signal transmitted from a corresponding plane designating unit and when said color image data from said common data bus is written into the at least one connected memory plane, the at least one memory plane disconnected from said common data bus having written therein simultaneously the predetermined data transmitted from said predetermined data means.

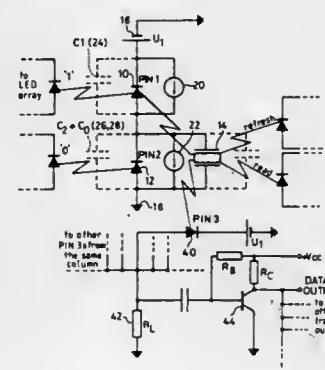
# 4,789,964 OPTOELECTRONIC DYNAMIC RANDOM ACCESS MEMORY SYSTEM

Goran Krilic, Pljesivicka 48, 41040 Zagreb, Yugoslavia  
Filed Jun. 4, 1986, Ser. No. 870,515  
Claims priority, application United Kingdom, Dec. 19, 1985, 8531347

U.S. Cl. 365—115

Int. Cl.<sup>4</sup> G11C 11/42

10 Claims



1. An optoelectronic dynamic random access memory device having a plurality of memory cells, each memory cell comprising a reversely biased first photodiode, a second photodiode so connected electrically with the first photodiode as to become subject to an increasing reverse bias when the first

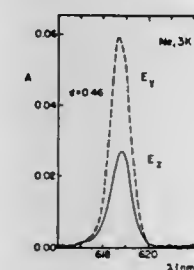
photodiode is optically addressed to cause photocurrent to flow at said first photodiode to reduce the reverse bias of said first photodiode, whereupon when the second photodiode is optically addressed a flow of photocurrent at the second photodiode will decrease the reverse bias at the second diode and permit restoration of reverse bias at the first photodiode, thereby to define logical '0' and '1' states dependently on the reversals of reverse bias, a light-transmitting optical switch electrically connected in circuit with at least one of said first and second photodiodes and which when optically read passes light principally in only one of the '0' and '1' states defined by the first and second photodiodes, and means defining an optical coupling between the optical switch and one of said first and second diodes, whereby the memory cell is optically refreshable in one of the two states without precluding reading by cyclically causing a light to pass at the optical switch and thereby be incident on said one of the first and second photodiodes to restore reverse bias lost at the other of said photodiodes due to decay.

# 4,789,965 METHODS AND COMPOSITIONS FOR RECORDING OPTICAL INFORMATION EMPLOYING MOLECULAR PSEUDOROTATION

Josef Michl, and Julimaz G. Radziszewski, both of Austin, Tex., assignors to The University of Utah, Salt Lake City, Utah  
Filed Oct. 31, 1986, Ser. No. 926,049  
Int. Cl.<sup>4</sup> G11C 13/00

U.S. Cl. 365—121

24 Claims

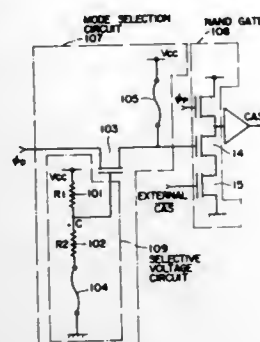


21. A method for recording optical information comprising the steps of:

- providing a solute-medium system comprising an effective quantity of solute molecules incorporated within a medium, wherein the solute molecules are capable of being selectively oriented by polarized light passed through the medium into a least two detectable configurations through the mechanism of generalized pseudorotation, and wherein said medium comprises a polymer which is sufficiently viscous with respect to the solute molecules to substantially prevent actual rotation of the solute molecules within the medium;
- directing a first quantity of polarized light into a selected location within the medium such that the solute molecules are oriented in a particular manner;
- directing a second quantity of light into the selected location within the medium;
- detecting the characteristics of the second quantity of light after it exists the medium in order to determine the orientation of the solute molecules within the selected location within the medium.



4,789,966  
**SEMICONDUCTOR MEMORY DEVICE WITH PAGE AND NIBBLE MODES**  
 Hideyuki Ozaki, Itami, Japan, assignor to Mitsubishi Denki Kabushiki, Hyogo, Japan  
 Filed Nov. 24, 1986, Ser. No. 933,806  
 Claims priority, application Japan, Dec. 11, 1985, 60-278509  
 Int. Cl. G11C 7/00, 11/40, 8/00  
 U.S. Cl. 365—189 5 Claims

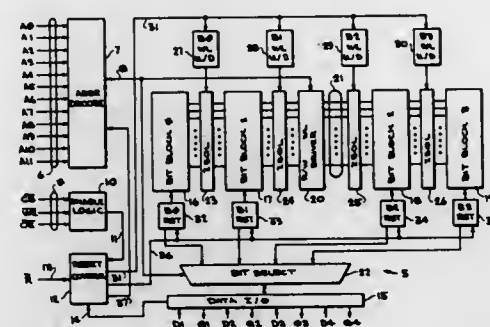


1. A semiconductor memory device comprising:
  - a memory cell array, comprising memory cells arranged in rows and columns to form a matrix;
  - array control means for controlling the memory cell array and being operable in a page mode or a nibble mode, said array control means comprising
  - a first CAS buffer circuit responsive to an external CAS signal for producing an internal CAS signal in synchronism with the external CAS signal, and
  - a second CAS buffer circuit which comprises a mode selection means for selective connection for operation in the page mode or the nibble mode, and a NAND gate for receiving the output of the mode selection means and the external CAS signal to produce an internal CAS signal; and
  - said mode selection means comprising:
    - a selective voltage circuit comprising a first fuse, connected to produce a ground potential when the first fuse is unblown and producing a power source voltage (Vcc) when the first fuse is blown, and
    - a MOS transistor receiving, at its gate, the output of said selective voltage circuit and having its drain connected to receive a first signal ( $\phi D$ ) related to the internal CAS signal, and its source connected through a second fuse to the power source (Vcc),
    - the source of the MOS transistor forming the output of the mode selection circuit.

4,789,967  
**RANDOM ACCESS MEMORY DEVICE WITH BLOCK RESET**  
 Jinn-Yan Liou, San Jose; May-Lin Lee, Cupertino; Moon S. Kok, Milpitas; James Ya, San Jose, and Aloysius T. Tam, Sunnyvale, all of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.  
 Filed Sep. 16, 1986, Ser. No. 908,072  
 Int. Cl. G11C 7/00  
 U.S. Cl. 365—189 20 Claims

1. An apparatus for storing data for read and write access receiving reset control signals identifying at least one block for reset, comprising:
  - a plurality of storage blocks, each block including an array of memory units for storing a unit of data;
  - reset control means, coupled to receive the reset control

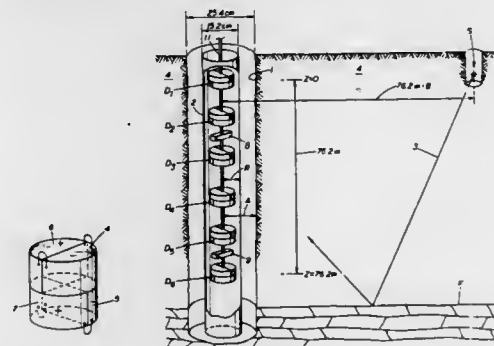
signals, for generating a block reset signal for the at least one block identified by the reset control signals; and



means, coupled to the memory units in each block and to receive the block reset signal, for resetting memory units in the at least one identified block to a reset value.

4,789,968  
**METHOD AND SYSTEM FOR SEISMIC EXPLORATION EMPLOYING A DUAL-DIPOLE HYDROPHONE STREAMER**

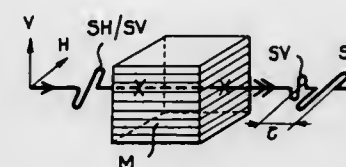
James A. Rice, Houston, Tex., assignor to Exxon Production Research Company, Houston, Tex.  
 Filed Apr. 24, 1987, Ser. No. 42,194  
 Int. Cl. G01V 1/40, 1/38  
 U.S. Cl. 367—20 18 Claims



1. A seismic exploration method employing a streamer having a longitudinal axis and including at least one pair of dipole hydrophones; each of the dipole hydrophones in the pair having an axis and a sensitivity to wave energy that is a function of the angle of incidence of the wave on the dipole hydrophone with respect to the axis, including the steps of:

- (a) orienting the dipole hydrophones in the at least one pair so that the axes of the dipole hydrophones are perpendicular to the longitudinal axis of the streamer and oriented at an angle with respect to each other;
- (b) generating a seismic wave that will propagate in a subterranean formation;
- (c) detecting at each of the dipole hydrophones in the at least one pair of dipole hydrophones, a signal corresponding to energy in the wave that has reflected from a reflector in the formation; and
- (d) determining the detected wave energy's incidence angle is a plane perpendicular to the streamer's longitudinal axis from the signals detected at each of the dipole hydrophones and the angle at which the axes of the dipole hydrophones are oriented.

4,789,969  
**METHOD OF MEASURING THE ANISOTROPY OF PROPAGATION OR REFLECTION OF A TRANSVERSE WAVE, PARTICULARLY A METHOD OF GEOPHYSICAL PROSPECTING BY MEASUREMENT OF THE ANISOTROPY OF PROPAGATION OR OF REFLECTION OF SHEAR WAVES IN ROCKS**  
 Charles Naville, Massy, France, assignor to Compagnie Generale de Geophysique, Massy, France  
 Filed Jun. 2, 1987, Ser. No. 57,279  
 Claims priority, application France, Jun. 3, 1986, 86 07964  
 Int. Cl. G01V 1/00  
 U.S. Cl. 367—36 7 Claims



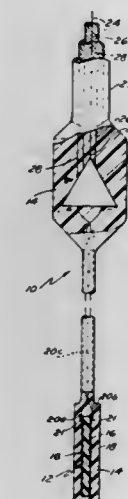
1. A method of measuring anisotropy of propagation of a transverse wave between two given reference points of a non-isotropic medium to be studied, particularly a method of geophysical prospecting by measurement of anisotropy of propagation of shear waves in rocks, wherein: a source and two detectors are arranged along a ray vector, said detectors being positioned at said respective points of reference, said source is excited by an excitation signal producing a transverse wave in said medium, respective resultant measurement signals produced by each of said detectors are received, from said excitation signal and said measurement signals, a transfer function for said medium along each of said two respective source-detector paths is determined, a differential transfer function of said medium is deduced between said two points of reference.

4,789,970  
**METHOD AND DEVICE FOR POSITIONING AN ELEMENT USING ULTRASONIC SENSORS**  
 Emile Levallois, Courbevoie, France, assignor to Institut Français du Pétrole, Malmaison, France  
 Filed Dec. 30, 1986, Ser. No. 947,753  
 Claims priority, application France, Dec. 30, 1985, 85 19462  
 Int. Cl. G01S 9/68  
 U.S. Cl. 367—104 7 Claims



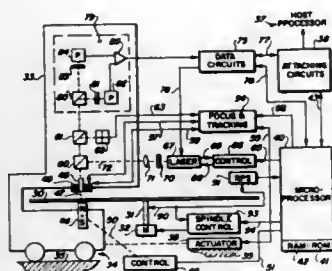
1. A drill setting guide used for drilling holes in a bone to which an associated bone fastening plate can be secured, comprising a body having a set of bushings, said bushings being provided with suitable blade edges in the portions which are adapted to contact the bone, the improvements which are characterized in that the drill bushings are mounted in the guide body and in that there are securing nuts threaded on said bushings in such a way that said nuts are situated close to the guide body.

4,789,971  
**BROADBAND, ACOUSTICALLY TRANSPARENT, NONRESONANT PVDF HYDROPHONE**  
 James M. Powers, Norwich; Mark B. Moffett, Waterford, both of Conn., and John C. McGrath, Surbiton, England, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.  
 Filed Apr. 7, 1986, Ser. No. 855,643  
 Int. Cl. H04R 17/00  
 U.S. Cl. 367—152 12 Claims



1. A hydrophone assembly comprising:
  - voided piezoelectric polymer sensing element means, having a characteristic acoustic impedance ( $\rho c$ ) selected to match that of sea water and a sensitivity based upon a preselected element means thickness, for producing electrical signals proportional to acoustic pressure waves impinging thereon;
  - a first electrical transmission means, the proximal end thereof being conductively attached to said sensing element means, for receiving and transmitting said electrical signals;
  - preamplifier means, attached to the distal end of said electrical transmission means, for receiving and amplifying said electrical signals from said electrical transmission means;
  - a second electrical transmission means, the proximal end thereof being conductively attached to said preamplifier means, for receiving said amplified signals from said preamplifier means and transmitting said amplifier signals to the distal end thereof; and
  - an elastomer window material, having an acoustic impedance ( $\rho c$ ) matching that of sea water and also matching said impedance of said sensing element means, said window material being potted under vacuum over said sensing element means, said first and second electrical transmission means, and said preamplifier means, for forming a waterproof covering for said hydrophone assembly which is at least acoustically transparent over said sensing element;
- whereby said  $\rho c$  voided sensing element means, in combination with said  $\rho c$  elastomer window, form an acoustically transparent, non-resonant hydrophone assembly having a flat frequency response at frequencies  $< 1$  MHz.

**4,789,972**  
**SELECTIVELY CONTROLLING THE ERASURE IN A MAGNETO-OPTIC RECORDING MEDIUM**  
 David M. Oldham, Tucson, Ariz., assignor to International Business Machines Corporation, Armonk, N.Y.  
 Filed Dec. 22, 1986, Ser. No. 944,407  
 Int. Cl. G11B 11/12, 13/04  
 U.S. Cl. 369—13 15 Claims



1. In a data recorder adapted to record information-bearing signals onto a magnetic record member along record tracks and to sense signals recorded on the magnetic record member along said record tracks;

the improvement including, in combination:

magnetic biasing means for supplying a magnetic field to a magnetic record member in the data recorder said magnetic field identifies one of two recording directions, and said magnetic biasing means including means to alternate the recording directions with one of said recording directions being an erasure direction and the second one of said directions being a data-indicating direction; indication means operatively coupled to said magnetic biasing means for indicating the recording directions for predetermined portions of said magnetic record member; direction means operatively coupled to said indication means for sensing said magnetic field direction for indicating said recording directions at said predetermined portions respectively;

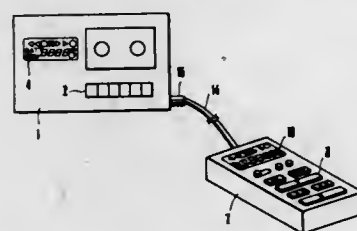
erasure control means connected to said direction means for indicating a magnetic erasure direction being the same as said indicated recording direction irrespective if one of the recording directions is for erasure or for data-indicating direction and the data-indicating direction being reversed from said indicated recording direction; and data channel means connected to said erasure means and being operatively coupled to said magnetic record member for recording and reading information-bearing signals on to and from said magnetic record member in accordance with said erasure means indication such that the erasure and recording directions on said magnetic record member alternate on said magnetic record member between said predetermined portions.

**4,789,973**  
**RECORDING/REPRODUCING APPARATUS WITH DUAL DISPLAY CAPABILITY**  
 Toshiaki Mabuchi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
 Filed Aug. 20, 1986, Ser. No. 898,324  
 Claims priority, application Japan, Aug. 22, 1985, 60-184596[U]; Aug. 22, 1985, 60-128317[U]  
 Int. Cl. G11B 31/00 16 Claims

1. A recording or reproducing system for recording information on a recording medium or for reproducing information from a recording medium on which said information is recorded, comprising:

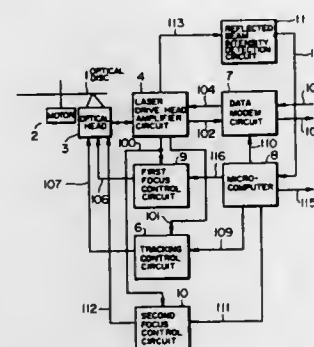
(a) recording or reproducing means for recording means for recording information on a recording medium or for

reproducing information from a recording medium on which said information is recorded;  
 (b) operation control means for controlling the operation of said recording or reproducing means; a first unit having  
 (c) first instruction means for instructing said operation control means to perform a control operation; and  
 (d) first display means for making a display corresponding to a state of operation performed by said recording or reproducing means according to the instruction of said first instruction means; a second unit for electrical connection to and disconnection from said first unit, said second unit having  
 (e) second instruction means for instructing said operation control means to perform a control operation; and



(f) second display means for making a display corresponding to a state of operation performed by said recording or reproducing means according to the instruction of said second instruction means; said system further including  
 (g) sensing means for sensing connection or disconnection of said first and second units; and  
 (h) display control means operably responsive to said sensing means for controlling at least said second display means to present a display corresponding to the operating state of said recording or reproducing means corresponding to the instruction of said second instruction means when said sensing means senses connection of said first and second unit.

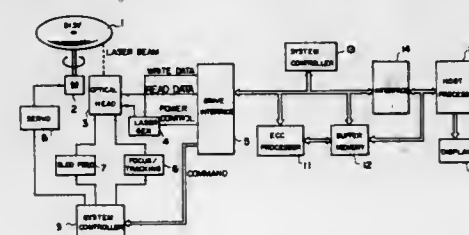
**4,789,974**  
**OPTICAL INFORMATION RECORDING/REPRODUCING APPARATUS**  
 Isao Satoh, Neyagawa; Yuzuru Kuroki, Toyonaka; Makoto Ichinose, Sakai, and Katsumi Mural, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Sep. 10, 1987, Ser. No. 94,899  
 Claims priority, application Japan, Sep. 16, 1986, 61-217425; Sep. 16, 1986, 61-217426; Sep. 26, 1986, 61-229005  
 Int. Cl. G11B 7/00, 5/09; G01J 1/20  
 U.S. Cl. 369—45 10 Claims



1. An optical information recording/reproducing apparatus comprising:

optical means for converging laser beams from a laser light source on an optical disc formed with guide tracks;  
 first focus control means for focusing a laser beam on a guide track on said optical disc;  
 second focus control means for focusing the laser beam on a surface of a substrate of said optical disc; and  
 reflected beam intensity detection means for detecting intensity of reflection of the laser beam which is focused on the surface of said optical disc substrate, said reflected beam detection means producing an output signal having a level which is representative of detection of contaminants on the surface of said optical disc.

**4,789,975**  
**APPARATUS FOR RECORDING AND/OR REPRODUCING DATA SIGNAL ON OR FROM DISK SHAPED RECORDING MEDIUM AT A VARIABLY SELECTED CONSTANT LINEAR VELOCITY**  
 Seiro Tanlyama, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan  
 Continuation of Ser. No. 785,676, Oct. 9, 1985, abandoned. This application Jun. 16, 1987, Ser. No. 60,971  
 Claims priority, application Japan, Oct. 17, 1984, 59-218142  
 Int. Cl. G11B 17/00, 19/24  
 U.S. Cl. 369—50 3 Claims

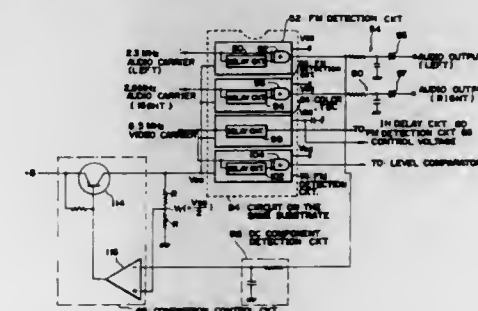


1. In an apparatus for recording and/or reproducing a data signal on or from a disc shaped recording medium having substantially spiral successive tracks arranged in series and in each of which a respective plurality of sectors are formed, said sectors having recorded therein respective address codes numbered in series from one to the other end of said series of successive tracks, said disc shaped recording medium including a special track in which at least control information is recorded indicative of a desired constant linear velocity of said recording medium during reproduction of said data signal within a CLV recording area on said recording medium and used for controlling the rotation of said recording medium in a CLV reproducing mode of said apparatus, said desired constant linear velocity being one of a plurality of values within a predetermined range, said control information recorded in said special track including a parameter indicating the inclination of the increase of the number of sectors from one to another of said successive tracks, said apparatus comprising:

a recording and/or reproducing head;  
 means for initially reproducing the control information from said special track on said recording medium;  
 memory means;  
 means for writing the initially reproduced control information in said memory means;  
 means operative in a reproducing mode of the apparatus for reading said control information which has been written in said memory means;  
 means for separating from the signal reproduced by said head the address code associated with each of said sectors scanned by said head;  
 control signal generating means supplied with the control information read from said memory means and the separated address code for generating a control signal based on said control information and said address code, and including an arithmetic unit for generating reference frequency information from each separated address code and

said parameter in the control information read from said memory means; and  
 rotation control circuit means supplied with said control signal for controlling the rotation of said recording medium while in said CLV reproducing mode such that the linear velocity of the rotation of said recording medium is maintained at said desired constant value indicated by said control information, said recording medium thereby being controllable to any one of said plurality of values in response to the particular control information recorded on that particular recording medium.

**4,789,976**  
**TEMPERATURE COMPENSATION CIRCUIT FOR A DELAY CIRCUIT UTILIZED IN AN FM DETECTOR**  
 Masakazu Fujishima, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan  
 Filed Mar. 25, 1987, Ser. No. 30,159  
 Claims priority, application Japan, Mar. 31, 1986, 61-47499[U]  
 Int. Cl. H03K 7/14; G11B 7/00  
 U.S. Cl. 369—54 5 Claims



1. A temperature compensation circuit for a delay circuit comprising:  
 a delay circuit which is used as a phase-shifter in a pulse FM detection circuit and whose delay time changes depending upon temperature and can be controlled in response to a control signal;  
 a dc component detection circuit for detecting a dc component in an output of said pulse FM detection circuit; and  
 comparison control means for comparing the dc component detected by said dc component detection circuit with a predetermined reference value for controlling delay time of said delay circuit with a comparison output of the comparison control means and thereby compensating a temperature characteristic of the delay time of said delay circuit.

**4,789,977**  
**OPTICAL DATA RECORDING DEVICE**  
 Adrianus H. Oudenhuysen, Colorado Springs, Colo., and Wal-Hon Lee, Cupertino, Calif., assignors to Laser Magnetic Storage International Company, Colorado Springs, Colo.  
 Filed Nov. 6, 1986, Ser. No. 927,924  
 Int. Cl. G11B 7/135; G02B 5/32  
 U.S. Cl. 369—109 8 Claims

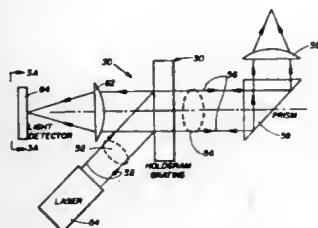
1. Light production and modification apparatus usable in an optical data recording device having a recording medium comprising:

a laser light source for producing a collimated light beam having a first cross-sectional beam shape;  
 first beam diffraction means positioned for receiving said collimated light beam from said laser light source and for diffracting said collimated light beam, said first means having a single planar holographic grating, said single planar holographic grating being operative to diffract said



collimated light beam to produce a diffracted light beam having a second cross-sectional beam shape wherein said second cross-sectional beam shape is different from said first cross-sectional beam shape;

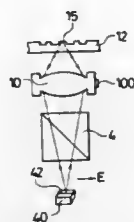
second means, positioned to receive said diffracted light beam, for directing said diffracted light beam towards the recording medium for reflection therefrom to provide a reflected light beam, said second means being operative to change the polarization of at least one of said diffracted



light beam and said reflected light beam, said reflected light beam impinging on said first means, and wherein said reflected light beam passes through said first means substantially perpendicular to the plane of said single planar holographic grating and substantially without change in direction during said passage;

focusing means disposed between said second means and the recording medium for focusing said diffracted light beam on the recording medium.

**4,789,978**  
**SYSTEM AND METHOD OF ASTIGMATISM CORRECTION IN AN OPTICAL HEAD APPARATUS**  
 Shinsuke Shikama, and Eiichi Toide, both of Nagakakyō, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan  
 Filed Nov. 24, 1986, Ser. No. 933,805  
 Claims priority, application Japan, Dec. 4, 1985, 60-274024  
 Int. Cl.<sup>4</sup> G11B 7/125  
 U.S. Cl. 369-112 17 Claims

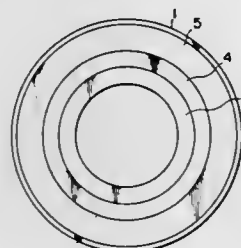


1. A method of producing an optical head apparatus of the type having a laser light source device emitting a linearly polarized light beam, and a converging lens for converging the light beam from the laser light source onto information recording tracks on a recording medium, said method comprising the steps of:

molding a plastic material, to form said converging lens whereby the astigmatism of the converging lens against the linearly polarized light beam varies with the rotation of the converging lens about the optical axis; and

adjusting the rotary position of the converging lens about the optical axis of the converging lens to minimize the astigmatism of the light beam as converged onto said recording medium.

**4,789,979**  
**OPTICAL DISK EXCLUSIVELY USED FOR REPRODUCTION WHEREIN GUIDE GROOVES LOCATED BETWEEN DATA MANAGING INFORMATION AND DATA RECORDING REGIONS HAVE NO TRACK ADDRESS SECTIONS**  
 Shigehiko Hiraoka, Toyomasa, Makoto Ichinose, Sakai, Isao Satoh, Neyagawa, and Tatsuo Sugimura, Fukuoka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Continuation of Ser. No. 739,320, May 30, 1985, abandoned.  
 This application Jan. 5, 1988, Ser. No. 143,261  
 Claims priority, application Japan, Jun. 1, 1984, 59-113294; Jun. 1, 1984, 59-113308; Jun. 5, 1984, 59-115002  
 Int. Cl.<sup>4</sup> G11B 7/013  
 U.S. Cl. 369-275 2 Claims



1. An optical disc, exclusively used for reproduction, having inner and outer peripheries, comprising optically detectable guide groove tracks having numbered addresses formed in the shape of concave and convex elements, the numbers of said addresses increasing successively in one direction, said guide groove tracks being adapted to include thereon data regions and data managing information regions, either one of said data regions and said data managing information regions being arranged in the same direction as that of the direction in which the numbers of said addresses increase, from one of said outer and inner peripheries of said optical disc, the other one of said data regions and said data managing information regions being arranged in the direction which is the reverse of the direction in which the numbers of said addresses increase, from the other one of said outer and inner peripheries, and having a middle region between said data regions and said data managing information regions, said middle region having guide groove tracks which include no data and no addresses.

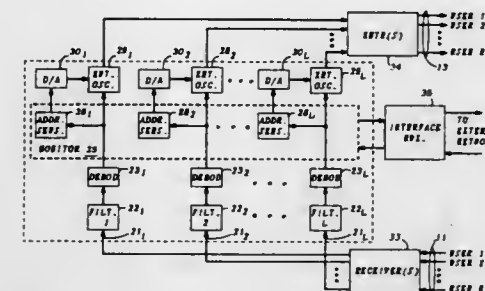
**4,789,980**  
**SWITCHING TECHNIQUES FOR FDM COMMUNICATION SYSTEMS**  
 Thomas E. Darcie, Hazlet, and Michael J. Gans, Monmouth Beach, both of N.J., assignors to American Telephone & Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.  
 Filed Aug. 18, 1986, Ser. No. 897,341  
 Int. Cl.<sup>4</sup> H04Q 11/02  
 U.S. Cl. 370-57 21 Claims

1. An arrangement for Frequency Division Multiplexed (FDM) switching of information signals in a communication system comprising N users wherein each user is assigned to receive information signals destined for that user over a separate one of N receive channels and to transmit information signals over a separate one of L transmit channels, where  $L \leq N$ , the switching arrangement comprising:

means for receiving up to a plurality of L concurrent multiplexed information signals from a corresponding plurality of up to L active system users and for directing each of the up to L concurrently received information signals to a separate one of L output terminals, each information signal including a destination user's address which is different for each system user;

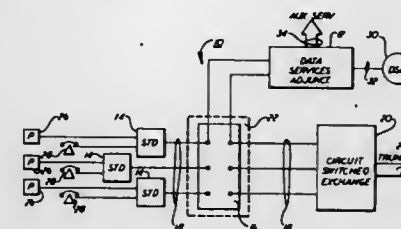
a plurality of L fixed paths for propagating up to L concurrent information signals through the switching arrangement, each path being connected to a separate one of the output terminals of the receiving and directing means and including;

means responsive to the signal information propagating on the path for (a) detecting the destination user's address included in the information signal propagating on the path



and (b) generating a separate control signal representative of the detected destination user's address, and transmitting means responsive to the control signal from the detecting and generating means for converting the information signal propagating on the path to the FDM receive channel assigned to the destined user as indicated by the destination user's address detected in the information signal on that path for subsequent transmission of the signal to the destined user.

**4,789,981**  
**SYSTEM FOR PROVIDING DATA SERVICES TO A CIRCUIT SWITCHED EXCHANGE**  
 John A. Yanczy, Jr., Stratford; Jitender K. Vij, Trumbull, and Santana Das, Shelton, all of Conn., assignors to Alcatel N.V., Amsterdam, Netherlands  
 Continuation of Ser. No. 705,462, Feb. 25, 1985, abandoned.  
 This application Nov. 16, 1987, Ser. No. 122,497  
 Int. Cl.<sup>4</sup> H04Q 11/04  
 U.S. Cl. 370-58 16 Claims



1. A system for providing data services to subscribers of an existing circuit switched exchange having at least one existing voice communication path, said system comprising:

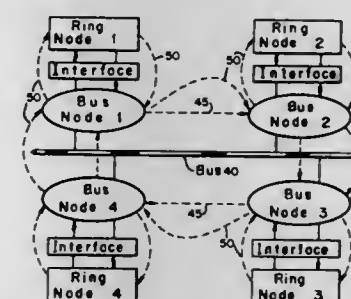
means for interfacing both voice and data subscriber peripherals to said existing voice communication path;

means for communicating voice and data information, said means including means for receiving and separating voice and data information, a data information path, connected to said means for receiving and separating voice and data, for communicating data information, a voice information path, separate from said data information path and connected to said means for receiving and separating voice and data information, for communicating voice information, means for interfacing said data information path to a data switching network, and means for interfacing said voice information path to a voice communication path; and

connector means, serially connected in said existing voice

communication path, for connecting a portion of the existing voice communication path connected to said means for interfacing both voice and data subscriber peripherals to said means for receiving voice and data information and for connecting said voice communication path to a portion of the existing voice communication path connected to said existing circuit switched exchange, whereby said means for communicating voice and data information receives voice and data information from said means for interfacing both voice and data subscriber peripherals via said existing voice communication path and provides voice information to said existing circuit switched exchange via said existing voice communication path.

**4,789,982**  
**METHOD FOR IMPLEMENTING A TOKEN PASSING RING NETWORK ON A BUS NETWORK**  
 Michael H. Coden, New York, N.Y., assignor to Codenoll Technology Corporation, Yonkers, N.Y.  
 Filed Jan. 27, 1986, Ser. No. 823,155  
 Int. Cl.<sup>4</sup> H04J 3/26  
 U.S. Cl. 370-85 1 Claim



1. A method of implementing a token passing ring network on a bus network wherein a plurality of bus nodes are interconnected by a bus and one of a plurality of ring nodes is selected to transmit by passing a token from ring node to ring node, said method comprising the steps of:

connecting a token ring node to each one of a plurality of bus nodes such that the token ring node appears to the bus node as terminal equipment and the bus node appears to the ring node as both the next token ring node and the preceding token ring node in a ring network,

transmitting a token ring frame from a token ring node to a bus node to which the ring node is connected,

encapsulating the token ring frame received at the bus node in a bus frame,

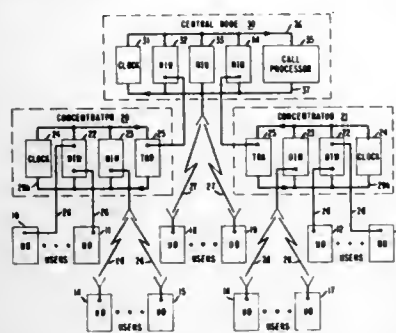
transmitting the bus frame including the encapsulated token ring frame to a destination bus node, and

transmitting the ring frame received in the encapsulated bus frame at the destination bus node to a ring node connected to the destination bus node.

**4,789,983**  
**WIRELESS NETWORK FOR WIDEBAND INDOOR COMMUNICATIONS**  
 Anthony Acampora, Freehold, and Jack H. Winters, Middletown, both of N.J., assignors to American Telephone and Telegraph Co., AT&T Bell Laboratories, Murray Hill, N.J.  
 Filed Mar. 5, 1987, Ser. No. 22,255  
 Int. Cl.<sup>4</sup> H04J 3/14  
 U.S. Cl. 370-96 10 Claims

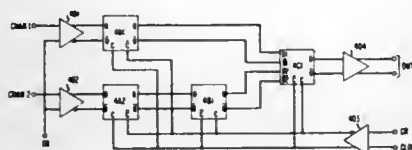
1. A wideband packet communication network comprising: a plurality of transmitters (10-19), each transmitter being associated with a separate user or group of users of the network for transmitting packets of information between an active user or group of users and the network via either

one of a hard-wired or wireless connection during a frame period; and  
 a central node (30) for communicating with each of the plurality of transmitters via the hard-wired or wireless connection, the central node comprising:  
 processor means (35) for (a) determining packet transmission requirements associated with each transmitter communicating with the central node via a wireless connection during a first subperiod of each frame period, (b) causing each wireless transmitter determined to have a packet transmission requirement, to transmit its packets of information during a separate second subperiod of time of each



frame period, (c) detecting during the first and/or second subperiods of each frame period, transmission impairments associated with each wireless transmitter, and (d) causing packets of information transmitted from each transmitter determined to have a transmission impairment to be transmitted at a transmission rate sufficient to lessen the determined transmission impairment, and  
 means (32-34) for (a) receiving packets of information from the plurality of transmitters of the network, and (b) re-transmitting the packets to receivers associated with the destined users of the packets of information via an appropriate hard-wired or wireless connection.

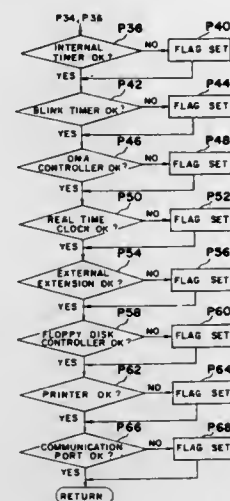
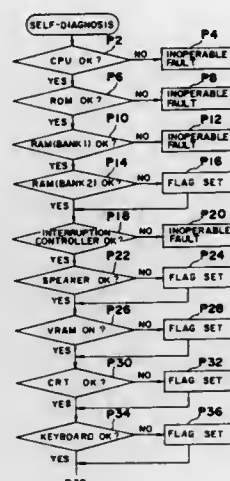
**4,789,984**  
**HIGH-SPEED MULTIPLEXER CIRCUIT**  
 Robert G. Swartz, Tinton Falls, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.  
 Filed Oct. 16, 1987, Ser. No. 109,122  
 Int. Cl. H04J 3/02  
 U.S. Cl. 370-112 13 Claims



1. A high output data rate M:1 multiplexer apparatus, where M is an even integer equal to or greater than four, said multiplexer apparatus comprising  
 means for generating M select signals from multiple phases of a select clock having a frequency which is 2/M of the frequency of a system clock, said system clock signal frequency being equal to one-half of the multiplexer output data rate,  
 a front-end multiplexer for multiplexing M input signals into two intermediate outputs, each of said M inputs selected for one of said intermediate outputs using a different combination of one or more of said select signals and phases of said system clock, and  
 a rear-end multiplexer connected to said two intermediate

outputs for providing a multiplexer apparatus output when clocked using said system clock.

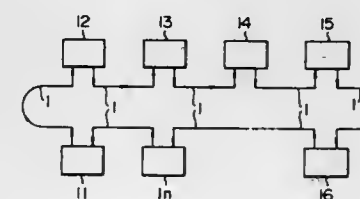
**4,789,985**  
**DOCUMENT PROCESSING APPARATUS HAVING FAULT DETECTION CAPABILITIES**  
 Kimiharu Akahoshi, Sakai, and Mikio Masui, Suita, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
 Filed Apr. 11, 1986, Ser. No. 850,931  
 Claims priority, application Japan, Apr. 16, 1985, 60-81915  
 Int. Cl. G06F 11/16  
 U.S. Cl. 371-11 5 Claims



1. In a document processing apparatus having:  
 a plurality of kinds of input resources for inputting data;  
 data processing means for processing data input through said input resources to correct, edit and/or to store the processed data in a storing means;  
 a plurality of kinds of output resources which are operable for outputting data by way of a display, a printer or a sound generation, in accordance with the processed data by said data processing means; and  
 control means for controlling said plurality of kinds of input and output resources and said data processing means to have a predetermined relationship to each other to enable a plurality of predetermined task modes;  
 the improvement which comprises:

diagnostic means for testing and determining whether or not each of said plurality of kinds of input and output resources is available;  
 detecting means for detecting, when said diagnostic means determines that one of said plurality of kinds of input and output resources is unavailable, whether or not any one of said plurality of kinds of input and output resources can substantially respond in an acceptable mode for said one resource which is unavailable; and  
 said control means, when said detecting means detects that the substitute source may respond in place of the unavailable resource, for selectively setting the task mode with the use of said substitute source to permit the document processing operation.

**4,789,986**  
**METHOD FOR CHECKING CONSISTENCY OF DISTRIBUTED DATA**  
 Minoru Koizumi; Kinji Mori, both of Yokohama; Yasuo Suzuki, Ebina; Katsumi Kawano, Fuchu; Masayuki Orimo, Machida; Hirokazu Kasashima, Hitachi, and Kozo Nakai, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Aug. 11, 1986, Ser. No. 895,218  
 Claims priority, application Japan, Aug. 28, 1985, 60-189158  
 Int. Cl. G06F 11/00  
 U.S. Cl. 371-67 6 Claims

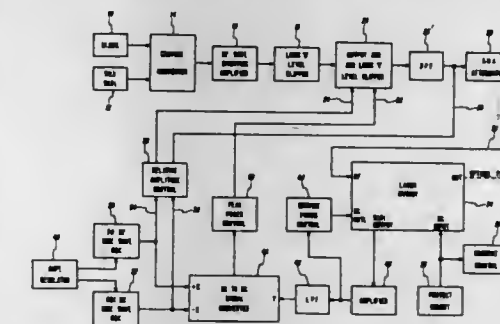


1. A method for editing information which is distributedly stored in memories of a plurality of devices connected to a common data transmission path, comprising the steps of:  
 transmitting messages including edited information from a plurality of said devices to said common transmission path;  
 collecting in at least one of said devices said messages transmitted from said plurality of devices;  
 comparing in said at least one of said devices, data located at specific positions in said collected messages;  
 selecting a correct message from said collected messages based on a result of the comparison;  
 wherein said correct messages include messages which are not redundant.

**4,789,987**  
**AUTOMATIC MODULATION CONTROL APPARATUS**  
 George D. Fraser, Richardson, Tex., assignor to Rockwell International Corporation, El Segundo, Calif.  
 Filed Jul. 1, 1987, Ser. No. 68,981  
 Int. Cl. H01S 3/13 5 Claims

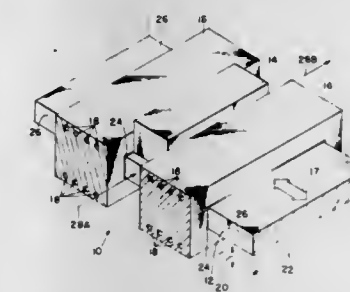
U.S. Cl. 372-31 5 Claims  
 5. Apparatus for automatically controlling the AC (alternating current) and DC (direct current) drive signals used in a laser diode data signal modulating device comprising, in combination:  
 laser diode modulation apparatus including a data signal input and a laser diode for providing a modulated optical signal output which is modulated between given maximum and minimum light intensities; and  
 detection means, connected to said data signal input of said laser diode modulation apparatus, for detecting the optical signal output of said laser diode modulation apparatus and for supplying to the data signal input thereof an amplitude modulated and level shift modulated data signal whose

amplitude is adjusted to maintain a given amount of distortion introduced into the amplitude and level shifting mod-



ulations of the optical light output signal by the biasing and signal driving of the laser diode.

**4,789,988**  
**SOLID-STATE LASER HAVING A MOVING LASING MATERIAL**  
 David J. Trost, Seattle, Wash., assignor to Spectra-Physics, Inc., San Jose, Calif.  
 Filed Sep. 29, 1987, Ser. No. 101,775  
 Int. Cl. H01S 3/045, 3/17 25 Claims



1. A solid-state laser having a smoothly moving lasing material, comprising:  
 a movable lasing material with a substantially fixed shape and surface portion;  
 lasing means for selectively causing a localized portion of the lasing material to lase;  
 a fluid-bearing assembly with a surface portion positioned to be in juxtaposition with and immediately adjacent to the lasing material surface portion as the lasing material moves relative to the fluid-bearing assembly, the fluid-bearing assembly further having fluid means for communication of a thermally conductive fluid to an interface between the fluid-bearing assembly surface portion and the lasing material surface portion to transfer heat and provide a fluid bearing therebetween;  
 means for supplying the thermally conductive fluid to the fluid-bearing assembly fluid means;  
 means for cooling the fluid-bearing assembly; and  
 transport means for moving the lasing material to pass the lasing material surface portion corresponding to the localized portion of the lasing material lased past the surface portion of the fluid-bearing assembly.



4,789,989

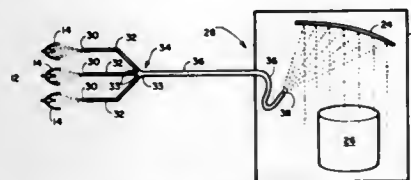
**SOLAR SIMULATOR EMPLOYING FLEXIBLE-OPTICS**  
Theodore G. Stera, Mickey Corawall, and Donald A. Nirschl, all of San Diego, Calif., assignors to General Dynamics Corp./Space Systems Div., San Diego, Calif.

Filed Sep. 25, 1987, Ser. No. 101,533

Int. Cl.<sup>4</sup> G02B 6/32

U.S. Cl. 350-96.18

15 Claims



1. An improved efficiency solar simulator system for substantially simulating the spectral radiance of the sun comprising:

- a high intensity light source producing substantially the spectral radiance of the sun;
- source optics for concentrating the high intensity light from the source into a narrow concentrated beam of light;
- a vacuum chamber having confining walls positioned remote from said high intensity light source;
- a test specimen positioned within said vacuum chamber;
- an elongated flexible illumination guide means for guiding said narrow concentrated beam of light from said source optics through an opening in said confining wall of said vacuum chamber and forming a pressure tight seal with said opening, and
- means positioned within said vacuum chamber for expanding said narrow concentrated beam of light to illuminate said test specimen therewith.

4,789,990

**GLASS MELTING FURNACE OF IMPROVED EFFICIENCY**

Helmuth Pieper, Lohr, Fed. Rep. of Germany, assignor to Sorg GmbH & Co. KG, Main, Fed. Rep. of Germany

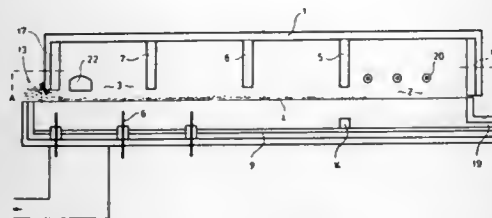
Filed Jan. 7, 1987, Ser. No. 1,064

Claims priority, application European Pat. Off., Jan. 23, 1986, 86100878.7

Int. Cl.<sup>4</sup> C03B 5/027

U.S. Cl. 373-32

12 Claims



1. A glass melting furnace comprising: a rectangular glass melting tank with a narrow side; feed means for feeding a mixture at the narrow side of said tank across the full width thereof; a section of burners positioned adjacent to an opposite narrow side for supplying energy; heat exchangers for energy exchange between combustion gases and combustion air supplied to the burners; openings for exhausting the exhaust gas disposed adjacent to the mixture feeding position, said furnace having a roof extending between the burner section and the mixture feeding section; at least one radiation protective barrier which depends from said roof and extends to a position spaced a small distance from the molten glass surface; and electrodes within the mixture feeding section for supplying electric energy in the region of the mixture feeding section.

4,789,991

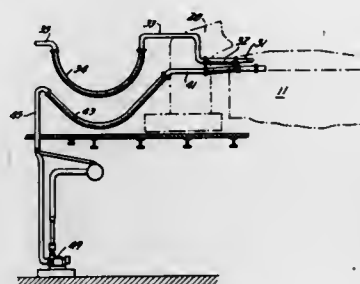
**COOLING SYSTEM FOR ELECTRIC ARC FURNACES**  
Otto H. Metelmann, Wexford, and Richard Prinsalac, Library, both of Pa., assignors to Mannesmann Aktiengesellschaft, Fed. Rep. of Germany

Filed Jan. 19, 1988, Ser. No. 145,605

Int. Cl.<sup>4</sup> F27D 1/02, 1/12

U.S. Cl. 373-74

15 Claims



1. In an electric arc furnace of the type having an open top vessel, a removable roof structure, a temperature responsive variable rate spray cooling system for at least selected portions of said furnace, and means for disposing of the spray coolant from said spray cooling system, the improvement in said disposing means characterized by

- (a) said selected furnace portions being provided with discharge outlet means for the gravity discharge of spray coolant;
- (b) discharge duct means connected to said discharge outlet means for leading said spray coolant away from said discharge outlet means by gravity;
- (c) a coolant disposal pump connected to said discharge duct means and located substantially below said discharge outlet;
- (d) said disposal pump being of a motor driven rotating disc type, with the discs thereof being in direct contact with spray coolant from said discharge duct means;
- (e) motor means for driving said pump substantially continuously during normal operations of said furnace.

4,789,992

**OPTICAL TEMPERATURE MEASUREMENT TECHNIQUES**

Kenneth A. Wickersheim, Menlo Park; Mel H. Sun, Los Altos; Stanley O. Heinemann, Irving, all of Calif., and Stanley O. Hinemann, Irvine, all of Calif., assignors to Luxtron Corporation, Mountain View, Calif.

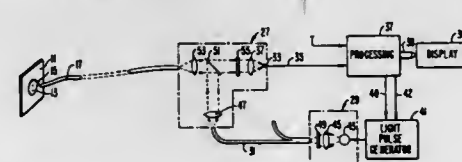
Division of Ser. No. 787,784, Oct. 15, 1985, Pat. No. 4,652,143, which is a continuation-in-part of Ser. No. 676,110, Nov. 29, 1984, abandoned. This application Mar. 19, 1987, Ser. No. 27,828

The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> G01K 11/20

U.S. Cl. 374-161

38 Claims



1. A method of determining the temperature of an environment, comprising the steps of: positioning in thermal communication with said environment a luminescent material which contains a luminescent activator of tetravalent manganese and which is charac-

4,789,994

**ADAPTIVE EQUALIZER USING PRECURSOR ERROR SIGNAL FOR CONVERGENCE CONTROL**

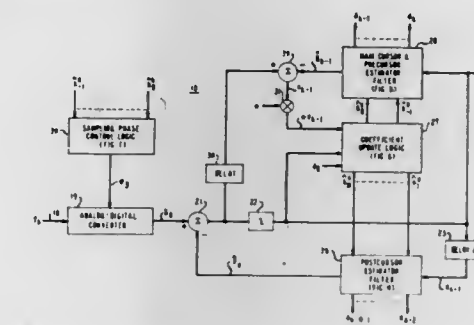
Roderick K. Randall, Newark, and William F. Zucker, Randolph, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 12, 1987, Ser. No. 84,356

Int. Cl.<sup>4</sup> H04B 3/14

U.S. Cl. 375-12

11 Claims



terized by emitting, when excited with transient radiation, luminescent radiation having an intensity which decreases after termination of the excitation radiation in a manner that can be correlated with the temperature of the luminescent material, exposing said luminescent material to transient excitation radiation, thereby causing said luminescent material, after termination of the excitation radiation, to luminesce with a decreasing intensity function related to the temperature of the luminescent material, and detecting and measuring the decreasing luminescent intensity function, thereby to measure the temperature of the luminescent material, whereby the temperature of said environment is determined.

4,789,993

**ONE FREQUENCY REPEATER FOR A DIGITAL RADIO SYSTEM**

Toshihiko Ryu, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

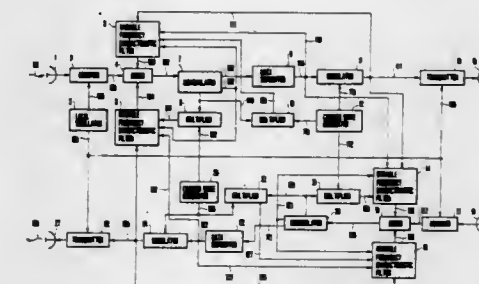
Filed Sep. 18, 1986, Ser. No. 908,847

Claims priority, application Japan, Sep. 18, 1985, 60-207066; Sep. 18, 1985, 60-207067; Sep. 30, 1985, 60-218380; Nov. 19, 1985, 60-259993

Int. Cl.<sup>4</sup> H04B 7/15

U.S. Cl. 375-4

9 Claims



1. A one frequency repeater for a digital radio system comprising: means for receiving a reception signal through a receiving antenna; a transmitting antenna from which a transmission signal is transmitted, the transmission signal from said transmitting antenna leaking into said receiving antenna; means for generating an interference cancellation signal for cancelling an interference signal caused by the leakage of the transmission signal included in an output signal from said receiving means; means for adding the interference cancellation signal and the output signal of said receiving means; demodulating means for detecting an amplitude and a phase of the interference signal from an output signal of said adding means, and providing a demodulated signal and an error signal obtained from said detected amplitude and phase of the interference signal; means for data-converting the demodulated signal; modulating means for modulating a carrier according to an output from said data converting means; and transmitting means for transmitting the modulated signal from said transmitting antenna; said interference cancellation signal generating means receiving the modulated signal and supplying the interference cancellation signal to said adding means in response to the error signal and converted data signal from said data converting means.

4,789,995

**SYNCHRONOUS TIMER ANTI-ALIAS FILTER AND GAIN STAGE**

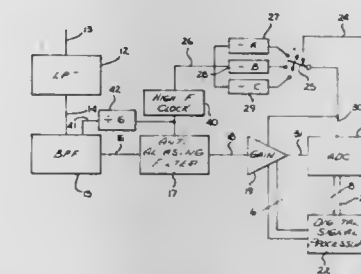
Paul Hurst, Yolo, Calif., assignor to Silicon Systems Inc., Tustin, Calif.

Filed May 1, 1987, Ser. No. 45,034

Int. Cl.<sup>4</sup> H04L 27/06

U.S. Cl. 375-75

17 Claims



1. A circuit for receiving and demodulating a data signal, said circuit comprising: clock signal generating means for providing a clock at a first frequency; first clock dividing means coupled to said clock signal generating means for dividing said first clock signal by a first divide value, said first clock dividing means outputting a second clock signal having an integer relationship to said first clock signal; first filter means coupled to said data signal and to said

second clock signal, said first filter means outputting a second data signal;  
 second filter means coupled to said second data signal, said second filter means being an anti-aliasing filter (AAF), said AAF coupled to said first clock signal, said second filter means outputting a third data signal;  
 gain stage means coupled to said third data signal, said gain stage means for amplifying said third data signal and outputting a fourth data signal;  
 second clock dividing means coupled to said first clock signal for selectively dividing said first clock signal by one of a plurality of second divide values, said second dividing means outputting a third clock signal coupled to said gain stage means, said second clock signal asynchronous with said third clock signal, said third clock signal in an integer relationship with said first clock signal;  
 control means coupled to said clock dividing means, said control means selecting said second one of said plurality of second divide values dependent on an amount of jitter in said data signal.

4,789,996

# CENTER FREQUENCY HIGH RESOLUTION DIGITAL PHASE-LOCK LOOP CIRCUIT

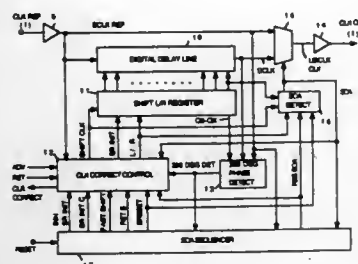
James S. Butcher, Phoenix, Ariz., assignor to Siemens Transmission Systems, Inc., Phoenix, Ariz.

Filed Jan. 28, 1988, Ser. No. 149,459

Int. Cl.<sup>4</sup> H04L 7/08

U.S. Cl. 375-120

24 Claims



1. A center frequency high resolution digital phase-lock loop circuit comprising:

digital phase correction means, having coupled thereto an input clock reference signal with a frequency  $f$ , and coupled thereto a clock output phase-locked frequency, where  $f$  is centered at said output phase locked frequency; divided-by-K circuit means for dividing said clock output phase-locked frequency by an integer K, to derive a data receive clock phase-locked to incoming data transitions; phase detector means having said data receive clock and said incoming data coupled thereto for generating phase correction signals whenever said data receive clock does not coincide in time with said incoming data transitions, and for coupling said phase correction signals to said digital phase correction means to selectively introduce a fixed delay in said clock output phase locked frequency, such that said clock output phase locked frequency equals said clock reference signal frequency;  
 said phase detector means including means for generating phase correction signals which are either phase advance or phase retard signals respectively, when said data receive clock is either late or early, respectively, with respect to said incoming data transitions;  
 wherein said digital phase correction means includes means for resetting said phase advance or phase retard signals after the phase of said clock output signal is corrected and a digital delay line means for providing an incremental delay from 0 to 360 degrees of the period of said clock reference signal; and

shift register means for selecting a desired incremental delay from said delay line; and  
 clock correction control means for controlling said shift register means in accordance with said phase advance and phase retard signals to select said incremental delay from said delay line.

4,789,997

# CIRCUIT ARRANGEMENT FOR PRODUCING HIGH VOLTAGES

Jens U. Madsen, Lyngby, and Peer K. Hansen, Hvidovre, both of Denmark, assignors to Andrex Radiation Products AS, Denmark

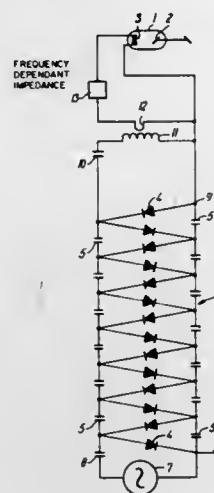
Filed Jul. 1, 1987, Ser. No. 68,323

Claims priority, application Denmark, Jul. 15, 1986, 3364/86

Int. Cl.<sup>4</sup> H05G 1/34, 1/50; H02M 7/00

U.S. Cl. 378-109

8 Claims



1. A circuit arrangement comprising:  
 a voltage multiplier;  
 an alternating current source feeding said voltage multiplier; and  
 means for supplying a small amplitude voltage with respect to the voltage multiplier high voltage, obtained from a ripple voltage across a component part of said voltage multiplier with an average potential not differing substantially from the high voltage to a utilizing circuit connected to said voltage multiplier.

4,789,998

# MEDIUM FREQUENCY X-RAY DIAGNOSTICS GENERATOR POWER CONTROL

Werner Kuchel, Uttenreuth, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Feb. 2, 1987, Ser. No. 9,452

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1986, 3610438

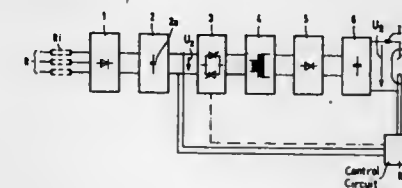
Int. Cl.<sup>4</sup> H05G 1/10, 1/34, 1/50

U.S. Cl. 378-110

5 Claims

1. A medium frequency x-ray generator comprising:  
 an x-ray tube;  
 means connecting said x-ray tube to a power source having an unknown internal network resistance; and  
 control means including an inverter connected between said

x-ray tube and said power source for controlling the x-ray tube input current dependent on the input voltage to said



inverter, thereby maintaining the x-ray tube voltage constant independently of said internal network resistance.

4,789,999

# LINE CIRCUIT FOR COUPLING A SUBSCRIBER SET TO A SWITCHING FACILITY TO PROVIDE A COMPLEX IMPEDANCE MATCH

Peter Meschkat, Waiblingen, and Jurgen Zanzig, Weil der Stadt, both of Fed. Rep. of Germany, assignors to Alcatel N.V., Amsterdam, Netherlands

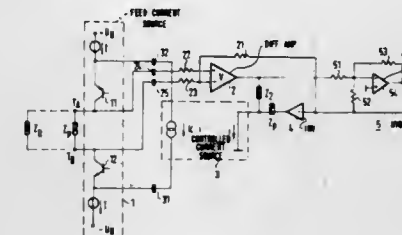
Filed Jul. 29, 1985, Ser. No. 760,199

Claims priority, application Fed. Rep. of Germany, Jul. 30, 1984, 3428106

Int. Cl.<sup>4</sup> H04B 1/58

U.S. Cl. 379-405

4 Claims



1. A line circuit for connecting a subscriber set to a switching facility to obtain an impedance match, said subscriber set connected to first and second subscriber terminals by a two-wire subscriber line to present a complex terminating impedance to said switching facility, a constant current source connected between said first and second terminals for supplying said subscriber set with a constant direct current, a controlled current source coupled between said first and second terminals for supplying said subscriber set with an alternating current, said controlled current source having a control input coupled to a receive terminal, a differential amplifier having a first input terminal coupled to said first terminal and a second input terminal coupled to said second terminal, with the output of said differential amplifier coupled to a transmit terminal, and a complex impedance coupled between the output of said differential amplifier and said control input of said controlled current source, wherein

said receive terminal is directly coupled to one input of said differential amplifier solely via a first resistor having no imaginary impedance component, and  
 said first and second inputs of said differential amplifier are coupled to said first and second terminals via separate second and third resistors of equal value and having no imaginary impedance components, with the ratio of said first resistor to one of said separate resistors selected to provide an optimum impedance match for said subscriber line as connected to said switching facility.

4,790,000  
**PORTABLE RADIO TELEPHONE SYSTEM**  
 Yasuaki Kinoshita, Hachioji, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

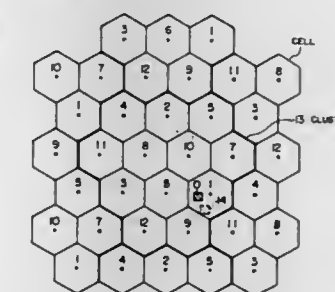
Filed Dec. 10, 1986, Ser. No. 940,489

Claims priority, application Japan, Dec. 11, 1985, 60-276749

Int. Cl.<sup>4</sup> H01N 11/00

U.S. Cl. 379-59

4 Claims



1. In a portable radio telephone system for use in a given area which is divided into a plurality of large areas, each of said large areas being further divided into a plurality of small cellular areas, wherein the same radio frequency channels are repeated for each of said large areas, while respective ones of said radio frequency channels are allocated to said respective small cellular areas in each large area, a system for effecting radio communication by means of a portable radio telephone set by use of selected ones of said allocated frequency channels, comprising:

a plurality of antennas provided in a local area disposed inside one of said small cellular areas for transmitting and receiving radio waves;  
 a portable radio telephone set;  
 a private branch exchange disposed within said local area; and  
 a transmission/reception circuit connecting said antennas to said private branch exchange;  
 wherein radio communication is carried out inside said local area by said portable radio telephone set by use of radio waves of one of said allocated frequency channels of a non-adjacent small cellular area which is different from the frequency channel allocated to the small cellular area in which said local area is disposed and the power of said radio waves used by said portable radio telephone set in said local area is larger than the power of radio waves of the same frequency radiated from small cellular areas other than said small cellular area in which said local area is disposed.

4,790,001

# METHODS OF COMMUNICATING OVER METALLIC CONDUCTORS HAVING MULTIPLE GROUNDS

Douglas R. Connally, and George G. Galloway, Jr., both of Mineral Wells, Tex., assignors to Industrial Technology, Inc., Mineral Wells, Tex.

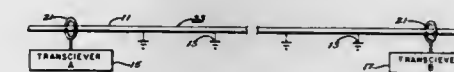
Continuation of Ser. No. 942,002, Dec. 15, 1986, which is a continuation of Ser. No. 691,490, Jan. 14, 1985. This application

Jul. 24, 1987, Ser. No. 77,171

Int. Cl.<sup>4</sup> H01M 11/00

U.S. Cl. 379-66

9 Claims



9. A method of communicating using a "distributed earth referenced carrier system" between a first location adjacent a



plurality of single metallic conductors that are disposed in close proximity to each other and a second location adjacent said plurality of single metallic conductors, comprising the step of grounding said single metallic conductors for A.C. current at various points between said first and second locations; the step of coupling a first transceiver electrically to one of said single metallic conductors at said first location; and the step of coupling a second transceiver electrically to another of said single metallic conductors at said second location.

4,790,002

# TELEPHONE DEVICE AND METHOD FOR OPERATING A TELEPHONE DEVICE

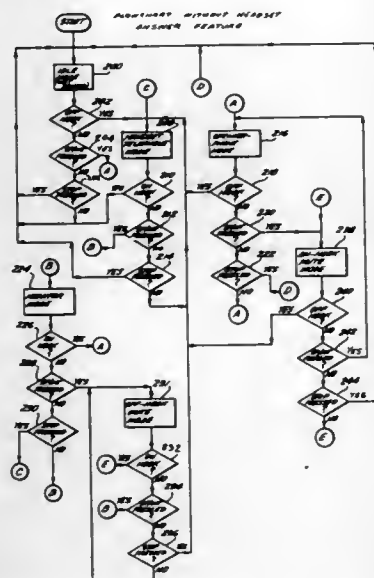
Nicholas A. D'Agosto, III, Trumbull, and David B. Chamberlin, Milford, both of Conn., assignors to Dictaphone Corporation, Rye, N.Y.

Filed Aug. 8, 1986, Ser. No. 894,549

Int. Cl.<sup>4</sup> H04M 1/65, 9/08

U.S. Cl. 379-70

34 Claims



30. A modular telephone/dictation system disposable in respective modes of operation for use by a user to carry out different system operating functions including a dictation function and a telecommunication function, said system comprising:

- a recording module for recording dictation on a record medium; and
- a physically independent communication module connectable to said recording module to form an integral structure therewith and for transmitting and receiving audio signals telephonically, said communication module including a handset having a first microphone and a first speaker; speakerphone means having a second microphone and a second speaker; hook switch means for detecting an on-hook condition of the handset and for detecting an off-hook condition of the handset; a speakerphone switch; and control means, responsive to said hook switch means and to said speakerphone switch, for enabling said first microphone and said first speaker in response to a change from the on-hook condition to the off-hook condition and for enabling said second speaker when said speakerphone switch is operated a first time during the off-hook condition.

4,790,003

# MESSAGE SERVICE SYSTEM NETWORK

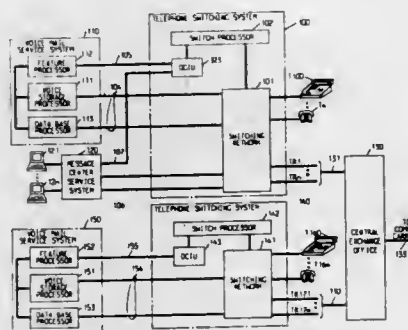
Garry D. Kopley, Boulder; John R. Lothrop, Longmont, and Albert Mizrahi, Boulder, all of Colo., assignors to American Telephone and Telegraph Company, AT&T Information Systems, Holmdel, N.J.

Filed Apr. 27, 1987, Ser. No. 43,016

Int. Cl.<sup>4</sup> H04M 3/50, 11/00

U.S. Cl. 379-88

12 Claims



1. A method of interconnecting a plurality of voice message service systems in a network for transmitting a voice message received from a message sender on a first one of said message service systems to a message recipient at one other one of said message service systems comprising the steps of: encoding in digitally compressed form said received message; appending to said encoded message in text form, the name of said message sender for display purposes at said other one of said message service systems; storing the appended encoded message in a memory of said one message service system as a data file; and transmitting, as a computer-to-computer file transfer operation, said stored encoded message from said first message service system to said other message service system.

4,790,004

# IMPLIED PRINCIPAL BUSY STATUS INDICATOR FOR COVERED CALLS

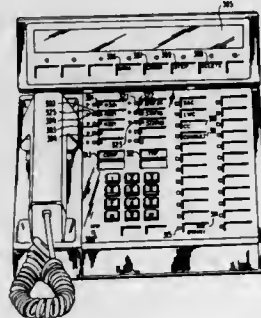
Robert D. Nalbene, Boulder, Colo., assignor to American Telephone and Telegraph Company, AT&T Information Systems, Holmdel, N.J.

Filed Dec. 10, 1986, Ser. No. 940,141

Int. Cl.<sup>4</sup> H04M 3/22, 3/54

U.S. Cl. 379-214

4 Claims



1. In a business communication system, a method for providing call coverage for a plurality of principal telephone station sets by a plurality of covering station sets of a predetermined call coverage path and each of said covering station sets having a plurality of pairs of indicators with a call appearance one

of the indicators of each pair displaying a call appearance and a status one of the indicators of each pair capable of displaying the status of any of said plurality of principal telephone station sets, and method comprising the steps of:

- determining in response to a covered call from a calling party directed to one of said principal telephone station sets the availability of a first one of said covering station sets in said predetermined call coverage path to handle said covered call;
- determining the availability of a second one of said covering station sets in said predetermined call coverage path to handle said covered call upon said first one of said covering station sets being unavailable;
- routing said covered call to said second one of said covering station sets upon said second one of said covering station sets being available;
- selecting one of said pairs of indicators of said second one of said covering station sets to service said covered call;
- displaying the presence of said covered call at said second one of said covering station sets via the call appearance indicator of the selected pair of indicators;
- initially displaying the status of said one of said principal telephone station sets via the status indicator of said selected pair of indicators thereby allowing a user of said second one of said covering station sets to assist said calling party;
- continually displaying said current status of said one of said principal telephone station sets upon said calling party wanting to wait until said current status of said one of said principal telephone station sets changes to an idle status; and
- continually determining the current status of said one of said principal telephone station sets thereby informing said user of said second one of said covering station sets when said covered call can be connected to said one of said principal telephone station sets by actions of said user of said second one of said covering station sets.

4,790,005

# CIRCUIT ARRANGEMENT FOR TELECOMMUNICATIONS SWITCHING SYSTEMS, PARTICULARLY TELEPHONE SWITCHING SYSTEMS WITH INFORMATION PROCESSING SWITCHING DEVICE AND PROCESSING LOAD LIMITING

Peter Hannelka, Mering, and Joerg Oehlerich, Ganting, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 29, 1987, Ser. No. 114,898

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1986, 3636992

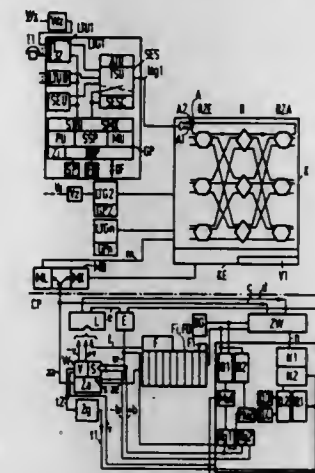
Int. Cl.<sup>4</sup> H04M 3/36

U.S. Cl. 379-244

2 Claims

1. Circuit arrangement for telecommunication switching systems, particularly telephone switching systems with at least one information processing switching device which is to maintain and process a series of technical switching information processing requests for selected individual call-ups as well as technical operating data processing requests for functional test procedures and/or for establishing and storing a data base serving the switching operation of a switching system, and with a measuring device, serving to measure the processing loadability of the switching device, which regulates a loadability through a reference-to actual comparison related to the respective sum of the actual occupied times per measuring period and a reference-occupied-total time resulting from the length of the measuring period and an established switching device reference traffic flow value, for example 95%, which indicates the momentary loadability of the switching device in terms of the number of information(s) to be processed by the switching device per measuring period and is accepted by a counter which accesses the inflow of the information to be processed to the switching system by counting the same through forward stepping, and in order to evaluate this inflow continuously in single steps is either caused to backward step

through a clock pulse determined by the loadability value, or is respectively reset to zero by means of time intervals determined by the loadability value, and whose maximum attained count is an evaluation of this inflow, which upon reaching or exceeding a limit value, causes non-acceptance devices to non-accept a part of the information waiting to be processed, characterized in that the information processing requests, as opposed to the data processing requests, are accepted by the switching unit on a priority basis and accordingly the data processing requests are accepted only when fewer than a maximum number of information processing requests are presented to the same, that the reference-actual-comparison is initially based upon the resulting sum of the actual-occupied-times and the switching unit-reference-traffic flow rate corresponding to



the total processing requests, that then, when this sum is smaller than the resulting reference-occupation-total duration, the number of information(s) to be processed by the switching unit is increased through the adjustment, but that then, when this sum is greater than the reference-occupation-total duration a modified reference-actual-comparison is accomplished, based only upon the sum of the actual-occupied-times resulting from the information processing requests and only the switching unit reference-traffic flow value corresponding to the information processing requests, and that the adjustment of the loadability value upon this modification of the reference-actual-comparison follows in such manner that then, when the indicated sum is smaller/greater than the resulting reference-occupation-total duration, the loadability value is increased/low-ered.

4,790,006

# METHOD FOR ELECTRICALLY SIMULATING A CRADLE SWITCH AND A HANDS FREE TALKING-LOUDSPEAKING KEY IN A HANDS FREE TALKING-LOUDSPEAKING TELEPHONE STATION

Gerrit W. Nijmolen, and Franz Bloechl, both of Bocholt, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 13, 1987, Ser. No. 25,659

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1986, 3609706

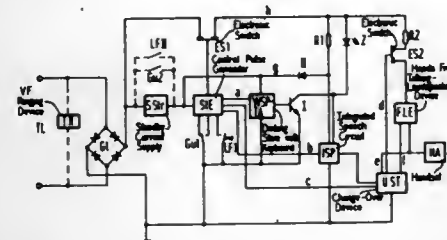
Int. Cl.<sup>4</sup> H04M 1/02

U.S. Cl. 379-388

4 Claims

4. A hands free talking telephone station, comprising: a telephone channel line and means for connecting a subscriber line to the telephone channel line; the telephone channel line connecting to a hands free talking-LOUDSPEAKING device and wherein first and second switches are provided in series between the hands free talking-LOUDSPEAKING device and said means for connecting to the subscriber line;

a handset, and a change-over means connected for activating either said hands free talking-loudspeaking device or said handset and also for controlling said second switch; an integrated speech circuit connecting to said change-over device; a dialing store means with an associated keyboard for abbreviated dialing and automatic redialing; a control pulse generator means having a first output connecting to the first switch, a control line connecting to the dialing store means, a second output connecting to the changeover means, another control line connecting to the integrated speech circuit, a first input connecting to a cradle switch, and a second input connecting to a hands free talking-loudspeaking key; a standby current supply connecting between said telephone channel line and said control pulse generator means; an electronic switch with a connected light controlled by said dialing store means with associated keyboard;



said standby current supply being connected such that in a rest state the control pulse generator means and dialing store means with associated keyboard are supplied with supply voltage from said standby current supply, and means being provided to decouple the standby current supply from the telephone channel line when the first switch is closed; and said control pulse generator means controlling the change-over means upon actuation of the hands free talking-loudspeaking key such that the hands free talking-loudspeaking device is turned on and is provided with power from the telephone channel line via the second switch controlled by the change-over means, and also upon actuation of the hands free talking-loudspeaking key, said control pulse generator means controlling said electronic switch via said dialing store means with associated keyboard such that the light is controlled in accordance with dialing at said keyboard and during talking on the station.

4,790,007

## TELEPHONE INSTRUMENT

Ludwig Richter, Heusenstamm; Karl H. Niederhofer, Frankfurt; Dieter Kramer, Idstein; Gerhard Sussner, Meerholz; Wolfgang Girscher; Volker Munch, both of Frankfurt; Heinrich Vial, Eschborn; Helmut R. Mayer, Frankfurt, and Hayo Reyher, Bad Nauheim, all of Fed. Rep. of Germany, assignors to Teleorma Telefonbau und Normalzeit GmbH, Fed. Rep. of Germany

Filed Jan. 23, 1987, Ser. No. 6,938

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1986, 3602271; Mar. 8, 1986, 3607727

Int. Cl. H04M 1/02

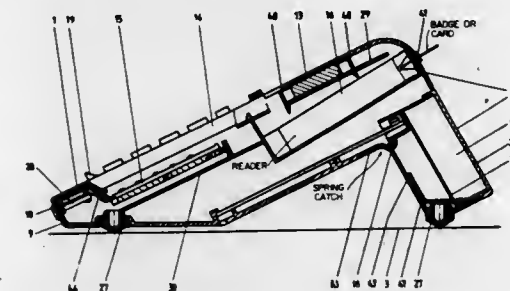
U.S. Cl. 379-420

9 Claims

3. A telephone set adapted for placement on a surface, comprising:

a housing formed by an upper side, two lateral sides, a rear wall and a bottom side; at least one of a dialing keyset, a service keyset, an indicator device, a speaker device, a handset, and cradle means for retaining said handset; said housing being substantially L-shaped in a longitudinal cross-section, said upper side being inclined at an angle of more than 20 degrees and less than 45 degrees to said

support surface, said rear wall being at an angle of between 80 degrees and 100 degrees to said upper side, said bottom side having a portion substantially parallel to said upper side and a portion substantially parallel to said rear wall, the space between the bottom side and the upper side being occupied by at least one printed circuit board in-



stalled substantially parallel to said upper side and comprising electrical and electronic components for basic functions of the telephone instrument; and, at least one module housing between said rear wall and said bottom side, said at least one module housing being accessed by at least one opening in said rear wall.

4,790,008

## TELEPHONE LINE SWITCH APPARATUS

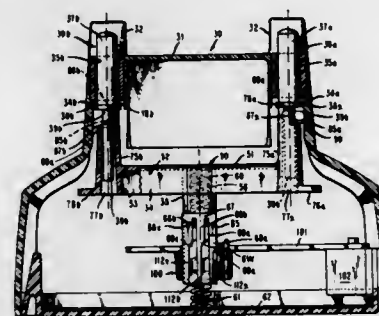
Harold L. Bohannon, Shreveport, La., assignor to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Filed Apr. 18, 1986, Ser. No. 853,576

Int. Cl. H04M 1/08

U.S. Cl. 379-427

9 Claims



1. Apparatus comprising: a telephone stand having a housing with a cradle on its top for a telephone handset, a pair of vertically movable laterally-spaced plungers passing from said cradle through holes in said housing down into its interior, a line switch in said housing below said plungers, vertically movable piston means disposed in said interior between said plungers and switch and adapted by a force coupled relation with each to be driven downward in response to downward driving of said plungers so to actuate said switch, and a pair of coupling means respective to said plungers and coupling them to parts of said piston means to provide guided positioning by said plungers of said parts as said piston means moves vertically in said housing, said pair of coupling means comprising separate parts of said piston means disposed on laterally opposite sides of said piston means and having formed therein respective vertical passages into which are received respective portions of said plungers extending into the interior of said housing.

4,790,009

## SCRAMBLER SYSTEM

Yukinobu Ishigaki, Machida; Katsuhiko Onuki, and Fumio Kawabata, both of Tokyo, all of Japan, assignors to Victor Company of Japan, Ltd., Japan

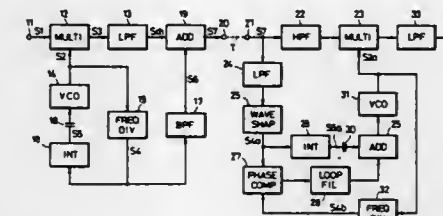
Filed Oct. 28, 1985, Ser. No. 791,786

Claims priority, application Japan, Oct. 29, 1984, 59-227241; Oct. 29, 1984, 59-227242

Int. Cl. H04K 1/02

U.S. Cl. 380-9

21 Claims



1. A scrambler system comprising: an input terminal applied with an input audio signal which is to be scrambled; a first oscillator for generating a first local oscillation signal; first frequency dividing means for obtaining a first frequency divided signal by frequency-dividing said first local oscillation signal by 1/N; first triangular wave signal generating means for converting said first frequency divided signal into a first triangular wave signal, said first triangular wave signal being supplied unmodified to said first oscillator and controlling an oscillation frequency thereof; first multiplying means for obtaining a frequency converted audio signal by multiplying said first local oscillation signal with said input audio signal; pilot signal generating means for generating from said first frequency divided signal a pilot signal having a single frequency; first adding means for obtaining a scrambled signal by adding said pilot signal and said frequency converted audio signal; transmitting means for transmitting the scrambled signal through a predetermined transmission path so that the pilot signal coexists with the frequency converted audio signal on the predetermined transmission path; receiving means for receiving the scrambled signal which is transmitted through the predetermined transmission path; first separating means supplied with the scrambled signal from said receiving means for separating the pilot signal from the scrambled signal; square wave signal generating means for generating from the output separated pilot signal of said first separating means a square wave signal having approximately the same waveform as said first frequency divided signal; second triangular wave signal generating means for generating from said square wave signal a second triangular wave signal; a second oscillator for generating a second local oscillation signal which is approximately the same as said first local oscillation signal; second frequency dividing means for obtaining a second frequency divided signal by frequency-dividing said second local oscillation signal by 1/N; phase comparing means for comparing phases of said second frequency divided signal and said square wave signal and for generating a phase error signal; second adding means for obtaining an added signal by adding said phase error signal and said second triangular wave signal, said added signal being supplied to said second oscillator and controlling an oscillation frequency thereof; second separating means supplied with the scrambled signal

from said receiving means for separating the frequency converted audio signal from the scrambled signal; and second multiplying means for obtaining the original input audio signal by multiplying said second local oscillation signal with the output separated frequency modulated audio signal of said second separating means.

4,790,010

## ENHANCED SCRAMBLING METHOD AND SYSTEM FOR TV SIGNALS

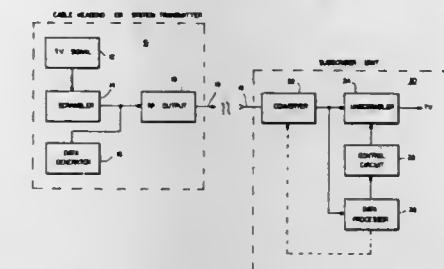
Gary J. Sgrignoli, Mount Prospect, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Feb. 24, 1987, Ser. No. 18,145

Int. Cl. H04N 7/167

U.S. Cl. 380-10

8 Claims



1. A method of operating a television communication system including scrambling means at a transmitting station and unscrambling means at a receiving station comprising the steps of:

transmitting a scrambled television signal and a data signal; receiving said scrambled television signal and said data signal and under control of said data signal, selectively; operating the unscrambling means at the receiving station for unscrambling said scrambled television signal; and operating the unscrambling means at the receiving station for further scrambling said scrambled television signal.

4,790,011

## AUTO CLAMP FOR MODULATOR FOR SUPPRESSED SYNC SIGNALS

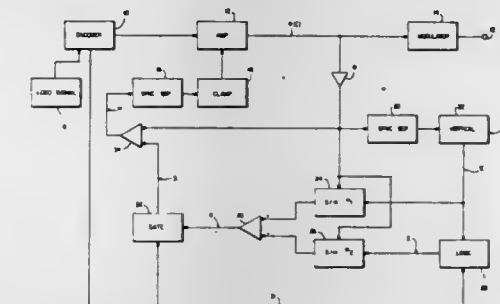
Andrew S. Bellavia, Jr., Elk Grove Village, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

Filed Oct. 17, 1986, Ser. No. 920,804

Int. Cl. H04N 7/167, 5/18, 5/53

U.S. Cl. 380-15

4 Claims

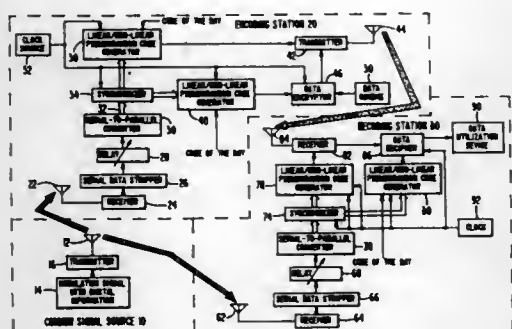


1. In combination: a source of first video signal including a vertical interval portion having normal sync pulses and other portions having suppressed sync pulses; an amplifier having an input for receiving said first video signal and an output for supplying an output signal to a modulator;



clamp means for maintaining the correct DC level in said output signal of said amplifier;  
correction means for developing a second video signal with restored sync pulses for application to said clamp means for automatically compensating operation of said clamp means for suppressed ones of said sync pulses, said correction means including;  
means for sampling the level of said sync pulses during said vertical interval;  
means for sampling the level of the first suppressed sync pulse occurring after said vertical interval;  
means for comparing said levels to develop a signal representative of the amount of said suppression; and  
means for restoring said sync pulse level in said second video signal.

4,790,012  
**ENCRYPTION-DECRYPTION SYSTEM**  
 Eldon M. Stupha, Jr., Merrimack, N.H., assignor to General  
 Electric Co., Burlington, Mass.  
 Filed Dec. 20, 1965, Ser. No. 811,272  
 Int. Cl.<sup>4</sup> H04L 9/00



14. A method for encrypting and decrypting data at geographically separated encoding and decoding stations, comprising:

the step of transmitting a carrier modulated with a time varying predetermined code from a geographically separate common transmitting station; encoding predetermined data at an encoding station with the predetermined code received from said common station for forming encoded data, including the step of extracting the code modifying from the carrier received from said common station wherein the encoded predetermined data at the encoding station is determined solely in response to a code modifying signal received at the encoding station from said common station;

transmitting the encoded data to a receiving station; and decoding the encoded data at the receiving station utilizing the predetermined code for recovering the predetermined data, including the step of extracting the code modifying signal from the signal received from said common station to produce the predetermined data is recovered at the receiving station solely in response to the code modifying signal received from the common station.

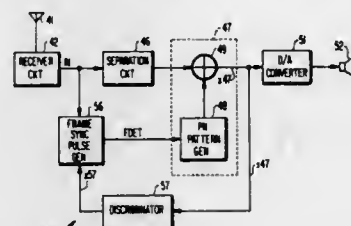
4,790,013  
RECEIVER CAPABLE OF QUICKLY ESTABLISHING  
STABLE FRAME SYNCHRONIZATION  
Kozou Kage, Tokyo, Japan, assignor to NEC Corporation,  
Tokyo, Japan

Filed Apr. 8, 1985, Ser. No. 720,934  
Claims priority, application Japan, Apr. 6, 1984, 59-67348  
Int. Cl.<sup>4</sup> H04J 3/06; H04K 1/00

U.S. Cl. 380—48 9 Claims  
1. A receiver responsive to an input signal comprising a plurality of frames, each frame to include information signals

following frame synchronization signals, for producing a reproduction of said information signals with frame synchronization established, said receiver including a signal producing means responsive to said input signal for producing a succession of digital signals conveying the respective information signals and signal converting means for converting said digital signals into said reproduction, wherein the improvement comprises:

monitoring means for monitoring a predetermined one of said succession of digital signals and said reproduction of

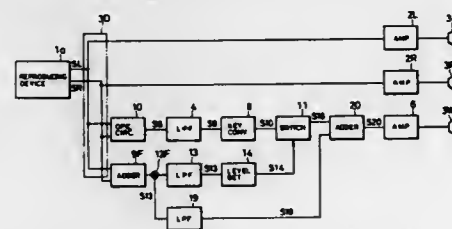


said information signals to produce a result signal indicative of whether or not said information signals are produced in response to said input signal; and frame synchronization establishing means responsive to said input signal and said result signal for establishing said frame synchronization, said frame synchronization establishing means including means to monitor said result signal and said frame synchronization signals of said input signal over a plurality of said frames to keep said frame synchronization even in the absence of said frame synchronization signals.

**4,790,014**  
**LOW-PITCHED SOUND CREATOR**  
**Koji Watanabe; Katsuhiko Hayashi; Nobuaki Minakuchi, all of**  
**Osaka; Masayuki Misaki, Kyoto; Kenichi Terai, Osaka;**  
**Yasutoshi Nakama, Ikoma, and Masaharu Morita, Osaka, all**  
**of Japan, assignors to Matsushita Electric Industrial Co.,**  
**Ltd., Osaka, Japan**

Filed Mar. 30, 1987, Ser. No. 30,910  
Claims priority, application Japan, Apr. 1, 1986, 61-74778;  
Aug. 11, 1986, 61-188143; Oct. 17, 1986, 61-247808; Dec. 26,  
1986, 61-312190; Feb. 19, 1987, 62-36105  
Int. Cl.<sup>7</sup> H04S 1/00

U.S. Cl. 381-1 8 Claims



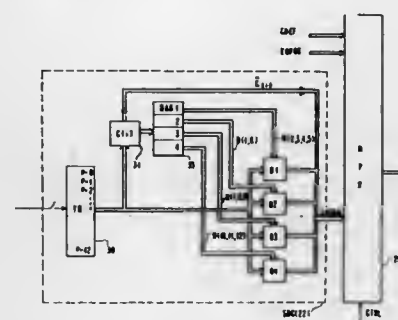
1. A low-pitched sound creator comprising:
  - (a) means for deriving two channel analog sound signals;
  - (b) a low-pass filter selecting low-frequency components from at least one of the analog sound signals and deriving a low-pitched sound signal representing the selected low-frequency components;
  - (c) means for lowering a key of the low-pitched sound signal and thereby deriving a very low-pitched sound signal from the low-pitched sound signal;
  - (d) means for adding the two channel signals to form a mixed signal;
  - (e) a second low-pass filter selecting low-frequency components from the mixed signal and thereby deriving a second

(f) means for adding the second low-pitched sound signal and the very low-pitched sound signal to form a processed low-pitched sound signal.

**4,790,015**  
**MULTIRATE DIGITAL TRANSMISSION METHOD AND**  
**DEVICE FOR IMPLEMENTING SAID METHOD**  
**Paul Callens, and Claude Galand, both of Cagnes-Sur-Mer,**  
**France, assignors to International Business Machines Corporation,**  
**Armonk, N.Y.**

Continuation of Ser. No. 485,803, Apr. 18, 1983, abandoned.  
This application Mar. 25, 1987, Ser. No. 31,152  
Claims priority, application European Pat. Off., Apr. 30,  
1982, 82430012.3

U.S. Cl. 381-31      Int. Cl.<sup>4</sup> G10L 5/00      13 Claims



1. A method for digitally transmitting a limited frequency band speech signal at a given transmission rate chosen from amongst a group of predetermined different transmission rates, said method including the steps of:

sampling and digitally coding said speech signal;  
 selecting at least part of said frequency band represented by  
 said digitally coded speech signal;  
 dividing said selected frequency band into a fixed number of  
 sub-bands;

regrouping said sub-bands into subgroups, each of said subgroups being assigned to one of said predetermined different transmission rates;

quantizing the sub-band signals in each of said sub-groups by dynamically allocating the quantizing bits among the sub-bands in each of said sub-groups and quantizing each sub-group at a rate which is a function of the transmission rate assigned to each said sub-group:

multiplexing said quantized sub-band signals by arranging the bits obtained from said coding and the bits obtained from said quantizing of said sub-band signals into a multi-rate frame comprising a plurality of zones;

ordering said plurality of zones from most significant to least significant, said most significant zone receiving those bits which are most significant to the reconstruction of said speech signal, said most significant zone corresponding to

the lowest of said transmission rates, each remaining successive zone of said plurality of zones of successively lesser significant order and corresponding to successively higher of said transmission rates receiving those bits from

higher or said transmission rates receiving those bits from said coding and said quantizing which are of successively lesser significance to the reconstruction of said speech signal; and

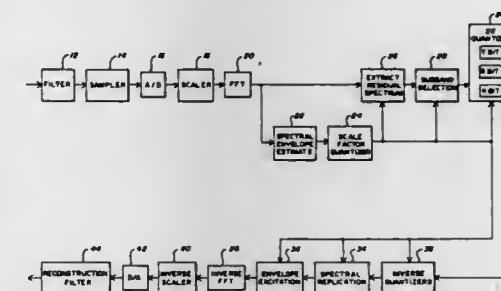
selecting for transmission all or a portion of said multirate frame, said portion being commenced with said most significant zone, said portion continuing, if at all, with the next zone of said successively lesser significant order, the number of said zones in said transmission being a function of said given transmission rate.

4,790,016  
ADAPTIVE METHOD AND APPARATUS FOR CODING  
SPEECH

Baruch Mazor, Newton, and Dale E. Veeneman, Southborough,  
both of Mass., assignors to GTE Laboratories Incorporated,  
Waltham, Mass.

Filed Nov. 14, 1985, Ser. No. 798,174  
Int. Cl.<sup>4</sup> G10L 5/00

U.S. Cl. 381-36 19 Claims



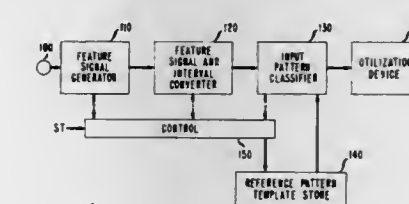
1. A speech coding system comprising:
  - transform means for performing a discrete transform of a window of speech to generate a discrete transform spectrum of coefficients;
  - envelope defining and encoding means for defining an approximate envelope of the discrete spectrum in each of a plurality of subbands of coefficients and for encoding the defined envelope of each subband of coefficients;
  - means for scaling each spectrum coefficient relative to the defined envelope of the respective subband of coefficients; and
  - coefficient encoding means for encoding the scaled spectrum coefficients within each subband in a number of bits determined by the defined envelope of the subband.

4,790,017  
SPEECH PROCESSING FEATURE GENERATION  
ARRANGEMENT

Harvard S. Hinton, Naperville, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 474,091, Mar. 10, 1983, abandoned.  
This application Dec. 22, 1986, Ser. No. 942,929  
Int. Cl.<sup>4</sup> G10L 5/00

U.S. Cl. 381-43 6 Claims



1. A speech pattern recognition arrangement comprising:  
means for partitioning an input speech pattern into successive time frame portions  $i=1, 2, \dots, i, \dots, I$ ;  
means responsive to each speech pattern time frame portion  $i$  for generating a set of first signals  $U(i)$  representative of the acoustic features of the time frame portion;  
means responsive to the time frame sequence of first signals of the speech pattern for successively forming a plurality of speech pattern time intervals  $k$ , each time interval comprising a set of  $2m+1$  successive time frames of said speech pattern, the first signals of the time interval  $2m+1$

successive time frames having a prescribed degree of similarity;  
 means responsive to the first signals of the  $2m+1$  time frames of each speech pattern interval  $k$  for generating a set of second signals  $I(k,1), I(k,2), \dots, I(k,p+3)$  representative of the acoustic features of said interval;  
 means for storing a plurality of reference pattern templates, each template comprising an interval sequence of second signals corresponding to a reference pattern; and  
 means jointly responsive to said speech pattern time interval sequence of second signals and said reference pattern time interval sequence of second signals for identifying said speech pattern as one of said reference patterns;  
 said speech pattern time interval forming means comprising:  
 means for sequentially designating each successive frame  $i$  as an anchor time frame for the set of time frames  $i-m$  to  $i+m$ ;  
 means responsive to the first signals of the anchor time frame  $i$  and the first signals of the  $m$  time frames  $i-1, i-2, \dots, i-m$  preceding said anchor time frame for comparing the first signals of said anchor time frame  $i$  with the first signals of each of the  $m$  time frames  $i-1, i-2, \dots, i-m$  preceding said anchor time frame to generate  $m$  signals  $S(i-1), S(i-2), \dots, S(i-m)$  representative of the similarity between said anchor time frame  $i$  first signals and the first signals of each of the  $m$  preceding time frames  $i-1, i-2, \dots, i-m$ ;  
 means responsive to the similarity signal  $S(i)$  of the designated anchor time frame being less than or equal to each of the similarity signals  $S(i-m), S(i-m+1), \dots, S(i+m)$  for the preceding  $m$  time frames and the succeeding  $m$  time frames for generating a signal identifying the time interval of said  $2m+1$  successive time frames  $i-m, i-m+1, \dots, i+m$  as a second signal time interval; and  
 means responsive to said identification signal for assigning said  $2m+1$  successive time frames from time frame  $i-m$  to  $i+m$  to a speech pattern time interval  $k$ .

4,790,018

## FREQUENCY SELECTION CIRCUIT FOR HEARING AIDS

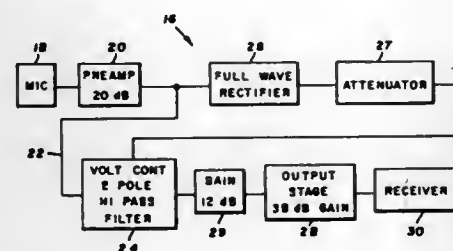
David A. Preves, Edina, and William A. Johnson, Minneapolis, both of Minn., assignors to Argosy Electronics, Eden Prairie, Minn.

Filed Feb. 11, 1987, Ser. No. 13,376

Int. Cl.<sup>4</sup> H04R 25/00, 3/00; H03G 3/00, 5/00

U.S. Cl. 381-68.2

17 Claims



1. A signal processing circuit for a hearing aid, including:
  - a sound pressure level sensing means for sensing an audio signal and generating an electrical signal corresponding to said sensed audio signal;
  - a broadband signal amplifying means for amplifying said electrical signal to produce an amplified electrical signal;
  - a broadband detecting means, having as an input substantially the entire frequency spectrum of said amplified electrical signal, said detecting means generating an output comprising a control signal having a control signal level proportional to said amplified electrical signal substantially over said entire frequency spectrum;
  - an adaptive high-pass filtering means, having as a first input

said amplified electrical signal, and as a second input said control signal, for selectively suppressing a low frequency portion of said amplifier electrical signal to generate a selectively modified signal, the frequency bandwidth of said suppressed low frequency portion, relative to the width of the entire frequency spectrum of said amplified electrical signal, increasing with said control signal level; and  
 a receiver means for generating an audio signal corresponding to said selectively modified signal.

4,790,019

## REMOTE HEARING AID VOLUME CONTROL

Fritz Hueber, Vienna, Austria, assignor to Viennatone Gesellschaft m.b.H., Vienna, Austria

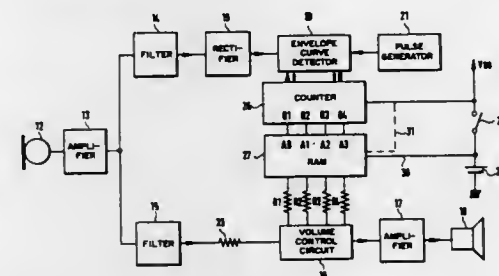
Filed Jul. 8, 1985, Ser. No. 752,909

Claims priority, application Austria, Jul. 18, 1984, 2329/84

Int. Cl.<sup>4</sup> H04R 25/00; H03G 3/02

U.S. Cl. 381-68.4

17 Claims



1. In combination:
  - (a) a hearing aid to be worn on the head of a hard-of-hearing person comprising
    - (1) a microphone in the hearing aid having an input and an output for respectively receiving and transmitting a range of sound wave signals comprising speech signals and control signals;
    - (2) a battery-operated earphone in the hearing aid having an input for receiving the range of sound wave signals transmitted by the microphone; and
    - (3) an amplifying circuit in the hearing aid connecting the microphone output to the earphone input, the amplifying circuit including a frequency-selective circuit component comprising a high-pass filter and a low-pass filter to divide the speech signals from the control signals and a sound level adjustment circuit component for the speech signal connected to the frequency-selective circuit component;
  - (b) a memory for the adjusted sound level connected to the sound level adjustment circuit component for controlling the sound level to store the adjusted sound level; and
  - (c) a remote sound wave control signal emitter circuit separate from the hearing aid and emitting sound wave control signals within the frequency range of the microphone input.

4,790,020

## HORN TYPE LOUSPEAKERS

Kuang-Yao Lin, No. 5 Lane 110, Wei-Kiao Street, Tainan, Taiwan

Filed Oct. 26, 1987, Ser. No. 112,110

Int. Cl.<sup>4</sup> G10K 13/00

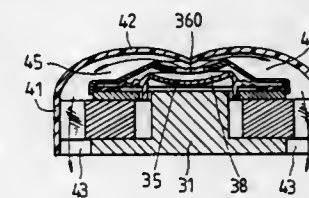
U.S. Cl. 381-156

4 Claims

1. In a loudspeaker having a drive unit including a yoke, a center pole extending from the yoke, a magnet disposed around the center pole so as to define a first air space therebetween, a guide ring disposed around the center pole so as to define a second air space therebetween, a diaphragm extending

over and spaced from the center pole and a voice coil attached to the diaphragm and extending into the second air space, the improvements comprising:

- (a) a fixing plate extending over, but spaced from the diaphragm such that the diaphragm is located between the fixing plate and the center pole, the fixing plate defining a central hole therethrough; and,



- (b) a reflection cover extending over, but spaced from the fixing plate, the reflection cover having a curved cross-sectional configuration with a protruding tip located adjacent to the central hole of the fixing plate wherein the reflection cover defines a plurality of discharge openings uniformly located around an outer periphery.

4,790,021

## ELECTROSTATIC TRANSDUCER

Richard Pribyl, Vienna, Austria, assignor to AKG Akustische u. Kino-Geräte Gesellschaft m.b.H., Vienna, Austria

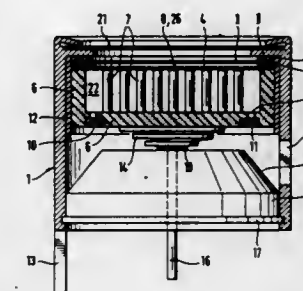
Filed Jul. 8, 1987, Ser. No. 71,013

Claims priority, application Austria, Jul. 24, 1986, 2009/86

Int. Cl.<sup>4</sup> H04R 19/04

U.S. Cl. 381-191

7 Claims



1. An electrostatic transducer, comprising a diaphragm, a stretching ring supporting the diaphragm, a back plate mounted spaced apart from the diaphragm, the back plate composed of a thin metal plate, a carrier member carrying the back plate, a plurality of support members attached to the carrier member and distributed over the area of the carrier member, the support members having free ends facing away from the carrier member, the back plate being glued to the free ends of the support members.

4,790,022

## METHOD AND APPARATUS FOR DETECTING COLORED REGIONS, AND METHOD AND APPARATUS FOR ARTICLES THEREBY

Timothy J. Dennis, Colchester, United Kingdom, assignor to Lockwood Graders (UK) Limited, Danbury, England

Filed Mar. 6, 1986, Ser. No. 837,045

Claims priority, application United Kingdom, Mar. 6, 1985, 8505781; Oct. 2, 1985, 8524234

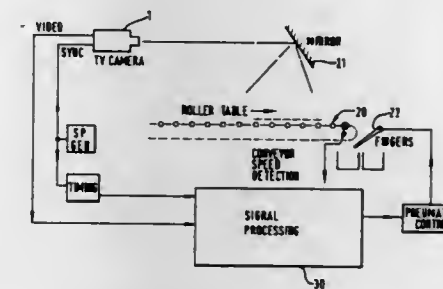
Int. Cl.<sup>4</sup> G06K 9/00

U.S. Cl. 382-8

21 Claims

1. A method of sorting articles, comprising the steps of: inspecting the articles to determine any occurrence of target colours, and

routing the articles in accordance with the colours detected thereon, wherein the articles are inspected by scanning the articles using a raster scan technique to develop electrical output signals containing colour information, time shifting said electrical output signals to produce time-shifted signals, forming the difference between each said electrical output signal and its counterpart time-shifted signal to thereby obtain spatial colour difference signals, and applying said spatial colour difference signals to a memory device,



wherein said memory device has a plurality of storage locations and corresponding address lines allowing access to said storage locations, and wherein information as to target colours is stored in said storage locations, and wherein said spatial colour difference signals are applied to said memory device, by way of buffering means, as address signals to the address lines of the memory device to access selected ones of said storage locations, and wherein said memory device is arranged to provide an output only when specific combinations of said spatial colour difference signals are applied thereto, said memory device output thereby indicating an occurrence on one of the article of a target colour.

4,790,023

## METHOD FOR MEASURING DIMENSIONS OF FINE PATTERN

Shougo Matsui, Sagami, and Kenichi Kobayashi, Tokyo, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

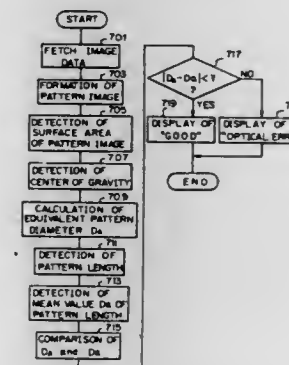
Filed Mar. 9, 1987, Ser. No. 23,493

Claims priority, application Japan, Mar. 10, 1986, 61-51959

Int. Cl.<sup>4</sup> G06K 9/46

U.S. Cl. 382-8

4 Claims

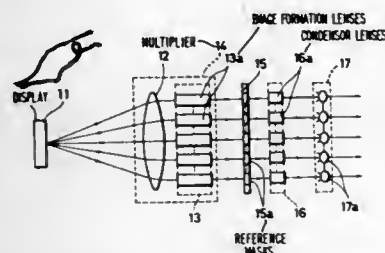


1. A method for measuring dimensions of a fine pattern, comprising: calculating a surface area and determining a profile of a displayed pattern image;



calculating a center of gravity in the pattern image;  
calculating an equivalent diameter of a circular pattern having the same surface area as the pattern image;  
calculating a mathematical mean value of pattern lengths of lines which all pass through the center of gravity of the pattern image and which intersect the pattern image at two points of the profile, said pattern lengths being defined as distances between the two points; and  
comparing the means value with the equivalent diameter of the circular pattern image.

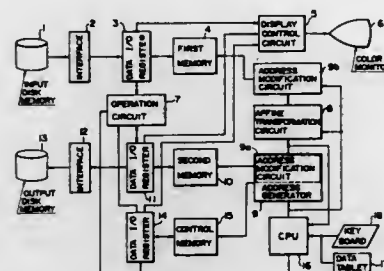
**4,790,024**  
**VECTOR DISCRIMINATION APPARATUS**  
Norman A. Peppers, Belmont; James R. Young, Palo Alto, and Gerald A. Pierce, Redwood City, all of Calif., assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan  
Filed Apr. 14, 1987, Ser. No. 38,632  
Int. Cl.<sup>4</sup> G06K 9/74  
U.S. Cl. 382—32 7 Claims



1. A vector discrimination apparatus for performing discrimination of a vector consisting of a plurality of vector components corresponding to features of predetermined information, comprising:

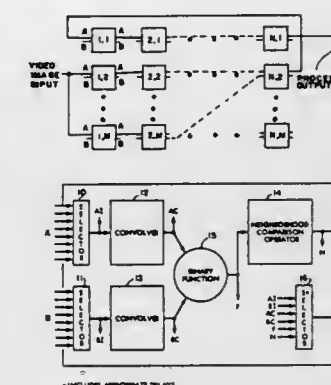
- a display in which a plurality of displaying areas are respectively assigned in correspondence with said plurality of vector components on a screen, said display respectively displaying predetermined plurality of line-like or spot-like optical patterns at positions proportional to the rated value of each of said vector components in said plurality of displaying areas;
- various types of reference masks in which a plurality of areas are respectively assigned in one-to-one correspondence with said plurality of displaying areas of said display, each of said various types of reference masks having a plurality of line-like or spot-like reference patterns respectively being formed by a gray scale in correspondence with said plurality of optical patterns in said plurality of displaying areas such that said plurality of reference patterns are matched with said predetermined plurality of optical patterns;
- multiplier means for optically multiplying the predetermined optical patterns displayed on said display and for forming a plurality of pattern images each having a substantially identical shape in the vicinities of said various types of reference masks; and
- light detecting means for detecting beams guided respectively through said various types of reference masks by matching the pattern image with the reference pattern.

**4,790,025**  
**PROCESSING METHOD OF IMAGE DATA AND SYSTEM THEREFOR**  
Toshifumi Inoue; Mitsuhiro Yamada, both of Kyoto, and Shigeru Miki, Shiga, all of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan  
Filed Sep. 26, 1985, Ser. No. 780,563  
Claims priority, application Japan, Dec. 7, 1984, 59-258618; Mar. 29, 1985, 60-63762  
Int. Cl.<sup>4</sup> G06K 9/36  
U.S. Cl. 382—41 5 Claims



1. A method for processing data of an original picture, comprising the steps of:
  - (a) storing data as image data in a memory having a large capacity and a relatively low access speed;
  - (b) dividing at least one group of the data into a plurality of data portions, on the basis of a processable size, between two memories capable of performing writing and reading at high speeds;
  - (c) reading out the image data in each data portion from the low-speed memory to perform at least one type of image processing on the read-out image data between the two high-speed memories;
  - (d) storing the thus-processed image data against in the low-speed memory; and
  - (e) performing the above steps (b) through (d) repeatedly on all of the data of the original picture so as to store the processed data of the original picture in the large-capacity and low-speed memory; wherein address control for each of the two high speed memories employed in the course of the image processings (b) through (e) is performed in accordance with a multidimensional array and addresses of one of the two high speed memories are identified by an affine transformation or inverse affine transformation of addresses of the other high speed memory, whereby the processing of the image data between the two high speed memories is performed in such a way that the image data, which is transferred between both high speed memories, is subjected to the affine transformation or the inverse affine transformation, wherein prior to subjecting the image data to the affine transformation between the two high speed memories, the address control of each of which is performed in accordance with the multidimensional array, the initial setting upon performing the processing of the image data between both high speed memories is effected by finding out the degree of overlapping between the two-dimensional address area of the high speed memory in which the image data before the affine transformation thereof are stored, and the two-dimensional address area of the high speed memory in which the affine-transformed image data are stored through the inverse affine transformation of the addresses of one of the high speed memories, changing the address length or lengths of the two-dimensional array or arrays of either one or both of the memories so as to optimize the overlapped area, obtaining parameter or parameters corresponding to the address length or lengths and then obtaining an affine coefficient by which the addresses of both high speed memories are corresponding to each other through inverse affine transformation.

**4,790,026**  
**PROGRAMMABLE PIPELINED IMAGE PROCESSOR**  
Donald B. Gennery, Glendale, and Brian Wilcox, Tujunga, both of Calif., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.  
Filed Dec. 31, 1985, Ser. No. 815,103  
Int. Cl.<sup>4</sup> G06K 9/54  
U.S. Cl. 382—49 5 Claims



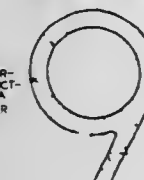
1. A pipelined video image processor having an input and an output for processing a pixel data stream comprising a two-dimensional array of computing modules, each module having at least one input and one output, disposed in N columns and M rows, and each module having at least a first selector adapted to selectively interconnect at least said one output of a module to said input of at least one module in a succeeding column of the same or different row, thereby enabling the programming of selected computing paths, whereby said data stream may be processed in accordance with a predetermined processing algorithm, said data stream flowing essentially in one selected data path generally through the same or different rows wherein said data stream may undergo serial processing at each column of said computing modules, and further wherein said data stream may undergo branching to other data paths to undergo parallel processing, where another data path may converge with said one data path as required by said processing algorithm, and means for connecting directly said computing modules located in the Nth column to at least one selected module located in the first column, whereby a programmed data path in the algorithm to be executed which requires more than N modules to complete may proceed from one module in the Nth column to an input of a module in the first column and different row such that said programmed data path may pass through said array more than one time, whereby a wide range of processing algorithms requiring different path lengths and branching requirements may be accommodated wherein said modules are each comprised of two convolvers and two selectors for selecting separate inputs to each convolver, a binary function operator responsive to the outputs of said convolvers for generating a function of one or two variables, a neighborhood comparison operator responsive to the output of said binary function operator for producing a module output, and said output selector connected to produce as a second output the output of any one of said components including said input selectors and said neighborhood comparison operator.

**4,790,027**  
**METHOD FOR AUTOMATIC SEPARATING USEFUL AND NOISE INFORMATION IN MICROSCOPIC IMAGES PARTICULARLY MICROSCOPIC IMAGES OF WAFER SURFACES**  
Wolfgang Scherl, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed Aug. 28, 1986, Ser. No. 901,390  
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1985, 3534911  
Int. Cl.<sup>4</sup> G06K 9/40, 9/48  
U.S. Cl. 382—54 4 Claims

RECONSTRUCTION OF THE ORIGINAL PATTERN EDGES FROM THE DATA STRUCTURE STORED COMPUTER-INTERNAL THE EDGES ARE PROXIMATED BY POLYGON STROKES



THE NUMERICAL INFORMATION RECONSTRUCTED FROM THE DATA STRUCTURES AFTER THE CLEANING PROCESS



1. A method for automatic separation of useful and noise information in microscope images, particularly microscope images of wafer surfaces, for the purpose of automatic recognition of wafer identification characterized in reading a microscope image with a video camera; low pass filtering an image obtained by said reading (FIG. 1) to convert it into a low-contrast image (FIG. 2), standardizing the low pass filtered image by the existing gray tones according to the equation

$$B3 = (B1/B2 - D)F$$

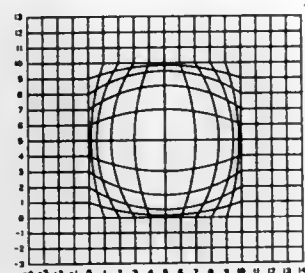
to obtain a standardized image (FIG. 3) free of disturbing brightness fluctuations, where B1, B2 and B3 are mutually corresponding picture elements of the microscope, low contrast and standardized images (FIG. 1, FIG. 2 and, respectively, FIG. 3), and D and F are standardization constants defined by trial runs; producing a black/white image by evaluating the picture element information of the standardized image (FIG. 3) free of brightness fluctuations, using a permanently prescribed picture element brightness threshold; approximating both the edges of noise and useful components existing in the black/white image (FIG. 4) using polygon strokes with a tangential point identification method (FIG. 5) so that, respectively, tangential points for a saddle (S), a branching (F), a bottom point (B) or a top point (T) are identified when scanning the edges in four directions (0°, 45°, 90°, 135°), for which purpose the image content is converted into a data structure containing a digital image which can be plotted for test purpose (FIG. 6); eliminating the noise still present in the data structure (cf. FIG. 6) from the digital image which are eliminated by simple, predetermined dimensioning criteria so that the original identification structure free of noise elements can be accurately reconstructed (FIG. 7); and automatically identified.

4,790,028

METHOD AND APPARATUS FOR GENERATING  
VARIABLELY SCALED DISPLAYSWilliam W. Ramage, Murrysville, Pa., assignor to Westinghouse  
Electric Corp., Pittsburgh, Pa.Filed Sep. 12, 1986, Ser. No. 906,718  
Int. Cl.<sup>4</sup> G06K 9/42

U.S. Cl. 382-47

22 Claims



1. A method of variablely rescaling a total image composed of a plurality of image points disposed within boundaries of the total image for display within a display area of fixed dimensions, without altering the boundaries of the total image displayed, said method comprising the steps of:

- dividing the total image into image area segments,
- assigning a selected scaling function to each image area segment, each said selected scaling function being assigned such that the selected scaling function in at least one image area segment has a value greater than one and the selected scaling function in at least another image area segment has a value smaller than one, but with the selected scaling functions over the total image having a mean value equal to one in all directions,
- generating an associated transformation function for each image area segment as a function of the selected scaling function,
- generating transformed image points for each image area segment in accordance with the associated transformation function, and
- generating in said display area of fixed dimensions a rescaled image utilizing the transformed image points such that the total image remains displayed although at least one image area segment of the total image is magnified.

4,790,029

COLLAPSIBLE BAG WITH SQUARE ENDS FORMED BY  
TRIANGULAR PORTIONSArthur E. LaFleur, Arnie LaFleur, and Lee LaFleur, all of  
Manistee, Mich., assignors to Custom Packaging Systems,  
Inc., Manistee, Mich.

Filed Jan. 5, 1987, Ser. No. 58,924

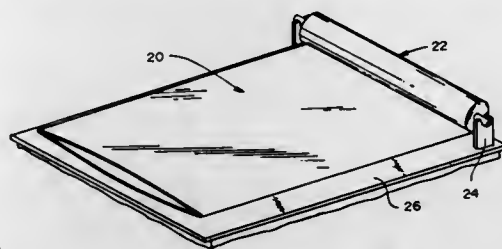
Int. Cl.<sup>4</sup> B65D 30/04, 33/14, 33/16, 33/36

U.S. Cl. 383-24

12 Claims

1. A collapsible bag which when filled has a pair of spaced apart ends each being generally square with four side wall portions extending therebetween, which comprises: a tubular blank of one piece of flexible material having a circumferentially continuous central portion and four substantially identical isosceles triangular portions adjacent each end, each triangular portion having a pair of sides extending from the central portion toward an apex of the triangular portion, said sides of each triangle being essentially at a right angle to each other,

connector means connecting together adjacent sides of adjacent triangular portions adjacent their edges along lines of connection extending from at least closely adjacent the central portion toward their associated apexes at least three-fourths of the distance therebetween, and the lines of connection associated with the triangular portions adjacent at least one end of the central portion terminating short of their apexes so as to at least in part define an access opening therethrough adjacent the center of the generally square end defined by such triangular portions when such bag is expanded such that when filled such bag has a pair of spaced apart and substantially square and flat ends interconnected by four generally rectangular side



walls and when empty can be collapsed into a compact configuration having a pair of overlying panels with a generally hexagonal shape with a pair of folded gusseted panels received therebetween with the fold line between adjacent gusseted panels extending between substantially the apexes of their associated opposed triangular portions and the fold lines lying closely adjacent each other, a tubular spout which is circumferentially continuous and of a separate piece of flexible material, said spout being disposed in such central access opening with an end portion of each triangular portion defining such central access opening overlapping said spout, and connector means connecting said tubular spout to said triangular portion at least substantially around the periphery of said spout.

4,790,030

## TUNER WITH INSERTABLE ANTENNA COUPLER

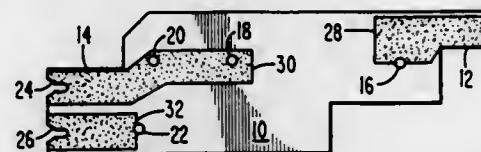
David J. Carlson, and William L. Lehmann, both of Indianapolis,  
Ind., assignors to RCA Licensing Corporation, Princeton,  
N.J.

Filed Nov. 25, 1986, Ser. No. 934,887

Int. Cl.<sup>4</sup> H04B 1/18; H03J 1/06

U.S. Cl. 455-193

3 Claims



1. In a tuner, apparatus comprising:

- a first printed circuit board having a transmission line inductor disposed on a surface thereof and having a perimeter surrounded by an outer wall member having an aperture formed therein proximate to a first end of said inductor;
- an internal shield member mounted normal to said surface, proximate to a second end of said inductor and parallel to said outer wall members, said member having a notch formed in an upper edge thereof; and
- a second printed circuit board mounted normal to said surface, having a first end extending through said aperture, having a second end with a projecting tab supported by said notch, said second printed circuit board having an antenna coil secured thereto, said aperture and said notch

being positioned with respect to said inductor so as to align said antenna coil in a plane normal to and centered with respect to said inductor;

said second printed circuit board also having a static discharge resistor secured thereto, said static discharge resistor being electrically connected at a first end thereof to a first conductive surface disposed on said second printed circuit board and electrically connected to said antenna coil, said static discharge resistor being electrically connected at a second end thereof to a second conductive

surface disposed on said tab of said second printed circuit board;

said second conductive surface being soldered to said internal shield member at said notch both for electrically grounding said second end of said static discharge resistor and for securing said second end of said second circuit board so as to fixedly establish the lateral position of said antenna coil with respect to a major axis of said transmission line inductor.



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## DESIGNS

DECEMBER 6, 1988

298,780

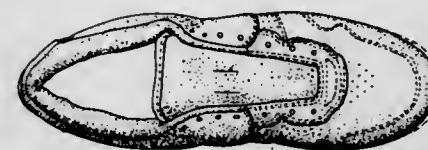
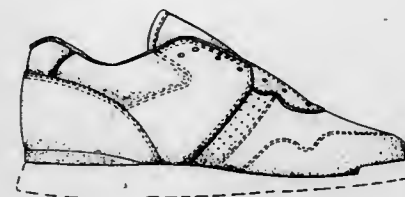
## SHOE UPPER

Joan Swett, Lake Oswego, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.

Filed Feb. 17, 1988, Ser. No. 156,653

Term of patent 14 years

U.S. Cl. D2—314



298,782

## TIE HANGER

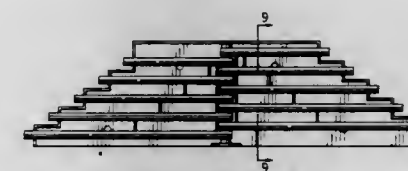
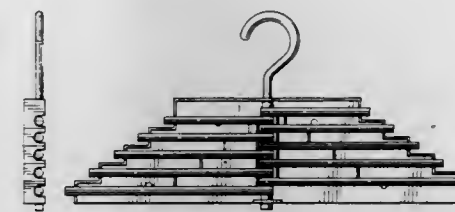
Elizabeth Rybka, and Frank Zormann, both of 35 High Park Ave., Unit 906, Toronto Ontario, Canada (M6P 2R6)

Filed Feb. 10, 1986, Ser. No. 827,958

Claims priority, application Canada, Sep. 20, 1985, 20-09-85-4

Term of patent 14 years

U.S. Cl. D6—315



298,783

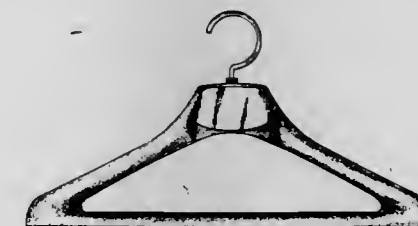
## GARMENT HANGER

Russell O. Blanchard, Zeeland, Mich., assignor to Batts, Inc., Zeeland, Mich.

Filed Feb. 18, 1986, Ser. No. 833,750

Term of patent 14 years

U.S. Cl. D6—319



298,781

## COMBINED KEY RING AND LIGHTER HOLSTER

George R. Thomas, 1510 S. Quincy St., Topeka, Kans. 66612

Filed Dec. 17, 1985, Ser. No. 809,910

Term of patent 14 years

U.S. Cl. D3—103



298,784

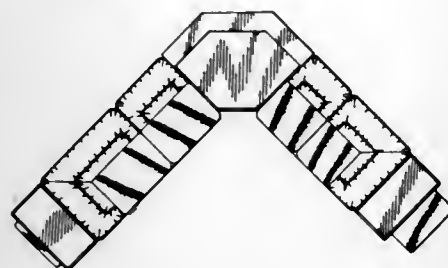
## COMBINED SOFA AND PLURAL TABLE UNIT

Alan H. Friedman, Millburn, N.J., assignor to Kanowsky Furniture, Inc., Sacramento, Calif.

Filed Oct. 2, 1986, Ser. No. 914,257

Term of patent 14 years

U.S. Cl. D6—335



298,785

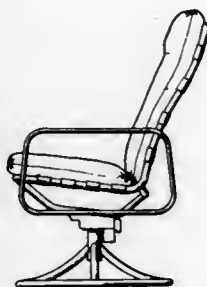
## SWIVEL CHAIR

Donald B. Colby, Sarasota, Fla., assignor to Tropitone Furniture Company, Sarasota, Fla.

Filed May 9, 1986, Ser. No. 862,604

Term of patent 14 years

U.S. Cl. D6—365



298,786

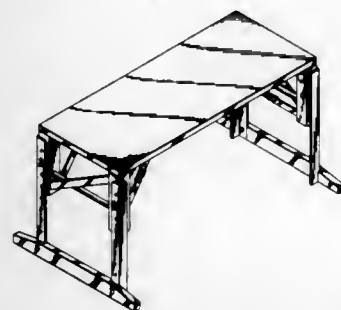
## ADJUSTABLE EXERCISE BENCH OR SIMILAR ARTICLE

William T. Wilkinson, Morris Farms, Rte. 841, Kemblesville, Pa.

Filed Apr. 3, 1986, Ser. No. 847,828

Term of patent 14 years

U.S. Cl. D6—367

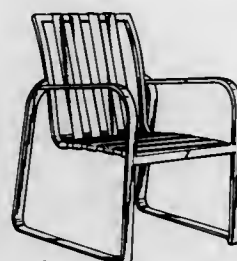
298,787  
CHAIR

Michael W. Greene, Incline Village, Nev., assignor to Little Lake Industries, Inc., Incline Village, Nev.

Filed Aug. 11, 1986, Ser. No. 895,068

Term of patent 14 years

U.S. Cl. D6—373



298,788

## CHAIR BACK

Charles E. Thompson, Knoxville, Tenn., assignor to Hospital Supply Company, Inc., Knoxville, Tenn.

Filed Dec. 20, 1985, Ser. No. 811,665

Term of patent 14 years

U.S. Cl. D6—502



298,789

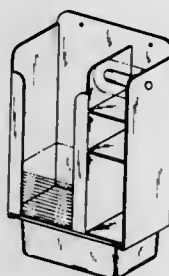
## CLEANING SUPPLIES HOLDER OR SIMILAR ARTICLE

Ronald J. Grahn, 805 W. Gruenwald Ave., Oshkosh, Wis. 54901

Filed Mar. 3, 1986, Ser. No. 841,338

Term of patent 14 years

U.S. Cl. D6—524



298,790

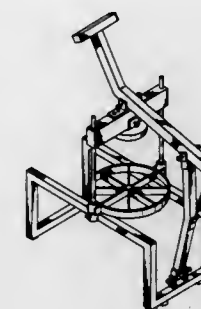
## FOOD SECTIONING APPARATUS

Dean Hutchinson, Redco, Inc., P.O. Box 1887, 1920 Hutton St., Wilmington, Del. 19899

Filed Mar. 25, 1986, Ser. No. 845,804

Term of patent 14 years

U.S. Cl. D7—43



298,791

## COMBINATION CAKE TRAY AND COVER

Michael E. Holzkopf, Libertyville, Ill., assignor to Ekco Products, Inc., Wheeling, Ill.

Filed Aug. 6, 1985, Ser. No. 763,030

Term of patent 14 years

U.S. Cl. D7—83



298,792

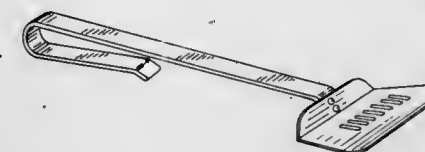
## BARBECUE SPATULA

James E. Tucker, Batavia, and John F. Beecher, III, Carpentersville, both of Ill., assignors to Weber-Stephen Products Co., Palatine, Ill.

Filed Aug. 8, 1985, Ser. No. 763,856

Term of patent 14 years

U.S. Cl. D7—102



298,793

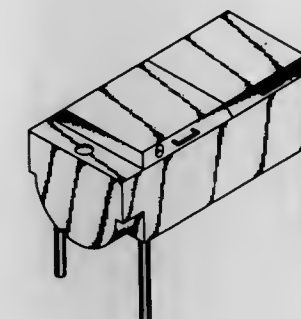
## BARBEQUE GRILL

Robert E. Ragon, 1655 College Pky., Lewisville, Tex. 75067

Filed Oct. 14, 1986, Ser. No. 918,859

Term of patent 14 years

U.S. Cl. D7—332



298,794

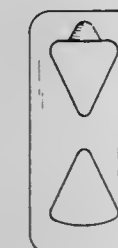
## METAL FENCE POST REMOVER

Roswell D. Allen, 2880 Highway 92, Hotchkiss, Colo. 81419

Filed Apr. 18, 1985, Ser. No. 724,640

Term of patent 14 years

U.S. Cl. D8—19





298,795

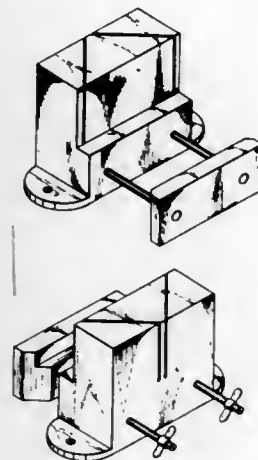
## MITRE BOX

Ronald N. Belsham, 68 St. Leonards Avenue, Leederville, Australia

Filed Oct. 28, 1985, Ser. No. 791,799

Term of patent 14 years

U.S. Cl. D8—71



298,797

## DOOR HANDLE

Paul S. White, Barnsley, and Arthur N. Searl, Wigan, both of United Kingdom, assignors to GKN Crompton Limited, Lancashire, England

Filed Feb. 27, 1986, Ser. No. 836,598

Claims priority, application United Kingdom, Sep. 3, 1985, 1028996

Term of patent 14 years

U.S. Cl. D8—319



298,798

## SPARK PLUG WIRE HARNESS

Ron Finley, Rte. 1, Box 399, Wendell, Id. 83355

Filed Nov. 12, 1985, Ser. No. 805,033

The portion of the term of this patent subsequent to Jun. 17, 2000, has been disclaimed.

Term of patent 14 years

U.S. Cl. D8—357

298,796

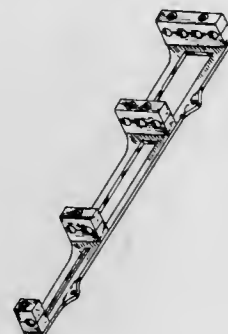
## ATTACHMENT FOR AN ELECTRICAL WALL SWITCH

William L. Comolli, 119 N. McIntosh St., Elberton, Ga. 30635

Filed Dec. 3, 1985, Ser. No. 804,104

Term of patent 14 years

U.S. Cl. D8—300



298,799

## ROLLER BUOY FOR STORING ROPE CONNECTED TO AN UNDERWATER ARTICLE

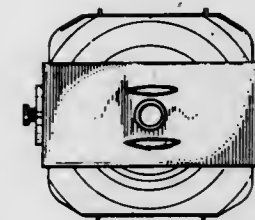
Kenneth D. Saulnier, P.O. Box 97, Yarmouth, Nova Scotia, Canada (B4H 1W5), and Hubert J. Van Leeuwen, 11 Princess Street, Amherst, N.S., Canada

Filed Dec. 24, 1985, Ser. No. 813,212

Claims priority, application Canada, Aug. 1, 1985, 01-08-85-9

Term of patent 14 years

U.S. Cl. D8—359



298,801

## PANEL FASTENER OR THE LIKE

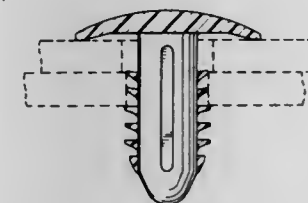
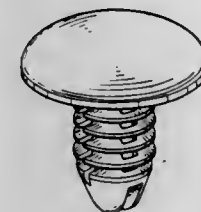
Tomoaki Satoh, Yokohama, Japan, assignor to Nifco Inc., Yokohama, Japan

Filed Mar. 20, 1986, Ser. No. 845,375

Claims priority, application Japan, Sep. 26, 1985, 60-40478

Term of patent 14 years

U.S. Cl. D8—382



298,802

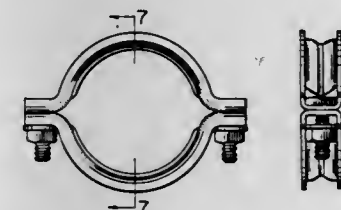
## PIPE CLAMP

Harry Tekirian, 4561 Curtis, Dearborn, Mich. 48126

Filed Mar. 24, 1986, Ser. No. 845,764

Term of patent 14 years

U.S. Cl. D8—396



298,800

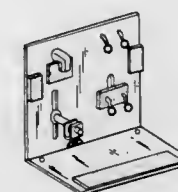
## COWBELL/WOODBLOCK AND FOOT PEDAL SUPPORT STAND

Gilberto B. Diaz, P.O. Box 3287, Taos, N. Mex. 87571

Filed May 31, 1985, Ser. No. 739,677

Term of patent 14 years

U.S. Cl. D8—373



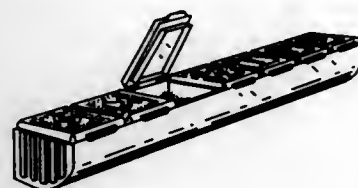
298,803

## COMPARTMENTED PILL CONTAINER

Wade M. Ebling, 1017 Beecher Ave., Brigham City, Utah 84302  
Filed Oct. 28, 1985, Ser. No. 791,739

Term of patent 14 years

U.S. Cl. D9—339



298,804

## BEER BOTTLE

Hans Brindfors, Stockholm, Sweden, assignor to AB Broderus  
Spendrup, Sweden

Filed Dec. 19, 1985, Ser. No. 810,597

Term of patent 14 years

U.S. Cl. D9—390



298,805

## BOTTLE OR SIMILAR ARTICLE

William H. Harrison, Seattle, Wash., assignor to International  
Labricants, Inc., Seattle, Wash.

Filed Dec. 9, 1985, Ser. No. 806,743

Term of patent 14 years

U.S. Cl. D9—411



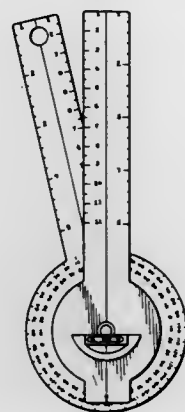
298,806

## LEVELING ROTATIONAL GONIOMETER

Carol J. Tandy, 82 Mountain View Rd., Williston, Vt. 05495  
Filed May 15, 1986, Ser. No. 863,538

Term of patent 14 years

U.S. Cl. D10—62



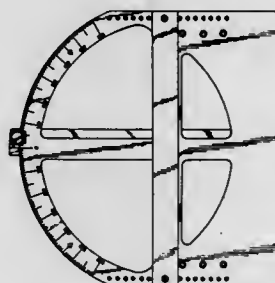
298,807

## PORTABLE PRECISION GUIDE FOR POWERED HAND TOOLS

Charles B. Small, 8804 Citation Dr., Lake Park, Fla. 33410  
Filed Jan. 15, 1986, Ser. No. 818,962

Term of patent 14 years

U.S. Cl. D10—65



298,808

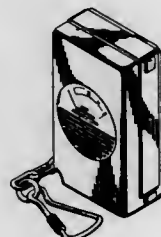
## VOLTMETER OR SIMILAR ARTICLE

James Wang, Taipei, Taiwan, assignor to Stuart Instrument Co.,  
Ltd., Taiwan

Filed Feb. 4, 1986, Ser. No. 825,887

Term of patent 14 years

U.S. Cl. D10—107



298,809

## ARTIFICIAL FLOWER WITH INFLATED BLOSSOM

John C. Davis, Palatine, Ill., assignor to CTI Industries Corpo-  
ration, Barrington, Ill.

Filed Jul. 28, 1986, Ser. No. 889,897

Term of patent 14 years

U.S. Cl. D11—117



298,811

## FOUR WHEELED MOTORCYCLE

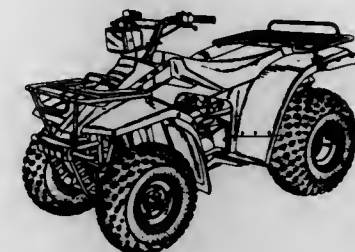
Kazuo Morita, Koshi, Japan, assignor to Suzuki Jidosha Kogyo  
Kabushiki Kaisha, Shizuoka, Japan

Filed May 16, 1986, Ser. No. 864,121

Claims priority, application Japan, Jan. 10, 1986, 61-653

Term of patent 14 years

U.S. Cl. D12—107



298,812

## FOUR WHEELED MOTORCYCLE

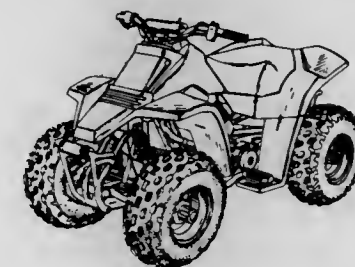
Ichiro Miyata, Hamamatsu, Japan, assignor to Suzuki Jidosha  
Kogyo Kabushiki Kaisha, Shizuoka, Japan

Filed May 16, 1986, Ser. No. 864,122

Claims priority, application Japan, Jan. 21, 1986, 61-1784

Term of patent 14 years

U.S. Cl. D12—107



298,813

## STEM FOR BICYCLE HANDLEBARS

Lucio Borromeo, Torino, Italy, assignor to 3 T. S.p.A., Torino,  
Italy

Filed Sep. 24, 1986, Ser. No. 911,286

Claims priority, application Italy, Mar. 24, 1986, 53179/86[U]

Term of patent 14 years

U.S. Cl. D12—118



298,810

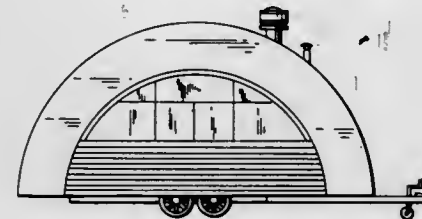
## MOBILE FOOD STAND

Jüri Vilval, Sturegatan 28, 114 36 Stockholm, Sweden  
Filed Nov. 7, 1986, Ser. No. 929,208

Claims priority, application Sweden, May 9, 1986, 86-1153

Term of patent 14 years

U.S. Cl. D12—102





298,814

**SUPPORT FOR A SADDLE OF A BICYCLE**

Lacio Borromeo, Torino, Italy, assignor to 3 T S.p.A., Torino, Italy

Filed Jan. 23, 1986, Ser. No. 824,340

Claims priority, application Italy, Jul. 31, 1985, 53661/85[U]

Term of patent 14 years

U.S. Cl. D12-119



298,817

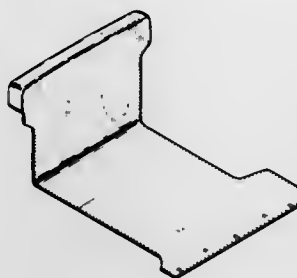
**CARGO LINER FOR OPEN CARGO COMPARTMENT OF AN AUTOMOBILE**

Thomas F. Hamilton, 1634 Ixias Court, San Jose, Calif. 95124

Filed May 14, 1986, Ser. No. 863,390

Term of patent 14 years

U.S. Cl. D12-155



298,815

**BABY CARRIAGE**

Kenzon Kassai, Osaka, Japan, assignor to Aprica Kassai Kabushikikaisha, Osaka, Japan

Filed Nov. 18, 1986, Ser. No. 932,894

Claims priority, application Japan, May 20, 1986, 61-19279

Term of patent 14 years

U.S. Cl. D12-129



298,818

**TRUCK CAP**

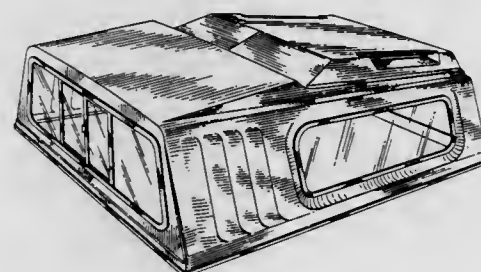
Richard J. Sillicker, 10 St. Andrews Drive, Unit 56, Hamilton, Ontario, Canada (L8K 5J6)

Filed Sep. 4, 1986, Ser. No. 904,308

Claims priority, application Canada, Mar. 11, 1986, 11-03-86-1

Term of patent 14 years

U.S. Cl. D12-156



298,816

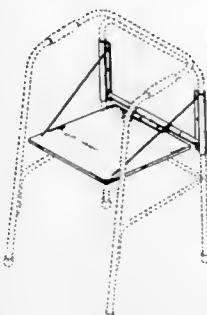
**SEAT UNIT FOR HEALTH CARE WALKER**

Elder Burkhardt, deceased, late of Richmond; by James Burkhardt, executor, 2519 E. Main, and Ruth C. Mason, 1674 SW. 39th St., both of Richmond, all of Ind. 47374

Filed Aug. 22, 1984, Ser. No. 643,190

Term of patent 14 years

U.S. Cl. D12-133



298,819

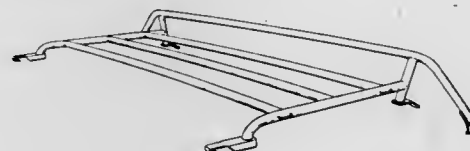
**RACK FOR AN AUTOMOBILE**

Arne R. Holmström, Trollhättan, Sweden, assignor to Saab-Scania Aktiebolag, Trollhättan, Sweden

Filed Jul. 10, 1986, Ser. No. 884,304

Term of patent 14 years

U.S. Cl. D12-157



298,820

**BICYCLE MUD GUARD**

John D. Breen, Franklin, and Richard D. Williams, Brentwood, both of Tenn., assignors to The Murray Ohio Manufacturing Co., Brentwood, Tenn.

Filed Mar. 18, 1986, Ser. No. 845,052

Term of patent 14 years

U.S. Cl. D12-186



298,822

**PADDLE**

Tomislav F. Littledeer, Carignan, Canada, assignor to The Murray Ohio Manufacturing Co., Brentwood, Tenn.

Filed Mar. 3, 1986, Ser. No. 841,346

Term of patent 14 years

U.S. Cl. D12-215



298,821

**AUTOMOBILE MAT**

Harry J. Riley, 5401 Old National Hwy., Apt. 1301, College Park, Ga. 30349

Filed Feb. 28, 1985, Ser. No. 706,821

Term of patent 14 years

U.S. Cl. D12-203



298,823

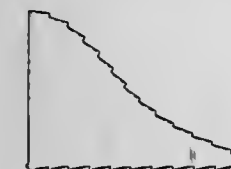
**COMBINED AUTO CHOCK AND CONTAINER**

Aaron Zutler, 19 Clearmeadow La., Woodbury, N.Y. 11797

Filed Nov. 20, 1986, Ser. No. 933,068

Term of patent 14 years

U.S. Cl. D12-217



298,824

**POWER INVERTER**

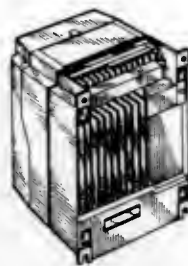
Nobuyuki Kondo; Yoshinori Abe, both of Kamakura; Hideaki Tata, Nagoya; Eiji Ito, Nagoya; Katsuhiko Chonan, Nagoya, and Hideo Iinuma, Nagoya, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 3, 1985, Ser. No. 743,703

Claims priority, application Japan, Dec. 3, 1984, 59-49661; Dec. 3, 1984, 59-49665; Dec. 3, 1984, 59-49666; Dec. 3, 1984, 59-49667

Term of patent 14 years

U.S. Cl. D13-4



298,825

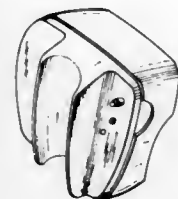
**RECHARGEABLE POWER SUPPLY FOR BICYCLE ACCESSORIES**

Hubert Konzor, Fröndenberg, Fed. Rep. of Germany, assignor to Union Sila, van de Loo & Co. GmbH, Fröndenberg, Fed. Rep. of Germany

Filed Aug. 8, 1985, Ser. No. 763,679

Term of patent 14 years

U.S. Cl. D13-11



298,826

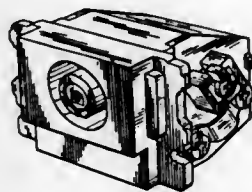
**CONNECTOR FOR COAXIAL CABLE**

Toshiaki Nakajo, and Hideo Hayashi, both of Kadoma, Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Sep. 25, 1985, Ser. No. 782,945

Term of patent 14 years

U.S. Cl. D13-24



298,827

**INTERCOMMUNICATION TELEPHONE HANDSET AND STAND THEREFOR**

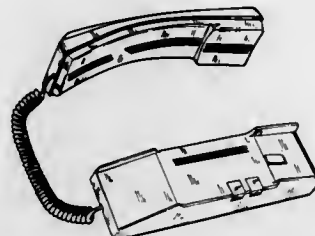
Orlando Miozzo, Via A. Ferrero, 9, 35133 Padova, Italy

Filed Mar. 20, 1987, Ser. No. 28,293

Claims priority, application Italy, Dec. 4, 1986, 23928/86[U]

Term of patent 14 years

U.S. Cl. D14-52



298,828

**INTERCOM TELEPHONE SET HOUSING**

Orlando Miozzo, Via A. Ferrero, 9, 35133 - Padova, Italy

Filed Mar. 20, 1987, Ser. No. 28,294

Claims priority, application Italy, Oct. 24, 1986, 23485/86[U]

Term of patent 14 years

U.S. Cl. D14-52



298,829

**HANDSET TELEPHONE AND STAND FOR VEHICLES**

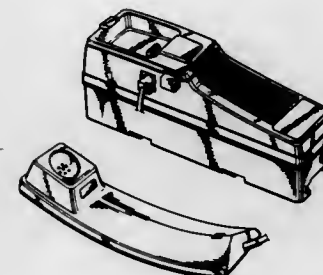
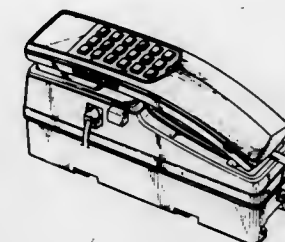
Katsuhito Watanabe, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Dec. 17, 1986, Ser. No. 945,295

Claims priority, application Japan, Jun. 20, 1986, 61-23644

Term of patent 14 years

U.S. Cl. D14-53



298,831

**TELEPHONE INSTRUMENT BASE**

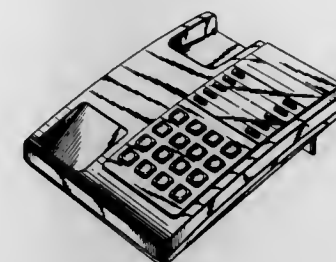
Steven W. Hughes, Burgess Hill, and Paul L. Brennan, London, both of England, assignors to British Telecommunications public limited company, Great Britain

Filed Jan. 12, 1987, Ser. No. 2,258

Claims priority, application United Kingdom, Jul. 15, 1986, 1035352

Term of patent 14 years

U.S. Cl. D14-62



298,830

**COMBINATION TELEPHONE HANDSET AND STAND WITH DIALING MEANS**

Guillermo F. Brignole, Pasadena, and Robert E. Lee, Solana Beach, both of Calif., assignors to TeleQuest, Inc., San Diego, Calif.

Filed Feb. 26, 1987, Ser. No. 19,293

Term of patent 14 years

U.S. Cl. D14-53



298,832

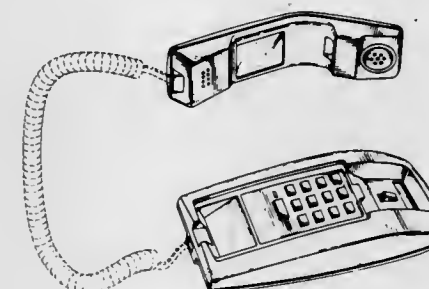
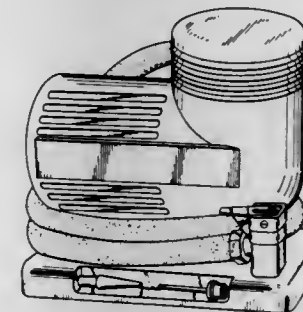
**PORTABLE AIR COMPRESSOR**

Jerald V. Dunlap, Pacific Palisades, Calif., assignor to M-D & Co., Mammoth Lakes, Calif.

Filed Apr. 10, 1986, Ser. No. 851,368

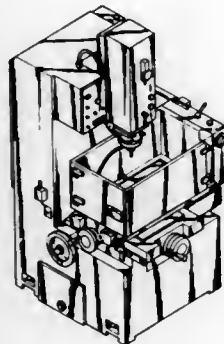
Term of patent 14 years

U.S. Cl. D15-9





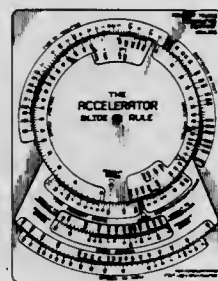
298,833  
MACHINE FOR CUTTING WORKPIECES UTILIZING  
ELECTRICAL DISCHARGE  
Shun T. Yang, No. 49, Lane 265, Tai Ping Road, Tai Ping  
Hsiang, Taichun Hsien, Taiwan  
Filed Mar. 28, 1986, Ser. No. 846,562  
Term of patent 14 years  
U.S. Cl. D15-127



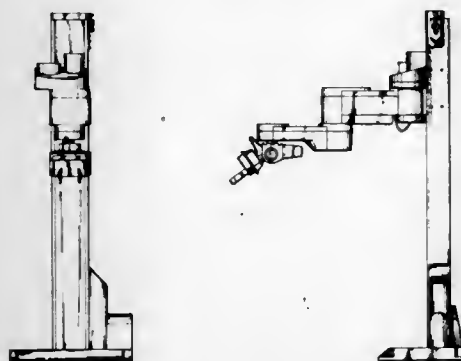
298,835  
EYE GLASS HOLDER  
Mike Vukasinovich, 315 Mobil Ave., Camarillo, Calif. 93010  
Filed Jul. 10, 1986, Ser. No. 884,020  
Term of patent 14 years  
U.S. Cl. D16-129



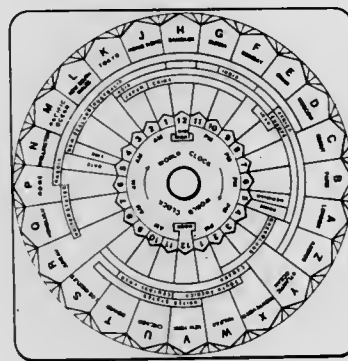
298,836  
SLIDE RULE  
R. Deil Pugh, 13622 Pine Villa La., Ft. Myers, Fla. 33912  
Filed Dec. 12, 1985, Ser. No. 808,288  
Term of patent 14 years  
U.S. Cl. D18-10



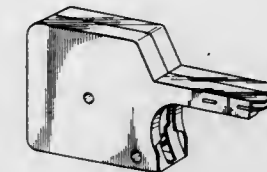
298,834  
ROBOTIC ARM  
Timothy J. Jones, London, England, assignor to Universal Machine Intelligence Limited, London, England  
Filed Jul. 25, 1985, Ser. No. 758,799  
Claims priority, application United Kingdom, May 10, 1985, 1026718  
Term of patent 14 years  
U.S. Cl. D15-199



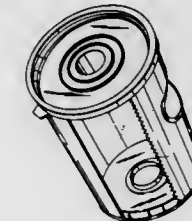
298,837  
WORLD TIME ZONE INDICATOR/CALCULATOR  
Robert J. Thomas, 3451 Academy, Dearborn, Mich. 48124  
Filed Oct. 9, 1985, Ser. No. 785,771  
Term of patent 14 years  
U.S. Cl. D19-64



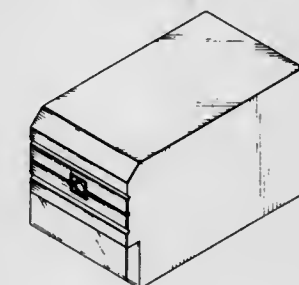
298,838  
CASSETTE FOR TAPE OF PAPER PUNCHING HOLE  
REINFORCING PIECE  
Norio Suets, Chiba, and Hiroyasu Hoshino, Tokyo, both of  
Japan, assignors to Elm Industry Co., Ltd., Tokyo, Japan  
Filed Nov. 21, 1986, Ser. No. 933,689  
Term of patent 14 years  
U.S. Cl. D19-67



298,839  
COMBINED MASKING TAPE DISPENSER AND LOCK  
Hans Söderberg, Försbacken, and Olof Engwall, Lidingö, both  
of Sweden, assignors to Sprayway Maskin AB, Stockholm,  
Sweden  
Filed Dec. 23, 1985, Ser. No. 812,908  
Claims priority, application Sweden, Jun. 28, 1985, 85-1654  
Term of patent 14 years  
U.S. Cl. D19-69



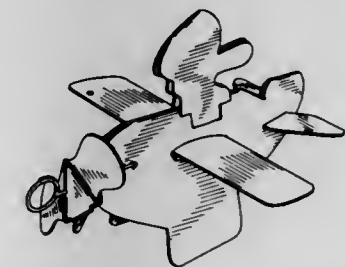
298,840  
PENCIL SHARPENER  
William Macowski, Caldwell, N.J., assignor to Ketcham &  
McDougall, Inc., Roseland, N.J.  
Filed Jun. 24, 1985, Ser. No. 747,756  
Term of patent 14 years  
U.S. Cl. D19-73



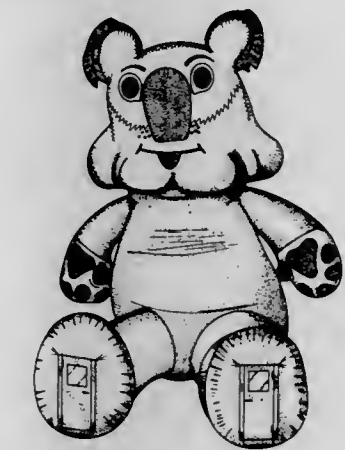
298,841  
WHISTLE  
Douglas L. Green, 250 S. Lincoln St., Denver, Colo. 80209  
Filed Nov. 19, 1985, Ser. No. 805,768  
Term of patent 14 years  
U.S. Cl. D21-64



298,842  
AIRPLANE TOY  
John H. Newnam, 20 Village Avenue, Doncaster, Victoria  
3108, Australia  
Filed Mar. 27, 1986, Ser. No. 847,005  
Claims priority, application Australia, Oct. 14, 1985, 2920/85  
Term of patent 14 years  
U.S. Cl. D21-89



298,843  
INFLATABLE KOALA BEAR FIGURE  
James A. Daemar, New South Wales, Australia, assignor to  
Syndicated Amusements Limited, New South Wales, Australia  
Filed Mar. 19, 1986, Ser. No. 845,066  
Claims priority, application Australia, Sep. 19, 1985, 2628/85  
Term of patent 14 years  
U.S. Cl. D21-159



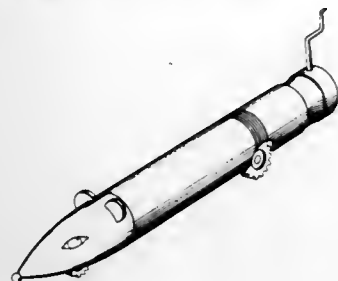
298,844

## SIMULATIVE WHEELED TOY

Richard J. Hood, 1520 Harry Rd., Manhattan, Kans. 66502  
Filed Dec. 2, 1985, Ser. No. 803,830

Term of patent 14 years

U.S. Cl. D21-188



298,845

## PHYSICAL EXERCISER

Sonja Giger, Tugginerweg 3, 4500-Solothurn, Switzerland  
Filed Nov. 18, 1985, Ser. No. 805,171

Claims priority, application Hague, Jun. 10, 1985, DM/005  
376

Term of patent 14 years

U.S. Cl. D21-191



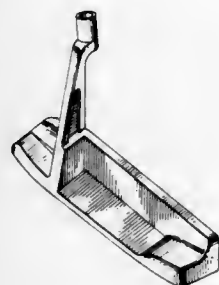
298,846

## GOLF CLUB HEAD

Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204  
Filed Apr. 4, 1986, Ser. No. 847,890

Term of patent 14 years

U.S. Cl. D21-217



298,847

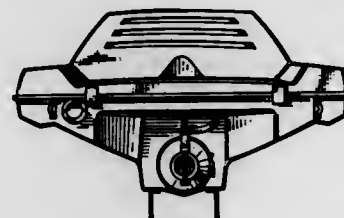
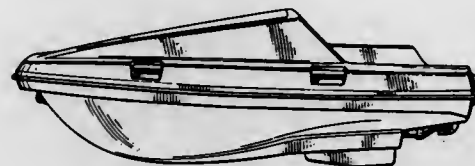
## WATER CRAFT

Leon Raiter, St. Cloud, Minn.; John Mor, Vernon, Canada, and  
Devlin Hunt, Brainard, Minn., assignors to Ski-Free Marine,  
Inc., Calgary, Canada

Filed Sep. 10, 1986, Ser. No. 905,938

Term of patent 14 years

U.S. Cl. D21-228



298,848

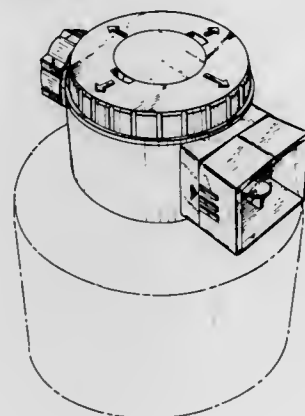
## ASPIRATION SPRAYER FOR INSECTICIDES

Ho Chow, Cliffside Park, N.J., and Edward A. Kozloski, Baby-  
lon Village, N.Y., assignors to Hunter-Melnor

Filed Apr. 7, 1986, Ser. No. 850,412

Term of patent 14 years

U.S. Cl. D23-213



298,849

## CAP FOR SAP COLLECTING UNIT

Michel Lanoue, Ste-Foy, Canada, assignor to Les Industries  
Provinciales Ltee, St. Damien, Canada

Filed Oct. 7, 1985, Ser. No. 784,944

Term of patent 14 years

U.S. Cl. D23-260



298,850

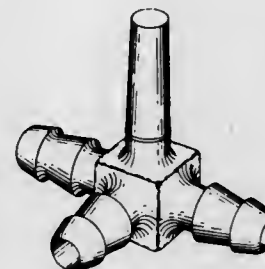
## CONNECTOR FOR SAP-COLLECTING SYSTEM

Michel Lanoue, Ste-Foy, Canada, assignor to Les Industries  
Provinciales Ltee, St. Damien, Canada

Filed Oct. 7, 1985, Ser. No. 784,943

Term of patent 14 years

U.S. Cl. D23-263



298,851

COMBINED SHOWER SPLASH GUARD AND SOAP  
HOLDER

Paul A. Bourque, Moncton, Canada, assignor to Magnum Enter-  
prises Ltd., New Brunswick, Canada

Filed Feb. 5, 1986, Ser. No. 826,506

Claims priority, application Canada, Aug. 6, 1985, 06-08-85-12

Term of patent 14 years

U.S. Cl. D23-307



298,852

## GABLE VENTILATOR

Arthur Waltz, 2000 E. Columbia Way, Vancouver, Wash. 98661,  
and Raymond E. Irwin, 3515 S. Cedar, Tacoma, Wash. 98409

Filed Sep. 13, 1982, Ser. No. 417,710

The portion of the term of this patent subsequent to Oct. 11,  
2002, has been disclaimed.

Term of patent 14 years

U.S. Cl. D23-387



298,853

## GABLE VENTILATOR

Arthur Waltz, 2000 E. Columbia Way, Vancouver, Wash. 98661,  
and Raymond E. Irwin, 3515 S. Cedar, Tacoma, Wash. 98409

Filed Sep. 13, 1982, Ser. No. 417,919

The portion of the term of this patent subsequent to Oct. 11,  
2002, has been disclaimed.

Term of patent 14 years

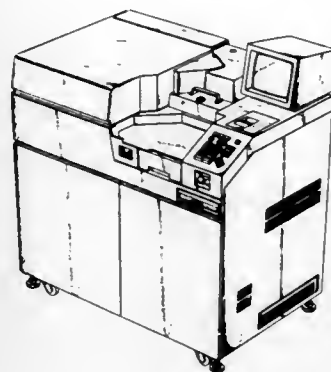
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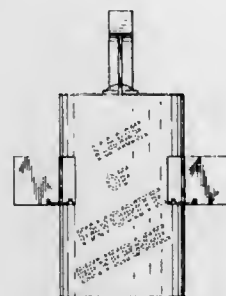
298,854

**AUTOMATIC ENZYME IMMUNOLOGICAL ANALYZER**  
Masaharu Kame, Sagami-hara, and Kenichi Abe, Hachioji, both of Japan, assignors to Olympus Optical Company, Inc., Japan  
Filed Apr. 30, 1986, Ser. No. 858,298  
Term of patent 14 years  
U.S. Cl. D24—1.1



298,857

**SELF-CONTAINED BEVERAGE CONCESSION STAND**  
Thomas W. Hodson, 155 Plantation Ave., P.O. Box 1026, Tavernier, Fla. 33070  
Filed Jul. 23, 1985, Ser. No. 758,114  
Term of patent 14 years  
U.S. Cl. D25—1.1



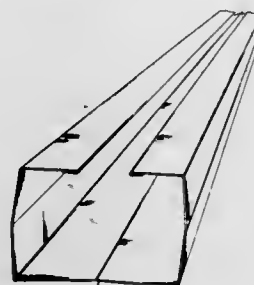
298,855

**COMBINED DENTAL PICK AND FLOSSING AID**  
Douglas J. White, Oceanport, N.J., assignor to Bio-Pak Associates, Farmingdale, N.J.  
Filed Oct. 16, 1986, Ser. No. 919,816  
Term of patent 14 years  
U.S. Cl. D24—11



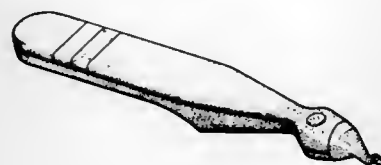
298,858

**DOWNPIPE OR THE LIKE**  
Karl G. Andersson, deceased, late of Risögrund (by Marianne Berglund, heir), and Bengt Paulsson, Järnforsen, both of Sweden, assignors to AB Siba-Verken, Järnforsen, Sweden  
Filed Mar. 12, 1985, Ser. No. 710,681  
Term of patent 14 years  
U.S. Cl. D25—164



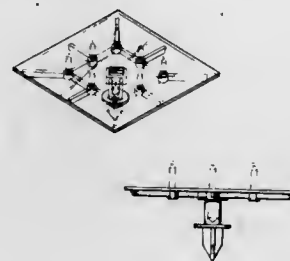
298,856

**OPHTHALMIC INSTRUMENT**  
Steven E. Feldon, San Marino; David A. Wallace, Beverly Hills; James E. Grove, Van Nays, and Thor R. Halseth, Simi Valley, all of Calif., assignors to Design Team Partners, Glendale, Calif.  
Filed Sep. 27, 1985, Ser. No. 782,026  
Term of patent 14 years  
U.S. Cl. D24—17



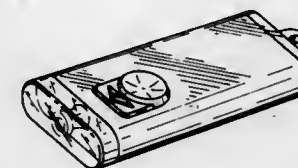
298,859

**COMBINED CAKE SHIELD AND CANDLE HOLDER**  
Louis Crisci, 406 N. Putnam Ave., Lindenhurst, N.Y. 11757  
Filed Aug. 18, 1986, Ser. No. 897,726  
Term of patent 14 years  
U.S. Cl. D26—10



298,860

**MINIATURE RECHARGEABLE POCKET LAMP**  
Waldemar Witte, Steinbergerstrasse 2, 7157 Murrhardt, Fed. Rep. of Germany  
Filed Apr. 8, 1986, Ser. No. 850,902  
Term of patent 14 years  
U.S. Cl. D26—46



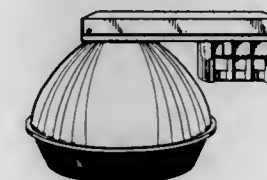
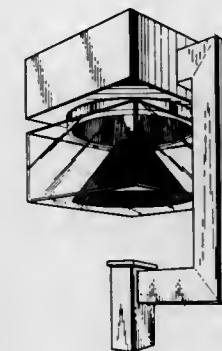
298,863

**LOW PROFILE LIGHTING FIXTURE**  
Terry M. Tharp; David W. Roberts; John C. McCartney, and John W. Harvey, all of Newark, Ohio, assignors to Manville Corporation  
Filed Feb. 19, 1986, Ser. No. 834,462  
Term of patent 14 years  
U.S. Cl. D26—88



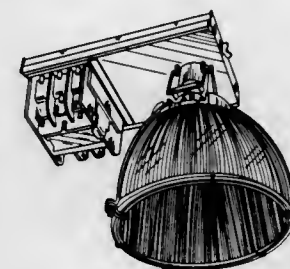
298,861

**AREA LIGHT**  
Robert L. Ewing; Herbert A. Fouke, both of Newark; James S. Hughes, and Bruce G. Bruggeman, both of Columbus, all of Ohio, assignors to Manville Corporation, Denver, Colo.  
Filed Feb. 3, 1986, Ser. No. 825,298  
The portion of the term of this patent subsequent to May 17, 2002, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D26—71



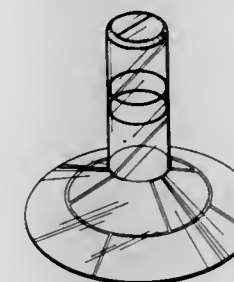
298,862

**LOW PROFILE LIGHTING FIXTURE DESIGN**  
Terry M. Tharp; David W. Roberts; John C. McCartney, and John W. Harvey, all of Newark, Ohio, assignors to Manville Corporation, Denver, Colo.  
Filed Feb. 19, 1986, Ser. No. 834,465  
Term of patent 14 years  
U.S. Cl. D26—88



298,864

**DISPOSABLE HANDLE FOR OPERATING ROOM LIGHTS**  
John R. Jefferson, Longwood, Fla., assignor to Devon Industries, Inc., Chatsworth, Calif.  
Filed Aug. 15, 1985, Ser. No. 765,657  
Term of patent 14 years  
U.S. Cl. D26—140



298,865

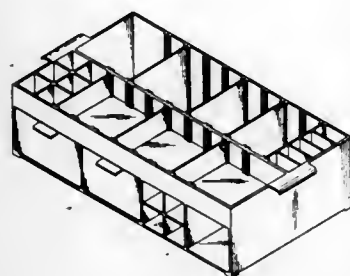
## TRAY FOR COSMETICS AND SUNDRIES

Howard Sassman, 1079 Hillaboro Mile, Hillaboro, Fla. 33062

Filed May 16, 1986, Ser. No. 864,944

Term of patent 14 years

U.S. Cl. D28—76



298,868

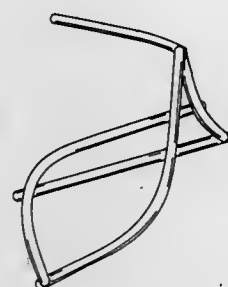
## FACE GUARD FOR A HELMET

Kenneth C. Klindt, 1422 Tim Ct., Port Orange, Fla. 32019

Filed Feb. 26, 1986, Ser. No. 836,572

Term of patent 14 years

U.S. Cl. D29—16



298,866

## HAIR WEAVING MACHINE

Teresa Reed, 1632 Martin Luther King, East St Louis, Ill. 62205

Filed Dec. 12, 1985, Ser. No. 808,023

Term of patent 14 years

U.S. Cl. D28—93



298,869

## PROTECTIVE SLEEVE

Earlyne M. Thomas, 4627 Korte St., St. Louis, Mo. 63115

Filed Dec. 27, 1985, Ser. No. 814,033

Term of patent 14 years

U.S. Cl. D29—20



298,867

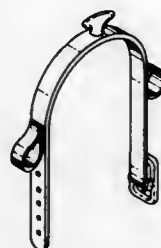
## BODY HARNESS OR SIMILAR ARTICLE

Darren Herron, 600-64 Sumpter, Belleville, Mich. 48111

Filed Apr. 28, 1986, Ser. No. 857,818

Term of patent 14 years

U.S. Cl. D29—11



298,870

## CARRIER FOR SMALL ANIMALS OR THE LIKE

Lynn M. Heisler, 2691 Wadsworth Rd., Shaker Heights, Ohio

44122

Filed May 12, 1986, Ser. No. 862,573

Term of patent 14 years

U.S. Cl. D30—109



298,872

## COLLAR-MOUNTED ANIMAL TRAINING RECEIVER UNIT

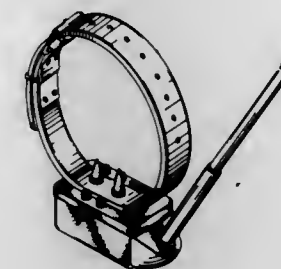
Robert L. Cassel, and John Vancza, both of Tucson, Ariz.,

assignors to Tri-Tronics, Inc., Tucson, Ariz.

Filed Jun. 30, 1986, Ser. No. 879,967

Term of patent 14 years

U.S. Cl. D30—199



298,871

## FLEXIBLE CAT EXERCISER

John C. Killen, 271 S. Grand St., Orange, Calif. 92666

Filed Aug. 26, 1985, Ser. No. 769,428

Term of patent 14 years

U.S. Cl. D30—160



298,873

## COMBINED WASHER AND DRYER

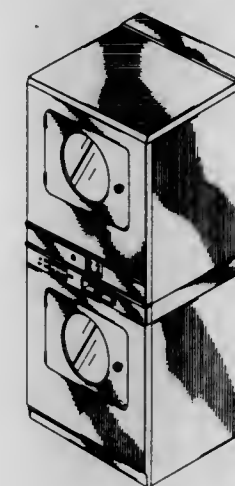
Donald E. Erickson, and James D. Wilson, both of Newton,

Iowa, assignors to The Maytag Company, Newton, Iowa

Filed Jan. 15, 1986, Ser. No. 819,210

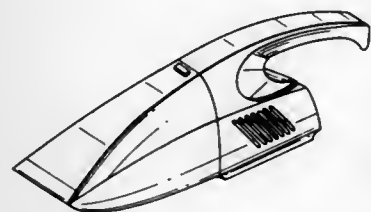
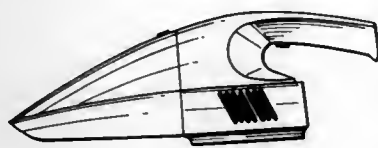
Term of patent 14 years

U.S. Cl. D32—5





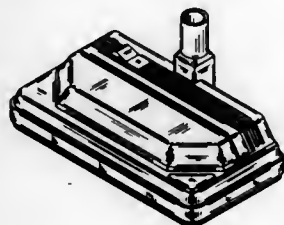
298,874  
**VACUUM CLEANER**  
 Kazuharu Nakamura, Aichi, Japan, assignor to Toyotomi Kogyo Co., Ltd., Aichi, Japan  
 Filed Dec. 17, 1985, Ser. No. 809,824  
 Claims priority, application Japan, Jun. 18, 1985, 60-25739  
 Term of patent 14 years  
 U.S. Cl. D32—18



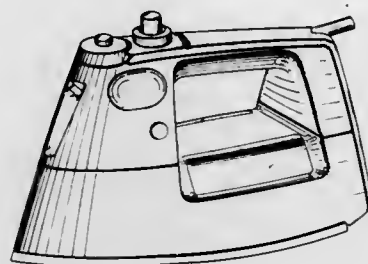
298,875  
**VACUUM CLEANER**  
 Kazuharu Nakamura, Aichi, Japan, assignor to Toyotomi Kogyo Co., Ltd., Aichi, Japan  
 Filed Dec. 17, 1985, Ser. No. 809,823  
 Claims priority, application Japan, Jun. 18, 1985, 60-25740  
 Term of patent 14 years  
 U.S. Cl. D32—18



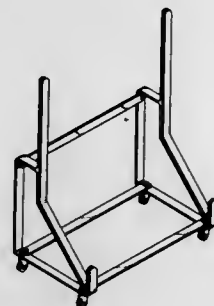
298,876  
**VACUUM CLEANER NOZZLE**  
 Sachio Yamamoto, and Chikashi Kuriya, both of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan  
 Filed Apr. 18, 1986, Ser. No. 855,770  
 Claims priority, application Japan, Nov. 1, 1985, 60-46206  
 Term of patent 14 years  
 U.S. Cl. D32—33



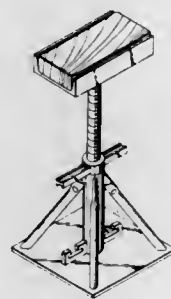
298,877  
**ELECTRIC IRON**  
 Robert Osit, Shelton, Conn., assignor to Black & Decker, Inc., Newark, Del.  
 Filed Sep. 15, 1986, Ser. No. 906,782  
 Term of patent 14 years  
 U.S. Cl. D32—70



298,878  
**STORAGE CART**  
 Richard S. Dunchock, South Laguna, Calif., assignor to SL Corporation, Troy, Mich.  
 Filed Apr. 16, 1986, Ser. No. 852,928  
 Term of patent 14 years  
 U.S. Cl. D34—17



298,879  
**SUPPORTING AND STABILIZING STAND FOR A BOAT**  
 Reg D. Corbett, Bay Village, Ohio, assignor to Rolec, Inc., Westlake, Ohio  
 Filed Aug. 7, 1986, Ser. No. 894,130  
 Term of patent 14 years  
 U.S. Cl. D34—31



## LIST OF PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF DECEMBER, 1988

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- A. & M. Cousin Etablissements Cousin Freres: See—  
 Papon, Yves; and Droulon, Georges, 4,789,205, Cl. 297-367.000.
- A/S Niro Atomizer: See—  
 J. na, Ebbe S.; M. Iler, Jens T.; and Nielsen, Kirsten K., 4,789,532, Cl. 423-240.000.
- A/S Raufoss Ammunisjonsfabrikker: See—  
 Eftedal, Bard, 4,789,116, Cl. 244-114.00R.
- AAI Corporation: See—  
 Chandler, Charles E., 4,788,899, Cl. 89-6.000.
- Aalborg Værft A/S: See—  
 Holm, Ejler L.; and Clausen, Jens C., 4,788,919, Cl. 110-347.000.
- Aarseth, Craig T., to Eaton Corporation. Low elevation guidance system. 4,789,864, Cl. 342-408.000.
- AB Volvo: See—  
 Andersson, Bert R., 4,789,186, Cl. 280-808.000.
- Abatjoglou, Anthony G.: See—  
 Billig, Ernst; Abatjoglou, Anthony G.; Bryant, David R.; Murray, Rex E.; and Maher, John M., 4,789,753, Cl. 558-85.000.
- Abe, Kazutoshi: See—  
 Nishimura, Tsutomu; Saito, Yasuo; Shindo, Kenji; and Abe, Kazutoshi, 4,789,707, Cl. 525-157.000.
- Abel, Jean-Claude: See—  
 Trieba, Friedrich; Raedisch, Helmer; Bravet, Jean-Louis; Abel, Jean-Claude; and Crux, Noel, 4,789,600, Cl. 428-425.600.
- Abert, Christine; Beileites, Eggert; Carl, Gunter; Grosse, Steffen; Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi, Ralf; Jungto, Harry; Knak, Guenther; Kreisel, Lutz; Musil, Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner, to Veb Jenaer Glaswerk. Micaceous-cordierite-glass ceramic. 4,789,649, Cl. 501-3.000.
- ABM Industries, Inc.: See—  
 Shore, Barry; and Schwarzberger, Michael, 4,789,054, Cl. 194-212.000.
- Abraham, Frederic C. Expansion anchor stud. 4,789,282, Cl. 411-24.000.
- Acampora, Anthony; and Winters, Jack H., to American Telephone and Telegraph Co., AT&T Bell Labs. Wireless network for wideband indoor communications. 4,789,983, Cl. 370-96.000.
- Acebo Company: See—  
 Sorensen, Jens O., 4,789,326, Cl. 425-575.000.
- Ackermans, Fabienne: See—  
 Frank, Robert; Klein, Jean P.; Ackermans, Fabienne; and Bazin, Herve, 4,789,735, Cl. 530-395.000.
- Ackland, Martin R.; and De'Ath, Roderick M., to Metal Box p.l.c. Apparatus for detecting micro-organisms. 4,789,635, Cl. 435-291.000.
- Acton, Mary. Fence guard device. 4,789,138, Cl. 256-59.000.
- Adachi, Keiichi: See—  
 Sakanoue, Kei; Hirano, Shigeo; Ueda, Takehiko; and Adachi, Keiichi, 4,789,624, Cl. 430-372.000.
- Adams, J. Robert, Jr., to Ethyl Corporation. Polyaryloxyposphazene caustic wash. 4,789,728, Cl. 528-489.000.
- Adhesive Engineering Company: See—  
 Senf, John W., 4,789,100, Cl. 239-61.000.
- Adman, Nils G., to Atlas Copco Aktiebolag. Hydraulic torque impulse generator. 4,789,373, Cl. 464-25.000.
- Advance Process Supply Company: See—  
 Knoth, Dale W., 4,789,621, Cl. 430-283.000.
- Advanced Composite Materials Corporation: See—  
 Rhodes, James F.; Dziedzic, Chester J.; and Beatty, Ronald L., 4,789,277, Cl. 409-131.000.
- Advanced Micro Devices, Inc.: See—  
 Birkner, John M.; Tavana, Danesh M.; Chan, Andrew K.; and Wong, Sing Y., 4,789,951, Cl. 364-716.000.
- Cox, William P.; and Liang, Mong-Song, 4,789,883, Cl. 357-23.700.
- Koyama, Linda J.; Thomas, Mammen; and Levinson, Harry J., 4,789,760, Cl. 174-68.500.
- Liou, Jinn-Yau; Lee, May-Lin; Kok, Moon S.; Yu, James; and Tam, Aloysius T., 4,789,967, Cl. 365-189.000.
- Vasceghi, Nader, 4,789,797, Cl. 307-475.000.
- Yen, Yung-Chau, 4,789,560, Cl. 427-96.000.
- Advanced Mineral Technologies, Inc.: See—  
 Brierley, James A.; Brierley, Corale L.; Decker, Raymond F.; and Goyak, George M., 4,789,481, Cl. 210-661.000.
- Advanced Technology Materials, Inc.: See—  
 Stevens, Ward C., 4,789,563, Cl. 427-252.000.
- Advantest Corporation: See—  
 Nijima, Hironobu, 4,789,945, Cl. 364-490.000.
- AEC-Societe de Chimie Organique et Biologique: See—  
 Giraud, Jean, 4,789,686, Cl. 514-562.000.
- Aerodyne Controls Corporation: See—  
 Miller, James R.; and Tetrault, Leonard P., 4,789,762, Cl. 200-61.45R.
- Aerospatiale Societe Nationale Industrielle: See—  
 Bellego, Roger; and Foch, Etienne, 4,789,119, Cl. 244-226.000.
- Affenzeller, Josef; and Jost, Wolf-Dieter, to Semperit AG. Material based on a caoutchouc-type mixture for producing hard rubber, method of using such material for producing engine components, and engine components manufactured from such material. 4,789,697, Cl. 523-437.000.
- Agency of Industrial Science and Technology: See—  
 Tsuchitani, Masatoshi; Naito, Sakae; and Nakajima, Ryoichi, 4,789,456, Cl. 208-39.000.
- Agfa-Gevaert AG: See—  
 Bauer, Walter; and Schmidt, Manfred, 4,788,810, Cl. 53-266.00R.
- Ahlstrom, Sven A.: See—  
 Palsgard, Gote; Palsgard, Bo; and Ahlstrom, Sven A., 4,788,773, Cl. 33-333.000.
- Ahlstromforetagen Svenska AB: See—  
 Ryham, Rolf, 4,789,428, Cl. 159-47.300.
- Ahmed, Mahboob, to HR, Incorporated. Dryers and control systems therefor. 4,788,775, Cl. 34-48.000.
- Ahmed, Mohamed S.; and Robinson, Geoffrey, to Transfer Technology Limited. Apparatus for working electrically conductive materials by electric erosion. 4,789,447, Cl. 204-224.00M.
- Aho, Kenneth A., to Minnesota Mining and Manufacturing Company. Cone shaped Fresnel reflector. 4,789,921, Cl. 362-348.000.
- Ahrend Groep N.V.: See—  
 van Zee, Eric; Boomama, Harm; Lewerissa, Ronald; and Verbrugge, Jeroen, 4,789,203, Cl. 297-316.000.
- Ahrens, Max, to Steel Casting Engineering, Ltd. Short mold for continuous casting. 4,789,021, Cl. 164-436.000.
- Aiba, Yoshiro: See—  
 Sugie, Masuo; Kurihara, Koji; Aiba, Yoshiro; and Maeda, Toshiaki, 4,789,651, Cl. 501-103.000.
- Aihara, Masahiro: See—  
 Morita, Kouji; and Aihara, Masahiro, 4,788,878, Cl. 74-422.000.
- Ainslie, Norman G.; Brusci, Vlasta A.; Chapman, Daniel W.; Roman-kiw, Lubomir T.; and Wilmer, Richard K., to International Business Machines Corporation. Thin film magnetic read-write head/arm assemblies. 4,789,914, Cl. 360-103.000.
- Air Preheater Company, Inc., The: See—  
 Muscato, Lawrence J., 4,789,024, Cl. 165-10.000.
- Aisin Seiki Kabushiki Kaisha: See—  
 Fukumoto, Ryoichi, 4,788,754, Cl. 24-114.500.
- Okumura, Junji, 4,788,743, Cl. 16-82.000.
- Suzuki, Hiroshi, 4,789,374, Cl. 464-64.000.
- Teranishi, Shunichi, 4,789,209, Cl. 512-12.000.
- Yokoi, Shinji; Naitoh, Kimitaka; and Ohta, Masami, 4,788,731, Cl. 5-478.000.
- Ajiki, Yoshio: See—  
 Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, 4,788,946, Cl. 123-90.160.
- Ajinomoto Co., Inc.: See—  
 Iwai, Kazuo, 4,789,687, Cl. 514-627.000.
- Takemoto, Tadashi; Yukawa, Toshihide; and Hisamitsu, Kunio, 4,789,758, Cl. 562-448.000.
- Yamazaki, Toshihiko; Murase, Shoji; and Motohashi, Tatsuro, 4,789,398, Cl. 71-122.000.
- Yoshimoto, Ryota; Kashima, Nobukazu; Hamuro, Junji; and Mitsugi, Koji, 4,789,658, Cl. 514-12.000.
- Akagi, Motoo: See—  
 Fukke, Hajime; Akagi, Motoo; Kato, Yoshiki; and Nagashiro, Waichi, 4,789,581, Cl. 428-65.000.
- Akahoshi, Kimiharu; and Masui, Mikio, to Minolta Camera Kabushiki Kaisha. Document processing apparatus having fault detection capabilities. 4,789,985, Cl. 371-11.000.
- Akaishi, Yoshiaki: See—  
 Iwase, Yasuyuki; Akaishi, Yoshiaki; and Muranishi, Masaomi, 4,789,261, Cl. 401-190.000.
- Akasaka, Yoshimichi; Nakamura, Ichiro; Ichiryu, Ken; Kometani, Eiji; and Gotoh, Yasuharu, to Hitachi Ltd.; and Hitachi Construction Machinery. Thrust hydrostatic bearing device for use in axial piston machine. 4,788,902, Cl. 91-486.000.
- Akashi, Naotomo; Yokokawa, Takeshi; Ninomiya, Katsuaki; Shima, Harumi; and Horiguchi, Takeshi, to Nippon Sheet Glass Co., Ltd. Transport speed control system for glass annealing installation. 4,789,814, Cl. 318-77.000.
- AKG Akustische u. Kino-Gerate Gesellschaft m.b.H.: See—  
 Pribyl, Richard, 4,790,021, Cl. 381-191.000.
- Akhavi, David S., to Iolab Corporation. Molded optic for an intraocular lens. 4,789,324, Cl. 425-352.000.
- Akino, Hiroshi, to Kabushiki Kaisha Audio-Technica. Narrow directional microphone. 4,789,044, Cl. 181-158.000.

- Akiyama, Hideki: See—  
Morita, Toyoo; and Akiyama, Hideki, 4,788,812, Cl. 53-447.000.
- Akutsu, Shigeru, to Konishiroku Photo Industry Co., Ltd. Magnetic recording medium. 4,789,583; Cl. 428-143.000.
- Albe S.A.: See—  
Germann, Werner, 4,789,263, Cl. 401-2.090.
- Albin, Robert D., to Hewlett-Packard Company. Integrated capacitance structures in microwave finline devices. 4,789,840, Cl. 329-161.000.
- Alcatel N.V.: See—  
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- Alexandrovich, Peter S.: See—  
Bugner, Douglas E.; and Alexandrovich, Peter S., 4,789,614, Cl. 430-110.000.
- Alfred Teves GmbH: See—  
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- All-States Inc.: See—  
Shely, William W.; and Wells, Peter M., 4,788,751, Cl. 24-16.0PB.
- Allan, William W., to Packaging Corporation of America. Denesting apparatus. 4,789,291, Cl. 414-128.000.
- Allen, Kenneth R., Jr.: See—  
Swainbank, Hugh B.; Swainbank, Christopher A.; and Allen, Kenneth R., Jr., 4,788,992, Cl. 134-64.00R.
- Allen, Robert H.; and Ibrahim, Jameel, to Ethyl Corporation. Dopant coated bead-like silicon particles. 4,789,596, Cl. 428-404.000.
- Allied Automation Systems, Inc.: See—  
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- Allied Colloids Ltd.: See—  
Farrar, David; and Flesher, Peter, 4,789,695, Cl. 523-336.000.  
Field, John R.; Moody, Gillian M.; and Hunter, Trevor K., 4,789,485, Cl. 210-727.000.
- Allied-Signal, Inc.: See—  
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- Allsopp, Mary F.: See—  
Berger, Joseph P.; Allsopp, Mary F.; Cook, Christopher D.; Fraleigh, Jonathan O.; Hamilton, David; Kessberger, John E.; Maiorano, Helen; Rawlings, Stuart O.; Warmus, James L.; Wilczynski, Janet A.; and Wong, Did-bun, 4,789,147, Cl. 270-1.100.
- Alpha Industries, Inc.: See—  
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- Alphonse, Gerard A., to General Electric Company. Low coherence optical system having reflective means. 4,789,881, Cl. 357-17.000.
- Alps Electric Co., Ltd.: See—  
Kobayashi, Hiroshi; Nagahamaya, Yuji; Ueda, Kazuo; and Hibino, Ikuo, 4,789,260, Cl. 400-697.100.  
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- Alter, Roy H. Inflatable seat cushion. 4,789,202, Cl. 297-284.000.
- Altounian, Georges N., to Neocher: Polymers Inc. Manufacture of block polyester polyols, and polyurethanes derived therefrom. 4,789,719, Cl. 528-73.000.
- Aluminum Company of America: See—  
Calhoun, Jeffrey D.; and Davis, David A., 4,788,841, Cl. 72-22.000.  
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- Amada Engineering & Service & Co., Inc.: See—  
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- Ambrose-Ritchey, Geneva; Jachimowicz, Felek; and Lundquist, Joseph T., to W. R. Grace & Co.-Conn. Battery separator. 4,789,609, Cl. 429-144.000.
- American Cyanamid Company: See—  
Jarrett, Peter K.; Casey, Donald J.; and Lehmann, Leonard T., 4,788,979, Cl. 128-335.500.
- American Home Products Corporation: See—  
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- American Maize-Products Company: See—  
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- American Motors Corporation: See—  
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- American National Can Company: See—  
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- American Safety Razor Company: See—  
Itten, Clemens A., 4,789,080, Cl. 221-279.000.
- American Tech Manufacturing, Inc.: See—  
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- American Telephone and Telegraph Company: See—  
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- American Telephone and Telegraph Co., AT&T Bell Laboratories: See—  
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- Randall, Roderick K.; and Zucker, William F., 4,789,994, Cl. 375-12.000.
- Swartz, Robert G., 4,789,984, Cl. 370-112.000.
- American Telephone and Telegraph Co., AT&T Bell Labs: See—  
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- American Telephone and Telegraph Company, AT&T Information Systems: See—  
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- Amersham International plc: See—  
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- Amlani, Kish D.: See—  
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- Ammermann, Eberhard: See—  
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- AMP Incorporated: See—  
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- Ampex Corporation: See—  
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- Amphenol Corporation: See—  
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- Anderson, Arthur A., to Specialty Manufacturing Co. High pressure coaxial flow nozzles. 4,789,104, Cl. 239-455.000.
- Anderson, Charlie E., to General Motors Corporation. Performance control of a motor vehicle engine for consistent high quality transmission shifting. 4,788,890, Cl. 74-851.000.
- Anderson, John C.; and Goodwin, John C., to Northern Telecom Limited. Fiber optic switch with prism mounted for reciprocal and rotational movement. 4,789,215, Cl. 350-96.190.
- Anderson, Lawrence M.; and Wixson, David P., to VTM Industries. Humidity control apparatus for an area. 4,789,097, Cl. 236-1.0EB.
- Andersson, Bert R., to AB Volvo. Belt guide fitting. 4,789,186, Cl. 280-808.000.
- Ando Electric Co., Ltd.: See—  
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- Ando, Toshihiko: See—  
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- Andrex Radiation Products AS: See—  
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- Ansaldo S.p.A.: See—  
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- Aoki, Katsuo; and Ueda, Toshio, to Dow Mining Co., Ltd. Hydrothermal process for producing magnetoplumbitic ferrite. 4,789,494, Cl. 252-62.590.
- Aoki, Takashi; and Miyachi, Tatsuo, to Matsushita Refrigeration Company. Refrigerator. 4,788,832, Cl. 62-382.000.
- Aoyama, Motoo: See—  
Morimoto, Yuichi; Maruyama, Hiromi; Aoyama, Motoo; Zukeran, Atsushi; Bessho, Yasunori; Matsumoto, Tomoyuki; Ishii, Yoshihiko; Fujimura, Kouji; and Uchikawa, Sadao, 4,789,520, Cl. 376-419.000.
- Apparatebau Rothemuhle Brandt & Kritzler GmbH: See—  
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- Applied Science Group, Inc.: See—  
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- Arahara, Kojo; Ohnishi, Toshikazu; and Fukumoto, Hiroshi, to Canon Kabushiki Kaisha. Production of toner through polymerization. 4,789,617, Cl. 430-137.000.
- Arai, Hiromi: See—  
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- Arai, Kenji; Mito, Nobuaki; Morita, Kouichi; and Hirata, Naonori, to Sumitomo Chemical Company, Limited. Certain pyridyl thio or phenyl thio-Ethane-1,3-cyclohexane dione-oximino ester herbicides. 4,789,396, Cl. 71-94.000.
- Arai, Kenji: See—  
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- Arai, Masaru; and Saita, Itsuro, to Nippon Wiper Blade Co., Ltd. Yoke member connecting device in windshield wiper. 4,788,736, Cl. 15-250.420.
- Arco Chemical Company: See—  
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- Arends, Charles B.: See—  
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- Argosy Electronics: See—  
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- Arita, Hiroyuki: See—  
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- Arjomari-Prioux: See—  
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- Armstrong, Rosa: See—  
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- Armstrong, William J.: See—  
Stich, Richard A.; and Armstrong, William J., 4,789,130, Cl. 249-120.000.
- Arsenault, Edna M.; and Spector, George. Eyeglass wipers. 4,789,233, Cl. 351-158.000.
- Artur Fischer GmbH & Co. KG: See—  
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- Artzt, Peter; Egbers, Gerhard; Muller, Heinz; and Stark, Ullrich, to Du Pont de Nemours, E. I., and Company. Automatic piecing of combination open end rotor spun yarn. 4,788,817, Cl. 57-263.000.
- Asahi Denka Kogyo K.K.: See—  
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- Asahi Glass Company Ltd.: See—  
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- Asahi Kasei Kogyo Kabushiki Kaisha: See—  
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- Asahi Kogyo Kogyo Kabushiki Kaisha: See—  
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- Asakura, Masahiko; and Hosono, Genzo, to Honda Giken Kogyo Kabushiki Kaisha. Control system for an engine-driven AC generator. 4,789,817, Cl. 322-28.000.
- Asami, Ken: See—  
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- ASARCO Incorporated: See—  
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- ASCI Corporation: See—  
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- ASEA Aktiebolag: See—  
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- Ash, Charles E.: See—  
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- Ashland Oil, Inc.: See—  
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- Aslan, Edward E., to Narda Microwave Corporation. The Dipole antenna for monitoring electromagnetic waves over an extended frequency range. 4,789,869, Cl. 343-801.000.
- Aslanian, Jerry L. Flow control device for administration. 4,789,000, Cl. 137-556.000.
- Astra Lakemedel Aktiebolag: See—  
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- AT&T Information Systems Inc.: See—  
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- Atara Corporation: See—  
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- Atlas Copco Aktiebolag: See—  
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- Atlas Pacific Engineering Company: See—  
Tichy, Oldrich J.; and Meissner, Konrad E., 4,788,910, Cl. 100-120.000.
- Attwood Corporation: See—  
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- Aucnet Inc.: See—  
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- Augusti, Ferdinando; Bonatto, Luigi; and Puglisi, Anna M., to Ing. C. Olivetti & Co., S.p.A. Digital reading device for facsimile apparatus. 4,789,901, Cl. 358-284.000.
- Ausimont S.p.A.: See—  
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- Aust, Fredrik: See—  
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- Austin, Robert: See—  
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- Autohaul Industries, Inc.: See—  
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- Automotive Products, plc: See—  
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- AVM, Inc.: See—  
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- Ayers, Ray R.; and Kopp, Frans, to Shell Oil Company. Winged pipe-laying. 4,789,269, Cl. 405-158.000.
- B. Dugdale & Son Limited: See—  
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- Baba, Toru, to Kioritz Corporation. Cord cutter head having a noncircular cross section. 4,788,771, Cl. 30-276.000.
- Babendererde, Siegmund; Hillemeier, Bernd; and Braach, Otto, to Hoechst Aktiengesellschaft Vorm. Gebr. Helfmann. Method of and apparatus for concrete tunnel lining. 4,789,267, Cl. 405-146.000.
- Bachler, Anton R. Ski-track forming apparatus. 4,788,783, Cl. 37-220.000.
- Bachtold, Walter. Apparatus for the preparation of meat products displaying a pattern when cut. 4,788,750, Cl. 17-35.000.
- Backe, Bengt S.; and Durham, Lamoyne W., to South Bend Lathe, Inc. Operating system for a valve. 4,789,001, Cl. 137-554.000.
- Badono, Shinji: See—  
Martin, Wallace W.; Exall, Douglas I.; Tomoda, Toshimasa; and Badono, Shinji, 4,788,852, Cl. 73-61.10R.
- Badwal, Sukhvinder P. S.; and Bannister, Michael J., to Commonwealth Scientific and Industrial Research Organization. Low temperature solid electrolyte oxygen sensor. 4,789,454, Cl. 204-424.000.
- Baggett, Don W.; Herther, Jay G.; and Basham, Deborah E., to Hughes Aircraft Company. Method and apparatus for detecting an out of beam condition in a monopulse radar receiver. 4,789,861, Cl. 342-152.000.
- Bagnall-Wild, Ralph H.; and Grant, Neil F., to Barr & Stroud Limited. Gunnery training system. 4,789,339, Cl. 434-20.000.
- Baiker, Alfons; Doilenmeier, Peter; and Glinksi, Marek, to Lonza Ltd. Catalyst for reductive conversion of nitrogen oxides in waste gases. 4,789,533, Cl. 423-239.000.
- Bailey, Angel F.: See—  
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- Bailey, Guy R.; and Bailey, Angel F. Method and apparatus for converting data in a binary format. 4,789,852, Cl. 341-50.000.
- Bailey, Raymond E.: See—  
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- Baker, Josefine T.; Pagano, Joseph F.; and Schoengold, Ronald J., to SmithKline Beckman Corporation. Method and device for collecting and testing for fecal occult blood. 4,789,629, Cl. 435-7.000.
- Baker Oil Tools, Inc.: See—  
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- Balbinot, Renzo: See—  
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- Baldner, Klaus-Rainer: See—  
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- Ballard, Donald E.; and Klappert, Willi, to General Electric Company. Amorphous metal transformer core and coil assembly. 4,789,849, Cl. 336-210.000.
- Ballard, Gary W.; and Dempsey, Daniel J., to Carrier Corporation. Gas furnace control system. 4,789,330, Cl. 431-75.000.
- Banes, Albert J. Biocompatible polyorganosiloxane composition for cell culture apparatus. 4,789,601, Cl. 428-447.000.
- Banjo, Toshinobu; Murasawa, Yasuhiro; and Onoda, Shigeo, to Mitsubishi Denki Kabushiki Kaisha. Memory card. 4,789,347, Cl. 439-140.000.
- Bannink, Engbert T., Jr., to Boeing Company. The Fastened lightning protection repair system and method for its use. 4,789,918, Cl. 361-218.000.
- Bannister, Michael J.: See—  
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- Bansemir, Manfred, to VEB Elektromat Dresden. Apparatus for ultrasonic wire bonding. 4,789,093, Cl. 228-1.100.
- Bareaud, Jean P. Sailing craft. 4,788,923, Cl. 114-39.100.
- Barmag AG: See—  
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- Barnette, William E.; Dean, Thomas R.; Petersen, Wallace C.; and Wexler, Barry A., to Du Pont de Nemours, E. I., and Company. Herbicidal pyridine N-oxide sulfonylureas. 4,789,465, Cl. 71-90.000.
- Barney, Jesus: See—  
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- Barnhart, Gary A.; Carson, David E.; and Criss, Gerald L., to Carson/Burger/Weekly, Inc. Machine for orienting and stacking receptacles. 4,789,290, Cl. 414-105.000.
- Barr & Stroud Limited: See—  
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- Barra, James M. Competitive reaction-time game toy. 4,789,155, Cl. 273-1.0GE.
- Baschiera, Daniel; and Courtois, Bernard, to U.S. Philips Corporation. Test device for a combinatorial logic circuit and integrated circuit including such a device. 4,789,821, Cl. 324-73.00R.
- Baselmans, Antonius W. H. M.; and van de Ven, Adrianus J. C., to U.S. Philips Corporation. Suspension means for shadow mask in a cathode ray tube. 4,789,805, Cl. 313-404.000.
- BASF Aktiengesellschaft: See—  
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- BASF Corporation: See—  
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- Basquin, Serge: See—  
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- Bassett, Michael L., to Dana Corporation. Spring damper drive for a clutch driven disc assembly, 4,789,375, Cl. 464-68.000.
- Bassham, Deborah E.: See—  
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- Bastin, Danielle: See—  
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- Bateman Engineering (International) Limited: See—  
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- Bates, Kenneth W.; Cudby, Joseph W.; and Dixon, Peter R., to Injectall Limited. Nozzles for injecting substances into liquids, 4,789,141, Cl. 266-270.000.
- Batheja, Pramod; Goetzmann, Claus; Kumpf, Hermann; and Rau, Peter, to Kraftwerk Union Aktiengesellschaft. Liquid-cooled nuclear reactor especially a boiling-water reactor, 4,789,518, Cl. 376-353.000.
- Bettelle-Institut e.V.: See—  
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- Bettenfeld GmbH: See—  
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- Bauer, Gerfried. Toothbrush having signal producing means, 4,788,734, Cl. 15-105.000.
- Bauer, Walter; and Schmidt, Manfred, to Agfa-Gevaert AG. Device for loading and unloading X-ray film cassettes, 4,788,810, Cl. 53-266.00R.
- Beues, Peter: See—  
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- Baus, Heinz G. Towel-holder, 4,789,069, Cl. 211-105.300.
- Baxter, Bobby G., to Binkley Company, The. Wheeled vehicle suspension, 4,789,181, Cl. 280-681.000.
- Baxter, Gordon D., to Northern Telecom Limited. Insulated electrical conductor wire and method for making same, 4,789,589, Cl. 428-317.500.
- Baxter International Inc.: See—  
DiGianfilippo, Alessandro; Hitchcock, James R.; Lewis, Robert E.; Zielsdorf, Randall A.; Vos, James P.; Starai, Rudolph; Becker, Michael J.; Warner, Donald W.; and Huang, Leon, 4,789,014, Cl. 141-83.000.
- Baxter Travenol Laboratories, Inc.: See—  
Lindsay, Edward R.; Kusmierczyk, Robert C.; and Cameron, Norman F., 4,789,467, Cl. 210-103.000.
- Bayer Aktiengesellschaft: See—  
Bonten, Heinz; Niellinger, Werner; Michael, Dietrich; Selbeck, Harald; and Meyer, Rolf-Volker, 4,789,698, Cl. 524-100.000.
- Holmwood, Graham; Buchel, Karl H.; Lurssen, Klaus; Frohberger, Paul-Ernst; and Brandes, Wilhelm, 4,789,672, Cl. 514-184.000.
- Kraatz, Udo; and Feyen, Peter, 4,789,746, Cl. 548-262.000.
- Noll, Klaus; Pedain, Josef; and Schonfelder, Manfred, 4,789,718, Cl. 528-49.000.
- Bazin, Herve: See—  
Frank, Robert; Klein, Jean P.; Ackermans, Fabienne; and Bazin, Herve, 4,789,735, Cl. 530-395.000.
- BBC Brown Boveri AG: See—  
Perego, Ambrogio, 4,789,253, Cl. 384-517.000.
- BBC Brown, Boveri Ltd.: See—  
Ruedi, Beat, 4,789,792, Cl. 307-141.000.
- Beatty, Ronald L.: See—  
Rhodes, James F.; Dziedzic, Chester J.; and Beatty, Ronald L., 4,789,277, Cl. 409-131.000.
- Becker, Abram, to Societe Anonyme: Sanofi Pharma S.A. - Succursale de Carouge. Process for the preparation of 2,4-diamino-5-benzylpyrimidines, 4,789,743, Cl. 544-325.000.
- Becker, Michael J.: See—  
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- Becton, Dickinson and Company: See—  
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- Beecham Group p.l.c.: See—  
Hamilton, Thomas C.; and Buckingham, Robin E., 4,789,679, Cl. 514-353.000.
- Beer, Carl C.; Hewitt, C. Lee; and Larson, Sherman, to Sherman Industries, Incorporated. Vehicle reciprocating spray washing apparatus, 4,788,993, Cl. 134-123.000.
- Behee, Ronald D.: See—  
Robinson, McDonald; Behee, Ronald D.; deBoer, Wiebe B.; and Johnson, Wayne L., 4,789,771, Cl. 219-405.000.
- Behringwerke Aktiengesellschaft: See—  
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- Beiter, Andreas H.: See—  
Muller-Lierheim, Wolfgang G. K.; and Beiter, Andreas H., 4,789,634, Cl. 435-288.000.
- Beitz, Donald C.: See—  
Tipton, Carl L.; and Beitz, Donald C., 4,789,670, Cl. 514-182.000.
- Beleites, Eggert: See—  
Albert, Christine; Beleites, Eggert; Carl, Gunter; Grosse, Steffen; Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi, Ralf; Jungto, Harry; Knak, Guenther; Kreisel, Lutz; Musil,

- Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner, 4,789,649, Cl. 501-3.000.
- Bell, John F. M., to Coal Industry (Patents) Limited. Moisture meter, 4,788,853, Cl. 73-73.000.
- Bell, Robert R. Knock-down utility cart, 4,789,180, Cl. 280-652.000.
- Bella, Roger J.; and Rochedieu, William B. Reformable carton and cat litter housing assembly, 4,788,935, Cl. 119-1.000.
- Bellavia, Andrew S., Jr., to Zenith Electronics Corporation. Auto clamp for modulator for suppressed sync signals, 4,790,011, Cl. 380-15.000.
- Bellego, Roger; and Foch, Etienne, to Aerospatiale Societe Nationale Industrielle. System for controlling the high-lift flaps of an aircraft, 4,789,119, Cl. 244-226.000.
- Bennett, Richard. Clothes airer, 4,789,070, Cl. 211-200.000.
- Bennett, William E., to Kirkos Development Partners, Ltd. Rearmable spring caged and energized free gyro, 4,788,872, Cl. 74-514.000.
- Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, to Salomon S.A. Manipulation lever for closing and latching of a rear-entry ski boot, 4,788,781, Cl. 36-50.000.
- Bereiter, Bruce A., to Henkel Corporation. Process and apparatus for saponification reactions, 4,789,499, Cl. 252-369.000.
- Berg, William E., to Tektronix, Inc. Switch device, 4,789,765, Cl. 200-245.000.
- Bergander, Mark J., to Electric Power Research Institute. Magnetic flux leakage probe with radially offset coils for use in nondestructive testing of pipes and tubes, 4,789,827, Cl. 324-220.000.
- Berger, Joseph P.; Allsopp, Mary F.; Cook, Christopher D.; Fraleigh, Jonathan O.; Hamilton, David; Kessberger, John E.; Maiorano, Helen; Rawlings, Stuart O.; Warmus, James L.; Wilczynski, Janet A.; and Wong, Did-bun, to R. R. Donnelley & Sons Company. System and method for selective assembly and imaging of books, 4,789,147, Cl. 270-1.100.
- Bergman, Mikael; Kullborg, Ove; and Porsander, Thord, to ASEA Aktiebolag. Industrial robot, 4,789,296, Cl. 414-735.000.
- Beriont, Walter J.: See—  
Mustafa, Mehmet; Tweedy, Ernest P.; Stoddard, James C.; and Beriont, Walter J., 4,789,895, Cl. 358-147.000.
- Berkeley, James E., to Kwik-Way Manufacturing Company. Boring stand, 4,789,275, Cl. 408-66.000.
- Berkers, Ansvat, to P. J. Zwegers En Zonen Landbouwmachinefabriek BV. Adjustable blade support for round bale press stripper, 4,788,900, Cl. 100-88.000.
- Berkowitz, Steven: See—  
Geller, Paul; and Berkowitz, Steven, 4,789,335, Cl. 433-81.000.
- Bernaude, Philippe: See—  
Carton, Georges; Bernaud, Philippe; Rauffer, Jean-Louis; and Drutel, Yves, 4,788,876, Cl. 74-335.000.
- Berry, Richard E.; Johnson, Steven E.; and Ruiz, Thomas M., to International Business Machines Corporation. Methods of displaying help information nearest to an operation point at which the help information is requested, 4,789,962, Cl. 364-900.000.
- Berti, Corrado: See—  
Manaresi, Piero; Pilati, Francesco; Berti, Corrado; and Petri, Alberto, 4,789,723, Cl. 528-175.000.
- Bertleson, Peter C.: See—  
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- Bertrand, Jacques C.: See—  
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- Bessho, Yasunori: See—  
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- Best, Anthony; Hunt, Kenneth V.; and Hoole, Raymond, to BTR PLC a British Company. Mounting arrangement for vehicle engines, 4,788,949, Cl. 123-192.00R.
- Beta Instruments Co., Ltd.: See—  
Orchard, Owen J., 4,789,813, Cl. 318-6.000.
- Bethune, William; Pikor, Steven J.; Bertleson, Peter C.; and LePage, Bernard E. Casket assembly, 4,788,757, Cl. 27-2.000.
- Betz Laboratories, Inc.: See—  
Holder, E. Paul; Klaessig, Frederick C.; Pearce-Landers, Pamela J.; and Reichgott, David W., 4,789,406, Cl. 134-3.000.
- Betz, Tilman: See—  
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- Beutler, Rolf-Dieter: See—  
Ebinger, Jürgen; Beutler, Rolf-Dieter; and Lindner, Helmut, 4,789,401, Cl. 106-122.000.
- Bexton, Robert A. Gel-filled, variably-adjustable cushioning system for supporting a person, 4,788,730, Cl. 5-454.000.
- Beziers, Daniel, to Societe Nationale Industrielle Aerospatiale et. Process for the polymerization and/or crosslinking of a resin used in the composition of a composite material part by means of ionizing radiation, 4,789,505, Cl. 264-22.000.
- Bie, Paul R.: See—  
Calviello, Joseph A.; Bie, Paul R.; and Pomian, Ronald J., 4,789,645, Cl. 437-51.000.
- Bieringer, Heimo; and Hofmann, Peter, to Huels Aktiengesellschaft, a part interest. Process for polymerizing vinyl chloride with polyglycol polyol esters, 4,789,715, Cl. 526-200.000.
- Bigas-Balcells, Ramon: See—  
Sant-Pont, Jose M.; and Bigas-Balcells, Ramon, 4,789,576, Cl. 428-34.100.

- Bilgin, Sitki, to University of Manchester Institute of Science and Technology. Material processing, 4,789,511, Cl. 264-108.000.
- Billig, Ernst; Abatjoglou, Anthony G.; Bryant, David R.; Murray, Rex E.; and Maher, John M., to Union Carbide Corporation. Phosphite ligands, 4,789,753, Cl. 558-85.000.
- Billings, Lanny D. Methods for bedding livestock and treating sludge, 4,788,936, Cl. 119-1.000.
- Billy Pugh Co., Inc.: See—  
Pugh, Billy G., 4,789,045, Cl. 182-190.000.
- Binkley Company, The: See—  
Baxter, Bobby G., 4,789,181, Cl. 280-681.000.
- Bio-Rad Laboratories, Inc.: See—  
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- Bioresearch Spa: See—  
Gennari, Federico, 4,789,666, Cl. 514-51.000.
- Bird, Everett L.: See—  
Hung, Chuan-Yung; and Bird, Everett L., 4,789,959, Cl. 364-900.000.
- Birkner, John M.; Tavana, Danesh M.; Chan, Andrew K.; and Wong, Sing Y., to Advanced Micro Devices, Inc. Programmable array logic cell, 4,789,951, Cl. 364-716.000.
- Birtell, Donald W.: See—  
Schramm, Dale E.; and Birtell, Donald W., 4,789,536, Cl. 423-345.000.
- Bishop, Roger B.; Ash, Charles E.; and Herliczek, Siegfried H., to Libbey-Owens-Ford Co. Prepress apparatus for an assembly of stacked sheets, 4,788,911, Cl. 100-155.00G.
- Bittler, Dieter: See—  
Nickisch, Klaus; Laurent, Henry; Bittler, Dieter; Wiechert, Rudolf; and Losert, Wolfgang, 4,789,668, Cl. 514-173.000.
- Bizek, Donald R., to Stocker Hinge Manufacture Co. Torque hinge having its knuckles individually crimped around the hinge pin, 4,788,748, Cl. 16-308.000.
- Bjork, Peter. Air-cushion element for air-cushion transport equipment, 4,789,039, Cl. 180-124.000.
- Blair, Michael L.: See—  
Gordon, Keith M.; and Blair, Michael L., 4,788,758, Cl. 29-148.40R.
- Blake, Joseph W., III. Surgical stapler, 4,789,090, Cl. 227-19.000.
- Blaney, Lawrence F. Aesthetic displaying device for video cassette tapes and the like, 4,789,058, Cl. 206-232.000.
- Blasing, Horst; and Meyer, Walter, to Schering Aktiengesellschaft. Method of and arrangement for cleaning, activating and metallizing of bore holes in conductor boards, 4,789,405, Cl. 134-1.000.
- Bloch, Will; Sheridan, Patrick J.; and Goodson, Robert J., to Cetus Corporation. Ionic compounds containing the cationic meriquinone of a benzidine, 4,789,630, Cl. 435-7.000.
- Bloechl, Franz: See—  
Nijmolen, Gerrit W.; and Bloechl, Franz, 4,790,006, Cl. 379-388.000.
- Blokhina, Olga G.: See—  
Rudashevsky, German E.; Krichevsky, Alexandr G.; Blokhina, Olga G.; and Mirkin, Alexandr S., 4,788,968, Cl. 128-41.000.
- Blotenberg, Wilfried, to Man Gutehoffnungshutte GmbH. Method and apparatus for controlling the operation of a turbocompressor, 4,789,298, Cl. 415-27.000.
- Boeing Company, The: See—  
Bannink, Engbert T., Jr., 4,789,918, Cl. 361-218.000.
- Cox, Philip R., 4,789,788, Cl. 250-504.00R.
- Ford, Robert J., 4,789,416, Cl. 156-222.000.
- Kane, Jeffrey P.; and Franklyn, Steven E., 4,788,797, Cl. 51-170.0PT.
- Knoll, Frederick L., 4,789,328, Cl. 425-384.000.
- Laskody, Jerome R., 4,788,855, Cl. 73-117.400.
- Stawski, Stanley W., 4,789,594, Cl. 428-397.000.
- Boge AG: See—  
Brenner, Heinrich, 4,789,144, Cl. 267-140.100.
- Boggs, Ernest R. Overboot, 4,788,780, Cl. 36-7.10R.
- Boggs, Robert J.; and Snell-Kelly, Janet E., to Quaker Oats Company, The. Simulated toy flash camera, 4,789,371, Cl. 446-219.000.
- Bohan, John E., Jr.; Erdman, John L.; Nelson, Marvin D.; and Ratz, James W., to Honeywell Inc. Thermostatically operated fuel valve control circuit, 4,789,329, Cl. 431-46.000.
- Bohannon, Harold L., to American Telephone and Telegraph Company, and AT&T Information Systems Inc. Telephone line switch apparatus, 4,790,008, Cl. 379-427.000.
- Bohman, Carl E.: See—  
Strosser, Richard P.; Bohman, Carl E.; and Chow, Mark K., 4,788,813, Cl. 56-10.200.
- Bohmer, Winfried: See—  
Von Ropenack, Adolf; Bohmer, Winfried; Smykalla, Gunter; and Wiegand, Volker, 4,789,446, Cl. 204-119.000.
- Bohner, Beat; Pissiotas, Georg; and Moser, Hans, to Ciba-Geigy Corporation. Annularly-linked triazole compounds, 4,789,394, Cl. 71-76.000.
- Boiko, Robert S., to Tri-Brothers Chemical Corporation. Method to dissolve hydrated aluminum hydroxide gel in potable hot water heaters, 4,789,407, Cl. 134-22.100.
- Bolduc, Darryl W.: See—  
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- Bon, Charles K.; Brattesani, Donald N.; and Meldrum, Kevin S., to Dow Chemical Company, The. Nickel alloy anodes for electrochemical cell, 4,789,449, Cl. 204-242.000.
- Bonatto, Luigi: See—  
Augusti, Ferdinando; Bonatto, Luigi; and Puglisi, Anna M., 4,789,901, Cl. 358-284.000.
- Bonk, Robert R.: See—  
Ying, Wei-chi; and Bonk, Robert R., 4,789,484, Cl. 210-721.000.
- Bonten, Heinz; Niellinger, Werner; Michael, Dietrich; Selbeck, Harald; and Meyer, Rolf-Volker, to Bayer Aktiengesellschaft. Flame-proof, glass fibre-reinforced polyamide moulding materials, 4,789,698, Cl. 524-100.000.
- Boobar, Lewis R.; Sardelis, Michael R.; and Brown, Walter M., III, to United States of America, Army. Collapsible insect trap, 4,788,789, Cl. 43-113.000.
- Boomsma, Harm: See—  
van Zee, Eric; Boomsma, Harm; Lewerissa, Ronald; and Verbrugge, Jeroen, 4,789,203, Cl. 297-316.000.
- Boone, David D., to Lynx Golf, Inc. Golf club measuring apparatus, 4,788,774, Cl. 33-508.000.
- Borah, Joshua D.; and Flagg, Barbara N., to Applied Science Group, Inc. Method and system for generating a description of the distribution of looking time as people watch television commercials, 4,789,235, Cl. 351-246.000.
- Botzelmann, Herbert: See—  
Nussbaumer, Erwin; Gross, Rainer; Botzelmann, Herbert; Haller, Hans; and Buchwald, Franz, 4,788,886, Cl. 74-665.00T.
- Boucher, Raymond J., Jr.; and Insoce, Jack E., to International Business Machines Corp. Article manipulator for robot, 4,789,295, Cl. 414-497.000.
- Bougsty, Larry J., to General Motors Corporation. Instrument panel having light pipe having legs, 4,789,224, Cl. 350-345.000.
- Boultinghouse, Harold D., to Phillips Petroleum Company. Polymer welding process and composition, 4,789,498, Cl. 252-364.000.
- Bour, George: See—  
Van Sickle, Richard G.; and Bour, George, 4,788,772, Cl. 33-178.00R.
- Bourbeau, Robert D., to Solidur Plastics Co. Slider bed conveyor apparatus and associated method, 4,789,056, Cl. 198-823.000.
- Bournonville, Jean-Paul: See—  
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- Bouttier, Pierre: See—  
Douche, Jean-Pierre; Coulon, Jean-Claude; and Bouttier, Pierre, 4,789,569, Cl. 427-421.000.
- Bowe Reinigungstechnik GmbH: See—  
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- Boyle, John T. A.; and Todd, Richard S., to John Wyeth and Brothers Limited. N-alkyl-[N-(N-alkyl)-N-[4-(4-quinolinylamino)benzoyl-jamino]alkyl]benzenesulphonamides, 4,789,677, Cl. 514-313.000.
- Braach, Otto: See—  
Babendererde, Siegmund; Hillemeier, Bernd; and Braach, Otto, 4,789,267, Cl. 405-146.000.
- Bramhall, George H.: See—  
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- Brandemuhl, Michael J.; and Reason, John R., to Carrier Corporation. Control apparatus for refrigerated cargo container, 4,789,025, Cl. 165-30.000.
- Brandes, Wilhelm: See—  
Holmwood, Graham; Buchel, Karl H.; Lurssen, Klaus; Frohberger, Paul-Ernst; and Brandes, Wilhelm, 4,789,672, Cl. 514-184.000.
- Brattesani, Donald N.: See—  
Bon, Charles K.; Brattesani, Donald N.; and Meldrum, Kevin S., 4,789,449, Cl. 204-242.000.
- Brault, Francois, to Olaer Industries. Pressure vessel incorporating a sensor for detecting liquid in a gas chamber, 4,788,851, Cl. 73-49.200.
- Braun Aktiengesellschaft: See—  
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- Braun, James L., deceased: See—  
Scavone, Timothy A.; and Braun, James L., deceased, 4,789,554, Cl. 426-417.000.
- Braun, Pauletta Mary, legal representative: See—  
Scavone, Timothy A.; and Braun, James L., deceased, 4,789,554, Cl. 426-417.000.
- Bravet, Jean-Louis: See—  
Trieb, Friedrich; Raedisch, Helmer; Bravet, Jean-Louis; Abel, Jean-Claude; and Crux, Noel, 4,789,600, Cl. 428-425.600.
- Brennand, Peter R.; and Murray, Bruce, to U.S. Philips Corp. Interface between a receiver and a sub-system, 4,789,860, Cl. 340-825.510.
- Brenner, Heinrich, to Boge AG. Hydraulically damped motor mounts or bearings and elastic bearings, 4,789,144, Cl. 267-140.100.
- Breuleux, Gerald: See—  
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- Brewer, Jackie D.; Gartin, Maynard H.; and Yoneshige, Frank T., to Chesebrough-Pond's Inc. Washing apparatus for bung of a drum, 4,788,739, Cl. 15-322.000.
- Bridgeford, Douglas J.; and Rahman, Matiur, to Teepak, Inc. Cellulose aminomethanate sausage casings, 4,789,006, Cl. 138-118.100.
- Bridgestone Corporation: See—  
Morimura, Yasuhiro; Fukuura, Yukio; Ishikawa, Hikaru; Tanuma, Itsuo; and Honda, Toshio, 4,789,586, Cl. 428-216.000.
- Umezawa, Yujiro, 4,788,815, Cl. 57-212.000.
- Brierley, Corale L.: See—  
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Brierley, James A.; Brierley, Corale L.; Decker, Raymond F.; and Goyak, George M., to Advanced Mineral Technologies, Inc. Metal recovery. 4,789,481, Cl. 210-661.000.

Brighton, Jeffrey E.; Hollingsworth, Deems R.; Welch, Michael; McMann, Ronald E.; Torreno, Manuel L., Jr.; and Sullivan, Charles W., to Texas Instruments Incorporated. Self-aligned silicide in a polysilicon self-aligned bipolar transistor. 4,789,885, Cl. 357-34.000.

Brill, Klaus; and Grothe, Wolfgang, to Robert Bosch GmbH. Heat retention device for windows, doors and the like. 4,789,582, Cl. 428-136.000.

Brink, Loren S.; and Newton, James R. Pulse rate controlled entertainment device. 4,788,983, Cl. 128-734.000.

Bristol-Myers Company: See—  
Fuller, Ronald C., 4,788,862, Cl. 73-426.000.  
Oka, Masahisa; Numata, Keiichi; and Konishi, Masataka, 4,789,731, Cl. 530-317.000.

Bristow, Julian P. Q.; Keur, Michael; Lukas, Gregory J.; Sriram, Sriram; and Wey, Albert C., to Amphenol Corporation. Integrated optical polarizer with high extinction ratio and low insertion loss, and improved method of fabrication thereof. 4,789,212, Cl. 350-96.120.

British Broadcasting Corporation: See—  
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Brockett, Nickie W. Catfish bait holder. 4,788,788, Cl. 43-44.990.

Brother Kogyo Kabushiki Kaisha: See—  
Izaki, Takeshi, 4,789,877, Cl. 355-3.0FU.

Brown, Boveri & Cie AG: See—  
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Brown, John K., III; Cronch, Darell D.; Graham, Patricia A.; and Tucker, Kevin N., to International Business Machines Corporation. Line find feature for an electronic typewriter. 4,789,257, Cl. 400-582.000.

Brown, Lawrence G. Exercise system. 4,789,153, Cl. 272-73.000.

Brown, Patti E.: See—  
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Brown, Walter M., III: See—  
Boobar, Lewis R.; Sardelis, Michael R.; and Brown, Walter M., III, 4,788,789, Cl. 43-113.000.

Broze, Guy; Bastin, Danielle; and Laitem, Leo, to Colgate-Palmolive Company. Built nonaqueous liquid nonionic laundry detergent composition containing. 4,789,496, Cl. 252-99.000.

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Brunswick Corporation: See—  
Frazzelli, Michael E.; Koepsel, Roger E.; and Gius, William J., 4,789,303, Cl. 416-63.000.

Gautraud, Michael G., 4,789,157, Cl. 273-37.000.

Bruschke, Hartmut. Membrane module and the use thereof for the separation of liquids according to the pervaporation process. 4,789,480, Cl. 210-640.000.

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Ainslie, Norman G.; Brusic, Vlasta A.; Chapman, Daniel W.; Romankiw, Lubomyr T.; and Wilmer, Richard K., 4,789,914, Cl. 360-103.000.

Bryant, David R.: See—  
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BTR PLC a British Company: See—  
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Buchanan, Stuart W.: See—  
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Buchel, Karl H.: See—  
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Buchwald, Franz: See—  
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Buck, Volker: See—  
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Buckingham, Robin E.: See—  
Hamilton, Thomas C.; and Buckingham, Robin E., 4,789,679, Cl. 514-353.000.

Buckman Laboratories International, Inc.: See—  
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Buell Industries, Inc.: See—  
Peterson, Francis C., 4,789,288, Cl. 411-386.000.

Bugner, Douglas E.; and Alexandrovich, Peter S., to Eastman Kodak Company. Toners and developers containing benzylidimethylalkylammonium charge-control agents. 4,789,614, Cl. 430-110.000.

Bull, James R.; Thomson, Russell I.; Laurent, Henry; Schroeder, Helmut; and Wiechert, Rudolf, to Schering Aktiengesellschaft. 14,17 $\beta$ -ethano-14 $\beta$ -estratrienes and estratetraenes, process for their production, and pharmaceutical preparations containing them. 4,789,671, Cl. 514-182.000.

Bull, Jeffrey F., to Karg Corporation. Control for a bobbin carrier. 4,788,898, Cl. 87-57.000.

Buma, Shuichi; Onuma, Toshio; Ohashi, Kaoru; and Itou, Masami, to Toyota Jidosh Kaisha Kaisha. Suspension controller. 4,789,935, Cl. 364-424.050.

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Buschor, Karl, to Ransburg-Gema AG. Electrostatic spraying device for spraying articles with powdered material. 4,788,933, Cl. 118-629.000.

Bush, Ira J., to Litton Systems, Inc. Wavelength switched passive interferometric sensor system. 4,789,240, Cl. 356-345.000.

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Busta, Jeffrey A.; and Vinceri, Vincent A. Electric plug retainer. 4,789,353, Cl. 439-373.000.

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Byers, Frank L., to Orbital Sciences Corporation II. Pad apparatus for supporting a payload in a cradle apparatus of a space vehicle. 4,789,118, Cl. 244-158.00R.

Byrne, Donald F.; Johnson, David R.; and Heyse, John V., to Chevron Research Company. Reverse-graded catalyst systems for hydrometallation and hydrosulfurization. 4,789,462, Cl. 208-213.000.

Cahall, James L.; and Dimond, Harold L., to Drackett Company. The Hypochlorite compositions containing a tertiary alcohol. 4,789,495, Cl. 252-95.000.

Cahill, Richard F.: See—  
Michal, Ronald J.; Udd, Eric; and Cahill, Richard F., 4,789,241, Cl. 356-350.000.

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Drake, Donald J.; Hawkins, William G.; Pond, Stephen F.; Campanelli, Michael R.; Hartman, Pamela J.; and Bailey, Raymond E., 4,789,425, Cl. 156-644.000.

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Matteau, Luc C.; and Closs, Ralph D., 4,788,930, Cl. 177-16.000.

Canning, Lewis R.; Nowotnik, David P.; Neirincx, Rudi D.; and Piper, Ian M., to Amersham International plc. Complexes of technetium-99m with propylene amine oximes. 4,789,736, Cl. 534-14.000.

Canon Denshi Kabushiki Kaisha: See—  
Yamamoto, Kazuto; and Takahashi, Kazushi, 4,789,816, Cl. 318-696.000.

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Arahara, Kozo; Ohnishi, Toshikazu; and Fukumoto, Hiroshi, 4,789,617, Cl. 430-137.000.

Endo, Makoto; and Saito, Yoshihiro, 4,789,878, Cl. 355-14.00D.

Katayanagi, Jun, 4,789,259, Cl. 400-624.000.

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Ota, Masakazu; and Omata, Takashi, 4,789,222, Cl. 350-167.000.

Sato, Mitsuya; Imai, Shunzo; and Hiraga, Ryojo, 4,789,294, Cl. 414-416.000.

Takahashi, Masatomo, 4,789,900, Cl. 358-257.000.

Tanaka, Tsunefumi; Ikemori, Keiji; Kato, Masatake; and Tanaka, Kazuo, 4,789,227, Cl. 350-427.000.

Carbone, Robert: See—  
Leone, Michel; and Carbone, Robert, 4,789,577, Cl. 428-34.500.

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Dennis, Derek, 4,789,191, Cl. 292-347.000.

Carl, Gunter: See—  
Abert, Christine; Beileites, Eggert; Carl, Gunter; Grosse, Steffen; Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi, Ralf; Jungto, Harry; Knak, Gunther; Kreisel, Lutz; Musil, Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner, 4,789,649, Cl. 501-3.000.

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Carrier Corporation: See—  
Ballard, Gary W.; and Dempsey, Daniel J., 4,789,330, Cl. 431-75.000.

Brandemuehl, Michael J.; and Reason, John R., 4,789,025, Cl. 165-30.000.

Waser, Max P.; and Zinsmeyer, Thomas M., 4,789,317, Cl. 418-189.000.

Carroll, Thomas A.: See—  
Ehni, George J.; Tai, Jy-Der; Chiu, Edison H.; and Carroll, Thomas A., 4,789,793, Cl. 307-303.000.

Carroll, Timothy, to Schwinn Bicycle Company. Adjustable cycle-type seat post assembly. 4,789,176, Cl. 280-289.00R.

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Barnhart, Gary A.; Carson, David E.; and Criss, Gerald L., 4,789,290, Cl. 414-105.000.

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Carter, Clyde T., to Wells Electronics, Inc. Socket device for fine pitch lead and leadless integrated circuit package. 4,789,345, Cl. 439-71.000.

Carton, Georges; Bernaud, Philippe; Rauffer, Jean-Louis; and Drutel, Yves, to Renault Vehicules Industriels. Device for controlling transmission dog clutches. 4,788,876, Cl. 74-335.000.

Casey, Donald J.: See—  
Jarrett, Peter K.; Casey, Donald J.; and Lehmann, Leonard T., 4,788,979, Cl. 128-335.500.

Casey, James M., to Shell Western E&P, Inc. Retractable towing shackle. 4,788,927, Cl. 114-249.000.

Castonguay, Roger N.; and Meiners, David J., to General Electric Company. Molded case circuit breaker latch and operating mechanism assembly. 4,789,848, Cl. 335-167.000.

Catalysts & Chemicals Industries Co., Ltd.: See—  
Hirano, Tetsuji; Sato, Goro; Higashi, Hidehiro; Migita, Teruo; and Eto, Yoshio, 4,789,634, Cl. 502-66.000.

Cellini, Francesco; Gervasutti, Vittorio; Tancorra, Raffaele; and Tonti, Sergio, to Montedipe S.p.A. Process for the synthesis of epsilon-caprolactam. 4,789,741, Cl. 540-535.000.

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Winkelman, Lowell, 4,789,733, Cl. 530-383.000.

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Nunberg, Jack H., 4,789,702, Cl. 530-324.000.

Chakraborty, Pijush K.: See—  
Khan, Sadath U.; Chakraborty, Pijush K.; Grabowski, Albert T.; and Phillips, Reginald, 4,789,549, Cl. 424-480.000.

Chamberlin, David B.: See—  
D'Agosto, Nicholas A., III; and Chamberlin, David B., 4,790,002, Cl. 379-70.000.

Chan, Andrew K.: See—  
Birkner, John M.; Tavana, Danesh M.; Chan, Andrew K.; and Wong, Sing Y., 4,789,951, Cl. 364-716.000.

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Fuk Fan, Max C., 4,788,735, Cl. 15-172.000.

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Chandler, Charles E., to AAI Corporation. Ammunition with internal light-settable pickup arrangement for digital memory storage. 4,788,899, Cl. 89-6.000.

Chang, Niensuan J.; and Walley, Darlene R., to Procter & Gamble Company. The Method for preparing biodegradable fabric softening compositions. 4,789,491, Cl. 252-8.750.

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Ainslie, Norman G.; Brusic, Vlasta A.; Chapman, Daniel W.; Romankiw, Lubomyr T.; and Wilmer, Richard K., 4,789,914, Cl. 360-103.000.

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Shuler, Eugene L., 4,788,839, Cl. 70-143.000.

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Chauvier, Daniel J. V. D.; and Woodman, Peter. Displacement apparatus for submerged cleaner. 4,789,364, Cl. 440-5.000.

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Smith, Philip M.; Hollingsworth, Elmont E.; Wandmacher, Robert A.; Rosckes, Thomas W.; Roiko, Russell A.; and Cheesebrow, Dennis M., 4,789,354, Cl. 439-395.000.

Chen, Nai Y.; and McCullen, Sharon B., to Mobil Oil Corporation. Crystalline silicate zeolite beta of improved stability. 4,789,656, Cl. 502-74.000.

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Cheng, Jyi-Min. Pulse detection circuit using amplitude and time qualification. 4,789,838, Cl. 328-150.000.

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Brewer, Jackie D.; Gartin, Maynard H.; and Yoneshige, Frank T., 4,788,739, Cl. 15-322.000.

Cheshire, Thomas, to Cheshire, Thomas; and Stanek, Douglas A. Earthquake safety light. 4,789,922, Cl. 362-158.000.

Chevron Research Company: See—  
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Hsueh, Liming, 4,788,848, Cl. 73-29.000.

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Chi Yu, Simon S. Method for fabricating stiff polymeric plastic slats for venetian blinds. 4,789,515, Cl. 264-283.000.

Chiesa, David J. Golf club visual aid device. 4,789,158, Cl. 273-163.00A.

Chihara, Kohji Y.: See—  
Fabris, Hubert J.; Melby, Earl G.; Chihara, Kohji Y.; and Cocain, Harry W., 4,789,703, Cl. 524-464.000.

Chikamura, Takao: See—  
Miyata, Yutaka; Chikamura, Takao; Shibata, Takuo; and Fujiwara, Shinji, 4,789,888, Cl. 357-30.000.

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Taniguchi, Masahiko; and Goi, Shigeru, 4,789,592, Cl. 428-373.000.

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Ehni, George J.; Tai, Jy-Der; Chiu, Edison H.; and Carroll, Thomas A., 4,789,793, Cl. 307-303.000.

Chow, Mark K.: See—  
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Chow, Melanie M.; Cronin, John E.; Guthrie, William L.; Kaanta, Carter W.; Luther, Barbara; Patrick, William J.; Perry, Kathleen A.; and Standley, Charles L., to International Business Machines Corporation. Method for producing coplanar multi-level metal/insulator films on a substrate and for forming patterned conductive lines simultaneously with stud vias. 4,789,648, Cl. 437-225.000.

Christensen, C. Paul, to Potomac Photonics, Inc. High frequency discharge apparatus with impedance matching. 4,789,809, Cl. 315-39.000.

Christiaan, Steinz H., to HCS Industrial Safeguarding B.V. Logic voting-circuit. 4,789,795, Cl. 307-401.000.

Christian, Donald J., to Texas Instruments Incorporated. Method and apparatus for filtering reflections from direct images for mobile robot navigation. 4,789,940, Cl. 364-468.000.

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Bohner, Beat; Pissiotas, Georg; and Moser, Hans, 4,789,394, Cl. 71-76.000.

Meier, Rene, 4,789,680, Cl. 514-359.000.

Monnier, Charles E.; Eldin, Sameer H.; and Flury, Peter, 4,789,711, Cl. 525-507.000.

Paioni, Romeo, 4,789,674, Cl. 514-227.800.

Ciccarelli, Roger N.; and Bertrand, Jacques C., to Xerox Corporation. Toner compositions with nicotinate charge enhancing additives. 4,789,615, Cl. 430-126.000.

Cieplak, Jerzy: See—  
Karas, Wlodzimierz; Granowski, Robert; Ramotowski, Witold; Tuziemski, Aleksander; Cieplak, Jerzy; and Pilawski, Kazimierz, 4,788,970, Cl. 128-92.0ND.

Cirjak, Larry M.; and Schmidt, Richard P., Jr., to Standard Oil. Method of preparing ammonia and ammonia synthesis catalysts. 4,789,538, Cl. 423-362.000.

Cislo, Daniel M. Guardian lockbox for pistols. 4,788,838, Cl. 70-63.000.

Clanton, Ronald L.: See—  
Freeman, John E.; and Clanton, Ronald L., 4,789,567, Cl. 427-410.000.

Clare, Ronald T.; and Egan, Wayne J. N., to Colt Engineering Corporation. Method for removing water from crude oil containing same. 4,789,461, Cl. 208-187.000.

Clarius, H. William, to Lion Brothers, Co., Inc. Adhesively applied Schiffl embroidery. 4,788,922, Cl. 112-403.000.

Clarke, David A., to International Business Machines Corporation. Digital data processing arbitration system. 4,789,926, Cl. 364-200.000.

Clarke, Roger S., to Diversified Electronics, Inc. Twist drill for tough plastics. 4,789,276, Cl. 408-230.000.

Clarke, Samuel Y., Jr.; and Griffith, Clifford J., Jr., to Power Curbers, Inc. Self-propelled construction apparatus. 4,789,266, Cl. 404-96.000.

Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, to Emhart Industries, Inc. Electronic locking system and key therefor. 4,789,859, Cl. 340-825.310.

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Clement, George: See—  
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Clements, Larry R.; and Eschenbach, Paul W., to Milliken Research Corporation. Texturized synthetic yarns. 4,788,816, Cl. 57-208.000.

Clifford, George M., Jr., to Hewlett-Packard Company. Tape cartridge brake. 4,789,915, Cl. 360-132.000.

Cloeren, Peter F., to P.C.E. Corp. Coextrusion apparatus and process. 4,789,513, Cl. 264-171.000.

Clopton, Lancelot M. Portable blind. 4,788,997, Cl. 135-117.000.

Closs, Ralph D.: See—  
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Coal Industry (Patents) Limited: See—  
Bell, John F. M., 4,788,853, Cl. 73-73.000.

Cocain, Harry W.: See—  
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Coden, Michael H., to Codenoll Technology Corporation. Method for implementing a token passing ring network on a bus network. 4,789,982, Cl. 370-85.000.

Codenoll Technology Corporation: See—  
Codon, Michael H., 4,789,982, Cl. 370-85.000.

Codos, Richard N., to Pathe Computer Systems, Inc. Sewing machine having rotatable and axially movable frame. 4,788,921, Cl. 112-118.000.



Coffen, David L.; Schmid, Rudolf; and Sebastian, Mark J., to Hoffman-La Roche Inc. 2(trimethyl-tridecyl)-tetramethylchroman intermediates for vitamin E. 4,789,750, Cl. 549-407.000.

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Colt Engineering Corporation: See—  
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Colvin, Arthur E.: See—  
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Commercial Shearing, Inc.: See—  
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Compagnie Generale de Geophysique: See—  
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Hommel, Martin; Mein-Fang Sun, Anthony; and Goosen, Mattheus F. A., 4,789,550, Cl. 424-493.000.

Connelly, Arthur J.; and Thronburg, James B., to Quadco, Inc. Method and cable anchor assembly for anchoring plastic coated rope. 4,789,136, Cl. 254-391.000.

Connor, Jerome: See—  
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Berger, Joseph P.; Allsopp, Mary F.; Cook, Christopher D.; Fraleigh, Jonathan O.; Hamilton, David; Kessberger, John E.; Maiorano, Helen; Rawlings, Stuart O.; Warmus, James L.; Wilczynski, Janet A.; and Wong, Did-bun, 4,789,147, Cl. 270-1.100.

Cook, Robert D. Discharge ionization detector. 4,789,783, Cl. 250-379.000.

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Webb, Brent J.; and Coomes, Edmund P., 4,789,517, Cl. 376-299.000.

Cooper, Todd H., to Eastman Kodak Company. Motion analyzer with interleaved image reproduction. 4,789,894, Cl. 358-105.000.

Corlew, Robin F.; and Bolduc, Darryl W., to Quetzal, Inc. Removable and reattachable index for bound volumes. 4,789,187, Cl. 281-15.00R.

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Schermerhorn, Paul M.; Teter, Michael P.; and Vandewoestine, Robert V., 4,789,389, Cl. 65-3.120.

Cornwall, Mickey: See—  
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Costa, Norman J. Water treatment apparatus. 4,789,003, Cl. 137-605.000.

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Cox, Philip R., to Boeing Company, The. Optically pumped radiation source. 4,789,788, Cl. 250-504.00R.

Cox, Russell; and Ledbetter, Stephen M., to Square D Company. Advanceable and retractable plug-on unit assembly for a motor control center. 4,789,919, Cl. 361-339.000.

Cox, William P.; and Liang, Mong-Song, to Advanced Micro Devices, Inc. Integrated circuit structure having gate electrode and underlying oxide and method of making same. 4,789,883, Cl. 357-23.700.

Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., to Exxon Research & Engineering Co. Molecular weight distribution modification in tubular reactor. 4,789,714, Cl. 526-88.000.

Crake, John F.: See—  
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Cramer, Martin L.; and Moneypenny, Mark J., to NCR Corporation. Checkout counter. 4,789,048, Cl. 186-61.000.

Crawford, David R.; and Criscione, Frank J., II, to Simon-Johnson, Inc. Method and apparatus for loading poultry carcasses into drag type positive control chiller. 4,788,831, Cl. 62-374.000.

Crawford, Delmar E.; and Fields, Harold T., to General Electric Company. Method of assembling a core and method of assembling a slot liner. 4,788,761, Cl. 29-596.000.

Crawford, Fred, to Pavco Industries, Inc. Fluid-tight blind rivet. 4,789,283, Cl. 411-43.000.

Crellin, Inc.: See—  
Thomas, Alvin D.; and Pruitt, Garner, 4,789,111, Cl. 242-118.100.

Cremonesi, Pietro: See—  
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Cretel, Jacques L. Method of making compound pipes for conveying various fluids and pipe obtained by this method. 4,789,007, Cl. 138-174.000.

Criscione, Frank J., II: See—  
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Criss, Gerald L.: See—  
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Crossley, Ian; Donoghue, Daniel; Goldwasser, Robert; Miley, John; and Spooner, Frank, to Alpha Industries, Inc. Controlling oscillator. 4,789,887, Cl. 357-55.000.

Crouch, Milton R.; and Czelusniak, Paul A., Jr., to Fieldcrest Cannon, Inc. Textile winder equipped with air splicer and attendant method. 4,788,814, Cl. 57-22.000.

Croucher, Melvin D.; Wong, Raymond W.; Ober, Christopher K.; and Hair, Michael L., to Xerox Corporation. Processes for liquid developer compositions with high transfer efficiencies. 4,789,616, Cl. 430-137.000.

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Crux, Noel: See—  
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Cucksey, Edward L.: See—  
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Cudby, Joseph W.: See—  
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Custom Packaging Systems, Inc.: See—  
LaFleur, Arthur E.; LaFleur, Arnie; and LaFleur, Lee, 4,790,029, Cl. 383-24.000.

Cutler, Royce L.; and Hohmann, Edward A., to Musselman, Austin T. Apparatus and method for automatically scoring a dart game. 4,789,932, Cl. 364-411.000.

Cvitas, Vilim; Faltejssek, Karl; Klinar, Gottfried; and Hanke, Reinhart, to Voest-Alpine Aktiengesellschaft. Apparatus for continuously introducing or removing gases into and/or from liquids. 4,789,469, Cl. 210-150.000.

Cymbaluk, Ted H.: See—  
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Czelusniak, Paul A., Jr.: See—  
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Czyzewski, Donald. Mounting fish heads using the natural skin and jaws. 4,789,341, Cl. 434-296.000.

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Umeno, Masayoshi; Sakai, Shiro; and Soga, Tetsuo, 4,789,421, Cl. 156-610.000.

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Yanosy, John A., Jr.; Vij, Jitender K.; and Das, Santanu, 4,789,981, Cl. 370-58.000.

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Calhoun, Jeffrey D.; and Davis, David A., 4,788,841, Cl. 72-22.000.

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Davis, Michael H. Method and composition for in vivo radiolabeling of red blood cells with <sup>99m</sup>Tc. 4,789,541, Cl. 424-1.100.

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deBoer, Wiebe B.: See—  
Robinson, McDonald; Bebee, Ronald D.; deBoer, Wiebe B.; and Johnson, Wayne L., 4,789,771, Cl. 219-405.000.

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Hodor, Jim R.; Barney, Jesus; and Decker, Herman J., 4,789,236, Cl. 356-33.000.

Decker, Raymond F.: See—  
Brierley, James A.; Brierley, Corale L.; Decker, Raymond F.; and Goyak, George M., 4,789,481, Cl. 210-661.000.

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de los Reyes, Gaston: See—  
DiLeo, Anthony J.; and de los Reyes, Gaston, 4,789,482, Cl. 210-651.000.

Delude, Stephen G.; and Luinstra, Edward A., to Shell Oil Company. Production of hydrogen sulphide containing gas from underground formations. 4,789,030, Cl. 166-267.000.

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Kunkle, Gerald E.; Pecoraro, George A.; and Demarest, Henry M., Jr., 4,789,390, Cl. 65-27.000.

Demetrius, Kris; and Spector, George. Liquid and air pump B. 4,789,299, Cl. 415-73.000.

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Ballard, Gary W.; and Dempsey, Daniel J., 4,789,330, Cl. 431-75.000.

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Dennis, Timothy J., to Lockwood Graders (UK) Limited. Method and apparatus for detecting colored regions, and method and apparatus for articles thereby. 4,790,022, Cl. 382-8.000.

deNora, Oronzio; and Spaziante, Placido M., to Oronzio deNora Impianti Elettrochimici S.p.A. Novel electrolysis cell. 4,789,443, Cl. 204-98.000.

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DeBusk, Audrey O. V., 4,788,972, Cl. 128-89.00R.

Desai, Kishor V.; and Kohn Harold, to International Business Machines Corporation. Method for mounting a flexible film semiconductor chip carrier on a circuitized substrate. 4,788,767, Cl. 29-830.000.

deSilva, Sunil G., to Westinghouse Electric Corp. Catalyzed oxygen removal with hydrogen for steam generator systems. 4,789,488, Cl. 210-750.000.

Detroit, William J., to Reed Lignin Inc. Controlled release formulation for fertilizers. 4,789,391, Cl. 71-27.000.

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Kullman, Werner, deceased; Spang, Ursula, heir; and Buck, Volker, 4,788,932, Cl. 118-211.000.

Deutsche ITT Industries GmbH: See—  
Kappeler, Otmar; and Ehrhardt, Dietmar, 4,789,897, Cl. 358-188.000.

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Dewhurst, John E.; and Harasin, Stephen J., to Mobay Corporation. Rim polyurethane compositions containing internal mold release agents. 4,789,688, Cl. 521-110.000.

Dexter, William R.; and Wasserbaech, Eberhard E., to General Motors Corporation. Planetary milling machine. 4,789,278, Cl. 409-200.000.

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Kurihara, Kazumasa; and Arai, Kenji, 4,789,936, Cl. 364-424.100.

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DiGianfilippo, Alejandro; Hitchcock, James R.; Lewis, Robert E.; Zielsdorf, Randall A.; Vos, James P.; Starai, Rudolph; Becker, Michael J.; Warner, Donald W.; and Huang, Leon, to Baxter International Inc. Automated system for adding multiple fluids to a single container. 4,789,014, Cl. 141-83.000.

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Cahall, James L.; and Dimond, Harold L., 4,789,495, Cl. 252-95.000.

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Director, Fruit Tree Research Station, Ministry of Agriculture, Forestry and Fisheries Government of Japan, The: See—  
Yamazaki, Toshihiko; Murase, Shoji; and Motohashi, Tatsuou, 4,789,398, Cl. 71-122.000.

Director-General of Agency of Industrial Science and Technology: See—  
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Clarke, Roger S., 4,789,276, Cl. 408-230.000.

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Dobal, Daniel F.; and Smith, Michael D., to Cross Company, The. Tooling assembly for automatic tool changing. 4,789,280, Cl. 409-233.000.

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Muller-Lierheim, Wolfgang G. K.; and Beiter, Andreas H., 4,789,634, Cl. 435-288.000.

Dr. Rudolf Schieber GmbH & Co., KG: See—  
Weingartner, Albin; and Retallick, David, 4,788,835, Cl. 66-75.200.

Doelfel, John G. Clip on belt loops for clothing. 4,788,723, Cl. 2-271.000.

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Dolson, Mark G.: See—  
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Domay, Theodor: See—  
Monson, Clifford L.; Perry, Danny C.; Domay, Theodor; and Wilks, Henry A., 4,788,738, Cl. 15-320.000.

Domb, Abraham J.; and Langer, Robert S., to Massachusetts Institute of Technology. Preparation of anhydride copolymers. 4,789,724, Cl. 528-176.000.

Dombeck, John A.: See—  
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Dominion Automotive Industries Inc.: See—  
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 Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Hildegard R.; Stadler, Brigitte M.; Stadler, Sigrid A.; and Breuleux, Gerald. Heterocyclic carboxylic acid amides and esters. 4,789,673, Cl. 514-214.000.  
 D'Onofrio, Vincent G. Rescue fin. 4,789,368, Cl. 441-79.000.  
 Donoghue, Daniel: See—  
 Crossley, Ian; Donoghue, Daniel; Goldwasser, Robert; Miley, John; and Spooner, Frank, 4,789,887, Cl. 357-55.000.  
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 Edgett, David B.; and Zunkel, Richard L., 4,788,742, Cl. 16-79.000.  
 Doorenbos, Daryl E. Device for assisting in putting on elastic hosiery. 4,789,087, Cl. 223-111.000.  
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 Schaefer, Wolfgang; and Schmidberger, Rainer, 4,789,561, Cl. 427-126.100.  
 Doros, Jacek P., to Illinois Tool Works Inc. Pushbutton switch with resilient extensible pivotable contact element. 4,789,764, Cl. 200-159.00A.  
 Dorsey, Paul S.; and Ponikwia, Edward F., to Whirlpool Corporation. Magnetically hinged smoke shield assembly for an over-the-range oven. 4,788,964, Cl. 126-299.00R.  
 Doryokuro Kakuneryo Kaihatsu Jigyodan: See—  
 Onishi, Koichi; Ouchi, Yoshifusa; Suganuma, Takashi; Utsumi, Atsushi; and Kuroiwa, Takao, 4,789,239, Cl. 356-316.000.  
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 Douche, Jean-Pierre; Coulon, Jean-Claude; and Bouttier, Pierre, to Saint-Gobain Vitreage. Process and device for metering pulverulent materials. 4,789,569, Cl. 427-421.000.  
 Dougherty, Michael J.; and MacMullin, Robert E., to Microdot Inc. Electrical connectors system for adjustable automotive suspension components. 4,789,343, Cl. 439-34.000.  
 Dow Chemical Company, The: See—  
 Bon, Charles K.; Brattesani, Donald N.; and Meldrum, Kevin S., 4,789,449, Cl. 204-242.000.  
 Hoffman, Dwight K.; and Arends, Charles B., 4,789,712, Cl. 525-528.000.  
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 Milovanovic-Lerik, Olga; van der Wal, Hanne R.; and Tribelhorn, Ulrich, 4,789,690, Cl. 521-137.000.  
 Priddy, Duane B., 4,789,730, Cl. 528-498.000.  
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 Vaughn, Walter L.; and Wu, Marinda L., 4,789,386, Cl. 55-16.000.  
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 Milani, Francesco; Franz, Wolfgang; Geier, Michael; and Koch, Jochim, 4,788,965, Cl. 600-22.000.  
 Drake, Donald J.; Hawkins, William G.; Pond, Stephen F.; Campanelli, Michael R.; Hartman, Pamela J.; and Bailey, Raymond E., to Xerox Corporation. Thermal ink jet printhead fabricating process. 4,789,425, Cl. 156-644.000.  
 Drent, Eit, to Shell Oil Company. Process for the preparation of an ester of a 3-aryl-substituted acrylic acid. 4,789,756, Cl. 560-104.000.  
 Dreschmann, Peter; and Walter, Wilhelm, to FAG Kugelfischer George Schafer (KGaA). Bearing system with water exclusion. 4,789,252, Cl. 384-486.000.  
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 Drullinger, Robert E., to United States of America, Commerce. Heat pipe oven molecular beam source. 4,789,779, Cl. 250-251.000.  
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 Dunlop Limited: See—  
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 Dunnavant, William R.: See—  
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 Barnette, William E.; Dean, Thomas R.; Petersen, Wallace C.; and Wexler, Barry A., 4,789,465, Cl. 71-90.000.  
 Hanagan, Mary A., 4,789,393, Cl. 71-92.000.  
 Linder, Karen E., 4,789,543, Cl. 424-1.100.  
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 E.C.C. America Inc.: See—  
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 Cooper, Todd H., 4,789,894, Cl. 358-105.000.  
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 Van Sickle, Dale E.; Morris, John C.; McCall, Marvin A.; Fleischer, Jean C.; and Walker, Ted R., Jr., 4,789,755, Cl. 560-78.000.  
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 Eberhard, Patrick; Mindt, Wolfgang; and Palma, Jean-Pierre, to Kontron Holding A.G. Electrodes for the combined measurement of oxygen and carbon dioxide. 4,789,453, Cl. 204-412.000.  
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 Ediger, Melvin C.; and Fox, R. M. Skip, to Marquis Corp. Spa with slide valve. 4,788,725, Cl. 4-542.000.  
 Effland, Richard C.; and Klein, Joseph T., to Hoechst-Roussel Pharmaceuticals, Inc. Memory enhancing  $\alpha$ -alkyl-4-amino-3-quinolinemethanols and 1-(4-alkylamino-3-quinolinyl)alkanes and related compounds. 4,789,678, Cl. 514-313.000.  
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Finley, Ron. Quick release valve cover. 4,788,950, Cl. 123-195.00C.  
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Forshee, David J. Foldable golf bag umbrella-like cover. 4,788,996, Cl. 135-16.000.  
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Frazzell, Michael E.; Koepsel, Roger E.; and Gius, William J., to Brunswick Corporation. Marine propeller carry handle and emergency spare kit. 4,789,303, Cl. 416-63.000.  
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Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., to American Maize-Products Company. Foodstuffs containing starch of a dull waxy genotype. 4,789,557, Cl. 426-578.000.  
Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., to American Maize-Products Company. Starch of waxy genotype and products produced therefrom. 4,789,738, Cl. 536-102.000.  
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Fuchs, Karl-Dieter, to Feldmuehle Aktiengesellschaft. Skimming blade with wave shaped troughs for a papermaking machine. 4,789,433, Cl. 162-352.000.  
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Fujitsu Limited: See—  
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Matsui, Shougo; and Kobayashi, Kenichi, 4,790,023, Cl. 382-8.000.  
Miyahara, Yutaka, 4,789,611, Cl. 430-5.000.  
Takahashi, Hitoshi; and Fujisaku, Kiminori, 4,789,963, Cl. 364-900.000.  
Yasuda, Hiroshi; and Honjo, Ichiro, 4,789,786, Cl. 250-492.200.  
Fujiwara, Shinji: See—  
Miyata, Yutaka; Chikamura, Takao; Shibata, Takuo; and Fujiwara, Shinji, 4,789,888, Cl. 357-30.000.  
Fujiyama, Masaaki: See—  
Sato, Masami; Fujiyama, Masaaki; Suzuki, Masami; and Yamada, Yasuyuki, 4,789,590, Cl. 428-323.000.  
Fujiyama, Susumu: See—  
Mochida, Isao; Fujiyama, Susumu; Sakai, Yukio; and Otsuka, Hiroyuki, 4,789,455, Cl. 208-39.000.  
Fuk Fan, Max C., to Chan, Cheong P.; Chan, Cheong W. and Chan; Hayakwan. Cleaning brush. 4,788,735, Cl. 15-172.000.  
Fukahori, Junichi: See—  
Kon, Shuji; Suzuki, Yuji; Iwata, Toshimitsu; and Fukahori, Junichi, 4,789,565, Cl. 427-375.000.  
Fukke, Hajime; Akagi, Motoo; Kato, Yoshiki; and Nagashiro, Waichi, to Hitachi, Ltd. Magnetic recording medium. 4,789,581, Cl. 428-65.000.

Fukui, Yutaka: See—  
Nakamura, Shigeyoshi; Kashimura, Tetsuo; Iizuka, Nobuyuki; Fukui, Yutaka; Morikawa, Minoru; and Kurosawa, Soichi, 4,789,412, Cl. 148-408.000.  
Fukumoto, Hiroshi: See—  
Arahara, Kozo; Ohnishi, Toshikazu; and Fukumoto, Hiroshi, 4,789,617, Cl. 430-137.000.  
Fukumoto, Ryoichi, to Aisin Seiki Kabushiki Kaisha. Hook for a wire-type window regulator. 4,788,754, Cl. 24-114.500.  
Fukumura, Kagenori: See—  
Yasue, Hideki; and Fukumura, Kagenori, 4,789,937, Cl. 364-424.100.  
Fukushima, Yoshihisa; Satoh, Isao; Ichinose, Makoto; Kuroki, Yuzuru; and Takagi, Yuuji, to Matsushita Electric Industrial Co., Ltd. Information recording and reproducing apparatus. 4,789,911, Cl. 360-72.200.  
Fukuta, Minoru, to Iwatsu Electric Co. Ltd. Microprocessor emulation apparatus for debugging a microprocessor of an electronic system without utilizing an interrupt signal and a stop signal to temporarily stop an operation of the system. 4,789,924, Cl. 364-200.000.  
Fukuura, Yukio: See—  
Morimura, Yasuhiro; Fukuura, Yukio; Ishikawa, Hiku; Tanuma, Itsuo; and Honda, Toshio, 4,789,586, Cl. 428-216.000.  
Fulks, Jack. Marine engine flushing and emergency bilge pumping assembly. 4,789,367, Cl. 440-88.000.  
Fuller Company: See—  
Hogue, David J., 4,788,917, Cl. 110-203.000.  
Fuller, Ronald C., to Bristol-Myers Company. Plastic measuring scoop with foldable handle. 4,788,862, Cl. 73-426.000.  
Fulop, Charles. Flywheel. 4,788,882, Cl. 74-572.000.  
Furukawa, Haruo: See—  
Kawajiri, Ryoichi; Honda, Masahiro; and Furukawa, Haruo, 4,788,811, Cl. 53-426.000.  
Furukawa, Hisao; and Kawamura, Jo, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Process for preparation of a room-temperature curable resin. 4,789,710, Cl. 525-440.000.  
Furuta, Masami, to Fuji Electric Co., Ltd. DC voltage converter. 4,789,818, Cl. 323-285.000.  
Futaba Denshi Kogyo Kabushiki Kaisha: See—  
Morimoto, Kiyoshi; Takagi, Toshinori; and Matsubara, Kakuei, 4,789,500, Cl. 252-584.000.  
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Miyoshi, Kenichi; and Fuwa, Toru, 4,789,737, Cl. 536-27.000.  
G H Trading AB: See—  
Mattsson, Erik P., 4,789,123, Cl. 248-240.400.  
Gable, Duane S., to Ingersoll-Rand Company. Gear lubrication pump for an air motor. 4,789,316, Cl. 418-88.000.  
Gaertner, Hans; Kaufmann, Friedrich; Schlossherr, Horst W.; and Schulz, Dietrich, to Isover Saint-Gobain. Installation for manufacturing differing mineral fibre products including manual controls for varying stored control signals. 4,789,942, Cl. 364-470.000.  
Galan Inchaurre, Jose M. J. Pipe socket connection for a spacial structure. 4,789,264, Cl. 403-8.000.  
Galand, Claude: See—  
Callens, Paul; and Galand, Claude, 4,790,015, Cl. 381-31.000.  
Galloway, George G., Jr.: See—  
Connally, Douglas R.; and Galloway, George G., Jr., 4,790,001, Cl. 379-66.000.  
Gamez, Victor. Locking device to prevent unauthorized use of an automotive vehicle. 4,789,043, Cl. 180-287.000.  
Ganik, Jan: See—  
Gidseg, Edward D.; and Ganik, Jan, 4,789,121, Cl. 248-188.200.  
Gans, Michael J.: See—  
Darcie, Thomas E.; and Gans, Michael J., 4,789,980, Cl. 370-57.000.  
Garcia, Rafael V., to Uralita, S.A. Roof tiles and wall tiles and process for their manufacture. 4,789,319, Cl. 425-131.100.  
Garreau, Claude. Device suitable for lengthening of lumps of dough. 4,789,325, Cl. 425-372.000.  
Gartin, Maynard H.: See—  
Brewer, Jackie D.; Gartin, Maynard H.; and Yoneshige, Frank T., 4,788,739, Cl. 15-322.000.  
Gas Research Institute: See—  
Hemsath, Klaus H., 4,789,333, Cl. 432-176.000.  
Kasprzyk, Martin R., 4,789,506, Cl. 264-25.000.  
Gasdorf Tool & Machine Co., Inc.: See—  
Rayl, Waldo G., 4,789,418, Cl. 156-468.000.  
Gath, Dietmar; and Von Hayn, Holger, to Alfred Teves GmbH. Sensor with a lateral retaining arm. 4,788,870, Cl. 73-866.500.  
Gaudfrin, Guy. Filter for liquids laden with solid particles, and a filter installation including such a filter. 4,789,474, Cl. 210-333.010.  
Gautier, Jacky: See—  
Rio, Pierre; Gautier, Jacky; and Ubertal, Hubert, 4,789,524, Cl. 422-53.000.  
Gautraud, Michael G., to Brunswick Corporation. Method of playing a bowling game. 4,789,157, Cl. 273-37.000.  
Gay, Christian; and Lassiaz, Philippe, to Valeo. Automotive clutch release bearing. 4,789,052, Cl. 192-98.000.  
Gayot, Anne: See—  
Thomas-Leurquin, Genevieve; Gayot, Anne; Poitou, Pierre; and Basquin, Serge, 4,789,662, Cl. 514-21.000.  
GE Solid State Patents, Inc.: See—  
Morris, Stephen W.; and Lydick, Richard P., 4,789,889, Cl. 357-68.000.  
Gedeon, Andras; and Lindblad, Lars-Erik, to ICOR AB. Device for determining depth of anaesthesia. 4,788,982, Cl. 128-670.000.



Geier, Michael: See—  
Milani, Francesco; Franz, Wolfgang; Geier, Michael; and Koch, Jochim, 4,788,965, Cl. 600-22.000.  
Geller, Paul; and Berkowitz, Steven. Method and apparatus for use in endodontic treatment. 4,789,335, Cl. 433-81.000.  
GenCorp Inc.: See—  
Fabris, Hubert J.; Melby, Earl G.; Chihara, Kohji Y.; and Cocain, Harry W., 4,789,703, Cl. 524-464.000.  
General Dynamics Corp./Space Systems Div.: See—  
Stern, Theodore G.; Cornwell, Mickey; and Nirschl, Donald A., 4,789,989, Cl. 350-96.180.  
General Dynamics Corp./Space Systems Division: See—  
Parmer, Jerome F., 4,789,349, Cl. 439-161.000.  
General Electric Company: See—  
Alphonse, Gerard A., 4,789,881, Cl. 357-17.000.  
Ballard, Donald E.; and Klappert, Willi, 4,789,849, Cl. 336-210.000.  
Castonguay, Roger N.; and Meiners, David J., 4,789,848, Cl. 335-167.000.  
Crawford, Delmar E.; and Fields, Harold T., 4,788,761, Cl. 29-596.000.  
Fisher, Lynn E., 4,788,763, Cl. 29-622.000.  
Guggenheim, Thomas L.; and Guiles, Joseph W., 4,789,725, Cl. 528-201.000.  
Koopman, Lawrence J., 4,789,834, Cl. 524-417.000.  
Stich, Richard A.; and Armstrong, William J., 4,789,130, Cl. 249-120.000.  
Sutphin, Eldon M., Jr., 4,790,012, Cl. 380-21.000.  
True, Thomas T., 4,789,221, Cl. 350-162.120.  
General Instrument Corporation: See—  
Pike, Douglas A., Jr., 4,789,886, Cl. 357-53.000.  
General Motors Corporation: See—  
Anderson, Charlie E., 4,788,890, Cl. 74-851.000.  
Bougaty, Larry J., 4,789,224, Cl. 350-345.000.  
Dexter, William R.; and Wasserbaech, Eberhard E., 4,789,278, Cl. 409-200.000.  
Haydu, Bartley A., 4,789,165, Cl. 277-12.000.  
Hoying, John F.; and Smith, Stanley E., 4,789,142, Cl. 267-140.100.  
Javaherian, Hossein, 4,788,854, Cl. 73-117.300.  
Johnson, George H., 4,788,903, Cl. 98-1.500.  
Kruckmeyer, William C.; and Fannin, Wayne V., 4,789,051, Cl. 188-299.000.  
Miller, Larry D., 4,788,794, Cl. 49-214.000.  
Owen, Marvin L.; and Swain, Robert C., 4,788,881, Cl. 74-500.500.  
Robinson, John H.; and Burnham, Donald R., 4,788,877, Cl. 74-388.0PS.  
Smith, Stanley E.; and Hoying, John F., 4,789,143, Cl. 267-140.100.  
Warner, Harold J.; and Folarin, Abayomi O., 4,789,192, Cl. 293-134.000.  
Warner, Hermann, 4,788,744, Cl. 16-85.000.  
General Motors of Canada Ltd.: See—  
Wiacak, Stanley P.; and Flonders, Ernest G., 4,789,273, Cl. 407-34.000.  
General Technology Applications, Inc.: See—  
O'Mara, Dion P.; Hadermann, Albert F.; and Trippe, Jerry C., 4,789,383, Cl. 44-55.000.  
Genise, Thomas A.; to Eaton Corporation. Auxiliary transmission section shift control system. 4,788,875, Cl. 74-334.000.  
Gennari, Federico; to Biorsearch Spa. Cytidine-diphosphocholine salts, particularly suitable for oral use. 4,789,666, Cl. 514-51.000.  
Gennaro, Antonio: See—  
Pernicone, Nicola; Ferrero, Francesco; and Gennaro, Antonio, 4,789,657, Cl. 502-243.000.  
Gennery, Donald B.; and Wilcox, Brian; to United States of America, National Aeronautics and Space Administration. Programmable pipelined image processor. 4,790,026, Cl. 382-49.000.  
Genodman, Yury: See—  
Niksa, Marilyn J.; Pohio, Gerald R.; Lakatos, Leslie K.; Wheeler, Douglas J.; Solomon, Frank; Niksa, Andrew J.; Schue, Thomas J.; Genodman, Yury; Turk, Thomas R.; and Hagel, Daniel P., 4,788,764, Cl. 29-731.000.  
Gentiluomo, Joseph A. Detection device for electrically conductive fluids. 4,789,853, Cl. 340-604.000.  
Gentron Corporation: See—  
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George, Henry H., Jr.: See—  
Wesley, John L.; and George, Henry H., Jr., 4,789,507, Cl. 264-29.200.  
George, William A.: See—  
Grossman, Mark W.; George, William A.; and Marcucci, Rudolph V., 4,789,784, Cl. 250-436.000.  
Gerchakov, Barbara J., executrix: See—  
Little, Brenda J.; and Gerchakov, Sol M., deceased, 4,789,434, Cl. 204-1.00T.  
Gerchakov, Sol M., deceased: See—  
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Gerhartz, Siegmund: See—  
Schippers, Heinz; and Gerhartz, Siegmund, 4,789,112, Cl. 242-178.000.  
Germann, Werner; to Albe S.A. Process for the production of a ball-point pen tip supplied with liquid ink, and tip produced thereby. 4,789,263, Cl. 401-2.090.  
Gerrath, Karl-Heinz; to Battelle-Institut e.V. Circuit arrangement for averaging. 4,789,953, Cl. 364-724.010.

Gervasutti, Vittorio: See—  
Cellini, Francesco; Gervasutti, Vittorio; Tancorra, Raffaele; and Tonti, Sergio, 4,789,741, Cl. 540-535.000.  
Gesson, Jean-Pierre; Mondon, Martine; Jacquesy, Jean-Claude; and Kraemer, Hans P.; to Laboratoires Hoechst S. A.; and Behringwerke Aktiengesellschaft. Anthracyclines and drugs containing them. 4,789,665, Cl. 514-34.000.  
Ghoresly, Mansor: See—  
Smith, Reginald W.; and Ghoresly, Mansor, 4,789,522, Cl. 420-514.000.  
Giannetti, Enzo; Rotasperi, Angelo; and Marchese, Enrico; to Ausimont S.p.A. Process for the polymerization in aqueous dispersion of fluorinated monomers. 4,789,717, Cl. 526-209.000.  
Gibbons, Charles E.; Tanner, Cynthia L.; and Whillock, Allan A.; to International Paper Company. Non-foil composite structures for packaging juice. 4,789,575, Cl. 428-34.200.  
Gidseg, Edward D.; and Ganik, Jan; to Gidseg, Edward D. System for supporting and adjusting refrigerators and the like. 4,789,121, Cl. 248-188.200.  
Gifu Husky Co., Ltd.: See—  
Sasamura, Minoru; and Takenaka, Kazutoshi, 4,789,320, Cl. 425-190.000.  
Gilmore, Larry J. Wood chip classifying system. 4,789,068, Cl. 209-44.300.  
Ginsburg, Arthur P.; Ginsburg, David A.; and Ginsburg, Robert P.; to Vistech Consultants, Inc. Apparatus and method for testing the motion contrast visual sensitivity of an individual. 4,789,234, Cl. 351-239.000.  
Ginsburg, David A.: See—  
Ginsburg, Arthur P.; Ginsburg, David A.; and Ginsburg, Robert P., 4,789,234, Cl. 351-239.000.  
Ginsburg, Jayme P., executrix: See—  
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Ginsburg, Robert P.: See—  
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Giorgi, Ettore; to SAES Getters SpA. Reinforced insulated heater getter device. 4,789,309, Cl. 417-51.000.  
Giraud, Jean; to AEC-Societe de Chimie Organique et Biologique. Process for the preparation of an aqueous solution of the sodium salt of methionine. 4,789,686, Cl. 514-562.000.  
Girscher, Wolfgang: See—  
Richter, Ludwig; Niederhofer, Karl H.; Kramer, Dieter; Sussner, Gerhard; Girscher, Wolfgang; Munch, Volker; Vial, Heinrich; Mayer, Helmut R.; and Reyher, Hayo, 4,790,007, Cl. 379-420.000.  
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Gleason, John T., Jr.; and Frost, James, Jr.; to DeVilbiss Company, The. Hold down mechanism for a pivotally mounted motor. 4,789,127, Cl. 248-666.000.  
Glidden Company, The: See—  
Hahn, Kenneth G., Jr., 4,789,694, Cl. 523-310.000.  
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Baiker, Alfons; Dollenmeier, Peter; and Glinski, Marek, 4,789,533, Cl. 423-239.000.  
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Taylor, Reginald M., 4,789,701, Cl. 524-382.000.  
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Ellefson, Jerome K., 4,789,370, Cl. 446-113.000.  
Goegelman, Robert T.; to Merck & Co., Inc. Anthelmintic fermentation products of microorganisms. 4,789,684, Cl. 514-450.000.  
Goetze, Klaus-Peter: See—  
Winter, Josef; Wagner, Rene; and Goetze, Klaus-Peter, 4,789,164, Cl. 277-9.000.  
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Goff, Anthony J.: See—  
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Goffman, Martin; and Kudryk, Val; to ASARCO Incorporated. Method for the electrodeposition of metals. 4,789,445, Cl. 204-114.000.  
Goi, Shigeru: See—  
Taniguchi, Masahiko; and Goi, Shigeru, 4,789,592, Cl. 428-373.000.  
Gold, Inc.: See—  
Rafalko, John S., 4,788,726, Cl. 5-93.00R.  
Goldwasser, Robert: See—  
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Gomoll, Guenter; and Hauslaib, Wolfgang; to Mannesmann AG. Paper feeding and transport through printers. 4,789,258, Cl. 400-605.000.  
Goodman, Mark M.; and Knapp, Fum F., Jr.; to United States of America, Energy. Radiiodinated glucose analogues for use as imaging agents. 4,789,542, Cl. 424-1.100.  
Goodnow, Ronald F.; Reid, Robert A.; and Austin, Robert; to Thermo Electron Web Systems, Inc. Doctoring apparatus. 4,789,432, Cl. 162-281.000.

Goodson, Robert J.: See—  
Bloch, Will; Sheridan, Patrick J.; and Goodson, Robert J., 4,789,630, Cl. 435-7.000.  
Goodwin, John C.: See—  
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Gordon, Keith M.; and Blair, Michael L.; to MPB Corporation. Method of making axially hardened bearings. 4,788,758, Cl. 29-148.40R.  
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Schick, Jean-Francois, 4,789,092, Cl. 227-111.000.  
Gotoh, Yasuharu: See—  
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Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., 4,789,557, Cl. 426-578.000.  
Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., 4,789,738, Cl. 536-102.000.  
Gould Inc.: See—  
Lach, Lawrence E., 4,789,798, Cl. 307-475.000.  
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Osborne, James C.; and Murphy, Patrick T., 4,789,301, Cl. 415-206.000.  
Gowda, Byre V.; Wilson, Robert M.; and Wepfer, Robert M.; to Westinghouse Electric Corp. Anti-vibration bars for nuclear steam generators. 4,789,028, Cl. 165-162.000.  
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Graham, Patricia A.: See—  
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Grailat, Gerard; to Salomon S.A. Three point support. 4,789,177, Cl. 280-607.000.  
Grams, Allan E.: See—  
Fritsch, Ronald J.; and Grams, Allan E., 4,789,344, Cl. 439-43.000.  
Granowski, Robert: See—  
Karasz, Wlodzimierz; Granowski, Robert; Ramotowski, Witold; Tuziowski, Aleksander; Cieplak, Jerzy; and Pilawski, Kazimierz, 4,788,970, Cl. 128-92.0ND.  
Grant, Frederic F. Vibration isolating heat sink. 4,789,023, Cl. 165-1.000.  
Grant, George G.; to Reliance Electric Company. Gear type shaft coupling. 4,789,376, Cl. 464-154.000.  
Grant, Neil F.: See—  
Bagnall-Wild, Ralph H.; and Grant, Neil F., 4,789,339, Cl. 434-20.000.  
Gray, Bruce A.: See—  
Ramsey, Everett M.; Gray, Bruce A.; and Evans, Donald C., 4,789,332, Cl. 432-59.000.  
Greenbaum, Elias; to United States of America, Energy. Method and apparatus for nondestructive in vivo measurement of photosynthesis. 4,789,436, Cl. 204-1.00T.  
Gregory, Thomas A.; Keller, Christopher G.; Kennedy, Bruce E.; Murray, Bruce A.; and Rothschild, Wayne J.; to International Business Machines Corporation. Method and apparatus for lubricating a magnetic disk continuously in a recording file. 4,789,913, Cl. 360-97.030.  
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Gribens, Joel A.: See—  
Rei, Nuno M.; and Gribens, Joel A., 4,789,692, Cl. 523-122.000.  
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Clarke, Samuel Y., Jr.; and Griffith, Clifford J., Jr., 4,789,266, Cl. 404-96.000.  
Griffith Laboratories U.S.A., Inc.: See—  
Judd, Virginia L., 4,789,555, Cl. 426-503.000.  
Griffiths, Alan D.; to Dunlop Limited. Marine growth retarding hose. 4,789,005, Cl. 138-103.000.  
Grindmaster Corporation: See—  
Weber, Robert L., 4,789,106, Cl. 241-101.200.  
Groner, Albrecht; and Knauf, Werner; to Hoechst Aktiengesellschaft. Process for growing granulosis viruses. 4,789,632, Cl. 435-235.000.  
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Nussbaumer, Erwin; Gross, Rainer; Botzelmann, Herbert; Haller, Hans; and Buchwald, Franz, 4,788,886, Cl. 74-665.00T.  
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Grossman, Mark W.; George, William A.; and Marcucci, Rudolph V.; to GTE Products Corporation. Apparatus for isotopic alteration of mercury vapor. 4,789,784, Cl. 250-436.000.  
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Malabarba, Adriano; Trani, Aldo; Ferrari, Pietro; and Tarzia, Giorgio, 4,789,661, Cl. 514-8.000.  
Gruzling, Josip. Propeller shroud. 4,789,302, Cl. 415-213.00C.  
GTE Government Systems Corporation: See—  
Mustafa, Mehmet; Tweedy, Ernest P.; Stoddard, James C.; and Beriont, Walter J., 4,789,895, Cl. 358-147.000.  
GTE Laboratories Incorporated: See—  
Kadkade, Prakash G., 4,788,793, Cl. 47-58.000.  
Mazor, Baruch; and Veeneman, Dale E., 4,790,016, Cl. 381-36.000.  
GTE Products Corporation: See—  
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GTE Valeron Corporation: See—  
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Guerra, Donato R. Exercise device. 4,789,152, Cl. 272-144.000.  
Guettinger, Kurt; to Gutag Innovations AG. Positive displacement machine, more particularly pump, and method for fabricating such pump. 4,789,315, Cl. 418-56.000.  
Guggenheim, Thomas L.; and Guiles, Joseph W.; to General Electric Company. Phenylene ether-carbonate copolymer containing spiroindane group. 4,789,725, Cl. 528-201.000.  
Guiles, Joseph W.: See—  
Guggenheim, Thomas L.; and Guiles, Joseph W., 4,789,725, Cl. 528-201.000.  
Gukkenberger, Horst; Eberle, Karl; and Weigel-Krengel, Karola; to U.S. Philips Corporation. Method of manufacturing a magnetic head for a video magnetic tape apparatus. 4,788,762, Cl. 29-603.000.  
Gundersen, Steven C.; and Worthington, Thomas K.; to International Business Machines Corporation. Signature verification algorithm. 4,789,934, Cl. 364-419.000.  
Gupta, Ved; Hager, Jerome E.; and Noble, Ralph A.; to Fetherstonhaugh & Co. Incorporation of chemically reactive agents on resin particles. 4,789,597, Cl. 428-467.000.  
Gustafson, Robert; and Nagle, David P.; to United Technologies Corporation. Insulated propeller blade. 4,789,304, Cl. 416-95.000.  
Gutag Innovations AG: See—  
Guettinger, Kurt, 4,789,315, Cl. 418-56.000.  
Guttsell, David R.; to Ditto Sales, Inc. Table base construction. 4,789,122, Cl. 248-188.700.  
Guthrie, William L.: See—  
Chow, Melanie M.; Cronin, John E.; Guthrie, William L.; Kaanta, Carter W.; Luther, Barbara; Patrick, William J.; Perry, Kathleen A.; and Standley, Charles L., 4,789,648, Cl. 437-225.000.  
Gutierrez, Arturo M. Aerosol operating device. 4,789,083, Cl. 222-108.000.  
Guzy, Raymond L.; to Hughes Tool Company. Synthetic elastomer with improved chemical, aging and oil resistance. 4,789,708, Cl. 525-263.000.  
Haas, Fred; to Viceroy Homes Limited. Skylight. 4,788,804, Cl. 52-200.000.  
Haas, Karl H.; to Karl Kassbohrer Fahrzeugwerke GmbH. Hydraulic steering device. 4,789,036, Cl. 180-6.480.  
Haddad, James H.; Owen, Hartley; and Schatz, Klaus W.; to Mobil Oil Corporation. Fluid catalytic cracking with plurality of catalyst stripping zones. 4,789,458, Cl. 208-151.000.  
Hadden, Charles T.: See—  
Revis, Nathaniel W.; Osborne, Tanya R.; and Hadden, Charles T., 4,789,478, Cl. 210-611.000.  
Hadermann, Albert F.: See—  
O'Mara, Dion P.; Hadermann, Albert F.; and Trippe, Jerry C., 4,789,383, Cl. 44-55.000.  
Hagel, Daniel P.: See—  
Niksa, Marilyn J.; Pohio, Gerald R.; Lakatos, Leslie K.; Wheeler, Douglas J.; Solomon, Frank; Niksa, Andrew J.; Schue, Thomas J.; Genodman, Yury; Turk, Thomas R.; and Hagel, Daniel P., 4,788,764, Cl. 29-731.000.  
Hager, G. Brent; to Metropolitan Government of Nashville and Davidson County. Method and portable apparatus for chemical spraying of unwanted bird roosts. 4,789,099, Cl. 239-10.000.  
Hager, Jerome E.: See—  
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Hahn, Kenneth G., Jr.; to Glidden Company, The. Ambient cure latex paint. 4,789,694, Cl. 523-310.000.  
Hair, Michael L.: See—  
Croucher, Melvin D.; Wong, Raymond W.; Ober, Christopher K.; and Hair, Michael L., 4,789,616, Cl. 430-137.000.  
Hakansson, Nils. Attachment means for a work piece. 4,789,169, Cl. 279-2.00R.  
Halcyon Waterbed Inc.: See—  
Liu, Dean S., 4,788,727, Cl. 5-174.000.  
Hale, Gordon B.; Friddle, Donald J.; and McBride, Edward D.; to Outboard Marine Corporation. Marine propulsion device ball clutch transmission. 4,789,366, Cl. 440-75.000.  
Hale, John R.; to RCA Licensing Corp. Electron gun assembly having a reinforced heater tab. 4,789,807, Cl. 313-446.000.



Hall, David R.: See—  
McPherson, James N.; and Hall, David R., 4,789,251, Cl. 384-317.000.

Haller, Hans: See—  
Nussbaumer, Erwin; Gross, Rainer; Botzelmann, Herbert; Haller, Hans; and Buchwald, Franz, 4,788,886, Cl. 74-665.00T.

Halliburton Company: See—  
Sullaway, Bob L.; Knox, Lloyd C.; and Zunkel, Gary D., 4,789,271, Cl. 405-225.000.

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Mori, Shinichi; Sakamoto, Keijiro; Nakauchi, Hiroaki; Hamada, Akiyoshi; and Yoshida, Kazuyuki, 4,789,880, Cl. 355-55.000.

Hamburg, Douglas R., to Ford Motor Company. Adaptive air fuel control using hydrocarbon variability feedback, 4,789,939, Cl. 364-431.050.

Hamel, Renald. Sailing system, 4,788,924, Cl. 114-39.100.

Hamilton, David: See—  
Berger, Joseph P.; Allsopp, Mary F.; Cook, Christopher D.; Fraleigh, Jonathan O.; Hamilton, David; Kessberger, John E.; Maiorano, Helen; Rawlings, Stuart O.; Warmus, James L.; Wilczynski, Janet A.; and Wong, Did-bun, 4,789,147, Cl. 270-1.100.

Hamilton Kent Manufacturing, Inc.: See—  
Housas, Jim, 4,789,167, Cl. 277-207.00A.

Hamilton, Martin W.; and Amlani, Kish D., to Eaton Corporation. Load cell, 4,789,035, Cl. 177-211.000.

Hamilton, Thomas C.; and Buckingham, Robin E., to Beecham Group p.l.c. Method for treating incontinence, 4,789,679, Cl. 514-353.000.

Hammett, Roy, to International Container Systems, Inc. Spacer tray for packaging containers, 4,789,063, Cl. 206-432.000.

Hamprecht, Gerhard: See—  
Husslein, Gerd; Ammermann, Eberhard; Hamprecht, Gerhard; and Wuerzer, Bruno, 4,789,747, Cl. 548-262.000.

Hampton, Clifton G., to Siecor Corporation. Modular connector with unitary dust cover, 4,789,348, Cl. 439-142.000.

Hamuro, Junji: See—  
Yoshimoto, Ryota; Kashima, Nobukazu; Hamuro, Junji; and Mitsugi, Koji, 4,789,658, Cl. 514-12.000.

Han, Hak-Rhim, to Minnesota Mining and Manufacturing Company. Cap liner, 4,789,074, Cl. 215-347.000.

Hanagan, Mary A., to Du Pont de Nemours, E. I., and Company. Herbicidal pyridine sulfonamides, 4,789,393, Cl. 71-92.000.

Handa, Hideo: See—  
Ikeda, Takeshi; Handa, Hideo; and Nakano, Keisuke, 4,789,509, Cl. 264-29.200.

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Katsumata, Shigeru; Handa, Takuro; Kamakura, Tamiji; Tanaka, Noriyoshi; Katoh, Hidekatsu; Namiwa, Kimiyoshi; and Shoji, Yoshikazu, 4,789,492, Cl. 252-32.70E.

Handel, Hubert: See—  
Schoening, Josef; and Handel, Hubert, 4,789,519, Cl. 376-381.000.

Haneda, Satoshi; and Yoshino, Kunihisa, to Konishiroku Photo Industry Co., Ltd. Method for forming color image, 4,789,612, Cl. 430-42.000.

Hani, Kiyoshi: See—  
Yano, Isamu; Hani, Kiyoshi; Yamashita, Shu; Kawabata, Kazuo; and Kogure, Naoyuki, 4,788,759, Cl. 29-159.00B.

Hanke, Reinhart: See—  
Cvitas, Vilim; Faltejssek, Karl; Klinar, Gottfried; and Hanke, Reinhart, 4,789,469, Cl. 210-150.000.

Hankins, Edward E.: See—  
Twyford, David R.; and Hankins, Edward E., 4,789,578, Cl. 428-40.000.

Hanley, Matthew W.: See—  
Nelson, Edmund A.; Colvin, Arthur E.; Hanley, Matthew W.; and Scott, Stephen C., 4,788,871, Cl. 73-866.500.

Hannah, Marc, to Silicon Graphics, Inc. Interleaved pipeline parallel processing architecture, 4,789,927, Cl. 364-200.000.

Hanselka, Peter; and Oehlerich, Joerg, to Siemens Aktiengesellschaft. Circuit arrangement for telecommunications switching systems, particularly telephone switching systems with information processing switching device and processing load limiting, 4,790,005, Cl. 379-244.000.

Hansen, Peer K.: See—  
Madsen, Jens U.; and Hansen, Peer K., 4,789,997, Cl. 378-109.000.

Hansen, Robert D.: See—  
Klimpel, Richard R.; and Hansen, Robert D., 4,789,392, Cl. 209-166.000.

Harasin, Stephen J.: See—  
Dewhurst, John E.; and Harasin, Stephen J., 4,789,688, Cl. 521-110.000.

Hareng, Michel: See—  
Le Pesant, Jean-Pierre; Hareng, Michel; and Mourey, Bruno, 4,789,228, Cl. 350-355.000.

Harley, Jack: See—  
Jewitt, Joseph H.; and Harley, Jack, 4,789,076, Cl. 220-309.000.

Harlow, Richard L.: See—  
Sparrow, Timothy H.; and Harlow, Richard L., 4,788,753, Cl. 24-113.0MP.

Harold, Paul D.: See—  
Tower, Timothy M.; Reichman, James M.; and Harold, Paul D., 4,789,313, Cl. 417-388.000.

Harris, Amos L. Word and message forming board game, 4,789,162, Cl. 273-272.000.

Harris Corp.: See—  
Hildebrandt, Eric A., 4,789,956, Cl. 364-736.500.

Pipkin, Mark A., 4,789,426, Cl. 156-643.000.

Harris, Gregory D.: See—  
Kersenbrock, Michael D.; Lowry, David A.; Harris, Gregory D.; Henry, Michael D.; and Kohlmeier, Francis D., 4,789,789, Cl. 307-40.000.

Harris, Jim C. Holder for blood collecting needle, 4,788,986, Cl. 128-763.000.

Hart, Duane H., to Minnesota Mining and Manufacturing Company. Injection head for filling dispenser that meters proportionate increments of dissimilar materials, 4,789,012, Cl. 141-18.000.

Harte, Richard A.; and Wilson, David B., to Environmental Concerns, Inc. Water purification material, process therefor, and device for the removal of heavy metal toxins, 4,789,475, Cl. 210-502.100.

Hartman, Pamela J.: See—  
Drake, Donald J.; Hawkins, William G.; Pond, Stephen F.; Campanelli, Michael R.; Hartman, Pamela J.; and Bailey, Raymond E., 4,789,425, Cl. 156-644.000.

Hasenack, Hendrikus J. A.: See—  
Martens, Franciscus J. A.; and Hasenack, Hendrikus J. A., 4,789,384, Cl. 48-197.00R.

Hashiba, Takahiro: See—  
Nagata, Atsushi; and Hashiba, Takahiro, 4,789,763, Cl. 200-61.540.

Hashimoto, Yasuhiro: See—  
Takano, Hiroshi; and Hashimoto, Yasuhiro, 4,789,378, Cl. 474-13.000.

Hashimoto, Junji; Murata, Harumi; and Nishio, Hiroshi, to Itoki Co., Ltd. Automatic rental safe-deposit box system, 4,789,293, Cl. 414-273.000.

Hashimoto, Tsuyoshi: See—  
Kato, Yasuyuki; Yuyama, Masahiro; Moritani, Masahiko; Matsura, Hideaki; Iijima, Susumu; and Hashimoto, Tsuyoshi, 4,789,709, Cl. 525-366.000.

Hashizume, Akio, to Hashizume, Yasuyoshi, a part interest. Rotor for a driving device, 4,788,883, Cl. 74-572.000.

Hashizume, Yasuyoshi: See—  
Hashizume, Akio, 4,788,883, Cl. 74-572.000.

Hata, Kotaro: See—  
Nakamura, Eitaro; and Hata, Kotaro, 4,789,599, Cl. 428-411.100.

Hauser, Hans H.; Rebsamen, Arthur; Slavik, Walter; and Landwehrkamp, Hans, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Process and apparatus for winding a thread supplied at a constant speed onto a cross wound bobbin, 4,789,107, Cl. 242-45.000.

Hauslaib, Wolfgang: See—  
Gomoll, Guenter; and Hauslaib, Wolfgang, 4,789,258, Cl. 400-605.000.

Hawkins, William G.: See—  
Drake, Donald J.; Hawkins, William G.; Pond, Stephen F.; Campanelli, Michael R.; Hartman, Pamela J.; and Bailey, Raymond E., 4,789,425, Cl. 156-644.000.

Hayashi, Hiroshi: See—  
Kobayashi, Osamu; Hayashi, Hiroshi; and Nakajima, Kenji, 4,789,079, Cl. 221-232.000.

Hayashi, Katsuhiko: See—  
Watanabe, Koji; Hayashi, Katsuhiko; Minakuchi, Nobuaki; Misaki, Masayuki; Terai, Kenichi; Nakama, Yasutoshi; and Morita, Masaharu, 4,790,014, Cl. 381-1.000.

Hayashi, Kenichi, to Toshiba Kabushiki Kaisha. Gyrotron device with adjustable pitch factor, 4,789,808, Cl. 315-4.000.

Hayashi, Yoshimasa, to Nissan Motor Co., Ltd. Cooling system for automotive engine or the like, 4,788,943, Cl. 123-41.270.

Haydu, Bartley A., to General Motors Corporation. Pressure compensating seal, 4,789,165, Cl. 277-12.000.

Hays, Douglas E.; and Lederer, James F., to International Business Machines Corporation. Correction buffer, 4,789,255, Cl. 400-63.000.

Hazenbroek, Jacobus E.; and Verrijp, Bastiaan. Crop removal system, 4,788,749, Cl. 17-11.000.

HCS Industrial Safeguarding B.V.: See—  
Christiaan, Steinz H., 4,789,795, Cl. 307-401.000.

Heinemann, Stanley O.: See—  
Wickersheim, Kenneth A.; Sun, Mei H.; Heinemann, Stanley O.; and Hinemann, Stanley O., 4,789,992, Cl. 374-161.000.

Heki, Tatsuo: See—  
Inoue, Noriyuki; Heki, Tatsuo; and Ueda, Shinji, 4,789,627, Cl. 430-406.000.

Helbig, Peter; and Schonherr, Walter, to Patent-Treuhand Gesellschaft fur Elektrische Gluhlampen m.b.H. Lamp and base assembly, particularly for association with an automotive head lamp reflector, 4,789,920, Cl. 362-61.000.

Heldenbrand, William C. Knock-down cattle guard, 4,789,137, Cl. 256-17.000.

Hemsath, Klaus H., to Gas Research Institute. Convective heat transfer within an industrial heat treating furnace, 4,789,333, Cl. 432-176.000.

Henkel Corporation: See—  
Bereiter, Bruce A., 4,789,499, Cl. 252-369.000.

Henkel, Dietmar, to MAN Nutzfahrzeuge GmbH. Apparatus for removing soot from the exhaust gases of an internal combustion engine, in particular a diesel engine, 4,788,819, Cl. 60-303.000.

Henkel Kommanditgesellschaft auf Aktien: See—  
Spei, Brigitte; and Wehle, Volker, 4,789,483, Cl. 210-708.000.

von Rybinski, Wolfgang; and Koester, Rita, 4,789,466, Cl. 209-166.000.

Henkelmann, Dieter, to Brown, Boveri & Cie AG. Digital measuring instrument for displaying a measured value that varies over time, 4,789,824, Cl. 324-114.000.

Henry, Michael D.: See—  
Kersenbrock, Michael D.; Lowry, David A.; Harris, Gregory D.; Henry, Michael D.; and Kohlmeier, Francis D., 4,789,789, Cl. 307-40.000.

Hercules Incorporated: See—  
Jabloner, Harold; and Nguyen, Tuyen T., 4,789,722, Cl. 528-172.000.

Parrent, George B., Jr.; Zeiders, Glenn W.; Reilly, James P.; and Khazen, Antonio, 4,789,820, Cl. 324-58.50R.

Herlein, Richard F., to Fairchild Camera & Instrument Corporation. Control of signal timing apparatus in automatic test systems using minimal memory, 4,789,835, Cl. 328-72.000.

Herliczek, Siegfried H.: See—  
Bishop, Roger B.; Ash, Charles E.; and Herliczek, Siegfried H., 4,788,911, Cl. 100-155.00G.

Hermann, Michael G.: See—  
Kirchgeorg, John; and Hermann, Michael G., 4,788,973, Cl. 128-214.180.

Hermann, Walter, to Oehler AG. Apparatus for applying decorative elements, 4,789,419, Cl. 156-499.000.

Herther, Jay G.: See—  
Baggett, Don W.; Herther, Jay G.; and Bassham, Deborah E., 4,789,861, Cl. 342-152.000.

Hewitt, C. Lee: See—  
Beer, Carl C.; Hewitt, C. Lee; and Larson, Sherman, 4,788,993, Cl. 134-123.000.

Hewlett-Packard Company: See—  
Albin, Robert D., 4,789,840, Cl. 329-161.000.

Clifford, George M., Jr., 4,789,915, Cl. 360-132.000.

Majette, Mark W.; Walsh, William J.; and Wickeraad, John A., 4,789,874, Cl. 346-140.00R.

Heyse, John V.: See—  
Byrne, Donald F.; Johnson, David R.; and Heyse, John V., 4,789,462, Cl. 208-213.000.

Heywang, Walter; and Baues, Peter, to Siemens Aktiengesellschaft. Electro-optical modulator having a monomode light waveguide modulator, 4,789,213, Cl. 350-96.150.

Hibert, Marcel; and Gittos, Maurice W., to Merrell Dow Pharmaceuticals Inc. Aromatic 2-aminoalkyl-1,2-benzisothiazol-3(2H)-one-1,1-dioxide derivatives, useful as anxiolytic agents, 4,789,676, Cl. 514-292.000.

Hibino, Ikuo: See—  
Kobayashi, Hiroshi; Nagahama, Yuji; Ueda, Kazuo; and Hibino, Ikuo, 4,789,260, Cl. 400-697.100.

Hicks, John W. Laser diode optical modulating devices, 4,789,843, Cl. 332-7.510.

Hidaka, Sachio: See—  
Sakai, Hiroaki; and Hidaka, Sachio, 4,788,820, Cl. 60-444.000.

Higashi, Hidehiro: See—  
Hirano, Tetsuji; Sato, Goro; Higashi, Hidehiro; Migita, Teruo; and Eto, Yoshio, 4,789,654, Cl. 502-66.000.

Higdon, Scott. Method and apparatus for preventing floodback in cooling apparatus, 4,788,826, Cl. 62-126.000.

Higuchi, Mitsuru: See—  
Wakabayashi, Hiroshi; Tsukahara, Daiki; Katayama, Akira; Machida, Kiyosada; Kazami, Kazuyuki; Katano, Yuji; Terunuma, Hiroshi; and Higuchi, Mitsuru, 4,789,875, Cl. 354-195.100.

Higuchi, Tautomu; and Kambe, Shigeharu, to Unozawa-Gumi Iron Works, Ltd. Multi-section roots vacuum pump of reverse flow cooling type with internal flow division arrangement, 4,789,314, Cl. 418-9.000.

Hijiya, Hiromi: See—  
Hirao, Mamoru; Hijiya, Hiromi; and Miyaka, Toshio, 4,789,559, Cl. 426-658.000.

Hikari Kosakusho Co., Ltd.: See—  
Katori, Hideo, 4,788,891, Cl. 74-781.00R.

Hilborn, Robert R. Keyed mounting assembly for lockable swivel caster, 4,788,741, Cl. 16-35.00R.

Hildebrandt, Eric A., to Harris Corp. Maximum negative number detector, 4,789,956, Cl. 364-736.500.

Hill Top Research, Inc.: See—  
Quisno, Robert A., 4,788,971, Cl. 128-743.000.

Hillemeier, Bernd: See—  
Babendererde, Siegmund; Hillemeier, Bernd; and Braach, Otto, 4,789,267, Cl. 405-146.000.

Hinemann, Stanley O.: See—  
Wickersheim, Kenneth A.; Sun, Mei H.; Heinemann, Stanley O.; and Hinemann, Stanley O., 4,789,992, Cl. 374-161.000.

Hinton, Harvard S., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Speech processing feature generation arrangement, 4,790,017, Cl. 381-43.000.

Hinton, James L.: See—  
LaManna, Richard J.; Hinton, James L.; and Cucksey, Edward L., 4,789,420, Cl. 156-540.000.

Hiraga, Ryoze: See—  
Sato, Mitsuya; Imai, Shunzo; and Hiraga, Ryoze, 4,789,294, Cl. 414-416.000.

Hirai, Hidetoshi: See—  
Kubo, Masahiro; Dohnomoto, Tadashi; Tanaka, Atsuo; and Hirai, Hidetoshi, 4,789,605, Cl. 428-614.000.

Hiramatsu, Hiroyoshi: See—  
Oshiyama, Shigeki; Kishimoto, Koji; Hirota, Takeshi; Suzue, Shigetoshi; Hiramatsu, Hiroyoshi; Yoshikawa, Kiyooki; and Suzuki, Nobuyuki, 4,789,381, Cl. 8-115.600.

Hirano, Shigeo: See—  
Sakanoue, Kei; Hirano, Shigeo; Ueda, Takehiko; and Adachi, Keiichi, 4,789,624, Cl. 430-372.000.

Hirano, Tetsuji; Sato, Goro; Higashi, Hidehiro; Migita, Teruo; and Eto, Yoshio, to Catalysts & Chemicals Industries Co., Ltd. Hydrotreating catalysts, 4,789,654, Cl. 502-66.000.

Hirao, Mamoru; Hijiya, Hiromi; and Miyaka, Toshio, to Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo. Anhydrous crystals of maltitol and the whole crystalline hydrogenated starch hydrolysate mixture solid containing the crystals, and process for the production and uses thereof, 4,789,559, Cl. 426-658.000.

Hiraoka, Shigehiko; Ichinose, Makoto; Satoh, Isao; and Sugimura, Tatuo, to Matsushita Electric Industrial Co., Ltd. Optical disk exclusively used for reproduction wherein guide grooves located between data managing information and data recording regions have no track address sections, 4,789,979, Cl. 369-275.000.

Hirata, Naonori: See—  
Arai, Kenji; Mito, Nobuaki; Morita, Kouichi; and Hirata, Naonori, 4,789,396, Cl. 71-94.000.

Hirose Electric Co., Ltd.: See—  
Yamaguchi, Masao; and Teramura, Kimio, 4,789,357, Cl. 439-607.000.

Hirota, Takeshi: See—  
Oshiyama, Shigeki; Kishimoto, Koji; Hirota, Takeshi; Suzue, Shigetoshi; Hiramatsu, Hiroyoshi; Yoshikawa, Kiyooki; and Suzuki, Nobuyuki, 4,789,381, Cl. 8-115.600.

Hirsch, Martin; Lommert, Hermann; and Serbent, Harry, to Metallgesellschaft Aktiengesellschaft. Process of reducing higher metal oxides to lower metal oxides, 4,789,580, Cl. 423-49.000.

Hisamitsu, Kunio: See—  
Takemoto, Tadashi; Yukawa, Toshihide; and Hisamitsu, Kunio, 4,789,758, Cl. 562-448.000.

Hitachi Construction Machinery: See—  
Akasaka, Yoshimichi; Nakamura, Ichiro; Ichiryu, Ken; Kometani, Eiji; and Gotoh, Yasuharu, 4,788,902, Cl. 91-486.000.

Hitachi Ltd.: See—  
Akasaka, Yoshimichi; Nakamura, Ichiro; Ichiryu, Ken; Kometani, Eiji; and Gotoh, Yasuharu, 4,788,902, Cl. 91-486.000.

Fukke, Hajime; Akagi, Motoo; Kato, Yoshiki; and Nagashiro, Waichi, 4,789,581, Cl. 428-65.000.

Kinoshita, Yasuaki, 4,790,000, Cl. 379-59.000.

Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Kawano, Katsumi; Orimo, Masayuki; Kasashima, Hirokazu; and Nakai, Kozo, 4,789,986, Cl. 371-67.000.

Maajima, Hideo; Hotta, Takashi; Masuda, Ikuro; Iwamura, Masahiro; Kurita, Kouzaburo; and Ueno, Masahiro, 4,789,958, Cl. 364-787.000.

Masuda, Kenmei; Terada, Toshimichi; Ogiro, Kenji; Yokoo, Shozo; and Uchiyama, Osamu, 4,789,912, Cl. 360-85.000.

Minamihata, Shigeaki; and Kamegaki, Kazuyuki, 4,789,884, Cl. 357-34.000.

Morimoto, Yuichi; Maruyama, Hiromi; Aoyama, Motoo; Zukeran, Atsushi; Bessho, Yasunori; Matsumoto, Tomoyuki; Ishii, Yoshihiko; Fujimura, Kouji; and Uchikawa, Sadao, 4,789,520, Cl. 376-419.000.

Nakamura, Shigeyoshi; Kashimura, Tetsuo; Iizuka, Nobuyuki; Fukui, Yutaka; Morikawa, Minoru; and Kurosawa, Soichi, 4,789,412, Cl. 148-408.000.

Ozeki, Masayoshi, 4,789,855, Cl. 340-703.000.

Umetani, Yukio, 4,789,955, Cl. 364-745.000.

Wada, Yutaka; Kiguchi, Takashi; Kobayashi, Yasuhiro; and Mitsuta, Toru, 4,789,944, Cl. 364-488.000.

Willis, Donald H., 4,789,960, Cl. 364-900.000.

Hitachi Medical Corp.: See—  
Nishimura, Hiroshi, 4,789,833, Cl. 324-320.000.

Nishimura, Hiroshi; and Miyazaki, Osamu, 4,789,929, Cl. 364-413.150.

Hitchcock, James R.: See—  
DiGianfilippo, Alessandro; Hitchcock, James R.; Lewis, Robert E.; Zielsdorf, Randall A.; Vos, James P.; Starai, Rudolph; Becker, Michael J.; Warner, Donald W.; and Huang, Leon, 4,789,014, Cl. 141-83.000.

Hochtemperatur-Reaktorbau GmbH: See—  
Schoening, Josef; and Handel, Hubert, 4,789,519, Cl. 376-381.000.

Hochtief Aktiengesellschaft Vorm. Gebr. Helfmann: See—  
Babendererde, Siegmund; Hillemeier, Bernd; and Braach, Otto, 4,789,267, Cl. 405-146.000.

Hock, Darryl A.; and Kaleita, David L., to Jabil Circuit Company. Power door lock interlock circuit, 4,789,851, Cl. 340-52.00D.

Hodge, Robert R.: See—  
Tenuto, John B., Jr.; Hodge, Robert R.; Williams, Arthur V.; and Karreman, Hans E., 4,789,134, Cl. 254-104.000.

Hodor, Jim R.; Barney, Jesus; and Decker, Herman J., to Lockheed Missiles & Space Company, Inc. Stress sensor, 4,789,236, Cl. 356-33.000.

Hoechst Aktiengesellschaft: See—  
Groner, Albrecht; and Knauf, Werner, 4,789,632, Cl. 435-235.000.

Ruckert, Hans; and Knaul, Joachim, 4,789,619, Cl. 430-270.000.

van der Hoeven, Johannes C. W., 4,789,604, Cl. 428-503.000.

Hoechst Celanese Corporation: See—  
Forschirm, Alex, 4,788,948, Cl. 123-142.50R.

Wesley, John L.; and George, Henry H., Jr., 4,789,507, Cl. 264-29.200.

Hoechst-Roussel Pharmaceuticals, Inc.: See—  
Effland, Richard C.; and Klein, Joseph T., 4,789,678, Cl. 514-313.000.



Hoeland, Wolfram: See—  
 Abert, Christine; Beileites, Eggert; Carl, Gunter; Grosse, Steffen; Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi, Ralf; Jungto, Harry; Knak, Guenther; Kreisel, Lutz; Musil, Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner, 4,789,649, Cl. 501-3.000.

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 Marquardt, Reinhard; and Priesmeier, Ernst, 4,789,254, Cl. 384-611.000.

Hoffman, Dwight K.; and Arends, Charles B., to Dow Chemical Company, The. Stable dispersions of polymers in polyepoxides. 4,789,712, Cl. 525-528.000.

Hoffman-La Roche Inc.: See—  
 Coffen, David L.; Schmid, Rudolf; and Sebastian, Mark J., 4,789,750, Cl. 549-407.000.

Hofkirchner, Wilhelm: See—  
 Mahr, Erich; and Hofkirchner, Wilhelm, 4,789,440, Cl. 204-28.000.

Hofmann, Jürgen: See—  
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Hogue, David J., to Fuller Company. Shaft furnace bypass system. 4,788,917, Cl. 110-203.000.

Hohmann, Edward A.: See—  
 Cutler, Royce L.; and Hohmann, Edward A., 4,789,932, Cl. 364-411.000.

Holcomb, Gregory W. End effector for robotic equipment. 4,789,292, Cl. 414-226.000.

Holder, E. Paul; Klaessig, Frederick C.; Peerce-Landers, Pamela J.; and Reichgott, David W., to Betz Laboratories, Inc. Method and compositions for penetrating and removing accumulated corrosion products and deposits from metal surfaces. 4,789,406, Cl. 134-3.000.

Hollingsworth, Deems R.: See—  
 Brighton, Jeffrey E.; Hollingsworth, Deems R.; Welch, Michael; McMan, Ronald E.; Torreno, Manuel L., Jr.; and Sullivan, Charles W., 4,789,885, Cl. 357-34.000.

Hollingsworth, Elmont E.: See—  
 Smith, Philip M.; Hollingsworth, Elmont E.; Wandmacher, Robert A.; Roskes, Thomas W.; Roiko, Russell A.; and Cheesebrow, Dennis M., 4,789,354, Cl. 439-395.000.

Hollis, C. George; and Lutey, Richard W., to Buckman Laboratories International, Inc. Method for the control of mollusks. 4,789,489, Cl. 210-755.000.

Holm, Ejler L.; and Clausen, Jens C., to Aalborg Værf A/S. Fluidized bed reactor and process for the operation of a fluidized bed reactor. 4,788,919, Cl. 110-347.000.

Holmwood, Graham; Buchel, Karl H.; Lurssen, Klaus; Froberger, Paul-Ernst; and Brandes, Wilhelm, to Bayer Aktiengesellschaft. 1-hydroxyethyl-azole compounds and agricultural compositions. 4,789,672, Cl. 514-184.000.

Holt, James L.; and Olson, Jeffrey A., to Outboard Marine Corporation. Marine propulsion device including gauge with adjustable sensitivity. 4,789,362, Cl. 440-2.000.

Hommel, Martin; Mein-Fang Sun, Anthony; and Goosen, Mattheus F. A., to Connaught Laboratories Limited. Microcapsule composition suitable for cardiovascular injection. 4,789,550, Cl. 424-493.000.

Honda Giken Kogyo Kabushiki Kaisha: See—  
 Asakura, Masahiko; and Hosono, Genzo, 4,789,817, Cl. 322-28.000.

Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, 4,788,946, Cl. 123-90.160.

Mieno, Toshiyuki; Nakajima, Toyohiko; Tanaka, Akira; and Nagao, Akira, 4,788,822, Cl. 60-602.000.

Nakajima, Toyohiko; Okada, Yasushi; Mieno, Toshiyuki; and Oono, Nobuyuki, 4,788,958, Cl. 123-489.000.

Octobe, Yutaka; Fujimoto, Sachio; and Katoh, Akira, 4,788,954, Cl. 123-327.000.

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Suzuki, Yoshio; and Kimura, Shigehiro, 4,788,956, Cl. 123-414.000.

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Honda, Toshio: See—  
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Honey, Francis J.: See—  
 Foster, John; Kedward, Eric C.; Honey, Francis J.; and Restall, James E., 4,789,441, Cl. 204-37.100.

Honeywell Inc.: See—  
 Bohan, John E., Jr.; Erdman, John L.; Nelson, Marvin D.; and Ratz, James W., 4,789,329, Cl. 431-46.000.

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 Yasuda, Hiroshi; and Honjo, Ichiro, 4,789,786, Cl. 250-492.200.

Honsel, Karl-Heinz. Method and apparatus for manufacturing mailing envelopes or bags. 4,789,350, Cl. 493-232.000.

Hoogovens Groep B.V.: See—  
 Bunk, Huig; Van Haastrecht, Gijsbertus C.; and Mooij, Joop N., 4,789,439, Cl. 204-28.000.

Hoole, Raymond: See—  
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Hoover Universal, Inc.: See—  
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Hopp, Michael: See—  
 Abert, Christine; Beileites, Eggert; Carl, Gunter; Grosse, Steffen; Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi, Ralf; Jungto, Harry; Knak, Guenther; Kreisel, Lutz; Musil, Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner, 4,789,649, Cl. 501-3.000.

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Horodysky, Andrew G., to Mobil Oil Co. Lubricants containing n-alkylalkylenediamine amides. 4,789,493, Cl. 252-51.50A.

Hoskins, Nathan D. Universal joint. 4,789,377, Cl. 464-157.000.

Hosoi, Masatoshi, to Ricoh Company, Ltd. Multi-color energy transfer image recording system. 4,789,872, Cl. 346-76.0PH.

Hosokawa, Masuo; Tanaka, Akio; Kohmitsu, Keiichi; Yokoyama, Tohei; Urayama, Kiyoshi; Matsuo, Sadamitsu; and Kato, Masashi, to Hosokawa Micron Corporation. Particulate material treating apparatus. 4,789,105, Cl. 241-67.000.

Hosokawa Micron Corporation: See—  
 Hosokawa, Masuo; Tanaka, Akio; Kohmitsu, Keiichi; Yokoyama, Tohei; Urayama, Kiyoshi; Matsuo, Sadamitsu; and Kato, Masashi, 4,789,105, Cl. 241-67.000.

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Housas, Jim, to Hamilton Kent Manufacturing, Inc. Pipe gasket with reinforcing means in its base self-energizing. 4,789,167, Cl. 277-207.00A.

Howard, James K.; and Wang, Run-Han, to International Business Machines Corporation. Thin film medium for horizontal magnetic recording having an improved cobalt-based alloy magnetic layer. 4,789,598, Cl. 428-408.000.

Howmet Turbine Components Corporation: See—  
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Hoying, John F.; and Smith, Stanley E., to General Motors Corporation. Electronic motor mount with magnetic decoupler. 4,789,142, Cl. 267-140.100.

Hoying, John F.: See—  
 Smith, Stanley E.; and Hoying, John F., 4,789,143, Cl. 267-140.100.

HR, Incorporated: See—  
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Huang, Leaf; and Connor, Jerome, to University of Tennessee Research Corporation. Fused liposome and acid induced method for liposome fusion. 4,789,633, Cl. 435-240.200.

Huang, Leon: See—  
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Huang, Yun-Yang: See—  
 Fischer, Ronald H.; Huang, Yun-Yang; LaPierre, Rene B.; and Varghese, Philip, 4,789,457, Cl. 208-68.000.

Hubbell Incorporated: See—  
 Sales, Kenneth B., 4,789,923, Cl. 362-346.000.

Hudson, William R. Ring making apparatus. 4,789,323, Cl. 425-352.000.

Hueber, Fritz, to Viennatone Gesellschaft m.b.H. Remote hearing aid volume control. 4,790,019, Cl. 381-68.400.

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 Kottsch, Hans-Joachim; Srebný, Hans-Gunther; and Vahlensieck, Hans-Joachim, 4,789,752, Cl. 556-54.000.

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Zwirn, Robert; and Thomas, Michael, 4,789,898, Cl. 358-227.000.

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Hughes Tool Company: See—  
 Guzy, Raymond L., 4,789,708, Cl. 525-263.000.

Hugi, Bruno: See—  
 Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Hildegard R.; Stadler, Brigitte M.; Stadler, Sigrid A.; and Breuleux, Gerald, 4,789,673, Cl. 514-214.000.

Hull, Ezekiel H.; and Frappier, Edward P., to Morflex Chemical Company, Inc. Citrate esters and method. 4,789,700, Cl. 524-310.000.

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 Scholz, Bernhard-Peter, 4,789,716, Cl. 526-201.000.

Hulshof, Jozef J. M., to U.S. Philips Corporation. Line deflection circuit in a picture display device. 4,789,811, Cl. 315-371.000.

Hung, Chuan-Yung; and Bird, Everett L., to Intersil, Inc. Delay circuit for a real time clock. 4,789,959, Cl. 364-900.000.

Hung, Michael. Multi-function implement for illumination and air-supply. 4,789,310, Cl. 417-234.000.

Hunt, Kenneth V.: See—  
 Best, Anthony; Hunt, Kenneth V.; and Hoole, Raymond, 4,788,949, Cl. 123-192.00R.

Hunter, John E.: See—  
 Seligson, Frances H.; Hunter, John E.; and St. Clair, Albert H., 4,789,664, Cl. 514-23.000.

Hunter, Trevor K.: See—  
 Field, John R.; Moody, Gillian M.; and Hunter, Trevor K., 4,789,485, Cl. 210-727.000.

Hurley, George F.: See—  
 Shalek, Peter D.; Katz, Joel D.; and Hurley, George F., 4,789,537, Cl. 423-346.000.

Hurst, Paul, to Silicon Systems Inc. Synchronous timer anti-alias filter and gain stage. 4,789,995, Cl. 375-75.000.

Husslein, Gerd; Ammermann, Eberhard; Hamprecht, Gerhard; and Wuerzer, Bruno, to BASF Aktiengesellschaft. Control of unwanted plant growth with 2-aryloxy-2-azolyalkanecarboxamides, herbicides containing them, and the manufacture thereof. 4,789,747, Cl. 548-262.000.

Hustad, Gerald O.: See—  
 Winkler, Gary A.; and Hustad, Gerald O., 4,789,558, Cl. 426-639.000.

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 Karas, Włodzimierz; Granowski, Robert; Ramotowski, Witold; Tużemski, Aleksander; Cieplak, Jerzy; and Pilawski, Kazimierz, 4,788,970, Cl. 128-92.0ND.

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Hypres Incorporated: See—  
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 Allen, Robert H.; and Ibrahim, Jameel, 4,789,596, Cl. 428-404.000.

Icaro Olivieri & C. SpA: See—  
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Ichikawa, Fusao; and Michimoto, Kiyoharu, to Fuji Photo Film Co., Ltd. Method of inspecting magnetic disk surface. 4,789,238, Cl. 356-237.000.

Ichikawa, Kenji; Sugimoto, Hiroyuki; Nakamura, Ryosuke; and Morita, Akihiro, to Shinagawa Refractories Co., Ltd. Basic refractory composition. 4,789,652, Cl. 501-127.000.

Ichikawa, Yataro: See—  
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Ichinose, Makoto: See—  
 Fukushima, Yoshihisa; Satoh, Isao; Ichinose, Makoto; Kuroki, Yuzuru; and Takagi, Yuuji, 4,789,911, Cl. 360-72.200.

Hiraoka, Shigehiko; Ichinose, Makoto; Satoh, Isao; and Sugimura, Tatsu, 4,789,979, Cl. 369-275.000.

Satoh, Isao; Kuroki, Yuzuru; Ichinose, Makoto; and Murai, Katsumi, 4,789,974, Cl. 369-45.000.

Ichiryu, Ken: See—  
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Idemitsu Petrochemical Co., Ltd.: See—  
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Iida, Hideaki; Mamiya, Johji; and Morimoto, Yutaka, to International Business Machines Corporation. Method for generating quadratic curve signal. 4,789,954, Cl. 364-720.000.

Iida, Mitsuhiro: See—  
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Iijima, Susumu: See—  
 Kato, Yasuyuki; Yuyama, Masahiro; Moritani, Masahiko; Matsura, Hideaki; Iijima, Susumu; and Hashimoto, Tsuyoshi, 4,789,709, Cl. 525-366.000.

Iiyama, Akihiro; and Nishimura, Toshifumi, to Nissan Motor Company, Limited. Fuel injection pump. 4,788,959, Cl. 123-503.000.

Iizuka, Nobuyuki: See—  
 Nakamura, Shigeyoshi; Kashimura, Tetsuo; Iizuka, Nobuyuki; Fukui, Yutaka; Morikawa, Minoru; and Kurosawa, Soichi, 4,789,412, Cl. 148-408.000.

Ikedo Bussan Co., Ltd.: See—  
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Ikedo, Hayato; Iwama, Kazuaki; and Kitahama, Satoshi, to Kabushiki Kaisha Toyoda Jidoshokki Seisakusho. Swash plate type compressor. 4,789,311, Cl. 417-269.000.

Ikedo, Tadashi: See—  
 Sakanoue, Kei; Kishimoto, Shinzo; and Ikeda, Tadashi, 4,789,626, Cl. 430-393.000.

Ikeda, Takeshi; Handa, Hideo; and Nakano, Keisuke, to Mitsubishi Chemical Industries Ltd. Method for fibrillating carbonaceous fibers. 4,789,509, Cl. 264-29.200.

Ikegami, Masato: See—  
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Imade, Shinichi: See—  
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Imae, Kazuyoshi: See—  
 Otsuka, Kozi; Kira, Tohru; Imae, Kazuyoshi; and Yoshikawa, Mitsuhiro, 4,789,910, Cl. 360-113.000.

Imai, Shunzo: See—  
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Impact Systems, Inc.: See—  
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Imperial Chemical Industries PLC: See—  
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Industrial Technology, Inc.: See—  
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Ing. C. Olivetti & C. S.p.A.: See—  
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Ing. C. Olivetti & Co., S.p.A.: See—  
 Augusti, Ferdinando; Bonatto, Luigi; and Puglisi, Anna M., 4,789,901, Cl. 358-284.000.

Ingersoll-Rand Company: See—  
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Ingram, Gary D.: See—  
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Injectall Limited: See—  
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Innovative Controls, Inc.: See—  
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Inoue, Hiroshi: See—  
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Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, to Honda Giken Kogyo Kabushiki Kaisha. Valve operating mechanism for internal combustion engine. 4,788,946, Cl. 123-90.160.

Inoue, Koui, to Ando Electric Co., Ltd. Device for selecting a light source for measuring the wavelength characteristics of an optical element. 4,789,237, Cl. 356-73.100.

Inoue, Nobuaki; Sasaoka, Senzo; and Takahashi, Toshiro, to Fuji Photo Film Co., Ltd. Silver halide photographic material and very high contrast negative image-forming process using same. 4,789,618, Cl. 430-264.000.

Inoue, Noriyuki; Heki, Tatsu; and Ueda, Shinji, to Fuji Photo Film Co., Ltd. Method for forming direct positive color images. 4,789,627, Cl. 430-406.000.

Inoue, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. IC card. 4,789,776, Cl. 235-492.000.

Inoue, Toshifumi; Yamada, Mitsuhiro; and Miki, Shigeru, to Dainippon Screen Mfg. Co., Ltd. Processing method of image data and system therefor. 4,790,025, Cl. 382-41.000.

Inscoc, Jack E.: See—  
 Boucher, Raymond J., Jr.; and Inscoc, Jack E., 4,789,295, Cl. 414-497.000.

Institut electrosvarki imeni e.o. Patona: See—  
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Institut Français du Pétrole: See—  
 Levallois, Emile, 4,789,970, Cl. 367-104.000.

Lumbroso, Daniel; and LePage, Jean-Paul, 4,789,459, Cl. 208-155.000.

Travers, Christine; Bournonville, Jean-Paul; and Franck, Jean-Pierre, 4,789,655, Cl. 502-66.000.

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Institute Mashinovedeniya imeni Blagonravova A.A. AN USSR: See—  
 Rudashevsky, German E.; Krichevsky, Alexandr G.; Blokhina, Olga G.; and Mirkin, Alexandr S., 4,788,968, Cl. 128-41.000.

Interlube Systems Limited: See—  
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International Business Machines Corporation: See—  
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Romankiw, Lubomir T.; and Wilmer, Richard K., 4,789,914, Cl.  
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Boucher, Raymond J., Jr.; and Inscoc, Jack E., 4,789,295, Cl.  
414-497.000.  
Brown, John K., III; Cronch, Darrell D.; Graham, Patricia A.; and  
Tucker, Kevin N., 4,789,257, Cl. 400-582.000.  
Callens, Paul; and Galand, Claude, 4,790,015, Cl. 381-31.000.  
Chow, Melanie M.; Cronin, John E.; Guthrie, William L.; Kaanta,  
Carter W.; Luther, Barbara; Patrick, William J.; Perry, Kathleen  
A.; and Standley, Charles L., 4,789,648, Cl. 437-225.000.  
Clarke, David A., 4,789,926, Cl. 364-200.000.  
Desai, Kishor V.; and Kohn Harold, 4,788,767, Cl. 29-830.000.  
Gregory, Thomas A.; Keller, Christopher G.; Kennedy, Bruce E.;  
Murray, Bruce A.; and Rothschild, Wayne J., 4,789,913, Cl.  
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Howard, James K.; and Wang, Run-Han, 4,789,598, Cl.  
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International Paint PLC: See—  
Jewitt, Joseph H.; and Harley, Jack, 4,789,076, Cl. 220-309.000.  
International Paper Company: See—  
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Intersil, Inc.: See—  
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manufacturing amorphous photovoltaic-cell module, 4,789,641, Cl.  
437-4.000.  
Inventive Enterprises Inc.: See—  
Summers, Donald L.; Summers, David J.; and Tolomei, John G.,  
4,788,844, Cl. 72-110.000.  
Iolab Corporation: See—  
Akhavi, David S., 4,789,324, Cl. 425-352.000.  
Iowa State University Research Foundation, Inc.: See—  
Tipton, Carl L.; and Beitz, Donald C., 4,789,670, Cl. 514-182.000.  
IRE-Celltag, S.A.: See—  
Le Clef, Brigitte A. L. G. M. J.; Laub, Ruth; and Schneider, Yves-  
Jacques E., 4,789,587, Cl. 514-252.000.  
Ishigaki, Yukinobu; Onuki, Katsuhiko; and Kawabata, Fumio, to Victor  
Company of Japan, Ltd. Scrambler system, 4,790,009, Cl. 380-9.000.  
Ishii, Takatoshi, to ASCII Corporation. Color video display apparatus,  
4,789,854, Cl. 340-703.000.  
Ishii, Yoshihiko: See—  
Morimoto, Yuichi; Maruyama, Hiromi; Aoyama, Motoo; Zukeran,  
Atsushi; Bessho, Yasunori; Matsumoto, Tomoyuki; Ishii, Yo-  
shihiko; Fujimura, Kouji; and Uchikawa, Sadao, 4,789,520, Cl.  
376-419.000.  
Ishikawa, Hikaru: See—  
Morimura, Yasuhiro; Fukuura, Yukio; Ishikawa, Hikaru; Tanuma,  
Ituo; and Honda, Toshio, 4,789,586, Cl. 428-216.000.  
Isover Saint-Gobain: See—  
Gaertner, Hans; Kaufmann, Friedrich; Schlossherr, Horst W.; and  
Schulz, Dietrich, 4,789,942, Cl. 364-470.000.  
Isuzu Motors Limited: See—  
Kawamura, Hideo, 4,789,331, Cl. 431-262.000.  
Itai, Masaru: See—  
Nishibata, Katsuji; Takano, Hiroshi; Itai, Masaru; and Shimote,  
Tsugutaka, 4,789,388, Cl. 55-158.000.  
Italfarmaco S.p.A.: See—  
Sportoletti, Giancarlo; Cremonesi, Pietro; and Sarret, Monique,  
4,789,681, Cl. 514-392.000.  
Itami: See—  
Ueno, Ryuzo; Kanayama, Tatsuo; Nakashima, Toshitaka; Itami;  
Tomiyasu, Kunihiko; and Matsuda, Toshio, 4,789,497, Cl.  
252-194.000.  
Iten, Clemens A., to American Safety Razor Company. Utility blade  
dispenser, 4,789,080, Cl. 221-279.000.  
Ito, Masaki: See—  
Kanayama, Shigehiro; Tanaka, Kazuto; and Ito, Masaki, 4,789,891,  
Cl. 358-55.000.  
Ito, Norifumi: See—  
Matsubara, Tetsuyuki; Ito, Norifumi; Iwamoto, Mune; and Ando,  
Toshihiko, 4,789,272, Cl. 406-48.000.  
Itoh, Hiroshi; Kasezawa, Tadashi; and Mizutani, Yoshiki, to Mitsubishi  
Denki Kabushiki Kaisha. Judgement circuit and adaptive filter incor-  
porating the same, 4,789,890, Cl. 358-31.000.

Itoki Co., Ltd.: See—  
Hashimoto, Junji; Murata, Harumi; and Nishio, Hiroshi, 4,789,293,  
Cl. 414-273.000.  
Itou, Masami: See—  
Buma, Shuichi; Onuma, Toshio; Ohashi, Kaoru; and Ito, Masami,  
4,789,935, Cl. 364-424.050.  
Itozawa, Kenji: See—  
Nakamura, Issai; and Itozawa, Kenji, 4,789,591, Cl. 428-328.000.  
Iwai, Kazuo, to Ajinomoto Co., Inc. Food containing vanillylamine and  
derivatives useful for accelerating lipid metabolism, 4,789,687, Cl.  
514-627.000.  
Iwama, Kazuaki: See—  
Ikeda, Hayato; Iwama, Kazuaki; and Kitahama, Satoshi, 4,789,311,  
Cl. 417-269.000.  
Iwamoto, Mune: See—  
Matsubara, Tetsuyuki; Ito, Norifumi; Iwamoto, Mune; and Ando,  
Toshihiko, 4,789,272, Cl. 406-48.000.  
Iwamura, Masahiro: See—  
Maejima, Hideo; Hotta, Takashi; Masuda, Ikuro; Iwamura,  
Masahiro; Kurita, Kouzaburo; and Ueno, Masahiro, 4,789,958,  
Cl. 364-787.000.  
Iwasa, Kenji: See—  
Takemasa, Kazuo; Yoshida, Fukuji; and Iwasa, Kenji, 4,788,829,  
Cl. 62-335.000.  
Iwase, Osamu: See—  
Matoba, Takao; Iwase, Osamu; Nezu, Tuguo; and Sugiura, Shinji,  
4,789,568, Cl. 427-412.100.  
Iwase, Yasuyuki; Akaishi, Yoshiaki; and Muranishi, Masaomi, to Mit-  
subishi Pencil Co., Ltd. Liquid aerosol applicator with sponge buffer  
to brush, 4,789,261, Cl. 401-190.000.  
Iwata, Toshimitsu: See—  
Kon, Shuji; Suzuki, Yuji; Iwata, Toshimitsu; and Fukahori, Junichi,  
4,789,565, Cl. 427-375.000.  
Iwatsu Electric Co. Ltd.: See—  
Fukuta, Minoru, 4,789,924, Cl. 364-200.000.  
Iyama, Yoshitada: See—  
Matsunaga, Makoto; Iyama, Yoshitada; and Takeda, Fumio,  
4,789,846, Cl. 333-104.000.  
Iyengar, Dorewamy R.; and Krikke, James J., to BASF Corporation.  
Soft textured high strength alkali blue pigment and process for pre-  
paring the same, 4,789,404, Cl. 106-408.000.  
Izaki, Takeshi, to Brother Kogyo Kabushiki Kaisha. Pressing device,  
4,789,877, Cl. 355-3.0FU.  
J. H. Fenner & Co. Limited: See—  
Seabrook, Colin; and Usher, Simon D., 4,789,188, Cl. 285-94.000.  
J. Kinderman & Sons: See—  
Kinderman, Abraham S.; and Maas, Fred, 4,789,571, Cl. 428-10.000.  
J. M. Huber Corporation: See—  
Schramm, Dale E.; and Birtell, Donald W., 4,789,536, Cl.  
423-345.000.  
Jabil Circuit Company: See—  
Hock, Darryl A.; and Kaleita, David L., 4,789,851, Cl. 340-52.00D.  
Jablonek, Harold; and Nguyen, Tuyen T., to Hercules Incorporated.  
Polyarylene polyether made using mixed base system, 4,789,722, Cl.  
528-172.000.  
Jachimowicz, Felek: See—  
Ambrose-Ritchey, Geneva; Jachimowicz, Felek; and Lundquist,  
Joseph T., 4,789,609, Cl. 429-144.000.  
Jackson, Michael; Danielsson, Knut O.; and Falk, Bo G. S., to Sunds  
Defibrator Aktiebolag. Method of making mechanical pulp,  
4,789,429, Cl. 162-241.000.  
Jackson, Thomas, to Plessey Overseas, Limited. Analogue to digital  
converters, 4,789,862, Cl. 341-155.000.  
Jacobi, Ralf: See—  
Abert, Christine; Beleites, Eggert; Carl, Gunter; Grosse, Steffen;  
Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi,  
Ralf; Jungto, Harry; Knak, Guenther; Kreisel, Lutz; Musil,  
Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner,  
4,789,649, Cl. 501-3.000.  
Jacobs, Robert S.; and Faulkner, D. John, to University of California,  
The Regents of the. Monoalide analogs, 4,789,749, Cl. 549-313.000.  
Jacobsen, Stephen C.; Wood, John E.; and Price, Richard H., to Sarcos,  
Inc. Micropositioner systems and methods, 4,789,803, Cl.  
310-309.000.  
Jacquesy, Jean-Claude: See—  
Gesson, Jean-Pierre; Mondon, Martine; Jacquesy, Jean-Claude; and  
Kraemer, Hans P., 4,789,665, Cl. 514-34.000.  
Janas, Norman F.: See—  
Elliott, Michael; Janas, Norman F.; Elliott, Richard L.; Khambay,  
Bhupinder P. S.; and Pulman, David A., 4,789,754, Cl.  
558-388.000.  
Japan Physitec Co., Ltd.: See—  
Miyake, Yoshinobu, 4,789,802, Cl. 310-309.000.  
Japan Society for the Promotion of Machine Industry: See—  
Katori, Hideo, 4,788,891, Cl. 74-781.00R.  
Japan Tobacco, Inc.: See—  
Nambu, Yutaka; Sugawara, Hitosi; and Saitoh, Yasuo, 4,788,989,  
Cl. 131-303.000.  
Jarrett, Peter K.; Casey, Donald J.; and Lehmann, Leonard T., to  
American Cyanamid Company. Bioabsorbable coating for a surgical  
article, 4,788,979, Cl. 128-335.500.  
Jarvi, Paul R., to Mitchell Bradford International Corp. Black conver-  
sion coating, 4,789,409, Cl. 148-6.240.  
Javaherian, Hossein, to General Motors Corporation. Method of esti-  
mating the fuel/air ratio of an internal combustion engine, 4,788,854,  
Cl. 73-117.300.

Jen, Kwan-Yue A.; and Eisenbaumer, Ronald L., to Allied-Signal, Inc.  
Process for preparing electrically conductive poly(isothianaphthene)  
from 1,3-dihydroisothianaphthene, 4,789,748, Cl. 549-58.000.  
Jenkins, John W., to Johnson Matthey Public Limited Co. Catalytic  
hydrogen generator for use with methanol, 4,789,540, Cl.  
423-648.100.  
Jenkinson, Anthony N. Device for producing variable moire patterns,  
4,789,573, Cl. 428-28.000.  
Jensen, Steven L.: See—  
Shurman, Leonid; and Jensen, Steven L., 4,788,975, Cl.  
128-303.100.  
Jeol Ltd.: See—  
Nagayama, Kuniaki, 4,789,832, Cl. 324-312.000.  
Jewitt, Joseph H.; and Harley, Jack, to International Paint PLC. Head  
seam for a pail, 4,789,076, Cl. 220-309.000.  
Jhaveri, Satish S.; Dunnivant, William R.; and Langer, Heimo J., to  
Ashland Oil, Inc. Heat curable foundry mixes and binder composi-  
tions, 4,789,693, Cl. 523-145.000.  
Jidosha Kiki Co., Ltd.: See—  
Takeshima, Sadao; and Yabe, Hideo, 4,789,041, Cl. 180-142.000.  
Jons, Ebbe S.; Moller, Jens T.; and Nielsen, Kirsten K., to A/S Niro  
Atomizer. Method for cleaning of a hot flue gas stream from waste  
incineration, 4,789,532, Cl. 423-240.000.  
John Wyeth and Brothers Limited: See—  
Boyle, John T. A.; and Todd, Richard S., 4,789,677, Cl.  
514-313.000.  
John Zink Company: See—  
Keller, Michael R., 4,788,918, Cl. 110-215.000.  
Johnson, David R.: See—  
Byrne, Donald F.; Johnson, David R.; and Heyse, John V.,  
4,789,462, Cl. 208-213.000.  
Johnson, George H., to General Motors Corporation. Motor vehicle air  
management system, 4,788,903, Cl. 98-1.500.  
Johnson, Marvin M.; Cymbaluk, Ted H.; and Nowack, Gerhard P., to  
Phillips Petroleum Company. Absorption of hydrogen sulfide with an  
alkali metal ethylenediaminetetraacetate and/or alkali metal nitrilotri-  
acetate, 4,789,530, Cl. 423-226.000.  
Johnson, Marvin M.: See—  
Tabler, Donald C.; and Johnson, Marvin M., 4,789,460, Cl.  
208-180.000.  
Johnson Matthey Public Limited Co.: See—  
Jenkins, John W., 4,789,540, Cl. 423-648.100.  
Johnson, Steven E.: See—  
Berry, Richard E.; Johnson, Steven E.; and Ruiz, Thomas M.,  
4,789,962, Cl. 364-900.000.  
Johnson, Wayne L.: See—  
Robinson, McDonald; Behee, Ronald D.; deBoer, Wiebe B.; and  
Johnson, Wayne L., 4,789,771, Cl. 219-405.000.  
Johnson, William A.: See—  
Preves, David A.; and Johnson, William A., 4,790,018, Cl.  
381-68.200.  
Johnston, Barry W. Valve mechanism for controlling a reciprocating  
engine power stroke, 4,788,823, Cl. 60-656.000.  
Jones, Glyn T.: See—  
Wall, George W.; and Jones, Glyn T., 4,789,471, Cl. 210-231.000.  
Jones, Graham R. Ridge system, 4,788,801, Cl. 52-57.000.  
Jones, Jeffrey K. Aquacycle, 4,789,365, Cl. 440-21.000.  
Jones, Marvin H., to AMP Incorporated. Assembly for an electrical  
cable providing strain relief and a water-tight seal, 4,789,759, Cl.  
174-65.055.  
Jost, Wolf-Dieter: See—  
Affenzeller, Josef; and Jost, Wolf-Dieter, 4,789,697, Cl.  
523-437.000.  
Ju, Shiao: See—  
Czegwitz, Charles; Ju, Shiao; and Verstrate, Gary W., 4,789,714,  
Cl. 526-88.000.  
Judd, Virginia L., to Griffith Laboratories U.S.A., Inc. Apparatus and  
method for preparing patterned baked goods, 4,789,555, Cl.  
426-503.000.  
Jue, Bruce: See—  
Robinson, Murry C.; Kirk, Donald W.; and Jue, Bruce, 4,789,529,  
Cl. 423-109.000.  
Jungto, Harry: See—  
Abert, Christine; Beleites, Eggert; Carl, Gunter; Grosse, Steffen;  
Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi,  
Ralf; Jungto, Harry; Knak, Guenther; Kreisel, Lutz; Musil,  
Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner,  
4,789,649, Cl. 501-3.000.  
Kaanta, Carter W.: See—  
Chow, Melanie M.; Cronin, John E.; Guthrie, William L.; Kaanta,  
Carter W.; Luther, Barbara; Patrick, William J.; Perry, Kathleen  
A.; and Standley, Charles L., 4,789,648, Cl. 437-225.000.  
Kabushiki Kaisha Araki Gomu: See—  
Yoshitomi, Shingo, 4,789,084, Cl. 222-174.000.  
Kabushiki Kaisha Audio-Technica: See—  
Akino, Hiroshi, 4,789,044, Cl. 181-158.000.  
Kabushiki Kaisha Hayashibara Seibutsu Kagaku Kenkyujo: See—  
Hirao, Mamoru; Hijiyu, Hiromi; and Miyaka, Toshio, 4,789,559, Cl.  
426-658.000.  
Kabushiki Kaisha Kito: See—  
Watanabe, Hisatsugu, 4,789,135, Cl. 254-362.000.  
Kabushiki Kaisha Kobe Seiko Sho: See—  
Sakai, Hiroaki; and Hidaka, Sachio, 4,788,820, Cl. 60-444.000.  
Kabushiki Kaisha Light Kohki Seisakusho: See—  
Shimizu, Fumio, 4,789,231, Cl. 350-560.000.  
Kabushiki Kaisha Sugiya Denki Seisakusho: See—  
Sugiya, Yoshio; and Kozuka, Yoshimi, 4,788,908, Cl. 100-47.000.  
Kabushiki Kaisha Toshiba: See—  
Kasahara, Koichi; Yanagisawa, Toshio; and Kajimura, Motoji,  
4,789,223, Cl. 350-333.000.  
Kobayashi, Hiroaki, 4,789,095, Cl. 228-102.000.  
Otani, Nobuhisa, 4,788,827, Cl. 62-126.000.  
Usui, Yoshiyuki; and Kitamura, Koji, 4,788,834, Cl. 62-514.00R.  
Yokota, Tsuneshi; and Kondo, Osamu, 4,789,856, Cl. 340-720.000.  
Kabushiki Kaisha Toyoda Jidoshokki Seisakusho: See—  
Ikeda, Hayato; Iwama, Kazuaki; and Kitahama, Satoshi, 4,789,311,  
Cl. 417-269.000.  
Kabuta, Kazuma: See—  
Nitta, Koichi; Kabuta, Kazuma; Yamaguchi, Masami; Nakagawa,  
Tadashi; and Moriyasu, Katsuyuki, 4,788,931, Cl. 118-503.000.  
Kaczynski, Bernhard; and Komaroff, Iwan, to Robert Bosch GmbH.  
Device for injecting fuel into a combustion chamber of an internal  
combustion engine, 4,788,953, Cl. 123-297.000.  
Kadkade, Prakash G., to GTE Laboratories Incorporated. Method of  
inhibiting premature budding of short-day floral crops, 4,788,793, Cl.  
47-58.000.  
Kage, Kouzou, to NEC Corporation. Receiver capable of quickly  
establishing stable frame synchronization, 4,790,013, Cl. 380-48.000.  
Kajikawa, Yasutomo, to Mitsubishi Denki Kabushiki Kaisha. Method of  
manufacturing a heterojunction bipolar transistor involving etch and  
refill, 4,789,643, Cl. 437-31.000.  
Kajimura, Motoji: See—  
Kasahara, Koichi; Yanagisawa, Toshio; and Kajimura, Motoji,  
4,789,223, Cl. 350-333.000.  
Kaleita, David L.: See—  
Hock, Darryl A.; and Kaleita, David L., 4,789,851, Cl. 340-52.00D.  
Kallin, Fredrik L. N., to NCR Corporation. Quickly assembled appara-  
tus for moving documents, 4,789,151, Cl. 211-274.000.  
Kamada, Takeshi; and Takahashi, Shuichi, to Ricoh Company, Ltd.  
Integrated reader/recorder, 4,789,903, Cl. 358-296.000.  
Kamakura, Tamiji: See—  
Katsumata, Shigeru; Handa, Takuro; Kamakura, Tamiji; Tanaka,  
Noriyoshi; Katoh, Hidekatsu; Namiwa, Kimiyoshi; and Shoji,  
Yoshikazu, 4,789,492, Cl. 252-32.70E.  
Kambe, Shigeharu: See—  
Higuchi, Tsutomu; and Kambe, Shigeharu, 4,789,314, Cl. 418-9.000.  
Kamegaki, Kazuyuki: See—  
Minamihata, Shigeaki; and Kamegaki, Kazuyuki, 4,789,884, Cl.  
357-34.000.  
Kanayama, Shigehiro; Tanaka, Kazuto; and Ito, Masaki, to Fuji Photo  
Optical Co., Ltd. Spacer with an inclined surface for mounting a solid  
image pickup element to a color separation prism, 4,789,891, Cl.  
358-55.000.  
Kanayama, Tatsuo: See—  
Ueno, Ryuzo; Kanayama, Tatsuo; Nakashima, Toshitaka; Itami;  
Tomiyasu, Kunihiko; and Matsuda, Toshio, 4,789,497, Cl.  
252-194.000.  
Kanazawa, Yuzo, to Ikeda Bussan Co., Ltd. Reclining device for auto-  
motive seat, 4,789,204, Cl. 297-355.000.  
Kanbara, Teruhisa: See—  
Kondo, Shigeo; Sotomura, Tadashi; Kanbara, Teruhisa; and  
Sekido, Satoshi, 4,789,610, Cl. 429-191.000.  
Kane, Jeffrey P.; and Franklyn, Steven E., to Boeing Company, The.  
Self-supporting hand-held grinding device, 4,788,797, Cl. 51-  
170.0PT.  
Kane, Thomas J. Apparatus for assisting a golfer to keep the golfer's  
head level with the ball and still while the golfer is in the process of  
hitting the ball, 4,789,159, Cl. 273-183.00B.  
Kanebo, Ltd.: See—  
Sugimoto, Isao; and Tsuta, Hiroyuki, 4,789,669, Cl. 514-178.000.  
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: See—  
Furukawa, Hisao; and Kawamura, Jo, 4,789,710, Cl. 525-440.000.  
Kaneko, Takayuki: See—  
Fujita, Yuichi; Kaneko, Takayuki; Okada, Mitsuo; Shima, Kazumi;  
Yanaru, Hideaki; and Numaguchi, Tooru, 4,789,132, Cl.  
251-129.110.  
Kang, Henry R.: See—  
Solodar, Warren E.; Kang, Henry R.; and Weber, Joseph R.,  
4,789,400, Cl. 106-22.000.  
Kanner, Bernard; King, Roswell E., III; and Hopper, Steven P., to  
Union Carbide Corporation. Hydridoaminosilane treatment for ren-  
dering surfaces water-repellent, 4,789,564, Cl. 427-255.600.  
Kansai Paint Co., Ltd.: See—  
Tatsuno, Tadayoshi; Kashiwada, Seiji; Matsui, Komaji; Wakimoto,  
Mituo; and Tabuchi, Ichiro, 4,789,566, Cl. 427-388.200.  
Kansai Paint Co., Ltd., a Japanese Corp.: See—  
Matoba, Takao; Iwase, Osamu; Nezu, Tuguo; and Sugiura, Shinji,  
4,789,568, Cl. 427-412.100.  
Kao Corporation: See—  
Ohtani, Shoji; Takemura, Kazunari; Sato, Yukiya; and Tsushima,  
Rikio, 4,789,613, Cl. 430-110.000.  
Oshiyama, Shigeki; Kishimoto, Koji; Hirota, Takeshi; Suzue,  
Shigetoshi; Hiramatsu, Hiroyoshi; Yoshikawa, Kiyooki; and  
Suzuki, Nobuyuki, 4,789,381, Cl. 8-115.600.  
Kappeler, Otmar; and Ehrhardt, Dietmar, to Deutsche ITT Industries  
GmbH. Frequency converting apparatus for converting an RF televi-  
sion signal to a video signal employing low IF techniques, 4,789,897,  
Cl. 358-188.000.  
Karasz, Wlodzimierz; Granowski, Robert; Ramotowski, Witold; Tu-  
ziemski, Aleksander; Cieplak, Jerzy; and Pilawski, Kazimierz, to



Huta Baidon. Drill setting guide for drilling holes in bones. 4,788,970, Cl. 128-92.0ND.  
 Karasawa, Nobuyoshi: See—  
 Onitsuka, Hatsuki; and Karasawa, Nobuyoshi, 4,789,479, Cl. 210-635.000.  
 Karg Corporation: See—  
 Bull, Jeffrey F., 4,788,898, Cl. 87-57.000.  
 Karl Kassbohrer Fahrzeugwerke GmbH: See—  
 Haas, Karl H., 4,789,036, Cl. 180-6.480.  
 Karreman, Hans E.: See—  
 Tenuto, John B., Jr.; Hodge, Robert R.; Williams, Arthur V.; and Karreman, Hans E., 4,789,134, Cl. 254-104.000.  
 Karube, Isao; and Muramatsu, Hiroshi, to Seiko Instruments & Electronics Ltd. Analytical device and method utilizing a piezoelectric crystal biosensor. 4,789,804, Cl. 310-311.000.  
 Kasahara, Koichi; Yanagisawa, Toshio; and Kajimura, Motoji, to Kabushiki Kaisha Toshiba. Matrix-addressed liquid crystal display device with compensation for potential shift of pixel electrodes. 4,789,223, Cl. 350-333.000.  
 Kasai, Kazumi, to Yoshida Kogyo K. K. Cord tightening device. 4,788,755, Cl. 24-136.00R.  
 Kasashima, Hirokazu: See—  
 Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Kawano, Katsumi; Orimo, Masayuki; Kasashima, Hirokazu; and Nakai, Kozo, 4,789,986, Cl. 371-67.000.  
 Kase, Mitsuo; Okoshi, Noboru; and Tsuyuzaki, Kazuo, to Dainippon Ink and Chemicals, Inc. Resin composition comprising an isocyanate having an isocyanurate ring in a nonpolar petroleum hydrocarbon solvent. 4,789,705, Cl. 524-590.000.  
 Kasezawa, Tadashi: See—  
 Itoh, Hiroshi; Kasezawa, Tadashi; and Mizutani, Yoshiki, 4,789,890, Cl. 358-31.000.  
 Kashima, Nobukazu: See—  
 Yoshimoto, Ryota; Kashima, Nobukazu; Hamuro, Junji; and Mit-sugi, Koji, 4,789,658, Cl. 514-12.000.  
 Kashimura, Tetsuo: See—  
 Nakamura, Shigeyoshi; Kashimura, Tetsuo; Iizuka, Nobuyuki; Fukui, Yutaka; Morikawa, Minoru; and Kurosawa, Soichi, 4,789,412, Cl. 148-408.000.  
 Kashiwada, Seiji: See—  
 Tatsuno, Tadayoshi; Kashiwada, Seiji; Matsui, Komaji; Wakimoto, Mituo; and Tabuchi, Ichiro, 4,789,566, Cl. 427-388.200.  
 Kasner, William H.; Roach, James F.; and Toth, Vincent A., to Westinghouse Electric Corp. Controlled depth laser drilling system. 4,789,770, Cl. 219-121.700.  
 Kasprzyk, Martin R., to Gas Research Institute. Method of producing tubular ceramic articles. 4,789,506, Cl. 264-25.000.  
 Katagiri, Shingo; and Oishi, Kengo, to Fuji Photo Film Co., Ltd. Hub locking mechanism in a magnetic tape cassette. 4,789,113, Cl. 242-198.000.  
 Katano, Yuji: See—  
 Wakabayashi, Hiroshi; Tsukahara, Daiki; Katayama, Akira; Ma-chida, Kiyosada; Kazami, Kazuyuki; Katano, Yuji; Terunuma, Hiroshi; and Higuchi, Mitsuru, 4,789,875, Cl. 354-195.100.  
 Katayama, Akira: See—  
 Wakabayashi, Hiroshi; Tsukahara, Daiki; Katayama, Akira; Ma-chida, Kiyosada; Kazami, Kazuyuki; Katano, Yuji; Terunuma, Hiroshi; and Higuchi, Mitsuru, 4,789,875, Cl. 354-195.100.  
 Katayanagi, Jun, to Canon Kabushiki Kaisha. Cut sheet feed apparatus. 4,789,259, Cl. 400-624.000.  
 Kato, Masashi: See—  
 Hosokawa, Masuo; Tanaka, Akio; Kohmitsu, Keiichi; Yokoyama, Tohei; Urayama, Kiyoshi; Matsuo, Sadamitsu; and Kato, Masashi, 4,789,105, Cl. 241-67.000.  
 Kato, Masatake: See—  
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Kreinberg, Earl R.; and Vinson, Paul, to AMP Incorporated. Power connector having linearly moving cam for daughter card. 4,789,352, Cl. 439-260.000.

Kreisel, Lutz: See—  
Abert, Christine; Beileites, Eggert; Carl, Gunter; Grosse, Steffen; Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi, Ralf; Jungto, Harry; Knak, Guenther; Kreisel, Lutz; Musil, Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner, 4,789,649, Cl. 501-3.000.

Kress, Robert F.: See—  
Vorus, William S.; and Kress, Robert F., 4,789,306, Cl. 416-223.00R.

Krichewsky, Alexandr G.: See—  
Rudashevsky, German E.; Krichewsky, Alexandr G.; Blokhina, Olga G.; and Mirkin, Alexandr S., 4,788,968, Cl. 128-41.000.

Krikke, James J.: See—  
Iyengar, Doreswamy R.; and Krikke, James J., 4,789,404, Cl. 106-408.000.

Kritic, Goran. Optoelectronic dynamic random access memory system. 4,789,964, Cl. 365-115.000.

Kronseider, Hermann. Machine for filling containers such as bottles. 4,789,013, Cl. 141-177.000.

Kruckemeyer, William C.; and Fannin, Wayne V., to General Motors Corporation. Damper with internally powered selective ride valving. 4,789,051, Cl. 188-299.000.

Kubo, Masahiro; Dohnomoto, Tadashi; Tanaka, Atsuo; and Hirai, Hidetoshi, to Toyota Jidosha Kabushiki Kaisha. Composite material with light matrix metal and with reinforcing fiber material being short fiber matrix mixed with potassium titanate whiskers. 4,789,605, Cl. 428-614.000.

Kubota, Kazuo: See—  
Sakaguchi, Masaaki; and Kubota, Kazuo, 4,789,110, Cl. 242-67.10R.

Kudryk, Val: See—  
Goffman, Martin; and Kudryk, Val, 4,789,445, Cl. 204-114.000.

Kuehnel, Werner, to Siemens Aktiengesellschaft. Medium frequency x-ray diagnostics generator power control. 4,789,998, Cl. 378-110.000.

Kuei, Andrew. Angle vise. 4,789,146, Cl. 269-69.000.

Kullborg, Ove: See—  
Bergman, Mikael; Kullborg, Ove; and Porsander, Thord, 4,789,296, Cl. 414-735.000.

Kullman, Werner, deceased; Spang, Ursula, heir; and Buck, Volker, to Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt e.V. Device for coating the groove of a ball bearing with a powder-type solid lubricating material. 4,788,932, Cl. 118-211.000.

Kumpf, Hermann: See—  
Batheja, Pramod; Goetzmann, Claus; Kumpf, Hermann; and Rau, Peter, 4,789,518, Cl. 376-353.000.

Kunkle, Gerald E.; Pecoraro, George A.; and Demarest, Henry M., Jr., to PPG Industries, Inc. Batch melting vessel lid cooling construction. 4,789,390, Cl. 65-27.000.

Kuragano, Tetsuzo; and Sasaki, Nobuo, to Sony Corporation. System for automatically generating tool path data for automatic machining center. 4,789,931, Cl. 364-474.180.

Kurihara, Kazumasa; and Arai, Kenji, to Diesel Kiki Co., Ltd. Automatic transmission system. 4,789,936, Cl. 364-424.100.

Kurihara, Koji: See—  
Sugie, Masuo; Kurihara, Koji; Aiba, Yoshiro; and Maeda, Toshiaki, 4,789,651, Cl. 501-103.000.

Kurita, Kouzaburo: See—  
Macjima, Hideo; Hotta, Takashi; Masuda, Ikuro; Iwamura, Masahiro; Kurita, Kouzaburo; and Ueno, Masahiro, 4,789,958, Cl. 364-787.000.

Kuroiwa, Takao: See—  
Onishi, Koichi; Ouchi, Yoshifusa; Suganuma, Takashi; Utsumi, Atsushi; and Kuroiwa, Takao, 4,789,239, Cl. 356-316.000.

Kuroki, Yuzuru: See—  
Fukushima, Yoshihisa; Satoh, Isao; Ichinose, Makoto; Kuroki, Yuzuru; and Takagi, Yuuji, 4,789,911, Cl. 360-72.200.

Satoh, Isao; Kuroki, Yuzuru; Ichinose, Makoto; and Murai, Katsumi, 4,789,974, Cl. 369-45.000.

Kurosawa, Masaji: See—  
Saito, Naohide; Tamura, Junichi; Kurosawa, Masaji; and Terada, Isao, 4,789,585, Cl. 428-185.000.

Kurosawa, Soichi: See—  
Nakamura, Shigeyoshi; Kashimura, Tetsuo; Iizuka, Nobuyuki; Fukui, Yutaka; Morikawa, Minoru; and Kurosawa, Soichi, 4,789,412, Cl. 148-408.000.

Kuryluk, Michael H. Mineral separator. 4,789,464, Cl. 209-161.000.

Kushi, Kenji: See—  
Sasaki, Isao; Kushi, Kenji; and Inukai, Ken-ichi, 4,789,620, Cl. 430-280.000.

Kusmierczyk, Robert C.: See—  
Lindsay, Edward R.; Kusmierczyk, Robert C.; and Cameron, Norman F., 4,789,467, Cl. 210-103.000.

Kwik-Way Manufacturing Company: See—  
Berkeley, James E., 4,789,275, Cl. 408-66.000.

Kyytönen, Markku; Pihlajamaa, Raimo; Fabritius, Kai; Niskanen, Heikki; and Uotinen, Jaakko, to Oy Wartsila Ab. Web winding method and winder. 4,789,109, Cl. 242-56.00R.

La Jolla Cancer Research Foundation: See—  
Pierschbacher, Michael D., 4,789,734, Cl. 530-395.000.

Laboratoires Hoechst S. A.: See—  
Gesson, Jean-Pierre; Mondon, Martine; Jacquesy, Jean-Claude; and Kraemer, Hans P., 4,789,665, Cl. 514-34.000.

Lach, Lawrence E., to Gould Inc. ECL to GAA logic conversion circuit with positive feedback. 4,789,798, Cl. 307-475.000.

Lacord, Maurice; Lavergne, Christian; and Vegeais, Patrick, to Societe d'Applications Generales d'Electricite. Method and device for controlling a thermal printing head. 4,789,870, Cl. 346-1.100.

Lacza, Tony: See—  
Ritter, Rodney L.; Crake, John F.; and Lacza, Tony, 4,789,414, Cl. 156-184.000.

LaFleur, Arnie: See—  
LaFleur, Arthur E.; LaFleur, Arnie; and LaFleur, Lee, 4,790,029, Cl. 383-24.000.

LaFleur, Arthur E.; LaFleur, Arnie; and LaFleur, Lee, to Custom Packaging Systems, Inc. Collapsible bag with square ends formed by triangular portions. 4,790,029, Cl. 383-24.000.

LaFleur, Lee: See—  
LaFleur, Arthur E.; LaFleur, Arnie; and LaFleur, Lee, 4,790,029, Cl. 383-24.000.

Lahti, Archie E., to Unisys Corporation. Vector data logical usage conflict detection. 4,789,925, Cl. 364-200.000.

Laine, Richard M., to SR1 International. Transition metal carbides and process for making same. 4,789,534, Cl. 423-241.000.

Laitem, Leo: See—  
Broze, Guy; Bastin, Danielle; and Laitem, Leo, 4,789,496, Cl. 252-99.000.

Lakatos, Leslie K.: See—  
Nikka, Marilyn J.; Pohio, Gerald R.; Lakatos, Leslie K.; Wheeler, Douglas J.; Solomon, Frank; Niksa, Andrew J.; Schue, Thomas J.; Genodman, Yuri; Turk, Thomas R.; and Hagel, Daniel P., 4,788,764, Cl. 29-731.000.

Lake, Kerry L. Contoured pillow with central aperture. 4,788,728, Cl. 5-434.000.

LaManna, Richard J.; Hinton, James L.; and Cucksey, Edward L., to National Business Systems, Inc. Credit card embossing system. 4,789,420, Cl. 156-540.000.

Landwehrkamp, Hans: See—  
Hauser, Hans H.; Rebsamen, Arthur; Slavik, Walter; and Landwehrkamp, Hans, 4,789,107, Cl. 242-45.000.

Laney, Roy N. Portable walking beam pump jack. 4,788,873, Cl. 74-41.000.

Langer, Heimo J.: See—  
Jhaveri, Satish S.; Dunnivant, William R.; and Langer, Heimo J., 4,789,693, Cl. 523-145.000.

Langer, Robert S.: See—  
Domb, Abraham J.; and Langer, Robert S., 4,789,724, Cl. 528-176.000.

Lant, Victoria M.: See—  
Ray, Brian E.; Lant, Victoria M.; and Phillips, Robert W., 4,789,149, Cl. 271-215.000.

LaPierre, Rene B.: See—  
Fischer, Ronald H.; Huang, Yun-Yang; LaPierre, Rene B.; and Varghese, Philip, 4,789,457, Cl. 208-68.000.

Laput, William. Fitting for channel-shaped framing members. 4,789,286, Cl. 411-84.000.

Larson, Sherman: See—  
Beer, Carl C.; Hewitt, C. Lee; and Larson, Sherman, 4,788,993, Cl. 134-123.000.

Larsson, Svante. Displacement and locking means. 4,789,071, Cl. 211-208.000.

Laser Magnetic Storage International Company: See—  
Oudenhuysen, Adrianus H.; and Lee, Wai-Hon, 4,789,977, Cl. 369-109.000.

Laskody, Jerome R., to Boeing Company. The Test apparatus for measuring jet engine thrust. 4,788,855, Cl. 73-117.400.

Lassiaz, Philippe: See—  
Gay, Christian; and Lassiaz, Philippe, 4,789,052, Cl. 192-98.000.

Laub, Ruth: See—  
Le Clef, Brigitte A. L. G. M. J.; Laub, Ruth; and Schneider, Yves-Jacques E., 4,789,587, Cl. 514-252.000.

Laurent, Henry: See—  
Bull, James R.; Thomson, Russell I.; Laurent, Henry; Schroeder, Helmut; and Wiechert, Rudolf, 4,789,671, Cl. 514-182.000.

Nickisch, Klaus; Laurent, Henry; Bittler, Dieter; Wiechert, Rudolf; and Losert, Wolfgang, 4,789,668, Cl. 514-173.000.

Lauro, Karen L.: See—  
Sones, Richard A.; and Lauro, Karen L., 4,789,930, Cl. 364-413.130.

Lavergne, Christian: See—  
Lacord, Maurice; Lavergne, Christian; and Vegeais, Patrick, 4,789,870, Cl. 346-1.100.

Lawwill, Mert. Suspension bicycle. 4,789,174, Cl. 280-284.000.

Layh, Hand-Dieter. Two terminal light barrier system. 4,789,778, Cl. 250-221.000.

Layne, Clyde B., to United States of America. Energy. Gradient index retroreflector. 4,789,219, Cl. 350-97.000.

Lazzeroni, John J.; and Lazzeroni, Melinda K. Motorcycle helmet microphone mount and plug mount. 4,788,724, Cl. 2-422.000.

Lazzeroni, Melinda K.: See—  
Lazzeroni, John J.; and Lazzeroni, Melinda K., 4,788,724, Cl. 2-422.000.

Le, Thanh-Son, to Nixdorf Computer AG. Through bolt connection for unilaterally accessible locations. 4,789,287, Cl. 411-107.000.

Le Clef, Brigitte A. L. G. M. J.; Laub, Ruth; and Schneider, Yves-Jacques E., to IRE-Cellarg, S.A. (1,3-dioxolan-2-yl-methyl)-1H-imidazoles as bactericidal and/or fungicidal agents. 4,789,587, Cl. 514-252.000.

Ledbetter, Stephen M.: See—  
Cox, Russell; and Ledbetter, Stephen M., 4,789,919, Cl. 361-339.000.

Lederer, James F.: See—  
Hays, Douglas E.; and Lederer, James F., 4,789,255, Cl. 400-63.000.

Lee, Jang-Woo. Winding-type antenna and its winding mechanism. 4,789,867, Cl. 343-877.000.

Lee, Jimmy L., to Zenion Industries, Inc. Electrokinetic transducing methods and apparatus and systems comprising or utilizing the same. 4,789,801, Cl. 310-308.000.

Lee, Len F.; Spear, Kerry L.; and Dolson, Mark G., to Monsanto Company. 5-sulfur substituted pyridine monocarboxylic herbicides. 4,789,395, Cl. 71-94.000.

Lee, May-Lin: See—  
Liou, Jiunn-Yau; Lee, May-Lin; Kok, Moon S.; Yu, James; and Tam, Aloysius T., 4,789,967, Cl. 365-189.000.

Lee, Noel. Electrical compression connector. 4,789,355, Cl. 439-584.000.

Lee, San A.: See—  
Ellerstein, Stuart M.; and Lee, San A., 4,789,625, Cl. 430-372.000.

Lee, Wai-Hon: See—  
Oudenhuysen, Adrianus H.; and Lee, Wai-Hon, 4,789,977, Cl. 369-109.000.

Lehmann, Leonard T.: See—  
Jarrett, Peter K.; Casey, Donald J.; and Lehmann, Leonard T., 4,788,979, Cl. 128-335.500.

Lehmann, William L.: See—  
Carlson, David J.; and Lehmann, William L., 4,790,030, Cl. 455-193.000.

Leigh-Monstevens, Keith V.: See—  
Mienko, David K.; Vander Poortie, John G.; and Leigh-Monstevens, Keith V., 4,788,821, Cl. 60-585.000.

Leitko, Curtis E., Jr.: See—  
Rehm, William A.; McDonald, William J.; Maurer, William C.; and Leitko, Curtis E., Jr., 4,789,032, Cl. 175-45.000.

Leitner, Frank W., Sr. Apparatus for straightening bow in fabric in a tenter frame. 4,788,756, Cl. 26-51.400.

Leonard, Thomas W.: See—  
Enever, Robin P.; Leonard, Thomas W.; and Mikula, Karol K., 4,789,660, Cl. 514-4.000.

Leone, Michel; and Carbone, Robert, to Etat Francais. Multichannel structures made of composites, processes and semifinished products for the manufacture thereof. 4,789,577, Cl. 428-34.500.

LePage, Bernard E.: See—  
Bethune, William; Pikor, Steven J.; Bertleson, Peter C.; and LePage, Bernard E., 4,788,757, Cl. 27-2.000.

LePage, Jean-Paul: See—  
Lumbroso, Daniel; and LePage, Jean-Paul, 4,789,459, Cl. 208-155.000.

Lepelletier, Pierre A. G., to Valeo. Adaptable layshaft type gearbox using a planetary gearset, in particular for automobile vehicles. 4,788,887, Cl. 74-674.000.

Le Pesant, Jean-Pierre; Hareng, Michel; and Mourey, Bruno, to Thomson-CSF. Electrically controlled optical switching device. 4,789,228, Cl. 350-355.000.

Le Poole, Jan B.; and Van der Mast, Karel D., to U.S. Philips Corporation. Apparatus for energy-selective visualization. 4,789,780, Cl. 250-305.000.

Lerner, Ross E. Combined cleaning glove and disposal bag. 4,788,733, Cl. 15-104.940.

Lesch, David A.: See—  
Flanigen, Edith M.; Lesch, David A.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., 4,789,535, Cl. 423-306.000.

Levallois, Emile, to Institut Francais du Pétrole. Method and device for positioning an element using ultrasonic sensors. 4,789,970, Cl. 367-104.000.

Levinson, Harry J.: See—  
Koyama, Linda J.; Thomas, Mammen; and Levinson, Harry J., 4,789,760, Cl. 174-68.500.

Lewerissa, Ronald: See—  
van Zee, Eric; Boomsma, Harm; Lewerissa, Ronald; and Verbrugge, Jeroen, 4,789,203, Cl. 297-316.000.

Lewis, Cheri. Art of protecting a dental instrument. 4,789,336, Cl. 433-116.000.

Lewis Corporation: See—  
Swainbank, Hugh B.; Swainbank, Christopher A.; and Allen, Kenneth R., Jr., 4,788,992, Cl. 134-64.00R.

Lewis, Jewell V. Cover for open bed of pickup truck. 4,789,197, Cl. 296-100.000.

Lewis, Robert E.: See—  
DiGianfilippo, Alessandro; Hitchcock, James R.; Lewis, Robert E.; Zielsdorf, Randall A.; Vos, James P.; Starai, Rudolph; Becker, Michael J.; Warner, Donald W.; and Huang, Leon, 4,789,014, Cl. 141-83.000.

Leyrer, Reinhold J.; Wegner, Gerhard; and Mueller, Michael, to BASF Aktiengesellschaft. Production of resist images, and a suitable dry film resist. 4,789,622, Cl. 430-286.000.



Li, Paul Z.-f., to Florida State University. Apparatus for measuring fluid flow. 4,788,869, Cl. 73-861.710.

Liang, Mong-Song: See—  
Coa, William P.; and Liang, Mong-Song. 4,789,883, Cl. 357-23.700.

Liaw, Huey-sen. Compact lifting assembly. 4,789,133, Cl. 254-103.000.

Libbey-Owens-Ford Co.: See—  
Bishop, Roger B.; Aah, Charles E.; and Herliczek, Siegfried H., 4,788,911, Cl. 100-155.00G.

Licht, Reiner, to Siemens Aktiengesellschaft. Apparatus and circuit for monitoring the ink supply and ink printer devices. 4,788,861, Cl. 73-304.00R.

Lidow, Alexander, to International Rectifier Corporation. High power MOSFET with direct connection from connection pads to underlying silicon. 4,789,882, Cl. 357-23.400.

Liebermann, Leonard N., to TIF Instruments, Inc. Fuel injector testing device and method. 4,788,858, Cl. 73-119.00A.

Liedtke, Kurt: See—  
Focke, Heinz; and Liedtke, Kurt, 4,789,060, Cl. 206-274.000.

LifeLines Technology, Inc.: See—  
Preziosi, Anthony F.; and Prusik, Thaddeus, 4,789,637, Cl. 436-2.000.

Lift-All Company, Inc.: See—  
Meals, William D., 4,789,193, Cl. 294-74.000.

Lim, Franklin, to Damon Biotech, Inc. Production of sustained released system. 4,789,516, Cl. 264-4.320.

Lin, Chiu-Hong, to Upjohn Company, The. Certain 3-[3-(3-pyridinyloxy)propoxy or propylthio]acetic acid derivatives which are useful as synthetase inhibitors. 4,789,745, Cl. 546-301.000.

Lin, Jiange-Jen: See—  
Waddill, Harold G.; Lin, Jiange-Jen; and Speranza, George P., 4,789,721, Cl. 528-111.000.

Lin, Kuang-Yao. Horn type loudspeakers. 4,790,020, Cl. 381-156.000.

Lindblad, Lars-Erik: See—  
Gedeon, Andras; and Lindblad, Lars-Erik, 4,788,982, Cl. 128-670.000.

Linder, Karen E., to Du Pont de Nemours, E. I., and Company. Neutral technetium 99-m complexes useful as radiodiagnostic agents. 4,789,543, Cl. 424-1.100.

Lindner, Helmut: See—  
Ebinger, Jürgen; Beutler, Rolf-Dieter; and Lindner, Helmut, 4,789,401, Cl. 106-122.000.

Lindsay, Edward R.; Kusmierczyk, Robert C.; and Cameron, Norman F., to Baxter Travenol Laboratories, Inc. Automated disinfection system. 4,789,467, Cl. 210-103.000.

Lindstrom, Jon M., to Salk Institute for Biological Studies, The. Assays for myasthenia gravis. 4,789,640, Cl. 436-504.000.

Linear Technology Corporation: See—  
Nelson, Carl T., 4,789,819, Cl. 323-314.000.

Lion Brothers, Co., Inc.: See—  
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Liou, Jiunn-Yau; Lee, May-Lin; Kok, Moon S.; Yu, James; and Tam, Aloysius T., to Advanced Micro Devices, Inc. Random access memory device with block reset. 4,789,967, Cl. 365-189.000.

Lirones, Nick G., to Howmet Turbine Components Corporation. Ceramic porous bodies suitable for use with superalloys. 4,789,140, Cl. 266-238.000.

Lisiecki, Robert E., to Ex-Cell-O Corporation. Container with protective seal and tear strip. 4,789,066, Cl. 206-611.000.

Litchford, George B., to Litchstreet Co. Collision avoidance system. 4,789,865, Cl. 342-455.000.

Litchstreet Co.: See—  
Litchford, George B., 4,789,865, Cl. 342-455.000.

Little, Brenda J.; and Gerchakov, Sol M., deceased (by Gerchakov, Barbara J., executrix), to United States of America, Navy. Method and apparatus for measuring corrosion current induced by microbiological activities. 4,789,434, Cl. 204-1.00T.

Liton Systems, Inc.: See—  
Bush, Ira J., 4,789,240, Cl. 356-345.000.

Pier, Nicolas F., 4,788,864, Cl. 73-517.00B.

Liu, Dean S., to Halcyon Waterbed Inc. Collapsible base for beds. 4,788,727, Cl. 5-174.000.

Lo, Pei-hwa; and Thong, Tran, to Tektronix, Inc. Method and apparatus for digital compensation and digital equalization. 4,789,952, Cl. 364-724.200.

Lo, Ying-Cheng, to Aluminum Company of America. Methods of producing biaxially oriented polymer sheet. 4,789,514, Cl. 264-280.000.

Lock, Tomas E.: See—  
Vilhelmsen, Kennet J. A.; and Lock, Tomas E., 4,789,214, Cl. 350-96.150.

Lockheed Missiles & Space Company, Inc.: See—  
Hodor, Jim R.; Barney, Jesus; and Decker, Herman J., 4,789,236, Cl. 356-33.000.

Lockwood Graders (UK) Limited: See—  
Dennis, Timothy J., 4,790,022, Cl. 382-8.000.

Lofgren, Michael S.; and Stewart, Brian C. Steering method and mechanism for three-wheel vehicle. 4,789,173, Cl. 280-281.0LP.

Loge, Olaf: See—  
Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Elger, Walter; Loge, Olaf; and Town, Michael-Harold, 4,789,685, Cl. 514-530.000.

Loglift, Sari: See—  
Evin, Jean, 4,789,050, Cl. 187-134.000.

Lok, Brent M. T.: See—  
Flanigen, Edith M.; Lesch, David A.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., 4,789,535, Cl. 423-306.000.

Lommert, Hermann: See—  
Hirsch, Martin; Lommert, Hermann; and Serbent, Harry, 4,789,580, Cl. 423-49.000.

Long, James C.: See—  
Buschor, Josef J.; and Long, James C., 4,788,850, Cl. 73-49.200.

Lonza Ltd.: See—  
Baiker, Alfons; Dollenmeier, Peter; and Glinski, Marek, 4,789,533, Cl. 423-239.000.

Loral Corporation: See—  
Burger, Henry A.; and White, Harold E., 4,788,766, Cl. 29-830.000.

Frater, James T., 4,788,914, Cl. 102-399.000.

Lorenzo, Joseph P.; and Soref, Richard A., to United States of America, Air Force. Method for fabricating low loss crystalline silicon waveguides by dielectric implantation. 4,789,642, Cl. 437-24.000.

Losch, Manfred: See—  
Reymann, Wolfgang; and Orth, Wilhelm, 4,789,010, Cl. 140-111.000.

Losert, Wolfgang: See—  
Nickisch, Klaus; Laurent, Henry; Bittler, Dieter; Wiechert, Rudolf; and Losert, Wolfgang, 4,789,668, Cl. 514-173.000.

Lothrop, John R.: See—  
Kepley, Garry D.; Lothrop, John R.; and Mizrahi, Albert, 4,790,003, Cl. 379-88.000.

Loughlin, Thomas G.: See—  
Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, 4,789,859, Cl. 340-825.310.

Lowry, David A.: See—  
Kershenbrock, Michael D.; Lowry, David A.; Harris, Gregory D.; Henry, Michael D.; and Kohlmeier, Francis D., 4,789,789, Cl. 307-40.000.

Lubrizol Corporation, The: See—  
Kostusyk, Joseph L., 4,789,402, Cl. 106-273.100.

Luchinger, Paul; Rutishauser, Heinz; and Wachter, Hanspeter, to Mettler Instrumente AG. Analytical balance. 4,789,034, Cl. 177-181.000.

Ludwig, George C., to AVM, Inc. Counterbalance apparatus with transverse pneumatic spring and bellcrank linkage. 4,788,747, Cl. 16-306.000.

Luinstra, Edward A.: See—  
Delude, Stephen G.; and Luinstra, Edward A., 4,789,030, Cl. 166-267.000.

Luk Lamellen und Kupplungsbau GmbH: See—  
Reik, Wolfgang; and Elison, Hans-Dieter, 4,788,884, Cl. 74-574.000.

Lukas, Gregory J.: See—  
Bristow, Julian P. G.; Keur, Michael; Lukas, Gregory J.; Sriram, Sriram; and Wey, Albert C., 4,789,212, Cl. 350-96.120.

Luke, Mike A.: See—  
Stone, Patrick C.; Luke, Mike A.; and Ingram, Gary D., 4,789,029, Cl. 166-134.000.

Lumbroso, Daniel; and LePage, Jean-Paul, to Institut Francais du Petrole. Process for recovering power from a fluid catalytic cracking unit used particularly for the treatment of heavy charges. 4,789,459, Cl. 208-155.000.

Lundquist, Joseph T.: See—  
Ambrose-Ritchey, Geneva; Jachimowicz, Felek; and Lundquist, Joseph T., 4,789,609, Cl. 429-144.000.

Lundstrom, Jan O. G.: See—  
Florvall, Gosta L.; Lundstrom, Jan O. G.; Ramsby, Sten I.; and Ogren, Sven O., 4,789,683, Cl. 514-428.000.

Lurssen, Klaus: See—  
Holmwood, Graham; Buchel, Karl H.; Lurssen, Klaus; Frohberger, Paul-Ernst; and Brandes, Wilhelm, 4,789,672, Cl. 514-184.000.

Lutley, Richard W.: See—  
Hollis, C. George; and Lutley, Richard W., 4,789,489, Cl. 210-755.000.

Luther, Barbara: See—  
Chow, Melanie M.; Cronin, John E.; Guthrie, William L.; Kaanta, Carter W.; Luther, Barbara; Patrick, William J.; Perry, Kathleen A.; and Standley, Charles L., 4,789,648, Cl. 437-225.000.

Luxtron Corporation: See—  
Wickersheim, Kenneth A.; Sun, Mei H.; Heinemann, Stanley O.; and Hinemann, Stanley O., 4,789,992, Cl. 374-161.000.

Lydick, Richard P.: See—  
Morris, Stephen W.; and Lydick, Richard P., 4,789,889, Cl. 357-68.000.

Lyman, Ronald L., to Fantasy Toys, Inc. Toy building blocks with multiple pivoting interconnections. 4,789,369, Cl. 446-101.000.

Lynx Golf, Inc.: See—  
Boone, David D., 4,788,774, Cl. 33-508.000.

M.A.N. Roland Druckmaschinen AG: See—  
Fischer, Hermann, 4,788,912, Cl. 101-177.000.

Ma, Bao-Min: See—  
Narasimhan, Kalathur S. V. L.; and Ma, Bao-Min, 4,789,521, Cl. 420-83.000.

Maas, Fred: See—  
Kinderman, Abraham S.; and Maas, Fred, 4,789,571, Cl. 428-10.000.

Maat, Johan H. H. T., to Imperial Chemical Industries PLC. Catalyst of a sintered iron oxide-containing article. 4,789,659, Cl. 502-328.000.

Mabuchi, Toshiaki, to Canon Kabushiki Kaisha. Recording/reproducing apparatus with dual display capability. 4,789,973, Cl. 369-24.000.

MacFarlane, Walter J., to Stanley Works, The. Hasp-type latch with combination lock. 4,788,837, Cl. 70-3.000.

Machida, Kiyosada: See—  
Wakabayashi, Hiroshi; Tsukahara, Daiki; Katayama, Akira; Machida, Kiyosada; Kazami, Kazuyuki; Katano, Yuji; Terunuma, Hiroshi; and Higuchi, Mitsuru, 4,789,875, Cl. 354-195.100.

Maciejczak, Robert A. Inspection system and method for mechanical structures. 4,789,947, Cl. 364-512.000.

MacMullin, Robert E.: See—  
Dougherty, Michael J.; and MacMullin, Robert E., 4,789,343, Cl. 439-34.000.

Macy, Robert L., Jr.: See—  
Speakman, David; and Macy, Robert L., Jr., 4,789,552, Cl. 426-107.000.

Maddock, William H., to Noma Inc. Artificial shrub. 4,789,570, Cl. 428-8.000.

Madsen, Jens U.; and Hansen, Peer K., to Andrea Radiation Products AS. Circuit arrangement for producing high voltages. 4,789,997, Cl. 378-109.000.

Maeda Industries, Ltd.: See—  
Ozaki, Nobuo, 4,789,206, Cl. 301-111.000.

Ozaki, Nobuo; and Wauke, Tsukasa, 4,789,379, Cl. 474-82.000.

Maeda, Toshiaki: See—  
Sugie, Masuo; Kurihara, Koji; Aiba, Yoshiro; and Maeda, Toshiaki, 4,789,651, Cl. 501-103.000.

Machata, Hiromi; Okuda, Yutaka; Masaki, Shoichi; Asami, Ken; and Sakai, Kazunori, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Anti-skid control with fail-safe function. 4,789,938, Cl. 364-426.020.

Maejima, Hideo; Hotta, Takashi; Masuda, Ikuro; Iwamura, Masahiro; Kurita, Kouzaburo; and Ueno, Masahiro, to Hitachi, Ltd. Carry-over-ahead adder including bipolar and MOS transistors. 4,789,958, Cl. 364-787.000.

Maggio, Edward T., to Synbiotics Corporation. Immunoassay for anti-dirofilaria immitis antibody. 4,789,631, Cl. 435-7.000.

Maher, John M.: See—  
Billig, Ernst; Abatjoglou, Anthony G.; Bryant, David R.; Murray, Rex E.; and Maher, John M., 4,789,753, Cl. 558-85.000.

Mahr, Erich; and Hofkirchner, Wilhelm, to Maschinenfabrik Andritz Actiengesellschaft. Process and apparatus for the continuous electrolytic treatment and/or coating of a moving metallic strip while changing the spacing between the strip and at least one electrode. 4,789,440, Cl. 204-28.000.

Maierano, Helen: See—  
Berger, Joseph P.; Allsopp, Mary F.; Cook, Christopher D.; Fraleigh, Jonathan O.; Hamilton, David; Kessberger, John E.; Maiorano, Helen; Rawlings, Stuart O.; Warmus, James L.; Wilczynski, Janet A.; and Wong, Did-bun, 4,789,147, Cl. 270-1.100.

Majette, Mark W.; Walsh, William J.; and Wickeraad, John A., to Hewlett-Packard Company. Single channel encoder system. 4,789,874, Cl. 346-140.00R.

Makino, Yuji; Matagi, Hideo; and Suzuki, Yoshiki, to Teijin Limited. External pharmaceutical composition and methods of use. 4,789,667, Cl. 514-161.000.

Malabarba, Adriano; Trani, Aldo; Ferrari, Pietro; and Tarzia, Giorgio, to Gruppo Lepetit S.p.A. De-(acetylglucosaminyl)-di(dehydro)-deoxy teicoplanin derivatives. 4,789,661, Cl. 514-8.000.

Malcolm, Jerry W., to International Business Machines Corporation. Printer throughput. 4,789,949, Cl. 364-519.000.

Malone, Charles F.; and Durham, Larry M., to Scott Fetzer Company. Appliance timer. 4,789,761, Cl. 200-38.00C.

Mamiya, Johji: See—  
Iida, Hideaki; Mamiya, Johji; and Morimoto, Yutaka, 4,789,954, Cl. 364-720.000.

Man Gutehoffnungshutte GmbH: See—  
Blotenberg, Wilfried, 4,789,298, Cl. 415-27.000.

MAN Nutzfahrzeuge GmbH: See—  
Henkel, Dietmar, 4,788,819, Cl. 60-303.000.

Manaresi, Piero; Pilati, Francesco; Berti, Corrado; and Petri, Alberto, to Enichem Tecnorefine S.p.A. Polycarbonate branched with double-ring aromatic compound. 4,789,723, Cl. 528-175.000.

Mann, Brian M.; and Buchanan, Stuart W., to Siemens-Pacesetter, Inc. Pacemaker having PVC response and PMT terminating features. 4,788,980, Cl. 128-419.0PG.

Mannesmann AG: See—  
Gomoll, Guenter; and Hauslaib, Wolfgang, 4,789,258, Cl. 400-605.000.

Mannesmann Aktiengesellschaft: See—  
Metelmann, Otto H.; and Prislac, Richard, 4,789,991, Cl. 373-74.000.

Mannesmann Kienzle GmbH: See—  
Koch, Siegfried; and Scholl, Hans-Peter, 4,789,774, Cl. 235-30.00R.

Manning, Patrick R.; and West, Donald W., to Medtest Corporation. Device for cell sampling in a body cavity. 4,788,985, Cl. 128-759.000.

Mantey, Paul G.: See—  
Fassbinder, Hans G.; and Mantey, Paul G., 4,789,139, Cl. 266-221.000.

Marchese, Enrico: See—  
Giannetti, Enzo; Rotaspetti, Angelo; and Marchese, Enrico, 4,789,717, Cl. 526-209.000.

Marcucci, Rudolph V.: See—  
Grossman, Mark W.; George, William A.; and Marcucci, Rudolph V., 4,789,784, Cl. 250-436.000.

Marquardt, Reinhard; and Priesmeier, Ernst; to Hoesch Aktiengesellschaft. Large antifriction bearing. 4,789,254, Cl. 384-611.000.

Marquis Corp.: See—  
Ediger, Melvin C.; and Fox, R. M. Skip, 4,788,725, Cl. 4-542.000.

Marsh, Susan K.: See—  
Owen, Hartley; Daviduk, Nicholas; Marsh, Susan K.; and Wright, Bernard S., 4,789,528, Cl. 422-190.000.

Marsik, Robert W., to ProCare Industries Ltd. Method and kit for use in conceiving a child of a desired gender. 4,788,984, Cl. 128-738.000.

Martens, Franciscus J. A.; and Hasenack, Hendrikus J. A., to Shell Oil Company. Process for partial oxidation of a hydrocarbon-containing fuel. 4,789,384, Cl. 48-197.00R.

Martin Marietta Corporation: See—  
Idler, Richard L., 4,788,746, Cl. 16-297.000.

Martin, Wallace W.; Exall, Douglas I.; Tomoda, Toshimasa; and Badono, Shinji, to Petro-Canada Inc.; and Mitsubishi Electric Corp., a part interest. Metering choke. 4,788,852, Cl. 73-61.10R.

Maruyama, Hiromi: See—  
Morimoto, Yuichi; Maruyama, Hiromi; Aoyama, Motoo; Zukeran, Atsushi; Bessho, Yasunori; Matsumoto, Tomoyuki; Ishii, Yoshihiko; Fujimura, Kouji; and Uchikawa, Sadao, 4,789,520, Cl. 376-419.000.

Maruyama, Masato, to Seiko Epson Corporation. Apparatus for removing extraneous material from clothing. 4,788,769, Cl. 30-133.000.

Maruzen Petrochemical Co., Ltd.: See—  
Tsuchitani, Masatoshi; Naito, Sakae; and Nakajima, Ryoichi, 4,789,456, Cl. 208-39.000.

Masaki, Shoichi: See—  
Machata, Hiromi; Okuda, Yutaka; Masaki, Shoichi; Asami, Ken; and Sakai, Kazunori, 4,789,938, Cl. 364-426.020.

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Mahr, Erich; and Hofkirchner, Wilhelm, 4,789,440, Cl. 204-28.000.

Mashburn, James S.; and Mashburn, Jerry P. Cantilevered gas barbecue. 4,788,962, Cl. 126-25.00R.

Mashburn, Jerry P.: See—  
Mashburn, James S.; and Mashburn, Jerry P., 4,788,962, Cl. 126-25.00R.

Massachusetts Institute of Technology: See—  
Domb, Abraham J.; and Langer, Robert S., 4,789,724, Cl. 528-176.000.

Masuda, Ikuro: See—  
Maejima, Hideo; Hotta, Takashi; Masuda, Ikuro; Iwamura, Masahiro; Kurita, Kouzaburo; and Ueno, Masahiro, 4,789,958, Cl. 364-787.000.

Masuda, Kenmei; Terada, Toshimichi; Ogino, Kenji; Yokoo, Shozo; and Uchiyama, Osamu, to Hitachi, Ltd. Magnetic recording and reproducing apparatus of rotary head type. 4,789,912, Cl. 360-85.000.

Masui, Mikio: See—  
Akahoshi, Kimiharu; and Masui, Mikio, 4,789,985, Cl. 371-11.000.

Materials-Concepts-Research Limited: See—  
Robinson, Murry C.; Kirk, Donald W.; and Jue, Bruce, 4,789,529, Cl. 423-109.000.

Mathieu, Bernd; Weber, Wolfram; and Schulz, Wolfgang, to Fresenius AG. Filter for obtaining plasma or plasma water. 4,789,473, Cl. 210-321.800.

Mathur, Prabodh, to Amada Engineering & Service & Co., Inc. Orientation determining system for a device. 4,789,243, Cl. 356-375.000.

Matkovich, Vlado I., to Pall Corporation. Vacuum diagnostic device. 4,789,526, Cl. 422-101.000.

Matoba, Takao; Iwase, Osamu; Nezu, Tuguo; and Sugiura, Shinji, to Kansai Paint Co., Ltd., a Japanese Corp. Coating composition. 4,789,568, Cl. 427-412.100.

Matsubara, Kakuei: See—  
Morimoto, Kiyoshi; Takagi, Toshinori; and Matsubara, Kakuei, 4,789,500, Cl. 252-584.000.

Matsubara, Tetsuyuki; Ito, Norifumi; Iwamoto, Mune; and Ando, Toshihiko, to Mitsui Toatsu Chemicals, Incorporated; and Toyo Engineering Corporation. Transportation method of synthetic rubber chips. 4,789,272, Cl. 406-48.000.

Matsuda, Toshio: See—  
Ueno, Ryuzo; Kanayama, Tatsuo; Nakashima, Toshitaka; Itami, Tomiyasu; Kunihiro; and Matsuda, Toshio, 4,789,497, Cl. 252-194.000.

Matsui, Komaji: See—  
Tatsuno, Tadayoshi; Kashiwada, Seiji; Matsui, Komaji; Wakimoto, Mituo; and Tabuchi, Ichiro, 4,789,566, Cl. 427-388.200.

Matsui, Shougo; and Kobayashi, Kenichi, to Fujitsu Limited. Method for measuring dimensions of fine pattern. 4,790,023, Cl. 382-8.000.

Matsumoto, Koichi: See—  
Takagi, Shuhei; Uehara, Makoto; and Matsumoto, Koichi, 4,789,242, Cl. 356-375.000.

Matsumoto, Tomoyuki: See—  
Morimoto, Yuichi; Maruyama, Hiromi; Aoyama, Motoo; Zukeran, Atsushi; Bessho, Yasunori; Matsumoto, Tomoyuki; Ishii, Yoshihiko; Fujimura, Kouji; and Uchikawa, Sadao, 4,789,520, Cl. 376-419.000.

Matsunaga, Makoto; Iyama, Yoshitada; and Takeda, Fumio, to Mitsubishi Denki Kabushiki Kaisha. Microwave semiconductor switch. 4,789,846, Cl. 333-104.000.

Matsuo, Sadamitsu: See—  
Hosokawa, Masuo; Tanaka, Akio; Kohmitsu, Keiichiro; Yokoyama, Tohei; Urayama, Kiyoshi; Matsuo, Sadamitsu; and Kato, Masashi, 4,789,105, Cl. 241-67.000.

Matsushita Electric Industrial Co., Ltd.: See—  
Fukushima, Yoshihisa; Satoh, Isao; Ichinose, Makoto; Kuroki, Yuzuru; and Takagi, Yuuji, 4,789,911, Cl. 360-72.200.

Hiraoka, Shigehiko; Ichinose, Makoto; Satoh, Isao; and Sugimura, Tatuo, 4,789,979, Cl. 369-275.000.

Kondo, Shigeo; Sotomura, Tadashi; Kanbara, Teruhisa; and Sekido, Satoshi, 4,789,610, Cl. 429-191.000.

Miyata, Yutaka; Chikamura, Takao; Shibata, Takuo; and Fujiwara, Shinji, 4,789,888, Cl. 357-30.000.

Satoh, Isao; Kuroki, Yuzuru; Ichinose, Makoto; and Murai, Katsumi, 4,789,974, Cl. 369-45.000.



- Watanabe, Koji; Hayashi, Katsuhiko; Minakuchi, Nobuaki; Misaki, Masayuki; Terai, Kenichi; Nakama, Yasutoshi; and Morita, Masaharu, 4,790,014, Cl. 381-1.000.
- Matsumita Refrigeration Company: See—  
Aoki, Takashi; and Miyachi, Tatsuo, 4,788,832, Cl. 62-382.000.
- Matsuura, Hideaki: See—  
Kato, Yasuyuki; Yuyama, Masahiro; Moritani, Masahiko; Matsuura, Hideaki; Iijima, Susumu; and Hashimoto, Tsuyoshi, 4,789,709, Cl. 525-366.000.
- Matsuura, Takao, to Alps Electric Co., Ltd. Thermal transfer printer, 4,789,873, Cl. 346-76.0PH.
- Matteau, Luc C.; and Closs, Ralph D., to Canadian Corporate Management Company Limited. Weigh bridge for variable inclination conveyor, 4,788,930, Cl. 177-16.000.
- Matthews, Mark E. Removable rear truck window, 4,788,796, Cl. 49-404.000.
- Mattox, Ernest M. Neck exercise device, 4,789,154, Cl. 272-94.000.
- Mattsson, Erik P., to G H Trading AB. Telescopic stay, 4,789,123, Cl. 248-240.400.
- Matugi, Hideo: See—  
Makino, Yuji; Matugi, Hideo; and Suzuki, Yoshiki, 4,789,667, Cl. 514-161.000.
- Matzke, Guenter; Horn, Peter; and Schmidt, Hans U., to BASF Aktiengesellschaft. Elastomers containing polyamide groups and polyurea groups in bonded form, as well as a process for the preparation of elastic, non-cellular molded articles from these elastomers, 4,789,691, Cl. 521-159.000.
- Mauck, John C.: See—  
Warren, Harold C., III; and Mauck, John C., 4,789,525, Cl. 422-56.000.
- Maurer, William C.: See—  
Rehm, William A.; McDonald, William J.; Maurer, William C.; and Leitko, Curtis E., Jr., 4,789,032, Cl. 175-45.000.
- Maurice, Francois. Active matrix display screen with line and column redundancy, 4,789,857, Cl. 340-784.000.
- Masey, William, III: See—  
Calupca, Gary A.; Crone, Lewis L.; Masey, William, III; and Rubenic, Eckhard K., 4,788,823, Cl. 62-84.000.
- May, George A. Circuit for use with a light pen to reduce jitter, 4,789,836, Cl. 328-117.000.
- Mayer, Helmut R.: See—  
Richter, Ludwig; Niederhofer, Karl H.; Kramer, Dieter; Sussner, Gerhard; Girscher, Wolfgang; Munch, Volker; Vial, Heinrich; Mayer, Helmut R.; and Reyher, Hayo, 4,790,007, Cl. 379-420.000.
- Mayo, William T., Jr., to North American Philips Corporation. Producing pseudocolor magnetic resonance images, 4,789,831, Cl. 324-309.000.
- Mazda Motor Corporation: See—  
Ide, Yoshikazu, 4,789,198, Cl. 296-192.000.
- Komatsu, Masanobu; Senba, Takashi; Miyahara, Hisao; Kimura, Kunzi; and Sakamoto, Shunji, 4,789,417, Cl. 156-356.000.
- Komatsu, Nobuhiro, 4,789,199, Cl. 296-194.000.
- Mazor, Baruch; and Veeneman, Dale E., to GTE Laboratories Incorporated. Adaptive method and apparatus for coding speech, 4,790,016, Cl. 381-36.000.
- McBride, Edward D.: See—  
Hale, Gordon B.; Fiddle, Donald J.; and McBride, Edward D., 4,789,366, Cl. 440-75.000.
- McCall, Marvin A.: See—  
Van Sickle, Dale E.; Morris, John C.; McCall, Marvin A.; Fleischer, Jean C.; and Walker, Ted R., Jr., 4,789,755, Cl. 560-78.000.
- McCaul, Ronald M.: See—  
Seaman, Roy C.; and McCaul, Ronald M., 4,788,843, Cl. 72-58.000.
- McCauley, Jerry L.: See—  
Nguyen, Phong T.; Keith, Charles L.; and McCauley, Jerry L., 4,789,038, Cl. 180-24.020.
- McClain, Herbert D.; and Ferrante, Ronald A., to NCR Corporation. Optical scanner, 4,789,775, Cl. 235-470.000.
- McCollum, Anthony W.: See—  
Stavinoha, Jerome L.; and McCollum, Anthony W., 4,789,602, Cl. 428-480.000.
- McCracken, Laurence W. Apparatus and method for increasing fluid flow rate in a flow path including a curved flow path section, 4,789,004, Cl. 137-827.000.
- McCullen, Sharon B.: See—  
Chen, Nai Y.; and McCullen, Sharon B., 4,789,656, Cl. 502-74.000.
- McDonald, William J.: See—  
Rehm, William A.; McDonald, William J.; Maurer, William C.; and Leitko, Curtis E., Jr., 4,789,032, Cl. 175-45.000.
- McDonnell Douglas Corporation: See—  
Michal, Ronald J.; Udd, Eric; and Cahill, Richard F., 4,789,241, Cl. 356-350.000.
- McDowall, Neil A., to Pro Board, Inc. Cement finisher's knee board, 4,789,046, Cl. 182-230.000.
- McGrath, John C.: See—  
Powers, James M.; Moffett, Mark B.; and McGrath, John C., 4,789,971, Cl. 367-152.000.
- McIntyre, Deborah J.; and Reed, Dwight E., to American National Can Company. Method of thermally processing low-acid foodstuffs in hermetically sealed containers and the containers having the foodstuffs therein, 4,789,553, Cl. 426-325.000.
- McLaughlin, Charles W.: See—  
Ferguson, James L.; and McLaughlin, Charles W., 4,789,858, Cl. 340-784.000.
- MCM Incorporated: See—  
Ritter, Ernesto, 4,789,486, Cl. 210-747.000.
- McMann, Ronald E.: See—  
Brighton, Jeffrey E.; Hollingsworth, Deems R.; Welch, Michael; McMann, Ronald E.; Torreno, Manuel L., Jr.; and Sullivan, Charles W., 4,789,885, Cl. 357-34.000.
- McPherson, James N.; and Hall, David R., to Smith International, Inc. Cooling networks for PCD bearing surfaces, 4,789,251, Cl. 384-317.000.
- McPherson, John M.: See—  
Wallace, Donald G.; Smestad, Thomas L.; McPherson, John M.; Piez, Karl A.; Seyedin, Said; and Armstrong, Rosa, 4,789,663, Cl. 514-21.000.
- McWilliams, Joseph A., to Micropore International Limited. Infra-red heaters, 4,789,772, Cl. 219-464.000.
- Meals, William D., to Lift-All Company, Inc. Universal sling fitting, 4,789,193, Cl. 294-74.000.
- Meda, Laura, to SGS Microelettronica SpA. Process for fabrication, by means of epitaxial recrystallization, of insulated-gate field-effect transistors with junctions of minimum depth, 4,789,644, Cl. 437-41.000.
- Medilase, Inc.: See—  
Shturman, Leonid; and Jensen, Steven L., 4,788,975, Cl. 128-303.100.
- Medri, Mario W., to Consumer Products Corp. Multiple-layer tablet with contrasting organoleptic characteristics, 4,789,546, Cl. 424-441.000.
- Medtest Corporation: See—  
Manning, Patrick R.; and West, Donald W., 4,788,985, Cl. 128-759.000.
- Meershoek, Hans, to U.S. Philips Corp. Cathode ray tube deflection unit comprising means for compensating for misalignment of the line and field deflection coil systems, 4,789,806, Cl. 313-440.000.
- Meguro, Kanji; and Nishikawa, Kohei, to Takeda Chemical Industries, Ltd. 1,4-benzoxazine derivatives and pharmaceutical use, 4,789,675, Cl. 514-229.800.
- Mehta, Surendra C.: See—  
Song, Suk-Zu; Mehta, Surendra C.; Rashidbaigi, Zahra A.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 4,789,547, Cl. 424-449.000.
- Meier, Rene, to Ciba-Geigy Corporation. Aralkyltriazole compounds, 4,789,680, Cl. 514-359.000.
- Mein-Fang Sun, Anthony: See—  
Hommel, Martin; Mein-Fang Sun, Anthony; and Goosen, Mattheus F. A., 4,789,550, Cl. 424-493.000.
- Meiners, David J.: See—  
Castonguay, Roger N.; and Meiners, David J., 4,789,848, Cl. 335-167.000.
- Meissner, Konrad E.: See—  
Tichy, Oldrich J.; and Meissner, Konrad E., 4,788,910, Cl. 100-120.000.
- Meissner, Werner, to Zinser Textilmaschinen GmbH. Process and apparatus for reducing the breakdown quota or rate of stopping devices in a spinning or twisting machine, 4,788,818, Cl. 57-264.000.
- Melby, Earl G.: See—  
Fabris, Hubert J.; Melby, Earl G.; Chihara, Kohji Y.; and Cocain, Harry W., 4,789,703, Cl. 524-464.000.
- Meldrum, Kevin S.: See—  
Bon, Charles K.; Brattesani, Donald N.; and Meldrum, Kevin S., 4,789,449, Cl. 204-242.000.
- Merck & Co., Inc.: See—  
Goegelman, Robert T., 4,789,684, Cl. 514-450.000.
- Stokker, Gerald E., 4,789,682, Cl. 514-422.000.
- Merrell Dow Pharmaceuticals Inc.: See—  
Hibert, Marcel; and Gittos, Maurice W., 4,789,676, Cl. 514-292.000.
- Merz + Co. GmbH & Co.: See—  
Ebinger, Jurgen; Beutler, Rolf-Dieter; and Lindner, Helmut, 4,789,401, Cl. 106-122.000.
- Meschkat, Peter; and Zanzig, Jurgen, to Alcatel N.V. Line circuit for coupling a subscriber set to a switching facility to provide a complex impedance match, 4,789,999, Cl. 379-405.000.
- Metal Box p.l.c.: See—  
Ackland, Martin R.; and De'Ath, Roderick M., 4,789,635, Cl. 435-291.000.
- Metallgesellschaft Aktiengesellschaft: See—  
Hirsch, Martin; Lommert, Hermann; and Serbent, Harry, 4,789,580, Cl. 423-49.000.
- Metcal, Inc.: See—  
Doljack, Frank A., 4,789,767, Cl. 219-9.500.
- Metelmann, Otto H.; and Prislac, Richard, to Mannesmann Aktiengesellschaft. Cooling system for electric arc furnaces, 4,789,991, Cl. 373-74.000.
- Methode Electronics, Inc.: See—  
Paul, Christopher A.; and Schramme, Stephan H., 4,789,218, Cl. 350-96.210.
- Metropolitan Government of Nashville and Davidson County: See—  
Hager, G. Brent, 4,789,099, Cl. 239-10.000.
- Mettler Instrumente AG: See—  
Luchinger, Paul; Rutishauser, Heinz; and Wachter, Hanspeter, 4,789,034, Cl. 177-181.000.
- Meyer, Rolf-Volker: See—  
Bonten, Heinz; Niellinger, Werner; Michael, Dietrich; Selbeck, Harald; and Meyer, Rolf-Volker, 4,789,698, Cl. 524-100.000.
- Meyer, Walter: See—  
Blasing, Horst; and Meyer, Walter, 4,789,405, Cl. 134-1.000.

- Michael, Dietrich: See—  
Bonten, Heinz; Niellinger, Werner; Michael, Dietrich; Selbeck, Harald; and Meyer, Rolf-Volker, 4,789,698, Cl. 524-100.000.
- Michael, George W., III: See—  
Fisher, Robert L., Jr.; and Michael, George W., III, 4,789,351, Cl. 439-248.000.
- Michal, Ronald J.; Udd, Eric; and Cahill, Richard F., to McDonnell Douglas Corporation. Optical fiber sensing systems having acoustical optical deflection and; modulation devices, 4,789,241, Cl. 356-350.000.
- Michimoto, Kiyoharu: See—  
Ichikawa, Fusao; and Michimoto, Kiyoharu, 4,789,238, Cl. 356-237.000.
- Michl, Josef; and Radziszewski, Julius G., to University of Utah. The Methods and compositions for recording optical information employing molecular pseudorotation, 4,789,965, Cl. 365-121.000.
- MicroBeam Inc.: See—  
Parker, Norman W., 4,789,787, Cl. 250-396.0ML.
- Microdot Inc.: See—  
Dougherty, Michael J.; and MacMullin, Robert E., 4,789,343, Cl. 439-34.000.
- Rericha, Brian F.; and Stritzke, Bernard G., 4,789,166, Cl. 277-134.000.
- Micropore International Limited: See—  
Hughes, John T., 4,789,512, Cl. 264-120.000.
- McWilliams, Joseph A., 4,789,772, Cl. 219-464.000.
- Midcon Labs, Inc.: See—  
Nelson, Ralph; and Schlink, Gerald, 4,789,544, Cl. 424-92.000.
- Mienko, David K.; Vander Poorte, John G.; and Leigh-Monstevens, Keith V., to Automotive Products, plc. Hydraulic shift for motor vehicle transmission, 4,788,821, Cl. 60-585.000.
- Mieno, Toshiyuki; Nakajima, Toyohi; Tanaka, Akira; and Nagao, Akira, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for controlling boost pressure in turbocharged internal combustion engines, 4,788,822, Cl. 60-602.000.
- Mieno, Toshiyuki: See—  
Nakajima, Toyohi; Okada, Yasushi; Mieno, Toshiyuki; and Oono, Nobuyuki, 4,788,958, Cl. 123-489.000.
- Migita, Teruo: See—  
Hirano, Tetsuji; Sato, Goro; Higashi, Hidehiro; Migita, Teruo; and Eto, Yoshio, 4,789,634, Cl. 502-66.000.
- Mihail, Stavros, to Promotion Incorporated. Container filling apparatus, 4,789,016, Cl. 141-143.000.
- Miki, Shigeru: See—  
Inoue, Toshifumi; Yamada, Mitsuhiro; and Miki, Shigeru, 4,790,025, Cl. 382-41.000.
- Mikiya, Toshio: See—  
Shoji, Michihiro; and Mikiya, Toshio, 4,789,274, Cl. 408-11.000.
- Mikschl, Bernhard, to E.G.O. Elektro-Gerate Blanc u. Fischer. Electrical radiant heater for heating heating surfaces, 4,789,773, Cl. 219-464.000.
- Mikula, Karol K.: See—  
Enever, Robin P.; Leonard, Thomas W.; and Mikula, Karol K., 4,789,660, Cl. 514-4.000.
- Milani, Francesco; Franz, Wolfgang; Geier, Michael; and Koch, Joachim, to Dragerwerk Aktiengesellschaft. Incubator, 4,788,965, Cl. 600-22.000.
- Miley, John: See—  
Crossley, Ian; Donoghue, Daniel; Goldwasser, Robert; Miley, John; and Spooner, Frank, 4,789,887, Cl. 357-55.000.
- Miller, Bruce E.: See—  
Taylor, Stewart S.; and Miller, Bruce E., 4,789,799, Cl. 307-540.000.
- Miller, David C.; and Pendleton, Thomas J., to Mobil Oil Corporation. Wastebasket with lid catch, 4,789,078, Cl. 220-335.000.
- Miller, James R.; and Tetrauli, Leonard P., to Aerodyne Controls Corporation. Miniature multiplanar acceleration switch, 4,789,762, Cl. 200-61.45R.
- Miller, Larry D., to General Motors Corporation. Four sided flush glass, 4,788,794, Cl. 49-214.000.
- Miller Paint Equipment, Ltd.: See—  
Morbeck, James A., 4,789,245, Cl. 366-217.000.
- Miller, William E., to National Semiconductor Corp. MOS I/O protection using switched body circuit design, 4,789,917, Cl. 361-56.000.
- Milliken Research Corporation: See—  
Clements, Larry R.; and Eschenbach, Paul W., 4,788,816, Cl. 57-208.000.
- Millipore Corporation: See—  
DiLeo, Anthony J.; and de los Reyes, Gaston, 4,789,482, Cl. 210-651.000.
- Milliron, Daniel E.: See—  
Saxe, Charles L.; and Milliron, Daniel E., 4,789,950, Cl. 364-577.000.
- Milovanovic-Lerik, Olga; van der Wal, Hanno R.; and Tribelhorn, Ulrich, to Dow Chemical Company. The Polyurethane foam and process for its preparation, 4,789,690, Cl. 521-137.000.
- Minakuchi, Nobuaki: See—  
Watanabe, Koji; Hayashi, Katsuhiko; Minakuchi, Nobuaki; Misaki, Masayuki; Terai, Kenichi; Nakama, Yasutoshi; and Morita, Masaharu, 4,790,014, Cl. 381-1.000.
- Minamihata, Shigeaki; and Kamegaki, Kazuyuki, to Hitachi, Ltd. IIL circuit with PNP injector, 4,789,884, Cl. 357-34.000.
- Mindt, Wolfgang: See—  
Eberhard, Patrick; Mindt, Wolfgang; and Palma, Jean-Pierre, 4,789,453, Cl. 204-412.000.
- Minnesota Mining and Manufacturing Company: See—  
Aho, Kenneth A., 4,789,921, Cl. 362-348.000.
- Han, Hak-Rhim, 4,789,074, Cl. 215-347.000.
- Hart, Duane H., 4,789,012, Cl. 141-18.000.
- Smith, Philip M.; Hollingsworth, Elmont E.; Wandmacher, Robert A.; Roscoe, Thomas W.; Roiko, Russell A.; and Cheesebrow, Dennis M., 4,789,354, Cl. 439-395.000.
- Minolta Camera Kabushiki Kaisha: See—  
Akahoshi, Kimiharu; and Masui, Mikio, 4,789,985, Cl. 371-11.000.
- Mori, Shinichi; Sakamoto, Keiji; Nakauchi, Hiroaki; Hamada, Akiyoshi; and Yoshida, Kazuyuki, 4,789,880, Cl. 355-55.000.
- Mirkin, Alexander S.: See—  
Rudashevsky, German E.; Krichevsky, Alexander G.; Blokhina, Olga O.; and Mirkin, Alexander S., 4,788,968, Cl. 128-41.000.
- Misaki, Masayuki: See—  
Watanabe, Koji; Hayashi, Katsuhiko; Minakuchi, Nobuaki; Misaki, Masayuki; Terai, Kenichi; Nakama, Yasutoshi; and Morita, Masaharu, 4,790,014, Cl. 381-1.000.
- Misra, Chanakya, to Aluminum Company of America. Aluminum borate fibers, 4,789,422, Cl. 156-623.00R.
- Mitch, John H., to Tektronix, Inc. Method of and apparatus for securing elongate members of generally cylindrical form in end-to-end relationship, 4,789,217, Cl. 350-96.210.
- Mitchell Bradford International Corp.: See—  
Jarvi, Paul R., 4,789,409, Cl. 148-6.240.
- Mito, Nobuaki: See—  
Arai, Kenji; Mito, Nobuaki; Morita, Kouichi; and Hirata, Naonori, 4,789,396, Cl. 71-94.000.
- Mitschele, Mark A. Hand tool for removing sprinkler heads from underground watering systems, 4,788,894, Cl. 81-488.000.
- Mitsubishi Cable Industries, Ltd.: See—  
Onishi, Koichi; Ouchi, Yoshifusa; Suganuma, Takashi; Utsumi, Atsushi; and Kuroiwa, Takao, 4,789,239, Cl. 356-316.000.
- Mitsubishi Chemical Industries Ltd.: See—  
Ikeda, Takeshi; Handa, Hideo; and Nakano, Keisuke, 4,789,509, Cl. 264-29.200.
- Mitsubishi Denki Kabushiki: See—  
Ozaki, Hideyuki, 4,789,966, Cl. 365-189.000.
- Mitsubishi Denki Kabushiki Kaisha: See—  
Banjo, Toshinobu; Murasawa, Yasuhiro; and Onoda, Shigeo, 4,789,347, Cl. 439-140.000.
- Inoue, Takeshi, 4,789,776, Cl. 235-492.000.
- Inuzuka, Takahiko, 4,789,641, Cl. 437-4.000.
- Itoh, Hiroshi; Kasezawa, Tadashi; and Mizutani, Yoshiki, 4,789,890, Cl. 358-31.000.
- Kajikawa, Yasutomo, 4,789,643, Cl. 437-31.000.
- Komurasaki, Satoshi, 4,788,957, Cl. 123-425.000.
- Matsunaga, Makoto; Iyama, Yoshitada; and Takeda, Fumio, 4,789,846, Cl. 333-104.000.
- Morishita, Mitsuharu; and Kohge, Shinichi, 4,789,040, Cl. 180-142.000.
- Shikama, Shinsuke; and Toide, Eiichi, 4,789,978, Cl. 369-112.000.
- Watanabe, Eiki; and Sakurada, Takeshi, 4,789,049, Cl. 187-130.000.
- Yamanaka, Torao, 4,789,790, Cl. 307-66.000.
- Yano, Isamu; Hani, Kiyoshi; Yamashita, Shu; Kawabata, Kazuo; and Kogure, Naoyuki, 4,788,759, Cl. 29-159.00B.
- Mitsubishi Electric Corp.: See—  
Martin, Wallace W.; Exall, Douglas I.; Tomoda, Toshimasa; and Badono, Shinji, 4,788,852, Cl. 73-61.10R.
- Mitsubishi Gas Chemical Co. Inc.: See—  
Mochida, Isao; Fujiyama, Susumu; Sakai, Yukio; and Otsuka, Hiroyuki, 4,789,455, Cl. 208-39.000.
- Mitsubishi Mining and Cement Co., Ltd.: See—  
Ogata, Yasuyuki; Ono, Hidetsugu; and Yamanaka, Seiji, 4,789,653, Cl. 501-134.000.
- Mitsubishi Pencil Co., Ltd.: See—  
Iwase, Yasuyuki; Akaishi, Yoshiaki; and Muranishi, Masaomi, 4,789,261, Cl. 401-190.000.
- Mitsubishi Rayon Co. Ltd.: See—  
Sasaki, Isao; Kushi, Kenji; and Inukai, Ken-ichi, 4,789,620, Cl. 430-280.000.
- Mitsuboshi Belting Limited: See—  
Takano, Hiroshi; and Hashimoto, Yasuhiro, 4,789,378, Cl. 474-13.000.
- Mitsugi, Koji: See—  
Yoshimoto, Ryota; Kashima, Nobukazu; Hamuro, Junji; and Mitsugi, Koji, 4,789,658, Cl. 514-12.000.
- Mitsui-Cyanamid Ltd.: See—  
Nishimura, Tsutomu; Saito, Yasuo; Shindo, Kenji; and Abe, Kazutoshi, 4,789,707, Cl. 525-157.000.
- Mitsui Toatsu Chemicals, Incorporated: See—  
Matsubara, Tetsuyuki; Ito, Norifumi; Iwamoto, Mune; and Ando, Toshihiko, 4,789,272, Cl. 406-48.000.
- Morita, Moritsugu; and Miyazaki, Kazuo, 4,788,846, Cl. 72-160.000.
- Mitsuta, Toru: See—  
Wada, Yutaka; Kiguchi, Takashi; Kobayashi, Yasuhiro; and Mitsuta, Toru, 4,789,944, Cl. 364-488.000.
- Miura, Kin-ichiro: See—  
Moriyama, Tsuto; Miura, Kin-ichiro; Shimotohno, Kunitada; Ikegami, Masato; and Ichikawa, Yataro, 4,789,636, Cl. 435-320.000.
- Miyachi, Tatsuo: See—  
Aoki, Takashi; and Miyachi, Tatsuo, 4,788,832, Cl. 62-382.000.
- Miyahara, Hisao: See—  
Komatsu, Masanobu; Senba, Takashi; Miyahara, Hisao; Kimura, Kunzi; and Sakamoto, Shunji, 4,789,417, Cl. 156-356.000.



Miyahara, Yutaka, to Fujitsu Limited. Method for amending a photo-mask. 4,789,611, Cl. 430-5.000.

Miyai, Kiyoshi; Utani, Shuhei; and Tsunemine, Toyohiko, to Sanyo Electric Co., Ltd. Portable type image forming apparatus. 4,789,876, Cl. 355-3.00R.

Miyake, Toshio: See—  
Hirao, Mamoru; Hijiya, Hiromi; and Miyake, Toshio, 4,789,559, Cl. 426-658.000.

Miyake, Yosinobu, to Japan Physitec Co., Ltd. High voltage, multi-stage electrostatic generator. 4,789,802, Cl. 310-309.000.

Miyata, Yutaka; Chikamura, Takao; Shibata, Takuo; and Fujiwara, Shinji, to Matsushita Electric Industrial Co., Ltd. Solid-state image sensor. 4,789,888, Cl. 357-30.000.

Miyazaki, Kazuo: See—  
Morita, Moritsugu; and Miyazaki, Kazuo, 4,788,846, Cl. 72-160.000.

Miyazaki, Osamu: See—  
Nishimura, Hiroshi; and Miyazaki, Osamu, 4,789,929, Cl. 364-413.150.

Miyoshi, Kenichi; and Fuwa, Toru, to Wakunaga Seiyaku Kabushiki Kaisha. Oligonucleotide derivatives and production thereof. 4,789,737, Cl. 536-27.000.

Mizrahi, Albert: See—  
Kepley, Garry D.; Lothrop, John R.; and Mizrahi, Albert, 4,790,003, Cl. 379-88.000.

Mizuguchi, Kenji: See—  
Okonogi, Shigeo; Kawahara, Kunisuke; Oizumi, Saburo; Mizuguchi, Kenji; Koide, Osamu; and Shimada, Hiroshi, 4,789,556, Cl. 426-573.000.

Mizukami, Yukio: See—  
Tani, Naoyuki; Ueno, Motomu; Yoshida, Kusutaru; and Mizukami, Yukio, 4,789,413, Cl. 156-77.000.

Mizutani, Junichi; and Arita, Hiroyuki, to Nichirei Corporation. Apparatus for loosening and freezing heat processed cereals. 4,788,907, Cl. 99-517.000.

Mizutani, Yoshiki: See—  
Itoh, Hiroshi; Kasezawa, Tadashi; and Mizutani, Yoshiki, 4,789,890, Cl. 358-31.000.

Mller, Jens T.: See—  
J ns, Ebbe S.; M ller, Jens T.; and Nielsen, Kirsten K., 4,789,532, Cl. 423-240.000.

Moate, Peter D.; and Read, Patrick J., to Interlube Systems Limited. Lubrication pump with improved priming handle assembly. 4,789,312, Cl. 417-374.000.

Mobay Corporation: See—  
Dewhurst, John E.; and Harasin, Stephen J., 4,789,688, Cl. 521-110.000.

Mobbs, Christopher R. Drinking straw dispensers. 4,789,081, Cl. 221-281.000.

Mobil Oil Co.: See—  
Horodysky, Andrew G., 4,789,493, Cl. 252-51.50A.

Mobil Oil Corporation: See—  
Chen, Nai Y.; and McCullen, Sharon B., 4,789,656, Cl. 502-74.000.

Fischer, Ronald H.; Huang, Yun-Yang; LaPierre, Rene B.; and Varghese, Philip, 4,789,457, Cl. 208-68.000.

Haddad, James H.; Owen, Hartley; and Schatz, Klaus W., 4,789,458, Cl. 208-151.000.

Miller, David C.; and Pendleton, Thomas J., 4,789,078, Cl. 220-335.000.

Owen, Hartley; Daviduk, Nicholas; Marsh, Susan K.; and Wright, Bernard S., 4,789,528, Cl. 422-190.000.

Mochida, Isao; Fujiyama, Susumu; Sakai, Yukio; and Otsuka, Hiroyuki, to Mitsubishi Gas Chemical Co. Inc. Process for producing pitch used as starting material for the making of carbon materials. 4,789,455, Cl. 208-39.000.

Mochizuki, Syouzi: See—  
Fujimura, Shuzo; Kato, Yoshikazu; and Mochizuki, Syouzi, 4,789,427, Cl. 156-643.000.

Moffett, Mark B.: See—  
Powers, James M.; Moffett, Mark B.; and McGrath, John C., 4,789,971, Cl. 367-152.000.

Moloney, Richard, to American Tech Manufacturing, Inc. Pin grid array straightening method and apparatus. 4,789,011, Cl. 140-147.000.

Mondon, Martine: See—  
Gesson, Jean-Pierre; Mondon, Martine; Jacquesy, Jean-Claude; and Kraemer, Hans P., 4,789,665, Cl. 514-34.000.

Moneypenny, Mark J.: See—  
Cramer, Martin L.; and Moneypenny, Mark J., 4,789,048, Cl. 186-61.000.

Mongeau, Peter: See—  
Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, 4,789,859, Cl. 340-825.310.

Monnier, Charles E.; Eldin, Sameer H.; and Flury, Peter, to Ciba-Geigy Corporation. Multifunctional epoxide resins. 4,789,711, Cl. 525-507.000.

Monsanto Canada Inc.: See—  
Whiteley, Joseph D., 4,788,800, Cl. 52-1.000.

Monsanto Company: See—  
Lee, Len F.; Spear, Kerry L.; and Dolson, Mark G., 4,789,395, Cl. 71-94.000.

Monson, Clifford L.; Perry, Danny C.; Domay, Theodor; and Wilks, Henry A. Compact self-contained hand held extraction cleaner. 4,788,738, Cl. 15-320.000.

Montedipe S.p.A.: See—  
Cellini, Francesco; Gervasutti, Vittorio; Tancorra, Raffaele; and Tonti, Sergio, 4,789,741, Cl. 540-535.000.

Moody, Gillian M.: See—  
Field, John R.; Moody, Gillian M.; and Hunter, Trevor K., 4,789,485, Cl. 210-727.000.

Moosij, Joop N.: See—  
Bunk, Huig; Van Haastrecht, Gijsbertus C.; and Moosij, Joop N., 4,789,439, Cl. 204-28.000.

Morbeck, James A., to Miller Paint Equipment, Ltd. Disc-type apparatus for mixing paint cans. 4,789,245, Cl. 366-217.000.

Morduchowitz, Abraham; and Sammells, Anthony F., to Texaco Inc. Means for reducing oxalic acid to a product. 4,789,451, Cl. 204-275.000.

Morell, Joseph: See—  
Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, 4,788,781, Cl. 36-50.000.

Morflex Chemical Company, Inc.: See—  
Hull, Ezekiel H.; and Frappier, Edward P., 4,789,700, Cl. 524-310.000.

Mori, Kinji: See—  
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Kawano, Katsumi; Orimo, Masayuki; Kasashima, Hirokazu; and Nakai, Kozo, 4,789,986, Cl. 371-67.000.

Mori, Shinichi; Sakamoto, Keiji; Nakauchi, Hiroaki; Hamada, Akiyoshi; and Yoshida, Kazuyuki, to Minolta Camera Kabushiki Kaisha. Focusing device for use in optical apparatuses. 4,789,880, Cl. 355-55.000.

Morikawa, Minoru: See—  
Nakamura, Shigeyoshi; Kashimura, Tetsuo; Iizuka, Nobuyuki; Fukui, Yutaka; Morikawa, Minoru; and Kurosawa, Soichi, 4,789,412, Cl. 148-408.000.

Morimoto, Kiyoshi; Takagi, Toshinori; and Matsubara, Kakuei, to Futaba Denshi Kogyo Kabushiki Kaisha. Optical control element. 4,789,500, Cl. 252-584.000.

Morimoto, Takeshi; and Endoh, Eiji, to Asahi Glass Company Ltd. Highly durable cathode of low hydrogen overvoltage and method for manufacturing the same. 4,789,452, Cl. 204-290.00R.

Morimoto, Yuichi; Maruyama, Hiromi; Aoyama, Motoo; Zukeran, Atsushi; Bessho, Yasunori; Matsumoto, Tomoyuki; Ishii, Yoshihiko; Fujimura, Kouji; and Uchikawa, Sadao, to Hitachi Ltd. Fuel assembly and nuclear reactor. 4,789,520, Cl. 376-419.000.

Morimoto, Yutaka: See—  
Iida, Hideaki; Mamiya, Johji; and Morimoto, Yutaka, 4,789,954, Cl. 364-720.000.

Morimura, Yasuhiro; Fukuura, Yukio; Ishikawa, Hikaru; Tanuma, Itsuo; and Honda, Toshio, to Bridgestone Corporation. Vibration damping metal panels. 4,789,586, Cl. 428-216.000.

Morinaga Milk Industry Company Limited: See—  
Okonogi, Shigeo; Kawahara, Kunisuke; Oizumi, Saburo; Mizuguchi, Kenji; Koide, Osamu; and Shimada, Hiroshi, 4,789,556, Cl. 426-573.000.

Morinaga, Tsuto; Miura, Kin-ichiro; Shimotohno, Kunitada; Ikegami, Masato; and Ichikawa, Yataro, to Teijin Limited. Double-stranded DNA having sequences complementary to a single-stranded DNA and derived from mungbean yellow mosaic virus. 4,789,636, Cl. 435-320.000.

Morishita, Mitsuharu; and Kohge, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Motor-driven power steering system for a vehicle. 4,789,040, Cl. 180-142.000.

Morita, Akihiro: See—  
Ichikawa, Kenji; Sugimoto, Hiroyuki; Nakamura, Ryosuke; and Morita, Akihiro, 4,789,652, Cl. 501-127.000.

Morita, Kouichi: See—  
Arai, Kenji; Mito, Nobuaki; Morita, Kouichi; and Hirata, Naonori, 4,789,396, Cl. 71-94.000.

Morita, Kouji; and Aihara, Masahiro, to Nissan Motor Company, Limited. Rack and pinion steering gear. 4,788,878, Cl. 74-422.000.

Morita, Masaharu: See—  
Watanabe, Koji; Hayashi, Katsuhiko; Minakuchi, Nobuaki; Misaki, Masayuki; Terai, Kenichi; Nakama, Yasutoshi; and Morita, Masaharu, 4,790,014, Cl. 381-1.000.

Morita, Moritsugu; and Miyazaki, Kazuo, to Mitsui Toatsu Chemicals, Incorporated. Process for the correction of curls of flexible metal clad laminate and for the improvement of its dimensional stability. 4,788,846, Cl. 72-160.000.

Morita, Toyoo; and Akiyama, Hideki, to Yoshida Kogyo K. K. Method and apparatus for stacking elongated tape-like articles. 4,788,812, Cl. 53-447.000.

Moritani, Masahiko: See—  
Kato, Yasuyuki; Yuyama, Masahiro; Moritani, Masahiko; Matsura, Hideaki; Iijima, Susumu; and Hashimoto, Tsuyoshi, 4,789,709, Cl. 525-366.000.

Moriyasu, Katsuyuki: See—  
Nitta, Koichi; Kabuta, Kazuma; Yamaguchi, Masami; Nakagawa, Tadahi; and Moriyasu, Katsuyuki, 4,788,931, Cl. 118-503.000.

Morris, Donald E. Method and apparatus for injecting charged particles across a magnetic field. 4,789,839, Cl. 328-234.000.

Morris, John C.: See—  
Van Sickle, Dale E.; Morris, John C.; McCall, Marvin A.; Fleischer, Jean C.; and Walker, Ted R., Jr., 4,789,755, Cl. 560-78.000.

Morris, Stephen W.; and Lydick, Richard P., to GE Solid State Patents, Inc. Integrated circuit device having slanted peripheral circuits. 4,789,889, Cl. 357-68.000.

Morse, Ronald W.: See—  
Paul, Richard L.; and Morse, Ronald W., 4,789,360, Cl. 439-620.000.

Morton Thiokol, Inc.: See—  
Ellerstein, Stuart M.; and Lee, San A., 4,789,625, Cl. 430-372.000.

Rei, Nuno M.; and Gribens, Joel A., 4,789,692, Cl. 523-122.000.

Moser, Hans: See—  
Bohner, Beat; Pissiotas, Georg; and Moser, Hans, 4,789,394, Cl. 71-76.000.

Moteki, Eiji, to Fuji Electric Company Ltd. Method and apparatus for placing servo information at predetermined locations on a disc. 4,789,909, Cl. 360-78.140.

Motohashi, Tatsuro: See—  
Yamazaki, Toshihiko; Murase, Shoji; and Motohashi, Tatsuro, 4,789,398, Cl. 71-122.000.

Motomura, Noriyuki, to Toshiba Kikai Kabushiki Kaisha. Apparatus for supplying molten metal to die cast machines. 4,789,020, Cl. 164-147.100.

Mourey, Bruno: See—  
Le Pesant, Jean-Pierre; Hareng, Michel; and Mourey, Bruno, 4,789,228, Cl. 350-355.000.

MPB Corporation: See—  
Gordon, Keith M.; and Blair, Michael L., 4,788,758, Cl. 29-148.40R.

Mraek, Wilhelm. Enclosed wind device mechanism with eccentric rotor shaft. 4,789,297, Cl. 415-2.00R.

Mueller, Clifford F., to Schwinn Bicycle Company. Bicycle seat post clamp mechanism. 4,789,172, Cl. 280-281.00R.

Mueller, Michael: See—  
Leyrer, Reinhold J.; Wegner, Gerhard; and Mueller, Michael, 4,789,622, Cl. 430-286.000.

Muller, Heinz: See—  
Artzt, Peter; Egbers, Gerhard; Muller, Heinz; and Stark, Ullrich, 4,788,817, Cl. 57-263.000.

Muller-Lierheim, Wolfgang G. K.; and Beiter, Andreas H., to Dr. Muller-Lierheim KG Biologische Laboratorien. Carrier for the cultivation of human and/or animal cells in a fermenter. 4,789,634, Cl. 435-288.000.

Munch, Volker: See—  
Richter, Ludwig; Niederhofer, Karl H.; Kramer, Dieter; Sussner, Gerhard; Girscher, Wolfgang; Munch, Volker; Vial, Heinrich; Mayer, Helmut R.; and Reyher, Hayo, 4,790,007, Cl. 379-420.000.

Munguia, Richard. Combined chair and umbrella support structure. 4,789,200, Cl. 297-184.000.

Murai, Katsumi: See—  
Satoh, Isao; Kuroki, Yuzuru; Ichinose, Makoto; and Murai, Katsumi, 4,789,974, Cl. 369-45.000.

Murakami, Hisatoshi: See—  
Eguchi, Kazumasa; Nakatani, Fumio; Wakita, Shinichi; Murakami, Hisatoshi; and Terada, Tsunehiko, 4,789,411, Cl. 148-24.000.

Murakami, Susumu, to Sharp Kabushiki Kaisha. Copier for composite copying with automatic magnification adjusting means. 4,789,879, Cl. 355-14.00R.

Muramatsu, Hiroshi: See—  
Karube, Isao; and Muramatsu, Hiroshi, 4,789,804, Cl. 310-311.000.

Muranishi, Masaomi: See—  
Iwase, Yasuyuki; Akashi, Yoshiaki; and Muranishi, Masaomi, 4,789,261, Cl. 401-190.000.

Murasawa, Yasuhiro: See—  
Banjo, Toshinobu; Murasawa, Yasuhiro; and Onoda, Shigeo, 4,789,347, Cl. 439-140.000.

Murase, Shoji: See—  
Yamazaki, Toshihiko; Murase, Shoji; and Motohashi, Tatsuro, 4,789,398, Cl. 71-122.000.

Murata, Harumi: See—  
Hashimoto, Junji; Murata, Harumi; and Nishio, Hiroshi, 4,789,293, Cl. 414-273.000.

Murata Manufacturing Co., Ltd.: See—  
Nitta, Koichi; Kabuta, Kazuma; Yamaguchi, Masami; Nakagawa, Tadahi; and Moriyasu, Katsuyuki, 4,788,931, Cl. 118-503.000.

Sakamoto, Yukio; Tanabe, Takeshi; Hori, Toshio; Takeda, Masashi; and Iida, Mitsuhiko, 4,789,847, Cl. 333-185.000.

Murphy, Declan, to Atara Corporation. Air removal snorkel device. 4,789,503, Cl. 261-77.000.

Murphy, Patrick T.: See—  
Osborne, James C.; and Murphy, Patrick T., 4,789,301, Cl. 415-206.000.

Murray, Bruce: See—  
Brennand, Peter R.; and Murray, Bruce, 4,789,860, Cl. 340-825.510.

Murray, Bruce A.: See—  
Gregory, Thomas A.; Keller, Christopher G.; Kennedy, Bruce E.; Murray, Bruce A.; and Rothschild, Wayne J., 4,789,913, Cl. 360-97.030.

Murray, Rex E.: See—  
Billig, Ernst; Abatjoglou, Anthony G.; Bryant, David R.; Murray, Rex E.; and Maher, John M., 4,789,753, Cl. 558-85.000.

Muscato, Lawrence J., to Air Preheater Company, Inc., The. Low profile element basket assembly with integral lifting means. 4,789,024, Cl. 165-10.000.

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Abert, Christine; Beletes, Eggert; Carl, Gunter; Grosse, Steffen; Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi, Ralf; Jungto, Harry; Knak, Guenther; Kreisel, Lutz; Musil, Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner, 4,789,649, Cl. 501-3.000.

Musselman, Austin T.: See—  
Cutler, Royce L.; and Hohmann, Edward A., 4,789,932, Cl. 364-411.000.

Mustafa, Mehmet; Tweedy, Ernest P.; Stoddard, James C.; and Beriont, Walter J., to GTE Government Systems Corporation. System for synchronizing digital bit stream for telecommunication system. 4,789,895, Cl. 358-147.000.

Mutchler, Paul A., to Engineered Air Systems, Inc. Fuel supply system for heater. 4,788,963, Cl. 126-116.00A.

Mutolo, Francis V., to Thomson Industries, Inc. Linear motion bearing and shaft. 4,789,249, Cl. 384-43.000.

Myers, John E., to Torque Converter Rebuilding Systems. Test stand apparatus and method for testing a rebuilt torque converter. 4,788,857, Cl. 73-118.100.

Nagahamaya, Yuji: See—  
Kobayashi, Hiroshi; Nagahamaya, Yuji; Ueda, Kazuo; and Hibino, Ikuo, 4,789,260, Cl. 400-697.100.

Nagahiro, Kenichi: See—  
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaki, 4,788,946, Cl. 123-90.160.

Nagamori, Yukito: See—  
Nakagawa, Koji; and Nagamori, Yukito, 4,789,442, Cl. 204-73.00A.

Nagao, Akira: See—  
Mieno, Toshiyuki; Nakajima, Toyohi; Tanaka, Akira; and Nagao, Akira, 4,788,822, Cl. 60-602.000.

Nagao, Shigemitsu: See—  
Torii, Sigeru; Tanaka, Hideo; Ogata, Yuzuru; Sasaki, Michio; Saito, Norio; and Nagao, Shigemitsu, 4,789,740, Cl. 540-358.000.

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Nagashima, Akira, to Kioritz Corporation. Means for mounting carburetor on working machine with internal combustion engine. 4,788,951, Cl. 123-198.00E.

Nagashiro, Waichi: See—  
Fukke, Hajime; Akagi, Motoo; Kato, Yoshiki; and Nagashiro, Waichi, 4,789,581, Cl. 428-65.000.

Nagata, Atsushi; and Hashiba, Takahiro, to Toyoda Gosei Co., Ltd. Horn switch system of steering wheel. 4,789,763, Cl. 200-61.540.

Nagayama, Kuniaki, to Jeol Ltd. Three-dimensional NMR spectroscopy. 4,789,832, Cl. 324-312.000.

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Gustafson, Robert; and Nagle, David P., 4,789,304, Cl. 416-95.000.

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Yamada, Takashi; Nomura, Masaaki; Yamamoto, Ryoichi; and Nahara, Akira, 4,789,606, Cl. 428-694.000.

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Sato, Kozo; and Naito, Hideki, 4,789,623, Cl. 430-351.000.

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Nakagawa, Tadahi: See—  
Nitta, Koichi; Kabuta, Kazuma; Yamaguchi, Masami; Nakagawa, Tadahi; and Moriyasu, Katsuyuki, 4,788,931, Cl. 118-503.000.

Nakai, Kozo: See—  
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Kawano, Katsumi; Orimo, Masayuki; Kasashima, Hirokazu; and Nakai, Kozo, 4,789,986, Cl. 371-67.000.

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Kobayashi, Osamu; Hayashi, Hiroshi; and Nakajima, Kenji, 4,789,079, Cl. 221-232.000.

Nakajima, Ryoichi: See—  
Teuchitani, Masatoshi; Naito, Sakae; and Nakajima, Ryoichi, 4,789,456, Cl. 208-39.000.

Nakajima, Toyohi; Okada, Yasushi; Mieno, Toshiyuki; and Oono, Nobuyuki, to Honda Giken Kogyo Kabushiki Kaisha. Method of air/fuel ratio control for internal combustion engine. 4,788,958, Cl. 123-489.000.

Nakajima, Toyohi: See—  
Mieno, Toshiyuki; Nakajima, Toyohi; Tanaka, Akira; and Nagao, Akira, 4,788,822, Cl. 60-602.000.

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Watanabe, Koji; Hayashi, Katsuhiko; Minakuchi, Nobuaki; Misaki, Masayuki; Terai, Kenichi; Nakama, Yasutoshi; and Morita, Masaharu, 4,790,014, Cl. 381-1.000.

Nakamura, Eitaro; and Hata, Kotaro, to Nippon Zeon Co., Ltd. Magnetic recording medium. 4,789,599, Cl. 428-411.000.

Nakamura, Ichiro: See—  
Akasaka, Yoshimichi; Nakamura, Ichiro; Ichiryu, Ken; Kometani, Eiji; and Gotoh, Yasuharu, 4,788,902, Cl. 91-486.000.

Nakamura, Issei; and Itozawa, Kenji, to Konishiroku Photo Industry Co., Ltd. Magnetic recording medium. 4,789,591, Cl. 428-328.000.

Nakamura, Kenichi, to Canon Kabushiki Kaisha. Device for controlling a motor for rotating a magnetic disc. 4,789,812, Cl. 318-567.000.

Nakamura, Ryosuke: See—  
Ichikawa, Kenji; Sugimoto, Hiroyuki; Nakamura, Ryosuke; and Morita, Akihiro, 4,789,652, Cl. 501-127.000.

Nakamura, Shigeyoshi; Kashimura, Tetsuo; Iizuka, Nobuyuki; Fukui, Yutaka; Morikawa, Minoru; and Kurosawa, Soichi, to Hitachi, Ltd.



Cobalt-base alloy having high strength and high toughness, production process of the same, and gas turbine nozzle. 4,789,412, Cl. 148-408.000.

Nakano, Keisuke: See—  
Ikeda, Takeshi; Handa, Hideo; and Nakano, Keisuke, 4,789,509, Cl. 264-29.000.

Nakashima, Toshitaka: See—  
Ueno, Ryuzo; Kanayama, Tatsuo; Nakashima, Toshitaka; Itami; Tomiyasu, Kunihiko; and Matsuda, Toshio, 4,789,497, Cl. 252-194.000.

Nakatani, Fumio: See—  
Eguchi, Kazumasa; Nakatani, Fumio; Wakita, Shinichi; Murakami, Hisatoshi; and Terada, Tsunehiko, 4,789,411, Cl. 148-24.000.

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Mori, Shinichi; Sakamoto, Keijiro; Nakauchi, Hiroaki; Hamada, Akiyoshi; and Yoshida, Kazuyuki, 4,789,880, Cl. 355-55.000.

Nalbone, Robert D., to American Telephone and Telegraph Company AT&T Information Systems. Implied principal busy status indicator for covered calls. 4,790,004, Cl. 379-214.000.

Nambu, Yutaka; Sugawara, Hitosi; and Saitoh, Yasuo, to Japan Tobacco, Inc. Process for the temperature control of a drying apparatus for tobacco leaves. 4,788,989, Cl. 131-303.000.

Namiwa, Kimiyoshi: See—  
Katsumata, Shigeru; Handa, Takuro; Kamakura, Tamiji; Tanaka, Noriyo; Katoh, Hidekatsu; Namiwa, Kimiyoshi; and Shoji, Yoshikazu, 4,789,492, Cl. 252-32.70E.

Napco Industries, Inc.: See—  
White, Bernard C., 4,788,785, Cl. 42-72.000.

Narasimhan, Kalathur S. V. L.; and Ma, Bao-Min, to Crucible Materials Corporation. Permanent magnet alloy. 4,789,521, Cl. 420-83.000.

Narda Microwave Corporation, The: See—  
Aalan, Edward E., 4,789,869, Cl. 343-801.000.

Naruse, Kazuo: See—  
Tobita, Hideaki; Naruse, Kazuo; and Yajima, Shigeru, 4,789,768, Cl. 219-78.010.

National Business Systems, Inc.: See—  
LaManna, Richard J.; Hinton, James L.; and Cucksey, Edward L., 4,789,420, Cl. 156-540.000.

National Research Development Corporation: See—  
Elliott, Michael; Jones, Norman F.; Elliott, Richard L.; Khambay, Bhupinder P. S.; and Fulman, David A., 4,789,754, Cl. 558-388.000.

Klinner, Wilfred E.; and Goff, Anthony J., 4,788,901, Cl. 100-188.00R.

National Semiconductor Corp.: See—  
Miller, William E., 4,789,917, Cl. 361-56.000.

Naumann, Karin: See—  
Abert, Christine; Beileite, Eggert; Carl, Gunter; Grosse, Steffen; Gudziol, Hilmar; Hoeland, Wolfram; Hopp, Michael; Jacobi, Ralf; Jungto, Harry; Knak, Guenther; Kreisel, Lutz; Musil, Rudolf; Naumann, Karin; Vogel, Frank; and Vogel, Werner, 4,789,649, Cl. 501-3.000.

Naville, Charles, to Compagnie Generale de Geophysique. Method of measuring the anisotropy of propagation or reflection of a transverse wave, particularly a method of geophysical prospecting by measurement of the anisotropy of propagation or of reflection of shear waves in rocks. 4,789,969, Cl. 367-36.000.

Naxera, Jiri. Composite transistor device with over-current protection. 4,789,842, Cl. 350-298.000.

Nayak, P. N., to VXR, Inc. Devices for carrying out ligand/anti-ligand assays, methods of using such devices and diagnostic reagents and kits incorporating such devices. 4,789,628, Cl. 435-7.000.

NCR Corporation: See—  
Cramer, Martin L.; and Moneypenny, Mark J., 4,789,048, Cl. 186-61.000.

Kallin, Fredrik L. N., 4,789,151, Cl. 271-274.000.

McClain, Herbert D.; and Ferrante, Ronald A., 4,789,775, Cl. 235-470.000.

Ray, Brian E.; Lant, Victoria M.; and Phillips, Robert W., 4,789,149, Cl. 271-215.000.

NDC Company, Ltd.: See—  
Fujita, Masahito; Ohgawara, Akira; Sakai, Takeshi; Ohgaki, Toshinaga; and Ohsaki, Tsuyoshi, 4,789,607, Cl. 428-653.000.

NEC Corporation: See—  
Kage, Kouzou, 4,790,013, Cl. 380-48.000.

Noguchi, Masahiko; and Tsuda, Kiyoshi, 4,789,148, Cl. 271-94.000.

Ryu, Toshihiko, 4,789,993, Cl. 375-4.000.

Negre, Guy. Process and apparatus for controlling a gas evacuation circuit of a rotational distribution motor. 4,788,945, Cl. 123-80.0BA.

Neil Enterprises, Inc.: See—  
Fine, Neil H., 4,789,073, Cl. 215-13.100.

Neirnick, Rudi D.: See—  
Canning, Lewis R.; Nowotnik, David P.; Neirnick, Rudi D.; and Piper, Ian M., 4,789,736, Cl. 534-14.000.

Nelson, Bertel S.; and Danforth, William R., deceased (Danforth, executor, by Nelson). Differential clutch. 4,788,874, Cl. 74-142.000.

Nelson, Carl T., to Linear Technology Corporation. Breakpoint compensation and thermal limit circuit. 4,789,819, Cl. 323-314.000.

Nelson, Edmund A.; Colvin, Arthur E.; Hanley, Matthew W.; and Scott, Stephen C., to Steeltin Can Corporation. Probe for sensing temperature and/or pressure. 4,788,871, Cl. 73-866.500.

Nelson, Marvin D.: See—  
Bohan, John E., Jr.; Erdman, John L.; Nelson, Marvin D.; and Ratz, James W., 4,789,329, Cl. 431-46.000.

Nelson, Ralph; and Schlink, Gerald, to Midcon Labs, Inc. Co-vaccination using non-O-carbohydrate side-chain gram-negative bacteria preparation. 4,789,544, Cl. 424-92.000.

Nemesi, Stephen A.; and Klimczak, William J., to Venturedyne, Ltd. Dust collector. 4,789,387, Cl. 55-96.000.

Neochem Polymers Inc.: See—  
Altounian, Georges N., 4,789,719, Cl. 528-73.000.

Nerrinck, Bernard: See—  
Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, 4,788,781, Cl. 36-50.000.

Nesbitt, Russell U.: See—  
Song, Suk-Zu; Mehta, Surendra C.; Rashidbaigi, Zahra A.; Nesbitt, Russell U.; and Fawzi, Mahdi B., 4,789,347, Cl. 424-449.000.

Neumann, Peter; Wegerle, Dieter; and Krallmann, Reinhold, to BASF Aktiengesellschaft. Benzophenone ether esters and use thereof to improve the light fastness of polyester dyes. 4,789,382, Cl. 8-442.000.

New York Blood Center, Inc.: See—  
Woods, Kenneth R.; and Orme, Thomas W., 4,789,545, Cl. 424-101.000.

Newton, James R.: See—  
Brink, Loren S.; and Newton, James R., 4,788,983, Cl. 128-734.000.

Neyrinck, Mark S.: See—  
Warner, Larry W.; and Neyrinck, Mark S., 4,789,163, Cl. 273-336.000.

Nezu, Tuguo: See—  
Matoba, Takao; Iwase, Osamu; Nezu, Tuguo; and Sugiura, Shinji, 4,789,568, Cl. 427-412.100.

Nguyen, Phong T.; Keith, Charles L.; and McCauley, Jerry L., to Structural Instrumentation, Inc. Axle weight distribution controller. 4,789,038, Cl. 180-24.020.

Nguyen, Tuyen T.: See—  
Jablonec, Harold; and Nguyen, Tuyen T., 4,789,722, Cl. 528-172.000.

Nichirei Corporation: See—  
Mizutani, Junichi; and Arita, Hiroyuki, 4,788,907, Cl. 99-517.000.

Nickel, Bernd, to Siemens Aktiengesellschaft. Apparatus for measuring the locational and attitudinal change of a rigid body in space. 4,788,987, Cl. 128-777.000.

Nickisch, Klaus; Laurent, Henry; Bittler, Dieter; Wiechert, Rudolf; and Losert, Wolfgang, to Schering Aktiengesellschaft. 1 $\alpha$ ,7 $\alpha$ -dithio-substituted spiroacetones, processes for their preparation, and their use as medicines. 4,789,668, Cl. 514-173.000.

Niederhofer, Karl H.: See—  
Richter, Ludwig; Niederhofer, Karl H.; Kramer, Dieter; Sussner, Gerhard; Girscher, Wolfgang; Munch, Volker; Vial, Heinrich; Mayer, Helmut R.; and Reyher, Hayo, 4,790,007, Cl. 379-420.000.

Niehaus, Jeffrey A.; and Engle, Jesse O., to Texas Instruments Incorporated. Status output for a bit slice ALU. 4,789,957, Cl. 364-749.000.

Nielinger, Werner: See—  
Bonten, Heinz; Nielinger, Werner; Michael, Dietrich; Selbeck, Harald; and Meyer, Rolf-Volker, 4,789,698, Cl. 524-100.000.

Nielsen, Kirsten K.: See—  
Jensen, Ebbe S.; Moller, Jens T.; and Nielsen, Kirsten K., 4,789,532, Cl. 423-240.000.

Nieschwitz, Paul-Josef: See—  
Kopp, Reiner; Baldner, Klaus-Rainer; and Nieschwitz, Paul-Josef, 4,788,842, Cl. 72-45.000.

Nijima, Hironobu, to Advantest Corporation. Method and apparatus for charged particle beam exposure. 4,789,945, Cl. 364-490.000.

Nijmolen, Gerrit W.; and Bloechi, Franz, to Siemens Aktiengesellschaft. Method for electrically simulating a cradle switch and a hands free talking-loudspeaking key in a hands free talking-loudspeaking telephone station. 4,790,006, Cl. 379-388.000.

Nikon Corporation: See—  
Takagi, Shuhei; Uehara, Makoto; and Matsumoto, Koichi, 4,789,242, Cl. 356-375.000.

Wakabayashi, Hiroshi; Tsukahara, Daiki; Katayama, Akira; Machida, Kiyosada; Kazami, Kazuyuki; Katano, Yuji; Terunuma, Hiroshi; and Higuchi, Mitsuru, 4,789,875, Cl. 354-195.100.

Niksa, Andrew J.: See—  
Niksa, Marilyn J.; Pohto, Gerald R.; Lakatos, Leslie K.; Wheeler, Douglas J.; Solomon, Frank; Niksa, Andrew J.; Schue, Thomas J.; Genodman, Yuri; Turk, Thomas R.; and Hagel, Daniel P., 4,788,764, Cl. 29-731.000.

Niksa, Marilyn J.; Pohto, Gerald R.; Lakatos, Leslie K.; Wheeler, Douglas J.; Solomon, Frank; Niksa, Andrew J.; Schue, Thomas J.; Genodman, Yuri; Turk, Thomas R.; and Hagel, Daniel P., to Eltech Systems Corporation. Method of making a unitized electrode assembly. 4,788,764, Cl. 29-731.000.

Ninomiya, Katsuaki: See—  
Akashi, Naotomo; Yokokawa, Takeshi; Ninomiya, Katsuaki; Shima, Harumi; and Horiguchi, Takeshi, 4,789,814, Cl. 318-77.000.

Nippon Coinco Co., Ltd.: See—  
Kobayashi, Osamu; Hayashi, Hiroshi; and Nakajima, Kenji, 4,789,079, Cl. 221-232.000.

Nippon Gakki Seizo Kabushiki Kaisha: See—  
Fujishima, Masakazu, 4,789,976, Cl. 369-54.000.

Uchiyama, Yasuji; and Suzuki, Shigeru, 4,788,896, Cl. 84-1.010.

Nippon Oil Co. Ltd.: See—  
Saito, Naohide; Tamura, Junichi; Kurosawa, Masaji; and Terada, Isao, 4,789,585, Cl. 428-185.000.

Nippon Paint Co., Ltd.: See—  
Nishimura, Tsutomu; Saito, Yasuo; Shindo, Kenji; and Abe, Kazutoshi, 4,789,707, Cl. 525-157.000.

Nippon Seiko Kabushiki Kaisha: See—  
Saito, Hiroyuki, 4,789,184, Cl. 280-804.000.

Nippon Sheet Glass Co., Ltd.: See—  
Akashi, Naotomo; Yokokawa, Takeshi; Ninomiya, Katsuaki; Shima, Harumi; and Horiguchi, Takeshi, 4,789,814, Cl. 318-77.000.

Peppers, Norman A.; Young, James R.; and Pierce, Gerald A., 4,790,024, Cl. 382-32.000.

Nippon Wiper Blade Co., Ltd.: See—  
Arai, Masaru; and Saita, Itsuro, 4,788,736, Cl. 15-250.420.

Nippon Zeon Co., Ltd.: See—  
Nakamura, Eitaro; and Hata, Kotaro, 4,789,599, Cl. 428-411.100.

Nippondenso Co., Ltd.: See—  
Maehata, Hiromi; Okuda, Yutaka; Masaki, Shoichi; Asami, Ken; and Sakai, Kazunori, 4,789,938, Cl. 364-426.020.

Nirschl, Donald A.: See—  
Stern, Theodore G.; Cornwall, Mickey; and Nirschl, Donald A., 4,789,989, Cl. 350-96.180.

Nishibata, Katsuji; Takano, Hiroshi; Itai, Masaru; and Shimote, Tsugutaka, to Teijin Limited. Oxygen enriching apparatus. 4,789,388, Cl. 55-158.000.

Nishikawa, Kohei: See—  
Meguro, Kanji; and Nishikawa, Kohei, 4,789,675, Cl. 514-229.800.

Nishimura, Hiroshi, to Hitachi Medical Corp. Method for correcting position deviation due to static magnetic field change in NMR imaging device. 4,789,833, Cl. 324-320.000.

Nishimura, Hiroshi; and Miyazaki, Osamu, to Hitachi Medical Corporation. CT system for spirally scanning subject on a movable bed synchronized to X-ray tube revolution. 4,789,929, Cl. 364-413.150.

Nishimura, Sanji: See—  
Watanabe, Morio; Nishimura, Sanji; and Watanabe, Nobuatsu, 4,789,444, Cl. 204-107.000.

Nishimura, Toshifumi: See—  
Iiyama, Akihiro; and Nishimura, Toshifumi, 4,788,959, Cl. 123-503.000.

Nishimura, Tsutomu; Saito, Yasuo; Shindo, Kenji; and Abe, Kazutoshi, to Mitsui-Cyanamid Ltd.; and Nippon Paint Co., Ltd. Coating resin composition with high number of imino groups. 4,789,707, Cl. 525-157.000.

Nishio, Hiroshi: See—  
Hashimoto, Junji; Murata, Harumi; and Nishio, Hiroshi, 4,789,293, Cl. 414-273.000.

Niskanen, Heikki: See—  
Kyytonen, Markku; Pihlajamaa, Raimo; Fabritius, Kai; Niskanen, Heikki; and Uotinen, Jaakko, 4,789,109, Cl. 242-56.00R.

Nissan Motor Co., Ltd.: See—  
Hayashi, Yoshimasa, 4,788,943, Cl. 123-41.270.

Iiyama, Akihiro; and Nishimura, Toshifumi, 4,788,959, Cl. 123-503.000.

Morita, Kouji; and Aihara, Masahiro, 4,788,878, Cl. 74-422.000.

Nitta, Koichi; Kabuta, Kazuma; Yamaguchi, Masami; Nakagawa, Tadashi; and Moriyasu, Katsuyuki, to Murata Manufacturing Co., Ltd. Tool for forming external electrodes of chip parts. 4,788,931, Cl. 118-503.000.

Nitto Kohki Co., Ltd.: See—  
Shoji, Michihiro; and Mikiya, Toshio, 4,789,274, Cl. 408-11.000.

Nixdorf Computer AG: See—  
Le, Thanh-Son, 4,789,287, Cl. 411-107.000.

NL Chemicals, Inc.: See—  
Williams, Roy C., 4,789,706, Cl. 525-107.000.

Noble, Ralph A.: See—  
Gupta, Veda; Hager, Jerome E.; and Noble, Ralph A., 4,789,597, Cl. 428-467.000.

Nocera, Paula K.; and Hopp, Bernd P. Hair piece. 4,788,991, Cl. 132-156.000.

Noe, Renato R., to Public Service Electric & Gas Company. Closure apparatus for a high pressure vessel. 4,789,077, Cl. 220-319.000.

Noguchi, Masahiko; and Tsuda, Kiyoshi, to NEC Corporation. Aligning-and-feeding apparatus for flat articles. 4,789,148, Cl. 271-94.000.

Noll, Klaus; Pedain, Josef; and Schonfelder, Manfred, to Bayer Aktiengesellschaft. Polyurethanes soluble or dissolved in aromatic hydrocarbons, a process for their preparation and their use. 4,789,718, Cl. 528-49.000.

Noma Inc.: See—  
Maddock, William H., 4,789,570, Cl. 428-8.000.

Nomura, Hiroshi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Device for driving a lens unit having a tripod mount. 4,789,225, Cl. 350-255.000.

Nomura, Masaaki: See—  
Yamada, Takashi; Nomura, Masaaki; Yamamoto, Ryoichi; and Nahara, Akira, 4,789,606, Cl. 428-694.000.

Nordica SPA: See—  
Pozzobon, Adolfo; Balbinot, Renzo; and Perotto, Riccardo, 4,788,782, Cl. 36-119.000.

Nordlund, Tore H., to Purac AB. Arrangement for charging granular or pulp-like material to a container in which the material is processed. 4,789,477, Cl. 210-520.000.

North American Philips Corporation: See—  
Mayo, William T., Jr., 4,789,831, Cl. 324-309.000.

North American Philips Corporation, Signetics Division Company: See—  
Davis, Mark A., 4,789,646, Cl. 437-141.000.

Northern Telecom Limited: See—  
Anderson, John C.; and Goodwin, John C., 4,789,215, Cl. 350-96.190.

Baxter, Gordon D., 4,789,589, Cl. 428-317.500.

Nowack, Gerhard P.: See—  
Johnson, Marvin M.; Cymbaluk, Ted H.; and Nowack, Gerhard P., 4,789,530, Cl. 423-226.000.

Nowotnik, David P.: See—  
Canning, Lewis R.; Nowotnik, David P.; Neirnick, Rudi D.; and Piper, Ian M., 4,789,736, Cl. 534-14.000.

Nu Aire, Inc.: See—  
Peters, Max D., 4,788,939, Cl. 119-17.000.

Numaguchi, Tohru: See—  
Fujita, Yuichi; Kaneko, Takayuki; Okada, Mitsuo; Shima, Kazumi; Yanaru, Hideaki; and Numaguchi, Tohru, 4,789,132, Cl. 251-129.110.

Numata, Keiichi: See—  
Oka, Masahisa; Numata, Keiichi; and Konishi, Masataka, 4,789,731, Cl. 530-317.000.

Nunberg, Bennett. Computerized vehicle classification system. 4,789,941, Cl. 364-436.000.

Nunberg, Jack H., to Cetus Corporation. Feline leukemia virus vaccine. 4,789,702, Cl. 530-324.000.

Nussbaumer, Erwin; Gross, Rainer; Botzmann, Herbert; Haller, Hans; and Buchwald, Franz, to Daimler-Benz Aktiengesellschaft. Planetary transmission for two axles of a motor vehicle. 4,788,886, Cl. 74-665.00T.

O&K Orenstein & Koppel Aktiengesellschaft: See—  
Zenglein, Egon, 4,789,182, Cl. 280-725.000.

Ober, Christopher K.: See—  
Croucher, Melvin D.; Wong, Raymond W.; Ober, Christopher K.; and Hair, Michael L., 4,789,616, Cl. 430-137.000.

Occidental Chemical Corporation: See—  
Ying, Wei-chi; and Bonk, Robert R., 4,789,484, Cl. 210-721.000.

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Oehler AG: See—  
Hermann, Walter, 4,789,419, Cl. 156-499.000.

Oehlerich, Joerg: See—  
Hanselka, Peter; and Oehlerich, Joerg, 4,790,005, Cl. 379-244.000.

Ogata, Yasuji, to Olympus Optical Co., Ltd. Zoom lens system. 4,789,226, Cl. 350-427.000.

Ogata, Yasuyuki; Ono, Hidetsugu; and Yamanaka, Seiji, to Mitsubishi Mining and Cement Co., Ltd. Method for production of ceramic composition. 4,789,653, Cl. 501-134.000.

Ogata, Yuzuru: See—  
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Ogiro, Kenji: See—  
Masuda, Kenmei; Terada, Toshimichi; Ogiro, Kenji; Yokoo, Shozo; and Uchiyama, Osamu, 4,789,912, Cl. 360-85.000.

Ogren, Sven O.: See—  
Florvall, Gosta L.; Lundstrom, Jan O. G.; Ramsby, Sten I.; and Ogren, Sven O., 4,789,683, Cl. 514-428.000.

Ohara, Yuji, to Fuji Photo Film Co., Ltd. Radiation image recording and reproducing system. 4,789,782, Cl. 250-327.200.

Ohashi, Kaoru: See—  
Buma, Shuichi; Onuma, Toshio; Ohashi, Kaoru; and Ito, Masami, 4,789,935, Cl. 364-424.050.

Ohe, Junzo; and Kondo, Hiroshi, to Toyota Jidosha Kabushiki Kaisha. Automobile antenna system. 4,789,866, Cl. 343-712.000.

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Ohi Seisakusho Co., Ltd.: See—  
Kobayashi, Fumio; Sakai, Kunio; and Yamagashi, Jun, 4,789,815, Cl. 318-135.000.

Ohmatoi, Naoyuki. Three-electrode sensor for phase comparison and pulse phase adjusting circuit for use with the sensor. 4,789,822, Cl. 324-60.00R.

Ohmori, Susumu; Yagi, Akira; and Takase, Satoshi, to Toyo Boseki Kabushiki Kaisha. Electretized material for a dust filter. 4,789,504, Cl. 264-22.000.

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Arahara, Koza; Ohnishi, Toshikazu; and Fukumoto, Hiroshi, 4,789,617, Cl. 430-137.000.

Ohno, Atsumi. Process for continuous casting of metal ribbon. 4,789,022, Cl. 164-463.000.

Oho, Hiroshi. Nail clipper with guard means. 4,788,768, Cl. 30-28.000.

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Ohsawa, Yutaka: See—  
Takami, Satoshi; and Ohsawa, Yutaka, 4,789,777, Cl. 250-214.00A.

Ohta, Akira, to Fuji Xerox Co., Ltd. F- $\theta$  Lens for use in a light beam scanning device. 4,789,230, Cl. 350-480.000.

Ohta, Masami: See—  
Yokoi, Shinji; Naitoh, Kimitaka; and Ohta, Masami, 4,788,731, Cl. 5-478.000.



Ohtani, Shoji; Takemura, Kazunari; Sato, Yukiya; and Tsushima, Rikio, to Kao Corporation. Electrostatic image developing toner with high dielectric material. 4,789,613, Cl. 430-110.000.

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Kitagawa, Masaki; Ohtomo, Akira; and Fujimoto, Teruo, 4,789,781, Cl. 250-310.000.

Oishi, Kengo, to Fuji Photo Film Co., Ltd. Magnetic disk cartridge. 4,789,916, Cl. 360-133.000.

Oishi, Kengo: See—  
Katagiri, Shingo; and Oishi, Kengo, 4,789,113, Cl. 242-198.000.

Oizumi, Saburo: See—  
Okonogi, Shigeo; Kawahara, Kunisuke; Oizumi, Saburo; Mizuguchi, Kenji; Koide, Osamu; and Shimada, Hiroshi, 4,789,556, Cl. 426-573.000.

Oka, Masahisa; Numata, Keiichi; and Konishi, Masataka, to Bristol-Myers Company. Semi-synthetic peptide antibiotics. 4,789,731, Cl. 530-317.000.

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Nakajima, Toyohi; Okada, Yasushi; Mieno, Toshiyuki; and Oono, Nobuyuki, 4,788,958, Cl. 123-489.000.

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Okoshi, Noboru: See—  
Kase, Mitsuo; Okoshi, Noboru; and Tsuyuzaki, Kazuo, 4,789,705, Cl. 524-590.000.

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Okumura, Junji, to Aisin Seiki Kabushiki Kaisha. Door check for automobiles. 4,788,743, Cl. 16-82.000.

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Brault, Francois, 4,788,851, Cl. 73-49.200.

Oldham, David M., to International Business Machines Corporation. Selectively controlling the erasure in a magneto-optic recording medium. 4,789,972, Cl. 369-13.000.

Olin Corporation: See—  
Polan, Ned W., 4,789,438, Cl. 204-13.000.

Oliver, Betty H. Fabric fashion accessory. 4,788,722, Cl. 2-207.000.

Olivieri, Oliviero, to Icaro Olivieri & C. SpA. Tread for the soles of long-distance ski boots. 4,789,178, Cl. 280-615.000.

Olson, Jeffrey A.: See—  
Holt, James L.; and Olson, Jeffrey A., 4,789,362, Cl. 440-2.000.

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Nagasaki, Tatsuo; Taguchi, Koji; Imade, Shinichi; Ikuta, Eishi; and Shionoya, Kazunori, 4,788,981, Cl. 128-660.070.

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Ogata, Yasujiro, 4,788,967, Cl. 128-6.000.

Yamanashi, Takao, 4,789,229, Cl. 350-427.000.

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Omata, Takashi: See—  
Ota, Masakazu; and Omata, Takashi, 4,789,222, Cl. 350-167.000.

Onishi, Koichi; Ouchi, Yoshifusa; Suganuma, Takashi; Utsumi, Atsushi; and Kuroiwa, Takao, to Mitsubishi Cable Industries, Ltd.; and Doryokuro Kakuneryo Kaihatsu Jigyodan. Emission spectroscopic analyzer. 4,789,239, Cl. 356-316.000.

Onitsuka, Hatsuaki; and Karasawa, Nobuyoshi, to Asahi Kasei Kogyo Kabushiki Kaisha. Packing for chromatography. 4,789,479, Cl. 210-635.000.

Ono, Hidetsugu: See—  
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Byers, Frank L., 4,789,118, Cl. 244-158.00R.

Orchard, Owen J., to Beta Instruments Co., Ltd. Apparatus for tension control of a flexible material during winding or unwinding from a drum or reel. 4,789,813, Cl. 318-6.000.

Orimo, Masayuki: See—  
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Kawano, Katsumi; Orimo, Masayuki; Kasahima, Hirokazu; and Nakai, Koza, 4,789,986, Cl. 371-67.000.

Orme, Thomas W.: See—  
Woods, Kenneth R.; and Orme, Thomas W., 4,789,545, Cl. 424-101.000.

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Stroud, John R.; and Ornellas, Donald L., 4,788,913, Cl. 102-202.500.

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de Nora, Oronzio; and Spaziant, Placido M., 4,789,443, Cl. 204-98.000.

Orth, Wilhelm: See—  
Reymann, Wolfgang; and Orth, Wilhelm, 4,789,010, Cl. 140-111.000.

Osberg, Hans. Process for the preparation of chloramine. 4,789,539, Cl. 423-413.000.

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Revis, Nathaniel W.; Osborne, Tanya R.; and Hadden, Charles T., 4,789,478, Cl. 210-611.000.

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Winkler, Gary A.; and Hustad, Gerald O., 4,789,558, Cl. 426-639.000.

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Osman, Robert M.; and Shulik, Larry J., to Exxon Research & Engineering Co. Catalytic gas synthesis apparatus. 4,789,527, Cl. 422-148.000.

Oswald, John A., to Saft America, Inc. Pressure venting device. 4,789,608, Cl. 429-56.000.

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Otobe, Atsumu: See—  
Komoda, Norio; and Otobe, Atsumu, 4,788,892, Cl. 74-866.000.

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Mochida, Isao; Fujiyama, Susumu; Sakai, Yukio; and Otsuka, Hiroyuki, 4,789,455, Cl. 208-39.000.

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Ottenstein, Sidney A., to Innovative Controls, Inc. Photocell temperature switch for high intensity discharge lamp fixture. 4,789,810, Cl. 315-308.000.

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Onishi, Koichi; Ouchi, Yoshifusa; Suganuma, Takashi; Utsumi, Atsushi; and Kuroiwa, Takao, 4,789,239, Cl. 356-316.000.

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Hale, Gordon B.; Friddle, Donald J.; and McBride, Edward D., 4,789,366, Cl. 440-75.000.

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Wood, Le Roy T., 4,788,955, Cl. 123-413.000.

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Kyytonen, Markku; Pihlajamaa, Raimo; Fabritius, Kai; Niskanen, Heikki; and Uotinen, Jaakko, 4,789,109, Cl. 242-56.00R.

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Ozeki, Masayoshi, to Hitachi, Ltd. Device for editing document in colors. 4,789,855, Cl. 340-703.000.

P.C.E. Corp.: See—  
Cloeren, Peter F., 4,789,513, Cl. 264-171.000.

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Berkers, Ansva, 4,788,900, Cl. 100-88.000.

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Allan, William W., 4,789,291, Cl. 414-128.000.

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Baker, Josefina T.; Pagano, Joseph F.; and Schoengold, Ronald J., 4,789,629, Cl. 435-7.000.

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Matkovich, Vlado L., 4,789,526, Cl. 422-101.000.

Palma, Jean-Pierre: See—  
Eberhard, Patrick; Mindt, Wolfgang; and Palma, Jean-Pierre, 4,789,453, Cl. 204-412.000.

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Krause, Walter O.; and Davis, Peter J., 4,788,929, Cl. 116-276.000.

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Parmer, Jerome F., to General Dynamics Corp./Space Systems Division. Thermal contraction conductor joint. 4,789,349, Cl. 439-161.000.

Parrent, George B., Jr.; Zeiders, Glenn W.; Reilly, James P.; and Khazen, Antonio, to Hercules Incorporated. Apparatus and method for sensing multiple parameters of sheet material. 4,789,820, Cl. 324-58.50R.

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Tutas, Edward P.; and Passehl, Donald J., 4,789,579, Cl. 428-41.000.

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Paterson, Robert W.; Werle, Michael J.; and Presz, Walter M., Jr., to United Technologies Corporation. Bodies with reduced base drag. 4,789,117, Cl. 244-130.000.

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Codos, Richard N., 4,788,921, Cl. 112-118.000.

Patrick, William J.: See—  
Chow, Melanie M.; Cronin, John E.; Guthrie, William L.; Kaanta, Carter W.; Luther, Barbara; Patrick, William J.; Perry, Kathleen A.; and Standley, Charles L., 4,789,648, Cl. 437-225.000.

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Flanigan, Edith M.; Lesch, David A.; Lok, Brent M. T.; Patton, Robert L.; and Wilson, Stephen T., 4,789,535, Cl. 423-306.000.

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Crawford, Fred, 4,789,283, Cl. 411-43.000.

Pecoraro, George A.: See—  
Kunkle, Gerald E.; Pecoraro, George A.; and Demarest, Henry M., Jr., 4,789,390, Cl. 65-27.000.

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Noll, Klaus; Pedain, Josef; and Schonfelder, Manfred, 4,789,718, Cl. 528-49.000.

Pedersen, Richard A.: See—  
Carelli, John A.; Pedersen, Richard A.; and Pritchett, Robert L., 4,789,825, Cl. 324-158.00T.

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Holder, E. Paul; Klaessig, Frederick C.; Peerce-Landers, Pamela J.; and Reichgott, David W., 4,789,406, Cl. 134-3.000.

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Zell, Karl; Seidel, Peter; and Pelzl, Leo, 4,789,358, Cl. 439-607.000.

Penas, Paul J. Pocketed mail bag. 4,789,248, Cl. 383-38.000.

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Miller, David C.; and Pendleton, Thomas J., 4,789,078, Cl. 220-335.000.

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Monson, Clifford L.; Perry, Danny C.; Domay, Theodor; and Wilka, Henry A., 4,788,738, Cl. 15-320.000.

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Barnette, William E.; Dean, Thomas R.; Petersen, Wallace C.; and Wexler, Barry A., 4,789,465, Cl. 71-90.000.

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Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, 4,788,781, Cl. 36-50.000.

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Martin, Wallace W.; Esall, Douglas I.; Tomoda, Toshimasa; and Badono, Shinji, 4,788,852, Cl. 73-61.10R.

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Dyer, Henry B.; Phaal, Cornelius; and Brunand, Richard P., 4,789,385, Cl. 51-293.000.

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Tauber, David; and Philippon, William, 4,788,928, Cl. 114-255.000.

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Boultinghouse, Harold D., 4,789,498, Cl. 252-364.000.

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Sones, Richard A.; and Lauro, Karen L., 4,789,930, Cl. 364-413.130.

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Thomas-Leurquin, Genevieve; Gayot, Anne; Poitou, Pierre; and Basquin, Serge, 4,789,662, Cl. 514-21.000.

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Wallace, Donald G.; Smestad, Thomas L.; McPherson, John M.; Piez, Karl A.; Seyedin, Saied; and Armstrong, Rosa, 4,789,663, Cl. 514-21.000.

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Pipkin, Mark A., to Harris Corp. Process for performing variable selectivity polysilicon etch. 4,789,426, Cl. 156-643.000.

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Pitta, Michael W. Constant tension device. 4,789,042, Cl. 180-231.000.  
Plain, Margaret C., to Xerox Corporation. Sheet stacking apparatus with trail edge control flaps. 4,789,150, Cl. 271-220.000.  
Planet Products Corporation: See—  
Steurner, Karl H., 4,789,055, Cl. 198-425.000.  
Plessey Overseas, Limited: See—  
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Poe, Lloyd R. Constraining tamper proof padlock hasp apparatus. 4,788,836, Cl. 70-2.000.  
Pohto, Gerald R.: See—  
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Pomian, Ronald J.: See—  
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Pond, Stephen F.: See—  
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Porter, Lynn L. Multipurpose barrow vehicle. 4,789,171, Cl. 280-47.180.  
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Pouring, Andrew A.; and Ferrer, Daniel G., to Sonex Research, Inc. Internal combustion engine using dynamic resonating air chamber. 4,788,942, Cl. 123-26.000.  
Power Curbers, Inc.: See—  
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Powers, James M.; Moffett, Mark B.; and McGrath, John C., to United States of America, Navy. Broadband, acoustically transparent, non-resonant PVDF hydrophone. 4,789,971, Cl. 367-152.000.  
Pozzebon, Adolfo; Balbinot, Renzo; and Perotto, Riccardo, to Nordica SPA. Foot presser device, particularly for ski boots. 4,788,782, Cl. 36-119.000.  
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Das, Balbhadra, 4,789,593, Cl. 428-391.000.  
Kunkle, Gerald E.; Pecoraro, George A.; and Demarest, Henry M., Jr., 4,789,390, Cl. 65-27.000.  
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Preves, David A.; and Johnson, William A., to Argosy Electronics. Frequency selection circuit for hearing aids. 4,790,018, Cl. 381-68.200.  
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Pritchard, James A.; and Pritchard, Anton E. Linear moving carriage. 4,789,125, Cl. 248-479.000.  
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Scavone, Timothy A.; and Braun, James L., deceased, 4,789,554, Cl. 426-417.000.  
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Nordlund, Tore H., 4,789,477, Cl. 210-520.000.  
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Quam, Dean R.; and Schmitz, Robert J. Hydraulic manhole cover lifter. 4,789,072, Cl. 212-166.000.  
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Radtke, Wolfgang, to Siemens Aktiengesellschaft. Assembly for cooling vehicle parts. 4,788,904, Cl. 98-2.180.  
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Raj Technology, Inc.: See—  
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Ramotowski, Witold: See—  
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Randolph, Arthur J. Upholstery button driver. 4,789,091, Cl. 227-67.000.  
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Raychem Corporation: See—  
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Reberland Equipment, Inc.: See—  
Reber, Larry F., 4,789,170, Cl. 280-5.00D.  
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Hauser, Hans H.; Rebsamen, Arthur; Slavik, Walter; and Landwehrkamp, Hans, 4,789,107, Cl. 242-45.000.  
Recalde, Carlos E., to Santa Fe International Corporation. Multi-reel operational lines laying vessel. 4,789,108, Cl. 242-54.00R.  
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McIntyre, Deborah J.; and Reed, Dwight E., 4,789,553, Cl. 426-325.000.  
Reed Lignin Inc.: See—  
Detroit, William J., 4,789,391, Cl. 71-27.000.  
Rehm, William A.; McDonald, William J.; Maurer, William C.; and Leitko, Curtis E., Jr. Orienting and circulating sub. 4,789,032, Cl. 175-45.000.  
Rei, Nuno M.; and Gribens, Joel A., to Morton Thiokol, Inc. Resin-immobilized biocides. 4,789,692, Cl. 523-122.000.  
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Reid, Robert A.: See—  
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Wedenig, Wolfgang; and Resch, Wilfried, 4,789,334, Cl. 433-37.000.

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Weingartner, Albin; and Retallick, David, 4,788,835, Cl. 66-75.200.  
Revis, Nathaniel W.; Osborne, Tanya R.; and Hadden, Charles T. Conversion of inorganic ions to metal sulfides by microorganisms. 4,789,478, Cl. 210-611.000.  
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Reymann, Wolfgang; and Orth, Wilhelm, to Losch, Manfred; and Reymann, Wolfgang. Apparatus for manufacturing reinforcements. 4,789,010, Cl. 140-111.000.  
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Rhodes, James F.; Dziedzic, Chester J.; and Beatty, Ronald L., to Advanced Composite Materials Corporation. Method of cutting using silicon carbide whisker reinforced ceramic cutting tools. 4,789,277, Cl. 409-131.000.  
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Salinas, Jorge E.; Dunaway, Weyman H.; and Rice, Camilla A., 4,789,595, Cl. 428-402.000.  
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Richardson, Brian P.: See—  
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Richter, Ludwig; Niederhofer, Karl H.; Kramer, Dieter; Sussner, Gerhard; Girscher, Wolfgang; Munch, Volker; Vial, Heinrich; Mayer, Helmut R.; and Reyher, Hayo, to Telenorma Telefonbau und Normalzeit GmbH. Telephone instrument. 4,790,007, Cl. 379-420.000.  
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Ritter, Ernesto, to MCM Incorporated. Water desalination process. 4,789,486, Cl. 210-747.000.  
Ritter, Rodney L.; Crake, John F.; and Lacza, Tony, to Ford Motor Company. Method and apparatus for maintaining wire lead protection of components on a storage reel. 4,789,414, Cl. 156-184.000.  
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Robinson, McDonald; Behee, Ronald D.; deBoer, Wiebe B.; and Johnson, Wayne L., to Epsilon Limited Partnership. Method and apparatus for substrate heating in an axially symmetric epitaxial deposition apparatus. 4,789,771, Cl. 219-405.000.  
Robinson, Murry C.; Kirk, Donald W.; and Jue, Bruce, to Materials Concepts-Research Limited. Recovery of zinc from zinc bearing sulphidic ores and concentrates by controlled oxidation roasting. 4,789,529, Cl. 423-109.000.  
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Ruedi, Beat, to BBC Brown, Boveri Ltd. Feeding of matching circuit. 4,789,792, Cl. 307-141.000.

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Seligson, Frances H.; Hunter, John E.; and St. Clair, Albert H., 4,789,664, Cl. 514-23.000.

Saint-Gobain Vitrage: See—  
Douche, Jean-Pierre; Coulon, Jean-Claude; and Bouttier, Pierre, 4,789,569, Cl. 427-421.000.

Triebis, Friedrich; Raedisch, Helmer; Bravet, Jean-Louis; Abel, Jean-Claude; and Crux, Noel, 4,789,600, Cl. 428-425.600.

Saita, Itsuro: See—  
Arai, Masaru; and Saita, Itsuro, 4,788,736, Cl. 15-250.420.

Saito, Hiroyuki, to Nippon Seiko Kabushiki Kaisha. Passive seat belt system. 4,789,184, Cl. 280-804.000.

Saito, Naohide; Tamura, Junichi; Kurosawa, Masaji; and Terada, Isao, to Nippon Oil Co. Ltd. Heat transfer block for cross flow heat exchanger. 4,789,585, Cl. 428-185.000.

Saito, Norio: See—  
Torii, Sigeru; Tanaka, Hideo; Ogata, Yuzuru; Sasaoka, Michio; Saito, Norio; and Nagao, Shigemitsu, 4,789,740, Cl. 540-358.000.

Saito, Yasuo: See—  
Nishimura, Tsutomu; Saito, Yasuo; Shindo, Kenji; and Abe, Kazutoshi, 4,789,707, Cl. 525-157.000.

Saito, Yoshihiro: See—  
Endo, Makoto; and Saito, Yoshihiro, 4,789,878, Cl. 355-14.00D.

Saito, Yoshio: See—  
Seshimoto, Osamu; and Saito, Yoshio, 4,789,435, Cl. 204-1.00T.

Saitoh, Yasuo: See—  
Nambu, Yutaka; Sugawara, Hitosi; and Saitoh, Yasuo, 4,788,989, Cl. 131-303.000.

Sakaguchi, Masaaki; and Kubota, Kazuo, to Fuji Photo Film Co., Ltd. Method and device for winding magnetic tape using magnetic alignment. 4,789,110, Cl. 242-67.10R.

Sakai, Hiroaki; and Hidaka, Sachio, to Kabushiki Kaisha Kobe Seiko Sho. Hydraulic circuit for large crane. 4,788,820, Cl. 60-444.000.

Sakai, Kazunori: See—  
Machata, Hiromi; Okuda, Yutaka; Masaki, Shoichi; Asami, Ken; and Sakai, Kazunori, 4,789,938, Cl. 364-426.020.

Sakai, Kunio: See—  
Kobayashi, Fumio; Sakai, Kunio; and Yamagashi, Jun, 4,789,815, Cl. 318-135.000.

Sakai, Shiro: See—  
Umeno, Masayoshi; Sakai, Shiro; and Soga, Tetsuo, 4,789,421, Cl. 156-610.000.

Sakai, Takeshi: See—  
Fujita, Masahito; Ohgawara, Akira; Sakai, Takeshi; Ohgaki, Toshinaga; and Ohsaki, Tsuyoshi, 4,789,607, Cl. 428-653.000.

Sakai, Yukio: See—  
Mochida, Isao; Fujiyama, Susumu; Sakai, Yukio; and Otsuka, Hiroyuki, 4,789,455, Cl. 208-39.000.

Sakamoto, Keiji: See—  
Mori, Shinichi; Sakamoto, Keiji; Nakauchi, Hiroaki; Hamada, Akiyoshi; and Yoshida, Kazuyuki, 4,789,880, Cl. 355-55.000.

Sakamoto, Shunji: See—  
Komatsu, Masanobu; Senba, Takashi; Miyahara, Hisao; Kimura, Kunzi; and Sakamoto, Shunji, 4,789,417, Cl. 156-356.000.

Sakamoto, Yukio; Tanabe, Takeshi; Hori, Toshio; Takeda, Masashi; and Iida, Mitsuhiro, to Murata Manufacturing Co., Ltd. Filter connector. 4,789,847, Cl. 333-185.000.

Sakanoue, Kei; Hirano, Shigeo; Ueda, Takehiko; and Adachi, Keiichi, to Fuji Photo Film Co., Ltd. Silver halide color photographic light-sensitive material. 4,789,624, Cl. 430-372.000.

Sakanoue, Kei; Kishimoto, Shinzo; and Ikeda, Tadashi, to Fuji Photo Film Co., Ltd. Method for processing silver halide color photographic materials containing sensitizing dyes and two-equivalent magenta polymer couplers. 4,789,626, Cl. 430-393.000.

Sakurada, Takeshi: See—  
Watanabe, Eiki; and Sakurada, Takeshi, 4,789,049, Cl. 187-130.000.

Sales, Kenneth B., to Hubbell Incorporated. Reflector for roadway lighting luminaire. 4,789,923, Cl. 362-346.000.

Salinas, Jorge E.; Dunaway, Weyman H.; and Rice, Camilla A., to E.C.C. America Inc. Process for surface treating layered lattice silicates and resultant products. 4,789,595, Cl. 428-402.000.

Salk Institute for Biological Studies, The: See—  
Lindstrom, Jon M., 4,789,640, Cl. 436-504.000.

Salomon S.A.: See—  
Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, 4,788,781, Cl. 36-50.000.

Graillat, Gerard, 4,789,177, Cl. 280-607.000.

Sammells, Anthony F.: See—  
Morduchowitz, Abraham; and Sammells, Anthony F., 4,789,451, Cl. 204-275.000.

Sampson, Renick F. Container discharge control. 4,789,082, Cl. 222-1.000.

Sanada, Seiji: See—  
Takahashi, Shingo; Sanada, Seiji; Tanaka, Sakae; and Umeyama, Kazuya, 4,789,899, Cl. 358-236.000.

Sanchez, Theolinde. Soap holding cleaning pad. 4,789,262, Cl. 401-201.000.

Sanden Corporation: See—  
Kazuo, Nishimura, 4,789,380, Cl. 474-174.000.

Sato, Motoharu, 4,788,828, Cl. 62-214.000.

Sandhu, Jaswinder S., to Raj Technology, Inc. Construction of liquid crystal cell for acoustic imaging. 4,788,865, Cl. 73-603.000.

Sangamo Weston, Inc.: See—  
Ridgers, Timothy J., 4,789,837, Cl. 328-142.000.

Sankyo Chemical Co., Ltd.: See—  
Tani, Naoyuki; Ueno, Motomu; Yoshida, Kusutaru; and Mizukami, Yukio, 4,789,413, Cl. 156-77.000.

Sanner, Axel; and Vogel, Friedrich, to BASF Aktiengesellschaft. Preparation of terpolymers. 4,789,713, Cl. 526-81.000.

Sant-Pont, Jose M.; and Bigas-Balcells, Ramon. Supporting bar. 4,789,576, Cl. 428-34.100.

Santa Fe International Corporation: See—  
Recalde, Carlos E., 4,789,108, Cl. 242-54.00R.

Sanwa Needle Bearing Co., Ltd.: See—  
Tanaka, Masamitsu, 4,789,114, Cl. 242-199.000.

Sanyo Electric Co., Ltd.: See—  
Kishi, Hiroyasu; and Arai, Hiromi, 4,789,896, Cl. 358-154.000.

Miyai, Kiyoshi; Uotani, Shuhei; and Tsunemine, Toyohiko, 4,789,876, Cl. 355-3.00R.

Takemasa, Kazuo; Yoshida, Fukuji; and Iwasa, Kenji, 4,788,829, Cl. 62-335.000.

Sarcos, Inc.: See—  
Jacobsen, Stephen C.; Wood, John E.; and Price, Richard H., 4,789,803, Cl. 310-309.000.

Sardelis, Michael R.: See—  
Boobar, Lewis R.; Sardelis, Michael R.; and Brown, Walter M., III, 4,788,789, Cl. 43-113.000.

Sarret, Monique: See—  
Sportoletti, Giancarlo; Cremonesi, Pietro; and Sarret, Monique, 4,789,681, Cl. 514-392.000.

Sasaki, Isao; Kushi, Kenji; and Inukai, Ken-ichi, to Mitsubishi Rayon Co. Ltd. Liquid photosensitive resin composition containing carboxylated epoxy acrylates or methacrylates. 4,789,620, Cl. 430-280.000.

Sasaki, Nobuo: See—  
Kuragano, Tetsuzo; and Sasaki, Nobuo, 4,789,931, Cl. 364-474.180.

Sasamura, Minoru; and Takenaka, Kazutoshi, to Gifu Husky Co., Ltd. Stamper-holding apparatus for use in injection mold. 4,789,320, Cl. 425-190.000.

Sasaoka, Michio: See—  
Torii, Sigeru; Tanaka, Hideo; Ogata, Yuzuru; Sasaoka, Michio; Saito, Norio; and Nagao, Shigemitsu, 4,789,740, Cl. 540-358.000.

Sasaoka, Senzo: See—  
Inoue, Nobuaki; Sasaoka, Senzo; and Takahashi, Toshiro, 4,789,618, Cl. 430-264.000.

Sato, Goro: See—  
Hirano, Tetsuji; Sato, Goro; Higashi, Hidehiro; Migita, Teruo; and Eto, Yoshio, 4,789,654, Cl. 502-66.000.

Sato, Kozo; and Naito, Hideki, to Fuji Photo Film Co., Ltd. Method for forming an image. 4,789,623, Cl. 430-351.000.

Sato, Masami; Fujiyama, Masaaki; Suzuki, Masami; and Yamada, Yasuyuki, to Fuji Photo Film Co., Ltd. Abrasive tape. 4,789,590, Cl. 428-323.000.

Sato, Mitsuya; Imai, Shunzo; and Hiraga, Ryocho, to Canon Kabushiki Kaisha. Wafer handling apparatus and method. 4,789,294, Cl. 414-416.000.

Sato, Motoharu, to Sanden Corporation. Control device for use in a refrigeration circuit. 4,788,828, Cl. 62-214.000.

Sato, Yukiya: See—  
Ohtani, Shoji; Takemura, Kazunari; Sato, Yukiya; and Tsushima, Rikio, 4,789,613, Cl. 430-110.000.

Satoh, Isao; Kuroki, Yuzuru; Ichinose, Makoto; and Murai, Katsumi, to Matsushita Electric Industrial Co., Ltd. Optical information recording/reproducing apparatus. 4,789,974, Cl. 369-45.000.

Satoh, Isao: See—  
Fukushima, Yoshihisa; Satoh, Isao; Ichinose, Makoto; Kuroki, Yuzuru; and Takagi, Yuji, 4,789,911, Cl. 360-72.200.

Hiraoaka, Shigehiko; Ichinose, Makoto; Satoh, Isao; and Sugimura, Tatsu, 4,789,979, Cl. 369-275.000.

Sauvestre, Jean-Claude. Hunting ammunition comprising a bullet of increased effectiveness. 4,788,915, Cl. 102-439.000.

Sawada, Kenji, to Alps Electric Co., Ltd. Fixed-terminal structure. 4,789,359, Cl. 439-620.000.

Saxe, Charles L.; and Milliron, Daniel E., to Tektronix, Inc. Pre-interpolation adaptive filter. 4,789,950, Cl. 364-577.000.

Saxton, Nancy. Cushion pouch tray. 4,788,916, Cl. 108-43.000.

Sayle, Alan, to B. Dugdale & Son Limited. Silage additive. 4,789,551, Cl. 426-54.000.

Scavone, Timothy A.; and Braun, James L., deceased (by Braun, Pauletta Mary, legal representative), to Procter & Gamble Company. The high temperature vacuum steam distillation process to purify and increase the frylife of edible oils. 4,789,554, Cl. 426-417.000.

Schaefer, Wolfgang; and Schmidberger, Rainer, to Dornier System GmbH. Oxygen electrode with layer comprising electrode and electrolyte materials. 4,789,561, Cl. 427-126.100.

Schafer, Willi; and Sepp, Gunther, to Raumausstattung Willi Schafer. Installation tool for laying carpet (trim) strips. 4,788,760, Cl. 29-278.000.

Schatz, Klaus W.: See—  
Haddad, James H.; Owen, Hartley; and Schatz, Klaus W., 4,789,458, Cl. 208-151.000.

Scheibelhoffer, Anthony S.: See—  
DeFranco, Paul J.; King, Alan G.; and Scheibelhoffer, Anthony S., 4,788,798, Cl. 51-406.000.

Scherer Aktiengesellschaft: See—  
Blasing, Horst; and Meyer, Walter, 4,789,405, Cl. 134-1.000.

Bull, James R.; Thomson, Russell I.; Laurent, Henry; Schroeder, Helmut; and Wiechert, Rudolf, 4,789,671, Cl. 514-182.000.

Nickisch, Klaus; Laurent, Henry; Bittler, Dieter; Wiechert, Rudolf; and Losert, Wolfgang, 4,789,668, Cl. 514-173.000.

Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Elger, Walter; Loge, Olaf; and Town, Michael-Harold, 4,789,685, Cl. 514-530.000.

Scherl, Wolfgang, to Siemens Aktiengesellschaft. Method for automatic separating useful and noise information in microscopic images particularly microscopic images of wafer surfaces. 4,790,027, Cl. 382-54.000.

Schermerhorn, Paul M.; Teter, Michael P.; and Vandewoestine, Robert V., to Corning Glass Works. Method for producing ultra-high purity, optical quality, glass articles. 4,789,389, Cl. 65-3.120.

Schick, Jean-Francois, to Goro S.A. Apparatus for fastening stirrup-links on a conveyor-belt or the like. 4,789,092, Cl. 227-111.000.

Schilling, Peter; and Brown, Patti E., to Westvaco Corporation. Cationic and anionic lignin amines corrosion inhibitors. 4,789,523, Cl. 422-12.000.

Schippers, Heinz; and Gerhart, Siegmund, to Barmag AG. Yarn winding method and resulting package. 4,789,112, Cl. 242-178.000.

Schlink, Gerald: See—  
Nelson, Ralph; and Schlink, Gerald, 4,789,544, Cl. 424-92.000.

Schloemann, Ernst F. R. A., to Raytheon Company. Broad-band non-reciprocal microwave devices. 4,789,844, Cl. 333-1.100.

Schlosser, Horst W.: See—  
Gaertner, Hans; Kaufmann, Friedrich; Schlossherr, Horst W.; and Schulz, Dietrich, 4,789,942, Cl. 364-470.000.

Schluter, Siegfried, to Apparatebau Rothemuhle Brandt & Kritzler GmbH. Thrust bearing or axial journal bearing, in particular for slow-running machines. 4,789,250, Cl. 384-305.000.

Schmeidl, Karl: See—  
Kranz, Joachim; and Schmeidl, Karl, 4,789,739, Cl. 540-137.000.

Schmid, Rudolf: See—  
Coffen, David L.; Schmid, Rudolf; and Sebastian, Mark J., 4,789,750, Cl. 549-407.000.

Schmidberger, Rainer: See—  
Schaefer, Wolfgang; and Schmidberger, Rainer, 4,789,561, Cl. 427-126.100.

Schmidt, Hans U.: See—  
Matzke, Guenter; Horn, Peter; and Schmidt, Hans U., 4,789,691, Cl. 521-159.000.

Schmidt, Manfred: See—  
Bauer, Walter; and Schmidt, Manfred, 4,788,810, Cl. 53-266.00R.

Schmidt, Richard P., Jr.: See—  
Cirjak, Larry M.; and Schmidt, Richard P., Jr., 4,789,538, Cl. 423-362.000.

Schmitz, Robert J.: See—  
Quam, Dean R.; and Schmitz, Robert J., 4,789,072, Cl. 212-166.000.

Schneider, Yves-Jacques E.: See—  
Le Clef, Brigitte A. L. G. M. J.; Laub, Ruth; and Schneider, Yves-Jacques E., 4,789,587, Cl. 514-252.000.

Schnoor, Halina. Blanket convertible to a tote bag. 4,789,247, Cl. 383-4.000.

Schoengold, Ronald J.: See—  
Baker, Josefina T.; Pagano, Joseph F.; and Schoengold, Ronald J., 4,789,629, Cl. 435-7.000.

Schoening, Josef; and Handel, Hubert, to Hochtemperatur-Reaktorbau GmbH. Nuclear reactor plant. 4,789,519, Cl. 376-381.000.

Scholl, Hans-Peter: See—  
Koch, Siegfried; and Scholl, Hans-Peter, 4,789,774, Cl. 235-30.00R.

Scholz, Bernhard-Peter, to Huls Aktiengesellschaft. Method of manufacturing polymaleic anhydride powders. 4,789,716, Cl. 526-201.000.

Schonfelder, Manfred: See—  
Noll, Klaus; Pedain, Josef; and Schonfelder, Manfred, 4,789,718, Cl. 528-49.000.

Schonherr, Walter: See—  
Helbig, Peter; and Schonherr, Walter, 4,789,920, Cl. 362-61.000.

Schonholzer, Arthur. Rotary piston internal combustion engine. 4,788,952, Cl. 123-245.000.

Schramm, Dale E.; and Birtell, Donald W., to J. M. Huber Corporation. Process for producing silicon carbide whiskers. 4,789,536, Cl. 423-345.000.

Schramm, Siegfried K. H. Vehicle for the disabled. 4,789,175, Cl. 280-289.00C.

Schramme, Stephan H.: See—  
Paul, Christopher A.; and Schramme, Stephan H., 4,789,218, Cl. 350-96.210.

Schreiner, Michael S.: See—  
Schreiner, R. Alan; and Schreiner, Michael S., 4,788,830, Cl. 62-344.000.

Schreiner, R. Alan; and Schreiner, Michael S. Apparatus for bulk ice making and dispensing. 4,788,830, Cl. 62-344.000.

Schroeder, Helmut: See—  
Bull, James R.; Thomson, Russell I.; Laurent, Henry; Schroeder, Helmut; and Wiechert, Rudolf, 4,789,671, Cl. 514-182.000.

Schrott, Werner G., to Amphenol Corporation. Guide device for a light wave conductor. 4,789,216, Cl. 350-96.200.

Schubert & Salzer Maschinenfabrik Aktiengesellschaft: See—  
Hauser, Hans H.; Rebsamen, Arthur; Slavik, Walter; and Landwehrkamp, Hans, 4,789,107, Cl. 242-45.000.

Schue, Thomas J.: See—  
Nikka, Marilyn J.; Pohlo, Gerald R.; Lakatos, Leslie K.; Wheeler, Douglas J.; Solomon, Frank; Nikka, Andrew J.; Schue, Thomas J.; Genodman, Yury; Turk, Thomas R.; and Hagel, Daniel P., 4,788,764, Cl. 29-731.000.

Schulz, Dietrich: See—  
Gaertner, Hans; Kaufmann, Friedrich; Schlossherr, Horst W.; and Schulz, Dietrich, 4,789,942, Cl. 364-470.000.

Schulz, Siegfried. Cyclone separator with two separating zones and static guide mechanisms. 4,789,476, Cl. 210-512.100.

Schulz, Wolfgang: See—  
Mathieu, Bernd; Weber, Wolfram; and Schulz, Wolfgang, 4,789,473, Cl. 210-321.800.

Schwarz, Norbert: See—  
Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbruggen, Helmut; Elger, Walter; Loge, Olaf; and Town, Michael-Harold, 4,789,685, Cl. 514-530.000.

Schwarzberger, Michael: See—  
Shore, Barry; and Schwarzberger, Michael, 4,789,054, Cl. 194-212.000.

Schwarze, Rigobert. Pipe bending machine. 4,788,845, Cl. 72-157.000.

Schwinn Bicycle Company: See—  
Carroll, Timothy, 4,789,176, Cl. 280-289.00R.

Mueller, Clifford F., 4,789,172, Cl. 280-281.00R.

Science Application International Corporation: See—  
Stribling, Donald, 4,789,829, Cl. 324-263.000.

Scortecci, Gerard. Dental implant for the securement of fixed dental prostheses, its tool for its positioning and its insertion process. 4,789,337, Cl. 433-173.000.

Scott Fetzer Company: See—  
Malone, Charles F.; and Durham, Larry M., 4,789,761, Cl. 200-38.00C.

Scott, Stephen C.: See—  
Nelson, Edmund A.; Colvin, Arthur E.; Hanley, Matthew W.; and Scott, Stephen C., 4,788,871, Cl. 73-866.500.

Seabrook, Colin; and Usher, Simon D., to J. H. Fenner & Co. Limited. Swivel or rotating joints. 4,789,188, Cl. 285-94.000.



Seaman, Roy C.; and McCaul, Ronald M., to R. Seaman Company. Method and apparatus for hydraulically forming a tubular body. 4,788,843, Cl. 72-58.000.

Sease, R. Gregg. Assembly of molding strips adapted to mount flexible coverings on support surfaces. 4,788,806, Cl. 52-222.000.

Sebastian, Mark J.: See—  
Coffen, David L.; Schmid, Rudolf; and Sebastian, Mark J., 4,789,750, Cl. 349-407.000.

Segal, Paul. Retainer clip for stentails. 4,789,064, Cl. 206-493.000.

Seidel, Peter: See—  
Zell, Karl; Seidel, Peter; and Pelzl, Leo, 4,789,358, Cl. 439-607.000.

Seiko Epson Corporation: See—  
Moriyama, Masato, 4,788,769, Cl. 30-133.000.

Seiko Instruments & Electronics Ltd.: See—  
Karube, Isao; and Muramatsu, Hiroshi, 4,789,804, Cl. 310-311.000.

Seiksha Co., Ltd.: See—  
Takahashi, Shingo; Sanada, Seiji; Tanaka, Sakae; and Uemeyama, Kazuya, 4,789,899, Cl. 358-236.000.

Seitz, John A. Modular insulated building structure and method. 4,788,803, Cl. 52-82.000.

Sekido, Satoshi: See—  
Kondo, Shigeo; Sotomura, Tadashi; Kanbara, Teruhisa; and Sekido, Satoshi, 4,789,610, Cl. 429-191.000.

Selbeck, Harold: See—  
Bonten, Heinz; Nielinger, Werner; Michael, Dietrich; Selbeck, Harold; and Meyer, Rolf-Volker, 4,789,698, Cl. 524-100.000.

Selbert, Alan J., to Hoover Universal, Inc. Seat trim attachment strip. 4,789,201, Cl. 292-218.000.

Seligson, Frances H.; Hunter, John E.; and St. Clair, Albert H., to Procter & Gamble Company, The. Food compositions with superior blood cholesterol lowering properties. 4,789,664, Cl. 514-23.000.

Seliaky, Steven L. Diving weight. 4,789,270, Cl. 405-186.000.

Selvey, Timothy C. Removable protective liner for vehicles. 4,789,574, Cl. 428-31.000.

Semperit AG: See—  
Affenzeller, Josef; and Jost, Wolf-Dieter, 4,789,697, Cl. 523-437.000.

Senba, Takashi: See—  
Komatsu, Masanobu; Senba, Takashi; Miyahara, Hisao; Kimura, Kunzi; and Sakamoto, Shunji, 4,789,417, Cl. 156-356.000.

Seuf, John W., to Adhesive Engineering Company. Multiple fluid pumping system. 4,789,100, Cl. 239-61.000.

Senko Medical Instrument Mfg. Co., Ltd.: See—  
Phuc, Tran N., 4,788,974, Cl. 128-204.210.

Sepp, Gunther: See—  
Schaefer, Willi; and Sepp, Gunther, 4,788,760, Cl. 29-278.000.

Sepso, Roger P.; and Everett, Charles J., to Robertshaw Controls Company. Temperature sensor construction and method of making the same. 4,789,850, Cl. 338-25.000.

Serbent, Harry: See—  
Hirsch, Martin; Lommert, Hermann; and Serbent, Harry, 4,789,580, Cl. 423-49.000.

Seshimoto, Osamu; and Saito, Yoshio, to Fuji Photo Film Co., Ltd. Method and device of measuring ion activity. 4,789,435, Cl. 204-1.00T.

Seyedin, Said: See—  
Wallace, Donald G.; Smetad, Thomas L.; McPherson, John M.; Piez, Karl A.; Seyedin, Said; and Armstrong, Rosa, 4,789,663, Cl. 514-21.000.

Sgrignoli, Gary J., to Zenith Electronics Corporation. Enhanced scrambling method and system for TV signals. 4,790,010, Cl. 380-10.000.

SGS Microelectronics SpA: See—  
Meda, Laura, 4,789,644, Cl. 437-41.000.

Shalek, Peter D.; Katz, Joel D.; and Hurley, George F., to United States of America, Energy. Preactivated catalyst for growing silicon carbide whiskers. 4,789,537, Cl. 423-346.000.

Shank, Brian E.; and Shaubach, Robert M., to Thermacore, Inc. Polished surface capillary grooves. 4,789,026, Cl. 165-104.260.

Sharp Kabushiki Kaisha: See—  
Murakami, Susumu, 4,789,879, Cl. 355-14.00R.

Otsuka, Kozi; Kira, Tohru; Imae, Kazuyoshi; and Yoshikawa, Mitsuhiro, 4,789,910, Cl. 360-113.000.

Shaubach, Robert M.: See—  
Shank, Brian E.; and Shaubach, Robert M., 4,789,026, Cl. 165-104.260.

Shaw, Daniel M. Cover for wall mounted air conditioner. 4,788,805, Cl. 52-202.000.

Shaw, Lawrence N., to University of Florida. Spatial transplanter mechanism. 4,788,920, Cl. 111-2.000.

Shell Oil Company: See—  
Ayers, Ray R.; and Kopp, Frans, 4,789,269, Cl. 405-158.000.

Delude, Stephen G.; and Luinstra, Edward A., 4,789,030, Cl. 166-267.000.

Drent, Eit, 4,789,756, Cl. 560-104.000.

Martens, Franciscus J. A.; and Hasenack, Hendrikus J. A., 4,789,384, Cl. 48-197.00R.

Slaugh, Lynn H., 4,789,502, Cl. 260-413.000.

Shell Western E&P, Inc.: See—  
Casey, James M., 4,788,927, Cl. 114-249.000.

Shely, William W.; and Wells, Peter M., to All-States Inc. Cable tie. 4,788,751, Cl. 24-16.0PB.

Shepherd, David W.; and Shepherd, Michelle L. System for heating vehicular operator space and engine fuel, and for separating moisture therefrom. 4,789,098, Cl. 237-12.30R.

Shepherd, Michelle L.: See—  
Shepherd, David W.; and Shepherd, Michelle L., 4,789,098, Cl. 237-12.30R.

Sheridan, Patrick J.: See—  
Bloch, Will; Sheridan, Patrick J.; and Goodson, Robert J., 4,789,630, Cl. 435-7.000.

Sherman Industries, Incorporated: See—  
Beer, Carl C.; Hewitt, C. Lee; and Larson, Sherman, 4,788,993, Cl. 134-123.000.

Shibata, Takuo: See—  
Miyata, Yutaka; Chikamura, Takao; Shibata, Takuo; and Fujiwara, Shinji, 4,789,888, Cl. 357-30.000.

Shikama, Shinsuke; and Toide, Eiichi, to Mitsubishi Denki Kabushiki Kaisha. System and method of astigmatism correction in an optical head apparatus. 4,789,978, Cl. 369-112.000.

Shima, Harumi: See—  
Akashi, Naotomo; Yokokawa, Takeshi; Ninomiya, Katsuaki; Shima, Harumi; and Horiguchi, Takeshi, 4,789,814, Cl. 318-77.000.

Shima, Kazumi: See—  
Fujita, Yuichi; Kaneko, Takayuki; Okada, Mitsuo; Shima, Kazumi; Yanaru, Hideaki; and Numaguchi, Tohru, 4,789,132, Cl. 251-129.110.

Shimada, Hiroshi: See—  
Okonogi, Shigeo; Kawahara, Kunisuke; Oizumi, Saburo; Mizuguchi, Kenji; Koide, Osamu; and Shimada, Hiroshi, 4,789,556, Cl. 426-573.000.

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Nishibata, Katsuji; Takano, Hiroshi; Itai, Masaru; and Shimote, Tsugutaka, 4,789,388, Cl. 55-158.000.

Shimotohno, Kunitada: See—  
Morinaga, Tsuto; Miura, Kin-ichiro; Shimotohno, Kunitada; Ikegami, Masato; and Ichikawa, Yataro, 4,789,636, Cl. 435-320.000.

Shimura, Kazuo, to Fuji Photo Film Co., Ltd. Image signal processing method. 4,789,902, Cl. 358-284.000.

Shinagawa Refractories Co., Ltd.: See—  
Ichikawa, Kenji; Sugimoto, Hiroyuki; Nakamura, Ryosuke; and Morita, Akihiro, 4,789,652, Cl. 501-127.000.

Shinbara, Kaoru, to Dainippon Screen Mfg. Co. Wafer holding mechanism. 4,788,994, Cl. 134-157.000.

Shindo, Kenji: See—  
Nishimura, Tsutomu; Saito, Yasuo; Shindo, Kenji; and Abe, Kazutoshi, 4,789,707, Cl. 525-157.000.

Shionoya, Kazunori: See—  
Nagasaki, Tatsuo; Taguchi, Koji; Imade, Shinichi; Ikuta, Eishi; and Shionoya, Kazunori, 4,788,981, Cl. 128-660.070.

Shitanoki, Kazuaki, to Honda Giken Kogyo Kabushiki Kaisha. Neutral position indicator for electrically conductive cable in steering wheel. 4,789,342, Cl. 439-15.000.

Shoji, Michihiro; and Mikiya, Toshio, to Nitto Kohki Co., Ltd. Boring apparatus. 4,789,274, Cl. 408-11.000.

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Katsumata, Shigeru; Handa, Takuro; Kamakura, Tamiji; Tanaka, Noriyoshi; Katoh, Hidekatsu; Namiwa, Kimiyoshi; and Shoji, Yoshikazu, 4,789,492, Cl. 252-32.70E.

Shore, Barry; and Schwarzer, Michael, to ABM Industries, Inc. Vending machine for returnable cartridges. 4,789,054, Cl. 194-212.000.

Showa Electric Wire & Cable Co., Ltd.: See—  
Kon, Shuji; Suzuki, Yuji; Iwata, Toshimitsu; and Fukahori, Junichi, 4,789,565, Cl. 427-375.000.

Shturman, Leonid; and Jensen, Steven L., to Medilase, Inc. Control system and method for improved laser angioplasty. 4,788,975, Cl. 128-303.100.

Shuler, Eugene L., to Chapman Industries Corp. Tamper resistant lock bolt assembly. 4,788,839, Cl. 70-143.000.

Shulik, Larry J.: See—  
Osman, Robert M.; and Shulik, Larry J., 4,789,527, Cl. 422-148.000.

Sieber, Helmut: See—  
Fuhling, Heinrich; and Sieber, Helmut, 4,788,776, Cl. 34-76.000.

Siecor Corporation: See—  
Hampton, Clifton G., 4,789,348, Cl. 439-142.000.

Siemens Aktiengesellschaft: See—  
Heywang, Walter; and Baues, Peter, 4,789,213, Cl. 350-96.150.

Kuehnell, Werner, 4,789,998, Cl. 378-110.000.

Lichti, Reiner, 4,788,861, Cl. 73-304.00R.

Nickel, Bernd, 4,788,987, Cl. 128-777.000.

Nijmolen, Gerrit W.; and Bloechl, Franz, 4,790,006, Cl. 379-388.000.

Radtke, Wolfgang, 4,788,904, Cl. 98-2.180.

Scherl, Wolfgang, 4,790,027, Cl. 382-54.000.

Zell, Karl; Seidel, Peter; and Pelzl, Leo, 4,789,358, Cl. 439-607.000.

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Hanselka, Peter; and Oehlerich, Joerg, 4,790,005, Cl. 379-244.000.

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Mann, Brian M.; and Buchanan, Stuart W., 4,788,980, Cl. 128-419.0PG.

Siemens Transmission Systems, Inc.: See—  
Butcher, James S., 4,789,996, Cl. 375-120.000.

Silano, Rocco. Carton. 4,789,067, Cl. 206-615.000.

Silicon Graphics, Inc.: See—  
Hannah, Marc, 4,789,927, Cl. 364-200.000.

Silicon Systems Inc.: See—  
Hurst, Paul, 4,789,995, Cl. 375-75.000.

Simard, Rodrigue. Scraper for scratch coupons. 4,788,770, Cl. 30-169.000.

Simon, Jochen; and Stracke, Hans-Joachim. Hollow body with flexible envelope. 4,788,925, Cl. 114-69.000.

Simon-Johnson, Inc.: See—  
Crawford, David R.; and Criscione, Frank J., II, 4,788,831, Cl. 62-374.000.

Sing, Fung Y.: See—  
Sing, Miu W.; and Sing, Fung Y., 4,789,437, Cl. 204-12.000.

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Sinz, Wolfgang, to VDO Adolf Schindling AG. System for measuring the level of filling. 4,789,946, Cl. 364-509.000.

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Sisto, Eugene, to Eastman Kodak Company. Adjustable mold for forming containers. 4,789,129, Cl. 249-102.000.

Skarvelen, Ragnvald: See—  
Eike, Einar; and Skarvelen, Ragnvald, 4,789,190, Cl. 291-6.000.

Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorbruegggen, Helmut; Elger, Walter; Loge, Olaf; and Town, Michael-Harold, to Schering Aktiengesellschaft. 9-fluoroprostaglandin derivatives, their preparation and use as medicinal agents. 4,789,685, Cl. 514-530.000.

Slaugh, Lynn H., to Shell Oil Company. Carboxylic acid production. 4,789,502, Cl. 260-413.000.

Slavik, Walter: See—  
Hauser, Hans H.; Rebsamen, Arthur; Slavik, Walter; and Landwehrkamp, Hans, 4,789,107, Cl. 242-45.000.

Sloan, Donald L. Floating pump assembly. 4,789,307, Cl. 417-40.000.

Slocum, Donald H. Building panel and method of fabrication. 4,788,808, Cl. 52-521.000.

Smetad, Thomas L.: See—  
Wallace, Donald G.; Smetad, Thomas L.; McPherson, John M.; Piez, Karl A.; Seyedin, Said; and Armstrong, Rosa, 4,789,663, Cl. 514-21.000.

Smirnov, Boris A.: See—  
Strekopytov, Alexei A.; Smirnov, Boris A.; Danilov, Mikhail V.; and Yangibaev, Zaribbai, 4,788,978, Cl. 128-334.00R.

Smith International, Inc.: See—  
McPherson, James N.; and Hall, David R., 4,789,251, Cl. 384-317.000.

Smith, Kenneth D.: See—  
Dollar, William O., Jr.; and Smith, Kenneth D., 4,789,160, Cl. 273-186.00A.

Smith, Lawrence C.: See—  
Kirby, Eric J.; and Smith, Lawrence C., 4,788,897, Cl. 84-422.00R.

Smith, Michael D.: See—  
Dobut, Daniel F.; and Smith, Michael D., 4,789,280, Cl. 409-233.000.

Smith, Philip M.; Hollingsworth, Elmont E.; Wandmacher, Robert A.; Roskes, Thomas W.; Roiko, Russell A.; and Cheesebrow, Dennis M., to Minnesota Mining and Manufacturing Company. Voice/data communication termination connector. 4,789,354, Cl. 439-395.000.

Smith, Reginald W.; and Ghorehshy, Mansor, to Queen's University at Kingston. Castable zinc-aluminum alloys. 4,789,522, Cl. 420-514.000.

Smith, Robert M.: See—  
Sovis, John F.; Smith, Robert M.; and Bramhall, George H., 4,788,740, Cl. 15-339.000.

Smith, Stanley E.; and Hoving, John F., to General Motors Corporation. Electronic motor mount with rotary flow control valve. 4,789,143, Cl. 267-140.100.

Smith, Stanley E.: See—  
Hoving, John F.; and Smith, Stanley E., 4,789,142, Cl. 267-140.100.

SmithKline Beckman Corporation: See—  
Baker, Josefine T.; Pagano, Joseph F.; and Schoengold, Ronald J., 4,789,629, Cl. 435-7.000.

SMS Hasenclever Maschinenfabrik GmbH: See—  
Kopp, Reiner; Baldner, Klaus-Rainer; and Nieschwitz, Paul-Josef, 4,788,842, Cl. 72-45.000.

Smykalla, Gunter: See—  
Von Ropenack, Adolf; Bohmer, Winfried; Smykalla, Gunter; and Wiegand, Volker, 4,789,446, Cl. 204-119.000.

Snell-Kelly, Janet E.: See—  
Boggs, Robert J.; and Snell-Kelly, Janet E., 4,789,371, Cl. 446-219.000.

Snodgrass, Thomas A.: See—  
Dunn, Gerald R.; Economy, Kenneth W.; and Snodgrass, Thomas A., 4,789,096, Cl. 228-179.000.

Snow, Philip A.: See—  
Kramer, David N.; and Snow, Philip A., 4,789,638, Cl. 436-111.000.

Societe Anonyme: Sanofi Pharma S.A. - Succursale de Carouge: See—  
Becker, Abram, 4,789,743, Cl. 544-325.000.

Societe d'Applications Generales d'Electricite: See—  
Lacord, Maurice; Lavergne, Christian; and Vegeais, Patrick, 4,789,870, Cl. 346-1.100.

Societe Nationale Industrielle Aerospatiale et: See—  
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Soga, Tetsuo: See—  
Umeno, Masayoshi; Sakai, Shiro; and Soga, Tetsuo, 4,789,421, Cl. 156-610.000.

Solex Research Corporation of Japan: See—  
Watanabe, Morio; Nishimura, Sanji; and Watanabe, Nobuatsu, 4,789,444, Cl. 204-107.000.

Solidur Plastics Co.: See—  
Bourbeau, Robert D., 4,789,056, Cl. 198-823.000.

Solodar, Warren E.; Kang, Henry R.; and Weber, Joseph R., to Xerox Corporation. Waterfast ink jet compositions and process. 4,789,400, Cl. 106-22.000.

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Niksa, Marilyn J.; Pohto, Gerald R.; Lakatos, Leslie K.; Wheeler, Douglas J.; Solomon, Frank; Niksa, Andrew J.; Schue, Thomas J.; Genodman, Yury; Turk, Thomas R.; and Hagel, Daniel P., 4,788,764, Cl. 29-731.000.

Sonea, Richard A.; and Lauro, Karen L., to Picker International, Inc. Energy dependent gain correction for radiation detection. 4,789,930, Cl. 364-413.130.

Sonex Research, Inc.: See—  
Pouring, Andrew A.; and Ferer, Daniel G., 4,788,942, Cl. 123-26.000.

Song, Suk-Zu; Mehta, Surendra C.; Rashidbaigi, Zahra A.; Nesbitt, Russell U.; and Fawzi, Mahdi B., to Warner-Lambert Company. Transdermal matrix system. 4,789,547, Cl. 424-449.000.

Sony Corporation: See—  
Ezaki, Tadashi, 4,789,905, Cl. 358-335.000.

Kuragano, Tetsuzo; and Sasaki, Nobuo, 4,789,931, Cl. 364-474.180.

Taniyama, Seiro, 4,789,975, Cl. 369-50.000.

Urata, Kaoru; and Tsuji, Sentaro, 4,789,906, Cl. 360-33.100.

Soref, Richard A.: See—  
Lorenzo, Joseph P.; and Soref, Richard A., 4,789,642, Cl. 437-24.000.

Sorensen, Jens O., to Acebo Company. Stabilized-core injection molding of hollow thin-walled plastic products. 4,789,326, Cl. 425-575.000.

Sorg GmbH & Co. KG: See—  
Pieper, Helmut, 4,789,990, Cl. 373-32.000.

Sotomura, Tadashi: See—  
Kondo, Shigeo; Sotomura, Tadashi; Kanbara, Teruhisa; and Sekido, Satoshi, 4,789,610, Cl. 429-191.000.

South Bend Lathe, Inc.: See—  
Backe, Bengt S.; and Durham, Lamoyne W., 4,789,001, Cl. 137-554.000.

Sovis, John F.; Smith, Robert M.; and Bramhall, George H., to Royal Appliance Mfg. Co. Hand vacuum cleaner. 4,788,740, Cl. 15-339.000.

Spang, Ursula, heir: See—  
Kullman, Werner, deceased; Spang, Ursula, heir; and Buck, Volker, 4,788,932, Cl. 118-211.000.

Sparkes, Donald G., to Pulp and Paper Research Institute of Canada. Method and apparatus for the rapid consolidation and/or drying of moist porous webs. 4,788,779, Cl. 34-117.000.

Sparrow, Timothy H.; and Harlow, Richard L., to Universal Fasteners Inc. Expansion compensating two piece button. 4,788,753, Cl. 24-113.0MP.

Spaziente, Placido M.: See—  
deNora, Oronzio; and Spaziente, Placido M., 4,789,443, Cl. 204-98.000.

Speakman, David; and Macy, Robert L., Jr. Frozen edible product and method for making the same. 4,789,552, Cl. 426-107.000.

Spear, Kerry L.: See—  
Lee, Len F.; Spear, Kerry L.; and Dolson, Mark G., 4,789,395, Cl. 71-94.000.

Specialty Manufacturing Co.: See—  
Anderson, Arthur A., 4,789,104, Cl. 239-455.000.

Spector, George: See—  
Arsenault, Edna M.; and Spector, George, 4,789,233, Cl. 351-158.000.

Demetrius, Kris; and Spector, George, 4,789,299, Cl. 415-73.000.

Sweetser, Jackie A.; and Spector, George, 4,789,019, Cl. 150-52.00R.

Spectra-Physics, Inc.: See—  
Trost, David J., 4,789,988, Cl. 372-34.000.

Spectrum Manufacturing Company, Inc.: See—  
Kempf, D. Dale, 4,789,101, Cl. 239-242.000.

Spei, Brigitte; and Wehle, Volker, to Henkel Kommanditgesellschaft auf Aktien. Process for controlling the breaking of oil-in water emulsions. 4,789,483, Cl. 210-708.000.

Speranza, George P.: See—  
Waddill, Harold G.; Lin, Jiange-Jen; and Speranza, George P., 4,789,721, Cl. 528-111.000.

Spidel, Jeffrey L., to Kidde, Inc. Carrier track system for extensible and retractable boom machines. 4,789,120, Cl. 248-49.000.

Spooner, Frank: See—  
Crossley, Ian; Donoghue, Daniel; Goldwasser, Robert; Miley, John; and Spooner, Frank, 4,789,887, Cl. 357-55.000.

Spooner, Richard C. Self-adjusting resilient bar stock support. 4,788,895, Cl. 82-38.00A.

Sport Koter U.S.A., Inc.: See—  
Wilson, Jack H.; and Dykes, Willis G., 4,789,265, Cl. 404-75.000.

Sportoletti, Giancarlo; Cremonesi, Pietro; and Sarret, Monique, to Italfarmaco S.p.A. Cytoprotective guanidine derivatives useful in ischemic diseases. 4,789,681, Cl. 514-392.000.

Sprung, Philip D. Cooling system for greenhouse structures. 4,788,791, Cl. 47-17.000.

Spurr, Charles A.; and Spurr, James R. Electrical power plant and method of producing electricity. 4,788,824, Cl. 60-671.000.

Spurr, James R.: See—  
Spurr, Charles A.; and Spurr, James R., 4,788,824, Cl. 60-671.000.

Square D Company: See—  
Cox, Russell; and Ledbetter, Stephen M., 4,789,919, Cl. 361-339.000.



Srebnay, Hans-Gunther: See—  
Kotzsch, Hans-Joachim; Srebnay, Hans-Gunther; and Vahlensieck, Hans-Joachim, 4,789,752, Cl. 556-54.000.

SRI International: See—  
Laine, Richard M., 4,789,534, Cl. 423-241.000.

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Stadler, Brigitte M.: See—  
Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Hildegard R.; Stadler, Brigitte M.; Stadler, Sigrid A.; and Breuleux, Gerald, 4,789,673, Cl. 514-214.000.

Stadler, Hildegard R.: See—  
Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Hildegard R.; Stadler, Brigitte M.; Stadler, Sigrid A.; and Breuleux, Gerald, 4,789,673, Cl. 514-214.000.

Stadler, Sigrid A.: See—  
Donatsch, Peter; Engel, Gunter; Hugi, Bruno; Richardson, Brian P.; Stadler, Hildegard R.; Stadler, Brigitte M.; Stadler, Sigrid A.; and Breuleux, Gerald, 4,789,673, Cl. 514-214.000.

Standard Concrete Materials, Inc.: See—  
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Standard Oil: See—  
Cirjak, Larry M.; and Schmidt, Richard P., Jr., 4,789,538, Cl. 423-362.000.

Standley, Charles L.: See—  
Chow, Melanie M.; Cronin, John E.; Guthrie, William L.; Kaanta, Carter W.; Luther, Barbara; Patrick, William J.; Perry, Kathleen A.; and Standley, Charles L., 4,789,648, Cl. 437-225.000.

Stanek, Douglas A.: See—  
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MacFarlane, Walter J., 4,788,837, Cl. 70-3.000.

Starai, Rudolph: See—  
DiGianfilippo, Alejandro; Hitchcock, James R.; Lewis, Robert E.; Ziesdorf, Randall A.; Vos, James P.; Starai, Rudolph; Becker, Michael J.; Warner, Donald W.; and Huang, Leon, 4,789,014, Cl. 141-83.000.

Stark, Ulrich: See—  
Artzt, Peter; Egbers, Gerhard; Muller, Heinz; and Stark, Ulrich, 4,788,817, Cl. 57-263.000.

Starks, Jimmie: See—  
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Stavinoha, Jerome L.: See—  
McCollum, Anthony W., to Eastman Kodak Company, Hydroxyethylisobornene compounds and a process for their preparation, 4,789,602, Cl. 428-480.000.

Stawski, Stanley W.: See—  
Boeing Company, The, Method of forming composite radius fillers, 4,789,594, Cl. 428-397.000.

Steag Aktiengesellschaft: See—  
Eichholtz, Andreas; and Weiler, Helmut, 4,789,531, Cl. 423-235.000.

Steel Casting Engineering, Ltd.: See—  
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Frigette Corporation, Drier for air conditioning system, 4,788,833, Cl. 62-474.000.

Steeltin Can Corporation: See—  
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Stenzenberger, Horst; and Koenig, Peter, to Technochemie GmbH, Curable resin from bis maleimide and alkenyl phenyl hydroxy ether, 4,789,704, Cl. 524-548.000.

Sterghos, Peter M.: See—  
Rodbuster, Inc., Rod bending apparatus, 4,788,847, Cl. 72-213.000.

Stern, Theodore G.; Cornwall, Mickey; and Nirschl, Donald A., to General Dynamics Corp./Space Systems Div., Solar simulator employing flexible-optics, 4,789,989, Cl. 350-96.180.

Steurner, Karl H.: See—  
Planet Products Corporation, Apparatus for arranging articles in a predetermined manner and method of making same, 4,789,055, Cl. 198-425.000.

Stevens Institute of Technology, The Trustees of the: See—  
Sirkar, Kamalash K., 4,789,468, Cl. 210-137.000.

Stevens, Ward C., to Advanced Technology Materials, Inc., Sol gel formation of polysilicate, titania, and alumina interlayers for enhanced adhesion of metal films on substrates, 4,789,563, Cl. 427-252.000.

Stewart, Brian C.: See—  
Lofgren, Michael S.; and Stewart, Brian C., 4,789,173, Cl. 280-281.0LP.

Stewart, Kelso, Paper towel dispensing and soiled towel stowing equipment, 4,788,909, Cl. 100-102.000.

Stich, Richard A.; and Armstrong, William J., to General Electric Company, Container and ice cube tray assembly, 4,789,130, Cl. 249-120.000.

Stiffer, Mario, Process for manufacturing hydrate salts-base granule-shaped thermal energy accumulators with an adherent hermetic coating, and accumulators obtained by said process, 4,789,562, Cl. 427-212.000.

Stocker Hinge Manufacture Co.: See—  
Bizek, Donald R., 4,788,748, Cl. 16-308.000.

Stoddard, James C.: See—  
Mustafa, Mehmet; Tweedy, Ernest P.; Stoddard, James C.; and Beriont, Walter J., 4,789,895, Cl. 358-147.000.

Stokar, Saul, to Elscint Ltd., Determining absolute image intensity in magnetic resonance systems, 4,789,830, Cl. 324-308.000.

Stokker, Gerald E., to Merck & Co., Inc., Antihypercholesterolemic compounds, 4,789,682, Cl. 514-422.000.

Stone, Patrick C.; Luke, Mike A.; and Ingram, Gary D., to Baker Oil Tools, Inc., Tension set packing apparatus for subterranean wells, 4,789,029, Cl. 166-134.000.

Stracke, Hans-Joachim: See—  
Simon, Jochen; and Stracke, Hans-Joachim, 4,788,925, Cl. 114-69.000.

Strekopytov, Alexei A.; Smirnov, Boris A.; Danilov, Mikhail V.; and Yangibayev, Zaribai, Surgical instrument for applying linear staple sutures and intersecting the tissue therebetween, 4,788,978, Cl. 128-334.00R.

Stribling, Donald, to Science Application International Corporation, Method and apparatus for determining RE gasket shielding effectiveness, 4,789,829, Cl. 324-263.000.

Stritzke, Bernard G.: See—  
Rericha, Brian F.; and Stritzke, Bernard G., 4,789,166, Cl. 277-134.000.

Strosser, Richard P.; Bohman, Carl E.; and Chow, Mark K., to Ford New Holland, Inc., Metal detection in the vicinity of ferrous boundaries, 4,788,813, Cl. 56-10.200.

Stroud, John R.; and Ornellas, Donald L., to United States of America, Energy, Flying-plate detonator using a high-density high explosive, 4,788,913, Cl. 102-202.500.

Structural Instrumentation, Inc.: See—  
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Suganuma, Takashi: See—  
Onishi, Koichi; Ouchi, Yoshifusa; Suganuma, Takashi; Utsumi, Atsushi; and Kuroiwa, Takao, 4,789,239, Cl. 356-316.000.

Sugawara, Hitosi: See—  
Nambu, Yutaka; Sugawara, Hitosi; and Saitoh, Yasuo, 4,788,989, Cl. 131-303.000.

Sugie, Masuo; Kurihara, Koji; Aiba, Yoshiro; and Maeda, Toshiaki, to Toshiba Ceramics Co., Ltd., Process for producing a zirconia refractory body and a product produced by the process, 4,789,651, Cl. 501-103.000.

Sugihara, Taizo: See—  
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Sugimoto, Hiroyuki: See—  
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Sugimoto, Isao; and Tsuta, Hiroyuki, to Kanebo, Ltd., Vaginal suppository, 4,789,669, Cl. 514-178.000.

Sugimura, Masahiko: See—  
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Sugimura, Tatuo: See—  
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Sugiura, Shinji: See—  
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Sugiyama, Yoshio; and Kozuka, Yoshimi, to Kabushiki Kaisha Sugiyama Denki Seisakusho, Automatic release timing control system, 4,788,908, Cl. 100-47.000.

Sullaway, Bob L.; Knox, Lloyd C.; and Zunkel, Gary D., to Halliburton Company, Remote fluid transfer system and method for sub-sea baseplates and templates, 4,789,271, Cl. 405-225.000.

Sullivan, Charles W.: See—  
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Sulzer Brothers Limited: See—  
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Sumitomo Electric Industries, Ltd.: See—  
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Summers, David J.: See—  
Summers, Donald L.; Summers, David J.; and Tolomei, John G., 4,788,844, Cl. 72-110.000.

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Maggio, Edward T., 4,789,631, Cl. 435-7.000.

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Perrin, Alan P., 4,789,584, Cl. 428-159.000.

Tabler, Donald C.; and Johnson, Marvin M., to Phillips Petroleum Company, Process for facilitating filtration of used lubricating oil, 4,789,460, Cl. 208-180.000.

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Vilhelmsson, Kennet J. A.; and Lock, Tomas E., 4,789,214, Cl. 350-96.150.

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Ehni, George J.; Tai, Jy-Der; Chiu, Edison H.; and Carroll, Thomas A., 4,789,793, Cl. 307-303.000.

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Yamamoto, Kazuto; and Takahashi, Kazushi, 4,789,816, Cl. 318-696.000.

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Takahashi, Shuichi: See—  
Kamada, Takeshi; and Takahashi, Shuichi, 4,789,903, Cl. 358-296.000.

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Meguro, Kanji; and Nishikawa, Kohei, 4,789,675, Cl. 514-229.800.

Takeda, Fumio: See—  
Matsunaga, Makoto; Iyama, Yoshitada; and Takeda, Fumio, 4,789,846, Cl. 333-104.000.

Takeda, Masashi: See—  
Sakamoto, Yukio; Tanabe, Takeshi; Hori, Toshio; Takeda, Masashi; and Iida, Mitsuhiro, 4,789,847, Cl. 333-185.000.

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Takemura, Kazunari: See—  
Ohtani, Shoji; Takemura, Kazunari; Sato, Yukiya; and Tsushima, Rikio, 4,789,613, Cl. 430-110.000.

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Sasamura, Minoru; and Takenaka, Kazutoshi, 4,789,320, Cl. 425-190.000.

Takeshima, Sadao; and Yabe, Hideo, to Jidosha Kiki Co., Ltd., Control device for power steering apparatus, 4,789,041, Cl. 180-142.000.

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Ferguson, James L.; and McLaughlin, Charles W., 4,789,858, Cl. 340-784.000.

Tam, Aloysius T.: See—  
Liou, Jiunn-Yau; Lee, May-Lin; Kok, Moon S.; Yu, James; and Tam, Aloysius T., 4,789,967, Cl. 365-189.000.

Tamura, Junichi: See—  
Saito, Naohide; Tamura, Junichi; Kurosawa, Masaji; and Terada, Isao, 4,789,585, Cl. 428-185.000.

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Tanaka, Akio: See—  
Hosokawa, Masuo; Tanaka, Akio; Kohmatsu, Keiichiro; Yokoyama, Tohei; Urayama, Kiyoshi; Matsuo, Sadamitsu; and Kato, Masashi, 4,789,105, Cl. 241-67.000.

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Mieno, Toshiyuki; Nakajima, Toyohiko; Tanaka, Akira; and Nagao, Akira, 4,788,822, Cl. 60-602.000.

Tanaka, Atsuo: See—  
Kubo, Masahiro; Dohmoto, Tadashi; Tanaka, Atsuo; and Hirai, Hidetoshi, 4,789,605, Cl. 428-614.000.

Tanaka, Hideo: See—  
Tori, Sigeru; Tanaka, Hideo; Ogata, Yuzuru; Sasaoka, Michio; Saito, Norio; and Nagao, Shigemitsu, 4,789,740, Cl. 540-358.000.

Tanaka, Kazuo: See—  
Tanaka, Tsunefumi; Ikemori, Keiji; Kato, Masatake; and Tanaka, Kazuo, 4,789,227, Cl. 350-427.000.

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Kanayama, Shigehiro; Tanaka, Kazuto; and Ito, Masaki, 4,789,891, Cl. 358-55.000.

Tanaka Manufacturing Co., Ltd.: See—  
Tanaka, Yoshihisa, 4,788,863, Cl. 73-493.000.

Tanaka, Masamitsu, to Sanwa Needle Bearing Co., Ltd., Composite tape guide of cassette tape for VTR, 4,789,114, Cl. 242-199.000.

Tanaka, Noriyoshi: See—  
Katsumata, Shigeru; Handa, Takuro; Kamakura, Tamiji; Tanaka, Noriyoshi; Katoh, Hidekatsu; Namiwa, Kimiyoshi; and Shoji, Yoshikazu, 4,789,492, Cl. 252-32.70E.

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Takahashi, Shingo; Sanada, Seiji; Tanaka, Sakae; and Umeiyama, Kazuya, 4,789,899, Cl. 358-236.000.

Tanaka, Toshiaki, to Idemitsu Petrochemical Co., Ltd., Immersion oil composition having low fluorescence emissions for microscope, 4,789,490, Cl. 252-1.000.

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Cellini, Francesco; Gervasutti, Vittorio; Tancorra, Raffaele; and Tonti, Sergio, 4,789,741, Cl. 540-535.000.



- Tani, Naoyuki; Ueno, Motomu; Yoshida, Kusutaro; and Mizukami, Yukio, to Sankyo Chemical Co., Ltd. Process for preparing a gas permeable adhesive tape. 4,789,413, Cl. 156-77.000.
- Taniguchi, Masahiko; and Goh, Shigeru, to Chisso Corporation. Hot-melt-adhesive composite fiber. 4,789,592, Cl. 428-373.000.
- Taniguchi, Masahiko: See—  
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- Tanimoto, Kenichi; and Date, Kazuhiro, to Doryokuro Kakunenryo Kaihatsu Jigyodan. Method and apparatus for visualizing ultrasonic waves in liquid-solid systems. 4,788,866, Cl. 73-606.000.
- Taniyama, Seiro, to Sony Corporation. Apparatus for recording and/or reproducing data signal on or from disk shaped recording medium at a variably selected constant linear velocity. 4,789,975, Cl. 369-50.000.
- Tanner, Cynthia L.: See—  
Gibbons, Charles E.; Tanner, Cynthia L.; and Whillock, Allan A., 4,789,575, Cl. 428-34.200.
- Tanuma, Itsumo: See—  
Morimura, Yasuhiro; Fukura, Yukio; Ishikawa, Hikaru; Tanuma, Itsumo; and Honda, Toshio, 4,789,586, Cl. 428-216.000.
- Tarzia, Giorgio: See—  
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- Tatsuno, Tadayoshi; Kashiwada, Seiji; Matsui, Komaji; Wakimoto, Mituo; and Tabuchi, Ichiro, to Kansai Paint Co., Ltd. Process for coating a metallic substrate. 4,789,566, Cl. 427-388.200.
- Tatsuta Electric Wire and Cable Co., Ltd.: See—  
Eguchi, Kazumasa; Nakatani, Fumio; Wakita, Shinichi; Murakami, Hisatoshi; and Terada, Tsunehiko, 4,789,411, Cl. 148-24.000.
- Tauber, David; and Philippon, William. Pneumatic plunger system. 4,788,928, Cl. 114-255.000.
- Tavana, Danesh M.: See—  
Birkner, John M.; Tavana, Danesh M.; Chan, Andrew K.; and Wong, Sing Y., 4,789,951, Cl. 364-716.000.
- Taylor, Fred R., to PPG Industries, Inc. Methods of inducing plant growth responses. 4,789,397, Cl. 71-107.000.
- Taylor, Reginald M., to Glyzinic Pharmaceuticals Limited. Plastics or rubber materials modified by crystalline glycerato-zinc complex. 4,789,701, Cl. 524-382.000.
- Taylor, Stewart S.; and Miller, Bruce E., to Tektronix, Inc. Limiting circuit. 4,789,799, Cl. 307-540.000.
- Taylor, Terry R. Coaxial cable connector. 4,789,356, Cl. 439-584.000.
- Taylor, William W., Jr.: See—  
Clarkson, Bruce A.; Frere, Ronald J.; Loughlin, Thomas G.; Taylor, William W., Jr.; and Mongeau, Peter, 4,789,859, Cl. 340-825.310.
- Technochemie GmbH: See—  
Stenzenberger, Horst; and Koenig, Peter, 4,789,704, Cl. 524-548.000.
- Teepak, Inc.: See—  
Bridgeford, Douglas J.; and Rahman, Matiu, 4,789,006, Cl. 138-118.100.
- Teffenbart, John M., to Tyndale Plains-Hunter, Ltd. Hydrophilic polyurethanes prepared from mixed oxyalkylene glycols. 4,789,720, Cl. 528-76.000.
- Teijin Limited: See—  
Makino, Yuji; Matugi, Hideo; and Suzuki, Yoshiki, 4,789,667, Cl. 514-161.000.
- Morinaga, Tsuto; Miura, Kin-ichiro; Shimotohno, Kunitada; Ikegami, Masato; and Ichikawa, Yataro, 4,789,636, Cl. 435-320.000.
- Nishibata, Katsuji; Takano, Hiroshi; Itai, Masaru; and Shimote, Tsugutaka, 4,789,388, Cl. 55-158.000.
- Tektronix, Inc.: See—  
Berg, William E., 4,789,765, Cl. 200-245.000.
- Grellmann, H. Erwin, 4,789,791, Cl. 307-119.000.
- Kersenbrock, Michael D.; Lowry, David A.; Harris, Gregory D.; Henry, Michael D.; and Kohlmeier, Francis D., 4,789,789, Cl. 307-40.000.
- Lo, Pei-hwa; and Thong, Tran, 4,789,952, Cl. 364-724.200.
- Mitch, John H., 4,789,217, Cl. 350-96.210.
- Saxe, Charles L.; and Milliron, Daniel E., 4,789,950, Cl. 364-577.000.
- Taylor, Stewart S.; and Miller, Bruce E., 4,789,799, Cl. 307-540.000.
- Telenorma Telefonbau und Normalzeit GmbH: See—  
Richter, Ludwig; Niederhofer, Karl H.; Kramer, Dieter; Sussner, Gerhard; Girscher, Wolfgang; Munch, Volker; Vial, Heinrich; Mayer, Helmut R.; and Reyber, Hayo, 4,790,007, Cl. 379-420.000.
- Templin, Robert W. Novel display system and method for producing same. 4,788,784, Cl. 40-657.000.
- Tenzato, John B., Jr.; Hodge, Robert R.; Williams, Arthur V.; and Karrenman, Hans E. Forcible entry tool. 4,789,134, Cl. 254-104.000.
- Terada, Isao: See—  
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- Terada, Toshimichi: See—  
Masuda, Kenmei; Terada, Toshimichi; Ogiro, Kenji; Yokoo, Shozo; and Uchiyama, Osamu, 4,789,912, Cl. 360-85.000.
- Terada, Tsunehiko: See—  
Eguchi, Kazumasa; Nakatani, Fumio; Wakita, Shinichi; Murakami, Hisatoshi; and Terada, Tsunehiko, 4,789,411, Cl. 148-24.000.
- Terai, Kenichi: See—  
Watanabe, Koji; Hayashi, Katsuhiko; Minakuchi, Nobuaki; Misaki, Masayuki; Terai, Kenichi; Nakama, Yasutoshi; and Morita, Masaharu, 4,790,014, Cl. 381-1.000.
- Teramura, Kimio: See—  
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- Teranishi, Shunichi, to Aisin Seiki Kabushiki Kaisha. Casing for storing therein a plurality of cassettes. 4,789,209, Cl. 312-12.000.
- Terunuma, Hiroshi: See—  
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- Tesic, Mike M.: See—  
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- Teter, Michael P.: See—  
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- Tetrault, Leonard P.: See—  
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- Texaco Inc.: See—  
Morduchowitz, Abraham; and Sammells, Anthony F., 4,789,451, Cl. 204-275.000.
- Waddill, Harold G.; Lin, Jiange-Jen; and Speranza, George P., 4,789,721, Cl. 528-111.000.
- Zimmerman, Robert L.; and Renken, Terry L., 4,789,689, Cl. 521-115.000.
- Texas Instruments Incorporated: See—  
Brighton, Jeffrey E.; Hollingsworth, Deems R.; Welch, Michael; McMann, Ronald E.; Torreno, Manuel L., Jr.; and Sullivan, Charles W., 4,789,885, Cl. 357-34.000.
- Christian, Donald J., 4,789,940, Cl. 364-468.000.
- Ehni, George J.; Tai, Jy-Der; Chiu, Edison H.; and Carroll, Thomas A., 4,789,793, Cl. 307-303.000.
- Nichaus, Jeffrey A.; and Engle, Jesse O., 4,789,957, Cl. 364-749.000.
- Theodoropoulos, Spyros. Isomaleimide and isophthalimide derivatives of chromophors. 4,789,742, Cl. 544-69.000.
- Thermacore, Inc.: See—  
Shank, Brian E.; and Shaubach, Robert M., 4,789,026, Cl. 165-104.260.
- Thermo Electron Web Systems, Inc.: See—  
Goodnow, Ronald F.; Reid, Robert A.; and Austin, Robert, 4,789,432, Cl. 162-281.000.
- Thomas, Alvin D.; and Pruitt, Garner, to Crellin, Inc. Dye tube. 4,789,111, Cl. 242-118.100.
- Thomas-Leurquin, Genevieve; Gayot, Anne; Poitou, Pierre; and Basquin, Serge, to Pierre Fabre Medicament. Method for the treatment of periodontal pockets with a composition comprising collagen and an antiseptic or anti-inflammatory substance. 4,789,662, Cl. 514-21.000.
- Thomas, Mammen: See—  
Koyama, Linda J.; Thomas, Mammen; and Levinson, Harry J., 4,789,760, Cl. 174-68.500.
- Thomas, Michael: See—  
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- Thompson, Marion E. Stationary seat crutch. 4,788,969, Cl. 128-78.000.
- Thomson-CSF: See—  
Le Pesant, Jean-Pierre; Hareng, Michel; and Mourey, Bruno, 4,789,228, Cl. 350-355.000.
- Thomson Industries, Inc.: See—  
Mutolo, Francis V., 4,789,249, Cl. 384-43.000.
- Thomson, Russell I.: See—  
Bull, James R.; Thomson, Russell I.; Laurent, Henry; Schroeder, Helmut; and Wiechert, Rudolf, 4,789,671, Cl. 514-182.000.
- Thong, Tran: See—  
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- Thronburg, James B.: See—  
Connelly, Arthur J.; and Thronburg, James B., 4,789,136, Cl. 254-391.000.
- Thurrow, Jerry A.: See—  
Rice, Dennis A.; and Thurrow, Jerry A., 4,789,126, Cl. 248-503.100.
- Tichy, Oldrich J.; and Meissner, Konrad E., to Atlas Pacific Engineering Company. Press for extracting juice from comestible solids and semi-solids such as fruits and vegetables. 4,788,910, Cl. 100-120.000.
- TIF Instruments, Inc.: See—  
Liebermann, Leonard N., 4,788,858, Cl. 73-119.00A.
- Tindall, Robert J., to Kirsch Technologies, Inc. Computer memory back-up with automatic tape positioning. 4,789,961, Cl. 364-900.000.
- Tipton, Carl L.; and Beitz, Donald C., to Iowa State University Research Foundation, Inc. Method and compositions for suppression of atherogenesis utilizing cholesterol hydroperoxides. 4,789,670, Cl. 514-182.000.
- Tisdale, John W. Medication and method for treating heartworms in dogs. 4,789,548, Cl. 424-472.000.
- Titus, Matthew G. Smoking device. 4,788,988, Cl. 131-198.200.
- TLV Co., Ltd.: See—  
Yonemura, Masao; and Yokoyama, Takeshi, 4,788,849, Cl. 73-40.50A.
- Tobita, Hidesaki; Naruse, Kazuo; and Yajima, Shigeru, to Toyota Jidosha Kabushiki Kaisha; and Yajima Kogyo, Inc. Projection welder. 4,789,768, Cl. 219-78.010.
- Toda, Yasuhiko, to Ube Industries, Ltd. Process for producing a shaped, sintered magnesia article having an enhanced resistance to

- hydration and an improved mechanical strength. 4,789,510, Cl. 264-60.000.
- Todd, Richard S.: See—  
Boyle, John T. A.; and Todd, Richard S., 4,789,677, Cl. 514-313.000.
- Toho, Masato: See—  
Tsuzuki, Toshiyuki; and Toho, Masato, 4,789,892, Cl. 358-80.000.
- Toide, Eiichi: See—  
Shikama, Shinsuke; and Toide, Eiichi, 4,789,978, Cl. 369-112.000.
- Tokai Kogyo Kabushiki Kaisha: See—  
Unuma, Sadao; and Yamashita, Masashi, 4,789,088, Cl. 226-74.000.
- Tolomei, John G.: See—  
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- Tomiyasu, Kunihiko: See—  
Ueno, Ryuzo; Kanayama, Tatsuo; Nakashima, Toshitaka; Itami, Tomiyasu, Kunihiko; and Matsuda, Toshio, 4,789,497, Cl. 252-194.000.
- Tomoda, Toshimasa: See—  
Martin, Wallace W.; Exall, Douglas I.; Tomoda, Toshimasa; and Badono, Shinji, 4,788,852, Cl. 73-61.10R.
- Tonti, Sergio: See—  
Cellini, Francesco; Gervasutti, Vittorio; Tancorra, Raffaele; and Tonti, Sergio, 4,789,741, Cl. 540-535.000.
- Torii, Sigeru; Tanaka, Hideo; Ogata, Yuzuru; Sasaoka, Michio; Saito, Norio; and Nagao, Shigemitsu, to Otsuka Kagaku Yakuhin Kabushiki Kaisha. Halogenation process for preparing 2-(oxoazetidinyl)-3-chloromethyl-3-butenolate. 4,789,740, Cl. 540-358.000.
- Tornblom, Bengt H., to Tornbloms Kvalitetskontroll AB. Coolant structure for a device for determining the quality of hot test objects. 4,789,828, Cl. 324-224.000.
- Tornbloms Kvalitetskontroll AB: See—  
Tornblom, Bengt H., 4,789,828, Cl. 324-224.000.
- Torque Converter Rebuilding Systems: See—  
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- Torreno, Manuel L., Jr.: See—  
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- Toshiba Ceramics Co., Ltd.: See—  
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- Toshiba Kabushiki Kaisha: See—  
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- Toshiba Kikai Kabushiki Kaisha: See—  
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- Toso Corporation: See—  
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- Toso Sasteel Co., Ltd.: See—  
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- Toth, Dennis M. Universal bracket for archery bow accessories. 4,788,961, Cl. 124-24.00A.
- Toth, Vincent A.: See—  
Kasner, William H.; Roach, James F.; and Toth, Vincent A., 4,789,770, Cl. 219-121.700.
- Tower Manufacturing Corporation: See—  
Krause, W. Barry, 4,789,766, Cl. 200-302.300.
- Tower, Timothy M.; Reichman, James M.; and Harold, Paul D., to FlowDrill Corporation. Apparatus for and method of pumping output fluids such as abrasive liquids. 4,789,313, Cl. 417-388.000.
- Town, Michael-Harold: See—  
Skuballa, Werner; Raduechel, Bernd; Schwarz, Norbert; Vorybruggen, Helmut; Elger, Walter; Loge, Olaf; and Town, Michael-Harold, 4,789,685, Cl. 514-530.000.
- Toyo Boseki Kabushiki Kaisha: See—  
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- Toyo Engineering Corporation: See—  
Fujita, Yuichi; Kaneko, Takayuki; Okada, Mitsuo; Shima, Kazumi; Yanaru, Hideaki; and Numaguchi, Tohru, 4,789,132, Cl. 251-129.110.
- Matsubara, Tetsuyuki; Ito, Norifumi; Iwamoto, Mune; and Ando, Toshihiko, 4,789,272, Cl. 406-48.000.
- Toyo Kasei Kogyo Kabushiki Kaisha: See—  
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- Toyoda Gosei Co., Ltd.: See—  
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- Toyota Jidosha Kabushiki Kaisha: See—  
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- Komoda, Norio; and Otake, Atsumu, 4,788,892, Cl. 74-866.000.
- Kubo, Masahiro; Dohmoto, Tadashi; Tanaka, Atsuo; and Hirai, Hidetoshi, 4,789,605, Cl. 428-614.000.
- Machata, Hiromi; Okuda, Yutaka; Masaki, Shoichi; Asami, Ken; and Sakai, Kazunori, 4,789,938, Cl. 364-426.020.
- Ohe, Junzo; and Kondo, Hiroshi, 4,789,866, Cl. 343-712.000.
- Tobita, Hideaki; Naruse, Kazuo; and Yajima, Shigeru, 4,789,768, Cl. 219-78.010.
- Yasue, Hideaki; and Fukumura, Kagenori, 4,789,937, Cl. 364-424.100.
- Toyota, Sumio, to Yoshida Kogyo K. K. Automatic fastener assembling machine. 4,789,089, Cl. 227-15.000.
- Trani, Aldo: See—  
Malabarba, Adriano; Trani, Aldo; Ferrari, Pietro; and Tarzia, Giorgio, 4,789,661, Cl. 514-8.000.
- Transfer Technology Limited: See—  
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- Transmatic, Incorporated: See—  
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- Travers, Christine; Bournonville, Jean-Paul; and Franck, Jean-Pierre, to Institut Francais Du Petrole. Catalyst of high mordenite content for isomerizing normal paraffins and process for producing the catalyst. 4,789,655, Cl. 502-66.000.
- Tri-Brothers Chemical Corporation: See—  
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- Tribelhorn, Ulrich: See—  
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- Trieba, Friedrich; Raedisch, Helmer; Bravet, Jean-Louis; Abel, Jean-Claude; and Crux, Noel, to Saint-Gobain Vitrage. Method for manufacturing laminated glasses. 4,789,600, Cl. 428-425.600.
- Trippe, Jerry C.: See—  
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- Trompetto, Mario: See—  
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- Trost, David J., to Spectra-Physics, Inc. Solid-state laser having a moving lasing material. 4,789,988, Cl. 372-34.000.
- Troughton, Brian H. P., to Huyck Corporation. Sixteen harness dual layer weave. 4,789,009, Cl. 139-383.00A.
- Trowbridge, Christina M.: See—  
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- True, Thomas T., to General Electric Company. Light valve projector apparatus having increased light efficiency. 4,789,221, Cl. 350-162.120.
- TRW Repa GmbH: See—  
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- TRW United-Carr GmbH: See—  
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- Tsuchitani, Masatoshi; Naito, Sakae; and Nakajima, Ryoichi, to Agency of Industrial Science and Technology; and Maruzen Petrochemical Co., Ltd. Process for preparing mesophase pitches. 4,789,456, Cl. 208-39.000.
- Tsuda, Kiyoshi: See—  
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- Tsuji, Sentaro: See—  
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- Tsukahara, Daiki: See—  
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- Tsunemine, Toyohiko: See—  
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- Tsushima, Rikio: See—  
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- Tsuta, Hiroyuki: See—  
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- Tsutsumikoshi, Shinobu, to Suzuki Motor Company Limited. Two-and-four-wheel drive shifting system. 4,788,888, Cl. 74-710.500.
- Tsuyuzaki, Kazuo: See—  
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- Tsuzuki, Toshiyuki; and Toho, Masato, to Fuji Xerox Co., Ltd. Color adjusting device including matrix-masking circuitry. 4,789,892, Cl. 358-80.000.
- Tucker, Kevin N.: See—  
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- Tuckey, Charles H., to Walbro Corporation. Self-contained electric fuel pump with output pressure regulation. 4,789,308, Cl. 417-44.000.
- Turetsky, Isadore. Adsorption apparatus. 4,789,472, Cl. 210-248.000.
- Turk, Thomas R.: See—  
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- Tutas, Edward P.; and Passehl, Donald J., to Kranz Incorporated. Die-cut paint masking part. 4,789,579, Cl. 428-41.000.
- Tuziemski, Aleksander: See—  
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- Tweedy, Ernest P.: See—  
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- Twyford, David R.; and Hankins, Edward E., to Premier Coatings Limited. Protection membrane. 4,789,578, Cl. 428-40.000.
- Tyndale Plains-Hunter, Ltd.: See—  
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- Typpo, Pekka, to Impact Systems, Inc. Apparatus for sensing the thickness of a pulp suspension on the forming wire of a paper machine. 4,789,431, Cl. 162-263.000.



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 Ullman, Johan M.; and Aust, Fredrik, to Ullman, Johan. Combined boat fender and emergency ladder. 4,788,926, Cl. 114-219.000.  
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Walker, Robert A. Air mattress with audible pressure relief valve. 4,788,729, Cl. 5-449.000.  
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Croucher, Melvin D.; Wong, Raymond W.; Ober, Christopher K.; and Hair, Michael L., 4,789,616, Cl. 430-137.000.  
Wong, Sing Y.: See—  
Birkner, John M.; Tavana, Danesh M.; Chan, Andrew K.; and Wong, Sing Y., 4,789,951, Cl. 364-716.000.  
Wood, John E.: See—  
Jacobsen, Stephen C.; Wood, John E.; and Price, Richard H., 4,789,803, Cl. 310-309.000.  
Wood, Le Roy T., to Outboard Marine Corporation. Apparatus for spark advance throttle control. 4,788,955, Cl. 123-413.000.  
Woodhouse, Derek A. Device for control of scale formation. 4,789,448, Cl. 204-228.000.  
Woodman, Peter: See—  
Chauvier, Daniel J. V. D.; and Woodman, Peter, 4,789,364, Cl. 440-5.000.  
Woods, Kenneth R.; and Orme, Thomas W., to New York Blood Center, Inc. Removal of lipid soluble process chemicals from biological materials by extraction with naturally occurring oils or synthetic substitutes thereof. 4,789,545, Cl. 424-101.000.  
Worthington, Thomas K.: See—  
Gundersen, Steven C.; and Worthington, Thomas K., 4,789,934, Cl. 364-419.000.  
Wreede, John E., to Hughes Aircraft Company. Hologram stabilizing assembly and method. 4,789,211, Cl. 350-3.610.  
Wright, Bernard S.: See—  
Owen, Hartley; Daviduk, Nicholas; Marsh, Susan K.; and Wright, Bernard S., 4,789,528, Cl. 422-190.000.  
Wu, Marinda L.: See—  
Vaughn, Walter L.; and Wu, Marinda L., 4,789,386, Cl. 55-16.000.  
Wuerzer, Bruno: See—  
Husslein, Gerd; Ammermann, Eberhard; Hamprecht, Gerhard; and Wuerzer, Bruno, 4,789,747, Cl. 548-262.000.  
Wupper, Hans, to Alfred Teves GmbH. Slip-controlled brake system for automotive vehicles. 4,789,207, Cl. 303-113.000.  
Wurz, Rainer, to U.S. Philips Corporation. Circuit arrangement for noise reduction at the minimum volume setting of an amplifier. 4,789,841, Cl. 330-149.000.  
Xerox Corporation: See—  
Ciccarelli, Roger N.; and Bertrand, Jacques C., 4,789,615, Cl. 430-126.000.  
Croucher, Melvin D.; Wong, Raymond W.; Ober, Christopher K.; and Hair, Michael L., 4,789,616, Cl. 430-137.000.  
Drake, Donald J.; Hawkins, William G.; Pond, Stephen F.; Campanelli, Michael R.; Hartman, Pamela J.; and Bailey, Raymond E., 4,789,425, Cl. 156-644.000.  
Plain, Margaret C., 4,789,150, Cl. 271-220.000.  
Solodar, Warren E.; Kang, Henry R.; and Weber, Joseph R., 4,789,400, Cl. 106-22.000.  
Yabe, Hideo: See—  
Takeshima, Sadao; and Yabe, Hideo, 4,789,041, Cl. 180-142.000.  
Yagi, Akira: See—  
Ohmori, Susumu; Yagi, Akira; and Takase, Satoshi, 4,789,504, Cl. 264-22.000.  
Yajima Kogyo, Inc.: See—  
Tobita, Hideaki; Naruse, Kazuo; and Yajima, Shigeru, 4,789,768, Cl. 219-78.010.  
Yajima, Shigeru: See—  
Tobita, Hideaki; Naruse, Kazuo; and Yajima, Shigeru, 4,789,768, Cl. 219-78.010.  
Yamada, Mitsuhiro: See—  
Inoue, Toshifumi; Yamada, Mitsuhiro; and Miki, Shigeru, 4,790,025, Cl. 382-41.000.  
Yamada, Takashi; Nomura, Masaaki; Yamamoto, Ryoichi; and Nahara, Akira, to Fuji Photo Film Co., Ltd. Magneto-optical recording medium. 4,789,606, Cl. 428-694.000.  
Yamada, Yasuyuki: See—  
Sato, Masami; Fujiyama, Masaaki; Suzuki, Masami; and Yamada, Yasuyuki, 4,789,590, Cl. 428-323.000.  
Yamagashi, Jun: See—  
Kobayashi, Fumio; Sakai, Kunio; and Yamagashi, Jun, 4,789,815, Cl. 318-135.000.  
Yamaguchi, Masami: See—  
Nitta, Koichi; Kabuta, Kazuma; Yamaguchi, Masami; Nakagawa, Tadashi; and Moriyasu, Katsuyuki, 4,788,931, Cl. 118-503.000.  
Yamaguchi, Masao; and Teramura, Kimio, to Hirose Electric Co., Ltd. Electrical connector shield case. 4,789,357, Cl. 439-607.000.  
Yamamoto, Kazuto; and Takahashi, Kazushi, to Canon Denahi Kabushiki Kaisha. Stepping motor drive control apparatus. 4,789,816, Cl. 318-696.000.



Yamamoto, Ryoichi: See—  
Yamada, Takashi; Nomura, Masaaki; Yamamoto, Ryoichi; and Nahara, Akira, 4,789,606, Cl. 428-694.000.  
Yamanaka, Mamoru; and Sugimura, Masahiko, to Yaskawa Electric Mfg. Co. Ltd. Thread cutting control method, 4,789,943, Cl. 364-474.280.  
Yamanaka, Seiji: See—  
Ogata, Yasuyuki; Ono, Hidetsugu; and Yamanaka, Seiji, 4,789,653, Cl. 501-134.000.  
Yamanaka, Torao, to Mitsubishi Denki Kabushiki Kaisha. Digital equipment, 4,789,790, Cl. 307-66.000.  
Yamanashi, Takanori, to Olympus Optical Co., Ltd. Zoom lens system, 4,789,229, Cl. 350-427.000.  
Yamashita, Masashi: See—  
Unuma, Sadao; and Yamashita, Masashi, 4,789,088, Cl. 226-74.000.  
Yamashita, Shu: See—  
Yano, Isamu; Hani, Kiyoshi; Yamashita, Shu; Kawabata, Kazuo; and Kogure, Naoyuki, 4,788,759, Cl. 29-159.00B.  
Yamazaki, Kikuo; and Kitada, Akira, to Fuji Photo Film Co., Ltd. Radiation image converting material, 4,789,785, Cl. 250-487.100.  
Yamazaki, Toshihiko; Murase, Shoji; and Motohashi, Tatsuro, to Director, Fruit Tree Research Station, Ministry of Agriculture, Forestry and Fisheries Government of Japan, The; and Ajinomoto Co., Inc. Flower-thinning agent for fruit trees, 4,789,398, Cl. 71-122.000.  
Yanagisawa, Toshio: See—  
Kasahara, Koichi; Yanagisawa, Toshio; and Kajimura, Motoji, 4,789,223, Cl. 350-333.000.  
Yanaru, Hideaki: See—  
Fujita, Yuichi; Kaneko, Takayuki; Okada, Mitsuo; Shima, Kazumi; Yanaru, Hideaki; and Numaguchi, Tooru, 4,789,132, Cl. 251-129.110.  
Yang, Pay J. Detachable fan base, 4,789,128, Cl. 248-616.000.  
Yangibaev, Zaribai: See—  
Stekopytov, Alexei A.; Smirnov, Boris A.; Danilov, Mikhail V.; and Yangibaev, Zaribai, 4,788,978, Cl. 128-334.00R.  
Yano, Isamu; Hani, Kiyoshi; Yamashita, Shu; Kawabata, Kazuo; and Kogure, Naoyuki, to Mitsubishi Denki Kabushiki Kaisha. Method and apparatus for manufacturing steering wheel, 4,788,759, Cl. 29-159.00B.  
Yanosy, John A., Jr.; Vij, Jitender K.; and Das, Santanu, to Alcatel N.V. System for providing data services to a circuit switched exchange, 4,789,981, Cl. 370-58.000.  
Yarnell, Ian R., to Internal Pipe Drillings Limited. Device and method for removing irregularities in or enlarging an underground duct, 4,789,268, Cl. 405-154.000.  
Yaskawa Electric Mfg. Co. Ltd.: See—  
Yamanaka, Mamoru; and Sugimura, Masahiko, 4,789,943, Cl. 364-474.280.  
Yasuda, Hiroshi; and Honjo, Ichiro, to Fujitsu Limited. Method of projecting photoelectron image, 4,789,786, Cl. 250-492.200.  
Yasue, Hideki; and Fukumura, Kagenori, to Toyota Jidosha Kabushiki Kaisha. Method and system for shift control of an automatic transmission, 4,789,937, Cl. 364-424.100.  
Yen, Yung-Chau, to Advanced Micro Devices, Inc. Diffusion stop method for forming silicon oxide during the fabrication of IC devices, 4,789,560, Cl. 427-96.000.  
Yi, Basilio: See—  
Chan, Harry; and Yi, Basilio, 4,789,322, Cl. 425-336.000.  
Chan, Harry; and Yi, Basilio, 4,789,327, Cl. 425-133.100.  
Ying, Wei-chi; and Bonk, Robert R., to Occidental Chemical Corporation. Treatment of electroless nickel plating baths, 4,789,484, Cl. 210-721.000.  
Yokoi, Shinji; Naitoh, Kimitaka; and Ohta, Masami, to Aisin Seiki Kabushiki Kaisha. Mattress, 4,788,731, Cl. 5-478.000.  
Yokokawa, Takeshi: See—  
Akashi, Naotomo; Yokokawa, Takeshi; Ninomiya, Katsuaki; Shima, Harumi; and Horiguchi, Takeshi, 4,789,814, Cl. 318-77.000.  
Yokoo, Shozo: See—  
Masuda, Kenmei; Terada, Toshimichi; Ogiro, Kenji; Yokoo, Shozo; and Uchiyama, Osamu, 4,789,912, Cl. 360-85.000.  
Yokota, Tsuneshi; and Kondo, Osamu, to Kabushiki Kaisha Toshiba. Display apparatus with interface cable for transferring image data to CRT in parallel format, 4,789,856, Cl. 340-720.000.  
Yokoyama, Takeshi: See—  
Yonemura, Masao; and Yokoyama, Takeshi, 4,788,849, Cl. 73-40.50A.  
Yokoyama, Tohei: See—  
Hosokawa, Masuo; Tanaka, Akio; Kohmitsu, Keiichi; Yokoyama, Tohei; Urayama, Kiyoshi; Matsuo, Sadamitsu; and Kato, Masashi, 4,789,105, Cl. 241-67.000.  
Yonemura, Masao; and Yokoyama, Takeshi, to TLV Co., Ltd. Steam trap operation monitoring device, 4,788,849, Cl. 73-40.50A.  
Yoneshige, Frank T.: See—  
Brewer, Jackie D.; Gartin, Maynard H.; and Yoneshige, Frank T., 4,788,739, Cl. 15-322.000.  
Yoon, InBae. Plug for use in a reversible sterilization procedure, 4,788,966, Cl. 128-831.000.  
Yoshida, Fukuji: See—  
Takemasa, Kazuo; Yoshida, Fukuji; and Iwasa, Kenji, 4,788,829, Cl. 62-335.000.

Yoshida, Kazuyuki: See—  
Mori, Shinichi; Sakamoto, Keiji; Nakauchi, Hiroaki; Hamada, Akiyoshi; and Yoshida, Kazuyuki, 4,789,880, Cl. 355-55.000.  
Yoshida Kogyo K. K.: See—  
Kasai, Kazumi, 4,788,755, Cl. 24-136.00R.  
Morita, Toyoo; and Akiyama, Hideki, 4,788,812, Cl. 53-447.000.  
Toyota, Sumio, 4,789,089, Cl. 227-15.000.  
Yoshida, Kusutaro: See—  
Tani, Naoyuki; Ueno, Motomu; Yoshida, Kusutaro; and Mizukami, Yukio, 4,789,413, Cl. 156-77.000.  
Yoshikawa, Kiyooki: See—  
Oshiyama, Shigeki; Kishimoto, Koji; Hirota, Takeshi; Suzue, Shigetoshi; Hiramatsu, Hiroyoshi; Yoshikawa, Kiyooki; and Suzuki, Nobuyuki, 4,789,381, Cl. 8-115.600.  
Yoshikawa, Mitsuhiko: See—  
Otsuka, Kozi; Kira, Tohru; Imae, Kazuyoshi; and Yoshikawa, Mitsuhiko, 4,789,910, Cl. 360-113.000.  
Yoshimoto, Ryota; Kashima, Nobukazu; Hamuro, Junji; and Mitsugi, Koji, to Ajinomoto Company, Incorporated. Immunoprophylactic and immunotherapeutic agents, 4,789,658, Cl. 514-12.000.  
Yoshino, Kunihisa: See—  
Haneda, Satoshi; and Yoshino, Kunihisa, 4,789,612, Cl. 430-42.000.  
Yoshitomi, Shingo, to Kabushiki Kaisha Araki Gomu. Tool for assisting spray work at high position, 4,789,084, Cl. 222-174.000.  
Young, James R.: See—  
Peppers, Norman A.; Young, James R.; and Pierce, Gerald A., 4,790,024, Cl. 382-32.000.  
Yu, James: See—  
Liou, Jiunn-Yau; Lee, May-Lin; Kok, Moon S.; Yu, James; and Tam, Aloysius T., 4,789,967, Cl. 365-189.000.  
Yukawa, Toshihide: See—  
Takemoto, Tadashi; Yukawa, Toshihide; and Hisamitsu, Kunio, 4,789,758, Cl. 562-448.000.  
Yuyama, Masahiro: See—  
Kato, Yasuyuki; Yuyama, Masahiro; Moritani, Masahiko; Matsura, Hideaki; Iijima, Susumu; and Hashimoto, Tsuyoshi, 4,789,709, Cl. 525-366.000.  
Zanzig, Jurgen: See—  
Meschkat, Peter; and Zanzig, Jurgen, 4,789,999, Cl. 379-405.000.  
Zeager, Charles B. Method of making a dark, uniformly-colored, hardwood mulch, 4,788,790, Cl. 47-9.000.  
Zeiders, Glenn W.: See—  
Parrent, George B., Jr.; Zeiders, Glenn W.; Reilly, James P.; and Khazen, Antonio, 4,789,820, Cl. 324-58.50R.  
Zell, Karl; Seidel, Peter; and Pelz, Leo, to Siemens Aktiengesellschaft. Cable plug, 4,789,358, Cl. 439-607.000.  
Zenglein, Egon, to O&K Orenstein & Koppel Aktiengesellschaft. Device for pivoting a rigid axle driven by a universal shaft to the frame of an automotive vehicle, 4,789,182, Cl. 280-725.000.  
Zenion Industries, Inc.: See—  
Lee, Jimmy L., 4,789,801, Cl. 310-308.000.  
Zenith Electronics Corporation: See—  
Bellavia, Andrew S., Jr., 4,790,011, Cl. 380-15.000.  
Sgrignoli, Gary J., 4,790,010, Cl. 380-10.000.  
Zielsdorf, Randall A.: See—  
DiGianfilippo, Alessandro; Hitchcock, James R.; Lewis, Robert E.; Zielsdorf, Randall A.; Vos, James P.; Starai, Rudolph; Becker, Michael J.; Warner, Donald W.; and Huang, Leon, 4,789,014, Cl. 141-83.000.  
Zikria, Bashir A. Surgical student teaching aid, 4,789,340, Cl. 434-272.000.  
Zimmerman, Robert L.; and Renken, Terry L., to Texaco Inc. Amine catalyst for urethanes, 4,789,689, Cl. 521-115.000.  
Zimmermann, Walter, to Braun Aktiengesellschaft. Fuse, in particular for electric motors, 4,789,800, Cl. 310-68.000.  
Zinser Textilmaschinen GmbH: See—  
Meissner, Werner, 4,788,818, Cl. 57-264.000.  
Zinsmeyer, Thomas M.: See—  
Waser, Max P.; and Zinsmeyer, Thomas M., 4,789,317, Cl. 418-189.000.  
Ziss, Rainer: See—  
Fischer, Matthias; and Ziss, Rainer, 4,789,053, Cl. 192-106.200.  
Zucker, William F.: See—  
Randall, Roderick K.; and Zucker, William F., 4,789,994, Cl. 375-12.000.  
Zukeran, Atsushi: See—  
Morimoto, Yuichi; Maruyama, Hiromi; Aoyama, Motoo; Zukeran, Atsushi; Bessho, Yasunori; Matsumoto, Tomoyuki; Ishii, Yoshihiko; Fujimura, Kouji; and Uchikawa, Sadao, 4,789,520, Cl. 376-419.000.  
Zunkel, Gary D.: See—  
Sullaway, Bob L.; Knox, Lloyd C.; and Zunkel, Gary D., 4,789,271, Cl. 405-225.000.  
Zunkel, Richard L.: See—  
Edgett, David B.; and Zunkel, Richard L., 4,788,742, Cl. 16-79.000.  
Zwirn, Robert; and Thomas, Michael, to Hughes Aircraft Company. Demand auto focus driven by scene information only, 4,789,898, Cl. 358-227.000.  
501 Ueno Seiyaku Kabushiki Kaisha: See—  
Ueno, Ryuzo; Kanayama, Tatsuo; Nakashima, Toshitaka; Itami, Tomiyasu, Kunihiko; and Matsuda, Toshio, 4,789,497, Cl. 252-194.000.

## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 6TH DAY OF DECEMBER, 1988

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Bayer Aktiengesellschaft: See—  
Holmwood, Graham; Lursen, Klaus; and Frohberger, Paul-Ernst, Re. 32,796, Cl. 544-335.000.  
Dunne, Maurice J.: See—  
Engelberger, Joseph F.; Lindbom, Torsten H.; Dunne, Maurice J.; Perzley, William; Roberts, Wilbur N.; and Gardener, Horace L., deceased, Re. 32,794, Cl. 414-730.000.  
Eastman Kodak Company: See—  
Harvey, Donald M., Re. 32,797, Cl. 354-481.000.  
Engelberger, Joseph F.; Lindbom, Torsten H.; Dunne, Maurice J.; Perzley, William; Roberts, Wilbur N.; and Gardener, Horace L., deceased (by Gardener, Mrs. Horace L., administratrix), to Unimation, Inc. Programmable automatic assembly system, Re. 32,794, Cl. 414-730.000.  
Frohberger, Paul-Ernst: See—  
Holmwood, Graham; Lursen, Klaus; and Frohberger, Paul-Ernst, Re. 32,796, Cl. 544-335.000.  
Gardener, Horace L.: See—  
Engelberger, Joseph F.; Lindbom, Torsten H.; Dunne, Maurice J.; Perzley, William; Roberts, Wilbur N.; and Gardener, Horace L., deceased, Re. 32,794, Cl. 414-730.000.  
Gardener, Mrs. Horace L., administratrix: See—  
Engelberger, Joseph F.; Lindbom, Torsten H.; Dunne, Maurice J.; Perzley, William; Roberts, Wilbur N.; and Gardener, Horace L., deceased, Re. 32,794, Cl. 414-730.000.  
Harvey, Donald M., to Eastman Kodak Company. Pseudo format camera with exposure control, Re. 32,797, Cl. 354-481.000.  
Holmwood, Graham; Lursen, Klaus; and Frohberger, Paul-Ernst, to Bayer Aktiengesellschaft. Benzyl-pyrimidinylalkyl-ethers as plant growth regulators and fungicides, and corresponding pyrimidinyl-carbinols, Re. 32,796, Cl. 544-335.000.  
Lindbom, Torsten H.: See—  
Engelberger, Joseph F.; Lindbom, Torsten H.; Dunne, Maurice J.; Perzley, William; Roberts, Wilbur N.; and Gardener, Horace L., deceased, Re. 32,794, Cl. 414-730.000.  
Lursen, Klaus: See—  
Holmwood, Graham; Lursen, Klaus; and Frohberger, Paul-Ernst, Re. 32,796, Cl. 544-335.000.  
Matsuura, Toshio; Suwa, Kyoichi; Shimizu, Hisayuki; and Tanimoto, Akikazu, to Nikon Corporation. Exposure apparatus for production of integrated circuit, Re. 32,795, Cl. 356-121.000.  
Nikon Corporation: See—  
Matsuura, Toshio; Suwa, Kyoichi; Shimizu, Hisayuki; and Tanimoto, Akikazu, Re. 32,795, Cl. 356-121.000.  
Perzley, William: See—  
Engelberger, Joseph F.; Lindbom, Torsten H.; Dunne, Maurice J.; Perzley, William; Roberts, Wilbur N.; and Gardener, Horace L., deceased, Re. 32,794, Cl. 414-730.000.  
Roberts, Wilbur N.: See—  
Engelberger, Joseph F.; Lindbom, Torsten H.; Dunne, Maurice J.; Perzley, William; Roberts, Wilbur N.; and Gardener, Horace L., deceased, Re. 32,794, Cl. 414-730.000.  
Shimizu, Hisayuki: See—  
Matsuura, Toshio; Suwa, Kyoichi; Shimizu, Hisayuki; and Tanimoto, Akikazu, Re. 32,795, Cl. 356-121.000.  
Suwa, Kyoichi: See—  
Matsuura, Toshio; Suwa, Kyoichi; Shimizu, Hisayuki; and Tanimoto, Akikazu, Re. 32,795, Cl. 356-121.000.  
Tanimoto, Akikazu: See—  
Matsuura, Toshio; Suwa, Kyoichi; Shimizu, Hisayuki; and Tanimoto, Akikazu, Re. 32,795, Cl. 356-121.000.  
Unimation, Inc.: See—  
Engelberger, Joseph F.; Lindbom, Torsten H.; Dunne, Maurice J.; Perzley, William; Roberts, Wilbur N.; and Gardener, Horace L., deceased, Re. 32,794, Cl. 414-730.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

DePasquale, Ralph J.; and Wilson, Michael E., to SCM Corporation. Aqueous systems containing silanes for rendering masonry surfaces water repellent, B1 4,648,904, 12-6-88, Cl. 106-2.000.  
Nagano, Masashi, to Shimano Industrial Company Limited. Three-stage speed change front derailleur, B1 4,604,078, 12-6-88, Cl. 474-80.000.  
SCM Corporation: See—  
DePasquale, Ralph J.; and Wilson, Michael E., B1 4,648,904, Cl. 106-2.000.  
Shimano Industrial Company Limited: See—  
Nagano, Masashi, B1 4,604,078, Cl. 474-80.000.  
Wilson, Michael E.: See—  
DePasquale, Ralph J.; and Wilson, Michael E., B1 4,648,904, Cl. 106-2.000.

## LIST OF DESIGN PATENTEEES

AB Broderna Spendrup: See—  
Brindfors, Hans, 298,804, Cl. D9-390.000.  
AB Siba-Verken: See—  
Anderson, Karl G., deceased; and Paulsson, Bengt, 298,858, Cl. D25-164.000.  
Abe, Kenichi: See—  
Kame, Masaharu; and Abe, Kenichi, 298,854, Cl. D24-1.100.  
Abe, Yoshinori: See—  
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Inuma, Hideo, 298,824, Cl. D13-4.000.  
Allen, Roswell D. Metal fence post remover, 298,794, 12-6-88, Cl. D8-19.000.  
Anderson, Karl G., deceased (by Berglund, Marianne, heir); and Paulsson, Bengt, to AB Siba-Verken. Downpipe or the like, 298,858, 12-6-88, Cl. D25-164.000.  
Antonious, Anthony J. Golf club head, 298,846, 12-6-88, Cl. D21-217.000.  
Aprica Kassai Kabushikikaisha: See—  
Kassai, Kenzo, 298,815, Cl. D12-129.000.  
AVIA Group International, Inc.: See—  
Swett, Joan, 298,780, Cl. D2-314.000.  
Batts, Inc.: See—  
Blanchard, Russell O., 298,783, Cl. D6-319.000.  
Beecher, John F., III: See—  
Tucker, James E.; and Beecher, John F., III, 298,792, Cl. D7-102.000.  
Belsham, Ronald N. Mitre box, 298,795, 12-6-88, Cl. D8-71.000.  
Berglund, Marianne, heir: See—  
Anderson, Karl G., deceased; and Paulsson, Bengt, 298,858, Cl. D25-164.000.



Bio-Pak Associates: See—  
White, Douglas J., 298,855, Cl. D24-11.000.  
Black & Decker, Inc.: See—  
Oxit, Robert, 298,877, Cl. D32-70.000.  
Blanchard, Russell O., to Batts, Inc. Garment hanger. 298,783, 12-6-88, Cl. D6-319.000.  
Borromeo, Lucio, to 3 T. S.p.A. Stem for bicycle handlebars. 298,813, 12-6-88, Cl. D12-118.000.  
Borromeo, Lucio, to 3 T. S.p.A. Support for a saddle of a bicycle. 298,814, 12-6-88, Cl. D12-119.000.  
Bourque, Paul A., to Magnum Enterprises Ltd. Combined shower splash guard and soap holder. 298,851, 12-6-88, Cl. D23-307.000.  
Breen, John D.; and Williams, Richard D., to Murray Ohio Manufacturing Co., The. Bicycle mud guard. 298,820, 12-6-88, Cl. D12-186.000.  
Brennan, Paul L.: See—  
Hughes, Steven W.; and Brennan, Paul L., 298,831, Cl. D14-62.000.  
Brignole, Guillermo F.; and Lee, Robert E., to TeleQuest, Inc. Combination telephone handset and stand with dialing means. 298,830, 12-6-88, Cl. D14-53.000.  
Brindfors, Hans, to AB Broderne Spenndrup. Beer bottle. 298,804, 12-6-88, Cl. D9-390.000.  
British Telecommunications public limited company: See—  
Hughes, Steven W.; and Brennan, Paul L., 298,831, Cl. D14-62.000.  
Bruggeman, Bruce G.: See—  
Ewing, Robert L.; Fouke, Herbert A.; Hughes, James S.; and Bruggeman, Bruce G., 298,861, Cl. D26-71.000.  
Burkhart, Elder, deceased; by Burkhart, James, executor; and Mason, Ruth C. Seat unit for health care walker. 298,816, 12-6-88, Cl. D12-133.000.  
Burkhart, James, executor: See—  
Burkhart, Elder, deceased; Burkhart, James, executor; and Mason, Ruth C., 298,816, Cl. D12-133.000.  
Cassel, Robert L.; and Vancza, John, to Tri-Tronics, Inc. Collar-mounted animal training receiver unit. 298,872, 12-6-88, Cl. D30-199.000.  
Chonan, Katsuhiko: See—  
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 298,824, Cl. D13-4.000.  
Chow, Ho; and Kozloski, Edward A., to Hunter-Melnor. Aspiration sprayer for insecticides. 298,848, 12-6-88, Cl. D23-213.000.  
Colby, Donald B., to Tropitone Furniture Company. Swivel chair. 298,785, 12-6-88, Cl. D6-365.000.  
Comolli, William L. Attachment for an electrical wall switch. 298,796, 12-6-88, Cl. D8-300.000.  
Corbett, Reg D., to Rolet, Inc. Supporting and stabilizing stand for a boat. 298,879, 12-6-88, Cl. D34-31.000.  
Crisi, Louis. Combined cake shield and candle holder. 298,859, 12-6-88, Cl. D26-10.000.  
CTI Industries Corporation: See—  
Davis, John C., 298,809, Cl. D11-117.000.  
Daemar, James A., to Syndicated Amusements Limited. Inflatable koala bear figure. 298,843, 12-6-88, Cl. D21-159.000.  
Davis, John C., to CTI Industries Corporation. Artificial flower with inflated blossom. 298,809, 12-6-88, Cl. D11-117.000.  
Design Team Partners: See—  
Feldon, Steven E.; Wallace, David A.; Grove, James E.; and Halseth, Thor R., 298,856, Cl. D24-17.000.  
Devon Industries, Inc.: See—  
Jefferson, John R., 298,864, Cl. D26-140.000.  
Diaz, Gilberto B. Cowbell/woodblock and foot pedal support stand. 298,800, 12-6-88, Cl. D8-373.000.  
Dunchock, Richard S., to SL Corporation. Storage cart. 298,878, 12-6-88, Cl. D34-17.000.  
Dunlap, Jerald V., to M-D & Co. Portable air compressor. 298,832, 12-6-88, Cl. D15-9.000.  
Ebling, Wade M. Compartmented pill container. 298,803, 12-6-88, Cl. D9-339.000.  
Ekco Products, Inc.: See—  
Holzkopf, Michael E., 298,791, Cl. D7-83.000.  
Elm Industry Co., Ltd.: See—  
Sueta, Norio; and Hoshino, Hiroyasu, 298,838, Cl. D19-67.000.  
Engwall, Olof: See—  
Soderberg, Hans; and Engwall, Olof, 298,839, Cl. D19-69.000.  
Erickson, Donald E.; and Wilson, James D., to Maytag Company, The. Combined washer and dryer. 298,873, 12-6-88, Cl. D32-5.000.  
Ewing, Robert L.; Fouke, Herbert A.; Hughes, James S.; and Bruggeman, Bruce G., to Manville Corporation. Ares light. 298,861, 12-6-88, Cl. D26-71.000.  
Feldon, Steven E.; Wallace, David A.; Grove, James E.; and Halseth, Thor R., to Design Team Partners. Ophthalmic instrument. 298,856, 12-6-88, Cl. D24-17.000.  
Finley, Ron. Spark plug wire harness. 298,798, 12-6-88, Cl. D8-357.000.  
Fouke, Herbert A.: See—  
Ewing, Robert L.; Fouke, Herbert A.; Hughes, James S.; and Bruggeman, Bruce G., 298,861, Cl. D26-71.000.  
Friedman, Alan H., to Kanowsky Furniture, Inc. Combined sofa and plural table unit. 298,784, 12-6-88, Cl. D6-335.000.  
Giger, Sonja. Physical exerciser. 298,845, 12-6-88, Cl. D21-191.000.  
GKN Crompton Limited: See—  
White, Paul S.; and Searl, Arthur N., 298,797, Cl. D8-319.000.  
Graham, Ronald J. Cleaning supplies holder or similar article. 298,789, 12-6-88, Cl. D6-524.000.  
Green, Douglas L. Whistle. 298,841, 12-6-88, Cl. D21-64.000.  
Greene, Michael W., to Little Lake Industries, Inc. Chair. 298,787, 12-6-88, Cl. D6-373.000.  
Grove, James E.: See—  
Feldon, Steven E.; Wallace, David A.; Grove, James E.; and Halseth, Thor R., 298,856, Cl. D24-17.000.  
Halseth, Thor R.: See—  
Feldon, Steven E.; Wallace, David A.; Grove, James E.; and Halseth, Thor R., 298,856, Cl. D24-17.000.  
Hamilton, Thomas F. Cargo liner for open cargo compartment of an automobile. 298,817, 12-6-88, Cl. D12-155.000.  
Harrison, William H., to International Lubricants, Inc. Bottle or similar article. 298,805, 12-6-88, Cl. D9-411.000.  
Harvey, John W.: See—  
Tharp, Terry M.; Roberts, David W.; McCartney, John C.; and Harvey, John W., 298,862, Cl. D26-88.000.  
Tharp, Terry M.; Roberts, David W.; McCartney, John C.; and Harvey, John W., 298,863, Cl. D26-88.000.  
Hayashi, Hideo: See—  
Nakajo, Toshiaki; and Hayashi, Hideo, 298,826, Cl. D13-24.000.  
Heisler, Lynn M. Carrier for small animals or the like. 298,870, 12-6-88, Cl. D30-109.000.  
Herron, Darren. Body harness or similar article. 298,867, 12-6-88, Cl. D29-11.000.  
Hodson, Thomas W. Self-contained beverage concession stand. 298,857, 12-6-88, Cl. D25-10.000.  
Holmstrom, Arne R., to Saab-Scania Aktiebolag. Rack for an automobile. 298,819, 12-6-88, Cl. D12-157.000.  
Holzkopf, Michael E., to Ekco Products, Inc. Combination cake tray and cover. 298,791, 12-6-88, Cl. D7-83.000.  
Hood, Richard J. Simulative wheeled toy. 298,844, 12-6-88, Cl. D21-188.000.  
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Hospital Supply Company, Inc.: See—  
Thompson, Charles E., 298,788, Cl. D6-502.000.  
Hughes, James S.: See—  
Ewing, Robert L.; Fouke, Herbert A.; Hughes, James S.; and Bruggeman, Bruce G., 298,861, Cl. D26-71.000.  
Hughes, Steven W.; and Brennan, Paul L., to British Telecommunications public limited company. Telephone instrument base. 298,831, 12-6-88, Cl. D14-62.000.  
Hunt, Devlin: See—  
Raiter, Leon; Mor, John; and Hunt, Devlin, 298,847, Cl. D21-228.000.  
Hunter-Melnor: See—  
Chow, Ho; and Kozloski, Edward A., 298,848, Cl. D23-213.000.  
Hutchinson, Dean. Food sectioning apparatus. 298,790, 12-6-88, Cl. D7-43.000.  
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Waltz, Arthur; and Irwin, Raymond E., 298,852, Cl. D23-387.000.  
Waltz, Arthur; and Irwin, Raymond E., 298,853, Cl. D23-387.000.  
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Jefferson, John R., to Devon Industries, Inc. Disposable handle for operating room lights. 298,864, 12-6-88, Cl. D26-140.000.  
Jones, Timothy J., to Universal Machine Intelligence Limited. Robotic arm. 298,834, 12-6-88, Cl. D15-199.000.  
Kame, Masaharu; and Abe, Kenichi, to Olympus Optical Company, Inc. Automatic enzyme immunological analyzer. 298,854, 12-6-88, Cl. D24-1.100.  
Kanowsky Furniture, Inc.: See—  
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Kassai, Kenzo, to Aprica Kassai Kabushikikaisha. Baby carriage. 298,815, 12-6-88, Cl. D12-129.000.  
Ketcham & McDougall, Inc.: See—  
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Killen, John C. Flexible cat exerciser. 298,871, 12-6-88, Cl. D30-160.000.  
Klindt, Kenneth C. Face guard for a helmet. 298,868, 12-6-88, Cl. D29-16.000.  
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, to Mitsubishi Denki Kabushiki Kaisha. Power inverter. 298,824, 12-6-88, Cl. D13-4.000.  
Konzor, Hubert, to Union Sils, van de Loo & Co. GmbH. Rechargeable power supply for bicycle accessories. 298,825, 12-6-88, Cl. D13-11.000.  
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Lanoue, Michel, to Les Industries Provinciales Ltee. Connector for sap-collecting system. 298,850, 12-6-88, Cl. D23-263.000.  
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Brignole, Guillermo F.; and Lee, Robert E., 298,830, Cl. D14-53.000.  
Les Industries Provinciales Ltee: See—  
Lanoue, Michel, 298,849, Cl. D23-260.000.  
Lanoue, Michel, 298,850, Cl. D23-263.000.  
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Littledeer, Tomislav F. Paddle. 298,822, 12-6-88, Cl. D12-215.000.  
M-D & Co.: See—  
Dunlap, Jerald V., 298,832, Cl. D15-9.000.  
Macowski, William, to Ketcham & McDougall, Inc. Pencil sharpener. 298,840, 12-6-88, Cl. D19-73.000.  
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Matsushita Electric Works, Ltd.: See—  
Nakajo, Toshiaki; and Hayashi, Hideo, 298,826, Cl. D13-24.000.  
Maytag Company, The: See—  
Erickson, Donald E.; and Wilson, James D., 298,873, Cl. D32-5.000.  
McCartney, John C.: See—  
Tharp, Terry M.; Roberts, David W.; McCartney, John C.; and Harvey, John W., 298,862, Cl. D26-88.000.  
Tharp, Terry M.; Roberts, David W.; McCartney, John C.; and Harvey, John W., 298,863, Cl. D26-88.000.  
Miozzo, Orlando. Intercommunication telephone handset and stand therefor. 298,827, 12-6-88, Cl. D14-52.000.  
Miozzo, Orlando. Intercom telephone set housing. 298,828, 12-6-88, Cl. D14-52.000.  
Mitsubishi Denki Kabushiki Kaisha: See—  
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 298,824, Cl. D13-4.000.  
Miyata, Ichiro, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Four wheeled motorcycle. 298,812, 12-6-88, Cl. D12-107.000.  
Mor, John: See—  
Raiter, Leon; Mor, John; and Hunt, Devlin, 298,847, Cl. D21-228.000.  
Morita, Kazuo, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Four wheeled motorcycle. 298,811, 12-6-88, Cl. D12-107.000.  
Murray Ohio Manufacturing Co., The: See—  
Breen, John D.; and Williams, Richard D., 298,820, Cl. D12-186.000.  
Nakajo, Toshiaki; and Hayashi, Hideo, to Matsushita Electric Works, Ltd. Connector for coaxial cable. 298,826, 12-6-88, Cl. D13-24.000.  
Nakamura, Kazuharu, to Toyotomi Kogyo Co., Ltd. Vacuum cleaner. 298,874, 12-6-88, Cl. D32-18.000.  
Nakamura, Kazuharu, to Toyotomi Kogyo Co., Ltd. Vacuum cleaner. 298,875, 12-6-88, Cl. D32-18.000.  
Newnam, John H. Airplane toy. 298,842, 12-6-88, Cl. D21-89.000.  
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Oki Electric Industry Co., Ltd.: See—  
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Olympus Optical Company, Inc.: See—  
Kame, Masaharu; and Abe, Kenichi, 298,854, Cl. D24-1.100.  
Oxit, Robert, to Black & Decker, Inc. Electric iron. 298,877, 12-6-88, Cl. D32-70.000.  
Paulsson, Bengt: See—  
Anderson, Karl G., deceased; and Paulsson, Bengt, 298,858, Cl. D25-164.000.  
Pugh, R. Dell. Slide rule. 298,836, 12-6-88, Cl. D18-10.000.  
Ragon, Robert E. Barbecue grill. 298,793, 12-6-88, Cl. D7-332.000.  
Raiter, Leon; Mor, John; and Hunt, Devlin, to Ski-Free Marine, Inc. Water craft. 298,847, 12-6-88, Cl. D21-228.000.  
Reed, Teresa. Hair weaving machine. 298,866, 12-6-88, Cl. D28-93.000.  
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Rolet, Inc.: See—  
Corbett, Reg D., 298,879, Cl. D34-31.000.  
Rybka, Elizabeth; and Zormann, Frank. Tie hanger. 298,782, 12-6-88, Cl. D6-315.000.  
Saab-Scania Aktiebolag: See—  
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Satoh, Tomoaki, to Nifco Inc. Panel fastener or the like. 298,801, 12-6-88, Cl. D8-382.000.  
Saulnier, Kenneth D.; and Van Leeuwen, Hubert J. Roller buoy for storing rope connected to an underwater article. 298,799, 12-6-88, Cl. D8-359.000.  
Searl, Arthur N.: See—  
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Silliker, Richard J. Truck cap. 298,818, 12-6-88, Cl. D12-156.000.  
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SL Corporation: See—  
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Small, Charles B. Portable precision guide for powered hand tools. 298,807, 12-6-88, Cl. D10-65.000.  
Soderberg, Hans; and Engwall, Olof, to Sprayway Maskin AB. Combined masking tape dispenser and lock. 298,839, 12-6-88, Cl. D19-69.000.  
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Sussman, Howard. Tray for cosmetics and sundries. 298,865, 12-6-88, Cl. D28-76.000.  
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Swett, Joan, to AVIA Group International, Inc. Shoe npper. 298,780, 12-6-88, Cl. D2-314.000.  
Syndicated Amusements Limited: See—  
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Tandy, Carol J. Leveling rotational goniometer. 298,806, 12-6-88, Cl. D10-62.000.  
Tata, Hideaki: See—  
Kondo, Nobuyuki; Abe, Yoshinori; Tata, Hideaki; Ito, Eiji; Chonan, Katsuhiko; and Iinuma, Hideo, 298,824, Cl. D13-4.000.  
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Tharp, Terry M.; Roberts, David W.; McCartney, John C.; and Harvey, John W., to Manville Corporation. Low profile lighting fixture design. 298,862, 12-6-88, Cl. D26-88.000.  
Tharp, Terry M.; Roberts, David W.; McCartney, John C.; and Harvey, John W., to Manville Corporation. Low profile lighting fixture. 298,863, 12-6-88, Cl. D26-88.000.  
Thomas, Earlyne M. Protective sleeve. 298,869, 12-6-88, Cl. D29-20.000.  
Thomas, George R. Combined key ring and lighter holster. 298,781, 12-6-88, Cl. D3-103.000.  
Thomas, Robert J. World time zone indicator/calculator. 298,837, 12-6-88, Cl. D19-64.000.  
Thompson, Charles E., to Hospital Supply Company, Inc. Chair back. 298,788, 12-6-88, Cl. D6-502.000.  
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Borromeo, Lucio, 298,814, Cl. D12-119.000.  
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Toyotomi Kogyo Co., Ltd.: See—  
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Union Sils, van de Loo & Co. GmbH: See—  
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Universal Machine Intelligence Limited: See—  
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Vancza, John: See—  
Cassel, Robert L.; and Vancza, John, 298,872, Cl. D30-199.000.  
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Waltz, Arthur; and Irwin, Raymond E. Gable ventilator. 298,853, 12-6-88, Cl. D23-387.000.  
Wang, James, to Stuart Instrument Co., Ltd. Voltmeter or similar article. 298,808, 12-6-88, Cl. D10-107.000.  
Watanabe, Katsuhito, to Oki Electric Industry Co., Ltd. Handset telephone and stand for vehicles. 298,829, 12-6-88, Cl. D14-53.000.  
Weber-Stephen Products Co.: See—  
Tucker, James E.; and Beecher, John F., III, 298,792, Cl. D7-102.000.  
White, Douglas J., to Bio-Pak Associates. Combined dental pick and flossing aid. 298,855, 12-6-88, Cl. D24-11.000.  
White, Paul S.; and Searl, Arthur N., to GKN Crompton Limited. Door handle. 298,797, 12-6-88, Cl. D8-319.000.  
Wilkinson, William T. Adjustable exercise bench or similar article. 298,786, 12-6-88, Cl. D6-367.000.  
Williams, Richard D.: See—  
Breen, John D.; and Williams, Richard D., 298,820, Cl. D12-186.000.  
Wilson, James D.: See—  
Erickson, Donald E.; and Wilson, James D., 298,873, Cl. D32-5.000.  
Witte, Waldemar. Miniature rechargeable pocket lamp. 298,860, 12-6-88, Cl. D26-46.000.  
Yamamoto, Sachio; and Kuriya, Chikashi, to Sharp Corporation. Vacuum cleaner nozzle. 298,876, 12-6-88, Cl. D32-33.000.  
Yang, Shun T. Machine for cutting workpieces utilizing electrical discharge. 298,833, 12-6-88, Cl. D15-127.000.  
Zormann, Frank: See—  
Rybka, Elizabeth; and Zormann, Frank, 298,782, Cl. D6-315.000.  
Zutler, Aaron. Combined auto chock and container. 298,823, 12-6-88, Cl. D12-217.000.

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Holtkamp, Reinhold, Sr. African violet plant named Barbados. 6,437, 12-6-88, Cl. 69.000.	Schenk, Peter, to Bischoff Tulleken Leliecultuur B.V. Liliun compass. 6,440, 12-6-88, Cl. 68.000.
Holtkamp, Reinhold, Sr. African violet plant named Sagitarius. 6,438, 12-6-88, Cl. 69.000.	Schenk, Peter, to Bischoff Tulleken Leliecultuur B.V. Liliun "Parisi- enne". 6,448, 12-6-88, Cl. 68.000.
Holtkamp, Reinhold, Sr. African violet plant named Mississippi. 6,439, 12-6-88, Cl. 69.000.	Shimamoto, Alan: See— Shimamoto, George; and Shimamoto, Alan, 6,449, Cl. 54.000.
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Jackson & Perkins Co.: See— Warriner, William A., 6,443, Cl. 11.000. Warriner, William A., 6,445, Cl. 15.000. Warriner, William A., 6,446, Cl. 11.000.	University of California, Regents of the: See— Ryugo, Kay, 6,452, Cl. 36.000.
Klemm, Siegfried. Carnation named Klegofas. 6,441, 12-6-88, Cl. 70.000.	Visser, Tjjs, to Instituut voor de Veredeling van Tuinbouwgewassen. Elstar apple tree. 6,450, 12-6-88, Cl. 34.000.
Klemm, Siegfried. Carnation named Kletouwi. 6,442, 12-6-88, Cl. 70.000.	Warriner, William A., to Jackson & Perkins Co. Rose plant Jacyo. 6,443, 12-6-88, Cl. 11.000.
Klemm, Siegfried. Carnation named Klekopi. 6,444, 12-6-88, Cl. 70.000.	Warriner, William A., to Jackson & Perkins Co. Rose plant Jachy. 6,445, 12-6-88, Cl. 15.000.
Klemm, Siegfried. Carnation named Klemaxi. 6,447, 12-6-88, Cl. 70.000.	Warriner, William A., to Jackson & Perkins Co. Rose plant Jacplum. 6,446, 12-6-88, Cl. 11.000.
	Yensen, Nicholas P., to Salt Weeds. Saltgrass plant named Yensen 3. 6,451, 12-6-88, Cl. 89.000.

## LIST OF STATUTORY INVENTION REGISTRATIONS

APPLICANTS TO WHOM

STATUTORY INVENTION REGISTRATIONS WERE ISSUED ON THE  
6TH DAY OF DECEMBER, 1988

A. E. Staley Manufacturing Division of Staley Continental, Inc.: See— Brown, Cheryl C.; and Woerman, John H., H561, Cl. 426-661.000.	Lukic, Andrzej T.: See— Coomes, Edmund P.; and Lukic, Andrzej T., H558, Cl. 252-478.000.
American Telephone and Telegraph Company: See— Chaoui, Ghazi M.; Fegley, Charles R.; Lipson, Jan; Moyer, Ralph S.; and Stakelon, Thomas S., H551, Cl. 350-96.200.	Marion, John E., II: See— Morris, Robert C.; Marion, John E., II; and Gaultieri, Devlin M., H557, Cl. 252-62.570.
AT&T Technologies, Incorporated: See— Chaoui, Ghazi M.; Fegley, Charles R.; Lipson, Jan; Moyer, Ralph S.; and Stakelon, Thomas S., H551, Cl. 350-96.200.	Morris, Robert C.; Marion, John E., II; and Gaultieri, Devlin M., to United States of America. Energy. Epitaxial strengthening of crystals. H557, 12-6-88, Cl. 252-62.570.
Bell Telephone Laboratories, Incorporated: See— Chaoui, Ghazi M.; Fegley, Charles R.; Lipson, Jan; Moyer, Ralph S.; and Stakelon, Thomas S., H551, Cl. 350-96.200.	Morse, James S.: See— Trachier, Gary M.; and Morse, James S., H562, Cl. 364-557.000.
Brown, Cheryl C.; and Woerman, John H., to A. E. Staley Manufacturing Division of Staley Continental, Inc. Cold process fruit filling. H561, 12-6-88, Cl. 426-661.000.	Moyer, Ralph S.: See— Chaoui, Ghazi M.; Fegley, Charles R.; Lipson, Jan; Moyer, Ralph S.; and Stakelon, Thomas S., H551, Cl. 350-96.200.
Brown, Scott C., to United States of America. Air Force. Advancing gelation front cure technique. H559, 12-6-88, Cl. 264-102.000.	Oversstreet, C. Denise: See— Hester, Troy L.; and Oversstreet, C. Denise, H550, Cl. 73-167.000.
Chaoui, Ghazi M.; Fegley, Charles R.; Lipson, Jan; Moyer, Ralph S.; and Stakelon, Thomas S., to American Telephone and Telegraph Company; Bell Telephone Laboratories, Incorporated; and AT&T Technologies, Incorporated. Optical package with improved fiber alignment fixture. H551, 12-6-88, Cl. 350-96.200.	Ritter, Catharine A.; and Kreps, Robert W., to United States of America. Navy. Moisture absorbing anti-arcing coating and method for applying same. H555, 12-6-88, Cl. 524-507.000.
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Fegley, Charles R.: See— Chaoui, Ghazi M.; Fegley, Charles R.; Lipson, Jan; Moyer, Ralph S.; and Stakelon, Thomas S., H551, Cl. 350-96.200.	Tarko, Paul L. Method of manufacture and machine for manufacturing subterranean wall drain. H556, 12-6-88, Cl. 156-379.800.
Furth, Harold P.: See— Dawson, John M.; Furth, Harold P.; and Tenney, Fred H., H554, Cl. 376-107.000.	Tenney, Fred H.: See— Dawson, John M.; Furth, Harold P.; and Tenney, Fred H., H554, Cl. 376-107.000.
Gaultieri, Devlin M.: See— Morris, Robert C.; Marion, John E., II; and Gaultieri, Devlin M., H557, Cl. 252-62.570.	Trachier, Gary M.; and Morse, James S. Accurate electronic thermometer. H562, 12-6-88, Cl. 364-557.000.
Gaultieri, John, to United States of America. Army. Method of manufacturing dislocation and etch channel free quartz resonator blanks. H560, 12-6-88, Cl. 156-601.000.	United States of America Air Force: See— Brown, Scott C., H559, Cl. 264-102.000.
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Lipson, Jan: See— Chaoui, Ghazi M.; Fegley, Charles R.; Lipson, Jan; Moyer, Ralph S.; and Stakelon, Thomas S., H551, Cl. 350-96.200.	Wilson, Ben F., H553, Cl. 222-389.000.
Lloyd, Joseph P., to Shell Oil Company. Apparatus and method for locating towed seismic apparatus. H549, 12-6-88, Cl. 367-19.000.	Energy: See— Coomes, Edmund P.; and Lukic, Andrzej T., H558, Cl. 252-478.000.

## CLASSIFICATION OF PATENTS

ISSUED DECEMBER 6, 1988

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2 207 4,788,722 271 4,788,723 422 4,788,724	CLASS 37 220 4,788,783	CLASS 66 75.2 4,788,835	CLASS 89 6 4,788,899	413 4,788,955 414 4,788,956 425 4,788,957 489 4,788,958 503 4,788,959 506 4,788,960	CLASS 144 231 4,789,018
CLASS 4 342 4,788,725	CLASS 40 657 4,788,784	CLASS 70 2 4,788,836 3 4,788,837 63 4,788,838 143 4,788,839 164 4,788,840	CLASS 91 486 4,788,902	CLASS 124 24 A 4,788,961	CLASS 148 6.24 4,789,409 20 4,789,410 24 4,789,411 408 4,789,412
CLASS 5 93 R 4,788,726 174 4,788,727 434 4,788,728 449 4,788,729 454 4,788,730 478 4,788,731	CLASS 42 72 4,788,785	CLASS 43 1 4,788,787 44.99 4,788,788 113 4,788,789	CLASS 98 1.5 4,788,903 2.18 4,788,904	CLASS 126 25 R 4,788,962 116 A 4,788,963 299 R 4,788,964	CLASS 150 52 R 4,789,019
CLASS 8 115.6 4,789,381 158 4,788,732 442 4,789,382	CLASS 44 55 4,789,383	CLASS 47 9 4,788,790 17 4,788,791 41.12 4,788,792 58 4,788,793	CLASS 99 357 4,788,905 450 4,788,906 517 4,788,907	CLASS 128 6 4,788,967 41 4,788,968 78 4,788,969 89 R 4,788,970 92 ND 4,788,971 204.21 4,788,972 214.18 4,788,973 303.1 4,788,974 303.13 4,788,975 305 4,788,976 334 R 4,788,977 335.5 4,788,978 419 PG 4,788,979 660.07 4,788,980 670 4,788,981 734 4,788,982 738 4,788,983 743 4,788,984 759 4,788,985 763 4,788,986 777 4,788,987 831 4,788,988	CLASS 156 77 4,789,413 184 4,789,414 222 4,789,415 356 4,789,416 468 4,789,417 499 4,789,418 519 4,789,419 540 4,789,420 610 4,789,421 623 R 4,789,422 631 4,789,423 637 4,789,424 643 4,789,425 644 4,789,426 644 4,789,427
CLASS 15 104.94 4,788,733 105 4,788,734 172 4,788,735 250.42 4,788,736 257 R 4,788,737 320 4,788,738 322 4,788,739 339 4,788,740	CLASS 48 197 R 4,789,384	CLASS 49 214 4,788,794 352 4,788,795 404 4,788,796	CLASS 100 47 4,788,908 88 4,788,909 102 4,788,910 120 4,788,911 155 G 4,788,912 188 R 4,788,913	CLASS 106 2 BI 4,648,904 20 4,789,399 22 4,789,400 478.401 4,789,401 273.1 4,789,402 408 4,789,403 417 4,789,404 117.3 4,788,855 117.4 4,788,856 118.1 4,788,857 119 A 4,788,858 146 4,788,859 204.27 4,788,860 304 R 4,788,861 493 4,788,862 517 B 4,788,863 603 4,788,864 606 4,788,865 722 4,788,866 760 4,788,867 861.71 4,788,868 866.5 4,788,869 4,788,870 4,788,871	CLASS 159 47.3 4,789,428
CLASS 16 35 R 4,788,741 79 4,788,742 82 4,788,743 85 4,788,744 114 R 4,788,745 297 4,788,746 306 4,788,747 308 4,788,748	CLASS 51 170 PT 4,788,797 293 4,789,385 406 4,788,798 424 4,788,799	CLASS 52 1 4,788,800 57 4,788,801 79.1 4,788,802 82 4,788,803 200 4,788,804 202 4,788,805 222 4,788,806 410 4,788,807 521 4,788,808 741 4,788,809	CLASS 108 43 4,788,916	CLASS 110 203 4,788,917 215 4,788,918 347 4,788,919	CLASS 162 145 4,789,430 241 4,789,429 263 4,789,431 281 4,789,432 352 4,789,433
CLASS 17 11 4,788,749 35 4,788,750	CLASS 53 266 R 4,788,810 426 4,788,811 447 4,788,812	CLASS 54 16 4,789,386 96 4,789,387 158 4,789,388	CLASS 109 198.2 4,788,988 303 4,788,989	CLASS 111 2 4,788,920	CLASS 164 147.1 4,789,020 436 4,789,021 463 4,789,022
CLASS 24 16 PB 4,788,751 113 MP 4,788,753 114.5 4,788,754 136 R 4,788,755	CLASS 55 16 4,789,386 96 4,789,387 158 4,789,388	CLASS 56 148.4 R 4,788,758 159 B 4,788,759 278 4,788,760 596 4,788,761 603 4,788,762 622 4,788,763 731 4,788,764 827 4,788,765 830 4,788,766 4,788,767	CLASS 112 118 4,788,921 403 4,788,922	CLASS 113 69 4,788,923 219 4,788,924 249 4,788,925 255 4,788,926 276 4,788,927 211 4,788,928 303 4,788,929 629 4,788,930 1 4,788,931 554 4,788,932 556 4,788,933 596 4,788,934 605 4,788,935 827 4,788,936 4,788,937 5 4,788,938 17 4,788,939 71 4,788,940 96 4,788,941	CLASS 166 134 4,789,029 267 4,789,030 369 4,789,031
CLASS 27 2 4,788,757	CLASS 57 10.2 4,788,813	CLASS 58 22 4,788,814 208 4,788,815 212 4,788,816 263 4,788,817 264 4,788,818	CLASS 114 39.1 4,788,923 69 4,788,924 219 4,788,925 249 4,788,926 255 4,788,927 276 4,788,928 211 4,788,929 303 4,788,930 629 4,788,931 1 4,788,932 554 4,788,933 556 4,788,934 605 4,788,935 827 4,788,936 4,788,937 5 4,788,938 17 4,788,939 71 4,788,940 96 4,788,941	CLASS 115 246 4,789,408	CLASS 168 65 SS 4,789,759 68.5 4,789,760
CLASS 29 148.4 R 4,788,758 159 B 4,788,759 278 4,788,760 596 4,788,761 603 4,788,762 622 4,788,763 731 4,788,764 827 4,788,765 830 4,788,766 4,788,767	CLASS 59 214 4,788,819 335 4,788,820 344 4,788,821 374 4,788,822 382 4,788,823 474 4,788,824 514 R 4,788,825	CLASS 60 303 4,788,819 444 4,788,820 585 4,788,821 602 4,788,822 656 4,788,823 671 4,788,824	CLASS 116 276 4,788,929	CLASS 117 1 4,788,932 514 4,788,933 554 4,788,934 556 4,788,935 596 4,788,936 605 4,788,937 827 4,788,938 4,788,939 5 4,788,940 17 4,788,941 71 4,788,942 96 4,788,943	CLASS 170 45 4,789,032
CLASS 30 28 4,788,768 133 4,788,769 169 4,788,770 276 4,788,771	CLASS 61 84 4,788,825 126 4,788,826 214 4,788,827 335 4,788,828 344 4,788,829 374 4,788,830 382 4,788,831 474 4,788,832 514 R 4,788,833	CLASS 62 303 4,788,819 444 4,788,820 585 4,788,821 602 4,788,822 656 4,788,823 671 4,788,824	CLASS 118 211 4,788,932 303 4,788,933 629 4,788,934 1 4,788,935 554 4,788,936 556 4,788,937 596 4,788,938 605 4,788,939 827 4,788,940 4,788,941 5 4,788,942 17 4,788,943 71 4,788,944 96 4,788,945	CLASS 119 1 4,788,932 514 4,788,933 554 4,788,934 556 4,788,935 596 4,788,936 605 4,788,937 827 4,788,938 4,788,939 5 4,788,940 17 4,788,941 71 4,788,942 96 4,788,943	CLASS 172 16 4,788,930 137 4,788,931 181 4,788,932 211 4,788,933
CLASS 33 178 R 4,788,772 333 4,788,773 308 4,788,774	CLASS 63 84 4,788,825 126 4,788,826 214 4,788,827 335 4,788,828 344 4,788,829 374 4,788,830 382 4,788,831 474 4,788,832 514 R 4,788,833	CLASS 64 303 4,788,819 444 4,788,820 585 4,788,821 602 4,788,822 656 4,788,823 671 4,788,824	CLASS 120 26 4,788,942 41.27 4,788,943 56 AC 4,788,944 80 BA 4,788,945 90.16 4,788,946 90.55 4,788,947 142.5 R 4,788,948 192 R 4,788,949 195 C 4,788,950 198 E 4,788,951 245 4,788,952 297 4,788,953 327 4,788,954	CLASS 121 26 4,788,942 41.27 4,788,943 56 AC 4,788,944 80 BA 4,788,945 90.16 4,788,946 90.55 4,788,947 142.5 R 4,788,948 192 R 4,788,949 195 C 4,788,950 198 E 4,788,951 245 4,788,952 297 4,788,953 327 4,788,954	CLASS 174 65 SS 4,789,759 68.5 4,789,760
CLASS 34 48 4,788,775 76 4,788,776 92 4,788,777 117 4,788,778 239 4,788,779	CLASS 65 7.1 R 4,788,780 50 4,788,781 119 4,788,782	CLASS 66 3.12 4,789,389 27 4,789,390	CLASS 122 26 4,788,942 41.27 4,788,943 56 AC 4,788,944 80 BA 4,788,945 90.16 4,788,946 90.55 4,788,947 142.5 R 4,788,948 192 R 4,788,949 195 C 4,788,950 198 E 4,788,951 245 4,788,952 297 4,788,953 327 4,788,954	CLASS 123 26 4,788,942 41.27 4,788,943 56 AC 4,788,944 80 BA 4,788,945 90.16 4,788,946 90.55 4,788,947 142.5 R 4,788,948 192 R 4,788,949 195 C 4,788,950 198 E 4,788,951 245 4,788,952 297 4,788,953 327 4,788,954	CLASS 176 45 4,789,032



130	CLASS 187	208	4,789,071	214 A	4,789,777	227	4,789,168	CLASS 322	4,789,817	480	4,789,227
134	4,789,049	CLASS 212	4,789,072	221	4,789,778	CLASS 279	4,789,169	CLASS 323	4,789,818	560	4,789,230
299	CLASS 188	CLASS 215	4,789,073	251	4,789,779	CLASS 280	4,789,170	285	4,789,819	632	4,789,232
98	4,789,052	13.1	4,789,074	310	4,789,781	5 D	4,789,171	314	4,789,820	CLASS 351	4,789,233
106.2	4,789,053	347	4,789,075	379	4,789,782	47.18	4,789,172	58.5 R	4,789,821	158	4,789,234
212	CLASS 194	9.5	4,789,076	396 ML	4,789,783	281 LP	4,789,173	60 R	4,789,822	239	4,789,235
425	4,789,055	78.01	4,789,077	436	4,789,784	281 R	4,789,174	73 R	4,789,823	246	4,789,236
823	4,789,056	86.25	4,789,078	487.1	4,789,785	289 R	4,789,175	95	4,789,824	195.1	4,789,237
38 C	CLASS 200	121.7	4,789,079	492.2	4,789,786	289 WC	4,789,176	114	4,789,825	481	4,789,238
61.45 R	4,789,076	405	4,789,080	504 R	4,789,788	615	4,789,177	158 T	4,789,826	3 FU	4,789,239
61.34	4,789,077	464	4,789,081	CLASS 251	4,789,131	652	4,789,178	208	4,789,827	14 D	4,789,240
159 A	4,789,078	CLASS 220	4,789,082	28	4,789,132	681	4,789,179	220	4,789,828	14 R	4,789,241
245	4,789,079	4 F	4,789,083	129.11	4,789,133	725	4,789,180	224	4,789,829	55	4,789,242
302.3	4,789,080	309	4,789,084	CLASS 252	4,789,134	801	4,789,181	263	4,789,830	CLASS 355	4,789,243
1 T	4,789,081	319	4,789,085	1	4,789,135	806	4,789,182	308	4,789,831	CLASS 356	4,789,244
12	4,789,082	335	4,789,086	8.75	4,789,136	808	4,789,183	312	4,789,832	CLASS 357	4,789,245
13	4,789,083	CLASS 221	4,789,087	32.7 E	4,789,137	CLASS 281	4,789,184	320	4,789,833	CLASS 358	4,789,246
28	4,789,084	232	4,789,088	51.5 A	4,789,138	72	4,789,185	332	4,789,834	CLASS 359	4,789,247
37.1	4,789,085	279	4,789,089	62.59	4,789,139	117	4,789,186	333	4,789,835	CLASS 360	4,789,248
73 A	4,789,086	281	4,789,090	95	4,789,140	142	4,789,187	334	4,789,836	CLASS 361	4,789,249
98	4,789,087	CLASS 222	4,789,091	99	4,789,141	142	4,789,188	335	4,789,837	CLASS 362	4,789,250
107	4,789,088	1	4,789,092	194	4,789,142	150	4,789,189	336	4,789,838	CLASS 363	4,789,251
114	4,789,089	108	4,789,093	299.5	4,789,143	234	4,789,190	337	4,789,839	CLASS 364	4,789,252
119	4,789,090	174	4,789,094	364	4,789,144	CLASS 291	4,789,191	338	4,789,840	CLASS 365	4,789,253
224 M	4,789,091	600	4,789,095	384	4,789,145	161	4,789,192	339	4,789,841	CLASS 366	4,789,254
242	4,789,092	603	4,789,096	645	4,789,146	CLASS 292	4,789,193	340	4,789,842	CLASS 367	4,789,255
269	4,789,093	CLASS 223	4,789,097	103	4,789,147	218	4,789,194	341	4,789,843	CLASS 368	4,789,256
275	4,789,094	111	4,789,098	104	4,789,148	347	4,789,195	342	4,789,844	CLASS 369	4,789,257
290 R	4,789,095	CLASS 224	4,789,099	362	4,789,149	CLASS 293	4,789,196	343	4,789,845	CLASS 370	4,789,258
412	4,789,096	74	4,789,100	391	4,789,150	134	4,789,197	344	4,789,846	CLASS 371	4,789,259
424	4,789,097	CLASS 225	4,789,101	CLASS 256	4,789,151	CLASS 294	4,789,198	345	4,789,847	CLASS 372	4,789,260
1.5	4,789,098	111	4,789,102	17	4,789,152	74	4,789,199	346	4,789,848	CLASS 373	4,789,261
232	4,789,099	CLASS 226	4,789,103	59	4,789,153	82.1	4,789,200	347	4,789,849	CLASS 374	4,789,262
246	4,789,100	77	4,789,104	CLASS 257	4,789,154	CLASS 295	4,789,201	348	4,789,850	CLASS 375	4,789,263
274	4,789,101	CLASS 227	4,789,105	17	4,789,155	37.6	4,789,202	349	4,789,851	CLASS 376	4,789,264
387	4,789,102	CLASS 228	4,789,106	59	4,789,156	100	4,789,203	350	4,789,852	CLASS 377	4,789,265
427	4,789,103	111	4,789,107	CLASS 258	4,789,157	192	4,789,204	351	4,789,853	CLASS 378	4,789,266
493	4,789,104	CLASS 229	4,789,108	194	4,789,158	192	4,789,205	352	4,789,854	CLASS 379	4,789,267
555	4,789,105	179	4,789,109	CLASS 260	4,789,159	194	4,789,206	353	4,789,855	CLASS 380	4,789,268
611	4,789,106	CLASS 230	4,789,110	221	4,789,160	CLASS 296	4,789,207	354	4,789,856	CLASS 381	4,789,269
615	4,789,107	1.1	4,789,111	228	4,789,161	CLASS 297	4,789,208	355	4,789,857	CLASS 382	4,789,270
39	4,789,108	2.5	4,789,112	238	4,789,162	CLASS 298	4,789,209	356	4,789,858	CLASS 383	4,789,271
68	4,789,109	CLASS 231	4,789,113	270	4,789,163	CLASS 299	4,789,210	357	4,789,859	CLASS 384	4,789,272
151	4,789,110	102	4,789,114	274	4,789,164	CLASS 300	4,789,211	358	4,789,860	CLASS 385	4,789,273
155	4,789,111	179	4,789,115	282	4,789,165	CLASS 301	4,789,212	359	4,789,861	CLASS 386	4,789,274
180	4,789,112	CLASS 232	4,789,116	284	4,789,166	CLASS 302	4,789,213	360	4,789,862	CLASS 387	4,789,275
187	4,789,113	30 R	4,789,117	286	4,789,167	CLASS 303	4,789,214	361	4,789,863	CLASS 388	4,789,276
213	4,789,114	470	4,789,118	288	4,789,168	CLASS 304	4,789,215	362	4,789,864	CLASS 389	4,789,277
232	4,789,115	492	4,789,119	290	4,789,169	CLASS 305	4,789,216	363	4,789,865	CLASS 390	4,789,278
44.3	4,789,116	CLASS 233	4,789,120	292	4,789,170	CLASS 306	4,789,217	364	4,789,866	CLASS 391	4,789,279
161	4,789,117	179	4,789,121	294	4,789,171	CLASS 307	4,789,218	365	4,789,867	CLASS 392	4,789,280
166	4,789,118	CLASS 234	4,789,122	296	4,789,172	CLASS 308	4,789,219	366	4,789,868	CLASS 393	4,789,281
103	4,789,119	30 R	4,789,123	298	4,789,173	CLASS 309	4,789,220	367	4,789,869	CLASS 394	4,789,282
137	4,789,120	470	4,789,124	299	4,789,174	CLASS 310	4,789,221	368	4,789,870	CLASS 395	4,789,283
130	4,789,121	492	4,789,125	300	4,789,175	CLASS 311	4,789,222	369	4,789,871	CLASS 396	4,789,284
169	4,789,122	CLASS 235	4,789,126	302	4,789,176	CLASS 312	4,789,223	370	4,789,872	CLASS 397	4,789,285
221	4,789,123	179	4,789,127	304	4,789,177	CLASS 313	4,789,224	371	4,789,873	CLASS 398	4,789,286
248	4,789,124	CLASS 236	4,789,128	306	4,789,178	CLASS 314	4,789,225	372	4,789,874	CLASS 399	4,789,287
321.8	4,789,125	179	4,789,129	308	4,789,179	CLASS 315	4,789,226	373	4,789,875	CLASS 400	4,789,288
333.01	4,789,126	CLASS 237	4,789,130	310	4,789,180	CLASS 316	4,789,227	374	4,789,876	CLASS 401	4,789,289
502.1	4,789,127	179	4,789,131	312	4,789,181	CLASS 317	4,789,228	375	4,789,877	CLASS 402	4,789,290
512.1	4,789,128	CLASS 238	4,789,132	314	4,789,182	CLASS 318	4,789,229	376	4,789,878	CLASS 403	4,789,291
520	4,789,129	179	4,789,133	316	4,789,183	CLASS 319	4,789,230	377	4,789,879	CLASS 404	4,789,292
611	4,789,130	CLASS 239	4,789,134	318	4,789,184	CLASS 320	4,789,231	378	4,789,880	CLASS 405	4,789,293
635	4,789,131	179	4,789,135	320	4,789,185	CLASS 321	4,789,232	379	4,789,881	CLASS 406	4,789,294
640	4,789,132	CLASS 240	4,789,136	322	4,789,186	CLASS 322	4,789,233	380	4,789,882	CLASS 407	4,789,295
651	4,789,133	179	4,789,137	324	4,789,187	CLASS 323	4,789,234	381	4,789,883	CLASS 408	4,789,296
661	4,789,134	CLASS 241	4,789,138	326	4,789,188	CLASS 324	4,789,235	382	4,789,884	CLASS 409	4,789,297
708	4,789,135	179	4,789,139	328	4,789,189	CLASS 325	4,789,236	383	4,789,885	CLASS 410	4,789,298
721	4,789,136	CLASS 242	4,789,140	330	4,789,190	CLASS 326	4,789,237	384	4,789,886	CLASS 411	4,789,299
727	4,789,137	179	4,789,141	332	4,789,191	CLASS 327	4,789,238	385	4,789,887	CLASS 412	4,789,300
747	4,789,138	CLASS 243	4,789,142	334	4,789,192	CLASS 328	4,789,239	386	4,789,888	CLASS 413	4,789,301
750	4,789,139	179	4,789,143	336	4,789,193	CLASS 329	4,789,240	387	4,789,889	CLASS 414	4,789,302
755	4,789,140	CLASS 244	4,789,144	338	4,789,194	CLASS 330	4,789,241	388	4,789,890	CLASS 415	4,789,303
105.3	4,789,141	179	4,789,145	340	4,789,195	CLASS 331	4,789,242	389	4,789,891	CLASS 416	4,789,304
200	4,789,142	CLASS 245	4,789,146	342	4,789,196	CLASS 332	4,789,243	390	4,789,892	CLASS 417	4,789,305

488	4,789,944	31	4,790,015	95	4,789,304	65	4,789,581	140	4,789,347	CLASS 523	4,789,692
490	4,789,945	36	4,790,016	131	4,789,305	136	4,789,582	142	4,789,348	122	4,789,693
509	4,789,946	43	4,790,017	223 R	4,789,306	143	4,789,583	144	4,789,349	145	4,789,694
512	4,789,947	68.2	4,790,018	CLASS 417	4,789,307	159	4,789,584	146	4,789,350	146	4,789,695
514	4,789,948	68.4	4,790,019	40	4,789,308	185	4,789,585	148	4,789,351	147	4,789,696
519	4,789,949	156	4,790,020	44	4,789,309	216	4,789,586	150	4,789,352	148	4,789,697
577	4,789,950	191	4,790,021	51	4,789,310	288	4,789,587	152	4,789,353	149	4,789,698
716	4,789,951	CLASS 382	4,790,022	54	4,789,311	317.5	4,789,588	154	4,789,354	150	4,789,699
720	4,789,952	8	4,790,023	55	4,789,312	323	4,789,589	156	4,789,355	151	4,789,700
724.01	4,789,953	32	4,790,024	56	4,789,313	328	4,789,590	158	4,789,356	152	4,789,7

## CLASSIFICATION OF DESIGNS

D2— 314 298,780	319 298,797	119 298,814	62 298,831	D23— 213 298,848	140 298,864
D3— 103 298,781	357 298,798	129 298,815	9 298,832	260 298,849	76 298,865
D6— 315 298,782	359 298,799	133 298,816	127 298,833	263 298,850	93 298,866
319 298,783	373 298,800	155 298,817	199 298,834	307 298,851	11 298,867
335 298,784	382 298,801	156 298,818	129 298,835	387 298,852	16 298,868
365 298,785	396 298,802	157 298,819	10 298,836	298,853	20 298,869
367 298,786	399 298,803	186 298,820	64 298,837	1.1 298,854	109 298,870
373 298,787	390 298,804	203 298,821	67 298,838	11 298,855	160 298,871
502 298,788	411 298,805	215 298,822	69 298,839	17 298,856	199 298,872
524 298,789	62 298,806	217 298,823	73 298,840	10 298,857	5 298,873
D7— 43 298,790	65 298,807	4 298,824	64 298,841	164 298,858	18 298,874
83 298,791	107 298,808	11 298,825	89 298,842	10 298,859	33 298,876
102 298,792	117 298,809	24 298,826	159 298,843	46 298,860	70 298,877
332 298,793	102 298,810	52 298,827	188 298,844	71 298,861	17 298,878
D8— 19 298,794	107 298,811	53 298,828	191 298,845	88 298,862	31 298,879
71 298,795	298,812	217 298,846	217 298,846	298,863	
300 298,796	118 298,813	228 298,847	228 298,847		

## CLASSIFICATION OF PLANTS

P— 11 6,443	34 6,450	68 6,440	6,438	6,442	6,447
15 6,445	54 6,449	69 6,437	70 6,441	6,444	89 6,451

## STATUTORY INVENTION REGISTRATIONS

73— 167 H550	209— 587 H552	478 H558	350— 96.20 H551	367— 19 H549	426— 661 H561
156— 379.8 H556	222— 389 H553	6,448	364— 557 H562	376— 107 H554	524— 507 H555
601 H560	252— 62.57 H557	264— 102 H559			

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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

01 : 4,789,160	4,789,202	4,789,840	4,789,304	4,789,014	4,789,544
4,789,323	4,789,211	4,789,858	4,789,409	4,789,035	4,789,753
4,789,548	4,789,214	4,789,861	4,789,438	4,789,054	4,789,130
4,789,575	4,789,219	4,789,874	4,789,563	4,789,073	4,789,162
4,788,724	4,789,236	4,789,882	4,789,827	4,789,085	4,789,255
4,788,745	4,789,240	4,789,883	4,789,848	4,789,158	4,789,237
4,788,766	4,789,241	4,789,886	4,789,850	4,789,163	4,789,166
4,788,843	4,789,243	4,789,894	4,789,971	4,789,172	4,789,228
4,788,894	4,789,244	4,789,898	4,789,981	4,789,176	4,790,006
4,788,916	4,789,251	4,789,915	4,789,981	4,789,212	4,789,171
4,789,000	4,789,283	4,789,917	4,789,922	4,789,218	4,789,628
4,789,047	4,789,292	4,789,927	4,789,927	4,789,245	4,788,871
4,789,183	4,789,300	4,789,948	4,789,948	4,789,284	4,788,893
4,789,200	4,789,305	4,789,956	4,789,956	4,789,341	4,788,899
4,789,352	4,789,324	4,789,951	4,789,951	4,789,361	4,788,942
4,789,771	4,789,326	4,789,959	4,789,959	4,789,366	4,788,966
4,789,780	4,789,336	4,789,967	4,789,967	4,789,407	4,789,608
4,789,972	4,789,349	4,789,989	4,789,989	4,789,553	4,789,609
4,789,996	4,789,353	4,789,992	4,789,992	4,789,555	4,789,638
4,789,019	4,789,355	4,789,995	4,789,995	4,789,557	4,789,757
4,789,137	4,789,369	4,789,995	4,789,995	4,789,557	4,789,852
03 : 4,788,730	4,789,431	4,790,024	4,788,920	4,789,621	4,788,793
4,788,733	4,789,449	4,790,026	4,788,934	4,789,738	4,789,018
4,788,739	4,789,462	4,788,726	4,789,043	4,789,764	4,788,868
4,788,742	4,789,463	4,788,746	4,789,063	4,789,798	4,789,018
4,788,774	4,789,472	4,788,780	4,789,134	4,789,947	4,789,018
4,788,777	4,789,475	4,788,806	4,789,155	4,790,010	4,789,065
4,788,778	4,789,499	4,788,869	4,789,262	4,790,011	4,789,125
4,788,830	4,789,515	4,788,964	4,789,367	4,790,017	4,789,233
4,788,836	4,789,534	4,789,118	4,789,410	4,788,763	4,789,235
4,788,838	4,789,560	4,789,189	4,789,426	4,788,841	4,789,432
4,788,848	4,789,573	4,789,370	4,789,467	4,788,856	4,789,482
4,788,850	4,789,598	4,789,460	4,789,470	4,788,862	4,789,543
4,788,858	4,789,629	4,789,751	4,789,498	4,788,986	4,789,642
4,788,864	4,789,630	4,789,779	4,789,574	4,789,122	4,789,692
4,788,872	4,789,631	4,789,826	4,648,904	4,789,147	4,789,724
4,788,910	4,789,640	4,789,829	4,789,403	4,789,165	4,789,784
4,788,913	4,789,663	4,789,977	4,789,595	4,789,276	4,789,820
4,788,962	4,789,702	4,790,003	4,789,837	4,789,307	4,789,843
4,788,980	4,789,732	4,790,004	4,788,738	4,789,330	4,789,844
4,789,023	4,789,734	Re.32,794	4,789,368	4,789,375	4,789,887
4,789,023	4,789,749	4,788,837	4,789,950	4,789,387	4,789,895
4,789,082	4,789,760	4,788,895	4,788,748	4,789,387	4,790,016
4,789,091	4,789,767	4,788,905	4,788,751	4,789,834	4,788,740
4,789,096	4,789,783	4,788,979	4,788,839	4,789,960	4,788,757
4,789,100	4,789,787	4,788,992	4,788,840	4,790,030	4,788,761
4,789,101	4,789,797	4,789,078	4,788,844	4,788,788	4,788,772
4,789,108	4,789,801	4,789,090	4,788,865	4,789,087	4,788,794
4,789,139	4,789,819	4,789,106	4,788,874	4,789,126	4,788,795
4,789,174	4,789,831	4,789,117	4,788,935	4,789,275	4,788,802
4,789,195	4,789,835	4,789,161	4,788,985	4,789,670	4,788,821
4,789,838	4,789,838	4,789,286	4,789,001	4,789,033	4,788,854
4,789,197	4,789,839	4,789,288	4,789,006	4,789,290	4,788,875



## GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

4,788,877	30 :	4,789,289	4,789,062	4,788,944	4,789,345	4,789,602
4,788,881	31 :	4,788,906	4,789,064	4,788,964	4,789,346	4,789,689
4,788,889		4,788,936	4,789,102	4,788,971	4,789,351	4,789,721
4,788,890		4,788,995	4,789,111	4,789,002	4,789,390	4,789,793
4,788,938		4,789,248	4,789,121	4,789,017	4,789,397	4,789,810
4,788,947	32 :	4,788,857	4,789,129	4,789,048	4,789,416	4,789,885
4,788,961		4,789,399	4,789,150	4,789,051	4,789,422	4,789,904
4,788,996	33 :	4,788,758	4,789,221	4,789,055	4,789,465	4,789,932
4,789,015		4,790,012	4,789,299	4,789,138	4,789,488	4,789,940
4,789,066	34 :	4,788,768	4,789,301	4,789,142	4,789,514	4,789,949
4,789,097		4,788,808	4,789,335	4,789,143	4,789,521	4,789,957
4,789,127		4,788,921	4,789,360	4,789,156	4,789,571	4,789,962
4,789,140		4,788,948	4,789,371	4,789,167	4,789,572	4,789,965
4,789,154		4,789,011	4,789,389	4,789,170	4,789,593	4,789,968
4,789,157		4,789,067	4,789,400	4,789,192	4,789,682	4,789,987
4,789,180		4,789,077	4,789,408	4,789,234	4,789,688	4,790,001
4,789,196		4,789,210	4,789,425	4,789,247	4,789,727	4,788,988
4,789,201		4,789,282	4,789,451	4,789,333	4,789,759	4,789,646
4,789,224		4,789,340	4,789,484	4,789,402	4,789,770	4,789,803
4,789,278		4,789,420	4,789,506	4,789,418	4,789,807	4,788,937
4,789,280		4,789,424	4,789,525	4,789,491	4,789,825	4,789,080
4,789,281		4,789,445	4,789,526	4,789,495	4,789,991	4,789,115
4,789,306		4,789,457	4,789,535	4,789,538	4,790,028	4,789,145
4,789,308		4,789,458	4,789,539	4,789,554	4,788,722	4,789,383
4,789,392		4,789,468	4,789,545	4,789,664	4,788,729	4,789,516
4,789,404		4,789,493	4,789,564	4,789,694	4,788,747	4,789,766
4,789,414		4,789,507	4,789,614	4,789,703	4,788,796	4,789,923
4,789,415		4,789,527	4,789,615	4,789,713	4,788,816	4,788,728
4,789,712		4,789,528	4,789,645	4,789,930	4,789,277	4,788,775
4,789,730		4,789,546	4,789,648	4,789,933	4,789,376	4,788,797
4,789,744		4,789,547	4,789,660	4,789,999	4,789,523	4,788,826
4,789,745		4,789,549	4,789,706	4,788,873	4,788,972	4,788,855
4,789,851		4,789,603	4,789,725	4,788,918	4,789,042	4,788,859
4,789,859		4,789,625	4,789,742	4,789,271	4,789,099	4,789,016
4,789,939		4,789,637	4,789,762	4,789,530	4,789,377	4,789,038
4,789,961		4,789,656	4,789,794	4,789,708	4,789,436	4,789,046
4,790,029		4,789,678	4,789,845	4,788,725	4,789,478	4,789,279
4,788,737	27 :	4,789,684	4,789,853	4,788,784	4,789,489	4,789,291
4,788,785		4,789,714	4,789,863	4,789,068	4,789,542	4,789,313
4,788,939		4,789,720	4,789,864	4,789,098	4,789,633	4,789,328
4,788,975		4,789,748	4,789,865	4,789,173	4,789,755	4,789,372
4,788,983		4,789,750	4,789,869	4,789,217	4,789,761	4,789,517
4,789,012		4,789,769	4,789,907	4,789,365	4,789,788	4,789,594
4,789,072		4,789,842	4,789,914	4,789,765	4,788,824	4,789,918
4,789,074		4,789,881	4,789,934	4,789,789	4,788,833	4,789,988
4,789,104		4,789,889	4,789,941	4,789,791	4,788,927	4,789,753
4,789,131		4,789,952	4,789,982	4,789,799	4,788,990	4,788,765
4,789,170		4,789,980	4,788,756	4,789,950	4,788,997	4,788,787
4,789,329		4,789,983	4,788,814	4,789,950	4,789,029	4,788,803
4,789,423		4,789,984	4,789,004	4,788,790	4,789,032	4,788,805
4,789,913		4,789,994	4,789,187	4,788,813	4,789,045	4,788,955
4,789,921	35 :	4,789,031	4,789,266	4,788,825	4,789,124	4,788,973
4,789,925		4,789,136	4,789,295	4,788,867	4,789,153	4,789,057
4,790,018		4,789,481	4,789,487	4,788,917	4,789,269	4,789,152
4,789,265		4,789,537	4,789,601	4,788,922	4,789,321	4,789,220
4,789,356	36 :	4,789,577	4,789,639	4,788,993	4,789,348	4,789,303
4,789,434		4,788,767	4,789,700	4,789,026	4,789,354	4,789,344
4,788,831		4,788,903	4,789,849	4,789,028	4,789,386	4,789,362
4,788,963		4,788,929	4,788,764	4,789,056	4,789,406	4,789,391
4,789,181		4,788,976	4,788,798	4,789,120	4,789,502	4,789,552
4,789,363		4,788,991	4,788,807	4,789,193	4,789,513	4,789,558
4,789,395		4,789,024	4,788,898	4,789,249	4,789,536	4,789,579
4,789,501		4,789,025	4,788,911	4,789,316	4,789,567	4,789,699
4,789,541		4,789,058	4,788,914	4,789,343		

## DESIGN PATENTS

04 :	298,872	10 :	298,790	16 :	298,798	26 :	298,783	32 :	298,855	42 :	298,786
06 :	298,817	12 :	298,785	17 :	298,791		298,802	35 :	298,800	47 :	298,788
	298,830		298,807		298,792		298,837	36 :	298,823		298,820
	298,832		298,836		298,809		298,867		298,859	48 :	298,793
	298,835		298,857		298,866	27 :	298,847	39 :	298,861	49 :	298,803
	298,856		298,864	18 :	298,816	29 :	298,869		298,862	50 :	298,806
	298,871		298,865	19 :	298,873	32 :	298,787		298,863	53 :	298,805
08 :	298,878		298,868	20 :	298,781	34 :	298,784		298,870		298,852
09 :	298,794	13 :	298,796		298,844		298,840	41 :	298,879		298,853
	298,841		298,796	24 :	298,846		298,848		298,780	55 :	298,789
	298,877		298,821								

## PLANT PATENTS

04 :	6,451	06 :	6,443		6,445		6,446		6,449		6,452
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## STATUTORY INVENTION REGISTRATIONS

01 :	H550		H559	24 :	H555		H560	48 :	H549	50 :	H562
	H553	09 :	H556								
06 :	H554	17 :	H561	34 :	H557	42 :	H551		H552	53 :	H558

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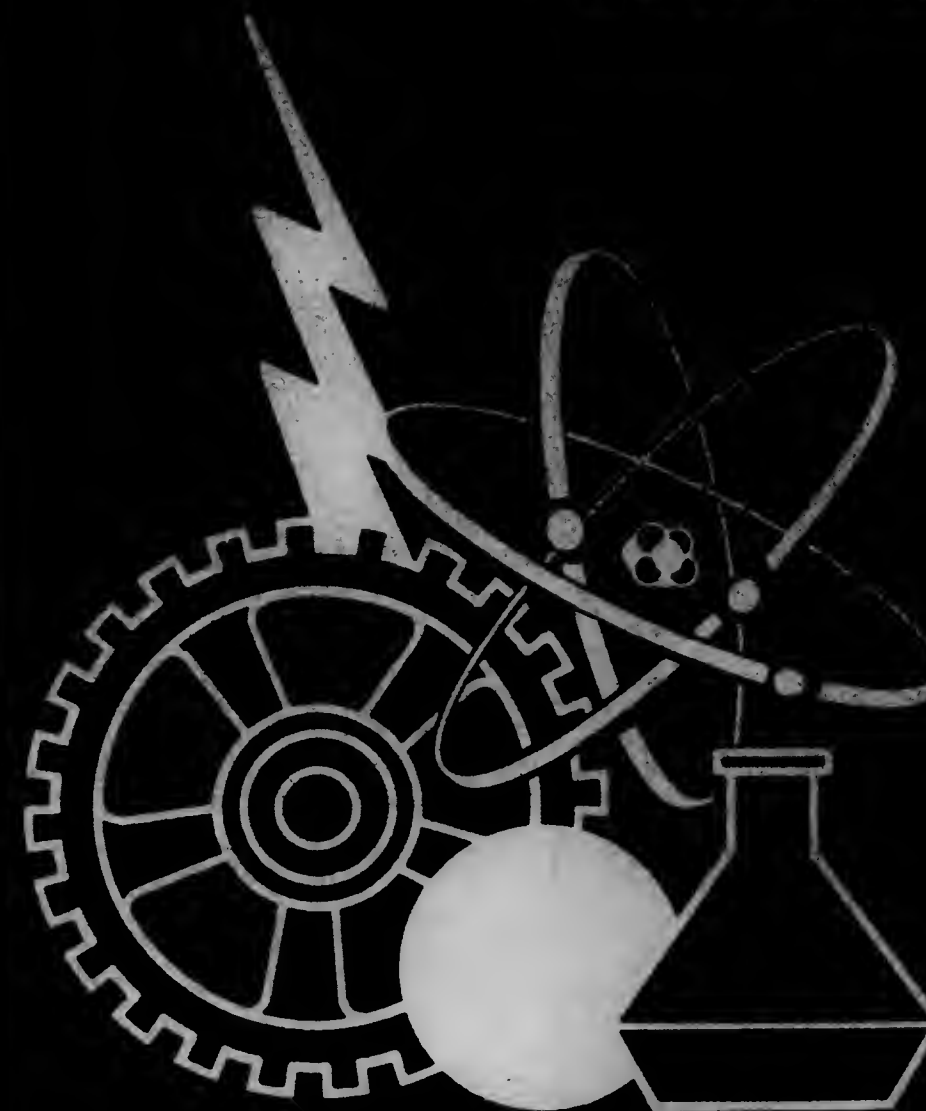
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December 13, 1988



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OFFICIAL GAZETTE of the  
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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

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## PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Oct. 1, 1988, and was announced in the *Official Gazette* at 1094 O.G. 2 on Sept. 6, 1988.

Domestic PCT fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date when Japan is elected under PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Danish declaration under PCT Article 64(1)(a), that Denmark shall not be bound by PCT Chapter II, as from Nov. 1, 1988, was announced at 1095 O.G. 2 on Oct. 4, 1988.

The withdrawal of the Norwegian declaration under PCT Article 64(1)(a), that Norway shall not be bound by PCT Chapter II, as from Jan. 1, 1989, was announced at 1096 O.G. 34 on Nov. 22, 1988.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

Transmittal fee: . . . . .	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed: . . . . .	520.00
—Corresponding prior U.S. national application filed: . . . . .	350.00
—Supplemental search fee, per additional invention . . . . .	140.00
European Patent Office as Searching Authority . . . . .	1160.00

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Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority . . . . .	370.00
—Additional examination fee, per additional invention . . . . .	125.00
—Searching Authority not the USPTO . . . . .	570.00
—Additional examination fee, per additional invention . . . . .	190.00
International fees	
Basic fee: . . . . .	485.00
Basic Supplemental fee (for each page over 30): . . . . .	10.00
Designation fee per country or region for the first 10 national or regional offices: . . . . .	120.00
Designation fee for 11th and subsequent designations: . . . . .	No Charge
Handling fee: . . . . .	150.00

U.S. National Stage fees	Small Entity	Non-small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA . . . . .	170.00	340.00
USPTO was neither ISA nor IPEA . . . . .	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) . . . . .	25.00	50.00
—For each independent claim in excess of 3 . . . . .	17.00	34.00
—For each claim in excess of 20 . . . . .	6.00	12.00
—For each application containing a multiple dependent claim . . . . .	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 . . . . .	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 . . . . .	26.00	26.00

DONALD J. QUIGG,  
Assistant Secretary and  
Commissioner of Patents  
and Trademarks.

Oct. 26, 1988.

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct.

DECEMBER 13, 1988

U.S. PATENT AND TRADEMARK OFFICE

1097 OG 13

5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on December 10, 1985, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,556,991 through 4,558,465  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

## 37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . \$ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . \$ 225.00  
By other than a small entity . . . . . \$ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . \$ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . \$ 55.00  
By other than a small entity . . . . . \$ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . \$ 500.00"

Notice of Expiration of Patents  
Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anni-

versary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED SEPTEMBER 25, 1988,  
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,472,836	06/476,378	9/25/84
4,472,850	06/390,202	9/25/84
4,472,851	06/474,364	9/25/84
4,472,855	06/494,851	9/25/84
4,472,857	06/357,670	9/25/84
4,472,862	06/521,755	9/25/84
4,472,863	06/362,417	9/25/84
4,472,864	06/451,359	9/25/84
4,472,878	06/462,871	9/25/84
4,472,892	06/440,300	9/25/84
4,472,897	06/489,074	9/25/84
4,472,901	06/325,220	9/25/84
4,472,902	06/234,951	9/25/84
4,472,906	06/500,674	9/25/84
4,472,908	06/422,849	9/25/84
4,472,915	06/342,937	9/25/84
4,472,916	06/265,591	9/25/84
4,472,918	06/262,240	9/25/84
4,472,922	06/341,325	9/25/84
4,472,925	06/444,843	9/25/84
4,472,930	06/359,597	9/25/84
4,472,951	06/337,980	9/25/84
4,472,956	06/392,467	9/25/84
4,472,969	06/391,497	9/25/84
4,472,974	06/447,580	9/25/84
4,472,976	06/280,267	9/25/84
4,472,987	06/252,498	9/25/84
4,472,995	06/217,429	9/25/84
4,473,016	06/421,879	9/25/84
4,473,022	06/378,912	9/25/84
4,473,031	06/498,946	9/25/84
4,473,037	06/513,904	9/25/84
4,473,044	06/569,044	9/25/84
4,473,045	06/570,801	9/25/84
4,473,051	06/437,535	9/25/84
4,473,057	06/551,955	9/25/84
4,473,061	06/422,090	9/25/84
4,473,063	06/410,011	9/25/84
4,473,066	06/257,179	9/25/84
4,473,069	06/398,014	9/25/84
4,473,072	06/448,334	9/25/84
4,473,074	06/306,268	9/25/84
4,473,081	06/261,778	9/25/84
4,473,084	06/419,760	9/25/84
4,473,087	06/546,535	9/25/84
4,473,088	06/267,809	9/25/84
4,473,100	06/493,343	9/25/84
4,473,105	06/272,136	9/25/84
4,473,107	06/294,376	9/25/84
4,473,111	06/347,063	9/25/84
4,473,113	06/371,731	9/25/84
4,473,121	06/404,597	9/25/84
4,473,123	06/405,615	9/25/84
4,473,125	06/442,280	9/25/84
4,473,127	06/407,864	9/25/84
4,473,130	06/430,797	9/25/84
4,473,132	06/324,844	9/25/84
4,473,147	06/260,979	9/25/84
4,473,152	06/477,826	9/25/84
4,473,155	06/427,040	9/25/84
4,473,170	06/520,657	9/25/84
4,473,175	06/349,040	9/25/84
4,473,179	06/451,215	9/25/84
4,473,181	06/411,442	9/25/84
4,473,182	06/464,158	9/25/84
4,473,189	06/416,591	9/25/84
4,473,195	06/317,062	9/25/84
4,473,196	06/413,306	9/25/84



Patent Number	Serial Number	Issue Date	4,473,555	06/542,632	9/25/84
4,473,197	06/265,113	9/25/84	4,473,558	06/401,461	9/25/84
4,473,204	06/230,274	9/25/84	4,473,561	06/365,957	9/25/84
4,473,213	06/460,452	9/25/84	4,473,574	06/461,223	9/25/84
4,473,215	06/338,854	9/25/84	4,473,576	06/546,849	9/25/84
4,473,224	06/342,062	9/25/84	4,473,578	06/403,076	9/25/84
4,473,227	06/546,550	9/25/84	4,473,580	06/436,245	9/25/84
4,473,228	06/278,689	9/25/84	4,473,585	06/262,820	9/25/84
4,473,236	06/378,138	9/25/84	4,473,588	06/505,411	9/25/84
4,473,248	06/425,530	9/25/84	4,473,590	06/255,845	9/25/84
4,473,254	06/267,370	9/25/84	4,473,593	06/357,999	9/25/84
4,473,258	06/252,852	9/25/84	4,473,596	06/464,808	9/25/84
4,473,261	06/273,141	9/25/84	4,473,600	06/363,382	9/25/84
4,473,262	06/438,540	9/25/84	4,473,603	06/577,740	9/25/84
4,473,266	06/342,217	9/25/84	4,473,604	06/478,989	9/25/84
4,473,269	06/391,779	9/25/84	4,473,605	06/302,473	9/25/84
4,473,273	06/304,994	9/25/84	4,473,608	06/415,625	9/25/84
4,473,280	06/543,233	9/25/84	4,473,610	06/484,524	9/25/84
4,473,283	06/501,816	9/25/84	4,473,612	06/297,335	9/25/84
4,473,291	06/478,210	9/25/84	4,473,613	06/475,578	9/25/84
4,473,296	06/428,867	9/25/84	4,473,614	06/380,613	9/25/84
4,473,299	06/359,499	9/25/84	4,473,615	06/563,900	9/25/84
4,473,306	06/499,229	9/25/84	4,473,616	06/563,901	9/25/84
4,473,307	06/387,847	9/25/84	4,473,626	06/488,297	9/25/84
4,473,312	06/451,214	9/25/84	4,473,637	06/440,606	9/25/84
4,473,335	06/275,247	9/25/84	4,473,647	06/349,691	9/25/84
4,473,342	06/416,559	9/25/84	4,473,648	06/378,420	9/25/84
4,473,355	06/509,788	9/25/84	4,473,651	06/392,213	9/25/84
4,473,364	06/370,633	9/25/84	4,473,659	06/482,698	9/25/84
4,473,366	06/369,073	9/25/84	4,473,672	06/363,229	9/25/84
4,473,367	06/374,006	9/25/84	4,473,680	06/326,058	9/25/84
4,473,371	06/412,127	9/25/84	4,473,723	06/384,911	9/25/84
4,473,383	06/465,270	9/25/84	4,473,734	06/424,440	9/25/84
4,473,395	06/379,047	9/25/84	4,473,747	06/318,021	9/25/84
4,473,397	06/358,972	9/25/84	4,473,753	06/408,627	9/25/84
4,473,402	06/483,828	9/25/84	4,473,759	06/370,886	9/25/84
4,473,404	06/570,429	9/25/84	4,473,763	06/307,172	9/25/84
4,473,428	06/348,289	9/25/84	4,473,766	06/450,274	9/25/84
4,473,430	06/466,591	9/25/84	4,473,769	06/517,686	9/25/84
4,473,456	06/360,769	9/25/84	4,473,776	06/387,724	9/25/84
4,473,466	06/471,559	9/25/84	4,473,781	06/408,252	9/25/84
4,473,468	06/495,327	9/25/84	4,473,798	06/325,314	9/25/84
4,473,469	06/353,355	9/25/84	4,473,822	06/374,596	9/25/84
4,473,470	06/387,452	9/25/84	4,473,850	06/287,693	9/25/84
4,473,480	06/461,446	9/25/84	4,473,855	06/462,433	9/25/84
4,473,503	06/443,940	9/25/84	4,473,858	06/401,342	9/25/84
4,473,514	06/513,338	9/25/84	4,473,861	06/411,714	9/25/84
4,473,517	06/455,488	9/25/84	4,473,865	06/340,214	9/25/84
4,473,532	06/325,651	9/25/84	4,473,867	06/362,545	9/25/84
4,473,533	06/415,566	9/25/84	4,473,868	06/546,818	9/25/84
			4,473,870	06/499,436	9/25/84
			4,473,877	06/254,889	9/25/84

**Notification of Acceptance of Delayed Payment of Maintenance Fee**  
(35 U.S.C. 41(e); 37 CFR 1.378)

The patent(s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,384,838	06/285,745	5/24/83	7/22/81	9/29/88
4,415,192	06/246,631	11/15/83	3/23/81	10/28/88
4,422,134	06/276,043	12/20/83	6/22/81	11/14/88
4,426,293	06/491,588	1/17/84	5/4/83	11/14/88

**REISSUE APPLICATIONS FILED**

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

**4,409,897**, Re. S.N. 261,888, Filed Oct. 25, 1988, Cl. 102/200, APPARATUS AND METHOD FOR SELECTIVELY ACTIVATING PLURAL ELECTRICAL LOADS AT PREDETERMINED RELATIVE TIMES, Ian J. Kirby, et al., Owner of Record: *Imperial*

Chemical Industries, Ltd., London, England, Attorney or Agent: Dale S. Lazar, Ex. Gp.: 221

**4,450,441**, Re. S.N. 263,780, Filed Oct. 26, 1988, Cl. 340/773, DOT MATRIX PLASMA DISPLAY AND METHOD FOR DRIVING SAME, Herman R. Person, Owner of Record: *Dale Electronics, Columbus, Nebr.*, Attorney or Agent: Michael G. Voorhees, Ex. Gp.: 264

**4,527,578**, Re. S.N. 259,339, Filed Oct. 18, 1988, Cl. 15/302, VEHICLE WASH AND DRYER, James A. Nelson, Owner of Record: *Ryko Manufacturing Co., Grimes, Iowa*, Attorney or Agent: Bradley J. Huibert, Ex. Gp.: 243

**4,610,216**, Re. S.N. 242,322, Filed Sept. 9, 1988, Cl. 118/46, PAPER COLORING APPARATUS, Gustav Paulsen, Owner of Record: *Inventor*, Attorney or Agent: Authur Schwartz, Ex. Gp.: 139

**4,636,617**, Re. S.N. 264,382, Filed Oct. 31, 1988, Cl. 219/375, HEATING COIL ASSEMBLY FOR A HEAVY DUTY HOT AIR BLOWER, Walter J. Peterson, Owner of Record: *Wagner Spray Tech Corp., Minneapolis, Minn.*, Attorney or Agent: Steven H. Noll, Ex. Gp.: 216

**4,639,170**, Re. S.N. 260,178, Filed Oct. 19, 1988, Cl. 408/76, MAGNETIC BASE FOR PORTABLE TOOLS, Bernhau Palm, Owner of Record: *Inventor*, Attorney or Agent: Bayard H. Michael, Ex. Gp.: 322

**4,697,432**, Re. S.N. 259,961, Filed Oct. 19, 1988, Cl. 62/233, ICE MAKER SYSTEM, Ronald E. Cole, Owner of Record: *Emhart Industries, Farmington, Conn.*, Attorney or Agent: Charles W. Hoffman, Ex. Gp.: 344

**REQUESTS FOR REEXAMINATION FILED**

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

**3,876,375**, Reexam. No. 90/001,633, Requested: Nov. 7, 1988, Cl. 436/16, BIOLOGICAL COMPOSITION FOR USE AS A REFERENCE CONTROL IN DIAGNOSTIC ANALYSIS, Jonas Maurukas, Owner of Record: *Inventor, St. Petersburg, Fla.*, Attorney or Agent: Knobbe, Martens, et al., Ex. Gp.: 180, Requester: Owner

**3,918,029**, Reexam. No. 90/001,634, Requested: Nov. 3, 1988, Cl. 235/472, SCANNING SYSTEM AND METHOD, Jerome Lemelson, Owner of Record: *Inventor, Princeton, N.J.*, Attorney or Agent: David Fink, Ex. Gp.: 230, Requester: Owner

**3,931,011**, Reexam. No. 90/001,632, Requested: Nov. 4, 1988, Cl. 210/136, FLUID SEPARATION APPARATUS, Mark S. Richards, Owner of Record: *Parker Hannifin Corp., Cleveland, Ohio*, Attorney or Agent: Unknown, Ex. Gp.: 130, Requester: Willibrord Losing Filter-Technik, Hattingen, Germany

**4,702,783**, Reexam. No. 90/001,631, Requested: Oct. 21, 1988, Cl. 156/64, ADHESIVE TECHNOLOGY, William H. Mason, Owner of Record: *Uncommon Conglomerates Inc., Minneapolis, Minn.*, Attorney or Agent: A. G. Eggink, Ex. Gp.: 130, Requester: Northwest Screen Systems, Minneapolis, Minn.

Department of Commerce  
Patent and Trademark Office  
37 CFR §1.15  
[Docket No. 80515 - 8209]

**Requests for Identifiable Records**

Agency: Patent and Trademark Office, Commerce  
Action: Final Rule.

**Summary:** This final rule sets forth changes that the Patent and Trademark Office (PTO) is making to the rules governing requests for records not disclosed to the public as part of the regular informational activity of the PTO. The prior rule sets out the PTO Freedom of Information Act (FOIA) procedures. The final rule updates these procedures and specifies that FOIA requests will be processed in accordance with Department of Commerce regulations contained in Part 4 of 15 CFR (Public Information).

**Effective Date:** Dec. 30, 1988.

For Further Information Contact: Albin F. Drost by telephone at (703) 557-4035 or by mail marked to his attention and addressed to Box 8, Commissioner of Patents and Trademarks, Washington, D.C. 20231.

**Supplementary Information:** As presently written, 37 CFR 1.15 describes procedures for obtaining documents under the Freedom of Information Act that have been superseded. The purpose of this rule change is to bring the PTO FOIA procedures into conformity with the Department of Commerce FOIA rules. The final rule directly advises requesters that the PTO will follow the Department of Commerce rules for disclosure of information under FOIA.

A notice of proposed rulemaking was published on July 19, 1988 (53 Fed. Reg. 27 177). Interested parties were requested to submit written comments on or before Sept. 20, 1988. No comments were received.

**Other Considerations**

This rule change will not have a significant impact on the quality of the human environment or the conservation of energy resources.

This rule change is in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96-354), Executive Orders 12291 and 12612, and the Paperwork Reduction Act of 1980, 44 U.S.C. §3501 et seq.

The General Counsel of the Department of Commerce has certified to the Small Business Administration that the rule change will not have a significant adverse economic impact on a substantial number of small entities [Regulatory Flexibility Act, Pub. L. 96-354] because no increase in fees or paperwork should result from this rule change.

The Patent and Trademark Office has determined that this rule change is not a major rule under Executive Order 12991. The annual effect to the economy will be less than \$100 million. There will be no major increase in costs or prices for consumers, individual industries, federal, state or local government agencies, or geographic regions. There will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The PTO has also determined that this notice has no federalism implications affecting the relationship between the National Government and the states as outlined in Executive Order 12612.

The rule change will not impose a burden under the Paperwork Reduction Act of 1980, 44 U.S.C. §3501 et seq., since no record keeping or reporting requirement within the coverage of the Act are placed upon the public.

**List of Subjects in 37 CFR Part 1**

Administrative practice and procedure, Courts, Freedom of Information, Records.



For the reasons set out in the preamble and under the authority granted to the Commissioner of Patents and Trademarks by 35 U.S.C. §6, the Patent and Trademark Office amends Title 37 of the Code of Federal Regulations as set forth below:

# PART 1 - RULES OF PRACTICE IN PATENT CASES

1. The authority citation for 37 CFR Part 1 continues to read as follows:

AUTHORITY: 35 U.S.C. §6 unless otherwise noted.

2. Section 1.15 is revised as follows:

## §1.15 Requests for identifiable records.

(a) Requests for records, not disclosed to the public as part of the regular informational activity of the Patent and Trademark Office and which are not otherwise dealt with in the rules in this part, shall be made in writing, with the envelope and the letter clearly marked "Freedom of Information Request." Each such request, so marked, should be submitted by mail addressed to the "Patent and Trademark Office, Freedom of Information Request Control Desk, Box 8, Washington, D.C. 20231," or hand delivered to the Office of the Solicitor, Patent and Trademark Office, Arlington, Virginia. The request will be processed in accordance with the procedures set forth in Part 4 of Title 15, Code of Federal Regulations.

(b) Any person whose request for records has been initially denied in whole or in part, or has not been timely determined, may submit a written appeal as provided in §4.8 of Title 15, Code of Federal Regulations.

(c) Procedures applicable in the event of service of process or in connection with testimony of employees on official matters and production of official documents of the Patent and Trademark Office in civil legal proceedings not involving the United States shall be those established in parts 15 and 15a of Title 15, Code of Federal Regulations.

DONALD J. QUIGG,

Nov. 21, 1988

Assistant Secretary and  
Commissioner of Patents  
and Trademarks.

Department of Commerce  
Patent and Trademark Office  
37 CFR Parts 1 and 2  
[Docket No. 81024-8224]

## Revision of Patent and Trademark Fees

Agency: Patent and Trademark Office, Commerce

Action: Notice of Proposed Rulemaking

Summary: The Patent and Trademark Office proposes to amend the rules of practice in patent and trademark cases, Parts 1 and 2 of Title 37, Code of Federal Regulations, to adjust patent fee amounts and to reduce certain trademark fee amounts. The Office also proposes to amend the rules of practice in patent cases to clarify requirements in the filing of applications and to provide for procedures for applicants to cure certain defects in the filing of applications.

Establishment and adjustment of patent fees is provided for by §6 and §41 of Title 35, United States Code, and section 103(b) of Pub. L. 100-\*\*\*. Establishment and adjustment of trademark fees is provided for by section 31 of the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. §1113) and section 103(c) of Pub. L. 100-\*\*\*. Dates: Written comments must be submitted on or before Jan. 4, 1989; a public hearing will be held on Jan. 4, 1989, at 9:00 A.M. Requests to present oral testimony should be received on or before Jan. 3, 1989.

Addresses: Address written comments and requests to present oral testimony to the Commissioner of Patents

and Trademarks, Washington, D.C. 20231, Attention: Frances Michalkewicz, Suite 904, Crystal Park 2. The hearing will be held in Suite 912 on the 9th floor of Bldg. 2, Crystal Park, located at 2121 Crystal Dr., Arlington, Va. Written comments and a transcript of the public hearing will be available for public inspection in Suite 904 of Bldg. 2, Crystal Park at 2121 Crystal Dr., Arlington, Va.

For Further Information Contact: Frances Michalkewicz by telephone at (703) 557-1610 or by mail marked to her attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Supplementary Information: Patent fees were set on Oct. 1, 1982, in accordance with the provisions of Title 35, United States Code (Pub. L. 97-247). Patent fees were adjusted effective Oct. 5, 1985, in accordance with the provisions of Title 35, United States Code. Trademark fees were set on Oct. 1, 1982, in accordance with the provisions of §31 of the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. §1113) and adjusted on Oct. 1, 1986, in accordance with the provisions of that Act and Title 35. On Nov. 6, 1986, legislation modifying the way fee adjustments could be made was enacted as Pub. L. 99-607. The fee adjustment provisions of Pub. L. 99-607, §3(a) and §3(b) expired on Sep. 30, 1988. On Nov. \*\*, 1988, legislation extending §3(a) and §3(b) of Pub. L. 99-607 was enacted as Pub. L. 100-\*\*\*. Therefore, patent and trademark fee adjustments will be guided by the provisions of Title 35, United States Code, and by Pub. L. 100-\*\*\*, and the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. §1113), and by Pub. L. 100-\*\*\*.

The Patent and Trademark Office is proposing to amend 37 CFR §2.6 to reduce the fee for filing an application for trademark registration from \$200 to \$175 per class. The Office further proposes to reduce the fee for recording trademark assignments and agreements or other papers relating to the property in a registration or application from \$100 to \$8 for each mark in the same document.

Effective Oct. 1, 1982, trademark operations within the Office became 100 percent user-fee funded. Experience to date has demonstrated that the fees first established in Oct. 1982, and as later adjusted in Oct. 1986, are more than adequate to meet total trademark function costs. At the end of fiscal year 1988, total trademark function fees exceeded total trademark function costs by approximately \$10 million. Left undisturbed, it is projected that the current trademark fee structure will result in an additional \$12.7 million in excess fees over the course of the next three-year fee cycle. Thus, by the end of fiscal year 1991, total trademark fees are projected to exceed total trademark costs by almost \$23 million if the current fee structure remains in place.

In this light, the Office is proposing to reduce both the trademark application and assignment fees. A reduction of the application fee to \$175 would be consistent with the legislative history surrounding passage of Pub. L. 97-247. In its report (H. Rep. No. 97-542, May 17, 1982), the House Committee on the Judiciary stated that, "It is expected that the Commissioner will set the [trademark] fees in a way that the filing fee will be kept as low as possible to foster use of the Federal registration system." The application filing fee from Oct. 1982 to Oct. 1986 was \$175. The filing fee was increased in 1986 to \$200 in an effort to recover a greater percentage of the actual costs incurred in the processing of trademark applications. While the proposed reduction will increase the discrepancy between the application filing fee and out projected unit cost, the size of the current "surplus," as well as the objective of encouraging filings, supports the proposed action.

A reduction of the fee for recording trademark assignments to \$8 for each mark would make such fees consistent with those proposed for the recording of patent assignments.

While the proposed fee reductions still will leave a healthy "surplus," prudence suggests that further reductions be held in abeyance pending implementation of

"The Trademark Law Revision Act of 1988" (Pub. L. 100-\*\*\*). The Act, among other things, would permit applicants to file applications for Federal trademark registrations based upon a bona fide "intent-to-use" the mark in commerce. Implementation of "intent-to-use" legislation will require the Office to incur additional expenditures, such as increased personnel costs and improved computer capabilities. The Office will review its trademark fee structure approximately 18 months from implementation and propose further fee adjustments if warranted.

Even absent "intent-to-use," the Office will probably be required to upgrade its computer capabilities within the near future. Moreover, implementation of an automated trademark assignment system, now scheduled for fiscal year 1990, and other improvements in automated searching, will result in increased demands on trademark resources.

## BACKGROUND:

Provisions of Title 35 and Title 15, United States Code, and Pub. L. 100-\*\*\* Which Affect This Notice of Proposed Rulemaking

Patent and Trademark Office fees are authorized by 35 U.S.C. §41 and 35 U.S.C. §376. Section 41(a) of Title 35, United States Code, establishes a number of statutory fees. Among the more significant of these are fees for filing a patent application and issuing a patent. Certain other fees, such as appeal fees, the fee for filing a disclaimer, fees for filing petitions seeking to revive an abandoned application and for extensions of time also are set in 35 U.S.C. §41(a). Section 41(b) of Title 35, United States Code, sets forth the statutory fees for maintaining a patent in force if the application was filed on or after Aug. 27, 1982.

The provisions of Pub. L. 96-517 also establish maintenance fees for patents other than design and plant patents issued on applications filed on or after Dec. 12, 1980 and before Aug. 27, 1982. These maintenance fees are to recover 25 percent of the estimated cost to the Office of processing patent applications.

Section 1 of Pub. L. 97-247 authorized the reduction by 50 percent in the fees paid under 35 U.S.C. §41(a) and §41(b) by independent inventors, small business concerns, and nonprofit organizations, who meet the definitions establish. Section 1(a)(2) of Pub. L. 99-607 makes this provision permanent in 35 U.S.C. §41(h).

Section 41(f) of Title 35, United States Code, provides that fees established in 35 U.S.C. §41(a) and 35 U.S.C. §41(b), "may be adjusted by the Commissioner on Oct. 1, 1985, and every third year thereafter, to reflect any fluctuations occurring during the previous three years in the Consumer Price Index, as determined by the Secretary of Labor." Section 41(f) also provides that changes of less than one percent may be ignored. Pub. L. 100-\*\*\* makes no modifications to 35 U.S.C. §41(f).

Section 41(d) of Title 35, United States Code, provides that the "Commissioner will establish fees for all other processing, services, or materials related to patents" which are not covered in 35 U.S.C. §41(a) and 35 U.S.C. §41(b), "to recover the estimated average cost to the Office of such processing, services or materials."

Section 103(b) of Pub. L. 100-\*\*\* changes the way fees established under 35 U.S.C. §41(d) can be adjusted. For fiscal years 1989, 1990, and 1991, the Commissioner cannot increase fees established under §41(d) except for the purposes of making adjustments which in the aggregate do not exceed fluctuations during the previous three years in the Consumer Price Index.

Section 103(b) of Pub. L. 100-\*\*\* provides that the Commissioner cannot establish additional fees under 35 U.S.C. §41(d) during fiscal years 1989, 1990, and 1991.

Section 376 of Title 35, United States Code, authorizes the Commissioner to set fees for patent applications filed under the Patent Cooperation Treaty. The fees under the Patent Cooperation Treaty are keyed to full cost

recovery of the processing costs under the Treaty. Pub. L. 100-\*\*\* makes no modifications to 35 U.S.C. §376.

Section 31 of the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. §1113) authorizes the Commissioner to establish fees for the filing and processing of an application for the registration of a trademark or other mark, and for all other services and materials relating to trademarks and other marks. No fee for the filing or processing of an application for the registration of a trademark or other mark or for the renewal or assignment of a trademark or other mark will be adjusted more than once every three years. The House Committee on the Judiciary, in a report that accompanied H.R. 6260, which ultimately was enacted as Pub. L. 97-247, recommended a trademark fee schedule to the Commissioner which was established by rule published in the *Federal Register* on July 30, 1982 at 47 FR 33086, effective Oct. 1, 1982.

A final rule to increase the trademark application filing fee per class and the fee for copies of trademarks was published in the *Federal Register* on Aug. 4, 1986 at 51 FR 28052. The increased fees became effective on Oct. 1, 1986.

Section 103(a) of Pub. L. 100-\*\*\* changes the way fees established under the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. §1113) can be adjusted. For fiscal years 1989, 1990 and 1991, the Commissioner cannot increase fees established under the Act except for the purposes of making adjustments which in the aggregate do not exceed fluctuations during the previous three years in the Consumer Price Index.

Section 103(a) of Pub. L. 100-\*\*\* provides that the Commissioner cannot establish additional fees under the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. §1113) during fiscal years 1989, 1990, and 1991.

However, as described above under Supplementary Information, the Office is proposing only to reduce the fee for filing an application, per class, and the fee for recording trademark assignments and agreements or other papers relating to the property in a registration or application.

## Proposed Rule Changes

### General Procedures

Cost Calculations: The Office calculated unit costs for all fees based on OMB Circular A-25, "User Fees," and OMB Circular A-130, "Management of Federal Information Resources." Costs were determined from the best available records (for example, the 1987 end of fiscal year financial statements for the Office) and included direct and indirect costs to the Office of carrying out the activity, as directed by OMB Circular A-25. To estimate costs for the three-year fee cycle Apr. 1989-Mar. 1992, the 1987 actual costs were then adjusted by a mid-cycle inflation rate of 12.644 percent derived from the Administration's inflation projection.

### Workload Projections

Determination of future year workloads varies by fee code. Principal workload projection techniques are as follows:

Patent and trademark application workloads were projected from statistical regression models using recent application trends. Associated application workloads, for example, patent claims and extensions of time, grow relative to patent applications. Patent issues are projected from an in-house patent productivity model and reflect examiner production achievements and goals. Patent maintenance fee workloads utilize patents issued 3.5, 7.5 and 11.5 years prior to payment and assume payment rates of 80 percent, 50 percent and 25 percent, respectively. Trademark affidavits and renewals are based on prior year registrations and renewal trends. Service fee workloads follow linear trends from prior year activ-



ities. All workload estimates are approved by the manager responsible for the fee program.

#### Policy for applying the Consumer Price Index:

The Office of Management and Budget has determined that the Patent and Trademark Office should use Consumer Price Index-U (CPI) to adjust patent fees. The Department of Labor's Consumer Price Index is made public approximately twenty-one days after the end of the month being calculated. The time lag between the initiation and the completion of the rulemaking process dictates that the Aug. 1988 through Mar. 1989 inflation rate be projected. The Administration's projected cumulative CPI for the three-year period Apr. 1986-Mar. 1989 is 10.303 percent. This estimate is included in the cumulative three-year CPI applied to patent fees. Before the final fee schedule is published, the estimate will be recalculated using the additional actual data that will have become available in the interim.

#### Rounding Procedures:

After application of the 10.303 percent projected fluctuation in the CPI to fees, amounts were rounded by applying standard arithmetical rules so that the amounts rounded would be de minimis and convenient to the user. Fees of \$100 or more were rounded to the nearest \$10. Fees between \$10 and \$99 were rounded to the nearest even number so that the comparable small entity fee would be a whole number. Fees under \$2 were rounded for convenience. Since the amounts of the patent fees that went into effect on Oct. 5, 1985 were rounded after application of the Consumer Price Index, a first step in calculating proposed new fee amounts was to eliminate any effects of rounding prior years' fee adjustments. For example, 35 U.S.C. §41(a), sets the patent application filing fee at \$300.00. Applying the 11.8 percent CPI for the period 1983-1985 resulted in an allowable increase to \$335.40. This amount was rounded to \$340.00. For purposes of this fee adjustment process, the base used to adjust fees for the next fee cycle was the "unrounded" fee amount; i.e., the \$335.40 for patent application filing fees. Similarly, the cost for certifying Office records was \$2.70. This amount was rounded to \$3.00. For purposes of this fee adjustment process, the base was unrounded amount of \$2.70.

It should be noted that following routine rounding off practices can result in some fee items being adjusted by more or less than CPI. This divergence from the CPI ceiling will only exist in the short term because of the policy of applying the CPI adjustment factor to the unrounded amount from the previous fee cycle.

#### Proposed Rule Changes Under Title 35 and Title 15, United States Code and Pub. L. 100-\*\*\*

Statutory patent fees established under 35 U.S.C. §41(a) and 35 U.S.C. §41(b) will be adjusted in accordance with 35 U.S.C. §41(f) to reflect any fluctuations occurring during the previous three years in the CPI.

Non-statutory patent fees established under 35 U.S.C. §41(d) will be adjusted in accordance with §103(b) of Pub. L. 100-\*\*\* to reflect, in the aggregate, any fluctuations occurring during the previous three years (Apr. 1986-Mar. 1989) in the Consumer Price Index, as determined by the Secretary of Labor. Fees established under 35 U.S.C. §376 will be adjusted to recover the full cost of processing under the Patent Cooperation Treaty. International patent fees under 37 CFR §1.492 are related to patent fees established under 35 U.S.C. §41(a) and will be adjusted to reflect fluctuations in the CPI.

For fees established under section 31 of the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. §1113), the Office is proposing only to reduce the fee for filing an application, per class, and the fee for recording trademark assignments and agreements or other papers relating to the property in a registration or application as fully described above under Supplementary Information.

#### Fee Adjustment Methodology

1. **PROJECTED ACTUAL COSTS.** The projected actual costs for all fee items were calculated by applying the principles of OMB Circulars A-25 and A-130.

a. Statutory patent fees were derived by: (1) identifying those operational units of the Office involved in, or contributing to, the processing of a patent application through all phases of examination; (2) identifying and certifying actual fiscal year 1987 obligations incurred by the operational units in processing an application; (3) projecting those obligations to the period of Apr. 1989 through Mar. 1992 in accordance with approved budgets and future year budget targets; and (4) increasing the obligations projected for the period of Apr. 1989 through Mar. 1992 by the Administration's estimates for federal pay raise adjustments and projected inflation. Projected actual costs for Apr. 1989-Mar. 1992, \$729,810,051 less projected budget authority of \$265,834,000, are \$463,976,051.

b. For non-statutory patent fees, projected costs for each fee item were established by (1) identifying actual costs for 1987, and (2) projecting actual costs for fiscal years 1988 through Mar. 1992 by applying the Administration's inflation projection of 12.644 percent. This projected actual cost was then multiplied by the projected workload for each fee item. The sum of the projected costs for all fee items is the projected actual cost of operation during the three-year fee cycle. Projected actual costs for Apr. 1989-Mar. 1992 are \$64,661,341.

c. The same methodologies as described in paragraphs (a) and (b) above were applied to Patent Cooperation Treaty fees. Projected actual costs for Apr. 1989-Mar. 1992 are \$16,531,990.

d. The same methodology as described in paragraph (b) above was applied to Trademark fees. Projected actual costs for Apr. 1989-Mar. 1992 are calculated to be \$74,329,783.

#### 2. INCOME PROJECTIONS

a. The maximum amount of statutory fee income that the Office is authorized to recover under 35 U.S.C. §41(f) was calculated as follows.

For each statutory patent fee, the unrounded base (i.e., the 1986 adjusted fee before rounding) was multiplied by the projected CPI fluctuation of 10.303 percent for the three-year period Apr. 1986-Mar. 1989. This amount was then multiplied by the projected workload for Apr. 1989-Mar. 1992 to project the income from that fee item during the Apr. 1989-Mar. 1992 fee cycle. The sum of the projected incomes from all statutory patent fees is the maximum amount that the Office is authorized by 35 U.S.C. §41(f) to recover during the fee cycle and is equal to \$464,676,178.

b. The maximum amount of non-statutory fee income that the Office is authorized to recover under §103(b) of Pub. L. 100-\*\*\* was calculated as follows.

For each non-statutory patent fee, the unrounded base (i.e., the 1986 adjusted fee before rounding) was multiplied by the projected CPI fluctuation of 10.303 percent for the three-year period Apr. 1986-Mar. 1989. This amount was then multiplied by the projected workload for Apr. 1989-Mar. 1992 to project the income from that fee item during the Apr. 1989-Mar. 1992 fee cycle. The sum of the projected incomes from all non-statutory patent fees is the maximum amount that the Office is authorized by §103(b) of Pub. L. 100-\*\*\* to recover during the fee cycle and is equal to \$62,101,874.

c. For Patent Cooperation Treaty fees, the Office is authorized by 35 U.S.C. §376 to recover the full cost of processing under the Treaty. Thus, the projected costs identified in paragraph 1(c) for Patent Cooperation Treaty fees of \$16,531,990 would be the maximum level of recovery.

d. The maximum amount of trademark fee income that the Office is authorized to recover under §103(a) of Pub. L. 100-\*\*\* was calculated as follows.

For each trademark fee, the unrounded base (i.e., the 1986 adjusted fee before rounding) was multiplied by the projected CPI fluctuation of 10.303 percent for the three-year period Apr. 1986-Mar. 1989. This amount was then multiplied by the projected workload for Apr. 1989-Mar. 1992 to project the income from that fee item during the Apr. 1989-Mar. 1992 fee cycle. The sum of the projected incomes from all trademark fees is the maximum amount that the Office is authorized by §103(a) of Pub. L. 100-\*\*\* to recover during the fee cycle and is equal to \$107,704,135.

e. Each statutory patent fee amount identified in paragraph 2(a), and each PCT amount identified in paragraph 2(c) above was rounded according to the de minimis rounding rules described above.

Sections 103(a) and 103(b) of Pub. L. 100-\*\*\* allow the Office to set fees "in the aggregate." The fee

amounts proposed for non-statutory patent fees, and trademark fees would recover the maximum amount of income determined in paragraph (b) and (d) above.

Each of these fee amounts was multiplied by the projected workload during the fee cycle to project the income from that fee item. The sum of the projected income from all patent fees is \$542,281,082, which is the sum of the projected incomes from statutory patent fees, \$463,626,421, non-statutory patent fees, \$62,047,763, and Patent Cooperation Treaty fees, \$16,606,898.

f. The Office reduced two trademark fees, as described above under Supplementary Information. Each trademark fee amount was multiplied by the projected workload during the fee cycle to project the income from that fee item. The sum of the projected income from all trademark fees is projected to be \$72,972,690.

#### Summary:

Fee Category	Projected Cost April - Mar 1992	Maximum Allowable Recovery	Projected Income April 1989 - Mar 1992
Statutory Patent	\$463,976,051	\$464,676,178	\$463,626,421
Non-Statutory Patent	\$64,661,341	\$62,101,874	\$62,047,763
PCT	\$16,531,990	\$16,531,990	\$16,606,898
Total - Patent	\$545,169,382	\$543,310,042	\$542,281,082
Total - Trademarks	\$74,329,783	\$107,704,135	\$72,972,690
Total - All Fees	\$619,499,165	\$651,014,177	\$615,253,772

The unit costs by fee item are summarized in Appendix A. The Office has detailed cost calculation worksheets for each fee item, which are available for public inspection in Suite 904 of Bldg. 2, Crystal Park at 2121 Crystal Dr., Arlington, Va.

It is intended that the amount of any fee due and payable on or after Apr. 1, 1989 is the amount set in this rulemaking. For purposes of determining the amount of the fee to be paid, the date of mailing indicated on a proper Certificate of Mailing, where authorized under 37 CFR 1.8, will be considered to be the date of receipt in the Office. A "Certificate of Mailing under Section 1.8" is not "proper" for items which are specifically excluded from the provisions of §1.8. Section 1.8 should be consulted for those items for which a Certificate of Mailing is not "proper." Such items include, inter alia, the filing of national and international applications for patents and the filing of trademark applications. The provisions of 37 CFR §1.10, relating to filing of papers and fees by "Express Mail" with certificate, however, do apply to any paper or fee (including patent and trademark applications) to be filed in the Office. If an application or fee is filed by "Express Mail" with a certificate of express mailing dated on and after the effective date of the rules, the amount of the fee to be paid is the fee established herein if a change is being made in the fee. In order to ensure clarity in the implementation of the fee proposals, a discussion of specific sections is set forth below.

#### DISCUSSION OF SPECIFIC RULES

##### 37 CFR §1.12 Assignment records open to public inspection.

Section 1.12, paragraph (a), if amended as proposed, would refer to the renumbered §1.19(b)(4). Paragraph (c), if amended as proposed, would refer to the renumbered §1.17(i)(1).

##### 37 CFR §1.14 Patent applications preserved in secrecy.

Section 1.14, paragraph (e), if amended as proposed, would refer to the renumbered §1.17(i)(1).

##### 37 CFR §1.16 National application filing fee.

Section 1.16, if amended as proposed, would adjust patent application filing fees established in 35 U.S.C. §41(a) and set forth in 37 CFR §1.16(a)-(b), (d) and (f)-(i) to reflect fluctuations in the CPI.

Section 1.16, paragraph (e), if amended as proposed, would adjust the patent application surcharge fee authorized by 35 U.S.C. §111 to reflect fluctuations in the CPI.

##### 37 CFR §1.17 Patent application processing fees.

Section 1.17, if amended as proposed, would adjust patent application processing fees established in 35 U.S.C. §41(a) and set forth in 37 CFR §1.17(a)-(g) and (l)-(m) to reflect fluctuations in the CPI.

Section 1.17, if amended as proposed, would adjust the patent application processing fees authorized by 35 U.S.C. §41(d) and set forth in 37 CFR §1.17(h)-(k) to reflect fluctuations in the CPI.

Section 1.17, if amended as proposed, would establish one fee amount for filing a petition to the Commissioner under 37 CFR §§1.12, 1.14, 1.47, 1.48, 1.55, 1.103, 1.177, 1.182, 1.183, 1.295, 1.312, 1.313, 1.314, 1.377, 1.378(e), 1.644(e), 1.644(f), 1.666(b), 1.666(c), 5.12, 5.13, 5.14, 5.15, and 5.25. The proposed fee would recover the estimated average cost to the Office of processing all petitions to the Commissioner mentioned above. In addition, the single fee for all petitions is expected to facilitate pre-processing of petition requests.

Section 1.17(i)(1), if further amended as proposed, would establish the fees identified in 37 CFR §§1.53, 1.60 and 1.62 to accord a filing date.

Section 1.17, if amended as proposed, would provide in new paragraph (i)(2) and \$80 fee for filing a petition to the Commissioner under 37 CFR §1.102 to make an application special.

##### 37 CFR §1.18 Patent issue fees

Section 1.18, if amended as proposed, would adjust patent issue fees established in 35 U.S.C. §41(a) and set forth in 37 CFR §1.18(a)-(c) to reflect fluctuations in the CPI.



## 37 CFR §1.19 Document supply fees.

Section 1.19, if revised as proposed, would adjust the fees authorized by 35 U.S.C. §41(d) for services and materials as set forth in 37 CFR §1.19 to reflect fluctuations in the CPI.

Section 1.19(a)(2), if revised as proposed, would adjust the fees for copies of plant patents and statutory invention registrations to reflect fluctuations in the CPI.

Section 1.19, if revised as proposed, would renumber paragraph (a)(5) as (a)(3) and provide for a flat fee for a certified copy of an Office document, for each 30 pages or fraction thereof.

Section 1.19, if revised as proposed, would revise paragraphs (a)(4)-(a)(6) and (b)(4) to set the fees for the purchase of color copies of color drawings identified in utility patents and for expedited service for fulfillment of orders for patent copies and orders for copies of patent applications as filed. The provision for color drawings in utility patent applications is in §1.84(p). Although color drawings may be permitted in a utility patent application by petition, copies of printed patents will only be provided in black and white. If a copy of the printed patent with copies of the drawings in color is desired, it must be separately ordered and accompanied by the fee proposed in paragraph (a)(4). The fees proposed in paragraphs (a)(5), (a)(6) and (b)(4) are for expedited processing of copy orders.

The Public Service Window (PSW) in the Patent Public Search Room referred to in proposed new paragraph 37 CFR §1.19(a)(5) is located on the lobby level of Crystal Plaza Building 3. The Office rents numbered lock boxes (delivery boxes) to members of the public for copy order delivery purposes. Members of the public may place coupon orders at the PSW and request that the copies be delivered to their boxes at the PSW. PSW staff members receive and process the coupon orders and forward them to the copy fulfillment contractor. Upon receipt of the copies, PSW staff members place them in the appropriate delivery box for pickup by the box holder.

Section 1.19, paragraph (a), if revised as proposed, would remove the charge for a microfiche copy of a microfiche.

Section 1.19, if revised as proposed, would renumber paragraph (a)(3) as (b)(1) and provide for one fee for a certified copy of a patent application as filed.

Section 1.19, if revised as proposed, would renumber paragraph (a)(4) as (b)(2) and provide for a flat fee for a certified copy of a patent file wrapper, with no limitation on the number of pages.

Section 1.19, if revised as proposed, would renumber paragraph (a)(7) as (b)(3) and provide for one fee for a certified copy of a patent assignment record.

Section 1.19, if revised as proposed, would renumber paragraph (b)(1) as (b)(5).

Section 1.19, if revised as proposed, would renumber paragraph (b)(2) as (b)(6) and adjust the fee for a search of assignment records, abstract of title and certification, per patent to reflect fluctuations in CPI.

Section 1.19, if revised as proposed, would remove paragraph (c) as the requirement for a special fee for providing subscription services has been eliminated. The Office will provide subscription services at no cost to the subscriber.

Section 1.19, if revised as proposed, would renumber paragraph (d) as paragraph (c).

Section 1.19, if revised as proposed, would renumber paragraph (e) to paragraph (d) and provide for a list of all United States patents and statutory invention registrations in a subclass, with no limit to the number at the proposed flat fee.

Section 1.19, if revised as proposed, would remove paragraph (f).

Section 1.19, if revised as proposed, would renumber paragraphs (g)-(j) as paragraphs (e)-(h) and adjust the fees to reflect fluctuations in the CPI.

## 37 CFR §1.20 Post-issuance fees.

Section 1.20, paragraphs (a)-(c), if amended as proposed, would adjust patent post-issuance fees authorized by 35 U.S.C. §41(d) to reflect fluctuations in the CPI.

Section 1.20, if amended as proposed, would clarify the language in paragraph (a) that the fee charged is for a correction of an applicant's mistake.

Section 1.20, paragraphs (d) and (h)-(j), if amended as proposed, would adjust patent post-issuance fees established in 35 U.S.C. §41(a) and 35 U.S.C. §41(b) to reflect fluctuations in the CPI.

Section 1.20, paragraphs (e)-(g), if amended as proposed, would adjust post-issuance fees authorized by §2 of Publ. L. 96-517, as modified by §404 of Pub. L. 98-622. These fees must be set at a level to eventually recover 25 percent of the estimated cost to the Office of processing patent applications. In order to achieve this level of recovery, these maintenance fees are proposed to be adjusted to reflect fluctuations in the CPI.

Section 1.20, paragraph (k), if amended as proposed, would adjust the patent application surcharge fee authorized by §2 of Pub. L. 96-517.

Section 1.20, paragraph (l), if amended as proposed, would adjust the post-issuance fee authorized by 35 U.S.C. §41(b).

Section 1.20, paragraph (m), if amended as proposed, would adjust the post-issuance fee authorized by 35 U.S.C. §41(c)(1).

Section 1.20, paragraph (n), if amended as proposed, would adjust the post-issuance fee authorized by Pub. L. 98-417 and 35 U.S.C. §156.

## 37 CFR §1.21 Miscellaneous fees and charges.

Section 1.21, if amended as proposed, would adjust the miscellaneous fees and charges authorized by 35 U.S.C. §41(d) and set forth in 37 CFR §1.21(a)-(b), (d)-(j) and (l)-(m) to reflect fluctuations in the CPI.

Section 1.21(f), if further amended as proposed, would establish a flat fee for conducting an inventor search of Office records for a ten-year period.

The CopiShare Card referred to in 37 CFR §1.21(g) relates to the photocopiers and reader/printers for use by members of the public in the Office's search facilities. Each photocopier and reader/printer is connected to an access device which affords access to the equipment through the use of a magnetic card which has been encoded with an amount pre-paid by the customer. The access devices, encoding equipment, and magnetic cards comprise an equipment access system called the CopiShare system. The magnetic CopiShare Cards are purchased by the public and encoded with an amount of funds paid to the Office. The customer places the encoded card in the device connected to the photocopier or reader/printer, and a pre-set amount is deducted for each copy produced.

The Office is proposing to authorize the public to use credit cards for the purchase of CopiShare Cards. This will be a pilot program for accepting credit cards for fees, and if feasible, may be extended to other operations of the Office.

Section 1.21(h), if further amended as proposed, would establish one fee for recording each property in an assignment, agreement or other paper relating to the property in a patent or application. The fee reflects increased costs to enhance the processing of assignments.

Section 1.21, if amended as proposed, would add a new paragraph (n) for handling incomplete or improper applications under §§1.53(c), 1.60 or 1.62.

## 37 CFR §1.26 Refunds.

Section 1.26, if amended as proposed, would change paragraph (c) to provide for a refund of \$1,500 if the Commissioner decides not to institute reexamination proceedings. The \$1,500 refund would apply to those instances where the proposed reexamination fee of \$1,980 under 37 CFR 1.20(c) was paid. The current \$1,300

refund will be made in those cases where the current \$1,770 reexamination fee was paid.

## 37 CFR §1.53 Serial number, filing date, and completion of application.

Section 1.53, if amended as proposed, would establish a procedure whereby the failure to name all the inventors on filing an application, which results in a filing date not being accorded to the application, could be excused upon the filing of a petition satisfactorily explaining the delay. If the petition is granted, the application would be accorded a filing date as of the date the original papers were deposited. No specific provision allowing this relief is now in the rules. Paragraph (c), if amended as proposed, would set forth the procedure which the Office uses to notify an applicant that the names of the inventors have been omitted and would refer to the handling fee set in §1.21, rather than including the fee amount in the rule so as to be consistent with the other rules which refer to fees.

## 37 CFR §1.55 Claim for foreign priority.

Section 1.55, paragraph (a), if amended as proposed, would refer to the renumbered §1.17(i)(1).

## 37 CFR §1.60 Continuation or divisional application for invention disclosed in a prior application.

Section 1.60, if amended as proposed, would require that an applicant, who desires an application under the rule, indicate that the application is being filed pursuant to the rule. Applications which are not specifically designated as being filed under §1.60 or §1.62 are considered as having been filed under §1.53, which does not require an originally executed declaration before a filing date is given. The proposed amendment would also establish a procedure whereby the failure to file a true copy of the prior application or the statement that the papers are a true copy, which results in a filing date not being accorded the application, could be excused upon the filing of a petition satisfactorily explaining the delay in filing these items. If the petition is granted, the application would be accorded a filing date as of the date of deposit of the request for a §1.60 application. No specific provision allowing this relief is now in the rules. Paragraph (c), if added as proposed, would set forth the procedure which the Office uses to notify an applicant that an application filed under paragraph (b) is incomplete and the handling fee which is deducted from the amount refunded if an application is not completed after notice to do so has been given.

## 37 CFR §1.62 File wrapper continuing procedure.

Section 1.62, if amended as proposed, would specifically state that changes to the prior application must be made by an amendment to the prior application filed in the application under §1.62. An application which includes a copy of the prior application or a new specification is improper under the rule and is not accorded a filing date. This specific statement would hopefully eliminate errors by applicants. The paragraph would also establish a procedure whereby such an error could be excused upon the filing of a petition with instructions to cancel the copy or specification. If the petition is granted, the application would be accorded a filing date as of the date of deposit of the request for a §1.62 application. Paragraph (j), if added as proposed, would set forth the procedure which the Office uses to notify the applicant that an application filed under the section is improper and the handling fee which is deducted from the amount refunded if an application is not corrected after notice to do so has been given.

## 37 CFR §1.96 Submission of computer program listings.

Section 1.96, if amended as proposed, would include a copy of the microfiche appendix as part of the file wrapper and contents.

## 37 CFR §1.102 Advancement of examination.

Section 1.102, paragraph (d), if amended as proposed, would refer to the petition fee set forth in proposed new paragraph 1.17(i)(2).

## 37 CFR §1.103 Suspension of action.

Section 1.103, paragraph (a), if amended as proposed, would refer to the renumbered §1.17(i)(1).

## 37 CFR §1.171 Application for reissue.

Section 1.171, if amended as proposed, would refer to the renumbered §1.17(i)(1).

## 37 CFR §1.177 Reissue in divisions.

Section 1.177, if amended as proposed, would refer to the renumbered §1.17(i)(1).

## 37 CFR §1.296 Withdrawal of request for publication of statutory invention registration.

Section 1.296, if amended as proposed, would adjust the handling fee for withdrawal of a statutory invention registration to reflect fluctuations in the CPI.

## 37 CFR §1.313 Withdrawal from issue.

Section 1.313, paragraph (a), if amended as proposed, would refer to the renumbered §1.17(i)(1).

## 37 CFR §1.314 Issuance of patent.

Section 1.314, if amended as proposed, would refer to the renumbered §1.17(i)(1).

## 37 CFR §1.334 Issue of patent to assignee.

Section 1.334, paragraph (c), if amended as proposed, would refer to the renumbered §1.17(i)(1).

## 37 CFR §1.445 International application filing and processing fees.

Section 1.445, if amended as proposed, would adjust the fees authorized by 35 U.S.C. §376 for international application processing as set forth in 37 CFR §1.445(a)(2) and (a)(3) to recover the cost to the Office of such processing, as determined by fluctuations in CPI.

## 37 CFR §1.451 The priority claim and priority document in an international application.

Section 1.451, paragraph (b), if amended as proposed, would refer to the renumbered §1.19(b)(1) and §1.19(b)(6).

## 37 CFR §1.482 International preliminary examination fees.

Section 1.482, if amended as proposed, would adjust the fees authorized by 35 U.S.C. §376 for international application processing as set forth in 37 CFR §1.482(a) to recover the estimated average cost to the Office of such processing.

## 37 CFR §1.492 National stage fees.

Section 1.492, if amended as proposed, would adjust the fees authorized by 35 U.S.C. §376 for international application processing as set forth in 37 CFR 1.492(a)-(b) and (d)-(f) to recover the estimated average cost to the Office of such processing as determined by fluctuations in the CPI.

## 37 CFR §1.666 Filing of interference settlement agreements.

Section 1.666, paragraph (b), if amended as proposed, would refer to the renumbered §1.17(i)(1).



## 37 CFR §2.6 Trademark fees.

Section 2.6, if amended as proposed, would adjust trademark fees established pursuant to the Trademark (Lanham) Act of 1946, as amended (15 U.S.C. §1113), as set forth in paragraphs (a) and (q).

**Other Considerations:** The proposed rule change is in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96-354), Executive Orders 12291 and 12612, and the Paperwork Reduction Act of 1980, 44 U.S.C. §§3501 et seq. There are no information collection requirements relating to patent fee rules.

The Office has determined that this notice has no Federalism implications affecting the relationship between the National Government and the States as outlined in Executive Order 12612.

The General Counsel of the Department of Commerce has certified to the Chief Counsel for Advocacy, Small Business Administration, that the proposed rule change will not have a significant adverse economic impact on a substantial number of small entities (Regulatory Flexibility Act, Pub. L. 96-354). The principal impact of the major patent fees has already been taken into account in Pub. L. 99-607, which provided small entities with a 50 percent reduction in the major patent fees. The proposed rule change will adjust fees to reflect the change in the CPI and cost of processing services as provided by statute (35 U.S.C. §41(d) and §41(f)).

The Office has determined that this proposed rule change is not a major rule under Executive Order 12291. The annual effect on the economy will be less than \$100 million. There will be no major increase in costs or prices for consumers, individual industries, federal, state, or local government agencies, or geographic regions, because most major fees are being adjusted to reflect changes in the CPI over the past three years. There will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

## List of Subjects in 37 CFR Part 1 and Part 2

Administrative practice and procedure, Authority delegations (government agencies), Conflict of interests, Courts, Inventions and patents, Lawyers, Trademarks.

For the reasons set forth in the preamble, the Office is proposing to amend Title 37 of the Code of Federal Regulations as set forth below. All proposed additions are printed between arrows (> <) and all deletions are shown between brackets ([ ]).

## Part 1 Rules of Practice in Patent Cases

1. The authority citation for 37 CFR Part 1 would continue to read as follows:

Authority: 35 U.S.C. §6 unless otherwise noted.

2. Section 1.12 is proposed to be amended by revising paragraph (a) to read as follows:

## §1.12 Assignment records open to public inspection.

(a) The assignment records, relating to original or reissue patents, including digests and indexes, and assignment records relating to pending or abandoned trademark applications and to trademark registrations, are open to public inspection >, < and copies of any instrument recorded may be obtained upon request [§] and payment of the fee set forth in [§1.19(a)(5)] > §1.19(a)(3) <.

\*\*\*\*\*

(c) Any request by a member of the public seeking copies of any assignment records of any pending or abandoned patent application preserved in secrecy under

§1.14, or any information with respect thereto, must (1) be in the form of a petition accompanied by the petition fee set forth in [§1.17(i)] > §1.17(i)(1), < or (2) include written authority granting access to the member of the public to the particular assignment records from the applicant or applicant's assignee or attorney or agent of record.

\*\*\*\*\*

3. Section 1.14 is proposed to be amended by revising paragraph (e) to read as follows:

## §1.14 Patent applications preserved in secrecy.

\*\*\*\*\*

(e) Any request by a member of the public seeking access to, or copies of, any pending or abandoned application preserved in secrecy pursuant to paragraphs (a) and (b) of this section, or any papers relating thereto, must (1) be in the form of a petition and be accompanied by the petition fee set forth in [§1.17(i)] > §1.17(i)(1), < or (2) include written authority granting access to the member of the public in that particular application from the applicant or the applicant's assignee or attorney or agent of record. See §1.612(a) for access by an interference party to a pending or abandoned application.

4. Section 1.16 is proposed to be amended by revising paragraphs (a)-(b) and (d)-(i) to read as follows:

## §1.16 National application filing fees.

(a) Basic fee for filing each application for an original patent, except design or plant case:

By a small entity (§1.9(f)) . . . . . [\$170.00] > \$185.00 <  
By other than a small entity . . . . . [\$340.00] > \$370.00 <

(b) In addition to the basic filing fee in an original application, for filing or later presentation of each independent claim in excess of 3:

By a small entity (§1.9(f)) . . . . . [\$17.00] > \$18.00 <  
By other than a small entity . . . . . [\$34.00] > \$36.00 <

\*\*\*\*\*

(d) In addition to the basic filing fee in an original application, if the application contains, or is amended to contain a multiple dependent claim(s) per application:

By a small entity (§1.9(f)) . . . . . [\$55.00] > \$60.00 <  
By other than a small entity . . . . . [\$110.00] > \$120.00 <

(If the additional fees required by paragraphs (b), (c) >, < and (d) are not paid on filing or on later presentation of the claims for which the additional fees are due, they must be paid or the claims canceled by amendment, prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.)

(e) Surcharge for filing the basic filing fee or oath or declaration on a date later than the filing date of the application:

By a small entity (§1.19(f)) . . . . . [\$55.00] > \$60.00 <  
By other than a small entity . . . . . [\$110.00] > \$120.00 <

(f) For filing each design application:

By a small entity (§1.9(f)) . . . . . [\$70.00] > \$75.00 <  
By other than a small entity . . . . . [\$140.00] > \$150.00 <

(g) Basic fee for filing each plant application:

By a small entity (§1.9(f)) . . . . . [\$110.00] > \$125.00 <  
By other than a small entity . . . . . [\$220.00] > \$250.00 <

(h) Basic fee for filing each reissue application:

By a small entity (§1.9(f)) . . . . . [\$170.00] > \$185.00 <  
By other than a small entity . . . . . [\$340.00] > \$370.00 <

(i) In addition to the basic filing fee in a reissue application, for filing or later presentation of each independent claim which is in excess of the number of independent claims in the original patent:

By a small entity (§1.9(f)) . . . . . [\$17.00] > \$18.00 <  
By other than a small entity . . . . . [\$34.00] > \$36.00 <

\*\*\*\*\*

(Note, see §1.445 for international application filing and processing fees.) > . <

5. Section 1.17 is proposed to be amended by revising paragraphs (a)-(i)(1) and (j)-(m), and by adding a new paragraph (i)(2), to read as follows:

## §1.17 Patent application processing fees.

(a) Extension fee for response within first month pursuant to §1.136(a):

By a small entity (§1.9(f)) . . . . . [\$28.00] > \$31.00 <  
By other than a small entity . . . . . [\$56.00] > \$62.00 <

(b) Extension fee for response within second month pursuant to §1.136(a):

By a small entity (§1.9(f)) . . . . . [\$85.00] > \$90.00 <  
By other than a small entity . . . . . [\$170.00] > \$180.00 <

(c) Extension fee for response within third month pursuant to §1.136(a):

By a small entity (§1.9(f)) . . . . . [\$195.00] > \$215.00 <  
By other than a small entity . . . . . [\$390.00] > \$430.00 <

(d) Extension fee for response within fourth month pursuant to §1.136(a):

By a small entity (§1.9(f)) . . . . . [\$305.00] > \$340.00 <  
By other than a small entity . . . . . [\$610.00] > \$680.00 <

(e) For filing a notice of appeal from the examiner to the Board of Patent Appeals and Interferences:

By a small entity (§1.9(f)) . . . . . [\$65.00] > \$70.00 <  
By other than a small entity . . . . . [\$130.00] > \$140.00 <

(f) In addition to the fee for filing a notice of appeal, for filing a brief in support of an appeal:

By a small entity (§1.9(f)) . . . . . [\$65.00] > \$70.00 <  
By other than a small entity . . . . . [\$130.00] > \$140.00 <

(g) For filing a request for an oral hearing before the Board of Patent Appeals and Interferences in appeal under 35 U.S.C. §134:

By a small entity (§1.9(f)) . . . . . [\$55.00] > \$60.00 <  
By other than a small entity . . . . . [\$110.00] > \$120.00 <

(h) For filing a petition to the Commissioner under a section of this part listed below which refers to this paragraph . . . . . [\$140.00] > \$120.00 <

§1.47 - for filing by other than all the inventors or a person not the inventor.

§1.48 - for correction of inventorship

§1.182 - for decision on questions not specifically provided for.

§1.183 - to suspend rules.

§1.295 - for review of refusal to publish a statutory invention registration.

§1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of patent.

§1.378(e) - for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in expired patent.

§1.644(e) - for petition in an interference.

§1.644(f) - for request for reconsideration of a decision on petition in an interference.

§1.666(c) - for late filing of interference settlement agreement.

§§5.12, 5.13, & 5.14 - for expedited handling of foreign filing license.

§5.15 - for changing the scope of a license.

§5.25 - for retroactive license.

(i) > (1) < For filing a petition to the Commissioner under a section of this part listed below which refers to this paragraph . . . . . [\$72.00] > \$120.00 <

§1.12 - for access to an assignment record.

§1.14 - for access to an application.

> §1.53 - to accord a filing date. <

§1.55 - for entry of late priority papers.

> §1.60 - to accord a filing date. <

> §1.62 - to accord a filing date. <

[§1.102 - to make application special.]

§1.103 - to suspend action in application.

§1.177 - for divisional reissue to issue separately.

§1.312 - for amendment after payment of issue fee.

§1.313 - to withdraw an application from issue.

§1.314 - to defer issuance of a patent.

§1.334 - for patent to issue to assignee, assignment recorded late.

§1.666(b) - for access to interference settlement agreement.

> (2) For filing a petition to the Commissioner under §1.102 of this part to make application special . . . . . \$80.00 <

(j) For filing a petition to institute a public use proceeding under §1.292 . . . . . [\$860.00] > \$1,200.00 <

(k) For processing an application filed with a specification in a non-English language (§1.52(d)) . . . . . [\$26.00] > \$30.00 <

(l) For filing a petition (1) for the revival of an abandoned application under 35 U.S.C. §133, or §371 or (2) for delayed payment of the issue fee under 35 U.S.C. §151:

By a small entity (§1.9(f)) . . . . . [\$28.00] > \$31.00 <  
By other than a small entity . . . . . [\$56.00] > \$62.00 <

(m) For filing a petition (1) for revival of an unintentionally abandoned application >, < or (2) for the unintentionally delayed payment of the fee for issuing a patent:

By a small entity (§1.9(f)) . . . . . [\$280.00] > \$310.00 <  
By other than a small entity . . . . . [\$560.00] > \$620.00 <

\*\*\*\*\*

6. Section 1.18 is proposed to be amended to read as follows:

## §1.18 Patent issue fees.

(a) Issue fee for issuing each original or reissue patent, except a design or plant patent:

By a small entity (§1.9(f)) . . . . . [\$280.00] > \$310.00 <  
By other than a small entity . . . . . [\$560.00] > \$620.00 <

## (b) Issue fee for issuing a design patent:

By a small entity(\$1.9(f)) ..... [\$100.00]>\$110.00<  
By other than a small entity ..... [\$200.00]>\$220.00<

## (c) Issue fee for issuing a plant patent:

By a small entity(\$1.9(f)) ..... [\$140.00]>\$155.00<  
By other than a small entity ..... [\$280.00]>\$310.00<

7. Section 1.19 is proposed to be revised to read as follows:

*§1.19 Document supply fees.*

The Patent and Trademark Office will supply copies of the following documents upon payment of the fees indicated:

## (a) Uncertified copies of Office documents:

....

(2) Printed copy of a plant patent or statutory invention registration in color ..... [\$6.00]>\$10.00<

[(3)] Copy of patent application as filed ..... \$9.50

(4) Copy of patent file wrapper and contents, per 200 pages or a fraction thereof ..... \$75.00

[(5)]>(3)< Copy of Office [records] > documents <, except as otherwise provided in this, [per page] > for each 30 pages or a fraction thereof < ..... [\$5.00]>\$10.00<

[(6)] Microfiche copy of microfiche, per microfiche ..... \$5.00

(7) Copy of patent assignment record ..... \$1.50

>(4) Copy of a utility patent with drawings in color (see §1.84(p)) ..... \$20.00

(5) Expedited local service for copy of a patent as in paragraph (a)(1) of this section, fulfilled within one work day for orders delivered to the Public Service Window in the Patent Public Search Room ... \$3.00

(6) Expedited service for copy of a patent as in paragraph (a)(1) of this section, ordered by electronic ordering service and delivered to the customer within two work days ..... \$25.00<

## (b) Certified copies of Office documents:

>(1) Certified copy of patent application as filed ..... \$10.00

(2) Certified copy of patent file wrapper ... \$170.00

(3) Certified copy of patent assignment record ... \$5.00

(4) Expedited service for certified copy of patent application as filed in paragraph (a)(3) of this section, fulfilled within 5 work days, excluding mailing time ... \$20.00<

[(1)] >(5)< For certifying Office records, per certificate ..... \$3.00

[(2)] >(6)< For a search of assignment records, abstract of title and certification, per patent ..... [\$12.00]>\$15.00<

## (c) Subscription services:

(1) Subscription orders for printed copies of patents as issued, annual service charge for entry of order and ten subclasses ..... \$7.00

(2) For annual subscription to each additional subclass in addition to the ten covered by the fee under paragraph (c)(1) of this section, per subclass .... \$2.00

[(d)] >(c)< Library service (35 U.S.C. §13): For providing to libraries copies of all patents issued annually, per annum ..... \$50.00

## (e) List of patents in a subclass:

[(1)] >(d)< For list of all United States patents and statutory invention registrations in a subclass [ , per 100 numbers or fraction thereof ..... \$1.00

(2) For list of United States patents and statutory invention registrations in a subclass limited by date or number, per 50 numbers or fraction thereof ..... \$1.00/\$2.00<

[(f)] Microfiche copy of patent file record ..... \$6.00

[(g)] >(e)< Uncertified statement as to status of the payment of maintenance fees due on a patent or expiration of a patent ..... [\$3.00]>\$5.00<

[(h)] >(f)< Uncertified copy of a non-United States patent document, per document ..... \$10.00

[(i)] >(g)< To compare and certify copies made from Patent and Trademark Office records but not prepared by the Patent and Trademark Office, per copy of document ..... [\$5.00]>\$10.00<

[(j)] >(h)< Additional filing receipts:

(1) Duplicate ..... \$14.00

(2) Corrected due to applicant error ..... \$14.00

>duplicate or corrected due to applicant error ..... \$15.00<

8. Section 1.20 is proposed to be amended by revising paragraphs (a)-(n) to read as follows:

*§1.20 Post issuance fees.*

(a) For providing a certificate of correction [of] >for applicant's < mistake (§1.323) ... [\$29.00]>\$60.00<

(b) Petition for correction of inventorship in patent (§1.324) ..... [\$140.00]>\$120.00<

(c) For filing a request for reexamination (§1.510(a)) ... [\$1,770.00]>\$2,000.00<

(d) For filing each statutory disclaimer (§1.321):

By a small entity(\$1.9(f)) ..... [\$28.00]>\$31.00<  
By other than a small entity ..... [\$56.00]>\$62.00<

(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond [4] >four< years; the fee is due by three years and six months after the original grant ... [\$225.00]>\$245.00<

(f) For maintaining an original or reissue patent, a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond [8] >eight< years; the fee is due by seven years and six months after the original grant ... [\$445.00]>\$495.00<

(g) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 12 years; the fee is due by eleven years and six months after the original grant ..... [\$670.00]>\$740.00<

(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond [4] >four< years; the fee is due by three years and six months after the original grant:

By a small entity(\$1.9(f)) ..... [\$225.00]>\$245.00<  
By other than a small entity ..... [\$450.00]>\$490.00<

(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application, filed on or after Aug. 27, 1982, in force beyond [8] >eight< years; the fee is due by seven years and six months after the original grant:

By a small entity(\$1.9(f)) ..... [\$445.00]>\$495.00<  
By other than a small entity ..... [\$890.00]>\$990.00<

(j) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 12 years; the fee is due by eleven years and six months after the original grant:

By a small entity(\$1.9(f)) ..... [\$670.00]>\$740.00<  
By other than a small entity ... [\$1,340.00]>\$1,480.00<

(k) Surcharge for paying a maintenance fee during the [6] >six< -month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 ..... [\$110.00]>\$120.00<

(l) Surcharge for paying a maintenance fee during the [6] >six< -month grace period following the expiration of three years and six months, seven years and six months and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(\$1.9(f)) ..... [\$55.00]>\$60.00<  
By other than a small entity ..... [\$110.00]>\$120.00<

(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable ..... [\$500.00]>\$550.00<

(n) For filing an application for extension of the term of a patent (§1.740) ..... \$550.00/>\$600.00<

9. Section 1.21 is proposed to be amended by revising paragraphs (a), (b), (d)-(j), and (l)-(m) to read as follows:

*§1.21 Miscellaneous fees and charges.*

The Patent and Trademark Office has established the following fees for the services indicated:

## (a) Registration of attorneys and agents:

(1) For admission to examination for registration to practice, fee payable upon application ..... [\$250.00]>\$270.00<

(2) On registration to practice ..... [\$81.00]>\$90.00<

(3) For reinstatement to practice ... [\$9.00]>\$10.00<

(4) For certificate of good standing as an attorney or agent ..... \$10.00  
Suitable for framing ..... [\$88.00]>\$100.00<

(5) For review of a decision of the Director of Enrollment and Discipline under §10.2(c) ..... [\$92.00]>\$100.00<

(6) For requesting regrading of an examination under §10.7(c) ..... [\$92.00]>\$100.00<

## (b) Deposit accounts:

(1) For establishing or reinstating a deposit account ... [\$8.00]>\$10.00<

.....

(3) ....

(d) Delivery box: Local delivery box rental, per annum ... [\$43.00]>\$50.00<

(e) International type search reports: For preparing an international type search report of an international type search made at the time of the first action on the merits in a national patent application [\$28.00]>\$30.00<

(f) Search of Office records: For [searching Patent and Trademark] >conducting an inventor search of< Office records for [purposes not otherwise specified, per one half-hour or fraction thereof] >a ten-year period< ..... [\$14.00]>\$10.00<

(g) CopiShare card: Cost per copy ... [\$0.20]>\$.15<

## (h) [Recording of documents:

(1)] For recording each assignment, agreement or other paper relating to the property in a patent or application >per property< ..... [\$7.00]>\$8.00<

[(2)] Where a document to be recorded under paragraph (h)(1) of this section refers to more than one patent or application, for each additional patent or application ..... \$2.00

(i) Publication in Official Gazette: For publication in the Official Gazette of a notice of the availability of an application or a patent for licensing or sale, each application or patent ..... [\$7.00]>\$20.00<

(j) For a duplicate or replacement of a permanent Office user pass (There is no charge for the first permanent user pass) ..... [\$5.00]>\$10.00<

.....

(l) For processing and retaining any application abandoned pursuant to section 1.53(d) unless the required basic filing fee has been paid ... [\$100.00]>\$120.00<

(m) For processing each check returned "unpaid" by a bank ..... [\$20.00]>\$50.00<

>(n) For handling incomplete or improper application under §1.53(c), §1.60 or §1.62 ..... \$20.00<

10. Section 1.26 is proposed to be amended by revising paragraph (c) to read as follows:

*§1.26 Refunds.*

.....

(c) If the Commissioner decides not to institute a reexamination proceeding, a refund of [\$1,300] >\$1,500< will be made to the requestor of the proceeding. Reexamination requesters should indicate whether any refund should be made by check or by credit to a deposit account.

11. Section 1.53 is proposed to be amended by revising paragraph (c) to read as follows:



**§1.53 Serial number, filing date, and completion of application.**

\*\*\*\*\*

(b) The filing date of an application for patent is the date on which: (1) a specification containing a description pursuant to §1.71 and at least one claim pursuant to §1.75, and (2) any drawing required by §1.81(a), are filed in the Patent and Trademark Office in the name of the actual inventor or inventors as required by §1.41. No new matter may be introduced into an application after its filing date (§1.118). > If all the names of the actual inventor or inventors are not supplied when the specification and any required drawing are filed, the application will not be given a filing date earlier than the date upon which the names are supplied unless a petition with the fee set forth in §1.17(i)(1) is filed which satisfactorily explains the delay in supplying the names. <

(c) If any application is filed without the specification >, < [or] drawing > or name, or names, or the actual inventor or inventors < required by paragraph (b) of this section, applicant will be so notified and given a time period within which to submit the omitted specification >, < [or] drawing <, name, or names, of the actual inventor, or inventors, < in order to obtain a filing date as of the date of filing of such submission. If the omission is not corrected within the time period set, the application will be returned or otherwise disposed of; the fee, if submitted, will be refunded less [a \$15.00] > the < handling set forth in §1.21 (a) <.

\*\*\*\*\*

12. Section 1.55 is proposed to be amended by revising paragraph (a) to read as follows:

**§1.55 Claim for foreign priority.**

(a) An applicant may claim the benefit of the filing date of a prior foreign application under the conditions specified in 35 U.S.C. §119 and §172. The claim to priority need be in no special form and may be made by the attorney or agent if the foreign application is referred to in the oath or declaration as required by §1.63. The claim for priority and the certified copy of the foreign application specified in the second paragraph of 35 U.S.C. §119 must be filed in the case of > an < interference (§1.630); when necessary to overcome the date of a reference relied upon the examiner; or when specifically required by the examiner; and in all other cases they must be filed not later than the date the issue fee is paid. If the papers filed are not in the English language, a translation need not be filed except in the three particular instances specified in the preceding sentence, in which event a sworn translation or a translation certified as accurate by a sworn or official translator must be filed. If the priority papers are submitted after the date the issue fee is paid, they must be accompanied by a petition requesting their entry and the fee set forth in [§1.17(i)] > §1.17(i)(1) <.

\*\*\*\*\*

13. Section 1.60 is proposed to be amended by revising paragraph (b) and adding new paragraph (c) to read as follows:

**§1.60 Continuation or divisional application for invention disclosed in a prior application.**

\*\*\*\*\*

(b) An applicant may omit signing of the oath or declaration in a continuation or divisional application if (1) the prior application was a complete application as set forth in §1.51(a), (2) applicant > indicates that the application is being filed pursuant to this section and < files a true copy of the prior complete application as filed in-

cluding the specification (including claims), drawings, oath or declaration showing the signature or an indication it was signed, and any amendments referred to in the oath or declaration filed to complete the prior application, and (3) the inventors named in the continuation or divisional application are the same or less than all the inventors named in the prior application. The copy of the prior application must be accompanied by a statement that the application papers filed are a true copy of the prior application and that no amendments referred to in the oath or declaration filed to complete the prior application introduced new matter therein. Such statements must be by the applicant or applicant's attorney or agent and must be a verified statement if made by a person not registered to practice before the Patent and Trademark Office. Only amendments reducing the number of claims or adding a reference to the prior application (§1.78(a)) will be entered before calculating the filing fee and granting the filing date. If the continuation or divisional application is filed by less than all the inventors named in the prior application >, < a statement must accompany the application when filed requesting deletion of the names of the person or persons who are not inventors of the invention being claimed in the continuation or divisional application. > If a true copy of the prior application as filed is not filed with the application or if the statement that the application papers are a true copy is omitted, the application will not be given a filing date earlier than the date upon which the copy and statement are filed, unless a petition with the fee set forth in §1.17(i)(1) is filed which satisfactorily explains the delay in filing these items. <

> (c) If an application filed pursuant to paragraph (b) of this section is incomplete, applicant will be given a time period within which to complete the application in order to obtain a filing date as of the date of filing the omitted item provided the omitted item is filed before the patenting or abandonment of or termination of proceedings on the prior application. If the omission is not corrected within the time period set, the application will be returned or otherwise disposed of; the fee, if submitted, will be refunded less the handling fee set forth in §1.21(n). <

14. Section 1.62 is proposed to be amended by revising paragraph (e) and by adding a new paragraph (j) to read as follows:

**§1.62 File wrapper continuing procedure.**

\*\*\*\*\*

(e) An application filed under this section will utilize the file wrapper and contents of the prior application to constitute the new continuation, continuation-in-part, or divisional application but will be assigned a new application serial number. > Changes to the prior application must be made in the form of an amendment to the prior application as it exists at the time of filing the prior application under this section. No copy of the prior application or new specification is required and the filing of such a copy or specification will be considered improper, and a filing date will not be granted to the application unless a petition with the fee set forth in §1.17(i)(1) is filed with instructions to cancel the copy or specification. <

\*\*\*\*\*

> (j) If any application filed under this section is found to be improper, the applicant will be notified and given a time period within which to correct the filing error in order to obtain a filing date as of the date the filing error is corrected provided the correction is made before the payment of the issue fee, abandonment of, or termination of proceedings on the prior application. If the filing error is not corrected within the time period set, the application will be returned or otherwise disposed of; the fee, if submitted, will be refunded less the handling fee set forth in §1.21(n). <

\*\*\*\*\*

15. Section 1.96 is proposed to be amended to read as follows:

**§1.96 Submission of computer program listings.**

\*\*\*\*\*

(b)(1) Availability of appendix. Such computer program listings on microfiche will be available to the public for inspection, and [paper or] microfiche copies thereof will be [separately] available for purchase > with the file wrapper and contents <, after a patent based on such [an] application is granted or the application is otherwise made publicly available.

16. Section 1.102 is proposed to be amended to read as follows:

**§1.102 Advancement of examination.**

\*\*\*\*\*

(d) A petition to make an application special on grounds other than those referred to in paragraph (c) of this section must be accompanied by the petition fee set forth in §1.17(i) > (2) <.

17. Section 1.103, paragraph (a) is proposed to be amended to read as follows:

**§1.103 Suspension of action.**

(a) Suspension of action by the Office will be granted for good and sufficient cause and for a reasonable time specified upon petition by the applicant and, if such cause is not the fault of the Office, the payment of the fee set forth in [§1.17(i)] > §1.17(i)(1) <. Action will not be suspended when a response by the applicant to an Office action is required.

\*\*\*\*\*

18. Section 1.171 is proposed to be amended to read as follows:

**§1.171 Application for reissue.**

An application for reissue must contain the same parts required for an application for an original patent, complying with all the rules relating thereto except as otherwise provided, and >, < in addition, must comply with the requirements of the rules relating to reissue applications. The application must be accompanied by a certified copy of an abstract of title or an order for a title report accompanied by the fee set forth in [§1.19(b)(2)] > §1.19(b)(6) <, to be placed in the file, and by an offer to surrender the original patent (§1.178).

19. Section 1.177 is proposed to be amended to read as follows:

**§1.177 Reissue in divisions.**

The Commissioner may, in his or her discretion, cause several patents to be issued for distinct and separate parts of the thing patented, upon demand of the applicant, and upon payment of the required fee for each division. Each division of a reissue constitutes the subject of a separate specification descriptive of the part or parts of the invention claimed in such division; and the drawing may represent only such part of parts, subject to the provisions of §§1.83 and 1.84. On filing divisional reissue applications, they shall be referred to the Commissioner. Unless otherwise ordered by the Commissioner upon petition and payment of the fee set forth in [§1.17(i)] > §1.17(i)(1) <, all the divisions of a reissue will issue simultaneously; if there be any controversy as to one division, the others will be withheld from issue until the controversy is ended, unless the Commissioner shall otherwise order.

20. Section 1.296 is proposed to be amended to read as follows:

**§1.296 Withdrawal of request for publication of statutory invention registration.**

A request for a statutory invention registration, which has been filed, may be withdrawn prior to the date of the notice of the intent to publish a statutory invention registration issued pursuant to §1.294(c) by filing a request to withdraw the request for publication of a statutory invention registration. The request to withdraw may also include a request for a refund of any amount paid in excess of the application filing fee and a handling fee of [§100] > \$120.00 < which will be retained. Any request to withdraw the request for publication of a statutory invention registration filed on or after the date of the notice of intent to publish issued pursuant to §1.294(c) must be in the form of a petition pursuant to §1.183 accompanied by the fee set forth in §1.17(h).

21. Section 1.313, paragraph (a), is proposed to be amended to read as follows:

**§1.313 Withdrawal from issue.**

(a) Applications may be withdrawn from issue for further action at the initiative of the Office or upon petition by the applicant. Any such petition by the applicant must include a showing of good and sufficient reasons why withdrawal of the application is necessary and, if the reason for the withdrawal is not the fault of the Office, must be accompanied by the fee set forth in [§1.17(i)] > §1.17(i)(1) <. If the application is withdrawn from issue, a new notice of allowance will be sent if the application is again allowed. Any amendment accompanying a petition to withdraw an application from issue must comply with the requirement of §1.312.

\*\*\*\*\*

22. Section 1.314 is proposed to be amended to read as follows:

**§1.314 Issuance of patent.**

If payment of the issue fee is timely made, the patent will issue in regular course unless (a) the application is withdrawn from issue (§1.313) >, < or (b) issuance of the patent is deferred. Any petition by the applicant requesting deferral of the issuance of a patent must be accompanied by the fee set forth in [§1.17(i)] > §1.17(i)(1) < and must include a showing of good and sufficient reasons why it is necessary to defer issuance of the patent.

23. Section 1.334, paragraph (c), is proposed to be amended to read as follows:

**§1.334 Issue of patent to assignee.**

\*\*\*\*\*

(c) If the assignment is recorded after the date of payment of the issue fee, the assignee may petition that the patent issue to the assignee as recorded. Any such petition must be accompanied by the fee set forth in [§1.17(i)] > §1.17(i)(1) <.

24. Section 1.445 is proposed to be amended by revising paragraph (a) to read as follows:

**§1.445 International application filing and processing fees.**

(a) The following fees and charges are established by the Patent and Trademark Office under the authority of 35 U.S.C. §376:

\*\*\*

(2) A search fee (see 35 U.S.C. §361(d) and PCT Rule 16) where:

(i) No corresponding prior United States national application with basic filing fee has been filed ..... [§520.00] > \$550.00 <

(ii) A corresponding prior United States national application with basic filing fee has been filed . . . . . [\$350.00] > \$380.00 <

(3) A supplemental search fee when required per additional invention . . . . . [\$140.00] > \$150.00 <

\*\*\*\*\*

25. Section 1.451 is proposed to be amended by revising paragraph (b) to read as follows:

*§1.451 The priority claim and priority document in an international application.*

\*\*\*\*\*

(b) Whenever the priority of an earlier United States national application is claimed in an international application, the applicant may request in a letter of transmittal accompanying the international application upon filing with the United States Receiving Office or in a separate letter filed in the Receiving Office not later than 16 months after the priority date, that the Patent and Trademark Office prepare a certified copy of the national application for transmittal to the International Bureau (PCT Article 8 and PCT Rule 17). The fee for preparing a certified copy is stated in [§1.19 (a)(3) and (b)(1)] > \$1.19 (b)(1) and (b)(5) <.

\*\*\*\*\*

26. Section 1.482 is proposed to be amended by revising paragraph (a) to read as follows:

*§1.482 International preliminary examination fees.*

(a) The following fees and charges for international preliminary examination are established by the Commissioner under the authority of 35 U.S.C. §376:

\*\*\*\*\*

(1) A preliminary examination fee is due on filing the Demand:

(i) Where an international search fee as set forth in §1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office as an International Searching Authority, a preliminary examination fee of . . . [\$370.00] > \$400.00 <

(ii) Where the International Searching Authority for the international application was an authority other than the United States Patent and Trademark Office, a preliminary examination fee of . . . [\$570.00] > \$600.00 <

(2) An additional preliminary examination fee when required, per additional invention:

(i) Where a supplemental search fee as set forth in §1.445(a)(3) has been paid on the international application to the United States Patent and Trademark Office as an international Searching Authority . . . . . [\$125.00] > \$130.00 <

(ii) Where the International Searching Authority for the international application was an authority other than the United States Patent and Trademark Office . . . . . [\$190.00] > \$200.00 <

\*\*\*\*\*

27. Section 1.492 is proposed to be amended by revising paragraphs (a)(1)-(3), (b), and (d)-(f) to read as follows:

*§1.492 National stage fees.*

The following fees and charges for international applications entering the national stage under 35 U.S.C. §371 are established by the Commissioner under 35 U.S.C. §376:

(a) The basic national fee:

(1) Where an international preliminary examination fee as set forth in §1.482 has been paid on the international application to the United States Patent and Trademark Office:

By a small entity (§1.9(f)) . . . . . [\$150.00] > \$165.00 <  
By other than a small entity . . . . . [\$300.00] > \$330.00 <

(2) Where no international preliminary examination fee as set forth in §1.482 has been paid to the United States Patent and Trademark Office, but an international search fee as set forth in §1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office as in International Searching Authority:

By a small entity (§1.9(f)) . . . . . [\$170.00] > \$185.00 <  
By other than a small entity . . . . . [\$340.00] > \$370.00 <

(3) Where no international preliminary examination fee as set forth in §1.482 has been paid and no international search fee as set forth in §1.445(a)(2) has been paid on the international application to the United States Patent and Trademark Office:

By a small entity (§1.9(f)) . . . . . [\$225.00] > \$250.00 <  
By other than a small entity . . . . . [\$450.00] > \$500.00 <

\*\*\*

(b) In addition to the basic national fee, for filing or later presentation of each independent claim in excess of 3:

By a small entity (§1.9(f)) . . . . . [\$17.00] > \$18.00 <  
By other than a small entity . . . . . [\$34.00] > \$36.00 <

\*\*\*\*\*

(d) In addition to the basic national fee, if the application contains, or is amended to contain, a multiple dependent claim(s), per application:

By a small entity (§1.9(f)) . . . . . [\$55.00] > \$60.00 <  
By other than a small entity . . . . . [\$110.00] > \$120.00 <

(If the additional fees required by paragraphs (b),

(c) > < and (d) are not paid on presentation of the claims for which the additional fees are due, they must be paid or the claims canceled by amendment, prior to the expiration of the time period set for response by the Office in any notice of fee deficiency.)

(e) Surcharge for filing the basic national fee or oath or declaration later than 20 months from the priority date pursuant to §1.494(c) or later than 30 months from the priority date pursuant to §1.495(c):

By a small entity (§1.9(f)) . . . . . [\$55.00] > \$60.00 <  
By other than a small entity . . . . . [\$110.00] > \$120.00 <

(f) For filing an English translation of an international application later than 20 months after the priority date (§1.494(c)) or filing an English translation of the international application or of any annexes to the international preliminary examination report later than 30 months after the priority date (§1.495(c) and (e)): . . . . . [\$26.00] > \$30.00 <

28. Section 1.666 is proposed to be amended by revising paragraph (b) to read as follows:

*§1.666 Filing of interference settlement agreements.*

\*\*\*\*\*

(b) If any party filing the agreement or understanding under paragraph (a) of this section so requests, the copy will be kept separate from the file of the interference, and made available only to Government agencies on written request, or to any person upon petition accompanied by the fee set forth in [§1.17(i)] > §1.17(i)(1) < and on a showing of good cause.

\*\*\*\*\*

## Part 2 Rules of Practice in Trademark Cases

### Revision of Trademark Fees

1. Section 2.6 is proposed to be amended by revising paragraphs (a) and (q)

#### §2.6 Trademark fees.

The following fees and charges are established by the Patent and Trademark Office for trademark cases:

\*\*\*\*\*

(a) For filing an application, per class . . . . . [\$200.00] > \$175.00 <

\*\*\*\*\*

(q) For recording trademark assignments and agreements or other papers relating to the property in a registration or application, per [document] > mark < . . . . . [\$100.00] > \$8.00 <

[For each mark in addition to one assigned in the same document . . . . . \$20.00]

\*\*\*\*\*

Nov. 21, 1988

DONALD J. QUIGG,  
Assistant Secretary and  
Commissioner of Patents  
and Trademarks.



## STATUTORY PATENT FEES - LARGE ENTITY

CFR	PTO FEE CODE	DESCRIPTION	PRESENT FEE	PROJECTED COST	PRESENT FEE ADJ. BY C.P.I.	PROPOSED FEE
1.16(a)	101	Basic Filing Fee	340.00	**	369.96	370.00
1.16(b)	102	Independent Claims	34.00	**	37.00	36.00
1.16(c)	103	Claims in Excess of 20	12.00	**	12.33	12.00
1.16(d)	104	Multiple Dependent Claims	110.00	**	123.32	120.00
1.16(f)	106	Design Filing Fee	140.00	**	154.15	150.00
1.16(g)	107	Plant Filing Fee	220.00	**	246.64	250.00
1.16(h)	108	Reissue Filing Fee	340.00	**	369.96	370.00
1.16(i)	109	Reissue Independent Claims	34.00	**	37.00	36.00
1.16(j)	110	Reissue Claims in Excess of 20	12.00	**	12.33	12.00
1.17(a)	115	Extension - First Month	56.00	**	61.66	62.00
1.17(b)	116	Extension - Second Month	170.00	**	184.98	180.00
1.17(c)	117	Extension - Third Month	390.00	**	431.62	430.00
1.17(d)	118	Extension - Fourth Month	610.00	**	678.25	680.00
1.17(e)	119	Notice of Appeal	130.00	**	141.82	140.00
1.17(f)	120	Filing A Brief	130.00	**	141.82	140.00
1.17(g)	121	Request for Oral Hearing	110.00	**	123.32	120.00
1.17(h)	140	Petition-Revive Abandoned Appl.	56.00	**	61.66	62.00
1.17(m)	141	Petition-Revive Uninten Aband. App.	560.00	**	616.59	620.00
1.18(a)	142	Issue Fee	560.00	**	616.59	620.00
1.18(b)	143	Design Issue Fee	200.00	**	215.81	220.00
1.18(c)	144	Plant Issue Fee	280.00	**	308.30	310.00
1.20(d)	148	Statutory Disclaimer	56.00	**	61.66	62.00
1.20(h)	173	Maintenance Fee - 3.5 - 97-247	450.00	**	493.28	490.00
1.20(i)	174	Maintenance Fee - 7.5 - 97-247	890.00	**	986.55	990.00
1.20(j)	175	Maintenance Fee - 11.5 - 97-247	1,340.00	**	1,479.83	1,480.00

\* The 1986 unrounded base fee increased by projected C.P.I.  
- see explanation under Background, Fee Adjustment Methodology, paragraph 2(a).

\*\* See Background, Fee Adjustment Methodology, paragraph 1(a)  
for an explanation of cost calculations for statutory patent fees.

## STATUTORY PATENT FEES - SMALL ENTITY

CFR	PTO FEE CODE	DESCRIPTION	PRESENT FEE	PROJECTED COST	PRESENT FEE ADJ. BY C.P.I.	PROPOSED FEE
1.16(a)	201	Basic Filing Fee	170.00	**	186.08	185.00
1.16(b)	202	Independent Claims	17.00	**	18.50	18.00
1.16(c)	203	Claims in Excess of 20	6.00	**	6.17	6.00
1.16(d)	204	Multiple Dependent Claims	55.00	**	61.66	60.00
1.16(f)	206	Design Filing Fee	70.00	**	77.08	75.00
1.16(g)	207	Plant Filing Fee	110.00	**	123.32	125.00
1.16(h)	208	Reissue Filing Fee	170.00	**	184.98	185.00
1.16(i)	209	Reissue Independent Claims	17.00	**	18.50	18.00
1.16(j)	210	Reissue Claims in Excess of 20	6.00	**	6.17	6.00
1.17(a)	215	Extension - First Month	28.00	**	30.83	31.00
1.17(b)	216	Extension - Second Month	85.00	**	92.49	90.00
1.17(c)	217	Extension - Third Month	195.00	**	215.81	215.00
1.17(d)	218	Extension - Fourth Month	305.00	**	339.13	340.00
1.17(e)	219	Notice of Appeal	65.00	**	70.91	70.00
1.17(f)	220	Filing A Brief	65.00	**	70.91	70.00
1.17(g)	221	Request for Oral Hearing	55.00	**	61.66	60.00
1.17(h)	240	Petition-Revive Abandoned Appl.	28.00	**	30.83	31.00
1.17(m)	241	Petition-Revive Uninten Aband. App.	280.00	**	308.30	310.00
1.18(a)	242	Issue Fee	280.00	**	308.30	310.00
1.18(b)	243	Design Issue Fee	100.00	**	107.91	110.00
1.18(c)	244	Plant Issue Fee	140.00	**	154.15	155.00
1.20(d)	248	Statutory Disclaimer	28.00	**	30.83	31.00
1.20(h)	273	Maintenance Fee - 3.5 - 97-247	225.00	**	246.64	245.00
1.20(i)	274	Maintenance Fee - 3.5 - 97-247	445.00	**	493.28	495.00
1.20(j)	275	Maintenance Fee - 11.5 - 97-247	670.00	**	739.91	740.00

\* The 1986 unrounded base fee increased by projected C.P.I.  
- see explanation under Background, Fee Adjustment Methodology, paragraph 2(a).

\*\* See Background, Fee Adjustment Methodology, paragraph 1(a)  
for an explanation of cost calculations for statutory patent fees.

## NON-STATUTORY PATENT FEES

CFR	PTO FEE CODE	DESCRIPTION	PRESENT FEE	PROJECTED COST	PRESENT FEE ADJ. BY C.P.I.	PROPOSED FEE
1.16(e)	105	Surcharge - Late Filing Fee	110.00	120.00	121.33	120.00
1.16(e)	205	Surcharge - Late Filing Fee	55.00	60.00	60.67	60.00
1.17(h)	122	Petition - Not all Inventors	140.00	119.11	151.08	120.00
1.17(h)	123	Petition - Correction of Inventorship	140.00	119.11	151.08	120.00
1.17(h)	124	Petition - Decision on Questions	140.00	119.11	151.08	120.00
1.17(h)	125	Petition - Suspend Rules	140.00	119.11	151.08	120.00
1.17(h)	160	Petition - Expedited License	140.00	119.11	151.08	120.00
1.17(h)	161	Petition - Scope of License	140.00	119.11	151.08	120.00
1.17(h)	162	Petition - Retroactive License	140.00	119.11	151.08	120.00
1.17(h)	163	Petition - Refusing Maint. Fee	140.00	119.11	151.08	120.00
1.17(h)	164	Petition - Refusing Maint. Fee - Expired Pat	140.00	119.11	151.08	120.00
1.17(h)	165	Petition - Interference	140.00	119.11	151.08	120.00
1.17(h)	166	Petition - Reconsider Interference	140.00	119.11	151.08	120.00
1.17(h)	167	Petition - Late Filing of Interf.	140.00	119.11	151.08	120.00
1.17(h)	168	Petition - Refusal to Pub Sir	140.00	119.11	151.08	120.00
1.17(i)	127	Petition - For Assignment Record	72.00	119.11	78.91	120.00
1.17(i)	128	Petition - For Application	72.00	119.11	78.91	120.00
1.17(i)	129	Petition - Late Priority Papers	72.00	119.11	78.91	120.00
1.17(i)	130	Petition - Make Appl. Special	72.00	78.72	78.91	80.00
1.17(i)	131	Petition - Suspend Action	72.00	119.11	78.91	120.00
1.17(i)	132	Petition - Divisional Reissues	72.00	119.11	78.91	120.00
1.17(i)	133	Petition - For Interference Agree	72.00	119.11	78.91	120.00
1.17(i)	134	Petition - Amendment After Issue	72.00	119.11	78.91	120.00
1.17(i)	135	Petition - Withdrawal From Issue	72.00	119.11	78.91	120.00
1.17(i)	136	Petition - Defer Issue	72.00	119.11	78.91	120.00
1.17(i)	137	Petition - Issue to Assignee	72.00	119.11	78.91	120.00
1.17(j)	138	Petition - Public Use Proceeding	860.00	1,224.44	941.91	1,200.00
1.17(k)	139	Non-English Specification	26.00	28.16	28.45	30.00
1.17(n)	112	Sir - Prior to Examiner's Action*	400.00	400.00	448.23	400.00
1.17(n)	113	Sir - After Examiner's Action*	800.00	800.00	931.89	800.00
1.20(a)	145	Certificate of Correction	29.00	61.42	31.78	60.00
1.20(b)	146	Petition - Correction of Inventorship	140.00	119.11	151.08	120.00
1.20(c)	147	Reexamination	1,770.00	1,967.73	1,950.01	2,000.00
1.20(e)	170	Maintenance Fee - 3.5 - 96-517	225.00	245.00	248.18	245.00
1.20(f)	171	Maintenance Fee - 7.5 - 96-517	445.00	495.00	490.85	495.00
1.20(g)	172	Maintenance Fee - 11.5 - 96-517	670.00	740.00	739.03	740.00
1.20(k)	176	Surcharge - 6 Months - 96-517	110.00	120.00	121.33	120.00
1.20(l)	177	Surcharge - 6 Months - 97-247	110.00	120.00	121.33	120.00
1.20(l)	277	Surcharge - 6 Months - 97-247	55.00	60.00	60.67	60.00
1.20(m)	178	Surcharge After Expiration	500.00	550.00	551.52	550.00
1.20(n)	111	Extension of Term of Patent	550.00	610.33	606.67	600.00

\* Reduced by filing fee.

## NON-STATUTORY PATENT FEES - SERVICES

CFR	PTO FEE CODE	DESCRIPTION	PRESENT FEE	PROJECTED COST	PRESENT FEE ADJ. BY C.P.I.	PROPOSED FEE
1.19(a-1)	501	Copy of Patent	1.50	2.03	1.53	1.50
1.19(a-2)	503	Copy of Plant Patent	6.00	11.17	6.21	10.00
1.19(a-3)	506	Copy of Office Rec's, (30 PGS/DOC)	0.50	0.30	8.82	10.00
1.19(a-4)	NFC*	Copy of Utility Patent in Color	0.00	20.00	20.00	20.00
1.19(a-5)	NFC	Patent Copy - Expedited Service	0.00	3.00	3.00	3.00
1.19(a-6)	NFC	Patent Copy Expedited Service Via EOS	0.00	25.00	25.00	25.00
1.19(b-1)	504	Copy of Application as filed, Cert.	9.00	9.71	9.75	10.00
1.19(b-2)	505	Copy of File Wrapper, Cert.	75.00	174.17	94.89	170.00
1.19(b-3)	533	Copy of Patent Assignment, Cert.	1.50	4.56	1.52	5.00
1.19(b-4)	NFC	Cert. Copy of Patent Appl. Expedited	0.00	20.00	20.00	20.00
1.19(b-5)	508	Certifying Office Records	3.00	2.61	1.98	3.00
1.19(b-6)	509	Search of Records	12.00	12.99	13.50	15.00
1.19(c)	513	Library Service	50.00	4,470.00	55.15	50.00
1.19(d)	514	List of Patents in Subclass	1.00	2.13	1.47	2.00
1.19(e)	528	Uncertified Statement	3.00	3.67	3.47	5.00
1.19(f)	532	Copy of Non-US Document	10.00	5.64	11.48	10.00
1.19(g)	510	Comparing Copies Per Doc	5.00	6.96	5.96	10.00
1.19(n)	534	Duplicate or Corrected Filing Receipt	14.00	12.95	15.98	15.00
1.21(a-1)	609	Admission to Examination	250.00	273.23	273.89	270.00
1.21(a-2)	610	Registration to Practice	81.00	89.32	89.04	90.00
1.21(a-3)	611	Reinstatement to Practice	9.00	9.97	9.92	10.00
1.21(a-4)	612	Copy of Certificate of Good Standing	10.00	9.98	10.90	10.00
1.21(a-4)	613	Certificate of Good Stand - Framing	88.00	99.69	96.65	100.00
1.21(a-5)	615	Review of Decision of Director, OED	92.00	99.80	101.53	100.00
1.21(a-6)	616	Regrading of Examination	92.00	99.32	101.53	100.00
1.21(b-1)	607	Establish Deposit Account	8.00	9.00	8.98	10.00
1.21(b-2/3)	608	Service Charge for Below Min. Balance	20.00	22.00	22.06	20.00
1.21(c)	516	Filing a Disclosure Doc	6.00	6.00	6.99	6.00
1.21(e)	526	International Type Search Report	28.00	13.89	30.88	30.00
1.21(f)	517	Searching, 10 Years	14.00	10.03	15.82	10.00
1.21(g)	524	Copishare Card Per Page	0.20	0.11	0.17	0.15
1.21(h)	518	Recording Patent Property	7.00	7.51	7.50	8.00
1.21(i)	520	Publication in OG	7.00	16.51	7.67	20.00
1.21(j)	521	Duplicate User Pass	5.00	9.02	5.53	10.00
1.21(k)	522	Box Rental	43.00	49.44	47.07	50.00
1.21(k)	523	Locker Rentals	0.25	0.25	0.28	0.25
1.21(l)	529	Retaining Abandoned Appl.	100.00	112.64	110.30	120.00
1.21(m)	617	Processing Returned Checks	20.00	22.00	22.06	50.00
1.21(n)	530	Handling Fee	15.00	16.90	16.80	20.00
1.296	531	Handling Fee for Withdrawal	100.00	112.64	110.30	120.00

\* NFC - New fee code to be established.



## PATENT COOPERATION TREATY FEES

CFR	PTO FEE CODE	DESCRIPTION	PRESENT FEE	PROJECTED COST	PRESENT FEE ADJ. BY C.P.I.	PROPOSED FEE
1.445(a-1)	150	Transmittal Fee	170.00	168.36	*	170.00
1.445(a-2)	151	PCT Search Fee - No U.S. Appl.	520.00	554.33	*	550.00
1.445(a-2)	153	PCT Search - Prior U.S. Appl.	350.00	379.04	*	380.00
1.445(a-3)	152	Supplemental Search	140.00	149.85	*	150.00
1.482(a-1)	190	Preliminary Exam Fee	370.00	400.85	*	400.00
1.482(a-1)	191	Preliminary Exam Fee	570.00	600.80	*	600.00
1.482(a-2)	192	Add'l Invention	125.00	129.81	*	130.00
1.482(a-2)	193	Add'l Invention	190.00	199.75	*	200.00
1.492(a-1)	956	IPEA	300.00	**	330.99	330.00
1.492(a-1)	957	IPEA	150.00	**	165.50	165.00
1.492(a-2)	958	Searching Authority	340.00	**	370.05	370.00
1.492(a-2)	959	Searching Authority	170.00	**	185.02	185.00
1.492(a-3)	960	PTO NOT SA or IPEA	450.00	**	496.49	500.00
1.492(a-3)	961	PTO NOT SA or IPEA	225.00	**	248.24	250.00
1.492(a-4)	962	Claims - IPEA	50.00	**	55.17	50.00
1.492(a-4)	963	Claims - IPEA	25.00	**	27.58	25.00
1.492(b)	964	Claims - Extra Individual (Over 3)	34.00	**	37.00	36.00
1.492(b)	965	Claims - Extra Individual (Over 3)	17.00	**	18.50	18.00
1.492(c)	966	Claims - Extra Total (Over 20)	12.00	**	12.33	12.00
1.492(c)	967	Claims - Extra Total (Over 20)	6.00	**	6.17	6.00
1.492(d)	968	Claims - Multiple Dependents	110.00	**	123.35	120.00
1.492(d)	969	Claims - Multiple Dependents	55.00	**	61.67	60.00
1.492(e)	154	Surcharge	110.00	120.00	121.36	120.00
1.492(e)	254	Surcharge	55.00	60.00	60.00	60.00
1.492(f)	156	English Translation - After 20 Mos.	26.00	28.08	28.08	30.00

\* Adjustment by C.P.I. is not applicable to these fees.

\*\* These fees are set to recover the cost of processing under the Treaty. The cost calculation methodology for statutory patent fees, under Background, Fee Adjustment Methodology, paragraph 1(a), applies to these fees.

## TRADEMARK FEES

CFR	PTO FEE CODE	DESCRIPTION	PRESENT FEE	PROJECTED COST	PRESENT FEE ADJ. BY C.P.I.	PROPOSED FEE
TRADEMARK PROCESS FEES						
2.6(a)	301	Application for Registration	200.00	242.87	220.66	175.00
2.6(b)	302	Application for Renewal	300.00	42.34	330.99	300.00
2.6(s)	303	Surcharge for Late Renewal	100.00	100.00	110.33	100.00
2.6(c)	304	Publication of Mark Under Sec 12c	100.00	131.93	110.33	100.00
2.6(d)	305	Issuing New Certificate of Registration	100.00	61.32	110.33	100.00
2.6(e)	306	Cert of Correction of Applicant Error	100.00	106.21	110.33	100.00
2.6(f)	307	Filing Disclaimer to Registration	100.00	133.39	110.33	100.00
2.6(g)	308	Filing Amendment to Registration	100.00	67.64	110.33	100.00
2.6(h)	309	Filing Affidavit Under Section 8	100.00	19.70	110.33	100.00
2.6(i)	310	Filing Affidavit Under Section 15	100.00	19.77	110.33	100.00
2.6(j)	311	Filing Affidavit Under Section 8 & 15	200.00	19.77	220.66	200.00
2.6(k)	312	Petitions to the Commissioner	100.00	114.06	110.33	100.00
2.6(l)	313	Petition to Cancel	200.00	393.96	220.66	200.00
2.6(l)	314	Notice of Opposition	200.00	498.49	220.66	200.00
2.6(m)	315	Ex Parte Appeal to the TTAB	100.00	478.62	110.33	100.00

## TRADEMARK SERVICE FEES

2.6(n)	401	Printed Copy of Each Registered Mark	1.50	1.84	1.65	1.50
2.6(o)	403	Certify TM Records, Per Certificate	3.50	4.06	3.86	3.50
2.6(p)	404	Photocopies of TM Records, Per Page	0.30	0.39	0.33	0.30
2.6(q)	405	Recording TM Assignment Documents	100.00	7.51	110.33	8.00
2.6(r)	407	Abstracts of Title, Per Registration	12.00	8.19	13.24	12.00
2.6(n)	408	Copy of Reg Mark With Title or Status	6.50	5.97	7.17	6.50
2.6(o)	410	Make Certification Special	25.00	5.00	27.58	25.00
1.21(g)	424	Farecards for Copy Machines	0.20	0.11	0.22	0.15

Department of Commerce  
Patent and Trademark Office  
37 CFR Part 1  
[Docket Number 80108-8200]

Miscellaneous Changes in Patent Practice

Agency: Patent and Trademark Office, Commerce  
Action: Final Rule

**Summary:** The Patent and Trademark Office is amending its regulations to (1) correct certain rules to conform to previous changes in other rules, (2) require all correspondence directed to the Patent and Trademark Office concerning a patent application to include the series code and serial number or serial number and filing date, (3) provide for the indication of copyright and mask work protection in patent applications, (4) require that any necessary corrections to drawings be made only by submission of new or replacement drawings, (5) provide in limited situations for the use of color drawings in utility patent applications, (6) prohibit the use of broken lines in design patent application drawings to show hidden planes and surfaces, and (7) provide for a refund of a portion of the preliminary examination fee where the Demand is withdrawn. The change pertaining to the drawings would remove any need for patent applicants or their representatives to borrow drawings filed in patent applications from the Office after the effective date of the rule change for purposes of making corrections.

**Effective Date:** Jan. 1, 1989. The non-return of drawings provision of §1.85(b) will apply to drawings in patent applications filed after Jan. 1, 1989.

**For Further Information Contact:** Louis O. Maassel by telephone at (703) 557-3070 or by mail marked to his attention and addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

**Supplemental Information:** Proposed rulemaking request comment was published on May 9, 1988 in the *Federal Register* at 53 FR 16522 - 16527 and on May 24, 1988 in the *Official Gazette* at 1090 O.G. 57 - 62.

An oral hearing was conducted on July 21, 1988 to receive comments.

Written comments were received from 5 patent law groups, 2 patent law firms and 6 individuals. One person also presented oral testimony.

No comments were received relating to the proposed amendment of §§1.4, 1.5(b), 1.53(d), 1.56, 1.81, 1.84(j) & (l), 1.152, 1.378, 1.421 and 1.480.

The comments received relating to amendments to particular sections and replies thereto are listed below.

*Comments relating to §1.5(a).*

**Comment**

Six comments indicated that they considered the punishment of rebelow.

*Comments relating to §1.5(a).*  
*could result in the necessity of paying extension of time fees or revival of an abandoned application.*

**Reply**

The return of papers with improper identification is not intended to serve as punishment or a penalty, but as a solution to a major problem. In fact, most of the improperly identified papers are not ones for which a time period is running, e.g., priority papers, information disclosure statements, status inquiries, etc. The Patent and Trademark Office's (PTO) goal is to match papers with the appropriate application as quickly as possible. The practice of the PTO has been to attempt to match papers with the correct application by using the Patent Application Locating and Monitoring (PALM) System to conduct a search by applicant's name. Such a search is very slow and merely lists all application numbers under the name of the inventor. These application numbers must then be individually checked to attempt to match any other identifying information found on the paper. If this process is unsuccessful, attempts are made to reach the sender by telephone. Telephone calls usually require

further followup since the paper cannot usually be identified immediately. Frequently, the serial number is not even available to the sender since application-related papers are being sent to the PTO before notification of serial number has been received. For papers not successfully matched after these attempts, the process of using PALM and making telephone calls is repeated days and weeks later. Despite the considerable effort and resources applied to matching papers, there are still thousands of unmatched papers. Undoubtedly, many were followed up by status inquiries or complaint letters from the senders, subsequent PTO searches for missing papers, and resubmissions by senders, some with petitions or extension of time fees. This waste of resources by both the PTO and the applicants is a major concern. Since the goal is to match papers as quickly and efficiently as possible, and not to institute a harsh penalty, the final rule was modified. Papers which are not properly identified will be returned, but if they are resubmitted to the PTO within two weeks of the date they are returned by the PTO, the original date of receipt will be retained without the need for paying fees for extension of time or revival of an abandoned application. Where no return address is available, the papers will be retained for a reasonable period of time to await any followup correspondence. If no followup correspondence is received within a reasonable period of time, the papers will be destroyed.

**Comment**

Three comments included the proposal that the filing date and serial number be accepted as meeting the requirements of §1.5(a).

**Reply**

This proposal has been adopted in the final rule.

**Comment**

One comment proposed that implementation of the proposal be delayed for one year to provide sufficient time to allow applicants to adapt to the requirements.

**Reply**

The requirements are believed to be quite simple and are already met by almost all papers filed in the PTO. Therefore, an extended period of time to adapt is not seen to be necessary or appropriate.

**Comment**

Two comments suggested that a procedure be developed under which an applicant could resubmit a corrected return paper with fee in a timely manner, and receive the benefit of the date of the original submission as its filing date.

**Reply**

The substance of this suggestion has been adopted in final §1.5(a), but without the charge of a fee. The final rule provides resubmission of a returned paper with proper identification within two weeks of the PTO mailing date of the letter returning the paper to the sender to resubmit the paper and retain the benefit of the filing date of the original submission. If desired, the resubmission could be mailed under the certificate of mailing procedure of §1.8 or the "Express Mail" procedure of §1.10.

**Comment**

Three comments suggested that a form or notice be sent, with a time limit set for return of appropriate identification with minimal fee or subcharge.

**Reply**

The proposal would require the PTO to retain the unmatched papers in some kind of order, probably alphabetically by inventor name and or by receipt date, so that responses could be matched. A double matching of all papers would be necessary. The responses with the appropriate identification would have to be matched to the original papers submitted, then these would have to be matched with the applications. If responses with appropriate identification did not reference the fact that a notice had been sent, they may not be associated with the original, again resulting in more unmatched papers. Accordingly, the proposal was not adopted.

**Comment**

One comment indicated that including the word "must" with respect to providing the serial number and series code is too severe a requirement.

**Reply**

The current rules in 37 CFR 1.5 state such identification "should" be on application-related papers. This term has apparently been too permissive and has contributed to the problem. The use of "must" is believed to be sufficiently strong to aid in resolving the problem.

**Comment**

One comment included the proposal that a wrong serial number be considered as a defective execution under 35 U.S.C. 26 which could be corrected without loss of filing date.

**Reply**

The legislative history of 35 U.S.C. 26 is quite clear that the intent of the section was to remedy problems only in the execution of oaths and declarations.

**Comment**

Two comments questioned the meaning of "series code."

**Reply**

The series code is the two digit number preceding the serial number on the application filing receipt. A new series code is assigned each time a new series of six digit serial numbers is begun. The current series code is "07". It appears before the serial number, for example 07/123,456. An illustrative example is also included in the final rule.

**Comment**

One comment included the proposal that a more appropriate name for the combination of series code and serial number would be "application number."

**Reply**

This proposal has been adopted in the final rule.

**Comment**

One comment raised the question as to whether correspondence relating to a patent application should contain both the heading "PATENT" as suggested in the helpful hints and "PATENT APPLICATION" as called for in 1.5(a).

**Reply**

"PATENT APPLICATION" should be used on patent application correspondence. This should be placed in an obvious location on the top page.

**Comment**

One comment noted that the return post card only contains the serial number and not the series code.

**Reply**

The PTO plans to begin identifying an eight-digit application number on return post cards. The series code will be the first two digits, followed by a slant "/" and the six digit serial number. Although the series code has not been stamped along with the serial number on the return post card used by many applicants, the series code changes only once about every 7 or 8 years when a new set of serial numbers is begun with 000,001. Therefore, until the eight-digit application number is stamped on return post cards, the current series code "07" can be used along with the serial number currently stamped on the post card.

**Comment**

Three comments suggested that the rules provide that a paper without proper identification be returned only if the PTO found it impossible to match the paper to a particular application file.

**Reply**

Attempts to match improperly identified papers with a particular application file is very time consuming and experience has shown that the benefits of such time consuming effort are not worth the effort expended.

**Comment**

One comment questioned the meaning of "such information" in the second sentence of §1.5(a).

**Reply**

"Such information" means the items referred to in the first sentence, namely, the series code and serial number, serial number and filing date, or international application number.

**Comment**

One comment indicated that the PTO may not return a paper in a timely manner.

**Reply**

Although no assurance can be given as to the prompt return of all improperly identified papers, such papers will be returned in most instances from the PTO Mail Room within one day of the opening of the envelopes containing the papers and discovery of incomplete identification. Also, the time for resubmission of a returned paper is calculated from the PTO mailing date so that no injury would result from a prompt resubmission.

**Comment**

One comment indicated that if the filing receipt is delayed or lost, it would preclude timely status inquiries or cause delays in preliminary matters such as a request for a foreign filing license.

**Reply**

A self-addressed return post card, with proper postage, can be used to obtain early notification of the application number.

*Comments relating to §1.53.*

**Comment**

One comment pointed out inconsistent wording between proposed §1.53 and the explanatory comments in the notice of proposed rulemaking.

**Reply**

The apparent inconsistency has been corrected.

*Comments relating to §1.71 and §1.84(o).*

**Comment**

One comment raised a question whether the PTO should make a comment as to the legal sufficiency of a copyright notice mentioned in §1.71 since the PTO does not administer the copyright law.

**Reply**

An indication of what is considered to be legally sufficient copyright notice was included to assist applicants who may not be familiar with the copyright law.

*Comments relating to §1.84(a).*

**Comment**

Five comments were received objecting to the prohibition of photolithographs as drawings.

**Reply**

The final rule does not prohibit photolithographs as drawings.

*Comments relating to §1.84(b).*

**Comment**

Three comments were received relating to drawing sheet sizes. One comment favored using only the A4 size and the other two comments favored using letter size (8½ by 11 inches).

**Reply**

Since applicants have three different size sheets which may be used as they choose, no need is currently seen to make a single size mandatory. The use of letter size drawing sheets requires further study and if acceptable, will be proposed for public comment in the future.

*Comments relating to §1.84(i).*

**Comment**

One comment included the suggestion that clarifying language changes be made in §1.84(i).

**Reply**

The comment relating to the wording of the last sentence of §1.84(i) has been adopted.

*Comments relating to §1.84(n).*

**Comment**

One comment supported the change to §1.84(n).

*Comments relating to §1.84(p).*

**Comment**

Two comments relating to color drawings in utility applications were received. One comment proposed that the applicant be permitted to file color drawings at his or her choice but that the patent be printed in black and white only with copies of the color drawings being available at extra cost. The other comment related to



the patent examiner having the discretion to accept color drawings rather than requiring a petition to be filed.

#### Reply

In the past only a very few applications have shown a need to include drawings in color. Until more experience is gained, it is considered best to allow color drawings in limited situations and approval to remain in a central location by petition.

#### Comment

One comment stated that it is not proper to charge a higher fee where color drawings are required.

#### Reply

Color drawings are considered to be beyond the normal requirements set forth in the rules and therefore require waiver of the rules for acceptance.

#### Comments relating to §1.85(a).

#### Comment

One comment was received suggesting that "may" be changed to "shall" in §1.85(a).

#### Reply

The PTO is currently very liberal in accepting informal drawings and no need is seen for making the proposed change.

#### Comments relating to §1.85(b) & (c).

#### Comment

One comment proposed allowing drawings filed in the PTO to be withdrawn to make minor changes.

#### Reply

The problems relating to charging out drawings would remain if drawings are allowed to be removed from the PTO for any reason. A major purpose of the rule change is to remove the necessity to have a drawing charge-out system in the PTO in the future.

#### Comment

One comment asked whether §1.85(b) would be construed to deny access to a PTO drawing for making a copy.

#### Reply

Applicants and their representatives will continue to have access to their files and obtain copies of drawings.

#### Comment

One comment proposed adding another sentence to §1.85(c) to clarify that an extension of time is available under §1.136 for filing of formal drawings but not for payment of the issue fee.

#### Reply

This proposal has been adopted with somewhat different wording.

#### Comment

One comment indicated that the three month period for submitting corrections should be measured from the "notice of allowability" rather than the "notice of allowance."

#### Reply

This proposal has been adopted in the final rule.

#### Discussion of specific rules

Section 1.4, as amended, corrects the listing of rules in paragraph (a)(2).

Section 1.5, as amended, provides that all correspondence related to a U.S. national patent application already filed with the Patent and Trademark Office must include the identification of the application number which comprises both the series code and the serial number assigned to that application by the Patent and Trademark Office, (e.g., 07/123,456) or the serial number and filing date. Any correspondence not containing such identification will be returned to the sender where a return address is available. The final rule has been revised to provide that if the correspondence is remailed to the PTO within two weeks of the mailing date of the PTO's cover letter returning the correspondence, the PTO will grant the benefit of the original date of receipt of the returned correspondence. The two-week period will not be extended under §1.136. Applicants may use either §1.8 or §1.10 mailing procedures for resubmissions

of returned correspondence. No correspondence relating to an application should be filed prior to when notification of the application number is received from the PTO. If for some reason returned correspondence is resubmitted later than two weeks after the return mailing by the PTO, the resubmitted correspondence will be accepted but given its date of receipt with proper identification. If the original date of receipt is desired, applicants may petition under §1.183 for waiver of the rules. Given there are over 30,000 documents to be routed each day, this requirement greatly facilitates the matching of correspondence received with the relevant patent application file. Without proper number identification, documents are either significantly delayed during processing or are never matched with the relevant application file. The amendments to paragraph (b) draw attention to the different requirements for identification in correspondence relating to the payment of maintenance fees.

Section 1.53(c) and (d), as amended, state that a copy of the "Notice of Incomplete Application" or "Notice to File Missing Part" form sent to the applicant by the Office should accompany any response submitted to the Office in order for the response to be accepted. This will prevent the inadvertent assignment of a new application number to correspondence sent in response to such notices or the misrouting of the correspondence.

Section 1.56(e), as amended, corrects the reference to the "Board of Appeals" to read "Board of Patent Appeals and Interferences."

Section 1.71, as amended, contains new paragraphs (d) and (e) relating to the inclusion of copyright and mask word notices in patent applications. The provisions proposed are similar to those set forth in the Official Gazette notice dated Mar. 20, 1987 titled "Inclusion of Copyright or Mask Work Notice in Patents" appearing on Apr. 21, 1987 at 1077 O.G. 22. Under current intellectual property laws, it is possible to obtain copyright protection or mask work protection as well as patent protection for certain designs and technologies. On occasion, an author or inventor considers it desirable to include a notice of copyright or mask work in a design or utility patent which discloses material on which copyright or mask work protection previously has been established.

The inclusion of a copyright or mask work notice in a patent that discloses material on which copyright or mask work protection previously has been established, will serve to publicize and thereby protect the various intellectual property rights of the author or inventor. Further, this publication would tend to protect the public by militating against an unintentional encroachment of the rights. The presence of an unrestricted copyright or mask work notice in a patent could have an inhibiting effect on public dissemination of the patent disclosure to the extent it discourages the facsimile reproduction of the patent. The possible effect would be contrary to the mission of the Patent and Trademark Office to disseminate knowledge and information publicly by way of patent issuance, publication, and distribution. To avoid this effect, it is considered necessary to include an appropriate authorization by the author or inventor for copying of the patent itself with any copyright or mask work notice appearing in the patent. Inclusion of a copyright or mask work notice after a Notice of Allowance has been mailed will be permitted only if the criteria of 37 CFR 1.312 have been fulfilled. If the authorization required by amended §1.71(e) is not included, the notice will be objected to as improper by the examiner. If the examiner maintains the objection upon reconsideration, further review must be by way of a petition filed in accordance with 37 CFR 1.181.

Section 1.81, as amended, clarifies that high quality copies of drawings should be submitted in patent applications. Since corrections are the responsibility of the applicant, the original drawing(s) should be retained by the applicant for future correction, if necessary.

Section 1.84(a), as amended, eliminates reference to two-ply or three-ply bristol board. Amended paragraph

(a) also adds a reference to paragraph 1.84(p) relating to color drawings in utility patent applications.

Only one copy of the drawing is required or desired. The Office had attempted to encourage the submission of three copies, but compliance was very low. It was determined that it is more efficient for the Office to rely on consistency and only one copy. Accordingly, hereafter only one copy of the drawings should be submitted.

The Patent and Trademark Office will no longer release to applicants, bonded drafting companies, or others, drawings from patent applications filed after the effective date of these rule changes. See amended §1.85(b). If corrections to the drawings are necessary, new corrected drawings must be prepared by the applicant and filed in the Patent and Trademark Office. Therefore, the applicant, attorney or agent should retain the original drawing so that a corrected original drawing or corrected copy may be later submitted if necessary.

The Office will continue to allow applicants to borrow drawings for correction which have been filed prior to the effective date of these rule changes.

Section 1.84(b), as amended, provides for applicants using drawing sheets which are 8½ by 13 inches in size.

Section 1.84(i), as amended, contains grammatical corrections in the text of the rules and clarifies Office drawing requirements as to exploded views, enlarged views and views which require several sheets.

Section 1.84(j), as amended, clarifies how views should be arranged when they are placed sideways on the drawing sheet.

Section 1.84(l) as amended, indicates that drawings may be identified by lightly writing identifying information in the top margin on the drawings. For identification by application number, the Office prefers that the information be placed on the front of the drawing. When the applicant forwards drawings separate from the original application papers, a cover letter identifying the application by application number should accompany the drawings. The application number should also be placed on drawings filed after the application number has been indicated in correspondence to the applicant, in accordance with §1.84(l).

Section 1.84(n) is added and permits numbering of the drawing sheets. However, such numbering would not appear on the drawings of the printed patent.

Section 1.84(o) is added and provides for the indication of copyright or mask work protection notice on patent application drawings. This procedure is the same as that established by the Official Gazette notice dated Mar. 20, 1987 published on Apr. 21, 1987 at 1077 O.G. 22.

Section 1.84(p) is added and provides in the rules for the filing of color drawings in a very limited number of utility patent applications. An Official Gazette notice relating to this topic dated Aug. 6, 1986, titled "Use of Color Drawings in Utility Patents" was published on Sept. 15, 1987 at 1082 O.G. 25. In light of the substantial administrative and economic burden associated with printing a utility patent with color drawings, the letters patent and the patent copies which are printed at the issuance of the patent will be only in black and white. However, copies of the patent with the color drawings may be purchased separately from the Patent and Trademark Office upon special request and payment of the fee.

It is anticipated that color drawings will only be permitted when color drawings are the only practical method in a utility patent application in which to disclose the subject matter sought to be patented. In order to avoid issues of lack of description or enablement under 35 U.S.C. 112 or new matter under 35 U.S.C. 132, applicants are advised to file the desired color drawings as part of the original application papers. The petition should be directed to the attention of the Deputy Assistant Commissioner for Patents.

Section 1.85, as amended, indicates that drawings not complying with §1.84 will be accepted in some instances for purposes of examination and that drawings which do comply with all the rules relating to drawings will be re-

quired later, and that no corrections will be permitted to drawings filed in the Patent and Trademark Office after the effective date of the rule change.

When corrected drawings are required to be submitted at the time of allowance, the applicant is required to submit acceptable drawings within three months from the mailing of the "Notice of Allowability." Within that three-month period, two weeks should be allowed for review of the drawings by the Drafting Branch. If the Office finds that further correction is necessary, the applicant must submit a new corrected drawing to the Office within the original three-month period to avoid the necessity of obtaining an extension of time and paying the extension fee. Therefore, the applicant should file corrected drawings as soon as possible following the receipt of the Notice of Allowability.

Section 85(b) provides that the Patent and Trademark Office will not release drawings filed in applications having a filing date after Jan. 1, 1989 for purposes of correction. Also, in order to give sufficient notice to applicants, allow most patent applications currently on file to be processed, and set a time at which the PTO need no longer provide a system for borrowing of any drawings, §1.85(b) provides that after Jan. 1, 1991 no drawings may be borrowed from the PTO for the purpose of making drawing corrections.

Section 1.152, as amended, permits broken lines on drawings to show visible environmental structure but not hidden planes and surfaces in design patent application drawings.

Section 1.378, as amended, conforms with section 404 of Public Law 98-622 which states:

"(a) Notwithstanding section 41(c) of title 35, United States Code, as in effect before the enactment of Public Law 97-247 (96 Stat. 317), the Commissioner of Patents and Trademarks may accept after the six-month grace period referred to in such section 41(c), the payment of any maintenance fee due on any patent based on an application filed in the Patent and Trademark Office on or after Dec. 12, 1980, and before Aug. 27, 1982, to the same extent as in the case of patents based on applications filed in the Patent and Trademark Office on or after Aug. 27, 1982."

The amended rule wording includes reference to maintenance fees due on patents based on applications filed in the Patent and Trademark Office on or after Dec. 12, 1980 and before Aug. 27, 1982.

Section 1.421(f), as amended, deletes reference to a cancelled PCT Rule and adds reference to the current PCT Rule provision.

Section 1.480(d), as amended, provides for a refund of a portion of the international preliminary examination fee where the applicant withdraws the demand before the examiner has begun the international preliminary examination. An amount equal to the transmittal fee would be retained by the Patent and Trademark Office to cover the administrative cost involved.

#### Environmental, Energy, and Other Considerations

The rule change does not have a significant impact on the quality of the human environment or conservation of energy resources.

The rule change is in conformity with the requirements of the Regulatory Flexibility Act (Pub. L. 96-354), Executive Orders 12291 and 12612, and the Paperwork Reduction Act of 1980, 44 U.S.C. et seq.

The General Counsel of the Department of Commerce has certified to the Chief Counsel for Advocacy, Small Business Administration that the rule change will not have a significant adverse economic impact on a substantial number of small entities (Regulatory Flexibility Act, Pub. L. 96-354) because the rule change corrects some rules so that they correspond to earlier changes, relate to identification of applications on correspondence, allow greater flexibility in patent drawing content and handling, and provide for a refund where



a proper demand for international preliminary examination has been filed but withdrawn later.

The Patent and Trademark Office has determined that this rule change is not a major rule under Executive Order 12291. The annual effect on the economy will be less than \$100 million. There will be no major increase in costs or prices for consumers, individual industries, federal, state or local government agencies, or geographic regions. There will be no significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The Patent and Trademark Office has also determined that this notice has no Federalism implications affecting the relationship between the National Government and the States as outlined in Executive Order 12612.

The rule change involves collection of information requirements subject to the Paperwork Reduction Act of 1980, 40 U.S.C. 3501 *et seq.*, and are cleared under OMB Control No. 0651-0011.

#### List of Subjects in 37 CFR Part 1.

Administrative practice and procedure, Authority delegations (Government agencies), Courts, Inventions and patents, Lawyers.

Notice is hereby given that pursuant to the authority granted by the Commissioner of Patents and Trademarks by 35 U.S.C. 6 and 41, the Patent and Trademark Office is amending Title 37 of the Code of Federal Regulations as set forth below.

37 CFR, Part 1, is amended as follows:

#### PART 1—RULES OF PRACTICE IN PATENT CASES

1. The authority citation for 37 CFR Part 1 would continue to read as follows:

AUTHORITY: 35 U.S.C. 6 unless otherwise noted.

2. Section 1.4 is amended by revising paragraph (a)(2) to read as follows:

##### *§1.4 Nature of correspondence.*

(a) . . . . .

(2) Correspondence in and relating to a particular application or other proceeding in the Office. See particularly the rules relating to the filing, processing, or other proceedings of national applications in Subpart B, §§1.31 to 1.378; of international applications in Subpart C, §§1.401 to 1.499; of reexamination of patents in Subpart D, §§1.501 to 1.570; of interferences in Subpart E, §§1.601 to 1.690; of extension of patent term in Subpart F, §§1.710 to 1.785; and of trademark applications §§2.11 to 2.189.

. . . . .

3. Section 1.5 is amended by revising paragraphs (a) and (b) to read as follows:

##### *§1.5 Identification of application, patent or registration.*

(a) No correspondence relating to an application should be filed prior to when notification of the application number is received from the Patent and Trademark Office. When a letter directed to the Patent and Trademark Office concerns a previously filed application for a patent, it must identify on the top page in a conspicuous location, the application number (consisting of the series code and the serial number, e.g., 07/123,456), or the serial number and filing date assigned to that application by the Patent and Trademark Office, or the international application number of the international application. Any correspondence not containing such identification will be returned to the sender where a return address is

available. The returned correspondence will be accompanied with a cover letter which will indicate to the sender that if the returned correspondence is resubmitted to the Patent and Trademark Office within two weeks of the mail date on the cover letter, the original date of receipt of the correspondence will be considered by the Patent and Trademark Office as the date of receipt of the correspondence. Applicants may use either the certificate of mailing procedure under §1.8 or the Express Mail procedure under §1.10 for resubmissions of returned correspondence if they desire to have the benefit of the date of deposit in the United States Postal Service. If the returned correspondence is not resubmitted within the two-week period, the date of receipt of the resubmission will be considered to be the date of receipt of the correspondence. The two-week period to resubmit the returned correspondence will not be extended. If for some reason returned correspondence is resubmitted with proper identification later than two weeks after the return mailing by the Patent and Trademark Office, the resubmitted correspondence will be accepted but given its date of receipt. In addition to the application number, all letters directed to the Patent and Trademark Office concerning applications for patent should also state "PATENT APPLICATION," the name of the applicant, the title of the invention, the date of filing the same, and if known, the group art unit or other unit within the Patent and Trademark Office responsible for considering the letter and the name of the examiner or other person to which it has been assigned.

(b) When the letter concerns a patent other than for purposes of paying a maintenance fee, it should state the number and date of issue of the patent, the name of the patentee, and the title of the invention. For letters concerning payment of a maintenance fee in a patent, see the provisions of §1.366(c).

. . . . .

4. Section 1.53 is amended by revising paragraphs (c) and (d) to read as follows:

##### *§1.53 Serial number, filing date, and completion of application.*

. . . . .

(c) If any application is filed without the specification or drawing required by paragraph (b) of this section, applicant will be so notified and given a time period within which to submit the omitted specification or drawing in order to obtain a filing date as of the date of filing of such submission. A copy of the "Notice of Incomplete Application" form notifying the applicant should accompany any response thereto submitted to the Office. If the omission is not corrected within the time period set, the application will be returned or otherwise disposed of; the fee, if submitted, will be refunded less a \$15.00 handling fee.

(d) If an application which has been accorded a filing date pursuant to paragraph (b) of this section does not include the appropriate filing fee or an oath or declaration by the applicant, applicant will be so notified, if a correspondence address has been provided and given a period of time within which to file the fee, oath, or declaration and to pay the surcharge as set forth in §1.16 (e) in order to prevent abandonment of the application. A copy of the "Notice to File Missing Parts" formed mailed to applicant should accompany any response thereto submitted to the Office. If the required fee is not timely paid, or if the processing and retention fee set forth in §1.21(l) is not paid within one year of the date of mailing of the notification required by this paragraph, the application will be disposed of. No copies will be provided or certified by the Office of an application which has been disposed of or in which neither the required basic filing fee nor the processing and retention fee has been paid. The notification pursuant to this paragraph may be made simultaneously with any notification

pursuant to paragraph (c) of this section. If no correspondence address is included in the application, applicant has two months from the filing date to file the basic filing fee, oath or declaration and to pay the surcharge as set forth in §1.16(e) in order to prevent abandonment of the application; or, if no basic filing fee has been paid, one year from the filing date to pay the processing and retention fee set forth in §1.21(l) to prevent disposal of the application.

5. Section 1.56 is amended by revising paragraph (e) to read as follows:

##### *§1.56 Duty of disclosure; fraud; striking or rejection of applications.*

. . . . .

(e) The examination of an application for compliance with paragraph (d) of this section will normally be delayed until such time as (1) all other matters are resolved, or (2) appellant's reply brief pursuant to §1.193(b) has been received and the application is otherwise prepared for consideration by the Board of Patent Appeals and Interferences, at which time the appeal will be suspended for examination pursuant to paragraph (d) of this section. The prosecution of the application will be reopened to the extent necessary to conduct the examination pursuant to paragraph (d) of this section including any appeal pursuant to §1.191. If an appeal has already been filed based on a rejection on other grounds, any further rejection under this section shall be treated in accordance with §1.193(c).

. . . . .

6. Section 1.71 is amended by adding new paragraphs (d) and (e) to read as follows:

##### *§1.71 Detailed description and specification of the invention.*

. . . . .

(d) A copyright or mask work notice may be placed in a design or utility patent application adjacent to copyright and mask work material contained therein. The notice may appear at any appropriate portion of the patent application disclosure. For notices in drawings, see §1.84(o). The content of the notice must be limited to only those elements required by law. For example, "©1983 John Doe" (17 U.S.C. 401) and "M\* John Doe" (17 U.S.C. 909) would be properly limited and, under current statutes, legally sufficient notices of copyright and mask work, respectively. Inclusion of a copyright or mask work notice will be permitted only if the authorization language set forth in paragraph (e) of this section is included at the beginning (preferably as the first paragraph) of the specification.

(e) The authorization shall read as follows:

A portion of the disclosure of this patent document contains material which is subject to copyright or mask work protection. The copyright or mask work owner has no objection to the facsimile reproduction by anyone of the patent document or the patent disclosure, as it appears in the Patent and Trademark Office patent file or records, but otherwise reserves all copyright or mask work rights whatsoever.

7. Section 1.81 is amended by revising the title and paragraph (a) to read as follows:

##### *§1.81 Drawings required in patent application.*

(a) The applicant for a patent is required to furnish a drawing of his or her invention where necessary for the understanding of the subject matter sought to be patented; this drawing, or a high quality copy thereof, must be filed with the application. Since corrections are the responsibility of the applicant, the original draw-

ing(s) should be retained by the applicant for any necessary future correction.

. . . . .

8. Section 1.84 is amended by revising paragraphs (a), (b), (i), (j) and (l) and by adding new paragraphs (n), (o), and (p), to read as follows:

##### *§1.84. Standards for drawings.*

(a) *Paper and Ink.* Drawings or high quality copies thereof which are submitted to the Office must be made upon paper which is flexible, strong, white, smooth, non-shiny and durable. India ink, or its equivalent in quality, is preferred for pen drawings to secure perfectly black solid lines. The use of white pigment to cover lines is not normally acceptable. See paragraph (p) of this section for use of color drawings in utility patent applications.

(b) *Size of sheet and margins.* The size of the sheets on which drawings are made may be exactly 8½ by 14 inches (21.6 by 35.6 cm.), exactly 8½ by 13 inches (21.6 by 33.1 cm.), or exactly 21.0 by 29.7 cm. (DIN size A4). All drawing sheets in a particular application must be the same size. One of the shorter sides of the sheet is regarded as its top.

. . . . .

(2) On 8½ by 13 inch drawing sheets, the drawing must include a top margin of 1 inch (2.5 cm.) and bottom and side margins of ½ inch (6.4 mm.) from the edges, thereby leaving a "sight" precisely 8 by 11½ inches (20.3 by 29.8 cm.). Margin border lines are not permitted. All work must be included within the "sight." The sheets may be provided with two ½ inch (6.4 mm.) diameter holes having their centerlines spaced 11/16 inch (17.5 mm.) below the top edge and 2½ inches (7.0 cm.) apart, said holes being equally spaced from the respective side edges.

(3) On 21.0 by 29.7 cm. drawing sheets, the drawing must include a top margin of at least 2.5 cm., a left side margin of 2.5 cm., a right side margin of 1.5 cm., and a bottom margin of 1.0 cm. Margin border lines are not permitted. All work must be contained within a sight size not to exceed 17 by 26.2 cm.

. . . . .

(i) *Views.* The drawing must contain as many figures as may be necessary to show the invention; the figures should be consecutively numbered if possible in the order in which they appear. The figures may be plan, elevation, section, or perspective views, and detail views of portions or elements, on a larger scale if necessary, may also be used. Exploded views, with the separated parts of the same figure embraced by a bracket, to show the relationship or order of assembly of various parts are permissible. When an exploded view is shown in a figure which is on the same sheet as another figure, the exploded view should be placed in brackets. When necessary, a view of a large machine or device in its entirety may be broken and extended over several sheets if there is no loss in facility of understanding the view. Where figures on two or more sheets form in effect a single complete figure, the figures on the several sheets should be so arranged that the complete figure can be understood by laying the drawing sheets adjacent to one another. The figures, even through on separate sheets, should be labeled as separate figures, for example as Fig. 1a, Fig. 1b, etc.; so that it would be apparent that the views actually comprise one figure. The arrangement should be such that no part of any of the figures appearing on the various sheets is concealed and that the complete figure can be understood even though spaces will occur in the complete figure because of the margins on the drawing sheets. The plane upon which a sectional view is taken should be indicated on the general view by a broken



line, the ends of which should be designated by numerals corresponding to the figure number of the sectional view and have arrows applied to indicate the direction in which the view is taken. A moved position may be shown by a broken line superimposed upon a suitable figure if this can be done without crowding, otherwise a separate figure must be used for this purpose. Modified forms of construction can only be shown in separate figures. Views should not be connected by projection lines nor should centerlines be used. When a portion of a figure is enlarged for magnification purposes, the figure and the enlarged figure must be labeled as a separate figures.

(j) *Arrangement of Views.* All views on the same sheet should stand in the same direction and, if possible, stand so that they can be read with the sheet held in an upright position. If views longer than the width of the sheet are necessary for the clearest illustration of the invention, the sheet may be turned on its side so that the top of the sheet with the appropriate top margin to be used as the heading space is on the right-hand side. One figure must not be placed upon another or within the outline of another.

(l) *Identification of drawings.* Identifying indicia (such as the application number, group art unit, title of the invention, attorney's docket number, inventor's name, number of sheets, etc.) not to exceed 2½ inches (7.0 cm.) in width may be placed in a centered location between the side edges within three-fourths inch (19.1 mm.) of the top edge. Either this marking technique on the front of the drawing or the placement, although not preferred, of this information and the title of the invention on the back of the drawings is acceptable. Authorized security markings may be placed on the drawings provided they are outside the illustrations and are removed when the material is declassified. Other extraneous matter will not be permitted upon the face of a drawing.

(n) *Numbering of drawing sheets.* The drawing sheets may be numbered in consecutive arabic numbers at the top of the sheets, in the middle, but not in the margin. Such numbering will be deleted for printing purposes since page numbers are added at the time of printing the patent by the Office.

(o) *Copyright or Mask Work Notice.* A copyright or mask work notice may appear in the drawing but must be placed with the "sight" of the drawing immediately below the figure representing the copyright or mask work material and be limited to letters having a print size of ½ to ⅝ inches (3.2 to 6.4 mm) high. The content of the notice must be limited to only those elements required by law. For example, "©1983 John Doe" (17 U.S.C. 401) and "©M\* John Doe" (17 U.S.C. 909) would be properly limited and, under current statutes, legally sufficient notices of copyright and mask work, respectively. Inclusion of a copyright or mask work notice will be permitted only if the authorization language set forth in §1.71(e) is included at the beginning (preferably as the first paragraph) of the specification.

(p) *Limited use of color drawings in utility patent applications.* Paragraph (a) of this section requires that drawings in utility patent applications must be in black on white paper. However, on rare occasion, color drawings may be necessary as the only practical medium by which to disclose the subject matter sought to be patented in a utility patent application. The Patent and Trademark Office will accept color drawings in utility patent applications only after granting of a petition by the applicant under §1.183 of this part which requests waiver of the requirements of paragraph (a) of this section. Any such petition should be directed to the Office of the Deputy Assistant Commissioner for Patents and must include the following:

- (1) The appropriate fee set forth in §1.17(h).
- (2) Five (5) sets of color drawings on DIN size A4 (21.0 by 29.7 cm.) sheets.
- (3) A proposed amendment to insert in the specification the following language as the first paragraph in the portion of the specification relating to the brief description of the drawing:

"The file of this patent contains at least one drawing executed in color. Copies of this patent with color drawing(s) will be provided by the Patent and Trademark Office upon request and payment of the necessary fee."

9. Section 1.85 is revised to read as follows:

#### §1.85 Corrections to drawings.

(a) The requirements of §1.84 relating to drawings will be strictly enforced. A drawing not executed in conformity thereto, if suitable for reproduction, may be admitted for examination but in such case a new drawing must be furnished.

(b) The Patent and Trademark Office will not release drawings in applications having a filing date after Jan. 1, 1989, or any drawings from any applications after Jan. 1, 1991, for purposes of correction. If corrections are necessary, new corrected drawings must be submitted within the time set by the Office.

(c) When corrected drawings are required to be submitted at the time of allowance, the applicant is required to submit acceptable drawings within three months from the mailing of the "Notice of Allowability." Within that three-month period, two weeks should be allowed for review of the drawings by the Drafting Branch. If the Office finds that correction is necessary, the applicant must submit a new corrected drawing to the Office within the original three-month period to avoid the necessity of obtaining an extension of time and paying the extension fee. Therefore, the applicant should file corrected drawings as soon as possible following the receipt of the Notice of Allowability. The provisions with respect to obtaining an extension of time relates only to the late filing of corrected drawings. The time limit for payment of the issue fee is a fixed three-month period which cannot be extended as set forth in 35 U.S.C. 151.

10. Section 1.152 is revised to read as follows:

#### §1.152 Drawing.

The design must be represented by a drawing made in conformity with the rules laid down for drawings of mechanical inventions and must contain a sufficient number of views to constitute a complete disclosure of the appearance of the article. Appropriate surface shading must be used to show the character or contour of the surfaces represented. Broken lines may be used to show visible environmental structure, but may not be used to show hidden planes and surfaces which cannot be seen through opaque materials.

11. Section 1.378 is amended by revising paragraphs (b)(1) and (c)(1) to read as follows:

#### §1.378 Acceptance of delayed payment of maintenance fee in expired patent to reinstate patent.

- (b) (1) The required maintenance fee set forth in §1.20 (e) - (j).
- (c) (1) The required maintenance fee set forth in §1.20 (e) - (j).

- (1) The required maintenance fee set forth in §1.20 (e) - (j).

\*\*\*

12. Section 1.421 is amended by revising paragraph (f) and adding a new paragraph (g) to read as follows:

#### §1.421 Applicant for international application.

\*\*\*\*\*

(f) Changes in the person, name, or address of the applicant of an international application shall be made in accordance with PCT Rule 92bis.

(g) The wording of PCT Rule 92bis is as follows:

PCT Rule 92bis - Recording of Changes in Certain Indications in the Request or the Demand 92bis *Recording of Changes by the International Bureau*

(a) The International Bureau shall, on the request of the applicant or the receiving Office, record changes in the following indications appearing in the request or demand:

- (i) person name, residence, nationality or address of the applicant,
- (ii) person, name or address of the agent, the common representative or the inventor.

(b) The International Bureau shall not record the requested change if the request for recording is received by it after the expiration:

- (i) of the time referred to in Article 22(1), where Article 39(1) is not applicable with respect to any Contracting State;
- (ii) of the time limit referred to in Article 39(1)(a), where Article 39(1) is applicable with respect to at least one Contracting State.

13. Section 1.480 is amended by revising paragraph (d) to read as follows:

#### §1.480 Demand for international preliminary examination.

\*\*\*\*\*

(d) Withdrawal of a proper Demand prior to the start of the international preliminary examination will entitle applicant to a refund of the preliminary examination fee minus the amount of the transmittal fee set forth in §1.445(a)(1).

DONALD J. QUIGG,

Assistant Secretary and  
Commissioner of Patents  
and Trademarks.

Nov. 21, 1988

#### Adverse Decisions in Interference

In the designated interferences involving the following patents, final decisions have been rendered that the respective patentees are not entitled to patents containing the claims listed.

Patent No. 4,276,084, James E. Reynolds, Alan R. Williams, HYDROMETALLURGICAL PROCESS FOR THE RECOVERY OF LEAD, Interference No. 101,935, decided Sept. 30, 1988, claims 1-21.

Patent No. 4,306,908, Shinji Takayama, Yasuo Tsukuda, Kazuo Shiiki, Shigekazu Otomo, Mitsuhiro Kudo, Yasunobu Ogata, Yoshizo Sawada, FERROMAGNETIC AMORPHOUS ALLOY, Interference No. 101,777, decided Sept. 16, 1988, claims 1-11.

Patent No. 4,347,251, Joseph P. Joseph, John P. Dusz, Seymour Bernstein, NOVEL 3-SUBSTITUTED AMINO-1-SUBSTITUTED HETEROARYL-2-PYRA-

ZOLINES, Interference No. 101,902, decided Sept. 20, 1988, claims 1-5.

Patent No. 4,410,403, Stanley C. Jacobs, Raymond D. Wiltzius, John R. Minick, Perry A. Foster, Jr., ELECTROLYSIS METHOD, Interference No. 101,705, decided Sept. 16, 1988, claims 1-7.

Patent No. 4,427,825, William Sacks, BLENDS OF POLYAMIDE AND ETHYLENE VINYL ALCOHOL COPOLYMERS, Interference No. 101,458, decided Sept. 16, 1988, claims 1-21.

Patent No. 4,468,427, William Sacks, BLENDS OF POLYAMIDE AND ETHYLENE VINYL ALCOHOL COPOLYMERS, Interference No. 101,459, decided Sept. 16, 1988, claims 1-15.

Patent No. 4,479,782, Jan A. Orłowski, David V. Butler, VISIBLE LIGHT-CURED ORTHODONTIC ADHESIVE, Interference No. 101,683, decided Sept. 20, 1988, claims 1-25.

Patent No. 4,483,808, Harry M. Dillow, Anthony E. Sansone, Raymond K. Swartz, METHODS OF MAKING A COMPOSITELY INSULATED CONDUCTOR HAVING A LAYER OF IRRADIATION CROSS-LINKED POLYMERIC MATERIAL, Interference No. 101,743, decided Sept. 30, 1988, claims 1-7.

Patent No. 4,490,148, Bo Beckstrom, PROTECTOR AGAINST INCONTINENCE OR DIAPER, Interference No. 101,768, decided July 28, 1988, claims 1-9.

Patent No. 4,530,457, William H. Down, WAVE-SOLDERING OF PRINTED CIRCUIT BOARDS, Interference No. 101,824, decided Oct. 12, 1988, claims 1-28.

Patent No. 4,577,289, Liam D. Comerford, Steve R. White, HARDWARE KEY-ON-DISK SYSTEM FOR COPY-PROTECTING MAGNETIC STORAGE MEDIA, Interference No. 101,776, decided Aug. 31, 1988, claims 1-63.

Patent No. 4,595,546, John R. Wheeler, Jr., MANUFACTURE OF ELONGATED EXTRUDED CROSS-LINKED PRODUCTS, Interference No. 101,858, decided Nov. 3, 1988, claims 1-5.

Patent No. 4,645,371, Chien-Yuan Wang, SAFETY JOINT MECHANISM, PARTICULARLY FOR FOLDING LADDERS, Interference No. 101,998, decided Sept. 30, 1988, claim 1.

Patent No. 4,673,082, Richard O. Hemme, GOLF BAG WITH ROTARY CLUB CARRIER, Interference No. 101,875, decided Oct. 26, 1988, claims 1, 2, 4, 5 and 7.

NANNIE B. HENRY,

Deputy Clerk,

Board of Patent Appeals  
and Interferences.

#### Patents Available for License or Sale

Inquiries should be directed to John K. McCulloch at 5219 Colony Dr. N., Saginaw, Mich. 48603.

3,750,283. BLADE ATTACHMENT MEANS FOR SABER SAW ASSEMBLY.  
3,823,473. BLADE ATTACHMENT MEANS FOR SABER SAW ASSEMBLY.  
3,901,117. SABER SAW AND BLADE THEREFOR.

4,204,692. BLADE HOLDER FOR SABER SAW.  
4,285,129. HOLDER FOR SABER SAW BLADE.  
4,299,402. BLADE HOLDER FOR SABER SAW.  
4,470,196. HOLDER FOR SABER SAW BLADE.  
4,594,781. HOLDER FOR SABER SAW BLADE.  
4,648,182. HOLDER FOR SABER SAW BLADE.

4,185,407. Jack W. Lamb, 10822 Magnolia Blvd. #142, North Hollywood, Calif. 91601, ELECTRIC OR BATTERY RUN.

4,491,212. Frank J. Gray, P.O. Box 2950, Gary, Ind. 46403, PICKERS AID.

4,576,178. Guy W. Shoup, Wyatt, Gerber, Shoup & Badie, One Rockefeller Plz. New York, N.Y. 10020, AUDIO SIGNAL GENERATOR.

4,702,704. Leonard R. Svensson, Birch, Stewart, Kolasch & Birch, P.O. Box 747, Falls Church, Va. 22046, TETRAHEDRAL GODON STEREO-TABLE.  
4,765,618. Peter R. Bahn, 744 New Britain Ave., Farmington, Conn. 06032, WESTPHAL DELEY.  
4,767,511. Pedro Aragon, 306 Highpoint Dr., Wadsworth, Ohio 44281, CHLORINATION AND PH CONTROL SYSTEM.

07/158,398. Glenn E. Simpson, 204 N. 3rd St., Libertyville, Ill. 60048, ELECTRONIC DIGITAL DICE I, ELECTRONIC DIGITAL DICE II.  
07/185,131. Stanley Walker, Rte. 3 Box 13, Eureka Springs, Ariz. 72632, BEVEL-SPLINED.  
07/238,519. Dorothy Smith, 5828 Vandegrift Ave., Rockville, Md. 20851, FRAME A SPECIAL CARD.

## PATENT NOTICES

## Certificates of Correction for the Week of Dec. 13, 1988

D. 290,572	4,709,299	4,745,082	4,756,548
D. 293,774	4,710,504	4,745,367	4,756,555
D. 295,504	4,710,893	4,745,724	4,756,890
D. 295,889	4,712,177	4,745,773	4,756,927
4,461,557	4,712,737	4,746,005	4,757,127
4,548,923	4,712,752	4,746,372	4,757,147
4,550,440	4,716,959	4,746,516	4,757,284
4,558,286	4,718,086	4,746,700	4,757,610
4,575,227	4,718,365	4,746,902	4,757,638
4,594,725	4,721,576	4,746,919	4,757,746
4,601,453	4,722,794	4,746,965	4,757,800
4,603,154	4,723,475	4,747,303	4,757,809
4,606,812	4,723,850	4,747,791	4,758,070
4,611,593	4,724,224	4,747,987	4,758,363
4,613,994	4,724,660	4,748,034	4,758,619
4,624,679	4,725,158	4,748,276	4,758,811
4,632,857	4,725,300	4,748,669	4,759,045
4,634,615	4,726,470	4,748,775	4,759,081
4,635,138	4,726,982	4,749,137	4,759,476
4,636,811	4,727,382	4,749,383	4,759,487
4,640,831	4,727,690	4,749,775	4,759,500
4,644,519	4,727,900	4,750,217	4,759,595
4,654,790	4,728,566	4,750,288	4,759,795
4,654,884	4,728,607	4,750,746	4,759,899
4,662,455	4,728,999	4,750,925	4,759,960
4,666,941	4,730,848	4,751,377	4,760,137
4,672,458	4,730,912	4,751,379	4,760,404
4,675,553	4,731,281	4,751,465	4,760,405
4,676,475	4,731,728	4,752,213	4,760,493
4,676,589	4,734,122	4,752,404	4,760,746
4,676,610	4,734,762	4,752,845	4,760,914
4,683,976	4,739,007	4,752,941	4,761,203
4,685,666	4,739,177	4,753,099	4,761,224
4,688,713	4,739,274	4,753,532	4,761,327
4,696,052	4,739,275	4,753,730	4,761,620
4,697,292	4,739,651	4,753,804	4,761,658
4,698,051	4,740,445	4,754,207	4,761,781
4,698,557	4,740,614	4,754,498	4,762,253
4,698,912	4,740,616	4,754,585	4,762,445
4,700,265	4,741,292	4,754,732	4,762,614
4,701,512	4,741,658	4,755,097	4,763,077
4,701,745	4,741,867	4,755,196	4,763,124
4,701,882	4,741,897	4,755,247	4,763,466
4,702,877	4,742,400	4,755,585	4,763,985
4,703,111	4,743,040	4,755,690	4,764,145
4,703,203	4,743,093	4,755,923	4,764,635
4,706,669	4,743,225	4,755,933	4,765,891
4,706,678	4,744,308	4,756,082	4,766,820
4,707,540	4,744,434	4,756,096	4,772,954
4,708,474	4,744,447	4,756,363	

## Disclaimers

4,379,878.—William A. Larkin, Morristown, N.J. FOOD-GRADE VINYL HALIDE POLYMER COMPOSITIONS STABILIZED WITH MONOALKYL TIN COMPOUNDS. Patent dated Apr. 12, 1983. Disclaimer filed Oct. 4, 1988, by the assignee, M&T Chemicals Inc.

Hereby enters this disclaimer to all claims of said patent.

4,680,972.—William Wareham, Marion, Mass. PRES-SURE TRANSDUCER. Patent dated July 21, 1987. Disclaimer filed Oct. 17, 1988, by the assignee, Dynisco, Inc.

The term of this patent subsequent to July 14, 2004, has been disclaimed.



## SPECIAL BOXES FOR MAIL

Special PTO mail box numbers should be used to allow forwarding of particular types of mail to the appropriate areas as quickly as possible. Such mail is forwarded directly to the appropriate area without being opened. Only the specified type of document should be placed in an envelope addressed to one of these special boxes. If any documents other than the specified type identified for each box are addressed to that box, they will be delayed in reaching the appropriate area for which they are intended.

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Box FWC	Requests for File Wrapper Continuation Applications.
Box Interference	Communications relating to interferences and applications and patents involved in interference.
Box Issue Fee	Issue Fee Transmittals (PTOL Form 85) and associated fees and corrected drawings.
Box M. Fee	Correspondence related to a patent that is subject to the payment of a maintenance fee.
Box Non Fee Amendment	Non-fee amendments to patent applications. (Use Box AF for responses after final rejection).
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Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent applications prior to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
TRADEMARK APPLICATION	New trademark application and associated papers and fees.

## Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification*, *Index to the U.S. Patent Classification*, *Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effective access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	Name of Library	Telephone Contact
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Alaska	Anchorage Municipal Libraries	(907) 261-2907
Arizona	Tempe: Noble Library, Arizona State University	(602) 965-7140
Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3200
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2347
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
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	Moscow: University of Idaho Library	(208) 885-6235
Idaho	Chicago Public Library	(312) 269-2865
Illinois	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis-Marion County Public Library	(317) 269-1741
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Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
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	Detroit Public Library	(313) 833-1450
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Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
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Nebraska	Lincoln: Engineering Library, University of Nebraska—Lincoln	(402) 472-3411
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	Cleveland Public Library	(216) 623-2870
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	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-6546
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Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
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	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas at Austin	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 670-1468
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
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Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin—Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

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## PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF November 5, 1988

## PATENT EXAMINING GROUPS

Actual Filing Date of Oldest  
New Case Awaiting Action

## CHEMICAL EXAMINING GROUPS

GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director .....	2-10-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director .....	9-3-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130— R. F. WHITE, Director .....	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director .....	5-4-87
BIOTECHNOLOGY, GROUP 180—S. N. ZAHARNA, Acting Director .....	1-17-86

## ELECTRICAL EXAMINING GROUPS

INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director .....	1-20-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director .....	7-31-86
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director .....	2-15-85
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director .....	6-8-87
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director .....	2-27-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260— S. G. KUNIN, Director .....	1-28-87
DESIGN, GROUP 290—K. L. CAGE, Director .....	1-3-86

## MECHANICAL EXAMINING GROUPS

HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director .....	11-10-87
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—VACANT, Director .....	5-13-87
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—VACANT, Director .....	1-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director ..	4-16-87
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director .....	1-4-88

Expiration of patents: The patents within the range of numbers indicated below expire during November 1988, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,616,463 to 3,624,838, inclusive  
Plant Patents ..... None

1097 OG 48

## REEXAMINATIONS

DECEMBER 13, 1988

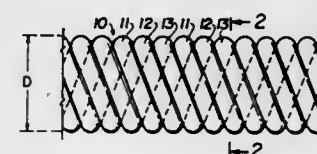
Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 Re. 30,332 (958th)  
MULTI-STRANDED COILED ORTHODONTIC ARCH  
WIRE

Melvin Wallshein, 8645 Bay Pkwy., Brooklyn, N.Y. 11214  
Reexamination Request No. 90/001,408, Dec. 31, 1987.  
Reexamination Certificate for Reissue Patent Re. 30,332, issued  
Jul. 15, 1980, Ser. No. 967,723, Dec. 8, 1978.  
Original No. 4,086,702, dated May 2, 1978, Ser. No. 708,304,  
Jul. 26, 1976.

Int. Cl.<sup>4</sup> A61C 7/00

U.S. Cl. 433—20



AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:

The patentability of claims 1-60 is confirmed.

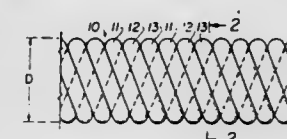
1. An orthodontic arch wire adapted to be connected to an orthodontic bracket mounted on a maloccluded tooth, the arch wire comprising a plurality of adjacent strands coiled in the form of a tightly wound elongated coiled wire normally having an array of interleaved turns of and generally parallel, and having a lumen extending therethrough, said strands when formed into said turns having a predetermined radial thickness (t), said turns having a common internal dimension (d-FIG. 2; s1-FIG. 9) of said lumen no greater than two times said predetermined radial thickness (t) of said strands and having a common outer dimension no greater than approximately 0.025 inches, said strands being made from a material sufficiently elastic to at least permit bending of the arch wire over a short length thereof by selectively and at least partially separating adjacent turns, and to provide sufficient stiffness over a long length to provide adequate anchoring characteristics for orthodontic devices attached thereto.

B1 Re. 30,593 (959th)  
MULTI-STRANDED COILED ORTHODONTIC ARCH  
WIRE

Melvin Wallshein, 8645 Bay Pkwy., Brooklyn, N.Y. 11214  
Reexamination Request No. 90/001,409, Dec. 31, 1987.  
Reexamination Certificate for Reissue Patent Re. 30,593, issued  
May 2, 1978, Ser. No. 708,304, Jul. 26, 1976.  
Original No. 4,086,702, dated May 2, 1978, Ser. No. 708,304,  
Jul. 26, 1976. Division of Ser. No. 967,723, Dec. 8, 1978, now  
Re. 30,332.

Int. Cl.<sup>4</sup> A61C 7/00

U.S. Cl. 433—20



AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:

The patentability of claims 2-12, 14-24, 26-31, 33-38 and 40-69 is confirmed.

Claims 1, 13, 25, 32 and 39 were previously cancelled.

52. In combination, an orthodontic bracket adapted to be mounted on a tooth, the bracket having an arch wire receiving opening therein; and an orthodontic arch wire fixedly mounted in said arch wire receiving opening of said orthodontic bracket;

said arch wire comprising:

a plurality of adjacent strands coiled in the form of a tightly wound elongated coiled wire normally having an array of interleaved turns of said strands, said turns being successively abutting and generally parallel, and having a lumen extending therethrough, said strands when formed into said turns having a predetermined radial thickness (t), said turns having a common internal dimension (d-FIG. 2; s1-FIG. 9) of said lumen no greater than two times said predetermined radial thickness (k) of said strands and having a common outer dimension no greater than approximately 0.025 inches, said strands being made from a material sufficiently elastic to at least permit bending of the arch wire over a short length thereof by selectively and at least partially separating adjacent turns, and to provide sufficient stiffness over a long length to provide adequate anchoring characteristics for orthodontic devices attached thereto.

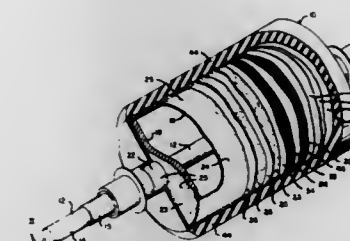
B1 3,520,747 (960th)  
METHOD OF MAKING STRUCTURAL MEMBERS OF  
LAYERS OF CORROSION RESISTANT COATINGS AND  
FIBROUS MATERIAL

Robert S. McGaughey, Indiana, Pa., assignor to McCreary Tire & Rubber Company, Indiana, Pa.

Reexamination Request No. 90/001,082, Sep. 5, 1986.  
Reexamination Certificate for Patent No. 3,520,747, issued Jul.  
14, 1970, Ser. No. 505,621, Oct. 29, 1965.

Int. Cl.<sup>4</sup> B32B 27/12

U.S. Cl. 156—153



AS A RESULT OF REEXAMINATION, IT HAS BEEN  
DETERMINED THAT:

The patentability of claims 6-8 and 10 is confirmed.

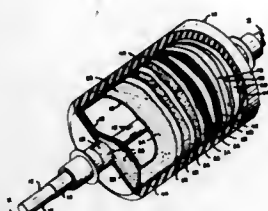
Claims 1-5, 9, and 11-20 are cancelled.

6. In a process for covering a roll for use in a hydrofluoric and other corrosive environments, said roll including a gener-



ally cylindrical core structure and a shaft extending axially therethrough, said process including the steps of roughening the exposed surfaces of said shaft and of said core structure including the cylindrical work surface and the annular end faces thereof, applying a coating on said shaft portions and said end faces and said work surfaces of resin selected from the group consisting of polyester, phenolic and epoxy resins, applying a layer of fiber glass material to said resin coating in coextension therewith, impregnating and coating said fiber glass material with an additional quantity of said resin material, applying a layer of a fibrous material selected from the group consisting of crocidilite, asbestos, and fibrous polyvinyl chloride-acrylonitrile copolymer to said second resin coating in coextension therewith, impregnating and coating said fibrous material with a third quantity of said resin, and adhering a layer of corrosion-resistant elastomeric material to said last-mentioned resin coating, said elastomeric layer being coextensive only with the cylindrical work surface of said roll.

**B1 3,646,651 (961st)**  
**ABRASION AND CORROSION RESISTANT COMPOSITE STRUCTURAL MATERIALS AND THE LIKE**  
 Robert S. McGaughey, Indiana, and Paul Simbrell, Pittsburgh, both of Pa., assignors to McCreary Tire & Rubber Company, Indiana, Pa.  
 Reexamination Request No. 90/000,965, Mar. 10, 1986.  
 Reexamination Certificate for Patent No. 3,646,651, issued Mar. 7, 1972, Ser. No. 565,692, Oct. 29, 1965.  
 Int. Cl.<sup>4</sup> B21B 31/08  
 U.S. Cl. 29—130

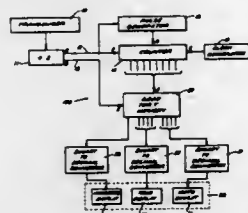


AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1-26 are cancelled.

[1. A roll for use in a corrosive environment, said roll including a core structure forming part thereof, a corrosion-resistant resin layer adhered to said core structure, a layer of fiber glass material adhered to said resin layer, an additional layer of said resin material impregnating and covering said fiber glass material, a layer of a mat formed from at least one of the group consisting of fibrous crocidilite, asbestos, and polyvinyl chloride-acrylonitrile copolymer covering said second resin layer, and another layer of said resin material impregnating and covering said mat layer.]

**B1 3,717,140 (962nd)**  
**HEART RATE COUNTER WITH DIGITAL STORAGE AND NUMERICAL READOUT**  
 Eugene C. Greenwood, 468 Prospect St., Newport Beach, Calif. 92660  
 Reexamination Request No. 90/001,216, Apr. 10, 1987.  
 Reexamination Certificate for Patent No. 3,717,140, issued Feb. 20, 1973, Ser. No. 89,245, Nov. 13, 1970.  
 Int. Cl.<sup>4</sup> A61B 5/02  
 U.S. Cl. 128—689



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-9 is confirmed.

Claim 10 is determined to be patentable as amended.

New claim 11 is added and determined to be patentable.

11. An apparatus for measuring and displaying the pulse of an individual, comprising:  
 transducer means for sensing heartbeats;  
 a source of clock pulses;  
 digital read-only memory means having a plurality of address locations, each of said address locations containing a plurality of predetermined bits of digital information, counting means for counting number of clock pulses occurring between heartbeats, said address locations being operative to store different pulses which occur between heartbeats, said count in said counting means being applied to said memory means to select the address location having stored therein the bits of digital information indicative of the pulse rate corresponding to the number of counted clock pulses;  
 display means responsive to said bits of digital information at said selected address location for visually displaying a decimal number equal to said selected pulse rate; and means for giving a characteristic indication when the pulse rate lies outside a given range and where the counting means counts the number of clock pulses between consecutive heartbeats.

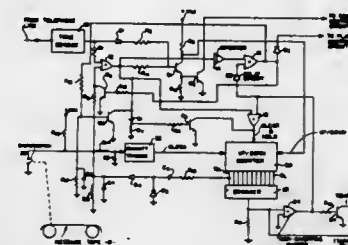
**B1 3,903,369 (963rd)**  
**TELEPHONE ANSWERING SYSTEM WITH REMOTE PLAYBACK**  
 James R. Darwood, Paramount, Calif., assignor to Fortel, Inc., Compton, Calif.  
 Reexamination Request No. 90/001,087, Sep. 12, 1986.  
 Reexamination Certificate for Patent No. 3,903,369, issued Sep. 2, 1973, Ser. No. 460,921, Apr. 15, 1974.  
 Int. Cl.<sup>4</sup> H04N 7/00  
 U.S. Cl. 379—77

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-5 is confirmed.

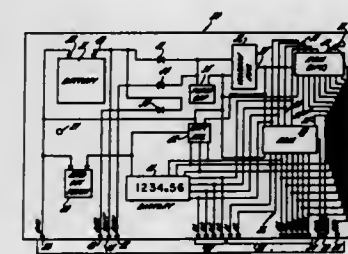
1. In a telephone answering system for responding to tele-

phone messages received over a telephone line and which includes a message storage means for recording the messages, the combination of: a tone sensing circuit coupled to the telephone line for sensing a tone signal of a predetermined frequency received over the line and for producing an output in response thereto; first circuit means coupled to said tone sensing circuit and responsive to said output for introducing a rewind control signal to the telephone answering system and to cause said message storage means to return to a reference position; an up-down counter for measuring the displacement of said message storage means from its reference position; second circuit means coupled to said up-down counter for terminating said rewind signal when said message storage means is returned to said reference position and for then introducing a playback control signal to the telephone answering



system to cause the telephone answering system to transmit the messages recorded on said message storage means over the telephone line; third circuit means coupled to said message storage means for introducing clock pulses to said up-down counter when said message storage means is activated; and fourth circuit means coupled to said second circuit means for causing said up-down counter to count from a reference count to a further count as said message storage means is being returned to its reference position, and for causing said up-down counter to return to its reference count as the telephone answering system is transmitting the messages recorded on said message storage means, said second circuit means terminating the introduction of said playback control signal to the telephone answering system when said up-down counter returns to its reference count.

**B1 4,001,550 (964th)**  
**UNIVERSAL FUNDS TRANSFER AND IDENTIFICATION CARD**  
 Vernon L. Schatz, 250 Sunset Ridge Rd., Northfield, Ill. 60093  
 Reexamination Request No. 90/001,257, Jun. 15, 1987.  
 Reexamination Certificate for Patent No. 4,001,550, issued Jan. 4, 1977, Ser. No. 637,712, Dec. 4, 1975.  
 Int. Cl.<sup>4</sup> G06F 15/30; G06K 19/00, 19/06; G11C 17/02  
 U.S. Cl. 235—379



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

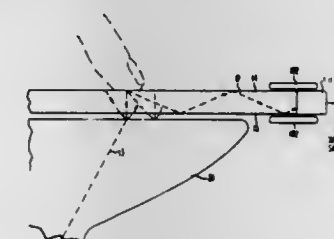
Claims 1 and 4 are determined to be patentable as amended.

Claims 2, 3 and 5-12, dependent on an amended claim, are determined to be patentable.

New claims 14-17 are added and determined to be patentable.

1. In a universal funds transfer and identification card for use with electronic terminals adapted to perform transactions and produce signals for carrying out and recording said transactions, the improvement comprising, random access memory means in said card for storing information including the following changeable information:  
 account balance,  
 total amount of transactions since last update of card, and date of last update; connecting means along a single edge of said card adapted to mate said terminal for coupling signals between said card and said terminal, and selecting means [coupling said connecting means to said random access memory means] for selectively addressing fields within said memory means, said selecting means being coupled between said connecting means and said random access memory means, and means for transferring data between addressed fields and said terminal, whereby said card serves as an up to date record of said account.

**B1 4,346,376 (965th)**  
**TOUCH POSITION SENSITIVE SURFACE**  
 James B. Mallos, Freehold, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.  
 Reexamination Request No. 90/001,252, Jun. 1, 1987.  
 Reexamination Certificate for Patent No. 4,346,376, issued Aug. 24, 1982, Ser. No. 140,716, Apr. 16, 1980.  
 Int. Cl.<sup>4</sup> G08B 5/36; G09G 1/14  
 U.S. Cl. 340—712



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1-3, 5, 6, 8, 10, 11, 13, 16 and 17 were previously disclaimed.

Claims 9, 14, 15 and 20-22 are cancelled.

Claims 4, 7, 12, 18 and 19 are determined to be patentable as amended.

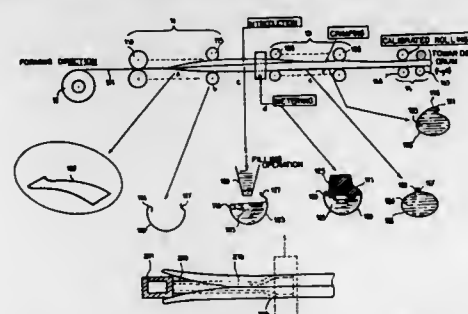
New claims 23-28 are added and determined to be patentable.

12. [The invention set forth in claim 6 wherein said distinctive output is generated by means which include] A touch sensitive device for use in conjunction with a signal source, said device comprising spaced apart surfaces arranged such that signals are introduced between said surfaces so as to become entrapped within said device by total internal reflection between said surfaces as a result of a touch of one of said surfaces, and signal utilization means communicating with a region between said surfaces, said signal utilization means including a two-

color detector which provides a distinctive output when said signals are so introduced between said surfaces.

Claims 7 and 8, dependent on an amended claim, are determined to be patentable.

1. Method of treating a metallurgical bath, comprising the steps of unwinding from a drum into said bath a predetermined length of a composite tubular product having a closed profiled tubular envelope [ ] filled with an [aggregated] powder and



having a [flattened] rectangular cross-section, said tubular envelope being made of a [material] metal strip which is non-reactive with respect to said bath and with two edges hooked and crimped along their length to enclose the powder, said [aggregated] powder being a compacted [but porous] and reactive powder, wherein said cross-section resulted from deforming said envelope while keeping its perimeter substantially constant, whereby said aggregated powder is rendered compacted.

B1 4,486,227 (966th)

# MANUFACTURE OF A COMPOSITE TUBULAR PRODUCT

Michel Douchy, Solemmer; Jean-Louis Tranchant, Valenciennes, and Michel Jehan, La Flamengrie, all of France, assignors to Vallourec, Paris, France

Reexamination Request No. 90/000,991, Apr. 23, 1986.

Reexamination Certificate for Patent No. 4,486,227, issued Dec. 4, 1984, Ser. No. 429,725, Sep. 30, 1982.

Continuation of Ser. No. 237,805, Feb. 24, 1981, Pat. No. 4,364,770.

Claims priority, application France, Feb. 26, 1980, 80 04194 The portion of the term of this patent subsequent to Aug. 4, 2001, has been disclaimed.

Int. Cl.<sup>4</sup> C22B 9/00; C21C 70/64  
U.S. Cl. 75—53

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 2, 3 and 6 are cancelled.

Claims 1, 4 and 5 are determined to be patentable as amended.

## REISSUES

DECEMBER 13, 1988

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,798

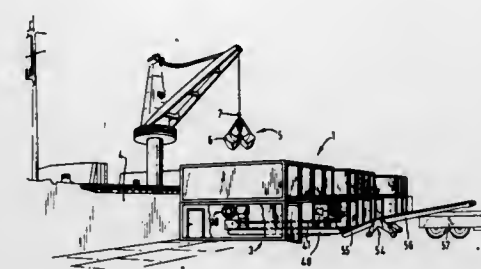
### METHOD OF MATERIAL DISTRIBUTION AND APPARATUS FOR USE IN THE METHOD

Jan Van Der Wal, Rotterdam, Netherlands, and Gerardus L. Nederpel, Sanderstead, United Kingdom, assignors to Nat Shipping Bagging Services Limited, Hamilton, Bermuda  
Original No. 4,563,858, dated Jun. 14, 1986, Ser. No. 386,064, Jan. 7, 1982. Application for reissue Feb. 6, 1987, Ser. No. 11,742

Claims priority, application United Kingdom, Jun. 10, 1981, 8117753

Int. Cl.<sup>4</sup> B65B 51/07, 7/02, 1/04  
U.S. Cl. 53—418

14 Claims



9. A mobile bagging plant for bagging free-flowing material in bags, comprising:

- a first transportable module of standard shipping container dimensions and being readily movable from a first site to a second site, said first module being compatible with other like standardized containers so that said first module is stackable on and among said other like containers;
- a second transport module of standard shipping container dimensions and being readily movable from a first site to a second site, said second module being compatible with other like standardized containers so that said second module is stackable on and among said other like containers;
- a receiving hopper formed in said second module, said second module being interlockable with and positionable above said first module; and
- a bagging apparatus housed in said first module, said bagging apparatus including

an inlet means for receiving the material from the receiving hopper and closable by a first valve means, weighing means including a receptacle having an inlet and an outlet, and means for measuring the weight of the material within the receptacle, said inlet of said receptacle being positioned to receive material from said inlet means, second valve means for closing said outlet, bag retention means for positioning bags under said outlet of said receptacle when said second valve means is opened and for removing the bags after the bags have been filled, control means for closing said first valve means and then opening said second valve means when the weight of the material in said receptacle reaches a predetermined weight such that predetermined weights of material are fed into the bags from said receptacle, and closure means for closing the bags after filling.

Re. 32,799

### COIN COUNTING AND DISPENSING APPARATUS

Hiroshi Abe, Tokyo, Japan, assignor to Asahi Seiko Kabushiki Kaisha, Tokyo, Japan

Original No. 4,437,478, dated Mar. 20, 1984, Ser. No. 279,426, Jul. 1, 1981. Application for reissue Mar. 20, 1986, Ser. No. 841,601

Claims priority, application Japan, Jul. 8, 1980, 55-92280

Int. Cl.<sup>4</sup> G07D 5/02, 9/04

6 Claims



4. A coin dispensing apparatus comprising a hopper for holding a supply of coins, a rotary disc in said hopper that is inclined to the horizontal and has coin engaging means on an upper face thereof, said rotary disc being rotated by means of a drive shaft at a center thereof in one direction to carry coins upward from near the bottom of the hopper, a delivery knife near the top of the disc to which coins are delivered by the rotary disc for guidance to a delivery chute and which has a substantially upwardly facing surface that the coins engage edgewise, a counter roller supported retractably at a position opposite to the surface of the knife so as to engage with a peripheral edge of the coin, said coin dispensing apparatus being characterized by:

means for rotatably supporting the rotary disc on an inclined supporting plate, the supporting means including a circular race, grooved in the bottom surface of the rotary disc at a peripheral portion of the rotary disc, a plurality of balls arranged in the circular race, a retainer for rotatably retaining the balls in the circular race at positions spaced from each other circumferentially and biasing means on the drive shaft extending through a central opening in the rotary disc toward the supporting plate, thereby maintaining the position of the peripheral portion of the rotary disc at a constant position.

Re. 32,800

### METHOD OF MAKING MOSFET BY MULTIPLE IMPLANTATIONS FOLLOWED BY A DIFFUSION STEP

Yu-Pin Han, Dallas, and Tsai C. Chan, Carrollton, both of Tex., assignors to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.

Original No. 4,599,118, dated Jul. 8, 1986, Ser. No. 654,281, Sep. 24, 1984. Division of Ser. No. 335,608, Dec. 30, 1981, abandoned. Application for reissue May 21, 1987, Ser. No. 53,269

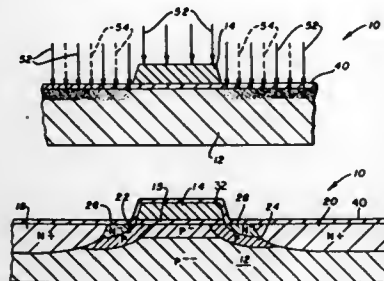
Int. Cl.<sup>4</sup> H01L 21/265, 21/308  
U.S. Cl. 437—27

7 Claims

1. A method for manufacturing a metal oxide semiconductor transistor device comprising: providing a semiconductor substrate of a first conductivity type; forming a first insulating layer of silicon dioxide on an active surface of the substrate; implanting ions of a first conductivity type into said substrate;



depositing a layer of polysilicon on said first insulating layer; implanting ions of a second conductivity type through said polysilicon layer; growing a second region of silicon dioxide, said silicon dioxide region being grown over said polysilicon layer; placing a photoresistive mask over said second oxidation layer for forming a gate of the semiconductor device; etching a predetermined portion of said second oxidation layer; plasma etching said polysilicon layer; removing a predetermined portion of said polysilicon layer underneath said second silicon dioxide layer; [etching said second layer of silicon dioxide;]



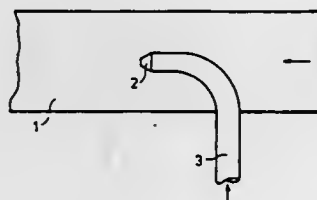
stripping said photoresist area from said second oxidation layer; implanting ions of the second conductivity type; [implanting ions of the first conductivity type;] etching said second layer of silicon dioxide overhanging said polysilicon gate layer; [etching said first layer of silicon dioxide surrounding said polysilicon gate layer;] implanting ions of said first conductivity type; implanting ions of said second conductivity type; diffusing the implanted ions into said substrate; and oxidizing the active surface of said substrate, including said polysilicon gate.

Re. 32,801  
PROCESS AND APPARATUS FOR THE PREPARATION OF MIXTURES OF ISOCYANATE AND WATER WHICH ARE STABLE FOR A SHORT TIME FOR GLUEING PARTICULATE MATERIAL IN PARTICULAR CHIPS, FIBERS OR THE LIKE

Robert Peters, Cologne; Klaus Schulte, Leverkusen; Hanns I. Sachs, and Peter Kasperek, both of Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Original No. 4,652,595, dated Mar. 24, 1987, Ser. No. 736,162, May 20, 1985. Application for reissue Oct. 30, 1987, Ser. No. 115,074  
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1984, 3420997

Int. Cl.<sup>4</sup> C08G 18/08  
U.S. Cl. 523—315

2 Claims



1. A process for the preparation of mixtures of isocyanate and water suitable for glueing particulate material, in particular chips, fibers or the like, in which [water-miscible] water-immiscible isocyanate is injected at a pressure of above 50 bar into the water, characterized in that the water is delivered to the site of injection as a stream under a pressure below 10 bars.  
2. The process of claim 1, characterized in that the isocyanate is injected at least approximately in the direction of flow of the water.

## PLANT PATENTS

GRANTED DECEMBER 13, 1988

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,453

MINIATURE ROSE PLANT 'MY SUNSHINE'  
Cecilia L. D. Bennett, 489 Minot Ave., Chula Vista, Calif. 92010  
Filed Feb. 4, 1987, Ser. No. 10,718  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—8

1 Claim

1. A new and distinct variety of miniature rose plant named, 'My Sunshine' of hardy, dwarf, vigorous growth, well-branched and attractive in appearance, substantially as illustrated and described, characterized by its five-petaled blooms of bright yellow, ranging from near Buttercup Yellow to near Indian Yellow.

6,454

MINIATURE ROSE PLANT 'SITTING PRETTY'  
Cecilia L. D. Bennett, 489 Minot Ave., Chula Vista, Calif. 92010  
Filed Feb. 4, 1987, Ser. No. 10,719  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—9

1 Claim

1. A new and distinct variety of miniature rose plant, named 'Sitting Pretty' of hardy, dwarf, vigorous growth, well-branched and attractive in appearance, substantially as illustrated and described, characterized by its blooms of pale pink, ranging from near Neyron Rose to near Empire Rose, with a base, ranging from near Chinese Coral to near Peach, and a reverse of pale yellow, ranging from near Empire Yellow to near Aureolin.

6,455

MINIATURE ROSE PLANT 'FAT 'N SASSY'  
Cecilia L. D. Bennett, 489 Minot Ave., Chula Vista, Calif. 92010  
Filed Feb. 4, 1987, Ser. No. 10,720  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—7

1 Claim

1. A new and distinct variety of miniature rose plant named 'Fat 'N Sassy' of hardy, dwarf, vigorous growth, well-branched and attractive appearance, substantially as illustrated and described, characterized by its blooms of pale yellow to near white with a blush of red, ranging from near Crimson to near Tyrian Rose, that covers all sun-exposed surfaces.

6,456

MINIATURE ROSE PLANT 'CHEER UP'  
Cecilia L. D. Bennett, 489 Minot Ave., Chula Vista, Calif. 92010  
Filed Feb. 4, 1987, Ser. No. 10,826  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—10

1 Claim

1. A new and distinct variety of miniature rose plant named, 'Cheer Up' of hardy, dwarf, vigorous growth, well-branched and attractive in appearance, substantially as illustrated and described, characterized by its blooms of bright orange-red, ranging from near Mandarin Red to near Capsicum Red.

6,457

ROSE PLANT NAMED 'PARTY TIME'  
O. L. Weeks, 12610 Central Ave., Suite 76, Chino, Calif. 91710  
Filed Jan. 5, 1987, Ser. No. 428  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—11

1 Claim

1. A new and distinct variety of rose plant of the hybrid tea rose class, substantially as shown and described, characterized particularly by red and yellow colored flowers changing in tonality upon aging, borne singly on strong, erect stems.

6,458

GRAPEVINE, 'FLAMED GLOBE'  
George A. Lucas, Sr., P.O. Box 520, Delano, Calif. 93216  
Filed Feb. 24, 1987, Ser. No. 22,621  
Int. Cl.<sup>4</sup> A01H 5/03

U.S. Cl. Plt.—47

1 Claim

1. A new and distinct variety of grapevine to be designated variably as the Flamed Globe substantially as illustrated and described which is characterized principally as to novelty by its production of grapes which are mature for commercial harvesting approximately September 1 through September 15 under the ecological conditions prevailing in the San Joaquin Valley of Central California, said grapes maturing several weeks earlier than the Emperor Grapevine (unpatented) with which it most closely resembles but from which it is distinguished by producing berries which have a reddish brown color and which further have leaves which have a sagittate petiolar sinus and serrate marginal edge.

6,459

SALTGRASS PLANT NAMED YENSEN 2  
Nicholas P. Yensen, Tucson, Ariz., assignor to Salt Weeds, Tucson, Ariz.  
Filed Aug. 28, 1986, Ser. No. 901,316  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—89

1 Claim

1. A new and distinct grain variety of *Distichlis palmeri* as shown and described, which is principally characterized by a pleasing grain coloration grading from light brown posteriorly to dark brown anteriorly, reduced shatter characteristics, high grain fertilization rate, and a grain habit suitable for harvest.

6,460

FICUS BENJAMINA PLANT NAMED 'GOLDEN KING'  
Adrien Simoons, Merelbeke, Belgium, assignor to Golden King Holdings, Inc., Miami, Fla.  
Filed Aug. 27, 1986, Ser. No. 901,009  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—88

1 Claim

1. A new and distinct cultivar of *Ficus benjamina* named Golden King, as illustrated and described, and particularly characterized by its vigorous growth habit, luxuriant green leaves variegated light yellow entirely around the border and irregularly inwardly of the borders, and by its temperature tolerance.

6,461

SALTGRASS PLANT NAMED YENSEN 1  
Nicholas P. Yensen, Tucson, Ariz., assignor to Salt Weeds, Tucson, Ariz.  
Filed Aug. 28, 1986, Ser. No. 901,315  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—89

1 Claim

1. A new and distinct plant variety *Distichlis palmeri* as shown and described, which is principally characterized by vigorous growth, high grain yield and ideal form for harvesting.

6,462

**EUPHORBIA PLANT CV. STILOGA**

Alfred Stirnadel, Zweibrücken-Oberauerbach, Fed. Rep. of Germany, assignor to Marianné Stirnadel-Schwab, Zweibrücken-Oberauerbach, Fed. Rep. of Germany  
Filed Jan. 2, 1987, Ser. No. 80  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A hybrid plant of *Euphorbia milli* cv. Stiloga and the parts thereof, substantially as shown and described herein and particularly characterized by the following combination of characteristics: its upright and bushy habit with very abundant branching forming a compact-round plant; its early production on strong solid short stalks of from about 10 to 15 blossom clusters each cluster consisting of about 7 to 15 single blossoms; its production of new leaves and new blossom clusters approximately every 20 days after first reaching a stem height of about 7 cm; its leaves of up to 4 cm in width and 8 cm in length; and its irregular number (2-8) of thorns forming a comb on small nodes, the nodes occurring at intervals of 0.8 to 1 cm along about five stem ridges.

6,463

**ROSE PLANT JACPAW**

William A. Warriner, Tustin, Calif., assignor to Jackson & Perkins Co., Medford, Oreg.  
Filed Dec. 22, 1986, Ser. No. 945,131  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—11

1 Claim

1. A new and distinct variety of rose plant of the hybrid tea class, substantially as herein shown and described, characterized particularly as to novelty by the unique combination of its large, high-centered, pink and white flower; pleasant fragrance; long cut flower vase life; profusion of glands and prickles on petioles and peduncles; and its dark green foliage combined with vigorous upright growth habit.

6,464

**GRAPEVINE VARIETY, VITIS VINIFERA, PRODUCING SEEDLESS GRAPES WITH A LONG SHELF-LIFE, NAMED KING HUSAINY**

Mordechai Karniel, Zichron Yaacov, Israel, assignor to Zan-zivival-Ferrara S.r.l., Fossanova San Marco, Italy  
Filed Sep. 22, 1986, Ser. No. 910,144  
Int. Cl.<sup>4</sup> A01H 5/03

U.S. Cl. Plt.—47

1 Claim

1. A new and distinct asexually reproduced grapevine variety, extremely vigorous and highly productive, characterized by very large, green-yellow colored, seedless berries with a long shelf-life, few falling berries and not requiring thinning, substantially as illustrated and described.

6,465

**CHRYSANTHEMUM GOLDEN REFLA**

Martinus van der Jagt, Ter Aar, Netherlands, assignor to Chrysanthemum Breeders Association, N.V., Curacao, Netherlands Antilles

Filed Jan. 15, 1987, Ser. No. 3,541

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—74

1 Claim

1. A new and distinct cultivar of Chrysanthemum named Golden Refla, as described and illustrated in the foregoing specification and accompanying drawings.

6,466

**CHRYSANTHEMUM NAMED "WHITE REMEMBER"**

Martinus van der Jagt, Ter Aar, Netherlands, assignor to Chrysanthemum Breeders Association, N.V., Curacao, Netherlands Antilles

Filed Jan. 15, 1987, Ser. No. 3,542

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—74

1 Claim

1. A new and distinct cultivar of Chrysanthemum named White Remember, as described and illustrated in the foregoing specification and accompanying drawings.

6,467

**CHRYSANTHEMUM NAMED RENDU GOLD**

Martinus van der Jagt, Ter Aar, Netherlands, assignor to Chrysanthemum Breeders Association, N.V., Curacao, Netherlands Antilles

Filed Jan. 15, 1987, Ser. No. 3,543

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—78

1 Claim

1. A new and distinct cultivar of Chrysanthemum named Rendu Gold, as described and illustrated in the foregoing specification and accompanying drawings.

6,468

**MINIATURE ROSE PLANT**

Ralph S. Moore, Visalia, Calif., assignor to Sequoia Nursery, Visalia, Calif.

Filed Jan. 27, 1987, Ser. No. 6,782

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—26

1 Claim

1. A new and distinct variety of rose plant of the Floribunda class, of hardy, dwarf, bushy, rounded, much branched habit, substantially as illustrated and described, characterized by buds and flowers of an unusual pink/lavender blend, the bud being pointed and quite slender in the early opening stages, with the open flower being single with 5-7 wavy petals, and further characterized by a plant of compact, vigorous, well rounded shape, with main stems and shoots, moderately thorny, the said plant being easy to propagate from soft wood cuttings and by budding, with an abundance of large semi-glossy to glossy foliage, the flowers usually being borne several together in loose clusters on medium length stems.

**PATENTS**

GRANTED DEC. 13, 1988

**ERRATA**

For CLASS	See PATENT NO.
004-499	4,790,037
005-247	4,790,038
051-360	4,790,121
052-173	4,790,122
057-350	4,790,136
089-035	4,790,231
119-001	4,790,260
119-014	4,790,261
160-370	4,790,591
354-090	4,790,644
350-096	4,790,648
446-486	4,790,714
423-302	4,790,995
560-112	4,791,097
528-076	4,791,156
290-040	4,791,309
364-718	4,791,384
357-022	4,791,396
341-051	4,791,403
341-122	4,791,404
341-158	4,791,405
341-144	4,791,406
341-068	4,791,407
360-132	4,791,484
379-392	4,791,638
370-058	4,791,639
370-058	4,791,640
371-038	4,791,641
371-038	4,791,642
371-040	4,791,643



# PATENTS

GRANTED DECEMBER 13, 1988

## GENERAL AND MECHANICAL

4,790,031

### EYE SHIELD

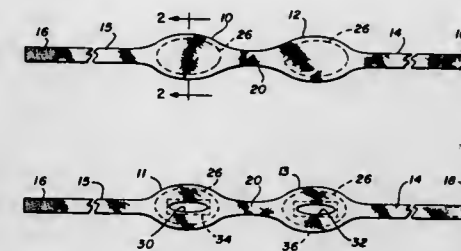
Stormy W. Duerer, 4020 Bobbin La., Dallas, Tex. 75244

Filed Sep. 29, 1986, Ser. No. 912,535

Int. Cl.<sup>4</sup> A61F 9/04

U.S. Cl. 2-15

12 Claims



1. In an eye shield of the type having a mask-like portion with two eye members and a nose bridge integrally formed with and interconnecting said eye members, each of said eye members being configured to conform to an eye socket of the wearer for shielding the eye for a minimum of facial coverage and means attached to the mask-like portion for securing said eye members in place over the eyes, the improvement comprising:

- a. an inner and an outer sheet of soft, light-weight fabric forming said mask-like portion;
- b. a flexible sun blocking material located between and encompassed by said inner and outer sheets of fabric for totally shielding the eyes from visible sun rays and harmful ultraviolet rays,
- c. a relatively thick layer of soft material located between said inner and outer sheets of fabric for providing body to said mask-like portion and comfort to said wearer,
- d. a relatively small sight opening formed in each eye member in each eye shield, and
- e. a semi-opaque lens plate located between said inner and outer sheets of fabric and extending across said eye member openings for blocking harmful ultraviolet rays yet allowing the wearer to see through said lens plate and said eye openings.

4,790,032

### WOMAN'S SLIP WITH V-SHAPED CUTOUTS

Ester D. Girouard, P.O. Box 726, Gantier, Miss. 39553

Continuation of Ser. No. 881,796, Jul. 3, 1986. This application

Sep. 17, 1987, Ser. No. 97,262

Int. Cl.<sup>4</sup> A41B 9/00

U.S. Cl. 2-109

10 Claims



1. In a woman's slip for use under a skirt or dress, which skirt

or dress may or may not be provided with an elongated slit or slits, comprising:

- a main body portion for wearing by a person from the waist downwardly, said main body portion comprising a lowermost circumferential rim portion;
- the improvement comprising: at least one V-shaped cut-out having the wider portion thereof originating coplanar with said lowermost circumferential rim portion; said at least one V-shaped cut-out having an apex thereof spaced from said rim portion toward the waist portion of the undergarment;
- and a pair of substantially triangularly-shaped closure pieces for closing off said at least one V-shaped opening and for exposed said at least one V-shaped opening when it is desired to form same, each of said pair of closure pieces having a side edge thereof formed integrally with a corresponding portion of said main body portion for pivotal movement thereat so that each said closure piece may be alternatively swung outwardly to close off said at least one V-shaped opening and alternatively swung inwardly to expose said at least one V-shaped opening; and
- means for fastening each of said pair of closure pieces in said outwardly-swung position and in said inwardly-swung position.

4,790,033

### COLLAPSIBLE CAP

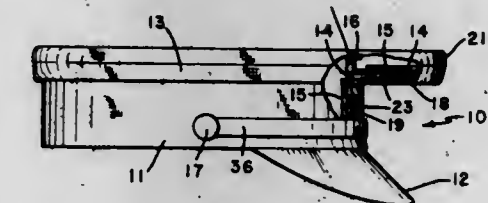
Stephen Goldman, and John Richardson, both of Little Rock, Ark., assignors to Bancroft Cap Company, Framingham, Mass.

Filed Sep. 14, 1987, Ser. No. 96,006

Int. Cl.<sup>4</sup> A42B 1/00, 1/20

U.S. Cl. 2-195

9 Claims



- 1. A collapsible cap having a peak, frame, grommet, visor and cap cover, said cap comprising:
- a means for opening and closing said cap;
- a first plastic material that encapsulates a portion of the lower section of said means, said first material is connected to said frame;
- a second plastic material that encapsulates a portion of the upper section of said means, said second material is connected to a fabric that holds a portion of said grommet so that said cap may be opened when said second material is pushed up and said cap may be closed when said second material is pushed down.

4,790,034

### CAP HAVING A STIFFENER

Harold Pass, 7402 Bexwood Ct., Louisville, Ky. 40222

Filed Aug. 6, 1987, Ser. No. 82,323

Int. Cl.<sup>4</sup> A42B 1/02

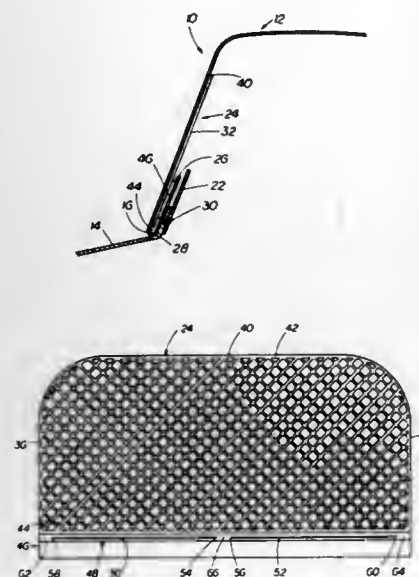
U.S. Cl. 2-195

13 Claims

- 1. A cap comprising:
- (a) a crown; and

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(b) a crown stiffener located to the interior side of the crown to overlay at least a front portion of the crown to be supported from collapsing and biased toward the underlying crown portion, the stiffener is attached to the



crown proximate the crown brim and the stiffener comprises a resilient hinge joint proximate the attachment of the stiffener to the crown brim having a pivot axis generally parallel to the crown brim about which the stiffener is biased toward the underlying crown portion.

4,790,035  
HEADGEAR

Iris Whyte, 22 West Park, Motttingham, London, SE9 4RQ., England

Filed Jul. 27, 1987, Ser. No. 77,738

Claims priority, application United Kingdom, Jul. 25, 1986, 8618164

Int. Cl. A42B 5/00

U.S. Cl. 2—207

2 Claims



1. A pre-fabricated hat comprising an elongate strip of material having terminal ends, a mid-point between the ends having two arms, respective arms extending from said mid-point to a respective distal one of said ends and each arm having first and second edges, at least one of said arms being looped around the other, each arm having at least a portion of either of its ends adjacent its distal end attached to at least a portion of an edge of an arm adjacent the mid-point and at least a portion of either of its edges adjacent its distal end attached to at least a portion of an edge of the other arm adjacent the distal end, the loop

being arranged so that one arm can be pulled through the other arm to alter the "hat size".

4,790,036

# METHOD AND DEVICE FOR THE AUTOMATIC CLEANING OF A TOILET SEAT

Ernst Vogell, Zurich; Jean-Jacques Asper, Croix-de-Rozon; Erwin Zacher, Le Lignon, all of Switzerland, and Erika Schnyder, Im Grubli, FL-9497, Triesenberg, Liechtenstein, assignors to Erika Schnyder, Triesenberg, Liechtenstein

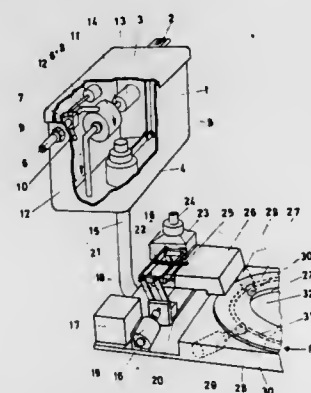
Filed Oct. 7, 1986, Ser. No. 923,445

Claims priority, application Switzerland, Oct. 14, 1985, 04427/85; Oct. 14, 1985, 04446/85

Int. Cl. A47K 13/00

U.S. Cl. 4—233

21 Claims



10. A toilet with an automatically cleanable toilet seat comprising:

- a toilet bowl;
- a flush water cistern;
- a substantially ring-shaped toilet seat, said toilet seat being rotatable in a circumferential direction;
- mounting means for mounting said toilet seat on said toilet bowl for relative rotation therebetween in said circumferential direction;
- a water inlet pipe, connected to said flush water cistern, for supplying water to said flush water cistern;
- first valve means, connected to said water inlet pipe, for controlling the flow of water through said water inlet pipe to maintain a predetermined water level in said flush water cistern;
- lever-actuated second valve means for fluidically connecting said toilet bowl and said flush water cistern and for controlling the flow of water from said flush water cistern to said toilet bowl, said lever-actuated second valve means including a manually actuable lever movable between a valve closed position and a valve open position;
- a slide housing means slidably movable between a neutral position adjacent said toilet seat and an operative position disposed above a segment of said toilet seat, for housing spray means for applying a cleaning liquid to said toilet seat when said slide housing means is in said operative position and drying means for drying said toilet seat after application of said cleaning liquid;
- first motor means, responsive to a power input, for moving said slide housing means between said neutral position and said operative position;
- second motor means, responsive to a power input, for rotating said toilet seat in said circumferential direction, relative to said toilet bowl;
- power supply means, responsive to actuation of said manually actuable lever, for providing power to said first motor means and said second motor means;
- control electronics means, operably connected to said first motor means, said second motor means and said power

supply means, for controlling the distribution of power from said power supply means to said first motor means and said second motor means; whereby upon movement of said manually actuable lever from said valve closed position to said valve open position, said water in said flush water cistern is released into said toilet bowl and said first valve means opens to allow water to flow into said flush water cistern through said water inlet pipe and said power supply means provides power to said control electronics means and said control electronics means causes said first motor means to move said slide housing means from said neutral position into said operative position and said spray means applies said cleaning liquid to said toilet seat, while also causing said second motor means to rotate said toilet seat through at least 360° while said drying means dries said toilet seat after application of said cleaning liquid.

4,790,037

# SWIMMING POOL COVER ASSEMBLY

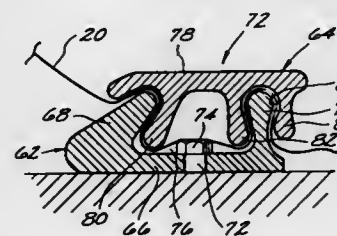
Dwaine Phillips, Oklahoma City, Okla., assignor to Air-Lok Pool Covers, Inc., Oklahoma City, Okla.

Filed May 13, 1987, Ser. No. 49,734

Int. Cl. E04H 3/19

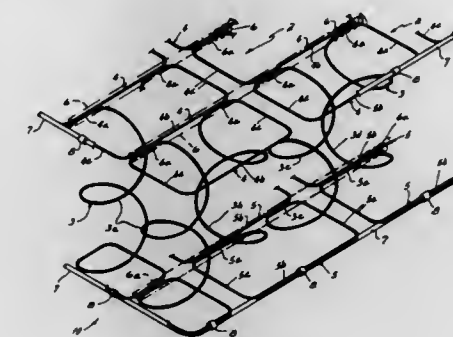
U.S. Cl. 4—499

6 Claims



- 2. A swimming pool cover assembly comprising
  - a. an air impervious cover member adapted to span the pool, the cover member having an inlet opening in one end portion thereof and dimensions greater than the dimensions of the pool;
  - b. anchor means disposed about the perimeter of the pool for securing the cover member over the pool and for forming a substantially air-tight seal with the cover member, the anchor means comprising:
    - (1) a stationary backup element secured to the deck perimeter about the pool, the backup element having a securement plate and a pair of spatially disposed tab engaging members extending from the securement plate and cooperating with the securement plate to form a locking cavity therebetween; and
    - (2) a cover locking element having a cover plate and a pair of spatially disposed locking tabs extending therefrom and angularly disposed in a diverging direction and positionable within the locking cavity for locking engagement with the tab engaging members of the backup element so that when a portion of the cover member is positioned therebetween and the locking element is disposed within the cover locking cavity a substantially fluid-tight seal is formed therebetween, the cover locking element further comprising a third locking tab extending from the cover plate and spatially disposed from one of the locking tabs, the third locking tab and the adjacently disposed locking tab cooperating to define a tab receiving cavity adapted to receive one of the tab engaging members of the backup element; and
  - c. blower means connected to the cover member via the inlet opening for producing a sufficient volume of air to provide a cushion of air between water in the pool and the cover member and to support the cover member in an elevated position relative to the surface of the pool.

4,790,038  
BEDDING SPRING ASSEMBLY  
Minoru Ikeda, Kokubunji, Japan, assignor to Leggett & Platt, Incorporated, Carthage, Mo.  
Filed Aug. 5, 1987, Ser. No. 82,078  
Int. Cl. A47C 23/02  
U.S. Cl. 5—247  
17 Claims



- 1. A bedding mattress comprising a spring assembly having an upper and a lower planar surface, said assembly comprising a plurality of rows of coils, each of said rows being formed from a single, continuous length of wire, and each of said rows containing a plurality of coils interconnected by substantially planar interconnecting segments, alternate ones of said interconnecting segments being disposed in the planes of the upper and lower surfaces of said spring assembly, portions of said interconnecting segments extending beyond the periphery of said coils, the axes of said coils being disposed perpendicular to the upper and lower surfaces of said spring assembly, said interconnecting segments including U-shaped portions having two parallel leg sections connected by a web section, said web section of each U-shaped portion of each row being overlapped relative to a pair of selected portions of interconnecting segments of an adjacent row, helical spring means extending parallel to said rows for the length of said rows, said helical spring means being wound around said overlapped portions so as to secure said rows of coils in an assembled relation, a covering material over at least the top surface of said spring assembly, and an upholstered covering material encasing said spring assembly and said covering material.

4,790,039  
TECHNIQUE FOR SANITIZING TOILET SEATS  
Lane L. Speer, Corpus Christi, Tex., assignor to W. W. Scarborough, Corpus Christi, Tex.  
Filed Nov. 9, 1987, Ser. No. 118,449  
Int. Cl. A47K 13/00  
U.S. Cl. 4—233  
4 Claims

- 1. A toilet having a throw-away plastic curved seat including means affixing the seat to the toilet; and a cover of like configuration on the seat comprising a hollow member having an upper seating surface and capable of transporting a charge of hygienic spray, the hollow member being attached to the seat and providing a lower surface in contact with the seat and an upper spray permeable surface, a source of pressurized



hygienic spray and a conduit interconnecting the source and the hollow member whereby the pressurized hygienic spray is



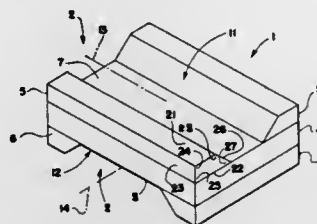
delivered to the upper seating surface of said throw-away cover.

**4,790,040**  
**TRANSPORT CONTAINER FOR VICTIM**  
**CONTAMINATED BY HAZARDOUS MATERIAL**  
William L. Grillot, and Mary I. Grillot, both of 1986 Home Ave., Dayton, Ohio 45417  
Filed Apr. 6, 1987, Ser. No. 34,726  
Int. Cl. A47G 9/08; A61G 1/00  
U.S. Cl. 5-413



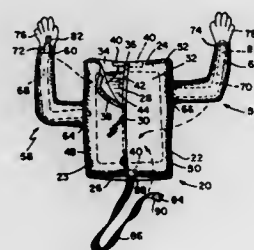
1. A victim transport container for a person who is a victim contaminated by hazardous material or the like comprising:  
a front panel which includes two portions, a slide fastener attached to the two portions and forming a joint for joining and separating the two portions, sealing means extending along the length of the slide fastener to cover the slide fastener and the joint formed thereby, a back panel, a pair of side panels, means attaching the side panels to the back panel and to the front panel, a neck band attached to at least one of the panels, the neck band being adapted to encompass the neck of a victim, the hood section being adapted to cover a major portion of the head of the victim with the face of the victim uncovered, the panels being of a liquid and gas impermeable material which is also impervious and resistant to hazardous materials, means for securing the neck band around the neck of the victim and means for securing the hood section upon the head of the victim, the neck band being integral with the back panel and comprises a folded extension portion of the back panel, the container adapted to cover the body of a victim, with only the face portion of the victim being exposed.

**4,790,041**  
**PILLOW FOR RITUAL CIRCUMCISIONS AND METHOD**  
Kiva Y. Shtull, 4130 Ellison Rd., South Euclid, Ohio 44121  
Filed Nov. 5, 1987, Ser. No. 117,057  
Int. Cl. A47C 27/15  
U.S. Cl. 5-431 13 Claims



1. A pillow for ritual circumcisions, comprising a main support body having a substantially continuous top and a substantially continuous bottom, bottom wall means proximate a pair of opposite edges of the bottom of said main support body for defining therewith a contoured area to fit relatively securely on the lap of a person, and top wall means proximate a pair of opposite edges of the top of said main support body for defining therewith a contoured area to receive and to support a baby therein, and wherein said top wall means and the top of said main support body have an overall length long enough to hold a baby from head to toe, said bottom wall means include elongate strips having a sloping surface to provide a contour with the bottom of said main support body to cooperate with the lap portion of a person to facilitate relatively secure positioning on the lap over the legs of such person, and said bottom wall means and the bottom of said main support body have inverted U-shape cross-section with an axis in one direction, and said top wall means and the top of said main support body have U-shape cross-section.

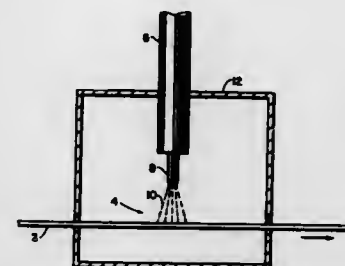
**4,790,042**  
**BABY COMFORTER**  
Beth A. Reich, 620 Horton St., Greenwood, Ind. 46142  
Filed Oct. 5, 1987, Ser. No. 104,221  
Int. Cl. A47C 20/02  
U.S. Cl. 5-437 2 Claims



1. A baby comforter comprising a body portion including means defining a pocket, the body being constructed at least in part from a textile or textile-like material, a crotch strap, and two arms, each of the crotch strap and arms having a proximal end and a distal end, means for attaching the proximal ends of the arms in opposed orientation on the body, means for attaching the proximal end of the crotch strap to the body at a point generally equidistant from the locations at which the proximal ends of the two arms are attached to the body, and means for selectively joining the distal ends of the two arms and the distal end of the crotch strap, the joining means provided adjacent the remote ends of the arms and crotch strap, the arms comprising textile or textile-like material covers and selectively formable cores formed by deformable rods within the covers,

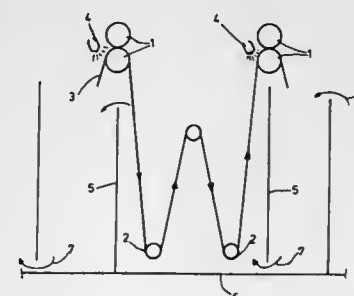
the cores being formable to accommodate babies of different sizes.

**4,790,043**  
**PROCESS AND APPARATUS FOR APPLYING A**  
**CHEMICAL TO A TEXTILE SUBSTRATE**  
Joseph S. Chappell, Dalton, Ga., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.  
Continuation of Ser. No. 620,341, Jun. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 536,761, Sep. 27, 1983, abandoned. This application Jan. 21, 1987, Ser. No. 8,131  
Int. Cl. D06B 5/02  
U.S. Cl. 8-151 11 Claims



9. A continuous process for applying and simultaneously fixing a trichromatic acid dye mixture to a natural or synthetic polyamide carpet, said process comprising:  
heating a liquid formulation containing said trichromatic dye mixture to a temperature just below the boiling point thereof;  
continuously moving said polyamide carpet past an application position; and  
at said application position directly spraying said heated liquid dye formulation in the absence of a gaseous carrier toward said polyamide carpet, thus driving said heated liquid dye formulation into said polyamide carpet at a temperature sufficient to achieve substantially instantaneous fixation of said dye.

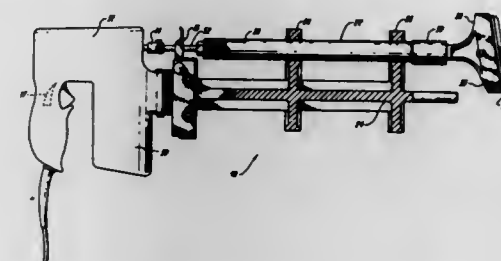
**4,790,044**  
**PROCESS FOR THE PURIFICATION OF PRODUCTS OF**  
**REGENERATED CELLULOSE**  
Hans-Gert Kirchner, Bomlitz, and Bernd Wahle, Kaarst, both of Fed. Rep. of Germany, assignors to Wolff Walsrode AG, Walsrode, Fed. Rep. of Germany  
Filed Oct. 9, 1986, Ser. No. 916,776  
Claims priority, application Fed. Rep. of Germany, Oct. 12, 1985, 3536537  
Int. Cl. D06B 3/12  
U.S. Cl. 8-151 1 Claim



1. A process for the purification of films of salt-containing regenerated cellulose, comprising passing the film through at least one washing cycle wherein the film is sprayed with water, squeezing the film, passing the film about deflection elements

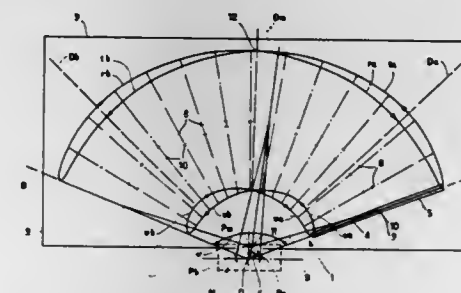
immersed in countercurrently-flowing wash water so as to wash the film, again spraying with water and again squeezing the film, the squeezing linear pressure ranging from about 100 to 500N per cm and the residence time immersed in the countercurrently-flowing wash water being less than about 10 seconds.

**4,790,045**  
**POWER WALLPAPER REMOVAL ADAPTER FOR**  
**JIGSAWS**  
John P. Doherty, 49 Soley St., Charlestown, Mass. 02129  
Filed Feb. 22, 1988, Ser. No. 158,571  
Int. Cl. A47L 11/12, 13/08  
U.S. Cl. 15-236.01 8 Claims



1. A power wallpaper removal adapter for a jigsaw, comprising:  
an extension having a foot;  
means for clamping the foot to a jigsaw so that the extension is rigidly attached thereto without tilting off the axis of elongation thereof;  
an elongated post having a blade end and an end remote from the blade end;  
means for mounting the elongated post to the extension for reciprocating motion with respect to the extension; and  
means for fastening the end of the post remote from the blade end to a chuck of a jigsaw so that the post is moved reciprocally with the reciprocating motion of the chuck of the jigsaw.

**4,790,046**  
**WINDSHIELD WIPER DEVICE WITH A**  
**NON-CIRCULAR SWEEPING MOTION**  
Jean-Pierre E. Emstache, Antony, France, assignor to Equipements Automobiles Marchal, Issy-Les-Moulineaux, France  
Filed Jan. 3, 1986, Ser. No. 816,057  
Claims priority, application France, Jan. 4, 1985, 85 00069  
Int. Cl. B60S 1/24 10 Claims



1. In a windshield wiper device with a non-circular sweeping motion, for vehicles, comprising a blade which has a composite motion comprising an alternating oscillation about an axis of rotation combined with a movement of translation, such

that the windshield wiper blade describes a first path during an outward movement stage of the oscillation from a first angular end position to a second angular end position, and a second path, which differs from the first path, during a return movement stage thereof from the second end position to the first end position, the improvement comprising, a drive mechanism for causing the longitudinal ends of the windshield wiper blade and the windshield wiper blade between said ends to describe paths having the shape of a curved and flattened figure 8 whose concave area faces the axis of rotation, with the point of intersection of the lobes of the flattened 8 being disposed substantially in the axis of the vehicle, and the ends of the lobes being substantially tangential to the angular end positions of the windshield wiper blade, and wherein said drive mechanism comprises, a main windshield wiper arm which carries, at a location remote from the axis of rotation, a rocker arm articulated on the main arm for movement about a first transverse axis which is substantially parallel to the surface to be cleaned, said windshield wiper blade being articulated to said rocker arm for movement about a second transverse axis substantially parallel to said first transverse axis, an auxiliary arm articulated on the rocker arm, generally between said two transverse axes, said auxiliary arm controlling the rocker arm movements to cause a displacement of the windshield wiper blade in a direction substantially parallel to its longitudinal direction, in which the movements of the main arm and the auxiliary arm are angularly offset such that, in the two angular end positions of the main arm and in the median position of this arm, the two articulations of the auxiliary arm and the main arm occupy a relative median position in the longitudinal direction of the main arm, whereas these two articulations move, during the outward stage, through a relative end position for a position of the main arm disposed between the first angular end position of the main arm and its substantially median position, and during the return stage from said second end position, the articulations pass through the relative end position for a position of the main arm disposed between the second angular end position of the main arm and its substantially median position.

**4,790,047**  
**HINGE BUSHING ADJUSTMENT MEANS FOR A HINGE ASSEMBLY**

Robert J. Myslicki, Sterling Heights, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Filed Apr. 4, 1988, Ser. No. 176,959  
Int. Cl.<sup>4</sup> E05D 7/12

U.S. Cl. 16—386

5 Claims

1. A hinge assembly for use in hingedly attaching a movable closure to a vehicle body comprising a male hinge member which is adapted to be secured to one of said closure and vehicle body,

said male hinge member including an integral ferrule having an opening therethrough and which is located intermediate its opposite sides,

a female hinge member which is adapted to be secured to the other of said closure and vehicle body,

said female hinge member including a pair of spaced ears having aligned openings therethrough,

said ears straddling said ferrule and with the opening in the latter being aligned with the openings in said ears,

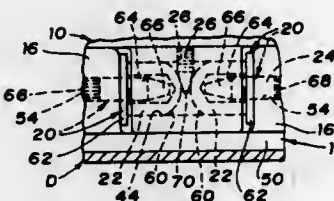
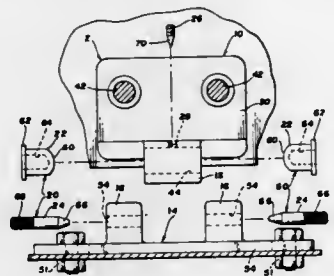
and connecting means including hinge pin means for pivotally connecting said male and female hinge members together for relative pivotal movement, the improvement being that

said connecting means comprising first and second bushings which are slidably received within opposite end portions of the opening in said ferrule, said bushings at one end having flanges for engaging the adjacent end of the ferrule and at their adjacently located ends being rounded,

first and second hinge pins which extend through said ears and into said first and second bushings to connect the hinge members together,

and adjustment means for accommodating fabricating toler-

ances in said hinge members and to prevent rattling therebetween, said adjustment means comprising an adjustment screw threadably received in a threaded opening in said ferrule between said first and second hinge bushings,

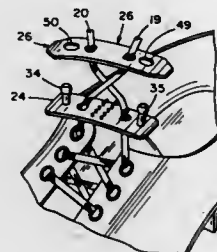


said screw having a tapered bushing engaging end which engages and forces the bushings outward until the flanges thereof engage the ears on the female hinge member when the screw is rotated in a tightening direction and with the friction between the screw and the bushing being less than the friction between the screw threads whereby the screw will not back out during operation of the vehicle.

**4,790,048**  
**SHOELACE LOCK**  
Sharon M. Arnt, 779 Stearns Rd., Bartlett, Ill. 60103  
Filed Nov. 5, 1987, Ser. No. 116,979  
Int. Cl.<sup>4</sup> A43C 7/00

U.S. Cl. 24—117

11 Claims

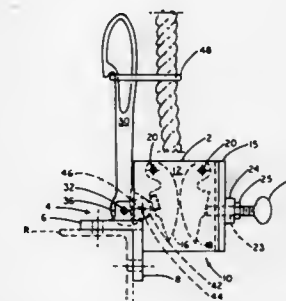


11. A shoelace lock for threaded shoelaces terminating with a pair of lace end portions extending from spaced shoe eyelets, comprising; a bottom member having spaced openings therein adapted to receive the lace end portions, a top member over the bottom member having means therein for holding the lace end portions in a spaced, condition, a gripping means in at least one of the top and bottom members for gripping the laces as they cross when the top member is rotated 180 degrees with respect to the bottom member with the lace end portions therethrough, and snap lock means for attaching the top and bottom members together after the top member is rotated 180

degrees with respect to the bottom member including widely spaced posts on one of said members and cooperating slightly interfering apertures in the other of said members, the means for gripping the laces when crossed including downward projection means on the top member and cooperating upward projection means on the bottom member, the top member being somewhat flexible and constructed to bend as the top member is snap locked to the bottom member, said gripping projection means each including a plurality of aligned small projections.

**4,790,049**  
**ROPE LOCKING DEVICE**  
Jack F. Grosh, 2117 Sunnybank Dr., La Canada, Calif. 91011  
Filed Apr. 20, 1987, Ser. No. 40,062  
Int. Cl.<sup>4</sup> F16G 11/00  
U.S. Cl. 24—132 WL

4 Claims



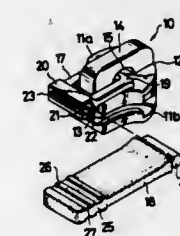
1. In a rope locking device having a housing, a pair of opposed dogs pivotally mounted on said housing between which the rope is to be clamped and a handle pivotally mounted on said housing, said handle having an engagement portion for moving one of said dogs into engagement with the rope to be clamped, the improvement comprising an elastomeric insert on the surface of the locking dog to be engaged by said handle portion and a rotatable roller on said handle engagement portion engageable in over center locking arrangement with said elastomeric insert such that in a locking position of said handle, said elastomeric insert is compressed by said roller and movement of said handle from said locking position toward an unlocking position first causes said roller to further compress said elastomeric insert before relieving said compression as said handle moves to the unlocking position.

**4,790,050**  
**PULL TAB FOR SLIDE FASTENER SLIDER**  
Susumu Ishii, Kurobe, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan  
Filed Mar. 28, 1988, Ser. No. 174,439  
Claims priority, application Japan, Apr. 13, 1987, 62-54658[U]

U.S. Cl. 24—429

Int. Cl.<sup>4</sup> A44B 19/30

6 Claims



1. A pull tab for a slide fastener slider which comprises a first member made of a metal or hard plastics material and pivotally

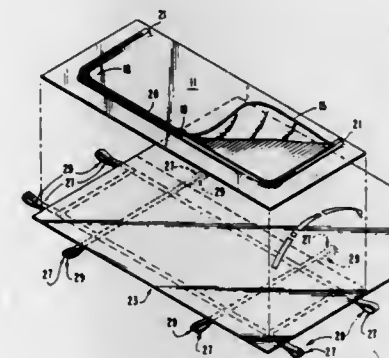
connected to the slider and a second member made of a soft, resilient material, said first member having a socket and said second member having a plug engageable with said socket, said socket having a cross-sectionally generally U-shaped transverse cavity with one end open and the other end closed adapted to receive a complementarily shaped plug.

**4,790,051**  
**ODOR-PROOF DISASTER POUCH**  
Robert L. Knight, 4959 Platt Springs Rd., West Columbia, S.C. 29169

Filed Aug. 31, 1987, Ser. No. 91,450  
Int. Cl.<sup>4</sup> A61G 1/00

U.S. Cl. 27—28

7 Claims



1. A pouch, for transporting and storing a dead human body or bodies, comprising:  
an outer envelope having an openable primary panel on one side of said outer envelope, and  
an outer sealing means to secure temporarily the closure of said primary panel of said outer envelope, and  
an inner liner within said outer envelope whose outer edges are sealed to the outer edges of said outer envelope, which inner liner has an openable secondary panel on the same side of said pouch as the said openable primary panel, and  
an inner sealing means to secure temporarily the closure of said secondary panel of said inner liner, and  
reinforcement means underlaying and attached to the underside of said outer envelope for supporting said pouch, and  
grippable means attached to said outer envelope for lifting and carrying said pouch.

**4,790,052**  
**PROCESS FOR MANUFACTURING HOMOGENEOUSLY NEEDED THREE-DIMENSIONAL STRUCTURES OF FIBROUS MATERIAL**

Pierre Olry, Bordeaux, France, assignor to Societe Europeenne De Propulsion, Suresnes, France  
Continuation-in-part of Ser. No. 685,056, Dec. 20, 1984, Pat. No. 4,621,662. This application Jun. 23, 1986, Ser. No. 877,254  
Claims priority, application France, Jun. 27, 1985, 85 09820; Jun. 27, 1985, 85 09821

Int. Cl.<sup>4</sup> D04H 1/46, 3/10, 5/02

U.S. Cl. 28—110

13 Claims

1. A process for manufacturing homogeneously needed three-dimensional structures of fibrous material to be used as reinforcing structures in composite materials, said process comprising the steps of:

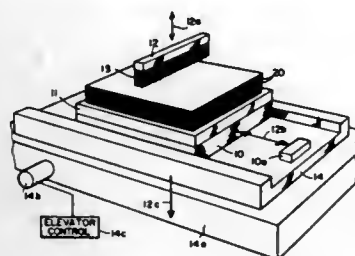
superposing on a support layer after layer of fibrous material in sheet form;

individually needling each layer with a substantially same and constant needling density per unit of surface by thrusting needling needles through said layer and to a predetermined depth below said layer;

increasing the distance between the support and the needles

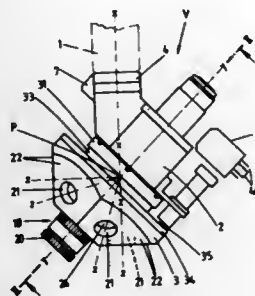


by a value substantially equal to the thickness of a needed layer each time a new layer is superposed so as to keep said depth at a substantially constant value with each newly superposed layer; and  
after a final layer has been superposed and needled, carrying out additional finishing needling steps with the distance



between the support and the needles being increased after each finishing needling step during which the structure is once needled over the whole outer surface of the final layer so as to have a needling density in the last superposed layers substantially equal to the inside the other layers, whereby a substantially uniform needling density is achieved through the structure.

**4,790,053**  
**DEVICE FOR COUPLING AN ASSEMBLY TOOL, SUCH AS GRIPPER OR SIMILAR**  
Helax Godbecker, Wustbach, Fed. Rep. of Germany, assignor to Sad Finanz S.A., Luxembourg, Luxembourg  
Filed Feb. 20, 1987, Ser. No. 17,158  
Claims priority, application Fed. Rep. of Germany, Feb. 21, 1986, 3605590; Feb. 10, 1987, 3703993  
Int. Cl.<sup>4</sup> B23B 39/20  
U.S. Cl. 29-42 12 Claims



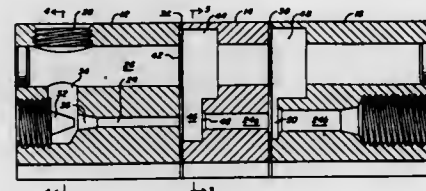
1. A device for mounting an assembly tool to the end of a robot arm, said device comprising:  
a turret head;  
a turret head support member, said turret head support member including a socket for receiving said end of said robot arm;  
means rotatably supporting said turret from said turret head support member for rotation about an axis extending at an acute angle relative to said robot arm;  
a setting motor for rotating said turret head;  
locking means for locking said turret head in any of several positions relative to said turret head support member;  
said turret head further comprising a plurality of openings for receiving a plurality of assembly tools;  
one of said assembly tools being disposed in an operative position coaxial with the axis of said robot arm when said turret head is locked to said turret head support member;  
said turret head having an enlarged central chamber;

two push rods mounted on said turret support member and extending into said chamber;  
said push rods being disposed on axes angulated with respect to one another and converging adjacent to an assembly tool mounted disposed in said operative position;  
and fluid pressure means for selectively actuating said rods.

**4,790,054**  
**MULTI-STAGE VENTURI EJECTOR AND METHOD OF MANUFACTURE THEREOF**

William O. Nichols, 14 Rowland St., Marblehead, Mass. 01945  
Division of Ser. No. 754,168, Jul. 12, 1985. This application Aug. 6, 1986, Ser. No. 894,480  
Int. Cl.<sup>4</sup> B23P 13/00

U.S. Cl. 29-156.7 R 7 Claims



1. A method of manufacturing a multi-stage venturi ejector assembly, comprising  
extruding an elongated body having first and second spaced axially extending apertures,  
forming venturi ejector body segments by cutting said elongated body transversely, each body segment having a front end and a rear end,  
forming a venturi cavity in each of said body segments at the front end of the first aperture of each body,  
forming a fluid flow passage connecting the venturi cavity of a body segment to the second aperture of the body segment, and  
assembling said body segments end to end with the front end of each segment after the front segment being positioned at the rear end of the segment in front thereof,  
whereby said segment apertures form first and second fluid flow passages in the assembly, and whereby fluid exiting the first aperture of each body segment except the rear body segment discharges through a venturi cavity into the first aperture of the body segment to the rear thereof.

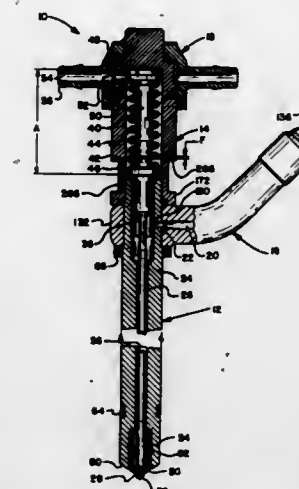
**4,790,055**  
**METHOD OF ASSEMBLING A FUEL NOZZLE ASSEMBLY**

Robert Ranfelsen, Simsbury; David A. Chance, Canton Center, and Leon P. Janik, Suffield, all of Conn., assignors to Stannadyne, Inc., Windsor, Conn.  
Filed Jan. 15, 1987, Ser. No. 61,711  
Int. Cl.<sup>4</sup> B21K 1/20; B23P 13/00

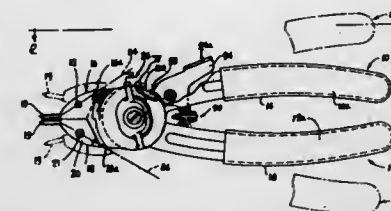
U.S. Cl. 29-156.7 R 11 Claims

1. A method for securing a fuel inlet stud transversely to a substantially cylindrical fuel injection nozzle body, the nozzle body having a portion containing an axially extending valve chamber, comprising the steps of:  
selecting a stud having a substantially annular ring portion and a delivery tube portion extending rigidly radially outwardly from the ring portion, the ring portion having an inner diameter at ambient temperature that is smaller than the outer diameter of said nozzle body portion and the tube portion having a longitudinal blind passage of a first diameter extending inwardly from the outer end thereof opposite the ring portion to the ring portion;  
heating the ring portion to expand the inner diameter thereof to a dimension greater than the outer diameter of said body portion;  
positioning the ring portion over said body portion;

cooling the ring portion to form a rigid shrink-fit annular connection with said body portion;



**4,790,056**  
**RETAINING RING TOOL**  
J. Edward C. Anderson, Moreland Hills, Ohio, assignor to Milbar Corporation, Chagrin Falls, Ohio  
Continuation of Ser. No. 669,672, Nov. 8, 1984, Pat. No. 4,625,379. This application Jul. 14, 1986, Ser. No. 885,473  
The portion of the term of this patent subsequent to Dec. 2, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> B23P 19/04  
U.S. Cl. 29-229 6 Claims

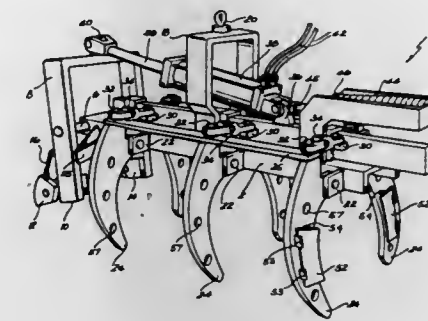


1. Apparatus for manipulating resilient retaining rings or the like, comprising:  
(a) a pair of handles operatively connected to a pair of movable jaw members;  
(b) a pair of ring engaging tips each associated with a different one of said jaw members;  
(c) a pair of clamping plate members each secured to an associated jaw member, each plate member including a portion overlying a portion of the associated jaw member;  
(d) a first of the associated members of each associated pair including tip surfaces for engaging complementary surfaces of said associated tip;  
(e) at least one member of each pair of associated members including a projection for engaging the other member of the associated pair at a location remote from an outward end of said tip surface; and  
(f) each of said clamping plate members including an aperture by which said clamping plate is secured to its associated jaw member by a fastener, said aperture being located such that an imaginary line extending between said projection and said aperture intersects the outward end of an associated tip surface.

**4,790,057**  
**PIPE MANIPULATOR**

James B. Baker, 25 Lachlan St., Cowra, NSW, Australia 2794  
Filed Feb. 12, 1987, Ser. No. 13,854  
Int. Cl.<sup>4</sup> B23P 19/04

U.S. Cl. 29-237 9 Claims



1. A pipe manipulator for detaching a first pipe from one of a coupling and a second pipe, the coupling and the second pipe being connected together at a joint, the pipe manipulator being placed on said first pipe adjacent said joint, the pipe manipulator comprising:  
a longitudinal frame;  
a slide constrained by said frame to move in a longitudinal direction;  
a pipe gripper attached to said frame and adapted to grip said first pipe;  
said gripper being movable between an open and a closed position;  
a disengager adapted to engage said one of said coupling and said second pipe and being movable with respect to said frame;  
a connector connecting said slide to said gripper, whereby movement of said slide opens and closes said gripper;  
elongated telescoping means connected at one end thereof to said disengager and at the other end thereof to said slide, whereby said telescoping means moves between first, second and third positions, causing movement of at least one of said slide and said disengager;  
a first stop for limiting said movement of said disengager; biasing means for biasing said slide to said first position such that said telescoping means has a first length, said disengager being adjacent to said first stop, said gripper being in a closed position, and wherein the length of said telescoping means is changed from said first length to a second length such that said disengager is urged against said stop and said slide is urged against said biasing means to a second position, thereby opening said gripper such that said manipulator is adapted to be placed on said first pipe; and  
a third length intermediate said first and second lengths such that said slide is in said third position when said gripper initially grips said first pipe, and  
said disengager engaging said one of said second pipe and said coupling as said telescoping means moves from said third position toward said first position, thereby separating said first pipe from said one of said second pipe and said coupling, said slide being simultaneously urged to move in a direction increasing the grip of said pipe gripper on said first pipe.

# 4,790,058 CLAMP

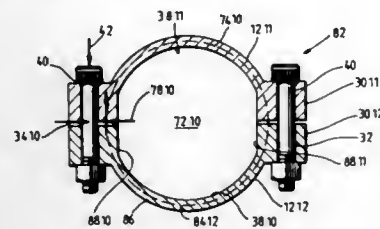
Jack F. Miller, Houston, Tex., assignor to International Clamp Company, Houston, Tex.

Filed Mar. 14, 1986, Ser. No. 840,329

Int. Cl.<sup>4</sup> B23Q 17/00

U.S. Cl. 29—407

1 Claim



1. A process for providing a pipe clamp having an optimized weight, the pipe clamp having a pair of complementary clamping members to the clamped together to complete the clamp, the process comprising the steps of:

A. designing a pipe clamp having

a clamp wall which radially defines a wall tensile load center line around a central point; and laterally spaced bolting flanges, each flange defining a bolt force center line at a selected offset distance from the wall center line;

wherein the clamp so designed meets at least a minimal acceptable criteria for clamp wall thickness, clamp body bending stress and bolt bending stress; clamp body bending stress and bolt bending stress;

B. optimizing the offset distance to provide a minimized clamp weight, by a process which includes the steps of

(a) selecting an offset distance of approximately zero;

(b) calculating the physical dimensions of a clamp having the selected offset distance, the clamp meeting at least minimum acceptable criteria for clamp wall thickness, clamp body bending stress and bolt bending stress;

(c) determining the weight of a clamp having the calculated physical dimensions;

(d) incrementally increasing the selected offset distance;

(e) calculating the physical dimensions of a clamp having the incrementally increased offset distance, the clamp meeting at least a minimum acceptable criteria for clamp wall thickness, clamp body bending stress and bolt bending stress;

(f) determining the weight of a clamp having the physical dimensions calculated in step (e);

(g) testing to determine if the weight of the clamp having the incrementally increased offset distance is less than the weight of a clamp having the previous offset increment;

(h) repeating steps (d) through (g) until a clamp having the desired minimized weight is obtained; and

C. forming the designed clamp having the optimized offset distance.

# 4,790,059

## CARPET LAYING TOOL AND METHOD OF USE

Ronald E. Killpack, 216 N 1160 E, Springville, Utah 84663

Filed Jan. 12, 1988, Ser. No. 143,075

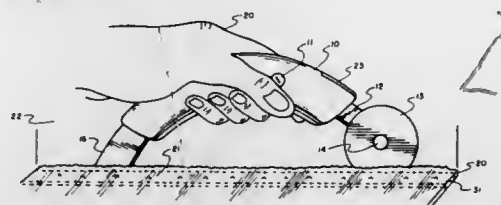
Int. Cl.<sup>4</sup> B23P 11/02

U.S. Cl. 29—451

6 Claims

1. A double action carpet laying tool for use in tucking down the edge of a carpet over a tacking strip when the carpet is laid to the edge of a wall, said tool comprising a curved handle with the center portion being adapted to being grasp by a human hand and permitting the fingers of the hand to fit around and under the handle, and the front and rear terminal end portions of said handle being curved downward, the front terminal end of said handle being attached to a moveable

tucker wheel member which wheel is free to rotate when the hand presses the handle downward and is adapted to fitting in the groove between the edge of the carpet and the wall to turn the edge of the carpet downward over the tacking strip, and the rear terminal end of said handle fixedly attached to a short flat tucking blade member which blade is also adapted to fitting in the groove between the edge of the carpet and the wall to insure that the edge of the carpet remains turned down over the tacking strip.



6. A process for laying carpet which comprises cutting the carpet to the correct size, stretching the carpet tight and placing the edge of the carpet over a tacking strip and then using the carpet laying tool as defined in claim 1 to insure the edge is tucked over the tacking strip by pressing the handle of the tool downward and running the tucker wheel and the tucking blade in the groove between the wall and the tacking strip.

# 4,790,060

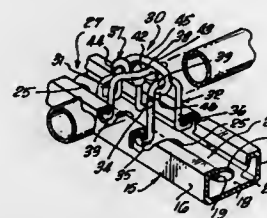
METHOD FOR HOLDING A CONDUIT TO A CHANNEL  
Jerry W. Council, 14456 Dartmoor, Norwalk, Calif. 90650, and Richard C. Kessinger, 13126 Wardman, Apt. 1, Whittier, Calif. 90602

Filed Dec. 7, 1987, Ser. No. 129,465

Int. Cl.<sup>4</sup> F16K 7/00

U.S. Cl. 29—525.1

4 Claims



1. A method for holding a conduit at a right angle against the open edge of an elongated channel member, said elongated channel member being of the type having a base and two legs extending at right angles from its base toward the open edge of the channel and the legs terminating in longitudinal, inwardly and basewardly directed arms, said conduit having first and second sides, said method comprising:

grasping a first conduit holding member, said first conduit holding member having an exterior central portion and having first and second outwardly directed hooks for attachment under the arms of a channel member and said first and second hooks being spaced from one another so that one hook fits under one of the arms and the other hook fits under the other of the arms;

inserting the outwardly directed hooks of said first conduit holding member into the open edge of said channel member so that the outwardly directed hooks fit around the inwardly and basewardly directed arms of the channel; positioning said first conduit holding member adjacent a first side of said conduit;

grasping a second conduit holding member, said second conduit holding member having an exterior central portion and having first and second outwardly directed hooks

and said first and second hooks being spaced from one another so that one hook fits under one of the arms and the other hook fits under the other of the arms; inserting the outwardly directed hooks of said second conduit holding member into the open edge of said channel member so that the outwardly directed hooks fit around the inwardly and basewardly directed arms of the channel; positioning said second conduit holding member adjacent a second side of said conduit; affixing a clasp member between the exterior central portion of the first conduit holding member and the exterior central portion of the second conduit holding member and over said conduit; and closing said clasp member to tighten the first and second conduit holding members against the conduit and to removably hold said conduit to said elongated channel member.

# 4,790,061

## MACHINING THE ENDS OF LENGTHS OF WIRE AND BAR AND SIMILAR WORKPIECES

Derek W. R. Walker, Four Gates, Hopstone, Claverley, Wolverhampton, England

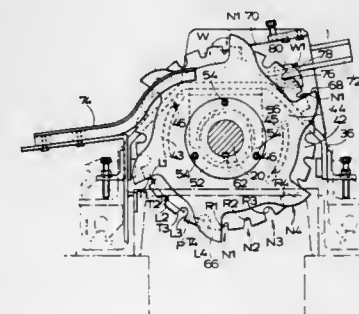
Filed Oct. 23, 1987, Ser. No. 113,137

Claims priority, application United Kingdom, Oct. 24, 1986, 8625498

Int. Cl.<sup>4</sup> B23Q 7/02; B65G 47/00

U.S. Cl. 29—563

10 Claims



1. In apparatus comprising a machining head for the automatic or semi-automatic removal of material from the ends of elongate workpieces such as lengths of wire, bar or tube, workpiece-transporting means comprising feeding means having a workpiece carrier arranged to carry a workpiece from storage and present it in a machining position at which the workpiece is held for one of its two ends to be machined by a tool mounted on the machining head, the carrier comprising a rotatable feeding wheel which has a plurality of peripheral workpiece-receiving notches which are uniformly distributed about the axis of the wheel and a plurality of workpiece-picking fingers which project radially adjacent to the notches for picking workpieces from storage and introducing them singly into the notches as the wheel rotates, and the transporting means comprising also indexing means arranged to cause rotation of the feeding wheel in uniform indexing steps in order to bring workpieces successively to the machining position.

# 4,790,062

## APPARATUS FOR STRIPPING AN ELECTRICAL CONDUCTOR

Shlomo Amir, 106 Machanayim Street, Tel-Aviv, Israel

Filed Mar. 30, 1987, Ser. No. 31,761

Claims priority, application Israel, Apr. 4, 1986, 78420

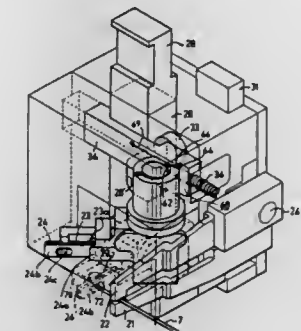
Int. Cl.<sup>4</sup> H01R 43/04

U.S. Cl. 29—564.4

19 Claims

1. Apparatus for stripping the insulation from the end of an electrical conductor, comprising: a pair of clamping jaws for

clamping the electrical conductor therebetween; a pair of cutting blades mounted to one side of the clamping jaws for cutting the insulation while the conductor is clamped by the clamping jaws; a drive for driving said clamping jaws and cutting blades; and displacing means driven by said drive for effecting relative movement between said clamping jaws and



cutting blades in order to strip the cut insulation from the ends of the conductor; said pair of cutting blades being carried by a support pivotally mounted with respect to said, clamping jaws; said displacing means pivoting said cutting blades support away from the clamping jaws to strip the cut insulation from the end of the conductor.

# 4,790,063

## METHOD AND APPARATUS FOR FABRICATING ARMATURE OF FLAT MOTOR

Hiroshi Kawazoe, and Tokuhito Hamane, both of Hirakata, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Nov. 14, 1986, Ser. No. 930,759

Claims priority, application Japan, Nov. 25, 1985, 60-264034

Int. Cl.<sup>4</sup> H01R 43/06

U.S. Cl. 29—597

5 Claims

1. A method of fabricating an armature of a flat motor, comprising the steps of:

(a) forming a continuous coil material having a plurality of flat unit coils and a plurality of coupling parts disposed alternately and successively with each other;

(b) receiving and holding said continuous coil material in a holding means;

(c) carrying said continuous coil material in a rotating manner to an armature forming rest;

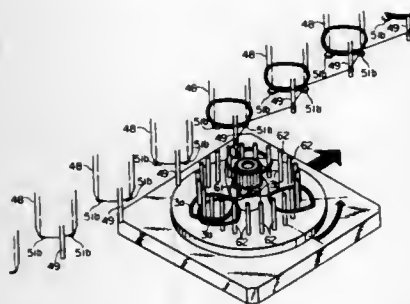
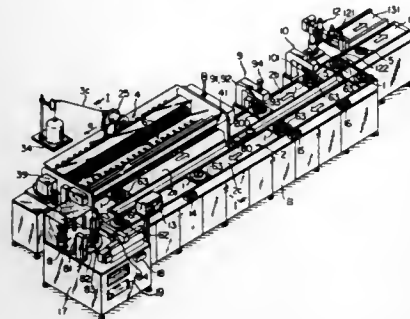
(d) transferring pairs each comprising one of said unit coils and one of said coupling parts onto the armature forming rest successively in accordance with movement and rotation of the armature forming rest;

(e) coupling said coupling parts to a plurality of unit coil receiving parts of a commutator;

(f) mounting said unit coils on a plurality of unit coil positioning parts arranged around the commutator such that said unit coils are overlapped relative to each other and positioned around the commutator, said coupling of said coupling parts and said mounting of said unit coils being performed alternately and in a predetermined positional order;



(g) electrically connecting said coupling parts to said unit coil receiving parts of the commutator; and



(h) coupling said unit coils with each other at each overlapped position thereof.

4,790,064

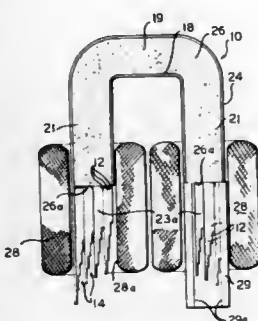
**METHOD OF MANUFACTURING AN AMORPHOUS METAL TRANSFORMER CORE AND COIL ASSEMBLY**  
Donald E. Ballard, Conover, and Willi Klappert, Hickory, both of N.C., assignors to General Electric Company, King of Prussia, Pa.

Division of Ser. No. 804,412, Dec. 4, 1985, Pat. No. 4,734,975.  
This application Jan. 19, 1988, Ser. No. 147,821

Int. Cl.<sup>4</sup> H01F 41/02

U.S. Cl. 29—606

4 Claims



1. A method of manufacturing an amorphous metal core and coil assembly for a transformer comprising the steps of:

A. forming a generally rectangular laminated core having four sides joined at corner regions and surrounding a core window, the core comprising essentially single-turn laminations arranged in superposed relationship and having a series of joints between the ends of said laminations situated in a localized joint region located within one of said sides, each said joint including opposed joint halves, each containing a plurality of said laminations, with radially adjacent joints being staggered, said one side including

between said joint region and corner regions at opposite ends of said one side predetermined side portions that are displaceable to separate said joints and open said core;

B. annealing said core;

C. restraining relative movement of said laminations in a region of said core removed from said joint region;

D. separating said joints by displacing at least one of said predetermined side portions into a position of approximate alignment with the one side interconnected therewith at a corner region, thereby flexing the interconnecting corner region;

E. applying to said one side portion and said interconnected side approximately aligned therewith a splint having a thin wall that at least partially surrounds said one side portion and at least a segment of said interconnected side, thereby holding said one side portion and said interconnected side in approximately aligned relation;

F. inserting said one side portion, said interconnected side, and said splint as a unit into the bore of a preformed coil;

G. sliding said splint off said one side portion and said interconnected side by moving said splint axially of said bore; and

H. displacing said side portions into positions to remake said joints and thereby close said core about said coil with the coil positioned about said interconnected side.

4,790,065

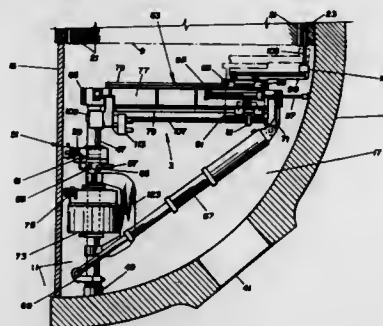
**METHOD FOR SERVICING A STEAM GENERATOR**  
Frank W. Cooper, Jr., and Raymond P. Castner, both of Monroeville, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Division of Ser. No. 164,859, Jul. 1, 1980, Pat. No. 4,347,652, which is a division of Ser. No. 952,431, Oct. 18, 1978, Pat. No. 4,262,402. This application Oct. 15, 1981, Ser. No. 311,712

Int. Cl.<sup>4</sup> B23P 15/26, 19/00

U.S. Cl. 29—723

10 Claims



1. A method of servicing a steam generator having a planar tubesheet provided with an array of holes therethrough and bisected by a divider plate perpendicular thereto including the steps of:

mounting first and second tool arms for rotation about one end thereof in planes parallel to a first face of the tubesheet, one on each side of the divider plate;

controlling the angular positions of said first and second tool arms in the planes parallel to the tubesheet and the positions of carriages movable longitudinally along the first and second tool arms to sequentially align tools carried by the carriages with a plurality of preselected pairs of corresponding holes in the tubesheet, said corresponding holes in each pair being on opposite sides of the divider plate; operating tools carried by said carriages to spot-face said corresponding holes on opposite side of said divider plate to a common plane;

positioning one end of a U-shaped tube into each of said

corresponding holes from the second face of the tubesheet until they project through said first face thereof; operating a tool carried by said first carriage to push a first end of said U-shaped tube into the tubesheet until it is substantially flush with said spot-face and securing it in place; and operating a tool carried by said second carriage to push the second end of said U-shaped tube into the tubesheet until it is substantially flush with said spot-face and securing it in place.

4,790,066

**ELECTRICAL CONNECTOR ASSEMBLY MACHINE**  
Kensaku Sato, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan

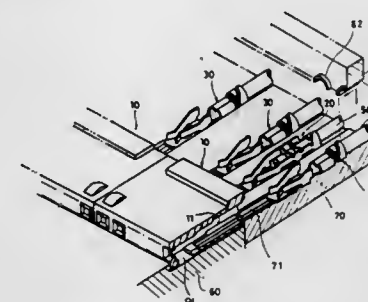
Filed Dec. 4, 1987, Ser. No. 128,922

Claims priority, application Japan, Dec. 5, 1986, 61-186880[U]

Int. Cl.<sup>4</sup> H01R 43/00

U.S. Cl. 29—747

2 Claims



1. An electrical connector assembly machine for loading a plurality of insulating housings each having a plurality of parallel apertures with a plurality of contacts, each having terminated a conductor, which comprises:

a housing support with a crosswise cut-out for receiving said insulating housings slidable along a shoulder of said crosswise cut-out;

a flat table having on its top surface a plurality of parallel channels at equal intervals and in registration with said parallel apertures for receiving said contacts;

an elongated pusher disposed over said table so as to be movable vertically and laterally along said parallel channels and having a plurality of grooves spaced lengthwise at intervals equal to those of said parallel channels for receiving said conductors adjacent said contacts when said pusher is lowered; and

said grooves each having at the front edge a jaw portion for pushing forward a rear edge of said contact when said pusher is moved forward along said parallel channels.

4,790,067

**CONNECTING COAXIAL CABLE TO CONNECTOR**  
Daniel E. Grindle, Santa Paula, Calif., assignor to Teradyne, Inc., Boston, Mass.

Filed Jun. 5, 1987, Ser. No. 58,808

Int. Cl.<sup>4</sup> H01R 43/02

U.S. Cl. 29—748

15 Claims

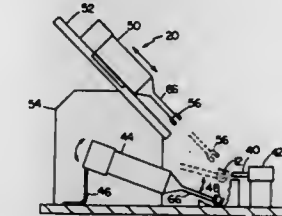
1. Apparatus for connecting a coaxial cable to a first connector having a metal base for connection to a conductive shield of said cable via a solder ring within a heat-shrinkable tube, said apparatus comprising

a first fixture for engaging an end of said coaxial cable and first connector,

a first heater mounted in a predetermined position with respect to said fixture for directing a controlled amount of heat to said solder and heat-shrinkable tube, and

a second heater mounted in a predetermined position with

respect to said fixture for providing controlled heat of different magnitude than that provided by said first heater



to a heat-shrinkable sleeve provided over the heat-shrinkable tube and extending therebeyond along said cable.

4,790,068

**TERMINATION TOOL**

Kensaku Sato, Tokyo, Japan, assignor to Hirose Electric Co., Ltd., Tokyo, Japan

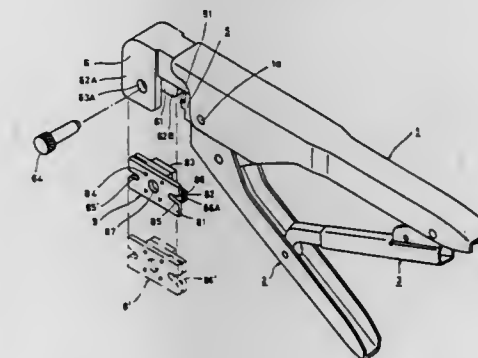
Filed Dec. 4, 1987, Ser. No. 128,902

Claims priority, application Japan, Dec. 5, 1986, 61-288970

Int. Cl.<sup>4</sup> B23P 19/04; B21D 7/06

U.S. Cl. 29—761

2 Claims



1. A termination tool capable of terminating a conductor to either piercing type contact with a pair of piercing walls or crimping type contact with a pair of clamp tabs, which comprises:

a fixed base for supporting either said piercing or crimping type contact, said fixed base including a contact support surface on which a connection section of said piercing or crimping type contact is placed, a receiving recess extending laterally from said contact support surface such that it surrounds a contact section of said piercing or crimping type contact, and an abutment face lying in a plane perpendicular to said contact support surface, against which a front end of said conductor is abutted for accurate positioning of said conductor;

a movable die having a piercing end adapted to terminate said conductor to said piercing type contact and a crimping end adapted to terminate said conductor to said crimping type contact, said piercing end having means to push said conductor into a piercing type contact so that insulation on said conductor is pierced by piercing walls on said piercing type contact and said crimping end having only means to deform tabs on said crimping type contact around a conductor seated in said crimping type contact; and

means connecting said movable die to said tool for allowing selection of either said piercing or crimping end to be used for terminating operation according to said piercing or crimping type contact to be terminated.

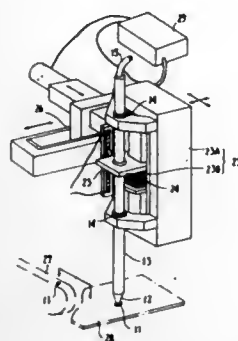
**4,790,069**  
**METHOD AND APPARATUS FOR MOUNTING ELECTRONIC PARTS**

Masahiro Maruyama; Eiji Itomada; Kazuhiro Mori, and Mikio Hasegawa, all of Osaka, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
PCT No. PCT/JP85/00490, § 371 Date Apr. 28, 1986, § 102(e) Date Apr. 28, 1986, PCT Pub. No. WO86/01676, PCT Pub. Date Mar. 13, 1986

PCT Filed Aug. 30, 1985, Ser. No. 862,226  
Claims priority, application Japan, Sep. 6, 1984, 59-186770  
Int. Cl.<sup>4</sup> H05K 13/04

U.S. Cl. 29—832

12 Claims



1. A method for mounting an electronic part on a circuit board, comprising the steps of:

- measuring a distance between (a) the under surface of a part maintaining section for maintaining said electronic part and (b) said circuit board by a distance measuring means attached to said part maintaining section; and
- determining a normal mounting of said electronic part by comparing the measured distance with a thickness of said electronic part measured in advance.

5. An apparatus for mounting an electronic part on a circuit board, comprising:

- a sliding shaft having a part maintaining section at an end thereof;
- a motor for moving said sliding shaft upwardly and downwardly, said motor comprising a position sensor for outputting a position signal for controlling said motor;
- a drive unit for moving said sliding shaft within a horizontal plane;
- distance measuring means for measuring a distance between said circuit board and the under surface of said part maintaining section by calculating a dropping amount of said part maintaining section on the basis of said position signal of said position sensor when said electronic part is mounted on said circuit board; and
- determining means for determining a normal mounting of said part by comparing the measured distance with a thickness of said electronic part measured in advance.

**4,790,070**  
**WIRE CUTTER INCLUDING CLIPPED WIRE RETAINING MEANS**

James H. Olson, 3735 Linda Ln., Racine, Wis. 53405.  
Filed Dec. 19, 1986, Ser. No. 943,506

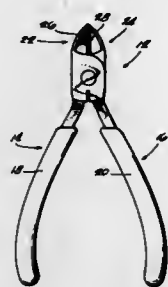
Int. Cl.<sup>4</sup> B25F 3/00

U.S. Cl. 30—134

11 Claims

- 1. A wire cutter comprising
- a pair of pivotally mounted members including handle portions and opposed jaw portions, each having a recessed region including a bottom wall terminating in a cutting portion said cutting portions having edges which mate and said bottom walls defining a pocket when said jaw portions are closed to cut wire; and

means for retaining a small segment of wire as it is clipped from a larger section of wire including elastomeric gripping members disposed in said recessed regions and having closely spaced, opposed inner faces which extend generally perpendicularly to the cutting plane of said cutting edges and cooperate to clamp a clipped segment of wire therebetween when said jaw



portions are closed, each of said gripping members extending over a substantial portion of the respective cutting portion and bonded to the respective bottom wall by an intervening layer of a bonding agent except for a portion adjacent said cutting portion which is completely free to move relative to said cutting portion when a wire is being cut.

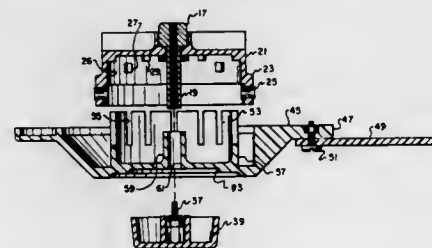
**4,790,071**  
**LINE TRIMMER WITH REPLACEABLE CUTTING BLADE ASSEMBLY**

Michael A. Helmig, Springtown, Tex., and John F. Gander, Cape Town, South Africa, assignors to Trimrite, Inc., Weatherford, Tex.

Filed Jan. 2, 1987, Ser. No. 81  
Int. Cl.<sup>4</sup> B26B 7/00

U.S. Cl. 30—276

6 Claims



1. An apparatus for cutting vegetation, comprising in combination:

- a motor driven shaft;
- a head mounted to the shaft for rotation therewith, the head having a depending wall defining a cavity;
- a plurality of lower drive lugs located in the cavity for rotation with the head, spaced in a circular array surrounding the shaft below and rotationally staggered from the upper drive lugs;
- at least one aperture located in the wall of the head;
- a spool adapted to be removably stored in the cavity, and being wrapped with a flexible line which has a free end adapted to extend through the aperture in the head, the spool being movable between upper and lower positions in engagement with the upper and lower drive lugs, respectively, for coupling the spool with the head for rotation and for feeding out additional line when moving between said upper and lower positions;
- a blade carrier having an upward protruding cylindrical central wall portion and a peripheral rim, the central wall

**4,790,073**  
**GAUGE PIN HOLDER**  
Robert L. DuPlant, 627 N. Citrus Ave., Vista, Calif. 92084  
Filed Dec. 8, 1987, Ser. No. 130,164  
Int. Cl.<sup>4</sup> G01B 3/46

U.S. Cl. 33—178 B

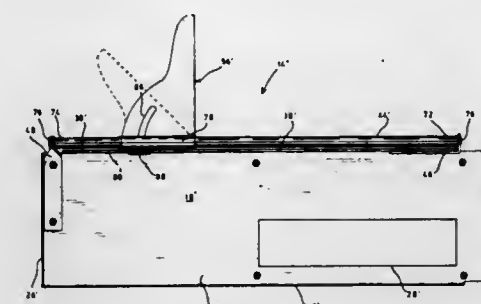
20 Claims



**4,790,072**  
**SAW GUIDE HAVING PIVOTAL PROTRACTOR MEANS**  
Gary L. Edwards, 896 Dunn St., Morristown, Tenn. 37814  
Continuation-in-part of Ser. No. 763,295, Aug. 7, 1985, Pat. No. 4,624,054. This application Nov. 24, 1986, Ser. No. 934,029  
Int. Cl.<sup>4</sup> B27B 9/04

U.S. Cl. 30—376

3 Claims



1. A saw guide for controlling the path/direction of travel, with respect to a selected reference on an object such as a board to be cut, of a rotary or jig saw blade during cutting operations, said saw guide being secured to the base plate of a rotary or jig blade type saw and including:

- a carriage having upper and lower substantially planar surfaces and defining first and further longitudinal edge portions, a forward edge portion and a rearward edge portion, said first and further longitudinal edge portions being sloped upwardly to facilitate sliding movement of said carriage with respect to said object to be cut, said carriage defining an opening for receiving a rotary or jig saw blade there-through, said carriage opening being proportioned for registering with at least a portion of an opening in said base plate of said saw upon mounting said carriage thereon;

rod means mounted on said carriage so as to be disposed proximate and substantially parallel to said first longitudinal edge portion, said rod means defining first and further end portions; and

travel control means for controlling the direction of travel of said saw from a reference defined on said object to be cut, said travel control means including a movable sleeve for being slidably received by said rod means and including protractor means rotatably mounted on said sleeve, said protractor means including means for adjusting the rotational position of said protractor means with respect to a longitudinal axis of said rod, and protractor face plate means which engages said reference from which the direction of travel of said saw is controlled, said first longitudinal edge portion of said carriage being provided with a cut away portion proximate said rearward edge portion of said carriage to provide storage means for enabling pivotal movement of said protractor means from a position below said lower surface of said carriage to a stored location proximate said upper surface of said carriage whereby said cut away portion accommodate said protractor such that the motion of said saw is controlled by said saw guide and said saw can be used in a conventional manner as though said saw guide had been removed.

**4,790,074**  
**APPARATUS FOR TESTING RACK TEETH**  
Roland A. Warr, Bedfordshire, and Rogers, Peter R., Gwent, both of Great Britain, assignors to TRW Cam Gears Ltd., Hertfordshire, United Kingdom  
Filed Feb. 3, 1986, Ser. No. 825,276  
Claims priority, application United Kingdom, Feb. 4, 1985, 8502736

Int. Cl.<sup>4</sup> G01B 5/00

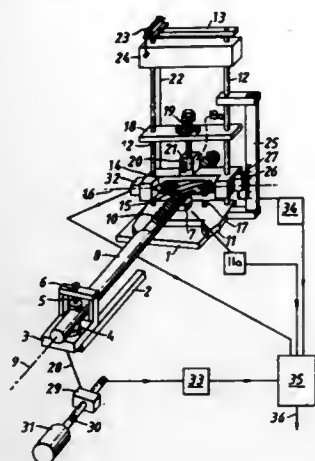
U.S. Cl. 33—199 R

11 Claims

1. Apparatus for testing rack teeth of a rack member for a rack and pinion vehicle steering gear, said apparatus comprising a support for mounting the rack member for longitudinal displacement, a helically toothed test pinion member having an axis, a carriage mounting the test pinion member for rotation about its axis and in driving engagement with the rack teeth, biasing means for applying a biasing force urging the test-pin member into engagement with the rack teeth and for providing a predetermined spacing between the longitudinal axis

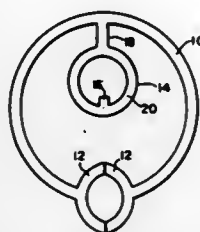


of the rack member and the axis of the test pinion member, means for adjusting the biasing force of the biasing means at said predetermined spacing, drive means for effecting displacement of one of the rack and test pinion members to impart displacement to the other of the rack and test pinion members, first sensing means for sensing the displacement of one of the rack and test pinion members which results from successive and predetermined unit displacement of the other of the rack and test pinion members, second sensing means for sensing a variation from the predetermined spacing between the axes of the rack and pinion members which is caused by said unit



displacements, the first and second sensing means providing respective output signals upon sensing the displacement of one of the rack and test pinion members and the variation from the predetermined spacing between the axes of the rack and test pinion members, respectively, from which output signals characteristics of the rack member under test can be compared with the standard characteristics acceptable for the rack member, the support for mounting the rack member comprising means for supporting the rack member for rolling motion about its longitudinal axis during its driving engagement with the test pinion member.

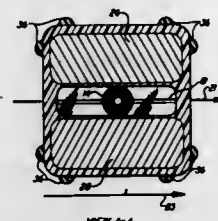
**4,790,075**  
**PORTABLE REMOVABLE GUN SIGHT**  
Alfred R. Howard, Sr., 110 E. Summit Rd., Wilmington, Del. 19804  
Filed Aug. 14, 1987, Ser. No. 85,532  
Int. Cl.<sup>4</sup> F41G 1/10  
U.S. Cl. 33—233 1 Claim



1. An improved gun sight attachment for detachable connection to a shotgun, rifle or other firearm comprising:  
(a) a nearly circular clamping member, made of springable material, with means located at its ends for screwless engagement about the barrel of a firearm; and  
(b) a sighting means connected within said circular member, consisting of an arm connected to the inside of the circumference of said nearly circular clamping member, extend-

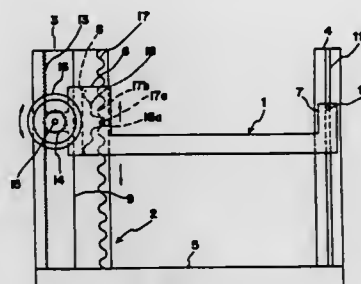
ing down from its midpoint, having a second circle connected to the arm; and  
(c) a sighting structure mounted within said second circle.

**4,790,076**  
**INSTRUMENT RESPONSIVE TO ACCELERATION FORCES**  
Eric M. Adams, 9222 S.W. 5th St. Apt. C, Boca Raton, Fla. 33428  
Filed Nov. 25, 1986, Ser. No. 934,894  
Int. Cl.<sup>4</sup> G01P 15/11  
U.S. Cl. 33—365 5 Claims



1. An instrument responsive to acceleration forces, comprising in combination:  
(a) a body of magnetic material;  
(b) spindle means adapted to support said body of magnetic material  
(c) a supporting structure having an outer perimeter and a cavity therein, said supporting structure also including channel means adapted to cooperate with said spindle means to support said body of magnetic material in said cavity such that said body of magnetic material is selectively movable along predetermined paths defined by said channel means;  
(d) magnetic means affixed to said supporting structure and adapted to produce a magnetic field in said cavity such that the position of said body of magnetic material has a predetermined relationship to said magnetic field and the acceleration forces to which said instrument is subjected such that said body of magnetic material changes positions as said acceleration forces vary.

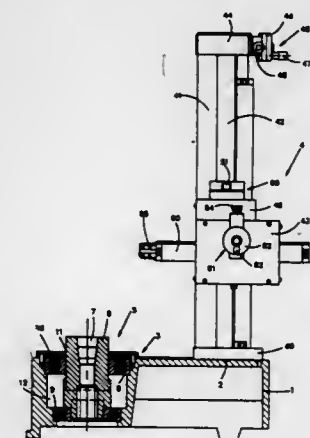
**4,790,077**  
**RULER FOR FIXED-DISTANCE MOVEMENT**  
Hiroshi Tsujioke, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Sep. 25, 1987, Ser. No. 100,823  
Claims priority, application Japan, Sep. 26, 1986, 61-228673  
Int. Cl.<sup>4</sup> B43L 13/02  
U.S. Cl. 33—447 2 Claims



1. A ruler for fixed-distance movement which comprises: ruler section with upward bent portions at each end, with a guide member projecting from the rear side of one of said bent portions, and a guide protrusion provided on the rear side of the other of said bent portions,

base plate having two vertical guide sections, one of said vertical guide sections having a vertical step formed in the center thereof with which said guide member makes slidable contact, the other of said vertical guide sections having a vertical groove formed thereon in which said guide protrusion is slidably mounted such that said ruler section moves at a specified angle with respect to said vertical guide sections,  
a corrugated gear provided along one side of said vertical guide section having said vertical step formed thereon, which gear comprises recesses at uniform intervals, and  
a leaf spring provided on said guide member having a projection thereon for engagement with said recesses of said corrugated gear, whereby movement of said ruler section is intermittently stopped by engagement of said projection of said leaf spring with one of said recesses, thus effecting movement of said ruler section step-by-step over a fixed distance at said specified angle.

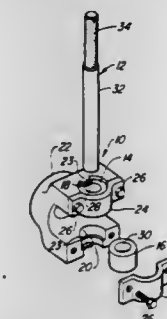
**4,790,078**  
**MEASURING APPARATUS TO DETERMINE THE DIMENSIONS OF AN OBJECT IN THREE DIMENSIONS**  
Rudolf Schneider, Reinach, Switzerland, assignor to Erowa AG, Reinach, Switzerland  
Filed Jan. 28, 1987, Ser. No. 7,465  
Claims priority, application European Pat. Off., Dec. 9, 1986, 86810675.8; Fed. Rep. of Germany, Jan. 2, 1987, 3700053  
Int. Cl.<sup>4</sup> G01B 5/02  
U.S. Cl. 33—503 23 Claims



1. A measuring apparatus to determine the dimensions of an object in three dimensions, the apparatus comprising  
a base plate member;  
object receiving means mounted on said base plate member adapted to rotatably but axially and radially immovably fix an object to be measured;  
a measuring carriage assembly mounted on said base plate member distantly to said object receiving means, said measuring carriage assembly including a guiding column projecting from said base plate member and extending in a first direction, and a measuring carriage slidably mounted on said guiding column to be movable along said guiding column;  
a measuring rail slidably mounted on said measuring carriage to be movable in a second direction perpendicular to said first direction;  
first driving means provided on said guiding column and adapted to drive said measuring carriage to a movement along said guiding column in said first direction, and second driving means provided on said measuring carriage and adapted to drive said guiding rail to a linear movement in said second direction;

measuring calliper means mounted on said measuring rail at one end thereof;  
locking means provided on said measuring carriage and adapted to lock the movement of said measuring carriage along said guiding column to fix said measuring carriage in an arbitrary position on said guiding column;  
said first and second driving means each provided with a rotatable driving member, with a reversing gear assembly coaxially mounted and operatively coupled to said driving member, and with a driven member coaxially mounted and operatively coupled to said reversing gear assembly to drive said driven member to a first speed, said first and second driving means each including auxiliary driving member means engagable with said driving member to directly drive said driven member to a second speed lower than said first speed;  
said measuring calliper means including a measuring calliper with a calliper body and a calliper head mounted on said calliper body and displaceable with regard to said calliper body, said calliper head being connected to said calliper body such that any constant measuring force acting on said calliper head in an arbitrary direction between and including said first and said second directions results in a displacement of said calliper head with regard to said calliper body with identical value and direction, and said measuring calliper means further including position detecting means adapted to display the position of said calliper head with regard to said calliper body.

**4,790,079**  
**UNIVERSAL JOINT ALIGNMENT CHECKING TOOL**  
Richard P. Meyers, Toledo, Ohio, assignor to Dana Corporation, Toledo, Ohio  
Continuation-in-part of Ser. No. 8,890, Jan. 30, 1987, abandoned. This application Nov. 25, 1987, Ser. No. 125,493  
Int. Cl.<sup>4</sup> G01B 5/08  
U.S. Cl. 33—517 6 Claims

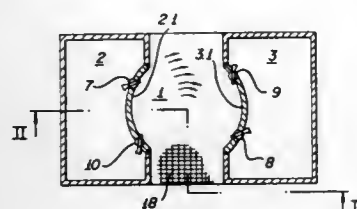


1. A gaging tool for determining if the half round bearing seats establishing the cross holes of a universal joint yoke are in alignment comprising, in combination:  
a pair of gage bushings each having an outside diameter corresponding to the diameter of the cross holes whose alignment is to be checked and a uniform internal gage bore;  
means for removably securing one gage bushing in one cross hole;  
means for removably securing the other gage bushing in the other cross hole; and  
a cylindrical alignment bar having a gaging portion spanning the distance between said cross holes, said gaging portion having an external diameter adapted to be closely received through the internal gage bore in each of said pair of gage bushings, said alignment bar being axially slidably and removably received through said gage bores of each of said pair of gage bushing only when said gage bores are in alignment and otherwise being axially slidable through

only one gage bushing to thereby provide an indication of the alignment or lack of alignment of said cross holes. site from the end at which said element is journaled on said rear spoiler, wherein said cable is adapted to engage said lower

**4,790,080**  
**APPARATUS FOR CLEANING CONTAMINATED SURFACES BY MEANS OF FLOWING AIR**  
Rudiger Detzer, Alten-Buseck, and Dietfried Gersch, Glessen, both of Fed. Rep. of Germany, assignors to Kessler & Luch GmbH, Glessen, Fed. Rep. of Germany  
Filed Feb. 12, 1987, Ser. No. 14,265  
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1986, 3604422

Int. Cl.<sup>4</sup> F24F 9/00  
U.S. Cl. 34—225 15 Claims

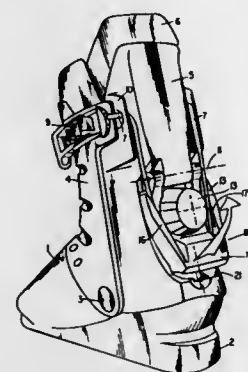


1. Pass-through station for conducting an air flow and for cleaning contaminated surfaces in the station with flowing air, comprising a passageway for conducting an air flow having a substantially circular air flow cross section, a central axis, oppositely disposed segmental side walls and oppositely disposed end surfaces defining a given height of said passageway therebetween, air chambers alongside said passageway having segmental inner walls forming said oppositely disposed segmental side walls, said inner walls of said air chambers having at least one pair of slit-like air outlets formed therein diametrically opposite one another with respect to said central axis and extending over substantially all of said given height, and incoming air chamber connected in common to said air chambers, means disposed in said air chambers for evening out air outflow velocities from said air outlets over substantially all of said given height, and at least one return air pipe coaxial to said substantially circular cross section at least at one of said end surfaces.

**4,790,081**  
**MANIPULATION LEVER FOR CLOSING AND LATCHING OF A REAR-ENTRY SKI BOOT**  
Louis Benolt, Frangy; Bernard Nerrinck, La Balme-De-Sillingy; Joseph Morell, Annecy, and Roland Petrini, Chambéry, all of France, assignors to Salomon S.A., Annecy, France  
Division of Ser. No. 700,302, Feb. 11, 1985, Pat. No. 4,698,920.  
This application May 20, 1987, Ser. No. 51,765  
Claims priority, application France, Feb. 11, 1984, 84 02900; May 18, 1984, 84 08598

Int. Cl.<sup>4</sup> A43C 11/00; A43B 5/04  
U.S. Cl. 36—50 27 Claims

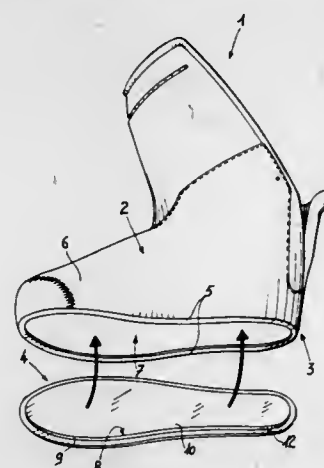
1. A manipulation element for closing and latching a rear spoiler of a boot on a leg of a skier, wherein said boot further comprises a cable attached to said boot and said element, wherein said element is journaled on said rear spoiler, wherein journalling of said element on said rear spoiler tensions said cable, wherein tensioning of said cable closes and latches said rear spoiler on said leg, wherein said element comprises two lateral ribs adapted to engage said cable so as to comprise means for protecting said cable, wherein said element further comprises a lower end portion on an end of said element oppo-



end portion of said element as said cable extends between said two ribs.

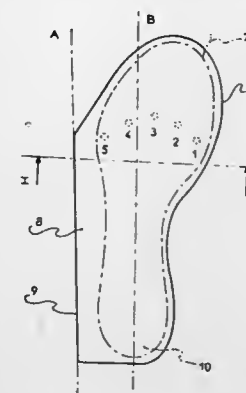
**4,790,082**  
**INNER SHOE FOR SKI BOOTS**  
Adolfo Pozzebon, Sala d'Istrana, Italy, assignor to Nordica S.p.A., Montebelluna TV, Italy  
Filed Jan. 2, 1987, Ser. No. 56,843  
Claims priority, application Italy, Jun. 20, 1986, 82547 A/86  
Int. Cl.<sup>4</sup> A43B 5/04

U.S. Cl. 36—119 9 Claims



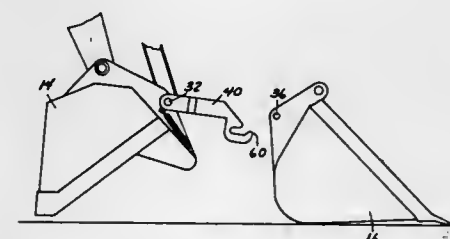
1. An inner shoe for ski boots, comprising:  
an upper having an opening at its lower end;  
a perimeteral border along said opening;  
an inner sole arranged for association with said upper and having a lower surface facing towards the exterior of said upper;  
at least one raised portion formed centrally of said inner sole arranged for insertion into the inner edge of said perimeteral border and with a top surface facing towards the interior of said upper;  
at least one perimeteral tab formed in said inner sole peripherally of said raised portion and having an upper surface facing the inside of said upper;  
wherein said perimeteral border projects towards the inside of said upper to partially occlude said opening; and  
wherein said upper surface of said perimeteral tab is facing and connected to the lower surface of said perimeteral border.

**4,790,083**  
**GOLF SHOE**  
Pierre Dufour, Annecy, France, assignor to Salomon S.A., Metz-Tessy, France  
Filed Nov. 17, 1986, Ser. No. 931,084  
Claims priority, application France, Nov. 22, 1985, 85 17489  
Int. Cl.<sup>4</sup> A43B 5/00  
U.S. Cl. 36—127 30 Claims



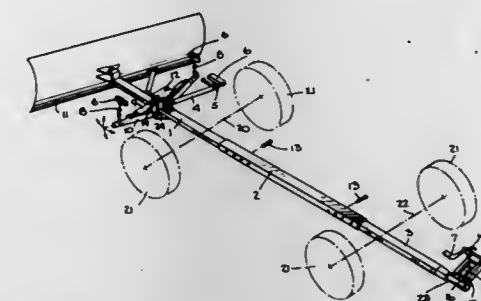
1. A shoe sole for use with a shoe having an insole, said sole having an interior portion and an exterior and having at least one peripheral portion adapted to extend laterally beyond said insole of the shoe to which said sole is to be affixed, said sole having a lower surface, said lower surface of said sole having at least one edge which defines a pivot axis having a generally longitudinal orientation relative to said sole around which the foot of the wearer is adapted to pivot and wherein said peripheral portion comprises a thickened elastic material portion of transverse triangular cross-section, said cross-section increasing from said interior portion towards said exterior of the sole.

**4,790,084**  
**BACKHOE BUCKET TRANSPORT SYSTEM**  
Ronald L. Anderson, Burlington, Iowa, and Donald E. Rieser, Riverside, Ill., assignors to J. I. Case Company, Racine, Wis.  
Filed Mar. 7, 1988, Ser. No. 165,251  
Int. Cl.<sup>4</sup> E02F 3/76  
U.S. Cl. 37—117.5 17 Claims



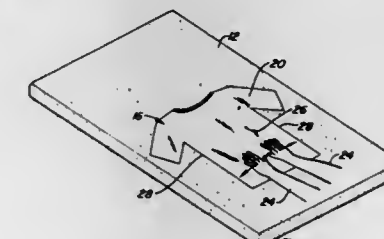
1. In a backhoe bucket transport system of the type including a tractor, a loader bucket attached to the tractor and having bottom and top walls and edges, and a backhoe bucket in the loader bucket, the backhoe bucket having a backhoe-mounting pin, the improvement comprising an engagement member secured to the loader bucket and having an open hook configured to receive the backhoe-mounting pin, the hook positioned adjacent to the top edge to support the backhoe bucket within the loader bucket such that pivoting of the loader bucket allows rotation of the backhoe bucket with respect thereto about the hook.

**4,790,085**  
**THRUST COUPLING FOR A VEHICLE**  
Michael Rossmann, Benerberg, Fed. Rep. of Germany, assignor to Rossmann Research, Phoenix, Ariz.  
Filed May 11, 1987, Ser. No. 48,326  
Claims priority, application Fed. Rep. of Germany, May 27, 1986, 3617708  
Int. Cl.<sup>4</sup> E01H 5/08  
U.S. Cl. 37—231 15 Claims



13. A thrust coupling comprising  
an elongated thrust frame;  
a parallelogram arrangement of links at a rear end of said frame for suspending said frame from a hitching device of a vehicle;  
a block mounted on a front end of said frame;  
a pair of cross arms articulated to opposite sides of said block, each arm being pivotal about a vertical axis relative to said block and being pivotal about a horizontal axis relative to said block;  
a pair of pistons, each piston being connected between said block and a respective cross arm for pivoting said respective cross arm vertically relative to said block;  
means at an end of each cross arm for suspending said cross arms from a vehicle frame; and  
a strut pivotally connected to said block and having a distal end for pivotal connection to the vehicle frame.

**4,790,086**  
**METHOD OF SMOOTHING FABRIC**  
Ann-Britt Bosson, 526 Woodmont Ave., Berkeley, Calif. 94708  
Filed Aug. 21, 1987, Ser. No. 88,164  
Int. Cl.<sup>4</sup> D06F 59/02, 83/00  
U.S. Cl. 38—144 3 Claims



1. A method of smoothing wrinkled fabric without the use of a heated pressing implement comprising:  
stretching furniture grade velour over a board with the velour bristles facing upward away from the board, securing the stretched velour to the board, the velour characterized by a resilient, vertically standing bristle having a uniform bristle height of approximately 1/32" to 1/16";  
providing a substantially dry article to be smoothed;  
laying upon the upwardly, vertically standing bristles the article to be smoothed, the article to be smoothed having a downward facing surface that is in contact with the upwardly facing bristles, an upward facing surface that is



opposite from the downward facing surface, a perimeter, and one or more wrinkles in the upward facing and downward facing surface;  
pressing downwardly into the upward facing surface of the article to be smoothed with at least one of the user's hands; moving the user's hand in a spreading motion while maintaining the downwardly pressing force, the spreading motion consisting of the hand moving from a center position on the upward facing surface of the article, radially towards and to the perimeter of the article;  
serially conveying by the spreading motion wrinkles from center positions on the upward facing surface of the article, radially to and towards extinguishment at the perimeter of the article;  
repeating the serial conveying by the spreading motion of the hand until all wrinkles in the upward facing surface of the article have been serially conveyed to extinguishment at the perimeter of the article;  
removing the article from the bristles in a smoothed wrinkle free condition.

4,790,087

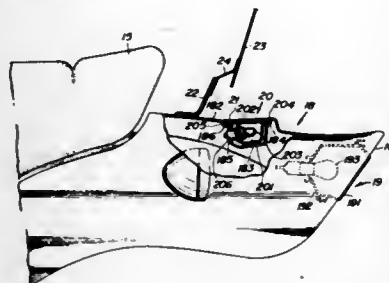
**LICENSE PLATE ASSEMBLY FOR MOTORCYCLES**  
Kenji Hamada, and Masato Iwakura, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 14, 1986, Ser. No. 896,509  
Claims priority, application Japan, Aug. 19, 1985, 60-126190[U]

Int. Cl.<sup>4</sup> G09F 13/02

U.S. Cl. 40—204

3 Claims



1. A license plate assembly on a motorcycle having a front and a rear and including a rear cover and a seat, the assembly comprising:  
a rear light unit disposed at the rear end of said rear cover;  
a license plate having a display surface directed substantially rearwardly of said motorcycle;  
a stay by which said license plate is erected rearward of said seat from said rear cover; and  
an illumination device disposed separately from said rear light unit and embedded into a cavity formed in said rear cover below and rearward of said license plate, said illumination device having a lamp for upwardly emitting a light beam to directly illuminate said display surface.

4,790,088

**PERMANENT PHOTOGRAPHIC MEMORIAL MARKER**  
Artie J. Morvant, Thibodaux, La., assignor to Artico, Inc., Thibodaux, La.

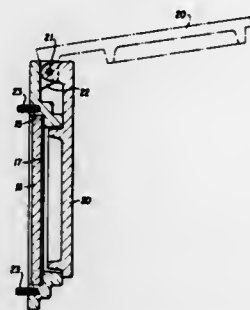
Filed Jun. 22, 1987, Ser. No. 64,705  
Int. Cl.<sup>4</sup> G09F 19/00; E04H 13/00

U.S. Cl. 40—124.5

1 Claim

1. For use with a permanent grave marker, a photograph laminated front and rear with a light stable abrasion resistant film of a transparent abrasion-resistant polyurethane film pre-coated with a long-aging solvent pressure sensitive acrylic adhesive, an aluminum backing plate for said photograph, said laminated picture and said aluminum plate being fused by a

neoprene contact adhesive having plasterizer resistance and containing rubber and vinyl, a molded picture frame having a flat back and a tiered recessed opening complementary to said photograph, and said aluminum backing plate being complementary to said recessed opening in the back of said picture frame and being fused to said laminated photograph by said rubber-vinyl adhesive, means sealing the back of said picture frame and aluminum plate flush to said permanent grave marker with said picture exposed forwardly of said marker in place in said frame with a silicone rubber adhesive sealant



rubber caulk anchoring means having a rubber adhesive sealant for said frame and picture entering the rear of said picture frame and covering the entire rear surface of the picture frame and backing plate flush therewith in a water sealed condition, a hinged gravity closing cover connected to said frame to selectively cover the laminated picture to shield it from ultraviolet light when not being viewed by an observer, and the rear of said frame spaced from the sealed recessed area having a plurality of openings spaced from the picture area, and mechanical attaching means for securing said frame to said grave marker.

4,790,089

**PICTURE FRAME**

Pietro Astolfi, Bologna, Italy, assignor to Pico-Glass S.p.A., Italy

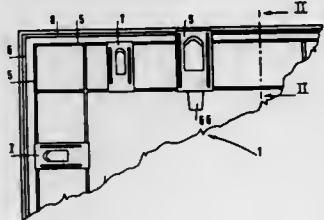
Filed Oct. 30, 1986, Ser. No. 925,365

Claims priority, application Italy, Oct. 31, 1985, 3587 A/85

Int. Cl.<sup>4</sup> G09F 1/12

U.S. Cl. 40—156

11 Claims



1. A picture frame arrangement comprising  
a framework receiving a substantially rigid, flat support element and a transparent element, a picture being interposed between said flat support element and said transparent element, the support and the transparent elements and the picture defining together a picture block, said picture block being held together within an interior said framework by at least one locking member, said at least one locking member having a base portion, a lip and a side wall extending from the base portion, said picture block is supported by the base portion and situated between the side wall and the lip of said at least one locking member, a free end of the side wall engages with a first groove located within the support element, a first spring element

extends from the side wall and presses the picture block within said locking member against the lip,  
said framework having the picture block attached to a supporting surface through at least one coupling element, said at least one coupling element comprising a first elongated base portion, a second base portion exposed at an angle to said first elongated base portion, a second spring element extending from said first elongated base portion, a free end of said second base portion engaging with said first groove of said support element and a free end of said first base portion engaging a second groove situated within a wall of the framework, an opening within the first elongated base receiving a hanging element, whereby in the assembled condition of the arrangement said second spring element presses against the side wall of said at least one locking member keeping the entire arrangement together.

4,790,090

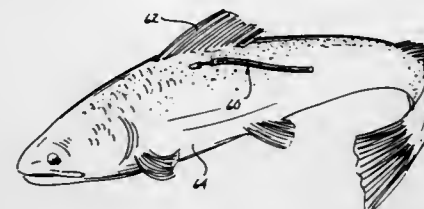
**FISH TAG**

Norman G. Sharber, P.O. Box 1059, Flagstaff, Ariz. 86002  
Filed Apr. 30, 1987, Ser. No. 44,989

Int. Cl.<sup>4</sup> G09F 3/00

U.S. Cl. 40—300

20 Claims



1. An invasive tag for tagging living specimens, said tag comprising in combination:  
(a) an anchor for initially anchoring said tag invasively to the specimen; and  
(b) invasively placed material comprising a part of said anchor and receptive to cellular ingrowth for developing a bond between the flesh of the tagged specimen and said tag, said bond being formed by cellular ingrowth; whereby, said material anchors said tag long term.

4,790,091

**YARD SIGN**

Jack W. Hull, 24476 Via Secreto, El Toro, Calif. 92630  
Continuation-in-part of Ser. No. 715,406, Mar. 25, 1985, Pat. No. 4,685,233. This application Jun. 26, 1987, Ser. No. 67,319

Int. Cl.<sup>4</sup> G09F 15/00

U.S. Cl. 40—607

18 Claims



1. A yard sign, a rigid upstanding post, a slot on one side of and extending downwardly from the top of said post, mounting means remote from said post top for holding said post upright on a surface, and a sign panel, said panel comprising an indicia carrying member and edge member on one end of said panel, said indicia carry member having a free end extending from said edge member, said edge member being insertable into and removably secured in said post slot and having a width suitable for wedgelike lodgement in said post when

inserted into said slot, said panel free end being free of connection to said post and flexible responsive to pressure applied against said panel, said edge member being insertable into and removable from said post slot upon bending said edge member against said indicia carrying member.

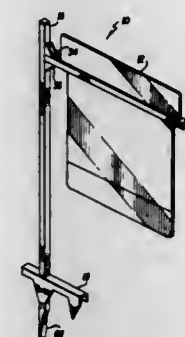
4,790,092  
**DISPLAY SIGN**

Kenneth R. Farmer, 891 Glenbrook Dr., NW., Atlanta, Ga. 30318

Continuation-in-part of Ser. No. 819,812, Jan. 17, 1986, abandoned. This application Aug. 18, 1986, Ser. No. 896,321  
Int. Cl.<sup>4</sup> G09F 15/00

U.S. Cl. 40—607

17 Claims



1. A display sign comprising:  
a panel adapted to receive a display, said panel comprising a lower portion, an upper portion having a predetermined width and a neck portion disposed between said upper and lower portion having a predetermined width less than that of the upper portion;  
a vertical post;  
a horizontal arm supported in cantilever fashion on said vertical post;  
a through slot formed in said horizontal arm from top to bottom thereof; and  
means for supporting said panel in said slot whereby said panel is supported on said horizontal arm, said means for supporting said panel in said slot comprising means for selectively reducing the length of said slot from a first length greater than or equal to the width of the upper portion of said panel to a second length less than the width of said upper portion and greater than or equal to the width of the neck portion of said panel.

4,790,093

**MOLDED PLASTIC SIGNHOLDER**

Richard C. Ernest, Lake Forest, and Burton L. Siegal, Skokie, both of Ill., assignors to Crown Metal Manufacturing Company, Chicago, Ill.

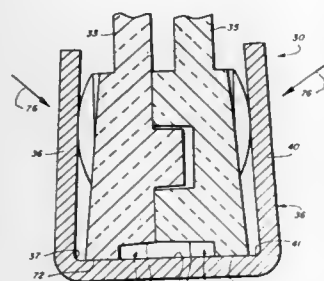
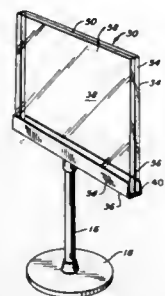
Continuation-in-part of Ser. No. 875,721, Jun. 18, 1986, Pat. No. 4,726,132. This application Sep. 2, 1987, Ser. No. 92,324  
Int. Cl.<sup>4</sup> G09F 3/18

U.S. Cl. 40—661

10 Claims

1. A molded plastic signholder subassembly, the subassembly forming half of a mating two-piece signholder assembly, said subassembly comprising:  
a clear, flexible molded synthetic plastic substantially planar piece having a face surface, said piece adapted to be mated to a second substantially identical piece and mounted along a bottom edge in a retaining bracket so that said bottom edge contacts said retaining bracket;  
said piece including means for biasing said piece in a direction substantially perpendicular to the plane of said piece and toward said second piece when mated therewith to

form a bearing surface, and when said mated pieces are inserted in said retaining bracket a gripping action is created between said face surfaces; means for positively engaging said piece with said second piece when mated therewith; and



said bottom edge of said piece having a length, a width and a stepped recess designed to correspond with a similar recess of said second piece to maintain the alignment of said signholder assembly within said bracket.

#### 4,790,094 SIDE-BY-SIDE CARTRIDGE MAGAZINE FOR RIM-FIRE CARTRIDGES

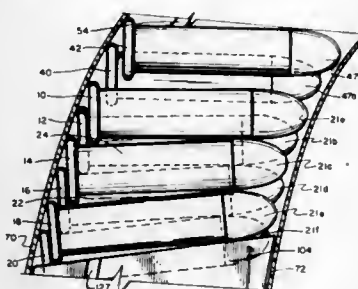
M. Gaines Chesnut, Kremmling, and Thomas L. Castetter, Elizabeth, both of Colo., assignors to Pam-Line, Inc., Golden, Colo.

Continuation-in-part of Ser. No. 805,303, Dec. 4, 1985, Pat. No. 4,672,760. This application Dec. 3, 1986, Ser. No. 937,360. The portion of the term of this patent subsequent to Jun. 16, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> F41C 25/02

U.S. Cl. 42—50

13 Claims



1. An apparatus for use in housing rim-fire cartridges in a side-by-side relationship comprising:  
first and second side walls;  
first and second end walls, at least a portion of said first end

wall being defined by a radius, said radius being about 5.29 inches;  
said first and second side walls and said first and second end walls forming a magazine having a chamber, a bottom end, and an opened end, said chamber including a storage zone and a transition zone; and  
a plurality of rim-fire cartridges, each of said rim-fire cartridges having a rim, a body portion, and a nose end, at least some of said plurality of rim-fire cartridges being contained in said storage zone in a side-by-side relationship, each of said rims of said plurality of cartridges being adjacent to said first end wall.

#### 4,790,095 GUNSTOCKS AND GUNSTOCK ATTACHMENTS

Conrad H. Campos, P.O. Box 606, Hurricane, Utah 84737  
Continuation-in-part of Ser. No. 716,099, Mar. 26, 1986, abandoned. This application Sep. 2, 1987, Ser. No. 92,128  
Int. Cl.<sup>4</sup> F41C 23/00

U.S. Cl. 42—73

5 Claims



1. A firearm having a barrel and a rearwardly extending gunstock when the firearm is in the firing position, and a gunstock attachment, said gunstock attachment comprising:  
a butt plate attachable to the butt end of the gunstock;  
a first gunstock extending member having a foot portion and a leg portion adapted to engage coacting means on the butt plate; and  
a second gunstock extending member including a body engaging arm member and a rod member, said rod member telescopically engaging the leg portion; and further comprising a gun trigger and guard mounted adjacent an integral portion of said gunstock which is contoured to form a piston grip for nesting engagement with a gun user's hand, said pistol grip having a downwardly contoured surface for engagement with three fingers of a gun user's hand, said gunstock including an integral sideways projecting portion disposed above and behind said guard and having a thumb engagement upper surface and a forefinger engagement lower surface, said upper surface and said lower surface being disposed such that a gun user may position a forefinger on the gun trigger and in engagement with said lower surface, and a thumb on said upper surface with said sideways projecting portion nested between said thumb and forefinger, and wherein said trigger guard has a front upper end and a back upper end, and wherein said sideways projecting portion is disposed completely above the level of the back upper end, and, wherein said gunstock includes a forearm, said forearm having a gripping portion which widens towards a front end of the firearm and which is flared down for an increased forearm height towards said front, and wherein said sideways projecting portion is disposed completely above an uppermost level of said upper ends of said trigger guard.

#### 4,790,096 GUN LIFT

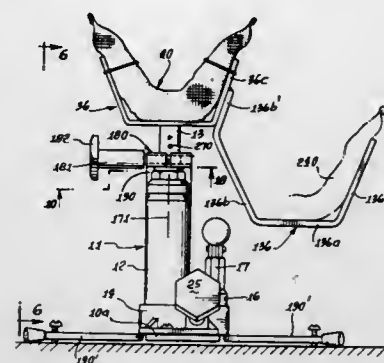
David E. Gibson, and Steven D. Gibson, both of 717 Cynthia St., Alhambra, Calif. 91801

Continuation-in-part of Ser. No. 30,079, Mar. 26, 1987, abandoned. This application Jan. 20, 1988, Ser. No. 146,269

Int. Cl.<sup>4</sup> F41C 29/00

U.S. Cl. 42—94

14 Claims



1. In a gun or pistol sighting and lifting device the combination comprising:

- a base,
- a vertical actuator mounted on the base,
- holder structure mounted on the actuator to form multiple, upward opening, saddle shaped recesses, and
- the recesses adapted to support at least one sandbag received in one of the recesses at selected height, and supported by the holder structure to form generally V-shaped walls of a groove which opens upwardly, to in turn support a gunstock, or the hands of a person gripping a pistol,
- whereby the gun or pistol supported by the sandbag V-shaped walls is accurately steadied, for sighting,
- said holder structure comprising a first generally U-shaped plate having upper generally horizontal edges and said sandbag covering said upper edges,
- and said holder structure also including a second U-shaped plate, one plate carried by the actuator and the other plate carried by said one plate, the two plates being at different levels.

#### 4,790,097 BAIT CUTTING DEVICE

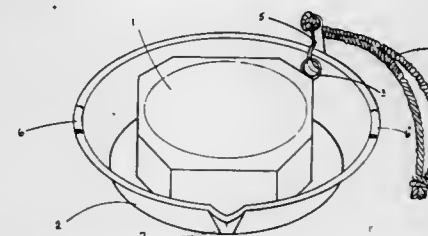
Lester N. Blackiston, 6 N. 18th St., Richmond, Va. 23223

Filed Feb. 23, 1988, Ser. No. 159,181

Int. Cl.<sup>4</sup> A01K 97/04

U.S. Cl. 43—4

7 Claims



1. A totally portable fishing device to facilitate cleaning and providing a self-contained area to cut bait for an angler comprising: a solid octagonal cutting block whose planar bottom is attached to a tub or reservoir having up standing walls and said cutting block being permanently attached to the bottom of said tub or reservoir, the octagonal cutting block's shape will uniquely interact with said tub or reservoir to prevent the

angler's cutting tool from bouncing or leaping out of the tub or reservoir when the device is vibrated by the motion of a sport fishing vessel.

#### 4,790,098 PLANAR TYPE CAST NET FOR FISHING

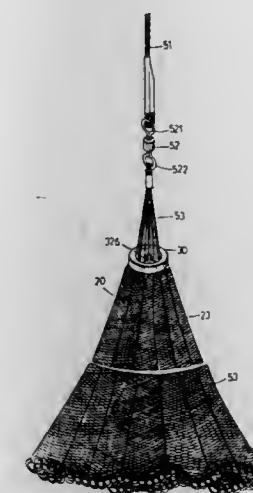
Pang C. Lu, No. 22, Chun Fu Lane, Chun Tsu Village, Siu Swai Hsiang, Changhua, Taiwan

Filed Nov. 6, 1987, Ser. No. 118,155

Int. Cl.<sup>4</sup> A01K 73/00

U.S. Cl. 43—7

8 Claims



1. A net used for fishing, the net comprising:

- a net element having a generally circular configuration when planarly disposed;
- a number of counterweight elements attached to the net element at an outer periphery thereof;
- a ring-shaped element attached to said net element at generally the center thereof, said ring-shaped element comprising a top element and a bottom element, said top and bottom elements being fastened to different sides of said net element; and
- a plurality of rope which passes through said ring shaped element, one end of each rope being coupled to said periphery of said net element, the other end of each rope being fastened together.

#### 4,790,099

#### ICE FISHING SIGNAL AND REPORTING DEVICE

John Miller, Jr., R.D. #5, Amsterdam, N.Y. 12010

Filed Sep. 30, 1986, Ser. No. 913,250

Int. Cl.<sup>4</sup> A01K 85/01, 97/01

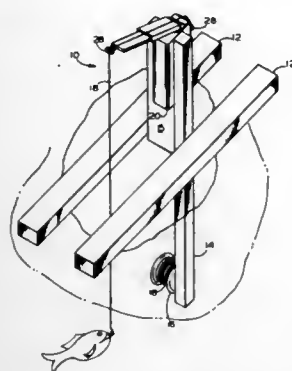
U.S. Cl. 43—17

2 Claims

1. An ice fishing signaling and reporting device comprising:  
attachment means for securing the device to a tip-up support;  
guide means on said device adapted to receive and orient the travel of fishing line;  
means for sensing an increase in tension on the fishing line beyond a predetermined limit;  
alarm means having a normally biased inactive state and an active alarm state said alarm state being entered in response to tension on the fishing line exceeding a predetermined limit as sensed by said tension sensing means, whereby said alarm state automatically activates and deactivates as the line tension alternates above and below said predetermined limit, respectively;  
means for adjusting the tension required on the line to activate the alarm;

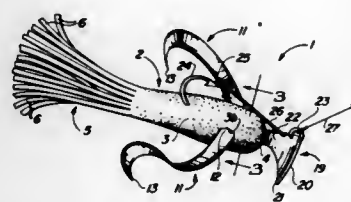


a button which activates the alarm when said button is depressed, said button biased to its inactive state; and



a cantilever, over which the fishing line is guided, for depressing said button when the tension on the line increases and exceeds said predetermined limit, said cantilever telescoping between an advanced and retracted position.

**4,790,100**  
**FLEXIBLE FISHING LURE WITH REMOVABLE CORE MEMBER**  
Richard T. Green, Sr., 1023 N. 15 St., Arkadelphia, Ark. 71923  
Filed Mar. 4, 1988, Ser. No. 164,089  
Int. Cl.<sup>4</sup> A01K 85/00  
U.S. Cl. 43—42.26 33 Claims



1. A flexible fishing lure comprising an elongated sleeve member having a cavity provided therein and at least one opening provided in said sleeve member intermediate the ends of said sleeve member, said opening communicating with said cavity; a core member provided in said cavity of said sleeve member; hook means extending through said sleeve member and said core member; and at least one leg means carried by said core member, said leg means projecting through said opening for attracting fish responsive to retrieval of said flexible fishing lure.

**4,790,101**  
**SEMI-WEEDLESS LURE**  
Larry E. Craddock, 10926 Jollyville, Apt. 416, Austin, Tex. 78759  
Filed Oct. 26, 1987, Ser. No. 112,696  
Int. Cl.<sup>4</sup> A01K 85/00  
U.S. Cl. 43—42.37 8 Claims

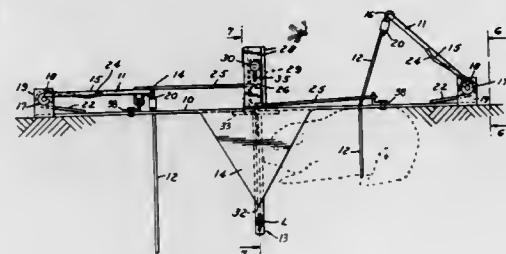
1. A semi-weedless lure comprising
  - a. a hook,
  - b. a hook eye at a right angle to a shank of said hook,
  - c. a round metallic weight around said hook eye,

d. an elongated metallic tying collar around said shank of said hook and behind said round metallic weight,



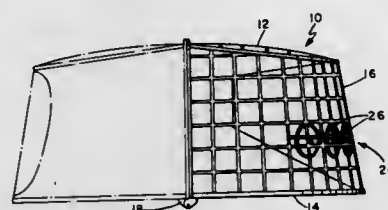
e. a round clear flat plastic deflector plate rigidly fastened around said tying collar and adjacent to said round metallic weight.

**4,790,102**  
**MOLE TRAP**  
Samuel McPherson, 12080 Andersonville Rd., Davisburg, Mich. 48019  
Filed Jul. 13, 1987, Ser. No. 72,731  
Int. Cl.<sup>4</sup> A01M 23/30  
U.S. Cl. 43—86 14 Claims



1. A mole trap and the like comprising a base adapted to be placed on the ground, a pair of spring loaded levers pivoted to said base and movable from a latched position to an unlatched position, a pair of flexible non-metallic loops, one loop being associated with each said lever and adapted to extend below said base into the ground transversely of a mole tunnel, a pair of latches, each latch engaging a respective one of said levers and holding its respective loop in the path of a mole approaching in either direction along the tunnel, and a single trip member projecting into the tunnel and adapted to be engaged by the mole in its travel through the tunnel after it has moved into either one of said loops to selectively unlatch the lever associated with that loop and permit the spring associated with the unlatched lever to move that loop and engage and trap the mole.

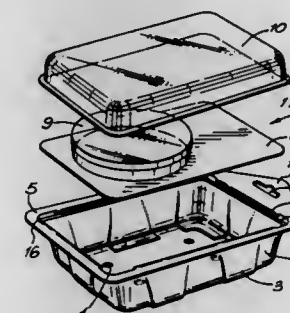
**4,790,103**  
**SHELLFISH TRAP**  
John L. Tarantino, 921 Windflower, San Diego, Calif. 92106  
Filed Jan. 22, 1988, Ser. No. 147,353  
Int. Cl.<sup>4</sup> A01K 69/08  
U.S. Cl. 43—102 5 Claims



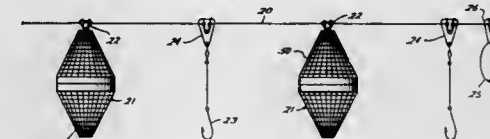
1. A shellfish trap, comprising:

a cage-like, lattice work enclosure of molded plastics material having an upper wall, a lower wall and a peripheral side wall; the side wall having at least one entrance passage extending from the side wall towards the center of the enclosure; at least one ring formed in the lattice-work of the enclosure for selectively defining an escape vent; the ring having ribbing extending across it for normally closing the vent; and pilot means at the center of the ribbing for guiding a point of a drill bit to cut out the ribbing extending across the ring to form an open escape vent.

**4,790,105**  
**PACKAGED PLANT MATERIAL AND METHOD OF PRODUCTION**  
Philip F. Wareing, Dyfed, Wales, and Allan C. Cassella, East County Cork, Ireland, assignors to Research Corporation Limited, London, United Kingdom  
PCT No. PCT/GB86/00058, § 371 Date Nov. 26, 1986, § 102(e) Date Nov. 26, 1986, PCT Pub. No. WO86/04563, PCT Pub. Date Aug. 14, 1986  
PCT Filed Feb. 3, 1986, Ser. No. 923,835  
Claims priority, application United Kingdom, Feb. 2, 1985, 8502702  
Int. Cl.<sup>4</sup> A01G 9/02  
U.S. Cl. 47—84 18 Claims

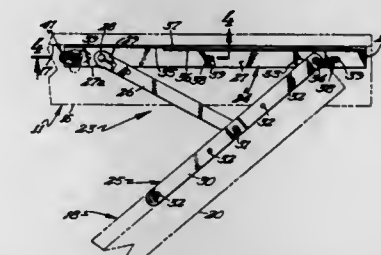


**4,790,104**  
**LINE ATTACHMENT DEVICE**  
Harris J. Dorsey, 1917 Stella Cir., Port Neches, Tex. 77651  
Continuation of Ser. No. 860,049, May 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 756,718, Jul. 19, 1985, abandoned. This application Dec. 14, 1987, Ser. No. 133,186  
Int. Cl.<sup>4</sup> A01K 91/04  
U.S. Cl. 43—44.85 5 Claims



1. A device for use in suspending an object from a selected location along the length of a flexible line, comprising a thin, relatively rigid body having front and back faces, an upper end, and a lower end from which the object may be suspended, said body having a substantially "U" shaped opening formed therein with legs which extend along opposite sides of a depending tongue, and a flap on the lower end of the tongue which projects from the front face of the body, said tongue being flexible about its upper end, and the side edges of the flap being closer to the adjacent side edges of the opening than the side edges of the tongue thereabove, when said tongue is unstressed, so that said tongue is bent outwardly as the line is forced between said edges and under the flap to a position behind the upper end of the tongue, and then returns to its unstressed conditions, the back face of the upper end of the tongue being substantially coplanar with the back face of the body on opposite sides thereof, to permit the line to be grasped and pulled upwardly from behind the tongue to form a loop above the upper end of the body, the loop then being bent over the upper end and across the front face of the body on opposite sides of the tongue and beneath the flap, so that, as tension is applied to the line, the loop is pulled upwardly behind the tongue, the legs of the openings and the adjacent side edges of the upper end of the tongue being spaced apart sufficiently to permit the line to be pulled upwardly within the legs into a position adjacent the portions of the line initially pulled upwardly behind the tongue wherein the lower end of the body has means spaced from said opening for attaching the object.

**4,790,106**  
**CAM ADJUSTMENT DEVICE**  
Jack C. La See, 308 W. Cedar, Abbotsford, Wis. 54405  
Filed Nov. 2, 1987, Ser. No. 115,851  
Int. Cl.<sup>4</sup> E05D 15/30  
U.S. Cl. 49—252 4 Claims



1. A track and hinge assembly set for use with a casement window sash unit mounted on a window frame of a building, the window frame including upper and lower horizontal frame members connected by vertical frame members, said track assembly set comprising similar upper and lower track and hinge assemblies, each track and hinge assembly including an elongate horizontal L-shaped track secured to one of the horizontal frame members, a hinge mechanism including a pair of pivotally interconnected links, one of which is pivotally connected to the track, and the

other link is secured to the casement sash and is slidably connected with the track for shifting the casement sash between open and closed positions, each track having a plurality of longitudinally spaced apart, and longitudinally elongated openings therein, a plurality of attachment screws, each extending through an opening for attaching each track to one of the horizontal window frame members, each opening shaped to permit a predetermined amount of longitudinal movement of the track in opposite directions relative to the window frame and the attaching screw when the attaching screw is in a centered position in an opening, each track having a cam opening therein, said cam opening having an edge defining a cam surface, each track having a cam positioned in the track cam opening and engaging the cam surface, an attachment screw extending through a first opening in the cam and into the associated horizontal window frame member, said cam being shiftable from a center position in either direction to shift the track a predetermined amount relative to the associated horizontal window frame before the attachment screws are tightened to adjust the position of the hinge relative to the window frame and to thereby overcome sash sag.

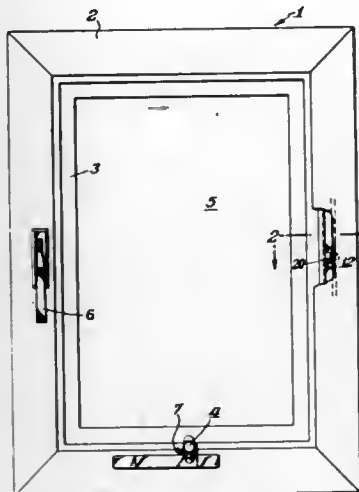
4,790,107

## WINDOW SECURING DEVICE

Phillip J. Cunningham, Claymont; Leon F. Slocumb, Jr., and George Wilkie, both of Wilmington, all of Del., assignors to Slocumb Industries, Inc., Wilmington, Del.  
Filed Oct. 21, 1986, Ser. No. 921,123  
Int. Cl.<sup>4</sup> E06B 7/16

U.S. Cl. 49—383

9 Claims



1. In a casement window or the like having a master frame with a casement frame hinged to the master frame, the improvement being a vent securing device for maintaining the window closed along one side thereof when said casement frame is moved to its closed position, said vent securing device comprising an abutment member mounted to said master frame along said one side, said abutment member having a first end and a second end, said first end of said abutment member projecting away from said master frame a distance than said second end, a non-planar contacting surface on said abutment member extending from said first end toward said second end, said vent securing device further including an engaging member mounted to said casement frame along said one side, said abutment member being in the path of motion of said engaging member when said casement frame is moved from its open to its closed positions, said engaging member having a first end disposed toward said first end of said abutment member and a

second end disposed toward said second end of said abutment member, said second end of said engaging member projecting away from said casement frame a greater distance than said first end, a non-planar contacting surface on said engaging member extending from said second end toward said first end, said contacting surfaces of said abutment member and said engaging member being complementary to each other, said contacting surfaces mating when said casement frame is in its closed position whereby a force urging said casement frame away from said master frame causes said contacting surfaces to remain in mating contact to prevent said casement frame from being moved away from said main frame at said vent securing device, said casement frame being hinged to said main frame along the top and bottom sides thereof, a manual lock being provided along a side between and adjacent to said top and bottom sides, and said securing device being mounted to said one side which is opposite the side having said manual lock and adjacent to said top and bottom sides.

4,790,108

## WEATHER STRIP

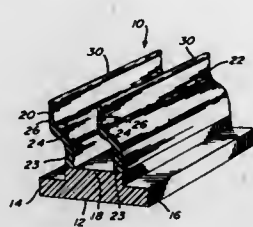
Jean P. Giguere, Lotbiniere, Canada, assignor to Donat Flamand Inc., Quebec, Canada

Filed May 5, 1987, Ser. No. 46,199

Int. Cl.<sup>4</sup> E06B 7/16

U.S. Cl. 49—484

10 Claims



1. For use with an air closure device of the type having two relatively movable members, a weather strip in the form of an extruded one-piece element adapted to be mounted between the two members of the closure device, said air closure device being of the type wherein one of said two members is movable by translation with respect to the other of said members, said weather-strip comprising:

- a base made of a relatively rigid material; and
- two sealing wings made of a flexible and rubber-like material, said sealing wings extending in a direction generally perpendicular to the direction of translational movement of said one of said members, said sealing wings being connected to and extending side by side from said base and being slightly spaced apart from each other, each sealing wing comprising:
  - (a) an inner portion connected to said base and projecting therefrom;
  - (b) an outer sealing portion having a free edge adapted to contact one of said members; and
  - (c) a curved intermediate portion connecting said inner portion to said outer portion, said outer portion being offset in relation to said inner portion in a generally transversal direction to the wing, said curved intermediate portion constituting hinge means allowing said wing to flex laterally upon engagement of said outer sealing portion by a member in translational motion.

4,790,109

## PROTECTIVE STRUCTURE

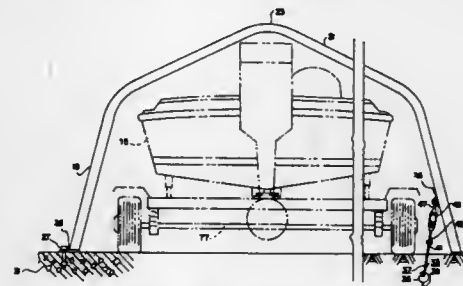
Agnes Whidden, Rte. 2, Box 13, Moorehaven, Fla. 33471

Filed Jan. 8, 1987, Ser. No. 1,577

Int. Cl.<sup>4</sup> E04B 1/32; E04H 6/00

U.S. Cl. 52—79.4

7 Claims



1. A protective structure comprising a plurality of interengaging sections, each section having a pair of spaced and parallel edges, each one of said sections having a trapezoidal male portion on one edge and a female portion on the opposite edge, said male portion of one section engaging and overlapping the female portion of one adjacent section on one edge and said female portion of one section engaging and overlapping a male portion of an adjacent section on the opposite edge; means for removably securing one section to another adjacent section on an opposite edge thereof; means for arranging a plurality of such interengaging sections in alignment with each other and seriatim to form an elongate protective structure; said protective structure having two ends, means for closing one end of said protective structure; means for closing the other end of said protective structure; first access means in one end closure; means for locking said first access means; second access means in said other end closure; means for locking said second access means; and means for fastening said protective structure to a base comprising a turnbuckle having on one end means engaging a side of said structure and having on the other end means engaging a rod, said rod having a portion of a helical surface at one end which portion is embedded into said base.

4,790,110

## TILE-LIKE CERAMIC ELEMENT HAVING AN ELECTRICALLY CONDUCTIVE SURFACE GLAZE ON THE VISIBLE SIDE

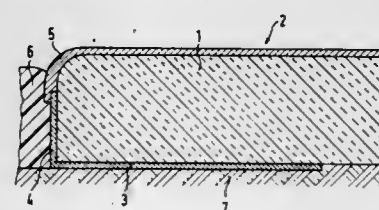
Martin Bard, Amberg, Fed. Rep. of Germany, assignor to Bach-tal Gesellschaft mit beschränkter Haftung, Fed. Rep. of Germany

Filed Jun. 1, 1987, Ser. No. 56,062

Int. Cl.<sup>4</sup> E04I 13/08

U.S. Cl. 52—173 R

6 Claims



1. A tile-like ceramic element for attachment to a substructure having a visible side and a side facing away from the visible side, comprising: an electrically conductive surface glaze on the visible side which, when the tile-like ceramic element is laid with a plurality of such elements to form a covering for lining walls or floors, communicates conductively with the substructure which diverts electricity and is disposed under the covering, characterized in that at least part of the

side of the tile-like ceramic element facing away from the visible side is coated with a material having good electrically conductive properties which communicates with the surface glaze in electrically conductive fashion via a coating on at least one side edge which corresponds to the coating on the side facing away from the visible side; with said coating on said side edge not extending onto said visible side.

4,790,111

## REDUCING HOOP STRESS IN SILOS

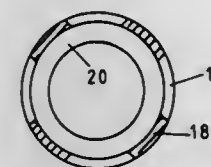
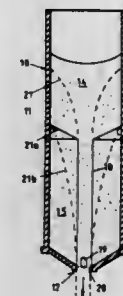
Bruce L. Johinke, Kent Town, Australia, assignor to South Australian Co-Operative Bulk Handling Limited, Australia

Continuation-in-part of Ser. No. 726,030, Apr. 23, 1985. This application Nov. 6, 1987, Ser. No. 118,531

Int. Cl.<sup>4</sup> B65G 65/34

U.S. Cl. 52—197

18 Claims



1. Means for reducing hoop stress in a grain silo of the type having cylindrical walls upstanding from a base and defining therewith a cell having an outlet adjacent said base comprising, an upstanding grain tube located centrally within the silo and extending part way up said cell, support means for supporting the upper end of said tube on said side walls, said tube including a side wall and having an open upper end and an open lower end communicating with said outlet, said tube side wall being provided with a plurality of apertures adjacent said lower end arranged symmetrically about the central vertical axis of said tube, a gate valve for closing said base outlet and for opening said base outlet to permit grain above said tube upper end to enter said tube upper end and flow downwardly through said tube out said base outlet, and a restrictor in said tube below and operatively associated with said apertures to restrict the flow of grain from said cell into said tube through said apertures during said grain flow until the grain level in said cell corresponds to the level of the upper end of said tube and thereafter to permit grain flow from said cell into said tube through said apertures out said base outlet.

4,790,112

## ASSEMBLY OF TWO INTERCONNECTED SIMILAR PLASTIC PLANKS AND A FRAMEWORK

Cheh Wang, 4th FL, No. 8, Alley 2, Lane 81, Yung Li Rd., Yung-Ho City, Taipei Hsein, Taiwan

Filed Jul. 17, 1987, Ser. No. 74,869

Int. Cl.<sup>4</sup> E04C 1/36; E04D 1/36

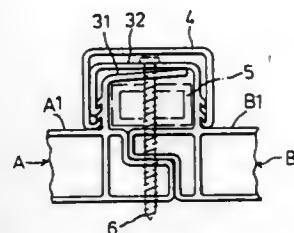
U.S. Cl. 52—460

17 Claims

1. An improved assembly of the type having two intercon-



nected similar plastic planks, a framework, and a fastening means for attaching said planks to said framework, said planks including a first plank and a second plank, characterized in that each of said planks includes a first side including an L-shaped projecting plate thereon, a second side positioned opposite to said first side and including a U-shaped projecting plate, and means formed on said L-shaped projecting plate and said U-shaped projecting plate for holding said L-shaped projecting plate of said first plank on said U-shaped projecting plate of said second plank, each of said L-shaped projecting plates including a vertical plate extending longitudinally upwardly from the upper surface of said plank, and a horizontal plate extending horizontally outwardly from the end of said vertical



plate, each of said U-shaped projecting plates including a long vertical plate extending longitudinally upwardly from the upper surface of said plank a distance slightly greater than that of said long vertical plate of said L-shaped projecting plate, a second horizontal plate extending horizontally outwardly from the end of said vertical plate of said U-shaped projecting plate and being of a width slightly greater than that of said horizontal plate of said L-shaped projecting plate, and a short vertical plate extending longitudinally downwardly from the end of said horizontal plate of said U-shaped projecting plate a distance less than said vertical plate of said U-shaped projecting plate; whereby, said L-shaped projecting plate of said first plank can be held within and on said U-shaped projecting plate of said second plank.

4,790,113

## ADJUSTABLE DEPTH TRUSS

Robert K. Gregory, 1110 Elkel, Ste. E, New Braunfels, Tex. 78130

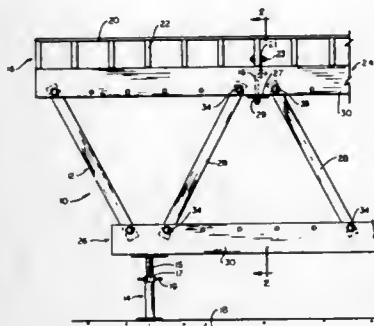
Continuation of Ser. No. 831,368, Feb. 18, 1986, abandoned.

This application Jun. 16, 1987, Ser. No. 63,724

Int. Cl.<sup>4</sup> E04H 12/18

U.S. Cl. 52-646

12 Claims



1. An adjustable depth truss comprising:
  - first and second chords, each of said chords having a plurality of pre-existing holes therethrough spaced along the length thereof;
  - a plurality of diagonal supports, each of said diagonal supports having a hole at each end thereof;

a first set of connectors selectively positioned within a first set of the pre-existing holes in said chord; and  
 a second set of connectors positioned within a selected set of the pre-existing holes through said second chord, said first set of connectors being received within the holes at one end of each of said diagonal supports and said second set of connectors being received within the holes at the other end of each of said diagonal supports, said first set of connectors being selectively positionable in any one of a plurality of second sets of the pre-existing holes in said first chord for changing the angle at which said diagonal supports are mounted relative to said first and second chords to provide multiple positions and angles of said diagonal supports for adjusting the space between said first and second chords without changing the length of said diagonal supports or changing the hole in said diagonal supports in which said first and second set of connectors are received.

4,790,114

## MASONRY ANCHOR

Gene A. Falco, 34 Windemere Way, Woodbury, N.Y. 11797

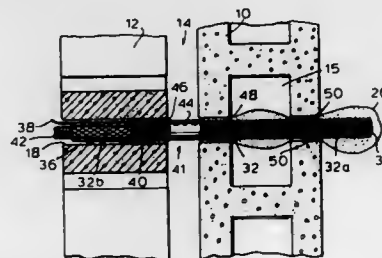
Continuation of Ser. No. 880,287, Jun. 30, 1986, abandoned.

This application May 7, 1987, Ser. No. 47,167

Int. Cl.<sup>4</sup> E04B 1/41; E21D 20/02

U.S. Cl. 52-707

7 Claims



1. Apparatus for performing in combination with a hardenable thixotropic adhesive, an anchor between spaced masonry elements comprising an axially elongated cylindrically shaped screen sleeve of a length sufficient to substantially pass through said masonry elements and, having a leading end and a trailing end, said screen sleeve being closed at its leading end with an impervious wall and open at its trailing end for the insertion of ram means adapted to extrude the hardenable mass through said screen, said screen sleeve being provided with at least two axial sections each having a different mesh size so as to selectively regulate the amount of hardenable adhesive extruded radially through said screen sleeve along the length thereof selectively filling the spaces between said masonry elements and the screen sleeve and within the masonry elements.

4,790,115

## TURRET FOR PACKAGING MACHINES

Heinz Focke, Verden, Fed. Rep. of Germany, assignor to Focke & Co (GmbH & Co.), Verden, Fed. Rep. of Germany

Filed Aug. 7, 1987, Ser. No. 82,611

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1986, 3627912

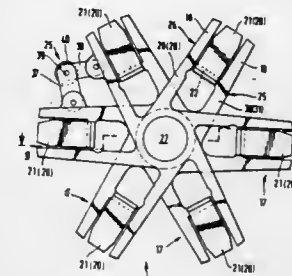
Int. Cl.<sup>4</sup> B65B 11/28

U.S. Cl. 53-234

12 Claims

1. An intermittently rotatable turret for transporting cuboid packs and mounted on a rotatable axis comprising:
  - a plurality of pockets arranged along the turret's periphery for receiving respective packs (11),
  - each pocket (17) being defined by at least two parallel side walls (18, 19) extending generally radially from said axis;
  - two separate and independent per turrets mounted on said axis and each carrying one of said side walls, each side

wall having an axially extending portion such that the respective portions engage opposed sides of said packs in the same plane perpendicular to said axis and without any axial displacement between said portions;  
 regulating means for independently rotating said part turrets relative to one another during operation of the turrets to



move (35) said side walls (18, 19) toward or away from one another in the peripheral direction of the turret in order to increase or reduce the cross-section of each pocket;  
 means for radially inserting packs into, said radially pushing packs out of, said pockets when the side walls are moved away from one another.

4,790,116

## APPARATUS FOR AUTOMATICALLY PACKING PRODUCTS IN PACKAGES

Kent Stridh, Falsterbovägen 50, S-236 00 Hölleviksnäs, Sweden

PCT No. PCT/SE86/00295, § 371 Date Jun. 20, 1985, § 102(e)

Date Jan. 20, 1985, PCT Pub. No. WO86/07573, PCT Pub.

Date Dec. 31, 1986

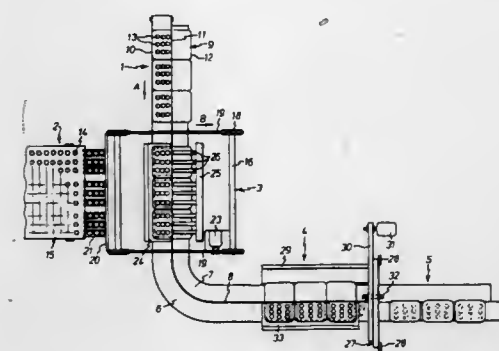
PCT Filed Jun. 18, 1986, Ser. No. 31,069

Claims priority, application Sweden, Jun. 20, 1985, 8503072

Int. Cl.<sup>4</sup> B65B 35/30

U.S. Cl. 53-244

11 Claims



1. An apparatus for automatically packing fragile products in a package, said apparatus comprising:
  - (a) a delivery station for delivering empty packages,
  - (b) a collecting station for products,
  - (c) a packing station located opposite said collecting station and arranged for packing products in a package, and
  - (d) a conveyor for conveying a package through said delivery station and said packing station said packing station having
    - (i) carrier members movable substantially transversely of said conveyor for collecting products from said collecting station opposite said packing station, said members having carrying surfaces for carrying products thereon, and
    - (ii) means provided in the path of movement of said carrier members across said conveyor for gently removing

products from said carrier members and causing removed products to drop into a package on said conveyor.

4,790,117

## METHOD OF MOLDING, FILLING AND SEALING A CONTAINER

Gerhard Hansen, Heerstrasse 20, 7166 Sulzbach-Laufen am Kocher, Fed. Rep. of Germany

Continuation of Ser. No. 509,040, Jun. 29, 1983, which is a division of Ser. No. 289,170, Aug. 3, 1981, Pat. No. 4,425,090.

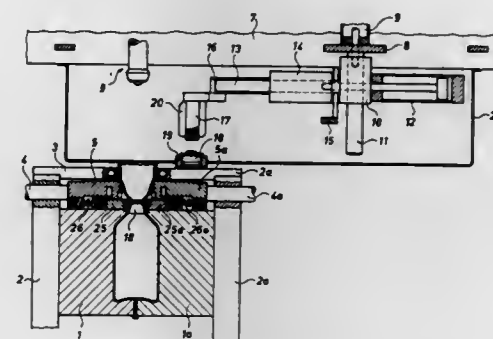
This application May 24, 1985, Ser. No. 737,476

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1980, 3033821

Int. Cl.<sup>4</sup> B65B 3/02, 43/00, 61/18, 61/22

U.S. Cl. 53-410

1 Claim



1. A method of molding, top filling, and sealing a container in an apparatus to provide a sterile product within the sealed container and to mold an auxiliary component as an integral part of the top of the container, all in a continuous operation wherein the apparatus includes:

- (a) a split mold assembly having two coacting first or main mold halves defining a first cavity for the container body, two coacting second or upper sealing mold halves above said two first mold halves defining a second cavity communicating with said first cavity for receiving therein said auxiliary component and molding it into the top of said container, and two coacting third mold halves above said two second mold halves;
  - (b) a pair of vacuum operable holding jaws having an inner surface for gripping a parison; and
  - (c) a blowing and filling assembly for sealingly engaging said parison, for subsequently discharging pressurized gas into said parison for blow molding the container, and for subsequently dispensing a product into the molded container;
- (A) opening said first and second mold halves;  
 (B) extruding a parison in the form of an elongated hollow tube vertically between said first and second mold halves to extend below and above said first and second mold halves;  
 (C) gripping with said vacuum operable jaws the upper portion of the parison by a reduced pressure effected between the outer surface of the parison and said inner surface of said jaws to maintain an opening in the upper portion of said parison above said second mold halves;  
 (D) closing said first mold halves about said parison to confine a portion of said parison therebetween while maintaining an opening in the upper portion of said parison with said holding jaws;  
 (E) severing said parison above said holding jaws to provide a top opening at the end of the upper portion of the severed length of parison adapted to receive in seriatim said blowing and filling assembly and said auxiliary component;  
 (F) extending said blowing and filling assembly through said

- top opening at the end of the upper portion of the severed length of parison to seal said top opening with the assembly pressing the parison against the first mold halves;
- (G) blowing gas into said parison from said blowing and filling assembly to mold said container;
- (H) venting said molding container;
- (I) discharging a product into said molded container from said blowing and filling assembly to fill said container;
- (J) retracting said blowing and filling assembly from said top opening of said parison;
- (K) holding said auxiliary component at the bottom of a cylindrical arm and positioning said auxiliary component within said parison top opening adjacent said second mold halves;
- (L) closing said second mold halves about both said auxiliary component and the surrounding parison to compress the parison between the exterior surfaces of the auxiliary component and the interior surfaces of said second mold halves to hermetically seal the formed and filled container about at least a portion of the auxiliary component;
- (M) withdrawing said cylindrical arm and closing said third mold halves about said parison above said auxiliary component to seal said parison so as to form a sealed cavity above said auxiliary component and so as to form a tab extending above said cavity which may be grasped and to which force may be subsequently applied to break said tab providing access to said auxiliary component;
- (N) forming a frangible or breakable portion in said parison adjacent said auxiliary component for facilitating access to said auxiliary component upon breaking said tab; and
- (O) opening said mold halves to expose the formed, filled, and hermetically sealed container with the auxiliary component integrally molded therewith.

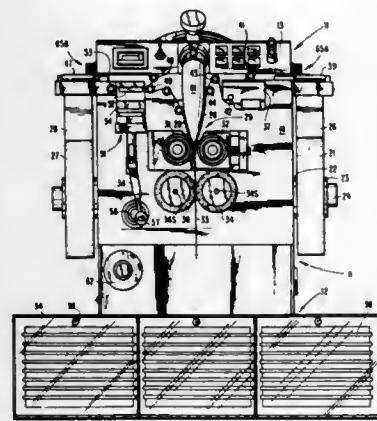
4,790,118

**MEDICATION PACKAGING AND DISPENSING SYSTEM**  
Elmer F. Chilcoat, Plainfield, Ind., assignor to Econodose, Inc., Indianapolis, Ind.

Filed Apr. 13, 1987, Ser. No. 37,631  
Int. Cl.<sup>4</sup> B65B 61/02, 5/04, 5/06

U.S. Cl. 53—411

20 Claims



1. Apparatus for packaging and dispensing medication units for unit-dosage administration to patients, said apparatus comprising:
- a machine body;
  - a packaging station on said body;
  - a reservoir for holding a quantity of identical medication units;
  - a feeder means on said body and coupled to said reservoir to deliver medication units individually from said reservoir to said packaging station;

packaging material supply means to supply packaging material in two media to said packaging station;

merging means at the packaging station and merging portions of the two media together around said medication units at the packaging station and sealing portions of the two media together around said units to thereby individually package said units; and

marking means by the path of travel of one medium of said media, and marking said one medium with patient identification and medication sortation and administration information at spaced locations on said one medium for each individual package of medication unit;

said feeder means and merging means being arranged to place identical medication units in a plurality of said individual packages in continuous succession in the merged media.

4,790,119

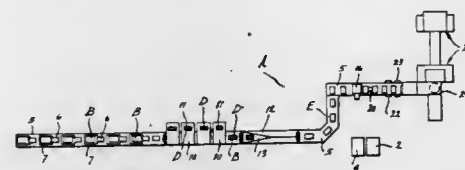
**MACHINE AND PROCESS FOR ORGANIZING PUBLICATIONS FOR DISTRIBUTION IN A POSTAL SYSTEM**

Paul T. McDaniel, Effingham, Ill., assignor to World Color Press, Inc., Effingham, Ill.

Filed Aug. 10, 1987, Ser. No. 83,109  
Int. Cl.<sup>4</sup> B65B 61/02

U.S. Cl. 53—411

16 Claims



1. A machine for organizing publications of different titles for distribution in a postal or similar system, said machine comprising: a conveyor capable of moving the publications one after the other along a path; a plurality of publication dispensing units located along the path, with each holding identical publications of a specific title and being capable upon receipt of a command of dispensing onto the conveyor a publication of the specific title which it holds; a plurality of insert dispensing units located along the path downstream from the publication dispensing units, with each holding identical inserts and being capable upon receipt of a command of depositing an insert on a publication located on and being transported by the conveyor; means located along the path downstream from the insert dispensing units for enclosing the publication and any insert deposited on it in an envelope to create a mailing piece; an ink jet printing unit located along the path downstream from the insert dispensing units and being capable, upon receipt of a signal, of directing ink in the form of letters and numbers toward the portion of the mailing piece passing by it so as to impart an address to the mailing piece; stacking means located along the path for receiving mailing pieces from the conveyor and arranging them in stacks; and electronic computing means capable of receiving addresses and for directing commands to the publication dispensing units capable of causing the publication dispensing units to dispense in sequence publications of the specified titles required for the addresses at a specific carrier route, for directing additional commands to the insert dispensing units so as to deposit inserts desired to accompany the publications dispensed by the publication dispensing units, for providing signals to the ink jet printing unit suitable for causing that unit to apply the proper address to each mailing piece, and for controlling the stacking means such that each stack contains mailing pieces which bear addresses for only a single carrier route.

4,790,120

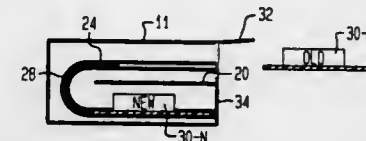
**METHOD OF AND MAILER FOR DELIVERY OF REPLACEMENT UNITS AND RETURN OF REPLACED UNITS**

Flavio M. Manduley, Woodbury; Paul M. Kasaruskas, Stamford; Norman R. Lilly, Stratford, and Kenneth A. Teran, Stamford, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Feb. 25, 1987, Ser. No. 18,880  
Int. Cl.<sup>4</sup> B65D 73/02

U.S. Cl. 53—468

8 Claims



1. A mailer for delivery of a replacement unit and return of a replaced unit, comprising:
- (a) a housing, said housing having a pair of spaced, opposed walls and an opening for insertion of said replaced unit;
  - (b) first indicia representative of the address to which said replacement unit is to be delivered affixed to said housing;
  - (c) second indicia representative of the address to which said replaced unit is to be returned affixed to said mailer;
  - (d) means for holding said replacement unit within said housing and for responding to insertion of said replaced unit to release said replacement unit, said housing means further comprising guide means fixed to the inner surfaces of said walls for receiving and guiding said replaced unit as it is inserted; and
  - (e) said guide means including track guides enclosing flexible linkages whereby said replaced unit will, when partially inserted into said housing, bear on said flexible linkages, said flexible linkages shaped such that force applied to said flexible linkages is transferred to said replacement unit to force said replacement unit out of said housing; wherein said units each comprise a printed circuit board.

4,790,121

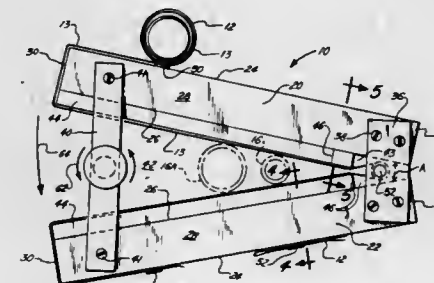
**APPARATUS FOR FEEDING AND SECURING SANDING CLOTH WHEN SANDING TUBULAR OBJECTS**

Devon Roberts, and Rustin Roberts, both of 250 Athanasia Parkway, Metairie, La. 70001

Filed Aug. 3, 1987, Ser. No. 80,954  
Int. Cl.<sup>4</sup> B24D 15/04

U.S. Cl. 51—360

12 Claims



1. An apparatus for feeding and securing sanding cloth when sanding stationary tubular members, the apparatus comprising:
- a. a first upper body portion;
  - b. a second lower body portion;
  - c. means for securing together the upper body portion and the lower body portion at a first end substantially adjacent one another;
  - d. means for positioning and maintaining a second end of the upper body portion and lower body portion a fixed distance

apart so that a space is defined between the body portions which provides for a continuous converging space between the first ends of the upper body portion and the lower body portion and the second end of the upper body portion and the lower body portion, for engaging various diameters of tubular members between the upper body portion and the lower body portion; therewithin; and

- e. a length of sanding cloth positioned intermediate and along the length of the body portions and a tubular member positioned in the converging space for abrading the surface of the tubular member as the tubular member makes contact with the sanding cloth on the upper body portion and the lower body portion, as the apparatus is rotated around the surface of the stationary tubular member.

4,790,122

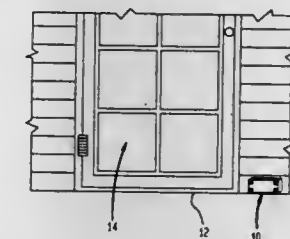
**KICK PAD FOR REMOVING DEBRIS FROM FOOTWEAR**

Joseph W. Marriott, 32 Birch Ct., Burlington, Vt. 05401

Filed Jul. 31, 1987, Ser. No. 80,067  
Int. Cl.<sup>4</sup> E04N 14/00

U.S. Cl. 52—173 R

4 Claims



1. A structural arrangement for minimizing damage to a building, due to kicking by persons trying to remove debris from their footwear upon entering, in an area adjacent the doorframe, comprising:
- a rectangular shaped pad mounted on the exterior of a building in an area adjacent the location of the doorframe; and
  - means for mounting said pad onto an exterior wall of the building.

4,790,123

**METHOD AND A MACHINE FOR THE MANUFACTURING OF PACKING CONTAINERS**  
Tommy Ljungström, Höör, and Anders Sjöström, Lund, both of Sweden, assignors to AB Tetra Pak, Lund, Sweden

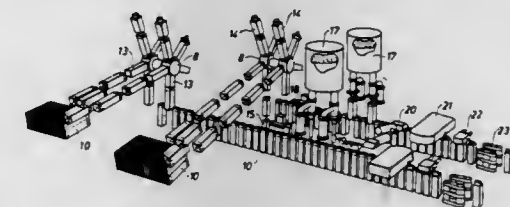
Filed Sep. 23, 1986, Ser. No. 910,675

Claims priority, application Sweden, Oct. 3, 1985, 8504574

Int. Cl.<sup>4</sup> B65B 43/26, 43/44, 43/56

U.S. Cl. 53—458

8 Claims



1. In a method for the manufacture of filled and closed packing containers along two production lines on which the packing containers are advanced intermittently by means of



two conveying elements between different processing stations, the improvement comprising:

continuously driving an electric drive motor;  
advancing the conveying elements asynchronously by operatively connecting the conveying elements to the continuously driven motor in a mutually offset pattern such that one of the conveying elements is operatively connected to the continuously driving motor while the other conveying element is operatively disconnected therefrom and the other conveying element is operatively connected to the continuously driving motor while the one conveying element is operatively disconnected therefrom; and  
activating the processing stations along one of the conveying elements alternately with the processing stations along the other of the conveying elements and in cycle with the intermittent driving of the respective conveying element.

3. In a packing machine including conveying elements for the transport of packing containers between different stations for filling, closing and other processing, the improvement comprising:

two intermittently drivable conveying elements each arranged along a separate set of the different stations;  
an electric driving motor adapted to be continuously driven during the intermittent driving of the conveying elements; and  
at least one indexing gear box connecting said electric driving motor to the conveying elements, said conveying elements being adapted to be driven according to a similar but mutually offset intermittent pattern of movement.

4,790,124

## ARTICLE PACKAGING APPARATUS

Kazumi Kaji, Osaka, Japan, assignor to Kabushiki Kaisha Asada, Tokyo and Coll Master Kogyo Kabushiki Kaisha, Osaka, both of Japan

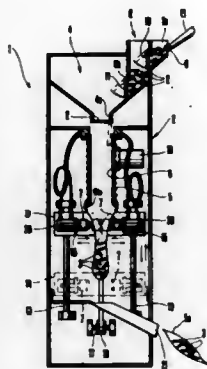
Filed Aug. 13, 1987, Ser. No. 84,997

Claims priority, application Japan, Mar. 30, 1987, 62-48427[U]

Int. Cl.<sup>4</sup> B65B 9/12, 39/06

U.S. Cl. 53—552

5 Claims



1. A method for the continuous production of filled and sealed resinous containers comprising the steps of:  
feeding a resinous material onto a generally tubular cassette having an upper portion of an outside diameter, said upper portion communicating with a charging station, and a bulbous lower portion having a widest outside diameter that is greater than the outside diameter of said upper portion;  
retaining said resinous material on said cassette by a retainer ring surrounding said cassette and located generally near said bulbous portion;  
applying heat to said resinous material by means of moveable heat press plates such that said resinous material is sealingly bound to itself in an area;  
moving said heat press plates downwardly to pull said resin-

ous material and separate said resinous material in said area such that said resinous material is sealingly bound to itself above and below the point of separation, said area being exposed to the downward force from the movement of said heat press plates and the upward force of said retainer ring and said bulbous portion said generally opposing upward and downward forces facilitating said separation of said resinous material in said area;  
removing said heat press plates from said resinous material such that the portion of said resinous material pulled apart from said area is dropped away and said heat press plates return to a position near said cassette.

4,790,125

## FEED ROLLERS FOR ROUND BALER NET DISPENSER

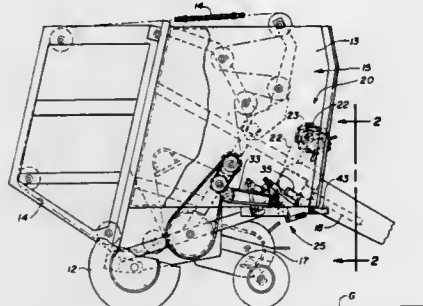
John H. Merritt, III, New Holland, Pa., assignor to New Holland Inc., New Holland, Pa.

Filed May 1, 1987, Ser. No. 45,946

Int. Cl.<sup>4</sup> B65B 11/04

U.S. Cl. 53—587

3 Claims



1. In a round baler utilized for making cylindrical bales of crop material and having a wheeled frame adapted for movement over the ground; a pair of transversely spaced apart, generally vertical side sheets supported by said frame; bale forming means movably supported between said side sheets for forming a cylindrical bale of crop material; and a net dispensing means positioned adjacent said bale forming means for selectively dispensing netting material from a source of supply of said netting material into said bale forming means so that a finished cylindrical bale of crop material can be wrapped therearound with said netting material, an improved net dispensing means comprising:

a driven transverse feed roller journaled between said sheets and a pair of movable, transversely extending rotatable pinch rollers engageable with said feed roller along the transverse length thereof, said pinch rollers being movable away from said feed roller to permit the introduction of netting material therebetween, said pinch rollers being movable into engagement with said feed roller to pinch said netting material therebetween and permit a feeding thereof into said bale forming means, one of said pinch rollers being mounted between transversely spaced plates and being positioned on one side of said feed roller, the other said pinch roller being rotatably journaled between a pair of pivot arms which are pivotally connected to the corresponding said plate to permit a movement of said other pinch roller relative to said feed roller and said one pinch roller, said other pinch roller being positioned on the opposing side of said feed roller, each said plate being slidably mounted on the adjacent side sheet, said pivot arm being connected to an overcenter linkage to effect a pivotal movement thereof into a position in which said other pinch roller is engaged with said feed roller so that any subsequent pivotal movement of said pivot arm will

effect a sliding movement of said plate to draw said one pinch roller into engagement with said feed roller.

4,790,126

## FILL AND SEAL MACHINE FOR RECLOSABLE BAGS

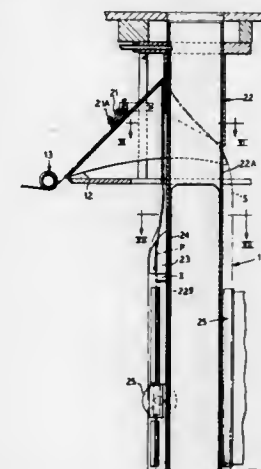
Hugo Boeckmann, Arlington Heights, Ill., assignor to Minigrip Inc., Orangeburg, N.Y.

Filed Jun. 29, 1987, Ser. No. 67,480

Int. Cl.<sup>4</sup> B65B 9/08

U.S. Cl. 53—451

10 Claims



1. In a form/fill/seal packaging machine for making product-containing bags from a continuous length of sheet material having lengthwise directed male and female reclosable fastener strips, said machine having means for effecting intermittent advancement of said sheet material, means for sealing free edges of said bags, and means for interlocking said male and female fastener strips during formation of said bags, improvement comprising:

a spotweld means for applying a spotweld of facing sheet material portions at the side edges of said interlocked fastener strips for each bag, and means for activating said spotweld means during dwell periods between advancements of said sheet material prior to the completion of formation of the product-containing bag so that the spotweld will hold the fastener strip interlocked at the bag sides and the strip can be separated and again interlocked between the bag side edges.

4,790,127

## BERRY HARVESTER

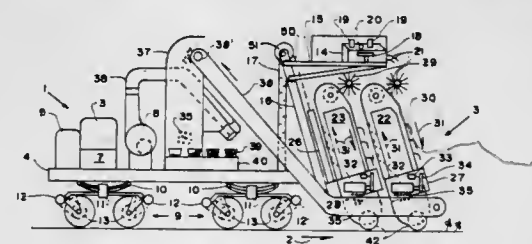
Elton N. Nason, and Laurence R. Grant, both c/o Agreco, Inc., P.O. Box 100, Millbridge, Me. 04658

Filed Mar. 19, 1987, Ser. No. 28,171

Int. Cl.<sup>4</sup> A01D 46/00, 46/20

U.S. Cl. 56—330

20 Claims



1. A berry picking apparatus, comprising picking head means for picking berries, mobile support means for operatively carrying said picking head means, said mobile support

means being movable in a travel direction, said picking head means comprising a plurality of individual picking units arranged in a row extending substantially perpendicularly to said travel direction, each picking unit comprising a picking frame, two spaced chain guide tracks forming part of said picking frame, a pair of endless chains riding along said chain guide tracks, a plurality of picking combs each including a plurality of picking teeth for picking berries, pivot means individually securing each picking comb with its ends to said endless chains so that said picking combs ride along with said pair of endless chains, chain drive means including drive sprocket means arranged in each picking frame for driving said endless chains carrying said picking combs, mounting means for movably and individually mounting each picking frame to said mobile support means, first power lifting means arranged between each picking frame and said mounting means for individually lifting each of said picking frames, ground condition sensor means operatively and separately connected to each picking frame of each picking unit for providing an obstacle representing signal, said ground condition sensor means comprising for each picking unit at least one ground engaging wheel, see-sawing lever means for securing the respective ground engaging wheel to the corresponding picking frame, said see-sawing lever means having two ends, first journal means pivotally securing said see-sawing lever means to the respective picking frame intermediate said ends to form two rocker lever arms, second journal means journaled said ground engaging wheel to one of said lever arms, and signal transmitting means pivoted to the other of said lever arms and connected to said first power lifting means for transmitting said obstacle representing signal to said first power lifting means for activating said first power lifting means and individually lifting the respective picking unit out of the way of an obstacle independently of any lifting of any other picking unit by its respective first power lifting means for permitting any other not lifted picking unit to continue picking berries.

4,790,128

## CROP HARVESTING APPARATUS AND METHODS

Wilfred E. Klinner, Milton Keynes, United Kingdom, assignor to National Research Development Corporation, London, England

PCT No. PCT/GB85/00442, § 371 Date May 27, 1986, § 102(e) Date May 27, 1986, PCT Pub. No. WO86/01972, PCT Pub. Date Apr. 10, 1986

PCT Filed Sep. 26, 1985, Ser. No. 879,109

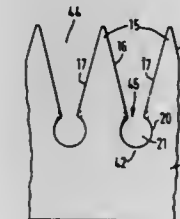
Claims priority, application United Kingdom, Sep. 27, 1984, 8424396

The portion of the term of this patent subsequent to Oct. 8, 2002, has been disclaimed.

Int. Cl.<sup>4</sup> A01D 82/00, 65/02, 89/00

U.S. Cl. 56—364

16 Claims



1. Apparatus for harvesting crop comprising:  
a mobile frame for movement over the ground;  
moveable support means mounted for driven movement relative to the frame;  
a plurality of outwardly projecting crop engaging elements mounted on the moveable support means;

guide means co-operating with the crop engaging elements to form a crop flow passage; and drive means for driving the moveable support means so as to detach from standing crop predetermined required parts of the crop, and to move the detached crop parts along the crop flow passage, the moveable support means being arranged to carry the elements upwardly and rearwardly at a front region of the apparatus, at least some of the crop engaging elements comprising crop stripping elements each of which has a distal tip for entering into and dividing crop, and has side edges diverging from each other in a direction away from the distal tip of the element, the crop stripping elements being arranged to engage standing crop while projecting forwardly relative to the direction of forward travel of the apparatus, the crop stripping elements having relief spaces at the junctions of adjacent elements defined by re-entrant edges extending sideways into the elements for stripping crop parts from regions of the standing crop which face forwardly relative to the intended direction of movement of the apparatus.

4,790,129

## GROUND CONTROL

Warwick Hutchins, Coburg North, Australia, assignor to Rock Engineering Pty. Limited, Victoria, Australia  
Continuation of Ser. No. 736,344, May 21, 1985, abandoned.  
This application Dec. 17, 1986, Ser. No. 942,953  
Claims priority, application Australia, May 22, 1984, PG5113  
Int. Cl.<sup>4</sup> F16B 13/02

U.S. Cl. 57—204

3 Claims



1. An improved cable bolt of high tensile strength for ground control made from a standard cable bolt comprising a plurality of individually twisted wires of a constant pitch, said improved cable bolt comprising a plurality of said individually twisted wires which, over at least part of the length of the bolt, are twisted in the direction opposite to the original twist of the wires without rewinding the wires so as to provide between the ends of the wires, a region in which at least the outermost wires each follow a path of the shape of a single simple regular helix and these outermost wires together form at least three successive areas of enlarged diameter wherein the wires are spaced, one from the other, and are separated only by nodes therebetween wherein the wires lie closely adjacent to one another but are not wound or revolved one around the other, said nodes being of very short length as compared with the lengths of the areas of enlarged diameter and the distance between the centers of the said nodes being substantially equal to the pitch length of the wires of the standard cable bolt.

4,790,130

## SPINNING UNIT PIECING PROCESS FOR PRODUCING FEED SPOOLS

Fritz Stahlecker, Josef-Neidhart-Strasse 18, 7347 Bad Überkingen, Fed. Rep. of Germany, and Hans Stahlecker, Haldenstrasse 20, 7334 Süssen, Fed. Rep. of Germany  
Filed Oct. 8, 1987, Ser. No. 105,813  
Claims priority, application Fed. Rep. of Germany, Oct. 9, 1986, 3634464

Int. Cl.<sup>4</sup> D01H 15/00

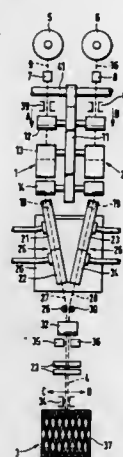
U.S. Cl. 57—261

14 Claims

1. A piecing process for piecing prestrengthened slivers formed in a unit of the type having drafting roller means for supplying a pair of drafted slivers, pneumatic false twisting means for forming prestrengthened slivers from the pair of drafted slivers, prestrengthened sliver withdrawing means for withdrawing the prestrengthened slivers from the false twisting means and joint sliver wind-up means for jointly winding

up the pair of prestrengthened slivers to form feed spools of multiple wound prestrengthened slivers which can be used in subsequent twisting operations or the like to form commercially usable yarn, said process comprising the sequential steps of

starting the supply of the pair of drafted slivers by the drafting roller means,



inserting the pair of drafted slivers into the false twisting means, jointly gripping the pair of slivers at the outlet end of the false twisting means, and inserting the slivers into the withdrawing means where they are fed to the wind-up means.

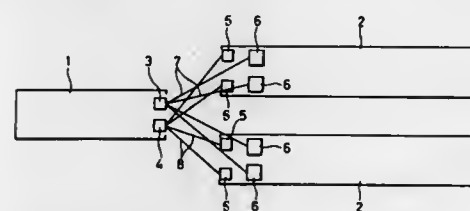
4,790,131

## SPINNING WINDER

Hiroshi Uchida, Oumihachiman, Japan, assignor to Murata Kikai Kabushiki Kaisha, Kyoto, Japan  
Continuation of Ser. No. 643,073, Aug. 22, 1984, Pat. No. 4,736,581. This application Sep. 1, 1987, Ser. No. 91,892  
Claims priority, application Japan, Aug. 25, 1983, 58-155967  
Int. Cl.<sup>4</sup> D01H 9/18, 9/00; B65H 67/06

U.S. Cl. 57—281

7 Claims



1. A spinning winder comprising:  
a spinning frame having an empty bobbin receiving portion and being operable to doff spinning bobbins;  
a winder having a spinning bobbin receiving portion and being operable to discharge empty bobbins;  
a work passage between said spinning frame and said winder;  
a transporting device for said spinning bobbins and said empty bobbins, said transporting device comprising:  
a substantially vertical spinning bobbin conveyor provided adjacent the spinning frame for upwardly transporting spinning bobbins doffed by the spinning frame,  
an inclined spinning bobbin chute mounted above the work passage at an incline from the upper end of said spinning

bobbin conveyor to the spinning bobbin receiving portion of the winder,  
a substantially vertical empty bobbin conveyor provided adjacent the winder for upwardly transporting empty bobbins discharged from the winder, and  
an inclined empty bobbin chute mounted above the work passage at an incline from the upper end of said empty bobbin conveyor to the empty bobbin receiving portion of the spinning frame.

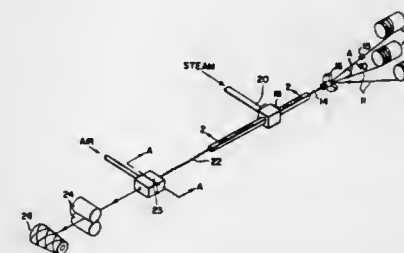
4,790,132

## PROCESS FOR MAKING A FALSE TWISTED DIFFERENTIAL TENSION YARN

Thomas L. Nelson, Georgetown, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Division of Ser. No. 857,350, Apr. 30, 1986, Pat. No. 4,704,856, and a continuation-in-part of Ser. No. 817,385, Jan. 9, 1986, abandoned. This application Jul. 16, 1987, Ser. No. 74,243  
Int. Cl.<sup>4</sup> D02G 3/38, 3/04

U.S. Cl. 57—284

8 Claims



1. A process for making a continuous multifilament crimped polyamide yarn suitable for use in loop pile carpeting comprising the steps of:  
(a) combining at least two multifilament crimped polyamide yarns at different tensions such that the yarns are not overwrapped and feeding such combined yarns through a heating zone in a false-twisted state;  
(b) heating the false-twisted yarns with saturated steam; and  
(c) false-twisting the yarns.

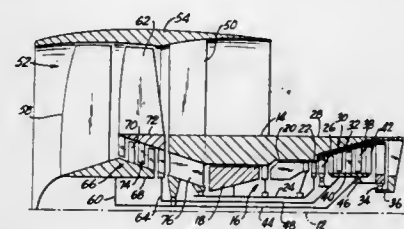
4,790,133

## HIGH BYPASS RATIO COUNTERROTATING TURBOFAN ENGINE

Alan R. Stuart, Boston, Mass., assignor to General Electric Company, Cincinnati, Ohio  
Continuation of Ser. No. 902,259, Aug. 29, 1986, abandoned.  
This application Mar. 10, 1988, Ser. No. 166,749  
Int. Cl.<sup>4</sup> F02K 3/072

U.S. Cl. 60—226.1

8 Claims



1. A gas turbine engine comprising:  
a unitary gas generator effective for generating combustion gases;  
a counterrotatable power turbine completely aft of said gas generator including first and second interdigitated counterrotatable turbine blade rows effective for rotating first and second drive shafts, respectively;  
a counterrotatable fan section completely forward of said

gas generator including a first fan blade row connected to said first drive shaft and a second fan blade row connected to said second drive shaft; and  
a counterrotatable booster compressor completely forward of said gas generator including a first compressor blade row connected to said first drive shaft and a second compressor blade row interdigitated with said first compressor blade row and connected to said second drive shaft, whereby each turbine row of the first and second turbine blade rows respectively drives both a fan blade row and a compressor blade row.

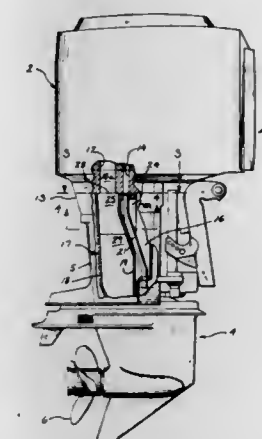
4,790,134

## OUTBOARD MOTOR EXHAUST TUBE DIVIDER

Clemens A. Johnson, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.  
Filed Jun. 11, 1987, Ser. No. 61,904  
Int. Cl.<sup>4</sup> F01N 3/02

U.S. Cl. 60—321

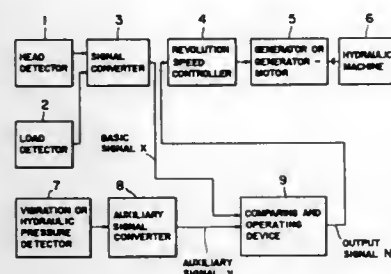
2 Claims



1. An outboard motor comprising, in combination:  
(a) an upper unit (2) having an internal combustion engine (3) and with said engine having a pair of side-by-side exhaust ports (12; 12a) separated by a web (11; 11a),  
(b) a lower unit (4) mounted to said upper unit and with said lower unit including a drive shaft housing (5) and a propeller (6) driveable by said engine,  
(c) a longitudinally extending exhaust tube (17) disposed within said housing and with said exhaust tube adapted to provide for passage of exhaust from said exhaust ports downwardly toward said propeller,  
(d) divider means integrated into and forming a part of the upper end portion of said exhaust tube for separating said exhaust tube into multiple individual channels (10b) communicating respectively with said exhaust ports,  
(e) said exhaust tube (17) being provided with opposed wall portions (18, 19),  
(f) said divider means including a longitudinally extending divider plate (25) having vertical edges anchored to said opposed wall portions,  
(g) said engine (3) including a cooling water intake port (14) to which a downwardly extending cooling water tube (21) is connected,  
(h) and an elongated longitudinal housing (22) extending inwardly within said exhaust tube (17) and effectively forming part of one of said wall portions (18, 19),  
(i) said last-named housing carrying said cooling water tube,  
(j) one said vertical edge of said divider plate (25) being anchored to said last-named housing so that the latter forms part of said divider means.



**4,790,135**  
**STEADY OPERATION METHOD FOR HYDRAULIC MACHINE OPERATING AT VARIABLE SPEED**  
 Osamu Noji, Odawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Apr. 24, 1987, Ser. No. 42,254  
 Claims priority, application Japan, Apr. 26, 1986, 61-97100  
 Int. Cl.<sup>4</sup> F16D 31/00  
 U.S. Cl. 60—327 7 Claims

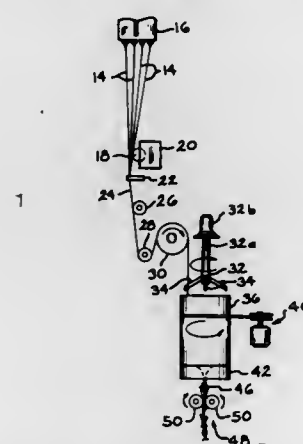


1. A steady operation method for a hydraulic machine operating at a variable revolution speed which is controlled in accordance with a head or load at a steady operation of the hydraulic machine, comprising the steps of:  
 detecting a head or load of a hydraulic machine;  
 obtaining a basic signal in response to a detected value of the head or load so as to control a revolution speed of the hydraulic machine;  
 detecting parallelly a vibration or hydraulic pressure variation of the hydraulic machine;  
 converting a detected value of the vibration or hydraulic pressure variation into an auxiliary signal; and  
 controlling the revolution speed of the hydraulic machine operating at a variable speed in such a manner as that when the auxiliary signal is below a predetermined upper limit thereof regarding the vibration or the hydraulic pressure variation, said revolution speed is controlled by said basic signal, and otherwise, when the auxiliary signal is beyond said predetermined upper limit, said revolution speed is controlled by a signal other than said basic signal.

**4,790,136**  
**METHOD AND APPARATUS FOR THE MANUFACTURE OF GLASS FIBER STRAND ROVING**  
 Hellmut I. Glaser, and William L. Streicher, both of Granville, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio  
 Filed Oct. 19, 1987, Ser. No. 109,671  
 Int. Cl.<sup>4</sup> D01H 7/00; D02G 3/18, 3/22; D02J 1/02  
 U.S. Cl. 57—350 6 Claims

1. In a method of forming a roving from a plurality of fibers, the roving having axially extending loops and a relatively large number of unbroken cross-axially extending loops formed in the axially extending loops and at least partly extending outwardly from the axially extending loops, the axially extending loops and the cross-axially extending loops being interengaged and intertwined with one another, the roving having a relatively high bulk, said method comprising the steps of:  
 providing a plurality of fibers;  
 combining said plurality of fibers into a plurality of strands, each of said strands comprising more than one of said fibers;  
 providing a spinner having an inside surface defining a passage with an inlet, an outlet and a central axis extending between said inlet and said outlet;  
 providing a wheel with a plurality of fingers projecting outwardly therefrom and a central axis, each of said fingers having a tip;  
 rotating said wheel about said central axis;  
 advancing said plurality of strands in a direction that extends

axially of said plurality of strands toward and between the fingers of said wheel as said wheel rotates about said central axis;  
 providing an orifice adjacent said outlet of said passage of said spinner, said orifice having an axis that is generally parallel to said axis of said passage of said spinner, the size of said orifice in a plane extending transversely of said axis of said orifice being very small relative to the size of said passage in a plane extending transversely of said passage; rotating said spinner about said central axis of said passage; advancing said plurality of strands with said plurality of loops through said passage of said spinner from the tips of said plurality of fingers to said outlet to thereby twist said plurality of strands with said plurality of loops and form a mass of said plurality of strands with said plurality of loops

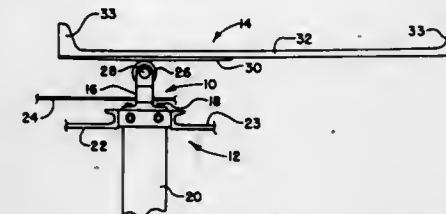


in said spinner adjacent said outlet of said passage, said mass having no appreciable velocity in a direction extending axially of said plurality of strands with said plurality of loops to form a second plurality of loops in said plurality of strands with said plurality of loops, said second plurality of loops extending crosswise of said plurality of strands with said plurality of loops to interengage and intertwine with said plurality of strands with said plurality of loops and other loops in said second plurality of loops; and withdrawing said plurality of strands with said plurality of loops and said second plurality of loops from said mass in said spinner through said orifice;  
 the improvement wherein the tip of said each of said plurality of fingers is positioned within said passage of said spinner between said inlet and said outlet.

**4,790,137**  
**AIRCRAFT ENGINE OUTER DUCT MOUNTING DEVICE**  
 Ronald E. Quinn, Hamilton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.  
 Filed Jul. 17, 1987, Ser. No. 74,802  
 Int. Cl.<sup>4</sup> F02K 3/04; F02C 7/20  
 U.S. Cl. 60—226.1 10 Claims

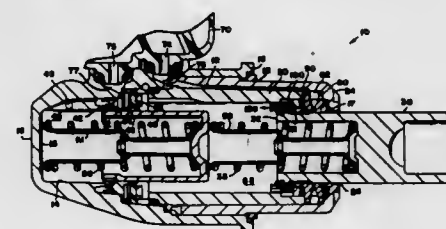
1. A mounting assembly for a turbofan engine having inner and outer casings comprising:  
 (a) a support post mounted on the inner casing;  
 (b) roller means attached to said support post; and  
 (c) a contact surface comprising a tapered roller track attached to said outer casing wherein said roller means contacts said outer casing at said contact surface and moves in motion between said inner and outer casings and wherein said roller track has a minimum radial dimension relative to the engine centerline coinciding with a non-

operating position of said roller means and is tapered to a larger radial dimension, in the axial direction, in order to



compress said roller means with a desired force during operation of the turbofan engine.

**4,790,138**  
**MASTER CYLINDER FAST FILL VALVING MECHANISM WITH RAMP**  
 John E. Steer, South Bend, Ind., assignor to Allied-Signal Inc., Morristown, N.J.  
 Filed Feb. 3, 1987, Ser. No. 10,359  
 Int. Cl.<sup>4</sup> B60T 11/08, 11/16  
 U.S. Cl. 60—578 27 Claims

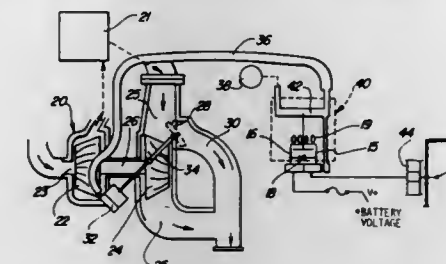


25. A master cylinder, comprising a master cylinder housing with a bore extending axially therein, a reservoir providing fluid for said bore, a pair of pistons associated with said master cylinder housing, one of said pistons having a fast fill mechanism disposed thereat, the fast fill mechanism including means for reducing an input master cylinder actuation force after a predetermined fast fill pressure is attained in an associated pressure chamber, the reducing means including a resilient mechanism which permits the fast fill mechanism to be displaceably actuated toward an exterior end of the one piston by the predetermined fast fill pressure so that the fast fill pressure is relieved smoothly and deteriorates substantially, and the fast fill mechanism continuing to be displaceably actuated toward the exterior end of the one piston after the predetermined fast fill pressure has deteriorated and while the one piston is returning toward an at-rest position.

**4,790,139**  
**RETROFIT TURBOCHARGER BOOSTER**  
 James L. Roach, 3133 Auburn Rd., Auburn Hills, Mich. 48057  
 Filed Jan. 29, 1987, Ser. No. 66,973  
 Int. Cl.<sup>4</sup> F02B 37/12  
 U.S. Cl. 60—602 12 Claims

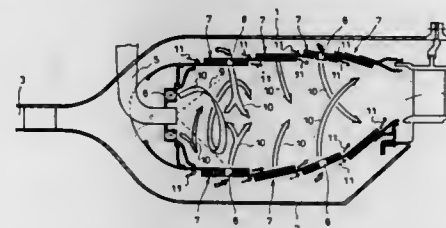
1. A retrofit turbocharger booster for use in combination with an internal combustion engine having a turbocharger, the turbocharger having a compressor operatively connected to an exhaust turbine, an exhaust gas wastegate, a wastegate actuator, control means for providing a normal pulse train of on and off voltage, a wastegate control valve having a solenoid controlled manifold vacuum supply gate which shifts the wastegate actuator between a wastegate closed position when voltage is applied to the solenoid and a wastegate opened position when voltage is removed from the solenoid, the retrofit turbocharger booster comprising:  
 first and second conductors electrically connected to oppo-

site poles of the solenoid respectively, said first conductor being electrically connected to a voltage source, and said second conductor being electrically connected to ground through the control means; and  
 pulse modification means connected to at least one of said first and second conductors for extending the effective



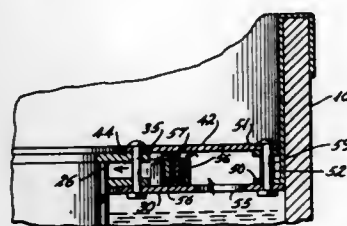
length of the on pulse portion of the pulsing voltage subsequent to generation of the pulse train by the control means, the extension being relative to said normal pulse train provided by the control means, said pulse modification means being effective to extend the effective length of the on pulse upon the change in the normal pulsing voltage from on to off.

**4,790,140**  
**LINER COOLING CONSTRUCTION FOR GAS TURBINE COMBUSTOR OR THE LIKE**  
 Yukinori Sato, Iruma; Takeshi Watanabe, Ome; Isao Nikai, and Kenji Watanabe, both of Yokohama, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha, Tokyo, Japan  
 Continuation of Ser. No. 852,771, Apr. 16, 1986, abandoned.  
 This application Oct. 29, 1987, Ser. No. 115,630  
 Claims priority, application Japan, Apr. 18, 1985, 60-8299  
 Int. Cl.<sup>4</sup> F02C 7/12, 7/20  
 U.S. Cl. 60—757 1 Claim



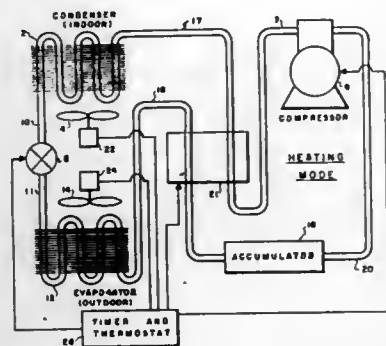
1. A liner of a gas turbine combustor or the like, comprising: a plurality of axially spaced liner sections; each liner section having an inner and an outer liner wall, axially extending partition walls sandwiched between said inner and outer liner walls and corrugated angularly across said liner walls so as to define a plurality of parallel, separate channels which are closed except for an upstream inlet opening and a downstream outlet opening; a plurality of twisted tapes respectively disposed in said channels between said openings; said liner sections being arranged such that the inner liner wall of a liner section is an uninterrupted, substantially aligned extension of the outer liner wall of an adjacent upstream liner section; and means for passing cooling air into said upstream openings, through said channels, and out from said downstream openings, whereby the cooling air is caused to swirl by said twisted tapes and leaves the downstream openings swirling to thereby cool the inner liner walls.

4,790,141  
**APPARATUS AND PROCESS FOR QUICK FREEZING OF BLOOD PLASMA**  
 Battle Glascock, Knoxville, Tenn., assignor to Industrial Gas and Supply Company, Bluefield, W. Va.  
 Filed Dec. 14, 1987, Ser. No. 132,024  
 Int. Cl. F24F 3/16  
 U.S. Cl. 62—78



8. For use with a cryogenic container having upstanding walls, a bottom, an open top, and a removable lid, the improvement comprising, plate means extending transversely of said walls and between said bottom and open top, said plate means in sealed relationship with said walls, thermally conductive cooling tower means having side walls, a closed bottom and an open top, said plate means receiving the upper portion of said cooling tower means and in sealed relationship with the side walls thereof, said cooling tower means having duct means extending along its side walls from adjacent its upper portion to a position therebelow, said duct means having inlet means at its upper portion for receiving vapor from beneath said plate means, said duct means having port means for discharging vapor inwardly, said container having means for discharging vapor which is in the space above said plate means, whereby liquid cryogen in said container at a level just below said plate means is in thermally conductive relation with a cryobiological container in said cooling tower means, and whereby evolving cryogen vapor passes through said duct means and said port means into contact with said cryobiological container, said vapor passing upwardly along said container in heat exchange relation therewith into the space above said plate means for discharge from said cryogenic container.

4,790,142  
**METHOD FOR MINIMIZING CYCLING LOSSES OF A REFRIGERATION SYSTEM AND AN APPARATUS USING THE METHOD**  
 Thomas J. Beckey, Edina, Minn., assignor to Honeywell Inc., Minneapolis, Minn.  
 Filed Aug. 19, 1987, Ser. No. 87,114  
 Int. Cl. F25B 13/00  
 U.S. Cl. 62—115



1. A method for controlling a refrigeration system having an indoor coil, an indoor coil fan, an outdoor coil, an outdoor coil

9 Claims

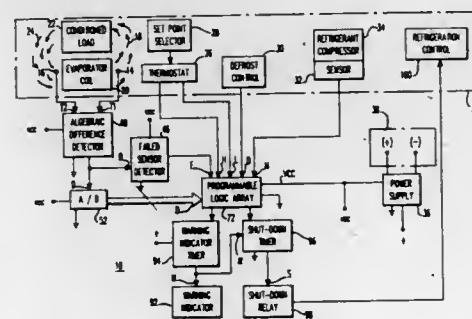
fan, a refrigerant line between one end of the indoor coil and one end of the outdoor coil, a compressor means and a reversing valve connecting a compressor means between the other end of the indoor coil and the other end of the outdoor coil including the steps of operating the reversing valve to a state opposite to the one representative of the operating condition of the refrigeration system for a predetermined period of time starting prior to an energization of the compressor means and ending after the energization of the means which period of time is sufficiently short to minimize a differential pressure across the compressor means without allowing a redistribution of a liquid refrigerant in the refrigeration system and restoring the reversing valve to a state needed for the operating condition of the refrigeration system at the end of the period of time while continuing the energization of the compressor means.

4,790,143  
**METHOD AND APPARATUS FOR MONITORING A TRANSPORT REFRIGERATION SYSTEM AND ITS CONDITIONED LOAD**

Jay L. Hanson, Bloomington, Minn., assignor to Thermo King Corporation, Minneapolis, Minn.  
 Filed Oct. 23, 1987, Ser. No. 111,910  
 Int. Cl. F25B 49/00, 13/00

U.S. Cl. 62—126

18 Claims

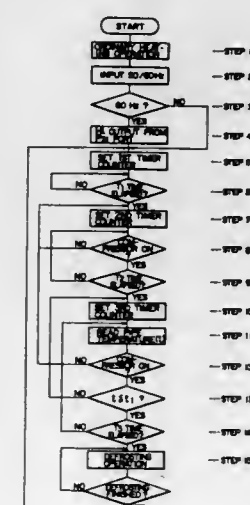


1. A method of monitoring and protecting a transport refrigeration system and a load in a load space to be conditioned by the transport refrigeration system, with the transport refrigeration system having a selectable set point temperature for the load space which is maintained by heating and cooling modes, comprising the steps of: providing a signal H indicative of whether the refrigeration system is in a heating or a cooling mode, locking out the heating mode when the set point temperature selected is below a predetermined temperature, detecting the temperature T1 of air discharged from the refrigeration system into the load space, detecting the temperature T2 of air returning to the refrigeration system from the load space, providing a difference signal D equal to the difference between T1 and T2, preserving the sign of the difference, determining if the sign of D is consistent with signal H, activating a first timer when the sign of D is not consistent with signal H, selecting a first reference value V1 having a magnitude responsive to whether or not the heating mode has been locked out, with the first reference value V1 being indicative of a warning threshold value for D, below which a warning signal W may be provided, determining if D exceeds the first reference value V1 when the sign of D is consistent with signal H, activating the first timer when D does not exceed the reference value V1, resetting the first timer in response to D exceeding the reference value V1, and providing the warning signal W in response to the first

timer being continuously active for a first predetermined period of time.

4,790,144  
**DEFROSTING CONTROL APPARATUS FOR A TEMPERATURE CONTROL SYSTEM**  
 Akira Yokouchi, Kusatsu; Katsumi Fukuda, Shiga; Keiichi Kuriyama, Kusatsu; Makoto Kaibara, Otsu, and Masahiro Watanabe, Kusatsu, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Nov. 14, 1986, Ser. No. 930,754  
 Claims priority, application Japan, Nov. 18, 1985, 60-258002; Nov. 18, 1985, 60-258003; Nov. 18, 1985, 60-258005; Jan. 24, 1986, 61-14021

Int. Cl. F25D 21/06  
 U.S. Cl. 62—156

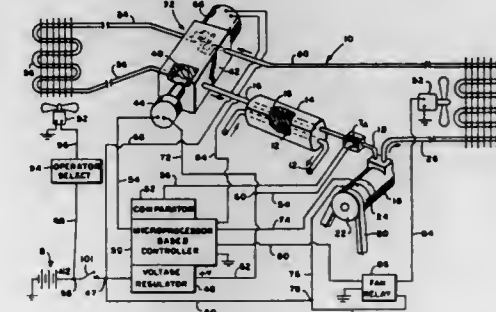


1. A defrosting control apparatus for use with a temperature control system having a compressor, an indoor heat exchanger with an inlet pipe, an expansion device, an outdoor heat exchanger, and cycle switching means for switching between a heating cycle and a defrosting cycle, said defrosting control apparatus controlling said cycle switching means and comprising:

temperature detecting means for detecting the temperature of a refrigerant at the inlet pipe of said indoor heat exchanger;  
 set temperature memory means for providing a boundary value temperature at which the heating cycle is to be switched to the defrosting cycle;  
 temperature comparing means for detecting whether the temperature detected by said temperature detecting means is lower than said boundary value temperature provided by said set temperature memory means and for outputting the result of the detection;  
 time measuring means for measuring a time corresponding to how long the temperature detected by the temperature detecting means has been lower than the boundary value temperature provided by the set temperature storing means;  
 set time memory means for storing a predetermined low-level time;  
 time comparing means for detecting a coincidence between said time detected by said time measuring means and the low-level time set in said set time memory means and for outputting the result of the detection;  
 determining means for generating an output which determines when to switch from the heating cycle to the defrosting cycle on the basis of the output of said time com-

paring means and the output of said temperature comparing means; and  
 selection output means for controlling said cycle switching means to switch from the heating operation to the defrosting operation in response to the output of said determining means.

4,790,145  
**SUPERHEAT CONTROL OF AIR CONDITIONING SYSTEM INCORPORATING FUEL COOLER**  
 Michael B. Thompson, Hoffman Estates, and Robert J. Torrence, Addison, both of Ill., assignors to Eaton Corporation, Cleveland, Ohio  
 Filed Nov. 13, 1987, Ser. No. 119,943  
 Int. Cl. F25B 41/00, 41/04; F02M 15/00, 31/20  
 U.S. Cl. 62—212



1. A system for controlling vapor lock in an engine fuel line comprising:

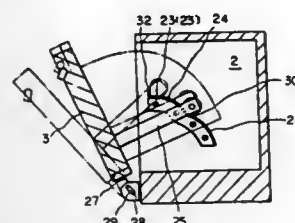
(a) a first and a second endothermic heat exchanger serially connected, said first exchanger disposed for cooling a compartment and said second exchanger in heat exchange relationship with said fuel line;  
 (b) an exothermic heat exchanger;  
 (c) electrically operated expansion valve means;  
 (d) refrigerant conduit means connecting said expansion valve means intermediate said exothermic heat exchanger and first endothermic heat exchanger;  
 (e) compressor means operative upon energization to circulate refrigerant through said exothermic heat exchanger through said expansion valve means and through said first and second endothermic heat exchangers;  
 (f) pressure sensing means disposed to sense the pressure of refrigerant flow between said first and second endothermic heat exchangers and provide an electrical signal indicative of said pressure;  
 (g) temperature sensing means disposed in a conduit means between said second endothermic heat exchanger and said compressor means and operative to provide an electrical signal T<sub>A</sub> indicative of the temperature of refrigerant flow in said conduit means;  
 (h) means to convert said sensed pressure to saturation temperature, T<sub>S</sub>, for the refrigerant being circulated; and  
 (i) comparator means operable to compare T<sub>A</sub> and T<sub>S</sub> and generate a control signal indicative of said comparison and means for operating said expansion valve means responsive to said control signal; and  
 (j) means operative to circulate engine fuel through said second endothermic heat exchanger for heat exchange with said refrigerant.



# 4,790,146 REFRIGERATOR

Im H. Mun, Soowonsi; Jang E. Young, Banghae; Park J. Hun, Soowonsi, and Suh M. Hwan, Ahnyansi, all of Rep. of Korea, assignors to Sam Sang Electronics Co., Ltd., Maitan, Rep. of Korea

Filed Jan. 7, 1987, Ser. No. 995  
Claims priority, application Rep. of Korea, Mar. 4, 1986, 86-2533; Mar. 20, 1986, 86-3410; Aug. 20, 1986, 86-12654  
Int. Cl. F25D 11/02  
U.S. Cl. 62-441 1 Claim



1. A refrigerator having a cold storage compartment and a freezer compartment located below the cold storage compartment, the freezer compartment being provided with a door which opens downwardly and closes upwardly, and said door being provided with a handle, wherein said door has lever means connected thereto, roller means being operatively associated with said lever means, guide rail means being provided on the interior of said freezer compartment and having a sliding surface which cooperates with said roller means, wherein the sliding surface of said guide rail means defines two connected arcs whose centers are displaced from each other, and pivot means connecting said door with said freezer compartment for permitting said door to be opened and closed by moving said roller means from one arc on the sliding surface to the other arc on the sliding surface and, wherein said pivot means comprises an axle pin on one of said door and freezer compartment and a female member with an oblong hole on the other of said door and freezer compartment to receive the axle pin such that one end of the oblong hole defines the center for one arc and another end of the oblong hole defines the center for the other arc so that the door can be opened and closed in a two-step action.

# 4,790,147 HELIUM COOLING APPARATUS

Toru Kuriyama, Yokohama, and Ryuichi Hakamada, Tokyo, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

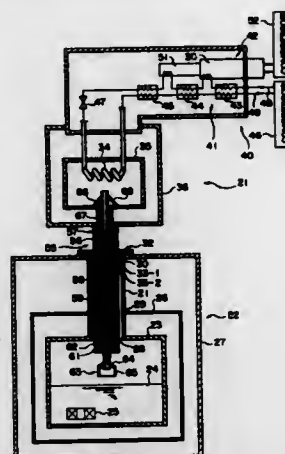
Filed Nov. 13, 1987, Ser. No. 120,547  
Claims priority, application Japan, Nov. 18, 1986, 61-274891  
Int. Cl. F25B 19/00

U.S. Cl. 62-514 R 15 Claims

1. A helium cooling apparatus comprising:

- a liquid helium container which, in use, stores liquid helium;
- a condensation chamber incorporating a condensation heat exchanger for condensing gas helium into liquid helium; and
- a transfer tube for allowing said liquid helium container to communicate with said condensation chamber, said transfer tube including a gas helium flow path and a liquid helium flow path that is independent of said gas helium flow path, wherein:
  - when the liquid helium in said liquid helium container is evaporated into gas helium, the gas helium is supplied to said condensation chamber through said gas helium flow path and is condensed by said condensation heat exchanger into liquid helium and the liquid helium is guided

to said liquid helium container through said liquid helium flow path and



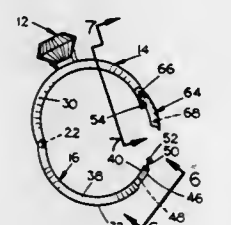
(e) the ratio of (cross-sectional area of the gas helium flow path)/[(cross-sectional area of the gas helium flow path)+(cross-sectional area of the liquid helium flow path)] is between 0.15 and 0.85.

# 4,790,148 RING SHANK

Gerard Faini, 2519 W. 8th St., P.O. Box 926, Sioux Falls, S. Dak. 57101

Filed Dec. 10, 1987, Ser. No. 130,942  
Int. Cl. A44C 9/00

U.S. Cl. 63-15.7 2 Claims



- A ring shank, comprising,
  - a first, elongated, arcuate shank portion having first and second ends,
  - a second, elongated, arcuate shank portion having first and second ends,
 each of said first and second shank portions having a quadrilateral cross section with inner, outer and opposite side surfaces, means pivotally connecting said first ends of said first and second shank portions, each of said first and second shank portions being generally semicircular in shape so as to form a complete circular ring shank when said second ends are pivoted into abutting relation,
  - a first stub portion extending from said second end of said first shank portion,
  - said first stub portion having a quadrilateral cross section with inner, outer and opposite side surfaces,
  - the opposite side surfaces of said first stub portion being spaced inwardly of said opposite side surfaces of said first shank portion,
  - the outer surface of said first stub portion being spaced inwardly of the outer surface of said first shank portion,
  - a shaft portion extending from said first stub portion,

a ball member mounted on said shaft portion, said first stub portion having a bore formed therein which extends inwardly into the outer surface thereof, a second stub portion extending from said second end of said second shank portion and having inner, outer, and opposite side surfaces, said second stub portion having a bore formed in its end and extending inwardly therein, said second stub portion further having a pair of opposing slots formed in its end bisecting the bore to form an expansion socket which is adapted to detachably, frictionally receive said ball member therein at times to enable said first and second shank portions to form a circular ring shank, an elongated U-shaped clasp pivotally connected at one end thereof to said second stub portion and being pivotally movable from an unlocked position to a locked position, said U-shaped clasp comprising an outer wall member having opposite side walls extending inwardly therefrom, the exterior surfaces of said side walls being flush with the opposite side surfaces of said first and second ring shank portions, and the exterior surfaces of said outer wall being flush with the outer surfaces of said first and second shank portions when said clasp is in said locked position, said clasp embracing said first and second stub portions when in its said locked position to prevent the expansion of said expansion socket, and a pin extending from said clasp which is received by said bore in said first stub portion when said clasp is in its locked position to prevent the separation of said ball member from said socket.

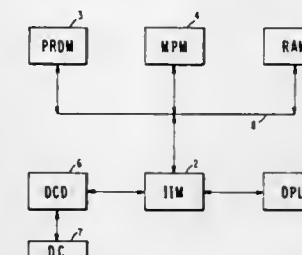
# 4,790,149

## FLATBED KNITTING MACHINE WITH ELECTRONIC CONTROL

Albin Weingartner, and David Retallick, both of Munich, Fed. Rep. of Germany, assignors to Universal Maschinenfabrik and Rudolf Schieber GmbH, both of Westhausen, Fed. Rep. of Germany

Filed Feb. 4, 1981, Ser. No. 231,525  
Claims priority, application Fed. Rep. of Germany, Oct. 1, 1979, 2939820

U.S. Cl. 66-75.2 12 Claims



1. In an electronic control system for a flatbed knitting machine with electronic control, said control system being of the type having memory means for storing a first division of data containing motif pattern draft data, a second division of data containing needle set-up data, a third division of data containing knitting plan data, a fourth division of data containing function number schedule data and a fifth division of data containing plan run data, and data entry means for entering data into said memory means, said knitting machine being of the type wherein a pattern is knitted in accordance with selected data retrieved from said memory means according to a knitting program, said knitted pattern including at least one of a plurality of standard patterns each defined by a portion of the data in said third division and a portion of the data in said fourth division, the improvement comprising: said memory means comprising a freely accessible memory,

e.g. a random access memory (RAM), for storing said first, second and fifth data divisions; and a programmable fixed-word memory, e.g. programmable read only memory (PROM) for storing at least said third division of data and the portion of said fourth division of data necessary to define said standard patterns.

# 4,790,150 FLAT KNITTING MACHINE

Thomas Stoll, Reutlingen, Fed. Rep. of Germany, assignor to H. Stoll GmbH & Co., Reutlingen, Fed. Rep. of Germany

Filed Dec. 30, 1987, Ser. No. 139,805  
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1987, 3701671

Int. Cl. D04B 3/06 10 Claims



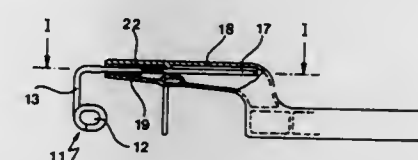
1. Flat knitting machine with thread guides conveyable on guide rails arranged above the needle beds and with thread-leading members for guiding the threads from the needle bed ends to the thread guides, characterized in that the thread-leading members are constructed as a thread-leading duct (15, 20, 25 30) which envelops the thread and which is adaptable, with its thread exit point on the side nearest the thread guide, to the changing distance between thread guides (10) and needle bed ends, at least one of which ducts is allotted to each thread guide (10).

# 4,790,151

YARN STOP MOTION FOR TEXTILE MACHINES  
Ernst Goller, Reutlingen; Fritz Walker, Kusterdingen, and Franz Schmid, Bodelshausen, all of Fed. Rep. of Germany, assignors to H. Stoll GmbH & Co., Reutlingen, Fed. Rep. of Germany

Filed Sep. 30, 1987, Ser. No. 102,621  
Claims priority, application Fed. Rep. of Germany, Sep. 30, 1986, 3633108

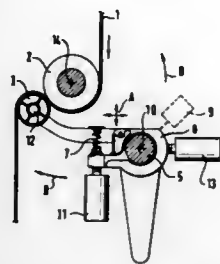
Int. Cl. D04B 3/06 4 Claims



1. A yarn guide assembly for use with a stop motion mechanism of a textile machine comprising: a housing which can be carried on a carrier rail, said housing including a front end; a yarn guide member at the front end of said housing into which the yarn or thread is introduced from the side, said yarn guide member being made from a one-piece round wire or rod and including (a) a yarn guide eye formed by a spiral of at least 5/4 turns of said wire or rod and (b) a support formed from a straight section of said wire or rod and having in at least one circumferential position a flat region extending over at least a part of the length thereof; an adjustable securing means for securing said support of said yarn guide member to said housing so that said sup-

port is adjustably movable in said securing means and thus the distance of said yarn guide eye from said housing is adjustable; and  
 a guide means in which said flat region of said support is received for preventing rotation of said yarn guide member.

**4,790,152**  
**FABRIC DRAW-OFF ARRANGEMENT IN FLAT KNITTING MACHINES**  
 Otto Geitner, Bopflingen, Fed. Rep. of Germany, assignor to Universal Maschinenfabrik Dr. Rudolf Schleber GmbH & Co., Westhausen, Fed. Rep. of Germany  
 Filed Nov. 12, 1987, Ser. No. 119,769  
 Claims priority, application Fed. Rep. of Germany, Nov. 11, 1986, 3638374  
 Int. Cl.<sup>4</sup> D04B 15/88  
 U.S. Cl. 66—149 R 10 Claims

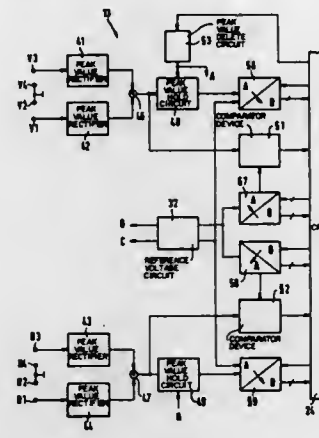


1. Fabric draw-off arrangement for a flat knitting machine, comprising a driven fabric draw-off member consisting of a plurality of roller elements and pressure rollers of a fabric pressure member, which are associated with the roller elements and which are mounted on a common rocker shaft and are adjustably and resiliently pressable against the respective roller element, which pressure rollers can be pivoted by electro-motor means together into and out of variable end positions, the pressure force of each pressure roller being individually settable by electro-motor means.

**4,790,153**  
**SAFETY DEVICE FOR FLAT-BED KNITTING MACHINES**  
 Jürgen Ploppa, Pfullingen, and Gerd Mak, Reutlingen, both of Fed. Rep. of Germany, assignors to H. Stoll GmbH & Co., Fed. Rep. of Germany  
 Filed Nov. 13, 1987, Ser. No. 119,869  
 Int. Cl.<sup>4</sup> D04B 35/10  
 U.S. Cl. 66—157 28 Claims

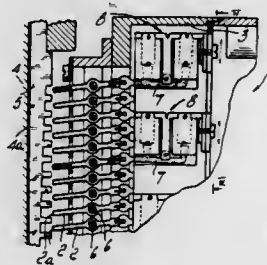
1. A safety device, in particular for flat-bed knitting machines having at least one cam carriage and drive means for stoppage of the machine in the event of a change in the power to the carriages as compared with applicable normal operation resulting from disruptions in removal of the goods, in loop formation and yarn insertion, or caused by the specification of excessively high loop tightness or the like, comprising:  
 a measuring means for detecting the actual value of a torque-proportional variable associated with the drive means;  
 a central processing unit for receiving the actual values of the torque-proportional variable and for generating threshold values of the torque-proportional variable;  
 an adjustable comparator device for receiving the actual values of the torque-proportional variable and the threshold values, said actual values and said threshold values being compared and a shutoff signal generated by the

adjustable comparator device when an actual value exceeds a threshold value; and



a shutoff device triggered by the shutoff signal for stopping the machine.

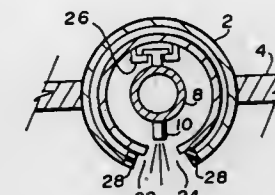
**4,790,154**  
**DEVICE FOR SELECTING NEEDLES IN A CIRCULAR KNITTING MACHINE, IN PARTICULAR FOR STOCKINGS**  
 Francesco Lonati, Brescia, Italy, assignor to Lonati S.p.A., Brescia, Italy  
 Filed Jun. 15, 1987, Ser. No. 61,620  
 Claims priority, application Italy, Jul. 8, 1986, 21063 A/86  
 Int. Cl.<sup>4</sup> D04B 15/78  
 U.S. Cl. 66—221 20 Claims



1. Device for selecting needles in a circular knitting machine, in particular for stockings, comprising a plurality of superimposed selection levers individually pivoted at an intermediate portion thereof to a supporting structure, said selection levers each having one of its ends facing the needle-bearing cylinder in the region of the selectors and being oscillatable in a selection plane from a first position, whereat said end is at an intermediate level between the heels of the selectors so as to not interfere therewith, to a second position, whereat said end is at the level of the heels of the selectors so as to interfere therewith, an actuating lever being provided for each selection lever, acting on the opposite end of said selection lever with respect to said selectors for its passage from said first position to said second position, wherein said actuating lever has at an intermediate portion thereof a fulcrum, said actuating lever being pivoted at said fulcrum to a frame and controllably oscillable in an actuation plane, and wherein said device comprises two electromagnets arranged on opposite sides with respect to said fulcrum of said actuating lever, said electromagnets having cores and being selectively activatable for causing oscillation of said actuating lever, wherein said frame has a base portion, at least one central portion, and at least two other portions, said central portion and said two other portions

extending parallel to each other from said base portion of said frame, said central portion oscillably supporting said actuating lever, said other two portions defining said cores of said electromagnets, said base portion having a reduced thickness at said central portion to define at least two magnetic circuits in said frame.

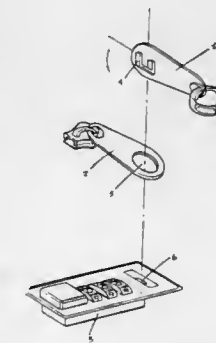
**4,790,155**  
**REPLACEABLE FLUID DYE APPLICATOR FOR INERT-BLANKETED REGIONS**  
 Vernon T. Daniel, Oak Ridge, and Jessie Gettiffe, Greensboro, both of N.C., assignors to Burlington Industries, Inc., Greensboro, N.C.  
 Filed Nov. 18, 1986, Ser. No. 932,020  
 Int. Cl.<sup>4</sup> D06B 1/02  
 U.S. Cl. 68—205 R 22 Claims



12. In an apparatus for continuously dyeing fabric including fabric feed means; an enclosed, inert-atmosphere tenter provided with liquid dyeing and heatsetting means therein; vacuum extractor means; solvent scouring means; drying means; and fabric take-up means; the improvement comprising a fluid nozzle dispensing assembly associated with an exterior wall of said enclosed tenter for applying liquid dye to said fabric, said assembly including:

an elongated, rotatable housing provided along its length with a relatively narrow slot, said housing mounted within the said exterior wall of said enclosed tenter;  
 said housing and said manifold rotatable from a first operative position wherein said nozzle is in communication with said interior of said tenter to a second inoperative position wherein said nozzle is substantially isolated from the interior of said tenter.

**4,790,156**  
**BAGGAGE ZIPPER LOCKING DEVICE**  
 Fu-Hsiung Yang, No. 158-1, 3rd Floor, Chao-Chou St., Taipei, Taiwan  
 Filed Aug. 28, 1987, Ser. No. 90,327  
 Int. Cl.<sup>4</sup> E05B 67/38  
 U.S. Cl. 70—68 1 Claim

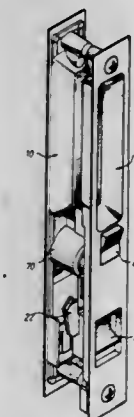


1. In a baggage container of the type having at least two edges adapted to be joined by a separate zipper fastener having

a pair of opposite ends and a pair of slider elements which meet to close, each of which slider elements has a respective zipper leaf secured thereto, the baggage container further being of the type having a baggage zipper locking device for securing the zipper leafs to one another, so as to hold the fastener in a closed position, sealing and locking the luggage container, the improvement thereupon, in combination, comprising:

one zipper leaf having a first end secured to a respective slider positioned at one end of the zipper, said one zipper leaf further having a second opposite free end provided with a raised locking hook having a substantially U-shaped configuration,  
 another second zipper leaf having a first end secured to a respective slider positioned at the other opposite end of the zipper, said second zipper leaf further having a second opposite free end provided with a hooking gap formed therein for removably receiving the said locking hook when the one zipper leaf is placed at least partially overlapping the second zipper leaf; and  
 a lock with a hasp secured to the baggage container, so that after the said baggage container is closed with the slider elements of the zipper, the one zipper leaf is placed at least partially overlapping the second zipper leaf, and the said locking hook carried on the second free end of the one zipper leaf is received through said hooking gap formed in the second free end of the second zipper leaf and engages the hasp, whereby the hasp removably secures the locking hook, so as to lock the one and the second zipper leafs of the said baggage container in place.

**4,790,157**  
**LOCKING APPARATUS FOR SLIDING DOOR**  
 Andrew Lin, 25, Lane 97, Hertzuoeh St., Feng Yuan City, Taiwan  
 Filed May 18, 1987, Ser. No. 50,869  
 Int. Cl.<sup>4</sup> E05B 65/08  
 U.S. Cl. 70—95 4 Claims



1. A locking apparatus for a sliding door having at least a first and a second leaf slidable in a groove, said locking apparatus comprising:

a hooking assembly mounted on the first leaf;  
 a corresponding hook retaining means mounted on the second leaf;  
 an overriding safety lock means pivotal on the hooking assembly between a first position when a locking means of the hooking assembly moves to an open position allowing the slidable door to be opened and a second position when the locking means moves to a closed position to prevent opening of the sliding door;  
 a first and a second vertical panel mounted on the first leaf with the rear side of the vertical panels facing each other, wherein the first panel comprises a key operated lock having a post projecting rearwards from the rear face of



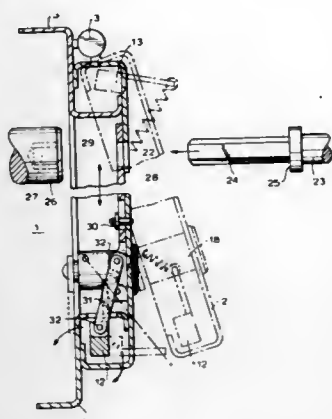
the lock, and wherein the second panel comprises a slidable locking block vertically slidable along an inner surface of the second vertical panel, the locking block being provided with an opening to receive the rearwardly projecting post of the lock, said locking block carrying a locking plate adapted for engagement with the hook retaining means mounted on the second leaf, said second vertical panel being further provided with an opening for receiving an overriding locking means in pivotal relationship to the second vertical panel; and wherein the overriding safety lock means is provided with a first spring retaining post projecting from the rear face thereof for engagement with a corresponding opening of the slidable locking block.

#### 4,790,158 LOCKING MECHANISM FOR DOORS OF SWITCHING CELLS

Rolf Dirks, Willich, Fed. Rep. of Germany, assignor to Felten & Guillaume Energietechnik GmbH, Cologne, Fed. Rep. of Germany  
Division of Ser. No. 720,143, Apr. 4, 1985, Pat. No. 4,674,305.  
This application Oct. 14, 1986, Ser. No. 919,080  
Claims priority, application Fed. Rep. of Germany, Apr. 4, 1984, 3412612

Int. Cl.<sup>4</sup> E05B 65/06  
U.S. Cl. 70—139

5 Claims

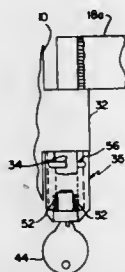


1. A pressure-resistant locking mechanism for locking doors of switch cells, wherein a door to be locked is hinged to a switch cell and has a U-shaped cross-section and inwardly curved edges and a switch cell has an outer wall having U-shaped, outwardly extending edges which define with the inwardly curved edges of the door two opposing hollow spaces extending over the entire length of the door, the locking mechanism comprising two torsion bars pivotable between a locked position and a released position and mounted to a hinge side and a closing side of the door and each being received in a respective hollow space and having a non-central axis of elongation; two pivotable levers each rigidly connected to a respective pivotable bar at one end thereof and having a free end; two springs connected to an inner side of the door and each being suspended on the free end of a respective lever so that each torsion bar remains in the locked position when the spring assigned thereto is unloaded, and reaches the released position when the lever connected thereto is pivoted outwardly by 90° and said spring is loaded, said door being provided with an actuation opening for passing therethrough a switching lever for a switch device positioned in said switch cell; and a locking slide connected to the torsion bar on said closing side and operated for closing said actuation opening when the door is opened.

4,790,159  
QUIC-KEY SYSTEM  
Roy C. Quinn, 48 Glenda Rd., Deer Park, N.Y. 11729  
Filed Mar. 11, 1988, Ser. No. 167,263  
Int. Cl.<sup>4</sup> F16B 41/00

U.S. Cl. 70—232

17 Claims

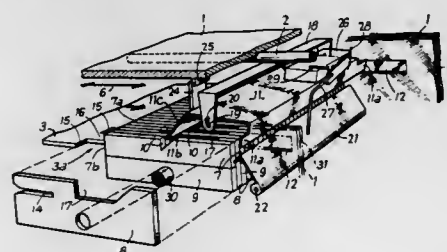


1. Apparatus for securing the exposed end of a hinge pin to prevent retraction of said pin, said pin including a hole along a diameter of said pin adjacent said exposed end, comprising:  
a. inner sleeve means for enclosing said exposed end and including openings aligned with said hole to accommodate a holding pin means to engage said sleeve means with said pin;  
b. outer cylinder means to enclose said inner sleeve means to prevent said holding pin from being removed;  
c. lock means for insertion through said outer cylinder means and extending into the interior of said inner sleeve means; and  
d. key means for causing expansion of gripping means out of said lock means to engage said inner sleeve means to prevent removal of the latter from said hinge pin thereby maintaining said holding pin means in place and securing said hinge pin.

4,790,160  
LOCK HAVING LONGITUDINAL TUMBLERS  
Michel M. Chateau, 9, rue Louis David, 75116 Paris, France  
Continuation at PCT FR86/00237 filed Jul. 4, 1986 published as WO87/00232 Jan. 15, 1987. This application filed Mar. 2, 1987, Ser. No. 20,874  
Claims priority, application France, Jul. 5, 1985, 85 10354  
Int. Cl.<sup>4</sup> E05B 23/00

U.S. Cl. 70—351

12 Claims



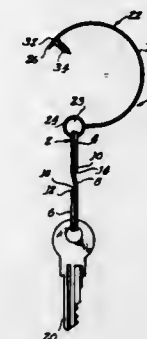
1. A lock assembly for controlling a bolt comprising a lock and a key, said lock comprising a plurality of elongate generally rectangular spaced parallel plates slideably mounted for movement inwardly in a longitudinal direction, said plates including a longitudinal end surface positioned to be engaged for inward movement with insertion of said key in said lock and a side surface portion disposed parallel to said longitudinal direction, said side surface portions of said plates being disposed in coplanar alignment, notches formed in said side surfaces of said plates at one of several predetermined positions therealong, the notches of said plates being adapted to be shifted into alignment responsive to insertion of said key in said lock a feeler member biased against said side surfaces, said feeler member being adapted to enter into said notches when

the same are aligned and to be coupled with said plates in said entered position, said feeler member being shiftably mounted in said longitudinal direction, bolt control means coupled to said feeler member and said bolt for shifting said bolt inwardly to an opening position in said longitudinal direction responsive to movement of said feeler member inwardly in said longitudinal direction, and means for returning said bolt control means, said bolt, said plates, and said feeler member to the locked position thereof responsive to removal of said key.

4,790,161  
KEYRING ACCESSORY  
Edward M. Dick, 711 River Rd., Des Plaines, Ill. 60016  
Filed Jul. 16, 1987, Ser. No. 74,266  
Int. Cl.<sup>4</sup> B25B 33/00

U.S. Cl. 70—456 R

4 Claims



1. In a keyring of the type having a body of a length of spring material with opposite ends and shaped to form two substantially congruent circles which are abutting and coaxial, and with there being a crossover section of the spring material that joins the two circles and is offset from each circle and defines in cooperation with said opposite ends a pair of adjacent access openings at which a key may be mounted on or removed from the keyring by first spreading one of said opposite ends from the region of the crossover to provide a sufficiently large opening for installing or removal from the ring, an improvement comprising an accessory with a one piece flexible plastic body having means for attaching said accessory to said keyring body, said accessory having a wedge thereon, said wedge being sized and shaped to be manually inserted between the circles to open either of the access openings and thereby permit installation or removal of a key from the ring, said accessory furthermore being resilient and with an arcuate shaped portion between said wedge and said attaching means, said arcuate shaped portion maintaining an arcuate configuration during the insertion and removal of the wedge from between said circles.

4,790,162  
DOOR-LOCK MOUNTING PLATE  
Werner Thur, 56 rue du Fief, 62840 Sallly sur la Lys, France  
Filed Sep. 4, 1987, Ser. No. 92,894  
Claims priority, application France, Feb. 3, 1987, 87/01723  
Int. Cl.<sup>4</sup> E05B 15/02

U.S. Cl. 70—452

9 Claims

1. A door lock mounting plate for mounting on a door comprising:  
a door plate fixed in the door and having an opening therethrough;  
an inwardly facing recess formed in said door plate, said recess substantially concentric with said opening;  
at least one inwardly facing groove formed in said door plate, said groove intersecting said recess, thereby forming an opening in a peripheral wall of said recess;

a square operating rod extending through said opening in said door plate;  
a locking mechanism having a locking bolt operatively coupled to said square operating rod;  
a handle for receiving and capturing one end of said square operating rod for rotation therewith, said handle capable of rotating said square rod from a first position wherein said locking mechanism is in a locking position to a second position wherein said locking mechanism is in a non-locking position, said handle being asymmetric with respect to an axis of rotation of said square operating rod received and captured therein, wherein the force of gravity acting

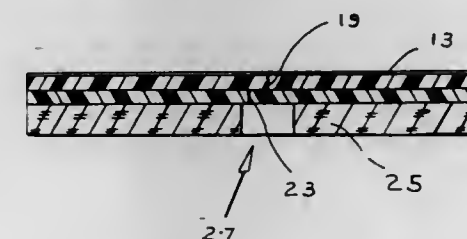


on said asymmetrical handle produces a torque, tending to rotate said handle from said first position to said second position; and  
a compensating means for holding said handle in said first position against said torque tending to rotate said handle, said compensating means including a spiral spring mounted within said recess in said door plate, said spiral spring having a first end thereof operatively coupled to said square operating rod and a second end thereof being inserted in said opening in said peripheral wall of said recess and captured in said groove formed in said door plate.

4,790,163  
KEY-WAY COVER  
Paul Appelbaum, P.O. Box 27006, Denver, Colo. 80227  
Filed Mar. 23, 1988, Ser. No. 174,151  
Int. Cl.<sup>4</sup> E05B 17/18

U.S. Cl. 70—455

11 Claims



1. Cover for the keyway of a lock, said cover comprising a multi-layered key-penetrable structure, including:  
(a) upper layer of resilient water-resistant material having a first, water-resistant slit extending therethrough;  
(b) intermediate layer of resilient water-resistant material having a second, water-resistant slit extending therethrough, said second slit lying parallel to, and in a vertical plane that is laterally spaced from said first slit; and  
(c) lower layer of material appreciably less resilient than said upper layer and intermediate layer, and having an opening therein which lies generally below said first slit and second slit, and said lower layer supporting major portions of said intermediate and upper layers against downward deformation while allowing unsupported portions to be

downwardly deformable, whereby a downwardly moving key engaging said first slit will downwardly deform said upper layer so as to open said first slit and pass said key, and whereby said key will engage said lower layer and deform it downwardly into said opening thereby opening said second slit to pass said key.

4,790,164

## ROLLER ENTRY GUIDE

Herbert Rothe, Stöckstrasse 12, D-7570 Baden-Baden 24, Fed. Rep. of Germany

PCT No. PCT/EP86/00474, § 371 Date Apr. 17, 1987, § 102(e) Date Apr. 17, 1987, PCT Pub. No. WO87/01059, PCT Pub. Date Feb. 26, 1987

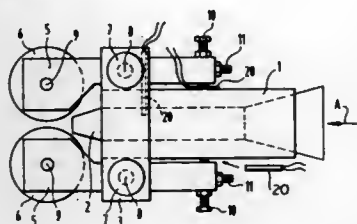
PCT Filed Aug. 12, 1986, Ser. No. 51,748

Claims priority, application Fed. Rep. of Germany, Aug. 19, 1985, 8523750[U]

Int. Cl.<sup>4</sup> B21B 39/16

U.S. Cl. 72-8

9 Claims



1. A roller guide assembly for guiding a length of rolled material leaving the pass of a previous roll stand and entering the pass of a subsequent roll stand, which roll stands form a part of a billet, bar or wire rolling-mill roll-stand train, the assembly including:

- a supporting structure disposed between the passes of previous and subsequent roll stands;
- a pair of guide rollers mounted for rotation about two parallel axes on the supporting structure for engaging opposite sides of the material after the material has been compressed in the pass of the previous roll stand;
- the supporting structure includes a housing, an entry guide member for guiding the material towards the guide rollers, a pair of arms supporting the guide rollers, the entry guide member being at least partially disposed within the housing, and the arms extending in the longitudinal direction of the entry guide member and being mounted on the housing to pivot about two axes parallel to the axes of rotation of the guide rollers;
- sensor means disposed on the supporting structure for detecting pressure transmitted to the guide rollers by the material in engagement therewith, the sensor means providing an output signal in correlation with the pressure; and
- means for adjusting the guide rollers in response to the output signal in order to maintain a constant pressure transmitted to the guide rollers, thereby compensating for wear of the guide rollers and pass of the previous roll stand so that a constant cross section and proper guidance is maintained for the material entering the pass of the subsequent roll stand.

4,790,165

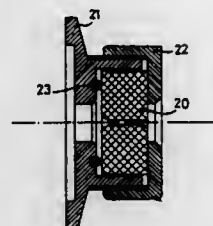
## FEED-THROUGH ELEMENT FOR A VACUUM APPARATUS

Hugo Lievens, Gent, and Wilfried Coppens, Kortrijk-Marke, both of Netherlands, assignors to N.V. Bekaert S.A., Zwevegem, Belgium

Filed Oct. 9, 1987, Ser. No. 106,366

Claims priority, application Netherlands, Oct. 23, 1986, 8602659

Int. Cl.<sup>4</sup> B21C 3/02; B21D 37/16; C21D 1/74; C23C 14/56  
U.S. Cl. 72-38 5 Claims



1. In a vacuum apparatus for wire-shape material having at least one vacuum chamber defined by end walls, adapted to receive wire-shaped material passing through said chamber so that the material may be treated under vacuum conditions; the improvement comprising a feed-through element disposed in an end wall, said feed-through element comprising a drawing die means for reducing the cross-sectional area of said wire-shaped material as the material is passed therethrough, holding means for retaining said drawing die, means for providing a gas-tight seal between said holding means and said drawing die, and means for providing a gas-tight seal between said holding means and said end wall, at least one of said aforementioned means for providing a gas-tight seal being detachable whereby said drawing die may be replaced to accommodate wire-shaped material of different size.

4,790,166

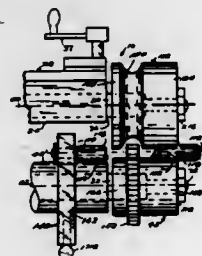
## ROUND COLLAR MAKER

Richard A. Kaar, 5151 W. 1st, Wahoo, Nebr. 68066  
Continuation-in-part of Ser. No. 757,722, Jul. 22, 1985, Pat. No. 4,614,102. This application Jul. 1, 1986, Ser. No. 880,874

Int. Cl.<sup>4</sup> B21D 5/14, 17/04

U.S. Cl. 72-106

2 Claims



1. A round collar maker comprising: a combination rotary machine having: a main frame, upper and lower parallel shafts rotatably mounted on and projecting to one side of said main frame, drive means causing rotation of at least one of said shafts, upper and lower main rollers on said shafts respectively whereby said main rollers rotate in opposite directions about upper and lower axes, said rollers having opposed metal-driving portions, said opposed portions being closely spaced for pressing against a workpiece of sheet metal passing therebetween during roller rotation, one of said rollers having a circumferential groove and the other roller having a circumferential

tial ridge protruding into said groove, a guide rotatable about its axis parallel to said axes, means mounting said guide on said machine, said guide having a guiding surface elongated in parallelism with said axes and disposed in a position spaced horizontally from one side of said rollers and closely adjacent to said opposed portions of said rollers and capable of causing sheet metal passing said rollers and guided by said guiding surface to be deflected into a cylindrical shape, a stop, said machine having a horizontally extending projecting spindle having a substantially cylindrical outer surface, said guide being mounted on said spindle, a carrier means attaching said stop to said spindle, said carrier means being attached to said spindle in an adjustable manner axially along said spindle for varying the position of said stop with respect to said rollers.

4,790,167

## EXTRUSION RUN-OUT TABLE

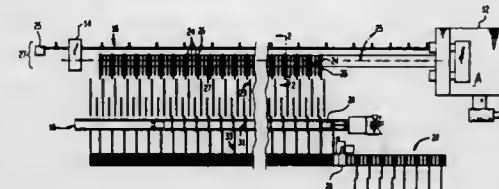
Charles B. Gentry, Belmont; Robert M. Scanlon, Sand Lake, and John C. Bugal, Comstock Park, all of Mich., assignors to Granco-Clark, Inc., Mich.

Filed Jun. 23, 1987, Ser. No. 65,838

Int. Cl.<sup>4</sup> B21C 29/00

U.S. Cl. 72-257

19 Claims



1. In an extrusion run-out table for aluminum extrusions and the like, the run-out table comprising:

- an extrusion support table for supporting extruded profiles as they are extruded from an extrusion press along an extrusion path;
- conveyor means for moving the extruded shapes from the extrusion support table to a cooling area and to a further processing area;
- side extrusion support table including a set of elongated heat-resistant support means mounted perpendicular to the extrusion path;
- means to impart relative vertical motion between said conveyor means and said set of support means to alternatively support said extruded shapes on said conveyor means or on said set of support means;
- the improvement which comprises: said elongated heat-resistant support means having a length which extends laterally of said extrusion path into said cooling area and a distance sufficient to position at least one of said extruded shapes in laterally spaced relationship to the extrusion path to permit additional shapes to be extruded along the extrusion path while said at least one extruded shape is cooling in said cooling area and on said support means; and
- said conveyor means and said means to impart vertical motion index each successive extruded shape into said cooling area on said elongated support means subsequent to completion of extrusion thereof.

4,790,168

## PIPE CRIMPING AND CUTTING

Gregory W. Vonthien, "Eloura", Walbundrie, N.S.W., 2642, Australia

Filed Sep. 3, 1986, Ser. No. 903,155

Claims priority, application Australia, Sep. 9, 1985, PH2329

Int. Cl.<sup>4</sup> B21D 28/00

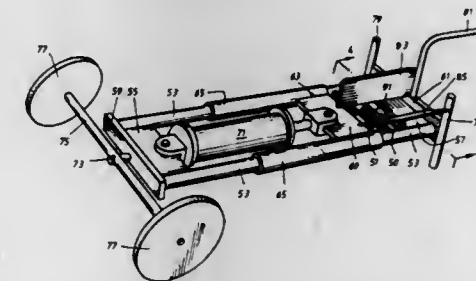
U.S. Cl. 72-331

9 Claims

1. A portable wheeled apparatus for cutting and crimping

metal pipe, of the kind used for making fences, said apparatus comprising:

a first jaw and a second jaw, said first jaw being slidably mounted on a support structure for relative movement toward and away from said second jaw, said second jaw being fixedly mounted on said support structure, said first and second jaws being capable of cutting and crimping a metal pipe placed therebetween by being inserted along a feed path into said jaws, said first and second jaws have a first section provided with means for cutting and crimping pipe, and a second section adjacent said first section provided without means for cutting pipe wherein pipe placed in said second section can be crimped only, said first and second section being oriented transverse to said feed path; means mounted on said support structure for driving said first jaw towards said second jaw;



first guide means removably mounted on said support structure on one side of said first and second jaws at any selected angle relative to a cutting edge of said second jaw for selectively guiding a pipe placed between said first and second jaws whereby an operator can position the pipe relative to said first guide means so as to selectively cut and crimp at said selected angle; and said support structure further comprises a pair of parallel elongate members arranged horizontally in spaced relation carrying a sliding yoke therebetween and a wheel at one end of said elongate members, said first jaw being attached to said sliding yoke, and a cross member at an other end of said support structure for securing said second jaw so that movement of said sliding yoke toward said one end of said support structure enables said jaws to cooperatively move toward one another to engage a pipe selectively placed therebetween.

4,790,169

## APPARATUS FOR DOMING CAN BOTTOMS

Bert E. Johansson, and Conrad M. Grims, both of Golden, Colo., assignors to Adolph Coors Company, Golden, Colo.

Continuation-in-part of Ser. No. 823,308, Jan. 28, 1986, Pat. No. 4,723,433. This application Feb. 5, 1988, Ser. No. 152,672

Int. Cl.<sup>4</sup> B21D 51/26

U.S. Cl. 72-354

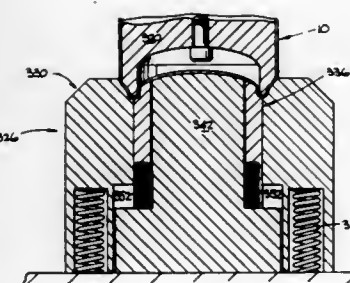
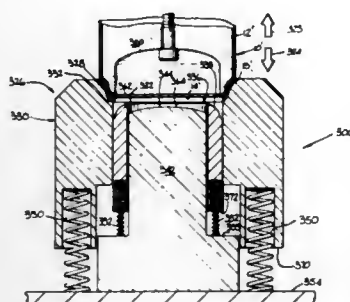
1 Claim

1. An apparatus for forming a can bottom configuration in an aluminum can body of the type comprising a generally cylindrical sidewall terminating in an open top end and a generally flat, circular bottom wall connected with the cylindrical sidewall by an inwardly tapering annular portion in which the bottom wall configuration to be formed comprises a peripheral ring portion extending downwardly and inwardly from said can body sidewall; a relatively small radius, downwardly convex support ring portion integrally connected to said peripheral ring portion for supporting the can constructed from the can body on an underlying base surface; a generally vertically extending riser ring portion integrally connected to said support ring portion and extending upwardly therefrom; and an upwardly projecting dome portion integrally connected to said riser ring portion, said formed bottom configuration being adapted to nest within a can end provided on a can identical to



and situated below a can constructed from said can body for enabling stable stacking of such cans, the apparatus comprising:

- (a) an axially, reciprocally movable punch means insertable within the can body in engagement with the interior bottom surface thereof for urging the can body in a first axial direction against die means for forming the can bottom configuration, said punch means comprising a surface portion conforming generally to the configuration of the can bottom peripheral ring portion, the can bottom support ring portion and the can bottom riser portion;
- (b) die means for coacting with said punch means to form said can bottom configuration, said die means comprising:
  - (i) an axially reciprocally movable outer die ring means for forming an outer portion of said can bottom configuration, having a can body engaging surface conforming generally to said can bottom peripheral ring portion and an outer portion of said can bottom support ring portion;



- (ii) an axially reciprocally movable middle die ring means for forming a middle portion of said can bottom configuration, positioned concentrically with and inwardly of said outer die ring means and in closely adjacent relationship therewith, said middle die ring means having a can body engaging surface conforming generally to an inner portion of said can bottom support ring portion, said can bottom riser portion and an outer annular portion of said can bottom dome portion; and
- (iii) a relatively fixed, inner die means for forming an inner portion of said can bottom configuration, positioned concentrically with said outer die ring means and said middle die ring means and located inwardly of said middle die ring means in closely spaced, adjacent relationship therewith; said inner die means having a can body engaging surface conforming generally to an inner portion of said can bottom dome portion.

4,790,170

Patent Not Issued For This Number

4,790,171

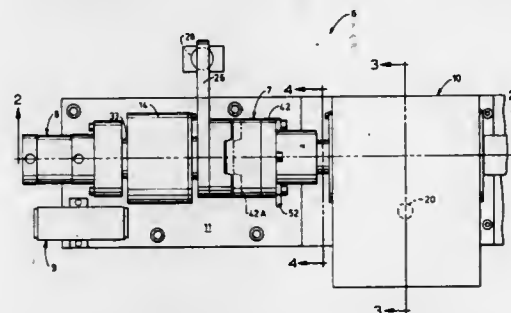
## UPSTACKER REJECT APPARATUS

Elton G. Kaminski, Sidney, and Richard J. Hasselbeck, Troy, both of Ohio, assignors to The Stolle Corporation, Sidney, Ohio

Filed Jul. 29, 1987, Ser. No. 79,244  
Int. Cl.<sup>4</sup> B21D 22/00

U.S. Cl. 72-361

10 Claims



1. An upstacker reject device for use with a press ram, comprising:
  - (a) a shaft capable of oscillatory motion, supported by a base, said shaft having a longitudinal axis;
  - (b) at least one plunger capable of reciprocating motion;
  - (c) means for connecting the plunger to the shaft, said plunger connecting means comprising at least one yoke pivotally connected at a first end to the plunger and secured at a second end to the shaft;
  - (d) means for connecting the shaft to the press ram, said shaft connecting means comprising:
    - (1) a cylinder, having a longitudinal axis, rotatably mounted on the base, the longitudinal axis of the cylinder being substantially co-linear with the longitudinal axis of the shaft;
    - (2) a bellcrank secured at a first end to the cylinder;
    - (3) means for connecting the cylinder to the shaft so that rotary motion in the cylinder is transferred to the shaft; and
    - (4) linkage means for connecting the bellcrank to the press ram;
  - (e) a transfer belt, having apertures, for carrying selected articles,
 whereby the downward stroke of the press ram causes the plunger to move upwardly through a belt aperture to reject an article on the belt.

4,790,172

## METHOD FOR PROVIDING A TUBULAR NODE IN A FRAMEWORK TRUSS STRUCTURE SUCH AS OFFSHORE PLATFORMS FOR OIL DRILLING AND PRODUCTION

Per A. Simensen, L  venstad, and Gunnar H. Elde, Sandvika, both of Norway, assignors to Saga Petroleum a.s., H  vik, Norway

PCT No. PCT/NO85/00056, 8 371 Date May 20, 1986, 8 102(e)  
Date May 20, 1986, PCT Pub. No. WO86/01752, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 18, 1985, Ser. No. 878,981

Claims priority, application Norway, Sep. 21, 1984, 843792

Int. Cl.<sup>4</sup> B21K 1/14

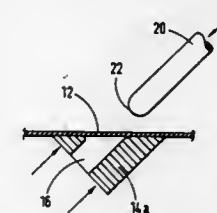
U.S. Cl. 72-368

13 Claims

1. Method for providing transition member between structural elements for a node in a frame work truss structure, particularly for offshore platforms such as drilling and production platforms, said method comprising:

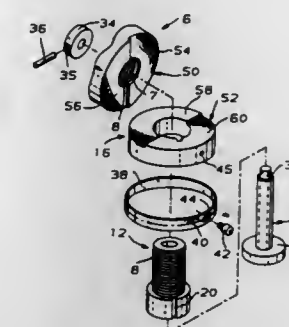
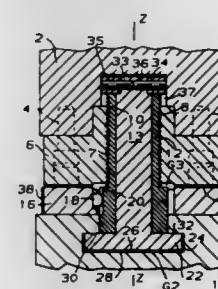
- (a) providing a blank of rolled steel plate of curved shape with suitable size and thickness for constituting a section of one of the structural elements,

- (b) positioning the blank in a two-part pressing and extrusion tool composed of a matrix curved to match the curved shape of the blank and provided with a matrix opening with a rounded transition surface leading into the matrix opening and corresponding to the desired outside surface of a brace stub to be formed in the blank and, a piston-like pressing tool with a diameter substantially corresponding to the desired inside diameter of the brace stub to be formed and having a rounded off working end, said piston being arranged to be movable towards and into said matrix opening in the matrix, and



- (c) forming a brace stub terminating with a brace stub opening from the part of the blank covering the matrix opening by moving the piston towards the matrix with the blank positioned thereon effective to press the part of the blank covering the matrix opening into the matrix opening about the rounded transition surface causing an extrusion deformation of the part of the blank covering the matrix opening to extend the length of the brace stub and to form in the blank the brace stub having inside and outside surfaces smoothly curved from the blank proper towards the brace stub opening with gradually decreasing wall thickness from the blank proper to the brace stub opening as a result of the extrusion deformation.

with the angular position of said dial about said axis, said second ram being in force transmitting relationship with



said first ram by way of said block and said dial as said first ram is driven by said second ram.

4,790,174

## ADJUSTING DRIVE FOR INSERT TIGHTENERS OF PRESSES

Wilfried Wendland, Hilchenbach, Fed. Rep. of Germany, assignor to Firma Maschinenfabrik Hiltma GmbH, Fed. Rep. of Germany

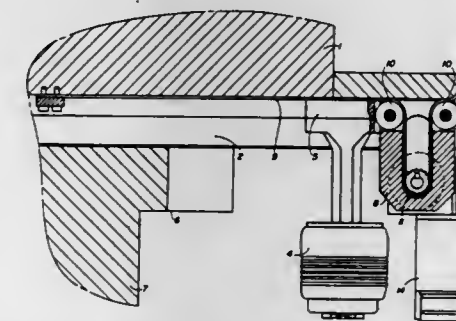
Filed May 21, 1987, Ser. No. 53,137

Claims priority, application Fed. Rep. of Germany, May 30, 1986, 3618286

Int. Cl.<sup>4</sup> B21D 37/14

U.S. Cl. 72-481

11 Claims



## SHUT HEIGHT ADJUSTMENT MEANS IN PRESSING APPARATUS

Andrew G. Boucher, Jr., Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed May 29, 1987, Ser. No. 55,671

Int. Cl.<sup>4</sup> B21J 13/00

U.S. Cl. 72-446

11 Claims

1. In pressing apparatus having a first ram, and a second ram connected thereto in spaced relationship therewith, to drive the first ram along a predetermined path, adjusting means for coupling together and altering the effective spacing between said rams, said adjusting means comprising:

- a ram mounting block fixed to the second ram, and being located between said rams, said block having a screw threaded bore having a longitudinal axis extending lengthwise of said path;
- a screw device in said bore meshing with the threads thereof and being rotatable therein about said axis, for movement relative to said block, lengthwise of said axis, said screw device being connected to said first ram with axial play;
- an adjusting dial keyed to said screw device, for rotation about said axis to move the first and second rams relatively towards and away from each other; and
- ramp means acting between said block and said dial, for determining the spacing between said rams in accordance

1. An adjusting device for fastening a die to the clamping face of a press ram having a T-groove communicating with the clamping face, comprising a tenon block mounted for movement in the T-groove, traction means for moving the tenon block along said T-groove including a toothed belt which is flexible and unstretchable with respect to a longitudinal axis thereof, disposed in and extending along the T-groove, said

tenon block being operably connected to said traction means for displacing said tenon block along the T-groove, an insert tightener connected to said tenon block and movable with said tenon block to engaging a die to hold the die against the clamping face, and a drive motor operably connected to said traction means for causing movement of said tenon block along the T-groove for engaging said insert tightener with a die for holding the die against the clamping face.

4,790,175

# METHOD AND APPARATUS FOR CALIBRATING A TRANSDUCER HAVING REAL AND REACTIVE IMPEDANCE

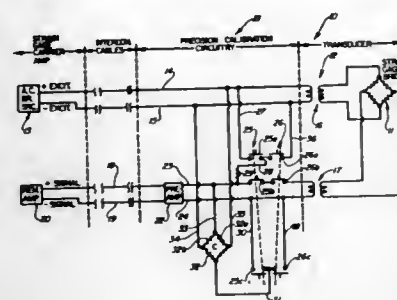
Sydney Himmelstein, Barrington Hills, Ill., assignor to S. Himmelstein & Company, Hoffman Estates, Ill.

Filed Jul. 5, 1985, Ser. No. 752,172

Int. Cl. G01D 18/00; G01L 25/00

U.S. Cl. 73-1 R

19 Claims



1. The method of calibrating a transducer having real and reactive impedance which is excited from an excitation source and which provides an output signal at a transducer output connected by electrical conductor means to a remote load, said method of calibrating comprising in combination the steps of: providing a preamplifier having a high impedance input and a low impedance output connected to said electrical conductor means; and alternatively (a) connecting said transducer output to said preamplifier input for preamplifying said transducer output signal and providing through said conductor means to said remote load a low impedance preamplified output signal, and (b) providing a substantially purely resistive calibration signal to said preamplifier input for use in calibrating said transducer.

4,790,176

# PROCESS AND DEVICE FOR CALIBRATING A SAMPLING AND METERING PIPETTE

Eric Martean d'Antry, 72, rue Gambetta, 95400 Villiers-le-Bel, France

Filed Dec. 16, 1986, Ser. No. 942,392

Claims priority, application France, Nov. 27, 1986, 86 16574

Int. Cl. G01F 25/00; B01L 3/00; G01N 1/14

U.S. Cl. 73-1 H

9 Claims

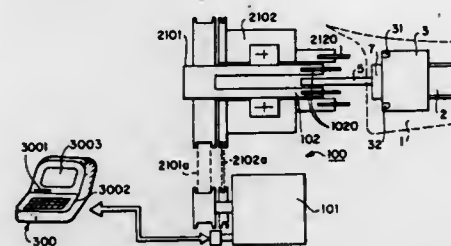
5. A device for calibrating a sampling and metering pipette, said pipette of the type comprising: a pipette body (1) including a sampling chamber and means for displaying the volume of a sample contained therein; an adjusting screw (2); a knurled button (3) for adjusting the volume of said sample chamber; a brake screw (7) including mechanical drive means thereon for adjusting a zero setting of the volume of said sampling chamber; a plunger (4) reciprocally mounted in said body and whose stroke in the pipette body determines the sample volume; a central rod (5) integrally fastened to said plunger; said brake screw (7) forming an end-stop adjustable in rela-

tion to said knurled button (3) which is mounted on said rod;

said device employing the calibrating steps comprising:

(a) adjusting the volume of said sampling chamber to zero by means of said knurled button and then actuating said adjusting brake screw (7) to set the stroke of said plunger substantially at zero;

(b) adjusting the volume of said sample chamber at a low non-zero volume and then performing a plurality of samplings of the above-mentioned volume of a reference substance;



(c) determining a mean of the calculated values of the volumes of the plurality of the above-mentioned samplings, following a test for consistency of the plurality of above-mentioned samplings, and

(d) performing a new adjustment of said adjusting brake screw (7) by a number of turns corresponding in value and in sign to the difference between the displayed volume value and the above-mentioned mean value;

said device further including:

means (100) for driving said brake screw (7) and said knurled button (3); and

means (300) for controlling said means for driving said brake screw (7) and said knurled button (3).

4,790,177

# SHIFTING CONTROL FOR AUTOMATED MANUAL TRANSMISSION SHIFTER

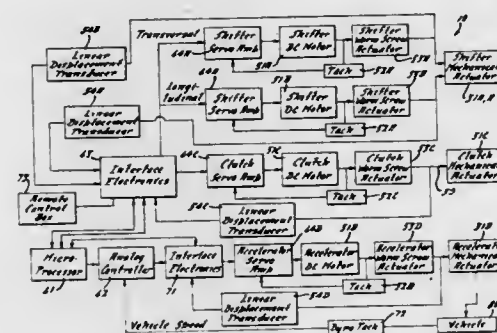
Francis G. King, Bloomfield Hills, and Stewart V. Gable, Ypsilanti, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 9, 1987, Ser. No. 106,476

Int. Cl. G01M 15/00

U.S. Cl. 73-117

9 Claims



1. A transmission shifting method with clutch and accelerator pedal control using shifter and pedal actuators for the automatic operation of a manual transmission gear shift mechanism in an automotive vehicle, the automotive vehicle having a plurality of manual transmission shift positions, including first, second and third gears, wherein said actuators are used to control the shifting of gears and speed of a vehicle according

to a predetermined drive cycle, said shifting method including the steps of:

determining an engagement point for the clutch, recording actuator positions to control the speed of the vehicle, moving the clutch pedal to the engagement point with the clutch pedal actuator, recording the clutch actuator position and establishing that the clutch is disengaged, moving the gear shift actuators to the desired gear, recording the gear shift actuator position and establishing that the desired gear position is achieved, controlling the clutch and accelerator pedal actuators with sufficient frequency to achieve a desired speed for the vehicle during any shifting operation so as to be able to follow closely the prescribed vehicle speed of the predetermined drive cycle, gear upshifting from first gear position to second gear position, gear upshifting from second gear position to third gear position, gear downshifting from third gear position to second gear position, initiating acceleration from idle including releasing the clutch relatively slowly, initiating deceleration to an idle speed, controlling a coasting condition for the vehicle, and using open loop accelerator pedal control during shifting.

4,790,178

# INTAKE STRUCTURE OF INTERNAL COMBUSTION ENGINE WITH BYPASS INTAKE PASSAGE FOR MOUNTING AIR FLOW METER

Toshifumi Usui; Kinsaku Yamada; Tadao Osawa, and Hirotooshi Kawano, all of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

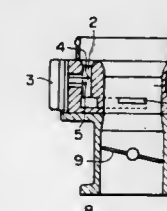
Filed Sep. 3, 1987, Ser. No. 92,620

Claims priority, application Japan, Sep. 3, 1986, 61-205967

Int. Cl. G01F 9/00

U.S. Cl. 73-118.2

2 Claims



1. An intake structure for an internal combustion engine comprising:

a first body having therein a main passage through which intake air is introduced to said engine and a bypass passage bypass a portion of said main passage and accommodating an air flow sensor therein;

a second body connected to said first body and having therein an intake passage in which is disposed a throttle valve;

locating projection means provided on the joint surface of one of said first body and said second body; and

locating recess means formed in the joint surface of the other of said first and second bodies, said locating projection means and said locating recess means being adapted to fit each other and being determined such that, when said locating projection means and said locating recess means fit each other, said first and second members are positioned substantially coaxially to each other, wherein said locating projection means includes a pair of cylindrical projections, while said locating recess means includes a cylindrical hole for engaging one of said cylindrical pro-

jections and an elongated hole for engaging the other of said cylindrical projections.

4,790,179

# DETECTOR OF INFLATION PRESSURE OF TIRES OF A VEHICLE

Gerhard Hettich, Dietschhofen; Lothar Haas, Stein, and Hans-Dieter Schmid, Nürnberg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE86/00443, § 371 Date Aug. 7, 1987, § 102(e) Date Aug. 7, 1987, PCT Pub. No. WO87/03545, PCT Pub. Date Jun. 18, 1987

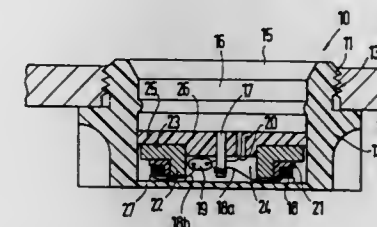
PCT Filed Nov. 5, 1986, Ser. No. 105,301

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1985, 3543865

Int. Cl. B60C 23/04

U.S. Cl. 73-146.5

4 Claims



1. In a tire pressure detector for motor vehicles, comprising an electric oscillating circuit having a coupling coil; a pressure element connected with said circuit in series and acted upon by air pressure in a vehicle tire, the oscillating circuit being fastened at a circumference of a wheel rim; a signal receiver including a signal receiver coil (31), wherein the coupling coil, which revolves with the wheel rim, cooperates with said receiver coil which is located opposite said coupling coil and is arranged in the area of the wheel rim so as to be stationary and sense the oscillation of the oscillating circuit; and an evaluating circuit connected to said signal receiver coil, the improvement comprising a plate-shaped ferrite core (23) having a middle limb (22), the coupling coil (18) being arranged on the middle limb (22) of the plate-shaped ferrite core (23).

4,790,180

# METHOD FOR DETERMINING FLUID CHARACTERISTICS OF SUBTERRANEAN FORMATIONS

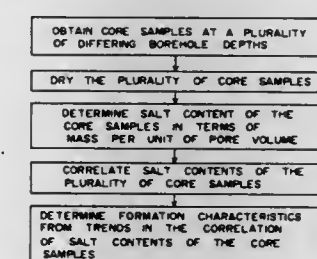
Ali A. Sinnokrot, Dallas, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 16, 1988, Ser. No. 156,069

Int. Cl. E21B 49/02

U.S. Cl. 73-153

11 Claims



1. A method for determining the fluid characteristics of subterranean formations, comprising the steps of:

(a) obtaining core samples from a plurality of differing depths with said subterranean formations,



- (b) drying said plurality of core samples to effect an evaporation of the water content of said core samples,  
 (c) determining the salt content of said plurality of core samples,  
 (d) correlating the determined salt content of said plurality of core samples with the differing depths from which said plurality of core samples were obtained, and  
 (e) determining the fluid characteristics of said subterranean formations at in-situ reservoir conditions, of pressure and temperature and at the in-situ state of reservoir wettability, from trends identified in the correlation of the salt contents of said plurality of core samples with depth.

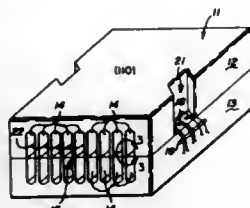
4,790,181

# **THERMAL MASS FLOW METER AND METHOD OF MAKING SAME**

Harry E. Aine, 30600 Page Mill Rd., Los Altos, Calif. 94022  
 Continuation-in-part of Ser. No. 765,839, Aug. 15, 1985, Pat. No. 4,691,566, and Ser. No. 556,800, Dec. 1, 1983, Pat. No. 4,633,578, said Ser. No. 765,839, is a continuation-in-part of Ser. No. 666,040, Dec. 7, 1984, abandoned. This application Aug. 23, 1985, Ser. No. 768,857  
 Int. Cl.<sup>4</sup> G01F 1/68

U.S. Cl. 73—204.18

16 Claims



1. In a method for thermal measurement of fluid flow the steps of:  
 partitioning the fluid flow to be measured into a plurality of generally parallel elongated ribbon-shaped partitioned flow stream portions, each ribbon-shaped stream portion having in cross-section a broad dimension and a narrow dimension for providing rectified flow conditions over a relatively wide range of fluid flow rates; and  
 disposing a thermal flow sensor across the said narrow dimensions of a plurality of said partitioned ribbon-shaped flow portions and in heat-exchanging relation predominantly with the narrow dimensions of a plurality of said ribbon-shaped flow stream portions for measuring the fluid flow.

4,790,182

# **HOT WIRE AIR FLOW METER**

Minoru Takahashi; Hirotsu Tokuda, both of Katsuta; Tadao Suzuki, Hitachi; Masumi Takada, and Tsutomu Kooriyama, both of Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 30, 1986, Ser. No. 913,379

Claims priority, application Japan, Oct. 9, 1985, 60-223580

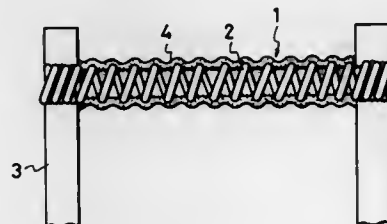
Int. Cl.<sup>4</sup> G01F 1/68; G01M 15/00

U.S. Cl. 73—204.21

8 Claims

1. In the bypass air passage of an internal combustion engine, a hot wire air flow meter, comprising a resistor for measuring an amount of air flow in said bypass air passage formed in an air intake passage, and an electric driving circuit for controlling application of an electric current to said resistor and for providing a signal as an output voltage which provides an indication of a measured amount of air flow, said resistor being composed of a platinum wire in the form of coil and an outer surface of the coiled platinum wire being overcoated with a glass material except for portions at the respective ends thereof, so that said coiled platinum wire overcoated with glass

material forms a hollow core in which there is no bobbin and in which the coiled platinum wire is embedded in the inner



surface of the hollow core, whereby the inner surface of said coil is exposed.

4,790,183

# **ACOUSTIC IMPEDANCE SYSTEM FOR LIQUID BOUNDARY LEVEL DETECTION**

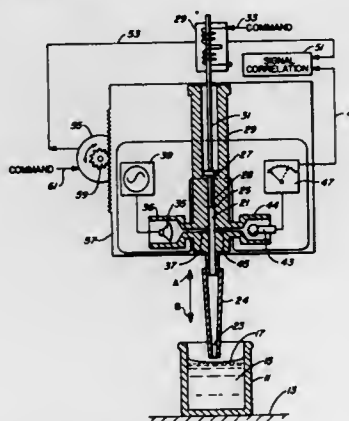
Dale R. Pfost, San Carlos; R. Fred Pfost, Los Altos, and Eric W. Lachenmeier, San Jose, all of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed May 5, 1987, Ser. No. 47,043

Int. Cl.<sup>4</sup> G01F 23/00

U.S. Cl. 73—290 V

21 Claims



1. Apparatus for measuring contact between a conduit and a liquid boundary comprising,  
 an open-ended conduit adapted for insertion into a liquid boundary of a liquid body, said open-ended conduit being movable towards and away from said liquid body,  
 pressure wave generating means directing pressure waves into said conduit for establishing a first acoustic impedance,  
 insertion means for moving the open end of said open-ended conduit into said liquid boundary, thereby closing said open end and establishing a second acoustic impedance, said insertion means generating a conduit position signal,  
 detector means for detecting a change in acoustic impedance during insertion of the liquid handling means into the liquid boundary from said acoustic impedance to said second acoustic impedance and for producing an electrical output signal in response thereto, and  
 signal correlating means receiving said electrical output signal and said conduit position signal for indicating liquid boundary position.

4,790,184

# **OIL GAUGE FOR CARTRIDGE-TYPE OIL TANK** Yutaka Nakanishi, Aichi, Japan, assignor to Toyotomi Kogyo Co., Ltd., Aichi, Japan

Filed Jun. 12, 1987, Ser. No. 60,800

Claims priority, application Japan, Jun. 13, 1986, 61-138725

Int. Cl.<sup>4</sup> G01F 23/58

U.S. Cl. 73—317

8 Claims



1. An oil gauge for a cartridge-type oil tank which is arranged in the oil tank through an opening formed at a substantially central portion of a side wall of said cartridge-type oil tank to quantitatively indicate the amount of oil in said cartridge-type oil tank, comprising:  
 a transparent cover plate arranged on said side wall of said cartridge-type oil tank so as to airtightly cover said opening of said cartridge-type oil tank;  
 a gauge base mounted on an inside of said cover plate;  
 an arm rod pivotally mounted at a proximal end thereof on said gauge base and provided at a distal end thereof with a float;  
 an oil indicator pivotally mounted at one end thereof on said gauge base and provided with an indication means for quantitatively indicating the amount of oil in said cartridge-type oil tank depending on a level of oil in said cartridge-type oil tank; and  
 two actuation members provided one on each side of said arm rod for engaging said oil indicator so that one of said actuation members pivotally varies the position of said oil indicator depending on a variation in the level of oil when said oil tank is in a working position and the other of said actuation members pivotally varies the position of said oil indicator depending on a variation in the level of oil when said oil tank is in an oil feed position which is inverted relative to said working position, such that said indication means indicates a corresponding level of oil in said oil tank irrespective of said positions of said oil tank.

4,790,185

# **FUEL SENDER MOUNT**

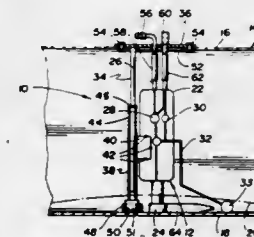
William E. Fedelem, and Robert B. Hutter, both of Livonia, Mich., assignors to American Motors Corporation, Southfield, Mich.

Filed May 16, 1986, Ser. No. 864,192

Int. Cl.<sup>4</sup> G01F 23/00, 23/32

U.S. Cl. 73—317

17 Claims



1. In combination with a resiliently deformable fuel tank

containing a fuel sender having an inlet for fluid communication with the bottom of the tank, the improvement comprising:  
 means for displaceably supporting said fuel sender from a top wall of the fuel tank, including means for resiliently urging said fuel sender to a relatively fixed position within said fuel tank at which said inlet is normally retained in a fixed position at the bottom of said tank;  
 wherein said top wall and a bottom wall of said fuel tank are resiliently deformable upon impact; and  
 wherein said means for displaceably supporting includes means for guiding and repositioning the fuel sender to said relatively fixed position within said fuel tank after deformation of said resiliently deformable tank upon impact, including guide means retained on said bottom wall of said tank for aligning the fuel sender.

4,790,186

# **DEVICE FOR MOUNTING A TERMINAL TO AN ELECTRIC INDICATOR**

Yoji Nakazaki, and Yoshio Isobe, both of Shimada, Japan, assignors to Yazaki Corporation, Japan

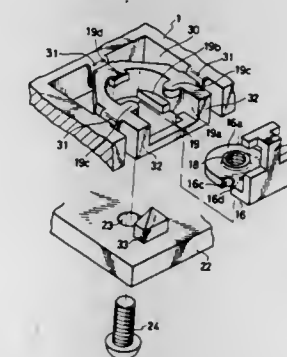
Filed Apr. 30, 1987, Ser. No. 44,283

Claims priority, application Japan, Apr. 30, 1986, 61-64244[U]; Apr. 30, 1986, 61-64245[U]; Apr. 30, 1986, 61-64248[U]

Int. Cl.<sup>4</sup> G01D 3/08, 11/00, 13/00

U.S. Cl. 73—431

29 Claims



1. A device for mounting a terminal to an electric indicator, comprising:  
 a meter body of the indicator having a through hole;  
 an electrical wiring board having a through hole, said electrical wiring board being disposed beneath said meter body;  
 a gauge support plate made of electrically insulating material disposed on said meter body, said gauge support plate having at least one concavity to which the terminal is mounted;  
 a screw for fastening the electrical terminal accommodated in the concavity via the through hole in the meter body; means for preventing a deformation or displacement in said gauge support plate or the meter body caused by a fastening force of the screw or twisting force by said fastening of the screw, thereby preventing an occurrence of indication error in the indicator caused by the deformation or displacement.

4,790,187

**PROBE FOR DETERMINING LOCAL SHEAR STRESS**

Arkady Tsinober, Raanana; Meir Teitel, Rishon LeZion, and Eliezer Kit, Raanana, all of Israel, assignors to Ramot University Authority for Applied Research & Industrial Development Ltd. Tel Aviv University, Tel Aviv, Israel

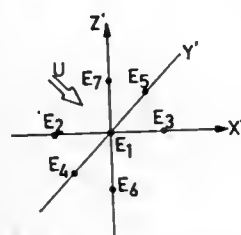
Filed May 5, 1987, Ser. No. 46,194

Claims priority, application Israel, May 9, 1986, 78737

Int. Cl.<sup>4</sup> G01M 9/00

U.S. Cl. 73-432.1

20 Claims



1. A probe for determining local shear stress on the face of a solid surface caused by relative movement between the solid surface and a fluid, said probe comprising a 3-dimensional array including seven spaced electrodes constituted of: one electrode at the center of the array, two electrodes equally spaced from, and on opposite sides of, said center electrode along a first line through said center, two electrodes equally spaced from, and on opposite sides of, said center electrode along a second line through said center and perpendicular to said first line, and two electrodes equally spaced from, and on opposite sides of, said center electrode along a third line through said center and perpendicular to said first and second lines.

4,790,188

**METHOD OF, AND AN APPARATUS FOR, EVALUATING FORMING CAPABILITIES OF SOLID PLATE**

Jean F. Bussiere, St. Bruno; Cheng-Kuei Jen, Brossard; Irina D. Makarov, Rawdon, all of Canada; Brigitte Bacroix, St. Germain en Laye; Philippe H. Lequen, La Buisse, both of France, and John J. Jonas, Westmount, Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

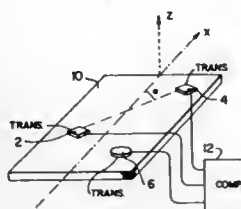
Filed Jul. 10, 1987, Ser. No. 71,857

Claims priority, application Canada, Jul. 18, 1986, 514163

Int. Cl.<sup>4</sup> G01N 29/00

U.S. Cl. 73-597

19 Claims



1. A rapid and non destructive method of evaluating forming capabilities of a solid plate of known density, the plate having a rolling direction, comprising: launching acoustic waves into the plate; detecting acoustic waves propagating in the plate to establish acoustic velocities in the plate along at least two different directions; and determining the value of a certain plastic strain characteristic from a previously established empirical relationship between the said velocities and the value of the plastic strain characteristic.

**METHOD FOR ELIMINATING SENSOR DRIFT IN A VIBRATION MONITORING SYSTEM**

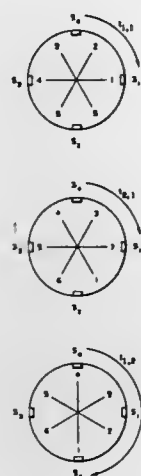
Michael Twerdochlib, Oviedo, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 2, 1987, Ser. No. 20,827

Int. Cl.<sup>4</sup> G01H 11/00

U.S. Cl. 73-660

6 Claims



1. A method for monitoring blade vibration with a vibration monitor which senses the position of individual blades of a rotating blade row in a machine, the vibration monitor including a plurality of sensors positioned about a blade row with each sensor providing a time-dependent output signal responsive to the passage of a blade, wherein the vibration monitor stores sensor output signals as a function of time relative to the periodic rotation of the blade row, comprising the steps of:

- determining, based on output signals provided from each sensor, the actual arrival time of each of a plurality of blades rotating from a predetermined position to the position of each sensor during at least one blade row rotational period;
- calculating an average arrival time required for a blade to rotate from the predetermined position to the position of each sensor;
- calculating for at least one blade, based on the difference between the actual arrival time of the at least one blade and the calculated average arrival time required for a blade to rotate from the predetermined position to the position of each sensor, the displacement between blade position and sensor position at the average arrival time for each sensor position; and
- deriving a signal indicative of vibration of the at least one blade based on a time sequence of calculated displacements between actual blade position and sensor position at each average arrival time.

4,790,190

**ON-LINE ACOUSTIC DETECTION OF BEARING DEFECTS**

Joseph E. Bambara, North Babylon; John L. Frarey, and Richard L. Smith, both of Latham, all of N.Y., assignors to Servo Corporation of America, Hicksville, N.Y.

Filed Oct. 2, 1987, Ser. No. 104,801

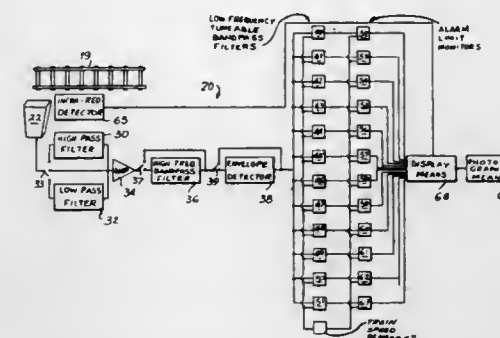
Int. Cl.<sup>4</sup> G01N 29/04

U.S. Cl. 73-660

16 Claims

1. An apparatus for monitoring bearing assemblies of railroad cars for defects during operation comprising: means for transducing acoustic vibrations produced by said assemblies into a first electric signal; means for filtering frequency components not substantially equal to a preselected carrier frequency band substantially

in the range from 10 to 12 Kilohertz from said first electrical signal, said filtering means having an output; means for receiving said filtering means output, demodulating an envelope which modulates said carrier frequency



band, and transmitting said envelope, said envelope having frequency components; means for receiving said envelope, analyzing said frequency components of said envelope; and display means responsive to said analyzing means.

4,790,191

**COMPARATIVE MECHANICAL FAULT DETECTION APPARATUS AND CLAMP**

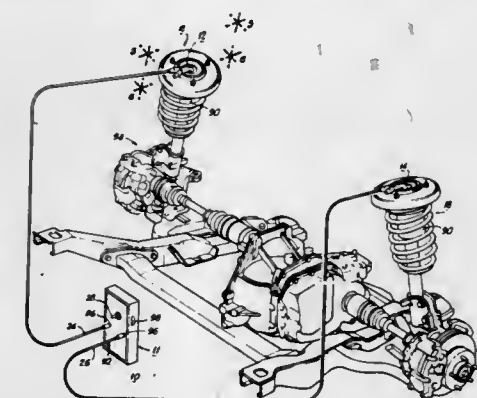
William L. Shultz, Jr., 409 N. Lombard Ave., Lombard, Ill. 60148

Filed Jan. 12, 1987, Ser. No. 2,131

Int. Cl.<sup>4</sup> G01N 29/04

U.S. Cl. 73-661

9 Claims



4. A comparative mechanical fault detector comprising: a first piezoelectric device interconnected to a first metal clamp means, said first clamp means spring biased for attachment to a first metal automotive part; a second piezoelectric device interconnected to a second metal clamp means, said second clamp means spring biased for attachment to a second metal automotive part; said first and second metal clamp means each including a pair of rigid elongated L-shaped, metal lever arms hingedly connected at a hinge pin disposed between front connecting ends forming part of a foot portion of each L-shaped lever arm and a handle end forming a leg portion of each L-shaped lever arm, said lever arms being spring biased to force the connecting ends of the lever arms to converge toward each other, so that the connecting ends of the lever arms will diverge against the spring biasing force for attachment to said automotive part, said connecting ends of said foot portions of said lever arms each including an elongated edge for attachment to said

automotive part, said elongated edges shaped to diverge toward a leading and extending nose portion, said nose portions extending inwardly toward each other for clamping contact against said automotive part; a first electrical conductor operatively attached to said first piezoelectric device and to an electrical switch; a second electrical conductor operatively attached to said second piezoelectric device and to an electrical switch such that said first and second piezoelectric devices can be alternatively switched to an operative position to provide first and second electrical signals indicative of mechanical vibration at the first and second clamped automotive parts, respectively; and indicator means alternatively operatively connected to said electrical switch for providing an indication of the amplitude of the first and second electrical signals.

4,790,192

**SILICON SIDE BY SIDE COPLANAR PRESSURE SENSORS**

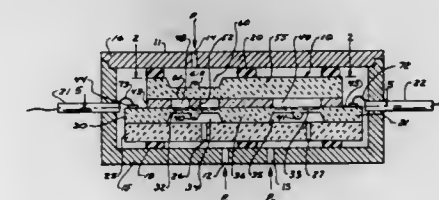
Thomas A. Knecht, Chanhassen, and Mark G. Romo, Eden Prairie, both of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.

Filed Sep. 24, 1987, Ser. No. 100,488

Int. Cl.<sup>4</sup> G01L 7/08, 9/06

U.S. Cl. 73-721

18 Claims



1. A media-isolated multiple pressure sensor for providing outputs representing pressures of pressurized media coupled thereto, comprising:

- a first layer having sensing means for providing the outputs disposed on a first surface thereof aligned with first and second cavities extending into the first layer from a second surface of the first layer opposite the first surface to form first and second pressure sensing diaphragms respectively in the first layer;

connection means electrically coupled to the sensing means and extending over a portion of the first surface for electrically coupling the outputs to a location spaced away from the sensor;

reference means coupled to the first surface for providing a media-free reference pressure to the first diaphragm; and mounting means sealingly affixed to the second surface surrounding the cavities for mounting the sensor, the mounting means having at least a first passageway there-through for coupling the pressurized media to the diaphragms such that the sensing means and connection means are isolated from contact with the media.

4,790,193

**PRESSURE TRANSDUCER APPARATUS**

Yousuke Moriuchi, and Tadaaki Kohsai, both of Fuji, Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan  
Continuation-in-part of Ser. No. 900,732, Aug. 27, 1986, Pat. No. 4,733,566. This application Mar. 7, 1988, Ser. No. 164,793  
Claims priority, application Japan, Aug. 30, 1985, 60-132646[U]

Int. Cl.<sup>4</sup> G01L 7/00, 9/00

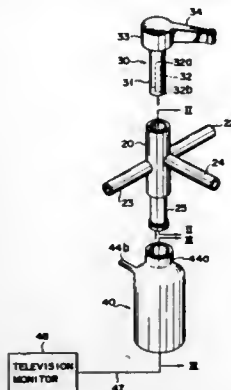
U.S. Cl. 73-756

2 Claims

1. A fluid pressure transducer apparatus comprising: (A) a fluid pressure transducer means including: (A-i) a fluid pressure detection means, having a detection



surface of a fluid pressure, for converting a fluid pressure into an electrical signal, and  
 (a-ii) a chamber, formed on said detection surface, for storing a fluid; and  
 (B) a path means, selectively communicating said chamber with a fluid pressure measurement portion, for transmitting a fluid pressure of the measurement portion to said detection surface, said path means including:  
 (B-i) a cylindrical member having a first port communicating with said chamber and a plurality of second ports arranged on a surface substantially perpendicular to an axis of said cylindrical member, said first port being arranged on a lower portion of said cylindrical member, and



(B-ii) a stop cock arranged in said cylindrical member to be slidable with respect to an inner surface of said cylindrical member, said stop cock having a path defined therein and handle means for slidably rotating said stop cock in said cylindrical member through a predetermined angle so that said path communicates said first port with only one of said plurality of second ports and no other second ports communicate with each other, said stop cock further having an annular groove communicating with said first port and a substantially vertical groove communicating said annular groove and said second ports one at a time.

4,790,194

## FLOW MEASUREMENT DEVICE

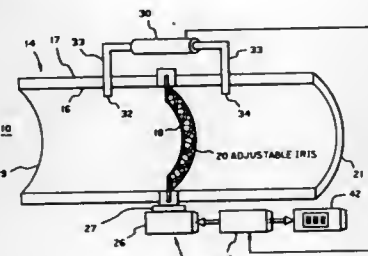
James C. Bellows, Maitland, and Michael Twerdochlib, Oviedo, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 1, 1987, Ser. No. 44,625

Int. Cl.<sup>4</sup> G01F 1/22

U.S. Cl. 73—861.53

1 Claim



1. An apparatus for continuously measuring fluid flow through a pipe in which the fluid flow varies over a range of about 0 to 400 cubic feet per minute comprising:  
 a measurement pipe having an inner wall, an outer wall, a first end, and a second end;  
 first and second measurement orifices each connecting the

inner and outer walls, the first and second measurement orifices being spaced apart along the pipe, said measurement pipe being connectable to other pipes so that fluid which is to be monitored enters said measurement pipe through the first end and exits said measurement pipe through the second end;  
 an iris having an adjustable opening, said iris being placed across the inner wall or said pipe between the first and second orifices;  
 differential pressure means coupled to said first and second orifices for providing data representative of pressure therebetween;  
 mechanical means for adjusting the opening of said iris; and  
 control means for controlling said mechanical means in order to develop differential pressures between the first and second measurement orifices which are suitable for calculating rates of fluid flow through said measurement pipe, said control means including means for calculating rates of fluid flow through said measurement pipe, means responsive to said rates of fluid flow for selectively establishing a desired differential pressure value, and means for controlling said mechanical means for maintaining differential pressure at said selected desired value.

4,790,195

## FLOW SENSORS

Murray F. Feller, P.O. Box 1247, Dunnellon, Fla. 32630

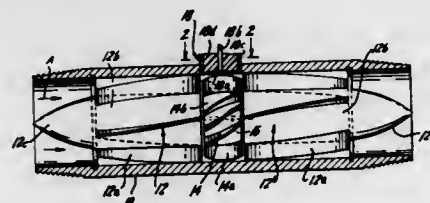
Division of Ser. No. 749,267, Jun. 7, 1985, Pat. No. 4,649,756.

This application Nov. 3, 1986, Ser. No. 926,108

Int. Cl.<sup>4</sup> G01F 1/10

U.S. Cl. 73—861.77

8 Claims



1. Apparatus for sensing the flow of liquid such as tap water that exhibits appreciable electrical conductivity, including means providing a cylindrical surface that defines a flow passage, a flow-driven rotor in said passage, and means for providing signals representing the rotation of said rotor, said rotor being formed of material having high resistivity compared to the resistivity of liquid whose flow is to be sensed and said rotor having a core supported coaxially in the cylindrical passage, said core bearing outward-extending vanes that are spaced apart around said core, said signal providing means including a sensing electrode exposed to said passage and disposed outward of the path of the vanes' outer edges and in proximity thereto, and a companion electrode, separated by insulation from said sensing electrode, and a circuit comprising flow-representing signal-deriving means and a source of excitation between the sensing and companion electrodes, said companion electrode including portions that are exposed to the flow passage and located at opposite sides of said sensing electrode around the cylindrical flow passage so that paths of current are formed between said sensing electrode and said companion electrode in the absence of said vanes, and so related to said rotor vanes that, at recurring positions in the rotation of said rotor, the vanes form successive pairs of insulating barriers in said passage between said sensing electrode and said portions of the companion electrode, for impeding the flow of current between the exposed surfaces of said electrodes.

4,790,196

## SAMPLER OF PARTICULATE MATERIAL ON A MOVING BELT

Gregory Gould, 30 Clairmont Ave., Thornwood, N.Y. 10594

Filed Sep. 3, 1987, Ser. No. 92,663

Int. Cl.<sup>4</sup> G01N 1/12

U.S. Cl. 73—863.91

3 Claims



1. A device for periodically obtaining samples of particulate material from a moving belt comprising a sample cutter provided with an opening at one end, means for moving said sample cutter across said moving belt, said sample cutter being provided with at least one adjustable side, which side may be modified so that the length of the downstream side of said sample cutter is greater than the length of the upstream side of said sample cutter, depending upon the speed of the belt and the speed of the sample cutter moving across the belt for maximizing the effective opening of said sample cutter.

4,790,197

## LIQUID SAMPLING APPARATUS

Rigino Kimonides, 18 Chattrworth Road, Stamford, Lincolnshire PE9 2UM, England

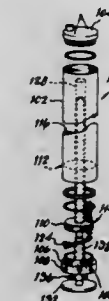
Filed Jul. 29, 1987, Ser. No. 79,104

Int. Cl.<sup>4</sup> G01N 1/12

U.S. Cl. 73—864.65

7 Claims

1. Liquid sampling apparatus comprising:  
 (a) a scalable sampling vessel having an upper end and a lower end and defining a sampling chamber to receive and temporarily store a liquid to be sampled, said liquid constituting a liquid in a liquid tank having a bottom surface or other tank structure therein, or constituting sea water overlying a sea bed;  
 (b) support means for said sampling vessel whereby said sampling vessel can be lowered into the liquid to be sampled prior to sampling and subsequently raised after sampling when containing a sample of the liquid to be sampled;  
 (c) the weight of said sampling vessel being such that when said chamber is full of air prior to sampling and the vessel is lowered into the liquid to be sampled, the vessel sinks;  
 (d) an upper port formed in said sampling vessel at the upper end thereof to permit escape of air from within said chamber during the sampling process, and upper valve means mounted at said port to control the passage of fluids through said upper port;  
 (e) a lower port formed in said sampling vessel at the lower end thereof to permit the entry into said chamber of liquid to be sampled during the sampling process, and lower valve means mounted at said port to control the passage of fluids through said lower port;  
 (f) valve control means to permit control of said lower valve means to enable selective admission of the liquid, into which said apparatus is lowered, to be sampled;  
 (g) both said upper and lower valve means comprising valve members mounted for movement outwards and inwards with respect to said sampling vessel, respectively to open said valve means upon outward movement and to close said valve means upon inward movement;  
 (h) said control means including a valve actuating assembly having a reversible lever mechanism, and an outwardly



projecting actuator member extending below the lower end of said sampling vessel and engageable with said bottom surface or other structure, or said sea bed, said actuator member being mounted for movement outwards and inwards with respect to said sampling vessel and an operation connection connecting to the lower valve member to said reversible lever mechanism for actuating said lower valve member whereby, respectively, inward movement of said actuator member with respect to said sampling vessel causes outward movement of said lower valve member to open said lower valve means, and outward movement of said actuator member with respect to said sampling vessel causes inward movement of said lower valve member to close said lower valve means;  
 (i) said lower valve means comprising said lower valve member, a cooperating valve seat, a valve guide for said valve member, and spring means biasing said valve member in inward and closing direction to close the lower valve means automatically upon raising of the apparatus

from said bottom surface or other structure or said sea bed;  
 (j) said operative connection of said actuator member to said lower valve member being adjustable for permitting the degree of projection of said actuator member to be adjusted to vary the depth of said sampling vessel with respect to said bottom surface or other structure or said sea bed at which said lower valve means is opened;  
 (k) said actuator member including a stem and said operative connection of said actuator member to said lower valve means comprising said valve actuating assembly, said stem of said actuator member being slidably received in said being lengthwise-adjustable with respect to said valve actuating assembly by means of a releasable detent mechanism; and  
 (l) said stem being telescopically received in tube means having a lower outer end and extending lengthwise into said sampling chamber and forming a zone open at its lower outer end to the main body of the liquid to be

sampled and sealed against the escape into said zone of fluid in the sampling chamber.

#### 6. Liquid sampling apparatus comprising:

a sealable longitudinal sampling vessel having an upper end and a lower end and defining an internal sampling chamber to receive and temporarily store a liquid to be sampled, said liquid constituting a body of liquid overlying a submerged bottom surface downwardly engageable by engagement means at the lower end of said vessel;

support means for lowering said vessel into said liquid prior to sampling and for raising the vessel after sampling when containing a sample of said liquid, the vessel weight being sufficient for the vessel to sink in the liquid when said chamber is full of air prior to sampling and the vessel is lowered into the liquid;

an upper port formed at the vessel upper end to permit escape of air from within said chamber during the sampling process, and a pressure responsive upper valve mounted at said upper port to control the passage of fluids through said upper port, including an upper valve member mounted for movement outwards relative to said vessel to open said upper valve under excess internal pressure in said chamber relative to the existing pressure of the liquid external to said vessel when the vessel has been lowered into the liquid, and correspondingly for movement inwards relative to said vessel to close said upper valve automatically in the absence of excess internal pressure in said chamber relative to the existing pressure of the liquid external to said vessel when the vessel has been lowered into the liquid;

a lower port formed at the vessel lower end to permit entry into said chamber of liquid to be sampled during the sampling process, and a mechanically actuated lower valve mounted at said lower port to control the passage of fluids through said port, including a lower valve member having a biasing spring and mounted for movement outwards relative to said vessel to open said lower valve against the force of the biasing spring and the existing pressure of the liquid external to said vessel when the vessel has been lowered into the liquid, and correspondingly for movement inwards relative to said vessel to close said lower valve automatically under the force of the biasing spring and the existing pressure of the liquid external to said vessel when the vessel has been lowered into the liquid; the upper valve member and lower valve member being movable independently of each other, and the lower valve being disposed completely within said vessel and spaced from the upper end thereof; and

an actuating mechanism for moving the lower valve member to open the lower valve, including an operatively mounted lever having one end operatively connected to the lower valve member and an opposite end operatively connected to a longitudinally movable control member, a longitudinally movable elongate actuator member, and adjustable connection means for adjustably connecting the actuator member to the control member;

said control member being mounted at the lower end of said vessel for longitudinal movement outwards relative to said vessel to cause said lever to move said lower valve member inwards to close said lower valve, and correspondingly for longitudinal movement inwards relative to said vessel to cause said lever to move said lower valve member outwards to open said lower valve;

said lower portion engagement means extending below the vessel lower end for engagement with such bottom surface, and said actuator member having longitudinally inserted upper portion extending inwardly into the vessel; and

said adjustable connection means connecting the actuator member to the control member at a selective longitudinal position of movement of the actuator member relative to said vessel for common movement of the actuator member and the control member, said selective longitudinal position of movement determining the degree of projection of the lower portion of the actuator member below the vessel

lower end for varying the depth of said vessel relative to said bottom surface,

whereby upon engagement of the lower portion of the actuator member with said bottom surface, the vessel weight will cause the lever to move relative to said actuator member and control member to open said lower valve to permit entry into said chamber of liquid to be sampled, and in turn the incoming liquid will upwardly displace and compress the air in said chamber to cause the upper valve to open under the thereby generated excess internal pressure in said chamber for escape of such air and completion of the filling of the chamber with the liquid to be sampled, after which the upper valve will reclose automatically, and upon raising the vessel the lever will move relative to said actuator member and control member to reclose the lower valve automatically.

4,790,198

#### GRAIN PROBE

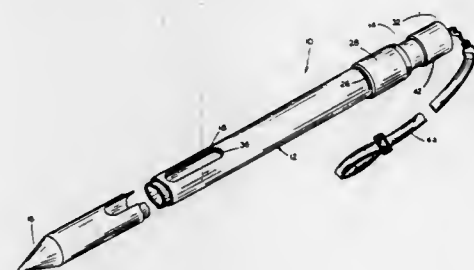
Jon Awtry, 1411 Victoria, and Dennis R. Hefflin, Rte. 4, Box 211A, both of Harlan, Iowa 51537

Filed Sep. 11, 1987, Ser. No. 96,518

Int. Cl.<sup>4</sup> G01N 1/12

U.S. Cl. 73-864.64

3 Claims



1. A grain probe, comprising, an elongated outer tubular member having an open upper end and a closed lower end, said outer tubular member having a plurality of vertically spaced-apart openings formed therein, an elongated inner tubular member rotatably mounted within said outer tubular member and having upper and lower ends, said inner tubular member having a plurality of vertically spaced-apart openings formed therein adapted to register with the openings in said outer tubular member, when said inner tubular member is rotated to a first position with respect to said outer tubular member, to permit grain to enter the interior of said inner tubular member, said openings in said inner tubular member being out of register with the openings in said outer tubular member, when said inner tubular member is rotated to a second position relative to said outer tubular member, to maintain the grain within said inner tubular member or to prevent grain from entering the interior of said inner tubular member, said inner tubular member having a partition means between pairs of adjacent openings in said inner tubular member to create a plurality of vertically spaced compartments therein, said inner tubular member being selectively longitudinally slidably mounted in said outer tubular member for longitudinal slidable movement only when said inner tubular member is rotated to its second position, to permit said inner tubular member to be pulled outwardly from said outer tubular member thereby successively exposing the openings in said inner tubular member to permit the grain in each of said compartments to be individually successively dumped therefrom, and

a yieldable retaining means to selectively restrict the longitudinal movement of said inner tubular member in said outer tubular member.

4,790,199

#### MECHANICAL CONTROL DEVICE

Karl-Heinz Bauer, Bad Neustadt, and Viktor Geiss, Hochheim, both of Fed. Rep. of Germany, assignors to Preh Elektrofeinmechanische Werke Jakob Preh Nachf. GmbH & Co., Bad Neustadt, Fed. Rep. of Germany

Continuation of Ser. No. 802,704, Nov. 26, 1985, abandoned.

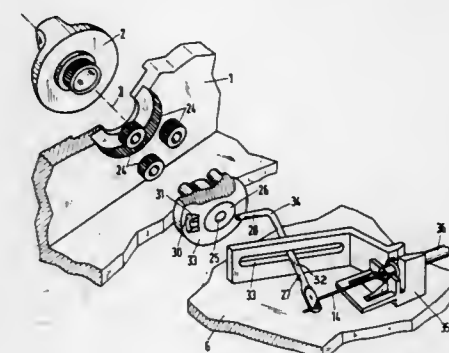
This application Jan. 15, 1988, Ser. No. 145,733

Claims priority, application Fed. Rep. of Germany, Nov. 30, 1984, 3444230

Int. Cl.<sup>4</sup> F16H 21/16

U.S. Cl. 74-48

9 Claims



1. A control device for mechanically converting a distance of travel which occurs during rotary motion into a linear displacement which exceeds said distance of rotary travel comprising:

control knob means having an end adapted for operator rotation about an axis of rotation and an opposing end, the rotation of said control knob means controlling the distance travelled during said rotary motion;

lever means including a first, shorter arm member and a second, longer arm member joined to said first shorter arm member at an obtuse included angle thereby forming a bend in said lever means for coupling said control knob means and an linearly moving member;

a bore in said opposing end of said control knob means intersecting said axis of rotation at an oblique angle, said bore receiving and obliquely supporting said first, shorter arm member of the lever means; and

guide means receiving said second, longer member for constraining transverse movement of an end of said second arm member remote from said bend along a straight line, said straight line movement exceeding said distance travelled during rotary motion of said control knob means.

4,790,200

#### PROGRESSIVE CONTROL

Lennart Hallstedt, Lyckeby, Sweden, assignor to Dynapac Light Equipment AB, Ljungby, Sweden

Filed Feb. 8, 1983, Ser. No. 465,029

Claims priority, application Sweden, Feb. 9, 1982, 8200733

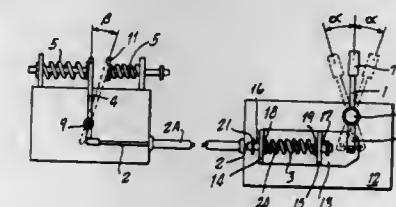
Int. Cl.<sup>4</sup> G05G 1/00, 1/04

U.S. Cl. 74-517

3 Claims

1. A manually actuated control apparatus comprising an operating component and an adjusting component; connecting means between the operating component and the adjusting component for actuating the adjusting component in response to actuation of the operating component, the connecting means including a first spring means interposed therein for absorbing, as last motion, a portion of the movement of said operating

component; and a second spring means coupled to the adjusting component for opposing movement thereof, to provide a



non-linear relationship between the movement of the operating component and the movement of the adjusting component.

4,790,201

#### ELECTROMECHANICAL LINEAR ACTUATOR FOR TIPPING THE DRIVER'S CAB OF A COMMERCIAL VEHICLE

Carlo Gheddo, Turin, Italy, assignor to Iveco Fiat S.p.A., Turin, Italy

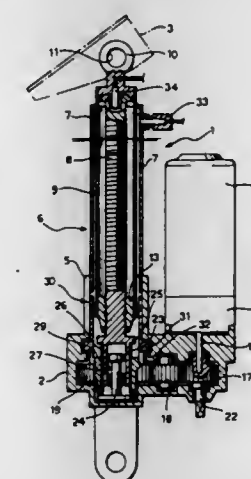
Filed Apr. 22, 1987, Ser. No. 41,280

Claims priority, application Italy, Jan. 21, 1987, 52870/87[U]

Int. Cl.<sup>4</sup> F16H 19/02

U.S. Cl. 74-89.15

3 Claims



1. A linear actuator for tipping a driver's cab pivoted on a frame of a commercial vehicle, said actuator comprising:

a support body adapted to be pivotally mounted on said frame,

a drive motor mounted on said body, a set of reduction gears mounted on said body in operative engagement with said drive motor, a driven screw connected to one of said reduction gears for rotation thereby and axial sliding movement relative thereto,

a hollow shaft adapted to be pivotally connected at one end to said cab, said shaft telescopically surrounding said screw and having a nut at an opposite end thereof in threaded engagement with said screw for extending and retracting said hollow shaft upon rotation of said screw,

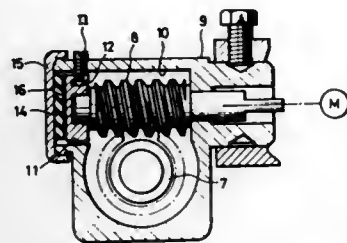
abutment means disposed on said screw adjacent said reduction gear to limit movement of said screw toward said reduction gear,

a radially expandable and contractible sleeve mounted on said body and surrounding the end of said screw adjacent said reduction gearing, said nut being engagable with said sleeve to cause expansion of said sleeve when said nut and shaft are retracted and complementary abutment means



on said sleeve adapted to engage said abutment means on said screw when said sleeve is contracted upon telescopic extension of said shaft and movement of said nut out of engagement with said sleeve to prevent axial movement of said screw relative to said reduction gear.

**4,790,202**  
**DRIVE APPARATUS FOR POWER SEATS**  
Masayuki Hayashi, Toyohashi, and Takumi Sasaki, Kariya, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan  
Filed Nov. 21, 1986, Ser. No. 933,539  
Claims priority, application Japan, Nov. 26, 1985, 60-263911  
Int. Cl.<sup>4</sup> F16H 1/16, 35/06  
U.S. Cl. 74—396 **3 Claims**

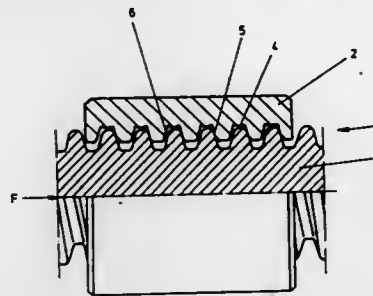


1. An apparatus for driving a power seat, comprising:
  - a housing having a bore;
  - a rotatably driven worm wheel disposed in said housing, said worm wheel having teeth;
  - a worm disposed at one end in said housing, said worm having helical threads for engaging said teeth;
  - a cover closing one end of said bore;
  - a plug disposed in said bore, said plug supporting said worm at one end thereof and being radially movable in a direction toward and away from said worm wheel for positioning said helical threads relative to said teeth, said plug having a planar surface opposing said cover;
  - a damper positioned between said cover and the planar surface of said plug, said damper having a surface with a first coefficient of friction;
  - a spacer interposed between said damper and the planar surface of said plug, said spacer having a surface with a second coefficient of friction less than the first coefficient of friction, said damper being in frictional contact between said spacer and said cover for urging the helical threads of said worm radially into engagement with said wheel; and
  - screw means for slidably adjusting the radial position of the plug in the bore relative to the spacer.

**4,790,203**  
**WORM GEAR**  
Manfred Brandenstein, Essenheim, and Horst-Manfred Ernst, Eltinghausen, both of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany  
Filed Oct. 8, 1987, Ser. No. 106,607  
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1986, 3635040  
Int. Cl.<sup>4</sup> F16H 25/24  
U.S. Cl. 74—424.8 R **4 Claims**

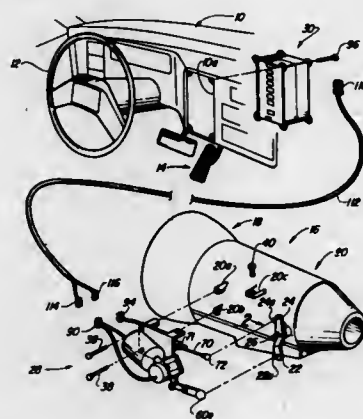
1. In a worm gear having an outwardly directed thread on a spindle and an inwardly directed thread on a nut and meshed with said outwardly directed thread, said inwardly and outwardly directed threads having similar trapezoidal shapes for their entire lengths, whereby when the threads are inclined to one another, the tipping force receiving contact point or contact section is exclusively on the thread crown surface of the respective thread region of at least one of said threads, and whereby under radial forces acting in the same direction at the two ends of the threads, the two threads exhibit small or no

axial play with respect to one another and the thread crown surface of said one thread engages the corresponding section of the groove bottom of the other thread; the improvement wherein the thread flanks of at least said one thread have a convex profile in the radial direction and the groove bottom of at least one thread comprises a



central support projection extending therealong and a radially deeper edge region adjacent each side of the support projection, whereby at least one gap is provided between the transition regions of the thread flanks and the thread crown surface of the one thread and the edge region of the groove bottom of the other thread at the maximum inclined position of the threads to one another.

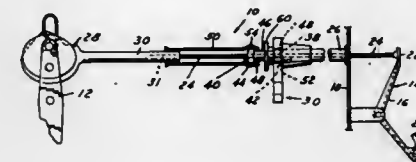
**4,790,204**  
**ELECTRIC SHIFT APPARATUS**  
Edward L. Tury, Brighton; David F. Salzmann, South Lyon; Keith V. Leigh-Monstevens, Troy; John G. Vander Poorte, St. Clair Shores, and David C. Peterson, Walled Lake, all of Mich., assignors to Automotive Products, plc, Warwickshire, England  
Filed Jun. 16, 1987, Ser. No. 62,775  
Int. Cl.<sup>4</sup> G05G 11/00  
U.S. Cl. 74—483 PB **26 Claims**



1. An electric shift apparatus for use with a motor vehicle having an automatic transmission of the type including a mode select lever and a kick-down lever positioned outside of the transmission housing and mounted for pivotal movement at one end thereof about a common axis, said apparatus comprising:
  - (A) a bracket adapted to be secured to said transmission housing proximate said levers;
  - (B) first motor means mounted on said bracket and adapted to be drivingly connected to the free end of the mode select lever; and
  - (C) second motor means mounted on said bracket and adapted to be drivingly connected to the free end of the mode select lever.

adapted to be drivingly connected to the free end of the kick-down lever.

**4,790,205**  
**CABLE FLEXIBLE JOINT**  
Raymond Stocker, West Bloomfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.  
Filed Dec. 15, 1986, Ser. No. 941,877  
Int. Cl.<sup>4</sup> F16C 1/10  
U.S. Cl. 74—500.5 **1 Claim**

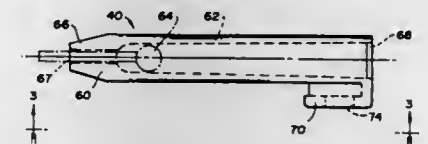


1. A flexible cable assembly for connecting a vehicle accelerator pedal to an engine carburetor throttle valve lever, comprising a flexible Bowden wire type cable fixedly connected at one end to a first movable lever and at its opposite end to a second movable lever for operation of the latter lever upon movement of the first lever, a stationary rigid support bracket intermediate to the levers, and flexible joint means operably supporting the cable in the bracket in a manner permitting a variable bending of the cable between a normal position and a position approximately at a right angle from the normal position and return to the normal position, a sheath surrounding and protecting the cable and fixedly secured within the support bracket for non-relative movement between the cable and sheath and bracket, the flexible means including a soft pliable bendable sleeve slidably receiving the cable therein with a frictional fit and rigidly connected at one end to the bracket and having a portion protruding from the support bracket at its other end for approximately a major portion of its length to permit bending of the sleeve between the original and right angle positions and return without damage to the sleeve or cable, a rigid dust tube surrounding and spaced from the cable and axially spaced from the support bracket, and ball and socket type connecting means connecting one end of the tube to the protruding portion of the bendable sleeve for a limited swiveling movement of the tube relative to the sleeve to maintain the interconnection between the tube and sleeve while accommodating bending of the sleeve from its normal position, the sleeve being symmetrically formed at opposite ends with a dumbbell-like shape providing shoulder-type ball joints at opposite ends for anchoring the sleeve both to the support bracket and to the tube, the tube having a socket-like end having a bubble-like shape overlapping the shoulder of the sleeve ball joint, the diameters of the bubble-like end and contiguous sleeve shoulder providing an interference fit between the tube preventing separation during severe bending movement of the sleeve and tube while permitting angular tilting movement of the tube upon the sleeve.

**4,790,206**  
**LOST MOTION LINK**  
Robert M. Thomas, South Lyon, Mich., assignor to American Motors Corporation, Southfield, Mich.  
Continuation of Ser. No. 817,140, Jan. 8, 1986, abandoned. This application Dec. 4, 1987, Ser. No. 129,857  
Int. Cl.<sup>4</sup> F16C 1/10  
U.S. Cl. 74—502.4 **12 Claims**

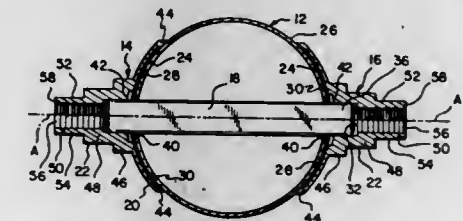
1. A lost motion assembly for providing a selective lost motion connection with a movable member, comprising:
  - a control cable having an enlarged terminus shiftable between a range of positions, and

a link for selective lost motion connection between said movable member and said control cable, wherein said link comprises an elongated body having integral mounting means for pivotally mounting said body on the movable member, a longitudinal passage through said body dimensioned to receive the terminus of the control cable at one end and permitting free movement of the movable mem-



ber relative to the cable when the cable is shifted to a selected one extreme of its range of positions, and means on said body for restricting displacement of said terminus within said passage at an opposite end of said passage.

**4,790,207**  
**BICYCLE CONTROL LEVER MOUNTING SYSTEM**  
Robert L. Diekmann, Kent, and Douglas A. Barchek, Issaquah, both of Wash., assignors to Huff Corporation, Miamisburg, Ohio  
Filed Nov. 14, 1986, Ser. No. 931,362  
Int. Cl.<sup>4</sup> G05G 1/04, 11/00; F16B 9/00; B25G 3/00  
U.S. Cl. 74—523 **10 Claims**



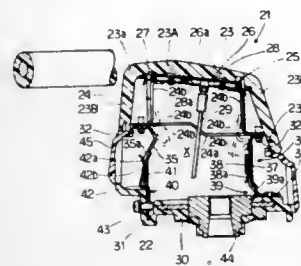
1. In combination with a bicycle frame tube having a transverse hole, a control lever mounting system comprising:
  - first and second boss members, each shaped to receive a control lever thereon and each including a bore in registry with said hole; and
  - connector pin means joining said first and second boss members together, said pin means extending through said hole and including opposing end segments, each of said end segments protruding outwardly from said hole and into said bore of said boss members, forming an interference fit therewith, whereby said connector pin means holds said boss members against opposite sides of said tube.
10. In combination with a bicycle frame tube having a transverse hole therethrough, a control lever mounting system comprising:
  - first and second boss members, each having a base including a concave inner face engaging an outer surface of said frame tube and including a first recess formed in said face, concentric with said base, shaped to accommodate adhesive between said inner face and outer surface, a rectangular bore formed in said face and in registry with said hole and a second recess, of greater depth than said first recess, and a boss element extending from said base and including a spacer block adjacent to said base, a cylindrical portion adjacent to said block, and an eccentric outer portion adjacent to said cylindrical portion;
  - a connector pin having a rectangular cross section and extending through said tube hole and into said bores of said first and second boss members in an interference fit, thereby holding said boss members against said tube; and
  - adhesive means positioned in said first recess for joining said base to said tube.

**4,790,208**  
**KNOB AND SHAFT ASSEMBLY**  
 Duane R. Johnson, Wellington, Ohio, assignor to Allied-Signal Inc., Morristown, N.J.  
 Filed Mar. 4, 1988, Ser. No. 164,290  
 Int. Cl.<sup>4</sup> F16D 1/06  
 U.S. Cl. 74—548 4 Claims



1. A knob and shaft assembly comprising a knob member having a front face and a barrel defining an axis projecting from the side of the knob member opposite the said front face, said barrel including a circumferentially extending wall defining a substantially cylindrical cavity therewithin, said cavity being defined by a circumferentially extending wall surface defined by the wall of said barrel, said circumferentially extending wall surface including a threaded portion carrying threads, and a shaft member terminating in an end portion received within said cavity, said end portion defining a circumferentially extending outer surface, said outer surface including a threaded portion carrying threads threadingly engaging the threads on the wall surface of the cavity, and cooperating detent means carried by each of said surfaces on said threaded portions separate from the threads for releasably locking the knob member on the shaft member in a predetermined angular position after the threads on the wall surface of the knob member are threadingly engaged with the threads on the outer surface of the shaft member.

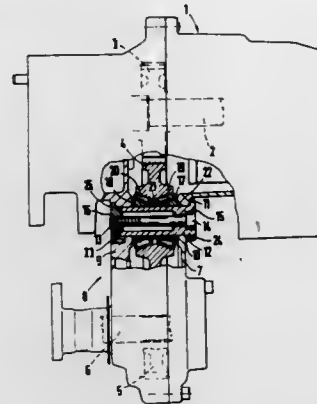
**4,790,209**  
**IMPACT ENERGY ABSORBING STEERING WHEEL**  
 Syuichi Ishida, Ichinomiya, Japan, assignor to Toyota Gosei Co., Ltd., Nishikasuga, Japan  
 Filed Aug. 29, 1986, Ser. No. 902,959  
 Claims priority, application Japan, Aug. 29, 1985, 60-132015[U]; Aug. 29, 1985, 60-190540  
 Int. Cl.<sup>4</sup> B62D 1/04  
 U.S. Cl. 74—552 13 Claims



1. An impact energy-absorbing steering wheel, comprising: a steering wheel having an axially-central boss portion having an upper end provided with a boss plate having an outer periphery; a cover pad having an upper end wall and a depending peripheral sidewall means; said cover pad being arranged on said steering wheel boss portion and having said sidewall means thereof juxtaposed

with said outer periphery of said boss plate so as to enclose above said boss plate an inner space; an impact energy absorber, comprising: (a) support means secured on said boss portion and including at least two laterally-spaced support members which project axially upwardly from respective sites located near said outer periphery of said boss plate radially within bounds of said inner space; (b) a thin metal sheet having a transversally extending annular base flange portion from which at least two laterally spaced leg portions project axially upwardly from respective sites, said leg portions having upper ends; (c) transversally extending plate means secured with an interconnecting said upper ends of said leg portions; and (d) first connecting means provided on said support members of said support means engaged with second connecting means provided on further support members provided on said base flange portion of said thin metal sheet for securing said thin metal sheet in place on said support means with said leg portions of said thin metal sheet occupying radially outer portions of said inner space and said transversally extending plate occupying an axially upper portion of said inner space, with both said thin metal sheet and said transversally extending plate being enclosed by said cover pad and said transversally extending plate being located under and adjacent said upper end wall of said cover pad; said leg portions of said thin metal sheet being composed and shaped to comprise a bending point to bend, upon delivery of an axially downward impact force on said cover pad, downwardly and inwardly, in a folded manner, so as to become disposed at least partially axially below said annular base flange portion of said thin metal sheet.

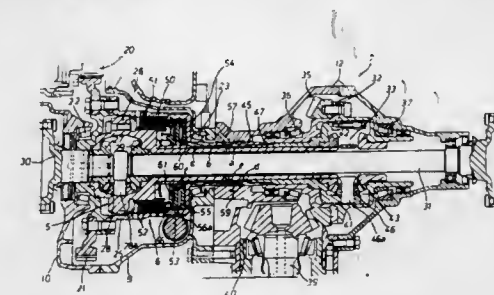
**4,790,210**  
**BEARING OF AN IDLER GEAR OF AN ALL-WHEEL TRANSFER TRANSMISSION**  
 Robert Müller, Mönshelm; Peter Hoebel, Wlensheim-Serres, and Ulrich Maier, Freiberg, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany  
 Filed Sep. 17, 1987, Ser. No. 97,719  
 Claims priority, application Fed. Rep. of Germany, Feb. 21, 1987, 3705606  
 Int. Cl.<sup>4</sup> F16C 35/06; F16H 37/06, 57/02  
 U.S. Cl. 74—665 GA 7 Claims



1. A bearing of an idler gear of an all-wheel transfer transmission, said idler gear being disposed between first and second casing walls of a transmission case and mating with both a driven gear wheel originating from an all-wheel locking system and an output gear wheel driving one vehicle axle, comprising:

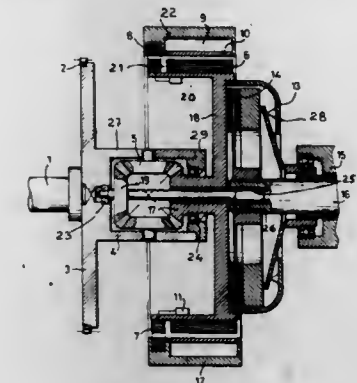
a bush on which said idler gear is disposed, said bush having at least one side with a stop collar which rests against said first casing wall and another side which is axially braced on the outside with respect to said second casing wall; and tightenable connection means for axially bracing said bush with respect to said second casing wall, wherein said tightenable connection means is a screwed connection means comprising a screw that passes centrally through said bush and a nut, said screw having a head which forces said stop collar against said first casing wall, said nut resting against said second casing wall, and wherein said first and second casing walls include a bore through which said bush is fitted, and further comprising O-rings for sealing off said bore with respect to said first and second casing walls, wherein said O-ring which seals off said second casing wall is between said nut and an end face of said bush.

**4,790,211**  
**POWER TRANSMISSION DEVICE FOR FOUR WHEEL DRIVE VEHICLE HAVING AN IMPROVED DIFFERENTIAL MOTION LIMITING MECHANISM**  
 Tatsuya Iwatsuki, Okazaki; Mutsumi Kawamoto, Tokyo, and Takenori Kano, Anjo, all of Japan, assignors to Aisin-Warner Kabushiki Kaisha, Anjo, Japan  
 Filed Dec. 31, 1986, Ser. No. 948,218  
 Claims priority, application Japan, Sep. 30, 1985, 60-218433  
 The portion of the term of this patent subsequent to May 24, 2005, has been disclaimed.  
 Int. Cl.<sup>4</sup> F16H 37/10  
 U.S. Cl. 74—701 3 Claims



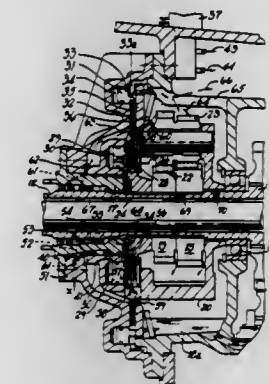
1. A power transmission device with an improved differential motion limiting mechanism for a four wheel drive vehicle having automatic transmission means, front wheel differential gear means, differential motion limiting means and transfer unit means including center differential gear means, comprising: a first gear mount casing having a gear adapted to mesh with an output of a transmission; a differential motion limiting device arranged together with a front wheel differential gear in said first gear mount casing, said front wheel differential gear having a first diff-carrier and said differential motion limiting device comprising a hydraulic friction clutch for engaging and disengaging said first gear mount casing with the first diff-carrier of said front wheel differential gear; a second gear mount casing disposed coaxially with respect to said first gear mount casing; and a transfer unit including a center differential gear arranged in said second gear mount casing, said center differential gear comprising a second diff-carrier coupled with said first gear mount casing, a first side gear coupled with the first diff-carrier of said front wheel differential gear, and a second side gear coupled with said second gear mount casing for transmitting power to the rear wheels.

**4,790,212**  
**ENGINE BRAKE CLUTCH INCLUDING ELECTRICAL BRAKE**  
 Jean-Paul Sibaud, Saint Symphorien d3 Ozon Lyon, France, assignor to Renault Vehicules Industriels, Lyons, France  
 Filed Dec. 8, 1986, Ser. No. 939,066  
 Claims priority, application France, Dec. 6, 1985, 85 18061  
 Int. Cl.<sup>4</sup> F16H 1/44; F16D 67/02; H02K 49/04  
 U.S. Cl. 74—710.5 6 Claims



1. An engine brake clutch device in a motor vehicle having an engine and a transmission, comprising: a differential system placed between said engine and said transmission and mechanically coupled to said engine; an electric machine mechanically coupled to an output of said differential system and comprising brake means for transforming mechanical energy into heat; a clutch connected between said output of said differential system and said transmission; and a control device for controlling said electric machine such that said output of said differential system is braked.

**4,790,213**  
**PLANETARY GEAR ASSEMBLIES**  
 Jean J. Lasoen, 4 Av des Pres Vendome, 78450 Villepreux, France  
 PCT No. PCT/EP83/00056, § 371 Date Oct. 28, 1983, § 102(e) Date Oct. 28, 1983, PCT Pub. No. WO83/03289, PCT Pub. Date Sep. 29, 1983  
 PCT Filed Feb. 28, 1983, Ser. No. 563,417  
 Claims priority, application United Kingdom, Mar. 11, 1982, 8207134  
 Int. Cl.<sup>4</sup> F16H 37/04  
 U.S. Cl. 74—740 2 Claims

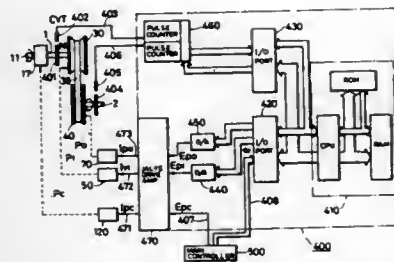


1. A planetary gear assembly (10) comprising co-axial input and output shafts (12,14) first and second sun gears (13,15)



splined one onto each adjacent shaft end portion (12a, 14a), a carrier (20) rotatable about the axis of the input and output shafts, planet gear means (22, 23) carried by the carrier and meshing with the first and second sun gears respectively, a stationary housing (18), brake means (31) operable to hold the carrier stationary so that the assembly operates in its planetary ratio, and clutch means (27) operable to lock-up the assembly and provide a direct drive ratio, the assembly being characterized in that the adjacent end portions (12a, 14a) of the input and output shafts (12, 14) have the same diameter and spline formations of the same cross-sectional form, in that the clutch means (27) is operable to clutch one of the shafts (12) to the carrier (20) via a torque path (24) not involving either sun gear to lock up the assembly, and in that either sun gear (13, 15) can be engaged with either the input or output shaft splined end portion and the meshing planet gear means (22, 23) can be located accordingly so that a given gear assembly can be assembled to give either an overdrive or underdrive planetary ratio.

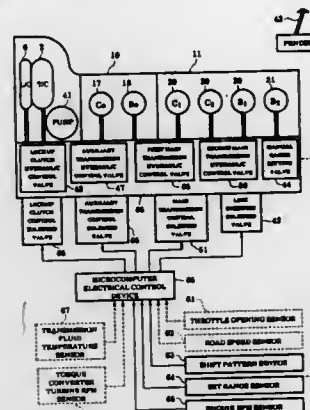
**4,790,214**  
**REVOLUTION SPEED RATIO CONTROL SYSTEM FOR A CONTINUOUSLY VARIABLE TRANSMISSION**  
 Katsuhiko Hattori, Hideyuki Sasaki, Hiroyuki Yamaguchi, and Takeo Ogasawara, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan  
 Filed Jul. 29, 1986, Ser. No. 890,651  
 Claims priority, application Japan, Aug. 2, 1985, 60-170933  
 Int. Cl. B60K 41/16  
 U.S. Cl. 74-866 13 Claims



1. A revolution speed ratio control system for a continuously variable transmission comprising a driving pulley provided on an input shaft; a driven pulley provided on an output shaft disposed in parallel with said input shaft; an endless belt wound on both said pulleys; each of said pulleys comprising a fixed member secured to said input or output shaft and having a conical surface, and a movable member which has a conical surface facing that of said fixed member and is provided so that said movable member is rotated together with said input or output shaft and can be slid on said shaft in the axial direction thereof; and said endless belt has both its oblique side surfaces frictionally engaged with said conical surfaces of said fixed and movable members; an electronic control circuit including a means for calculating the actual revolution speed ratio between said driving and driven pulleys of said transmission, a means for generating a first electric control signal corresponding to the difference between said actual revolution speed ratio and an aimed revolution speed ratio between said pulleys determined by information of the input torque of said input shaft and required torque for said output shaft, and a means for generating a second electric control signal determined by the sum of an electric signal corresponding to said actual revolution speed ratio and an electric signal corresponding to said difference; and a hydraulic control circuit including a pressure oil source, a first cylinder which is provided on said input shaft and supplied with working oil from said pressure oil source to push the movable member of said driving pulley toward the fixed member thereof, a second cylinder which is provided on said output shaft and supplied with working oil from said pressure oil source to push the movable member of said driven

pulley toward the fixed member thereof, a first control valve which is disposed in an oil passage for connecting said pressure oil source and said first cylinder to each other and acts on the basis of said first electric control signal to control the flow rate of the working oil supplied to or drained from said first cylinder, and a second control valve which is disposed in an oil passage for connecting said pressure oil source and said second cylinder to each other and acts on the basis of said second electric control signal to control the pressure of the working oil supplied to said second cylinder.

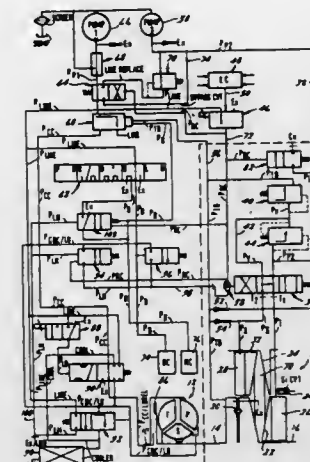
**4,790,215**  
**METHOD AND SYSTEM FOR CONTROL OF TWO PART TYPE TRANSMISSION PROVIDING LIMITED TIME FOR AUXILIARY TRANSMISSION OVERDRIVE ENGAGEMENT WITH MAIN TRANSMISSION SPEED REDUCTION ENGAGEMENT**  
 Yukio Hamano, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
 Continuation of Ser. No. 878,620, Jun. 26, 1986, abandoned.  
 This application Dec. 14, 1987, Ser. No. 133,232  
 Claims priority, application Japan, Jun. 26, 1985, 60-139983  
 Int. Cl. B60K 41/06  
 U.S. Cl. 74-866 36 Claims



1. A transmission control method for an automatic transmission of a vehicle, said transmission comprising:  
 (a) an auxiliary gear transmission mechanism, comprising a power input shaft and a power output shaft, and switchingly controllable to provide either a directly connected speed stage between its said power input shaft and its said power output shaft or a speed increasing overdrive speed stage between its said power input shaft and its said power output shaft; and  
 (b) a main gear transmission mechanism, comprising a power input shaft rotationally connected to said power output shaft of said auxiliary gear transmission mechanism and a power output shaft, and switchingly controllable to provide either a directly connected speed stage between its said power input shaft and its said power output shaft or at least one speed reducing speed stage between its said power input shaft and its said power output shaft;  
 said method, comprising the steps of:  
 (c) switching said auxiliary gear transmission mechanism between providing its said directly connected speed stage and providing its said speed increasing overdrive speed stage, both when said main gear transmission mechanism is switched to provide its said directly connected speed stage and when said main gear transmission mechanism is switched to its said speed reducing speed stage, so as to provide a series of speed stages of varying gear ratios by various combinations of said directly connected speed stage and said speed increasing overdrive speed stage of

said auxiliary gear transmission mechanism and said directly connected speed stage and said speed reducing speed stage or stages of said main gear transmission mechanism, according to said vehicle operational parameters, and;  
 (d) setting a maximum time limit period over which said auxiliary gear transmission mechanism is switched to provide its said speed increasing overdrive speed stage when said main gear transmission mechanism is switched to provide its said speed reducing speed stage, such a maximum period being determined according to a vehicle operational parameter.

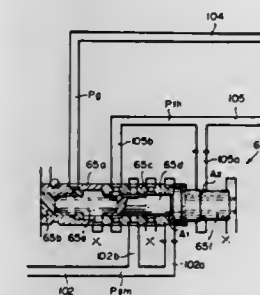
**4,790,216**  
**CONTROL VALVE SYSTEM FOR A CONTINUOUSLY VARIABLE BELT DRIVEN TRANSMISSION FOR MOTOR VEHICLES**  
 Ulrich Eggert, Cologne, and Hermann Staffell, Bergisch-Gladbach, both of Fed. Rep. of Germany, assignors to Ford Motor Company, Dearborn, Mich.  
 Division of Ser. No. 887,852, Jul. 21, 1986, Pat. No. 4,733,582.  
 This application Aug. 26, 1987, Ser. No. 89,470  
 Claims priority, application Fed. Rep. of Germany, Jan. 24, 1986, 3602137  
 Int. Cl. B60K 41/12, 41/10  
 U.S. Cl. 74-866 3 Claims



1. A hydraulic valve system for controlling a continuously variable drive ratio automotive vehicle transmission adapted to shift continuously between different drive ratios and having first and second control pulleys driveably connected by an endless traction belt, a displacement cylinder associated with each pulley, the location of the belt on each pulley being radially variable in response to hydraulic fluid pressure in the associated cylinder to shift between the drive ratios, comprising:  
 first and second hydraulic fluid pumps;  
 main pressure regulation valve means connected to the discharge of the second pump for producing line pressure and torque converter supply pressure;  
 torque converter means for hydrodynamically, driveably connecting the engine of the vehicle to a transmission pulley, said torque converter means having an impeller, a turbine, the impeller connected to the engine, the turbine connected to said pulley;  
 a lockup clutch adapted to selectively driveably connect the turbine and the impeller when hydraulic fluid flows in a first direction through the torque converter and to disconnect the turbine and impeller when said flow is in the opposite direction;  
 a lockup valve supplied with line pressure, coupled to the electronic control means for opening and closing communication between line pressure and a converter lockup

pressure line in accordance with the control of the electronic control means;  
 a lockup on-off valve subject to torque converter lockup pressure for connecting torque converter supply pressure to the inlet of the torque converter and for connecting line pressure to the outlet of the torque converter in accordance with the control of the torque converter lockup pressure;  
 torque converter relief valve means supplied with torque converter discharge pressure and line pressure for producing emergency control pressure at an outlet port when the discharge flow rate from the torque converter is above a predetermined flow rate and for disconnecting line pressure from the outlet port when said flow rate is below the predetermined flow rate;  
 ratio control valve means hydraulically connected to the discharge of the first pump for selectively opening hydraulic communication between the discharge of the first pump and the first and second displacement cylinders to produce ratio control pressure; and  
 an emergency shift valve means subject to emergency control pressure and ratio control pressure supplied with torque converter discharge pressure for connecting the ratio control valve means to the converter discharge pressure when emergency control pressure and ratio control pressure are absent.

**4,790,217**  
**LINE PRESSURE CONTROL SYSTEM FOR AUTOMATIC TRANSMISSION**  
 Toru Kawano, and Hidehiko Mishima, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Japan  
 Filed Aug. 7, 1986, Ser. No. 894,277  
 Claims priority, application Japan, Aug. 8, 1985, 60-174794  
 Int. Cl. B60K 41/06  
 U.S. Cl. 74-868 13 Claims



1. A line pressure control system for an automatic transmission which has a transmission gear mechanism for transmitting the engine output power by way of a plurality of power transmission paths, and friction engagement elements which are operated by a line pressure from a control valve to change the power transmission path through the transmission gear mechanism, and in which the feed of the line pressure is controlled by a throttle pressure corresponding to the engine load and a governor pressure corresponding to the output speed of the transmission gear mechanism to effect gear shifting, the line pressure control system comprising a regulator valve for regulating the line pressure, and a throttle modulator valve for determining a throttle modulator pressure for controlling the regulator valve according to the governor pressure and the throttle pressure so that the line pressure is increased with increase of the throttle pressure and is lowered with increase of the output speed of the transmission gear mechanism; said throttle modulator valve comprising first and second spools, a first spring disposed between the first and second spools to urge the second spool in one direction, and the first spool in an opposite direction and a second spring for urging the second

spool in the direction opposite to said one direction, said first spool includes a governor pressure receiving surface for controlling the throttle modulator pressure so that the line pressure decreases as the governor pressure increases, and said second spool has a throttle pressure receiving surface for controlling the throttle modulator pressure so that the line pressure increases as the throttle pressure increases.

4,790,218

## ROTARY SOCKET WRENCH

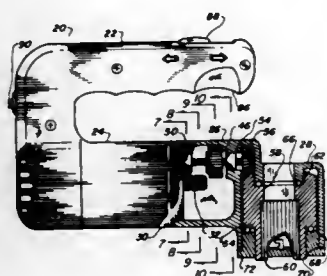
Leonel M. Cabrera, 12013 Alberts St., #12, North Hollywood, Calif. 91607

Filed Nov. 19, 1987, Ser. No. 122,759

Int. Cl.<sup>4</sup> B25B 17/00

U.S. Cl. 81—57.13

8 Claims



1. An electrically powered socket wrench for imparting rotational torque to objects embraced thereunto comprising:

- (a) a structural housing with a handle for enclosing and protecting elements contained within;
- (b) an electric motor having a toothed gear shaft converting electrical energy into rotational torque on said shaft, the motor disposed within said housing, parallel with said handle, providing the motivational force for the wrench;
- (c) a drive gear cluster with an integral drive shaft located within said housing, said cluster having:
  - a first bearing on one end of said drive shaft retained by said housing for reducing the rotational friction of the drive shaft,
  - a first drive gear retained on said drive shaft meshingly interfaced with said toothed motor gear shaft transmitting the rotational torque from the motor to the drive shaft, further having a diameter larger than that of the motor gear, therefore decreasing the speed of the drive shaft relative to the motor,
  - a second drive gear retained on said drive shaft contiguous with said first drive gear and of a relatively smaller diameter for additionally reducing the rotational speed of the motor,
  - a second bearing on the other end of said drive shaft also retained by said housing for decreasing the rotational friction of the shaft,
- (d) a driven gear train with an integral driven shaft within said housing said train having:
  - a third bearing on one end of said driven shaft retained by said housing for reducing the rotational friction of the shaft,
  - a driven gear retained on the driven shaft in alignment and meshed with said second drive gear transmitting the motor rotational torque to the driven shaft, said driven gear of a relatively larger diameter than the first drive gear, thereby further decreasing the rotational speed of the driven shaft,
  - a fourth bearing on the driven shaft in close proximity to the driven gear retained by said housing the reducing the rotational friction of the shaft, and,
  - a drive beveled gear disposed upon the end of the driven shaft for transmitting the rotational torque at a right angle to the driven shaft and at a slower speed,
- (e) a socket retaining geared hub disposed within said hous-

ing at a right angle to said motor, the hub having a female splined hollow therethrough, with a driven beveled geared first end and a recessed shoulder on the second end, the first end matingly engaging said bevel gear providing the rotational drive from the motor through the drive gear cluster and driven gear train, the hub further having a bearing race cavity between the geared first end and the splined hollow,

- (f) an upper ball bearing drivingly abutted between said housing and said hub, also a lower ball bearing positioned on the second end of the hub defining a reduced friction interface allowing the hub to rotate freely therebetween,
- (g) a retaining collar having a separate bearing race positioned tightly into said housing directly beneath said hub second end retaining the hub between the ball bearings providing a structural keeper containing rotational or linear thrust from either the first or second end of the hub; and,
- (h) a removable socket having a male splined exterior configured to slidably engage with the female splined hollow of the hub in a removable manner, the socket having a shape to receive objects embraced thereunto, such as a hex nut or head of a bolt, allowing the wrench to rotate the object in a given direction as powered by the rotational torque of the electric motor.

4,790,219

## HANDLED RATCHET-BREAKER BAR TOOL

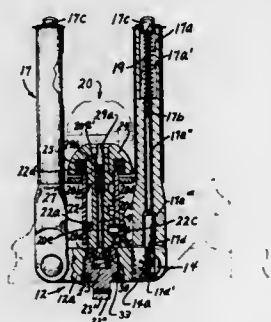
Kenneth L. Will, 5621 Beaver Trail, Indianwoods, Evansville, Ind. 47715

Filed Sep. 18, 1986, Ser. No. 908,727

Int. Cl.<sup>4</sup> B25B 13/46; B25G 1/04, 1/06

U.S. Cl. 81—63

2 Claims



1. In a tool including a base positioning an operating drive at the mid-area thereof, a pair of elongated handles pivotally mounted to and extending from said base at each end and laterally with respect to the longitudinal axis thereof, where each elongated handle is individually positionable in any one of a range of pivotal positions by structure including a spring-urged control member selectively engaging a pin with one of a plurality of cooperating notches, where said operating drive mounts extendible and rotatable knob means which serves to receive manual pressure for application against a workpiece during a use condition, and where said knob means is removable and spring-urged into a mounted position on said operating drive, said knob means including a sleeve, an elongated body received in said sleeve having a plurality of cut-outs therein, and a spring-urged pull-pin in said sleeve for selectively engaging one of said plurality of cut-outs, said elongated body including a spring-urged shaft operating a detent device in said operating drive.

2. In a tool including a base positioning a ratchet mechanism at the mid-area thereof, a pair of elongated handles pivotally mounted to and extending from said base at each end and laterally with respect to the longitudinal axis thereof, where each elongated handle is individually positionable in any one of

a range of pivotal positions by structure including a spring-urged control member selectively engaging a pin with one of a plurality of cooperating notches, where said ratchet mechanism includes a rotatable gear presenting a square operating drive, hand operated means for selectively controlling the movement mode of said rotatable gear to be fixed, clockwise or counterclockwise in said base, and where said movement control means includes selectively and independently rotatable dowels, a toothed lever pivotally engaging said rotatable gear, and a resilient plate continually urging said toothed lever toward the location thereof which establishes the fixed mode of said rotatable gear, said dowels selectively engaging said toothed lever to limit its pivotal motion in either or both pivotal directions.

4,790,220

## SAFETY SEAL STRIPPER

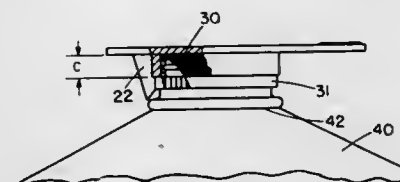
James Lloyd, 2000 South College Ave., Philadelphia, Pa. 19121

Filed Feb. 29, 1988, Ser. No. 161,785

Int. Cl.<sup>4</sup> B67B 7/44

U.S. Cl. 81—3.09

11 Claims



1. An apparatus for stripping a safety seal from a safety cap, said apparatus comprising:

- a cap engagement means adapted to engage a safety cap and allow rotational movement between said safety cap and said said apparatus; and
- safety seal stripper means extending from said cap engagement means so as to project into a notch in said safety seal upon engagement of said safety cap by said cap engagement means such that upon rotational movement of said apparatus with respect to said safety cap, said safety seal is separated from said safety cap.

4,790,221

## METHOD OF MACHINING A BRAKE CALIPER

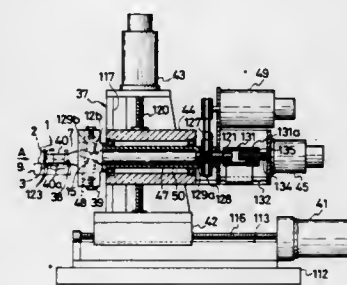
Yukio Iwata, and Shigenori Matsumoto, both of Saitama, Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan Division of Ser. No. 9,970, Feb. 2, 1987. This application Oct. 14, 1987, Ser. No. 108,325

Claims priority, application Japan, Feb. 1, 1986, 61-20530; Feb. 10, 1986, 61-27657; Feb. 10, 1986, 61-27658; Feb. 22, 1986, 61-24790[U]

Int. Cl.<sup>4</sup> B23B 1/00, 5/02, 29/034

U.S. Cl. 82—1 C

3 Claims



1. A method for machining a caliper for a brake, said caliper

having a pair of pin holes, a cylinder hole and a claw, said method comprising the steps of:

- setting said caliper on a workpiece mount with an opening defined by said claw oriented in the upward direction;
- moving a spindle of a cutting machine radially in relation to said cylinder hole to a position and spindle along a central axis of said cylinder hole;
- moving said spindle axially in relation to said central axis of said cylinder hole to position a cutter in said cylinder hole, said cutter being connected to said spindle;
- moving said cutter radially in relation to said central axis of said cylinder hole to be eccentric thereto; and simultaneously
- rotating said spindle such that said cutter machines an inner peripheral wall of said cylinder hole.

4,790,222

## APPARATUS FOR CUTTING VARIOUS FORMS OUT OF A PICTURE FRAME MAT OR THE LIKE

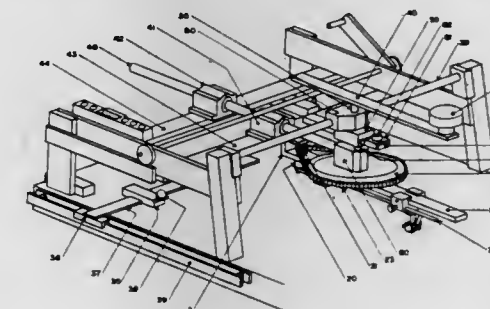
Carey C. Morgan, 440 Hwy. 51 North, Madison, Miss. 39110

Filed Oct. 29, 1987, Ser. No. 114,663

Int. Cl.<sup>4</sup> B23B 41/04; B76D 3/10

U.S. Cl. 82—1.3

19 Claims



1. An apparatus for cutting picture frame mats or the like comprising:

- a ruler arm assembly connected to a vertical support shaft;
- a Y-shaft attached to a bearing shaft block having a passage-way therethrough for acceptance of said vertical support shaft;
- a drive mechanism attached to said vertical support shaft;
- a tool holder bar secured to said vertical support shaft, said tool holder bar having a housing unit supporting a crank mechanism rotatably attached to said drive mechanism;
- a sliding rod extending through said crank mechanism;
- a reciprocating rod movably secured to said sliding rod; and
- a cutting unit releasably securable to both said tool holder bar and said reciprocating rod.

4,790,223

## METHOD AND APPARATUS FOR SEPARATING OFF INDIVIDUAL ITEMS FROM A STACK OF PRECUT STRIPS

Gerhard Busch, Brookdamm 28, D-2105 Sevetal 2 (Meckel-feld), Fed. Rep. of Germany

Filed Apr. 17, 1987, Ser. No. 39,286

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1986, 3613563; Aug. 21, 1986, 3628301

Int. Cl.<sup>4</sup> B26D 7/02, 7/04

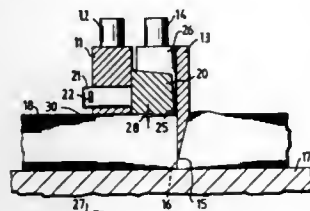
U.S. Cl. 83—48

9 Claims

1. A method of separating stacks of individual shaped items from precut stacked strips of the shaped items, comprising the steps of superimposing individual shaped items in multilayer stacked strips of the shaped items with the shapes of the shaped items fitted into one another, applying downward pressure against said stacked strips substantially along a horizontally non-straight line which corresponds in configuration to a hori-

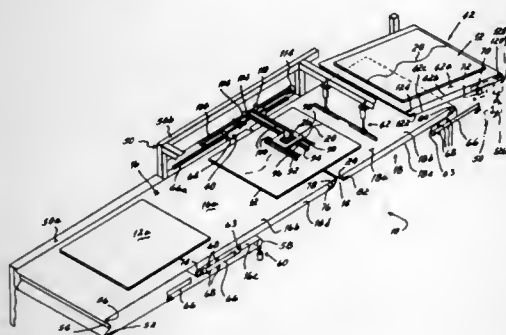


zontally non-straight punch line between said individual shaped items corresponding to the shape of said individual



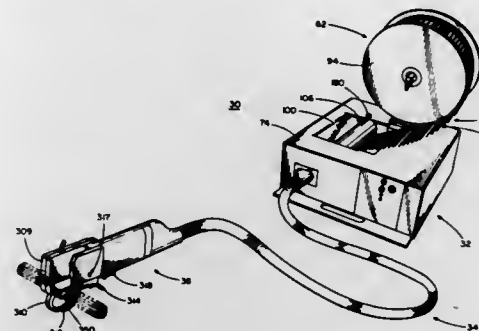
items, and separating stacks of the individual shaped items along said punch line.

**4,790,224**  
**TRAVELLING GAP CONVEYOR CUTTING METHOD AND APPARATUS**  
Michael A. Krutilla, Chagrin Falls, and John Klein, Fairview Park, both of Ohio, assignors to Belcan Corporation, Cincinnati, Ohio  
Filed Aug. 20, 1987, Ser. No. 87,663  
Int. Cl.<sup>4</sup> B26F 3/00; B26D 3/00  
U.S. Cl. 83—53 40 Claims



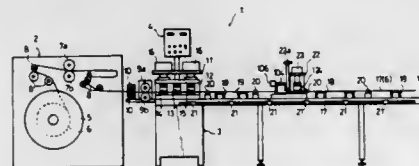
1. A cutting machine comprising a pair of independently operable, longitudinally aligned endless conveyor belts, said belts having upper runs movable in a common horizontal plane, said upper runs of said endless conveyor belts having a length dimension extending longitudinally of said conveyor belts, said belts being adjacent one another and spaced apart to define a longitudinal gap, a cutting medium extendible through said gap for cutting a workpiece positioned over said gap, and means for simultaneously and synchronously moving said gap and said cutting medium longitudinally relative to said workpiece so as to cut said workpiece in a longitudinal direction, said gap moving means being operable to maintain said length dimension of said upper run of at least one of said belts unchanged as said gap is moved relative to said workpiece and said workpiece is transported from said upper run of one of said conveyor belts to the upper run of the other of said conveyor belts.

**4,790,225**  
**DISPENSER OF DISCRETE CABLE TIES PROVIDED ON A CONTINUOUS RIBBON OF CABLE TIES**  
Roy A. Moody, Flossmoor; John J. Bulanda, New Lenox; Robert F. Levin, Bollingbrook; Steven S. Timian, Lockport, and Stephen A. Waltasti, Bollingbrook, all of Ill., assignors to Panduit Corp., Tinley Park, Ill.  
Division of Ser. No. 671,642, Nov. 15, 1984, Pat. No. 4,632,247, which is a division of Ser. No. 444,495, Nov. 24, 1982, Pat. No. 4,498,506. This application Oct. 21, 1986, Ser. No. 922,493  
Int. Cl.<sup>4</sup> B26D 7/32; B29F 9/02  
U.S. Cl. 83—100 18 Claims



1. A dispenser for providing individual cable ties from a continuous ribbon of cable ties to a cable tie installation tool, the ribbon having a laterally disposed strip portion, the strip portion having sufficient rigidity to define a substantially planar ribbon with said cable ties extending from said strip portion and being connected to said strip portion by a connecting means, comprising:  
means for providing the ribbon to said dispenser;  
means for separating the individual ties from the strip portion of the ribbon;  
transfer means for delivering discrete ties from said dispenser; and  
means for accurately positioning and sequentially carrying the individual ties on the ribbon to said separating means and said transfer means, including guide means for positioning the ribbon relative to said separation means to ensure accurate separation of the individual ties from the strip portion of the ribbon, said guide means aligning engaging the laterally disposed strip portion of the ribbon.

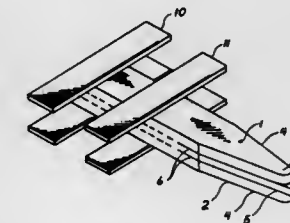
**4,790,226**  
**APPARATUS FOR CUTTING BLIND SLATS**  
Kazuo Tsuchida, Shiga, Japan, assignor to Tachikawa Corporation, Japan  
Filed Sep. 10, 1986, Ser. No. 906,164  
Claims priority, application Japan, Dec. 24, 1985, 60-291195; Dec. 24, 1985, 60-291196; Dec. 24, 1985, 60-291197; Dec. 26, 1985, 60-294696; Dec. 26, 1985, 60-294697; Dec. 27, 1985, 60-299167  
Int. Cl.<sup>4</sup> B23P 23/00; B23D 23/00  
U.S. Cl. 83—208 10 Claims



1. An apparatus for cutting blind slats, including: a conveying device for sequentially conveying a slat material; and a cutting device turned on and off in synchronism with the

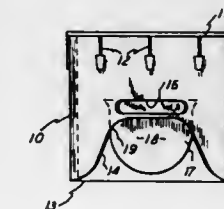
conveyance of said slat material so as to produce slats of a desired length,  
an input device having means for entering the length of a slat and for entering a desired height of a blind;  
a control device having means for converting the output signal of said input device to pulse signals corresponding to the slat length entered and outputting them; said control device having means for calculating the number of slats required for a set of blinds on the basis of said input height of the blind and the width of a slat and means for outputting said pulse signals intermittently in a number which corresponds to said number of slats; and  
a motor rotated on the basis of said pulse signals output from said control device so as to convey said slat material by predetermined lengths.

**4,790,227**  
**PICKS FOR STRINGED INSTRUMENTS**  
Donald W. Lakehart, Rock Bluff Rd., R.R. 4, Ottumwa, Iowa 52501  
Filed Jul. 6, 1987, Ser. No. 70,306  
Int. Cl.<sup>4</sup> G10D 3/16  
U.S. Cl. 84—322 7 Claims



1. A pick for a stringed musical instrument, comprising: three planar elements, each having a predetermined flexibility; said planar elements being oriented parallel to one another and having at least one surface in contact with at least one of the other planar elements; said planar elements being secured together over a selected portion of said contact surface to form a body portion of the pick adapted to be held by the thumb and forefinger of a user, the remaining portion of the planar elements forming picking tips; the picking tips of the top and bottom elements having a predetermined length and the picking tip of the middle element having a slightly longer length than said predetermined length; and gripping means fixed to said body portion.

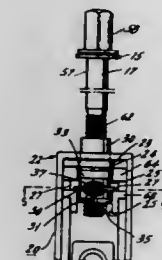
**4,790,228**  
**ACOUSTIC DRUM**  
Terry R. Thirion, 5910 Thomas Ave., Schofield, Wis. 54476  
Division of Ser. No. 666,436, Oct. 30, 1984, Pat. No. 2,731,141.  
This application Jul. 7, 1987, Ser. No. 70,554  
Int. Cl.<sup>4</sup> G10D 13/02  
U.S. Cl. 84—411 R 2 Claims



1. In an acoustic drum consisting of a hollow cylindrical

body having a single cylindrical opening extending along the longitudinal axis of said cylindrical body, a percussion drum head extending over one end of said cylindrical body, the end of said cylindrical body opposite said one end being completely open and being defined by a terminal edge on said cylindrical body, the improvement comprising said cylindrical body having only one elongated opening extending diametrically therethrough and at a location spaced from said terminal edge for the passage of sound waves through said opening, and the elongated axis of said elongated opening extending along the circumference of said cylindrical body for only a minor fraction of the total length of said circumference, to thereby have the sound waves which pass through said elongated opening be directed only transverse to said longitudinal axis of said cylindrical body, and a baffle affixed to the interior of said cylindrical body and extending at an obtuse angle to said longitudinal axis and having a face directed toward said elongated opening for deflecting sound waves from said drum head and through said elongated opening.

**4,790,229**  
**LUG NUT FOR DRUM HEAD**  
Yoshihiro Hoshino, Nagoya, Japan, assignor to Hoshino Gakki Co., Ltd., Japan  
Filed Jul. 13, 1987, Ser. No. 72,331  
Claims priority, application Japan, Feb. 13, 1987, 62-020392[U]  
Int. Cl.<sup>4</sup> G10D 13/02  
U.S. Cl. 84—413 17 Claims



1. A lug and lug nut combination for a musical instrument drum, and the like, comprising:  
a hollow lug for being attached to a musical instrument drum, or the like, the lug having an end and a first opening through that end; first and second abutable surfaces supported spaced apart in the hollow of the lug near the end thereof;  
a lug nut including a shank for extending through the first opening in the lug; the lug nut being sized in the lug to pass by the surfaces without abutting the surfaces in moving thereby; the lug nut being internally threaded for screw threadedly receiving a threaded bolt therethrough; the lug nut including a second opening therethrough in the portion thereof inside the lug for providing access to the bolt threaded into the lug;  
lug nut support means carried on the lug nut and including a first part extending into the second opening of the lug nut for contacting and for pressing upon the bolt to inhibit rotation of the bolt in the lug nut and the support means comprising a second part of a size and shape that the second part will abut one or the other of the first and second surfaces as the lug nut is moved in directions which would move the lug nut out of the lug through the first opening as the threaded bolt is tightened or into the lug away from the first opening.

4,790,230

**LOW PROFILE KEYBOARD DEVICE AND SYSTEM FOR RECORDING AND SCORING MUSIC**

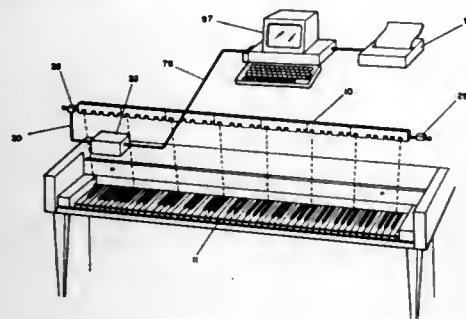
Stephen N. Sanderson, 6301 Glendora Dr., NE., Albuquerque, N. Mex. 87109

Continuation-in-part of Ser. No. 861,317, May 9, 1986, Pat. No. 4,768,412. This application Mar. 13, 1987, Ser. No. 25,495

Int. Cl.<sup>4</sup> G10G 3/04; G10H 1/34

U.S. Cl. 84-462

17 Claims



14. A method for acquiring data representative of a performance on a keyboard instrument comprising:

for each key within a selected group of keys on the keyboard instrument,

- (a) emitting light from a source,
- (b) impinging the light onto the key,
- (c) reflecting the light from the key onto a photodetector in accordance with the amount the key is depressed to generate an electrical analog output signal indicative of the amount of key depression,

using steps (a), (b), and (c), in accordance with a clock signal, sequentially initiating the electrical analog output signal for each key within the group of keys sufficiently frequently to provide a series of electrical analog output signals representative of key depression as a function of time, comprising key striking and release velocities.

monitoring the series of electrical analog output signals for each key to acquire data representative of the performance, and

comparing the strengths of consecutive electrical analog output signals within the series from each key within the group of keys to determine if a change in the amount of depression for each key has occurred and generating note expression data representative of key strike and release velocity when the signal strength comparison step indicates a change in key depression has occurred for a key.

4,790,231

**LIGHTWEIGHT BELT LINK FOR TELESCOPED AMMUNITION AND BELT FORMED THEREFROM**

Eugene M. Stoner, Palm City, Fla., assignor to ARES, Inc., Port Clinton, Ohio

Continuation of Ser. No. 774,160, Sep. 9, 1985, abandoned. This application Oct. 13, 1987, Ser. No. 110,044

Int. Cl.<sup>4</sup> F42B 39/08

U.S. Cl. 89-35.02

7 Claims

1. A belt of linked ammunition, comprising:

- (a) a plurality of telescoped cylindrical ammunition shells each having an annular recess formed in the cylindrical surface thereof adjacent the forward end thereof;
- (b) a plurality of plastic links interconnected by said cylindrical shells;

(c) each link having

- (i) first, second and third rings,

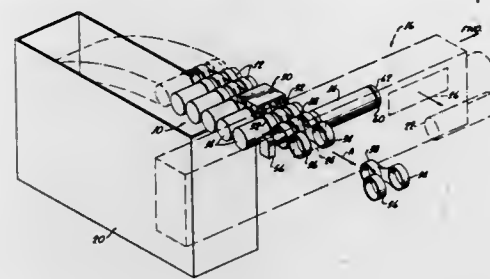
(A) each ring defining a smooth cylindrical interior surface of the same interior diameter, said interior diameter being in excess of the exterior diameter of the cylindrical ammunition shells, whereby the shells

may be pushed forward through the rings without the rings binding thereon, and

- (B) the first ring of each link terminating at its forward extremity in a forward facing annular surface; and

- (ii) web means connecting and spacing the rings of the link, such that the first and second rings are spaced apart on one side of the web means and have a common axis for their interior cylindrical surfaces, and the third ring is disposed centrally on the other side of the web means, with the interior cylindrical surface thereof being axially parallel to and at a spaced apart location from the common axis of the first and second rings;

- (d) the third ring of each link fitting between the first and second rings of each adjacent link in the belt so as to



provide an interior surface in registration with the interior surfaces thereof;

- (e) the plural links being interconnected into a belt by the interposition of the cylindrical ammunition shells within said registered cylindrical surfaces of the rings of adjacent links; and

- (f) each link having detent means protruding from the cylindrical interior surface of the first ring of the link, said detent means being disposed adjacent the forward facing annular surface of the first ring, and being in engagement with the annular recess formed in the surface of the associated cylindrical ammunition shell, whereby the ammunition shell can be rammed forward out of the links without producing excessive distortion of the plastic links and consequent binding of the shell by the links.

4,790,232

**HOLDER FOR A GUITAR SLIDE AND PICK**

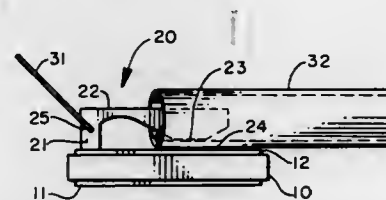
Jeffrey M. Rosen, 86 Riverbank Dr., Stamford, Conn. 06903

Filed Jan. 11, 1988, Ser. No. 142,422

Int. Cl.<sup>4</sup> G10G 7/00

U.S. Cl. 84-329

4 Claims



1. Means for retaining a slide and a pick to a stringed instrument, comprising:

a generally rectangular base, said base including a generally planar top surface and a generally planar bottom surface; an arm unit comprising a vertical member extending from said base top surface, and a horizontal member integrally joined to said vertical member extending over said base top surface;

said vertical member including a slot extending through a portion of said first member, said slot disposed to accept and retain said pick therein; and,

4,790,234

**FLUIDIC POWER-ASSISTED SETTING DEVICE**

Karel Hampejs, and Stefan Gabriel, both of Neuhausen am Rheinfall, Switzerland, assignors to Sig Schweizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Nov. 17, 1986, Ser. No. 931,125

Claims priority, application Switzerland, Nov. 29, 1985, 5109/85

Int. Cl.<sup>4</sup> F15B 13/16

U.S. Cl. 91-362

8 Claims

**4,790,233  
METHOD AND APPARATUS FOR CONTROLLING HYDRAULIC SYSTEMS**

Bengt S. Backe, Dundee, and La Moyne W. Durham, Bartlett, both of Ill., assignors to South Bend Lathe, Inc., South Bend, Ind.

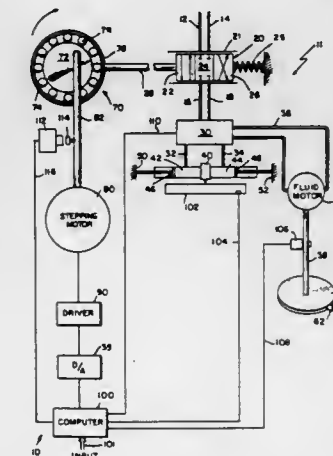
Division of Ser. No. 647,158, Sep. 4, 1984, Pat. No. 4,706,456.

This application Jul. 8, 1987, Ser. No. 71,164

Int. Cl.<sup>4</sup> F15B 13/16

U.S. Cl. 91-361

10 Claims



1. A method of controlling a system for generating hydraulic power, including a variable displacement pump, means for driving said variable displacement pump, means for adjusting the swash plate of said variable displacement pump in response to command signals, a fluid motor means for receiving the fluid output of said variable displacement pump and providing mechanical output power, comprising:

- applying an initial control signal, representative of a desired mechanical output power, to said means for adjusting said swash plate;
- calculating the difference between said desired mechanical output power and the actual mechanical output power to obtain an error signal;
- continuing to apply said initial control signal to said means for adjusting said swash plate until said error signal reaches a predetermined level;
- calculating the revised control signal necessary to produce zero error signal as a function of at least one of a plurality of known system component characteristics, when said error signal reaches said predetermined level; and
- applying said revised control signal to said means for adjusting said swash plate so as to attain precisely said desired mechanical output power.

- 1. A fluidic power-assisted setting device comprising
  - (a) a setting motor having an output shaft for transmitting a torque of said setting motor;
  - (b) a threaded spindle supported for rotation;
  - (c) a spindle nut threadedly mounted on said spindle and being arranged for linear displacement by said spindle relative thereto upon rotation thereof;
  - (d) a setting member attached to said spindle nut for linear travel therewith; a displacement of said setting member being opposable by an external force;
  - (e) gearing means for transmitting the output torque of said setting motor to said spindle; said gearing means including
    - (1) a first spur gear mounted on said output shaft of said setting motor;
    - (2) a second spur gear operatively connected to said spindle; and
    - (3) a third spur gear arranged between and meshing with said first and second spur gears; said third spur gear having a rotary shaft and an axis of rotation;
  - (f) signalling means coupled to said gearing means for generating an output signal when the linear force derived from the output torque of said setting motor is insufficient to overcome the external force opposing linear displacement of said setting member; said signalling means comprising a carrier supporting said rotary shaft of said third spur gear and being arranged for displacement in a direction generally perpendicular to the axis of rotation of said third spur gear when said third spur gear travels circumferentially relative to said first and second spur gears; said displacement of said carrier constituting said output signal;
- (g) a fluidic power means including
  - (1) a source containing hydraulic fluid under pressure;
  - (2) a hydraulic motor operatively connected to said setting member for applying thereto a linear force which, in combination with a linear force derived from the output torque of said setting motor is sufficient to overcome said external force opposing said setting member; and
  - (3) a hydraulic control valve means operatively connected to said carrier for being operated by said carrier as a function of the displacement of said carrier; said hydraulic control valve means being further operatively connected to said source and said hydraulic motor for establishing and maintaining hydraulic communication between said source and said hydraulic motor as a function of said displacement of said carrier for causing said hydraulic motor to generate a force applied at least indirectly to said setting member as said linear force for overcoming the external force opposing said setting member.



**4,790,235**  
**BRAKE BOOSTER UNIT MOUNTED ON A FIXED WALL**  
**OF A VEHICLE AND PROCESS FOR ASSEMBLING**  
**SUCH A UNIT**

Jean-Pierre Gantier, Anthony Soms Bois, and Jean-Claude Blot, Louvres, both of France, assignors to Bendix France, Drancy, France

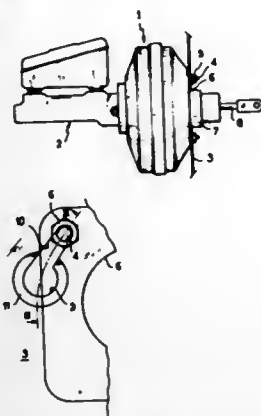
Filed Sep. 3, 1987, Ser. No. 92,839

Claims priority, application France, Sep. 10, 1986, 86 12668

Int. Cl.<sup>4</sup> F01B 29/00, 11/02

U.S. Cl. 92—128

6 Claims



1. A mounting mechanism for a brake booster unit to be mounted on a fixed wall of the vehicle and with at least one assembly bolt fixed to the booster and having thereon an associated nut, said mounting mechanism comprising an orifice in said wall comprising an elongated shape with a first end zone of enlarged cross-section allowing passage of the nut engaged on the bolt, a second end zone of a cross-section corresponding to that of said bolt, and retention means provided in the wall for interacting with the nut in an effective tightened position on the bolt which is received in said second end zone of said orifice, in order to prevent said brake booster unit from separating from the wall, the retention means comprising the second end zone disposed in planar alignment with the plane of the fixed wall and an offset projecting part of said wall that is in non-planar alignment with the plane of said wall.

**4,790,236**  
**FLOATING PISTON COUPLING FOR PLUNGER TYPE**  
**PUMPS**

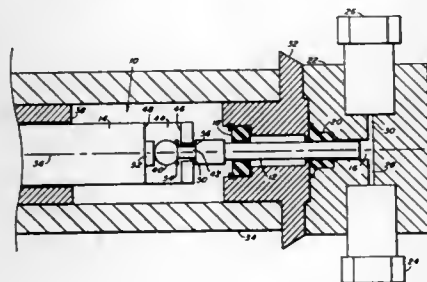
Scott Macdonald, Pleasant Hill, and William D. Homberg, Oakland, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Sep. 12, 1983, Ser. No. 530,930

Int. Cl.<sup>4</sup> F16J 1/10

U.S. Cl. 92—129

6 Claims



1. In a pump including a shaft supported by shaft bearing means for longitudinal reciprocating motion and a piston supported by guide means for longitudinal reciprocating motion

within a cylinder substantially in line with the shaft, a springless floating coupling between the shaft and the piston, comprising:

- a spherical member connected to an end of the said piston opposing said cylinder and having semi-spherical surfaces facing toward and away from the piston;
- a socket formed in an end of said shaft for receiving said spherical member and having first and second opposing substantially parallel inner walls normal to a longitudinal axis of the shaft and having an opening in the first outermost wall nearest to said piston and substantially coaxial with the longitudinal axis of said shaft, said opening dimensioned to loosely receive a portion of said piston adjacent to the connection of said spherical member to said piston to accommodate pivotal and transverse movement of said piston relative to said shaft; and
- bearing means positioned around the portion of said piston adjacent to the connection of said spherical member to said piston and between the semi-spherical surface of said spherical member facing toward said piston and the first wall of said socket to transmit force between said spherical member and said first wall of the shaft when said piston is withdrawn from said cylinder by withdrawing movement of said shaft, with transverse and pivotal freedom of movement between said piston and said shaft.

**4,790,237**  
**DAMPER**

Masashi Usuda; Kiyoshi Shimizu; Eiji Iwata; Hideo Yamada; Kazutaka Onozuka, all of Tokyo; Toshio Kuno, Fukuoka; Hideo Kuno, Fukuoka, and Yukio Kuno, Fukuoka, all of Japan, assignors to Takenaka Corporation, Osaka and Kyoritsu Co., Ltd., Fukuoka, both of Japan

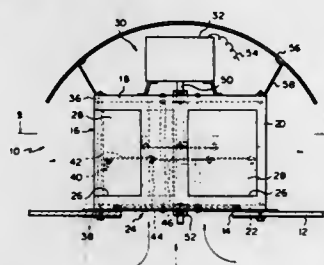
Filed Mar. 3, 1986, Ser. No. 835,227

Claims priority, application Japan, Mar. 5, 1985, 60-31750[U]; Mar. 5, 1985, 60-31751[U]; Mar. 7, 1985, 60-33052[U]

Int. Cl.<sup>4</sup> F24F 7/02, 13/10

U.S. Cl. 98—42.16

8 Claims



1. A self-contained, motorized damper adapted to be removably mounted on a roof of a building comprising:

- an enclosed hollow housing having a circularly tubular side wall, an annular bottom wall arranged perpendicularly to said side wall for mounting said hollow housing onto the roof of the building, a single aperture defined in the center of said bottom wall for admitting air from a space of the building, a plurality of outlet apertures formed in said tubular side wall for allowing said air to flow out of said housing, the total flow area of said outlet apertures being greater than that of said single inlet aperture, and a top wall arranged on said side wall in axially opposed relationship to said bottom wall;
- a plurality of movable closure members mounted on said housing adjacent respective ones of said outlet apertures for openably closing said outlet apertures in order to control the flow of air flowing from said housing; and
- actuating means for conjointly moving said closure members from a first position wherein all of said closure members close said respective outlet apertures, to a second position

wherein all of said members open said respective outlet apertures, said actuating means including a drive motor mounted on the center of said top wall of said hollow housing, a rotatably driven shaft extending from said motor coaxially into said hollow housing, lever means connected to said shaft, and a linkage mechanism connected between said lever and said plurality of movable closure members to conjointly move said closure members in response to rotation of said shaft.

**4,790,238**  
**APPARATUS FOR THE PRODUCTION OF ETHANOL**  
**AND FERMENTED BEVERAGES**

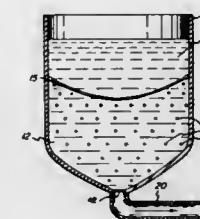
Win-Pen Hsu, Woodhaven, N.Y., assignor to J. E. Siebel Sons' Company Inc., Chicago, Ill.

Continuation of Ser. No. 593,627, Mar. 26, 1984, Pat. No. 4,659,662. This application Apr. 2, 1987, Ser. No. 34,073

Int. Cl.<sup>4</sup> C12C 11/00

U.S. Cl. 99—276

18 Claims



1. An apparatus for the yeast-assisted batch fermentation of a fermentable substrate, comprising:

- vessel means for holding a batch of fermentable substrate and for holding a plurality of yeast-containing particles comprised of living yeast cells substantially encapsulated within a porous, semi-permeable matrix material which is insoluble in said fermentable substrate, the pores of said matrix material being sized so as to retain therein said yeast cells yet be permeable to said compounds in the fermentable substrate; and
- retaining means arranged within the interior of the said vessel at a predetermined height therein which insures that said retaining means will be submerged below the surface of fermentable substrate in said vessel and above the level in said substrate in which the yeast-containing particles are present whereby the yeast-containing particles are freely-movable within at least a portion of the substrate during the fermentation process, said retaining means comprising a semi-permeable surface and means for affixing said surface at a fixed level within said vessel, said surface being impermeable to the yeast-containing particles.

**4,790,239**  
**SYSTEM FOR BREWING AND SERVING A HOT**  
**BEVERAGE**

Alan R. Hewitt, Sante Fe, N. Mex., assignor to Starbucks Corporation, Seattle, Wash.

Filed Apr. 8, 1987, Ser. No. 35,833

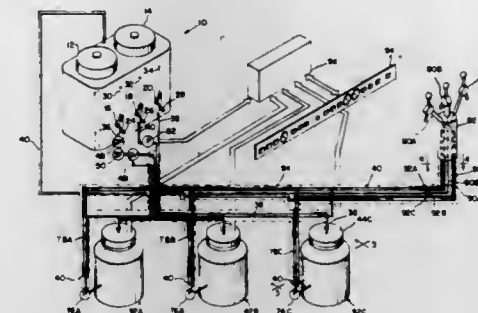
Int. Cl.<sup>4</sup> A47J 31/00

U.S. Cl. 99—279

17 Claims

- 1. A hot beverage brewing and serving system, comprising: a brewing vessel for brewing separate batches of hot beverages at a temperature in a brewing temperature range; an insulated storage tank for storing a batch of a beverage brewed in the brewing vessel at a temperature in a storage temperature range so that the beverage from the same brewing vessel may be simultaneously brewed and served, the storage temperature range being lower than the brewing temperature range;

a serving tap remote from the brewing vessel and storage tank;  
 a first feed line for carrying the beverage from the brewing vessel to the storage tank;  
 a second feed line for carrying the beverage from the storage tank to the serving tap for dispensing the hot beverage; and



means for maintaining the beverage in the second feed line at a serving temperature so that when the serving tap is operated after a period of inoperation, it serves the beverage at the serving temperature, the serving temperature being lower than the storage temperature range.

**4,790,240**  
**MACHINE FOR BREWING HOT BEVERAGES**

Stefan Henn, and Rudolf Maass, both of Solingen, Fed. Rep. of Germany, assignors to Robert Krups Stiftung & Co. KG., Solingen, Fed. Rep. of Germany

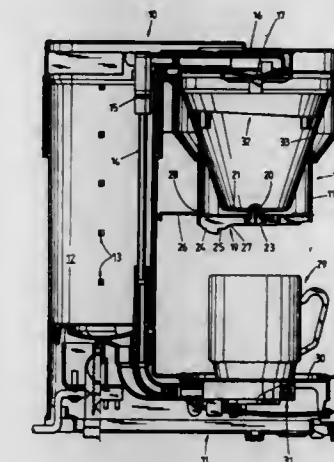
Filed Apr. 22, 1988, Ser. No. 184,683

Claims priority, application Fed. Rep. of Germany, Apr. 24, 1987, 8705964[U]

Int. Cl.<sup>4</sup> A47J 31/00

U.S. Cl. 99—282

26 Claims



1. A beverage brewing machine comprising a hollow housing; a water container in said housing; a filter holder provided on said housing and having an intake; a water heater in said housing; a hot water conduit provided in said housing and having a first part adjacent said heater and a water-discharging second part; and a manifold having an inlet connected with the second part of said conduit, a first outlet connected with said intake, and a second outlet communicating with said container, said manifold comprising a first section defining said first outlet, a second section defining said second outlet, and a temperature-responsive valving element having a first portion held

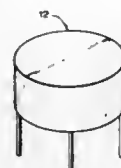
between said sections and a second portion movable between a first position which said second portion assumes when the temperature of water supplied by said conduit is below a given value and in which said element seals said inlet only from said first outlet, and a second position which said second portion assumes when the temperature of water supplied by said conduit is above said given value and in which said element seals said inlet only from said second outlet.

**4,790,241**  
**BAGEL BOARD DEVICE**  
John Lago, Milford, Conn., assignor to LBB Associates, Woodbridge, Conn.

Filed Apr. 16, 1987, Ser. No. 39,312  
Int. Cl.<sup>4</sup> A21B 1/44

U.S. Cl. 99—352

13 Claims



1. A device for holding a series of boiled food products comprising a plurality of vertically-stacked carriages having pivotally mounted boards thereon for holding the boiled food products wherein the carriages are positioned adjacent to and aligned with an opening of a rotatable oven on a movable table such that each carriage may be disposed within the oven in successive shelves; wherein the shelves support the carriages within the oven and wherein each board has a lever movable between a first position, wherein the boiled food products rest on the boards in a generally horizontal position, and a second position, wherein the lever is rotated permitting the boiled food products to fall onto the shelves of the oven.

**4,790,242**  
**DISCHARGE MANIFOLD FOR CHEESE CASTING MACHINE**

Gerald J. Driessen, Little Chute, Wis., assignor to Hart Design & Manufacturing Inc., Green Bay, Wis.

Filed Dec. 15, 1987, Ser. No. 133,373

Int. Cl.<sup>4</sup> A01J 25/00; A23C 9/00

U.S. Cl. 99—455

8 Claims

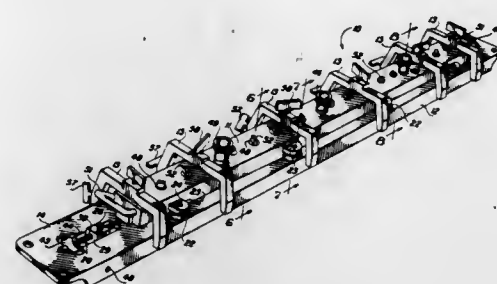
1. A manifold for dispensing a sheet of hot processed cheese product upon a cooling belt, said manifold comprising:

- a elongated hollow upper chamber having a top and a bottom opened along at least a part of its length for seating on the top surface of an elongated hollow lower chamber,
- a plurality of input ports spacedly positioned along the length of the top of said upper chamber to extend into its interior,
- said elongated hollow lower chamber having a top surface for receiving in a sealing arrangement thereon the periphery of the opening of said bottom of said upper chamber, means for securing said upper chamber on said lower chamber in said sealing arrangement,
- a plurality of spacedly positioned ports in communication with the opening of the bottom of said upper chamber and extending through the top surface of said lower chamber and into its interior,
- a plurality of adjustable valves, one for each of said ports

mounted on and extending through the top of and into the interior of said upper chamber for selectively controlling product flow from said upper chamber through said ports and into said lower chamber, and

a controllable gate mounted along one side of said lower chamber,

said gate causing a ribbon-like flow of the product out of said



lower chamber and being adjustable for controlling its thickness,

whereby the product is introduced into said upper chamber of the manifold under pressure, flows from said upper chamber through said ports and into said lower chamber in a controlled manner, and out of said lower chamber through said controllable gate in ribbon form of a selected thickness.

**4,790,243**  
**OFFSET SHORT INKING UNIT WITH DAMPENING FLUID SEPARATION**

Heinrich K. Grosshauser, Würzburg, Fed. Rep. of Germany, assignor to Koenig & Bauer Aktiengesellschaft, Würzburg, Fed. Rep. of Germany

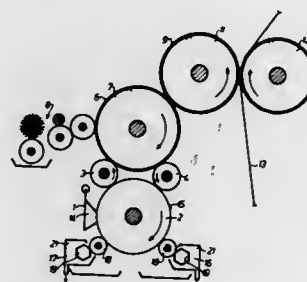
Filed Jun. 30, 1987, Ser. No. 67,978

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1986, 3622550

Int. Cl.<sup>4</sup> B41C 25/00

U.S. Cl. 101—147

5 Claims



1. An offset short inking unit for supplying ink to at least one printing plate that also receives dampening fluid from a dampening fluid supply unit, said offset short inking unit comprising:

- a screen surface ink fountain roller;
- means to supply printing ink to a surface portion of said screen surface ink fountain roller;
- at least a first ink form roller contacting said screen surface ink fountain roller and the at least one printing plate to transfer said printing ink to the at least one printing plate; and
- at least a first dampening fluid separation unit having a rubber roller contacting said surface portion of said screen

surface ink fountain roller and a separating roller having a polygonal cross-sectional shape contacting said rubber roller, said at least first dampening fluid separation unit being positioned in the direction of rotation of said ink fountain roller intermediate said at least first ink form roller and said ink supply means.

**4,790,244**  
**SUCTION SYSTEM FOR SHEET GUIDING CYLINDERS IN PRINTING MACHINES**

Rndolph Otfried, Dresden, and Peter Gunter, Radebeul, both of German Democratic Rep., assignors to Kombinat Polygraph "Werner Lamberz" Leipzig, Leipzig, German Democratic Rep.

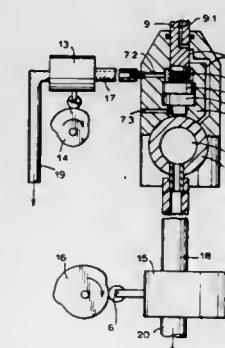
Filed Mar. 10, 1987, Ser. No. 24,377

Claims priority, application German Democratic Rep., Apr. 21, 1986, 2893991

Int. Cl.<sup>4</sup> B41F 21/06

U.S. Cl. 101—231

1 Claim



1. In a suction system positioned on a rotary sheet guiding cylinder of a printing machine provided with means to effect printing on one side of the sheet only or printing on both sides of the sheet when the sheet is first printed on one side and thereupon is turned over around a rear edge thereof and printed on a back of the sheet, said guiding cylinder having a sheet-supporting peripheral surface receiving a sheet being turned, the suction system being pneumatically operated to turn said sheet over at said rear edge and comprising a suction head, and means supplying suction air to said suction head, said suction system being pivotable relative to said guiding cylinder; a sucker body; a control element, said suction head being rigidly connected to said control element; said sucker body defining a cylindrical bore; said sucker body including a suction channel which is connected to said suction air supplying means, said control element including a suction passage adapted to communicate with said suction channel; a control piston, said control element being rigidly connected to said piston and being displaceable therewith in said cylindrical bore upon application of suction by said sucker air supplying means; and a compression spring positioned in said bore and biasing said control element, said suction body further including a control passage which opens into said cylindrical bore, said suction passage (9.1) in said control element selectively overlapping said suction channel (7.1) upon the movement of said control element.

**4,790,245**  
**SUPPORT ASSEMBLY FOR A CYLINDER GROOVE**  
Christian M. M. Fischer, Markttheidenfeld, and Detlef F. Stork, Offstein, both of Fed. Rep. of Germany, assignors to Koenig & Bauer Aktiengesellschaft, Würzburg, Fed. Rep. of Germany

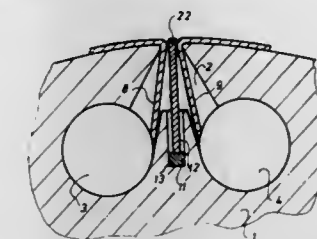
Filed Dec. 11, 1987, Ser. No. 131,659

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1986, 3644501

Int. Cl.<sup>4</sup> B41F 27/12

U.S. Cl. 101—375

9 Claims



1. A support assembly for a cylinder groove of a plate or blanket cylinder in a rotary printing machine, said support assembly comprising:

- an elongated support bar positionable in said cylinder groove, said support bar having a support surface;
- an elongated slot formed in a bottom portion of said cylinder groove, said elongated slot extending along said cylinder groove generally parallel to the axis of rotation of the cylinder;
- means in said slot to removably secure said support bar to said bottom portion of said cylinder groove; and
- means to locate said support bar longitudinally in said cylinder groove to position said support surface of said support bar generally at the periphery of the plate or blanket cylinder.

**4,790,246**  
**FUSE**  
Andreas Hälssig, Denkingen; Horst Moosmann, Schramberg, and Horst Dinger, Tennenbronn, all of Fed. Rep. of Germany, assignors to Gebrüder Junghans GmbH, Schramberg, Fed. Rep. of Germany

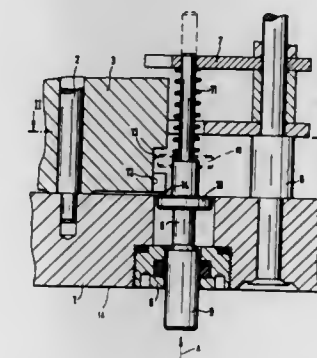
Filed Oct. 1, 1987, Ser. No. 103,496

Claims priority, application Fed. Rep. of Germany, Oct. 15, 1986, 3635084

Int. Cl.<sup>4</sup> F42C 15/00, 15/34

U.S. Cl. 102—254

7 Claims



1. In a fuse of the type comprising a rotor mechanism which is movable from a safety position to a live position, said fuse comprising an installation safety means movable between a first position for preventing installation of the fuse into a war-head and a second position permitting such installation, said



installation safety means normally disposed in said first position, said rotor mechanism including means preventing movement of said installation safety means to said second position when said rotor mechanism is in said live position and for permitting movement of said installation safety means to said second position only when said rotor mechanism is in said safety position, said installation safety means configured such that no portion thereof is disposed to prevent movement of said rotor mechanism to its live position after the fuse has been installed.

4,790,247

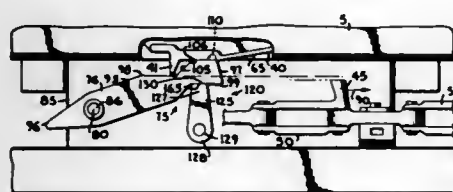
**TROLLEY STOP FOR POWER AND FREE CONVEYORS**  
Garth D. Samma, Riverside, Mo., assignor to Midwest Conveyor Company, Inc., Kansas City, Kans.

Filed Nov. 4, 1986, Ser. No. 926,672

Int. Cl. B61B 13/00; B61K 7/02

U.S. Cl. 104-172.2

8 Claims



1. A trolley stop assembly for use in a trolley system including a mobile trolley with a depending, movable trolley dog engageable in a lower position by an upwardly extending drive dog of a trolley drive mechanism for movement of the trolley along a track, said trolley stop assembly comprising:

- (a) a frame member;
- (b) a stop arm pivotally mounted on said frame member, including a lower rest surface, and pivotable between a lower trolley engaged position and an upper trolley disengaging position to cause a trolley dog of a trolley to disengage from a drive dog of a trolley drive mechanism;
- (c) a cam member pivotally mounted on said frame member, engaging said stop arm rest surface, and pivoted between a substantially vertical stop arm raising position to thereby urge said stop arm to said trolley disengaging position and a stop arm releasing position to thereby release said stop arm to said trolley engaged position;
- (d) cam motor means connected to said cam member and selectively activated to pivot said cam member between said arm releasing position and said arm raising position;
- (e) said cam member being configured to cooperate with said rest surface of said stop arm to provide stable support to said stop arm to thereby maintain said stop arm in said upper trolley disengaging position without said cam motor means being active; and
- (f) said stop arm, said cam member, and said cam motor means cooperating to position said stop arm in said lower trolley engaged position and to cause said stop arm to remain in said lower trolley engaged position without said cam motor means being active.

4,790,248

**DUAL GIMBAL COUPLING**

Ernst Piepenbreier, and Josef Trost, both of Essen, Fed. Rep. of Germany, assignors to Thyssen Industrie AG, Fed. Rep. of Germany

Filed Sep. 12, 1985, Ser. No. 775,490

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1984, 3433801; Apr. 19, 1985, 3514124

Int. Cl. B61B 12/00; F16D 3/04, 3/62

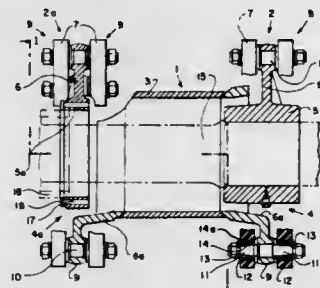
U.S. Cl. 105-131

17 Claims

1. A dual gimbal coupling for connecting a hollow rail

vehicle shaft to a rail vehicle axle extending through the shaft, comprising

- a hollow intermediate shaft extending around the rail vehicle axle with radial clearance, the intermediate shaft having opposite ends each with a plurality of outwardly extending arms, said arms at each opposite end lying in a common plane at each opposite end of said hollow intermediate shaft;
- a first hub adapted for connection to the axle and disposed adjacent one end of said intermediate shaft, said first hub having a plurality of outwardly extending arms alternating with said plurality of arms at one end of said intermediate shaft and lying in the common plane at said one end of the intermediate shaft;
- a second hub adapted for connection to the hollow rail vehicle shaft and disposed adjacent the opposite end of said intermediate shaft, said second hub having a plurality of outwardly extending arms alternating with said arms at the opposite end of said intermediate shaft and lying in the



common plane at said opposite end of said intermediate shaft; and

- a pair of elastic rod members connected between each arm of said intermediate shaft and an adjacent arm of said first and second hubs, said rod members in each pair of rod members lying in parallel planes on opposite sides of each common plane, each elastic rod member including first and second metallic inserts;
- a pair of parallel bolts connected to each arm of said intermediate shaft, said first hub and said second hub, said parallel bolts each extending perpendicularly to the common planes, each bolt extending on opposite sides of each arm, said pairs of rod members being connected through the associated metallic insert between bolts of adjacent arms of said intermediate shafts of said first hub and said second hub;
- a bushing connected between each bolt and a metallic insert of said rod member, said bushing having an inner tapering surface engaged with a tapering surface of said bolt and an outer cylindrical surface engaging said rod member.

4,790,249

**LOAD-CARRYING PALLET**

H. Richard Webb, 14687 Los Padres, Chesterfield, Mo. 63017

Continuation-in-part of Ser. No. 827,861, Feb. 10, 1986,

abandoned. This application May 14, 1987, Ser. No. 50,281

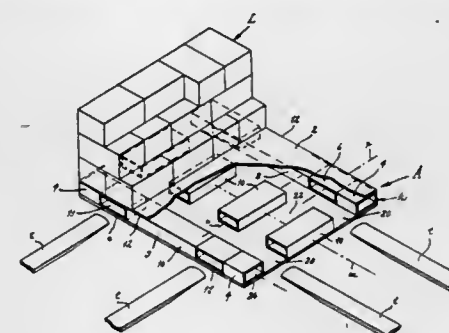
Int. Cl. B65D 9/34

U.S. Cl. 108-51.3

12 Claims

1. A load-carrying pallet comprising: a rectangular deck having parallel side edges and parallel end edges which meet at corners; corner, side entry and intervening blocks arranged in a row along each side edge of the deck to form runners along those edges, there being for each runner two corner blocks which are attached to the deck beneath the corners along one of the side edges of the deck, two side entry blocks which are located adjacent the corner blocks along the same side edge and permit the tines of a forklift to pass through the runner and under the deck where such blocks are located, and an intervening block attached to the deck between the side entry blocks,

so as to likewise be along the same side edge; center blocks attached to the deck between the two runners and being spaced from the runners such that entry slots exist between the runners and the center blocks, with the entry slots extending from one end edge of the deck to the other end edge, there being a different center block along each end edge of the deck and at least one additional center block spaced from the center blocks that are along the end edges so as to provide cross channels which align with the side entry blocks for the runners and are generally perpendicular to the entry slots; and separate end entry blocks located at the ends of the entry slots where they are along the end edges of the deck, each end entry block being in a tubular configuration with rigid walls that are joined integrally together to surround a hollow interior which opens out of each end of the block, the walls of each entry block



being formed from particles or segments of cellulose material and a bonding agent which joins the particles or segments together firmly to provide the walls and the entry blocks which they form with substantial strength and rigidity, the walls having a density of at least 22 lbs./ft<sup>3</sup>, the rigid tubular end entry blocks being oriented such that their hollow interiors open outwardly of the pallet along the end edges of the pallet so as to form portions of the entry slots, whereby the end entry blocks line the ends of the entry slots and protect the corner blocks of the runners and the center blocks that are located along the end edges; all of the blocks being substantially the same height, at least the corner blocks of the runners or the center blocks that are along the end edges being formed from paper honeycomb material having cells oriented such that the axes of those cells are generally perpendicular to the deck.

4,790,250

**DRY ASH HANDLING SYSTEM FOR AN INCINERATOR**  
Abner B. Turner, Hempfield Twp., Westmoreland County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 9,847, Jan. 30, 1987, abandoned. This application Feb. 5, 1988, Ser. No. 157,085

Int. Cl. F23J 1/00

U.S. Cl. 110-165 A

12 Claims



2. An ash handling system, comprising:  
a sealable vehicle chamber openable at two ends and including a burn-out chamber with an air opening;  
an ash chute entering said vehicle chamber and having a negative air pressure; and  
an ash car positionable under the ash chute in said vehicle chamber, receiving ash from said chute and having an air entrance tube abutting the air opening when in said burn-

out chamber, no ash being deposited in said car when in said burn-out chamber and the tube having air slots allowing air to move through the ash into said chute while said car is in said burn-out chamber.

4,790,251

**HIGH PRESSURE AND HIGH TEMPERATURE ASH DISCHARGE SYSTEM**

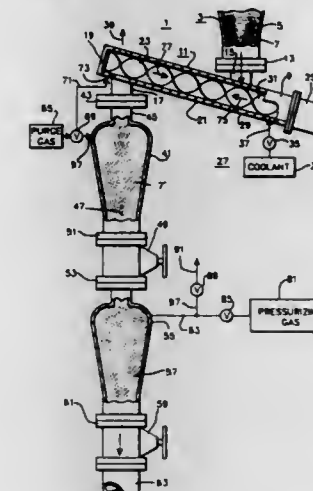
Edward J. Vidd, Churchill Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 8, 1987, Ser. No. 95,381

Int. Cl. F23J 1/00

U.S. Cl. 110-165 R

16 Claims



1. A method of discharging and cooling hot ash from a coal combustion unit operating at a pressure of greater than 40 pounds per square inch and a temperature in excess of 700° C., comprising:

- charging said hot ash directly from the combustion unit into a screw conveyor having a rotatable screw contained in a housing, said screw conveyor having means thereon for cooling of the hot ash during passage through the housing thereof;
- moving the hot ash through said housing, while at said pressure, by said screw, in a first direction while cooling said hot ash, at said pressure, to a temperature below 320° C.;
- passing a purge gas through said housing in a second direction countercurrent to the movement of the hot ash there-through;
- discharging said purge gas, and gases evolved from said hot ash, from the housing into said combustion unit; and
- discharging said ash, while at said pressure and after cooling, from said housing into a collection vessel.

4,790,252

**SELECTIVE NEEDLE TUFTING MACHINES**

H. Brian Bardale, Euxton, England, assignor to Spencer Wright Industries, Inc., Dalton, Ga.

Filed Nov. 20, 1987, Ser. No. 123,258

Claims priority, application United Kingdom, Dec. 6, 1986, 8629241

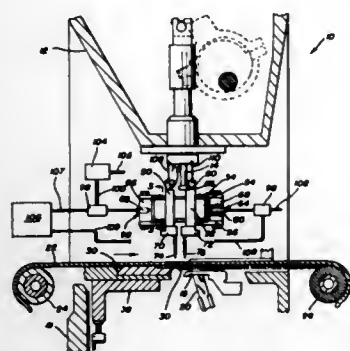
Int. Cl. D05C 15/06

U.S. Cl. 112-80.4

16 Claims

1. In a tufting machine having a head for mounting drive means for reciprocating in a linear path, apparatus for mounting at least a pair of needles for selective coupling of one of said needles to said drive means, a bed disposed beneath the head and having loop seizing means for seizing loops of yarn presented by said needles, said apparatus comprising guide means

fixedly supported in said machine, a needle support carriage mounted in said guide means for movement in a direction transverse to said path, said needle support carriage having a pair of spaced apart elongated slots extending parallel to said path, an elongated needle holder mounted in each of said slots for reciprocation therein, means for supporting a needle from one end of each of said needle holders extending toward said loop seizing means, biasing means for urging said needle holders away from said loop seizing means, coupling means associated with said drive means and with each of said needle holders for selective coupling and uncoupling of said needle holders



with said drive means, displacement means engageable with said carriage for moving said carriage between at least first and second positions, said first position being defined as that where one of said needle holders is disposed for coupling to said drive means, and said second position being defined as that where the other of said needle holders is disposed for coupling to said drive means, and control means for actuating said displacement means in accordance with a preselected pattern to selectively move said carriage to said first and second positions for coupling said needle holders to said drive means to overcome the respective biasing means and reciprocably drive a selected needle for cooperation with said loop seizing means.

#### 4,790,253 NEEDLE DRIVING APPARATUS FOR SEWING MACHINE

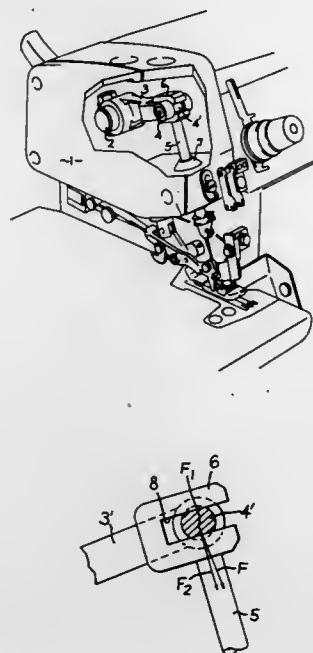
Takashi Kasuda, Osaka, Japan, assignor to Pegasus Sewing Machine Mfg. Co., Ltd., Osaka, Japan  
Filed Jan. 29, 1988, Ser. No. 149,711  
Claims priority, application Japan, Jan. 31, 1987, 62-13582[U]  
Int. Cl. D05B 55/14

U.S. Cl. 112-221

5 Claims

1. A needle driving apparatus for a sewing machine comprising an oscillating lever which oscillates up and down interlocking with a main shaft; a needle bar supported in a frame of the sewing machine such that it can move up and down; a guide member to be disposed on the upper end of the needle bar and provided with a linear guide groove which is orthogonal with

the needle bar; and a slider to be rotatably supported horizontally between the arms of a fork extending forwardly from the



free end of said oscillating lever and slidably fitted to the guide groove of said guide member.

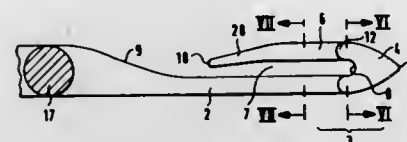
#### 4,790,254 BEARDED NEEDLE FOR BOOKBINDING AND EMBROIDERY MACHINES

Harry Vornholt, Blitz, Fed. Rep. of Germany, assignor to Theodor Groz & Soehne and Ernst Beckert Nadelfabrik Commandit-Gesellschaft, Albstadt Ebingen, Fed. Rep. of Germany  
Filed Dec. 14, 1987, Ser. No. 147,163  
Claims priority, application Fed. Rep. of Germany, Dec. 13, 1986, 3642693

Int. Cl. D05B 85/04

U.S. Cl. 112-222

11 Claims



1. A bearded needle having a longitudinal plane of symmetry for bookbinding machines, embroidery machines and other similar machines comprising:

- a needle shank having a neck portion;
- a beard;
- a needle head supporting said beard, being connected to said neck portion and having an essentially conical needle tip; and

wherein said beard and said shank are connected to said needle head to form a needle eye having a rounded fillet at the side of said eye facing said needle tip, said needle tip having a portion in a region of the fillet which has an upright essentially rectangular configuration with rounded edges and two narrow sides each having a center, the longitudinal plane of symmetry intersects the centers of said narrow sides, and said needle head at least in a region of the needle eye has a first laterally smooth taper

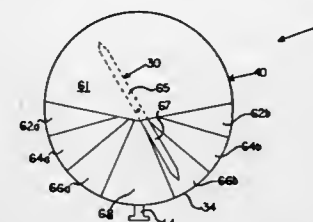
thereby forming a thread travel area on each side of the longitudinal plane of symmetry.

#### 4,790,255 WIND AND BOOM DIRECTION INDICATING DEVICE

Nina Shively, and Peter Cordes, both of P.O. Box 136, South Kent, Conn. 06785  
Filed Jun. 22, 1987, Ser. No. 64,559  
Int. Cl. G01W 1/02

U.S. Cl. 114-97

2 Claims



1. A means for correlating in a sailboat desirable boom position with actual boom position comprising in combination a first device indicating desirable boom position comprising a wind vane mounted on one end of a rotatable shaft having attached thereto at its other end a drive gear intermeshing with a main gear being affixed to one end of a rotatable shaft penetrating a main disc and carrying at its other end a double ended pointer, wherein the lower half of the main disc is divided into colored sectors indicating desirable boom position and wherein the radius ratio of the main gear to the drive gear is two to one; and a second device indicating actual boom position comprising an essentially semicircular face portion having marked sections color coded coincidental with the main disc sectors and being attachable to the mast, and a pointer being attachable to the boom in close proximity to the face portion; wherein observation as to which color sector is indicated by said first device allows proper adjustment of the boom so that the indicator of the second device rests within the appropriate colored section; and wherein said first device and said second device are independent of each other and do not require any electrical circuitry in order to indicate desired and actual boom positions.

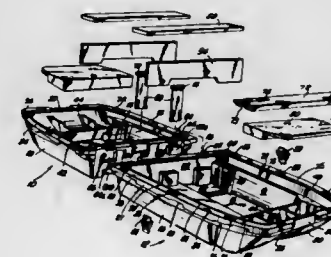
#### 4,790,256 TWO-PIECE COMBINATION BOAT AND LUGGAGE CARRIER

Howard E. Levine, 4401 E. Hearn Rd., Phoenix, Ariz. 85032  
Continuation-in-part of Ser. No. 788,684, Oct. 16, 1985, abandoned, which is a continuation-in-part of Ser. No. 660,717, Oct. 15, 1984, abandoned. This application Feb. 20, 1986, Ser. No. 831,313

Int. Cl. B63B 7/04

U.S. Cl. 114-352

20 Claims



1. A two-section boat comprising, first and second substantially identical sections each having a substantially horizontal bottom surface, at least two generally vertical side walls joined to said bottom surface

at the periphery thereof, and a generally vertical connecting wall, said connecting wall configured with a plurality of vertically aligned male connectors which protrude from the surface of said connecting wall in a direction generally normal to the plane of said connecting wall, and a plurality of vertically aligned complementary female connectors which are recessed into said connecting wall in a direction generally normal to the plane of said connecting wall, said male and female connectors symmetrically disposed from a vertical center line of the connecting wall, and adapted to mate with each other when the connecting walls of said first and second sections are placed in abutting relation to one another, and a removable planar connector adapted to join the male and female connectors.

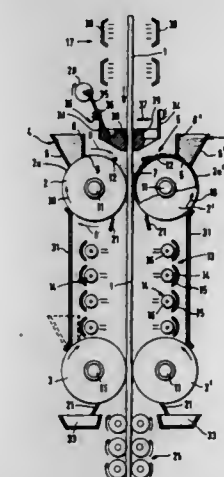
#### 4,790,257 APPARATUS FOR THE PRODUCTION OF FIBER WEB REINFORCED PLASTIC LAMINATES

Konrad Schermutzki, Remseck, Fed. Rep. of Germany, assignor to Santrade Ltd., Lucerne, Switzerland  
Filed Oct. 24, 1986, Ser. No. 923,124  
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1985, 3540388

Int. Cl. B05C 19/00

U.S. Cl. 118-227

23 Claims



1. Apparatus for producing fiber web-reinforced plastic comprising:

means for advancing a fibrous web generally vertically, and a pair of powder-throwing means comprising mutually opposed first rolls rotatable about parallel axes, disposed on opposite sides of the generally vertically advancing web, each of said first rolls comprising:

a powder-throwing surface movable in a first direction in converging relationship with a respective side of said web, and then in a second direction in non-converging relationship with said respective web side, a width of said surface approximately corresponding to a web width,

powder depositing means arranged above said surface for loosely depositing plastic powder onto said surface as said surface travels beneath said depositing means, so that plastic powder is loosely carried on said surface, and

drive means for moving said surface and plastic powder loosely carried thereby in said first direction such that said loosely carried powder is thrown against said respective web side as said surface changes from said first



to said second direction, said thrown powder entering said respective web side,  
an additional pair of rollers spaced vertically below said first rolls and disposed on opposite sides of said web downstream of said first rolls,  
heating means disposed between said first rolls and said additional rolls for heating said web and plastic powder contained therein,  
means disposed downstream of said heating means for urging said web and powder together under an influence of heat and pressure, and  
means disposed between said first rolls and said additional rolls of guiding said web in a zigzag direction of travel.

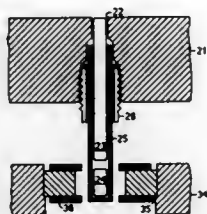
4,790,258

**MAGNETICALLY COUPLED WAFER LIFT PINS**  
David J. Drage, Sebastopol; Roger B. Lachenbruch, Sausalito; Herbert G. Drake, Jr., San Rafael, and Jerris H. Peavey, Novato, all of Calif., assignors to Tegal Corporation, Petaluma, Calif.

Filed Apr. 3, 1987, Ser. No. 34,121  
Int. Cl.<sup>4</sup> B05C 13/00

U.S. Cl. 118—500

5 Claims



1. In a plasma reactor having a platelike member for receiving an article to be treated, a pin lift mechanism connected with said plate comprising:  
a non-magnetic sleeve having a first end which is closed and a second end located within a bore in said member;  
a magnetic slug located in said sleeve near said closed end;  
a pin located in said sleeve;  
wherein said slug and said pin are freely moveable within said sleeve; and  
means, outside said sleeve and magnetically coupled to said slug, for moving said slug and said pin within said sleeve.

4,790,259

**TOOL FOR ROBOTIC APPLICATION OF LIQUID TO A WORK SURFACE**

James R. Morris, Davenport, Iowa, and Douglas K. Boyd, Colona, Ill., assignors to Genesis Systems Group, Ltd., Davenport, Iowa

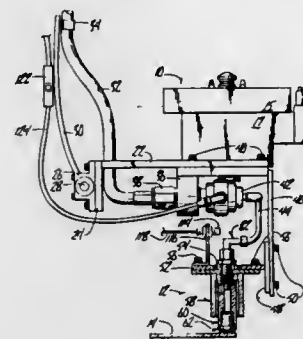
Filed Feb. 29, 1988, Ser. No. 162,137  
Int. Cl.<sup>4</sup> B05C 1/02

U.S. Cl. 118—707

10 Claims

1. A tool adapted to be attached to a robot assembly for the robotic application of liquid to a work surface comprising:  
a compliance guide comprising a compliance housing having an elongated cylindrical bore extending therethrough and having an open upper bore end and an open lower bore end, closure means partially blocking said open upper end and having an opening therein which is smaller than the cross-sectional size of said bore;  
connecting means for connecting said compliance guide to said robot;  
an applicator holder body having upper and lower ends and being slidably fitted within said cylindrical bore of said compliance guide for reciprocating sliding movement within said bore, said holder body having an elongated passageway extending therethrough and having an upper passageway end and a lower passageway end;  
nipple means having a lower end attached to said holder

body and extending upwardly therefrom through said opening in said closure means to an upper end located outside said bore of said compliance guide, said nipple means having a nipple bore extending therethrough and providing communication from outside said bore of said compliance guide to said upper passageway end of said holder body, said nipple means being slidable within said opening and being movable in unison with said holder body when said holder body slides within said bore of said compliance guide;  
connecting means on said upper end of said nipple means for connecting



said nipple bore in communication with a source of said liquid; stop means on said nipple means above said closure member for limiting downward movement of said nipple and said holder body beyond a predetermined lower position relative to said compliance guide;  
spring means between said holder body and said closure member for yieldably urging said holder body and said nipple means toward said lower position;  
applicator means attached to said application holder body and being in liquid communication with said lower passageway end of said holder body for receiving said liquid therefrom, said applicator means being adapted for engaging said work surface and applying said liquid to said work surface.

4,790,260

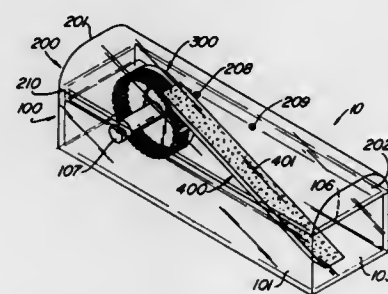
**INSECT ACTUATED NOVELTY DEVICE**

Thomas K. Jones, 737 Poplar St., Langhorne, Pa. 19047  
Filed Feb. 3, 1986, Ser. No. 825,716

Int. Cl.<sup>4</sup> A01K 1/00

U.S. Cl. 119—1

8 Claims



1. An amusement device adopted to receive at least one insect therein, said device comprising:  
container means for receiving and containing said insect, said container means having an opening therein;  
cover means removably fitted into said opening in said container means for closing said opening;

a wheel assembly vertically mounted within said container means and rotatable about a horizontal axis; and  
a stepless ramp within said container means, said ramp being directed toward and extending over and above said wheel assembly, whereby an insect stepping off the end of said ramp steps onto said wheel assembly.

4,790,261

**METHOD OF MECHANICAL MILKING**

Bernhard S. Wartenhorst, Warendorf, Fed. Rep. of Germany, assignor to Westfalia Separator AG, Oelde, Fed. Rep. of Germany

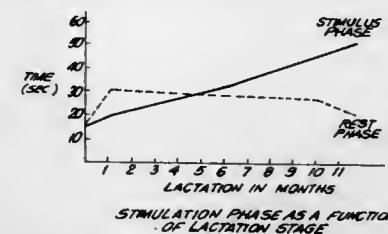
Filed Jun. 12, 1987, Ser. No. 62,525

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1986, 3621666

Int. Cl.<sup>4</sup> A01J 5/00

U.S. Cl. 119—14.02

8 Claims



1. In a method of mechanical milking wherein pulsating milking cups that communicate with a vacuum line are applied to the teats of the animal being milked and the main milking phase is preceded by a stimulation phase that consists of a stimulus phase during which the teats are stimulated and of a rest phase, the improvement wherein the length of the stimulation phase and the temporal ratio of the stimulus phase to the rest phase are determined as a function of the animals' different stimulation requirements, resulting in individual-specific stimulation that is specific for each individual animal, and wherein the particular lactation stage of each animal is the basis of individual-specific stimulation.

4,790,262

**THIN-FILM COATING APPARATUS**

Maneo Nakayama, Tokyo; Akira Uehara, Kanagawa; Hiroyoshi Sago, and Hideyuki Mizuki, both of Tokyo, all of Japan, assignors to Tokyo Denshi Kagaku Co., Ltd., Kanagawa, Japan

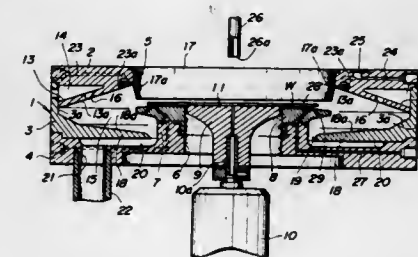
Filed Oct. 1, 1986, Ser. No. 914,328

Claims priority, application Japan, Oct. 7, 1985, 60-153308[U]

Int. Cl.<sup>4</sup> B05C 11/08

U.S. Cl. 118—52

5 Claims



1. An apparatus for coating a thin film on a workpiece comprising:  
a casing, including an annular top plate having a circular hole at its center, an annular bottom plate having a circu-

lar hole at its center, and a substantially cylindrical wall interconnecting said top and bottom plates;  
a spinner for supporting said workpiece within said casing;  
first means for rotating said spinner;  
second means, disposed upwardly of said spinner, for applying a coating material in liquid form onto the workpiece, said second means including a nozzle from which said coating material in liquid form is ejected; and  
third means for directing an inert gas to said nozzle so as to provide an inert atmosphere between said nozzle and the surface of said workpiece, wherein said third means includes a plurality of inert gas passages defined in said top plate of the casing, each having one end connectable to an external inert gas source, and a plurality of orifices formed at the top surface of said top plate in circumferentially equally spaced relation and in communication with the other end of said gas passages, said inert gas being directed through said orifices to said nozzle.

4,790,263

**PROCESS FOR APPLICATION OF FREE-FLOWING MATERIAL ON THE INNER SURFACE OF A TUBE BLANK AND DEVICE FOR PERFORMING THE PROCESS**

Beat Eckert, Olten; Guido Huber, Baar, and Norbert Riehle, Remetschwil, all of Switzerland, assignors to Lonza, Ltd., Gampel, Switzerland

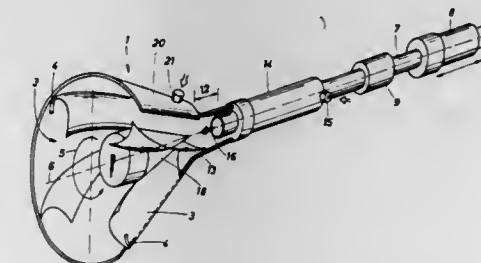
Filed Jun. 26, 1987, Ser. No. 66,523

Claims priority, application Switzerland, Jul. 3, 1986, 02682/86

Int. Cl.<sup>4</sup> B05B 1/02

U.S. Cl. 118—317

8 Claims



1. A device for application of a free-flowing material to the inner surface of a tube blank with a continuous, at least approximately cylindrical hollow space, comprising: feeding means for a continuous carrier gas flow laden with the material; a passage element (1) providing a passage space (2) for the laden carrier gas flow having an inlet end and an outlet end; said feeding means including a feed pipe (7) for the laden carrier gas flow having an outlet mouthpiece (16) directed to the inlet end of the passage space (2); guide vanes (3) placed in the passage space (2) between the inlet and outlet ends thereof and forming a swirl-producing device for the laden carrier gas stream; the outlet end of the passage space (2) being adapted to axially direct to the hollow space of the tube blank the laden gas flow provided with its swirl; several jets (4) situated near the outlet end of the passage space (2) distributed evenly on its periphery, each being suitably fastened on one of the guide vanes (3); means (13) for feeding to the jets (4) a continuous gas stream which is not laden with the material; and the jet or jets (4) being skewed in relation to the axis (6) of the passage space (2) of the passage element (1) for producing at least one gas flow flowing helically at the inner surface of the hollow space of the tube blank and having the same direction of rotation as the swirl of the laden gas flow.

**4,790,264**  
**ANIMAL WATERERS FOR SNAP-ON ASSEMBLY WITH WATER PIPE**

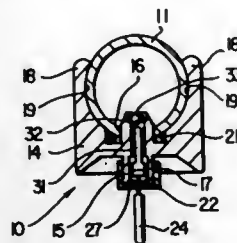
Frank Lack, and Francis R. Rustin, both of Springfield, Mo., assignors to Agri Manufacturing Corporation, Springfield, Mo.

Filed Jun. 17, 1987, Ser. No. 64,100

Int. Cl.<sup>4</sup> A01K 7/06

U.S. Cl. 119—72.5

11 Claims



1. An animal waterer for mounting on a cylindrical pipe comprising:
  - a valve body including a base, and interior and exterior aligned bosses projecting from said base in opposite directions;
  - said valve body having a bore extending axially through said bosses and base, defining a valve chamber;
  - an annular cap member secured to said exterior boss at its distal end;
  - said cap member defining a valve seat;
  - a valve closure member, including an enlarged closure head disposed in said valve chamber for engagement with said valve seat, and including an actuator stem projecting axially from said head through said annular cap member to be operated by animals;
  - spring means disposed in said valve chamber, urging said closure head into sealing relation with said valve seat;
  - at least two spring fingers projecting integrally from said valve body base, in generally parallel relation with said interior boss and on opposite sides thereof;
  - said fingers having confronting means for engaging the cylindrical sides of said pipe to maintain said valve body in a fixed spring grip relation to said pipe;
  - said interior boss being configured to extend into said pipe, through a hole in the pipe wall having a diameter slightly larger than the diameter of said boss; annular sealing means for sealing between said valve body base and said pipe; and said fingers being adapted to maintain said valve body in coupled relation with said pipe, with said sealing means providing effecting sealing between said pipe and said valve body.

**4,790,265**  
**CAT SCRATCHING POST AND EXERCISE CENTER**

Blair R. Manson, 102 Spa Dr., Annapolis, Md. 21403

Filed Jul. 16, 1987, Ser. No. 74,220

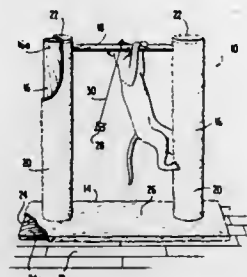
Int. Cl.<sup>4</sup> A01K 15/02

U.S. Cl. 119—29

7 Claims

1. A combined cat scratching post and exercise center comprising:
  - a horizontal base member for placement on a building floor,
  - a pair of posts fixedly mounted on the top of said base member and extending vertically, substantially perpendicularly upward therefrom to substantially equal heights and in laterally spaced, parallel positions, and a cross bar fixedly mounted at respective ends to respective posts at a position above said base and adjacent the post upper ends and spanning horizontally between said posts, said cross bar being in the form of a rod considerably smaller in diameter than the diameters of said posts, and wherein at least said posts are covered over a substantial vertical length thereof with woven pile-like material, whereby the cat can stand on the base and scratch the side of either

post, or after climbing one post can walk across the bar from post to post or hang from the cross bar by its front



legs with its rear legs gripping the pile material on one of the two vertical posts.

**4,790,266**  
**FEEDER FOR ANIMALS**

Jonathan R. Kleinsasser, and Dan Kleinsasser, both of Ste. Agathe, Canada, assignors to Gro Master Feed, Inc., Omaha, Nebr.

Continuation-in-part of Ser. No. 829,301, Feb. 14, 1986, Pat. No. 4,660,508. This application Feb. 11, 1987, Ser. No. 13,539

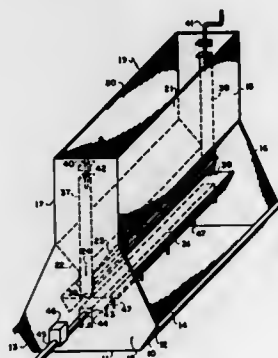
Claims priority, application Canada, Jun. 10, 1985, 483602

The portion of the term of this patent subsequent to Apr. 28, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> A01K 5/02, 7/06

U.S. Cl. 119—51.5

9 Claims



1. A feeder unit for animals comprising an elongate trough having a base and a sidewall for receiving and containing feed and arranged such that the head of the animal can reach over an upper front edge of the sidewall to the base for eating the feed, an elongate shelf extending substantially along a full length of the trough and providing a substantially horizontal surface for receiving feed, said horizontal surface of said shelf being arranged at a height above and rearwardly of said front edge and separate from said trough such that any feed falling therefrom along the full length thereof can fall directly vertically downwardly into the trough and so as to allow access by the head of the animal to said shelf for direct feeding therefrom, and between said shelf and said front edge to said base, and hopper means for directly and continuously depositing feed onto said shelf, said hopper means including an elongate lowermost edge, means mounting said lowermost edge and said shelf such that the lowermost edge extends substantially wholly along, adjacent to and spaced from said horizontal surface by a vertical distance and spaced from a front edge of the shelf by a horizontal distance such that the angle of repose of the feed from the lowermost edge to said shelf prevents the

feed from falling over the front edge of the shelf and thus automatically controls deposit of further feed onto said shelf, said mounting means including means for manually adjusting the vertical distance from the lowermost edge to the surface and being arranged to maintain said lowermost edge fixed against animal actuated movement, said shelf and trough being arranged such that deposited feed on the shelf remains on said shelf but can be removed to the trough solely by direct contact with the animal.

**4,790,267**  
**ARRANGEMENT FOR BURNING FUELS IN A FLUIDIZED BED WITH AN AUGMENTED SOLIDS CIRCULATION IN A COMBUSTION CHAMBER OF A STEAM GENERATOR**

Horst Möllenhoff, Mülheim; Helko Rehwinkel, Kirchbellen, and Dirk Bunthoff, Essen, all of Fed. Rep. of Germany, assignors to Deutsche Babcock Werke Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany

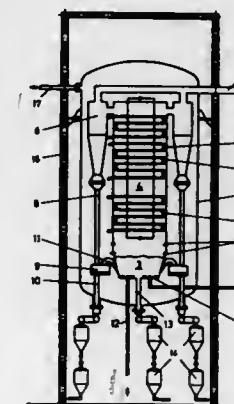
Filed Dec. 22, 1987, Ser. No. 136,833

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1986, 3644083

Int. Cl.<sup>4</sup> F23C 11/02

U.S. Cl. 122—4 D

3 Claims



1. A method of burning fuels in a fluidized bed with an augmented solids circulation in a combustion chamber of a steam generator, comprising the steps: cooling flue gases to 300° C. to 500° C. and cleaning preliminarily said flue gases in coarse-particle precipitators communicating with said combustion chamber at a top portion of said combustion chamber; returning at least a part of resulting solids to the fluidized bed; burning fuel in the fluidized bed under pressure; maintaining densities of 0.5 to 5 kg of solids per kg of flue gas in a free space above said fluidized bed by fluidizing rate of 1 to 5 m/sec; and regulating the temperature of said bed and load on said bed by amount of solids returned to the fluidized bed.

**4,790,268**  
**SUBMERSIBLE CHAMBER WATER HEATER**

John P. Eising, Oconomowoc, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Division of Ser. No. 701,963, Feb. 14, 1985, Pat. No. 4,685,425.

This application Mar. 30, 1987, Ser. No. 31,538

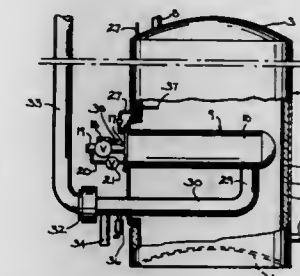
Int. Cl.<sup>4</sup> F22B 5/00

U.S. Cl. 122—17

3 Claims

1. A high efficiency water heating apparatus, comprising a tank to contain water to be heated, means for withdrawing heated water from the upper end of the tank, heating means for heating water in the tank and comprising a tubular member disposed in an opening in the side wall of the tank and extending across said tank, a burner disposed within the tubular member, gas supply means for supplying a combustible gas fuel to said burner, means for supplying air to the burner to provide

a combustible fuel-air mixture, pilot light means for igniting said mixture and generating waste gases of combustion, a heat exchanger located beneath the tubular member, conduit means for conducting waste gases from the tubular member to the heat exchanger, a flue communicating with the heat exchanger, a blower disposed in the flue and located downstream of said heat exchanger, whereby operation of said blower will draw said gases from said tubular member through said heat exchanger and discharge said gases to the atmosphere, a gas valve disposed in said gas supply means for controlling the flow of gas to the burner, temperature sensing means respon-



sive to a preset temperature of the water in said tank and operably connected to said gas valve for operating said gas valve and admitting gas to the burner when the temperature of the water falls below said preset temperature, flow sensing means for sensing the flow of gas to said burner and operating said blower, and a vent tube, one end of said vent tube being disposed adjacent said pilot light means and the other end of said vent tube being disposed outside of said tubular member and communicating with the atmosphere, said vent tube serving to vent gases generated by burning of said pilot light means.

**4,790,269**  
**METHOD AND APPARATUS FOR IMPROVED START-UP PROCEDURES IN CONVENTIONAL STEAM POWER GENERATORS AND DUAL FLUID CHENG CYCLE ENGINES**

James Hamill, San Jose; Ramarao Digumarthi; William Conlon, both of Palo Alto; Dah Y. Cheng, Los Altos Hills, and Chung-Nan Chang, Los Altos, all of Calif., assignors to International Power Technology, Inc., Redwood City, Calif.

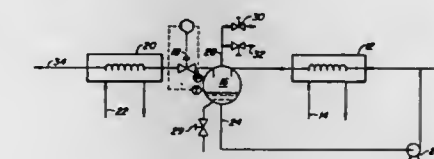
Division of Ser. No. 752,570, Jul. 8, 1985, Pat. No. 4,735,043.

This application Apr. 4, 1988, Ser. No. 176,933

Int. Cl.<sup>4</sup> F22D 7/00

U.S. Cl. 122—406 ST

6 Claims



1. An improved start-up procedure for a steam producing boiler, which boiler comprises, in part, an economizer section, an evaporator section, a superheater section and a water storage drum located between and connected to said evaporator and superheater sections and wherein said improved start-up procedure comprises the steps of:

- (a) increasing the pressure in said drum by providing an external pressure source to the drum, said increased drum pressure substantially greater than atmospheric pressure;
- (b) applying heat to said evaporator and superheater sections;
- (c) maintaining said drum in communication with said exter-



nal pressure source as the liquid temperature in said drum approaches its normal operating temperatures, and;  
(d) obtaining steady state operation of said boiler, producing steam of desired quality for subsequent process steps.

4,790,270

## DIRECT FUEL INJECTED ENGINES

Michael L. McKay, Willetton, and Steven R. Ahern, Claremont, both of Australia, assignors to Orbital Engine Company Proprietary Limited, Balclutha, Australia

PCT No. PCT/AU86/00202, § 371 Date Mar. 11, 1987, § 102(e) Date Mar. 11, 1987, PCT Pub. No. WO87/00575, PCT Pub. Date Jan. 29, 1987

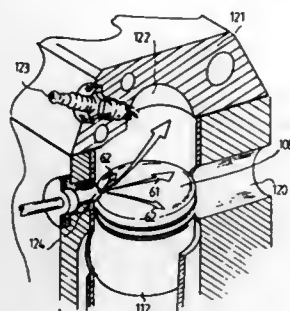
PCT Filed Jul. 18, 1986, Ser. No. 41,131

Claims priority, application Australia, Jul. 19, 1985, PH01559; Aug. 16, 1985, PH01991; Nov. 11, 1985, PH03344

Int. Cl.<sup>4</sup> F02B 33/04

U.S. Cl. 123—73 C

17 Claims



1. A method of fuelling a two stroke cycle spark ignited engine having a cylinder in which a combustible charge is prepared, and a cylinder head closing one end of said cylinder, an ignition means mounted in said head to ignite the combustible charge, a piston supported to reciprocate in said cylinder, and an exhaust port in the wall of said cylinder spaced in the axial direction from said cylinder head, said method comprising injecting a metered quantity of fuel into the cylinder from a single injector located in the cylinder wall between the level of the exhaust port and the cylinder head, said fuel being injected in the form of at least two individual streams, said streams being arranged so a first part of the fuel is directed towards the ignition means in the cylinder head and a second part of the fuel is directed into that portion of the cylinder on the opposite side of a diametral plane of the cylinder at the location of injection of the fuel to the cylinder head.

4,790,271

## AUTO-DECOMPRESSION SYSTEM FOR ENGINES

Takanori Onda, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1987, Ser. No. 47,743

Claims priority, application Japan, May 9, 1986, 61-106398

Int. Cl.<sup>4</sup> F01L 13/08

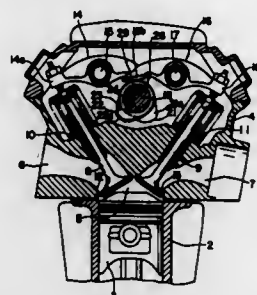
U.S. Cl. 123—182

14 Claims

1. A valve control device for an engine having a combustion chamber, a valve controlling communication with said chamber, a camshaft rotatably mounted in said engine, a valve motion cam fixed to said camshaft for rotation therewith, and a valve actuation mechanism including a cam follower engageable with said valve motion cam, said valve control device comprising:

a decompression cam carried by said camshaft axially adjacent said valve motion cam, said decompression cam including a base circle portion defining an outer peripheral surface smaller in radial extent than the outer peripheral surface of said valve motion cam and having an inner bore to loosely encircle said camshaft;  
means for adjusting the position of said decompression cam

with respect to said camshaft between two locations including a first location on which said outer peripheral surface of said decompression cam extends radially outwardly from the axis of said camshaft to an extent greater than that of said valve motion cam to engage said cam follower for decompression operation of said valve, and a second location at which said outer peripheral surface of



said decompression cam extends radially outwardly from the axis of said camshaft to an extent less than that of said valve motion cam whereby said valve motion cam engages said cam follower for normal operation of said valve; and  
means responsive to the rotational speed of said camshaft for automatically moving said decompression cam between said first and second locations.

4,790,272

## NON-CIRCULAR POPPET VALVES FOR INTERNAL COMBUSTION ENGINE CYLINDER ASSEMBLIES

William E. Woolenweber, 3169 Camino del Arco, La Costa, Calif. 92009-7856

Filed Oct. 15, 1987, Ser. No. 108,456

Int. Cl.<sup>4</sup> F01L 3/10

U.S. Cl. 123—188 B

8 Claims



1. Means forming an internal combustion engine having one or more cylinder assemblies containing pistons, adapted to be driven by an air-fuel mixture introduced into the one or more cylinder assemblies through one or more valve openings for combustion and adapted to expel the combusted air-fuel mixture from the cylinder assembly through said one or more valve openings, each of said one or more valve openings having a poppet valve to open and close the valve opening, at least one of said one or more valve openings and poppet valves having a non-circular periphery.

4,790,273

## VERTICAL ENGINE FOR WALK BEHIND LAWN MOWER

Kiyohiko Oguri, and Yoshiharu Isaka, both of c/o 2500 Shingai, Iwata-shi, Shizuoka-ken, Japan

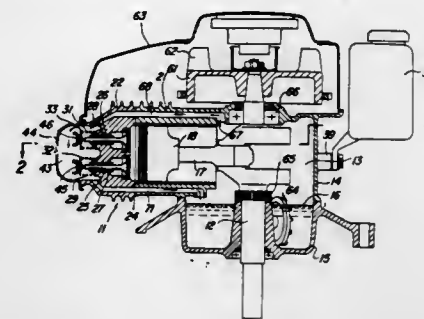
Filed Dec. 28, 1987, Ser. No. 138,313

Claims priority, application Japan, Feb. 19, 1987, 62-36683; Feb. 19, 1987, 62-36684

Int. Cl.<sup>4</sup> F01M 1/00

U.S. Cl. 123—196 W

19 Claims



1. In an engine having a poppet type exhaust valve and a poppet type intake valve each adapted to reciprocate about horizontally disposed axes and having the tips of their stem portions operating in a common valve operating chamber, the improvement comprising said exhaust valve lying vertically above said intake valve, means for delivering lubricant to a point above said exhaust valve for flow of lubricant first across the stem of said exhaust valve for cooling said exhaust valve and then by gravity to the stem of said intake valve.

4,790,274

## VALVE OPERATING MECHANISM FOR INTERNAL COMBUSTION ENGINE

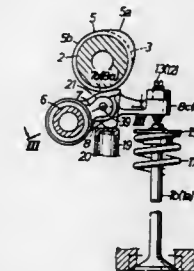
Kazuo Inoue, Kenichi Nagahiro, Yoshio Ajiki, and Masaaki Katoh, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 30, 1987, Ser. No. 8,741

Int. Cl.<sup>4</sup> F01L 1/34, 1/26; F02D 13/06

U.S. Cl. 123—198 F

12 Claims



1. A valve operating mechanism for operating a plurality of valves of a particular cylinder of an internal combustion engine, comprising:

a camshaft rotatable in synchronism with rotation of the internal combustion engine and having at least one cam; a plurality of cam followers, one of which slidably engages with said cam for selectively operating the valves according to a cam profile of said cam; and  
means for selectively interconnecting and disconnecting said cam followers to operate the valves differently in different speed ranges of the internal combustion engine, said speed ranges including a range in which all of the valves remain inoperative.

4,790,275

## FUEL SUPPLY CUT-OFF CONTROL SYSTEM FOR ENGINE OF AN AUTOMOTIVE VEHICLE

Masamichi Iida, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

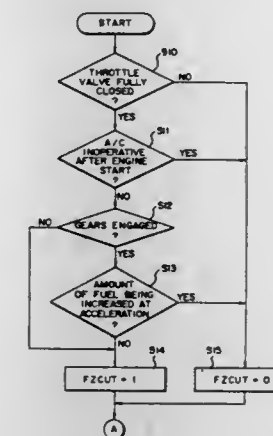
Filed Jan. 25, 1988, Ser. No. 147,697

Claims priority, application Japan, Jan. 27, 1987, 62-15157

Int. Cl.<sup>4</sup> F02D 41/12, 5/02

U.S. Cl. 123—325

11 Claims



restoration rpm, which is set to be less than said fuel cut-off rpm, at which the fuel supply is resumed when sensed engine rpm is less than said fuel restoration rpm, said setting means setting, as said specific operating region in which the supply of fuel is cut off, a region in which engine rpm is greater than said fuel cut-off rpm and engine load is less than prescribed;

said setting means changing over said fuel cut-off rpm and said fuel restoration rpm between that for said manual-type transmission and that for said automatic-type transmission in dependence upon the determination made by said determination means; and

said setting means setting the width between said fuel cut-off rpm and said fuel restoration rpm for said automatic-type transmission to be greater than the width between said fuel cut-off rpm and said fuel restoration rpm for said manual-type transmission.

4,790,276

# IDLING REVOLUTION CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE

Takeo Sasaki, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

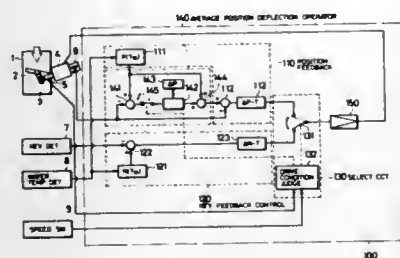
Filed Jun. 26, 1987, Ser. No. 66,448

Claims priority, application Japan, Jun. 26, 1986, 61-150404; Jun. 26, 1986, 61-150405; Jun. 26, 1986, 61-150406

Int. Cl.<sup>4</sup> F02D 41/16

U.S. Cl. 123-339

8 Claims



1. An idle revolution control device for an internal combustion engine associated with a revolution detector for detecting engine revolution, an idle detector for detecting an engine condition in which a throttle valve is not opened, an actuator for controlling an amount of intake air during an idling condition of the engine, and an actuator position detector for detecting a drive position of said actuator and adapted to control said actuator according to information from at least said revolution detector, said idle detector and said actuator position detector, said idle revolution control device comprising:

- a revolution number feedback control portion for comparing a predetermined revolution number with an actual revolution number from said revolution number detector and for controlling said actuator to control an amount of intake air of said engine in an idling condition so that said actual revolution number converges to said predetermined revolution number;
- an average position deflection operating portion for averaging a position deflection between a first predetermined position of said actuator and an actual position thereof when said actual revolution number becomes equal to said predetermined revolution number over a predetermined time period;
- a position feedback control portion for adding an averaged position deflection obtained by said average position deflection operating portion to said first predetermined position of said actuator to obtain a second position of said actuator to which the actual position of said actuator is controlled;
- a selection circuit for selecting an output of said revolution number feedback control portion when said throttle is in the idle condition and an output of said position feedback

control portion when said engine is out of idle condition or a vehicle mounting said engine is moving; and

a drive portion for driving said actuator according to an output of said selection circuit to force said actuator to said second position.

4,790,277

# SELF-ADJUSTING FUEL INJECTION SYSTEM

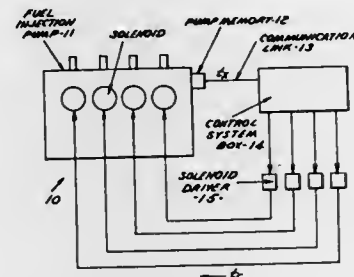
Michael M. Schechter, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jun. 3, 1987, Ser. No. 57,199

Int. Cl.<sup>4</sup> F02D 31/00

U.S. Cl. 123-357

10 Claims



1. A self-adjusting fuel injection system including:
  - a fuel pump;
  - a memory associated with said fuel pump for storing fuel delivery data and test data associated with and characterizing said fuel pump including additional data or corrections necessary to compensate for cycle-to-cycle variations in fuel delivery;
  - a control means coupled to said fuel pump for applying an actuating control pulse to said fuel pump as a function of the desired amount of fuel, said control means including a correction means coupled to said memory for varying the width of said actuating control pulse thereby correcting for the deviation of individual characteristics of a particular pump from a standard characteristic and using said additional data to make suitable corrections in the control pulse width following a specific sequence corresponding to a known pattern of cylindrical variations in fuel delivery; and
  - a sensor coupled to said control system and the engine capable of recognizing a selected reference cycle and providing a synchronizing signal to said control system to assure that the sequence of corrections is a proper synchronization with the sequence of variations, said additional data being such that said sequence of corrections eliminates cycle-to-cycle variations in fuel delivery.

4,790,278

# CENTRIFUGAL AXLE SPEED GOVERNOR

Kraig J. Schlosser, Auburn, and Howard W. Reaser, Fort Wayne, both of Ind., assignors to Dana Corporation, Toledo, Ohio

Filed Dec. 10, 1986, Ser. No. 940,872

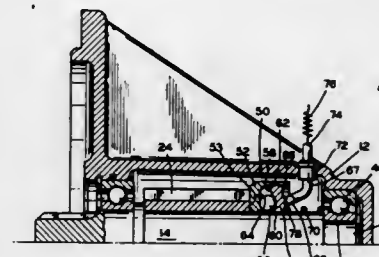
Int. Cl.<sup>4</sup> F02D 11/04; G01P 3/18

U.S. Cl. 123-376

1 Claim

1. In an axle apparatus including a rotary input shaft disposed for coupling to a prime mover, said prime mover including power modulating means; an improvement comprising said input shaft having a speed control governor fixed thereto, said governor operatively connected to said power modulating means, wherein said governor comprises a pair of annular plates, one of said plates fixed to said input shaft, the other of said plates axially slidable on said shaft, and a plurality of radially moveable weights circumferentially spaced between

said plates and axially interposed therebetween, one plate including a plurality of axially extending, circumferentially spaced tangs, the other plate including a plurality of circumferentially spaced, axially extending slots, said slots matingly disposed for receiving said tangs in sliding registration as said slidable plate moves axially along said input shaft, wherein said weights comprise slide members, and wherein one of said plates defines a radially extending slide ramp for each slide member, each ramp defining a cam surface whereby as centrifugal force urges each weight radially outwardly toward the peripheries of said plates, said slidable plate is urged axially away from said fixed plate, wherein said plate containing said plurality of slide ramps further comprises an axially extending



tang at the circumferential extremity of each slide ramp, wherein the other of said plates comprises pairs of parallel slide slots, each member containing mating pairs of slide locators extending radially thereon, each mating locator and slot combination providing a means for one slide member to track radially along a predetermined path as said slide member moves outwardly under centrifugal force, wherein said plate containing said slide slots further comprises a plurality of circumferentially disposed tang receiving slots disposed for registering axially with said axially extending tangs of said other plate, and wherein each slide member contains a tang contact groove disposed for engaging said tang and for limiting radially outward movement of said slide member.

4,790,279

# IGNITION CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Motoi Tobinaga; Shigeo Okumura; Kenichi Handa, all of Hamamatsu, and Shinya Atsumi, Kobayashi, all of Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Japan

Continuation of Ser. No. 945,185, Dec. 23, 1986, abandoned, which is a continuation of Ser. No. 842,821, Mar. 24, 1986, abandoned, which is a division of Ser. No. 611,846, May 18, 1984, Pat. No. 4,606,315. This application Sep. 30, 1987, Ser. No. 104,520

Claims priority, application Japan, May 19, 1983, 58-86672; May 19, 1983, 58-86673; May 19, 1983, 58-86674

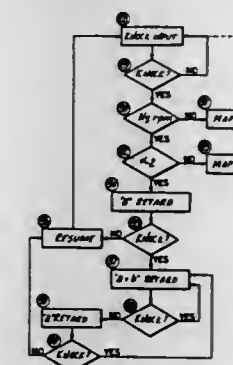
Int. Cl.<sup>4</sup> F02P 5/04

U.S. Cl. 123-417

4 Claims

1. A method of controlling the spark advance for an internal combustion engine, comprising the steps of:
  - measuring the speed of said engine,
  - measuring the air flow to the induction system of said engine,
  - determining an optimum spark advance in response to said speed and air flow measurements and setting the spark advance to the optimum spark advance,
  - sensing for the presence of a knock condition,
  - varying said spark advance in a predetermined sequence upon detection of said knock condition only if both the speed and air flow measurements have exceeded individual predetermined threshold values, said predetermined sequence including the steps of retarding the spark advance from said optimum spark advance in predetermined increments over predetermined time intervals until said

knock condition no longer exists, and then advancing the spark advance toward said optimum spark advance in a



reverse order of said predetermined increments over said predetermined time intervals.

4,790,280

# IGNITION APPARATUS

Kazuhiro Umehara, and Toshiya Katana, both of Hamamatsu, Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Hamamatsu, Japan

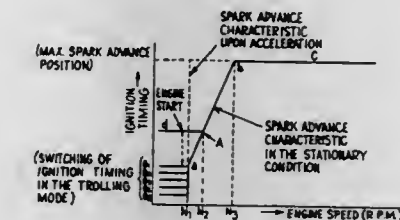
Filed Aug. 25, 1987, Ser. No. 89,482

Claims priority, application Japan, Aug. 26, 1986, 61-200418

Int. Cl.<sup>4</sup> F02P 5/145

U.S. Cl. 123-422

4 Claims



1. An ignition apparatus for an engine having a crankshaft, comprising:
  - first ignition signal output means for outputting a first ignition timing signal having a predetermined spark advance synchronously with the rotation of the engine;
  - second ignition signal output means for outputting, as a signal for troling, a second ignition timing signal which is delayed from the first ignition timing signal from said first ignition signal output means by a time interval representing the time required for the crankshaft to rotate through a predetermined angle;
  - a spark advance operating circuit for performing an arithmetic operation on the basis of the output of said first ignition signal output means and for outputting a third ignition timing signal which respectively advances and delays an ignition timing in response to an increase and decrease in the rotational speed of the engine;
  - first ignition timing setting means for using said first ignition timing signal as a signal to set the ignition timing for a selected period of time after the start of the engine and for switching to use of said second ignition timing signal as a signal to set the ignition timing after elapse of said selected period of time;
  - second ignition timing setting means which is immediately made operative when the engine is accelerated before the expiration of said selected period of time after the start of



the engine for switching to use said third ignition timing signal as a signal to set the ignition timing; and third ignition timing setting means which is immediately made operative when the engine is suddenly decelerated and which switches and uses the second ignition timing signal as a signal to set the ignition timing in place of said third ignition timing signal.

#### 4,790,281 METHOD OF AND APPARATUS FOR CONTROLLING IGNITION TIMING IN INTERNAL COMBUSTION ENGINE

Toshiyuki Mieno; Toyohito Nakajima; Akira Nagao; Yukihiko Suzuki; and Akira Tanaka, all of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 17, 1987, Ser. No. 74,733

Claims priority, application Japan, Jul. 22, 1986, 61-170930;  
Jul. 22, 1986, 61-170931

Int. Cl.<sup>4</sup> F02P 5/15  
U.S. Cl. 123-425

4 Claims

Control region	Maximum retarding amount (°)	Maximum advancing amount (°)	Wait period (sec)	Maximum retarding amount (°)	Maximum advancing amount (°)
Z1	0.00	1.00	1.00	0.00	0.00
Z2	0.00	1.00	1.00	0.00	0.00
Z3	0.00	1.00	1.00	0.00	0.00
Z4	0.00	1.00	1.00	0.00	0.00

1. An apparatus for controlling ignition timing in an internal combustion engine, comprising:  
first means for detecting an angular position of an engine crankshaft to generate a signal indicative of engine speed;  
second means for detecting a state of engine load to generate a signal in response thereto;  
third means for detecting a knock condition of the engine to generate a signal in response thereto;  
control means for receiving output signals of the first, second and third means to determine a basic ignition timing of the engine based upon the detected engine speed and engine load, and to retard the basic ignition timing by a predetermined retarding amount when the knock condition is detected, said control means further determining, based upon the detected engine speed, a maximum retarding amount for retarding the ignition timing, a wait period and a maximum advancing amount for advancing the ignition timing, said control means advancing the retarded ignition timing by a predetermined advancing amount when the wait period has lapsed if the knock condition is not detected, said control means further determining whether an accrued amount for retarding or an accrued amount for advancing reaches the respective maximum retarding or advancing amount and when it does, limiting the respective accrued amount to said respective maximum amount, said control means generating a signal in response to the determined ignition timing; and  
ignition means for receiving the output signal of the control means to ignite an air/fuel mixture in a combustion chamber of the engine.

#### 4,790,282 FUEL SUPPLY CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINE

Yoshiaki Kanno; Katsuya Nakamoto; and Jiro Sumitani, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

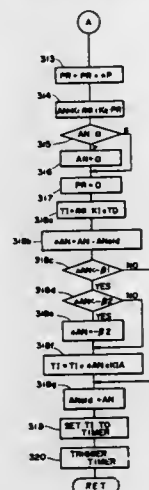
Filed Mar. 24, 1987, Ser. No. 29,762  
Claims priority, application Japan, Apr. 23, 1986, 61-93873;  
Apr. 23, 1986, 61-93874

Int. Cl.<sup>4</sup> F02D 41/12  
U.S. Cl. 123-493

2 Claims

1. A fuel supply control apparatus for an internal combustion engine, comprising:

an air flow sensor for detecting a quantity of air sucked into said internal combustion engine;  
a revolution sensor for measuring a number of revolutions of said internal combustion engine;  
first detecting means, responsive to said air flow sensor and said revolution sensor, for generating a first value, synchronously with the revolution of said internal combustion engine, indicative of a quantity of air drawn into said engine per one suction;  
AN computing means, responsive to said first detecting means, for blurring said first value synchronously with said revolution to produce a blurred value;



second detecting means, responsive to said AN computing means, for generating a second value indicative of an amount of decrease in said blurred value and for adjusting said second value to an adjusted second value when said second value is less than a predetermined amount;  
control means, responsive to said AN computing means, for determining a fuel supply quantity based at least in part on said blurred value; and  
correcting means for correcting said fuel supply quantity based at least in part on said adjusted second value when said second value is less than a predetermined amount.

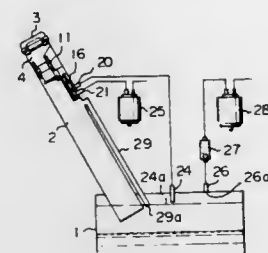
#### 4,790,283 FUEL TANK

Koji Uranishi, Susono, and Takaaki Ito, Mishima, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Feb. 21, 1986, Ser. No. 831,623  
Claims priority, application Japan, Feb. 25, 1985, 60-24691[U]  
Int. Cl.<sup>4</sup> F02M 39/00

U.S. Cl. 123-519

7 Claims



1. A fuel tank vapor system comprising:

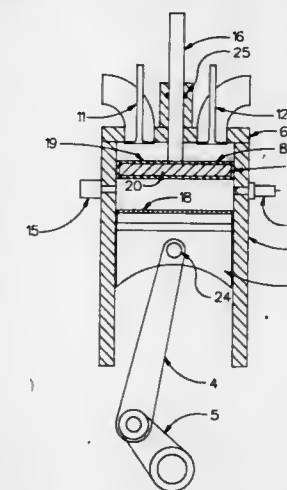
a fuel tank body having an interior portion and an upper wall;  
a fuel supply pipe mounted on said fuel tank body, said fuel supply pipe having an inlet for receiving a fuel supply nozzle and an outlet communicating with said fuel tank interior portion, said outlet being spaced a selected first distance downwardly from said upper wall;  
a first vapor passage having an outlet in said fuel tank interior spaced from the fuel supply pipe outlet and spaced downwardly a distance substantially equal to said first selected distance from said upper wall;  
a first fuel vapor absorbing canister in vapor communication with said fuel tank interior through said first vapor passage;  
a change-over control valve provided in said first vapor passage between said spaced outlet and said first canister, said control valve having an open and a closed position, said control valve being actuated to said open position such that said spaced outlet is in vapor communication with said first canister in response to the insertion of the fuel supply nozzle in said fuel supply pipe inlet and said valve being actuated to said closed position in response to the withdrawal of the fuel nozzle from said fuel supply inlet;  
a second vapor passage having an outlet in said fuel tank interior, said outlet being spaced from said upper wall by a distance less than said first selected distance;  
a second fuel vapor absorbing canister in vapor communication with said fuel tank interior through said second vapor passage; and  
a pressure biased check valve in said second vapor passage between said outlet and said second canister for releasing vapor into said second canister in response to a predetermined vapor passage in said tank.

#### 4,790,284 REGENERATIVE INTERNAL COMBUSTION ENGINE Allan J. Ferrenberg, Canoga Park, and William T. Webber, Agoura, both of Calif., assignors to Regenic Corporation, Canoga Park, Calif.

Filed Oct. 2, 1985, Ser. No. 782,959  
Int. Cl.<sup>4</sup> F02G 5/00

U.S. Cl. 123-543

3 Claims



1. In a thermally regenerated reciprocating cyclic internal combustion engine having a rotating power output shaft composed of a number of similar working units, each working unit comprising (1) a cylinder closed at one end by a cylinder head, with a number of intake valves to draw cool fresh air into the cylinder, and a number of exhaust valves to exhaust the spent combustion gases from the cylinder; (2) a first means for opening and closing said intake and exhaust valves in a predeter-

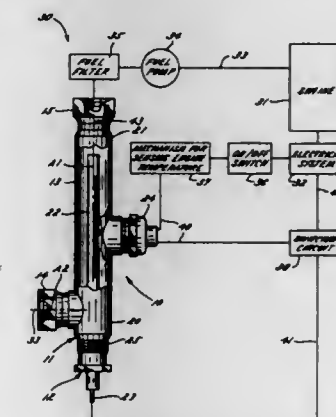
mined manner once in each engine cycle; (3) a piston inside the cylinder moving along the axis of the cylinder in a reciprocating manner toward and away from the cylinder head between the top dead center position closest to the cylinder head and the bottom dead center position furthest away from the cylinder head, said piston being connected to the power output shaft by a second means which translates the reciprocating motion of said piston to rotation of the power output shaft; (4) a thermal regenerator inside the cylinder between the cylinder head and the piston, capable of being moved in predetermined cyclic reciprocating motion along the axis of the cylinder and comprising a permeable core and other structure, to absorb heat from the hot combustion gases when moved in one direction, and to transfer the absorbed heat to the cool fresh air when moved in the opposite direction; (5) a third means for imparting a predetermined periodic motion to said thermal regenerator; (6) an injection means for injecting combustible fuel into the cylinder; and (7) an ignition means for igniting the mixture of said air and said fuel in the cylinder:

the thermal regenerator in which the permeable core comprises multiple layers of fabric woven from high temperature resistant ceramic fiber yarn.

#### 4,790,285 FUEL SYSTEM Gilbert Wolf, 7412 Laramie, Skokie, Ill. 60077 Filed May 15, 1986, Ser. No. 863,507 Int. Cl.<sup>4</sup> F02M 31/12

U.S. Cl. 123-549

1 Claim



1. For an engine which has an electrical system for providing electrical energy, a fuel system comprising a fuel line for supplying fuel to the engine, a fuel filter for removing impurities from the fuel, and a fuel heater including a hollow casing having a first end, a second end, and a longitudinal axis and being fabricated from stainless steel, wherein the casing has an inlet means connected to the fuel line for admitting fuel into the casing, the inlet means being disposed near the first end of the casing and including a threaded coupling attached to the fuel line and having an axis perpendicular to the longitudinal axis of the casing, and has an outlet means connected directly to the fuel filter for discharging fuel from the casing, the outlet means being disposed at the second end of the casing and including a threaded coupling attached to the fuel filter, the coupling having an axis colinear with the longitudinal axis of the casing, the fuel heater further including a heating unit operatively associated with the casing and having an electrical heating element removably disposed within the casing, connector means coupled to the electrical system for supplying electrical energy to the heating element, and means mounted to the casing for sensing fuel temperature within the casing and interrupting the supply of electrical energy to the heating element in response to a predetermined fuel temperature, the fuel temperature sensing means being mounted to the casing indepen-

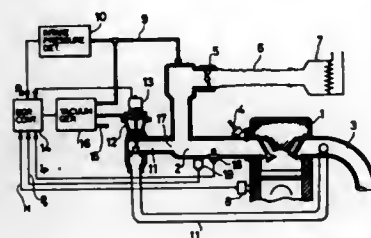
dently of the heating element whereby the heating element may be removed from the casing without removing the fuel temperature sensing means, and means for sensing engine temperature and interrupting the supply of electrical energy to the heating element in response to a predetermined engine temperature.

#### 4,790,286 EGR CONTROL DEVICE FOR INTERNAL COMBUSTION ENGINE

Minoru Nishida; Noriyuki Inoue; Yoshiaki Asayama, and Hiroyoshi Suzuki, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Nov. 27, 1987, Ser. No. 126,059  
Claims priority, application Japan, May 31, 1986, 61-126508; Dec. 2, 1986, 61-288424; Dec. 2, 1986, 61-288426  
Int. Cl.<sup>4</sup> F02M 25/06

U.S. Cl. 123—571

4 Claims



1. An EGR control device for an internal combustion engine comprising an EGR control valve installed in an EGR passageway communicating with an exhaust system and an intake system of an internal combustion engine, an oxygen sensor for detecting the oxygen content of the intake air installed in the downstream of the opening of the EGR passageway in said intake system, a pressure sensor for detecting the atmospheric pressure in said oxygen sensor, and EGR control means for computing a first quantity corresponding to a target EGR rate, correcting the output signal of said oxygen sensor using the output signal of said pressure sensor, and opening or shutting said EGR control valve in proportion to the deviation of the second quantity thus corrected from said first quantity in order to set the operating condition of said engine in conformity with a predetermined target EGR.

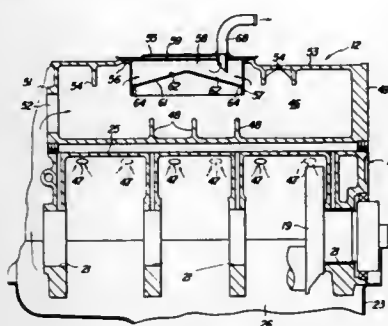
#### 4,790,287 CRANKCASE VENT SYSTEM

Kenichi Sakurai, Shizuka, and Kazutoshi Ueda, Iwata, both of Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Oct. 3, 1986, Ser. No. 914,869  
Claims priority, application Japan, Oct. 11, 1985, 60-226287  
Int. Cl.<sup>4</sup> F01M 13/00

U.S. Cl. 123—573

7 Claims



1. An internal combustion engine comprised of a cylinder

block having a pair of angularly spaced cylinder banks and defining an upper portion of a crankcase, a chamber formed by said cylinder block between said cylinder banks and separated from said crankcase by an integral lower wall of said cylinder block, opening means formed in said lower wall for communicating said chamber with the crankcase, said cylinder block forming an integral upper wall closing said chamber and having an opening formed therein, and a separator for separating lubricant from the crankcase ventilating gases comprising an outer housing defining an internal cavity closed by an upper wall and surrounded by a sidewall, said outer housing upper wall being supported upon said cylinder block integral upper wall and closing said cylinder block upper wall opening with said separator outer housing side wall depending into said cavity, a discharge conduit extending through said upper wall, and a baffle plate affixed at spaced locations to said sidewall and spaced inwardly from said sidewall at other locations for admitting crankcase gases to said cavity from said chamber and for return of condensed liquids to the crankcase of the associated engine from said chamber.

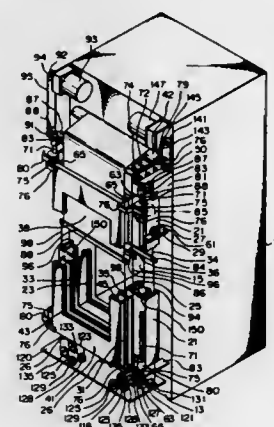
#### 4,790,288 THERMOSTATIC OVEN

Minoru Yashima, Tokyo, Japan, assignor to Yashima Works, Ltd., Tokyo, Japan

Filed Sep. 23, 1987, Ser. No. 100,109  
Int. Cl.<sup>4</sup> F23M 7/00

U.S. Cl. 126—190

13 Claims



1. A thermostatic oven having an oven body with a front opening having a door which comprises at least one windable sheet which covers the front opening and is wound or unwound to open and close said front opening; means located on the oven body for winding and unwinding the windable sheet; wherein said winding means comprises a rotatable winding roller to which one end of the windable sheet is connected to wind and unwind the windable sheet by the rotation of the winding roller; means located on the oven body for actuating the rotatable winding roller, and further comprising means for pressing the windable sheet against the oven body when the front opening is closed by the windable sheet wherein said pressing means comprises a movable frame having an opening corresponding to the front opening for pressing a peripheral edge of the windable sheet against the oven body to seal the front opening when the front opening is closed by the windable sheet.

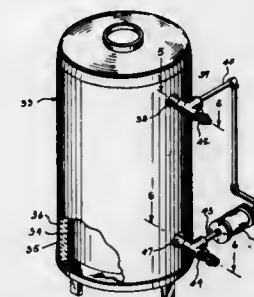
#### 4,790,289 SEDIMENT AGITATING APPARATUS FOR WATER HEATER

Fred E. Barrett, Columbia, S.C., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Continuation-in-part of Ser. No. 047,662, May 7, 1987. This application Nov. 19, 1987, Ser. No. 122,756  
Int. Cl.<sup>4</sup> F24H 1/00

U.S. Cl. 126—362

5 Claims



1. A water heater, comprising a tank to contain water to be heated and having a pair of apertures, a first of said apertures being located in the upper portion of said tank and a second of said apertures being located in the lower portion of said tank, outlet conduit means for withdrawing heated water from the tank and disposed in said first aperture, inlet conduit means for introducing cold water to said tank and disposed within said second aperture, and water circulating means including a pump, a first line connecting the inlet side of the pump to the interior of said tank and disposed within said first aperture, and a second line connecting the discharge side of the pump to said interior of the tank and disposed within said second aperture, operation of said pump acting to withdraw water from said tank through said first line and discharge water through said second line into the lower end of the tank.

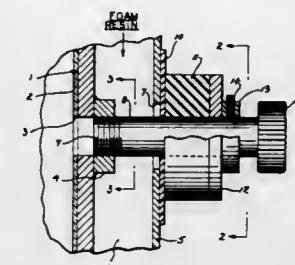
#### 4,790,290 METHOD AND APPARATUS FOR FOAM INSULATING A VESSEL

James L. Chevalier, Mequon; Douglas D. King, Menomonee, and John D. Pfeffer, Brookfield, all of Wis., assignors to A. O. Smith Corporation, Milwaukee, Wis.

Filed Sep. 28, 1987, Ser. No. 101,847  
Int. Cl.<sup>4</sup> F24H 1/00; B29C 65/00

U.S. Cl. 126—361

16 Claims



1. A tank assembly comprising, a tank to contain a fluid and having aperture means therein, a jacket spaced outwardly of said tank and having a hole aligned with said aperture means, the space between said tank and said jacket adapted to receive a liquid foamable resin, an elongated member engaged with said aperture means and extending outwardly through said hole in said jacket, resilient sealing means connected to the outer portion of said elongated member and disposed in contact with the outer surface of said jacket, rigid pressure means disposed against the outer surface of said sealing means,

and means for moving said pressure means in a direction toward said jacket to exert a force against said sealing means to compress said sealing means against the outer surface of said jacket and seal said hole.

10. In a method of making a water heater, the steps of forming an opening in a water heater tank, spacing a jacket around the tank and aligning a hole in the jacket with said opening, inserting an elongated member into the hole with the inner end of said elongated member closing off said opening and the outer end of said elongated member extending outwardly of said jacket, mounting a resilient sealing member on the outer end of said elongated member and positioning said sealing member tightly against the outer surface of said jacket to seal said hole, positioning a rigid back member against the outer surface of said sealing member, and exerting a force axially through said back member and against said sealing member to compress said sealing member against the outer surface of said jacket.

#### 4,790,291 SEDIMENT AGITATING APPARATUS FOR WATER HEATER

Fred E. Barrett, El Paso, Tex., assignor to A.O. Smith Corporation, Milwaukee, Wis.

Filed May 7, 1987, Ser. No. 47,662  
Int. Cl.<sup>4</sup> F24H 1/00

U.S. Cl. 126—362

6 Claims



1. A water heater, comprising a tank to contain water to be heated and having a lower head, inlet means for introducing cold water to said tank, outlet means disposed in the upper end of the tank for withdrawing heated water, heating means for heating the water in said tank, and agitating means for agitating the water in said tank, said agitating means comprising a closed circulation system including pumping means, first conduit means providing communication between the interior of the tank and the suction side of said pump means and second conduit means providing communication between the discharge side of said pumping means and the interior of said tank, said pumping means being constructed and arranged to withdraw water from said tank through said first conduit means and discharge through said second conduit means into the lower end of the tank and across said lower head to agitate the water and prevent buildup of sediment on the lower head of said tank, said tank having an access opening in the lower portion thereof, a removable panel to enclose said opening, said agitating means being carried by said panel.



4,790,292

## COOKING VESSEL

Jacques Kuhn, Rikon, Switzerland, assignor to Heinrich Kuhn Metallwarenfabrik AG, Rikon, Switzerland

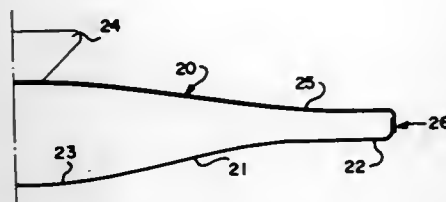
Continuation-in-part of Ser. No. 543,793, Oct. 21, 1983, abandoned, which is a continuation of Ser. No. 379,976, Apr. 19, 1982, abandoned, which is a continuation of Ser. No. 825,488, Aug. 17, 1977, abandoned. This application Oct. 27, 1986, Ser. No. 923,334

Claims priority, application Switzerland, Oct. 31, 1985, 4682/85

Int. Cl.<sup>4</sup> A47J 27/00

U.S. Cl. 126—390

19 Claims



1. A cooking vessel adapted for use on induction plates and for electric or flame cooking, heating and serving, and including a pot having an inner wall and an outer wall, each of which are continuously formed shells connected to one another in spaced relation to one another, a heat-conducting plate connected between bottom portions of the inner wall and the outer wall in a heat-conducting manner, and a double-walled lid; wherein the pot and the lid are stepped in their contact zone including a recessed annular surface in the inner wall of the pot and a matching bearing surface of the lid so that the lid is embedded in the pot, and the pot and the lid meet along a widened circumferential rim for ensuring dimensional stability along the rim; wherein at least the outer wall of the pot is produced from a composite material having at least one layer formed of a ferromagnetic material; and wherein the inner wall and the outer wall of the pot are connected to one another in a gas-tight manner at the rim.

4,790,293

## APPARATUS AND METHOD FOR SOLAR HEATING OF WATER

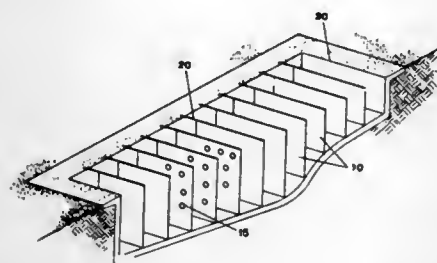
R. Scott Calmes, Greer, S.C., assignor to American Hoechst Corporation, Somerville, N.J.

Filed Feb. 10, 1984, Ser. No. 578,949

Int. Cl.<sup>4</sup> F24J 3/02; E04H 3/18

U.S. Cl. 126—415

38 Claims



1. An apparatus for heating a tank of water comprising at least three substantially planar plastic strips positioned substantially vertically in spaced relationship in said water, such that said strips are substantially immersed in the water to be heated, and means for positioning said strips in said water with the provisos (1) that said strips are light absorbent on both major

planar surfaces and (2) that said positioning means is of such construction as to minimize absorption of solar radiation by the positioning means rather than by said strips.

19. A method for solar heating of a tank of water comprising the steps of positioning at least three substantially vertical, substantially planar plastic strips in spaced relationship in said water, such that said strips are substantially immersed in the water to be heated, with the proviso that said strips are light absorbent on both major planar surfaces, and exposing said strips to solar radiation.

36. A recreational swimming pool equipped with a solar heating apparatus comprising at least three substantially planar plastic strips removably positioned substantially vertically in spaced relationship in the pool water, such that and means for removably positioning said strips in spaced relationship in said pool water with the proviso that said strips are light absorbent on both major planar surfaces.

4,790,294

## BALL-AND-SOCKET BEAD ENDOSCOPE STEERING SECTION

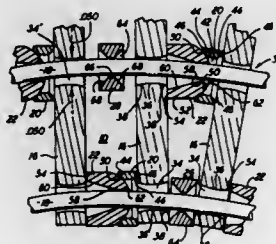
Jimmie B. Allred, III, Skaneateles, and Richard Bingham, Auburn, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Jul. 28, 1987, Ser. No. 78,713

Int. Cl.<sup>4</sup> A61B 1/00

U.S. Cl. 128—4

18 Claims



1. In a steerable endoscope or borescope of the type having a viewing head, a cable-bendable steering section proximally of the viewing head and including a flexible sheath, a plurality of axially aligned generally flat washers each having a central passage and a plurality of peripheral bores therethrough pairs of which are generally diametrically disposed, a plurality of steering cables passing through respective axially aligned peripheral bores of said washers, and pairs of spacer beads disposed at the locations of at least certain ones of said steering cables and serving to define bending locations for said steering section such that displacement of one opposed pair of the steering cables results in bending of the steering section; the improvement wherein said pairs of spacer beads include a ball bead and a socket bead, respectively having a convex surface and a concave surface in sliding contact relative to one another, and each having a relatively flat surface disposed against an associated one of said washers.

4,790,295

## ENDOSCOPE HAVING TRANSPARENT RESIN SEALING LAYER

Yoshio Tashiro, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Dec. 8, 1987, Ser. No. 130,090

Claims priority, application Japan, Dec. 16, 1986, 61-297728; Mar. 20, 1987, 62-67241

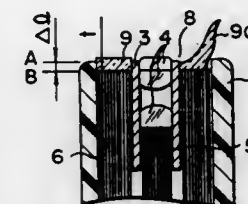
Int. Cl.<sup>4</sup> A61B 1/00

U.S. Cl. 128—6

11 Claims

1. An endoscope comprising: a small-diameter insertion section able to enter a body cavity, the insertion section having a hollow cylindrical mem-

ber one end of which has an opening to the outside, said cylindrical member containing a light guide fiber bundle for emitting a beam of illumination light into the body cavity, an object optical system for receiving a beam reflected from the body cavity, to form an image, and image transmission means for transmitting the image formed;



a recess portion having a side wall defined by said cylindrical member, a bottom wall defined by said light guide fiber bundle, and an opening at said one end of the cylindrical member; and  
a transparent resin layer of a uniform thickness, arranged within said recess portion and sealing the inside of said cylindrical member at said one end thereof, said resin layer having an end face which is substantially flush with said one end of the cylindrical member.

4,790,296

## SEXUAL STIMULATION APPARATUS

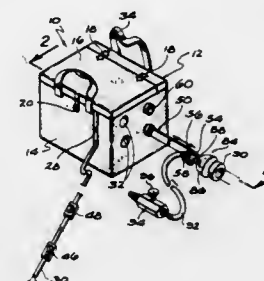
Daniel A. Segal, 19433 Pacific Coast Hwy., Malibu, Calif. 90265

Filed Apr. 10, 1987, Ser. No. 36,919

Int. Cl.<sup>4</sup> A61H 7/00

U.S. Cl. 128—51

19 Claims



1. A sexual stimulation apparatus, comprising:  
motor means for rotating a drive shaft coupled to the motor means;  
an elongated arm having a first end situated proximate to the drive shaft and extending away therefrom to a second end;  
means for coupling the first end of the elongated arm to the drive shaft in a manner translating the rotational motion of the drive shaft into reciprocating and substantially linear motion of the elongated arm along its longitudinal axis, the coupling means including means for selectively adjusting the length of the reciprocation stroke of the elongated arm;  
means for surrounding the motor means to provide a sound-insulating barrier, the surrounding means including passage means for permitting passage of the elongated arm therethrough;  
a power supply means including means for controlling the motor means; and  
means for engaging the glans of a user to provide the desired sexual stimulation, the engaging means being attached to the elongated arm proximate its second end; wherein the engaging means includes a dildo member having a project-

ing shaft held securely adjacent the second end of the elongated arm, and a rigid bell having a soft tubular sleeve placed on the bell in a manner forming a receptacle for the glans penis, said rigid bell including adjustable valve means for providing suction whereby the user can adjust the amount of suction on the glans penis when situated within the receptacle, only one of said engaging means being connected to said elongated arm at any one time.

4,790,297

## SPINAL FIXATION METHOD AND SYSTEM

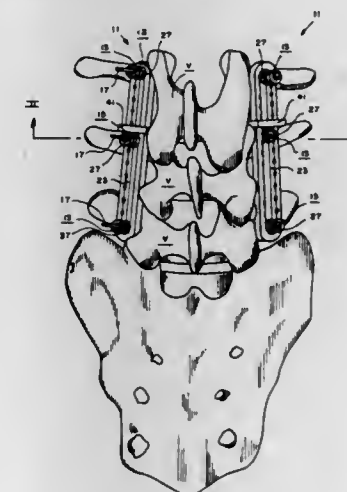
Eduardo R. Luque, De Las Aeolias, Mexico, assignor to Biotechnology, Inc., Memphis, Tenn.

Filed Jul. 24, 1987, Ser. No. 77,440

Int. Cl.<sup>4</sup> A61F 5/00

U.S. Cl. 128—69

7 Claims



1. In a spinal fixation method including the step of first exposing at least a portion of the vertebrae of a spinal column; the improvement comprising the steps of:

(a) introducing at least a spaced pair of guide wires directly through the cancellous portions of the portion of the vertebrae and into the middle of the vertebral body thereof leaving an exposed length of each of said guide wires extending outward thereof, at least one end of each of said guide wires being substantially blunt to help preclude penetration of the anterior cortex by said guide wires;  
(b) X-raying the vertebrae to confirm the position of said guide wires in the portion of the vertebrae;  
(c) introducing a cannulated screw tap over said guide wires to cut screw threads into the portion of the vertebrae along said guide wires to a desired depth;  
(d) placing a rigid plate over the portion of the vertebrae with said guide wires passing through said plate; and  
(e) introducing cannulated screws over said guide wires, through said plate and into the screw threads cut into the portion of the vertebrae to secure said plate thereto.

4,790,298

## PENILE PROSTHESIS AND METHOD

Robert E. Trick, Racine, Wis., assignor to Medical Engineering Corporation, Racine, Wis.

Filed Aug. 5, 1987, Ser. No. 82,155

Int. Cl.<sup>4</sup> A61F 2/26

U.S. Cl. 128—79

20 Claims

1. A penile prosthesis comprising,  
(a) a proximal end portion and a distal end portion,  
(b) a flexible main body portion intermediate said proximal and distal end portions, said main body portion having a

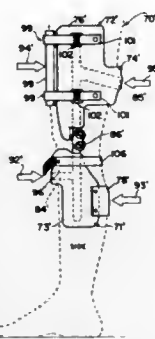
predetermined plurality of segments arranged side-by-side to permit relative movement with respect to each other in a predetermined direction,

- (c) stiffening means engageable with said main body portion, for rendering said main body portion substantially inflexible, said segments each having at least a first predetermined longitudinal magnitude along a longitudinal axis of said prosthesis, said stiffening means including a predetermined plurality of interference members having not greater than a second predetermined longitudinal magnitude along said longitudinal axis, said second predetermined longitudinal magnitude being less than said first predetermined longitudinal magnitude,



- (d) said stiffening means being disposable in a first position relative to said main body portion to permit said main body portion to remain flexible such that said main body portion can bend and assume a contour that corresponds to the contour of a flaccid penis,
- (e) said stiffening means being disposable in a second position of predetermined engagement with said main body portion to prevent said main body portion from bending and to maintain said main body portion in a substantially straight configuration, to support a penis in a substantially erectile position.

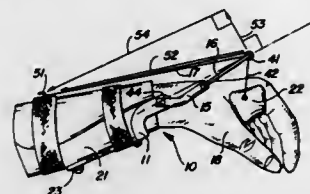
**4,790,299**  
**KNEE STABILIZER**  
Stuart H. Marquette, 8604-A Via Mallorca Dr., La Jolla, Calif. 92037  
Continuation of Ser. No. 732,345, May 8, 1985, abandoned, which is a continuation-in-part of Ser. No. 579,728, Feb. 13, 1984, Pat. No. 4,733,656. This application Nov. 26, 1986, Ser. No. 935,257  
The portion of the term of this patent subsequent to Mar. 29, 2005, has been disclaimed.  
Int. Cl.<sup>4</sup> A61F 5/01, 5/04  
U.S. Cl. 128—80 C



1. A knee stabilizer, comprising  
an elongated relatively rigid anterior tibial shell substantially conformed to the leg of a wearer including the region adjacent the knee and defining a posterior opening;  
an elongated relatively rigid posterior femoral shell substantially conformed to the thigh of the wearer including the region adjacent the knee and defining an anterior opening;  
the femoral shell forming a first posterior pressure section, and further comprising relatively rigid strap means spanning the anterior opening at the superior border thereof and including a rigid anterior femoral plate for providing a second pressure section above the first pressure section;  
a substantially closed rigid band system comprising: a pair of uprights extending one on the lateral side of the knee and one on the medial side of the knee and rigidly connecting

the tibial and femoral shells, each upright having a pivotal construction proximate the knee for substantially tracking flexion of the knee; a femoral band section attached to the uprights on opposite sides of the femoral shell and spanning the posterior side of that shell proximate the first pressure section; and a tibial band section attached to the uprights on opposite sides of the tibial shell and spanning the anterior side of that shell; and  
the tibial shell forming a third superior anterior tibial pressure section adjacent the knee and further including strap means spanning the posterior tibial shell opening for providing a fourth pressure section proximate the distal border of said shell below the third pressure section; whereby the four pressure sections provide a stable, four-point pressure system for restraining rotation and displacement of the knee.

**4,790,300**  
**DYNAMIC SPLINTING COMPONENT**  
Ralph H. Marx, 7714 N. 17th Pl., Phoenix, Ariz. 85020  
Filed Jan. 27, 1987, Ser. No. 6,769  
Int. Cl.<sup>4</sup> A61F 5/04  
U.S. Cl. 128—84 C

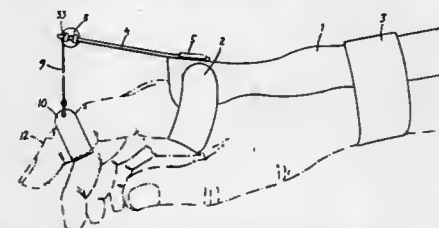


1. A low-profile dynamic splint device for mounting on the wrist and forearm of a user which subjects the associated hand to a perpendicular force about the wrist joint while substantially avoiding the application of any compression force to the wrist comprising:  
a first frame means having two spaced parallel arranged pivotally mounted arms rigidly formed at their first ends to form a laterally extending proximal leg,  
a second frame means extending between the other ends of said arms,  
said arms each being bent in a common direction terminating in a plane,  
said second frame means comprising a wire, the end segments of which are bent in a common direction to lie in said plane connecting one to each of said arms and having a center section,  
a wrist mountable gauntlet,  
a first means for securing said leg to said gauntlet,  
a spring biasing means connected to said center section of said second frame means and a point on said gauntlet for rotating said arms in unison about a point on said first frame means toward said gauntlet,  
a palmar sling means for supporting the hand of a user, and  
a second means flexibly connecting said palmar sling means to said center section of said second frame means,  
whereby in use the component of force applied to the hand of a user by said spring means is substantially a perpendicular force directed outwardly from the dorsum of the associated hand of the user.

**4,790,301**  
**DEVICE FOR AND METHOD OF DYNAMIC SPLINTING**  
Kristen Silfverskiold, Mellangatan 25, 413 01 Gothenburg, Sweden  
Filed Oct. 23, 1987, Ser. No. 113,213  
Int. Cl.<sup>4</sup> A61F 5/04, 5/10  
U.S. Cl. 128—87 A

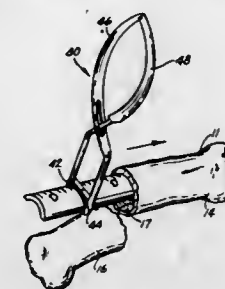
1. A dynamic splinting device, comprising:  
a first device part for attachment to one part of a limb of a patient;

- a second device part for attachment to a second part of the limb of the patient, said second part of the limb of the patient being a different part than the part of the limb of the patient to which said first device part is attached to, the second limb part of the patient being jointed to the first limb part of the patient; and,  
a spring mechanism serving as a means for providing a force for the dynamic splinting and movement of a digit of the patient, said spring mechanism being the sole means for interconnecting said first device part and said second



- device part, said spring mechanism comprising:  
a rotatable spool;  
a line which is windable on to and off of the spool and has a portion leading away from the spool which is attached to said second device part;  
a support carrying said spool and attached to said first device part; and  
at least one spring acting with torsion on the spool to urge said spool in the rotational sense in which the line is wound up thereon.

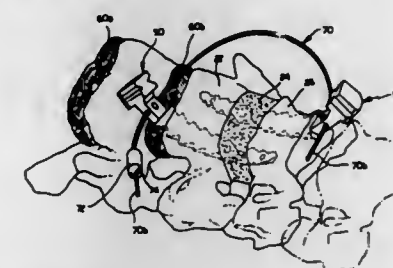
**4,790,302**  
**METHOD AND APPARATUS FOR FIXING BONE FRACTURES**  
John C. Colwill, 2254 Shawnee, Grand Rapids, Mich. 49506, and Kenneth M. Wilson, 1456 Mayfield, Grand Rapids, Mich. 49505  
Continuation-in-part of Ser. No. 875,072, Jan. 17, 1986, abandoned. This application Jun. 9, 1987, Ser. No. 60,119  
Int. Cl.<sup>4</sup> A61F 5/04  
U.S. Cl. 128—92 YZ



1. A method of permanently fixing a bone fracture comprising the steps:  
overlaying an elongated plate having two spaced apertures therein on the external cortex of the bone with one said aperture on each side of the fracture, said plate having a convex seating surface abutting the intramedullary cortex; drilling a hole in the bone at the location of each said aperture extending from the external cortex to the intramedullary cortex;  
separating the bone portions at the fracture;  
inserting said plate between the bone portions and into the interior of the bone;  
aligning said apertures with said holes;  
placing a fastener having a head and a stem into each said hole with the head outside the bone; and  
locking each said fastener stem into the respective said aperture with said plate abutting the intramedullary cortex; wherein said plate has a scale comprising a series of longitudinally spaced marks on said seating surface and wherein said

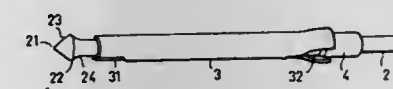
step of aligning further comprises locating the plate with the same said mark at the fracture as during said overlaying step.

**4,790,303**  
**APPARATUS AND METHOD FOR SECURING BONE GRAFT**  
Arthur D. Steffee, Moreland Hills, Ohio, assignor to AcroMed Corporation, Cleveland, Ohio  
Filed Mar. 11, 1987, Ser. No. 24,577  
Int. Cl.<sup>4</sup> A61F 5/04  
U.S. Cl. 128—924 M



5. An apparatus for securing bone graft between a pair of bone portions in which the bone graft contracts as it resorbs in at least one direction along a line extending between the bone portions, said apparatus comprising:  
an elongate curved member having a shank for extending into the bone graft and bone portions, said shank being a single projection with a longitudinal central axis and having a constant curvature along said longitudinal axis;  
an end portion on said shank for receiving a tool adapted to grip said shank and to transmit a force to drive said shank into one of the pair of bone portions, the bone graft and then the other one of the pair of bone portions; and  
a plurality of barbs extending from said shank in a direction allowing relative movement of one of the bone portions toward the other of the bone portions in a direction along the line extending between the bone portions as the bone graft contracts and for resisting relative movement of one of the bone portions away from the other of the bone portions in a direction along the line extending between the bone portions.

**4,790,304**  
**SELF-LOCKING PIN DEVICE PARTICULARLY USEFUL FOR INTERNALLY FIXING BONE FRACTURES**  
Lior Rosenberg, 13 Harduf Street, Omer, Beer Sheva, Israel  
Filed Jan. 10, 1985, Ser. No. 690,323  
Claims priority, application Israel, Jan. 20, 1984, 70736  
Int. Cl.<sup>4</sup> A61F 5/04  
U.S. Cl. 128—92 Y



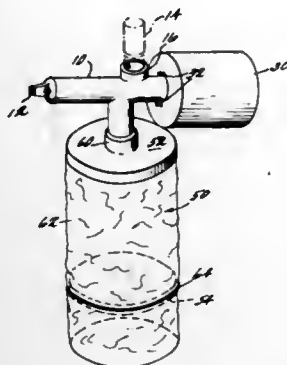
1. A self-locking pin device comprising:  
a pin having proximal and distal ends and formed with an enlargement in the region of its distal end;  
a tube received over said pin and having a diameter smaller than said enlargement, said tube being axially split at both its distal and proximal ends;  
a collar received between the proximal ends of said pin and tube, such that affecting relative axial movement between the enlargement at the distal end of the pin and the distal end of the tube splays outwardly the distal end of the tube about its axial split, and effecting relative axial movement between the collar and the proximal end of the tube splays outwardly the proximal end of the tube along its axial split;



and manually gripping means attachable to the proximal end of the pin, tube and collar, to facilitate their insertion and the splaying of the two ends of the tube.

**4,790,305**  
**MEDICATION DELIVERY SYSTEM**  
 Bert J. Zoltan, Old Tappan, N.J.; Beth L. Laube, and George K. Adams, III, both of Baltimore, Md., assignors to The Johns Hopkins University, Baltimore, Md.  
 Filed Jun. 23, 1986, Ser. No. 877,331  
 Int. Cl.<sup>4</sup> A61M 11/00, 16/60  
 U.S. Cl. 128—200.23

10 Claims

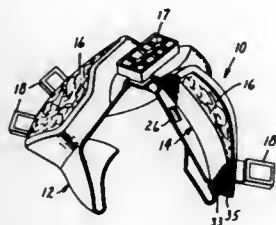


1. A device for delivery of aerosolized medication to a patient, said device comprising:  
 a mouthpiece having an inhalation end and another end;  
 means for connecting a medication container to said mouthpiece intermediate said ends;  
 first chamber means fixed to said mouthpiece at said other end for holding the aerosolized medication before inhalation thereof; and  
 further chamber means fixed to said mouthpiece for supplying a variable volume of air to said inhalation end before the aerosolized medication is inhaled.

**4,790,306**  
**RESPIRATORY MASK HAVING A RIGID OR SEMI-RIGID, INSERT-MOLDED FILTRATION ELEMENT AND METHOD OF MAKING**  
 David L. Braun, Lake Elmo, and Donald L. Melvin, Maplewood, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 25, 1987, Ser. No. 100,830  
 Int. Cl.<sup>4</sup> A62B 23/02  
 U.S. Cl. 128—206.12

21 Claims



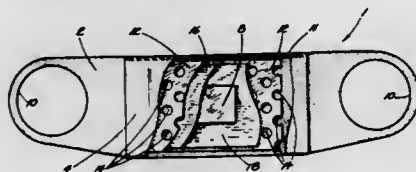
20. Method of making a filtering device using an injection mold adapted to receive as an insert a resilient, porous, substantially rigid filtration element that has inflow and outflow faces separated by a peripheral surface, the mold being formed so that, upon being closed, it partially compresses the filtration element at said peripheral surface to seal off said inflow and

outflow faces from the flow channel of the mold, said method comprising the steps of:

- (1) inserting into the flow channel said filtration element and a piece of thermoplastic resin covering said peripheral surface of the filtration element,
- (2) closing the mold,
- (3) injecting resin into the flow channel at a pressure and temperature such that the piece of thermoplastic resin is softened and conforms to and seals the peripheral surface of the filtration element but substantially does not extend into its pores, and
- (4) removing from the mold a filtering device of which said filtration element is supported by a mount formed by both said injected resin and said piece of thermoplastic resin.

**4,790,307**  
**DISPOSABLE SURGICAL MASK HAVING A SELF-CONTAINED SUPPLY OF ANTI-BACTERIAL MATERIAL**  
 Terry M. Haber, Lake Forest, Calif., and Romeo LeMarie, Hong Kong, Hong Kong, assignors to Habley Medical Technology Corporation, Laguna Hills, Calif.  
 Filed Dec. 15, 1986, Ser. No. 941,311  
 Int. Cl.<sup>4</sup> A62B 7/10  
 U.S. Cl. 128—206.19

3 Claims



1. A surgical mask to reduce the possibility of iatrogenic and nosocomial disease transmitted by a wearer of the mask, said mask comprising:  
 means for securing said mask to the face of a wearer;  
 top and bottom layers of air permeable material;  
 rupturable container means located between said top and bottom layers and having a plurality of fluid reservoirs in which respective supplies of anti-bacterial fluid are contained, said container means adapted to rupture upon the application of a predetermined minimum force to expulse said anti-bacterial fluid from said plurality of fluid reservoirs;  
 an absorbent material located between said top and bottom layers to surround said container means for absorbing and dispensing said anti-bacterial fluid from said fluid reservoirs when said container means is ruptured and said fluid is expelled; and  
 fluid channel means extending from respective ones of said fluid reservoirs for evenly distributing said anti-bacterial fluid throughout said absorbent material when said container means is ruptured and said fluid is expelled.

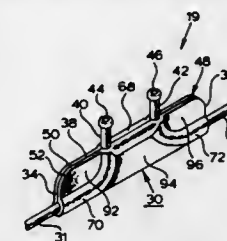
**4,790,308**  
**NASAL CANNULA HARNESS**  
 Edwin G. Weichselbaum, Eureka, Mo., assignor to Sherwood Medical Company, St. Louis, Mo.  
 Filed Apr. 4, 1984, Ser. No. 596,754  
 Int. Cl.<sup>4</sup> A61M 15/08  
 U.S. Cl. 128—207.18

17 Claims

1. A nasal cannula harness for delivering gas to the nasal passages of a patient comprising a pair of flexible tubes each having opposed end portions, one end portion of each of said tubes being adapted for connection to gas supply means, and a bridge connected to the other end portion of each of said tubes and holding the same for insertion into the nares of the patient, said bridge including a pair of sheet members, said other end portions of said tubes extending between said sheet member,

said sheet members having inner sides with portions secured together in facing relation at locations on opposed sides of each of said other end portions of said tubes, said bridge having opposed bottom and upper sides and opposed longitudinally

guide being secured to each segment of the flexible tube; and

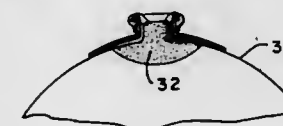


spaced ends, said other end portions of said tubes extending longitudinally into said opposed ends of said bridge, respectively, and upwardly and out of said upper side of said bridge for insertion into the nares of the patient.

means for spreading the segments in order to radially diverge the waveguides.

**4,790,309**  
**TISSUE EXPANDER STENT**  
 Hilton Becker, 2584 NW, 23rd Way, Boca Raton, Fla. 33413  
 Filed Apr. 10, 1987, Ser. No. 36,800  
 Int. Cl.<sup>4</sup> A61B 17/00  
 U.S. Cl. 128—303 R

3 Claims



1. A tissue expander and stent for use in the reconstruction of a nipple in a human breast comprising a soft, pliable and resilient member of a biologically compatible non-porous elastomer defining a hollow radially flared annular segment and a cylindrical tube extending outwardly from the top of said segment and formed integrally therewith, and a rigid ring encompassed by the cylindrical tube at the distal end thereof, said conically shaped radially flared annular segment defining a hollow base portion for placement on the breast of a patient so that the proximal end of said tube is elevated by at least several millimeters from the portion of the breast which is undergoing reconstruction, and said rigid ring forced over and closely surrounding said cylindrical tube and with said cylindrical tube folded over said ring and extending downwardly to the region of the top of said radially flared annular segment to thereby form a double walled tube with said ring at the distal end thereof, and the distal end of said tube is adapted to be sutured to said breast in a manner to force the proximal end downward against the breast whereby the resiliency of the radially flared annular segment maintains the suture under tension as the tissue expands upwardly into the interior of the tube.

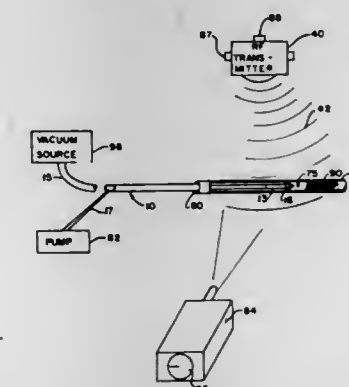
**4,790,310**  
**LASER CATHETER HAVING WIDE ANGLE SWEEP**  
 Robert Ginsburg, 2489 Alpine Rd., Menlo Park, Calif. 94025, and David F. Proffitt, 1154 Madison, Santa Clara, Calif. 95050  
 Filed Feb. 4, 1987, Ser. No. 10,868  
 Int. Cl.<sup>4</sup> A61N 5/01, 5/06  
 U.S. Cl. 128—303.1

15 Claims

1. A catheter system comprising:  
 an elongate flexible tube having a proximate end and a distal end, said distal end being axially split into at least two spreadable segments;  
 a plurality of optical waveguides, with at least one wave-

**4,790,311**  
**RADIO FREQUENCY ANGIOPLASTY CATHETER SYSTEM**  
 Oscar F. Ruiz, 3655 Bay Homes Dr., Coconut Grove, Fla. 33133  
 Continuation-in-part of Ser. No. 870,152, Jun. 3, 1986, abandoned. This application Jan. 20, 1987, Ser. No. 5,120  
 Int. Cl.<sup>4</sup> A61B 17/38  
 U.S. Cl. 128—303.1

13 Claims



1. A method for unblocking fluid channels such as blood vessels in the body of an animal which are blocked or partially blocked by natural debris such as plaque, comprising the steps of:  
 inserting a catheter into the vessel, said catheter having a heatable, groundable tip, a flexible conduit proximal portion, and means extending through the flexible conduit proximal portion for grounding said tip, said means for grounding said tip being electrically connected to said tip; moving the catheter to the debris; grounding the heatable tip by connecting the means for grounding the tip to an external electrical ground; transmitting radio frequency waves from a source separate and removed from the catheter toward the body of the animal; heating the tip of the catheter by the self-focusing of electromagnetic waves thereon to provide a hot debris contact surface at a temperature of at least approximately 100° C., said heating step including the step of focusing the radio frequency waves, the grounded tip acting to focus the radio frequency waves to raise the temperature of the tip; and moving said heated tip of the catheter through the debris by disintegrating at least a portion of the debris by heat to open the vessel to natural flow.

4,790,312

## SURGICAL KNIFE

Francis A. Capasso, Sr., Stonham, and Vincent J. Piraino, Belmont, both of Mass., assignors to Becton Dickinson Acute-care, Inc., Waltham, Mass.

Filed Jan. 20, 1987, Ser. No. 5,039

Int. Cl. A61B 17/32

U.S. Cl. 128—305

9 Claims



1. A surgical instrument for operating percutaneously in a living body comprising:
  - an elongated hollow handle,
  - a shaft having a proximal portion extending within and secured, during use, to said handle and a distal portion extending distally of said handle,
  - surgical cutting means fixedly supported during use by the distal end of said shaft,
  - a slidable tubular sheath having a distal portion extending distally of said handle, about said shaft, to the region of said cutting means, said sheath sized and constructed for introduction into the living body through a puncture opening in its flesh,
  - means for moving said sheath axially relative to said handle between a first position in which the distal portion of said sheath surrounds said cutting means, enabling safe positioning of said instrument in the body without cutting, and a second, retracted position exposing said surgical cutting means, the position of said cutting means relative to said handle being fixed during movement of said sheath, and
  - a proximal cap removably connected to said handle, said sheath and said handle defining an elongated passage extending axially the length of said instrument, and said shaft and said cutting means being sized relative to said passage through said sheath and said handle whereby, upon disassembly of said cap from said handle, said shaft and blade are adapted for removal proximally through said passage, while said sheath remains in said puncture opening in the flesh of the living body.

4,790,313

## SEALING DEVICE FOR TUBING

Jacques Borrelly, 1 rue de la Vigne des Sables, 54180 Heillecourt, France

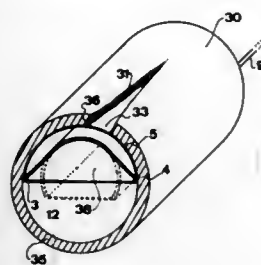
Filed Sep. 11, 1986, Ser. No. 906,062

Claims priority, application France, Sep. 13, 1985, 85 13580

Int. Cl. A61B 17/04; A61M 29/00; F16L 55/12

U.S. Cl. 128—334 R

11 Claims



1. A medical sealing device for sealing tracheal tubing, said device comprising:
  - a tubular central core of generally U-shaped cross section having opposed ends and sidewalls defining laterally spaced longitudinal edges, said central core having a

degree of elasticity to deformation of its shape in a plane perpendicular to its longitudinal direction;

a membrane disposed around said central core having opposed ends, said membrane being made of a flexible and elastic material having a much higher coefficient of elasticity than said central core, the opposed ends of said membrane being sealed to the outer periphery of the U-shaped cross section central core and said membrane further being sealed at the side wall edges of said central core to form an external, closed deformable chamber of substantially crescent-shaped cross section;

resilient traction means interconnecting the longitudinal edges of said central core of U-shaped section; and

means for admitting a fluid under pressure to the inside of said chamber, whereby when said device is inserted within a tracheal tube of a diameter in excess of the diameter of the U-shaped cross section central core, pressurization of the chamber causes the membrane to stretch and the central core to deform so that its longitudinal edges tend to move apart and apply tension to the resilient membrane tending to cause the edge of the central core to contact with the inside surface of the tube and under further increased pressurization, the membrane is subjected to further deformation and spreads itself evenly over the entire facing area of the inside surface of the tube for closing off any leaks within the tube by surface contact therewith.

4,790,314

## ORIFICE DILATOR

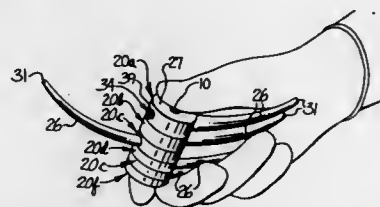
Kenneth Weaver, 311 Princeton Pl., Princeton Rd., Johnson City, Tenn. 37601

Filed Mar. 16, 1988, Ser. No. 168,683

Int. Cl. A61M 29/00

U.S. Cl. 128—341

9 Claims



7. A surgical instrument adapted to probe body orifices of different sizes, and comprising
  - a post defining a central axis,
  - a plurality of separate probe members mounted in a side-by-side arrangement axially along said post and for independent rotation about said axis, with each of said probe members comprising a mounting portion having a transverse opening receiving said post, and an elongate cylindrical dilator extending radially outwardly from said mounting portion and tapering to a blunt point, wherein said elongate dilators are each arcuately curved along its length when viewed in a direction perpendicular to the axis of said post, with the length of the dilators and the extent of the curvature being substantially uniform among the dilators, and with each dilator having a size different from that of the other dilators of said instrument, each of said mounting portions of said probe members being of a disc-like configuration and including opposite parallel end faces which lie in planes which are perpendicular to said axis of said post, and with the thickness of each of said mounting portions between said parallel end faces being at least as great as the maximum diameter of said dilator so that each of said probe members may be freely and independently rotated about said axis of said post without interference with other probe members, and

means for maintaining the axial positioning of said probe members on said post,

whereby a probe member having a dilator of a desired size may be selected and rotated to a position where such dilator is separated from the other dilators, to thereby permit the selected dilator to be individually used in probing a body orifice.

4,790,315

## PERFUSION DILATION CATHETER AND METHOD OF MANUFACTURE

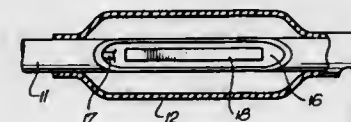
Richard L. Mueller, Jr., Mountain View, and Andrew L. Lerohl, San Jose, both of Calif., assignors to Advanced Cardiovascular Systems, Inc., Mountain View, Calif.

Filed Sep. 2, 1986, Ser. No. 903,028

Int. Cl. A61M 25/00

U.S. Cl. 128—344

11 Claims



1. A dilation catheter for use in angioplasty comprising an elongated flexible shaft having proximal and distal ends, an inflatable balloon concentrically mounted on the shaft near the distal end thereof, a first lumen extending within the shaft between the proximal end of the shaft and the balloon for inflating and deflating the balloon, a cylindrical segment-shaped cut-away in the flexible shaft extending along essentially the entire interior of the balloon which exposes the first lumen to the interior of the balloon and which provides an elongated surface onto which portion of the deflated balloon can be folded to thereby provide for a lower profile, a second lumen extending within the shaft between the proximal and distal ends thereof, and openings in the side wall of the shaft communicating with the second lumen on the proximal and distal sides of the balloon for carrying blood around the balloon when the balloon is inflated within a patient's artery.

4,790,316

## SURGICAL INSTRUMENT FOR REMOVING OBJECTS FROM THE SKIN

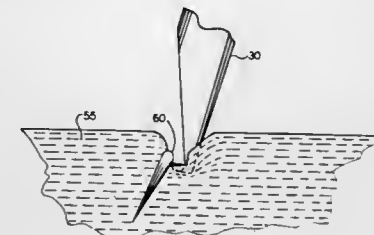
Raymond Bogdan, 520 Burr Oak, Lake Zurich, Ill. 60047

Filed May 13, 1987, Ser. No. 49,325

Int. Cl. A61B 17/50

U.S. Cl. 128—355

3 Claims



1. An improved surgical tool for removing objects imbedded in skin or the like comprising:
  - a handle portion;
  - an elongated shaft portion having an operative end portion thereof formed to project substantially transverse thereto and forming a heel portion at the transition thereof, wherein said elongated shaft portion exhibits edges along opposing sides thereof proximate said heel portion ar-

ranged to slice the skin proximate contact with said heel portion during insertion of the tool; and

a pointed tip portion generally in the form of a truncation of the operative end portion to provide a point angled toward said handle portion.

4,790,317

## APPARATUS FOR RECOGNITION AND TERMINATION OF VENTRICULAR TACHYCARDIA AND VENTRICULAR FIBRILLATION

David W. Davies, St. Bartholomew's Hospital, London EC1, England

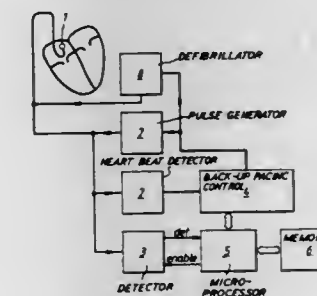
Filed Oct. 27, 1986, Ser. No. 923,408

Claims priority, application United Kingdom, Oct. 25, 1985, 8526417

Int. Cl. A61N 1/00

U.S. Cl. 128—419 D

18 Claims



1. A system for automatic recognition of either ventricular tachycardia or ventricular fibrillation of a heart, comprising:
  - at least a first sensor connected to a left ventricle at a cardinal surface thereof and at least a second sensor attached to a right ventricle at a cardinal surface thereof;
  - first means for detecting first and second respective pulse sequences derived from signals from the first and second sensors and determining whether activation sequence and time duration between detection of onset of depolarization for the two pulse sequences compared to each other indicate acceptable sinus rhythm;
  - second means for treating ventricular fibrillation;
  - third means for treating ventricular tachycardia; and
  - fourth means connected to the first means for identifying and distinguishing between ventricular fibrillation and ventricular tachycardia by detection of a lack of synchrony of the activation sequence, and for activating the third means to treat ventricular fibrillation when such treatment is identified and for activating said fourth means when ventricular tachycardia is identified.

4,790,318

## CARDIAC PACER FOR PACING A HUMAN HEART

Hakan Elmqvist; Anders Lekholm, both of Bromma; Sven-Erik Hedberg, Mungsgöden, and David C. Amundson, Bromma, all of Sweden, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 16, 1986, Ser. No. 874,597

Int. Cl. A61N 1/36

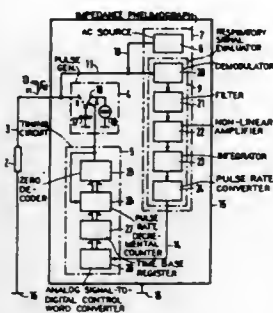
U.S. Cl. 128—419 PG

18 Claims

1. A cardiac pacer for pacing a human heart in a patient comprising
  - (a) means for generating pacing pulses at a predetermined pacing rate;
  - (b) means for generating an alternating signal having an amplitude less than that necessary to pace the heart;
  - (c) means connected to said means for generating pacing pulses and to said means for generating an alternating signal for transmitting the pacing pulses together with the alternating signal directly to the heart along a common



transmission path wherein said alternating signal is modified at least in part by the respiratory activity of said patient, and for receiving said modified alternating signal from said heart,



- (d) means connected to said means for transmitting and receiving for processing the alternating signal after transmittal to the heart for obtaining a respiratory signal therefrom; and
- (e) means for varying the predetermined pacing rate dependent on the respiratory signal.

4,790,319

## STIMULATOR FOR HEMODIALYSIS

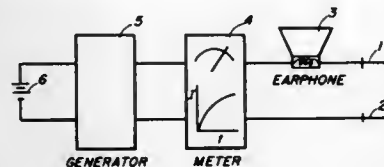
Petr Slovak, Prague, Czechoslovakia, assignor to Ceske vysoke uceni technicke v Praze, Prague, Czechoslovakia  
Continuation of Ser. No. 549,487, Nov. 4, 1983, abandoned, which is a continuation-in-part of Ser. No. 343,696, Jan. 28, 1982, abandoned. This application Feb. 28, 1986, Ser. No. 834,917

Claims priority, application Czechoslovakia, Jan. 28, 1981, 624-81

Int. Cl.<sup>4</sup> A61N 1/36

U.S. Cl. 128-419 R

4 Claims



1. An electrical stimulator for a patient undergoing hemodialysis, comprising two electrodes to be applied to the body of the patient, and a circuit for energizing said electrodes, said circuit comprising a generator of an electric signal composed of electrical pulses in the range of 250 Hz to 5 KHz, a direct current source for energizing the generator, and output circuit means connected to the generator and to the electrodes, comprising an earphone for audibly indicating fluctuations in the current flowing in the output circuit means and means for indicating the average value of the current flowing in the output circuit means and means for measuring the time derivative

$$(dI_{av})/(dt).$$

4,790,320  
PARALLEL ULTRASONIC INFORMATION PROCESSING

Herbert Perten, Pomona, N.Y., and Ralph Scallion, Durham, N.C., assignors to Johnson & Johnson Ultrasound Inc., New Brunswick, N.J.

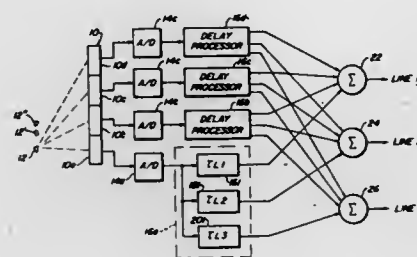
Filed Mar. 15, 1984, Ser. No. 589,973

Claims priority, application United Kingdom, Mar. 18, 1983, 8307654

Int. Cl.<sup>4</sup> A61B 10/00

U.S. Cl. 128-661.01

6 Claims



1. In an ultrasonic diagnostic imaging system which transmits ultrasonic energy into the tissue of a patient and receives ultrasonic echoes reflected by the patient in response to such transmissions, apparatus for processing simultaneously more than one vector of echo information for each transmission, which comprises:

an array of transducer elements for detecting time dependent ultrasonic echo information and converting such echo information into electrical signals;

a plurality of delay means, for delaying said received electrical signals to produce a plurality of time independent delayed signals, each of said delay means including:

(i) one main delay means, having an input coupled to receive electrical signals from a given one of said transducer elements and an output, for delaying received electrical signals by a preselected main time period; and

(ii) at least one incremental delay means having an input coupled to the output of said main delay means and a plurality of delay means outputs, for additionally delaying said signals delayed by said main delay by some incremental time period, generally relatively small compared to the corresponding main time period, such that each of said delay means outputs produces time independent delayed signals; and

at least two processing means, each coupled to receive time independent delayed signals from an output of each of said delay means so that each of said processing means produces from said time independent delayed signals a composite representing one unique vector of time synchronized echo information for each transmission.

4,790,321

## METHOD OF DISPLAYING STREAM LINES OF AN INHOMOGENEOUS FLOWING MEDIUM AND A DEVICE THEREFOR

Hirohide Miwa, Kawasaki; Takaki Shimura, Machida; Tadahiko Yanashima, Fujisawa, and Shinichi Amemiya, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Nov. 14, 1986, Ser. No. 930,413

Claims priority, application Japan, Nov. 14, 1985, 60-255401

Int. Cl.<sup>4</sup> A61B 10/00

U.S. Cl. 128-660.07

14 Claims

1. A method for displaying in real time a stream line of an inhomogeneous flowing medium by tracing motion of speckles appearing in tomograms taken sequentially and separated by a predetermined time interval, said method comprising the steps of:

(a) scanning an object in which said inhomogeneous flowing

medium is situated by sending out pulses of an ultrasonic wave beam to scan the object plural times within a predetermined time interval;

(b) forming images of the speckles by combining a first echo of one of said speckles with a second echo of said



one of said speckles taken after said first echo but within said time interval; and

(c) obtaining graphic images of a trajectory of said speckles by producing and displaying an image corresponding to a difference between the two echoes of the same speckle.

4,790,322

## ULTRASONIC TYPE BLOOD FLOW AMOUNT MEASURING APPARATUS

Kazuhiro Hinuma, Tochigi, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

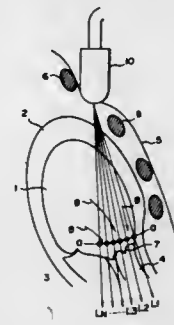
Filed Jul. 23, 1986, Ser. No. 888,510

Claims priority, application Japan, Jul. 24, 1985, 60-164565

Int. Cl.<sup>4</sup> A61B 10/00

U.S. Cl. 128-661.10

9 Claims



1. An ultrasonic blood flow amount measuring apparatus comprising:

ultrasonic transducer means for steering a plurality of ultrasonic beams through a region of interest of a subject which has at least one portion through which blood flows converting echoes from said region of interest into echo signals;

Doppler signal detecting means for detecting respective Doppler signals from said echo signals delivered from said ultrasonic transducer means, which correspond to the ultrasonic beams; and

calculation means coupled to said Doppler signal detecting means, for calculating an amount of blood flowing through the region of interest on the basis of the Doppler signals obtained along at least one line orthogonal with the ultrasonic beams.

4,790,323

## FLOW IMAGING DETECTOR

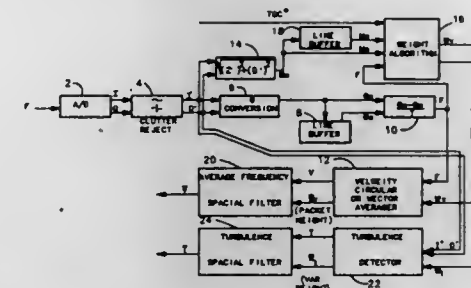
Steven C. Leavitt, Hampstead, N.H.; David Lipschutz, Lexington, Mass.; Stephen E. Lincoln, Buxford, Mass.; Karl Thiele, Methuen, Mass., and Paul A. Magna, Andover, Mass., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 3, 1986, Ser. No. 926,078

Int. Cl.<sup>4</sup> A61B 10/00

U.S. Cl. 128-661.09

9 Claims



1. In apparatus for deriving signals representing the velocity and signals representing the turbulence of fluid flow at different ranges along a line in response to quadrature components of reflections from said ranges of a plurality of bursts of ultrasonic carrier waves transmitted along the line wherein the quadrature components are displaced from each other by 90° of the carrier wave, the combination of

input circuits to which said quadrature components are to be respectively applied,

means coupled to said input circuits for deriving first signals respectively indicating the angles represented by the quadrature components,

means coupled to said latter means for deriving second signals respectively representing the differences between the angles indicated by said first signals for successive bursts at each range,

means for deriving at least one weighting factor for each of said second signals,

means for deriving third signals respectively representing the average velocity of fluid flow at each range from the second signals for the range and corresponding weighting factors, and

means for deriving fourth signals respectively representing the turbulence of fluid flow at each range from the second signals for the range and corresponding weighting factors.

4,790,324

## METHOD AND APPARATUS FOR MEASURING INTERNAL BODY TEMPERATURE UTILIZING INFRARED EMISSIONS

Gary J. O'Hara, Escondido, and David B. Phillips, San Diego, both of Calif., assignors to Intelligent Medical Systems, Inc., Carlsbad, Calif.

Continuation of Ser. No. 869,578, Jun. 2, 1986, abandoned, which is a continuation of Ser. No. 663,769, Oct. 23, 1984, Pat. No. 4,602,642. This application Mar. 25, 1987, Ser. No. 31,164

The portion of the term of this patent subsequent to Jul. 29, 2003, has been disclaimed.

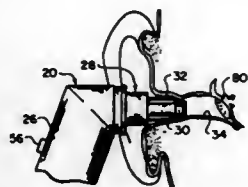
Int. Cl.<sup>4</sup> A61B 5/00

U.S. Cl. 128-664

13 Claims

7. In combination, an infrared sensor; a housing supporting and thermally connected to the infrared sensor, the housing including a metal body having a recess in which the infrared sensor is received; means mounted in the metal body for heating the metal body upon application of first electrical signals thereto; a hollow probe dimensioned and configured for insertion into the external ear canal and being made of a non-metal-

lic material for minimizing conductive heat transfer when in contact with the skin of the ear canal;  
a waveguide thermally coupled to the housing for directing infrared emissions to the sensor, the waveguide being dimensioned to extend within the probe; and



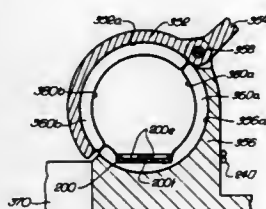
means for supporting the waveguide within the probe and spaced therefrom for directing infrared radiation from the ear canal to the infrared sensor.

#### 4,790,325 AUTOMATIC ARTERIAL BLOOD PRESSURE RECORDER

Arnold S. Lee, 2008 Cotner Ave., Los Angeles, Calif. 90025  
Division of Ser. No. 801,248, Nov. 25, 1985. This application Jul.  
16, 1987, Ser. No. 74,363  
Int. Cl.<sup>4</sup> A61B 5/02

U.S. Cl. 128—677

15 Claims



1. A device for facilitating the measurement of blood pressure in the brachial artery of an arm of a test subject, said system including:

a transducer of the type for estimating blood pressure, the transducer having an active surface, a rim connected to the transducer and substantially surrounding the active surface, and means for supplying a coupling fluid to the partially enclosed space defined by the rim and active surface; and

means for supporting the transducer in a substantially horizontal position such that when the rim is in intimate contact with the arm, and the active surface is in close proximity to the skin adjacent to the brachial artery, a liquid located in the partially enclosed space remains in said partially enclosed space;  
wherein the liquid couples the active surface of the transducer to the skin adjacent to the brachial artery and wherein said liquid is in operable contact with both the active surface of the transducer and the arm of the test subject.

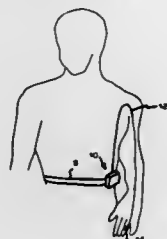
#### 4,790,326 METHOD AND APPARATUS FOR DETERMINING PULSE RATE

Bruce C. Mather; William C. Fox; Harry H. Peel, and Dennis J. Wenzel, all of San Antonio, Tex., assignors to Nippon Colin Co., Ltd., Komaki, Japan

Filed Apr. 1, 1987, Ser. No. 33,407  
Int. Cl.<sup>4</sup> A61B 5/02

U.S. Cl. 128—689

7 Claims



1. A method for determining the pulse rate of a person, comprising the steps of:  
obtaining a set of data corresponding to pulsatile variations in a blood vessel of said person;  
processing said data to obtain a pulse distribution profile of said pulse rates, said step of processing said data comprising the steps of forming an array of time position indices corresponding to the said data points and calculating pulse rates for each of said time position indices;  
locating the region of maximum density in said pulse distribution profile; and  
determining said person's pulse rate from said region of maximum density in said pulse distribution profile.

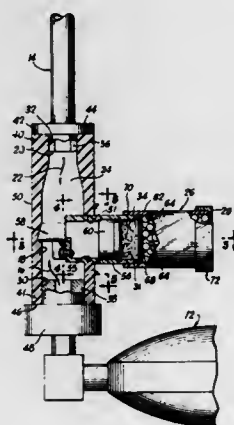
#### 4,790,327 ENDOTRACHEAL INTUBATION DEVICE

George Despotis, 5320 N. Sheridan Rd., Apt. 806, Chicago, Ill. 60640

Filed Jul. 27, 1987, Ser. No. 78,256  
Int. Cl.<sup>4</sup> A61M 16/00

U.S. Cl. 128—719

42 Claims



1. A portable endotracheal intubation device for verifying the correct placement of an endotracheal tube in the trachea of a patient comprising:

an endotracheal tube having a proximal end adapted to extend from the breathing passageway of a patient and a distal end adapted to extend into the trachea of a patient;  
means for supplying air to said endotracheal tube;  
means including a patient port, air supply port and an exhalation port, adapted to be connected to said air supply means and said endotracheal tube for providing an air inhalation passageway between the patient port and said air supply

port and for providing an air exhalation passage way between said patient port and said exhalation port, wherein said exhalation port is in communication with the atmosphere and is isolated from said air supply port during exhalation; and  
means serially coupled between said exhalation port and said atmosphere for providing a visual indication of the placement of the endotracheal tube in the trachea of the patient comprising a visual indicating material which changes color in the presence of carbon dioxide.

#### 4,790,328 DEVICE FOR DIAGNOSIS AND TREATMENT OF URINARY INCONTINENCE

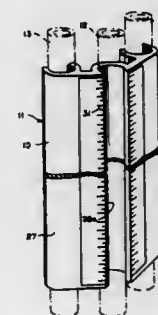
David E. Young, Bowlers Piece, 16 Couching Street, Watlington, Oxon, England OX9 5QQ

Filed Sep. 16, 1987, Ser. No. 97,636  
Claims priority, application United Kingdom, Sep. 24, 1986, 8623020

U.S. Cl. 128—748

Int. Cl.<sup>4</sup> A61B 10/00

6 Claims



1. A cystometric device for diagnosing and treating urinary incontinence, comprising a straight, vertically-elongated body of substantially uniform cross section throughout its length having a front face and a rear face; a vertical front channel extending along the length of said front face and a pair of vertical rear channels extending along the length of said rear face; at least said front channel being of C-shaped horizontal cross-sectional outline and having a forwardly-directed longitudinal opening of a width smaller than the maximum cross-sectional dimension of such channel; said body being opaque and concealing said rear channels from the view of a user facing the longitudinal opening of said front channel.

#### 4,790,329 ADJUSTABLE BIOPSY LOCALIZATION DEVICE

Morris Simon, Boston, Mass., assignor to Trustees of Beth Israel Hospital, Boston, Mass.

Filed Jun. 12, 1987, Ser. No. 62,443  
Int. Cl.<sup>4</sup> A61B 10/00

U.S. Cl. 128—749

7 Claims

1. An adjustable biopsy localization device comprising:  
a single cannula having a substantially tubular wall and an internal lumen;  
an open slot in said tubular wall;  
a pointed rod inserted into said lumen of said cannula, said rod being advanceable, retractable and rotatable within said lumen; and  
an extendable and retractable appendage means disposed on said rod, said appendage means being rotatably alignable

with said slot and being extendable for anchoring said device at a target biopsy site in a subject's body and being



retractable through said slot in said tubular wall for enabling removal and possible relocation of said device.

#### 4,790,330 BLOOD WITHDRAWAL DEVICE WITH SAFETY VALVE AND CYLINDRICAL CONTAINER

Eckhard Schwöbel, Lucerne, and Hubert Bäumle, Escholzmat, both of Switzerland, assignors to Intermedicat GmbH, Emmenbrücke, Switzerland

Filed Nov. 12, 1986, Ser. No. 930,349  
Claims priority, application European Pat. Off., Nov. 30, 1985, 85115241

U.S. Cl. 128—764

Int. Cl.<sup>4</sup> A61R 5/00

8 Claims



1. A blood withdrawal device comprising:  
a syringe body having a front end and a rear end, a hollow cannula holder extending forwardly from the front end, a closure block fixedly mounted in the syringe body at the front end thereof, the closure block defining an interior cavity therein, a closing piece mounted in the interior cavity of the closure block and movable therein between a first open position and a second closed position, a hollow tube member having front and rear ends, the front end of the tube member being fixedly mounted in the closing piece and movable therewith between the first and second positions, the first open position of the closing piece permitting the flow of blood from the cannula holder to the interior cavity of the closure block to the closing piece and interior of the hollow tube member, the second closed position preventing flow of blood from the cannula holder through the closing piece; and  
a collecting container comprising a hollow cylinder having a front end and a rear end, the collecting container capable of being slidably received within the syringe body, the collecting container comprising a seal at its front end through which the tube member may pass in a sealing arrangement, a piston movable within the hollow cylinder and in sealing engagement therewith, and an opening at



the rear end of the collecting container which is sealed by the abutment of the piston thereagainst, wherein insertion of the collecting container into the syringe body moves the tube member and the closing piece into the first open position, further insertion causes the piston to move from the front end of the collecting container to the rear end thereof thus creating a negative pressure differential permitting blood to flow from the cannula holder to the collecting container, and, upon withdrawal of the collecting container, the closing piece is moved into the second closed position to prevent flow of blood from the cannula holder to the tube member.

4,790,331

# METHOD FOR PLACEMENT OF CATHETER IN A BLOOD VESSEL

Yosuke Okada, and Munehito Kurimoto, both of Shizuoka, Japan, assignors to Sherwood Medical Company, St. Louis, Mo.

Filed Dec. 2, 1986, Ser. No. 936,854

Int. Cl.<sup>4</sup> A61M 25/00

U.S. Cl. 128—772

3 Claims



1. A method for blood vessel catheterization using a catheter with a guide wire slidably inserted through a lumen through the catheter, comprising the steps of:

extending a J-shaped distal portion of the guide wire out of an open distal end of the catheter by sliding the guide wire within the catheter lumen to an extended position wherein the J-shaped distal portion of the guide wire is outside, and past the distal end of, the catheter and a comparably straight intermediate portion of the guide wire proximally adjoining the J-shaped distal portion is positioned within distal end portion of the catheter, and

advancing the catheter and guide wire, with the guide wire in the extended position, within and along a first blood vessel until the distal end of the catheter is opposite a juncture of the first blood vessel with a second blood vessel; then

retracting substantially all of the J-shaped distal portion of the guide wire within the catheter by sliding the guide wire within the catheter lumen to a retracted position wherein the J-shaped distal portion of the guide wire is within the distal end portion of the catheter.

rotating the guide wire, with the guide wire in the retracted position, until the distal end of the catheter is oriented toward the juncture of the second blood vessel, and advancing the distal end of the catheter, with the guide wire in the retracted position, into the second blood vessel.

4,790,332

# SMOKE ELIMINATOR FOR CIGARETTE SMOKERS

Fred E. Wallace, 3508 California Blvd., Kissimmee, Fla. 32741

Filed Aug. 27, 1985, Ser. No. 769,679

Int. Cl.<sup>4</sup> A24F 13/06, 13/08, 13/22, 19/00

U.S. Cl. 131—175

7 Claims

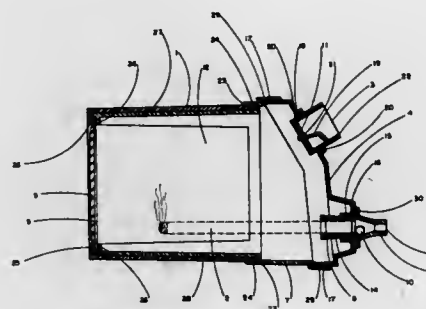
2. A hand-held smoking device comprising:

a body having three flat surfaces, one a vertical surface and the other two surfaces extending perpendicularly on the

same side from the top and bottom of said vertical surfaces, and having recesses around its perimeter for mating with a cover and filter retainer; and

a cover attached to the body on the opposite side of the two perpendicularly extending surfaces, having a tapered rib on its perimeter which mates with a recess in the body to form a seal, having two openings, a bottom opening on a vertical portion of the cover for insertion of a mouthpiece for inhaling a cigarette and a top opening on an inwardly slanting portion of the cover for holding a mouthpiece for exhaling smoke from a cigarette; and

a removable mouthpiece for inhalation which is press-fitted into the bottom hole of the cover, the outer end of said mouthpiece tapered as it extends outward from said cover to a small diameter for insertion in a smoker's mouth, said mouthpiece further having a cigarette holder press-fitted or attached to the inner end of said mouthpiece, said cigarette holder having a tapered end and inner diameter to accommodate cigarettes of varying sizes, said mouthpiece and cigarette holder having a small ball or bearing trapped inside to allow smoke to pass freely through the mouthpiece during inhalation yet seal the mouthpiece during exhalation; and



a mouthpiece for exhalation which is press-fitted into the top opening on the inwardly slanted top portion of the cover, having an inner end which press fits into the top opening in the cover, and having a finger molded to the inside thereof which extends inward to the inner end of said mouthpiece where the finger snaps into a hole in the center of a disc to form a low-pressure one-way valve, said disc having a tapered circumference which mates with an inwardly tapered circumference of the inner end of said mouthpiece; and

a filter retainer having two flat surfaces which slide over the two perpendicular flat surfaces of the body and have a standing rib around the perimeter that mates into a recess in the body to create a seal therebetween, and which has inwardly extending ribs from the ends of the two flat surfaces for holding two disposable filters, said filters extending between the two flat surfaces of the filter retainer and an inner filter made of HEPA or like material to remove particulates from smoke and an outer filter made of polyurethane foam or like material which is impregnated with charcoal to remove any remaining odor from the air as it passes through the filters into the ambient atmosphere.

4,790,333

# APPARATUS FOR FEEDING CIGARETTES OR THE LIKE TO A PACKAGING MACHINE

Heinz Focke, Verden, Fed. Rep. of Germany, and Henk G. Onderwaater, Holland, Netherlands, assignors to Focke & Co., Verden, Fed. Rep. of Germany

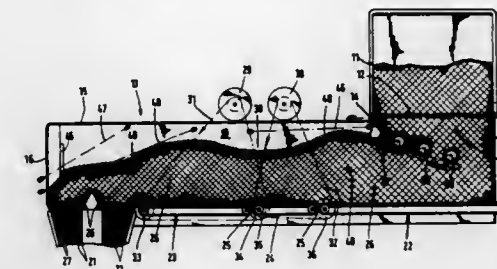
Filed Aug. 1, 1983, Ser. No. 519,480

Claims priority, application Fed. Rep. of Germany, Aug. 4, 1982, 3229092; Feb. 8, 1983, 3304131

Int. Cl.<sup>4</sup> A24C 5/35

U.S. Cl. 131—283

31 Claims



12. In an apparatus for transporting cigarettes or the like to a packaging machine comprising:

an intermediate container containing including laterally opposed sidewalls, longitudinally opposed end walls, said intermediate container being upwardly open at one end such that cigarettes fall by gravity from an upturned cigarette container when emptied into the opening within the top of said intermediate container at that end such that said cigarettes fall under gravity to form a continuous cigarette stream consisting of cigarettes which are oriented parallel to one another and transversely to the longitudinal axis of said intermediate container and to the direction of transport,

and said intermediate container further comprises at least one conveyor forming the bottom of said intermediate container, and underlying the continuous cigarette stream and moving parallel to the intermediate container sidewall such that the direction of transport of the cigarettes is away from the end of the intermediate container bearing the opening at the top thereof, the improvement comprising a first conveyor located beneath the opening within the top of the intermediate container and underneath the cigarette receptacle, means for stopping said first conveyor during interruption of cigarette supply and a change of cigarette receptacles, and wherein said at least one conveyor comprises several separately controllable conveyors adjoining one another, and downstream of said first conveyor in the direction of a packing machine at the opposite end of said intermediate container from said opening for receiving cigarettes from overturned cigarette containers positioned thereof.

4,790,334

# PORTABLE CURING FRAME

George B. Day, V; Larry G. Wells; Timothy D. Smith, and Ira J. Ross, all of Lexington, Ky., assignors to The University of Kentucky Research Foundation, Lexington, Ky.

Filed Feb. 2, 1987, Ser. No. 9,949

Int. Cl.<sup>4</sup> A24B 1/08

U.S. Cl. 131—290

13 Claims

1. A portable curing frame for receiving and holding tobacco plants or the like having stalks, comprising:

a frame member including a substantially continuous and elongated slotted track in the longitudinal direction for



receiving in free sliding engagement a portion of the plant stalks.

4,790,335

# TOBACCO CURER

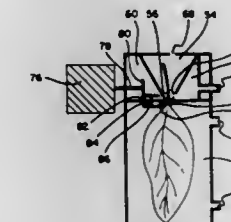
James A. Marley, 2448 Owen Dr., Fayetteville, N.C. 28306, and Eugene W. Blount, 244 Wallstone Rd., Fayetteville, N.C. 28301

Filed May 15, 1987, Ser. No. 49,932

Int. Cl.<sup>4</sup> A24B 3/10, 3/18

U.S. Cl. 131—304

10 Claims



1. An apparatus for curing tobacco comprising:

(a) a dual chamber duct system for isolating the leaf and stem of the tobacco including an elongated stem chamber for containing the stem of the tobacco, an elongated leaf chamber adjacent to but separated from the stem chamber for containing the leaf of the tobacco, and an elongated slot-like opening communicating between said stem chamber and said leaf chamber through which the stem of the tobacco extends;

(b) means for conveying said tobacco lengthwise through said duct system, with the leaf of the tobacco taking up a substantial portion of the cross-sectional area of said leaf chamber and the stem of the tobacco projecting through said slot-like opening into said stem chamber; and

(c) an air circulating means for heating and circulating air through said stem chamber and said leaf chamber while said tobacco is conveyed through said duct system said air circulating means including means for independently controlling the temperature of the air within the leaf and stem chambers respectively.

4,790,336

# DENTAL FLOSS APPLICATOR

Ming-Chuan Kuo, 19350 Christina Ct., Cerritos, Calif. 90701

Filed Jul. 23, 1987, Ser. No. 76,770

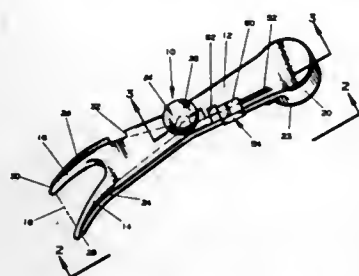
Int. Cl.<sup>4</sup> A61C 15/00

U.S. Cl. 132—325

25 Claims

1. A dental floss applicator comprising:

a fork having a pair of elongated legs projecting from an elongated handle;  
 container means on the handle for storing a supply of dental floss;  
 dispensing means on the handle for withdrawing a continuous string of dental floss from the container means under tension and passing the dental floss from the container means across the distance between the end portions of the legs of the fork so the dental floss can be continuously fed from the container means across said distance and held thereacross under tension for use in teeth cleaning;



in which the dispensing means includes a rotatable reel around which the dental floss is wound so that rotation of the reel withdraws the floss from the container means and passes it along the length of one leg and across said distance between the legs; and  
 means on the handle adjustably movable into contact with the continuous string of floss between the reel and the supply means to apply a controlled amount of tension to the floss prior to its being wound on the reel.

#### 4,790,337 APPARATUS FOR REMOVING PCB'S FROM ELECTRICAL APPARATUS

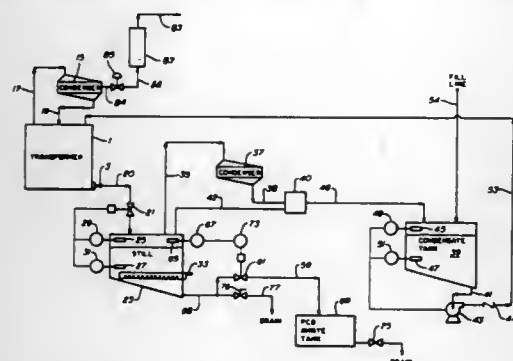
David E. Fowler, Gainesville, Fla., assignor to Quadrex HPS Inc., Gainesville, Fla.

Continuation of Ser. No. 884,787, Jul. 11, 1986, abandoned, which is a division of Ser. No. 613,909, Jul. 18, 1984, Pat. No. 4,685,972. This application Oct. 9, 1987, Ser. No. 107,916

Int. Cl.<sup>4</sup> B08B 3/10

U.S. Cl. 134—109

42 Claims



1. An apparatus for removing contaminants such as polychlorinated biphenyls from transformers and from a dielectric fluid/solvent contained therein comprising:

- (a) a charge of a dielectric fluid/solvent in liquid state sufficient to substantially fill the transformer to an operable level, the polychlorinated biphenyls being soluble in said dielectric fluid/solvent, said dielectric fluid/solvent selected from the group consisting of:  
 a. trichlorotrifluoroethane;  
 b. perchloroethylene;

- c. perfluorocyclic ether;  
 d. perfluorobicyclo-(2.2.1)heptane;  
 e. perfluorotriethyl amine;  
 f. monochloropentadecafluoroheptane;  
 g. perfluorodibutyl ether;  
 h. perfluoro-heptane;  
 i. mixtures of trichlorotrifluoroethane and perchloroethylene;  
 (b) a distillation means receiving said dielectric fluid/solvent having polychlorinated biphenyls dissolved therein;  
 (c) means for maintaining the transformer substantially filled to its operational level with said dielectric fluid/solvent in liquid state.

#### 4,790,338 COMBINED GOLFING UMBRELLA AND GOLF BALL RETRIEVER STRUCTURE

Thomas J. Strobl, 1011 Whittier Rd., Grosse Pointe Park, Mich. 48230

Filed Mar. 28, 1985, Ser. No. 717,143,  
 Int. Cl.<sup>4</sup> A45B 3/00

U.S. Cl. 135—16

18 Claims



1. Golfing accessory structure comprising a combined golfing umbrella and golf ball retriever including an outer hollow shaft section, an umbrella screen frame secured to the outer shaft section at one end thereof, an umbrella screen secured to the umbrella screen frame for sheltering a golfer from rain, a handle at the other end of the outer shaft section, telescoping inner shaft sections including means constructed and arranged to telescope into and out of the outer shaft section from the one end thereof and golf ball engaging structure secured to one end of the smallest diameter telescoping inner shaft section specifically constructed and arranged to facilitate picking up golf balls from a distance outside the usual reach of a golfer by a golfer.

#### 4,790,339 MULTI-PURPOSE STICK

Devane D. Bennett, 120B Enoch Ave., Fayetteville, N.C. 28301

Filed Sep. 16, 1987, Ser. No. 97,052

Int. Cl.<sup>4</sup> A45B 7/00, 9/00

U.S. Cl. 135—65

7 Claims

1. A multi-purpose stick comprising: a first end; a first elongated portion extending from said end to a first bend; a first hook portion connected to the end of said bend opposite said first elongated portion; a second elongated portion connected to the end of said first hook portion opposite said bend, the longitudinal axis of said second elongated portion being angu-

larly disposed from the longitudinal axis of said first elongated portion; and a second hook portion connected to the end of said second elongated portion opposite its connection to said first hook portion and terminating at a second end and wherein said first bend, first hook portion, second elongated portion,



and second hook portion form a generally elongated coiled section that defines an appendage containing space for receiving, enclosing, and supporting an appendage such that a user may move and position the enclosed appendage by moving the first end of the stick.

#### 4,790,340 CANOPY FOR A CHILD'S PLAYPEN

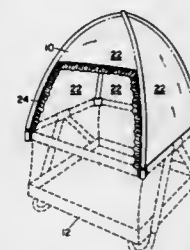
Diane P. Mahoney, 28 Lowell St., Pepperell, Mass. 01463

Filed Feb. 8, 1988, Ser. No. 152,986

Int. Cl.<sup>4</sup> E04H 15/04

U.S. Cl. 135—90

3 Claims



1. A portable and collapsible canopy for use in combination with a conventional child's playpen, the combination comprising:

- a pair of flexible rods;  
 a dome shaped canopy constructed of a fabric type material, said material having two integral elongated pockets intersecting at approximately 90 degrees at the midpoint of said canopy, one of said flexible rods being contained within one of said pockets, the other of said rods being contained in the other of said pockets, said rods being pivotally affixed to one another at said midpoint, whereby the canopy and rods are assembled as a collapsible unit;

four connectors configured for mounting on the rails of said playpen at the corners thereof, each of said connectors having means for vertically attaching an end of one said rods thereto, whereby said rods each flex into an arch and a dome shaped structure results, each of said connectors comprising a spring clip having a c-shaped cross section dimensioned for frictional engagement with a rail of a playpen when inserted thereon, said spring clip having a vertically oriented aperture on the top thereof for receiving the end of a rod, said spring clip having its opening oriented downward at an angle to provide a vector of resistance to removal in both the horizontal and vertical planes;

and locking means between said material and said connector for vertically locking said material to said connector, said locking means comprising a downward extending projection on each of said connectors, and an elastic loop se-

cured to said material adjacent a respective connector, said loop being engagable with said projection to lock said canopy to said connector.

#### 4,790,341 HYDRANT AND COMPONENTS THEREOF

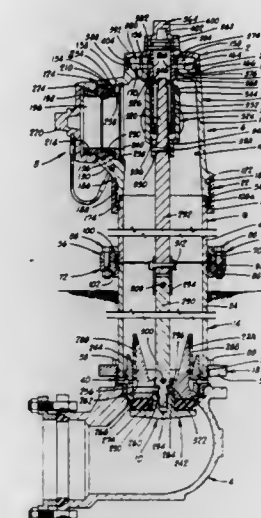
David F. Laurel, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jan. 22, 1988, Ser. No. 146,884

Int. Cl.<sup>4</sup> E03B 9/04

U.S. Cl. 137—15

2 Claims



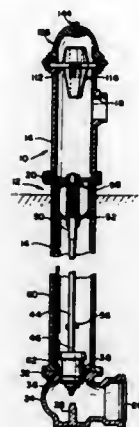
1. A method of coupling a first standpipe section of a hydrant to a second standpipe section of the hydrant for enclosing a valve stem, a valve, and an operating sleeve and an operating nut of an operating assembly, comprising the steps of:

- sliding a retaining sleeve over an end of the second standpipe section, said sleeve including a first inner engagement surface, a second inner engagement surface and an outer surface through which an opening is defined, said opening intersecting said first inner engagement surface;  
 mounting a retainer ring on the second standpipe section so that said retainer ring is located between said second inner engagement surface of said retaining sleeve and the end of the second standpipe section;  
 positioning the first standpipe section in alignment with the second standpipe section with an end of the first standpipe section adjacent the end of the second standpipe section;  
 moving said retaining sleeve relative to the aligned first and second standpipe sections so that said second inner engagement surface is adjacent said retainer ring and so that said first inner engagement surface is radially aligned with an external groove of the first standpipe section;  
 inserting an end of a rod through said opening of said retaining sleeve and retaining said end of said rod in the external groove of the first standpipe section; and  
 rotating said retaining sleeve relative to the first standpipe section and thereby pulling said rod through said opening of said retaining sleeve and bending said rod into the external groove of the first standpipe section so that said rod engages both the external groove of the first standpipe section and said first inner engagement surface of said retaining sleeve, whereby said retainer ring, said rod and said retaining sleeve couple the first standpipe section to the second standpipe section.



**4,790,342**  
**FIRE HYDRANT VALVE ACTUATOR**  
 Milton Segal, Apt. 212E Park Towne Pl. - 22nd & The Parkway,  
 Philadelphia, Pa. 19130  
 Filed Nov. 30, 1987, Ser. No. 126,359  
 Int. Cl.<sup>4</sup> F16K 17/40, 43/00  
 U.S. Cl. 137—68.1

10 Claims



1. In a fire hydrant of the type including a first housing that defines an internal chamber wherein said housing comprises an upper portion and a lower portion which are connected to each other by a member wherein said lower portion is adapted to be installed in the ground and the upper portion and said member are adapted to be above the ground, a closure for the upper end of the upper portion of said housing, a water inlet valve in the lower portion of said housing, and a water inlet valve operating mechanism which includes means for urging said water inlet valve to its closed position and a first operating rod, the improvement comprising,

said means for urging said water inlet valve to its normally closed position being disposed in said lower portion of said housing,

said first operating rod being disposed in the lower portion of said housing, one end of said first operating rod being in engagement with said water inlet valve, the other end of said first operating rod being below the connection of said upper and lower portions of said housing,

means for supporting said first operating rod for axial movement between a first position where it opens said water inlet valve and a second position where said water inlet valve is closed,

the upper portion of said internal housing not containing any part of said valve operating mechanism when said water inlet valve is closed, so that if said upper portion is damaged or broken, there is no damage to said water inlet valve or said valve operating mechanism whereby repair of said hydrant can be made without having to remove or replace said water inlet valve or said valve operating mechanism,

an aperture in said closure,

said aperture being for receiving a means for moving said first operating rod to open said water inlet valve.

**4,790,343**  
**PRESSURE REGULATOR**  
 Masahiro Mochizuki, Chiryu, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan  
 Filed Mar. 30, 1987, Ser. No. 31,266  
 Claims priority, application Japan, Mar. 31, 1986, 61-47254[U]

Int. Cl.<sup>4</sup> F16K 17/38

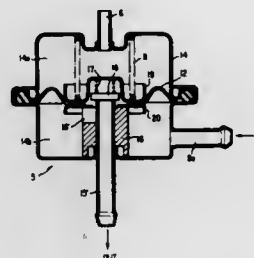
U.S. Cl. 137—80

3 Claims

1. A pressure regulator for regulating a pressure differential

between a fuel pressure and an intake manifold vacuum, said regulator comprising:

a casing member;  
 a diaphragm dividing an interior portion of said casing member into a vacuum chamber connected with an engine intake manifold and a fuel pressure chamber connected with a branch conduit of a fuel supply conduit;  
 a valve member being associated with said diaphragm and controlling fluid communication between said branch conduit and a return conduit connected with a fuel tank; and

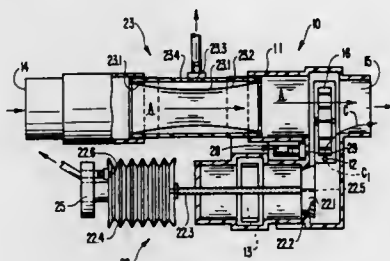


a coiled spring disposed in said vacuum chamber for biasing said diaphragm and constructed of a material having a temperature-actuated shape memory alloy, said coiled spring expanding to a predetermined shape at high temperature so as to increase a biasing force thereof, wherein said diaphragm is clamped between an upper retainer and a lower retainer; said lower retainer is provided with a centrally located aperture and having a disk shape; and wherein a metallic cylindrical member is interposed between said lower retainer and said casing member and is provided with a conduit member connected with said return conduit.

**4,790,344**  
**FLUID FLOW REGULATOR**  
 Daniel J. V. D. Chauvier, and Peter Woodman, both at 57 Miller Road, Nuffield Springs, South Africa  
 Filed Apr. 1, 1987, Ser. No. 32,621  
 Claims priority, application South Africa, Mar. 27, 1986, 86/2317; Apr. 2, 1986, 86/2408; Sep. 17, 1986, 86/7062  
 Int. Cl.<sup>4</sup> F16K 31/12

U.S. Cl. 137—112

18 Claims



1. Fluid flow regulating means comprising:

a first flow passage extending between an inlet thereto and an outlet therefrom;

a second flow passage extending between an inlet thereto and an outlet therefrom;

the outlets being adapted in use to be connected to a single suction source so that suction may be applied through both flow passages for causing fluid flow therethrough; first and second valve assemblies operable to open and close the first and second flow passages, respectively;

at least one of the valve assemblies comprising a body defin-

ing a flow passage therethrough and a fluid pressure operable closure member for opening and closing said flow passage;  
 actuating means adapted to utilize suction pressure and relatively higher ambient pressure to vary pressure acting on the pressure operable closure member to operate the member; and  
 fluid driven means adapted to drive the actuating means to operate the valve assemblies to open and close their respective passages in tandem so that when one passage is open, the other is closed.

**4,790,345**  
**PROPORTIONAL VALVE**  
 Abel E. Kolchinsky, Glenview, Ill., assignor to Parker-Hannifin Corporation, Cleveland, Ohio  
 Continuation of Ser. No. 026,825, Mar. 17, 1987, abandoned.  
 This application Feb. 17, 1988, Ser. No. 157,207  
 Int. Cl.<sup>4</sup> F16K 31/06  
 U.S. Cl. 137—269

15 Claims



10. In a proportional fluid flow control valve having a valve body defining a flow chamber having an inlet and an outlet, a movable valve member in said chamber for adjustably controlling fluid flow through said valve chamber between said inlet and outlet, improved means for adjustably positioning said valve member, comprising:

a solenoid tube having one end sealingly secured to said valve body in communication with said chamber and an opposite end;

a solenoid armature movably disposed within said tube; means responsive to positioning of said armature for correspondingly positioning said valve member;

an annular solenoid coil concentrically surrounding said solenoid tube for controllably positioning said armature; securing means for selectively (a) fixedly retaining said coil at a preselected position longitudinally of said tube, and (b) permitting longitudinal movement of said coil past said opposite end of the solenoid tube for selective installation and removal of said coil relative to said control valve as desired; and

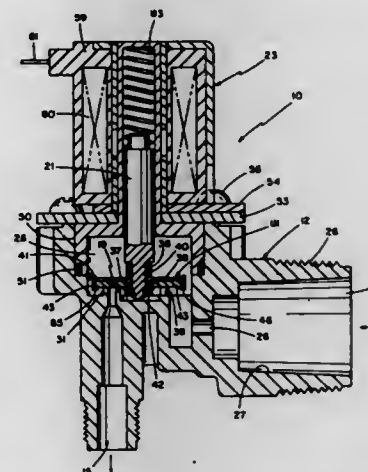
low friction means on said armature for slidably supporting the armature accurately coaxially in said solenoid tube adjacent opposite ends of said armature, said solenoid tube defining an inner surface having a mirror surface slidably engaged by said low friction means.

**4,790,346**  
**FLUID CONTROL VALVE**  
 Lawrence A. Kolze, and Barbara J. Kolze, both of 437 S. Addison St., Bensenville, Ill. 60106  
 Filed Sep. 11, 1987, Ser. No. 95,429  
 Int. Cl.<sup>4</sup> F16K 29/02, 25/00

U.S. Cl. 137—331

15 Claims

8. A fluid flow control valve, comprising: a valve body, an inlet in the valve body, an outlet in the valve body and a valve seat separating the inlet and the outlet, a valve member reciprocal in the valve body movable from an open position spaced from the valve seat to a closed position in engagement with the valve seat blocking fluid flow from the inlet to the outlet, and



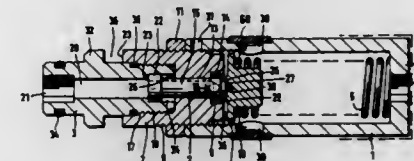
closed position toward its open position, the valve member tends to fulcrum on the edge of the valve seat in the valve body facilitating opening of the valve as the differential pressure acting on the valve member at the valve seat tends to close the valve member and the actuation means tends to open the valve member causing pivoting of the valve member, said inlet being positioned such that inlet pressure tends to close the valve member and also positioned such that it directs inlet flow against the valve member upstream from the valve seat to cause rotation thereof.

**4,790,347**  
**PRESSURE-RELIEF VALVE DEVICES**  
 Walter Weirich, and Werner Grommas, both of Dortmund, Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhütte Westfalen GmbH, Lünen, Fed. Rep. of Germany  
 Filed Nov. 4, 1987, Ser. No. 116,299  
 Claims priority, application Fed. Rep. of Germany, Nov. 6, 1986, 3637888

Int. Cl.<sup>4</sup> F16K 17/04

U.S. Cl. 137—484.2

16 Claims



1. In a valve device for pressure relief of hydraulic pressure fluid used with mining equipment; said device comprising a hollow sleeve providing a main housing;

a guide having an axial bore; screw-threaded connection means between the guide and the housing;

a valve member with a stem having a lower end and a head opposite the lower end, the stem being slidably received in the axial bore of the guide; an axial blind bore in the stem

which is open from the lower end of the stem to form fluid inlet means remote from the housing and radial bores leading to the periphery of the stem which communicate with the axial bore therein;

sealing means between the periphery of the stem and the axial guide bore which cooperates with the radial bores to establish a valve between the fluid inlet means and the interior of the housing;

a spring located in the housing to apply closure force to the head of the stem of the valve member;

a pressure member for transferring the closure force from the spring to the head of the valve member;

and a connector for facilitating mounting the device to said mining equipment, the connector having a through bore serving to transfer pressure fluid to the lower end of the valve member;

the improvement comprising means for detachably connecting the connector to the guide for easy removal from the remainder of the device to permit the valve member to be withdrawn and released from the guide bore, a piston at the lower end of the valve member which locates in a recessed portion of the connector coaxial with the through bore and is confronted with opposed stop faces, delimiting the open and closed positions of the valve, formed by the recessed portion and by the guide, wherein the guide has an internally screw-threaded bore of larger diameter than the guide bore and the connector has an external screw-threaded region engaging within the screw-threaded bore of the guide.

4,790,348

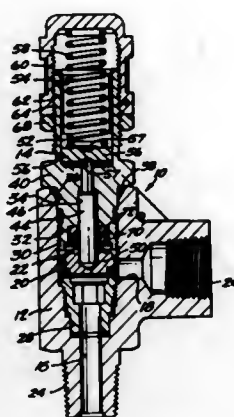
## LOW PRESSURE RELIEF VALVE

Theodore J. Gamman, Willoughby, and Gary W. Scheffel, Streetsboro, both of Ohio, assignors to Nupro Company, Willoughby, Ohio

Filed Aug. 26, 1987, Ser. No. 89,430  
Int. Cl.<sup>4</sup> F16K 17/06

U.S. Cl. 137—516.29

5 Claims



1. A pressure relief valve comprising:
  - a valve body having an inlet port and an enlarged cylindrical bore extending axially into said body in alignment with said inlet port to define an enlarged valve chamber;
  - an outlet port opening laterally from said valve chamber at a location spaced from said inlet port;
  - a seat insert member threadedly received in said enlarged bore and sealed with said body to define an axially facing raised seat closely adjacent the wall of the bore and circumferentially about said inlet port at a location upstream of said outlet port at an elevation substantially corresponding to the elevation of said outlet port;
  - a poppet valve mounted in said chamber, said poppet valve having a truncated conical configuration with a maximum outer diameter only slightly less than the inner diameter of said enlarged bore and a first end face for engaging said

seat and blocking flow from said inlet to said outlet; said maximum outer diameter of said poppet valve being adjacent said first end face and sized to provide guiding movement on the inner diameter of said enlarged bore;

a bonnet threadedly received in said enlarged bore at a location axially spaced from seat insert;

a stem carried in said bonnet to extend into said enlarged valve chamber in axial alignment with said seat insert;

said stem having a cylindrical end portion received in a cylindrical opening formed axially into said poppet member on the end thereof opposite said seat insert, said cylindrical end portion and said cylindrical opening being sized to permit lateral shifting and alignment of said poppet valve member relative to said seat while preventing excessive unwanted tilting of said poppet valve member relative to said bore such that said poppet is guided by the inner diameter of said enlarged bore and the outer diameter of said cylindrical end portion of said stem; and

means for maintaining said stem member and said poppet valve member under a predetermined bias toward said seat.

4,790,349

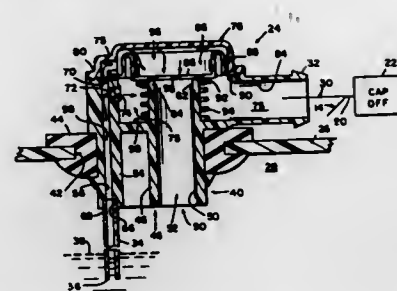
## TANK PRESSURE CONTROL SYSTEM

Robert S. Harris, Connersville, Ind., assignor to Stant Inc., Connersville, Ind.

Filed Apr. 4, 1988, Ser. No. 177,126  
Int. Cl.<sup>4</sup> F16K 24/00

U.S. Cl. 137—587

31 Claims



1. An apparatus for controlling discharge of fuel vapor from a fuel tank having a filler neck during refueling, the apparatus comprising
  - means for conducting fuel vapor between the fuel tank and a distal portion of the filler neck,
  - means for selectively blocking flow of fuel vapor through the conducting means, the blocking means being operable between a flow-blocking position and a flow-delivery position,
  - means for yieldably biasing the blocking means away from its flow-blocking position to a flow-delivery position, and
  - means defining a venting control chamber in communication with the blocking means for using liquid fuel in the fuel tank to develop a pressure head in the venting control chamber having a magnitude in excess of a predetermined threshold level to exert a closing force on the blocking means in opposition to the biasing means so that the blocking means is moved to its flow-blocking position, thereby preventing discharge of pressurized fuel vapor in the tank to the filler neck through the conducting means.

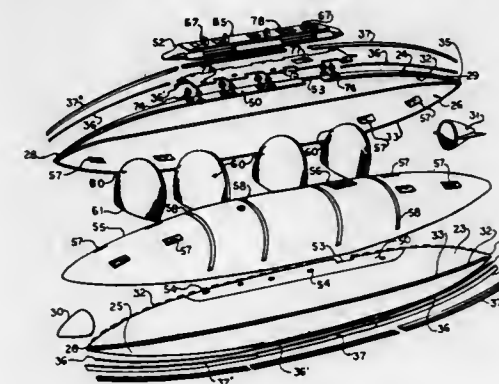
4,790,350

## COMBAT RAPID ASSEMBLY FUEL TANK

Charles M. Arnold, 4544 Thomasville Rd., Tallahassee, Fla. 32308

Continuation-in-part of Ser. No. 826,160, Feb. 4, 1986, abandoned. This application Apr. 17, 1987, Ser. No. 39,164  
Int. Cl.<sup>4</sup> F16K 24/00; B65D 8/00  
U.S. Cl. 137—588

20 Claims



1. An expendable fuel tank for mounting to the pylon of an aircraft comprising, a housing having separate longitudinal sections, each of said sections having forward and aft ends, generally convex outer surfaces and generally concave inner surfaces and opposite edges, said sections being shaped so as to be nestable one within another when disassembled, a generally flexible fuel retaining bladder cooperatively received between said sections of said housing, said bladder having upper and lower portions and being substantially impervious to fluid but having an opening through an upper portion thereof, strongback means, first connector means for connecting said housing to said strongback means, a first opening in said housing which is in alignment with said opening in said bladder, fuel dispensing means disposed within said bladder and mounted within said opening therein, and second connector means for joining said opposite edges of said sections in assembled relationship with respect to one another so that said housing supports said bladder therein.

4,790,351

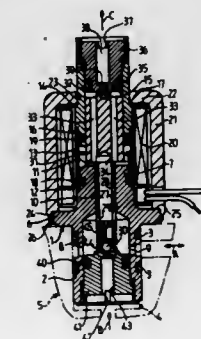
## SOLENOID VALVE

Gilbert Kervagoret, Argenteuil, France, assignor to Bendix France, Drancy, France

Continuation of Ser. No. 24,230, Mar. 10, 1987, abandoned. This application Apr. 12, 1988, Ser. No. 183,351

Claims priority, application France, Mar. 19, 1986, 86 03938  
Int. Cl.<sup>4</sup> F15B 13/04; F16K 31/06  
U.S. Cl. 137—596.17

10 Claims



1. A solenoid valve comprising a mounting base having a

first axial bore, an upper piece having a second axial bore and supported on the base concentrically relative to the base by means of a tubular supporting piece and held in position by means of a cover, a coil surrounding at least an axial portion of the upper piece, and a first insert and a second insert which are mounted respectively in the first axial bore and the second axial bore and which form stops for axially opposite ends, forming valve means, of a plunger structure stressed elastically and having a fluid through-passage, at least the first insert having an inner fluid passage opening into a valve seat which can be closed off by the adjacent valve means of the plunger structure, characterized in that the mounting base comprises an inner cylindrical part forming a pole piece projecting axially into the coil toward the upper piece and formed with a third bore coaxial relative to the first axial bore and second axial bore, the plunger structure comprising a cylindrical core sliding in the second axial bore and interacting in engagement contact with a tubular extension piece made of nonmagnetic material which has an inner passage and which slides in the third bore, the core comprising at least one axial passage communicating permanently with an adjacent end of the inner passage in the extension piece, the inner passage comprising a blind axial bore formed over some of the extension piece which has at least one radial passage in the vicinity of the end forming the adjacent valve means, the one axial passage communicating with a central axial end chamber aligned with the inner passage, and the core having a pair of parallel axial passages providing communication between the second insert and inner cylindrical part.

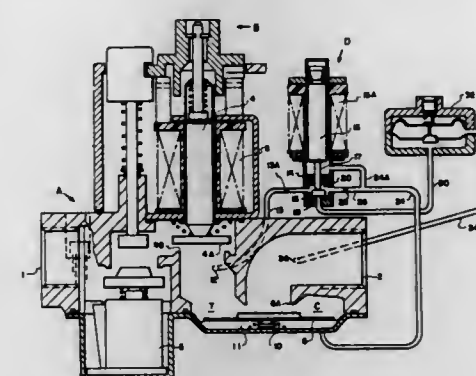
4,790,352

SLOW OPENING AND FAST CLOSURE GAS VALVE  
Paul Dietiker, Redondo Beach, and Frederick W. Johnson, Torrance, both of Calif., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Aug. 7, 1987, Ser. No. 82,457  
Int. Cl.<sup>4</sup> F16K 31/42

U.S. Cl. 137—613

5 Claims

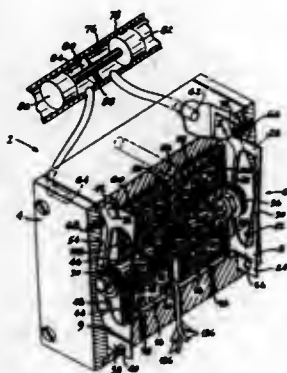


3. A valve comprising
  - a valve seat,
  - a valve closure member facing said valve seat,
  - first flow path means for providing an operation of rapidly admitting a pressurized gas to urge the member against the seat,
  - a second flow path means having a fixed flow restriction and control means for blocking the operation of said first flow path means and introducing said second flow path means as an exit path for the pressurized gas through said restriction to interrupt the urging of said valve closure member against said valve seat by the pressurized gas by allowing the pressurized gas to slowly exit through said fixed restriction, wherein said control means includes a valve having a first outlet connected to said first flow path means, a second outlet connected to said second flow path



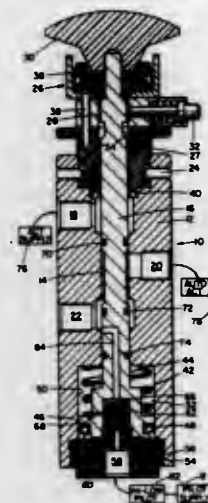
means, a first inlet connected to said valve inlet means, a third gas exit outlet and valve flow path control means for selectively and alternately connecting said first inlet to said first outlet and said second outlet to said third gas exit outlet, and further including a valve inlet means arranged to be connected to the source of the pressurized gas permitting the pressurized gas to said first flow path means and concurrently to urge said valve closure member away from said valve seat.

**4,790,353**  
**ELECTROMAGNETIC HYDRAULIC VALVE OPERATOR**  
 Jerome K. Hastings, Sussex; James H. Bigelow, Milwaukee, both of Wis., and Gary Schultz, Novi, Mich., assignors to Eaton Corporation, Cleveland, Ohio  
 Continuation of Ser. No. 406,649, Aug. 9, 1982, abandoned. This application Jun. 28, 1984, Ser. No. 625,198  
 Int. Cl.<sup>4</sup> F15B 13/044; F16K 31/06  
 U.S. Cl. 137—625.65 31 Claims



1. An electromagnetically actuated hydraulic switch, comprising:  
 a housing;  
 hydraulic valve means in said housing, including bistable snap blade means operable between different hydraulic circuit positions; and  
 electromagnetic actuator means mounted in said housing for actuating said snap blade means,  
 wherein said electromagnetic actuator means comprises coil means energizable to create magnetic flux, yoke means for directing the flux path of said coil means, and movable armature means responsive to energization of said coil means to actuate said snap blade means.  
 wherein said housing includes a cavity into which a portion of said armature means extends and engages said snap blade means, and including a hydraulic fluid entry port into said cavity, a hydraulic fluid exit port out of said cavity, and a hydraulic fluid vent port out of said cavity, said snap blade means in a first position blocking said vent port and opening said entry port such that hydraulic fluid flow may flow from said entry port to said exit port, said snap blade means in a second position blocking said entry port such that hydraulic fluid may flow from said exit port to said vent port.  
 wherein said housing has a second cavity into which an opposite distal portion of said armature means extends and engages second bistable snap blade means operable between different hydraulic circuit positions.

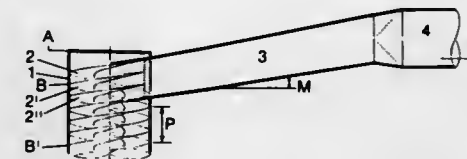
**4,790,354**  
**MANUAL RELAY VALVE**  
 Kip B. Goans, P.O. Box 1708, Gretna, La. 70053  
 Filed Oct. 26, 1987, Ser. No. 112,455  
 Int. Cl.<sup>4</sup> F19B 13/042  
 U.S. Cl. 137—625.66 20 Claims



1. A relay valve of the type including a valve body with an elongate bore within the body, a control fluid inlet port, a control fluid outlet port, a vent port, a pilot fluid inlet port, a valve stem slidable within the elongate bore, a knob affixed to the slidable valve stem for manually placing the relay valve in a relay open position, a piston affixed to the valve stem having a pilot fluid pressure surface and an opposing pressure surface, biasing means within the bore for biasing the valve stem in a relay closed position, the valve stem being selectively shiftable in response to pilot fluid pressure from (a) the relay open position establishing fluid communication between the control fluid inlet port and the control fluid outlet port and simultaneously precluding communication between the control fluid outlet port and the vent port, to (b) the relay closed position establishing fluid communication between the control fluid outlet port and the vent port and precluding fluid communication between the control fluid inlet port and the control fluid outlet port, the improvement comprising:  
 the piston having a cylindrical interior surface of a uniform diameter between the relay open and relay closed positions of the valve stem;  
 the valve body having a cylindrical interior body surface of a uniform diameter between the relay open and relay closed positions of the valve stem, the interior body surface defining a chamber between the piston and the vent port;  
 a first sealing means for continued sealing engagement between the interior surface of the piston and the valve body while the valve stem moves between the relay open and relay closed positions;  
 a second sealing means for continued sealing engagement with the interior body surface while the valve stem moves between the relay open and relay closed positions;  
 a third sealing means for sealing engagement between the valve body and the valve stem to prevent fluid communication between the vent port and the chamber when the valve stem is in the relay closed position, and for permitting fluid communication between the vent port and the chamber when the valve stem is in the relay open position; and  
 a fluid passageway means for controllably establishing fluid communication between the chamber and either the pilot pressure port or the vent port depending on the axial

position of the fluid passageway means with respect to the first sealing means.

**4,790,355**  
**HELICOIDAL RAMP DROPSHAFT**  
 John F. Kennedy, Iowa City, Iowa, assignor to University of Iowa Research Foundation, Iowa City, Iowa  
 Filed Mar. 23, 1987, Ser. No. 29,522  
 Int. Cl.<sup>4</sup> D21F 1/68  
 U.S. Cl. 138—37 4 Claims



1. A dropshaft for conducting a liquid flow downward and for dissipating the energy of the flow, the dropshaft comprising a vertical cylinder;  
 entrance ducts at the top of the cylinder, open to the atmosphere, disposed to deliver the flow into the cylinder in a direction substantially tangent to the periphery of the cylinder, the top and bottom of the entrance ducts being aligned with  
 helicoidal ramps attached to the inside wall of the cylinder and extending radially inwards a distance less than the radius of the cylinder, and terminating above the bottom of the cylinder, whereby flow is constrained in a helicoidal path regardless of the volume of liquid admitted by the entrance ducts, and a column of air is maintained in the axis of the cylinder;  
 a chamber at the bottom of the cylinder below the terminus of the helicoidal ramps; and  
 an exit duct at the bottom of the cylinder disposed to convey the flow away from the chamber, the exit duct being disposed in a direction substantially tangent to the periphery of the cylinder.

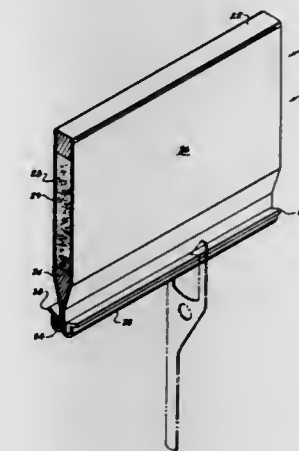
**4,790,356**  
**DRAIN PIPE PLUG DEVICE**  
 George Tash, 18658 Chase St., Northridge, Calif. 91324  
 Filed Nov. 23, 1987, Ser. No. 123,875  
 Int. Cl.<sup>4</sup> G01M 03/02; B08B 09/02  
 U.S. Cl. 138—93 22 Claims



1. An improved drain pipe plug device, said device comprising, in combination:  
 (a) an elongated, elastomeric, hollow, flexible, resilient, generally cylindrical member having interconnected side walls and end walls defining a generally central passageway extending throughout the length thereof, with exits at opposite ends thereof through said end walls, said generally cylindrical member having contiguous front outlet portion, rear inlet portion and middle portion, all of substantially the same external diameter and all being radially expandable under air and water pressure to block drain pipes, said sidewalls substantially uniformly tapering down in thickness from said front outlet portion through said middle portion and said rear inlet portion, whereby said front outlet portion deflates more rapidly than said middle portion and said rear inlet portion, for improved performance;  
 (b) connector means sealingly connected to said rear inlet

portion for introduction of fluid under pressure into said passageway to radially expand said cylindrical member to cause it to plug a drain pipe; and,  
 (c) a pressure relief valve in said front outlet portion to prevent rupture of said device under excess pressure.

**4,790,357**  
**HARNESS FRAME SLAT AND HEDDLE**  
 Charles F. Kramer, Greenville, S.C., assignor to Steel Heddle Mfg., Inc., Greenville, S.C.  
 Filed Aug. 6, 1987, Ser. No. 82,803  
 Int. Cl.<sup>4</sup> D03C 9/04  
 U.S. Cl. 139—91 21 Claims



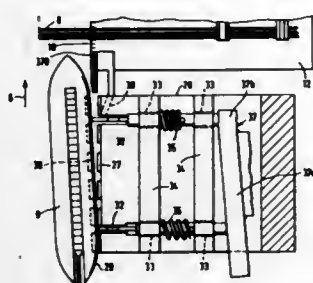
1. A heddle frame assembly for a weaving machine, comprising:  
 (a) elongated top and bottom frame slats, each of which includes:  
 (1) a generally rectangular portion extending horizontally of said frame, having a front and rear wall of thin metallic materials affixed to an upper protrusion cap and a lower protrusion element to form a rigid, hollow, rectangular body, said walls being integral below the lower protrusion element to conform to a vertical plane which extends through the longitudinal axis of said rectangular portion, and terminates in a heddle support bar portion extending from, and along a longitudinal edge from said slat, said heddle support bar portion having heddle supporting surfaces extending from said bar on each side of said vertical plane, disposed in planes which intersect each other and said vertical plane at a point between the upper end of said heddle supporting surface and the free end of said heddle support bar;  
 (b) side members for maintaining said upper and lower slats in spaced substantially parallel relation to each other with said heddle bar portions disposed along adjacent longitudinal edges of said top and bottom slats; and  
 (c) a plurality of elongated heddles extending between said upper and lower slats supported at each end by the heddle support bars on said slats, each of said heddles having an elongated body and a generally U-shaped opening at each of its ends, each of said U-shaped openings comprising two spaced longitudinal arms, each of which terminates in a hook having a support surface inclined towards the bottom of said U-shaped opening which lies in a plane which conforms to the plane of its supporting surface, whereby force exerted along the longitudinal axis of said heddle, away from the support bar, cams each of said longitudinal arms towards the longitudinal axis of the heddle supporting bar.

**4,790,358**  
**MULTI-SYSTEM WEAVING LOOM WITH PERMANENT MAGNET SHUTTLE DRIVE**

Adolf Linka, Hechingen-Bechtoldsweller, Fed. Rep. of Germany, assignor to Lindaner Dornier Gesellschaft m.b.H., Lindau/Bodensee, Fed. Rep. of Germany  
Filed Nov. 20, 1987, Ser. No. 123,376  
Claims priority, application Fed. Rep. of Germany, May 30, 1987, 3718306

Int. Cl.<sup>4</sup> D03D 47/26  
U.S. Cl. 139—436

11 Claims



1. Multi-system weaving loom having means for forming a shed (8); means for defining a straight shuttle guide path (15a) for guiding the shuttle through the shed; means for defining a curved shuttle guide path (15b) merging into said straight shuttle guide path; a guide reed (10) located adjacent said straight guide path (15a) outside of the shed for guiding movement of the shuttle through the shed; a plurality of magnetic shuttle moving elements (16) located adjacent the guide paths (15a, 15b) for moving the shuttles in said guide paths; shuttle magnetic means located on the shuttle (9) for magnetic attractive coupling with the respective magnetic shuttle moving elements; and drive means coupled to the magnetic shuttle moving elements for moving said shuttle moving elements and hence the shuttles through the shed, and comprising, in accordance with the invention, means for separating the shuttles (9) adhering to an associated shuttle moving element (19) by magnetic attractive force as the shuttle is moving through said curved guide path and adjacent the terminal ends of the guide reeds, said separating means permitting passage of the shuttle over the straight guide path, said separating means being carried by said shuttle moving elements (16) and being operated, in dependence on the instantaneous position of the shuttle moving elements upon approach of the shuttle magnetically adhered to the shuttle moving element, to the guide reed, to lift the shuttle off the shuttle moving elements by a distance necessary for operation of the shuttle lengthwise of the guide reed.

**4,790,359**  
**GAS INJECTION MEANS**  
Darryl R. Whitford, Angaston, Australia, assignor to S. Smith & Son Pty. Ltd., South Australia, Australia

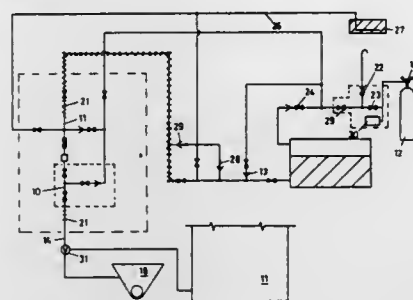
Filed Apr. 27, 1987, Ser. No. 43,148  
Claims priority, application Australia, May 2, 1986, PH5720  
Int. Cl.<sup>4</sup> B65B 3/10

U.S. Cl. 141—67

5 Claims

1. Gas injection means for injecting small quantities of gas into a large container, comprising:  
a conduit "T" piece having three limbs, a respective power operated valve in each said limb, logic control means connected to the valves for the control of a sequence of operation thereof,  
a first source of liquified gas which is to be injected into said

container, a first said power operated valve being connected by first conduit means to said first source of liquified gas,  
a second source of other gas at the same pressure as said liquified gas, a second said power operated valve being connected by second conduit means to said second source of other gas,

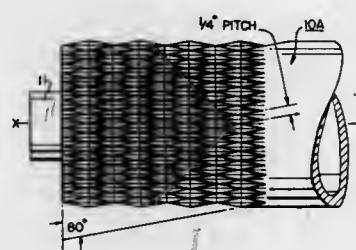


and the third said power operated valve connected by third conduit means to said second source of other gas and to said container, said sequence of operation being arranged to open the first power operated valve to allow flow of liquified gas from said first source into the conduit "T" piece, then close the first power operated valve but open the second power operated valve to blow said liquified gas from the "T" piece through said third conduit means into the container.

**4,790,360**  
**WOOD TENDERIZING APPARATUS AND METHOD**  
Michael R. Clarke, West Vancouver, and Donald C. Walser, Surrey, both of Canada, assignors to Forintek Canada Corp., Vancouver, Canada

Filed Oct. 26, 1987, Ser. No. 112,297  
Int. Cl.<sup>4</sup> B27L 5/00; B27M 1/02  
U.S. Cl. 144—213

32 Claims

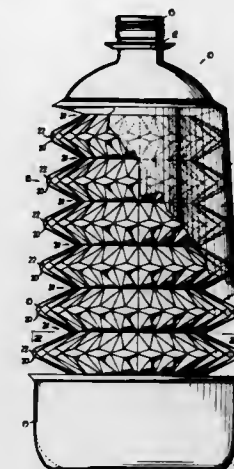


1. A wood incising roll comprising:  
an elongate structurally rigid roller having a plurality of formations projecting therefrom and which are an integral part of the outer periphery of the roller, said cutting formations being spaced apart from one another in a selected predetermined pattern and each having a knife-like cutting edge of finite length extending in a predetermined direction relative to the axis of rotation of the roller, said plurality of formations being defined by grooves in the surface of the roller crossing one another.

**4,790,361**  
**COLLAPSIBLE CARBONATED BEVERAGE CONTAINER**  
David T. S. Jones, and Gareth W. Jones, both of Westminster, S.C., assignors to Containers Unlimited, Westminster, S.C.

Filed Jul. 25, 1986, Ser. No. 890,399  
Int. Cl.<sup>4</sup> B65D 1/40, 23/00  
U.S. Cl. 150—55

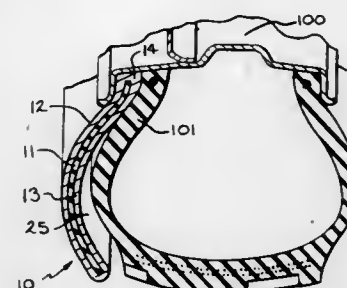
19 Claims



1. An improved soft drink container, comprising: a generally cylindrical container body having one closed end and a second open end for receiving a removable cap;  
corrugation means defined on said container body for allowing axial collapse of said body, said corrugation means defining a plurality of ridges and grooves; and means for retarding axial tilt of said body comprising a plurality of separate first planar regions located on each of said ridges, said first planar regions having sides, each of said first planar regions extending generally parallel to the axis of said container body, and a plurality of second planar regions adjacent to and extending from said sides of said first planar regions toward said grooves, whereby the container may be collapsed as the contents thereof are removed while still maintaining the ability of the container to sit upright.

**4,790,362**  
**TIRE SHIELD DEVICE**  
Donald R. Price, 210 Elvin Ct., Lansing, Mich. 48912  
Continuation of Ser. No. 695,209, Jan. 25, 1985, abandoned. This application Nov. 19, 1986, Ser. No. 933,318  
Int. Cl.<sup>4</sup> B60C 23/18; B32B 3/10  
U.S. Cl. 152—153

8 Claims



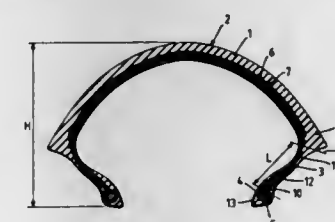
1. A shield protecting a sidewall of a tire having a ground contacting tread adjacent the sidewall from penetration by foreign objects and which is capable of use on a road at high speeds wherein the shield is mounted between a flange of a tire

rim and a bead portion of the tire axially outward of and extending over the sidewall which comprises:  
an annulus defining a foreign object penetration shield having a curved cross-section with opposed convex and concave wide sides and with opposed short sides between the wide sides, one short side defining an inner opening and providing a radially inside bead portion of the annulus with a diameter conforming to the diameter of one flange of the rim upon which the shield is mounted with the tire, wherein the shield has a penetration resistant rubber core, wherein the radially inside bead portion of the shield has been molded to conform to the shape of an axially outside portion of the bead of the tire and which mates with the flange so as to mount axially between the flange of the rim and said bead portion of the tire, wherein there is an air pocket between the sidewall of the tire and the concave side of the shield when the shield is mounted on the flange of the rim, wherein a radially outer portion of the shield is adjacent and of substantially the same radial extent as the tread of the tire and wherein the shield straightens out or decambers away from the sidewall of the tire due to centrifugal force upon rotation at a high speed above 5 mph of the shield with the tire and flange.

**4,790,363**  
**RADIAL MOTORCYCLE TIRES**  
Peter Ingley, Amington; David R. Watkins, Birmingham, and Gerald A. Griffiths, Lichfield, all of Great Britain, assignors to SP Tyres UK Limited, Birmingham, England  
Filed Nov. 21, 1986, Ser. No. 933,379  
Claims priority, application United Kingdom, Dec. 7, 1985, 8530213

Int. Cl.<sup>4</sup> B60C 9/08, 13/00  
U.S. Cl. 152—454

7 Claims



1. A radial tire having a very flexible and very short sidewall which consists essentially of a ground contacting tread region reinforced between its edges by a breaker structure and having a substantially curved profile in the radial cross-section of the tire, a pair of tire beads each reinforced by a substantially inextensible bead reinforcement hoop and a tire sidewall disposed between each tread edge and bead region, wherein each sidewall is reinforced by not more than two mutually contacting layers of carcass ply reinforcement for at least 80% of the length of the sidewall from the tread edge to the bead, such that the 80% or more of the sidewall is substantially flexible, the tire sidewalls edges and the length of the tire sidewalls each extending radially and axially inwardly of the tread edges and the length the tire sidewalls being less than 35% of the tire sectional height whereby the sidewalls are short and flexible.



4,790,364  
SIDEWALL AND BEAD REINFORCING STRUCTURE  
FOR A PNEUMATIC AIRCRAFT TIRE

Jolan F. Lobb, North Canton; Clarence B. Alsobrook, Akron, both of Ohio, and Robert G. Armbruster, Strassan, Luxembourg, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jul. 27, 1987, Ser. No. 77,823

Int. Cl.<sup>4</sup> B60C 3/00, 15/06

U.S. Cl. 152—454

4 Claims



1. A pneumatic tire comprising:

a pair of annular beads;  
two turn-up carcass plies of reinforcing elements oriented at 75 to 90 degrees with respect to the mid-circumferential plane of the tire, the turn-up carcass plies having main portions and pairs of axially spaced apart edge portions, each of said edge portions being folded axially and radially outwardly around one of the annular beads; and  
first and second pairs of reinforcing strips, folded around one of the annular beads, said first pair of reinforcing strips being disposed between the two turn-up carcass plies and said second pair of reinforcing strips being folded around both turn-up carcass plies each reinforcing strip of the first and second pairs being contiguous and overlapping with the other reinforcing strip of the same pair only in an area between the annular bead and the base of the bead portion.

4,790,365  
TIRE COMPOUNDS CONTAINING  
SYNDIOTACTIC-1,2-POLYBUTADIENE

Paul H. Sandstrom; Neil A. Maly, both of Tallmadge, and Mark A. Marinko, Stow, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 11, 1987, Ser. No. 95,205

Int. Cl.<sup>4</sup> B60C 1/00, 21/04; C08L 9/00, 15/02

U.S. Cl. 152—510

14 Claims

1. A pneumatic rubber tire which comprises a circumferential rubber tread, a supporting carcass therefor, two spaced beads, two rubber sidewalls connecting said beads and an innerliner: wherein said innerliner is comprised of from 1 to 30 phr of syndiotactic-1,2-polybutadiene and at least one rubber selected from the group consisting of polyisoprene and halogenated butyl rubbers, wherein said syndiotactic-1,2-polybutadiene has a melting point which is within the range of 120° C. to 160° C.

4,790,366  
PNEUMATIC RADIAL TIRE FOR HEAVY DUTY  
VEHICLE

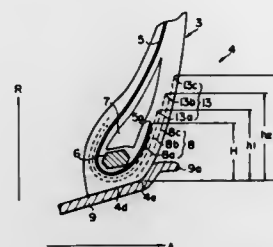
Kuninobu Kadota, Kodaira, Japan, assignor to Bridgestone Corporation, Tokyo, Japan

Filed Oct. 25, 1985, Ser. No. 791,527

Claims priority, application Japan, Nov. 16, 1984, 59-241840; Jul. 1, 1985, 60-145310

Int. Cl.<sup>4</sup> B60C 15/06

7 Claims



1. A pneumatic radial tire for heavy duty vehicles having a pair of bead portions each comprising:

a bead core disposed circumferentially of the tire on a plane which is substantially perpendicular to a rotational axis of the tire,  
a rubber stiffener disposed radially outwardly of said bead core and shaped in the form of a triangle in cross section, at least one carcass having a fold-back portion folding back at said bead core in a radial direction substantially perpendicular to said rotational axis to cover said bead core and in part said rubber stiffener, and  
at least first, second and third chafer plies disposed around said carcass to reinforce said bead portion and having embedded therein a plurality of first parallel cords, a plurality of second parallel cords and a plurality of third parallel cords, respectively, with the cords of adjacent plies arranged to cross each other in diagonally opposite directions, the cords of said first, second and third chafer plies being all composed of organic textile material, said cords of said first, second and third chafer plies extending with respect to said radial direction at chafer angles of  $\theta_1$ ,  $\theta_2$  and  $\theta_3$ , respectively, defined by the following equations,

$$35^\circ \leq \theta_1 \leq 55^\circ,$$

$$35^\circ \leq \theta_2 \leq 55^\circ$$

$$70^\circ \leq \theta_3 < 90^\circ,$$

said first, second and third chafer plies having a first chafer height  $h_1$  measured in said radial direction from a laterally outward and radially outermost end of said first chafer ply to a heel point at which a bead base of said bead portion and a flange portion of a rim having mounted said bead base thereon are intersected with each other, a second chafer height  $h_2$  measured in said radial direction from a laterally outward and radially outermost end of said second chafer ply to said heel point and a third chafer height  $h_3$  measured in said radial direction from a laterally outward and radially outermost end of said third chafer ply to said heel point, respectively,

said carcass having a fold-back height  $H$  measured in said radial direction from a radially outermost end of said fold-back portion thereof to said heel point, the first, second and third chafer heights  $h_1$ ,  $h_2$  and  $h_3$  being selected within ranges defined by the following equations,

$$1 < \frac{h_1}{H} \leq 2.0, 1 < \frac{h_2}{H} \leq 2.0, \frac{h_3}{H} \leq 2.5,$$

said third chafer height  $h_3$  which has the maximum chafer angle  $\theta_3$  with respect to said radial direction being radially taller than the other chafer heights  $h_1$  and  $h_2$  respectively having said chafer angles  $\theta_1$  and  $\theta_2$  each smaller than said chafer angle  $\theta_3$ .

4,790,367  
METHODS FOR PREPARING A FORMED CELLULAR  
PLASTIC MATERIAL PATTERN EMPLOYED IN METAL  
CASTING

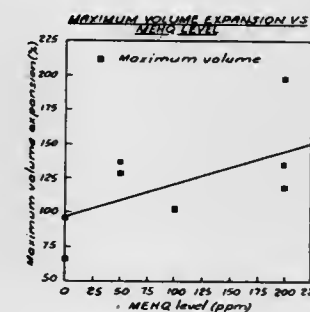
Norman G. Moll, Sanford, and David R. Johnson, Midland, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 890,036, Jul. 28, 1986. This application Jan. 28, 1988, Ser. No. 149,288

Int. Cl.<sup>4</sup> B22C 9/02

U.S. Cl. 164—34

36 Claims



1. A method of replica-casting a metal casting comprising the steps of:

(a) forming a pattern having a heat-destructible portion with the heat-destructible portion being an expanded multicellular closed-cell cellular plastic material having:  
(A) a plastic material, polymerized from one or more monomers, containing a majority, by weight of the plastic material, of monomeric repeat units of the formula:



wherein R is selected from the group consisting of alkanes having 1-4 carbon atoms (C), hydroxy alkanes having 1-4 C and cycloalkanes having 3-6 C, and R' is selected from the group consisting of  $\text{CH}_3$  and  $\text{C}_2\text{H}_5$ ; and

(B) a volatile blowing agent entrapped in the expanded closed-cell cellular plastic material;  
wherein the expanded closed-cell cellular plastic material article after expansion from an expandable plastic material particle has (i) a volume increase by a factor of at least 20 after a period of 5 minutes from the start of expansion conditions; (ii) a maximum volume expansion of at least 60; and (iii) maintains a volume expansion of at least 60 for an additional period of 30 minutes under expansion conditions after reaching a volume expansion of 60; all wherein the expansion of the expandable plastic material particle article into the expanded closed-cell cellular plastic material article occurs at ambient pressure with hot air in an oven at a temperature of 25° C. above the glass transition temperature of the plastic material; and  
casting the metal casting with the pattern having the heat-destructible portion being the expanded closed-cell cellular plastic material.

4,790,368  
METHOD OF MANUFACTURING THIN METAL SHEET  
DIRECTLY FROM MOLTEN METAL AND APPARATUS  
FOR MANUFACTURING SAME

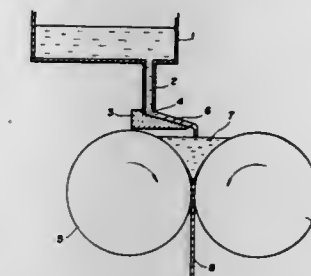
Takaji Kusakawa, Tokyo; Kazuo Ebato, Kanagawa; Takeya Tohge, Kanagawa; Masato Noda, Kanagawa, and Yasuhide Kuroda, Kanagawa, all of Japan, assignors to Nippon Yakin Kogyo Co. Ltd. and Talako Kusakawa, both of Tokyo, Japan

Continuation of Ser. No. 891,881, Jul. 31, 1986, abandoned. This application Aug. 24, 1987, Ser. No. 89,913

Claims priority, application Japan, Aug. 13, 1985, 60-176906

Int. Cl.<sup>4</sup> B22D 11/06, 11/10

12 Claims



1. A method of manufacturing a wide thin metal sheet directly from molten metal, comprising the steps of:

melting the metal to form a pool;  
channeling a flow of molten metal in a vertical direction;  
discharging said molten metal in a fan-shaped pattern along a downwardly inclined direction on an inclined plate;  
maintaining said discharged molten metal in a constant fan-shaped flow having a uniform flow rate;  
directing said fan-shaped flow to a molten metal flow space having a restricted passage;  
depositing said fan-shaped flow, from above, into said molten metal flow space without causing a disturbance on the surface of the molten metal by feeding the molten metal from the plate from an outlet positioned above a molten pool;  
applying rotational forces to said molten metal in said flow space; and  
simultaneously cooling and solidifying said molten metal passing through said flow space and said rotational forces.

4,790,369  
METHOD AND APPARATUS FOR CONTINUOUSLY  
MAINTAINING A VOLUME OF COOLANT WITHIN A  
PRESSURIZED COOLING SYSTEM

Walter C. Avrea, 1405 Whalers Way, Tempe, Ariz. 85283

Continuation of Ser. No. 768,494, Aug. 22, 1985, abandoned, and a continuation-in-part of Ser. No. 632,526, Jul. 19, 1984, abandoned, which is a continuation of Ser. No. 372,915, Apr. 29, 1982, Pat. No. 4,461,342. This application Jan. 25, 1988, Ser. No. 148,283

Int. Cl.<sup>4</sup> F01P 11/02; F28D 15/00

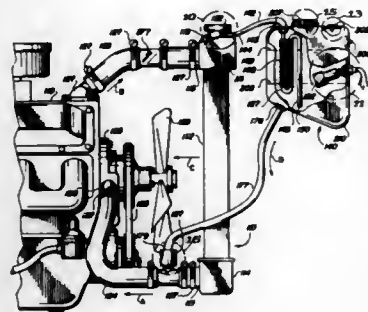
U.S. Cl. 165—104.32

5 Claims

1. In a pressurized liquid cooling system for circulation of coolant and dissipation of heat from an internal combustion engine, which system has a finite capacity and includes a water jacket having an inlet and an outlet, a radiator having an inlet tank and an outlet tank, a supply conduit communicating between the outlet tank and the inlet of the water jacket, a return conduit communicating between the outlet of the water jacket and the inlet tank, and a pump for circulating coolant through the supply conduit from the radiator to the water jacket, improvements therein for purging gaseous matter from the system and for continuous maintenance of the volumetric

capacity of coolant within the system, said improvements comprising:

- a normally sealed accumulator for holding a reserve supply of coolant and for receiving overflow coolant from said system;
- an overflow conduit communicating between a high point in said system and said accumulator;
- normally closed pressure valve mean in series with said overflow conduit for permitting flow of fluid from said system into said accumulator when the pressure within said system exceeds a predetermined maximum value;



- vent valve means for venting said accumulator to atmosphere in response to a predetermined pressure being attained within said accumulator, said predetermined pressure having a value lesser than the maximum value of said system and greater than ambient;
- a make-up conduit communicating between said accumulator and a location within said system up-stream of said pump; and
- a check valve in series with said make-up conduit for permitting flow of fluid from said accumulator into said system in response to the differential pressure across said check valve exceeding a predetermined value.

4,790,370

#### HEAT EXCHANGER APPARATUS FOR ELECTRICAL COMPONENTS

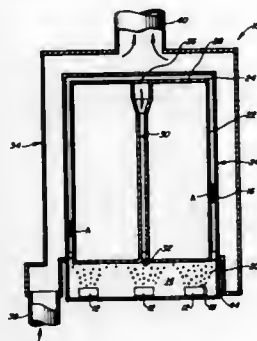
Richard E. Niggemann, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Continuation of Ser. No. 87,126, Aug. 19, 1987, abandoned. This application May 6, 1988, Ser. No. 193,144

Int. Cl. H01L 23/44

U.S. Cl. 165-104.33

14 Claims



1. An attitude insensitive heat exchanger apparatus for heat liberating components in thermal communication with a dielectric liquid, comprising:

- means defining a main chamber for holding said dielectric liquid and non-condensable gas above said liquid;

condenser means associated with said chamber to receive a

dielectric liquid vapor generated by cooperation of said dielectric liquid and said heat liberating components means defining a storage tank; and means cooperating with said non-condensable gas and an interior region of said tank to thereby ensure that non-condensable gas displaced by said dielectric liquid vapor is in fluid communication with said interior region of said storage tank and to ensure that said interior of said storage tank is fluidly isolated from said dielectric liquid, thereby providing a heat exchanger apparatus that is insensitive to changes in the attitude of said heat exchanger and the dielectric liquid therein.

4,790,371

#### TUBE-TYPE HEAT EXCHANGER

Daniel Zundel, 20, rue de la Herse, 68000 Colmar (Haut-Rhin), France

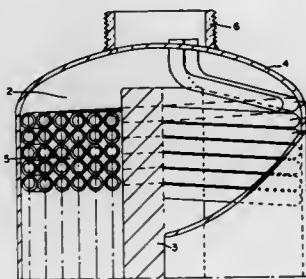
Filed Jul. 19, 1983, Ser. No. 515,069

Claims priority, application France, Feb. 24, 1983, 83 03202

Int. Cl. F28F 9/22

U.S. Cl. 165-163

4 Claims



1. A tube-type heat exchanger, comprising a plurality of tubes (1) disposed in an annular chamber (2) having a central core (3) and an external envelope (4), the tubes being all of the same length and being disposed in the form of touching concentric annular cylindrical spirals of different pitch, at least some of said cylindrical spirals being constituted each by a plurality of said tubes all of which are bent to the same radius, the number of said tubes in a said helical spiral increasing as the diameter of the spiral.

4,790,372

#### HEAT EXCHANGER HAVING FUSION BONDED PLASTIC TUBES/SUPPORT PLATE

Hermann Gemeinhardt, Obernburg, Fed. Rep. of Germany, and Hugo P. Korstanje, Rozendaal, Netherlands, assignors to Akzo NV, Netherlands

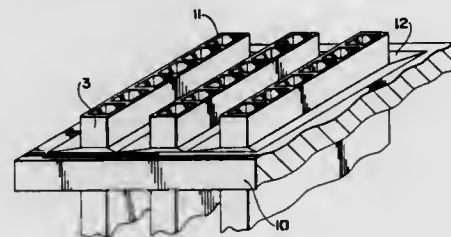
Filed Dec. 15, 1986, Ser. No. 941,377

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1985, 3544405; Apr. 28, 1986, 3614322

Int. Cl. F16L 41/02; F28F 9/02

U.S. Cl. 165-173

14 Claims



1. A heat exchanger manufactured by a process comprising

placing a support plate comprising a plurality of openings in an essentially horizontal position; placing a plurality of thermoplastic rods, each having at least one continuous cavity therethrough in substantially vertical positions such that at least one end of each of said rods is positioned in and surrounded by an inner wall of an opening, said cavity exhibiting a hydraulic diameter at least as large as 10% of a minimum outside cross-sectional dimension of said rod; and

applying sufficient heat from above without contacting the support plate or rods with a source of said heat to soften said rod ends and to expand the outside walls of said rod ends to such an extent that said outside walls of said rod ends touch and adhere to said inner walls of said openings, thereby fusing the thermoplastic material of said outside walls of said rod ends to said inner walls of said openings such that a seamless transition between said thermoplastic material and the surface of said support plate is produced, each said rod being permanently fastened to at least one said support plate, wherein said cavities become enlarged toward said ends of said thermoplastic rods.

4,790,374

#### AIRFLOW DIRECTIONAL VANE FOR A HEATSINK

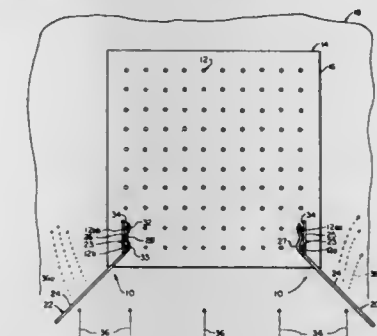
John H. Jacoby, Providence, R.I., assignor to PinFin, Inc., Warren, R.I.

Filed Jun. 15, 1987, Ser. No. 61,465

Int. Cl. F28F 7/00; H02B 7/34

U.S. Cl. 165-185

16 Claims



4,790,373

#### COOLING SYSTEM FOR ELECTRICAL COMPONENTS

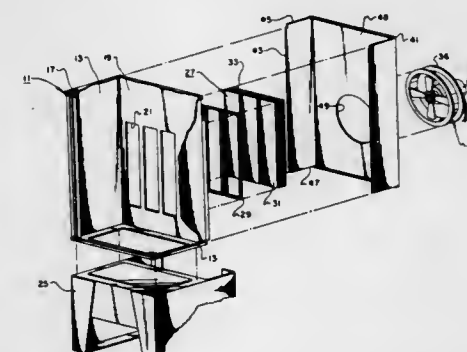
Vester R. Raynor, and Dick L. Knox, both of Claremore, Okla., assignors to Hughes Tool Company, Houston, Tex.

Continuation of Ser. No. 893,117, Aug. 1, 1986, abandoned. This application Sep. 8, 1987, Ser. No. 97,349

Int. Cl. F28F 7/00

U.S. Cl. 165-185

1 Claim



1. In an electrical apparatus of the type having a housing containing a plurality of electrical components, an improved cooling system for cooling the electrical components, comprising in combination:

- a back wall in the housing having an aperture;
- a metal heat sink mounted outside the housing to the back wall flush against the aperture, having a front surface exposed to the interior of the housing through the aperture to which electrical components are adapted to be mounted, the heat sink having a back surface containing a plurality of parallel, vertical fins, defining channels therebetween with open tops and bottoms;
- a shroud mounted to the rear of the housing, having a back wall parallel with the back wall of the housing and spaced rearwardly from it, the back wall of the shroud having a hole therein, the shroud having an open top and an open bottom; and

fan means mounted to the back wall of the shroud over the hole, for discharging air into the channels against the back surface of the heat sink, and for causing the air discharge to split into two flow paths when contacting the back surface of the heat sink, and flow through the channels in opposite directions out the top and the bottom of the channels and out the top and bottom of the shroud.

1. A self-mounting airflow directional vane for a heatsink having a plurality of heat-dissipating elements which extend from a base comprising:

- a vane portion extending outwardly from the heatsink to direct airflow across the heatsink through the heat-dissipating elements; and
- a self-securing clamping portion integral with said vane portion for frictionally gripping and engaging at least one of said heat-dissipating elements.

4,790,375

#### MINERAL WELL HEATING SYSTEMS

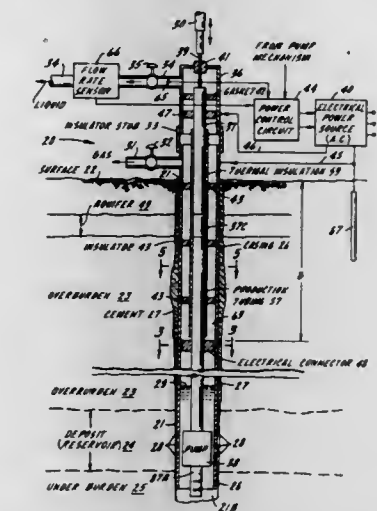
Jack E. Bridges, Park Ridge; Guggilam C. Sresty, Burbank, both of Ill.; Vincent R. Young, Tulsa, Okla., and Homer L. Spencer, Calgary, Canada, assignors to ORS Development Corporation, Tulsa, Okla.

Filed Nov. 23, 1987, Ser. No. 123,931

Int. Cl. E21B 36/00, 43/00

U.S. Cl. 166-60

56 Claims



1. A well heating system for a mineral well of the kind in which a flow of a mineral fluid moving upwardly above a predetermined subsurface depth D is subject to impairment due to condensation of paraffin or other condensable constituents from the fluid flow or to increasing viscosity of that fluid,



caused by temperature reduction, the well comprising a well bore projecting downwardly from a surface to a fluid reservoir and having an outer wall that is electrically conductive, and an electrically conductive production tubing extending down into the well bore in physically spaced and electrically insulated relation to the well bore wall, the heating system comprising:

an electrical power source;  
connection means for electrically connecting the power source to the tubing and to the electrically conductive wall so that the tubing and wall conjointly afford a two-conductor heating apparatus projecting downwardly into the well bore, which heating apparatus functions electrically approximately as a coaxial line;

means for effectively terminating the coaxial line so that most of the electrical power supplied to the coaxial line from the power source is dissipated within the well above the depth D;

and control means for controlling the electrical power supplied to the coaxial line from the power source to maintain the mineral fluid flowing in the tubing approximately at or above a flow impairment temperature for the fluid without substantially exceeding a predetermined upper limit temperature for the fluid in more than a minor fractional part of the well from depth D to the surface, in which the temperature limits are:

content of mineral fluid	flow impairment temperature	upper limit temperature
paraffin	cloud point	paraffin melting point
sulfur	sulfur precipitation point	300° F.
hydrates	crystal precipitation point	300° F.
heavy, viscous oil	no-flow pour point	five centipoise temperature

4,790,376

## DOWNHOLE JET PUMP

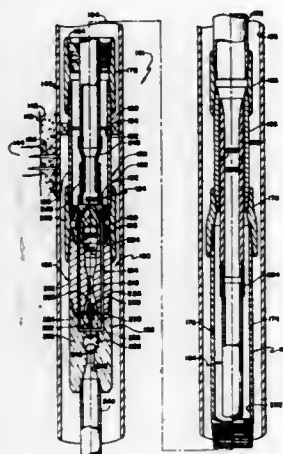
Benjamin R. Weeks, Corpus Christi, Tex., assignor to Texas Independent Tools & Unlimited Services, Inc., Corpus Christi, Tex.

Filed Nov. 28, 1986, Ser. No. 935,819

Int. Cl.<sup>4</sup> E21B 43/00

U.S. Cl. 166—68

4 Claims



1. A well equipped to produce oil at the surface from a subterranean formation including a casing string cemented in a well bore penetrating the earth to a depth below the formation, the casing string comprising

ing perforations extending through the casing string into communication with the formation;

a packer sealed against the interior of the casing string above the formation;

a tubing string inside the casing string and providing therewith an annulus, the tubing string being connected to the packer and extending upwardly to the surface, the tubing string and annulus providing a first upward path to the surface and a second downward fluid path from the surface;

and a jet pump assembly including

a jet pump below the packer comprising a body having an upper end, an outlet in communicating with the first fluid path, a nozzle section having a suction inlet below the packer and a power fluid inlet, means providing communication between the second fluid path and the nozzle section for delivering power fluid to the power fluid inlet and means connecting the upper jet pump body end to the tubing string comprising a J-slot receptacle secured to the upper jet pump body end having a J-slot therein, a tubular member connected with and communicating with the tubing string and having a J-slot pin on the lower end thereof removably received in the J-slot and means sealing between the J-slot receptacle and J-slot pin;

a first conduit including a receiver having a smooth interior passage comprising part of the tubing string, a perforated joint connected to the receiver and a stinger connected to the perforated joint extending through the packer to the jet pump; and

a second conduit having a seal section sealingly engaging the smooth interior passage of the receiver and a conduit section secured to the seal section and extending inside the stinger and connected to the tubular member, the pump assembly providing a first passage through the conduit section and a second passage between the conduit section and the stinger.

4,790,377

## SIDE ENTRY SUB WELL LOGGING APPARATUS AND METHOD

E. Edward Rankin, Fort Worth, Tex., assignor to Halliburton Company, Duncan, Okla.

Division of Ser. No. 837,383, Mar. 7, 1986, Pat. No. 4,678,038.

This application Jul. 1, 1987, Ser. No. 69,289

The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> E21B 17/046

U.S. Cl. 166—65.1

10 Claims



1. In a well logging system in which conductor cable extends outside of a drill string assembled of drill pipe and a side entry sub, the cable entering into a sidewall passage of the side entry sub and extending through the drill pipe to a logging instrument located at the lower end of the drill string, an apparatus for releasing the side entry sub from the drill string in the event the drill string becomes stuck, the apparatus comprising:

(a) a release sub having a telescoping joiner means for connection to the drill string below the side entry sub;

- (b) means for releasably latching the side entry sub to the release sub serially with the drill string, said means releasing the side entry sub from the release sub to enable the side entry sub to be pulled upwardly from the drill string;
- (c) said release sub has a lower end threaded to connect to the drill string and an upper end shaped to axially internally receive an elongate mandrel;
- (d) an internal groove within said release sub;
- (e) said latch means comprising mandrel supported locking members inserted into said internal groove; and
- (f) said latch means further comprising means for shifting said mandrel to alter locking of said locking members.

4,790,378

## WELL TESTING APPARATUS

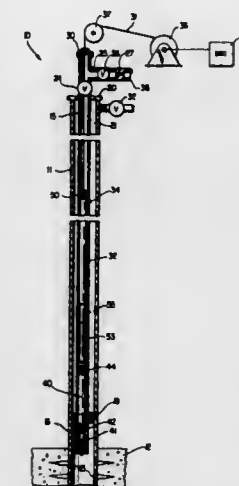
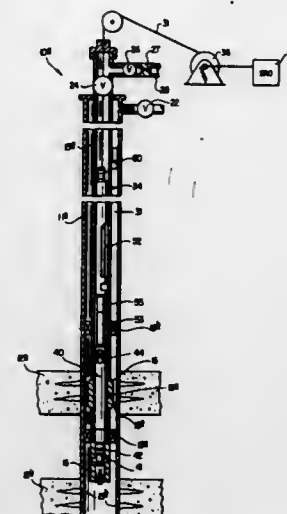
Carlos E. Montgomery, Anchorage, Ak.; Craig L. Zitterich, Carrollton, and Ricky M. Holloman, Lewisville, both of Tex., assignors to Otis Engineering Corporation, Dallas, Tex.

Filed Feb. 6, 1987, Ser. No. 12,076

Int. Cl.<sup>4</sup> E21B 47/06

U.S. Cl. 166—66

30 Claims



1. A system for testing a subterranean earth formation, comprising:

- (a) a well bore penetrating said earth formation to be tested;
- (b) a well casing in said well bore extending from the surface into said earth formation, said well casing being perforated opposite said earth formation to admit formation fluids from said earth formations into said well casing;

rated opposite said earth formation to permit formation fluids to enter said well casing;

(c) a well tubing in said well casing, said well tubing having a well packer sealing between the exterior of said well tubing and said well casing at a location above said earth formation, said well tubing also having a landing receptacle located near said well packer.

(d) a test tool string means lowered from the surface on a single-conductor electric cable and lockingly and sealingly engaged in said landing receptacle, said test tool string including:

(i) valve means including telescoped tubular members having lateral flow ports in their walls, and being relatively slidable longitudinally between positions opening and closing said flow ports for permitting or preventing flow therethrough,

(ii) first pressure sensing means for sensing fluid pressures below said valve means,

(iii) second pressure sensing means for sensing fluid pressures above said valve means, and

(iv) switching means connected to both said first and second pressure sensing means for alternately switching electric power, transmitted to it from the surface through said electric cable, therebetween, each said pressure sensing means, in turn, generating a signal and transmitting the same to the surface to indicate the magnitude of the pressures sensed thereby; and

(e) surface readout equipment connected to said electric cable for supplying power to said first and second pressure sensing means and for receiving the signals generated thereby and processing the same for display and/or recording.

4. A system for testing subterranean earth formations of a well having an upper and a lower producing zone, comprising:

(a) a well bore traversing vertically spaced apart upper and lower earth formations;

(b) a well casing in said well bore extending from the surface at least into said lower earth formation, said well casing being perforated opposite both said upper and lower earth formations to admit formation fluids from said earth formations into said well casing;

(c) a well tubing in said well casing, said well tubing including a well packer sealing between said well tubing and said well casing at a location between said upper and lower earth formations, said well tubing including a landing receptacle located near said well packer, said well tubing also including means providing a lateral flow port near said upper production zone for admitting production fluids therefrom into the well tubing;

(d) a test tool string lowered from the surface on a single-conductor electric cable and lockingly and sealingly engaged in said landing receptacle, said test tool string including:

(i) valve means including telescoped tubular members having lateral flow ports in their walls, and being relatively slidable longitudinally between positions opening and closing said flow ports for permitting or preventing flow therethrough,

(ii) a test tool having means thereon for anchoring and sealing said test tool string in said landing receptacle, and

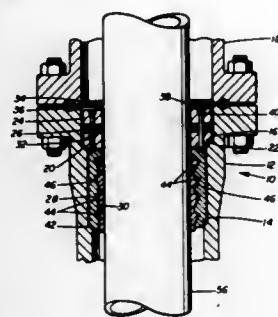
(iii) pressure sensing means for sensing fluid pressures of said upper and lower producing zones, said pressure sensing means including:

(1) a first electrically-powered pressure gage for sensing the pressure of the production fluids from said lower production zone and generating a suitable signal and transmitting it through said electric cable to the surface to indicate the magnitude of the pressure sensed thereby,

(2) a second electrically-powered pressure gage for sensing fluid pressures of production fluids from said upper production zone and generating a suitable signal and transmitting it through said electric cable

- to the surface to indicate the magnitude of the pressure sensed thereby, and
- (3) switching means connected to both said first and second pressure gages for alternately switching power, transmitted to it from the surface through said electric cable, therebetween, each said pressure gage in turn, generating a signal and transmitting it to the surface; and
- (e) surface readout equipment connected to said electric cable for supplying power to said first and second pressure gages and for receiving the signals generated thereby and processing such signals for display and/or recording.

**4,790,379**  
**WELLHEAD HANGER**  
 Delbert E. Vanderford, Jr., Cypress, Tex., assignor to Cameron Iron Works USA, Inc., Houston, Tex.  
 Filed Nov. 5, 1987, Ser. No. 116,774  
 Int. Cl.<sup>4</sup> F21B 19/10; F16L 21/00  
 U.S. Cl. 166—208 **6 Claims**



1. A wellhead hanger comprising a segmented bowl structure having a plurality of segments, means for connecting said bowl segments into a bowl ring, each of said bowl segments having a lower outer tapered seat and a plurality of inner camming surfaces which taper downwardly and inwardly, a plurality of slips, means supporting said slips on the bowl segments and allowing relative axial movement between the slips and the bowl segments, said slips each having an inner surface of string engaging teeth and a plurality of outer camming surfaces, said camming surfaces of said slips having at least one portion which tapers downwardly and inwardly at a very slight angle with respect to the vertical axis of the unit and the remaining surfaces which taper downwardly and inwardly at a substantially larger angle with respect to the vertical axis of the unit, and a packing assembly positioned above said slips, said packing assembly being actuated to set position by the downward movement of said bowl segments whereby the setting forces on the packing assembly are limited by the seating of the bowl segments.

**4,790,380**  
**WIRELINE WELL TEST APPARATUS AND METHOD**  
 Kelly D. Ireland, and Robert R. Green, both of Houston, Richard A. Meador, Spring, all at assignors to Baker Hughes Incorporated, Houston, Tex.  
 Filed Sep. 17, 1987, Ser. No. 97,671  
 Int. Cl.<sup>4</sup> E21B 47/00; G01V 1/40  
 U.S. Cl. 166—250 **25 Claims**

1. Apparatus for monitoring well fluid characteristics during a subterranean well test utilizing a test string positioned in a subterranean well bore in fluid communication with a formation of interest, the test string including a central passageway

for lowering wireline tools to a selected test string depth via a conductor wireline, the apparatus comprising:

a test valve positioned on the test string;

a sensor means positioned on the test string for sensing well fluid characteristics below the test valve and generating a first signal functionally related to a sensed characteristic;

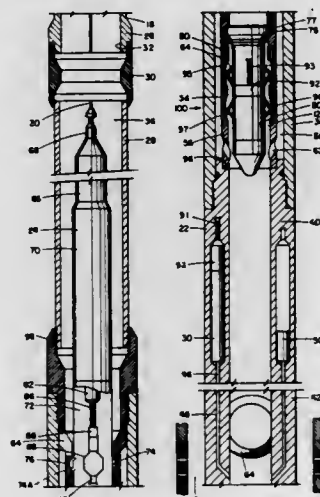
a landing receptacle means positioned on the test string axially above the test valve;

converter means positioned on the test string functionally related to the first signal;

generating means positioned on the test string for inducing a fluctuating electromagnetic field within, an electrically conductive portion of the landing receptacle means adjacent the generator means in response to the second AC signal;

latch tool means carried by the wireline and positionable within the central passageway of the test string for temporarily latching in a fixed axial position on the landing receptacle;

receiver means carried by the latch tool means adjacent an electrically conductive portion of the latch tool means and spaced radially inward of and in ohmic isolation from the generating means when said latch tool means is temporarily latched in said landing receptacle means for providing a third signal induced by the fluctuating electromagnetic field and having a characteristic proportional thereto;



signal conditioning means carried by the wireline for amplifying and converting the third signal for transmission to the surface via the electric wireline; and

computer means at the surface for analysis of the converted signal in real time.

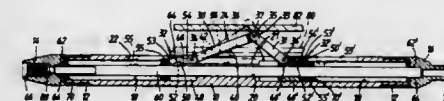
15. A method of monitoring well fluid characteristics during a subterranean well bore in fluid communication with a formation of interest, the tubular string including a central passageway for lowering wireline tools to a selected depth via a conductive wireline, the method comprising:
- lowering a latch tool having a receiver by the wireline to a selected position within the central passageway of the tubular string;
- temporarily latching the latch tool in a fixed axial position on the tubular string with said receiver in ohmic isolation from said string;
- sensing well fluid characteristics from a sensor positioned on the tubular string and generating a first signal functionally related to a sensed characteristic;
- generating a second signal in the well bore having a characteristic functionally related to the first signal;
- inducing a fluctuating electromagnetic field with a down-hole electrical conductive portion of the tubular string in response to the second signal;
- generating a third signal within the latch tool induced by the

fluctuating electromagnetic field and having a characteristic proportional thereto;

conditioning the third signal for transmission to the surface via the conductor wireline; and

processing the conditioned signal at the surface in real time.

**4,790,381**  
**CENTRALIZING DEVICES FOR USE IN BORE-HOLES**  
 Richard A. Armell, St. Cyrus, Scotland, assignor to Drexel Equipment (U.K.) Limited, London, England  
 Continuation-in-part of Ser. No. 850,666, Apr. 11, 1986, abandoned. This application Nov. 6, 1987, Ser. No. 118,757  
 Int. Cl.<sup>4</sup> E21B 17/10  
 U.S. Cl. 166—241 **18 Claims**



1. An assembly of a centralizing device and a sensor or other operational tool, the device being for use down-well in maintaining the sensor or other operational tool in a location accurately centralized on the axis of the bore hole irrespective of the angular orientation of the device and tool at any given location, said device comprising

an elongate body member having a longitudinal axis, which axis is, in use, maintained coincident with the longitudinal axis of the bore hole, the elongate body member having a plurality of spaced slots distributed around its circumferential surface, each said slot extending parallel to said longitudinal axis,

a corresponding plurality of two-armed assemblies spaced around the longitudinal axis of the elongate body member, each arm each assembly being pivotally connected at a radially outer location at end portions of the arms, and capable of being accommodated substantially wholly within the envelope defined by the elongate body member when the arms are in a retracted configuration, radially outer pivots providing the pivotal connection at the radially outer end portions of the respective said arms, two slide blocks each having external cross-sections within the confines of the outer cross section of the elongate body member, each slide block defining a plurality of recesses corresponding to the number of two-armed assemblies, each said recess receiving an inner end portion of a said arm,

means retaining the respective inner end portions of the arms in a respective one of the slide blocks,

anti-friction members, each mounted at a said radially outer pivot of the two-armed assemblies and intended for contacting engagement with the surrounding structure of the bore hole.

means at at least one end of the elongate body member for connecting it, when required, to an adjacent said operational tool or other component, and

resilient means acting on at least one of said slide blocks to bias the two-armed assemblies outwardly from the body member so that the anti-friction members are always, in use, in contact with surrounding structure of the bore hole.

**4,790,382**  
**ALKYLATED OXIDIZED LIGNINS AS SURFACTANTS**  
 Lawrence R. Morrow, Richmond; Michael G. DaGne, Houston, and Lawrence E. Whittington, Katy, all of Tex., assignors to Texaco Inc., White Plains, N.Y.  
 Division of Ser. No. 947,226, Dec. 29, 1986, Pat. No. 4,739,041.  
 This application Oct. 26, 1987, Ser. No. 112,585  
 Int. Cl.<sup>4</sup> E21B 43/22  
 U.S. Cl. 166—274 **4 Claims**

1. A method of recovering hydrocarbons from an under-

ground hydrocarbon formation penetrated by at least one injection well and at least one production well, which comprises:

injecting into the formation through an injection well a surfactant slug comprising about 0.1% to about 10% by weight of surfactants produced from lignin, said surfactants produced by subjecting lignin to a reaction selected from the group consisting of alkylation at phenolic oxygen sites with an alkyl chain having about 3 to about 24 carbon atoms and oxidation sufficient to break the lignin into smaller polymeric and monomeric units, oxidizing the alkylated lignin sufficiently to break the lignin into smaller polymeric and monomeric compounds if the first reaction was an alkylation reaction, and alkylating the oxidized lignin at phenolic oxygen sites with an alkyl chain having about 3 to about 24 carbon atoms if the first reaction was an oxidation reaction;

injecting into the formation through the injection well a drive fluid to push the surfactant slug towards a production well; and

recovering hydrocarbons at the production well.

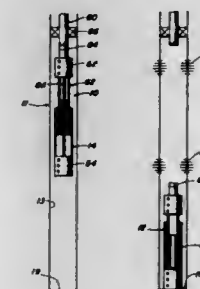
3. A method of recovering hydrocarbons from an underground hydrocarbon formation penetrated by at least one injection well and at least one production well, which comprises:

injecting into the formation through an injection well a surfactant slug comprising about 0.1% to about 10% by weight of an alkyloxybenzoic acid having about 3 to about 24 carbon atoms in the alkyl chain;

injecting into the formation through the injection well a drive fluid to push the surfactant slug towards a production well; and

recovering hydrocarbons at the production well.

**4,790,383**  
**METHOD AND APPARATUS FOR MULTI-ZONE CASING PERFORATION**  
 William A. Savage, and Larry N. Kendrick, both of Hobbs, N. Mex., assignors to Conoco Inc., Ponca City, Okla.  
 Filed Oct. 1, 1987, Ser. No. 104,455  
 Int. Cl.<sup>4</sup> E21B 43/117  
 U.S. Cl. 166—297 **9 Claims**



1. Apparatus for perforating spaced, multiple zones of a cased wellbore, said apparatus comprising:
- a first perforating gun;
- means for detachably attaching said first perforating gun to a lower end of a production gun;
- a second perforating gun;
- means for securing said second perforating gun at a fixed interval relative to said first perforating gun, said fixed interval being equal to the distance between said spaced multiple zones, said means for securing including a first telescoping spacer section, at least one additional telescoping spacer section, said first and said at least one additional telescoping spacer section being formed so that one may be received substantially within the other, means for releasably holding said one telescoping spacer section at an



extended position with respect to the other, means for sealing said one spacer section with respect to the other to prevent fluid influx, means for mechanically releasing said releasable holding means to enable said telescoping spacer sections to collapse under their own weight sliding relative to each other upon detachment of said attaching means dropping said perforating apparatus into a rathole after said perforating guns have been fired, said means for mechanically releasing being formed as part of said perforating apparatus.

**4,790,384**  
**HYDRAULIC WELL PENETRATION APPARATUS AND METHOD**

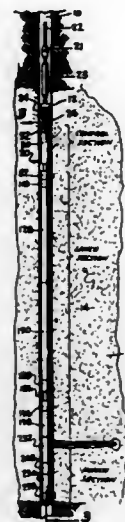
Herman J. Schellstede, New Iberia, La.; Robert W. McQueen, and Alan D. Peters, both of Houston, Tex., assignors to Penetrators, Inc., Houston, Tex.

Filed Apr. 24, 1987, Ser. No. 42,191

Int. Cl.<sup>4</sup> E21B 43/112, 7/18

U.S. Cl. 166—298

28 Claims



6. A method of penetrating a well casing and surrounding earth strata comprising the steps of:

- (a) positioning a punch member internally of the casing at a desired depth in alignment with strata desired to be penetrated; and
- (b) forcing said punch member outwardly through the casing to an extended position to effect the provision of an aperture in the casing while simultaneously moving a jet nozzle means outwardly through said punch member while concurrently providing a high pressure liquid jet from said nozzle means to effect the application of force to the casing to weaken the casing and aid the operation of the punch in cutting the casing and surrounding strata.

7. A well penetrator of the type including a housing means, a source of pressurized working fluid provided in said housing means, selectively operable control means connected to said source of pressurized working fluid, an outwardly movable punch member having an inner end and an outer end and being mounted for axial movement between a retracted position in which said punch member is fully enclosed within said housing means and an extended position in which the outer end of said punch member extends outwardly of said housing means a sufficient distance to cut through a well casing in which the housing means is positioned, wedge cam means mounted in said housing means for reciprocation, camming surface means on said wedge cam means, cam follower means engaging said camming surface means and connected to said punch member so that axial movement of said wedge cam means extends or retracts said punch member relative to said housing means, hydraulic cylinder means, a piston and rod assembly mounted

for movement in said hydraulic cylinder means, means connecting said piston and rod assembly to said wedge cam means and wherein said wedge cam means is mounted between said hydraulic cylinder and said source of pressurized working fluid and further including conduit means fixedly connected on an upper end to said control means and having a lower fixedly positioned conduit portion extending axially through said wedge cam means so that said wedge cam means is moveable relative to said lower fixedly positioned conduit portion which is connected in communication with said hydraulic cylinder means and wherein said control means includes means for connecting said source of pressurized working fluid to said conduit means or for alternatively connecting said conduit means to exhaust for effecting movement of said piston and rod assembly and said wedge cam means.

27. In a well penetrator for penetrating the casing of a well of the type including a housing means, high pressure lance means having an inner end and an outer end and nozzle means on said outer end, said lance means being mounted for movement outwardly of the housing means through the casing of a well for penetrating the surrounding formation by the ejection of a high pressure jet from nozzle means on the outer end of the lance means, the improvement comprising power means mounted in said housing means for extending the lance means from the casing and retracting the lance means into the casing, said power means comprising first and second cylinder means mounted in the housing means, first and second piston means respectively mounted for reciprocation in said first and second cylinder means, rod means connecting said first and second piston means to each other and to the inner end of said lance means, sealing means engaging said rod means for hydraulically isolating said first and second cylinder means, selectively operable power fluid supply means in said housing means for selectively simultaneously supplying pressurized fluid to said first and second cylinder means at locations between said first and second piston means on opposite sides of said sealing means for selectively extending and retracting said lance means while simultaneously maintaining tension in said rod means.

**4,790,385**  
**METHOD AND APPARATUS FOR PERFORATING SUBSURFACE EARTH FORMATIONS**

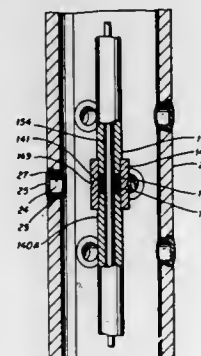
Gerald B. McClure, Sugarland, and William A. McPhee, Houston, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 516,811, Jul. 25, 1983, Pat. No. 4,491,185. This application Nov. 13, 1984, Ser. No. 670,835

Int. Cl.<sup>4</sup> E21B 43/116

U.S. Cl. 166—299

19 Claims



1. A method of establishing fluid communications between a well bore annulus and a tubing annulus, comprising the steps of:

- positioning on the end of a tubing string below a packer

assembly within said well bore annulus a sub having a plurality of vent ports closed by rupture discs, said tubing string having a tubing annulus fluidly isolated from said well bore annulus; and  
initiating a shock pressure wave originating within said sub, said pressure wave forcibly opening said vent ports by rupturing said rupture discs, thereby fluidly communicating said well bore annulus to said tubing annulus.

**4,790,386**  
**METHOD AND MEANS FOR INTRODUCING TREATMENT COMPOSITION INTO A WELL BORE**  
Irvin D. Johnson, Englewood, and Charles R. Bruce, Littleton, both of Colo., assignors to Marathon Oil Company, Findlay, Ohio

Filed Feb. 1, 1988, Ser. No. 150,810

Int. Cl.<sup>4</sup> E21B 41/02

U.S. Cl. 166—310

16 Claims



1. A method of introducing a treatment composition into a well containing corrosive fluid, comprising the steps of: loading an elongated container with a non-porous treatment composition adapted to dissolve in the well fluid, the container including side walls adapted to be corroded away by the well fluid; lowering the loaded container into the well; preventing the well fluid from corroding the outer surface of the side walls of the container; and exposing the treatment composition to the well fluid at an end of the container;

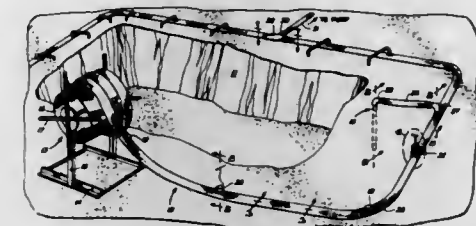
whereby the treatment composition exposed to the well fluid will dissolve therein and the well fluid will contact the adjacent inner surface of the container walls previously covered by the dissolved treatment composition, the container walls thus being progressively corroded away along the length of the container and the treatment composition progressively dissolving along said length of the container.

11. A container for holding and introducing treatment composition into a well containing corrosive fluid, comprising: an elongated hollow container having side walls subject to corrosive attack by the well fluid; the container carrying treatment composition in non-porous form, the treatment composition being adapted to dissolve in the well fluid; a coating on the outside surface of the container side walls preventing the well fluid from contacting said outside surface; and an end of the container being adapted to permit the well fluid to contact the treatment composition adjacent said end to allow the well fluid to dissolve the treatment composition exposed thereto, thereby enabling the well fluid

to reach the adjacent inner surface of the side walls of the container and progressively corrode away the side walls along the length of the container.

**4,790,387**  
**WELLPOINT ASSEMBLY AND METHOD OF INSTALLING A WELLPOINT ASSEMBLY**  
Jack H. Share, P.O. Box 250 N. Halifax Dr., and Stanley Share, P.O. Box 211 Ellicott Dr., both of Ormond Beach, Fla. 32074  
Filed Mar. 26, 1984, Ser. No. 592,534  
Int. Cl.<sup>4</sup> E21B 43/00; E21F 16/00  
U.S. Cl. 166—379

15 Claims



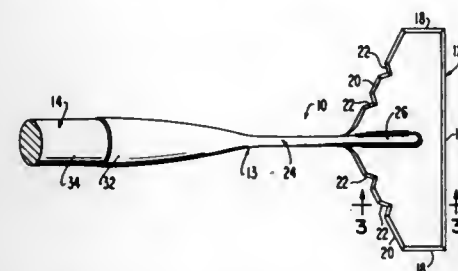
1. A wellpoint assembly comprising in combination: an elongated flexible header pipe; a plurality of coupling joints attached to said flexible header, each said coupling joint being adapted for attaching a well point assembly; a flexible header pipe support for supporting said flexible header pipe; and means to align portions of a continuous flexible header pipe for attaching a plurality of wellpoint assemblies, said means to align portions of said flexible header pipe including an alignment tool for aligning each flexible header coupling joint into a predetermined position for attaching a well point assembly line whereby a wellpoint assembly can be laid out around an excavation site in a wide variety of patterns.
10. A method of installing a wellpoint system comprising the steps of: laying a continuous flexible header pipe in a pattern for installing a wellpoint system, including unreeling said flexible header pipe from a reel prior to laying the flexible header pipe in a pattern for installing a wellpoint system; aligning a continuous flexible header pipe in a plurality of locations therealong for attaching a plurality of well point assemblies thereto; removing coupling plugs from wellpoint coupling members in the flexible header pipe; and attaching wellpoint assemblies to said wellpoint coupling members.

**4,790,388**  
**CULTIVATION TOOL REAR EDGES**  
Keith C. Badham, 1157 San Diego Dr., Salinas, Calif. 93901  
Filed Jul. 6, 1987, Ser. No. 69,927  
Int. Cl.<sup>4</sup> A01B 1/20  
U.S. Cl. 172—375

6 Claims

1. A cultivation tool comprising: a plate having a generally straight front edge, a pair of spaced, generally parallel side edges, and a pair of rear edges, said edges defining an outer periphery, said edges being sharpened along and about said outer periphery, said rear edges converging toward each other as the rear end of the plate is approached, said rear edges extending rearwardly and inwardly from said side edges; a handle; and means coupling the handle to the plate, said means including a first, elongated rigid segment secured along its length to the plate and being substantially parallel

to the side edges, said first segment extending to the rear end of said plate, said rear edges extending to said first segment, and a second, elongated rigid segment extending



rearwardly away from the first segment and from said plate and being inclined relative thereto, said handle being coupled to the second segment.

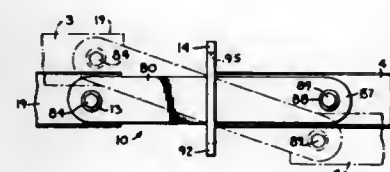
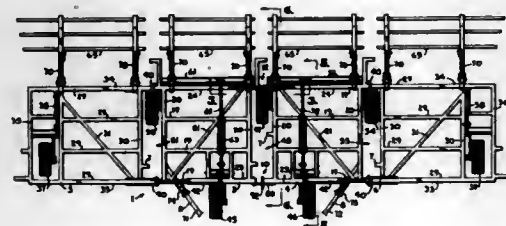
#### 4,790,389 FIELD CULTIVATOR FRAME WITH LIMITING ASSEMBLY

Raymond A. Adee, Newton; James A. Boone, and Dennis L. Lewallen, both of Quinter, all of Kans., assignors to Flex-King Corporation, Quinter, Kans.

Filed Apr. 22, 1986, Ser. No. 854,533  
Int. Cl.<sup>4</sup> A01B 73/04

U.S. Cl. 172-776

15 Claims



6. A field cultivator frame comprising:
- a first center frame section having a forward end and a rearward end;
  - a second center frame section pivotally connected to said first center frame section along a central axis extending longitudinally of said frame and having a forward end and a rearward end;
  - ground engaging wheels positioned on the center frame sections to movably support same over a ground surface;
  - tongue means connected to at least one of said first and second center sections for coupling to a prime mover;
  - a flex link assembly extending between and pivotally connected to said first center frame section and said second center frame section; said flex link assembly including a connecting link positioned externally of said first center frame section and said second center frame section, said link having a first end pivotally connected to said first center frame section externally of said first section and a

second end pivotally connected to said second center frame section externally of said second section; and

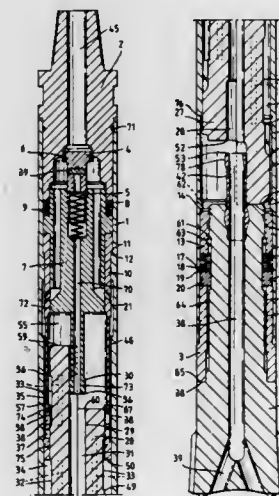
- flex link limiting means positioned on one of said first and second center frame sections and extending vertically therefrom, said flex link limiting means positioned intermediate said first end and said connecting link extending through said limiting means, said limiting means alternately engageable with said connecting link in two spaced vertical positions of said link to limit vertical displacement of said connecting link and said first and second center frame sections relative to one another.

4,790,390  
VALVELESS DOWN-THE-HOLE DRILL  
Peter J. Sweeny, Limerick, Ireland, assignor to Minroc Technical Promotions Ltd., Smithstown, Ireland  
Filed Jan. 25, 1988, Ser. No. 147,704  
Claims priority, application Ireland, Jan. 26, 1987, 191/87; Dec. 1, 1987, 3263/87

Int. Cl.<sup>4</sup> B23Q 5/033

U.S. Cl. 173-17

10 Claims



1. A valveless percussive down-the-hole drill actuated by a supply of pressure fluid, comprising
  - an outer wear sleeve,
  - a backhead assembly secured to one end of the outer wear sleeve connectable to a drill string and to a supply of pressure fluid, through the drill string,
  - a pressure fluid diverter located within the outer wear sleeve adjacent to the backhead,
  - a drill bit suspendably supported in bit retaining means secured to the other end of the outer wear sleeve,
  - an inner sleeve located inside the outer wear sleeve towards the said one end thereof adjacent to the pressure fluid diverter, defining a fluid passageway between the inner sleeve and the outer wear sleeve allowing fluid communication between the pressure fluid diverter and a chamber so defined within the outer wear sleeve and between the diverter at one end and the drill bit at the other end,
  - a piston disposed within said chamber having a first slidable contact surface with a first chamber wall portion towards one end of the piston and a second slidable contact surface with a second chamber wall portion towards the other end of the piston so as to be slidably reciprocable within the said chamber,
  - a porting means associated with the inner sleeve and the piston for alternately directing live pressure fluid from the said fluid passageway to either end surface of the piston so as to reciprocate the piston and to cause it to repeatedly strike the drill bit,
  - an exhaust means operably associated with the porting

means for alternately exhausting pressure fluid supplied to either side of the piston to the drill exterior and

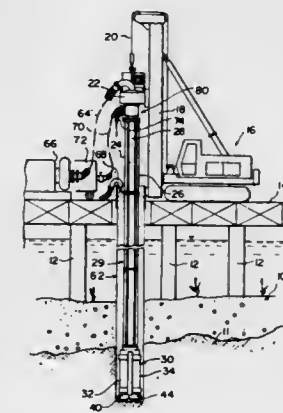
- a means for trapping a volume of pressure fluid in a space defined intermediate said first and second sliding contact surfaces of the piston between the piston and the outer wear sleeve, such that when said volume is compressed during rearward motion of the piston the trapped pressure fluid firstly exerts a retarding force against the rearward motion of the piston and then exerts an additional driving force at the commencement of forward motion.

4,790,391  
AIR PRESSURE IMPACT DRILLING METHOD AND APPARATUS FOR SAME  
Hiroyuki Hamamura, Saitama; Hiroyuki Kawasaki, and Taro Watanabe, both of Tokyo, all of Japan, assignors to Tone Drilling Co., Ltd., Tokyo, Japan  
Filed Sep. 24, 1986, Ser. No. 911,251  
Claims priority, application Japan, Oct. 4, 1985, 60-221566; Mar. 5, 1986, 61-47540

U.S. Cl. 173-57

Int. Cl.<sup>4</sup> B25D 17/14

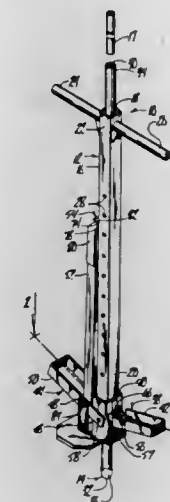
9 Claims



1. An air-pressure impact type drilling apparatus comprising: an air hammer drill including a cylinder member for slidably supporting a hollow bit in an axial direction thereof by a forward end portion thereof provided with a seal member, a piston supported in the axial direction thereof in said cylinder member and having a hollow central portion for giving impacts to said bit by a bottom end portion thereof, an air pressure feed passage to be alternately communicated with pressure chambers provided at the top and bottom of said piston in accordance with the vertical movement of said piston, an air exhaust passage to be alternately communicated with said pressure chambers provided at the top and bottom of said piston in accordance with vertical movement of said piston to discharge the air used for the vertical movement of said piston, and a water discharge passage opened at a position close to said bit, for discharging cutout substances cut out by said bit together with the water, said water discharge passage extending through said hollow piston and supported by a central portion of said bit through a seal;
- a drilling pipe parallelly provided therein with an air feed pipe, an air exhaust pipe and a water discharge pipe to be communicated with and connected to an air feed passage, an air exhaust passage and a water discharge passage of said air hammer drill, respectively;
- a swivel device for rotatably supporting said drilling pipes and provided with a passage communicated with the pipes constituting said drilling pipe;
- connecting flanges formed at opposite ends of said drilling pipe; and
- a seal member provided on the surface of one of said flanges.

4,790,392  
SOIL SAMPLE CORE EXTRACTION TOOL  
James M. Clements, R.R. 1, Box 186, Newton, Iowa 50208  
Filed Aug. 24, 1987, Ser. No. 90,083  
Int. Cl.<sup>4</sup> E21B 11/02, 25/00, 49/02  
U.S. Cl. 175-20

19 Claims



9. A soil sample core extraction tool, comprising: an elongated handle member having a longitudinal axis and having first and second open ends; an elongated soil probe member having a hollow interior for retention of a soil sample, said probe member movably mounted on the handle member within a hollow interior of the handle member, said probe member being at least as long as the handle member; and a clutch means for selectively providing for extension, retraction and prevention of movement of the soil probe member with respect to the handle member to allow said soil probe member to be inserted into soil to take a continuous soil sample along approximately the entire length of the soil probe member.
13. A hammer means for use with a soil sample core extraction tool to assist in driving a soil probe member into the soil, said extraction tool including an elongated handle member having a longitudinal axis and a hollow interior for movable retention of the soil probe member, and having first and second open ends, the hammer means comprising: an elongated rod member having first and second ends, said first end being slidably and removably insertable through an open end into the hollow interior of the handle member and an end opening of a soil probe member, said first end being generally matably positionable within the interior of the end opening of the soil probe member and including a collar member of a outside diameter greater than the end opening the soil probe member so that the collar will abut against an end of the probe member, but less than the diameter of the open end and hollow interior of the handle member; and a hammer member of elongated shape having a central bore along its longitudinal axis and outside diameter less than the diameter of the open end and hollow interior of the handle member for matably sliding reception of the elongated rod member between the second end and the collar member, so that by slidably raising and then slidably accelerating and impacting the handle member along the rod member onto the collar member, when the rod member is positioned in the handle member of the extraction tool, the hammering force will be exerted through the collar member against the soil probe member to drive it into the soil.

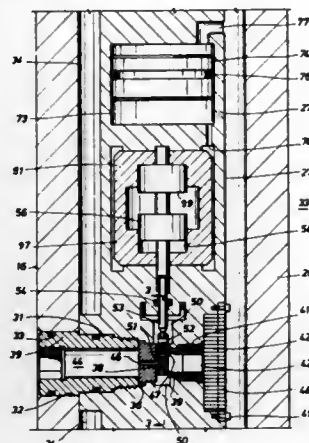


**4,790,393**  
**VALVE FOR DRILLING FLUID TELEMETRY SYSTEMS**  
 Michael L. Larronde, Maamohan S. Kalsi, and M. Vikram Rao,  
 all of Houston, Tex., assignors to NL Industries, Inc., New  
 York, N.Y.

Filed Jan. 24, 1983, Ser. No. 460,461  
 Int. Cl.<sup>4</sup> E21B 21/10

U.S. Cl. 175—40

20 Claims



1. A downhole valve apparatus suitable for use in a drilling fluid telemetry system for developing pressure changes in the drilling fluid during a borehole drilling operation utilizing a drill member suspended from a drill string and circulating a drilling fluid down the drill string and up the annulus between the drill string and the borehole wall, comprising:

- passage means connecting the interior and the exterior of a tubular member;
- shear valve means positioned in said passage means and including a movable gate and a seat rigidly mounted to said tubular member;
- means accessible from the exterior of said tubular member for rigidly clamping said seat to said tubular member when in position and for providing an opening for removing said gate and seat from said valve means when removed;
- valve operating means for connection to said gate for moving said gate relative to said seat to open said passage means; and
- floating connection means between said valve operating means and said gate.

**4,790,394**  
**HYDRAULIC DRILLING APPARATUS AND METHOD**  
 Ben W. O. Dickinson, III, 2125 Broderick St., San Francisco, Calif. 94115; Robert W. Dickinson, 40 Maplewood Dr., San Rafael, Calif. 94901; Richard R. Jensen, Hacienda Heights, Calif.; Sherman C. May, San Francisco, Calif.; Charles S. Mackey, Bakersfield, Calif., and Robert D. Wilkes, Jr., Berkeley, Calif., assignors to Ben Wade Oakes Dickinson, III and Robert Wayne Dickinson, both of San Francisco, Calif.  
 Continuation-in-part of Ser. No. 853,548, Apr. 18, 1986, abandoned. This application Nov. 19, 1986, Ser. No. 932,711  
 Int. Cl.<sup>4</sup> E21B 7/18

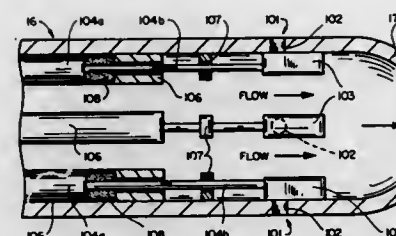
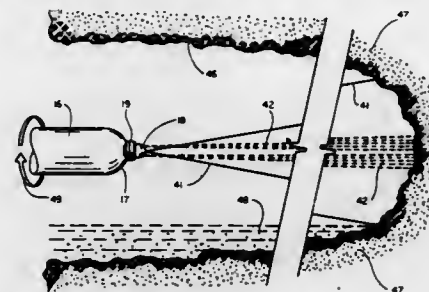
U.S. Cl. 175—61

60 Claims

1. In hydraulic drilling apparatus: a drill head having an internal chamber, means for producing a whirling mass of pressurized fluid in the chamber, and a discharge nozzle through which the pressurized fluid is discharged as a high velocity cutting jet in the form of a thin conical shell.

27. In a method of drilling a borehole in the earth with a hydraulic drill head at the distal end of a tubular drill string to which a pressurized fluid is applied, the steps of: producing a whirling mass of the pressurized fluid, and introducing the

whirling fluid into a discharge nozzle in such manner that the fluid spins helically within the nozzle and emerges therefrom



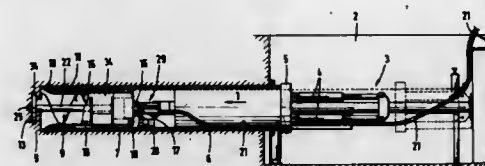
as a high velocity cutting jet in the form of a thin conical shell for cutting into the earth.

**4,790,395**  
**PIPE-DRIVING APPARATUS**  
 Helmut Gack, and Gerhard Kaiser, both of Nuremberg, Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhütte Westfalen GmbH, Fed. Rep. of Germany  
 Filed Feb. 11, 1987, Ser. No. 13,428  
 Claims priority, application Fed. Rep. of Germany, Feb. 18, 1986, 3605009

Int. Cl.<sup>4</sup> E21B 7/00, 10/44

U.S. Cl. 175—102

20 Claims



1. Pipe-driving apparatus comprising: a pressing station in an access zone for thrusting a succession of pipe sections end-to-end to form a pipe string, a working pipe section at the front end of the pipe string defining a working zone, cutting means and a conveyor worm at the working zone for detaching material from a working face and for conveying such material away from the face, a displaceable container operably associated with the cutting means and the conveyor worm to receive said material, the cutting means taking the form of a rotatable boring head carried on a drive shaft extending through the container, the drive shaft being provided with a spiral flight constituting at least part of the conveyor worm, the cutting head being adjustable to vary its effective diameter by means of a mechanism connected to and operated by the drive shaft, the container being movable between the working and access zones to transfer the material, a drive unit for driving the cutting means and the conveyor worm, the drive unit being supported by the container, and bracing means which selectively cooperates with the working pipe section to brace the

container and hold the container in position whilst it is filled with material.

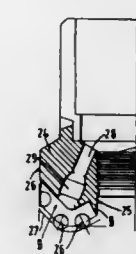
**4,790,396**  
**ROTARY DRILL BITS FOR USE IN CORING HOLES IN SUBSURFACE FORMATIONS**  
 John Fuller, Penzance, England, assignor to NL Petroleum Products Limited, England

Filed Jan. 26, 1986, Ser. No. 879,137  
 Claims priority, application United Kingdom, Jul. 2, 1985, 16776/85

Int. Cl.<sup>4</sup> E21B 10/02

U.S. Cl. 175—249

5 Claims



4. A rotary drill bit for use in coring holes in subsurface formations, comprising a bit body having a shank for connection to a core barrel, an outer peripheral gauge portion for engagement with the peripheral wall of the hole being drilled, an inner peripheral gauge portion defining at least a part of a central, generally circular aperture extending axially through the bit body, a plurality of cutting elements mounted at an end face of the bit body, at least one passage in the bit body for delivering drilling fluid to said end face of the bit body for cooling and cleaning said cutting elements, and sealing means on said inner gauge portion of the bit including a labyrinth seal comprising a number of axially spaced peripheral annular grooves, separated by peripheral lands, in the surface of the inner gauge portion, which lands, in use, engage the outer surface of the core being cut by the bit in a manner to form an hydraulic seal and prevent or restrict flow of drilling fluid in an axial direction between the inner gauge portion and the core.

**4,790,397**  
**ROTARY DRILLING DEVICE**  
 Oscar Kaalstad, Winterpark, Fla., and Neil G. Reid, Whiteleaf Aylesbury, Great Britain, assignors to Cledisc International BV, Amsterdam, Netherlands

Filed May 6, 1987, Ser. No. 47,420  
 Int. Cl.<sup>4</sup> E21B 10/08

U.S. Cl. 175—365

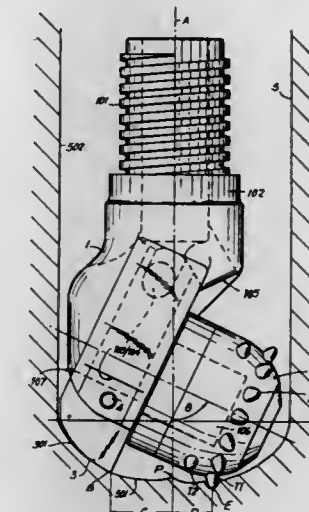
10 Claims

1. A rotary drilling device of the type having a body connected to a rotary drive system for rotation about a primary axis in order to bore into the ground to form a cylindrical hole having a bottom and side wall, said device comprising:

- a rotary cutting member mounted on one side near the bottom of said body for rotation about an inclined axis of rotation which forms an angle with the primary axis of rotation, the cutting member being inclined towards the

bottom and the side wall of the hole, the cutting member being shaped to form a hole with a substantially concave bottom; and

a counter-reaction member disposed on the side of the body away from that carrying said cutting member and near the bottom thereof, the counter-reaction member being constructed and positioned so as to be in contact with only the concave bottom of the hole and so that the maximum radial projection from the primary axis of rotation of any



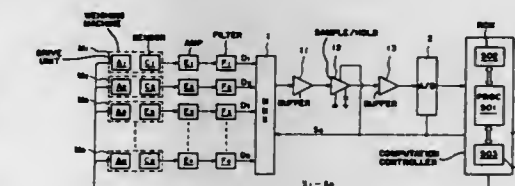
part of said counter-reaction member and its means of attachment to said body is less than the radius of the hole, with the highest point of the surface of contact between said counter-reaction member and the hole being situated below a line defined by the intersection between the concave bottom of the hole and its cylindrical side wall, said counter-reaction member having a convex surface in contact with and closely conforming to the concave surface of the bottom of the hole.

**4,790,398**  
**COMBINATORIAL WEIGHING METHOD AND APPARATUS THEREFOR**

Hideo Nobutsugu, Kyoto, Japan, assignor to Kabushiki Kaisha Ishida Koki Seisakusho, Kyoto, Japan  
 Continuation of Ser. No. 942,926, Dec. 17, 1986, abandoned, which is a continuation of Ser. No. 687,020, Dec. 28, 1984, abandoned. This application Jan. 27, 1988, Ser. No. 149,891  
 Claims priority, application Japan, Dec. 28, 1983, 58-251707  
 Int. Cl.<sup>4</sup> G01G 13/00, 23/10

U.S. Cl. 177—1

14 Claims



1. A combinatorial weighing method for performing a combinatorial calculation based on output data from a plurality of weighing machines and for selecting a combination of weight data, corresponding to the output data, indicative of a total combined weight equal or closest to a target value within a preset range, comprising the steps of:

- (a) repeatedly reading output data from each of the weighing

machines and storing the output data as plural data items for the respective weighing machines in a weighing cycle shorter than a combinatorial calculation cycle and preset according to the weighing machines supplied with articles to be weighed;

- (b) obtaining the mean value of the plural data items stored for the respective weighing machines, and updating a preceding mean value with the current mean value;
- (c) determining, for each weighing machine, whether the weighing machine is in a stable state based on a comparison between the preceding mean value and the current mean value; and
- (d) performing a combinatorial calculation upon weight data corresponding to the output data from each weighing machine sensed to be in a stable state, in a next combinatorial calculation cycle.

4,790,399

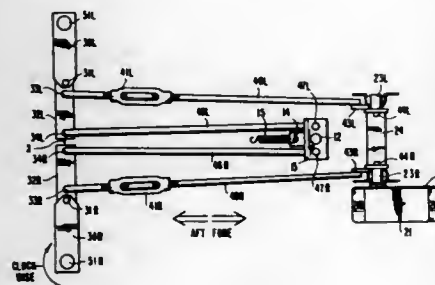
#### STEERING MECHANISM FOR A ZERO TURNING RADIUS VEHICLE

Tommy A. Middlesworth, Greentown, Ind., assignor to Middlesworth Engineering & Manufacturing, Inc., Greentown, Ind.  
Filed Mar. 9, 1988, Ser. No. 165,760

Int. Cl. B62D 6/00

U.S. Cl. 180-6.2

17 Claims



1. A driving and steering mechanism for a vehicle having a pair of driving wheels, comprising:
- reversible motor means for driving each one of said pair of driving wheels, including control means for controlling the speed and direction of rotation of each one of said pair of driving wheels independently of the other, thereby controlling the actual speed and actual steering of the vehicle;
- a steering mechanism operable by the operator of the vehicle to prescribe a steering for the vehicle and having a first output representing said prescribed steering;
- an accelerator mechanism operable by the operator of the vehicle to prescribe a speed for the vehicle and having a second output representing said prescribed speed; and
- integrator linkage means, disposed between said control means and said first and second outputs, for integrating said first and second outputs into a third output, said third output being applied to said control means to coordinate the speed and direction of rotation of each of said reversible motor means in response to said prescribed steering and said prescribed speed, and including means for reducing said actual vehicle steering relative to said prescribed steering as said prescribed speed is increased.

4,790,400

#### STEPPING VEHICLE

Eric Sheeter, C22 Beaver Point Road, RR No. 1, Fulford Harbour, British Columbia, Canada V0S 1C0

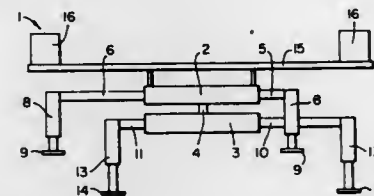
Filed Jul. 20, 1987, Ser. No. 75,475

Claims priority, application United Kingdom, Jul. 24, 1986, 8618044

Int. Cl. B62D 57/02

U.S. Cl. 180-8.6

16 Claims



1. A vehicle comprising:
- a first substantially horizontal mounting;
- a second substantially horizontal mounting beneath the first mounting;
- pivot means by which the 1st and 2nd mountings are pivotally interconnected;
- means for rotating the mountings relative to each other about the pivot through at least about 45°;
- substantially horizontal, first and second mounting extensions, each comprising front and rear portions and slidably mounted on, respectively, the first and second mountings for longitudinal motion relative to the mountings;
- means for reciprocally sliding each substantially horizontal mounting extension longitudinally relative to its associated mounting, and
- first and second sets of supports for alternately supporting the mountings above the ground and that include ground engaging members and that are connected, respectively, to the first and second mounting extensions at the ends of the extensions distant from the mountings,
- means for raising and lowering the ground engaging members of one set above or below the ground engaging members of the other set whereby each set of supports may alternately serve as a load bearing set of supports that support the mounting above the ground and the ground engaging members of which are in a load bearing contact with the ground,
- and in which a work platform is secured on the first or second mountings for substantially horizontal movement with the mountings and the pivot,
- and the means for sliding the mounting extensions comprise means for sliding the mounting extension connected to the load bearing supports in a first direction relative to its associated mounting and thereby moving the pivot in a second opposite, direction relative to the load bearing supports, and
- means for simultaneously sliding the other mounting extension relative to its associated mounting in the said second direction.

4,790,401

#### STEERING FORCE CONTROLLER FOR POWER STEERING APPARATUS

Hirofetu Sonoda, Saitama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Sep. 2, 1987, Ser. No. 92,221

Claims priority, application Japan, Sep. 11, 1986, 61-214491

Int. Cl. B62D 5/08

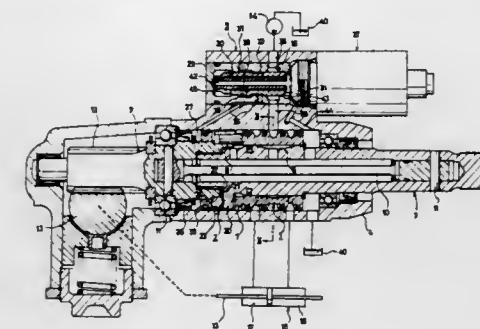
U.S. Cl. 180-142

6 Claims

1. A steering force controller for power steering apparatus including a servo valve for controlling the distribution of an oil pressure from a discharge port of a pump to a power cylinder

through a relative rotation of a pair of valve members, a reaction mechanism for producing a steering reaction in accordance with an oil pressure supplied to an oil pressure reaction chamber and a pressure controlling mechanism for controlling the oil pressure which is supplied to the oil pressure reaction chamber;

the pressure controlling mechanism comprising a spool valve slidably fitted in an internal bore within a housing, a solenoid connected to the spool valve for causing a reciprocating displacement thereof, a pair of low pressure chambers formed at the opposite ends of the spool valve and communicating with a tank associated with the pump, a distribution passage formed around an external peripheral surface of the spool valve, a feed passage opening into



a surface of the housing against which the spool valve slides and communicating with the discharge port of the pump, a reaction passage opening into the sliding surface and communicating with the oil pressure reaction chamber, and a discharge passage opening into the sliding surface and communicating with the tank, the feed passage and the reaction passage and the discharge passage opening into the sliding surface in a sequential order as viewed in the axial direction of the spool valve, the distribution passage being effective to increase a channel area between the reaction passage and the feed passage and to reduce a channel area between the reaction passage and the discharge passage in accordance with a displacement of the spool valve in one direction by the solenoid.

4,790,402

#### AUTOMATED GUIDED VEHICLE

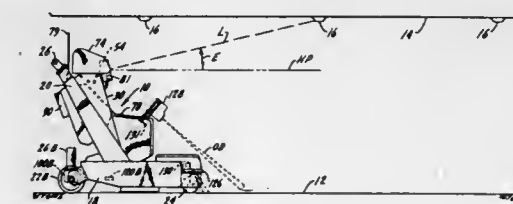
Bruce F. Field, Minneapolis, and Joseph G. Kasper, Golden Valley, both of Minn., assignors to Tennant Company, Minneapolis, Minn.

Filed Sep. 28, 1987, Ser. No. 101,508

Int. Cl. B62D 1/00

U.S. Cl. 180-169

26 Claims



1. In an automated guided vehicle having a frame, drive means mounted on the frame for propelling the vehicle, and steering means associated with the frame for controlling the vehicle's direction of travel, an improved guidance system for controlling the drive means and steering means so as to guide

the vehicle along a desired predetermined path, the guidance system comprising:

- a plurality of spaced retroreflective targets mounted in a sequential manner along the desired path;
- sighting means mounted on the vehicle including transmitting means for emitting a light beam and receiving means for detecting said emitted light beam reflected from one of said targets and defining a target-in-view signal when such light is detected;
- tracking means on the vehicle for controlling the angle of elevation of the transmitted light beam, with reference to a horizontal plane, so as to maintain a target-in-view signal substantially continuously as the vehicle moves by automatically tracking said targets in a sequential manner; and
- control means responsive to the sighting means for activating the drive means or steering means so as to keep the vehicle on the desired path.

4,790,403

#### OUTPUT CONDITION MONITOR APPARATUS FOR A VELOCITY SUSTAINING DEVICE

Tokihiko Akita, Toyota, and Hitoshi Hyodo, Okazaki, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya City, Japan

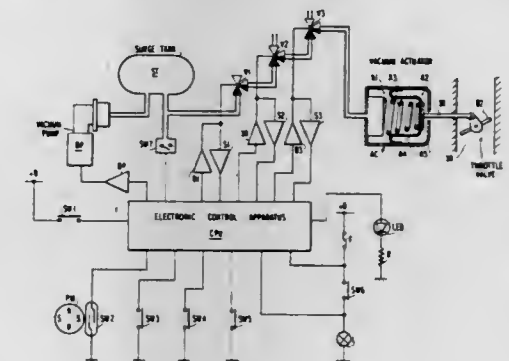
Filed Dec. 18, 1986, Ser. No. 943,010

Claims priority, application Japan, Dec. 21, 1985, 60-288157

Int. Cl. B60K 31/06

U.S. Cl. 180-176

1 Claim

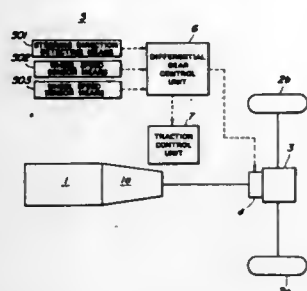


1. A velocity-sustaining apparatus comprising:
- a detector means for detecting the velocity of a vehicle in which the apparatus is installed;
- a storage means in which a desired velocity is stored;
- an actuator means for opening or closing a throttle valve of the vehicle;
- an electronic control means for comparing the velocity detected by the detector means with the velocity stored in the storage means and providing an output signal to a driver means which provides an input signal to the actuator means in such a way that the difference between the detected velocity and the stored velocity is reduced down to zero;
- a comparator means for comparing the output signal from the electronic control means with the input signal to the actuator means;
- a monitor means which stops the operation of the electronic control means when said output signal and said input signal do not agree;
- wherein said monitor means has a first time limit means and provides an output signal which stops the operation of the electronic control means when the time limit means indicates that disagreement between said output signal from said electronic control means and said input signal persists for a first period of time;
- wherein said monitor means has a second time limit means



which inhibits the electronic control means from resuming its normal operation when said output signal from said monitor means persists for a second period of time; and wherein the first period of time for which said first time limit means is set is longer than the second period of time for which said second time limit means is set.

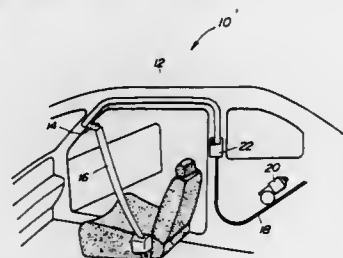
**4,790,404**  
**CONTROL SYSTEM FOR LIMITED-SLIP DIFFERENTIAL GEAR UNIT ASSOCIATED WITH WHEEL-SPINNING PREVENTIVE TRACTION CONTROL SYSTEM**  
Gempel Naito, Kanagawa, Japan, assignor to Nissan Motor Company, Limited, Kanagawa, Japan  
Filed Mar. 12, 1987, Ser. No. 25,171  
Claims priority, application Japan, Mar. 13, 1986, 61-55880  
Int. Cl.<sup>4</sup> B60K 23/04, 31/00  
U.S. Cl. 180—197 10 Claims



1. A differential gear control system for an automotive vehicle which facilitates operation of a traction control system for monitoring a vehicular driving condition indicative of vehicle wheel slippage based on preselected control parameters and being responsive to wheel slippage for adjusting driving torque depending upon a magnitude of said wheel slippage, said differential gear control system comprising:

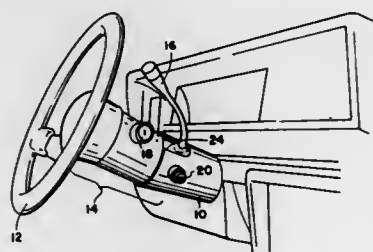
- a differential gear unit disposed within a vehicular power train for distributing a driving torque to first and second driven wheels;
- a slip-limiting means, associated with said differential gear unit, for adjusting a distribution ratio of drive torque for said first and second wheels, said slip-limiting means varying said distribution ratio of said driving torque according to a slip control signal value;
- a steering sensor monitoring steering behavior of a vehicular steering system to produce a sensor signal indicative of a steering direction and a magnitude of steering angular displacement;
- a differential gear control means receiving said steering angle signal for identifying first and second driven wheels relative to a curve, in which said first driven wheel is located inside with respect to the curve and said second wheel is located outside with respect to the curve, and producing said slip control signal for adjusting said distribution ratio to set a slip ratio of said second wheel at a given set value when a wheel speed at said first driven wheel is higher than that at said second wheel, said control means being responsive to said wheel speed at said first wheel being higher than that at said second wheel to output a traction control disabling signal for disabling said traction control system.

**4,790,405**  
**SEAT BELT SYSTEM**  
Sachiro Kataoka, Ebina, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan  
Filed Sep. 28, 1987, Ser. No. 102,060  
Claims priority, application Japan, Sep. 26, 1986, 61-226189  
Int. Cl.<sup>4</sup> B60R 21/00  
U.S. Cl. 180—268 14 Claims



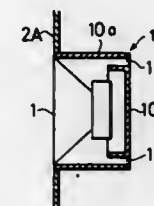
1. A seat belt system for a vehicle comprising: a seat belt for restricting the occupant; drive means for causing said seat belts to move between fitted position, in which the occupant is restricted by means of said seat belt, and a release position, in which the occupant is released from said seat belt; control means for controlling the movement of said seat belt; prohibition means for preventing said seat belt from moving from said fitted position to said release position for a predetermined time when the vehicle is rapidly decelerated; and confirmation means for confirming the connection in said prohibition means and for checking emergency seat belt locking condition.

**4,790,406**  
**ANTI-THEFT DEVICE FOR AN AUTOMOBILE**  
Richard A. Ferrell, Rte. 3, Box 67, Mounds, Okla. 74045, and Edgar E. Spurgeon, 15002 N. Trenton, Skiatook, Okla. 74070  
Filed Nov. 12, 1987, Ser. No. 119,713  
Int. Cl.<sup>4</sup> B60R 25/04  
U.S. Cl. 180—287 5 Claims



1. A defender shield for use with an automobile having a steering wheel on a steering column on which is mounted a shift bowl with lever bracket which comprises: a frusto-conical shaped member having a notch in one end through which the lever bracket of said shift bowl may extend; a lock tube extending outwardly from said member and circumferentially spaced from said notch, the axis of said lock tube extending radially with respect to said frusto-conical shaped member; a bolt lock inserted in said lock tube.

**4,790,407**  
**RESONANCE-COMPENSATED SPEAKER SYSTEM FOR VEHICLE**  
Hideo Yamamoto, and Kazunori Takagi, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan  
Filed Aug. 27, 1986, Ser. No. 900,923  
Claims priority, application Japan, Aug. 29, 1985, 60-130839[U]  
Int. Cl.<sup>4</sup> H05K 5/00  
U.S. Cl. 181—141 8 Claims



1. A vehicular speaker system for use in a movable vehicle having a substantially closed interior passenger compartment comprising: a speaker assembly adapted to be installed in said vehicle for projecting sound into said compartment, wherein said speaker assembly comprises: a speaker unit; an axially extending chamber having a peripheral portion and an end portion respectively enclosing lateral sides and a rear side of said speaker unit; wherein said chamber includes ports formed between said peripheral portion and said end portion and wherein said chamber has a resonance frequency in a range of 300-600 Hz.

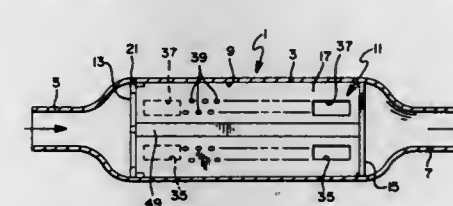
**4,790,408**  
**COILED EXPONENTIAL BASS/MIDRANGE HORN LOUDSPEAKERS**  
John F. Adair, 147 Norwood St., Shreveport, La. 71105  
Filed Jan. 25, 1988, Ser. No. 148,050  
Int. Cl.<sup>4</sup> H05K 5/00  
U.S. Cl. 181—152 22 Claims



1. A coiled exponential bass/midrange horn loudspeaker comprising enclosure means having an open top, said enclosure means adapted for mounting in a selected location for use as a loudspeaker; flared sound chamber means provided in said enclosure means in convoluted relationship, said flared sound chamber means defining an exponentially expanding sound passage inside said enclosure means; a substantially sealed air chamber provided in said enclosure means and an aperture provided in said air chamber, said aperture communicating with said flared sound chamber means; and low frequency driver means provided in said air chamber adjacent to said aperture, for generating sound and projecting the sound

through said flared sound chamber means and from said open top of said enclosure means.

**4,790,409**  
**MUFFLER WITH REVERSE FLOW PASSAGES**  
Don A. Deaver, Jackson, Mich., assignor to Tenneco, Inc., Lincolnshire, Ill.  
Filed May 14, 1987, Ser. No. 50,152  
Int. Cl.<sup>4</sup> F01N 1/08  
U.S. Cl. 181—265 20 Claims

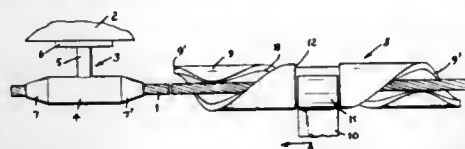


1. A sound attenuating muffler for exhaust gas or the like comprising an elongated tubular housing of round cross section having an inlet at one end and an outlet at the other end and a frame inside the housing constructed and arranged to act with the housing to provide a retroverted path for gas to flow in flowing from the inlet to the outlet, said frame comprising a first transverse partition and a second transverse partition, said transverse partitions extending diametrically across and fitting inside of the housing, said first partition having a substantially imperforate wall with an opening for gas to flow through it, said second partition having a substantially imperforate wall with an opening for gas to flow through it, a first longitudinal partition secured to said first and second transverse partitions, said first partition being substantially trough-shaped with the base of the trough being located substantially adjacent and parallel to the longitudinal axis of the housing, said first longitudinal partition having one end aligned with the opening in the first transverse partition and the other end aligned with the wall of the second transverse partition, a second longitudinal partition secured to said first and second transverse partitions, said second longitudinal partition being substantially trough-shaped with the base of the trough being located substantially adjacent and parallel to the longitudinal axis of the housing, the trough shape of said first longitudinal partition defining a first longitudinal gas passage, the trough shape of said second longitudinal partition defining a second longitudinal gas passage, the space in said housing between said first and second transverse partitions and outside of said trough-shaped first and second longitudinal partitions defining a third longitudinal gas passage, one of said second and third longitudinal gas passages being connected at one end with the opening in said second transverse partition, and gas flow openings located between the first and second transverse partitions providing for transverse gas flow from the downstream end of one longitudinal gas passage to the upstream end of another longitudinal gas passage whereby said first, second, and third longitudinal gas passages provide said retroverted path for gas to follow in flowing from the inlet to the outlet.

**4,790,410**  
**SAFETY TRACK SUPPORT AND COUPLING**  
George P. Sharp, Clwyd, and Thomas W. Brown, Netley Abbey, both of United Kingdom, assignors to Barrow Hepburn Equipment Ltd., London, England  
Filed Dec. 22, 1987, Ser. No. 136,348  
Claims priority, application United Kingdom, Dec. 23, 1986, 8630787  
Int. Cl.<sup>4</sup> A62B 37/00  
U.S. Cl. 182—36 10 Claims

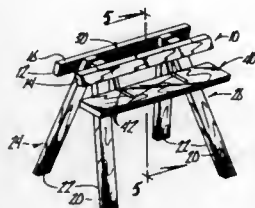
1. Apparatus comprising support means (7,17,30) for locally

supporting a safety track member (1) in spaced relation to a fixed structure (2), and coupling means (8,21,38) for coupling a load to such track member (1), said support means and said coupling means being constructed and arranged to enable said coupling means to pass said support means during travel of said coupling means along the path of said track member (1), characterised in that either said support means (7,17,30) or said coupling means (8,21,38) comprises an arm (5,23,26,31) for attachment to a said fixed structure (2) or to a load as the case may be, whereas the other of said support and coupling means



comprises (i) a tube (9,18,28,40) which defines a passageway for said track member (1), such tube being peripherally interrupted along its length by a slot (16,46) which is wide enough to allow said arm (5,23,26,31) to pass therealong, and (ii) a bearing part (11,19,39) which rotatably supports said tube (9,18,28,40) but so as to allow said arm (5,23,26,31) to pass by such bearing part; at least one end (9',47) of said tube (9,18,28,40) being shaped so that axial abutment pressure of said arm (5,23,26,31) against said end causes rotation of the tube to bring the adjacent end of said slot (16,46) into line with such arm.

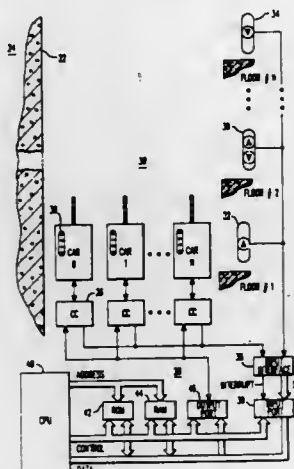
**4,790,411**  
**SAWHORSE WORK TABLE**  
James A. Ottoson, Rte. 4, Box 248, Viroqua, Wis. 54665  
Filed Jan. 2, 1987, Ser. No. 194  
Int. Cl. B27B 21/00; B25H 1/06  
U.S. Cl. 182-129



1. A sawhorse work table comprising,
  - a first inverted V-shaped leg support assembly at one end of said table and a second inverted V-shaped leg support assembly at the other end of said table, each leg assembly includes a pair of leg members having top and bottom ends and inner and outer longitudinal vertical surfaces,
  - a pair of horizontally spaced apart horizontally disposed members secured to the outer surfaces of said leg members to provide spaced apart horizontally disposed coplanar support surfaces whereby the spacing between said horizontal members is sufficient to allow for work tools to operate therebetween on work pieces supported on said support surfaces, and
  - a hinge pivotally interconnects each pair of leg members at their top ends, said hinge being entirely below the top ends of said leg members, and the support surfaces of said horizontal members whereby work tools may operate in the space between said horizontal members over each said hinge throughout the full length of said horizontal members, and said top ends having end surfaces which are coplanar and horizontal, and said coplanar horizontal support surfaces and said end surfaces of said top ends of said leg members being coplanar and horizontal.

**4,790,412**  
**ANTI-BUNCHING METHOD FOR DISPATCHING ELEVATOR CARS**  
Robert C. MacDonald, W. Caldwell, and Elsa Abrego, Nutley, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Mar. 16, 1988, Ser. No. 169,210  
Int. Cl. B66B 1/18

U.S. Cl. 187-127 5 Claims

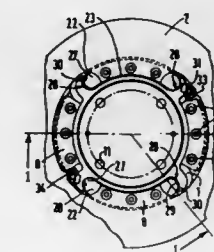


1. A method for assigning hall calls registered from floors of a building to a plurality of elevator cars which provide elevator service for the floors of the building, comprising the steps of:
  - selecting a travel path for each car relative to a floor having a registered hall call to be assigned,
  - preparing a trip list for each car using the travel path selected, including stops to be made for car calls, and previously assigned hall calls,
  - determining the time (ETA) for each car to service the associated trip list and arrive at the floor of a hall call under consideration,
  - and assigning each hall call to an elevator car based upon the relative ETA times,
  - said step of determining the ETA time for each car including the steps of:
    - determining if the car presently being considered has an intervening stop on its trip list, behind the floor of the hall call presently being considered,
    - calculating a dynamic bias value when the car has such an intervening stop, with the dynamic bias value being inversely proportional to a car travel distance between two predetermined locations,
    - and biasing the ETA time of the associated car by subtracting the bias value from the car's ETA time.

**4,790,413**  
**MULTIPLE DISC BRAKE**  
Guy Meynier, Aulnay-sous-Bois, France, assignor to Bendix France, Drancy, France  
Filed Oct. 21, 1987, Ser. No. 111,737  
Claims priority, application France, Oct. 29, 1986, 8615045  
Int. Cl. F16D 65/12

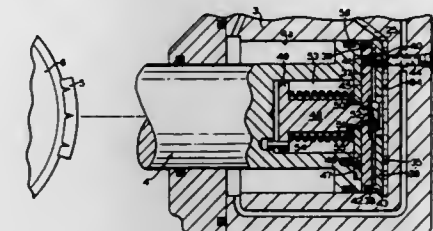
- U.S. Cl. 188-18 A 7 Claims
1. A multiple disc brake comprising a first rotary disc fixed to a hub connected to a rotating member to be braked and at least one second rotary disc capable of sliding axially relative to the hub and to the first disc while at the same time being integral in terms of rotation with the first rotary disc, the axes of the hub and of the discs coinciding with one another, and a set of friction blocks having friction linings capable of being laid against faces of the disc by means of an actuating device,

characterized in that a connection between the second rotary disc and the hub is made by means of at least two axially sliding shoes which are uniformly distributed about the hub and which are each accommodated in an axial receptacle of a cross-section matching that of the shoe, the shoes fixed to one of the inner periphery of the second rotary disc and the outer periphery of a flange part fixed to the hub, and the axial receptacles provided conversely on one of the outer periphery of the flange part fixed to the hub and the inner periphery of the second rotary disc, the axial receptacles including radially spaced open and closed sides and having concave rounded lateral stop flanks for transmitting retaining torque of the second rotary disc to the hub and means for radial retention of the shoes, the radial retention means comprising one edge of a respective lateral stop flank which projects into the open side of the receptacle and which closes over the corresponding shoe in order to retain the shoe at least in one radial direction



**4,790,415**  
**HYDROPNEUMATIC BRAKE ACTUATOR ARRANGED TO MAINTAIN A CONSTANT BRAKE SHOE CLEARANCE**

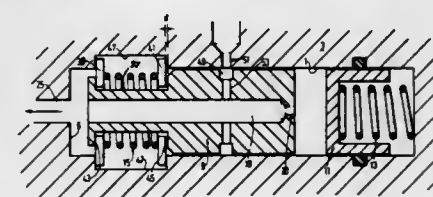
Lewis R. Noah, Greenville, S.C., assignor to American Standard Inc., Spartanburg, S.C.  
Filed Mar. 3, 1988, Ser. No. 163,493  
Int. Cl. F16D 65/54  
U.S. Cl. 188-196 P 9 Claims



of movement, each shoe having at least one convex rounded end which interacts with an associated concave rounded lateral stop flank of the receptacle, an outer edge of the associated concave rounded lateral stop flank closing over the convex rounded end of the shoe in order to trap the shoe radially in the receptacle with a tangential play allowing the shoe to execute small radial and rotational movements and axial sliding to bring the second disc into contact with the associated friction linings, at least one play-compensating spring interposed at one of between the second rotary disc and hub and between a sliding shoe and associated receptacle, and the flange part fixed to the hub having outer peripheral tongues to which inner peripheral tongues integral with the first rotary disc are fastened laterally, the axial receptacles being disposed between the outer peripheral tongues of the flange part, so that each receptacle receives a sliding shoe fixed to the secondary rotary disc.

**4,790,414**  
**RAILWAY DECELERATION CONTROLLER FOR BRAKE**  
Anthony W. Harrison, Selly Oak, England, assignor to Lucas Industries public limited company, Birmingham, England  
Filed Mar. 2, 1987, Ser. No. 20,349  
Claims priority, application United Kingdom, Mar. 7, 1986, 8605716

Int. Cl. B60T 11/10 3 Claims



1. A deceleration controller comprising a body having therein a chamber in the form of an elongate cylindrical bore of substantially uniform diameter extending through said body, a cylindrical valve member movable in said bore between open and closed position to control fluid flow between an inlet port

in the wall of said bore and an outlet port, a piston sealed to the wall of said bore and defining a volume chamber between said valve member and said piston, a passage extending axially through said valve member to connect that part of said bore containing the outlet port with said volume chamber, a main spring located between one axial end of said chamber and said piston, said cylindrical valve member having a reduced diameter region over which a spring is located together with two annular abutment plates, said spring being arranged between said abutment plates to bias said abutment plates apart, said abutment plates extending radially into an annular groove formed in the wall of said bore, whereby the spring biases the valve member towards an axial position in said bore, said inlet port communicating with a radial passage in the valve member, which radial passage connects with said passage which extends axially through the valve member.

1. A vehicle brake actuator device for use with a vehicle having a friction brake surface and brake means movable into and out of engagement therewith, said brake actuator device comprising:

- (a) a cylinder body having a bore therein with an open end and a closed end;
- (b) a power piston operably-disposed in said bore and forming at its one end in cooperation with said closed end of said bore a chamber in which the presence of fluid pressure is effective to actuate said power piston from a brake release position to a brake application position;
- (c) means for urging movement of said power piston toward said release position;
- (d) friction means for providing a stop with which said power piston is engageable to establish said release position thereof in the absence of fluid pressure in said chamber, comprising:
  - (i) first and second pressure plates in said chamber between said power piston and said closed end of said bore;
  - (ii) an annular groove formed jointly by said first and second pressure plates at the periphery thereof;
  - (iii) elastomeric means in said annular groove having frictional engagement with said bore; and
  - (iv) means for adjusting the relative axial position of said first and second pressure plates to vary the width of said groove and thereby the radial pressure with which said elastomeric means engages said bore; and
- (e) means for providing a lost-motion connection between said power piston and said friction means via which said friction means is axially displaced along said bore subsequent to movement of said power piston a predetermined distance from said release position, said predetermined



distance corresponding to the distance said brake means is retracted from said braking surface during movement of said power piston from said brake application position to said brake release position.

4,790,416

## DESK CONVERTING CARRYING CASE

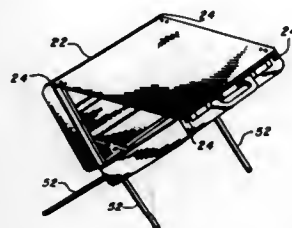
Franklin W. Baker, Los Angeles, Calif., assignor to William M. Kitner, Rolling Hills Estates and Martha T. Cota, Granada Hills, both of Calif., part interest to each  
PCT No. PCT/US85/01449, § 371 Date Dec. 8, 1986, § 102(e)  
Date Dec. 8, 1986, PCT Pub. No. WO87/00737, PCT Pub. Date Feb. 12, 1987

PCT Filed Aug. 1, 1985, Ser. No. 942,454

Int. Cl. A47B 3/10

U.S. Cl. 190—11

20 Claims



1. A desk converting carrying case comprising:

- (a) a rigid carrying case with a handle, a lining, and a clam shell hinge to open in the center;
  - (b) a plurality of leg retaining housings, having external threads thereupon positioned within said case on each outside corner providing a storage enclosure and structured guide;
  - (c) a plurality of housing retaining caps having an aligned bore and a spring retaining cavity on opposed sides, said cap threadably fastened on one end of each leg retaining housing, each cap contiguous with the inside surface of said case and including confining means for interface with said case;
  - (d) restraining means between said leg retaining housing and said rigid case on the end opposite said retaining cap for joining said housing permanently thereunto by urging said cap onto the inside surface of the case in a compressible manner;
  - (e) a plurality of telescoping legs, one slidably disposed with each housing providing an extended member when advanced therefrom;
  - (f) leg retaining means disposed integrally with each leg limiting the extension of travel when said leg is advanced from said retaining housing by structural interference;
  - (g) resilient end means fixed to the extended end of each leg providing an elastic surface on which said case resides in the opened desk converted condition; and,
  - (h) a leg release actuator means on each leg mechanically restricting the movement of said leg within said housing in the retracted position by an interference thereunto, with manual release actuation externally from said case allowing the legs to be extended from outside before opening the case.
11. A desk converting carrying case comprising:
- (a) a rigid carrying case with a handle, a lining, and a clam shell hinge to open in the center;
  - (b) a removable table top having a flat surface on the upper side positioned upon said opened case with at least two edges contiguous thereunto, providing a planar work surface;
  - (c) fastening means connecting said top to said case in a removable manner providing a secure attachment therefor;
  - (d) a plurality of leg retaining housings, having external threads on each end, positioned within said case on each

outside corner providing a storage enclosure and structured guide;

- (e) a plurality of housing retaining caps having an aligned bore and a spring retaining cavity on opposed sides, said cap threadably fastened on one end of each leg retaining housing, each cap contiguous with the inside surface of said case and including confining means for interface with said case;
- (f) restraining means between said leg retaining housing and said rigid case on the end opposite said retaining cap for joining said housing permanently thereunto by urging said cap onto the inside surface of the case in a compressible manner;
- (g) a pair of telescoping legs, having an innermost and outermost leg with said outermost leg having a top and bottom end with an indexing projection near the bottom end, slideably disposed in tandem within each housing providing an extended combined member when advanced therefrom;
- (h) female leg retaining means disposed integrally with each leg limiting the extension of travel when said leg is advanced from said retaining housing by structural interference;
- (i) resilient end means fixed to the extended end of the outermost leg providing an elastic surface on which said case resides in the opened desk converted condition; and,
- (j) a leg release actuator means on each leg manually restricting the movement of said leg within said housing in the retracted position by a mechanical interference thereunto with manual release actuation externally from said case allowing the legs to be extended from outside before opening.

4,790,417

## BRIEF CASE WITH A PORTABLE WIRELESS TELEPHONE

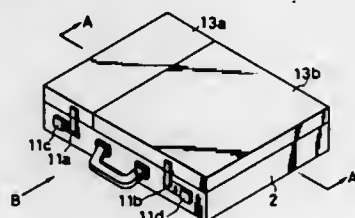
Arifumi Tomikawa, and Nihiko Yasukawa, both of Norcross, Ga., assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 10, 1987, Ser. No. 71,966

Int. Cl. A45G 15/00

U.S. Cl. 190—102

3 Claims



1. A brief case for containing a portable wireless telephone set and other items, comprising:

- a base having a first space for accommodating the telephone set and a second space for accommodating said other items;
- a lid assembly capable of being partially opened to permit access and use of the telephone set, said lid assembly comprising a first lid covering said first space, and a second lid covering said second space;
- a hinge member secured to said base and said lid assembly, said hinge member having an axis about which said lid assembly is rotatable for opening and closing with respect to said base; wherein said first and second lids have abutting edges which extend at right angles to the axis of said hinge member; and
- said abutting edges of said first and second lids having protrusions which overlap each other.

4,790,418

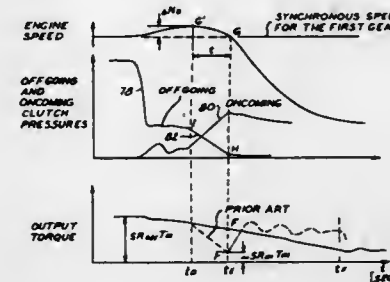
TRANSMISSION CLUTCH LOOP TRANSFER CONTROL  
Larry T. Brown, Westland, and Davorin D. Hrovat, Dearborn, Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 30, 1987, Ser. No. 44,094

Int. Cl. B60K 41/02; F16D 43/284, 43/286

U.S. Cl. 192—0.032

6 Claims



1. A method for controlling transfer of torque from a first friction element to a second friction element while making a speed ratio change from a first speed ratio to a second speed ratio in an automatic transmission adapted for driveable connection to an engine and having a gearset and an output, the friction elements being selectively engaged and disengaged in accordance with the magnitude of hydraulic pressure supplied to the friction elements, comprising:

reducing pressure supplied to the first friction element until engine speed increases by a predetermined amount  $N_e$  above synchronous speed for the first speed ratio; determining the rotating inertia of the engine  $I$ , the speed ratio of the transmission gearset located between the engine and second friction element  $SR_2$ , the speed ratio of the transmission gearset located between the engine and first friction element  $SR_1$ , the speed ratio of the transmission gearset located between the transmission output and first friction element  $SR_1'$ , the speed ratio of the transmission gearset located between the transmission output and second friction element  $SR_2'$ , the value of the ratio  $s = SR_1'/SR_2'$ , and the value of a constant  $s'$  such that  $1 \leq s' \leq s$ ;

calculating transfer constant  $c_1$  from the relationship

$$c_1 = [s'/SR_2' - 1/SR_1'] \cdot 15/[I \cdot \pi \cdot N_e]$$

determining the magnitude of torque to be transferred from the first friction element to the second friction element  $T_1(0)$ ;

calculating the time rate of decrease of torque carried by the first friction element  $k$  from the relationship  $k = c_1 [T_1(0)]^2$ ;

concurrently decreasing at time rate  $k$  pressure supplied to the first friction element and increasing at time rate  $ks'$  pressure supplied to the second friction element; reducing pressure supplied to the first friction element substantially to zero when engine speed declines to synchronous speed for the second speed ratio.

4,790,419

CLUTCH WITH DAMPER TYPE FLYWHEEL  
Pierre Loizeau, Ville D'Avray, France, assignor to Valeo, Paris, France

Filed Jun. 12, 1987, Ser. No. 60,913

Claims priority, application France, Jun. 27, 1986, 86 09339

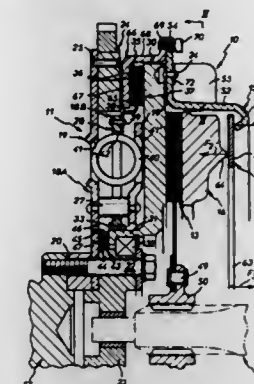
Int. Cl. F16F 15/12; F16D 3/14, 3/66

U.S. Cl. 192—70.18

6 Claims

1. Clutch comprising a flywheel adapted to be constrained to rotate with a first shaft, a friction disk adapted to be constrained to rotate with a second shaft, a clutch cover constrained to rotate with said flywheel, a pressure plate con-

strained to rotate with said cover and movable axially relative to said cover, and axially acting spring means bearing on said cover and adapted to urge said pressure plate towards said flywheel for clamping said friction disk against said flywheel, said cover having a bearing surface, said flywheel comprising first and second parts rotatable relative to each other and circumferentially acting spring means being adapted to resist such relative rotation, said first part being adapted to be constrained to rotate with said first shaft and including a flange



constituting a support flange for the clutch, said second part against which said friction disk is adapted to bear axially, comprising a plate constituting the reaction plate proper and, a torque limiter comprising friction facings and axially acting spring means for clamping up said friction facings, said torque limiter being operative between said plate and said bearing surface on said cover, and said axially acting spring means associated with said friction disk also constituting said axially acting spring means associated with said friction facings of said torque limiter.

4,790,420

## INCHING CONTROL SYSTEM FOR A VEHICLE WITH AUTOMATIC TRANSMISSION

Seiichi Hata, Kamakura; Hideo Akima, Yokohama; Kiyoshi Kitagawa, Tokyo; Masaya Hyodo, and Koji Niinomi, both of Kariya, all of Japan, assignors to Fujitsu Limited, Kawasaki and Kabushiki Kaisha Toyota Jidoshaokki Seisakusho, Kariya, both of Japan

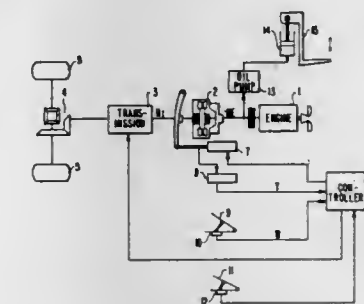
Filed Jul. 3, 1986, Ser. No. 881,929

Claims priority, application Japan, Jul. 5, 1985, 60-148932

Int. Cl. F16D 13/75

U.S. Cl. 192—111 A

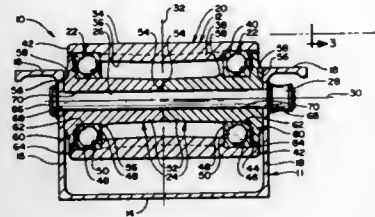
1 Claim



1. An inching control system for a vehicle including an automatic transmission, a clutch, gears, an actuator which drives the clutch, a controller which controls the actuator, an engine, and an inching pedal, comprising: means for detecting an amount of depression of the inching

pedal and for controlling an amount of engagement of the clutch by operating the clutch in accordance with said amount of depression on the inching pedal, means for measuring the clutch position and, means for correcting the amount of engagement of the clutch based on said measured clutch position by fixing a relation between the amount of depression of the inching pedal and the engagement of said clutch as constant.

**4,790,421**  
**ROLLER ASSEMBLY**  
Frederick J. Gorges, Bellevue, Wash., assignor to The Boeing Company, Seattle, Wash.  
Filed Oct. 22, 1987, Ser. No. 111,983  
Int. Cl.<sup>4</sup> B65G 13/00  
U.S. Cl. 193—37 19 Claims

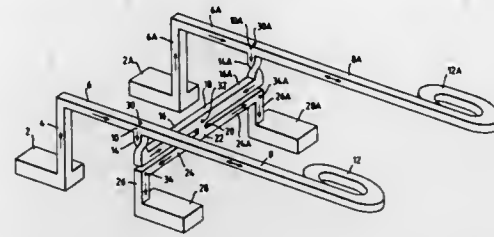


1. A roller assembly comprising:
  - a. a mounting structure comprising two laterally spaced mounting members,
  - b. a shaft having a longitudinal axis, first and second end portions, and a middle portion, the end portions of the shaft being adapted to be mounted to said mounting members,
  - c. first and second locating members, each comprising a main mounting portion, adapted to be mounted to and positioned around said shaft, and an end spacing portion,
  - d. first and second bearing members, adapted to take primarily radial loads, and being adapted to be positioned adjacent to and axially inwardly from, the end spacing portions of the first and second locating members, respectively, and positioned around and supported from the main mounting portions of the locating members,
  - e. a roller member adapted to be positioned around said shaft and bearing members, and supported by said bearing members,
  - f. said assembly being characterized in that in an assembled position said roller member is in operative engagement with said spacing portions and in direct load bearing relationship with said bearing members in a manner that while radial loads are transmitted from said roller member into said bearing members, axial loads on said roller member are transmitted into said locating members and to said mounting structure;
  - g. the main mounting portions of the locating members having axially inwardly located end portions which engage one another so as to locate said locating members relative to one another on said shaft.

**4,790,422**  
**CONVEYOR SYSTEM FOR ROD-LIKE ARTICLES**  
Peter A. Clarke, London, and David C. M. Carter, Coventry, both of England, assignors to Molins PLC, London, England  
Filed Aug. 8, 1986, Ser. No. 894,863  
Claims priority, application United Kingdom, Aug. 9, 1985, 8520104  
Int. Cl.<sup>4</sup> B65G 1/00  
U.S. Cl. 198—347 8 Claims

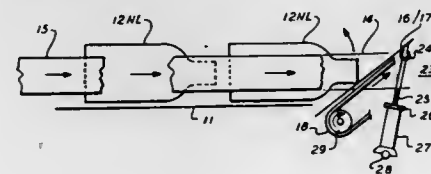
1. A conveyor system for rod-like articles in multi-layer stack formation, comprising a plurality of delivery devices including at least two reversible reservoir units, a plurality of separately driven receiving devices for performing indepen-

dent operations on said rod-like articles, first conveyor means for delivering articles from said reservoir units, means defining a junction for receiving articles in opposite directions from the first conveyor means, and second conveyor means for delivering articles in opposite directions from said junction to either



of at least two of said receiving devices, said first conveyor means having at least a portion comprising unidirectional conveyor means disposed between each reservoir unit and said junction, so that articles cannot be delivered from either reservoir unit to the other reservoir unit.

**4,790,423**  
**BOTTLE STAND UP APPARATUS**  
Patrick J. Hegarty, Belleville, and Dennis Amato, Verona, both of N.J., assignors to Pace Packaging Corporation, Fairfield, N.J.  
Filed Nov. 17, 1986, Ser. No. 931,738  
Int. Cl.<sup>4</sup> B65G 47/24  
U.S. Cl. 198—400 17 Claims

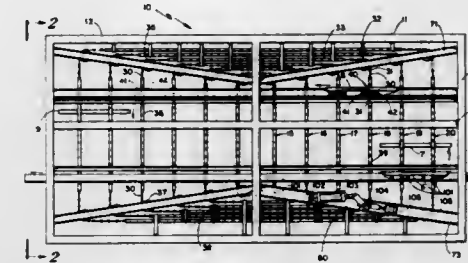


1. A bottle orientation apparatus for the uprighting, on their bases, of a plurality of bottles, whether neck leading or base leading said orientation apparatus comprising:
  - (a) means for conveying each bottle of said plurality of bottles in direction parallel to the axis extending between the neck and the base of said bottle;
  - (b) spaced ramp means, spaced from each other, defining an upward inclined ramp disposed in the path of said bottles while being conveyed by said conveying means;
  - (c) belt means disposed between the respective ramps of said spaced ramp means and upwardly inclined at or near the angle of inclination of said spaced ramp means said belt means being driven in an upward direction;
  - (d) said spaced ramp means interfering with the forward progress of a base leading bottle being conveyed by said conveying means so as to form a fulcrum at the said base of said bottle cooperating with said conveying means for levering the neck of said bottle upward and forward, pivoting on said base into an upright position.

**4,790,424**  
**CONVEYING SYSTEMS**  
Lee E. Tomlinson, Plymouth, Minn., assignor to Environmental Air Contractors, Inc., St. Paul, Minn.  
Filed Jan. 21, 1987, Ser. No. 5,669  
Int. Cl.<sup>4</sup> B65G 47/26  
U.S. Cl. 198—457 8 Claims

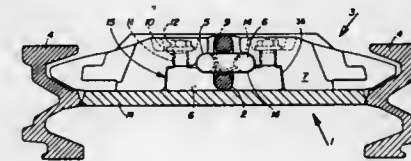
1. A conveyor system for transporting articles comprising:
  - a first conveyor for conveying articles in a first direction;
  - a second conveyor having a section for removing an article

from said first conveyor, said second conveyor having a carrier roller for supporting an article as the article is removed from said first conveyor, said second conveyor having at least two carrousel conveyors with a section for elevating an article and a section for lowering an article, each of said carrousel conveyors comprises a pair of end-



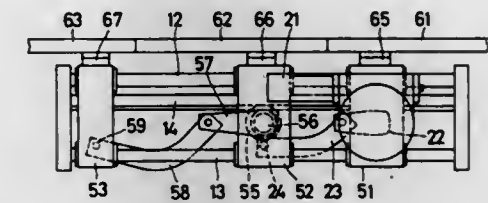
- less chains with a rotatable carrier roller connecting each of said endless chains; and
- a pair of friction drive rollers for engaging said carrier roller for moving said carrier roller to propel an article away from said section for removing an article from said first conveyor.

**4,790,425**  
**CHAIN SCRAPER CONVEYOR HAVING CENTRALLY GUIDED TENSION CHAIN AND CATCHES ATTACHED THERETO**  
Gert Braun, and Ernst Braun, both of Essen-Heisingen, Fed. Rep. of Germany, assignors to Halbach & Braun Industrieanlagen, Fed. Rep. of Germany  
Filed Dec. 5, 1986, Ser. No. 938,649  
Claims priority, application Fed. Rep. of Germany, Dec. 7, 1985, 3543349  
Int. Cl.<sup>4</sup> B65G 19/24  
U.S. Cl. 198—731 3 Claims



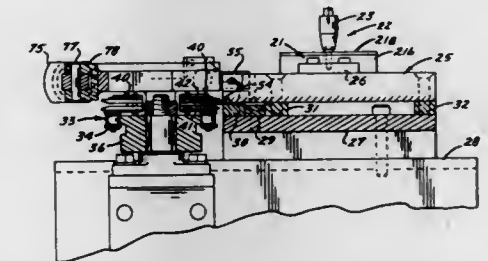
1. A chain scraper conveyor comprising a conveyor trough having a bottom and side guide walls; a centrally guided tension chain between said guide walls; catches fastened to the chain that are guided by the side guide walls, the catches having an underside adjacent the trough bottom with a chain link holder assembly for attaching an O-shaped chain link located parallel to the bottom of the trough, said assembly including a chain stirrup holder, and an elongate chain stirrup having opposite ends which are receivable in the chain stirrup holder in cooperation therewith to releasably grip a central portion of the chain link securely to elastically deform the chain stirrup; said stirrup holder including a bore extending on each of the catches, clamping bolts provided on opposite ends of the chain stirrup which are set with play into the bores of said stirrup holder, and a clamping nut on the other side of the stirrup holder, characterised in that, the chain stirrup holder has bracing surfaces located adjacent the ends of the chain stirrup and the center of the chain stirrup, whereby the chain stirrup can be tightened progressively against the bracing surfaces by the clamping nuts to thereby tighten the chain link and to stretch the chain stirrup holder with an elastic arcuate deformation in the plane of the catch.

**4,790,426**  
**TRANSFER APPARATUS**  
Sadaaki Tenzuki, and Satoru Uemura, both of Kariya, Japan, assignors to Toyoda Koki Kabushiki Kaisha, Kariya, Japan  
Filed Jul. 30, 1987, Ser. No. 79,400  
Claims priority, application Japan, Aug. 5, 1986, 61-184036; Aug. 12, 1986, 61-187702  
Int. Cl.<sup>4</sup> B65G 25/00  
U.S. Cl. 198—741 10 Claims



1. A transfer apparatus designed to transfer workpieces at different pitches by means of a plurality of transfer bars, comprising:
  - a frame;
  - first and second transfer bars supported on said frame in said a manner as to be movable axially in the horizontal direction;
  - guide means provided on said frame so as to extend in parallel to said first and second transfer bars;
  - a first slider block supported on said guide means in such a manner as to be movable horizontally;
  - a driving motor provided on said slider block;
  - advancing means for sliding said slider block along said guide means by means of the rotational output of said driving motor;
  - arm means rotatably supported on said slider block and rotated by means of the rotational output of said driving motor; and
  - first and second transmission means for transmitting the movements of said slider block and said arm means to said first and second transfer bars, respectively whereby said first transfer bar has different pitch of movement than the pitch of movement of said second transfer bar.

**4,790,427**  
**APPARATUS FOR HANDLING PALLET-SUPPORTED WORKPIECES**  
Paul H. Dixon, Belvidere, Ill., assignor to Dixon Automatic Tool, Inc., Rockford, Ill.  
Division of Ser. No. 864,417, May 19, 1986, Pat. No. 4,703,843.  
This application Aug. 20, 1987, Ser. No. 87,698  
The portion of the term of this patent subsequent to Dec. 8, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> B65G 49/00  
U.S. Cl. 198—803.01 2 Claims



1. Apparatus for handling workpieces and comprising a row of pallets each adapted to hold a workpiece, continuously driven power-and-free conveyor means for advancing said

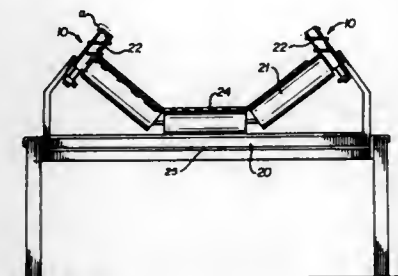


pallets along a predetermined path, each of said pallets including a lip extending along said path and projecting toward said conveyor means, said conveyor means comprising a series of spaced clamp means for normally gripping the lips of said pallets tightly to advance said pallets along said path, said clamp means slipping frictionally along the lip of each pallet when the pallet is stopped along said path and as driving of said conveyor continues.

**4,790,428**  
**CONVEYOR BELT GUIDE ROLLERS**  
Dean L. Ramsey, 207 Silverview Dr., Sarver, Pa. 16055  
Filed Feb. 9, 1987, Ser. No. 12,153  
Int. Cl.<sup>4</sup> B65G 15/60

U.S. Cl. 198—840

4 Claims



1. A guide apparatus for repositioning a misaligned conveyor belt and restricting lateral movement of said belt comprising:

- (a) a load-bearing idler roller located underneath said conveyor belt and mounted on a center pivoted structure assembly, said load-bearing idler roller having a generally smooth surface; and
- (b) a first non-load bearing guide roller mounted on said center pivoted structure assembly and positioned along a side of said conveyor belt and aligned generally perpendicular to said belt for restraining lateral movement of said belt, said first guide roller mounted on said center pivoted structure assembly in such a manner that said first guide roller is longitudinally offset from said assembly in an upstream direction relative to the movement of said conveyor belt such that a section of the belt will contact the first guide roller ahead of the load-bearing idler roller, said first guide roller having a spiral ring encircled about it to guide the belt and force it downwardly along the first guide roller when an upper lateral edge of the belt contacts the spiral ring thereby preventing said belt from climbing above said first guide roller.

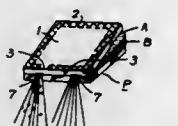
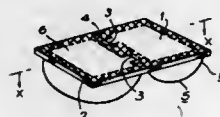
**4,790,429**  
**PACKAGE**  
Taduo Fukushima, Kawasaki, Japan, assignor to Dispen Pak Japan Co., Inc., Tokyo, Japan  
Filed Dec. 30, 1987, Ser. No. 139,622  
Claims priority, application Japan, Jan. 8, 1987, 62-627[U]  
Int. Cl.<sup>4</sup> B65D 25/08

U.S. Cl. 206—219

3 Claims

1. A package comprising:
  - a lid made of a stiff material and having a bending line at the center of the surface thereof; and
  - a container member made of a flexible material, fixed to the reverse of said lid around its peripheral portion and forming pockets on both sides of said bending line;

each of said pockets having a communication portion communicating with one of different portions on said bending



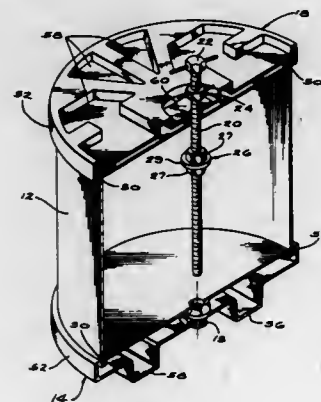
line of said lid but not communicating with another portion.

**4,790,430**  
**AIRCRAFT BRAKE SHIPPING CONTAINER**  
William A. Thomas, 2444 Santa Ynez Way, Palm Springs, Calif. 92264

Filed Jan. 19, 1988, Ser. No. 145,477  
Int. Cl.<sup>4</sup> B65D 85/02

U.S. Cl. 206—303

20 Claims



1. A compact, lightweight, reusable container for shipping brake assemblies comprising:
  - an open ended cylindrical tube having first and second ends;
  - a rotationally molded, plastic base support member on which said first end of said cylindrical tube is mounted;
  - a base nut imbedded in the center of said base support member and aligned with the vertical axis of said cylindrical tube;
  - a rotationally molded, plastic top closure member having a hole centered along the vertical axis of said cylindrical tube and which is mounted on said second end of said cylindrical tube;
  - a threaded shaft running along the vertical axis of said cylindrical tube with one end of said shaft threaded into said base nut and the other end of said shaft extending slightly above the upper surface of said top closure member through said hole in said member;
  - means for rotating said threaded shaft, said rotating means being rigidly affixed to the upper end of said threaded shaft extending through said top closure member;
  - a snug nut threaded onto said threaded shaft between said rotating means and said top closure member, whereby tightening of said snug nut against said upper surface of

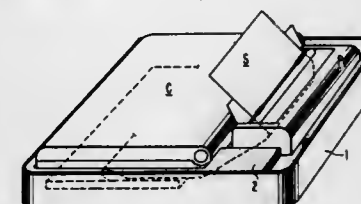
said top closure member forces said top closure member and said base support member against said ends of said cylindrical tube;  
upper and lower spaced means for holding said brake assemblies in place within said container; and  
plug nut means threaded on said threaded shaft for clamping said upper and lower spaced holding means together with said brake assemblies supported between them as said means for rotating said threaded shaft is actuated.

**4,790,431**  
**CARRYING CASE FOR STORING A COMPUTER AND A PRINTER OPERATIVELY CONNECTED THERETO**  
James W. Reel; James R. Simpson, both at Atlanta, Ga., assignor to International Computer Marketing Corporation, Norcross, Ga.

Filed Mar. 31, 1987, Ser. No. 32,386  
Int. Cl.<sup>4</sup> B65D 85/38; G06F 15/02

U.S. Cl. 206—305

19 Claims



1. A carrying case for storing a computer and a printer operatively connected thereto for use thereof in the carrying case, comprising:

- a case formed in two parts which are pivotally connected together along one side of said case;
- closure means disposed on the other side of said case for removably securing said two parts together;
- handle means disposed on said case for single-handed portability of said case;
- a computer removably fitted in said case;
- a printer removably fitted in said case and operatively connectable to said computer for use together without removing either said computer or said printer from said case, said printer being discrete from said computer so as to be removable from said case without removing said computer from said case and said computer being removable from said case without removing said printer from said case;

paper storage means discrete from the printer disposed in said case for receiving paper and guiding the paper as it is withdrawn by said printer during a printing operation while said printer is supported in said case, said paper storage means comprising a space positioned beneath said computer which accommodates a stack of folded paper and guides a continuous sheet of the folded paper such that the continuous sheet forms a loop which passes through said space as it is unfolded and withdrawn by said printer during a printing operation; and  
insert means for positioning said computer and said printer in said case.

18. A carrying case for storing a computer and a printer operatively connected thereto for use thereof in the carrying case, comprising:

- a case formed in two parts which are pivotally connected together along one side of said case;
- closure means disposed on the other side of said case for removably securing said two parts together;
- handle means disposed on said case for single-handed portability of said case;
- insert means for removably supporting a computer and a printer discrete from the computer in said case so that the computer and printer can be operatively connected to-

gether and used without removal thereof from said case, and  
paper storage means discrete from the printer disposed in said case for receiving folded paper and guiding the folded paper as it is unfolded and withdrawn by said printer during a printing operation while the printer is supported in said case, said paper storage means comprising a space positioned beneath said computer when the computer is supported in the case which accommodates a stack of folded paper and guides a continuous sheet of the folded paper such that the continuous sheet forms a loop which passes through said space as it is unfolded and withdrawn by said printer during a printing operation when the printer is supported in the case, said insert means comprising at least one foam insert which defines said space and positions said computer and said printer in said case.

19. A carrying case for storing a computer and a printer operatively connected thereto for use thereof in the carrying case, comprising:

- a case formed in two parts which are pivotally connected together along one side of said case;
- closure means disposed on the other side of said case for removably securing said two parts together;
- handle means disposed on said case for single-handed portability of said case;
- insert means for removably supporting a computer and a printer discrete from the computer in said case so that the computer and the printer can be operatively connected together and used without removal thereof from said case;
- paper storage means disposed in said case for receiving folded paper and guiding the folded paper as it is unfolded and withdrawn by the printer during a printing operation while the printer is supported in said case, said insert means comprising a plurality of foam inserts which cooperate to define said paper storage means and position the computer and the printer in said case, said inserts including a pair of spaced-apart computer support members disposed adjacent opposite inner walls of said case, said computer support members defining therebetween said paper storage means, a printer support member disposed between said opposite inner walls of said case, a separator member along said opposite inner walls of said case and along opposite inner end walls of said case, said separator member being disposed between each of said computer support members and said opposite inner walls of said case and having a height in a direction perpendicular to a bottom surface of said case greater than the height in said direction of said computer support members, said separator member also being disposed between said printer support member and at least one of said inner end walls of said case, said separator member having an upper surface thereof separated from said bottom surface of said case by a distance greater than the distance between the upper surface of said printer support member and said bottom surface of said case.

**4,790,432**  
**TACKLE BOX ASSEMBLY**  
Michael Rees, 1604 Lemon, Highland, Ill. 62249  
Filed May 19, 1987, Ser. No. 51,414  
Int. Cl.<sup>4</sup> A47C 7/62

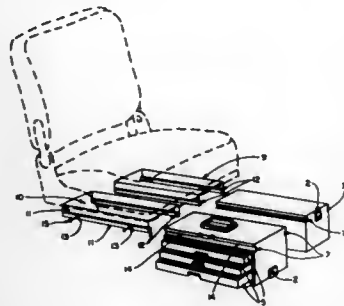
U.S. Cl. 206—315.11

3 Claims

1. A portable, attachable fishing tackle-box and mounting means, comprising:

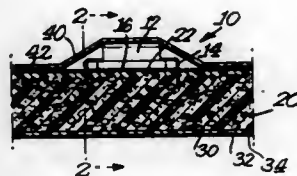
- (1) a tackle-box having upper and lower sections detachably connected to each other by a latch means, each section comprising a shell with an essentially rectangular cross-section having a plurality of slidable drawers therein, a front cover which is slidably attached so as to fold underneath the bottom drawer to allow access to said drawers, and longitudinal attaching grooves on the upper back and front edges thereof;
- (2) a pair of attaching brackets each having a horizontal top

fixedly attached to the underside of a single pedestal fisherman's swivel chair, and two perpendicular sides, each side having a longitudinal ridge projecting inwardly adapted for receipt of said longitudinal grooves in said tackle-box sections;



whereby said upper and lower sections can be detached from each other and attached to the underside of a single pedestal fisherman's swivel chair so that the plurality of drawers in each section faces outwardly from each side of said chair.

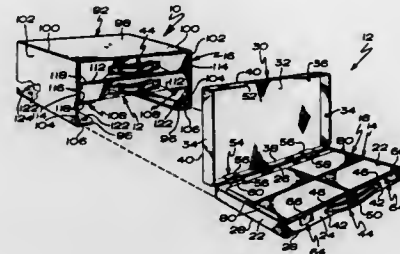
**4,790,433**  
**PACKAGING COMBINATION**  
Lewis R. Raszewski, Stevensville, Md., assignor to The Crowell Corporation, Newport, Del.  
Continuation-in-part of Ser. No. 82,794, Aug. 6, 1987, and a continuation-in-part of Ser. No. 940,566, Dec. 12, 1986, Pat. No. 4,698,254, and a continuation-in-part of Ser. No. 873,819, Jun. 13, 1986, each is a continuation-in-part of Ser. No. 783,430, Oct. 4, 1985, Pat. No. 4,693,056. This application Sep. 22, 1987, Ser. No. 99,727  
Int. Cl.<sup>4</sup> B65D 69/00, 73/02; B32B 3/26  
U.S. Cl. 206—329 7 Claims



1. A packaging assembly for an integrated circuit having a number of connector leads projecting in essentially the same direction, the assembly having a layer of electrically conductive crisp plastic foam about 5 to about 8 millimeters thick, an anti-stat cohesive-nonadhesive coating on a first face of the foam layer, a polyethylene terephthalate film about 25 microns thick laminated to the opposite face of the foam, an anti-stat coating on said film, the integrated circuit being mounted on a central portion of said first foam face with said leads penetrating through that face into the foam, the integrated circuit being covered by a second polyethylene terephthalate film that has one of its faces coated with an anti-stat cohesive-nonadhesive layer and has that face adhered to the anti-stat cohesive-nonadhesive layer on the foam around the integrated circuit.

**4,790,434**  
**DATA CARTRIDGE STORAGE AND HANDLING SYSTEM**

Carl J. Schoberg, Zambro Falls, and Daniel C. Johnson, Rochester, both of Minn., assignors to Liberty Diversified Industries, New Hope, Minn.  
Filed Jul. 3, 1986, Ser. No. 882,134  
Int. Cl.<sup>4</sup> B65D 85/672, 1/24  
U.S. Cl. 206—387 6 Claims



1. A data cartridge handling system for storing and transporting a plurality of data cartridges, said data cartridges being of at least one type selected from varied sizes of data cartridges, said system comprising:  
at least one carrying case having a length and a width dimension, said carrying case having a gripping handle thereon, a base, a lid hingedly attached to said case for swinging movement between an open position and a closed position in covering relation to said base such that a generally dust tight seal is formed between an interior region and an exterior region of the case, and means to secure said lid in said closed position;  
means for removably and engagingly receiving one or more of the data cartridges of a first type selected from the varied sizes in a first pattern or for receiving one or more of the data cartridges of a second type selected from the varied sizes in a second pattern within said base of said carrying case, said means comprising a first array of interconnected partitions corresponding to said first pattern such that said first array of partitions may be disposed between the data cartridges of the first type, and a second array of interconnected partitions corresponding to said second pattern such that said second array of partitions may be disposed between the data cartridges of the second type, said first and second arrays of partitions each being selectively and removably insertable within said case, said first and second arrays of partitions each having a length and width corresponding to said length and width dimensions of said case;  
a shelf module for removably and slidably receiving a plurality of said carrying cases.

**4,790,435**  
**CARD DISPENSER**  
Robert D. Trusty, Mitchell, S. Dak., assignor to Cardmatic, Inc., Sioux Falls, S. Dak.  
Filed Oct. 20, 1987, Ser. No. 111,511  
Int. Cl.<sup>4</sup> B65D 85/67  
U.S. Cl. 206—39.5 13 Claims

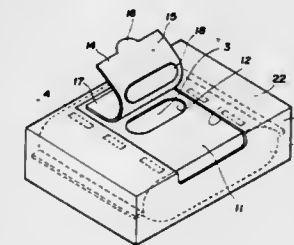


1. A cardholder for containing a plurality of business cards or the like, comprising:  
covering means for supporting business cards,

flat spring means for supporting the covering means, said flat spring means comprising a flat spring having upturned flange portions for retaining the covering means in position;  
backing means for supporting the spring means; and  
housing means for supporting the backing means, spring means and covering means;  
wherein the backing means, spring means and covering means are engaged in the housing means, and business cards are dispensed through an opening between the housing means and a flange on the backing means.

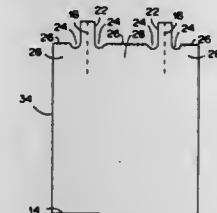
9. A cardholder comprising:  
a housing having a window opening for displaying a card,  
a backing plate supported by flanges extending from the housing and spaced from the window opening, said backing plate comprising a flange at one end cooperating with said housing to form a slot,  
a flat spring supported by the backing plate and comprising oppositely extending flat spring portions and a flange extending upwardly from each end of the flat spring, and a cover plate mounted on the flat spring in contact with at least one of said flat spring portions and portioned between the upwardly extending flanges,  
wherein a business card may be carried by the cover plate aligned with said window opening and said slot to permit the user to contact the card through the window opening and dispense the card through the slot.

**4,790,436**  
**RESEALABLE DISPENSER-CONTAINER**  
Kenji Nakamura, 3-7, Nishiwaji 6-chome, Higashiyodogawa-ku, Osaka, Japan  
Filed Jun. 22, 1987, Ser. No. 64,888  
Claims priority, application Japan, Jun. 23, 1986, 61-095832[U]; Aug. 22, 1986, 61-128777[U]  
Int. Cl.<sup>4</sup> B65D 61/18  
U.S. Cl. 206—449 32 Claims



1. A resealable dispenser-container comprising:  
a deformable container, which is made of a flexible sheet; and a shape maintaining member, which is made of a material harder than said container;  
said container containing contents;  
said container having an opening for dispensing said contents therethrough and a flap secured to said container at all times, said flap made of a flexible sheet material which covers said opening and which is repeatedly opened and closed;  
said shape maintaining member having an opening means for defining larger than said opening formed in said container;  
said opening formed on said container being located within said opening formed in said shape maintaining member; and  
said sheet of said container being fixed to said shape maintaining member at a position near said opening formed in said container.

**4,790,437**  
**THERMOPLASTIC BAG, BAG PACK AND METHOD OF MAKING THE SAME**  
Timothy W. Pistner, Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.  
Filed Nov. 26, 1984, Ser. No. 675,109  
Int. Cl.<sup>4</sup> B65D 30/08, 33/10, 69/00  
U.S. Cl. 206—554 9 Claims



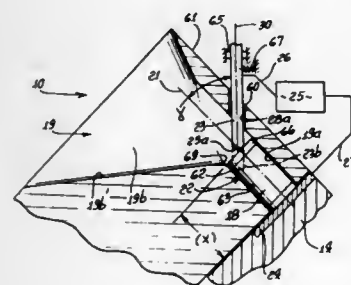
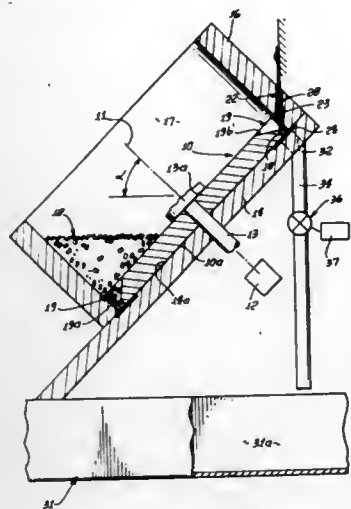
1. A bag structure made of a thermoplastic film comprising a front and rear bag wall, a bottom and an open mouth top portion, said open mouth portion being characterized by having a single film loop handles near opposite ends thereof, said bag having seamless un Gusseted sides, said bag being folded so that said sides meet at a common center line, the bottom of said bag being heat sealed through four layers of film, said bag being folded again along a line coincident with said center line so that said handles are in registration.

**4,790,438**  
**ELECTRICAL COMPONENT SEQUENTIAL TESTING APPARATUS**  
William G. Wilhelm, and Joseph W. Crowmover, both of La Jolla, Calif., assignors to Array Instruments, Inc., San Diego, Calif.  
Continuation-in-part of Ser. No. 18,028, Feb. 24, 1987, abandoned. This application Apr. 3, 1987, Ser. No. 33,722  
Int. Cl.<sup>4</sup> B07C 5/344; G01R 15/00  
U.S. Cl. 209—573 10 Claims

1. In sorting apparatus for electrical components, the combination comprising:  
(a) an electrical test station,  
(b) transport means forming pockets for receiving electrical components and for sequentially lifting said received components to the test station,  
(c) test means including relatively movable contacts at the test station for electrically testing the components, sequentially,  
(d) and the tested components then being discharged from the pockets,  
(e) a receptacle in which multiple of said electrical components are received for exposure to said pockets so as to loosely fit therein, the transport means extending into the receptacle at an angle such as that electrical components lifted by the transport means, but not received in the pockets, fall back into the receptacle, the transport means comprising a rotor having said pockets with tapered entrances and in an annular sequence,  
(f) the electrical contacts being engageable with opposite ends of an electrical component in the pocket lifted to the test station, one contact comprising a conductive ring extending beneath said pockets, the other of the contacts comprising a runner at the test station sidewardly movable into position over the upper end of the component in the pocket lifted to the test station,  
(g) the rotor including a slot, extending about an axis about

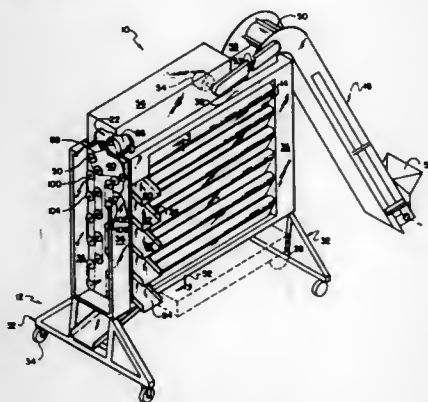


which the rotor is rotatable, and in which said runner is sidewardly movable, and



(h) including a pivot supporting the runner for pivoting in said slot.

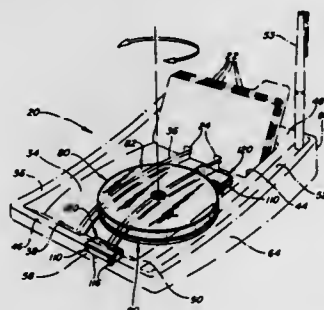
**4,790,439**  
**GRADING MACHINE**  
Roger C. McIntyre, P.O. Box 20, Aransas Pass, Tex. 78336, and  
James W. Smith, 402 Del Mar, Corpus Christi, Tex. 78404  
Filed Nov. 28, 1986, Ser. No. 935,820  
Int. Cl.<sup>4</sup> B07C 1/10  
U.S. Cl. 209-667 14 Claims



1. A device for sorting articles according to size, comprising

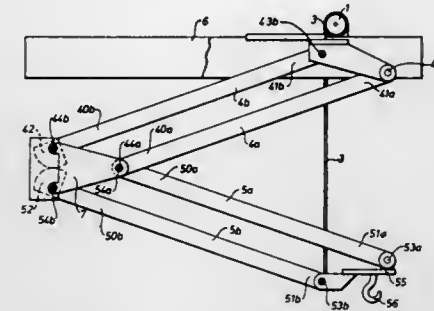
a frame;  
a multiplicity of vertically spaced pairs of laterally spaced rollers mounted on the frame for rotation about parallel inclined axes in an inclined orientation from an elevated inlet end to an outlet end lower than the inlet end, the rollers of each pair being spaced apart at a bight therebetween a greater distance than that of the rollers of the next subjacent pair, each of the rollers including an external surface at least the majority thereof comprising a cylinder and a flat section comprising a chord of the cylinder, the flat section of each roller facing the flat section of the laterally spaced roller in the bight during rotation of the rollers, the rollers of each pair being positioned to deliver articles passing through the bight therebetween into the bight of the next subjacent pair;  
guide means comprising first and second upwardly diverging planar chutes each having a lower end disposed adjacent the bight between the rollers of a first pair and an upper end extending upwardly to adjacent a plane defined by the bottom of the rollers in the pair immediately above the first pair, the chutes and the flat roller sections being coplanar once during each revolution of the rollers;  
means for delivering the articles into the bight of the uppermost pair of rollers;  
means for rotating the rollers in opposite directions with facing surfaces moving upwardly; and  
means adjacent the outlet end of each pair of rollers for separately collecting the articles rejected thereby.

**4,790,440**  
**REVOLVING FILE WITH SWIVEL BASE**  
John Leszczak, Roselle Park, N.J., assignor to The Bates Manufacturing Company, Hackensack, N.J.  
Filed Oct. 30, 1986, Ser. No. 925,710  
Int. Cl.<sup>4</sup> B42F 17/00  
U.S. Cl. 211-11 5 Claims



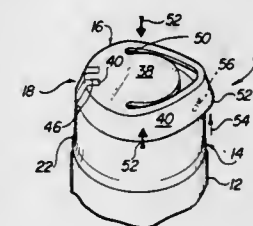
1. A swivelable card file comprising:  
a card file housing having a bottom surface;  
a swivel base;  
said swivel base comprising:  
a top member;  
a bottom member;  
roller bearing means slideably coacting with the top member and with the bottom member;  
fastening means rotatably fastening the top member with the bottom member;  
connecting means connecting said top member to said bottom surface; and  
stabilizer means radially displaced from said swivel base and extending from said bottom surface to approximately the plane of said bottom member.

**4,790,441**  
**DISPLACEMENT APPARATUS**  
Anders B. N. Hansen, Mellby, S-312 00 Laholm, Sweden  
Filed Sep. 15, 1986, Ser. No. 907,673  
Int. Cl.<sup>4</sup> B66C 13/06  
U.S. Cl. 212-147 15 Claims



1. Apparatus for the displacement of articles between positions located substantially in a vertical plane comprising first and second carrier members each including a pair of parallel arms having respective opposite ends, a plate, a first journal means rotatably connecting one of the ends of one of the arms of the first and second carrier members together to said plate for relative rotational movement about a common axis, second and third journal means connecting one of the ends of the other of the arms of the first and second carrier members to said plate for relative rotational movement, a suspension device, means pivotably connecting the other of the ends of the arms of the first carrier member to said suspension device, support means for an article to be displaced, means pivotably connecting the other of the ends of the second carrier member to said suspension device, drive means interconnecting said suspension device and said support means for displacing the same relative to one another in a vertical plane, gear wheels respectively coupled to said second and third journal means and to said one ends of said other arms of said first and second carrier members for undergoing rotation as said other arms undergo rotational movement relative to said plate, said gear wheels being in mesh with one another to provide concordant rotation of said other arms by said second and third journal means as said suspension device and said support means undergo relative displacement in a vertical plane whereby said plate moves in a vertical plane and said arms in said pairs remain parallel to one another, the arms in one pair forming an angle with the arms in the other pair, said arms being all of equal length.

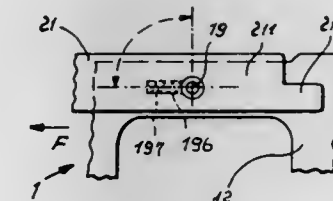
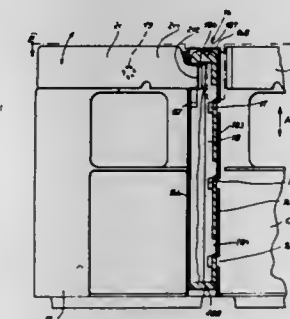
**4,790,442**  
**CHILD RESISTANT CLOSURE**  
Peter P. Gach, Evansville, Ind., assignor to Sunbeam Plastics Corporation, Evansville, Ind.  
Filed Apr. 22, 1988, Ser. No. 184,690  
Int. Cl.<sup>4</sup> B65D 55/02  
U.S. Cl. 215-216 12 Claims



1. A dispensing closure for a container neck comprising:  
a base cap having a top with a dispensing orifice there-

through, an annular skirt depending from the periphery of said top, and means for attachment to said container neck;  
a low profile lid having a top wall and a side wall conforming with said annular cap skirt and contacting said cap top when said lid is in a closed position covering said orifice;  
a hinge connecting said lid to said cap allowing said lid to be swung between said closed position covering said orifice and an open dispensing position; and  
an arcuate slot extending through said lid top adjacent said lid side wall and subtending an angle of at least 180°; whereby said lid can be squeezed inwardly from diametrically opposed points displacing a portion of said lid for swinging the lid from said closed position to said open dispensing position.

**4,790,443**  
**TAKE-APART BOTTLE CARRIER**  
Helmnt Auer, Berlin, Fed. Rep. of Germany, assignor to Peter Dipl.-Kfm. Cremer, Dortmund, Fed. Rep. of Germany  
PCT No. PCT/DE86/00363, § 371 Date May 1, 1987, § 102(e)  
Date May 1, 1987, PCT Pub. No. WO87/01676, PCT Pub. Date Mar. 26, 1987  
PCT Filed Sep. 12, 1986, Ser. No. 47,435  
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1985, 3533114  
Int. Cl.<sup>4</sup> B65D 6/04, 25/04, 25/28  
U.S. Cl. 220-23.4 21 Claims

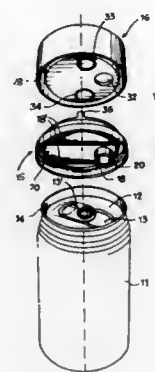


1. A multiple two-part plastic bottle carrier with divisions paralleling one wall; an auxiliary partition demarcating each half of said carrier; interlocking fasteners in form of hooks on said auxiliary partition and projecting beyond said partition at one corner; a shaft at another corner of said partition, recesses matching said hooks ending in said shaft; bolt means in said shaft and engaging behind a hook on a corresponding half of said carrier with corresponding areas; handles pivoting on ends of the halves of said carrier and against said halves, said handles pivoting on pivot means; said handle having flanks with free ends extending beyond said pivot means; at least a free end of said handle having an extension on a side of the half of said carrier having said shaft; said shaft having a wall with an opening facing said extension; said bolt means having a recess in vicinity of said opening; said opening and recess being shaped and positioned so that when said handle is pivoted

against the corresponding half of said carrier, said extension engaging said recess in said bolt means and raising said bolt means into a locking position; said handle having spring-loaded catch means allowing said handle to be pivoted down against its associated carrier half even when said bolt means has been at least partly raised into said locking position.

12. A multiple two-part plastic bottle carrier with divisions paralleling one wall; an auxiliary partition demarcating such half of said carrier; interlocking fasteners in form of hooks on said auxiliary partition and projecting beyond said partition at one corner; a shaft at another corner of said partition, recesses matching said hooks ending in said shaft; bolt means in said shaft and engaging behind a hook on a corresponding half of said carrier with corresponding areas; handles pivoting on ends of the halves of said carrier and against said halves, said handles pivoting on pivot means; and handle having flanks with free ends extending beyond said pivot means; at least a free end of said handle having an extension on a side of the half of said carrier having said shaft; said shaft having a wall with an opening facing said extension; said bolt means having a recess in vicinity of said opening; said opening and recess being shaped and positioned so that when said handle is pivoted against the corresponding half of said carrier, said extension engaging said recess in said bolt means and raising said bolt means into a locking position; said bolt means having spring-loaded catch means allowing said handle to be pivoted down against its associated carrier half even when said bolt means has been at least partly raised into said locking position.

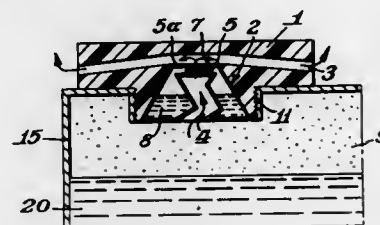
**4,790,444**  
**CUP-CAP COMBINATION FOR SOFT DRINK CANS**  
Dario Terzi, Sarnico, Italy, assignor to Terzi Stampi S.n.c.di Dario Terzi & C., Italy  
Filed Sep. 23, 1987, Ser. No. 100,111  
Claims priority, application Italy, Nov. 27, 1986, 5250 A/86; Jul. 7, 1987, 5206 A/87  
Int. Cl.<sup>4</sup> A47E 19/22  
U.S. Cl. 220—90.2



1. Cup-cap combination applicable to the rim of cans for soft drinks and the like, for pouring or consuming the contents without directly touching the rim, the can having a lid with an opening therein, characterized in that it consists of (a) a base hood fixedly mounted on said rim and having a mouthpiece in juxtaposition with said opening and (b) a cup element rotatably mounted on said hood and having a base aperture positionable in juxtaposition with said mouthpiece for sealing said can.

**4,790,445**  
**CAP FOR CONTAINERS USED TO STORE VOLATILE LIQUIDS**

Yoshihiko Shibata, Okayama, Japan, assignor to Japan Gore-Tex, Inc., Japan  
Filed Mar. 28, 1988, Ser. No. 174,216  
Claims priority, application Japan, Apr. 7, 1987, 62-051591[U]  
Int. Cl.<sup>4</sup> B65D 51/6  
U.S. Cl. 220—202

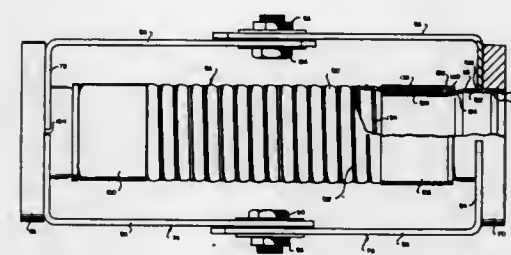
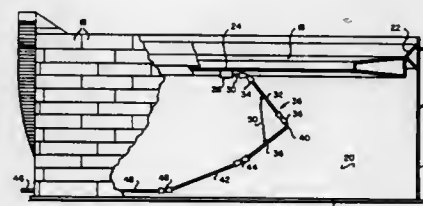


1. A vented cap for a container used to store volatile liquids comprising:  
a main body having a vent port and means for affixing said cap to said container,  
a filter accommodation space within said main body adjacent said vent port,  
a filter assembly affixed in said filter accommodation space, said filter assembly having an open inner channel and an outer annular space,  
said inner channel extending from the bottom of said filter assembly part way into, but not completely through, said filter assembly,  
the inner channel having a first hydrophobic porous membrane installed over the innermost end of said channel, and a second hydrophobic porous membrane installed between said vent port and said filter assembly, thus forming a liquid passageway between said first and second membrane,  
and an aqueous liquid partly, but not completely, filling said annular space such that, in an upright position, said liquid does not immerse said first membrane.

**4,790,446**  
**FLOATING ROOF DRAIN SYSTEM**  
Roger W. Thiltgen, Buena Park, Calif., assignor to Pivot Masters, Inc., Houston, Tex.  
Filed Sep. 13, 1982, Ser. No. 417,705  
Int. Cl.<sup>4</sup> B65D 88/42  
U.S. Cl. 220—219

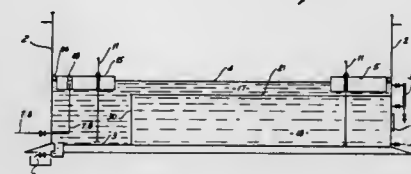
1. A swivel joint comprising the combination of a pair of side frames, each having a central portion and an opposite pair of leg portions, each of the leg portions being pivotally coupled to a different one of the leg portions of the other side frame, a pair of pipe couplings, each being mounted on the central portion of a different one of the pair of the side frames and having a generally circular aperture therein, a length of flexible pipe disposed within the pair of side frames and having a first end coupled to a first one of the pair of pipe couplings and an opposite second end coupled to a second one of the pair of pipe couplings, the length of flexible pipe being comprised of an outer wire helix, and an inner wire helix disposed within the outer wire helix and a hollow, generally cylindrical length of flexible hose disposed between the outer wire helix and the inner wire helix, a pair of hollow, generally circular swedges, each being mounted within the generally circular aperture of a different one of the pair of pipe couplings and mounting a different one of the first and second ends of the length of flexible pipe thereon, a pair of hollow, generally cylindrical collars, each being disposed over a portion of the outside of a different one of the pair of swedges and receiving a different

one of the first and second ends of the length of flexible pipe therebetween, each of the swedges having a first generally cylindrical portion of larger diameter welded to a different one of the pipe couplings within the generally circular aperture thereof and tapering to a second generally cylindrical portion of smaller diameter disposed inside of a different one of the first



and second ends of the length of flexible pipe, and a pair of rings, each disposed on the outside of a different one of the pair of swedges where the swedge tapers from the first generally cylindrical portion of larger diameter to the second generally cylindrical portion of smaller diameter and residing against an end of a different one of a pair of generally cylindrical collars.

**4,790,447**  
**MODIFICATION TO FLOATING ROOF TANK DESIGN**  
Lealie M. Lenny, Caringbah, Australia, assignor to Caltex Oil (Australia) Pty. Limited, New South Wales, Australia  
Continuation of Ser. No. 723,008, Apr. 16, 1985, abandoned, which is a continuation of Ser. No. 531,506, Sep. 12, 1983, abandoned. This application Sep. 17, 1986, Ser. No. 910,298  
Claims priority, application Australia, Sep. 13, 1982, PF5853  
Int. Cl.<sup>4</sup> B65D 88/34, 88/40, 88/54  
U.S. Cl. 220—220



1. A floating roof liquid storage tank, comprising:  
a tank shell supported by a fixed, substantially flat base;  
a floating roof buoyantly supported by stored liquid in said tank, said roof including projections extending downwardly therefrom to support said roof at a minimum liquid level in said tank by engagement of lowermost portions of said projections with said base, said projections having a substantially negligible volume relative to the volume of said tank; and  
displacement means for displacing a major portion of said stored liquid normally present between said base and roof when said roof is at said minimum liquid level, wherein said displacement means comprises (1) a rigid dam wall

extending upwardly from said base and having a wall height which extends nearly to but lower than a lowermost surface portion of said roof when said roof is at said minimum liquid level position and (2) a substantially constant volume of a displacement liquid retained on said base by said dam wall, said displacement liquid covering an area less than that of said base of said storage tank and having a substantially constant depth substantially equal to the height of said dam wall so as to displace said stored liquid and reduce the inventory of said stored liquid that would otherwise remain at emptying of the tank while retaining said displacement liquid behind said dam, said displacement liquid having a specific gravity greater than that of said stored liquid in said tank.

12. A method of displacing an inventory heel of a stored liquid normally located adjacent the base of a floating roof tank that is difficult to withdraw at emptying of the tank, which comprises:

a tank shell supported by a fixed base;  
a floating roof buoyantly supported by said stored liquid in said tank, said roof including a plurality of projections extending downwardly therefrom to support said roof at a minimum liquid level in said tank by engagement of lowermost portions of said projection with said base, and said projections having a substantially negligible volume relative to the volume of said tank, and a dam wall extending upwardly from said base; wherein

said method comprises the step of displacing a major portion of said stored liquid in said tank normally present between said base and said roof when said roof is at said minimum level by introducing a substantially constant volume of ballast material into said tank adjacent the base thereof, and setting the depth of said ballast material to be less than the height of said roof above said base when said roof is at said minimum liquid level such that said roof is in contact with only said stored liquid when buoyantly supported by said stored liquid in said tank above said minimum liquid level wherein said ballast material comprises a displacement liquid having a specific gravity greater than that of the stored liquid supporting said roof; and

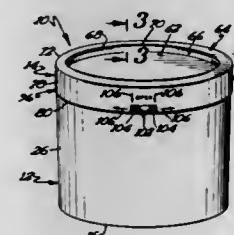
restraining said displacement liquid to an area of said tank by retaining said displacement liquid behind said dam wall, said dam wall having a height substantially corresponding to the depths of said displacement liquid so as to displace said stored liquid and thereby reduce the inventory heel of said stored liquid while retaining said displacement liquid behind said dam.

**4,790,448**  
**CONTAINER AND LID WITH TAMPER EVIDENT CLOSURE**

James V. Ostrum, St. Paul; Gary C. Springer, Maple Grove; Kenneth G. Weller, Minneapolis; John E. Richard, Rockford, and Robert E. Montrose, Plymouth, all of Minn., assignors to Liberty Diversified Industries, New Hope, Minn.  
Filed Sep. 8, 1987, Ser. No. 93,980  
Int. Cl.<sup>4</sup> B65D 17/34

U.S. Cl. 220—270

26 Claims



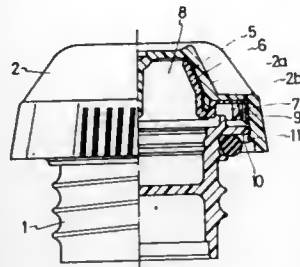
1. A container and lid assembly comprising:  
a container body, said container body including a bottom portion, a container wall having an inner surface and an



outer surface extending upwardly from said bottom portion to a top edge defining an open top, a container rim extending peripherally around said open top, a locking bead extending radially outward from said outer surface of said container wall adjacent said top edge of said container wall, a first shoulder extending radially outward from said outer surface of said container wall below said locking bead and terminating in an outer edge, and a second shoulder extending radially outward from said container wall and having a top surface; and

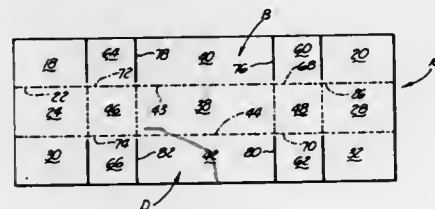
a lid member forming a sealing closure over the open top of the container body when said lid member is mounted on the container rim, said lid member comprising a top portion, a generally vertical inner wall connected to said top portion, and a skirt portion connected to and depending from said top portion and defining an inner surface, said skirt portion being positioned confronting the outer surface of the container wall and said inner wall of the lid member confronting the inner surface of the container wall when said lid member is mounted on the container rim, said skirt portion defining a ridge member extending radially inwardly from said inner surface of said skirt portion and positioned below the locking bead of the container body when said lid member is mounted on the container rim, said skirt portion further having a groove extending around said inner surface of said skirt portion below said ridge member and defining a tear strip region below said groove, said groove engaging the outer edge of the first shoulder when said lid member is mounted on the container rim, said tear strip further defining a gripping region and a distal end, said distal end closely confronting the top surface of the second shoulder when the lid member is mounted on the container rim.

**4,790,449**  
**SAFETY PLASTIC FILLER NECK CAP**  
 Sato Kyokuchi, and Kayatani Tooru, both of Soja, Japan, assignors to OM Industrial Co., Ltd., Okayama, Japan  
 Filed Mar. 24, 1988, Ser. No. 173,061  
 Claims priority, application Japan, Jan. 16, 1988, 63-7113  
 Int. Cl.<sup>4</sup> B65D 41/04  
 U.S. Cl. 220—288 1 Claim



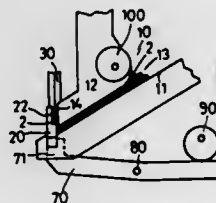
1. A plastic filler neck cap for automobiles or the like wherein a screw body to be threadably fitted into the fuel supplying port and a cap being positioned on the handgrip operating side are unitedly assembled with each other in opening-closing torque controllable manner, characterized in that the cap comprises two members of a cover portion and an annular thin latching member both made from different materials, and that there is provided between said two members of the cover portion and latching member a whirl-stop of a plurality of concavo-convex coupling portions to unitedly assemble said two members.

**4,790,450**  
**MEAT CONTAINER**  
 William E. Archibald, Oklahoma City, Okla., assignor to Wilson Foods Corporation, Oklahoma City, Okla.  
 Filed Sep. 20, 1982, Ser. No. 420,017  
 Int. Cl.<sup>4</sup> B65D 5/02, 5/56  
 U.S. Cl. 220—418 13 Claims



10. A container for fresh cuts of meat comprising:  
 a bottom panel;  
 side walls including flaps formed integrally with said bottom panel and extending perpendicularly upwardly therefrom;  
 end wall panels formed integrally with said bottom panel and extending perpendicularly upwardly therefrom and at right angles to said side wall flaps, each of said end wall panels including portions adjacent said bottom panel which are formed integrally with lower portions of said flaps and cooperate with said lower portions of said flaps and said bottom panel to form closed, liquid impermeable corners, and said bottom panel and the lower portions of said side wall flaps and end wall panels together forming an unslitted tray located at, and constituting, the bottom portion of said container and including said imperforate corners; and  
 a container top extending between said side wall flaps and parallel to said tray bottom panel, and completely closing said container, said bottom panel and container top each being craft corrugated board including:  
 an inner liner;  
 an outer liner; and  
 a corrugated medium positioned between said outer liner and said inner liner, said outer liner having a wire side located on the opposite side of the outer liner from the side thereof adjacent the medium, and having a felt side adjacent the medium.

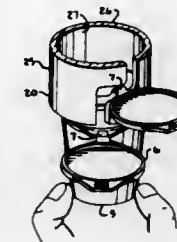
**4,790,451**  
**APPARATUS FOR DISPENSING CYLINDRICAL CAPSULES**  
 Robert Cassou; Maurice Cassou, both of Rue Clémenceau, and Bertrand Cassou, Saint Symphorien des Bruyeres, all of, 61000 L'Aigle, France  
 Filed Jan. 20, 1987, Ser. No. 4,894  
 Claims priority, application France, Jan. 27, 1986, 86 01094  
 Int. Cl.<sup>4</sup> B65G 59/06  
 U.S. Cl. 221—233 7 Claims



1. A dispenser for dispensing and conveying capsules to a printer for receiving indicia comprises a sloping ramp and a complementary guide means which define a conveying pas-

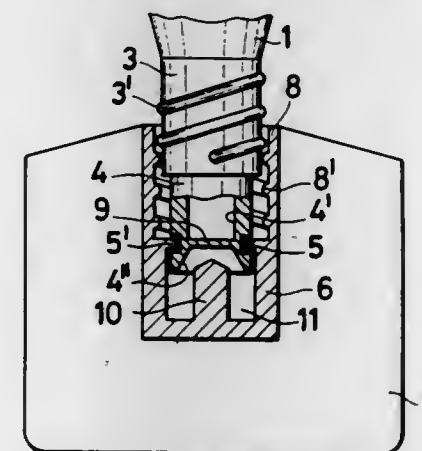
sageway having an inlet and an outlet and a vertically movable slide member associated with said outlet and movable between a first position wherein said slide member receives a capsule from said conveying passageway outlet and a second position wherein a portion of said slide member seals said conveying passageway outlet wherein said slide member when in said second position defines with said complementary guide means above said outlet a horizontally extending passageway for conveying the capsule to the printer including drive means associated with said horizontally extending passageway for receiving said capsule when said slide member is in said second position and transporting said capsule to said printer wherein the slide member comprises at least one pair of contact rollers arranged at the end of the slide member which cooperate with said drive means for conveying the capsule.

**4,790,452**  
**VIAL DISPENSER**  
 Harold T. Pehr, P.O. Box 6698, Leawood, Kans. 66206  
 Filed Dec. 1, 1987, Ser. No. 127,209  
 Int. Cl.<sup>4</sup> A47F 1/08  
 U.S. Cl. 221—303 6 Claims



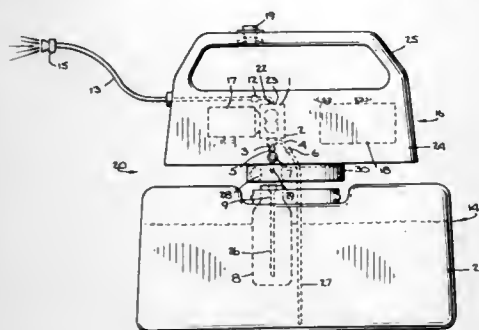
1. A tubular dispenser in combination with a plurality of vials; each of said vials having a cap secured to a body by a hinge member projecting radially outward from said body; said dispenser comprising:  
 (a) an elongate tubular member sized to slidably receive said vial bodies in nested relationship to one another having a central axis and an outer wall;  
 (b) support structure for mounting said member such that said axis is generally vertically aligned;  
 (c) said tubular member including an elongate slot extending between opposite ends of said tubular member; said hinge member being smaller in width than said slot and each of said caps and said bodies being substantially larger in width than said slot; said slot being sized to receive the hinge member between the body and cap of each of said vials and said slot extending between the interior and exterior of said tubular member wall; and wherein:  
 (d) said slot includes a non-vertical offset near a lower end of said tubular member; said offset supporting said hinge member of a lowest of said vials; each of said caps positioning their respective hinge member, when their respective vial body is in said that their hinge member will engage said offset when said vial is the lowest of said vials, such as to hold vials positioned thereabove while not urging said cap against said tubular member, but adapted to allow a user to selectively rotate a single vial at said offset and then remove said single vial from said dispenser.

**4,790,453**  
**PLASTIC CONTAINER FOR THE CONTROLLED DISPENSING OF POWDERS AND/OR LIQUIDS**  
 Antonio Fontana; Giovanni Ferrari, both of Carpi; Evro Fabbri, Rovereto di Novi, and Romano Campanini, Siena, all of Italy, assignors to Lameplast di Giovanni Ferrari & C. s.n.c., Modena and Sclavo S.p.A., Siena, both of Italy  
 Filed Dec. 30, 1986, Ser. No. 947,893  
 Claims priority, application Italy, Dec. 31, 1985, 29063/85[U]  
 Int. Cl.<sup>4</sup> B67B 7/24  
 U.S. Cl. 222—83 3 Claims



1. A container provided for the controlled dispensing of powders and liquids which comprises,  
 a container body,  
 an externally threaded neck provided on said container body,  
 a cylindrical, tubular extension member axially connected at one end to the externally threaded container neck,  
 said cylindrical, tubular extension member having an inner bore comprising a calibrated portion and terminating at the other end thereof in a divergent frustoconical outlet mouth portion,  
 a rupturable transverse membrane diaphragm sealingly separating the calibrated portion from the outlet mouth portion,  
 a circumferential groove provided on the outer surface of said tubular extension member, in the vicinity of the diaphragm, and  
 a cylindrical capsule acting as a sealing and resealing device, said capsule having at one end thereof an internally threaded portion adapted for screw engagement with the externally threaded neck, an elastic restraining ring circumferentially provided on the inner surface of the cylindrical capsule for spring-engagement with said circumferential groove, and a piercing pin extending axially within said cylindrical capsule, said piercing pin piercing the diaphragm when the cylindrical capsule is screwed down onto said neck causing the restraining ring to exit the circumferential groove of the tubular extension member, wherein the calibrated portion of the inner bore of said tubular extension has a diameter larger than the minimum diameter of the divergent frustum conically shaped outlet mouth portion and as such becomes equal to said minimum diameter by the overlapping of the diaphragm edges generated by the piercing action of the piercing pin of the cylindrical capsule, whereby when the restraining ring is engaged in said circumferential groove, the axial movement of the cylindrical capsule relative to the externally threaded neck is prevented.

**4,790,454**  
**SELF-CONTAINED APPARATUS FOR ADMIXING A PLURALITY OF LIQUIDS**  
 Richard J. Clark, Bexar County, Tex., and Stephen R. Horvath, Jr., Racine County, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.  
 Filed Jul. 17, 1987, Ser. No. 74,550  
 Int. Cl.<sup>4</sup> B67D 5/48, 5/60  
 U.S. Cl. 222—136 18 Claims

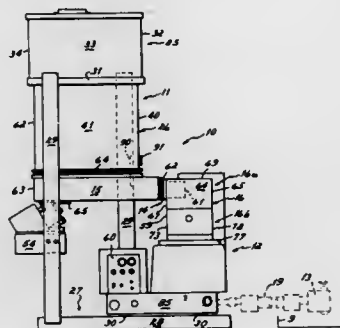


1. A self-contained apparatus for admixing a plurality of liquids to produce a liquid mixture, the apparatus comprising:
  - a. a positive-displacement pump means able to provide a substantially constant liquid flow without pulsation and having a suction side, a dispensing side, a plurality of inlet orifices at the suction side thereof, and at least one outlet orifice at the dispensing side thereof;
  - b. a power source operatively connected to the pump means for driving said positive-displacement pump means;
  - c. means, in fluid communication with the outlet orifice of the pump means, for preventing backflow of said liquid mixture through said positive-displacement pump means;
  - d. a plurality of conduit means, in fluid communication with the pump means and corresponding in number to the plurality of pump means inlet orifices, for providing fluid communication between each pump means inlet orifice and a respective one of a corresponding plurality of liquid-containment vessels;
  - e. means, in fluid communication with each respective one of the plurality of pump means inlet orifices, for preventing backflow of said plurality of liquids through the plural conduit means back into each respective liquid-containment vessel;
  - f. means, in fluid communication with one of the plurality of inlet orifices via the corresponding conduit means thereof, for selecting liquid flow rate through said corresponding conduit means relative to liquid flow rate through at least one other of the plurality of conduit means; and
  - g. dispensing means, in fluid communication with the outlet orifice, by which the liquid mixture can be discharged from said apparatus;
  - h. whereby said plurality of liquids can be drawn into said positive-displacement pump means from their respective liquid-containment vessels via each respective one of said plural conduit means, can be mixed in said pump means, and can be discharged from said apparatus via said dispensing means.

**4,790,455**  
**HOT MELT DISPENSING APPARATUS HAVING OFFSET HOPPER**  
 Bruce G. Dieringer, Norcross, and Kenneth E. Rothrauff, Suwanee, both of Ga., assignors to Nordson Corporation, Westlake, Ohio  
 Filed Nov. 10, 1986, Ser. No. 928,962  
 Int. Cl.<sup>4</sup> A47G 19/12  
 U.S. Cl. 222—146.2 4 Claims

1. An apparatus for converting solid thermoplastic material

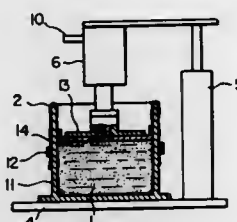
to molten thermoplastic material and for dispensing the molten thermoplastic material, said apparatus comprising a solid thermoplastic material receiving hopper having side walls and a bottom opening, a feed chute mounted beneath said opening in said hopper, said chute having an open upper end for receiving solid material from the bottom opening of said hopper, said chute having a discharge end opening laterally offset from the vertical plane of said hopper, means for vibrating said chute so as to effect movement of solid thermoplastic material along said chute and out of said discharge end opening of said chute,



- a reservoir mounted beneath said discharge end opening of said chute, said reservoir being open at the top for receiving solid thermoplastic material from said discharge end opening of said chute, means for heating said reservoir so as to convert said solid thermoplastic from a solid to a molten state,
- said hopper being laterally offset from said heated reservoir so as to prevent heat from said reservoir from melting solid thermoplastic material contained within said hopper, and
- said discharge end of said chute being enclosed within a hood, which hood has a bottom open to the open top of said reservoir.

**4,790,456**  
**MATERIAL SUPPLY EQUIPMENT FOR VISCOUS FLUID PRESSURE FEED SYSTEM**  
 Yasuji Nakane, and Yoshihumi Fujii, both of Tokyo, Japan, assignors to Three Bond Co., Ltd., Tokyo, Japan  
 Filed Oct. 3, 1985, Ser. No. 783,470  
 Claims priority, application Japan, Oct. 6, 1984, 59-151445[U]  
 Int. Cl.<sup>4</sup> B65D 88/60 2 Claims

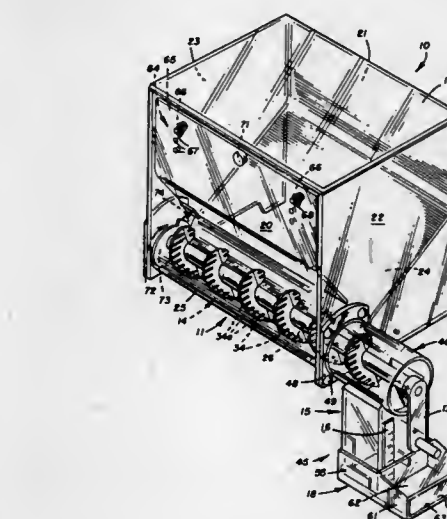
U.S. Cl. 222—183



1. In a pressure feed system for feeding high-viscosity fluids by sucking the fluid from a polyethylene bag placed in a container with a suction pump, material supply equipment for said viscous fluid pressure feed system comprising: a cylindrical container having a constant diameter substan-

tially to the bottom thereof, the bottom being substantially planar:  
 a planar inside cover plate matching the planar surface of the bottom of said container having a peripheral surface closely fitting the inside surface of said container to tightly press said polyethylene bag against the interior of said container when said planar inside cover plate is inserted in said container; said planar inside cover plate having a plurality of small central suction holes;  
 a planar suction plate secured to a lower end of said suction pump; a lower surface of said planar suction plate mating with, closely fitting, and substantially covering the upper surface of said planar inside cover plate; said planar suction plate having a plurality of small centrally located suction holes in registration with said plurality of small central suction holes in said planar inside cover plate; suction pump lifting and lowering means adapted to press said planar suction plate down on said planar inside cover plate when said pump is lowered;  
 an O-ring groove in said planar suction plate encircling said plurality of small central suction holes, and an O-ring seated in said groove to minimize infusion of air beneath said planar inside cover plate; and  
 fastening means for fastening an upper edge portion of said polyethylene bag overlapping and folding down around the outside of said cylindrical container in place.

**4,790,457**  
**SANITARY FOODSTUFF DISPENSER WITH BAFFLE**  
 Hugh B. Morse, 680 Wildwood Drive, Watsonville, Calif. 95076, and John V. Ciolino, 13558 Paseo Terrano, Salinas, Calif. 93908  
 Continuation-in-part of Ser. No. 941,732, Dec. 15, 1986. This application Jul. 20, 1987, Ser. No. 75,130  
 Int. Cl.<sup>4</sup> B67D 5/60 9 Claims

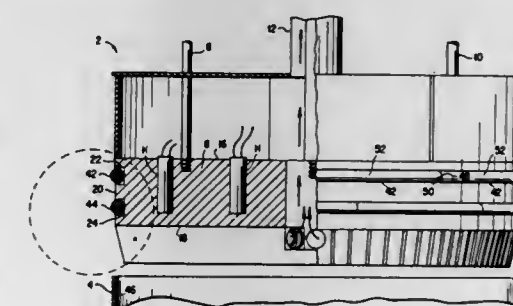


1. A sanitary foodstuff dispenser for dispensing a measured quantity of solid foodstuff comprising upstanding front, back and side walls and a bottom wall secured in said container to slope downwardly from said back wall toward said front wall, a closed container defining a chamber adapted to be at least partially filled with a preselected quantity of solid foodstuff, a measuring cup means mounted on said container for receiving said measured quantity of said foodstuff, screw means exposed to the foodstuff in said chamber for selectively filling said cup means with said measured quantity of foodstuff in response to rotation of said screw

means, said screw means positioned closely adjacent to a juncture of said front wall and said bottom wall, dispensing means for dispensing said measured quantity of foodstuff from said cup means, baffle means movably mounted in said chamber, said baffle means comprising a baffle mounted on said front wall and sloping downwardly and away from said front wall and towards said bottom wall to terminate at an edge defined on a lower end thereof spaced from said bottom wall to define an unobstructed gate controlling the quantity of foodstuff to said screw means, and actuating means secured on and responsive to rotation of said screw means for shaking said baffle means and said foodstuff.

**4,790,458**  
**FOLLOWER PLATE SEAL**  
 Leo M. Moore, Chesterfield, Va., assignor to Industrial Machine Manufacturing, Inc., Richmond, Va.  
 Filed Sep. 11, 1987, Ser. No. 95,117  
 Int. Cl.<sup>4</sup> B67D 5/62 12 Claims

U.S. Cl. 222—386



1. Apparatus for use in dispensing, comprising: a plate of material shaped to fit inside a container of dispensable material, said plate having an upper surface, a lower surface and a side surface which extends from said upper surface to said lower surface; at least one groove in said side surface extending around the periphery of said plate, said groove including a base and a pair of opposing side walls extending from said base towards said side surface, one of said opposing side walls having an end opposite said base including a first retaining surface, and the other of said opposing side walls having an end opposite said base including a second retaining surface, said first and second retaining surfaces being spaced from each other to form a groove opening which extends about the periphery of said plate; and, at least one resilient member having a first end, a second end, and a body section extending therebetween, said member retained in said groove in the absence of stretching and tension by said first and second retaining surfaces and protruding from said groove opening, the structural interrelationship between said groove and said member being such that a portion of said member protruding from said groove opening sealingly engages an inner wall of said container, (b) a portion of said member in said groove sealingly engages said base and at least one of said retaining surfaces, (c) respective of said portions of said member roll upon said inner wall, said base and said at least one of said retaining surfaces, and (d) said first end and said second end contact each other sufficiently to effect a seal therebetween by compression of said at least one resilient member, when said plate is being lowered into said container or raised out of said container.



4,790,459

## CHILD CARRY DEVICE

Mark R. Moseley, 1760 Wellesley Ave., West Los Angeles, Calif. 90025

Filed Jul. 6, 1987, Ser. No. 70,294

Int. Cl. A61G 1/00

U.S. Cl. 224-159

6 Claims



1. A child carrying device comprising:
  - a hip pad of rectangular configuration large enough to comfortably support a portion of the weight of a 6 to 18 month old child;
  - an arcuate thigh pad of rectangular configuration to comfortably support the remainder of the aforementioned child's weight;
  - a vertical strap which is dependent upon interconnecting said hip pad and said thigh pad;
  - adjustable means including a buckle on the said hip pad coupling with said vertical strap;
  - a flexible seat having opposite ends and pliable enough to safely and comfortably support the posterior of a young child wherein one end couples with said hip pad;
  - a set of hinged non-ferrous upright buttresses connected between said thigh pad and said other end of said seat for conducting vertical load forces from said seat onto said thigh pad and toward the person's center of gravity.

4,790,460

## SKATEBOARD CARRIER

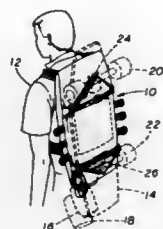
Arthur L. Harper, Jr., Houston, Tex., assignor to Recreation Products of Texas, Inc., Houston, Tex.

Filed Aug. 10, 1987, Ser. No. 83,178

Int. Cl. A45F 3/04

U.S. Cl. 224-209

5 Claims



1. A skateboard carrier, comprising:
  - a pair of flexible front and back panels of generally rectangular peripheral configuration with a vertical length and horizontal width of sufficient size to overlay substantially at least the upper back of a wearer, said panels having opposed upper and lower end edges and opposed side edges connecting the end edges, with fastening means fastening the opposed side edges and the opposed end

edges, said fastened edges defining a cavity within said panels,

a resiliently deformable foam support pad contained in said cavity and sized to occupy the width and length of said cavity to support said panels and separate the opposed said fastened side and end edges thereof in full extension one from another,

a pair of shoulder straps affixed to said front panel, the place of uppermost fixation of the straps being spaced from the upper end edge of the front panel such that a portion of the carrier rises freestanding above said place of affixation, a first pair of flexible inelastic cinching strap attachment members, each member being affixed to opposite side edges of the panels at a location near the upper end edge of the panels and vertically lower than said place of uppermost fixation of said shoulder straps,

a second pair of flexible inelastic cinching strap attachment members, each member being affixed to opposite side edges of the panels at a location near the lower end edge of the panels, and

first and second flexible inelastic cinching straps for respective attachment to said first and second pair of attachment members, the first cinching straps being adapted to be removably positioned and cinched across the underside of a skateboard in a loop of which a forward run lies in front of, and a rear run lies behind, the axle support bracket for the skateboard wheels that are upwardly disposed when said skateboard is vertically oriented and positioned with its topside against the back panel of the carrier, the second cinching straps being adapted to be removably positioned and cinched across the underside of the skateboard in a loop of which a forward run lies in front of, and a rear run lies behind, the axle support bracket for the skateboard wheels that are downwardly disposed in the said orientation of the skateboard, whereby the weight of skateboard is supported by the said attachment members and cinching straps at the loop rear run of the cinching straps, vertical movement of the skateboard is restrained by the said attachment members and cinching straps at the loop forward run of the cinching straps, and lateral movement of the skateboard is restrained by wrap engagement of said front panel side edges at said cinching strap attachment members and by said cinching strap attachment members across portions of the lateral margins and underside of said skateboard.

4,790,461

## IMPLEMENT HOLDER

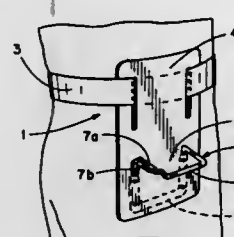
Ernest L. Stover, 1030 North St., Lockport, Ill. 60441

Filed Jan. 4, 1988, Ser. No. 140,563

Int. Cl. A45F 5/00

U.S. Cl. 224-241

13 Claims



1. An implement holder for a tool having an elongated handle and a working member carried by and projecting generally from one end of the handle, comprising a waist belt, a support pad carried by the waist belt, and a cradle-like collar defining a tool storage opening for receiving the tool including a partial loop and a hinged gate having two angularly-spaced elongated elements joined together at a junction, the gate being pivotally supported relative the partial loop approximately at

4,790,463

## DIVER'S BAG

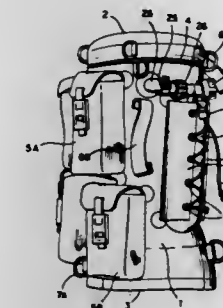
Larsen Hansen, Stavanger, Norway, assignor to Viking-Stavanger A/S, Stavanger, Norway

Filed Jan. 30, 1987, Ser. No. 67,863

Int. Cl. B65D 30/00

U.S. Cl. 224-253

6 Claims



the junction of the two elements, with the collar being fixed to and projecting from the pad, with the tool storage opening being accessible for storing a tool by a first pivoting movement of the gate in response to a gate opening force applied by the tool to one of the elements, and with the tool being removed from the tool storage opening by a second pivoting movement of the gate which is a reversal of the first pivoting movement in response to a force applied by the tool to the second element.

4,790,462

## BOOT CARRIER

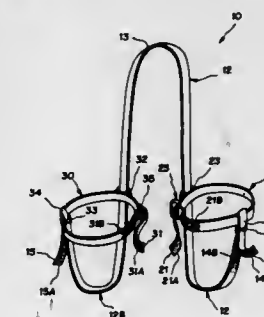
Richard S. Kawaguchi, 948 Gilgalad Way, Fort Collins, Colo. 80525

Filed Jul. 21, 1987, Ser. No. 76,152

Int. Cl. A45F 3/14

U.S. Cl. 224-250

12 Claims



1. A boot carrier for carrying a pair of boots in side-by-side fashion, said carrier comprising:

- (a) an elongated strap having first and second ends;
- (b) first and second snugging members, wherein each said snugging member comprises a flexible strap which includes first and second ends, wherein said first end of said first snugging member is secured to a first ring member, wherein said second end of said first snugging member is adapted to pass through said first ring member and be fastened; wherein said first end of said second snugging member is secured to a second ring member, wherein said second end of said second snugging member is adapted to pass through said second ring member and be fastened;
- (c) first and second sleeve members secured to said first and second snugging members, respectively; wherein said first end of said elongated strap passes through said first sleeve member and is adapted to be detachably fastened to said first snugging member in a manner such that a first loop is formed by said elongated strap beneath said first snugging member; wherein said second end of said elongated strap passes through said second sleeve member and is adapted to be detachably fastened to said second snugging member in a manner such that a second loop is formed by said elongated strap beneath said second snugging member; wherein one said boot is adapted to be supported by said first loop and encircled by said first snugging member, and wherein the other said boot is adapted to be supported by said second loop and encircled by said second snugging member; wherein said first end of said second snugging member is adapted to pass through said first ring member and said second ring member in a manner such that said first and second snugging members are detachably secured together.

1. A bag for use by divers for transporting articles under water comprising:
  - an endless side wall open at either end;
  - means closing both ends of the endless side wall which together with the endless side wall forms a watertight hollow receptacle having an inner cavity forming a single buoyancy chamber;
  - means for manually carrying the bag attached to said receptacle;
  - unidirectional valve means mounted on said receptacle for buoyancy control of the single buoyancy chamber;
  - a plurality of watertight inflation means mounted on said receptacle communicating with the single buoyancy chamber;
  - wherein gas can be supplied to said single buoyancy chamber by said plurality of watertight inflation means and discharged from said single buoyancy chamber by said unidirectional valve means to provide the bag with a variable buoyancy, said single buoyancy chamber forming the sole buoyancy chamber of the bag;
  - wherein the means closing one end of said endless sidewall comprises: a lid; and a watertight zipper extending about one end of the endless sidewall between said endless sidewall and said lid, said zipper movable between a first position in which said lid engages said endless sidewall in a watertight manner to form said single buoyancy chamber and a second position in which said lid is movable away from said sidewall.

4,790,464

## METHOD AND APPARATUS FOR CUTTING OPTICAL FIBRES

Bruno Bortolin, Cinisello Balsamo, and Enrico Dotti, Milan, both of Italy, assignors to Societa' Cavi Pirelli S.p.A., Milan, Italy

Filed Feb. 5, 1987, Ser. No. 11,048

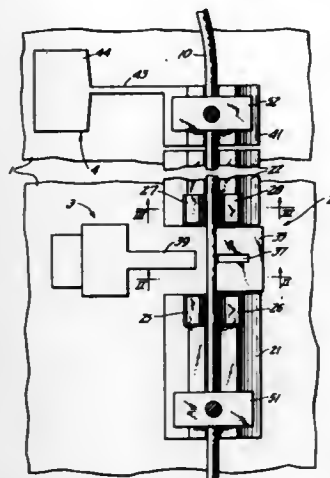
Claims priority, application Italy, Feb. 6, 1986, 19322 A/86  
Int. Cl. C03B 37/16

U.S. Cl. 225-2

7 Claims

1. Method for cutting an optical fibre which is long relative to its cross-section and having a central unitary portion and which is provided with at least one protective covering, characterized by the fact of comprising the following steps:
  - maintaining the portion of fibre to be cut, rectilinear and subjected to a constant axial tension;
  - while maintaining the fibre under axial tension, simultaneously scoring said fibre in the direction transverse to its axis at two points lying on a plane perpendicular to the fibre axis and circumferentially separated by an arc contained within an angle, having its apex at the intersection

of said plane with the axis of the fibre, in the range from 135° to 180° while simultaneously contacting and supporting said fibre on the side thereof opposite to the direction



of scoring and preventing any lateral shifting and bending of said portion of the fibre being scored in a direction transverse to said axis.

**4,790,465**  
**CLEAVING OPTICAL FIBERS**  
Andrew T. Fellows, London, and Nicholas D. Channon, Salisbury, both of England, assignors to York Technology Limited, Hampshire, England  
Filed May 8, 1987, Ser. No. 47,386  
Claims priority, application United Kingdom, May 9, 1986, 8611399

Int. Cl.<sup>4</sup> C03B 37/16  
U.S. Cl. 225-2

13 Claims

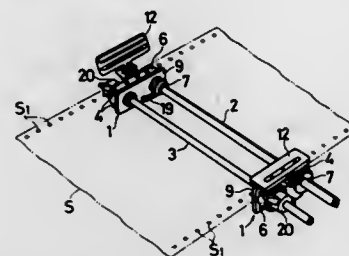


1. A method of cleaving an optical fibre, comprising the steps of:  
supporting the said fibre in a working position;  
bringing about steady movement of a cleaving blade towards a point of lateral contact with the said fibre, behind which point the fibre is laterally unsupported; and  
superimposing on the said steady movement of the blade a vibratory component of movement, said vibratory component being towards and away from the axis of the fibre and having a frequency in a range from one kilohertz to one hundred kilohertz, thereby to facilitate the desired cleaving.

**4,790,466**  
**PIN TRACTOR**  
Toohiko Ueno, and Hiroshi Daini, both of Kobe, Japan, assignors to Bando Chemical Industries, Ltd., Hyogo, Japan  
Filed Jul. 9, 1987, Ser. No. 71,498  
Claims priority, application Japan, Jul. 9, 1986, 61-162550; Jul. 9, 1986, 61-162551; Jul. 9, 1986, 61-162552; Aug. 14, 1986, 61-191493

Int. Cl.<sup>4</sup> G03B 1/30  
U.S. Cl. 226-74

18 Claims

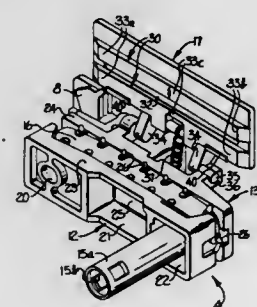


1. A pin tractor for feeding blank paper with feed perforations at both edges thereof comprising:  
a frame having a single base plate,  
a driving pulley having a toothed body portion and a side surface at one side of said body portion,  
means rotatably mounting one end of said driving pulley opposite from said side surface to said base plate,  
a belt having a plurality of pins on one surface thereof adapted to engage said feed perforations of said blank paper and teeth on another surface of said belt for engaging said toothed body portion of said driving pulley, said belt being supported on said frame and wound around said driving pulley for driving engagement therewith, and  
a positioning mark on said side surface of said driving pulley, whereby said driving pulley will be rotatably supported at only one end by said base plate and said positioning mark will be exposed for positioning said driving pulley and belt in relation to said frame.

**4,790,467**  
**WEB FEED MECHANISM AND DOOR WITH STATIC PROTRUSIONS**  
Donald K. Rex, Highland Beach, Fla., and James P. Ruse, Charlotte, N.C., assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed Mar. 25, 1986, Ser. No. 843,746  
Int. Cl.<sup>4</sup> G03B 1/22

U.S. Cl. 226-74

12 Claims



1. A feed mechanism for moving a web having uniformly spaced perforations along a web path, the feed mechanism comprising:  
means for engaging the web at the uniformly spaced perforations

tions, said means including a movable drive member having a plurality of uniformly spaced drive pins fixed in position relative to the movable drive member where the fixed drive pins extend through and engage the web perforations, each fixed drive pin having a base portion proximate the drive member and an upper end extending outwardly therefrom,

means for guiding the web onto the fixed drive pins, said means for guiding having a guiding surface below an upper end of the fixed drive pins along the entire length of said guiding surface, and said guiding surface further being in a predetermined spaced relationship generally aligned with at least a predetermined segment of the means for engaging the web, the means for guiding having at least first and second ends and a mediate portion between the first and second ends,

the first end defining a pin insertion zone between the means for guiding and the means for engaging the web where the fixed drive pins are inserted into the web perforations, and

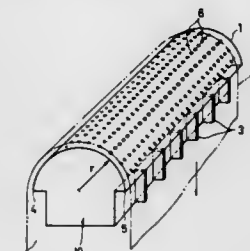
the middle portion defining a web transport zone between means for guiding and the movable drive member where the guide surface in the web transport zone remains below an upper end of the fixed drive pins and where the fixed drive pins remain inserted into the web perforations, and

at least one of said ends including a static protrusion means for urging the web and its associated perforations toward the base portion of the fixed drive pins without contacting said fixed drive pins, the static protrusion means being disposed in the pin insertion zone without extending significantly into the web transport zone, being attached to said means for guiding, and extending below the guiding surface thereof and protruding generally perpendicularly towards the surface of the web and the base portion of the fixed drive pins, thereby narrowing the clearance between the means for guiding and the base portion of the fixed drive pins.

**4,790,468**  
**FLOATING TYPE WEB GUIDING DEVICE**  
Hiroshi Nakashima, and Sanahiro Fukuhara, both of Kanagawa, Japan, assignors to Fujii Photo Film Co., Ltd., Kanagawa, Japan  
Filed Jan. 21, 1987, Ser. No. 5,819  
Claims priority, application Japan, Jan. 21, 1986, 61-8894  
Int. Cl.<sup>4</sup> B65H 20/14, 23/24

U.S. Cl. 226-97

6 Claims



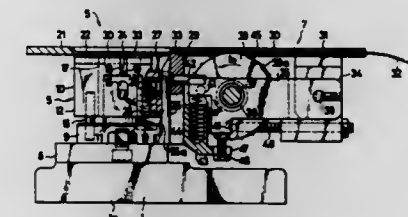
1. In a floating type web guiding device comprising:  
an air blowing box including a plate forming a guide surface having fluid jetting apertures therein for floating a web on jets of fluid issuing from said apertures above said surface, said web being moved in a direction across said surface; the improvement comprising:  
two groups of multiple, fixed, laterally spaced, thin, flat flow straightening boards provided respectively at a web lead-in part and a web lead-out part of said guide surface, the multiple flat flow straightening boards of each group extending parallel to each other and extending parallel to said web moving direction and having thin edges facing

said web and lying adjacent said web in such a manner that each flow straightening board is parallel with the direction of movement of said web and projects perpendicular to and away from the surface of said web to suppress fluttering of the web during movement over the floating type web guiding device.

**4,790,469**  
**TAPE FEED APPARATUS**  
Sumio Toyota, Toyama, Japan, assignor to Yoshida Kogyo K.K., Tokyo, Japan  
Filed Aug. 13, 1986, Ser. No. 896,066  
Claims priority, application Japan, Aug. 14, 1985, 60-123999[U]

Int. Cl.<sup>4</sup> A41H 37/00; B65H 20/22  
U.S. Cl. 226-129

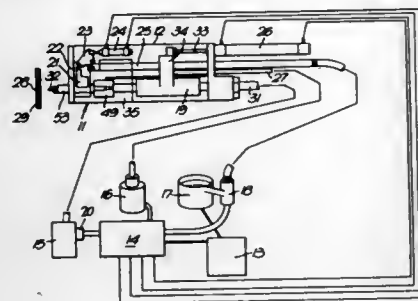
3 Claims



1. An apparatus for feeding a tape, comprising:  
(a) a tape guide defining a guide channel through which the tape is to be fed;  
(b) a holder pivotally connected at one end to a first bracket fixedly secured to said tape guide;  
(c) a shaft rotatably supported by said holder and connected at one end to a knob for rotation by hand;  
(d) a first spring acting between said holder and said shaft so as to normally urge the latter to rotate in one direction;  
(e) a feed roller mounted on said shaft via a one-way clutch for rotation with said shaft only when the latter is manually rotated in the other direction against the bias of said first spring, said feed roller having a peripheral portion normally projecting into said guide channel of said tape guide for engagement with the tape to feed the same in response to the rotation of said feed roller, said feed roller further having a plurality of peripheral projections on said peripheral portion for piercing the tape so as to prevent the latter from slipping on said peripheral portion;  
(f) a second spring acting between a second bracket and a free end of said holder so as to normally urge said holder to pivot so that said peripheral projections of said feed roller are projectable into said guide channel of said tape guide; and  
(g) means for restricting an angle of the rotation of said shaft including a pusher plate fixedly mounted on said shaft, a pin mounted on said pusher plate at an eccentric position, a stop pin secured to said tape guide for engagement with said pin so as to restrict the rotation of said shaft in said one direction, and a stop screw adjustably supported by said first bracket and angularly spaced from said stop pin by a predetermined angle about said shaft for engagement with said pin so as to restrict the rotation of said shaft in said other direction.

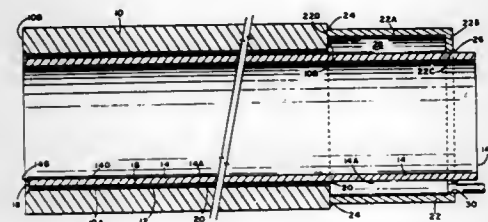


**4,790,470**  
**FASTENER INSTALLATION APPARATUS**  
 Michael Miles, Stevenage, England, assignor to Avdel Limited, Hertfordshire, England  
 Filed Apr. 7, 1987, Ser. No. 35,188  
 Claims priority, application United Kingdom, Apr. 11, 1986, 8608817  
 Int. Cl.<sup>4</sup> B21J 15/28  
 U.S. Cl. 227—1 6 Claims



1. Fastener installation apparatus for installing a fastener with a portion which is broken off at installation, which apparatus comprises:  
 fastener installation means for installing a fastener and thereby producing a broken-off portion;  
 conveying means for conveying the broken-off portion away from the installation means; and  
 portion detection means operatively connected to the conveying means at a predetermined position therealong for detecting when the broken-off portion has reached said predetermined position on its journey along the conveying means.

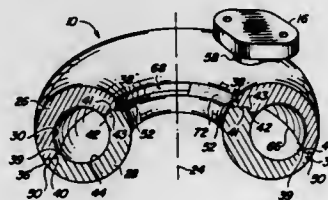
**4,790,471**  
**METHOD OF CLADDING TUBING AND PLATE PRODUCTS**  
 William C. Turner, 85 Plato La., Sedona, Ariz. 86336  
 Continuation-in-part of Ser. No. 694,347, Jan. 24, 1985. This application Oct. 20, 1986, Ser. No. 920,681  
 The portion of the term of this patent subsequent to Nov. 4, 2003, has been disclaimed.  
 Int. Cl.<sup>4</sup> B23K 1/00  
 U.S. Cl. 228—131 17 Claims



1. A method of manufacturing a clad metal plate product employing an rectangular metal base plate having four edges and first and second opposed surfaces, comprising:  
 (a) plating the first surface of the base plate with a low melting point bonding metal alloy;  
 (b) positioning a rectangular metal cladding plate having four edges and a first and second opposed surface juxtaposed to said base plate, the cladding plate first surface being contiguous to said low melting point bonding metal alloy plated on said base plate first surface;  
 (c) welding three edges of said base plate to three corresponding edges of said cladding plate;

(d) welding a gas bag to the fourth edges of said base plate and cladding plate to form a sealed subassembly;  
 (e) evacuating the space between said base plate and said cladding plate first surfaces and charging it with inert gas by attachment of apparatus to said gas bag in a manner to substantially remove all water and oxygen and to leave the space filled with inert gas; and  
 (f) heating the subassembly from about 1,650° F. to 2,100° F. and rolling the plates to force them into intimate contact with said bonding metal alloy therebetween.

**4,790,472**  
**METHODS FOR MANUFACTURING A TOROIDAL PRESSURE VESSEL**  
 Bela Bunkoczy, Chandler, Ariz., assignor to Allied Signal Inc., Morris Township, Morris County, N.J.  
 Continuation-in-part of Ser. No. 767,228, Aug. 16, 1985, abandoned, which is a division of Ser. No. 659,606, Oct. 11, 1984, Pat. No. 4,561,476. This application Feb. 6, 1987, Ser. No. 13,219  
 Int. Cl.<sup>4</sup> B23K 31/02, 33/00  
 U.S. Cl. 228—171 14 Claims

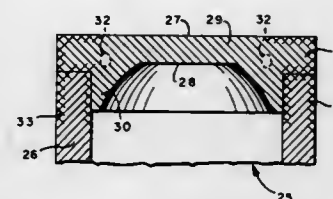


1. A method of manufacturing a toroidal pressure vessel comprising the steps of:  
 (a) providing a first annular member configured to define a semi-toroidal portion of a hollow toroidal body and having axially offset radially inner and outer annular edge portions and a radially inner wall thickness greater than its radially outer wall thickness;  
 (b) providing a second annular member configured to define the balance of said toroidal body and having axially offset radially inner and outer annular edge portions and a radially inner wall thickness greater than its radially outer wall thickness;  
 (c) providing complementary axially and radially extending engagement surfaces on at least one of the radially inner and radially outer annular edge portions of said first annular member and on at least the corresponding one of the radially inner and radially outer annular edge portions of said second annular member;  
 (d) engaging said complementary engagement surfaces with one another to dispose said first annular member and said second annular member in a singular selected relative axial and radial position; and  
 (e) forming said toroidal body by respectively sealingly intersecuring said inner edge portions and said outer edge portions of said first and second annular members.

**4,790,473**  
**PROCESS FOR WELDING A CAST IRON WEAR MEMBER TO A CAM FOLLOWER**  
 Sundaram L. Narasimhan, Marshall; Ronald J. Lake, Battle Creek, and Jay M. Larson, Marshall, all of Mich., assignors to Eaton Corporation, Cleveland, Ohio  
 Continuation-in-part of Ser. No. 924,298, Oct. 29, 1986, abandoned. This application Jan. 22, 1987, Ser. No. 8,147  
 Int. Cl.<sup>4</sup> B23K 9/235, 15/00; F01L 1/14  
 U.S. Cl. 228—206 7 Claims

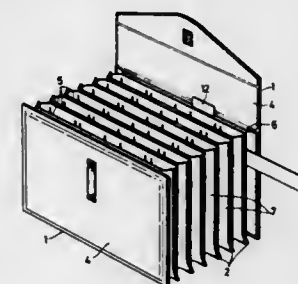
1. In a process for making a cam follower having a cast iron reaction member welded to a steel base member at respective

interfacing surfaces therebetween, the improvement comprising the steps of:  
 plating a nickel-rich consumable weld metal onto the steel member interface surface; and



welding said members at said interface, whereby the presence of the nickel-rich consumable plating produces a weld zone therebetween having austenitic properties including good ductility and impact resistance.

**4,790,474**  
**DOCUMENT FILE**  
 Masuhiro Mitsuyama, 1071, Kinugasa, Wake-cho, Wake-gun, Okayama, Japan  
 Filed Apr. 1, 1987, Ser. No. 32,590  
 Claims priority, application Japan, Jan. 30, 1987, 62-13168[U]  
 Int. Cl.<sup>4</sup> B65D 3/00  
 U.S. Cl. 229—1.5 R 4 Claims



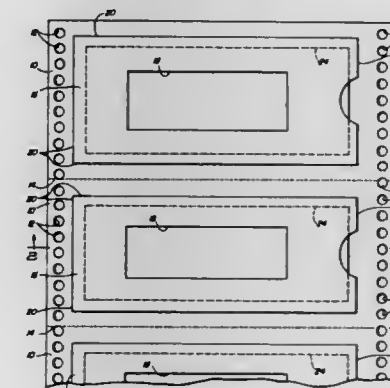
1. A document file comprising:  
 a plurality of upwardly opening compartments attached together in accordion-like fashion;  
 a plurality of pocket-like sheaths defined between adjacent ones of said plurality of compartments for receiving a reinforcing padding member; and  
 a plurality of reinforcing padding members removably inserted into said plurality of pocket-like sheaths for reinforcing and keeping open each compartment of said plurality of upwardly opening compartments.

**4,790,475**  
**REUSABLE STATIONERY CARRIER**  
 Michael L. Griffin, 1147 E. 12th St., Tucson, Ariz. 85719  
 Filed Jul. 12, 1982, Ser. No. 397,358  
 Int. Cl.<sup>4</sup> B65D 27/10

U.S. Cl. 229—69 10 Claims

1. A continuous stationery carrier adapted to be fed through computer printers, word processing printers, and the like, so as to permit stationery carried thereby to be printed upon, comprising:  
 a plurality of backing sheets sequentially joined together and provided with a plurality of feed apertures along the right and left margins thereof, each of said backing sheets adjacent to each other being joined together by a common fold line of partial perforations in order to permit folding of a continuous strip of a plurality of carriers without

tearing said strip, said backing sheets including a relatively strong durable plastic fiber material; and  
 a plurality of cover sheets each one joined to one of said plurality of backing sheets to form a pocket therewith into which said stationery may be inserted, each of said plurality of cover sheets being equipped with at least one aperture through which said stationery may be printed upon followed by the removal of said stationery after printing thereon from the pocket formed in said carrier so that said carrier can be reused, said cover sheets including a relatively strong durable plastic fiber material.  
 10. A reusable stationery carrier adapted to be fed through computer printers, word processing printers, high speed print-



ers, and the like so as to permit stationery carried thereby to be printed upon, comprising:  
 a polyethylene plastic backing sheet having a plurality of feed apertures therein along the right and left margins thereof; and  
 a polyethylene plastic cover sheet joined to said backing sheet so as to form a pocket therein into which said stationery may be inserted after the manufacturing of said carrier is completed, said cover sheet being equipped with at least one printing aperture through which said stationery may be printed upon followed by the removal of the stationery having been printed thereon from the pocket formed in said carrier for multiple repeated use of said carrier.

**4,790,476**  
**MONEY-COLLECTING DEVICE**  
 Akito Tanaka, and Kazuhito Kimura, both of Himeji, Japan, assignors to Glory Kogyo Kabushiki Kaisha, Hyogo, Japan  
 Filed Feb. 29, 1988, Ser. No. 162,103  
 Claims priority, application Japan, Mar. 2, 1987, 62-30845  
 Int. Cl.<sup>4</sup> B65D 91/00

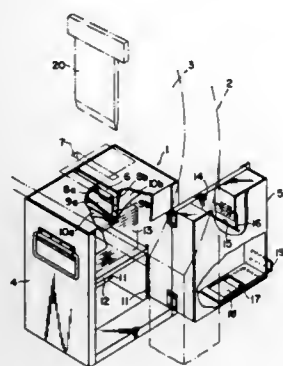
U.S. Cl. 232—1 D 9 Claims

1. A money-collecting device comprising in combination:  
 a box structure having an interior serving as a currency bill receiving chamber and a ceiling panel provided therethrough with a slot for insertion therethrough of money and the like from outside into said interior;  
 an insertion plate for thrusting from above a currency bill which has been laid transversely across the top of said slot downward in folded state through the slot and into the interior;  
 two guide members having respective lower end parts closely confronting each other and aligned below and parallel to the slot at a height position above the upwardly directed two ends of the bill after the bill has been thus thrust downward between and completely past said lower end parts by said insertion plate inserted to the lowermost position thereof, said guide members further having respective guiding parts flaring substantially sym-

metrically upward from said lower end parts and outward;

a receiving platform supported horizontally in a manner permitting ascent and descent thereof within said interior and functioning to support bills thus inserted in succession; and

lifting means for continually applying a force urging said platform to ascent toward said lower end parts, whereby the insertion plate, after thrusting the bill in folded state downward between and past said lower end parts, presses the receiving platform downward against the



counter force of said lifting means until said upwardly directed ends of the bill have slipped past and clear of said lower end parts, and then, when the insertion plate is withdrawn upward from said lowermost position, the receiving platform and the bill ascend in a following manner, said ends of the bill thereby being forced apart by said guiding parts in unfolding movement until the bill is lying in flat state and pressed against said lower end parts by the receiving platform, succeeding bills similarly inserted thereby being deposited in a neat stack thereof on said receiving platform.

4,790,477

## SOLAR HEATING

Mark P. Forkin, Drogheda; Colin Holmes, and William Quigley, both of Dublin, all of Ireland, assignors to Claudius Enterprises Limited, Ireland

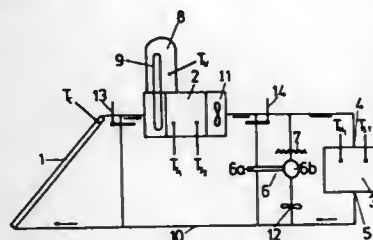
Filed Jan. 21, 1987, Ser. No. 5,594

Claims priority, application Ireland, Jan. 23, 1986, 196/86

Int. Cl.<sup>4</sup> G05D 23/00

U.S. Cl. 237-2 B

11 Claims



1. A unit for a ducted, air space heating system powered by an air cooled solar collector, comprising:
  - (a) a thermally insulated, airtight housing;
  - (b) a plurality of first air ducts leading to and from the solar collector;
  - (c) at least one first air outlet from and at least one first air inlet to the housing, which are connectable to and disconnectable from the first air ducts;
  - (d) a plurality of second air ducts leading to and from the space to be heated;
  - (e) at least one second air inlet to the housing, which are

connectable to and disconnectable from the second air ducts;

- (f) a heat store within the housing;
- (g) an air-to-air heat pump in the housing for supplementing the heat provided by the solar collector, the heat pump comprising an evaporator and a condenser, an air-tight partition within the housing separating the heat pump evaporator from the heat pump condenser;
- (h) valve means in the housing, operable to direct air passing through the housing and divide the space heating system into a plurality of air flow paths;
- (i) a plurality of forced draught mechanisms within the housing operable to drive air along the selected air flow paths; and
- (j) a control system for controlling the operation of the heat pump, the draught mechanisms and the valve means so as to operate the space heating system to move air along selected air flow paths, wherein the air flow paths include a first air flow path in which the heat pump, the forced draught mechanisms, and the valve means are operated such that air flows along the first air flow path, the first air flow path extending from the heat pump evaporator to at least one of the solar collector and the heat store for the air to collect heat and then back to the heat pump evaporator for the air to yield up heat in the heat pump evaporator, and wherein substantially the same mass of air is continuously recirculated along the first air flow path; and a second air flow path in which the heat pump, the forced draught mechanisms, and the valve means are operated such that air flows along the second air flow path, the second air flow path extending from the heat pump condenser to the space to be heated where the air yields up heat and then back to the heat pump condenser where the air collects further heat.

4,790,478

## GREENHOUSE HEATING BY MEANS OF IMMERSED WATER-BED (BASIN)

Yvan Sauvageau, 69 des Lauriers, Bezeuil, Canada J3G 3E2

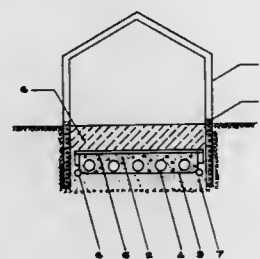
Filed Aug. 21, 1987, Ser. No. 88,114

Claims priority, application Canada, Jul. 15, 1986, 1207727

Int. Cl.<sup>4</sup> A01G 9/00

U.S. Cl. 237-69

3 Claims



1. A system for heating a greenhouse from the ground comprises of, a bed of soil suitable for cultivation, an impervious envelope situated under the said bed of soil suitable for cultivation in which a bed of gravel or other compatible material is immersed in a liquid heat conductor, along with a heating coil, situated on the inside of the impervious envelope under the said bed of gravel which serves to heat the gravel and the liquid in such a way that this combination of the two heats the bed of soil suitable for cultivation by means of heat exchange.

4,790,479

## OSCILLATING CONSTRUCTION FOR AN ULTRASONIC ATOMIZER INHALER

Kazuhiko Matsumoto, Kyoto; Kei Asai, Osaka, and Hirohito Yamamoto, Ohtsu, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

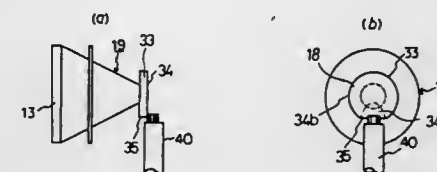
Continuation of Ser. No. 774,502, Sep. 10, 1985, abandoned. This application Feb. 8, 1988, Ser. No. 154,461

Claims priority, application Japan, Sep. 7, 1984, 59-188702; Sep. 7, 1984, 59-136283[U]; Sep. 8, 1984, 59-136311[U]; Sep. 10, 1984, 59-137533[U]; Sep. 10, 1984, 59-139891[U]; Sep. 12, 1984, 59-192271

Int. Cl.<sup>4</sup> B05B 1/08

U.S. Cl. 239-102.2

7 Claims



1. An oscillation apparatus for atomizing a liquid in an ultrasonic atomizing inhaler, said apparatus comprising:
  - an oscillation element having a liquid receiving region and an atomization region, said liquid receiving region and said atomization region having different fundamental frequencies of vibration; and
  - a drive means for exciting said oscillation element to vibrate ultrasonically, said drive means having a driving frequency substantially equivalent to a resonant frequency of said atomization region, said drive means causing said atomization region to vibrate with a large amplitude and said liquid receiving region to vibrate with a smaller amplitude, so that constant atomization of the liquid is obtained even if the liquid supply load on said oscillating element changes.

4,790,480

## LIQUID FUEL ATOMISER

Alan G. Rennie, Derby, England, assignor to Northern Engineering Industries plc, Newcastle upon Tyne, England

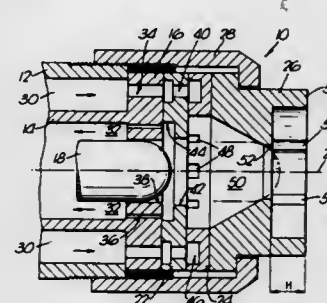
Filed Jan. 23, 1987, Ser. No. 6,681

Claims priority, application United Kingdom, Feb. 15, 1986, 8603759

Int. Cl.<sup>4</sup> B05B 12/00, 1/26

U.S. Cl. 239-125

18 Claims



1. A liquid fuel atomiser comprising a body within which are defined a fuel supply passage, a swirl chamber and annularly-distributed internal passages for fuel to flow from said supply passage to said swirl chamber to rotate therein about an axis of rotation passing through said chamber, an orifice defined by said body coaxially with said axis, said orifice having an inlet opening communicating with said chamber and an outlet open-

ing from which fuel exits from said orifice in a substantially hollow diverging frusto-conical pattern, an external wall having an inner diameter greater than said outlet opening being formed on said body coaxially with said axis immediately downstream, relative to fuel flow, of said orifice and external formation extending both parallel to said axis and radially inwardly from said wall at circumferentially spaced-apart positions about said wall, said external wall being continuous both in a direction parallel to said axis and in a circumferential direction, and each of said radially inwardly extending formations terminating in an inward edge, the radial distance between generally opposite inward edges thereof being greater than the diameter of the outlet opening of said orifice, thereby to interact with the fuel exiting from said orifice to alter the shape of said frustoconical pattern into a split pattern.

4,790,481

## POP-UP IRRIGATION SPRINKLER

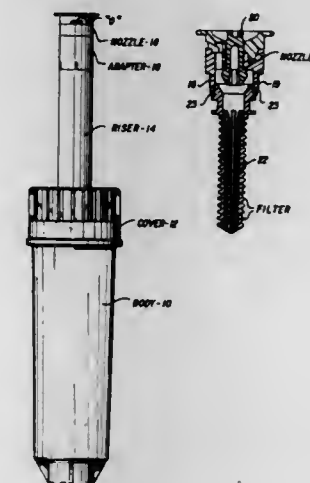
Charles A. Ray, Stateline, and Billy J. Hobbs, Jr., Gardnerville, both of Nev., assignors to Gardena Corporation, Carson City, Nev.

Filed Jan. 4, 1987, Ser. No. 140,586

Int. Cl.<sup>4</sup> B05B 15/10

U.S. Cl. 239-204

8 Claims



1. In a pop-up irrigation sprinkler assembly which includes: a tubular body having an opening in the lower end thereof for connection to a pressurized water source; a cover attached to the upper end of said body and having a central aperture therein; a riser mounted in said body and movable therein from a retracted position to a position in which it extends upwardly through the aperture in said cover in response to water pressure in said body; and resilient means mounted in said body for biasing said riser to its retracted position, the combination of: a nozzle removably mounted to the upper end of said riser; and an elongated filter mounted on the lower end of said nozzle to be removable from said riser with said nozzle and attached to said nozzle extending coaxially down into said riser.

4,790,482

## SHEET METAL LIQUID ATOMIZER

Vann Y. Won, 6697 Gloria Dr., Sacramento, Calif. 95831

Filed Mar. 11, 1987, Ser. No. 24,448

Int. Cl.<sup>4</sup> B05B 3/02

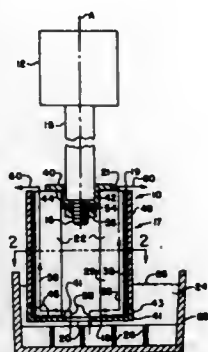
U.S. Cl. 239-215

10 Claims

1. A liquid atomizer comprising:
  - a liquid atomizing rotor rotatable about an axis and having a rotor liquid inlet and a rotor fluid outlet,
  - said liquid atomizing rotor including liquid feeding atomizing means responsive to rotation of said rotor about said



axis for feeding the liquid from said inlet and through said outlet as an atomized spray, said means including liquid flow surfaces providing at least a portion of the liquid flow path for said liquid from said inlet to said outlet, at least some of said flow surfaces being formed by a bent,



fluted sheet member forming a closed figure surrounding said axis, and said sheet member including two generally symmetrically formed sheet portions, and doubler seams on diametrically opposite sides of said sheet portions for securing together opposite sides of said sheet portions for counterbalancing said rotor during rotor rotation about said axis.

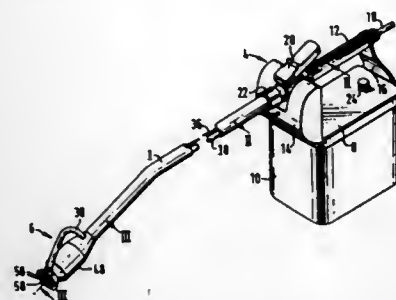
**4,790,483**  
**SPRAYING EQUIPMENT**  
David C. Gill, Bristol, United Kingdom, assignor to Nomix Manufacturing Co. Limited, Bristol, United Kingdom  
Continuation of Ser. No. 932,464, Nov. 18, 1986, abandoned, which is a continuation of Ser. No. 861,547, May 9, 1986, abandoned, which is a continuation-in-part of Ser. No. 555,958, Nov. 29, 1983, Pat. No. 4,609,148. This application Jul. 27, 1987, Ser. No. 78,041

Claims priority, application United Kingdom, Nov. 30, 1982, 8234125; Feb. 12, 1983, 8305003; Aug. 1, 1983, 8320678  
The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> B05B 3/10

U.S. Cl. 239—224

16 Claims



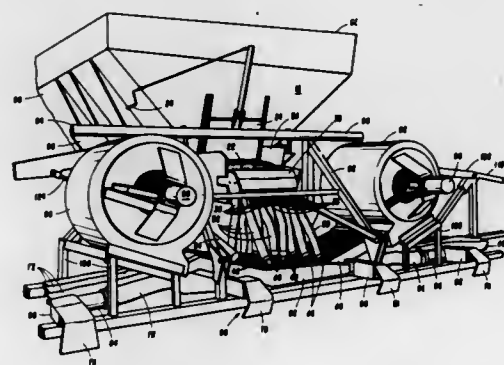
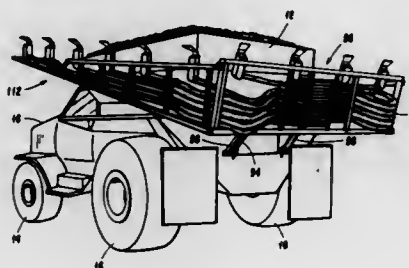
1. Spraying equipment comprising a hollow support tube fitted at one end to a handset, the other end of the tube carrying a spraying head comprising an atomizing disc and an electric motor for driving the atomizing disc in rotation, the equipment further comprising an electrical lead connected to the motor, and a liquid supply tube for supplying liquid to the atomizing disc, the electrical lead and the supply tube extending within the tube and the electrical lead being provided with means for connection to a source of electrical power, the handset comprising a handle member provided with a valve for controlling the flow of fluid through the supply tube, the

outlet of the valve being connected in a fluid-tight manner to the supply tube and the inlet of the valve being connected in a fluid-tight manner to an intermediate duct which extends through the handle member and is provided with means for connecting the intermediate duct to a container of liquid to be sprayed.

**4,790,484**  
**APPARATUS FOR DISTRIBUTING GRANULAR MATERIAL**  
George B. Wall, Delhi, Iowa, assignor to Highway Equipment Company, Cedar Rapids, Iowa  
Filed Oct. 22, 1986, Ser. No. 922,014  
Int. Cl.<sup>4</sup> A01C 15/04

U.S. Cl. 239—655

10 Claims



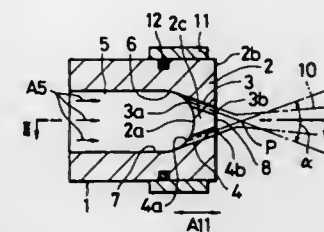
1. Spreading apparatus for distributing material and adapted to be mounted on, a vehicle of the type having storage means for the material to be distributed and means for conveying the material from the storage means and discharge unit, said apparatus comprising a boom assembly moveable from a spreading position to a transport position, said boom assembly including a central section, a right section extending outwardly from the right side of the vehicle and transversely of the direction of movement of the vehicle, a left section extending outwardly from the left side of the vehicle and transversely of the direction of movement of the vehicle, each of the right and left sections being pivotally connected to the center section about an axis that is generally horizontal when the boom assembly is in a spreading position, each of the right and left sections being independently moveable relative to the center section about the pivotal connection with the center section, means for mounting the central section of the boom assembly on the vehicle for pivotal movement of the boom assembly from the spreading position upwardly and forwardly to the transport position, power means to control the pivotal movement of the boom assembly, power means for independently moving the right and left sections upwardly and downwardly when the boom assembly is in the spreading position and for moving the right and left sections forwardly when the boom assembly is in the transport position, and means for conveying material dis-

charged from the material storage means to selected points along the boom assembly to distribute the material.

8. Apparatus for distributing material and adapted to be mounted on the rear of a vehicle of the type having storage means for the material to be distributed and means for conveying the material from the storage means through a discharge opening, said apparatus comprising a boom assembly, means for mounting the boom assembly on the vehicle so that the boom assembly extends outwardly from the vehicle to right and left sides of the vehicle, said boom assembly supporting a plurality of separate air ducts each having an inner end positioned near the discharge opening and each extending outwardly along the boom assembly in substantially a straight line to a discharge end, some of the ducts extending to the right side of the boom assembly and some of the ducts extending to the left side of the boom assembly, the inner ends of the ducts extending to the right side being spaced apart in a generally horizontal plane to receive alternate ones of the inner ends of the ducts extending to the left side, the discharge ends of the ducts being positioned at spaced selected intervals along both the right and left sides of the boom assembly, means at each of the discharge ends of the ducts for directing the material generally rearwardly, first air moving means discharging into the inner ends of the ducts extending to the left side, second air moving means discharging into the inner ends of the ducts extending to the right side, said first and second air moving means each being positioned so that the direction of air flow is in substantial alignment with the respective ducts into which the air is discharged, material dividing means adapted to be positioned near the discharge opening of the material storage means of the vehicle and directly over the inner ends of the air ducts to receive the material from the storage means and direct the material by gravity into the air ducts at a point downstream from the respective air moving means, and separate material tubes connected between the material dividing means and the inner ends of all the ducts, one such material tube for each duct.

**4,790,485**  
**GUN HEAD FOR POWDER PAINTING**  
Masahiro Yamamoto, Sakura, Japan, assignor to Onoda Cement Company, Ltd., Yamaguchi, Japan  
Filed Feb. 24, 1987, Ser. No. 17,351  
Claims priority, application Japan, Mar. 6, 1986, 61-049293  
Int. Cl.<sup>4</sup> B05B 5/00, 15/04, 1/14, 1/26  
U.S. Cl. 239—707

4 Claims



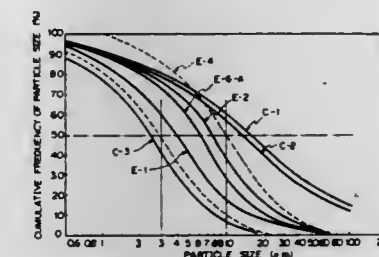
1. A gun head for powder painting comprising a cylindrical body having a peripheral wall defining an internal powder path and an end wall having a pair of opposed slits formed therein such that the spacing between said slits gradually decreases from their inner ends toward their outer ends, and said inner ends communicate with said powder path within said cylindrical body at opposed locations close to the inner surface of said peripheral wall which surrounds said powder path, said slits having side ends extending through said peripheral wall of said cylindrical body and said gun head further including a pattern adjusting cylinder surrounding said peripheral wall of said cylindrical body and a rubber ring between said cylinder and said body, said pattern adjusting cylinder positioned inwardly of said end wall and axially moveable along the axis of said cylindrical body to selectively cover portions of

said outer ends to adjust the effective width of said slits and the elasticity of said rubber ring being capable of retaining said cylinder in a desired axial position.

**4,790,486**  
**PROCESS FOR PREPARATION OF PAPER-MAKING HYDROUS SILICIC ACID FILLER**  
Shigeru Elmaeda; Kunihiko Aida; Shinji Seto, and Takao Suzuki, all of Tomakomai, Japan, assignors to Oji Paper Company, Ltd., Tokyo, Japan  
Filed Oct. 31, 1986, Ser. No. 926,707  
Int. Cl.<sup>4</sup> B02C 19/12

U.S. Cl. 241—20

11 Claims

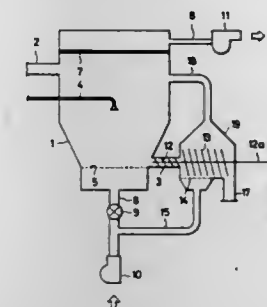


1. A process for preparing a wet hydrous silicic acid filler used in the wet state for papermaking, consisting essentially of obtaining a slurry containing fine particles of hydrous silicic acid by neutralizing sodium silicate with sulfuric acid, and then pulverizing said slurry by use of a wet pulverizer so that the proportion of particles of hydrous silicic acid having a particle size of 1–30 μm is at least 80% and the proportion of particles of hydrous silicic acid having a particle size of at least 70 μm is not more than 0.4%.

**4,790,487**  
**CONTINUOUS GRANULATOR**  
Tetsuo Noguchi; Masao Tanaka, both of Shizuoka, and Hiroshi Nakanishi, Fujieda, all of Japan, assignors to Kabushiki Kaisha Okawara Seisakusho, Shizuoka, Japan  
Filed Jul. 8, 1987, Ser. No. 70,959  
Claims priority, application Japan, Jul. 9, 1986, 61-161523  
Int. Cl.<sup>4</sup> B02C 23/22

U.S. Cl. 241—79.1

25 Claims



1. Apparatus for continuously processing powdered materials into granules of a given classified size, comprising: a first stage having means for continuously processing powdered materials into granules; first conveying means for continuously conveying granules and ungranulated powdered materials from the first stage; and a second stage connected to continuously receive the conveyed granules and ungranulated powdered materials and having pneumatic separating means for pneumatically separating granules of a given classified size from the

other granules and ungranulated powdered materials, means for returning the other granules and ungranulated powdered materials to the first stage for re-use, and second conveying means for continuously conveying the granules of given classified size through the second stage for discharge from the apparatus.

4,790,488

**UTENSIL FOR CUTTING FOOD MATERIALS**

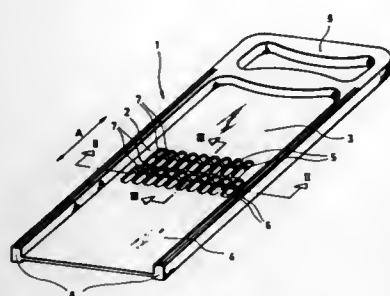
Alfred Borner, Neustr., D 5565 Niederkail, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 817,040, Jan. 8, 1986, abandoned. This application Jun. 4, 1987, Ser. No. 58,175

Int. Cl.<sup>4</sup> A47J 43/25

U.S. Cl. 241—95

22 Claims



1. A utensil for cutting food materials into strips comprising a base plate including upper and lower sides, and forming a multitude of through openings extending through the base plate; the upper side of the base plate being substantially planar, having longitudinal and transverse axes, and further having front and back longitudinally spaced apart slide surfaces; and
- a plurality of rows of knives, each row transversely extending across the base plate between the front and back slide surfaces; each knife being connected to the base plate, extending over a respective one of the through openings, and including a front inside surface and a back inside surface;
- each front inside surface including (i) a front U-shaped cutting edge projecting above the front and back slide surfaces, and (ii) a lower end edge; the front inside surface having a substantially concave shape between the front and lower end edges thereof; the front inside surface having a slope at the front cutting edge that is substantially parallel to the upper side of the base plate, and having a slope at the lower end edge that is substantially perpendicular to the upper side of the base plate;
- each back inside surface including (i) a back U-shaped cutting edge projecting above the front and back slide surfaces, and (ii) a lower end edge; the back inside surface having a slope at the back cutting edge that is substantially parallel to the upper side of the base plate, and having a slope at the lower end edge of the back inside surface that is substantially perpendicular to the upper side of the base plate.

4,790,489

**BALE SHREDDER**

Nicholas J. Paul, Nr. Trowbridge, England, assignor to Kidd Farm Machinery Limited, Wiltshire, England

Filed Apr. 20, 1987, Ser. No. 40,596

Claims priority, application United Kingdom, May 3, 1986, 8610883

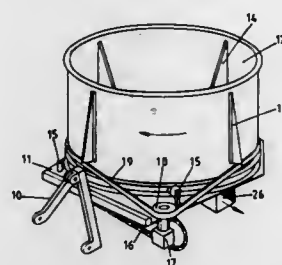
Int. Cl.<sup>4</sup> B02C 19/12

U.S. Cl. 241—101 A

10 Claims

1. A bale shredding device comprising a stationary platform, a bale container in the form of a tub rotatable about a predetermined axis and disposed above and rotatable relative to said

platform, said tub having an open lower end, said platform having an opening formed therein so as to be offset from said axis of the tub, a rotor disposed in alignment with the opening formed in said platform and having an axis of rotation parallel to and similarly offset from the axis of rotation of the tub, said rotor having a diameter which is substantially smaller than the internal diameter of the tub, one or more blades mounted on the rotor and projecting into the tub for engaging and shredd-



ding a bale disposed within the tub, and bale support means disposed above said rotor for controlling the amount of engagement of the blades with a bale, the tub and the rotor being rotatable in use by power-operated means about said substantially parallel and spaced axes, the arrangement being such that, in use, a bale placed in said tub is rotated thereby whilst said blade or blades remove material from the lower end of the bale.

4,790,490

**SELF-LOCKING, DRIVER MECHANISM REGULATED TISSUE DISPENSING SYSTEM WITH HANDS-FREE OPERATION OPTION**

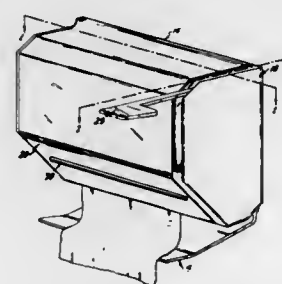
Shyamal Chakravorty, 7360 Silver Pine Dr., Springfield, Va. 22153

Filed Feb. 29, 1988, Ser. No. 162,211

Int. Cl.<sup>4</sup> B65H 19/00, 35/00

U.S. Cl. 242—55.53

6 Claims



1. A dispenser for dispensing a web from a roll of material comprising: a housing having a dispensing outlet, a shaft rotatably supporting the roll of web material in the housing, said shaft having at one end thereof a first toothed gear, said first toothed gear comprising a central body attached to said shaft, said first gear further comprising a plurality of teeth on the periphery of said central body, said dispenser further comprising a second gear rotatably mounted in said housing, said second gear further comprising a plurality of teeth pivotally mounted thereon around the outer periphery of the teeth of the first gear, the second gear further comprising protrusions, said protrusions being located near the teeth of the second gear and limiting the movement thereof, the teeth of the second gear hanging vertically downward unless obstructed by the teeth of the first gear or by the protrusions of the second gear, the teeth of the second gear having means to contact the teeth of the first gear, said second gear driving the first gear when the teeth of

the second gear contact the teeth of the first gear to rotate the shaft and thus dispense the web through said dispensing outlet.

4,790,491

**APPARATUS FOR WINDING UP A WEB SECTION WITHOUT USING A CORE**

Friedhelm Mundus, Lengerich, and Hans-Ludwig Voss, Tecklenburg, both of Fed. Rep. of Germany, assignors to Windmüller & Hölscher, Lengerich, Fed. Rep. of Germany

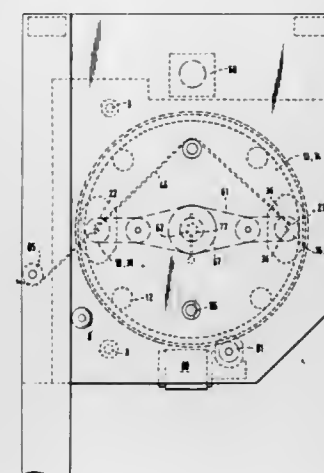
Filed Sep. 18, 1986, Ser. No. 908,776

Claims priority, application Fed. Rep. of Germany, Sep. 18, 1985, 3533321

Int. Cl.<sup>4</sup> B65H 19/20

U.S. Cl. 242—68.4

11 Claims



1. Apparatus for winding up without using a core a web section which has been torn along a transverse perforation line from a web which is continuously supplied and provided with longitudinally spaced transversely extending perforation lines, which apparatus comprises:

a frame;

a pair of winding stations carried by said frame, each winding station including a pair of aligned and opposed winding heads defining a winding axis and spaced transversely from each other relative to the web movement direction, said winding heads each carrying a pair of rotatably mounted winding pins movable within an associated winding head along the winding axis from an extended, spread position to a retracted, non-spread position relative to the winding head while pivoting for scissor-like movement about a common axis transverse to the winding axis; means for extending said winding pins from said retracted, non-spread position to said extended, spread position and for retracting said winding pins from said extended, spread position to said retracted, non-spread position;

rotary drive means for rotating pairs of said winding pins together about a winding axis; and

means rotatably mounted in said frame and connected to said rotary drive means for carrying the winding stations;

said winding pins protruding freely from said winding heads when in the extended, spread position and spread outwardly relative to each other in a transverse direction relative to the winding axis, and retractable to said retracted, non-spread position, wherein the web to be wound extends between each pair of winding pins of one winding station when the web is wound up in the other winding station, and wherein the web is subsequently wound up in the one winding station, and wherein when the web is wound up in the other winding station, the winding pins of said other winding station are extended from their retracted, non-spread position to their extended, spread position, in which they hold the web there-

between, said winding pins spaced from each other on opposite sides of the winding axis and movable apart by said means for extending and for retracting said winding pins a distance sufficient to permit the web to move freely between said winding pins, said means for extending and retracting said winding pins moving said winding pins relative to each other in spaced parallel planes from said extended, spread position to said retracted, non-spread position.

4,790,492

**REVOLUTION SENSOR FOR A SPOOL ON A FISHING REEL**

Takashi Atobe, Tokyo, Japan, assignor to Daiwa Seiko, Inc., Tokyo, Japan

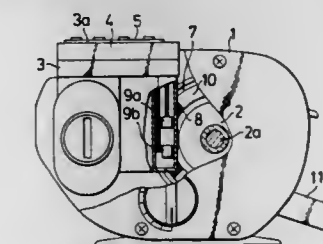
Continuation of Ser. No. 752,849, Jul. 8, 1985, abandoned. This application Apr. 1, 1987, Ser. No. 32,966

Claims priority, application Japan, Jul. 20, 1984, 59-109880[U]

Int. Cl.<sup>4</sup> A01K 85/15

U.S. Cl. 242—84.1 M

3 Claims



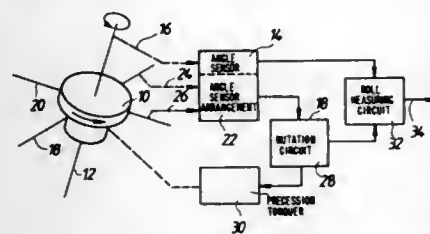
1. A fishing reel for casting comprising a body and a spool rotatably carried by the body, a microcomputer for calculating the length of fishing line paid out or wound up by the spool, means for displaying the length so calculated, and a device for detecting rotation of the spool, including a rotation sensor for sensing rotation of the spool, the rotation sensor comprising annular magnet means carried by the spool, the magnet means being an annularly shaped member made from magnetic material extending concentrically around the axis of rotation of the spool coaxial to the spool and carried on a side of the spool, at least one finite, integrally formed, arcuate portion of the annularly shaped member magnetized to produce a magnetic field, the annularly shaped member including a remaining, non-magnetized arcuate portion serving to cause the circumferential distribution of the weight of the spool to be uniform, and a fixed magnetic field detecting device disposed opposite to the annularly shaped member for responding to the magnetic field produced by the arcuate integrally formed portion of the annularly shaped member upon rotation of the magnet means to provide sensing of each rotation of the spool for developing a pulse-form voltage for counting and calculation by the microcomputer of the length of the line so paid out and wound up by the spool, whereby rotation of the spool is maintained even at a relatively high rate of speed in a uniform, stable and smooth state without resonance or abnormal sound and casting distance is increased.



4,790,493  
**DEVICE FOR MEASURING THE ROLL RATE OR ROLL ATTITUDE OF A MISSILE**  
 Gerhart Schwarzkopf, Uhlinden-Mühlhofen, and Bernd Dulat, Uhlinden/Bodensee, both of Fed. Rep. of Germany, assignors to Bodenseewerk Geratetechnik GmbH, Fed. Rep. of Germany

Filed Oct. 5, 1987, Ser. No. 103,969  
 Claims priority, application Fed. Rep. of Germany, Oct. 8, 1986, 3634192

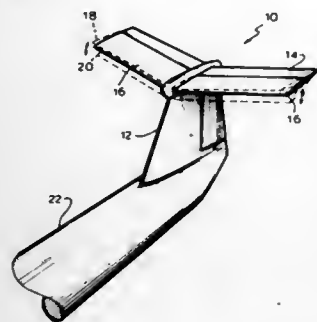
Int. Cl.<sup>4</sup> F41G 7/00  
 U.S. Cl. 244—3.21 5 Claims



1. Device for measuring the roll rate or roll attitude of a missile which rotates about its roll axis, comprising:
  - (a) an attitude gyro arranged in a seeker head of the missile and
  - (b) means for stimulating the attitude gyro to nutate with its natural nutation frequency in inertial space, characterized by
  - (c) means for detecting the rotational frequency ( $f_R$ ) of the attitude gyro (10) relative to the missile,
  - (d) means for detecting the nutation frequency ( $f_N$ ) of the attitude gyro (10) relative to the missile, and
  - (e) means for generating a signal representing the roll rate or roll attitude of the missile by subtraction of the rotational frequency and nutation frequency ( $f_R$  and  $f_N$ , respectively) obtained by said means, multiplied by factors depending on the gyro.

4,790,494  
**AIRCRAFT EMPENNAGE WITH FIXED TRAILING EDGE HORIZONTAL STABILIZER**  
 Jerome S. Kohn, Plainview, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Oct. 14, 1986, Ser. No. 926,988  
 Int. Cl.<sup>4</sup> B64C 5/02  
 U.S. Cl. 244—87 9 Claims



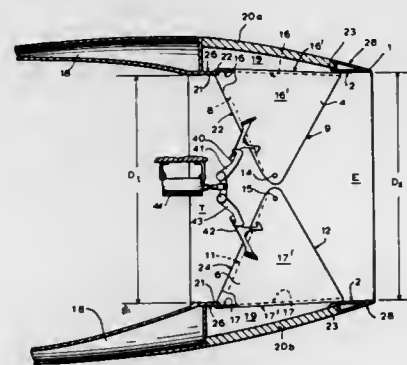
1. An empennage for an aircraft having a fuselage, comprising:
  - (a) a vertical stabilizer having an upper portion and being affixed to the fuselage of the aircraft; and
  - (b) an aerodynamically smooth horizontal stabilizer having a length and including a fixed trailing edge portion with a forward facing edge having a length and a movable leading edge portion with an aft facing edge having a length,

said length of said forward facing edge of said fixed trailing edge portion and said length of said aft facing edge of said movable leading edge portion being substantially equivalent to each other and to said length of said horizontal stabilizer, said fixed trailing edge portion being fixedly attached to said upper portion of said vertical stabilizer and said aft facing edge of said movable leading edge portion being pivotally mounted to said forward facing edge of said fixed trailing edge portion allowing said movable leading edge portion to be movable relative to said fixed trailing edge portion without forming a gap therebetween so that air flows smoothly from said movable leading edge portion to said fixed trailing edge portion with minimal boundary layer separation and turbulence so as to provide the aircraft with increased static and dynamic longitudinal stability and increased landing attitude control.

4,790,495  
**CASCADE THRUST REVERSER**  
 William K. Greathouse, and Sherman F. Martin, both of East Northport, N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Continuation of Ser. No. 679,140, Dec. 6, 1984, abandoned. This application Nov. 12, 1987, Ser. No. 122,556  
 Int. Cl.<sup>4</sup> F02K 1/60

U.S. Cl. 244—110 B 10 Claims



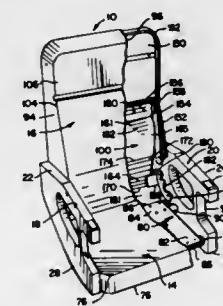
1. A thrust reverser for an aircraft jet engine in a nacelle having a casing, said thrust reverser comprising:
  - (a) a convergent-divergent jet exhaust nozzle having an axis, an aft end with an exit area thereat, an inner surface and a throat area spaced from said exit area and forward thereof, said exit and throat areas having diameters and the ratio of the exit to throat diameter being from 1.00 to 1.05;
  - (b) two symmetrical blocker doors each having an axis substantially coincident with the axis of said nozzle, each of said blocker doors having opposite forward and rear edges and a surface extending between said edges and each being pivotally mounted to pivot about a pivot axis transverse to the axis of said nozzle and disposed downstream of said engine in said nacelle, said pivot axes being in a plane intersected by the axis of said nozzle, each of said blocker doors having an inner surface and an outer surface and being movable between a first, stowed, position in which the inner surfaces thereof are substantially contiguous with the inner surface of said nozzle and said forward and rear edges thereof are spaced from each other so that said nozzle is substantially unobstructed and a second, fully deployed, position in which said rear edges are in closely adjacent relation and said inner surfaces form a substantially continuous obstruction across said nozzle thereby blocking said nozzle, the forward edge of each of said blocker doors having an extended part;
  - (c) moving means coupled to said blocker doors for selectively

pivoting said blocker doors about their axes in directions toward and away from each other;  
 cascade vane exhaust directing means in said nacelle casing; latching means for releasably latching said blocker doors in said stowed position; and  
 joint means having cooperating parts on said nozzle and on said blocker doors for providing a small downstream facing step between said blocker doors and said nacelle and nozzle at said opening of said nacelle when said blocker doors are in said stowed position, said joint means comprising a stationary lip extending downstream from said nacelle into said opening, the inner surface of the extended part of said forward edge of each of said blocker doors abutting and overlapping said lip when said blocker doors are in said stowed position, the outer surface of the rear edge of each of said blocker doors abutting and overlapping said nozzle adjacent the aft edge of said opening.

4,790,496  
**AIRCRAFT SEAT WITH FLEXIBLE LUMBAR PANEL**  
 Ralph G. Marrajo, Winston-Salem, N.C., assignor to The Jepson Burns Corporation, Winston-Salem, N.C.

Filed Jul. 31, 1987, Ser. No. 80,677  
 Int. Cl.<sup>4</sup> B64D 11/06

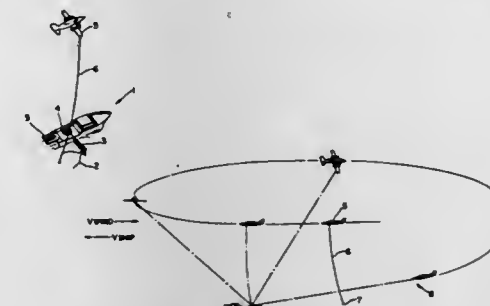
U.S. Cl. 244—122 R 10 Claims



1. A chair, comprising:
  - (a) seat means for supporting the seat and upper legs of a person; leg means connected to said seat means for supporting said seat means; and
  - (b) back means connected to said seat means for supporting the back of the person sitting on said seat means;
  - (c) said back means comprising a back frame assembly and a flexible moveable lumbar panel, said back frame assembly having an upper back portion with an intermediate section, a headrest-supporting portion, and a substantially horizontal torque bar positioned slightly below said headrest-supporting portion at said intermediate section of said upper back portion for enhancing torsional rigidity of said back frame assembly, said moveable lumbar panel having a lumbar shaped contour for supporting the lumbar region of the back of the person sitting in the chair, said moveable lumbar panel having a curved upper portion with a fixed upper end fixedly connected to and cantilevered from said torque bar and a moveable lower portion with a free unattached bottom end positioned in proximity to said seat means, said upper portion of said lumbar panel having a convex curvature and said lower portion of said lumbar panel having a concave curvature as viewed from the front of said chair, and said lumbar panel having a back surface and a front surface for flexibly supporting the lumbar region of the back of the person sitting on said seat means in the absence of a triangular bar, rearward strip, or distance member positioned against the back surface of said lumbar panel.

4,790,497  
**POINT-LANDING METHOD FOR NON VERTICAL TAKE OFF AND LANDING FLYING OBJECTS**  
 Meir Yoffe, 27 Hahets Street, Holon 58435, Israel  
 Filed Jun. 5, 1987, Ser. No. 58,815  
 Int. Cl.<sup>4</sup> B64F 1/00

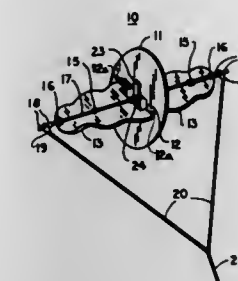
U.S. Cl. 244—115 13 Claims



1. A method for landing a flying object at a point location comprising:
  - (a) flying a flying object substantially horizontally towards a retrieval apparatus including a cable and winch mounted on the location,
  - (b) releasing from the flying object a trailing cable or pole carrying at its end a hooking up device,
  - (c) causing said hooking up device to engage the cable of the retrieval apparatus,
  - (d) continuing the flight of the flying object and causing the winch to unwind the cable during the continuing flight,
  - (e) maneuvering the flying object to a landing starting point at a reduced speed,
  - (f) causing the winch to pull in the cable at a rate to maintain the flying object at or above minimal safe airspeed, and
  - (g) catching the flying object with said retrieval apparatus.

4,790,498  
**SPACE SPINNER**  
 Daniel Jeffrey, 108 N. 5th St., Martins Ferry, Ohio 43935  
 Filed Mar. 11, 1988, Ser. No. 167,023  
 Int. Cl.<sup>4</sup> B64C 31/06

U.S. Cl. 244—153 A 2 Claims



1. A space spinning kite, comprising a stabilizing disc and a wing formed of a rigid lightweight material, assembled at right angles to each other, wherein the disc is chordwise secured to the center of the wing, said wing being fictionally retained in a slotted opening in the disc and tapered towards its peripheral edges, a solid dowel extending lengthwise externally to the median plane of the wing and detachably secured thereto by rubber bands which extend through rubber band holes in the wing on opposite sides of said disc and which are stretched over the ends of the solid dowel, thereby detachably and yieldably holding the solid dowel in place, a pair of radially extending elements rigidly secured centrally of said dowel and

being spaced apart by substantially the thickness of said stabilizing disc so as to normally engage the outer surfaces of said stabilizing disc to assure a right angular relationship between said stabilizing disc and wing, a slot centrally of said wing through which said elements extend, said slot being of slightly greater length than said radially extending elements whereby said elements may be turned by said dowel from a position within said slot to one at right angles thereto, a V bridle of string having extremities rotatably secured to the ends of said dowel, and a mooring line of string attached to the apex of said V-bridle and extending to the ground.

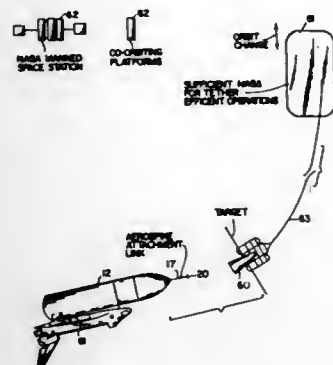
#### 4,790,499 AEROSPIKE FOR ATTACHMENT TO SPACE VEHICLE SYSTEM

Thomas C. Taylor, P.O. Box 1547, Wrightwood, Calif. 92397, and Peter Cerna, 2815 California, #4, Dickinson, Tex. 77539  
Continuation of Ser. No. 636,292, Jul. 31, 1984, Pat. No. 4,650,139. This application Oct. 31, 1986, Ser. No. 925,290  
The portion of the term of this patent subsequent to Mar. 17, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B64G 1/64

U.S. Cl. 244-161

23 Claims



1. An aerospike adapted to be attached to a nose of a space vehicle, said aerospike comprising an elongated portion having a first end which is adapted to be attached to said nose and a second end distant from said nose, said aerospike further comprising a disc-shaped tip member with a substantially curved front surface which is integrally formed with said second end of said elongated portion, said elongated portion comprising means for attaching said vehicle to another object in space, either said other object or said space vehicle further comprising a tether cord attached to said disc-shaped tip member, said tether cord and said tip together comprising means for attaching said vehicle to said other object in space and for pulling both said vehicle and said other object to a higher orbit, said elongated portion and said disc-shaped tip member together comprising means for reducing the aerodynamic drag of said space vehicle to which said aerospike is adapted to be attached during ascent of said vehicle into an orbital position.

#### 4,790,500 OPTICAL CONDUCTOR CABLE SUPPORTING STAND FOR A LIGHT RAY RADIATION DEVICE USED IN MEDICAL TREATMENT

Kei Mori, 3-16-3-501, Kaminaga, Setagaya-ku, Tokyo, Japan  
Filed Aug. 3, 1987, Ser. No. 81,044

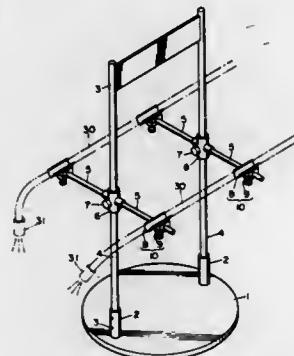
Claims priority, application Japan, Aug. 26, 1986, 61-199737  
Int. Cl.<sup>4</sup> F16L 3/00

U.S. Cl. 248-49

12 Claims

1. A light ray radiation device for use in medical treatment comprising an elongated optical conductor cable for transmitting the visible light rays component of solar rays, said cable having a longitudinal end, a light emitting means on said longitudinal

tudinal end for emitting said transmitted light rays on to a person's body, a supporting stand for supporting said optical conductor cable, said support stand comprising a pedestal, a plurality of spaced upright poles fixed to said pedestal, a support fixture slidably and rotatably mounted on each of said poles, a support arm fixed to each of said support fixtures and extending perpendicular to said poles, a cable support means slidably and rotatably mounted on each of said support arms, one of said cable support means receiving and engaging a first



section of said cable, another of said cable support means receiving and engaging a second section of said cable, said first section being longitudinally spaced from said second section, whereby the position and orientation of said light emitting end on the longitudinal end of said cable can be varied by independently sliding and rotating either one of said support fixtures on its respective pole, by independently sliding and rotating either one of said cable support means on its respective support arm, and by sliding and rotating said cable in each of said cable support means.

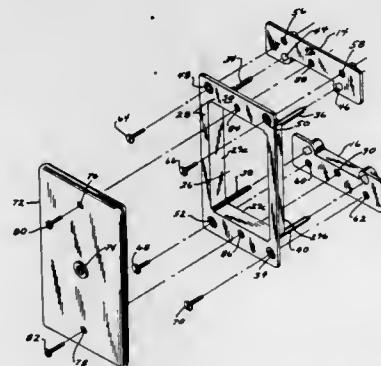
#### 4,790,501 WALL MOUNTING DEVICE

Joseph T. Waters, 1630 S. 82nd St., West Allis, Wis. 53214  
Filed Jul. 23, 1987, Ser. No. 76,879

Int. Cl.<sup>4</sup> G12B 9/00

U.S. Cl. 248-27.1

18 Claims



1. A device for framing an opening in a panel, said panel having spaced first and second surfaces, comprising: frame means for mounting adjacent said first surface of said panel and having an opening adapted to communicate with said panel opening, said frame means being provided with projection means formed integrally therewith and extending through said opening and having a portion projecting past said second panel surface; and one or more retainer means distinct from said frame means

for mounting said frame means to said panel, said retainer means having engagement means adapted for slidable engagement with said portion of said projection means projecting past said second panel surface for positioning said retainer means adjacent said second panel surface upon slidable engagement of said engagement means with said projecting portion of said projection means, to mount said frame means to said panel; and securing means extending between said frame means and said retainer means for reinforcing the mounting of said frame means to said panel.

#### 4,790,502 CLAMP FOR DISPOSING AND SECURING SMALL-DIAMETER PIPE

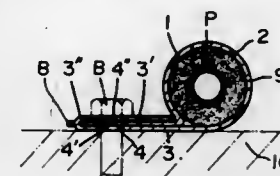
Shigeru Saegusa, Shizuoka, Japan, assignor to Usui Kokusai Sangyo Kabushiki Kaisha, Shizuoka, Japan

Filed Jan. 29, 1988, Ser. No. 150,091

Int. Cl.<sup>4</sup> F16L 3/08

U.S. Cl. 248-74.1

8 Claims



1. A metal clamp for disposing and securing a small-diameter pipe, said clamp having a gripping wall for clamping the pipe, the gripping wall being formed by bending the longitudinally central portion of a rectangular piece of plate in the shape of a cylinder which extends laterally, and flat first and second support walls which are defined by two end portions, respectively, of the piece of plate which are contiguous with said gripping wall, said support walls being superposed one upon the other and provided with respective mounting bores which are disposed so as to align with each other when said clamp is secured to a base, wherein the improvement comprises a clamping wall defined by a projecting end portion of said first support wall which projects beyond the edge of the second support wall, said clamping wall being folded over and clamping the second support wall to the first support wall securing the clamp to the pipe, said clamping wall having a bore which is provided to align with said mounting bores, and a cut portion formed in the fold of said clamp wall to said first support wall in the lateral direction, said second support wall having a projection on the longitudinal end thereof, said projection being engaged with the cut portion, whereby the engagement of the clamp wall with the second support wall and the engagement of said projection with said cut portion ensures alignment of said clamp to facilitate subsequent mounting of the clamp to a base.

#### 4,790,503 HOT LID HOLDER

Edna L. Pohler, 6152 W. Wabash Rd., Huntington, Ind. 46750  
Filed Mar. 29, 1988, Ser. No. 174,873

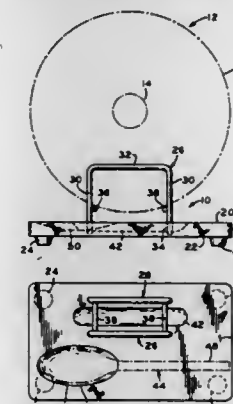
Int. Cl.<sup>4</sup> F16M 11/00

U.S. Cl. 248-176

20 Claims

1. A lid holding apparatus for holding a lid, comprising: a base including a top surface having an outer periphery; vertical support means for maintaining said lid in a vertically upright position, said vertical support means comprising a pair of spaced, substantially parallel vertical support members between which at least a portion of said lid is capable of being interposed, each of said pair of vertical support members being attached to said base and extending vertically upwardly from said top surface; and horizontal support means for maintaining said lid in spaced

relationship above said top surface, said horizontal support means comprising a pair of spaced, horizontal cross members, each of said pair of cross members extending



between and attaching to said pair of vertical support members in a manner adapted to permit the peripheral edge of said lid to contact said pair of cross members without contacting said top surface.

#### 4,790,504 DISPLAY SUPPORT MECHANISM

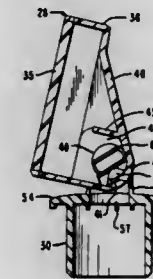
David C. Wills, and Jay D. Atkinson, both of Cambridge, Ohio, assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 21, 1987, Ser. No. 136,068

Int. Cl.<sup>4</sup> F16M 13/00

U.S. Cl. 248-183

10 Claims



1. The combination comprising: a base member having a pair of opposed spaced-apart finger portions extending upwardly therefrom; oppositely positioned engaging means mounted on the inside surfaces of said finger portions; a structure mounted on said base member for limited tilt and swivel movement, said structure including socket means having a pair of opposed apertures and a rear flexible wall portion having an end portion including a raised engaging portion, said socket means further including slotted portions for receiving the engaging means of said base member enabling the engaging means to be mounted within the socket means allowing the structure to be rotated about said engaging means; and said base member including an edge portion engaging the end portion of the rear wall portion whereby upon the rotation of the structure about the engaging means to a predetermined position, said edge portion engages the raised engaging portion thereby deflecting the rear wall portion to move to a position engaging the raised engaging portion for holding the structure at said predetermined position.



4,790,505

**ELECTRICAL BOX SUPPORT BRACKET**

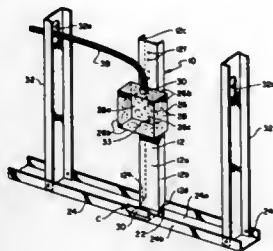
Steven A. Rose, 11730 W. Washington Blvd. #10, Los Angeles, Calif. 90066, and Irving Birken, 809 S. Bundy Dr., W. Los Angeles, Calif. 90049

Filed Mar. 28, 1988, Ser. No. 173,735

Int. Cl.<sup>4</sup> A47F 5/00

U.S. Cl. 248—205.1

5 Claims



1. A bracket for supporting an electrical box at a pre-selected height in the wall-framing space between metallic channel-type wall studs affixed to and extending vertically upward from a metallic U-shaped base channel, said bracket, comprising:

- (a) an elongated sheet metal channel member having a main wall and like side walls, said main wall presenting a front surface for the mounting thereon of an electrical box; and
- (b) a foot member for said elongated channel member formed from an extended section of the main wall of said channel member first folded rearwardly at a right angle from said main wall for a distance equal to the depth of said channel member, thence folded forwardly in a 360° tight bend forming a heel edge of said foot member and extending forwardly for a distance equal to the inner width of the base channel into which said foot member is to be placed, thence folded upwardly in a right angle bend for a distance equal to the inner height of the front side wall of said base channel, and finally folded downwardly in a 360° toe bend with an inner diameter equal to the thickness of the front side wall of said base channel and for a distance less than the outer height of said foot member for clamping engagement of the upper lip portion of said front side wall to maintain said bracket in said base channel in a fixed vertical upright position.

4,790,506

**SUPPORT STAND FOR READING MATERIAL**

Stephen A. Malinowski, 1850 Arch St. #5, Berkeley, Calif. 94709, and Douglas C. George, P.O. Box 908, Redway, Calif. 95560

Filed Aug. 17, 1987, Ser. No. 86,296

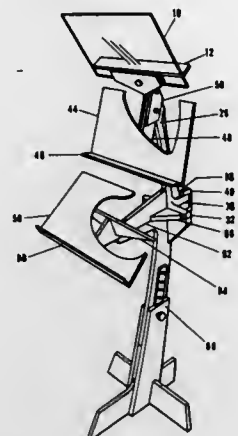
Int. Cl.<sup>4</sup> A47B 23/00

U.S. Cl. 248—441.1

8 Claims

- 1. A support stand for holding reading material above eye level of a seated or standing human, comprising:
  - a rigid transparent plate having front and back major surfaces and top, bottom, left and right edges,
  - means for supporting said plate such that (a) said plate is substantially above eye level of said seated or standing human, and (c) said plate is inclined from the vertical such that said top edge of said plate is approximately the same distance from said human's head as said bottom edge thereof,
  - means attached to said back major surface for supporting said reading material lying against said back major surface,
  - a second rigid plate,
  - means for holding said second plate below said transparent

plate, inclined in the opposite direction as said transparent plate, and



means attached to said second plate for supporting reading material lying against said second plate.

4,790,507

**TOOL FOR THE PRECISE MOVEMENT OF MACHINES**

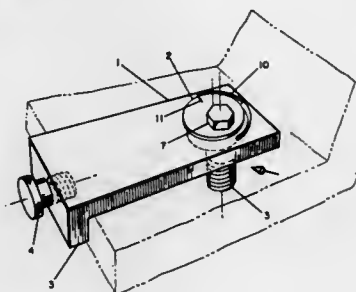
Brian J. Morrissey, 1911 Landry Dr., Baker, La. 70714

Filed May 18, 1987, Ser. No. 50,962

Int. Cl.<sup>4</sup> F16M 13/00

U.S. Cl. 248—651

3 Claims



- 1. A precision moving mechanism for adjusting the position of an object comprising:
  - (a) a body having a hole adjacent one end,
  - (b) the opposite end of said body having an L-shaped lip edge for contacting a surface of said object,
  - (c) a circular member engageable in said body hole having an eccentric means to engage a fulcrum extending through a slot in said object,
  - (d) means to rotate said circular member,
  - (e) said lip edge restraining movement of said object in one direction opposed to the direction of force applied through rotation of said circular member,
  - (f) means for restraining movement of said fulcrum, and
  - (g) rotation of said circular member in one direction reducing the distance between said lip edge and said fulcrum to thereby effect positional adjustment of said object.

4,790,508

**CONCRETE CASTING FORM INCLUDING RETRACTABLE CORE**

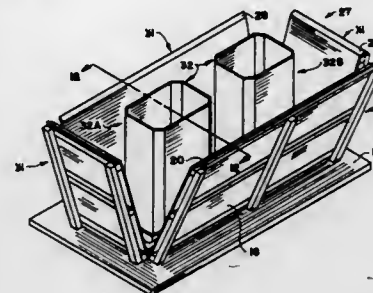
Don Henderson, 822 Anclote Rd., Tarpon Springs, Fla. 33589, and Dirk Henderson, 195 E. Canal Dr., Palm Harbor, Fla. 33563

Filed Nov. 28, 1986, Ser. No. 935,925

Int. Cl.<sup>4</sup> B28B 7/30

U.S. Cl. 249—11

17 Claims



- 1. A form for casting a structurally reinforced concrete structure for use on a horizontal supporting slab comprising:
  - an outer container form having a plurality of rigid walls with each rigid wall extending vertically relative to the supporting slab;
  - each rigid wall of said plurality of rigid walls having a first and a second end;
  - said first end of each rigid wall of said plurality of rigid walls being pivotally secured to the supporting slab to enable said second end of each rigid wall to be pivoted outwardly relative to said first end to a position less than vertical;
  - means to brace each rigid wall of said plurality of rigid walls of said outer form to prevent pivoting during the pouring and curing of the concrete against said rigid walls;
  - a casting core positioned within said outer container form and having vertically extending walls relative to the supporting slab defining an internal contiguous core wall;
  - said internal contiguous core wall of said casting core being resilient to enable retraction and extension thereof relative to said plurality of rigid walls of said outer form;
  - said casting core further includes chamfered corners having a thickness greater than the thickness of any said vertically extending walls comprising the internal contiguous core wall;
  - means for retracting said internal contiguous core wall of said casting core such that said internal contiguous core wall of said casting core is retracted to a first position and said pivoting of each rigid wall of plurality of said rigid walls of said outer form outwardly relative to said first end of said rigid wall to a position less than vertical after the cast reinforced concrete structure is cured enables the cast reinforced concrete structure to be easily released and removed from the form and prior to adding concrete enables the placement of the structural reinforcing within said mold cavity;
  - each rigid wall of said plurality of said rigid walls of said outer form and said internal contiguous core wall of said casting core being spaced apart to define a mold cavity therebetween;
  - a form base supported by the supporting slab and positioned within said mold cavity to releasably support the cast concrete structure within the form;
  - said form base having an inner and outer edge;
  - said internal contiguous core wall of said casting core includes an upper and lower periphery;
  - said lower periphery of said internal contiguous core wall being spaced above the supporting slab to enable extension and retraction of said internal contiguous core wall of

said casting core relative to each rigid wall of said plurality of rigid walls of said outer form;

said lower periphery of said internal contiguous core wall of said casting core being adjacent said inner edge of said form base to sealingly abut said inner edge of said form base when said internal contiguous core wall of said casting core is extended and braced at a second position during pouring and curing of the concrete within said mold cavity;

means for extending said internal contiguous core wall of said casting core such that said pivoting of each rigid wall of said plurality of rigid walls of said outer form to a substantially vertical position relative to the supporting slab and extending said internal contiguous core wall to said second position sealingly abuts said form base and aligns the structural reinforcing relative to said internal contiguous core wall of said casting core and each rigid wall of said plurality of rigid walls of said outer form within said mold cavity prior to the pouring and curing of the concrete within said mold cavity;

means for bracing said internal contiguous core wall of said casting core during the pouring and curing of the concrete in said mold cavity.

4,790,509

**TUBULAR CONCRETE FORM COLLAR**

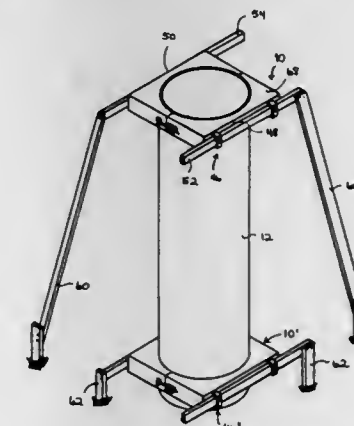
William L. Cardwell, Rte. 7, Box 517, Clinton, Tenn. 37716, and Charles A. Hodge, 527 Watauga Ave., Knoxville, Tenn. 37917

Filed May 19, 1987, Ser. No. 51,391

Int. Cl.<sup>4</sup> E04G 13/02

U.S. Cl. 249—93

7 Claims



- 1. A collar for supporting a tubular concrete form, comprising:
  - cooperating sections each having a substantially rectangular outline formed by intersection edges one edge of each section defining a semi-circular interior surface dimensioned for receiving a portion of the circumferences of said tubular concrete form therein;
  - means for releasably joining and cooperating sections of said collar together such that said collar engages said form around at least a substantial portion of said circumference; and
  - bracket means carried by said cooperating sections and suitable for being connected to a temporary frame which supports said collar while concrete cures in said form, said bracket means including at least one bracket unit attached to each collar section on an edge of said section other than the edge defining said semi-circular interior surface said bracket units each provided with as first opening there-through dimensioned for receiving a portion of said temporary frame, and a further opening intersecting said first opening for receiving a removable fastener means for

releasably attaching said bracket units to said portion of said temporary frame.

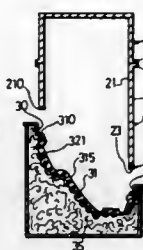
#### 4,790,510 SLUSH MOLD

Shigeki Takamatsu, Toyota; Yoshio Taguchi, Nagoya, and Takeshi Kato, Toyota, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Sep. 23, 1986, Ser. No. 910,690  
Int. Cl.<sup>4</sup> B29C 33/02

U.S. Cl. 249—117

15 Claims



#### 1. A slush mold comprising:

- a mold body having a molding surface and a flange surface, said molding surface including a molding portion and a marginal portion, said marginal portion being adjacent to and surrounding said molding portion at a peripheral edge of said molding portion;
- a skirt detachably joined to said mold body in a molding position, said skirt having an interior portion defined by a lower edge of said skirt, said lower edge contacting said peripheral edge of said molding portion so that said molding portion is within said interior portion and said marginal portion is outside said interior portion when said skirt is joined to said mold body; and
- guide means operatively coupled to said mold body and said skirt for guiding said mold body and said skirt during relative joining movements of said mold body and said skirt when said mold body and said skirt are detached to cause said lower edge of said skirt to contact said peripheral edge of said molding portion when said mold body and said skirt are joined in said molding position.

#### 4,790,511

#### HYDRAULIC APPARATUS, IN PARTICULAR A 2-WAY PROPORTIONAL THROTTLE VALVE

Norbert Gehrig, Zelligen-Duttenbrunn, and Hans Wölfiges, Lohr, both of Fed. Rep. of Germany, assignors to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed Sep. 12, 1986, Ser. No. 906,452

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1985, 3532591

Int. Cl.<sup>4</sup> F16K 31/40

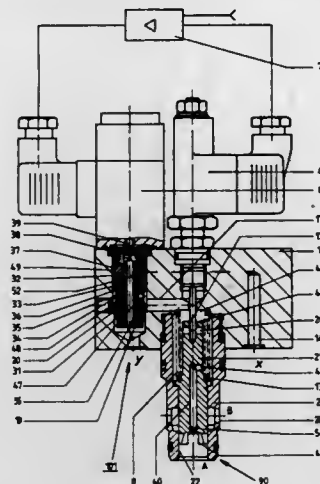
U.S. Cl. 251—30.02

7 Claims

#### 1. A 2-way proportional throttle valve comprising:

- a throttle valve housing;
- a main, 2-way valve mounted to said housing and having a main spool actuable by means of pilot oil and having a pump side, a spring chamber side, and defining first pilot oil passage means for fluidly coupling the pump side of the main spool with the spring chamber side of said main spool;
- a proportional solenoid mounted to said housing;
- a pilot control valve mounted to said housing and operatively coupled to said proportional solenoid;
- second pilot oil passage means for fluidly coupling said pilot control valve and said spring chamber side, said pilot valve defining first control edge means on a surface thereof for providing a single edge control for controlling the size of a vent passage to a tank during a single edge

control mode in accordance with the position of said proportional solenoid independently of a flow through opening defined between said control valve and said second pilot oil passage means, whereby said first and second pilot oil passage means provide a connection between the



pump side of the main spool and said first control edge means, said first pilot oil passage means including a jet means such that on contamination of said jet means or said first pilot oil passage means, an automatic transfer from the single edge control mode to a two-edge control mode occurs.

#### 4,790,512

#### REMOTELY OPERABLE HERMETICALLY SEALED PLUG VALVE

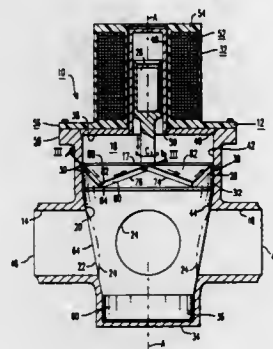
Malcolm Lindsay, O'Hara Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 23, 1987, Ser. No. 124,322

Int. Cl.<sup>4</sup> F16K 31/06, 31/528

U.S. Cl. 251—129.2

12 Claims



1. A hermetically sealed valve adapted to be placed in flow communication with a fluid line, comprising:
  - a housing having a fluid inlet and a fluid outlet and an intermediate chamber in flow communication therewith forming a flow path through the valve, said housing adapted to be hermetically coupled in flow communication with the fluid line, said housing including a pair of spaced concentric cylindrical surfaces and an interconnecting valve seat;
  - a plug being positionable in the chamber of the housing in operative relationship with the fluid inlet and fluid outlet

between open and closed positions, said plug having a through opening therein for opening the flow path from the inlet to the outlet when in the open position and for blocking the flow path when in the closed position, said plug further including a pair of cylindrical spaced members mating with the cylindrical surfaces in the housing and an interconnecting portion mating with the valve seat, said plug being free to both unidirectionally rotate and reciprocate in the housing respectively about a concentric common axis of the cylindrical surfaces;

an actuator axially interconnected with the plug for axially reciprocating the plug between seated and unseated positions; and

a cam and cam follower cooperating with at least one of the cylindrical surfaces and a corresponding one of the cylindrical members for guiding said plug between the open and closed positions of the plug, said cam guiding the plug from rest in the open or closed position to open or close the flow path when the drive is actuated from rest at the seated position through the unseated position and back to the seated position, whereby axial movement of the drive causes simultaneous rotational and axial movement of the plug between open and closed positions.

#### 4,790,513

#### SOLENOID VALVE ASSEMBLY

Ronald G. Davis; David S. Dennis; James S. Hickman, all of Anderson, and William J. Lynch, Knightstown, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

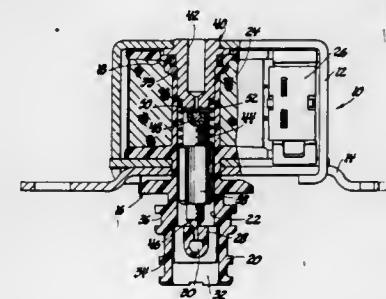
Continuation of Ser. No. 552,829, Nov. 17, 1983, abandoned.

This application Jul. 5, 1985, Ser. No. 751,875

Int. Cl.<sup>4</sup> F16K 31/02

U.S. Cl. 251—129.21

4 Claims



1. A solenoid valve comprising a valve body; a bore in said valve body; a fluid port in said valve body comprising a central flow passage; a valve seat area surrounding said flow passage including a frusto-conical surface portion diverging from said central flow passage, an annular recess having a V-shaped cross section with the radially inner edge thereof terminating at the radially outer edge of said valve seat area, and a frusto-conical surface diverging from the radially outer edge of said annular recess; a valve member slidably disposed in said bore and having a flat end surface adapted to seat on said valve seat area only at the linear intersection of the control passage and the frusto-conical surface to prevent contact between said valve member and said frusto-conical surface; spring means for urging said valve member off said valve seat area; and selectively energizable solenoid coil means surrounding a portion of said valve member for forcing said valve member into abutment with said valve seat area to close said fluid port.

#### 4,790,514

#### REMOTE CONTROL VALVE OPERATOR

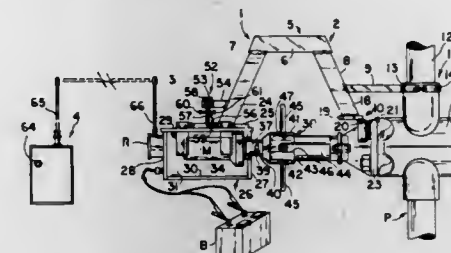
Harold L. Marks, Rte. 1, Box 29AA, Burnsville, W. Va. 26335

Filed Jan. 27, 1988, Ser. No. 150,237

Int. Cl.<sup>4</sup> F16K 31/05

U.S. Cl. 251—129.03

16 Claims



1. A remote control apparatus for manipulating a pipeline valve having a stem including:
  - a support assembly having a valve end and an opposite actuating assembly end,
  - means removably attaching said support assembly valve end adjacent a valve stem,
  - an actuating assembly including a housing, shiftable means attaching said housing to said support assembly actuating assembly end,
  - a motor in said housing and having a shaft, coupling means on said shaft engageable with the valve stem,
  - means interlocking said coupling means relative the valve stem, and
  - said shiftable attaching means allowing relative longitudinal displacement between said support assembly and housing whereby, rotation of said motor, shaft, coupling means and engaged valve stem produces an axial extension or retraction of the valve stem and a corresponding axial displacement of said housing as said support assembly remains stationary.

#### 4,790,515

#### FORCE MULTIPLIER USEFUL AS A LIFTING DEVICE

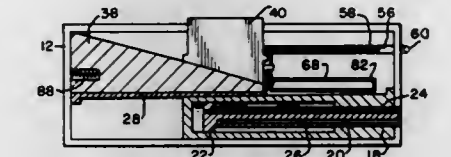
Silvano Pocci, Eric Dr., Kinnelon, N.J. 07405

Filed Jul. 27, 1987, Ser. No. 78,398

Int. Cl.<sup>4</sup> B24B 4/06

U.S. Cl. 254—104

19 Claims



1. A force multiplier useful as a lifting device, comprising:
  - a housing; and
  - a base set within said housing; wherein said base has a trackway formed therein;
  - an open-center frame slidably and removably set upon said base above said trackway;
  - a lifting block set upon said frame and astride said trackway; and
  - means within said trackway operative for elevating said lifting block above said frame.



4,790,516

## REACTOR FOR IRON MAKING

Saburo Sugura, Aichi; Masanobu Ikeda, Mie, and Noboru Demukai, Gifu, all of Japan, assignors to Daido Tokushuko Kabushiki Kaisha, Aichi, Japan

Division of Ser. No. 445,534, Nov. 30, 1982, Pat. No. 4,605,437.

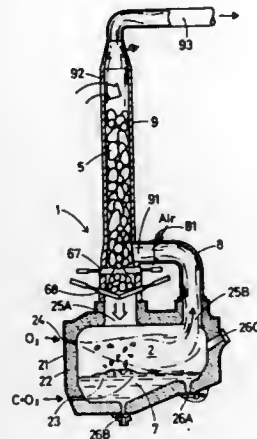
This application May 21, 1986, Ser. No. 865,301

Claims priority, application Japan, Feb. 1, 1982, 57-14443

Int. Cl.<sup>4</sup> F27B 3/22

U.S. Cl. 266—144

3 Claims



1. An apparatus for reactor iron making comprising a reactor having an upper part, a lower part, a top part connected to said upper part, and a refractory lining in said upper part and said lower part; at least one upper gas blowing nozzle means in said upper part of said reactor for blowing gas onto molten iron in said refractor when molten iron is present in said reactor; at least one lower gas blowing nozzle means in said lower part of the reactor for blowing gas directly into molten iron in said reactor when molten iron is present in said reactor; iron scrap charging inlet means formed in said top part of said reactor for directly charging iron scrap into said reactor; a vertical shaft installed directly above said inlet means and connected therewith, said vertical shaft having an upper end, a lower end, a low temperature gas exit at said upper end and an iron scrap entrance at said upper end, means installed in said lower end for controlling charging of the iron scrap to said reactor, said vertical shaft having a gas inlet positioned directly above said means for controlling charging, by-pass tube means connected between said top part of the reactor and said gas inlet for permitting exit of high temperature exhaust gases from said reactor and introducing said exhaust gases and iron scrap therein to be charged, and means in said by-pass tube means for introducing oxygen gas or air into the high temperature exhaust gases to react therewith and generate further heat.

4,790,517

## APPARATUS FOR THE DIRECT REDUCTION OF SULPHUROUS IRON ORES

Waldemar Mathews, Bergheim, Fed. Rep. of Germany, assignor to Korf Engineering GmbH, Dusseldorf, Fed. Rep. of Germany

Division of Ser. No. 753,416, Jul. 10, 1985, Pat. No. 4,735,653.

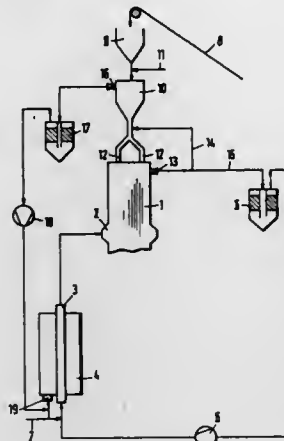
This application Dec. 30, 1987, Ser. No. 139,476

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1984, 3432090

Int. Cl.<sup>4</sup> F27B 1/20

U.S. Cl. 266—156

3 Claims



1. An apparatus for reducing sulphurous iron ores, comprising: a shaft furnace, an iron ore bunker arranged above and separate from said shaft furnace, a catalytic reducing gas converter having a catalyst tube, means for feeding sulphurous iron ores into said ore bunker, first conduit means connecting said ore bunker and said shaft furnace for feeding pre-heated desulphurized iron ores from said ore bunker into said shaft furnace, second conduit means connecting said catalyst tube with a bottom part of said furnace for introducing reducing gas produced in said tube into said shaft furnace for reducing the desulphurized iron ores therein, third conduit means connecting a top portion of said shaft furnace with said iron ore bunker for feeding spent reducing gas from said shaft furnace to said iron ore bunker for preheating said iron ores, fourth conduit means connecting a top portion of said shaft furnace with said catalyst tube for feeding spent reducing gas from said shaft furnace to said catalyst tube, a source of hydrocarbons, fifth conduit means for introducing hydrocarbons from said source into said fourth conduit, and thereby into said catalyst tube with spent reducing gas for producing reducing gas, and sixth conduit means connecting said iron ore bunker and said catalytic reducing gas converter for heating said reducing gas with spent reducing gas from said ore bunker.

4,790,518

## AUTOMATICALLY RECHARGING AIR SPRING

Michael J. Lerman, Edison, and William B. Zamory, Somerville, both of N.J., assignors to De Dietrich (USA), Inc., Union, N.J.

Filed Apr. 16, 1986, Ser. No. 852,593

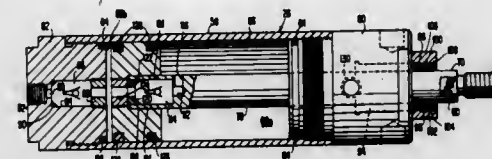
Int. Cl.<sup>4</sup> E05F 3/00; F16F 5/00, 9/14; B62D 25/00

U.S. Cl. 267—64.11

16 Claims

1. An air spring assembly to assist in movement of a movable member including a cylinder formed by a housing having a chamber therein, cap means for closing opposite ends of said cylinder and sealing said chamber from ambient conditions, a piston, a rod extending through one of said cap means to a first end outside said chamber, means attaching the second end of said rod to said piston so that said piston and rod move conjointly upon relative movement of said housing and piston

through each complete cycle of movement between limit positions, said piston serving to divide said chamber into a first subchamber on one side of said piston and a second subchamber on the other side of said piston, a first checkvalve means connected between said first subchamber and the atmosphere, and a second checkvalve means in said piston and connecting said first and second subchambers, said second checkvalve means and said piston cooperating with said chamber in said housing to retain gas in said second subchamber under pressure elevated with respect to the pressure in the first subchamber under normal circumstances, said first and second checkvalve means being automatically operable for both pressurizing said second subchamber to a pressure level to balance the force to



be exerted on said movable member and restoring pressure to said second subchamber previously charged in the maintenance of said pressure level under circumstances of leakage of pressure from said second subchamber, initial pressurization of said second subchamber and the restoration of pressure in said second subchamber being carried out by flow of a compressible fluid from said first to said second subchamber through said second checkvalve upon movement of said piston in one direction with respect to said housing through at least one cycle of movement, and means for connecting one of said housing and rod at first end to a support and the other of said housing and rod to said movable member requiring assistance in movement by one of a pushing and a pulling force.

4,790,519

## BORDERWIRE HINGE CLIP

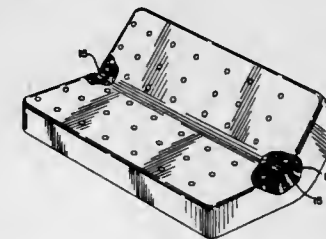
Gary M. Stewart, Rensselaer, Ind., assignor to Sealy, Incorporated, Chicago, Ill.

Filed Dec. 29, 1986, Ser. No. 946,973

Int. Cl.<sup>4</sup> F16F 3/00; A47C 23/02

U.S. Cl. 267—106

2 Claims



1. A spring assembly comprising: a plurality of springs organized into a support area, means for retaining said springs in said support area, a border wire assembly surrounding said support area, and having a first border wire section and a second border wire section which meet along portions formed on each border wire section, said border wire sections being generally U-shaped with said border wire portions being formed at the ends of each U and extending inwardly of said support area, and a clip for joining said border wire portions together, said clip being stamped in a single piece and having a longitudinal axis with sleeves formed on either side of said axis in which said respective border wire portions are received, with at least one barb having a pointed barb end formed inwardly of a sleeve with said barb end pointed generally parallel to said longitudinal axis to secure said barbed sleeve in place on its respective border wire portion

through sliding said clip on juxtaposed border wire portions of respective border wire sections with said barb pointing opposite the direction of sliding, said clip permitting said border wire sections to freely rotate with respect to each other.

4,790,520

## VIBRATION INSULATING DEVICE WITH FLEXIBLE DIAPHRAGM BETWEEN RADially OUTER GAS CHAMBER AND RADially INNER LIQUID CHAMBER

Atruo Tanaka, Zama; Takao Okubo, Atsugi; Takao Ushijima, Chigasaki, and Takeshi Noguchi, Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd. and Bridgestone Corporation, both of Japan

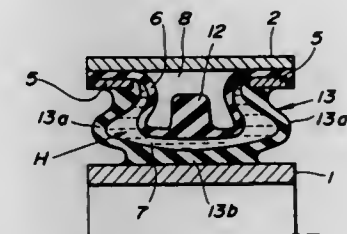
Filed Nov. 24, 1986, Ser. No. 933,898

Claims priority, application Japan, Nov. 25, 1985, 60-262393

Int. Cl.<sup>4</sup> F16M 1/00; F16F 7/00, 9/10

U.S. Cl. 267—140.1

24 Claims



1. A vibration insulating device comprising: an inner cylindrical member; an outer cylindrical member disposed generally coaxially around said inner cylindrical member; an annular elastic member disposed between said inner and outer cylindrical members and securely connected to said inner and outer cylindrical members, respectively, said annular elastic member being generally coaxial with said inner cylindrical member; means defining an annular hollow chamber between said inner and outer cylindrical members, said annular hollow chamber being generally coaxial with said inner cylindrical member, at least a part of said annular hollow chamber being defined by said annular elastic member; an annular flexible diaphragm member at least a part of which is disposed within said hollow chamber to define, within said hollow chamber, an annular liquid chamber filled with a liquid and an annular gas chamber filled with a gas, said flexible diaphragm member, said liquid chamber, and said gas chamber being generally coaxial with said outer cylindrical member, each of said liquid and gas chambers extending throughout a periphery of said annular elastic member and being effective for vibrations in all radial directions.

4,790,521

## ANTI-VIBRATION APPARATUS FOR MOUNTING A POWER UNIT ON A SUPPORTING BODY WITH SUPPRESSION OF VIBRATIONS

Takanobu Ide, and Ikuro Shimoda, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama and Oiles Industry Company, Limited, Tokyo, both of Japan

Filed Oct. 3, 1986, Ser. No. 915,073

Claims priority, application Japan, Oct. 3, 1985, 60-220906; Dec. 6, 1985, 60-274834; Dec. 6, 1985, 60-274835

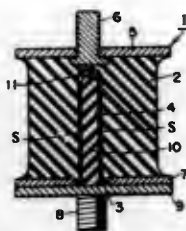
Int. Cl.<sup>4</sup> F16F 15/04; B60G 5/00; B60K 5/00; F16M 13/00

U.S. Cl. 267—219

20 Claims

1. An apparatus comprising: (a) a first attachment member; (b) a second attachment member;

- (c) an elastic block member intervened between the first and second attachment members;
- (d) a cavity in a form of an elongated groove extended within the elastic block member;
- (e) a plate-like shearing resistance element, one end of which is fixed to the second attachment member and extended within the cavity;



- (f) a viscous fluid having a relatively high viscosity and filled within the cavity of the elastic block member, so as to be present between a portion of the cavity and an opposing surface of the shearing resistance element, the viscous fluid generating a shearing resistance force dependent on vibration frequency along the opposing surface of the shearing resistance element in response to a relative displacement at constant speed between the resistance element and the wall surface of the cavity.

4,790,522

## ELECTROVISCOUS FLUID CONTROL DEVICE

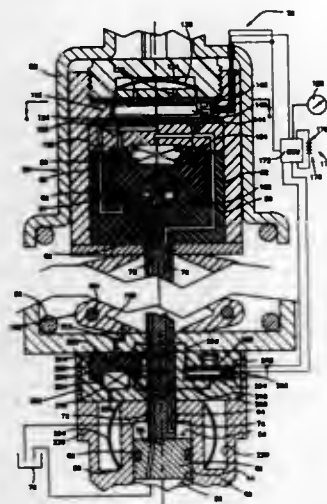
Gilbert H. Drutchas, deceased, late of Birmingham, Mich. (by Elaine M. Drutchas, legal representative), assignor to TRW Inc., Lyndhurst, Ohio

Filed Feb. 25, 1988, Ser. No. 160,486

Int. Cl.<sup>4</sup> F16F 13/00

U.S. Cl. 267-225

30 Claims



1. An apparatus for connection between relatively movable parts, said apparatus comprising:
- means defining a variable volume fluid chamber having a first portion for connection with one of the parts and a second portion for connection with another of the parts, said chamber having fluid therein for resisting movement of the parts relative to each other;
- a valve for controlling fluid flow from said chamber to a location at which the fluid does not resist relative movement of the parts;
- said valve including a valve member movable from a first

position to provide fluid communication between said chamber and said location; and

an electroviscous fluid control device for resisting movement of said valve member from said first position.

4,790,523

## METHOD AND A SYSTEM FOR DISPLACING OBJECTS

David Tomer, Haifa, Israel, assignor to Galram Technology Industries Ltd., Haifa, Israel

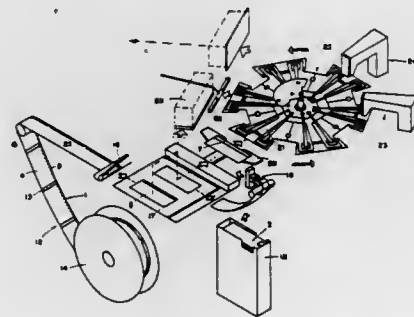
Filed Aug. 19, 1986, Ser. No. 897,837

Claims priority, application Israel, Sep. 2, 1985, 76277

Int. Cl.<sup>4</sup> B41L 43/12

U.S. Cl. 270-37

15 Claims



1. A system for displacing substantially planar objects into a predetermined disposition, comprising:
- depositing means for depositing said objects on a supporting surface in a relatively spaced apart disposition;
- a tracking arm;
- a pair of spaced apart optical sensors carried by said tracking arm for successively sensing positional coordinates of each object and transmitting data relating to said coordinates for storage in a programmed central processor unit;
- arm displacing means for displacing said tracking arm over said supporting surface in any required direction; and
- object displacing means for displacing each object with respect to a succeeding object in an order reverse to the order of sensing so as to locate each object in a predetermined relative disposition with respect to the position of said succeeding object as stored in said processor unit, said object displacing means being formed integrally with said tracking arm and comprising an object gripping surface formed on said arm, said arm displacing means being capable of displacing said arm towards and away from said surface.

4,790,524

## SHEET SUPPLYING APPARATUS

Reiji Murakami, Yokohama; Shinichi Hashimoto, Fujisawa; Mamoru Shimino, Yokohama, and Fumito Ide, Zama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 8,653, Jan. 20, 1987, abandoned, which is a division of Ser. No. 643,275, Aug. 22, 1984, Pat. No. 4,682,789. This application Aug. 17, 1987, Ser. No. 87,961

Claims priority, application Japan, Aug. 26, 1983, 58-155753

Int. Cl.<sup>4</sup> B65H 3/44

U.S. Cl. 271-10

8 Claims

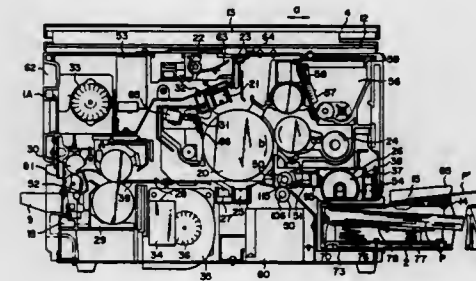
1. A sheet supplying apparatus for supplying a sheet from a stored location to a sheet feed location, comprising:
- a sheet storing cassette for storing sheets to be automatically fed;
- pickup means for picking up sheets from said cassette one by one to automatically feed sheets, and for guiding manually inserted sheets, said pickup means including a pick up roller which is rotatable about a fixed axis and having a curved peripheral surface adapted to contact said sheets

which are to be automatically fed and a flat peripheral surface adapted to guide a manually inserted sheet, said flat surface being smaller in area than an area of a rectangular cross-section of an area passing through a center of a cylinder having a radius equal to a radius of said pickup roller;

register means for aligning a sheet from said pickup means to supply said sheet to the sheet feed location, said register means including a pair of rotatable register rollers which contact each other at a nip portion thereof;

a guide plate, fixed on said cassette, for guiding a manually inserted sheet to an area between the cassette and the flat peripheral surface of the pickup roller, the guide plate located such that the guided sheet passes between said

having variable degrees of geometric and physical condition, including a sheet material stack holding means, a sheet feeding means, a sheet withdrawing means and a stack retaining means, wherein the sheet material is conveyed in stacks in variable physical and geometric conditions via a stack transporting system to the stack holding means up to the stack retaining means, from which the sheet material is separated from the stack by a separation process, fed sheet by sheet to a sheet feeding system leading on further by the interaction of the feeding, withdrawing and retaining means, the improvement comprising first means arranged to rearrange the geometric and physical condition of the stack so that a predetermined geometric and physical condition of the stack is effected by manipulation of the sheet material in the stack during the process of separation; a second means for monitoring the separation sequence and detecting a defect in the separation process; and a control unit in communication with said first and second means arranged to activate the first means in case of the occurrence of an undue deviation in the separation process.



4,790,526

## METHOD AND APPARATUS FOR CONTROLLING THE ROTATION OF A BILL ACCUMULATING WHEEL

Masaaki Egashira, Urawa, Japan, assignor to Laurel Bank Machines Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 786,488, Oct. 11, 1985, abandoned.

This application Jul. 2, 1987, Ser. No. 70,158

Claims priority, application Japan, Nov. 6, 1984, 59-233674

Int. Cl.<sup>4</sup> B65H 29/20

U.S. Cl. 271-315

5 Claims

guide plate and said flat peripheral surface into said nip portion between said register rollers; and

driving means for controlling an automatic sheet feed by: first, rotating only said pickup roller to pick up a sheet from said cassette which contacts with the curved peripheral surface of said pickup roller and to transport the sheet to a location where the leading edge of the picked up sheet abuts against the nip portions of said register rollers, next, stopping the rotation of said pickup roller while keeping a trailing edge of the sheet engaged with said pickup roller thereby ensuring that alignment of the sheet is maintained, and next rotating simultaneously the pick-up roller and at least one of the register rollers to supply the aligned sheet to the sheet feed location.

4,790,525

## APPARATUS AND A METHOD FOR SEPARATING SHEET MATERIAL

Wilhelm Mitzel, Neukeferloh; Karl-Heinz Leuthold, and Josef Geler, both of Munich, all of Fed. Rep. of Germany, assignors to GAO Gesellschaft für Automation und Organisation mbH, Fed. Rep. of Germany

Continuation of Ser. No. 812,313, Dec. 23, 1985, abandoned.

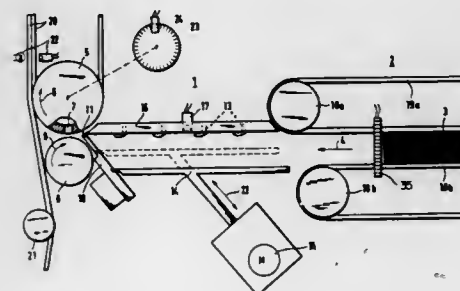
This application Jan. 28, 1988, Ser. No. 149,899

Claims priority, application Fed. Rep. of Germany, Dec. 28, 1984, 3447777

Int. Cl.<sup>4</sup> B65H 3/14

U.S. Cl. 271-97

25 Claims



1. In sheet separating apparatus for separating sheet material

1. An apparatus for controlling the rotation of a bill accumulating wheel which is disposed downstream of a bill conveying passage to receive a bill therefrom between a pair of successive blades of the accumulating wheel, which comprises:
- a first sensor for detecting the passage of the bill through a predetermined position in the conveying passage,
- a second sensor for detecting a blade and generating a detection signal corresponding to the rotating angle of the blade of the accumulating wheel,
- drive means for driving the accumulating wheel,
- a drive circuit for supplying a driving current to said drive means of the accumulating wheel, and
- a control circuit for detecting a difference in time between a time detected by the second sensor and a time detected by the first sensor and for operating the drive circuit to rotate said drive means at a speed required for rotating the blade of the accumulating wheel up to an angle at which the bill can be received between a pair of the blades, wherein said control circuit includes:
- storing means (15) for digitally storing a difference between a preset value corresponding to an initial count value at the time when a bill is fed in at a safe timing and the lapse of time from the time when the blade is detected by the second sensor to the time when the bill is detected by the first sensor to generate an output corresponding to the difference,
- counting means (18) for digitally counting the lapse of time



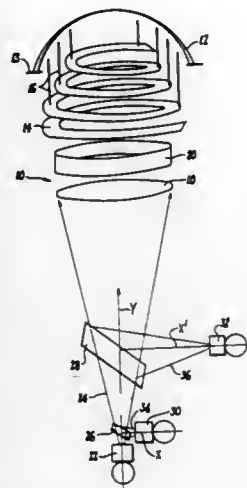
from the time when the bill was detected by the first sensor to the time when the count value of the counting means coincides with the difference stored in the storing means to generate an output, comparator means (20) for comparing the output of the counting means (18) with the output of the storing means (15) to detect the time when both outputs are coincident, and means (14, 16) for driving said drive means at a speed twice as fast as a normal speed during a period from the time when the bill was detected to the time when the coincidence of the outputs is detected by the comparator means.

**4,790,527**  
**ENTERTAINMENT OR AMUSEMENT STRUCTURE**  
Michael R. Browning, Flinders, Australia, assignor to Concord St. George Productions Pty. Ltd., Victoria, Australia  
PCT No. PCT/AU86/00051, § 371 Date Nov. 5, 1986, § 102(e) Date Nov. 5, 1986, PCT Pub. No. WO86/05114, PCT Pub. Date Sep. 12, 1986

PCT Filed Mar. 5, 1986, Ser. No. 939,792  
Claims priority, application Australia, Mar. 5, 1985, PG9567; Mar. 8, 1985, PG9622

Int. Cl.<sup>4</sup> A63J 3/00  
U.S. Cl. 272-10

15 Claims



1. An entertainment or amusement structure comprising: a frame extending upwardly from a base; an enclosure housing said frame; a horizontally disposed cinema screen mounted in a lower portion of said enclosure, said screen having images projected thereon; and an elongated movable walkway suspended from said frame, said walkway being located in an upper portion of said enclosure and extending circumferentially around said screen and being located above said screen for permitting viewers on said walkway to see said screen; and means for moving said walkway in a controlled manner, the viewers on said walkway generally experiencing an increased feeling of realism of the images on said screen in response to movement of said walkway.

**4,790,528**  
**TRAINING DEVICE FOR REHABILITATION**  
Shinroku Nakao, Kanagawa, and Masao Ito, Tokyo, both of Japan, assignors to Combi Co., Ltd., Tokyo, Japan  
Filed Mar. 31, 1987, Ser. No. 32,647  
Claims priority, application Japan, Jul. 29, 1986, 61-178470  
Int. Cl.<sup>4</sup> A63B 69/16  
U.S. Cl. 272-73

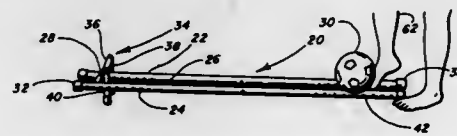
4 Claims



1. A rehabilitation training device in which at least four training steps of warming-up, automatic control, interval control and cool-down are provided, said rehabilitation training device comprising: pulse rate measuring means for detecting a heart rate of a user at rest before said training steps and during said training steps; data inputting means for freely setting a target heart rate as an exercise reference for said user; processing circuit means for processing input data from said pulse rate measuring means and said data inputting means; an ergometer for being operatively manipulated by a said user and having a load controlled by an output of said processing circuit means; warm-up control means for gradually increasing said load of said ergometer during said warm-up step until a detected heart rate of said user reaches said target heart rate; automatic control means for controlling said load of said ergometer during said automatic control step so that, after reaching said target heart rate, a detected heart rate is maintained within a predetermined tolerance of said target heart rate; interval control means for changing said load of said ergometer during said interval control step at intervals, according to an average load value of said load during a predetermined period of said automatic control step; and cool-down control means for gradually decreasing said load of said ergometer during said cool-down step following said interval control step; and wherein said warm-up control means, said automatic control means, said interval control means and said cool-down control means being provided in conjunction with an operation of said processing circuit.

**4,790,529**  
**EXERCISE AND TRAINING DEVICE**  
Ralph D. Pelle, 1932 S. 50th Ave., Cicero, Ill. 60650  
Filed Jan. 16, 1987, Ser. No. 3,726  
Int. Cl.<sup>4</sup> A63B 63/04, 69/20, 69/32, 69/40  
U.S. Cl. 272-93

9 Claims

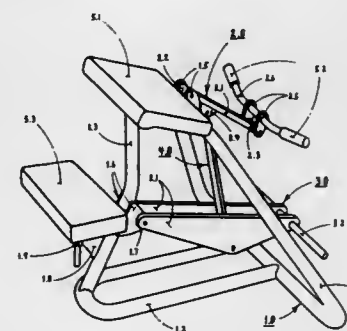


1. An exercise and training device comprising a pair of

spaced elongated members, said members having two pairs of adjoining ends, means for spacing said members, at one pair of said adjoining ends, at a predetermined distance from each other to define a rolling ball path, means for adjustably elevating said one pair of adjoining ends with respect to the other pair of adjoining ends to define a gravity return ball path, said other pair of adjoining ends being adjustably positioned with respect to each other, said adjustably elevating means comprising a bracket having a pair of uprights interconnected by a transverse member, elevated end portions of said elongated members having a plurality of holes, and studs passing through said end portions and said uprights.

**4,790,530**  
**ARM FLEXION EXERCISE MACHINE**  
Henry Maag, 5332 Clark Cir., Westminster, Calif. 92683  
Filed Apr. 14, 1987, Ser. No. 38,025  
Int. Cl.<sup>4</sup> A63B 21/00  
U.S. Cl. 272-134

1 Claim



1. An exercise machine which develops an operator's arm flexing muscles through applying resistive forces to the operator's wrist joints which tend to make the wrist joints move through circular paths about the operator's elbow joints in the direction of arm extension, comprising: a rigid frame which includes means for fixing the positions of said operator's upper arms on generally parallel lines which are generally perpendicular with the axis of rotation of said operator's elbow joints; a rigid rotating effort arm which is journaled in said frame on a generally horizontal axis which is approximately common with the axes of rotation of said operator's elbow joints while said operator's upper arms are supported on said fixing means; said rigid rotating effort arm including hand-engaging surfaces which, through body-machine contact, apply resistive forces to the operator's wrist joints through circular paths about the operator's elbow joints; a rigid rotating weight arm which is journaled in said frame on an axis which is both parallel with and separated by a specific distance from the axis of rotation of said rigid rotating effort arm; said rigid rotating weight arm includes means for loading weights onto at a point offset from its axis of rotation; said rigid rotating effort arm and said rigid rotating weight arm are mechanically linked to each other at axes which are both parallel with and offset by specific distances from their respective axes of rotation by a rigid connecting link which has a specific length between its centers of connection; said rigid rotating effort arm, said rigid rotating weight arm, said link mechanically joining said rigid rotating effort arm and said rigid rotating weight arm, and said frame of said arm flexion exercise machine join together to form a 4-bar linkage which, when acting in conjunction with the sinusoidally changing values of force applied by the machine's rotating weight arm as the weights swing through

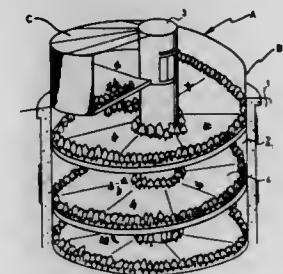
a circular path through the gravitational field, applies a predetermined variably resistive force which varies as a function of the degrees of rotation of the operator's elbow joints and which is characteristic of the relationships in length and orientation of the four rigid members forming the 4-bar linkage and the orientation of the rotating weight arm to the gravitational field throughout the range of the exercise movement;

said specific distance between the axis of rotation of said rigid rotating effort arm and the axis of rotation of said rigid rotating weight arm, said specific distance between the axis of rotation of said rigid rotating effort arm and the axis of connection of said connecting link on said rigid rotating effort arm, said specific distance between the axis of rotation of said rigid rotating weight arm and the axis of connection of said connecting link on said rigid rotating weight arm, and said specific distance between the centers of connection on said connecting link all have a definite non-changing relationship to each other, which relationship, along with their orientations to each other, is determined through kinematic analysis of the moving parts of the 4-bar linkage/rotating weight arm force-varying mechanism and is dependent on said predetermined variably resistive force which said 4-bar linkage/rotating weight arm force-varying mechanism is designed to put out throughout the exercise movement.

**4,790,531**  
**INDOOR SKI SLOPE AND APPARATUS FOR MAKING SNOW THEREON**  
Nobuyuki Matsui; Shinichi Yokota; Kazuo Otsuka; Shuhei Mizote; Tadashi Yoshida; Hachiro Nomaka, and Tsutomu Okumura, all of Tokyo, Japan, assignors to Kajima Corporation, Tokyo, Japan  
Filed Nov. 18, 1986, Ser. No. 932,869  
Claims priority, application Japan, Nov. 19, 1985, 60-259594; Apr. 18, 1986, 61-89627; May 20, 1986, 61-115712; Jun. 18, 1986, 61-142318

Int. Cl.<sup>4</sup> A63G 21/00  
U.S. Cl. 272-565 SS

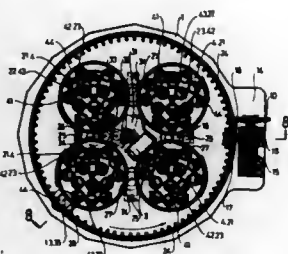
33 Claims



2. An indoor skiing facility comprising: a vertical support tower; a helical ski ramp positioned around and supported by said support tower, and including artificial turf on said ski ramp and a flexible inflatable mat positioned between said ski ramp and said artificial turf.

24. An indoor skiing facility comprising: a vertical support tower; a helical ski ramp positioned about said vertical support tower; a thermally insulated containment building encasing said vertical support tower and said helical ski ramp; and means to transport skiers from the base to the top of said helical ski ramp.

4,790,532  
**TOY FISHING PLAY UNIT WITH MULTIPLE TURNING DISCS**  
 Tsan-Ling Chen, No. 14, Hsin Ping Road, An Ping Industrial Zone, Tainan, Taiwan  
 Filed Nov. 16, 1987, Ser. No. 121,273  
 Int. Cl.<sup>4</sup> A63B 67/00; A63F 71/00  
 U.S. Cl. 273—1 GE 1 Claim

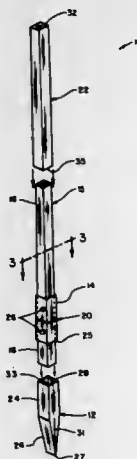


1. A toy fishing play unit with multiple turning discs comprising:  
 a base plate which is provided with a shaft at the center of its surface;  
 a big turning disc having a plurality of recessed holes and being rotatably mounted on said base plate;  
 small turning discs with peripheral teeth turnably mounted in respective ones of said recessed holes;  
 a notch cut in the wall forming each recessed hole at the place where each recessed hole is nearest to the other;  
 transmitting gears extending in and engaging with said peripheral teeth of every two small turning discs;  
 a plurality of posts arranged near the peripheral edge of said big turning disc to engage with a gear mounted on said base plate;  
 a horizontal shaft connected with said gear at one end and with an endless belt at the other end;  
 a longitudinal shaft mounting the propellers of a windmill, said shaft adapted to be turned by said endless belt;  
 peripheral teeth on said base plate adapted to engage with a gear which is also engaged with the peripheral teeth of one of said small turning discs for transmitting revolutions from said small turning disc to the big turning disc;  
 an electric motor mounted on said big turning disc, and gear means connecting said electric motor to one of said small turning discs.

4,790,533  
**BASEBALL BASE SETTING APPARATUS**  
 Clarence H. Potthast, Sr., R.R. #1, Box 231, Pocahontas, Ill. 62275  
 Continuation of Ser. No. 858,195, May 1, 1986, abandoned. This application Apr. 1, 1988, Ser. No. 178,843  
 Int. Cl.<sup>4</sup> A63B 71/00

U.S. Cl. 273—25 11 Claims  
 1. A base setting means for setting at a selected location on a playing field with a defined side line a base which has a stud member of rectangular cross-section associated with the underside thereof a kit of separate components, including a base anchor socket member, a base anchor setting means, and a driving means, assembleably engageable with one another to permit the placement and installation of said base anchor socket member at the selected location for the base;  
 said base anchor socket member having an upper portion with a socket of rectangular cross-section formed therein and defined by side walls and having a lower portion depending from said upper portion, said lower portion being wedge-shaped with a substantially closed bottom and being tapered to terminate at its lower end in a ground piercing surface, said side walls of said upper portion being of substantially uniform thickness, devoid of guide projections extending outwardly therefrom, and having

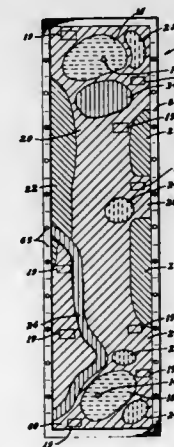
an upper edge, said socket being of sufficient depth and dimensioned to containably receive therein and to engage the stud member associated with the underside of the base; said base anchor setting means including an elongated shank portion having upper and lower end portions of rectangular cross-section and an intermediately disposed force transferring means, said lower end portion of said shank portion being dimensioned substantially similarly to the stud member associated with the underside of the base, being shorter than the depth of said socket member, and being adapted to be slidably inserted into said socket of said base anchor socket member in fitted engagement with the side walls of said socket, said force transferring means including a first surface for receiving a force applied thereto and a force transmitting portion, including a force transmitting surface disposed adjacent to and in contact with said upper edge of said side walls of said base socket member when said lower end portion of said shank portion of said base anchor setting means is engageably inserted into said socket of said base anchor socket member, for transmitting a force applied to said first surface from said first surface to said base anchor socket member; and, driving means including an elongated tubular driving member of rectangular cross-section having an upper end and a lower end, said elongated driving member being telescopically slidably complementarily engageable with said



upper end portion of said shank portion of said base anchor setting means in fitted engagement therewith and reciprocally slidably movable by a user when so engaged to cause said lower end thereof to impact said first surface of said force transferring means to thereby effect the application of a force to said first surface of said force transferring means, said upper end of said elongated driving member projecting above said upper end portion of said shank member to facilitate the slidable movement of said elongated driving member by the user;  
 said base anchor socket member being positionable at the selected location for the base with said base anchor setting means engageably inserted into said socket of said base anchor socket member and with said driving member slidably telescopically complementarily engaged with said upper end portion of said shank portion of said base anchor setting means, said base anchor socket member when so engaged being readily visually alignable with a defined side line of the playing field by rotational movement of said driving member by the user and said driving member being reciprocally slidably movable to cause said lower end thereof to impact said first surface of said force transferring means to effect the application of force to said first surface, said force transmitting portion of said force transferring means transmitting the force applied to said first

surface from said first surface to said base anchor socket member whereby, by repetitive reciprocal slidable movements of said elongated driving member, said base anchor socket member can be driven into the ground in alignment with a side line at the selected location on the playing field until said upper edge of said base anchor socket member is at least flush with the surface of the playing field;  
 said base anchor setting means and said driving means being thereafter disengageable from one another and from said installed base anchor socket member to permit the stud member associated with the underside of the base to be engageably inserted into said socket of said base anchor socket member.

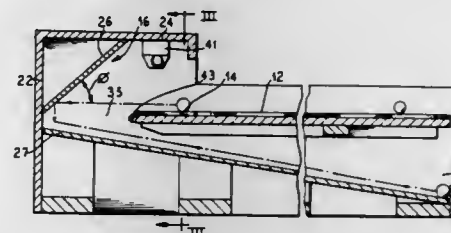
4,790,534  
**TABLE TOP GOLF GAME**  
 William L. Jamison, 6260 E. 106th St., Noblesville, Ind. 46060  
 Continuation-in-part of Ser. No. 542,723, Oct. 17, 1983, abandoned. This application Feb. 13, 1986, Ser. No. 829,083  
 Int. Cl.<sup>4</sup> A63F 7/20; A63B 69/36  
 U.S. Cl. 273—87.2 1 Claim



1. A table top golf game, including in combination:  
 a generally horizontal base member providing a simulated surface terrain of a playing hole for golf, and providing regions for both the starting and stopping of a playing ball, striking means devoid of any support which could be engaged with the base member to provide guidance to the path of striking encounter against the ball, and also devoid of any support which would prevent the striking encounter against the ball from being at any location on the base member, so that the striking means requires manual support by the golfer both prior to and at the occasion of the striking impact with the ball, the manual support of the striking means being required with respect to both direction and inclination guidance being given to the ball by the striking means, and the striking means being fully movable with respect to the base member and enabling the playing ball to be struck from any location on the base member with sufficient vigor to impart sufficient energy thereto so that its movement has a substantial air-flight characteristic as guided both as to direction and inclination by the said manual support of the striking means, and  
 an ultra-light playing ball formed from expanded synthetic resinous material having a sufficiently low density, including a density range of 1.3 to 1.7 pounds per cubic foot, to cause it to have operative game-play characteristics such

that a ball of said material will have a low momentum effect in which its air-flight trajectory is significantly affected and/or impeded by air friction and air resistance even in a flight of only one foot or less even though it is struck smartly enough to achieve an air-flight nature of its trajectory, and which will have a very low momentum as to bouncing or rolling a distance of no more than a few inches on the base member after an air-flight trajectory shot, yet having sufficiently density as to permit the same ball to be also used for putting shots in which no air-flight trajectory is to be imparted to the ball,  
 the ball having an exterior surface of sufficient frictional character, in combination with the very low density of the ball and its overall mass as limited by its small size and very low density, that if sufficient back-spin has been imparted to the ball by the striking means, the ball maintains this back-spin rotation when alighting on the base member so that the ball will jump or bounce backwardly when alighting, thus simulating the action of a conventional golf ball which has been struck by a shot by which significant back-spin has been imparted,  
 the ball thus having a distinct three-dimensional air-flight characteristic inclusive of mostly air-flight and/or bouncing type of travel, and providing the backspin action after alighting as specified above,  
 the ball thus providing a three-dimensional, air-flight type of play to the game, including the requirement of manual support of the striking means prior to and at the occasion of the striking means impacting the ball, thus achieving a simulation of golf in a table top game.

4,790,535  
**APPARATUS FOR PLAYING MARBLES**  
 Edward J. Droske, Jr., 5120 W. Cornelia Ave., Chicago, Ill. 60641  
 Filed Jun. 24, 1986, Ser. No. 878,013  
 Int. Cl.<sup>4</sup> A63D 3/00, 5/02  
 U.S. Cl. 273—118 R 17 Claims

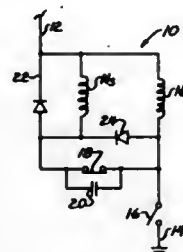


1. An apparatus for playing a game comprising:  
 a surface for supporting a plurality of marbles, the surface extending from a front end of the apparatus and terminating before a back wall of the apparatus;  
 a chute for capturing marbles that are propelled towards the back wall off the surface, the chute being defined, in part, by the back wall, a pair of side walls, a top plate, and a plate extending from the top plate to the back wall, the plate extending from the back wall and top plate at an included angle that is acute, the inclined plate intersecting a plane defined by the surface for supporting; and  
 an inclined floor for returning the marbles from the chute area to the front end of the apparatus.

4,790,536  
**PARALLEL COIL PIN BALL FLIPPER SOLENOID**  
 Kurt W. Deger, 1163 E. Paddock Dr., Palatine, Ill. 60067  
 Filed Feb. 2, 1988, Ser. No. 151,633  
 Int. Cl.<sup>4</sup> A63F 7/26  
 U.S. Cl. 273—121 A 5 Claims  
 1. A dual force solenoid having a first actuation force and a second holding force including a plunger disposed for move-

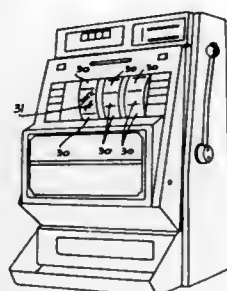


ment along an axis between first deactuated and second actuated positions; a pair of windings disposed around the axis; means for applying an electrical potential in parallel across the pair of windings thereby generating the first actuation force on the plunger, said actuation force urging the plunger between the first deactuated and the second actuated positions; said means for applying an electrical potential across the pair of



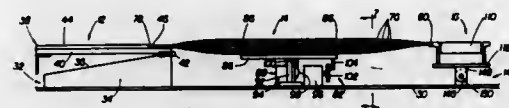
windings including switch diode means, operatively connected to the plunger, for disconnecting the electrical potential from one of the windings when the plunger reaches the actuated position whereby the electrical potential across the other winding generates the second holding force on the plunger, said holding force maintaining the plunger in the actuation position.

**4,790,537**  
**MULTI-SIZE REEL SYMBOLS**  
Richard E. Smyth, Kyle Bay, and Daniel A. Tracy, Drummoyne, both of Australia, assignors to Ainsworth Nominees Pty. Ltd., Rosebery, Australia  
Filed May 6, 1987, Ser. No. 46,547  
Claims priority, application Australia, Jul. 25, 1986, PH07147  
Int. Cl.<sup>4</sup> A63F 5/04  
U.S. Cl. 273-143 R 14 Claims



7. A slot machine including one or more display reels, each of said reels including a cylindrical peripheral surface to which a plurality of indicia are applied, each of said indicia having a symbol space within which the indicia is substantially centrally located, said symbol spaces occupying a proportion of the circumference of the cylindrical surface which is different from different indicia on said surface, a majority of the indicia on each said reel having symbol spaces of uniform size and the remainder of the indicia on each respective reel having a symbol space which differs from the uniform size by an amount which is a fraction of the uniform size, said remainder of the indicia being divided into two groups, one consisting of indicia having symbol spaces occupying a proportion of said circumference which is greater than that of said majority and the other consisting of indicia having symbol spaces occupying a proportion of said circumference which is less than that of said majority.

**4,790,538**  
**GOLF PUTTING PRACTICE APPARATUS**  
Irvin C. Gettelfinger, P.O. Box 1407, New Albany, Ind. 47150  
Filed Aug. 10, 1987, Ser. No. 83,318  
Int. Cl.<sup>4</sup> A63B 67/02  
U.S. Cl. 273-176 H 20 Claims



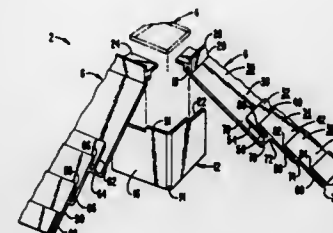
1. A golf ball putting practice apparatus comprising:  
a shooting area upon which a golfer stands when putting a golf ball;  
a selectively contourable putting surface immediately downrange of the shooting area across which the golfer hits the golf ball and means for selectively inclining and declining the putting surface;  
a target area formed with at least one golf ball target hole at the downrange end of the putting surface; and  
means for selectively inclining and declining the shooting area relative to the putting surface without affecting the contour of the putting surface.

**4,790,539**  
**GOLF SWING TRAINING APPARATUS**  
Richard Clark, 5885 N. Washington Rd., Piqua, Ohio 45356  
Filed Dec. 21, 1987, Ser. No. 135,201  
Int. Cl.<sup>4</sup> A63B 69/36  
U.S. Cl. 273-190 B 7 Claims



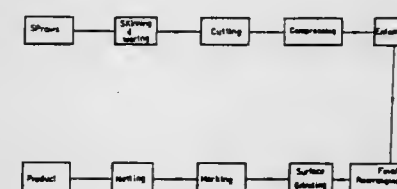
1. A golf swing training apparatus for use in practicing proper head movement comprising:  
(A) a headpiece adapted to be worn by a golfer including a head band adapted to surround the golfer's head approximately at the forehead level;  
(B) a retaining pin;  
(C) a bracket fixed on said headpiece and adapted to support said pin when the apparatus is not in use;  
(D) a flexible cord connecting said bracket to said pin, said cord having a length sufficient to allow said pin to be removed from said headpiece and to be inserted into the ground in front of golfer and on the opposite side of a ball addressed by the golfer.

**4,790,540**  
**DISPLAY TRAY AND BOARD GAME SUPPORT**  
Edmond H. Lim, and Delores S. Middleton, both of El Cerrito, Calif., assignors to Limardee Enterprises, Ltd., El Cerrito, Calif.  
Continuation-in-part of Ser. No. 49,077, May 12, 1977. This application Jul. 20, 1987, Ser. No. 75,155  
Int. Cl.<sup>4</sup> A63F 1/00, 9/00  
U.S. Cl. 273-309 18 Claims



14. A display tray assembly for use with board games of the type using sheet-like play elements comprising:  
a display tray having first and second edges;  
a tray support mounted to the display tray for supporting the display tray at a display angle to the horizontal with the first edge raised relative to the second edge;  
the display tray including a game board support ledge at the first edge whereby a plurality of said assemblies can be used to support a game board;  
the display tray having a plurality of support surfaces in planes offset from one another, the support surfaces having upper and lower portions; and  
the display tray including barrier panels overlying and spaced apart from the lower portions of the support surfaces to define pockets for receipt of the sheet-like playing elements.

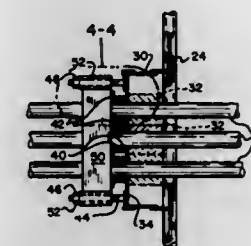
**4,790,541**  
**METHOD OF MANUFACTURING A DARTBOARD**  
Shih-Chung Lin, 5th Fl., No. 2, Alley 2, Lane 105, Jian Kung Road, Mucha Dist., Taipei, Taiwan  
Filed Feb. 19, 1988, Ser. No. 159,162  
Int. Cl.<sup>4</sup> F41J 3/00  
U.S. Cl. 273-408 2 Claims



1. A method of manufacturing a dartboard comprising:  
(a) providing a bundle of skinned straws each of which is torn into longitudinal pieces;  
(b) transversely cutting said bundle of straws into pieces having a predetermined thickness;  
(c) putting said transverse pieces in step (b) into a dartboard-contouring frame having an open top;  
(d) compressing said frame from the top and bottom thereof and around the periphery thereof;  
(e) allowing segments of said longitudinal pieces in said transverse pieces to finally expand and rearrange in said frame for a predetermined period of time;  
(f) surface-grinding said transverse pieces from said open top; and

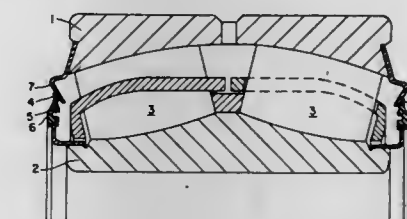
(g) marking said transverse pieces on the ground surface thereof to obtain a final dartboard.

**4,790,542**  
**FURNACE FRONT WALL SEALS**  
Richard Kalinowski, Osgoode, Canada, assignor to Combustion Engineering, Inc., Windsor, Conn.  
Filed Dec. 7, 1987, Ser. No. 129,571  
Int. Cl.<sup>4</sup> F16J 15/10  
U.S. Cl. 277-12 5 Claims



1. In a furnace waterwall having a pipe extending there-through and through a seal box front plate, the improvement comprising a gland seal outside of the seal box which includes:  
a ceramic rope packing surrounding said pipe and abutting said seal box front plate;  
a metal clamp band surrounding and radially constricting said ceramic band; and  
a compression plate adjacent said pipe and compressing said ceramic rope in the direction of said seal box front plate.

**4,790,543**  
**SEALING DEVICE GOVERNED BY CENTRIFUGAL FORCE**  
Henning Wittmeyer, Gothenburg; Magnus Kellström, Partille; Staffan Jarskär, Molndal, and Matts Floderus, Gothenburg, all of Sweden, assignors to Aktiebolaget SKF, Sweden  
Filed Nov. 10, 1987, Ser. No. 119,152  
Claims priority, application Sweden, Nov. 12, 1986, 8604831  
Int. Cl.<sup>4</sup> F16J 15/36  
U.S. Cl. 277-25 3 Claims



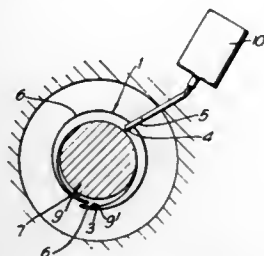
1. A device for sealing off an annular slot between an outer race ring (1) and an inner race ring (2) of a bearing assembly which are rotatable relative to each other, whereby an annular elastic sealing lip (4) is arranged on a sealing portion (5), which is connected to the inner race (2) via a flexible sealing portion (6), whereby the lip, when no rotation is at hand, contacts an opposed annular sealing surface (7) mounted on said outer race ring (1) of said bearing with a force, which has a component directed radially outwards relative to the rotational axis, and the center of gravity (9) of said sealing portion is axially displaced relative to the flexible sealing portion (7) thus that a torsional moment created by the centrifugal force tends to bend the sealing portion with the lip away from its contact with the opposed sealing surface, characterized therein that said sealing portion (5) and the opposed sealing surface (7) in a sectional plane incorporating the rotational axis of the rotat-

able member have profiles of such shapes and such mutual positions, that, when the sealing portion with the lip is bent by the centrifugal force, the lip is displaced in a direction, which has a component directed radially outwards relative to the rotational axis.

**4,790,544**  
**EXPANSIBLE SEAL**  
Christian F. Kemp, Kurt Schumacher Str., Fed. Rep. of Germany, assignor to Raychem GmbH, Putzbrunn, Fed. Rep. of Germany  
Continuation of Ser. No. 912,172, Sep. 25, 1986, abandoned, which is a continuation of Ser. No. 684,998, Dec. 21, 1984, abandoned. This application Oct. 13, 1987, Ser. No. 110,057  
Claims priority, application United Kingdom, Dec. 19, 1983, 8333722

U.S. Cl. 277—34 Int. Cl.<sup>4</sup> F16J 15/46

13 Claims



1. A method of sealing a duct comprising:
  - (a) selecting an envelope having a plurality of perforations on at least a portion of the outer surface thereof and a sealant over at least a portion of said outer surface;
  - (b) inserting the envelope into the duct;
  - (c) wrapping the envelope over on to itself with the outer surface thereof being positioned to face the interior wall of the duct;
  - (d) introducing a curable foamable material into the envelope; and
  - (e) allowing the foamable material to foam thereby causing the outer surface of the envelope to come into sealing engagement with the interior wall of the duct, such sealing being enhanced by a small proportion of said foamable material forced through said perforations.

**4,790,545**  
**WORKPART CENTERING MECHANISM FOR A CHUCK**  
Victor F. Dziewaltowski, and Walter C. Dodd, both of Springfield, Vt., assignors to Bryant Grinder Corporation, Springfield, Vt.

Filed Jan. 11, 1988, Ser. No. 142,549  
Int. Cl.<sup>4</sup> B23B 15/00

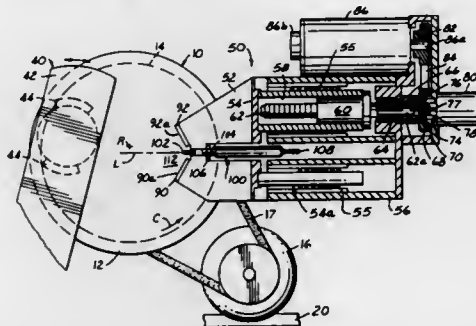
U.S. Cl. 279—1 L

21 Claims

1. In combination with a workpart chuck having a chuck axis of rotation for rotating a workpart about its workpart axis when the axes are substantially aligned, apparatus for centering the workpart on the rotating chuck from an initial offset position where the workpart axis moves in an eccentric path relative to the chuck axis, comprising:

- a centering member movable relative to the chuck axis as the chuck rotates the workpart and engageable with the workpart for moving the workpart axis toward the chuck axis with said eccentric path changing as the workpart moves, means for sensing the extent of eccentric movement of the workpart as the centering means moves the workpart and generating a signal that is indicative of the extent of said eccentric movement, and means for moving

the centering member toward the chuck axis until said signal reaches a predetermined value indicative that the

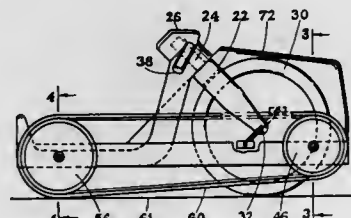


workpart is rotating substantially about its own workpart axis.

**4,790,546**  
**TOY TRACKED VEHICLE**  
Charles A. Mendenhall, 309 Buck Hill Rd., Rochester, Monroe County, N.Y. 14626  
Filed Apr. 13, 1988, Ser. No. 181,032  
Int. Cl.<sup>4</sup> B62K 5/06

U.S. Cl. 280—1.11 R

11 Claims



11. A toy in the form of a tracked vehicle containing a pair of tracks which turn in a manner which simulates a full-sized tracked vehicle, said vehicle having a supporting frame, drive means mounted on said frame, said drive means including a pair of actuated drive wheels mounted at the forward end of said frame and a pair of auxiliary wheels in parallel relationship to each other mounted at the opposite end of said frame, steering means connected to said drive wheels for turning said drive means in any direction thereby controlling the direction of said tracked vehicle, and idler means mounted on said frame associated with each auxiliary wheel and positioned forward of said auxiliary wheels, each of said tracks being affixed respectively to one of said auxiliary wheels and said associated idler means to allow for track movement in response to movement of said auxiliary wheels, said idler means being positioned to maintain said tracks out of contact with the riding surface of said vehicle at the forward end of said frame.

**4,790,547**  
**TWO-WHEELED HAND TRUCK CONSTRUCTION**  
Carl N. Mortenson, Midland, Mich., assignor to Magline, Inc., Pinconning, Mich.

Filed Jul. 27, 1987, Ser. No. 77,744  
Int. Cl.<sup>4</sup> B62B 1/04

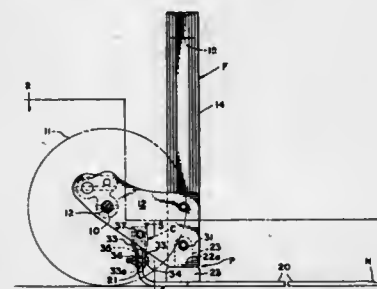
U.S. Cl. 280—47.27

5 Claims

1. A method of securing an angle-shaped nose plate, having a forwardly extending load support platform, and an upturned rear portion, to the lower end of a two-wheeled hand truck construction comprising a pair of horizontally spaced, vertically extending side rails connected laterally to form a hand

truck frame; a discrete axle supporting bracket fixed to the lower end of each of the side rails and extending rearwardly therefrom; axle means supported by said brackets, and a pair of wheels on said axle means, the steps including:

- a. releasably fixing spaced apart, upstanding pedestal parts having vertical axes to the upper surface of the said platform;

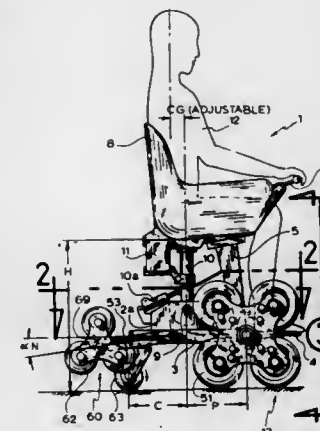


- b. relatively telescoping the side rails and pedestal parts along said axes to a rail received position and releasably fixing the side rails in received telescoped position;
- c. further releasably fixing the upturned portion of the nose plate to each axle-supporting bracket at a spaced distance rearwardly from each side rail to resist pivoting of the nose plate.

**4,790,548**  
**CLIMBING AND DESCENDING VEHICLE**  
Fabien Decelles, and Pierre Decelles, both of 2380 St. Alexis Blvd., St. Maurice, Canada G0X 2X0  
Filed Jun. 1, 1987, Ser. No. 56,249  
Claims priority, application Canada, May 4, 1987, 536338  
Int. Cl.<sup>4</sup> B62B 9/06

U.S. Cl. 280—5.26

2 Claims



1. A stair climbing and descending vehicle comprising: a frame; a pair of co-axial axles, each independently and each rotatably mounted on said frame transversely of said vehicle; a spider freely rotatable on each axle and forming at least three radial arms; the two spiders disposed on opposite sides of said vehicle; evenly-spaced ground-engaging wheels, each rotatably mounted at one extremity of a radial arm; a differential gearing including an input gear fixed to each axle; an output gear freely rotatable on each axle intermediate pinions meshing with said input and output

gears and rotatable on radial stud shafts fixed to said spider;

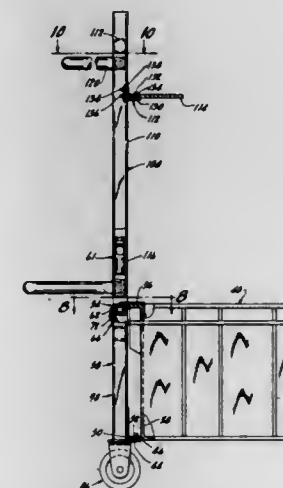
a direction-reversing transmission means carried by each radial arm and serving as a driving link between said output gear and the respective wheels, whereby the driving force of each axle is apportioned to said wheels and to said spider to rotate said spider when any of said wheels is prevented from rotating, and wherein the wheels rotate in the same direction as the spider;

each said spider comprising an inner plate, a parallel outer plate and an internal plate between said inner and said outer plates; said internal plate having a central circular opening; said differential gearing being located between said inner plate and said internal plate, and said transmission means being located between said internal plate and said outer plate.

**4,790,549**  
**TRANSPORT DEVICE**  
Bjorn Armand, Hagersten, Sweden, assignor to Stubben Utveckling AB, Sweden  
Continuation-in-part of Ser. No. 781,123, Sep. 26, 1985, abandoned. This application Apr. 29, 1987, Ser. No. 43,943  
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1984, 8428334[U]

U.S. Cl. 280—47.18 Int. Cl.<sup>4</sup> B62B 11/00

13 Claims



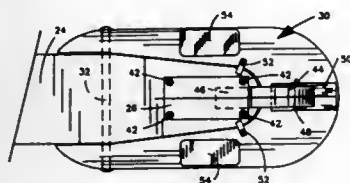
1. A transport device comprising a first essentially rectangular frame having at least one flat side (12), a second essentially rectangular frame having at least one flat side, separate wheel means (14) attached to the lower end of said first frame and to the lower end of said second frame for movement of said frames, each of said frames having a lower container support means and an upper container support means having container securement means, and at least one container (10) having a first mounting side with a bottom edge located on said lower container support means of said first frame and a top edge for engagement with said container securement means for detachably securing said container to said one flat side of said first frame and said one container having a second spaced mounting side with a bottom edge located on said lower container support means of said second frame and a top for engagement with said container securement means for detachably securing said container to said one flat side of said second frame, each of said container securement means including a pair of L-shaped retaining hooks angled by approximately 90°, said pair of retaining hooks being mounted on opposite sides of said frame (12) for pivoting motion about an axis (28) extending approximately transversely of the frame, said retaining hooks, while in container-retaining position, having a horizontally extending side



resting on the top edge of said container and a downwardly depending side extending into said container, and resilient means connected to each retaining hook for selectively holding said retaining hook in either a container-retaining position or a container-release position.

4,790,550  
SCOOTER

Paul A. Simpson, 22844 Halburton Rd., Beachwood, Ohio 44122  
Filed Feb. 12, 1987, Ser. No. 13,906  
Int. Cl.<sup>4</sup> A63C 17/14  
U.S. Cl. 280—87.04 A 8 Claims



1. A locomotion device comprising:
  - a substantially planar footboard;
  - a front skateboard truck assembly, including a pair of wheels, secured to the front underside of said footboard;
  - a rear skateboard truck assembly, including a pair of wheels, secured to the rear underside of said footboard;
  - a substantially planar brakeboard pivotally secured to the rear portion of said footboard said brakeboard having a U-shape with an end portion and two leg portions which are adapted to nest along the rear end portion and rear side portions respectively of said footboard;
  - pin means for pivotally securing the leg portions of said brakeboard to said footboard;
  - detent means secured to the underside of said brakeboard for limiting the upward pivotal movement of said brakeboard to a position which is coplanar with said footboard;
  - a leaf spring secured at one end to the rear underside of said footboard and at its other end to the underside of said brakeboard, said other end being curved arcuately upwardly for biasing said brakeboard upwardly into said coplanar position; and
  - a brake pad secured to the underside of each leg portion of said brakeboard, each brake pad being positioned over a respective wheel of said rear skateboard truck assembly, wherein said brakeboard is adapted to be urged downwardly for bringing said brake pads into frictional engagement with said rear wheels.

4,790,551

#### STEERING SYSTEM FOR MOTOR VEHICLE

Norio Ueki; Mitsuya Serizawa; Yasuharu Oyama; Yoshimi Furukawa; Masami Ogura, and Tsuyoshi Sato, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 3, 1987, Ser. No. 10,457  
Claims priority, application Japan, Feb. 12, 1986, 61-19093; Feb. 12, 1986, 61-19094

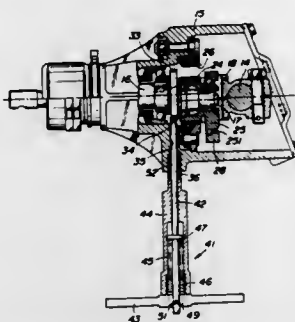
Int. Cl.<sup>4</sup> B62D 7/00

U.S. Cl. 280—91

10 Claims

1. A steering system for a motor vehicle, comprising:
  - a steering wheel;
  - a steering assembly for steering vehicle wheels in response to angular movement of said steering wheel,
  - said steering assembly including a front wheel steering mechanism and a rear wheel steering mechanism mechanically connected to each other; and

a centering mechanism mounted on at least a portion of said steering assembly for establishing a neutral steering position of said steering assembly while said steering assembly is being assembled and serviced.



tion of said steering assembly while said steering assembly is being assembled and serviced.

4,790,552

#### CHILDREN'S CABLE DRIVEN MINI-CAR

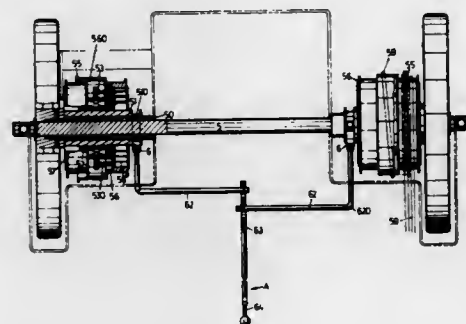
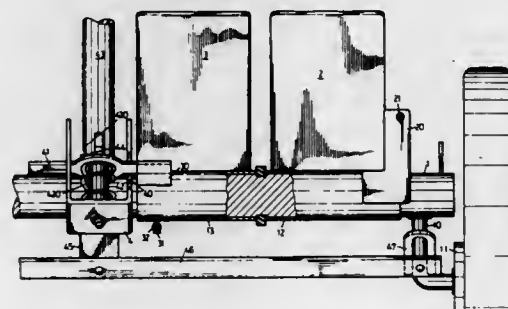
Hong R. Lian, 2F, No. 479, An-Leh Road, Yung Heh City, Taipei Hsien, Taiwan

Filed Nov. 2, 1987, Ser. No. 115,904

Int. Cl.<sup>4</sup> B62L 3/02; B62M 1/04

U.S. Cl. 280—230

7 Claims



7. A children's mini-car comprising:
  - a front transverse rotational axle having a pair of opposite ends;
  - a rear transverse rotational axle having a pair of opposite ends and further having a toothed portion defining a toothed gear shaft;
  - a pair of front wheels, each of said front wheels disposed on a respective opposite end of the front axle for rotational movement therewith;
  - a pair of rear wheels, each of said rear wheels disposed on a

- respective opposite end of the rear axle for rotational movement therewith;
- a first sleeve rotatably received on the front axle for rotational movement thereabout;
- an accelerator pedal mounted on the first sleeve and extending outwardly therefrom, whereby the application of force upon the accelerator pedal pivotably rotates said pedal and rotates the first sleeve therewith;
- a rotational toothed transmission gear, said transmission gear disposed so that the teeth thereof mesh with the teeth of the toothed portion of the rear axle, whereby rotational movement of either one of the rear axle or the toothed transmission gear drives the other, said transmission gear further being transversely, slidably movable along the toothed portion of the rear axle, said transmission gear further having a width;
- a three-gear set including a forward gear, a reverse gear and an idle gear therebetween, the gears of said three-gear set being axially aligned for rotational movement about the rear axle, the rotational movement of the forward gear being in a first forward direction, the rotational movement of the reverse gear being in a second reverse direction and the rotational movement of the idle gear being in both the forward and reverse directions, each of said gears having a width, the width of the transmission gear being greater than the width of any one of either the forward, reverse or idle gears, said width of the transmission gear further being less than the width of the idle gear combined with either the forward gear or the reverse gear, each of said gears having teeth that mesh with the teeth of the transmission gear, such that the rotational movement of either the forward and idle gears in the first forward direction is transmitted to the rear axle, whereby forward movement of the vehicle is provided or of the reverse and idle gears in the second reverse direction is transmitted to the rear axle, whereby reverse movement of the vehicle is provided;
- means for transversely, slidably moving the transmission gear, such that the teeth of the said transmission gear mesh with the idle gear and with either the forward or reverse gears, whereby the direction of movement of the vehicle is selectively chosen;
- a first rotational frame secured to the forward gear for rotational movement therewith in the first, forward direction and for rotational movement independently thereof in the second reverse direction;
- a second rotational frame secured to the reverse gear for rotational movement therewith in the second reverse direction and for rotational movement independently thereof in the first forward direction;
- a first drive cable having a first end secured to the first rotational frame, said first cable being wound in a first direction about the first rotational frame, such that forward movement of the first drive cable unwinds the first cable from the first frame rotating the first frame in the first forward direction;
- a second drive cable having a first end secured to the second rotational frame, said second cable being wound in a second opposite direction about the second rotational frame, such that forward movement of the second drive cable unwinds the second cable from the second frame rotating the second frame in the second reverse direction;
- the first and second drive cables each further having a second opposite end secured to either the first sleeve or the accelerator pedal, such that the application of forward force on the accelerator pedal pulls both the first and second cables forwardly, thereby unwinding both of said first and second cables from the first and second frames rotating the first frame and the forward gear associated therewith in the first forward direction, and further rotating the second frame and the reverse gear associated therewith in the second reverse direction;
- resilient means for reversing the rotation of the first and second frames when the first and second drive cables are

unwound therefrom, so that the cables are automatically rewound on the respective frame; and  
brake means for stopping the movement of the vehicle.

4,790,553

#### LIGHTWEIGHT WHEELCHAIR HAVING SWING-AWAY FOOTREST ASSEMBLY

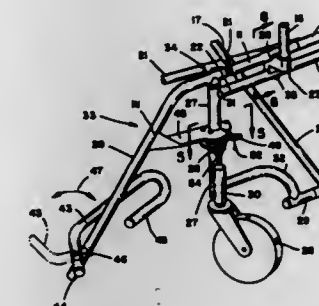
James Okamoto, Clovis, Calif., assignor to Motion Designs, Inc., Fresno, Calif.

Filed Nov. 16, 1987, Ser. No. 121,126

Int. Cl.<sup>4</sup> A47C 7/52; A61G 5/02

U.S. Cl. 280—242 WC

16 Claims



1. A lightweight wheelchair including a frame including a tubular front frame member, a footrest assembly, and mounting means including a pivotal joint mounting said footrest assembly to said frame member for pivotal movement about a substantially vertically oriented axis between a first position in front of said wheelchair and a second position beside said wheelchair, wherein the improvement in said wheelchair assembly comprises:
  - said footrest assembly depending downwardly and outwardly from said pivotal joint;
  - support bracket means extending between said footrest assembly and said frame below said pivotal joint, said support bracket means including an inner end mating with and rotatably engaging a side of said frame member and supporting said footrest assembly from said frame member during said pivotal movement; and
  - a latch assembly positioned proximate said inner end and releasably latching said footrest assembly against pivotal movement in said first position and securing said inner end tightly against said frame member in said first position to relatively rigidly support said footrest assembly from said frame.

4,790,554

#### PULLEY SHIFT ASSEMBLY

John T. Siegwart, Jr., Birmingham, Ala., assignor to Research Corporation, New York, N.Y.

Filed Nov. 24, 1986, Ser. No. 934,276

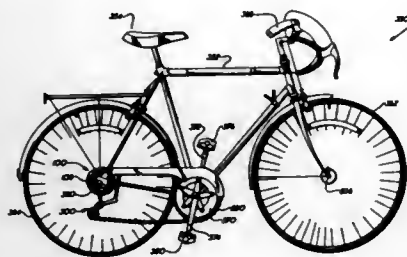
Int. Cl.<sup>4</sup> B62M 9/14

U.S. Cl. 280—236

33 Claims

29. A bicycle, comprising
  - a frame;
  - a seat connected to the frame to support a rider;
  - front and back axles supported by the frame and defining front and back axes respectively;
  - a front wheel mounted on the front axle for rotation about the front axis;
  - a back wheel mounted on the back axle for rotation about the back axis;
  - a drive sprocket rotatably supported by the frame;
  - left and right crank arms connected to the drive sprocket for rotation therewith;
  - left and right pedals connected to the left and right crank

arms, respectively, to rotate the crank arms and the drive sprocket;  
 a sprocket sub-assembly mounted on the back axle for rotation about the back axis, and including a plurality of sprockets, each sprocket including a multitude of sections, at least a plurality of sections of each sprocket being axially movable relative to a selected section of the sprocket, the sprockets having a normal position wherein all of the sections of each sprocket are co-planar and the sprockets are axially spaced apart a preset distance;  
 a drive chain mounted on the drive sprocket and on one of the sprockets of the sprocket sub-assembly to rotate said sprocket sub-assembly with the drive sprocket;  
 means connected to the sprocket sub-assembly and to the back wheel to transmit rotary movement thereto from the sprocket sub-assembly;



a shift sub-assembly mounted on the back axle, and having a disengaged position for maintaining the sprockets in the normal position, and an engaged position to slide at least first and second of the axially movable sections of at least a first sprocket, one at a time, from the plane thereof, into the plane of a second, adjacent sprocket, and then to slide at least said first and second of the axially movable sections of the first sprocket together from the plane of the second sprocket back into the plane of the first sprocket to shift the drive chain from said second sprocket to said first sprocket; and  
 actuator means connected to the shift sub-assembly to move the shift sub-assembly from the disengaged position to the engaged position.

#### 4,790,555 BICYCLE FAIRING AND MOUNTING MEANS THEREFOR

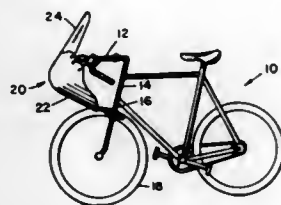
John Noble, Fairfield Engineering, 71 Wildwood Rd., Fairfield, Conn. 06430

Filed Sep. 29, 1987, Ser. No. 101,982

Int. Cl.<sup>4</sup> B62J 17/04

U.S. Cl. 280—289 S

5 Claims



1. A bicycle fairing for a bicycle having a frame, a handlebar, front wheel fork holder coupling said handlebar to said front wheel fork comprising:  
 a blunt molded body shield having an upstanding rearwardly sloping transparent windshield attached thereto,  
 said body shield having a blunt end with a surface formed of rearwardly sloping increasing ellipsoids, the blunt end of which has an axis passing therethrough forming an angle

with the rearwardly sloping windshield from a side elevation which is more than twice the angle of the rearwardly sloping lower surface of the rearwardly sloping increasing ellipsoids formed with said axis,  
 the portion of said fairing above said axis in side elevation being approximately twice the length of the portion of the fairing extending below said axis,  
 mounting means attached to diametrically opposed outer extremities of said body shield for detachably coupling said fairing to opposite sides of said handlebars,  
 a means mounted on the rearwardly sloping lower surface of said body shield for adjustably detachably coupling said fairing to opposite sides of said front wheel fork with said body shield extending below the top of the front wheel of a bicycle whereby said shield is detachably and adjustably coupled to four points on said bicycle for maximum rigidity yet being easily adjustable and removably installed on said bicycle,  
 said rearwardly sloping lower surface of said shield has a U-shaped slot therein for position said front bicycle wheel therein when said shield is mounted on said bicycle and a U-shaped clip mounted on said shield bordering said slot, said clip having opposite ends thereon mounted on said front wheel fork.

#### 4,790,556 ANTI-JACKKNIFING APPARATUS

Wallace H. Hawkins, Greenville, and Calvin B. Gonnell, Travelers Rest, both of S.C., assignors to Red Arrow International, Inc., S.C.

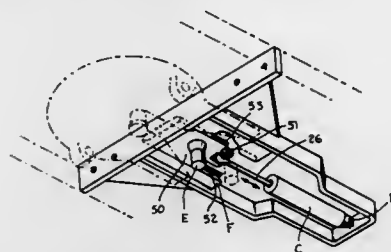
Division of Ser. No. 758,677, Jul. 25, 1985, abandoned. This application Oct. 23, 1986, Ser. No. 922,440

The portion of the term of this patent subsequent to Oct. 20, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B62D 53/06

U.S. Cl. 280—432

3 Claims



1. An anti-jackknifing apparatus for use on a tractor trailer including a fifth wheel with a longitudinal slot having a tapered diverging opening defining spaced ear portions extending rearwardly carried on the tractor, and a forward frame portion on said trailer, said apparatus comprising:  
 a substantially rectangular longitudinal frame;  
 said longitudinal frame having a transverse mounting bar secured adjacent a forward end thereof for securement to said forward frame portion of said trailer in superposed relation to said slot;  
 a fluid operated cylinder having an extensible member extending forwardly from one end thereof;  
 means securing a fluid operated cylinder within said frame; abutment means carried within a forward portion of said frame connected to said cylinder for movement between a first position extending downwardly within said slot and a second position wherein the abutment means is removed from said slot; and  
 support means carried within said frame having fixed relation thereto providing lateral support for said abutment means in said first position;  
 whereby said cylinder and said abutment means are supported within said frame so as to avoid damage thereto

when said abutment means is in said first position looking the tractor and trailer against relative angular movement to avoid jackknifing.

#### 4,790,557 THREE-POINT HITCH STABILIZER

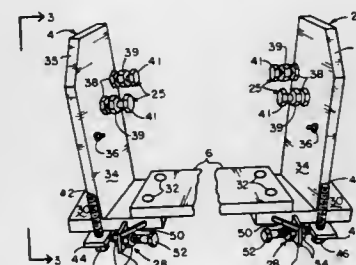
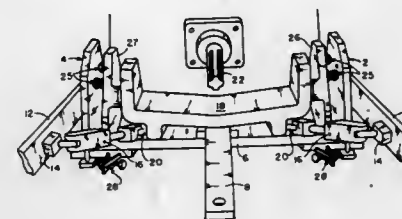
Kenneth J. Klingler, Rte. #1 - Box 186A, New Ulm, Minn. 56073

Filed Jan. 29, 1987, Ser. No. 67,253

Int. Cl.<sup>4</sup> B62D 1/00

U.S. Cl. 280—460 A

5 Claims



1. Apparatus for stabilizing a vehicle-mounted implement hitch having a pair of hitch arms capable of being raised and lowered and each exhibiting side-to-side sway comprising:

- (a) first and second upright planar members, vertically supported from a bottom edge and having a pair of vertically disposed threaded weldments extending downward on opposite sides of respective first and second laterally extending, horizontal mounting plates rigidly secured to the vehicle frame and wherein the spacing between the pairs of threaded weldments is greater than the width of said first and second mounting plates to permit the horizontal rotation of each planar member;
- (b) first and second clamp plates respectively receiving the pairs of threaded weldments of said first and second planar members and means mounting to said threaded weldments for compressively drawing each upright planar member and clamp plate to its mounting plate; and
- (c) length adjustable stop means for adjustably supporting an upper and a lower end of each upright planar member relative to the vehicle and its associated mounting plate to bring each upright planar member into planar parallel relation to each hitch arm at an outer sway extreme whereby each hitch arm slidably contacts one of said upright planar members as it is raised and lowered.

#### 4,790,558 FRONT MOUNTED BALE CARRIER ASSEMBLY

Jerald C. Ellis, R.R. 1, Weldon, Iowa 50264

Filed Aug. 17, 1987, Ser. No. 85,753

Int. Cl.<sup>4</sup> A01D 87/12; B60P 1/64

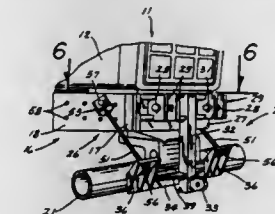
U.S. Cl. 280—481

5 Claims

5. A carrier assembly including a mounting unit for use with a tractor having a substantially U-shaped frame, the frame having a base extending transversely across the front end of the

tractor and having rearwardly extending legs, the mounting unit comprising:

- an upper portion having openings formed therein adapted to receive fastening devices for attachment to the tractor frame at the tractor front end and having further pin means adapted to pivotally receive a pair of arms extending forwardly of the tractor;
- an upright member secured centrally of said upper portion and depending therefrom, said upright member having



fastening means at a lower end thereof adapted to receive a thrust means extending forwardly of the tractor for attachment to the arms;  
 a lower portion connected to said upright member and having outer ends, each outer end having openings formed therein, said mounting unit upper portion, upright member and lower portion disposed generally within a common plane and forming an I-shape; and  
 thrust resisting means fastened between said lower portion at said outer end openings and the tractor frame.

#### 4,790,559 UTILITY CARRIER

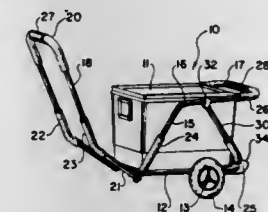
Joseph Edmonds, 17817 Crenshaw, #1, Torrance, Calif. 90504

Filed Jan. 4, 1988, Ser. No. 140,638

Int. Cl.<sup>4</sup> B62B 1/20

U.S. Cl. 280—655

6 Claims



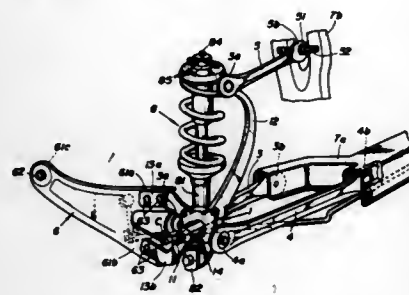
1. A portable utility carrier for transporting various articles and loads across paved or sand surfaces, said carrier adapted to be collapsed into a storage position or extended into an operative position, said carrier comprising the combination of:

- a rectangular base frame having a front end and a rear end connected together by said elements;
- a U-shaped rail in plan view having parallel side sections pivotally secured at one end to said frame rear end and having their other ends terminating with a cross bar extending over said frame front end in a raised cantilevered relationship while in said operative position, said U-shaped rail lying substantially adjacent said base frame while in said storage position;
- brace means pivotally attached at one end to said frame front end and terminating in a slidable supporting connection means at an opposite end with each of said side sections, said brace means supporting said cross bar in a raised operative position over said frame front end, and said brace means lying substantially adjacent said base frame while in said storage position;
- U-shaped handle means pivotally carried on said frame rear end and positionable between an outwardly extending



operative position and a storage position with said handle lying substantially adjacent to said base frame; wheels removably disposed on said frame midway between its front and rear ends for rollably supporting said frame on a paved surface; and a slider plate removably disposed on said frame front end for slidably supporting said frame on a sand surface.

**4,790,560**  
**INDEPENDENT REAR SUSPENSION FOR USE ON MOTOR VEHICLES**  
Nobuyoshi Asanuma, Saitama; Kanji Kubo, Kanagawa, and Keiichi Mitobe, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed May 29, 1986, Ser. No. 868,808  
Claims priority, application Japan, Jun. 3, 1985, 60-120243  
Int. Cl.<sup>4</sup> B60G 3/00  
U.S. Cl. 280-701 2 Claims

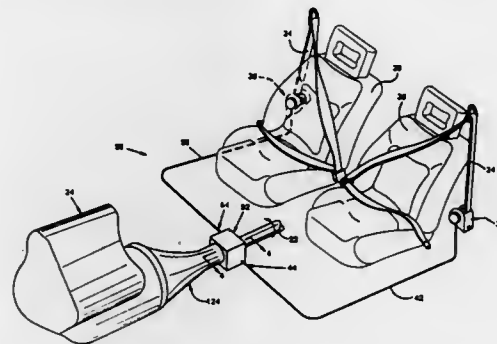


1. An independent rear suspension comprising: a knuckle having a spindle for supporting a wheel rotatably thereon, said spindle having a central axis; a trailing arm coupled to said knuckle; a pair of spaced lower links pivotally mounted on said knuckle; a knuckle arm extending substantially upwardly from said knuckle; an upper link pivotally mounted on said knuckle arm; and a damper having a lower end coupled to said knuckle at a position below the central axis of said spindle, said damper having a lower portion disposed between said spaced lower links and in the vicinity of said central axis of said spindle; said lower portion of said damper is located substantially in alignment with said central axis of said spindle when viewed in side elevation.

**4,790,561**  
**SEAT BELT SYSTEM**  
Louis R. Brown, Livonia, Mich., assignor to TRW Vehicle Safety Systems Inc., Lyndhurst, Ohio  
Filed Dec. 22, 1987, Ser. No. 136,561  
Int. Cl.<sup>4</sup> B60R 22/46  
U.S. Cl. 280-806 13 Claims

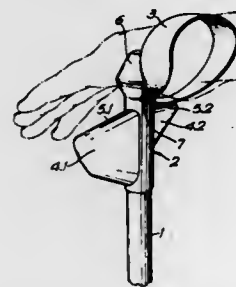
1. An apparatus for use in a vehicle having a member rotatably driven by a motive power source of the vehicle, said apparatus comprising: a seat belt retractor having a spool supported for rotation in belt retraction and belt withdrawal direction; and clutch means for connecting the spool and the driven member so that rotation of the driven member rotates said spool in the belt retraction direction in response to the vehicle decelerating at a rate above a predetermined rate, said clutch means comprising: a ratchet wheel having a plurality of ratchet teeth extending therefrom, said ratchet wheel being connected to and rotatable with the driven member; and a clutch dog supported for pivotal movement to a position

engaging a tooth on said ratchet wheel to connect said spool with said driven member; and



means for pivoting said clutch dog into the position engaging said tooth on said ratchet wheel in response to the vehicle decelerating at a rate above the predetermined rate.

**4,790,562**  
**SKI POLE HANDLE DEVICE**  
Halldor Skard, Ankerveien 42, Oslo, Norway  
Filed Oct. 21, 1987, Ser. No. 110,858  
Claims priority, application Norway, Oct. 28, 1986, 864260; Feb. 18, 1987, 870637  
Int. Cl.<sup>4</sup> A63C 11/22  
U.S. Cl. 280-821 6 Claims

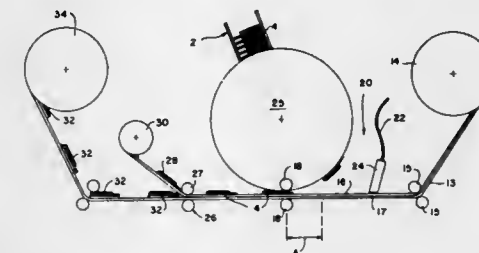


1. Ski pole handle device comprising a laterally protruding element which forms a supporting surface for the palm of the hand, wherein the support surface extends sloping downwardly in a direction away from the ski pole, a second element which forms a supporting surface for the thumb protrudes laterally substantially oppositely of the first element, and a knob projects upwardly between said elements, the knob including fastening means for a strap at a position higher than said supporting surfaces.

**4,790,563**  
**LABELS AND MANUFACTURE THEREOF**  
David J. Instance, Past Heap Farm, Pembury, Tunbridge Wells, Kent, England  
Division of Ser. No. 731,724, May 8, 1985, Pat. No. 4,675,062.  
This application Jan. 16, 1987, Ser. No. 3,799  
Claims priority, application United Kingdom, May 18, 1984, 8412739  
The portion of the term of this patent subsequent to Jun. 3, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> B42D 15/00, 15/04, 9/00; G09F 3/00  
U.S. Cl. 283-81 5 Claims

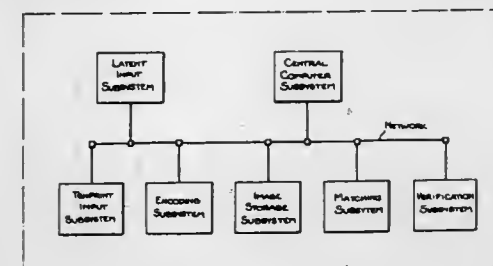
1. A self-adhesive label on a release backing material comprising a sheet which has been folded along a folded edge so

that an upper sheet portion covers, and extends over an edge of, a lower sheet portion, said upper sheet portion having an upper surface bearing a desired lithographically printed image, the opposed inner surfaces of said sheet portions formed when said sheet is folded bearing a second desired printed image, self-adhesive backed material carried on a support web including release backing material, a lower surface of said lower



sheet portion and a lower surface of an extending part of said upper sheet portion being adhered to an upper surface of said self-adhesive backed material, and a weakened tear line which extends across that part of said upper sheet portion which covers said lower sheet portion whereby said tear line can be torn thereby to unfold said sheet and reveal said two opposed inner surfaces.

**4,790,564**  
**AUTOMATIC FINGERPRINT IDENTIFICATION SYSTEM INCLUDING PROCESSES AND APPARATUS FOR MATCHING FINGERPRINTS**  
Philippe Larcher, Avon; Francois Irigoien-Gulchandut, Chailly-en-Biere; Daniel Vassy, Bourron-Marlotte; Michel Lenci, Moret-Sur-Loing; Patrick Longepierre, Avon, and Bernard Didier, Hericy, all of France, assignors to Morpho Systemes, Avon, France  
Filed Feb. 20, 1987, Ser. No. 16,884  
Int. Cl.<sup>4</sup> B42D 15/00; G06K 9/74, 9/00  
U.S. Cl. 283-69 20 Claims

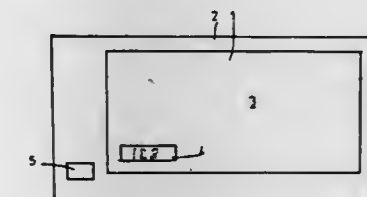


1. In a method for the automatic identification of fingerprints in which minutiae of a search print to be identified are matched with respect to their respective coordinates of location and angle against the coordinates of location and angle of minutiae of a plurality of file prints in a data base of fingerprints, in order to determine the existence or not of a match between said search print and one or more of said file prints, the improvement comprising the steps of

- (1) replicating at least one search print minutia by varying at least one of its coordinates of location and angle, thereby to obtain at least one additional minutia which is different from said search print minutia in at least one of said coordinates and
- (2) including said set of search print minutiae to be compared against the minutiae of said file prints.

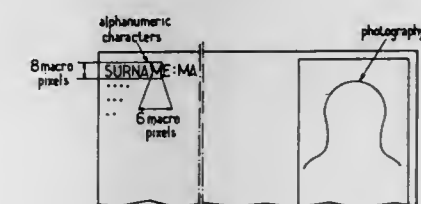
**4,790,565**  
**GAME**

Ivan V. Steed, Stirling, Australia, assignor to Steed Signs Pty., Limited, Wayville, Australia  
Filed Mar. 17, 1987, Ser. No. 26,739  
Int. Cl.<sup>4</sup> B42D 15/00  
U.S. Cl. 283-85 6 Claims



1. Game label components comprising a plurality of labels printed on an opaque sheet, said labels being removably attached to a backing sheet, each label and the backing sheet having identifying indicia printed thereon with lightfast ink, the indicia on the label being overprinted with a coloured ink, selected labels which will be the winning labels having the indicia overprinted with a non-lightfast ink which will fade over a period of time to visibly disclose the winning indicia thereunder.

**4,790,566**  
**IDENTITY DOCUMENT DIFFICULT TO FALSIFY AND A PROCESS FOR MANUFACTURING SUCH A DOCUMENT**  
Alain Boissier, Marly le Roi, and Alain Glatigny, Rueil Malmaison, both of France, assignors to Matra, Paris, France  
Filed Oct. 11, 1985, Ser. No. 786,853  
Claims priority, application France, Oct. 11, 1984, 84 15607  
Int. Cl.<sup>4</sup> B42D 15/00  
U.S. Cl. 283-91 9 Claims



1. Identity document having a support and graphical information printed on said support, said graphical information including uncoded alphanumeric information visible to the naked eye and which is specific to a holder of said document or to said document,

wherein the graphical information consists of a network of a large number of macropixels each having a specific light absorption, and wherein each of said macropixels consists of a dot pattern matrix of macropixels each having a light absorption selected among at least two predetermined light absorptions, whereby the light absorption of the macropixel is equal to the sum of the light absorptions of the micropixels in the matrix, the micropixels having different ones of said predetermined light absorptions in the same one of said matrices and being distributed for reproducing part of said uncoded specific information on a microscopic scale in a directly readable form.

9. A process for manufacturing an identity document having a graphic image including alphanumeric characters represent-

ing information in clear language and a background screen printed on a same support, comprising the steps of:

- compressing the dynamic range of contrast of an original graphic image to be reproduced to reduce it to a contrast range lower than that which may be obtained as printed micropixels of predetermined size;
- breaking down the graphic image up into macropixels having a dimension greater than that of the printed micropixels and each including the same predetermined plurality of micropixels;
- computing the optical density to be given to each micropixel in each of said macropixels for representing on a microscopic scale one of a plurality of characters a screen correlated to said information and for leaving the overall contrast of the macropixel unchanged, and
- printing the micropixels on the support.

4,790,567

## CONNECTOR FOR PLASMAPHERESIS BAG

Yukihiro Kawano, Yokohama; Tomihiro Juji, Tokyo; Toshihiko Ono, Oita; Hirofumi Iga, Oita; Seichi Ono, Oita, and Yoshiyuki Isobe, Oita, all of Japan, assignors to Kawasumi Laboratories, Inc., Tokyo, Japan

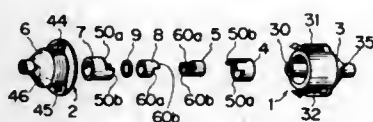
Continuation of Ser. No. 893,898, Jul. 29, 1986, abandoned. This application Dec. 22, 1987, Ser. No. 136,860

Claims priority, application Japan, Jul. 31, 1985, 60-167650; Oct. 23, 1985, 60-161328; Oct. 30, 1985, 60-241376; May 9, 1986, 61-68838

Int. Cl.<sup>4</sup> F16L 35/00

U.S. Cl. 285-24

14 Claims



1. A plasmapheresis connector to be furnished on a tube path for restoring a blood component to a blood donor from a blood plasmapheresis bag set after a blood plasma component has been extracted from blood collected in a blood bag of the plasmapheresis bag set, the connector comprising:

- a male connecting member and a female connecting member, each of said connecting members having a plurality of coaxially arranged rings of different diameters which radially overlap each other, said rings of said male connecting member corresponding diametrically with said rings of said female connecting member;
- means for fixing said rings of said male connecting member against rotation relative to each other and to said male connecting member;
- means for fixing said rings of said female connecting member against rotation relative to each other and to said female connecting member;
- means for releasably keeping both of said connecting members together; said releasably keeping means including hook connecting means formed on at least one of said connecting members and receiving means formed on the other of said connecting members, said receiving means being formed to receive and releasably retain said hook connecting means so as to releasably keep said connecting members together;
- means for making said male and female connecting members compatible only with each other to avoid mismatch; said making means including a projection extending longitudinally from each of said rings of both of said connecting members so that when said connecting members are brought together along a common axis, said projections on each of said rings of said male connecting member overlaps and locks against a respective one of said projections on said rings of said female connecting member so as

to prevent said connecting members from being rotatable relative to each other; and means for providing a flow path through said connecting members to accommodate a flow of the blood to be restored.

4,790,568

## APPARATUS FOR SELECTIVE COMBINATION OF AT LEAST ONE FIRST STATIONARY PIPELINE FOR LIQUIDS WITH A PLURALITY OF SECOND STATIONARY PIPELINES

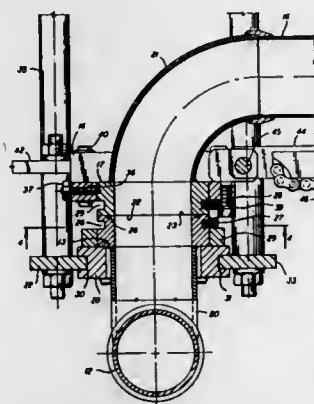
Hubert Skibowski, Hamburg, Fed. Rep. of Germany, assignor to Dover Corporation, New York, N.Y.

Filed Jul. 31, 1986, Ser. No. 891,541

Int. Cl.<sup>4</sup> F16L 39/00

U.S. Cl. 285-28

9 Claims



1. An apparatus for selective combination of at least one first stationary pipeline for liquids with a plurality of second stationary pipelines by means of a movable pipeline connection which via detachable coupling systems interact with said first and said second stationary pipelines, wherein the coupling systems have first coupling parts and second coupling parts, the second coupling parts having a circular annular groove, the first coupling parts having a coupling annular segment with a leg extending over an arch length of 180 degrees or less and gripping into the annular groove of the second coupling part when the front surfaces of interacting coupling parts are jointly moved along approximately in a common plane, characterized in that said first and second pipelines have each a movable connecting pipeline (10, 15), which at its free end contains a connecting head (20, 21), the connecting heads of said first pipelines being guided by means of first guides along parallel first axes and connecting heads of said second pipelines being guided by means of second guides along parallel second axes that extend perpendicularly to the first axes, and said connecting heads having terminal portions, the ends of which hold first coupling parts (17) or second coupling parts (13) in such a manner such that all the front surfaces are approximately in one coupling plane.

4,790,569

## REVERSE TAPER RING LOCK COUPLER AND METHOD

Bradley A. Chaffee, Littleton, Colo., assignor to The Gates Rubber Company, Denver, Colo.

Filed Jan. 12, 1987, Ser. No. 2,072

Int. Cl.<sup>4</sup> F16L 33/22

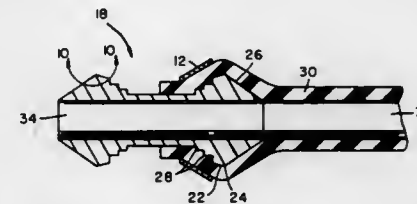
U.S. Cl. 285-40

33 Claims

1. In a closed fluid containment system of the type that includes an elastomeric hose coupled to a nipple wherein the hose has a coefficient of expansion greater than a coefficient of expansion of the nipple, the improvement of substantially

eliminating cold temperature leakage of a fluid between the nipple and coupled hose, the improvement comprising using a nipple that has an obverse taper extending to a maximum diameter of the nipple and a reverse taper extending from the maximum diameter of the nipple, the rise and fall from the

and thereby insulate said opposing surfaces of said two receiving elements; and means for pressing said two receiving elements together.



4,790,571

## QUICK-COUPLING CONNECTOR GROUP FOR PIPES, PILES OR THE LIKE

Paolo Montanari, San Lazzaro, and Oneglio Sala, Bologna, both of Italy, assignors to Riva Calzoni S.p.A., Bologna, Italy

Filed Apr. 14, 1987, Ser. No. 38,034

Claims priority, application Italy, Apr. 15, 1986, 20091 A/86

Int. Cl.<sup>4</sup> F16L 15/00

U.S. Cl. 285-86

12 Claims

maximum diameter establishing a radial deflection that radially deflects and tensions an end portion of the hose against the nipple as established by an elastic modulus of the elastomer of the hose, and thereby seals the hose and the nipple against cold leakage.

4,790,570

## ELECTRICALLY INSULATED JOINT FOR METAL PIPES

Wilhelmus A. E. M. De Gruijter, Zwijndrecht, Belgium, assignor to Angli Holding B.V., Rotterdam, Netherlands

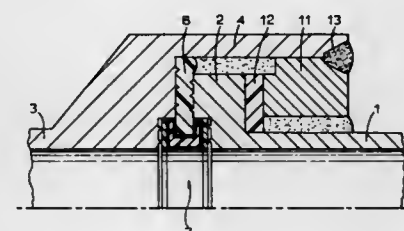
Filed May 13, 1987, Ser. No. 51,955

Claims priority, application Netherlands, May 14, 1986, 8601212

Int. Cl.<sup>4</sup> F16L 21/00

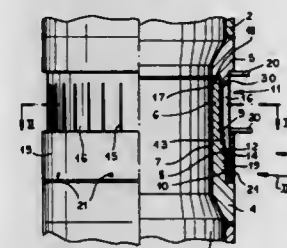
U.S. Cl. 285-54

15 Claims



1. An electrically insulated joint for metal piping, comprising:

- two receiving elements each having an opposing surface facing each other, at least one of said opposing surfaces having a projecting portion and a recessed portion recessed relative to said projecting portion, said recessed portion having an outer diameter smaller than an outer diameter of said projecting portion;
- an insulating ring composed of a metallic element having an outer surface and an insulation member of high compression strength lining the whole outer surface of and adhering to said metallic element so as to make said insulating ring impermeable to gas and liquid, said metallic element including a metal ring and at least one leg integral with and extending radially from said metal ring so as to provide said insulating ring with an outermost diameter, said recessed portion extending in a radial direction along all of said leg;
- an elastic sealing ring having an inner diameter in a non-compressed state smaller than said outermost diameter of said insulating ring, said leg having an inner surface facing said elastic sealing ring, said inner surface lying substantially in one common plane with said projecting portion, said insulation member on said leg being disposed against said recessed portion, said two receiving elements being pressed together so as to compress said insulating ring and said elastic sealing ring between said opposing surfaces

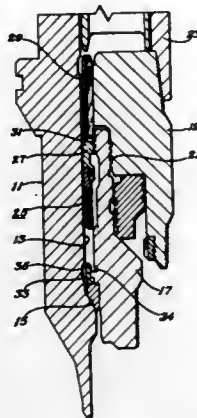


1. A quick-coupling assembly for joining together two tubular members, said assembly comprising:

- a male half-coupler connected to one of said tubular members and comprising:
  - a tubular body having a free end forming an axial-abutment surface,
  - a tubular portion formed on said body and extending away from said axial abutment surface toward said one of said tubular members, and
  - an external raised annular profile formed on said body adjacent said tubular portion;
- a female half-coupler connected to the other of said tubular members and receiving said tubular portion and said external annular raised profile, said female half-coupler being formed with:
  - a multiplicity of axially extending slits running to a free end of said female half-coupler and defining outwardly deflectable flexible lamellar elements,
  - internally of said female half-coupler on said lamellar elements and close to said free end of said female half-coupler, formations matingly interlockable with said external raised profile whereby said flexible lamellar elements are outwardly deflected upon axial fitting of said male half-coupler into said female half-coupler until said formations interlock with said external raised profile, and
  - spaced axially inwardly of said formations, an annular inwardly extending axial-abutment surface abuttingly engageable with said axial-abutment surface on said free end of said body; and
- an axially inmovable ring mounted on one of said half-couplers and having an internal diameter equal to an external diameter of said female half-couplers in a zone thereof provided with said formations in an undeflected state of said lamellar elements, said ring being shiftable over said zone to prevent radial deformation of said female half-coupler at said free end thereof and secure said joint.



**4,790,572**  
**TAPERED WEDGE PACKOFF ASSEMBLY FOR A CASING HANGER**  
 Richard W. Slyker, Houston, Tex., assignor to Vetco Gray Inc., Houston, Tex.  
 Filed Dec. 28, 1987, Ser. No. 138,617  
 Int. Cl.<sup>4</sup> E21B 33/04, 33/043  
 U.S. Cl. 285—140 5 Claims



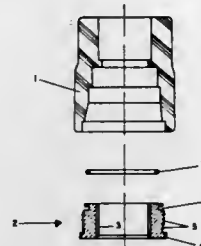
1. In a wellhead assembly having a wellhead within which a casing hanger lands, an improved packoff assembly for sealing between the wellhead and casing hanger, comprising in combination:

- a metal seal member having inner and outer seal rings, the inner seal ring having an inner wall for sealing against the hanger, the outer seal ring having an outer wall for sealing against the wellhead;
- the inner seal ring having an outer wedge surface, the outer seal ring having an inner wedge surface spaced from and opposing the outer wedge surface to define a central cavity;
- an annular wedge member located in the central cavity and having inner and outer wedge surfaces which mate slidably with the wedge surfaces of the seal rings;
- a drive member located above the wedge member;
- a web section joining the upper end of the wedge member with the lower end of the drive member;
- inner and outer elastomeric seals located on the inner and outer sides, respectively, of the web section and spaced between the lower end of the drive member and the upper ends of the seal rings; and
- means for moving the drive member from an upper position downward to a lower position relative to the seal rings, moving the wedge member downward for driving the seal rings apart to provide a metal high pressure seal between the hanger and the wellhead, and deforming the elastomeric seals between the drive member and the seal rings to provide a low pressure seal between the hanger and the wellhead.

**4,790,573**  
**SEALING SYSTEM BETWEEN A METAL INSERT AND PLASTIC COUPLING, AND RESULTING PRODUCT**  
 Daniel A. Cardozo, Joinville, Brazil, assignor to Tubos e Conexões Tigre S/A, Brazil  
 Filed Jan. 24, 1987, Ser. No. 65,990  
 Claims priority, application Brazil, Jul. 7, 1986, 8603153  
 Int. Cl.<sup>4</sup> F16L 25/00 2 Claims

1. An improvement in a sealing system comprising: a plastic coupling; a metal insert being installed in the interior of said plastic coupling; said metal insert having a cylindrical tubular-shaped part with internal threads and having an externally

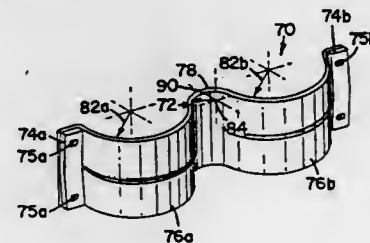
knurled external flange at one end, followed by an intermediate section whereon external teethlike serrations are provided, and



further followed by a circumferential recess; and an elastic sealing ring disposed in said recess.

**4,790,574**  
**APPARATUS FOR COUPLING TUBULAR MEMBERS**  
 Wayne M. Wagner, Apple Valley; Douglas E. Flemming, Rosemount; Gary J. Rocklitz, Burnsville, and Timothy Bethke, Apple Valley, all of Minn., assignors to Donaldson Company, Inc., Minneapolis, Minn.  
 Filed Jan. 16, 1987, Ser. No. 3,947  
 Int. Cl.<sup>4</sup> F16L 21/06 29 Claims

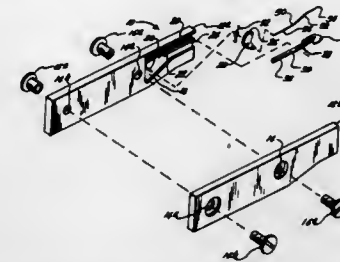
U.S. Cl. 285—419



1. A clamp suitable for joining a pair of tubular members, comprising:
- (a) a ductile band having a length substantially equal to the circumference of the tubular members;
  - (b) a pair of half-carriage bolts having a D-shaped portion disposed adjacent a head portion and a pair of hex nuts;
  - (c) a first reinforcing member attached to one end of the band forming a pair of D-shaped holes suitable for receiving and engaging the D-shaped portions of the half-carriage bolts, said D-shaped holes disposed with the rounded corners thereof facing said band; and
  - (d) a second reinforcing member attached to the other end of the band forming a pair of holes suitable for receiving the threaded portions of the half-carriage bolts, wherein when the clamp is placed about the joint between the tubular members and when the half-carriage bolts are inserted into the holes formed by the reinforcing members, the hex nuts can be threadably engaged with the half-carriage bolts to draw the reinforcing members together and the band into sealing engagement with the tubular members, whereby the D-shaped holes prevent the half-carriage bolts from turning and decrease stress risers in the band adjacent the D-shaped holes.

**4,790,575**  
**KNOTTING DEVICE**  
 John L. Tate, 36341 Caraway Rd., Denham Springs, La. 70726  
 Filed Nov. 2, 1987, Ser. No. 115,345  
 Int. Cl.<sup>4</sup> D03J 3/00 9 Claims

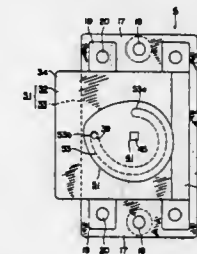
U.S. Cl. 289—17



1. A knotting device which comprises:
- (a) a handle having an internally located cavity;
  - (b) an elongated member pivotally mounted to said handle whereby said elongated member is movable between a first position and a second position and said elongated member having a first portion which is in said cavity and a second portion which is out of said cavity, said second portion having a knot-engaging recess associated therewith;
  - (c) an elongated needle member having a first portion in said cavity and a second portion out of said cavity, said second portion terminating in at least substantially a point, said elongated needle member being movable between a first position and a second position, said second position locating said point closer to said handle than when said elongated needle member is in said first position; and
  - (d) a linking member at least partially located in said cavity, said linking member being associated with said first portion of said elongated member and with said first portion of said elongated needle member whereby movement of said elongated member from said first position to said second position will cause said point to move towards said handle and away from said knot recess.

**4,790,576**  
**MAGNET CATCH**  
 Chiyo-kazu Higashi, Saitama, and Takayuki Tajima, Tokyo, both of Japan, assignors to Kabushiki Kaisha Murakoshi Seiko, Tokyo, Japan  
 Filed Mar. 7, 1988, Ser. No. 164,850  
 Claims priority, application Japan, Jun. 26, 1987, 62-98302[U]  
 Int. Cl.<sup>4</sup> E05C 17/56 2 Claims

U.S. Cl. 292—251.5

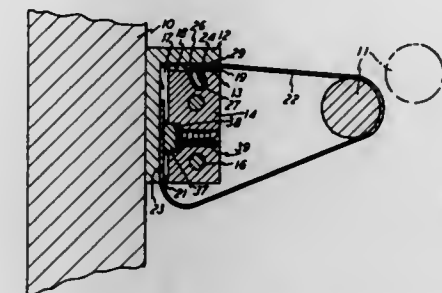


1. A magnet catch comprising:
- a case with an open front;
  - a magnet assembly installed in the case from the front opening in such a way that it can be moved back and forth;
  - an adjust spindle rotatably mounted to one side portion of the case and disposed in a direction perpendicular to that in which the magnet assembly advances and retracts;
  - a cam pin projecting from the magnet assembly either on the

front side or the rear side of the adjust spindle with respect to a moving direction of the magnet assembly; and an adjust cam secured to the adjust spindle so that it can rotate with the latter and having a cam groove with which the cam pin engages, the cam groove being formed in such a manner that the cam groove radius from the adjust spindle as the rotating center continuously changes.

**4,790,577**  
**DOOR PUSH-BAR LOCK-OUT RETAINER**  
 Curtis L. Holding, 2803 Fleetwood Dr., and Carl R. Larrabee, 4234 Wood Rd., both of Racine, Wis. 53403  
 Filed Feb. 29, 1988, Ser. No. 161,496  
 Int. Cl.<sup>4</sup> E05B 65/10 7 Claims

U.S. Cl. 292—92



1. A door push bar lock-out retainer of the type used on a hinged door having a push bar swingably mounted on said door and spaced from said door and extending horizontally and being movable for swinging toward and away from said door and being in a door-unlocked position when swung in toward said door, comprising a block mountable on said door and having a latch opening therein, a restrainer having an end attached to said block to be swingably mounted on said block and extending therefrom in a portion engageable with said push bar for holding said push bar in the door-unlocked position, said restrainer having a latch portion insertable into said latch opening, a spring in said block adjacent said latch opening for releasably engaging said latch portion and thereby releasably secure said restrainer to said block, and a key insertable into said block and operative on said spring for deflecting said spring for releasing said latch portion from said block.

**4,790,578**  
**DROP ROD LATCH FOR DOUBLE-HUNG GATES**  
 Raymundo M. Barrera, 2219 Ash St., Laredo, Tex. 78040  
 Filed Sep. 17, 1985, Ser. No. 776,890  
 Int. Cl.<sup>4</sup> E05B 67/00; E05C 5/02 10 Claims

U.S. Cl. 292—148

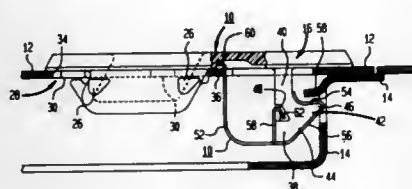


1. In a double-hung gate assembly wherein each gate has a stile closely adjacent to a stile on the other gate, means latching a rod mounting a for vertical reciprocation on a first stile to

engage at said rod's lower end a ground-mounted socket and having a handle projecting laterally of said rod's upper end, a fork latch mounted on the other stile to pivot between a horizontal position in which the fork latch embraces said first stile and a vertical position in which said fork latch is free of said first stile means including a padlock for retaining said fork latch in said horizontal position, the improvement comprising an abutment member on said latching rod to engage the latching rod mounting means after said latching rod is moved clear of said ground mounted socket.

**4,790,579**  
**SLIDING SPRING LATCH**  
James Maxwell, Clarkston, and Rodney Raabe, Tucker, both of Ga., assignors to Siemens Energy & Automation, Inc., Atlanta, Ga.

Filed Mar. 1, 1988, Ser. No. 161,557  
Int. Cl.<sup>4</sup> E05C 1/10  
U.S. Cl. 292—175 4 Claims



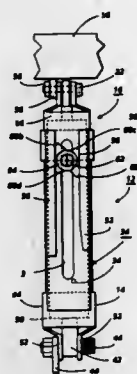
1. A two-piece spring latch assembly comprising: a sliding latch body defining a top surface and a bottom surface, the top surface defining means for engaging the sliding latch body; a latch member extending from the bottom surface defining a latch surface and a strike surface; a latch spring defining a spring member, a latch bearing surface and a strike bearing surface; the spring member being adapted for urging the sliding latch body into a latched position, the latch bearing surface being fixed relative to the latch surface and the strike bearing surface being fixed relative to the strike surface.

**4,790,580**  
**LOCKING SUPPORT FOR VERTICALLY TRANSLATABLE ARTICLE**  
Leonello Casilio, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 24, 1987, Ser. No. 41,957  
Int. Cl.<sup>4</sup> E05C 17/30  
U.S. Cl. 292—262 5 Claims

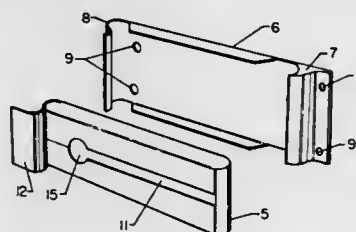
1. A locking support for an article adapted to be moved from a first to a second position comprising: a first assembly including a piston cylinder arrangement with one end of the piston rod secured to the article; a second assembly secured to the article and adapted to be movable therewith, said second assembly including a guideway member extending in a generally perpendicular direction to the article and having a longitudinally extending slot therethrough, said guideway member also including a first and second guide bar positioned on opposite sides of said slot and further including a raised lug at the bottom terminus of said slot; and a star cam rotatably mounted on said first assembly on an axis transverse thereto and extending through said slot, said cam having two sets of pawls in diametrically opposed relationship; said cam rotation being normally constrained by said guide bars; whereby, when the article is moved to a new position, said

cam pawls interact with the lower edges of the guide bars and the lug to establish a locked position of the cam sufficient to enable the article to be supported by one set of opposed pawls.



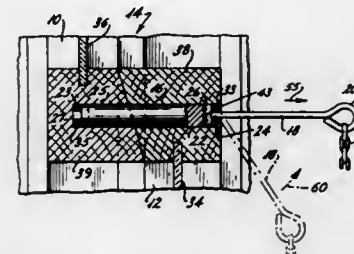
**4,790,581**  
**SAFETY DOOR LATCH**  
Walter H. Boswell, 913 Coleman Dr., and Richard D. Hibbard, 315 Penniman Rd., both of Williamsburg, Va. 23185

Filed Aug. 28, 1987, Ser. No. 91,046  
Int. Cl.<sup>4</sup> E05C 17/36  
U.S. Cl. 292—264 2 Claims



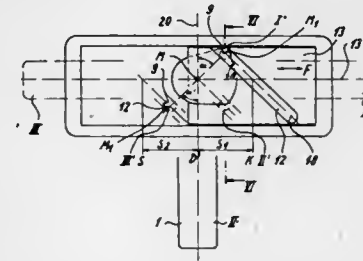
1. A safety door latch which can be simply and quickly disengaged in the event of an emergency, the safety door latch comprising: an elongated keeper plate which is secured to the inside of the stile of a door in proximity to the edge of the stile, the longitudinal axis of the keeper plate being substantially perpendicular to the edge of the stile; an elongated slide adapted to be received by and releasably retained within the keeper plate, the slide having an elongated slot therein for releasably securing a chain thereto, the slide having a proximal end and a distal end, the proximal end positioned within the keeper plate near the edge of the stile, and the distal end positioned within the keeper plate away from the edge of the stile and terminating in a clasp, the slide being received by and releasably retained within the keeper plate by spring tension applied by the keeper plate on the slide; and a chain having anchor means secured on one end thereof for anchoring the chain to the striker jamb of the door, and a pin secured to the other end of the chain for insertion into the slot in the slide and releasable retainment therein.

**4,790,582**  
**CONCEALED WINDOW LOCK**  
Edward Keast, 106 Cambridge Dr., Glen Mills, Pa. 19342  
Filed Oct. 2, 1986, Ser. No. 914,658  
Int. Cl.<sup>4</sup> E05C 19/18  
U.S. Cl. 292—288 3 Claims



1. A removable window lock comprising: (a) a removable, solid, generally cylindrical bolt having two ends, one of said bolt ends being tapered, said bolt including on the opposite end a set of channels, one longitudinal channel extending from said bolt end's center inward along said cylinder's longitudinal axis a predetermined distance and, at least one radial channel located inwardly of the end of said cylinder and opening into said longitudinal channel, said channel's diameters and lengths sized to workably receive and positively lock together with an extractor pin; and (b) an elongated extraction pin having grasping means at one end, said pin's other end bent perpendicularly, said bent pin section sized relative to said channels to be inserted through said longitudinal channel and then into said radial channel, such that when said pin abuts a surface of said longitudinal channel, said bent end oppositely extends into at least a portion of said radial channel whereby, when said bolt is fully inserted into a predrilled channel in a set of window sashes, said sashes are locked in place until said extractor pin is inserted into said bolt's radial channel to permit said pin bent end to hook and positively lock itself into said radial channel and thereby pull said bolt from the window.

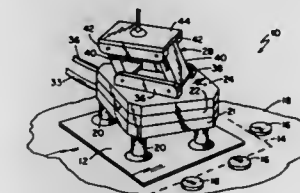
**4,790,583**  
**ACTUATING ARRANGEMENT FOR WINDOW CASEMENT OR DOOR LEAF FITTINGS**  
Armin Tönnmann, and Bernd Diekmann, both of Bielefeld, Fed. Rep. of Germany, assignors to Schuco Heinz Schuermann GmbH & Co., Bielefeld, Fed. Rep. of Germany  
Filed Dec. 18, 1986, Ser. No. 943,630  
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1985, 3545859  
Int. Cl.<sup>4</sup> E05C 21/02  
U.S. Cl. 292—336.3 17 Claims



1. An arrangement for actuating door or window fittings of

a turnable and/tiltable door leaf or window casement structure, which are operated by a pusher bar, comprising: a housing having a longitudinal axis; an actuating handle mounted on said housing for turning about a turning axis; and a transmission accommodated in said housing and actuated by said actuating handle, said transmission including a slide centered on a central longitudinal axis, mounted in said housing for displacement along said longitudinal axis of said housing, and having an elongated guiding groove centered on a groove axis extending at an acute angle with respect to said central longitudinal axis of said slide, an eccentric connected to said actuating handle and equipped with an entraining pin which is received in said guiding groove of said slide for movement longitudinally of said guiding groove, said entraining pin having a central axis, said slide extending along an imaginary plane which is intersected by said turning and central axis at respective intersection points, and an entraining member secured to said slide, said actuating handle being switchable between a first position, a second position, and a third position, so that when said actuating handle is in said first and third positions a connecting line which connects said intersecting points extends at a right angle with respect to said longitudinal groove axis, and when said actuating handle is in the second position said longitudinal groove axis extends through the intersecting point of said turning axis with said imaginary plane whereby with a constant angular speed of said actuating handle a speed of said entraining member in said first and third positions goes to zero and in said second position reaches a maximum and with a constant torque at said actuating handle a force which acts on said entraining member in said first and third positions reaches a maximum and in said second position reaches a minimum.

**4,790,584**  
**COMPLIANT LINK**  
Antonios E. Prentakis, Cambridge, Mass., assignor to Teradyne, Inc., Boston, Mass.  
Continuation of Ser. No. 872,178, Jan. 9, 1986, abandoned. This application Oct. 30, 1987, Ser. No. 115,270  
Int. Cl.<sup>4</sup> H05K 3/30; B65G 47/40; B65H 9/10  
U.S. Cl. 294—1.1 21 Claims



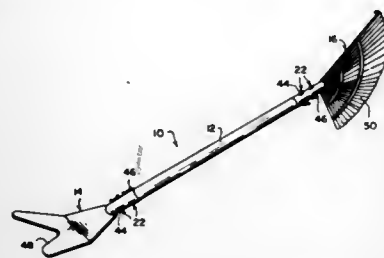
1. Compliant linkage apparatus for providing, in a single stage, three degrees of freedom in a single plane, said apparatus comprising: an upper plate, a lower plate under the upper plate, sliding means for allowing said upper and lower plates to slide relative to each other laterally along orthogonal axes and rotationally, orientation means for causing said plates to attract each other in a particular orientation to resiliently resist relative lateral and rotational displacements of said plates, means for displacing connected to one said plate, and means for engaging an object connected to the other said plate,



whereby a compliant linkage is provided between said means for displacing and said means for engaging.

relatively large diameter section of the inner wall overlying the outer wall of the socket and the relatively small diameter

**4,790,585**  
**DOUBLE DUTY WEEDER**  
James J. Vernon, c/o George Spector, 3615 Woolworth Bldg.,  
233 Broadway, and George Spector, 3615 Woolworth Bldg.,  
233 Broadway, both of New York, N.Y. 10007  
Filed Sep. 22, 1983, Ser. No. 534,698  
Int. Cl.<sup>4</sup> F41C 27/04  
U.S. Cl. 294—51



1. A double headed garden tool which comprises:
  - (a) an elongated handle with transverse apertures at right angles to each other at opposite ends of said handle;
  - (b) a plurality of different types of attachable garden tools, and
  - (c) means for attaching one garden tool to one end of the elongated handle and another garden tool at a 90° angle to the other end of the elongated handle so that when one garden tool is not in use it will be out of the way when the other garden tool is in use, wherein each of the garden tools has affixed at its end a tapered sleeve having a transverse aperture therethrough that will line up with said transverse aperture at either end of the elongated handle, wherein the means for attaching one garden tool to one end of the elongated handle and another garden tool at a 90° angle to the other end of the elongated handle comprises:
    - (d) a pair of bolts, each bolt placed through the transverse aperture in the tapered sleeve and the transverse aperture in the tapered end of the elongated handle; and
    - (e) a pair of wing nuts, each wing nut threaded onto an end of each bolt so that each garden tool is secured to the handle, wherein the elongated handle includes pivotally secured portions which are moveable from an extended coaxial position to a collapsed position with said portions adjacent and parallel.

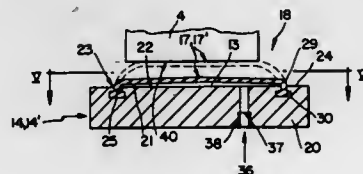
**4,790,586**  
**COLLAR FOR HAND TOOLS**  
John M. Stoner, Jr., Middletown, Pa., assignor to Emhart Industries, Inc., Farmington, Conn.  
Filed Nov. 4, 1987, Ser. No. 117,188  
Int. Cl.<sup>4</sup> A01B 1/22; B25G 3/02  
U.S. Cl. 294—57

1. A collar for use on hand tools of the type having an elongated socket to receive a tool handle, said collar comprising a molded plastic body having an outer wall defined by a first tapered portion extending lengthwise of the body from one end towards the middle thereof and a second tapered portion extending lengthwise of the body from the other end towards the middle thereof to form relatively thin wall portions at each end of said body and a relatively thick wall portion at the interface of said first and second tapered portions, with the inner wall of the collar being defined by a first relatively large diameter section and a second relatively small diameter section, with the interface of said first and second sections defining a radially extending flange-like surface, with the end of the socket engaging the flange-like surface, the

1 Claim

section of the inner wall overlying the outer wall of the tool handle.

**4,790,587**  
**GRIPPING DEVICE**  
Kurt Stoll, Lenzhalde 72, 7300 Esslingen, Fed. Rep. of Germany  
Filed Jul. 10, 1987, Ser. No. 71,986  
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1986, 3624000  
Int. Cl.<sup>4</sup> B66C 1/46  
U.S. Cl. 294—119.3



1. In a gripping device of the kind comprising a pair of gripping elements each including a rigid backing plate and a flexible membrane attached thereto defining therewith a pneumatic pressure space, means mounting the gripping elements spaced apart in opposed relation so that the membranes provide opposed article gripping surfaces defining between them an article receiving space, and means for supplying air under pressure into the pneumatic pressure space, whereby the membranes are deformable by inflation into the article receiving space to grip an article therebetween, the improvement residing in that each backing plate is formed with a continuous, annularly extending, undercut groove and the membrane is integrally formed with a continuous resiliently deformable bead extending completely around its perimeter which bead is receivable in the groove in a snap fit thereby to mount the membrane on the backing plate in hermetic sealing engagement therewith.

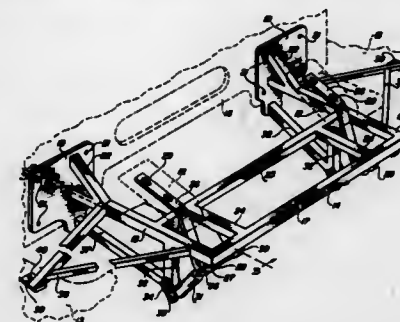
4 Claims

**4,790,588**  
**AUTOMOBILE BODY CONVERSION SYSTEM**  
Randall G. Corson, 317 E. Acapulco La., Phoenix, Ariz. 85022  
Filed Jun. 19, 1987, Ser. No. 63,994  
Int. Cl.<sup>4</sup> B60R 27/00  
U.S. Cl. 296—1.1

1. An automobile conversion system comprising a frame, mounting means positioned at one end portion of the frame, said mounting means comprising at least one upright plate member having fastener receiving openings therein adapted to be aligned with fasteners by which the bumper is mounted on the automobile, hinge means positioned in the opposite end portion of the frame, and a hood member carried by said hinge

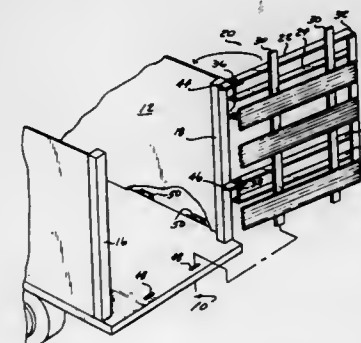
5 Claims

means and extending over said frame and a portion of said automobile, said hinge means permitting said hood to move



upwardly about the hinge means to expose an interior region of the automobile.

**4,790,589**  
**REMOVABLE PIVOTABLE TAILGATE**  
Larry R. Moore, 22833 Dequindre, Hazel Park, Mich. 48030,  
and David Juhnke, 42235 Nottingham Ct., Northville, Mich. 48167  
Filed Jun. 22, 1987, Ser. No. 65,336  
Int. Cl.<sup>4</sup> B62D 25/00  
U.S. Cl. 296—50



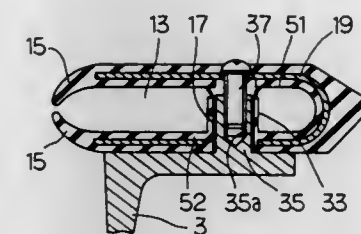
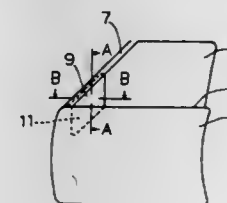
1. In a vehicle having a load carrying bed terminating at a rearward edge, a pair of rigid vertical posts fixed to and projecting upwardly from said bed respectively at opposite sides of said bed adjacent said rearward edge, and a tailgate having a generally rectangular rigid frame for closing the opening between said posts, the improvement comprising:

mounting means for hingedly and detachably mounting said tailgate on one of said posts, said mounting means comprising vertically spaced upper and lower hinge plates fixedly mounted on said one of said posts and projecting rearwardly from said one of said posts and outwardly from the outer side of said one of said posts, means defining a vertical pin receiving bore through each of said hinge plates, said bores having a common vertical axis displaced rearwardly and outwardly from the rear and outer sides of said one of said posts, a first pair of vertically spaced frame members on said tailgate frame projecting horizontally outwardly from one vertical side edge of said tailgate adjacent the top of said tailgate, a second pair of vertically spaced frame members on said tailgate frame projecting horizontally outwardly from said one vertical side of said tailgate at locations spaced below the respective first pair of frame members by a distance equal to the vertical spacing between said upper and lower hinge plates, means defining a vertical pin receiving bore through each of said frame members, said bores having a common vertical axis, upper and lower hinge pins respec-

tively coupling said first pair of frame members to said upper hinge plate and said second pair of frame members to said lower hinge plate, each hinge pin projecting downwardly successively through the bores in the upper of the pair of frame members, the associated hinge plate, and the lower of the pair of frame members to mount said tailgate upon said post for hinging movement and for vertical movement relative to said post upwardly from a gravitationally maintained rest position wherein the upper and lower hinge plates are in underlying supporting engagement with the uppermost of the respective first and second pairs of frame members and an elevated position wherein the lowermost of the first and second pairs of frame members are in underlying engagement with the respective upper and lower hinge plates, means for releasably retaining said hinge pins against removal from said bores, a plurality of horizontally spaced vertical stakes fixedly mounted on said tailgate frame and projecting vertically downwardly from the lower edge of said tailgate by a distance less than the vertical spacing between the first pair of frame members, and means in said bed defining a plurality of upwardly opening stake receiving recesses in said bed located adjacent the rearward edge of said bed to receive said stakes when said tailgate is in said rest position to establish a closed position of said tailgate.

**4,790,590**  
**CORNER BRACKET OF SIDE DOOR FOR AUTOMOBILE**  
Akira Ito, Aichi; Hideo Hagiwara, Ichinomiya, and Tetsuo Katsaku, Komaki, all of Japan, assignors to Toyota Gosei Co., Ltd., Nishikasugai, Japan  
Filed Dec. 9, 1986, Ser. No. 939,882  
Claims priority, application Japan, Dec. 9, 1985, 60-189279[U]; Dec. 29, 1985, 60-298934; Mar. 28, 1986, 61-046375[U]; Jul. 15, 1986, 61-166274  
Int. Cl.<sup>4</sup> B60R 1/06  
U.S. Cl. 296—146

12 Claims



1. A corner bracket for an automobile side door of a door type which has an inside and an outside and a sector of spaced defined between a generally horizontal door belt line and a pillar which slants upwards from a juncture with the door belt line, whereby the sector of space has an included angle between the door belt line and the slanting pillar, said corner bracket comprising: an accessory-attaching member having a main portion of generally triangular form, for fully occupying said

sector of space, from said juncture out to a given lateral distance from said juncture;

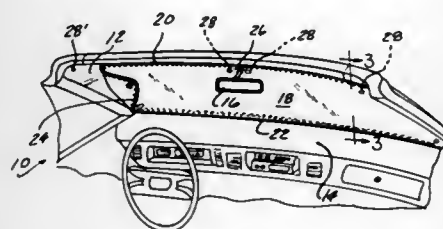
an attaching foot member extending laterally from said main portion of said accessory-attaching member and being provided with securement means for fixing said accessory-attaching member to an automobile side door;

said accessory-attaching member main portion comprising an insert having a U-shaped cross-sectional shape, said insert having a coating of high molecular weight elastic material, said main portion thereby including an inner side wall and an outer side wall, relative to an automobile, defining between them a groove, open at one end, for receiving a door glass;

means defining at least one pair of aligned openings transversally through said main portion, including one opening through said inner side wall of said insert and one opening through said outer side wall of said insert;

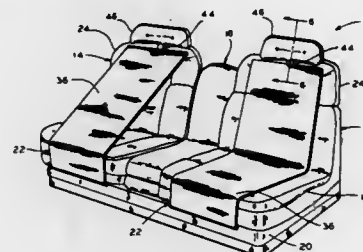
said coating of high molecular weight elastic material including an integral tubular flash based on one of said side walls within said groove and disposed so as to surround an axis passing between said aligned openings, thereby providing an axially extending inner peripheral wall; said integral tubular flash terminating short of the other of said side walls in a free end, and having a free end portion located axially adjacent said free end, said free end portion being constituted by an axially short annular band in which said high molecular weight elastic material is abruptly thinner than within a main portion constituting a remainder of said integral tubular flash, said tubular flash remaining substantially unobstructed radially internally of said main portion thereof by said annular band.

4,790,591  
**REMOVABLE PROTECTIVE VEHICLE WINDSHIELD SCREEN**  
 Jess J. Miller, 220-C Lakewood Cir., Margate, Fla. 33063  
 Filed Sep. 21, 1987, Ser. No. 98,886  
 Int. Cl. A B60J 3/00  
 U.S. Cl. 160—370.2 14 Claims



1. A removable screen adapted to be mounted on the interior of a windshield for inhibiting the transfer of heat, solar energy, ultraviolet radiation and the like through a windshield into the interior of the associated vehicle comprising:
  - (a) a flexible sheet having an upper edge, a lower edge and two opposed side edges defining a continuous outer peripheral edge, the flexible sheet adapted to correspond in size to the associated windshield, the flexible sheet having a plurality of individual sheets of metallized nylon plastic film joined in overlying relationship to one another and defining at least one sealed air pocket positioned between the individual sheets; and
  - at least one air tight seam located adjacent to the outer peripheral edge; and
  - (b) means for removably mounting the flexible sheet to the interior of the windshield.

4,790,592  
**AUTOMOBILE SEAT HAVING RETRACTABLE PROTECTIVE COVERING**  
 Fiorenzo Busso, Ann Arbor, Mich., and Vincent Russo, Cary, N.C., assignors to ITT Corporation, New York, N.Y.  
 Filed May 11, 1987, Ser. No. 48,056  
 Int. Cl. A A47C 31/11  
 U.S. Cl. 297—184 3 Claims

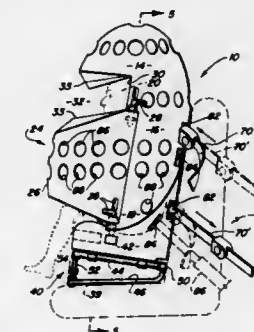


1. An automobile seat, comprising:
  - a frame including a back cushion and a seat cushion;
  - a trim piece extending around a front end of said seat cushion, said trim piece being adjacent the bottom of said frame and extending upwardly therefrom to define a transverse opening between the top edge of said trim piece and said front end of said seat cushion;
  - protective covering means mounted to said frame below said seat cushion and behind said trim piece, said protective covering means including a flexible covering extending through said opening for movement between a retracted position and an extended position wherein said flexible covering extends over an external surface of said seat cushion;
  - a free end of said flexible covering including retention means engaging said trim piece in said retracted position, said retention means including a grasp for extending said flexible covering over said external surface of said seat cushion, wherein said retention means includes a member affixed to said free end of said flexible covering, said member having an inverted U-shaped configuration for engaging said top edge of said trim piece in said retracted position of said flexible covering.

4,790,593  
**PROTECTIVE SUPPORT ASSEMBLY FOR AN OCCUPANT OF A VEHICLE**  
 Manuel R. Davalos, 4040 W. 7th La., Hialeah, Fla. 33012, and Kenneth B. Feldman, 280 N.E. 173 St., North Miami Beach, Fla. 33162  
 Filed Oct. 23, 1986, Ser. No. 924,980  
 Int. Cl. A A47C 31/00  
 U.S. Cl. 297—250 12 Claims

1. A protective support assembly for an occupant of a vehicle, said assembly comprising:
  - a. a base positionable on a supporting surface within the vehicle and a housing mounted on said base and including a hollow interior portion dimensioned to contain an occupant therein;
  - b. occupant support means contained within said housing for maintenance of the occupant in a supported position;
  - c. containment means mounted within said hollow interior portion in adjacent relation to said occupant support means and structured for engagement with and containment of the occupant in said supported position;
  - d. said housing comprising an outer shell formed of impact-resistant material and configured to define a substantially surrounding enclosure of the occupant;
  - e. said shell comprising an integral one-piece construction including a bottom portion, mid portion, top portion and an access opening contiguous to said bottom, mid and top

- portions and communicating with said hollow interior portion;
- f. said top portion configured in a surrounding disposition relative to rear, top and frontal portions of the occupant's head; said mid portion configured in surrounding disposition relative to rear and opposite sides of the occupant's torso and said bottom portion configured in surrounding disposition to underportions of the occupant's body and being connected to said occupant support means;
- g. closure means comprising a door movably secured to said shell for at least partial closure of said access opening and selective positioning between an open and a closed position relative to said access opening and said hollow interior portion, said closed position defined by substantially covering, protective disposition of the frontal portion of the occupant by said door structure,

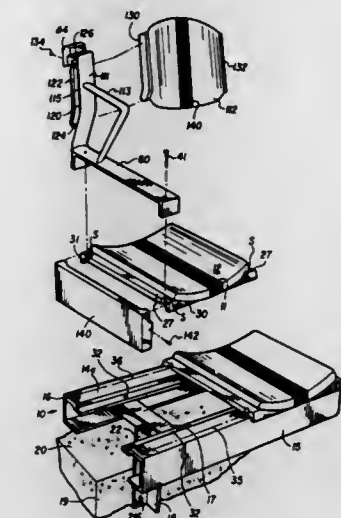


- h. said closure means having a lesser dimension than said access opening and configured to define a viewing space through said access opening when said door is in said closed position, said viewing space disposed between and defined by an upper periphery of said door structure and a lower periphery of said top portion of said shell;
- i. connecting means formed on said shell and disposed and configured for connection with an interior of the vehicle, whereby said shell is maintained on the supporting surface of the vehicle; and
- j. padding structure secured to and extending outwardly from an interior surface of said shell and said door in surrounding and at least partially enclosing relation to the occupant within said hollow interior portion.

4,790,594  
**MODULAR STADIUM SEATING AND ASSEMBLY METHOD**  
 Ullis J. Temos, Nazareth, Pa., assignor to Contour Seats, Inc., Allentown, Pa.  
 Continuation of Ser. No. 917,105, Oct. 8, 1986, abandoned. This application Jan. 29, 1988, Ser. No. 150,449  
 Int. Cl. A A47C 1/12  
 U.S. Cl. 297—248 10 Claims

1. A modular stadium seat assembly comprising:
  - (a) a plurality of adjacent side-by-side modular seat units, each including generally centrally located mold lines formed therein and a plurality of other centrally located lines formed therein for disguising said mold lines;

- (b) a support framework for supporting the seat units in side-by-side relationship above a stadium support structure, the support framework including front and rear laterally extending parallel rails positioned beneath the seat units and supporting front and rear portions respectively of the adjacent side-by-side modular seat units, the front rail being connected to the rear rail by a plurality of rearwardly inclined cross-members extending between and attached to the front and rear rails so that the modular seat units incline rearwardly between the front and rear rails;
- (c) a plurality of adjacent backrest modules, each including generally centrally located mold lines formed therein and a plurality of other centrally located lines formed therein for disguising said mold lines, the backrest modules being positioned side-by-side above corresponding seat units to engage and rest a user's back;
- (d) clamp-down members extending over adjacent side portions of adjacent seat units;
- (e) self-drilling, self-tapping screws for attaching the clamp-down members to the front and rear rails of the seat unit supporting means with adjacent side portions of adjacent seat units sandwiched between the clamp-down members and the rails of the seat unit supporting means;
- (f) a score-line groove extending along a top surface of each of said rails for alignment of said self-drilling, self-tapping screws; and



- (g) upright backrest supports for supporting the backrest modules above the seat units, the backrest supports being attached to and supported by corresponding clamp-down members, the upright support including generally U-shaped, sidewardly open slots for mating with and supporting corresponding side portions of the backrest modules, the U-shaped slots being defined by front and rear wall portions connected by a slot bottom wall portion, the U-shaped slot having an open top which is selectively closable by a top cap which is screw-fastenable to the assembly to connect the front and rear wall portions and thereby form a top wall portion of the slot, the side portions of the seat backs being vertically slidable within open U-shaped slots between the front and rear slot wall portions when the top caps are unfastened to insert or remove the backrest modules from the backrest supports, wherein screw-fastening of the top caps with the backrest modules inserted in the slots interconnects and secures the backrest modules with the backrest supports.



4,790,595  
**CHAIR HAVING SEAT AND BACK CAPABLE OF  
 RELATIVE TILTING**

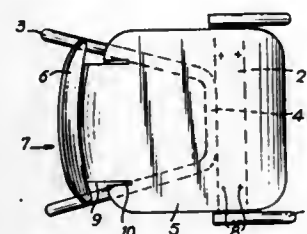
Willi Hessel, Willingen; Jurgen Lange, Grafenau, and Reinhard Paulus, Cologne, all of Fed. Rep. of Germany, assignors to Manser Waldeck AG, Waldeck, Fed. Rep. of Germany

Filed Apr. 21, 1987, Ser. No. 40,678

Claims priority, application Fed. Rep. of Germany, Apr. 21, 1986, 3613381; European Pat. Off., Oct. 4, 1986, 86113762.8  
 Int. Cl.<sup>4</sup> A47C 3/00

U.S. Cl. 297—285

14 Claims



1. In a chair having a seat part integrally joined to a back part and defining a one-piece bucket seat with a flexible bending region at the location of joining of the seat and back parts, said bucket seat being attached to a chair frame support structure, the improvement comprising:

- (a) the bending region of the bucket seat has a width as measured from opposite sides of the seat and back parts thereof;
- (b) the seat part includes longitudinal slots extending from the opposite sides of the bending region toward the front thereof; and
- (c) the area of the seat and back parts located laterally between the slots is of continuous solid construction.

4,790,596  
**RESILIENT CHAIR**

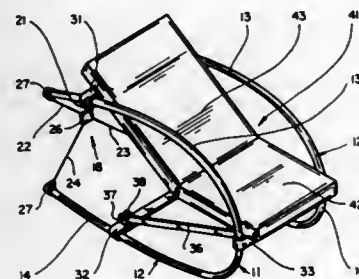
Tessera D. Shifferaw, 1856 Carlson, Richmond, Calif. 94804

Filed Jan. 26, 1987, Ser. No. 67,314

Int. Cl.<sup>4</sup> A47C 3/00

U.S. Cl. 297—287

13 Claims



1. In a chair: a plurality of elongated resilient rods which will return to a substantially straight condition if unrestrained, each of said rods being bent to a U-shaped configuration with upper and lower horizontally extending sections, retaining means for preventing the rods from straightening beyond the U-shaped configuration, and means mounted on the rods and resiliently supported thereby for receiving a person sitting on the chair.

4,790,597  
**VEHICLE SEAT WITH A LONGITUDINAL GUIDE, WITH  
 AN ADJUSTMENT OF HEIGHT OR INCLINATION, AND  
 WITH AN ATTACHMENT FOR SEAT BELT LOCK**

Heinz Bauer; Barchard Becker; Ernst-Reiner Frohnhaus; Alfred Gedig, all of Solingen; Josef Klink, Nagold, and Antonin Koucky, Sindelfingen, all of Fed. Rep. of Germany, assignors to Firma C. Rob Hammerstein GmbH and Daimler-Benz AG, both of, Fed. Rep. of Germany

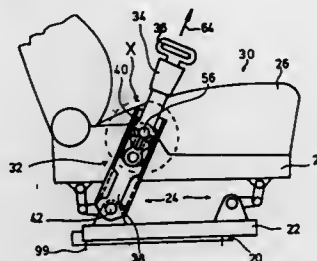
Filed Oct. 29, 1987, Ser. No. 114,679

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1986, 8628855[U]

U.S. Cl. 297—468

Int. Cl.<sup>4</sup> A47C 31/00

13 Claims



1. A vehicle seat, comprising:

- a longitudinal guide with at least one floor rail (20) and seat rail (22);
- a device (24) for adjustment of at least one of a height and an inclination of a seat surface (30) of the seat, located between a seat carrier (26) for the seat surface (30) and the seat rail (22);
- a seatbelt lock attachment on an inboard side of the seat, a lower end of the seatbelt lock attachment being fastened to the seat rail (22) and an upper end of the seatbelt lock attachment supporting a seatbelt lock (34), which can accommodate a coupling piece (36) of a safety belt and is movable to said inboard side of the seat;
- said seatbelt lock attachment (32) having a lower part (38) which is linked relative to the seat rail (22), and an upper part (40), which is linked relative to the seat carrier (26) and is connected with the seatbelt lock (34) such that one of the upper and lower parts can slide freely in a longitudinal guide defined by the other of said upper and lower parts, one of said upper and lower parts being provided with at least one stop projection and the other of said upper and lower parts having locking devices interacting with said stop projection, and further comprising a locking piece (50), holding the upper and lower parts (38, 40) in a normal position which permits their free sliding relative movement, and the locking piece (50) being overridden by a force affecting the safety belt during an accident, whereupon the stop projection (60) engages in the locking devices and relative movement of the upper part (40) and the lower part (38) is thereby prevented, and wherein said lower part (38) is linked relative to the seat rail (22) via a rocker (88), linked to the seat rail.

4,790,598  
**INCLINABLE CHAIR PROVIDED WITH BALANCE OR  
 ROCKER STRUCTURE**

Hermann Locher, Dornach, Switzerland, assignor to Giroflex Entwicklungs AG, Koblenz, Switzerland

Filed Oct. 9, 1987, Ser. No. 106,455

Claims priority, application Switzerland, Oct. 14, 1986, 4124/86; Jul. 8, 1987, 2589/87

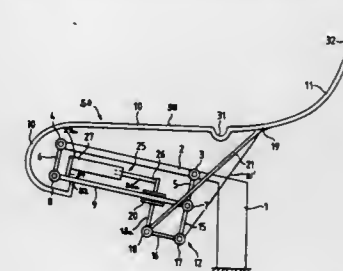
Int. Cl.<sup>4</sup> A47C 1/02

U.S. Cl. 297—325

14 Claims

1. A chair including a knee region and a backrest region, comprising:

a seat portion;  
 a backrest portion positioned to cooperate with said seat portion;  
 a support portion for supporting said seat portion and said backrest portion;  
 said support portion including a cantilevered support arm;  
 at least one pair of links comprising at least two link elements;  
 one of said at least two link elements being arranged at the knee region of the chair;  
 the other one of said at least two link elements being arranged at the backrest region of the chair;  
 a balance device cooperating with said at least two link elements;  
 means for pivotably connecting said at least two link elements to said cantilevered support arm such that there is



provided a substantially parallelogram suspension for said balance device on which there are supported the seat portion and the backrest portion;  
 said link element which is arranged at said backrest region of the chair comprises an extension arm having an end;  
 a thrust rod;  
 means for connecting said end of said extension arm to said thrust rod;  
 a slide;  
 means for operatively connecting said thrust rod with said slide;  
 spring means having opposite ends;  
 said balance device including a knee region end;  
 one end of said spring means being supported at said slide; and  
 the other end of said spring means being supported at said knee region end of said balance device.

4,790,599  
**PIVOTING RECLINER APPARATUS AND METHOD**  
 Paul R. Goldman, 8 Joyce Ter., Andover, Mass. 01810, assignor to Paul R. Goldman, Andover, Mass.

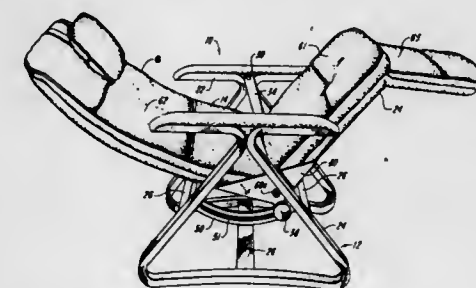
Continuation of Ser. No. 853,005, Apr. 17, 1986, abandoned.

This application Sep. 2, 1987, Ser. No. 93,150

Int. Cl.<sup>4</sup> A47C 1/02

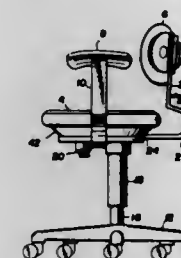
U.S. Cl. 297—327

4 Claims



1. A swinging recliner structure comprising a supporting frame structure, and

a fixed seat structure,  
 said seat structure having  
 a back portion, a seat portion, and a footrest portion, said back, seat, and footrest portions having a fixed, integral, positional relationship to each other,  
 said frame structure having  
 a first and a second side member,  
 means for pivotably connecting said seat structure to said side members for freely swinging motion therebetween between an upright sitting position and a maximum fully reclined position, said side members supporting, from a pivot pin in each side member, the weight of the seat structure including the weight of any occupant of the seat structure,  
 bar members extending downward from a pivoting connection of said bar members with said side members at the pivot points, and connecting to said seat structure for supporting said seat member, and  
 a guide track element supported by each side member for connecting to said bar members for providing stability to said recliner structure,  
 whereby said seat structure can swing beneath a pivot axis defined by the pivot points of the first and second side members,  
 said fixed positional relationship provides, in fully reclined position of said seat structure, that the lower legs, below the knee, of an occupant of the recliner are above the occupant's heart, and  
 means for positionally fixing said seat structure at least in said upright sitting position and said fully reclined position.



4,790,600  
**TASK CHAIR**  
 John Behringer, North Kingstown, R.I., assignor to J. G. Furniture Systems, Inc., Quakertown, Pa.  
 Filed Jan. 16, 1987, Ser. No. 3,866  
 Int. Cl.<sup>4</sup> A47C 1/02  
 U.S. Cl. 297—337  
 8 Claims

1. A chair comprising a base, a seat operatively connected to said base through an intermediate member, and a seat back, wherein the seat and seat back are mounted on a single, elongated support brace, said brace comprising a seat support portion mounting said seat and a seat back support portion mounting said seat back, said seat support and seat back support portions connected by an integrally formed hinge portion; first means adjustably mounting said seat for linear movement toward and away from said seat back and the seat back support portion; and  
 second means, independent from said first means, adjustably mounting the seat for pivotal movement about a horizontal axis extending in a direction perpendicular to the seat support portion of said brace to alter the pitch of the seat, such that linear adjustment of said seat may be accomplished without effect of the pitch of the seat, wherein first and second concentrically oriented adjustment knobs are provided for effecting adjustments permitted by said first and second means, respectively.

4,790,601

## CHILD'S SEAT FOR A MOTOR VEHICLE

David W. Burleigh, Bogner Regis, England; Waldemar Czernakowski, Blaustein, and Hermann Wetter, Ulm, both of Fed. Rep. of Germany, assignors to Britax-Excelsior Limited, England and Romer-Britax Autogurte GmbH, Fed. Rep. of Germany

Filed Apr. 5, 1988, Ser. No. 177,769

Claims priority, application United Kingdom, Apr. 15, 1987, 8709141

Int. Cl.<sup>4</sup> A47D 15/00

U.S. Cl. 297-484

8 Claims



1. A child's seat for a motor vehicle comprising a back portion, a harness including two shoulder straps, two elongate slots formed in the back portion with each slot extending over the range of desired positions for the opening for a respective shoulder strap, a carriage mounted on the rear side of the back portion for vertical sliding movement relative thereto, two horizontal slots in the carriage each aligned with a respective one of the elongate slots in the back portion so as to define a respective opening for each shoulder strap, and control means for varying the position of the carriage relative to the back portion.

4,790,602

## FLUID ACTUATED APPARATUS FOR MECHANICALLY SPLITTING ROCK-LIKE MATERIAL

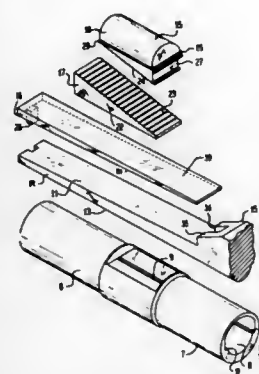
Silvano Pucci, Eric Dr., Kinnelon, N.J. 07405

Filed Sep. 21, 1987, Ser. No. 98,917

Int. Cl.<sup>4</sup> E21C 37/04

U.S. Cl. 299-21

20 Claims



1. Apparatus to break rock and concrete slabs in situ when inserted into a predrilled hole in said rock and concrete slab comprising:

first and second members each having an outer surface and a longitudinal axis parallel to each other and a wall of said predrilled hole, said first member having a longitudinal groove therein, said groove including a bottom surface parallel to said longitudinal axes of said first and second members coextensive with said first member, a pair of spaced, outwardly extending ledge-like surfaces disposed as an extension of said bottom surface in a plane parallel to

said longitudinal axes of said first and second members coextensive with said bottom surface and a pair of spaced vertical surfaces extending upward from the outer edges of said ledge-like surfaces and coextensive therewith;

a third member having a driven end, a free end, a first surface parallel to said longitudinal axes of said first and second members slidably engaging said bottom surface and said pair of ledge-like surfaces of said longitudinal groove in said first member and a second surface opposite said first surface having a first predetermined slope along a given length of said third member from a point adjacent to said driven end to said free end, said third member having a single inward stroke of a predetermined length during each cycle of operation; and

first means disposed between said second surface of said third member and an inner surface of said second member slidably engaging said pair of vertical surfaces of said groove, said first means when rendered operative causing said outer surfaces of said first and second members to engage said wall of said predrilled hole and responding to said inward stroke of said third member to apply a powerful breaking force directly to said second member resulting in lateral movement thereof and to apply a reaction force equal to said breaking force to said first member to break said rock and concrete slabs surrounding said predrilled hole.

4,790,603

## APPARATUS FOR CONTINUOUSLY FORMING A CONTINUOUS FABRIC

Albert D. Harmon, Clemson, S.C., and Ernest Koella, III, Rockford, Tenn., assignors to Rockford Manufacturing Company, Rockford, Tenn.

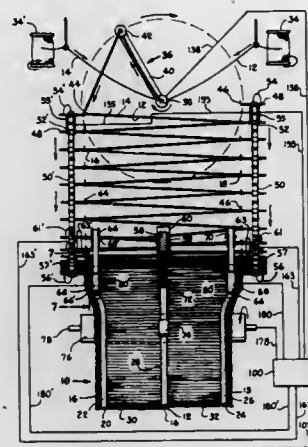
Division of Ser. No. 833,828, Feb. 26, 1986, Pat. No. 4,717,616.

This application Nov. 25, 1987, Ser. No. 125,619

Int. Cl.<sup>4</sup> A47L 13/20

U.S. Cl. 300-16

8 Claims



1. An apparatus for continuously forming a continuous fabric, suitable for later processing into mop heads, comprising:

(a) means for continuously feeding a strand of textile material from a supply thereof;

(b) means for repeatedly folding said strand back and forth so as to provide a predetermined length of said strand between sequential foldings and at each folding for providing a looped end between consecutive discrete lengths of said strand;

(c) means for supporting said consecutive discrete lengths of said strand at their consecutive looped ends and for moving said folded and supported strand lengths in a direction

substantially parallel to a line joining the midpoints of said consecutive strand lengths;

(d) means for gripping and releasing said consecutive strand lengths along said midline thereof;

(e) means for twisting said consecutive strand lengths from each looped end inwardly toward the midline thereof a prescribed number of turns in a single twist sense while said strand lengths are gripped by said means therefor, for providing on each side of said midline a consecutive plurality of twisted cabled cords;

(f) means for moving said plurality of twisted cabled cords into side-by-side abutting adjacency on each side of said midline;

(g) means for gripping and releasing said side-by-side twisted cords in sequence at a location on each side of said midline inward of and adjacent to said looped ends, and for moving said consecutive cords in said aforesaid direction of movement of said strand lengths;

(h) means for removing said supporting means from said looped ends of said now twisted cords;

(i) means for adhesively applying supportive tape adjacent to said location on each side of said midline to a surface of said consecutive cords arranged in side-by-side abutting adjacency to one another; and

(j) means for energizing, physically supporting, interconnecting, and controlling all elements of said apparatus, including energizing all moveable means for movement as hereinbefore defined and interconnecting and controlling said energizing and rates of movement of said means hereinbefore defined to effect the defined functions and cooperations thereof.

4,790,604

## A CONTINUOUS PROCESS FOR MAKING A CONTINUOUS FABRIC

Albert D. Harmon, Clemson, S.C., and Ernest Koella, III, Rockford, Tenn., assignors to Rockford Manufacturing Company, Rockford, Tenn.

Division of Ser. No. 833,828, Feb. 26, 1986, Pat. No. 4,717,616.

This application Nov. 25, 1987, Ser. No. 125,393

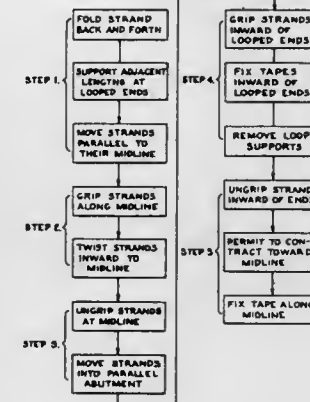
Int. Cl.<sup>4</sup> A47L 13/20

U.S. Cl. 300-21

5 Claims

PROCESS STEPS IN FORMING A MOP HEAD

FABRIC IN A CONTINUOUS PROCESS



1. A continuous process for making a continuous mop head fabric comprising the steps:

a. continuously feeding a strand of textile material from a supply thereof;

b. repeatedly folding said strand back and forth so as to provide a discrete and predetermined length of said strand between sequential foldings and at each folding to provide a looped end between consecutive discrete lengths of said strand;

c. supporting said consecutive discrete lengths of said strand at their consecutive looped ends for moving said folded

and supported lengths of said strand in a direction substantially parallel to a line joining the midpoints of said consecutive lengths of said strand and so moving said strand lengths;

d. gripping said consecutive strand lengths along said midline thereof, and twisting from each looped end of said strand lengths inwardly toward said midline a prescribed number of turns to provide a twisted or cabled cord;

e. consecutively releasing said strand lengths along their midline, and continuing to move them in said direction while bringing said cords thereof into side-by-side, parallel abutting relationship on each side of said midline;

f. gripping said twisted cords inwardly of their looped ends and adhesively fixing a tape proximal the location of said gripping to a surface of said cords to fix said cords in their abutting relationship with one another; and

g. releasing said support at said looped ends, and releasing said gripping inwardly of said looped ends.

4,790,605

## VEHICLE WHEEL WITH ORNAMENTAL PLASTIC OVERLAY

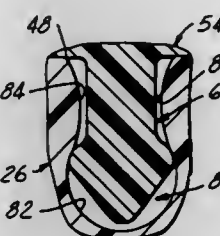
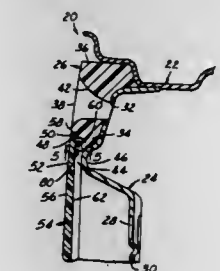
Robert J. Stalter, Sr., Bowling Green, Ohio, assignor to Motor Wheel Corporation, Lansing, Mich.

Filed Feb. 27, 1987, Ser. No. 19,709

Int. Cl.<sup>4</sup> B60B 7/00

U.S. Cl. 301-37 CM

8 Claims



1. In a composite styled wheel having a metallic portion comprising a wheel mounting disc and a rim secured to said disc and adapted to receive a tire thereon, and a plastic portion comprising an ornamental overlay body disposed adjacent and covering at least a part of the outboard face of said metallic portion, said body being permanently affixed to said metallic portion and comprising a homogeneous one-piece body made of a resilient urethane elastomeric material, the outboard face of said body being exposed to view from the outboard side of said wheel and having a decorative surface spaced axially of the wheel outboard from the covered part of the outboard face of said metallic portion, said outboard face of said body having a contour differing from the contour of the covered part of the outboard face of said metallic portion and adapted to provide decorative contour over at least part of the metallic portion of said wheel, the improvement in combination therewith of hub cap retainer means provided in said body opening at an exterior hub cap seating surface provided on the outboard face



thereof, said retainer means being adapted to yieldably engage and retain attachment prongs of a hub cap adapted for removable attachment to the outboard face of said body on said seating surface, said hub cap retainer means comprising a plurality of circumferentially spaced blind cavity pocket means mold formed in and made of said resilient urethane elastomeric material of said body and each having an opening at said outboard exterior seating surface of said body adapted for registration individually with an associated one of the hub cap prongs, each said cavity pocket means having juxtaposed entrance edges at said exterior surface defining said opening and spaced apart a distance less than a maximum transverse dimension of said prongs to provide an interference fit therewith, each said cavity pocket means having interior wall surfaces defining an undercut relationship relative to said cavity pocket opening edges, said cavity pocket entrance edges and the contiguous wall surfaces of each said cavity being formed of said resilient elastomeric material of said ornamental overlay body and thus being yieldable so as to spread apart to permit insertion of said prongs and then return to a spring keeper relationship once the associated prong reaches a seated position in the associated said cavity pocket matching the fully seated position of the hub cap on said body.

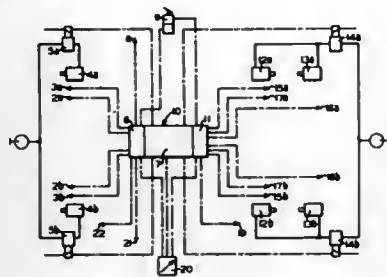
4,790,606

#### APPARATUS FOR THE MEASUREMENT AND/OR REGULATION OF A BRAKING FORCE AND/OR OF A BRAKING TORQUE

Erich Reinecke, Burgdorf, Fed. Rep. of Germany, assignor to WABCO Westinghouse Fahrzeugbremsen GmbH, Hannover, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 821,628, Jan. 22, 1986, abandoned. This application Aug. 25, 1987, Ser. No. 89,186  
Claims priority, application Fed. Rep. of Germany, Jan. 23, 1985, 3502050

Int. Cl.<sup>4</sup> B60T 8/00; G01L 1/00, 3/16; G05D 15/00  
U.S. Cl. 303—103 29 Claims



1. An apparatus for performing at least one of measuring and regulating a braking force produced by at least one of at least two brake units, which braking force of each of said at least two brake units is transmitted to a brakable element for decelerating such brakable element, said apparatus comprising:

- a deceleration sensor mounted on said brakable element to provide an output signal value that is representative of a measured deceleration value of said brakable element;
- at least one mass sensor mounted on said brakable element to provide an output signal value that is representative of a measured mass value of said brakable element;
- at least one temperature-dependent measuring element mounted on each brake unit to provide an output signal value that is representative of a measured temperature value of a brake unit on which said at least one temperature-dependent measuring element is mounted;
- an evaluation means connected to receive said output signal values of said deceleration sensor and said at least one mass sensor and said at least one temperature-dependent element;
- said evaluation means having parameters stored therein of each brake unit for determining a temperature-develop-

ment of each brake unit during activation of each such brake unit;

- said evaluation means having a capability of determining changes of temperature signal values of said brake units having occurred in a time interval at least during an activation of said brake units;
- said evaluation means being capable of determining a medium deceleration value in said time interval; and
- said evaluation means from said changes of said temperature signal values of said brake units and from said output signal value of said mass sensor and from said medium deceleration value generates and transmits an output signal value representative of a medium braking force produced by said at least one brake unit during said time interval.

23. A method of at least one of measuring and regulating a braking force produced by at least one of at least two brake units, which braking force of each of said at least two brake units is transmitted to a brakable element for decelerating such brakable element, said method comprising the steps of:

- generating an output signal value that is representative of a measured deceleration value of said brakable element;
- generating an output signal value that is representative of a measured mass value of said brakable element;
- generating an output signal value that is representative of a measured temperature value of a brake unit;
- transmitting said output signal values generated in steps (a) and (b) and (c) to an evaluation means having stored therein parameters for determining a temperature development of each brake unit during activation of such brake unit;
- determining changes of said measured temperature value of said brake unit as they occur in a time interval at least during an activation of said brake unit;
- determining a medium deceleration value in said time interval; and
- generating and transmitting an output signal value from said evaluation means that is representative of a medium braking force produced by said at least one brake unit during said time interval as determined in said evaluation means from said changes of said temperature signal values of said brake units and from said output signal value of said mass sensor and from said medium deceleration value.

4,790,607

#### VEHICLE ANTI-LOCK BRAKE SYSTEM

Thomas M. Atkins, Ann Arbor, Mich., assignor to Kelsey Hayes Company, Romulus, Mich.

Continuation-in-part of Ser. No. 702,765, Feb. 19, 1985, Pat. No. 4,673,226. This application Jun. 15, 1987, Ser. No. 63,361  
Int. Cl.<sup>4</sup> B60T 8/66

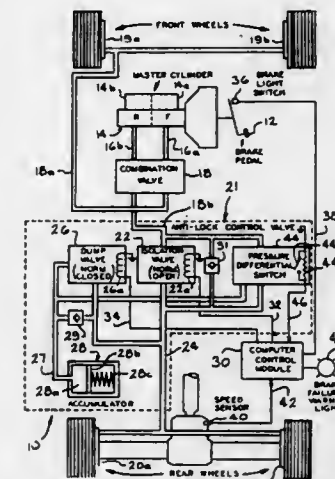
U.S. Cl. 303—109

41 Claims

1. In a wheeled vehicle having means for supplying pressurized brake fluid to actuate the associated wheel brakes of the vehicle, a brake control system for controlling the application of pressurized brake fluid to at least one selected wheel brake to control the braking of the associated wheel, said control system comprising:

- a normally open isolation valve means connected between the supply means and the selected wheel brake;
- a normally closed dump valve means connected between the selected wheel brake and a fluid reservoir; and
- control means connected to operate said isolation valve means and said dump valve means, said control means including means for detecting wheel speed departures of the associated wheel relative to the actual speed of the vehicle, said control means operable to close said isolation valve means to hold the fluid pressure to the selected wheel brake at a relatively constant level after a first wheel speed departure of the associated wheel is detected, said control means operable to selectively open said dump valve means after said isolation valve means has been closed to enable fluid to flow into said fluid reservoir to

selectively reduce fluid pressure to the selected wheel brake to a first predetermined pressure and correct said first wheel speed departure, said control means further operable to selectively open said isolation valve to selectively increase pressure to the wheel brake to cause a second wheel speed departure after said first wheel speed



departure has been corrected, said control means operable to selectively open said dump valve means after said second wheel speed departure has been detected to selectively reduced pressure to the selected wheel brake to a second predetermined pressure greater than said first predetermined pressure.

4,790,608

#### SKID-CONTROLLED BRAKE SYSTEM WITH MASTER CYLINDER PISTONS AND WITH PLUNGERS SUPPORTED ON STATIONARY TRANSVERSE MEMBER

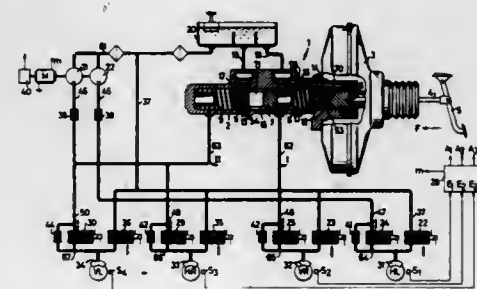
Jochen Burgdorf, Offenbach-Rumpenheim, and Hans-Dieter Reinartz, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Jul. 27, 1987, Ser. No. 78,233

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1986, 3627000

Int. Cl.<sup>4</sup> B60T 8/32, 8/48, 8/44, 13/14

U.S. Cl. 303—114 4 Claims



1. A skid-controlled brake system for use with automotive vehicles, said system comprising a pedal-operated, auxiliary-force-supported brake pressure generator including a master cylinder; main brake lines for connecting the pressure chambers of the master cylinder to the wheel brakes of the vehicle; electromagnetically operable pressure fluid inlet and outlet valves inserted into the main brake lines; hydraulic auxiliary pressure pumps; wheel sensors and electronic circuits for de-

tecting the wheel rotation pattern and for generating electric brake pressure control signals for skid control; pistons in the master cylinder, the pistons being provided with central control valves which valves are open in the brake releasing position to provide communication through pressure fluid conduits between a pressure fluid tank and the pressure chambers, said central control valves being closed in the braking position to close said pressure fluid conduits, the main brake lines being connected to in-flow lines in which are located check valves, the hydraulic pumps being in communication with the in-flow lines and, the main brake lines and the pressure chambers, the suction connections of the hydraulic pump being in communication with the intake tank through an intake line, wherein the central control valve disposed in the piston of the master cylinder comprises a valve body longitudinally displaceable in a recess and cooperating with an opening plunger such that the plunger moves the valve body into its opening position when the piston is in its releasing position, the plunger being supported on a stationary transverse member.

4,790,609

#### COMBINATION FOLDABLE-SCREEN ROOM DIVIDER AND CURIO CABINET

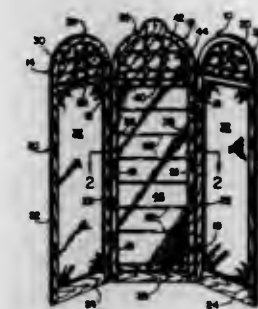
Richard Guy, 28052 Camino Capistrano, Laguna Niguel, Calif. 92677

Filed Jun. 22, 1982, Ser. No. 390,908

Int. Cl.<sup>4</sup> A47F 3/00

U.S. Cl. 312—117

4 Claims



1. An ornamental foldable-screen room divider and curio cabinet in combination, comprising:  
a plurality of foldable upright screen sections hingedly interconnected to define said room divider;  
hinge means disposed along the adjacent edges of said screen sections to allow said screen sections to be folded or angularly positioned to establish the stable upright position for said room divider;  
a curio cabinet attached to at least one of said screen sections; and  
means to provide access to said curio cabinet;  
wherein said access means comprises means for hinging said curio cabinet along one edge thereof to said screen section, and wherein said section is provided with a transparent panel to cover said curio cabinet in a closed position, and to allow the viewing of the interior of said curio cabinet.

4,790,610

#### MEDICAL EMERGENCY CRASH CART

Robert J. Welch, Dallas; Albert Kolvits, Mountaintop, and Robert M. White, Conyngham, all of Pa., assignors to Inter-Metro Industries Corporation, Wilkes-Barre, Pa.

Filed Aug. 26, 1986, Ser. No. 901,056

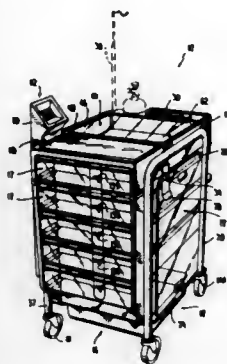
Int. Cl.<sup>4</sup> E05B 53/00

U.S. Cl. 312—218

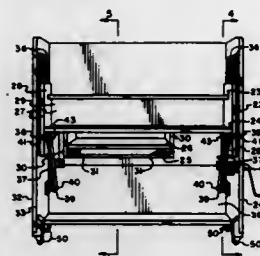
38 Claims

1. An emergency crash cart, comprising:  
housing means having a top formed with a recessed tray for

storing instruments, supplies, and the like, and at least one side having an opening therein;  
cover means including a first engaging portion, for selectively covering said tray but providing access to the interior thereof when removed therefrom;  
removable door means enclosing said opening in said one side; and



when the flexible member is drawn to change the position of the lever arm,  
(d) a stabilizing means for retaining the work surface in a substantially horizontal position, and



(e) a cranking means attached to the flexible member such that when the cranking means is operated the flexible member moves the lever arm.

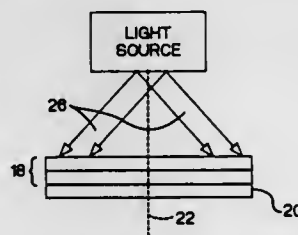
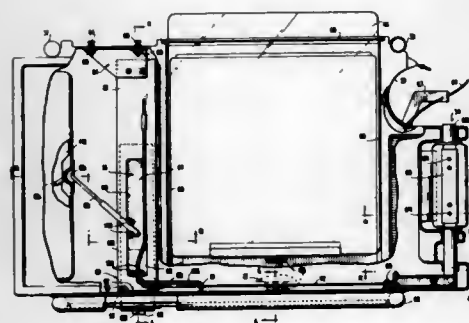
4,790,612

#### METHOD AND APPARATUS FOR COPYING HOLOGRAPHIC DISKS

LeRoy D. Dickson, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 15, 1986, Ser. No. 906,865

Int. Cl.<sup>4</sup> G02B 5/32, 26/10; G03B 27/00; G03H 1/30  
U.S. Cl. 350—3.69 9 Claims



1. Apparatus for replicating a multi-faceted holographic disk comprising:  
a source disk having a first layer of light-transmitting, developed photosensitive material capable of producing multiple, collimated reference beams simultaneously, and a second adjacent layer of light-transmitting developed photosensitive material, said second layer being the multi-faceted holographic disk to be replicated;  
a coherent light source positioned on a normal from the center of the source disk, said light source being capable of illuminating a predetermined portion of the first layer in said source disk with coherent light at a predetermined angle relative to the normal; and  
means for positioning a third layer of unexposed photosensitive material adjacent the second layer of the source disk.

4,790,613

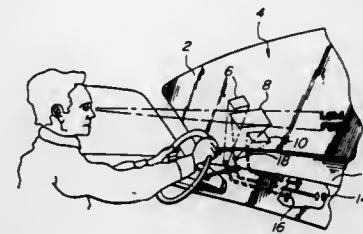
#### HOLOGRAPHIC DISPLAY PANEL FOR A VEHICLE WINDSHIELD

Gaylord E. Moss, Marina del Rey, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Jan. 6, 1987, Ser. No. 790

Int. Cl.<sup>4</sup> G02B 5/32; G03H 1/00  
U.S. Cl. 350—3.7 29 Claims  
1. An improved display panel for a vehicle having a windshield comprising:  
means for monitoring an operating characteristic of the vehicle;  
means for providing an indication of the status of the vehicle

operating characteristic including a substantially transparent hologram member mounted adjacent and in the line of sight of the windshield and having a predetermined indicia indicative of the specific status, the transparent hologram



member includes an indicia of a virtual image that appears to be realized at a location offset and exterior of the windshield to facilitate viewing by far-sighted drivers, and means to illuminate the indicia indicative of a certain corresponding status.

4,790,615

#### DEMULTIPLEXING AND/OR MULTIPLEXING OPTICAL CIRCUIT

Masafumi Seki; Yoshiyuki Hanada, and Ryolchi Sugawara, all of Doshomachi, Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

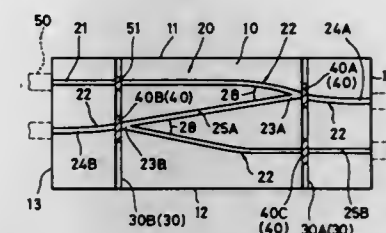
Filed Mar. 4, 1987, Ser. No. 21,756

Claims priority, application Japan, Mar. 6, 1986, 61-49408; Jul. 23, 1986, 61-173091

Int. Cl.<sup>4</sup> G02B 6/10

U.S. Cl. 350—96.12

8 Claims



1. A demultiplexing and/or multiplexing optical circuit wherein an optical waveguide, including branching portions for dividing an incident optical path into transmitting and reflecting optical paths, is formed in a substrate, a groove for crossing said optical waveguide and said branching portions and a portion midway along one of said optical paths as needed is formed, and filters are fitted in said groove, and wherein said optical waveguide is embedded in said substrate, said groove is formed from one of a pair of opposing parallel sides of said substrate to the other thereof straight and perpendicularly thereto, and a filler having a refractive index greater than one, is filled in a portion of said groove where said groove crosses said optical waveguide and said filter is not fitted.

4,790,614

#### OPTICAL FILTER AND OPTICAL DEVICE USING SAME

Katsuyuki Imoto, Sayama; Hirohisa Sano, Kokubunji, and Minoru Maeda, Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

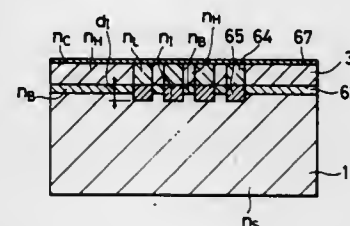
Filed Nov. 13, 1986, Ser. No. 929,911

Claims priority, application Japan, Nov. 21, 1985, 60-259760; Jan. 8, 1986, 61-540; May 28, 1986, 61-121010

Int. Cl.<sup>4</sup> G02B 6/10

U.S. Cl. 350—96.12

17 Claims



1. An optical filter comprising a cladding, an optical waveguide provided on said cladding, and at least one permeable material which is provided at an intermediate portion of said optical waveguide so as to extend in the light propagating direction, and which has a refractive index different from that of said waveguide, and a cover layer provided on an upper surface of said waveguide and said permeable material, wherein the width of said permeable material is set to about

$$\frac{m}{4} \cdot \lambda_0$$

wherein m is an odd number, and  $\lambda_0$  the wavelength of the light.

4,790,616

#### OPTICAL SEPARATING MODULE

Ferdinand Frenkel, Augsburg; Detlef Haberland, Steinebach, and Helmut Haltenorth, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

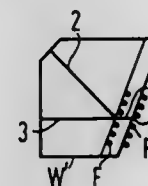
Filed May 1, 1986, Ser. No. 857,998

Claims priority, application Fed. Rep. of Germany, May 3, 1985, 3515981

Int. Cl.<sup>4</sup> G02B 6/26

U.S. Cl. 350—96.15

5 Claims



1. In an optical separating module having a first optical fiber and second optical fiber aligned on a common axis and separated from one another by a wavelength selective beam-splitter layer arranged to extend obliquely with respect to the common axis, said module having an additional third optical fiber which extends obliquely relative to the aligned first and second fibers and has its axis intersecting the common axis in the plane of the wavelength selective beam-splitter and being aligned in a reflective direction of the beam-splitter to receive light reflected from the first fiber, the improvements comprising a filter layer having a transmission characteristic corresponding to the transmission characteristic of the beam-splitter layer being applied to the optical fiber end face of the second fiber, both



said filter layer and the wavelength selective beam-splitter being formed of a plurality of layers vapor deposited in one and the same manufacturing step to have the same sequence, composition, and thickness, and said second optical fiber being adapted for connection to an optical electrical transducer for a reception module.

4,790,617

# METHODS AND APPARATUS FOR OPTICAL FIBER SYSTEMS

Bruce D. Campbell, Portola Valley; James T. Triplett, Livermore, and Richard E. Tylor, Fremont, all of Calif., assignors to Raychem Corp., Menlo Park, Calif.

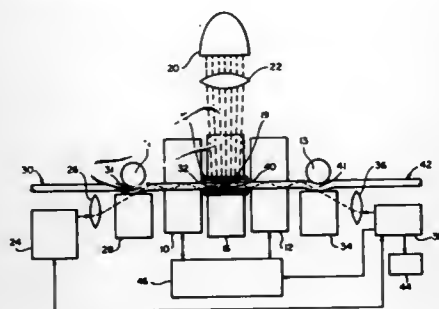
Continuation-in-part of Ser. No. 602,242, Apr. 19, 1984, Pat. No. 4,728,169, which is a division of Ser. No. 437,053, Oct. 27, 1982, abandoned, which is a continuation-in-part of Ser. No. 370,321, Apr. 21, 1982, abandoned, which is a continuation-in-part of Ser. No. 258,079, Apr. 27, 1981, abandoned. This application Mar. 6, 1987, Ser. No. 22,912

The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> G02B 6/26

U.S. Cl. 350—96.15

34 Claims



1. A method of withdrawing an optical signal from a core of an optical fiber, the fiber comprising the core, a cladding, and a buffer, comprising the steps of:
  - beading a portion of the optical fiber about a bend radius sufficiently small such that core light can be withdrawn from the fiber core at the bent fiber portion by using an optical coupler;
  - withdrawing part of the optical signal from the optical fiber core through the buffer and into the optical coupler at the bent fiber portion; and
  - detecting the withdrawn optical signal part.

4,790,618

# SEMICONDUCTOR LASER MODULE

Yuji Abe, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Oct. 31, 1986, Ser. No. 925,551

Claims priority, application Japan, Nov. 1, 1985, 60-16941319[U]

Int. Cl.<sup>4</sup> G02B 6/26

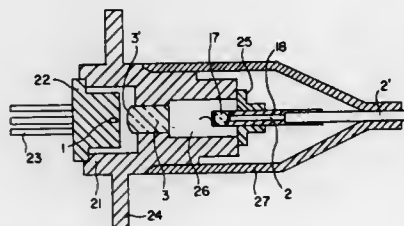
U.S. Cl. 350—96.15

7 Claims

1. A semiconductor laser module having a semiconductor laser comprising:
  - an optical fiber for guiding a laser beam which issues from the semiconductor laser, said optical fiber having a core and an end face which is inclined 3° to 10° relative to a plane which is perpendicular to an axis of said optical fiber;
  - a transparent optical member having a first end face which is intimately engaged with said end face of said optical fiber and a second end face which faces said first end face and is perpendicular to said axis of said optical fiber, the end face of said optical fiber and the first end face of said optical member being rigidly connected by a transparent adhesive having substantially the same refractive index as

the core of said optical fiber and said optical member having substantially the same refractive index as the core of said optical fiber and extending over a predetermined length along said axis of said optical fiber;

- a reflection preventing film provided on said second end face of said optical member whereby said laser beam is



incident to said reflection preventing film with an optical axis of said laser beam extending perpendicular to said second end face; and

- a lens interposed between said semiconductor laser and said optical member for conducting said laser beam from said semiconductor laser into said core of said optical fiber.

4,790,619

# APPARATUS COMPRISING RAMAN-ACTIVE OPTICAL FIBER

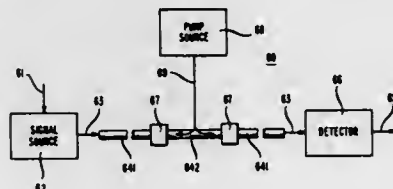
Malcolm E. Lines, Millington; Kenneth B. Lyons, Clinton Township, Hunterdon County; Anne E. Miller, Westfield, and Kurt Nassau, Bernardsville, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 25, 1986, Ser. No. 856,165

Int. Cl.<sup>4</sup> G02B 6/16; G02F 1/39

U.S. Cl. 350—96.16

12 Claims



1. Apparatus comprising
  - (a) a source of electromagnetic signal radiation;
  - (b) optical fiber means forming a transmission path for the signal radiation from a first fiber location to a second fiber location;
  - (c) means for coupling the signal radiation into the fiber at the first fiber location, and signal radiation-responsive means at the second fiber location; and
  - (d) signal radiation Raman amplification means comprising a length of a Raman-active optical fiber that forms part of the transmission path for the signal radiation, the Raman-active optical fiber comprising a core and a cladding surrounding the core;
    - characterized in that at least the core of the Raman-active optical fiber consists of glass comprising
    - (e) a glass-forming first major component selected from the group consisting of GeO<sub>2</sub>, SiO<sub>2</sub>, AsO<sub>1.5</sub>, and combinations thereof; and
    - (f) a heavy metal oxide second major component selected from the group consisting of PbO, BiO<sub>1.5</sub>, SbO<sub>1.5</sub>, TiO<sub>0.5</sub>, and combinations thereof; and
    - further characterized in that

the relative Raman cross section for the signal radiation in the Raman-active optical fiber is at least 15; and  
(h) the first and second major components together are at least 70 mol% of at least the core.

4,790,620

# OPTICAL COUPLING DEVICE FOR A PHOTO-SEMICONDUCTOR ELEMENT AND AN OPTICAL FIBER

Kazuhiko Niwayama, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

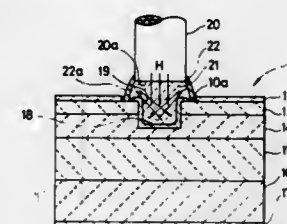
Filed Dec. 1, 1981, Ser. No. 326,252

Claims priority, application Japan, Dec. 16, 1980, 55-178248

Int. Cl.<sup>4</sup> G02B 6/36; H01J 5/16; H01L 31/12

U.S. Cl. 350—96.20

3 Claims



1. An optical coupling device for a photo-semiconductor element having a light sensitive area and an optical fiber having one end face disposed opposite said light sensitive area of said photo-semiconductor element with a space therebetween wherein a reflection preventing film adapted to transmit light and to prevent optical reflection is disposed in contact with said light sensitive area to permit said light sensitive area to receive light emitted from the end face of said optical fiber, the improvement comprising a transparent light transmitting resin completely filling the space directly between said end face of said optical fiber and said reflection preventing film on said light sensitive area of said photo-semiconductor element whereby the light being transmitted by said light transmitting resin has a smaller angle of spread than in air and a film of light reflecting resin completely covering said transparent resin between the end face of the optical fiber and the reflection preventing film to prevent light from escaping outwardly from said transparent resin in the space between the end face of said optical fiber and said film on said light sensitive area of said photo-semiconductor element.

4,790,621

# FIBER OPTIC SWITCH

Lauren F. Calahy, Huntington Beach, Calif., and David A. Cooper, Loganton, Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Dec. 7, 1987, Ser. No. 129,502

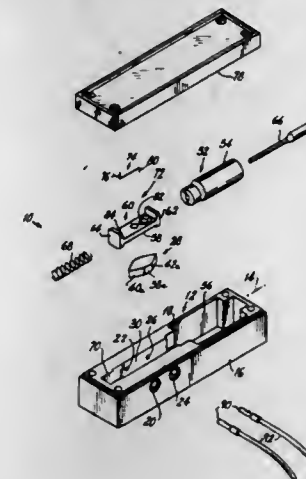
Int. Cl.<sup>4</sup> G02B 6/36, 6/38

U.S. Cl. 350—96.20

3 Claims

1. A 2×2 optical switch comprising: a multi-cavitated housing having a longitudinal axis, and spaced apart first and second side walls parallel to said longitudinal axis; a first optical fiber port in said first side wall; a second optical fiber port in said second side wall, diametrically opposed to said first port and in optical axis alignment therewith; a third optical fiber port in said first side wall spaced from and in transverse alignment with said first port; a fourth optical fiber port in said second side wall spaced from and in transverse alignment with said second port, diametrically opposed to said third port and in optical axis alignment therewith; a prism mounted upon a shuttle, said shuttle being mounted for movement along said longitudinal axis positioned in one of said cavities of said housing, said prism having a vertical plane of symmetry aligned with said longitudinal axis and having first and second spaced apart, congruent end faces orthogonal to said vertical plane of

symmetry; first, second and third pairs of side faces orthogonal to and connecting said end faces, said first pair of side faces being positioned between said second and third pairs and being parallel to said vertical plane of symmetry and orthogonal to said optical axes; said prism having a first position wherein said first pair of side faces is positioned on the optical axis between said third port and said fourth port, with no part of said prism extending on the optical axis between said first port and said second port; said prism having a second position wherein said second pair of side faces is positioned on the optical axis be-



tween said first and second ports and said third pair of side faces is positioned on the optical axis between said third and fourth ports; and means provided in a second cavity of said housing for causing said prism to move between said first and second positions, said means comprises a solenoid; shuttle is moved from said first position to said second position by the application of power to said solenoid and said housing includes mechanical latching means cooperating with said shuttle to maintain said shuttle in said second position upon removal of said power from said solenoid.

4,790,622

# CONTACT FOR TERMINATING AN OPTICAL FIBER

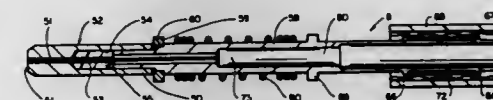
Frank H. Levinson, Redwood City; Pravin Soni, Union City; Adam C. Tanous, San Francisco; Richard J. McCrae, Dublin, and Mark Ostasink, Fremont, all of Calif., assignors to Raychem Corp., Menlo Park, Calif.

Filed Nov. 20, 1985, Ser. No. 799,898

Int. Cl.<sup>4</sup> G02B 6/36

U.S. Cl. 350—96.20

22 Claims



1. An optical fiber contact for terminating an optical fiber comprising:
  - a contact body having a cavity therein and an aperture through which an optical fiber to be terminated can extend; and
  - a solid substantially uncured thermoset disposed within the cavity through which the optical fiber can be inserted subsequent to softening the thermoset within the cavity, the thermoset comprising a multi-component room-temperature stable solid mixture which when heated softens, liquifies, mixes and then cures to form an adhesive capable of adhering to the optical fiber and the contact body.

4,790,623

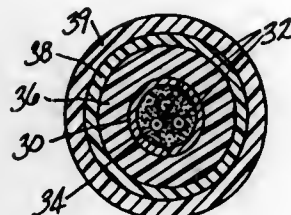
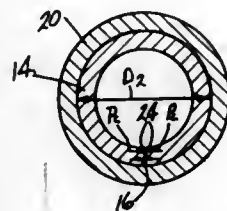
## OPTICAL FIBER CABLE ASSEMBLIES

Joseph Winter, New Haven, and Michael J. Pryor, Woodbridge, both of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation of Ser. No. 497,522, May 24, 1983, abandoned, which is a continuation-in-part of Ser. No. 461,736, Jan. 28, 1983, abandoned. This application Feb. 19, 1987, Ser. No. 16,609 Int. Cl.<sup>4</sup> G02B 6/44

U.S. Cl. 350—96.23

3 Claims



1. An optical fiber cable comprising: a substantially cylindrical tubular structure having a desired diameter and a generally longitudinally extending seam defined by spaced apart edges in close proximity; said structure being formed from a metal or metal alloy strip; said edges being placed in said close proximity by forces within said metal or metal alloy forming said tubular structure; said forces being created by initially forming said strip into an open tubular section having a minor diameter less than said desired diameter, a major diameter greater than said desired diameter and two legs forming an opening and subsequently forming said open tubular section into said substantially cylindrical tubular structure; and at least one optical fiber within said tubular structure.

4,790,624

## METHOD AND APPARATUS FOR SPATIALLY ORIENTING MOVABLE MEMBERS USING SHAPE MEMORY EFFECT ALLOY ACTUATOR

Michael Van Hove, Anaheim; Geoffrey L. Taylor, Valencia, and Hamid Saghatchi, Burbank, all of Calif., assignors to Identech Corporation, Dallas, Tex.

Filed Oct. 31, 1986, Ser. No. 926,357

Int. Cl.<sup>4</sup> G02B 23/26

U.S. Cl. 350—96.26

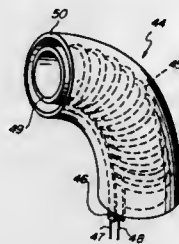
42 Claims

28. An apparatus for deflecting the tip of a borescope at the end of a flexible cable to point in a desired direction comprising:

- (a) at least one helical spring fabricated from a shape memory effect alloy and having a memory of at least one shape imprinted on said spring, said shape being recoverable with the production of accompanying external force when at least part of said spring is heated to the transition temperature of said shape memory effect alloy of which said spring is fabricated, the degree of completeness of said shape recovery being proportional to the closeness of the

actual temperature of said spring to said transition temperature of said spring.

- (b) means for restoring said spring to a quiescent, second shape when said spring is cooled below said transition temperature,



- (c) means for coupling said shape transitions to said borescope tip and cable effective in moving said tip relative to said cable,
- (d) means for heating said spring to approach said transition temperature as closely as desired, and
- (e) means for cooling said spring to a temperature below said transition temperature.

4,790,625

## METHOD OF APPLYING HERMETIC COATING ON OPTICAL FIBER

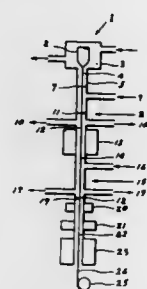
Dipak R. Biswas, and Satyabrata Raychaudhuri, both of Roanoke, Va., assignors to Alcatel USA, Corp., New York, N.Y. Continuation of Ser. No. 838,223, Mar. 10, 1986, abandoned, which is a division of Ser. No. 644,305, Aug. 24, 1984, Pat. No. 4,575,463, which is a continuation-in-part of Ser. No. 580,280, Feb. 17, 1984, Pat. No. 4,518,628, which is a continuation of Ser. No. 382,856, May 28, 1982, abandoned. This application Aug. 20, 1987, Ser. No. 88,547

The portion of the term of this patent subsequent to May 21, 2002, has been disclaimed.

Int. Cl.<sup>4</sup> G02B 6/10, 6/22, 6/00

U.S. Cl. 350—96.33

12 Claims



1. A hermetic coating for an optical fiber comprising: a material, having a fine grained structure without growth cones, formed on the outer surface of the fiber at a time when the fiber is just formed and retains sufficient heat to cause said material to form at the surface of said fiber rather than adjacent thereto, said material being formed from reactants at a temperature of at least 200° C., said material being selected from the group consisting of a metallic material and a dielectric material.

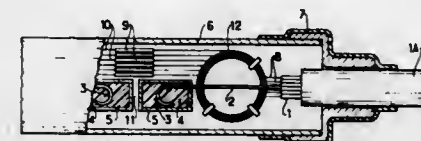
4,790,626

## CONNECTION BETWEEN AN OPTICAL FIBER CABLE AND A JUNCTION BOX

Jean-Pierre Bonicel, and Gérard Couvrié, both of Lyons, France, assignors to Les Câbles De Lyon, Clichy, France Continuation-in-part of Ser. No. 814,124, Dec. 27, 1985, abandoned. This application Oct. 7, 1987, Ser. No. 105,364 Claims priority, application France, Dec. 28, 1984, 84 20044 Int. Cl.<sup>4</sup> G02B 6/36

U.S. Cl. 350—96.20

1 Claim



1. A connection for connecting the ends of optical fiber cables within a junction box, said cables having a non-metallic axial strength member and a central core containing a plurality of optical fibers, said connection comprising:

- (a) an optical fiber connection cavity within said junction box for storing excess lengths of said optical fibers,
- (b) means for directing away the optical fibers from the ends of said central cores at the inlet of said connection cavity,
- (c) means for connecting together the ends of the optical fibers of the said cables within said optical fiber connection cavity,
- (d) said non-metallic axial strength members having swan-like curved ends, protruding into said optical fiber connection cavity, and
- (e) chambers forming gripping cavities filled with a cold polymerized resin, said chambers being fixed within said optical fiber connection cavity and receiving, respectively, said swan-like curved ends which ends are enclosed in said cold polymerized resin.

4,790,627

## INCOHERENT LASER SYSTEM FOR PRODUCING SMOOTH AND CONTROLLABLE SPATIAL ILLUMINATION PROFILES

Robert H. Lehmberg, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Jun. 5, 1987, Ser. No. 58,415

Int. Cl.<sup>4</sup> G02B 27/42, 27/46

U.S. Cl. 350—162.12

15 Claims



1. A system for achieving a very smooth and controllable laser illumination profile on a target by transforming a uniform beam from a broadband spatially-incoherent light source into a beam of the desired profile, the system comprising:

- first means for imposing the desired spatial illumination profile on the beam beyond the source;
  - second means for transforming the profile into a beam of specified width having many coherence zones of small width; and
  - third means for transforming the beam containing the coherence zones back into a beam having the desired spatial illumination profile and size;
- said first, second and third means acting in concert to produce the desired beam without producing beamlets formed by echelons.

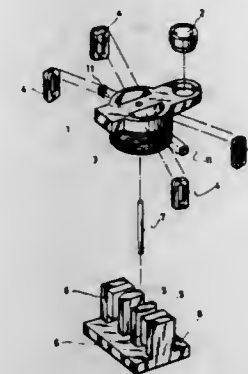
4,790,628

## APPARATUS FOR ACTUATING OBJECTIVE LENS

Ikuo Nanno, Atsunobu Nakajima, Seiji Hoshi, and Hiroyoshi Yamamoto, all of Tokyo, Japan, assignors to Seiko Instruments & Electronics Ltd., Tokyo, Japan Filed Dec. 3, 1986, Ser. No. 937,603 Claims priority, application Japan, Dec. 17, 1985, 60-283735 Int. Cl.<sup>4</sup> G02B 7/02; G11B 5/09

U.S. Cl. 350—247

13 Claims



1. In an apparatus for actuating an objective lens having an objective lens retaining tube which is rotatable about a supporting shaft and slidable in the axial direction of the supporting shaft, an objective lens mounted on the objective lens retaining tube such that the objective lens is spaced apart from the supporting shaft, coil means for effecting focusing of the objective lens, the coil means being mounted on a peripheral portion of the objective lens retaining tube, and yokes and magnets mounted either inside or outside of the objective lens retaining tube so as to form magnetic gaps such that the coil means is positioned in the magnetic gaps,

the improvement comprising: at least one magnetic member mounted on the peripheral portion of the objective lens retaining tube and disposed entirely inside of each of the magnetic gaps or near the ends of each of the magnetic gaps, as viewed in the axial direction, so as to retain the objective lens at a neutral position in the axial direction.

4,790,629

## VISUAL DISPLAY SYSTEM WITH TRIANGULAR CELLS

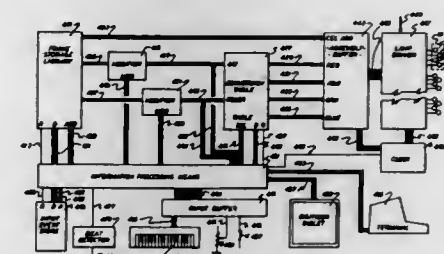
Michael Rand, 1005 Whiteoak Dr., San Jose, Calif. 95129 Division of Ser. No. 679,064, Dec. 6, 1984, Pat. No. 4,622,881. This application Sep. 29, 1986, Ser. No. 913,012

The portion of the term of this patent subsequent to Nov. 18, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> G02B 7/00; A63J 17/00

U.S. Cl. 350—321

10 Claims



5. A lighting effect system comprising:

- (a) a visual display unit including:
  - i. a diffuser surface
  - ii. a plurality of compartments each containing at least



- three discrete light sources, each adapted to produce a different color, and each accepting a power input;
- (b) dimming means for each of the light sources in each of a plurality of compartments, each such dimming means having a signal input, and varying the average voltage or current supplied to the power input of said each of the light sources within a range of values in response to the value present at said signal input;
- (c) at least one memory means for storing a plurality of value sets, each of said value sets corresponding to the adjustment of the luminous condition of each of said plurality of compartments of said visual display unit required to produce a desired display condition;
- (d) means for entering values corresponding to said desired luminous conditions of said compartments;
- (e) means, coupled to said memory means for storing and to said means for entering, cooperating with said memory means for storing and with said means for entering, to store said values entered by said means for entering in said memory means for storing, and further for identifying at least one desired display condition with which said values are to be associated;
- (f) at least one input means having an output and capable of producing a plurality of output conditions at said output;
- (g) means for specifying a plurality of sequences, each of said sequences comprising a plurality of display conditions to be associated with one of said output conditions of said input means;
- (h) means, coupled to said means for specifying, for maintaining a record of said sequences; and
- (i) means, coupled to said means for maintaining, to said means for storing, to said input means, and to said signal inputs of said dimming means, for supplying to said dimming means the values required to produce said luminous conditions of said compartments of said visual display unit required to reproduce each of said desired display conditions in a sequence upon receipt of each of said output conditions associated with each of said sequences from said input means.

4,790,630

# ACTIVE MATRIX DISPLAY SCREEN WITH DRAIN RESISTANCE AND PROCESSES FOR PRODUCING THIS SCREEN

Francois Maurice, 125 Boulevard de la Corniche, 22700 Perros Guirec, France

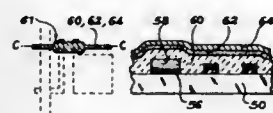
Filed Jan. 27, 1987, Ser. No. 7,091

Claims priority, application France, Jan. 27, 1986, 86 01082

Int. Cl.<sup>4</sup> G02F 1/133; G09G 3/36

U.S. Cl. 350—334

5 Claims



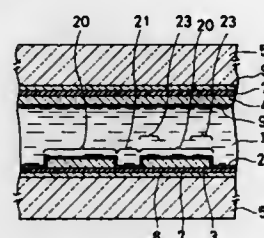
1. Active matrix display screen comprising a first plate (10) coated with a matrix of conductive blocks (22), thin-film transistors (20), a plurality of conductive addressing lines (14) and a plurality of conductive addressing columns (12), each transistor (20) having a gate connected to an addressing line, a source formed by a projection connected to one of said blocks and a drain connected to a column, said screen further having a second plate (24) comprising a counter-electrode (26) and an electrooptical material inserted between the two plates, said screen being characterized by the fact that each drain-column connection is made by a strip (55) of conductive material exhibiting a certain resistance, the drain of each transistor being formed by the part of the strip located in the zone where an addressing line overlaps said strip and wherein each addressing line has a certain width in the zone where the transistors are formed and another width smaller than the first, in the zone where said strip intersects an addressing column.

4,790,631  
LIQUID CRYSTAL DEVICE WITH FERROELECTRIC LIQUID CRYSTAL ADAPTED FOR UNIPOLAR DRIVING  
Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan  
Filed Dec. 31, 1987, Ser. No. 140,202  
Claims priority, application Japan, Jan. 5, 1987, 62-302; Jan. 5, 1987, 62-303

Int. Cl.<sup>4</sup> G02F 1/13

U.S. Cl. 350—336

4 Claims



1. A liquid crystal device comprising:  
a pair of substrates, at least one of which is transparent;  
a layer of ferroelectric liquid crystal interposed between said substrates having two stable states;  
an adjunct electrode arrangement for inducing an electric field normal to said substrate in said liquid crystal layer, in order that said liquid crystal layer be in one of said states; and  
a main electrode arrangement for selectively inducing a reverse electric field in at least one of the pixels which are defined by said main electrode arrangement and change the state of the pixel subjected to said reverse electric field.

4,790,632

# LIQUID CRYSTAL DEVICE HAVING THE MICROLENSSES IN CORRESPONDENCE WITH THE PIXEL ELECTRODES

Tadashi Miyakawa, Kazuhiko Yanagihara, Hisao Oishi, Tsunehiko Takahashi, all of Kaipei-Machi; Takeshi Nakamura, Osaka; Kazuhiko Akimoto, Osaka, and Mitsuaki Shioji, Osaka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa and Sharp Kabushiki Kaisha, Osaka, both of, Japan

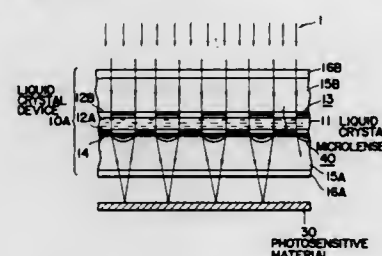
Filed Aug. 11, 1987, Ser. No. 84,232

Claims priority, application Japan, Aug. 12, 1986, 61-189207

Int. Cl.<sup>4</sup> G02F 1/13

U.S. Cl. 350—347 V

10 Claims



7. A liquid crystal device, comprising:  
a liquid crystal filled in a space between an arrangement of pixel electrodes and a common electrode facing each other with said space therebetween;  
a pair of base plates sandwiching said pixel electrodes and said common electrode therebetween;  
polarizing plates each placed in a respective layer on surfaces of respective ones of the base plates exterior to said pixel electrodes and said common electrode;  
a plurality of microlenses disposed on at least one of the base plates in correspondence with the pixel electrodes for

converging light rays irradiated onto the pixel electrodes for the image formation thereby;  
wherein recording light passes from an incident side to a recording side of said device and the microlenses are formed on the base plate on said incident side; and  
further comprising a photomask provided on the base plate at the incident side, said photomask having openings corresponding to the pixel electrodes and located upon those portions of said base plate where the irradiated light rays are received.

4,790,633

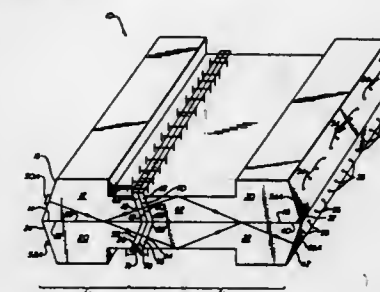
# LIQUID CRYSTAL SWITCHING APPARATUS

Anthony P. Baker, New York, N.Y., assignor to ITT Defense Communications, a Division of ITT Corporation, Nutley, N.J.  
Filed Sep. 30, 1986, Ser. No. 913,875

Int. Cl.<sup>4</sup> G02F 1/133

U.S. Cl. 350—347 V

16 Claims



1. A liquid crystal switching apparatus, comprising:  
a plurality of juxtaposed liquid crystal switching devices, each said device including a beam splitter segment for splitting an incident light beam into polarized components, said beam splitting segment having a first layer of liquid crystal material common thereto;  
wherein each said device further comprises:  
a beam combiner segment for recombining said polarized components into a single beam, said beam combiner segments having a second layer of liquid crystal material common thereto; and  
means for selectively reorienting the polarization of said polarized components, each said means being disposed between said beam splitter segment and said beam combiner segment of each said device, said apparatus having a third layer of liquid crystal material common to said polarization reorientation means.

4,790,634

# BISTABLE LIQUID CRYSTAL IN A FABRY-PEROT ETALON

Alan Miller, and Jacqueline Staromlynska, both of Worcester-shire, England, assignors to The Secretary of State for Defence in her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Sep. 4, 1987, Ser. No. 93,039

Claims priority, application United Kingdom, Sep. 5, 1986, 8621439

Int. Cl.<sup>4</sup> G02F 1/13; G01B 9/02; G02B 5/23

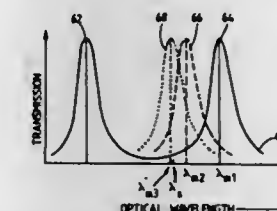
U.S. Cl. 350—347 V

The portion of this term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

8 Claims

1. An optically bistable device including a Fabry-Perot etalon containing intracavity optically nonlinear material and arranged to exhibit optical bistability, and wherein:

- (1) the cavity material refractive index is electro-optically tunable via etalon biasing means to move an etalon interference fringe maximum from a wavelength  $\lambda_{m1}$  to a wavelength  $\lambda_{m2}$ ,  
(2) a light source having a wavelength  $\lambda_s$  is arranged to pass light through the etalon, where  $\lambda_{m2}$  lies between  $\lambda_{m1}$  and



- $\lambda_{m1}$ ,  $\lambda_s$  and the source intensity being arranged to initiate optical bistability at an etalon fringe wavelength of  $\lambda_{m2}$  but to be inappropriate for bistability at a fringe wavelength of  $\lambda_{m1}$ , and  
(3) the etalon biasing means are connected to a variable voltage source arranged at least for etalon fringe maximum tuning from  $\lambda_{m1}$  to  $\lambda_{m2}$ .

4,790,635

# ELECTRO-OPTICAL DEVICE

Norman Apsley, Malvern, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

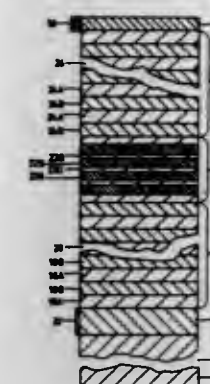
Filed Apr. 24, 1987, Ser. No. 42,342

Claims priority, application United Kingdom, Apr. 25, 1986, 8610129

Int. Cl.<sup>4</sup> G02F 1/01; H01L 27/14, 31/00

U.S. Cl. 350—356

12 Claims

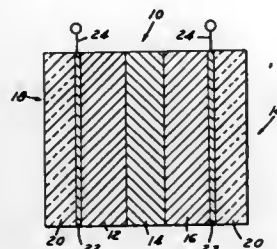


1. In an electro-optical device comprising a Fabry-Perot etalon having a central region of electro-optic material between two mirrors of multilayer construction, and electrical biasing means, connected to the mirrors, for applying a variable bias to the mirrors to vary the refractive index of the central region and thereby the etalon fringe maximum wavelength, the improvement wherein:

- (1) the central region and the mirrors are a heterostructure of successively deposited layers of semiconductor materials, and  
(2) the mirrors are doped to have mutually opposite conductivity type and the central region has lower doping than the mirrors to provide a PIN diode structure in which bias

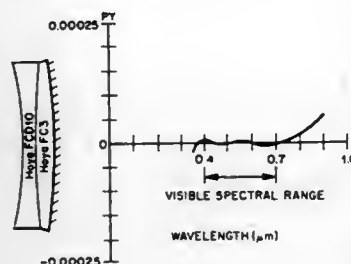
voltage applied by the biasing means appears predominantly across the central region,  
 (3) the etalon has an interference fringe maximum in the vicinity of a central region optical absorption wavelength associated with electric field dependent refractive index, and  
 (4) the biasing means is arranged to reverse bias the PIN diode structure.

**4,790,636**  
**METHOD OF FORMING A COUNTER ELECTRODE FOR AN ELECTROCHROMIC OPTICAL SHUTTER**  
 Robert L. Carlson, Southgate, Mich., assignor to Ford Motor Company, Dearborn, Mich.  
 Filed Dec. 18, 1986, Ser. No. 943,233  
 Int. Cl.<sup>4</sup> G02F 1/01  
 U.S. Cl. 350—357



1. A method of forming a counter electrode for an electrochromic optical shutter in which an electrochromic material, an ion conductor, and said counter electrode are sandwiched between electrodes, which comprises the step of:  
 applying said counter electrode to, as a base therefor, either said ion conductor or one of said electrodes in a pyrolytic spray process in which a solution containing nickel as pyrolyzable organic salt dissolved in an organic medium is sprayed on said base heated to a temperature sufficient to pyrolyze said spray material and form a nickel oxide counter electrode which is transparent and not electrochromic.

**4,790,637**  
**COLOR-CORRECTED CATADIOPTRIC SYSTEMS**  
 Romeo I. Mercado, San Jose, and Paul N. Robb, Sunnyvale, both of Calif., assignors to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.  
 Division of Ser. No. 419,705, Sep. 20, 1982. This application Dec. 12, 1986, Ser. No. 941,255  
 Int. Cl.<sup>4</sup> G02B 17/00  
 U.S. Cl. 350—444

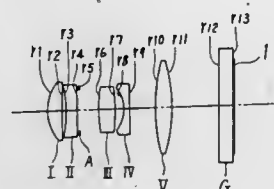


1. A catadioptric optical system color-corrected at more than three discrete wavelengths, said system comprising a plurality of refractive elements disposed along an optic axis for said system, said refractive elements being made from only two different optical materials, at least one of said refractive ele-

ments being made of a first one of said made of a second one of said optical materials, said first and second ones of said optical materials having different indices of refraction, said refractive elements coacting with each other so that paraxial marginal rays passing through said system come to a focus at said more than three wavelengths.

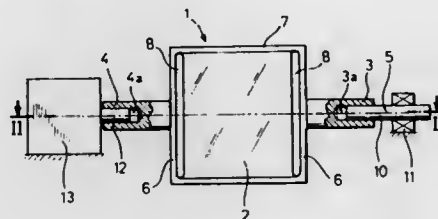
**4,790,638**  
**LENS SYSTEM FOR PROJECTING IMAGES OF MICROFILM**

Satoshi Iwasaki; Toshihiko Ueda, both of Toyokawa, and Kunihiro Konoma, Aichi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
 Filed Sep. 29, 1986, Ser. No. 913,078  
 Claims priority, application Japan, Sep. 30, 1985, 60-218491  
 Int. Cl.<sup>4</sup> G02B 9/60



1. A lens system for projecting images of microfilm comprising from the magnification side to the reduction side,  
 a first lens component of a positive meniscus lens component convex to the magnification side,  
 a second lens component of a negative meniscus lens component concave to the magnification side,  
 a third lens component of a biconvex lens component,  
 a fourth lens component of a biconcave lens component having a powerful concave surface faced to the magnification side, and  
 a fifth lens component of a biconvex lens component, wherein said lens components are respectively spaced from each other on an optical axis.

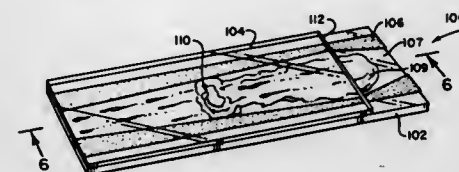
**4,790,639**  
**ROTARY MIRROR FOR OPTICAL SYSTEMS**  
 Klaus Baumgarten, Eggenharting, and Kurt Hummel, Munich, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm Gesellschaft mit Beschränkter Haftung, Munich, Fed. Rep. of Germany  
 Filed Jul. 16, 1987, Ser. No. 73,994  
 Claims priority, application Fed. Rep. of Germany, Jul. 29, 1986, 3625642  
 Int. Cl.<sup>4</sup> G02B 26/10  
 U.S. Cl. 350—486



1. A rotary mirror device for an optical system, comprising mirror means for reflecting radiation, said mirror means including a thin mirror section having a given small thickness and ribs forming a shape retaining stiff box frame around said mirror section, said ribs having, perpendicularly to said mirror

section, a height corresponding to several times said given thickness to form box frame sides, first rotation bearing means connected to said stiff box frame at one side of said stiff box frame, second rotation bearing means connected to an opposite side of said stiff box frame, said first and second rotation bearing means defining a common rotational axis, first and second slots in said mirror section, said slots extending alongside a first pair of opposite stiff box frame sides and symmetrically relative to said common rotational axis, said slots having a length corresponding substantially to a distance between two further box frame sides forming a second pair of box frame sides.

**4,790,640**  
**LABORATORY SLIDE**  
 Frederic L. Nason, 6830 Orion Ave., Van Nuys, Calif. 91406  
 Filed Oct. 11, 1985, Ser. No. 786,745  
 Int. Cl.<sup>4</sup> G02B 21/34; G01N 21/01  
 U.S. Cl. 350—534

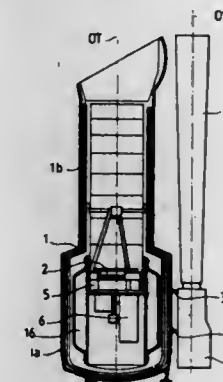


1. A laboratory slide, comprising:  
 a lower slide plate;  
 a transparent coverslip; and  
 an adhesive bonding agent for securing said coverslip in overlying relation upon said slide plate, said bonding agent being interposed directly between said slide plate and coverslip, said bonding agent being patterned to define at least one chamber with a precision controlled and predetermined spacing dimension between said slide plate and coverslip on the order of about 0.003 inch or less; said bonding agent being patterned to define an elongated and open-ended flow channel, said bonding agent cooperating with said slide plate and coverslip to close the top, bottom, and sides of said flow channel, having a precision controlled and predetermined cross sectional size and shape, and further including at least one reagent within said flow channel.

**4,790,641**  
**SPACE TELESCOPE CONNECTED TO A STAR TRACKER**  
 Thorsteinn Halldorsson, Munich, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschränkter Haftung, Munich, Fed. Rep. of Germany  
 Filed Dec. 3, 1986, Ser. No. 937,366  
 Claims priority, application Fed. Rep. of Germany, Jan. 11, 1986, 3600658  
 Int. Cl.<sup>4</sup> G02B 23/00; G01B 11/26; G01J 1/32  
 U.S. Cl. 350—537

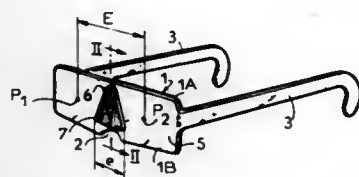
1. A space telescope connected to a star tracker, comprising a telescope lens, an instrument platform orientable toward a reference star by means of said star tracker, optical means arranged for transmitting images projected from said telescope lens into a beam path of the star tracker, said optical means including a collimator lens and an orderly arranged light conductor bundle (7) having an entry end arranged in the focal

plane ( $f_1$ ) of said telescope lens (2), said light conductor bundle having an exit end (7b) leading into the focal plane ( $f_k$ ) of said





holding said frame in such an in-use position, said frame being transparent at least in those regions thereof intended to be placed directly in front of the center of the eyes' pupils, and the apparatus including at least one moving opaque element wherein support and guide means are fixed to the frame for supporting said at least one movable opaque element and for guiding reversible movement thereof relative to said frame



positioned in the recess of the associated connecting lug so as to limit relative sliding displacement of said two ends with respect to each other; and one screwing member received in the screw receiving means of each of the thus positioned lateral retaining blocks of each said rim piece for securing said ends of each said rim piece together in precise alignment.

**4,790,645**  
**FITTED EYEGLASS FRAMES**  
Donald A. Gish, 3107 Frandoras Cir., Oakley, Calif. 94561  
Filed Feb. 20, 1987, Ser. No. 16,844  
Int. Cl.<sup>4</sup> G02C 5/14

U.S. Cl. 351-119

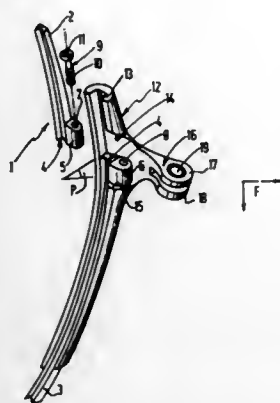
11 Claims

under the effect of gravity between three position: a first position in which said opaque element uncovers the both pupil centers; and second and third positions in which it prevents vision with respectively the one or other of the eyes, by covering the corresponding pupil center, depending on the tilting of the head of the baby and wherein the movable element is dimensioned so that it is not obstructed by the nose of the baby when moved between the said three positions.

**4,790,644**  
**GLASSES FRAME**  
Bernard Lhoapice, Blois, France, assignor to Essilor International (Compagnie Generale d'Optique), Creteil Cedex, France  
Filed Nov. 14, 1986, Ser. No. 931,692  
Claims priority, application France, Nov. 25, 1985, 8517390  
Int. Cl.<sup>4</sup> G02C 1/08

U.S. Cl. 351-90

2 Claims



1. An adjustable eyeglass frame comprising: two open metallic rim-pieces, each for supporting an eyeglass lens in the frame, each said rim piece including two free ends adapted to abut against each other, each free end having a lateral retaining block with screw receiving means for receiving a screwing member;

a connecting lug associated with each rim piece, each said connecting lug including a continuous elongated guiding groove means for precisely aligning said free ends of the associated rim piece with respect to each other, and an open recess in communication with the guiding groove means;

one of said ends of each said rim piece being secured in the guiding groove means of the associated connecting lug and the other end of said rim piece being slidably mounted in said continuous elongated guiding groove means so as to be placed in precise alignment with respect to said one end;

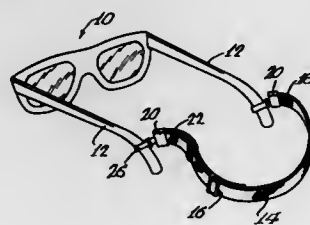
said lateral retaining blocks of each said rim piece being

1. Eyeglasses frames, comprising:  
a bow adapted to be supported on the nose of the wearer and formed for holding a pair of lenses before the eyes of the wearer,  
a pair of sidebars extending rearwardly from said bow on opposite side thereof,  
relatively rigid ear engaging members movably mounted as a unit on the rear ends of said sidebars said ear engaging members being curved downward and the forward to engage around the top, rear and bottom portions of the ear of the wearer adjacent to the head,  
said ear engaging members being mounted to move rearwardly as a unit for facilitating removal of said eyeglasses from the head of the wearer and  
yieldable spring means engaging between said sidebars and said ear engaging members and biasing said ear engaging members forwardly.

**4,790,646**  
**EYEGLASS HOLDER**  
Suren V. Seron, Joliet, Ill., assignor to Seron Manufacturing Company, Joliet, Ill.  
Filed Jan. 18, 1984, Ser. No. 571,680  
Int. Cl.<sup>4</sup> G02C 3/00

U.S. Cl. 351-156

8 Claims



1. An eyeglass holder comprising  
a temple receiving fixture formed of a body of elastomer to include a base with a projection extending therefrom and having an elongated slot extending through said projection through which the temple of an eyeglass may be passed and a recess in said base at an end thereof remote from said projection;

an elongated strap having a cross sectional shape approximating that of said recess and having an end disposed in said recess; and bonding means in said recess bonding said end to said body, said bonding means comprising an adhesive.

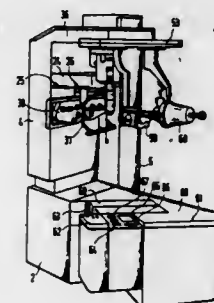
gaging recesses, said mating surfaces being formed to resist relative rotational movement;  
means interconnecting said grasping fittings for restricting axial movement of said cables in compression; and  
means for resisting axial movement of said cables in tension.

**4,790,647**  
**EXAMINATION UNIT**  
Dieter Mann, Aschaffenburg; Dieter Fornoff, Darmstadt; Andreas Ries, Darmstadt; Eberhard Klett, Darmstadt, and Michael van Suntum, Darmstadt, all of Fed. Rep. of Germany, assignors to Dieter Mann GmbH, Aschaffenburg, Fed. Rep. of Germany  
Filed Dec. 5, 1985, Ser. No. 805,854  
Claims priority, application Fed. Rep. of Germany, Dec. 6, 1984, 3444580

U.S. Cl. 351-245

Int. Cl.<sup>4</sup> A61B 3/00

13 Claims



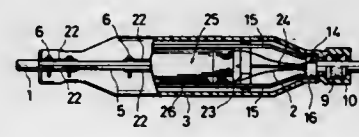
1. Ophthalmic examination unit, comprising a common support element having a first cantilever section, said common support element being adjustable in elevation through a first drive, a plurality of examination instruments mounted to said first cantilever section in a suspended arrangement, and a chin rest mounted to said first cantilever section in a suspended arrangement, said common support element having a second cantilever section, additional instruments attached to said second cantilever section, and wherein said second cantilever section is designed for elevation adjustment relative to said first cantilever section by means of a second drive.

**4,790,648**  
**CLOSURE FOR CABLE CONNECTOR**  
Shin-ichiro Ohta; Hidehisa Miyazawa; Etsuo Tanabe, and Shigeru Tachigami, all of Ichihara, Japan, assignors to The Furukawa Electric Co., Ltd., Ichihara, Japan  
Filed Aug. 5, 1987, Ser. No. 81,780  
Claims priority, application Japan, Aug. 12, 1986, 61-122941[U]

U.S. Cl. 350-96.20

Int. Cl.<sup>4</sup> G02B 6/36

6 Claims



1. An enclosure for a cable connector covered at the ends of the cables connected with each other in a sleeve through end face plates for closing both the ends of the sleeve and grasping fittings mounted in engaging recesses at the ends of the cable contained in the sleeve, comprising:

means for resisting rotational movement of the cables including mating surfaces of said grasping fittings and said en-

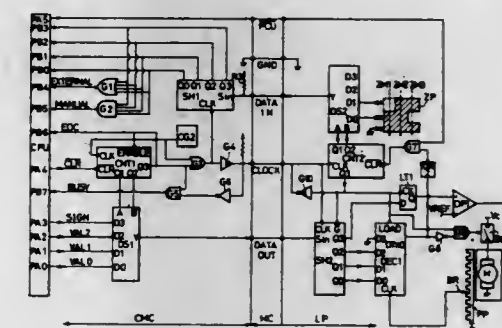
**4,790,649**  
**AUTOMATIC FOCUSING APPARATUS**  
Yoshihito Harada, Kawasaki, and Akira Ishizaki, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 2, 1985, Ser. No. 688,355  
Claims priority, application Japan, Jan. 12, 1984, 59-3998; Jan. 19, 1984, 59-8342

U.S. Cl. 354-400

Int. Cl.<sup>4</sup> G03B 3/00

40 Claims



1. A photographic apparatus having a camera body with a focusing detection circuit for forming a signal for focusing a lens, and a lens unit with a lens drive circuit for driving said lens in accordance with the signal from said focusing detection circuit, comprising:

(a) a terminal section for transferring the signal from said focusing detection circuit to said lens unit;  
(b) a receiving circuit for receiving the signal supplied from said focusing detection circuit through said terminal section and for driving said lens drive circuit in accordance with the signal received by said receiving circuit;  
(c) an operating signal forming circuit for producing an operating signal when said lens is being driven by said drive circuit, the operating signal from said operating signal forming circuit being terminated when the driving of said lens drive circuit has been completed and being transmitted to said camera body through said terminal section; and  
(d) a control circuit for substantially prohibiting operation of said focusing detection circuit, said control circuit inhibiting the operation of said focusing detection circuit during the time in which an operating signal is transmitted through said terminal section, and releasing the inhibition of the operation of said focusing detection circuit in response to the termination of the operation signal.

**4,790,650**  
**CONDENSATION NUCLEUS COUNTER**  
Patricia B. Keady, Minneapolis, Minn., assignor to TSI Incorporated, St. Paul, Minn.  
Filed Apr. 17, 1987, Ser. No. 40,540  
Int. Cl.<sup>4</sup> G01N 31/00, 1/00, 15/02

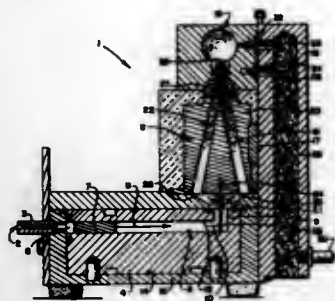
U.S. Cl. 356-37

13 Claims

1. A thermal-diffusional continuous-flow condensation nucleus counter comprising:

(a) a reservoir;  
(b) a saturator block, the saturator block residing within the reservoir, the saturator block being formed of a porous, electrically conductive material such that a static electric

- charge cannot be accumulated in regions in fluid communication with the reservoir;
- (c) a liquid, the liquid being housed within the reservoir, the liquid thereby permeating throughout the saturator block;
- (d) a sample gas stream, the sample gas stream being in fluid communication with the reservoir, the reservoir having a volume substantially filled by the saturator block, the sample gas thereby entraining the vapor from the saturator block;
- (e) a cooling condenser, the condenser substantially surrounding the sample gas stream as the sample gas exits the reservoir, the condenser serving to cool the sample gas stream such that the entrained vapor condenses on any particulate matter residing within the sample gas stream so as to form droplets relatively larger than the particulate matter; and
- (f) indicating means, the indicating means encountering the sample gas stream as the sample gas stream exits the cooling condenser, the indicating means serving to count and identify the number of droplets formed within the sample gas stream.



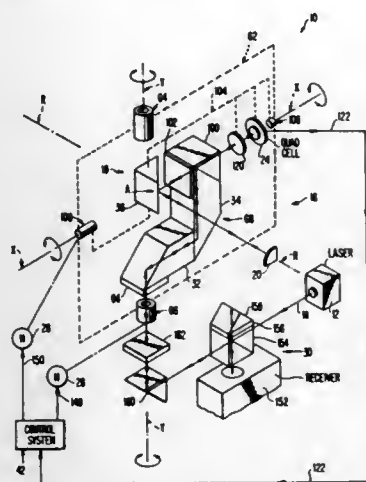
4,790,651

## TRACKING LASER INTERFEROMETER

Lawrence B. Brown, Annapolis, Md.; David N. Wells, Alexandria, Va., and J. Bradford Merry, Annapolis, Md., assignors to Chesapeake Laser Systems, Inc., Lanham, Md.  
Filed Sep. 30, 1987, Ser. No. 103,116  
Int. Cl.<sup>4</sup> G01B 9/02

U.S. Cl. 356-4.5

27 Claims



20. A method of continually tracking a moving object relative to X and Y axes which are perpendicular and intersect at a point A at a reference location, comprising the steps of rigidly coupling a retroreflector to the object,

directing a laser beam along the Y axis towards the X axis, redirecting the laser beam from the Y axis, before the beam intersects the X axis, along the X axis, redirecting the laser beam from the X axis at point A along an R axis incident on the retroreflector, the R axis being substantially perpendicular to the X axis and intersecting the X and Y axes at point A, generating an error signal from the displacement of the laser beam after incidence of the laser beam on the retroreflector representing movement of the retroreflector and object relative to the X and Y axes, and relocating the R axis relative to the retroreflector and object so as to reduce the error signal to zero.

4,790,652

## METHOD AND APPARATUS FOR DETERMINING PARAMETERS OF GASEOUS SUBSTANCES

Leif Uéus, and Svante Wallin, both of Lund, Sweden, assignors to Opsis AB, Lund, Sweden

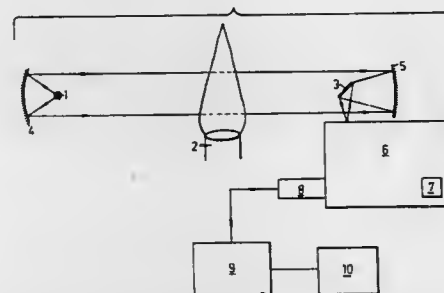
PCT No. PCT/SE86/00282, § 371 Date Feb. 4, 1987, § 102(e)  
Date Feb. 4, 1987, PCT Pub. No. WO86/07455, PCT Pub. Date Dec. 18, 1986

PCT Filed Jun. 12, 1986, Ser. No. 30,838

Claims priority, application Sweden, Jun. 13, 1985, 8502946  
Int. Cl.<sup>4</sup> G01J 5/58, 3/06, 3/32

U.S. Cl. 356-45

3 Claims



1. A method for determining a parameter such as pressure, temperature or concentration of a gaseous substances present in combustion processes and other high temperature processes, comprising

- (a) transmitting spectral broad-band, continuous light towards the gaseous substances, a part of the light being absorbed by the gaseous substances and a part of the light being transmitted through said gaseous substance;
- (b) spectrally dividing the transmitted light, whereby the absorption spectrum of the gaseous substances is obtained;
- (c) recording the absorption spectrum of the gaseous substances in a studied wavelength range a large number of times, each recording taking place sequentially by sweeping the absorption spectrum relative to a single-channel detector and for such a short time that the total intensity of the entire wavelength range is constant during each recording;
- (d) generating the means value of the recorded absorption spectra; and
- (e) calculating the parameter on the basis of the appearance of the mean absorption spectrum and absorption spectra determined for known conditions.

4,790,653

## HOUSING FOR A FLOW CYTOMETRY APPARATUS WITH PARTICLE UNCLOGGING FEATURE

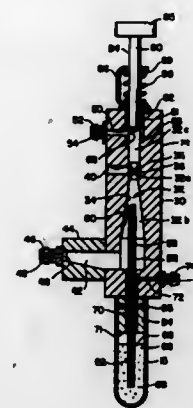
Howard L. North, Jr., Los Gatos, Calif., assignor to Becton Dickinson and Company, Franklin Lakes, N.J.

Filed May 22, 1986, Ser. No. 866,003

Int. Cl.<sup>4</sup> G01N 15/00

U.S. Cl. 356-73

17 Claims



1. A housing for a flow cytometry apparatus comprising:
- a body member having a passageway therethrough for the passage of particles which are to be analyzed, said passageway including an analysis portion, a pre-analysis portion and a postanalysis portion;
- a first channel extending through said body member for fluid communication with the pre-analysis portion of said passageway for the introduction of a liquid for ensheathing said particles which flow into the analysis portion of said passageway;
- a second channel extending through said body member for fluid communication with the post-analysis portion of said passageway for the passage of particles and liquids out of said housing after passing through said analysis portion; and
- a plunger having an inner end slidably positioned in fluid-tight engagement in said post-analysis portion of said passageway and an outer end extending outwardly of said body member, said plunger being depressible within said post-analysis portion so that said inner end closes said fluid communication of said second channel with said post-analysis portion of said passageway thereby blocking the flow of liquids and particles from said housing through said second channel to create increased pressure in said passageway post-analysis portion for dislodging clogged particles or debris from said analysis portion.

4,790,654

## SPECTRAL FILTER

Stanley P. Clarke, Rancho Palos Verdes, Calif., assignor to TRW Inc., Redondo Beach, Calif.

Filed Jul. 17, 1987, Ser. No. 74,812

Int. Cl.<sup>4</sup> G01J 3/02

U.S. Cl. 356-310

21 Claims

1. Image processor apparatus for processing and spectrally modifying an optical image received at an input to a spectrally different image at an output, comprising:

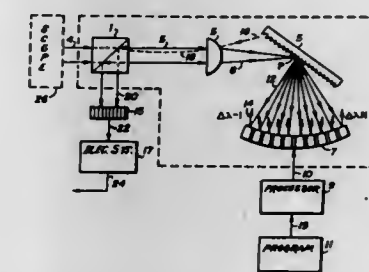
- light splitter means for passing incident light traveling in a first direction and for reflecting incident light traveling from a second direction, opposite to said first direction; optical lens means responsive to light passed by said splitter means traveling in a first direction for condensing said light image into a stripe and responsive to a light stripe traveling in a second direction, opposed to said first direction, for enlarging said stripe into a larger light image; dispersing means responsive to said incident stripe of light

produced by said optical lens means for dispersing said light stripe into a plurality of spectral components, each of said spectral components being in the form of a stripe and each traveling from said dispersing means at a different angle with respect thereto;

mirror means, said mirror means having a series of individual mirror segments spaced from one another over a predetermined area;

each of said segments having a reflectivity characteristic that is adjustable in level responsive to the level of a control input applied thereto;

said mirror means being positioned to receive said spectral light components from said dispersing means, different ones of said spectral light components being incident upon different individual ones of said mirror segments and for attenuating and reflecting said incident spectral components back to said dispersing means;



control means for individually controlling the reflectivity of each of said mirror segments to permit said segments to possess different reflectivity and thereby control the level of spectral components within the light reflected by said mirror means;

said dispersing means being further responsive to said return light stripes reflected from said mirror means for reflecting said return stripes in a second direction of travel to said optical lens means, and said lens means enlarging said reflected stripes and registering such enlargements into a larger multispectral image representative of said input image, whereby the spectral components of the image formed by said reflected light may be different from and eliminate certain of the spectral components of said light stripe formed by said optical lens means.

4,790,655

## SYSTEM FOR MEASURING LASER SPECTRUM

Shu Yamamoto, Chofu, and Kiyofumi Mochizuki, Hachioji, both of Japan, assignors to Kokusai Denzetsu Deawa Kabushiki Kaisha, Tokyo, Japan

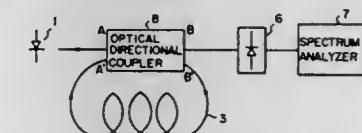
Filed May 5, 1986, Ser. No. 859,993

Claims priority, application Japan, May 15, 1985, 60-101486

Int. Cl.<sup>4</sup> G01B 9/02

U.S. Cl. 356-345

4 Claims



1. In a system for measuring a laser spectrum in which a laser output light to be measured is branched into one light branch and another light branch and having means including a spectrum analyzer so that the laser spectrum of the output light is measured from a beat output resulting from mixing a delayed light obtained by delaying the one light branch for a certain period of time with said another light branch undelayed, the improvement comprising optical directional control



means for optically controlling delay time of the delayed light branch by repetitive passage thereof along a constant length path thereof effective so that the delay time thereof undergoes such variations as to assume a value equal to an integral multiple of a predetermined fixed delay time effective to obtain a desired resolution of the laser spectrum.

4,790,656

# DUAL HOMODYNE DETECTION SYSTEM TO MEASURE ASYMMETRIC SPECTRUM BY USING ANGLE MIRRORS

Takahige Tsukishima, Aichi, Japan, assignor to Nagoya University, Nagoya, Japan

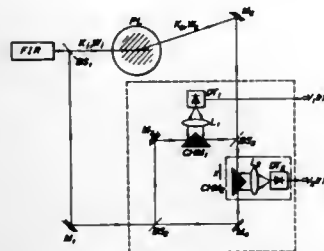
Continuation of Ser. No. 691,040, Jan. 14, 1985, abandoned. This application Apr. 23, 1987, Ser. No. 42,622

Claims priority, application Japan, Apr. 27, 1984, 59-83857

Int. Cl.<sup>4</sup> G01B 9/02

U.S. Cl. 356-349

3 Claims



1. A dual homodyne detection system for measuring asymmetric spectrum by using angle mirrors, comprising a coherent light beam source for a range covering optical and/or quasi-optical frequency range, a first beam splitter adapted to split a coherent light beam from said source into a measuring light beam and a local light beam, a second beam splitter adapted to split the local light beam into two auxiliary light beams, means for irradiating a specimen with said measuring light beam so as to produce scattered light beam emanating from the specimen, a third beam splitter adapted to split the scattered light beam into two main light beams, a mirror group including a pair of angle mirrors disposed symmetrically relative to a line connecting said second and said third beam splitters, each of said angle mirrors being adapted to receive one of said main light beams and one of said auxiliary light beams from opposite directions so as to produce reflected parallel light beams from thus received light beams perpendicular to said received light beams, a pair of condenser lenses associated with said angle mirrors respectively so as to condense the reflected parallel light beams, means to vary the distance between said angle mirrors in a direction perpendicular to said parallel reflected light beams at one of the angle mirrors, and a pair of homodyne detectors associated with said condenser lenses respectively so as to detect time-varying quadrature signals which are recorded and then used to calculate upper and lower sideband components in the scattered light beam by means of obtaining a sum and a difference between said time-varying quadrature signals respectively, wherein each one of said pair of angle mirrors, each one of said condenser lenses and each one of said pair of homodyne detectors are fixedly combined in the same arrangement respectively, the pair of the combinations being disposed symmetrically relative to said line connecting said second and said third beam splitters, one of the combinations being mounted on one board in common and the position of the combination mounted on said board being varied by said means to vary distance between said angle mirrors, so as to obtain a 90 degree phase difference between said time-varying quadrature signals detected by said pair of homodyne detectors respectively.

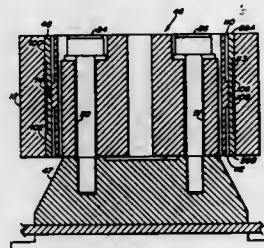
4,790,657  
RING LASER GYROSCOPE CURVED BLADE FLEXURE AND SUPPORT RING ASSEMBLY AND METHOD  
William Kozma, Calabasas, Calif., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed Mar. 18, 1986, Ser. No. 840,893

Int. Cl.<sup>4</sup> G01C 19/64

U.S. Cl. 356-350

30 Claims



21. A ring laser gyroscope, comprising:  
a frame having a cavity therein;  
a dither flexure mounted to said frame inside said cavity, said dither flexure including an outer flexure ring; and  
means for mounting said dither flexure to said frame to form a plurality of annular voids between said outer flexure ring and said frame.

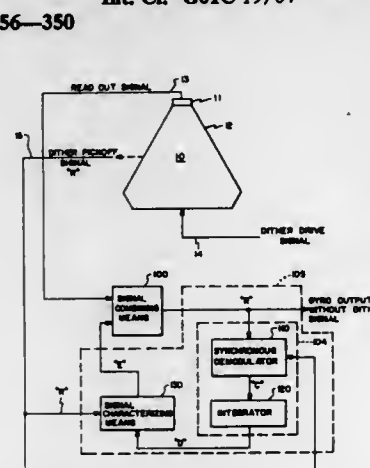
4,790,658  
DITHER SIGNAL REMOVER FOR A DITHERED RING LASER ANGULAR RATE SENSOR  
Wesley C. Sewell, Dunedin, Fla., assignor to Honeywell Inc., Minneapolis, Minn.

Filed May 24, 1985, Ser. No. 738,141

Int. Cl.<sup>4</sup> G01C 19/64

U.S. Cl. 356-350

4 Claims



1. A dithered angular rate sensor comprising:  
means for generating counter-propagating waves along a closed-loop path, each of said waves having a frequency related to the rotation of said sensor;  
means for dithering the frequency of at least one of said waves;  
means coupled to said sensor for generating a first dither reference signal having phase and magnitude related to said dithering;  
first signal means, having means for receiving a phase control signal and said first dither reference signal, for producing a second dither reference signal shifted in phase relative to said first dither reference signal in response to said phase control signal;  
readout means responsive to said waves for producing at

least one readout signal indicative of rotation of said sensor, said readout signal including a signal component do to said dithering;  
second signal means for combining said readout signal and at least one correction signal to produce at least one sensor output signal which is characteristic of the difference between said readout signal and said correction signal; and  
correction signal means including, converter means responsive to said second dither reference signal as a function of said second dither reference signal, said converter means having input means for receiving a converter control signal operative to affect the relationship between said second dither reference signal and said correction signal, control means responsive to any dither signal component in said sensor output signal for generating said converter control signal as a selected function of any dither signal component in said sensor output signal,  
third signal means responsive to said sensor output signal for providing said phase control signal as a selected function of any dither signal component in said sensor output signal, said phase control signal being operative to affect the phase of said second reference signal to alter the effective phase of said correction signal, and  
said converter means and said third signal means cooperating together to drive any dither signal component in said sensor output signal toward a minimum.

4,790,660

# SHAPE MEASURING INSTRUMENT

Giichi Ito, Koganei; Kouzoku Mukai, Tokyo; Yuichi Shimizu, Koganei, and Saji Suzuki, Chofu, all of Japan, assignors to NTT Technology Transfer Corporation, Tokyo, Japan

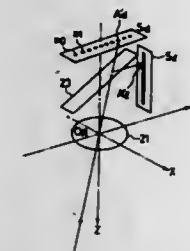
Filed Sep. 28, 1987, Ser. No. 101,455

Claims priority, application Japan, Oct. 3, 1986, 61-234308; Mar. 3, 1987, 62-46743

Int. Cl.<sup>4</sup> G01B 11/06, 11/02

U.S. Cl. 356-376

12 Claims



1. A shape measuring instrument comprising:  
a measuring head;  
a light projecting unit mounted on the measuring head, for projecting a flat signal light beam and oscillating it to sweep the surface of an object with a bright line;  
a light receiving unit mounted on the measuring head for focusing the bright light on the object surface into an image on a plurality of photosensor arrays by optical means;  
switching circuits each provided for each of the photosensor arrays, for sequentially switching output terminals of photosensors of each photosensor array at a speed higher than the oscillation speed of the signal light beam and picking up their outputs;  
detecting means operatively connected to each of the switching circuits, for detecting the signal light component from each output of the switching circuit;  
means for generating a signal indicating the direction of projection of the signal light beam;  
deciding means for deciding, for each array, the position of a photosensor from which the signal component has been detected; and  
computing means for computing the positions of a plurality of points in the bright line, based on the decided photosensors in the photosensor arrays and the direction of projection of the oscillating signal light beam;  
said light receiving unit including line photosensors of the same number as the photosensor arrays, the bright line being focused by said optical means into an image on the line photosensors, a dropout signal being generated which indicates the disappearance of the signal component from the output of each line photosensor, and said computing means including means for calculating the position of a gap in the surface of the object, using the detected positions of the photosensors and the dropout signal.

4,790,659  
OPTICAL SAMPLE ILLUMINATION DEVICE FOR A SPECTROSCOPIC ELLIPSOMETER HAVING A HIGH LATERAL RESOLUTION

Marko Erman, Paris; Claude E. Hilly, Oronne-Le-Voulgis, and Jean Le Bris, Quincy Sous Senart, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

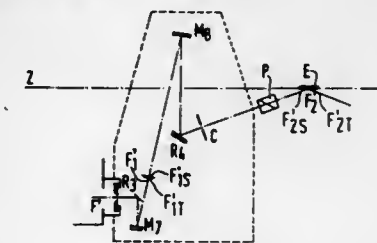
Filed Oct. 13, 1987, Ser. No. 108,510

Claims priority, application France, Oct. 10, 1986, 86 14123

Int. Cl.<sup>4</sup> G01N 21/21

U.S. Cl. 356-369

2 Claims



1. An optical sample illumination device for a spectroscopic ellipsometer of the rotating analyzer type, comprising a monochromator having an exit slit whose image is conjugated with a surface of the sample by at least a first spherical mirror, and comprising a polarizer arranged between said spherical mirror and the sample, characterized in that for realizing the said conjugation the device also comprises a second spherical mirror as well as an astigmatism correction slit arranged in the proximity of the image of the exit slit of the monochromator formed by the first spherical mirror and arranged perpendicularly to the exit slit and to the optical path so that said correction slit is conjugated with the sample through the second spherical mirror resulting in a luminous spot corrected for astigmatic errors being obtained on the surface of the sample.

4,790,661

# CROSS-MASK HOLDER DEVICE

Mark Leonov, Santa Clara, Calif., assignor to Intel Corporation, Santa Clara, Calif.

Filed Sep. 18, 1987, Ser. No. 98,523

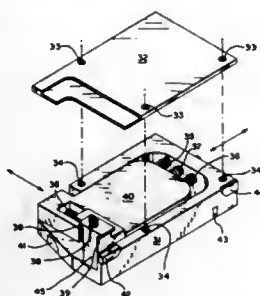
Int. Cl.<sup>4</sup> G01B 11/00

U.S. Cl. 356-401

17 Claims

1. An apparatus for aligning a cross-mask, comprising:  
a holder;  
a cross-mask apparatus coupled with said holder;  
a first adjustment means coupled with said holder for adjusting said cross-mask in a first linear direction;  
a second adjustment means coupled with said holder for

adjusting said cross-mask in a second linear direction generally perpendicular to said first linear direction; said cross-mask moving in said first linear direction when said first adjustment means is adjusted and said cross-mask



moving in said second linear direction when said second adjustment means is adjusted; whereby, said cross-mask may be aligned through use of said first and said second adjustment means.

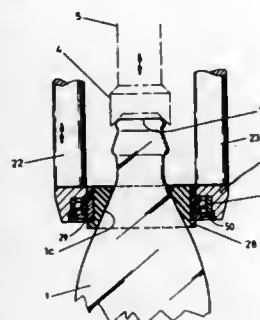
#### 4,790,662 METHOD AND DEVICE FOR INSPECTING EMPTY BOTTLES

Reimer Bischoff, Neutraubling, and Karl Griesbeck, Regensburg, both of Fed. Rep. of Germany, assignors to Krones AG Hermann Kronseder Maschinenfabrik, Neutraubling, Fed. Rep. of Germany

Filed Jun. 26, 1987, Ser. No. 67,610  
Claims priority, application Fed. Rep. of Germany, Jul. 1, 1986, 3621976

Int. Cl.<sup>4</sup> G01N 21/90  
U.S. Cl. 356—428

10 Claims



1. A method of inspecting bottles for foreign bodies and other contaminants by passing said bottles through consecutive optoelectronic inspection zones in either order, comprising: gripping the bottle at its mouth while the bottom of the bottle is on a support to provide an unobstructed view of the bottle wall from the bottom to near the mouth of the bottle while the bottle is passing through and is being scanned in one of said optoelectronic inspection zones, and gripping the bottle at about its shoulder while the bottom of the bottle is on said support to provide an unobstructed view of the shoulder and neck region from where it is gripped up to the mouth of the bottle while the bottle is passing through and is being scanned in the other of said optoelectronic inspection zones.

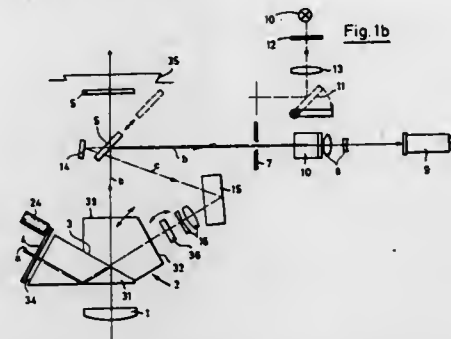
#### 4,790,663 PHOTOMETER TUBE FOR MICROSCOPES

Bernd Faltermeler, Aalen, and Martin Laudenberg, Murrhardt, both of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany

Filed Oct. 19, 1987, Ser. No. 109,956  
Claims priority, application Fed. Rep. of Germany, Oct. 28, 1986, 36366616

Int. Cl.<sup>4</sup> G02B 21/18; G01J 1/42  
U.S. Cl. 356—432

6 Claims



1. A photometer tube for a microscope, said photometer tube including prism means having a first image inlet and a second image inlet, a measuring field stop, means providing a back-illumination ray path for back-illumination of said measuring field stop, means for directing light from a microscope objective into said first image inlet of said prism means, said prism means including means for splitting light entering said first image inlet into a viewing ray path (a) and a photometry ray path (b), means for reflecting an image of said measuring field stop into said viewing ray path, reflection of said image of said measuring field stop being along a ray path extending in part coaxial to an axis of said photometry ray path (b), and a first switchable reflector (5) effective in one position to separate a portion of said ray path of said measuring field stop from said photometry ray path and to direct it along a ray path (c) to said second image inlet (32) of said prism means.

#### 4,790,664 DEVICE AND METHOD FOR MEASURING OPTICAL PROPERTIES

Kenji Saito, Tokyo; Ken Eguchi, Atsugi; Haruki Kawada, Atsugi; Yoshinori Tomida, Atsugi; Takashi Nakagiri, Tokyo; Yukuo Nishimura, Sagami, and Kiyoshi Takimoto, Atsugi, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

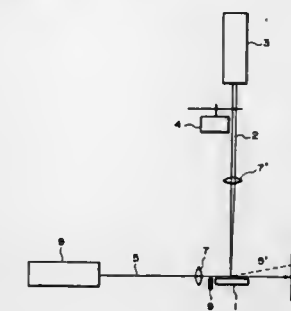
Filed Aug. 15, 1986, Ser. No. 897,055  
Claims priority, application Japan, Aug. 16, 1985, 60-179398; Aug. 16, 1985, 60-179399; Aug. 16, 1985, 60-179400; Dec. 16, 1985, 60-281107; Dec. 16, 1985, 60-281108; Dec. 16, 1985, 60-281109; Dec. 16, 1985, 60-281110

Int. Cl.<sup>4</sup> G01N 21/00  
U.S. Cl. 356—432

10 Claims

1. A device for measuring optical properties, comprising: an exciting light source for emitting exciting light to a site of a sample to be measured; a light intensity modulator for modulating the exciting light; a probe light source for emitting a probe light having an intensity distribution; a light position detector for receiving the probe light; and intensity distribution modifying means for bringing a gravi-

tational center of the light intensity distribution of said probe light close to the sample when the probe light



emitted from the probe light source approaches the site to be measured.

#### 4,790,665 KNEADING APPARATUS FOR BREAD DOUGH AND THE LIKE AND A METHOD OF CONTROLLING THE QUALITY THEREOF DURING KNEADING

Torahiko Hayashi, Utsunomiya, Japan, assignor to Rheon Automatic Machinery Company, Ltd., Tochigi, Japan

Division of Ser. No. 923,642, Oct. 27, 1986, Pat. No. 4,747,690.

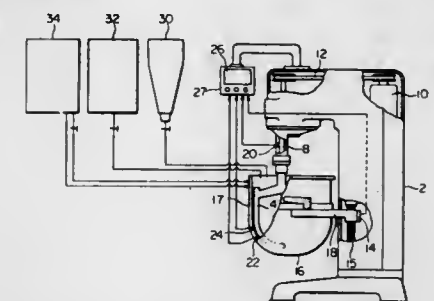
This application Jan. 13, 1988, Ser. No. 143,182

Claims priority, application Japan, Oct. 29, 1985, 60-242292

Int. Cl.<sup>4</sup> B01F 15/00

U.S. Cl. 366—98

1 Claim



1. A method of controlling the quality of bread dough and the like during kneading, comprising the steps of continuously and simultaneously measuring chronological changes of the kneading resistance value, pH value, temperature value, and weight value, of dough being kneaded, monitoring the thus obtained measurements, adjusting or changing the kneading conditions as required, and stopping the kneading operation when it is judged completed.

#### 4,790,666 LOW-SHEAR, CYCLONIC MIXING APPARATUS AND METHOD OF USING

Dale L. Koziol, Minneapolis, Minn., assignor to Ecolab Inc., St. Paul, Minn.

Filed Feb. 5, 1987, Ser. No. 10,920  
Int. Cl.<sup>4</sup> B01F 3/08

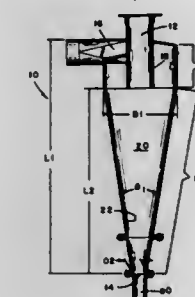
U.S. Cl. 366—165

17 Claims

1. A low-shear mixing apparatus, comprising: (a) a cyclone separator having (i) a top defining an overflow outlet port, (ii) an imperforate bottom defining an underflow outlet port, (iii) a sidewall defining an inner conical cavity, and (iv) a tangential inlet port; elements (i), (ii), (iii) and (iv) defining a means for separating a feed stream introduced into the inner conical cavity through the tangential inlet port into an underflow portion which passes

out of the cyclone separator through the underflow outlet port and an overflow portion which passes out of the cyclone separator through the overflow outlet port; and (b) a cyclone mixer comprising a funnel shaped vessel having (I) a top defining an underflow inlet orifice in communication with the underflow outlet port of the cyclone separator, (II) a bottom defining an outlet orifice, (III) a sidewall defining an inner conical chamber, and (IV) a tangential inlet orifice; elements (I), (II), (III) and (IV) defining a means for combining and mixing, under low-shear conditions, a mixing feed stream vortically introduced into the inner conical chamber through the tangential inlet orifice and the underflow portion from the cyclone separator vortically introduced into the cyclone mixer through the underflow inlet orifice; the mixing feed stream and underflow portion mixing together as they vortically travel together in the cyclone mixer.

13. A method of mixing two components comprising the steps of:



(a) providing a cyclone separator having (i) a top defining an overflow outlet port, (ii) an imperforate bottom defining an underflow outlet port, (iii) a sidewall defining an inner conical cavity, and (iv) a tangential inlet port; (b) introducing a first feed stream into the cyclone separator through the inlet port; (c) separating the first feed stream into a vortically rotating overflow portion and a vortically rotating underflow portion in the cyclone separator; (d) tangentially introducing a second feed stream into a funnel shaped vessel so as to develop a spiralling vortex of the second feed stream; (e) combining the vortically rotating underflow portion of the first feed stream and the spiralling vortex of second feed stream in the funnel shaped vessel such that the underflow portion of the first feed stream and the second feed stream combine to form a substantially homogeneous mixture as they vortically travel together in the vessel.

#### 4,790,667 FOOD PROCESS AGITATOR

Warren A. Pardo, Bel Air; Richard J. Pardo, and Valentino Gabriele, both of Baltimore, all of Md., assignors to J. C. Pardo and Sons, Baltimore, Md.

Filed Sep. 15, 1986, Ser. No. 907,001  
Int. Cl.<sup>4</sup> B01F 7/04

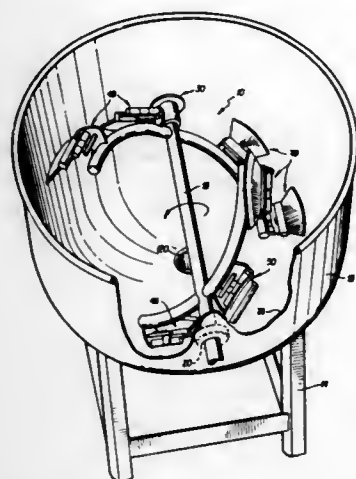
U.S. Cl. 366—311

30 Claims

1. An agitator mounted for rotation within a kettle within which food materials are heated, the food materials being uniformly mixed by the rotary action of the agitator, comprising: a rotary shaft horizontally disposed within the kettle; arcuate segments rigidly attached to and disposed two each on each end of the shaft, the arcuate segments at each end being disposed substantially in the same plane and being disposed diametrically opposite each other relative to the shaft, the planes within which the arcuate segments at each end of the shaft lie being fixed relative to each other



during rotation and intersecting at a given angle greater than 0; and, means carried by the arcuate segments and extending



toward inner walls of the kettle for contacting at least portions of the food materials within the kettle and displacing said materials within the kettle to effect mixing thereof.

4,790,668

## VISCOMETRIC THERMOMETER

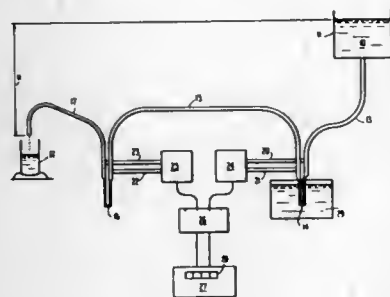
Jamal Seyed-Yagoobi, Bryan, Tex., assignor to Westvaco Corporation, New York, N.Y.

Filed Jan. 19, 1988, Ser. No. 145,136

Int. Cl.<sup>4</sup> G01N 11/00, 25/00

U.S. Cl. 374—54

8 Claims



1. An apparatus for measuring the temperature of a designated environment comprising:

A fluid flow conduit connected between a fluid flow drive of substantially constant pressure differential;

At least two heat sensing capillaries in series flow circuit with said conduit;

Pressure differential detecting means connected to said fluid flow conduit respective to each sensing capillary for measuring fluid flow pressure differential across respective sensing capillaries;

Temperature controlled environment means surrounding a first of said sensing capillaries with the second of the sensing capillaries located in said designated environment; and

A fluid flow medium within said flow conduit of calibrated temperature and viscosity correlation.

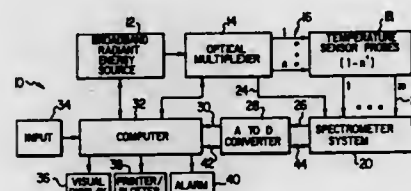
4,790,669  
SPECTROSCOPIC METHOD AND APPARATUS FOR OPTICALLY MEASURING TEMPERATURE  
Douglas A. Christensen, Salt Lake City, Utah, assignor to CV Technology, Inc., Dallas, Tex.

Filed Apr. 8, 1986, Ser. No. 849,435

Int. Cl.<sup>4</sup> G01J 5/08

U.S. Cl. 374—131

12 Claims



1. An apparatus for measuring temperature, comprising: a radiant energy source with a broad wavelength spectrum; semiconductor temperature sensors for receiving radiant energy from said source including means for transmitting or reflecting radiant energy;

means for determining wavelength spectrum characteristics of the radiant energy transmitted or reflected from said sensors;

waveguide means for receiving radiant energy from said source and optically coupled to said sensors and said wavelength spectrum determining means for transmitting radiant energy from said source to said sensors and for transmitting said energy transmitted or reflected from said sensors to said determining means;

electronic digital signal processing means for deriving the value of the temperature of said sensors from said determined wavelength spectrum characteristics; and

radiant energy multiplexer means optically coupled between said source and said said sensors, for sequentially transmitting radiant energy from said source to said sensors.

4,790,670

## BAG WITH CLOSEABLE FLAP AND METHOD OF MANUFACTURING SAME

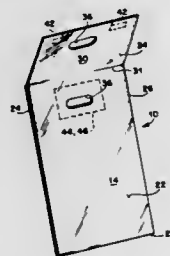
Matthew Barbaro, Kings Park, N.Y., assignor to Poly-Pak Industries, Inc., Melville, N.Y.

Filed Jan. 11, 1985, Ser. No. 690,676

Int. Cl.<sup>4</sup> B65D 33/16

U.S. Cl. 383—62

20 Claims



1. A closeable bag comprising:

first and second overlying panel portions and a flap portion extending from and integral to said second panel portion, said first and second panel portions and said flap portion each having an inner surface and an outer surface, said inner surfaces of said first and second panel portions at at least side edges thereof having surface characteristics which render them capable of being firmly heat sealed together, and said outer surfaces of said second panel portion and said flap portion at at least side edges thereof

having surface characteristics which render them capable of being only weakly heat sealed together; said inner surfaces of said first and second panel portions being heat sealed along said side edges thereof to provide a first heat sealed seam of a first strength and to define an opening between said first and second panel portions; said flap portion being initially heat sealed to said outer surface of said second panel portion along said side edges thereof to provide a second heat sealed seam of a second strength which is weaker than the first strength, said second heat sealed seam along said side edges of said flap portion and said second panel portion overlying said first heat sealed seam along said side edges of said first and second panel portions, and the end of said flap portion remote from said fold line being adapted to be pulled away from said outer surface of said panel portion to break said second heat sealed seam while said first heat sealed seam is maintained so that said flap portion may be folded about said fold line to close said opening.

14. A method of manufacturing a bag, comprising the steps of:

providing first and second panel portions of plastic material, each of said panel portions having an inner surface and an outer surface, said second panel portion including an integral flap portion adapted to be folded along a fold line, said inner surfaces of said first and second panel portions at at least the side edges thereof having surface characteristics rendering them capable of being firmly heat sealed together, and said outer surfaces of said second panel portion and of said flap portion at at least the side edges thereof having surface characteristics rendering them capable of being only weakly heat sealed together;

positioning said first and second panel portions in overlying relationship such that said inner surfaces thereof are adjacent to and face one another and such that the side edges thereof are in stacked overlying relationship;

arranging said flap portion of said second panel portion in an initial folded position in which said outer surface of said flap portion is adjacent to and faces said outer surface of said second panel portion, and in which the side edges of said flap portion are in stacked overlying relationship to the side edges of said first and second panel portions; and heat sealing together the stacked side edges of said first and second panel portions and said flap portion, whereby said side edges of said first and second panel portions are firmly heat sealed together and said side edges of said flap portion are weakly heat sealed to said second panel portion.

4,790,671

## SPLIT ROLLER BEARING ASSEMBLY

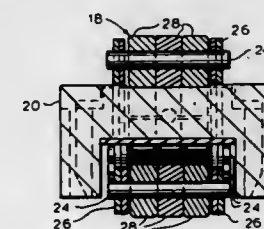
Alfred M. Rogers, Deer Park, N.Y., assignor to Thomson Industries, Inc., Port Washington, N.Y.

Filed Mar. 9, 1988, Ser. No. 165,840

Int. Cl.<sup>4</sup> F16C 29/06

U.S. Cl. 384—44

9 Claims



1. A linear recirculating roller bearing assembly, which comprises:

a bearing body having a load bearing surface and a return

surface defining a path for continuous recirculating movement of rollers thereabout;

an endless roller chain mounted on the bearing body, the roller chain including a plurality of pins arranged in a spaced, parallel relationship, and link members connecting the axial ends of adjacent pins together; and

means to minimize skewing include a plurality of rollers mounted on the chain and disposed about the path in engagement with the bearing body surfaces, each roller being mounted on a corresponding pin of the chain and including at least two roller components rotatably mounted on the same pin co-axially to each other, each roller component being rotatable independently of the other components on the same pin.

4,790,672

## PRESSED SLEEVE BEARING

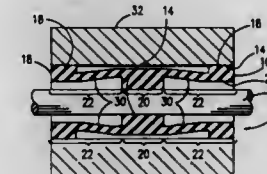
Steven R. Komplin, Lexington, Ky., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 19, 1986, Ser. No. 944,683

Int. Cl.<sup>4</sup> F16C 27/02

U.S. Cl. 384—125

5 Claims



1. A bearing for insertion into a bore to support a shaft comprising:

a cylindrical having ends and an interior diameter defining a first cylindrical surface and an outside diameter;

a bearing surface for said shaft comprising a second cylindrical interior surface, said second surface having a length substantially less than the length of said cylinder and a diameter of less than said interior diameter of said cylinder, said bearing surface supported within said first cylinder and positioned intermediate and spaced from said ends of said cylinder;

a plurality of frictional engaging protrusions distributed about the exterior surface of said cylinder and proximate said ends of said cylinder, said protrusions having a dimension in the radial direction less than one-half the difference between the diameter of said second cylindrical interior surface and the diameter of said first cylindrical surface and a length of less than the distance from said end of said cylinder to said second cylindrical interior surface;

said protrusions being deflectable inwardly when inserted into said bore to thereby create retaining force against said bore with said cylindrical interior surface being unaffected by said deflections.

4,790,673

## ROCK NECK BEARING ASSEMBLY AND INNER BEARING COMPONENT THEREFOR

Thomas E. Simmons, Westford, Mass., assignor to Morgan Construction Company, Worcester, Mass.

Filed Mar. 30, 1987, Ser. No. 31,416

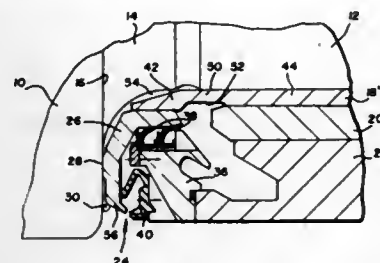
Int. Cl.<sup>4</sup> F16C 33/74

U.S. Cl. 384—147

11 Claims

1. In a bearing assembly of the type adapted to rotatably support the neck of a roll in a rolling mill, the roll having a roll body joined to the roll neck at a juncture therebetween which is at least partially defined by a roll end face, the bearing assembly including an inner bearing component adapted to be axially received on the roll neck and an inner seal ring positioned

adjacent to the roll end face, the improvement comprising: said seal ring being mounted with an interference fit on an end portion of said inner bearing component, said end portion being spaced radially from said roll neck and being configured



and dimensioned to deflect radially inwardly under the influence of hoop stresses developed in said seal ring as a result of said interference fit, thereby causing said seal ring to be inclined towards said roll end face.

#### 4,790,674 IMPACT PRINTER HAVING WEAR-RESISTANT PLATINGS ON HAMMER SPRINGS AND POLE PIECE TIPS

Robert A. Kleist, Newport Beach; Norman E. Farb, Villa Park, and John S. Kinley, Costa Mesa, all of Calif., assignors to Printronix, Inc., Irvine, Calif.

Filed Jul. 1, 1987, Ser. No. 69,034  
Int. Cl.<sup>4</sup> B41J 3/02

U.S. Cl. 400—121

17 Claims



1. A magnetic hammer actuator for use in an impact printer, said actuator comprising the combination of an elongated, resiliently flexible, essentially flat hammer spring having essentially uniform thickness, having an intermediate portion and having an opposite, free second end thereof on the other side of the intermediate portion from the first end, the second end having a pole piece-receiving surface, at least one pole piece having a tip thereof disposed adjacent the pole piece-receiving surface of the second end of the hammer spring, a permanent magnet magnetically coupled to the at least one pole piece and operative to normally hold the hammer spring in a retracted position against the at least one pole piece with the pole piece receiving surface engaging the tip of the pole piece, a coil associated with the at least one pole piece and operative when momentarily energized to release the hammer spring from the retracted position, the hammer spring when released from the retracted position moving away from the at least one pole piece to perform impact printing and then returning to the retracted position where it impacts the tip of the at least one pole piece, and a mass of wear-resistant material consisting essentially of hexavalent chromium plated on the pole piece-receiving surface of the second end of the hammer spring, the mass of wear-resistant material being confined to the pole piece-receiving surface at the second end of the hammer spring and being operative to minimize wear of the pole piece-receiving

ing surface and being of generally convex configuration such that a central region of the mass is thicker than the thickness of the mass at the edges thereof.

#### 4,790,675 UNIVERSAL RIBBON CARTRIDGE

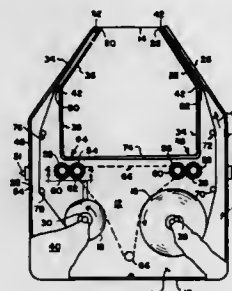
Tyrone N. Surti, 424 Harding Industrial Dr., Nashville, Tenn. 37211

Continuation-in-part of Ser. No. 855,072, Apr. 22, 1986, which is a continuation-in-part of Ser. No. 725,931, Apr. 22, 1985, Pat. No. 4,629,346. This application Jun. 8, 1987, Ser. No. 59,598. The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> B41J 32/00

U.S. Cl. 400—208

4 Claims



1. A ribbon cartridge for use in a plurality of printers having a drive shaft for operating said ribbon cartridge from different locations, comprising:  
a body having a cavity therein;  
a pair of ribbon carrying spools rotatably mounted in spaced relation in said cavity;  
ribbon exit and entry guides secured to said body, said guides defining a path for passage of ribbon therethrough;  
a ribbon carried on said spools and extending therebetween, said ribbon disposed for passing from a first of said pair of spools and out of said body adjacent said exit guide and back into said body adjacent said entry guide for winding on the outer periphery of the second of said pair of spools;  
drive means including two spaced sets of drive wheels, each set comprised of two adjacent drive wheels in intermeshing relation, said drive wheels mounted in said cavity, and a predetermined one of said drive wheels disposed for operatively engaging said drive shaft of said printer for rotation thereby, each of said drive wheels including means for being alternately operatively engaged on opposite ends thereof for rotation by the drive shaft of one of said printers; and  
said drive means further including a belt carried around a drive wheel of each set of drive wheels for rotation thereby and in engaged relation with the outer periphery of said ribbon on said spools for rotation thereof, whereby said first of said pair of spools is rotated by said belt to dispense ribbon therefrom while said ribbon is wound on said second of said pair of spools responsive to rotation thereof by said belt.

#### 4,790,676 PRINTER RIBBON AND FILM USED FOR PREPARATION THEREOF

Makoto Karatsu, and Sumio Goto, both of Ohita, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 31, 1987, Ser. No. 80,238

Claims priority, application Japan, Jul. 31, 1986, 61-178942  
Int. Cl.<sup>4</sup> B41J 31/00

U.S. Cl. 400—241.1

5 Claims

1. A film for a printer ribbon, which is made of a resin composition comprising, 55 to 95% by weight of high-density

polyethylene and 5 to 45% by weight of low-density polyethylene and having a melt tension of at least 1.4 g but smaller than 3.5 g and a density of 0.94 to 0.96 g/cm<sup>3</sup>, said film having a thickness of 8 to 20  $\mu$ m.

#### 4,790,677 METHOD AND APPARATUS FOR DETERMINING HALT OF TAPE FEED IN A TAPE CARTRIDGE FOR A PRINTER

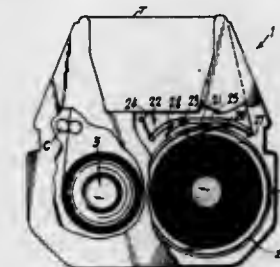
Kenneth Kress, Huntington, N.Y., assignor to Primages, Inc., Bohemia, N.Y.

Filed Oct. 3, 1985, Ser. No. 783,768

Int. Cl.<sup>4</sup> B41J 35/36

U.S. Cl. 400—249

4 Claims



1. Apparatus for use with a tape cartridge for a printer to determine halt of tape feed from a supply reel having a tape thereon to a take-up reel, said apparatus comprising first means on one of said reels for undergoing rotation therewith, second means fixed in position to face said first means to cooperate with said first means without mechanical contact therewith for producing electrical output pulses as said first means rotates with said one reel, third means coupled to said second means for determining halting of rotation of said one reel and consequent halting of tape feed upon cessation of said output pulses, locking means for locking said supply reel against rotation at the end of tape feed from the supply reel, and ratchet means coupled to said supply reel, said locking means being coupled to said ratchet means, said ratchet means including a ratchet wheel secured for common rotation with said supply reel and a pivotable pawl lever engaging the tape under tension during feed of the tape and including a pawl tooth engageable with said ratchet wheel, said locking means including a second tooth on said lever for engaging said ratchet wheel to lock the ratchet wheel against rotation when tension in the tape increases at the end of tape feed.

#### 4,790,678 MECHANISM FOR EXTRUDING AND RETRACTING A WRITING MEMBER OF A WRITING INSTRUMENT

Toshio Araki, Aichi, Japan, assignor to Pilot Ink Co., Ltd., Nagoya, Japan

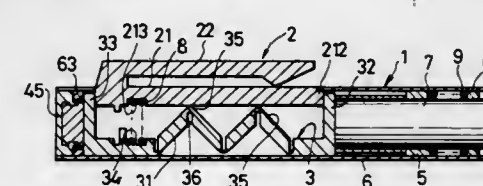
Filed Jun. 25, 1987, Ser. No. 66,276

Claims priority, application Japan, Jun. 25, 1986, 61-97486[U]; Aug. 29, 1986, 61-133105[U]

Int. Cl.<sup>4</sup> B43K 24/04, 24/12

U.S. Cl. 401—104

8 Claims



1. A writing instrument, comprising:

a cylinder;  
a writing member contained in said cylinder and biased backwards against a front of said cylinder;  
a clip member radially pressable through said cylinder and having a base equipped with mating projections on both sides thereof and a clip holder arranged in a slot of said cylinder;  
a flexible working element contained in said cylinder and pressable against a back of said writing member to move said writing member forward, said working element having a plurality of flexing zigzag portions positioned under said base and having a fixed rear portion, wherein a pressing of said clip member causes said working element to move said writing element forward to protrude from a front opening of said cylinder and a releasing of said clip member causes a retraction of said writing member from said front opening; and  
a cam tube fitted with said working element and having an axial slit being arranged opposite said slot of said cylinder for receiving said clip member and having in side walls cam holes for engaging with said mating projections and for guiding an elevation of said clip member.

#### 4,790,679 POWER PAINT BRUSH WITH FLOW RESTRICTOR AND REMOVABLE BRUSH HEAD

Edward P. Murphy, Coon Rapids, Minn., assignor to Graco Inc., Minneapolis, Minn.

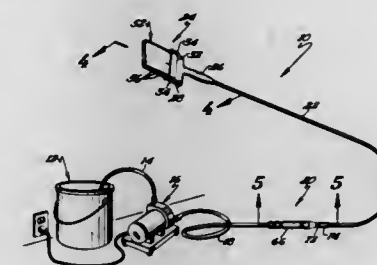
Filed Oct. 30, 1987, Ser. No. 116,011

The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> A46B 11/02, 11/06

U.S. Cl. 401—146

4 Claims



2. A pressure-fed brush coating applicator having a pump, at least one hose section, a handle, a valve in said handle, a flexible bladder and a brush member, the improvement comprising a flow restrictor assembly located intermediate said pump and said handle, said restrictor being operable to vary the flow between first and second predetermined flow rates and comprising:  
first and second flow restrictors wherein all flow through said assembly passes through said first restrictor and a reduced proportion of said flow may be directed through said second restrictor when in series with said first restrictor.

#### 4,790,680 FASTENER STRUCTURE FOR FILES AND MULTI-PURPOSE CLIP FOR USE THEREWITH

Izhak Givati, and Ehud Baruch, both of Tel-Aviv, Israel, assignors to Shikbar Investments Ltd., Tel Aviv, Israel

Filed Dec. 22, 1987, Ser. No. 136,667

Claims priority, application Israel, Jan. 14, 1987, 81263

Int. Cl.<sup>4</sup> B42F 13/36, 13/00, 3/00, 1/02

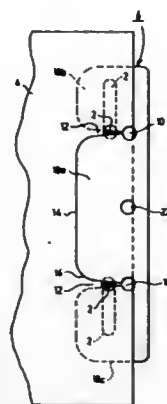
U.S. Cl. 402—68

13 Claims

1. A multi-purpose clip for clipping papers and also useful in a fastener structure for a paper file, comprising: an elongated member formed with a pair of longitudinally-spaced holes



adjacent to one edge dimensioned to receive the fastening elements of the paper file; said elongated member being further formed with a slot extending from each of said holes to the opposite edge of the elongated member such that said slots permit the elongated member to be removed from the fastening

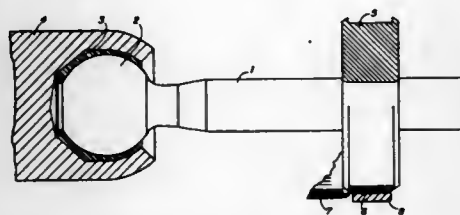


elements by moving the elongated member laterally in the direction of said opposite edge, said slots defining a center jaw and a pair of end jaws for clamping together the papers overlying the place in the file where one or more papers are to be added or removed.

**4,790,681**  
**HOLDING RING FOR SEAL BELLOWS ON TRACK**  
RODS OF MOTOR VEHICLES  
Reinhard Buhl, Bohmte, Fed. Rep. of Germany, assignor to Lemförder Metallwaren AG, Fed. Rep. of Germany  
Filed Sep. 4, 1987, Ser. No. 93,578.  
Claims priority, application Fed. Rep. of Germany, Sep. 5, 1986, 3630337

Int. Cl.<sup>4</sup> F16C 11/00  
U.S. Cl. 403—134

4 Claims



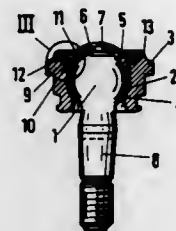
3. A seal bellows mounting for a universal joint, including a link pin having a ball head which is pivotally mounted and a shank portion having an annular recess, a holding ring of elastic material having an interior surface with an altered molecular structure rotatably supported on the recess of said shank portion wherein the surface of said ring has a hardened, smooth molecular structure.

**4,790,682**  
**BALL JOINT**  
Günther Henkel, Düsseldorf, Fed. Rep. of Germany, assignor to TRW Ehrenreich GmbH & Co. KG, Düsseldorf, Fed. Rep. of Germany

Filed Jan. 23, 1987, Ser. No. 65,394  
Claims priority, application Fed. Rep. of Germany, Jul. 12, 1986, 3623542

Int. Cl.<sup>4</sup> F16C 11/06  
U.S. Cl. 403—140

9 Claims



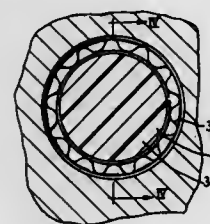
8. A ball joint comprising:

a housing;  
a ball stud having a ball head disposed in said housing and a shank portion projecting from said housing;  
an elastically deformable bearing member interposed between said ball head and said housing, said bearing member comprising an outer shell having a rim flange defining an opening, and an inner shell received in said opening; and  
a closing member for closing one end of said housing and for preloading said bearing member, said closing member having a rim portion and an inner surface engaging said flange and said inner shell when said closing member closes the one end of the housing, said closing member preloading said inner shell to exert a predetermined pressure on said ball head;  
said housing having a first inner step for engaging said rim flange of said outer shell when said bearing member is received in said housing, a second inner step displaced axially and radially outwardly relative to said first inner step for supporting said rim portion of said closing member, and a rolled-in rim for engaging said rim portion of said closing member to effect preloading of said bearing member, the axial distance between said first and second inner steps controlling the maximum clamping force acting on said rim flange.

**4,790,683**  
**TOLERANCE RING AND SHIM AND METHOD OF USE**  
Arthur A. Cramer, Jr., 11 N. Grant St., Hinsdale, Ill. 60521, and Brian S. Cramer, R.R. 2, Box 174, Manhattan, Ill. 60442  
Filed Oct. 5, 1987, Ser. No. 104,251

Int. Cl.<sup>4</sup> B25G 3/34  
U.S. Cl. 403—372

7 Claims

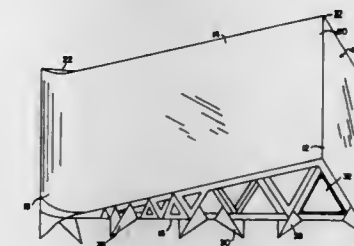


1. A tolerance ring and shim assembly for use in conjunction with a cylindrical surface of a relatively soft material, said tolerance ring being in the form of a split cylinder defining a longitudinal axis and having a plurality of laterally spaced,

axially extending corrugations projecting radially from said cylinder, which is to be sandwiched between an inner cylindrical surface of an outer member and an outer cylindrical surface of an inner member, one of said members being formed of a relatively soft material compared to said tolerance ring and said shim being in the form of a split cylinder with a smooth surface, comprising:

said shim having a diameter sized to engage against said soft material cylindrical surface, and  
said tolerance ring having a diameter sized to engage against said shim on an opposite side of said shim from said soft material cylindrical surface,  
whereby, said shim will prevent said corrugations from deforming said soft material cylindrical surface.

vides a gradual inclination facing seaward, the module being placed in the coastal waters at the approximate depth of water

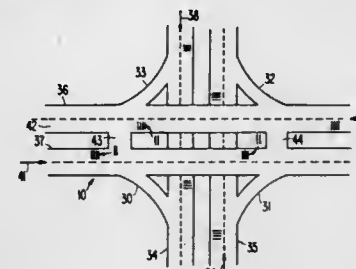


at low tide corresponding with the approximate height of the base of the module.

**4,790,684**  
**ROADWAY WARNING SYSTEM**  
Wilbur R. Adams, Terre Haute, Ind., assignor to Simulators Limited, Inc., Terre Haute, Ind.  
Continuation-in-part of Ser. No. 65,937, Jan. 23, 1987. This application Jul. 16, 1987, Ser. No. 74,260  
Int. Cl.<sup>4</sup> E01F 9/04, 9/10

U.S. Cl. 404—16

8 Claims

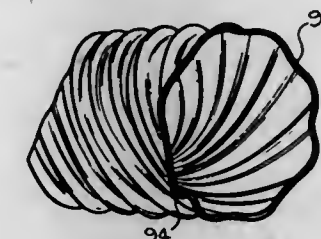


1. A warning system for a multi-lane roadway, said system comprising a roadway extending in a first direction and in a second direction, said roadway having a first plurality of lanes designated for traffic flow in said first direction, said system further comprising a plurality of strip members, said strip members having a bottom side and a first edge and a second edge, said first edge being longer than said second edge, wherein said bottom side of said strip members are attached to said roadway in a grouped and spaced fashion such that said first edges are substantially parallel to each other, said group of strip members being placed only in the left-most lane as referenced by persons situated in said first plurality of lanes and facing said first direction and in the right-most lane as referenced by persons situated in said first plurality of lanes and facing opposite said first direction.

**4,790,686**  
**PROTECTED METAL ARTICLE**  
Christy Christ, Trenton; Herbert F. Campbell, Franklin, both of Ohio; Gayle P. Fields, Ashland, and James L. Barris, Russell, both of Ky., assignors to Armco Inc., Middletown, Ohio  
Division of Ser. No. 849,986, Apr. 10, 1986, Pat. No. 4,716,075.  
This application Oct. 5, 1987, Ser. No. 104,742

Int. Cl.<sup>4</sup> E01F 5/00  
U.S. Cl. 405—124

4 Claims



1. A ferrous base drainage culvert having a composite protective coating on at least one side, the coating including an inner hot dipped metallic coating layer, an outer bituminous layer and an intermediate heat resistant fibrous layer, the improvement comprising:  
the fibrous layer including a nonwoven, permeable, fusion bonded, composite paper of synthetic polymer staple fiber and fibril binding agent,  
said synthetic polymer having a degradation temperature above the melting point of the metallic coating,  
said fibrous layer being continuously embedded in said metallic coating layer,  
the bituminous layer being continuously bonded by said fibers,  
whereby said composite coating is strongly bonded to said ferrous base and provides good corrosion protection.

**4,790,685**  
**SHORELINE BREAKWATER FOR COASTAL WATERS**  
Thomas P. Scott, P.O. Box 234, Tice, Fla. 33905, and Jerry Todd, Sr., 513 SE. 24th Ave., Apartment 4, Cape Coral, Fla. 33904  
Continuation of Ser. No. 868,326, May 28, 1986. This application Jan. 15, 1987, Ser. No. 3,475  
Int. Cl.<sup>4</sup> E02B 3/04

U.S. Cl. 405—30

3 Claims

1. A resilient module for use as a shoreline breakwater for placement in coastal waters, the module being generally triangular in shape and having base side and hypotenuse faces, wherein the hypotenuse provides the supporting face of the module in the coastal waters, and the acute angled side pro-

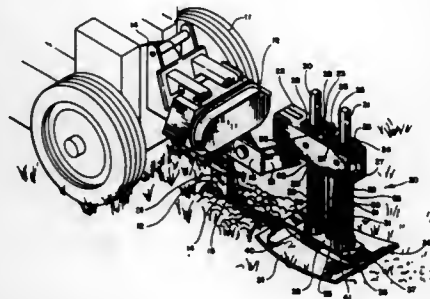
**4,790,687**  
**TAMPER ATTACHMENT FOR VIBRATORY PLOW AND METHOD OF LAYING LINE AND CABLE**  
Alvin K. Wright, Rte. 14, Box 580, Hickory, N.C. 28601  
Filed Oct. 2, 1987, Ser. No. 103,903  
Int. Cl.<sup>4</sup> E02F 5/00

U.S. Cl. 405—182

12 Claims

1. A tamper attachment for a vibratory plow vehicle of the type wherein vibrating means imparts vibrations to a plow which is used to plow a narrow, relatively shallow furrow to receive a line or cable, said tamper attachment comprising:  
(a) attachment means for attaching the tamper to the vibrating means of the plow;  
(b) a housing fixedly secured to said attachment means;

- (c) a tamper foot positioned below said housing in ground contacting relation for rapidly impacting the ground in response to vibrations transmitted by said vibratory means for closing and tamping the furrow opened by the vibratory plow;
- (d) a pair of spaced apart, spring loaded tamper foot guide



arms connected to said tamper foot and slidably mounted in said housing for transmitting rapid up and down movement from the vibrating means through the housing to the tamper foot; and

(e) a tamper adjustment arm connected to said tamper foot and mounted in said housing for limiting reciprocatory movement of the tamper foot guide arms.

4,790,688

#### LANDFILL LEACHATE CONTROL PROCESS AND PRODUCT

Trevor P. Castor, Cambridge, Mass., assignor to Esg, Inc., Cambridge, Mass.

Filed Jan. 28, 1987, Ser. No. 7,793

Int. Cl.<sup>4</sup> E02D 3/12

U.S. Cl. 405—128

10 Claims

1. A method for treating the geologic base of a waste landfill to prevent the migration of waste from the landfill to the surrounding environment comprising:

selecting a gellable solution which in a gelled state is impermeable to and resistant to degradation by said waste, said gellable solution including a waste-active material capable of acting on the waste in the landfill,

creating a fracture in said geologic base,

filling said fracture with said gellable solution, and

allowing or causing said gellable solution to gel thereby forming an impermeable barrier beneath the waste for blocking the migration of waste from the landfill.

4,790,689

#### METHOD AND APPARATUS FOR PRODUCING A SUPPORT ELEMENT IN THE GROUND

Günter Henn; Manfred Stocker, both of Schrobenehausen; Erwin Stötzer, Alchach; Konrad Friedrich, and Thomas Baner, both of Schrobenehausen, all of Fed. Rep. of Germany, assignors to Baner Spezialtiefbau GmbH, Schrobenehausen, Fed. Rep. of Germany

Filed Jul. 17, 1987, Ser. No. 74,741

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1986, 3624202

Int. Cl.<sup>4</sup> E02D 5/34

U.S. Cl. 405—240

15 Claims

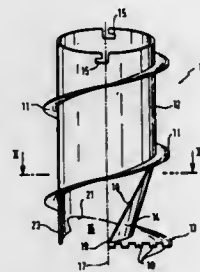
1. A method for producing a columnar support element in the ground, comprising the steps of:

providing a cylindrical core tube having a longitudinal axis, a hollow interior space and an outlet opening, the core tube having an inclined wedge surface extending into the hollow space of the core tube and a cutting edge extending perpendicularly to the axis at a lower end of the wedge surface;

sinking a hole through non-load bearing soil at least down to load bearing soil by rotating the core tube in a first direc-

tion and axially moving the cylindrical core tube so that the cutting edge cuts through non-load bearing soil; simultaneously displacing said non-load bearing soil radially outward into an area surrounding said hole by said inclined wedge surface;

feeding support material into the hollow interior space of said cylindrical core tube;



retracting the cylindrical core tube from the hole so that the support material pours through said hollow interior space and through said outlet opening into said hole;

rotating the core tube in a second, opposite direction so that the cutting edge covers the entire cross-section of the hole; and

tamping said support material into said hole during axial movement of the cylindrical core tube out of said hole by means of said cutting edge.

4,790,690

#### STABILISED EARTH STRUCTURES

Henri Vidal, 8 bis, Boulevard Maillot, Neuilly-sur-Seine, France, and Daniel Weisbach, Rexdale, Canada, assignors to Henri Vidal, Neuilly-sur-Seine, France

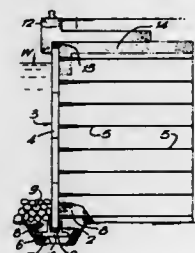
Filed Jan. 29, 1987, Ser. No. 7,994

Claims priority, application United Kingdom, Feb. 5, 1986, 8602783

Int. Cl.<sup>4</sup> E02D 29/02

U.S. Cl. 405—262

12 Claims



1. A method of constructing a stabilised earth structure under water, comprising lowering a base unit on to a site under water, lowering into a position immediately above said base unit a facing unit to which is attached at least one elongate flexible reinforcement for stabilising the earth, the facing unit being guided during lowering by at least one guide member connected to the base unit, and backfilling the base and facing units with earth to cover the or each reinforcement, wherein the base unit comprises an elongate box and support material is introduced into said elongate box to provide means for supporting said facing unit with its lower edge horizontal, the guide member being substantially rigid and connected to the elongate box such that the rigid guide member is adjustable to a vertical orientation.

4,790,691

#### FIBER REINFORCED SOIL AND METHOD

W. Wayne Freed, 100 Woodshore Dr., Columbia, S.C. 29223

Filed Oct. 3, 1986, Ser. No. 914,871

Int. Cl.<sup>4</sup> E02D 3/12

U.S. Cl. 405—263

9 Claims

1. Reinforced soil having improved engineering properties for construction and excavation purposes comprising:

natural soil selected from the group consisting of gravel, sand, silt, clay and mixtures thereof; and

from about 0.1 to 5 percent by weight of a fiber additive mixed therein to improve the punching shear resistance, the total angle of internal friction, the average total cohesion and the average initial tangent modulus of said soil, said fiber additives being selected from the class consisting of thermoplastic polymers and fiberglass which fiber additives do not deteriorate in soil.

4,790,692

#### ARRANGEMENT FOR TRANSPORTING DISINTEGRATED PARTICULATE SOLIDS

Yorgi Banyoz, Malmö; Ulrik Rasmussen, Naestved, and Ib Larsen, Vissenbjerg, both of Denmark, assignors to Fläkt AB, Nacka, Sweden

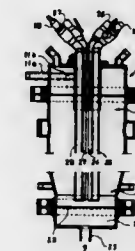
Continuation of Ser. No. 802,016, Nov. 25, 1985. This application Mar. 4, 1987, Ser. No. 21,753

Claims priority, application Sweden, Dec. 4, 1984, 8406142

Int. Cl.<sup>4</sup> B65G 33/52

U.S. Cl. 406—181

16 Claims



1. A pulverized or powdered coal burning arrangement having:

- (a) at least one powdered-coal burner connected to a combustion furnace provided with a fire hearth, where primary air is supplied to said fire hearth through a first conduit, having an open end arranged adjacent the powdered-coal burner, and secondary air is supplied to said fire hearth through a second connection,
- (b) a powdered-coal transporting arrangement, including a first conduit, through which powdered coal is fed from a unit continuously to said at least one powdered-coal burner,
- (c) a second conduit for transporting to said unit from a vessel, by pressurized air, said mixture of powdered coal and air having a powdered-coal to air weight ratio higher than the powdered-coal to air weight ratio in said first conduit connected to said at least one powdered-coal burner wherein said unit is effective to transform incoming powdered-coal to air weight ratio into a lower powdered-coal to air weight ratio by supplying to said unit pressurized air through a third conduit so that prepared powdered coal stored in a silo, can be transported to said burner through at least two transporting stages, a first stage where the powdered-coal to air weight ratio in said second conduit shall be greater than twenty and a second stage where the powdered-coal to air weight ratio in said first conduit shall be greater than five, a junction between the first and the second stages arranged in the proximity of the powdered-coal burner and said pressurized air supplied through said third conduit is also used in said burner, and
- (d) the powdered-coal/air mixture for the first stage being

supplied to the unit through a conduit extending substantially tangentially in an upper region of the unit; and a plurality of conduits, one for said at least one powdered-coal burner extending vertically through the container with exit orifices of said plurality of conduits located adjacent one another in a lower region of the unit.

4,790,693

#### INTERFITTING ON-EDGE INSERTS FOR MILLING CUTTERS

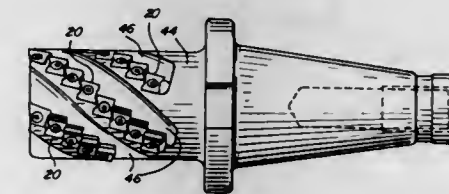
Robert T. Koblesky, Rockford, Ill., assignor to Ingersoll Cutting Tool Company, Rockford, Ill.

Continuation of Ser. No. 11,591, Feb. 6, 1987, abandoned. This application Jul. 1, 1988, Ser. No. 214,862

Int. Cl.<sup>4</sup> B23C 5/10, 5/20

U.S. Cl. 407—35

6 Claims



1. An on-edge insert for milling cutters comprising a flat, six-sided block of cutting material having two major parallel plane faces constituting the seating and clearance faces respectively of the insert and two opposed minor edge surfaces providing two parallel cutting edges of equal rake angle by their respective intersections with at least one of said major faces and constituting the rake faces of the insert, said block having two additional opposed minor edge surfaces extending between said two major faces and said two first-mentioned minor edge surfaces, each of said last-mentioned minor edge surfaces being complementarily shaped by an indentation centrally of its major dimension to define a lateral projection of the block at each corner of the major faces and a recess in each of said last-mentioned minor edge surfaces extending between the lateral projections thereof and between said major faces to receive therein the lateral projection of an adjacent like insert in an interfitting array of such inserts with circumferentially offset cutting edges collectively constituting an uninterrupted effective cutting edge.

4,790,694

#### METHOD AND SYSTEM FOR MULTI-LAYER PRINTED CIRCUIT BOARD PRE-DRILL PROCESSING

John W. Wilent; Robert F. Benson, both of San Jose, and Robert A. Sparks, Palo Alto, all of Calif., assignors to Loma Park Associates, Campbell, Calif.

Filed Oct. 9, 1986, Ser. No. 916,779

Int. Cl.<sup>4</sup> B23C 3/00

U.S. Cl. 408—1 R

13 Claims

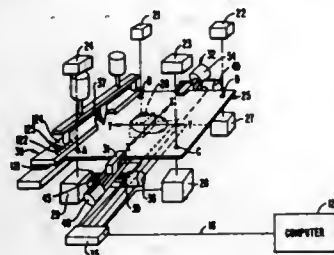
1. A method of preparing a multi-layer printed circuit board for automatic drilling in a drilling apparatus, said board comprising a laminated stack of individual boards each having a plurality of target areas located at predetermined locations thereon so that corresponding target areas on different individual boards overlap, said method comprising the steps of:

(a) positioning said multi-layer board in an inspection fixture;

(b) examining said target areas with a radiation source and a detector;

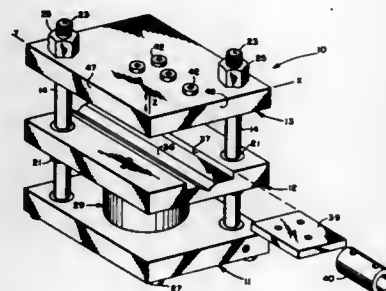


(c) comparing the locations of said target areas with predetermined location coordinates; and



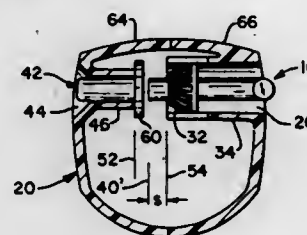
(d) marking said multi-layer board with reference indicia providing optimum positioning for the multi-layer board in the drilling apparatus.

**4,790,695**  
**MODULAR DRILL JIG AND METHOD OF MAKING SAME**  
Robert R. Abernethy, 6541 Brookhill Dr., Garfield Hts., Ohio 44125  
Filed May 24, 1982, Ser. No. 381,196  
Int. Cl.<sup>4</sup> B23B 47/28  
U.S. Cl. 408—115 R 15 Claims



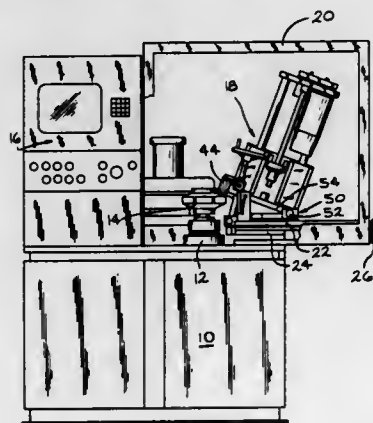
1. A drill jig comprising a bushing plate adapted to have one or more drill guide bushings located therein, and means for clamping a part to be drilled to said bushing plate, said bushing plate having at least two precision machined flat and adjacent right angle edge faces defining orthographic reference planes for use as a reference in locating precisely the orthogonal coordinates of the drill guide bushings in said bushing plate, said means for clamping including a tool plate, said tool plate also having at least two precision machined flat and adjacent right angle edge faces, said bushing and tool plates having opposed clamping faces which are precision machined flat at right angles to the respective precision machined edge faces thereof, said clamping face on said tool plate having locating means for positioning in relation to said bushing plate a part to be drilled, said precision machined edge faces on said tool plate defining orthographic reference planes for use as a reference in locating precisely the orthogonal coordinates of said locating means on said tool plate, an at least two guide posts fixed in respective guide post bores in one of said plates at right angles to the clamping face thereof and slidably received in respective guide post bores in the other of said plates and cooperative therewith to maintain parallel and vertically aligned the clamping faces of said plates, the corresponding precision machined edge faces of said bushing and tool plates also being co-planar.

**4,790,696**  
**CHUCK KEY MOUNTING AND EJECTOR ARRANGEMENT**  
Edward A. Williams, Southam, England, assignor to The Stanley Works, New Britain, Conn.  
Filed Dec. 3, 1987, Ser. No. 128,268  
Int. Cl.<sup>4</sup> B25F 5/02; B23B 45/00  
U.S. Cl. 408—241 R 11 Claims



1. An arrangement for detachably mounting a chuck key or the like having a key head, onto the housing of a tool, comprising:  
a tool having a housing;  
first and second coaxial openings on opposite sides of the housing;  
means for guiding the key head through said first opening into the interior of the housing;  
means coaxial with the means for guiding, for retaining the key head within the housing; and  
means associated with said second opening for reciprocating toward and away from said first opening to selectively disengage said key head from its retained position within said means for retaining the key head.

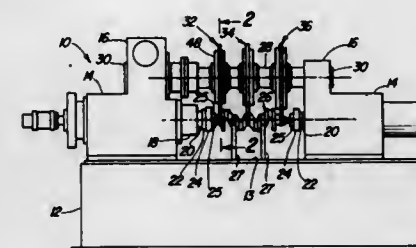
**4,790,697**  
**AUTOMATIC GRINDER**  
Gordon E. Hines, Ann Arbor; Lee D. Case, Monroe, and Ronald W. Anderson, Ann Arbor, all of Mich., assignors to Hines Industries, Inc., Ann Arbor, Mich.  
Filed May 21, 1987, Ser. No. 52,835  
Int. Cl.<sup>4</sup> B23C 3/00; G01M 1/38  
U.S. Cl. 409—133 24 Claims



1. A process for determining the amount and angle of workpiece unbalance and applying a corrective removal application comprising the steps of:  
positioning a workpiece on a support;  
rotating such workpiece to determine the amount and angle of unbalance in the workpiece;  
stopping the rotation of the workpiece and orienting the workpiece relative to a material removal device;  
calculating a material removal rate for the workpiece, such

calculation being based upon a data base having correction information relating to specific correction parameters;  
positioning said material removal device into contact with the workpiece;  
activating such material removal device to eliminate workpiece material according to said calculated material removal rate.

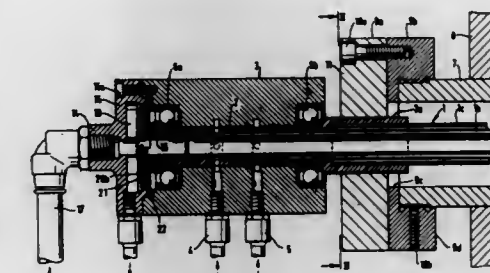
**4,790,698**  
**MONOTONIC CUTTING MACHINE**  
Allan J. Heffron, Midland, Mich., assignor to CM Systems, Incorporated, Midland, Mich.  
Filed May 13, 1987, Ser. No. 49,607  
Int. Cl.<sup>4</sup> B23C 1/00  
U.S. Cl. 409—200 12 Claims



1. An apparatus for machining a workpiece, said workpiece having a centerline, said apparatus comprising:  
a lathe bed;  
means for detachably mounting said workpiece to said lathe bed with said workpiece centerline disposed in a predetermined direction;  
means for rotating said workpiece around said centerline in a first rotational direction and at a first rotational speed;  
an arbor having a longitudinal axis spaced from and parallel to said workpiece centerline;  
means for rotating said arbor about said longitudinal axis in a second rotational direction and at a second rotational speed, said second rotational direction being the same as said first rotational direction;  
a planar disk perpendicularly mounted to said arbor and being rotatable therewith so as to define a disk center; and  
a sequential plurality of tools attached to the circumference of said disk at circumferentially spaced positions therealong, said teeth increasing in radial spacing from said disk center from one angular position and to a second angular position on said disk, wherein said disk rotates a single revolution per machining operation,  
wherein said first rotational speed is substantially greater than said second rotational speed so that rotation of said workpiece against said tools removes material from said workpiece.

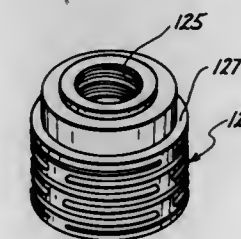
**4,790,699**  
**AIR FEED TUBE ASSEMBLY FOR A PNEUMATIC CHUCK**  
Michael Ringel, Ramat Gan, Israel, assignor to Amcor Ltd., Tel-Aviv, Israel  
Filed Apr. 20, 1987, Ser. No. 40,162  
Claims priority, application Israel, Apr. 22, 1986, 78582  
Int. Cl.<sup>4</sup> B23Q 5/04; B23B 31/30  
U.S. Cl. 409—231 4 Claims  
1. A rotary coaxial air feed tube assembly for a pneumatic chuck, comprising  
a first end of said assembly for screw coupling to a pneumatic chuck;  
a second end of said assembly for coupling to a rotary air feed joint;

a first outer collar component to be secured to said drive spindle;  
a second and inner collar component to be secured to said tube assembly, and  
adjacent surfaces of said components provided with axially directed interengaging serrations,



said collar components constituting a two piece annular collar and constituting keying means for coupling said feed tube assembly to a rotary drive spindle so as to impart a rotary drive to said assembly and said pneumatic chuck.

**4,790,700**  
**INTEGRAL SPRING FLEXURE FOR USE WITH HIGH SPEED ROTATING SHAFTS**  
Everett H. Schwartzman, 2751 Toledo St., Ste. 309, Torrance, Calif. 90503  
Continuation-in-part of Ser. No. 635,716, Jul. 30, 1984, Pat. No. 4,640,653. This application Dec. 12, 1986, Ser. No. 940,948  
Int. Cl.<sup>4</sup> B23Q 3/12; F16F 1/02  
U.S. Cl. 409—233 9 Claims



1. An integral machined spring assembly comprising:  
spring means including a cylindrical body member having spaced end faces,  
said cylindrical body member including wall means between said end faces,  
said wall means including a plurality of tiered slots and lands and solid sections located between said slots,  
said slots and solid section extending circumferentially of said body and said slots alternating with a solid section, said slots being disposed such that there is at least one land disposed axially with respect to said slot,  
said end faces including an adjacent slot with the remainder of said slots being disposed between said adjacent slots, the remainder of said slots having a predetermined axial width dimension, and  
said adjacent slots having a predetermined axial width dimension which is less than the predetermined axial dimension of the remainder of said slots.

4,790,701

**FLOATING FASTENER RETAINER ASSEMBLY WITH REMOVABLE FASTENERS**

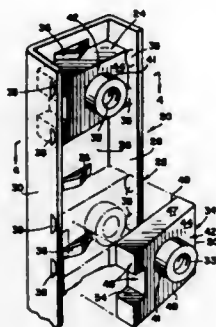
Richard C. Baubles, Maplewood, N.J., assignor to Jacobson Mfg. Co., Inc., Kenilworth, N.J.

Filed May 8, 1987, Ser. No. 47,139

Int. Cl.<sup>4</sup> F16B 27/00; E04B 1/38

U.S. Cl. 411—85

24 Claims



1. A fastener assembly comprising:
  - a channel member having a web portion and two spaced apart flange portions extending from the same side of said web portion;
  - at least one fastener captivated by said channel member, each captivated fastener including a base defined by opposed sides;
  - for each captivated fastener, said channel member including one or more discrete projections extending from at least one of the flange portions over the respective captivated fastener base towards the other flange portion;
  - there being an opening into the channel member extending between one projection on said one flange portion and an opposed flange portion or between one projection on said one flange portion and a projection extending from the opposite flange portion depending on the number and locations of projections used for retaining each fastener;
  - said channel member, said one or more discrete projections extending over a captivated fastener base and each captivated fastener base being sized such that each captivated fastener has limited movement with respect to said channel member when the base of each captivated fastener is positioned in said channel member between said web portion and respective one or more discrete projections extending from at least one of said flange portions, and such that removal of a captivated fastener base through said opening is prevented while said channel member is unflexed;
  - said one or more discrete projections extending from at least one of said flange portion having configuration which facilitates the insertion of the base of each captivated fastener into said channel member through said opening, such that when one side of each captivated fastener base is disposed in said channel member the opposite side rests on at least one of said discrete projections having said configuration, said channel member being elastically flexible such that the application of a relatively small force to said fastener base causes elastic flexing of said channel member such that at least one flange portion moves outwardly a distance sufficient for said fastener base to clear said one or more projections extending from said one flange portion and be seated in said channel member between said web portion and said one or more discrete projections;
  - said fastener base further having configuration for facilitating removal of said fastener base from said channel member through said opening, said fastener base configuration being disposed adjacent at least one of said opposed sides of said fastener base which at least one side is disposed

adjacent a flange portion of said channel member when said fastener base is captivated in said channel member; for each captivated fastener, said at least one projection, if it be projecting from said flange portion adjacent said configuration of said fastener base, being sized and positioned so as to permit access to said fastener base configuration for removing said fastener base from said channel member.

4,790,702

**NUT AND BOLT ASSEMBLY**

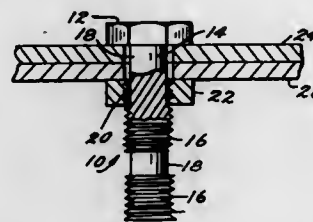
Nicholas H. Maganias, Reston Medical Bldg., 1715 Club House Rd., Reston, Va. 22090

Filed Mar. 27, 1986, Ser. No. 844,938

Int. Cl.<sup>4</sup> F16B 35/04

U.S. Cl. 411—412

3 Claims



1. An assembly of elements comprising at least one member having an unthreaded hole therethrough; a one-piece bolt having a head at one end thereof extending through the hole, the bolt having external a plurality of alternate threaded and unthreaded portions along its length; and a nut having an internal threaded portion which is threadably engageable with one of the threaded portions of the bolt, the nut having an internal diameter large enough to allow the nut to slide axially along the unthreaded bolt portions and the threaded portion of the nut being no greater than the axial dimension of each unthreaded bolt portion, and the threaded nut portion residing wholly on an unthreaded portion of the bolt, with an axially facing surface of the nut in engagement with said one member and the end of the nut thread remote from said one member abutting the end of the thread of one of the threaded bolt portions whereby the nut is clamped to said one member.

4,790,703

**PREVAILING TORQUE FASTENER ASSEMBLY**

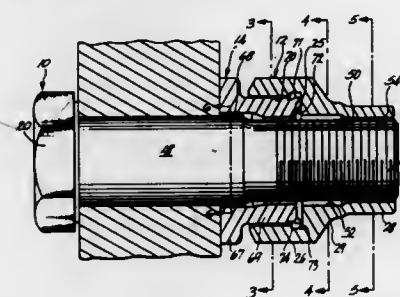
George S. Wing, 531 Esplanade, Apartment 515, Redondo Beach, Calif. 90277

Filed Apr. 24, 1987, Ser. No. 42,358

Int. Cl.<sup>4</sup> F16B 39/16

U.S. Cl. 411—260

22 Claims



1. An improved fastener assembly of a male fastener with a threaded shank engaged with a female fastener with a threaded axial bore comprising:
  - (a) a tri-lobular shape of the shank having three equiangularly spaced lobes with a side between each lobe, the

tri-lobular shape having the same diametric dimension regardless of where taken around 360°; and

- (b) the female fastener having a base and a barrel, the threaded bore extending through both the base and the barrel as a continuous thread with the thread in the barrel having a smaller pitch diameter than the thread in the base, a radius to the tip of a lobe being greater than a radius to the root of the thread in the barrel, the female thread in the barrel when unstressed being substantially circular in cross-sections taken perpendicular to the axis of the female fastener but being elastically deformed into substantial conformity with the tri-lobular shape by the thread engagement between the barrel and the shank to form a prevailing torque thread lock, the female thread in the base being in threaded engagement with the shank and in such engagement being circular in cross-sections taken perpendicular to the axis of the nut.

4,790,704

**RETAINER ASSEMBLY**

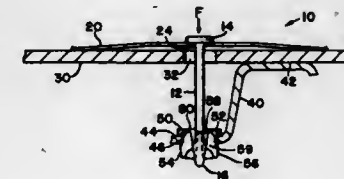
Robert B. Temple, Granger, and Donald D. Johannesen, South Bend, both of Ind., assignors to Allied-Signal Inc., Morristown, N.J.

Filed Sep. 22, 1987, Ser. No. 99,869

Int. Cl.<sup>4</sup> F16B 21/18

U.S. Cl. 411—522

12 Claims



1. A retainer assembly for maintaining a first member in engagement with a second member, comprising a retainer body which extends longitudinally between a head member at one end and a flared member at the other end, a resilient member having an opening receiving the retainer body and abutting the head member, the resilient member disposed between said head member and a surface of the first member so that the retainer body extends through an opening in the first member, the second member having a pair of surfaces spaced apart from one another and one of the pair of surfaces having an opening, a receiving member disposed within the opening in the second member and having a passage therethrough, the receiving member gripping flexibly the second member so that insertion of the flared member through the passage in the receiving member causes the receiving member to be deformed resiliently by the flared member and then return toward an initial position wherein the receiving member retains the retainer body by means of engagement with the flared member, the resilient member biasing the head member so that the flared member retracts slightly axially the receiving member through the opening in the second member to cause the receiving member to capture securely the flared member, the receiving member including a stepped exterior circumference which engages said opening in the second member so that the slight axial retraction of the receiving member through the opening in the second member causes the receiving member to contract and engage more tightly the flared member, and the retainer assembly biasing the first member into engagement with the second member.

4,790,705

**METHOD OF FORMING A BUCKLE RESISTANT CAN END**

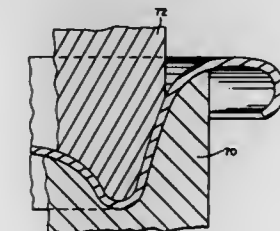
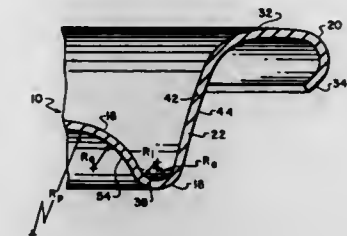
Harlen E. Wilkinson, Crystal Lake, and Neal E. Langseder, Rolling Meadows, both of Ill., assignors to American National Can Company, Chicago, Ill.

Division of Ser. No. 307,209, Sep. 30, 1981, abandoned, which is a continuation-in-part of Ser. No. 112,569, Jan. 16, 1980, abandoned. This application Feb. 11, 1987, Ser. No. 13,599

Int. Cl.<sup>4</sup> B21D 51/44

U.S. Cl. 413—8

1 Claim



1. A method for reforming an end closure for a tubular container body to enhance the buckle resistance thereof, wherein said closure includes a central panel extending laterally from a central longitudinal axis of rotation merging downwardly at its periphery into an upwardly facing countersink groove having a lowermost central portion, the outer extremity of said groove merging into an upwardly and outwardly extending countersink wall and terminal peripheral flange comprising the steps of:

- (a) engaging said upwardly facing countersink groove between a punch and a die to trap the wall of said groove therebetween, wherein said groove is reformed and set with an outer arcuate wall portion and an inner arcuate wall portion, said wall portions merging at a root, and wherein said outer arcuate wall portion has a radius of curvature of about 0.020"—0.025" and said inner arcuate wall portion has a radius of curvature of about 0.035"—0.045" and wherein the origin of said outer radius and the origin of said inner radius are both located on a common axis, said axis being normal to said countersink groove at said root;
- (b) inwardly bowing said countersink wall along a continuous arc from its mergence with said flange to its mergence with said outer arcuate wall; and
- (c) doming said central panel to severely stretch said central panel beyond its yield point and make said central panel taut said doming being effected while said inner and outer arcuate wall portions are entrapped between said punch and said die and wherein said entrapped wall portions are constrained from being drawn inward toward said central panel as said doming is effected.

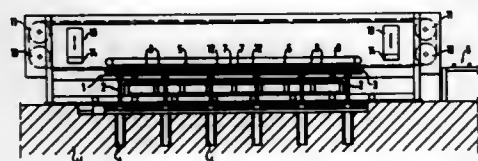


**4,790,706**  
**DISTRIBUTING DEVICE FOR PLACING**  
**INTERMEDIATE ELEMENTS ONTO A LAYER OF**  
**ELONGATE MATERIAL**

Friedrich W. Elhans, Dorfstr. 21, D-7761, Moos, Fed. Rep. of Germany  
 Continuation of Ser. No. 739,562, May 30, 1985, abandoned.  
 This application Aug. 6, 1987, Ser. No. 83,916  
 Claims priority, application Fed. Rep. of Germany, Jun. 1, 1984, 3420602

Int. Cl. B65G 57/06, 57/18  
 U.S. Cl. 414-42

17 Claims



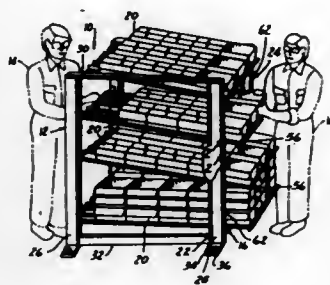
9. A distributing device for placing intermediate elements onto a layer of elongate material such as aluminum sections or the like, to form a material stack in a stacker which comprises a stacking table adapted to be lowered relative to a stacking plane and a roller bed which includes a head and spaced rollers disposed between two lateral chains for conveying the material into a stacking location over the stacking table and within the stacking plane and which is adapted to be removed from the stacking location in parallel to the stacking plane, said distributing device comprising an intermediate-element distributor positioned at the head of said roller bed adapted to be taken along thereby, said distributor successively placing intermediate elements onto the material layer as said roller bed is removed from the stacking location.

**4,790,707**  
**MODULAR PARTS SUPPLY RACK**  
 Eugene Magretta, Redford Township, Wayne County, Mich., and Steven A. Read, Pickering, Canada; assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Mar. 14, 1988, Ser. No. 168,023  
 Int. Cl. B65G 1/08

U.S. Cl. 414-276

5 Claims



1. A modular parts supply rack for supplying a plurality of containers filled with small parts from a loading end to a delivery end for use by vehicle assembly line operators and for return of empty nested containers from the delivery end to the loading end, the rack comprising a pair of upstanding spaced apart side walls each having a loading end and a delivery end, at least three vertically spaced apart loading end support bars extending between said loading ends of the side walls, at least three delivery end support bars extending between said delivery ends of the side walls, detachable fastening means securing each end of each support bar to its respective side wall, each loading end support bar being paired with the delivery end support bar occupying the same vertical sequential position, the lowermost loading end support bar being at substantially

the same vertical level as the lowermost delivery end support bar, the loading end support bar of each of the remaining pairs of support bars being at a higher vertical level than its paired delivery end support bar, the lowermost loading end support bar and the delivery end support bars of said remaining pairs having a generally circular cross-section, a plurality of side-by-side slide members extending between each set of paired support bars, the lowermost slide members extending substantially horizontally for manual return of empty nested containers from the delivery end to the loading end, the remaining slide members being angled downwardly from the loading end support bars to the delivery end support bars for gravity feed of filled containers from the loading end to the delivery end, each slide member including a generally C-shaped mounting bracket structure at each end thereof in detachable engagement with the paired support bars between which the slide member extends, each C-shaped bracket structure having an open mouth, the mouth of the C-shaped bracket structure engaging the support bars which have a generally circular cross-section facing towards the opposite end of the rack with said bracket received on said support bar, the mouth of the other C-shaped bracket structure facing downwardly with said bracket received on the other support bar of the pair, whereby the slide members each are mountable on a pair of support bars by first hooking the C-shaped bracket structure having its mouth facing towards the opposite end of the rack onto the support bar having a generally circular cross-section with the other C-shaped bracket positioned above the other support bar of the pair and then pivoting the slide member downwardly using said hooked support bar as a pivot to engage the other C-shaped bracket with the other support bar of the pair.

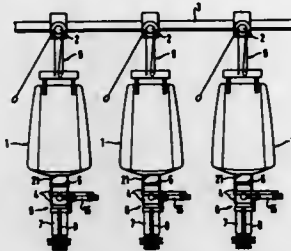
**4,790,708**  
**DEVICE FOR EMPTYING CONTAINERS**  
 Andreas von Bennigsen-Mackiewicz, and Christoph von Bennigsen-Mackiewicz, both of Mühlenstr. 17, D-3211 Banteln, Fed. Rep. of Germany

Filed Jul. 17, 1986, Ser. No. 886,372  
 Claims priority, application Fed. Rep. of Germany, Oct. 8, 1985, 8528561[U]

Int. Cl. B65G 65/23

U.S. Cl. 414-403

25 Claims



1. In an apparatus for emptying a flexible or rigid container having a flexible discharge stub with a given inside diameter for holding in-bulk goods, said discharge stub being sealable by being tied shut and issuing into an emptying apparatus from where said in-bulk goods are conveyed out by partial vacuum or free fall, the improvement comprising:

said emptying apparatus (6) comprising an upright cylindrical housing (7) having an outside diameter less than said inside diameter of said discharge stub (4), said housing when connected to said discharge stub being spanned by said discharge stub, at least two jaws (10) pivotably mounted for opening and closing by actuating means around the entire periphery of said discharge stub around said housing and a space between said jaws and said housing when closed, at least one longitudinal stretchable elastic which in a closed state of said jaws rests while

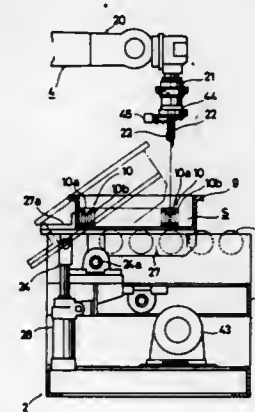
prestressed over said entire periphery of said discharge stub spanning said housing, said elastic located in said space and attaching to said jaws.

**4,790,709**  
**ARTICLE PICKING UP MECHANISM**  
 Hideharu Sakimori; Hiroyuki Hayashi, both of Hiroshima; Daijiro Ida, Narashino, and Seiji Takahashi, Sakura, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 28, 1987, Ser. No. 78,787  
 Claims priority, application Japan, Jul. 30, 1986, 61-180871  
 Int. Cl. B65G 65/02

U.S. Cl. 414-416

12 Claims



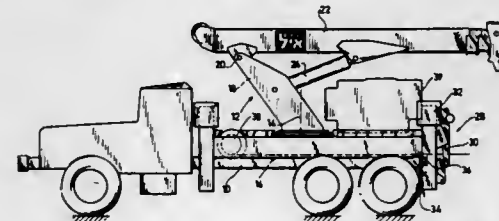
1. An article picking up mechanism for picking up articles one by one from a container in which the articles are located, said mechanism comprising tiltable base means for receiving the container and tilting the container so that the articles in the container are shifted to one side of the container leaving a space at the other side, and manipulator means for shifting an article in the container toward a location in said space where the relocated article does not contact any other article in the container, the manipulator means including gripping means for gripping said relocated article in the container, said gripping means including radially expandable finger means including inner fingers and outer fingers radially displaced outwardly of said inner fingers.

**4,790,710**  
**TOW TRUCK**  
 Israel Ayalon, Ramat Hasharon, Israel, assignor to Eyal Engineering & Industrial Co. Ltd., Herzliya, Israel

Filed May 9, 1986, Ser. No. 861,552  
 Claims priority, application Israel, May 9, 1985, 75141  
 Int. Cl. B60P 1/54, 3/12

U.S. Cl. 414-563

4 Claims



1. A multi-purpose integrated recovery vehicle comprising: a wheel mounted chassis defining a bed; a slewing crane mounted on said chassis; and a recovery assembly mounted at a rearward end of said

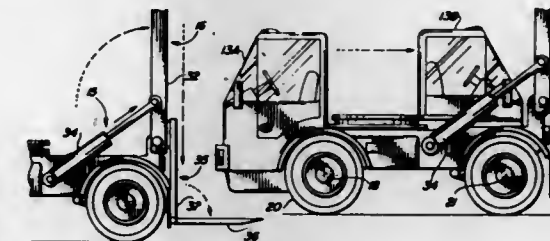
chassis at a location which does not interfere with the operation of the crane, said recovery assembly comprising an extensible and retractable towing assembly, a retractable anchor assembly, and a retractable stabilizer assembly, said retractable towing assembly being mounted rearwardly and below said bed of said chassis and comprising a base mounted onto said chassis, an intermediate member pivotally mounted onto said base, a telescoping member extendibly mounted onto said intermediate member, a first piston extending between said base and said intermediate member for orienting said intermediate member and a second piston extending between said intermediate member and said telescoping member for orienting said telescoping member relative to said intermediate member, and said retractable anchor assembly being arranged forwardly of said retractable towing assembly.

**4,790,711**  
**SELF-LOADING AND UNLOADING TRUCK TRAILER ASSEMBLY**  
 Timothy T. Calaway, 4812 E. Virginia Ave., Phoenix, Ariz. 85008-1623

Filed Apr. 15, 1988, Ser. No. 182,169  
 Int. Cl. B60P 1/00

U.S. Cl. 414-635

7 Claims



1. A motor vehicle comprising: a wheeled chassis, a dual purpose operator's cab comprising a fixed first operator's portion including controls for operating the motor vehicle and a movable second operator's portion both located at one end of said chassis, a forklift assembly mounted at the other end of said chassis, said forklift assembly comprising a mast and a forklift for controlled movement along said mast, said mast being pivotally mounted at said other end of said chassis for movement about a horizontal axis from a position lying in a horizontal orientation on top of said chassis and extending longitudinally thereof to a vertically extending position located laterally of said other end of said chassis, a first means mounted on said chassis for pivoting said mast from said horizontally extending position to its vertically extending position and vice versa, horizontally extending and vertically rigid supporting and turning means mounting said second portion of said cab on said chassis for moving said second portion of said cab about a vertical axis located intermediate the length of said chassis for selective adjustment of said second portion of said cab either into a transit position at said one end of said chassis or into a cargo transfer position at said other end of said chassis, a reversible power transmitting means selectively operatively associated with said supporting and turning means so that actuation of said supporting and turning means by said power transmitting means in one direction will move said second portion of said cab from said transit to said cargo transfer position and in another direction will return said second portion of said cab to said transit position, and said second portion of said cab including controls for selec-

tively operating said forklift and said motor vehicle for cargo moving activity when said second portion of said cab is in said cargo transfer position.

4,790,712

## LOG LOADING APPARATUS

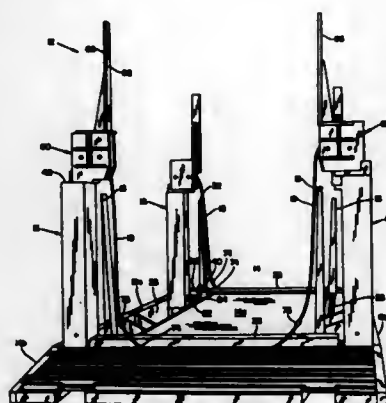
Dossie M. Batson, 85124 N. Cloverdale Rd., Creswell, Oreg. 97426

Filed Jul. 25, 1986, Ser. No. 889,336

Int. Cl. B65G 67/12

U.S. Cl. 414-399

21 Claims



1. An apparatus for loading and storing elongate load members, comprising:
  - a base frame;
  - at least two pairs of opposed extensible load support columns connected to the frame, the columns of each pair being laterally spaced across the frame from one another and each pair being spaced longitudinally of the frame from the other pair;
  - load support means on each column of a pair for cooperatively raising and supporting a load therebetween with the columns extended;
  - extensible leg means connected to the base frame to raise and lower the frame for loading and unloading the base frame from a vehicle;
  - the extensible leg means comprising sections of said extensible columns;
  - each column including means for extending said column in an upward direction from said base frame and means for extending said extensible leg means and base frame relative to one another to elevate said frame;
  - said means for extending said column and said means for extending said leg means including a common fluid-powered extensible cylinder means;
  - said extensible leg means comprising said extensible cylinder means.

4,790,713

## ARTICULATED MOTORCYCLE CARRIER

Robert W. Miller, 15946 Mariner Dr., Huntington Beach, Calif. 92649

Filed Jul. 13, 1987, Ser. No. 72,630

Int. Cl. B60R 11/00

U.S. Cl. 414-462

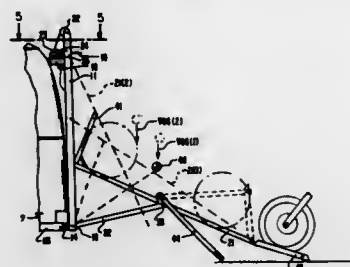
5 Claims

3. An articulated lifting structure attachable to the rear of a motor vehicle and conformed to support a motorcycle thereon, comprising:

- an elongate vertical channel member, of a first length selectively secured to the rear of said vehicle in vertical alignment therewith, said channel member including an upper and a lower end;
- an elongate track, of a second length, defined by a first end engaged for rolling translation along said channel member and a second end, and conformed for longitudinal receipt

within said channel member, said second length being substantially equal to said first length;

elongate link means pivotally engaged to said lower end and to said track intermediate said first and second ends, said elongate link means being of a third length substantially one half of said second length;



locating means fixed to said track for aligning said motorcycle thereon whereby the center of mass of said motorcycle is aligned proximate the pivotal connection of said link means to said track; and

lifting means for advancing said first end along said channel member, whereby the weight of said motorcycle assists in the advancement of said first end towards said upper end.

4,790,714

## EXPANDABLE CUBE TOY

Abraham Schnapp, 28 Yaffo Street, Haifa, Israel

Filed Dec. 31, 1986, Ser. No. 811

Int. Cl. A63H 33/00

U.S. Cl. 446-486

9 Claims



1. A toy in the shape of a collapsible and expandable box folded from a blank of a stiff sheet material, said box having an inside and an outside, adapted to be collapsed and flattened into a flat Greek cross by pressure on its top and to be expanded into a perfect cube by internal contracting means, upon release of said pressure, said box comprising

- a top and a bottom of identical square configuration, in parallel alignment,
- four square side walls hingedly attached to the edges of said top and said bottom, each said side wall being adapted to fold outwardly about a central folding line parallel to said edge of said top and bottom, by pressure applied onto said top urging it towards said bottom,
- four tongues, each of a width equal to the width of said side walls, one tongue each being hingedly attached to the inside of one of said side walls along said central folding line, and each said tongue being provided with at least one perforation, the added length of two opposite tongues being substantially equal to the width of said top and said bottom,

- at least two elastic contracting means, having their ends attached to said tongues on opposite sidewalls in crossed alignment by means of said perforations, and adapted to pull said opposite walls into perfect planes perpendicular to the planes of said top and said bottom, upon release of pressure on said top, whereby each said side wall is pre-

vented from being pulled inwardly by said tongues attached to the adjoining side walls.

4,790,715

## DUMP TRUCK ACCESSORY

Richard E. Alexander, 501 Okoboji Ave., Milford, Iowa 51351

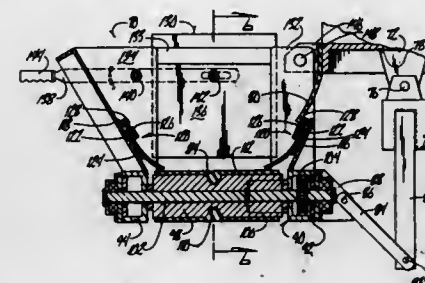
Continuation-in-part of Ser. No. 723,315, Apr. 15, 1985,

abandoned. This application Nov. 20, 1987, Ser. No. 123,127

Int. Cl. B60P 1/36

U.S. Cl. 414-489

6 Claims



1. A dump truck accessory for a dump truck having a vehicle frame with forward and rearward ends, and a truck box having forward and rearward ends, said truck boxes and said vehicle frames being pivotally connected adjacent their rearward ends whereby said truck box can pivot about a horizontal truck box axis from a lowered position to an elevated position; said accessory comprising:

- an accessory frame comprising forward and rearward channel frames spaced apart and parallel to one another and extending transversely of said vehicle, a plurality of spacer frames extending between said channel frames;
- first and second conveyor rollers extending between said channels frames in spaced apart parallel relation to one another, said first and second rollers being rotatably mounted for rotation about roller axes extending in the direction of travel of said vehicle, each of said rollers having an outer cylindrical surface and annular groove in said cylindrical surface;
- an endless conveyor belt trained around said conveyor rollers, said belt having forward and rearward edges and having an endless rib trained around said conveyor rollers and protruding within said annular grooves of said conveyor rollers,
- conveyor power means connected to said first conveyor roller for driving said first conveyor roller and said conveyor belt;
- roller mounting means movably mounting said second conveyor roller to said accessory frame for adjustable movement toward and away from said first conveyor roller;
- roller adjustment means connected to said roller mounting means for causing selective adjustable movement of said second conveyor roller relative to said first conveyor roller;
- a forward attached to said forward channel frame and extending upwardly and forwardly therefrom;
- a rearward wall attached to said rearward channel frame and extending upwardly and rearwardly therefrom;
- first and second end gates spaced apart from one another and spanning the distance between said forward and rearward walls, each of said end gates having a lower edge and being movable from a lower position wherein said lower edge is closely adjacent said conveyor belt to an upper position wherein said lower edge is spaced upwardly from said conveyor belt;
- first and second manually operable gate actuating means attached to said first and second gates respectively for causing said gates to move between said upper and lower positions;
- an elongated front flashing member having an upper edge

- attached to said forward wall and having a lower edge resting on said conveyor belt on a line spaced inwardly from said forward edge of said conveyor belt;
- an elongated rear flashing member having an upper edge attached to said rearward wall and a lower edge resting on said conveyor belt on a line spaced inwardly from said rearward edge of said conveyor belt;
- hinge means pivotally connecting said forward wall to said truck box for pivotal movement about a horizontal accessory axis located rearwardly of said truck box axis,
- leveling link means having a forward end pivotally connected to said truck frame for pivotal movement about a first horizontal link axis located below said truck box axis, and having a rearward end pivotally connected to said accessory frame for pivotal movement about a second link axis located below said accessory axis, whereby said leveling link will maintain said accessory frame in a substantially constant level orientation in response to pivotal movement of said truck box between said lowered and elevated positions;
- flap extension means attached to said rearward end of said truck body and engaging said front wall to permit the contents of said truck box to be deposited on said conveyor with a minimum of spillage to the ground.

4,790,716

## DEVICE FOR HANDLING A WHEELCHAIR

Sylvia J. McConnell, P.O. Box 4048, Opelika, Ala. 36801

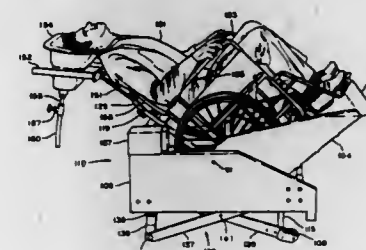
Continuation-in-part of Ser. No. 869,983, Jan. 3, 1986, Pat. No.

4,726,730. This application Mar. 31, 1987, Ser. No. 32,769

Int. Cl. A61G 7/10

U.S. Cl. 414-678

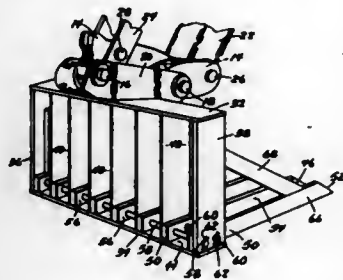
13 Claims



12. A device for lifting and tilting a wheelchair and a patient in said wheelchair comprising:
  - an elongated housing, said housing having a front end and a rear end;
  - means for supporting said housing;
  - a wheelchair receptacle pivotally attached to said housing;
  - means connected to said rear end of said housing for selectively lifting or lowering said rear end of said housing in a vertical direction;
  - jack means pivotally attached to said supporting means, said lifting means and said front end of said housing so that when said lifting means raises the said rear end of said housing, it also raises said jack means which in turn raises the said front end of said housing;
  - means connected to both said housing and said wheelchair receptacle for selectively tilting said wheelchair receptacle forward and backward; and
  - means for securely attaching said wheelchair and said wheelchair patient to said wheelchair receptacle.



4,790,717  
**IMPLEMENT FOR MOVING ROCKS AND THE LIKE**  
 Ronald L. Anderson, Burlington, Iowa, assignor to J. I. Case Company, Racine, Wis.  
 Filed Dec. 14, 1987, Ser. No. 132,773  
 Int. Cl.<sup>4</sup> B67C 1/00  
 U.S. Cl. 414—722 19 Claims



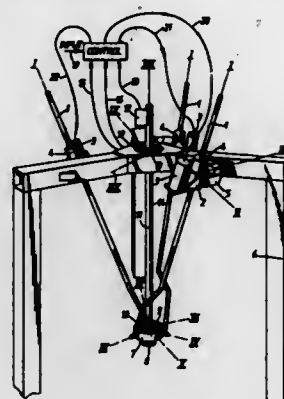
1. In a device for lifting and moving large rocks and the like from the ground of the type including a vehicle, a boom with a proximal end secured to the vehicle and a distal end movable with respect to the vehicle, and a scoop member secured at the distal end, the improvement wherein the scoop member comprises:

- a frame having a horizontal upper member and extending downwardly therefrom to a lower edge;
- means secured to the horizontal upper member and pivotally connected to the boom, the connection means including a pair of spaced pivot attachment means forming separate pivot axes to allow both lifting and tilting of the frame by the boom;
- means forming a shelf extending laterally from a proximal end along the frame lower edge to a distal end, the shelf means having a multiplicity of upwardly-facing support surfaces spaced thereacross and separated by substantial laterally-extending voids therebetween, thereby to support large rocks and the like without holding particulates; and
- means extending along and adjacent to the lower edge to removably attach the proximal end of the shelf means to the lower edge of the frame member selectively in either a forward position or a rearward position.

4,790,718  
**MANIPULATORS**  
 Mark G. Vickers, Littlethorpe, United Kingdom, assignor to The English Electric Company plc, London, United Kingdom  
 Filed Mar. 27, 1986, Ser. No. 844,564  
 Claims priority, application United Kingdom, Mar. 27, 1985, 8508387; Apr. 12, 1985, 8509402  
 Int. Cl.<sup>4</sup> B25J 9/10  
 U.S. Cl. 414—735 11 Claims

1. A manipulator having: three arms connecting fixed points on a supporting structure to an end effector mounting, the three arms each being pivotally connecting to different fixed points on the mounting to allow rotation of the arms relative to the mounting about respective axes which intersect at a common point and which are co-planar; and three drive means each acting on a part of a corresponding arm so as to drive that part along a straight line passing through the said common

point, said mounting including a fourth arm and a slidable connection operable to permit the fourth arm to pivot and to

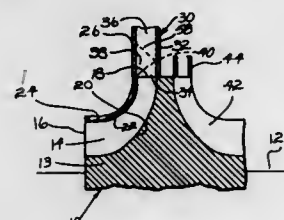


slide longitudinally relative to the supporting structure, said fourth arm being connected to the end effector.

4,790,719  
**METHOD FOR STORING AND FEEDING TIRE BEADS**  
 Steven J. Portalupi, Akron, and Robert S. Riggs, Stow, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio  
 Division of Ser. No. 761,181, Jul. 31, 1985, Pat. No. 4,683,020.  
 This application Apr. 10, 1987, Ser. No. 37,143  
 Int. Cl.<sup>4</sup> B65G 47/00, 15/12; B29D 30/08  
 U.S. Cl. 414—786 7 Claims

1. A method for transferring a plurality of adjacent, separated annular beads in a container to a conveyor assembly having a plurality of endless belt conveyors for moving said annular beads along said conveyor assembly while maintaining said annular beads in a separated condition comprising:
- (a) positioning said annular beads in said container over said conveyor assembly for engagement by said endless belt conveyors while said annular beads are in said container;
  - (b) disengaging said annular beads from said container;
  - (c) actuating said endless belt conveyors to carry said annular beads toward said one end of said conveyor assembly while maintaining said adjacent, separated annular beads in said separated condition; and
  - (d) transferring said annular beads one at a time to a transfer apparatus.

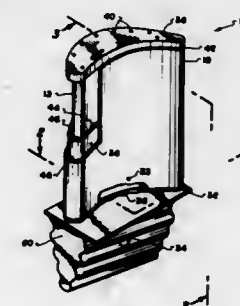
4,790,720  
**LEADING EDGES FOR DIFFUSER BLADES**  
 Colin Rodgers, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.  
 Filed May 18, 1987, Ser. No. 50,865  
 Int. Cl.<sup>4</sup> F04D 29/44  
 U.S. Cl. 415—211 10 Claims



1. In a rotary machine including a centrifugal compressor, the combination of:  
 a rotor including a hub mounting a plurality of compressor

blades, each having a radially outward discharge end interconnecting a hub side whereat the blade joins the hub and an opposite free edge;  
 a shroud in adjacency to said free edges; and  
 a radial diffuser about said rotor in adjacency to said shroud, said diffuser having an annular inlet facing said discharge ends, a remote outlet and a series of elongated diffuser blades arranged in a circular pattern and in spaced relation about said annular inlet and between said annular inlet and said outlet, said diffuser blades having a leading edge that is closer to said discharge ends adjacent said hub sides than adjacent said free edges, said leading edge being defined by the merger of opposed sides of each of said blades, said opposed sides merging at differing angles along the length of said leading edges.

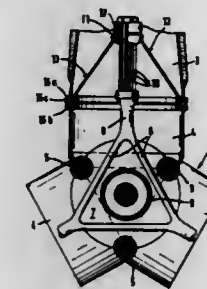
4,790,721  
**BLADE ASSEMBLY**  
 Donald H. Morris, Agoura, and Daniel M. Shea, Moorpark, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.  
 Filed Apr. 25, 1988, Ser. No. 185,221  
 Int. Cl.<sup>4</sup> F01D 5/18  
 U.S. Cl. 416—96 A 5 Claims



1. An airfoil shaped blade assembly suitable for attachment to a turbine rotor hub, the blade assembly including a structurally supportive metallic core having inner and outer surfaces, a ceramic blade jacket fitted over the metallic core, each having a leading edge and trailing edge, a base element including means for affixing the base element to the turbine rotor hub, and a blade cap; the improvement comprising:

- a thin coolant liner including inner and outer surfaces, the liner positioned intermediate the blade metallic core and ceramic jacket;
- multiple and variably spaced ridges formed on the thin liner inner surface in contact with the metallic core outer surface;
- variable-size multiple cooling passages formed between the thin liner inner surface and metallic core outer surface by the multiple spaced ridges in contact with the metallic core outer surface;
- a circumferential stagnant air gap formed between the thin liner and the ceramic blade jacket, the air gap communicating with a pressure equalizing vent in the assembly base element;
- positioning tabs affixed to the outer surface of the liner at the top thereof, two of which are positioned at a leading edge pressure side and at least one positioned at a trailing edge pressure side, all in contact with the ceramic jacket inner surface adjacent the blade assembly cap;
- a friction reducing washer located intermediate the cap and the top of the assembly ceramic blade jacket to protect the ceramic blade jacket against compression loads; and
- a compressible compliant material wave flexure located intermediate the base of the ceramic jacket and the base element to seal the stagnant air gap during assembly operation.

4,790,722  
**MULTI-BLADE ROTOR FOR A WINDMILL-TYPE APPARATUS**  
 Hans-Joachim Herrmann, Schwabach, Fed. Rep. of Germany, assignor to M A N Gutehoffnungshütte GmbH, Oberhausen, Fed. Rep. of Germany  
 Filed Dec. 17, 1986, Ser. No. 943,647  
 Claims priority, application Fed. Rep. of Germany, Dec. 18, 1985, 3544814  
 Int. Cl.<sup>4</sup> F07D 1/06; B64C 11/06  
 U.S. Cl. 416—205 7 Claims



1. In a windmill-type apparatus of a wind power installation having a multi-blade rotor including a hub supported on shaft means, and rotor blades that are connected to said hub, via bearing means, in such a way that said rotor blades are rotatable about their longitudinal axes, said hub having the improvement therewith comprising:

- rotationally symmetrical hollow bodies, the number of which corresponds to the number of rotor blades journaled on said hub, said hollow bodies being provided with a shell-type construction and respectively being joined free of any screw bolts and irregularities including holes, notches, grooves, slots, depressions and the like for a smooth surfacing therewith;
- rod-like pressure members on which said hollow bodies are mounted, with the number of said pressure members corresponding to the number of said hollow bodies; said pressure members being mounted on said shaft means, via bearing plates, having longitudinal central axes of said pressure members respectively disposed at least nearly at the point of concentration of the bending moment surface of the pertaining hollow body; and
- a radially disposed tie rod system that holds said hollow bodies together and includes prestressed tie rods that extend at least nearly in the axes of symmetry of said hollow bodies, with said prestress of said tie rods being located extending in the axes of symmetry of said hollow bodies that are substantially free of any bending load thereon and that are stressed thereby with only compressive forces.

4,790,723  
**PROCESS FOR SECURING A TURBINE BLADE**  
 Ian L. W. Wilson; William G. Clark, Jr., both of Murrysville, and Kenneth C. Radford, North Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
 Filed Jan. 12, 1987, Ser. No. 2,537  
 Int. Cl.<sup>4</sup> F01D 5/28  
 U.S. Cl. 416—220 R 20 Claims

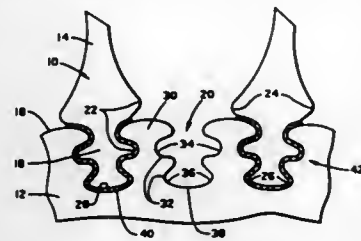
1. A process for attaching a blade to a blade support of a turbine wherein said blade has a root portion adapted for insertion within a groove in a surface of said blade support, said groove being disposed between two steeples, located one on either side of said groove, said process comprising the steps of:  
 forming said root portion of said blade to a shape approximately that of said groove;  
 inserting said root portion of said blade within said groove;

positioning a composition comprising a hydrolyzable compound having the formula:



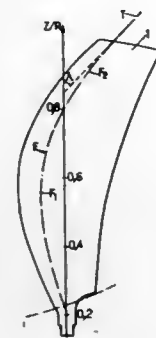
wherein

M is a metal,  
each R is independently selected from the group consisting of alkyl groups having from 1 to 10 carbon atoms,



each R' is independently selected from the group consisting of alkyl groups having from 1 to 10 carbon atoms, v is an integer equal to the valence of M, and n is an integer of from 2 to v, between said root portion of said blade and said steeples; and hydrolyzing said compound to attach said blade to said blade support.

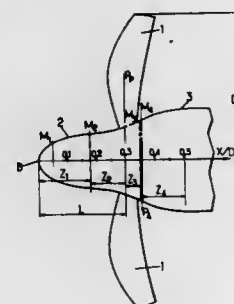
**4,790,724**  
**AERIAL PROPELLORS MORE ESPECIALLY FOR AIRCRAFT PROPULSIVE UNITS**  
Jean-Marc Bousquet, Paris; Alain Faubert, Voisins-le Bretonneux, and Georges Vingut, Marseille, all of France, assignors to Office National d'Etudes et de Recherche Aérospatiales, Châtillon Sous Bagneux, France  
Filed Oct. 7, 1987, Ser. No. 105,210  
Claims priority, application France, Oct. 24, 1986, 86 14826  
Int. Cl. 4 B64C 11/18  
U.S. Cl. 416-223 R 3 Claims



1. An aerial propeller, particularly for an aircraft propulsive unit, having a plurality of blades, each blade having a mean line, said mean line defined using a reference trihedron constituted by axis OX formed by the axis of rotation of the propeller, axis OZ formed by the pivoting axis of the blade and axis OY completing the trirectangular trihedron, wherein said mean line is formed by a flat continuous curve contained in a plane OZ-OY, forming with the plane of rotation of the propeller an angle  $\theta_0$  between 35° and 55° and preferably between 40° and 50°, said curve having a first part of negative  $Y_0$  and positive Z coordinates, and a second part of positive  $Y_0$  and positive Z coordinates, the coordinate point  $Y_0=0$  being situated between the values of Z included between 0.75 and 0.85 R (R designating the radius of the propeller), the tangent to this curve has its end corresponding to the end of the blade forming

with the axis Oz and angle between 30° and 50° and preferably between 35° and 45°.

**4,790,725**  
**AERIAL PROPELLERS MORE ESPECIALLY FOR AIRCRAFT PROPULSIVE UNITS**  
Jean-Marc Bousquet, Paris, and Alain Faubert, Voisins-le Bretonneux, both of France, assignors to Office National d'Etudes et de Recherche Aérospatiales, Châtillon Sous Bagneux, France  
Filed Oct. 7, 1987, Ser. No. 105,221  
Claims priority, application France, Oct. 23, 1986, 86 14722  
Int. Cl. 4 B64C 11/14  
U.S. Cl. 416-245 R 4 Claims

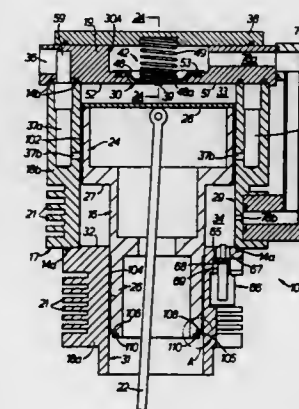


1. An aerial propeller, particularly for aircraft propulsive units, having a plurality of blades projecting from a cowling at a distance L from the leading edge of said cowling, wherein said cowling is defined by a meridian line having: at its origin, forming the leading edge of the cowling, a maximum curvature greater than 15, between its origin and a first relative abscissa point  $X=x/D$  equals 0.05, a curvature decreasing rapidly from the maximum value to about a value of 7, between said first point and a second point situated at a distance from the leading edge between 0.5 and 0.7 times the leading edge-blade plane distance L, a curvature decreasing substantially linearly from a value 7 to a value 0, between said second point and a third point situated in the plane of the blades, a curvature decreasing more slowly than said linear decrease, from value 0 to a minimum value between -3 and -5, between said third point and a fourth point situated in the rear plane of the cowling, a curvature increasing rapidly from the minimum value to a value of 0.

**4,790,726**  
**RECIPROCATORY PISTON AND CYLINDER MACHINE**  
Guenter K. W. Balkau, Springvale; Eckhard Bez, Monrabbin, and John L. Farrant, North Balwyn, all of Australia, assignors to Commonwealth Scientific and Industrial Research Organization, Victoria, Australia  
Continuation of Ser. No. 820,585, Jan. 21, 1986, Pat. No. 4,699,572, which is a continuation of Ser. No. 491,967, Apr. 13, 1983, abandoned. This application Feb. 24, 1987, Ser. No. 17,405  
Claims priority, application Australia, Aug. 13, 1981, PF0217/81  
Int. Cl. 4 F04B 3/00 2 Claims

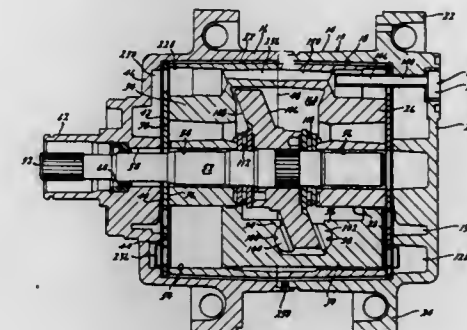
U.S. Cl. 417-254 2 Claims  
1. An air free reciprocatory vacuum pump, comprising:  
a cylinder having a first portion closed at one end and a second portion contiguous with, but of smaller diameter than the first portion;  
a piston having a first hollow, metallic cylindrical head portion relatively slidable in the first cylinder portion and

a second hollow, metallic piston portion relatively slidable in the second cylinder portion, said first piston head portion having a front face facing the closed cylinder end and an annular back face;  
a gas inlet in said cylinder for inlet of gas to the interior of the first cylinder portion between the front face of the piston head portion and the closed cylinder end on reciprocation of the piston with said piston acting as a valve member to control the flow of gas through said gas inlet;  
a first exhaust port for exhaustion of gas from the interior of the first cylinder portion ahead of the piston head portion by pumping action of the front face of the piston head portion;  
a first one-way valve in said first exhaust port operable to permit exhaustion of gas from the interior of the first cylinder portion ahead of the piston head portion;  
a second exhaust port for exhaustion of gas from the interior of the first cylinder portion behind the first piston head portion by pumping action of the back face of the first piston head portion;  
a second one-way valve in said second exhaust port;  
a passage by which gas may be passed from the interior of the first cylinder portion ahead of the piston head portion to the interior of the first cylinder portion behind the piston head portion; and,



respective sealing means for substantially sealing the annular space between said cylindrical piston portions and the respective cylinder portions in which they are slidably reciprocable, in lieu of oil or other liquid lubricant;  
characterized in that said sealing means for the first piston head portion includes a first sleeve of a low friction material disposed on the cylindrical surface of the first piston head portion, such that, over the temperature range encountered during normal operation of the pump, a mean gap is sustained about the sleeve between the sleeve and the cylinder, which gap is of a maximum size at which leakage of gas past the sleeve is at a level acceptable for a vacuum to be sustained by the pump;  
said sealing means for the second piston portion includes a second sleeve of low friction material disposed on the cylindrical surface of the second piston portion, such that, over the temperature range encountered during normal operation of the pump, a mean gap is sustained about the sleeve between the sleeve and the cylinder over substantially the entire surface of the sleeve and a sealing ring element about said cylindrical surface of the second piston portion, at or adjacent an end of the second sleeve remote from said first piston portion, and means biasing the sealing ring element into sliding contact with the second cylinder portion.

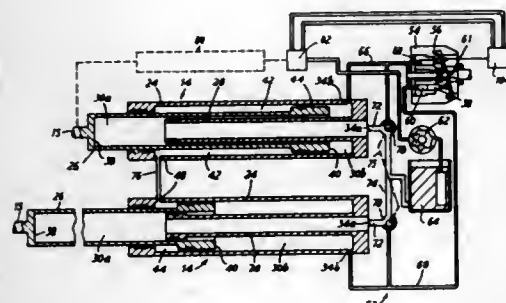
**4,790,727**  
**SWASHPLATE COMPRESSOR FOR AIR CONDITIONING SYSTEMS**  
Duane F. Steele, Dearborn, Mich., assignor to Ford Motor Company, Dearborn, Mich.  
Filed Sep. 25, 1987, Ser. No. 101,110  
Int. Cl. 4 F04B 27/08  
U.S. Cl. 417-269 9 Claims



1. An air conditioning compressor comprising:  
two generally cylindrical housing portions, one end of each housing portion being open and having an end wall closing the other end;  
the open ends of said housing portions being assembled in end-to-end relationship thus defining an internal cylindrical cavity;  
a pair of cylinder blocks in said cavity disposed in juxtaposed relationship, each cylinder block having a plurality of axially disposed cylinder openings arranged in angularly spaced relationship about the axis of said cavity, each cylinder opening in one cylinder block being aligned with an opening in the other cylinder block, a plurality of double acting pistons each having one end thereof received in the corresponding cylinder opening of said one cylinder block and the opposite end received in the aligned cylinder opening of said other cylinder block whereby said double acting pistons align said cylinder blocks with respect to each other;  
the end wall of each housing portion being formed with refrigerant pressure discharge and supply cavities forming refrigerant flow passages;  
each said piston being axially movable with reciprocating motion in its cylinder, sliding slipper bearings on each said piston;  
a swashplate and driveshaft assembly journaled in said cylinder blocks including a swashplate disposed in a plane forming an angle relating to the axis of said cylinder blocks, the swashplate being slidably engaged by said slipper bearings whereby said pistons are reciprocated when said swashplate and driveshaft assembly is rotated;  
a valve assembly disposed adjacent each of said end walls whereby refrigerant is distributed therethrough from said supply cavity and to said cylindrical openings and from said cylindrical openings to said pressure discharge cavity from said cylindrical openings; and  
each cylinder block being formed with axial refrigerant supply passages that communicate with the supply cavities in said end walls, and a refrigerant supply passage including an inlet port in one of said housing portions and a through passage in each cylinder block that distributes refrigerant from said inlet port to the region of said swashplate whereby said refrigerant supply passages are supplied with refrigerant with a relative uniform distribution of refrigerant.

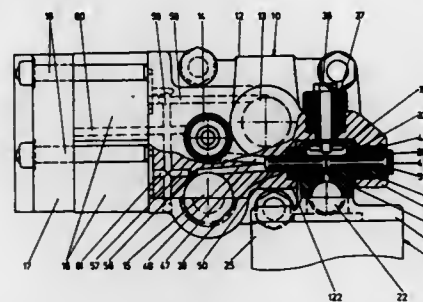


**4,790,728**  
**DUAL-RIGID-HOLLOW-STEM ACTUATORS IN OPPOSITE-PHASE SLURRY PUMP DRIVE HAVING VARIABLE PUMPING SPEED AND FORCE**  
 Anthony F. Dwyer, 10 Windsor Road, Finchley, London N3, England  
 Filed Nov. 25, 1985, Ser. No. 801,531  
 Claims priority, application United Kingdom, Feb. 12, 1985, 8503501  
 Int. Cl.<sup>4</sup> F04B 15/02, 9/10; F15B 13/06  
 U.S. Cl. 417—342 6 Claims



1. A pumping apparatus, comprising:  
 means defining first and second variable-volume pumping chambers;  
 first and second pumping members reciprocable within the first and second pumping chambers, respectively, to vary the volumes thereof, the pumping chambers each having an inlet for the introduction of material to be pumped and an outlet for the delivery of material from the pumping chamber;  
 first and second actuator means coupled to the first and second pumping members, respectively, and operable to reciprocate the pumping members, said first and second actuator means driving said first and second pumping members with mutually opposite phases;  
 each of said actuator means comprising  
 a cylinder having a cylinder bore therein,  
 a plunger located within the cylinder,  
 a tubular partition fixed with respect to the cylinder and arranged within the plunger, the partition cooperating with said plunger and said cylinder for defining first and second drive chambers which have different working areas, the plunger being slidable in the cylinder bore and with respect to the tubular partition to vary the volumes of said drive chambers,  
 a pump for supplying pressure fluid,  
 pump output selection means comprising first and second valve means arranged within conduit means between said pump and said first and second actuator means, respectively, each said valve means being operable to shut off flow of pressure fluid from said pump to one of said drive chambers of its associated actuator means to determine the pumping force transmitted to its associated pumping member,  
 and valve control means for controlling operation of said first and second valve means so that both of said first and second valve means are in the same position at any given time and pressure fluid is supplied on alternate strokes to corresponding drive chambers in said first and second actuator means.

**4,790,729**  
**BRAKE EQUIPMENT FOR A HYDRAULIC VEHICLE BRAKE SYSTEM**  
 Wilhelm Zirpe, Hemmingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
 Filed Apr. 14, 1987, Ser. No. 38,113  
 Claims priority, application Fed. Rep. of Germany, Jan. 4, 1986, 3618835  
 Int. Cl.<sup>4</sup> F04B 21/00  
 U.S. Cl. 417—363 20 Claims



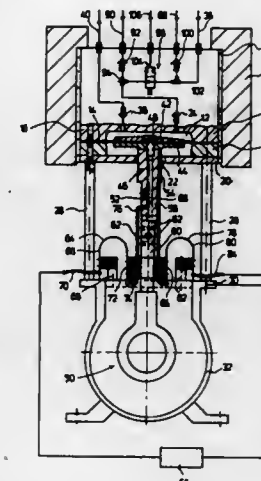
1. Brake equipment for a hydraulic vehicle brake system, including an assembly housing and an electrically driven feed pump in a feed pump housing which is suspended in elastic bearings on said assembly housing in which said pump communicates with said assembly housing via at least one pressure line, said assembly housing and said pump housing includes suction and pressure lines which comprise housing bores, connection bores and bearing bores, said housing bores being in said pump housing and communicating with said pump, said connection bores being in said assembly housing, at least one connecting tube (50) being disposed in sets of two of said bearing bores which are flush with one another, one of which is disposed in the assembly housing and the other of which is disposed in said pump housing, assembled in a pivotable and longitudinally displaceable manner sealing off said bearing bores; said assembly housing and said pump housing being capable of executing a limited relative movement with respect to one another; and a respective one of said housing bores and said connection bores communicating through associated sets of bearing bores with the end of said connecting tube axially remote from the connection bore being sealed off.

**4,790,730**  
**HEATABLE DIAPHRAGM PUMP FOR GASES**  
 Tilman Spaeth, Ernstsreute, and Eberhard Lembcke, Überlingen, both of Fed. Rep. of Germany, assignors to Bodenseewerk Geratetechnik GmbH, Fed. Rep. of Germany  
 Filed Feb. 12, 1988, Ser. No. 155,231  
 Claims priority, application Fed. Rep. of Germany, Feb. 14, 1987, 3704700  
 Int. Cl.<sup>4</sup> F04B 35/00, 39/06, 21/04; H05B 11/00  
 U.S. Cl. 417—373 13 Claims

1. A heatable diaphragm pump for gases, for example for the pumping of smoke gases which are to be analysed for noxious components, comprising

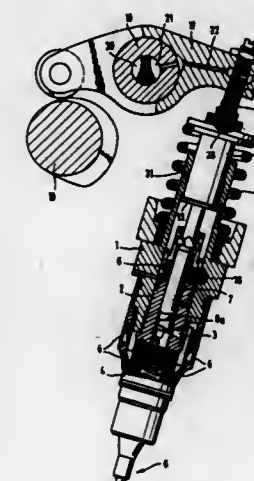
- a pump head (10) with a diaphragm chamber (12) which is closed by a flexible diaphragm (14) and which communicates with a gas inlet (36) through a check valve (34) opening in inlet direction, and communicates with a gas outlet (40) through a check valve (38) opening in outlet direction,
- a driving motor (32)
- a connecting rod (46) which is fixedly connected to the diaphragm (14) through clamping plates (42,44) and which is arranged to be driven for reciprocatory motion by the driving motor (32) through a crank drive (50),
- insulation means (26,28) for thermic insulation of the pump head (10), and

(e) pump head heating means (24) for heating the pump head (10) characterized in that



(f) heating means (52) are provided in the connecting rod (46) in addition to the pump head heating means (24).

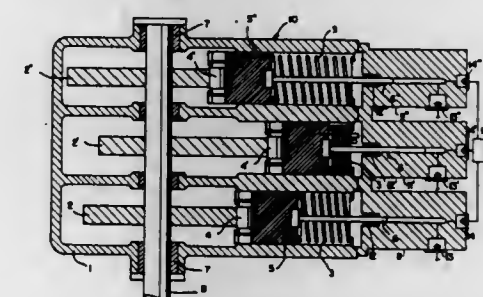
**4,790,731**  
**FUEL INJECTION PUMP FOR DIESEL ENGINES**  
 Otto Freudenschuss, Vienna, Austria, assignor to Steyr-Daimler Puch AG, Vienna, Austria  
 Filed Dec. 3, 1987, Ser. No. 128,047  
 Claims priority, application Austria, Dec. 10, 1986, 3270/86  
 Int. Cl.<sup>4</sup> F02M 59/32  
 U.S. Cl. 417—490 4 Claims



1. In a fuel injection pump for a diesel engine, comprising a housing,  
 a pump cylinder sleeve mounted in said housing and having at least one radial fuel port,  
 an injector plunger, which is slidably mounted pump cylinder sleeve for a discharge stroke and has two axially spaced apart valving edges for cooperation with said fuel port,  
 a cylindrical plunger follower, which is slidably mounted in said housing and axially coupled to said plunger,  
 an actuating member axially engaging said plunger follower,  
 a camshaft cooperating with said actuating member to impart via said actuating member an axial movement to said

plunger follower and via said plunger follower to said plunger,  
 a first return spring opposing said axial movement of said plunger follower,  
 an axially adjustable stop, which is engageable by said injector plunger to determine the stroke position of said plunger,  
 a hydraulic timing cylinder,  
 a timing piston, which is slidably mounted in said timing cylinder for a limited stroke and is coupled to said stop and operable to adjust said stop,  
 an oil supply line comprising a check valve and connected to said timing cylinder, and  
 an oil passage leading from said oil supply line into said plunger follower,  
 the improvement residing in that  
 said timing cylinder is constituted by said plunger follower and is formed with a first oil outlet port,  
 said housing is formed with a second outlet port, which is aligned with said first outlet port in the axial direction of said plunger follower,  
 said injector plunger is coupled to said plunger follower with an axial backlash and is arranged to assume at the end of said discharge stroke a position in which said first and second outlet ports register and communicate with each other, and  
 said timing piston is movable from a predetermined initial position in a first direction to reduce said axial backlash by axially adjusting said stop in response to a supply of hydraulic oil to said timing cylinder, and  
 a second return spring is provided, which opposes the movement of said timing piston in said first direction.

**4,790,732**  
**DRIVING MEANS OF THE TRIPLE-CYLINDER PLUNGER PUMP**  
 Yoshichi Yamatani, 1870 Manazuru, Manazuru-machi Ashigarashimogun, Kanagawa-ken, Japan  
 Continuation of Ser. No. 911,482, Sep. 25, 1986, abandoned, which is a continuation of Ser. No. 753,104, Jul. 9, 1985, abandoned. This application Nov. 19, 1987, Ser. No. 122,517  
 Claims priority, application Japan, Jul. 31, 1984, 59-119200[U]  
 Int. Cl.<sup>4</sup> F04B 11/00  
 U.S. Cl. 417—539 2 Claims



1. A triple cylinder plunger pump of the type having a rotatable cam shaft and wherein each cylinder comprises a reciprocating drum, a plunger connected to the drum, a suction valve to control suction volume and a discharge valve to control discharge volume, the pump having a pulsation ratio between the discharge volume and the suction volume comprising  
 a plurality of three disc cams rotated by the said cam shaft to respectively actuate the plungers,  
 the disc cams being rotated in a uniform circular motion by the cam shaft,  
 each said disc cam being angularly offset from another disc cam by 120 degrees;

the said plungers each being respectively in contact with one of the disc cams through one of said drums and each plunger being adapted for reciprocal discharge motion and suction motion, each cylinder being equipped with a roller interposed between the drum and its associated disc cam, and a spring, the spring being adapted to bias the drum toward its associated disc cam;

each of said disc cams being formed to have an outer peripheral contour consisting of two portions, a first discharge portion for actuating said plunger discharge motion and a second suction portion for actuating said plunger suction motion;

each of the said discharge portion and suction portion in each disc contour comprising three different ranges, namely, a positive acceleration range, a constant speed range and a negative acceleration range,

the angle of rotation of the positive acceleration range from zero to maximum pressure in the discharge portion being 30 degrees,

the angle of rotation of the constant speed range of the discharge portion at maximum pressure being 90 degrees,

the angle of rotation of the negative acceleration range of the discharge portion from maximum pressure to zero being 30 degrees,

the angle of rotation of the positive acceleration range of the suction portion plus the angle of rotation of the constant speed range of the suction portion, and

the angle of rotation of the negative speed range of the suction portion being 210 degrees;

the said discharge portions of the cams producing a discharge pressure, the discharge pressure increasing from zero to a maximum operating pressure during the positive acceleration range, the discharge pressure remaining constant at the maximum pressure during the constant speed range and the discharge pressure decreasing from the maximum pressure to zero during the negative acceleration range;

the three different ranges in the discharge portion and the three different ranges in the suction portion of each cam being determined to maintain the pulsation ratio in the discharge volume and in the suction volume to a minimum,

the disc cams being oriented relative to one another so that when a first disc cam is rotated to the end of its constant speed range, a second disc cam is rotated to start its positive acceleration range,

the disc cams being so oriented relative to one another that the sum of the discharge pressures produced by the acceleration range of a first cam and the negative acceleration range of a second cam is substantially equal to the maximum pressure to thereby maintain a substantially constant discharge pressure; and

the said suction portion of the contour of each disc cam being selected so that its associated plunger, when in its suction motion takes a time period of 1.4 times greater than that of the plunger when in its discharge motion, whereby any motion delay of the related suction valve will be compensated.

4,790,733

#### ROTARY CYLINDER CONFIGURATION AND METHOD TO CONTROL SLOT DIMENSIONS DURING DIRECT WELD ATTACHMENT TO THE SHELL

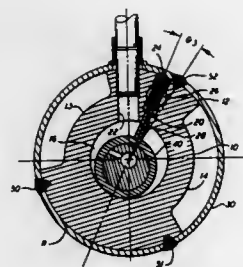
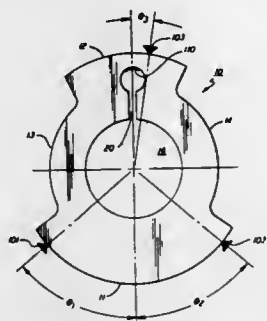
Joseph P. Vaccaro, Chittenango, N.Y., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jul. 21, 1987, Ser. No. 76,444

Int. Cl.<sup>4</sup> F04C 2/356, 15/00; F04B 39/12; B23K 31/00  
U.S. Cl. 418—63

1. A method for locating three weld points for securing a rotary cylinder having a vane slot in a shell with predetermined slot distortion comprising the steps of:

- selecting two loading points on the cylinder on opposite sides of the projected axis of the vane slot;
- while keeping the two loading points fixed, selectively locating a third loading point on the cylinder in the general vicinity of the vane slot;
- loading the cylinder at the three points;
- determining the strain on the vane slot due to loading the cylinder;
- continually repositioning the third loading point and repeating steps (c) and (d) until a third loading point is located at which strain representative of the predetermined slot distortion occurs at the vane slot.



8. In a hermetic compressor having a shell, a rotary cylinder having a central cylindrical compressor chamber, first and second asymmetrically located circumferential areas spaced by first and second recessed areas with said first circumferential area being larger than said second circumferential area, a radially extending vane slot formed in said cylinder and terminating in said compressor chamber such that a projection of the axis of said vane slot essentially bisects said first circumferential area, said rotary cylinder being welded in place in said shell at only three points two of which are on said first circumferential area and the third of which is on said second circumferential area.

4,790,734

#### RADIAL SEAL OF A ROTARY PISTON ENGINE

Dankwart Eiermann, Weissenberg-West, Fed. Rep. of Germany, assignor to Wankel GmbH, Berlin, Fed. Rep. of Germany  
Filed Aug. 27, 1987, Ser. No. 90,314

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1986, 3629554

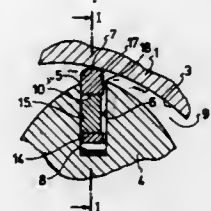
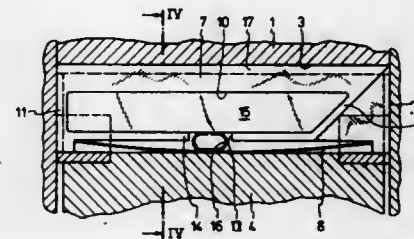
Int. Cl.<sup>4</sup> F01C 19/04

U.S. Cl. 418—123

5 Claims

1. A radial seal for a rotary piston engine having a trochoidal-shaped casing inner surfacing and multicorner piston means, with which sealing strips are arranged in radial grooves having groove walls including groove side walls in the corners of the piston means; the sealing strips engage under pressure of the operating chambers against the casing inner surfacing and respectively against a groove side wall dependent upon direction of higher pressure-respectively lower-pressure relation-

ship therewith; and the sealing strips have radially separate sealing strip pieces and have perforations between sealing surfaces which are lying in the groove and come into engagement against the groove walls; the improvement therewith comprising:



filler pieces disposed in between radially separate sealing strip pieces, said filler pieces being installed with nominal clearance in the perforations in the sealing strip, said filler pieces being narrower in peripheral direction than the dimensioning of the sealing strip; and  
a spring means holding the filler pieces in continuous engagement along an upper part of said sealing strip.

4,790,735

#### MATERIALS PROCESSING USING CHEMICALLY DRIVEN SPHERICALLY SYMMETRIC IMPLSIONS

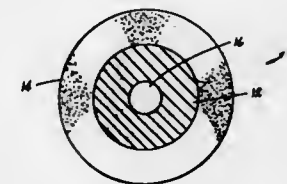
Frederick J. Mayer, Ann Arbor, Mich., assignor to KMS Fusion, Inc., Ann Arbor, Mich.

Continuation of Ser. No. 742,035, Jun. 6, 1985, abandoned, which is a division of Ser. No. 538,210, Oct. 3, 1983, Pat. No. 4,552,742. This application Oct. 14, 1986; Ser. No. 918,637

Int. Cl.<sup>4</sup> B29C 67/00

U.S. Cl. 425—1

17 Claims



1. A target for exposure to radiant energy to obtain implosive shock compression of materials comprising a spherical core including a spherically symmetrical sample of a said material concentrically surrounded by a symmetrical shell of high explosive material, and multiple spherically symmetrical radially contiguous shells of malleable materials of differing densities between said core and said shell of explosive material for limiting and extending application of peak pressure to the sample material.

4,790,736

#### APPARATUS FOR CENTRIFUGAL FIBER SPINNING WITH PRESSURE EXTRUSION

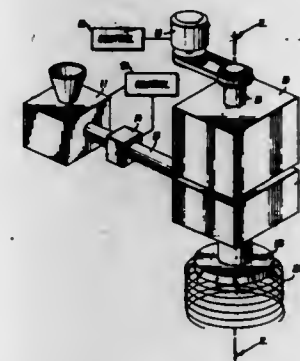
Herbert W. Koeschel, Tallmadge, Ohio, assignor to John E. Benoit, Amundale, Va., a part interest

Filed Jul. 29, 1984, Ser. No. 632,733

Int. Cl.<sup>4</sup> D01D 1/09, 5/18

U.S. Cl. 425—66

33 Claims



1. Apparatus for forming an article comprising fibers comprising a rotatable die comprising a periphery and an interior;

means for rotating said die;

at least one spinneret in said periphery of said die having an unobstructed orifice therethrough connected to said interior of said die, said orifice terminating substantially at said periphery of said rotatable die;

a source of molten polymer fiber-forming material;

at least one substantially leakproof closed channel interconnecting said rotatable die, said spinneret and said source of said molten polymer fiber-forming material; and

means for pumping said molten polymer fiber-forming material under a preselected positive pressure from said source through said channel to said die and said spinneret whereby said pumping means controls the extrusion rate of said molten polymer fiber-forming material through said spinneret so as to provide a predetermined continuous volumetric quantity of said fiber-forming material to said spinneret substantially independent of the viscosity of said material or a back pressure generated by said spinneret and the interior of said rotating die;

where said molten polymer fiber-forming material is expelled from said spinneret so as to produce fibers.

4,790,737

#### APPARATUS FOR MANUFACTURING REINFORCED HOSE

Satochi Fukumachi, Shimizu; Kenichi Mitsui, Ichinomiya; Kunihiko Matsuo, Inazawa, and Kazumi Korenaga, Ichinomiya, all of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasuga, Japan

Filed Jun. 30, 1987, Ser. No. 67,849

Claims priority, application Japan, Jun. 30, 1986, 61-100731[U]

Int. Cl.<sup>4</sup> B29C 47/04

U.S. Cl. 425—114

5 Claims

1. An apparatus for manufacturing a reinforced hose, which comprises:

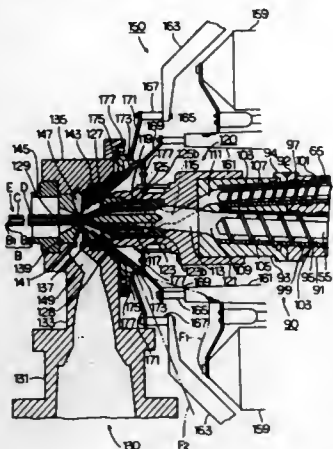
an inner tube extruder including:

a fixed torpedo member for forming a hollow within a hose;

an inner die for forming an inner tube structure, said torpedo member having an exterior end which projects beyond an exterior end of said inner die, said inner die being positioned about the torpedo member; and

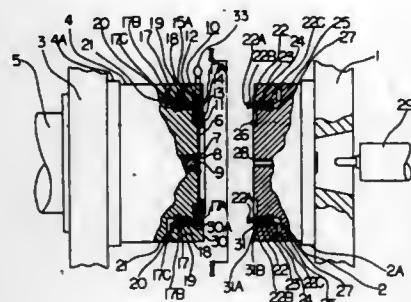


a cylinder formed with a plurality of extrusion passages connected to an inner head whose extended longitudinal axis serves as its longitudinal axis, said inner head being formed with a plurality of extrusion passages through which screws of said extruder are inserted in such a way that said extrusion passages are arranged along the extended longitudinal axis, partition means in said cylinder and inner head laterally separating said extrusion passages from one another; an outer tube extruder positioned about the torpedo member, said outlet tube extruder having an outlet positioned



downstream from said inner tube extruder so that a gap is formed therebetween, said outer tube extruder outlet including an intermediate die and an outer die for forming an outer tube over a just-extruded inner tube extended, in use, by said inner tube extruder; and a reinforcing layer-forming device, disposed such as to be concentric with the cylinder of said inner tube extruder, for leading-out reinforcing threads through a gap between said intermediate die and said inner die, said reinforcing layer-forming device being capable of implanting said threads into said inner tube immediately after extrusion of said inner tube.

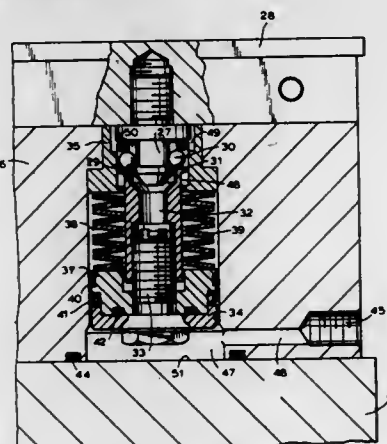
**4,790,738**  
**INJECTION MOLD HAVING ROTATABLE STAMPER HOLDING RING**  
Shunichi Shimoe, Aichi, and Ikue Asai, Nagoya, both of Japan, assignors to Melki Co., Ltd., Ohbu, Japan  
Filed Nov. 19, 1987, Ser. No. 123,019  
Claims priority, application Japan, Nov. 20, 1986, 61-277524  
Int. Cl.<sup>4</sup> B29C 33/30  
U.S. Cl. 425—192 R



1. An injection molding apparatus comprising; first and second mold halves having first and second mold cavities respectively therein, at least one of said first and

second mold halves being movable relative to the other to open and close the mold halves; a stamper removably disposed in the first mold cavity; outer stamper holding means for holding an outer edge portion of the stamper relative to the first mold half; first clamping means situated in the first mold half, said first clamping means releasably engaging the outer stamper holding means for immovably fixing the outer stamper holder means and the stamper to the first mold half and disengaging from the outer stamper holding means when the stamper is changed; and second clamping means situated in the second mold half, said second clamping means engaging and holding the outer stamper holding means only when the outer stamper holding means is released from the first clamping means, said outer stamper holding means including means for selectively engaging the outer stamper holding means with one of the clamping means while disengaging the outer stamper holding means from the other clamping means.

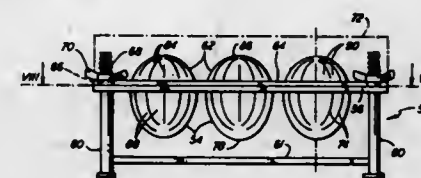
**4,790,739**  
**DIE AND BACKING BLOCK ASSEMBLY WITH QUICK RELEASE FASTENING MEANS**  
Walter Manfredi, Milan, Italy, assignor to Lema S.R.L., Al-mavilla, Italy  
PCT No. PCT/IT85/00037, § 371 Date May 13, 1987, § 102(e)  
Date May 18, 1987, PCT Pub. No. WO87/02308, PCT Pub. Date Apr. 23, 1987  
PCT Filed Oct. 8, 1985, Ser. No. 57,923  
Int. Cl.<sup>4</sup> B29C 33/32, 45/64  
U.S. Cl. 425—192 R



1. A die and backing block assembly with quick release fastening means for securing the die to the backing block, comprising said backing block being formed with a chamber, said fastening means including a pin connected to said die and having a head; a piston received in said chamber; a tubular body connected to said piston and having a mouth portion for receiving said head; elastic means positioned in said chamber and biasing said piston in a direction away from said head; pressure fluid admitting means connected to said chamber and feeding a pressure fluid into said chamber to force said piston to move towards said head of said pin when pressure of said fluid is greater than a force of said elastic means; bushing means positioned in said chamber and defining a first cylindrical seat and a second cylindrical seat for receiving said tubular body which is able to slide in said first cylindrical seat upon a movement of said piston in said chamber, said tubular body having in a region of said mouth portion a plurality of radial holes, said second cylindrical seat having a diameter which is greater than that of said first cylindrical seat; and a plurality of balls positioned in said radial holes and holding said head of said pin in said mouth portion to secure said die to said backing block when the force of said elastic means maintains said piston

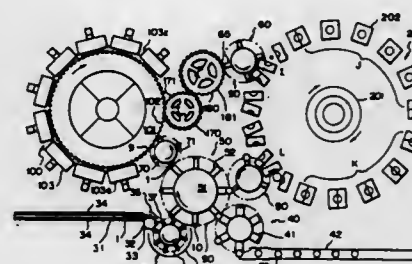
in a position remote from said head and said balls are enclosed in said first cylindrical seat, said balls moving along with said mouth portion into said second cylindrical seat upon the movement of said piston towards said head when the force of said elastic means is overcome by the pressure of said fluid admitted into said chamber so as to release said head of said pin from said balls and thus release a connection between said die and said backing block, whereby said die and said backing block can be either secured to each other or released from each other by a single control operation.

**4,790,740**  
**APPARATUS FOR PREPARING A DECORATIVE COOKED EGG**  
Melinda F. Pearlman, 46 Lakeriew Rd., Asheville, N.C. 28804  
Division of Ser. No. 696,106, Jan. 29, 1985, abandoned. This application Jun. 13, 1986, Ser. No. 874,291  
Int. Cl.<sup>4</sup> B29C 53/22  
U.S. Cl. 425—396



12 Claims  
1. A mold for making an egg having a corrugated form, said mold comprising:  
a first mold half;  
a second mold half engageable with said first mold half to form a substantially ovoid mold cavity sufficiently large to contain a shelled cooked egg of a preselected size in a substantially tight fit, said first and said second mold half having a longitudinal axis of symmetry in an assembled state of the mold; and  
shaping means including a plurality of corrugations within said first and said second mold half for molding said egg into a corrugated form upon a disposition of said egg in said mold cavity, said corrugations being circular and disposed in respective transverse planes oriented substantially perpendicularly to said axis.

**4,790,741**  
**APPARATUS FOR PREPARING HEAT-SET PLASTIC HOLLOW VESSEL**  
Nobuyuki Takakusaki, Yokohama; Yoshiji Mizutani; Nobuhiro Kishida, both of Tokyo, and Masabu Hosokawa, Kawasaki, all of Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan  
Filed Aug. 7, 1987, Ser. No. 82,466  
Int. Cl.<sup>4</sup> B29C 49/36, 49/64  
U.S. Cl. 425—526



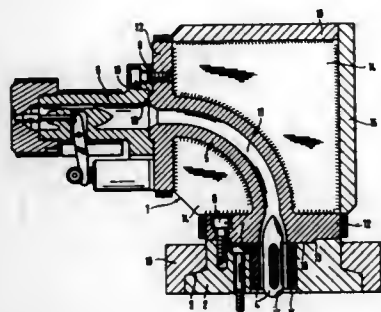
1 Claim  
1. An apparatus for preparing a drawing heat-set plastic hollow vessel, which comprises

a mandrel for supporting a preform composed of a plastic material and a hollow vessel formed from said preform, a supply zone for mounting the preform on said mandrel, a preheating zone comprising a turret having along the periphery thereof a plurality of supporting seats for supporting said mandrel and a heating mechanism for heating the preform on the mandrel, a blow-forming and heat-setting zone comprising a plurality of openable and closable blow-forming and heat-setting molds and a rotary member having along the periphery thereof mandrel supporting members corresponding to said molds, a delivery zone for delivering the mandrel having the preheated preform mounted thereon, which comes from the preheating zone, to the blow-forming and heat-setting zone, a withdrawal zone for withdrawing the mandrel having a blow-formed and heat-set vessel mounted thereon from the blow-forming and heat-setting zone, and an endless delivery passage for passing the mandrel through said supply zone, preheating zone, delivery zone, blow-forming and heat-setting zone and withdrawal zone in the recited order.  
the improvement wherein the blow-forming and heat-setting zone comprises a mold including means for heating said mold at a heat-setting temperature through the entire course of rotation, a mold opening and closing mechanism for closing the mold after the mold has passed through the delivery zone and opening the mold when the mold arrives at the withdrawal zone, a hollow drawing rod arranged concentrically with the mandrel, which is capable of reciprocating relatively to the preform, a first gas passage laid out between the periphery of the drawing rod and the mandrel and leading to the interior of the preform, a second gas passage arranged in the interior of the drawing rod and leading to the interior of the preform through openings distributed in the length direction of the drawing rod, a high-pressure hot air supply mechanism as a fluid for blow-drawing the preform, a hot air discharge mechanism, leading to the first gas passage through an opening-closing valve or a changeover valve, a low-pressure cold air supply mechanism leading to the second gas passage through an opening-closing valve, and an opening-closing control valve for connecting the first gas passage to the high-pressure hot air supply mechanism synchronously with insertion of the preform into the drawing rod to effect the draw-blow forming of the preform and simultaneously confining hot air in the formed vessel to effect the heat-setting of the formed vessel and for connecting the first gas passage to the hot air discharge mechanism after the heat-setting and connecting the second gas passage to the cold air supply mechanism to effect discharge of hot air and cooling of the vessel.

**4,790,742**  
**APPARATUS FOR THE MANUFACTURE OF PLASTIC PARTS BY INJECTION MOLDING OR REACTION INJECTION MOLDING**  
Hans-Heinrich Kaden, Friedrich-Herschel-Strasse 5., 8000 Munich 80, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 865,197, Apr. 1, 1986. This application Sep. 19, 1986, Ser. No. 909,840  
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1985, 3534253  
Int. Cl.<sup>4</sup> B29C 45/20  
U.S. Cl. 425—548

16 Claims  
1. A nozzle system for an apparatus having a plurality of molds and a locking unit used in the manufacture of plastic

parts from thermoplastic, thermoset and/or elastomer material by injection molding or reaction injection molding, an injection unit associated with said nozzle system for the simultaneous injection of the molds, a two-part movable center mold clamping plate sectioned crosswise relative to the locking direction, the two parts of said mold clamping plate being kept together by a high-speed clamping device and having a melt conduction system disposed between the two parts, the melt conduction system having one or a number of separate melt conduction rails, each being rigidly clamped on its face side



between the sectioned mold clamping plate lengthwise relative to the direction of flow of the melt, and a median centering collar and a widened melt inlet with rounded side walls adapted to receive said nozzle system arranged on a flange of the melt conduction rail, said nozzle system comprising:

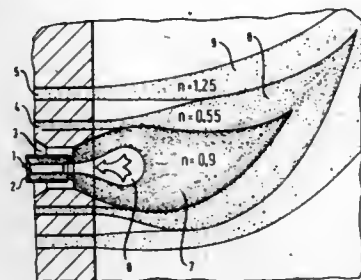
a spacing ring with a torpedo, a right-angled adapter and a cut-off nozzle exchangeably joined with each other to form a rigid unit carefully secured on the movable center, sectioned mold clamping plate by said high-speed clamping device.

**4,790,743**  
**METHOD OF REDUCING THE NO<sub>x</sub>-EMISSIONS DURING COMBUSTION OF NITROGEN-CONTAINING FUELS**

Klaus Leikert, Klaus-Dieter Rennert, and Gerhard Büttner, all of Garmersbach, Fed. Rep. of Germany, assignors to L. & C. Steinmüller GmbH, Garmersbach, Fed. Rep. of Germany. Continuation-in-part of Ser. No. 645,030, Aug. 28, 1984, abandoned. This application Dec. 3, 1986, Ser. No. 937,346. Claims priority, application Fed. Rep. of Germany, Sep. 5, 1983, 3331989.

Int. Cl.<sup>4</sup> F23C 5/00  
U.S. Cl. 431—8

9 Claims



1. A method for the reduction of the NO<sub>x</sub>-emission during the combustion of nitrogen-containing fuels via a plurality of burner units each including a primary burner and being arranged preferably vertically in a wall of a closed combustion chamber, the method including the step of supplying fuel and combustion air in stages to the burner flames via supply lines, which are separate from each other and open into the wall in a substantially vertical arrangement, the improvement in com-

bination therewith comprises with a number of said primary burners one arranged above the other the steps of: feeding coal dust along with its carrier gas, and a stream of mantle air, to the primary burner and generating a primary flame zone having a strong internal back flow region and burning the coal dust under fuel-rich conditions, feeding reduction fuel into the combustion chamber and generating a secondary flame zone in the vicinity of the primary flame zone and being operated under more-fuel-rich conditions than the primary flame zone, and feeding stage air into the combustion chamber and generating a final combustion zone in the vicinity of the secondary flame zone and being operated under fuel lean conditions.

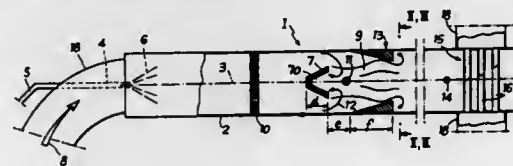
**4,790,744**  
**BURNER WITH LOW EMISSION OF POLLUTING GASES**

Jean-Claude Bellet, Poitiers; Didier Sancerneau, Buxerolles; Jean-Joseph Denis, Vouille, and Daniel Falaise, Poitiers, all of France, assignors to Centre National De La Recherche Scientifique, Paris, France.

Filed Mar. 16, 1987, Ser. No. 26,142  
Claims priority, application France, Mar. 14, 1986, 86 03697  
Int. Cl.<sup>4</sup> F23N 5/00

U.S. Cl. 431—75

11 Claims



1. Burner with a low emission of polluting gases, comprising: a straight conduit well which is made of refractory insulating material, an injector of fluid fuel which is supplied with combustion-supporting air and injects, in said conduit, a fuel/air mixture which burns, creating a flame, a flame stabilizer disposed in said conduit and formed by a piece made of refractory material, which obturates a central part of the cross-section of said conduit and is adapted to create a zone of recirculation, and an obstacle made of insulating refractory material, which is placed on the inner face of the wall of the conduit and causes a local reduction followed by a sudden increase of the cross-section of said conduit.

**4,790,745**  
**AUTOMATIC FIRE-EXTINGUISHING DEVICE FOR OIL BURNER**

Yutaka Nakanishi, Toshihiko Yamada, and Junji Mizuno, all of Aichi, Japan, assignors to Toyotomi Kogyo Co., Ltd., Aichi, Japan.

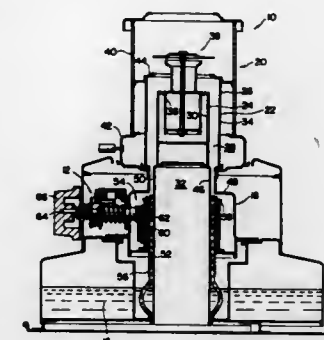
Filed Mar. 30, 1987, Ser. No. 31,645  
Claims priority, application Japan, Mar. 29, 1986, 61-46918[U]; Mar. 29, 1986, 61-46919[U]; Mar. 29, 1986, 61-46920[U]

Int. Cl.<sup>4</sup> F23N 5/24  
U.S. Cl. 431—88

13 Claims

1. An automatic fire-extinguishing device for an oil burner including a burner body, comprising: a wick operating shaft mounted on said burner body and rotated to vertically move a wick; a gear loosely fitted on said wick operating shaft; a return spring loosely fitted on said wick operating shaft and fixedly interposed between said gear with said wick operating shaft to wind said return spring during a wick raising operation;

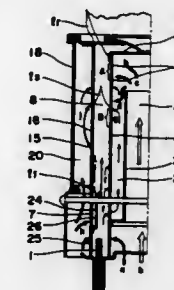
a stopper mounted on said burner body and including a holding portion for releasably engaging said gear to stop rotation of said gear to keep said return spring at a wound-up state, said gear being formed with a first cutout along a peripheral portion thereof which is opposite to the holding portion of said stopper when said gear is at a wick raising position corresponding to a combustion position of said wick;



a stop gear operatively connected to said first gear and arranged at said first cutout so as to be engaged with the holding portion of said stopper as a substitute for said gear at its said wick raising position, said stop gear being made of a material having a friction coefficient smaller than that of said gear.

**4,790,746**  
**VAPORIZING FUEL BURNER**  
Katsuhiko Uno; Katsuhiko Ishikawa, and Shojiro Inoue, all of Nara, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan.  
Filed Mar. 19, 1987, Ser. No. 27,819  
Claims priority, application Japan, Mar. 25, 1986, 61-66359; May 8, 1986, 61-105219; Jun. 20, 1986, 61-145169  
Int. Cl.<sup>4</sup> F23D 3/02, 3/14  
U.S. Cl. 431—314

9 Claims



1. A combustion apparatus for burning a vaporizable fuel by mixing said fuel with air, which comprises:

a vertically oriented outer flame cylinder having a lower vaporizing portion, which lower vaporizing portion has a first plurality of through holes therein and an upper red heat portion above said vaporizing portion, said upper red heat portion having a second plurality of through holes therein, said second plurality of through holes having a size larger than the size of said first plurality of through holes in said lower vaporizing portion; a vertically oriented inner flame cylinder within and spaced inwardly of said outer flame cylinder, said inner flame cylinder having a plurality of holes therein, said inner flame cylinder defining with said outer flame cylinder a vertically extending annular combustion space;

an outer cylinder around and spaced outwards of said outer flame cylinder;

a wick vertically movably mounted in the lower end of said combustion space for movement between a minimum height and a maximum height for adjusting the amount of combustion in said apparatus in accordance with the height of said wick, and a fuel source arranged for supplying vaporizable fuel to said wick;

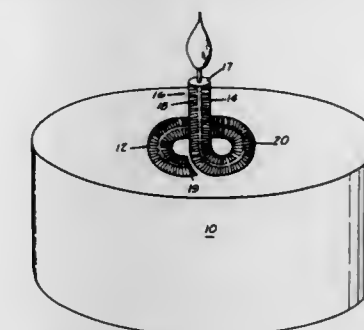
an outer control cylinder positioned inward of said outer flame cylinder, said outer control cylinder extending from a position above the maximum height of said wick to the upper end of said vaporizing portion of spaced radially inwardly from said outer flame cylinder for forming an outer control zone between said outer control cylinder and said outer flame cylinder which is directed upwardly along the inside of said outer flame cylinder, said outer control cylinder having a bottom closure member thereon by which said outer control cylinder is mounted on said outer flame cylinder; and

an air control cylinder positioned inward of said inner flame cylinder, said air control cylinder extending upwardly from a position above the maximum height of said wick and terminating at a position adjacent to an upper portion of said inner flame cylinder, said air control cylinder spaced from said inner flame cylinder to define a vertically extending annular air control zone between said air control cylinder and said inner flame cylinder; and means closing the bottom of said air control zone, said air control cylinder defining a vertically extending inner air path therewithin.

**4,790,747**  
**CONSUMABLE CANDLE WICK AND METHOD OF MAKING A CONSUMABLE CANDLE WICK**  
Mary O'Brien, Sherman Oaks, Calif., assignor to Nawick, Inc., Venice, Calif.  
Continuation of Ser. No. 435,747, Oct. 21, 1982, abandoned, which is a continuation-in-part of Ser. No. 307,450, Oct. 1, 1981, abandoned. This application Dec. 5, 1984, Ser. No. 678,259  
Int. Cl.<sup>4</sup> F23D 3/16

9 Claims U.S. Cl. 431—325

17 Claims



1. A free-standing, consumable candle wick in combination with a meltable body of wax, comprising:

a tufted core having a first end and a second end, said first end being turned upward into a vertical section to form a lighting element, and the second end being wound into a circular base; and a wax mixture coating placed on said tufted core for improving the burning thereof; said wick being placed on a flat surface of said meltable body of wax, such that when said wick is lit, said meltable body of wax is consumed.

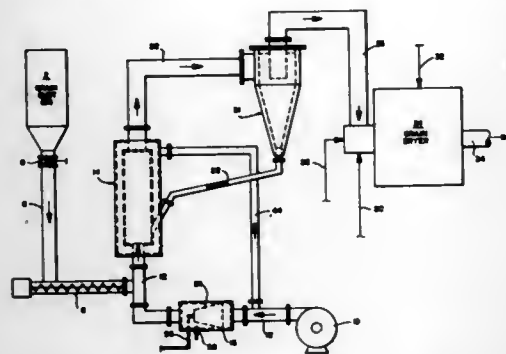


**4,790,748**  
**GRAIN DRYING METHOD AND APPARATUS**  
**UTILIZING FLUIDIZED BED**

Robert B. Litt, London, and John M. Corliss, Columbus, both of Ohio, assignors to Gwyer Grimmering, Grand Island, Nebr.  
 Filed Apr. 14, 1987, Ser. No. 38,312  
 Int. Cl.<sup>4</sup> F27B 15/00

U.S. Cl. 432—15

4 Claims



1. A method for drying grain comprising providing a fluidized bed, supplying a flow of air to said fluidized bed, adding grain dust to said flow of air, causing combustion of said grain dust in said fluidized bed, and directing combustion gases from said fluidized bed to a grain dryer.

**4,790,749**  
**KILN FOR FIRING CERAMIC MATERIALS SUCH AS**  
**TILES AND THE LIKE**

Poppi Mauro, Sassuolo, Italy, assignor to Poppi S.p.A., Castellano, Italy

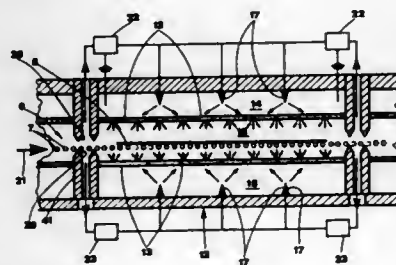
Filed Dec. 11, 1987, Ser. No. 131,831

Claims priority, application Italy, Oct. 30, 1987, 40147 A/86

Int. Cl.<sup>4</sup> F27B 9/28

U.S. Cl. 432—59

20 Claims



1. A kiln for heat treating materials such as tiles, comprising: a plurality of heat treatment zones arranged in succession, at least one of said zones including a means for heating; a conveyor means for transferring a material which is to be heat treated from one heat treatment zone to another; and, a means for transmitting thermal energy in each of said heat treatment zones from a respective one of said means for heating, said means for transmitting comprising at least one non-porous panel having a heat radiating face directed at said conveyor means, said means for transmitting allowing only a radiant transfer of thermal energy to the material which is to be heat treated.

**4,790,750**  
**AUTOMATED FLEXIBLE INSTALLATION FOR A RAPID**  
**THERMOCHEMICAL TREATMENT**

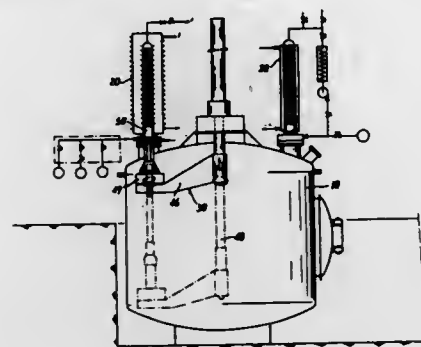
Jean Bourel, Le Perreux S/Marne; Denis Lebeaupin, Charenton, and Olivier Schweibel, Courcouronnes, all of France, assignors to Stein Hauray, Ris Orangis, France  
 Filed Oct. 20, 1986, Ser. No. 920,362

Claims priority, application France, Feb. 12, 1986, 8601913

Int. Cl.<sup>4</sup> F27D 3/00, 3/12

U.S. Cl. 432—239

12 Claims



1. An automated installation for the thermochemical treatment of parts comprising:

- (a) a transfer lock for exposing said parts to a controlled atmosphere;
- (b) a plurality of treatment modules associated with the transfer lock, said plurality of treatment modules comprising means for thermochemically treating said parts, each of said treatment modules being mounted stationary on the outside of said transfer lock for direct transfer of said parts between each of said modules through said transfer lock;
- (c) a loading lock for loading said parts into said transfer lock;
- (d) an unloading lock for unloading said parts from said transfer lock; and
- (e) a handling robot positioned within said transfer lock for successively transferring said parts from one of said modules to another of said modules through said transfer lock.

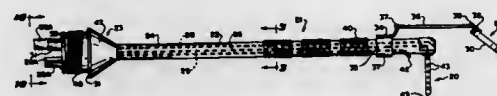
**4,790,751**  
**DENTAL VIEWING APPARATUS AND METHOD**  
 Richard A. Reinhardt, Roca, and Gerald J. Tussing, Lincoln, both of Nebr., assignors to The Board of Regents of the University of Nebraska, Lincoln, Nebr.

Continuation of Ser. No. 805,826, Dec. 6, 1985, abandoned. This application Oct. 30, 1987, Ser. No. 119,201

Int. Cl.<sup>4</sup> A61C 3/00

U.S. Cl. 433—29

6 Claims



1. Apparatus for dental viewing comprising: dental instrument assembly means; said dental instrument assembly means including an elongated handle and an elongated retractor having a retractor base, a retractor blade and a retractor edge; said elongated handle having a longitudinal axis, the length of the elongated handle along the longitudinal axis being between 6 centimeters and 25 centimeters long; said dental instrument assembly including means for guiding light through said elongated retractor to said retractor

edge and means for providing fluid flow toward the retractor edge;  
 said elongated retractor having a longitudinal axis substantially at right angles to the longitudinal axis of said handle and having a length sufficient and a width and thickness small enough to enter dental access openings;  
 said elongated handle being tubular and adapted to be connected to a source of light, fluid and air;  
 said means for providing fluid flow toward the retractor edge including fluid outlet means for selectively applying air alone, liquid alone, both air and liquid and neither air nor liquid through said tubular handle in the direction of said retractor edge;  
 said outlet means being less than 5 centimeters from the base of the retractor blade and focused at the retractor edge;  
 said means for guiding light including a light conductor and source of light having an intensity of at least 3.5 milliwatts per square millimeter positioned to transmit light through the light conductor whereby the light when emitted has an intensity at least sufficient for transillumination;  
 said retractor having a thickness of between 0.25 millimeters and 2 millimeters, and a width of between 0.50 and 10 millimeters; and  
 said elongated retractor having a length of between 3 and 30 millimeters.

axially a relatively small depth into said body, said tapered lower end (2-3) merging into an elongated cylindrical portion (10) provided along the whole length thereof with an external screwthread (11), said cylindrical portion merging into a frustoconical portion (13), a connecting neck defined between said cylindrical portion and said frustoconical portion, the frustoconical portion (13) merging into a base column (14) of a low length and having a polygonal cross section, said base column



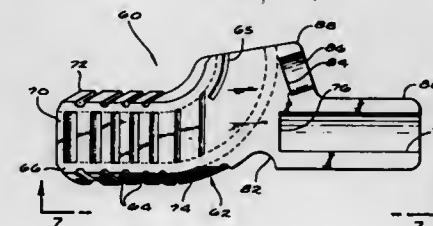
**4,790,752**  
**ILLUMINATED DENTAL IMPRESSION TRAY**  
 Leonard W. Cheslak, Tustin, Calif., assignor to Poly-Optical Products, Inc., Santa Ana, Calif.

Continuation-in-part of Ser. No. 9,413, Jan. 30, 1987, Pat. No. 4,765,701. This application Nov. 2, 1987, Ser. No. 115,668

Int. Cl.<sup>4</sup> A61C 9/00

U.S. Cl. 433—37

23 Claims



1. A dental tray comprising: a trough shaped optically transmissive tray body characterized by substantially total internal reflection having formed therein a channel being sufficiently curved to receive at least a partial arch-shaped group of teeth, said channel having a cross-section wider than said teeth to be received therein, said tray body having an outer surface with multiple, contiguously positioned recesses, each recess being defined by two opposing surfaces which angle inwardly from said outer surface toward each other to define therebetween an included angle, and with said tray body formed with at least a first light portal upon which a light source can be directed to direct light through said optically transmissive body for reflection and refraction from the inwardly angled surfaces of the recesses toward the channel of the tray body.

**4,790,753**  
**SCREW FOR DENTAL IMPLANTS**  
 Alejandro P. Fradera, 42, calle Angli, 08017 Barcelona, Spain  
 Filed Feb. 3, 1988, Ser. No. 152,023

Claims priority, application Spain, Feb. 13, 1987, 00360

Int. Cl.<sup>4</sup> A61C 8/00

U.S. Cl. 433—174

8 Claims

1. A screw for dental implants, comprising a single-piece main metallic body (1) having a tapered lower end (2-3) in which a central cavity (4) is formed, said cavity extending

forming an upper end of the screw body (1) and being provided with an axial bore (16) extending over approximately a half of the overall length of the screw, said axial bore including an initial portion (18) provided with an internal screwthread (20) which starts at an edge (21) of an outlet orifice (22) and extends over a major portion of the length of the initial portion, and a non-threaded end portion (19) terminating in a blind bottom (17) of the said axial bore (16).

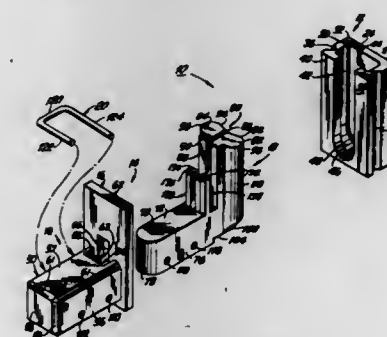
**4,790,754**  
**STABILIZED DENTURE ATTACHMENT**  
 Bernard Weissman, New York, N.Y., assignor to Ipcor Corporation, White Plains, N.Y.

Filed Dec. 11, 1987, Ser. No. 131,654

Int. Cl.<sup>4</sup> A61C 13/225

U.S. Cl. 433—182

18 Claims



1. A dental attachment for connecting a removable dental prosthesis to an adjoining fixed tooth, comprising: a female member including an upright housing having an open mouth channel, said female member being embedded into the fixed tooth with said channel exposed and facing the dental prosthesis; a male assembly including an insert member and a receiving member; said receiving member including an elongated housing having an upwardly extending face plate, a receiving chamber extending through said face plate and into said elongated housing;

said insert member including an elongated shank portion insertable into said receiving chamber, said shank portion supporting an upright plug at its forward end for positioning forward of said face plate; coupling means for securing said insert member in said receiving member; said male assembly being embedded into the dental prosthesis with said face plate at an outer surface of the dental prosthesis and with said plug projecting from the dental prosthesis for slidable insertion into said channel; and a stabilizing projection on said shank portion spaced rearward of said plug, wherein said face plate is straddled by said plug and said stabilizing projection for increased stability of said male assembly.

4,790,755

## AIRCRAFT PILOT-TRAINING APPARATUS

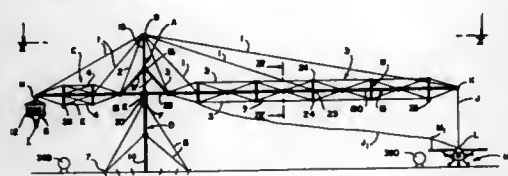
René Leduc, and Michèle Leduc, both of B.P. 120 - Place Fodère, St-Jean-de-Maurienne, France  
PCT No. PCT/FR86/00225, § 371 Date Feb. 20, 1987, § 102(e) Date Feb. 20, 1987, PCT Pub. No. WO87/00141, PCT Pub. Date Jan. 15, 1987

PCT Filed Jan. 26, 1986, Ser. No. 18,810

Claims priority, application France, Jul. 2, 1985, 8510196  
Int. Cl. B64F 3/00

U.S. Cl. 434-37

9 Claims



1. An apparatus for training aircraft pilots from a captive aircraft comprising:

- a support mast including a top end provided with an articulation means defining a vertical axis and a horizontal axis;
- a rigid boom mounted on the articulation means and extending outwardly therefrom for defining a small arm and a big arm;
- a balance weight including a top and a base, the top of the weight being attached under the small arm and the bottom of the base being provided with rolling and stopping contact means for engaging the ground and limiting the pivoting amplitude of the boom about the horizontal axis during raising of the big arm; and
- means carried by the big arm for suspending an aircraft at substantially its center of gravity, the suspending means including a first universal joint disposed adjacent the big arm and a second universal joint disposed adjacent the aircraft.

4,790,756

## WORLD GLOBE GEOGRAPHIC AREA VIEWER

Bradley L. Caldwell, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Sep. 29, 1987, Ser. No. 102,108

Int. Cl. G09B 27/08

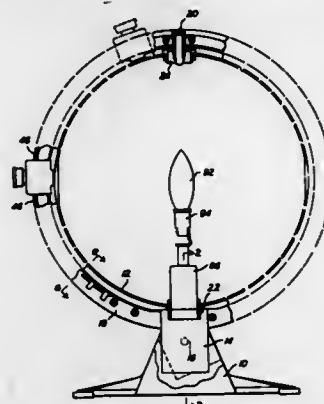
U.S. Cl. 434-145

13 Claims

1. A world globe geographic area viewer for viewing images of a selected geographic area of a rotatably mounted globe along a selected meridian thereof comprising:

- a film strip containing longitudinally spaced images of selected geographic areas of the globe;
- carrier means for the film strip at least partially encircling the rotatable globe along a meridian thereof;
- slider means slidably mounted on the carrier means movable to a selected position of latitude on the globe in which the

slider means are substantially in register with images of a selected geographic area; indicia on a geographic area of the globe corresponding to the images of the selected geographic area movable by



manual rotation of the globe into register with the slider means; and viewing means on the slider means for viewing the indicia and the images of the selected geographic area corresponding thereto.

4,790,757

## INSTRUMENT FOR PRACTICING MULTIPLICATION

Fumitaka Takahashi, Shizuoka, Japan, assignor to Kawai Gakki Seisakusho Co., Ltd., Shizuoka, Japan

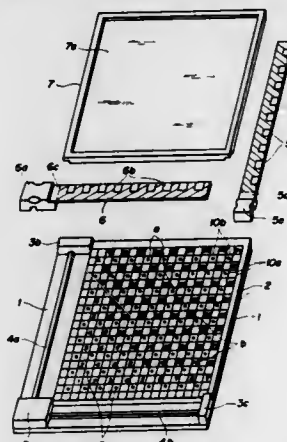
Filed Oct. 15, 1987, Ser. No. 108,648

Claims priority, application Japan, Oct. 19, 1986, 61-274153; Oct. 28, 1986, 61-254770

Int. Cl. G09B 1/00

U.S. Cl. 434-209

6 Claims



1. An instrument for practicing multiplication comprising a base plate, a square printed plate on the base plate and on which are printed vertical and horizontal rows of marks and figures, the rows of marks being interspersed between the rows of figures, a set of elongate vertical cursors each provided with a vertical row of windows, the cursors being slidably installed side-by-side on said base plate and covering all but one of said vertical rows or marks and figures on the printed plate, a set of elongate horizontal cursors each provided with a horizontal row of windows, the horizontal cursors being slidably installed side-by-side on the base plate and covering all but one of said horizontal rows of marks and figures on the printed plate, the cursors being arranged for sliding a selected number (X) of said

vertical cursors and a selected number (Y) of said horizontal cursors to a position toward one corner of the printed plate, and the windows, marks, and figures being mutually disposed whereby in said position of the cursors, a multiplication of the selected numbers X and Y is calculated, a figure representing the answer of the multiplication is displayed between respective cursors, and marks equal in number to the answer are displayed in aligned windows of the cursors.

4,790,758

## AIR NAVIGATIONAL INSTRUMENT SIMULATION AND INSTRUCTIONAL AID

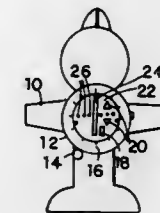
Richard C. Bellofatto, 4 Lewis Cir., Peabody, Mass. 01960

Filed Jan. 12, 1988, Ser. No. 143,455

Int. Cl. G09B 9/02

U.S. Cl. 434-243

11 Claims



1. A classroom training aid for air navigational instrument simulation and instruction comprising:

- a hand-held model simulating an airplane movable by hand and mountable primarily on a magnetic means on a vertical surface, over the entire area of which vertical surface the model may be moved and secured in any direction and orientation to simulate actual routes of travel of the airplane;

at least one simulated navigational instrument mounted on the model appearing and acting correspondingly to the appearance and apparent action of the actual navigational instrument on the airplane, which instrument comprises a Very High Frequency Omni Range (V.O.R.) indicator, wherein the V.O.R. indicator comprises a black circular card mounted on the hand-held model within a rotatable flat donut-shaped disc having compass markings simulating a course card, and pivotally mounted on the black circular card, at least one movable indicator element;

and wherein a simulated Omni Bearing Selector (OBS) knob is rotatably connected to the hand-held model, positioned in contact with an outer edge of the course card, and rotating the OBS knob rotates the course card to simulate selecting a radial from a VOR beacon;

a tensioned high friction band means stretched over a portion of a bottom face of the black circular card, wherein the band means serves to control at least one movable indicator element, wherein the movable indicator is set to a desired position manually and held in position by the band means;

and wherein an indicator element comprising an upper visible indicator portion is positioned visibly on an upper face of the black circular disc and, rigidly connected to the upper visible indicator portion a lower control portion is positioned on the bottom face of the black circular card in contact with the friction band means so that the friction band means holds the indicator element in a desired position.



4,790,759  
EDUCATIONAL BUILDING GAME  
Rémy Mosseri, 27, rue Jean Mermoz, 92700 Colombes, and Jean-François Sadoc, 5, Place de Savoie, 91940 Les Ulis, both of France

Filed Jul. 7, 1983, Ser. No. 511,663

Claims priority, application France, Jul. 9, 1982, 82 12101

Int. Cl. G09B 23/04

U.S. Cl. 434-403

14 Claims

1. An educational game comprising predetermined polyhedral bodies, characterized, in combination, by the fact that the dimensions of the edges of the polyhedral bodies are mutually in ratios equal to 1 or to a whole power of  $\tau$ , with

$$\tau = \frac{1 + \sqrt{5}}{2} = 1.618,$$

approximately, and by the fact that it comprises:

- at least one polyhedral body for defining a tetrahedral volume A,
- at least one polyhedral body for defining a pyramidal hexahedral volume S,
- at least one polyhedral body for defining a bipyramidal heptahedral volume Z,
- at least one polyhedral body for defining an octahedral volume H,

said polyhedral bodies allowing a non-periodical filling of the space, the formation of homothetic volumes of said volumes A, S, Z, H and of regular dodecahedral volumes.

4,790,760

## POWER DISTRIBUTION ADAPTER

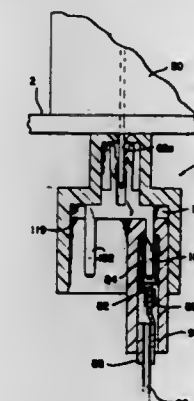
Earl R. Kreiberg, Phoenix, Ariz., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jan. 22, 1987, Ser. No. 65,239

Int. Cl. H01R 9/09

U.S. Cl. 439-55

5 Claims



1. In an electronic system including a first substrate having at least two edge card connectors mounted thereon, each edge card connector housing a second substrate therein, the edge



card connectors including pins projecting through the first substrate to form a pin field on an underside of the first substrate, the edge card connector pins being preselected and dedicated for a transfer of both power and data, the power pins having a like plurality of pins dedicated to a positive and a negative polarity for direct current power, a method of power distribution to the second substrates includes the steps of:

- providing a first insulated cable having a flat conductor therein;
- providing a current flow to the first flat conductor from a power source;
- dividing the current from the flat conductor into separate current paths equal in number to the plurality of pins on the first edge card connector dedicated to the positive polarity;
- interconnecting the current paths of the first cable to respective pins for the positive polarity on the first edge card connector;
- providing a second insulated cable having a flat conductor therein;
- commoning the first and second flat conductors together;
- dividing the current from the second flat conductor into separate current paths equal in number to the plurality of pins on the second edge card connector dedicated to the positive polarity; and
- providing a return path from the negative polarity pins on the first and second edge card connectors to the power source.

4,790,761

**CASSETTE CONNECTOR WITH PIVOT MECHANISM**  
Toshimatsu Sonebe, Tokyo, Japan, assignor to Thomas & Betts Corporation, Bridgewater, N.J.

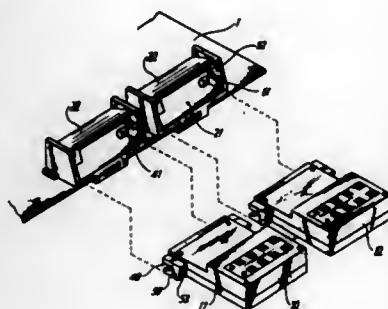
Filed Jul. 31, 1986, Ser. No. 892,218

Claims priority, application Japan, Aug. 8, 1985, 60-120944[U]

Int. Cl.<sup>4</sup> H01R 9/09

U.S. Cl. 439—59

4 Claims



1. An electrical connector assembly comprising:
  - a male member (10);
  - a female housing (20) for detachably holding said male member (10);
  - connection means (30, 31) for electrically connecting said male member and said female housing;
  - latch means (50, 51, 52, 53) for latching said male member to said female housing;
  - said female housing having a cavity (21) for receiving therein said male member, said cavity having an opening to allow insertion of said male member, said cavity expanding from a bottom thereof;
  - said connection means including a contact (30) arranged at a bottom surface of said male member and a spring contact (31) arranged adjacent a bottom surface of said female housing defining said cavity to face said contact (30) of said male member so that said spring contact (31) makes contact to said contact of said male member when said male member is inserted into said female housing; and
  - means for pivoting said male member from an inserted position to a latched position and for preventing overstressing of said spring contact (31) during insertion and rotation of said male member, said pivoting means including a shaft slot (40) formed at a lower portion of said male member and a shaft pin (41) extending into said cavity of said female housing to enter said shaft slot,

said latch means including projections (50) formed on opposite side ends of said male member and recesses (51) formed in opposite inner walls of said cavity for receiving said projections when said male member is inserted into said cavity and engaging with said projections when said male member is rotated.

4,790,762

**BACKPLANE FOR A MODULARLY EXPANDABLE PROGRAMMABLE CONTROLLER**

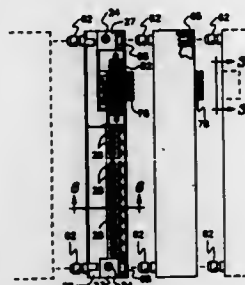
David S. Harms, deceased, late of Freeport, Ill.; Clarence Harms, heir, and Joan Harms, heir, both of Brillion, Wis., assignors to Honeywell Inc., Minneapolis, Minn.

Continuation of Ser. No. 758,192, Jul. 23, 1985, abandoned. This application Aug. 4, 1987, Ser. No. 83,013

Int. Cl.<sup>4</sup> H05K 1/00

U.S. Cl. 439—59

12 Claims



1. In an expansible backplane for supporting and electrically interconnecting input/output modules in a programmable controller, a plurality of substantially identical first backplane units each comprising:

- a first housing having first and second side walls and a seating surface transverse to the side walls against which an input/output module may be secured;
- means associated with said first housing to guide and position said input/output module as it is being secured against the seating surface;
- field wiring connection means supported by said first housing intermediate said side walls and accessible from the seating surface, said field wiring connection means having a first pluggable connector portion adapted to mate with a first connector portion on said module; and
- a first data bus segment extending between the side walls of said first housing, said first data bus segment terminating in second and third complementary pluggable connector portions in the first and second side walls respectively, the second and third connector portions being located so that when first backplane units are assembled side by side a connector portion in the first side wall of one first backplane unit mates with the connector portion in the second side wall of an adjacent first backplane unit to form a continuous data bus through the assembled backplane, each data bus segment having a fourth connector portion intermediate the walls of said first housing and accessible from the seating surface thereon, the fourth connector portion being adapted to mate with a second connector portion on said module.

4,790,763

**PROGRAMMABLE MODULAR CONNECTOR ASSEMBLY**

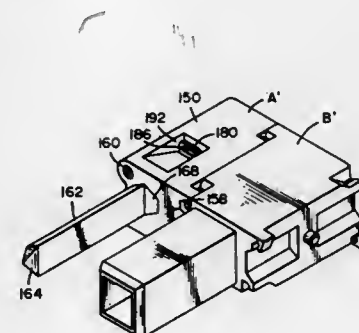
Ronald M. Weber, Lebanon, and William C. Van Scyoc, Shipensburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 855,225, Apr. 22, 1986. This application Sep. 15, 1986, Ser. No. 907,703

Int. Cl.<sup>4</sup> H01R 9/00

U.S. Cl. 439—65

8 Claims



1. A modular connector assembly for the distribution of power to a printed circuit board comprising:

- pairs of first and second matable individual connector modules, the first connector module of each pair having a pluggable mating face and a board-engaging face and the second connector module of each pair having a complementary pluggable mating face and a board-engaging face, each first individual module of respective pairs being provided with means to link itself with adjacent first modules to form a composite connector body, and each second individual module of respective pairs being provided with means to link itself with adjacent second modules to form a complementary composite connector body; and

at least one pair of first and second polarizing modules, said first and second polarizing modules being linkable with respective adjacent first and second connector modules, each said first and second polarizing module including a dielectric housing member having a multifaced cavity therein, said first polarizing module further including a polarizing projection having a corresponding multifaced surface for receipt in said first cavity in different rotational positions corresponding to the opposition of respective different faces of the cavity and projection, a forward end of the projection being free of a mating face of the housing member for mating engagement with a corresponding multifaced cavity of said second polarizing module of the pair, the other end of the projection being formed with a groove adapted to receive locking means therein, and a locking means adapted to be inserted through an access opening in the housing to engage said groove to lock the projection axially in the housing in any one of the rotational positions, a one end portion of the locking means extending from the housing for engagement by a release tool to withdraw the locking means from the groove to release the projection for withdrawal from the cavity and rotation to another polarizing position.

4,790,764

**ELECTRICAL POWER TERMINAL FOR CIRCUIT BOARDS**

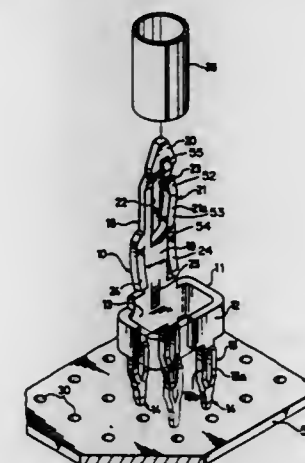
Akira Kawaguchi, Tachikawa, and Takinori Sasaki, Hino, both of Japan, assignors to AMP Incorporated, Harrisburg, Pa. PCT No. PCT/US86/01045, § 371 Date Mar. 9, 1987, § 102(e) Date Mar. 9, 1987, PCT Pub. No. WO86/07201, PCT Pub. Date Dec. 4, 1986

PCT Filed May 14, 1986, Ser. No. 29,506

Claims priority, application Japan, May 24, 1985, 60-110632 Int. Cl.<sup>4</sup> H01R 9/09

U.S. Cl. 439—78

16 Claims



1. An electrical terminal for electrically connecting a power supply contact (35) to a circuit board (50), the terminal comprising a body section (11) having mounting pins (14) extending from walls (12, 13) of the body section (11) and a contact portion (18), the mounting pins (14) have compliant sections (15a, 15b) which frictionally engage holes (30) of the circuit board (50), the contact portion (18) connects the power supply (35) to the terminal, a positive electrical connection is thereby effected, the electrical terminal being characterized in that:

the body section (11) has a rectangular annular configuration which has the mounting pins (14) extending from bottom edges of the walls (12, 13), and the contact portion (18) extends from an upper edge of the wall (13) opposite the mounting pins (14), the contact portion (18) has a vertical section (19) which has a resilient tongue (21) extending therefrom, the vertical section (19) and the tongue (21) form a male contact portion and cooperate to be inserted into and resiliently engage a female power supply contact (35).

4,790,765

**CONNECTOR SHUNT STRUCTURE**

Alfred L. Ehrenfels, Chesire, and Michael J. D'Amato, North Haven, both of Conn., assignors to Hubbell Incorporated, Orange, Conn.

Filed Oct. 5, 1987, Ser. No. 104,229

Int. Cl.<sup>4</sup> H01R 4/66

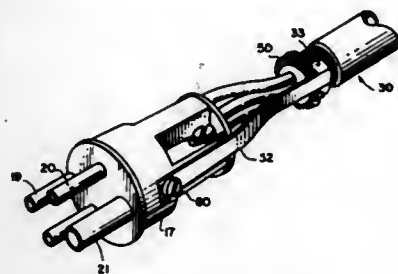
U.S. Cl. 439—96

4 Claims

1. A ground shunt structure for a connector of the type having a body of insulating material, a plurality of electrically conductive contact members including a ground contact member carried by said body for making electrical contact with mating contact members of a mating connector, means for receiving an electrical cable having an electrically conductive shield and a plurality of electrical conductors within said shield, and housing means for containing and supporting said body and said means for receiving so that said electrical conductors are connectable to said contact members with a por-

tion of said shield exposed within said housing means, said shunt structure comprising

a unitary T-shaped strip of electrically conductive material having an elongated leg and two outwardly extending arms at one end of said leg, said leg being significantly longer than said arms and said arms being bent out of the plane of said leg to approximate chords of a circle, said arms encircling less than 180° of said exposed portion of said shield, the distal ends of said arms having openings



therethrough, said leg having means at the other end thereof for making electrical contact with said ground contact member; and

an electrically conductive spring encircling the remainder of said exposed portion of said shield and making physical and electrical contact therewith, opposite ends of said spring being hooked through the openings in said distal ends of said arms to hold said arms in good electrical and mechanical contact with said shield.

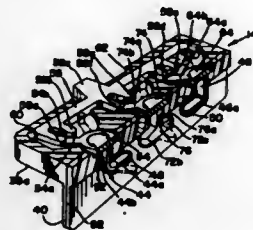
**4,790,766**  
**ELECTRICAL POWER TRACK SYSTEM**  
Donald J. Booty, Sr., 521 Durham Dr., Frankfort, Ill. 60423, and Donald J. Booty, Jr., 360 E. Randolph, Apt. 1603, Chicago, Ill. 60601

Filed Apr. 1, 1987, Ser. No. 33,397

Int. Cl.<sup>4</sup> H01R 25/14

U.S. Cl. 439—122

19 Claims



6. An electrical power track system as defined in claim 5 wherein said locking member is positioned intermediate said conductive contact members.

**4,790,767**  
**ELECTRICAL CONNECTOR FOR A DISTRIBUTORLESS IGNITION SYSTEM**  
Ronald P. Sturdevant, Tipton, Ga., and Michael E. LaCasse, Marysville, Mich., assignors to Prestolite Wire Corporation, Farmington Hills, Mich.

Filed Nov. 16, 1987, Ser. No. 121,077

Int. Cl.<sup>4</sup> H01J 13/44

U.S. Cl. 439—125

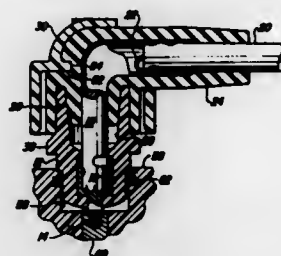
27 Claims

1. A connector for connecting an electrical terminal of a spark plug cable to a high voltage output terminal of a distributorless ignition system, said connector comprising:

a dielectric tower member having an electrode for electrically connecting said electrical terminal of said spark plug

cable with said high voltage output terminal of the distributorless ignition system;

an insulator boot having a central bore therethrough for receiving a portion of said electrical terminal and a portion of said spark plug cable therein, said insulator boot having a forward end engaging said tower member to

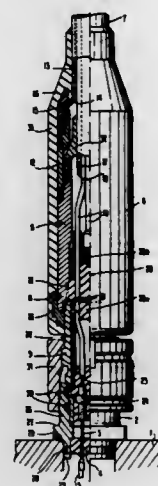


form a watertight seal therebetween when said electrical terminal is electrically connected to said electrode; and retainer means for locking said insulator boot to said tower member in said watertight arrangement and for maintaining said electrical connection between said electrical terminal and said electrode.

**4,790,768**  
**IMMERSIBLE ELECTRICAL COUPLING**  
Henri Domingues, Dourdan, France, assignor to Total Compagnie Francaise des Petroles, Paris, France  
Filed May 20, 1987, Ser. No. 51,564  
Claims priority, application France, May 20, 1986, 8607114  
Int. Cl.<sup>4</sup> H01R 13/52

U.S. Cl. 439—320

6 Claims



1. In an immersible electrical coupling of the type comprising:

(a) a fixed connector (1) mounted on a wall (1) of an electrical apparatus housing;

(b) an electrical cable terminal (6) fitted over one end of an electrical cable (7) which includes, in a radially inward direction, an outer insulating sheath (13), a metal armature (15), an inner insulating sheath (17), and a plurality of individually insulated electrical conductors (19) adapted to be engaged at terminal ends thereof in the fixed connector;

(c) first and second units of complementary contact parts, the first unit (3) being mounted inside the fixed connector and the second unit (24) being mounted inside the cable

terminal, each contact part of one unit being engaged with a complementary contact part of the other unit;

(d) a tubular metal structure (8, 9, 10, 12, 16) defined by the terminal (6) for retaining an end of the electrical cable in a watertight manner;

(e) a contact-carrying insulating part (23) mounted inside a front end of the metal structure, the contact parts of the second unit (24) being embedded in said insulated part and connected electrically to terminal ends of said electrical conductors (19);

(f) an end (14) of the outer insulating sheath (13) being disposed inside the cable terminal (6) at a greater distance from a front end of the terminal than an end (18) of the inner insulating sheath (17);

(g) an inner molding made of an elastomer material (32) applied between the inner sheath (17) of the cable and the metal structure (8); and

(h) a concentric outer molding made of an elastomer material (33) surrounding the outer sheath (13) and a major portion of the tubular metal structure (16, 12, 8, 10, 9); the improvement consisting in that;

(i) a space is defined within the cable terminal (6) between the end of the inner insulating sheath (17) and the contact-carrying insulating part (23), the individually insulated electrical conductors (19) being spaced from one another within said space; and

(j) an insulating plug (20) is disposed in said space, apart from said end of the inner insulating sheath and from said contact-carrying insulating part, said insulating plug surrounding each individually insulated electrical conductor in a watertight manner, and sealingly engaged inside the metal structure (8, 9).

**4,790,769**  
**TELEPHONE MODULAR JACK**  
Hiroshi Kanada, Hisai, Japan, assignor to Matsushita Electric Works, Ltd., Osaka, Japan

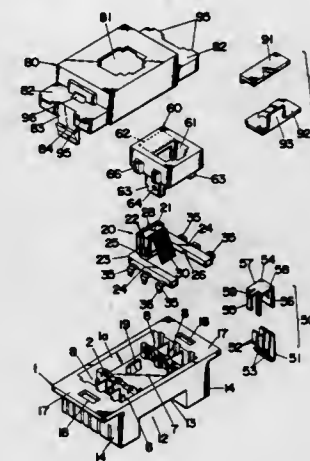
Filed Mar. 4, 1988, Ser. No. 164,295

Claims priority, application Japan, Apr. 15, 1987, 62-92450

Int. Cl.<sup>4</sup> H01R 4/50

U.S. Cl. 439—344

10 Claims



1. A telephone modular jack comprising:  
a housing having a plug cavity for receiving a mating modular plug with an array of contact members, said housing comprising a top-opened base of dielectric material and a cover of dielectric material which is assembled on the top of said base and has a profiled window for allowing the entry of said modular plug into the plug cavity;  
a contact block mounted in the housing and carrying an array of spring contacts for electrical engagement respectively with the contact members of the modular plug, said

spring contacts being stamped and formed from a metal strip;

a plurality of terminal units mounted in the housing each for wiring with a telephone wire, each of said terminal units having a lug for direct electrical connection with each of the spring contacts to provide electrical continuity from the respective spring contacts to the telephone wires through the corresponding terminal units;

said base being formed with a top-opened contact compartment for mounting therein said contact block and with a plurality of top-opened terminal compartments adjacent to said contact compartment for mounting therein said terminal units, said terminal compartment being separated from said contact compartments by upstanding partition means, said partition means being formed in its top surface with grooves into which said lugs of the terminal units are inserted, respectively;

said spring contacts each having along its length a first end portion, a middle portion, and a second end portion opposite of said first end portion, said portions being bent from the adjacent portions;

said contact block including an upright support in which the middle portions of said spring contacts are imbedded in such a manner that the first end portions of said spring contacts project from the top end of the upright support diagonally down to the bottom of said contact compartment in cantilever fashion within said plug cavity, said contact block further including a horizontal support in which the second end portions of said spring contacts are imbedded;

said second end portion of each spring contact having an integral lead tab projecting outwardly of the horizontal support, said lead tab being inserted in each of notches formed in the top surface of said partition means and crossed with said grooves such that said lug of each terminal unit retained in the groove can be engaged with the corresponding lead tab when the contact block is assembled down onto the base;

one of the lug of the terminal unit and the lead tab of the spring contact being formed therein with a slit for receiving the portion of the other in order to effect press-fit engagement therebetween upon the mounting of the contact block on the base; and

said cover having means for latching engagement with said base when the cover is assembled onto the base.

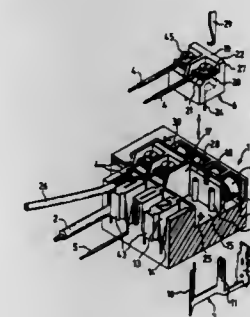
**4,790,770**  
**CONNECTOR BANK FOR CABLE WIRES, IN PARTICULAR OF TELEPHONE CABLES**  
Eberhard Klaiber, Berlin, Fed. Rep. of Germany, assignor to Krone Aktiengesellschaft, Fed. Rep. of Germany  
Filed Apr. 13, 1987, Ser. No. 37,703

Claims priority, application Fed. Rep. of Germany, Apr. 30, 1986, 3614592

Int. Cl.<sup>4</sup> H01R 4/24

U.S. Cl. 439—395

11 Claims



1. A connector bank for cable wires of telephone cables, the



cable wires being thick dropwire cable wires and thinner cable wires comprising: a plastic connection body defining a plurality of slots, at least one accommodation chamber and a plurality of overvoltage protection chambers; a plurality of connecting elements corresponding to each said slot, each connecting element including a connecting contact, a center contact and a contact spring, each connecting contact, center contact and contact spring being formed integral and positioned within said connection body such that said connecting contact is positioned in said slot with a cutting/clamping member positioned on each side of said slot, said center contact being positioned in communication with said at least one accommodation chamber through an opening in said accommodation chamber and said contact spring being positioned in one of said plurality of overvoltage protection chambers; a plurality of ground contact rails each ground contact rail being positioned within one of said plurality of overvoltage protection chambers and cooperating with one of said contact springs, each of said ground contacts and cooperating contact spring being adapted to receive an overvoltage suppressor in one of said overvoltage protection chambers; and, at least one plug having at least one cable connecting element and a corresponding contact lug, said at least one plug being positionable within said at least one accommodation chamber, said contact lug being positioned adjacent said opening engaging said center contact, thereby allowing one of the thick dropwire cable or thinner cable wires to be connected to said connecting contact in said slot and to be in electrical connection with another thick dropwired cable or thinner cable wire connected to said cable connecting element of said at least one plug and capable of being disconnected by removing said at least one plug without disturbing the cable wire connected to said connecting element of said slot which is still electrically connected to the overvoltage suppressor through said contact spring.

4,790,771

## WIRE TRAP TERMINAL

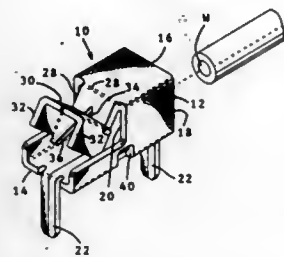
Wayne E. Kleiner, Mohrsville, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 23, 1987, Ser. No. 100,042

Int. Cl.<sup>4</sup> H01R 4/24

U.S. Cl. 439—421

7 Claims



1. A wire trap terminal for terminating an insulated electrical wire, where said terminal is provided with leads projecting therefrom for connection to an electrical circuit, said terminal comprising:

- a housing having a cavity therein as defined by a first opening for receiving an insulated wire, and a second opening through which said wire projects,
- a crimping member pivotal from an open to a closed position and attached to said housing at said second opening, where said member is provided with a V-shaped slot capable of cutting said insulation, and
- means for locking said crimping member against movement in said closed position.

4,790,772

## ELECTRIC CONNECTING TERMINAL

Siegfried Schulte; Manfred Böing, and Friedrich W. Ottinghaus, all of Lüdenscheld, Fed. Rep. of Germany, assignors to Schulte-Elektrotechnik GmbH & Co. KG, Lüdenscheld, Fed. Rep. of Germany

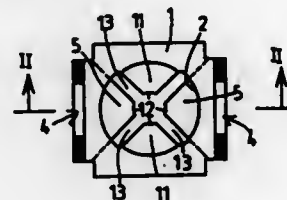
Filed Dec. 23, 1987, Ser. No. 137,513

Claims priority, application Fed. Rep. of Germany, Jan. 8, 1987, 3700318

Int. Cl.<sup>4</sup> H01R 4/24

U.S. Cl. 439—439

10 Claims



1. An electric connecting terminal for impaling on a stud or an analogous protuberance of a support, comprising a web having a stud-receiving opening and two first stud-engaging projections extending into said opening; and two sidewalls integral with said web and having springy second stud-engaging projections overlying a portion of said opening, said web and said sidewalls together forming a substantially L-shaped body and the projections of said sidewalls alternating with said first projections, each of said sidewalls having an outer panel which is integral with said web and an inner panel which is integral with the respective outer panel, said second projections being integral with and extending substantially at right angles to the respective inner panels.

4,790,773

## ELECTRICAL RECEPTACLE

Marilyn E. Hahn, York, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

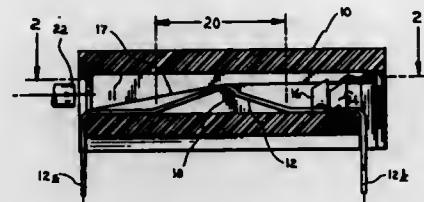
Continuation-in-part of Ser. No. 908,341, Sep. 17, 1986,

abandoned. This application Apr. 29, 1987, Ser. No. 43,821

Int. Cl.<sup>4</sup> H01R 13/26

U.S. Cl. 439—474

3 Claims



1. An electrical receptacle comprising: a formed resilient metal leaf spring member received in a through passage defined by bottom, side and top walls in a plastic supporting housing, said through passage having an inclined portion in its top wall for contacting said spring member, said spring member being formed with an arc in its central portion, said arc having a nonflexing hump formed therein and flat length continuing therefrom that serves as a stop against the bottom wall of the passage; and means for securing said spring member in said through passage with its central arc portion contacting said inclined portion of the through passage in the receptacle to elastically deform the arc portion of the spring to preload the spring.

4,790,774

## MOBILE ANTENNA MOUNTING

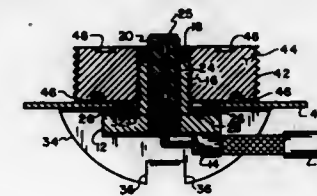
Wayne White, Hillside, Ill., assignor to Whilco Component Engineering, Inc., Glendale Heights, Ill.

Filed Nov. 30, 1987, Ser. No. 126,508

Int. Cl.<sup>4</sup> H01R 13/74

U.S. Cl. 439—551

3 Claims



1. Apparatus for mounting a mobile antenna through a hole in the body of a vehicle, said apparatus comprising a connector assembly including a bushing having a hollow, cylindrical, externally threaded lug extending outwardly from substantially the center of one surface, an electrical conductor extending longitudinally through and insulated from said threaded lug, and means for coupling the central wire of a co-axial cable to said electrical conductor and the shield of said co-axial cable to said bushing; a mounting bracket having a substantially flat upper surface with a central aperture therein and two spaced apart downwardly extending semi-oval shaped flanges, said mounting bracket being adapted to receive said connector assembly between said flanges such that said threaded lug extends through the upper surface of said bracket; and a retaining nut internally threaded to engage said threaded lug and externally threaded to receive a mobile antenna such that when said threaded lug is inserted through the hole in the body of a vehicle the upper surface of said mounting bracket engages the interior surface of said vehicle body and said retaining nut engages the outside surface of said body.

4,790,775

## TRANSITION CONNECTOR

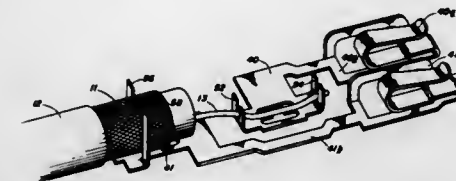
James J. David, Eters, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 9, 1988, Ser. No. 154,092

Int. Cl.<sup>4</sup> H01R 17/04

U.S. Cl. 439—579

4 Claims



1. A connector for connecting a plurality of coaxial cables arranged in a conductive pattern to another connector having terminals on spaced centers arranged in a different conductive pattern, each coaxial cable having a signal wire surrounded by a ground shield, said transition connector comprising: a terminal array arranged to match said spaced centers, each array including a plurality of elongated signal wire tabs having up-turned end portions with slots therein said slots having a width approximating the diameter of the signal wire, said signal wire tab having a central opening therethrough and a plurality of elongated ground tabs of conductive material, each having a central opening therethrough and upturned side portions spaced from each other a distance approximating the diameter of the ground shield of the coaxial cable, said signal wire tabs and said ground tabs being arranged in pairs.

and said ground wire tabs being arranged in pairs, each pair being axially aligned with each other and electrically isolated from each other; conductive paths connecting said ground and said signal tabs to said terminals according to the conductive pattern of the other connector to provide a desired programming of interconnection between said coaxial cables and said other connector; and a dielectric housing having multiple channels for receiving said coaxial cables, said signal tabs, said ground shield tabs and said conductive paths, said housing having openings therethrough aligned with said openings in said signal tabs and said ground shield tabs to permit access to said tabs for laser welding said tabs to respective ground shields and signal wires of said coaxial cables to form electrical connections therewith.

4,790,776

## ELECTRIC POWER PLUG

Makoto Iijima, Kawasaki, Japan, assignor to Kawasaki Electric Wire Co., Ltd., Kanagawa, Japan

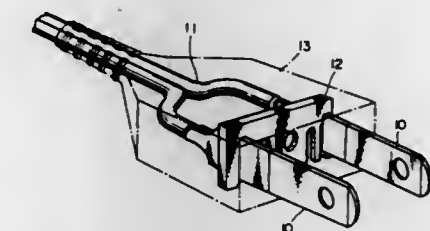
Filed Oct. 5, 1987, Ser. No. 104,209

Claims priority, application Japan, Oct. 6, 1986, 61-153221[U]

Int. Cl.<sup>4</sup> H01R 13/504

U.S. Cl. 439—695

3 Claims



1. An electric power plug comprising: a pair of elongated blades with each blade having at least one engaging means formed in a long side of the blade adjacent to one end of the blade for engaging with a blade retaining member; a blade retaining member made of an electrically insulating material and having a pair of blade engaging portions, each blade engaging portion comprising an outer tongue attached at one end to the blade retaining member and extending perpendicularly to the longitudinal direction of the blade retaining member, said outer tongue defining a slit between an inner side thereof and an opposing side of the blade retaining member, said slit opening to a longer side of the blade retaining member and having a width substantially equal to the thickness of the blade, said engaging portions engaging said engaging means of said pair of blades respectively to retain said blades relative to said blade retaining member; a cord having a pair of conductors, end portions of said conductors being connected to end portions of said pair of blades respectively; and a plug body made of a resin material with said blade retaining member and portions of said pair of blades in the vicinity of said blade retaining member including the end portions of the blades connected to said cord and said end portions of said conductors embedded in said plug body.

4,790,777

## CONNECTOR HOUSING

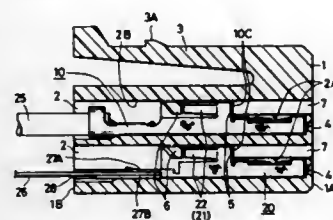
Isao Iimori, Kunitachi, and Kazumi Otsubo, Utsunomiya, both of Japan, assignors to Japan Aviation Electronics Industry Limited and Honda Giken Kogyo Kabushiki Kaisha, both of Tokyo, Japan

Filed Sep. 18, 1987, Ser. No. 97,985

Claims priority, application Japan, Sep. 24, 1986, 61-145930  
Int. Cl.<sup>4</sup> H01R 13/432

U.S. Cl. 439—744

3 Claims



1. A connector housing formed of a block of an insulating material, comprising:

- a plurality of elongated contact receiving holes extending between front and rear surfaces of said block, said contact receiving holes having openings arranged in at least two rows in parallel to each other in each of said front and rear surfaces of said block, each of said contact receiving holes comprising a front half portion with a low ceiling and a rear half portion with a higher ceiling, thereby defining a step portion which is oriented at substantially a right angle to the longitudinal direction of each hole at an intermediate portion of each of said contact receiving holes;
- a plurality of projections provided on the respective ceilings of said rear half portions of said contact receiving holes;
- a slit formed in said rear surface of said block to communicate respective ones of said contact receiving holes with one another in each of said rows; and
- a plurality of guide holes formed separately from said contact receiving holes in said front surface of said block to reach corresponding ones of said projections, respectively.

4,790,778

## EQUIPMENT QUICK-CONNECT TERMINAL FOR CONNECTING ELECTRICAL CONDUCTORS TO ELECTRICAL EQUIPMENT

Heinz Seidenbusch, Salzburg-Rosenberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 2, 1987, Ser. No. 34,141

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611366

Int. Cl.<sup>4</sup> H01R 4/36

U.S. Cl. 439—811

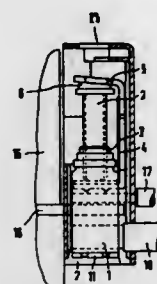
5 Claims

1. A quick-connect terminal for connecting electrical conductors to a bus bar of electrical equipment, comprising:

- a cover having a longitudinal channel with an opening at one end, an opening for entry of the equipment bus bar and funnels for entry of the electrical conductors, the longitudinal channel being arranged with respect to the bus bar entry opening such that the direction of bus bar entry is transverse to the longitudinal channel;
- a conductor frame terminal assembly comprising a conductor frame extending around the conductors and having a thread for a terminal screw, a U-shaped pressure piece having first and second legs and a bridge connecting the legs, the terminal screw surrounded by the U-shaped pressure piece with the second leg of the pressure piece with the conductor frame, the terminal screw having a head guiding the first leg of the U-shaped pressure piece,

the conductor frame terminal assembly being inserted into the opening of the longitudinal channel of the cover; means securing the assembly within the longitudinal channel of the cover in a snap-in manner;

the cover has N parallel longitudinal channels, where N is a number greater than or equal to 2, a corresponding number N of terminal assemblies, a corresponding number N of means for securing the N assemblies in the cover and N-1 recesses having an approximately rectangular cross-



4,790,779

## BURN-IN SOCKET FOR ZIG-ZAG INLINE SEMICONDUCTOR PACKAGE

Timothy B. Billman, King, and Joseph R. Goodman, Walkertown, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.

Filed May 6, 1987, Ser. No. 46,969

Int. Cl.<sup>4</sup> H01R 13/11

U.S. Cl. 439—842

19 Claims



1. An electrical socket for interconnecting an inline integrated circuit package having a plurality of leads to a plurality of electrical conductors on a printed circuit board, the socket comprising:

- an insulative housing having an upper package receiving face for receipt of the integrated circuit package, and a plurality of terminal receiving cavities, each of the cavities communicating with an opening in the upper face;
- a plurality of electrical terminals located within respective cavities, each terminal comprising a central base means having a conductor interconnecting section at a first end with an element interconnecting section at a second end, the element interconnecting section including two resilient contact arms extending along an axial lead insertion

axis with arcuately formed, oppositely directed convex contact sections being profiled such that tangent lines to the apices of the convex sections overlap the lead insertion axis, each of the contact arms including a section of terminal disposed adjacent to an associated opening, flaired away from the axial lead insertion axis to form a lead-in section for the leads of the inline integrated circuit package, whereby

when the package is inserted in the socket, the package leads are directed into engagement with respective terminals by the lead-in sections and deflect the contact arms through a distance equal to the sum of the overlap plus the thickness of the leads.

4,790,780

## ELECTRICAL CONNECTING APPARATUS

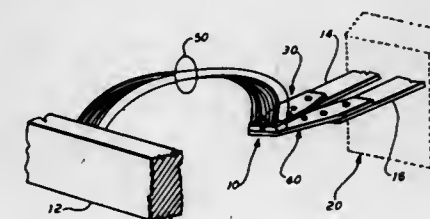
Harold D. Bushfield, Bloomington, Ill., assignor to Olin Fabricated Metal Products, Inc., Bloomington, Ill.

Filed Aug. 17, 1987, Ser. No. 85,563

Int. Cl.<sup>4</sup> H01R 9/24

U.S. Cl. 439—887

4 Claims



1. Electrical connecting apparatus for electrically interconnecting an electrical energy source and electrical energy utilization apparatus, comprising:

- a pair of first electrical conductors of a first electrically conductive material;
- a pair of second electrical conductors of a second electrically conductive material;
- a pair of third electrical conductors of said first electrically conductive material, said second and third electrical conductors of each pair electrically and mechanically interconnected;
- said pairs of said first, second and third electrical conductors oriented correspondingly and disposed substantially parallel;
- one end of each of said first electrical conductors electrically and mechanically interconnected with one of said third electrical conductors;
- a fourth electrical conductor comprised of a plurality of layers of said second electrically conductive material, one end of which is electrically and mechanically interconnected jointly to said pair of second electrical conductors; and
- the other end of each said first electrical conductors for being electrically and mechanically interconnected with said electrical energy utilization apparatus and the other end of said fourth electrical conductor for being electrically and mechanically interconnected with said electrical energy source.

4,790,781

## LUBRICATING CONSTRUCTION FOR MARINE PROPULSION DEVICE OF WATER JET TYPE

Hideharu Takahashi, Hamamatsu, Japan, assignor to Sahshin Kobyo Kabushiki Kaisha, Shizuoka, Japan

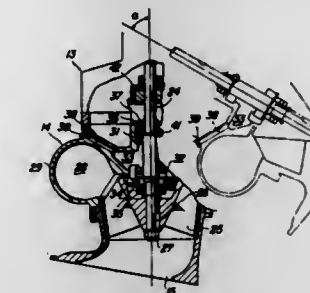
Filed Apr. 30, 1987, Ser. No. 44,811

Claims priority, application Japan, May 1, 1986, 61-101426  
Int. Cl.<sup>4</sup> B63H 11/02

U.S. Cl. 440—38

11 Claims

1. In a bearing arrangement for a marine outboard drive comprising an outer housing supported for pivotal movement



4,790,782

## BALANCED MARINE SURFACING DRIVE

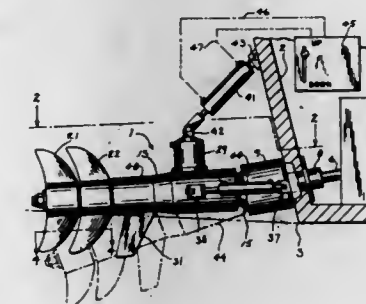
Daniel F. McCormick, Oakbrook, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Feb. 26, 1988, Ser. No. 160,834

Int. Cl.<sup>4</sup> B63H 21/26

U.S. Cl. 440—61

5 Claims



4. In a marine surfacing drive for attachment to a boat (3), the combination comprising:

- (a) a longitudinal propeller carrier (13) defining a drive axis (49);
- (b) means for mounting said carrier on the boat for lateral and vertical pivoting relative thereto;
- (c) a pair of adjacent water surface piercing propellers (21, 22) disposed coaxially at the rearward end of said carrier;
- (d) and means for driving said propellers from a single boat mounted engine and in contrarotating relationship;
- (e) each said propeller comprising a generally wedge-shaped body having a relatively sharp leading edge (32, 33) and a relatively blunt trailing edge (34, 35).



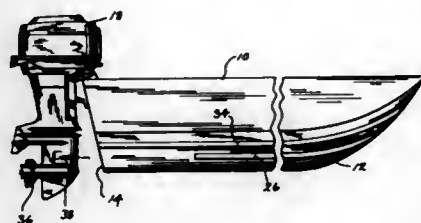
**4,790,783**  
**MARINE PROPULSION COMBINATION WITH IMPROVED COOLING**

Michael A. Karla, Hilbert, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Nov. 2, 1987, Ser. No. 115,697  
Int. Cl.<sup>4</sup> B63B 1/00

U.S. Cl. 440-66

8 Claims



1. A boat, comprising a hull including a bottom and having a centerline extending longitudinally along said bottom, a pair of strakes extending longitudinally along said bottom and spaced laterally outwardly from and on opposite sides of said centerline, each strake composed of a generally horizontal first surface extending laterally outward from said bottom and a second surface interconnecting said first surface and said bottom and extending upwardly and laterally outward from said first surface at an acute angle to the vertical and occupying the space otherwise adjacent a vertical side surface of the strake which would otherwise provide a low pressure region forming a path along such otherwise vertical strake side surface along which air can otherwise enter at the water surface when the boat is running and follow such low pressure path rearwardly resulting in ingestion of aerated water, said second surface extending from said first surface laterally upwardly and outwardly to said hull bottom at a sufficient angle relative to vertical to occupy said space and eliminate said low pressure path and ingestion of air.

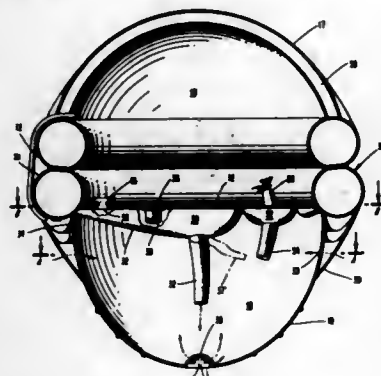
**4,790,784**  
**LIFE RAFT**

James A. Givens, Tiverton, R.I., assignor to Givens Buoy Life-raft Co., Inc., Tiverton, R.I.

Filed Jul. 14, 1986, Ser. No. 884,916  
Int. Cl.<sup>4</sup> B63C 9/04

U.S. Cl. 441-40

16 Claims



1. A self bailing, stabilized life raft comprising:  
a flotation platform for carrying at least one occupant including a peripheral, inflatable buoyant member and a flexible floor spanning said buoyant member;  
a generally hemispheric stabilization chamber formed of a flexible sack depending from the periphery of the flotation platform, said stabilization chamber being adapted to fill with water when the life raft is deployed, whereby a mass

of water in the stabilization chamber is loosely coupled to the flotation platform;

a bailing chamber located between said flotation platform and said stabilization chamber, said bailing chamber comprising a flexible sheet having a peripheral edge attached to the flotation platform, said flexible sheet having an area greater than an area of the flotation platform circumscribed by the attached peripheral edge of the flexible sheet, central portions of the flexible sheet being adapted to move relatively to the flexible floor, whereby the volume of the bailing chamber increases responsive to raft motion resulting in lifting a portion of the bailing chamber upward;

check valve means in spaced openings in the floor for permitting water collecting on the flexible floor to pass into the bailing chamber while simultaneously preventing water in the bailing chamber from being exhausted back through the openings onto the floor; and

a water outlet sleeve, attached to the flexible sheet, through which water is exhausted from the bailing chamber into the stabilization chamber at a location spaced beneath the flexible sheet in response to pressure exerted on the bailing chamber due to relative movement between the floor and the water in the stabilization chamber adjacent to the flexible sheet.

**4,790,785**

**MEANS AND METHOD FOR MANUFACTURE FOR A HIGH-RESOLUTION COLOR CATHODE RAY TUBE**

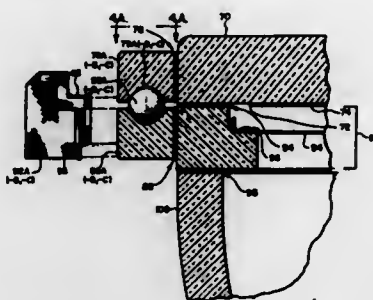
Sae D. Lee, Buffalo Grove, and Kazimir Palac, Carpentersville, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

Continuation of Ser. No. 758,174, Jul. 23, 1985, Pat. No. 4,713,034. This application Dec. 11, 1987, Ser. No. 131,968. The portion of the term of this patent subsequent to Dec. 15, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> H01J 9/20

U.S. Cl. 445-45

7 Claims



1. A flangeless flat faceplate with a target area for receiving at least one pattern of phosphor deposits, said faceplate having a plurality of discrete, detachable indexing elements affixed at preselected, widely spaced locations on the external edges or sides of said faceplate for registration with complementary indexing elements on another member, said detachable indexing elements being attached to said faceplate by a thermally degradable cement.

**4,790,786**

**FACTORY FIXTURE FRAME FOR AN IN-PROCESS TENSION MASK COLOR CATHODE RAY TUBE**

Paul Stamm, Chicago, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.

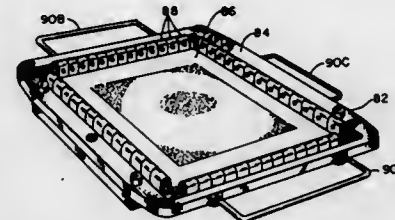
Filed May 18, 1987, Ser. No. 51,896  
Int. Cl.<sup>4</sup> H01J 9/227

U.S. Cl. 445-68

12 Claims

1. For use in the manufacture of a color cathode ray tube

having a flat faceplate and a tensed foil shadow mask, a reusable factory fixture frame for mounting an in-process shadow mask during photoexposure of an in-process faceplate in a lighthouse, said frame comprising generally rectangular frame means and quick-release mechanical mask-retaining means for temporarily and removably supporting an in-process shadow mask in tension, said frame having first six-point indexing means on a first side for registration with complementary



registration-affording means on an exposure lighthouse, and second six-point indexing means on a second, opposed side for registration with complementary registration-affording means on said in-process faceplate, whereby said in-process shadow mask can be precisely registered and re-registered with said lighthouse and said in-process faceplate for the photoexposure of said in-process faceplate while retaining said in-process shadow mask in tension.

**4,790,787**

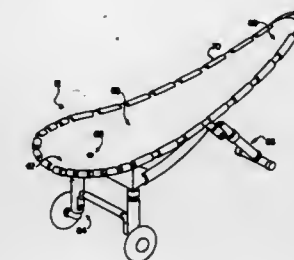
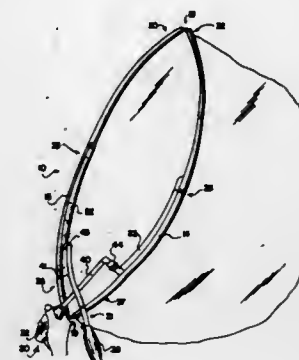
**BUBBLE MAKING SYSTEM HAVING RIGID BOW MEMBERS**

Lloyd V. Rector, 17 Academy St., #2, Barre, Vt. 05641  
Filed Nov. 26, 1986, Ser. No. 935,685

Int. Cl.<sup>4</sup> A63H 33/28; B62B 1/00

U.S. Cl. 446-15

20 Claims



1. A bubble maker comprising:  
a plurality of elongate, arcuate bow members, each having an upper end, a middle section, and a lower end, each of

said members rigid over its length from its upper end to its lower end, the upper end of each of said members pivotally connected to the upper end of each of the other members and the lower end of each of said members pivotally connected to the lower end of each of the other members; hand grips, each grip connected to a bow member near said member's lower end, whereby the bow members can be pivoted from a closed position generally parallel and in contact with one another over their length to an open position in which said members middle sections are apart from one another and said members enclose an opening of generally lenticular shape for making bubbles.

**4,790,788**

**AERIAL TOY**

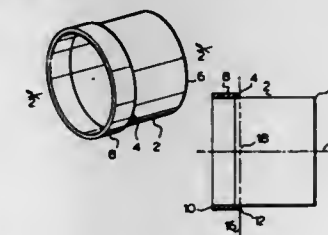
Jerry M. Hill, 34-2137 West 1st, Vancouver, British Columbia, Canada

Continuation of Ser. No. 822,633, Jan. 27, 1986, abandoned. This application Jan. 22, 1988, Ser. No. 147,292

Int. Cl.<sup>4</sup> A63H 27/00, 27/08; A63B 57/00; B64C 5/00

U.S. Cl. 446-61

6 Claims



1. A hand launched aerial toy consisting of a hollow open-cased resilient deformable body including forward and rearward body sections having a diameter greater than its length, said rearward body section constituting a relatively thin walled sail means, said thin walled sail means having a substantially constant thickness said forward body section being substantially axially shorter than said rearward section and of radially thicker construction and configured to define a linear substantially constant interior cross section with said rearward body section, said forward body section being of a greater external diameter than said rearward body section, said toy body being of substantially uniform internal diameter throughout its length, said forward body section including a chamfered leading edge and a diminishing external thickness adjacent the point of interconnection with said rearward body section and including a smooth outer surface to define a total external surface of greater size than said linear substantially constant interior cross section, and wherein said forward body section comprises an external airfoil, and wherein said toy body defines a configuration to create an interior high pressure region and an external low pressure region when launched through the air, and a relative length relationship is established between said forward and rearward body sections to place the longitudinal center of gravity at substantially the point of interconnection between said forward and rearward body sections.

**4,790,789**

**TOY FIGURE HAVING ADJUSTABLY MOVABLE JOINTS**

Michael S. Mathis, HCR 72, Box 5A, Lenora, Tex. 79749

Filed May 22, 1987, Ser. No. 52,918

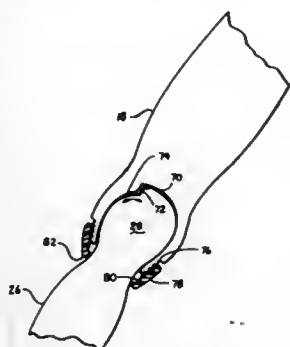
Int. Cl.<sup>4</sup> A63H 3/52, 33/30

U.S. Cl. 446-378

1 Claim

1. A new and improved toy figure having adjustably movable joints, said figure comprising:  
a body portion having a plurality of relatively movable first and second body parts attached thereto by ball joint means;

directional movement control means for controlling a direction of rotational movement between said body parts; and adjustable rotational movement control means for controlling an extent of rotational movement between said body parts in said established movement direction, and wherein said directional movement control means comprises a stop member formed on a ball of said ball joint means, and wherein said directional movement control means comprises a wall portion integrally formed on a socket of said ball joint means;



said directional movement control means comprises said stop member formed on said ball being abutable against said wall portion of said socket which receives said ball, wherein said adjustable rotational movement control means comprises an internally threaded conical ring member threadedly connected to and of limited adjustment relative to said socket of a first body part between said relatively movable body parts, said ring member surrounding overlying a second body part to provide an abutment lip means to enable only limited rotation of said second body part relative to said first body part.

4,790,790

## TOY MUSICAL INSTRUMENT

Masatoshi Todekoro, Tokyo, Japan, assignor to Staff Co., Ltd., Tokyo, Japan

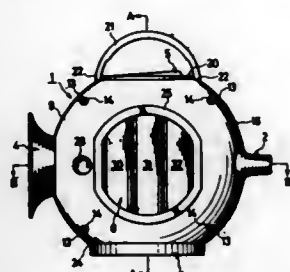
Filed Dec. 28, 1987, Ser. No. 138,334

Claims priority, application Japan, Sep. 4, 1987, 62-134597[U]

Int. Cl. A63H 5/00

U.S. Cl. 446-408

3 Claims



1. A toy musical instrument comprising:
  - (a) a toy body having one and the other side portions;
  - (b) an imitation mouthpiece projecting outward from the one side portion, formed similarly to a mouthpiece of a trumpet and having means to generate an imitation sound of a trumpet when a blast is given on said imitation mouthpiece with said imitation mouthpiece held in the mouth;
  - (c) an imitation bell, from which the imitation sound of a

trumpet is sent out, projecting outward from said other side portion;

- (d) other kinds of imitation musical instruments provided on the remaining portion of the body which include imitation castanets formed similarly to castanets and having means providing an imitation sound of castanets when they are beaten, an imitation piano formed similarly to a keyboard of a piano and having means providing the sound of a piano when it is beaten, an imitation drum formed similarly to a parchment of a drum and having means providing an imitation sound of a drum occurs when it is beaten, and an imitation xylophone formed similarly to a keyboard of a xylophone and having means providing an imitation sound of a xylophone when it is beaten, said imitation castanets being formed by fitting a vessel in said toy body, putting a cover includes a central portion and an inner surface on said vessel, pivotably connecting one end portion of said cover to the bottom portion of said vessel, providing a spring between the central portion of the inner surface of said cover and that of the bottom portion of said vessel, and providing the other end portion of said cover with a hammer projection by which a section acting as a sound generator set in the bottom portion of said vessel is beaten by said projection.

4,790,791

## RING-SHAPED COUPLING

Susumu Sumida, Kusatsu; Atsuo Kamata, Tondabayashi, and Fayuki Yoshii, Kobe, all of Japan, assignors to Daihatsu Diesel Mfg. Co., Ltd., Osaka, Japan

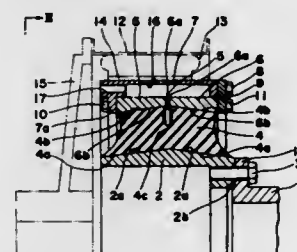
Filed Jun. 19, 1987, Ser. No. 64,009

Claims priority, application Japan, Jun. 20, 1986, 61-94833[U]

Int. Cl. F16D 3/76

U.S. Cl. 464-17

4 Claims



1. A ring-shaped coupling comprising:
  - a an inner ring;
  - a pair of outer rings which are placed facing each other in the axial direction and with a specified clearance therebetween, each having an inner circumferential surface consisting of a conical surface flaring toward the other;
  - a rubber ring disposed between the inner ring and the pair of outer rings, said rubber ring having an inner circumferential surface which forms a single, solid surface and which adheres by vulcanization to an outer circumferential surface of the inner ring while an outer surface thereof is divided into two conical surfaces, which adhere by vulcanization to the respective conical inner circumferential surfaces of the outer rings, by a circular groove provided axially in the middle of and in the circumferential direction of the rubber ring, wherein the circular groove forms a circular gap leading to the clearance of the outer rings when the outer rings are fixed in place together with the rubber ring; and
  - joining means having a cylindrical outer surface for putting said pair of outer rings close to each other in the axial direction and fixing them in place while compressing said rubber ring, and forming a circular air chamber leading outside between the inner surface thereof and the pair of outer rings, said circular groove communicating with said circular air chamber.

4,790,792

## TORSION DAMPING ASSEMBLY

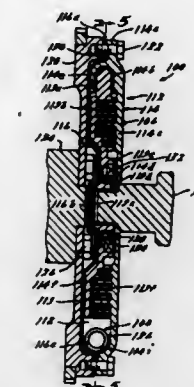
Warren G. Bopp, Farmington Hills, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Dec. 22, 1983, Ser. No. 564,537

Int. Cl. F16D 3/12, 3/80

U.S. Cl. 464-66

6 Claims



1. In an assembly adapted for connection between input and output drives of a torque transmitting driveline, the assembly including torsional energy isolating means and damping means disposed in parallel connection, the isolating means operative when connected between the input and output drives to transmit driveline torque between the drives and allow limited relative rotation of the drives in response to torsionals in the driveline torque, the improvement comprising:

a viscous coupling defining the torsional energy damping means, said coupling including a rotatably mounted housing member defining a chamber containing a viscous fluid and a second rotatably mounted member having a portion disposed in the chamber for viscous clutching coaction with the housing, said housing member and second member respectively connectable with one of the drives and operative to dampen said torsionals by the viscous clutching coaction in response to the isolating means allowing relative rotation of the drives said rotatably mounted housing member disposed for rotation about an axis and connectable at its outer periphery to one of the driveline drives, said housing member including first and second sidewalls extending radially outward of said axis to define said chamber, said first sidewall having a closed central portion extending across said axis, said second sidewall having open central portion allowing connection a said second member to the other drive of the driveline, and said chamber sealed against leakage by a dynamic seal sealingly interposed between said second rotatably mounted member and said second sidewall, whereby said chamber is sealed by a single dynamic seal.

4,790,793

## RESILIENT DEVICE FOR THE CENTERING AND COUPLING WITH BACKLASH OF TWO ROTARY COMPONENTS

Juan S. Bacardit, Barcelona, Spain, assignor to Bendix Espana S.A., Barcelona, Spain

Filed May 21, 1987, Ser. No. 53,213

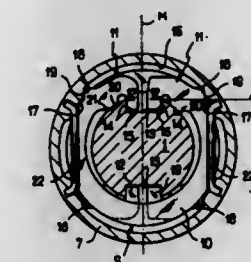
Int. Cl. B62D 5/08; F16D 3/30

U.S. Cl. 464-77

2 Claims

1. A resilient device for the centering and coupling with backlash of coaxial first and second rotary components, the second rotary component having a part surrounding a part of the first rotary component, said device being of the type com-

prising at least one C-spring disposed substantially coaxially between said parts of the first and second rotary components and having two adjacent end zones substantially coaxially between said parts of the first and second rotary components and having two adjacent end zones substantially symmetrical in relation to a median plane and connected together by a partially annular body part, each end zone comprising a first and a second stop edge, the stop edges normally, when the first and second rotary components are in a centered position, cooperating with and bearing against respective first and second stop surfaces disposed respectively at said parts of the first and second rotary components, the first stop edges being formed by end lugs extending substantially radially in an inward direction and received in an external cavity which is formed in said part of the first rotary component and whose mutually opposite faces form the first stop surfaces, characterized in that each second stop edge is formed by an external shoulder at a connection between the end zone and the body part of the spring, said each second stop edge being in nonlin-



ear alignment with and angularly offset from the associated first stop edge so as to be approximately parallel with one another, the second stop surfaces being formed opposite one another on an inside wall of said part of the second rotary component, the inside wall of said part of the second rotary component forming in an extension of each second stop surface a cylindrical surface whose radius is slightly greater than the outside radius of an adjacent zone of the body part of the C-spring, each end zone of the C-spring having an internally extending portion with a curved surface whose radius is slightly greater than the radius of an external surface of said part of the first rotary component and which adjoins the cavity, the device comprising a plurality of C-springs juxtaposed axially and placed alternately in opposition, the second stop surfaces for the springs being mutually coplanar, the juxtaposed C-springs held in position by at least one locking member mounted in said part of the second rotary component, and the locking member comprising a metal pin inserted into said part of the second rotary component.

4,790,794

## FLEXIBLE SHAFT COUPLING FOR TRANSMISSION OF HIGH TORQUE LOADS

Masaru Takeda, Toyota; Yoshihiro Nunotaki, Okazaki; Hiroshi Harada, Tsu; Michihiro Kawada, Nagoya, and Masahiro Ishigaki, Tsu, all of Japan, assignors to Toyo Tire & Rubber Co., Ltd., Osaka and Toyota Jidosha Kabushiki Kaisha, Aichi, both of Japan

Filed Sep. 17, 1987, Ser. No. 98,062

Claims priority, application Japan, Nov. 7, 1986, 61-171638[U]

Int. Cl. F16D 3/78

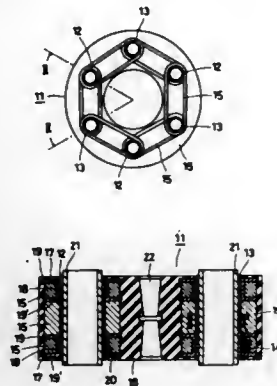
U.S. Cl. 464-93

6 Claims

1. A flexible shaft coupling for transmission of high torque loads comprising:
  - drive side cylindrical connecting elements and driven side cylindrical connecting elements arranged in pairs alternately and equidistantly in a circumferential orientation;
  - plural endless belts composed of fiber bundles each wrap-



ping around and interlinking pairs of adjacent drive side connecting elements and driven side connecting elements; an elastomer matrix embedding said connecting elements together with said fiber bundle belts therein; plural and separate bobbins-like collars mounted in axially spaced relation on the outer peripheries of said drive side connecting elements and said driven side connecting elements, each of said hollow-like collars being integrally formed of a short cylindrical tube and at least one radially extending, annular flange at least one end of said tube, said plural bobbin-like collars forming plural annular hollows each having a U-shaped cross-section defined by said radially extending flanges and said tube, one of said plural



fiber bundle belts being received and held within each of said hollows, at least two of said collars being provided on each of said drive side connecting elements and said driven side connecting elements, said collars each having two spaced radially extending flanges thereon adapted to receive between mutually adjacent ones of said flanges one of said plural fiber bundle belts, said collars being U-shaped in cross-section and oriented side-by-side with the mutually adjacent, radially extending flanges, being axially spaced so as to define a hollow free of a tube therebetween and in which is received one of said plural fiber bundle belts confined in the axial direction by said radially extending flanges.

4,790,795

#### CONNECTION CONSTRUCTION OF TURNING ANGLE DETECTOR

Yukihisa Oda, Chiryu; Keiji Yasuda, Handa, and Shigemitsu Hamajima, Oba, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Continuation of Ser. No. 844,493, Mar. 26, 1986, abandoned.

This application Nov. 23, 1987, Ser. No. 124,441

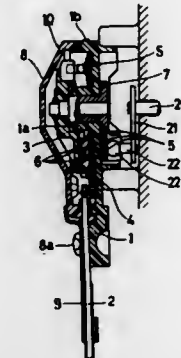
Claims priority, application Japan, Mar. 26, 1985, 60-043687 Int. Cl.<sup>4</sup> F16D 3/04

U.S. Cl. 464-102

5 Claims

1. A connection construction for connecting an input shaft of a turning angle detector with a valve shaft whose turning angle is to be detected by said detector comprising:
  - a lever member secured to said valve shaft and extending radially outwardly from the longitudinal axis of said valve shaft,
  - a pin member provided at one end of said lever member and extending therefrom in the opposite direction relative to said valve shaft,
  - a spherical member provided on the end of said pin member, a projection portion provided at one end, positioned outside said detector, of said input shaft and projecting in the radial direction from the axis of said input shaft, and pinching means provided on said projection portion and containing said spherical member, wherein said pinching means permits said spherical member to move in the radial direction and the axial direction with

respect to the axis of said input shaft and prevents movement of the spherical member in the circumferential direction thereof relative to said pinching means, and wherein said pinching means comprises a concave portion formed in said projection portion between two pinching



segments extending from said projection portion, wherein said pinching segments are disposed in a parallel relationship and have flat inner-sidewalls, and said spherical member is received by said concave portion and contained by said flat inner-sidewalls of said pinching segments.

4,790,796

#### FREE PISTON TYPE AUTO-TENSIONER

Yoshio Okabe, Chiryu; Yukimori Kobayashi, Gamagohri, and Eiichi Shirai, Okazaki, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

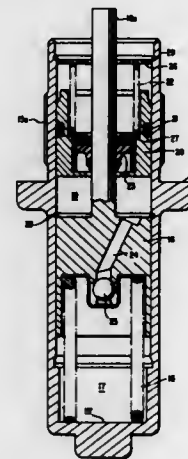
Filed Nov. 6, 1987, Ser. No. 117,537

Claims priority, application Japan, Nov. 6, 1986, 61-262650

Int. Cl.<sup>4</sup> F16H 7/12

U.S. Cl. 474-110

7 Claims



1. A free piston type auto-tensioner comprising:
  - a body;
  - a plunger having a rod and being slidably disposed in said body, said plunger cooperating with said body to form a first oil chamber in said body;
  - a free piston slidably disposed in said body and cooperating with said body and said plunger to form a second oil chamber in said body;
  - a first seal member disposed between said body and said piston;
  - a second seal member disposed for sealing between said piston and said rod of said plunger;

an oil passage formed in said plunger and comprising means for establishing oil communication between said first and second oil chambers;

- a check valve disposed in said oil passage and comprising means for permitting oil flow only in a direction from said second chamber to said first chamber;
- a first spring comprising means for biasing said plunger in the direction of said second oil chamber; and
- a second spring comprising means for biasing said piston in the direction of said second oil chamber.

4,790,797

#### LINK CHAIN

Kurt Allert, Panoramaweg 3, D-7238 Oberndorf, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 866,064, May 21, 1986, Pat. No. 4,710,153. This application Jul. 1, 1987, Ser. No. 68,957

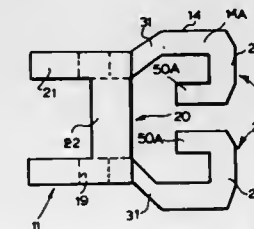
Claims priority, application Fed. Rep. of Germany, May 21, 1985, 3518160

The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> F16G 13/07

U.S. Cl. 474-211

6 Claims



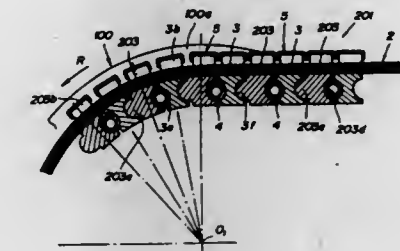
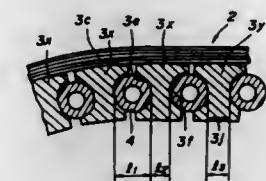
1. An elongated link chain comprising a plurality of hingedly connected chain links, each chain link being made of punched out sheet metal defining a first plane, and comprising two lateral walls extending in the longitudinal direction of the chain and spaced from one another in a direction transverse to said longitudinal direction, at least one transverse web in said first plane and rigidly interconnecting said lateral walls for holding said walls in position with respect to one another, each lateral wall including an arm, each arm having an end portion constituting a bearing pin, each of said lateral walls having a separate bearing hole punched-out in said sheet metal for receiving the respective associated bearing pin of another identical chain link which is arranged adjacently to said bearing holes, said separate bearing holes being made coaxial with one another by bending said lateral walls in a direction approximately at right angles to said first plane, so as to extend in a second plane, and to constitute an approximately U-shaped bracket with said transverse web, in which the bearing holes are spaced at an axial distance from one another, said bearing holes defining a first axis, and said parts of respective of said end portions of said bearing pins defining a second axis, said axes being parallel to one another, said bearing pins being bent back so that at least parts of respective of said end portions extend in a direction approximately parallel to that of said transverse web.

4,790,798  
V BELT FOR POWER TRANSMISSION  
Torao Hattori, Saltama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Division of Ser. No. 944,579, Dec. 22, 1986, Pat. No. 4,758,211.  
This application Dec. 7, 1987, Ser. No. 129,766  
Claims priority, application Japan, Dec. 25, 1985, 61-202221[U]; Mar. 10, 1986, 61-34092[U]; Mar. 14, 1986, 61-56556

Int. Cl.<sup>4</sup> F16G 5/16

U.S. Cl. 474-242

19 Claims



9. A V belt for power transmission to be stretched over a driving pulley and a driven pulley to effect power transmission therebetween, said V belt comprising:

- a looped metallic belt; and
- a plurality of V-shaped metallic blocks fitted on said metallic belt in a continuous manner along the length of said metallic belt, said V-shaped blocks each having at the upper part thereof a concave groove radially outwardly opening of said V belt so that said metallic belt faces thereon; said V-shaped blocks include a number of V-shaped blocks of a first type each having, on front and rear faces thereof in the length direction of said V belt, concave places located radially inside of said metallic belt, respectively, and a number of V-shaped blocks of a second type each having, on either face thereof in the length direction of said V belt, a concave place located radially inside of said metallic belt and, on the other face thereof in the length direction of said V belt, a convex part located radially inside of said metallic belt;
- a plurality of rollers each respectively disposed between said concave place of said V-shaped blocks of said second type and one of said concave places facing thereto of a corresponding one of said V-shaped blocks of said first type; and
- said convex part of each of said V-shaped blocks of said second type engages with one of said concave places facing thereto of a corresponding one of said V-shaped blocks of said first type.

14. A V belt for power transmission to be stretched over a driving pulley and a driven pulley to effect power transmission therebetween, said V belt comprising:

- a looped metallic belt; and
- a plurality of V-shaped metallic blocks fitted on said metallic belt in a continuous manner along the length of said metallic belt, said V-shaped blocks having at an upper part

thereof a concave groove radially outwardly opening of said V belt so that said metallic belt faces thereon; a plurality of rollers each respectively disposed between one of said V-shaped blocks and another of said V-shaped blocks adjacent thereto at the radially inner side of the loop of said metallic belt; each V-shaped block has concave places formed to receive one of said rollers at the front and rear thereof in the length direction of said V belt, respectively; and said V belt includes at least two types of V-shaped blocks, a first type having a first predetermined dimension as the distance between the deepest parts of respective said concave places thereof and a second type having a second predetermined dimension as the distance between the deepest parts of respective said concave places thereof.

4,790,799

# CONTINUOUSLY VARIABLE TRANSMISSION BELT AND PULLEY ARRANGEMENT

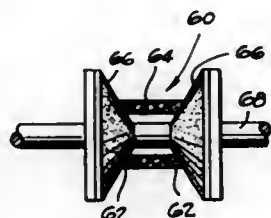
Thomas H. Sadler, Highlands Ranch, Colo., assignor to Manville Corporation, Denver, Colo.

Continuation-in-part of Ser. No. 878,547, Jun. 25, 1986, Pat. No. 4,692,128. This application May 12, 1987, Ser. No. 49,768. The portion of the term of this patent subsequent to Sep. 8, 2004, has been disclaimed.

Int. Cl. F16G 1/08

U.S. Cl. 474-268

5 Claims



1. In a power transmission arrangement having a drive shaft, a pulley mounted on the drive shaft, a driven shaft, a pulley mounted on the driven shaft, and a drive belt trained over and operatively connecting the pulleys, the improvement comprising:

- the drive belt comprising wear surfaces which contact the pulleys;
- the wear surfaces including particles of friction modifying material which, as a result of its operative contact with the pulleys, will erode to a greater extent than the surface of the pulleys contact by the drive belt; and
- the drive belt including a continuous portion which is connected to the wear surfaces of the drive belt but which is not in contact with the pulleys, the continuous portion having a greater resistance to high tensile forces than the wear surfaces.

4,790,800

# BELT TIGHTENING ASSEMBLY

Donovan E. Toews, Lashburn, and Alvin M. Toews, Neilburg, both of Canada, assignors to Husky Oil Operations Ltd., Calgary, Canada

Filed Mar. 18, 1987, Ser. No. 27,607

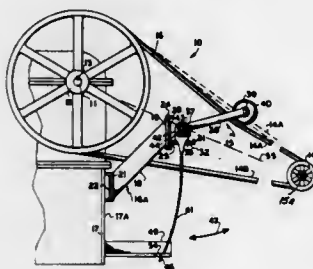
Int. Cl. F16H 7/12

U.S. Cl. 474-101

3 Claims

1. A belt drive device for belts extending around a drive pulley and a driven pulley with said belt having two runs therebetween, one of which is a drive run and the other a return run, said device comprising a selectively operable belt tightening and release assembly including in combination a belt tightener and belt release support means, a shaft journaled on said support means having first and second ends, a belt run engaging pulley, a pulley mounting arm, said belt run engaging

pulley being journaled for rotation upon one end of said pulley mounting arm, the other end of said pulley mounting arm being mounted on said first end of the shaft journaled on said support means, manual actuating means operatively secured to the second end of the shaft journaled on said support means for quick release of said pulley from said belt, and means to preset



the angular relationship between said actuating means and said pulley mounting arm comprising a worm and pinion gear assembly operatively connected to said actuating means and said pulley mounting arm and further means to rotate said worm gear selectively thereby rotating one of said actuating means and said pulley mounting arm relative to the other.

4,790,801

# MECHANIC-HYDRAULIC ACTUATING ELEMENT FOR A BELT TIGHTENER

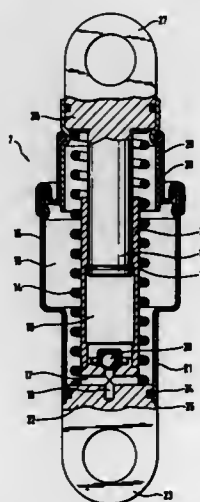
Dieter Schmidt, Nuremberg, and Dieter Goppelt, Aurachtal, both of Fed. Rep. of Germany, assignors to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

Filed Apr. 4, 1988, Ser. No. 177,490

Int. Cl. F16H 7/12

U.S. Cl. 474-110

1 Claim



1. A mechanic-hydraulic actuating element for a belt tightener especially for internal combustion engines comprising a piston (11) guided in a cylinder (10) between which a spring (14) acts so that piston (11) and cylinder (10) are urged apart wherein a pressure space (19) as defined by piston (11) and cylinder (10) is separated from an oil reservoir (16) by a check valve (20) which allows the free oil passage from the oil reservoir (16) into the pressure space (19) while an annular gap between piston (11) and cylinder (10) is dimensioned so that oil can flow under pressure which counteracts the force of the spring (14) from the pressure space (19) into the oil reservoir (16) through the annular gap, characterized in that the oil reservoir (16) is designed as a circular ring-shaped hollow

space which surrounds the cylinder (10) and is defined toward the outside by a hollow cylindrical cup-shaped housing (15) which is sealed at its open end by an elastic bellows seal (29) attached to the housing (15), on the one hand, and to an element (28) connected to the piston (11), on the other hand, and the spring (14) acting between the piston (11) and the cylinder (10) is designed as a helical spring arranged in the circular ring-shaped reservoir space (16).

4,790,802

# POWER TRANSMISSION BELT

Susumu Onoe, Osaka, and Mutsuyuki Yamaguchi, Izumisano, both of Japan, assignors to Bando Chemical Industries, Ltd., Hyogo, Japan

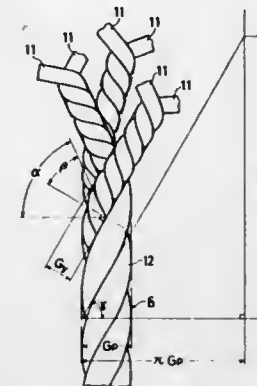
Continuation of Ser. No. 819,769, Jan. 17, 1986, abandoned. This application Sep. 11, 1987, Ser. No. 97,287

Claims priority, application Japan, Jan. 18, 1985, 60-7839

Int. Cl. F16G 1/10, 5/08

U.S. Cl. 474-260

14 Claims



1. A power transmission belt having a load carrier twisted cord embedded therein said load carrier twisted cord having a plurality of yarns selected from the group consisting of synthetic fiber yarns and inorganic fiber yarns and twisted together to form said load carrier twisted cord, said plurality of yarns, before final twist into said load carrier twisted cord, having each been first twisted, in the direction opposite to said final twist of said load carrier twisted cord, so that a first twist angle at which each yarn of said plurality of yarns crosses with a surface at right angle to the axial line of said load carrier twisted cord is between 87° to 93°.

4,790,803

# METHOD OF MAKING BOTTOM GUSSET BAG PAD ARRANGEMENT FOR LIQUID CONTAINERS

Ralph M. Roen; Terry D. Gebhardt, both of Longview, Tex., and Richard C. Dokmo, Barrington, Ill., assignors to T. C. Manufacturing Company, Inc., Evanston, Ill.

Division of Ser. No. 068,062, Jun. 30, 1987, Pat. No. 4,769,126.

This application Feb. 19, 1988, Ser. No. 157,583

Int. Cl. B31B 25/14, 35/64, 41/86

U.S. Cl. 493-195

7 Claims

1. In a method of forming a pair of bag pads each including a stack of identical flat bottom bags formed from flexible plastic material of film thickness dimensions, in which the bags of each pad are in flattened congruent relation, with each bag including side end seals at either end of and extending longitudinally of the ends of the respective bags, a bottom fold extending between the bag side edges and gusseted for flat bottom shaping when the bag is open, a front panel extending between the bag side ends and lengthwise of the bottom fold thereof, and including a free top edging forming the mouth of the bag, a back panel extending between the bag side ends and lengthwise of the bottom fold thereof, and including a back panel flange projecting a predetermined distance outwardly of the

bag mouth to define an edging paralleling the bag bottom fold, with said bags of each pad being heat sealed together in said flattened congruent relation along the back panel edging of the respective bags,

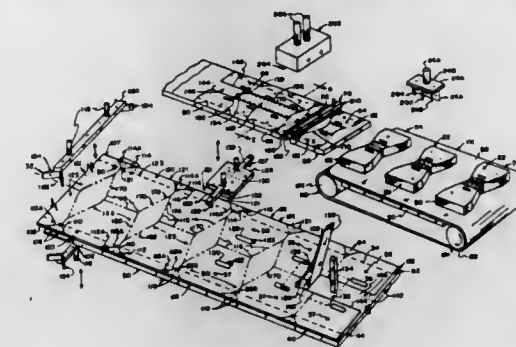
the method of forming the bag pads from a length of flattened plastic film web stock defining a band having a pair of opposed web stock side walls integrally joined by a pair of web stock opposite side edgings that are spaced apart transversely of the web stock, with the web stock side edgings being formed to define a continuous in-fold pleat integrally connecting the web stock side walls together at the web stock side edgings, with said pleats each forming first and second in-fold web stock plies along and within the respective web stock side edgings,

said method comprising:

passing the web stock in flattened relation lengthwise thereof, with one side wall of same facing upwardly and the other side wall of same facing downwardly,

heat sealing together, at and along each of said web stock edgings, said first and second plies and along pairs of spaced pairs of diagonal heat seals that, for each pair of heat seals, diverge in the direction of the respective web stock edgings and that, for each web stock edging, define a series of bag bottom end corners locating the site of a pair of top connected bags to be formed from the web stock along each web stock side edging transversely thereof,

stamp forming handle forming openings at each such bag site



through both walls of the web stock and that are equally spaced to either side of the longitudinal center line of the web stock,

forming a pair of spaced apart parallel score lines in the exposed portion of the web stock other side wall that are centered on either side of the longitudinal center line of the web stock and lie between the rows of handle forming openings,

shaping along the longitudinal center line of the web stock across the web stock said one and said other side walls consecutive cutouts of equal size that are each centered on the web stock center line and between the set of the diagonal heat seals that are transversely aligned crosswise of the web stock and thus defining the free front panel top edging and the back panel flange of consecutive sets of bag front and back panels lying on either side of the web stock center line of which the back panels of each set are integrally connected,

spot heat welding together the web stock side walls at each such bag site along the longitudinal centerline of each bag to be formed at the respective bag sites,

consecutively heat sealing and cut forming out of the web stock, crosswise of same, in centered alignment with the consecutive cutouts, and the web stock edging diagonal heat seals aligned therewith, transversely of the web stock, a pair of top connected bags that extend transversely of the web stock,

stacking the thus formed top connected bag pairs in congru-



ent relation to form a stack of such bag pairs and of a predetermined number of such bag pairs, and, simultaneously heat seal connecting the stacked bags through the congruently oriented back panel flanges of same and dividing the stacked bag pairs through said heat seal to form the pair of bag pads.

4,790,804

## BAG MANUFACTURING APPARATUS

Toyokichi Goto, Souka, and Masami Fujishiro, Tama, both of Japan, assignors to Newlong Machine Works, Ltd. and New Pack Company, Ltd., both of Tokyo, Japan

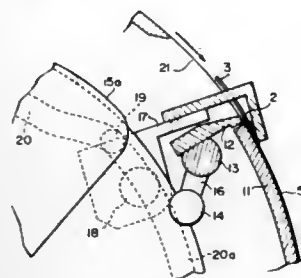
Filed Feb. 3, 1987, Ser. No. 10,583

Claims priority, application Japan, Feb. 7, 1986, 61-16357[U]

Int. Cl.<sup>4</sup> B31B 33/86; B65H 45/16

U.S. Cl. 493—226

9 Claims



1. A folding apparatus for folding an edge part on a paper sheet to form a lapel of double thickness on an open end of a bag made from said sheet comprising:

- a rotary cylinder having an opening formed thereon extending in both circumferential and axial directions of the cylinder, said paper sheet disposed on said cylinder with said edge part overlying said opening,
- a folding blade rotatable about an axis located outside said rotary cylinder and generally parallel with an axis of rotation of the rotary cylinder, and means for moving part of said folding blade into said opening on the rotary cylinder so that said folding blade contacts to direct said edge part into said opening,
- a holding pawl movable towards and away from an edge face of the opening for engagement with a folded portion of said edge part, and means for moving said holding pawl in operative association with the rotary cylinder towards the edge face to exert pressure contact against said folded portion of said edge part bearing against the edge face, and
- a depressing pawl positioned to project through the opening to cover a part of the outer circumferential surface of the rotary cylinder adjacent the edge face of the opening located opposite to the holding pawl to exert pressure contact against a free end of the edge part projecting out of the opening from the folded portion, and means for moving said depressing pawl in operative association with the rotary cylinder to exert said pressure contact.

4,790,805

## FOR CONSTANT PRESSURE IN LINE-WEB CRUSH-SCORING

Yefim Slobodkin, Lyndhurst, Ohio, assignor to Avery International Corporation, Pasadena, Calif.

Continuation of Ser. No. 776,850, Sep. 17, 1985, Pat. No. 4,678,457. This application Jun. 30, 1987, Ser. No. 68,906

The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B05B 1/14

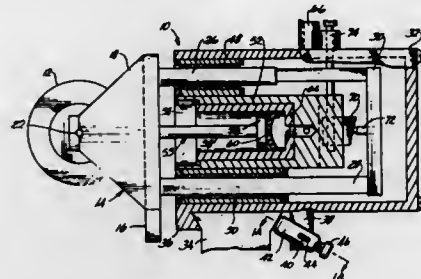
U.S. Cl. 493—355

1 Claim

1. A method for crush-scoring paper comprising the steps of:
- (a) passing one side of a paper web to be crush-scored over a segment of the outer side surface of a cylindrical anvil

having an axis, said cylindrical anvil rotating in the direction of paper travel;

- (b) contacting the opposed side of the paper web to be crush-scored with a plurality of circular crush scoring knife blades, each positioned on an axis parallel to the axis of the cylindrical anvil, each of said circular knife blades having a rounded crush-scoring edge rotating in the direction of paper travel;
- (c) supporting each knife blade in relation to the anvil to enable movement of the knife blade by an unconnected plunger to or from the point of contact with the paper in a substantially frictionless manner in a direction in line



with the axis of the cylindrical anvil and the axis of each circular knife blade; and

- (d) independently applying to each crush scoring knife blade, pneumatic pressure at a level sufficient to crush-score the paper to a uniform predetermined depth, the pneumatic pressure being transmitted to each crush scoring knife blade by a pressurized diaphragm acting on the plunger urged to a mounting bracket supporting each circular knife blade in free rotational movement, the force applied to each circular knife blade being unbiased and unidirectional in the direction of the axis of the cylindrical anvil.

4,790,806

## DECANTER CENTRIFUGE INCORPORATING AIRLIFT DEVICE

Robert E. High, 358B Mona Vale Road, St. Ives, New South Wales 2075, Australia

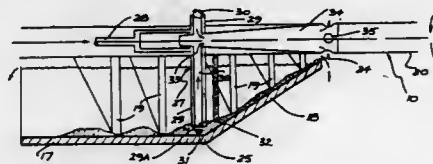
Filed Mar. 31, 1988, Ser. No. 176,255

Claims priority, application Australia, Apr. 21, 1987, PI1512

Int. Cl.<sup>4</sup> B04B 11/00

U.S. Cl. 494—26

9 Claims



1. A decanter centrifuge for the separation and recovery from an input sludge of at least a light phase and a heavy phase material, comprising an annular bowl, a hollow tube extending axially through said bowl, means for discharging from at least one end of said bowl one of said material phases, and a fluid-activated airlift device supported by said hollow tube for collecting from within said bowl during operation of said centrifuge another of said material phases and conveying said other phase to discharge means, said airlift device including a first part supported by said hollow tube and extending radially therefrom into said bowl and a second part connected to receive a fluid supply from said hollow tube and being connected

to introduce said fluid supply into said first part to activate said airlift device for collection of said other material phase.

4,790,807

## CENTRIFUGE ARRANGEMENT

Hans-Jürgen Neumann, St. Wendel, and Wolfram Weber, Spiesen-Elversberg, both of Fed. Rep. of Germany, assignors to Fresenius AG, Hamburg, Fed. Rep. of Germany

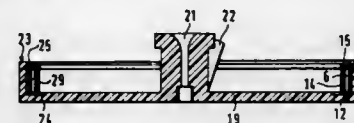
Filed Sep. 23, 1987, Ser. No. 100,236

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1986, 3632500

Int. Cl.<sup>4</sup> B04B 7/08

U.S. Cl. 494—45

16 Claims



1. Centrifuge arrangement comprising a centrifuge rotor which has the following components:

- a drive disc, a substantially perpendicular annular wall defining an inwardly disposed face formed on the periphery of said drive disc,
- a separation container disposed on the drive disc, said separation container defining outer surfaces, at least parts of the separation container outer surfaces bearing against said inwardly disposed face of said annular wall, a groove formed in the surface of the drive disc adjacent said annular wall, said separation container defining a bottom surface seated in said groove, said separation container comprising a separation passage, an inlet passage and a plurality of outlet passages for fluids,
- the separation container being formed as a self-supporting part of flexible material, and including an upper wall for said separation container, said upper wall forming a fluid-tight cover for the separation passage.

4,790,808

## COMPOSITE MATERIAL CENTRIFUGE ROTOR

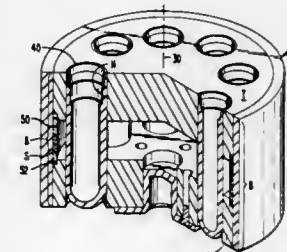
Alireza M. Piramoon, Santa Clara, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Filed Jun. 5, 1987, Ser. No. 58,435

Int. Cl.<sup>4</sup> B04B 7/08

U.S. Cl. 494—81

11 Claims



1. A composite rotor construction comprising in combination:

- a top disk and a bottom disk, each said disk fabricated from laminated layers with longitudinally extending fibers for reinforcing, said fibers bound together with resin;
- said laminated layers having a sequentially repeating pattern of radial directions having different angular orientations with respect to a selected radii extending normal to the spin axis of said rotor, each said laminated layer being normal to the spin axis of said rotor;
- a spacer ring comprising a wound fiber hoop sandwiched

between said top disk and said bottom disk to form a rotor assembly;

- a radial fiber hoop cured to shrink under tension over the periphery of said rotor assembly and over the outside surfaces of said top disk, said bottom disk, and said spacer ring therebetween whereby said rotor assembly at said top disk, bottom disk, and spacer ring are radially compressed with respect to the spin axis of said rotor equal and opposite to the dynamic forces of radial tension on said rotor.

4,790,809

## URETERAL STENT

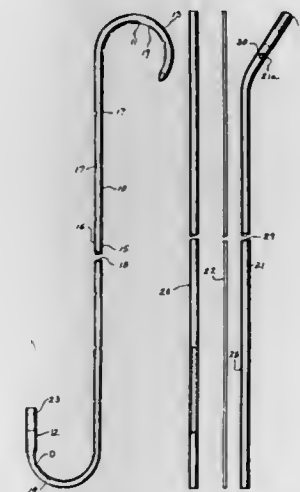
David H. Kantz, Los Angeles, Calif., assignor to Medical Engineering Corporation, Racine, Wis.

Continuation-in-part of Ser. No. 770,689, Aug. 29, 1985, abandoned. This application May 14, 1987, Ser. No. 50,509

Int. Cl.<sup>4</sup> A61M 25/00

U.S. Cl. 604—8

4 Claims



1. In a ureteral stent comprising an elongated, flexible, tubular member of substantially uniform outside diameter throughout its length and having at one end a hook for placement in the kidney and at the other end a hook for placement in the bladder, the improvement which comprises having a magnetically attractable tip at the other end of the stent, said tip being a cylinder of magnetically attractable material having a lumen through which a guidewire can be introduced into the tubular member.

4,790,810

## URETERAL CONNECTOR STENT

Robert W. Pugh, Jr., Lakeville, and Dezzo K. Levius, Bloomington, both of Minn., assignors to American Medical Systems, Inc., Minnetonka, Minn.

Filed Nov. 4, 1985, Ser. No. 794,575

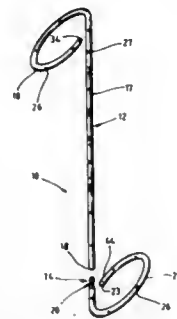
Int. Cl.<sup>4</sup> A61M 25/00

U.S. Cl. 604—8

29 Claims

1. A connector stent comprising:
- an elongated tubular member having a wall with apertures therethrough, and comprising a retaining means and an

essentially straight custom trimmed portion terminating in an axial opening; and



a connector comprising a retaining means and an adapter means that is fixedly secured within said axial opening of said straight custom trimmed portion.

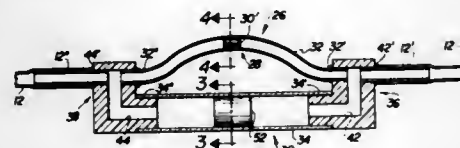
#### 4,790,811 COLONIC AND INTESTINAL IRRIGATION SYSTEM WITH FLOW INDICATOR

I. B. Bloxom, Jr., P.O. Box 357, Wilcomico, Va. 23184  
Continuation-in-part of Ser. No. 858,708, May 2, 1986, Pat. No. 4,698,054, which is a continuation of Ser. No. 707,717, Mar. 4, 1985, abandoned, which is a division of Ser. No. 556,036, Nov. 29, 1983, Pat. No. 4,518,382. This application Sep. 24, 1987, Ser. No. 126,805

Int. Cl.<sup>4</sup> A61M 1/00

U.S. Cl. 604-27

14 Claims



1. An apparatus for controlled intestinal irrigation comprising:
  - A. a container means for supply and storage of irrigating liquid,
  - B. introduction means positionable adjacent to and in fluid delivering relation with an entrance to an intestine being irrigated for introducing liquid thereto,
  - C. conduit means disposed in interconnecting and fluid communicating relation between said container means and said introduction means,
  - D. flow regulating means connected to said conduit means and structured and disposed to regulate liquid flow from said container means to said introduction means, whereby flow of irrigating liquid to the intestine may be selectively stopped by said flow regulating means upon an indication of peristaltic action of the intestine,
  - E. a flow indicator means for indicating direction of flow within said conduit means and connected to said conduit means between said container means and said introduction means,
  - F. said flow indicator means comprising a first flow channel and a second low channel means connected in fluid receiving relation to said conduit and relatively disposed to define two substantially parallel paths of liquid flow between said conduit means and said introduction means,
  - G. said flow indicator means further comprising a first indicator element of a specific gravity of about 1 and a second indicator element of a specific gravity of greater than 1.1 movably disposed within said first and second flow chan-

- nels respectively and within liquid flow passing there-through,
- H. said first flow channel having a transverse dimension substantially less than said second flow channel and responding more rapidly to pressure change of the liquid flow therealong,
- I. each of said flow indicator elements cooperatively disposed and structured relative to said respective flow channels and in which they are mounted for responsive displacement therein based on peristaltic action of the intestine during flow of liquid through said respective flow channels, and
- J. said first indicator element displaceable with liquid flow along the length of said first flow channel in a direction from said introduction means to said container means at a more rapid response rate than displacement of said second indicator element along said second flow channel.

#### 4,790,812 APPARATUS AND METHOD FOR REMOVING A TARGET OBJECT FROM A BODY PASSAGEWAY

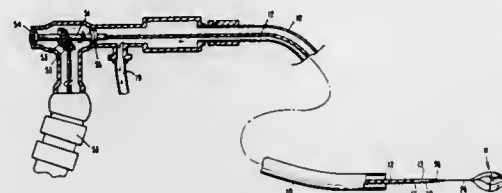
Irvin F. Hawkins, Jr., c/o Mail Department, Radiology, Shands Teaching Hospital, University of Florida, Gainesville, Fla. 32601, and Mark C. Hawkins, R.R. #2, Box 178, Micanopy, Fla. 32667

Filed Nov. 15, 1985, Ser. No. 798,563

Int. Cl.<sup>4</sup> A61B 17/20

U.S. Cl. 604-22

15 Claims



15. An apparatus for removing a target object from a body passageway or cavity by fragmenting the target object into a plurality of fragments and transporting the fragments outside the body, said apparatus comprising:
  - a catheter having proximal and distal open ends and having at least one lumen therethrough;
  - a spiral wound coil having proximal and distal ends and rotatably disposed within said lumen in said catheter, said spiral wound coil being resilient and flexible along its length;
  - a drilling tool means extending through said lumen in said catheter for engaging and fragmenting the target object so that the resulting fragments can be transported within said catheter to outside the body, said drill tool means having proximal and distal ends and having a bore along its length and a drilling head at its distal end;
  - a control wire extending through the bore of said drilling tool and through the lumen of said catheter and beyond the distal end of said catheter for guiding the drilling tool and preventing the drilling head from rupturing the body passageway;
  - a parachute basket means, including a plurality of loosely helical formed spring wires connected at their respective ends and a thin porous web attached to and extending between said spring wires, connected to the distal end of said control wire and sized and shaped to be advanced through said lumen in a stowed position, said parachute basket means when deployed being capable of permitting the flow of fluid but preventing passage of fragments from the target object;
  - means for advancing the parachute basket means beyond the distal end of said catheter and beyond the distal end of said drill tool means and then permitting said parachute basket

means to open to a deployed position within the body passageway;

a first drive means for rotatably driving said spiral wound coil within said lumen in order to create a flow which transports the fragmented portions of the target body through said lumen by a screw movement of said coil; and

a second drive means attached to said drilling tool for rotatably driving said drilling tool.

#### 4,790,813 METHOD AND APPARATUS FOR SURGICALLY REMOVING REMOTE DEPOSITS

Kenneth R. Kensey, Hinsdale, Ill., assignor to Intravascular Surgical Instruments, Inc., Frazer, Pa.  
Continuation of Ser. No. 682,393, Dec. 17, 1984, Pat. No. 4,631,052, which is a continuation-in-part of Ser. No. 567,506, Jan. 3, 1984, Pat. No. 4,589,412. This application May 30, 1986, Ser. No. 868,969

The portion of the term of this patent subsequent to Dec. 23, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> A61B 17/32

U.S. Cl. 604-22

13 Claims



1. A method of opening a restriction formed of material inside of a vessel within a living being, said vessel being formed of a tubular wall of tissue and having a longitudinal axis extending down its length, the inside diameter of said vessel being substantially smaller than its length, said method comprising: guiding a catheter having a longitudinal axis and rotatable working means located at a distal end portion thereof through said vessel along said longitudinal axis to the location of said restriction; applying a first fluid in said catheter and rotating said working means about said axis; advancing said catheter with said working means rotating about said axis and with respect to said material into said material while directing at least a portion of said fluid outward with respect to said axis to apply positive pressure to said vessel wall adjacent said working means to cause said vessel to move slightly outward radially with respect to said axis thereof, whereupon said restriction is opened, said positive pressure also acting to prevent damage to the tissue making up said vessel during said restriction opening.

#### 4,790,814 ARTIFICIAL FERTILIZATION CATHETER

Franz H. Fischl, Weimarer Strasse 5/16, A-1180 Vienna, and Ewald Pickhard, Redtenbachergasse 15, A-1160 Vienna, both of Austria

Filed Apr. 8, 1987, Ser. No. 35,993

Claims priority, application Austria, Apr. 9, 1986, 921/86

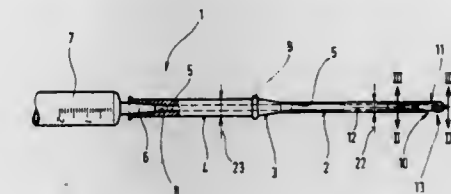
Int. Cl.<sup>4</sup> A61M 1/00

U.S. Cl. 604-27

7 Claims

1. A catheter for artificial insemination, which comprises
  - (a) a flexible hose-like catheter section defining a longitudinally extending internal passage and having a first terminal portion and a second, distal terminal portion opposite the first terminal portion, the distal terminal catheter section portion having
    - (1) a rounded-off closed extremity and
    - (2) two peripherally staggered radial outflow openings of different-sized outflow cross sections, one of the outflow openings being larger for outflow of semen and the

- second outflow opening being smaller for outflow of air,
- (3) the hose-like catheter section having a length enabling the hose-like catheter section to be inserted into a uterine cavity,
- (b) an impermeable flexible hose-like extension defining a longitudinally extending internal passage in alignment with the internal passage in the hose-like catheter section and having a terminal portion adjoining the first terminal portion of the catheter section,
- (1) the hose-like extension having a length corresponding substantially to the length of a vagina, and



- (c) a conical attachment at the first terminal portion of the hose-like catheter section and tapering inwardly towards the distal terminal portion thereof or attaching the hose-like extension to the hose-like catheter section, the conical attachment
  - (1) having an internal passage in communication with the internal passages in the hose-like catheter section and extension, and
  - (2) fitting into a cervical opening leading from the vagina into the uterine cavity.

#### 4,790,815 HEAT STERILIZABLE PLASTIC CONTAINER WITH NON-STICK INTERIOR SURFACES

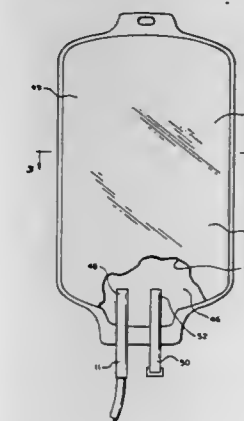
Patrick Baiteau, Saint Georges, and Francesco Peluso, Heverlee, both of Belgium, assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Mar. 12, 1987, Ser. No. 24,935

Int. Cl.<sup>4</sup> A61M 1/00

U.S. Cl. 604-29

13 Claims

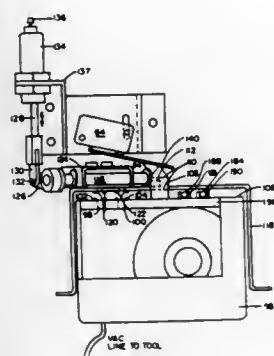
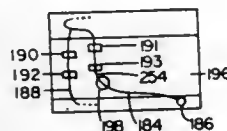


1. A container comprising a pair of facing flexible walls, one of said flexible walls including a nonuniformly roughened finish wall portion having a surface roughness with a mean depth exceeding about five microns, the other one of said flexible walls including a uniformly roughened finish wall portion which faces said nonuniformly roughened finish wall portion and which has a surface roughness with a mean depth greater than the mean depth of said nonuniformly roughened finish wall portion.



**4,790,816**  
**SURGICAL CASSETTE PROXIMITY SENSING AND LATCHING APPARATUS**  
 Lelf J. Sundblom, Castro Valley, and Daniel D. Rogers, Berkeley, both of Calif., assignors to Allon Laboratories, Inc., Fort Worth, Tex.  
 Division of Ser. No. 780,613, Sep. 26, 1985, Pat. No. 4,758,220.  
 This application Jul. 31, 1986, Ser. No. 892,347  
 Int. Cl.<sup>4</sup> A61M 1/00  
 U.S. Cl. 604—31

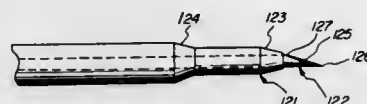
4 Claims



1. An apparatus for handling an aspirated fluid storage cassette having vacuum seal projections which mate with flexible seals on a cassette storage receptacle for a surgical instrument comprising:  
 means for engaging said cassette and pulling said cassette into a seated position where said vacuum seal projections engage and form an interface with said flexible seals to form vacuum seals;  
 means for sensing the proximity of the cassette to said engaging means having a status indicative of said proximity;  
 a cassette eject switch;  
 means for ejecting said cassette;  
 a vacuum generation system coupled through a vacuum line to said cassette, said flexible seals sealing the interface between said vacuum generation system and said cassette;  
 a vacuum sensor for detecting the level of actual vacuum in said cassette;  
 a logic means coupled to said cassette eject switch and to said means for sensing and said means for engaging for reading the status of said cassette proximity sensing means and for causing said means for engaging to engage said cassette and pull said cassette into seated position and to check the status of said cassette eject switch and for causing said cassette to be ejected when said cassette eject switch has been pushed and for conducting a first test of said vacuum seals and said cassette after said cassette has been seated by causing said vacuum generation system to attempt to generate a predetermined level of vacuum in said cassette and by reading the level of vacuum generated by said attempt after a first predetermined time interval.

**4,790,817**  
**ASSEMBLY OF STYLET AND CATHETER, AND NEEDLE AND CATHETER**  
 Ronald B. Luther, Newport Beach, Calif., assignor to Luther Medical Products, Inc., Tustin, Calif.  
 Continuation-in-part of Ser. No. 749,281, Jun. 22, 1985, Pat. No. 4,668,221, which is a continuation-in-part of Ser. No. 717,159, Mar. 28, 1985, Pat. No. 4,610,671. This application Apr. 28, 1986, Ser. No. 856,464  
 Int. Cl.<sup>4</sup> A61M 5/18  
 U.S. Cl. 604—53

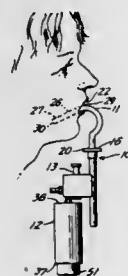
13 Claims



1. An assembly for piercing a vein, artery, organ, and the like, comprising:  
 a. a needle defining an outer surface, distal and proximal ends, and a bevel portion including a curved distal area;  
 b. a puncture tip formed at the proximal end of the needle;  
 c. a catheter comprising a hydrophilic polymer disposed over the needle, the catheter defining an inner surface, a distal end, and a proximal end adjacent the curved distal area, the inner surface being in close contact with the outer surface of the needle, whereby, the catheter and needle are enabled to enter a puncture site with reduced 'coring' and slippage, and upon contact with liquid in the puncture site, the catheter will expand and enable the needle to be withdrawn, leaving the catheter in place in the puncture site.

**4,790,818**  
**METHOD FOR CLEARING EPIGLOTTAL PASSAGES**  
 James T. DeLuca, 15 Wendover Rd., Forest Hills Gardens, N.Y. 11375, and Michael Fasano, 29 Henni Ct., Syosset, N.Y. 11791  
 Continuation-in-part of Ser. No. 486,217, Aug. 18, 1983, abandoned. This application Apr. 4, 1985, Ser. No. 720,019  
 Int. Cl.<sup>4</sup> A61M 31/00  
 U.S. Cl. 604—54

1 Claim

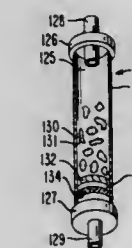
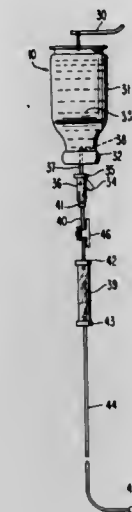


1. The method of removing obstructions lodged in the pharynx and/or larynx of a victim comprising the steps of:  
 providing a device including a tongue depressor element having a curved hollow member, a free end of which is insertable into the throat area of the victim, a source of compressed gas, a jet means for providing reduced atmospheric pressure at said free open end of said curved hollow member, and valving means for controlling operation of said jet means;  
 inserting said tongue depressor element into the mouth of a victim to a point where said free end of said curved hollow member is positioned in the area of the pharynx and/or larynx;  
 opening said valving means to cause suction at the free end of said tongue depressor element for a period of time

sufficient to dislodge an obstruction and retain said obstruction on said free end; and  
 while maintaining said reduced atmospheric pressure at said open end withdrawing said tongue depressor element through the mouth of the victim with an engaged obstruction.

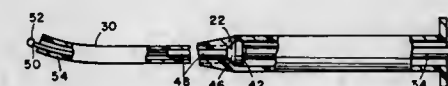
**4,790,820**  
**PARENTERAL AGENT DISPENSING EQUIPMENT WITH DRUG RELEASING MEMBER**  
 Felix Theeuwes, Los Altos, Calif., assignor to Alza Corporation, Palo Alto, Calif.  
 Continuation-in-part of Ser. No. 576,929, Feb. 3, 1984, abandoned, which is a division of Ser. No. 377,831, May 13, 1983, Pat. No. 4,439,183, which is a continuation-in-part of Ser. No. 310,047, Oct. 9, 1981, Pat. No. 4,511,353, which is a continuation-in-part of Ser. No. 283,077, Jul. 13, 1981, abandoned. This application Oct. 25, 1984, Ser. No. 664,802  
 The portion of the term of this patent subsequent to Jan. 3, 2001, has been disclaimed.  
 Int. Cl.<sup>4</sup> A61M 5/00  
 U.S. Cl. 604—85

5 Claims



**4,790,819**  
**FIBRIN CLOT DELIVERY DEVICE AND METHOD**  
 Lehmann K. Li, Fairfield; Russell F. Warren, Greenwich, both of Conn.; Steven P. Arnoczky, New York, N.Y., and Robert J. Bedard, Southbury, Conn., assignors to American Cyanamid Company, Stamford, Conn.  
 Filed Aug. 24, 1987, Ser. No. 88,743  
 Int. Cl.<sup>4</sup> A61M 31/00  
 U.S. Cl. 604—59

9 Claims

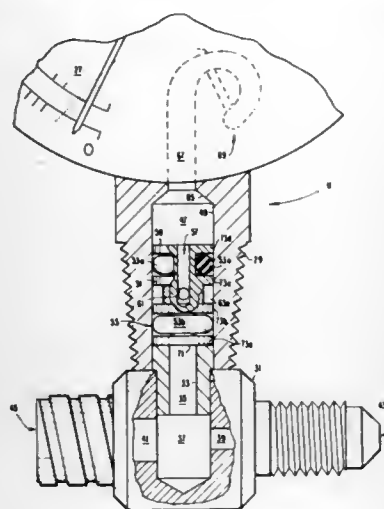


1. A delivery device for depositing an exogenous fibrin clot into a wound site during an arthroscopic surgical operation comprising:

- a hollow body having a first large internal diameter cylindrical section constituting a collection chamber, a second smaller internal diameter cylindrical section constituting an ejection chamber; and an internal frusto-conical shoulder formed between the first and second cylindrical sections and opening toward the internal area of the collection chamber;
- a plunger having a cylindrical handle means, an enlarged diameter cylindrical knob on one end of the handle means, a plunger rod axially extending from the knob, and a cylindrical tip positioned at the remote end of the plunger rod, the knob having an outside diameter slightly smaller than the internal diameter of the collection chamber of said hollow body, the plunger tip having an outside diameter slightly smaller than the internal diameter of the hollow body ejection chamber, and the axial length of the plunger rod and tip being longer than the axial length of the hollow body ejection chamber such that upon insertion of said plunger into the hollow body the plunger tip will extend axially outside the ejection chamber when the knob of said plunger abuts the internal body shoulder; and the handle means of said plunger having a cylindrical tamping means positioned at the remote end of the handle means, the tamping means having a frusto-conical surface facing away from the knob of the handle means such that if said plunger is inserted tamping means first into said hollow body the frusto-conical surface of the tamping means will be facing towards the internal frusto-conical hollow body surface.

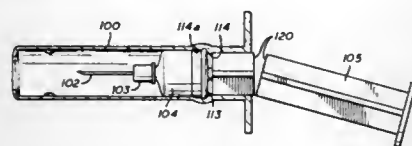
1. A formulation chamber for use with a parenteral delivery system, comprising:
- (a) a wall surrounding an internal lumen;
  - (b) an inlet adapted for placing the formulation chamber in the parenteral delivery system and for admitting a parenteral fluid into the formulation chamber;
  - (c) an outlet adapted for placing the formulation chamber in the parenteral delivery system and for letting parenteral fluid leave the formulation chamber;
  - (d) an ion exchange drug delivery system in the formulation chamber, comprising:
    - (1) a multiplicity of ion exchange resins; and,
    - (2) a beneficial parenterally administrable drug releasably bonded to the resin that forms with the parenterally administrable fluid that enters the chamber a parenterally administrable fluid drug formulation by the combined operations comprising regulating the flow of fluid into the chamber and the ion concentration of the fluid for contacting the resin and releasing the drug from the resin; and,
    - (e) means in the chamber for supporting the resin in the chamber.

4,790,821  
**PRESSURE GAUGE AND SYSTEM**  
 Joseph R. Stines, Poland, Ind., assignor to Vance Products Incorporated, Spencer, Ind.  
 Filed Aug. 24, 1987, Ser. No. 88,682  
 Int. Cl.<sup>4</sup> A61M 25/00  
 U.S. Cl. 604—98 19 Claims



19. In combination:  
 a sterilized balloon catheter;  
 means for supplying sterilized fluid coupled to said balloon catheter, said means for supplying fluid providing a sterilized working fluid to said balloon catheter; and  
 a sterilized pressure gauge operably coupled to said balloon catheter and including:  
 (a) a body having a sterilized piston chamber disposed therein partially defined by a piston chamber wall;  
 (b) a piston disposed in said piston chamber and reciprocally movable therein, said piston having a first gasket and a second gasket coupled thereto and engaging said chamber wall, said first gasket and said second gasket and said piston chamber wall and said piston define an inter-gasket pressure chamber therebetween; and  
 (c) means for measuring pressure in said piston chamber coupled to said body and isolated from said inter-gasket pressure chamber, said means for measuring containing a corrosion contaminated fluid above and in direct contact with said piston, wherein said working fluid from said means for supplying fluid contacting said piston, said piston providing a seal between said working fluid and said corrosion contaminated fluid.

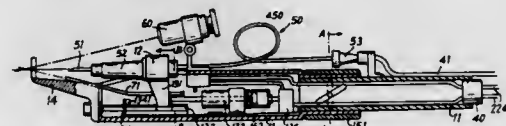
4,790,822  
**RETRACTABLE HYPODERMIC SAFETY SYRINGE**  
 Michael L. Haining, 6731 Ashmore, Houston, Tex. 77069  
 Filed Dec. 11, 1987, Ser. No. 131,631  
 Int. Cl.<sup>4</sup> A61M 5/00 5 Claims  
 U.S. Cl. 604—110



1. In a hypodermic syringe having a plunger and a retractable needle carrier on a needle carrier which fits by friction in one end of a barrel and wherein the needle carrier includes engaging means engageable with the plunger to retract the

needle carrier and needle into the barrel, the improvement comprising:  
 (a) providing said barrel with semi-rigid deformable walls;  
 (b) providing inwardly projecting shoulders in said barrel directly above said needle carrier to retain said needle carrier in place; and  
 (c) providing said plunger with expanding means to deform said walls and said shoulders outward and release said carrier when said engaging means engages said plunger to allow said needle and needle carrier to be retracted into said barrel.

4,790,823  
**APPARATUS FOR INJECTING OR WITHDRAWING SUBSTANCES**  
 Jean-Pierre Charton, Dijon, and Gilbert Gasquet, Nangis, both of France, assignors to Societe Civile de Recherches Mesalyse, Esternay, France  
 Filed Feb. 13, 1987, Ser. No. 14,498  
 Claims priority, application France, Feb. 14, 1986, 86 02448  
 Int. Cl.<sup>4</sup> A61M 5/20 23 Claims  
 U.S. Cl. 604—136

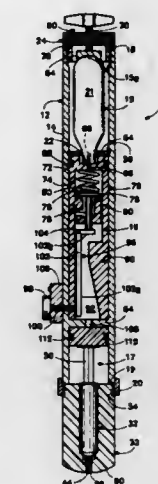


1. A device for injecting or withdrawing substances in an environment, particularly in the tissues of living beings, comprising at least one dispenser for said substance and a hand piece for holding an injector, said injector comprising an adaptor for connection thereof to said dispenser, a support for removably supporting a needle, a flexible conduit extending between said adaptor and said support for feeding said needle with said substance, whereby said needle support may move independently of said dispenser, means defining a guide path for movement therealong of said support between a rest position and an active position, catapult means for propelling said support from its rest position to its active position, and a support base for engaging a surface of said environment, said device further comprising pumping means for pumping said substance from said dispenser to said needle, and control means for controlling said pumping means and said catapult means.

4,790,824  
**NON-INVASIVE HYPODERMIC INJECTION DEVICE**  
 J. Thomas Morrow, Beaverton, Oreg., and Marvin Burns, Marina Del Rey, Calif., assignors to Bioject, Inc., Portland, Oreg.  
 Filed Jun. 19, 1987, Ser. No. 64,762  
 Int. Cl.<sup>4</sup> A61M 37/00 24 Claims  
 U.S. Cl. 604—143

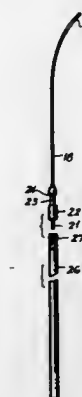
1. A non-invasive hypodermic injection device, means having a gas charge therein, for injecting a medication through a patient's skin, comprising:  
 a body including:  
 a first chamber containing the charge;  
 a valve chamber having an exhaust port and a normally closed valve closing said port, said valve chamber being constructed and arranged to contain the gas charge when same is released from the first chamber and said valve is in its normally closed condition;  
 a piston chamber operably connected to said port and having a moveable piston therein; and  
 actuator means for opening said valve, said valve, when open, allowing gas to flow from said valve chamber,

through said port, to said piston chamber thereby displacing said piston;  
 a medication containing ampule including a reservoir for retaining a supply of medication, orifice means located on and extending beyond one end of said reservoir, said orifice means having a passage therein for allowing transit of the medication therethrough, and plunger means, received in said reservoir, moveable from adjacent the other end of said reservoir towards said orifice means, and



including co-action means for moving said plunger with said piston; and  
 an ampule shroud having an ampule chamber therein for receiving said ampule, said ampule shroud enclosing said ampule, said shroud defining an opening for receiving therein said orifice means, said shroud and said opening being constructed and arranged to maintain a spaced apart relationship between the patient's skin and said orifice means during the course of an injection when said shroud is placed against the patient's skin.

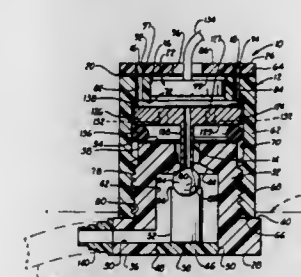
4,790,825  
**CLOSED CHEST CANNULATION METHOD AND DEVICE FOR ATRIAL-MAJOR ARTERY BYPASS**  
 Robert I. Bernstein, Tenafly, and Bernard Ackerman, Metuchen, both of N.J., assignors to Electro Catheter Corporation, Rahway, N.J.  
 Filed Sep. 5, 1986, Ser. No. 904,336  
 Int. Cl.<sup>4</sup> A61M 5/18 4 Claims  
 U.S. Cl. 604—170



1. An obturator device for facilitating the introduction of a cannula into the left ventricle of a patient's heart via the aortic valve using a trans-arterial insertion technique wherein the

cannula is passed over a catheter having an outside diameter which substantially corresponds to the inside diameter of the cannula and a length and which catheter has been previously inserted into the left ventricle, said device comprising:  
 an internal obturator for insertion into the catheter to stiffen same whereby the internal obturator and catheter, together, may be used as a guide to facilitate introduction of the cannula into the left ventricle, said internal obturator having a proximal end and a distal end, with the distal end terminating in a blunt curved portion to facilitate passage of the internal obturator through tortuous segments of the patient's arterial system as it is passed to the left ventricle, and wherein the proximal end of the internal obturator terminates in an enlarged section having an outside diameter substantially corresponding to the outside diameter of the catheter, whereby, when said internal obturator is inserted into the catheter and the enlarged section of said internal obturator is brought into abutting relation with the catheter, there results a substantially continuous uniform outside diameter traveling from the enlarged section of said internal obturator to the catheter so that the cannula may easily pass from the enlarged portion of said internal obturator to the catheter with a minimum of interference, said internal obturator further including a circular barb located between the enlarged section at the proximal end and the blunt curved portion at the distal end for retaining the catheter in abutting relation with the enlarged section during insertion of the cannula and subsequent removal of the catheter together with said internal obturator following cannula insertion, and wherein, said internal obturator has a length relative to the catheter length so that when said internal obturator is inserted in the catheter, the blunt curved portion terminates within the catheter about 1 centimeter before the catheter itself terminates within the patient's left ventricle;  
 said device further comprising an external obturator having an external diameter which substantially corresponds to the external diameter of the enlarged section of said internal obturator for passage of the cannula thereover; and  
 releasable attachment means for releasably attaching the external obturator to the proximal end of the internal obturator.

4,790,826  
**PERCUTANEOUS ACCESS PORT**  
 Nancy W. Elftman, 1020 Nashport, La Verne, Calif. 91750  
 Filed Mar. 28, 1986, Ser. No. 845,574  
 Int. Cl.<sup>4</sup> A61M 5/32 21 Claims  
 U.S. Cl. 604—175



1. A percutaneous access port for providing access to a selected body part in an animal, comprising:  
 a base assembly having an upper end, a lower end and an outer peripheral surface, a fluid chamber being formed in a portion of the base assembly generally between the upper and the lower ends thereof with an inlet port being formed in a portion of the base assembly generally near the lower end thereof, the inlet port being connectable to



the selected body part to provide communication between the fluid chamber and the selected body part, at least two vertical, laterally spaced access ports being formed through the upper end of the base assembly with each access port extending a distance through the base assembly and intersecting the fluid chamber to provide communication between the upper end of the base assembly and the fluid chamber; and

a septum assembly having a portion extending across each access port in the base assembly to seal each access port from fluids and for preventing fluid within the fluid chamber to pass through the upper end of the base assembly by way of the access ports, the septum assembly being adapted to provide resealable access through the septum assembly to the fluid chamber by way of the access ports, the base assembly being adapted for implanting in the animal with the upper end portion of the base assembly extending above the upper skin level and the lower end portion of the base assembly extending below the upper skin level in an implanted condition of the base assembly and the access ports providing resealable access to the fluid chamber from a position outside the body of the animal in an implanted condition of the percutaneous access port.

4,790,827

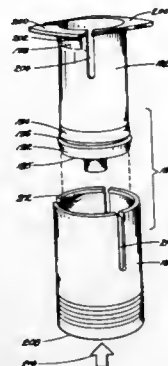
## SHIELDED SAFETY SYRINGE

Terry M. Haber, Lake Forest; Clark B. Foster, El Toro, and William H. Smedley, Lake Elsinore, all of Calif., assignors to Habley Medical Technology Corporation, Laguna Hills, Calif. Continuation-in-part of Ser. No. 043,042, Apr. 27, 1987, Pat. No. 4,758,231. This application Nov. 9, 1987, Ser. No. 118,767

Int. Cl.<sup>4</sup> A61M 5/32

U.S. Cl. 604—198

20 Claims



1. A shielded syringe assembly comprising an inner syringe cylinder having an open proximal end and a substantially closed distal end, a hypodermic needle supported at and extending outwardly from said distal end, and an outer protective sleeve having an open proximal end and an opening in a substantially closed distal end, said outer sleeve coaxially aligned with and axially advanceable relative to said inner cylinder from a retracted position, where said needle projects outwardly through the opening in said sleeve, to an extended position, where said needle is located within and completely surrounded by said sleeve;

said outer sleeve having means projecting radially inward thereof;

said inner cylinder having first catch means located adjacent the proximal end thereof and second catch means located adjacent the distal end, each of said first and second catch means including at least one stop member projecting radially outward from said inner cylinder adjacent the proximal and distal ends thereof, respectively; said first catch means releasably engaging the inwardly projecting means of said outer sleeve when said sleeve is

located in the retracted position, such that said inwardly projecting means rides over and drops behind the at least one stop member of said first catch means to prevent the inadvertent relocation of said sleeve to the extended position, and said second catch means engaging the inwardly projecting means of said outer sleeve when said sleeve is axially advanced relative to said inner cylinder from the retracted to the extended position, such that said inwardly projecting means rides over and drops behind the at least one stop member of said second catch means to prevent the return of said sleeve to the retracted position.

4,790,828

## SELF-CAPPING NEEDLE ASSEMBLY

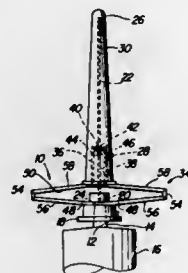
Mitchell P. Dombrowski, 103 Mapleton, Grosse Pointe Farms, Mich. 48236, and Robert A. Welch, 9573 Winterset Cir., Plymouth, Mich. 48170

Filed Aug. 7, 1987, Ser. No. 82,483

Int. Cl.<sup>4</sup> A61M 5/32

U.S. Cl. 604—198

18 Claims



1. A disposable needle assembly (10,10',10'') comprising: a hub portion (12,12',12'') having a central passageway (20,20',20''); a hollow needle portion (22,22',22'') in fluid communication with said passageway (20,20',22'') and including a distal tip (26,26',26''); cap means (28,28',28'') having a neutral unstressed position along said needle portion (22,22',22'') proximate to said hub (12,12',12'') exposing a length of said needle portion (22,22',22'') and an extended stressed position wherein said cap means (28,28',28'') is biased towards said neutral position for irreversibly capping said distal tip (26,26',26''); and tether means (34,34',34'') for connecting said cover means (28,28',28'') to said hub portion (12,12',12''), characterized by said cap means (28,28',28'') including at least one flange extending over said distal tip (26,26',26'') and said cap means (28,28',28'') and locking means for locking said distal tip (26,26',26'') under said flange (40,40',40'') 42,42',42'').

4,790,829

## REUSABLE INJECTION CATHETER

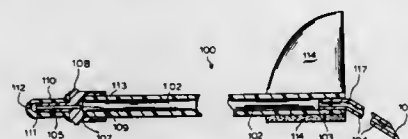
Russell Bowden, 11 Chanceville Pl., Middletown, N.J. 07748; Anthony Mauriello, 14-05 Ellis Ave., Fair Lawn, N.J. 07410, and Hasmukh Shah, 243 Probasco Rd., East Windsor, N.J. 08520

Filed Aug. 24, 1983, Ser. No. 525,920

Int. Cl.<sup>4</sup> A61M 5/00

U.S. Cl. 604—244

20 Claims



1. A reusable injection catheter comprising: a flexible conduit having a fluid path therethrough; a first cannula extending outwardly from a distal end of said

conduit in fluid communication with said conduit and being adapted for insertion into a patient; a connector housing at a proximal end of said conduit, said housing having a forward end, a rearward end adjacent to said conduit and a passageway therethrough, said passageway being in fluid communication with said conduit; a second cannula extending outwardly from said forward end of said housing in fluid communication with said passageway, a free end of said second cannula being furthest from said housing; and shield means, removably engaging said connector housing and covering said second cannula.

4,790,831

## TORQUE-CONTROL CATHETER

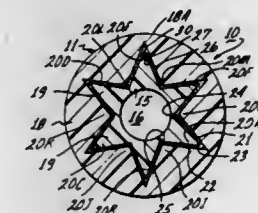
Robert P. Skribiski, Irvine, Calif., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Mar. 30, 1987, Ser. No. 31,867

Int. Cl.<sup>4</sup> A61M 25/00

U.S. Cl. 604—282

23 Claims



1. A catheter, comprising: an elongated flexible tube defining at least one lumen extending longitudinally within the tube, the tube having a size and shape adapted to be inserted into a cardiovascular system, which tube is composed of a material having a modulus of elasticity providing stiffness to enhance catheter torque control; a biocompatible sheath disposed over the tube, which sheath is composed of a biocompatible material having a modulus of elasticity providing softness to reduce catheter trauma to the cardiovascular system; the tube being stiffer than the sheath; and the tube having a plurality of longitudinally-extending ribs protruding radially outward at circumferentially spaced-apart locations on the tube and having longitudinally extending spaces between each adjacent pair of the ribs, said sheath having longitudinally extending inwardly facing ribs received in said spaces, respectively, to form an interlocking relationship with the ribs of the tube, each one of the ribs having a cross sectional area that increases inwardly, for engaging the sheath circumferentially, for defining an outer surface of the tube that generally faces outwardly toward the sheath to thereby facilitate a closely-confronting relationship between the sheath and tube over substantially the entire outer surface, and for extending the outer surface over an enlarged area to thereby facilitate a better bond of the sheath to the tube.

4,790,832

## SYSTEM FOR ADMINISTERING MEDICATION NASALLY TO A PATIENT

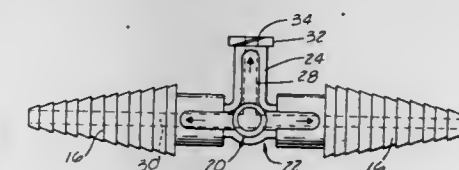
George A. Lopez, Orange County, Calif., assignor to ICU Medical, Inc., Mission Viejo, Calif.

Filed Jun. 6, 1986, Ser. No. 872,050

Int. Cl.<sup>4</sup> A61M 25/00

U.S. Cl. 604—283

3 Claims



1. A system including means for introducing, food into the stomach of a patient or removing fluid from the stomach through tubular means extending through the nose of the patient into the stomach of the patient, and for periodically introducing medication into the stomach through the tubular means, said tubular means varying in diameter for different patients,

4,790,830

## INFUSION NEEDLE

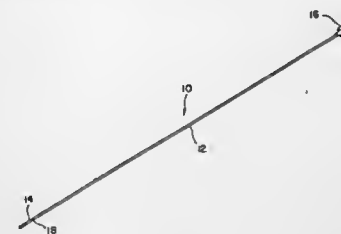
Edward N. Hamacher, 725 South Lincoln, Apt. C-4, Spokane, Wash. 99204

Continuation of Ser. No. 718,159, Apr. 1, 1985, Pat. No. 4,699,612. This application Jul. 24, 1987, Ser. No. 77,493

Int. Cl.<sup>4</sup> A61M 5/32

U.S. Cl. 604—274

12 Claims



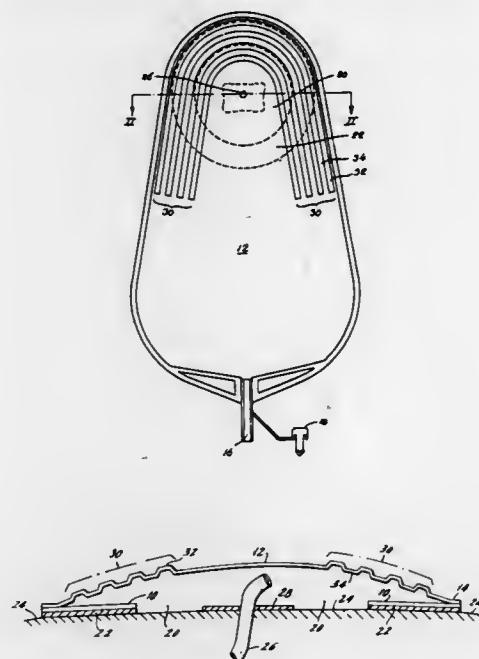
1. An infusion needle for use in area infiltration applications, and for preparation of a dissection plane, which reduces trauma to blood vessels during the injection process, comprising:

- a longitudinally extending, substantially rigid, cylindrical shaft of substantially constant diameter having a length between 3 and 18 inches to allow injection of fluid in a plurality of directions for infiltrating a large subcutaneous area from a single entry point through the dermis, and having an inner surface and an outer surface, the inner surface defining a longitudinal fluid conduit for transporting fluids to subcutaneous tissue;
- means, forming a tip portion, at one end of the shaft for penetrating and guiding the shaft through and along a substantial length of subcutaneous tissue and for diverting blood vessels around the shaft on insertion and penetration to avoid puncturing and damaging said vessels, wherein the tip portion forms a substantially blunt tip having a vertex which intersects and which is symmetrical about the longitudinal axis of the shaft and forms a portion of a curved surface so that the dermis must be incised to provide an entry point for the needle to encourage area infiltration of subcutaneous tissue from a single entry point, wherein the ratio of the vertex of curvature to the shaft diameter is in the range of approximately 0.1093:1 to 0.1504:1; and
- a portion of the outer surface communicating with a corresponding portion of the inner surface defining at least one outlet for dispensing fluids in a substantially radial direction from the shaft.

said tubular means including first tubular means having a first open end adapted to extend through the patient's nose and into the patient's stomach and a second end terminating at a point remote from the nose and removably attached to a connector, said connector comprising a body member having opposed first and second ends and a passageway extending through the body member between said first and second ends thereof, said body member having at said first and second ends a series of flanges having tapered edges so that each of said ends of the body member may be inserted into the open end of one of several different tubes varying in diameter, said first end of the body member being inserted into the second open end of the first tubular means, and a port between the open ends of the body member which is in communication with the passageway, a funnel member at the port which is adapted to receive the delivery end of a gastric syringe, and valve means including a cavity and a valve body member having therein a T-shaped channel, said valve body member being rotatably received in the cavity so that the T-shaped channel is in alignment with the passageway and the port to enable the port to be opened or closed, or the passageway to be opened or closed, in accordance with the position of the valve body member in the cavity, and

second tubular means having one end thereof connected to the second open of the body member and another end connected to means for pumping food into the stomach of the patient through the second tubular means, connector, and first tubular means or removing fluid from the stomach of the patient through the first tubular means, connector, and second tubular means.

form a supple film blister means to allow the user to manipulate a drain, said film blister means being of increased surface area



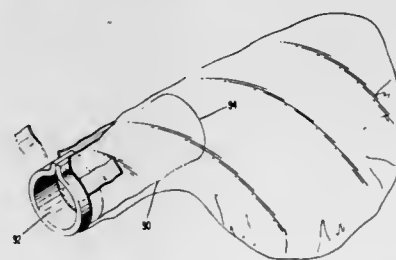
and reduced material thickness compared to the surface area and thickness without such processing.

#### 4,790,834 EXTERNAL SINGLE-USE CATHETER

Gerald W. Austin, Salem, Va., assignor to Professional Care Products, Inc., Roanoke, Va.  
Continuation-in-part of Ser. No. 737,428, May 24, 1985, Pat. No. 4,685,913. This application Jul. 16, 1987, Ser. No. 74,051  
Int. Cl.<sup>4</sup> A61F 5/44

U.S. Cl. 604—349

3 Claims



#### 4,790,833 BAG OF PLASTIC FILM FOR COLLECTING DISCHARGES FROM HUMAN OR ANIMAL BODIES VIA DRAINS

Richard Schmidt, Bagsvaerd, Denmark, assignor to Coloplast A/S, Denmark

PCT No. PCT/DK86/00107, § 371 Date May 22, 1987, § 102(e) Date May 22, 1987, PCT Pub. No. WO87/01932, PCT Pub. Date Apr. 9, 1987

PCT Filed Sep. 26, 1986, Ser. No. 59,877  
Claims priority, application Denmark, Sep. 27, 1985, 4381/85  
Int. Cl.<sup>4</sup> A61M 1/00

U.S. Cl. 604—317

8 Claims

1. A bag of plastic film for collecting discharges from human and animal bodies via drains, the bag consisting of a rear wall and a front wall sealed to each other along the peripheral edges, the rear wall being provided with an aperture adapted to receive a drain; means around said aperture for attaching the bag to the body surface around a body opening through which the drain carries the discharges from the body to the bag; wherein the upper part of the front wall in at least an area opposite the aperture in the rear wall has been processed to

1. A device for use as an external-single use catheter, comprising: a pliable plastic container having an interior space and provided with a closed end; an opening in said container opposite said closed end; a liquid-permeable partition located in said interior space integral with said container substantially separating said opening from said closed end, wherein said partition comprises a liquid-disintegrable material; and an absorbent means provided in said interior space defined by said closed end and said partition.

4,790,835

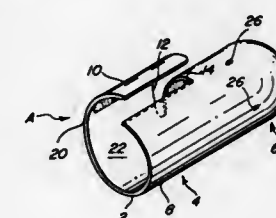
#### URINARY MALE DIAPER

Barney Elias, 500 W. State, Apt. 3D, Jacksonville, Ill. 62650  
Filed Jun. 3, 1987, Ser. No. 56,887

Int. Cl.<sup>4</sup> A61F 5/44

U.S. Cl. 604—349

7 Claims



1. A urinary diaper or shield for men comprising:
  - (a) a one-piece generally tubular-shaped sheath formed from moisture resistant material including an open proximal end portion and a closed distal end portion,
  - (b) said sheath including an inner surface and an outer surface,
  - (c) a thick absorbent liner positioned within said distal end portion of said sheath in direct contact with the entire inner surface thereof,
  - (d) the distal end of said sheath having a plurality of spaced aeration holes disposed on its surface and extending therethrough to permit both uniform ventilation and also air drying of the absorbent liner once it becomes wet,
  - (e) said proximal end portion including a first portion forming an uninterrupted continuation of a partial circumferential section of said distal end portion, and a fee flap portion forming an uninterrupted circumferential extension of said first portion,
  - (f) the free flap portion being of such a length so as to adjustably overlap upon said first portion to both close the sheath and to vary the diameter of said open proximal end portion,
  - (g) the fee flap portion being discontinuous with but on closure having an edge in normal abutting relationship with the adjacent edge of the distal portion, and including means for releasably attaching said overlapping flap portion to the said first portion.

4,790,836

#### DISPOSABLE DIAPER

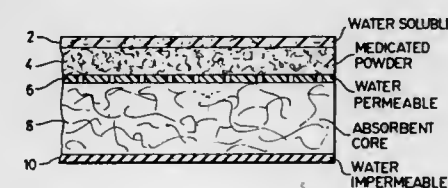
Arie Brecher, 23 Eilat Street, Holon 58 310, Israel  
Filed May 8, 1986, Ser. No. 860,881

Claims priority, application Israel, May 14, 1985, 75189

Int. Cl.<sup>4</sup> A61F 13/16

U.S. Cl. 604—359

19 Claims



1. A disposable diaper for application to an infant in contact with the infant's skin, comprising:
  - a liquid absorbent core;
  - a continuous, homogeneous water-soluble film which dissolves upon contact with water, said film being carried by said liquid absorbent core on one side thereof to be applied in contact with the infant's skin;
  - and a continuous, homogeneous layer of medicated powder

applied as a separate and distinct layer between said water soluble film and said liquid absorbent core.

4,790,837

#### URINE METER

James R. Gross, St. Charles, and Helmut W. G. Rosenberg, McHenry, both of Ill., assignors to The Kendall Company, Boston, Mass.

Division of Ser. No. 876,622, Jun. 20, 1986, Pat. No. 4,731,062.  
This application Nov. 9, 1987, Ser. No. 118,494

Int. Cl.<sup>4</sup> A61M 1/00

U.S. Cl. 604—322

11 Claims



1. A urine meter comprising:
  - a receptacle having a wall defining a cavity and an opening at a top of the receptacle communicating with the cavity, said opening facing upwardly when the receptacle is in a collection position;
  - a container having a front flexible wall and a back flexible wall defining a chamber, said front wall being secured to the top of the receptacle adjacent the opening of the receptacle and having an opening, said front wall opening in fluid communication with the opening at the top of the receptacle so as to place the chamber and cavity in fluid communication with one another, said back wall extending over said container opening; and
  - a support member; and
- means for supporting the receptacle from the support member in a first lower upright position of the receptacle, said receptacle being movable to a second upper tilted position sufficient to dump collected liquid from the cavity into the chamber, said supporting means including mechanical means positively biasing the receptacle from the second position to the first position.

4,790,838

#### DEVICE FORMING A SANITARY OR SIMILAR NAPKIN INCLUDING LATERAL WINGS OR FLAPS SEALED TOGETHER IMPROVING LATERAL TIGHTNESS, PREFERABLY PROVIDED WITH PLEATS

Raymond Pigneul, Durrenentzen, and Remy Rappel, Horbouren, both of France, assignors to Beghin-Say SA, Thumeries, France

Filed Sep. 16, 1987, Ser. No. 97,154

Claims priority, application France, Oct. 6, 1986, 86 13867  
Int. Cl.<sup>4</sup> A61F 13/16

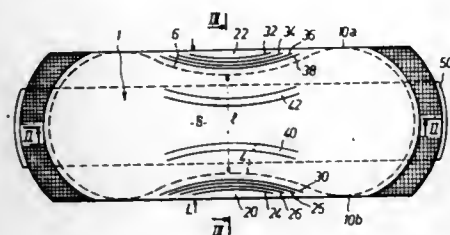
U.S. Cl. 604—366

10 Claims

1. Article for forming a sanitary or similar napkin, in particular for women's hygiene, including a preformed fluid-absorbent pad component defining a central biconcave area of reduced width, entirely arranged inside a covering that is permeable to said fluids, and a layer of a component impermeable to fluids which is inserted between said pad component and said covering, characterized in that said covering is designed with a width larger than the width of said pad component at the point of said reduced-width biconcave area, thus defining lateral wings or flaps that are sealed together so as to improve



lateral tightness to said fluids, said lateral wings or flaps being provided with one or more pleats shaped as arcs of a circle



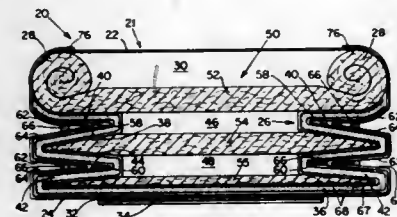
which are concentric with adjacent concavity that are sealed together, further improving lateral tightness.

#### 4,790,839 ABSORBENT ARTICLE HAVING AN EXPANDING OVERWRAP

Nicholas A. Ahr, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio  
Continuation of Ser. No. 794,861, Nov. 4, 1985, abandoned. This application Aug. 3, 1987, Ser. No. 81,551  
Int. Cl.<sup>4</sup> A61F 13/16

U.S. Cl. 604—367

10 Claims



#### 1. An absorbent article comprising:

- an absorbent core comprising a mixture of fiber material and hydrogel particles that expands when wetted, said absorbent core having an acquisition channel;
- a composite overwrap that extends around at least the sides and top of the absorbent article so as to at least partially encase said absorbent core and cover said acquisition channel, said overwrap having a multiplicity of overwrap layers, wherein said multiplicity of overwrap layers are inward longitudinal folds; and
- a releasable tack positioned on said composite overwrap between a first overwrap layer and a second overwrap layer for releasably securing said first overwrap layer and said second overwrap layer together to permit expansion of said composite overwrap as said absorbent core expands when wetted.

#### 4,790,840 COMBINED DISPOSABLE DIAPER AND CLEANING WIPE

Cathy Cortina, 3470 Foxcroft Rd., Miramar, Fla. 33024  
Filed Oct. 19, 1987, Ser. No. 109,672  
Int. Cl.<sup>4</sup> A61F 13/16

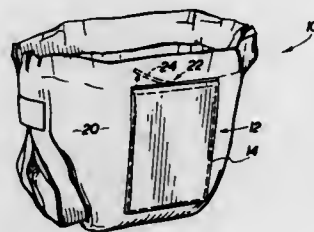
U.S. Cl. 604—385.1

11 Claims

- 1. A cleaning assembly for use in combination with a disposable diaper structure, said assembly comprising:
  - a. a wiper element formed of a liquid absorbent material and having sufficient softness in texture to be applied to the skin of an infant,
  - b. a cleaning composition applied to said wiper element and carried thereby, and being of sufficient quantity to moisten said wiper element,
  - c. a package means secured to the diaper structure having a

hollow interior for the containment of the wiper element therein,

- d. said package means having an opening formed thereon in contiguous relation to said hollow interior and defining an access to and from said hollow interior of said package means,
- e. closure means mounted on said package means adjacent said opening for selectively positioning said opening between an open and closed position,
- f. said package means formed of a liquid-proof material and dimensioned and configured to contain said wiper element and moisture therein within said hollow interior,



- g. whereby said wiper element is readily available for cleaning of an infant's skin on which the diaper structure is mounted, and
- h. said closure means comprising a tear strip integrally formed on said package means in covering, closing relation to said opening, said tear strip secured to the remainder of said package by a weakened segment line extending along the length of said tear strip and serving to removably interconnect said tear strip to the remainder of said package means.

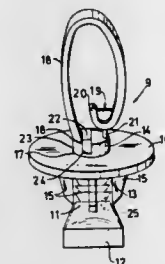
#### 4,790,841 DEVICE FOR BAG-SHAPED LIQUID-CONTAINERS FOR SICK-CARE

Karl-Erik Landh, Gislaved, and Tore Kers, Upsala, both of Sweden, assignors to Gislaved Plastindustri AB, Sweden  
PCT No. PCT/SE82/00102, § 371 Date Nov. 24, 1982, § 102(e) Date Nov. 24, 1982, PCT Pub. No. WO82/03332, PCT Pub. Date Oct. 14, 1982

PCT Filed Mar. 31, 1982, Ser. No. 445,372  
Claims priority, application Sweden, Mar. 31, 1981, 8102059  
Int. Cl.<sup>4</sup> A61B 19/00

U.S. Cl. 604—408

2 Claims



- 1. Sealing device for bag-shaped liquid containers of flexible material for sick care comprising one of more flat plastic films fused together along their edges, or a folded-over plastic film fused together at its free edges, and having at least one opening for filling and emptying the container, the sealing device comprising a disc-shaped member for sealing the opening and having a tube made in one piece therewith and extending in use towards the interior of the container, the end of the tube adjacent the disc-shaped member being closed by a cover which seals against the outside surface of the disc-shaped member

level therewith and can be torn off around the mouth of the tube, the other end of the tube being sealed by means of a flattening of the tube, said flattened portion of the tube extending transversely to the longitudinal direction of the tube to form two tube sidewall portions converging towards the flattened portion of the tube, at least one of said sidewall portions being penetrable by a cannula when inserted through the mouth of the tube and extending through the tube, wherein the wall thickness of the tube at and immediately before the flattened portion is thinner than that of the rest of the tube such as to permit steam to pass in sterilization.

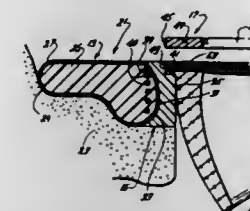
#### 4,790,843 PROSTHETIC HEART VALVE ASSEMBLY

Alain Carpentier, Paris, France, and Ernest Lane, Huntington Beach, Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jan. 16, 1986, Ser. No. 874,618  
Int. Cl.<sup>4</sup> A61F 2/24

U.S. Cl. 623—2

17 Claims

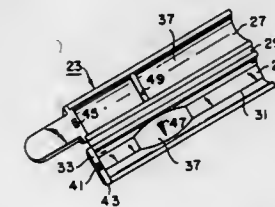


#### 4,790,842 BLOOD SAMPLE SEGMENT DETACHING AND TEARING DEVICE

Timothy J. Coburn, 24 Fox Lane S., Palos Park, Ill. 60464  
Continuation-in-part of Ser. No. 907,316, Sep. 15, 1986, abandoned. This application Aug. 31, 1987, Ser. No. 91,125  
Int. Cl.<sup>4</sup> A61B 19/00

U.S. Cl. 604—408

8 Claims



- 1. In a blood transfusion bag including synthetic plastic tubing connected therewith, the tubing being heat sealed at spaced locations along its length to define successive sections filled with samples of the blood within the bag, apparatus for severing a blood sample segment from the tubing and for piercing said segment, comprising

- (a) a tubular housing defining a chamber for receiving a blood sample segment, said housing having a longitudinal axis and including first and second longitudinal sections each having a hemicylindrical configuration;
- (b) hinge means for connecting said sections together along a longitudinal edge, whereby said sections are movable between open and closed positions;
- (c) said first section including first and second spaced projection means extending transversely therefrom for defining sharp edges, respectively, said first projection means being arranged at one end of said first section and said second projection means being arranged intermediate the ends thereof; and
- (d) said second section containing first and second slots opposite said first and second projection means of said first section, respectively, said second section slots receiving said first section projection means when said sections are in the closed position, whereby when said sections are in the open position, a blood sample segment is arranged within said second section with a seal arranged at said one end, and when said sections are moved to the closed position to enclose said blood sample segment within said chamber, said first and second projection means simultaneously break and puncture the seal and blood sample segment, respectively.

- 1. An implantable device for removably mounting a prosthetic valve, said implantable device comprising:

- a fixation ring having an inner periphery defining an opening through the fixation ring and an outer periphery and adapted to be affixed to the natural annulus of a patient;
- a mounting ring having an inner peripheral surface defining an opening through the mounting ring, said mounting ring being coupled to the fixation ring with said openings being in registry whereby a prosthetic valve can be received in said opening of the mounting ring;
- a retaining ring separate from the prosthetic valve so that when a prosthetic valve is received in said opening of the mounting ring the prosthetic valve can be angularly oriented independently of the retaining ring;
- means at least partially on said mounting ring for releasably attaching said retaining ring to the mounting ring so that the retaining ring can retain the prosthetic valve against moving in one direction out of the opening when the prosthetic valve is received in said opening of the mounting ring and the retaining ring can be removed to permit replacement of the prosthetic valve with another prosthetic valve;
- means for use in retaining the prosthetic valve against moving in another direction out of the opening in the mounting ring when the prosthetic valve is received in said opening of the mounting ring; and
- said retaining ring is annular, has an axis and is thin in the direction of said axis.

#### 4,790,844 REPLACEMENT OF CARDIAC VALVES IN HEART SURGERY

Yoel Ovil, 33 Bainbridge Avenue, Downsview, Ontario, Canada M3H 2J8

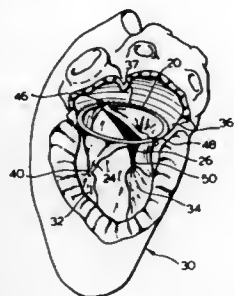
Filed Jan. 30, 1987, Ser. No. 8,816  
Int. Cl.<sup>4</sup> A61F 2/24

U.S. Cl. 623—2

7 Claims

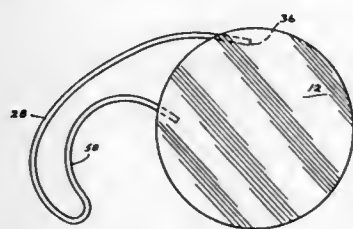
- 4. A method of replacing a cardiac valve in a heart of a patient; the method comprising providing a tissue valve consisting of flexible unsupported natural or artificial tissue having a bishop's miter shape with a cylindrical end portion and a pair of diametrically-opposite triangular flexible flap portions integral with and extending from the cylindrical end portion, each flexible flap portion having a free apical end; securing the cylindrical end of the tissue valve being

secured to a native annulus in the heart, and securing the apical end of each flexible flap portion to papillary muscle



of a ventricle or to a side wall of the pulmonary artery or the aorta.

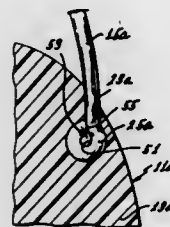
**4,790,845**  
**POSTERIOR CHAMBER LENS**  
Dennis T. Grendahl, Minneapolis, Minn., and Myron E. Lippman, Santa Barbara, Calif., assignors to Surgidey Corporation, Goleta, Calif.  
Division of Ser. No. 316,211, Oct. 29, 1981. This application Aug. 27, 1987, Ser. No. 89,061  
Int. Cl.<sup>4</sup> A61F 2/16  
U.S. Cl. 623—6



1. A posterior chamber lens implant for the human eye for use after extracapsular surgery in which a posterior capsule is left substantially intact, said lens implant comprising:

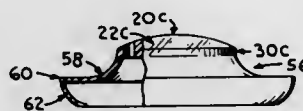
- a. a substantially circular PMMA optic having a plano anterior surface, a convex posterior surface and a substantially circular and continuous outer edge; and,
- b. two opposed loops, each loop comprising a filament of PMMA having two ends affixed substantially adjacent to each other and to said edge of said optic, each of said filament being predisposed to define a first curvature which curves in a first direction and reverses along a free end in a fold back to define a second curvature of a lesser radius than said first curvature in a second direction to thereby define an outer terminal end protrusion and an indentation, the distance between said first curvature and said second curvature continuously decreasing in a direction towards said terminal end protrusion between said edge of said optic and said fold back throughout a majority of its length, said loops being adapted to secure said optic to the eye within the posterior chamber, each of said loops affixed to said optic at an angle of about 15° anterior to said convex posterior surface such that said convex posterior surface is caused to abut against the posterior capsule.

**4,790,846**  
**HAPTIC TO OPTIC ATTACHMENT FOR A SOFT IOL**  
F. Richard Christ, Orange; Dean K. Pettit, Irvine, and Jeffrey C. Day, Mission Viejo, all of Calif., assignors to Allergan Pharmaceuticals, Inc., Irvine, Calif.  
Continuation of Ser. No. 806,376, Dec. 9, 1985, abandoned. This application Sep. 15, 1987, Ser. No. 96,745  
Int. Cl.<sup>4</sup> A61F 2/16; B29D 11/00  
U.S. Cl. 623—6



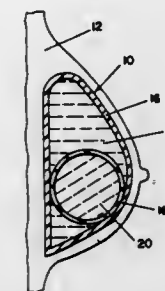
3. An intraocular lens comprising:  
at least one fixation member having proximal end portion, said proximal end portion including a filament with a region of the filament at the proximal end portion being formed into a loop;  
an optic, said proximal end portion being within the optic and a portion of said optic being in said loop to form a mechanical interlock between said loop and the optic and to attach the fixation member to the optic; and  
said loop being at a peripheral region of the optic and being substantially smaller than said optic.

**4,790,847**  
**INTRAOCULAR LENS IMPLANT HAVING EYE FOCUSING CAPABILITIES**  
Randall L. Woods, Rte. 4, Box 65, Clinton, Mo. 64735  
Filed May 26, 1987, Ser. No. 54,293  
Int. Cl.<sup>4</sup> A61F 2/16  
U.S. Cl. 623—6



1. An intraocular lens having focusing capabilities for implantation entirely within the confines of the capsule of a human eye between the anterior and posterior capsule walls, the eye also having a fovea behind said capsule, a ciliary muscle disposed about the capsule, and zonular fibers interposed between the ciliary muscle and capsule, said lens comprising:  
an optic presenting an anterior surface, a posterior surface, and a side marginal edge; and  
positioning means operably coupled with said optic, extending posteriorly of said posterior surface of the optic and outwardly of said marginal edge thereof, and presenting an outboard capsule-engaging portion spaced posteriorly of said optic anterior surface, said capsule-engaging portion including a structure for continuous anterior biasing of said optic such that the optic anterior surface is in constant, biased engagement with said anterior capsule wall at all times during operation of the lens,  
said positioning means comprising an arcuate in cross section skirt extending posteriorly and radially outwardly from said optic, the outer margin of said skirt lying in one plane, there being a flange extending posteriorly from the edge of said skirt's margin.

**4,790,848**  
**BREAST PROSTHESIS WITH MULTIPLE LUMENS**  
Thomas D. Cronin, Houston, Tex., assignor to Dow Corning Wright, Arlington, Tenn.  
Filed Nov. 27, 1987, Ser. No. 125,856  
Int. Cl.<sup>4</sup> A61F 2/12  
U.S. Cl. 623—8

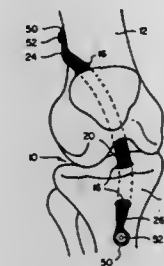


1. A multi-lumen mammary prosthesis for surgical implantation comprising:  
an outer, closed, broad-based flexible envelope of medical grade elastomer containing a first fluid material,  
an unattached second, closed, flexible envelope contained in said first fluid material and being motile therewithin, said second envelope being substantially spherical in shape and containing a second fluid material, the diameter of said substantially spherical envelope being sufficient to maintain outward projection of the prosthesis.

**4,790,849**  
**MALAR IMPLANT AND METHOD OF INSERTING THE PROTHESIS**  
Edward Terino, 2660 Townsgate Rd., No. 740, Westlake Village, Calif. 91361  
Continuation-in-part of Ser. No. 769,194, Aug. 23, 1985, abandoned. This application Jan. 5, 1987, Ser. No. 4,819  
Int. Cl.<sup>4</sup> A61F 2/10  
U.S. Cl. 623—11

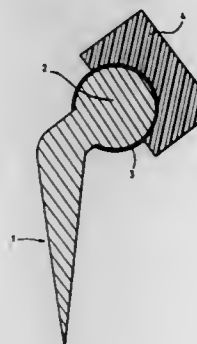
1. A malar implant used in cosmetic and reconstructive surgery for surgical incision adjacent the human eye socket and between the malar-zygomatic bone complex and the fleshy portion of the cheek area which comprises:  
a three-dimensional asymmetrical implant having an outer generally overall convex surface having a lower region and a lower mid-region, and an inner concave surface;  
said outer convex surface in said lower mid-region thereof, having a convex surface in both a longitudinal and transverse cross section such that at an intersection of the surfaces forms a maximum apex to yield an area of greatest prominence for forming a naturally appearing high cheekbone when implanted for aesthetic purposes and also for minimizing the sagging skin of the cheeks caused by the aging process;  
said outer convex surface and said inner concave surface merging to form an upper edge, a lower edge, an anterior edge, and a posterior edge;  
said anterior edge includes a maxilla extension extending from said lower region of said anterior edge;  
said upper edge includes an upwardly extending orbital rim surface;  
after said implant is implanted, said upper edge and said anterior edge, add support to the patient's lower eyelid to help the eyelid from descending with age to minimize the lower eyelid drooping caused by the aging process;  
said posterior edge being arcuate shaped below the rearward end of said orbital rim surface and converging with said lower edge forming a rearwardly extending zygomatic extension.

**4,790,850**  
**PHOSTHETIC LIGAMENT**  
Richard L. Dunn, Birmingham; Danny H. Lewis, Hartselle, both of Ala.; Thomas W. Sander, Memphis, Tenn.; James A. Davidson, Germantown, Tenn.; Neil B. Beals, Memphis, Tenn., and Yancy L. Gill, Smyrna, Ga., assignors to Richards Medical Company, Memphis, Tenn.  
Continuation-in-part of Ser. No. 840,298, Mar. 14, 1986, Pat. No. 4,731,084. This application Jun. 22, 1987, Ser. No. 64,634  
Int. Cl.<sup>4</sup> A61F 2/08  
U.S. Cl. 623—13



1. A prosthetic ligament for permanently connecting first and second body members comprising:  
a nonaugmented load bearing member for permanently spanning the distance between said first and second body members having a longitudinal gage, section and two ends for attachment to said first and second body members, wherein at least one of said ends is a looped extension of said gage section said load bearing member being intertwined into a braid from a plurality of biocompatible, high strength polyethylene yarns, each said yarn including at least fifty fibers and having a tensile strength greater than or equal to about 100,000 psi, each said fiber having an average diameter of less than about one hundred microns.

**4,790,851**  
**METHOD FOR MANUFACTURING SURGICAL IMPLANTS AT LEAST PARTIALLY COATED WITH A LAYER OF A METAL COMPOUND, AND IMPLANTS MANUFACTURED ACCORDING TO SAID METHOD**  
René Suire, Montauban De Bretagne; Christian Malet, Paris; Roger J. Spert, Conflans Sainte Honorine, and Coli Bernard, Cergy, all of France, assignors to France Implant and Innovatique S.A., both of, France  
Filed Mar. 14, 1986, Ser. No. 839,404  
Int. Cl.<sup>4</sup> A61F 2/36; C23C 16/00; A01N 1/02  
U.S. Cl. 623—16



1. A method of manufacturing surgical implants comprising a substrate at least partially coated with a deposition formed of a metal compound, comprising the following steps:  
i. a step of forming an implant blank from an electrically



- conductive substrate, said blank comprising at least one contact bearing surface having dimensional tolerances substantially equal to those of the finished implant;
- ii. a step of initial polishing of this contact bearing surface;
  - iii. a step of cleaning of the contact bearing surface, once polished, by physico-chemical means;
  - iv. a step of decontaminating by an ionic cleaning on the atomic scale of any trace of oxidation of this contact bearing surface, said decontaminating step being carried out by bombarding this surface with heavy ions such as titanium ions and hafnium ions coming from an evaporation source, in a reactor having a structure similar to that of an oven for thermo-chemical treatment by ionic bombardment in a non oxidizing atmosphere comprising a neutral gas such as argon or nitrogen, at a pressure of  $10^{-6}$  T to a few millitors, the implant blank being brought to a cathode potential greater than 800 volts so as to obtain an ionic bombardment of the contact bearing surface in which high kinetic energy ions strike the contact bearing surface while being repulverized and a fraction of the kinetic energy of the ions is transformed into heat energy causing heating of the blank;
  - v. a step of heating of the blank to a predetermined temperature at which said deposition is to be carried out, such heating being at least partially obtained in the decontaminating step by the transformation of the kinetic energy of the ions;
  - vi. once said predetermined temperature has been reached, the formation of said deposition by creating metal vapor inside the reactor, by introducing into the reactor a reactive gas and by reducing the cathode potential of the blank to a value between 100 and 400 volts;
  - vii. a step of final polishing of the contact bearing surface comprising said deposition.

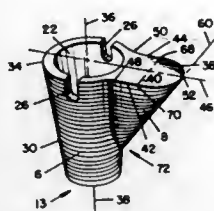
4,790,852

## SLEEVES FOR AFFIXING ARTIFICIAL JOINTS TO BONE

Douglas G. Nilles, New Canaan, Conn., assignor to Joint Medical Products Corporation, Stamford, Conn.  
Filed Sep. 15, 1986, Ser. No. 907,746  
Int. Cl.<sup>4</sup> A61F 2/30, 2/32

U.S. Cl. 623—18

14 Claims



1. A sleeve for affixing a component of an artificial joint to bone, said joint having a joint motion surface, said sleeve comprising a body having a longitudinal axis which defines first and second ends, the first end being towards the joint motion surface and the second end being away from the joint motion surface when the sleeve is implanted in the bone, said body having an outer surface which includes a plurality of terraces, each terrace lying in a plane substantially perpendicular to the longitudinal axis, the perimeter of the outer edge of each terrace located in the region of the first end of the body comprising (a) a portion of a circle centered on the longitudinal axis and (b) a portion of an ellipse whose center is offset from the longitudinal axis, said portion of an ellipse, for each of the terraces, (a) being a portion of a common ellipse so that all of the elliptical portions have the same shape, and (b) including a vertex of the ellipse, the perimeters of the terraces located in said first end region having lengths such that for each pair of adjacent terraces, the perimeter of the outer edge of the terrace closer to the first end is longer than the perimeter of the outer

edge of the terrace closer to the second end, at least some of said first end perimeters having an oblong form wherein the elliptical portion of the perimeter is half an ellipse and the perimeter includes two lines which are parallel to the ellipse's major axis, and tangent to the ellipse at the ends of its minor axis and spaced from one another by a distance which is less than the diameter of the circular portion of the perimeter.

4,790,853

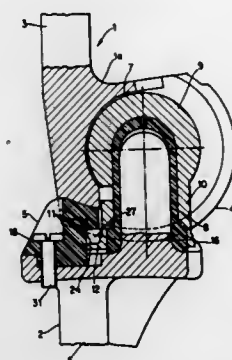
## KNEE JOINT PROSTHESIS

Eckart Engelbrecht; Elmar Nieder, both of Hamburg, and Arnold Keller, Kayhude, all of Fed. Rep. of Germany, assignors to GMT Gesellschaft Für Medizinische Technik MBH and Waldemar Link GmbH & Co., both of Hamburg, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 396,638, Jul. 15, 1982, Pat. No. 4,538,305. This application Aug. 26, 1985, Ser. No. 769,522  
Claims priority, application Fed. Rep. of Germany, Aug. 29, 1984, 3431645

The portion of the term of this patent subsequent to Sep. 3, 2002, has been disclaimed.  
Int. Cl.<sup>4</sup> A61F 2/38

U.S. Cl. 623—20

19 Claims



1. An artificial prosthesis, particularly an internal prosthesis, comprising elongated first and second components designed to engage with the respective parts of the anatomy which are normally connected to each other by a joint, such as a knee joint, said components being reciprocable with reference to each other in the directions of elongation thereof, said first component having a first extension receivable in a femur and said second component having a second extension receivable in a tibia; stop means for limiting the extent of reciprocability of said components with reference to each other in said directions of elongation thereof; and a first hinge defining a pivot axis extending substantially transversely of the directions of elongation of said components and arranged to permit relative pivotal movements of said components about said pivot axis, said first hinge comprising a first portion on said first component and a complementary second portion having a first guide, said first guide being pivotable with said second about said pivot axis and said second component having a second guide cooperating with said first guide to define therewith a second hinge for clockwise and counterclockwise angular movement of said components relative to each other about a second axis which is at least substantially normal to said pivot axis, one of said components being reciprocable relative to the other of said components in the direction of said second axis, said stop means comprising a first abutment provided on said first component and at least partially surrounding said first guide, and a second abutment provided on said second component and arranged to engage said first abutment in response to movement of said one component in the direction of said second axis and transversely of said pivot axis, said second guide extending into said first guide and being rigid with said second compo-

ment, said first guide surrounding said second guide and being coupled to said first component for movement about said pivot axis, said first guide having an end portion which is adjacent to said second component and said first abutment being provided on such end portion of said first guide.

4,790,854

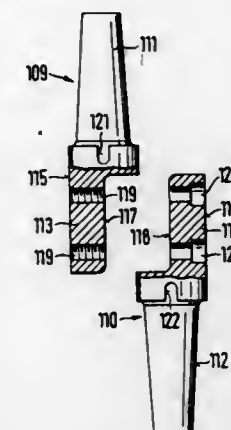
## BONE PROSTHESIS ASSEMBLY

Hans E. Harder, Probstelerhagen; Klaus Behrens, Rickling, both of Fed. Rep. of Germany, and Rainer Kotz, Vienna, Austria, assignors to Howmedica International Inc., Kiel, Fed. Rep. of Germany  
Continuation of Ser. No. 841,410, Mar. 19, 1986, Pat. No. 4,764,171, which is a division of Ser. No. 381,607, May 24, 1982, Pat. No. 4,578,081. This application Mar. 18, 1988, Ser. No. 170,192

The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> A61F 2/38, 2/36

U.S. Cl. 623—20

5 Claims



1. A bone prosthesis assembly for replacement of at least part of a natural joint of a patient comprising a connection member adapted to be connected to the bone of the patient at one end of said connection member, a joint component including a cylindrical shank portion adapted to be connected by a mutually engaging frictional self-locking cone-type connection to said connection member at the other end of said connection member, and a set of elongation pieces of varying length each adapted to be arranged between said joint component and the connection member, with said connection member being provided with an outer male conical portion and said joint component being provided with an inner female conical portion adapted for reception of and mutual engagement with said outer male conical portion, with each of said elongation pieces comprising a cylindrical body portion provided with an inner female conical portion opening to one end of the body portion,

and an outer male conical portion extending from the other end of the body portion, with the outer diameter of each of said elongation piece body portions being equal to the outer diameter of said joint component shank portion, and with the shank portion abutting the adjacent body portion when the joint component and elongation piece are connected.

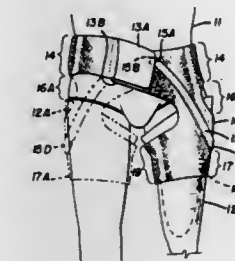
4,790,855

## TOTAL ELASTIC SUPPORT MEMBER FOR USE WITH AN ORTHOPEDIC DEVICE

David F. Jolly, 2250 Holly Hall, #292, Houston, Tex. 77054  
Continuation-in-part of Ser. No. 903,289, Sep. 3, 1986, abandoned. This application Mar. 27, 1987, Ser. No. 31,402  
Int. Cl.<sup>4</sup> A61F 2/60

U.S. Cl. 623—32

42 Claims



1. An integral elastic support member adapted for encircling the human body for holding an orthopedic device securely on the leg or a prosthetic device on the lower residual limb of a human body having an above the knee amputation of a leg, which member comprises:

- a elongated flexible elastic belt portion having free ends for encircling the lower torso of a human body, attachment means for detachably connecting said free ends together, and
- at least one flexible elastic sleeve means formed integrally with said belt and extending downwardly therefrom to encircle and to grip the top outer surface of the orthopedic device and provide flexible support for the orthopedic device, and
- a V-shaped adductor panel attached to the surface of the member positioned so that, when the member is worn, the adductor panel has the apex point generally directed in a downward direction attached to the lower sleeve means, with the sides pointing at generally about a 45° angle to the horizontal extending upwardly and attached to the belt portion, wherein the integral elastic support member comprises an elastic material having an elongation of 20 to 80% of the unstretched material.

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# CHEMICAL

4,790,856  
SOFTENING AND ANTI-STATIC NONIONIC  
DETERGENT COMPOSITION WITH  
SULFOSUCCINAMATE DETERGENT  
Harold E. Wixon, New Brunswick, N.J., assignor to Colgate-  
Palmolive Company, New York, N.Y.  
Continuation of Ser. No. 721,866, Apr. 10, 1985, abandoned,  
which is a continuation-in-part of Ser. No. 661,775, Oct. 17,  
1984, abandoned. This application Jan. 12, 1986, Ser. No.  
873,486

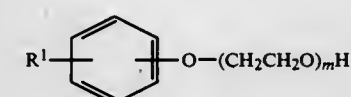
Int. Cl.<sup>4</sup> C11D 1/12, 1/86, 17/08; D06M 13/46  
U.S. Cl. 8—137 15 Claims

1. An aqueous liquid detergent composition for cleaning and  
softening soiled fabrics and which can be added to the wash  
cycle of an automatic laundry machine, said composition comprising:

(A) from about 10 to 50% by weight of a liquid nonionic  
detergent selected from the group consisting of compounds of formulae (I) and (II):

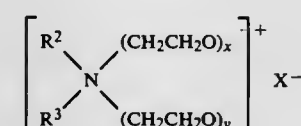


wherein R is a primary or secondary alkyl chain of from  
about 8 to 22 carbon atoms and n is an average of from about 5  
to 20;



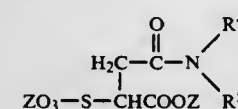
wherein R<sup>1</sup> is a primary or secondary alkyl chain of from  
4 to 12 carbon atoms and m is an average of from about 5  
to 20;

(B) from about 1 to 20% by weight of a mono-higher alkyl  
quaternary ammonium compound of formulae (III) or  
(IV):



wherein  
R<sup>2</sup> is a long chain aliphatic radical of from about 10 to 22  
carbon atoms,  
each of the R<sup>3</sup>'s in formula (III) and R<sup>3</sup> in formula (IV) are  
independently lower alkyl or hydroxy(lower alkyl),  
X is a water-soluble salt forming anion, and  
x and y are each positive numbers of at least 1 and the sum  
x+y is from 2 to 15;

(C) from about 1 to 20% by weight of a sulfosuccinamate  
detergent compound of the formula

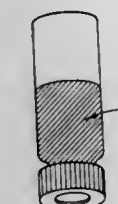


wherein Z is a monovalent salt-forming cation,  
R<sup>4</sup> is hydrogen, lower alkyl, carboxy(lower alkyl) or 1,2-  
dicarboxy(lower alkyl), and

R<sup>5</sup> is an open chain hydrocarbon of from 10 to 22 carbon  
atoms;  
(D) up to about 10% by weight of an anionic surfactant  
selected from the group consisting of linear higher alkyl  
aromatic sulfonates, poly-lower alkoxy higher alkanol  
sulfates, olefin sulfonates and paraffin sulfonates;  
(E) up to about 3% of an optical brightener;  
(F) up to about 15% of an ethoxylated amine;  
(G) up to about 5% of an alkaline substance;  
(H) up to about 3% of enzymes;  
(I) up to about 3% of soil release agent; and  
(J) aqueous solvent carrier;  
wherein the ratio of (B):(C) is in the range from about 3:1 to  
about 1:3.

4,790,857  
GASEOUS CONTAMINANT DOSIMETER WITH  
DIFFUSIVE MATERIAL FOR REGULATING MASS  
UPTAKE  
Robert R. Miksch, 548 E. Mallard Cir., Fresno, Calif. 93710  
Filed Nov. 20, 1986, Ser. No. 932,940  
Int. Cl.<sup>4</sup> B01D 53/22 9 Claims

U.S. Cl. 55—16



1. A gaseous contaminant dosimeter apparatus for measuring  
the concentration of gaseous contaminants in a gas mixture, the  
apparatus comprising:  
a container having an opening formed therein;  
a diffusing material borne by the container and disposed in  
fluid impeding relation in the opening to isolate the interior  
of the container from an outside gas mixture, said  
diffusing material including a pair of microporous membranes  
which are individually laminated on the opposite  
sides of a macroporous support member, the microporous  
membranes permitting the passage of the gaseous contaminants  
into the container substantially by Knudsen regime  
diffusion; and  
a collection medium disposed in the container and operable  
to combine with the gaseous contaminants entering  
therein thereby facilitating the measurement of the gaseous  
contaminant concentration.

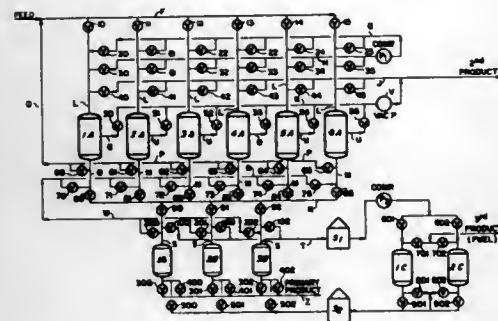
4,790,858  
FRACTIONATION OF MULTICOMPONENT GAS  
MIXTURES BY PRESSURE SWING ADSORPTION  
Shivaji Sircar, Wescosville, Pa., assignor to Air Products and  
Chemicals, Inc., Allentown, Pa.  
Filed Jan. 29, 1988, Ser. No. 149,808  
Int. Cl.<sup>4</sup> B01D 53/04 7 Claims

U.S. Cl. 55—26  
1. In the separation of a multicomponent feed gas mixture  
with the individual recovery of a primary key component and  
a secondary key component present in such mixture, by selective  
sorption, wherein said secondary key component is more  
strongly adsorbed than the primary key component and there  
is present in said mixture at least one minor dilute tertiary gas  
component less strongly sorbed than the secondary key component;  
the method which comprises, in an adiabatic adsorption  
pressure swing cycle the steps of:  
(a) passing such multicomponent gas mixture at initial super-  
atmospheric pressure and in selected flow direction



through a first sorbent column (A) packed with an adsorbent selected for preferential retention of said secondary key component and then passing the effluent from said first column through a second sorbent column (B) packed with an adsorbent selective for retention of said tertiary component(s) as opposed to said primary key component, and discharging from said second sorbent column unadsorbed primary key component, said passing of the multicomponent gas mixture being continued for a controlled time period until or short of breakthrough of said secondary key component from said first sorbent column, while retaining all of the said tertiary components in said second sorbent column;

- (b) thereafter discontinuing gas flow communication between said first and second sorbent columns, and
- (i) rinsing said first column by flowing a stream of relatively pure secondary key component therethrough at substantially the initial feed pressure level for a controlled time period effective to purge most of the void and displaced gases from the said first column, and during this time period (b),
- (ii) lowering the pressure in said second column to an intermediate level by withdrawing a gas stream therefrom including void and desorbed gases, and thereafter;
- (iii) further depressuring said second column to near ambient pressure followed by:
- (iv) purging the second column at near ambient pressure with a stream of primary key component;



- (c) after said rinsing step in (b) above reducing the pressure in said first column to an intermediate level by desorption of gas therefrom including previously sorbed secondary key component and during this step (c), repressuring the second column to an immediate pressure level by flow thereto of gas essentially free of the secondary key component;
- (d) following step (c) above further desorbing gas from said first column to lower the pressure therein to substantially ambient level, and thereafter;
- (e) evacuating said first column to subatmospheric level;
- (f) after attaining the subatmospheric level in the said first column, introducing thereto a gas stream substantially free of the secondary key component to bring said first column to an intermediate pressure level, and thereafter;
- (g) further repressurizing said first column to initial superatmospheric feed pressure level by flowing thereto primary key product gas via a second column already pressurized to the intermediate pressure level (step c), thereby bringing both columns of the feed pressure level and making them ready to repeat the defined sequence of steps beginning with the reintroduction of the multicomponent feed gas mixture into the said first sorbent column; the improvement which comprises:
- (h) passing to storage the gas withdrawn from a second column during the further depressuring of said second column to near ambient pressure;
- (j) also passing to storage the effluent obtained in the purging

of said second column with a stream of primary key component;

- (k) withdrawing the gas stored during steps (h) and (j) and passing said withdrawn gas through a third adsorption column packed with adsorbent selective for adsorption of the secondary key component as well as said minor tertiary gas component, while collecting unadsorbed gas discharged from said third column consisting essentially of primary key component;
- (l) discontinuing passing of stored gas into said third column and countercurrently desorbing said column to near ambient pressure;
- (m) at the attained near ambient pressure rinsing the third column countercurrently, using part of the unadsorbed gas collected during step (k); and
- (n) repressuring the rinsed third column with another portion of the unadsorbed gas collected during step k.

4,790,859

## METHOD OF SEPARATING GASEOUS MIXTURE

Chisato Marumo, Neyagawa, and Eiji Hayata, Osaka, both of Japan, assignors to Kanebo, Ltd., Tokyo, Japan

Filed Mar. 3, 1987, Ser. No. 21,119

Claims priority, application Japan, Oct. 18, 1986, 61-248146

Int. Cl.<sup>4</sup> B01D 53/04

U.S. Cl. 55—68

15 Claims



1. A method of separating at least a first gas from a gaseous mixture, which comprises contacting a gaseous mixture containing a first and a second gas having different chemical compositions in an amount of at least 50% by volume based on the entire mixture with a molecular sieving carbonaceous porous body, said porous body having (1) a carbon content of at least 85% by weight, (2) an apparent density of 0.1 to 0.8 g/cm<sup>3</sup>, (3) a porosity of 50 to 95%, (4) a maximum value of the pore diameter distribution at a pore diameter of not more than 10 Å and a pore volume at a pore diameter in the range of 15 to 200 Å of not more than 0.1 cm<sup>3</sup>/g and containing (5) open cells in a three-dimensional network structure so that the open cells of the porous body form substantial flow passages for the gaseous mixture, thereby to adsorb at least the second gas physically on the porous body, said open cells having an average diameter of 1 to 500 micrometers.

4,790,860

## DUAL MODE AIR PURIFIER AND METHOD

John M. Sexton, P.O. Box 343, Pleasant Garden, N.C. 27313

Filed Sep. 21, 1987, Ser. No. 98,978

Int. Cl.<sup>4</sup> B01D 53/04

U.S. Cl. 55—59

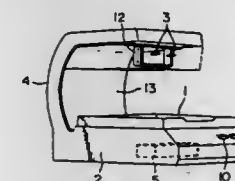
16 Claims

1. A method of operating a dual mode air purifier comprising the steps of: purifying compressed air by opening a first control valve to

- (a) direct compressed air in a first direction into a medium cartridge within a chemical medium purifier for contaminant removal,
- (b) passing the purified air out of the chemical medium purifier for consumption, and
- regenerating the chemical medium purifier by:
  - (a) closing the first control valve,

- (b) opening a second control valve to direct compressed air into a heating means,
  - (c) heating the air within said heating means to a high temperature by energizing the heating means,
  - (d) passing the heated air in a second direction opposite to said first direction into the medium cartridge of the chemical medium purifier,
  - (e) exhausting the heated air from the chemical medium purifier,
  - (f) deenergizing the heating means,
  - (g) passing ambient air through the deenergized heating means in the second direction to the chemical medium purifier;
  - (h) cooling the medium cartridge within the medium purifier by passing air around the outside of the medium cartridge, and
  - (i) exhausting the air from the chemical medium purifier.
5. A dual mode air purifier comprising: a chemical medium purifier, said medium purifier having:
- (a) a filter housing, and

trode; a large electrode electrically coupled to said auxiliary electrode, disposed below said small electrode, alongside said auxiliary electrode and above said ash reception plate; and a



means for applying a high voltage between said small electrode and said auxiliary electrode and between said small electrode and said large electrode.

4,790,862

## AIR CLEANING MACHINE

Noboru Nanno, Ibaraki; Syozo Tokumitsu, Kawanishi; Masao Fukunaga, Shiga, and Katsunori Zaizen, Mino, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

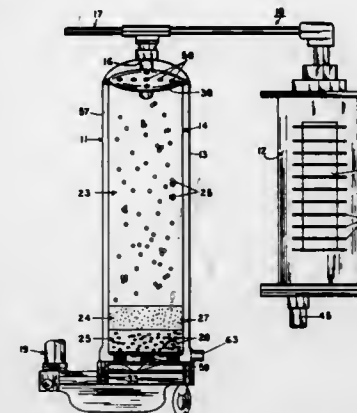
Filed Aug. 28, 1987, Ser. No. 90,665

Claims priority, application Japan, Aug. 29, 1986, 61-204074

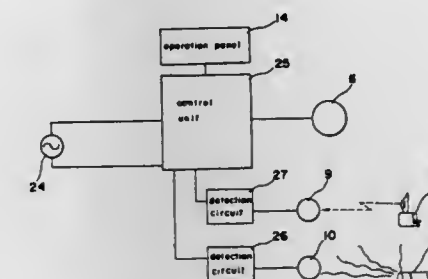
Int. Cl.<sup>4</sup> B01D 46/46

U.S. Cl. 55—210

9 Claims



- (b) a medium cartridge, said medium cartridge contained within and spaced inwardly from said filter housing to form a passageway between said filter housing and said medium cartridge, said medium cartridge for removing pollutants from air passing in a first direction therethrough, air heating means, said heating means having:
- (c) heating means housing, and
- (d) a heating element, said heating means housing containing said heating element, said filter housing communicating with said heating means housing whereby hot air can pass in a second direction from said heating means to said filter medium cartridge to remove contaminants therefrom and whereby ambient air can pass through said heating means housing and around said medium cartridge, a selector switch, a selector switch for controlling the purifier mode and direction of air flow, a cart housing, a cart frame, said cart housing attached to said cart frame, said filter housing and said heating means mounted within said cart housing for transportation purposes and said selector switch positioned on said cart housing for easy access thereto.



1. An air cleaning machine comprising:

- a filter portion;
- a fan means adjacent said filter portion for passing air through said filter portion;
- an ultraviolet ray sensor arranged to detect ultraviolet rays produced from flames and produce an output signal in response to such detection; and
- a control means to which said ultraviolet ray sensor is connected for receiving the output signal from said ultraviolet ray sensor and which is connected to said fan means for controlling the operation of said fan means in response to said output signal.

4,790,863

## AIR CLEANER

Koji Nobiraki, Yamatokooryama; Yoshiharu Metoku, Sakai; Hisato Urugami, Nara; Toshitaka Tamaki, Yamatokooryama; Keiji Yoshimura, and Kazuhiko Otsuka, both of Nara, all of Japan, assignors to Nitta Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 682,514, Dec. 17, 1984, abandoned. This application Apr. 23, 1986, Ser. No. 53,470

Claims priority, application Japan, Dec. 16, 1983, 58-237545;

Dec. 19, 1983, 58-240565; May 4, 1984, 59-065885; Jun. 14, 1984, 59-122323

Int. Cl.<sup>4</sup> B01D 46/00

U.S. Cl. 55—276

6 Claims

1. An air cleaner comprising a thin lightweight fan module

4,790,861

## ASHTRAY

Minoru Watai; Yasukazu Nishimuro, and Koichi Iwabuchi, all of Kanagawa, Japan, assignors to NEC Automation, Ltd., Kanagawa, Japan

Filed Jun. 11, 1987, Ser. No. 60,636

Claims priority, application Japan, Jun. 20, 1986, 61-142960; Mar. 4, 1987, 62-47819

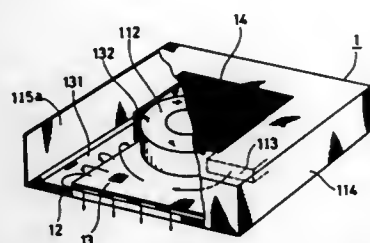
Int. Cl.<sup>4</sup> B03C 3/40

U.S. Cl. 55—137

3 Claims

1. An ashtray comprising an ash reception plate; a small electrode provided over said ash reception plate at a distance therefrom; an auxiliary electrode opposed to said small elec-

including a housing having an inlet and having at least one fan, and sound waves emanating from the engine for absorption at least one casing containing the at least one fan therein having thereof.  
an inlet and an outlet and a thin lightweight air filter frame



having a high efficiency particulate air filter; and an air flow moderator plate disposed between three walls of said housing and connected thereto to define a flow path between the fan and plate and the plate and air filter.

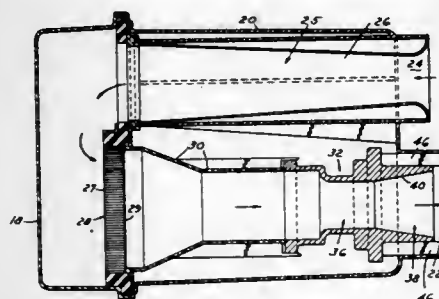
#### 4,790,864 COMPACT ENGINE AIR/CLEANER WITH INTEGRATED COMPONENTS

John D. Kostun, Brighton, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 16, 1987, Ser. No. 133,835  
Int. Cl. B01D 19/00

U.S. Cl. 55-276

5 Claims



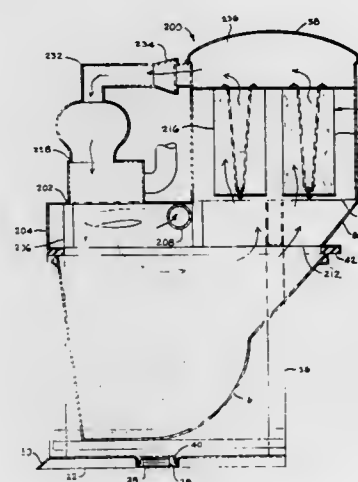
1. A compact engine air cleaner assembly comprising a number of air flow and noise attenuating elements totally contained within a single housing, the housing containing an essentially U-shaped air conduit consisting of first and second parallel air passages arranged in a side by side relationship having end portions adjacent one another, the first passage end portion containing an ambient air inlet extending through the housing for the flow of air into and through the first passage in one direction, the second passage end portion containing an outlet extending through the housing adjacent the first passage inlet for the flow of air through and out of the second passage and housing into an engine air inlet in a direction opposite to the direction of flow through the first passage, the U-shaped conduit further including an arcuate connecting base portion constituting an end chamber connecting the passages together for reversing the direction of air flow from the first to the second passage, an air filter located in the chamber and extending across at least one of the passages essentially at right angles thereto for filtering all of the air passing through the conduit, the second passage containing a convergent-divergent venturi coaxially mounted with respect to the second passage downstream of the filter for metering air flow therethrough and attenuating engine noise, an engine noise resonating chamber within the housing coaxial with and surrounding the second passage, and an inlet to the resonating chamber coaxial with and surrounding the second passage outlet and spaced radially therefrom for the passage into the resonating chamber of noises

#### 4,790,865 TWO COMPARTMENT INDUSTRIAL DUST COLLECTOR

Thomas DeMarco, 5815 N. Cicero Ave., Chicago, Ill. 60646  
Continuation-in-part of Ser. No. 868,695, May 30, 1986, Pat. No. 4,718,924. This application Nov. 5, 1987, Ser. No. 116,875  
Int. Cl. B01D 46/02

U.S. Cl. 55-337

11 Claims



1. A two compartment industrial dust collector, comprising: a hopper comprising a bin; only two compartments positioned above said hopper including a first compartment comprising a solids-gas separation compartment with a lower cyclone chamber containing solids-gas separator means for removing larger particulates of dust from a dusty fluid stream; said solids-gas separator comprising a cyclone positioned and arranged in said lower cyclone chamber for downward flow of said dusty fluid stream through said first solids-gas separation compartment; inlet means connected to said solids-gas separating compartment for feeding said dusty fluid stream to said solids-gas separating compartment; suction means for drawing said dusty fluid stream through said inlet conduit into said filtering compartment; a second compartment comprising a filtering compartment positioned generally along side and spaced laterally away from said solids-gas separation compartment and in an offset relationship thereto, rather than in vertical alignment or above said solids-gas separation compartment, said filtering compartment having a filtering chamber containing at least one filter for filtering said dusty fluid stream, said filtering compartment having an open bottom portion defining an inlet opening for directing said dusty fluid stream upwardly through said filter; and said hopper communicating with and connected to said first solids-gas separation compartment and said second filtering compartment for laterally passing said dusty fluid stream from said first solids-gas separation compartment to said second filtering compartment.

4,790,866

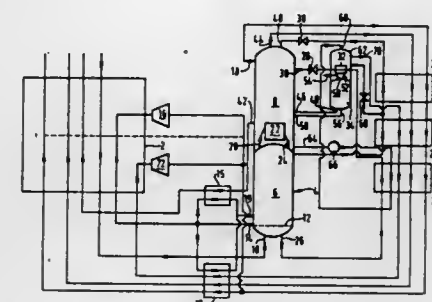
#### AIR SEPARATION

Thomas Rathbone, Walthamstow, England, assignor to The BOC Group plc, Windlesham, England

Filed Nov. 20, 1987, Ser. No. 123,492  
Int. Cl. F25J 3/04

U.S. Cl. 62-22

8 Claims



1. A method of separating air in a double distillation column comprising lower and higher pressure distillation columns, including the steps of withdrawing an argon-enriched fluid stream from the lower pressure column and separating an argon product from said fluid stream in a further distillation column provided with liquid argon reflux from a condenser, wherein liquid nitrogen is withdrawn from the higher pressure column and is reboiled in said condenser thereby providing a portion of the refrigeration therefor, the remainder of said refrigeration being provided by a stream of liquid withdrawn from the bottom of the higher pressure column, said stream of liquid being introduced into the lower pressure column downstream of its passage through the condenser, a gaseous stream is formed by mixing in a vapor-liquid contact column said reboiled nitrogen with oxygen taken from the lower pressure column, there being in said vapor-liquid contact column a downward flow of liquid that becomes progressively richer in nitrogen in the direction of its flow and an upward flow of vapor that becomes progressively richer in oxygen in the direction of its flow, said gaseous stream being withdrawn from an intermediate level in said column, at least part of the gaseous stream formed in said vapor-liquid contact column is withdrawn and warmed, said part of the gaseous stream being taken as product or expanded in a turbine to provide refrigeration.

4,790,867

#### COOLING SYSTEM FOR GLASS MOLDING EQUIPMENT

Zung-Sing Chang, and Jackson P. Trentelman, both of Painted Post, N.Y., assignors to Corning Glass Works, Corning, N.Y.

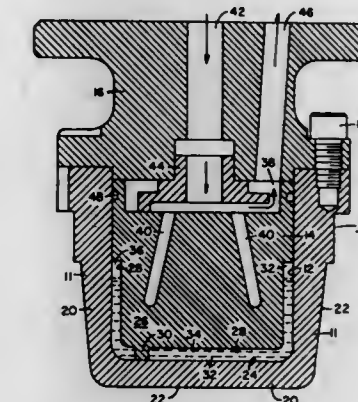
Filed Feb. 18, 1987, Ser. No. 15,993  
Int. Cl. C03B 9/38, 11/12

U.S. Cl. 65-356

7 Claims

1. A glass molding assembly for molding glass articles having an improved cooling system for accommodating various heat removal rates necessitated by differing production speeds which comprises:  
a molding body member having a solid portion with a glass-contacting surface on one side and an inner surface on the opposite side forming a hollow interior cavity;  
a cooling insert member removably positioned within said hollow interior cavity of said body member, said cooling insert having an outer surface portion and a hollow portion;  
means for supplying cooling fluid to and distributing such fluid within said hollow portion of said cooling insert while prohibiting such cooling fluid from contacting said molding body member;  
a low melting metal material, which is molten at glass form-

ing temperatures, provided in said hollow interior cavity between, and in intimate contact with, the inner surface of said body member and the outer surface portion of said cooling insert member to provide good thermal conductivity therebetween; and  
means for substituting different cooling inserts within said molding body member to facilitate different rates of cooling required by varying production speeds; and said cooling insert member having a predetermined thermal con-



ductivity and thickness predicated upon the proposed production speed of said molding body member, and said means for supplying cooling fluid also including means for directly cooling said cooling insert member by direct contact with said cooling fluid while preventing direct contact of said cooling fluid with said molding body member, and for cooling said body member by extracting heat therefrom through the molten metal material to the cooled insert member.

4,790,868

#### HERBICIDALLY ACTIVE SUBSTITUTED PHENOXY OR PHENYLTHIO BENZOXAZOLONE (OR BENZTHIAZOLONE) COMPOUNDS

Donald R. Nielsen, Wadsworth, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

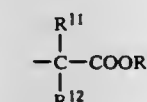
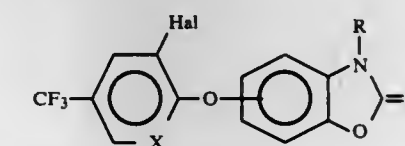
Continuation-in-part of Ser. No. 840,251, Mar. 17, 1986, abandoned. This application Jan. 7, 1987, Ser. No. 4,746

Int. Cl. A01N 43/76, 43/40; C07D 263/58

U.S. Cl. 71-88

3 Claims

1. A compound of the formula:



wherein R<sup>11</sup> and R<sup>12</sup> are independently hydrogen or C<sub>1</sub> to C<sub>4</sub> alkyl and R<sup>10</sup> is C<sub>1</sub> to C<sub>4</sub> alkyl.

3. In a method of controlling weeds growth wherein a herbicidally effective amount of herbicide is applied to the situs of



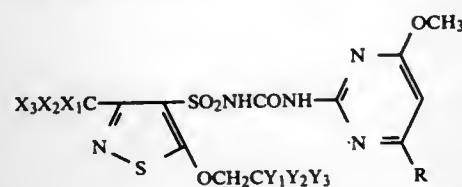
the weeds, the improvement residing in using as the herbicide a compound or mixture of compounds defined by claim 1.

**4,790,869**  
SULFONAMIDE COMPOUNDS AND SALTS THEREOF, HERBICIDAL COMPOSITIONS CONTAINING THEM  
Fumio Kimura; Takahiro Haga; Kazuyuki Maeda; Hiroshi Shimoharada; Tsunezo Yoshida; and Masahiko Ikeguchi, all of Kusatsu, Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

Filed Feb. 2, 1987, Ser. No. 9,924  
Claims priority, application Japan, Feb. 7, 1986, 61-25246; May 22, 1986, 61-118235; Sep. 12, 1986, 61-215543

Int. Cl.<sup>4</sup> A01N 43/54; C07D 239/47, 417/12  
U.S. Cl. 71-90 12 Claims

1. A sulfonamide compound and a salt thereof, the sulfonamide compound being represented by the following formula:



wherein each of X<sub>1</sub>, X<sub>2</sub>, and X<sub>3</sub> independently represents a hydrogen atom or a halogen atom, each of Y<sub>1</sub>, Y<sub>2</sub>, and Y<sub>3</sub> independently represents a halogen atom, and R represents a methyl group or a methoxy group.

10. A herbicidal composition essentially consisting of a herbicidally effective amount of the sulfonamide compound and the salt thereof defined in claim 1 and an agricultural adjuvant.

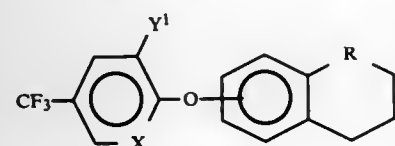
**4,790,870**  
HERBICIDALLY ACTIVE ARYLOXY OPTIONALLY OXO-SUBSTITUTED INDANE OR TETRALIN DERIVATIVES

David A. Hunt, Copley, and James A. Schwindeman, Akron, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 1, 1987, Ser. No. 44,675  
Int. Cl.<sup>4</sup> A01N 43/40

U.S. Cl. 71-94 3 Claims

1. A compound of the formula:



wherein:

X is N or CY<sup>4</sup> wherein Y<sup>4</sup> is hydrogen or halogen;  
Y<sup>1</sup> is hydrogen or halogen and R is CO, CHOH or CNOH.

2. A herbicidal composition containing an agronomically acceptable carrier and a herbicidally effective amount of a compound or mixture of compounds defined by claim 1.

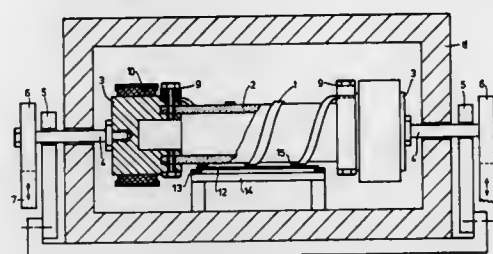
**4,790,871**  
STRIP-SHAPED FILMS OF METALS, A PROCESS AND AN APPARATUS FOR THE PRODUCTION THEREOF AND THE USE THEREOF

Ingo Schwirtlich, and Peter Woditsch, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 14, 1984, Ser. No. 589,612

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1983, 3311891

Int. Cl.<sup>4</sup> C22B 9/16 5 Claims



1. In the recrystallization and purification of a strip-shaped film of a metal or metalloid wherein one or more locally restricted melting zones are produced and are moved through the film in paths, the improvement which comprises advancing the film relative to a helical coil having an axis at a right angle in a plane parallel to the direction of advance, and passing sufficient energy through the coil to melt the film in zones moving transverse to the direction of advance of the strip-shaped film.

**4,790,872**  
ADDITIVE FOR PROMOTING SLAG FORMATION IN STEEL REFINING LADLE

Bradford C. Bowman, Ancaster, Canada, assignor to Hamilton Specialty Bar Division of Slater Industries, Inc., Hamilton, Canada

Filed Jan. 19, 1988, Ser. No. 145,549  
Int. Cl.<sup>4</sup> C22B 4/00; C21C 5/52

U.S. Cl. 75-10.58 13 Claims

1. A process of ladle refining of steel, comprising disposing in a ladle a quantity of molten steel to be refined, adding a material forming a molten protective slag covering on the steel in the ladle, heating at least a region of the slag with electric current passed to carbon electrodes immersed in the slag, gently stirring the steel to allow it to be heated by heat transfer from said heated region without substantially disturbing the continuity of the protective slag covering, and to substantially homogenize the steel, and subsequently discharging the heated and homogenized steel from the ladle, wherein the improvement comprises said material forming a molten protective slag consisting essentially of iron blast furnace slag, or of a mixture of solid particulate burnt lime or burnt dolomitic lime, or both, with iron blast furnace slag in an amount effective to serve as a flux promoting the melting of said lime and dolomitic lime, and wherein said iron blast furnace slag consists essentially of the following in percentages by weight based on the total weight of the slag:

CaO: about 30 to about 45%

SiO<sub>2</sub>: about 35 to about 45%

MgO: about 5 to about 15%

Al<sub>2</sub>O<sub>3</sub>: about 5 to about 15%

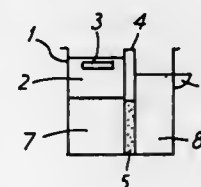
together with about 0 to 2% each of P, Na, K and Mn, about 1 to about 2% S, and about 1 to about 4% Fe.

**4,790,873**  
REMOVING INCLUSIONS FROM MOLTEN METAL  
Adam J. Gesing, Kingston; Martin R. Reeve, Beaconsfield, and Ghyslain Dube, Jonquiere, all of Canada, assignors to Alcan International Limited, Montreal, Canada

Filed Dec. 12, 1986, Ser. No. 941,515

Claims priority, application United Kingdom, Aug. 16, 1983, 8322020; Aug. 16, 1983, 8322021

Int. Cl.<sup>4</sup> C22B 9/02 13 Claims



1. A method of removing inclusions from molten metal which method comprises

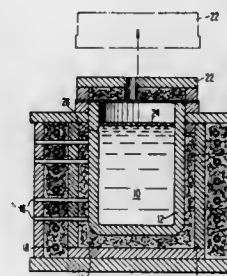
(a) providing a stream of molten metal containing inclusions including metal-wettable inclusions, and passing the stream through and in intimate contact with a medium which retains metal-non-wettable inclusions, characterized by also  
(b) passing the stream of molten metal through a filter of metal-wettable material which retains metal-wettable inclusions, steps (a) and (b) being performed in sequence in either order.

**4,790,874**  
METHOD FOR FORMING METALS WITH REDUCED IMPURITY CONCENTRATIONS

Nick G. Lirones, Muskegon, Mich., assignor to Howmet Turbine Components Corporation, Greenwich, Conn.

Filed Jan. 16, 1987, Ser. No. 3,749

Int. Cl.<sup>4</sup> C22B 9/00 5 Claims



1. A method of purifying molten metal comprising the steps of:

(a) providing an inert atmosphere;  
(b) melting said metal in said atmosphere to form molten metal;  
(c) placing said molten metal in a container;  
(d) maintaining the molten metal in a quiescent state to allow buoyant impurities therein to float to the top of the molten metal;  
(e) cooling the top of said molten metal to solidify the top portion of said molten metal to form a solid layer for entrapping said impurities in said solid layer;  
(f) melting the portion of said solid layer adjacent said container; and  
(g) pouring said molten metal from beneath said solid layer.

**4,790,875**  
ABRASION RESISTANT SINTERED ALLOY  
Shigeru Urano, Omiya, and Osamu Hirakawa, Yono, both of Japan, assignors to Nippon Piston Ring Co., Ltd., Tokyo, Japan

PCT No. PCT/JP84/00121, § 371 Date Apr. 1, 1985, § 102(e) Date Apr. 1, 1985, PCT Pub. No. WO85/00836, PCT Pub. Date Feb. 28, 1985

Continuation of Ser. No. 722,223, Apr. 1, 1985, abandoned. This PCT application Mar. 23, 1984, Ser. No. 158,106

Claims priority, application Japan, Aug. 3, 1983, 58-140964 Int. Cl.<sup>4</sup> C22C 29/06 17 Claims

U.S. Cl. 75-241



1. An abrasion-resistant sintered alloy containing, by weight, 1.5 to 4.0% of carbon, 0.5 to 1.2% of silicon, 1.0% or less of manganese, 2.0 to less than 20.0% of chromium, 0.5 to 2.5% of molybdenum, 0.2 to 0.8% of phosphorus, 0.5 to 2.5% of nickel, and the balance being iron, said alloy being sintered in a liquid-phase, and said alloy containing carbides granularly distributed in a base structure that comprises a matrix of martensite and bainite.

**4,790,876**  
CHEMICAL COPPER-PLATING BATH

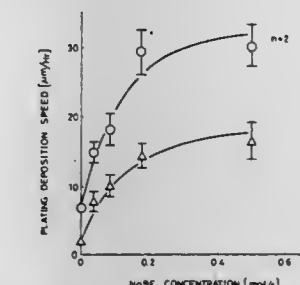
Koji Kondo, Chiryu; Katuhiko Murakawa, Obu; Nobumasa Ishida, Chiryu; Junji Ishikawa, Nagoya; Kaoru Nomoto, Okazaki, and Futoshi Ishikawa, Nagoya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jul. 1, 1987, Ser. No. 68,366

Claims priority, application Japan, Jul. 1, 1986, 61-152620; Jun. 23, 1987, 62-154309

Int. Cl.<sup>4</sup> B22F 7/00; B05D 5/12 17 Claims

U.S. Cl. 106-1.23



1. A chemical copper-plating bath, including a copper salt, a complexing agent, a reducing agent, a pH-adjusting agent, and an additive of borofluoride for accelerating the plating deposition speed.

4,790,877

**SILICONE EMULSION POLISHES AND THEIR FORMULATION**

Jeffery L. Vadaaz, Dunedin, Fla., assignor to Rojet Distributors, Inc., St. Petersburg, Fla.

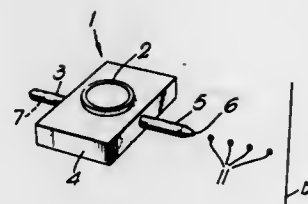
Filed Aug. 11, 1987, Ser. No. 83,972

Int. Cl.<sup>4</sup> C09D 3/02; B32B 9/06

U.S. Cl. 106—3

34 Claims

1. Wax-free buffing-free vehicle polish composition, comprising an aqueous mixture including at least one silicone polymer to the extent of several to about a half dozen percent, and citrus juice to the extent of at least several percent, and water-miscible lower alkanol to the extent of ten to twenty percent.



4,790,878

**CORROSION INHIBITING AQUEOUS COMPOSITIONS COMPRISING METAL-CHELATING DIPHENOLAMINE COMPOUNDS**

Walter O. Siegl, Dearborn, and Mohinder S. Chattha, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

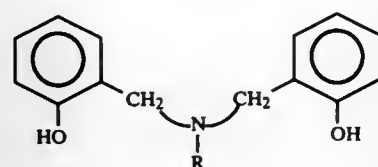
Filed Jan. 20, 1987, Ser. No. 5,183

Int. Cl.<sup>4</sup> C11D 7/00, 7/08; C23G 1/06; C04B 9/02

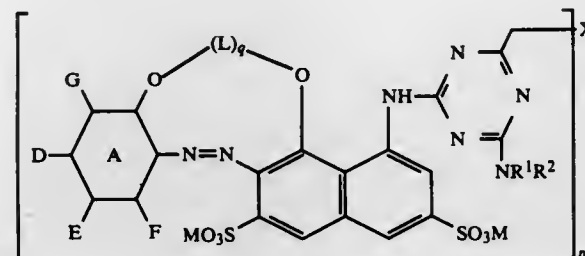
U.S. Cl. 106—14.15

10 Claims

1. An aqueous composition useful to deposit a corrosion inhibiting coating on a corrodible metal substrate, said composition (1) having a pH of between about 2 and about 5 and (2) consisting essentially of at least about 0.01 weight percent of a water-soluble or water-dispersible diphenolamine metal-chelating compounds selected from compounds having the general chemical formula:



wherein R is alkyl, aryl or hydroxy alkyl.



wherein

R<sup>1</sup> is  $-(C_6H_4O)_m(C_6H_4)_nH$ ,

R<sup>2</sup> is H or  $-(C_6H_4O)_m(C_6H_4)_nH$ , or

R<sup>1</sup> and R<sup>2</sup> together with the nitrogen atom form a morpholine ring

a and b are different and from 1 to 8

m is from 1 to 10;

n is from 0 to 9;

q is  $\frac{1}{2}$  or 1

p is 1 or 2

L is a transition metal capable of complexing with a dye

M is H, ammonium, or a monovalent metal;

D is a substituted azo group;

E is nitro, C<sub>1-4</sub>-alkyl, C<sub>1-4</sub>-alkoxy, halogen, or sulphonate;

G and F are H;

X is NR<sup>1</sup>R<sup>2</sup>, NR<sup>3</sup>R<sup>4</sup>,  $-NR^3-Z-NR^4-$ , OR<sup>3</sup>, or the residue of a mono- or dis-azo chromophore comprising benzene, naphthalene or hetero-mono- or bi-cyclic diazo and coupling components, linked to the triazine nucleus through a primary or secondary amino linking group in which R<sup>3</sup> and R<sup>4</sup> are each independently H, alkyl or aryl; and

Z is a divalent linking group.

4,790,880

**INK-JET PRINTING COMPOSITIONS CONTAINING MACROCYCLIC POLYETHERS**

Robert J. Miller, Burlingame, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 842,284, Mar. 21, 1986, abandoned. This application Jul. 9, 1987, Ser. No. 71,696

Int. Cl.<sup>4</sup> C09D 11/02

U.S. Cl. 106—22

32 Claims

1. Ink composition for ink-jet printers including (a) a vehicle comprising at least one member selected from the group consisting of water and a water-soluble, non-aqueous component, and (b) an anionic dye having cations associated herewith, characterized in that said ink composition further includes a macrocyclic polyether associated with said cations, the macrocyclic polyether having binding sites and a cavity size suitable for complexing said cations.

4,790,879

**WATER-SOLUBLE TRIAZANE DYESTUFFS FREE FROM CELLULOSE REACTIVE GROUPS AND SUITABLE FOR USE IN INKS**

Anthony G. W. Baxter, Manchester; Stephen B. Bostock, Bury, and David Greenwood, Oldham, all of England, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 765,001, Aug. 12, 1985. This application Dec. 22, 1986, Ser. No. 944,567

Claims priority, application United Kingdom, Aug. 24, 1984, 8421557

Int. Cl.<sup>4</sup> C09D 11/02

U.S. Cl. 106—22

14 Claims

1. An ink comprising a water-soluble dye, free from cellulose reactive groups, of the formula:

4,790,881

**MOLDED HYDROPHILIC POLYMER**

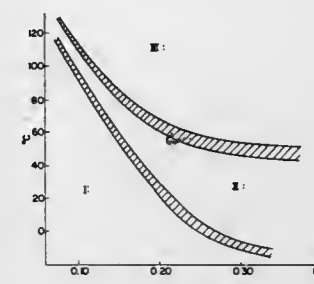
Fritz Wittwer, Lupatngen, and Ivan Tomka, Lenzburg, both of Switzerland, assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 362,177, Mar. 26, 1982, abandoned, which is a continuation-in-part of Ser. No. 698,264, Feb. 5, 1985, Pat. No. 4,655,840. This application Apr. 17, 1987, Ser. No. 18,651

Int. Cl.<sup>4</sup> C08L 1/08

U.S. Cl. 106—189

7 Claims



1. A non gelatin based hydrophilic polymer-water composition having no phase separation of water from the hydrophilic polymer-water mixture at a water content of between about 5 and 25% by weight of the hydrophilic polymer, said hydrophilic polymer selected from a class consisting of hydroxymethylcellulose, gum arabic, methylcellulose, polyvinylpyrrolidone, cellulose acetate phthalate, water soluble ethers and esters derived therefrom, and mixtures thereof, said mixture being obtained by:

- mixing the polymer with water in a predetermined amount between about 5 and 25% by weight of the hydrophilic polymer;
- heating the hydrophilic polymer with said water while maintaining said predetermined water content to form a melt; and
- further heating the hydrophilic polymer in water mixture above its glass transition temperature and above its melting point to dissolve the melt in the water and achieve a melt as a molecularly dispersed solution.

4,790,882

**FLUSHING AND RECHARGING METHOD FOR THE COOLING SYSTEM OF AN AUTOMOTIVE ENGINE**

Michael J. Barres, Jericho, N.Y., assignor to Autospa Corporation, Woodside, N.Y.

Continuation of Ser. No. 711,859, Mar. 14, 1985, abandoned.

This application Mar. 4, 1987, Ser. No. 21,643

Int. Cl.<sup>4</sup> B08B 9/00

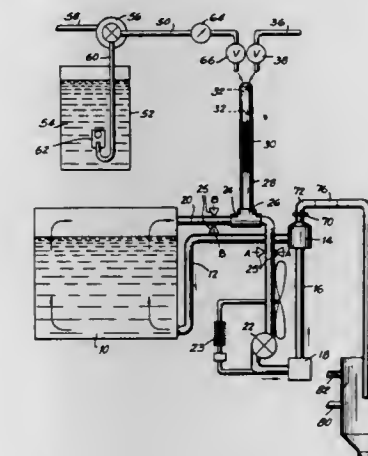
U.S. Cl. 134—22.18

3 Claims

1. A method of scavenging a normally closed cooling system of an automotive engine with a flow of flushing water under pressure separate from said cooling system, said cooling system containing a coolant fluid, and including a radiator including upper and lower headers, flexible conduits connecting said upper and lower headers to a cylinder block of said engine, a water pump interposed in a said conduit interconnecting said lower header and said cylinder block, and a heater core connected in parallel with said water pump, including the sequential steps of:

- opening a discharge opening of said upper header and introducing said flushing water into said conduit interconnecting said lower header and said cylinder block, and at a position intermediate said cylinder block and said water pump, and, operating said engine and said associated water pump of said engine;
- discharging admixed flushing water and coolant fluid of said cooling system, together with entrained particulate matter scavenged from said cooling system, through said opening

of said upper header of said radiator of said cooling system; subsequently discontinuing operation of said automotive engine, and thus discontinuing operation of said associated water pump; applying clamping means to said conduit associated with said lower header and at a position intermediate said water pump and said position of introduction of said flushing water into said conduit, to restrict the flow of flushing water under pressure to a back-washing reverse flow thereof through said cylinder block of said engine and through said upper header, in order to scavenge remaining particulate matter from within said cylinder block, and



- discharging said flushing water and entrained particulate matter through discharge opening of said upper header of said radiator;
- removing said clamping means and reapplying said clamping means to said conduit associated with said lower header and at a position intermediate said cylinder block and said position of introduction of said flushing water to restrict said flow of flushing water under pressure to a flow through said heater core of said engine and said radiator in a series flow relationship, and employing said water pump of said engine as an impedance to back flow through said water pump, and, discharging said flushing water and said entrained particulate matter through said discharge opening of upper header of said radiator.

4,790,883

**LOW LIGHT LEVEL SOLAR CELL**

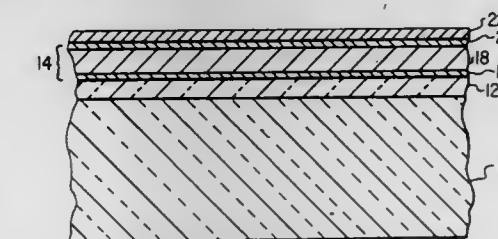
Porponth Sichanugrist, 1890 W. Hillcrest #428, Newbury Park, Calif. 91320, and Karl E. Knapp, 7745 Chimneaux Ave., Redwood, Calif. 91335

Filed Dec. 18, 1987, Ser. No. 134,737

Int. Cl.<sup>4</sup> H01L 31/06, 31/18

U.S. Cl. 136—258

7 Claims



1. In a photovoltaic cell of the type having a first current



collecting film, an amorphous silicon film having a p-i-n structure and having the p-region in contact with the first current collecting film, and a second current collecting film in contact with the n-region of said amorphous silicon film, the improvement comprising use of a doped microcrystalline silicon film having a thickness greater than 500 angstroms in place of at least one of said p-region and said first current collecting film or said n-region and said second current collecting film.

4,790,884

# ALUMINUM-LITHIUM FLAT ROLLED PRODUCT AND METHOD OF MAKING

Keston P. Young, Plum Boro; Edward L. Colvin, Monroeville, both of Pa.; Joel A. Bowers, and Robert W. Westerlund, both of Bettendorf, Iowa, assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Mar. 2, 1987, Ser. No. 20,600  
Int. Cl.<sup>4</sup> C22F 1/04

U.S. Cl. 148—2

20 Claims

1. A method of making aluminum base alloy flat rolled product substantially free of Luder's lines after stretching, the method comprising the steps of:

- providing a body of a lithium-containing aluminum base alloy;
- working said body to produce a flat rolled product;
- solution heat treating and quenching said flat rolled product;
- preaging said flat rolled product for a time and temperature which does not substantially affect final mechanical properties but which permits stretching said flat rolled product without formation of Luder's lines;
- stretching said preage flat rolled product; and
- aging said product to a condition having a substantially stable level of mechanical properties.

4,790,885

# METHOD OF PRODUCING HIGH TENSILE-HIGH TOUGHNESS STEEL

Masana Imagumai; Rikio Chijiwa, and Naomi Yamada, all of Kimitsu, Japan, assignors to Nippon Steel Corporation, Japan

Filed Jul. 9, 1985, Ser. No. 753,079

Claims priority, application Japan, Jul. 10, 1984, 59-142898  
Int. Cl.<sup>4</sup> C21D 8/02

U.S. Cl. 148—2

4 Claims

1. A method for manufacturing high tensile-high toughness steel plate comprising the steps of:

preparing a molten steel alloy consisting, by weight, of

- 0.03 to 0.20% C,
- 0.01 to 0.70% Si,
- 0.50 to 1.80% Mn,
- one or two selected from the group consisting of 0.005 to 0.05% Ti and 0.005 to 0.05% Zr,
- 0.005 to 0.10% Nb,
- not greater than 0.025% P,
- not greater than 0.015% S,
- not greater than 0.080% Al,
- not greater than 0.0030% N, and
- the balance Fe and impurities incidentally mixed in the normal steel manufacturing process and having a value not smaller than 0.60 of  $D_f$  defined by formula:

$$D_f = 1.11 \cdot \sqrt{(\text{weight \% of C}) \cdot [1 + 0.7 \cdot (\text{weight \% of Si})] \cdot$$

$$[5.1 \cdot (\text{weight \% of Mn}) - 1.12]}$$

preparing a steel slab or ingot by casting the said molten steel alloy, rolling said slab or ingot with an accumulative rolling reduction of at least 30% in a temperature range between  $(Ar_3 + 150^\circ \text{C.})$  and  $Ar_3$  during a cooling after casting, or in another cooling after reheating a cold steel slab or ingot in a temperature range between  $1000^\circ \text{C.}$  and  $1300^\circ \text{C.}$ , quench-

ing the rolled steel alloy from a temperature not less than  $(Ar_3 - 30^\circ \text{C.})$  within a period of time in which neither recovering nor recrystallization substantially occur, and tempering at a temperature of not higher than  $Ac_1$ .

4,790,886

# METHOD AND APPARATUS FOR REMOTE UNDER WATER TORCH CUTTING

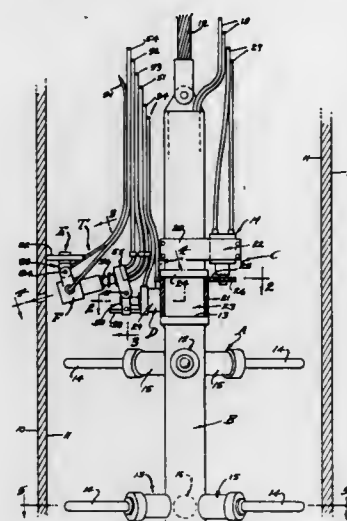
Ronald A. Daspl, 1301 E. Genie St., Chalmette, La. 70043

Filed Nov. 24, 1987, Ser. No. 124,584

Int. Cl.<sup>4</sup> B23K 7/04, 7/06

U.S. Cl. 148—9 C

47 Claims



1. A method for cutting through metal walls and the like, and including:

- a first step of preheating a cutting zone on the wall with a preheat flame comprised of metal dust in a carrier of oxidizing gas and at a calorific output to attain preheat temperature in said cutting zone,
- and a second step of adding a calorific increasing cutting agent into the preheat flame to increase the calorific output of the preheat flame by burning the metal dust thereof at increased temperature together with the metal wall of the cutting zone and burning therethrough.

4,790,887

# ADDITIVE FOR USE IN UNDERWATER ARC-WELDING

Ensi K. J. Niinivaara, Korja, Finland, assignor to GSS General Sea Safety Ltd., Helsinki, Finland

PCT No. PCT/FI86/00086, § 371 Date May 15, 1987, § 102(e) Date May 15, 1987, PCT Pub. No. WO87/00471, PCT Pub. Date Jan. 29, 1987

PCT Filed Jul. 23, 1986, Ser. No. 44,849  
Claims priority, application Finland, Jul. 24, 1985, 852877  
Int. Cl.<sup>4</sup> B23K 35/34

U.S. Cl. 148—23

11 Claims



1. A paste-like additive for use in arc welding including at least 10 percent by weight of a base material comprising a biomass, said biomass consisting essentially of, in weight percent on an ashless dry basis, 1 to 40 percent amino acids; 0.5 to

10 percent fatty acids; 50 to 98 percent carbohydrates; and up to about 0.5 percent other substances.

4,790,888

# STOP-OFF COMPOSITION

Charles M. Bessey, Plymouth, Mich., assignor to Kolene Corporation, Mich.

Division of Ser. No. 924,294, Oct. 22, 1986, Pat. No. 4,746,376.  
This application Feb. 22, 1988, Ser. No. 158,688

Int. Cl.<sup>4</sup> B23K 35/24

U.S. Cl. 148—28

7 Claims

1. A composition for preventing the diffusion of carbon or nitrogen into the surface of a metal at elevated temperatures comprising, an aqueous mixture of a refractory material selected from the group of zircon and aluminosilicate, sodium silicofluoride, and a sodium silicate binder.

4,790,889

# HOT-ROLLED STRIP HAVING A DUAL-PHASE STRUCTURE

Olaf Maid, Dinslaken; Lutz Meyer, Voerde; Antonio Massip, Duisburg, and Wolfgang Muschenborn, Dinslaken, all of Fed. Rep. of Germany, assignors to Thyssen Stahl AG, Duisburg, Fed. Rep. of Germany

Division of Ser. No. 793,075, Oct. 31, 1985, abandoned. This application May 19, 1987, Ser. No. 51,892

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1984, 3440752

Int. Cl.<sup>4</sup> C22C 38/10

U.S. Cl. 148—333

10 Claims

1. A hot-rolled strip having a dual-phase structure and having a ratio of yield point to tensile strength of less than 0.70, derived from a slab previously produced by ingot casting or continuous casting and containing carbon, manganese, silicon and chromium as constituents in addition to iron, by heating the slab up to the rolling temperature, produced by hot-rolling and finish rolling at a temperature  $> Ar_3$ , by rapid cooling from the rolling temperature and by coiling at a relatively low temperature, wherein the hot-rolled strip

- is produced from a steel which, in addition to 0.05 to 0.16% of C, 0.5 to 1.0% of Si, 0.3 to 1.5% of Cr,  $\leq 0.025\%$  of P,  $\leq 0.015\%$  of S, 0.02 to 0.10% of Al and  $\leq 0.011\%$  of N, contains 0.2 to 0.4% of Mn, the remainder being iron and usual impurities;
- is rapidly cooled, immediately after finish-rolling from the final rolling temperature down to the coiling temperature at a mean rate in the range from  $30^\circ \text{C./second}$  and without interruptions and
- is then coiled at a temperature in the range from  $330^\circ$  to  $190^\circ \text{C.}$

4,790,890

# PACKAGED EMULSION EXPLOSIVES AND METHODS OF MANUFACTURE THEREOF

Kenneth A. Miller, West Jordan, Utah, assignor to IRECO Incorporated, Salt Lake City, Utah

Filed Dec. 3, 1987, Ser. No. 128,097

Int. Cl.<sup>4</sup> C06B 45/00

U.S. Cl. 199—2

18 Claims

1. A method of manufacturing emulsion explosives comprising (a) forming an oil-continuous emulsion at an elevated temperature, (b) incorporating a density reducing agent into the emulsion to sensitize it, (c) packaging the sensitized emulsion into a flexible tubing of desired diameter, (d) cooling the loaded tubing to a desired temperature, and (e) overwrapping the loaded tubing with an additional packaging material.

4,790,891

# PROCESS FOR THE PRODUCTION OF A CARTRIDGED EXPLOSIVE WITH ENTRAPPED BUBBLES

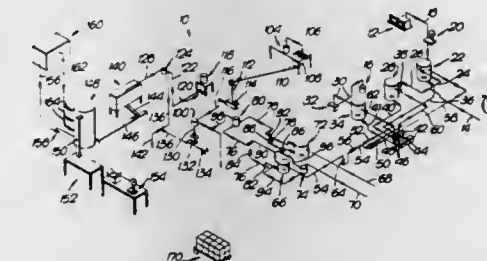
Pieter S. J. Halliday, Randburg, and Allan J. Harris, Knoppslaagte, both of South Africa, assignors to AECI Limited, Johannesburg, South Africa

Filed Jul. 7, 1987, Ser. No. 70,724

Claims priority, application South Africa, Nov. 4, 1986, 8410  
Int. Cl.<sup>4</sup> C06B 45/00

U.S. Cl. 149—2

6 Claims



1. In the production of a cartridge explosive in the form of an emulsion which comprises a discontinuous phase which forms an oxidizing salt-containing component and a continuous phase which is immiscible with the discontinuous phase and which form a fuel component, by forming a base emulsion comprising said oxidizing salt-containing component and said fuel component, introducing gas bubbles into said base emulsion and dispersing them therein while the base emulsion is at an elevated temperature and is essentially liquid to form an explosive, cartridgeing the explosive, and the cooling the cartridge explosive by means of a refrigerated fluid so that the continuous phase solidifies, thereby to entrap the bubbles and stabilize their positions in the explosive, a process which comprises the step, after the introduction of bubbles into the base emulsion, of subjecting the explosive to an elevated pressure before it is cartridgeed.

4,790,892

# METHOD OF PRODUCING A PNEUMATIC VEHICLE TIRE

Heinz-Dieter Rach, Garbsen; Udo Frerichs, Langenhagen; Hans-Ulrich Klose, Wiedensahl, and Carsten Boltze, Wernigsen, all of Fed. Rep. of Germany, assignors to Continental Aktiengesellschaft, Hanover, Fed. Rep. of Germany

Filed Mar. 5, 1986, Ser. No. 836,398

Claims priority, application Fed. Rep. of Germany, Mar. 5, 1985, 3507705

Int. Cl.<sup>4</sup> B29D 30/08

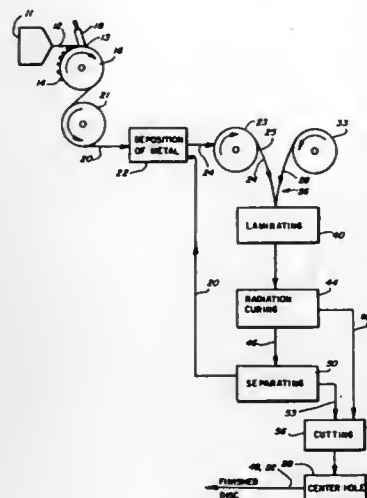
U.S. Cl. 156—130.7

6 Claims

1. A method of producing a pneumatic vehicle tire having heads including bead regions and bead cores which are pull and compression resistant, which can be mounted on a radially inner periphery of a rim, and which are pivotable relative to the bead cores; said method comprising the steps of:

- combining, on a drum, a carcass, along with the adjacent rubber layers, and the tire beads, along with their pull and compression resistant cores, to form an essentially cylindrical tire blank in a configuration, whereby what will later be the insides of the tire at this stage face radially outwardly, and whereby the interfaces of the tire beads at this stage extend radially outwardly and form an essentially right angle with the cylindrical surface of the blank; preliminary vulcanizing at least the bead regions of said tire blank while in said configuration;
- turning said blank in;
- imparting a toroidal shape to said turned-in blank;
- providing said toroidal-shaped blank with a tread strip; and
- final-vulcanizing said blank.

**4,790,893**  
**REPLICATION OF INFORMATION CARRIERS**  
 John B. Watkins, Independence, Mo., assignor to Hallmark Cards, Inc., Kansas City, Mo.  
 Continuation-in-part of Ser. No. 632,477, Jul. 19, 1984, abandoned. This application Jul. 18, 1986, Ser. No. 887,902  
 Int. Cl.<sup>4</sup> B29C 65/14, 59/00  
 U.S. Cl. 156—232 23 Claims

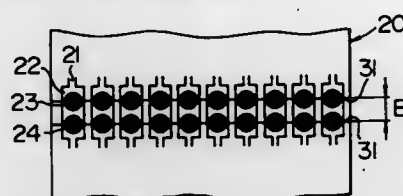


1. A process for replicating an information carrier containing stored digitally encoded information which comprises:
  - (a) extruding in the form of a web a thermoplastic material at a temperature above its softening point onto a patterned surface of a master, the patterned surface of said master having vertically displaced areas corresponding to digitally encoded information;
  - (b) applying pressure to force said thermoplastic material into contact with the patterned surface of the master;
  - (c) cooling the thermoplastic material to a temperature below its softening point to form an imaged thermoplastic web carrying a replication of the patterned surface from the master;
  - (d) separating from the master the imaged thermoplastic web;
  - (e) depositing a thin film of metal particles on the imaged surface of said imaged thermoplastic web to provide for a metallized imaged surface on said imaged thermoplastic web;
  - (f) laminating a substrate carrying an uncured coating of a radiation curable resin onto said metallized imaged surface of said imaged thermoplastic web to form a web of information carrying laminate;
  - (g) radiation said laminate to cure the resin substantially instantaneously; and
  - (h) removing an individual information carrier from said web of information carrying laminate.

**4,790,894**  
**PROCESS FOR PRODUCING PRINTED WIRING BOARD**  
 Masaji Homma, Yuki, and Hitoshi Yamauchi, Tochigi, both of Japan, assignors to Hitachi Condenser Co., Ltd., Tokyo, Japan  
 Filed May 6, 1987, Ser. No. 46,515  
 Claims priority, application Japan, Feb. 19, 1987, 62-36668; Mar. 24, 1987, 62-67843  
 Int. Cl.<sup>4</sup> B32B 31/00; B23K 31/02; B23P 17/00  
 U.S. Cl. 156—250 8 Claims

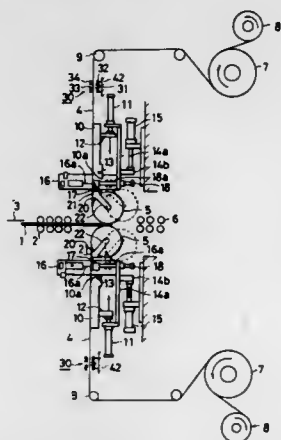
1. A process for producing base boards for printed wiring boards which comprises:

forming through-holes in predetermined portions of a base sheet, filling solder in the through-holes, and



cutting the base sheet to provide a plurality of adjacent base boards having semicircular through-holes filled with solder at side walls extending along adjacent base boards.

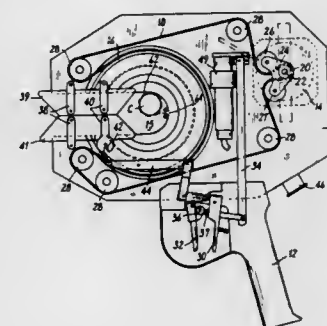
**4,790,895**  
**LAMINATER**  
 Takao Matsuo, Kobe, Japan, assignor to Somar Corporation, Tokyo, Japan  
 PCT No. PCT/JP86/00283, § 371 Date Feb. 6, 1987, § 102(e) Date Feb. 6, 1987, PCT Pub. No. WO86/07301, PCT Pub. Date Dec. 18, 1986  
 PCT Filed Jun. 6, 1986, Ser. No. 26,847  
 Claims priority, application Japan, Jun. 7, 1985, 60-122640  
 Int. Cl.<sup>4</sup> B32B 31/18 5 Claims



1. In a laminater for laminating a film onto a substrate and having feed means for feeding a substrate along a substrate feed path, the substrate having positioning holes to assist in aligning the film thereon, film feeding means for feeding the film from a continuous web along a film feed path, bonding means to bond the film onto a surface of the substrate, film handling means for tacking a leading edge portion of the film onto a leading edge portion of the substrate and for maintaining the position of the film relative to the substrate surface to prevent wrinkling of the film during bonding, cutting means positioned along the film feed path for cutting the film to a length corresponding to the length of the substrate during bonding, and means to remove the laminated substrate from the bonding means, the improvement comprising:
  - a punching device provided at a predetermined position on the film feed path to form alignment holes in said film;
  - removal means operatively associated with the punching device to remove from the film chips formed by the punching of the film and to collect said chips, said removal means including means for directing a gaseous fluid against the formed chips; and
  - control means to control operation of said punching device to form the alignment holes in said film at positions which

correspond to the positioning holes on said substrate when said film has been laminated on said substrate, said control means including sensor means positioned along said substrate feed path to detect the positioning holes in said substrate and operating means to operate said punching device in response to said sensor means.

**4,790,896**  
**MANUAL CONTROL DEVICE FOR TAPING ARTICLES SUCH AS NOTABLY BUNCHES OF CABLES**  
 Denis Schmalholtz, Cormeilles en Parisis, France, assignor to Derfi, Cormeilles en Parisis, France  
 Filed Nov. 12, 1987, Ser. No. 119,447  
 Claims priority, application France, Nov. 17, 1986, 86 15936  
 Int. Cl.<sup>4</sup> B65H 81/08 20 Claims

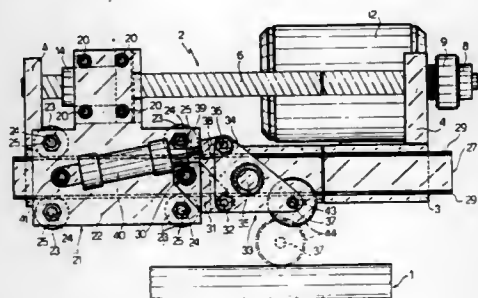




ing an expandable and contractable comb having two sets of tines, each offset from the other, one set of tines for guiding one group of rovings with a remaining set of tines for guiding the remaining rovings; and compaction means for compacting the rovings against the mandrel such that adjacent rovings permanently bond together whereby the compacted rovings form a band contoured to the mandrel.

13. Apparatus for producing fiber laminations comprising: (c) compacting said rovings against said receiving surface such that adjacent rovings permanently bond together and form a continuous band conformed to the contour of the receiving surface.

**4,790,899**  
**AUTOMATIC TRANSVERSE SPLICING DEVICE FOR ASSEMBLING TIRES**  
Tommaso Sacco, Roma, Italy, assignor to The Firestone Tire & Rubber Company, Akron, Ohio  
Filed Apr. 7, 1987, Ser. No. 35,324  
Claims priority, application Italy, Jul. 16, 1986, 67572 A/86  
Int. Cl.<sup>4</sup> B29D 30/28  
U.S. Cl. 156—421 3 Claims

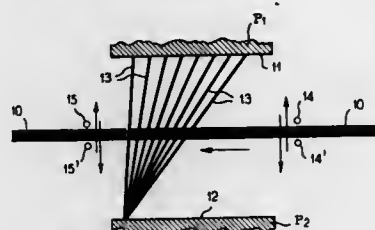


1. An automatic transverse splicing device for assembling layers of components for tires, particularly for affixing the front axial edge of a first layer to the outer surface of a tire building drum and for splicing together the opposite axial edges of said first layer and the opposite axial edges of subsequent layers in a first stage of tire assembly, the said device being designed to cooperate with a lateral strip portion of the curved outer surface of said tire building drum in a non-rotating phase of said tire building drum, said device comprising:

- (a) a concave splicing roller located facing the said lateral strip portion of the curved outer surface of the said tire building drum;
- (b) guide means extending laterally in relation to and parallel with the axis of said tire building drum;
- (c) slide means designed to travel along the said guide means;
- (d) driving means for moving said slide means in reciprocating manner along said guide means, said splicing roller being supported by said slide means; and
- (e) actuating means, provided between said slide means and said splicing rollers, for moving said splicing roller, in relation to said slide means, to and from an operating position cooperating with said lateral strip portion of the curved outer surface of the said tire building drum, said actuating means including dual rocker arm means, each of said rocker arm means having a fulcrum portion, said rocker arm means being hinged onto said slide means and fitted in a rotary manner with said splicing roller, and a linear actuator located between said slide means and said rocker arm means for pivoting the said rocker arm means about their respective fulcrum portions and for moving said splicing roller to and from said operating position, wherein each rocker arm is substantially triangular in shape with three tips, said fulcrum portion being located on one of said tips, with said splicing roller and said linear

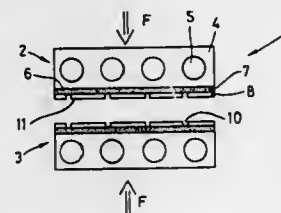
actuator engaging each of the said rocker arms on the other two tips, respectively.

**4,790,900**  
**APPARATUS FOR PRODUCING A FIBER WINDING OF VARYING WIDTH**  
Daniel Guillon, and Alain Bricard, both of Chambéry, France, assignors to Vetrotex Saint-Gobain, c/o Saint Gobain Recherche, Aubervilliers, France  
Filed Apr. 2, 1986, Ser. No. 847,389  
Claims priority, application France, Apr. 3, 1985, 85 05056  
Int. Cl.<sup>4</sup> B65H 57/02  
U.S. Cl. 156—441 10 Claims



1. An apparatus for producing a composite product of continuous fibers comprising:
  - a mobile guide element for gathering said fibers in a form of at least a layer of fibers;
  - a rotatable winding support onto which said layer is deposited;
  - a distribution head comprising first and second plates and a plurality of non-parallel rods through which said fibers pass, said plurality of non-parallel rods extending between said first and second plates and forming a three-dimensional comb structure in which said rods are not in the same plane; and
  - driving means to drive said mobile guide element in a direction perpendicular to said layer back and forth between two extreme positions as to vary the location at which said fibers pass through said plurality of non-parallel rods of said distribution head and thereby vary the spacing between said fibers upon leaving the distribution head.

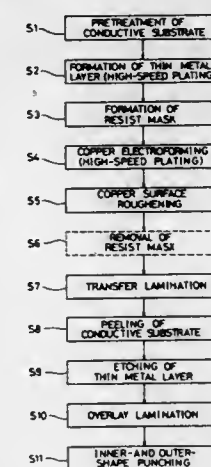
**4,790,901**  
**LAMINATING DEVICE FOR MANUFACTURING IDENTIFICATION CARDS**  
Johannes Kettelhoit, Verl; Hans W. Künne, Rheda-Wiedenbrück, and Erhard Schröder, Gütersloh, all of Fed. Rep. of Germany, assignors to D.I.S. Versand Service GmbH, Versmold, Fed. Rep. of Germany  
Continuation of Ser. No. 713,271, Mar. 18, 1985, abandoned.  
This application Feb. 3, 1988, Ser. No. 151,708  
Claims priority, application Fed. Rep. of Germany, Mar. 16, 1984, 3409808  
Int. Cl.<sup>4</sup> B30B 15/34  
U.S. Cl. 156—498 13 Claims



1. A laminating device for producing identification cards carrying data and/or information out of blanks including at

least one core foil of plastics, at least one transparent protective foil of plastics for a front side of a card and at least one transparent protective foil of plastics for a back side of a card, the device comprising a press including at least one metallic press member for welding said foils together and having cooling means and a pressing side facing a card to be laminated; a heating element on said pressing side; and a thin electrically insulated insulation layer positioned between said metallic press member and said heating element and partially transmitting heat generated by said heating element to said press member and providing homogenous pressure distribution during welding of said foils together, said heating element having small heating capacity and a small thickness and being formed as a metallic resistance heating element through which electric current applied thereto flows directly, said press member being cooled in cooperation with said insulation layer so that a temperature of said press member remains constant during the welding and the cooling, said metallic resistance heating element including a plurality of current conductive strips connected to each other in series and positioned in one plane and with a close spacing so as to provide a substantially continuous press face which forms an outer press face which directly contacts an identification card being produced.

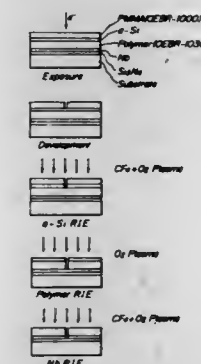
**4,790,902**  
**METHOD OF PRODUCING CONDUCTOR CIRCUIT BOARDS**  
Tatsuo Wada, Ebina; Keizo Yamashita, Shizuoka; Tasuku Touyama, Shimizu, and Teruaki Yamamoto, Shizuoka, all of Japan, assignors to Meiko Electronics Co., Ltd., Ayase, Japan  
PCT No. PCT/JP87/00111, § 371 Date Oct. 16, 1987, § 102(e)  
Date Oct. 16, 1987, PCT Pub. No. WO87/05182, PCT Pub. Date Aug. 27, 1987  
PCT Filed Feb. 21, 1987, Ser. No. 131,050  
Claims priority, application Japan, Feb. 21, 1986, 61-036712  
Int. Cl.<sup>4</sup> B44C 1/22; C03C 15/00, 25/06; C23F 1/00  
U.S. Cl. 156—630 8 Claims



1. A method of producing conductor circuit boards comprising steps of:
  - forming a thin metal layer with a thickness of 1 to 5  $\mu\text{m}$  on a planar, electrically conductive substrate with a surface roughness of 0.08 to 0.23  $\mu\text{m}$ , for use as a cathode, by spacing said cathode and a planar anode at an interelectrode distance of 3 to 30 mm from each other, and compulsorily supplying an electrolytic solution to said electrodes so that said electrolytic solution comes into contact with said electrodes at a solution contact speed of 2.6 to 20.0 m/sec, thereby electroplating said electrodes under the condition of a current density of 0.15 to 4.0 A/cm<sup>2</sup>;
  - forming a resist mask on the whole surface of said formed

thin metal layer except that portion thereof which is to be formed with a conductor circuit; forming said conductor circuit by electroplating the surface of said thin metal layer, with said resist mask thereon, under the same conditions as said electroplating conditions, using said electrolytic solution containing copper ions; roughening the surface of said formed conductor circuit; laminating and bonding together an insulating substrate and said conductive substrate, with thus formed conductor circuit therebetween, with use of heat and pressure; peeling off said conductive substrate only; and removing said thin metal layer by etching.

**4,790,903**  
**INTERMITTENT ETCHING PROCESS**  
Takuo Sugano, and Hideharu Miyake, both of Tokyo, Japan, assignors to University of Tokyo, Tokyo, Japan  
Continuation of Ser. No. 17,397, Feb. 24, 1987, abandoned. This application Mar. 18, 1988, Ser. No. 180,641  
Claims priority, application Japan, Apr. 28, 1986, 61-97002  
Int. Cl.<sup>4</sup> H01L 21/312  
U.S. Cl. 156—643 6 Claims



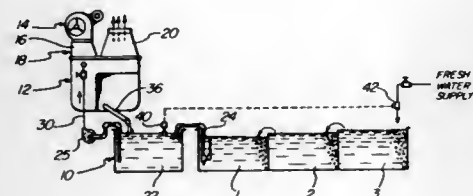
1. A process for forming a recess having a minute opening of a desired pattern with a width of about 0.1–0.15  $\mu\text{m}$  and a large aspect ratio in a niobium layer by means of reactive ion etching (RIE), comprising the steps of:
  - (a) forming a workpiece provided with the niobium layer covered by a three layered resist consisting of polymethylmethacrylate (PMMA) top layer, an amorphous silicon (a-Si) middle layer and an organic positive type electron beam resist (OEBM) bottom layer;
  - (b) subjecting said workpiece to electron beam exposure to form a removed portion with said desired pattern in the top layer; and
  - (c) subjecting the workpiece to intermittent RIE alternating with vacuumizing for evacuating gaseous reaction products to prevent a gaseous pressure increase in an etched recess, by making successive use of CF<sub>4</sub> plus O<sub>2</sub> gas plasma, O<sub>2</sub> gas plasma and CF<sub>4</sub> plus O<sub>2</sub> gas plasma, to form a recess having an opening with said desired pattern stepwise through the middle layer, bottom layer and niobium layer.

**4,790,904**  
**PLATING EVAPORATIVE RECOVERY TANK**  
William Yates, 403 N. Powder Horn, Anaheim, Calif. 92807  
Filed May 19, 1987, Ser. No. 51,730  
Int. Cl.<sup>4</sup> B01D 1/12, 1/16  
U.S. Cl. 159—16.1 5 Claims

1. An atmospheric evaporator apparatus for separating water from a chemical solution as it passes through the atmospheric evaporator by means of a blower, said atmospheric evaporator comprising:

a one-piece, molded, evaporator tank having an inlet side and an exhaust side;  
 a removable one-piece, molded, blower sleeve having an inlet duct formed at one end thereof on which is supported a blower, and an evaporator-support means formed at the opposite end thereof, said blower sleeve is removably mounted in said evaporator tank;  
 evaporator means mounted in said blower sleeve and supported by said evaporator-support means for defining a wet surface area over which air and said chemical solution flow to provide separation of water from said chemical solution; and  
 an outlet duct mounted over the exhaust side of said tank wherein said blower sleeve, said evaporator tank, and said outlet duct combine to define a substantially "U" shaped air flow wherein air enters from the top of said tank and is exhausted through the outlet duct positioned at the top of said tank adjacent to said inlet duct.

4. In combination, a plating system and an atmospheric-evaporator unit, comprising:  
 a plating system having a plurality of rinse stations and a process tank wherein said rinse stations are arranged to provide a counter-flow of water and plating chemicals disposed within said stations; and  
 an atmospheric evaporator including:  
 an evaporator tank having an inlet side and exhaust side;  
 a vertically arranged blower sleeve removably mounted at said inlet side of said tank;  
 an outlet duct mounted over said exhaust side of said tank; and



wherein said blower sleeve is formed with an inlet duct at the upper end thereof and an evaporator-support means integrally formed at the opposite lower end of said blower sleeve;  
 evaporator means mounted in said blower sleeve and supported by said evaporator-support means, said evaporator means defining a wet surface area over which air and solution flow from said process tank to provide separation of water from said chemical solution;  
 a mist-eliminator means positioned at the exhaust side of said evaporator tank;  
 blower means mounted on said blower sleeve for forcing air through said evaporator tank whereby said air transports moisture within said evaporator tank to said mist-eliminator means;  
 pump means interposed between said process tank and said evaporator; tank means for spraying the chemical solution in said process tank over said evaporator means so as to separate water from said chemical solution as said solution passes through said evaporator means with said air provided by said blower means; and  
 means connected to said evaporator tank to return said chemicals to said process tank,  
 whereby said blower sleeve, said evaporator tank, and said outlet duct combine to define a substantially "U" shaped air flow, wherein air enters from the top of said tank by said blower means and is exhausted through the outlet duct positioned over the exhaust side of said tank.

4,790,905  
**PROCESS FOR THE PULPING OF LIGNOCELLULOSE MATERIALS WITH ALKALI OR ALKALINE EARTH METAL HYDROXIDE OR SALT AND A SOLVENT**  
 Patrick M. F. Nivellet, de La Bruniere, and Jean P. M. Gallichon, both of Paris, France, assignors to Societe Tag Pulp Industries S.A., Liechtenstein  
 Continuation of Ser. No. 706,156, Feb. 27, 1988, abandoned.  
 This application Oct. 10, 1986, Ser. No. 918,612  
 Int. Cl.<sup>4</sup> D21C 3/02, 3/20

U.S. Cl. 162—56 5 Claims  
 1. A process for the pulping of a raw lignocellulosic material which consists essentially of the steps of  
 impregnating said raw lignocellulosic material in finely divided form at atmospheric pressure with an impregnating solution whose constituents consist essentially of water, 2 to 20% by weight of alkali metal hydroxide, alkali metal salt, alkaline earth metal hydroxide or alkaline earth metal salt and 2 to 20% by weight of a solvent having a boiling point above 150° C. selected from the group consisting of diols, alkanolamines and sulfoxides, said impregnating being effected at a temperature of 80° to 100° C. using a quantity of impregnating solution such the amount of said alkali metal hydroxide or salt or alkaline earth metal hydroxide or salt retained by said lignocellulosic material is 11 to 29% of the dry weight of said material, and the amount of said solvent retained is sufficient to lower the melting point of said alkali metal hydroxide, alkali metal salt, alkaline earth metal hydroxide or alkaline earth metal salt in the said impregnated mass to between 150° and 200° C.,  
 removing unabsorbed impregnating solution from the impregnated mass and adjusting the weight of the retained impregnating solution so that the ratio of the weight of said impregnated mass to the dry weight of said lignocellulosic material is not more than about 2.6:1,  
 cooking a material consisting of the resulting adjusted impregnated solid mass at a temperature from 150° and 200° C. for 15 to 60 minutes in an exclusively externally heated closed reactor without exerting any mechanical disintegration action on the mass, and  
 pressing the cooked product so as to extract therefrom the solubilized lignin in the form of a black liquor containing about 50% dry material.

4,790,906  
**METHOD FOR PRODUCING GLASS MAT USING GLASS HAVING A RELATIVELY HIGH ALKALI CONTENT**  
 Fred S. Coffey, Newark, Ohio; Thomas W. Allen, Ripley, Tenn., and James E. Wille, Toledo, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio  
 Filed Nov. 13, 1987, Ser. No. 119,882  
 Int. Cl.<sup>4</sup> D21H 5/18

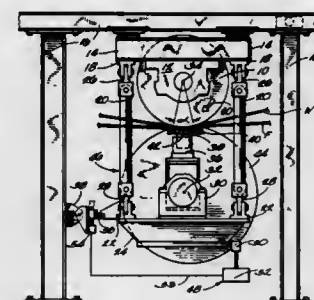
U.S. Cl. 162—156 3 Claims  
 1. A method for producing glass fibrous mat using glass fiber having an alkali content of about 10 percent, by weight, or greater, wherein the improvement comprises forming glass fibers, applying an aqueous fiber sizing, chopping the glass fibers while wet and thereafter lowering the temperature of the wet chopped fibers for a period of time sufficient to freeze the water in the sizing prior to placing the glass fibers in a water solution to slurry, dispersing the glass fibers uniformly throughout the slurry, and thereafter removing the water from the slurry to form a continuous mat of glass fibers.

4,790,907  
**SYNTHETIC FIBER**  
 Ted A. Mallen, Chattanooga, and Doyle B. Word, Cleveland, both of Tenn., assignors to Intera Company, Ltd., Cleveland, Tenn.  
 Filed Aug. 3, 1987, Ser. No. 80,916  
 Int. Cl.<sup>4</sup> D21H 5/12

U.S. Cl. 162—157.1 39 Claims  
 1. A method of making paper or non-woven articles, comprising:  
 (i) treating a fiber substrate to render said substrate durably hydrophilic, wherein said treating step comprises:  
 (a) contacting said substrate with an aqueous mixture at a temperature between about 40° C. and about 100° C. containing an effective amount of a water-soluble cross-linking vinyl monomer and an effective amount of an organic hydrophobic carrier compound having a greater affinity for the substrate than the surrounding aqueous mixture, all non-aromatic carbon-carbon bonds of said carrier compound being saturated; and  
 (b) thereafter initiating polymerization of said water-soluble cross-linking monomer to form a vinyl polymer on said substrate whereby the hydrophilic properties of said substrate are improved; and  
 (ii) forming said durable hydrophilic substrate into a paper or non-woven article on papermaking equipment.

4,790,908  
**EXTENDED NIP PRESS BELT GUIDE AND METHOD**  
 Arnold J. Roerig, and David V. Lange, both of Beloit, Wis., assignors to Beloit Corporation, Beloit, Wis.  
 Filed Feb. 19, 1988, Ser. No. 157,674  
 Int. Cl.<sup>4</sup> D21F 3/00

U.S. Cl. 162—199 5 Claims



1. In an extended nip web press having a frame, a rotatable roll having a longitudinal axis of rotation and a traveling pressing surface, said roll mounted to the frame, a looped felt and a looped belt corunning with a web through the extended nip in a path of travel, a shoe and shoe support means opposite the roll and located within the looped belt for providing nipping force between the belt and the roll surface, the improvement comprising: belt position sensing means for sensing lateral deviation of belt travel through the extended nip in either direction along the length of the nip and perpendicular to its path of travel, and for providing signals responsive to such movement of the belt; an actuator for receiving the signals and including means connected to the shoe support means structured for moving said shoe in a skewing motion relative to the roll surface and altering the path of belt travel and its position in the extended nip in response to said signals.

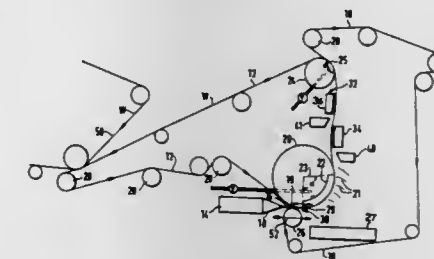
5. A method of guiding the belt in an extended-nip web press having two lateral ends and a center in between said ends, and having a frame, a backing roll having a pressing surface, a looped felt and a looped belt co-running with a web over a portion of the backing roll pressing surface, a shoe located within the looped belt and having a surface defining, with the belt and the roll pressing surface, the extended nip, the steps comprising:

monitoring the lateral position of the belt as the belt migrates

in a longitudinal direction beyond a predetermined place on either of said lateral ends of the extended nip press as the belt travels in the press;  
 providing signals responsive to the lateral position of the belt as it travels through the press;  
 moving and the shoe in a skewing motion relative to the surface of the roll in response to the signals, whereby the friction of the belt passing through the nip changes along the nip across the machine to cause the belt to move toward the center of the press.

4,790,909  
**TWO-WIRE PAPER FORMING APPARATUS**  
 John W. Harwood, Janesville, Wis., assignor to Beloit Corporation, Beloit, Wis.  
 Continuation of Ser. No. 942,731, Dec. 17, 1986, abandoned.  
 This application Mar. 28, 1988, Ser. No. 173,006  
 Int. Cl.<sup>4</sup> D21F 1/00

U.S. Cl. 162—301 9 Claims



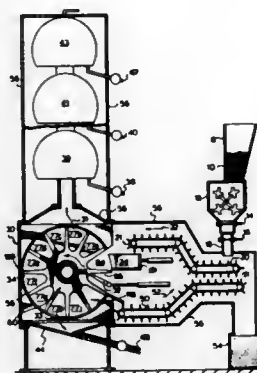
1. In a two-wire apparatus for forming a paper web, including first and second looped forming wires arranged to travel together in opposed array along a common path during a portion of their length, and a headbox for projecting a stream of stock into a throat formed by the forming wires, the improvement comprising:

a forming roll disposed within the second looped forming wire, the forming roll having an internal suction box and a foraminous surface for admitting water from the stock through the second forming wire;  
 a forming area on the forming roll surface over the suction box for receiving water urged through the foraminous surface and into the suction box;  
 the second forming wire looped over, and substantially wrapping, the forming roll and the forming area;  
 a couch roll disposed within the second looped forming wire downstream of and above the forming roll for receiving the co-running forming wires onto its surface and such that the wires run in a generally upwardly vertical path from the forming roll to the couch roll;  
 a wire-guiding means disposed within the first looped forming wire and arranged to guide the first forming wire to form a converging throat in conjunction with the second forming wire over the forming area of the forming roll, the first and second forming wires substantially wrapping the forming roll downstream of the throat;  
 first and second stationary dewatering shoe means, with the first dewatering shoe means disposed within the first forming wire, and the second dewatering shoe means disposed within the second forming wire, both shoe means located downstream of the forming roll and upstream of the couch roll;  
 said first and second shoe means defining, with the forming roll, a reversingly curved S-shaped path of travel of the co-traveling first and second forming wires in a formation zone extending from over the forming area to before the couch roll.



**4,790,910**  
**APPARATUS FOR EXTRACTING HYDROCARBONS FROM TAR SANDS**  
 Jaroslav J. Havlik, 311 Montrose Street, Cambridge, Ontario, Canada N3H 5C6  
 Filed Nov. 9, 1987, Ser. No. 118,735  
 Claims priority, application Canada, Aug. 13, 1987, 544,485  
 Int. Cl.<sup>4</sup> C10B 53/06; C10G 1/02  
 U.S. Cl. 196—112

19 Claims

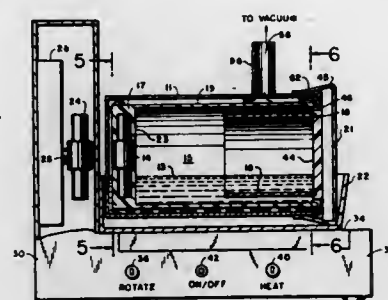


1. An apparatus for the separation of petroleum bitumen crude from tar sands, oil shales and other oil bearing materials comprising:

- a plurality of vertical, parallel, stationary heater plate means disposed side-by-side spaced from one another,
- a central aperture through the heater plates normal thereto, axle means extending through the central aperture and journaled for rotation about a horizontal axis,
- drive means to rotate the axle means about said axis,
- a plurality of similar thin, rotor plate means coupled to the axle means co-axially thereabout for rotation therewith with one rotor plate means sandwiched between each two adjacent heater plate means,
- each rotor plate means having central hub means about the axle means and a plurality of similar arm means extending radially outwardly from the hub means uniformly circumferentially spaced thereabout,
- the arm means of all the rotor plate means being in axial alignment,
- material retaining ring means located about the rotor plate means radially outwardly of an arc defined by the ends of the arm means on rotation of the rotor plate means,
- a plurality of material retaining pocket means defined for each rotor plate means between:
  - (i) each two adjacent arm means,
  - (ii) the heater plate means on each side of said rotor plate means,
  - (iii) the hub means, and
  - (iv) the material retaining ring means,
- each material retaining pocket means moving about the axle means with rotation of the rotor plate means,
- means to insert material from which crude is to be extracted into each material retaining pocket means when two arms forming each respective material retaining pocket means are at a first relative rotational position with respect to the axle means, and
- means to remove material from the material retaining pocket means when two arms forming each respective material retaining pocket means are at a relative rotational position with respect to the axle means displaced from said first relative rotational position by at least a major portion of one revolution of the rotor plate means about the axle means.

**4,790,911**  
**SOLVENT EVAPORATOR**  
 Martin Parkinson, 6 N. Delaware Dr., Nyack, N.Y. 10960  
 Continuation-in-part of Ser. No. 024,350, Mar. 10, 1987, abandoned. This application Dec. 11, 1987, Ser. No. 131,649  
 Int. Cl.<sup>4</sup> B01D 1/22, 3/08  
 U.S. Cl. 202—205

23 Claims



1. An apparatus for evaporating a solvent, which comprises:

- (A) A motor with an attached magnet;
- (B) A hot plate means;
- (C) A container for said solvent;
- (D) Said container having a base, and said container having an opening for the placement of a rotor within said container;
- (E) A closure for said opening in said container;
- (F) Means for connecting said container to a source of vacuum;
- (G) Said rotor being cylindrical in shape, having a base and an open top, said base in said rotor having an opening, said rotor being removably placed within said container;
- (H) Means for magnetically attracting said base of said rotor, being affixed to said base of said rotor; and
- (I) said container and said rotor being positioned in a substantially horizontal position on the top surface of said hot plate means, with the base of said container being immediately adjacent said magnet, such that the magnetic field of said magnet securely engages the means for magnetically attracting said base of said rotor so that when said motor is energized said magnet is caused to rotate which simultaneously causes said rotor to rotate in synchrony with said magnet, and a thin film of said solvent is caused to be deposited onto the inner and outer surfaces of said rotor.

**4,790,912**  
**SELECTIVE PLATING PROCESS FOR THE ELECTROLYTIC COATING OF CIRCUIT BOARDS WITHOUT AN ELECTROLESS METAL COATING**  
 Abraham M. Holtzman, Bat Yam, and Joseph Relis, Ramat Gan, both of Israel, assignors to Techno-Instruments Investments Ltd., Bta-Yam, Israel  
 Continuation-in-part of Ser. No. 872,093, Jun. 6, 1985. This application Nov. 14, 1986, Ser. No. 931,176  
 Int. Cl.<sup>4</sup> C25D 5/02

43 Claims

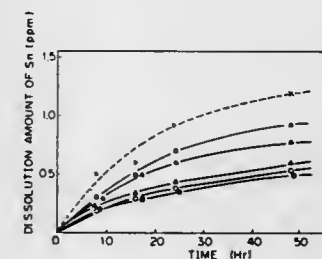
1. In a process for selectively depositing metals on a non-conductive substrate by employing the reductive capacity of hydrogen in the presence of a metal catalyst on the substrate, said metal catalyst being capable of combining with hydrogen that is generated electrolytically from a protic bath; said substrate being contacted with said metal catalyst to obtain a substrate that is combined with said catalyst; said substrate combined with said metal catalyst being contacted with a protic bath; the steps comprising:

- (a) imaging a photoresist on said substrate and neutralizing said photoresist after imaging and prior to contacting said substrate with said metal catalyst
- (b) electrolytically generating hydrogen from said protic

bath in an amount sufficient to combine with said metal catalyst and thereby obtain a metal catalyst combined with said hydrogen on said substrate  
 (c) contacting said metal catalyst combined with hydrogen on said substrate with a metal salt for a time sufficient to reduce said metal salt to a metal coating on said substrate.

**4,790,913**  
**METHOD FOR PRODUCING AN SN-BASED MULTILAYER COATED STEEL STRIP HAVING IMPROVED CORROSION RESISTANCE, WELDABILITY AND LACQUERABILITY**  
 Seizun Higuchi; Tomonari Oga; Masao Ikeda, and Hirohumi Nakano, all of Kitakyushu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan  
 Division of Ser. No. 879,273, Jun. 27, 1986, Pat. No. 4,713,301.  
 This application Jul. 10, 1987, Ser. No. 71,974  
 Claims priority, application Japan, Jul. 1, 1985, 60-144174  
 Int. Cl.<sup>4</sup> B32B 15/01  
 U.S. Cl. 204—37.3

12 Claims



1. A method for producing a surface-treated steel strip for use as a container, having improved properties, characterized by, electroplating on the steel strip a Fe-Ni-P based underlying coating layer having a weight of from 10 to 300 mg/m<sup>2</sup> and containing from 5% to 30% Ni and from 0.1% to 10% P, and then electroplating a Sn layer, heating and melting the Sn plated layer to form a Fe-Ni-Sn-P based alloy, while leaving metallic Sn on the layer of the Fe-Ni-Sn-P based alloy, and subsequently forming a chromate coating layer.

**4,790,914**  
**ELECTROLYSIS PROCESS USING CONCENTRIC TUBE MEMBRANE ELECTROLYTIC CELL**  
 Marius W. Sorenson, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.  
 Filed Sep. 30, 1985, Ser. No. 781,173  
 The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.  
 Int. Cl.<sup>4</sup> C25B 1/16, 1/34, 11/03  
 U.S. Cl. 204—98

12 Claims

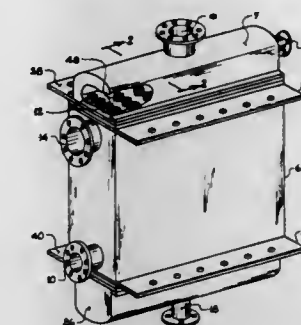
1. A method for operating a vertically disposed, electrolytic cell of the type having:

- a hydraulically permeable, hollow, cylindrically shaped cathode;
- a hydraulically permeable, hollow, cylindrically shaped anode concentric with and surrounding said cathode to define an annular space therebetween; and
- a hollow, cylindrically shaped, ion permeable membrane interposed between, and concentric with, said cathode and said anode, said membrane separating and defining an anode compartment containing the anode and a cathode compartment containing the cathode;

wherein said method comprises:

- (a) flowing a catholyte from a lower portion of the cathode compartment, upward toward an upper portion of the cathode compartment, at least a portion of said flow passing adjacent to the cathode at a rate sufficient to sweep away at least a portion of any gas, formed during electrolytic operation of the cell; wherein at least a

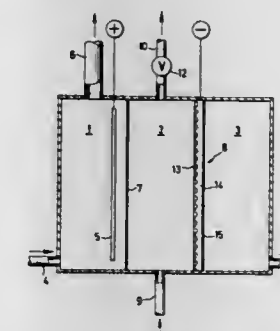
portion of said catholyte flow is through the annular space between the cathode and the ion permeable membrane and is at a rate sufficient to minimize the contact of the ion permeable membrane with the cathode;  
 (b) flowing the catholyte and gas upward and into a catholyte separation compartment;



(c) separating the gas from the catholyte;  
 (d) removing at least a portion of the catholyte from the catholyte separation compartment; and  
 (e) recycling at least a portion of the catholyte to a lower portion of the cathode compartment and upward toward the catholyte separation compartment.

**4,790,915**  
**PROCESS FOR THE ELECTROLYSIS OF ALKALI METAL CHLORIDE SOLUTIONS**  
 August Winsel; Rudolf Staab, and Nikolaj Medic, all of Kelheim, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany  
 Filed Jan. 12, 1987, Ser. No. 2,142  
 Claims priority, application Fed. Rep. of Germany, Jan. 14, 1986, 3600759  
 Int. Cl.<sup>4</sup> C25B 1/00  
 U.S. Cl. 204—98

6 Claims



1. A process for electrolyzing an aqueous alkali metal chloride solution in a membrane cell which contains an anode chamber with the anode and a cathode chamber with the cathode, the two chambers being separated from one another by a cation exchanger membrane, in which the cathode is porous and foil-like, the cathode and cation exchanger membrane form the actual cathode chamber filled with catholyte, the cathode and cell wall form a gas space, water is fed into the cathode chamber and alkali metal hydroxide solution is withdrawn from the cathode chamber, hydrogen is withdrawn from the cathode chamber and gas space, aqueous alkali metal chloride solution is fed into the anode chamber and gaseous chlorine, together with depleted alkali metal chloride solution, is withdrawn from the anode chamber, and a direct voltage

which is at least the same as the decomposition voltage is applied to the cathode and anode, which comprises establishing a higher pressure in the cathode chamber than in the gas space during the electrolytic process, and wherein the pressure in the catholyte chamber is 10 mbar to 0.5 bar higher than in the gas space, and no oxygen is supplied to the cathodes.

4,790,916

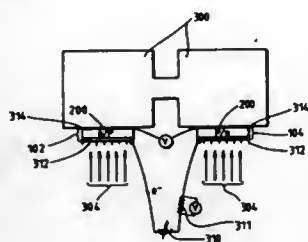
**ONE-UNIT PHOTO-ACTIVATED ELECTROLYZER**  
Oliver J. Murphy, and John O'M Bockris, both of College Station, Tex., assignors to The Texas A&M University System, College Station, Tex.

Division of Ser. No. 4,722,776, Feb. 2, 1983. This application Aug. 18, 1987, Ser. No. 86,561

Int. Cl.<sup>4</sup> C25B 1/02, 15/00; H01M 6/36

U.S. Cl. 204—129

4 Claims



1. A method, comprising:

- engaging with an electrolytic solution contained in an electrochemical reaction zone an anode and a cathode, said anode and cathode being in physical and ohmic contact with a photo-activated semiconductor device having separate donor and acceptor regions external of the electrolytic solution, said anode being contacted with the acceptor region and said cathode being contacted with the donor region; and
- exposing at least a portion of said photo-activated semiconductor device external of said electrolytic solution to a source of radiation.

4,790,917

**REFINING OF LITHIUM-CONTAINING ALUMINUM SCRAP**

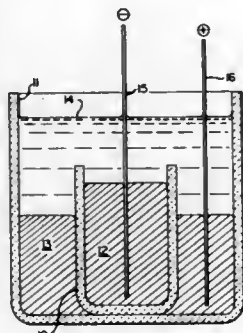
Ernest W. Dewing, Kingston, Canada, assignor to Alcan International Limited, Montreal, Canada

Filed Nov. 4, 1987, Ser. No. 117,037

Claims priority, application Canada, Nov. 7, 1986, 522510  
Int. Cl.<sup>4</sup> C25C 3/06

U.S. Cl. 204—140

11 Claims



1. A method of refining lithium-containing aluminum scrap to produce substantially pure Li and lithium-depleted scrap, which method comprises electrolyzing the lithium in an electrolytic cell employing said scrap in molten form as an anode, molten lithium as a cathode and a lithium chloride-based elec-

trolyte, and collecting lithium from the cathode and lithium-depleted scrap from the anode.

4,790,918

**ELECTROCHEMICAL ION EXCHANGE**

Nevill J. Bridger, Hermitage, and Andrew D. Turner, Abingdon, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

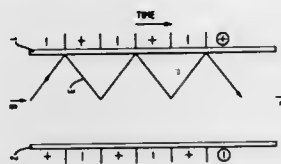
Filed Mar. 12, 1987, Ser. No. 25,206

Claims priority, application United Kingdom, Mar. 12, 1986, 8606038

Int. Cl.<sup>4</sup> C02F 1/46

U.S. Cl. 204—149

7 Claims



1. A method for the electrochemical removal of ions from an aqueous solution which comprises establishing an electrochemical cell by causing the aqueous solution, as cell electrolyte, to flow in contact with a working electrode that includes anion exchange material and with a second electrode, applying voltages of opposite polarity to each of said electrodes and repeatedly reversing the polarity of said voltages at each electrode while the aqueous solution is in contact with the working electrode so that ions therefrom are adsorbed and desorbed in succession at the working electrode, the rate of flow of the aqueous solution and the rate of reversal of polarity being such that ions from the solution are subjected to a plurality of adsorption/desorption cycles at the working electrode.

4,790,919

**PROCESS FOR PREPARATION OF ELECTROPHORESIS GEL MATERIAL**

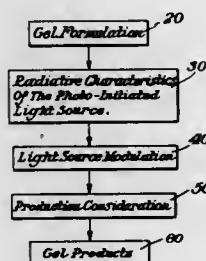
Charles Baylor, Jr., Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 28, 1984, Ser. No. 625,840

Int. Cl.<sup>4</sup> C08F 2/54, 20/56; B01D 13/02; G01N 27/40

U.S. Cl. 204—182.8

10 Claims



1. A porous electrophoretic gel product comprising an aqueous-swelled porous polymer matrix, formed of polymerized and cross-linked monomers and a photoinitiator, which defines a volume, the product characterized by having a constant atomic composition over its volume, being stable, having a controlled, electrophoretic resolving capacity that is reproducible from gel to gel for the electrophoretic separation of

charged macromolecular substances, having length, width and thickness dimensions, and having a porosity gradient along one of the length and width dimensions and uniform porosity along the thickness dimension which dimension is relatively thin.

4,790,920

**METHOD FOR DEPOSITING AN AL<sub>2</sub>O<sub>3</sub> CAP LAYER ON AN INTEGRATED CIRCUIT SUBSTRATE**

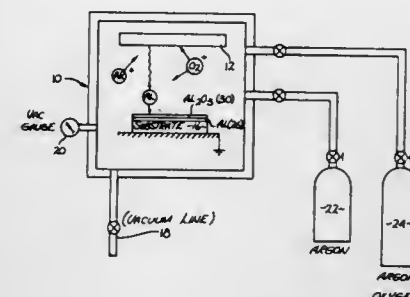
Brian M. Krzanich, Placitas, N. Mex., assignor to Intel Corporation, Santa Clara, Calif.

Continuation of Ser. No. 810,847, Dec. 20, 1985, abandoned, which is a continuation of Ser. No. 584,642, Feb. 29, 1984, abandoned. This application Jan. 8, 1987, Ser. No. 4,784

Int. Cl.<sup>4</sup> C23C 14/36

U.S. Cl. 204—192.17

11 Claims



1. A method for fabricating an integrated circuit wafer, comprising the steps of:

- positioning a thermally oxidized silicon wafer on a substrate holding fixture in a vacuum chamber;
- evacuating said vacuum chamber;
- introducing argon gas into said vacuum chamber until a first sputtering pressure of about  $6 \times 10^{-3}$  TORR. is attained;
- depositing an aluminum layer on said silicon wafer by sputtering an aluminum target at said first sputtering pressure until said aluminum layer reaches a thickness of about 1 micron;
- evacuating said vacuum chamber to a pressure in the mid  $10^{-7}$  TORR. range;
- introducing a gas mixture of argon and oxygen into said vacuum chamber until a second sputtering pressure of about  $1 \times 10^{-2}$  TORR. is reached;
- depositing an aluminum oxide layer on said aluminum layer by sputtering said aluminum target at said second sputtering pressure until said aluminum oxide layer attains a thickness of about 300 Angstroms;
- providing a desired resist pattern on said aluminum oxide layer;
- etching said aluminum and aluminum oxide layers whereby said aluminum oxide layer prevents etching acids from forming mouse bites or notches in said aluminum layer; and
- annealing said semi-conductor chip whereby said aluminum oxide layer manifests reduced film stress after heating.

4,790,921

**PLANETARY SUBSTRATE CARRIER METHOD AND APPARATUS**

Darrel R. Bloomquist, Boise; George A. Drennan, Eagle, both of Id., and James E. Opfer, Palo Alto, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Continuation-in-part of Ser. No. 659,983, Oct. 12, 1984, abandoned. This application Feb. 6, 1986, Ser. No. 827,832

Int. Cl.<sup>4</sup> C23C 14/34

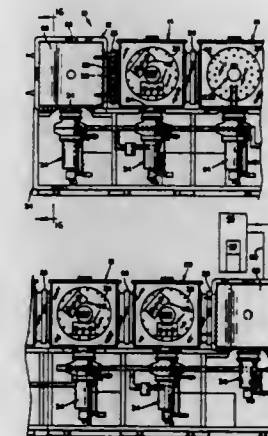
U.S. Cl. 204—192.12

6 Claims

1. A method of supporting substrates during sputter deposi-

tion of a film onto the major surfaces of the substrates comprising the steps of:

- hanging each of the substrates from a central substrate opening on a substrate support extending through the central substrate opening such that the substrates are supported in a vertical orientation;
  - transporting the substrates in a linear direction to a location disposed between first and second sputtering targets;
  - halting the linear motion of the substrates;
  - impacting planetary motion to the substrates;
  - simultaneously sputtering a film onto both surfaces of the substrates while the substrates are undergoing planetary motion; and
  - halting the planetary motion.
3. A substrate carrier apparatus which supports one or more substrates, said carrier apparatus mounted for rotation on a rotatable support mechanism, said carrier apparatus disposed between first and second sputtering targets during deposition of a film onto the sides of said substrates, said substrate carrier apparatus comprising:



a chassis;

said chassis including means for engaging said rotatable support mechanism so as to support said chassis in a vertical orientation for rotation about a chassis axis by said rotatable support mechanism during deposition; said chassis having a least one sputtering opening therethrough at a location spaced from said chassis axis, said sputtering opening having a diameter which is greater than the diameter of said substrate; and substrate support means for supporting a substrate in a vertical orientation for planetary motion upon rotation of said chassis, said substrate support means comprising means for supporting said substrate on a hub such that a first side of said substrate is exposed through said sputtering opening to the first sputtering target and a second side of said substrate is exposed to the second sputtering target, thereby permitting simultaneous deposition of both sides of the substrate.

4,790,922

**TEMPERABLE LOW EMISSIVITY AND REFLECTIVE WINDOWS**

Russell Huffer, Owatonna, Minn., assignor to Viracon, Inc., Owatonna, Minn.

Filed Jul. 13, 1987, Ser. No. 72,775

Int. Cl.<sup>4</sup> C23C 14/34

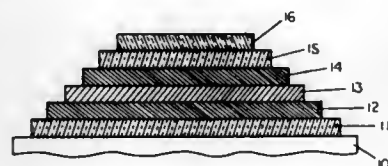
U.S. Cl. 204—192.27

9 Claims

1. A method of making a temperable low emissivity window comprising the steps of sputtering a first layer of a mixture of tin oxide and zinc oxide onto a glass substrate, sputtering a second layer of titanium,

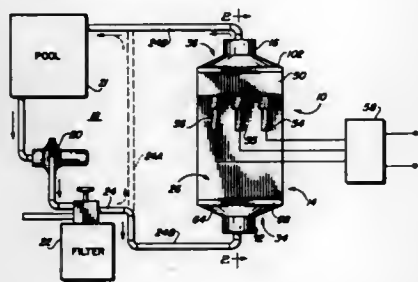


sputtering a third layer of silver,  
sputtering a fourth layer of titanium,  
sputtering a fifth layer of a mixture of tin oxide and zinc  
oxide,



sputtering a sixth layer of titanium oxide,  
then heating and shaping the glass at a temperature where  
the titanium layers on each side of the silver layer will  
oxidize but protect the silver from oxidizing.

**4,790,923**  
**LIQUID TREATING ELECTROLYTIC CELL**  
Neil W. Stillman, 1062 N. 24th St., Mesa, Ariz. 85203  
Filed Jul. 7, 1987, Ser. No. 70,813  
Int. Cl.<sup>4</sup> C25B 1/24, 9/02, 15/08  
U.S. Cl. 204-268 18 Claims



1. An electrolytic cell for producing a halogen biocide in a liquid containing a halogen salt as the liquid is passed through, said electrolytic cell comprising:

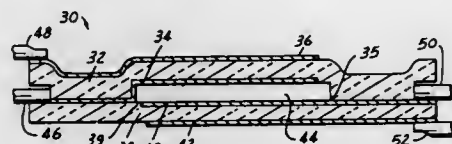
- a cell body defining an open ended chamber which forms a flow path for the liquid;
- a pair of end closure means each mounted on a different one of the open ends of said cell body;
- port means on at least one of said pair of end closure means for passage of the liquid through said electrolytic cell;
- a plurality of electrode plates each having an opposed pair of side edges and an opposed pair of end edges, said plurality of electrode plates being mounted in spaced apart parallel relationship in said cell body and coextensive with the flow path thereof;
- conductor means for connection of less than all of said plurality of electrode plates to a power supply;
- means for encasing the side edges of all of said plurality of electrode plates and the end edges of at least the ones of said plurality of electrode plates which are connectable to the power supply, said means for encasing including,
  - said cell body having an opposed pair of end walls with a plurality of spacedly arranged parallel slots formed on the inwardly facing surfaces thereof for encasing the side edges of each of said plurality of electrode plates,
  - each of said pair of end closure means including a cap plate for encasing the opposed end edges of the ones of said plurality of electrodes which are connectable to the power supply.

**4,790,924**  
**METHOD OF FABRICATION OF AIR/FUEL SENSORS BASED ON ELECTROCHEMICAL PUMPING AND SENSORS MADE THEREBY**

Eleftherios M. Logothetis, Birmingham, Mich.; William J. Kaiser, West Covina, Calif., and William C. Vassell, Birmingham, Mich., assignors to Ford Motor Company, Dearborn, Mich.  
Filed Dec. 28, 1987, Ser. No. 138,101  
Int. Cl.<sup>4</sup> G01N 27/58

U.S. Cl. 204-412

16 Claims



1. A method for making planar oxygen pumping devices by a batch technique, which method comprises:

providing a substantially uniform layer of a ceramic material having an inner surface in contact with a first surface of a substantially uniform layer of etchable material;  
then forming grooves in a second surface opposite said first surface of said etchable material by etching away, in a predetermined pattern, substantially parallel, rectangular solid strips of said etchable material to expose, as a bottom surface of each said groove, corresponding, substantially parallel rectangular surface portions of the inner surface of said layer of ceramic material, leaving at least a first set of substantially identical, substantially parallel, rectangular solid projecting strips of said etchable material;

then depositing a layer of first electrode material over at least on a portion of a top surface of each said rectangular solid projecting strip and at least a portion of one said groove bottom surface adjacent each said rectangular solid projecting strip, said layer of first electrode material extending laterally continuously from at least the middle of the top surface of each of said first set of rectangular solid projecting strips to at least about the middle of said adjacent groove bottom;

then depositing a cover layer of an oxygen-ion conductive electrolyte material over the first electrode material and any exposed (i) etchable material and (ii) said inner surface of said ceramic material;

then depositing a layer of second electrode material over at least a portion of a top surface of said oxygen-ion conductive electrolyte material to form a layered article, said layer of said second electrode material extending laterally continuously at least from the middle of the top surface of each of said first set of said rectangular solid projecting strips to at least about the middle of an adjacent groove bottom;

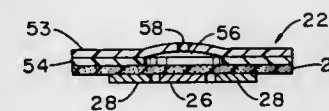
then cutting through said layered article perpendicular to the plane of said layered article in a grid pattern comprising (a) cuts between adjacent ones of said first set of rectangular solid projecting strips to expose for each one first and second electrode material and (b) cuts along lines perpendicular to said first cuts to produce a plurality of individual structures; and  
then etching away the remaining etchable material from said individual structures to form said devices.

9. The method according to claim 1, wherein said ceramic material is an oxygen-ion conducting electrolyte and, prior to depositing said ceramic material, said method further comprises depositing a layer of third electrode material on at least a portion of said first surface of said etchable material, said layer of said third electrode material extending laterally continuously at least from the middle of the top surface of each of first set of said rectangular solid projecting strip to at least about the middle of an adjacent groove bottom, said first and said second electrode materials being deposited so as to avoid

contact with each other, and prior to cutting through said layered article, depositing a layer of forth electrode material on an exposed surface of said ceramic material, said layer of forth electrode material extending laterally continuously at least from the middle of each of said first set of said rectangular solid projecting strips to at least about the middle of an adjacent groove bottom.

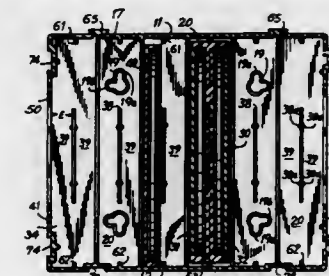
13. A device fabricated according to the method of claim 1.  
15. A device fabricated according to the method of claim 9.

**4,790,925**  
**ELECTROCHEMICAL GAS SENSOR**  
Barbara C. Miller, Catonsville; RaeAnn M. Auel, Westminster, and Alan A. Schneider, Reisterstown, all of Md., assignors to Mine Safety Appliances Company, Pittsburgh, Pa.  
Filed Sep. 19, 1987, Ser. No. 98,365  
Int. Cl.<sup>4</sup> G01N 27/30, 27/54  
U.S. Cl. 204-415 13 Claims



1. A gas sensor for determining an electrochemically active gas in the atmosphere comprising a working electrode and a counter electrode in contact with an electrolyte, the working electrode and counter electrode being bonded in close proximity on one surface of a gas-permeable membrane phobic to the electrolyte, each of said electrodes comprising a catalytic metal, means for exposing the working electrode and the counter electrode to the atmosphere to be tested and masking means for preventing exposure of at least a portion of the counter electrode to the electrochemically active gas, whereby the presence of electrochemically active gas in the atmosphere to be tested produces a current.

**4,790,926**  
**DUAL AND SINGLE AUDIO DISC BOX STORAGE TRAY**  
Patrick Mastronardo, 3151 Highbridge Rd., Stamford, Conn. 06903, and Fu-Jung Lin, Taipei, Taiwan, assignors to Patrick Mastronardo, Stamford, Conn.  
Continuation-in-part of Ser. No. 887,839, Jul. 21, 1986, Pat. No. 4,741,438. This application Jun. 15, 1987, Ser. No. 61,583  
The portion of the term of this patent subsequent to May 3, 2005, has been disclaimed.  
Int. Cl.<sup>4</sup> B65D 65/672  
U.S. Cl. 206-309 13 Claims



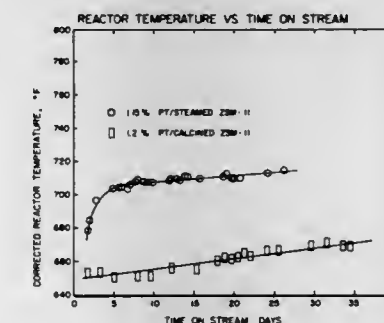
1. A storage tray for audio disc boxes comprising: opposed top and bottom walls, and a back wall interconnecting said top and bottom walls, a plurality of elongated first ribs disposed on at least one of the top and bottom walls, with the spacing between first ribs being about equal to the thickness of a conventional dual audio disc box, and a plurality of second ribs, and one of said second ribs being disposed between adjacent

first ribs with the distance between a first rib and an adjacent second rib being about equal to the thickness of a conventional single audio disc box, and wherein the length of the second rib being sized to slidably fit a back recess formed in the conventional dual audio disc box, said record rib comprising guide means for engaging within the recess, whereby one dual audio disc box is stored in the compartment between first ribs with the second rib and guide means fitting into the back recess, or two single audio disc boxes are stored in the compartment with each single disc box disposed between a first rib and a second rib.

**4,790,927**  
**PROCESS FOR SIMULTANEOUS HYDROTREATING AND HYDRODEWAXING OF HYDROCARBONS**  
John W. Ward, Yorba Linda, Calif., and Timothy L. Carlson, Palisade, Colo., assignors to Union Oil Company of California, Los Angeles, Calif.  
Division of Ser. No. 267,247, May 26, 1981, Pat. No. 4,428,862, which is a continuation-in-part of Ser. No. 172,868, Jul. 28, 1980, abandoned. This application Jan. 9, 1984, Ser. No. 569,297  
The portion of the term of this patent subsequent to Jan. 31, 2001, has been disclaimed.  
Int. Cl.<sup>4</sup> C10G 45/08, 45/12, 45/60, 65/04  
U.S. Cl. 208-89 102 Claims

102. A hydroprocessing process which comprises contacting a hydrocarbonaceous feed at hydrocarbon hydroprocessing conditions with a catalyst comprising an effective amount of a crystalline silica zeolite having uniform pore diameters, a hydrogenation component and a non-zeolitic inorganic oxide support.

**4,790,928**  
**CATALYTIC CONVERSION OVER DEHYDROXYLATED ZEOLITE**  
Clarence D. Chang, Princeton; Nai Y. Chen, Titusville; Stuart D. Hellring, Trenton, all of N.J.; Ying-Yen P. Tsao, Lahaska, and Dennis E. Walsh, Richboro, both of Pa., assignors to Mobile Oil Corporation, New York, N.Y.  
Continuation-in-part of Ser. No. 944,629, Dec. 19, 1986, Pat. No. 4,724,270, which is a continuation-in-part of Ser. No. 783,269, Oct. 4, 1985, abandoned, which is a continuation of Ser. No. 603,049, Apr. 23, 1984, abandoned. This application Feb. 8, 1988, Ser. No. 153,395  
Int. Cl.<sup>4</sup> C10G 47/02, 11/02; C07C 5/13  
U.S. Cl. 208-111 20 Claims



1. A process for catalytically dewaxing a hydrocarbon feedstock which comprises contacting the feedstock with a solid, porous catalyst comprising a zeolite having a Constraint Index of 1 to 12, a silica:alumina ratio of at least 12:1 and possessing acidic functionality, the zeolite having been heated to a temperature of at least 725° C. in an essentially water-free atmosphere to reduce its acidity to an alpha value below 100.

4,790,929

## HYDROTREATING PROCESS USING POROUS MULLITE

Barry K. Speronello, River Edge, N.J., assignor to Engelhard Corporation, Edison, N.J.

Division of Ser. No. 732,905, May 9, 1985, which is a continuation of Ser. No. 505,650, Jun. 20, 1983, abandoned. This application Aug. 19, 1986, Ser. No. 898,157

Int. Cl.<sup>4</sup> C10G 45/08

U.S. Cl. 208—216 PP

1 Claim

1. In a process for treating heavy hydrocarbon oil which contains heavy metals and/or sulfur comprising contacting said oil with hydrogen in the presence of a catalyst and recovering a hydrocarbon product having reduced content of heavy metals and/or sulfur, the improvement which comprises using as the catalyst one or more catalytic metals of the group consisting of cobalt, nickel, molybdenum and tungsten impregnated on porous supporting bodies consisting essentially of mullite crystals, and optionally free silica, said bodies having a molar ratio of  $\text{Al}_2\text{O}_3/\text{SiO}_2$  in excess of 0.50 and up to about 1.65 and having few, if any pores <100 Å in diameter and up to about 0.4 cc/g of pores having diameters >600 Å, said porous supporting bodies having been prepared by the method comprising calcining bodies of kaolin clay at a temperature in the range of about 1150° C. to about 1350° C. until the clay is converted into mullite and free silica, leaching the resulting bodies of calcined clay with an alkaline aqueous solution to remove at least a portion of said free silica, washing the leached clay bodies to remove alkali ions, drying and then recovering the resulting porous supporting bodies consisting essentially of mullite crystals.

4,790,930

## TWO-STEP HETEROCYCLIC NITROGEN EXTRACTION FROM PETROLEUM OILS

Ajay M. Madgavkar, Katy, Tex., and Don M. Washecheck, Naperville, Ill., assignors to Shell Oil Company, Houston, Tex.

Filed May 29, 1987, Ser. No. 55,479

Int. Cl.<sup>4</sup> C10G 17/04, 21/06

U.S. Cl. 208—254 R

26 Claims

1. A process for the removal of heterocyclic nitrogen compounds from a petroleum crude oil which comprises treating a petroleum crude oil rich in basic heterocyclic nitrogen compounds in a two-phase extraction zone comprising an extractant consisting essentially of an aqueous solution of a lower carboxylic acid in a concentration of from about 20 up to 95 weight percent in said aqueous phase, at separation conditions, to extract at extraction conditions said basic heterocyclic nitrogen compounds with said lower carboxylic acid and thereby remove at least a portion of said basic heterocyclic nitrogen compounds from said petroleum crude oil and to form a first extraction stream comprising a petroleum crude oil with a lean content of basic heterocyclic nitrogen compounds and a second extraction stream comprising an aqueous phase containing said lower carboxylic acid and having an increased content of basic heterocyclic nitrogen compounds, passing said first separation stream to a catalytic hydrotreatment zone to hydrotreat said petroleum crude oil in the presence of hydrogen and a catalytic composition of matter, at hydrotreatment conditions, to remove basic heterocyclic nitrogen compounds and recovering a hydrotreated petroleum crude oil stream having a lower content of basic heterocyclic nitrogen compounds than present in said first separation stream having a lean content of basic heterocyclic nitrogen compounds.

4,790,931

## SURFACTANT MIXTURES AS COLLECTORS FOR THE FLOTATION OF NON-SULFIDIC ORES

Rita Koester, and Wolfgang von Rybinski, both of Duesseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 2, 1987, Ser. No. 127,749

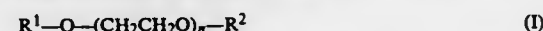
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1986, 3641447

Int. Cl.<sup>4</sup> B03D 1/02

U.S. Cl. 209—166

16 Claims

1. In a process for the froth flotation of a mineral-containing non-sulfidic ore using an anion-active surfactant as collector for the mineral, the improvement comprising the use therein of at least one alkyl or alkenyl polyethylene glycol ether which is terminally blocked by a hydrophobic radical as a co-collector for the mineral, wherein the at least one alkyl or alkenyl polyethylene glycol ether has the formula:



wherein  $\text{R}^1$  is a straight-chain or branched alkyl or alkenyl radical having 8 to 22 carbon atoms,  $\text{R}^2$  is a benzyl radical or a straight-chain or branched  $\text{C}_1\text{--C}_8$  alkyl radical, and  $n$  is a number of from 2 to 15.

4,790,932

## N-ALKYL AND N-ALKENYL ASPARTIC ACIDS AS CO-COLLECTORS FOR THE FLOTATION OF NON-SULFIDIC ORES

Beatrix Kottwitz, Wolfgang von Rybinski, and Rita Koester, all of Duesseldorf, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Dec. 3, 1987, Ser. No. 128,303

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1986, 3641579

Int. Cl.<sup>4</sup> B03D 1/02

U.S. Cl. 209—166

18 Claims

1. In a process for the froth flotation of non-sulfidic mineral-containing ores, the improvement comprising the use, as a flotation agent, of an anionic and/or nonionic collector surfactant in conjunction with at least one N-alkyl and/or N-alkenyl aspartic acid or salt thereof as a co-collector, in an amount sufficient to selectively concentrate the non-sulfidic mineral in the froth.

4,790,933

## DYNAMIC FILTRATION UNIT AND PROCESS OF USE

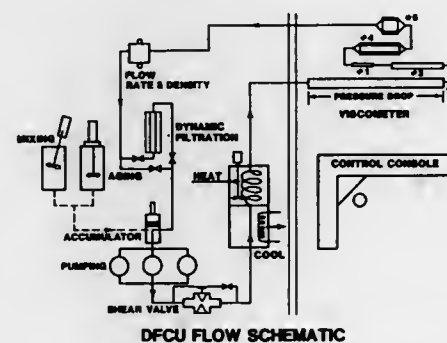
M. Scott Quigley, Plano, and Henry A. Seal, Euless, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 18, 1986, Ser. No. 932,053

Int. Cl.<sup>4</sup> B01D 25/06

U.S. Cl. 210—96.1

5 Claims



1. A drilling and completion fluid circulating unit comprising

ing (1) means for mixing such fluids; (2) means for aging the mixture; and a closed circuit connected to said mixing and aging means including (3) accumulator means for maintaining pumping pressure above the vapor pressure of said fluids said accumulator means leading to (4) means for pumping said fluid mixture in a circulating path through said unit having therein (5) temperature control means; and (6) means for measuring the viscosity of said fluids leading to (7) dynamic filtration means with an adjustable annulus means having multiple hollow cylindrical filters located centrally inside multiple vertical pressure housings; and

multiple vertical collection tubes attached to said filters; wherein each of said hollow cylindrical filters have a different outside diameter and leading therefrom back to said accumulator/pumping means.

4,790,934

## APPARATUS FOR FILTERING FLUID MEDIUM

Viktor V. Shishkin; Nikolai F. Kryazhevskikh, and Jury P. Shapovalov, all of Krasnodar, U.S.S.R., assignors to Inzhenerny Tsentri Trobooprovod, Krasnodar, U.S.S.R.

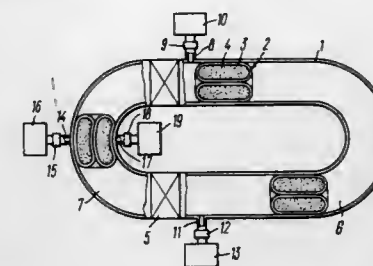
PCT No. PCT/SU86/00130, 8371 Date Jul. 28, 1987, 8102 (e) Date Jul. 28, 1987, PCT Pub. No. WO87/03821, PCT Pub. Date Jul. 2, 1987

PCT Filed Dec. 17, 1986, Ser. No. 124,778

Claims priority, application U.S.S.R., Dec. 24, 1985, 3988607 Int. Cl.<sup>4</sup> B01D 33/00

U.S. Cl. 210—189

1 Claim



1. An apparatus for filtering a fluid medium comprising a hollow body (1), a movable flexible filtering member (2) arranged in the body (1), and means (10, 13, 16, 19) for supplying a medium to be cleaned, removing the clean medium, cleaning the filtering member (2), and removing the cake, characterized in that the filtering member (2) is shaped as a toroid, whereas the body (1) is hermetically sealed, ring-shaped, and is equipped with slide valves (5) dividing the interior of the body (1) into two portions (6, 7), one portion (6) communicating, respectively, with the means (10, 13) for supplying the medium to be cleaned and removing the clean medium, and the other portion communicating with the means (16, 19) for cleaning the filtering member (2) and evacuating the cake.

4,790,935

## FILTER LEAF ASSEMBLY WITH BONDED SPACER AND SEALER

Willard L. Johnson, 12923 Lincoln Ave., Huntington Woods, Mich. 48070

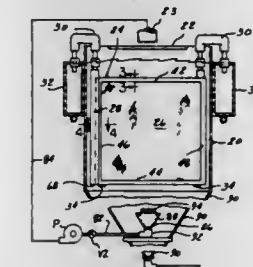
Filed Nov. 26, 1986, Ser. No. 932,010

Int. Cl.<sup>4</sup> B01D 25/04, 29/16, 29/32

U.S. Cl. 210—232

10 Claims

1. A filter leaf assembly comprising a pair of like generally rectangular filter media support panels, each of said panels having a plurality of spaced parallel longitudinally and transversely extending webs defining an open grid-like structure, and a plurality of elongate spacing members bonded to and between opposed webs on said panels to establish and maintain the panels in spaced parallel relationship to each other, said webs forming a plurality of openings extending through said panels for conducting fluid flow into the space between the panels, a rigid generally rectangular peripheral frame defined by spaced parallel longitudinal and transversing frame mem-



bers fixedly secured to each other to extend continuously around the peripheries of said support panels and fixedly secured thereto to support said panels in spaced parallel relationship to each other and to enclose said space between said panels, one frame member of said peripheral frame having an elongate opening therethrough defining a fluid outlet from said space and a pair of grooves located respectively on opposite sides of said one frame member, a pair of filter media sheets, one sheet overlying the outer side surfaces of each of said support panels, attachment means sealingly securing the edges of said sheets to said frame around the entire peripheries of the respective panels, an elongate rigid outlet pipe in fluid communication with said elongate opening through said one frame member, means defining a slot through the wall of said pipe extending axially from one end of said pipe, said slot having a width less than the thickness of said one frame member, said pair of grooves located respectively on opposite sides of said one frame member to slidably engage and receive the wall of said pipe at opposite sides of said slot to thereby locate and position said frame upon said pipe, means to sealingly said pipe to said one frame member, and means for sealingly closing said end of said pipe after said one frame member is located within said slot.

4,790,936

## COLLAPSABLE OIL SPILLAGE RECOVERY SYSTEM

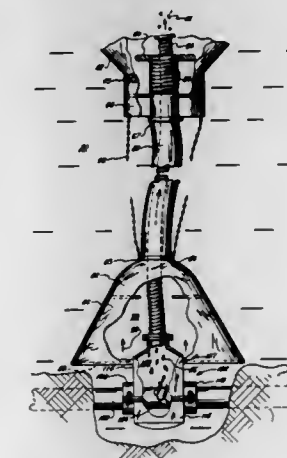
John L. Renfrow, 1236 E. Alexander, Lafayette, La. 70501

Division of Ser. No. 846,231, Mar. 31, 1986, Pat. No. 4,702,832. This application Aug. 26, 1987, Ser. No. 90,423

Int. Cl.<sup>4</sup> B01D 21/00

U.S. Cl. 210—242.3

2 Claims

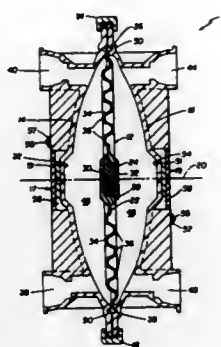


1. A system for recovering oil from a break in an underwater pipeline, the system comprising:  
a. means for substantially enveloping portion of the pipe, that portion of the pipe from which oil is leaking;  
b. a transport line in fluid communication with said means



for enveloping the flow of oil from the pipe line as it percolates through the water;  
c. means on the second end of the transport line for receiving the oil recovered in the pipe, the means including a partially submergible balloon, wherein the oil recovered is percolated through the water contained within the balloon and displaces the water from the balloon to form an upper layer of oil.

**4,790,937**  
**DIAPHRAGM AND CHAMBER DEVICE**  
George J. Ellers, Evergreen, Colo., assignor to Cobe Laboratories, Inc., Lakewood, Colo.  
Filed May 20, 1986, Ser. No. 865,364  
Int. Cl.<sup>4</sup> B01D 13/00  
U.S. Cl. 210—321.71 11 Claims



9. A dialysate supply machine comprising  
a first fluid flow chamber with a first inlet for connection to source of fresh dialysate, a first outlet for connection to a dialyzer, a second inlet for connection to said dialyzer, a second outlet for connection to a drain,  
valves controlling flow into and out of said inlets and outlets, a generally flat flexible sheet within said chamber and dividing said chamber into a fresh dialysate region communicating with said first inlet and outlet and a spent dialysate region communicating with said second inlet and outlet, said generally flat flexible sheet having a periphery sealed to said chamber and a central portion that is reciprocally movable along an axis perpendicular to a plane through said periphery,  
a magnet secured solely to the center of said sheet, said magnet having a front and a rear spaced from each other along said axis, said magnet being movable back and forth between said walls completely within said chamber, and  
a magnet position sensor outside of said chamber and controlling said valves in response to the position of said magnet.

**4,790,938**  
**FILTER FOR REMOVING PARTICULATE MATTER FROM FLUID WITHIN A MOVABLE BODY**  
Gilbert W. Younger, 2621 Merced Ave., El Monte, Calif. 91733  
Filed Jan. 24, 1986, Ser. No. 822,033  
Int. Cl.<sup>4</sup> B01D 27/08, 35/02  
U.S. Cl. 210—484 18 Claims

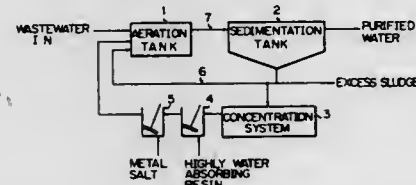
1. A filter for removing particulate matter from liquid within a movable body, said filter including:  
a filter body defining a porous unitary mass having an outer and an inner surface defined thereon,  
said filter body being formed from a resilient material, said filter body having a plurality of passageways defined between said inner and outer surface, said passageways extending to all portions of said outer surface area of said

filter body and terminating in openings in said outer surface,  
said passageways tapering continuously in a direction from said outer surface towards said inner surface of said filter body, and



said filter permitting simultaneous flow of liquid entering said filter body from any area of said outer surface through a plurality of said passageways.

**4,790,939**  
**METHOD OF IMPROVING SVI OF MIXED LIQUOR IN AERATION TANK**  
Akira Suzuki, Saitama; Norio Watanabe, Kanagawa, and Masashi Kage, Tokyo, all of Japan, assignors to Shinryo Corporation, Tokyo, Japan  
Continuation-in-part of Ser. No. 649,804, Sep. 12, 1984, abandoned. This application Jun. 18, 1986, Ser. No. 875,626  
Claims priority, application Japan, Oct. 4, 1983, 58-185488  
Int. Cl.<sup>4</sup> C02F 3/12, 11/14  
U.S. Cl. 210—608 3 Claims



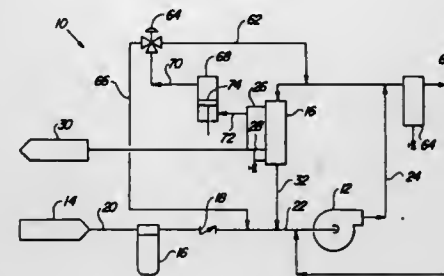
1. A method for improving the SVI of the mixed liquor residing in an aeration tank in an activated sludge treatment system which also includes a sedimentation tank, said method comprising the following steps:  
(A) feeding a concentration system other than said activated sludge treatment system with at least one of the mixed liquor in the aeration tank, the mixed liquor withdrawn from a line connecting the aeration tank and the sedimentation tank, and the settled sludge leaving said sedimentation tank;  
(B) introducing the concentrated sludge from said concentration system into a first mixing zone where said concentrated sludge is mixed with a polyacrylic acid resin which is able to absorb from 50 to 1000 times its own weight of water;  
(C) introducing a gel-like sludge-resin mixture from said first mixing zone into a second mixing zone where calcium chloride is added to said mixture thereby causing the gel to contract; and  
(D) returning to said aeration tank a contracted gel-sludge mixture leaving said second mixing zone.

**4,790,940**  
**PROCESS FOR WASTEWATER TREATMENT**  
Frank J. Castaldi; Timothy W. Trofe; Gordon C. Page, and Kevin M. Adams, all of Austin, Tex., assignors to Radian Corporation, Austin, Tex.  
Continuation-in-part of Ser. No. 935,235, Nov. 26, 1986, Pat. No. 4,737,289. This application Nov. 3, 1987, Ser. No. 113,796  
Int. Cl.<sup>4</sup> C02F 3/34  
U.S. Cl. 210—611 12 Claims

9. An integrated process for treating a wastewater containing free cyanide to convert said cyanide to thiocyanate and to eliminate said thiocyanate to produce a non-hazardous waste-

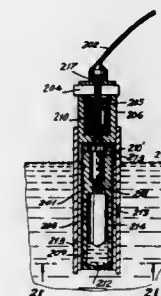
water effluent which comprises the steps of treating a wastewater containing free cyanide with sulfur in the form of polysulfide at a pH in the range of 9.2 to 10, in a weight ratio of polysulfide to cyanide ranging from 1:1 to 4:1 and in the presence of at least 100 mg/l of a cationic surfactant as a catalyst, thereafter adjusting the pH to a range of 6.7 to 7.2 and treating the resultant wastewater with a treating agent consisting essentially of cultures of bacteria of the genus *Thiobacillus* in combination with nitrifying bacteria effective to oxidize ammonia to nitrite and nitrite to nitrate.

**4,790,941**  
**FLUID DECONTAMINATION SYSTEM**  
John A. Taylor, Pinckney, Mich., assignor to Separation Dynamics, Inc., Southfield, Mich.  
Filed Mar. 18, 1988, Ser. No. 169,981  
Int. Cl.<sup>4</sup> B01D 13/01  
U.S. Cl. 210—639 15 Claims



10. A fluid separation process comprising the steps of:  
removing corrosive contaminants from a hydrocarbon fuel, by;  
conducting a flow of a fluid mixture to an inner surface (52) of a bore (50) of a plurality of hollow fiber membranes (34) to separate a permeate flowing tangentially through the membranes (34) from a retentate flowing through the bores (50) and removing resistance of the flow through the bores (50) of the membranes (34) aiding in increasing uniform flow through the length of the bores (50) of the membranes (36).

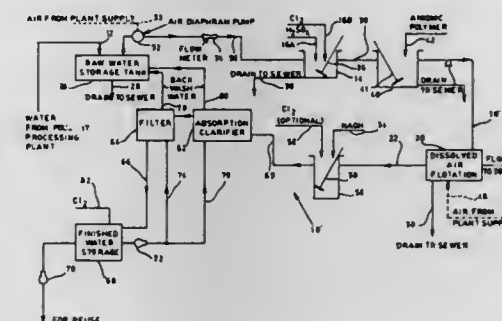
**4,790,942**  
**FILTRATION METHOD AND APPARATUS**  
Islef Shmidt, Brooklyn, and Mario Badiali, Bronx, both of N.Y., assignors to Membrex Incorporated, Garfield, N.J.  
Continuation of Ser. No. 684,304, Dec. 20, 1984, abandoned, which is a continuation-in-part of Ser. No. 563,319, Dec. 20, 1983, abandoned. This application Jan. 10, 1987, Ser. No. 61,007  
Int. Cl.<sup>4</sup> B01D 13/00, 33/06  
U.S. Cl. 210—650 45 Claims



1. A method of filtration of fluid samples comprising:  
feeding a fluid sample into a gap between a stationary outer body and a rotatable inner body by immersing at least a

lower portion of the outer body in a body of the fluid, the lower region of the gap being at least in part open for the passage of fluid into the gap, at least a portion of the outer surface of at least one of the inner and outer bodies which faces the gap comprising a filter for the passage of permeate from fluid in the gap;  
rotating the inner body at a rate which establishes a Taylor number ( $T_a$ ) greater than about 40 in at least a substantial portion of the fluid in the gap;  
causing permeate to flow through the filter from the gap; and  
collecting permeate from the surface of the filter which faces away from the gap.

**4,790,943**  
**RENOVATION OF USED WATER FROM POULTRY PROCESSING PLANTS**  
C. Lamar Dunn, Blount County, and David L. Turner, Knox County, both of Tenn., assignors to Southeastern Water Conservation Systems, Inc., Knoxville, Tenn.  
Filed May 7, 1987, Ser. No. 47,972  
Int. Cl.<sup>4</sup> C02F 1/56  
U.S. Cl. 210—705 17 Claims



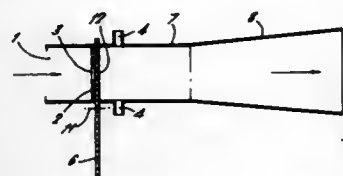
1. A process for the treatment of effluent water from processing poultry in a poultry processing plant to provide product water suitable for reuse in said plant, which comprises the steps of:  
treating said effluent water with a strong oxidant selected from the group consisting of chlorine, potassium permanganate, ozone, and chlorine dioxide, to oxidize color and destroy bacteria, in combination with a pH-adjusting agent selected from the group consisting of sulfuric acid, nitric acid, and hydrochloric acid, to adjust said effluent water to a pH of less than about 5.2 pH units to break oils and greases and to form a floc containing substantially all contaminants of said effluent water; and  
recovering a water phase from said floc, said water phase being suitable for reuse in said poultry processing plant.

**4,790,944**  
**PROCESS AND APPARATUS FOR THE SEPARATION OF FOREIGN MATTER FROM A LIQUID BY FLOTATION**  
Iain C. Gordon, Kempston, and Ian Christopher, Stubbington, both of United Kingdom, assignors to CJB Developments Ltd., London, England  
Filed Mar. 24, 1987, Ser. No. 29,698  
Claims priority, application United Kingdom, Mar. 27, 1986, 8607854  
Int. Cl.<sup>4</sup> B01D 17/035  
U.S. Cl. 210—706 5 Claims

1. A process for the separation of foreign matter from a liquid, which process comprises the steps of:  
(a) passing a stream of liquid contaminated with particles of foreign matter and in which gas is dissolved through a variable orifice nozzle and then causing the stream of

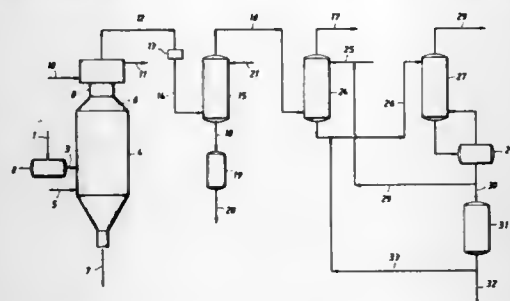
liquid to mix with a stream of induced gas which is the same as the gas which is dissolved in the liquid, thereby to provide a multi-phase flow;

- (b) causing said multi-phase flow to be subjected to turbulence and shearing thereby to produce a well dispersed bubbly liquid stream;
- (c) causing said bubbly liquid stream to pass into a vessel which contains said liquid contaminated with particles of



- foreign matter, said liquid in the vessel having a free surface, and said liquid stream being introduced below said free surface of the liquid in the vessel; and
- (d) allowing the bubbles of gas in said liquid to rise to said free surface of said liquid, whereby the particles of foreign matter contaminating the liquid are caused to float to said free surface by their surface adhesion to said bubbles of gas.

**4,790,945**  
**REMOVAL OF HYDROGEN SELENIDE**  
 Daniel C. Baker, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.  
 Filed May 8, 1987, Ser. No. 47,398  
 Int. Cl.<sup>4</sup> C02F 1/62; B01D 53/14  
 U.S. Cl. 210—712

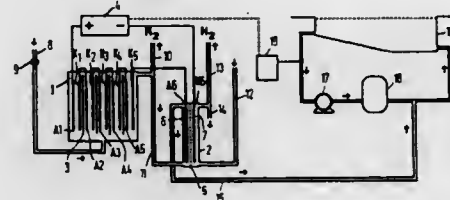


1. A process for removal of hydrogen selenide from a liquid stream which comprises treating a stream of solvent selected from the group consisting of (tertiary) amines, aminoalcohols, glycols, glycol ethers, sulfones, sulfoxides, N-heterocyclics, amides or mixtures thereof, with a heavy metal non-selenide salt to precipitate the hydrogen selenide as a heavy metal selenide.

7. A process for the purification of a gas stream containing hydrogen selenide and acidic gases which comprises (1) contacting the gas stream with an aqueous scrubbing solution to remove at least a part of the hydrogen selenide; (2) contacting the scrubbing solution with a heavy metal non-selenide salt to precipitate hydrogen selenide as a heavy metal selenide salt; and (3) treating the gas stream from (1) with a liquid solvent for the absorption of acidic gases.

**4,790,946**  
**PROCESS FOR THE PREPARATION OF A DISINFECTANT FOR WATER, SUCH AS DRINKING- OR SWIMMING-WATER**  
 Hermanus J. Jansen, 's-Gravenweg 108, 2911 CH Nieuwerkerk a/d IJssel, Netherlands  
 Filed Aug. 27, 1986, Ser. No. 900,743  
 Claims priority, application Netherlands, Aug. 27, 1985, 8502355

Int. Cl.<sup>4</sup> C02F 1/50  
 U.S. Cl. 210—748 5 Claims



1. A process for the preparation of a disinfectant for water which comprises the steps of first electrolyzing an aqueous NaCl solution in electrolysis cells to form either (a) in an hypochlorite electrolysis cell without a separated anode and cathode chamber, a residual NaCl solution containing electrolytically formed NaOCl; or (b) in an electrolysis cell having an ion-permeable membrane or diaphragm separating the anode and cathode chambers thereof, a residual NaCl solution containing dissolved electrolytically formed Cl<sub>2</sub>; introducing the yield of (a) or (b) depending upon the configuration of said cell for the first electrolysis into a second electrolysis cell and further electrolyzing the solution (a) of NaCl containing NaOCl in a cell configured by an ion-permeable membrane to convert at least some of the residual NaCl in the solution to dissolved Cl<sub>2</sub> gas; or electrolyzing the solution (b) of residual NaCl containing dissolved Cl<sub>2</sub> in a cell configured to convert at least some of said residual NaCl in the solution to NaOCl; and then adding the resultant disinfecting mixture of NaCl, NaOCl and dissolved Cl to the water to be disinfected.

**4,790,947**  
**WATER TREATING IN A VERTICAL SERIES COALESCING FLUME**  
 Kenneth E. Arnold, 3031 Shadowdale, Houston, Tex. 77043  
 Division of Ser. No. 735,686, May 20, 1985, Pat. No. 4,720,341.  
 This application Oct. 13, 1987, Ser. No. 108,127  
 Int. Cl.<sup>4</sup> B01D 17/028

U.S. Cl. 210—801 4 Claims

1. A method for separating oil from a mixture of oil and water, comprising the steps of:

introducing such mixture into a series of vertically disposed compartments having bulkhead means disposed between each pair of said compartments, the bulkhead means defining an upper compartment and a lower compartment and blocking flow therebetween;

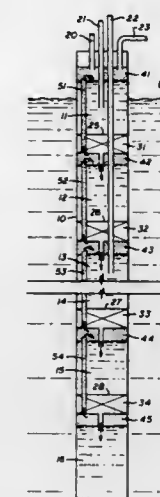
flowing such mixture from the upper compartment to the lower compartment through a conduit having a flow bore and at a flow velocity sufficient to induce turbulence in such a mixture for such time as necessary to coalesce droplets of such oil;

separating oil from such mixture within the lower compartment;

flowing the separated oil from an upper region of the lower compartment with a riser means;

receiving the separated oil from the riser means with a removal means;

discharging all the separated oil from the series of compartments with the removal means; and



discharging fluid from the lowermost compartment of the series.

**4,790,948**  
**LUBRICATING OIL CONTAINING DISPERSANT VISCOSITY INDEX IMPROVER**  
 Christopher S. Lin, Poughkeepsie, N.Y.; William F. Hart, Freehold, N.J., and Maria M. Kapuscinski, Carmel, N.Y., assignors to Texaco Inc., White Plains, N.Y.  
 Filed Oct. 14, 1986, Ser. No. 918,204  
 Int. Cl.<sup>4</sup> C10M 107/42; C08L 51/00

U.S. Cl. 252—47.5 37 Claims

1. The method of preparing a functionalized polymer which comprises

copolymerizing, under free radical polymerization conditions, (i) first monomer containing a copolymerizable ethylenically unsaturated carbon-carbon double bond and an epoxide moiety and (ii) second monomer containing a copolymerizable ethylenically unsaturated carbon-carbon double bond and which is free of epoxide moieties thereby forming a copolymer of molecular weight  $M_n$  of 10,000–1,000,000 containing at least two pendant side chains containing epoxide moieties;

functionalizing a first portion of said side chains containing epoxide moieties with first functionalizing agent containing at least one sulfur atom and at least one hetero nitrogen atom;

functionalizing a second portion of said side chains containing epoxide moieties with, as second functionalizing agent, a primary or secondary functionalizing polyamine thereby forming a dually functionalized product polymer; and

recovering said dually functionalized product polymer.

14. A functionalized polymer comprising moieties derived from (i) first monomer containing a copolymerizable ethylenically unsaturated carbon-carbon double bond and an epoxide moiety and (ii) second monomer containing a copolymerizable ethylenically unsaturated carbon-carbon double bond and which is free of epoxide moieties, said polymer backbone bearing at least two pendant side chains containing epoxide moieties, a first portion of said side chains containing epoxide moieties having been functionalized with first functionalizing agent containing at least one sulfur atom and at least one hetero nitrogen atom, and a second portion of said side chains containing epoxide moieties having been functionalized with, as second functionalizing agent, a primary or secondary functionalizing polyamine.

27. A lubricating oil composition comprising a major portion of a lubricating oil and a minor effective viscosity index im-

proving portion of, as additive, a functionalized polymer comprising moieties derived from (i) first monomer containing a copolymerizable ethylenically unsaturated carbon-carbon double bond and an epoxide moiety and (ii) second monomer containing a copolymerizable ethylenically unsaturated carbon-carbon double bond and which is free of epoxide moieties, said polymer backbone bearing at least two pendant side chains containing epoxide moieties, a first portion of said side chains containing epoxide moieties having been functionalized with first functionalizing agent containing at least one sulfur atom and at least one hetero nitrogen atom, and a second portion of said side chains containing epoxide moieties having been functionalized with, as second functionalizing agent, a primary or secondary functionalizing polyamine.

**4,790,949**  
**AQUEOUS BLEACHING AGENT SUSPENSIONS CONTAINING PEROXYCARBOXYLIC ACID, METHOD FOR THEIR PREPARATION AND USE**  
 Manfred Dankowski, Mömbria; Thomas Lieser; Günter Preacher, both of Hanau and Wolfgang Leonhardt, Frankfurt, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany  
 Filed Mar. 16, 1988, Ser. No. 168,996

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1987, 3709347

Int. Cl.<sup>4</sup> C11D 3/39, 7/20, 7/38; D06L 3/02  
 U.S. Cl. 252—95 20 Claims

1. A storage-resistant, pourable-to-pasty, aqueous bleaching agent suspension having a pH between approximately 1 and approximately 6, containing an aqueous carrier liquid, a particulate, substantially water-insoluble peroxycarboxylic acid, an acidifying agent, a thickening, colloidal silicic acid, the amount of silicic acid being 0.1 to about 7% by weight in relation to the bleaching agent suspension, and contains a hydrateforming neutral salt which desensitizes peroxycarboxylic acids in an amount of 10 to 400% by weight, calculated hydrate-free in relation to the peroxycarboxylic acid used.

**4,790,950**  
**AQUEOUS ALKALI METAL HALOGENITE COMPOSITIONS CONTAINING A COLORANT STABILIZED BY NH<sub>4</sub>OH**  
 Richard S. Hutchings, Cincinnati, Ohio, assignor to The Drackett Company, Cincinnati, Ohio  
 Filed Mar. 7, 1988, Ser. No. 165,046

Int. Cl.<sup>4</sup> A01N 59/00; C11D 3/48, 7/10; D06L 3/08  
 U.S. Cl. 252—102 20 Claims

1. An aqueous, alkaline cleaning composition comprising on a weight basis about 0.5 to about 5% of an alkali metal halogenite; from about 0.01 to about 3% of a dye normally chemically incompatible with said halogenite in aqueous media, and a stabilizer which is ammonium hydroxide, said stabilizer being present in the composition in an amount effective to stabilize the composition as evidenced by a substantial absence of chlorine dioxide in the composition.

**4,790,951**  
**LIQUID ALL-PURPOSE CLEANING PREPARATIONS CONTAINING TERPENE AND HYDROGENATED NAPHTHALENE AS FAT DISSOLVING AGENT**  
 Erich P. Frieser, and Alexander Jainschig, Vienna, Austria, assignors to Henkel Kommanditgesellschaft auf Aktien, Dueseldorf, Fed. Rep. of Germany  
 Filed Jan. 12, 1987, Ser. No. 61,939  
 Claims priority, application Austria, Jan. 12, 1986, 1601/86  
 Int. Cl.<sup>4</sup> C09D 9/00

U.S. Cl. 252—162 25 Claims

1. In a liquid cleaning preparation for removing fats and soil from hard surfaces of the type containing an anionic or non-ionic surfactant or both; a water-soluble builder; and a water-



miscible solvent; the improvement comprising a fat-dissolving agent consisting essentially of from about 0.25 to about 5.0% by weight of a terpene and from about 0.25 to about 5.0% by weight of a water-insoluble apolar solvent which is completely or partially hydrogenated naphthalene, and wherein the pH of the cleaning preparation is above about 7.

4,790,952

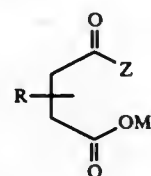
# ALKYL MONOPEROXSUCCINIC ACID PRECURSORS AND METHOD OF SYNTHESIS

Dale S. Steichen, Livermore; and Sheldon N. Lewis, Lafayette, Hao Ku, Pleasanton, all of Calif., assignors to The Clorox Company, Oakland, Calif.

Filed Aug. 14, 1986, Ser. No. 897,152

Int. Cl.<sup>4</sup> D06L 3/02; C11D 3/39; C07C 179/00, 178/00  
U.S. Cl. 252-186.39 20 Claims

1. A dry bleaching composition comprising a bleach effective amount of a peracid precursor compound of the general structure



wherein

Z is a leaving group, the conjugate acid of which has a pKa in the range of from about 4 to about 15;

R is a substituted or unsubstituted, alkyl or alkenyl group having from about one to about eighteen carbon atoms, and

M is hydrogen or an alkali or alkaline earth metal; and a source capable of yielding hydrogen peroxide in aqueous solution.

4,790,953

# LIQUID HYPOCHLORITE BLEACH CONTAINING OPTICAL BRIGHTENER SOLUBILIZED BY AMINE OXIDE

Samir A. Mansy, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

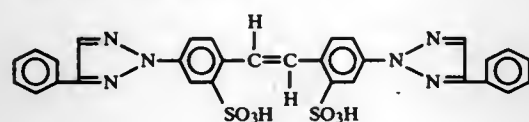
Continuation of Ser. No. 687,115, Dec. 28, 1984, abandoned.

This application Apr. 23, 1987, Ser. No. 45,242

Int. Cl.<sup>4</sup> C09K 3/00; D06L 3/12

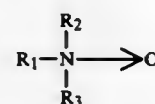
U.S. Cl. 252-187.26 7 Claims

1. An aqueous composition consisting essentially of:  
(a) from about 3% to about 8% sodium hypochlorite;  
(b) from about 0.025% to about 0.2% of an optical brightener having the formula:



or the salts thereof;

(c) from about 0.5% to about 2% of an amine oxide selected from the group consisting of those having the formula:



wherein R<sub>1</sub> is a C<sub>8</sub>-C<sub>18</sub> saturated alkyl group; R<sub>2</sub> and R<sub>3</sub> are C<sub>1</sub>-C<sub>12</sub> saturated alkyl groups.  
(d) at least about 80% water;  
wherein the amine oxide and brightener are present at a ratio of

40:1 to 10:1; and wherein said composition is a solution which is visibly clear of UV fluorescence and yet exhibits UV fluorescence on fabrics washed therein.

4,790,954

# MIXED METAL HYDROXIDE-CLAY ADDUCTS AS THICKENERS FOR WATER AND OTHER HYDROPHYLIC FLUIDS

John L. Burba, III, Angleton, and Audrey L. Barnes, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 752,326, Jul. 5, 1985, Pat. No. 4,664,843. This application May 7, 1987, Ser. No. 47,800

The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B01J 13/00; C01B 33/28; C09K 7/00

U.S. Cl. 252-315.5 23 Claims

1. A method for reacting a mineral clay with a monodispersed monolayer mixed metal hydroxide of the formula:



where

m is an amount of Li in the range of zero to about 1;

D is a divalent metal ion, and d is an amount of D in the range of zero to about 4;

T is a trivalent metal ion;

A represents monovalent or polyvalent anions of valence -n, with a being the amount of A anions;

(m+d) is greater than zero and (m+2d+3+na) is equal to or greater than 3;

said method comprising adding a small amount of a hydrophylic organic material to an aqueous gel of the above described compound, then drying the said aqueous gel sufficiently to obtain the compound in powder form, subsequently redispersing the powder in an aqueous media, and then combining the redispersed powder with an aqueous dispersion of clay to form an adduct therewith.

4,790,955

# AZEOTROPE-LIKE COMPOSITIONS OF TRICHLOROTRIFLUOROETHANE, ACETONE, NITROMETHANE AND HEXANE

Earl E. A. Lund, West Seneca; David P. Wilson; Rajat S. Basu, both of Williamsville, and Hang T. Pham, North Tonawanda, all of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Dec. 24, 1984, Ser. No. 685,871

Int. Cl.<sup>4</sup> C11D 7/50; C23G 5/036

U.S. Cl. 252-364 17 Claims

1. Azeotrope-like compositions comprising trichlorotrifluoroethane, acetone, nitromethane, and hexane.

4,790,956

# ACYLOXYALKANESULFONATE PASTE COMPOSITION AND METHOD FOR PREPARING SAME

Eugene A. Welpert, and David B. Markobrad, both of Kenosha, Wis., assignors to Mazer Chemicals, Inc., Gurnee, Ill.

Filed Jun. 29, 1987, Ser. No. 67,037

Int. Cl.<sup>4</sup> C11D 1/12, 17/00

U.S. Cl. 252-538 24 Claims

1. A paste composition consisting essentially of (a) between about 30 and about 80 weight percent of an acyloxy alkane sulfonate salt represented by the graphic formula:



where R is an aliphatic radical having from 6 to 22 carbon atoms, n is an integer of from 2 to 4 inclusive and M is an alkali metal cation, (b) between about 2 and about 8 weight percent of water-soluble ethoxylated monohydric alcohol represented by the graphic formula,



wherein R' is an alkyl radical having from about 8 to about 18 carbon atoms and m is a number of from about 4 to 50, and (c) the balance water.

4,790,957

# POLYCARBOXYLIC ACID ESTERS AND LUBRICANTS CONTAINING THESE ESTERS

Helmut Mach, Heidelberg; Hans-Henning Vogel, Frankenthal, and Juergen Jahn, Dannstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen am Rhein, Fed. Rep. of Germany

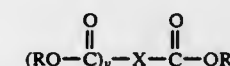
Filed Oct. 9, 1987, Ser. No. 106,390

Claims priority, application Fed. Rep. of Germany, Oct. 18, 1986, 3635490

Int. Cl.<sup>4</sup> C10M 129/72

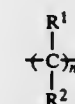
U.S. Cl. 252-56 S 6 Claims

1. A lubricant composition base oil consisting essentially of at least one aliphatic or aromatic polycarboxylic acid ester having the general formula:

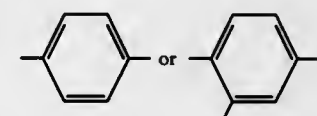


wherein

X is a straight or branched chain alkylene radical having the formula:



where R<sup>1</sup> and R<sup>2</sup> are, independently, hydrogen or C<sub>1</sub>-C<sub>5</sub> alkyl, and n is from 2 to 12; or an aryl radical having the formula:



R is a 9 or 13 carbon atom radical afforded by the oxo reaction of predominately linear n-butene oligomer having a degree of oligomerization of 2 or 3; and y is 1 or 2.

4,790,958

# CHEMICAL METHOD OF FERRIC ION REMOVAL FROM ACID SOLUTIONS

Arthur S. Teot, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 831,739, Feb. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 700,789, Feb. 11, 1985, abandoned. This application May 18, 1987, Ser. No. 50,642

Int. Cl.<sup>4</sup> E21B 43/27

U.S. Cl. 252-8.553 32 Claims

1. A process for thickening a strong aqueous haloacid in the presence of tetrahaloferrate ions comprising in any order the steps of:

- contacting said acid solution with a thickening amount of polymeric thickener or viscoelastic surfactant thickener composition containing cationic viscoelastic surfactants; and
- contacting said acid solution with an onium species conforming to the structural formula:



wherein

M is nitrogen, phosphorus or sulfur,  
at least two R groups are hydrocarbyl or inertly-substituted hydrocarbyl groups comprising from about 3 to about 12 carbon atoms and each other R group is hydrogen, a hydrocarbyl group or inertly-substituted hydrocarbyl group, said R groups being chosen such that the moiety (MR<sub>n</sub>)<sup>+</sup> is soluble in the acid solution but is not surface active and forms an insoluble precipitate with tetrahaloferrate anions,  
n is the number of R groups bonded to the onium forming species, and

X<sup>-</sup> is a suitable counterion, under conditions and in an amount such that said onium species forms an insoluble precipitate with substantial amounts of the tetrahaloferrate anions and such that substantial viscosity of the acid composition is maintained.

4,790,959

# DISPERSION

Masao Sasaki; Kaoru Onodera, both of Odawara, and Hideki Inahata, Minami-Ahigara, all of Japan, assignors to Konishiroku Photo Industry Co., Ltd., Japan

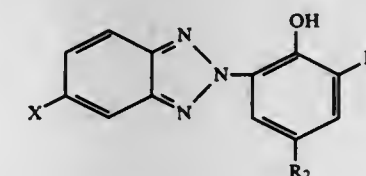
Continuation of Ser. No. 611,568, May 18, 1984. This application Jan. 12, 1987, Ser. No. 4,856

Claims priority, application Japan, May 21, 1983, 58-89591

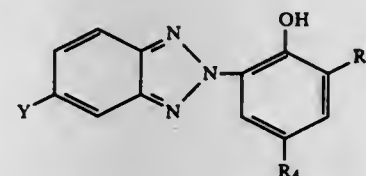
Int. Cl.<sup>4</sup> F21V 9/06

U.S. Cl. 252-589 11 Claims

1. A silver halide color photographic light-sensitive element comprising a support having thereon at least one layer containing a dispersion of oil globules containing an ultraviolet absorber and a high-boiling solvent, wherein said ultraviolet absorber is a mixture of 15 to 45 wt% of a compound of the following formula (I) and 85 to 55 wt% of a compound of the following formula (II), and said high-boiling solvent is a compound represented by the following formula (III) or (IV):



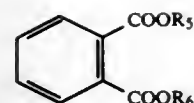
(I)



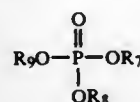
(II)

wherein R<sub>1</sub> and R<sub>2</sub> each represents an alkyl group having 1 to 4 carbon atoms, and X is a hydrogen atom, a halogen atom, a methyl group, an ethyl group, a methoxy group, an ethoxy group or an aryl group;

wherein R<sub>3</sub> and R<sub>4</sub> each represents an alkyl group, with the proviso that the total number of carbon atoms in the alkyl groups represented by R<sub>3</sub> and R<sub>4</sub> is 9 or more, and Y is a hydrogen atom, a halogen atom, a methyl group, an ethyl group, a methoxy group, an ethoxy group or an aryl group;



wherein  $R_5$  and  $R_6$  each represents an alkyl group, an alkenyl group, a cycloalkyl group or an aryl group;



wherein  $R_7$ ,  $R_8$  and  $R_9$  each represents an alkyl group, an alkenyl group, a cycloalkyl group or an aryl group.

4,790,960

# PROCESS FOR THE STRIPPING OF CESIUM IONS FROM AQUEOUS SOLUTIONS

Klaus Heckmann, Regensburg; Walter Rieger, Laaber-Hinterz-hof, and Reinhard Kroebel, Gondelsheim, all of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Fed. Rep. of Germany

Filed Jan. 30, 1986, Ser. No. 824,326

Claims priority, application European Pat. Off., Jan. 17, 1985, 86100612.0; Fed. Rep. of Germany, Jan. 30, 1985, 3502986

Int. Cl.<sup>4</sup> G21F 9/08, 9/00

U.S. Cl. 252—631

10 Claims

1. Process for selectively stripping cesium ions from a strongly acid aqueous radioactive waste solution in which a precipitation agent is added to the aqueous solution and the resulting precipitate, containing the  $Cs^+$  ions, is separated from the solution, comprising: adding to the solution a sodium or lithium tetraphenylborate having electron-attracting substituents on the phenyl rings as the precipitation agent, said precipitation agent being a compound which is disubstituted in the 2,4 positions of each of the phenyl rings, or is fourfold substituted in the 2,3,5,6 positions of each of the phenyl rings, or is fivefold substituted in the 2,3,4,5,6 positions of each of the phenyl rings, and wherein the substituents are fluorine atoms.

4,790,961

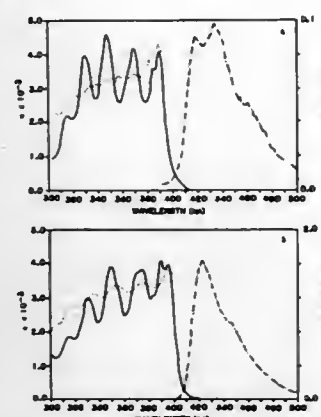
THERMALLY REVERSIBLE ORGANIC SOLVENT GELS  
Richard G. Weiss, Bethesda, Md., and Yih-chyan Lin, Arlington, Va., assignors to Georgetown University, Washington, D.C.

Filed Aug. 8, 1986, Ser. No. 894,878

Int. Cl.<sup>4</sup> B01J 13/00; C07C 50/18; C07J 9/00

U.S. Cl. 260—376

18 Claims



1. A gelled organic solvent comprising a solvent selected

from the group consisting of alkanes, alkenes, alkanols, aldehydes, acids, esters, and amines, in combination with a gel-producing amount of a compound having the formula (I)



wherein  $n$  is zero or a whole number between 2 and 20,  $R_1$  is an anthracene analogue or substituted anthracene analogue, and  $R_2$  is selected from the group consisting of cholesteryl, cholestanyl, and their derivatives.

(IV)

4,790,962

# PROCESS AND APPARATUS FOR THE INTERESTERIFICATION OF A TRIGLYCERIDE OIL AND PRODUCTS THEREFROM

Cornelis N. M. Keulemans, Rozenburg, and Adrianus Rozend-aal, Vlaardingen, both of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Continuation of Ser. No. 595,848, Apr. 2, 1984. This application Dec. 23, 1985, Ser. No. 814,154

Claims priority, application United Kingdom, Apr. 5, 1983, 8309143

The portion of the term of this patent subsequent to Apr. 29, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> C07C 3/02

U.S. Cl. 260—410.7

21 Claims

1. A process for the interesterification of a triglyceride oil employing a catalyst solution comprising a mixture of water, an alkali metal hydroxide and glycerol, wherein the oil is subjected to interesterification in a discrete charge, the process comprising (i) bringing together streams comprising respectively the catalyst solution and at least a part of a charge of oil, (ii) passing the combined streams through a spray nozzle into a low pressure chamber and thereby (a) homogenizing the combined oil and catalyst solution by subjecting to energetic shear, and (b) reducing the water content of the homogenized mixture within a period of 20 seconds so as to allow the formation of an active catalyst component and (iii) holding the mixture at a temperature sufficient to cause interesterification.

4,790,963

# PROCESS FOR SYNTHESIS OF ESTERS FROM GASEOUS REACTANTS CONTAINING ORGANIC HYDROXY COMPOUNDS AND MIXTURES OF HYDROGEN AND CARBON MONOXIDE

Thomas G. Attig, Aurora; Anne M. Graham, Northfield Center, and Frederick A. Pesa, Aurora, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Aug. 20, 1984, Ser. No. 642,406

Int. Cl.<sup>4</sup> C07C 67/36

U.S. Cl. 260—410.9 R

22 Claims

1. A process for producing an ester comprising contacting a gaseous reactant containing at least one organic hydroxy compound and a mixture of carbon monoxide and hydrogen with an ester synthesis catalyst of the formula



wherein

$M$  is selected from the group consisting of Ce, Cr, Fe, Mn and mixtures thereof,

$A$  is an alkali metal, alkaline earth metal or mixture thereof,

$a$  is from 0 to about 1,

$b$  is from 0.002 to about 10,

$c$  is from 0.2 to about 20,

$z$  is from 0 to about 1% by weight, and

$x$  is the number of oxygens needed to fulfill the valence requirements of the other elements.

# 4,790,964 VEHICLE MOUNTED RAM-AIR POWERED AERATOR FOR LIVE FISH CONTAINERS

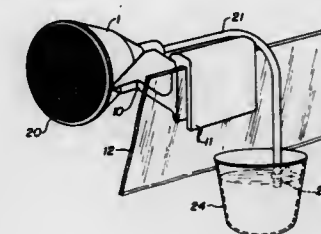
Randy G. Swanson, R.D. #3, Box 430A, Stewartstown, Pa. 17363

Filed Mar. 31, 1988, Ser. No. 175,954

Int. Cl.<sup>4</sup> H01K 63/02

U.S. Cl. 261—121.2

11 Claims



1. A vehicle mounted ram-air powered aerator for live bait or fish containers consisting of a generally funnel-shaped air collector having an angular discontinuity of 15° to 30° in its sidewalls to enhance collection pressure and efficiency; an air collection port having its entrance displaced approximately one-half (1/2) inch to three-quarters (3/4) inch forward of the rear wall of the collector; a rainwater sump region having two (2) to eight (8) drain holes to prevent flooding of the container during periods of rainfall and to enhance collection pressure and efficiency; an easily removable screen to prevent entry of large insects and airborne debris; a stand-off/support arm 2 to 10 inches in length and inclined 20° to 40° above the horizontal to position the air collector outboard of and above the low-pressure slip stream of the vehicle; a window mounting clip having a space maintainer ridge to provide a window gap for passage of the air tube into the vehicle; a flexible tube of one-quarter (1/4) inch to one-half (1/2) inch inside diameter to channel the air from the collection port of the collector to the fish container; and a clamping device to secure the outlet of the air tube at the proper location within the fish container.

4,790,965

# METHOD FOR SENSITIZING COMPOSITIONS TO RADIO FREQUENCY ENERGY

Agmund K. Thorsrud, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 707,613, Mar. 4, 1985, Pat. No. 4,661,299. This application Jan. 30, 1987, Ser. No. 8,814

Int. Cl.<sup>4</sup> B29C 19/02

U.S. Cl. 264—25

20 Claims

1. A method for molding wherein a substance suitable for radio frequency enhancement is treated by the method comprising admixing with said substance suitable for radio frequency enhancement a radio frequency sensitizing amount of zinc oxide (American process) inorganic radio frequency sensitizer treated essentially to remove absorbed an/or other volatiles and then subjected to radio frequency energy in a molding process.

4,790,966

# METHOD FOR FORMING A PALLET WITH DEEP DRAWN LEGS

L. Bogue Sandberg, Chassell; Bruce A. Haataja, Lake Linden; Douglas C. Jurmu, Laurium; Robert D. Palardy, Houghton; Frank H. Story, Dollar Bay, and William A. Yates, Calumet, all of Mich., assignors to Board of Control of Michigan Technological University, Houghton, Mich.

Filed Jun. 30, 1986, Ser. No. 879,937

Int. Cl.<sup>4</sup> B29C 43/34; D04H 1/44

U.S. Cl. 264—39

10 Claims

1. A method for molding an article having a major plane and

at least one non-planar portion displaced from the major plane, the method comprising the steps of:

providing flake-like wood particles;

admixing a resinous particle board binder into the wood particles;

depositing the mixture of wood particles and binder onto a support structure to form a loosely felted layered mat, the wood particles in the loosely felted layered mat lying substantially flat in planes generally parallel to the major plane of the mat, and said loosely felted layered mat including a first layer and a second layer supported by the first layer, and said wood particles in at least a portion of the first layer in the area of the mat to form the non-planar portion of the article being aligned in a first direction in substantially mutually parallel relation, and said wood particles in at least a portion of the second-layer in the area of the mat forming the non-planar portion being aligned in substantially mutually parallel relation in a second direction transverse to said first direction,

positioning the loosely felted layered mat in an open press between spaced dies having the shape of the molded article being formed, and

pressing the mat between the dies and applying sufficient heat and pressure to the mat to compress it into substantially the desired shape and size of the article to bond the wood particles together.

4,790,967

# METHOD AND APPARATUS FOR EXPANDING LOOSE FILL MATERIAL, SUCH AS EXPANDABLE POLYSTYRENE PELLETS

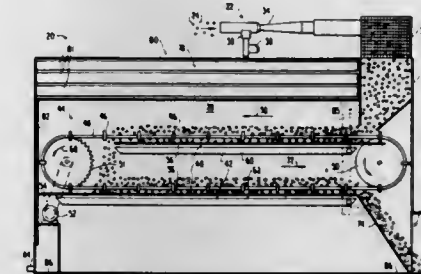
Erik T. Anderlind, Riverside, Conn., and Jean-Pierre Guille-mard, Saint Ouen, France, assignors to Compex Expanders S.A.R.L., Duclair, France

Filed Sep. 12, 1986, Ser. No. 907,096

Int. Cl.<sup>4</sup> C08J 9/22; F27B 15/08, 15/09, 15/14

U.S. Cl. 264—51

40 Claims



1. A method for expanding loose fill material comprising the steps of:

providing hopper means for receiving and storing loose fill material to be expanded;

providing an expansion chamber having a platform disposed therein for receiving loose fill material from said hopper means;

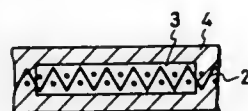
conveying and simultaneously tumbling loose fill material across said platform;

generating steam; and

distributed generated steam through said platform to expand said loose fill material as it is simultaneously conveyed and tumbled across said platform, said steam being substantially uniformly exposed to said loose fill material as a result of said simultaneous conveying and tumbling.

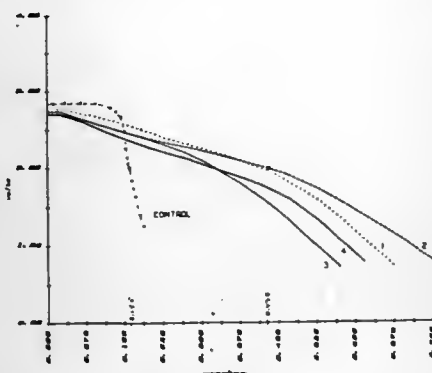


**4,790,968**  
**PROCESS FOR PRODUCING PRESSURE-SENSITIVE ELECTROCONDUCTIVE SHEET**  
 Kazuhiro Ohkawa, Ohta, and Taro Yamazaki, Yokohama, both of Japan, assignors to Toshiba Silicone Co., Ltd., Japan  
 Filed Oct. 7, 1986, Ser. No. 916,338  
 Claims priority, application Japan, Oct. 19, 1985, 60-232338;  
 Oct. 19, 1985, 60-232339  
 Int. Cl.<sup>4</sup> B29C 67/08; B05D 5/12; H01C 10/10; H01H 1/06  
 U.S. Cl. 264—104 15 Claims



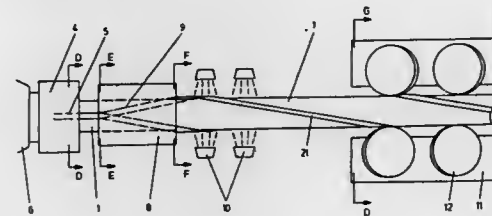
1. A process for producing a pressure-sensitive electroconductive sheet which comprises (A) forming conductor circuits or electrodes in a flexible porous substrate and (B) subsequently applying, followed by curing, a pressure-sensitive conductive paste onto either or both sides of said substrate and onto those areas of said substrate in which said conductor circuits or electrodes have been, thereby forming a pressure-sensitive conductive layer.

**4,790,969**  
**DRY MOLDED CATHODE COLLECTOR FOR LIQUID CATHODE SYSTEMS**  
 John C. Bailey, Columbia Station; Timothy D. Foley, North Olmsted, and Ernest D. Botos, Bay Village, all of Ohio, assignors to Eveready Battery Company, St. Louis, Mo.  
 Filed Jul. 16, 1987, Ser. No. 74,231  
 Int. Cl.<sup>4</sup> H01M 4/00  
 U.S. Cl. 264—105 10 Claims



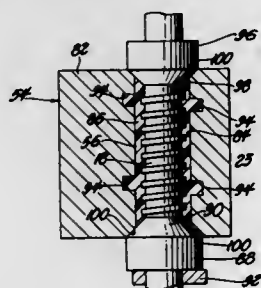
1. A method of forming porous carbon cathode collectors for electrochemical cells comprising the steps of:  
 mixing carbon black and binder with sufficient added liquid to obtain effective distribution of the binder with the carbon black in the form of a dough;  
 drying the dough mix to remove the added liquid;  
 compacting by rolling to improve the cohesive nature of the dry mix while at an elevated temperature less than about 300 degrees C.;  
 milling the dry compacted mix of carbon black and binder only until substantially all of the particles are greater than about 0.05 mm in diameter; and  
 press molding the dry milled mix into a resultant porous collector with at least 50% by volume of the pores being 10 microns or larger in size.

**4,790,970**  
**PROCESS FOR THE MANUFACTURE OF A LAUNCHING TUBE FOR MISSILES**  
 Josef Kurth, Troisdorf-Spich; Christoph Mathey, Ockenfels, and Waldemar Wisinger, Siegburg, all of Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany  
 Division of Ser. No. 731,015, May 6, 1985, Pat. No. 4,646,618, which is a continuation of Ser. No. 481,939, Apr. 4, 1983, abandoned. This application Aug. 15, 1986, Ser. No. 896,877  
 Claims priority, application Fed. Rep. of Germany, Apr. 5, 1982, 3212721  
 Int. Cl.<sup>4</sup> B29C 47/20, 47/94  
 U.S. Cl. 264—130 11 Claims



1. A process for the manufacture of a launching tube for missiles comprising a tubular element having guidance means on the inside for imparting spin to a missile fired from said tubular element, which comprises extruding a fiber-reinforced thermoplastic molding composition through an extrusion die to produce a tubular preform having a flow direction, a longitudinal axis and having at least one guide element located on an inside wall; said at least one guide element extending in parallel to the flow direction and to the longitudinal axis of the tubular preform within said extrusion die and exiting from said die in parallel to the longitudinal axis; and sizing the preform by passing the preform through a fixed sizing device having contact surfaces that shape and calibrate the preform into the tubular element having said guidance means on the inside, said sizing device imparting an axial twist to the preform as the preform passes through the sizing device to provide the at least one guide element with a helical configuration extending along the longitudinal axis of the tubular element, thereby forming said guidance means; the thus-sized tubular element leaving the sizing device with rotation corresponding to the axial twist imparted to said preform.

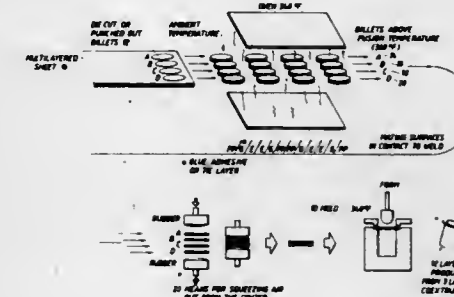
**4,790,971**  
**SHUTTLE TRANSFER SYSTEM**  
 Ross A. Brown, Cadillac, and Guy M. Davis, Traverse City, both of Mich., assignors to TranTek Inc., Traverse City, Mich.  
 Filed Jul. 9, 1986, Ser. No. 883,584  
 Int. Cl.<sup>4</sup> B21D 53/24; B29C 45/16; F16B 37/12  
 U.S. Cl. 264—138 9 Claims



1. A method of forming the threads (56) of a nut (54) on a multithreaded, high helix lead screw (18) of a nut drive and

lead screw assembly (10), said method comprising the steps of disposing a nut (54) having a cylindrical tube (82) and a center hole (84) larger than the diameter of the threads (23) of the lead screw (18) about the lead screw (18), filling the radial space (86) between the center hole (84) and the lead screw (18) with a polymer material, curing the polymer material and forming the high helix multiple threads (56) of the nut (54) complementary to the threads (23) of the lead screw (18) for providing polymer nut threads (56) having a greater radial thickness than the screw threads (23) and multipoint full thread contact completely about the screw (18) and minimizing tolerances between the threads (23,56) of the screw (18) and nut (54) to move the nut (54) at high speeds between the ends of the screw (18).

**4,790,972**  
**METHOD FOR STACKING BILLETS AND THERMOFORMING**  
 Paul M. Coffman, Houston, Tex., assignor to Rampart Packaging Inc., Williamsburg, Va.  
 Filed May 16, 1986, Ser. No. 863,753  
 Int. Cl.<sup>4</sup> B29C 51/14, 65/02  
 U.S. Cl. 264—152 4 Claims

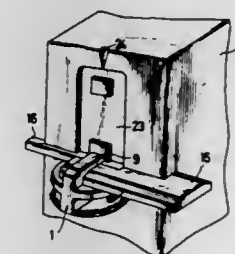


1. A process for forming containers from billets which comprises the steps of:  
 preparing a thermoplastic sheet of a layer of a polypropylene based polymer, an adhesive or tie layer and a barrier layer;  
 cutting or punching multilayer billets from said sheet;  
 stacking two or more of said billets together;  
 heating said stacked billets or the mating surfaces of said billets to at or above the fusion temperature of said mating surfaces of said billets so that said billets adhere to each other; and  
 thermoforming said stacked billets into containers.

**4,790,973**  
**METHOD OF MAKING INJECTION-MOLDED SLIDE FASTENER SLIDERS**  
 Hiroo Minami, Uozu, and Kazuo Ida, Toyama, both of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan  
 Filed Mar. 7, 1988, Ser. No. 165,026  
 Claims priority, application Japan, Mar. 17, 1987, 62-62106; Jan. 23, 1988, 63-13324  
 Int. Cl.<sup>4</sup> B28B 7/16; B29D 5/00  
 U.S. Cl. 264—242 10 Claims

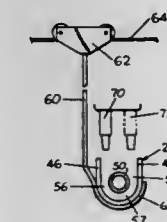
1. A method of making an injection-molded slide fastener slider, the slider including a slider body having upper and lower wings joined at their front ends by a neck so as to define therebetween a Y-shaped guide channel, an arch-shaped support lug integral with a top surface of the upper wing and extending longitudinally of the slider body so as to define jointly with the top surface a transverse hole, and a pull tab pivotally connected with the arch-shaped support lug and having a pintle loosely received in the transverse hole, said method comprising the steps of:  
 (a) providing a mold including a pair of complementary mold members jointly defining therebetween a first mold cavity for forming the slider body including the support

lug and a second mold cavity for forming the pull tab except the pintle, said first and second mold cavities communicating with each other, said mold further including a main slide core slidably disposed in said first cavity and having an auxiliary slide core slidably associated therewith, said main and auxiliary slide cores jointly have a shape complementary to the shape of the transverse hole, said auxiliary slide core being movable between a first position to block communication between said first and second mold cavities and a second position to allow communication between said first and second mold cavities;  
 (b) closing said mold while keeping said auxiliary slide core in said first position;  
 (c) injecting an amount of molten material into said closed mold to fill said first cavity, thereby forming the slider body and the support lug;



(d) thereafter, while keeping said mold in a closed condition, moving said auxiliary slide core from said first position to said second position to form a third cavity complementary in contour to the shape of the pintle, partly defined by an underside of the just molded support lug and communicating with said second mold cavity;  
 (e) then injecting an amount of molten material into said closed mold to fill said second and third mold cavities, thereby forming the pull tab with its pintle pivotally connected with the lug on the molded slider body; and  
 (f) cooling the molded slider body and pull tab for a length of time adequate for solidifying thereof and then removing from said mold the slider body and the pull tab molded in a coupled state.

**4,790,974**  
**METHOD FOR MANUFACTURING A VEHICLE CROSS-BEAM REAR AXLE**  
 David J. Perkins, Ann Arbor, and Louis D. Long, Rochester, both of Mich., assignors to Chrysler Motors Corporation, Highland Park, Mich.  
 Filed Nov. 30, 1987, Ser. No. 126,322  
 Int. Cl.<sup>4</sup> B32B 31/06; B60G 11/18  
 U.S. Cl. 264—328.1 2 Claims



1. A method for manufacturing a vehicle cross-beam axle in which:  
 a vehicle cross-beam axle member is an inverted channel with a U-shaped cross-section defined by a half-round bight wall portion terminating in opposed side wall portions;

a circular sectioned torsion tube coextensive with said axle member having its principal torsional axis positioned in a vertically disposed, longitudinally extending plane of symmetry of said axle member within the confines of said channel-shaped axle member, said wall portions and said torsion tube defining a generally D-shaped recess therebetween;

and wherein said D-shaped recess defines a pair of side gaps between said tube and its associated side wall portions together with an arcuate shaped gap located between said tube and said channel-shaped beam interior wall surface; which method comprises:

positioning said cross-beam axle member such that the open face of its U-shaped channel is directed upwardly;

injecting into one of said side gaps and said arcuate shaped central gap a first mass of hardenable urethane paste material via said open end face;

injecting into the remaining one of said gaps and said central space a second mass of hardenable urethane paste material;

permitting said masses of urethane paste material to coalesce into one integrated semi-rigid D-sectioned mass conforming to said recess by cooling at room temperature for a predetermined time interval;

advancing said axle member to a second station and subjecting said axle member to a hot water washing spray having a temperature of about 140 degrees F. thereby immersing said coalesced mass of urethane material in a heated water vapor atmosphere for a predetermined time interval thereby accelerating the curing cycle of said coalesced mass of urethane material; and

advancing said axle member to a third station wherein said axle member is preheated to a temperature of about 230 degrees F. for a predetermined time interval providing for a pre-wax set whereby said coalesced mass of urethane material is substantially fully cured into a one-piece damper member retaining said tube midpoint in said axle member.

4,790,975

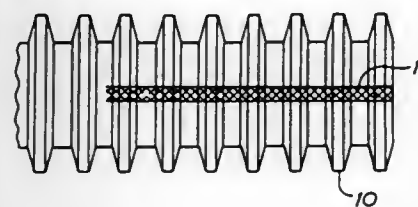
## METHOD AND DEVICE FOR EXTRUSION OF A DOUBLE WALL PLASTICS PIPE

Jyri Järvenkylä, Borås, and Paul Hölsä, Viskafors, both of Sweden, assignors to Oy Uponor AB, Nastola, Finland  
PCT No. PCT/SE86/00103, § 371 Date Dec. 19, 1986, § 102(e) Date Dec. 19, 1986, PCT Pub. No. WO86/05437, PCT Pub. Date Sep. 25, 1986

PCT Filed Mar. 11, 1986, Ser. No. 2,404  
Claims priority, application Sweden, Mar. 12, 1985, 8501213  
Int. Cl. B29C 47/04

U.S. Cl. 264—508

5 Claims



1. Method in extruding a double-walled plastic tube comprising the steps of:

extruding an inner wall of plastic material having a first color;

extruding an outer wall of plastic material having a second color concentrically with the inner wall;

corrugating the outer wall;

connecting the outer wall at the inside crests thereof to the outside surface of the inner wall;

diverting from the plastic material for the inner wall a fraction of such material to the outer wall; and

supplying the diverted plastic material to the outer wall as a

longitudinal strip of said first color on the outside of the outer wall of plastic material of said second color.

4. Extrusion tool for extruding a double walled plastic tube comprising:

a first annular output passage for plastic material for the inner wall of the tube;

a second annular output passage for plastic material for the outer wall of the tube; and

means inside the tool forming a passage connecting the first passage with the second passage and extending over a fraction of the respective circumferences of said first and second passages for diverting a strip of material from said first passage to said second passage.

4,790,976

## DEVICE FOR INSTALLING DRY PDD LANCES AND FOR FLUSHING OUT LANCE-HOUSING TUBES IN BOILING WATER REACTORS

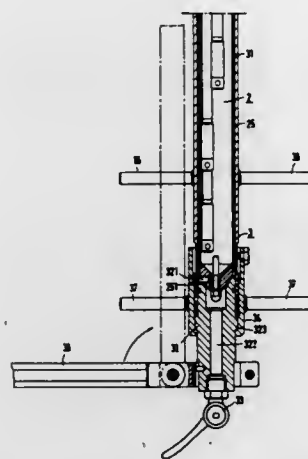
Artur Zahn, Bessenbach, and Karl Hannappel, Wiesenthal, both of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany  
Filed Aug. 8, 1986, Ser. No. 894,693

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1985, 3528723

Int. Cl. G21C 19/20

U.S. Cl. 376—260

5 Claims



1. In combination, a reactor pressure vessel of a boiling water reactor wherein reactor water is received, and a device for flushing out radioactive deposits accumulated in a lance-

housing tube at least partly disposed in the reactor pressure vessel and for aligning in the lance-housing tube a dry power distribution detector lance which partly protrudes with a pressure-tight lance passthrough from an end flange on the lance-housing tube of the reactor pressure vessel and is supported in a seat on the end flange, comprising a tubular housing surrounding from below a part of the lance protruding from the reactor pressure vessel, said tubular housing being sealed by a lance protection tube and being fastened to the end flange; and a piston arranged in said tubular housing underneath the lance sealed in said tubular housing, and being vertically displaceable and rotatable so as to entrain and lift the lance out of said seat in which it is supported so that reactor water received in the reactor pressure vessel is admitted to the lance-housing tube, said piston being formed with a flow passage for the reactor water admitted to the lance-housing tube and including a valve disposed in said flow passage for controlling the flow of reactor water out of the reactor pressure vessel.

4,790,977

## SILICON MODIFIED LOW CHROMIUM FERRITIC ALLOY FOR HIGH TEMPERATURE USE

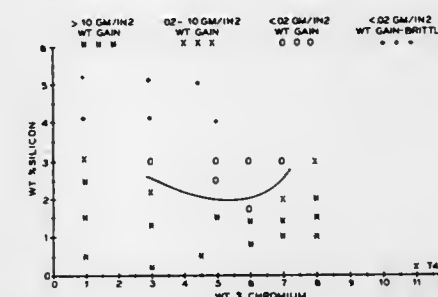
James A. Daniels, Loveland, and Joseph A. Douthett, Monroe, both of Ohio, assignors to Armco Advanced Materials Corporation, Lyndora, Pa.

Filed Sep. 10, 1987, Ser. No. 94,785

Int. Cl. C22C 38/34

U.S. Cl. 420—104

13 Claims



1. A ferritic steel alloy having good oxidation resistance and creep strength at elevated temperatures, said alloy consisting essentially of, by weight percent, from about 0.01% to about 0.3% carbon, about 2% maximum manganese, greater than 2.35% to about 4% silicon, about 3% to about 7% chromium, about 1% maximum nickel, about 0.15% maximum nitrogen, less than 0.3% aluminum, at least one carbide and nitride forming element selected from the group of niobium, tantalum, vanadium, titanium and zirconium in an amount up to 1.0% sufficient to maintain a ferritic structure, provide a fine grain size and pin the grain boundaries to improve creep strength, and control the level of carbon and nitrogen in solution to prevent austenite formation and the balance essentially iron.

4,790,978

## METHOD FOR DISINFECTION

Stig Allenmark, Kullavik; Magnus Lindstedt, and Lars Edebo, both of Göteborg, all of Sweden, assignors to Berol Kemi AG, Stenungsund, Sweden

Filed Dec. 31, 1986, Ser. No. 948,261

Claims priority, application Sweden, Jan. 7, 1986, 8600046

Int. Cl. A61L 2/18

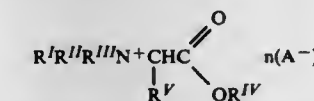
U.S. Cl. 422—28

14 Claims

1. A process of disinfecting at least one of food, human beings, animals and products to be brought in contact with one of food, human beings, and animals to combat microorganisms, comprising:

exposing the at least one of food, human beings, animals and products to a freshly prepared composition having a pH-value ranging from about 6 to about 8.5 and being com-

prised of an aqueous medium and a long-chain alkyl ester compound having the formula:



where  $\text{R}^I$ ,  $\text{R}^{II}$ , AND  $\text{R}^{III}$  are hydrogen or lower alkyl groups,  $\text{R}^{IV}$  is a long-chain alkyl group having 10–18 carbon atoms,  $\text{R}^V$  is hydrogen or a group having the formula  $\text{R}^V\text{N}^+\text{H}_3$ , where  $\text{R}^V$  is an alkylene group having 3–4 carbon atoms, A is a monovalent counter ion and n is a number of cationic groups in the ester compound.

4,790,979

## TEST STRIP AND FIXTURE

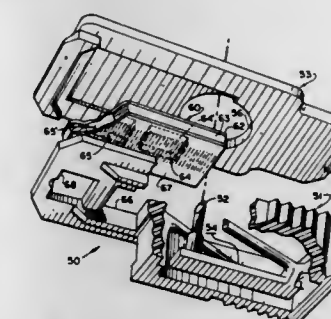
Louis Terminiello, Sunrise, and Jack L. Aronowitz, Delray Beach, both of Fla., assignors to Technimed Corporation, Fort Lauderdale, Fla.

Filed Aug. 29, 1986, Ser. No. 901,603

Int. Cl. G01N 31/22; A61B 17/34

U.S. Cl. 422—56

7 Claims



1. A self-contained analytical element for conducting an analysis of a heterogeneous fluid sample suspected of containing an analyte of interest comprising:

a test strip consisting essentially of two functional components, each of said functional components being maintained in spaced apart relationship and out of fluid contact with one another by a fluid impermeable barrier layer;

a first functional component of said test strip comprising an essentially planar wicking element for reception of the heterogeneous fluid sample and transport of the heterogeneous sample to a sample receptive surface of a porous membrane which has been impregnated with a dry chemistry reagent system;

a second functional component comprising an essentially planar porous membrane which has been impregnated with a dry chemistry reagent system specific for analysis of an analyte within the heterogeneous fluid sample, said membrane having a sample receptive surface of sufficient density to selectively exclude substantial penetration of suspended or dissolved matter of the sample which can interfere or mask the reaction of the analyte with the reagent system in the membrane, while allowing the remainder of the sample to be freely absorbed; and

a fluid impermeable barrier layer located between the wicking element and the sample receptive surface of said porous membrane for maintaining said wicking element out of fluid contact with said receptive surface, said barrier layer having at least one aperture for confinement of a pool of sample on the sample receptive surface of the porous membrane, the size and shape of said aperture permitting flow of the heterogeneous fluid sample from



the wicking element to the sample receptive surface of the membrane and roughly corresponding to an analysis site.

4,790,980

# DEVICE FOR THE GENERATION OF OZONE AND A PROCESS FOR ITS OPERATION

Peter Erni, Baden, and Gerard Kirsch, Zürich, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

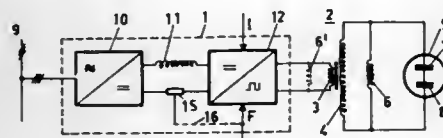
Filed Jun. 12, 1986, Ser. No. 873,710

Claims priority, application Switzerland, Jun. 21, 1985, 2643/85

Int. Cl.<sup>4</sup> B01J 19/08; C01B 13/10

U.S. Cl. 422—186.15

19 Claims



1. A device for the generation of ozone, comprising:
  - a high voltage transformer having a primary winding and a secondary winding;
  - a converter for supplying a square wave current of variable amplitude and of variable frequency to said primary winding;
  - an ozone generator connected across the secondary winding of said high voltage transformer, including a pair of electrodes separated by a solid dielectric and a gas path; and
  - variable compensation reactance means connected across a selected of the primary and secondary windings of said transformer for maintaining a resonant frequency of a resonant circuit including the compensation reactance means and the ozone generator at a desired frequency both when the ozone generator is in a start state and in an operating state, including a compensation choke and a switch connected to said choke for switching said choke into or out of said resonant circuit in dependence on the state of the ozone generator;
- wherein the compensation reactance means has an inductance and said converter has a frequency selected so that the resonant frequency of said resonant circuit formed by said compensating reactance means and said ozone generator lies below the operating frequency of said converter in all operating conditions of the converter.

4,790,981

# DISPENSER FOR SOLID AND POWDERED DETERGENT

James L. Mayer, 17271 Amaganset Way, Tustin, Calif. 92680, and William K. Russell, Costa Mesa, Calif., assignors to James L. Mayer, Tustin, Calif.

Continuation-in-part of Ser. No. 801,587, Nov. 25, 1985, Pat. No. 4,666,682. This application May 15, 1987, Ser. No. 50,081. The portion of this patent subsequent to May 19, 2004, has been disclaimed.

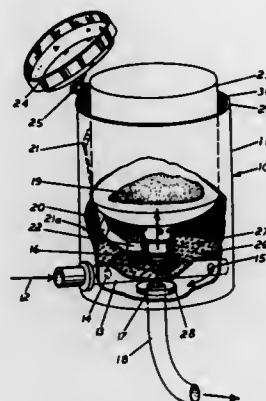
Int. Cl.<sup>4</sup> B01D 11/02

U.S. Cl. 422—263

8 Claims

1. A detergent dispenser, comprising:
  - a bowl member, defining an inner wall portion, an open end portion oriented upwardly, a lower closed portion in which are mixed detergent and water to form a solution and a slurry of detergent, and a drain for removing detergent solution by gravity;
  - a water supply line leading into the bowl at the lower closed portion;
  - a centrally disposed upstanding water outlet providing an outlet orifice, and connected to the water supply line for

- producing an upwardly directed spray or jet of water through the said orifice;
- d. at least one spray jet orifice on the water supply line inside the bowl for contacting detergent in the bowl with water;
- e. a perforated screen adjacent the outlet orifice of the upstanding water outlet to retain the detergent during contact with water; and,
- f. a fixed bracket, mounted on the screen and positioned to occlude the outlet orifice of the upstanding water outlet and to deflect water horizontally from the orifice onto detergent on the screen;



whereby:

- i. when the a container of detergent is inverted into the open end of the bowl, water from the upstanding outlet which is deflected outwardly by the fixed bracket will slurry and dissolve detergent in the container;
- ii. solid detergent which collects on the perforated screen will be dissolved and slurried by water from the upstanding outlet and will pass through the screen into the drain; and,
- iii. when the container of detergent is removed from the bowl, occlusion of the upstanding water outlet by the fixed bracket will prevent water and detergent from being ejected out of the bowl.

4,790,982

# METAL-CONTAINING SPINEL COMPOSITION AND PROCESS OF USING SAME

Jin S. Yoo, Flossmoor; Cecelia A. Radlowski, Riverside, both of Ill.; John A. Karch, Mariottsville, and Alakananda Bhattacharyya, Columbia, both of Md., assignors to Katalistiks International, Inc., Baltimore, Md.

Filed Apr. 7, 1986, Ser. No. 848,954

Int. Cl.<sup>4</sup> B01J 8/00; C01B 17/00; C10G 11/00

U.S. Cl. 423—239

33 Claims

1. A process for reducing at least one of (1) the sulfur oxide content of a sulfur oxide-containing gas and (2) the nitrogen oxide content of a nitrogen oxide-containing gas which comprises contacting said gas with a material at conditions to reduce at least one of (1) the sulfur oxide content of said gas and (2) the nitrogen oxide content of said gas, said material comprising at least one metal-containing spinel which includes a first metal and a second metal having a valence higher than the valence of said first metal, at least one component of a third metal other than said first and second metals effective to promote the oxidation of sulfur dioxide to sulfur trioxide at sulfur dioxide oxidation conditions, and at least one component of a fourth metal other than said first, second and third metals effective to promote the reduction of a sulfate of the first metal at first metal sulfate reduction conditions, wherein said third metal is selected from the group consisting of Group IB metals, Group IIB metals, Group VIA metals, the rare earth metals, the Platinum Group metals and mixtures thereof, and said fourth metal is selected from the group consisting of iron,

nickel, titanium, chromium, manganese, cobalt, germanium, tin, bismuth, molybdenum, antimony, vanadium and mixtures thereof and, wherein said third metal component and said fourth metal component are present in amounts effective to promote the oxidation of  $\text{SO}_2$  to  $\text{SO}_3$  and the subsequent reduction of the sulfate of the first metal formed by reaction with the metal containing spinel, to  $\text{H}_2\text{S}$  and the original spinel and in amounts effective to promote the reduction of nitrogen oxides at nitrogen oxide reduction conditions.

4,790,983

# HIGH ABSORPTIVITY SODIUM TRIPOLYPHOSPHATE

Mohan S. Saran, Grand Island, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Apr. 24, 1987, Ser. No. 41,966

Int. Cl.<sup>4</sup> C01B 15/16, 25/26

U.S. Cl. 423—315

3 Claims

1. A process for preparing sodium tripolyphosphate particles having an absorptivity of at least about 25%, said process consisting essentially of the steps of
  - (a) forming an aqueous solution of sodium phosphates by reacting phosphoric acid with sodium hydroxide or sodium carbonate,
  - (b) flash drying the aqueous sodium phosphate solution at a temperature in the range of from about 150° C. to about 250° C. to form anhydrous sodium orthophosphate particles,
  - (c) moisturizing the anhydrous sodium orthophosphate particles to a moisture content of between about 15% to about 25% to prepare hydrated sodium phosphate particles,
  - (d) calcining the hydrated particles at a temperature of from about 300° C. to about 600° C. to remove water and to convert sodium orthophosphate particles into particles of sodium tripolyphosphate, and
  - (e) recovering particles of sodium tripolyphosphate having an absorptivity of at least about 25%.

4,790,984

# PROCESS FOR PREPARING A SODIUM TRIPOLYPHOSPHATE HEXAHYDRATE POWDER

Paul L. Hensler, and Mark A. Bissell, both of Lawrence, Kans., assignors to FMC Corporation, Philadelphia, Pa.

Filed Aug. 10, 1987, Ser. No. 83,407

Int. Cl.<sup>4</sup> C01B 25/41

U.S. Cl. 423—315

5 Claims

1. The method of producing sodium tripolyphosphate hexahydrate powder comprising hydrating anhydrous sodium tripolyphosphate having a particle size such that at least 85% by weight is less than 100 mesh (U.S. Standard) with sufficient water to provide not more than 105% of the theoretical amount of water to form the hexahydrate, drying the sodium tripolyphosphate hexahydrate to remove substantially all of the uncombined water and maintaining said hydrating and drying steps at less than 80° C. thereby producing a sodium tripolyphosphate hexahydrate powder such that at least 50% by weight is less than 100 mesh (U.S. Standard).

4,790,985

# SYNTHESIS OF SODIUM ALUMINUM HYDRIDE

Gunner E. Nelson, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation-in-part of Ser. No. 919,658, Oct. 16, 1986, abandoned, which is a continuation-in-part of Ser. No. 457,897, Jan. 14, 1983, abandoned. This application Jul. 13, 1987, Ser. No. 72,628

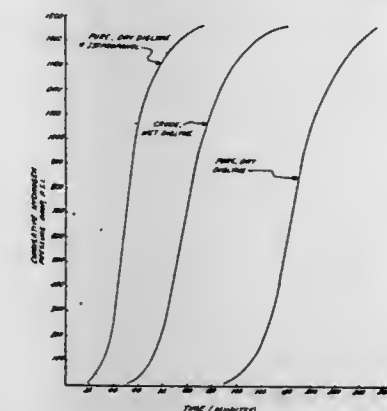
Int. Cl.<sup>4</sup> C01B 6/24

U.S. Cl. 423—644

24 Claims

1. In a process for the preparation of sodium aluminum tetrahydride by reaction of sodium, aluminum and hydrogen at an elevated temperature and pressure in a glycol dialkyl ether liquid reaction medium, the improvement wherein the liquid reaction medium initially contains an amount up to 3 mole

percent of water or up to 10 mole percent of an alcohol or both sufficient to promote initiation of the reaction so as to signifi-



cantly shorten the induction period that would otherwise be experienced under the same conditions when using said liquid reaction medium in pre-dried, alcohol-free form.

4,790,986

# METHOD AND APPARATUS TO PRODUCE A HOT FLUIDIZING GAS

Jonathan J. Kim, Williamsville; Viswanathan Venkateswaran, and Randolph Kujawa, both of Grand Island, all of N.Y., assignors to Stemcor Corporation, Cleveland, Ohio

Filed Oct. 15, 1986, Ser. No. 918,911

Int. Cl.<sup>4</sup> C01B 31/00

U.S. Cl. 423—659

3 Claims



1. A process for the continuous preheating of hot fluidizing gas for the treatment of refractory materials comprising:
  - providing a reaction zone;
  - heating the reaction zone by heating means;
  - allowing a particulate solid to pass into the reaction zone from the top of the reaction zone;
  - passing fluidizing gas within a conduit through the entire length of the reaction zone in a direction the same as the direction in which the particulate solid is passing into the reaction zone; and
  - causing the gas to ascend from below the reaction zone in a direction counter to the direction in which the particulate solid is passing and counter to the direction in which the incoming fluidizing gas is travelling to fluidize the particulate solid and to preheat up to a temperature of 2000° C.

the fluidizing gas passing within said conduit through the entire length of the reaction zone in a direction the same as the direction in which particulate solid is passing to the reaction zone.

4,790,987

## VIRAL GLYCOPROTEIN SUBUNIT VACCINE

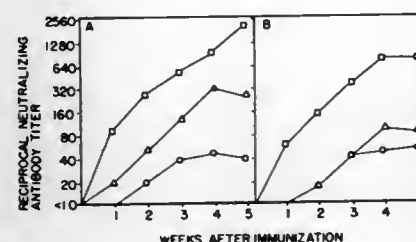
Richard W. Compans, Helena, and Ranjit Ray, Birmingham, both of Ala., assignors to Research Corporation, New York, N.Y.

Filed Nov. 15, 1985, Ser. No. 798,536

Int. Cl.<sup>4</sup> A61K 39/12

U.S. Cl. 424—89

19 Claims



1. A vaccine composition useful in prevention of virus-caused disease comprising, as an active agent, an immunogenically effective amount of at least one immunogenic (F) fushion viral envelope glycoprotein from said virus complexed with a lipid, and a pharmaceutically acceptable carrier.

4,790,988

## METHOD AND COMPOSITIONS FOR THE TREATMENT OF THROMBOTIC EPISODES

Jawahar L. Mehta, Gainesville, Fla., and Tom G. P. Saldeen, Uppsala, Sweden, assignors to University of Florida, Gainesville, Fla.

Filed Feb. 4, 1987, Ser. No. 10,603

Int. Cl.<sup>4</sup> A61K 37/48

U.S. Cl. 424—94.64

18 Claims

1. A method comprising administering to an animal having a thrombus a composition comprising a therapeutically effective dose of P6A.

4,790,989

## TREATMENT OF FUNGAL INFECTIONS

Pamela A. Hunter, Valerie Berry, both of Betchworth; Joshua Odaro-Yeboah, and Norman A. Orr, both of Worthing, all of England, assignors to Beecham Group p.l.c., England

Filed Apr. 10, 1987, Ser. No. 36,929

Claims priority, application United Kingdom, Jun. 26, 1986, 8615669; Dec. 11, 1986, 8629641

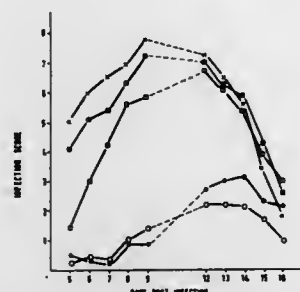
Int. Cl.<sup>4</sup> C07D 309/10; A01H 25/34

U.S. Cl. 424—404

10 Claims

1. A method for the treatment of a fungal infection, which comprises applying topically to a patient an antifungally effective amount of a topical pharmaceutical or veterinary composition comprising a pseudomonic acid or a non-toxic pharmaceutically or veterinary acceptable salt thereof, and a pharmaceutically or veterinary acceptable carrier, the pseudomonic acid or salt thereof being present in an amount that, in use, corresponds to at least the saturation solubility of the pseudomonic acid or salt in the carrier at ambient temperature.

—●— Group 1 - Strained  
—○— Group 2 - Strained  
—△— Group 3 - Strained  
—□— Group 4 - Strained  
—◇— Group 5 - Strained



sponds to at least the saturation solubility of the pseudomonic acid or salt in the carrier at ambient temperature.

4,790,990

## MAMMALIAN LIVESTOCK FEED, MAMMALIAN LIVESTOCK FEED ADDITIVE, AND METHODS FOR USING SAME

J. Russell Mason, Philadelphia; Morley R. Kare, Narberth, both of Pa., and Dorf A. DeRovira, Branchburg, N.J., assignors to Monell Chemistry Senses Center, Philadelphia, Pa.

Division of Ser. No. 644,544, Aug. 27, 1984, abandoned. This application Jul. 31, 1986, Ser. No. 892,188

Int. Cl.<sup>4</sup> A23K 1/18; A61K 31/24; A01N 37/18

U.S. Cl. 424—438

31 Claims

1. An improved mammalian feed additive, comprising a selective avian taste aversive agent selected from the group consisting of an ester of anthranilic acid a substituted anthranilic derivative and a mixture thereof, said agent being at least partially entrapped in an edible solid lipophilic starch vehicle to improve its taste persistency, said agent comprising 1 to 60 weight percent of said additive.

4,790,991

## INGESTIBLE AGGREGATE AND DELIVERY SYSTEM PREPARED THEREFROM

James J. Shaw, Morristown, and Shri C. Sharma, Mendham, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 698,511, Feb. 5, 1985, Pat. No. 4,747,881. This application Feb. 29, 1988, Ser. No. 161,541

Int. Cl.<sup>4</sup> A23C 1/29; A61K 9/16

U.S. Cl. 424—441

9 Claims



1. A method for treating hypercholesterolemia and related disorders comprising administering to a patient in need of treatment of said condition a therapeutically effective amount of an ingestible aggregate composition comprising the aggregate

particles produced by (a) preparing an aqueous composition of a hydrocolloid; (b) fluidizing substantially anhydrous substrate particles in an air stream; (c) contacting the substrate particle with the aqueous hydrocolloid composition to form the aggregates of the substrate and hydrocolloid; and (d) drying and collecting the aggregates, wherein the substrate contains cholestyramine.

4,790,992

## INJECTION MOLDING APPARATUS FOR MAKING FIBER-REINFORCED ARTICLES

Kazuo Nishikawa, Hiroshima, Japan, assignor to Mazda Motor Corporation, Hiroshima, Japan

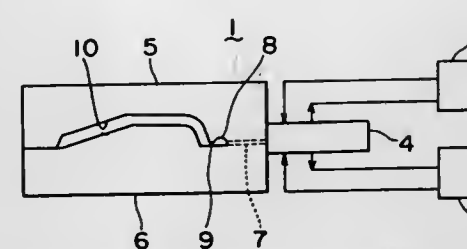
Filed Feb. 24, 1987, Ser. No. 18,025

Claims priority, application Japan, Apr. 30, 1986, 61-66563[U]

Int. Cl.<sup>4</sup> B29C 45/26

U.S. Cl. 425—206

3 Claims



1. An injection molding apparatus for making a molding of fiber-reinforced synthetic resin which comprises:

a mold assembly having upper and lower dies defining a molding cavity therebetween, into which a liquid molding material of synthetic resin containing reinforcing fibers is injected, said mold assembly having a gate defined therein, which gate has a thickness within the range of 0.2 to 0.4 times the thickness of a portion of the molding adjacent the gate, said gate having a gate land of a length within the range of 10 to 20 times the thickness of the gate; and

a supply channel for supplying the molding material to said mold assembly, said supply channel including an after-mixer comprised of first and second series of disconnected grooves formed in said upper and lower dies, respectively, said first and second series of disconnected grooves being cooperable with each other to define a generally zig-zag-shaped passage for the flow of the molding material when the upper and lower dies are fastened together.

4,790,993

## PROCESS FOR THE PRODUCTION OF ALCOHOL-FREE, YEAST WHITE BEER

Siegfried Schedl; Hermann Eppinger, and Volker Schuler, all of Munich, Fed. Rep. of Germany, assignors to Paulaner-Savator-Thomasbrau AG, Munich, Fed. Rep. of Germany

Filed Feb. 13, 1987, Ser. No. 14,505

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1986, 3606450

Int. Cl.<sup>4</sup> C12C 11/00

U.S. Cl. 426—13

13 Claims

1. A process for the production of an alcohol-free yeast white beer comprising:

providing an alcohol-containing yeast white beer which contains yeast and does not contain a fermentable substance;

physically separating the yeast therefrom;

subjecting the alcohol-containing beer to vacuum distillation until the beer has an alcohol content of less than 0.5% by volume to produce a beer concentrate, whereby an amount of water is lost;

adding to the concentrate as make-up water oxygen-free,

carbonic acid-containing water in an amount substantially corresponding to the amount of water lost during the vacuum distillation;

adding top-fermented brewers' yeast in an amount of about 1-3% by volume to the concentrate containing make-up water to form a product;

storing the product at a temperature of from 0° to 10° C.;

separating off the added brewers' yeast; and

adding a sufficient amount of yeast and carbon dioxide to form the resultant alcohol-free yeast white beer.

4,790,994

## METHOD FOR INHIBITING PSYCHROTROPHIC BACTERIA IN CREAM OR MILK BASED PRODUCTS USING A PEDIOCOCCUS

Mark A. Matrozza, Sarasota; Marianne F. Leverone, Bradenton, and Donald P. Boudreaux, Sarasota, all of Fla., assignors to MicroLife Technics, Inc., Sarasota, Fla.

Filed Oct. 2, 1987, Ser. No. 103,883

Int. Cl.<sup>4</sup> A23C 9/12, 19/076

U.S. Cl. 426—38

14 Claims

1. A method for inhibiting the growth of psychrotrophic bacteria in a milk or cream based product which comprises:

(a) inoculating the milk or cream based product with an effective count of cells of a *Pediococcus* which produces antimicrobial metabolites sufficient to inhibit the growth of the psychrotrophic bacteria without fermentation by the *Pediococcus*; and

(b) storing the milk or cream based product at a temperature so that the antimicrobial metabolites are produced without fermentation of the product by the *Pediococcus* and the psychrotrophic bacteria are inhibited without a significant increase in the cell count of the *Pediococcus*.

4,790,995

## PROCESS FOR STERILIZING SPICES

Stig Sorensen, Lyngby, Denmark, assignor to Scanflavour A/S, Lyngby, Denmark

PCT No. PCT/DK86/00035, § 371 Date Dec. 8, 1986, § 102(c) Date Dec. 8, 1986, PCT Pub. No. WO86/05956, PCT Pub. Date Oct. 23, 1986

PCT Filed Apr. 10, 1986, Ser. No. 4,438

Claims priority, application Denmark, Apr. 11, 1985, 1630/85

Int. Cl.<sup>4</sup> A23L 3/00, 1/22

U.S. Cl. 426—302

5 Claims

1. A process for sterilizing whole spices which consists essentially of coating a whole spice with an edible animal protein coating material in an amount of from 0.5 to 2.0% by weight, based on the weight of coated spice, to form a coated spice, and heat treating said coated spice in a sealed rotating autoclave with the simultaneous addition of water vapor at a temperature of from 105° to 110° C. for about 5 minutes to about 2 hours.

4,790,996

## PROCESS FOR PREPARING CEREAL PRODUCTS

Thomas M. Roush, Battle Creek, and Charles T. Stocker, Augusta, both of Mich., assignors to General Foods Corporation, White Plains, N.Y.

Filed Jun. 10, 1987, Ser. No. 61,058

Int. Cl.<sup>4</sup> A21D 6/00

U.S. Cl. 426—458

23 Claims

1. A process for preparing a food product comprising the steps of:

(a) feeding a farinaceous material containing protein into an extruder;

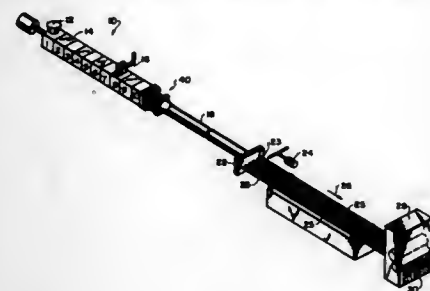
(b) adding sufficient moisture to the farinaceous material within the extruder to form a dough;

(c) heating the dough within the extruder for a time and at a temperature and pressure effective to raise the temperature of the dough to temperatures sufficiently high to



initiate gelatinization of the starch and denaturation of the protein;

- (d) discharging the heated farinaceous dough into a hollow attachment connected at the discharge end of the extruder for an effective time and at an effective temperature and pressure and said attachment being of sufficient area and length to completely gelatinize the starch, denature the protein and cook the farinaceous dough in an enclosed



- environment and wherein the internal surface of the hollow attachment is of sufficient smoothness to promote passage of the farinaceous dough therethrough;
- (e) cooling the cooked dough after discharge from the hollow attachment;
- (f) sizing the cooked, cooled farinaceous dough to a desired shape or form, and
- (g) drying the shaped or formed farinaceous dough to a desired moisture content.

4,790,997

#### FOOD STUFFS CONTAINING STARCH OF AN AMYLOSE EXTENDER DULL GENOTYPE

Robert B. Friedman, Chicago, Ill.; David J. Gottfeld, Griffith, Ind.; Eugene J. Faron, Schererville, Ind.; Frank J. Pustek, Munster, Ind., and Frances R. Katz, Crown Point, Ind., assignors to American Maize-Products Company, Stamford, Conn.

Filed Jul. 2, 1987, Ser. No. 69,264  
Int. Cl.<sup>4</sup> A23L 1/04, 1/195

U.S. Cl. 426—578 10 Claims

1. A thickened foodstuff for canning comprising a foodstuff, water and having as an essential ingredient therein an effective amount of a natural thin-thick starch, said starch extracted from a starch bearing plant having an amylose extender dull genotype, said starch providing no effective thickening characteristics to said foodstuff before canning while providing effective thickening characteristics to said foodstuff after canning.

4,790,998

#### BEVERAGE CLOUD BASED ON A WHEY PROTEIN-STABILIZED LIPID

Marsha L. Swartz, Santa Rosa, Calif., assignor to New Zealand Milk Products, Inc., Petaluma, Calif.

Filed Dec. 22, 1986, Ser. No. 945,344  
Int. Cl.<sup>4</sup> A23C 21/00

U.S. Cl. 426—535 13 Claims

1. A beverage clouding agent which comprises a whey protein-stabilized lipid emulsified in an acidic aqueous solution having a pH within a range from about 1.0 to about 4.5, the beverage clouding agent having a lipid to whey protein weight ratio within a range from about 1:4 to about 4:1 and a lipid density within a range from about 0.8 to about 1.10 grams per cubic centimeter.

4,790,999

#### ALCOHOLIC SOFT ICE

Robert S. Ashmont, Farmington; Thomas C. Bibean, Windsor; Anthony Livalch, Hartford, and Nancy J. McCormick, Farmington, all of Conn., assignors to Heublein, Inc., Hartford, Conn.

Filed Oct. 31, 1986, Ser. No. 925,441  
Int. Cl.<sup>4</sup> C12G 3/06

U.S. Cl. 426—592 17 Claims

1. A shelf stable, ready-to-consume alcoholic beverage comprising water, sugars, alcohol, flavorants, and carboxymethylcellulose wherein the sugars comprise at least one sugar selected from the group consisting of fructose and dextrose; the beverage has a proof in the range of about 10 to about 25; the carboxymethylcellulose is present in an amount ranging from about 0.02 to about 0.1% by weight; and wherein the ready-to-consume alcoholic beverage forms a soft ice upon being subjected to a temperature range of about 0° to about 10° F. and can be frozen and completely re-melted any number of times while maintaining the ability to form a soft ice at said temperature range.

4,791,000

#### FAT AND EDIBLE EMULSIONS WITH A HIGH CONTENT OF CIS-POLYUNSATURATED FATTY ACIDS

Pieter M. J. Holemans, Ekeren, Belgium; Robert Schijf, Vlaardingen, Netherlands; Karel P. A. M. Van Putte, Maasland, Netherlands, and Teunis De Man, Maassluis, Netherlands, assignors to Internationale Octrool Maatschappij "Octropa" B.V., Rotterdam, Netherlands

Filed Jul. 9, 1986, Ser. No. 883,726  
Claims priority, application Netherlands, Jul. 9, 1985, 8501957

The portion of the term of this patent subsequent to Oct. 27, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> A23D 5/02

U.S. Cl. 426—606 5 Claims

1. Hardstock comprising: H<sub>3</sub>, HHU, HUH and H<sub>2</sub>M triglycerides, wherein the ratio of HHU:HUH ranges from 1:4 to 6:1  
H is a saturated C<sub>16-24</sub> fatty acid;  
U is a mono- or a cis-polyunsaturated C<sub>16-24</sub> fatty acid;  
M is a saturated fatty acid, the chain length of which is 2 to 10 C-atoms shorter than the chain length of H, wherein the ratio of H<sub>2</sub>M:H<sub>3</sub> ranges from 1:2 to 4:1.

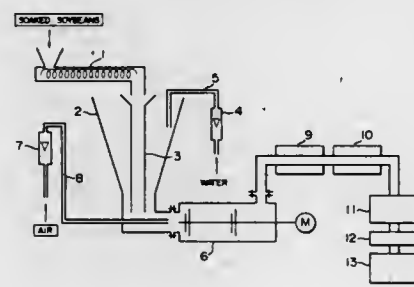
4,791,001

#### METHOD FOR GRINDING SOYBEANS AND METHOD FOR PRODUCING TOFU

Masaru Matsuura; Akio Obata; Norikazu Fujii, all of Noda; Akio Nobuhara, Kasukabe, and Danji Fukushima, Omiya, all of Japan, assignors to Kikkoman Corporation, Noda, Japan

Filed Jan. 12, 1987, Ser. No. 2,274  
Claims priority, application Japan, Jan. 14, 1986, 61-4282  
Int. Cl.<sup>4</sup> A23J 3/00; A23L 1/20

U.S. Cl. 426—634 14 Claims



14. A method for producing aseptic packed tofu which

comprises the steps in sequence of (a) soaking dehulled soybeans in water at a temperature of 45° to 55° C. and a pH of 9 to 11 for a sufficient time to remove from the soybeans at least 45% of the soluble saccharides contained therein; (b) cooling said soaked soybeans and grinding them at a temperature not higher than about 15° C. by using cold water at 10° C. or below in an amount of 3 to 4 times the weight of the soybeans and in the presence of 10 to 30% by volume of air relative to the total volume of soaked soybeans and cold water to obtain a soybean slurry; (c) heating the soybean slurry at 95° to 110° C. and then filtering the slurry to separate it into soybean milk and bean-curd refuse; (d) heat-sterilizing the soybean milk at 120° to 140° C.; (e) adding an aseptic coagulant to the sterilized soybean milk, filling the resulting mixture aseptically in a container, and tightly sealing the filled container; and (f) heating the container at 70° to 100° C. to effect coagulation of the soybean milk.

4,791,003

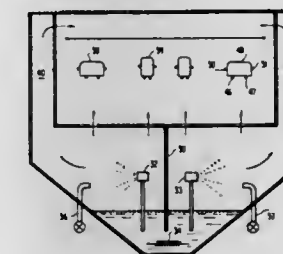
#### ATOMIZED PARTICLE LUBRICATION OF CUP-SHAPED CAN BODIES

James A. Bray, Salineville, and Robert L. Applegate, New Cumberland, both of W. Va., assignors to Weirton Steel Corporation, Weirton, W. Va.

Continuation-in-part of Ser. No. 11,112, Feb. 5, 1987, Pat. No. 4,724,155, which is a continuation-in-part of Ser. No. 681,630, Dec. 14, 1984, abandoned. This application Jun. 30, 1987, Ser. No. 68,065

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.  
Int. Cl.<sup>4</sup> B05D 1/06

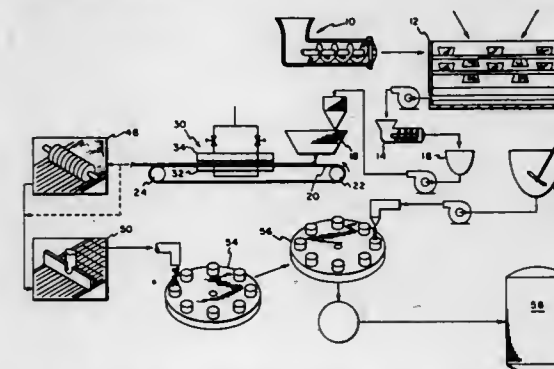
U.S. Cl. 427—28 7 Claims



#### 4,791,002 PROCESS FOR MAKING A CANNED MEAT WITH GRAVY PET FOOD

Gerald J. Baker, Wheaton; Arun K. Bansal, Barrington; John L. Konieczka, Chicago, and David A. Knutz, Glen Ellyn, all of Ill., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Mar. 31, 1987, Ser. No. 33,347  
Int. Cl.<sup>4</sup> A23K 1/10; A23J 1/06  
U.S. Cl. 426—641 13 Claims



1. A process for preparing a canned pet food comprising resilient meaty slices in a free-flowing gravy, the process comprising:

- preparing a slurry by grinding a mixture comprising liver and other meat and meat by-products and incorporating therein a binder comprising soybean flour and dry blood plasma to achieve a total fat content of at least 2% and a total meat content of at least 75% by weight including from 15 to 40% by weight of liver;
- subjecting the slurry to agitation and cutting sufficient to produce a meat emulsion;
- forming a sheet of emulsion;
- heating the sheet of emulsion to an internal temperature of at least 170° F.;
- cutting the sheet into discrete meaty pieces;
- feeding said meaty pieces and a clear free-flowing gravy into a can; and
- closing and retorting said can.

- Method for atomized liquid lubrication of cup-shaped sheet metal can bodies while continuously moving along a can body fabrication line comprising, in combination, the steps of providing an atomizing chamber reservoir means holding lubricant in liquid form, supplying gas at a pressure above atmospheric to such atomizing chamber, atomizing such liquid lubricant into particles capable of being moved pneumatically by such gas which is provided at a pressure above atmospheric to such atomizing chamber, providing a lubricant deposition chamber located vertically above such atomizing chamber, such deposition chamber being defined by wall means including a generally horizontally-oriented bottom wall for such deposition chamber confronting such atomizing chamber, interconnecting such deposition chamber and such atomizing chamber for gas flow purposes including apertures in such deposition chamber wall means communicating with such atomizing chamber means, pneumatically transporting such atomized particles into such deposition chamber with gas supplied to such atomizing chamber, supplying cup-shaped can bodies having a closed end wall and a side wall extending longitudinally therefrom symmetrically with a can body central longitudinal axis to define an open end longitudinally opposite to such closed end wall, providing a horizontally-oriented travel path for continuous movement of such can bodies through such lubricant application chamber by supporting and stabilizing individual can bodies with endless belt means of curvilinear cross-sectional configuration, controlling continuous movement of such can bodies into, through and out of such lubricant application chamber with such can bodies being oriented in spaced relationship to each other during such passage with their central longitudinal axes being parallel to each other and with their open ends facing vertically downwardly, and directing movement of such gas-borne lubricant particles into the lubricant deposition chamber from a plurality of locations in relation to such can body travel path for flow impingement deposition of gas-borne particles on such can bodies during passage through such chamber including directing atomized particles vertically upwardly through

apertures in such bottom wall means of the deposition chamber communicating with such atomizing chamber into interior portions of such can bodies from such apertures in such bottom wall means located vertically below the travel path for such can bodies.

4,791,004

# PROCESS FOR FORMING MULTILAYERED COATING FILM

Fumiyuki Suzuki, Yoshiaki Tamura, and Keisuke Shiba, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

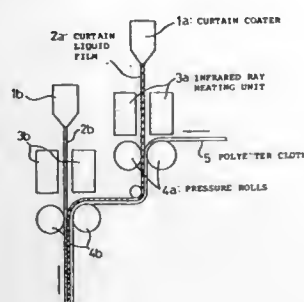
Filed May 22, 1987, Ser. No. 52,829

Claims priority, application Japan, May 22, 1986, 61-116044

Int. Cl.<sup>4</sup> B05D 3/06, 3/02

U.S. Cl. 427-54.1

2 Claims



1. A process for forming a multilayered coating film which comprises making a coating composition flow from a container to form a liquid film, increasing the viscosity of the liquid film to a diffusion constant of  $10^{-9}$  cm<sup>2</sup>/sec or less and a viscosity of at least about  $10^4$  cp by evaporation or for a solvent by heating with warm air, induction heating, or infrared heating, and laminating the liquid film having an increased viscosity onto a support or on a coating film formed on a support.

4,791,005

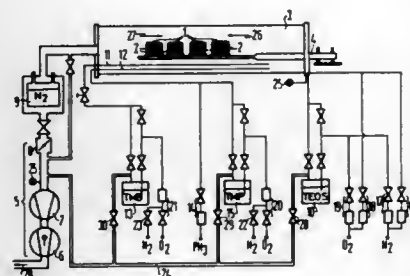
# METHOD FOR THE MANUFACTURE OF SILICON OXIDE LAYERS DOPED WITH BORON AND PHOSPHORUS

Frank S. Becker, Munich, and Dieter Pawlik, Groebenzell, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 855,399, Apr. 24, 1986, abandoned. This application Oct. 27, 1987, Ser. No. 113,412  
Claims priority, application Fed. Rep. of Germany, May 22, 1985, 3518452

Int. Cl.<sup>4</sup> C23C 16/00; B05D 5/12; C03C 3/06

U.S. Cl. 427-255.3

8 Claims



1. A method for the manufacture of silicon oxide layers doped with boron and phosphorus which is stable in contact with water comprises:

providing a reaction chamber, positioning silicon wafers in said reaction chamber, introducing into said reaction chamber from separate sources, the reactants;

- (a) tetraethylorthosilicate
- (b) trimethylborate and

(c) a phosphorus source consisting of trimethylphosphate and passing said trimethylphosphate and said trimethylborate in one direction through said reaction chamber and passing said tetraethylorthosilicate through said reaction chamber in the opposite direction, and decomposing said reactants in said reaction chamber to deposit silicon dioxide doped with boron and phosphorus onto said wafers, the decomposition being carried out at a temperature of at least 600° C. and at a substantially sub-atmospheric pressure, the resulting deposit containing at least 5% by weight boron.

4,791,006

# HIGH ACCURACY VARIABLE THICKNESS LAYDOWN METHOD FOR ELECTRONIC COMPONENTS

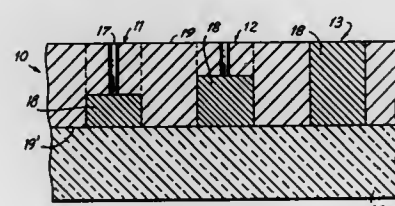
John L. Galvagni, Colorado Springs, and Philip A. Troup, Manitou Springs, both of Colo., assignors to AVX Corporation, Great Neck, N.Y.

Filed Jun. 4, 1987, Ser. No. 58,194

Int. Cl.<sup>4</sup> B05D 5/12, 1/32

U.S. Cl. 427-282

5 Claims



1. The method of forming on a substrate conductive paths of varying thickness comprising the steps of providing a planar mask having flat upper and lower surfaces, said lower surface of said mask including a path having at least one recessed portion extending toward but terminating short of said upper surface, at least one throughgoing aperture formed in said mask in registry with said recessed portion of said path, said mask including at least one additional path extending through the entire thickness of said mask placing said undersurface of said mask against said substrate, thereafter forcing a viscous conductor forming mass downwardly from said upper surface to said lower surface through said aperture and path to substantially fill said paths, thereafter removing said mask to form increments of said mass corresponding to the thickness of said paths and causing said increments of said mass remaining on said substrate to be converted to conductive material.

4,791,007

# PAINT SHIELD METHOD

Joseph D. Gleason, 2912 East McKellips, #90, Mesa, Ariz. 85203, and Mark L. Miller, 14806 East Second Avenue, #311, Aurora, Colo. 80011

Filed Oct. 28, 1986, Ser. No. 923,888

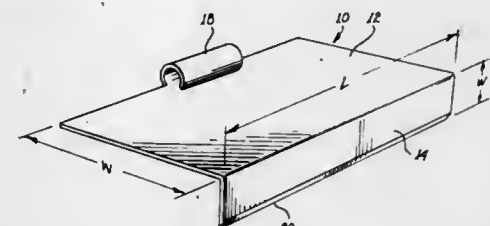
Int. Cl.<sup>4</sup> B05D 1/32

U.S. Cl. 427-282

1 Claim

1. A method for protecting a door or window frame from paint by using a paint shield comprising: placing a door or window frame covering means comprising a substantially planar rectangular front surface masking portion of sheet like material having a length greater than about 30 inches and a width greater than about 4 inches for covering a front surface portion of a door or window frame;

providing a substantially planar rectangular blade portion extending at a right angle to said rectangular front surface masking portion, said right angle rectangular blade portion having a width greater than the exposed thickness of said door or window frame, said right angle rectangular blade portion having a tapered free end portion that ex-



tends along a portion of the intersection of the wall to be painted and said door or window frame; and providing handle means coupled to said rectangular front surface masking portion for positioning said door or window frame covering means with respect to portions of said door or window frame.

4,791,008

# COATING COMPOSITIONS AND METHOD FOR IMPROVING THE PROPERTIES OF COATED SUBSTRATES

James M. Klotz, and Brian L. Klotz, both of Quakertown, Pa., assignors to Coatings for Industry, Inc., Souderton, Pa.  
PCT No. PCT/US86/01980, § 371 Date May 20, 1987, § 102(e)  
Date May 20, 1987, PCT Pub. No. WO87/01622, PCT Pub. Date Mar. 26, 1987

Continuation-in-part of Ser. No. 778,373, Sep. 20, 1985, Pat. No. 4,626,453. This PCT application Sep. 22, 1986, Ser. No. 67,463  
The portion of the term of this patent subsequent to Dec. 2, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> B05D 3/02; C09D 5/10

U.S. Cl. 427-397.7

18 Claims

1. An acidic aqueous coating composition comprising dissolved phosphate, dissolved dichromate, dissolved aluminum, inorganic colloidal particles and a water miscible organic component including an effective film-forming amount of a polypropylene glycol monoalkyl ether which is miscible in the composition and at least about 5 g/l of particulate material.

4,791,009

# PROCESS FOR THE PREPARATION OF RADIATION IMAGE STORAGE PANEL

Satoshi Arakawa, Minami-ashigara; Yuichi Hosoi, Chigasaki; Hisashi Yamazaki, Kanagawa, and Yoshiteru Ito, Minami-ashigara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Jul. 8, 1987, Ser. No. 71,084

Claims priority, application Japan, Jul. 9, 1986, 61-161733

Int. Cl.<sup>4</sup> B28B 1/14; B05D 5/06

U.S. Cl. 427-64

16 Claims

1. A process for the preparation of a radiation image storage panel which comprises a support, a light-reflecting layer and a stimutable phosphor layer, superposed in the foregoing order, wherein a binder solution-I containing a binder and a light-reflecting material in the range of 2:1 to 1:20 in volume and a binder solution II containing a binder and a stimutable phosphor in the range of 5:1 to 1:20 in volume are applied simultaneously onto a surface of a support in such manner that both binder solutions are superposed and the binder solution-I is arranged on the support side to form a light-reflecting layer and a stimutable phosphor layer.

9. A process for the preparation of a radiation image storage panel which comprises a support, a light-reflecting layer and a stimutable phosphor layer, superposed in the foregoing order,

wherein a binder solution-I containing a binder and a light-reflecting material in the range of 2:1 to 1:20 in volume and a binder solution-II containing a binder and a stimutable phosphor in the range of 5:1 to 1:20 in volume are applied simultaneously onto a surface of a plane sheet in such manner that both binder solutions are superposed and the binder solution-I is arranged on the sheet side to form a light-reflecting layer and a stimutable phosphor layer; both layers are then separated from the sheet and combined with a support in such manner that the light-reflecting layer faces the support.

4,791,010

# SIMULATED ETCHED GLASS WINDOW AND METHOD

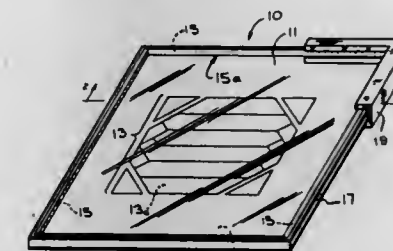
Paul A. Hanley, 1788 Baker, and Robert J. Plesscher, 5690 Babbitt, both of Haslett, Mich. 48840

Filed Aug. 10, 1987, Ser. No. 83,163

Int. Cl.<sup>4</sup> B44D 5/00

U.S. Cl. 428-34

15 Claims



1. In an insulated glass window including two spaced apart inner and outer panes of glass with aligned outer edges around an enclosed space and each pane having an inside and outside surface and a sealing strip adjacent the outer edges and on the inside surfaces between the panes, spacers adjacent the sealing strip within the enclosed space with perforations facing the enclosed space and a drying agent in the enclosed space which removes moisture from the enclosed space the improvement for simulating etched glass which comprises:

a small amount of dried ink and a clear varnish mixture which adheres to the glass provided on the inside surface of the inner or outer pane as a translucent appearing, frosted design, wherein the varnish constitutes at least about 99 percent by volume of the mixture wherein the enclosed space is substantially free of moisture which affects the dried mixture exposed to the enclosed space.

4,791,011

# VARIABLE BLIND

John Mecca, 110 Whittier Dr., San Remo, N.Y. 11754

Filed Nov. 6, 1986, Ser. No. 927,376

Int. Cl.<sup>4</sup> E06B 3/24

U.S. Cl. 428-34

8 Claims

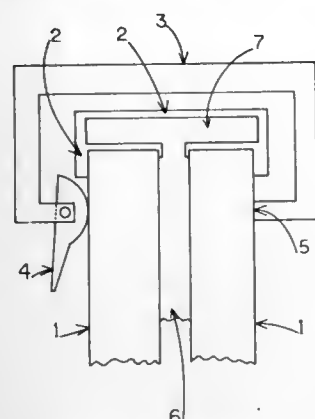
1. A variably transparent window consisting of a pair of spaced sheets of transparent material comprising:

a. means mounted along the perimeter of said window sealing the space between said spaced sheets and forming a reservoir communicating with said space;

b. a liquid filling the space between said spaced sheets and said reservoir, the transparency of said liquid being a function of and changing substantially with the thickness of the layer of said liquid between said sheets so that the



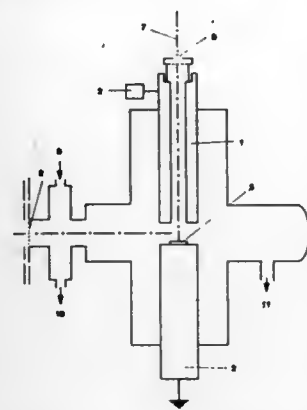
transparency of said liquid sandwiched between said sheets increases as said thickness decreases; and



c. means for reducing the spacing between said sheets thereby increasing the transparency of said window.

**4,791,012**  
**FILMS, LAYERS, TAPES, PLATES, AND SIMILAR STRUCTURES OF METAL OR OF PLASTIC MATERIALS, COATED WITH THIN POLYFLUOROCARBON FILMS**  
Riccardo d'Agostino; Francesco Cramarossa, both of Bari; Francesco Fracassi, Triggiano; Francesca Illuzzi, Giovinazzo, and Gerardo Caporiccio, Milan, all of Italy, assignors to Ausimont S.p.A., Milan, Italy

Filed Jan. 23, 1987, Ser. No. 6,173  
Claims priority, application Italy, Jan. 24, 1986, 19180 A/86  
Int. Cl.<sup>4</sup> B65D 1/00; B32B 15/08, 27/08  
U.S. Cl. 428—35.3



1. Bags for storing coffee under vacuum comprising a film of aluminum coated with a thin non-porous film of polyfluorocarbon having the formula  $(CF_x)_n$  wherein  $x$  has a value within the range of from about 1.7 to 2.0, said polyfluorocarbon film adhering to the surface of the aluminum film without the interposition of other materials, with an adherence ranging from about 30 to about 50 kg/cm<sup>2</sup>, having a critical surface tension within the range of from 18 to 22 dynes cm<sup>-1</sup>, and being obtained on the surface of said aluminum film by the plasma-polymerization of a gaseous stream of  $C_2F_6$  and  $H_2$ ; or  $C_2F_6$  and  $C_2F_4$ ; or  $CF_4$  and  $H_2$ ; or  $CF_4$  and  $C_2F_4$ ; or  $C_2F_4$ .

**4,791,013**  
**HOUSING PACK FOR PHOTOGRAPHIC PROCESSING SOLUTION**

Shigeharu Koboshi; Kazuhiro Kobayashi; Kazuyoshi Miyaoka; Syozo Aoki, and Naoki Takabayashi, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Dec. 8, 1986, Ser. No. 939,047  
Claims priority, application Japan, Dec. 9, 1985, 60-276513; Dec. 19, 1985, 60-286390; Dec. 27, 1985, 60-294856  
Int. Cl.<sup>4</sup> B65D 1/24, 35/22  
U.S. Cl. 428—35.3

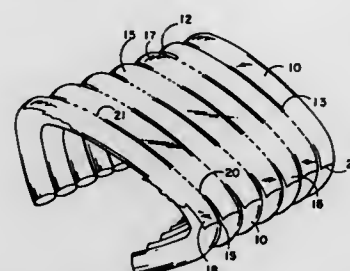
17 Claims



1. A container for storing sulfite-containing photographic processing solutions, said container comprising  
a housing member for forming external walls of said container and  
a partition member disposed within said housing member, said partition member defining at least two chambers including a first chamber for containing said processing solution and a second chamber for collecting a waste solution, each chamber further comprising an opening portion;  
wherein a portion of said housing member forming said first chamber comprises an oxygen shelter member for limiting the permeation of oxygen therethrough below 20 ml/m<sup>2</sup>/24 hrs and  
wherein a wetting action of said waste solution upon a corresponding side of said partition member prevents oxygen from permeating the partition and oxidizing the processing solution in the first chamber.

**4,791,014**  
**CLIP ATTACHMENT TAPE**  
Robert J. West, RFD 1, Box 682, Pownal, Me. 04069  
Filed Sep. 21, 1987, Ser. No. 98,962  
Int. Cl.<sup>4</sup> B32B 3/10  
U.S. Cl. 428—43

1 Claim



1. In combination, a row of clips arrayed adjacent to one another in a series for application by a tool, each clip having a crown and body portion and an adhering tape extending lengthwise to said row of clips, said tape applied on the crown portions of said clips, said tape having a plurality of rows of perforations defined therein extending perpendicularly to the length of said tape, each row of perforations positioned in the area between adjacent clips; each row of perforations including first and second side slits defined at each side of said tape forming loose ends of said tape between adjacent rows of said slits which tape's loose ends adhere to the body of said clip thereunder; and a central slit defined in said tape in line with said first and second side slits, leaving narrow bridges of unper-

forated tape therebetween holding each clip to the adjacent clip.

**4,791,015**  
**ORNAMENTED TILE SURFACE COVERING**  
Stephen E. Becker, Marietta; John S. Forry, Lancaster; Walter J. Lewicki, Jr., and Richard M. Ringer, both of Lancaster, all of Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.  
Division of Ser. No. 806,829, Dec. 10, 1985, Pat. No. 4,749,901.  
This application Jan. 19, 1988, Ser. No. 144,965  
Int. Cl.<sup>4</sup> B32B 3/00, 3/26

U.S. Cl. 428—156

3 Claims

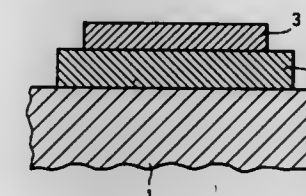
1. In a multi-level, embossed, dimensionally stable surface covering comprising:  
(a) a main body layer having at least in part a top surface and a bottom surface, said layer being comprised of a fused matrix resinous dryblend containing homogeneously distributed therein originally hollow non-thermoplastic particles;  
(b) first depressed portions on said main body layer, said depressed portions comprising fused resin in a substantially continuous phase and substantially completely crushed non-thermoplastic particles;  
(c) raised portions on said main body layer elevated with respect to said depressed portions and comprising fused resin in a relatively non-continuous phase with non-crushed and substantially only partially crushed non-thermoplastic particles therein;  
(d) a first substantially impermeable transparent fused resinous wear layer overlying the main body layer, and  
(e) a second substantially impermeable fused resinous layer bonded to the top surface of the main body layer and to the bottom surface of the wear layer.

**4,791,017**  
**HARD, GOLD-COLORED UNDER LAYER FOR A GOLD OR GOLD-CONTAINING SURFACE LAYER AND AN ARTICLE THEREWITH**

Dieter Hofmann, Bruchköbel; Klaus-Jürgen Heimbach, Hattersheim; Helmut Petersein, Gelnhausen-Höchst, and Wolf-Dieter Münz, Somborn, all of Fed. Rep. of Germany, assignors to Leybold-Heraeus GmbH, Cologne, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 762,556, Aug. 5, 1985, abandoned. This application Dec. 31, 1986, Ser. No. 947,991  
Claims priority, application Fed. Rep. of Germany, Aug. 6, 1984, 3428951

Int. Cl.<sup>4</sup> B32B 7/02, 15/04  
U.S. Cl. 428—216

15 Claims



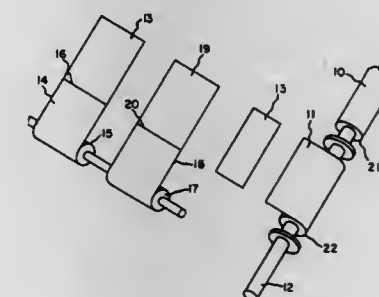
1. A structure comprising:  
a gold or gold-containing surface layer; and  
underlayer means for approximating the brilliance and color of the surface layer, whereby to disguise therewith worn away portions of the surface layer, the underlayer means comprising a gold-colored underlayer on the surface layer comprising at least one material selected from the group consisting of a carbonitride of titanium, zirconium, hafnium and vanadium.  
3. The structure of claim 1, wherein the surface layer is from about 0.05 micron to about 1 micron thick.  
5. The structure of claim 3, wherein the underlayer is from about 0.2 micron to about 0.3 micron thick.

**4,791,018**  
**CHOPPED TEXTILE REINFORCED SHOCK ABSORBER BUMPER**

Richard D. Candle, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio  
Filed Mar. 10, 1986, Ser. No. 837,982  
Int. Cl.<sup>4</sup> D04H 1/58

U.S. Cl. 428—288

7 Claims



1. A shock absorbing member composed of a series of plies formed by coating a fiber with unvulcanized elastomer, chopping said coated fiber into specific lengths, said series of plies being intimately merged together into a unitary member, said unitary member being cured to give a chopped fiber reinforced unitary member

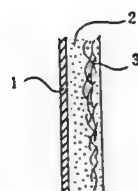
**4,791,019**  
**POLYURETHANE FOAM INTERIOR FINISHING**  
**MATERIAL HAVING FACING AND PROCESS FOR**  
**PREPARING THE SAME**

Takamichi Ohta, Kobe; Takashi Izumi, Toyota; Takeshi Yamazi, and Shigeyoshi Fukushima, both of Nagoya, all of Japan, assignors to Toyo Tire & Rubber Company Limited, Osaka, Japan

Filed Feb. 19, 1988, Ser. No. 157,872  
 Claims priority, application Japan, Feb. 20, 1987, 62-38383  
 Int. Cl.<sup>4</sup> B32B 3/26

U.S. Cl. 428—304.4

4 Claims



1. A polyurethane foam interior finishing material having a facing, characterized in that the material comprises a laminate of a thermoplastic synthetic resin facing material and an expanded pad layer, the expanded pad layer comprising a semi-rigid polyurethane foam reinforced with long glass fibers, the long glass fibers being present in the pad layer primarily in the vicinity of the rear side thereof, the finishing material having no core.

**4,791,020**  
**BONDED COMPOSITES OF CELLULOSE FIBERS**  
**POLYETHYLENE**

Bohuslav V. Kokta, Trois-Rivieres, Canada, assignor to Novacor Chemicals Ltd., Calgary, Canada

Filed Feb. 2, 1987, Ser. No. 9,893  
 Int. Cl.<sup>4</sup> B32B 23/00, 5/16

U.S. Cl. 428—326

23 Claims

1. A composite consisting essentially of discontinuous cellulose fibers dispersed in a matrix of polyethylene and bonded thereto through a compound containing at least one isocyanate group, said polyethylene being selected from the group consisting of homopolymers of ethylene and copolymers of a major proportion of ethylene and a minor portion of a higher olefin, said compound being present in an amount of about 0.1 to about 10 wt. % of the composite.

**4,791,021**  
**MAGNETIC RECORDING MEDIUM**  
 Kunihiko Honda; Toshihiko Miura, and Hiroaki Araki, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 13, 1987, Ser. No. 106,683  
 Claims priority, application Japan, Oct. 13, 1986, 61-241499; Oct. 13, 1986, 61-241500

Int. Cl.<sup>4</sup> G11B 5/712  
 U.S. Cl. 428—329

8 Claims

1. A magnetic recording medium comprising a non-magnetic support having provided thereon a magnetic layer containing ferromagnetic particles and a binder, wherein said ferromagnetic particles comprise iron nitride particles comprising iron oxide on the surface thereof in which the content of iron oxide (FeO<sub>x</sub>, 4/3 ≤ x ≤ 3/2) is from 0.5 to 10% (integral intensity ratio of X-ray diffraction peak) based on iron nitride (Fe<sub>4</sub>N) and said iron nitride-containing iron oxide particles have a crystal size of from 150 to 250 Å and are mainly comprised of γ'-Fe<sub>3</sub>N<sub>4</sub>.

**4,791,022**  
**DECORATIVE PANELS**

W. David Graham, Heath, Ohio, assignor to Owens-Corning Fiberglass Corporation, Toledo, Ohio

Continuation of Ser. No. 549,049, Nov. 7, 1983, abandoned. This application Dec. 21, 1984, Ser. No. 684,175  
 Int. Cl.<sup>4</sup> B32B 5/16, 19/00

U.S. Cl. 428—324

29 Claims

1. A method of producing a decorative surface having a high profile facing which comprises depositing a particulate material on a planular surface of a fiberglass wall or ceiling board, positioning a gas-curable resin consisting of furfuryl alcohol or an oligomeric acrylate in contact with the surface and the particulate material and contacting the resin with a gaseous curing agent to cure the resin and adhere said particulate material to said surface.

**4,791,023**  
**INFRARED ABSORBENT AND OPTICAL MATERIAL**  
**USING THE SAME**

Yoshiaki Suzuki; Gouichi Hayashi, and Masayoshi Tsuboi, all of Minami-ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

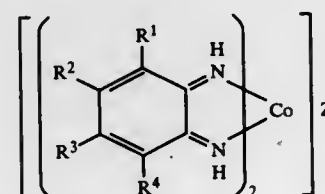
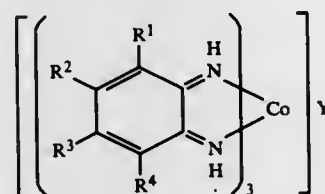
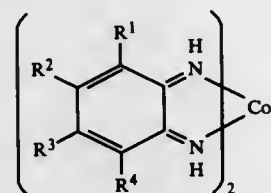
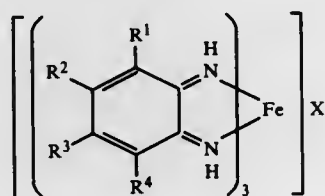
Filed Jul. 3, 1985, Ser. No. 751,448

Claims priority, application Japan, Jul. 7, 1984, 59-139769; Sep. 20, 1984, 59-197042; Nov. 1, 1984, 59-228907  
 Int. Cl.<sup>4</sup> F21V 9/04, 9/06

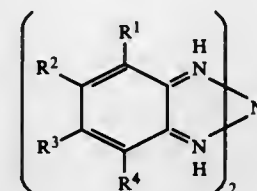
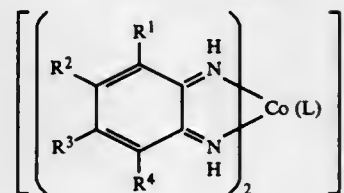
U.S. Cl. 428—336

26 Claims

1. An infrared absorbent composition comprising at least one compound selected from metal complex compounds represented by the following general formulae [I]—[VI]:



-continued



wherein, R<sup>1</sup> to R<sup>4</sup> each independently represents a hydrogen atom, halogen atom, cyano group or hydroxyl group, or a substituted or unsubstituted alkyl, aryl, cycloalkyl or heterocyclic group which may be bonded through a divalent connecting group to a benzene ring, or a group of nonmetal atoms forming at least one substituted or unsubstituted five-membered or six-membered ring by bonding of R<sup>1</sup> and R<sup>2</sup>, R<sup>2</sup> and R<sup>3</sup> or R<sup>3</sup> and R<sup>4</sup>; R<sup>1</sup> to R<sup>4</sup> may be the same or different; X and Y represent anions capable of neutralizing cations in the above-mentioned general formulae; Z represents a halogen and thiocyanate ion; and L represents a monodentate ligand containing a nitrogen, phosphorus or sulphur atom as a coordinate element.

**4,791,024**  
**DISMEMBERABLE ADHESIVE JUNCTION SYSTEM**  
 Piero R. Clerici, Milan, and Italo Casalegno, Merate, both of Italy, assignors to Ansonia S.p.A., Monza, Italy

Filed Feb. 4, 1983, Ser. No. 463,833  
 Claims priority, application Italy, Feb. 4, 1982, 19444 A/82; Dec. 20, 1982, 24851 A/82

Int. Cl.<sup>4</sup> C09U 7/02  
 U.S. Cl. 428—343

4 Claims



1. In a joining system wherein two like elements are to be repeatedly connected together and released, an adhesive element comprising a carrier and an adhesive layer carried by one side of said carrier, said adhesive layer being formed of elastomeric material and being firmly anchored to said carrier, said adhesive layer having a face surface bondable only to a like face surface, and the strengths of said carrier and that of the anchoring of said adhesive layer to said carrier being greater than the releasable bond between like face surfaces, said elastomeric material being cured but only to such a degree that said elastomeric material retains its adhesive characteristics on said face surface, said elastomeric material being cured to a different degree through its thickness with the degree of curing being the stronger adjacent said carrier.

**4,791,025**  
**STAINLESS STEEL WIRE AND PROCESS FOR**  
**MANUFACTURING THE SAME**

Masahiro Hiromori, and Toshimi Nakahara, both of Itami, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Apr. 17, 1986, Ser. No. 853,014  
 Claims priority, application Japan, Apr. 23, 1985, 60-88070; Jul. 17, 1985, 60-159189

Int. Cl.<sup>4</sup> B32B 15/00; D02G 3/00  
 U.S. Cl. 428—379

2 Claims

1. A cold drawn stainless steel wire having a coating of colored resinous paint with a thickness of 0.1 to 50 microns, wherein said coating is applied and baked to a pencil hardness of 6 or less before the wire is cold drawn, and said coating being heat-resistant so as not to discolor if heated for annealing for 1 to 60 minutes at a temperature of 200° to 400° C.

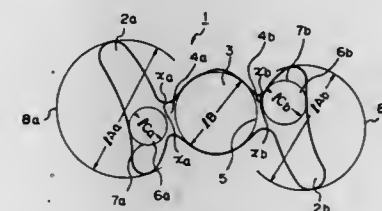
**4,791,026**  
**SYNTHETIC POLYMER MULTIFILAMENT YARN**  
**USEFUL FOR BULKY YARN AND PROCESS FOR**  
**PRODUCING THE SAME**

Masato Yoshimoto, Ibaraki, and Shinji Ohwaki, Minoo, both of Japan, assignors to Teijin Limited, Osaka, Japan

Filed Nov. 18, 1987, Ser. No. 122,255  
 Claims priority, application Japan, Nov. 27, 1986, 61-280807  
 Int. Cl.<sup>4</sup> D02G 3/00

U.S. Cl. 428—397

17 Claims



1. A synthetic polymer multifilament yarn capable of being converted to a bulky yarn, consisting of a plurality of irregular individual filaments, each of which individual filaments comprises a filament-forming synthetic polymer and is composed of:

- (A) at least two belt-shaped filamentary constituents each extending along the longitudinal axis of the filament;
- (B) at least one core filamentary constituent sinuously extending in wave form along the longitudinal axis of the filament, having a thickness thereof varying alternately between thick and thin and arranged between the belt-shaped filamentary constituents; and
- (C) at least two middle filamentary constituents each extending along the longitudinal axis of the filament and located between the core constituent and the belt-shaped constituents to connect the core constituent to the belt-shaped constituents therethrough, and in each of which individual filaments:
  - (a) the core constituent has a cross-sectional profile having an inscribed circle thereof having a diameter (1B);
  - (b) the belt-shaped constituents have a substantially I-shaped cross-sectional profile;
  - (c) the middle constituents have a waist-formed cross-sectional profile having a narrowest portion thereof; and
  - (d) cross-sectional regions consisting of the I-shaped cross-section segments and half portions of the middle cross-section segments located between the I-shaped segments and lines drawn along the narrowest portions of the middle segments have inscribed circles having diameters (1C) smaller than the diameter (1B) of the inscribed circle of the core segment.



4,791,027

**NYLON GRANULES HAVING AN OUTER SHELL**  
Horst Reimann, Worms; Franz Zahradnik, Ludwigshafen, and Hans-Peter Weiss, Mutterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Fed. Rep. of Germany

Filed Feb. 12, 1988, Ser. No. 155,521  
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1987, 3706356

Int. Cl.<sup>4</sup> B32B 27/34

U.S. Cl. 428—407

4 Claims

1. Nylon granules based on
  - (A) from 20 to 99.99% by weight of a nylon,
  - (B) from 0 to 60% by weight of fibrous or particulate fillers or a mixture thereof and
  - (C) from 0 to 40% by weight of an impact modifying rubber and containing
  - (D) from 0.01 to 1% by weight of an outer shell consisting of a mixture of
    - (d<sub>1</sub>) zinc stearate or aluminum stearate or a mixture of these,
    - (d<sub>2</sub>) calcium stearate and
    - (d<sub>3</sub>) an ester of an aliphatic carboxylic acid of 6 to 24 carbon atoms with an aliphatic saturated alcohol of 2 to 24 carbon atoms

4,791,028

**POLYMER COATINGS**

Alan Nevin, and Ian Shirley, both of Cheshire, England, assignors to Imperial Chemical Industries PLC, London, England  
Continuation of Ser. No. 720,382, Apr. 5, 1985, abandoned. This application Jul. 1, 1987, Ser. No. 68,703

Claims priority, application United Kingdom, Apr. 6, 1984, 8408953

Int. Cl.<sup>4</sup> B32B 27/08, 27/18; C08F 6/06

U.S. Cl. 428—421

17 Claims

1. A process for the preparation of a polymer composition composed of a polyarylene which process comprises at least the steps of:
  - (1) depositing on a substrate a layer composed of a first composition which comprises a polycyclohexadiene, an additive, and a solvent, said solvent for the polycyclohexadiene having a boiling point below 120° C.; and
  - (2) subjecting said first composition to a heat treatment at a temperature ranging from about 200° C. to 400° C. such that a major portion of the cyclohexenylene rings in the polycyclohexadiene are converted into aromatic groups, wherein said additive is an aromatic hydrocarbon or ester which is (a) soluble in the composition employed in said process, (b) is sufficiently involatile so that at least a portion thereof is present in the composition during at least the early stages of said heat treatment step, (c) does not undergo phase separation from the polyarylene at least at the temperatures at which said heat treatment step is conducted, and (d) constitutes between 2 and 20% w/w of said first composition.

4,791,029

**AQUEOUS EMULSIONS OF ORGANOPOLYSILOXANE COMPOSITIONS ADAPTED FOR COATING FLEXIBLE SUBSTRATES**

Alain Feu, Tassin La Demi-Lune; Gerard Fillippi, La Mulatiere, and Robert Violland, Lyons, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Filed Jun. 24, 1987, Ser. No. 66,030  
Claims priority, application France, Jun. 24, 1986, 86 09310  
Int. Cl.<sup>4</sup> B32B 9/04

U.S. Cl. 428—447

10 Claims

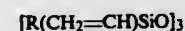
1. An organopolysiloxane composition of matter, comprising an aqueous emulsion A that includes:
  - (V<sub>1</sub>) a substantially linear diorganopolysiloxane blocked by

a vinylidiorganosiloxy group at each end of the polymer chain thereof;

(V<sub>2</sub>) a substantially linear random vinylorganodiorganopolysiloxane copolymer blocked at each end of the polymer chain thereof by vinylidiorganosiloxy or triorganosiloxy group containing at least three SiVi groups per molecule;

(H<sub>1</sub>) a substantially linear random diorganooorganohydrogenopolysiloxane copolymer containing at least three SiH groups per molecule and blocked at each end of the polymer chain thereof by a triorganosiloxy or diorganohydrogenopolysiloxane group;

(V<sub>3</sub>) a vinylated cyclotrisiloxane having the formula:



in which R is a C<sub>1</sub>–C<sub>4</sub> alkyl radical, a phenyl radical or a 3,3,3-trifluoropropyl radical, and said vinylated cyclotrisiloxane being present in such amount as to contribute from 0.5 to 60% of the total number of SiVi groups to the composition; and

(E) an emulsifier comprising a mixture of polyvinyl alcohol (E<sub>1</sub>) and at least one polyalkylene glycol alkyl ether or polyalkylene glycol alkylphenyl ether (E<sub>2</sub>);

wherein at least 90% of the organic radicals comprising the polysiloxanes (V<sub>1</sub>), (V<sub>2</sub>) and (H<sub>1</sub>) are methyl radicals, with the remaining organic radicals being ethyl, propyl, phenyl or 3,3,3-trifluoropropyl radicals, and further wherein the amounts of (V<sub>1</sub>), (V<sub>2</sub>), (V<sub>3</sub>) and (H<sub>1</sub>) are such that the numerical ratio of the SiH groups to the SiVi groups ranges from 0.5 to 5.

4,791,030

**SUPER HERO CUP HOLDER**

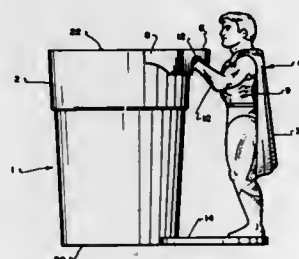
Robert A. DeMars, 7932 Maestro Ave., Canoga Park, Calif. 91304

Continuation-in-part of Ser. No. 739,564, May 30, 1985, Pat. No. 4,654,274. This application Mar. 26, 1987, Ser. No. 31,247  
The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B65D 25/28

U.S. Cl. 428—542.4

7 Claims



1. A cup holder for co-operative association with a handleless cup comprising a cylinder and a releasable handle, said cylinder section having substantially the same length as a pre-selected cup and having substantially the same inner configuration as the outer configuration of said cup, a ledge extending outwardly from said holder at or near its upper rim, at least one protrusion on a horizontal surface of said ledge for releasably engaging corresponding receptacle means on an outwardly extending arm of a shank portion of said handle, said receptacle means being at the distal end of said arm, said shank portion depending from a proximal end of said arm and extending to a lower support platform, said platform extending substantially in the same direction as said arm and having means therein to releasably receive at its outer edge a portion of the bottom rim of said cup.

4,791,031

**LEAD FRAME FOR IC HAVING A WIRE BONDING PART COMPOSED OF MULTI-LAYER STRUCTURE OF IRON CONTAINING ALLOY, REFRACTORY METAL AND ALUMINUM**

Hideyasu Nikaido, Tokyo, Japan, assignor to Sumitomo Metal Mining Co. Ltd., Tokyo, Japan

Filed Oct. 28, 1987, Ser. No. 113,661

Claims priority, application Japan, Oct. 29, 1986, 61-255903  
Int. Cl.<sup>4</sup> H01L 21/285

U.S. Cl. 428—620

5 Claims

1. A lead frame for a semiconductor integrated circuit device which includes an inner lead unit that has a wire bonding part and is composed of an iron-containing alloy, a layer of a metal having a melting point of at least 1700° C. on said wire bonding part of said inner lead unit, and a coating of aluminum on said layer of metal; said layer of metal reducing diffusion of metals from said inner lead frame to said coating of aluminum when subjected to elevated temperatures of at least 500° C.

4,791,032

**MAGNETIC RECORDING MEDIA AND PROCESS OF FABRICATING**

Kazunori Komatsu, and Tsunehiko Sato, both of Kanagawa, Japan, assignors to Fujii Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 11, 1987, Ser. No. 131,688

U.S. Cl. 428—694

3 Claims

Int. Cl.<sup>4</sup> H01F 10/02

1. A process for fabricating a magnetic recording medium, comprising the steps of:
  - forming a magnetic layer by applying a magnetic liquid to a continuously running support; and
  - randomly orienting said magnetic layer while said magnetic layer is wet, wherein a magnetic field intensity of said AC magnetic field applied is within a range of 1/10 to 1/1 of the magnetic coercive force of magnetic particles in said magnetic layer, and a frequency of said magnetic field (Hz) is set with respect to a running rate (m/min) of said magnetic layer through said magnetic field so as to form a ratio between said frequency and said running rate within a range of 1/10 to 1/1.

4,791,033

**FUEL CELL SYSTEM**

Pinakin Patel, Danbury, Conn., assignor to Energy Research Corporation, Danbury, Conn.

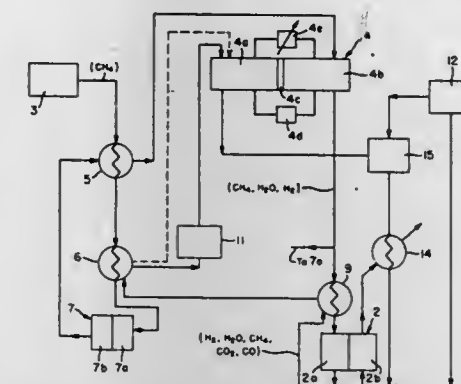
Filed Mar. 28, 1988, Ser. No. 174,075

U.S. Cl. 429—19

15 Claims

1. A fuel cell system adapted to receive a hydrocarbon fuel from a fuel supply, said fuel cell system comprising:
  - a fuel cell including: an anode compartment adapted to convey a fuel process gas stream and developing a first exhaust including hydrogen and water; a cathode compartment adapted to receive oxidant process gas and developing a second exhaust; and internal reforming means adapted to receive a mixture of said fuel and water and to steam reform the hydrocarbon content of said fuel to produce said fuel process gas stream;
  - transfer means comprising: anode means for receiving said first exhaust; cathode means; means for applying a voltage across said cathode and anode means; and means for sup-

plying hydrocarbon fuel from said fuel supply to said cathode means; said transfer means coupling water in said first exhaust in said anode means to said cathode means controllably in dependence on the supply of fuel to said cathode means and coupling hydrogen in said first exhaust in said anode means to said cathode means, the constitu-



ents in said cathode means including said applied fuel and coupled hydrogen and water forming a first stream and the remaining constituents in said anode means forming a second stream; and means for coupling said first stream to said internal steam reforming means.

4,791,034

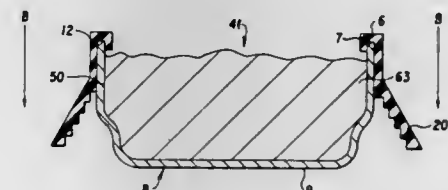
**SEALING SLEEVE**

Robert B. Dopp, Madison, Wis., assignor to Rayovac Corporation, Madison, Wis.

Filed Feb. 10, 1987, Ser. No. 12,999

U.S. Cl. 429—27

22 Claims

Int. Cl.<sup>4</sup> H01M 4/00, 2/08

1. A sealing sleeve of substantially uniform thickness having at least one mechanically unsupported ridge protruding inwardly of its inner surface, wherein said sleeve is capable, when contacted by another surface in a manner and at a pressure sufficient to distort at least one of its inwardly-protruding ridges, of forming a seal which substantially prevents the passage of fluids between said sleeve and said other surface.

4,791,035

**CELL AND CURRENT COLLECTOR FELT ARRANGEMENT FOR SOLID OXIDE ELECTROCHEMICAL CELL COMBINATIONS**

Philip Rechner, Plum Boro, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 10, 1987, Ser. No. 130,913

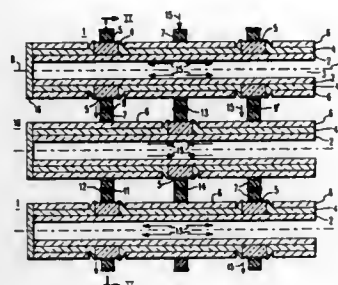
U.S. Cl. 429—31

15 Claims

Int. Cl.<sup>4</sup> H01M 8/12

1. A high-temperature solid electrolyte electrochemical cell combination, comprising an annular, axially elongated, continuous, interior electrode containing at least one interior gas feed conduit therein, annular, solid electrolyte segments around and

covering portions of the inner electrode; annular outer electrode segments around and covering the electrolyte segments; annular, electronically conducting, non-porous, interconnection material disposed between electrolyte segments and in contact with the inner electrode; and annular, electronically



conducting, porous, metal-fiber current collector felts disposed on and around the annular interconnection material and portions of the annular outer electrode segments, where the interconnection material and metal fiber felts are disposed circumferentially about the cell combination, transversely to the axial length of the cell combination.

**4,791,036**  
**ANODE CONDUCTOR FOR ALKALINE CELLS**  
David J. Schrenk, and Patrick E. Murphy, both of LaGrange, Ga., assignors to Duracell Inc., Bethel, Conn.  
Continuation of Ser. No. 923,941, Oct. 28, 1986, abandoned.  
This application Jan. 11, 1988, Ser. No. 140,952  
Int. Cl.<sup>4</sup> A01M 2/26

U.S. Cl. 429-178

8 Claims

1. An electrochemical cell comprised of an anode comprised of zinc; a cathode; and alkaline electrolyte; and a current collector comprised of a silicon bronze alloy that is comprised of 85-98% by weight copper and 1-5% by weight silicon with the remainder being comprised of at least one of manganese, iron, zinc, aluminum, tin, lead, or mixtures thereof; and a strip of metal tab stock welded to said current collector, said tab stock being a metal other than silicon bronze alloy.

**4,791,037**  
**CARBON ELECTRODE**  
Menahem Anderman, Boyds, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.  
Filed Aug. 15, 1986, Ser. No. 896,699  
Int. Cl.<sup>4</sup> H01M 6/14

U.S. Cl. 429-196

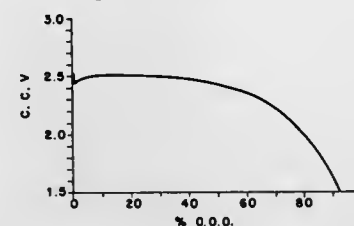
26 Claims

1. A carbon electrode suitable for use in a Li/SO<sub>2</sub> battery comprising at least one substantially homogeneous, microporous sheet having a composition of from about 7 to 22 volume percent of high density polyethylene having a weight average molecular weight of at least about 3,000,000, from 78 to 93 volume percent of a high surface area, conductive carbon having a surface area of from 30 to 500 m<sup>2</sup>/gm, a mean particle size of from 10 to 100 millimicrons and conductivity of at least 20 ohm<sup>-1</sup> cm<sup>-1</sup> and from 0 to 2 volume percent of a plasticizer for said polyethylene; and a current collector composed of a conductive material, said current collector being in intimate contact with each of said at least one sheet.

**4,791,038**  
**INHIBITING VOLTAGE SUPPRESSION IN LITHIUM/FLUORINATED CARBON BATTERIES**  
George A. Shia, North Tonawanda; David Nalewajek, and Michael F. Pyszczyk, both of West Seneca, all of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.  
Filed Oct. 9, 1986, Ser. No. 917,455  
Int. Cl.<sup>4</sup> H01M 4/58

U.S. Cl. 429-218

12 Claims

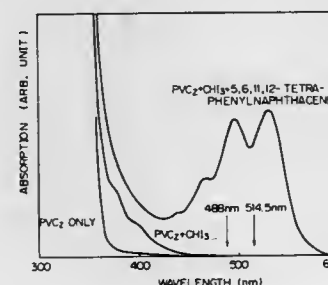


1. A lithium/fluorinated carbon battery having a reduced initial voltage suppression which comprises the incorporation in the battery cathode of fluorinated carbon which has been reacted with a compound selected from the group consisting of a Group IA metal-alkyl compound and a Group IA metal-aryl compound, which Group IA metal-aryl compound has at least 10 carbon atoms, until surface fluorine on the fluorinated carbon has been stripped and alkyl or aryl groups from the Group IA metal-alkyl compound or Group IA metal-aryl compound are substituted for surface fluorine atoms.

**4,791,039**  
**VISIBLE RAY-RECORDING HOLOGRAM MATERIAL**  
Takeshi Ishitsuka, Atsugi; Yasuo Yamagishi, Zama, and Akihiro Mochizuki, Atsugi, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
Filed Feb. 13, 1987, Ser. No. 14,695  
Claims priority, application Japan, Feb. 20, 1986, 61-036356; Oct. 14, 1986, 61-242084  
Int. Cl.<sup>4</sup> G03C 1/727

U.S. Cl. 430-2

9 Claims



1. A visible ray-recording hologram material comprising a polymer containing a carbazole ring, iodoform, and a phenyl-naphthacene.

**4,791,040**  
**MULTILAYERED ELECTROPHOTOGRAPHIC PHOTOCURABLE MEMBER**  
Makoto Fujikura; Toshiyuki Ohno; Shigeharu Onuma, all of Hitachi; Kunihiko Tamahashi, Mito; Mitsuo Chigasaki, and Yasuo Shimamura, both of Hitachi, all of Japan, assignors to Hitachi Ltd. and Hitachi Chemical Company, Ltd., both of Tokyo, Japan  
Filed Apr. 20, 1987, Ser. No. 41,246  
Claims priority, application Japan, Apr. 18, 1986, 61-89517  
Int. Cl.<sup>4</sup> G03G 5/085

U.S. Cl. 430-64

18 Claims

1. An electrophotographic photosensitive member comprising a conductive support and provided thereon in the following order, a barrier layer, a photoconductive layer made of amorphous silicon containing germanium and a surface layer, characterized in that

an intermediate layer is formed between said surface layer and said photoconductive layer and is made of amorphous silicon containing germanium and carbon and has an intermediate optical gap value between those of said photoconductive layer and said surface layer.

**4,791,041**  
**MAGNETIC CARRIER PARTICLES FOR ELECTROPHOTOGRAPHIC DEVELOPER**  
Takayoshi Aoki; Masayuki Takeda; Chiaki Suzuki, and Ikutaro Nagatsuka, all of Ashigara, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan  
Filed Jun. 5, 1987, Ser. No. 58,421  
Claims priority, application Japan, Jun. 5, 1986, 61-129253; Jun. 16, 1986, 61-138179; Jun. 16, 1986, 61-138180; Jun. 16, 1986, 61-138181  
Int. Cl.<sup>4</sup> G03G 9/10

U.S. Cl. 430-108

19 Claims

1. A carrier for developer which comprises a core having an average particle diameter of from about 50 to about 200  $\mu$ m and comprising magnetic particles having an average particle size of from 0.05 to 5  $\mu$ m dispersed in a binder resin, and a polymer overcoat having a critical surface tension of from about 10 to about 25 dyn/cm and comprising a fluorinated alkylacrylate or methacrylate copolymer, formed on the surface of the core.

**4,791,042**  
**EPOXY HARDENER IN DYE FIXING ELEMENT**  
Toshiaki Aono, and Takeshi Shibata, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Oct. 15, 1986, Ser. No. 919,116  
Claims priority, application Japan, Oct. 18, 1985, 60-231093  
Int. Cl.<sup>4</sup> G03C 5/54, 1/90

U.S. Cl. 430-203

20 Claims

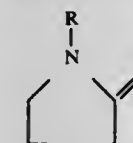
1. A process for forming an image comprising imagewise exposing a light-sensitive element comprising a support having thereon at least a light-sensitive silver halide, a binder, and a dye providing substance which produces or releases a mobile dye corresponding or counter-corresponding to a reaction where said light-sensitive silver halide is reduced to silver at an elevated temperature, and subsequently or simultaneously heating said light-sensitive element in the presence of at least one of a base and precursor thereof, and thereby transferring said mobile dye thus produced or released to a dye fixing element, wherein a coated layer of said dye fixing element has been hardened with an epoxy hardener.

**4,791,043**  
**POSITIVE PHOTORESIST STRIPPING COMPOSITION**  
Evan G. Thomas; Edmund W. Smalley, both of East Aurora, and Kane D. Cook, Buffalo, all of N.Y., assignors to HMC Patents Holding Co., Inc., Hampton, N.H.  
Continuation of Ser. No. 563,336, Dec. 20, 1983, abandoned.  
This application Apr. 17, 1987, Ser. No. 40,710  
Int. Cl.<sup>4</sup> G03C 11/12

U.S. Cl. 430-256

5 Claims

1. A stripping composition for removing an organic positive photoresist composition from the surface of a semiconductor substrate containing such photoresist comprising (a) N-amino-alkylpiperazine in a range between 0% and 90% by weight; N-hydroxyalkyl-piperazine between 0% and 90% by weight provided that at least one of said piperazines is present in an amount of at least 10% by weight; and (b) between 5% and 90% by weight of a pyrrolidone selected from the group consisting of alkyl or cycloalkyl-2-pyrrolidones of the formula



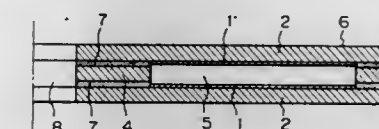
where R is an alkyl group of 1-6 carbon atoms or a 5 or 6 member cycloalkyl and including aminoalkyl and hydroxyalkyl of 1-6 carbon atoms.

5. A method of stripping positive photoresist from a substrate semiconductor surface having a layer of said photoresist applied thereon comprising contacting the photoresist layer with the composition of claim 1, at a temperature between about 15° C. and about 160° C. until said photoresist is substantially removed.

**4,791,044**  
**DISK TYPE INFORMATION RECORDING MEDIUM**  
Toshikazu Yoshino, Tokorozawa, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan  
Continuation of Ser. No. 824,130, Jan. 30, 1986, abandoned. This application Sep. 11, 1987, Ser. No. 97,324  
Claims priority, application Japan, Jan. 30, 1985, 60-011997[U]  
Int. Cl.<sup>4</sup> G01D 15/14

U.S. Cl. 430-270

7 Claims



1. A information recording disk medium comprising: a pair of disk-shaped substrates disposed in parallel to each other; information bearing layers made of a cyanine dye and formed respectively on surfaces of said pair of substrates which face each other, from which information is read by irradiating a light beam such as a laser beam thereon; an inner spacer concentrically interposed between said pair of substrates at a central part of said substrates so as to form a hollow space between said information bearing layers facing each other; an outer spacer concentrically interposed between said pair of substrates at a peripheral portion thereof; and polyurethane adhesive layers having a viscoelastic characteristic and respectively connecting said pair of substrates with said inner and outer spacers.



**4,791,045**  
**PHOTOSENSITIZERS AND POLYMERIZABLE**  
**COMPOSITIONS WITH MANNICH BASES AND**  
**IODONIUM SALTS**

Smarajit Mitra, Woodbury, and Robert J. DeVoe, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

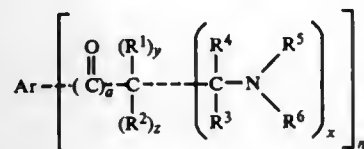
Filed Jan. 25, 1988, Ser. No. 147,446

Int. Cl. G03C 1/68

U.S. Cl. 430-281

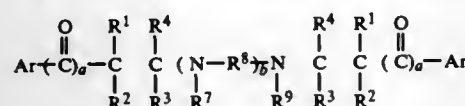
13 Claims

1. A photopolymerizable composition comprising a photosensitizationally effective amount of Mannich base photosensitizer compounds of the formulae:

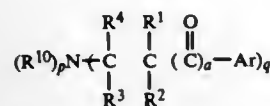


where a=1, 2, n=1, 2, 3, 4, x=1, 2, y and z chosen such that x+y+z=3

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> may be hydrogen, alkyl, aryl, aralkyl, or alkaryl, R<sup>5</sup> and R<sup>6</sup> are either independently substituted or unsubstituted alkyl, aryl, alkaryl or aralkyl groups, optionally containing up to 10 heteroatoms, or R<sup>5</sup> and R<sup>6</sup> together are selected from the group consisting of carbocyclic and heterocyclic groups, and Ar is an unsubstituted or substituted aromatic or heteroaromatic organic group



where a, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and Ar are as defined above and b=0 or 1, R<sup>7</sup> and R<sup>8</sup> are either independently alkyl, aryl, alkaryl, aralkyl groups, or R<sup>7</sup> and R<sup>8</sup> together with the nitrogens to which R<sup>8</sup> is attached forms a divalent organic group selected from the group consisting of heterocyclic groups and bis-heterocyclic groups, or R<sup>8</sup> is a chemical bond



where a, R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup> and Ar are as defined above and where q=1, 2 or 3, with the proviso that p+q=3, and

R<sup>10</sup> is selected from the group consisting of alkyl, aryl, aralkyl, and alkaryl  
 said Mannich base photosensitizer being in physical association with a photosensitive free radical diaryliodonium photoinitiator and at least one vinyl monomer.

**4,791,046**  
**PROCESS FOR FORMING MASK PATTERNS OF**  
**POSITIVE TYPE RESIST MATERIAL WITH**  
**TRIMETHYLSILYLNITRILE**

Ken Ogura, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Division of Ser. No. 727,395, Apr. 25, 1985, Pat. No. 4,686,280.

This application May 18, 1987, Ser. No. 50,482

Int. Cl. G03F 7/26

U.S. Cl. 430-296

20 Claims

1. A process for forming mask patterns of positive type resist material with trimethylsilylnitrile, comprising steps of

(a) forming a first resist layer on a wafer for planarizing the wafer surface;

(b) forming a second resist layer on said first resist layer, the second resist layer consisting essentially of, a photoactive resin having phenolic hydroxyl groups selected from the group consisting of an admixture of a naphthoquinone diazido sulfonic acid derivative compound and a phenol formaldehyde, and an ester of the reaction of a naphthoquinone diazido sulfonic acid derivative compound and a phenol formaldehyde, and 5 to 50% by weight of trimethylsilylnitrile based on the solid content of the positive resist material, wherein said first resist layer has a higher plasma etch rate than said second resist layer;

(c) selectively exposing on said second resist layer to form a pattern in that layer;

(d) removing exposed portions of said second resist layer to form a mask pattern in exposed portions of said second resist layer; and

(e) subjecting said mask pattern and said first resist layer to a reactive ion etching to remove the first resist layer by using the mask pattern as an etching mask.

12. A process for forming mask patterns of positive type resist material with trimethylsilylnitrile, comprising the steps of;



(a) forming a first resist layer on a wafer for planarizing the wafer surface;

(b) forming a second resist layer on said first resist layer the second resist layer consisting essentially of:

a base material solution forming a positive resist pattern, said base material solution being composed of a photoactive resin having phenolic hydroxyl groups selected from the group consisting of a naphthoquinone diazide sulfonic acid derivative compound and a phenol formaldehyde, and an ester of the reaction of a naphthoquinone diazide sulfonic acid derivative compound and a phenol formaldehyde, and 5 to 50% by weight of trimethylsilylnitrile based on the total weight of the solid content of the positive type resist solution;

(c) selectively exposing said second resist layer to energy to form a pattern in that layer;

(d) removing exposed portions of said second resist layer to form a mask pattern in exposed portions of said second resist layer; and

(e) subjecting said mask pattern and said first resist layer to a reactive ion etching to remove the first resist layer by using the mask pattern as an etching mask.

**4,791,047**  
**COLOR SOLID IMAGE PICKUP ELEMENT**

Jin Murayama; Hiroshi Tamura, and Yoshimitsu Kudoh, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Aug. 7, 1987, Ser. No. 82,472

Claims priority, application Japan, Aug. 7, 1986, 61-184327

Int. Cl. G03F 9/00; G03C 5/00; B32B 33/00, 31/00

U.S. Cl. 430-321

3 Claims

1. A color solid image pickup element, comprising:

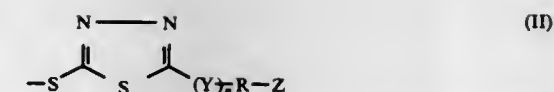
a semiconductor chip;

a color filter bonded to said semiconductor chip, wherein said color filter is a film filter of a lamination structure

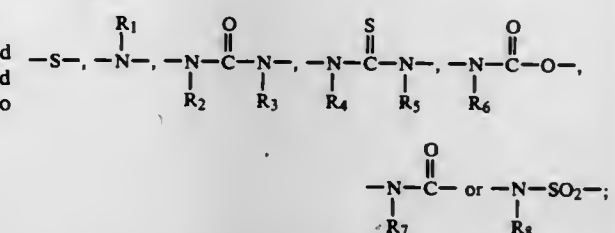
comprising a transparent glass substrate and at least one dielectric layer vacuum-deposited on said substrate; a buffer layer comprising a transparent resin interposed



between said color filter and said semiconductor chip; and an adhesive interposed between said buffer layer and said semiconductor chip, whereby said color filter is bonded to said semiconductor chip.



wherein R represents a straight chain or branched chain alkylene group, a straight chain or branched chain alkenylene group, a straight chain or branched chain aralkylene group or an arylene group; Z represents a polar substituent; Y represents



**4,791,048**  
**COLOR IMAGE FORMING PROCESS UTILIZING**  
**SUBSTANTIALLY WATER-INSOLUBLE BASIC METAL**  
**COMPOUNDS AND COMPLEXING COMPOUNDS**  
 Hiroyuki Hirai; Yoshiharu Yabuki, and Haruhiko Iwano, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 19, 1987, Ser. No. 16,591

Claims priority, application Japan, Feb. 19, 1986, 61-034895; Mar. 14, 1986, 61-056477; Mar. 28, 1986, 61-070055; Oct. 29, 1986, 61-257463

Int. Cl. G03C 5/24, 7/16, 7/40

U.S. Cl. 430-372

13 Claims

1. A process for forming a color image, comprising subjecting a silver halide photosensitive material comprising at least a photosensitive silver halide, a two equivalent coupler, a binder, and a substantially water-insoluble basic metal compound on a support, to development with a processing solution comprising a complexing compound capable of water-mediated complexing reaction with the metal ion of said substantially water-insoluble basic metal compound to release a base.

**4,791,049**  
**SILVER HALIDE PHOTOGRAPHIC MATERIAL**  
**CONTAINING A COMPOUND HAVING AN**  
**OXIDATION-REDUCTION MOIETY AND TIMING**  
**GROUP**

Tetsuro Kojima; Shigeo Hirano, and Hideo Usui, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Apr. 23, 1987, Ser. No. 41,570

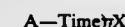
Claims priority, application Japan, Apr. 25, 1986, 61-96094

Int. Cl. G03C 1/08, 1/46, 7/26, 7/32

U.S. Cl. 430-544

14 Claims

1. A silver halide photographic material comprising a support having thereon at least one silver halide emulsion layer, wherein the silver halide photographic material contains at least one compound represented by the following general formula (I):



wherein A represents an oxidation reduction moiety comprising an atomic group which does not enable  $\text{---(Time)}_t\text{X}$  to be released until the oxidation reduction moiety is oxidized during photographic development processing; Time represents a timing group which is connected to A through a sulfur atom, a nitrogen atom or an oxygen atom; t represents an integer of 0 or 1; and X represents a group represented by the following general formula (II):

**4,791,050**  
**SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL**  
 Akira Ogawa, and Hiroshi Fukuzawa, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 7, 1987, Ser. No. 46,750

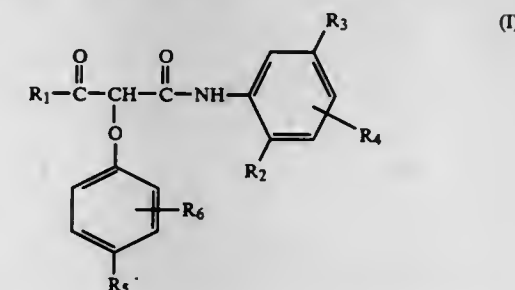
Claims priority, application Japan, May 7, 1986, 61-104246; Jun. 19, 1986, 61-143755

Int. Cl. G03C 7/36

U.S. Cl. 430-506

13 Claims

1. A silver halide color photographic material comprising a support having provided thereon at least a blue-sensitive emulsion layer, a green-sensitive emulsion layer and a red-sensitive emulsion layer, said blue-sensitive emulsion layer comprising at least two layers differing in sensitivity, one of which is the highest sensitive blue-sensitive emulsion layer containing at least one yellow-dye-forming coupler represented by the general formula (I), and the other of which is the lowest sensitive blue-sensitive emulsion layer containing at least one yellow-dye-forming coupler represented by the general formula (V):



(I) wherein R<sub>1</sub> represents a tertiary alkyl group; R<sub>2</sub> represents a halogen atom, an alkoxy group, or a hydrogen atom; R<sub>3</sub> represents an alkoxy carbonyl group, an aryloxy carbonyl group, an alkylsulfonamido group, an arylsulfonamido group, or an acylamino group; R<sub>4</sub> represents a hydrogen atom, a halogen atom, an alkoxy group, an alkyl group, or an acylamino group; R<sub>5</sub> represents an arylsulfonyl group, an alkylsulfonyl group, an alkoxy carbonyl group, an aryloxy carbonyl group, a cyano group, an acyl group, an acylamino group, an alkylsulfamoyl group, an arylsulfamoyl group, an alkylsulfonamido group, an





4,791,058  
**GRAPE POMACE AS SUBSTRATE FOR MICROBIAL  
 PRODUCTION OF CITRIC ACID**  
 Yong D. Haug, Geneva, N.Y., assignor to Cornell Research  
 Foundation, Inc., Ithaca, N.Y.  
 Filed May 10, 1985, Ser. No. 732,489  
 Int. Cl.<sup>4</sup> C12P 7/48; C12N 1/38; C12R 1/685  
 U.S. Cl. 435—144 4 Claims

U.S. Cl. 435-144

1. A fermentation process for producing citric acid which comprises fermenting grape pomace in the presence of citric acid producing amount of *Aspergillus niger* NRRL 567 in the presence of a citric acid production stimulating amount of methanol at a temperature and for a time sufficient to produce citric acid and recovering citric acid.

4,791,059

PROCESS FOR PREPARING LIPASE

Manahiro Nakao; Samio Asami; Takaharu Tanaka; Kyoichi Ogura; Teruo Amachi; Hajime Yoshizumi, and Hiroshi Ishigooka, all of Osaka, Japan, assignors to Suntory Limited, Osaka, Japan

PCT No. PCT/JP85/00409, § 371 Date Mar. 17, 1986, § 102(e) Date Mar. 17, 1986, PCT Pub. No. WO86/00925, PCT Pub. Date Feb. 13, 1986

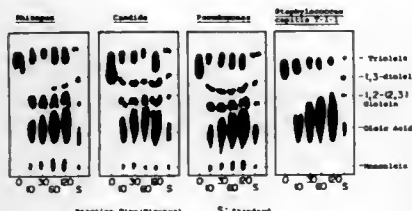
PCT Filed Jul. 19, 1985, Ser. No. 844,389

Claims priority, application Japan, Jul. 20, 1984, 59-149585

Int. Cl.<sup>4</sup> C12N 9/20

U.S. Cl. 435—198

2 Claims



1. A process for producing a novel lipase comprising the steps of culturing *Staphylococcus capitis* T-1-1 (SAM 001) FERM BP-384 in a culture medium to accumulate the lipase in the culture broth and recovering the lipase from the broth.

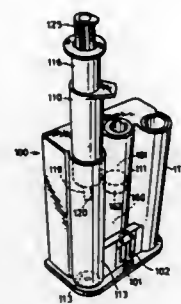
4,791,060

**DEVICE FOR PERFORMING QUALITATIVE ENZYME  
IMMUNOASSAYS**

**Howard M. Chandler, Orton, Canada, assignor to Allelix Inc.,  
Mississauga, Canada**

Continuation-in-part of Ser. No. 551,906, Nov. 15, 1983, Pat.  
No. 4,665,034. This application Nov. 21, 1986, Ser. No. 933,171  
Int. Cl.<sup>4</sup> C12M 1/00, 1/24; G01N 1/48, 33/544

U.S. Cl. 435—296 14 Claims



1. A device for performing an enzyme immunoassay, comprising:  
a body defining a receptacle including a first syringe containing a test liquid, and defining a second and a third

syringe formed integrally in the body, the receptacle and syringes all having outlets;

at least one assay tube being provided in the body, the tube having first and second ends and having an antibody, antigen or hapten attached to an internal surface of the tube;

the body being provided with a flat bottom surface having grooves in it which connect outlets of the first, second and third syringes to the first end of the assay tube;

a channel forming means being inserted over the bottom surface of the body, the means having a flat surface which coacts with the grooves to form channels for the flow of liquids from the syringes to the first end of the assay tube with the outlet of the second syringe being connected by a channel to the first end of the assay tube via the outlet of the first syringe; and

the second and third syringes being each provided with first and second pistons spaced from one another, the second piston being directly depressed by a plunger, and each second and third syringe having a wall with a groove in it connecting the syringe outlet with the space above the first piston when it is fully depressed, the second syringe being provided with a first wash solution in the space defined therein below its first piston, and an enzyme conjugate containing solution in the space defined therein above its first piston; and the third syringe being provided with a second wash solution in the space defined therein below its first piston, and a solution containing enzyme substrate and enzyme metabolite indicator in the space defined therein above its first piston.

4,791,061  
IMMOBILIZATION OF MICROORGANISMS BY  
ENTRAPMENT  
Tatsuo Sumino; Yasutomo Ohtake; Hiroki Nakamura; Masahiro  
Kon; Naomichi Mori, and Kazuo Nakajima, all of Chiyoda,  
Japan, assignors to Hitachi Plant Engineering & Construction  
Co., Ltd., Tokyo, Japan  
Filed May 30, 1986, Ser. No. 868,454  
Claims priority, application Japan, Jun. 28, 1985, 60-141901;  
Sen. 13, 1985, 60-202877

Sept. 13, 1965, 60-202817  
Int. Cl.<sup>4</sup> C12N 11/10, 11/04, 11/02  
U.S. Cl. 435—178 11 Claims  
1. A method of immobilizing microorganisms comprising the steps:  
mixing an activated sludge containing a suspension of organisms, alginic acid or water soluble alginate, and an acrylamide monomer to form a mixed solution; and  
dropping said mixed solution into a water solution of a polyvalent metal ion and persulfate,  
wherein simultaneously when said mixed solution is dropped, said alginic acid or water soluble alginate in said mixed solution is combined with said polyvalent metal ion to become insoluble, whereby drops of said mixed solution are formed into particles in said water solution, and wherein in said particles the polymerization of said acrylamide monomer is initiated by said persulfate and said microorganisms are immobilized in said particles by entrapment.

4,791,062  
FVR VACCINE  
Gary P. Wieschahn, Alameda; Richard E. Giles, Union City, and  
David R. Stevens, Fremont, all of Calif., assignors to Diamond  
Scientific Co., Des Moines, Iowa  
Continuation of Ser. No. 707,102, Feb. 28, 1985, abandoned.  
This application Jul. 6, 1987, Ser. No. 70,201  
Int. Cl. A61K 39/12, 39/245

U.S. Cl. 435—238 10 Claims  
1. A method of making a vaccine useful for inoculation of a feline host susceptible to feline virus rhinotracheitis, said method comprising:

DECEMBER 13, 1988

CHEMICAL

823

(1) inactivating at least one feline Herpesvirus 1 isolate by

- (a) adding to said feline Herpesvirus 1 isolate a small but inactivating effective amount of a furocoumarin; and thereafter
- (b) exposing said feline Herpesvirus 1 to ultraviolet light having a wavelength within the range of from about 300 nm to 400 nm and an intensity of from about 0.1 mW/cm<sup>2</sup> to 5 W/cm<sup>2</sup> at a temperature below about 40° C. for a time sufficient to render said virus noninfectious without destroying the characteristic immunologic response of said feline Herpesvirus 1 isolate.

4,791,063

**POLYIENE TRANSFORMED MODIFIED  
POLYSACCHARIDE SUPPORTS**

Kenneth C. Hou, S. Glastonbury; Chung-Jen Hou, South Windsor, and Haunlin Chen, Vernon, all of Conn., assignors to Cuno Incorporated, Meriden, Conn.

Continuation-in-part of Ser. No. 576,448, Feb. 2, 1984, Pat. No. 4,663,163, which is a continuation-in-part of Ser. No. 466,114, Feb. 14, 1983, abandoned. This application Jul. 23, 1985, Ser. No. 758,064

Int. Cl.<sup>4</sup> C12N 1/00; C08F 1/00  
U.S. Cl. 435—243 55 Claims

1. A polyionene-transformed modified polysaccharide separation matrix comprising a modified polysaccharide having a synthetic polymer covalently coupled thereto and a polyionene bonded to said modified polysaccharide.

21. A polyionene-transformed modified polysaccharide separation matrix which comprises:

- (1) polysaccharide covalently coupled to a synthetic polymer;
- (2) said synthetic polymer made from at least one of
  - (a) a polymerizable compound which has a chemical group capable of direct or indirect covalent coupling to said polysaccharide; and
  - (b) one or more polymerizable compounds containing
    - (i) an ionizable chemical group,
    - (ii) a chemical group capable of transformation to an ionizable chemical group,
    - (iii) a chemical group capable of causing the covalent coupling of said synthetic polymer (2) to an affinity ligand or biologically active molecule, or
    - (iv) a hydrophobic chemical group;

said modified polysaccharide having bonded thereto, a polyionene.

50. A method for removing and inactivating contaminants of a microorganism origin from a biological liquid comprising passing said liquid through a polyionene-transformed modified polysaccharide matrix wherein said modified polysaccharide matrix comprises

- (1) polysaccharide covalently coupled to a synthetic polymer;
- (2) said synthetic polymer made from at least one of
  - (a) a polymerizable compound which has a chemical group capable of direct or indirect covalent coupling to said polysaccharide; and
  - one or more polymerizable compounds containing
    - (i) an ionizable chemical group,
    - (ii) a chemical group capable of transformation to an ionizable chemical group,
    - (iii) a chemical group capable of causing the covalent coupling of said compound (2) to an affinity ligand or biologically active molecule, or
    - (iv) a hydrophobic chemical group;

said modified polysaccharide having bonded thereto a polyionene, said polyionene comprising a water-soluble polymer having polyquaternary ammonium groups separated by hydrophobic groups, said hydrophobic groups comprising aromatic groups or alkyl groups, said alkyl groups containing at least six carbon atoms.

**4,791,064**

**PLASMIDS FROM NOCARDIA**

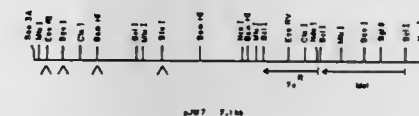
**Louis R. Fare, LaFayette Hill; Yong K. Oh, Phoenixville; Dean P. Taylor, King of Prussia, and Jennifer B. Wildger, Graterford, all of Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.**

**Continuation-in-part of Ser. No. 511,595, Jul. 7, 1983, abandoned. This application Jun. 12, 1985, Ser. No. 744,098**

**Int. Cl.<sup>4</sup> C12N 1/20, 1/00, 15/00; C12P 21/02**

**U.S. Cl. 435—252.3**

**17 Claims**



1. Plasmid pSO408, which is naturally present in *N. orientalis* strain NRRL 2452, isolated from such strain, or a functional mutant or genetically engineered derivative thereof wherein said mutant or derivative possesses sufficient amount of the replicon of pSO408 to permit stable autonomous replication.

4,791,065

**ETHANOL SENSITIVE SOLID**

David J. Rislave, Winona, Minn., assignor to Grobel Research Corporation, Orlando, Fla.

Filed Mar. 13, 1986, Ser. No. 839,230

Int. Cl.<sup>4</sup> G01N 31/22, 33/497

U.S. Cl. 436—132 8 Claims

4. An ethanol sensitive solid consisting essentially of a solid particulate carrier having absorbed thereon a substantially dehydrated mixture of a hexavalent chromium compound and an acid sulfate compound, said carrier being substantially chemically inert toward said mixture.

6. A method of making an ethanol sensitive solid which consists essentially of:

wetting silica gel particles with an acid solution of a hexavalent chromium compound;

heating the wetted gel sufficiently to drive off substantially all free water and cooling the gel to thereby obtain said ethanol sensitive solid.

4,791,066  
IMMUNOELECTROPHORESIS METHOD FOR  
DIAGNOSING AND DIFFERENTIATING CANCER  
USING LECTINS  
Tatsuya Ishiguro, Kyoto, Japan, assignor to Kyowa Medex Co.,  
Ltd., Toyota, Japan  
Filed Aug. 6, 1985, Ser. No. 762,970  
Claims priority, application Japan, Aug. 7, 1984, 59-165351  
Int. Cl.<sup>4</sup> G01N 33/558, 33/53

**U.S. Cl. 436—516** **4 Claims**

1. A method of differentiating primary hepatic carcinoma from metastatic hepatic carcinoma, comprising obtaining a sample of a body fluid from a patient suspected of having hepatic carcinoma, assaying said sample by means of cross-immunoaffinoelectrophoresis on each one of a pair of lectins selected from the group consisting of ConA-LCH, ConA-PHA-E, RCA-I-LCH, RCA-I-BSA-II and BSA-II-LCH, for the presence of  $\alpha$ -fetoprotein specific fraction binding patterns; and differentiating primary hepatic carcinoma from metastatic hepatic carcinoma based on the resulting specific fraction binding patterns.





# 4,791,074

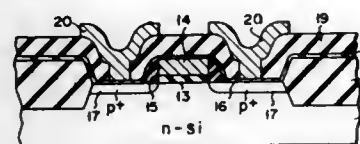
## METHOD OF MANUFACTURING A SEMICONDUCTOR APPARATUS

Yoshitaka Tsunashima, Kawasaki; Keisaku Yamada, Ebina, and Takako Kashio, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 15, 1987, Ser. No. 73,473  
Claims priority, application Japan, Aug. 29, 1986, 61-201703; Sep. 30, 1986, 61-231763

Int. Cl.<sup>4</sup> H01L 21/385  
U.S. Cl. 437—160

12 Claims



1. A method of manufacturing a semiconductor device, which comprises the steps of:
  - (a) depositing a boron layer on a silicon substrate by vacuum evaporating elemental boron onto the silicon substrate; and
  - (b) thermally diffusing boron from said boron layer into said silicon substrate.

# 4,791,075

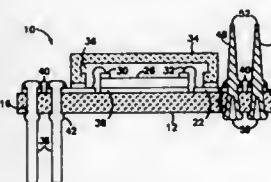
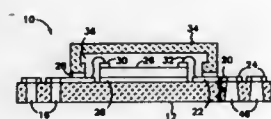
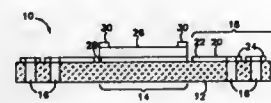
## PROCESS FOR MAKING A HERMETIC LOW COST PIN GRID ARRAY PACKAGE

Paul T. Lin, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 5, 1987, Ser. No. 104,478  
Int. Cl.<sup>4</sup> H01L 23/48

U.S. Cl. 437—209

19 Claims



1. A process for the assembling of a hermetic low cost pin grid array (PGA) semiconductor die package comprising the steps of:
  - providing an insulative substrate having a central die bonding area and a periphery, and a conductive pattern comprising a plurality of conductive material traces extending from the central die bonding area at their proximal ends to the periphery at their distal ends;
  - bonding a semiconductor die having a plurality of bonding pads thereon to the central die bonding area;
  - electrically connecting the bonding pads of the semiconductor die to the proximal ends of the conductive material traces;
  - hermetically sealing a cap onto the insulative substrate wherein the cap covers the semiconductor die and the

proximal ends of the conductive material traces, leaving exposed the distal ends of the traces; and affixing leads to the distal ends of the conductive material traces after the cap is hermetically sealed to the substrate, whereby the leads are in a position perpendicular to the conductive material traces, in the absence of a plastic encapsulation step.

# 4,791,076

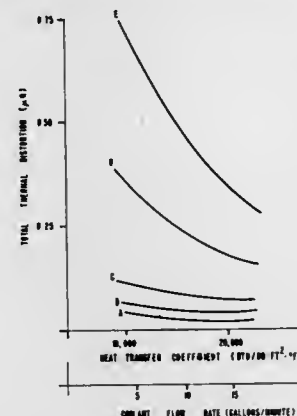
## GRAPHITE FIBER REINFORCED SILICA MATRIX COMPOSITE

Hyman Leggett, deceased, late of Chatsworth (by Sally S. Leggett, Administrator), and Kenneth M. Brown, Los Angeles, Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Aug. 2, 1984, Ser. No. 637,245  
Int. Cl.<sup>4</sup> C04B 35/02; G02B 5/08

U.S. Cl. 501—95

8 Claims



1. A graphite fiber reinforced silica matrix composite article characterized by a relatively low thermal distortion comprising:
  - (a) unidirectionally oriented yarn bundles of graphite fibers bonded together in (b) a silica matrix comprising predominantly silica, mixed with boron phosphate and  $\beta$ -spodumene modified by the addition of about 5 to about 6 percent by weight of an alkaline earth oxide based on the weight of the modified said  $\beta$ -spodumene.

# 4,791,077

## NEAR NET SHAPE FUSED CAST REFRACTORIES AND PROCESS FOR THEIR MANUFACTURE BY RAPID MELTING/CONTROLLED RAPID COOLING

Jonathan J. Kim, Williamsville, and Thomas A. Myles, Amherst, both of N.Y., assignors to Stemcor Corporation, Cleveland, Ohio

Filed Feb. 4, 1986, Ser. No. 826,636  
Int. Cl.<sup>4</sup> C04B 35/10, 35/48

U.S. Cl. 501—105

2 Claims



1. A refractory fusion cast molding of alumina-zirconia-silica

composition characterized in its as-cast form by the absence of a header and having throughout a generally random, uniform microstructure, generally evenly distributed closed pores and generally uniform chemistry.

# 4,791,078

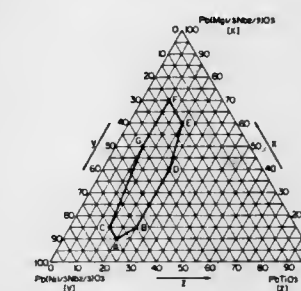
## CERAMIC COMPOSITION WITH IMPROVED ELECTRICAL AND MECHANICAL PROPERTIES

Susumu Saito, Masamoto Yonezawa, and Kazuaki Utsunomiya, Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Aug. 26, 1987, Ser. No. 89,456  
Claims priority, application Japan, Aug. 26, 1986, 61-201051

U.S. Cl. 501—136

2 Claims



1. A ceramic composition consisting essentially of a solid solution of (a) the ternary system consisting essentially of lead magnesium-niobate ( $\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3$ ), lead nickel-niobate ( $\text{Pb}(\text{Ni}_{1/3}\text{Nb}_{2/3})\text{O}_3$ ) and lead titanate ( $\text{PbTiO}_3$ ) as a major constituent, and (b) an additional constituent consisting essentially of lead manganese-niobate ( $\text{Pb}(\text{Mn}_{1/3}\text{Nb}_{2/3})\text{O}_3$ ) in a proportion of about 0.01 to about 10 mol% to said major constituent, said ternary system being expressed by the general empirical formula  $[\text{Pb}(\text{Mg}_x\text{Nb}_y)\text{O}_3]_x - [\text{Pb}(\text{Ni}_y\text{Nb}_z)\text{O}_3]_y - [\text{PbTiO}_3]_z$  wherein the subscripts x, y and z satisfy the equation  $x + y + z = 1$  and fall within the region defined by the line segments joining the seven points C, A, B, D, E, F and G which are given by the coordinates
  - A ( $x=0.10, y=0.70, z=0.20$ ),
  - B ( $x=0.15, y=0.60, z=0.25$ ),
  - C ( $x=0.15, y=0.70, z=0.15$ ),
  - D ( $x=0.40, y=0.35, z=0.25$ ),
  - E ( $x=0.60, y=0.20, z=0.20$ ),
  - F ( $x=0.70, y=0.20, z=0.10$ ), and
  - G ( $x=0.50, y=0.40, z=0.10$ ),
 on the triangular ternary-system diagram shown in the accompanying drawing.

# 4,791,079

## CERAMIC MEMBRANE FOR HYDROCARBON CONVERSION

Edward A. Hazbun, Media, Pa., assignor to Arco Chemical Company, Newtown Square, Pa.

Filed Jun. 9, 1986, Ser. No. 871,746  
Int. Cl.<sup>4</sup> B01J 21/10, 23/34, 35/00

U.S. Cl. 502—4

9 Claims

1. A ceramic membrane structure comprised of a first layer which is a mixed oxygen ion and electron conducting impervious ceramic layer and a second layer which is associated with said first layer and which is a catalyst-containing porous ion conducting ceramic layer.

# 4,791,080

## OXIDATIVE CATALYST REGENERATION

Wilhelm Gruber, Darmstadt; Klaus Langerbeins, Langen, and Wolfgang Ruppert, Seckheim-Jugenheim, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Jul. 27, 1987, Ser. No. 78,224  
Claims priority, application Fed. Rep. of Germany, Aug. 2, 1986, 3626255

Int. Cl.<sup>4</sup> B01J 27/28, 38/14; C07C 57/05, 51/377  
U.S. Cl. 502—52

1. A method for regenerating a solid catalyst used in oxydehydrogenation of isobutyric acid or its lower esters to form methacrylic acid or its lower esters, having the formula



wherein  
M is at least one metal ion,  
a has a value from 0 to 6,  
b has a value from 0 to 6,  
d has a value from 9 to 12  
e has a value from 0 to 3,  
a+bz has a value equal to or greater than 3, and  
a+bz is equal to  $75-6d-5e$ , where z is the valence of metal ion M,  
which method comprises contacting said solid catalyst at a temperature from 200° C. to 400° C. with a gas containing from 5 to 40 volume percent of elemental oxygen, said gas having a pressure from 0.1 bar to about 5 bar.

# 4,791,081

## SUPPORTED FLUOROCARBONSULFONIC ACID POLYMERS AND AN IMPROVED METHOD FOR THEIR PREPARATION

David L. Childress, La Grange; John D. Weaver, and Emmett L. Tasset, both of Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 832,626, Feb. 25, 1986, abandoned. This application Dec. 30, 1986, Ser. No. 947,788  
Int. Cl.<sup>4</sup> B01J 31/06

U.S. Cl. 502—62

16 Claims

1. The composition comprising a fluorinated polymer having pendant sulfonic acid groups, or halogen derivatives of sulfonic acid groups, on a support which support has an average pore diameter greater than about 0.1 micrometer and a surface area of less than about 20 m<sup>2</sup>/g.

# 4,791,082

## METHOD OF MAKING ZEOLITE CASTINGS

Jürgen Dörr, Krefeld; Peter Kleinschmitt, Hanau; Reinhard Klingel, Alzenau, and Reinhard Manner, Maintal, all of Fed. Rep. of Germany, assignors to Degussa AG, Frankfurt am Main, Fed. Rep. of Germany

Division of Ser. No. 000,741, Jan. 6, 1987, Pat. No. 4,748,082.  
This application Oct. 16, 1987, Ser. No. 109,839

Claims priority, application Fed. Rep. of Germany, Jan. 11, 1986, 3600628

Int. Cl.<sup>4</sup> B01J 29/08; C10G 11/02

U.S. Cl. 502—65

1 Claim

1. A method of producing a zeolite molded article comprising (1) powdery zeolite, (2) at least one silicate of the group consisting of an alkali silicate and an alkaline earth silicate and (3) at least one fibrous filler of the group consisting of mineral fibers and carbon fibers, said method comprising mixing the powdery zeolite (1) with the silicate (2) and water (4), mixing the fibrous filler (3) with the mixture of powdery zeolite (1), the silicate (2) and water (4), molding the mixture of fibrous filler (3), powdery zeolite (1), the silicate (2) and water (4) by applying a pressure of at least about 0.1 MPa, drying at an

elevated temperature to constant weight and then heating sufficiently to activate the zeolite.

4,791,083

# **CATALYTIC CRACKING CATALYSTS COMPRISING NON-ZEOLITIC MOLECULAR SIEVES**

Regis J. Pellet, Croton; Peter K. Coughlin, Yorktown Heights; Mark T. Stanulis, Peekskill; Gary N. Long, Putnam Valley, and Jule A. Rabo, Armonk, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 675,284, Nov. 27, 1984, abandoned.

This application Jun. 15, 1987, Ser. No. 62,492

Int. Cl.<sup>4</sup> B01J 29/02, 29/04

U.S. Cl. 502—64

25 Claims

5. A catalyst comprising at least one zeolitic aluminosilicate having cracking activity and at least one NZ-MS selected from the group consisting of SAPO, ELAPSO, MeAPO, TiAPO, FeAPO and FCAPO and characterized in its calcined form by an adsorption of isobutane of at least 2 percent by weight at a pressure of 500 torr and a temperature of 20° C. wherein the weight ratio between said aluminosilicate and NZ-MS is between about 1:10 and about 500:1.

8. The catalyst of claim 5, or claim 6 or claim 7 wherein said zeolitic aluminosilicate is selected from the group consisting of zeolite Y, zeolite X, zeolite beta, zeolite KZ-20, faujasite, LZ-210, LZ-10, ZSM-type zeolites and mixtures thereof.

9. The catalyst of claim 5 wherein said catalyst contains from 1 to 99 percent by weight of at least one inorganic oxide matrix component.

4,791,084

# **HYDROCARBON CATALYTIC CRACKING CATALYST COMPOSITIONS AND METHOD THEREFOR**

Goro Sato; Masamitsu Ogata; Takanori Ida, and Tatsuo Masuda, all of Kitakyushu, Japan, assignors to Catalysts & Chemicals Industries Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 808,414, Dec. 12, 1985, abandoned. This application Jun. 8, 1987, Ser. No. 58,979

Claims priority, application Japan, Dec. 21, 1984, 59-271199; Dec. 21, 1984, 59-271200; Dec. 21, 1984, 59-271201

Int. Cl.<sup>4</sup> B01J 29/06, 27/18

U.S. Cl. 502—65

14 Claims

6. A catalyst composition for the catalytic cracking of hydrocarbons, which comprises:

a porous inorganic oxide matrix containing mixed therein (1) particles of crystalline aluminosilicate zeolite and (2) alumina particles having a particle diameter of from 15 to 60  $\mu$ m and impregnated with (a) a phosphorus component and (b) at least one auxiliary component selected from the group consisting of alkaline earth metals, rare earth metals, antimony, bismuth, boron, manganese and tin.

4,791,085

# **BARIUM TITANIUM OXIDE-CONTAINING FLUIDIZABLE CRACKING CATALYST COMPOSITION**

Cornelis J. Groenenboom, Driehuizen, Netherlands, assignor to Akzo N.V., Arnhem, Netherlands

Filed Mar. 7, 1986, Ser. No. 837,400

Claims priority, application Netherlands, Mar. 12, 1985, 8500689; Oct. 29, 1985, 8502943

Int. Cl.<sup>4</sup> B01J 29/06, 21/16

U.S. Cl. 502—68

15 Claims

1. A fluidizable cracking catalyst comprising a zeolitic, crystalline aluminosilicate, a matrix material and a barium titanium oxide.

10. A catalyst according to claim 1, wherein said barium titanium oxide is barium titanate.

14. Particles comprising barium titanium oxide embedded in a matrix material.

4,791,086

# **OLEFIN POLYMERIZATION**

Gene H. C. Yeh, and Henry L. Hsieh, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 574,831, Jan. 30, 1984, Pat. No. 4,699,962. This application Jul. 1, 1987, Ser. No. 68,463

Int. Cl.<sup>4</sup> C08F 4/52

U.S. Cl. 502—102

10 Claims

1. A polymerization catalyst system comprising (1) a catalyst component A formed by admixing a rare earth metal hydride which is neodymium hydride, a Lewis acid selected from aluminum chloride and aluminum bromide and an electron donor ligand which is ethyl benzoate and (2) a cocatalyst component B comprising an organoaluminum compound in a mole ratio of organoaluminum compound to rare earth metal hydride ranging from about 10 to about 100 moles per mole and a mole ratio of organoaluminum compound to ligand of at least 1:1 and wherein the mole ratio of Lewis acid to rare earth metal hydride ranges from about 0.1 to about 10 and the mole ratio of said ligand to rare earth metal hydride is from about 1 to about 20.

4,791,087

# **TRIMETALLIC REFORMING CATALYST**

Mark D. Moser, Elk Grove Village, and R. Joe Lawson, Palatine, both of Ill., assignors to UOP Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 910,099, Sep. 22, 1986, Pat. No. 4,677,094. This application Jun. 23, 1987, Ser. No. 65,541

The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B01J 27/135

U.S. Cl. 502—227

12 Claims

1. A catalytic composite for the conversion of hydrocarbons comprising a uniformly dispersed platinum component, a uniformly dispersed Group IVA metal component, a surface-impregnated metal component selected from the group consisting of rhodium, ruthenium, cobalt, nickel and iridium and a halogen component on a refractory support having a uniform composition and a nominal diameter of at least 650 microns.

4,791,088

# **CRYSTALLINE LAYERED MATERIAL MCM-20 AND PROCESS FOR ITS PREPARATION**

Pochen Chu, West Deptford; Guenter H. Kuehl, Cherry Hill, and Michael E. Landis, Woodbury, all of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 797,276, Nov. 12, 1985, abandoned. This application Dec. 9, 1986, Ser. No. 939,265

Int. Cl.<sup>4</sup> B01J 21/08

U.S. Cl. 502—232

11 Claims

1. A pillared silicate composition comprising a layered silicate, which exhibits an X-ray diffraction pattern of Table I of the specification; and

(1) at least one oxide of an element from group IB, IIB, IIIA, IIIB, IVA, IVB, VA, VB, VIA, VIIA and VIIIA of the Periodic Table;

(2) precursors of said at least one oxide; or

(3) mixtures of (1) and (2);

where said (1), (2) or (3) is interposed between layers of said layered silicate, to separate and support said layers.

7. A silicate composition comprising a layered silicate, which exhibits an X-ray diffraction pattern of Table I of the specification; and silica, tetraalkylorthosilicate; hydrolysis products of tetraalkylorthosilicate, or admixtures of silica and either tetraalkylorthosilicate or hydrolysis products of tetraalkylorthosilicate or both, interposed between laminae of said layered silicate to separate and support said laminae.

4,791,089

# **ZIRCONIA-TITANIA-SILICA TERGELS AND THEIR USE AS CATALYST SUPPORTS**

Robert A. Dombro, Palatine, Ill., and William Kirch, Clinton, Iowa, assignors to Enron Chemical Corporation, Cincinnati, Ohio

Continuation of Ser. No. 858,076, Apr. 25, 1986, abandoned, which is a continuation of Ser. No. 755,927, Jul. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 540,004, Oct. 7, 1983, abandoned. This application Nov. 12, 1986, Ser. No. 928,586

Int. Cl.<sup>4</sup> B01J 21/06, 20/10

U.S. Cl. 502—236

54 Claims

37. An olefin polymerization or copolymerization catalyst prepared by the method comprising the steps of:

(a) mixing a zirconium compound of the formula  $M_4Zr(C_2O_4)_n \cdot nH_2O$  and a titanium compound of the formula  $M_2Ti(C_2O_4)_2 \cdot nH_2O$ , where M is an alkali metal or ammonium ion and n equals 0 to 10, with a silicon compound of the formula  $A_2SiO_3$ , where A is an alkali metal ion, in an aqueous solution at a pH sufficiently high to avoid precipitation of a tergel;

(b) adding an acidic material to said solution to lower the pH thereof sufficiently to result in precipitation of a porous hydrotergel containing silica, titania and zirconia and having a pore volume of at least about 1.5 cc/g, said zirconium, titanium and silicon compounds of (a) being mixed in proportions selected to result in respective independent concentrations of said zirconia and titania of between about 0.1 wt. % and 5 wt. % with respect to said silica;

(c) aging said hydrotergel of (b);

(d) washing said aged hydrotergel of (c) with an aqueous liquid;

(e) removing water from the washed hydrotergel of (d) by a method selected to avoid substantial collapse of the pores of said hydrotergel to produce a xerogel having a pore volume of at least about 1.5 cc/g;

(f) calcining said xerogel of (e);

(g) introducing a catalytically active compound onto said calcined xerogel of (f); and

(h) activating to produce an active polymerization or copolymerization catalyst.

4,791,090

# **HYDROPROCESSING CATALYST AND SUPPORT HAVING BIDISPERSE PORE STRUCTURE**

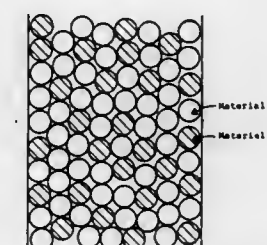
Joseph Pereira, and Wu-Cheng Cheng, both of Columbia, Md., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Continuation of Ser. No. 859,104, May 2, 1986, abandoned. This application Jul. 23, 1987, Ser. No. 77,066

Int. Cl.<sup>4</sup> B01J 21/12, 21/04, 35/10

U.S. Cl. 502—263

9 Claims



1. A catalyst support having a bidisperse micropore size distribution where the micropores have an average pore diameter of less than 600 Angstrom units and being adapted for use as a hydrotreating catalyst support for treating heavy feeds containing large metal bearing molecules comprising a refrac-

tory oxide formed particle made of two different micropore size materials having

(a) one small pore material being characterized as having a small micropore region having an average pore diameter of less than 100 Angstrom units; and

(b) another material being characterized as having a large micropore region having an average pore diameter

(i) which is less than 600 Angstrom units,

(ii) which is equal to or larger than 100 Angstrom units, and

(iii) which is much larger than the average diameter of the metal bearing molecules in a heavy feed to be processed;

the pore volume of the large micropore region comprising 10 to 90% of the total pore volume; and the pore volume of the small micropore region comprising 10 to 90% of the total pore volume.

4,791,091

# **CATALYST FOR TREATMENT OF EXHAUST GASES FROM INTERNAL COMBUSTION ENGINES AND METHOD OF MANUFACTURING THE CATALYST**

Maureen L. Bricker, Buffalo Grove, and R. Joe Lawson, Palatine, both of Ill., assignors to Allied-Signal Inc., Morristown, N.J.

Filed Sep. 30, 1987, Ser. No. 102,967

Int. Cl.<sup>4</sup> B01J 21/04, 23/10, 23/56

U.S. Cl. 502—303

20 Claims

1. A catalytic composite for treating an exhaust gas comprising a support which is a refractory inorganic oxide selected from the group consisting of alumina, silica, titania, zirconia, aluminosilicates and mixtures thereof, having dispersed thereon lanthanum oxide, the lanthanum oxide being dispersed on said support by the method of commingling a solution of a lanthanum salt with a hydrosol of the metal precursor of said support, forming particles from said lanthanum containing hydrosol, calcining said particles to form a particulate support containing lanthanum oxide, having an average crystallite size of less than 25 Angstroms, at least one other rare earth oxide and at least one noble metal component selected from the group consisting of platinum, palladium, rhodium, ruthenium and iridium.

4,791,092

# **AROMATIC CARBOXYLIC ANHYDRIDE CATALYST**

Israel E. Wachs, Bridgewater, N.J.; Ramzi Y. Saleh, Baton Rouge, La., and Claudio C. Chersich, Englewood Cliffs, N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Division of Ser. No. 626,405, Jun. 29, 1984, Pat. No. 4,582,911. This application Nov. 12, 1985, Ser. No. 796,707

Int. Cl.<sup>4</sup> B01J 21/06, 23/20, 23/22

U.S. Cl. 502—350

15 Claims

1. A process for preparing a catalyst composition comprising vanadium, tantalum and oxygen capable of catalyzing the oxidation of hydrocarbons which comprises:

(a) contacting titanium dioxide with a tantalum oxide source in a manner and under conditions sufficient to apply a discontinuous monolayer amount of said tantalum oxide source on said titanium dioxide to form a catalyst precursor;

(b) calcining said catalyst precursor in a manner and under conditions sufficient to convert at least a portion of said tantalum oxide source to tantalum oxide, to form a calcined catalyst precursor having a discontinuous monolayer amount of tantalum oxide adsorbed on said titanium dioxide;

(c) depositing a catalytically effective amount of at least one vanadium oxide source on said calcined catalyst precursor, to form a vanadium-containing catalyst precursor; and

(d) calcining said vanadium-containing catalyst precursor in



a manner and under conditions sufficient to convert at least a portion of said vanadium oxide source to vanadium oxide, thereby forming said catalyst composition comprising vanadium, tantalum and oxygen.

12. Improved catalyst which comprises from about 0.001 to 1 weight percent tantalum oxide, from about 0.7 to 50 weight percent vanadium oxide and from about 49 to 99.3 weight percent titanium dioxide anatase, and wherein said vanadium oxide is present in an amount of at least 1.7  $N_{min}$  grams wherein

$$N_{min} = (G') \times (A) \times (0.0007)$$

wherein  $G'$  is the weight in grams of the calcined catalyst precursor and  $A$  is the specific surface area of the titanium dioxide.

4,791,093

## HEAT-SENSITIVE RECORDING SHEET

Shigehisa Tamagawa, Kazuyuki Koike, and Tetsuro Fuchizawa, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 14, 1986, Ser. No. 918,442

Claims priority, application Japan, Oct. 15, 1985, 60-229543

Int. Cl. 4 B41M 5/18

U.S. Cl. 503—200

12 Claims

1. A heat-sensitive recording sheet comprising a paper support having provided thereon a heat-sensitive coupling layer, said paper support having an intermediate layer containing at least one white pigment disposed on a base paper comprising a mixture of synthetic pulp and natural pulp, wherein said base paper has a density of 0.8 to 1.0 g/cm<sup>3</sup>.

4,791,094

## RECORDING SHEET

Shojiro Sano, and Keiso Saeki, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Dec. 1, 1986, Ser. No. 936,406

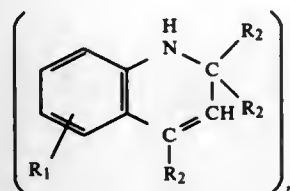
Claims priority, application Japan, Nov. 29, 1985, 60-267522

Int. Cl. 4 B41M 5/16, 5/18

U.S. Cl. 503—209

14 Claims

1. A pressure-sensitive recording sheet comprising microcapsules containing a solution which consists essentially of (1) a diarylamino-fluoran derivative as a substantially colorless electron donating dye, and (2) a quinoline derivative represented by formula (I)



wherein  $R_1$  represents a hydrogen atom, an alkoxy group having from 1 to 8 carbon atoms, an aryloxy group having from 6 to 18 carbon atoms or an aralkyloxy group having from 7 to 18 carbon atoms;  $R_2$  represents a hydrogen atom or a methyl group; and  $n$  is an integer of 1 to 10, said solution being free of color developers.

4,791,095

## HEAT-SENSITIVE RECORDING MATERIAL

Kensuke Ikeda, and Ken Iwakura, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 17, 1986, Ser. No. 931,095

Claims priority, application Japan, Nov. 15, 1985, 60-256405; Nov. 15, 1985, 60-256406

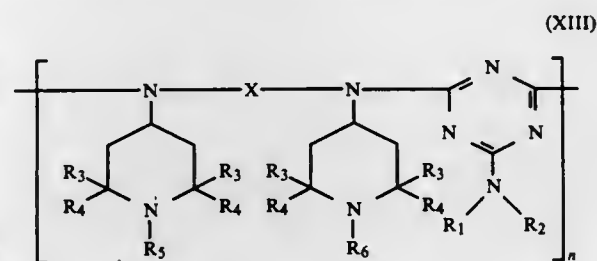
Int. Cl. 4 B41M 5/18

U.S. Cl. 503—209

8 Claims

1. A heat-sensitive recording material comprising a support

having provided thereon a heat-sensitive color-forming layer which contains a colorless or slightly colored electron-donating dye precursor and an electron-accepting compound capable of reacting with said electron-donating dye precursor to form color, wherein said heat-sensitive color-forming layer further contains about 0.5 wt% to less than about 20 wt%, based on said electron-accepting compound, of the compound represented by the following general formula (XIII):



wherein  $R_1$  and  $R_2$  each may represent a hydrogen atom, an alkyl group, an aryl group or  $R_1$  and  $R_2$  may combine to form a 5- to 7-membered ring optionally containing a hetero atom or atoms,  $X$  represents an alkylene group, an aralkylene group, an alkenylene group or an arylene group,  $R_3$  and  $R_4$  each may represent a hydrogen atom or an alkyl group,  $R_5$  and  $R_6$  each may represent a hydrogen atom, an alkyl group or an acyl group, and  $n$  represents an integer.

4,791,096

## COLOR-FORMING COMPOSITION

Noritoshi Mise, Takatsuki, Japan, assignor to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Nov. 25, 1987, Ser. No. 125,606

Claims priority, application Japan, Nov. 27, 1986, 61-283952; Feb. 12, 1987, 62-29999

Int. Cl. 4 B41M 5/16, 5/18, 5/22

U.S. Cl. 503—216

5 Claims

1. A color-forming composition which comprises a chromogenic dye and, as a color developer, an L-ascorbic acid 5,6-O-ketal or -acetal or an erythorbic acid 5,6-O-ketal or acetal.

4,791,097

## BENZOIC ACID ESTERS AND THEIR USE

Ismail Walele, Saddle Brook; Herman Brown, Teaneck, and Michael Esposito, Randolph, all of N.J., assignors to Finetex, Inc., Elmwood Park, N.J.

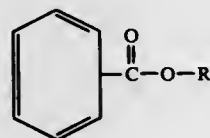
Filed Mar. 9, 1987, Ser. No. 23,767

Int. Cl. 4 C07C 9/76; C09B 3/22

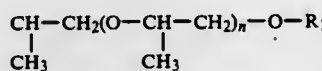
U.S. Cl. 560—112

10 Claims

1. A method of modifying while not suppressing foam in an aqueous surfactant composition comprising admixing with the aqueous composition a foam modifying amount of a substantially pure benzoate ester composition of the formula:



wherein  
 $R$  is



where  $n$  is 9–16 and  $R_1$  is a branched or linear alkyl of 3 to 22 carbon atoms whereby the foam is modified but not suppressed.

4,791,098

## 2-METHYL-3-(P-METHYLPHENYL)PROPIONITRILE, PREPARATION AND USE THEREOF AS SCENT

Roland Martin, Kallstadt, and Walter Gramlich, Edingen-Neckarhausen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Fed. Rep. of Germany

Filed Nov. 12, 1987, Ser. No. 119,539

Claims priority, application Fed. Rep. of Germany, Nov. 15, 1986, 3639158

Int. Cl. 4 A61K 7/46

U.S. Cl. 512—20

3 Claims

2. A scent composition containing 2-methyl-3-(p-methylphenyl)propionitrile.

4,791,099

## METHOD OF TREATMENT FOR CENTRAL NERVOUS SYSTEM DISEASES SUCH AS ALZHEIMER'S DISEASE AND PARKINSON'S DISEASE

Chaovane Aroonsakul, 505 N. Lake Shore Dr., Ste. 3006, Chicago, Ill. 60611

Filed Oct. 29, 1984, Ser. No. 666,254

Int. Cl. 4 A61K 37/00, 31/56, 35/55

U.S. Cl. 514—2

4 Claims

1. The method for alleviating the symptoms of central nervous system diseases in a human being, said diseases being Parkinson's disease, cerebral atrophy, Alzheimer's disease, cerebellar atrophy, senile tremor, or essential tremor, comprising administering to said human being an effective amount of growth hormone and an androgen.

4,791,100

## NOVEL POLYPEPTIDES WITH A BLOOD COAGULATION-INHIBITING ACTION, PROCESSES FOR THEIR PREPARATION AND ISOLATION, THEIR USE AND AGENTS CONTAINING THEM

Martin Kramer, Wiesbaden, and Dominique Tripler, Eppstein, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 15, 1986, Ser. No. 885,821

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1985, 3525428; Jan. 16, 1986, 3601032

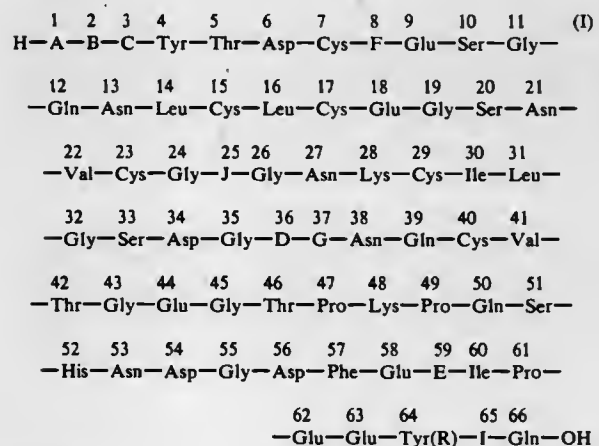
The portion of the term of this patent subsequent to May 26, 2004, has been disclaimed.

Int. Cl. 4 A61K 37/02; C07K 7/10

U.S. Cl. 514—12

10 Claims

1. A polypeptide of the formula I



wherein

$R$  represents a phenolic hydrogen or a phenolic ester group,  $A$  represents Ile or the absence of an amino acid,  $B$  represents Thr, Val, Ile, Leu or Phe,  $C$  represents Glu or the absence of an amino acid,  $D$  represents Glu or Pro,  $E$  represents Thr or Ile,  $F$  represents Lys or Lys-Asp,  $I$  represents Ala or Leu and  $J$  represents Gln or Lys,

provided that when  $A$  and  $B$  represent the absence of an amino acid,  $D$  represents the absence of an amino acid,  $E$  represents Pro,  $F$  represents Ile,  $G$  represents Lys-Asp,  $I$  represents Ala, or  $J$  represents Lys and wherein

7 15 17 29 23 40  
Cys and Cys, Cys, and Cys, and Cys and Cys

are linked in pairs via disulfide bridges, or a physiologically acceptable salt thereof.

4,791,101

## SYNERGISTIC MIXTURES OF INTERFERONS AND TUMOR NECROSIS FACTOR

Gunther Adolf, Vienna, Austria, assignor to Boehringer Ingelheim, Fed. Rep. of Germany

Filed Jun. 20, 1985, Ser. No. 746,793

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1984, 3423234

Int. Cl. 4 A61K 37/02

U.S. Cl. 514—2

27 Claims

1. A composition having a synergistic anti-proliferative effect on neoplastic animal cells, comprising a synergistically effective amount of

(a) highly purified tumor necrosis factor;  
(b) highly purified type I interferon; and  
(c) highly purified type II interferon.

4,791,102

## DERIVATIVES OF THE N-ARYLSULFONYLAMINOACYL-P-AMIDINO-PHENYLALANINAMIDES, THEIR PREPARATION PROCESS, THEIR USE AS MEDICAMENTS AND THE PHARMACEUTICAL COMPOSITIONS CONTAINING THEM

André Bernat, Ugnaux; Denis Delebassee, Portet; Daniel Frebel, Toulouse; Jean-Pierre Maffrand, Portet, and Eric Vallee, Tournefeuille, all of France, assignors to Sanofi, France

Filed Jan. 23, 1987, Ser. No. 6,421

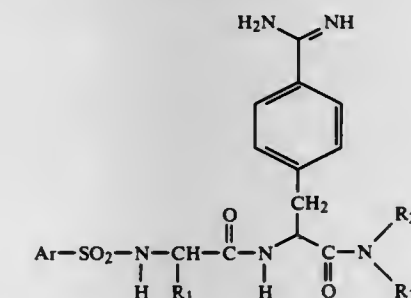
Claims priority, application France, Jan. 24, 1986, 86 01399; Jan. 24, 1986, 86 01400

Int. Cl. 4 A61K 37/02; C07C 143/78; C07D 279/10, 265/30, 241/04, 207/00, 211/06

U.S. Cl. 514—19

11 Claims

1. Compounds with the formula



in which:

R<sub>1</sub> represents a lower alkyl, lower hydroxyalkyl or benzyl group, a phenyl group or a 4-hydroxyphenyl group, R<sub>2</sub> and R<sub>3</sub>, identical or different, each represents a lower alkyl or hydroxyalkyl, lower alkenyl, or lower alkynyl radical, or together with the nitrogen to which they are attached, form a saturated heterocycle selected from the group consisting of morpholino, thiomorpholino, pyrrolidino unsubstituted or substituted by an alkoxycarbonyl or carboxyl group, piperazino, 4-(lower alkyl)piperazino, 4-(lower hydroxyalkyl)piperazino, or piperidino unsubstituted or substituted by a lower alkyl, benzyl, hydroxy, lower hydroxyalkyl, amino, lower aminoalkyl, alkoxycarbonyl or carboxyl group;

Ar represents a phenyl group, an alphanaphthyl or betanaphthyl group which may be substituted or unsubstituted, a heteroaryl group chosen from pyridyl, quinolyl, isoquinolyl, possibly substituted, and their addition salts with pharmaceutically acceptable mineral or organic acids as well as the isomers or their mixtures.

4,791,103

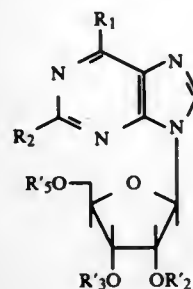
### 2,N<sup>6</sup>-DISUBSTITUTED ADENOSINES, DERIVATIVES AND METHODS OF USE

Bharat K. Trivedi, Canton; Walter Moos, Ann Arbor; Harriet W. Hamilton, and William C. Patt, both of Chelsea, all of Mich., assignors to Warner-Lambert Company, Morris Plains, N.J.

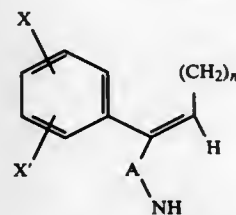
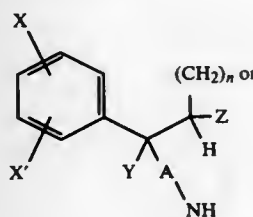
Continuation-in-part of Ser. No. 700,141, Feb. 8, 1985, and Ser. No. 665,218, Oct. 16, 1984. This application Sep. 5, 1985, Ser. No. 771,590

Int. Cl.<sup>4</sup> A01N 31/00; A61K 31/70; C07H 19/06, 19/16  
U.S. Cl. 514—46 48 Claims

1. A compound of the formula



wherein R<sub>1</sub> is of the formula



wherein n is one to four; Y is hydrogen, lower alkyl, or OR where R is hydrogen, lower alkyl or lower alkanoyl; A is a bond or a straight or branched alkylene of one to four carbon

atoms, inclusive with the proviso that A cannot be a bond when R<sub>1</sub> is of Formula II and n is one; X and X' are each independently hydrogen, lower alkyl, lower alkoxy, hydroxy, lower alkanoyl, nitro, trifluoromethyl, halogen, amino, monoloweralkyl or diloweralkylamino, or when taken together a methylenedioxy group; R<sub>2</sub> is (a) hydrogen, (b) halogen, (c) NR'R'' where R' and R'' are independently hydrogen, lower alkyl, phenyl, or phenyl substituted by lower alkyl, lower alkoxy, halogen, or trifluoromethyl, (d) SR''' where R''' is hydrogen, lower alkyl, lower alkanoyl, benzoyl, or phenyl; R<sub>2</sub>, R<sub>3</sub>, and R<sub>5</sub> are each independently hydrogen, alkanoyl having two to twelve carbon atoms, inclusive, in a straight or branched alkyl chain, benzoyl, or benzoyl substituted by lower alkyl, lower alkoxy, halogen, or R<sub>2</sub> and R<sub>3</sub> taken together are a five-membered ring having a total of up to twenty carbons; or R<sub>5</sub> is independently a phosphate, hydrogen, or dihydrogen phosphate, or an alkali metal or ammonium, or dialkali or diammonium salt thereof; its diastereomer; or a pharmaceutically acceptable acid addition salt thereof; with the proviso that overall when R<sub>1</sub> is II and X, X', Y, and Z are hydrogen, or lower alkyl then n cannot be two.

46. A method for treating psychosis in a mammal suffering therefrom comprising administering to such mammal a compound as claimed in claim 1 in unit dosage form.

48. A method for treating immunoinflammation in a mammal suffering therefrom, which comprises administering to such mammal a compound as claimed in claim 1 in unit dosage form.

4,791,104

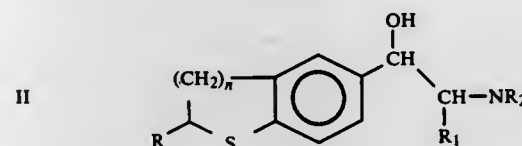
### DIHYDROBENZOTHIOPHENE AND THIOCHROMANE AMINOALCOHOLS

Gianpaolo Picciola, Milan; Mario Riva, Monza; PierGiuseppe De Meglio, Milan, and Piergiorgio Gentili, Treviglio, all of Italy, assignors to Maggioni-Winthrop S.p.A., Milan, Italy

Filed Dec. 10, 1986, Ser. No. 940,090  
Claims priority, application United Kingdom, Jun. 25, 1986, 8615562

Int. Cl.<sup>4</sup> A61K 31/70; C07D 409/02, 295/02, 409/14  
U.S. Cl. 514—58 9 Claims

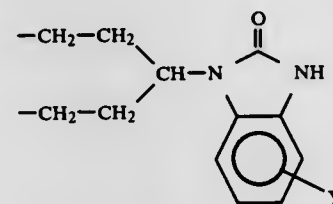
1. A compound of the formula



in its cis and trans configuration and mixtures thereof, wherein R and R<sub>1</sub> represent hydrogen or a lower alkyl group, n represents an integer selected from 1 and 2, and R<sub>2</sub> represents a divalent radical selected from

(a)

III



wherein Y represents hydrogen or halogen; (b)

4,791,105

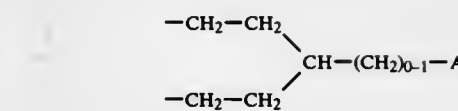
### THERAPEUTIC AND PREVENTIVE AGENT CONTAINING DOLICHOL

Isao Yamatsa; Takeshi Suzuki, both of Ushiku; Shinya Abe, Kikizaki; Kouji Nakamoto, Tsuchiura; Akiharu Kajiwara, Yatabemachi; Kouichi Katayama, Sakuramura; Hajime Tsunoda; Manabu Murakami, both of Toyosato; Hideki Ono, Sakura, and Kouji Yamada, Toride, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

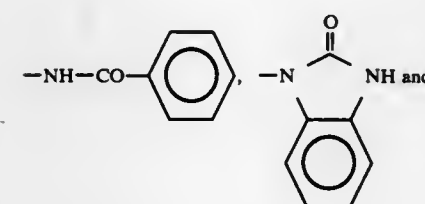
Filed Dec. 21, 1984, Ser. No. 684,873  
Claims priority, application Japan, Dec. 26, 1983, 58-244227  
Int. Cl.<sup>4</sup> A61K 31/66, 31/045

U.S. Cl. 514—134 4 Claims

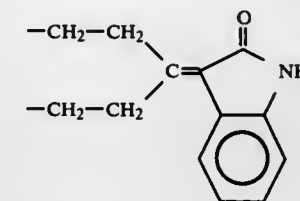
1. A method of treating hepatitis and hepatocirrhosis, which comprises administering to a subject requiring such treatment, a therapeutically effective amount of a treating composition comprising a pharmaceutical carrier and an effective amount of at least one substance selected from the group consisting of compounds having the formulas



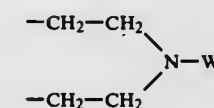
wherein A is a group selected from



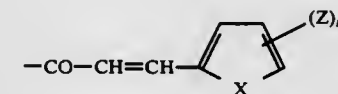
wherein R<sub>4</sub> represents a lower alkyl group; (c)



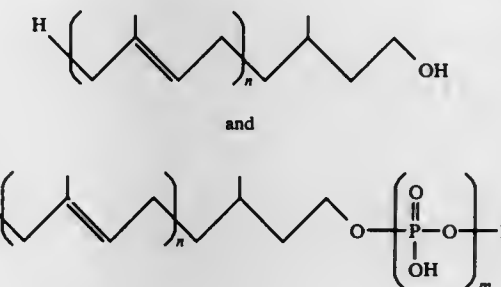
and (d)



wherein W represents a 2-furoyl radical or a group



wherein X represents a group selected from —CH=CH—, —O— and —S—, Z represents a hydrogen, halogen or a lower alkyl or alkoxy group and m is an integer from 1 to 3, and their salts with inorganic acids, organic acids, or cationic exchange resins and complexes with cyclodextrins.



wherein n is an integer of 14 to 24, and m is an integer of 1 to 3.

4,791,106

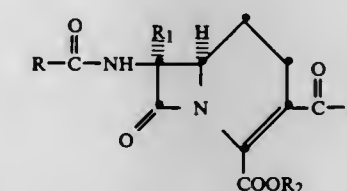
### 1-CARBACEPHALOSPORIN ANTIBIOTICS

John E. Munroe, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Continuation-in-part of Ser. No. 814,943, Dec. 30, 1985, abandoned. This application Jun. 26, 1987, Ser. No. 66,908

Int. Cl.<sup>4</sup> A61K 31/435; C07D 471/04  
U.S. Cl. 514—210 56 Claims

1. A compound of the formula



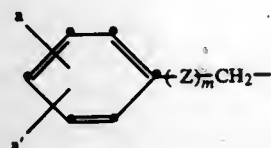
wherein R is hydrogen, C<sub>1</sub>–C<sub>6</sub> alkyl, C<sub>1</sub>–C<sub>6</sub> cyano, carboxy, halogen, amino, C<sub>1</sub>–C<sub>4</sub> alkoxy, C<sub>1</sub>–C<sub>4</sub> alkylthio, or trifluoromethylthio; a phenyl or substituted phenyl group of the formula



wherein a and a' independently are hydrogen, halogen, hydroxy, C<sub>1</sub>–C<sub>4</sub> alkoxy, C<sub>1</sub>–C<sub>4</sub> alkanyloxy, C<sub>1</sub>–C<sub>4</sub> alkyl, C<sub>1</sub>–C<sub>4</sub> alkylthio, amino, C<sub>1</sub>–C<sub>4</sub> alkanoylamino, C<sub>1</sub>–C<sub>4</sub> alkylsul-

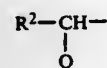


fonylamino, carboxy, carbamoyl, hydroxymethyl, aminomethyl, or carboxymethyl; or a group of the formula



a benzamido group

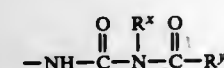
wherein a and a' have the same meanings as defined above, Z is O or S, and m is 0 or 1; or a heteroarylmethyl group of the formula  $R^1-CH_2-$  wherein  $R^1$  is thienyl, furyl, benzothienyl, benzofuryl, pyridyl, 4-pyridylthio, pyrimidyl, pyridazinyl, indolyl, pyrazolyl, imidazolyl, triazolyl, tetrazolyl, oxazolyl, thiazolyl, oxadiazolyl, thiadiazolyl, and said heteroaryl groups mono-substituted by amino, hydroxy, halogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, or C<sub>1</sub>-C<sub>4</sub> alkylsulfonylamino; or a substituted methyl group of the formula



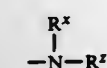
wherein  $R^2$  is cyclohex-1,4-dienyl, or a phenyl group of the formula



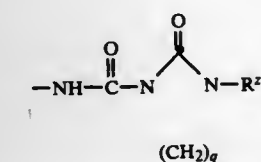
as defined above, or  $R^2$  is  $R^1$  as defined above, and Q is hydroxy, C<sub>1</sub>-C<sub>4</sub> alkanoyloxy, carboxy, sulfo, amino, sulfoamino, or a substituted amino group of the formula



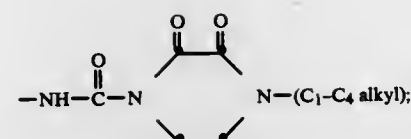
wherein  $R^x$  is hydrogen or C<sub>1</sub>-C<sub>3</sub> alkyl,  $R^y$  is C<sub>1</sub>-C<sub>4</sub> alkyl, furyl, thienyl, phenyl, halophenyl, nitrophenyl, styryl, halostyryl, nitrostyryl or a group of the formula



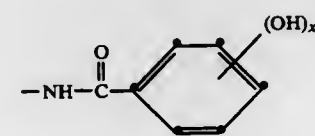
wherein  $R^x$  has the same meanings as defined above and  $R^z$  is hydrogen, C<sub>1</sub>-C<sub>3</sub> alkylsulfonyl, C<sub>1</sub>-C<sub>3</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> alkanoyl; or Q is a substituted amino group of the formula



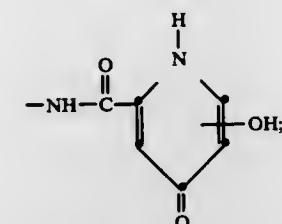
wherein  $R^2$  has the same meanings as defined above, and q is 2 or 3; or Q is a substituted amino group of the formula



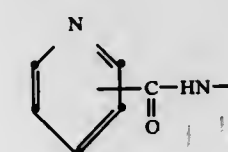
a benzamido group



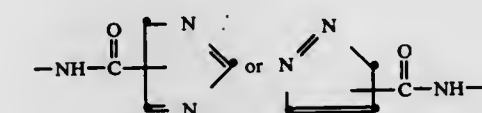
wherein t is 1 to 3;  
a pyridone group



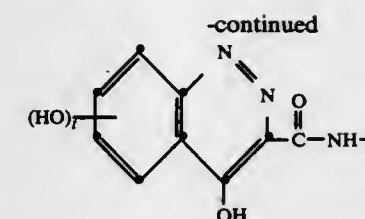
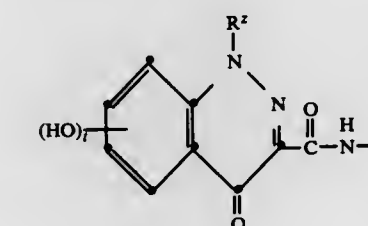
a pyridyl group



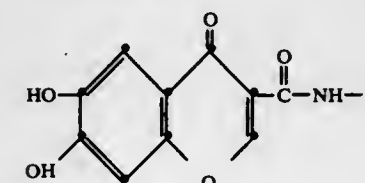
and said pyridyl group mono-substituted by C<sub>1</sub>-C<sub>4</sub> alkyl, amino, carboxy, hydroxy or halogen; an imidazolyl or pyrazolyl group



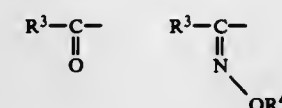
and said imidazolyl or pyrazolyl mono-substituted by C<sub>1</sub>-C<sub>4</sub> alkyl, carboxy, amino, or halogen; a benzpyridazin-4-one group or tautomer thereof



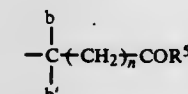
wherein z is hydrogen or C<sub>1</sub>-C<sub>3</sub> alkyl, and t is 1 to 3; or a benzopyranone group



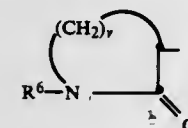
or R is a keto group or an oximino-substituted group of the formulae



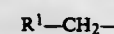
wherein  $R^3$  is  $R^1$  or  $R^2$  as defined above and  $R^4$  is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkyl substituted by halogen, a carboxy-substituted alkyl or cycloalkyl group represented by the formula



wherein b and b' independently are hydrogen, or C<sub>1</sub>-C<sub>3</sub> alkyl, n is 0, 1, 2, or 3; and b and b' when taken together with the carbon to which they are bonded form a 3- to 6-membered carbocyclic ring, and  $R^5$  is hydroxy, C<sub>1</sub>-C<sub>4</sub> alkoxy, amino, C<sub>1</sub>-C<sub>4</sub> alkylamino, or di(C<sub>1</sub>-C<sub>4</sub> alkyl)amino; or  $R^4$  is C<sub>1</sub>-C<sub>4</sub> substituted by phenyl or phenyl substituted by one or two of the same or different groups selected from among C<sub>1</sub>-C<sub>4</sub> alkyl, hydroxy, halogen, carboxy or protected carboxy; or  $R^4$  is C<sub>1</sub>-C<sub>4</sub> alkyl substituted by amino or protected amino; or  $R^4$  is C<sub>2</sub>-C<sub>4</sub> alkenyl; or  $R^4$  is a cyclic lactam group of the formula

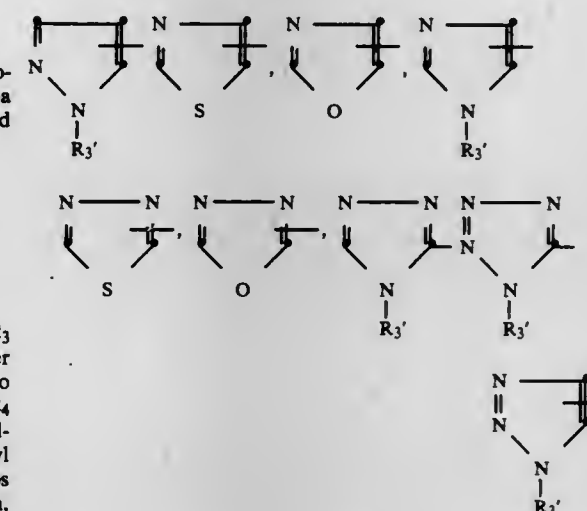


wherein v is 2-4 and  $R^6$  is hydrogen or C<sub>1</sub>-C<sub>3</sub> alkyl; or  $R^4$  is a heteroaryl group

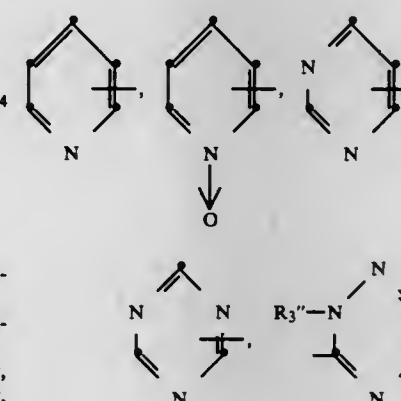


wherein  $R^1$  has the same meanings as defined hereinabove;  $R^1$  is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio; or formamido;  $R^2$  is hydrogen, a carboxy-protecting group, or a biologically labile ester; A is hydroxy, halo, azido, 2-(tri-C<sub>1</sub>-C<sub>4</sub> alkylsilyl)ethoxy, C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>2</sub>-C<sub>6</sub> alkenyloxy, C<sub>2</sub>-C<sub>6</sub> alkinyloxy, C<sub>1</sub>-C<sub>4</sub> alkoxy-carbonyloxy, phenoxy, or phenoxy substituted by one or two of the same or different groups selected from C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, methylenedioxy, halo, hydroxy, amino, C<sub>1</sub>-C<sub>4</sub> alkylamino, di(C<sub>1</sub>-C<sub>4</sub> alkyl)amino, C<sub>1</sub>-C<sub>4</sub> alkanoylamino, halo, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, cyano, carboxy, C<sub>1</sub>-C<sub>4</sub> alkoxy-carbonyl, carbamoyl, carbamoyloxy, N-(C<sub>1</sub>-C<sub>4</sub> alkyl)carbamoyloxy, N,N-di-(C<sub>1</sub>-C<sub>4</sub> alkyl)carbamoyloxy, C<sub>1</sub>-C<sub>4</sub> alkoxy-carbonyloxy, phenoxy-carbonyloxy, C<sub>1</sub>-C<sub>4</sub> alkoxy-carbonylamino, phenoxy-carbonylamino, N-(C<sub>1</sub>-C<sub>4</sub> alkyl)carbamoylamino, N,N-di-(C<sub>1</sub>-C<sub>4</sub> alkyl)carbamoylamino, N-phenylcarbamoylamino, anilino, substituted anilino, phenyl, substituted phenyl, where said substituted anilino and substituted phenyl groups are substituted on the phenyl ring by one or two of the same or different groups selected from among C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkyloxy, methylenedioxy, halo, hydroxy, amino, C<sub>1</sub>-C<sub>4</sub> alkylamino, di(C<sub>1</sub>-C<sub>4</sub> alkyl)amino, C<sub>1</sub>-C<sub>4</sub> alkanoylamino, carboxy, carbamoyl, cyano, trifluoromethyl, or C<sub>1</sub>-C<sub>4</sub> alkanoyl; or a heterocyclic amino group  $R_3NH-$  wherein  $R_3$  is thienyl, furyl or a 5-membered nitrogen containing heterocyclic ring represented by the formulae

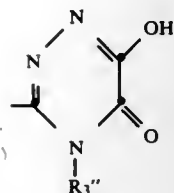
tuted by one or two of the same or different groups selected from C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, methylenedioxy, halo, hydroxy, amino, C<sub>1</sub>-C<sub>4</sub> alkylamino, di-(C<sub>1</sub>-C<sub>4</sub> alkyl)amino, C<sub>1</sub>-C<sub>4</sub> alkanoylamino, carboxy, carbamoyl, cyano, trifluoromethyl, or C<sub>1</sub>-C<sub>4</sub> alkanoyl; or C<sub>1</sub>-C<sub>6</sub> alkoxy substituted by one or two of the same or different groups selected from among hydroxy, amino, C<sub>1</sub>-C<sub>4</sub> alkylamino, di(C<sub>1</sub>-C<sub>4</sub> alkyl)amino, C<sub>1</sub>-C<sub>4</sub> alkanoylamino, halo, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, cyano, carboxy, C<sub>1</sub>-C<sub>4</sub> alkoxy-carbonyl, carbamoyl, carbamoyloxy, N-(C<sub>1</sub>-C<sub>4</sub> alkyl)carbamoyloxy, N,N-di-(C<sub>1</sub>-C<sub>4</sub> alkyl)carbamoyloxy, C<sub>1</sub>-C<sub>4</sub> alkoxy-carbonyloxy, phenoxy-carbonyloxy, C<sub>1</sub>-C<sub>4</sub> alkoxy-carbonylamino, phenoxy-carbonylamino, N-(C<sub>1</sub>-C<sub>4</sub> alkyl)carbamoylamino, N,N-di-(C<sub>1</sub>-C<sub>4</sub> alkyl)carbamoylamino, N-phenylcarbamoylamino, anilino, substituted anilino, phenyl, substituted phenyl, where said substituted anilino and substituted phenyl groups are substituted on the phenyl ring by one or two of the same or different groups selected from among C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkyloxy, methylenedioxy, halo, hydroxy, amino, C<sub>1</sub>-C<sub>4</sub> alkylamino, di(C<sub>1</sub>-C<sub>4</sub> alkyl)amino, C<sub>1</sub>-C<sub>4</sub> alkanoylamino, carboxy, carbamoyl, cyano, trifluoromethyl, or C<sub>1</sub>-C<sub>4</sub> alkanoyl; or a heterocyclic amino group  $R_3NH-$  wherein  $R_3$  is thienyl, furyl or a 5-membered nitrogen containing heterocyclic ring represented by the formulae



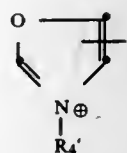
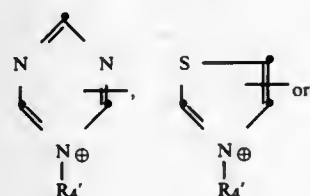
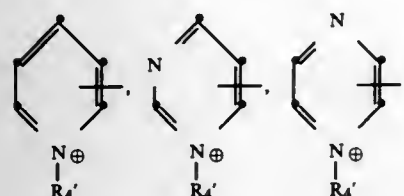
wherein  $R_3'$  is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>1</sub>-C<sub>4</sub> alkyl substituted by carboxy, sulfo, or di(C<sub>1</sub>-C<sub>4</sub> alkyl)amino; or  $R_3$  is a 6-membered nitrogen-containing ring represented by the formulae



-continued



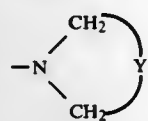
wherein  $R_3''$  is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl; or a thio group  $R_3'S$ — wherein  $R_3'$  is phenyl, substituted phenyl as defined above or  $R_3$  as defined above; or a quaternary heterocyclic group  $R_4^{\oplus}X^{\ominus}$  wherein  $R_4^{\oplus}$  is a nitrogen containing heterocycle represented by the formulae



wherein  $R_4'$  is C<sub>1</sub>-C<sub>4</sub> alkyl, benzyl, or  $-\text{CH}_2\text{COCH}_3$ , and  $X^{\ominus}$  is a halide, sulfate, or nitrate anion; or  $R_4^{\oplus}-S-X^{\ominus}$  wherein  $R_4^{\oplus}$  and  $X^{\ominus}$  are as defined above; or C<sub>1</sub>-C<sub>6</sub> alkoxy substituted by a heterocyclic group  $R_3$  as defined above; or A is an amino group represented by the formula



wherein  $R'$  and  $R''$  are independently hydrogen, phenyl, substituted phenyl as defined above, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkyl substituted by one or two of the same or different groups selected from among halo, hydroxy, C<sub>1</sub>-C<sub>4</sub> alkanoyloxy, C<sub>1</sub>-C<sub>4</sub> alkylsulfonyloxy, amino, or C<sub>1</sub>-C<sub>4</sub> alkanoylamino; or  $R'$  and  $R''$  can be taken together with the nitrogen atom to which they are bonded to form a 5-7 membered ring represented by the formula



wherein Y is  $-\text{CH}_2-$  or  $-\text{CH}_2-\text{Y}'-\text{CH}_2-$  wherein p is 2-4 and Y' is O, S, or NR'' wherein  $R''$  is hydrogen or C<sub>1</sub>-C<sub>4</sub> alkyl; or  $R'$  is hydrogen and  $R''$  is C<sub>1</sub>-C<sub>4</sub> alkyl substituted by a heterocyclic group  $R_3$ , or a quaternary heterocyclic group  $R_4^{\oplus}X^{\ominus}$ , wherein  $R_3$ ,  $R_3'$ ,  $R_4^{\oplus}$  and  $X^{\ominus}$  have the same meanings as defined above; or A is a heterocyclic amino group  $R_3\text{NH}-$  wherein  $R_3$  is

as defined above, phenyl, or substituted phenyl as defined above;

or A is C<sub>1</sub>-C<sub>4</sub> alkyl, or C<sub>1</sub>-C<sub>4</sub> alkyl monosubstituted by hydroxy, C<sub>1</sub>-C<sub>4</sub> alkanoyloxy, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, halogen, carboxy, cyano, amino, C<sub>1</sub>-C<sub>4</sub> alkylamino, di-(C<sub>1</sub>-C<sub>4</sub> alkyl)amino, C<sub>1</sub>-C<sub>4</sub> alkanoylamino, C<sub>1</sub>-C<sub>4</sub> alkylsulfonylamino, C<sub>1</sub>-C<sub>4</sub> alkylsulfonyloxy, phenyl, substituted phenyl as defined above, phenoxy, substituted phenoxy as defined above, anilino, substituted anilino as defined above, a heterocyclic group  $R_3$ , a heterocyclic amino group  $R_3\text{NH}$ , a thio group  $R_3'S-$ , or a quaternary heterocyclic group  $R_4^{\oplus}X^{\ominus}$  or  $R_4^{\oplus}-S-X^{\ominus}$ , wherein  $R_3$ ,  $R_3'$ ,  $R_4^{\oplus}$ , and  $X^{\ominus}$  are as defined above;

or A is phenyl, thienyl, furyl, pyridyl, pyrimidyl, imidazolyl, pyrazolyl, tetrazolyl, oxazolyl, thiazolyl, thiadiazolyl or oxadiazolyl, and said phenyl or heterocycle substituted by one or two of the same or different substituents selected from C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, halogen, amino, or hydroxy;

or A is a group of the formula  $-\text{COR}_6$  wherein  $R_6$  is hydrogen, hydroxy, C<sub>1</sub>-C<sub>4</sub> alkoxy, phenoxy, substituted phenoxy as defined above, tri-(C<sub>1</sub>-C<sub>4</sub> alkyl)silyloxy, amino, C<sub>1</sub>-C<sub>4</sub> alkylamino, di-(C<sub>1</sub>-C<sub>4</sub> alkyl)amino, phenyl, substituted phenyl as defined above, or C<sub>1</sub>-C<sub>4</sub> alkyl;

or A is the group  $-\text{CH}_2-\oplus\text{R}_4$  wherein  $\oplus\text{R}_4$  is pyridinium, or a substituted pyridinium group substituted by one or two of the same or different groups selected from among C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, hydroxy, halogen, trifluoromethyl, cyano, carboxy, carbamoyl, amino, or C<sub>1</sub>-C<sub>4</sub> alkoxy carbonyl; or the pyridinium ring is substituted on adjacent carbon atoms with a divalent alkylene group represented by the formula  $-\text{CH}_2-p'$  wherein  $p'$  is 3-5, or the divalent alkylene group is interrupted by an O, S, or one or two N atoms and in addition can contain one or two double bonds and can be substituted in either ring by one or two of the same or different substituents selected from the groups defined above when  $\oplus\text{R}_4$  is a substituted pyridine; or  $\oplus\text{R}_4$  is a thiazolium ring or a substituted thiazolium ring substituted by one or two of the same or different groups, amino, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkylthio, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkyl substituted by hydroxy, C<sub>1</sub>-C<sub>4</sub> alkanoyloxy, C<sub>1</sub>-C<sub>4</sub> alkylsulfonyloxy, halogen, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, or amino, or the thiazolium ring is substituted on the adjacent carbon atoms with a divalent alkylene group represented by the formula  $-\text{CH}_2-p'$  wherein  $p'$  is 3-5; and when  $R_2$  is hydrogen, the pharmaceutically acceptable non-toxic salts and biologically labile esters thereof.

56. A method for treating bacterial infections in man and animals which comprises administering an antibacterially effective amount of an antibiotic compound of claim 1 wherein  $R_2$  is hydrogen or a pharmaceutically acceptable non-toxic salt or biologically labile ester thereof.

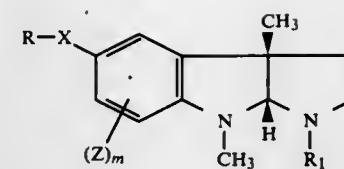
4,791,107  
MEMORY ENHANCING AND ANALGESIC  
1,2,3,3A,8,8A-HEXAHYDRO-3A,8 (AND) 1,3A,8-DI(AND)  
TRI-METHYLPYRROLO(2,3-B)INDOLES,  
COMPOSITIONS AND USE

R. Richard L. Hamer, Far Hills; Grover C. Helsley, Pluckemin; Edward J. Glankowski, Warren, and Yulin Chiang, Convect Station, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 885,991, Jul. 16, 1986. This application May 15, 1987, Ser. No. 49,894  
Int. Cl. C07D 487/04; A61K 31/40, 31/535

U.S. Cl. 514-228.2 26 Claims

1. A compound of the formula



where

- X is O or S;
- R is where Y is O or S; the group  $-\text{NR}_2\text{R}_3$  taken as a whole is 1-pyrrolidinyl, 1-piperidinyl, 4-morpholinyl, 4-thiomorpholinyl, 1-piperazinyl, 4-methyl-1-piperazinyl or 2-(2,6-dichlorophenylimino)-1-imidazolidinyl, and
- m is 1 or 2;
- each Z is independently H, loweralkyl, halogen, nitro,  $-\text{NH}_2$ , loweralkylcarbonylamino, arylcarbonylamino, loweralkoxycarbonylamino or loweralkylamino, and
- $R_1$  is H, loweralkyl, arylloweralkyl, heteroaryl, loweralkyl, cycloalkylmethyl or loweralkenylmethyl,

or the 3aR-cis isomer thereof or a mixture of the two isomers including the racemic mixture or a pharmaceutically acceptable acid addition salt thereof.

20. A pharmaceutical composition comprising an effective memory enhancing amount or pain alleviating amount of a compound as defined in claim 1 and a suitable carrier therefor.

4,791,108  
SULFONYL-DECAHYDRO-8H-ISOQUINO[2,1-G][1,6]-  
NAPHTHYRIDINES AND RELATED COMPOUNDS  
USEFUL AS  $\alpha_2$ -BLOCKERS

Robin D. Clark, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

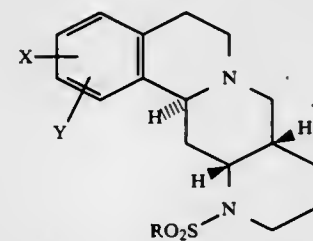
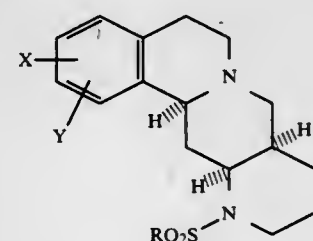
Filed Apr. 13, 1987, Ser. No. 37,320

Int. Cl. A61K 31/47; C07D 455/03

U.S. Cl. 514-233.2

28 Claims

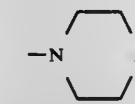
1. A compound of the formula (1) or (2):



in which:

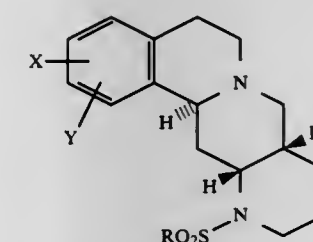
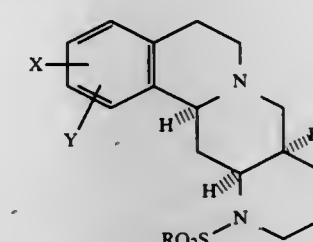
- X and Y are independently hydrogen, hydroxy, lower alkyl of one to six carbon atoms, lower alkoxy of one to six carbon atoms or halo, or X and Y taken together is methylenedioxy or ethylene-1,2-dioxy; and R is lower alkyl of one to six carbon atoms, phenyl optionally substituted by one or two substituents chosen from halo or nitro groups or lower alkyl or lower alkoxy groups of one to four carbon atoms,  $-(\text{CH}_2)_m\text{OR}^1$  or  $-\text{NR}^1\text{R}^2$  wherein m is an integer of 1 to 6 and  $R^1$  and  $R^2$

are independently hydrogen or lower alkyl, or  $-\text{NR}^1\text{R}^2$  taken together is a heterocycle of the formula:



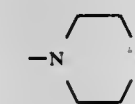
wherein A is  $-\text{CH}_2-$ ,  $-\text{NR}^1-$  or oxygen; or a pharmaceutically acceptable salt thereof.

23. A method for treating a mammal having a disease-state which is alleviated by treatment with an  $\alpha_2$ -blocker, which comprises administering a therapeutically effective amount of a compound of the formula



in which:

- X and Y are independently hydrogen, hydroxy, lower alkyl of one to six carbon atoms, lower alkoxy of one to six carbon atoms or halo, or X and Y taken together is methylenedioxy or ethylene-1,2-dioxy; and R is lower alkyl of one to six carbon atoms, phenyl optionally substituted by one or two substituents chosen from halo or nitro groups or lower alkyl or lower alkoxy groups of one to four carbon atoms,  $-(\text{CH}_2)_m\text{OR}^1$  or  $-\text{NR}^1\text{R}^2$  wherein m is an integer of 1 to 6 and  $R^1$  and  $R^2$  are independently hydrogen or lower alkyl, or  $-\text{NR}^1\text{R}^2$  taken together is a heterocycle of the formula:



wherein A is  $-\text{CH}_2-$ ,  $-\text{NR}^1-$  or oxygen; or a pharmaceutically acceptable salt thereof.

4,791,109  
NOVEL INDOLE CARBOXAMIDES  
Francois Clemece; Jacques Guillaume, both of Paris, and Gilles Hamon, Montrouge, all of France, assignors to Roussel Uclaf, Paris, France

Filed Jul. 10, 1986, Ser. No. 883,915

Claims priority, application France, Jul. 11, 1985, 85 10648

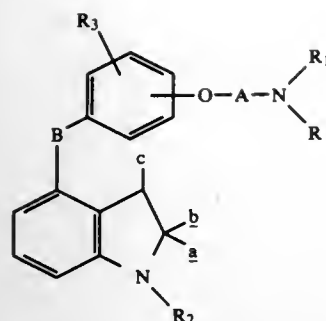
Int. Cl. A61K 31/535, 31/40; C07D 413/12, 209/34

U.S. Cl. 514-235.2

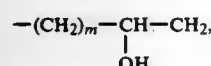
31 Claims

1. A compound selected from the group consisting of indole-carboxamides of the formula

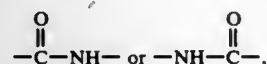




wherein R and R<sub>1</sub> are individually selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms, cycloalkyl or 3 to 7 carbon atoms, cycloalkylalkyl of 4 to 7 carbon atoms and aralkyl of 7 to 12 carbon atoms unsubstituted or substituted with 1 to 3 members of the group consisting of halogen, methyl, ethyl, methoxy, ethoxy, —CF<sub>3</sub>, CH<sub>2</sub>S—, —NH<sub>2</sub> and —NO<sub>2</sub> or R<sub>1</sub> and R taken together with the nitrogen atom to which they are attached are selected from the group consisting of pyrrolidino, piperidino, morpholino, piperazinyl, methylpiperazinyl, ethylpiperazinyl, propylpiperazinyl and a phenyl piperazinyl with the phenyl optionally substituted with 1 to 3 members of the group consisting of hydrogen halogen, methyl, ethyl, methoxy, ethoxy, CF<sub>3</sub>—, CH<sub>3</sub>S—, —NH<sub>2</sub> and —NO<sub>2</sub>, R<sub>3</sub> is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms, alkoxy of 1 to 3 carbon atoms, chlorine, bromine, iodine, —NO<sub>2</sub>, —NH<sub>2</sub>, acylamide of an aliphatic carboxylic acid of 2 to 5 carbon atoms and mono and dialkylamino with alkyl of 1 to 5 carbon atoms, a and b form =O and c is hydrogen or a and c form a carbon-carbon bond and b is hydrogen, A is selected from the group consisting of —(CH<sub>2</sub>)<sub>n</sub>— and



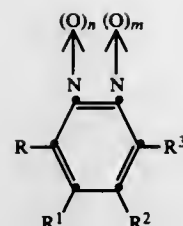
n is an integer from 2 to 5, m is an integer from 1 to 3, B is



R<sub>2</sub> is selected from the group consisting of hydrogen and alkyl of 1 to 5 carbon atoms and non-toxic, pharmaceutically acceptable acid addition salts thereof.

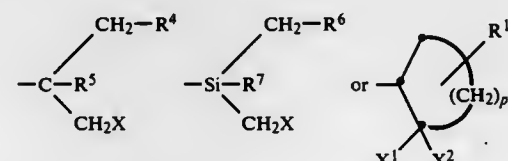
12. An antiarrhythmic composition comprising an antiarrhythmically effective amount of at least one compound of claim 1 and an inert pharmaceutical carrier.

4,791,110  
FUNGICIDAL PYRIDAZINES  
Wendell R. Arnold, Carmel, Ind.; William C. Dow, Hayward, Calif., and George W. Johnson, Greenfield, Ind., assignors to Eli Lilly and Company, Indianapolis, Ind.  
Continuation-in-part of Ser. No. 744,722, Jun. 14, 1985, abandoned. This application May 5, 1986, Ser. No. 859,558  
Int. Cl. A01N 55/00, 43/58; C07D 237/12, 405/12  
U.S. Cl. 514—247 45 Claims  
1. A compound of the formula



wherein

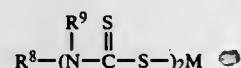
R<sup>3</sup> is chloro, bromo, methyl, cyano or iodo;  
R is chloro, bromo, iodo, methyl, cyano or furan-2-ylmethoxy;  
R<sup>1</sup> is hydrogen, methyl, ethyl or n-propyl;  
R<sup>2</sup> is



X is fluoro, chloro, bromo or iodo;  
X<sup>1</sup> and X<sup>2</sup> independently represent X or hydrogen, provided that no more than one of X<sup>1</sup> and X<sup>2</sup> is hydrogen;  
R<sup>4</sup> is hydrogen, chloro, bromo, methyl or ethyl;  
R<sup>5</sup> is hydrogen, chloro, methyl, ethyl, chloromethyl or dichloromethyl;  
or R<sup>4</sup> and R<sup>5</sup> combine with the group to which they are attached to form a C<sub>3</sub>–C<sub>7</sub> cycloalkyl group substituted with a R<sup>1</sup> group;  
R<sup>6</sup> is hydrogen, chloro, bromo, methyl or ethyl;  
R<sup>7</sup> is hydrogen, methyl, ethyl, chloromethyl or dichloromethyl;  
one of m and n is 0 or 1, and the other is 0;  
p is 0–4.

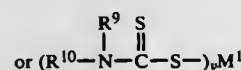
16. A fungicidal composition comprising a phytologically acceptable inert carrier and a compound of claim 1.

26. A fungicidal composition comprising a dithiocarbamate fungicide of the formula



wherein

R<sup>8</sup> is C<sub>1</sub>–C<sub>4</sub> alkylene;  
R<sup>9</sup> is C<sub>1</sub>–C<sub>3</sub> alkyl or hydrogen;  
M is a divalent metal ion or two monovalent metal ions;



wherein

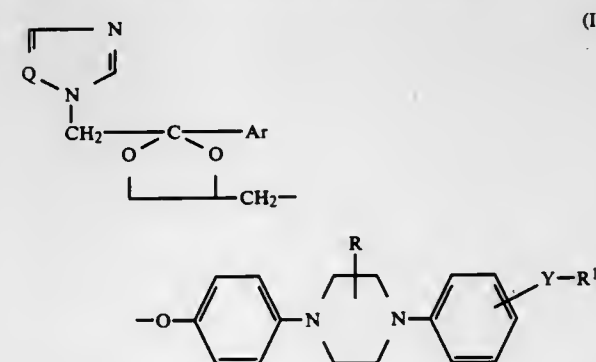
y is 1–3;  
M<sup>1</sup> is a metal ion of valence 1–3;  
R<sup>10</sup> is C<sub>1</sub>–C<sub>4</sub> alkyl; and a compound of claim 1.

4,791,111  
[[4-[4-(4-PHENYL-1-PIPERAZINYL)PHENOXYMETHYL]-1,3-DIOXOLAN-2-YL]METHYL]-1H-IMIDAZOLES AND 1H-1,2,4-TRIAZOLES HAVING ANTI-MICROBIAL PROPERTIES

Jan Heeres, Voesselaar, Leo J. J. Backx, Arendonk; Jozef B. A. Thijssen, Kasterlee, and Alfonsus G. Knaeps, Herentals, all of Belgium, assignors to Janssen Pharmaceutica, N.V., Beerse, Belgium

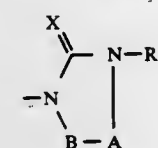
Continuation-in-part of Ser. No. 812,670, Dec. 23, 1985, abandoned. This application Oct. 16, 1986, Ser. No. 919,400  
Int. Cl. A61K 31/495; C07D 407/14, 405/14  
U.S. Cl. 514—252 25 Claims

1. A chemical compound having the formula

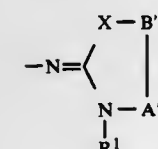


a pharmaceutically acceptable acid-addition salt or a stereochemically isomeric form thereof, wherein

Q is N or CH;  
Ar is aryl;  
R is hydrogen or C<sub>1-6</sub> alkyl; and  
Y–R<sup>1</sup> is a radical having the formula



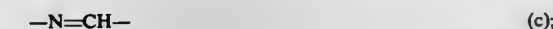
or a radical having the formula



wherein

R<sup>1</sup> is tetrahydrofuranyl, C<sub>1-6</sub> alkyl; or C<sub>1-6</sub> alkyl, C<sub>3-6</sub> cycloalkyl, aryl, C<sub>1-6</sub> alkyl or (C<sub>3-6</sub> cycloalkyl)C<sub>1-6</sub> alkyl all substituted on the C<sub>1-6</sub> alkyl and/or C<sub>3-6</sub> cycloalkyl moiety with oxo, thio, or with one or two radicals of formula —Z–R<sup>1-a</sup>;  
said Z being O or S;  
said R<sup>1-a</sup> being hydrogen, C<sub>1-6</sub> alkyl, aryl, C<sub>3-6</sub> cycloalkyl or tetrahydro-2H-pyran-2-yl;  
or where R<sup>1</sup> is substituted with two —Z–R<sup>1-a</sup> radicals, the two —R<sup>1-a</sup> radicals, taken together, may form a bivalent radical of formula —CH<sub>2</sub>—, —CH(CH<sub>3</sub>)—, —C(CH<sub>3</sub>)<sub>2</sub>—, —CH<sub>2</sub>—CH<sub>2</sub>—, —CH(CH<sub>3</sub>)—CH<sub>2</sub>— or —CH<sub>2</sub>—CH<sub>2</sub>—CH<sub>2</sub>—;  
X is O, S or NR<sup>2</sup>;  
said R<sup>2</sup> being hydrogen or C<sub>1-6</sub> alkyl;  
A is >C=O, NR<sup>3</sup>, methylene or methylene substituted with

up to two radicals selected from the group consisting of C<sub>1-6</sub> alkyl and aryl;  
said R<sup>3</sup> being hydrogen or C<sub>1-6</sub> alkyl;  
B is >C=O or methylene optionally substituted with up to two C<sub>1-6</sub> alkyl radicals;  
or A and B, taken together, form a bivalent radical of formula



A' and B' independently having the same meaning of A and B respectively, or A' and B', taken together, form a bivalent radical of formula



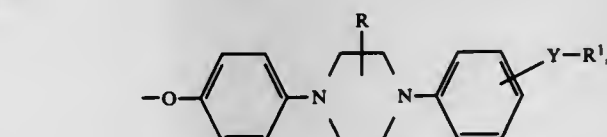
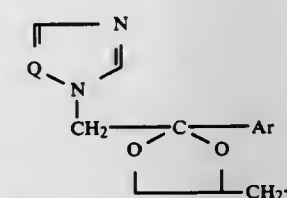
wherein the nitrogen atom in the bivalent radical (c) is connected to NR<sup>1</sup>; wherein one hydrogen in said radical (c) and up to two hydrogens in radical (d) may be replaced by a C<sub>1-6</sub> alkyl radical; provided that

(i) when Y–R<sup>1</sup> is a radical of formula (a) wherein —A–B— is other than a bivalent radical of formula (c), then R<sup>1</sup> is other than C<sub>1-6</sub> alkyl substituted with C<sub>1-6</sub> alkoxy;

(ii) when Y–R<sup>1</sup> is a radical of formula (b) then R<sup>1</sup> is other than C<sub>1-6</sub> alkyl substituted with C<sub>1-6</sub> alkoxy;

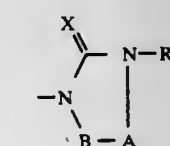
wherein aryl is phenyl or substituted phenyl, said substituted phenyl having from 1 to 3 substituents each independently selected from the group consisting of fluoro, chloro, bromo, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, and trifluoromethyl.

13. A method of inhibiting and/or eliminating the development of fungi and bacteria in warm-blooded animals suffering from diseases caused by these fungi and/or bacteria by the systemic or topical administration of an antimicrobially effective amount of a compound having the formula

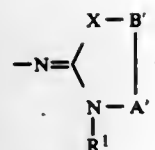


a pharmaceutically acceptable acid-addition salt or a stereochemically isomeric form thereof, wherein

Q is N or CH;  
Ar is aryl;  
R is hydrogen or C<sub>1-6</sub> alkyl; and  
Y–R<sup>1</sup> is a radical having the formula



or a radical having the formula



wherein

R<sup>1</sup> is tetrahydrofuranyl, C<sub>1-6</sub> alkyl; or C<sub>1-6</sub> alkyl, C<sub>3-6</sub> cycloalkyl, aryl, C<sub>1-6</sub> alkyl or (C<sub>3-6</sub> cycloalkyl)C<sub>1-6</sub> alkyl all substituted on the C<sub>1-6</sub> alkyl and/or C<sub>3-6</sub> cycloalkyl moiety with oxo, thioxo or with one or two radicals of formula —Z—R<sup>1-a</sup>;

said Z being O or S;

said R<sup>1-a</sup> being hydrogen, C<sub>1-6</sub> alkyl, aryl, C<sub>3-6</sub> cycloalkyl or tetrahydro-2H-pyran-2-yl;

or where R<sup>1</sup> is substituted with two —Z—R<sup>1-a</sup> radicals, the two —R<sup>1-a</sup> radicals, taken together, may form a bivalent radical of formula —CH<sub>2</sub>—, —CH(CH<sub>3</sub>)—, —C(CH<sub>3</sub>)<sub>2</sub>—, —CH<sub>2</sub>—CH<sub>2</sub>—, —CH(CH<sub>3</sub>)—CH<sub>2</sub>— or —CH<sub>2</sub>—CH<sub>2</sub>—CH<sub>2</sub>—;

X is O, S or NR<sup>2</sup>;

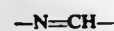
said R<sup>2</sup> being hydrogen or C<sub>1-6</sub> alkyl;

A is >C=O, NR<sup>3</sup>, methylene or methylene substituted with up to two radicals selected from the group consisting of C<sub>1-6</sub> alkyl and aryl;

said R<sup>3</sup> being hydrogen or C<sub>1-6</sub> alkyl;

B is >C=O or methylene optionally substituted with up to two C<sub>1-6</sub> alkyl radicals;

or A and B, taken together, form a bivalent radical of formula



A' and B' independently having the same meaning of A and B respectively, or A' and B', taken together, form a bivalent radical of formula



wherein the nitrogen atom in the bivalent radical (c) is connected to NR<sup>1</sup>; wherein one hydrogen in said radical (c) and up to two hydrogens in radical (d) may be replaced by a C<sub>1-6</sub> alkyl radical; provided that

(i) when Y—R<sup>1</sup> is a radical of formula (a) wherein —A—B— is other than a bivalent radical of formula (c), then R<sup>1</sup> is other than C<sub>1-6</sub> alkyl substituted with C<sub>1-6</sub> alkoxy;

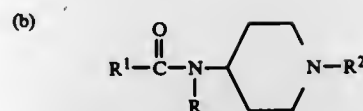
(ii) when Y—R<sup>1</sup> is a radical of formula (b) then R<sup>1</sup> is other than C<sub>1-6</sub> alkyl substituted with C<sub>1-6</sub> alkoxy;

wherein aryl is phenyl or substituted phenyl, said substituted phenyl having from 1 to 3 substituents each independently selected from the group consisting of fluoro, chloro, bromo, C<sub>1-6</sub> alkyl, C<sub>1-6</sub> alkoxy, and trifluoromethyl.

**4,791,112**  
N-HETEROCYCLIC-N-(4-PIPERIDYL)AMIDES AND PHARMACEUTICAL COMPOSITIONS AND METHODS EMPLOYING SUCH COMPOUNDS  
Jerome R. Bagley, Plainfield, and H. Kenneth Spencer, Chatham, both of N.J., assignors to The BOC Group, Inc., Montvale, N.J.

Filed Feb. 2, 1987, Ser. No. 9,857  
Int. Cl.<sup>4</sup> A61K 31/435, 31/395; C07D 215/16, 401/12, 239/28  
U.S. Cl. 514-252 28 Claims

1. A compound of the formula



optically active isomeric forms thereof, or pharmaceutically acceptable acid addition salts thereof, in which formula: R is pyrrolyl, pyrazyl, pyridyl, pyrimidyl, or triazolyl, all of which may be unsubstituted or substituted wherein the substituents are selected from the group consisting of halogen, lower alkyl, lower alkoxy, halogenated lower alkyl, lower alkylthio or combinations thereof; R<sup>1</sup> is a furanyl or thienyl or a lower alkoxy lower alkyl of 2 to 6 carbon atoms; and R<sup>2</sup> is a phenyl lower alkyl.

10. A method for causing in a mammal the reversal of one or more actions of narcotic analgesics or anesthetics, said actions including respiratory depression, comprising administering to said mammal an antagonistically effective amount of N-piperidyl-N-heterocyclic substituted furamide, thienylamide or lower alkoxy lower alkylamide and derivatives thereof, optically isomeric forms thereof, or pharmaceutically acceptable acid addition salts thereof, comprising administering to such mammal an antagonistically effective amount selectively reversing respiratory depression but not analgesia.

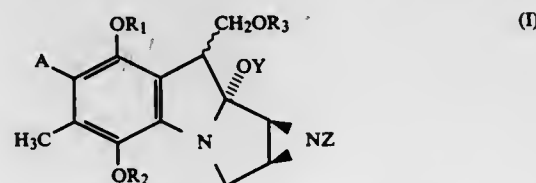
#### 4,791,113 MITOMYCIN DERIVATIVES AS ANTILEUKEMIA AGENTS

Tokuyuki Kuroda, Shizuoka; Koji Hisamura, Mie; Tohru Sagaya, Shizuoka; Yutaka Ohsawa, Shizuoka; Hideo Ueno, Shizuoka; Makoto Morimoto, Shizuoka, and Tadashi Ashizawa, Shizuoka, all of Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Japan

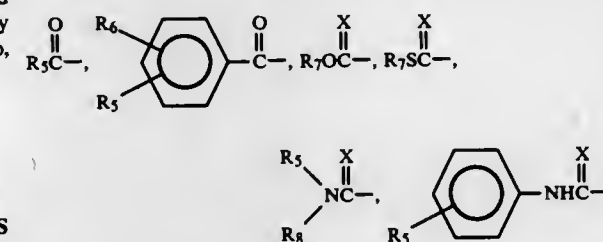
Filed May 12, 1987, Ser. No. 57,889  
Claims priority, application Japan, May 14, 1986, 61-110395; Nov. 26, 1986, 61-281585

Int. Cl.<sup>4</sup> A61K 31/505, 31/40; C07D 487/04  
U.S. Cl. 514-256 15 Claims

1. Mitomycin compounds represented by the formula:



wherein A is ON— or R<sub>4</sub>N=N— wherein R<sub>4</sub> is selected from



(wherein  
R<sub>5</sub> and R<sub>8</sub> are each independently selected from hydrogen, alkyl having 1-6 carbon atoms and cycloalkyl having 3-6 carbon atoms;

R<sub>6</sub> is selected from hydrogen, halogen, hydroxy, alkoxy having 1-6 carbon atoms, amino and nitro;

R<sub>7</sub> is selected from alkyl having 1-6 carbon atoms and cycloalkyl having 3-6 carbon atoms; and X is selected from oxygen, sulphur and imino) and an unsubstituted or substituted heterocyclic group selected from imidazolyl, imidazolyl, thiazolyl, thiazolyl, oxazolyl, oxazolyl, triazolyl and pyrimidyl (wherein the substituent is selected from alkyl having 1-6 carbon atoms);

R<sub>1</sub> and R<sub>2</sub> are each independently selected from hydrogen, alkyl having 1-6 carbon atoms, cycloalkyl having 3-6 carbon atoms, unsubstituted or substituted phenethyl, diphenylmethyl, trityl, benzyl, phenyl and naphthyl (wherein the substituent is selected from one or two members selected from halogen, nitro, cyano, alkyl having 1-6 carbon atoms and alkoxy having 1-6 carbon atoms), unsubstituted or substituted alkanoyl having 1-6 carbon atoms and alkanesulfonyl having 1-6 carbon atoms (wherein the substituent is selected from 1, 2 or 3 halogen benzenesulfonyl, p-toluenesulfonyl and benzylnsulfonyl);

R<sub>3</sub> is hydrogen or carbamoyl;

Y is hydrogen or methyl;

Z is selected from hydrogen, methyl and acetyl;

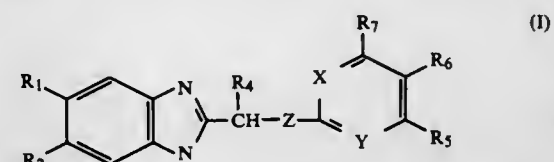
and ~ is an α or β bond.

#### 4,791,114 2-BENZIMIDAZOLYLALKYLTHIO (OR -SULFINYL OR -SULFONYL) DERIVATIVES, THEIR PREPARATION AND THEIR APPLICATION AS MEDICINAL PRODUCTS

Jordi F. Constans; Augusto C. Pinol, and Juan P. Corominas, all of Barcelona, Spain, assignors to 501 Laboratorios Del Dr. Esteve, Barcelona, Spain

Filed Jan. 15, 1987, Ser. No. 3,442  
Claims priority, application France, Jan. 20, 1986, 86 00695  
Int. Cl.<sup>4</sup> A61K 31/415; C07D 401/12, 403/12  
U.S. Cl. 514-256 6 Claims

1. 2-Alkylbenzimidazole derivatives corresponding to the formula:



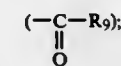
and their pharmaceutically acceptable salts in which formula:

X denotes a nitrogen atom (N), or a carbon atom linked to another radical R<sub>8</sub> (C-R<sub>8</sub>);

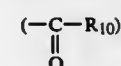
Y denotes a nitrogen atom (N) or an N-oxide group (N→O);

Z denotes a sulfur atom (S), a sulfinyl group (S→O) or a sulfonyl group (O→S→O);

R<sub>1</sub> and R<sub>2</sub>, which may be identical or different, denote a hydrogen atom, a halogen, a linear or branched C<sub>1</sub> to C<sub>4</sub> lower alkyl radical, a nitro group (NO<sub>2</sub>), a trifluoromethyl group (CF<sub>3</sub>), a C<sub>1</sub> to C<sub>4</sub> alkoxy or alkylthio radical, a carboxyl radical (COOH), a C<sub>1</sub> to C<sub>4</sub> carboxyalkyl radical or a C<sub>1</sub> to C<sub>4</sub> alkanoyl or aryloxy radical



R<sub>3</sub> denotes a hydrogen atom, a C<sub>1</sub> to C<sub>4</sub> lower alkyl radical or a carbonyl radical linked to another radical R<sub>10</sub>



R<sub>4</sub> denotes a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> lower alkyl radical;

R<sub>5</sub> denotes a hydrogen atom, a methyl radical, a hydroxy radical or a C<sub>1</sub> to C<sub>4</sub> alkoxy radical;

R<sub>6</sub> denotes a hydrogen atom, a methyl radical, a nitro radical (NO<sub>2</sub>) or a C<sub>1</sub> to C<sub>4</sub> alkoxy radical;

R<sub>7</sub> denotes a hydrogen atom, a C<sub>1</sub> to C<sub>4</sub> lower alkyl radical or a C<sub>1</sub> to C<sub>4</sub> alkoxy radical;

R<sub>8</sub> denotes a hydrogen atom or a methyl radical;

R<sub>9</sub> denotes a C<sub>1</sub> to C<sub>4</sub> lower alkyl radical, a C<sub>3</sub> to C<sub>6</sub> cycloalkyl radical or an aryl radical, and

R<sub>10</sub> denotes a C<sub>1</sub> to C<sub>4</sub> lower alkyl radical or a C<sub>1</sub> to C<sub>4</sub> alkoxy or aryloxy or alkylalkoxy radical,

wherein said aryl groups are single ring hydrocarbons; with the exception, however, of the compound of formula I in which:

X denotes CH,

Y denotes N,

Z denotes S, and

R<sub>1</sub> to R<sub>7</sub> denote H.

3. A method for treating gastrointestinal diseases and inhibiting gastric acid secretion in an individual comprising the administration of the derivatives of formula I and their therapeutically acceptable salts according to claim 1 to an individual in need of said treatment in an amount effective to inhibit gastric acid secretion.

#### 4,791,115 2,6-DIMETHYL-8-α-PIVALOYLAMINO-9,10-DIDEHYDRO-ERGOLINE

Walter Haefliger, Langnau, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Continuation of Ser. No. 811,079, Dec. 18, 1985, abandoned.

This application Jan. 12, 1987, Ser. No. 2,055

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1984, 3447383

Int. Cl.<sup>4</sup> A61K 31/48; C07D 457/12  
U.S. Cl. 514-288 4 Claims

1. A compound which is 2,6-dimethyl-8-α-pivaloylamino-9,10-didehydro-ergoline or a pharmaceutically acceptable acid addition salt thereof.

3. A method of effecting neuroleptic treatment which comprises administering a therapeutically effective amount of a compound of claim 1 or a pharmaceutically acceptable acid addition salt thereof to a subject in need of such treatment.

4. A method of inhibiting PRL secretion or treating Morbus Parkinson which comprises administering a therapeutically effective amount of a compound of claim 1 or a pharmaceutically acceptable acid addition salt thereof to a subject in need of such treatment.

#### 4,791,116 N,N-DIETHYL-N'-[(8-α)-1-ETHYL-6-METHYL-ERGOLIN-8-YL]-SULFAMIDE USEFUL AS PROLACTIN SECRETION INHIBITOR, ANTI-PARKINSON AGENTS AND ANTI-DEPRESSANT AGENTS

Paul Pfäffli, Oberwil, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

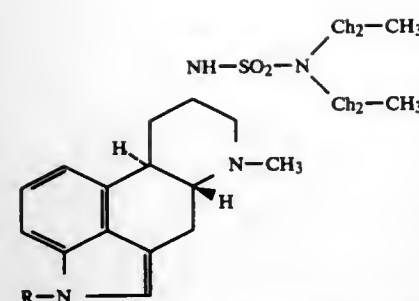
Continuation of Ser. No. 846,699, Apr. 1, 1986, abandoned, which is a continuation of Ser. No. 579,030, Feb. 10, 1984, abandoned. This application Dec. 1, 1986, Ser. No. 936,204

Claims priority, application Switzerland, Feb. 16, 1983, 863/83; Feb. 16, 1983, 862/83

Int. Cl.<sup>4</sup> A61K 31/48; C07D 457/12  
U.S. Cl. 514-288 4 Claims

1. A compound of formula I





where R is ethyl in free base form or in the form of a pharmaceutically acceptable acid addition salt.

3. A method of inhibiting prolactin secretion, treating depression or Morbus Parkinson in a subject which comprises administering a therapeutically effective amount of a compound of claim 1 to a subject in need of such treatment.

#### 4,791,118 QUINOLONECARBOXYLIC ACID DERIVATIVES AND THEIR PREPARATION

Kuniyoshi Masuzawa, Koga; Seigo Suzue; Keiji Hirai, both of Kuki, and Takayoshi Ishizaki, Washimiya, all of Japan, assignors to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Sep. 4, 1986, Ser. No. 903,424

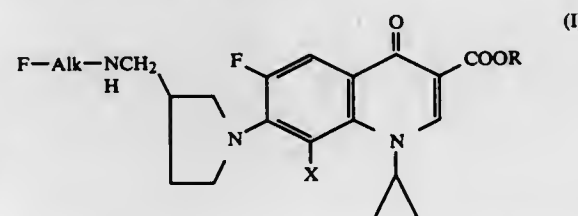
Claims priority, application Japan, Sep. 21, 1985, 60-209447

Int. Cl. C07D 401/04; A61K 31/47

U.S. Cl. 514—312

4 Claims

1. A compound of the formula (I);



wherein R is hydrogen atom or lower alkyl group, Alk is lower alkylene group and X is hydrogen atom or halogen atom; the hydrates or the pharmaceutically acceptable acid addition or alkali salts thereof.

#### 4,791,119 PHARMACEUTICAL COMPOSITION FOR TREATMENT OF OBESITY

Salomon Langer, Paris, France, assignor to Synthelabo, Paris, France

Filed Sep. 9, 1987, Ser. No. 94,430

Claims priority, application France, Sep. 10, 1986, 8612642

Int. Cl. A61K 31/445

U.S. Cl. 514—317

2 Claims

1. A method of treatment of obesity which comprises administering to a subject in need thereof an effective anorectic amount of 4-(2-naphthylmethoxy)piperidine.

#### 4,791,120 4-HETEROPENTACYCLIC-4-[N-(PHENYL)AMINO] PIPERIDINE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS AND METHOD EMPLOYING SUCH COMPOUNDS

Bor-Sheng Lin, Berkeley Heights; Linas V. Kudzma, North Bergen, and H. Kenneth Spencer, Chatham, all of N.J., assignors to The BOC Group, Inc., Montvale, N.J.

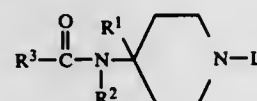
Filed Dec. 31, 1987, Ser. No. 139,899

Int. Cl. A61K 31/445; C07D 405/12, 417/12, 401/12

U.S. Cl. 514—326

57 Claims

1. A compound of the formula



optically active isomeric forms thereof, or pharmaceutically acceptable acid addition salts thereof, in which formula: R<sup>1</sup> is an unsubstituted or substituted oxadiazolyl, tetrazolyl, imidazolyl, or thiazolyl wherein the substituents are selected from the group consisting of lower alkyl, lower alkoxy, lower alkoxy lower alkyl or combinations thereof; R<sup>2</sup> is unsubstituted or substituted phenyl in which the substituent is a halogen atom; R<sup>3</sup> is a lower alkyl or a lower alkoxy lower alkyl; and L is lower alkyl, lower alkoxy, thienyl lower alkyl, thiazolyl lower alkyl which is unsubstituted or substituted in the 4-position with a lower alkyl group; (4,5-di-hydro-5-oxo-1H-tetrazol-1-yl) lower alkyl which is unsubstituted or substituted in the 4-position with a lower alkyl; pyrazolyl lower alkyl, pyridinyl

#### 4,791,117 2- OR 3-ARYL SUBSTITUTED IMIDAZO[1,2-A]PYRIDINES AND THEIR USE AS CALCIUM CHANNEL BLOCKERS

Jeffery B. Press, Rocky Hill, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

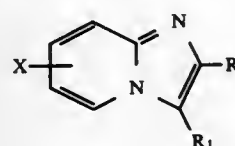
Continuation-in-part of Ser. No. 909,648, Sep. 22, 1986, Pat. No. 4,727,145. This application Aug. 31, 1987, Ser. No. 90,111

Int. Cl. A61K 31/415; C07D 471/04

U.S. Cl. 514—300

4 Claims

1. A method for blocking calcium channels of a mammal which comprises administering to a mammal an effective amount of a compound of the formula



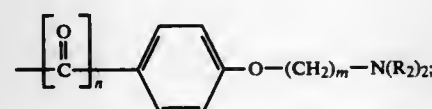
where

X is hydrogen, halogen, hydroxy, alkoxy, having 1—3 carbon atoms, benzyloxy, or C<sub>1</sub>—C<sub>6</sub> alkyl, either singularly or in combination;

R is H or Ar;

R<sub>1</sub> is H, CH<sub>3</sub> or Ar;

Ar is



R<sub>2</sub> is C<sub>1</sub>—C<sub>6</sub> alkyl;

N is 0 or 1 when R is Ar or 1 when R<sub>1</sub> is Ar; and m is 2—6, with the proviso that both R and R<sub>1</sub> are not Ar at the same time and at least one of R and R<sub>1</sub> is Ar.

lower alkyl, oxo phenyl lower alkyl, N-phthalimido lower alkyl, 2,4-(1H,3H)-pyridinedionyl, disubstituted in the 3 position with lower alkyl; or an unsubstituted or substituted phenyl lower alkyl in which the substituents are selected from the group consisting of lower alkyl, lower alkoxy, halogen, halogenated lower alkyl, or combinations thereof.

#### 4,791,121 4-PHENYL-4-(N-(PHENYL)AMIDO) PIPERIDINE DERIVATIVES AND PHARMACEUTICAL COMPOSITIONS AND METHOD EMPLOYING SUCH COMPOUNDS

Linas V. Kudzma, North Bergen; H. Kenneth Spencer, Chatham, and Sherry A. Severnak, Plainfield, all of N.J., assignors to The BOC Group, Inc., Montvale, N.J.

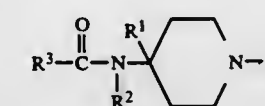
Filed Nov. 2, 1987, Ser. No. 115,284

Int. Cl. A61K 31/445; C07D 401/06

U.S. Cl. 514—326

10 Claims

1. A compound of the formula



optically active isomeric forms thereof, or pharmaceutically acceptable acid addition salts thereof, in which formula: R<sup>1</sup> is phenyl; R<sup>2</sup> is phenyl unsubstituted or substituted with one or more halogens; R<sup>3</sup> is a lower alkyl, lower cycloalkyl or a lower alkoxy lower alkyl; and L is (4,5-dihydro-5-oxo-1H-tetrazol-1-yl) lower alkyl which is unsubstituted or substituted in the 4-position with a lower alkyl.

#### 4,791,122 CIRCULATION ACTIVE NOVEL 5-ARYLDIHYDROPYRIDINES

Jürgen Stolltefuss, Haan; Rainer Gross, Wuppertal; Matthias Schramm, Cologne, all of Fed. Rep. of Germany; Günter Thomas, Garbagnate, Italy; Michael Kayser, Hagen, and Bernd Pelster, St. Augustin, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 8, 1986, Ser. No. 816,916

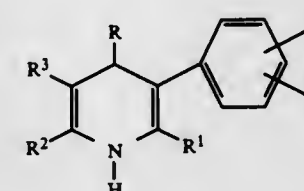
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1985, 3501855

Int. Cl. A61K 31/44, 31/455

U.S. Cl. 514—344

16 Claims

1. A 5-phenyl-1,4-dihydropyridine or salt according to the formula



R

represents C<sub>4</sub>—C<sub>7</sub>-cycloalkyl, thienyl, pyridyl, furyl, benzoxadiazolyl, or phenyl which is unsubstituted or substituted by up to three substituents independently selected from the group consisting of fluorine, chlorine, bromine, nitro, hydroxyl, carboxyl, cyano, C<sub>1</sub>—C<sub>4</sub>-alkoxycarbonyl, acetyl, acetyloxy, benzoyl, benzyloxy, or C<sub>1</sub>—C<sub>6</sub>-alkyl, C<sub>1</sub>—C<sub>6</sub>-alkoxy, C<sub>1</sub>—C<sub>6</sub>-alkylthio or C<sub>1</sub>—C<sub>6</sub>-alkylsulpho-

nyl each of which is unsubstituted or substituted by one or more fluorine atoms, by phenyl which is unsubstituted or substituted by methyl, ethyl, methoxy, fluorine, chlorine or nitro, or optionally by the group —Z—CH<sub>2</sub>—R<sup>4</sup>,

where

Z represents oxygen or sulphur, and

R<sup>4</sup> represents C<sub>4</sub>—C<sub>7</sub>-cycloalkyl,

thienyl, furyl or pyridyl, or

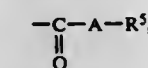
phenyl which is unsubstituted or substituted by fluorine, chlorine, bromine, cyano, nitro, hydroxyl, carboxyl, C<sub>1</sub>—C<sub>4</sub>-alkoxycarbonyl or by C<sub>1</sub>—C<sub>6</sub>-alkyl or C<sub>1</sub>—C<sub>6</sub>-alkoxy each of which is unsubstituted or substituted by one or more fluorine atoms,

R<sup>1</sup> and R<sup>2</sup>

are identical or different and

represent straight-chain or branched C<sub>1</sub>—C<sub>5</sub>-alkyl which is unsubstituted or substituted by phenyl, carboxyl, hydroxyl or C<sub>1</sub>—C<sub>4</sub>-alkoxycarbonyl,

R<sup>3</sup> represents nitro, cyano or the group



where

A represents oxygen, and where

R<sup>5</sup>

represents hydrogen,

C<sub>4</sub>—C<sub>7</sub>-cycloalkyl, or

a hydrocarbon radical with 1 to 10C atoms

X and Y

are identical or different and

represent hydrogen,

C<sub>1</sub>—C<sub>4</sub>-alkyl, C<sub>1</sub>—C<sub>4</sub>-alkoxy or C<sub>1</sub>—C<sub>4</sub>-alkoxycarbonyl, fluorine, chlorine, bromine, hydroxyl, nitro, carboxyl, cyano or

trifluoromethyl or trifluoromethoxy.

10. A method of combating cardiac insufficiency and hypotension which comprises administering to a patient in need thereof an amount effective thereof of a compound or salt according to claim 1.

#### 4,791,123 INSECTICIDAL TRIFLUORMETHYL ALKANE DERIVATIVES

Helga Franke; Heinrich Franke; Hans-Rudolf Krüger; Hartmut Joppies; Dietrich Baumert, and David Giles, all of Berlin, Fed. Rep. of Germany, assignors to Schering Akt., Fed. Rep. of Germany

Filed Jan. 22, 1987, Ser. No. 6,565

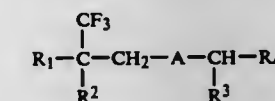
Claims priority, application Fed. Rep. of Germany, Jan. 22, 1986, 3602169

Int. Cl. A01N 43/40

U.S. Cl. 514—345

12 Claims

1. An alkane or alkoxyalkane derivative of the formula



in which

R<sub>1</sub> is aryl or heteroaryl or these groups substituted by C<sub>1</sub>—C<sub>4</sub> alkyl, halo-C<sub>1</sub>—C<sub>4</sub> alkyl, phenyl-C<sub>1</sub>—C<sub>4</sub> alkyl, C<sub>2</sub>—C<sub>4</sub> alkenyl, halo-C<sub>2</sub>—C<sub>4</sub> alkenyl, phenyl-C<sub>2</sub>—C<sub>4</sub> alkenyl, C<sub>2</sub>—C<sub>4</sub> alkynyl, halo-C<sub>2</sub>—C<sub>4</sub> alkynyl, phenyl-C<sub>2</sub>—C<sub>4</sub> alkynyl, C<sub>1</sub>—C<sub>4</sub> alkoxy, halo-C<sub>1</sub>—C<sub>4</sub> alkoxy, phenyl-C<sub>1</sub>—C<sub>4</sub> alkoxy, C<sub>2</sub>—C<sub>4</sub> alkenyloxy, halo-C<sub>2</sub>—C<sub>4</sub> alkenyloxy, phenyl-C<sub>2</sub>—C<sub>4</sub> alkenyloxy, C<sub>2</sub>—C<sub>4</sub> alkynyloxy, halo-C<sub>2</sub>—C<sub>4</sub> alkynyloxy, phenyl-C<sub>2</sub>—C<sub>4</sub> alkynyloxy, alkylsulphonyloxy, haloalkylsulphonyloxy, arylsulphonyloxy, halo, cyano, nitro, aryloxy, haloaryloxy, C<sub>1</sub>—C<sub>4</sub> alkyl-

aryloxy, or nitroaryloxy, wherein heteroaryl is benzofuran-2-yl, benzothiophenyl, benzoxazolyl, indanyl or benzodioxanyl

R<sub>2</sub> is hydrogen or C<sub>1-4</sub> alkyl,

R<sub>3</sub> is hydrogen, cyano or ethynyl,

R<sub>4</sub> is phenyl or pyridyl or these groups substituted by at least one of C<sub>1-6</sub> alkyl, halo-C<sub>1-6</sub> alkyl, phenyl-C<sub>1-6</sub> alkyl, C<sub>2-6</sub> alkyl interrupted by an O-, N- or S-atom, C<sub>2-4</sub> alkenyl, halo-C<sub>2-4</sub> alkenyl, phenyl-C<sub>2-4</sub> alkenyl, C<sub>1-4</sub> alkoxy, halo-C<sub>1-4</sub> alkoxy, phenyl-C<sub>1-4</sub> alkoxy, C<sub>2-4</sub> alkenyloxy, halo-C<sub>2-4</sub> alkenyloxy, phenyl-C<sub>2-4</sub> alkenyloxy, C<sub>2-4</sub> alkynyloxy, halo-C<sub>2-4</sub> alkynyloxy, phenyl-C<sub>2-4</sub> alkynyloxy, aryloxy, haloaryloxy, C<sub>1-4</sub> alkylaryloxy, arylamino, haloarylamino, C<sub>1-4</sub> alkylarylamino, aryl-N-C<sub>1-4</sub> alkylamino, aryl-N-C<sub>1-4</sub> acylamino, aroyl, haloaroyl, C<sub>1-4</sub> alkylaroyl, aryl, halo-aryl, C<sub>1-4</sub> alkylaryl or halo, and

A is CH<sub>2</sub> or O.

4,791,124

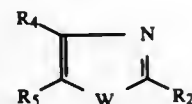
## PHOTOACTIVE AZOLE PESTICIDES

Kathryn A. Latomaki, Hightstown; Susan E. Burkart, Trenton, both of N.J.; Richard B. Phillips, Diamond Bar, Calif.; David M. Romah, Princeton, N.J., and Ignatius J. Turchi, Yardley, Pa., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 857,883, Apr. 30, 1986, abandoned, and a continuation-in-part of Ser. No. 908,754, Sep. 17, 1986, abandoned. This application Apr. 2, 1987, Ser. No. 34,259

Int. Cl.<sup>4</sup> A01N 43/76, 43/78; C07D 413/02, 417.14  
U.S. Cl. 514—365 10 Claims

1. A compound of the formula



wherein

W is selected from O and S;

R<sub>2</sub> is selected from the group consisting of phenyl, naphthyl, 2,2-difluoro-1,3-benzodioxyl, phenyl substituted with at least one substituent selected from halogen, lower alkyl, lower haloalkyl, cyano, lower alkoxy, lower haloalkoxy, di(lower)alkylamino, phenylthiocarbonyl, or phenylsulfonyloxy, thienyl, and thienyl substituted with a substituent selected from halogen, lower alkyl, or thienyl;

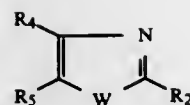
R<sub>4</sub> is selected from the group consisting of hydrogen, tri(lower)alkylsilyl, phenyl, halophenyl and thienyl;

R<sub>5</sub> is selected from the group consisting of hydrogen, phenyl, phenyl substituted with at least one substituent selected from halogen, lower alkyl, lower haloalkyl, lower alkoxy, phenyl, or nitro, thienyl, and thienyl substituted with a substituent selected from lower alkyl, halogen, lower hydroxyalkyl, methylthio, lower haloalkylthio, lower alkylsulfonyl, lower haloalkenylthio, lower alkoxy-carbonyl, and tri(lower)alkylsilyl;

wherein at least one of R<sub>2</sub> and R<sub>5</sub> is an optionally substituted thienyl group and at least one of R<sub>4</sub> and R<sub>5</sub> is other than hydrogen, with the proviso:

when R<sub>4</sub> is hydrogen, phenyl, or thienyl, then R<sub>5</sub> is other than hydrogen, phenyl, thienyl, alkylphenyl, or alkylthienyl; or R<sub>2</sub> is other than phenyl, alkylphenyl, thienyl or alkylthienyl.

9. A method for controlling insects, acarids, or nematodes which comprises applying to the locus where control is desired an insecticidally, acaricidally, or nematocidally effective amount of at least one compound of the formula



wherein

W is selected from O and S;

R<sub>2</sub> is selected from the group consisting of phenyl, naphthyl, 2,2-difluoro-1,3-benzodioxyl, phenyl substituted with at least one substituent selected from halogen, lower alkyl, lower haloalkyl, cyano, lower alkoxy, lower haloalkoxy, di(lower)alkylamino, phenylthiocarbonyl, or phenylsulfonyloxy, thienyl, and thienyl substituted with a substituent selected from halogen, lower alkyl, or thienyl;

R<sub>4</sub> is selected from the group consisting of hydrogen, tri(lower)alkylsilyl, phenyl, halophenyl and thienyl;

R<sub>5</sub> is selected from the group consisting of hydrogen, lower alkyl, phenyl, phenyl substituted with at least one substituent selected from halogen, lower alkyl, lower haloalkyl, lower alkoxy, phenyl, or nitro, thienyl, and thienyl substituted with a substituent selected from lower alkyl, halogen, lower hydroxyalkyl, lower haloalkylthio, lower alkylsulfonyl, lower haloalkenylthio, lower alkoxy-carbonyl, or tri(lower)alkylsilyl;

wherein at least one of R<sub>2</sub> and R<sub>5</sub> is an optionally substituted thienyl group, and R<sub>4</sub> is other than hydrogen when one of R<sub>2</sub> and R<sub>5</sub> is unsubstituted thienyl and the other of R<sub>2</sub> and R<sub>5</sub> is unsubstituted phenyl.

4,791,125

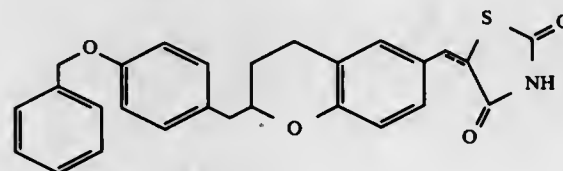
## THIAZOLIDINEDIONES AS HYPOGLYCEMIC AND ANTI-ATHEROSCLEROSIS AGENTS

David A. Clark, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Dec. 2, 1987, Ser. No. 127,831  
Int. Cl.<sup>4</sup> C07D 491/052; A61K 31/425

U.S. Cl. 514—369

1. A compound of the formula



or a pharmaceutically acceptable cationic salt thereof wherein the broken line is a bond or no bond.

4,791,126

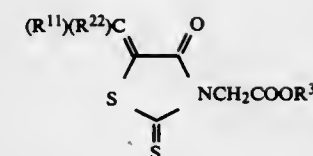
## RHODANINE DERIVATIVES, PROCESS FOR THEIR PREPARATION, AND ALDOSE REDUCTASE INHIBITOR CONTAINING THE RHODANINE DERIVATIVES AS ACTIVE INGREDIENTS

Tadao Tanouchi, Takatsuki; Masanori Kawamura, Ibaraki; Akio Ajima, Osaka; Tetsuya Mohri, Takatsuki; Masaki Hayashi, Takatsuki; Hiroshi Terashima, Takatsuki; Fumio Hirata, Suita, and Takeshi Morimura, Otsu, all of Japan, assignors to Ono Pharmaceutical Co., Ltd., Osaka, Japan

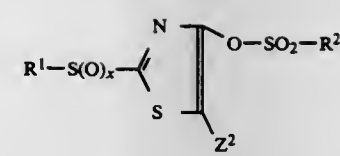
Continuation of Ser. No. 591,753, Mar. 21, 1984, abandoned, which is a division of Ser. No. 292,076, Aug. 12, 1981, Pat. No. 4,464,382. This application Sep. 10, 1987, Ser. No. 96,808  
Claims priority, application Japan, Aug. 22, 1980, 56-1155641  
Int. Cl.<sup>4</sup> C07D 277/36; A61K 31/425

U.S. Cl. 514—369

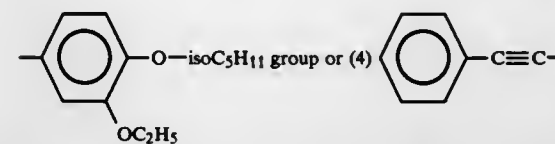
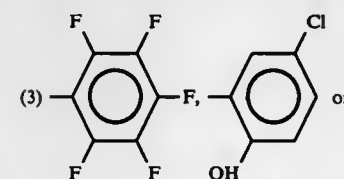
1. A rhodanine derivative represented by the general formula:



(I-A)



wherein (I) R<sup>11</sup> and R<sup>22</sup> are taken together to represent a tetramethylene or pentamethylene group; (II) R<sup>11</sup> represents a hydrogen atom, and R<sup>22</sup> represents (1) a cycloalkyl or cycloalkenyl group of 4-7 carbon atoms which is unsubstituted or substituted by at least one alkyl group of 1-4 carbon atoms, (2) a phenyl group which is substituted by at least one of (h) a phenyl group, (i) a 5- to 10-membered mono- or bicyclic heterocyclic group containing one or two nitrogen, oxygen or sulfur atom(s) which is unsubstituted or substituted by at least one of (a) halogen atom (b) trifluoromethyl group, (c) hydroxy group, (d) nitro group, (e) carboxy group (f) amino group which may be substituted by alkyl group(s) of 1-4 carbon atoms and (g) alkyl, alkoxy or alkylthio group of 1-5 carbon atoms and the above-described substituent (h), and (j) an alkyl group of 1-4 carbon atoms which is substituted by at least one of the above-described substituents (c), (h) and (i),



group; or (III) R<sup>11</sup> and R<sup>22</sup>, which may be the same or different from each other, each represents a phenyl group which is unsubstituted or substituted by at least one of the above-described substituents (a), (b), (c), (d), (e), (f), (g), (h), (i) and (j); and R<sup>3</sup> represents a hydrogen atom, an alkyl group of 1-12 carbon atoms, an aralkyl group of 7-13 carbon atoms, a cycloalkyl or cycloalkenyl group of 4-7 carbon atoms which is unsubstituted or substituted by at least one alkyl group of 1-4 carbon atoms, or a phenyl group which is unsubstituted or substituted by at least one of the above-described substituents (a), (b), (c), (d), (e), (f), (g), (h), (i) and (j) or, when R<sup>3</sup> represents a hydrogen atom, non-toxic salts of the acids.

4,791,127

## ALKANESULFONATE DERIVATIVES AND THEIR USE AS INSECTICIDES, ACARICIDES OR NEMATICIDES

Shoichi Kato; Shizuo Shimano; Tatsumi Hayaoka, all of Ageo, and Akio Masui, Ohmiya, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1986, Ser. No. 913,319  
Claims priority, application Japan, Oct. 7, 1985, 60-221846; May 13, 1986, 61-107591

Int. Cl.<sup>4</sup> C07D 277/34, 277/36; A61K 31/425

U.S. Cl. 514—369

1. A compound of the formula:

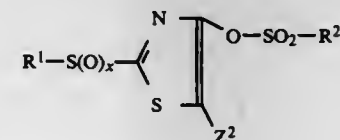
wherein

Z<sup>2</sup> is hydrogen, halogen, C<sub>1-4</sub>-alkyl unsubstituted or substituted with halogen,

R<sup>1</sup> is C<sub>1-8</sub>-alkyl; C<sub>1-7</sub>-alkyl which is substituted by 1-3 of F, Cl or Br, C<sub>1-4</sub>-alkoxy or C<sub>1-4</sub>-alkylthio; C<sub>3-7</sub>-cycloalkyl unsubstituted or substituted with 1-4 of F, Cl or methyl; C<sub>3-6</sub>-cycloalkylmethyl unsubstituted or substituted with 1-4 of F, Cl, Br or methyl; allyl; propargyl; phenyl or benzyl; R<sup>2</sup> is C<sub>1-4</sub>-alkyl unsubstituted or substituted with 1-3 of F or Cl,

x is integer of 0, 1 or 2.

6. A method for killing insect pests, acarids or nematodes, which comprises applying to insect pests, acarids or nematodes an effective amount of a compound of the formula:



wherein

Z<sup>2</sup> is hydrogen, halogen, C<sub>1-4</sub>-alkyl unsubstituted or substituted with halogen,

R<sup>1</sup> is C<sub>1-8</sub>-alkyl; C<sub>1-7</sub>-alkyl which is substituted by 1-3 of F, Cl or Br, C<sub>1-4</sub>-alkoxy or C<sub>1-4</sub>-alkylthio; C<sub>3-7</sub>-cycloalkyl unsubstituted or substituted with 1-4 of F, Cl or methyl; C<sub>3-6</sub>-cycloalkylmethyl unsubstituted or substituted with 1-4 of F, Cl, Br or methyl; allyl; propargyl; phenyl or benzyl; R<sup>2</sup> is C<sub>1-4</sub>-alkyl unsubstituted or substituted with 1-3 of F or Cl,

x is integer of 0, 1 or 2, to said insect pests, acarids or nematodes.

4,791,128

## RHIZOXIN ESTERS AND SALTS, THEIR PHARMACEUTICAL USE AS ANTI-TUMOR AGENTS

Shigenobu Okuda; Shigeo Iwasaki, both of Tokyo; Michio Namikoshi, Kokubunji; Masao Arakawa, and Fusaaki Shimizu, both of Hiromachi, all of Japan, assignors to Sankyo Company Limited, Tokyo, Japan

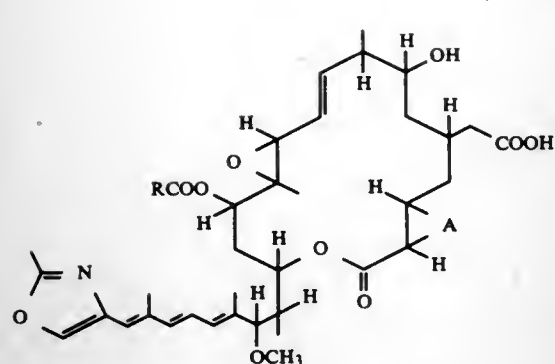
Continuation of Ser. No. 833,883, Feb. 25, 1986, abandoned. This application Jan. 11, 1988, Ser. No. 143,314

Claims priority, application Japan, Feb. 28, 1985, 60-39399  
Int. Cl.<sup>4</sup> A61K 31/42; C07D 493/22

U.S. Cl. 514—374

1. A compound of formula (I):

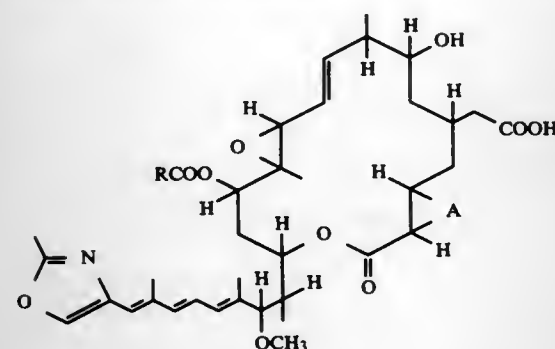




wherein:

R represents an alkyl group having 2-30 carbon atoms; and A represents an extra carbon-carbon bond or an oxygen atom, and pharmaceutically acceptable salts and ring-closed lactones thereof.

18. A pharmaceutical composition comprising an anti-tumor agent in admixture with a pharmaceutically acceptable carrier or diluent, wherein the anti-tumor agent is selected from the group consisting of compounds of formula (I):



wherein:

R represents an alkyl group having 2-30 carbon atoms; and A represents an extra carbon-carbon bond or an oxygen atom, and pharmaceutically acceptable salts and ring-closed lactones thereof.

4,791,129

### 1,3-DICARBOXAMIDOOXINDOLES AS ANALGESIC AND ANTIINFLAMMATORY AGENTS

Saul B. Kadin, New London, Conn., assignor to Pfizer Inc., New York, N.Y.

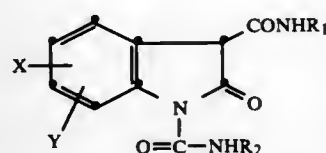
Division of Ser. No. 8,105, Jan. 20, 1987, Pat. No. 4,725,616, which is a continuation-in-part of Ser. No. 753,200, Jul. 9, 1985, abandoned. This application Nov. 9, 1987, Ser. No. 118,123

Int. Cl.<sup>4</sup> A61K 31/405; C07D 209/34

U.S. Cl. 514-411

6 Claims

1. A 1,3-dicarboxamidooxindole compound of the formula



and a pharmaceutically-acceptable base salt thereof, wherein X is selected from the group consisting of hydrogen, fluoro, chloro, bromo alkyl having one to four carbon atoms,

alkylthio having one to four carbon atoms, alkoxy having one to four carbon atoms, cycloalkyl having three to six carbon atoms, nitro, trifluoromethyl, acetyl, propionyl, butyryl, benzoyl and thenoyl;

Y is selected from the group consisting of hydrogen, fluoro, chloro, bromo, alkyl having one to four carbon atoms, alkoxy having one to four carbon atoms and alkylthio having one to four carbon atoms;

X and Y when taken together are selected from the group consisting of 4,5-, 5,6- and 6,7-methylenedioxy;

R<sub>1</sub> is selected from either (1) heterocyclic and mono-methylated heterocyclic, wherein said heterocyclic is selected from the group consisting of pyridyl, thienyl, furyl, pyrrolyl, thiazolyl, oxazolyl, imidazolyl and isoxazolyl; or (2) furylmethyl and thienylmethyl; and R<sub>2</sub> is hydrogen.

4. A method of treating an inflammatory disease in a mammalian subject, which comprises administering to said mammalian subject an inflammatory disease treating amount of a compound selected from claim 1.

4,791,130

### MITOMYCIN DERIVATIVES AS ANTILEUKEMIA AGENTS

(I) Tokuyuki Kuroda, Shizuoka; Koji Hisamura, Mie; Tooru Sugaya, Shizuoka; Yutaka Ohsawa, Shizuoka; Hideo Ueno, Shizuoka; Makoto Morimoto, Shizuoka, and Tadashi Ashizawa, Shizuoka, all of Japan, assignors to Kyowa Hakko Kogyo Kabushiki Kaisha, Japan

Filed Apr. 15, 1987, Ser. No. 38,376

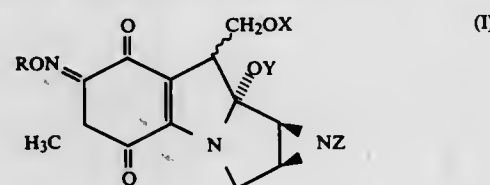
Claims priority, application Japan, Apr. 18, 1986, 61-89546

Int. Cl.<sup>4</sup> A61K 31/40; C07D 487/04

U.S. Cl. 514-410

11 Claims

1. Mitomycin compounds represented by the formula:



wherein R is selected from a member of the group consisting of a straight or branched alkyl having 1 to 6 carbon atoms, a cycloalkyl having 3 to 6 carbon atoms, benzyl, substituted benzyl wherein said substituent is selected from hydroxyl, methoxy, halogen, amino, nitro and C<sub>1</sub> to C<sub>6</sub> alkyl; phenethyl, diphenylmethyl and trityl; X is selected from hydrogen and carbamoyl; each of Y and Z is independently selected from hydrogen and methyl; and is selected from α and β bonds.

4,791,131

### ANALGESIC AND ANTIINFLAMMATORY 1-ACYL-2-OXINDOLE-3-CARBOXAMIDES

Saul B. Kadin, New London, Conn., assignor to Pfizer Inc., New York, N.Y.

Division of Ser. No. 14,120, Feb. 2, 1987, Pat. No. 4,730,004, which is a continuation-in-part of Ser. No. 821,296, Jan. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 753,200, Jul. 9, 1985, abandoned. This application Dec. 31, 1987, Ser. No. 140,056

Int. Cl.<sup>4</sup> A61K 31/40, 31/44; C07D 209/34

U.S. Cl. 514-418

9 Claims

1. A 1-acyl-2-oxindole-3-carboxamide compound of the formula

4,791,133

### PHENYLENE, FURYL, AND THIENYL LEUKOTRIENE B<sub>4</sub> ANALOGUES

Stevan W. Djuric, Glenview; Richard A. Haack, and Julie M. Miyashiro, both of Chicago, Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Filed Jun. 26, 1987, Ser. No. 67,526

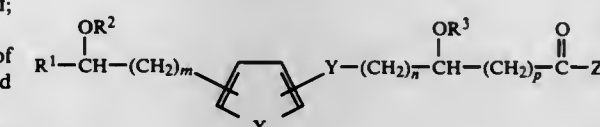
Int. Cl.<sup>4</sup> A61K 31/38, 31/34; C07D 211/08, 409/00, 333/22;

C07C 69/76, 59/48, 103/26

U.S. Cl. 514-438

24 Claims

1. A compound of the formula:



and the pharmaceutically-acceptable base salts thereof; wherein

X and Y are each selected from the group consisting of hydrogen, fluoro, chloro, bromo, trifluoromethyl and alkyl having 1 to 4 carbons;

R<sup>1</sup> is selected from the group consisting of heterocyclic, mono-methyl heterocyclic, furymethyl and thienylmethyl; wherein said heterocyclic is selected from the group consisting of pyridyl, thienyl, furyl, pyrrolyl, thiazolyl, oxazolyl, imidazolyl, isothiazolyl and isoxazolyl; and R<sup>2</sup> is alkyl having 1 to 6 carbons.

9. A method of treating an inflammatory disease in a mammalian subject, which comprises administering to said mammalian subject an inflammatory disease treating amount of a 1-acyl-2-oxindole-3-carboxamide compound according to claim 1.

4,791,132

### PHENYL, PYRROLIDIN-2-YL SUBSTITUTED PYRROLES HAVING ANTIPSYCHOTIC PROPERTIES

Ineke Van Wijngaarden; Cornelis G. Kruse; Roelof Van Hes, and Johannes A. M. Van Der Heyden, all of Weesp, Netherlands, assignors to Duphar International Research B.V., Weesp, Netherlands

Filed Sep. 9, 1987, Ser. No. 94,746

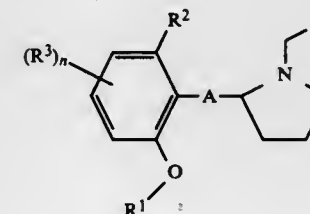
Claims priority, application Netherlands, Sep. 12, 1986, 8602305

Int. Cl.<sup>4</sup> A61K 31/40; C07D 207/30

U.S. Cl. 514-427

4 Claims

1. A compound of formula 1,



wherein:

R is hydrogen or alkyl having 1-3 carbon atoms;

R<sub>1</sub> is straight or branched alkyl having 1-4 carbon atoms;

R<sub>2</sub> is hydrogen;

R<sub>3</sub> is halogen or alkyl sulfonyl having 1-3 carbon atoms;

n is 0-2;

A is pyrrole, with the proviso that the phenyl substituent is in a meta-position with respect to the 2-pyrrolidinyl substituent; or an acid addition salt or prodrug thereof.

4. A pharmaceutical composition having antipsychotic activity which comprises an effective amount of at least one compound according to claim 1 as the active component and a suitable carrier.

4,791,134

### MILBEMYCIN DERIVATIVES AND THE USE THEREOF IN PEST CONTROL

Urs Bueckhardt, Basel, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 4, 1985, Ser. No. 741,041

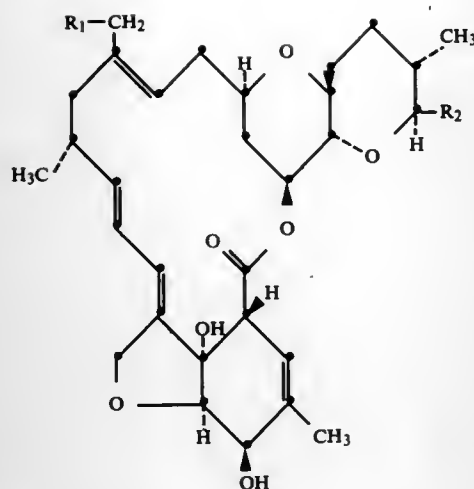
Claims priority, application Switzerland, Jun. 8, 1984, 2808/84

Int. Cl.<sup>4</sup> C07D 493/22; A61K 31/365

U.S. Cl. 514-450

12 Claims

1. A milbemycin derivative of the formula



wherein

R<sub>1</sub> is C<sub>1</sub>-C<sub>4</sub>-alkyl, chloro, bromo, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy, or C<sub>2</sub>-C<sub>6</sub>-hydroxyalkoxy, and R<sub>2</sub> is methyl, ethyl or isopropyl.

8. A pesticidal composition which contains at least one compound of claim 1 and an inert carrier.

4,791,135

#### NOVEL ANTIMALARIAL DIHYDROARTEMISININ DERIVATIVES

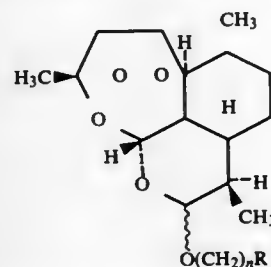
Al J. Lin, Gaithersburg; Daniel L. Klayman, Chevy Chase, and Wilbur K. Milhous, Rockville, all of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Aug. 20, 1987, Ser. No. 87,365

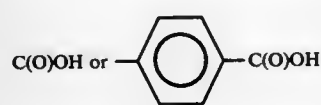
Int. Cl.<sup>4</sup> C07D 493/18; A61K 31/335

U.S. Cl. 514-450

1. A compound represented by the formula



or a pharmaceutically-acceptable salt thereof wherein R is



and n represents the positive integers 1 to 7.

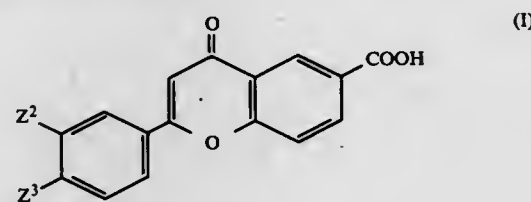
4,791,136  
PHARMACOLOGICALLY ACTIVE KETONES AND USE  
John F. Batchelor, Beckenham; Richard M. Hyde, Croydon, and David J. Livingstone, Beckenham, all of England, assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.  
Division of Ser. No. 662,709, Oct. 19, 1984, Pat. No. 4,626,431.  
This application Jul. 30, 1986, Ser. No. 891,768  
Claims priority, application United Kingdom, Oct. 25, 1983, 8328495

Int. Cl.<sup>4</sup> A61K 31/35

U.S. Cl. 514-456

12 Claims

1. A method for increasing the delivery of oxygen to the tissues of a mammal in need of an increased amount of oxygen to its tissues comprising administering to said mammal in need thereof a non-toxic, oxygen delivery increasing amount of a compound of formula (I)



wherein one of Z<sup>2</sup> and Z<sup>3</sup> is selected from the group consisting of hydroxyl and a group -O(C<sub>n</sub>H<sub>2n</sub>)X

where

X is selected from the group consisting of hydrogen and hydroxyl and

n is an integer from 1 to 3

provided that when X is hydroxyl then n is always greater than 1 and no single carbon atom in the radical -(C<sub>n</sub>H<sub>2n</sub>)<sub>n</sub>- is attached to both oxygen atoms and the other of Z<sup>2</sup> and Z<sup>3</sup> is hydrogen, or a pharmacologically acceptable salt thereof.

4,791,137

#### PHARMACEUTICAL AND VETERINARY COMPOSITIONS FOR THE TREATMENT OF ISCHEMIC CARDIAC DISORDERS

Marcel Descamps, Rosieres, and Yves Berger, Wemmel, both of Belgium, assignors to Sanofi, Paris, France

Division of Ser. No. 807,733, Dec. 11, 1985, Pat. No. 4,661,514, which is a division of Ser. No. 628,210, Jul. 5, 1984, Pat. No. 4,575,513. This application Dec. 2, 1986, Ser. No. 936,776

Claims priority, application France, Feb. 8, 1983, 83 12739

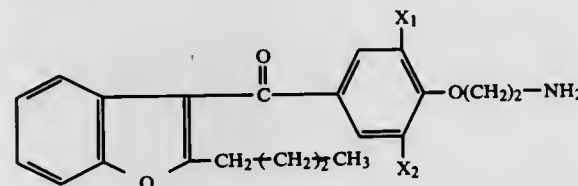
The portion of the term of this patent subsequent to Mar. 12, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> A61K 31/34

U.S. Cl. 514-469

16 Claims

1. A pharmaceutical or veterinary composition for the treatment of cardiac arrhythmia or angina pectoris, comprising as active ingredient from 50 to 1200 mg of a compound of formula:



wherein X<sub>1</sub> and X<sub>2</sub>, which may be the same or different, each represent hydrogen or iodine, or a pharmaceutically acceptable acid addition salt thereof, in association with a pharmaceutical carrier or excipient.

4,791,138

#### METHOD FOR TREATING OR PREVENTING DEEP VEIN THROMBOSIS USING LIPOXYGENASE INHIBITORS

Robert G. Schaub, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

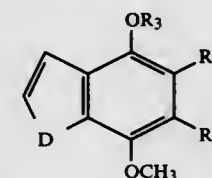
Continuation-in-part of Ser. No. 561,602, Dec. 14, 1983, abandoned. This application Jun. 25, 1986, Ser. No. 878,116

Int. Cl.<sup>4</sup> A61K 31/21, 31/075

U.S. Cl. 514-510

5 Claims

1. A method for preventing deep vein thrombosis (DVT) in a mammal susceptible to said DVT comprising administering to said mammal an amount effective to prevent said DVT of a lipoxigenase inhibitor, wherein the lipoxigenase inhibitor is a compound of the Formula I



wherein R<sub>1</sub> and R<sub>2</sub> are the same or different and are

- (a) hydrogen,
- (b) (C<sub>1</sub>-C<sub>10</sub>)alkyl,
- (c) (C<sub>2</sub>-C<sub>10</sub>)alkenyl, or
- (d) PhX;

wherein (PhX) is phenyl substituted by zero to 3 of the following:

- (a) (C<sub>1</sub>-C<sub>4</sub>)alkyl,
- (b) chloro,
- (c) fluoro,
- (d) bromo,
- (e) nitro,
- (f) trifluoromethyl; or
- (g) OR<sub>4</sub>;

wherein D is

- (a) -CH=CH-,

wherein R<sub>3</sub> is

- (a) CH<sub>3</sub>-C(O)-,
- (b) hydrogen;
- (c) -C(O)-(CR<sub>17</sub>R<sub>18</sub>)<sub>m</sub>-(CH<sub>2</sub>)<sub>n</sub>-NR<sub>14</sub>R<sub>15</sub>,
- (d) -C(O)-AA, or
- (e) -C(O)-PhX-NH<sub>2</sub>;

wherein m is 1, 2, 3, or 4;

wherein n is 0, 1, 2, 3, 4, or 5;

wherein -C(O)AA is the acyl portion derived from any naturally occurring alpha-amino acid,

wherein R<sub>14</sub> and R<sub>15</sub> are the same or different and are:

- (a) hydrogen,
- (b) (C<sub>1</sub>-C<sub>10</sub>)alkyl,
- (c) -C(O)R<sub>16</sub>,
- (d) -C(O)-PhX, or
- (e) -PhX;

with the proviso that R<sub>14</sub> and R<sub>15</sub> are other than hydrogen when n is zero;

wherein R<sub>16</sub> is (C<sub>1</sub>-C<sub>4</sub>)alkyl;

wherein R<sub>17</sub> and R<sub>18</sub> are the same or different and are:

- (a) hydrogen,
- (b) (C<sub>1</sub>-C<sub>10</sub>)alkyl,
- (c) -CH<sub>2</sub>-PhX, or
- (d) -PhX;

with the proviso that each occurrence of R<sub>17</sub> and R<sub>18</sub> may be the same or different; wherein PhX-NH<sub>2</sub> is an amino-substituted phenyl group additionally substituted by zero to 3 of the following:

- (a) (C<sub>1</sub>-C<sub>4</sub>)alkyl,
- (b) chloro,
- (c) fluoro,
- (d) bromo,
- (e) nitro,

(f) trifluoromethyl, or

(g) OR<sub>4</sub>;

wherein R<sub>4</sub> is

- (a) hydrogen, or
- (b) (C<sub>1</sub>-C<sub>4</sub>)alkyl;

with the following provisos

- (1) R<sub>3</sub> is not hydrogen;
- (2) and one of R<sub>2</sub> and R<sub>1</sub> is hydrogen or methyl, the other is not hydrogen or methyl;
- (3) when R<sub>2</sub> is phenyl, R<sub>1</sub> is other than hydrogen; or a pharmacologically acceptable acid addition salt thereof,

when R<sub>3</sub> is

- (c) -C(O)-(CR<sub>17</sub>R<sub>18</sub>)<sub>m</sub>-(CH<sub>2</sub>)<sub>n</sub>-NR<sub>14</sub>R<sub>15</sub>,
- (d) -C(O)-AA, or
- (e) -C(O)-PhX-NH<sub>2</sub>.

4,791,139

#### DIPHENYL ETHER DERIVATIVES AND THEIR USE AS INSECTICIDES

Michael J. Bushell, Wokingham, and Robin A. E. Carr, Camberley, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Feb. 25, 1987, Ser. No. 18,712

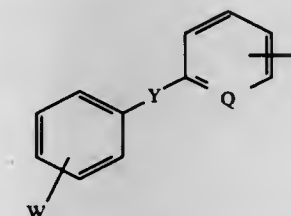
Claims priority, application United Kingdom, Mar. 4, 1986, 8605281

Int. Cl.<sup>4</sup> A16K 31/335, 31/44, 31/03, 31/045, 31/08, 31/085, 3/09; C07F 9/28, 9/02; C07C 43/03, 43/205; C07D 213/26

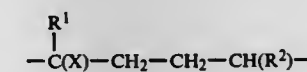
U.S. Cl. 514-721

9 Claims

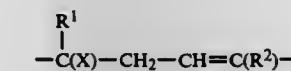
1. A compound of formula:



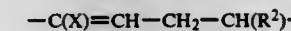
wherein W represents one or more substituents selected from halo, alkyl, alkoxy, alkoxyalkyl, haloalkyl and haloalkoxy or W represents a bidentate group linking adjacent carbon atoms selected from alkylene and alkylendioxy; Y is a group of formula



or



or



or



wherein X is a group of formula -(CF<sub>2</sub>)<sub>n</sub>R<sup>3</sup>, where R<sup>3</sup> is selected from hydrogen, chloro and fluoro, and n is one or two, R<sup>1</sup> is selected from hydrogen, chloro, fluoro and hydroxy and R<sup>2</sup> is selected from methyl, cyano, ethynyl and hydrogen; Q is selected from carbon bearing a hydrogen atom and nitrogen; and Z represents one or more substituents selected from fluoro, benzyl, phenoxy, chlorophenoxy, fluorophenoxy and bromophenoxy, or any isomer thereof, the alkyl, alkoxy, alk-



oxyalkyl, haloalkyl and haloalkoxy values for W containing up to six carbon atoms.

4,791,140

**METHOD OF PREVENTING CRAZING OF COSMETICS**  
Junichi Fukasawa, Yokohama; Yoshimitsu Ina, Funabashi, and Hisao Tsutsumi, Miyashiro-machi, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Apr. 25, 1986, Ser. No. 855,725

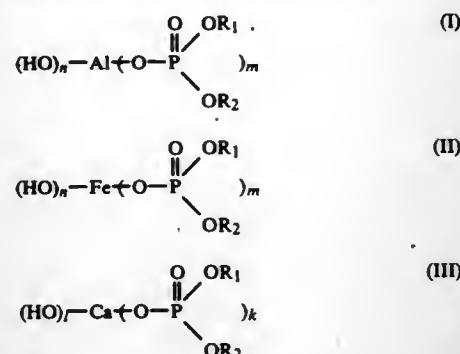
Claims priority, application Japan, May 7, 1985, 60-96343

Int. Cl.<sup>4</sup> A61K 7/021, 7/025, 7/031

U.S. Cl. 514—845

4 Claims

1. A method of preventing crazing or discoloration of a cosmetic, or oozing of oil therefrom, said cosmetic comprising at least one oil component selected from the group consisting of liquid paraffin, squalane, and an ester oil of an alcohol and a fatty acid: comprising adding to said cosmetic 0.1 to 30% of an oil gelling agent comprising at least one metal salt of a dialkyl phosphate of the following general formula (I), (II) or (III)



in which each R<sub>1</sub> and each R<sub>2</sub> independently represent a saturated or unsaturated, linear or branched hydrocarbon group having from 8 to 36 carbon atoms, m is an integer of from 1 to 3, n is an integer of from 0 to 2, k is a value of 1 or 2, and l is a value of 0 or 1.

4,791,141

**PROCESS FOR SYNTHESIZING A MIXTURE OF PRIMARY ALCOHOLS FROM A SYNTHESIS GAS IN THE PRESENCE OF A CATALYST CONTAINING COPPER, COBALT, ZINC AND ALUMINUM**

Patrick Chaussette, Bougival; Philippe Courty, Houilles; Daniel Durand, Rueil-Malmaison; Pierre Grandvallet, Marly, and Christine Travers, Rueil-Malmaison, all of France, assignors to Institut Français Du Pétrole, Rueil-Malmaison, France

Continuation of Ser. No. 732,488, May 10, 1985, abandoned.

This application Nov. 5, 1986, Ser. No. 928,655

Claims priority, application France, May 10, 1984, 84 07394

Int. Cl.<sup>4</sup> C07C 27/06, 31/02

U.S. Cl. 518—713

23 Claims

1. A process for manufacturing primary alcohols by reaction of carbon oxides with hydrogen in the presence of a catalyst comprising, by weight:

15-45% copper  
9-20% cobalt  
7-25% aluminum  
15-50% zinc  
0-0.05% alkali metal and/or alkaline earth metal,

wherein the atomic ratios of the metals are:

0.5:1 to 1.5:1	for Zn/Al,
0.25:1 to 0.55:1	for Co/Al, and
0.4:1 to 2:1	for Cu/Al,

any variation in atomic ratios of Al/Co, Cu/Co and Zn/Co being lower than 10% with respect to the average value of said ratios on the 5 nm scale.

4,791,142

**METHOD AND APPARATUS FOR PRODUCING A FOAM FROM A MOLTEN THERMOPLASTIC MATERIAL**

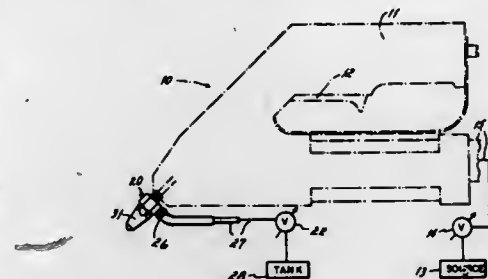
Harald Pleuss, Langenfeld, Fed. Rep. of Germany, and Peter E. Muller, Reinach, Switzerland, assignors to Nordson Corporation, Westlake, Ohio

Division of Ser. No. 798,106, Nov. 14, 1985, abandoned. This application Aug. 5, 1987, Ser. No. 82,042

Int. Cl.<sup>4</sup> C08G 85/00

U.S. Cl. 521—50

6 Claims



1. A method of creating a molten thermoplastic material foam which comprises:

pressurizing molten thermoplastic material to a pressure substantially greater than atmospheric pressure, separately pressurizing gas to a pressure greater than the pressure of the pressurized molten thermoplastic material, delivering the pressurized molten thermoplastic material and gas through separate passages to a first internal premixing chamber of a nozzle assembly, which nozzle assembly has a discharge orifice, passing the premixed mixture of molten thermoplastic material and gas through a sintered insert contained within a second chamber of said nozzle assembly, and passing the gas and liquid mixture from the second chamber to atmosphere through said discharge orifice of said nozzle assembly whereby a foam of said molten thermoplastic material is generated.

4,791,143

**COMPOSITION FOR NON-CROSSLINKED FOAM**  
Haruhiko Tanaka, Ohtake; Fukaishi Kagawa, Yamaguchi, and Kouji Nakashima, Hiroshima, all of Japan, assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 22, 1988, Ser. No. 158,487

Claims priority, application Japan, Feb. 28, 1987, 62-44056

Int. Cl.<sup>4</sup> C08J 9/00, 9/14

U.S. Cl. 521—89

15 Claims

1. An expandable composition for non-crosslinked foam comprising:

(a) 80 to 99% by weight of a 1-butene homopolymer,  
(b) 20 to 1% by weight of an ethylene polymer, and  
(c) a blowing agent,

the percentages being based on the total weight of the 1-butene polymer and the ethylene homopolymer.

4,791,144

**MICROPOROUS FILM AND PROCESS FOR PRODUCTION THEREOF**

Satoshi Nagou, Tokuyama, and Shunichi Nakamura, Hiraki, both of Japan, assignors to Tokuyama Soda Kabushiki Kaisha, Yamaguchi, Japan

Filed Jun. 12, 1987, Ser. No. 61,221

Claims priority, application Japan, Jun. 12, 1986, 61-135018; Jun. 13, 1986, 61-136153

Int. Cl.<sup>4</sup> B29C 67/20, 55/02; C08F 10/00; C08J 9/26

U.S. Cl. 521—90

30 Claims

1. A microporous polypropylene film comprising a propylene homopolymer, a copolymer of propylene with other copolymerizable monomer or a blend thereof, which has an intrinsic viscosity ( $\eta$ ) of 1.9 to 3.0 dl/g as measured at 135° C. in tetralin, said microporous film having a network structure comprising intercommunicating pores having a maximum pore size smaller than 1  $\mu$  and an average pore size of 0.005 to 0.6  $\mu$  and having a porosity of 30 to 90%, an air permeability of 5 to 500 sec/100 cc and a thickness of 5 to 200  $\mu$ , said microporous film being molecularly oriented by stretching.

4,791,145

**MODIFIED FLAME RETARDANT POLYPHENYLENE ETHER RESINS HAVING IMPROVED FOAMABILITY AND MOLDED ARTICLES MADE THEREFROM**

Eric Pressman, East Greenbush, N.Y., assignor to General Electric Company, Selkirk, N.Y.

Division of Ser. No. 62,891, Jun. 16, 1987, Pat. No. 4,728,675, which is a division of Ser. No. 900,705, Aug. 27, 1986, Pat. No. 4,695,594. This application Mar. 1, 1988, Ser. No. 162,696

Int. Cl.<sup>4</sup> C08J 9/08

U.S. Cl. 521—98

15 Claims

1. A foamed shaped article having high tensile strength, substantially free of surface streaking and substantially free of odor generation produced by heating and foaming a composition comprising (a) a polyphenylene ether, alone, or in combination with a styrene resin; (b) an effective flame retarding amount of a halogenated flame retardant, alone, or in combination with an antimony oxide compound; and (c) an effective foam generating amount of a foaming agent comprising citric acid and sodium bicarbonate.

4,791,146

**METHOD OF PREPARING DIMENSIONALLY STABLE, FLEXIBLE URETHANE FOAM AND THE FOAM PRODUCED THEREBY**

Eugene J. Tyenda, 14 Sagamore Rd., Parsippany, N.J. 07054

Continuation of Ser. No. 915,623, Oct. 6, 1986, Pat. No. 4,751,253. This application Apr. 29, 1988, Ser. No. 188,370

The portion of the term of this patent subsequent to Jun. 14, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> C08G 18/30

U.S. Cl. 521—114

9 Claims

1. A method of preparing a molded, high resilience, urethane foam product of improved dimensional stability, which method comprises:

(a) adding to a foamable urethane composition a cell opening amount of a cell opening additive, which additive is selected from the group consisting of:  
(i) a fatty acid;  
(ii) a polyethylene or polypropylene polyol fatty acid ester; and  
(iii) a mixture of (i) and (ii);  
(b) reacting the foamable urethane composition in a closed mold to provide a high resiliency, molded urethane foam product; and  
(c) recovering a molded foam product of improved dimensional stability and having a greater amount of open cells than the molded foam product produced without the cell opening additive.

4,791,147

**NON-CROSSLINKED FOAM**

Haruhiko Tanaka, Ohtake; Fukaishi Kagawa, Yamaguchi, and Kouji Nakashima, Hiroshima, all of Japan, assignors to Shell Oil Company, Houston, Tex.

Division of Ser. No. 96,100, Sep. 11, 1987, Pat. No. 4,739,547.

This application Nov. 16, 1987, Ser. No. 121,497

Claims priority, application Japan, Sep. 16, 1986, 61-215844

Int. Cl.<sup>4</sup> C08J 9/00

U.S. Cl. 521—134

10 Claims

1. A non-crosslinked foam of a composition comprising:  
(A) 72 to 98% by weight of a 1-butene homopolymer, and  
(B) 28 to 2% by weight of a propylene polymer, the percentages being based on the total weight of the 1-butene polymer and the propylene polymer.

4,791,148

**ISOCYANATE TERMINATED QUASI-PREPOLYMERS USEFUL FOR PREPARING POLYURETHANE/POLYSOCYANURATE FOAMS HAVING LOW THERMAL CONDUCTIVITY**

Robert E. Riley, Flat Rock, and Thirumurti Narayan, Grosse Ile, both of Mich., assignors to BASF Corporation, Parsippany, N.J.

Filed Feb. 12, 1987, Ser. No. 13,653

Int. Cl.<sup>4</sup> C08G 18/30

U.S. Cl. 521—159

7 Claims

1. An isocyanate-group terminated quasi-prepolymer consisting of the reaction product of an organic polyisocyanate with a polyester polyol consisting of the reaction product of phthalic anhydride and a low molecular weight aliphatic polyhydric alcohol.

4,791,149

**METHODS OF MAKING DRESSINGS**

David Pocknell, Antibes, France, assignor to Dow Corning France S.A., Valbonne, France

Filed Nov. 10, 1986, Ser. No. 929,252

Claims priority, application France, Nov. 12, 1985, 85 16655

Int. Cl.<sup>4</sup> C08L 6/00

U.S. Cl. 523—111

6 Claims



1. A method of making a medical dressing comprising the steps of

(A) procuring a package containing a room temperature curable polysiloxane composition consisting essentially of two component parts comprising ingredients which together provide an organosilicon polymer including siloxane units having an alkenyl group having 2 to 4 carbon atoms inclusive, an organosilicon polymer including siloxane units having a silicon-bonded hydrogen atom and a catalyst, the organosilicon polymers being such that they are capable of chemical reaction at room temperature when mixed in the presence of the catalyst to provide a non-cellular polysiloxane mass, said package comprising

two separate compartments within a container, one compartment for each component of the composition, each compartment, within a membrane, consists essentially of a component part of the composition where the ingredients present in each such component do not react with each other, there being a propellant located between the membrane and the container whereby the membrane may be caused by the propellant gas to expel the component when required, the package being so constructed and arranged that it may operate to mix predetermined proportions of the components in the absence of air and to dispense the mixed composition from the package,

- (B) operating the package to bring about mixing of the components in said predetermined proportions and  
(C) dispensing the mixed composition from the package to provide said dressing in a desired shape.

4,791,150

**COMPOSITION FOR USE IN MAKING BONE CEMENT**  
Michael Braden, Hertfordshire, and Laurence G. Wood, Surrey, both of England, assignors to Bonar Cole Polymers Limited, Surrey and The London Hospital Medical College, London, both of England

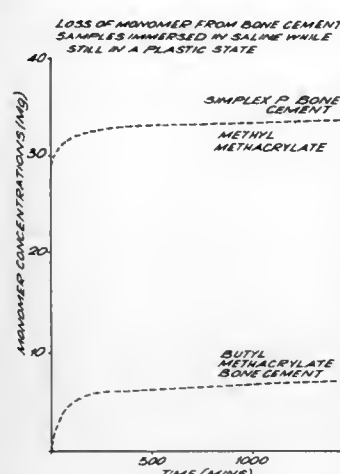
Filed Sep. 30, 1986, Ser. No. 913,311

Claims priority, application United Kingdom, Oct. 1, 1985, 8524152

Int. Cl.<sup>4</sup> A61K 6/08; C08K 3/10; C08L 31/02

U.S. Cl. 523—117

6 Claims



1. A composition for use in making a bone cement, the composition comprising a powder polymer component and a monomer component therefor, the components being sterile for medical use, an opacifier being incorporated within the polymer powder component, wherein the polymer is ethylmethacrylate polymer and the monomer is n-butyl methacrylate, whereby on polymerization of polymer and monomer little monomer is released on setting.

4,791,151

**MULTILOBALS**

Alexander Kowalski, Plymouth Meeting, Pa.; Joseph Wilczynski, Yorba Linda, Calif.; Robert M. Blankenship, Lansdale, and Cheun-Shyong Chou, Dresher, both of Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Filed Jul. 14, 1986, Ser. No. 885,069

Int. Cl.<sup>4</sup> C08L 83/00

U.S. Cl. 523—201

30 Claims

1. An aqueous dispersion comprising multilobal polymer particles where said multilobal polymer particles comprise a polymeric central core and at least two polymeric lobes on said polymeric core, said lobe polymer being compositionally different from said core polymer, and where the weight ratio of

lobe polymer to core polymer ranges from about 2 to 1 to about 500 to 1, and where said dispersion of said multilobal



polymer particles is useful in binder, coating and adhesive compositions.

4,791,152

**MULTI-COMPONENT COATING COMPOSITIONS**

Hilary E. Adeney, Surrey Hills, and Derrard M. Hall, Glen Waverley, both of Australia, assignors to Dulux Australia Limited, Victoria, Australia

Continuation of Ser. No. 753,067, Jul. 9, 1985, Pat. No.

4,696,957. This application May 13, 1987, Ser. No. 49,329

Claims priority, application Australia, Aug. 27, 1984, PG6784

Int. Cl.<sup>4</sup> C08L 63/02; C09D 3/58; C09J 3/14, 3/16

U.S. Cl. 523—406

1 Claim

1. A method of forming an aqueous coating composition comprising polymerizing monoethylenically unsaturated monomers in an aqueous dispersion in the presence of a dispersed epoxy resin to form an aqueous dispersion copolymer, the copolymer of said monoethylenically unsaturated monomers having a glass transition temperature in the range of about -55° C. to about 105° C., and then mixing the aqueous dispersion of copolymer and epoxy resin formed by said polymerization with an amine-functional resin in an amount to supply a weight ratio of amino hydrogen atoms to oxirane group of from 0.2 to 1.5.

4,791,153

**MOLDING RESIN COMPOSITION**

Shunichiro Yamanaka, Osaka, Japan, assignor to Orient Chemical Industries, Ltd., Japan

Filed Dec. 28, 1987, Ser. No. 138,294

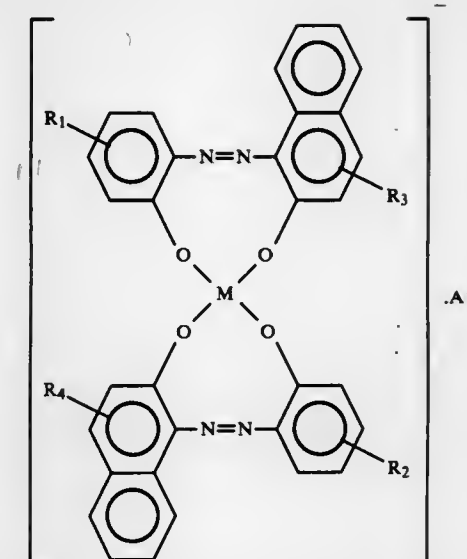
Claims priority, application Japan, Dec. 29, 1986, 61-312922

Int. Cl.<sup>4</sup> C08K 5/35

U.S. Cl. 523—453

10 Claims

1. Molding resin composition for preparing a molded product having a surface amenable to laser marking, the composition comprising a thermosetting resin, a curing agent, an inorganic white filler and a coloring agent, in which the coloring agent is a compound represented by the formula



wherein R<sub>1</sub> and R<sub>2</sub> are each hydrogen, halogen, C<sub>1</sub>-C<sub>8</sub> alkyl, substituted or unsubstituted sulfonamido or SO<sub>2</sub>CH<sub>3</sub>; R<sub>3</sub> and R<sub>4</sub> are each hydrogen, C<sub>1</sub>-C<sub>8</sub> alkyl, or substituted or unsubstituted carbonamido; M is Cr, Fe or Co; and A is H, NH<sub>4</sub>, ammonium ion of a primary, secondary or tertiary amine or quaternary ammonium ion.

4,791,154

**EPOXY RESIN COMPOSITION**

Larry S. Corley, Houston, and Donald R. Gehring, Fort Worth, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Nov. 30, 1987, Ser. No. 126,534

Int. Cl.<sup>4</sup> C08G 59/50

U.S. Cl. 523—456

22 Claims

1. A composition comprising:

- (a) an epoxy resin and  
(b) an effective amount of a curing agent for the epoxy resin, the curing agent comprising an aromatic azopolyamine.

4,791,155

**ASSEMBLY FOR MONITORING IONISING RADIATION**

David P. Gregory, Wilmslow; Bernard J. Dean, Knutsford, and Stephen R. Postle, Wilmslow, all of England, assignors to Ciba-Geigy AG, Basel, Switzerland

Filed Jul. 22, 1987, Ser. No. 76,719

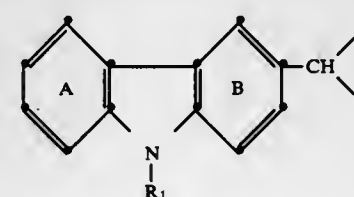
Claims priority, application United Kingdom, Jul. 24, 1986, 8618113

Int. Cl.<sup>4</sup> G01T 1/04; C08L 89/00

U.S. Cl. 524—22

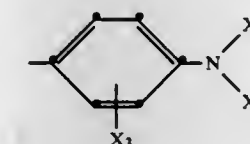
20 Claims

1. An assembly for the monitoring of ionising radiation which comprises coated on a base a layer which has been formed by drying down an aqueous emulsion of a binder having incorporated therein an organic solvent solution of a polychlorinated hydrocarbon and a solution or dispersion of at least one colour former of the general formula

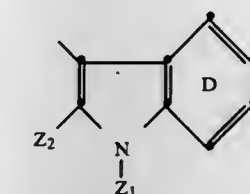


wherein Y represents an amino-substituted phenyl radical of the formula

(1)



or an indolyl radical of the formula



in which formulae each of

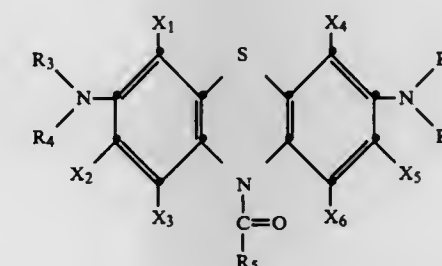
X<sub>1</sub> and X<sub>2</sub> independently represent hydrogen, alkyl of 1 to 12 carbon atoms which is unsubstituted or substituted by halogen, hydroxyl, cyano, phenyl or lower alkoxy; cycloalkyl, phenyl, benzyl, or phenyl or benzyl which is substituted by halogen, lower alkyl or lower alkoxy, or

X<sub>1</sub> and X<sub>2</sub> together with the nitrogen atom to which they are attached represent a 5- or 6-membered, preferably saturated, heterocyclic radical,

X<sub>3</sub> represents hydrogen, halogen, nitro, lower alkyl or lower alkoxy, these alkyl and alkoxy groups being unsubstituted or substituted by halogen, hydroxyl, cyano or lower alkoxy, acyl of 1 to 12 carbon atoms, phenyl, benzyl, or phenyl or benzyl which is substituted by halogen, lower alkyl, lower alkoxy or nitro, and

Z<sub>2</sub> represents hydrogen, lower alkyl or phenyl and the rings A, B and D independently can be further substituted by cyano, nitro, halogen, lower alkyl, lower alkoxy or lower alkylcarbonyl,

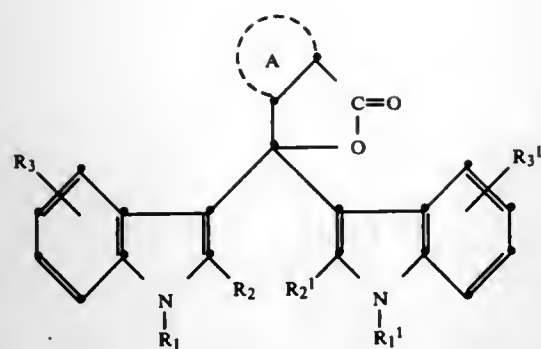
or of the general formula



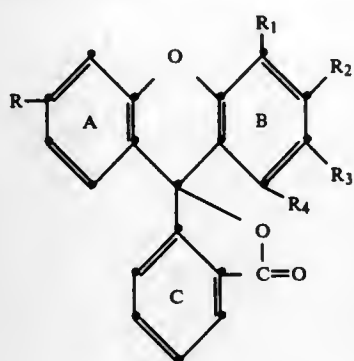
(2)

where each of R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are alkyl, aryl or aralkyl, and each of X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>, X<sub>4</sub>, X<sub>5</sub> and X<sub>6</sub> are hydrogen, alkyl, alkoxy, aryl or aralkyl, or of the general formula





wherein the ring A represents a fused-on optionally substituted benzene, naphthalene or heterocyclic ring, in particular a pyridine or quinoline ring,  $R_2$  and  $R_2'$  each represents hydrogen or lower alkyl or an aryl radical, preferably a radical of the benzene series,  $R_3$  and  $R_3'$  each represent hydrogen or a lower alkyl or alkoxy group and  $R_1$  and  $R_1'$  each represents hydrogen or preferably, an aralkyl radical or an optionally substituted alkyl or alkenyl radical, other than an aralkyl radical, with 1 to 18 and 3 to 18 carbon atoms respectively, or of the general formula



wherein R is a piperidino group, a pyrrolidino group, a morpholino group, an N-lower alkyl-cyclohexylamino group or an N-benzylcyclohexylamino group,  $R_1$  is a hydrogen atom, a lower alkyl group, a substituted or unsubstituted amino group or a halogen atom,  $R_2$  is a hydrogen atom, a lower alkyl group, a lower alkoxy group or a halogen atom,  $R_3$  is a hydrogen atom, a  $C_{1-8}$  alkyl group, a phenyl group, a piperidino group, a methylpiperidino group, a pyrrolidino group, a morpholino group, a group of the formula



where X represents a hydrogen atom, an acyl group, a lower alkyl group, a benzyl group, a cyclohexyl group or a substituted or unsubstituted aryl group; and Y represents a hydrogen atom, an alkyl group or a substituted or unsubstituted benzyl group, a halogen atom, an alkoxy group or a substituted or unsubstituted diphenylmethylamino group;  $R_4$  is a hydrogen atom, a lower alkyl group or a alkoxy group, provided that  $R_1$  and  $R_2$ ,  $R_3$  and  $R_4$  may be groups represented by the formula  $-\text{CH}=\text{CH}-\text{CH}=\text{CH}-$ , and, in this case, the naphthalene ring may have a halogen atom or a substituted or unsubstituted amino group, and the benzene ring C may have 1 to 4 halogen atoms, provided that when R is piperidino, pyrrolidino,

(3)

morpholino, cyclohexylamino or N-methylcyclohexylamino, at least one of  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  is a substituent other than hydroge, lower alkyl and halogen.

4,791,156

# DENTAL PROSTHETIC FROM HARD, RIGID, NON-HYDROPHILIC POLYURETHANE ELASTOMER Fritz Hostettler, R.F.D. Box 318E, Stillhouse Rd., Freehold, N.J. 07728

Continuation of Ser. No. 248,278, Mar. 27, 1981, abandoned.  
This application Aug. 12, 1982, Ser. No. 407,591  
Int. Cl.<sup>4</sup> C08G 18/32; A61C 13/00

U.S. Cl. 528—76

6 Claims

1. An artificial denture fabricated from a hard, rigid, substantially non-hydrophilic polyurethane elastomer having a heat distortion temperature of not less than about 65° C., said hard elastomer being the reaction product of a mixture consisting essentially of: (a) an organic polyisocyanate having at least two isocyanato groups and at least one cycloaliphatic or aromatic ring structure, at least one isocyanato group being directly bonded to the cycloaliphatic or aromatic structure or at least two isocyanato groups being bonded to separate divalent  $C_1$ - $C_4$ -aliphatic hydrocarbon chains which in turn are bonded to the cycloaliphatic or aromatic structure; and (b) branched chain polyester polyols selected from the group of (i) esterification polyol products resulting from the reaction of polycarboxylic acids and polyols wherein the ratio of hydroxyl groups to carboxyl groups exceeds one, and (ii) lactone polyols; (c) the hydroxyl equivalent weight of said polyester polyols being in the range of about 50 to 180; and (d) the ratio of isocyanato equivalents to hydroxyl equivalent being in the range of from about 0.9 to about 1.1.

4,791,157

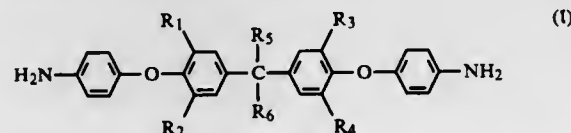
# POLYETHERAMIDE-IMIDE POLYMER COMPOSITION Hiroshi Nishizawa, Kitaibaraki, Tsuchi Sakata, Katsuta, and Yoshiyuki Mukoyama, Hitachi, all of Japan, assignors to Hitachi Chemical Co., Tokyo, Japan

Filed Mar. 2, 1987, Ser. No. 20,885  
Claims priority, application Japan, Oct. 3, 1986, 61-235889  
Int. Cl.<sup>4</sup> C08K 5/15

U.S. Cl. 524—108

5 Claims

1. A polyetheramide-imide polymer composition comprising an aromatic polyetheramide-imide polymer dissolved in a solvent selected from the group consisting of at least one ether compound, an alicyclic ketone compound and a mixture thereof, said aromatic polyetheramide-imide polymer having a reduced viscosity of 0.30 dl/g or more measured at 30° C. and being obtained by reacting trimellitic acid or a reactive acid derivative thereof with an aromatic diamine having ether linkages and represented by the formula:



wherein  $R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$  are independently a hydrogen atom, a lower alkyl group, a lower alkoxy group, a chlorine atom or a bromine atom; and  $R_5$  and  $R_6$  are independently a hydrogen atom, a methyl group, an ethyl group, a propyl group, a trifluoromethyl group or a trichloromethyl group.

(1)

# 4,791,158 THERMOPLASTIC MOLDING MATERIALS CONTAINING A POLYESTER AND A POLYCARBONATE

Dietrich Lausberg, Ludwigshafen; Graham E. McKee, Weinheim; Christof Taubitz, Wachenheim; Georg Wassmuth, Ludwigshafen, and Manfred Knoll, Wachenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Rheinland-Pfalz, Fed. Rep. of Germany

Filed Jul. 10, 1987, Ser. No. 72,031

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1986, 3627131

Int. Cl.<sup>4</sup> C08K 5/42; C08L 69/00

U.S. Cl. 524—156

22 Claims

1. A thermoplastic molding material, consisting essentially of:

- (A) from 10 to 89.99% by weight of a polyester,
- (B) from 10 to 89.99% by weight of a polycarbonate; and at least one member selected from the group consisting of (C<sub>1</sub>) and (C<sub>2</sub>) wherein
- (C<sub>1</sub>) is from 0.01 to 1% by weight of a low molecular weight organic compound of not more than 70 carbon atoms which contain  $-\text{SO}_3\text{H}$  groups;
- (C<sub>2</sub>) is from 0.01 to 30% by weight of a polymer containing sulfo groups, and having a weight average molecular weight of not less than 1000; and
- (D) from 0 to 30% by weight of a rubber impact modifier.

4,791,159

# RESURFACING COMPOSITIONS AND METHODS

Donald C. DuLaney, and Robert H. Lindsay, both of Madison, Wis., assignors to Lindsay Finishes, Madison, Wis.

Filed Jun. 26, 1987, Ser. No. 67,730

Int. Cl.<sup>4</sup> C08K 5/12

U.S. Cl. 524—297

30 Claims

1. An elastomeric adhesive composition useful in resurfacing applications comprising a liquid dispersion of:

- (a) a polar latex resin binder comprising an emulsion of water and a polyvinyl acetate homopolymer with a polyvinyl alcohol protective colloid, said binder being present in a concentration effective to adhere a resurfacing fabric to a surface wetted with said composition;
- (b) a chemical plasticizer effective in plasticizing and tackifying said latex resin binder;
- (c) a solvent comprising a volatile glycol ether;
- (d) a thickening agent present in an amount effective to modify the viscosity of said composition so that at atmospheric conditions said composition will not flow due to the influence of gravity when applied to a vertical surface to have a thickness of about 14 mils; and
- (e) about 6 to 7 wt % of the composition of diatomaceous silica.

4,791,160

# FLAME-RETARDANT RESIN COMPOSITIONS

Hiroshi Kato; Kazuhiko Kanemitsu, both of Nishinomiya, and Kiyoshi Furukawa, Kobe, all of Japan, assignors to Mitsubishi Cable Industries, Ltd., Hyogo, Japan

Continuation-in-part of Ser. No. 841,136, Mar. 19, 1986, abandoned. This application Feb. 9, 1987, Ser. No. 12,234  
Claims priority, application Japan, Mar. 20, 1985, 60-56301; Mar. 20, 1985, 60-56311

Int. Cl.<sup>4</sup> C08K 3/10, 3/26, 3/20

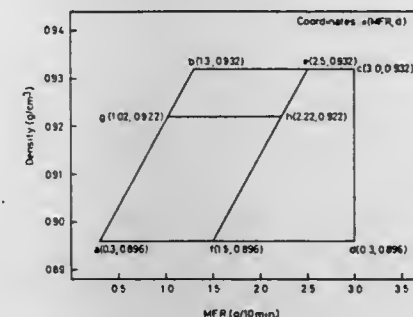
U.S. Cl. 524—322

12 Claims

1. A flame-retardant resin composition comprising:

- (A) about 100 parts by weight of a base polymer containing about 99 to about 20% by weight of a linear polyethylene and about 1 to about 80% by weight of a polyethylene- $\alpha$ -olefin copolymer having a melt flow rate (MFR) of about 1 to about 10 and a density of about 0.900 to about 0.850, said linear polyethylene having a MFR and a density both restricted to the range defined by a segment having points a, b, c and d at the corners thereof in the accompanying

drawing, FIG. 1, showing the relationship between the MFR (according to ASTM D1238) and the density (according to ASTM D1505) of said linear polyethylene, and



(B) about 50 to about 300 parts by weight of a hydrate of metallic oxide.

4,791,161

# CATIONIC LATICES OF COPOLYMERS BASED ON CONJUGATED DIENES

Frederic Leising, Vaujours, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Continuation of Ser. No. 573,835, Jan. 25, 1984, abandoned. This application May 27, 1986, Ser. No. 867,601

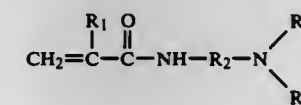
Claims priority, application France, Jan. 28, 1983, 83 01303  
Int. Cl.<sup>4</sup> C08L 41/00

U.S. Cl. 524—458

27 Claims

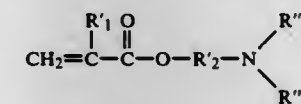
1. A cationic latex of at least one copolymer based on at least one conjugated diene, formed by the steps of:

- (A) preparing a pH independent cationic aqueous dispersion of particles at least substantially free from anionic species by reacting
- (i) at least one unsaturated tertiary nitrogen compound, selected from the group consisting of
- (a) an N-( $\omega$ -dialkylaminoalkyl)amide of an unsaturated carboxylic acid, having the formula:



where  $R_1$  is a hydrogen atom or a  $C_1$ - $C_4$  alkyl group,  $R_2$  is a  $C_1$ - $C_{12}$  alkylene group, and  $R_3$  and  $R'_3$  are either  $C_1$ - $C_6$  alkyl groups, or phenyl groups optionally substituted by a  $C_1$ - $C_9$  alkyl radical,

(b) an unsaturated amino-ester having the formula:



wherein  $R'_1$  is a  $C_1$ - $C_5$  alkyl group,  $R'_2$  is a linear or branched alkylene group with at least two carbon atoms, and  $R'_3$  and  $R'''_3$ , which may be identical, are either a  $C_1$ - $C_6$  alkyl group, optionally substituted by a hydroxyl radical, or a phenyl group, optionally substituted by a  $C_1$ - $C_9$  alkyl radical, wherein the total number of carbon atoms contained in the radicals  $R'_2$ ,  $R'_3$ , and  $R'''_3$  is greater than 8, and

- (c) a heterocyclic nitrogen compound with a nitrogen or carbon atom substituted by a vinyl group, with
- (ii) a cationic aqueous emulsion mixture at least substantially free from anionic species and containing:
- (a) at least one non-ionic monomer selected from the group

consisting of vinylaromatic compounds, vinyl esters, ethylenic nitriles, ethylenic carboxylic acid esters, dialkyl esters of ethylenic di-carboxylic acids, ethylenic amides, and the N-substituted derivatives of ethylenic amides;

(b) at least one unsaturated salt of a polycordinated onium of a group 5a or 6a element capable of polymerizing with said monomer;

(c) a cationic or non-ionic polymerization initiator; and

(d) a cationic or non-ionic emulsifier,

and wherein for every 100 parts by weight of said non-ionic monomer of (ii)(a) used, about 2 to 10 parts by weight of said unsaturated salt of polycordinated onium of a group 5a or 6a element is present, and a total of about 4 to 15 parts by weight of said salt and said unsaturated nitrogen compound taken together is used,

said nonionic monomer being converted to polymer in said reaction in a degree of up to at least about 30%; and

(B) polymerizing, in said aqueous dispersion, at least one conjugated diene or a mixture of said conjugated diene and at least one non-ionic monomer in the presence of a cationic or non-ionic polymerization initiator to form said cationic latex of copolymer.

4,791,162  
PREPARATION OF LARGE PARTICLE SIZE MONODISPERSE LATEXES  
John W. Vanderhoff; Fortunato J. Micale; Mohamed S. El-Aasser, and Chi-Ming Tseng, all of Bethlehem, Pa., assignors to Lehigh University, Bethlehem, Pa.  
Filed Dec. 17, 1984, Ser. No. 682,181  
Int. Cl.<sup>4</sup> C08F 2/16

U.S. Cl. 524—458 18 Claims

I. A method of preparing a monodisperse latex having an average particle size of at least 2–30 microns, which comprises polymerizing a mixture of:

(A) about 2–30 parts by weight of a monodisperse seed latex polymer of particle size on the order of 2 microns or less, said seed latex polymer containing a non-polymeric anionic emulsifier;

(B) about 10–50 parts by weight of a polymerizable, non-crosslinking monomer component selected from vinyl aromatic monomers and mixtures of vinyl aromatic monomers and different ethylenically unsaturated monomers;

(C) 0 to about 0.1 parts by weight of a polyethylenically unsaturated crosslinking monomer;

(D) about 0.01–0.2 parts by weight of an oil-soluble, sparingly water-soluble free radical initiator;

(E) about 0.001 to 0.1 parts by weight of at least one water-soluble of partially water-soluble and oil-soluble free radical inhibitor;

(F) an emulsifier component comprising:

(i) about 0.05–2.0 parts by weight of a first water-soluble polymeric emulsifier of molecular weight of about  $10^4$ – $10^7$  selected from at least one of:

a polyvinyl pyrrolidone in the presence of a water-soluble carboxylic oligomer emulsifier of molecular weight of about  $0.3 \times 10^3$ – $5 \times 10^3$ ,

a 95.0–99.8% nonionic hydrophilic backbone monomer/0–2.0% hydrophobic monomer/0.2–3.0% ionic monomer copolymer,

a polyacrylamide, and

a hydroxyethyl cellulose;

(ii) 0 to about 0.05 parts by weight of a second water-soluble comonomeric or polymeric emulsifier of molecular weight of about  $0.3 \times 10^3$ – $5 \times 10^3$ ;

(iii) 0 to about 0.01 parts by weight of a non-polymeric anionic emulsifier; and

(G) the balance being water, to make 100 parts by weight of total mixture.

4,791,163  
SILICONE ADHESIVE AND ORGANIC ADHESIVE EMULSIONS  
Frank J. Traver, Troy, and Duane F. Merrill, Ballston Spa, both of N.Y., assignors to General Electric Company, Waterford, N.Y.  
Filed May 6, 1987, Ser. No. 47,837  
Int. Cl.<sup>4</sup> C08L 83/00

U.S. Cl. 524—506 18 Claims

1. A emulsion comprising:

(a) 100 parts by weight of a continuous phase of water;

(b) from about 10 to about 400 parts by weight of a mixture of micelles comprising:

(i) from about 50 to about 99% by weight of said micelles comprising organic pressure-sensitive adhesive which is selected from the group consisting of milled natural rubber, styrene-butadiene rubber, butyl rubber, butadiene-acrylonitrile rubber polyvinyl ether rubber, polyacrylate ester rubber, styrene-butadiene-styrene rubber, and styrene-isoprene-styrene rubber, and

(ii) from about 1 to about 50% by weight of said micelles comprising silicone pressure-sensitive adhesive; and

(c) an effective amount of emulsifying agent effective to maintain the emulsion.

4,791,164  
POLYMERIC HOTMELT ADHESIVE  
Juergen Wichelhaus, Wuppertal; Werner Gruber, Korschenbroich, and Johannes Andres, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany  
Filed Feb. 13, 1986, Ser. No. 829,349  
Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504804  
Int. Cl.<sup>4</sup> C08L 77/08

U.S. Cl. 524—514 57 Claims

1. A hot melt adhesive comprising:

I: a polyamide consisting essentially of the reaction product of:

(a) about 20 to 49.5 mol%, based upon 100 mol% of polyamide, of dimerized fatty acid or dimerized fatty acid replaced with at least one C<sub>4</sub>–C<sub>12</sub>-aliphatic dicarboxylic acid in an amount up to about  $\frac{1}{3}$  of said dimerized fatty acid on a molar basis;

(b) about 0.5 to 15 mol%, based upon 100 mol% of polyamide, of at least one C<sub>12</sub>–C<sub>22</sub> monomeric fatty acid; and

(c) about 20 to 55 mol%, based upon 100 mol% of polyamide, of at least one C<sub>2</sub>–C<sub>40</sub>-aliphatic diamine;

wherein the weight ratio of the fatty acids (a+b) to the diamine (c) is from about 0.67 with the proviso that the polyamide has an amine number of 15 or less and

II: a terpolymer based on ethylene consisting essentially of the reaction product of:

(a) from about 50 to 95% by weight, based on the total weight of the terpolymer, of monomer selected from the group consisting of (i) ethylene; and (ii) ethylene and propylene, wherein the propylene is present in an amount up to about 15% by weight of ethylene;

(b) from about 2 to 30% by weight, based upon the total weight of the terpolymer, of at least one internal anhydride of an ethylenically unsaturated carboxylic acid; and

(c) from about 5 to 30% by weight, based on the total weight of terpolymer, of an ester selected from the group consisting of (i) an ester of acrylic acid with a linear or branched C<sub>1</sub>–C<sub>18</sub> aliphatic primary alcohol; (ii) an ester of methacrylic acid with a linear or branched C<sub>1</sub>–C<sub>18</sub>-aliphatic primary alcohol; (iii) a mixture thereof; and (iv) said acrylic acid ester or methacrylic acid ester, or mixture thereof, with an ester of vinyl alcohol and a C<sub>2</sub>–C<sub>18</sub> carboxylic acid

Wherein said polyamide and said ethylene-based terpolymer are each present in an amount of from about 5 to 95% by weight, based on the weight of the adhesive.

4,791,165  
INK-JET INK FOR PLAIN PAPER PRINTING  
James G. Bearss, Kootenai, Id., and Keaneth A. Norton, Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.  
Continuation of Ser. No. 756,864, Jul. 18, 1985, abandoned. This application Mar. 16, 1987, Ser. No. 28,021  
Int. Cl.<sup>4</sup> C08L 39/00

U.S. Cl. 524—516 8 Claims

1. An ink-jet composition comprising:

glycol 5–40 wt. %

water 60–90 wt. %

polymer blend 0.001–10 wt. %

dye 1–7 wt. %

wherein said polymer blend comprises polyvinyl pyrrolidone-/polyvinyl acetate copolymer, ranging in ratio from about 60/40 to 90/10 PVP/PVA or polyvinyl pyrrolidone-/polyvinyl dimethylaminoethylmethacrylate copolymer, ranging in ratio from about 60/40 to 90/10 PVP/polyvinyl dimethylaminoethylmethacrylate.

4,791,166  
FLUOROCARBON POLYMER COMPOSITIONS AND METHODS  
John C. Saukatis, East Greenwich, R.I., assignor to Hoechst Celanese Corporation, Somerville, N.J.  
Filed Mar. 23, 1988, Ser. No. 172,066  
Int. Cl.<sup>4</sup> C08L 27/12; C08F 12/30

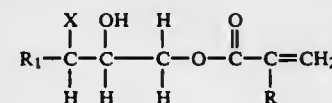
U.S. Cl. 524—544 9 Claims

1. A hydrocarbon-soluble fluorinated terpolymer comprising the polymerization product of monomers comprising:

(a) a fluorinated vinyl monomer containing at least one perfluoroaliphatic radical terminating in a CF<sub>3</sub> group and containing at least 25 percent by weight of its fluorine in the form of fluoroaliphatic radical;

(b) a higher aliphatic hydrocarbon vinyl monomer containing a higher aliphatic hydrocarbon group having from 8 to 20 carbon atoms, and

(c) a polyfunctional vinyl monomer selected from the group consisting of (1) a vinyl amido glycolate ether (2) a vinyl diketone ester and (3) a vinyl ester compound having the formula:



wherein R<sub>1</sub> is hydrogen or a lower alkyl group having 1 to 4 carbon atoms, preferably hydrogen, X is a halogen atom, preferably chlorine, and R is H or CH<sub>3</sub>,

said polymerization product being sufficiently soluble in odorless mineral spirits solvent for the application of odorless mineral spirit solutions containing effective amounts thereof to a variety of materials to substantially improve the oil- and water-resistance of such materials upon curing of said terpolymer.

4,791,167  
AUTOXIDIZABLE FLUOROCARBON POLYMER COMPOSITIONS AND METHODS  
John C. Saukatis, East Greenwich, R.I., assignor to Hoechst Celanese Corporation, Somerville, N.J.  
Filed Mar. 23, 1988, Ser. No. 172,003  
Int. Cl.<sup>4</sup> C08L 27/12; C08F 12/30

U.S. Cl. 524—544 11 Claims

1. A hydrocarbon-soluble fluorinated terpolymer comprising the polymerization product of monomers comprising:

(a) a fluorinated vinyl monomer containing at least one perfluoroaliphatic radical terminating in a CF<sub>3</sub> group and containing at least 25 percent by weight of its fluorine in the form of fluoroaliphatic radical;

(b) an alkyl vinyl ester monomer where the alkyl group has 8 to 20 carbon atoms, and

(c) an autoxidizable vinyl ester monomer which imparts autoxidizability to the terpolymer, selected from the group consisting of (1) a vinyl monomer having a pendant drying oil functionality and (2) a dicyclopentenylalkylene vinyl ester and (3) a dicyclopentenyl vinyl ester, said polymerization product being sufficiently soluble in odorless mineral spirits solvent for the application of odorless mineral spirit solutions containing effective amounts thereof to a variety of materials to substantially improve the oil- and water-resistance of such materials upon autooxidation curing of said terpolymer.

4,791,168  
POLYURETHANE RESINS IN WATER-DILUTABLE BASECOATS HAVING LOW FLASH AND QUICK-DRYING CHARACTERISTICS  
Timothy Salatin, Farmington Hills; Thomas C. Balch, West Bloomfield; Michael C. Knight, Center Line; Michael D. Shesterkin, Oak Park; John S. Van Antwerp, Royal Oak; Paul E. Lamberty, Romeo, and Robert A. Aamodt, Farmington Hills, all of Mich., assignors to BASF Corporation, Inmont Division, Clifton, N.J.  
Filed Apr. 15, 1987, Ser. No. 38,385  
Int. Cl.<sup>4</sup> C09D 3/52, 3/72

U.S. Cl. 524—601 55 Claims

1. A basecoat composition suitable for deposition onto metal or plastic comprising:

(a) about 20 to 80% weight percent based on the final solids content of said basecoat composition of an anionic polyurethane principal resin comprised of the reaction product of:

(i) a polyester component comprised of the reaction product of a carboxylic acid component with an alcohol having at least two hydroxyl groups wherein said carboxylic acid component is comprised of at least about 50% by weight of at least one long-chain carboxylic acid having between 18 and 60 carbon atoms and at most about 50% of at least one short-chain dicarboxylic acid;

(ii) a multi-functional compound having at least one active hydrogen and at least one carboxylic acid functionality;

(iii) a compound having at least 2 active hydrogen groups selected from the group consisting of hydroxyl, sulfhydryl, primary amine, and secondary amine, one of said primary amines accounting for one active hydrogen and;

(iv) a polyisocyanate;

(b) about 5 to about 50% by weight of an aminoplast cross-linking resin;

(c) 5 to about 35 weight percent of a branched chain polyester resin comprised of the reaction product of:

(i) a polyester component comprised of the reaction product of

(1) a carboxylic acid component comprised of at least 50% by weight of at least one long chain carboxylic acid containing compound having between 18 and 60 carbons and not more than 50% by weight of at least one short-chain dicarboxylic acid; and

(2) an alcohol component having an average functionality of at least 2; and

(ii) 2–25% by weight of a polyfunctional carboxylic acid or acid anhydride, said polyfunctional carboxylic acid or acid anhydride having at least 3 carboxylic acid groups; and

(d) about 2 to 75 weight percent of a pigment-containing grind resin comprising:

(i) About 6 to about 60% by weight of said pigment-containing grind resin of a pigment;

(ii) About 20 to about 75% by weight of said pigment-containing grind resin of a polyurethane resin produced by the reaction product of:



- (1) a polyester resin component produced by the reaction of a carboxylic acid component comprised of at least 50% by weight of a long-chain carboxylic acid having between 18 and 60 carbon atoms and at most about 50% of a short chain dicarboxylic acid and an alcohol having at least 2 hydroxyl groups; and
- (2) a mixture of a multi-functional compound having at least 1 active hydrogen and at least one carboxylic acid functionality, at least one compound having at least two active hydrogen groups, and a polyisocyanate, said carboxylic acid groups being neutralized with an amine; and
- (iii) About 20% to about 60% by weight of said pigment-containing grind resin of an aminoplast cross-linking agent.

4,791,169

# CARBOXYLATED POLYAMIDE FROM ISOPHTHALIC ACID AND POLYALKYLENE POLYAMINE

Manfred Drawert, Froedenberg, and Horst Kruse, Hamm, both of Fed. Rep. of Germany, assignors to Schering AG, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Nov. 19, 1986, Ser. No. 932,696

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1985, 3441693

Int. Cl.<sup>4</sup> C08G 69/34; C08L 77/08

U.S. Cl. 524-608

23 Claims

1. A carboxylated polyamide condensation product formed between

(A) an acid component comprising

(1) isophthalic acid and

(2) at least one dimerized fatty acid, wherein the ratio of acid equivalents of (A)(1) to (A)(2) is from 0.7:0.3 to 0.8:0.2, and

(B) an amine component comprising

(1) at least one member selected from the group consisting of diethylenetriamine and dipropylenetriamine, and

(2) (a) ethylenediamine and (b) a cycloaliphatic diamine, wherein the ratio of amino equivalents (B)(1) to (B)(2) ranges from 0.4:0.6 to 0.7:0.3 and the amount of (B)(2)(b) is from zero to 25 equivalent percent of the total amine component (B) and the ratio if (A) to (B) is from 1:0.7 to 1:0.85, based on the number of acid and amine equivalents, respectively.

4,791,170

# RUBBER COMPOSITIONS

Manoharu Makino, and Hisatake Satoh, both of Yokohama, Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Filed Jan. 29, 1988, Ser. No. 149,836

Claims priority, application Japan, Feb. 3, 1987, 62-22791

Int. Cl.<sup>4</sup> C08L 71/04, 57/02; C08F 8/00

U.S. Cl. 525-54.5

9 Claims

1. A rubber composition comprising:

(a) a starting rubber comprising ethylene and an alpha-olefin; and

(b) an aromatic hydrocarbon resin containing a phenolic hydroxyl group and having a hydroxyl number of 30-150 and a softening point of 50°-180° C., said hydrocarbon resin being present in an amount of 0.5-30 parts by weight based on 100 parts by weight of said starting rubber, said hydrocarbon resin being a polymeric material derived from copolymerization of an aromatic petroleum or coal fraction distilling at from 140°-240° C. with a phenol in the presence of an effective catalyst.

4,791,171

# SILYLATED POLY(VINYL)PHENOL POLYMERS

Wells C. Cunningham, Wellesley, Mass., assignor to Shipley Company Inc., Newton, Mass.

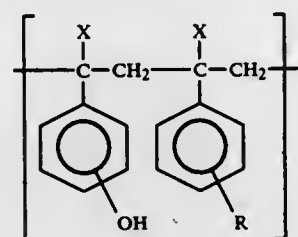
Filed Dec. 31, 1986, Ser. No. 948,330

Int. Cl.<sup>4</sup> C08F 8/00

U.S. Cl. 525-100

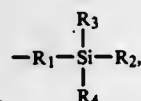
10 Claims

1. A partially silylated polymer, the polymer comprising the repeating unit represented by Formula (I):



Formula (I)

wherein X is H or CH<sub>3</sub>; R is —OH or



wherein R<sub>1</sub> is —O or —O(CH<sub>2</sub>)<sub>n</sub>, n is 1 to 4, and R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are independently selected from 1-4 carbon alkyl, aryl or benzyl, and wherein the average molecular weight of the silylated polymer is from about 2,700 to 22,000 and the average percent by weight silicon is from about 3% to 12%.

4,791,172

# PROCESS FOR THE PREPARATION OF PARTIALLY HYDROGENATED NITRILE RUBBERS

Johann Hohn, Dormagen; Franz-Josef Mersmann, Bergisch Gladbach; Werner Obrecht, Moers, and Zolt Szentivanyi, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen - Bayerwerk, Fed. Rep. of Germany

Filed Oct. 2, 1987, Ser. No. 103,661

Claims priority, application Fed. Rep. of Germany, Oct. 14, 1986, 3634882

Int. Cl.<sup>4</sup> C08L 9/02

U.S. Cl. 525-234

2 Claims

1. Process for the preparation of partially hydrogenated nitrile rubbers with residual double bond contents of between 2.0 and 5.0% characterized in that at least two partially hydrogenated nitrile rubbers with residual double bond contents of 1.5 to 7.5%, the residual double bond content of one nitrile rubber being above and the residual double bond content of the other nitrile rubber being below the predetermined set value, are mixed in amounts such that each of the individual rubbers is at least 10% by weight of the total mixture, the nitrile rubbers contain 85 to 50% by weight of a conjugated diene, 15 to 50% by weight of an unsaturated nitrile and 0 to 10% by weight of at least one further monomer which is copolymerizable with the conjugated diene and the unsaturated nitrile, and at most 25% by weight of partially hydrogenated nitrile rubbers with residual double bond contents of 5 to 7.5% are incorporated in the mixture.

4,791,173

# TIRE TREAD RUBBER COMPOSITIONS

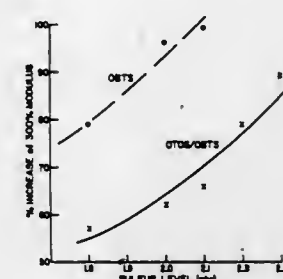
Robert W. Layer, Silver Lake, Ohio, assignor to The B F Goodrich Company, Akron, Ohio

Continuation-in-part of Ser. No. 854,858, Apr. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 775,965, Sep. 13, 1985, abandoned. This application Jul. 17, 1987, Ser. No. 74,826

Int. Cl.<sup>4</sup> C08C 19/20

U.S. Cl. 525-236

7 Claims



1. In a synthetic tread rubber compound essentially free from natural rubber, which compound yields a vulcanizate particularly adapted for use in a passenger tire tread which is substantially free from a proclivity to reversion when vulcanized with sulfur in the presence of a combination of benzothiazole sulfenamide (BTS) and tread compound accelerators, said tread rubber compound comprising,

- 100 parts of a synthetic rubber consisting essentially of at least 60 parts styrene-butadiene rubber, the remaining being another synthetic high unsaturation rubber;
- from 2 to 2.8 phr of sulfur;
- from 0.3 to 1.5 phr of a benzothiazole sulfenamide; and
- from 0.5 to 1.5 phr of a thiocarbonyl sulfenamide (TCS); provided the combined amount of sulfenamides is more than 1 phr but less than 2 phr, and there is more thiocarbonyl sulfenamide than benzothiazole sulfenamide, whereby the tensile strength is maintained without increasing the modulus or sacrificing oxidative stability.

4,791,174

# POLYMERS CONTAINING AMINO GROUPS, THEIR PREPARATION AND THEIR USE

Klaus Bronstert, Carlsberg, and Daniel Wagner, Wachenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Mar. 27, 1987, Ser. No. 30,467

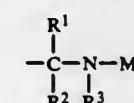
Claims priority, application Fed. Rep. of Germany, Apr. 5, 1986, 3611421

Int. Cl.<sup>4</sup> C08F 8/32

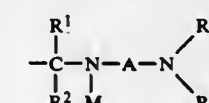
U.S. Cl. 525-274

4 Claims

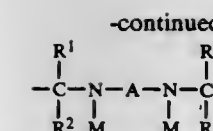
1. A homopolymer, copolymer or block copolymer, or mixtures thereof, which is composed of vinylaromatic, dienes or mixtures thereof and additionally contains at least one as functional groups, groups of the formulae (I) to (VI)



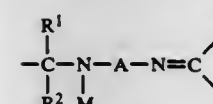
(I)



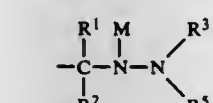
(II)



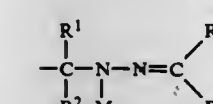
(III)



(IV)



(V)



(VI)

where N is nitrogen, R<sup>1</sup> and R<sup>4</sup> are each hydrogen, alkyl, cycloalkyl or aryl, R<sup>2</sup>, R<sup>3</sup> and R<sup>5</sup> are each alkyl, cycloalkyl or aryl, M is an alkali metal and A is an unsubstituted or substituted polymethylene bridge containing 2 to 12 CH<sub>2</sub> groups, or is a cycloaliphatic bridge or a phenylene bridge.

4,791,175

# PARTICULATE HYDROPEROXIDIZED POLY-N-VINYL LACTAM, ITS PREPARATION AND USE THEREOF

Robert A. Janssen, Alpharetta, Ga., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 892,535, Aug. 4, 1986, Pat. No. 4,678,838. This application Feb. 17, 1987, Ser. No. 15,818

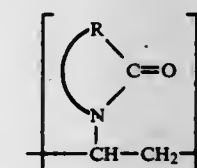
Int. Cl.<sup>4</sup> C08F 275/00

U.S. Cl. 525-287

9 Claims

1. A graft copolymer which comprises the graft copolymerization product of

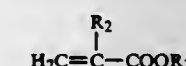
A about 1 to about 80% by weight, based on the total product, of a particulate poly-N-vinyl lactam derivative containing units of formula I



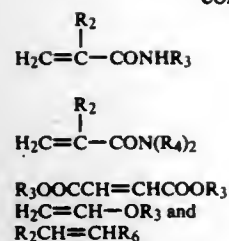
wherein R is alkylene of 2 to 8 carbon atoms and n is between about 40 and about 4000, and containing units of formula I which have additionally been hydroperoxidized by contacting said particulate poly-N-vinyl lactam derivative of formula I with ozone so that component (A) contains on average about 0.5 to about 20 hydroperoxy equivalents per mole of poly-N-vinyl lactam derivative, on which component (A) is grafted

- about 99 to about 20% by weight, based on the total product, of a hydrophilic or hydrophobic vinyl monomer or a mixture thereof, and
- 0 to 5% by weight, based on the total product, of a crosslinking agent; with said hydrophilic vinyl monomer of component (B) being selected from the group consisting of

(a) monomers of the formulae

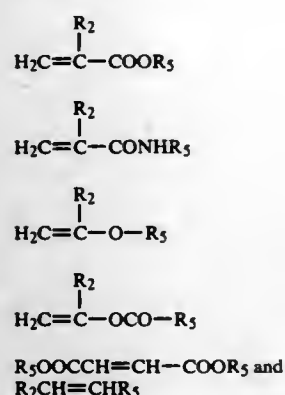


-continued



wherein  $R_2$  is hydrogen or methyl,  $R_3$  is  $R_6$  or hydrogen,  $R_4$  is an aliphatic hydrocarbon group of up to 10 carbon atoms substituted by at least one substituent selected from carboxy, hydroxy, amino, lower alkylamino, lower dialkylamino, polyethylene oxide group of 2-100 repeating units, sulfate, phosphate, phosphonate, carbox-amido, sulfonamido and phosphonamido; and  $R_4$  is alkyl of 1 to 3 carbon atoms; and

(b) monomers selected from the vinyl pyridines, vinyl piperidines, vinyl imidazoles and N-vinyl pyrrolidones; and with said hydrophobic vinylic monomer of component (B) being selected from the group consisting of monomers of the formulae



wherein  $R_2$  is hydrogen or methyl, and  $R_5$  is a straight or branched chain aliphatic, cycloaliphatic or aromatic group of up to 20 carbon atoms which is unsubstituted or substituted by at least one substituent selected from  $C_1$ - $C_{12}$ -alkoxy,  $C_1$ - $C_{12}$ -alkanoyloxy,  $C_1$ - $C_{12}$ -alkyl, halo and poly  $C_3$ - $C_5$ -alkyleneoxy having 2-100 repeating units.

#### 4,791,176 ALKENYLPHENOL AND ALKENYLPHENOL ETHER COPOLYMERS

Siegfried Birkle, Hoechststadt/Aisch; Recai Sezi, Roettenbach, and Hans-Dieter Feucht, Erlangen, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, München, Fed. Rep. of Germany

Filed Mar. 10, 1988, Ser. No. 166,437

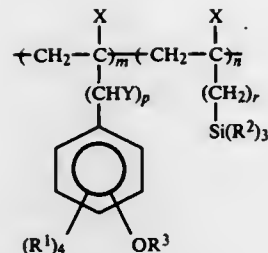
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1987, 3707843

Int. Cl.<sup>4</sup> C08F 30/08

U.S. Cl. 525-326.5

3 Claims

1. A copolymer of alkenyl silane and alkenyl phenol or alkenyl phenoether having the general formula



wherein:

$m+n$  is 1;

$p$  and  $r$  each independently denote 0, 1, or 2;

$X$  is H,  $CH_3$ ,  $C_2H_5$  or halogen;

$Y$  is H,  $CH_3$  or halogen;

$R^1$  is H, halogen, alkyl or halogen alkyl;

$R^2$  is H,  $CH_3$ ,  $C_2H_5$ ,  $C_3H_7$  or  $C_6H_5$ ;

$R^3$  is H or  $R^1$ ;

$R^1$  is  $CH_3$ ,  $C_2H_5$ ,  $C_3H_7$ ,  $CH(CH_3)_2$ ,  $C(CH_3)_3$ ,  $C_6H_{11}$ ,  $C_6H_5$ ,  $CH_2C_6H_5$ ,  $CH_2OCH_3$ ,  $CH_2OCH_2CH_2OCH_3$ ,  $Si(CH_3)_3$ , or  $Si(CH_3)_2C(CH_3)_3$ ; and said  $X$ ,  $R^1$ ,  $R^2$  and  $Y$  being identical or different.

#### 4,791,177 CONJUGATED POLYMER FILM AND PYROLYZED PRODUCT THEREOF

Ichiki Murase, Ootsu; Toshihiro Ohnishi, Takatsuki, and Takano Nogiuchi, Ootsu, all of Japan, assignors to Director-General of the Agency of Science and Technology, an Organ of the Ministry of International Trade and Industry of Japan, Tokyo, Japan

Division of Ser. No. 747,221, Jun. 21, 1985, Pat. No. 4,626,588.

This application Sep. 24, 1986, Ser. No. 911,216

Claims priority, application Japan, Jun. 26, 1984, 59-130032; Jan. 9, 1985, 60-869

Int. Cl.<sup>4</sup> C08F 8/00

U.S. Cl. 525-328.5

4 Claims

1. A high strength and high modulus conjugated polymer film with comprises as its principal unit a conjugated polymer structure represented by the formula:



wherein  $R$  is an aromatic hydrocarbon having 6 to 20 carbon atoms which forms a consecutive carbon to carbon conjugated system with the vinylene group, and  $n$  is an integer of 5 to 50,000; said conjugated polymer film has a tensile strength of 15 kg/mm<sup>2</sup> or more and an elastic modulus of 350 kg/mm<sup>2</sup> or more, obtained by stretch-orientating a polyelectrolyte of sulfonium salt in the form of film in the course of elimination of the sulfonium salt, and said film has a biaxial stretch ratio of 1.1 times or more, or an uniaxial stretch ratio of 3 times or more based on the size of the film of the polyelectrolyte of the sulfonium salt.

#### 4,791,178 RUBBER COMPOSITION FOR USE IN TIRE TREAD COMPRISING A RUBBER COMPONENT, CARBON BLACK AND PROCESS OIL

Tatsuo Fujimaki, Higashimurayama, and Noboru Oshima, Suzuka, both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Continuation of Ser. No. 894,601, Aug. 8, 1986, abandoned. This application Oct. 27, 1987, Ser. No. 117,346

Claims priority, application Japan, Aug. 12, 1985, 60-175913

Int. Cl.<sup>4</sup> C08C 19/20; C08F 8/34

U.S. Cl. 525-332.6

4 Claims

1. A rubber composition for use in tire treads, comprising: (A) a rubber component containing at least 30% by weight

of a conjugated diene-monoaromatic hydrocarbon copolymer which is prepared using an organic lithium compound as an initiator, wherein the percentage of vinyl bonds in the conjugated diene units in the copolymer molecules is from 55 to 85% and the content of the monoaromatic hydrocarbon units in the copolymer molecules is from 25 to 40% by weight,

(B) from 80 to 180 parts by weight of carbon black filler with respect to 100 parts by weight of the rubber component, wherein said carbon black filler has an average particle size of not more than 300 Å, and

(C) from 50 to 200 parts by weight of process oil with respect to 100 parts by weight of the rubber component, wherein said process oil has a viscosity specific gravity constant of from 0.900 to 0.999,

wherein said rubber composition has a 200% tensile modulus of from 5 to 50 kgf/cm<sup>2</sup> and a temperature integrated value of the loss tangent,

$$\int_{20^{\circ}C}^{100^{\circ}C} \tan \delta \, dT$$

of from 30 to 56.

#### 4,791,179 CHIP RESISTANT COATING COMPOSITIONS CONTAINING EPOXY-POLYESTER GRAFT COPOLYMERS

Andrew H. Dervan, Grosse Pointe Farms, and Panagiotis I. Kordomenos, Mt. Clemens, both of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 877,908, Jun. 23, 1986, Pat. No. 4,714,744.

This application Sep. 3, 1987, Ser. No. 93,171

Int. Cl.<sup>4</sup> C08G 59/16, 63/18, 63/20

U.S. Cl. 525-438

17 Claims

1. An organic solvent based, thermosetting coating composition comprising:

(I) A hydroxy functional epoxy-polyester graft copolymer suitable for use in a thermosetting composition, which copolymer has a number average molecular weight ( $M_n$ ) of between about 2,000 and about 20,000, said copolymer being the product of polymerization of lactone monomers in the presence of hydroxy functional epoxy ester resin precursor having reactive hydroxyl groups, said lactone monomers are polymerized and reacted with hydroxyl groups of the precursor to form pendent hydroxyl terminated polymer chains, wherein the polymerization reaction mixture comprises between about 10 and about 80 weight percent said hydroxy functional epoxy ester resin precursor and between about 90 and about 20 weight percent said lactone monomers, said precursor being the reaction product of:

(i) modified diepoxide being the product of polymerization of lactone monomers in the presence of diepoxide which has been chain extended substantially simultaneously with diphenol and dicarboxylic acid, said diepoxide being reacted substantially simultaneously with said diphenol and dicarboxylic acid in amounts sufficient to give a weight per epoxide of between about 500 and about 2500, wherein said lactone monomers reacted to form said modified diepoxide and the combined said diphenol and dicarboxylic acid are employed in a molar ratio of at least about 2:1, respectively; and

(ii) hydroxy functional secondary amine in chain termination reaction in about 1:1 equivalent ratio; and

(II) polyfunctional, hydroxy-reactive crosslinking agent.

#### 4,791,180 NEW POLYMERIZATION CATALYST

Howard W. Turner, Webster, Tex., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Division of Ser. No. 16,316, Feb. 19, 1987, Pat. No. 4,752,597, which is a continuation of Ser. No. 808,419, Dec. 12, 1985, abandoned. This application Sep. 28, 1987, Ser. No. 101,871

Int. Cl.<sup>4</sup> C08F 4/62, 4/64, 4/68

U.S. Cl. 526-160

8 Claims

1. A method for preparing polymers of ethylene and copolymers of ethylene and alpha-olefins or diolefins said method comprising effecting polymerization by contacting ethylene or a mixture of ethylene and alpha-olefins or diolefins with an olefin polymerization catalyst comprising the hydrocarbon insoluble reaction product of at least one metallocene of a metal of group IV B, VB, VI B and VIII of the Periodic Table with an alumoxane at a ratio of 1:12 to about 1:100 on a molar basis based on the metal and aluminum.

#### 4,791,181 RATE-MODERATED GROUP TRANSFER POLYMERIZATION

Anthony Pickering, Warrington, and Andrew J. Thorne, Chester, both of England, assignors to Imperial Chemical Industries PLC, London, England

Filed Feb. 8, 1988, Ser. No. 153,596

Claims priority, application United Kingdom, Feb. 13, 1987, 8703309

Int. Cl.<sup>4</sup> C08F 4/44

U.S. Cl. 526-190

5 Claims

1. A bulk polymerisation process which comprises contacting at least one polar acrylic or maleimide monomer under polymerisation conditions with (i) a tetracoordinate organosilicon, organotin or organogermanium initiator having at least one initiating site, (ii) a co-catalyst which is a source of fluoride, bifluoride, cyanide or azide ions or a Lewis acid, and (iii) from 0.1 to 10% by weight, based on the weight of monomer, of acetonitrile.

#### 4,791,182 COPPER SALTS AS CATALYSTS FOR MONOMERS HAVING AT LEAST ONE CYCLOBUTARENE GROUP

Robert A. Kirchhoff, Jo Ann Gilpin, Cynthia Baker, all of Midland, Mich., and Michael O. Myers, Baton Rouge, La., assignors to Dow Chemical Company, Midland, Mich.

Filed Sep. 8, 1987, Ser. No. 95,370

Int. Cl.<sup>4</sup> C08F 4/06

U.S. Cl. 526-221

23 Claims

1. An improved process for polymerizing a monomer having at least one cyclobutene group by subjecting the monomer to thermal or electromagnetic radiation at conditions sufficient to open the cyclobutene ring of the cyclobutene group; wherein the improvement comprises conducting the polymerization in the presence of a catalytic amount of a finely divided copper salt.

#### 4,791,183 STYRENE DERIVATIVE, POLYMER THEREOF AND PRODUCTION OF SAME

Takafumi Yamamizu, Kanagawa, Japan, assignor to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Division of Ser. No. 827,200, Feb. 7, 1986, abandoned, which is a continuation of Ser. No. 596,114, Apr. 2, 1984, abandoned.

This application Oct. 30, 1986, Ser. No. 924,724

Claims priority, application Japan, Apr. 1, 1983, 58-55247; Apr. 4, 1983, 58-58018; Apr. 4, 1983, 58-59116; Apr. 4, 1983, 58-59117

Int. Cl.<sup>4</sup> C08F 212/00

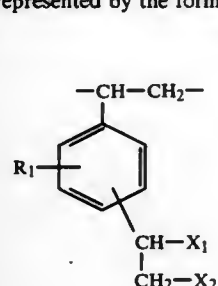
U.S. Cl. 526-261

25 Claims

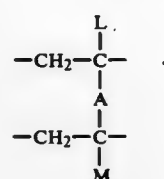
1. A linear or crosslinked polymer comprising 10 to 100 mol% of the polymeric units represented by the structural formula (2), 0 to 50 mol% of polymeric units represented by



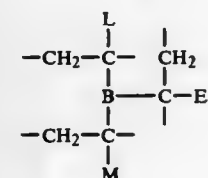
the structural formula (3) and/or (4), and 0 to 90 mol% of polymeric unit represented by the formula (5):



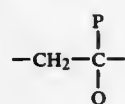
(2)



(3)



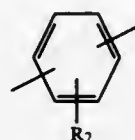
(4)



(5)

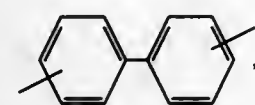
wherein  $R_1$  represents a hydrogen atom and a hydrocarbon group containing 1 to 10 carbon atoms;  $X_1$  and  $X_2$  are halogen atoms; L, M, and E represent hydrogen atoms and a methyl group; A is selected from the group consisting of

(i)

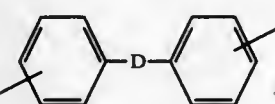


wherein  $R_2$  is a hydrogen atom or a hydrocarbon group containing 1 to 5 carbon atoms,

(ii)

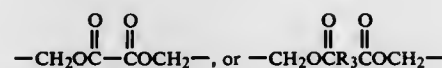
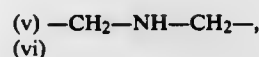


(iii)



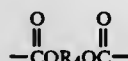
wherein D represents  $-O-$ ,  $-S-$ ,  $-NH-$ , or an alkylene group containing 1 to 5 carbon atoms,

(iv)



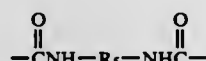
wherein  $R_3$  is a divalent hydrocarbon group containing 1 to 8 carbon atoms,

(vii)



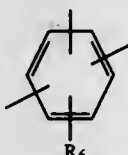
wherein  $R_4$  is a divalent hydrocarbon group containing 1 to 5 carbon atoms, and

(viii)



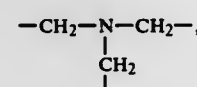
wherein  $R_5$  is a divalent hydrocarbon group containing 1 to 3 carbon atoms; and B is selected from the group consisting of

(i)

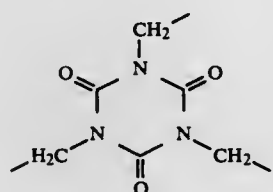


wherein  $R_6$  is a hydrogen atom or a hydrocarbon group containing 1 to 5 carbon atoms,

(ii)



and  
(iii)



and P and Q each represents a hydrogen atom, a halogen atom, an alkyl or haloalkyl group containing 1 to 10 carbon atoms, a cyano group, an aryl group, a halogenophenyl group, a hydroxyphenyl group, a hydroxymethylphenyl group, a carboxyphenyl group, an alkylphenyl group containing an alkyl moiety of 1 to 5 carbon atoms, a ha-

loalkylphenyl group, a hydroxyalkylphenyl group, a hydroxymethylalkylphenyl group, a carboxyalkylphenyl group,  $COOR_7$  wherein  $R_7$  is a hydrogen atom or a hydrocarbon group containing 1 to 10 carbon atoms,  $COR_8$  wherein  $R_8$  is a hydrogen atom or a hydrocarbon group containing 1 to 10 carbon atoms,  $OCOR_9$  wherein  $R_9$  is a hydrocarbon group containing 1 to 10 carbon atoms, and  $CONHR_{10}$  wherein  $R_{10}$  is a hydrogen atom or a hydrocarbon group containing 1 to 10 carbon atoms.

4,791,184

**METHACRYLIC RESIN MOLDING MATERIAL AND METHOD FOR PRODUCTION THEREOF**  
Haruo Nagai, Tetsuo Suzuki, and Kazuhiro Sato, all of Niigata, Japan, assignors to Kyowa Gas Chemical Industry Co., Ltd., Niigata, Japan  
Continuation of Ser. No. 906,798, Sep. 12, 1986, abandoned, which is a continuation of Ser. No. 715,474, Mar. 25, 1985, abandoned. This application Jun. 29, 1987, Ser. No. 67,932  
Claims priority, application Japan, Mar. 27, 1984, 59-258  
Int. Cl. C08F 20/10

U.S. Cl. 526—323.2

33 Claims

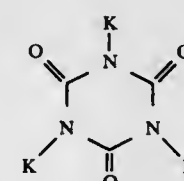
1. A methacrylic resin molding material comprising a partially cross-linked polymer gel obtained by partially polymerizing a mixture comprising (A) a resin raw material selected from the group consisting of monomeric C1-C4-alkyl methacrylates,  $\alpha,\beta$ -ethylenically unsaturated monomer mixtures formed predominantly of C1-C4-alkyl methacrylates, and a syrup containing at least one of said monomers and at least one of the polymers thereof and (B) 4 to 150 parts by weight of a cross-linking agent based on 100 parts by weight of said resin raw material in the presence of a polymerization initiator, whereby a cross-linked polymer is formed with the aid of said cross-linking agent and said polymerization initiator to the extent that the total polymer content reaches between 4 to 62% by weight over the polymer content of said mixture with the total polymer content kept from exceeding the upper limit of 62% by weight, said molding material being recovered from the polymerization system as a non-sticky, easy-handled, kneadable gel-like material which has shape-retaining properties, but which, on the application of shear stress, at normal room temperature or at an elevated temperature, is enabled to flow, and preserved for use in the manufacture of shaped articles.

4,791,185

**HIGH-REFRACTIVITY PLASTIC LENS RESIN FORMED FROM A POLYISOCYANATE AND A POLYTHIOL**  
Yoshinobu Kanemura, Katsuyoshi Sasagawa, Masao Imai, all of Yokohama; Teruyuki Nagata, Ohmuta, and Nobuyuki Kajimoto, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan  
Filed Nov. 5, 1987, Ser. No. 116,959  
Claims priority, application Japan, Nov. 21, 1986, 61-276791  
Int. Cl. C08G 18/28, 18/77, 18/32

U.S. Cl. 528—73  
14 Claims

1. A high-refractivity plastic lens resin obtained by polymerizing, with at least one polyisocyanate of at least bifunctionality, at least one polythiol represented by the general formula (I):



wherein K is a substituent  $-CH_2-(CHR)_m(O)_n-$   $(CO)_p(CH_2)_qSH$  in which R represents a hydrogen atom or

methyl group, m is an integer of 0-3, n is an integer of 0-1, p is an integer of 0-1 and q is an integer of 1-3.

4,791,186

**METHOD FOR PREPARING STORAGE STABLE, ONE PART CURABLE POLYORGANOSILOXANE COMPOSITIONS**

Gloria Janik, Midland, and Manuel Buentello, III, Thomas Township, Saginaw County, both of Mich., assignors to Dow Corning Corporation, Midland, Mich.  
Filed Jan. 4, 1988, Ser. No. 140,521  
Int. Cl. C08G 77/06

U.S. Cl. 528—15

6 Claims

1. In a method for preparing a one-part, heat curable organosiloxane composition, said method comprising blending to homogeneity

(A) at least one organosiloxane copolymer consisting essentially of from 80 to 96.5 mol percent of  $(CH_3)_2SiO$  units, from 2.0 to 10.0 mol percent of  $CH_3SiO_{1.5}$  units, from 1.25 to 6.0 mol percent of  $(CH_3)_3SiO_{0.5}$  units and from 0.25 to 4.0 mol percent of  $(CH_3)_2(CH_2=CH)SiO_{0.5}$  units;

(B) an organohydrogensiloxane containing at least two silicon-bonded hydrogen atoms per molecule, no more than one silicon-bonded hydrogen per silicon atom and organic radicals selected from the group consisting of alkyl containing from 1 to 6 carbon atoms per radical, phenyl and 3,3,3-trifluoropropyl, said organohydrogensiloxane providing from 0.7 to 1.2 silicon-bonded hydrogen atoms per silicon-bonded vinyl radical present in said composition;

(C) a platinum catalyst in an amount sufficient to promote the reaction of (A) and (B), and  
(D) a platinum catalyst inhibitor of the formula  $R^1_2NR^3NR^2_2$  or  $R^4NH_2$  in an amount sufficient to impart long term storage stability at temperatures of up to 70° C., where each  $R^1$  is individually selected from alkyl radicals containing from 1 to 4 carbon atoms,  $R^2$  is  $R^1$  or hydrogen,  $R^3$  represents an alkylene radical containing from 2 to 4 carbon atoms, and  $R^4$  represents an alkyl radical containing from 2 to 4 carbon atoms, the improvement consisting essentially of the following sequence of steps:

(1) forming a homogeneous mixture of said organohydrogensiloxane, said platinum catalyst and said platinum catalyst inhibitor,  
(2) aging said mixture for a period of at least 14 days under ambient conditions, and  
(3) combining the aged mixture with said organosiloxane copolymer to form said curable composition.

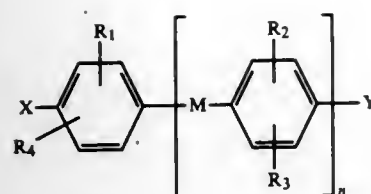
4,791,187

**LINEAR POLYURETHANE ELASTOMERS, AND A PROCESS FOR THE PREPARATION THEREOF**

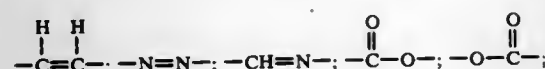
Carlhans Silling, Odeothal; Michael Kausch, Cologne, and Rudi Dauscher, Dormagen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany  
Filed Aug. 7, 1987, Ser. No. 82,531  
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1986, 3628141  
Int. Cl. C08G 18/30

U.S. Cl. 528—60  
10 Claims

1. A fiber comprising an essentially linear elastomeric polyurethane, polyurethane polyurea or combination thereof, where the elastomer is made from one or more dihydroxyl compounds of relatively high molecular weight, one or more diisocyanates and one or more organic chain extenders having liquid-crystalline properties of the general formula



in which  
M denotes



a single bond or a trans-amide group.

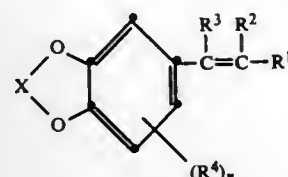
$R_1$ ,  $R_2$ ,  $R_3$  and  $R_4$ , independently of one another, denote a hydrogen, fluorine, chlorine, bromine or iodine atom, a cyano or trifluoromethyl group, an alkyl group with 1 to 12 carbon atoms or an alkyl group with 1 to 12 carbon atoms interrupted by one or more ether oxygen atoms,  $n$  is 1, 2 or 3, and  $X$  and  $Y$ , independently of each other, denote a group, which is reactive towards isocyanates, selected from OH, primary or secondary amino, SH or  $-\text{CO}-\text{NH}-\text{NH}_2$  groups, with the proviso that when  $X$  is a primary amino group,  $M$  cannot be a single bond.

**4,791,188**  
**CONDENSATION POLYMER CONTAINING THE RESIDUE OF A BENZODIOXYLMETHINE COMPOUND AND SHAPED ARTICLES PRODUCED THEREFROM**  
Max A. Weaver; Wayne P. Pruett, both of Kingsport, and Samuel D. Hilbert, Jonesborough, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.  
Filed Dec. 21, 1987, Ser. No. 135,425  
Int. Cl.<sup>4</sup> C08G 63/76, 73/16

U.S. Cl. 528—288

13 Claims

1. A composition comprising molding or fiber grade condensation polymer having copolymerized therein or reacted therewith the residue of a benzodioxymethine compound or mixture of benzodioxymethine compounds of the formula:



wherein

$R^1$  is cyano, carboxy alkenyloxycarbonyl or an unsubstituted or substituted alkoxy carbonyl, cycloalkoxy carbonyl or aryloxy carbonyl radical;  
 $R^2$  is one of the groups specified for  $R^1$  or an unsubstituted or substituted aryl, carbamoyl, alkanoyl, cycloalkanoyl, aroyl, alkylsulfonyl, cycloalkylsulfonyl, arylsulfonyl or heterocyclic aryl radical;  
 $R^3$  is hydrogen or an unsubstituted or substituted alkyl, cycloalkyl or aryl radical;  
 $R^4$  is hydrogen, alkyl, alkoxy, or halogen;  
 $n$  is 1 or 2; and  
 $X$  is an unsubstituted or substituted methylene or ethylene radical; provided the benzodioxymethine compound bears at least one substituent that is reactive with one of the monomers from which the condensation polymer is derived, said benzodioxymethine residue absorbing radiation in the range of about 250 nm to 390 nm and being

nonextractable from said polymer and stable under polymer processing conditions.

(I)

**4,791,189**  
**TERMINALLY UNSATURATED MACROMOLECULAR MONOMERS OF POLYLACTONES AND COPOLYMERS THEREOF**

Simon H. Yu, Westlake, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed May 7, 1987, Ser. No. 46,818

Int. Cl.<sup>4</sup> C08G 63/08, 63/10

U.S. Cl. 528—355

7 Claims

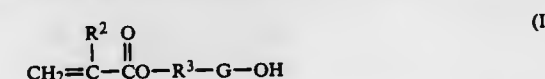
1. A process for the manufacture of a polylactone macromer having an ethylenically unsaturated functional group near one end and a hydroxyl group at the other, comprising, polymerizing

(A) a cationically ring-openable lactone having the structure:



wherein,  $n$  is an integer in the range from 4 to about 7;  $R^1$  is a group selected from hydrogen,  $C_1$ - $C_{20}$  alkyl, cycloalkyl, alkoxy and phenyl, and the number of  $R^1$  groups which are H is at least  $(n+2)$ ; and,

(B) an ethylenically unsaturated primary or secondary alcohol selected from the group consisting of  
(i) an acryloyl alcohol wherein the ethylenic unsaturation is adjacent a carbonyl group as in the structure

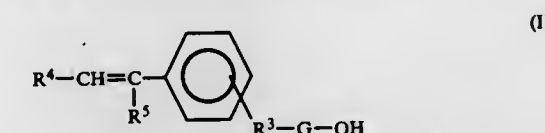


wherein  $R^2$  is H or alkyl having from 1 to about 20 carbon atoms ( $C_1$ - $C_{20}$ );

$R^3$ , if present, is selected from the group consisting of branched or linear alkylene, haloalkylene, alkoxy, haloalkoxy, each  $C_1$ - $C_{20}$ , aralkylene, haloaralkylene, aralkoxy, and haloaralkoxy, each  $C_7$ - $C_{20}$ ;

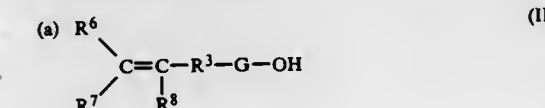
$G$  is a polymeric polyether spacer containing no active hydrogen, and having a number average molecular weight  $M_n$  up to about 30,000;

(ii) a styrylallyl unsaturated primary or secondary alcohol wherein the ethylenic unsaturation is adjacent an aromatic ring, said alcohol represented by the structure

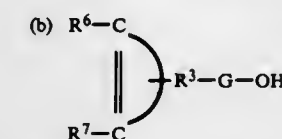


wherein,  $R^3$  and  $G$ , if either is present, is in an ortho-, meta-, or para-position of the phenyl ring which may be substituted, said position being relative to that of the olefinically unsaturated group; and,  
 $R^4$  and  $R^5$  are selected from the group consisting of hydrogen,  $C_1$ - $C_{10}$  alkyl and haloalkyl, and, at least one of  $R^4$  and  $R^5$  is always H;

(iii) an allylallyl unsaturated primary or secondary alcohol represented by the structure



wherein only  $G$  is optionally present; or



(IV)

wherein, both  $R^3$  and  $G$  are each optionally present;  $R^6$ ,  $R^7$  and  $R^8$  are independently selected from the group consisting of hydrogen,  $C_1$ - $C_{20}$  alkyl and haloalkyl, and,  $C_6$ - $C_{20}$  aryl and aralkyl; in the presence of an effective amount of

(C) a cationic initiator selected from the group consisting of an oxonium salt and etherate of boron trifluoride at a temperature in the range from 0° C. to 90° C.; so as to produce a macromer having substantially uniform molecular weight distribution such that its ratio of  $M_w/M_n$  is not above 5.0, with conversion in the range from about 81% to about 95%, said macromer having the structure



wherein  $R$  represents the residue of said alcohol having a vinyl group,

$M$  represents the polyester repeating unit of at least one said lactone which is ring-opened, and,  
 $m$  represents an integer in the range from 2 to about 500.

**4,791,190**  
**REMOVAL OF PALLADIUM COMPOUND CATALYST RESIDUES FROM POLYMER KETONES**

Johannes A. M. Van Broekhoven, CM Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Nov. 26, 1986, Ser. No. 935,430

Claims priority, application Netherlands, Nov. 26, 1985, 8503259

Int. Cl.<sup>4</sup> C08G 67/02

U.S. Cl. 528—483

35 Claims

1. A process for reducing catalyst residues in a polymer, which process comprises (1) suspending an isolated palladium compound catalyst-containing polymer of carbon monoxide, ethylene with or without at least one other olefinically unsaturated hydrocarbon in an organic liquid, (2) contacting the polymer suspension with an effective amount of carbon monoxide and (3) recovering a polymer having reduced palladium compound catalyst residues.

**4,791,191**  
**DEPYROGENATION OF CLINICAL ALBUMIN**  
Yu-Lee Hao, Potomac, Md., assignor to Plasmatech Corporation, Potomac, Md.

Filed Nov. 12, 1987, Ser. No. 126,120

Int. Cl.<sup>4</sup> C07K 3/28

U.S. Cl. 530—364

12 Claims

1. A method for the depyrogenation of clinical albumin comprising:

- (a) mixing at least the titrated amount of plasma with a given amount of pyrogenic albumin rendering the mixture non-pyrogenic as assayed by LAL test;
- (b) addition of physiological saline, 0.15 NaCl, to the mixture so that the protein concentration of 1.0 to 2.0% is reached;
- (c) adjusting the pH of the mixture to 5.75±0.05;
- (d) precipitation of endotoxins and impurities in the reaction mixture by the addition of ethanol in an amount sufficient to give a final concentration of 42% at pH of 5.85±0.05 at temperature of -5° to -6° C.;
- (e) removal of endotoxins and impurities as precipitate by centrifugation followed by filtration, or by direct filtration;

(f) precipitating albumin from the said filtrate at pH 4.8 and recovery of albumin paste by centrifugation or filtration.

**4,791,192**  
**CHEMICALLY MODIFIED PROTEIN WITH POLYETHYLENEGLYCOL**

Yasushi Nakagawa, Kawanishi, and Takashi Ito, Osaka, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jun. 18, 1987, Ser. No. 63,400

Claims priority, application Japan, Jun. 26, 1986, 61-151098; Apr. 21, 1987, 62-97990

Int. Cl.<sup>4</sup> C07K 15/00, 17/06; A61K 37/36

U.S. Cl. 530—399

16 Claims

1. A chemically modified protein with insulin secreting activity which comprises an islet-activating protein produced by bacteria belonging to the genus *Bordetella* and polyethylene glycol moiety of the formula



where  $R$  is a protective group for hydroxyl and  $l$  is an integer of about 7 to 700, the polyethylene glycol moiety being bound with a primary amino group of the islet-activating protein.

**4,791,193**  
**PROCESS FOR PRODUCING BOVINE LACTOFERRIN IN HIGH PURITY**

Shigeo Okonogi, Tokyo; Mamoru Tomita, Yokohama; Toshio Tomimura, Chiba; Yoshitaka Tamura, Yokohama, and Teruhiko Mizota, Tokyo, all of Japan, assignors to Morinaga Milk Industry Co., Ltd., Tokyo, Japan

Filed Jul. 16, 1987, Ser. No. 74,034

Claims priority, application Japan, Jul. 17, 1986, 61-168478

Int. Cl.<sup>4</sup> A23J 1/20

U.S. Cl. 530—416

5 Claims

1. A process for producing bovine lactoferrin in high purity from raw milk materials containing skim milk or whey originating from cow's milk, which comprises:

- (a) contacting said raw materials with a weakly acidic cation exchange resin which contains as cation exchange groups carboxymethyl groups, and has a hemoglobin adsorbing property more than 3.5 g/100 ml, at a temperature of between 0° and 60° C. to thereby adsorb said lactoferrin on said resin;
- (b) washing said ion exchange resin with water to remove substances other than those adsorbed on said cation exchange resin; and
- (c) desorbing said bovine lactoferrin from said cation exchange resin by washing said resin with a solution of at least one salt, to thereby yield purified bovine lactoferrin.

**4,791,194**  
**AZO COMPOUND PHOTORECEPTOR HAVING NAPHTHOL SUBSTITUENTS**

Tetsumi Suzuki, Isehara; Tetsuo Murayama, Machida; Hitoshi Ono, Yokohama; Shinji Aramaki, Machida, and Michio Yokoyama, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries, Ltd., Tokyo, Japan

Division of Ser. No. 686,991, Dec. 27, 1984, Pat. No. 4,618,555. This application Jul. 25, 1986, Ser. No. 890,769

Claims priority, application Japan, Jan. 11, 1984, 59-3167

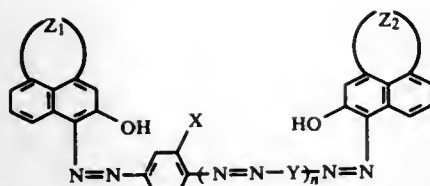
Int. Cl.<sup>4</sup> C09B 29/36, 29/42; D06P 01/08; D21H 01/46

U.S. Cl. 534—752

12 Claims

1. An azo compound having the formula:

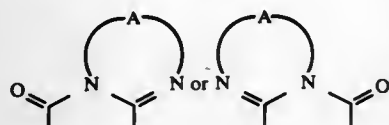




wherein X is selected from the group consisting of hydrogen, lower alkyl, lower alkoxy, halogen and cyano;

Y is phenylene or naphthylene;

Z<sub>1</sub> and Z<sub>2</sub> are independently the divalent group represented by the following formula:



where A is derived from an aromatic hydrocarbon or heterocyclic compound including one or more nitrogen atoms in the ring; and n is 1 or 2.

#### 4,791,195 NOVEL OLIGOSACCHARIDES HAVING PHARMACOLOGICAL PROPERTIES BY DEPOLYMERIZATION OF HEPARIN

Pietro Bianchini, and Giuseppe Mascellani, both of Corio, Italy, assigns to Opocrin A.P.A., Corio Modena, Italy  
Continuation-in-part of Ser. No. 582,933, Feb. 23, 1984, Pat. No. 4,629,699. This application Oct. 21, 1986, Ser. No. 921,332  
Claims priority, application Italy, Mar. 8, 1983, 40021 A/83  
Int. Cl.<sup>4</sup> C08B 37/10; A61K 31/725

U.S. Cl. 536-21

5 Claims

1. A heparin fraction which is a mixture of oligosaccharides containing an average of 13-17 monosaccharides, said oligosaccharides containing end groups composed of iduronic acid 2-sulfate, or glucosamine N, 6-disulfate, said end-groups monosaccharides containing the reducing anomeric carbon, said oligosaccharides being constituted by multiples of monosaccharide units and having a 4000-5000 molecular weight.

#### 4,791,196 CRYSTALLINE CEPHEM CARBOXYLIC ACID ADDITION SALT

Junya Ide, and Koichi Fujimoto, both of Tokyo, Japan, assigns to Sankyo Company Limited, Tokyo, Japan  
Filed Sep. 23, 1987, Ser. No. 100,204  
Claims priority, application Japan, Sep. 26, 1986, 61-227460  
Int. Cl.<sup>4</sup> C07D 501/46; A61K 31/545

U.S. Cl. 540-227

16 Claims

1. A storage-stable compound in crystalline form selected from the group consisting of 7-[2-(2-aminothiazol-4-yl)-(Z)-2-methoxyiminoacetamido]-3-[5-(2-hydroxyethyl)-4-methylthiazolomethyl]-3-cephem-4-carboxylate sulfate, the crystals being characterized by the following X-ray diffraction data determined by the powder method using the copper K<sub>α</sub>-ray, λ=0.154 nm with an error in measurement of relative intensity within ±5% (in this Table, d indicates crystal lattice and I/I<sub>max</sub> indicates relative intensity):

Phase d	Relative intensity I/I <sub>max</sub>	Phase d	Relative intensity I/I <sub>max</sub>
111.11	100	3.81	61
7.02	60	3.74	86

-continued

Phase d	Relative intensity I/I <sub>max</sub>	Phase d	Relative intensity I/I <sub>max</sub>
6.10	29	3.69	39
5.75	24	3.61	79
5.03	24	3.53	59
4.69	92	3.40	38
4.51	27	3.35	32
4.47	38	3.25	30
4.38	42	3.15	83
4.31	76	2.74	25
4.00	32	2.67	35
3.96	27		

#### 4,791,197 CEPHALOSPORIN COMPOUNDS

Kenji Sakagami, 156, Furukawa-cho, Saiwai-ku, Kawasaki-shi, Kanagawa-ken; Kunio Atsumi, 3-16-11, Hiyoshi, Kohhoku-ku, Yokohama-shi, Kanagawa-ken; Ken Nishihata, 23-3, Shiratoridai, Midori-ku, Yokohama-shi, Kanagawa-ken; Takashi Yoshida, 2-9-22, Himonya, Meguro-ku, Tokyo, and Shunzo Fukatsu, 1-13, Ichigaya Tamachi, Shinjuku-ku, Tokyo, all of Japan

Filed Jul. 2, 1985, Ser. No. 751,208

Claims priority, application Japan, Jul. 9, 1984, 59-140722

Int. Cl.<sup>4</sup> C07D 501/22; A61K 31/545

U.S. Cl. 540-227

1 Claim

1. 7-[2-(2-aminothiazol-4-yl)-2-carboxymethyleneacetamido]-3-(5-methyl-1,3,4-thiadiazol-2-yl)thiomethyl-3-cephem-4-carboxylic acid (Z-isomer), its trifluoroacetate and its sodium salt.

#### 4,791,198 BETA-LACTAM COMPOUND AND PREPARATION THEREOF

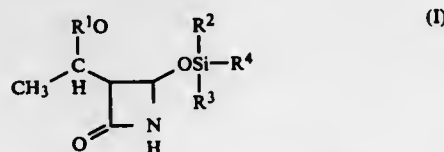
Takehisa Ohashi; Kazunori Kan, both of Kobe; Noboru Ueyama; Issa Sada, both of Akashi; Akimasa Miyama, Takasago, and Kiyoshi Watanabe, Akashi, all of Japan, assigns to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan  
Continuation-in-part of Ser. No. 750,214, Jul. 1, 1985, abandoned. This application Jan. 6, 1987, Ser. No. 810  
Claims priority, application Japan, Jul. 5, 1984, 59-139797; Jan. 14, 1986, 61-5636

Int. Cl.<sup>4</sup> C07D 205/08; C07F 7/18

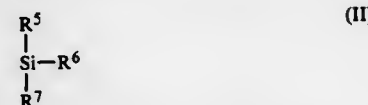
U.S. Cl. 540-354

3 Claims

1. A β-lactam compound of the formula (I):



wherein R<sup>1</sup> is a trialkylsilyl group of the formula (II):



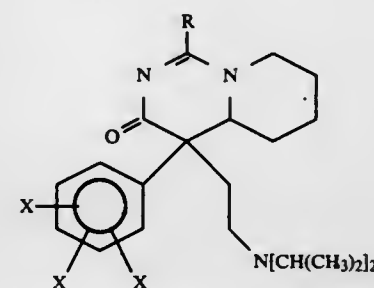
wherein each of R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> is independently a lower alkyl group, or R<sup>1</sup> is acetyl group, benzyloxycarbonyl group, o-nitrobenzyloxycarbonyl group, p-nitrobenzyloxycarbonyl group or t-butyl group, and each of R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> is independently a lower alkyl group having 1 to 4 carbon atoms, phenyl group or an aralkyl group.

4,791,199  
PROCESS FOR ANTIARRHYTHMIC  
1,3-DIAZABICYCLO[4.4.0]DEC-2-EN-4-ONES  
Kathleen T. McLaughlin, Arlington Heights; Robert J. Chorvat, Lake Bluff, and Kathleen A. Prodan, Buffalo Grove, all of Ill., assigns to G. D. Searle & Co., Chicago, Ill.  
Filed Sep. 19, 1985, Ser. No. 777,661  
Int. Cl.<sup>4</sup> C07D 471/04

U.S. Cl. 544-282

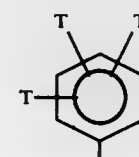
12 Claims

1. A process for preparing a 1,3-diazabicyclo[4.4.0]dec-2-en-4-one of the formula



or an isomer or a racemate thereof, wherein R is:

- hydrogen
- alkyl of 1 to 6 carbon atoms, inclusive; or
- phenyl



wherein each T is a substituent taken independently, selected from the group consisting of:

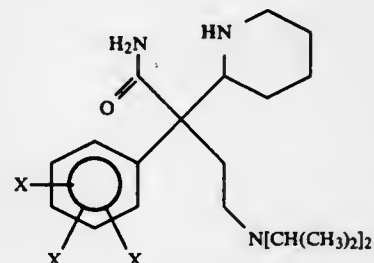
- hydrogen
- halogen;
- alkyl of 1 to 6 carbon atoms, inclusive;
- alkoxy of 1 to 6 carbon atoms, inclusive; or
- phenyl;

wherein each X is a substituent taken independently, selected from the group consisting of:

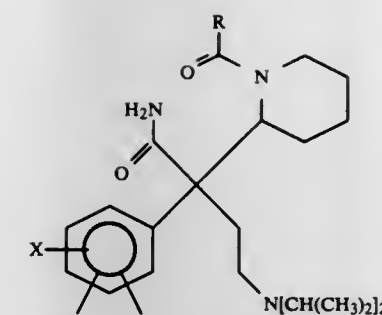
- hydrogen;
- halogen;
- alkyl of 1 to 6 carbon atoms, inclusive;
- alkoxy of 1 to 6 carbon atoms, inclusive; or
- phenyl

comprising

- acylating a 2-piperidineacetamide of the formula



or an isomer or a racemate thereof, wherein T and X are defined as above, to form a 1-acyl-2-piperidineacetamide of the formula



or an isomer or a racemate thereof, wherein R, T, and X are defined as above; and

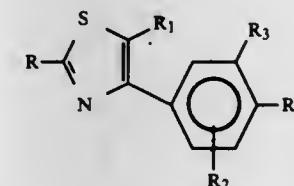
- cyclizing the 1-acyl-2-piperidineacetamide with a strong base taken from the group consisting of alkali metal hydroxides, alkali metal alkoxides, alkaline earth hydroxides, and quaternary ammonium hydroxides in a polar organic solvent.

4,791,200  
2-SUBSTITUTED-4-ARYL-SUBSTITUTED THIAZOLES  
Jeffery B. Press, Rocky Hill; Pauline Sanfilippo, Flemington, and Maud Urbanski, Belle Mead, all of N.J., assigns to Ortho Pharmaceutical Corporation, Raritan, N.J.  
Filed Jun. 22, 1987, Ser. No. 64,717  
Int. Cl.<sup>4</sup> C07D 277/28, 417/12; A61K 31/425

U.S. Cl. 544-369

13 Claims

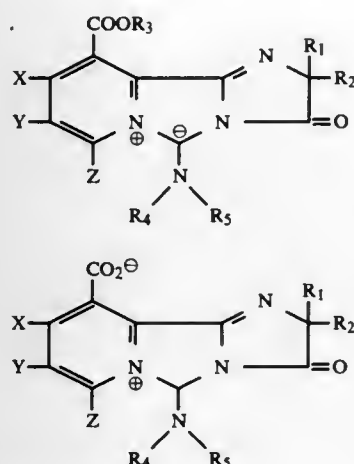
1. A compound of the formula



where

R is C<sub>1</sub>-C<sub>4</sub> alkyl, phenyl, phenyl substituted by CF<sub>3</sub>, halo selected from I, Br, Cl, C<sub>1</sub>-C<sub>3</sub> alkyl or C<sub>1</sub>-C<sub>3</sub> alkoxy, acetamido, nitro, cyano, alkylamino or dialkylamino having 1-4 carbons or pyridinyl,  
R<sub>1</sub> is H or C<sub>1</sub>-C<sub>4</sub> alkyl,  
R<sub>2</sub> is H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy Cl, Br, or I,  
R<sub>3</sub> or R<sub>4</sub> are —O—(CH<sub>2</sub>)<sub>m</sub>—NR<sub>5</sub>R<sub>6</sub>, wherein one of R<sub>3</sub> or R<sub>4</sub> is H, provided that when R<sub>4</sub> is —O—(CH<sub>2</sub>)<sub>m</sub>—NR<sub>5</sub>R<sub>6</sub>, R<sub>3</sub> is hydrogen, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy, or Cl, Br or I,  
R<sub>5</sub> and R<sub>6</sub> are the same or different and are C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, benzyl, benzyl substituted by C<sub>1</sub>-C<sub>3</sub> alkyl, C<sub>1</sub>-C<sub>3</sub> alkoxy, halo selected from Br, I, Cl or CF<sub>3</sub>, or R<sub>5</sub> and R<sub>6</sub> together with N are imidazole, triazole, piperidine, pyrrolidine or N-substituted piperazine wherein the substituent is C<sub>1</sub>-C<sub>4</sub> alkyl, phenyl or phenyl substituted by C<sub>1</sub>-C<sub>3</sub> alkoxy, and  
m is 2-6, and acid addition salts thereof.

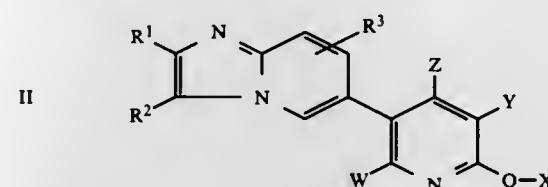
4,791,201  
**5H-IMIDAZO[2',1':4,3]IMIDAZO[1,5A]PYRIDIN-6-IUM  
 SALTS AND PROCESSES FOR THEIR PRODUCTION**  
 Marinus Los, Pennington, N.J., assignor to American Cyanamid  
 Company, Stamford, Conn.  
 Division of Ser. No. 822,098, Jan. 24, 1986, Pat. No. 4,698,092.  
 This application Jun. 25, 1987, Ser. No. 66,157  
 Int. Cl.<sup>4</sup> C07D 221/00, 471/14, 471/20  
 U.S. Cl. 546—15 19 Claims  
 1. A process for the preparation of a compound having the  
 structure



wherein

X is H, halogen or methyl;  
 Y and Z are each hydrogen, halogen, C<sub>1</sub>-C<sub>6</sub> alkyl hydroxy-  
 loweralkyl C<sub>1</sub>-C<sub>6</sub> alkoxy, C<sub>1</sub>-C<sub>4</sub> alkylthio, phenoxy,  
 C<sub>1</sub>-C<sub>4</sub> haloalkyl, nitro, cyano, C<sub>1</sub>-C<sub>4</sub> alkylamino, di-  
 loweralkylamino or C<sub>1</sub>-C<sub>4</sub> alkylsulfonyl group, or phenyl  
 optionally substituted with one C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy  
 or halogen, difluoromethoxy, trifluoromethoxy, 1,1,2,2-  
 tetrafluoroethoxy, C<sub>3</sub>-C<sub>8</sub> straight or branched alkenyloxy  
 optionally substituted with one to three halogens, or  
 C<sub>3</sub>-C<sub>8</sub> straight or branched alkynyloxy optionally substituted  
 with one to three halogens;  
 and when taken together Y and Z may form a ring represented  
 by —(CH<sub>2</sub>)<sub>n</sub>—, where n is an integer of 3 or 4, or —(CH)<sub>4</sub>—;  
 R<sub>1</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl;  
 R<sub>2</sub> is C<sub>1</sub>-C<sub>4</sub> alkyl or C<sub>3</sub>-C<sub>6</sub> cycloalkyl; and when R<sub>1</sub> and  
 R<sub>2</sub> are taken together with the carbon to which they are  
 attached they may represent C<sub>3</sub>-C<sub>6</sub> cycloalkyl optionally  
 substituted with methyl;  
 R<sub>3</sub> is H or lower alkyl optionally substituted by phenyl;  
 R<sub>4</sub> and R<sub>5</sub> are each C<sub>1</sub>-C<sub>4</sub> alkyl or phenyl, or when taken  
 together may form a piperidine or pyrrolidine ring;  
 and when R<sub>1</sub> and R<sub>2</sub> are not the same the optical isomers  
 thereof; comprising the steps of (1) reacting an imidazolin-2-yl  
 pyridine or quinolinecarboxylic acid ester or a carbamoyl  
 pyridine or quinolinecarboxylic acid ester with an approxi-  
 mately equimolar amount of a Vilsmeier reagent, said Vilsmeier  
 reagent comprising a formamide, having the structure  
 R<sub>4</sub>R<sub>5</sub>NCHO wherein R<sub>4</sub> and R<sub>5</sub> are as described above, reacted  
 with phosgene, thionylchloride or POCl<sub>3</sub>, and (2) op-  
 tionally treating the resulting product of step (1) with alcoholic  
 base, followed by (3) acidification and (4) isolation of the  
 product.

4,791,202  
**5-(6-IMIDAZO[1,2-A]PYRIDYL)PYRIDINE  
 DERIVATIVES**  
 Motosuke Yamanaka, Chiba; Kazutoshi Miyake, Ibaraki; Shinji  
 Suda, Ibaraki; Hideto Ohhara, Ibaraki, and Toshiaki Ogawa,  
 Ibaraki, all of Japan, assignors to Eisai Co., Ltd., Tokyo,  
 Japan  
 Division of Ser. No. 844,013, Mar. 26, 1986, Pat. No. 4,751,227.  
 This application Aug. 5, 1987, Ser. No. 81,778  
 Claims priority, application Japan, Mar. 26, 1985, 60-59450  
 The portion of the term of this patent subsequent to Jun. 14,  
 2005, has been disclaimed.  
 Int. Cl.<sup>4</sup> C07D 471/04  
 U.S. Cl. 546—121 2 Claims  
 1. A compound of the formula:



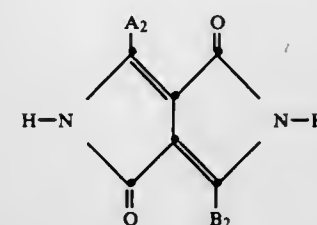
wherein:

R<sup>1</sup>=lower alkyl, phenyl or —CH<sub>2</sub>R<sup>4</sup>  
 R<sup>2</sup>=H or halogen  
 R<sup>3</sup>=H, lower alkyl or halogen  
 X=H or methyl  
 Y=CN, carboxamido, H, amino or halogen  
 Z=H or lower alkyl and  
 W=H or lower alkyl.

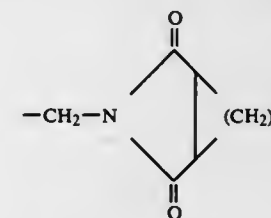
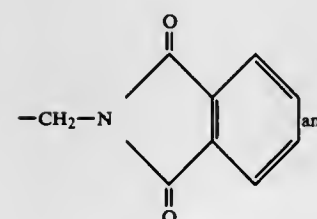
4,791,203  
**5-(6-IMIDAZO[1,2-A]PYRIDYL)PYRIDINE  
 DERIVATIVES**  
 Motosuke Yamanaka, Chiba; Kazutoshi Miyake, Ibaraki; Shinji  
 Suda, Ibaraki; Hideto Ohhara, Ibaraki, and Toshiaki Ogawa,  
 Ibaraki, all of Japan, assignors to Eisai Co., Ltd., Tokyo,  
 Japan  
 Division of Ser. No. 844,013, Mar. 26, 1986, Pat. No. 4,751,227.  
 This application Aug. 5, 1987, Ser. No. 81,776  
 Claims priority, application Japan, Mar. 26, 1985, 60-59450  
 The portion of the term of this patent subsequent to Jun. 14,  
 2005, has been disclaimed.  
 Int. Cl.<sup>4</sup> C07D 471/04  
 U.S. Cl. 546—121 7 Claims  
 1. A 5-(6-imidazo[1,2-a]pyridyl)pyridine compound which is:

A. 1,2-Dihydro-6-methyl-5-(7-methylimidazo[1,2-a]pyridin-  
 6-yl)-2-oxo-3-pyridinecarboxitrile  
 B. 1,2-Dihydro-6-methyl-5-(5-methylimidazo[1,2-a]pyridin-  
 6-yl)-2-oxo-3-pyridinecarboxitrile  
 C. 1,2-Dihydro-6-methyl-5-(imidazo[1,2-a]pyridin-6-yl)-2-  
 oxo-pyridine  
 D. 5-(3-Bromoimidazo[1,2-a]pyridin-6-yl)-1,2-dihydro-6-  
 methyl-2-oxo-3-pyridinecarboxitrile hydrobromide  
 E. 5-(3-Chloroimidazo[1,2-a]pyridin-6-yl)-1,2-dihydro-6-  
 methyl-2-oxo-3-pyridinecarboxitrile hydrobromide  
 F. 5-(Imidazo[1,2-a]pyridin-6-yl)-2-methoxy-6-methyl-3-  
 pyridinecarboxitrile.

4,791,204  
**1,4-DIKETOPYRROLO[3,4-C]PYRROLE PIGMENTS**  
 Max Jost, Oberwil; Abul Iqbal, Ettingen, and Alain C. Rochat,  
 Fribourg, all of Switzerland, assignors to Ciba-Geigy Corpora-  
 tion, Ardsley, N.Y.  
 Filed Nov. 19, 1986, Ser. No. 932,258  
 Claims priority, application Switzerland, Nov. 26, 1985,  
 5054/85  
 Int. Cl.<sup>4</sup> C07D 487/04  
 U.S. Cl. 548—101 3 Claims  
 1. A compound of formula IV'

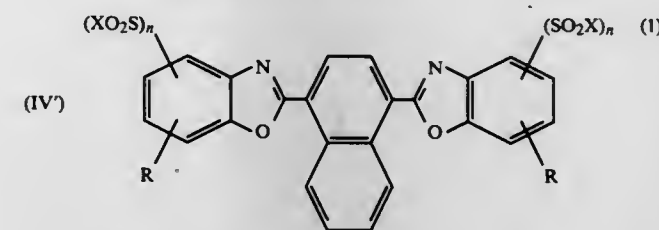


containing at least one group of the formulae —SO<sub>3</sub>L,  
 —CO<sub>2</sub>L, —PO<sub>3</sub>(L)<sub>2</sub>,



wherein A<sub>2</sub> or B<sub>2</sub> are identical or different phenyl groups or  
 phenyl radicals which are substituted by water-insolubilizing  
 substituents selected from the group consisting of halogen,  
 C<sub>1</sub>-C<sub>6</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxy, C<sub>1</sub>-C<sub>6</sub> alkyl-mercapto, trifluoro-  
 methyl, cyano, dimethylamino, diethylamino, C<sub>2</sub>-C<sub>6</sub> alkoxy-  
 carbonyl, acetylaminomethyl, carbamoyl or sulfamoyl, or A<sub>2</sub> and B<sub>2</sub>  
 are 4-biphenyl, naphthyl or pyridyl, L is —H, a group of  
 formula M<sup>+</sup>/n or N<sup>+</sup>H(R<sub>8</sub>)(R<sub>9</sub>)(R<sub>10</sub>), M is a monovalent,  
 divalent or trivalent metal cation, n is 1, 2 or 3, R<sub>8</sub>, R<sub>9</sub> and R<sub>10</sub>  
 are each independently —H or alkyl, benzyl, C<sub>5</sub>-C<sub>6</sub> cycloalkyl  
 or phenyl radicals, or R<sub>9</sub> and R<sub>10</sub>, together with the nitrogen  
 atom to which they are attached, form a morpholine or piperi-  
 dine radical, q is an integer from 1 to 4, with the proviso that  
 L may not be a sodium cation if the compounds of formula IV'  
 contain a —SO<sub>3</sub>L group.

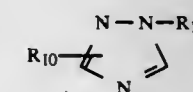
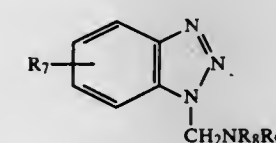
4,791,205  
**BISBENZOXAZOLYLNAPHTHALENES CONTAINING  
 SULFONATE OR SULFONAMIDE GROUPS, A PROCESS  
 FOR THEIR PREPARATION AND THEIR USE**  
 Erich Schinzel; Hans Frischkorn, both of Hofheim am Taunus,  
 and Thomas Martini, Kelkheim (Taunus), all of Fed. Rep. of  
 Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt  
 am Main, Fed. Rep. of Germany  
 Filed May 21, 1987, Ser. No. 52,783  
 Claims priority, application Fed. Rep. of Germany, May 23,  
 1986, 3617451  
 Int. Cl.<sup>4</sup> C07D 263/56 3 Claims  
 U.S. Cl. 548—106 3 Claims  
 1. A compound of the formula (I),



in which

n denotes 1 or 2,  
 X denotes an OMe group,  
 Me denotes a proton, an alkali metal cation or an unsubsti-  
 tuted or mono-, di-, or tri-hydroxy-substituted (lower  
 alkyl) ammonium cation,  
 R denotes hydrogen, a lower alkyl group or halogen, and, in  
 the event that  
 n is 1,  
 X also denotes an —NR<sup>1</sup>R<sup>2</sup> group in which R<sup>1</sup> and R<sup>2</sup> repre-  
 sent hydrogen or a lower alkyl group.

4,791,206  
**TRIAZOLE-ORGANODITHIOPHOSPHATE REACTION  
 PRODUCT ADDITIVES FOR FUNCTIONAL FLUIDS**  
 Robert M. O'Neill, Boothstown, England; Ulrich Kristen, and  
 Ulrich Häring, both of Riehen, Switzerland, assignors to  
 Ciba-Geigy Corporation, Ardsley, N.Y.  
 Filed May 9, 1986, Ser. No. 861,186  
 Claims priority, application United Kingdom, May 16, 1985,  
 8512444; Jun. 19, 1985, 8515477  
 Int. Cl.<sup>4</sup> C07F 9/65 12 Claims  
 U.S. Cl. 548—108 12 Claims  
 1. Reaction product obtained by reacting, at elevated tem-  
 perature,  
 (A) a triazole having the formula IA or IB:



wherein R<sub>7</sub> is hydrogen or a C<sub>1</sub>-C<sub>20</sub> alkyl residue;  
 R<sub>8</sub> and R<sub>9</sub> are the same or different and each is C<sub>1</sub>-C<sub>20</sub> alkyl,  
 C<sub>3</sub>-C<sub>20</sub> alkenyl, C<sub>5</sub>-C<sub>12</sub> cycloalkyl, C<sub>7</sub>-C<sub>13</sub> aralkyl,  
 C<sub>6</sub>-C<sub>10</sub> aryl or R<sub>8</sub> and R<sub>9</sub>, together with the nitrogen atom  
 to which they are attached, form a 5-, 6- or 7-membered  
 heterocyclic residue or R<sub>8</sub> and R<sub>9</sub> is each a residue of  
 formula:



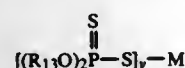


wherein

X is O, S or N(R<sub>12</sub>), R<sub>12</sub> is hydrogen or C<sub>1</sub>-C<sub>20</sub> alkyl, "alkylene" is a C<sub>1</sub>-C<sub>12</sub> alkylene residue and n is O or an integer from 1 to 6;

R<sub>10</sub> is hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl or C<sub>6</sub>-C<sub>10</sub> aryl or C<sub>7</sub>-C<sub>18</sub> alkyl phenyl; and R<sub>11</sub> is hydrogen, C<sub>1</sub>-C<sub>20</sub> alkyl or a residue -CH<sub>2</sub>NR<sub>8</sub>R<sub>9</sub> wherein R<sub>8</sub> and R<sub>9</sub> have their previous significance; with

(B) an organodithiophosphate having the formula:



in which R<sub>13</sub> is a C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>7</sub>-C<sub>18</sub> alkyl phenyl or C<sub>7</sub>-C<sub>13</sub> aralkyl group, M is a metal ion of Group IA, IB, IIA, IIB, VB, VIB, VIIB or VIII of the Periodic System of Elements, and y is the valency of M.

#### 4,791,207 ENANTIOSELECTIVE PROCESS FOR PRODUCING 1-BETAMETHYL CARBAPENEM ANTIBIOTIC INTERMEDIATES

Thomas N. Salzmann, North Plainfield; Lelia M. Fuentes, and Ichiro Shinkai, both of Westfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

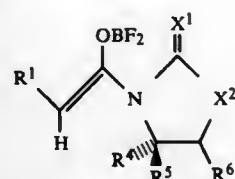
Continuation of Ser. No. 837,103, Mar. 6, 1986, abandoned, which is a continuation-in-part of Ser. No. 717,742, Mar. 29, 1985, abandoned. This application May 4, 1987, Ser. No. 45,724

Int. Cl.<sup>4</sup> C07F 5/02

U.S. Cl. 548-110

6 Claims

1. A compound of the formula:



wherein X<sup>1</sup> and X<sup>2</sup> are independently O or S, R<sup>1</sup> is C<sub>1</sub>-C<sub>4</sub> lower alkyl or alkoxy, R<sup>4</sup>, R<sup>5</sup> and R<sup>6</sup> are independently selected from H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>7</sub>-C<sub>10</sub> aralkyl, C<sub>6</sub>-C<sub>10</sub> aryl, C<sub>7</sub>-C<sub>10</sub> alkaryl, which can be substituted with -OH, -OR<sup>10</sup>, -SH, SR<sup>10</sup>, where R<sup>10</sup> is C<sub>1</sub>-C<sub>4</sub> alkyl, with the proviso that R<sup>4</sup> and R<sup>5</sup> are not identical.

#### 4,791,208 NOVEL 5-HALOGENOALKYL-1,3,4-THIADIAZOL-2-YLOX- YACETAMIDE HERBICIDES AND FUNGICIDES

Heinz Förster; Hans-Joachim Diehr; Fritz Maurer, all of Wuppertal; Erich Klauke, Odenthal; Ludwig Eue, Leverkusen; Hans-Joachim Santel, Cologne; Robert R. Schmidt, Bergisch-Gladbach; Paul Reinecke, Leverkusen, and Gerd Hänssler, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 684,567, Dec. 21, 1984, Pat. No. 4,708,731.

This application Aug. 7, 1987, Ser. No. 83,556

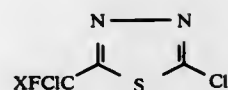
Claims priority, application Fed. Rep. of Germany, Jan. 4, 1984, 3400168

Int. Cl.<sup>4</sup> C07D 285/12

U.S. Cl. 548-136

3 Claims

1. A 2-chloro-5-trihalomethyl-1,3,4-thiadiazole of the formula



in which  
X is F or Cl.

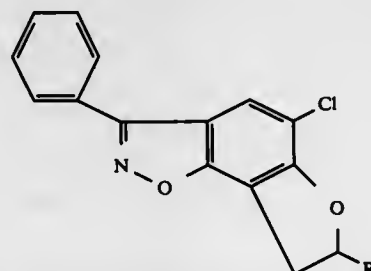
4,791,209  
FUROBENZISOXAZOLE DERIVATIVES  
Haruhiko Seto, Tokyo; Hiroshi Koga, Saitama; Takashi Dan, and Etsuro Onuma, both of Tokyo, all of Japan, assignors to Chugai Selyako Kabushiki Kaisha, Tokyo, Japan  
Filed May 6, 1986, Ser. No. 860,210  
Claims priority, application Japan, May 22, 1985, 60-109729; Dec. 23, 1985, 60-290133

Int. Cl.<sup>4</sup> C07D 498/04; A61K 31/42

U.S. Cl. 548-242

2 Claims

1. A compound of the formula:



wherein R is a hydroxymethyl group, a carboxyl group or a lower alkoxy carbonyl group having 1 to 3 carbon atoms or a nontoxic salt thereof when R is a carboxyl group.

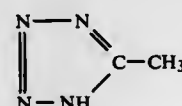
4,791,210  
PROCESS FOR THE PRODUCTION OF  
5-METHYLTETRAZOLE  
Günter Bison, Troisdorf; Johannes Schlupp, Bergisch-Gladbach; Josef Winterscheid, St. Augustin, and Klaus Thewalt, Witten, all of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany  
Filed Oct. 13, 1987, Ser. No. 106,872  
Claims priority, application Fed. Rep. of Germany, Oct. 11, 1986, 3634717

Int. Cl.<sup>4</sup> C07D 257/04

U.S. Cl. 548-250

8 Claims

1. A process for the production of 5-methyltetrazole of the formula:



which comprises reacting acetonitrile with an ammonium or alkali azide at reaction temperatures of 90°-160° C. in the presence of a trialkylamine solvent and an HCl addition salt thereof as a catalyst, said trialkylamine having alkyl groups containing 1 to 4 carbon atoms and said salt catalyst being a hydrochloride of a trialkylamine having alkyl groups containing 2 to 4 carbon atoms; the salt catalyst being present in equimolar quantity or in an excess of 0.02-10 mol-%, based on the azide.

4,791,211  
PROCESS FOR THE PRODUCTION OF  
2-STILBYLNAPHTHOTRIAZOLE OPTICAL BLEACHES  
Richard B. Lund, Jackson, and Larry W. Bass, Daphne, both of Ala., assignors to Ciba-Gelby Corporation, Ardley, N.Y.  
Continuation-in-part of Ser. No. 745,822, Jun. 18, 1985, abandoned, which is a continuation of Ser. No. 661,873, Oct. 17, 1984, abandoned, which is a continuation of Ser. No. 424,728, Sep. 27, 1982, abandoned. This application Jan. 20, 1987, Ser. No. 5,496

Int. Cl.<sup>4</sup> C07D 249/24

U.S. Cl. 548-260

4 Claims

1. In a process for preparing a 2-stilbynaphthotriazole optical bleach having the steps of:

(a) diazotizing an aminostilbene 2-sulfonic acid;  
(b) coupling the thus formed diazonium salt with a naphthylamino-sulfonic acid to form a stilbynaphthyl mono-azo salt;

(c) oxidizing said monoazo salt to form a 2-stilbynaphthotriazole compound; and

(d) isolating and recovering said 2-stilbynaphthotriazole optical bleach as its sodium salt;

the improvement comprising the step of conducting said coupling (b) by adding said naphthylaminosulfonic acid to said diazonium salt from the diazotization, neutralized to a pH in the range of 6-8 and maintaining the pH in the range of 6-8, in the presence of 2-butoxyethanol as a solvent for the organic reactants and products.

#### 4,791,212 4-ALKENYLAMINOCARBONYL- AND 4-ALKINYLAMINOCARBONYL-1-PHENYL-5- PYRAZOLAMINES

Reinhold Gehring, Wuppertal; Erich Klauke, Odenthal; Otto Schallner, Monheim; Jörg Stetter, Wuppertal; Hans-Joachim Santel, Cologne, and Robert R. Schmidt, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 659,731, Oct. 11, 1984, Pat. No. 4,668,280.

This application Dec. 30, 1986, Ser. No. 947,667

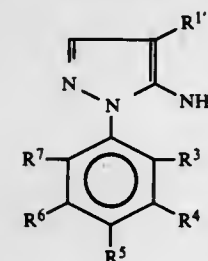
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1983, 3337543; Jun. 6, 1984, 3420985

Int. Cl.<sup>4</sup> C07D 231/38

U.S. Cl. 548-362

2 Claims

1. A 5-aminopyrazole of the formula



in which

R<sup>1</sup> represents alkenylaminocarbonyl or alkynylaminocarbonyl with in each case up to 4 carbon atoms is the individual hydrocarbyl parts and

R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup>, which are identical or different, represent hydrogen, halogen, cyano, nitro, alkyl, alkoxy, alkylsulfonyl, alkoxy carbonyl with up to 4 carbon atoms in the particular alkyl parts or a radical -(X)-R<sup>8</sup>,

wherein

X represents oxygen, sulphur, sulphonyl or sulphonyl, n represent 0 or 1 and

R<sup>8</sup> represents halogenoalkyl with up to 4 carbon atoms and up to 9 halogen atoms, with the proviso that at least one of the radicals R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> or R<sup>7</sup> represents a radical

-(X)-R<sup>8</sup> and when R<sup>1</sup> is methoxycarbonyl R<sup>3</sup> cannot be trifluoromethyl and R<sup>5</sup> cannot be chloro.

#### 4,791,213 2-HYDROXY-3-THIOXATHONYLOXY-1- PROPANAMINIUM SALTS

George Gawne, Great Bookham; Peter N. Green, and William A. Green, both of Liverpool, all of England, assignors to Ward Blenkinsop & Company Limited, Cheshire, England

Filed Nov. 5, 1986, Ser. No. 927,018

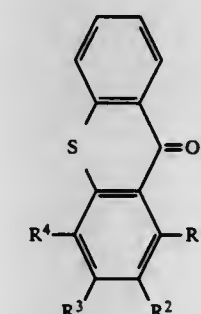
Claims priority, application United Kingdom, Nov. 29, 1985, 8529448

Int. Cl.<sup>4</sup> C07D 335/16

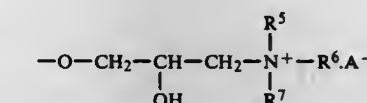
U.S. Cl. 549-27

5 Claims

1. A thioxanthone derivative of general formula



wherein one of R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> is a group of formula



in which one of R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> is a C<sub>1</sub>-20 alkyl or a benzyl group, the others being C<sub>1</sub>-6 alkyl groups and A<sup>-</sup> represents an anion, and R<sup>1</sup> and the others of R<sup>2</sup>, R<sup>3</sup>, and R<sup>4</sup> are independently selected from hydrogen atoms, C<sub>1</sub>-6 alkyl groups and C<sub>1</sub>-6 alkoxy groups.

4,791,214  
BONDING AGENT AND RESIN COMPOSITION  
Masahito Mori, Takatsuki; Masaaki So, Ibaraki, and Hirohide Tomoyasu, Morioka, all of Japan, assignors to Sunstar Giken Kabushiki Kaisha, Takatsuki, Japan

Filed Jul. 16, 1986, Ser. No. 886,152

Claims priority, application Japan, Jul. 18, 1985, 60-159584; Jul. 19, 1985, 60-160812

Int. Cl.<sup>4</sup> C07F 7/10

U.S. Cl. 556-423

1 Claim

1. A bonding agent which comprises a reaction product of an epoxyalkylalkoxysilane selected from the group consisting of  $\gamma$ -glycidoxypolydimethylethoxysilane,  $\gamma$ -glycidoxypolydimethyldiethoxysilane,  $\gamma$ -glycidoxypolytrimethoxysilane,  $\beta$ -(3,4-epoxycyclohexyl)ethyltrimethoxysilane and  $\beta$ -(3,4-epoxycyclohexyl)ethylmethyldimethoxysilane, and an aliphatic polyether polyamine having polypropylene glycol nucleus and having a molecular weight of 200 to 3,000.

**4,791,215**  
**DERIVATIVES OF GLUTAMIC ACID AND ASPARTIC ACID**

Luigi Rovati, Francesco Makovec, Rolando Chiste, and Paolo Sena, all of Monza, Italy, assignors to Rotta Research Laboratories S.p.A., Milan, Italy

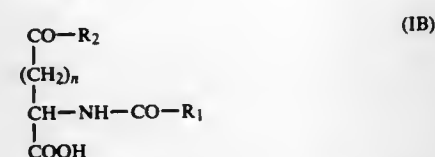
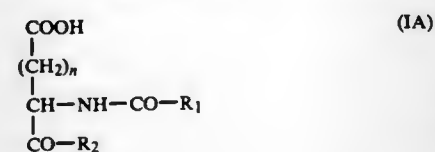
Filed Jun. 18, 1985, Ser. No. 746,065

Claims priority, application Italy, Jun. 25, 1984, 67644 A/84; Oct. 26, 1984, 68070 A/84

Int. Cl.<sup>4</sup> C07C 121/52; A61K 31/275

U.S. Cl. 558—415 **6 Claims**

1. Pharmaceutically active derivatives of D,L-glutamic acid and D,L-aspartic acid having the formulae:



in which n is equal to 1 or 2, R<sub>1</sub> is a phenyl group mono-, di- or tri-substituted with linear or branched C<sub>1</sub>-C<sub>4</sub> alkyl groups, which may be the same or different, or with halogens, with a cyano group or a trifluoromethyl group, and in which R<sub>2</sub> is selected from the group consisting of morpholino, piperidino and amino with one or two linear, branched or cyclic alkyl group substituents containing from 1 to 8 carbon atoms, which may be the same or different, and pharmaceutically-acceptable salts thereof.

**4,791,216**  
**PARA ETHYL AMINO PHENOL PHARMACEUTICAL COMPOUNDS**

Francis Ince, and Alan C. Tinker, both of Loughborough, Great Britain, assignors to Fisons plc, Leicestershire, England

Division of Ser. No. 662,348, Oct. 18, 1984, Pat. No. 4,657,929.

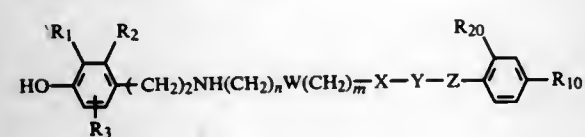
This application Dec. 5, 1986, Ser. No. 938,249

Claims priority, application United Kingdom, Oct. 25, 1983, 8328489; Oct. 25, 1983, 8328490

Int. Cl.<sup>4</sup> C07C 147/06, 103/85, 87/28

U.S. Cl. 560—39 **9 Claims**

1. A compound of formula I,



in which

R<sub>1</sub> represents CH<sub>2</sub>R<sub>12</sub>, or fluorine;  
 R<sub>2</sub> and R<sub>3</sub>, which may be the same or different, each independently represent hydrogen, fluorine, chlorine, bromine, alkyl C<sub>1</sub> to C<sub>6</sub>, nitro, nitrile, (CH<sub>2</sub>)<sub>p</sub>R<sub>9</sub> or SR<sub>9</sub>;  
 R<sub>12</sub> represents hydrogen, OH, SO<sub>2</sub>R<sub>13</sub> or alkyl C<sub>1</sub> to C<sub>6</sub>,  
 R<sub>13</sub> represents alkyl C<sub>1</sub> to C<sub>6</sub>,  
 W represents a single bond, a 1,2; 1,3; or 1,4-disubstituted benzene ring; a —CH=CH— group or a 1,4-cyclohexanedimethyl group;  
 X represents NH, O, S, SO<sub>2</sub>, CO, CH<sub>2</sub>, CONH or —COO;  
 Y represents (CH<sub>2</sub>)<sub>p</sub>, CO, CS, SO<sub>2</sub> and R<sub>20</sub> represents hydrogen, or Y represents CR<sub>15</sub>R<sub>16</sub>CR<sub>17</sub>R<sub>18</sub>, wherein the carbon atom bearing R<sub>15</sub> and R<sub>16</sub> is adjacent to X and in which R<sub>17</sub> and R<sub>18</sub>, together with the carbon atom to which they

are attached from a carbonyl group, and R<sub>15</sub>, R<sub>16</sub>, R<sub>17</sub> and R<sub>18</sub> each represent hydrogen, or  
 R<sub>15</sub>, R<sub>16</sub>, R<sub>17</sub> and R<sub>18</sub> each independently represent hydrogen or alkyl C<sub>1</sub> to C<sub>6</sub> and R<sub>20</sub> represents hydrogen;  
 Z represents a single bond, NR<sub>19</sub>, CH<sub>2</sub>, O, CO, S or SO<sub>2</sub>, in which R<sub>19</sub> represents hydrogen or alkyl C<sub>1</sub> to C<sub>6</sub>;  
 n, and m each independently represent an integer from 1 to 4 inclusive;

q represents an integer from 1 to 3 inclusive;

p represents 0 or an integer from 1 to 3 inclusive;

R<sub>9</sub> represents phenyl or phenyl substituted by hydroxy, and R<sub>10</sub> represents hydrogen or chlorine,

provided that

(i) when X represents SO<sub>2</sub>, CO, COO or CONH, Y does not represent CO, CS or SO<sub>2</sub>;

(ii) when Y represents CO, CS or SO<sub>2</sub>, then Z does not represent CO or SO<sub>2</sub>,

and pharmaceutically acceptable derivatives thereof.

**4,791,217**  
**SULPHUR DERIVATIVES OF PARA-METHOXYCINNAMIC ACID, PROCESSES FOR THEIR PRODUCTION, DERMO-PHARMACEUTICAL AND COSMETIC COMPOSITIONS CONTAINING THEM AND APPLICATIONS**

Dominique D. Robert, Draguignan, and Louis L. Jung, Strasbourg, both of France, assignors to Universite Louis Pasteur, Strasbourg Cedex, France

PCT No. PCT/FR85/00164, § 371 Date Apr. 9, 1986, § 102(e)

Date Apr. 9, 1986, PCT Pub. No. WO86/00304, PCT Pub.

Date Jan. 16, 1986

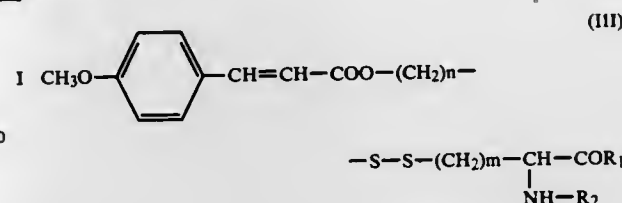
PCT Filed Jun. 21, 1985, Ser. No. 862,495

Claims priority, application France, Jun. 22, 1984, 84 10008

Int. Cl.<sup>4</sup> C07C 69/76

U.S. Cl. 560—55 **11 Claims**

1. Sulfurized derivatives of para-methoxycinnamic acid, characterized in that they correspond to the following general formula III:



in which:

the cinnamic double bond can exist either in the cis form, or in the trans form

n is a whole number comprised between 1 and 6

m is a whole number comprised between 1 and 6 and is preferably equal to 1 or 2

R<sub>1</sub> is an OR radical, R being a hydrogen atom or an alkyl or aryl group, R<sub>1</sub> can also be an amino-alkyl or amino-aryl group or have an amino-acid structure giving a peptide linkage

R<sub>2</sub> represents a hydrogen atom or an alkyl or an aryl group or a group of the formula R'—CO—, R' being an alkyl or aryl group or again R'—CO— having an amino-acid structure giving a peptide linkage.

**4,791,218**  
**CRYSTALLINE AMINO-PROTECTED AMINO ACIDS AND METHOD OF PREPARATION**

John M. Pascone, Neshanic Station, N.J., assignor to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed May 23, 1986, Ser. No. 866,546

Int. Cl.<sup>4</sup> C07C 125/073

U.S. Cl. 560—158 **18 Claims**

1. Crystalline alpha-tert-butyloxycarbonyl-epsilon-benzoyloxycarbonyl-L-lysine.

**4,791,219**  
**PREPARATION OF ETHERIFIED 3-HYDROXYVALERATES**

Rolf Fischer, Heidelberg, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

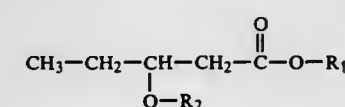
Filed Nov. 25, 1987, Ser. No. 125,567

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1986, 3640595

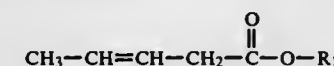
Int. Cl.<sup>4</sup> C07C 69/66

U.S. Cl. 560—187 **7 Claims**

1. A process for the preparation of an etherified 3-hydroxyvalerate of the formula I



and where R<sub>1</sub> and R<sub>2</sub> are identical or different and are each alkyl of 1 to 12 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, aralkyl of 7 to 10 carbon atoms or aryl of 6 to 10 carbon atoms, wherein a 3-pentenoate of the formula II



where R<sub>1</sub> has the above meanings, is reacted with a compound of the formula III



where R<sub>3</sub> has the same meanings as R<sub>2</sub>, at from 30° to 95° C. in the presence of a basic catalyst.

**4,791,220**  
**ISOMERIZATION OF 2-CIS-PENTENOATES TO 2-TRANS-PENTENOATES**

Rolf Fischer, Heidelberg, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

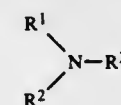
Filed Nov. 25, 1987, Ser. No. 125,532

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1986, 3640598

Int. Cl.<sup>4</sup> C07C 67/333

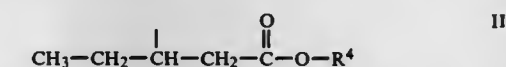
U.S. Cl. 560—205 **4 Claims**

1. A process for the isomerization of 2-cis-pentenoates to 2-trans-pentenoates, wherein a 2-cis-pentenoate is treated at from 20 to 250° C. with from 0.1 to 1 mole, per mole of 2-cis-pentenoate, of one or more compounds of the formula I



where R<sup>1</sup> is hydrogen or R<sup>1</sup> and R<sup>2</sup> are each cycloalkyl of 5 to 8 carbon atoms or alkyl of 1 to 6 carbon atoms, or R<sup>1</sup> and R<sup>2</sup> together with the nitrogen atom on which they are substituents

may form a 5-membered to 7-membered ring which may additionally contain a further nitrogen or oxygen atom, and R<sup>3</sup> is hydrogen or a radical of the formula II



where R<sup>4</sup> is alkyl of 1 to 6 carbon atoms, cycloalkyl of 5 to 7 carbon atoms, aralkyl of 7 to 10 carbon atoms or aryl of 6 to 10 carbon atoms, with the proviso that the tertiary amine is present only when R<sup>3</sup> is the radical of the formula II.

**4,791,221**  
**TRANSESTERIFICATION OF METHYL METHACRYLATE**

Philippe Gabillet, Paris, France, assignor to Francaise d'Organo Synthese, Paris, France

Filed Jul. 11, 1986, Ser. No. 884,631

Claims priority, application France, Jul. 11, 1985, 85 10674

Int. Cl.<sup>4</sup> C07C 67/02, 67/48

U.S. Cl. 560—217 **8 Claims**

1. A process for the preparation of methacrylic ester, comprising transesterifying methyl methacrylate with an alcohol heavier than methanol, wherein from 6 to 30 ppm of a lithium catalyst is incrementally added to the medium during transesterification, and wherein transesterification is carried out in the presence of an azeotrope-forming compound which forms, together with the methanol of reaction, an azeotrope which distills at a temperature of less than about 60° C.

**4,791,222**  
**PROCESS FOR PREPARING DIHYDROMYRCENOL AND DIHYDROMYRCENYL ACETATE**

Mark A. Sprecker, Sea Bright, N.J.; Stephen R. Wilson, Haverhill, United Kingdom; Leonard Steinbach, Cranford, and Thomas O'Rourke, Red Bank, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Jul. 31, 1984, Ser. No. 636,326

Int. Cl.<sup>4</sup> C07C 69/145, 67/11, 33/025, 29/124

U.S. Cl. 560—237 **4 Claims**

1. A process for preparing dihydromyrcenol comprising the steps of:

- hydrogenating α-pinene to form α-pinane;
- pyrolyzing the resulting α-pinane to form a mixture of hydrocarbons;
- reacting the resulting mixture of hydrocarbons with hydrogen chloride in the presence of an acid catalyst selected from the group consisting of Lewis acids and protonic acids thereby forming a mixture of tertiary chlorides;
- reacting the resulting mixture of tertiary chlorides with water in the presence of a hydroxylating catalyst having the structure:



wherein M represents an element selected from the group consisting of Zn, Ca, Mg, Mn and Co; wherein X represents 0 or an anion selected from the group consisting of halide, hydroxide, carbonate, bicarbonate, phosphate, monobasic acid phosphate and dibasic acid phosphate; and wherein P represents an integer of 1 or 3 and Q represents an integer of 1 or 2 with the provisos that when X is a trivalent anion, then P is 3 and Q is 2 and when X is a divalent anion or is 0, then P is 1 and Q is 1 and when X is a monovalent anion, then P is 1 and Q is 2 according to the reaction:



4,791,224

## PROCESS FOR PREPARATION OF AN OXYACETIC ACID/HYDROXYETHYL ETHER COMPOUND

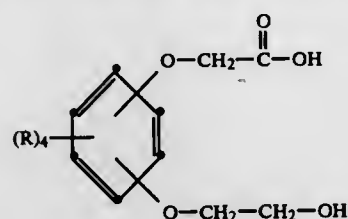
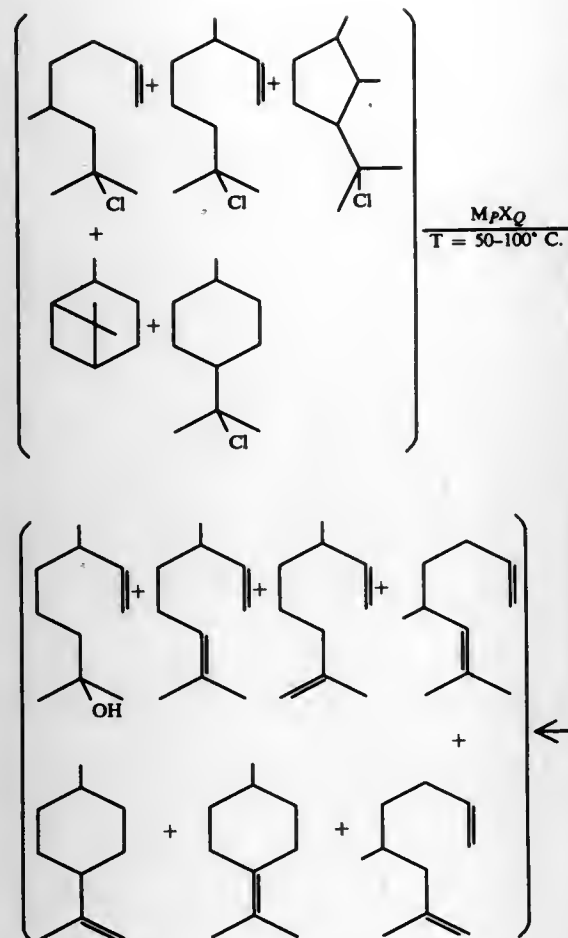
Charles E. Sumner, Jr., Kingsport, and Eric J. Fugate, Jonesborough, both of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Apr. 7, 1988, Ser. No. 178,702  
Int. Cl.<sup>4</sup> C07C 51/16

U.S. Cl. 562-421

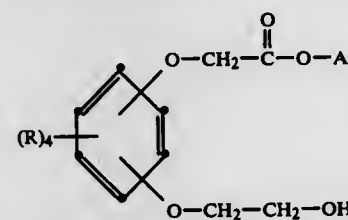
9 Claims

1. A process for the preparation of an oxyacetic acid/hydroxyethyl ether compound corresponding to the structure:

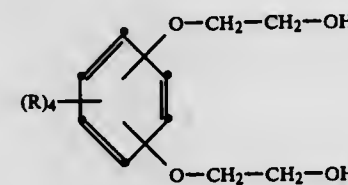


wherein R either individually or independently of one another represents hydrogen, alkyl, cycloalkyl, aryl, aralkyl, alkoxy, cycloalkoxy, aryloxy, halogen, alkylcarbonyl, arylcarbonyl, carboxyl or nitro, or represents a benzene ring fused to the phenyl ring, comprising

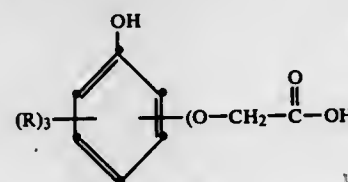
(a) preparing an alkali metal oxyacetate/hydroxyethyl ether compound corresponding to the structure:



wherein R is as described above and A is an alkali metal cation, by contacting an aryloxyethanol corresponding to the structure:



wherein R is as described above with oxygen in an aqueous alkaline reaction medium at a temperature range from 0° C. to the boiling point of the reaction medium in the presence of a catalytic amount of a catalyst comprised of palladium, bismuth and carbon in the presence of a phenol corresponding to the structure:

wherein R is as described above and p is 0, 1 or 2,  
(b) separating the oxyacetate/hydroxyethyl ether compound from the catalyst, and  
(c) preparing the oxyacetic acid/hydroxyethyl ether com-4,791,223  
PROCESS FOR THE PREPARATION OF 1,1,2,2-TETRAHYDROPERFLUOROALKANOLS AND THEIR ESTERS

André Lantz, Vernaison, and Pascal Michaud, La Mulatière, both of France, assignors to Societe Atochem, Puteaux, France

Filed Dec. 4, 1987, Ser. No. 128,825

Claims priority, application France, Dec. 22, 1986, 86 17983  
Int. Cl.<sup>4</sup> C07C 67/02

U.S. Cl. 560-266

8 Claims

1. A process for the preparation of 1,1,2,2-tetrahydroperfluoroalkanol and their esters comprising oxidizing a 2-(perfluoroalkyl)ethyl iodide using hydrogen peroxide in a carboxylic acid or an ester of such an acid and in the presence of sulphuric acid, and using from 1 to 30 moles of sulphuric acid, from 1 to 50 moles of carboxylic acid or of an ester of such an acid, and from 3 to 20 moles of hydrogen peroxide, all per mole of 2-(perfluoroalkyl)ethyl iodide.

pound acid by contacting the separated oxyacetate/hydroxyethyl ether compound with a mineral acid.

4,791,225

## HALOGENOBENZOIC ACID DERIVATIVES AND THEIR PREPARATION

Tsutomu Irikura, Tokyo; Seigo Suzue, Kuki; Satoshi Murayama, Tochigi; Keiji Hirai, Kuki, and Takayoshi Ishizaki, Saitama, all of Japan, assignors to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

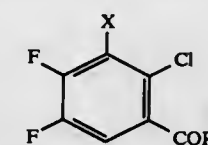
Filed Jan. 16, 1987, Ser. No. 4,042

Claims priority, application Japan, Jan. 20, 1986, 61-9648;  
Dec. 1, 1986, 61-286523Int. Cl.<sup>4</sup> C07C 63/68, 103/75

U.S. Cl. 562-493

1 Claim

1. A compound of the formula (I);



wherein R is a chlorine atom, amino group or hydroxy group, X is a chlorine or bromine atom.

4,791,226

## CATALYST AND PROCESS FOR PURIFICATION OF CRUDE TEREPHTHALIC ACID

Imre Puskas, Wheaton, and Steven A. Cereface, Naperville, both of Ill., assignors to Amoco Corporation, Chicago, Ill.  
Division of Ser. No. 507,707, Jun. 23, 1983, Pat. No. 4,476,242, which is a continuation-in-part of Ser. No. 316,300, Oct. 29, 1981, abandoned. This application Mar. 9, 1984, Ser. No. 587,947The portion of the term of this patent subsequent to Aug. 21, 2001, has been disclaimed.  
Int. Cl.<sup>4</sup> C07C 51/42

U.S. Cl. 562-487

9 Claims

1. A process for purifying crude terephthalic acid containing up to 10,000 ppm of 4-carboxybenzaldehyde wherein said 4-carboxybenzaldehyde is selectively hydrogenated and reduced to a level of less than 100 parts per million in a standard laboratory test wherein said process comprises hydrogenating said crude acid at a suitable temperature and pressure with hydrogen in the presence of a catalyst composition which comprises crystallites of catalytically-active palladium upon the surface of a porous activated carbonaceous support material consisting essentially of activated carbon granules having a surface area of at least 600 m<sup>2</sup>/g, said crystallites being predominantly less than 35 Å in longitudinal measurement, wherein said catalyst composition is prepared by contacting said activated support in the absence of hydrogen with a non-aqueous solution of a palladium salt in an organic solvent which is inert to said support material, wherein said palladium salt is reduced to palladium metal crystallites by said activated support.

4,791,227

## METHOD FOR HANDLING REACTION MIXTURES CONTAINING HYDROGEN FLUORIDE

Alfred Neumann, Rannheim; Willi Ploesser, Seehelm-Jugenheim and Hermann-Tobias Siebert, Darmstadt, all of Fed. Rep. of Germany, assignors to Röhm GmbH, Darmstadt, Fed. Rep. of Germany

Filed Sep. 23, 1982, Ser. No. 422,254

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1981, 3139653

Int. Cl.<sup>4</sup> C07C 67/38, 67/54, 67/58, 51/14, 51/44, 51/48  
U.S. Cl. 562-521

7 Claims

1. A method for reacting, distilling, or extracting a Koch reaction mixture comprising propylene, carbon monoxide, and

a substantial amount of hydrogen fluoride at a temperature between 80° C. and 160° C. and under pressure conditions usually employed in the Koch synthesis in a metal vessel having an interior wall wherein at least said interior wall of said vessel is made of

(a) aluminum, or of an aluminum alloy containing more than 95 percent by weight of aluminum, or of  
(b) a nickel-chromium-iron alloy containing from 30 to 50 percent by weight of nickel, from 20 to 30 percent by weight of chromium, and from 18 to 50 percent by weight of iron.

4,791,228

## PROCESS FOR PREPARING α,ω-DICARBOXYLIC ACIDS

Francesco Sclari, Barlassina; Pier P. Rossi, Gariasco, and Luigi Canavesi, Solbiate Olona, all of Italy, assignors to SNIA Viscosa Società Nazionale Industrie Applicazioni Viscosa S.p.A., Milan, Italy

Continuation of Ser. No. 348,320, Feb. 12, 1982, abandoned, which is a continuation of Ser. No. 90,967, Nov. 5, 1979, abandoned. This application Feb. 12, 1985, Ser. No. 700,334  
Claims priority, application Italy, Nov. 10, 1978, 29682 A/78  
Int. Cl.<sup>4</sup> C07C 51/235, 51/16

U.S. Cl. 562-531

9 Claims

1. A process for preparing α,ω-dicarboxylic acids of the formula



in which n is 6 to 10, comprising reacting a compound of the formula



(1)

in which X is CHO or COOH, and n is 6 to 10, with molecular oxygen in the presence of acetic acid at a temperature from 20° to 90° and in the presence of an effective amount of catalyst selected from the group consisting of cobalt (II) salts, ferrous salts and mixtures thereof, said catalyst being present in a quantity with respect to the aldehyde acid or dialdehyde, of about 0.0005 mole %, calculated as the cation, on the equivalents of the aldehyde groups on the starting compound of formula (1).

4,791,229

## PREPARATION OF ARYL CYANAMIDES FROM ARYLAMINES AND CYANOGEN CHLORIDE

Rudolf Fauss, Cologne, and Hans-Jochem Riebel, Wuppertal, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Oct. 24, 1986, Ser. No. 922,635

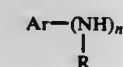
Claims priority, application Fed. Rep. of Germany, Oct. 26, 1985, 3538128

Int. Cl.<sup>4</sup> C07C 125/08, 147/12; C07D 307/91

U.S. Cl. 564-105

10 Claims

1. A process for the preparation of an aryl cyanamide comprising reacting an arylamine of the formula



in which

Ar is aryl,

R is hydrogen or alkyl, and

n is 1, 2 or 3.

(excepting 2-nitroaniline, 4-nitroaniline and arylamines having a nucleophilic character equal to or lower than 2-nitroaniline and 4-nitroaniline), with cyanogen chloride in 1-2 times the molar amount per mole of amino group of the arylamine initially in a homogeneous liquid phase, using as reaction medium

a solvent selected from the group consisting of acetic acid, acetic acid diluted with water, acetic acid diluted with a water-miscible organic auxiliary solvent and acetic acid diluted with water and a water-miscible organic auxiliary solvent, the reaction being effected in the presence of 1-1.5 molar equivalents of an auxiliary base for each amino group of the arylamine, there being more cyanogen chloride than equivalents of auxiliary base present in the reaction mixture at any point in time of the reaction, the pH of the reaction mixture being maintained below 7.

4,791,230

## HYDROXY-TERMINATED AMIDES

Jiang-Jen Lin, Round Rock, and George P. Speranza, Austin, both of Tex., assignors to Texaco Chemical Company, White Plains, N.Y.

Filed Mar. 30, 1988, Ser. No. 174,580

Int. Cl.<sup>4</sup> C07C 102/00

U.S. Cl. 564-159

10 Claims

1. A composition of matter of the formula:



wherein:

R is a polyoxyalkylene moiety selected from the group consisting of:



and



x ranges from 1 to 9,

y is 1 or 2; and

R' is a hydroxy moiety selected from the group consisting of:



and



4,791,231

## CARBOCYCLIC DERIVATIVES

Kenneth W. Bair, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C. Continuation of Ser. No. 801,060, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 673,531, Nov. 20, 1984, abandoned. This application Jan. 19, 1988, Ser. No. 145,581

Int. Cl.<sup>4</sup> C07C 87/28, 87/455

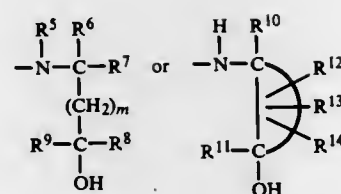
U.S. Cl. 564-387

7 Claims

1. A compound of the formula



or a pharmaceutically acceptable acid addition salt thereof wherein R<sup>1</sup> contains not more than eight carbon atoms and is a group



wherein

m is 0 or 1;

R<sup>5</sup> is hydrogen;R<sup>6</sup> and R<sup>7</sup> are the same or different and each is hydrogen or C<sub>1-5</sub> alkyl optionally substituted by hydroxy;R<sup>8</sup> and R<sup>9</sup> are the same or different and each is hydrogen or C<sub>1-3</sub> alkyl;

is a five- or six-membered saturated carbocyclic ring; R<sup>10</sup> is hydrogen, methyl or hydroxymethyl; R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> are the same or different and each is hydrogen or methyl; R<sup>14</sup> is hydrogen, methyl, hydroxy, or hydroxymethyl and Ar is 11H-Benzo[b]fluorene, 7H-Benzo[c]fluoranthene or 7H-Benzo[a]fluoranthene.

4,791,232

## CARBOCYCLIC DERIVATIVES

Kenneth W. Bair, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C. Continuation of Ser. No. 801,060, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 673,531, Nov. 20, 1984, abandoned. This application Jan. 19, 1988, Ser. No. 145,582

Int. Cl.<sup>4</sup> C07C 87/28, 87/455

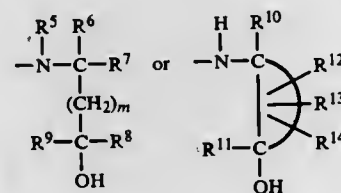
U.S. Cl. 564-387

7 Claims

1. A compound of the formula



or a pharmaceutically acceptable acid addition salt thereof wherein R<sup>1</sup> contains not more than eight carbon atoms and is a group



wherein

m is 0 or 1;

R<sup>5</sup> is hydrogen;R<sup>6</sup> and R<sup>7</sup> are the same or different and each is hydrogen or C<sub>1-5</sub> alkyl optionally substituted by hydroxy;R<sup>8</sup> and R<sup>9</sup> are the same or different and each is hydrogen or C<sub>1-3</sub> alkyl;

is a five- or six-membered saturated carbocyclic ring; R<sup>10</sup> is hydrogen, methyl or hydroxymethyl;

R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> are the same or different and each is hydrogen or methyl; R<sup>14</sup> is hydrogen, methyl, hydroxy, or hydroxymethyl and Ar is aceanthrylene or aceanthrene.

4,791,233

## CARBOCYCLIC DERIVATIVES

Kenneth W. Bair, Chapel Hill, N.C., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C. Continuation of Ser. No. 801,060, Nov. 22, 1985, abandoned, which is a continuation-in-part of Ser. No. 673,531, Nov. 20, 1984, abandoned. This application Jan. 19, 1988, Ser. No. 145,580

Int. Cl.<sup>4</sup> C07C 87/28, 87/455

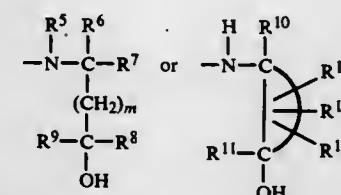
U.S. Cl. 564-387

7 Claims

1. A compound of the formula



or a pharmaceutically acceptable acid addition salt thereof wherein R<sup>1</sup> contains not more than eight carbon atoms and is a group

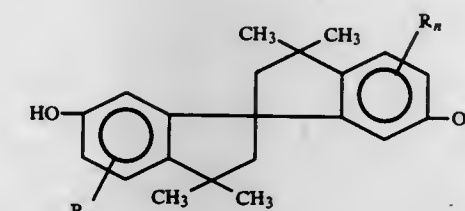
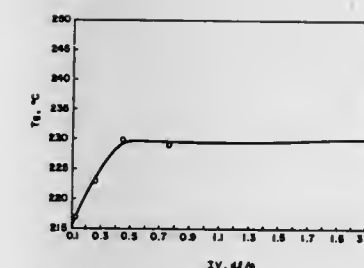


wherein

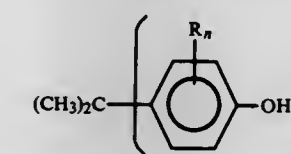
m is 0 or 1;

R<sup>5</sup> is hydrogen;R<sup>6</sup> and R<sup>7</sup> are the same or different and each is hydrogen or C<sub>1-5</sub> alkyl optionally substituted by hydroxy;R<sup>8</sup> and R<sup>9</sup> are the same or different and each is hydrogen or C<sub>1-3</sub> alkyl;

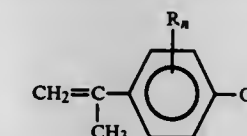
is a five- or six-membered saturated carbocyclic ring; R<sup>10</sup> is hydrogen, methyl or hydroxymethyl; R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> are the same or different and each is hydrogen or methyl; R<sup>14</sup> is hydrogen, methyl, hydroxy, or hydroxymethyl and Ar is naphthalene or benzantracene.



wherein each R is independently C<sub>1-4</sub> primary or secondary alkyl or halo and n is from 0 to 3, which comprises the steps of: (A) reacting at least one of bisphenols of the formula

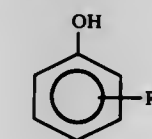


and isopropenylphenols of the formula

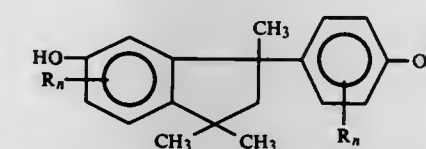


by contact at a temperature in the range of about 100°-200° C. with an acidic catalyst selected from the group consisting of alkanesulfonic acids and polyvalent metal halides which are strong Lewis acids, thereby producing a crude spirobiindane bisphenol;

(B) removing a major proportion of the by-products including phenols of the formula



and 1-(4-hydroxyphenyl)indanol of the formula



from the crude spirobiindane bisphenol; and

4,791,234

## SUBSTANTIALLY PURE SPIROBIINDANE BISPHENOLS AND METHOD FOR THEIR PREPARATION

Gary R. Faler, and Jerry C. Lynch, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y. Filed Oct. 10, 1986, Ser. No. 917,644

Int. Cl.<sup>4</sup> C07C 39/12

U.S. Cl. 568-719

20 Claims

1. A method for preparing a substantially pure spirobiindane bisphenol of the formula



(C) further purifying the product of step B by dissolution in a mixture of methanol and methylene chloride followed by precipitation by addition of water.

4,791,235

# PROCESS FOR SEPARATING 2,6-DIMETHYLNAPHTHALENE

Takao Maki, Fujisawa; Toshikazu Yokoyama; Akio Nakanishi, both of Machida; Katsushi Shioda, Hadano, and Haruki Asatani, Yokohama, all of Japan, assignors to Mitsubishi Chemical Industries Limited, Japan

Filed Nov. 30, 1987, Ser. No. 126,417

Claims priority, application Japan, Nov. 28, 1986, 61-283547; Dec. 11, 1986, 61-295589

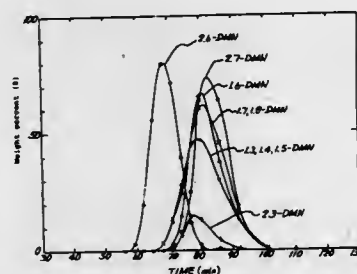
Int. Cl.<sup>4</sup> C07C 7/00

U.S. Cl. 585—806

14 Claims

1. A method of separating 2,6-dimethylnaphthalene from a feed material consisting essentially of a mixture of dimethylnaphthalene isomers comprising adsorption separation using an adsorbent of a zeolite Y containing alkali metal or zinc and a desorbent of an organic solvent consisting essentially of paraxylene and/or orthoxylene to obtain a solution consisting of the desor-

bent and the feed material wherein 2,6-dimethylnaphthalene comprises at least 60 wt% of said mixture of dimethylnaphthalene isomers, and



crystallization of said solution, said desorbent comprising between 30 to 90 wt% of the total weight of said solution, to obtain 2,6-dimethylnaphthalene of high purity in a crystalline form.

## ELECTRICAL

4,791,236

# RELEASABLE FLEXIBLE CONDUCTIVE JACKET

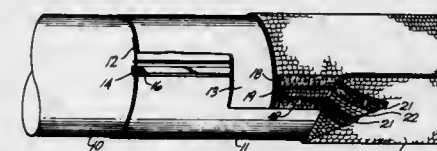
Laurence R. Klein, Torrance, and Walter A. Plummer, III, Santa Ana, both of Calif., assignors to The Zippertubing Co., Los Angeles, Calif.

Filed Jul. 10, 1987, Ser. No. 72,216

Int. Cl.<sup>4</sup> H01B 7/34

U.S. Cl. 174—36

8 Claims



1. An electrically conductive jacket comprising: an elongated flexible electrically insulating sheet; interlocking means along each longitudinal edge of the insulating sheet for releasably securing the longitudinal edges together to form a flexible tubular jacket; an elongated flexible electrically conductive sheet having a greater width than the insulating sheet, and having one longitudinal edge secured along one longitudinal edge of the insulating sheet; and means along each longitudinal edge of the conductive sheet for releasably securing the longitudinal edges together in overlapping relation to form a flexible tubular jacket outside of and concentric with the insulating jacket.

4,791,237

# CABLE SUSPENSION ASSEMBLY WITH GROUNDING MECHANISM

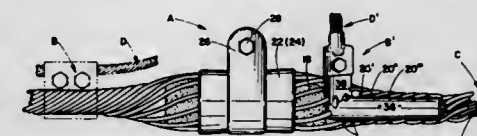
Thomas E. Sherman, Chagrin Falls, Ohio, assignor to Preformed Line Products Company, Cleveland, Ohio

Filed Nov. 18, 1987, Ser. No. 122,029

Int. Cl.<sup>4</sup> H02G 7/05

U.S. Cl. 174—40 R

19 Claims



8. A cable suspension assembly comprising: a plurality of helical elements adapted to receive a cable therethrough and grip the cable periphery; a bracket operatively engaging said helical elements and adapted to secure the cable to an associated support; and, a grounding mechanism having a first leg portion positioned within said helical elements and a second leg portion engaging said first leg portion, said second leg portion extending outwardly from the helical elements for operative connection with an associated ground wire.

4,791,238

# HIGH-DENSITY WIRED CIRCUIT BOARD USING INSULATED WIRES

Masao Kanno, Shimodate; Naoki Fukutomi, Yuki; Yorio Iwasaki, Shimodate; Fujio Kojima, Shimodate, and Hidehiro Nakamura, Shimodate, all of Japan, assignors to Hitachi Chemical Company, Ltd., Tokyo, Japan

Filed Mar. 31, 1987, Ser. No. 32,247

Claims priority, application Japan, Mar. 31, 1986, 61-73833

Int. Cl.<sup>4</sup> H05K 1/00, 3/00

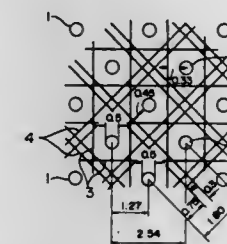
U.S. Cl. 174—68.5

20 Claims

1. A high-density wired circuit board comprising: an adhesive coating layer formed on an insulating substrate;

a first wiring grid of insulated conductors formed on said insulating substrate in X-Y directions; a second wiring grid of insulated conductors formed on said insulating substrate in said X-Y directions, and being spaced apart from said first wiring grid; a third wiring grid of insulated conductors formed on said insulating substrate at an angle of 45° with said first and second wiring grids; a plurality of through-holes being disposed in said insulating substrate at positions corresponding to centroids of said first wiring grid, such that the distance between adjacent through-holes in each of said X and Y directions is 100 mils.

11. A process for producing a high density wired circuit board using insulated wires, comprising the steps of:



forming an adhesive coating layer of an insulating substrate; forming a first wiring grid of insulated conductors on said insulating substrate in X-Y directions; forming a second wiring grid of insulated conductors on said insulating substrate in said X-Y directions and spaced apart from said first wiring grid; forming a third wiring grid of insulated conductors on said insulating substrate at an angle of 45° with said first and second wiring grids; forming a plurality of through-holes in said insulating substrate at positions corresponding to centroids of said first wiring grid, such that the distance between adjacent through-holes in each of said X and Y directions is 100 mils.

4,791,239

# MULTILAYER PRINTED WIRING BOARD AND METHOD FOR PRODUCING THE SAME

Isao Shirahata, Chigasaki; Shoji Shiga, Utsunomiya; Hisako Hori, Tokyo, and Takamasa Jinbo, Odawara, all of Japan, assignors to Furukawa Denki Kogyo Kabushiki Kaisha, Tokyo, Japan

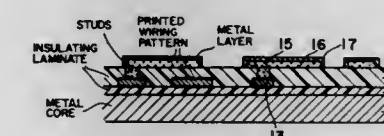
Filed May 29, 1987, Ser. No. 55,706

Claims priority, application Japan, May 30, 1986, 61-125118

Int. Cl.<sup>4</sup> H05K 1/00

U.S. Cl. 174—68.5

19 Claims

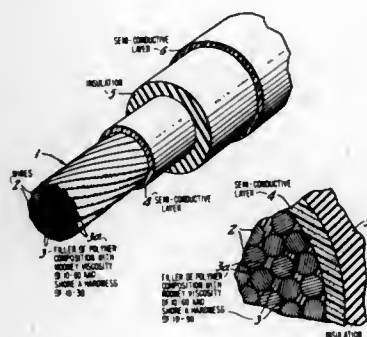


1. A multilayer printed wiring board comprising: a metal core; a first insulating laminate disposed on said metal core; a first layer of printed wiring pattern laminated to said first insulating laminate, said first layer of printed wiring pattern comprising a metal layer whose one surface is roughened in a manner that an average value of the differences in height between peaks and valleys thereof is 1 μm or more

more, a second layer of printed wiring pattern made of a cured conductive paste;  
 a second insulating laminate disposed to electrically insulate said first and second layers of printed wiring patterns from each other; and  
 a plurality of through studs forming conducting paths between said first layer of printed wiring pattern and said second layer of printed wiring pattern, said through studs being made of a cured conductive paste,  
 whereby said multilayer printed wiring board has excellent heat dissipating properties.

**4,791,240**  
**ELECTRIC CABLE WITH STRANDED CONDUCTOR FILLED WITH WATER BLOCKING COMPOUND AND WITH EXTRUDED INSULATION**  
 Carlo Marin, Vigevano, and Giovanni Pozzati, Olgiate Olona, both of Italy, assignors to Societa' Cavi Pirelli S.p.A., Milan, Italy

Filed Apr. 13, 1987, Ser. No. 37,603  
 Claims priority, application Italy, Apr. 14, 1986, 20078 A/86  
 Int. Cl.<sup>4</sup> H01B 9/02  
 U.S. Cl. 174—23 C 12 Claims

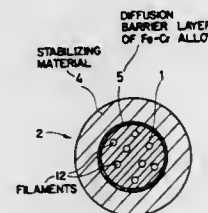


1. In an electric cable comprising at least one conductor surrounded by a semiconductor layer contacting said conductor and a layer of extruded insulation surrounding said semiconductor layer, said conductor comprising a plurality of metal wires laid-up together, and a polymeric filler compound filling any otherwise empty spaces between said wires, wherein the improvement is that said polymeric filler compound is a compound which, as compounded, is extrudable and has a Monney viscosity at 100° C. in the range from about 10 to about 60 and a Shore A hardness at room temperature in the range from about 10 to about 90 whereby said spaces are filled with a solid and hard compound extruded between said wires

**4,791,241**  
**STABILIZED SUPERCONDUCTING WIRE**  
 Toshinari Ando, Masataka Nishi, Yoshikazu Takahashi, and Susumu Shimamoto, all of Ibaraki, Japan, assignors to Japan Atomic Energy Research Institute and Sumitomo Elec. Inc. Ltd., both of Osaka, Japan  
 Filed May 19, 1987, Ser. No. 51,400  
 Claims priority, application Japan, May 19, 1986, 61-114457  
 Int. Cl.<sup>4</sup> H01B 12/00

U.S. Cl. 174—125.1 4 Claims  
 1. A stabilized superconducting wire comprising a multicore section having a plurality of filaments of superconducting compound material disposed in an alloy matrix, a stabilizing material section positioned around said multicore section, and a diffusion barrier layer disposed between said stabilizing mate-

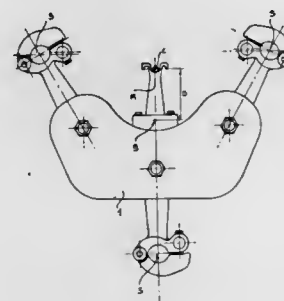
rial section and said multicore section, said stabilized superconducting wire being characterized in that:



said diffusion barrier layer is composed of an Fe-Cr alloy containing not less than 5 weight percent but not more than 25 weight percent Cr.

**4,791,242**  
**ELECTRIC LINE WITH BUNDLE CONDUCTORS ASSOCIATED TO METAL OR DIELECTRIC CABLES INCORPORATING OPTIC FIBERS FOR TELECOMMUNICATION**  
 Marco Gatti, Rome, Italy, assignor to Ente Nazionale Per L'Energia Elettrica, Rome, Italy

Filed Dec. 14, 1987, Ser. No. 132,313  
 Claims priority, application Italy, Dec. 19, 1986, 22782 A/86  
 Int. Cl.<sup>4</sup> H02G 7/05  
 U.S. Cl. 174—40 R 7 Claims



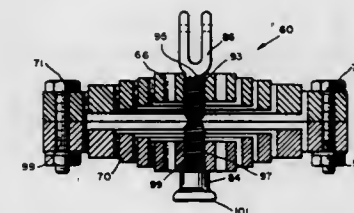
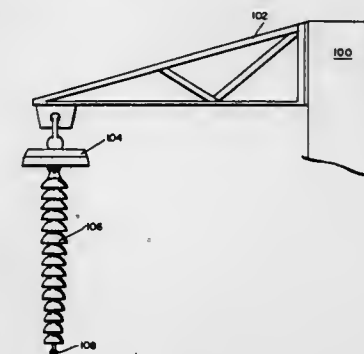
1. Line for transmitting electric energy and for telecommunication, of the type wherein each electric conductor consists of a bundle of at least three subconductors with respective spacers, characterized in that a metal or dielectric cable incorporating optic fibres for telecommunication is enclosed into at least one bundle conductor, said cable being supported by the spacers of the bundle.

**4,791,243**  
**COMPACT DEVICE FOR LONG STROKE ENERGY ABSORPTION**  
 Paul Ibanez, Woodland Hills, and Kelvin L. Merz, Los Angeles, both of Calif., assignors to Anco Engineers, Inc., Culver City, Calif.

Filed Feb. 4, 1987, Ser. No. 10,709  
 Int. Cl.<sup>4</sup> H02G 7/18, 7/04; F16F 7/12  
 U.S. Cl. 174—45 R 7 Claims  
 1. A compact apparatus for long stroke energy absorption, which apparatus is attached to the tower arm of a transmission tower and to the insulator string of a transmission tower, the apparatus comprising:

- a first energy absorbing coil aligned in a horizontal plane of orientation and configured so as to plastically deform out of its horizontal plane of orientation;
- a second energy absorbing coil aligned in a horizontal plane of orientation and disposed adjacent and parallel to said first energy absorbing coil and configured so as to

- plastically deform out of its horizontal plane of orientation and in a direction opposite to the direction of deformation of said first energy absorbing coil;
- said first energy absorbing coil and said second energy absorbing coil being fastened together at two points along their respective circumferences;
- a first fastening means attached to said first energy absorbing coil and extending transverse to the horizontal plane of the first energy absorbing coil and in the direction of the coil's deformation;
- a second fastening means attached to said second energy absorbing coil and extending transverse to the horizontal plane of the second energy absorbing coil and in the direction of the coil's deformation;
- said first energy absorbing coil set at a predetermined stress preload so as to prevent plastic deformation of the

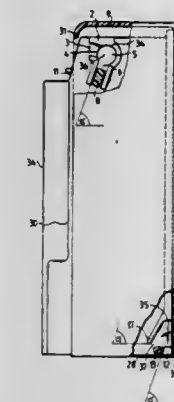


- coil until the predetermined stress preload has been exceeded;
- said second energy absorbing coil set at a predetermined stress preload so as to prevent plastic deformation of the coil until the predetermined stress preload has been exceeded;
- said first energy absorbing coil attached to said tower arm by said first fastening means; and
- said second energy absorbing coil attached to said insulator string by said second fastening means;
- whereby when a given load which exceeds the predetermined stress preload set into the first energy absorbing coil and set into the second energy absorbing coil is imparted to said transmission tower, said first and second energy absorbing coils plastically deform in opposite directions out of their plane of orientation to absorb the load imparted to the transmission tower.

**4,791,244**  
**CASING, PARTICULARLY A JUNCTION-BOX CASING FOR TELECOMMUNICATIONS ENGINEERING**  
 Christa Taybl, Berlin, Fed. Rep. of Germany, assignor to Krone Aktiengesellschaft, Berlin, Fed. Rep. of Germany  
 Filed May 6, 1987, Ser. No. 47,671  
 Claims priority, application Fed. Rep. of Germany, Jul. 16, 1986, 3624347  
 Int. Cl.<sup>4</sup> H02G 3/08 9 Claims

U.S. Cl. 174—52.1  
 1. A junction box type casing, such as a distributor casing for telecommunications engineering, wherein a box-shaped base

having a lower base surface and which is closable with a cover and wherein a sealing element is arranged between the base and the cover and elements including guide elements are arranged between opposing side walls of the base and cover to guide placement of the cover during opening and closing of the base, comprising:  
 said guide elements include upper and lower guide elements which are interposed between the base and the cover at



respective opposite sides thereof, and with said upper and lower guide elements on said respective sides being formed with pins and pin guides which collectively hinge the cover to the base, with pin guides including guide portions that are operatively inclined towards a rear wall of the base and are inclined at an acute angle with respect to the lower base surface, wherein said junction box includes means for supporting terminal connectors for cable cores.

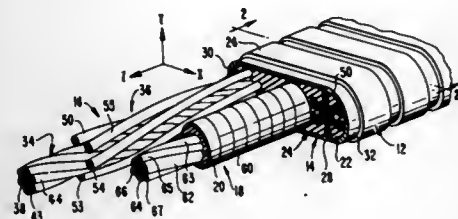
**4,791,245**  
**TERMINATED ELECTRIC CABLE**  
 David W. M. Thornley, Malmesbury, England, assignor to Raychem Limited, London, England  
 Continuation of Ser. No. 070,859, Jul. 8, 1987, abandoned. This application Mar. 10, 1988, Ser. No. 170,575  
 Claims priority, application United Kingdom, Jul. 15, 1986, 8617141  
 Int. Cl.<sup>4</sup> H02G 15/02, 15/068  
 U.S. Cl. 174—73.1 11 Claims



1. A self-supporting terminated cable, said cable comprising a conductor, a dielectric and an outer jacket, wherein at an end of said cable to be terminated, said outer jacket of the cable has been removed to expose said dielectric, the dielectric has been removed to expose said conductor, and connector means has been secured to the exposed conductor, and wherein an arrangement comprising a first tubular member that is recoverable and electrically insulating and that has a flexural modulus of at least 500 MPa over the temperature range -55° C. to +80° C. is disposed on said cable end such that said tubular member has a wall thickness of at least 1 mm and encloses said exposed cable dielectric and overlaps said cable outer jacket and said connector.



**4,791,246**  
**POWER CABLE USEFUL IN SEISMIC TESTING**  
 David H. Neuroth, Hamden, Conn., assignor to Hnbbell Incorporated, Orange, Conn.  
 Filed Aug. 19, 1987, Ser. No. 86,636  
 Int. Cl.<sup>4</sup> H01B 7/22  
 U.S. Cl. 174—102 R 17 Claims

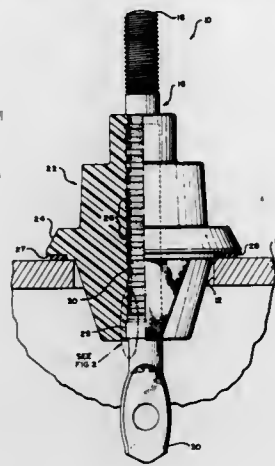


1. A power cable, the combination comprising: an outer armor layer having a longitudinal axis Z, orthogonal transverse axes X and Y, and a cavity defined therein having a height in the Y direction of A; a pair of tensile elements located in said cavity, extending along said Z axis, and spaced apart along said X axis, each of said tensile elements including an inner tensile member, and an outer tensile member, said outer tensile member including one pair of strands spirally wrapped about said inner tensile member, said strands in said pair being circumferentially spaced from one another through substantially 180°; said outer tensile member having circumferential gaps therein between said strands, and said strands having outer edges separated by a distance substantially equal to A; power conveying means located in said cavity, extending along said Z axis, and positioned between said pair of tensile elements; and filler material located in said cavity and substantially filling any otherwise empty spaces therein, said outer armor layer having a top wall in contact with the outer edges of said strands in each of said outer tensile members, and a bottom wall in contact with the outer edges of said strands in each of said outer tensile members, said top and bottom walls extending transversely of said cavity along the X axis.

**4,791,247**  
**POLYESTER BUSHING AND METHOD OF MAKING SAME**  
 Philip A. Cacalloro, Newton, N.C., and Joseph A. St. Jacques, Shreveport, La., assignors to General Electric Company, King of Prussia, Pa.  
 Continuation of Ser. No. 774,786, Sep. 11, 1985, abandoned. This application Apr. 13, 1988, Ser. No. 183,400  
 Int. Cl.<sup>4</sup> H01B 17/20  
 U.S. Cl. 174—152 R 18 Claims

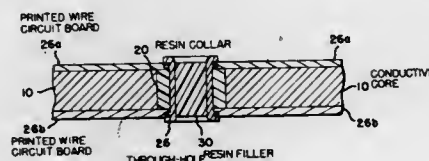
1. An electrical bushing for connection at one end to a power line and at its other end to electrical apparatus including a housing through which the bushing is adapted insulatively to carry electric current between the power line and the electrical apparatus, the bushing including, in combination, (a) a massive insulating body of a polyester material, (b) a current-carrying metal stud, and (c) a film-like adhesive coating of an epoxy-based adhesive far thinner than the wall thickness of said body applied to the peripheral surface of said stud and adhesively bonded to the metal stud, said polyester-material body being molded about said coated stud in bonded, fluid-sealing relation with said coating and said stud by (i) a molding operation that brings said polyester material in uncured

condition and under substantial pressure into contact with said adhesive coating about the outer surface of said adhesive coating after said adhesive coating has dried but not



fully cured and (ii) a curing operation that effects curing of said coating and said polyester material while in contact.

**4,791,248**  
**PRINTED WIRE CIRCUIT BOARD AND ITS METHOD OF MANUFACTURE**  
 Jayne L. Oldenettel, Kent, Wash., assignor to The Boeing Company, Seattle, Wash.  
 Filed Jan. 22, 1987, Ser. No. 6,823  
 Int. Cl.<sup>4</sup> H05K 1/00  
 U.S. Cl. 174—68.5 14 Claims

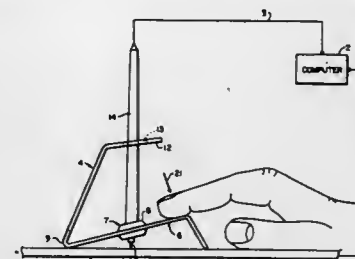


1. A conductive core printed wire circuit board, comprising: (a) a printed wire circuit board having a conductive core and at least one oversized through-hole extending through the core; (b) a dielectric collar in the through-hole, the collar being a cured filled resin substantially free of voids, having a coefficient of thermal expansion closer to that of the core than the coefficient of thermal expansion of epoxy, and having a central bore drilled into the collar and (c) a conductive plating on the inner surface of the bore forming a plated-through-hole, the plating providing electrical connection between one side of the board and the other side but being electrically insulated from the core by the collar.

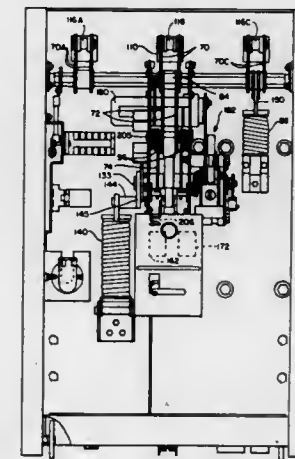
**4,791,249**  
**DIGITIZER PEN CADDY**  
 Eugene A. Santoro, 14 Peach Orchard Rd., Burlington, Mass. 01803  
 Filed May 2, 1986, Ser. No. 858,642  
 Int. Cl.<sup>4</sup> G08C 21/00  
 U.S. Cl. 178—18 9 Claims

1. A digitizer pen caddy configured to rest upon a digitizer pad for inputting data into a computer by sensing pressure

applied to selected areas of said pad by said digitizer pen, said caddy including a light transmissive resilient base member, and a digitizer pen receiving means formed upon said resilient base member, the resiliency of said base member being high enough to permit sufficient displacement of said pen receiving means toward said digitizer pad when said resilient base member is



**4,791,250**  
**TRIP-FREE, THREE-LINK SWITCH ASSEMBLY**  
 Simon Yin, Fremont, Calif., assignor to Square D Company, Palatine, Ill.  
 Filed Aug. 6, 1987, Ser. No. 82,442  
 Int. Cl.<sup>4</sup> H01H 3/00  
 U.S. Cl. 200—17 R 6 Claims



6. A switch assembly, comprising: (a) switch means movable between an opened condition and a closed condition; (b) a first, tripping link having an elongated slot and means supporting said tripping link for pivotal movement about a first fixed axis between a non-tripping position and a switch-tripping position; (c) a second link including cam means engaged within the slot in said tripping link for connecting said second link to said tripping link for sliding movement of the second link relative to the tripping link along a lengthwise path from a first, switch-opening position to a second, switch-closing position, so long as said tripping link remains in its non-tripping position; (d) a third link connected to said second link for pivotal movement about a second fixed axis between its own switch-opening and switch-closing positions simulta-

neously with and as a result of the movement of said second link between its switch-opening and switch-closing positions, said third link being connected with said switching means for moving the latter between its opened and closed conditions when said second and third links move between their respective switch-opening and switch-closing positions;

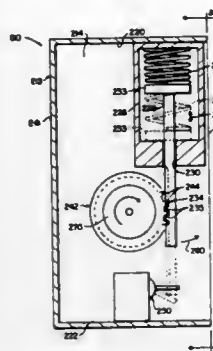
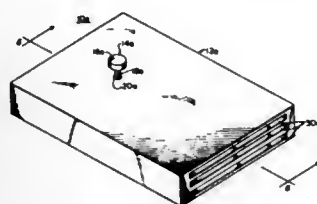
- (e) means for biasing said second and third links in their respective switch-opening positions;
- (f) cam means for applying a sufficient force to said second link when said tripping link is in its non-tripping position to slideably move said second link from its biased switch-opening position to its switch-closing position and for maintaining the second link in this latter position, whereby to move said third link from its switch-opening position to its switch-closing position and thereby move said switch means from its opened condition to its closed position and to maintain the switch means in this latter position;
- (g) means for biasing said first link in its tripping position;
- (h) means for removable retaining said first-link in its non-tripping position; and
- (i) said tripping and second links being connected together such that movement of said tripping link from its non-tripping position to its tripping position automatically causes said second link to disengage from said force applying cam means, whereby to remove the force applied to said second link by said cam means and thereby cause said second link to automatically move to its biased switch-opening position, whether said second link is at its switch-closing position or moving toward this latter position.

**4,791,251**  
**DELAYED ACTUATOR WITH VISCO-ELASTIC TIMER**  
 Robert E. Carter, Auburndale, Mass., and Porter Stone, Walpole, N.H., assignors to Piezo Electric Products, Inc., Cambridge, Mass.

Continuation-in-part of Ser. No. 940,803, Dec. 12, 1986, Pat. No. 4,742,189. This application May 26, 1987, Ser. No. 54,415  
 Int. Cl.<sup>4</sup> H01H 7/00; F22B 1/28; G04C 23/00; A01G 27/00  
 U.S. Cl. 200—33 R 31 Claims

1. A delayed actuator mechanism with visco-elastic timer comprising: a support section; an actuator section mounted to said support section; biasing means for urging said actuator section into a first state and permitting said actuator section to be selectively switched to a second state; means for restraining said actuator section in said second state; and

visco-elastic delay means for gradually releasing said means for restraining until said biasing means overcomes said

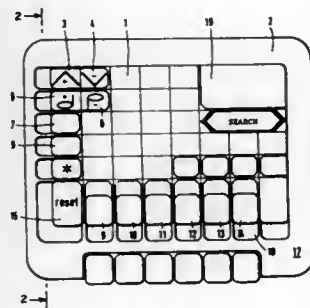


means for restraining to abruptly switch said actuator section to said first state.

**4,791,252**  
**TOUCH PANEL SWITCH OPERATING ARRANGEMENT**  
Klaus Mayer, Obertshausen, Fed. Rep. of Germany, assignor to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany  
Continuation of Ser. No. 900,218, Aug. 26, 1986, abandoned.  
This application Aug. 14, 1987, Ser. No. 86,182  
Claims priority, application Fed. Rep. of Germany, Aug. 30, 1985, 3530971

Int. Cl.<sup>4</sup> H01H 9/00, 35/00  
U.S. Cl. 200—52 R

4 Claims



1. A control panel configuration consisting of a plurality of sensor keys arranged on a flat surface of the panel, each of said keys being responsive to a touch of a respective sensor key surface to produce an electric pulse, the sensor keys forming a smooth, closed surface with continuous parts of the control panel;

the panel surface being surrounded by a frame with a surface configured in three-dimensions, the configuration of the frame surface including a sequence of undulations aligned

with sensor key surfaces in a predetermined peripheral pattern providing an operator with a feelable indication of the position of the individual sensor key surfaces; and wherein

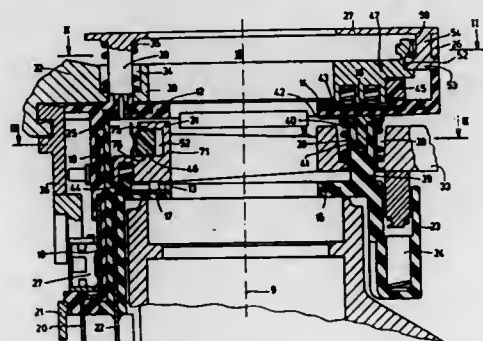
the surface undulations of the frame have troughs which are of the same size as corresponding sensor key surfaces, the troughs lying alongside respective ones of the sensor key surfaces, and being positioned on the frame for receiving a human finger, thereby to guide the finger to a selected key surface;

the panel surface being generally flat and being provided also with at least one rib for accessing sensor surfaces which do not lie at the edge of the panel surface.

**4,791,253**  
**STEERING COLUMN SWITCH**  
Herbert Erdelitsch; Walter Hecht, and Horst Rachner, all of Bietigheim-Bissingen, Fed. Rep. of Germany, assignors to SWF Auto-Electric GmbH, Bietigheim-Bissingen, Fed. Rep. of Germany  
Continuation-in-part of Ser. No. 8,616, Jan. 29, 1987, abandoned. This application Nov. 4, 1987, Ser. No. 117,177  
Claims priority, application Fed. Rep. of Germany, Feb. 7, 1986, 3603820

Int. Cl.<sup>4</sup> H01H 3/16  
U.S. Cl. 200—61.27

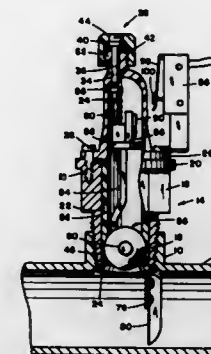
10 Claims



1. An electric switch having an insulation plate and having a switch lever and a switching member securely joined and jointly swivellably mounted against the insulation plate in a swivelling plane extending perpendicular to a swivelling axis which projects from the insulation plate and about which the switch lever and switching member swivel, the switch lever and switching member being tiltable from said swivelling plane, and, in the swivelling plane, said lever and switching member occupying several operating positions defined by means of a locking mechanism, said locking mechanism comprising two locking elements consisting of a locking cam and a detent, one of said locking elements being positioned on a resilient locking lever, with said locking lever being swivellably mounted in said swivelling plane by a first end fastened to the insulation plate and being prestressed against the switching member by means of a spring element, said switching member being guided in the swivelling plane by the locking lever, whereby switching occurs when said switch lever and switching member are swivelled between said operating positions so as to slide at least one set of bridging contacts into and out of contact with at least one set of contact points.

**4,791,254**  
**FLOW SWITCH**  
Paul G. Polverari, Branford, Conn., assignor to Hydroleve Company, New Haven, Conn.  
Filed Dec. 9, 1987, Ser. No. 130,444  
Int. Cl.<sup>4</sup> H01H 35/40  
U.S. Cl. 200—81.9 M

11 Claims



1. Apparatus responsive to fluid flow variations within a conduit which comprises:

a housing secured to the conduit about an opening communicating with the interior of the conduit and defining an elongated chamber extending outwardly from said conduit opening in substantially perpendicular relationship to said conduit to terminate at a substantially closed chamber end;

means within said housing for forming a substantially spherical seat adjacent the conduit opening;

a substantially spherical pivot ball rotatably mounted within said spherical seat;

a blade secured to said pivot ball and extending through said opening into said conduit for displacement by fluid flow therethrough to rotate said pivot ball;

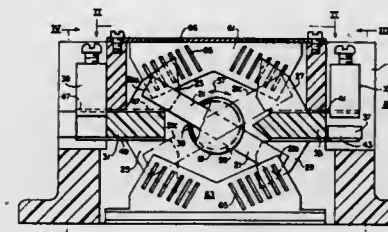
a lever having a first end eccentrically secured to said pivot ball and extending through said chamber with a second end positioned within the closed chamber end, whereby said lever is linearly movable along said chamber in response to rotation of said pivot ball; and

means responsive to the position of the second end of said lever for indicating a condition of fluid flow within said conduit.

**4,791,255**  
**TWIN BREAK TRANSFER SWITCH**  
Robert B. Eliezer, London, Ky., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Dec. 11, 1987, Ser. No. 131,692  
Int. Cl.<sup>4</sup> H01H 33/02

U.S. Cl. 200—144 R

4 Claims



1. An electrical transfer switch of the type used to alternatively deliver electrical power from either of two sources of electrical power to a load, comprising:

a base;

a pair of spaced power contacts disposed on said base the first of which is electrically connected to one of said two sources of electrical power and the second of which is electrically connected with the other of said two sources of electrical power;

first and second load contacts disposed on said base and interconnected electrically with each other and with said load;

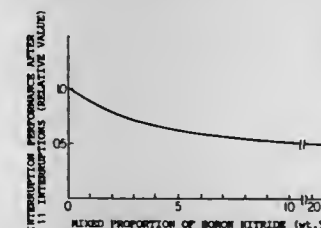
an electrically conductive bridge pivotally supported intermediate the ends thereof on said base for being rotated between a first angular disposition and a second angular disposition as power for said load is transferred from said one power source to said other power source, said first angular disposition being one in which one portion of said conductive bridge is in a disposition of electrical contact with said first power contact and the other portion of said conductive bridge is at a disposition of electrical contact with said first load contact, said second angular disposition being one in which said one portion of said conductive bridge is at a disposition of electrical contact with said second load contact and said other portion of said conductive bridge is at a disposition of electrical contact with said second power contact; and

said conductive bridge being mounted on a rotatable shaft, means for rotating said conductive bridge between said angular dispositions and including an actuating mechanism for reversely rotating the shaft, the shaft having a pair of arcuately spaced pins on one end thereof, the mechanism including a solenoid operable between thrust and retraction movements in response to a need to switch from one source of power to another, the mechanism also including a pair of actuators connected to the solenoid, each actuator being coupled with one of the pins for rotating the shaft in successive reverse directions, and each actuator having a surface engageable with a corresponding pin.

**4,791,256**  
**INSULATED NOZZLE FOR USE IN AN INTERRUPTER**  
Takashi Yonezawa; Toshiaki Yoshizumi; Mamoru Hosomi; Akiyoshi Onuma, and Ichiro Yamasaki, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan  
Filed Nov. 5, 1987, Ser. No. 117,640  
Claims priority, application Japan, Nov. 7, 1986, 61-263897  
Int. Cl.<sup>4</sup> H01H 33/02

U.S. Cl. 200—148 R

2 Claims



1. An insulated nozzle disposed between a pair of contacts of an interrupter and adapted to extinguish an arc occurring between said pair of contacts by blowing an insulated gas into the arc, said insulated nozzle comprising:

a fluoroplastic; and

a boron nitride mixed into said fluoroplastic at a weight percentage ranging from 0.3 to 0.8.

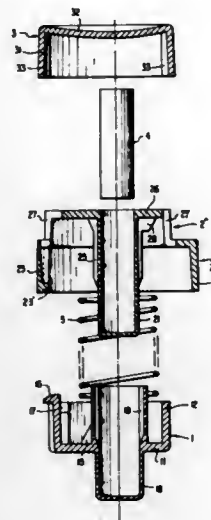


**4,791,257**  
**KEY ELEMENT FOR A CONTACTLESS KEYBOARD**  
 Werner U. Frey, Thalwil; Johannes Rometzsch, Rickenbach; Karl Iseli, Wädenswil, and Peter Wild, Mettmenstetten, all of Switzerland, assignors to Alcatel N.V., Amsterdam, Netherlands

Filed Apr. 14, 1983, Ser. No. 484,804  
 Int. Cl.<sup>4</sup> H01H 9/00

U.S. Cl. 200—159 R

2 Claims U.S. Cl. 200—302.1



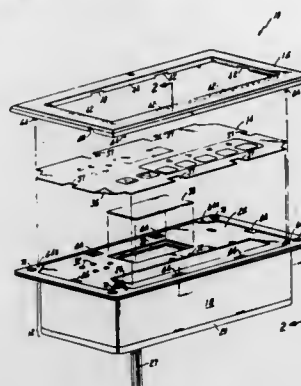
1. A keyswitch element for a contactless keyboard wherein a ferromagnetic core is movably mounted for insertion into a corresponding transformer winding located on a printed circuit board, said keyswitch element comprising:

- a box-like base having a cylindrical guiding tube integrally formed therewith and extending downwardly and upwardly from a bottom portion of said base and said cylindrical tube being closed at the lower end thereof, said base including a pair of integral non-resilient projections arranged at diagonally located corners of said base, said projections having the shape of hollow cylinder segments for positioning said base in a pair of bores in said printed circuit board and a pair of integral resilient arms at the same corners extending downwardly for fixing said base onto the said printed circuit board by engaging into the same pair of bores, said guiding tube having, along its internal surface, longitudinally extending guide grooves;
- a stem comprising a vertically extending and generally cylindrical ferromagnetic core holder slidably received in said guiding tube and said stem having a horizontal portion at the upper end of said core holder, said core holder having, along its internal surface, longitudinally extending ribs corresponding to and received in said guide grooves of said guiding tube, said stem having a downwardly directed generally rectangular skirt portion having at one sidewall thereof an inwardly directed projection for engaging an outwardly directed projection on said base to limit the movement of said stem away from said base, said stem having an upwardly directed generally cylindrical portion provided with recesses;
- a helical spring surrounding said core holder between said horizontal portion of said stem and said bottom portion of said base for yieldably urging said stem away from said base; and
- a hollow generally cylindrical cap with a closed upper end and provided internally with projections extending parallel to the axis of the cylinder and detachably engaging into said recesses of the stem.

**4,791,258**  
**SEALED ENCLOSURE FOR ELECTRICAL CIRCUITRY IN MOIST ENVIRONMENT**  
 Stephen E. Youtz, and Edward C. Rose, both of Fort Wayne, Ind., assignors to Hamilton Standard Controls, Inc., Farmington, Conn.

Filed Jul. 31, 1987, Ser. No. 80,520  
 Int. Cl.<sup>4</sup> H01H 9/04

7 Claims



1. A sealed enclosure for electrical circuitry for use in a moist environment comprising:
  - housing means of waterproof material structured to include a compartment therewithin for containing electrical circuitry, the housing means comprising a substantially sealed enclosure having an external display surface, the compartment being open to the display surface over a limited portion of said display surface;
  - a display overlay of waterproof electrical insulating material, the display overlay being contoured for and being in, close sealed engagement with the housing means display surface and being sized to continuously cover said portion of said display surface open to the compartment;
  - an annular retaining bezel adapted for close mechanical engagement with the housing means, the display overlay being interposed between the bezel and the housing means display surface in retained sealed engagement with the housing means display surface; and
  - wherein relief porting is included in at least said bezel for allowing moisture to naturally drain from the display overlay thereby to inhibit degradation of the sealed engagement of the display overlay with the housing means display surface.

**4,791,259**  
**METHOD AND APPARATUS FOR RETAINING A VALVE SEAT INSERT**

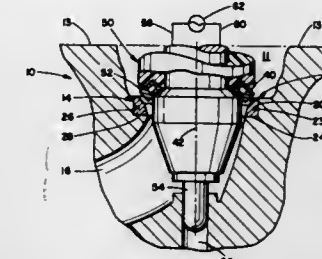
George D. Pfaffmann, Farmington, Mich., assignor to Tocco, Inc., Boaz, Ala.  
 Continuation-in-part of Ser. No. 007,798, Jan. 28, 1987, abandoned. This application Aug. 20, 1987, Ser. No. 87,507  
 Int. Cl.<sup>4</sup> H05B 6/10

U.S. Cl. 219—10.43

28 Claims

1. In combination, a cylinder head and an annular valve seat insert heat treated, in situ, from an initial condition to a heat treated condition by induction heating, said cylinder head having at least one combustion chamber, a cylindrical, countersunk valve bore in said head in communication with said combustion chamber, said counter-sunk valve bore defined by an annular base and an outer cylindrical wall extending therefrom; said insert within said bore having a bottom annular base surface in contact with said annular base, a smaller top annular surface, a generally cylindrical outer surface extending between said top and bottom annular surfaces in contact with said outer cylindrical wall and a frusto-conical seat surface

extending from said top annular surface towards said bottom annular base surface; the improvement comprising:  
 said initial condition established solely by a press fit condition at ambient temperature, said insert further having an annular blind recess extending from said outer surface towards said seat surface, said recess being deformed in said initial condition by said press-fit condition;  
 said insert having a first volume of a substantially martensitic grain structure defined by a cross-sectional configuration of said insert extending a predetermined first distance from said frusto-conical seat surface towards said outer



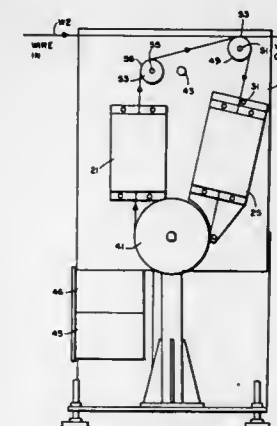
cylindrical wall, a second volume of a substantially non-martensitic grain structure defined by a cross-sectional configuration extending a predetermined second distance from said cylindrical outer surface towards said frusto-conical valve seat surface;  
 said first volume greater in said heat treated condition than in said initial condition and extending to at least a portion of said recess to cause a further deformation in said recess, said volumetric increase and said recess deformation sufficient to maintain said outer cylindrical surface tightly against said outer cylindrical wall.

**4,791,260**  
**INDUCTION TYPE ELECTRICAL WIRE PREHEATER**  
 Myron Waldman, Pawtucket, R.I., assignor to WST Power Electronics, Inc., Providence, R.I.

Filed Oct. 2, 1987, Ser. No. 103,684  
 Int. Cl.<sup>4</sup> H05B 6/44

U.S. Cl. 219—10.61 R

12 Claims



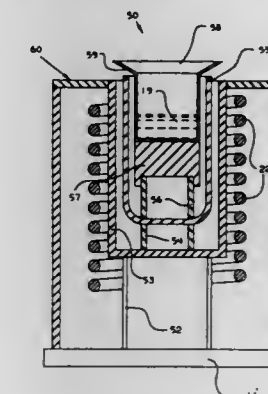
1. A preheater for heating electrical wire by induction comprising:
  - a mounting plate,
  - a first inductor mounted on said mounting plate,
  - a second inductor mounted on said mounting plate,
  - each inductor having a longitudinal insulated passageway,
  - one of said inductors being pivotally mounted on said mounting plate,

- f. an upper wheel rotatably mounted on said mounting plate above said inductors,
- g. a lower wheel rotatably mounted on said mounting plate below said inductors,
- h. the size of the upper wheel depending on the size of the wire being heated, the angular position of the two inductors relative to each other depending on the size of the upper wheel, and
- i. means for supplying current to the inductors,
- j. said electrical wire entering the preheater, passing over the upper wheel, down through the passageway in one of the inductors and under the lower wheel, up through the passageway in the other inductor and again over the upper wheel and then exiting the preheater.

**4,791,261**  
**CRUCIBLE FOR EVAPORATION OF METALLIC FILM**  
 Richard R. Phinney, South Hero, and David C. Strippe, Waterbury Center, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.  
 Filed Sep. 23, 1987, Ser. No. 100,068  
 Int. Cl.<sup>4</sup> H05B 6/24

U.S. Cl. 219—10.491

13 Claims



1. An evaporation source, comprising:
  - a crucible having a given depth and a given diameter, said crucible containing a volume of molten material to be evaporated;
  - a susceptor abutting said crucible, said susceptor being a solid columnar block, the volume of said molten material within said crucible prior to evaporation of said molten material being five eighths or less of the solid volume of said susceptor; and
  - a conductive coil disposed about said susceptor and said crucible for coupling RF energy to said susceptor and to said crucible.

**4,791,262**  
**VOLTAGE TRANSFORMER TYPE ELECTRIC FLUID HEATER**

Masao Ando, Yokohama; Takeshi Nanri, and Mikio Sho, both of Chiba, all of Japan, assignors to Chisso Engineering Co Ltd, Tokyo, Japan

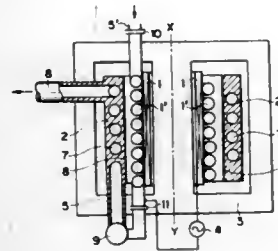
Filed Jul. 7, 1987, Ser. No. 70,550  
 Claims priority, application Japan, Jul. 7, 1986, 61-159150  
 Int. Cl.<sup>4</sup> H05B 6/40

U.S. Cl. 219—10.51

6 Claims

1. An electric fluid heater comprising in combination
  - (a) a primary coil which is supplied with electrical power, and
  - (b) a secondary coil in the form of an elongated tube,
  - (c) a transformer have a common core leg; passing through both said primary and secondary coils,
  - (d) said secondary coil

being single-turned electrically but multiple-turned as a fluid flow path, being made from a material whose skin effect with respect to an alternating current flowing therein is so small that it can be disregarded so as to thereby establish a substantially uniform current flow in said secondary coil,



functioning as a heating element having a fluid entrance metal tube and a fluid exit metal tube, said entrance and exit metal tubes being disposed at positions identical in electric potential so as to prevent any electrical arc upon metallic contact between said entrance and exit tubes,  
(e) said primary coil being configured to heat fluid flowing in said secondary coil.

4,791,263

# MICROWAVE SIMMERING METHOD AND APPARATUS

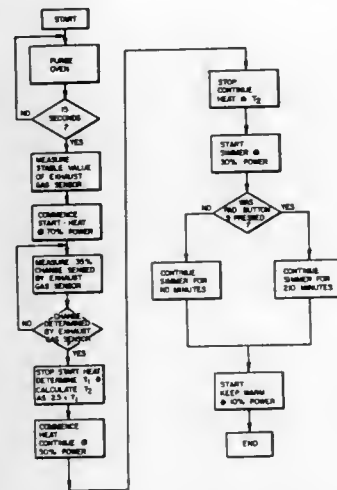
Edward C. Groeschel, Jr., Lincoln Township, Berrien County, Mich., assignor to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 28, 1987, Ser. No. 138,297

Int. Cl.<sup>4</sup> H05B 6/68

U.S. Cl. 219—10.55 M

24 Claims



1. A method of simmering food in a microwave oven having a microwave generator having a preselected maximum power level, and an adjustable control including a timer for causing energization of the generator to deliver microwave energy to food in said oven for selected times and at selected power levels, and means for sensing the degree to which food is said oven has been cooked by the subjection thereof to said microwave energy, said method comprising the steps of:

causing said control to energize said generator to deliver microwave energy to food in said oven at a first power level to raise the temperature thereof to a preselected heated condition, causing said control to energize said

generator to deliver microwave energy to said food at a second power level less than said first power level to raise the temperature thereof to a start-simmer temperature subjacent 100° C.;

causing said control to energize said generator to simmer said food for a period of time at a simmer power level which is less than 50% of said maximum power level; and maintaining the power level of said generator at a maintained-warm power level lower than said simmer power level.

4,791,264

# LOW FORCE WIRE GUIDE FOR EDM MACHINE

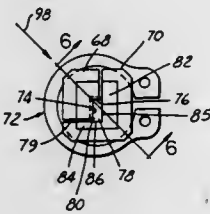
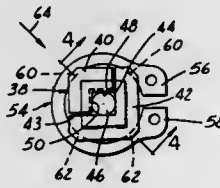
Thomas D. Walser, Chesaning, Mich., assignor to Raycon Textron Inc., Ann Arbor, Mich.

Filed Apr. 29, 1987, Ser. No. 43,889

Int. Cl.<sup>4</sup> B23H 7/10

U.S. Cl. 219—69 W

12 Claims



1. In a wire electrode holder for guiding a wire electrode to a conductive workpiece for establishing a stable spark gap for electrically discharge machining the workpiece the improvement comprising: wire guide housing means having a first elongated segment and a second elongated segment; each of said segments separated from one another at a break along the length thereof; flexible retaining means connecting said first and second segments at one end thereof to bias said segments toward one another at the opposite end thereof; and means on the opposite end of said first and second segments coacting to produce a compound tension force on a wire electrode direct through said wire guide housing means only at the opposite end of segments to maintain a low frictional force thereon during relative movement of a wire electrode with respect to said wire guide housing means; said coacting means further serving to reference the position of said wire electrode with respect to one of said first and second segments.

4,791,265

# METHODS AND APPARATUS FOR ELECTRIC RESISTANCE WELDING

Alfred R. Senni, Burlington, and Louis F. Grama, Robbinsville, both of N.J., assignors to Fifth Dimension Inc., Trenton, N.J.

Filed Jul. 29, 1986, Ser. No. 890,297

Int. Cl.<sup>4</sup> B23K 11/00

U.S. Cl. 219—91.2

7 Claims

7. A method of resistance welding a pair of workpieces together, said method comprising the steps of:

(A) providing a movable arm disposed movably in a frame means,

(B) mounting one of said workpieces in a movable electrode carried by said movable arm and mounting the other of said workpieces in a stationary electrode carried by said frame means opposite said movable electrode,  
(C) moving said movable electrode to bring said one workpiece into engagement with said other workpiece so as to be supported by said other workpiece,  
(D) adjusting an adjustable stop carried by one of said arm and frame means until said stop abuts an abutment carried by the other of said arm and frame means,

ends of the composite cable being of different configuration.

4,791,267

# METHOD OF FORMING IDENTIFYING INDICIA ON CATHODE RAY TUBES

Keishi Yokoyama, Tokyo; Mitsuru Matsushita, Nagaokakyo; Tetsuya Ohtsuka, Tokyo, and Yuji Okazaki, Nagaokakyo, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

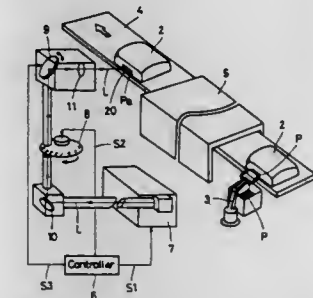
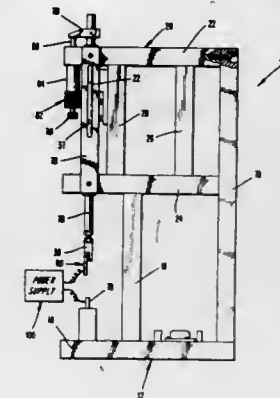
Filed Jan. 27, 1988, Ser. No. 148,949

Claims priority, application Japan, Jan. 28, 1987, 62-19001; Dec. 9, 1987, 62-312796

Int. Cl.<sup>4</sup> B23K 26/00

U.S. Cl. 219—121.69

8 Claims



(E) backing-off said stop from said abutment by a distance equal to the desired welding distance,  
(F) conducting an electrical pulse through said electrodes and workpieces to heat and soften said workpieces, whereupon said movable electrode moves gravitationally toward said stationary electrode to collapse said workpieces until said stop contacts said abutment once the electric pulse has terminated and physically obstructs said movable electrode from further movement beyond said desired welding distance.

1. A method for forming an identifying indicia on a cathode ray tube comprising an envelope, which method comprises the steps of:

applying a paint containing a powdered metal, mixed in a matrix and a solvent, to a selected exterior surface portion of the envelope, said paint being of a nature capable of withstanding both heat treatment and chemical treatment generally practiced in the manufacture of the cathode ray tube;

drying the applied paint to form a solid paint layer; and radiating a laser beam, with the use of a laser beam radiator, onto a portion of the solid paint layer to form the identifying indicia represented by at least one trace of plasticized deformation on a surface region of the solid paint layer.

4,791,266

# APPARATUS FOR SUPPLYING ELECTRIC CURRENT TO A WELDING OR CUTTING TORCH

Marhic Gérard, Cergy, France, assignor to L'Air Liquide, Paris, France

Filed Sep. 15, 1986, Ser. No. 907,739

Claims priority, application France, Sep. 16, 1985, 85 13675

Int. Cl.<sup>4</sup> B23K 9/00

U.S. Cl. 219—121.48

14 Claims



1. An arc welding outfit comprising:  
a torch head,  
combined means for supplying electric current and fluid and at least one flexible composite cable for supplying electric current and fluid from the combined supply means to the torch head,  
wherein connectors are provided on said combined supply means and on said torch head and wherein said composite cable has an upstream end with a connector identical to the connector on the torch head, adapted to be removably connected to the connector of the combined supply means, and a downstream end with a connector identical to that of the connector on the supply means, adapted to be removably connected to the connector on the torch head, the connectors on the upstream and downstream

4,791,268

# ARC PLASMA TORCH AND METHOD USING CONTACT STARTING

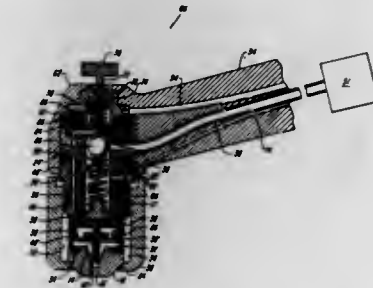
Nicholas A. Sanders, Norwich, Vt., and Richard W. Couch, Jr., Hanover, N.H., assignors to Hypertherm, Inc., Hanover, N.H.

Filed Jan. 30, 1987, Ser. No. 9,508

Int. Cl.<sup>4</sup> B23K 9/00

U.S. Cl. 219—121.57

23 Claims



1. A method for starting to operate an arc plasma torch



having a body with a plasma exit port at one end and an anode and a cathode that are movable relative to one another within the torch body along a first direction, comprising:

resiliently urging the cathode into electrical contact with the anode,

providing a surface transverse to said first direction that is operatively coupled with movable one of said cathode and anode,

blocking said exit port with said cathode when said cathode is in contact with said anode

providing a gas chamber within said torch body between said transverse surface and said cathode and said anode that is sealed by said blocking,

causing an electrical current to flow within the torch and from said cathode to said anode,

supplying a pressurized gas to the interior of the torch at said chamber, and

directing at least some of said gas in said chamber to act on said transverse surface to separate said anode from said cathode forcibly and against the force of said resilient urging whereby an electric arc is generated between said anode and said cathode and whereby said exit port is opened.

4,791,269

**METHOD OF FABRICATING A SPLINE DRIVE**

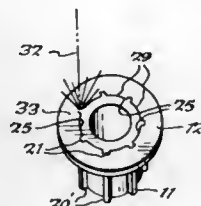
James N. McLean, and Bruce A. McLean, both of Tonawanda, N.Y., assignors to Herr Manufacturing Company, Inc., Tonawanda, N.Y.

Filed May 6, 1987, Ser. No. 46,516

Int. Cl.<sup>4</sup> B23K 26/00

U.S. Cl. 219—121.64

20 Claims



1. A method of fabricating a spline drive comprising the steps of providing a cylindrical member with axially extending first splines of a first depth thereon, reducing the height of said first splines at one end of said member to provide second splines of a second depth which is less than said first depth and simultaneously provide shoulders at the ends of said first splines at the junctions of said first and second splines, providing a washer with an internal surface thereon of complementary mating relationship to fit onto said one end of said member, mounting said washer on said one end of said member in abutting relationship with said shoulders to thereby locate said washer in a proper position on said member, and securing said washer to said member in said proper position.

4,791,270

**GAS TUNGSTEN ARC WELDING MACHINE WITH INFINITE ROTATING WELDING HEAD AND TORCH TILT**

Walter A. Nelson, Jr., Tinley Park, and Gerald A. Krantz, Naperville, both of Ill., assignors to Ferranti Sciaky, Inc., Chicago, Ill.

Filed Apr. 20, 1987, Ser. No. 40,254

Int. Cl.<sup>4</sup> B23K 9/12

U.S. Cl. 219—125.1

9 Claims

1. An automatic machine for practicing the gas tungsten arc welding process comprising:

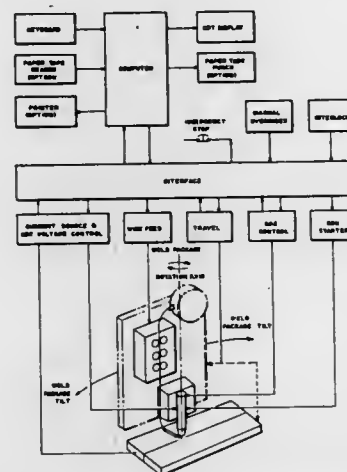
a welding torch;

means for supporting the said welding torch;

means for rotating the welding torch about its longitudinal axis an infinite number of degrees;

means for tilting the said welding torch about its welding tip over a predetermined angle;

means, associated with said means for tilting the said weld torch, for guiding the said welding torch along an arcuate path;



means for supplying the said torch with a cooling medium and one or more gases; and

means for simultaneously rotating and tilting the said welding torch, a wire feed and straightening mechanism and conduits for supplying a cooling medium to the welding torch and arc shielding gases to the welding torch area.

4,791,271

**CAPSTAN DRIVE ASSEMBLY FOR FILLER WIRE IN ELECTRIC ARC WELDING**

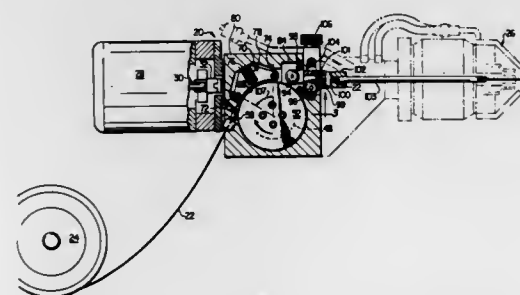
Floyd M. Thompson, Spring, Tex., assignor to CRC-Evans Pipeline International, Inc., Houston, Tex.

Filed Apr. 6, 1987, Ser. No. 34,652

Int. Cl.<sup>4</sup> B23K 9/12; B21F 1/02

U.S. Cl. 219—136

14 Claims



1. Apparatus for feeding and straightening a filler wire which is drawn from a spool and supplied to arc in electric arc welding, comprising:

a motor-driven capstan having a peripheral groove for receiving said filler wire,

means for pressing said filler wire against said capstan over a predetermined distance of the periphery of said capstan for impressing a predetermined cast into said filler wire to substantially eliminate any previous cast in said filler wire, said pressing means including a leading roller for pressing said filler wire into the groove at a first position on the periphery of said capstan and a trailing roller for pressing

said filler wire into the groove at a second position on the periphery of said capstan, said first and second positions being separated by the predetermined distance, said capstan for advancing said filler wire, and

means offset from said capstan for bending said filler wire, after separation of said filler wire from said capstan, to substantially counteract said predetermined cast and produce said filler wire in a substantially straight configuration for delivery to said arc.

4,791,272

**PTC HAIR ROLLER**

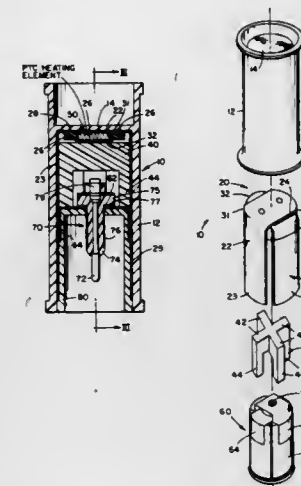
Arnold Thaler, Plantation, Fla., and P. C. Yip, Tsuenwan, Hong Kong, assignors to Windmere Corporation, Miami Lakes, Fla.

Filed Oct. 24, 1986, Ser. No. 922,945

Int. Cl.<sup>4</sup> A45D 2/36; H05B 3/00, 1/02; H01C 7/02

U.S. Cl. 219—222

14 Claims



1. A heat generating hair curling implement comprising:

a generally hollow cylindrical body member about which hair may be wound;

a positive temperature coefficient heating element having a first side and a second side;

a first U-shaped heat radiating plate composed of an electrically and thermally conductive material having two heat radiating legs and a base portion;

a second U-shaped heat radiating plate composed of an electrically and thermally conductive material having two heat radiating legs and a base portion,

said base portions being linked together with said heating element positioned between said base portions and in electrical and heat conducting relationship therewith;

the heat radiating plates being, with said heating element so positioned, disposed within the cylindrical body member so that the heat radiating legs of both plates extend away from their respective base portions in the same direction;

electrical contact means in said body member in electrical contact with said first and second heat radiating plates for connecting said first and second sides of said heating element with a source of electrical energy; and

means to hold said first and second plates within said cylindrical body member.

4,791,273

**VAPORIZER SYSTEM FOR ION SOURCE**

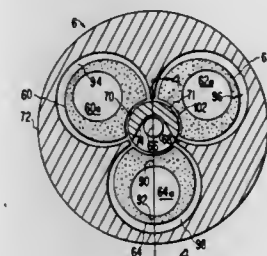
Shu Satoh, Rowley, and Louis E. Evans, Jr., Rockport, both of Mass., assignors to Varian Associates, Inc., Palo Alto, Calif.

Filed May 15, 1987, Ser. No. 51,076

Int. Cl.<sup>4</sup> F22B 1/28

U.S. Cl. 219—271

19 Claims



1. A vaporizer comprising:

at least two crucibles each having a cavity for containing a solid source material to be vaporized and having an outlet for vapor generated in said cavity;

radiation source means for providing radiation for heating a selected crucible and vaporizing a source material in said cavity of said selected crucible; and

movable reflector means having a first position for reflecting radiation from said radiation source means toward a first selected one of said crucibles vaporization of the source material contained and a second position for reflecting radiation from said radiation source means toward a second selected one of said crucibles.

4,791,274

**ELECTRIC FINNED-TUBE BASEBOARD SPACE HEATER EMPLOYING A VAPORIZED WORKING FLUID**

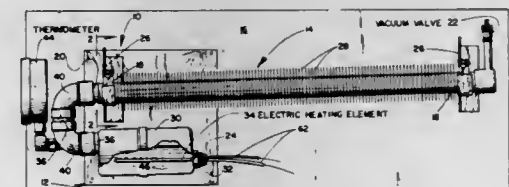
Paul V. Horst, 7333 Old Post Rd., Boulder, Colo. 80301

Filed Mar. 4, 1987, Ser. No. 21,496

Int. Cl.<sup>4</sup> F22D 1/28; F24H 3/06; H05B 3/00; F24D 13/04

U.S. Cl. 219—341

3 Claims



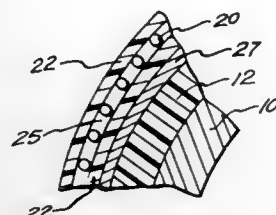
1. In an electrically-powered space heater of the type having a boiler connected to deliver a high-boiling point mixture of ethylene glycol and water in the form of a vapor to an open end of a horizontally-disposed finned-tube heat exchanger and receive condensate therefrom, the heat exchanger being closed at the other end so as to cooperate with the boiler to produce a closed system, the improvement which comprises: the high-boiling point mixture comprising a 2 to 1 mixture of ethylene glycol and water, the boiler having an internal volume of about sixteen cubic inches and being sized to be at least four times the internal volume of the finned tube heat exchanger with the combined internal volumes of the boiler and the finned-tube heat exchanger being between about seventeen cubic inches and about twenty cubic inches, the boiler being sized to have an internal volume greater than the volume of the high-boiling point mixture in the system whereby there is room in said boiler for vaporization of the mixture, and the heat exchanger having a length of between about one foot and about eight feet, an electrical heating means operatively connected to the boiler

to supply electrical energy to heat fluid in the boiler at a level between not less than about 300 watts and about 1200 watts with the wattage increasing at a rate of approximately 150 watts per half cubic inch increase in system volume in said internal volume range to boil said high-boiling point mixture at an initial pressure of approximately -5 p.s.i. and raise same to a temperature of between approximately 190° F. and 250° F. at a maximum working pressure of 15 p.s.i.

**4,791,275**  
**HIGH TEMPERATURE COMPLIANT ROLL**  
**PARTICULARLY ADAPTED FOR XEROGRAPHY**  
Raymond Lee, Schaumburg; Gregory A. Ferro, Chicago, both of Ill., and John Evan, Atlanta, Ga., assignors to IMI-TECH Corporation, Elk Grove Village, Ill.  
Filed Apr. 7, 1986, Ser. No. 848,583  
Int. Cl.<sup>4</sup> H05B 3/02

U.S. Cl. 219-469

5 Claims



1. A roll for heating a surface brought in contact therewith comprising:

- (a) a cylindrical layer of flexible, resilient polyimide foam capable of withstanding, on a continuous basis, temperatures within the range of 400° F. to 600° F.;
  - (b) electrical heating means comprised of a flexible electric circuit encapsulated between two sheets of a high temperature resistant polyimide film secured together by a high temperature adhesive, said electrical heating means being secured to the exterior of the foam by a high temperature adhesive, both said adhesives being capable of operating at temperatures up to at least 450° F.; and
  - (c) a relatively rigid cylinder over which the foam is concentrically disposed for support and rotation;
- whereby the heating means is adapted to be brought into compliant contact with a surface to be heated by rotation of the roll;
- said roll being capable of reaching surface temperatures within the range of 400° F. to 600° F. on a continuous operating basis.

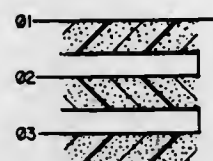
**4,791,276**  
**ELONGATE ELECTRICAL ASSEMBLIES**  
John A. Midgley, San Carlos, and Richard H. Halett, Los Altos, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.  
Continuation of Ser. No. 745,349, Jun. 14, 1985, Pat. No. 4,659,913. This application Nov. 5, 1986, Ser. No. 927,647  
The portion of the term of this patent subsequent to Apr. 15, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> H05B 3/34

U.S. Cl. 219-549

14 Claims

- 1. An electrical circuit which comprises
  - (1) a three phase power source;
  - (2) a first elongate electrical heater which comprises
    - (a) a first elongate electrical connection means having a near end and a far end;
    - (b) a second elongate electrical connection means having a near end and a far end; and
    - (c) a plurality of electrical heating elements which are

- connected in parallel with each other between the first and second electrical connection means;
- (3) a second elongate electrical heater which comprises
  - (a) a first elongate electrical connection means having a near end and a far end;
  - (b) a second elongate electrical connection means having a near end and a far end; and
  - (c) a plurality of electrical elements which are connected in parallel with each other between the first and second electrical connection means; and
- (4) a third elongate electrical heater which comprises



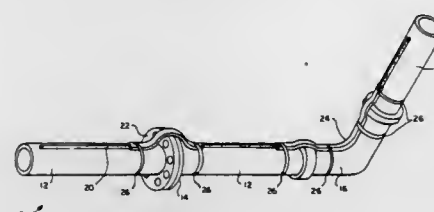
- (a) a first elongate electrical connection means having a near end and a far end;
- (b) a second elongate electrical connection means having a near end and a far end; and
- (c) a plurality of electrical elements which are connected in parallel with each other between the first and second electrical connection means; one end of one of the connection means of each of the first, second and third heaters being connected to the first, second or third phase of the power source, and the other ends of the other connection means of each of the heaters being connected to a different phase or to each other.

**4,791,277**  
**HEATING AND INSULATION ARRANGEMENT FOR A NETWORK OF INSTALLED PIPES AND METHOD**  
Garry L. Montierth, 5004 Wembley Ct., Newark, Calif. 94560; Robert O. Bylin, 1112 Lassen Dr., Belmont, Calif. 94002, and Raymond J. Scott, P.O. Box 2343, Redwood City, Calif. 94064

Filed Feb. 9, 1987, Ser. No. 12,444  
Int. Cl.<sup>4</sup> H05B 3/58

U.S. Cl. 219-535

31 Claims



1. A method of installing readily bendable electrical heat-tracing cable on and insulating a network of already installed pipes including straight sections of pipes, straight joints, and elbow sections, said method comprising the steps of:

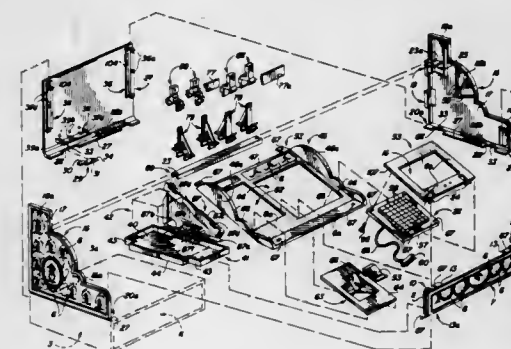
- (a) placing said heat-tracing cable along the lengths of and adjacent to said straight pipe sections, said joints and said elbow sections;
- (b) providing routing guides over and/or under the lengthwise surfaces of those segments of said cable adjacent to said joints and elbows;
- (c) retaining said cable and routing guides in place adjacent to said straight pipe sections, said joints and said elbow sections;
- (d) while said cable and routing guides are so retained, placing a layer of thermal insulation over said straight pipe sections, said joints, and said elbow sections as well as the

- retained cable and routing guides so that the cable is readily accessible at one or both ends thereof for connection with a source of power;
- (e) acting on those segments of said heat tracing cable adjacent said straight pipe sections in a specific way which causes the undersides of the cable segments acted upon to be pressed directly against their adjacent straight pipe sections along substantially the entire length of those cable segments; and
- (f) retaining said heat-tracing cable adjacent said straight pipe sections, said straight joints and said elbow sections in a way which allows segments of said cable to be replaced with new segments of cable which are acted upon in the same manner as the cable segments being replaced by pulling each cable segment to be replaced out of its originally installed position as a replacement cable is pulled therein.

**4,791,278**  
**CASH REGISTER COVER**  
Kenneth H. Hudson, Rte. 2, Box 203, Lowell, Ark. 72745; David E. Gormley, 309 NE. G St., Stigler, Okla. 74462; James E. Dowdy, 935 W. Center Box 1448, Greenwood, Ark. 72936, and Edward F. Vampola, 4408 S. 35 Drive, Fort Smith, Ark. 72903  
Continuation-in-part of Ser. No. 001,834, Jan. 9, 1987, Pat. No. 4,719,337. This application Oct. 9, 1987, Ser. No. 106,643  
Int. Cl.<sup>4</sup> G06F 1/00

U.S. Cl. 235-7 R

44 Claims

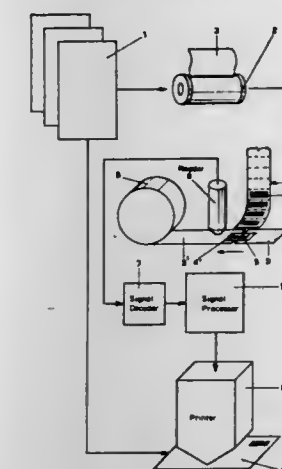


1. In a cash register cover for enclosing and operating a cash register having a cash box and a keyboard, said cash register cover comprising a front panel; a rear panel spaced from said front panel; a pair of side panels disposed in spaced, substantially parallel relationship with respect to each other, said side panels disposed in substantially perpendicular relationship with respect to said front panel and said rear panel and said side panels interconnecting said front panel and said rear panel to define a cover perimeter; a keyboard panel engaging said front panel and abutting said side panels and partially closing said cover perimeter for receiving the keyboard; and indication means closing said cover perimeter between said keyboard panel and said rear panel for supporting and enclosing at least one indication printed circuit board and displaying selected indicia on the indication printed circuit board responsive to operation of the keyboard, the improvement in combination therewith comprising barrier shield means disposed between said keyboard panel and the cash box of the cash register for preventing coins from electrically shorting the keyboard.

**4,791,279**  
**METHOD AND APPARATUS FOR CORRELATING PHOTOGRAPHIC FILM**  
Roberto Signoretto, Via Dosa 1, 30030 Olmo Di Martellago (Venezia), Italy  
Filed Jul. 8, 1986, Ser. No. 883,039  
Claims priority, application Italy, Aug. 8, 1985, 84136 A/85  
Int. Cl.<sup>4</sup> G06F 15/20

U.S. Cl. 235-375

6 Claims



1. A method for correlating negatives with corresponding processing envelopes in photographic laboratories, which comprises:

- (i) joining films together after being extracted from corresponding processing envelopes by taping together the films with a tape portion which has been progressively prenumbered with machine-readable code,
- (ii) machine reading a number printed on the tape portion connecting the films, and
- (iii) printing the machine-read number in machine-readable code on the corresponding processing envelope.

**4,791,280**  
**METHOD OF OPERATING A SECURITY DEVICE, SECURITY DEVICE AND DATA CARRIERS FOR USE IN THE METHOD**  
John O'Connell, Halesowen; Alan Webster, Birmingham; Roy S. Jefferies, and Hugh Trevor-Jones, both of Bridgnorth, all of United Kingdom, assignors to Lowe and Fletcher Limited, Birmingham, England  
PCT No. PCT/GB86/00394, § 371 Date Feb. 17, 1987, § 102(e) Date Feb. 17, 1987, PCT Pub. No. WO87/00233, PCT Pub. Date Jan. 15, 1987  
PCT Filed Jul. 9, 1986, Ser. No. 26,699  
Claims priority, application United Kingdom, Jul. 9, 1986, 8517347

Int. Cl.<sup>4</sup> G06K 7/01

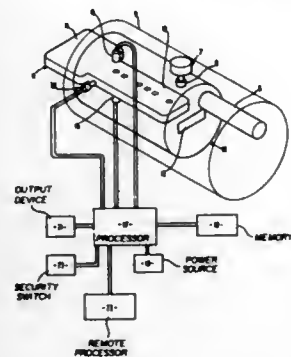
U.S. Cl. 235-382.5

11 Claims

1. A security system comprising first, second, third, fourth data carriers and subsequent data carriers, each presenting a respective encoded number, and a reading device for reading said numbers from the carriers, comparing numbers read from the carriers with numbers stored in the device and for providing an acceptance signal when a number read from a data carrier is found to be acceptable, wherein the reading device includes a memory for storing said data, a first of said carriers is able to introduce a second of the carriers to the device and the second of the carriers, when it has been introduced to the

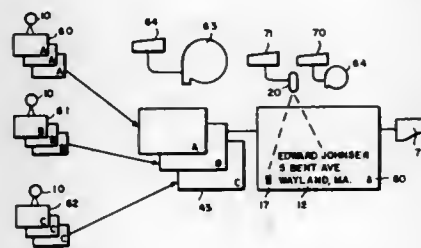


device, is able to introduce the third and subsequent carriers to the device whilst both the first and second data carriers remain



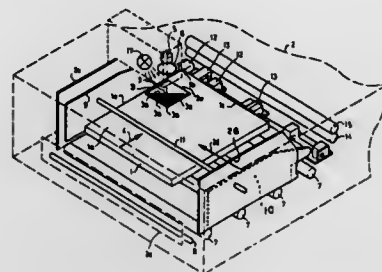
capable each of introducing further data carriers to the reading device.

**4,791,281**  
**ENCODING AND DECODING SYSTEM**  
Edward L. Johnson, Wayland, and David C. Hughes, South Yarmouth, both of Mass., assignors to C.P.C. Investment Trust, Nashua, N.H.  
Filed Oct. 16, 1986, Ser. No. 919,805  
Int. Cl.<sup>4</sup> G06K 15/00  
U.S. Cl. 235—383 16 Claims



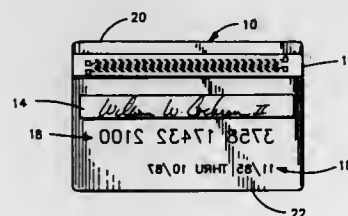
1. A method for producing trackable documents comprising the steps of:  
applying a unique code to each document;  
reading said unique code from each document and recording data representative of said code in a data base;  
assembling one or more documents into a package means;  
applying a person code to said package means; and  
recording data representative of said person code in said data base in such a manner that it is associated with the data representative of said unique codes of the documents assembled in said package means, so that the unique code on a document can be used to identify uniquely the person code applied to the package means in which said document was assembled.

**4,791,282**  
**SYSTEM FOR AUTOMATICALLY CHARGING AND DISCHARGING X-RAY FILM SHEETS INTO AND FROM CASSETTES AND A CASSETTE FOR USE IN THE SYSTEM**  
Manfred Schmidt, Kirchheim, and Herbert Gebele, Sauerlach, both of Fed. Rep. of Germany, assignors to AGFA-GEVAERT AG, Leverkusen, Fed. Rep. of Germany  
Filed Sep. 11, 1986, Ser. No. 906,916  
Claims priority, application Fed. Rep. of Germany, Sep. 24, 1985, 3533954  
Int. Cl.<sup>4</sup> G06K 7/10  
U.S. Cl. 235—462 8 Claims



1. An X-ray film cassette of a flat rectangular configuration for use in an automatic film sheet charging and discharging apparatus of the type having an intake compartment provided with transporting means for advancing the cassette in a feeding direction along a guiding means into engagement with stopping means, and a stationary bar code reader located above the intake compartment, the cassette comprising on its top wall a triangular bar code field in the form of an isosceles right triangle whose legs extend parallel to edges of said cassette, said field enclosing a bar code readable by a bar code reader and the bars of the code extending parallel to the hypotenuse of said triangle; said cassette having a leading edge and a lateral guiding edge forming together a reference corner; a bar code reader being located above a quadrant of said top wall pertaining to said reference corner, said hypotenuse facing said reference corner, and the vertex of said triangle opposite said hypotenuse being directed to a diametrically opposed cassette corner so that said bar code makes possible its reading by a stationary bar code reader in two mutually perpendicular directions.

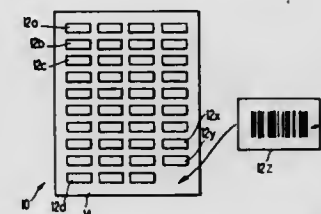
**4,791,283**  
**TRANSACTION CARD MAGNETIC STRIPE EMULATOR**  
Norman S. Burkhardt, Westminster, Colo., assignor to Intelliscard International, Inc., Colorado Springs, Colo.  
Filed Jun. 3, 1986, Ser. No. 870,005  
Int. Cl.<sup>4</sup> G06K 7/08, 19/06  
U.S. Cl. 235—438 8 Claims



1. A device for emulating a magnetic stripe having prerecorded data disposed in a predetermined area on a transaction

card to transfer data from said transaction card to a card reader as said card is moved through said card reader, comprising:  
means for sequentially generating data to be read by said card reader;  
magnetic field generator means for sequentially generating magnetic fields across substantially the entire portion of said predetermined area in response to said data, said magnetic fields having a field strength substantially equivalent to prerecorded data on said magnetic stripe;  
means contained in said card for detecting speed of movement of said card through said card reader to produce a rate control signal;  
means contained in said card for controlling the rate at which said data is sequentially generated in response to said rate control signal.

**4,791,284**  
**METHOD FOR ETCHING A BAR CODE ON METAL**  
Richard Ludden, 6030 Adams St., Lincoln, Nebr. 68507  
Filed Oct. 29, 1987, Ser. No. 114,066  
Int. Cl.<sup>4</sup> G06K 19/02  
U.S. Cl. 235—487 16 Claims

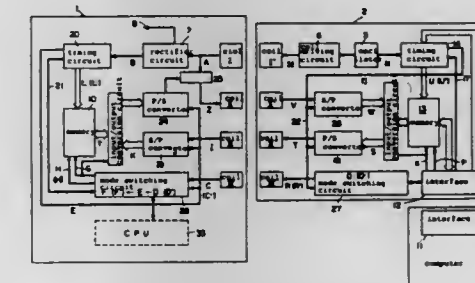


1. A method for etching a bar code having a plurality of dark bars on a metal surface, comprising the steps of:  
(a) preparing a positive of the bar code, the positive including a light-permeable support and dark bars depicted on the support, the dark bars depicted on the support corresponding to the dark bars to be etched on the metal surface;  
(b) exposing a sheet of transfer material to light through the positive, the transfer material including a light-permeable carrier and an adhesive layer of photosensitive substance on the carrier;  
(c) making an adhesive negative of the bar code by developing the sheet of transfer material to provide apertures in the adhesive layer, the apertures in the adhesive layer corresponding to the dark bars of the positive;  
(d) pressing the negative against the metal surface to transfer the adhesive layer to the metal surface;  
(e) removing the carrier from the adhesive layer;  
(f) etching the metal surface through the apertures in the adhesive layer; and  
(g) removing the adhesive layer.

**4,791,285**  
**READ/WRITE METHOD BY A NON-CONTACT SYSTEM AND BETWEEN A STORAGE SUBSTRATE AND READ/WRITE UNIT**  
Shinji Ohki, Osaka, Japan, assignor to Katsuo Gas Kogyo Co., Ltd., Osaka and Nippon LSI Card Co., Ltd., Higashiosaka, both of Japan  
Continuation of Ser. No. 753,474, Jul. 10, 1985, abandoned. This application Feb. 12, 1988, Ser. No. 158,075  
Int. Cl.<sup>4</sup> G06K 7/08  
U.S. Cl. 235—449 4 Claims

1. A system for transferring data between a read/write unit (R/W) and a storage substrate, which comprises:  
an IC card composing said storage substrate formed of an insulating material and having four coils therein positioned to be coupled electromagnetically with coils in the R/W unit and electronic circuits embedded therein, said

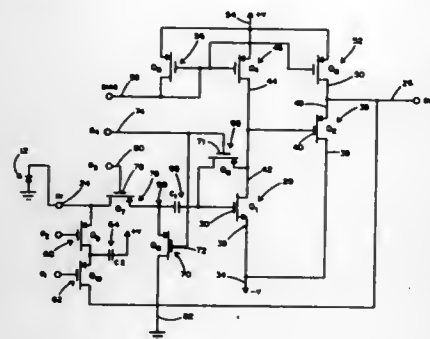
coils comprising a first coil, a second coil, a third coil and a fourth coil, and said electronic circuits comprising a rectifier circuit, a serial/parallel (S/P) convertor, a parallel/serial (P/S) convertor, an input/output (I/O) conversion circuit, a memory, a timing circuit, a mode switching circuit and a chopper circuit;  
said IC card first coil being arranged to couple with a first coil of the R/W unit to receive alternating current power from the R/W unit in order to drive the IC card electronic circuits except for the rectifier;  
said IC card second coil being arranged to couple with a second coil of the R/W unit to serially output data stored in the IC card memory to the R/W unit;  
said IC card third coil being arranged to couple with a third coil of the R/W unit to receive serial data from the R/W unit to be stored in the IC card memory;  
said IC card fourth coil being arranged to couple with a fourth coil of the R/W unit to receive mode commands from the R/W unit in order to sequentially switch operations of the IC card;  
said rectifier circuit being connected to rectify power from the IC card first coil and to supply rectified power to the other electronic circuits of the IC card;  
serial data received at the IC card third coil from the R/W unit being converted to parallel form by the S/P convertor and written in the IC card memory, via the I/O conversion circuit;  
data written in the IC card memory being converted under control of the I/O conversion circuit and chopper circuit



to serial data by the P/S convertor and output to the R/W second coil by the IC card second coil;  
said mode commands received at the IC card fourth coil being sent to the IC card memory by the mode switching circuit to set timings for write-in memory and read-out memory of the data;  
said timing circuit being connected to receive clock signals from the rectifier and convert them to shift clock signals which are supplied to the IC card S/P convertor, P/S convertor and mode switching circuit, and also supplied to select addresses in the IC card memory for the data to be written-in and read-out;  
the read/write unit (R/W) being connected to a computer and comprising a card holder for insertion of said IC card, and also comprising said R/W first coil, R/W second coil, R/W third coil and R/W fourth coil which are respectively positioned to be magnetically connected to said IC coils upon insertion of the IC card, and further comprising electronic circuits;  
said electronic circuits of the R/W unit comprising an oscillator, a coil driving circuit, a timing circuit, a memory, and input/output (I/O) conversion circuit, a parallel/serial (P/S) convertor, a serial/parallel (S/P) convertor, an interface and a mode switching circuit;  
said oscillator being caused to oscillate by application of DC power supplied from said computer outside the R/W unit, said oscillation being amplified by the coil driving circuit and coupled to the R/W first coil;  
said interface being connected to send data read-out signals

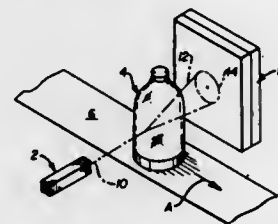
to the R/W memory and to send mode commands to the mode switching circuits;  
 said R/W memory upon read-out sending parallel data stored therein to the P/S convertor via the I/O convertor, serially converted data from the P/S convertor being applied to the R/W third coil;  
 said serial data received by the R/W second coil from the I/C second coil being converted to parallel data by the R/W S/P convertor and written into the R/W memory via the I/O convertor;  
 said R/W timing circuit receiving clock signals from the oscillator in the form of interruptions of the oscillator signal and converting them to shift clock signals, which are supplied to the P/S convertor, S/P convertor and mode switching circuit in the R/W unit;  
 said R/W mode switching circuit, in response to the shift clock signals, converting mode commands and sending them to the R/W fourth coil; and  
 said R/W timing circuit selecting addresses in the R/W memory for the data to be read out of and written into.

**4,791,286**  
**PRE-AMPLIFIER IN FOCAL PLANE DETECTOR ARRAY**  
 Llewellyn E. Wall, Concord, Mass., assignor to Irvine Sensors Corporation, Costa Mesa, Calif.  
 Filed Apr. 27, 1987, Ser. No. 42,686  
 Int. Cl. H01J 40/14  
 U.S. Cl. 250-214 A 8 Claims



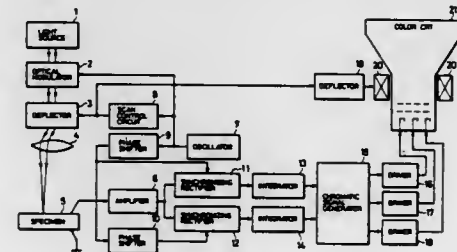
1. For use in a focal plane optical-electronics system having densely-packed photo-detectors, each electronically connected to a separate amplifier, first stage amplifier circuitry comprising:  
 an amplifying transistor whose input receives the signal of a given photo-detector, and whose output amplifies that signal;  
 a capacitor connected between the input of the amplifying transistor and the photo-detector output, the output side of the capacitor being connected to the input of the amplifying transistor, and the input side of the capacitor being connected to the photo-detector output;  
 first switching means for causing the input side of the capacitor to receive or not receive the signal output of the photo-detector;  
 second switching means for causing the input and output of the amplifying transistor to be interconnected or disconnected, in order to provide a diode-connected transistor mode when they are interconnected or an amplifying transistor mode when they are disconnected; and  
 means for synchronously operating the first and second switching means in order to alternate between (a) storing on the capacitor the voltage across the diode-connected transistor, and (b) subtracting the stored capacitor voltage from the photo-detector signal output when the transistor is in its amplifying mode.

**4,791,287**  
**APPARATUS AND AN ASSOCIATED METHOD FOR DETECTING HAZE OR PEARLESCENCE IN CONTAINERS**  
 Edward J. Flaher, Library, Pa., assignor to American Glass Research, Inc., Butler, Pa.  
 Filed Nov. 27, 1987, Ser. No. 125,936  
 Int. Cl. B07C 5/342  
 U.S. Cl. 250-223 B 21 Claims



1. Apparatus for detecting defects in a translucent container comprising  
 light source means for directing a beam of light onto said container,  
 photodetector means for receiving light passing through said container and being spaced from said light source means, said photodetector means including a photodetector array having detectors positioned to detect a light pattern corresponding to a container with haze and detectors positioned to detect a light pattern corresponding to a container with pearlescence, and  
 processing means for receiving output signals from said photodetector means, whereby said apparatus determines whether haze or pearlescence exists in said container.

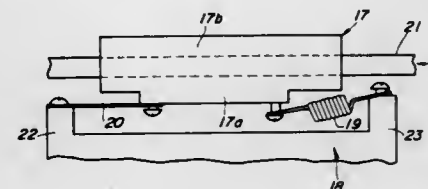
**4,791,288**  
**SCANNING PHOTON MICROSCOPE FOR SIMULTANEOUSLY DISPLAYING BOTH THE AMPLITUDE AND PHASE DISTRIBUTIONS OF AC PHOTOVOLTAGE OR PHOTOCURRENTS**  
 Kanji Kinameri, and Chusuke Munakata, both of Nishitama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Apr. 27, 1987, Ser. No. 42,833  
 Claims priority, application Japan, Apr. 30, 1986, 61-97931  
 Int. Cl. H01J 37/28  
 U.S. Cl. 250-226 2 Claims



1. A scanning photon microscope comprising: a photon beam generator means that generates a photon beam; an ac signal generator means that generates an ac signal with a specified frequency; an optical modulator means that modulates the intensity of the photon beam according to the output signal from the ac signal generator means; a photon beam converging means that converges the photon beam modulated by the optical modulator means on the surface of the specimen; a photon beam scanning means that sweeps the photon beam converged by the photon beam converging means across the specimen surface; a photoelectric effect detector means that detects one of an ac photovoltage and photocurrent generated

in the specimen when irradiated with the photon beam; an amplifier means that amplifies the one of the ac photovoltage and photocurrent detected by the photoelectric effect detector means; a reference signal generator that produces a reference signal with a specified phase difference from the output signal of the ac signal generator means; a phase shifter that produces a signal 90° out of phase with the reference signal; two synchronizing rectifiers that perform synchronizing rectification on the output signal of the amplifier means according to the reference signal and to the output signal of the phase shifter; two integrators that integrate the outputs of the two synchronizing rectifiers; a signal converter that combines and converts the two integrator output signals into three kinds of signals; and a color image displaying means that, according to the three kinds of signals from the signal converter, illuminates red, green and blue primaries and thereby displays a color image in synchronism with the photon beam scanning; whereby the signal converter processes the outputs of the two integrators in such a way that the hue and brightness of the image on the color image display means correspond, respectively, to the phase difference of the one of the ac photovoltage and photocurrent signal from the reference signal, and to the amplitude of the signal.

**4,791,289**  
**LINEAR SCALE MEASURING DEVICE**  
 Yoshio Watanabe, Takeshi Kitayama, and Shiratori Kazuo, all of Mofara, Japan, assignors to Futaba Denshi Kogyo Kabushiki Kaisha, Mofara, Japan  
 Filed May 13, 1987, Ser. No. 49,299  
 Claims priority, application Japan, May 21, 1986, 61-075355[U]  
 Int. Cl. H01J 3/14  
 U.S. Cl. 250-237 G 2 Claims

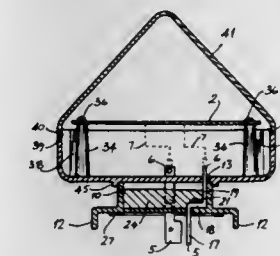


1. A linear scale measuring device comprising:  
 a main scale formed with optical lattices;  
 a slider having an index scale arranged opposite to said main scale, said slider and said main scale being mounted for relative movement along a predetermined direction;  
 a stationary link to which said slider is securely connected;  
 means for optically measuring the amount of relative movement between said main scale and said slider; and  
 elastic connection means connecting said slider to said stationary link at two positions along said predetermined direction, said elastic connection means comprising means for biasing said slider toward said main scale.

**4,791,290**  
**PHOTOELECTRIC CONTROL UNIT WITH COOLING CHAMBER**  
 Sean Noone, Corclough West, Belmullet, County Mayo; Michael Quinlan, Cabercoulish, and Denis O'Connell, Limerick, all of Ireland, assignors to Sean Noone, Mayo, Ireland  
 Filed Sep. 4, 1986, Ser. No. 903,667  
 Claims priority, application Ireland, Oct. 18, 1984, 2516/84; United Kingdom, Oct. 16, 1985, 8525440  
 Int. Cl. H01J 5/62  
 U.S. Cl. 250-239 6 Claims

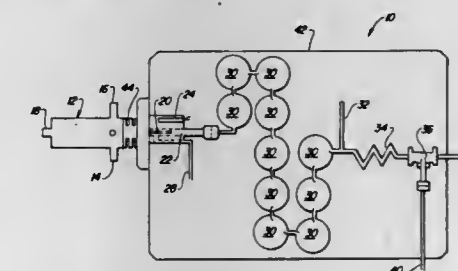
1. A photo-electric control unit for a lighting circuit comprising:

control means including a photo-electric sensor for switching a lamp which is a heat source output;  
 electrical connection means between the control means and the output, the electrical connection means comprising connector pins;  
 a cooling chamber for dissipating heat generated by the output conducted by the pins, the cooling chamber comprising:



prising a base wall and a side wall upstanding from the base wall; and  
 the connector pins extending through the cooling chamber and being cranked intermediate the ends thereof to define a cooling chamber base wall portion and a cooling chamber side wall portion for heat transfer from the pins to the walls of the chamber.

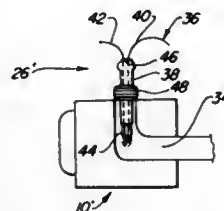
**4,791,291**  
**MASS SPECTROMETER SAMPLING SYSTEM FOR A LIQUID STREAM**  
 James C. Tou, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.  
 Filed Jul. 14, 1986, Ser. No. 885,362  
 Int. Cl. B01D 59/44  
 U.S. Cl. 250-288 20 Claims



1. A sampling system for a mass spectrometer, comprising:  
 conveying means for providing a stream of a predetermined carrier gas;  
 valve means for injecting a fluid sample into said carrier gas stream at substantially atmospheric pressure;  
 chamber means for modifying the concentration of said sample in said carrier gas stream as a predetermined function of time, said chamber means comprising a plurality of discrete volumes maintained at substantially atmospheric pressure and connected in series such that the entire concentration of said sample passes through each of said discrete volumes; and  
 sampling means, associated with the output of said chamber means, for introducing a portion of said sample in said carrier gas stream into a high vacuum fluid stream leading to said mass spectrometer.

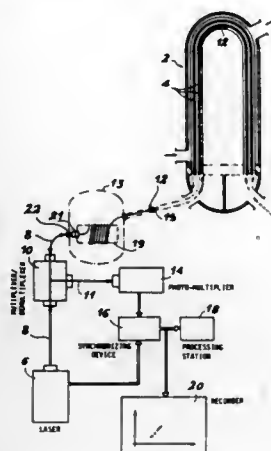


**4,791,292**  
**CAPILLARY MEMBRANE INTERFACE FOR A MASS SPECTROMETER**  
 Robert G. Cook; Mark E. Bier; Jennifer S. Brodbelt, all of West Lafayette, Ind.; James C. Tou, and Lemoyne B. Westover, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.  
 Filed Apr. 24, 1986, Ser. No. 855,894  
 Int. Cl.<sup>4</sup> H01J 41/04  
 U.S. Cl. 250—288 18 Claims



1. A device for introducing a sample into a mass spectrometer, comprising:  
 probe means for removably connecting said device to a mass spectrometer such that a barrel portion of said probe means will extend into said mass spectrometer when said probe means is connected to said mass spectrometer, said probe means having conduit means for permitting bidirectional fluid flow through said probe means; and  
 semipermeable tubing means connected to said conduit means of said probe means for permitting the flow of a fluid containing said sample down said probe means, through said tubing means and up said probe means such that at least a portion of said sample is transferred into said mass spectrometer through said tubing means.

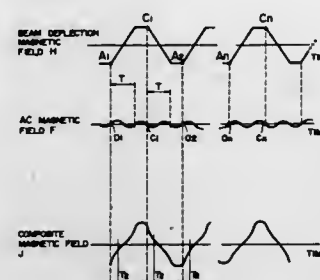
**4,791,293**  
**APPARATUS FOR THE REMOTE EXAMINATION OF FAULTS EMERGING ON THE INNER SURFACE OF A DEEP CAVITY**  
 André Barrière, Morsang sur Orge, France, assignor to Commissariat à l'Energie Atomique, Paris, France  
 Filed Oct. 6, 1986, Ser. No. 915,745  
 Claims priority, application France, Oct. 7, 1985, 85 14819  
 Int. Cl.<sup>4</sup> G01N 21/88  
 U.S. Cl. 250—302 9 Claims



1. An apparatus for remotely examining faults emerging at an inner surface of a deep cavity using photoluminescence of a substance fixed selectively in the faults of said surface, said apparatus comprising: a monochromatic radiation source; a

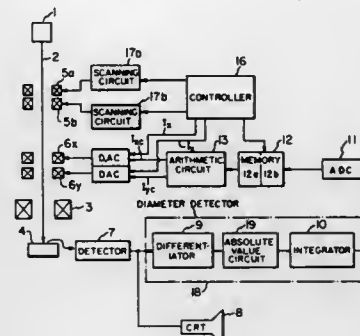
single optical fiber having one end connected to the radiation source and another end connected to an observation probe, said single optical fiber transmitting monochromatic radiation from the source to the observation probe and also transmitting photoluminescent return radiation from the probe to a processing means; separating means placed on the optical fiber for separating said photoluminescent radiation from said monochromatic radiation; said observation probe having a mirror inclined with respect to the inner surface so as to direct the monochromatic radiation transmitted by the optical fiber to the inner surface and so as to reflect the photoluminescent return radiation to said optical fiber which conducts it to said processing means, said mirror being mounted in rotary manner with respect to the observation probe; a drive motor for rotating said mirror; a rotary optical connection placed on the optical fiber so as to permit advance of the probe without any corkscrewing of said optical fiber; means for propelling said observation probe into said deep cavity; and means for scanning said inner surface of said cavity comprising a screw element and a nut element cooperating with said screw element, one of said elements being mounted in non-rotary manner in said probe, the other of said elements being linked in rotation with the drive motor so as to displace the mirror with respect to the probe along a travel path, and means for initiating reversal of rotation direction of the motor at each end of said travel path of said mirror.

**4,791,294**  
**ELECTRON BEAM SCANNING METHOD AND SCANNING ELECTRON MICROSCOPE**  
 Toshihiro Furuya, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan  
 Filed Oct. 7, 1987, Ser. No. 105,250  
 Claims priority, application Japan, Oct. 8, 1986, 61-237947  
 Int. Cl.<sup>4</sup> H01J 37/256  
 U.S. Cl. 250—310 8 Claims



1. A scanning electron microscope comprising means for generating a magnetic field for deflecting an electron beam, said means for receiving a scanning signal which operates on said electron beam to scan a sample having electrical characteristics approximating those of an insulator in one direction and another direction opposite to said direction alternately in a reciprocative fashion, with a time difference of  $n$  period(s) (where  $n=0, 1, 2, \dots$ ) plus a half period of a.c. power being provided between a scanning start time point in each scanning direction of said deflection magnetic field and a corresponding zero-cross time point of said a.c. power.

**4,791,295**  
**METHOD AND APPARATUS FOR AUTOMATICALLY CORRECTING ASTIGMATISM OF SCANNING ELECTRON MICROSCOPE OR THE LIKE**  
 Mitsuru Yamada, Tokyo, Japan, assignor to JEOL Ltd., Tokyo, Japan  
 Filed Feb. 9, 1988, Ser. No. 154,050  
 Claims priority, application Japan, Feb. 16, 1987, 62-32896  
 Int. Cl.<sup>4</sup> H01J 37/153  
 U.S. Cl. 250—310 3 Claims



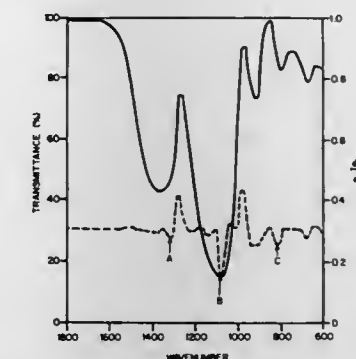
1. A method of automatically correcting the astigmatism of a scanning electron microscope or other similar apparatus equipped with a focusing lens system for focusing an electron beam onto a specimen and equipped with an xy solenoid stigmator for correcting the astigmatism of the focusing lens system, comprising the steps of:

- repeatedly scanning the specimen with the electron beam in a first direction;
- systematically varying correcting currents  $I_x$  and  $I_y$  fed to the x-axis and y-axis coils, respectively, of the xy stigmator for every scan;
- converting the signal emanating from the specimen into a signal indicating the diameter of the electron beam in the direction of scan during each scan;
- forming a combination of the correcting currents  $I_{xa}$  and  $I_{ya}$  flowing into the x-axis and y-axis stigmator coils, respectively, when the converted signal indicates that the diameter of the beam in the first direction of scan is minimal;
- repeating the steps (b) and (c) after changing the direction of scan to a second direction substantially perpendicular to the first direction;
- forming a combination of the correcting currents  $I_{xb}$  and  $I_{yb}$  flowing into the x-axis and y-axis, respectively, when the converted signal indicates that the diameter of the beam in the second direction of scan is minimal; and
- setting the correcting currents  $I_x$  and  $I_y$  fed to the x-axis and y-axis coils, respectively, substantially to  $(I_{xa} + I_{xb})/2$  and  $(I_{ya} + I_{yb})/2$ , respectively.

**4,791,296**  
**FAST METHOD OF MEASURING PHOSPHOROUS CONCENTRATION IN PSG AND BPSG FILMS**  
 Ronald A. Carpio, Colorado Springs, Colo., assignor to Inmos Corporation, Colorado Springs, Colo.  
 Filed Aug. 4, 1987, Ser. No. 81,492  
 Int. Cl.<sup>4</sup> G01J 3/433  
 U.S. Cl. 250—339 12 Claims

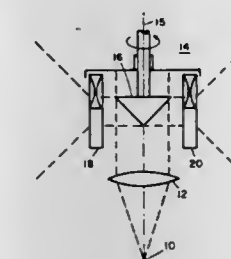
1. A method of measuring phosphorus concentration in phosphosilicate film, which comprises:  
 (a) depositing the film on a first wafer, and placing the first wafer for analysis in a dual beam infrared spectrometer;  
 (b) using a reference in the reference beam of the spectrometer;

- determining, with the spectrometer, a spectrum of the film;
- calculating the second derivative of said spectrum;



- determining from the second derivative calculation a value based on the P=O stretching band; and
- referring to a calibration curve which relates the value to the phosphorus concentration in the phosphosilicate film.

**4,791,297**  
**YAW SENSING CONICAL SCANNER HORIZON SENSOR**  
 Robert C. Savoca, Ridgefield, and Gerald Falbel, Stamford, both of Conn., assignors to Barnes Engineering Company, Shelton, Conn.  
 Filed Mar. 26, 1987, Ser. No. 31,436  
 Int. Cl.<sup>4</sup> G01J 5/08  
 U.S. Cl. 250—347 13 Claims



1. A system for determining attitude information for a orbiting body comprising:  
 a detector for detecting radiation,  
 an objective lens for imaging a field of view onto said detector,  
 a scanner for said detector having an axis of rotation,  
 first and second cylindrical lenses in said scanner spaced about said axis of rotation,  
 a common optical means in said scanner positioned on said axis of rotation for splitting the detector field of view into two fields, one from said first and one from said second cylindrical lenses which fields are normal to the axis of rotation and separated in phase,  
 rotating means for said scanner for scanning said detector across a celestial body so as to produce radiation signals from said detector which are used to determine the attitude of the orbiting body.

4,791,298

## INFRARED DETECTORS

William A. E. Dunn, Romsey, and David J. Gowlett, Southampton, both of England, assignors to U.S. Philips Corp., New York, N.Y.

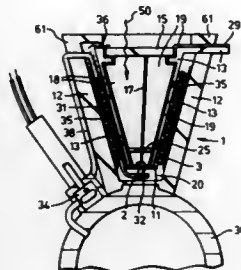
Filed Feb. 13, 1987, Ser. No. 14,511

Claims priority, application United Kingdom, Feb. 14, 1986, 8603680

Int. Cl.<sup>4</sup> F25B 19/00

U.S. Cl. 250—352

22 Claims



1. An infrared detector comprising a housing, at least one infrared detector element mounted at a first part of the housing, a Joule-Thomson cooling element formed around a core and accommodated in a second part of the housing, which cooling element serves to effect cooling of the detector element during operation of the detector by expansion of coolant into a space adjacent the first part of the housing, and infrared transmissive means at a front of the housing to permit transmission of infrared radiation to the detector element, characterized in that the core of the Joule-Thomson cooling element forms a third part of the housing, that the second and third parts of the housing extend from the first part of the housing towards the front of the housing, and that the third part of the housing is infrared transmissive in front of the detector element to permit transmission of the infrared radiation through the core of the Joule-Thomson cooling element, from the front of the housing to the infrared detector element.

4,791,299

## INFRARED RAY SENSING DEVICE

Hiroshi Naito, Tokyo; Hidemi Takahashi, Sagami-hara; Minoru Kimura, and Reiji Sano, both of Kawasaki, all of Japan, assignors to Agency of Industrial Science and Technology, Tokyo, Japan

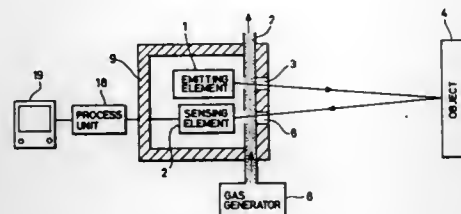
Filed Mar. 2, 1987, Ser. No. 20,732

Claims priority, application Japan, Mar. 3, 1986, 61-44105

Int. Cl.<sup>4</sup> G01J 3/00

U.S. Cl. 250—352

12 Claims



1. An infrared ray sensing device comprising:  
(a) an infrared ray sensing element;  
(b) a thermally insulating casing accommodating the sensing element and having a window which conducts infrared rays of predetermined wavelength to the sensing element; and

(c) means for flowing heat absorption gas so as to cover the window therewith;  
wherein the heat absorption gas essentially passes infrared rays of the predetermined wavelength to be detected by the sensing element and absorbs infrared rays of other wavelengths.

4,791,300

## MINIATURE GAMMA CAMERA

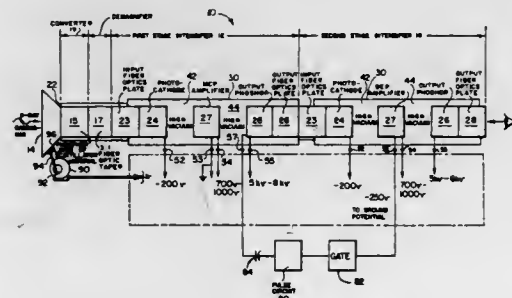
Lo I. Yin, Silver Spring, Md., assignor to QTR Corporation, Silver Spring, Md.

Filed Aug. 25, 1986, Ser. No. 899,641

Int. Cl.<sup>4</sup> G01T 1/20

U.S. Cl. 250—363 R

52 Claims



1. An apparatus for converting images of radiation emitting objects into visible light images, comprising:  
means for providing at an exit face a plurality of aligned rays of invisible radiation from an extended radiation emitting object;  
means including a microchannel plate image intensifier tube, for visible light intensification; and  
input means having a continuous entry surface disposed coextensively with said exit face for receiving all of said aligned rays, for converting said plurality of aligned rays into visible light and for coupling said aligned ray providing means and said visible light intensification means.

4,791,301

## DEVICE FOR THE INPUT OF A NOMINAL VALUE FOR THE IMPACT POINT OF AN ELECTRON BEAM ON A MEDIUM

Volker Bauer, Neuenberg; Josef Heimerl, Linsengericht, and Horst Ranke, Alzenau, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Oct. 28, 1986, Ser. No. 924,255

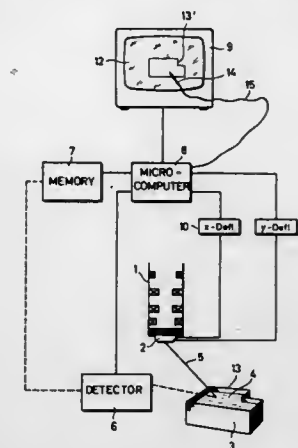
Int. Cl.<sup>4</sup> G01K 1/08; H01J 3/14

U.S. Cl. 250—397

15 Claims

1. Device for input of a nominal position value for the impact point of an electron beam on a medium located in a cruci-

ble, said device comprising a screen on which the contours of the crucible are represented and light pen means for establish-



ing a plurality of nominal positions of impact of the electron beam within the represented contours of the crucible.

4,791,302

## SEMICONDUCTOR WAFER FOR PROVIDING A PLURALITY OF SEMICONDUCTOR CHIPS THROUGH ELECTRON-BEAM LITHOGRAPHY

Hiroshi Nuzue, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

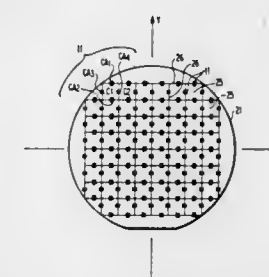
Filed Oct. 21, 1986, Ser. No. 921,183

Claims priority, application Japan, Oct. 21, 1985, 60-234937

Int. Cl.<sup>4</sup> A61N 5/00

U.S. Cl. 250—491.1

15 Claims



1. A semiconductor wafer comprising of a plurality of chip areas arrayed in a matrix form in which semiconductor elements are to be formed, a plurality of scribe regions surrounding each of said chip areas, and a registration mark for employment in electron-beam lithography provided in at least one of said scribe regions, said registration mark including a plurality of regularly spaced rectangular patterns extending in a parallel to each other, said rectangular patterns being arrayed such that the edges of said rectangular patterns are positioned in a straight line which runs in parallel with a boundary line of said scribe region, and each of said rectangular patterns being protruded or depressed from the part of said scribe region surrounding said rectangular pattern.

4,791,303

## METHODS AND APPARATUS FOR LAMINATING POLYMERIC SHEET MATERIAL

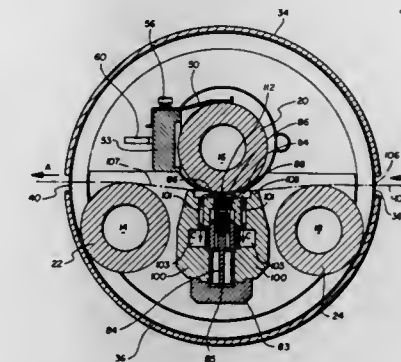
Ihor Wyslotsky, Chicago, Ill., assignor to Biflex Development Partners, Ltd., Grand Rapids, Mich.

Continuation-in-part of Ser. No. 662,570, Oct. 19, 1984, abandoned. This application Apr. 22, 1987, Ser. No. 41,874

Int. Cl.<sup>4</sup> G21G 5/00; G21K 5/00

U.S. Cl. 250—492.1

33 Claims



1. A cold plasma reactor apparatus for activating a treatment portion of the surface of a first sheet of polymeric film material to form free radicals thereon for effecting adhesion with a second sheet of polymeric sheet material, said reactor apparatus comprising:

a cold plasma generating cathode and an anode disposed in spaced proximity with such first sheet of polymeric material;  
means for flowing a stream of a cold plasma generatable gas past said cold plasma generating cathode;  
means for effectuating relative movement between said cathode and the surface of such first sheet of polymeric film material for exposing sequential treatment portions of the surface of such first sheet to such cold plasma; and  
cathode housing means disposed immediately adjacent said cold plasma generating cathode and containing therein sequential treatment portions of the first sheet of polymeric film material, said cathode housing means further defining a substantially closed cold plasma containing chamber, said cold plasma containing chamber further containing said cold plasma generating cathode and yet further containing means for applying the cold plasma directly and continuously to the treatment portion of the first sheet of polymeric film material.

4,791,304

## METHOD AND APPARATUS FOR SCANNING A WEB MATERIAL IN THE DIRECTION OF ITS WIDTH

Akihisa Iida, Shizuoka, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 15, 1987, Ser. No. 61,954

Claims priority, application Japan, Jun. 13, 1986, 61-137666

Int. Cl.<sup>4</sup> H01J 3/14

U.S. Cl. 250—563

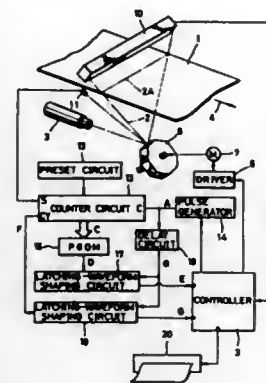
7 Claims

1. A method of scanning a web material in the direction of the width of said web material with a light beam moved by means of a polyhedral mirror with a constant speed of rotation in which said web material is spatially divided into smaller divisions in said scanning direction, said method comprising the steps of

producing a series of clock pulses;  
detecting said light beam at a reference position from which scanning starts to actuate a counter to count up said series of clock pulses; and  
accessing division data stored in a storing means with



counted values of said series of clock pulses by said counter to provide division signals, said division data being accessed by progressively more clock pulses as said light beam moves toward the center of said web material



and by progressively fewer clock pulses as said light beam moves away from the center of said web material, whereby said web material is spatially divided into said smaller divisions in said scanning direction.

4,791,305

**METHOD FOR MEASURING THE PROPERTIES OF A COMPOSITION CONSISTING OF A LIQUID AND SOLID PARTICLES AND APPARATUS USED IN THE METHOD**  
Ilkka Karala, Pirkkala, Finland, assignor to Valmet Oy, Tampere, Finland

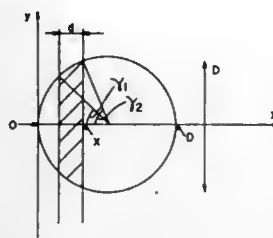
PCT No. PCT/FI87/00029, § 371 Date Oct. 23, 1987, § 102(e) Date Oct. 23, 1987, PCT Pub. No. WO87/05109, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 24, 1987, Ser. No. 271,143

Claims priority, application Finland, Feb. 25, 1986, 860800  
Int. Cl.<sup>4</sup> G01N 15/06, 15/07

U.S. Cl. 250-574

18 Claims



1. A method for measuring the properties, especially the dry matter content of a composition consisting of a liquid and solid particles, said method comprising  
leading electromagnetic radiation into the composition, maintaining the size of a zone to be radiated substantially constant,  
setting the composition and the zone to be radiated in motion relative to each other,  
measuring with a measuring means the intensity of radiation reflecting or scattering back from an electromagnetically radiated zone, the signals therefrom being processed into messages proportional to the properties, especially the dry matter content of a composition, wherein  
the electromagnetic radiation led into a composition is given a wavelength that is smaller than the smallest dimension of the particles in a composition to be measured,  
an intensity function is formed as a result of the movement

of an individual particle arriving in and passing by any given zone exposed to radiation and  
the intensity function is processed for finding out time relationships that are proportional to the thus appearing properties of a particle.

4,791,306

**METHOD AND APPARATUS FOR CONVERTING IMAGE INTO ELECTRICAL SIGNALS**

Jun Tokumitsu, Sagami, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

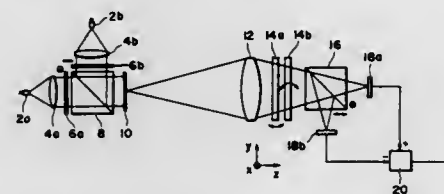
Continuation of Ser. No. 914,151, Oct. 1, 1986, abandoned. This application Dec. 23, 1987, Ser. No. 139,138

Claims priority, application Japan, Oct. 4, 1985, 60-220291

Int. Cl.<sup>4</sup> G02F 1/29

U.S. Cl. 250-578

34 Claims



1. A method of converting an image into electrical signals, comprising the steps of:  
exposing a single image on a plurality of solid-state image pickup devices a plurality of times each;  
shifting charges induced by exposure cycles and distributed in correspondence with the single image in said solid-state image pickup devices while exposure is performed, and adding shifted charges; and  
performing a subtraction of output signals from said solid-state image pickup devices, the output signals representing corresponding pixels of said plurality of solid-state image pickup devices.

4,791,307

**METHOD FOR READING OUT CHARGES IN SOLID-STATE IMAGE PICKUP UNIT**

Kazuhiro Kawajiri, and Masatoshi Tabei, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

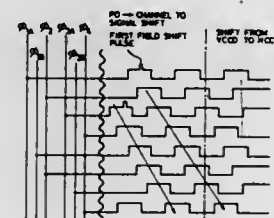
Filed Oct. 14, 1987, Ser. No. 108,340

Claims priority, application Japan, Oct. 14, 1986, 61-242046

Int. Cl.<sup>4</sup> H01J 40/14; H04N 3/14

U.S. Cl. 250-578

6 Claims



1. A method for reading out signal charges from a solid-state image pickup unit having a plurality of photoelectric conversion elements arranged in a matrix of rows and columns in which m rows are assigned to each scanning line with m being an integer greater than one, a vertical charge transfer section receiving signal charges from said photoelectric conversion elements, and a transfer control section for controlling the transfer of said signal charges, said method comprising the steps of:  
(1) exposing said pickup unit to light;  
(2) transferring a resulting signal charge in each photoelec-

tric conversion element of the m-th row in each scanning line to said vertical charge transfer section;  
(3) transferring the signal charges transferred in step (2) within said vertical charge transfer section vertically through a distance corresponding to one cell of said vertical charge transfer section;  
(4) transferring a signal charge in each photoelectric conversion element of the (m-1)-th row to said vertical charge transfer section;  
(5) transferring said signal charges transferred in step (4) within said vertical charge transfer section vertically through said distance corresponding to one cell of said vertical charge transfer section;  
(6) repeating steps (2) to (5) in th order of said m-th row to second row;  
(7) transferring a signal charge in each photoelectric conversion element of a first row in each scanning line to said vertical charge transfer section; and  
(8) transferring the signal charges then stored in said vertical charge transfer section to a horizontal charge transfer section.

4,791,308

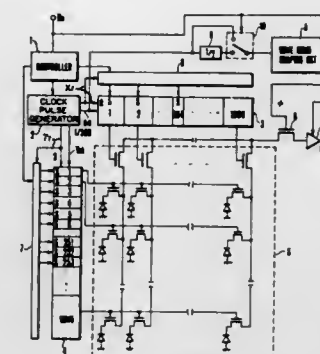
**SOLID-STATE IMAGE PICK-UP APPARATUS HAVING VARIABLE MAGNIFICATION OF IMAGE SIZES BY CHANGING THE IMAGE SENSOR ADDRESS RANGE**  
Yoshitake Nagashima, Chigasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 15, 1986, Ser. No. 919,186

Int. Cl.<sup>4</sup> H01J 40/14

U.S. Cl. 250-578

14 Claims



1. An image pick-up apparatus comprising:  
(a) image pick-up means having a plurality of photoelectric converting elements arranged in a matrix, each of said elements generating an electrical signal indicative of information of such image;  
(b) read-out means for reading out said electrical signals by addressing said photoelectric converting elements, said read-out means being responsive to respective diverse control signals to selectively read out different sizes of areas formed by said photoelectric converting elements within respective time periods of common duration; and  
(c) control means for generating said diverse control signals and for selectively combining said electrical signals in predetermined different combinations in correspondence with said size of areas of photoelectric converting elements addressed by said read-out means.

4,791,309

**ELECTRICAL CONTROL SYSTEMS**

Richard D. Payne, Surrey, and Eric E. Simpson, Essex, both of United Kingdom, assignors to Thamesmead Engineering Limited, London, England

Continuation of Ser. No. 498,090, Aug. 16, 1983, abandoned.

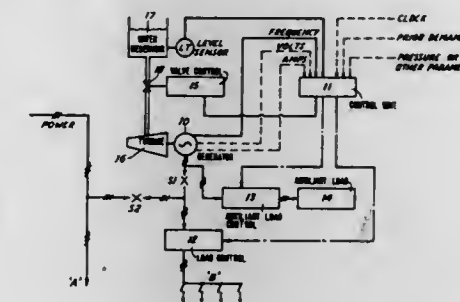
This application Dec. 28, 1987, Ser. No. 139,177

Claims priority, application United Kingdom, Sep. 21, 1982, 8226919

Int. Cl.<sup>4</sup> F02G 3/00; H02P 9/04

U.S. Cl. 290-40

12 Claims



1. A control system for an electrical power generating system comprising:  
a prime mover, an electrical generator driven thereby, consumer load supplied from the generator, an auxiliary control load, and a control system;  
said control system comprising a controller, a sensor for one or more parameters of the generating system and producing a signal responsive thereto, first control means for said prime mover whereby the output of the generator is influenced, second control means associated with said auxiliary control load whereby the proportions of the power received by the consumer load and the auxiliary control load are controlled, and connections from the controller to the first and second control means;  
the controller, in response to said signal from the sensor, effecting control of said proportions by alteration of the second control means; and also variation of the power output of the prime mover to the generator, and thus the power output of the generator, in a sense to allow steady state operation in which the auxiliary control load receives no or a minimum of power.

4,791,310

**FLUORESCENCE MICROSCOPY**

Arnold Honig, Oran, and James E. Smith, Camillus, both of N.Y., assignors to Syracuse University, Syracuse, N.Y.

Filed Oct. 2, 1986, Ser. No. 914,367

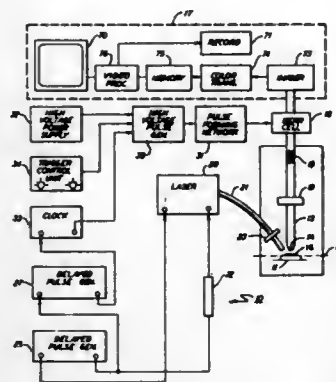
Int. Cl.<sup>4</sup> G01N 21/31

U.S. Cl. 250-458.1

18 Claims

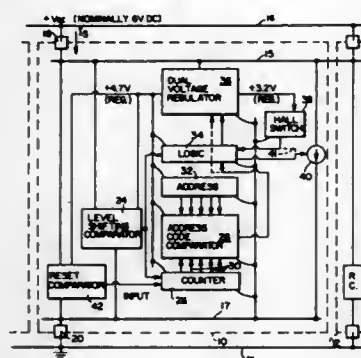
1. A multi-chronal fluorescence imaging apparatus for spatial differentiation of a multitude of separate biological, organic and inorganic components that includes  
a sample holder for containing a sample with a plurality of fluorescent dyes bonded to specific sample components, said dyes each reaching a different maximum output intensity upon being excited and having substantially different decay times with the dye of greatest maximum output intensity reaching final decay first and the remaining dyes decaying in the order of their respective maximum output intensities such that the maximum output of each dye can be detected in an ordered sequence with little interference from the other dyes,  
a pulsed light source for periodically irradiating a sample in said holder with a pulsed excitation radiation wherein each dye emits fluorescent radiation at about its maximum output before reaching final decay.

a spatially sensitive detector means positioned in an optical light path for viewing the radiation emitted by said dyes, a gate means having a shutter movable between a closed position wherein radiation emitted by said sample is prevented from reaching the detector means and an open position wherein radiation emitted by said sample is transmitted to the detector means,



means for intermittently energizing the light source to produce a light pulse having a duration that is less than the shortest decay time of said dyes, and control means to open the shutter at periodic intervals to permit the detector to view time resolved images produced by each dye prior to its decay.

**4,791,311**  
**TWO-TERMINAL MULTIPLEXABLE SENSOR**  
Ravi Vig, Concord, N.H., assignor to Sprague Electric Company, North Adams, Mass.  
Filed Sep. 28, 1987, Ser. No. 101,720  
Int. Cl. B60Q 1/00; B62D 45/00  
U.S. Cl. 307-10 R 12 Claims



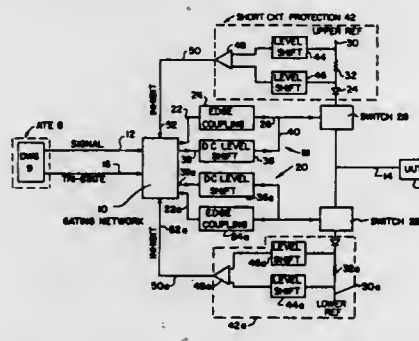
1. A two-terminal multiplexable sensor comprising a silicon integrated circuit chip comprising:
  - (a) a power terminal and a ground reference terminal;
  - (b) a binary counter means connected to said power terminal for counting the number of voltage pulses of one polarity that are superimposed on a DC supply voltage applied to said power terminal;
  - (c) a fixed binary address code circuit means for providing a particular fixed-circuit binary-number address code by which said sensor may be distinguished electrically from other two-terminal multiplexable sensors;
  - (d) an address code comparator means connected between an output of said binary counter means and said fixed address code circuit means for providing at an output

thereof a match signal only when the count of said counter means matches said address code;

- (e) a switchable current source connected between said power terminal and said ground terminal and having a control input;
- (f) an ambient-field-to-electrical-signal transducer, having an output connected to said control input of said current source, for switching on said current source when the ambient field strength exceeds a predetermined amount; and
- (g) a transducer control means connected between said output of said address code comparator means and said transducer

for turning on said transducer and switching on said current source for at least one particular portion of each period during which both the ambient field exceeds said amount and the count of said counter means matches said address code, so that the current-source current occurring during said one portion of each said period provides a signal through said power terminal indicating the presence of the ambient field that exceeds said amount, and for turning off said transducer during all other periods during which the count of said counter means does not match said address code.

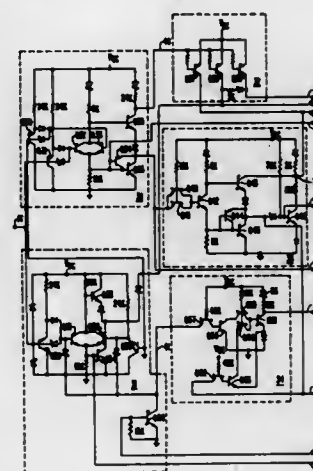
**4,791,312**  
**PROGRAMMABLE LEVEL SHIFTING INTERFACE DEVICE**  
John M. Weick, Centerville, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.  
Filed Jan. 8, 1987, Ser. No. 59,073  
Int. Cl. H03K 5/08, 5/12  
U.S. Cl. 307-264 2 Claims



1. A digital driver for variably translating low level input signals from an automatic test equipment to programmable levels acceptable to a unit undergoing test, the driver having two parallel paths, each of which comprises:
  - means for coupling the rising edge of the input signal to switching means for quickly turning on the switching means;
  - means for shifting the low voltage level input by a fixed amount for driving the switching means after the rising edge of an input signal is coupled thereto;
  - a variable reference voltage point;
  - the switching means connected at a control terminal to the output of the level shifting means and the edge coupling means for switching in synchronism with the input signal;
  - means connecting the reference voltage point to the switching means for generating a signal with a translated voltage level at the output of the switching means;
  - means connecting the output of the switching means to the input of a unit undergoing test;
  - wherein the outputs of the switching means for the two parallel paths are connected together for providing a binary signal in synchronism with the input signal and having voltage levels dependent upon respective high and low reference voltages;

gating means connected at its output to the input of each level shifting means, the input signal provided at the input of the gating means for passage to the parallel paths; the gating means having a tri-state control input for opening the gating means and producing a high output impedance at the switching means output regardless of the input signal.

**4,791,313**  
**BIPOLAR TRANSISTOR SWITCHING ENHANCEMENT CIRCUIT**  
James R. Kuo, Cupertino; Brian R. Carey, and Timothy G. Moran, both of Sunnyvale, all of Calif., assignors to Fairchild Semiconductor Corp., Cupertino, Calif.  
Filed Nov. 13, 1986, Ser. No. 930,608  
Int. Cl. H03K 5/01, 17/04  
U.S. Cl. 307-268 17 Claims



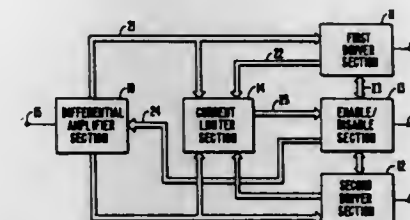
1. A circuit for turning on at least one PNP transistor at high speed comprising:
  - switching means responsive to an input signal for biasing said PNP transistor to turn on said transistor,
  - a first transistor having a base terminal coupled to said switching means such that said first transistor turns off when said switching means turns said PNP transistor on, a collector terminal coupled to a first voltage supply through a further switching means and a base region of said PNP transistor, and an emitter terminal coupled to a second voltage supply, and
  - capacitive means connected between said base and collector terminals of said first transistor,
  - whereby said capacitive means turns said first transistor momentarily on when said switching means turns on said PNP transistor to create a current surge from said base region of said PNP transistor.

**4,791,314**  
**OSCILLATION-FREE, SHORT-CIRCUIT PROTECTION CIRCUIT**  
James R. Kuo, Cupertino, and Timothy G. Moran, Sunnyvale, both of Calif., assignors to Fairchild Semiconductor Corporation, Cupertino, Calif.  
Filed Nov. 13, 1986, Ser. No. 930,593  
Int. Cl. H03K 5/153, 17/14, 17/30, 3/295  
U.S. Cl. 307-270 20 Claims

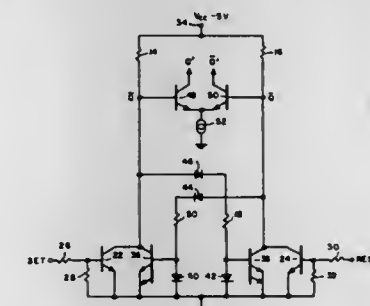
1. In a circuit having an output terminal for connection to a signal line, and an output transistor having an emitter terminal connected to said output terminal, a base terminal connected to two sources of current, and a collector terminal connected to a first voltage supply, said circuit comprising:
  - a first current sensing transistor coupled to said output transistor collector terminal in such a way that said first cur-

rent sensing transistor is turned on when current through said output transistor collector terminal exceeds a first limit,

- a second current sensing transistor coupled to said output transistor collector terminal in such a way that said second sensing transistor is turned on when current through said output transistor collector terminal exceeds a second limit,



**4,791,315**  
**CROSS-COUPLED LATCH**  
Walter S. Gontowski, Jr., Thompson, Conn., assignor to Cherry Semiconductor Corporation, East Greenwich, R.I.  
Filed Jun. 4, 1987, Ser. No. 58,049  
Int. Cl. H03K 3/286, 3/288  
U.S. Cl. 307-291 9 Claims



1. A cross-coupled latch circuit comprising:
  - means for receiving a voltage;
  - a first resistor having one end connected to said voltage receiving means and having an other end;
  - a second resistor having one end connected to said voltage receiving means so that said second resistor is in parallel with said first resistor and having an other end;
  - a first diode connected in series between said second resistor and ground;
  - a second diode connected in series between said first resistor and ground;
  - a first switching transistor having a collector coupled to the other end of said first resistor and having a base and emitter connected across said first diode so that the current in said first diode is mirrored and multiplied through said first switching transistor;
  - a second switching transistor having a collector coupled to the other end of said second resistor and having a base and emitter connected across said second diode so that the current in said second diode is mirrored and multiplied through said second switching transistor;
  - means connected to said first switching transistor for setting said latch circuit; and



means connected to said second switching transistor for resetting said latch circuit.

#### 4,791,316 LATCH-UP PROTECTION CIRCUIT FOR INTEGRATED CIRCUITS USING COMPLEMENTARY MOS CIRCUIT TECHNOLOGY

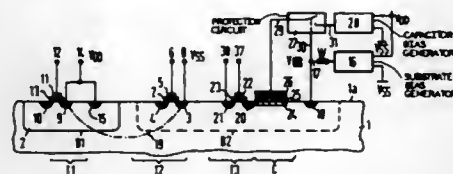
Josef Winnerl, Landshut; Werner Reczek, Munchen, both of Fed. Rep. of Germany, and Wolfgang Pribyl, Villach, Austria, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 13, 1987, Ser. No. 25,655

Int. Cl.<sup>4</sup> H03K 17/16

U.S. Cl. 307—296 R

21 Claims



1. A latch-up protection circuit for use in integrated circuits using complementary MOS circuit technology, the integrated circuit having a substrate bias terminal and a doped semiconductor substrate, the substrate biased terminal connected to an output of a substrate bias generator, comprising:

a capacitor having first and second capacitor surfaces, said first surface integrated in the semiconductor substrate; an electronic protection circuit connected to the substrate biased terminal and controlled by a voltage thereon, said electronic protection circuit also connected to said second surface of said capacitor, said electronic protection circuit having at least a first transistor with a predetermined threshold voltage; and

a capacitor bias generator for providing a predetermined voltage connected to said electronic protection circuit, said electronic protection circuit disconnecting said capacitor bias generator from said second surface of said capacitor when a voltage on the substrate bias terminal is greater than a difference between a reference potential and said threshold voltage of said first transistor in said electronic protection circuit, and said electronic protection circuit connecting said capacitor bias generator to said second surface of said capacitor when a voltage on the substrate bias terminal is less than said difference.

#### 4,791,317 LATCH-UP PROTECTION CIRCUIT FOR INTEGRATED CIRCUITS USING COMPLEMENTARY MOS CIRCUIT TECHNOLOGY

Josef Winnerl, Landshut, and Werner Reczek, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

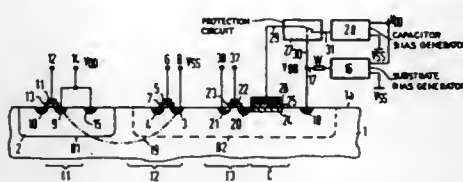
Filed Mar. 13, 1987, Ser. No. 25,654

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632828

Int. Cl.<sup>4</sup> H03K 17/16

U.S. Cl. 307—296 R

19 Claims



1. A latch-up protection circuit for use in integrated circuits

using complementary MOS circuit technology, the integrated circuit having a substrate bias terminal and a doped semiconductor substrate, the substrate bias terminal connected to an output of a substrate bias generator, comprising:

a capacitor having first and second capacitor surfaces, said first surface integrated in the semiconductor substrate; an electronic protection circuit connected to the substrate bias terminal and controlled by a voltage thereon, said electronic protection circuit also connected to said second surface of said capacitor, said electronic protection circuit having at least one first field effect transistor with a predetermined threshold voltage; and

a capacitor bias generator for providing a predetermined voltage connected to said electronic protection circuit, said (electronic protection circuit connecting said capacitor bias generator to said second surface of said capacitor when a voltage on the substrate bias terminal is less than a sum of a reference potential and said threshold voltage of said first transistor in said electronic protection circuit, and said electronic protection circuit disconnecting said capacitor bias generator from said second surface of said capacitor when a voltage on the substrate bias terminal is greater than said sum.

#### 4,791,318 MOS THRESHOLD CONTROL CIRCUIT

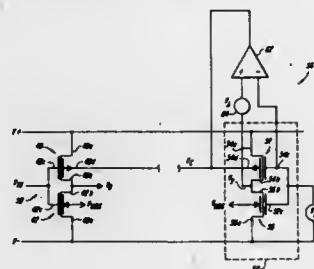
Stephen R. Lewis, Reading, and Scott Lefton, Melrose, both of Mass., assignors to Analog Devices, Inc., Norwood, Mass.

Filed Dec. 15, 1987, Ser. No. 132,934

Int. Cl.<sup>4</sup> H03K 17/30

U.S. Cl. 307—297

14 Claims



1. Apparatus for controlling a threshold voltage of a circuit including an MOS operating device having a back gate, comprising:

a reference stage including an input, an output and an MOS reference device having a back gate; means for applying a reference voltage  $V_R$  to the input of said reference stage, said reference voltage  $V_R$  being equal to the desired circuit threshold voltage; and feedback means for providing a control voltage to the back gate of said MOS reference device for maintaining a prescribed relationship between said reference voltage and a voltage  $V_X$  at said output, said control voltage being coupled to the back gate of said MOS operating device.

#### 4,791,319 SEMICONDUCTOR DEVICE WITH REDUNDANCY CIRCUIT AND MEANS FOR ACTIVATING SAME

Tomoyuki Tagami, and Masaru Nawaki, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 29, 1987, Ser. No. 44,105

Claims priority, application Japan, Jun. 20, 1986, 61-145582

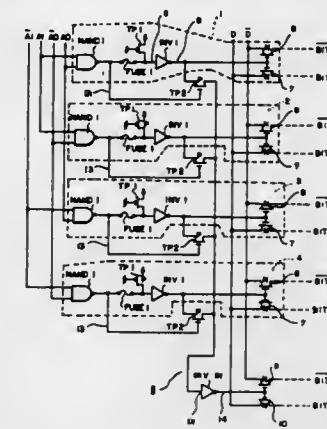
Int. Cl.<sup>4</sup> H03K 19/003

U.S. Cl. 307—441

2 Claims

1. A semiconductor device comprising a plurality of signal line circuits each including a selecting line for transmitting a line selecting signal therethrough and a normally closed circuit opening element, and

a redundancy signal line circuit connected to each of said signal line circuits through a single transistor, said circuit opening element connecting the gate of said transistor in series with said selecting line of said signal line circuit, said device being so structured that a defective one of said



signal line circuits can be inactivated by opening said circuit opening element in said defective signal line circuit and that a signal applied to said inactivated signal line circuit serves to activate said redundancy signal line circuit.

#### 4,791,320 BIPOLAR-MISFET COMPOUND INVERTER WITH DISCHARGE TRANSISTOR

Mitsuya Kawata, Yokohama, and Tetsu Tanizawa, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan

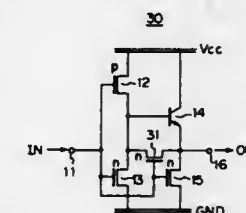
Filed Aug. 18, 1986, Ser. No. 897,460

Claims priority, application Japan, Aug. 20, 1985, 60-181065

Int. Cl.<sup>4</sup> H03K 19/01

U.S. Cl. 307—446

9 Claims



6. A compound transistor type inverter comprising: an input stage MIS transistor pair comprising a p-channel MIS transistor and n-channel MIS transistor both being connected in series between a power source and a ground and connected commonly, at their gates, with an input terminal;

an output stage transistor pair comprising an npn transistor and a pnp transistor being provided with a common output terminal connected to a series connection between the npn and the pnp transistors, said output transistors being connected in series between the power source and the ground, the npn and pnp transistors being commonly controlled, via their bases, by an output from the input stage MIS transistor pair; An additional transistor means connected in the inverter, which additional transistor means is operative between the base and the emitter of the npn transistor so as to attain a quick cut-OFF of the npn transistor and, at the same time, attain a quick discharge of current to be drawn from the output terminal to the ground via the n-channel MIS transistor at the input stage, and

said additional transistor means comprises an n-channel MIS transistor having a gate connected to said input terminal.

#### 4,791,321 CMOS OUTPUT CIRCUIT DEVICE

Yasunori Tanaka; Yukinori Uchino, both of Yokohama, and Hideo Hashimoto, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki and Tosbac Computer System Co., Ltd., Tokyo, both of, Japan

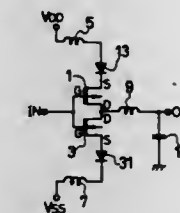
Filed Jul. 23, 1986, Ser. No. 888,369

Claims priority, application Japan, Dec. 27, 1985, 60-293209

Int. Cl.<sup>4</sup> H03K 17/60, 19/094

U.S. Cl. 307—451

6 Claims



1. A signal output circuit device, comprising: a first type MOS transistor having a source, a control gate, and a drain; a second type MOS transistor having a source, a control gate, and a drain; the control gates of said first and second type MOS transistors being connected together to an input terminal, the source of said first type MOS transistor being connected to a first power supply having a first polarity, the source of said second type MOS transistor being connected to a second power supply having a second polarity, the drains of said first and second type MOS transistors being connected together so as to produce an output signal on a common line; a first diode which is inserted in the forward direction between the first power supply and the source of said first type MOS transistor; a second diode which is inserted in the forward direction between the source of said second type MOS transistor and the second power supply; and a capacitor, one terminal of which is connected to said common output line and the other terminal of which is connected to ground, thereby suppressing both overshoot and undershoot phenomena when said first and second type MOS transistors are changed-over from one condition to the other condition in accordance with an input signal, wherein said first type MOS transistor is a P-MOS transistor and said second type MOS transistor is an NMOS transistor.

#### 4,791,322 TTL COMPATIBLE INPUT BUFFER

Andrew C. Graham, Sunnyvale, and Mark E. Fitzpatrick, San Jose, both of Calif., assignors to Gazelle Microcircuits, Inc., Santa Clara, Calif.

Filed May 19, 1987, Ser. No. 52,660

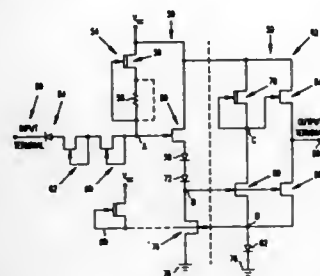
Int. Cl.<sup>4</sup> H03K 19/092, 17/16, 19/094

U.S. Cl. 307—475

12 Claims

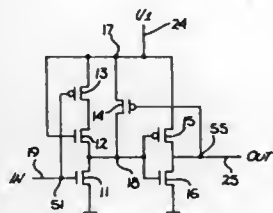
1. An input level shifter circuit having a shifter input signal lead for receiving an input signal, a shifter output signal lead for providing an output signal, a first voltage supply terminal, and a second voltage supply terminal, comprising: first and second transistors; said first transistor having a first current handling terminal connected to the first voltage supply terminal, a control terminal, and a second current handling terminal;

said second transistor having a first current handling terminal connected to the second current handling terminal of the first transistor, a control terminal, and a second current handling terminal connected to the second voltage supply terminal;  
the shifter output signal lead being connected to the first current handling terminal of the second transistor;



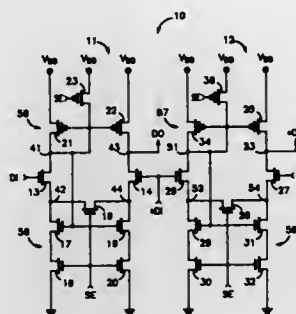
the shifter input signal lead being connected to the control terminal of the first transistor through a diode reverse biased in the direction of the input signal from the shifter input signal lead to the control terminal of the first transistor; and  
load means connected to the first voltage supply terminal and the control terminal of the first transistor.

**4,791,323**  
**LEVEL TRANSLATION CIRCUIT**  
Charles C. Austin, El Toro, Calif., assignor to Silicon Systems, Inc., Tustin, Calif.  
Filed Oct. 23, 1986, Ser. No. 922,536  
Int. Cl.<sup>4</sup> H03K 19/092, 17/16, 17/687  
U.S. Cl. 307-475 **8 Claims**



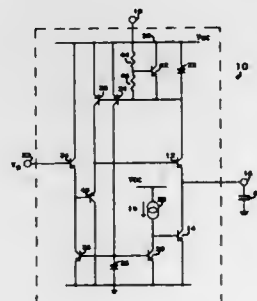
1. An electrical circuit for converting transistor transistor logic (TTL) voltages levels to complimentary metal oxide semiconductor (CMOS) voltage levels comprising:  
a first gain stage comprising first and second transistors of a first conductivity type serially connected at a first output node;  
a second gain stage comprising a third transistor of a second conductivity type coupled in series with a fourth transistor of said first conductivity type, said second gain stage coupled to the output node of said first stage;  
a fifth transistor of said second conductivity type coupled in series between a reference voltage and said first gain stage, said fifth transistor for enabling operation of said circuit in a low power mode when an input signal to said first gain stage approaches said reference voltage, said first and fifth transistor being gate coupled to said input signal, said second transistor gate coupled to said reference voltage;  
a sixth transistor of said second conductivity type coupled in series with said voltage reference and said output node of said first gain stage and in a feedback loop to said second gain stage, said sixth transistor for enabling said circuit to operate in a no power mode when said input signal approaches ground potential.

**4,791,324**  
**CMOS DIFFERENTIAL-AMPLIFIER SENSE AMPLIFIER**  
Stephen Hodapp, Austin, Tex., assignor to Motorola, Inc., Schaumburg, Ill.  
Filed Apr. 10, 1987, Ser. No. 36,626  
Int. Cl.<sup>4</sup> G01R 19/00; G06G 7/12; G11C 7/02  
U.S. Cl. 307-530 **10 Claims**



1. A sense amplifier, comprising:  
a first voltage-controlled current source having a control terminal, and first and second current terminals for carrying current therebetween, said second current terminal coupled to a power supply terminal;  
a first current mirror load having a reference portion and a load portion, said reference portion coupled to the control terminal of the first voltage-controlled current source and said load portion for providing a first output signal of said sense amplifier;  
a first transistor having a first current electrode coupled to the reference portion of said first current mirror load, a control electrode coupled to a first input signal, and a second current electrode coupled to the first current terminal of the first voltage-controlled current source;  
a second transistor having a first current electrode coupled to the load portion of said first current mirror load, a control electrode for receiving a second input signal, and a second current electrode coupled to the second current terminal of the first voltage-controlled current source;  
first disable means, coupled to the first current mirror load, for disabling the first current mirror load in response to a disable signal.

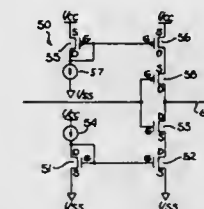
**4,791,325**  
**CLASS B CLAMP CIRCUIT**  
Michael McGinn, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.  
Filed Dec. 21, 1987, Ser. No. 135,851  
Int. Cl.<sup>4</sup> H03K 5/08  
U.S. Cl. 307-540 **4 Claims**



1. A circuit for providing a fixed reference voltage at an

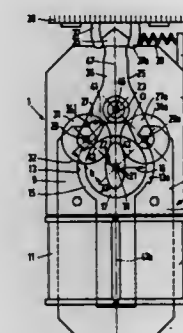
output thereof that is capable of sourcing and sinking large dynamic currents at the output, comprising:  
a push-pull output stage for sourcing or sinking current at the output of the circuit which includes first and second NPN transistors the respective collector-emitter conduction paths of which are coupled in series, and respective bases;  
a first current mirror circuit having an input coupled to the collector of said first transistor and an output;  
a second current mirror circuit having an input coupled to said output of said first current mirror circuit and an output coupled to said base of said second transistor;  
a reference current source for supplying a reference current at an output, said output being coupled to said base of said second transistor;  
input circuit means having an input to which a reference voltage is supplied and an output coupled to said base of said first transistor for establishing said reference voltage thereat; and  
current supply circuit means for supplying excess dynamic current to said collector of said first transistor when rendered conductive.

**4,791,326**  
**CURRENT CONTROLLED SOLID STATE SWITCH**  
Branislav Vajdic, Santa Clara, and Stephen L. Smith, Sunnyvale, both of Calif., assignors to Intel Corporation, Santa Clara, Calif.  
Filed Jan. 22, 1987, Ser. No. 5,941  
Int. Cl.<sup>4</sup> H03K 17/04, 5/08, 17/687, 17/14  
U.S. Cl. 307-571 **10 Claims**



1. A current controlled solid state electronic switching circuit for maintaining a substantially uniform switching speed as operating conditions change, comprising:  
a current source for providing a substantially constant first current;  
a first transistor coupled to said current source;  
a second transistor coupled to said first transistor for providing a substantially constant second current and isolated from said current source by said first transistor, but having said second current proportional to said first current;  
switching means coupled to one of said first and second transistors for causing said circuit to be switched on to provide said second current to a load which is coupled to said circuit;  
said second current having its peak current limited to a predetermined value due to said substantially constant first and second currents, wherein limiting maximum value of said peak current attained during switching of said circuit to said predetermined value provides for said substantially uniform switching speed as operating conditions which affect switching speed varies.

**4,791,327**  
**DRIVE MECHANISM FOR A DOMESTIC VIBRATION APPARATUS**  
Leo Bertram, Stolberg, Fed. Rep. of Germany; Hugo Schemmann, Schaesberg, Netherlands, and Ronald L. Bukoschek, Klagenfurt, Austria, assignors to U.S. Philips Corp., New York, N.Y.  
Filed Jul. 17, 1986, Ser. No. 887,151  
Claims priority, application Fed. Rep. of Germany, Aug. 6, 1985, 3528114; Mar. 29, 1986, 3610770  
Int. Cl.<sup>4</sup> H02K 7/118; F16H 25/16  
U.S. Cl. 310-41 **16 Claims**

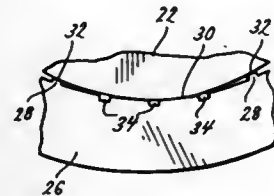


1. A drive mechanism for a domestic vibration apparatus which comprises a transmission path to a load having a vibration part, the drive mechanism including a rotor shaft of a single-phase synchronous motor which drives a cam-and-follower mechanism having a mirror-symmetrical cam which converts the rotary motion produced by the motor into a vibratory motion, the rotor of the motor having a magnetic detent torque and a main direction of magnetization, the stator comprising exciter coils capable of generating a current, the stator having a main field direction and the longitudinal axis of the mirror-symmetrical cam extending at an angle to the main direction of magnetization of the rotor, and in which cam follower rollers are mounted on a driven end of a pivotal arm which is pivotal about a central pivotpoint and a vibratory part to be driven between reversal points is arranged on a driving end of said pivotal arm, the cam-follower rollers being constantly in rolling contact with the cam profile, wherein at the end of the transmission path which exhibits backlash a compensation spring (38) acts on the vibratory part (39) to urge one of the cam-follower rollers (31, 31a) against the cam (21), causing the position of the cam (21) relative to the direction of a magnetization of the rotor to be changed in such a way that in the case of a parallel orientation of the direction (22) of magnetization of the rotor and the main stator-field direction (16), the rotor (17) is forced out of a parallel position by means of the spring (38), into a positive direction, said positive direction being the direction in which a torque exerted on the rotor (17) by the stator current becomes zero before the magnetic detent torque has become zero when the stator coils (11, 11a) are not energized whereby the rotor is rotated into a stable rest position, the vibratory part (39) being situated in the proximity of a reversal point in the case of said parallel orientation.

**4,791,328**  
**MULTI-PIECE ROTOR FOR DYNAMOELECTRIC MACHINE**  
Bryan L. Lakin, Springfield, Mo., assignor to Fasco Industries, Inc., Lake Forest, Ill.  
Filed Dec. 6, 1985, Ser. No. 806,103  
Int. Cl.<sup>4</sup> H02K 15/00  
U.S. Cl. 310-42 **13 Claims**  
1. In a multi-piece rotor assembly for a dynamoelectric machine, said rotor comprising a core mounted to a shaft, said



core having a substantial smooth outer surface and an annular magnetic sleeve glued to the core, the improvement comprising means formed along the inner surface of the sleeve to position and hold the sleeve in a concentric orientation to the core prior to application of the glue, said positioning means



having means to position and hold a sleeve having any inside diameter within a range of inside diameters, and said positioning means leaving spaces between the annular sleeve and the core to contain the glue which affixes said annular sleeve to the core in permanent fashion.

4,791,329

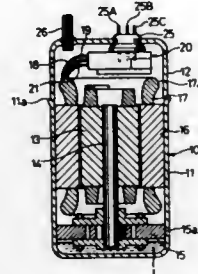
#### MOTOR PROTECTOR MOUNTING STRUCTURE FOR ENCLOSED ELECTRIC COMPRESSORS

Susumu Ubukata, 549-banchi, Nakasuna-cho, Tempaku-ku, Nagoya, Aichi; Yasukazu Mizutani, and Syozo Iyoda, both of Nagoya, all of Japan, assignors to Susumu Ubukata, Japan  
Filed Jun. 9, 1987, Ser. No. 60,089

Claims priority, application Japan, Jun. 16, 1986, 61-139901; Jul. 19, 1986, 61-170442; Jul. 31, 1986, 61-180480  
Int. Cl.<sup>4</sup> H02K 11/00; H02H 7/085

U.S. Cl. 310—68 C

5 Claims



1. A motor protector mounting structure for an enclosed electric compressor comprising a closed compressor housing containing coolant gas, a compressing means and an electric motor within said compressor housing, said motor having a stator core secured to the inside surface of the compressor housing and windings exposed to the coolant gas, and an exhaust pipe communicating to an interior of the compressor housing whereby the coolant gas, when compressed, is forced to flow through the exhaust pipe, said motor protector mounting structure comprising:

- (a) a terminal support provided in a wall of the compressor housing;
- (b) a plurality of electrically conductive pins in said terminal support wherein one end of each said pin projects out of said terminal support within the compressor housing and the other end of each said pin is connectable to an external circuit outside the compressor housing;
- (c) a socket secured to said terminal support within the compressor housing, said socket having a plurality of receptacles for engaging said conductive pins respectively for electrical connection;
- (d) a thermally responsive switch means within said socket; one of said receptacles being connected to a terminal portion of said thermally responsive switch means; and

the others of said receptacles being connected to leads extending from the winding of the motor.

4,791,330

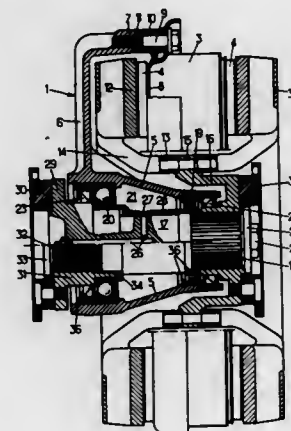
#### EDDY CURRENT RETARDERS FOR VEHICLES

Marc Charbonnier, Franconville, and Michel Durand, Cergy Pontoise, both of France, assignors to Labavia-S.G.E., France  
Filed Feb. 16, 1988, Ser. No. 156,001

Claims priority, application France, Feb. 16, 1987, 87 01937  
Int. Cl.<sup>4</sup> H02P 15/00

U.S. Cl. 310—105

3 Claims



1. Electric retarder for vehicle, comprising an inductor stator itself comprising a ring of electric coils (3) with axes parallel to the axis of the retarder, supported by an annular framework (1), and an armature rotor comprising two magnetic material disks (12) which axially enclose the ring of coils and which are both connected, through rings of bent arms (14), to a central collar (15) itself connected angularly with a section (17) of the transmission shaft to be retarded of the vehicle, the annular framework including a central socket (5) penetrating into the rotor, radial arms (6) extending this socket externally, a ring (8) carried by these arms and supporting the coils, and bearing surfaces (38, 39) for fixing the framework on the chassis of the vehicle (2), said shaft section to be slowed down (17) being mounted inside the socket (5) by means of two bearings (19, 20), characterized in that the socket (5) has a general truncated cone shape, in that the central collar (15) of the rotor is connected to the shaft section (17) by means of a pot (16) with cylindrical side wall covering the narrow end of the socket and in that the two bearings housed in this socket are a relatively small bearing (19) disposed in the vicinity of said narrow end of the socket, inside the pot (16)-collar (15) assembly, and a relatively large bearing (20) adapted for absorbing the axial forces and disposed in the vicinity of the widened end of the socket.

4,791,331

#### BRUSH ASSEMBLY FOR ELECTRIC COMMUTATOR MOTORS

Jean-Claude Girardin, La Chaux-de-Fonds, Switzerland, assignor to Portescap, La Chaux-de-Fonds, Switzerland  
Filed Apr. 14, 1987, Ser. No. 38,131

Claims priority, application Switzerland, Apr. 14, 1986, 1476/86

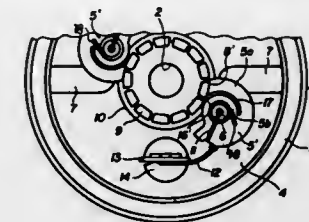
Int. Cl.<sup>4</sup> H02K 13/00

U.S. Cl. 310—248

2 Claims

1. A brush assembly for electric motors having a cylindrical commutator, comprising: a cam-shaped brush of electrically conducting material having at least one cylindrical contact surface; means for pivotally mounting said brush around a pivot axis; and spring means for rotationally urging said brush

with said contact surface against the commutator, said brush having a substantially cylindrical slot formed by two spaced apart surfaces which are substantially cylindrical and coaxial with respect to said pivot axis, said slot separating an outer



arcuate portion of said brush, one end of which forms said contact surface, from an inner arcuate portion of said brush surrounding said pivot axis which does not contact the commutator.

4,791,332

#### ROTOR FOR MOTOR TACHO-GENERATOR

Hans-Dieter Layh, Zachersweg 17, D-7121 Gemmingen, Fed. Rep. of Germany

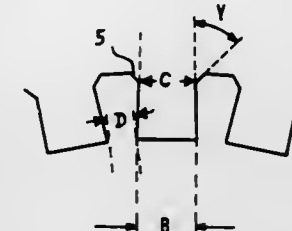
Filed Jun. 19, 1987, Ser. No. 63,996

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1986, 3620798

Int. Cl.<sup>4</sup> H02K 1/22

U.S. Cl. 310—268

7 Claims



1. A rotor for tachogenerator having axially extending teeth and grooves arranged at a rotor circumference, said grooves being defined by a bottom located radially inward from said rotor circumference and adjacent to outwardly extending sides, which sides define sides of said teeth, and wherein said grooves receive rotor windings, wherein said windings enclose at least one of said teeth, the improvement comprising:

- that said rotor is formed as a compact disk means;
  - that said disk means is essentially homogenous ferromagnetic material that carries out magnetic reversal only with considerable inertia;
  - that said bottom of said grooves in axial view of the disk means has a width at least twice as wide as a width of said teeth at said bottom; and wherein the grooves narrow slightly from the bottom radially outward
- that each of said teeth in axial view of the disk means have corner area means that are beveled in a chamfer manner to define an angle with an adjacent side of each of said teeth to allow said winding to extend radially toward the outside of said teeth that are directly adjacent the at least one of said teeth and toward the outside of said rotor winding.

4,791,333

#### ELECTRIC LAMP WITH INTERNAL CONDUCTIVE REFLECTOR FORMING PART OF THE CIRCUITRY THEREOF

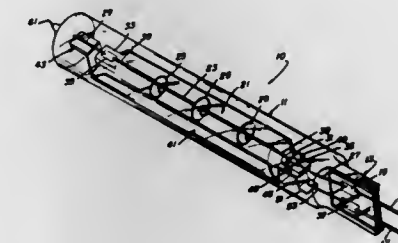
Merle E. Morris, and Stephen P. Senft, both of Lexington, Ky., assignors to GTE Products Corporation, Danvers, Mass.

Filed Jan. 30, 1987, Ser. No. 9,000

Int. Cl.<sup>4</sup> H01J 1/02

U.S. Cl. 313—25

9 Claims



1. In an electric lamp including an outer, light-transmitting envelope having a sealed end portion, first and second electrical conductors located within said sealed end portion, a sealed inner, light-transmitting envelope located within said outer envelope and including a filament structure therein and a pair of electrically conductive members connected to said filament and projecting externally of said sealed inner envelope, a first of said conductive members being electrically coupled to said first conductor within said sealed end portion of said outer envelope, the improvement comprising an electrically conductive reflector positioned within said outer envelope adjacent said inner envelope for reflecting radiant energy in the form of light and/or heat from said inner envelope in a predetermined direction through said outer envelope, said reflector electrically coupling a second of said conductive members projecting from said inner envelope to said second conductor located within said sealed end portion of said outer envelope, said reflector further including portions contacting said outer envelope to assist in maintaining said inner envelope in a predetermined position within said outer envelope.

4,791,334

#### METAL-HALIDE LAMP HAVING HEAT REDISTRIBUTION MEANS

William M. Keefe, Rockport; Zeya Krasko, Beverly, both of Mass.; Robert Karlotski, Weare, N.H., and James C. Morris, Wakefield, Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed May 7, 1987, Ser. No. 47,226

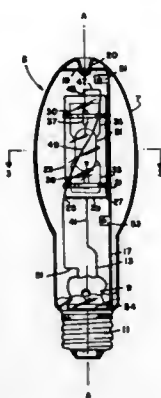
Int. Cl.<sup>4</sup> H01J 61/34, 61, 52

U.S. Cl. 313—25

10 Claims

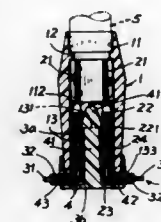
1. In a metal-halide arc discharge lamp having:
- (a) a hermetically sealed outer envelope having a longitudinal axis;
  - (b) an arc tube mounted within said outer envelope, said arc tube having a substantially cylindrical body about said longitudinal axis and at least one end, said body enclosing an interior containing a gaseous fill and a metal-halide additive, said body having an outer radius, r;
  - (c) a substantially cylindrical light-transmissive enclosure mounted within said outer envelope about said longitudinal axis and surrounding said arc tube, said enclosure having an inner radius, R;
  - (d) a vacuum within said outer envelope; and

(e) means for mounting said arc tube and said enclosure; the improvement comprising in combination:



(f) the ratio  $r/R$  being greater than approximately 0.60 and less than approximately 0.63.

**4,791,335**  
**DECORATIVE BULB WITH ANNULAR GROOVE AND WATER-PROOF SOCKET**  
 Mei-Mei Lin, 2nd Fl., No. 10, Alley 10, Lane 53, Tung-Nan St., Hsin-Chu, Taiwan  
 Filed Jan. 27, 1988, Ser. No. 148,863  
 Int. Cl.<sup>4</sup> H01J 5/60, 5/62; H01K 1/42; H01R 33/00  
 U.S. Cl. 313—318 5 Claims



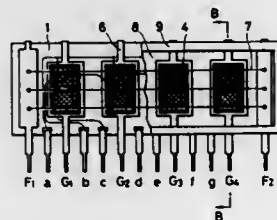
1. A decorative bulb means comprising:
  - a bulb socket having an upper cylindrical hole formed on an upper portion of the socket and a lower rectangular hole formed on a lower portion of the socket, said upper hole having a ring extension formed therein proximate to an upper opening edge of said socket, a lower seat formed on a lowest end of said upper hole;
  - a pair of doubly-sticking conducting plates respectively inserted in said socket, each conducting plate having an upper arcuate plate concave outwardly and retained between said ring extension and said lower seat in said upper hole, a lower slim plate protruding downwardly from said upper arcuate plate having an angle portion recessed inwardly operatively retaining an electric wire in said socket, a longitudinal needle portion protruding downwardly from said lower slim plate, and a transverse needle portion protruding horizontally inwardly from said lower plate;
  - a pair of electric wires for power source each forming an elbow having a vertical portion poking into said lower hole and a right-angle portion bent on a lower opening edge of said socket, said vertical portion being stuck by said transverse needle portion of said conducting plate and said right-angle portion stuck by said longitudinal needle portion of said conducting plate;
  - a sealing plug sealing a bottom portion of said socket and having a central partition stem inserted into said lower hole to separate the two electric wires and squeeze the two wires against an inside wall of said lower hole for better securing and electrically conducting of said wires in

said socket; and a grooved bulb having an annular groove formed on a lower periphery of said bulb operatively engaged with said ring extension of said socket, having two leads of bulb filament protruding outside said bulb and bent upwardly to dispose on two lower recess portions on a lower portion of said bulb to operatively contact said conducting plates in said upper hole of said socket.

**4,791,336**  
**FLUORESCENT COMPOSITION AND FLUORESCENT LUMINOUS DEVICE**  
 Kiyoshi Morimoto, Hitoshi Toki, and Yoshitaka Satoh, all of Mobara, Japan, assignors to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara, Japan  
 Filed Jun. 24, 1987, Ser. No. 66,072  
 Claims priority, application Japan, Jun. 26, 1986, 61-149982; Jun. 27, 1986, 61-152242; Jul. 8, 1986, 61-158872; Jul. 11, 1986, 61-164451; Jul. 31, 1986, 61-180769  
 Int. Cl.<sup>4</sup> C09K 11/80; H01J 63/06  
 U.S. Cl. 313—496 8 Claims

1. A phosphor having a general formula  $\text{ZnO-Ga}_2\text{O}_3\text{:Cd}$  wherein the molar ratio of  $\text{Ga}_2\text{O}_3$  to  $\text{ZnO}$  is 1:0.5–4.0 and Cd is present in an amount of  $5 \times 10^{-4}$  to  $3 \times 10^{-1}$  mol., the phosphor being excitable by electron or ultraviolet excitation and having a peak wavelength emission of about 365 nm and exhibiting a higher luminance than said phosphor absent Cd.
5. A fluorescent luminous device comprising:
  - filamentary cathodes for emitting electrons;
  - anode conductors to which an anode voltage is applied;
  - at least one  $\text{ZnO-Ga}_2\text{O}_3\text{:Cd}$  phosphor as defined in claim 1 arranged so as to be electrically connected to said anode conductors;
  - an envelope for receiving said respective electrode elements therein;
  - at least a luminous display section having an ultraviolet excitable visible light emitting phosphor deposited thereon within a region of radiation of ultraviolet rays radiated from said  $\text{ZnO-Ga}_2\text{O}_3\text{:Cd}$  phosphor and excitable by said rays to emit visible light.

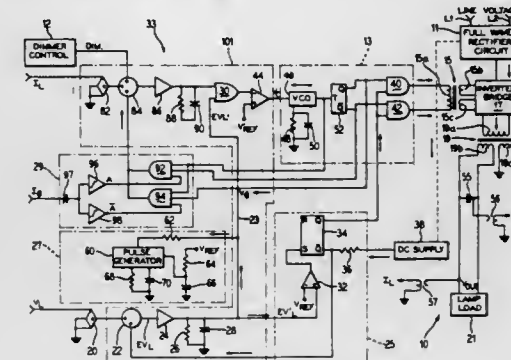
**4,791,337**  
**LIGHTING METHOD FOR VACUUM FLUORESCENT DISPLAY WITH REDUCED FLICKERING**  
 Hajime Murata, Shimada, Japan, assignor to Yazaki Corporation, Japan  
 Filed May 8, 1986, Ser. No. 860,920  
 Claims priority, application Japan, May 9, 1985, 60-096581  
 Int. Cl.<sup>4</sup> H05B 37/00, 39/00  
 U.S. Cl. 315—169.1 4 Claims



1. A method for preventing a flickering phenomena in a vacuum fluorescent display tube lighted dynamically and used as a display for a motor vehicle, comprising adjusting a ratio between a frequency  $f_1$  of a first time-varying voltage applied to at least one of an anode and a grid of the tube and a frequency  $f_2$  of a second time-varying voltage applied to a cathode of the tube so that a beat frequency of the  $f_1$  and  $f_2$  frequencies is produced and becomes larger than a critical fusion frequency for a human eye, wherein  $f_1$  is set at a frequency sufficiently smaller than frequencies which will cause radio

wave faults in devices disposed around the display for the motor vehicle, and  $f_2$  is adjusted approximately equal to  $(n+1)f_1$ , where  $n$  is a predetermined natural number.

**4,791,338**  
**FLUORESCENT LAMP CIRCUIT WITH REGULATION RESPONSIVE TO VOLTAGE, CURRENT, AND PHASE OF LOAD**  
 Thomas E. Dean, Cookeville, and William H. Heinrich, Sparta, both of Tenn., assignors to Thomas Industries, Inc., Del.  
 Filed Jun. 26, 1986, Ser. No. 878,819  
 Int. Cl.<sup>4</sup> H05B 41/24, 41/322, 41/233  
 U.S. Cl. 315—174 12 Claims



1. A start-up circuit energized by a direct voltage source for driving an inverter circuit coupled to a fluorescent lamp having a plurality of electrodes for initiating operation of the fluorescent lamp, wherein fluorescent lamp operation is sustained by application of a first voltage  $V_1$  across the fluorescent lamp electrodes by the inverter circuit said start-up circuit comprising:
  - power-up circuit means coupled to the direct voltage source for generating a power-up signal;
  - drive signal control means coupled to the inverter circuit and to said power-up signal for providing first drive signals to the inverter circuit to provide a second substantially constant voltage  $V_2$  to the fluorescent lamp electrodes for the heating thereof for a predetermined period of time; and
  - pulse generating means coupled to said drive control means and to said power-up circuit means and responsive to said power-up signal for generating a high voltage start-up pulse following receipt of said power-up signal and for providing said start-up pulse to said drive signal control means, whereupon said drive signal control means provides second drive signals to the inverter circuit to provide a third voltage  $V_3$  to the fluorescent lamp electrodes for initiating the operation of the fluorescent lamp, where  $V_3 > V_1$  and where  $V_3 > V_2$ .

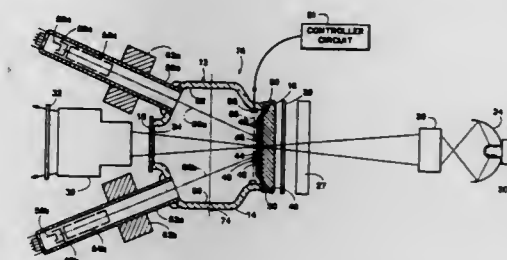
**4,791,339**  
**LIQUID CRYSTAL LIGHT VALVE WITH SPATIALLY UNIFORM LIGHT TRANSMITTANCE CHARACTERISTICS**  
 Arthur J. Draz, Tigard; Dana E. Whitlow, Aloha, and Stephen F. Blazo, Portland, all of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.  
 Filed May 5, 1987, Ser. No. 46,955  
 Int. Cl.<sup>4</sup> H01J 29/52, 29/56  
 U.S. Cl. 315—386 2 Claims

1. An electron beam-addressed liquid crystal light modulator having writing and erasing means for emitting a writing beam of primary electrons and an erasing beam of primary electrons that strike a target surface of a liquid crystal cell to cause the emission of secondary electrons from the target surface, the writing beam addressing selected portions of the target surface and the erasing beam erasing previously addressed portions of the target surface, the light modulator comprising:
  - video signal means developing a video signal for modulating

the beam current of the writing beam to address the selected portions of the target surface;

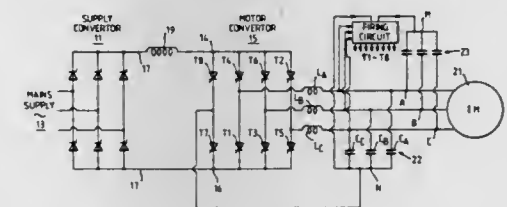
scan position indicating means for indicating the instantaneous scan position of the writing beam on the target surface, the scan position indicating means developing a "X" position signal and a "Y" position signal that indicate the instantaneous scan position of the writing beam; and

compensating means cooperating with the scan position indicating means to compensate for spatial variations in writing characteristics of different regions of the target surface, the compensating means comprising plural switches corresponding to different ones of the regions and being actuated at different times to conduct a compensating electrical current whose magnitude varies the mag-



nitude of the video signal, the compensating electrical current including a gain correction signal component proportional to the polynomial  $A_1X^2 + B_1Y^2 + C_1X^2Y^2$  for correcting the gain of the video signal and an offset correction signal component proportional to the polynomial  $A_2X^2 + B_2Y^2 + C_2X^2Y^2$  for correcting the offset of the video signal, where  $A_1$ ,  $A_2$ ,  $B_1$ ,  $B_2$ ,  $C_1$ , and  $C_2$  are constants whose values are adjustable so that polynomials of different values can be derived to correspond to different regions of the target surface, thereby to produce different amounts of beam current in the writing beam in response to its instantaneous scan position on the target surface to provide spatially uniform gray scale luminance across the target surface.

**4,791,340**  
**INDUCTION MOTOR DRIVE ARRANGEMENT**  
 David Finney, Daventry, England, assignor to The General Electric Company, p.l.c., England  
 PCT No. PCT/GB86/00456, § 371 Date Mar. 27, 1987, § 102(e) Date Mar. 27, 1987, PCT Pub. No. WO87/00992, PCT Pub. Date Feb. 12, 1987  
 PCT Filed Jul. 31, 1986, Ser. No. 44,460  
 Claims priority, application United Kingdom, Jan. 21, 1985, 8519270  
 Int. Cl.<sup>4</sup> H20P 5/28  
 U.S. Cl. 318—809 7 Claims



1. An induction motor drive arrangement comprising a controllable D.C. source, reactance means providing D.C. current inertia, a motor converter circuit comprising a thyristor bridge whose input is connected to said D.C. source and whose A.C. output is connected to motor supply terminals for connection to an induction motor, capacitive excitation means



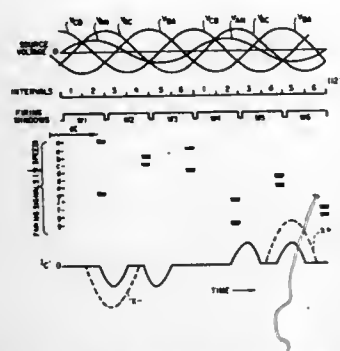
connected to said motor supply terminals for maintaining induction motor excitation, and a commutation circuit comprising commutating capacitance connected between each of said motor supply terminals and a commutation neutral point, and a bypass path comprising two thyristor arms in series between input terminals of said thyristor bridge, the junction of said two thyristor arms being connected to said neutral point, the thyristors of said bypass arms being fired to bypass current from said motor converter thyristors to said commutating capacitance, the thyristor of said motor converter bridge being fired cyclically in dependence upon the voltage across said commutating capacitance, and said D.C. source current being controlled in dependence upon required motor speed and torque.

**4,791,341**  
**SPEED REDUCING CONTROL SYSTEM FOR A POLYPHASE ELECTRIC MOTOR**

Herbert J. Brown, and Thomas D. Stitt, both of Erie, Pa., assignors to General Electric Company, Erie, Pa.  
Filed Jan. 19, 1988, Ser. No. 145,064  
Int. Cl.<sup>4</sup> A02P 5/40

U.S. Cl. 318—809

13 Claims



1. A "cycle-skipping" speed control system for a variable speed 3-phase a-c electric motor comprising:
  - a. a 3-phase source of alternating voltage having a fundamental frequency of "f" Hertz;
  - b. at least three output terminals respectively adapted to be connected to different phases of said motor;
  - c. interconnecting means including a plurality of controllable bidirectional switches and a plurality of controllable unidirectional switches connected between said output terminals and different phases of said source, each of said bidirectional switches having a non-conducting state, a positive conducting state in which motor current flows through the switch in one direction, and a negative conducting state in which motor current flows through the switch in the opposite direction, and each of said unidirectional switches having alternative conducting and non-conducting states;
  - d. means coupled to said source for providing a train of timing pulses having a frequency that varies with f;
  - e. means for providing a speed command signal indicative of whether full motor speed or a fraction (1/N) of full motor speed is desired, where N is a predetermined integer;
  - f. control means responsive to said speed command signal for cyclically producing, in synchronism with said timing pulses, a family of periodic firing signals that are effective selectively to initiate the conducting states of said switches, said family comprising six firing signals that respectively commence in a predetermined sequence at approximately 1/6f intervals when full speed is desired, and said control means being arranged, when a predetermined fraction of full speed is desired:
    - (1) to predetermine for each desired speed a particular family of six different pairs of firing signals,
    - (2) to establish a series of recurrent periods synchronized

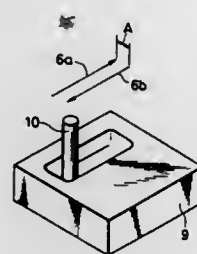
- with said timing pulses, each period having a duration of approximately N/f.
- (3) to preselect for each desired speed six separate portions of each of said periods during which firing signals can be produced, with only one pair of firing signals being permitted during any one of the preselected portions, and
- (4) to produce in turn, during succeeding preselected portions of each period, said predetermined pairs of firing signals, whereby each firing signal in said family is produced at a frequency of f/N Hertz;
- g. said six pairs of firing signals being produced in a pattern that is coordinated with said interconnecting means to cause a double-pulse current waveform in each phase of the motor, said waveform having a fundamental frequency of f/N and comprising two discrete intervals of current in the same direction and an interval of no current during each half cycle thereof.

**4,791,342**  
**NUMERICAL CONTROL DEVICE**

Takashi Okamoto, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Jun. 19, 1987, Ser. No. 63,946  
Claims priority, application Japan, Jun. 19, 1986, 61-143964  
Int. Cl.<sup>4</sup> G05B 19/10

U.S. Cl. 318—569

8 Claims



1. A numerical control device for controlling numerical control machine tools adapted to perform three-dimensional machining operations, which comprises:
  - machining-locus calculating means for determining a tool path according to machining data such as machining dimensions;
  - machining-unit forming means for dividing said tool path thus determined into machining units;
  - machining-amount calculating means for calculating the amount of machining of a workpiece for each of said machining units of said tool path;
  - speed parameter setting means for setting a tool feeding speed parameter according to said amount of machining thus calculated or the like; and
  - tool feeding speed calculating means for controlling a tool feeding speed according to said tool feeding speed parameter thus set.

**4,791,343**  
**STEPPER MOTOR SHAFT POSITION SENSOR**

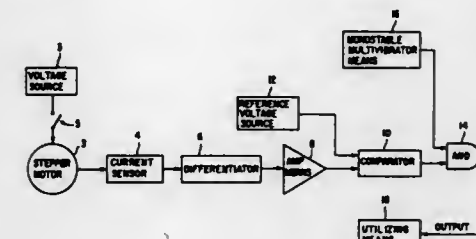
Terry J. Ahrendt, Gilbert, Ariz., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.  
Filed Aug. 31, 1987, Ser. No. 91,676  
Int. Cl.<sup>4</sup> H02P 8/00

U.S. Cl. 318—696

28 Claims

1. A stepper motor shaft position sensor, comprising:
  - means for sensing the current developed by the stepper motor when said motor is excited and for providing a motor current signal;
  - means for differentiating the motor current signal and for providing a differentiated signal including a first operational amplifier connected to the means for sensing the

- motor current, and a second operational amplifier connected to the first operational amplifier and providing the differentiated signal;
- means for providing a reference signal at a predetermined level;
- means for comparing the differentiated motor current signal and the signal at a predetermined level and for providing a comparison signal;
- means for providing a signal during a predetermined interval;



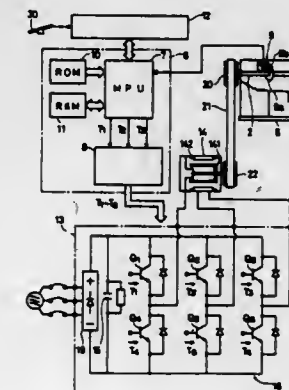
- means connected to the comparing means and the means for providing a signal during a predetermined interval and responsive to the comparison signal and the signal during the predetermined interval for providing an output signal, the output signal being at a first logic level when the motor shaft has taken a step and being at a second logic level when the motor shaft is stalled; and
- means connected to the means for providing the signals at the first and second logic levels for indicating the step status of the stepper motor shaft.

**4,791,344**  
**MOTOR CONTROL APPARATUS FOR A SEWING MACHINE**

Shinji Yoshida, and Toshiaki Yanagi, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan  
Filed Jun. 30, 1987, Ser. No. 68,209  
Claims priority, application Japan, Jul. 3, 1986, 61-156759  
Int. Cl.<sup>4</sup> G05B 19/10

U.S. Cl. 318—567

9 Claims



1. A motor control apparatus for a sewing machine comprising:
  - an induction motor having a stator coil and a rotor for moving a needle in upward and downward direction;
  - an inverter circuit for energizing said stator coil;
  - an inverter controller for controlling an activation of said inverter circuit and for generating a rotating magnetic field in said induction motor;
  - a command means for outputting a start command and a stop command of said induction motor to said inverter controller;
  - a detector for detecting a predetermined position of a needle

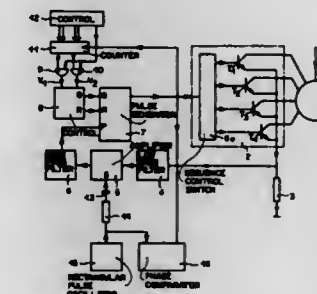
- and outputting a position signal thereof to said inverter controller; and
- wherein said inverter controller includes:
  - memory means for storing a predetermined set of activation control data representing voltage vectors relative to the rotating magnetic field and an activation time period relating to said voltage vectors;
  - activation control means responsive to the start command for sequentially reading said set of activation control data from said memory means at an interval of a first predetermined period and for sequentially generating the rotating magnetic field within said induction motor in response to said set of activation control data read from the memory means to move said needle in upward and downward direction; and
  - stop control means for maintaining the direction of the rotating magnetic field in an energizing state of said stator coil during a second predetermined period, utilizing the activation control data corresponding to the position signal received after issuance of said stop command from the command means.

**4,791,345**  
**DRIVING DEVICE FOR A STEPPING MOTOR**  
Pierre Bollat, Meyriez, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland  
Filed Aug. 6, 1987, Ser. No. 82,645  
Claims priority, application Switzerland, Aug. 20, 1986, 03334/86

U.S. Cl. 318—696

Int. Cl.<sup>4</sup> H02P 8/00

11 Claims



1. A driving device for controlling the drive frequency for a stepping motor, comprising
  - a voltage controlled pulse generator for producing electrical pulses having a pulse width and an operating frequency for driving said stepping motor;
  - said pulse generator comprising an RC network providing a time base for the pulse width and the operating frequency of said electrical pulses; said RC network comprising at least one controllable resistance and a first capacitor; and
  - a second capacitor coupled to said controllable resistance; said controllable resistance being controlled by the charging and discharging of said second capacitor.

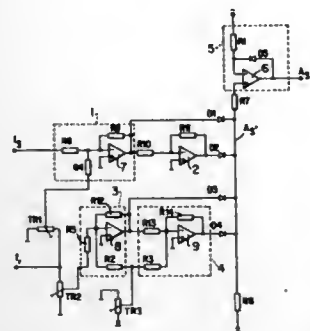
**4,791,346**  
**ELEVATOR MOTOR CONTROL**  
Matti Kähkönen, Hyvinkää, Finland, assignor to Kone Elevator GmbH, Baar, Switzerland  
Filed Mar. 16, 1987, Ser. No. 26,029  
Claims priority, application Finland, Mar. 19, 1986, 861145  
Int. Cl.<sup>4</sup> H02P 5/40

U.S. Cl. 318—805

3 Claims

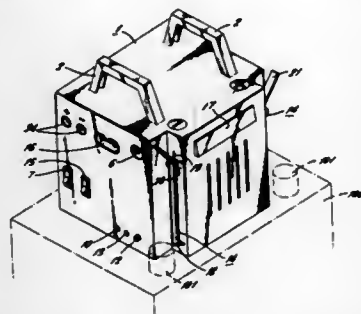
1. Apparatus for determining the amplitude of the reference voltage, with the exception of low stator voltages frequencies, of a three phase inverter supplying a squirrel cage motor, comprising:

first summing means for combining with said stator voltage frequency a correction component proportional to a rotor current frequency;  
absolute value amplifier means for forming the absolute value of the amplitude in the case of negative stator voltage frequencies;  
first adjustment means for adjusting the correction component proportional to the rotor current frequency;  
second summing means for approximating the non-linear portion at said low frequencies by forming a horizontal portion approximating the minimum of the curve, for said low positive stator voltage frequencies;



third summing means for adding to the amplitude value obtained from said second summing means the minimum value of the base curve in the case of said low negative stator voltage frequencies;  
second adjustment means for adjusting the correction component proportional to the rotor current frequency;  
third adjustment means for adjusting the minimum value of the base curve;  
and diodes and diode threshold error correction means for forming the amplitude in various parts of the curve.

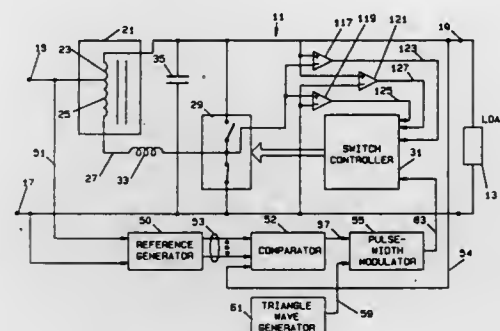
**4,791,347**  
**ELECTRICAL POWER SUPPLY**  
Martin T. Britton, 1 Beavertide, Clifton, York, England YO3 6ZG  
Filed Nov. 20, 1986, Ser. No. 933,016  
Claims priority, application United Kingdom, Feb. 3, 1986, 8602577  
Int. Cl.<sup>4</sup> H02J 7/00; H01M 10/46, 2/26  
U.S. Cl. 320-2 15 Claims



1. An electrical power supply, for use in augmenting the supply provided by a battery of an automobile having an electric starting motor, at the time of starting the automobile, comprising a housing; a battery mounted in the housing; a battery charger circuit arrangement mounted in the housing and connectable to the battery in the housing to affect charging thereof; power input means accessible to the exterior of the housing and by way of which electrical power can be supplied

to the battery charger circuit arrangement; and power output means comprising a pair of arms pivotally mounted on the housing that are resiliently biased relative to each other whereby they can grip respective terminal posts of the automobile battery by engagement with opposite sides of respective terminal posts, by which arms the battery in the housing can be connected to the battery of an automobile to augment the power thereof.

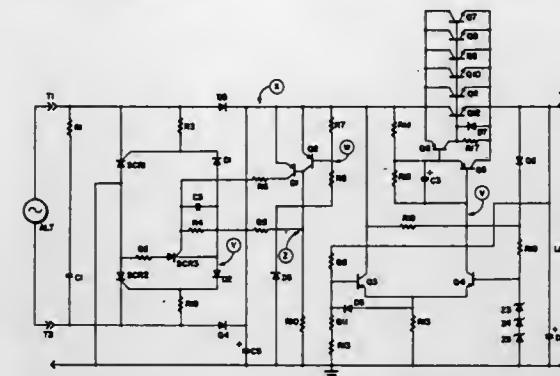
**4,791,348**  
**SWITCHING AC VOLTAGE REGULATOR**  
Thomas B. McGuire, and Charles M. Holmes, Jr., both of San Diego, Calif., assignors to Square D Company, Palatine, Ill.  
Filed Jan. 6, 1988, Ser. No. 141,323  
Int. Cl.<sup>4</sup> G05F 1/26 11 Claims



1. An ac voltage regulator for receiving an ac input signal having a voltage to be regulated and providing an ac output signal having a regulated voltage, the regulator comprising:  
a transformer having a plurality of windings;  
ac switching means, including four switching circuits, each containing a series-connected transistor and diode, for alternately connecting the transformer windings in a first switch configuration, in which the windings are connected such that the ac output signal is substantially the same as the ac input signal, and a second switch configuration, in which the windings are connected so as to transform the ac input signal and cause the ac output signal to have an instantaneous voltage that is a predetermined percentage of the instantaneous voltage of the ac input signal, the duty cycle of the alternate configuration providing a selected average voltage for the ac output signal;  
quadrant detection means for determining the instantaneous voltage polarity and current direction of the ac output signal and for producing a corresponding quadrant signal having four possible states; and  
control means, responsive to the quadrant signal, for controllably biasing selected transistors of the switching means so as to alternate between the first and second switch configurations at a predetermined modulation frequency substantially greater than the frequency of the ac input signal and at a prescribed duty cycle selected to provide a desired average voltage for the ac output signal; wherein, for each of the four possible states of the quadrant signal, the control means biases a predetermined first transistor on continuously and biases a predetermined second transistor alternately on and off at the predetermined modulation frequency, wherein each time the second transistor is biased on, the diode connected in series with the associated first transistor becomes reverse biased and electrical current is immediately diverted from the first transistor to the second transistor, without the need for any snubber circuit, and wherein each time the second transistor is biased off, electrical current is immediately

diverted from the second transistor to the associated first transistor, without the need for any snubber circuit.

**4,791,349**  
**ELECTRIC POWER SYSTEM**  
Floyd D. Minks, 2155 Macy Island Rd., Kissimmee, Fla. 32743  
Continuation-in-part of Ser. No. 683,771, Dec. 19, 1984, abandoned, and a continuation-in-part of Ser. No. 357,892, Mar. 15, 1982, Pat. No. 4,490,779. This application Oct. 24, 1986, Ser. No. 923,112  
Int. Cl.<sup>4</sup> G05F 1/563 14 Claims

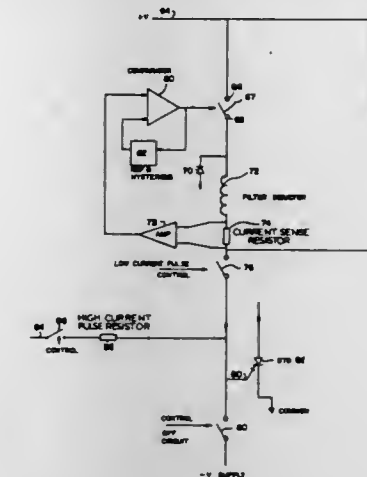


1. An electrical system, said system comprising:  
a source of alternating current power, the frequency, voltage and waveform of which fluctuate with respect to time and having a first impedance to limit the maximum current available therefrom;  
first circuit means coupled to said source and containing at least one device normally nonconductive in a given direction of current flow, and which may be rendered conducting in said direction responsive to a control signal applied thereto;  
means for supplying said control signal to said device until a voltage output of said first circuit means reaches a desired level, and removing said control signal when said first circuit means output rises above said level, said means for supplying said control signal comprising (a) a circuit element with an input terminal, an output terminal, and a common input/output terminal, said output terminal connected to supply said control signal, (b) first current means for supplying current through said input terminal and said common input/output terminal comprising a second impedance connected to receive power from the output of said first circuit means, and (c) second current means for supplying current through said input terminal and said common input/output terminal comprising a third impedance connected to receive power from said source.

**4,791,350**  
**CURRENT REGULATED SWITCHING REGULATOR FOR GATING GATE TURNOFF DEVICES**  
Richard W. Roof, Lexington, S.C., assignor to Square D Company, Palatine, Ill.  
Continuation of Ser. No. 677,729, Dec. 4, 1984. This application Jan. 27, 1987, Ser. No. 9,044  
Int. Cl.<sup>4</sup> G05F 1/575 7 Claims

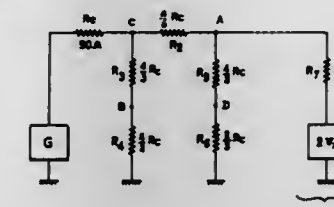
1. A gate current supply for a control electrode of a gate turn off thyristor (GTO) comprising:  
a source of direct electric current;  
a switch connected in series with said source of direct electric current, said control electrode of said GTO receiving current through said switch from said source of direct electric current;  
means for sensing said current received by said control electrode;

comparator means responsive to said current received by said control electrode for turning said switch on and off so that the average current received by said control electrode has a predetermined value; and  
a reference and hysteresis circuit connected to said comparator means for adjusting said average current received by



said control electrode to said predetermined value, and for switching said switch on at a predetermined low current value, and for switching said switch off at a predetermined high current value.

**4,791,351**  
**METHOD AND APPARATUS FOR RAPIDLY TESTING PASSIVE COMPONENTS BY REFLECTOMETRY IN THE VHF RANGE**  
André Le Traon, Cesson Seigne, France; Haraouba Brahim, Alger, Algeria; Jean-Claude Pilet; Michel De Burgat, both of Rennes, France; Jean-Loïc Meury, and Le Traon Flore, both of Cesson, France, assignors to Université de Rennes I, Rennes, France  
Filed Jun. 30, 1986, Ser. No. 880,177  
Claims priority, application France, Jul. 1, 1985, 85 10007  
Int. Cl.<sup>4</sup> G01N 22/00 43 Claims



1. A method of rapidly testing passive two terminal devices in the VHF range, said method comprising the steps of:  
(i) providing a distributed constant transmission line comprising a first end and a second end, and having a characteristic impedance  $R_c$ ;  
(ii) providing a resistive  $\pi$  network having an input and an output, said resistive  $\pi$  network comprising:  
a first leg including two resistances connected in series between said input and the ground, and an intermediate tab between said two resistances wherein a first resistance of said first leg, which is connected between the ground and the intermediate tab of the first leg has a value equal to  $\frac{1}{2}$  of the characteristic impedance  $R_c$  of said line, while a second resistance of said first leg, which is connected between the input and the intermediate tab of said first leg



has a value equal to  $4/3$  of the characteristic impedance  $R_c$  of said line,

a second leg including two resistances connected in series between said output and the ground, and an intermediate tab between said two resistances,

wherein a first resistance of said second leg, which is connected between the ground and the intermediate tab of the second leg has a value equal to  $1/3$  of the characteristic impedance  $R_c$  of said line, while a second resistance of said second leg, which is connected between the output and the intermediate tab of said second leg has a value equal to  $4/3$  of the characteristic impedance  $R_c$  of said line, and

a third leg including a resistance connected between said input and said output, and having a value equal to  $4/3$  of the characteristic impedance  $R_c$  of said line,

(iii) connecting the output of said resistive  $\pi$  network to the first end of said line,

(iv) connecting an electric signal generator capable of generating frequencies in the VHF range and having an internal impedance equal to the characteristic impedance of the line to the input of said resistive  $\pi$  network,

(v) connecting a two terminal device to be tested to the second end of said line,

(vi) detecting a first signal related to the wave  $V_r$  reflected by the device under test, between the output of said resistive  $\pi$  network and the intermediate tab of said first leg,

(vii) detecting a second signal related to the incident wave  $V_i$  between the input of said resistive  $\pi$  network and the intermediate tab of said second leg,

(viii) determining the behavior of a reflection coefficient  $\Gamma$  in the VHF range on the basis of the ratio of the modulus of the first signal and the modulus of the second signal  $|V_r|/|V_i|$  to deduce the impedance of the two terminal device.

4,791,352

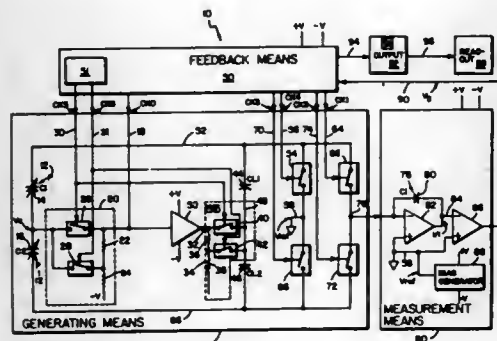
**TRANSMITTER WITH VERNIER MEASUREMENT**  
Roger L. Frick, Chanhassen, and John P. Schnite, Eden Prairie, both of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.

Filed Jul. 17, 1986, Ser. No. 887,603

Int. Cl. G01R 27/26

U.S. Cl. 324-60 CD

22 Claims



1. A transmitter for providing an output representative of a sensed parameter, comprising:

generating means for providing a generator signal comprising a plurality of charge packets at least some of which have a magnitude of charge which is a function of the sensed parameter; the generating means including reactance means for forming the charge packets in response to electrical excitation, and means for varying a level of the electrical excitation to the reactance means as a function of a control signal to alter magnitudes of the charge packets;

measurement means coupled to the generating means for measuring the generator signal as a function of the reac-

tance means and for providing a measurement signal as a function thereof;

feedback means coupled to the measurement means for providing a feedback signal to the generating means as a function of the measurement signal and for providing an output signal representative of the quantity of charge packets, the feedback means including adjustment means coupled to the generating means for providing the control signal to selectively vary the level of the electrical excitation to the reactance means to vary sensitivity of the transmitter to the sensed parameter such that the output is an improved representation of the sensed parameter.

4,791,353

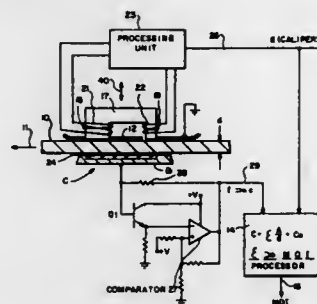
**SCANNING COMBINATION THICKNESS AND MOISTURE GAUGE FOR MOVING SHEET MATERIAL**  
Pekka Typpo, Cupertino, Calif., assignor to Impact Systems, Inc., San Jose, Calif.

Filed Aug. 14, 1987, Ser. No. 85,443

Int. Cl. G01R 27/26

U.S. Cl. 324-61 R

3 Claims



1. A scanning combination thickness and moisture gauge for moving sheet material comprising:

a pair of conductive plate means adapted for substantially contacting opposite sides of said moving sheet material and forming a capacitor whose capacitance is proportional to moisture in said sheet material and inversely proportional to thickness (caliper) of said sheet material between said plate means;

means for measuring said capacitance;

magnetic means integrally associated with said plate means for providing a magnetic flux path through said sheet material for measuring said thickness including passive magnetic means, carried by one of said pairs of plate means, for forming a part of said magnetic flux path; and

electrical processing means responsive to said measured capacitance and thickness for determining said moisture.

4,791,354

**METHOD FOR MEASURING THE AC ELECTRICAL CONDUCTANCE OF A POLYMERIC COMPOSITE TO DETERMINE HOMOGENEITY OF DISPERSION OF A FILLER**

Gerald E. Wardell, The Shieling, Killaloe, County Clare, Ireland  
Continuation of Ser. No. 728,778, Apr. 30, 1985, abandoned.

This application Sep. 1, 1987, Ser. No. 91,664

Claims priority, application Ireland, May 2, 1984, 1094/84

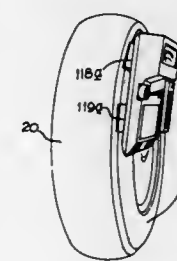
Int. Cl. G01R 27/00, 27/28

U.S. Cl. 324-65 R

8 Claims

1. A method for measuring the homogeneity of dispersion of a filler in a polymeric composite which method comprises applying two spaced apart capacitor plate electrodes closely adjacent the surface of the polymeric composite, a contact resistance inherently being provided between the capacitor plate electrodes and the polymeric composite, the polymeric composite exhibiting a conductance that is a function of the

dispersion of said filler therein, the capacitor plate electrodes having a sufficiently large surface area for providing a capacitive coupling into the polymeric composite; applying an AC voltage between the electrodes of a frequency that effectively



shunts said contact resistance; measuring the AC conductance through the polymeric composite from one electrode to the other electrode; and displaying the measured AC conductance so as to indicate the dispersion of filler in the composite.

4,791,355

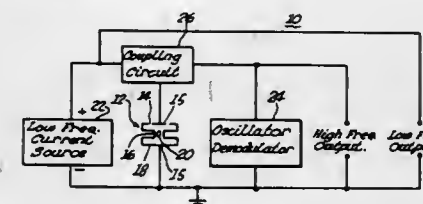
**PARTICLE ANALYZER FOR MEASURING THE RESISTANCE AND REACTANCE OF A PARTICLE**  
Wallace H. Coulter, Miami Springs, and Carlos M. Rodriguez, Miami, both of Fla., assignors to Coulter Electronics Inc., Hialeah, Fla.

Filed Oct. 21, 1986, Ser. No. 921,654

Int. Cl. G01N 27/00

U.S. Cl. 324-71.1

33 Claims



1. A particular analyzer comprising:

detector means through which a series of particles pass, said detector means having a certain resistance and reactance, at least one of which changes as a particle passes there-through;

oscillator means, including an active device and a resonant circuit, said resonant circuit being coupled to said detector means so that said detector means resistance and reactance are included as a part of said resonant circuit; and

means for sensing any change in the output signal of said oscillator as a result of a particle passing through said detector means.

4,791,356

IN-CIRCUIT TESTING SYSTEM

Frederick E. Warren, Walnut Creek; Harvey B. Crisler, El Sobrante; Robert G. Jacobson, Brentwood; Chang H. Kim, Berkeley, and Edward C. Llewellyn, Albany, all of Calif., assignors to Zehntel Incorporation, Walnut Creek, Calif.

Filed Sep. 19, 1986, Ser. No. 909,940

Int. Cl. G01R 31/28

U.S. Cl. 324-73 R

16 Claims

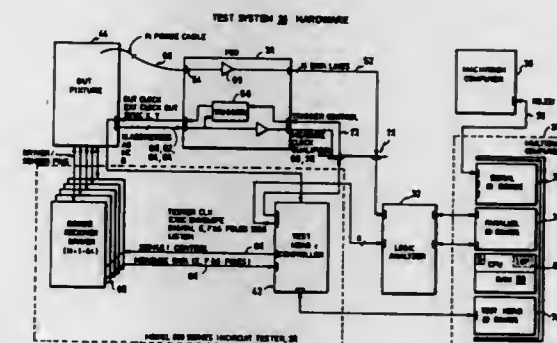
1. A test system for in-circuit testing of a device, the test system comprising:

a. means for stimulating the device with a first waveform at any desired electrical node of the device;

b. means for measuring and recording at any desired electrical node a second waveform generated by the device in response to the first waveform;

c. means for editing the second waveform generated by the device to produce a third waveform;

d. means for stimulating the device at any desired electrical node with the third waveform; and



e. means for measuring and recording at any desired electrical node a fourth waveform generated by the device in response to the third waveform.

4,791,357

**ELECTRONIC CIRCUIT BOARD TESTING SYSTEM AND METHOD**

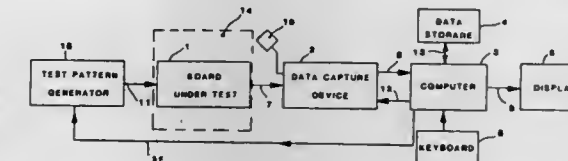
Stanley M. Hyduke, 513 Jenny Dr., Newbury Park, Calif. 91320

Filed Feb. 27, 1987, Ser. No. 19,641

Int. Cl. G01R 31/28

U.S. Cl. 324-73 PC

8 Claims



1. An electronic circuit board testing system comprising:

means for applying a signal test pattern input to an electronic circuit board being tested;

data capture means capturing an output signal sample from said circuit board;

data storage means storing an electronic circuit schematic model of said circuit board under test;

means for applying input signal test pattern received from said data capture means to corresponding points on said electronic circuit board schematic model retrieved from said data storage means;

calculating means for generating calculated signal sample representing the functional schematic model outputs from said signal test pattern input; and

comparing means comparing the functional schematic model calculated signal sample with the captured signal sample from said electronic circuit board being tested captured by said data capture means;

whereby defect in said electronic circuit board being tested are determined by discrepancies between the calculated signal samples from said functional schematic model outputs and captured signal sample from said electronic circuit board outputs.

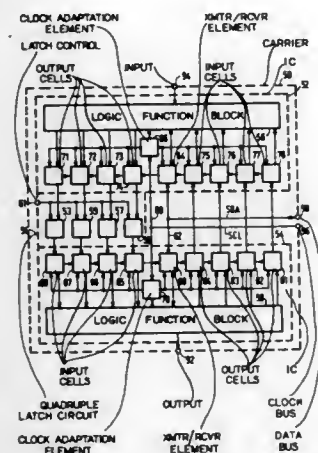
**4,791,358**  
**INTEGRATED CIRCUITS, CARRIERS THEREFOR AND TESTING APPARATUS AND METHOD FOR THE FOREGOING**

Wilhelm A. Sauerwald, Eindhoven; Johannes De Wilde, Hilversum; Karel J. E. Van Eerdewijk, Best; Franciscus P. M. Beekker, and Marinus T. M. Segers, both of Eindhoven, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 2, 1986, Ser. No. 902,910  
 Claims priority, application Netherlands, Sep. 11, 1985, 8502476

Int. Cl.<sup>4</sup> G01R 31/28, 31/02  
 U.S. Cl. 324—73 R

4 Claims



1. A method of testing a carrier provided with a plurality of interconnected integrated circuits, said method comprising the steps of:

- providing said integrated circuits with test bit string inputs and result bit string outputs;
- interconnecting said inputs and outputs by means of a serial bus that includes at least one clock line and at least one data line;
- selecting at least one first of said integrated circuits in a test input state for receiving a lost bit string via said bus;
- setting at least said first integrated circuit and at least one second of said integrated circuits to an execution state while activating an interconnection function between said first and second integrated circuits and forming a result pattern on the basis of the test bit string;
- selecting at least one said second integrated circuit for, in a test output state, outputting a result bit string via said bus; and
- characterizing said carrier with respect to a correct/incorrect operation of said integrated circuits cum interconnection function.

**4,791,359**  
**METHOD OF DETECTING POSSIBLY ELECTRICALLY-OPEN CONNECTIONS BETWEEN CIRCUIT NODES AND PINS CONNECTED TO THOSE NODES**

Douglas W. Raymond, Orinda, Calif., and Nicholas Winfield, Towcester, England, assignors to Zehntel, Inc., Walnut Creek, Calif.

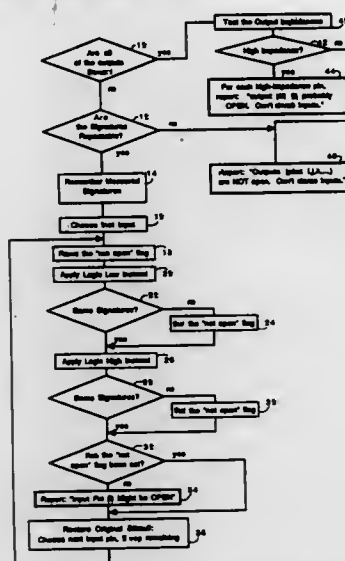
Filed Nov. 18, 1987, Ser. No. 122,280  
 Int. Cl.<sup>4</sup> G01R 31/28, 31/02  
 U.S. Cl. 324—73 R

13 Claims

1. For a circuit having nodes and having at least one component having pins, the pins physically connected to the nodes, the pins including input pins and output pins, the input pins connected to corresponding input nodes, the output pins connected to corresponding output nodes, a method of testing the

connections between the pins and their corresponding nodes, comprising the steps of:

- (a) determining if the connections between the input pins and the input nodes can be tested, said determining comprising the steps of:
  - (i) determining if the output nodes exhibit activity in response to application of stimuli to the input nodes;
  - (ii) continuing testing if any of the output nodes exhibit activity in response to application of stimuli to the input nodes;
  - (iii) determining if each output node exhibits a signature repeated identically in response to stimuli repeated identically at the input nodes;



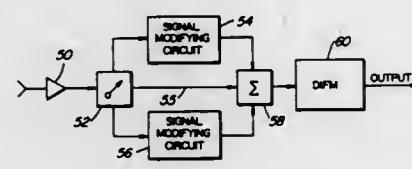
- (iv) continuing testing if each output node exhibits a signature repeated identically in response to stimuli repeated identically at the input nodes; and
- (b) testing for an electrically open connection between each input pin and its corresponding input node comprising the steps of:
  - (i) applying a first stimulus to a selected input node while applying a second stimulus to the rest of the input nodes; and
  - (ii) generating a signal indicating a possibly open connection if for every output node the response is identical to the response when the second stimulus is applied to all the input nodes.

**4,791,360**  
**METHOD AND APPARATUS FOR SIMULTANEOUS INSTANTANEOUS SIGNAL FREQUENCY MEASUREMENT**

Andre Gagnon, Hull; Myles McMillan, Wakefield, and P. Michael Gale, Kanata, all of Canada, assignors to Telemus Electronic Systems, Inc., Ontario, Canada

Filed Apr. 13, 1987, Ser. No. 37,846  
 Claims priority, application Canada, Apr. 11, 1986, 506511  
 Int. Cl.<sup>4</sup> G01R 33/20  
 U.S. Cl. 324—78 D

30 Claims

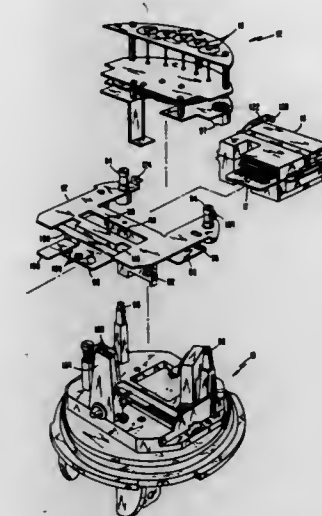


1. A signal sorter, comprised of:

**4,791,362**  
**MODULARIZED SOLID STATE REGISTER**  
 Ludlow Philpot, Duluth, Ga., assignor to Sangamo Weston, Inc., Norcross, Ga.

Filed Apr. 11, 1986, Ser. No. 850,575  
 Int. Cl.<sup>4</sup> G01R 11/04  
 U.S. Cl. 324—142

26 Claims



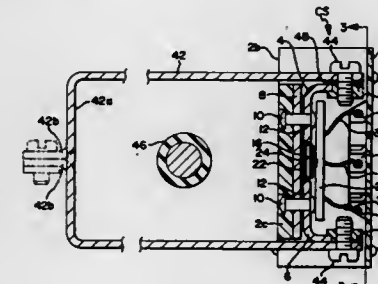
- (a) means for receiving a plurality of simultaneous signals of different frequencies,
- (b) a straight-through signal path for carrying said received simultaneous signals,
- (c) a plurality of frequency dependent signal modifying circuits for isolating respective ones of said simultaneous signals according to their respective frequencies,
- (d) switch means for successively applying said received simultaneous signals to respective ones of said signal modifying circuits and said straight-through path according to a predetermined switching rate, and
- (e) summing means connected to said straight-through path and said signal modifying circuits, for generating a time division multiplexed signal comprised of said simultaneous signal and said isolated ones of said signals in succession, each signal having a duration inversely proportional to said switching rate.

**4,791,361**  
**CURRENT SENSOR FOR UNIVERSAL APPLICATION**  
 Bruce C. Belhoff, Glendale; Jerome K. Hastings, Sussex; Mark A. Judd, New Berlin, and Michael S. Baran, Wauwatosa, all of Wis., assignors to Eaton Corporation, Cleveland, Ohio

Filed Jun. 11, 1987, Ser. No. 61,355  
 Int. Cl.<sup>4</sup> G01R 1/04

U.S. Cl. 324—126

23 Claims



1. A current sensor quantitatively measuring current flow in an electrical conductor of any cross-sectional shape comprising:

- an insulating housing;
- a magnetic flux concentrator in said housing comprising a pair of magnetic pole pieces having respective flat surfaces in spaced parallel facing relation to provide a magnetic sensing region therebetween and a magnetic shunt connected to said pole pieces across said region, said pole pieces further comprising magnetic terminal means accessible exteriorly of said housing;
- magnetizable means having a selectively predetermined configuration surrounding the cross-sectional shape of said electrical conductor in spaced relation thereto, said magnetizable means being removably attached to said magnetic terminal means establishing a magnetizable loop including said flux concentrator around said conductor providing a linear magnetic field in said magnetic sensing region having an intensity proportional to current flow in said conductor, said magnetizable means being oriented to locate said shunt between said conductor and said magnetic sensing region;
- means in said housing including transducer means disposed between said flat surfaces responsive to said magnetic field intensity in said magnetic sensing region providing electric signals in proportion to said magnetic field intensity; and
- electric wiring terminal means for each electric signal externally disposed on said housing, said electric wiring terminal means connected to said means responsive to magnetic field intensity receiving said electric signals thereat.

1. In an electrical measurement meter apparatus having a display register, a power supply, a measuring mechanism, and electrical circuitry defining functions performed by the meter apparatus, the improvement comprising:

- (a) a plurality of modules separately housing said display register, said power supply, said measuring mechanism and said electrical circuitry, respectively;
- (b) mechanical interconnecting means on a plurality of said display register, said power supply, said measuring mechanism and said electrical circuitry modules for removably interconnecting said modules to form said meter apparatus; and
- (c) electrical interconnecting means on each of said display register, said power supply, said measuring mechanism and said electrical circuitry modules for providing modular, replaceable, electrical interconnections among said modules;
- (d) said electrical interconnecting means including pressure means for making electrical contact by mechanical pressure on electrical connectors; and
- (e) said mechanical interconnecting means including retaining means for releasably retaining said modules in mechanical connections with one another, said electrical interconnecting means further comprising central interfacing means, said central interfacing means including a plurality of electrical connectors for connection to a plurality of respective modules, and electrical interconnectors connected between at least two of said electrical connectors, said central interfacing means comprising separate subsidiary circuit board means for permitting connection of one of said modules to another of said modules, wherein said electrical connectors are mounted to said subsidiary circuit board means forming said central interfacing means, said electrical connectors comprising at least first and second mounting means for connecting to corresponding respective mounting means on one and another of said modules to permit said another module to be mounted to said one module by connection to said central interfacing means, wherein said first and second mounting means provided on said subsidiary circuit board forming said central interfacing means include first and second electrical connectors,



said first electrical connector comprising a plurality of first connecting pins extending from said circuit board in a substantially coplanar configuration therewith, and said second electrical connector comprising a plurality of second connecting pins extending from said circuit board substantially perpendicularly thereto.

4,791,363

## CERAMIC MICROSTRIP PROBE BLADE

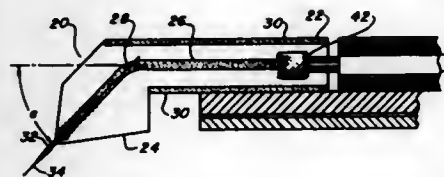
John K. Logan, 26527 Silver Spur Rd., Rancho Palos Verdes, Calif. 90274

Filed Sep. 28, 1987, Ser. No. 101,669

Int. Cl.<sup>4</sup> G01R 1/067, 19/145

U.S. Cl. 324—158 P

16 Claims



1. A high frequency ceramic microstrip probe blade comprising:

- (a) a ceramic body having a first and second side with a rectangular shank on one end and an angular portion on the other of relatively thin ceramic material;
- (b) a microstrip disposed planar with the first side centrally located upon the rectangular shank end and oriented in a circular arc on the angular portion into an obtuse angle relative to the planar portion, for conducting a high frequency signal at a specific impedance therewith;
- (c) a metalized ground plane covering the entire second side of the ceramic body opposite to the microstrip continuing around slightly to the first side on the rectangular shank end and on one edge of the angular portion providing an electrically conductive ground path therewith creating both a ground plane and a specific impedance to a high frequency signal; and,
- (d) a straight needle having a tapered end with a spherical tip attachingly disposed on a tangent to the microstrip on said angular portion of the body near the termination of the circular arc, said needle protruding therefrom parallel with said microstrip in such a manner as to interface with an electrical conductor, such as the test point pads on an integrated circuit wafer, a hybrid circuit or other small geometry microelectronic devices conducting high frequency signals, up to 10 gigahertz.

4,791,364

## THERMAL FIXTURE FOR TESTING INTEGRATED CIRCUITS

James C. Kufis, and Robert S. Semken, both of Sunnyvale, Calif., assignors to Thermonics Incorporated, Santa Clara, Calif.

Continuation of Ser. No. 767,522, Aug. 20, 1985, abandoned.

This application Jan. 11, 1988, Ser. No. 144,606

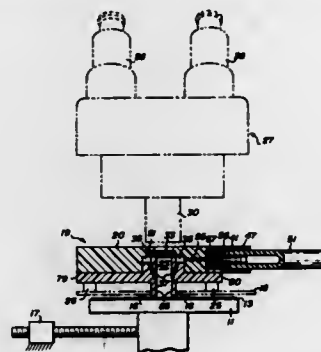
Int. Cl.<sup>4</sup> G01R 31/02

U.S. Cl. 324—158 F

9 Claims

1. In a device for individually testing integrated circuits which are part of a semiconductor wafer, said device being at a first temperature and having probing means for making electrical contact with individual integrated circuits, means for holding and positioning the semiconductor wafer to bring individual integrated circuits into position for contacting the probing means, the improvement comprising a thermal test fixture device having a body with an aperture therein, said body being connected to the probing means with said aperture superposing the surface of an individual integrated circuit being tested to permit visual inspection of said individual integrated circuit being tested while in electrical contact with the

probing means, a plenum chamber formed in said thermal test fixture device adjacent said aperture and gas inlet means in gas-flow communication with the plenum chamber to admit a flow of pressurized gas, at a predetermined temperature different from said first temperature, from the aperture onto the surface of the circuit being tested to bring the temperature of that circuit substantially equal to the predetermined tempera-



ture of the gas while simultaneously enabling visual inspection through the aperture of the circuit being tested; means for varying the predetermined temperature of said pressurized gas whereby the circuit being tested can be tested at different temperatures while in said position; and means for sequentially positioning individual integrated circuits of the wafers in alignment with said aperture for testing.

4,791,365

POSITION RESPONSIVE CONTROL SIGNAL GENERATOR HAVING RELATIVELY MOVABLE SENSOR AND MAGNETIC FLUX CONCENTRATORS  
Peter Johannes; Lutz Lampe; Wolfgang Lampe; Uwe Lorelt, all of Hermsdorf; Gottfried Neumärker, Bad-Klosterlausitz, and Peter Pertsch, Hermsdorf, all of German Democratic Rep., assignors to Kombinat VEB Keramische Werke Hermsdorf, Hermsdorf, Fed. Rep. of Germany

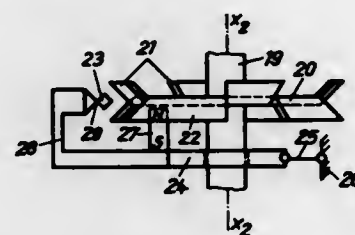
Filed Aug. 20, 1986, Ser. No. 898,283

Claims priority, application German Democratic Rep., Sep. 27, 1985, 281115

Int. Cl.<sup>4</sup> G01B 7/14, 33/02; F02P 7/00; H01L 43/08

U.S. Cl. 324—208

5 Claims



1. A generator for the production of position-dependent position signals with a magnet to produce a magnetic flux, said generator comprising a magnetic circuit including a magnet, a magnetoresistive sensor, and first, second and third magnetic flux concentrators, means for providing relative movement between said sensor with respect to said first concentrator and said second and third concentrators, to alternately direct magnetic flux between said first concentrator and said second and third concentrators, respectively, upon said relative movement, said second and third concentrators being mounted to extend parallel to the relative movement and staggered at

opposite sides of said sensor and said first concentrator, said second and said third concentrators having respective edges spaced from one another, the respective edges of said second and third concentrators being symmetrical to said sensor and said first concentrator and spaced at right angles to said relative movement, the first concentrator being on a side of said sensor facing away from said second and third concentrators, means for holding said sensor in the path of flux between said first concentrator and said second and third concentrators, said magnet being mounted to maintain a substantially constant magnetic flow between said first concentrator and said second and third concentrators of sufficient magnitude to continuously maintain magnetic saturation in said sensor when the flux is switched between said second and third flow concentrators upon said relative movement, said second and third concentrators being positioned to effect a substantially 90° change in direction of the magnetic flux when the flux is switched between said second and third flow concentrators upon said relative movement.

4,791,366

## APPARATUS INCLUDING A PAIR OF ANGULARLY SPACED SENSORS FOR DETECTING ANGLE OF ROTATION OF A ROTARY MEMBER

Tokio Suzuki, and Tsutomu Sato, both of Iwaki, Japan, assignors to Alpine Electronics Inc., Japan

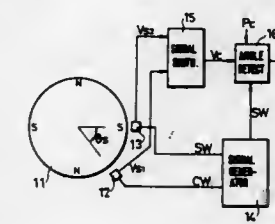
Filed Oct. 27, 1986, Ser. No. 923,300

Claims priority, application Japan, Oct. 31, 1985, 168333[U]

Int. Cl.<sup>4</sup> G01B 7/30, 33/06

U.S. Cl. 324—208

3 Claims



1. An apparatus for detecting an angle of rotation comprising:

- a rotary magnet having a circumference in a plane of rotation on which four magnetic poles are spaced apart from each other at equal angular intervals;
- first and second magnetic sensors of a ferromagnetic material disposed adjacent and facing toward the circumference of the rotary magnet spaced apart from each other at an angular interval of  $(2n+1)\pi/8$ , where  $n$  is an integer;
- a signal generating circuit connected to said first and second sensors for applying first and second sine wave signals thereto, respectively, which have a phase difference of  $\pi/2$  in electrical angle between them;
- a synthesizing circuit receiving respective signals output from said first and second sensors, as a result of said applied first and second sine wave signals and rotation of said rotary magnet through an angle  $\theta$  past said first and second sensors, for generating a synthesized signal based upon said received signals having a phase difference from the phase of said first sine wave signal corresponding to said angle  $\theta$  of rotation; and
- a rotation angle detecting circuit receiving the synthesized signal output from said synthesizing circuit and receiving said first sine wave signal from said signal generating circuit for generating an output representing the angle of rotation based on said phase difference.

4,791,367

## CONTACTING THICKNESS GAUGE FOR MOVING SHEET MATERIAL

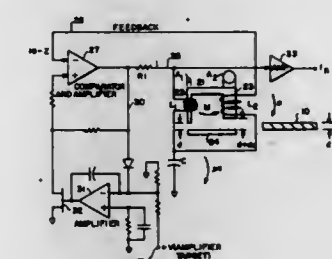
Pekka M. Typpo, Cupertino, Calif., assignor to Impact Systems, Inc., San Jose, Calif.

Filed Jul. 15, 1987, Ser. No. 73,734

Int. Cl.<sup>4</sup> G01B 7/10

U.S. Cl. 324—229

4 Claims



1. A contacting thickness gauge for moving sheet material comprising:

- active magnetic means on one side of said sheet and juxtaposed magnetic means on the other side of said sheet for providing a magnetic flux path through said sheet;
- said active magnetic means including a U-shaped pole piece having two legs juxtaposed with said sheet and said passive magnetic means;
- a pair of windings respectively wound around said two legs;
- resonant circuit means including said pair of windings, said circuit means having a resonant frequency determined substantially solely by mutual inductance between said windings, excluding stray inductance of the windings themselves, said resonant frequency being proportional to the gaps between said two legs and said passive magnetic means;
- and means for biasing one of said two legs into contact with said sheet material, but maintaining said other of said two legs spaced from said sheet material, said contacting one leg having a cross-section much smaller than that of said other leg whereby the gap between the end of the non-contacting other leg and said passive magnetic means is relatively insensitive relative to said flux path.

4,791,368

## AUTOMATIC MAGNETIC FIELD MEASURING APPARATUS USING NMR PRINCIPLES

Naohisa Tsuzuki, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 18, 1987, Ser. No. 27,430

Claims priority, application Japan, Mar. 24, 1986, 61-65492

Int. Cl.<sup>4</sup> G01R 33/24

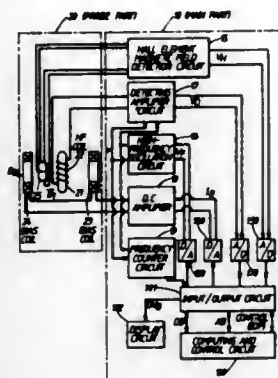
U.S. Cl. 324—301

10 Claims

1. An apparatus for measuring an external magnetic field, comprising:

- (a) a high-frequency coil for measuring said external magnetic field by detecting a nuclear magnetic resonance (NMR) effect, said coil having a variation of inductance depending on the presence or absence of said NMR effect;
- (b) bias means for generating a bias magnetic field to be superimposed on said external magnetic field;
- (c) an ancillary magnetic field measuring means;
- (d) a high-frequency generating means for generating a high-frequency voltage and applying said high-frequency voltage to said high-frequency coil;
- (e) a frequency computing means for computing the frequency of said high-frequency voltage to be applied to said high-frequency coil on the basis of a magnetic field measurement from said ancillary magnetic field measuring means;
- (f) a bias current means for varying, in a predetermined

range, a bias current which flows through said bias means, and supplying said bias current to said bias means;  
(g) a resonance point sensing means for sensing the bias current for which the variation of inductance of said high-frequency coil is a maximum;

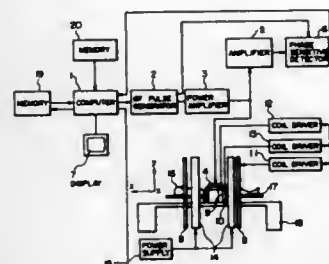


(h) a magnetic field computing means for computing the magnitude of said external magnetic field from the bias current for which said inductance variation is a maximum and from the frequency of said high-frequency voltage; and  
(i) a display means for displaying said magnitude of said external magnetic field.

**4,791,369**  
**METHOD OF MEASURING MAGNETIC FIELD ERROR OF AN NMR IMAGING APPARATUS AND OF CORRECTING DISTORTION CAUSED BY THE ERROR**  
Etsuji Yamamoto, Akishima, and Hideki Kohno, Suganami, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jul. 10, 1987, Ser. No. 72,035  
Claims priority, application Japan, Jul. 14, 1986, 61-163615  
Int. Cl. G01R 33/20

U.S. Cl. 324—312

9 Claims



1. A method of measuring error distribution in a static magnetic field and distributions of deviations of gradient magnetic fields from straight lines in first and second directions in an NMR imaging apparatus provided with means for generating the static magnetic field, means for generating the gradient magnetic fields in the first and second directions that are at right angles with each other, and means which generates an RF magnetic field, said method comprising:

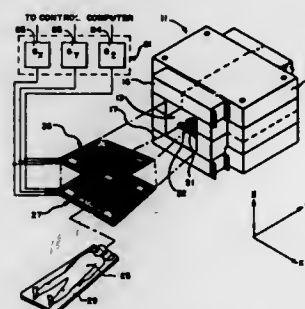
- a step for placing in said static magnetic field a phantom of which the spin density distribution is known;
- a step for exciting the spins of said phantom;
- a step for applying to said phantom a gradient magnetic field having a strength-time product which is programmable along said first direction;
- a step for reading the NMR signals from said phantom in the presence of a first read-out gradient magnetic field in the first direction along said second direction;
- a step for obtaining a first data train by repeating the

above-said steps (b) to (d) while successively changing the value of the programmable strength-time product of the gradient magnetic field in the first direction;  
(f) a step for obtaining a second data train by repeating the above-said steps (b) to (e) and by changing the read-out gradient magnetic field in step (d) into a second read-out gradient magnetic field of a direction opposite to the first direction;  
(g) a step for reconstructing first and second images that represent spin density distributions of said phantom by subjecting said first and second data trains to a two-dimensional Fourier transform, respectively;  
(h) a step for finding the distributions of distortion in the first and second reproduced images by comparing the first and second reconstructed images with the known density distribution of said phantom; and  
(i) a step for finding an error distribution in said static magnetic field from the distributions of distortion of said first and second reconstructed images, and for finding distributions of deviations of said first and second gradient magnetic fields from the straight lines.

**4,791,370**  
**GRADIENT FIELD STRUCTURE AND METHOD FOR USE WITH MAGNETIC RESONANCE IMAGING APPARATUS**  
Barry A. MacKinnon, Sunnyvale, Calif., assignor to Resonex, Inc., Sunnyvale, Calif.  
Filed Aug. 23, 1985, Ser. No. 768,873  
Int. Cl. G01R 33/20

U.S. Cl. 324—318

26 Claims



1. In a magnetic imaging apparatus, an electromagnet providing an opening for receiving the object to be imaged, said electromagnet having first and second coil assemblies providing a main magnetic field in the opening and first and second spaced apart substantially planar gradient field structures providing a set of three two-dimensional quadrupole fields in the opening, said gradient field structures comprising substantially parallel arrays of electrical conductors having substantially rectangular geometries lying in planes, the conductors having being distributed in space in each plane with respect to each other to provide a sheet-like current distribution in each plane.

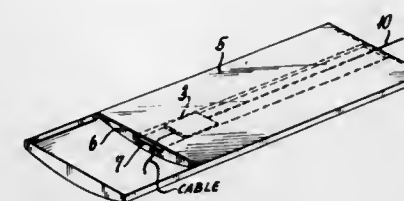
**4,791,371**  
**APPARATUS USEFUL IN MAGNETIC RESONANCE IMAGING**  
George S. Krol, Mamaroneck, N.Y., assignor to Memorial Hospital for Cancer and Allied Diseases, New York, N.Y.  
Filed Nov. 17, 1986, Ser. No. 931,613  
Int. Cl. G01R 33/20

U.S. Cl. 324—318

5 Claims

1. Apparatus for examination of a subject using magnetic resonance imaging, comprising:  
(a) a support means for said subject, said support means including non-magnetic plate;

(b) a plurality of non-magnetic support pillars, said pillars being attached to said plate by non-magnetic means, and adapted for reception of a sleeve means;  
(c) a sleeve means which engages said pillars, said sleeve means comprising a locking means;  
(d) a surface coil for use in magnetic resonance imaging, said

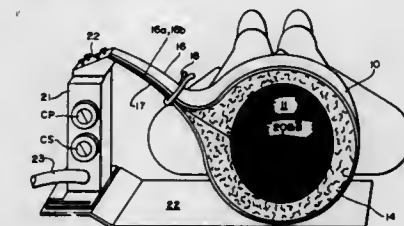


coil comprising a second locking means adapted for engagement with the locking means of said sleeve means and said sleeve means and surface coil being so adapted so that said coil fits into said sleeve means and may be moved along the longitudinal axis of said sleeve means; and  
(e) a non-magnetic traction means attached to said coil for moving said coil in said sleeve means.

**4,791,372**  
**CONFORMABLE HEAD OR BODY COIL ASSEMBLY FOR MAGNETIC IMAGING APPARATUS**  
Gregory L. Kirk, Palo Alto, Calif.; Jeffrey D. Mewborne, San Antonio, Tex., and David M. Parish, Sunnyvale, Calif., assignors to Resonex, Inc., Sunnyvale, Calif.  
Filed Aug. 17, 1987, Ser. No. 86,368  
Int. Cl. G01R 33/20

U.S. Cl. 324—318

7 Claims

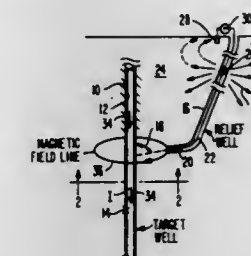


1. A head or body coil assembly having a predetermined magnetic axis for picking up free induction decay or spin-echo signals from a test specimen produced in a magnetic resonance imaging apparatus comprising:

inductive pickup coil means for substantially surrounding said test specimen including a thin, flexible, unitary, continuous band of conductive material substantially entirely covered with a flexible protective material, said band having a pair of ends with their facing interiors provided with mutually adhering surfaces which, when fastened together, provide a conforming fit of said band around specimens of varying diameter and configuration, said band being substantially cylindrical in configuration and having a central axis substantially coincident with said magnetic axis, said adhered ends forming an effective capacitor.

**4,791,373**  
**SUBTERRANEAN TARGET LOCATION BY MEASUREMENT OF TIME-VARYING MAGNETIC FIELD VECTOR IN BOREHOLE**  
Arthur F. Kuckes, 508 N. Aurora St., Ithaca, N.Y. 14850  
Filed Oct. 8, 1986, Ser. No. 916,755  
Int. Cl. G01V 3/11; E21B 7/04, 47/022  
U.S. Cl. 324—346

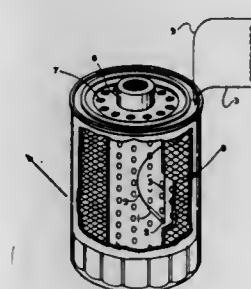
7 Claims



1. A method of locating, from a homing tool location, the direction to a target underground location, comprising:  
drilling a borehole at a location spaced from a target underground location;  
lowering into said borehole a homing tool having a longitudinal axis which is aligned with the axis of said borehole and incorporating a magnetic field sensor having an axis of maximum sensitivity aligned with said homing tool axis;  
producing a time-varying current flow on the target which provides a corresponding time-varying magnetic field at the homing tool location in said partially drilled borehole;  
measuring, by means of said magnetic field sensor, the component of said time-varying magnetic field which is parallel to said homing tool axis; and  
determining from said measured time-varying magnetic field component the direction to the target location from said borehole.

**4,791,374**  
**ACID SENSOR**  
Richard Yodice, Willoughby, and Richard E. Gapinski, Mentor, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio  
Filed Dec. 12, 1986, Ser. No. 941,018  
Int. Cl. G01N 27/12  
U.S. Cl. 324—439

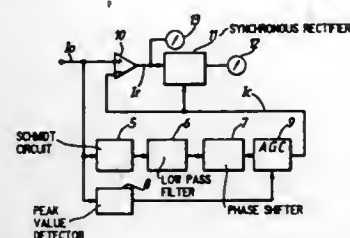
27 Claims



1. A device for determining the acidic hydrogen concentration of a substantially non-aqueous medium wherein the device includes an organic polymer capable of accepting protons, suitable means for exposing the organic polymer to the medium and protons therein, means for transmitting an electric current to and from the organic polymer capable of accepting protons and suitable means for measuring differences in resistance through the organic polymer due to the acceptance of protons.



**4,791,375**  
**APPARATUS FOR DETECTING DEGRADATION OF AN ARRESTER**  
 Masahiro Kan, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Aug. 26, 1986, Ser. No. 900,417  
 Claims priority, application Japan, Sep. 5, 1985, 60-196501  
 Int. Cl.<sup>4</sup> G01K 31/12  
 U.S. Cl. 324—552 4 Claims

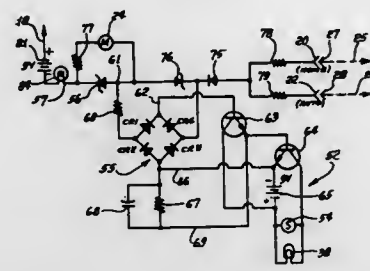


1. An apparatus for detecting degradation of an arrester grounded by a grounding conductor, comprising:  
 a wave conversion circuit for producing a total leakage current signal corresponding to the total leakage current flowing through the arrester, said total leakage current signal including a resistive component superimposed on a capacitive component;  
 means coupled to said wave conversion circuit for generating a cancelling wave signal  $I_c$  based on the total leakage current signal, including a phase shifter circuit for shifting the phase of the cancelling wave signal  $I_c$ ;  
 a differential amplifier for adding said cancelling wave signal  $I_c$  to the total leakage current signal and thereby extract a resistive-component leakage current signal  $I_r$  at an output thereof;  
 a synchronous rectifier circuit for synchronous rectification of the signal  $I_r$  from said differential amplifier according to said cancelling wave signal  $I_c$ ; and  
 means for adjusting the phase shift amount in said phase shifter circuit to produce a 90° phase difference between the signals  $I_r$  and  $I_c$  so that the output signal from said synchronous rectifier circuit may become zero, thereby bringing the phase of the cancelling wave signal  $I_c$  in agreement with the phase of the capacitive component of the total leakage current signal to detect at the output of said differential amplifier the resistive component of the total leakage current signal indicative of degradation of said arrester.

**4,791,376**  
**MULTI-PROBE, HAND-HELD CIRCUIT TESTER**  
 Milton W. Freedman, 3309 Iroquois Ave., Long Beach, Calif. 90808, and Dan Tucker, 5122 Huntington Dr., Los Angeles, Calif. 90032  
 Filed May 15, 1987, Ser. No. 29,174  
 Int. Cl.<sup>4</sup> G01R 31/02 6 Claims

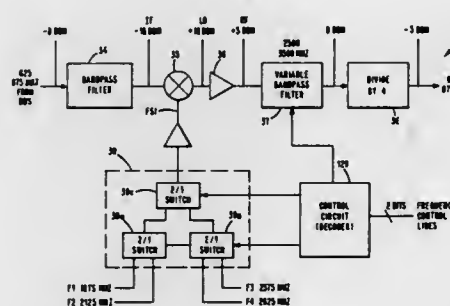
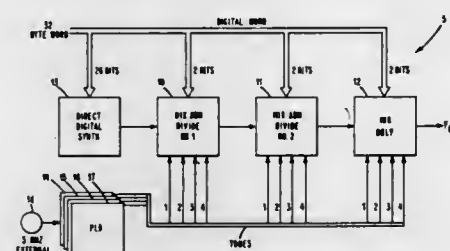
6. In a circuit testing device, the combination comprising:  
 (a) a casing having opposite ends,  
 (b) a single probe rigidly projecting from one end of the casing whereby the casing may be manipulated to forcibly insert the probe into an electrical power socket,  
 (c) the casing carrying a first socket and there being a second probe connected with the first socket,  
 (d) circuitry in the casing including at least one Zener diode and at least one half wave rectifier interconnecting the single probe and said socket terminal,  
 (e) a presence of voltage circuit in the casing and electrically connected with said single probe, said circuit including a presence-of-voltage indicator means and rectifier and amplifier means electrically connected between the single probe and the indicator means, the rectifier means includ-

ing a rectifier bridge having two terminals connected across the Zener diode,  
 (f) there also being a voltage level indicating meter connected in series with said circuitry,  
 (g) the indicator means comprising a light located at the opposite end of the casing, said indicator means also including a buzzer in the casing,



(h) the casing defining two recesses at said one end of the casing, the single probe projecting away from a location between the recesses,  
 (i) said first socket located at one of the recesses, and there being a second socket located at the other recess, the sockets adapted to receive jacks connected via wires with second and third probes,  
 (j) the meter located generally between the recesses.

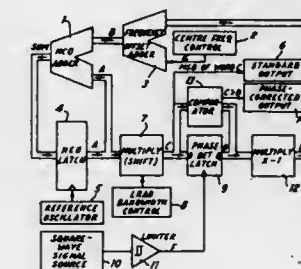
**4,791,377**  
**DIRECT FREQUENCY SYNTHESIZER**  
 John Grandfield, Assonet; James T. Campbell, Sherborn; Carl H. Gandel, Needham, and William Shillue, Norwood, all of Mass., assignors to GTE Government Systems Corporation, Waltham, Mass.  
 Filed Oct. 20, 1987, Ser. No. 110,396  
 Int. Cl.<sup>4</sup> H03B 21/02, 19/00  
 U.S. Cl. 328—14 3 Claims



1. A frequency synthesizer comprising:  
 a. tone generating means for providing a plurality of tones;

b. a plurality of series connected mix and divide circuits, including a first and a last mix and divide circuit, each mix and divide circuit including a mixer having an IF input, an LO input and a RF output, filter means for filtering the RF output of said mixer with a selectable passband; means for selecting a tone from said tone generating means and selecting a passband of said filter means in response to a segment of a digital word; means for coupling the selected tone to the IF input of said mixer, and frequency divider means for dividing the filtered RF output of said mixer;  
 c. a mix only circuit at the output of the last of said series connected mix and divide circuits, said mix only circuit including a mixer having an IF input, a LO input and a RF output, filter means for filtering the RF output of said mixer with a selectable passband, means for selecting a tone from said tone generating means and selecting a passband of said filter means in response to a segment of a digital word; means for coupling the selected tone to the IF input of said mixer, and  
 d. a digital synthesizer for providing a signal to the input of the first of said series connected mix and divide circuits, the frequency of said signal corresponding to a segment of a digital word.

**4,791,378**  
**PHASE-LOCKED LOOPS**  
 Richard M. Waltham, London, England, assignor to Thorn EMI plc, London, England  
 Filed Jan. 21, 1988, Ser. No. 146,426  
 Claims priority, application United Kingdom, Jan. 24, 1987, 8701573  
 Int. Cl.<sup>4</sup> H03K 5/13, 9/06; G05F 5/00  
 U.S. Cl. 328—155 3 Claims

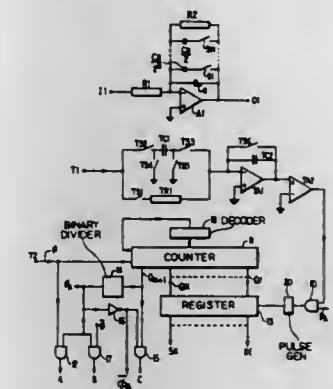


1. Circuitry comprising a phase-locked loop having accumulator means with adding means to effect summation of two input signals and with latch means whose input is connected to receive the summed output of the adding means, the latch means being clocked by reference-oscillator means, the output of the latch means being connected to an input of the adding means such that the output signal from the latch means constitutes one of the two input signals to the adding means, means to detect a change of value of the most-significant bit of the output of the latch means, means to generate an output in accordance with the output of the detection means and means to sample the output signal from the latch for derivation of a phase-correction.

**4,791,379**  
**ELECTRICAL FILTER WITH ADJUSTABLE RC PRODUCT**  
 John B. Hughes, Brighton, England, assignor to U.S. Philips Corporation, New York, N.Y.  
 Filed Feb. 10, 1986, Ser. No. 828,004  
 Claims priority, application United Kingdom, Feb. 13, 1985, 8503676; Nov. 29, 1985, 8529439  
 Int. Cl.<sup>4</sup> H03K 5/00; H03B 1/00  
 U.S. Cl. 328—167 19 Claims

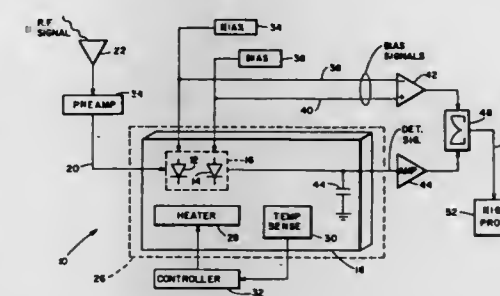
1. An integrated electrical filter comprising at least one filter section, said filter section comprising at least one capacitor and

at least one resistor coupled to an input terminal and an output terminal, switching means for forming a product of the resistance of the resistor and the capacitance of the capacitor, and a trimming circuit for operating the switching means to adjust said product of resistance and capacitance, characterised in that the trimming circuit comprises means for charging a further capacitor from a reference voltage source through a further resistor for a first period, means for removing the charge



from the further capacitor in discrete increments of charge during a second period, means for counting the number of charge increments required to remove the charge accumulated on the further capacitor during the first period, and means for operating the switching means to adjust the capacitance of said at least one capacitor or the resistance of said at least one resistor in dependence on the number of charge increments counted.

**4,791,380**  
**DETECTOR CIRCUIT WITH DUAL-DIODE COMPENSATION**  
 Joseph F. Chiappetta, Trumbull, Conn., assignor to Microphase Corporation, Norwalk, Conn.  
 Filed Oct. 9, 1987, Ser. No. 107,644  
 Int. Cl.<sup>4</sup> H03D 1/06; H03K 3/06  
 U.S. Cl. 329—179 17 Claims



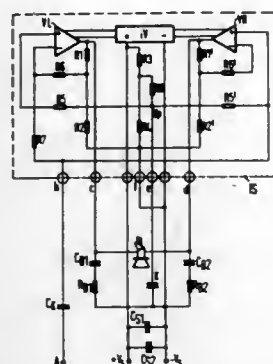
1. A detector circuit comprising:  
 a first diode, a second diode having characteristics matched to said first diode, each of said diodes having a first terminal and a second terminal, the second terminal of each of said diodes being connected together as a common terminal;  
 energy storage means, said second diode being operatively coupled to said energy storage means for detecting an input signal;  
 amplifying means having an output terminal, a first input channel and a second input channel, said first input channel being connected to said first terminal of said first

diode, said second input channel being connected to a terminal of said second diode; and wherein said first and said second input channels include respectively a first bias means and a second bias means for setting bias currents respectively in said first diode and said second diode; and said amplifying means amplifies said input signal while rejecting a common mode of bias voltages in said first and said second diodes to free a signal outputted at said output terminal of effects of thermal drift in either of said diodes.

**4,791,381**  
**INTEGRATED AMPLIFIER CIRCUIT**  
Michael Lenz, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Continuation of Ser. No. 844,028, Mar. 25, 1986, abandoned.  
This application Jan. 11, 1988, Ser. No. 144,608  
Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 3511189

Int. Cl.<sup>4</sup> H03F 3/68  
U.S. Cl. 330—84

10 Claims

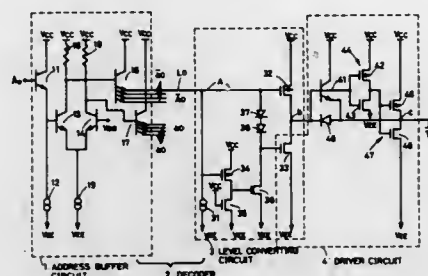


1. Integrated amplifier circuit assembly, comprising at least a first integrated amplifier circuit including:  
a first circuit node, a second circuit node, a supply potential node, and a reference potential node; first and second operational amplifiers each having an inverting input, a non-inverting input, an output; a terminal connected to said supply potential node, and a terminal connected to said reference potential node;  
two first ohmic voltage dividers each being formed of two resistors with a tap therebetween, each first voltage divider having one end connected to an output of a respective one of said operational amplifiers and another end connected to said first circuit node, and two further ohmic resistors each being connected between a respective one of said taps and a respective inverting input of a respective one of said operational amplifiers, providing real negative feedback to said operational amplifiers; and  
two ohmic supply resistors each being connected between second circuit node and a respective non-inverting input of said operational amplifiers;  
said integrated amplifier circuit assembly including a third ohmic voltage divider formed of two resistors with a tap therebetween, said third voltage divider having one end connected to said supply potential node and another end connected to said first circuit node, an intermediate ohmic resistor connected between said tap of said third voltage divider and said second circuit node;  
the integrated amplifier circuit further including an ohmic series resistor connected to said inverting input of said first operational amplifier;  
first terminals each being connected to a respective one of said outputs of said operational amplifiers, second terminals each being connected to a respective one of said

supply and reference potential nodes for connection to a supply voltage source, third terminals each being connected to a respective one of said first and second circuit nodes, and a single fourth terminal connected to said ohmic series resistor and to said non-inverting input of said second operational amplifier via connections internal to said integrated amplifier circuit, for feeding in a signal.

**4,791,382**  
**DRIVER CIRCUIT**  
Toru Shioimi, and Kenji Anami, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Filed Feb. 16, 1988, Ser. No. 156,433  
Claims priority, application Japan, Aug. 25, 1987, 62-210603  
Int. Cl.<sup>4</sup> H03F 3/18, 3/16  
U.S. Cl. 330—264

10 Claims



1. A driver circuit for amplifying current of an input signal of a first logical level or a second logical level and supplying the amplified current to a load, comprising  
an input terminal coupled to said input signal,  
an output terminal,  
a first potential source for applying a potential corresponding to the first logical level,  
a second potential source for applying a potential corresponding to the second logical level,  
a first CMOS inverter circuit responsive to the signal applied to said input terminal for deriving to said output terminal the potential of said first potential source or the potential of said second potential source,  
a first semiconductor element for passing current from said first potential source to said output terminal when the signal applied to said input terminal is changed from the second logical level to the first logical level, and  
a second semiconductor element for passing current from said output terminal to said second potential source when the signal applied to said input terminal is changed from the first logical level to the second logical level.

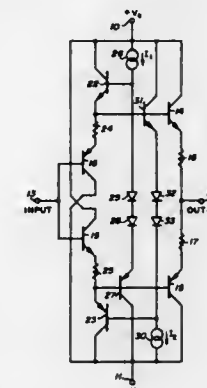
**4,791,383**  
**HIGH SPEED CURRENT AMPLIFIER BUFFER CIRCUIT**  
Dennis M. Monticelli, Fremont, and John W. Wright, Los Altos, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.  
Filed Sep. 4, 1987, Ser. No. 92,929  
Int. Cl.<sup>4</sup> H03F 3/30

U.S. Cl. 330—265

7 Claims

1. A buffer amplifier circuit having input and output terminals and connectable between the positive and negative rails of an operating power supply, said circuit comprising:  
a pair of complementary emitter follower output transistors having their outputs commonly coupled to said circuit output terminal and having their inputs driven in the same phase;  
a pair of complementary emitter follower input transistors having their inputs commonly coupled to said circuit input terminal and their outputs coupled to drive the inputs of said pair of complementary emitter follower

output transistors, said input transistors being arranged to be complementarily connected to said output transistors; and



a pair of complementary bootstrap load transistors connected to said input transistors and having inputs cross-coupled to be driven from the inputs of said output transistors.

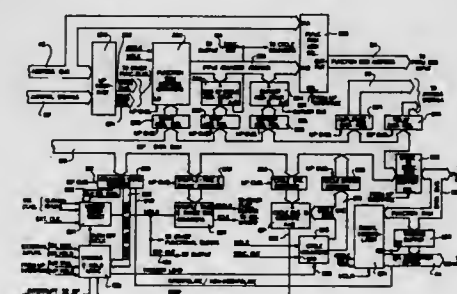
**4,791,384**  
**PROGRAMMABLE FUNCTION CONTROLLER FOR USE IN A WAVEFORM GENERATOR SYSTEM**

Peter J. Mackey, Hicksville, and Hakop Hakoopian, Lake Grove, both of N.Y., assignors to Harris Corporation, Melbourne, Fla.

Continuation of Ser. No. 580,223, Feb. 15, 1984, abandoned.  
This application Apr. 9, 1987, Ser. No. 36,195  
Int. Cl.<sup>4</sup> G06F 1/02

U.S. Cl. 364—718

13 Claims



1. A programmable function controller for use in a waveform generator system which generates waveforms wherein said controller controls the generation of the waveforms in dependence upon preloaded programmed control words, said system having a plurality of clock sources, a preloaded memory, and digital to analog converter means, and said controller comprises:

a plurality of data registers for respectively receiving and being preloaded prior to waveform generation with programmed parameter control words respecting the manner in which a waveform is to be generated;  
clock select logic means coupled to one of said registers and responsive to a control word therein for selecting one of said plurality of clock sources including at least two different internal clock sources internal to said system of different frequencies and an external clock source external to said system for providing clock pulses for use by the controller;  
memory address counting means sequentially incremented by said clock pulses for providing sequential addresses for use in sequentially addressing said preloaded memory to

obtain therefrom data words sequentially representing data points on a waveform to be generated;  
means for outputting said data words to said digital-to-analog converter means for providing an analog version of said waveform;  
wherein said one of data registers includes a command word register for receiving and being preloaded prior to waveform generation with a control word commanding clock selection of one of said plurality of clock sources, said clock select logic means being coupled to said command word register for responding to said control word therein for selecting a clock source for use by the controller as an internal master clock; and,  
a sample time register for receiving and being preloaded prior to waveform generation with a sample time control word defining one of a plurality scaling factors, and sample time counting means responsive to said sample time control word and to said master clock for dividing down said master clock to obtain an addressing clock.

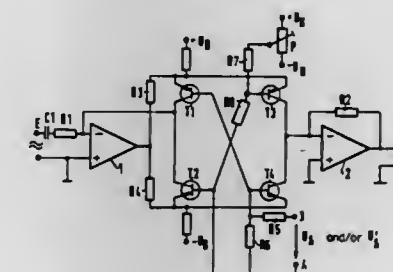
**4,791,385**  
**VOLTAGE CONTROLLED AMPLIFIER FOR SYMMETRICAL ELECTRICAL SIGNALS**  
Jurgen Wermuth, Peine/Sted., Fed. Rep. of Germany, assignor to ANT Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany

Filed Jul. 1, 1987, Ser. No. 69,537  
Claims priority, application Fed. Rep. of Germany, Jul. 5, 1986, 3622615

Int. Cl.<sup>4</sup> H03G 3/30

U.S. Cl. 330—278

19 Claims



1. A voltage controlled, ground symmetrical amplifier comprising:  
a logarithm circuit comprising a first pair of bipolar transistors and circuit means connecting the emitter-collector paths of said first pair of transistors,  
an antilog circuit comprising a second pair of bipolar transistors and circuit means connecting the emitter-collector paths of said second pair of transistors,  
means connected for applying a gain control voltage to the bases of one of said first pair of transistors and one of said second pair of transistors,  
a bipolar auxiliary transistor having an impedance in the emitter-collector path thereof,  
means connected for applying to the base of said auxiliary transistor a constant direct voltage, which is temperature stabilized over the operating range of the amplifier and whose value is approximately equal to  $U_{BE0} + \alpha \cdot 273^\circ \text{mV}$  where  
 $U_{BE0}$  = the base-emitter voltage across the p/n or n/p junction at  $0^\circ \text{C}$ . and with operating collector and emitter current, and  
 $\alpha$  = the temperature coefficient of this base-emitter voltage, whereby the auxiliary voltage appearing across said auxiliary transistor impedance is directly proportional to absolute temperature,  
means connected for thermally coupling said auxiliary transistor to said first and second pair of transistors,



circuit means connected for applying said auxiliary voltage to the base of the other of said second pair of transistors, whereby the output signal from said antilog circuit is ground symmetrical over at least a range of  $\pm 30^\circ$ , and means connected for generating said gain control voltage as a product voltage containing said auxiliary voltage as a factor.

4,791,386

# **DIGITAL PHASE-LOCKED LOOP WITH RANDOM WALK FILTER**

Nobuo Shiga, Kanagawa, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

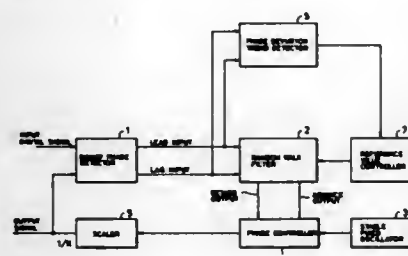
Filed Jul. 2, 1987, Ser. No. 69,121

Claims priority, application Japan, Jul. 8, 1986, 61-160368

Int. Cl.<sup>4</sup> H03L 7/08

U.S. Cl. 331—1 A

7 Claims



1. A digital phase-locked loop circuit, comprising: means for determining a phase of an input signal relative to an output signal to selectively supply one of a lead output and a lag output; a random walk filter receiving said lead and lag outputs to thereby supply one of a phase advance output and a phase retard output; phase control means receiving said phase advance and retard outputs and a stable oscillation signal for providing a phase compensated signal being said output signal; phase deviation trend detection means receiving said lead and lag outputs for detecting a trend of a deviation of said phase to thereby produce a phase trend indication signal; and a reference value control means for altering a reference value supplied to said random walk filter responsive to said phase trend indication signal.

4,791,387

# **MICROWAVE BAND FREQUENCY SYNTHESIZER**

Makoto Hasegawa, Tokyo; Kosei Misaizu, Kawasaki, and Mitsuo Makimoto, Yokohama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 15, 1987, Ser. No. 133,395

Claims priority, application Japan, Dec. 16, 1986, 61-299489; Dec. 16, 1986, 61-299490

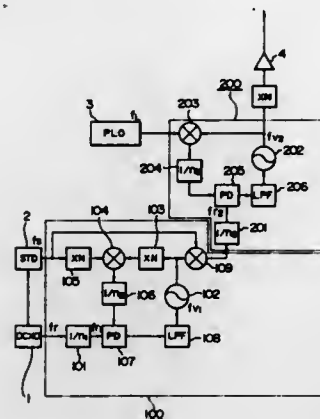
Int. Cl.<sup>4</sup> H03L 7/06

U.S. Cl. 331—2

1 Claim

1. A microwave band frequency synthesizer comprising: a first phase-locking loop including a first voltage controlled oscillator, a variable frequency divider and a first multiplier and generating an output signal whose frequency changes at the rate of a unit frequency change width of said first voltage controlled oscillator; a second phase-locking loop including a first fixed frequency divider for performing fixed frequency division of the output signal of said first phase-locking loop to provide a phase comparison reference signal of a frequency higher than that phase-compared in said first phase-locking loop, a second voltage controlled oscillator, a second fixed frequency divider for performing fixed frequency division of an output signal of said second voltage controlled

oscillator, a second phase comparator for performing phase comparison between a frequency division output signal of said second fixed frequency divider and said phase comparison reference signal to provide a signal for



- phase locking said second voltage controlled oscillator; and a second multiplier for multiplying an output signal from said second voltage controlled oscillator to provide a microwave band signal

4,791,388

# **CHANNEL WAVEGUIDE MODULATOR**

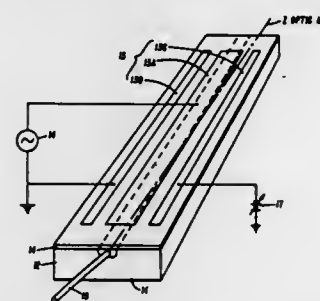
Norman A. Sanford, Stillriver, and Amareesh Mahapatra, Acton, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Apr. 27, 1987, Ser. No. 43,190

Int. Cl.<sup>4</sup> G02B 5/14

U.S. Cl. 332—7.51

6 Claims



1. An integrated optic modulator comprising: a z-propagating, ferroelectric crystal substrate having birefringent optical properties that can be varied in response to the application of electric fields, said substrate having formed therein a channel waveguide with effective indices of refraction higher than that of said substrate in two orthogonal planes where the effective index of refraction of said waveguide in one of said orthogonal planes is such that said waveguide provides lossless propagation of light polarized in the same plane and the axis of said waveguide is angularly offset from the optical axis of said substrate by an angle at which the effective index in the other orthogonal plane matches the index of said substrate in the same plane so that light polarized in said other plane of polarization can leak into said substrate; and electrodes on said substrate for selectively applying an electric field thereto to alter the optical properties of said waveguide, said electrodes being positioned on said substrate so that the electric field generated thereby in the

presence of an applied voltage thereto changes the effective index of refraction of said leaky mode of polarization so that it no longer matches that of said substrate in the same plane and thereby propagates light polarized in that plane without leaking into said substrate whereby the generation and removal of an electric field via said electrodes provides for the modulation of light.

4,791,389

# **MILLIMETER WAVE CIRCULATOR**

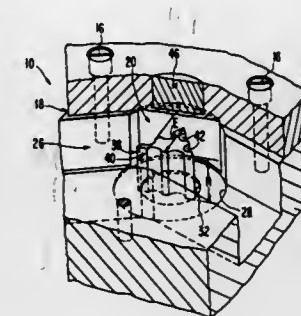
Paul H. Wolfert, Portola Valley, Calif., assignor to Varian Associates, Inc., Palo Alto, Calif.

Filed May 27, 1987, Ser. No. 54,717

Int. Cl.<sup>4</sup> H01P 1/39

U.S. Cl. 333—1.1

17 Claims



1. A broadband waveguide Y-junction millimeter wave circulator comprising: a statically magnetized ferrite prism possessing a pair of flat parallel ends and three identical vertical sides which extend between said ends, said three vertical sides each possessing at least one continuous vertical groove disposed therein.

4,791,390

# **MSE VARIABLE STEP ADAPTIVE FILTER**

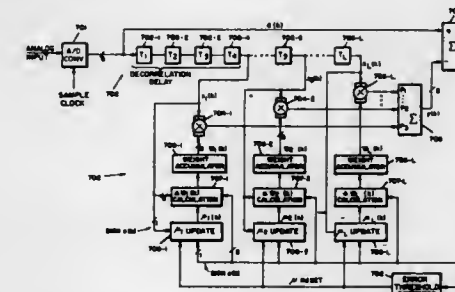
Richard W. Harris, Bountiful; Frank A. Bishop, and Glen D. Rattlingourd, both of Salt Lake City, all of Utah, assignors to Sperry Corporation, Blue Bell, Pa.

Filed Jul. 1, 1982, Ser. No. 394,488

Int. Cl.<sup>4</sup> H03H 15/00, 17/04

U.S. Cl. 333—166

29 Claims



1. Adaptive filter means comprising: input means for supplying an input signal, decorrelation means connected to said input means for producing a decorrelated signal, filter means for providing a filtered output signal, combining means for combining said input signal and said filtered output signal to produce a control signal, first scaling means connected to said combining means to receive said control signal and to said decorrelation means

to received said decorrelated signal in order to produce a first scaling signal, and second scaling means connected to receive said control signal and said first scaling signal in order to supply a second scaling signal to said filter means to alter the operating characteristics thereof.

4,791,391

# **PLANAR FILTER CONNECTOR HAVING THICK FILM CAPACITORS**

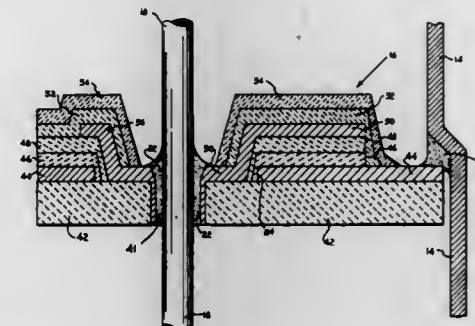
Thomas D. Linnell, Mechanicsburg; Arthur T. Murphy, Hershey, and Frederick J. Young, Bradford, all of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 480,593, Mar. 30, 1983, abandoned. This application Dec. 23, 1985, Ser. No. 812,301

Int. Cl.<sup>4</sup> H01P 13/648

U.S. Cl. 333—184

14 Claims



1. In an electrical filter connector having a conductive housing, a filter element enclosed within the housing and electrically conductive pins mounted in the filter element, the improvement whereby the filter element comprises an alumina substrate having opposed surfaces as well as through holes in which said pins are mounted and a planar array of closely spaced thick film capacitors formed by screen printing alternate conductive and dielectric layers on one of said surfaces, there being a capacitor associated with a respective pin, a first of said layers being a thick film metallization forming a ground electrode in electrical contact with the connector housing along two opposite edges, said ground electrode extending to the periphery of said substrate and being continuous except for holes sufficient in size to allow the conductive pins to pass without touching the electrode, a third of said layers being a thick film metallization forming a discrete pin electrode in electrical contact with each of the pins but not with the housing, and a second of said layers being a thick film dielectric between the electrodes.

4,791,392

# **RESONANCE SYSTEM**

Hermann Brunner, Schriesheim; Karl H. Haussner, and Werner Veith, both of Heidelberg, all of Fed. Rep. of Germany, assignors to Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V., Göttingen, Fed. Rep. of Germany

Filed Jun. 5, 1986, Ser. No. 871,087

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1985, 3520410

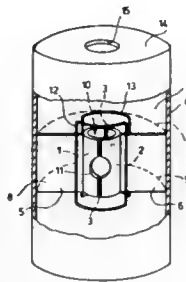
Int. Cl.<sup>4</sup> H01P 7/06; G01R 33/20

U.S. Cl. 333—219

15 Claims

1. Resonance system, in particular for use in ESR spectroscopy, comprising a loop-gap resonator including at least two metallic wall sections which define a cylindrical inner space having an axis and open ends each defining a plane which is perpendicular to said axis, each wall section having two end faces extending parallel to said axis, the end faces of adjacent wall sections facing each other and defining axial slots between

said adjacent wall sections, said loop-gap resonator having an inductance defined by the dimensions of the wall sections and a capacitance defined by the dimensions of the axial slots separating adjacent wall sections, the system further comprising a metallic shield surrounding the loop-gap resonator, the improvement comprising metallic structures connecting each one



of said wall sections to said metallic shield so that chambers are formed which are each limited by portions of said walls, of said metallic shield and of said metallic structures, and having an axis which is parallel to the axis of said cylindrical inner space, the perimeter of each of said chambers being significantly larger than the extent of the adjacent wall sections between their end faces in a plane which is perpendicular to said axis.

4,791,393

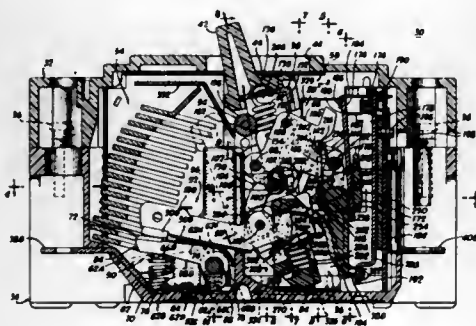
#### MOLDED CASE CIRCUIT BREAKER WITH MOVABLE UPPER ELECTRICAL CONTACT POSITIONED BY TORSION SPRINGS

Robert H. Flick, Brighton Township, Beaver County, and Walter K. Huffman, Towamencin Township, Montgomery County, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 562,603, Dec. 19, 1983, abandoned.  
This application Dec. 9, 1987, Ser. No. 131,273  
Int. Cl.<sup>4</sup> H01H 77/10

U.S. Cl. 335—16

17 Claims



1. An electrical circuit breaker comprising a first movable electrical contact having a base portion and an elongated stop pin fixedly secured to said base portion, a second electrical contact and operating means for moving said first and second electrical contacts into a CLOSED position and into an OPEN position, said operating means comprising a rotatable cross bar having an enclosed opening or pocket formed therein, said operating means further including means for retaining said base portion of said first electrical contact in said opening, said retaining means including biasing means disposed in said opening for biasing said base portion into contact with an interior surface of said cross bar for enabling rotational movement of said first electrical contact in unison with said cross bar, said retaining means and said

opening being physically configured to enable the rotational movement of said first electrical contact substantially independently of said cross bar upon the occurrence of a high level short circuit or fault current condition, said biasing means comprising a torsion spring having a first elongated torsion spring arm for transferring spring force from said torsion spring to said base portion through said first spring arm being disposed in physical contact with said stop pin, said stop pin being movable along the length of said first spring arm in a direction away from the fulcrum of said torsion spring upon the occurrence of said high level short circuit or fault current condition to reduce the spring force applied by said torsion spring to said first electrical contact.

4,791,394

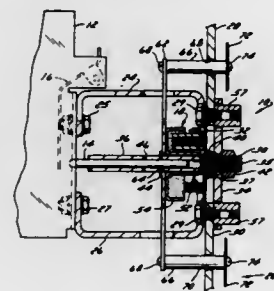
#### SENSOR-TRIPPER APPARATUS FOR A CIRCUIT INTERRUPTER

Harvey W. Mikulecky, Oconomowoc, Wis., assignor to RTE Corporation, Brookfield, Wis.

Filed Aug. 31, 1987, Ser. No. 91,187  
Int. Cl.<sup>4</sup> H01H 71/10

U.S. Cl. 335—174

20 Claims



1. A sensor-tripper apparatus for tripping a trip lever of a circuit interrupter, said apparatus comprising a housing, a trip rod mounted in said housing and being movable into engagement with the trip lever for the circuit interrupter, a thermally responsive member having a predetermined Curie temperature and having means for connecting in series a primary circuit for sensing fault currents, a magnet assembly operatively connected to said trip rod and being positioned to be magnetically attracted to said member, means biasing said magnet assembly away from said member when the temperature of said member reaches its Curie temperature, whereby said magnet assembly will move said trip rod into engagement with the trip lever, a magnetic disc assembly mounted on said trip rod and being responsive to a high fault current in said primary circuit to move said trip rod independently of said magnet assembly into engagement with said trip lever.

4,791,395

#### MAGNETIC CORE APPARATUS AND METHOD OF CONSTRUCTING THE SAME

Tony R. Henderson, Sr., Bluefield, W. Va., assignor to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.

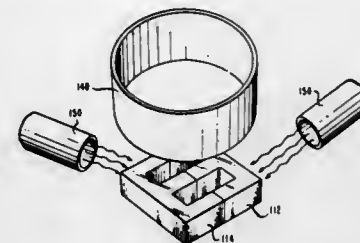
Filed Aug. 14, 1986, Ser. No. 895,989  
Int. Cl.<sup>4</sup> H01F 27/26, 41/02

U.S. Cl. 336—210

4 Claims

1. A magnetic core comprising:  
a first core component,  
a second core component,

the first and second core components juxtaposed with cross sections of flux paths of the first and second core components in direct physical contact in order to form at least one continuous closed flux path through the first and second core components as combined,



a continuous strip of heat shrinkable elastomer material positioned to encircle a perimeter of the first and second core components as juxtaposed, the continuous strip of heat shrinkable elastomer material having been heated so as to shrink and forcefully hold the first and second core components together as juxtaposed.

4,791,396

#### COLOR IMAGE SENSOR

Jun-ichi Nishizawa, 6-16, Komegafukuro 1-chome; Takashige Tamamushi, 3-8, Tsunogoro 1-chome, both of Sendai-shi, Miyagi, and István Bársony, Hamamatu, all of Japan, assignors to Jun-ichi Nishizawa; Takashige Tamamushi, both of Miyagi and Research Development Corporation, Tokyo, all of Japan

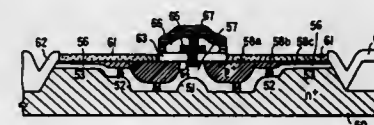
PCT No. PCT/JP84/00606, § 371 Date Aug. 28, 1985, § 102(e) Date Aug. 28, 1985, PCT Pub. No. WO85/03166, PCT Pub. Date Jul. 18, 1985

PCT Filed Dec. 21, 1984, Ser. No. 772,338

Claims priority, application Japan, Dec. 29, 1983, 58-249546  
Int. Cl.<sup>4</sup> H01L 29/80

U.S. Cl. 357—22

3 Claims



1. A photodetector-type color image sensor formed by a static induction transistor, comprising:  
an n<sup>+</sup>-type buried layer, forming one of a drain and a source region;  
a high resistivity i-type layer formed above said n<sup>+</sup>-type buried layer;  
a p-type region, formed on said i-type layer, forming a gate having a surface area A<sub>i</sub> for selectively detecting light of a specific wavelength λ<sub>i</sub> (where i=1, 2, 3, corresponding to blue, green and red light) and a total area A<sub>tot</sub> of the gate being defined as follows:

$$\frac{A(\lambda_i)}{A_{tot}} = \eta(\lambda_i) \frac{1}{1 - R(\lambda_i)}$$

where e=2.718, η(λ<sub>i</sub>) is a required quantum efficiency for the specific wavelength λ<sub>i</sub>, R(λ<sub>i</sub>) is a refractive index for the specific wavelength λ<sub>i</sub> and A<sub>tot</sub>=A(λ<sub>1</sub>)+A(λ<sub>2</sub>)+A(λ<sub>3</sub>), said p-type region being divided into areas for detecting light of three different wavelengths, arranged in a honeycomb-like pattern, the p-type region having a

diffusion depth x<sub>jp</sub>+ and a depletion width W<sub>i</sub> between the gate and said n<sup>+</sup>-type buried layer selected close to x<sub>jp</sub>+ = 0.2 μm, 0.5 μm, 1.3 μm

and

W<sub>i</sub>=0.4 μm, 0.9 μm, 2.3 μm

for blue, green and red light, respectively, so that photo-detection sensitivity of each of the wavelengths is maximum, the area of the gate for detecting green light being at least 1.6 times larger than either of the areas of the gate for detecting red and blue light.

4,791,397

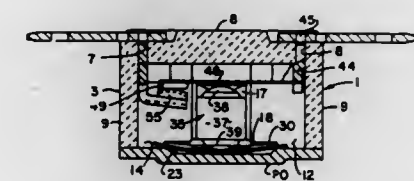
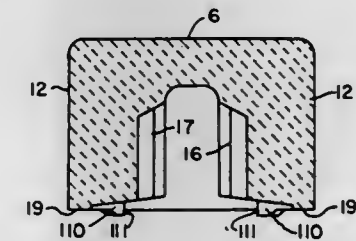
#### THERMOSTATIC SWITCH CONSTRUCTION

Gordon K. Wells, Mansfield, Ohio, assignor to Therm-O-Disc, Incorporated, Mansfield, Ohio

Filed Jan. 30, 1987, Ser. No. 68,617  
Int. Cl.<sup>4</sup> H01H 37/04

U.S. Cl. 337—354

14 Claims



1. In a snap-acting thermostat having snap disc means; switch means including stationary contact support means and a stationary contact supported thereby and a movable contact support arm and a movable contact supported thereby; an actuator mounted for translation by said disc means and operatively connecting said disc and said movable contact, and a case housing said snap disc means, stationary contact, movable contact and actuator, said case having a top wall, side walls and end walls, and an open bottom, and a closure closing the open bottom of said case, the improvement comprising interior side walls of said case on either side of said contacts, guide means in the form of guide channels in and integral with said side walls, said guide means facing one another and being on opposite sides of, spaced from and wholly outboard of said movable contact arm and spaced from one another with respect to said movable contact arm, said actuator having a part, substantially circular in section, extending within a compass of said guide means outboard of said contacts, said guide means constituting a sole guide for said actuator, and said case and closure constituting a complete enclosure of only two separate parts.



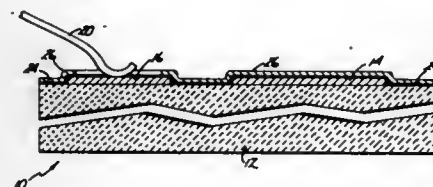
4,791,398

**THIN FILM PLATINUM RESISTANCE THERMOMETER WITH HIGH TEMPERATURE DIFFUSION BARRIER**

Fred C. Sittler, Victoria, and Adrian C. Toy, Eden Prairie, both of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.  
Filed Feb. 13, 1986, Ser. No. 829,279  
Int. Cl.<sup>4</sup> H01C 3/04, 7/02

U.S. Cl. 338—25

26 Claims U.S. Cl. 340—59



1. A temperature sensor comprising:
  - a. an electrically insulating substrate;
  - a. a resistance temperature sensing element formed of platinum on a first surface of the substrate;
  - a. a benign dielectric layer covering the temperature sensing element; and
  - a. a barrier layer overlying the dielectric layer which resists diffusion of contaminants into the platinum while permitting diffusion of oxygen through the barrier layer such that the platinum is protected from contamination.

4,791,399

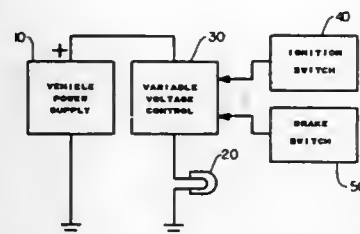
**VEHICLE STOP LAMP SYSTEM**

Michael J. Flanagan, and Michael Sivak, both of Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Filed May 30, 1986, Ser. No. 869,184  
Int. Cl.<sup>4</sup> B60Q 1/44

U.S. Cl. 340—71

17 Claims



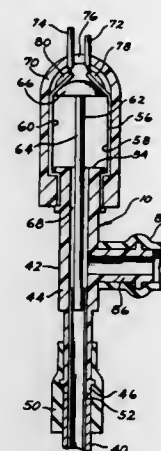
1. A vehicle stop lamp system comprising:
  - lamp means for producing an output luminance having a luminance magnitude responsive to application of a lamp input electrical signal having a magnitude parameter greater than a predetermined threshold signal level, said lamp means having a predetermined luminance magnitude characteristic responsive to said magnitude parameter of said lamp input electrical signal;
  - brake switch means having first and second states selected in response to the application of a braking force to the vehicle for controlling said lamp input electrical signal; and
  - signal control means responsive to said brake switch means for applying a first lamp input electrical signal having a magnitude parameter which is greater than zero and less than said predetermined threshold signal level when said brake switch means is in said first state, and applying a second lamp input electrical signal having a magnitude parameter which is greater than said predetermined threshold signal level when said brake switch means is in said second state.

4,791,400

**REMOTE CONTROL FOR ENGINE OIL LEVEL INDICATOR**

Leroy Burks, 5401 Ilex Ave., and Clarence E. Burks, 10202 Watterson Trail, both of Louisville, Ky. 40213  
Filed Feb. 24, 1987, Ser. No. 17,821  
Int. Cl.<sup>4</sup> B60Q 1/00

3 Claims



1. A remote control for an engine oil level indicator assembly for an engine for use with the dipstick assembly thereof, said indicator comprising:
  - a. a tube within the oil reservoir of the engine which is assembled to the dipstick assembly and terminates at its lower end at an oil level which represents approximately one quart low;
  - b. an air valve assembly comprised of a T-shaped housing where the head of the T is vertically disposed, the lower end of the T-head being provided with a rigid first tube means that is joined to the dipstick assembly, the upper end of the T-head being provided with an electrical switch and support for the vertical movement therein of an air-actuated switch connector, the base of the T-shaped housing being disposed horizontally and being provided with a flexible second tube means joined between it and the said manually operated plunger wherein said electrical switch is connected to an electrical circuit containing a source of electrical current;
  - c. whereby the oil level indicator assembly is operated when a manually-operated plunger means is caused to increase the air pressure within the said air valve assembly so as to cause the said switch connector to function and close the electrical switch; and
  - d. wherein the said manually operated plunger means is adapted to be associated with a vehicle dashboard within reach of a driver of the vehicle and said electrical circuit includes an illumination device that is visible when the driver operates the said plunger.

4,791,401

**HIGH LEVEL REAR BRAKE LAMP AND ALTERNATING DIRECTIONAL LAMPS**

William A. Heldman, Jr., 4604 Robbins, San Diego, Calif. 92122  
Continuation-in-part of Ser. No. 387,457, Jun. 11, 1982, Pat. No. 4,638,296. This application Jan. 16, 1987, Ser. No. 3,863  
Int. Cl.<sup>4</sup> B60Q 1/26

U.S. Cl. 340—71

5 Claims

1. An elevated level rear brake lamp and directional lamps for an automotive vehicle, said automotive vehicle having conventional turn and brake indicator lamps on each side of said vehicle positioned below said elevated rear brake lamp and directional lamps, a source of voltage, a turn indicating

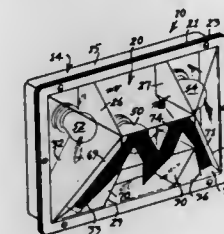
4,791,402

**FRONT SIGNAL LIGHT FOR AUTOMOTIVE VEHICLE**

Ernest L. Vaughn, 314 Sanders Ferry Rd., Hendersonville, Tenn. 37075  
Filed Mar. 19, 1987, Ser. No. 27,728  
Int. Cl.<sup>4</sup> B00Q 1/26

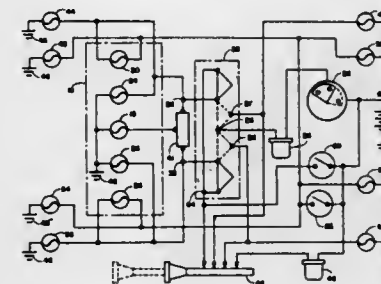
U.S. Cl. 340—74

12 Claims



switch for indicating right and left vehicle turns, a flasher element connected between said source of voltage and said turn signal switch, head lamps and turn signal lamps on each side of the front of said vehicle, combination stop and turn indicator lamps and tail lamps on each side of the rear of said vehicle, a head lamp activation switch positioned between said source of voltage and the head and tail lamps on each side of the rear of said vehicle and a hazard switch connected to said combined stop and turn indicator lamps, the invention comprising:

- a. a boxed shaped housing with an open side and an upper surface slanting downwardly and rearwardly toward a bottom surface;
- five lamps positioned within said housing;
- four divider walls within said housing for isolating the illumination from each of said plurality of lamps from each other within said housing;
- said five lamps comprise first and second lamps, third and fourth lamps, said first and second lamps and said third and fourth lamps being positioned on opposite ends of said housing separated by a fifth centrally positioned lamp, said first, second, third and fourth lamps are of an equal level of illumination with the fifth lamp having a substantially greater level of illumination than said first, second, third and fourth lamps;
- said first lamp being connected in parallel with said com-



- bined stop and turn indicator lamp on the left side of the vehicle;
- said fourth lamp being connected in parallel with said combined stop and turn indicator lamp on the right side of the vehicle;
- said second lamp being connected in series between said tail lamp and said combined stop and turn indicator lamp on the right side of the vehicle;
- said third lamp being connected in series between said tail lamp and said combined stop and turn indicator lamp on the left side of the vehicle; and
- an isolation means connected between said turn indicating switch and said fifth lamp for isolation of said source of voltage between the lighting circuits of the left and right side of the vehicle;
- whereby when the taillights of the vehicle are on said second and third lights are activated; when the taillights are on and the brakes are applied said first, fourth and fifth lights are activated and said second and third lights are deactivated; and when the taillights are on, the brakes are applied and the turn signal is activated, the two outer lamps on the side of the housing to which a turn is being made alternately flash on and off with respect to one another, the center lamp and the lamp positioned adjacent thereto on the opposite side of the housing are steadily illuminated, and the outermost lamp on the opposite side of the housing is deactivated.

1. A signal light device for the front end of an automotive vehicle, comprising:

- (a) a lamp housing having a light reflective back wall, vertically spaced top and bottom walls projecting forward from said back wall, left and right side portions and a front portion,
- (b) a pair of opposed side chamber walls within said lamp housing projecting downward from said top wall and defining a central lamp chamber,
- (c) top and bottom right passage walls defining a right light passageway intercepting and diverging downward from said central lamp chamber,
- (d) top and bottom left passage walls defining a left light passageway intercepting and diverging downward from said central lamp chamber,
- (e) illuminating means within said central lamp chamber for projecting light forward through said front portion and through said right and left light passageways,
- (f) all said passage walls terminating in front edges, the front edges of both said bottom passage walls projecting farther forward than the corresponding portions of the front edges of both said corresponding top passage walls,
- (g) each of said bottom passage walls having light reflective surfaces to reflect light in said corresponding passageways laterally outward, to the right and left of said lamp housing, and
- (h) mounting means on said lamp housing for supporting said lamp housing on the front end of an automotive vehicle.

4,791,403

**LOG ENCODER/DECODER SYSTEM**

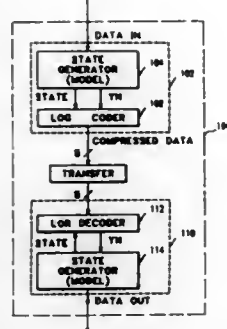
Joan L. Mitchell, Ossining; William B. Peenebaker, Carmel, and Gerald Coertzel, White Plains, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.  
Continuation of Ser. No. 805,157, Dec. 4, 1985. This application Jul. 28, 1987, Ser. No. 80,187  
Int. Cl.<sup>4</sup> H03M 7/00

U.S. Cl. 341—51

17 Claims

1. A machine-implemented method of compressing data where successive binary decisions are normally encoded to a point in a range R along a number line, wherein one decision outcome has a probability Q and the other decision outcome has a probability P and wherein the range R normally shrinks in magnitude with each successive encoded decision to a new range product of either R multiplied by Q (R\*Q) or R multiplied by P (R\*P), the method comprising the steps of:
  - producing, in a state generator, a string of decisions and a respective context state corresponding to each produced decision; and
  - logarithmically encoding the string of decisions and context states into a compressed form including the steps of:
    - representing the range and probability values of the new range product in the logarithmic domain, wherein each

such logarithmic value has a finite precision mantissa; and



re-computing a next range R in the logarithmic domain as the sum of the logarithm of the current R (log R) plus the logarithm of either P or Q (log P or log Q) depending on the decision outcome being encoded.

**4,791,404**  
**PREDICTIVE TIME BASE CONTROL CIRCUIT FOR A WAVEFORM SYSTEM**  
Allen L. Hollister, Beaverton, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.  
Continuation of Ser. No. 835,416, Mar. 3, 1986, abandoned. This application Nov. 6, 1987, Ser. No. 119,289  
Int. Cl.<sup>4</sup> H03M 1/36

U.S. Cl. 341-122

16 Claims



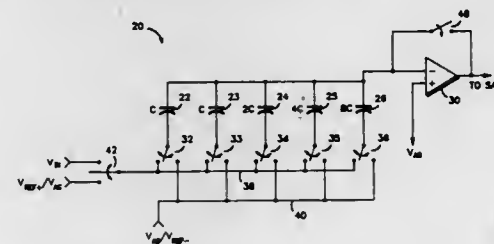
1. A method for controlling the timing of waveform sampling and data storage by a waveform sampling system of the type which samples an input waveform, converts a waveform sample into representative digital data, and stores the representative digital data in an addressable memory, the method comprising the steps of:  
generating a triggering signal in response to a triggering event in the input waveform to be sampled;  
generating a first periodic clock signal of constant frequency commencing upon generation of said triggering signal;  
generating a periodic sampling control signal in response to said first periodic clock signal, said periodic sampling control signal being delayed from said first periodic clock signal by an adjustable delay time;  
producing a periodic write control signal in delayed response to said periodic sampling control signal;  
applying said periodic write control signal to said addressable memory for controlling timing of storage by said addressable memory of digital data representative of waveform samples produced by said waveform sampling system in response to said periodic sampling control signal; and  
providing address data for addressing said addressable memory, said address data being incremented by an incrementing amount in response to each period of said periodic write control signal wherein the step of generating said periodic sampling control signal comprises the steps of:  
generating a second periodic clock signal having a frequency equal to that of said first periodic clock signal, said second periodic clock signal being phase skewed from said first periodic clock signal by an adjustable phase angle;  
generating an enabling signal after said time interval, said

time interval being determined by counting periods of said first periodic clock signal following said triggering signal; generating a third periodic clock signal following generation of said enabling signal by frequency dividing said second periodic clock signal; and  
combining said second and third periodic clock signals to form said periodic sampling control signal.

**4,791,405**  
**DATA CONVERTER FOR DIRECTLY PROVIDING OUTPUTS IN TWO'S COMPLEMENT CODE**  
Mathew A. Rybicki, Austin; James A. Miller, Pflugerville, both of Tex., and Ted A. Biggs, deceased, late of Houston, Tex. (by Jane G. Biggs, James K. Biggs, Jr., heirs), assignors to Motorola, Inc., Schaumburg, Ill.  
Filed Nov. 28, 1986, Ser. No. 935,867  
Int. Cl.<sup>4</sup> H03M 1/38

U.S. Cl. 341-158

7 Claims



1. In a data conversion system for receiving an analog input voltage and converting the received analog input voltage to a digital output code in a predetermined binary code, a method of configuring the data conversion system to directly provide the predetermined binary code as two's complement binary code, comprising the steps of:  
receiving the input voltage;  
comparing the input voltage with a predetermined first reference voltage to provide an output sign bit of the digital output voltage; and  
selectively coupling first and second reference voltage terminals of the data conversion system between either a first pair of reference voltages or a second pair of reference voltages in response to the output sign bit, the first pair of reference voltages comprising a second reference voltage coupled to the first reference voltage terminal and the first reference voltage coupled to the second reference voltage terminal, and the second pair of reference voltages comprising the first reference voltage coupled to the first reference voltage terminal and a third reference voltage coupled to the second reference voltage terminal.

**4,791,406**  
**MONOLITHIC INTEGRATED DIGITAL-TO-ANALOG CONVERTER**  
Soenke Mehrgardt, March, and Ulrich Theus, Gundelfingen, both of Fed. Rep. of Germany, assignors to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany  
Filed Jul. 16, 1987, Ser. No. 74,205  
Claims priority, application European Pat. Off., Jul. 21, 1986, 86109971.1; Mar. 14, 1987, 87103742.0  
Int. Cl.<sup>4</sup> H03M 1/74

U.S. Cl. 341-144

8 Claims

1. A monolithic integrated digital-to-analog converter comprising:  
a code converter having an input to which a multi-bit digital input signal is provided, said code converter providing a coded output signal for each of a plurality of sample periods determined by a sampling signal, said coded output signal comprising a plurality of binary outputs, a first

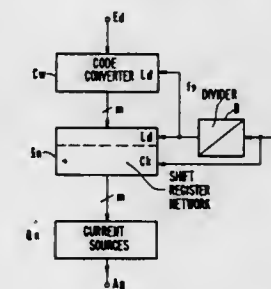
number of said outputs having a first binary condition and a second number of said outputs having a second binary condition, said first number equal to the numeric value of said digital input signal;  
a first shift register having a plurality of inputs connected to said code converter, said first shift register being loaded with said coded output signal from said code converter at a rate controlled by said sampling signal, the contents of said first shift register being shifted at a rate controlled by a clock signal having a frequency which is a multiple of the frequency of said sampling signal, said shift register providing a plurality of binary output signals on a corresponding plurality of output lines, said binary output

sequences, and (2) each subsequent occurrence of a logic "1" or logic "0" in digital data stream D1 in encoded into a level opposite the immediately prior level representing a logic "1" or logic "0" in each of the binary signal sequences S1 and S2.

**4,791,408**  
**KEYBOARD FOR ONE-HAND OPERATION**  
Paul Heusinkveld, American Consulate-Jeddah APO, New York, N.Y. 09697-0002, assignor to Ted Scudder, Arlington Heights, Ill. and Paul Heusinkveld, Arlington, Va.  
Filed May 14, 1987, Ser. No. 49,622  
Int. Cl.<sup>4</sup> G06F 3/02

U.S. Cl. 340-365 R

5 Claims

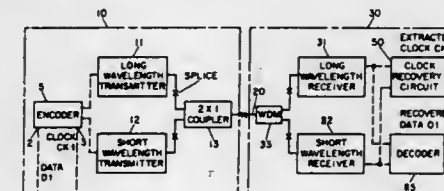


signals of said shift register having binary levels determined by said coded output signal from said code converter and changing as said shift register is shifted; and  
a plurality of current sources connected to said output lines of first shift register, said current sources being selectively activated in accordance with said binary levels of said output lines of said first shift register, each of said current sources being turned on for the same time duration in each of said sample periods, the number of said current sources turned on at any one time determined by said first number, said current sources being coupled to a summation stage whose output is the output of said digital-to-analog converter.

**4,791,407**  
**ALTERNATE MARK/SPACE INVERSION LINE CODE**  
Paul R. Prucnal, New York, N.Y., and Philippe A. Perrier, Viroflay, France, assignors to Trustees of Columbia University in the City of New York, New York, N.Y.  
Filed Aug. 4, 1987, Ser. No. 81,235  
Int. Cl.<sup>4</sup> H03M 5/04

U.S. Cl. 341-68

8 Claims



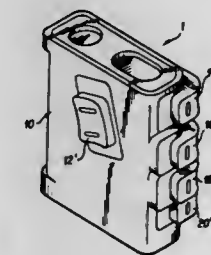
1. In a communication system for information in the form of a stream of binary digital data D1 occurring at a predetermined data rate, transmitting means comprising:  
means for encoding said digital data stream into first and second binary signal sequences S1 and S2 having predetermined first and second logic levels, said encoding means responding to said digital data stream such that (1) a first occurrence of logic "1" in said digital data stream D1 is encoded into the same logic level in both said first and second binary signal sequences and a first occurrence of a logic "0" in said digital data stream D1 is encoded into opposite logic levels in said first and second binary signal

**4,791,409**  
**SECURITY SYSTEM FOR ELECTRICAL APPLIANCES AND OTHER ITEMS WITH ELECTRICAL CIRCUITRY**  
Philip L. Reid, Rte. 2, Box 422, Duncan, S.C. 29334  
Filed Apr. 13, 1987, Ser. No. 37,701  
Int. Cl.<sup>4</sup> G08B 13/22

U.S. Cl. 340-539

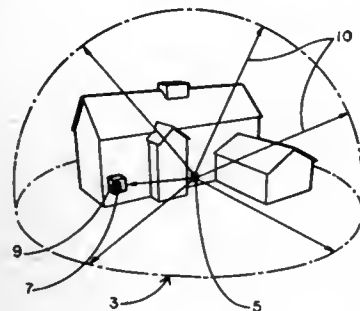
3 Claims

1. A security system for electrical household appliances having electrical circuitry, comprising:  
a signal source emitting a coded signal within a specified zone about said household; and



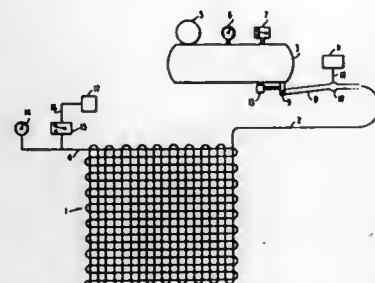


a receiver for said emitted signal attached to the electrical circuitry of said appliance to render said appliance operable inside said specified zone and inoperable outside said zone.



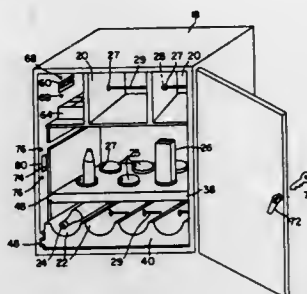
ble inside said specified zone and inoperable outside said zone.

**4,791,410**  
**ALARM SYSTEM**  
Erik Larsson, Västervik, Sweden, assignor to Safe Bridge AB, Västervik, Sweden  
PCT No. PCT/SE86/00341, § 371 Date Mar. 17, 1987, § 102(e)  
Date Mar. 17, 1987, PCT Pub. No. WO87/00666, PCT Pub. Date Jan. 29, 1987  
PCT Filed Jul. 22, 1986, Ser. No. 44,278  
Claims priority, application Sweden, Jul. 26, 1985, 8503621  
Int. Cl.<sup>4</sup> G08B 13/00, 13/20  
U.S. Cl. 340—550 8 Claims



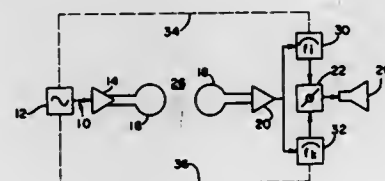
1. An alarm system, comprising: a signal line (2, 4) for indicating damage to and/or an attempt to interfere with said line, said line being suitable for incorporation in a net-structure particularly intended for use as a barrier net for denying foreign objects, such as underwater vessels, frogmen and the like access to water passageways, channels, etc., wherein the signal line contains a fluid and is connected to sensors (8-11) constructed to generate an alarm signal in response to a change in pressure and/or in the flow conditions in said line; the signal line including a flexible tubing constructed to prevent the flow channel extending therethrough from being completely closed by squeezing or compression forces, said fluid comprising a coloured indicating agent subjected to a pressure of such magnitude that in the event of perforating damage to the tubing, such as a fracture or rupture, the agent will exit from the tubing and indicate visually the location of the fracture signalled by one of the sensors, and the indicating agent having a density below that of water, so that when the alarm system is used under water said agent will flow to the surface of the water.

**4,791,411**  
**MANUAL FREE-ACCESS VENDING MACHINE**  
Marcel J. H. Staar, Brussels, Belgium, assignor to Staar Development Co., S.A., Belgium  
Filed Jan. 19, 1987, Ser. No. 63,950  
Claims priority, application Belgium, Jun. 20, 1986, 216.813  
Int. Cl.<sup>4</sup> G08B 21/00, 13/18  
U.S. Cl. 340—568 21 Claims



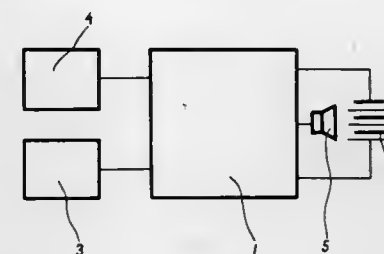
1. A manual free-access vending machine allowing unconstrained direct access to a plurality of different outer shaped articles, said vending machine comprising:  
a housing;  
support means provided in said housing and defining fixed reserved locations from which corresponding individual articles can be removed and replaced;  
detection means disposed at each of said reserved locations to detect statuses corresponding to the presence or absence of each of said individual articles in said reserved locations and to generate signals representative thereof; and  
processing means receiving the signals from said detection means to identify the status at each of said reserved locations and to register the presence or absence of an article at each of said reserved locations.

**4,791,412**  
**MAGNETIC ARTICLE SURVEILLANCE SYSTEM AND METHOD**  
Roger Brooks, North Palm Beach, Fla., assignor to Controlled Information Corporation, Lake Park, Fla.  
Filed Jan. 28, 1988, Ser. No. 149,579  
Int. Cl.<sup>4</sup> G08B 13/18  
U.S. Cl. 340—572 7 Claims



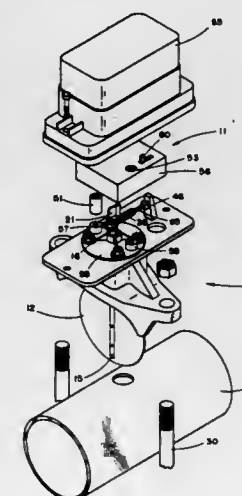
1. An article surveillance system, comprising:  
means for generating and transmitting reference signals at a fundamental frequency in a detection zone;  
a plurality of coded markers, each marker having means for generating harmonic signals of respective and predetermined phase shifts responsive to the reference signals;  
means for receiving the phase shifted harmonic signals generated by coded markers in the detection zone;  
means for determining the relative phase shift between at least two of the harmonic marker signals; and  
means for generating a control signal responsive to identification of a valid code by the determining means.

**4,791,413**  
**SOIL MOISTURE DETECTOR WITH LIGHT ACTIVATED AUDIO ALARM INHIBITOR**  
Kazimierz E. Lyczek, 428 Quail Ridge Cir., Spartanburg, S.C. 29303  
Filed Jul. 15, 1987, Ser. No. 78,126  
Int. Cl.<sup>4</sup> G08B 21/00  
U.S. Cl. 340—604 2 Claims



1. A soil moisture detector with light activated audio alarm inhibitor for use in household plant care by means of generating audio sound when moisture level is too low comprising: a source of DC electric current means, a conductivity sensor means to be inserted permanently into the soil, a photoelectric light sensor means, an ON-OFF controllable audio generator means having one input connected to the conductivity sensor and the other input connected to the photoelectric light sensor, wherein said ON-OFF controllable audio generator means includes means for generating audio frequency when both light sensor senses daylight (or any light whose intensity is equal to daylight) and conductivity sensor senses low conductivity of the soil.

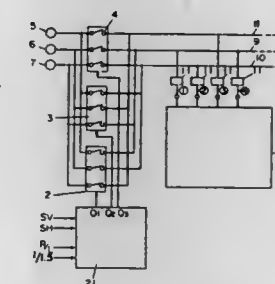
**4,791,414**  
**WATER-FLOW DETECTOR**  
Herbert C. Griess, Lincoln, Nebr., assignor to Pittway Corporation, Northbrook, Ill.  
Filed Oct. 15, 1985, Ser. No. 787,311  
Int. Cl.<sup>4</sup> G08B 21/00  
U.S. Cl. 340—606 5 Claims



1. A water-flow detector comprising:  
a source of radiation;  
radiation detector means for producing an electrical output related to the radiation incident upon it;  
means responsive to said water-flow for interrupting at least

a portion of said radiation passing from said radiation source to said detector means;  
means for producing timing signals;  
a counter responsive to said electrical output for counting said timing signals;  
means responsive to said counter for providing an indication of said water flow after a count sufficiently long to avoid nuisance alarms due to transient flow conditions; and  
means for stopping the advance of said counter upon provision of said indication of water flow.

**4,791,415**  
**DIGITAL DRIVING TYPE COLOR DISPLAY DEVICE**  
Koushiro Takahashi, Fujisawa, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan  
PCT No. PCT/JP86/00035, § 371 Date Sep. 29, 1986, § 102(e)  
Date Sep. 29, 1986, PCT Pub. No. WO86/04441, PCT Pub. Date Jul. 31, 1986  
PCT Filed Jan. 29, 1986, Ser. No. 521,008  
Claims priority, application Japan, Jan. 29, 1985, 60-14696  
Int. Cl.<sup>4</sup> G09G 3/34  
U.S. Cl. 340—701 3 Claims

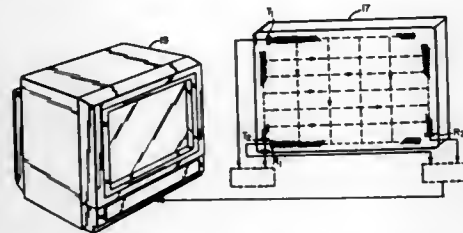


1. A digital color display device comprising:  
a display unit wherein display elements for displaying respective pixels, each pixel displaying one of three colors, are disposed as a matrix which is shifted by 1 pixel or 1.5 pixel in every row, and  
a driving circuit for successively switching three respective chrominance signals, each being one of the three colors, and supplying them to a driving electrode of each column of said display unit, said driving circuit including switching means for switching between a first supplying mode for alternately supplying each of the chrominance signals of the three colors by successively switching all the chrominance signals and a second supplying mode for alternately supplying two of the chrominance signals from the three chrominance signals of the three colors, and further including reverse switching means for reversing a supplying order of said three or said two chrominance signals by said switching means.

**4,791,416**  
**TOUCH CONTROL SYSTEM FOR CONTROLLABLE APPARATUS**  
Robert Adler, Northfield, Ill., assignor to Zenith Electronics Corporation, Glenview, Ill.  
Continuation-in-part of Ser. No. 698,306, Feb. 5, 1985, Pat. No. 4,700,176. This application Jul. 12, 1985, Ser. No. 755,036  
The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> G09G 3/00

U.S. Cl. 340—712 21 Claims  
1. For use with touch control apparatus, a system for recognizing touch positions along a predetermined axis on a surface associated with said apparatus comprising:  
a substrate positioned at a location remote from said apparatus and having a surface capable of propagating surface

acoustic waves and being so characterized that a touch on said substrate surface causes a perturbation, in the form of at least a partial absorption of energy, of a surface wave propagating through the region of the touch;  
input surface wave transducer means coupled to said substrate surface for launching a burst of surface waves on said surface;  
output surface wave transducer means coupled to said substrate for receiving said burst of surface waves;  
surface wave redirecting means coupled to said substrate surface for redirecting surface wave burst components derived from said launched surface wave burst across said substrate surface to said output transducer means along a

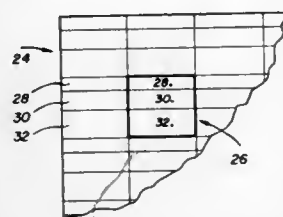


plurality of paths of different lengths which are respectively associated with different positions along said axis on said substrate surface; and  
circuit means coupled to said input and output transducer means for initiating surface wave bursts on said substrate surface and for detecting touch-induced perturbations of received wave burst components, said circuit means including means for determining, by an analysis based on the transit time of the detected perturbed wave burst component, which of said plurality of paths was traversed by the touch-perturbed wave burst component and thus the location of the touch along said axis of said substrate surface.

#### 4,791,417 DISPLAY DEVICE

Tadeusz Bobak, 540 San Vicente Blvd., Apt. 4, Santa Monica, Calif. 90405  
PCT No. PCT/US84/00324, § 371 Date Nov. 1, 1984, § 102(e) Date Nov. 1, 1984, PCT Pub. No. WO84/03577, PCT Pub. Date Sep. 13, 1984  
PCT Filed Mar. 1, 1984, Ser. No. 713,409  
Claims priority, application Switzerland, Mar. 1, 1983, 1115/83

Int. Cl.<sup>4</sup> G09G 3/36  
U.S. Cl. 340—784



1. A large panel display device, comprising:  
a viewable panel having a front surface for displaying an image thereon and a rear side opposing to said front surface;  
said front surface being comprised of a plurality of display elements, each display element including a plurality of liquid crystal display cells, each liquid crystal display cell having a viewable reflective surface which is different in size than the remaining reflective surfaces of the other display cells in said display element and which is operable

in a first mode wherein light directed at said reflective surface is reflected by said surface and in a second mode wherein light directed at said reflective surface is absorbed at said reflective surface;  
said image being produced solely by the reflection of light from said front surface and said large panel display device lacking and requiring no rear lighting for illuminating said front surface whereby said large panel display device is capable of being positioned against an opaque support;  
control means for independently controlling said first and second mode of operation of each liquid crystal display cell, said control means providing energizing signals to said cells having a variable phase shift adjustable between 0° and 180°; and  
support means for supporting said display elements to form said large panel display device.

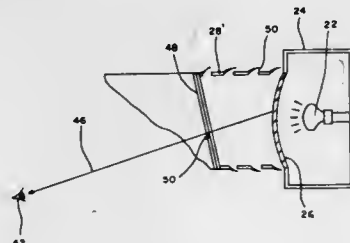
#### 4,791,418 SIGNAL LIGHT

Hideo Kawahara; Harunobu Yoshida, and Masato Hyodo, all of Osaka, Japan, assignors to Taliq Corporation, Sunnyvale, Calif.

Filed Jun. 24, 1987, Ser. No. 65,849  
Int. Cl.<sup>4</sup> G09G 3/36

U.S. Cl. 340—784

20 Claims



18. A signal light comprising:  
a light source disposed toward the rear of a casing for the signal light;  
a liquid crystal means disposed between said light source and a viewing area of the signal light for blocking or transmitting light according to a given electrical input;  
means for applying said electrical input to said liquid crystal means to transmit light when said light source is energized and for removing said electrical input to block light when said light source is de-energized;  
a substantially transparent colored plate disposed between said light source and said liquid crystal means so that light from said light source may be transmitted therethrough when said light source is energized; and  
an outer cylindrical hood extending from said casing with said liquid crystal means disposed within said hood in front of said light source and openings formed in said hood between said liquid crystal means and said light source for releasing heat therefrom.

#### 4,791,419 MICROWAVE ABSORBING MEANS

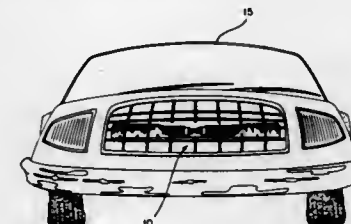
Gary R. Eubanks, 316 Westridge Dr., Raleigh, N.C. 27609  
Filed Dec. 23, 1985, Ser. No. 812,374  
Int. Cl.<sup>4</sup> H01Q 17/00

U.S. Cl. 342—1

6 Claims

1. A microwave absorbing means comprising: absorbing tube means filled with a gaseous medium for absorbing microwave radiation; antenna means electrically coupled to said absorbing tube for receiving said microwave radiation and transmitting the same to said absorbing tube, said antenna

means including a helical, electrical conductor wound about said absorbing tube means; and means for mounting said ab-



sorbing tube means on a vehicle whereby a device is provided for weakening the return signal of traffic type radar.

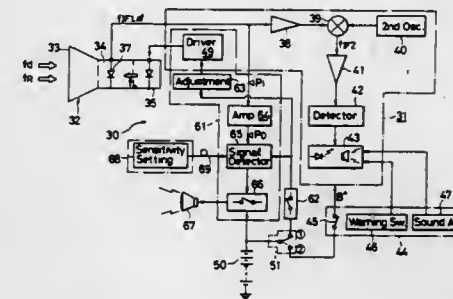
#### 4,791,420 RADAR DETECTOR/SECURITY DEVICE FOR AUTOMOBILES

Yoshihiko Baba, Noda, Japan, assignor to The Weston Corporation, Tokyo, Japan

Filed Dec. 29, 1987, Ser. No. 139,027  
Claims priority, application Japan, Jul. 23, 1987, 62-182187  
Int. Cl.<sup>4</sup> G01S 7/42, 13/56

U.S. Cl. 342—20

4 Claims



1. A car radar detector/security device comprising:  
a horn antenna structure provided with local oscillation means, a horn antenna that radiates a local oscillation frequency from the local oscillation means to the outside and receives radar waves from the outside, and a mixing chamber leading from said horn antenna, said horn antenna structure comprising means to output an intermediate frequency signal as a result of mixing in the mixing chamber an applied frequency signal with said radar wave detected by the horn antenna, means to detect a frequency signal that is reflected from a dielectric body of said local oscillation frequency radiated to the outside via said horn antenna, and means to output a low frequency signal which is a beat of said local oscillation frequency and said feedback frequency signal reflected from said dielectric body which has undergone a Doppler shift produced by the motion of said dielectric body;  
a radar wave detection circuit that detects said intermediate frequency signal output from said horn antenna structure with the detection of said radar wave and operates a warning means;  
a security circuit that detects said low frequency signal that is the beat component produced by said feedback frequency signal and operates an annunciating means; and  
a mode switching means for selecting either the radar detection circuit or the security circuit.

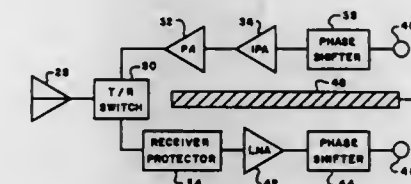
#### 4,791,421 TRANSMIT-RECEIVE MODULE FOR PHASED-ARRAY ANTENNAS

Alfred W. Morse, Ellicott City; Daniel C. Buck, Hanover, and Charles H. Granling, Jr., Ellicott City, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 10, 1986, Ser. No. 905,904  
Int. Cl.<sup>4</sup> H01Q 3/26

U.S. Cl. 342—368

18 Claims



1. A transmit-receive module for connection to radiating element positions of an active phased-array antenna system having a transmit and receive manifold system, said module comprising:

a single means for dividing a signal path between an associated radiating element and a transmit and receive manifold system into transmit and receive signal paths;  
first phase shifting means in said transmit path for shifting the phase of signals passing through said transmit path from said transmit and receive manifold system to the dividing means, said first phase shifting means having a first preselected degree of bit resolution;  
second phase shifting means in said receive path for shifting the phase of signals passing through said receive path from said dividing means to said transmit and receive manifold system, said second phase shifting means operating independently of and electrically isolated from said first phase shifting means, said second phase shifting means having a second preselected degree of bit resolution which is greater than said first preselected degree of bit resolution; and  
means for connecting said first and second phase shifting means to the manifold system of the phased-array antenna.

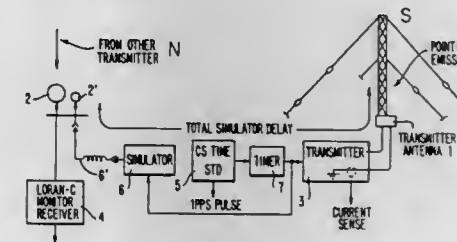
#### 4,791,422 METHODS OF AND APPARATUS FOR MEASURING TIME OF ARRIVAL OF REMOTE LORAN-C AND RELATED SIGNALS AND EFFECTIVE TIME OF TRANSMISSION OF LOCAL SIGNALS AT TRANSMITTER SITES

Robert B. Goddard, Stoneham, Mass., assignor to Megapulse Incorporated, Bedford, Mass.

Filed Jul. 14, 1986, Ser. No. 886,258  
Int. Cl.<sup>4</sup> G01S 1/24

U.S. Cl. 342—389

9 Claims



1. A method of measuring time of arrival (TOA) of Loran-C and similar signals from a remote transmitter at a local transmitter located at the same site at which the remote signal is to



be received in a receiving antenna disposed within a short distance of the antenna field of the local transmitter, that comprises, receiving at the receiving antenna the remote signal from the said remote transmitter; generating at said site a simulated Loran signal in a fixed, known time relationship to the signal locally transmitted by the local transmitter; coupling the simulated signal into the receiving antenna; measuring the time of arrival of the remote signal received in the receiving antenna from the same remote transmitter and comparing the same with the simulated signal; and clocking the simulated signal to occur in a time slot not occupied by the signal from the local transmitter.

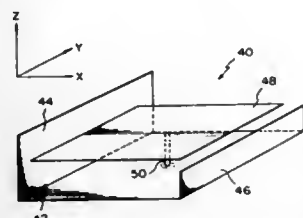
**4,791,423**  
**SHORTED MICROSTRIP ANTENNA WITH MULTIPLE GROUND PLANES**

Yukio Yokoyama, Tokyo; Yoshio Ebine, Kanagawa, and Toshio Ito, Tokyo, all of Japan, assignors to NEC Corporation and Nippon Telegraph & Telephone Corp., both of Japan  
Filed Dec. 3, 1986, Ser. No. 937,495

Claims priority, application Japan, Dec. 3, 1985, 60-271979; Dec. 3, 1985, 60-271980

Int. Cl.<sup>4</sup> H01Q 1/32  
U.S. Cl. 343—700 MS

11 Claims



1. A shorted microstrip antenna, comprising:
  - a generally rectangular radiating conductive sheet for supplying power to be radiated;
  - a first grounding conductive sheet spaced from, facing and extending generally parallel to said radiating conductive sheet;
  - a second grounding conductive sheet in contact with and extending perpendicularly to said first grounding conductive sheet, said radiating conductive sheet being connected to said second grounding conductive sheet; and
  - a third grounding conductive sheet in contact with and extending generally perpendicularly to said first grounding conductive sheet, said third grounding conductive sheet being spaced from and extending generally parallel to said second grounding conductive sheet.

**4,791,424**  
**DOPPLER RADAR KINEMETER**  
Jacques Pore, Eaubonne, France, assignor to Jeumont-Schneider Corporation, Puteaux cedex, France  
Filed Jan. 6, 1987, Ser. No. 586

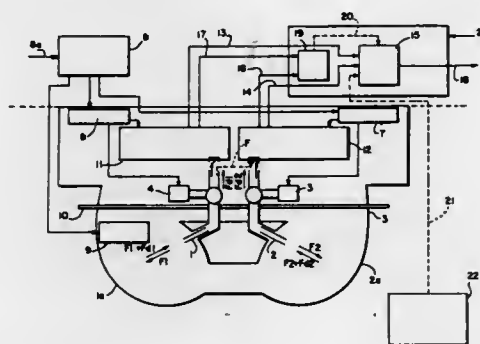
Claims priority, application France, Jan. 15, 1986, 86 00497  
Int. Cl.<sup>4</sup> H01Q 1/32

U.S. Cl. 343—711

11 Claims

1. A Doppler radar kinemeter, comprising a first Doppler radar antenna and a second Doppler radar antenna mechanically connected to one another with respective axes thereof at a predetermined angle between 60° and 120°; a first wave generator and signal processor assembly connected to said first antenna; a second wave generator and signal processor assembly independent of said first assembly and connected to said second antenna; the wave generator of said first assembly supplying ultrahigh frequency first waves of a first predetermined frequency to said first antenna, and said signal processor of said first assembly receiving the Doppler frequency of said first waves as received by said first antenna; the wave generator of said second assembly supplying ultrahigh frequency

second waves of a second predetermined frequency different from said first frequency to said second antenna, and said signal processor of said second assembly receiving the Doppler frequency of said second waves as received by said second antenna;



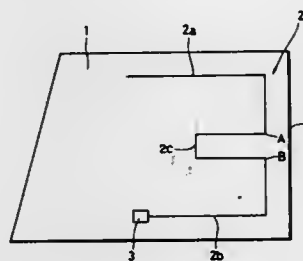
tenna; each said signal processor providing an output representing the corresponding Doppler frequency; and a computer connected to said signal processors and calculating velocity based on the respective outputs thereof.

**4,791,425**  
**WINDOW ANTENNA FOR A VEHICLE**  
Hiroshi Yotsuya; Hiroshi Kondo, both of Toyota; Kaoru Sakurai, Kawasaki; Haruori Murakami, Machida, and Hajime Murakami, Yokohama, all of Japan, assignors to Toyota Jidosha Kaisha and Nippon Sheet Glass Co., Ltd., both of Japan  
Filed May 15, 1986, Ser. No. 863,921

Claims priority, application Japan, May 20, 1985, 60-107981  
Int. Cl.<sup>4</sup> H01Q 1/32

U.S. Cl. 343—713

9 Claims



1. A window antenna mounted on a glass of a rear quarter window of a vehicle, comprising an L-shaped antenna consisting of a horizontal element and a vertical element provided along two adjacent edges of the window glass, and a coupling element provided midway along said antenna for coupling said horizontal and vertical antenna elements with phase adjustment between reception signals thereof in a specific frequency range, and a feed point connected to an open end of one of said antenna elements.

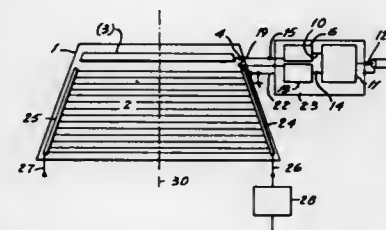
**4,791,426**  
**ACTIVE ANTENNA IN THE REAR WINDOW OF A MOTOR VEHICLE**

Heinz Lindenmeier, Planegg, and Gerhard Flachenecker, Otterbrunn, both of Fed. Rep. of Germany, assignors to Hans Kolbe & Co., Bad Salzdetfurth, Fed. Rep. of Germany  
Filed Mar. 21, 1985, Ser. No. 715,644

Claims priority, application Fed. Rep. of Germany, Mar. 21, 1984, 3410415

Int. Cl.<sup>4</sup> H01Q 1/32  
U.S. Cl. 343—713

26 Claims



1. An active antenna arranged in an electrically heated rear window of a motor vehicle to receive long-, medium-, short-, and ultra-short wave broadcasts, said rear window having a boundary conductor and a set of heating elements connected via bus bars to direct current power connections, said antenna comprising

an elongated, flat antenna element arranged in the window on a free area between said set of heating elements and said boundary conductor to receive long-, medium-, and short wave signals;

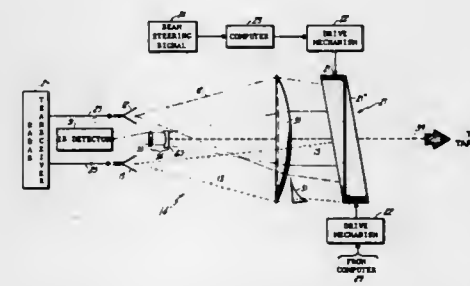
an antenna amplifier including a linear amplifying stage having a capacitive input connected to said flat antenna element for processing long-, medium- and short-wave signals, a branch circuit for processing ultra-short wave signals having an input coupled to said set of heating elements in said window acting as an antenna element for the reception of said ultra-short wave signals, and a common ground terminal connected to said boundary conductor; and

a frequency separating circuit having two inputs connected respectively to outputs of said amplifying stage and of said branch circuit to separate said long-, medium- and short-wave signals from said ultra-short wave signals and an output connected to a connector for an antenna cable.

**4,791,427**  
**MULTIMODE, MULTISPECTRAL ANTENNA**  
Peter E. Raber, Milford, and Lester H. Kosowsky, Stamford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.  
Filed Nov. 22, 1985, Ser. No. 800,938

Int. Cl.<sup>4</sup> H01Q 21/28  
U.S. Cl. 343—754

2 Claims



1. A multimode detection arrangement for the detection of remote targets electromagnetically, comprising an active feed

for transceiving electromagnetic radiation of a first selected radar spectrum bandwidth, said feed being effective for actively sourcing said radiation and receiving reflected portions of the actively sourced radiation, and refractive collimating lens means, having a collimating lens diameter, for directing and collimating radiation in said first selected radar spectrum bandwidth from said feed toward the region of said targets, wherein said arrangement further includes a detection means for detection of radiation from said targets at a second selected infrared spectrum bandwidth, said collimating lens being substantially transmissive to both of the spectrum bandwidths defining said forms of radiation; and wherein said arrangement includes a second refractive lens means disposed between said detection means and said collimating lens and substantially transmissive to radiation of said second selected infrared spectrum bandwidth and

shaped and positioned to focus radiation in said second bandwidth on said detection means, and characterized in that:

said collimating lens means is disposed on a lens axis and said active feed and said detection means are disposed along said lens axis at substantially the same position and displaced transversely from said lens axis by first and second predetermined amounts, respectively, whereby radiation focused by said collimating lens means or by said second refractive lens means into said active feed and said detection means makes corresponding first and second radiation angles with respect to said lens axis and at least one of said corresponding radiation angles is non-zero;

said arrangement includes a mechanically rotatable dual-wedge optical beam steering means having a steering means diameter substantially equal to said collimating lens diameter and having first and second rotatable wedge prisms, centered on said lens axis and controllable, under stored program control, to direct radiation from a predetermined location having a predetermined polar and azimuthal angular orientation with respect to said lens axis, into one of said active feed and said detection means, said first and second rotatable wedge prisms being transmissive to radiation in both said first and second spectrum bandwidths and independently rotatable by mechanical rotation means about said lens axis, whereby said beam steering means may selectively steer radar radiation from a predetermined angular position into said active feed by assuming a first predetermined angular configuration dependent on said radar spectrum bandwidth and said predetermined angular position and may steer infrared radiation from said predetermined angular position into said detection means by assuming a second predetermined angular configuration dependent on said infrared spectrum bandwidth and said predetermined angular position, thereby obtaining information about an object at said predetermined angular position in both the infrared and radar spectral regions.

**4,791,428**  
**MICROWAVE RECEIVING ANTENNA ARRAY HAVING ADJUSTABLE NULL DIRECTION**

Keith V. Anderson, P.O. Box 800, Black Hawk, S. Dak. 57718, assignor to Ray J. Hillenbrand and Keith V. Anderson, both of Rapid City, S. Dak.

Filed May 15, 1987, Ser. No. 50,605  
Int. Cl.<sup>4</sup> H01Q 3/00

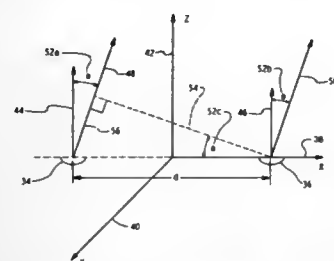
U.S. Cl. 343—758

14 Claims

1. A microwave receiving antenna array for providing maximum response to incident microwave radiation arriving from a primary receiving direction while rejecting incident microwave radiation arriving from a null-reception direction which differs from said primary receiving direction by only a small angle, comprising:

a plurality of directional antenna elements individually directed in said primary receiving direction and collectively distributed in a symmetrical pattern having a geometric

center, said plurality of directional antenna elements disposed in a plane perpendicular to said primary receiving direction, each of said plurality of directional antenna elements providing an electrical output signal representative of a component of said incident microwave radiation; a plurality of phase-shifting transmission line means having input ends and output ends, said input ends individually operably connected to a respective one of said antenna elements to accept one of said electrical output signals for presenting phase-shifted output signals at said output ends, the phase shifts introduced to said respective electrical output signals by their associated transmission line means being equal;



means for additively combining the phase-shifted output signals at the output ends of said plurality of phase-shifting transmission line means to produce a composite output signal therefrom and for delivering said composite output signal to an output transmission line means, said means for additively combining said phase-shifted output signals including impedance-matching means operably interposed between said plurality of phase-shifting transmission line means and said output transmission line means to effect an impedance match therebetween; and means for collectively rotating said plurality of directional antenna elements about an axis through said geometric center of said symmetrical pattern and parallel to said primary receiving direction thereby adjustably varying said null-reception direction.

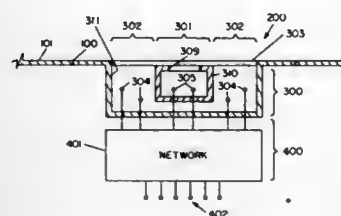
4,791,429

**MULTIMODE OMNIANTENNA WITH FLUSH MOUNT**  
Peter W. Hannan, Smithtown, N.Y., assignor to Hazeltine Corporation, Greenlawn, N.Y.

Filed May 11, 1987, Ser. No. 48,358  
Int. Cl.<sup>4</sup> H01Q 5/00

U.S. Cl. 343—770

29 Claims



1. A flush mounted, multimode antenna system using a plurality of apertures, said system comprising:  
(a) first aperture means, for providing at least two radiation pattern modes;  
(b) second aperture means, concentric with said first aperture means, for and providing at least two radiation pattern modes;  
(c) first feed system for exciting said first means;  
(d) second feed system for exciting said second means; and  
(e) circuit means associated with said second feed system, for providing an auxiliary excitation to said second aperture

means resulting in an optimized radiation pattern obtained during excitation of the first aperture means.

4,791,430

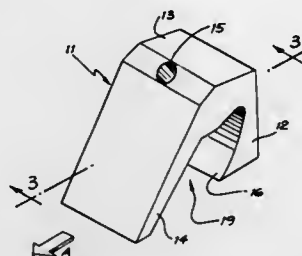
**ULTRASONIC ANTENNA**

David J. Mills, Kewdale, Australia, assignor to Agtronics Pty. Limited, Kewdale, Australia

Filed Jun. 12, 1986, Ser. No. 895,769  
Int. Cl.<sup>4</sup> H01Q 19/10

U.S. Cl. 343—837

11 Claims



1. An ultrasonic antenna adapted to co-operate with an ultrasonic transducer and comprising means for mounting the antenna in working interrelationship with the transducer and for directing an ultrasonic beam downwardly onto the ground, and first and second concave reflectors each being of part substantially cylindrical form extending around respective longitudinal axes which are arranged substantially at right angles to each other, and the first reflector being positioned to receive an ultrasonic beam from the transducer and to reflect the ultrasonic beam to the second reflector, with the sound reflector being positioned to receive the ultrasonic beam from the first reflector and then into space for range finding purposes, and wherein the distance from the second reflector to the virtual source of the transducer is less than the radius of curvature of the second reflector, whereby an ultrasonic beam from the transducer is reflected from the first reflector to the second reflector and is then reflected downwardly from the second reflector onto the ground at right angles to the axis of the first reflector.

4,791,431

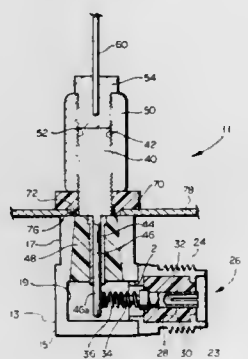
**ANTENNA MOUNT FOR VEHICLE**

Rudolph H. LaPointe, 11917 County Rd., 10-2, Delta, Ohio 43515

Filed Sep. 14, 1987, Ser. No. 96,913  
Int. Cl.<sup>4</sup> H01Q 1/50

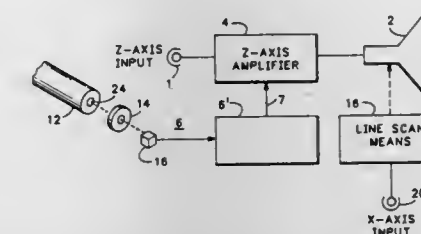
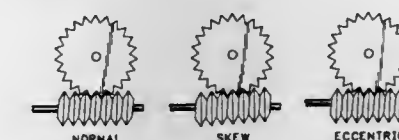
U.S. Cl. 343—906

3 Claims



1. A right-angle, antenna mount assembly adapted for securement to a grounded bracket, said assembly comprising:

(a) a principal, hollow, housing member inclusive of a vertically extending central core insulated from said housing member, said core having an upper end projecting beyond said housing and a lower stud end, said housing member including a lateral side opening,  
(b) an adjustable coupling threadably engageable with the upper end of said core, said coupling including means engageable with an antenna,  
(c) an annular insulator positioned to preclude contact of said coupling with said housing member and said bracket, and  
(d) a coax connector surrounding said lateral side opening, including an axially reciprocable, linear stem having a sleeve end and a pin end, but separated from said connector by surrounding insulator material, and a spring means surrounding said pin end normally urging said pin end away from said lower core stud but allowing contact when matching coax connector, having a central peg and connected with coax leading to a radio, threadably engages said coax urging said peg into said sleeve, compressing said spring and urging said pin end into contact with said lower core stud end.



4,791,432

**ANTENNA AND METHOD FOR FABRICATING SAME**  
Robert J. Piper, 22494 Ray, Detroit, Mich. 48223, and Helmut F. Homann, 16354 Greenland, Mt. Clemens, Mich. 48045

Division of Ser. No. 756,055, Jul. 17, 1985, Pat. No. 4,673,950.  
This application Dec. 24, 1986, Ser. No. 945,802

Int. Cl.<sup>4</sup> H01Q 15/14

U.S. Cl. 343—916

9 Claims



1. A method of fabricating a radio signal antenna (10) for receiving radio signals including an inner panel (12) having a curved inner receiving surface (14) and an outer panel (16), said method comprising the steps of positioning the inner panel (12) and outer (16) panels in coextensive spaced relationship to one another, positioning structural means (18) between the inner (12) and outer (16) panels for interlocking the panels (12, 16) together over the extent thereof, characterized by moving the inner (12) and outer (16) panels together to diminish the thickness of the structural means (18) between the panels (12, 16) until the panels (12, 16) are in predetermined positions relative to one another and respectively engaging the structural means (18) while precisely positioning the inner surface (14) of the inner panel (12) within closely predetermined tolerances, locking the structural means (18) and the panels (12, 16) together in the predetermined positions while maintaining the predetermined precise position of the inner surface (14) of the inner panel (12) to define a composite antenna (10) of substantial strength provided by the panels (12, 16) and structural means (18) locked together to present the inner surface (14) within the predetermined close tolerances over the surface thereof.

4,791,433

**LINE SCAN GRAPHIC RECORDER AND METHOD FOR INTENSITY CONTROL VIA MEDIUM VELOCITY ASSESSMENT**

Samuel W. Mallicoat, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Feb. 2, 1983, Ser. No. 463,353  
Int. Cl.<sup>4</sup> G01D 9/02; G01G 15/14

U.S. Cl. 346—1.1

12 Claims

7. Apparatus for varying the intensity of each scan line to be

displayed and recorded on a light sensitive medium by a line scan graphic recorder in response to fluctuations of the selected velocity of the recording medium driving means to improve the complete recorded image on the medium, the apparatus comprising:

means for generating a signal having characteristics that are directly proportional to the instantaneous velocity of the recording medium immediately prior to the display of each scan line; and means for modulating the intensity of each scan line as it is displayed and recorded, in response to the signal generation means.

4,791,434

**DROPLET STREAM ALIGNMENT FOR JET PRINTERS**  
Leslie J. Wills, Lidcombe, Australia, assignor to Commonwealth Scientific and Industrial Research Organization, Australia

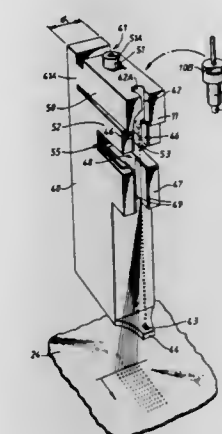
PCT No. PCT/AU85/00277, § 371 Date Jul. 10, 1986, § 102(c) Date Jul. 10, 1986, PCT Pub. No. WO86/02959, PCT Pub. Date May 22, 1986

PCT Filed Nov. 12, 1985, Ser. No. 897,007

Claims priority, application Australia, Nov. 12, 1984, 8071  
Int. Cl.<sup>4</sup> G01D 15/18

U.S. Cl. 346—75

8 Claims



1. A printing head for a jet printer comprising:

(a) a support body extending generally in a first direction which is perpendicular to a surface to be printed, a first slot formed in a top surface of the support body for mounting the support body in a jet printer, said slot extending substantially at right angles to said first direction;



- (b) an elongated first arm member extending in a second direction perpendicular to said first direction from an upper region of the support body adjacent said top surface;
- (c) a generally cylindrical cradle formed at an end of the first arm member which is remote from the support body, said cradle having an axis parallel to said first direction and at right angles to said second direction;
- (d) a jet body having an elongated cylindrical shape at one end of which is located an orifice from which droplets are projected, said jet body having a snug fit within said cradle;
- (e) a second arm member extending from the support body in said second direction and below said first arm member, said second arm member having a second slot formed at an end of the second arm member which is remote from the support body, said second slot extending parallel to the axis of the cradle, charging electrode means mounted on said second arm member within said second slot, for charging droplets projected from said orifice into the region of influence of said charging electrode means; and
- (f) a third arm member extending from the support member in said second direction and below said second arm member, said third arm member having a third slot formed in an end of the third arm member which is remote from the support body, said third slot extending in a direction parallel to the axis of the cradle, a pair of planar deflection electrodes mounted on opposed faces of said third slot, for deflecting charged droplets projected between the deflection electrodes after leaving the region of influence of said charging electrode means.

4,791,435

## THERMAL INKJET PRINTHEAD TEMPERATURE CONTROL

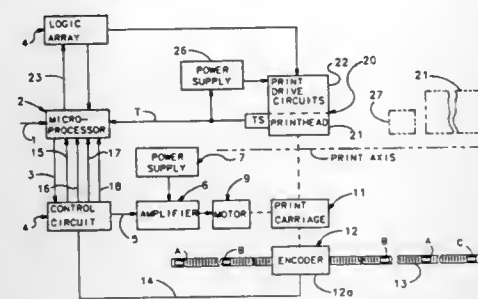
James C. Smith; Hatem E. Mostafa, and William J. Walsh, all of San Diego, Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Jul. 23, 1987, Ser. No. 77,552

Int. Cl.<sup>4</sup> G01D 15/24

U.S. Cl. 346—140 R

4 Claims



1. A temperature control system for a thermal inkjet printer, having a printer carriage drive, a printer carriage movable by said printer carriage drive across a printing zone between sweep limit positions and movable to and from a rest position in response to print commands, and having a thermal inkjet printhead mounted on said carriage, comprising:
- control means including said printer carriage drive and including print drive circuits coupled to said thermal inkjet printhead and responsive to the position of said printer carriage being driven by said printer carriage drive, for producing electrical pulses for firing ink drops from said thermal inkjet printhead in said printing zone and for stopping said electrical pulses outside of said printing zone;
- temperature sensor means for sensing the temperature of said thermal inkjet printhead; and
- means responsive to said temperature sensor means for controlling said printer carriage drive of said control means to

reduce printer carriage speed above a predetermined sensed temperature, to permit said printhead to cool and thereby to maintain the temperature of said thermal inkjet printhead substantially at said predetermined temperature.

4,791,436

## NOZZLE PLATE GEOMETRY FOR INK JET PENS AND METHOD OF MANUFACTURE

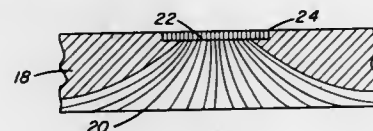
C. S. Chan, and Gary E. Hanson, both of Boise, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 17, 1987, Ser. No. 121,439

Int. Cl.<sup>4</sup> G01D 15/18

U.S. Cl. 346—140 R

7 Claims



5. A nozzle plate having a plurality of convergent orifices therein for ejecting ink onto a print medium, and a plurality of grooves in the interior contoured surface areas of said convergent orifices, with said grooves forming a sculptured interior orifice surface pattern and thereby maximizing the total interior surface area of said orifices, whereby the frequency response, wettability, damping factor, capillarity and fluid flow rate of said nozzle plate are optimized.

4,791,437

## MULTIPLE NOZZLE INK JET DOT PRINTER

Andrea Accattino, Romano, and Aldo Chiaro, Caluso, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

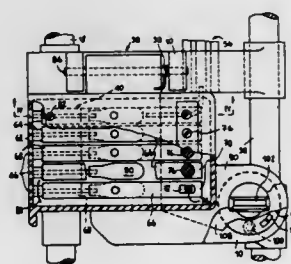
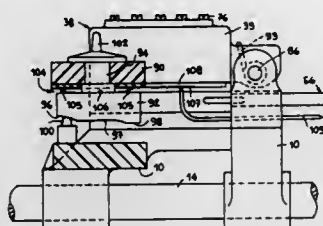
Filed Dec. 23, 1986, Ser. No. 945,524

Claims priority, application Italy, Dec. 23, 1985, 68097 A/85

Int. Cl.<sup>4</sup> G01D 15/16

U.S. Cl. 346—140 R

5 Claims



1. An ink jet dot printer comprising a print head mounted on a carriage movable in parallel to a printing line and having a plurality of nozzles aligned along a straight line which is inclined with respect to the printing line of the printer, to print on a carrier dots which are spaced in accordance with a predetermined print definition and adjusting means for rotating the

head about an axis perpendicular to the printing line to vary the inclination of the straight line and hence to set predetermined print definitions, wherein said adjusting means comprise a cam rotatable on a vertical axis, said cam having a lower profile provided with a plurality of steps associated with a plurality of degrees of print definitions and engaged with a cam follower provided on said carriage and spring means urging said profile against said cam follower, said cam being integral with a manipulative member for selectively rotating the cam to engage a selected step with the cam follower, whereby a different degrees of print definition corresponding to each angular position of the cam can be repeatedly selected.

4,791,438

## BALANCED CAPILLARY INK JET PEN FOR INK JET PRINTING SYSTEMS

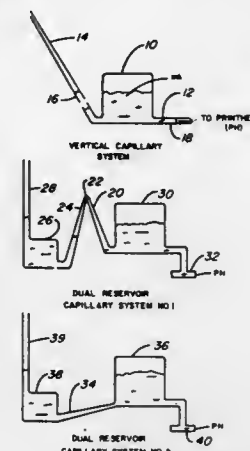
Gary E. Hanson; Gar P. Kelly; C. S. Chan, all of Boise, Id.; Bruce Cowger, Corvallis, Oreg., and James G. Bearas, Boise, Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 28, 1987, Ser. No. 115,013

Int. Cl.<sup>4</sup> G01D 15/16, 9/00

U.S. Cl. 346—140 R

16 Claims



1. A method for controlling backpressure in an ink jet pen which includes:
- providing primary and secondary ink reservoirs in a pen body housing,
  - providing ink in said primary reservoir and maintaining said ink at a controlled pressure,
  - providing an open ink flow path between said primary and secondary reservoirs, and
  - flowing ink back and forth through said open ink flow path between said reservoirs in response to variations in ambient temperature and changes in pressure above the liquid surface of said ink, whereby ink may be supplied from said main ink reservoir to an ink jet printhead at a substantially constant backpressure over a

4,791,439

## INK JET APPARATUS WITH IMPROVED RESERVOIR SYSTEM FOR HANDLING HOT MELT INK

Joseph W. Gules, Prospect, Conn., assignor to Dataproducts Corporation, Woodland Hills, Calif.

Filed Jul. 15, 1986, Ser. No. 885,966

Int. Cl.<sup>4</sup> G01D 15/16; F27B 14/00; B67D 5/62

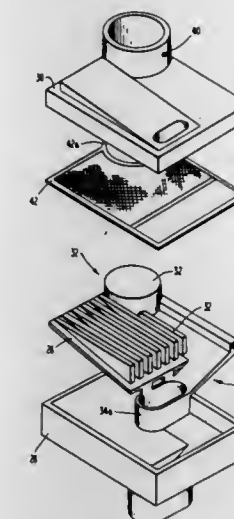
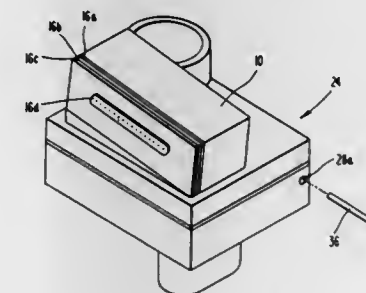
U.S. Cl. 346—140 R

14 Claims

1. An ink jet apparatus for use with hot melt ink, comprising: movable means for ejecting droplets of ink from at least one orifice;
- supply means, coupled to said movable ejecting means, for providing ink in its liquid state to said movable ejecting means;

first low-mass reservoir means, including heater means for melting the ink, for containing a supply of ink; and

second low-mass reservoir means, substantially surrounding said first reservoir means and supporting said movable ejecting means for movement therewith, for maintaining said supply of ink at a substantially constant head of ink



## THERMAL DROP-ON-DEMAND INK JET PRINT HEAD

Jerome M. Eldridge, Los Gatos; Gary S. Keller; Francis C. Lee, both of San Jose; George N. Nelson, Milpitas, and Graham Olive, San Jose, all of Calif., assignors to International Business Machine Corporation, Armonk, N.Y.

Filed May 1, 1987, Ser. No. 45,952

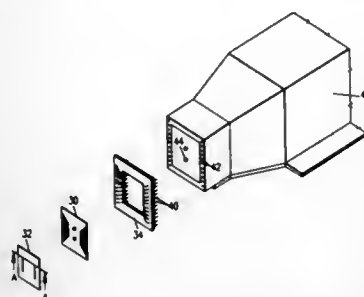
Int. Cl.<sup>4</sup> G01D 15/16

U.S. Cl. 346—140 R

6 Claims

1. A thermal ink jet print head comprising:
- a source of marking fluid;
- an electrically insulating substrate member;
- an array of heating means formed on a first surface of said substrate member, said heating means being formed in at least two groups;
- a first array of electrical connection members formed on said first surface of said substrate member, one of said first electrical connection members being in electrical contact with all of said heating means comprising one of said groups;

- a second array of electrical connection members deposited on said first surface of said substrate member, each of said second electrical connection members being in electrical contact with one heating means from each of said at least two groups of heating means within said array of heating means;
- a third array of electrical connection members on the reverse surface of said substrate member with respect to said first surface;
- a first array of electrical conduction members passing through said substrate to provide electrical contact between a plurality of said second electrical connection members and one of the electrical connection members of said third array of electrical connection members, said

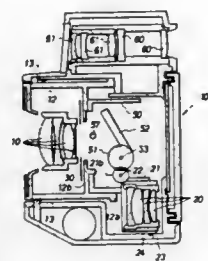


- first array of electrical conduction members having a central opening through at least some of said conduction members to convey said marking fluid; and
- a nozzle plate fixedly mounted adjacent to said substrate member and having a nozzle aligned with each of said central openings to receive said marking fluid, said nozzle plate having a nozzle therein disposed adjacent to and aligned with each of said heating means whereby, upon connection of a first electrical signal to a selected one of said first array of electrical connection members and, upon connection of a second electrical signal to a selected one of said third array of electrical connection members, a selected one of said heating means is energized and a drop of marking fluid is ejected from the adjacent nozzle.

**4,791,441**  
**MULTI-FOCUS CAMERA**  
Kohichi Nishi, Yokohama; Kunihisa Yamaguchi, Ichikawa, and Ikuya Turukawa, Yokohama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan  
Filed Oct. 27, 1987, Ser. No. 113,071  
Claims priority, application Japan, Oct. 28, 1986, 61-164219[U]

Int. Cl.<sup>4</sup> G03B 3/00  
U.S. Cl. 354—195.12

2 Claims



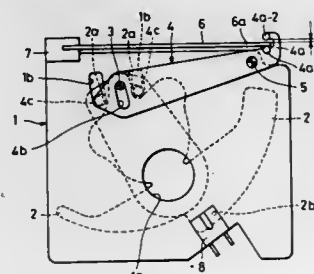
1. A two-focus camera in which a short focal-distance lens system is constituted by only a main lens when the main lens is set at a first position on an optical axis and a converter lens is set at a second position out of the optical axis, and a longer focal-distance lens system is constituted by the main lens and

- the converter lens when the main lens is set at a third position in front of the first position on the optical axis and the converter lens system is set at a fourth position behind the main lens on the optical axis, said two-focus camera comprising:
- a first means for moving the main lens between the first and third positions;
- a lens frame for holding the converter lens
- a support member for supporting the lens frame in order that the lens frame can move freely within a predetermined limit;
- a shaft fixed to one end of the support member and extending substantially orthogonal to an axis of the converter lens;
- a second means for moving the shaft in parallel with the optical axis in interlock with the first means; and
- a third means for swiveling the shaft around an axis perpendicular to the optical axis when the shaft is moving between a predetermined intermediate position and a foremost position.

**4,791,442**  
**CAMERA SHUTTER USING AN ELECTROSTRICTIVE STRAIN ELEMENT AS A DRIVING SOURCE**  
Kiyoshi Touma; Haruki Oe, and Akira Suzuki, all of Tokyo, Japan, assignors to Copal Company Limited, Tokyo, Japan  
Filed Dec. 22, 1987, Ser. No. 136,660  
Claims priority, application Japan, Dec. 23, 1986, 61-197959  
Int. Cl.<sup>4</sup> G03B 9/14

U.S. Cl. 354—234.1

3 Claims



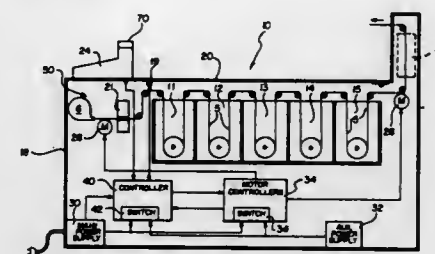
1. A camera shutter using an electrostrictive strain element as a driving source comprising:
- a shutter base plate having an exposure aperture;
- at least one shutter blade rockably supported on said shutter base plate to open and close said exposure aperture;
- an electrostrictive strain element fixed at one end on said shutter base plate and arranged at the other end as a freely displaceable driving end so as to be able to be strained and displaced when a voltage is applied to said electrostrictive strain element and to return to the original form when the accumulated charge is discharged; and
- a shutter blade opening and closing member supported rotatably and having one end portion engaged with the shutter blade and the other end forming an engaging portion engaged with the driving end of said electrostrictive strain element with a clearance,
- said engaging portion of said shutter blade opening and closing member being provided with a first engaging means engaging with the driving end of said electrostrictive strain element when said shutter blade opening and closing member is moved to open the shutter blades and a second engaging means engaged with the driving end of said electrostrictive strain element when said shutter blade opening and closing member is moved to close the shutter blades,
- and means for applying, when the shutter is released, first a reverse voltage to said electrostrictive strain element to engage the driving end with the second engaging means of said shutter blade opening and closing member and then a

forward voltage to said electrostrictive strain element to open the shutter blades.

**4,791,443**  
**PHOTOGRAPHIC PROCESSOR WITH AUXILIARY POWER SUPPLY**  
Walter D. Foley, and Robert J. Blackman, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Continuation of Ser. No. 62,303, Jun. 12, 1987, abandoned. This application Jan. 22, 1988, Ser. No. 147,061  
Int. Cl.<sup>4</sup> G03D 3/13

U.S. Cl. 354—321

16 Claims

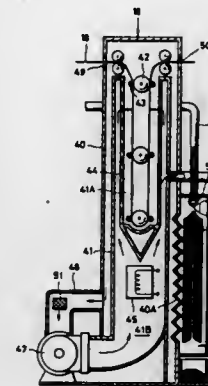


1. Apparatus for processing photographic material comprising:
- a plurality of processing stations, each including a processing liquid;
- means for moving said photographic material through said processing liquids;
- means connectable to an external source of power for supplying main power;
- means for supplying auxiliary power;
- switching means for normally applying said main power to said moving means, said switching means being actuatable to apply said auxiliary power to said moving means; and
- means responsive to an interruption in said main power for actuating said switching means to apply said auxiliary power to said moving means.

**4,791,444**  
**WASTE SOLUTION TREATING APPARATUS**  
Hiroshi Fujimoto, and Kiichiro Sakamoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Jan. 4, 1987, Ser. No. 58,102  
Claims priority, application Japan, Jun. 4, 1986, 61-128147;  
Jun. 4, 1986, 61-128148

Int. Cl.<sup>4</sup> G03D 3/02  
U.S. Cl. 354—324

11 Claims



1. A waste solution treating apparatus for use with a photographic processing apparatus which is adapted to process a

photographic material with a processing solution and to dry the processed photographic material in a drying chamber, a predetermined amount of said processing solution being run to waste and to supply replenishing solution continuously, said waste solution treating apparatus comprising:

a housing;

means for discharging said processing solution to be wasted into said housing;

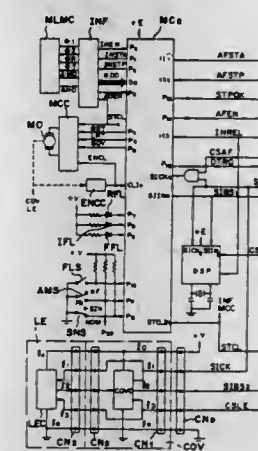
treating means disposed in said housing for allowing said processing solution discharged into said housing to flow thereover;

means for conducting air heated in said drying chamber of said processing apparatus into said housing in order to heat said treating means, thereby at least condensing said processing solution while said processing solution is flowing over said treating means.

**4,791,445**  
**AUTOMATIC FOCUS CONTROL CAMERA**  
Yasuaki Akada, Sakai; Norio Ishikawa; Takeshi Egawa, both of Osaka, and Nobuyuki Taniguchi, Toonabayashi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
Division of Ser. No. 764,742, Aug. 9, 1985, Pat. No. 4,671,640.  
This application Jun. 8, 1987, Ser. No. 59,863  
Claims priority, application Japan, Aug. 9, 1984, 59-167105; Sep. 6, 1984, 59-187109; Nov. 19, 1984, 59-243994  
Int. Cl.<sup>4</sup> G03B 3/00, 17/00

U.S. Cl. 354—402

5 Claims



1. An interchangeable objective lens with a diaphragm aperture which can be selectively mounted to a camera body having a focus condition detecting means and an effective aperture value with the diaphragm aperture fully open can be variable in accordance with the movement of at least a part of said interchangeable objective lens, comprising:
- means for enabling communication between said camera body and the interchangeable objective lens;
- means for outputting, irrespective of the actual movement of said interchangeable objective lens, a signal indicative of the maximum of the variable effective aperture value with the diaphragm aperture fully open, and
- means for transmitting to said camera body the signal output from said outputting means.



4,791,446

## LIGHT MEASURING DEVICE

Tokuji Ishida, Daito; Hiroshi Ootsuka, Sakai, and Hiromu Mukai, Kawachinagano, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Feb. 13, 1987, Ser. No. 14,708

Claims priority, application Japan, Feb. 14, 1986, 61-29960; Feb. 14, 1986, 61-29961; May 2, 1986, 61-102550; May 2, 1986, 61-102551; May 2, 1986, 61-102552; May 2, 1986, 61-102553

Int. Cl.<sup>4</sup> G03B 3/12, 7/093, 7/28

U.S. Cl. 354-408

38 Claims

1. A light measuring device, for use in a camera having an objective lens, for measuring a brightness of a spot of an object, comprising:

first light receiving means having a plurality of light receiving elements for producing charges at a rate related to an intensity of the light impinging thereon from said object; first integration means having a plurality of charge accumulation portions for integrating charge produced by corresponding light receiving elements;

second light receiving means provided adjacent said first light receiving means for producing a photocurrent at an amount relative to an intensity of the light impinging thereof from said object;

second integrating means for integrating charge produced by said second light receiving means;

comparing means for comparing said second integrated charge with a predetermined level, and for producing a stop integration signal when said integrated charge reaches said predetermined level, said stop integration signal being used for stopping the integration in said first integration means;

focus detection means for detecting the focus condition of said objective lens using the integrated charge data from said first integration means;

spot brightness detecting means for detecting the spot brightness of said spot of said object using the photocurrent from said second light receiving means; and exposure data calculating means for calculating exposure data based on the spot brightness.

4,791,447

## DUAL MODE COLOR FUSER

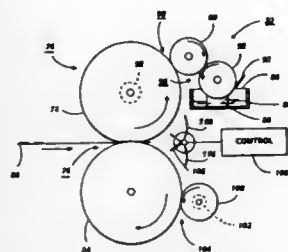
Robert M. Jacobs, Ontario, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 31, 1987, Ser. No. 91,466

Int. Cl.<sup>4</sup> G03G 15/20

U.S. Cl. 355-3 FU

13 Claims



1. Heat and pressure fuser apparatus for fixing toner images to copy substrates utilizing two roll structures forming first and second nips with a third roll structure, the improvement comprising:

means for effecting movement of copy substrates through either said first nip or said first and second nips in accordance with the type of copies that are to be reproduced, said movement effecting means comprising a deflector member movable to first and second positions, said deflector member serving to alter the direction of movement of

a copy substrate when in one of said positions whereby copy substrates are moved through both of said nips.

4,791,448

# HEAT ROLLER FIXING DEVICE FOR AN ELECTROPHOTOGRAPHIC PRINTING APPARATUS

Masato Kawashima, and Kyobei Hashizume, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan

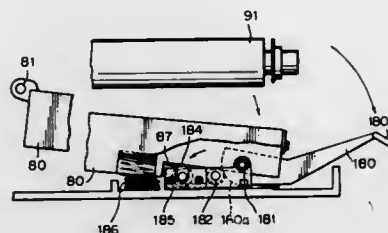
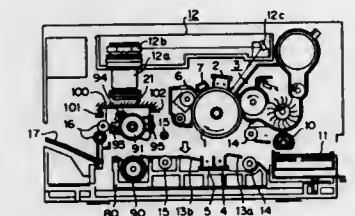
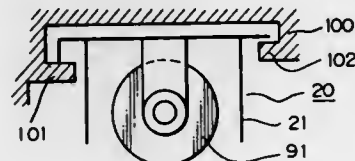
Filed Jul. 30, 1986, Ser. No. 890,511

Claims priority, application Japan, Aug. 20, 1985, 60-182207; Oct. 19, 1985, 60-234086

Int. Cl.<sup>4</sup> G03G 15/20

U.S. Cl. 355-3 FU

8 Claims



1. A printing apparatus, comprising:
  - (a) means for forming a toner image;
  - (b) means for feeding a medium;
  - (c) means for transferring the toner image to the medium fed by said feeding means at an intermediate position along a medium feed path;
  - (d) a pressure roller which is formed so as to move upward and downward; and
  - (e) a heat roller fixing unit, in which the pressure roller and a heat roller are arranged in opposition to each other, and said medium is passed between said rollers to fix said image formed thereon, said heat roller fixing unit including:
    - (i) a heat roller unit in which said heat roller is supported,
    - (ii) a main frame having guide rails for said heat roller unit, wherein said heat roller unit can be separately inserted into and withdrawn from said main frame along said guide rails separate from said pressure roller when said pressure roller is moved downward, and
    - (iii) a driving portion formed by a gear construction having gear portions to be engaged with a driving gear provided in said main frame, wherein said driving portion is engaged with said driving

gear provided in said main frame when said heat roller unit is inserted into said main frame.

(d) developing the latent electrostatic images with differently colored electroscopic toners

4,791,449

# SYSTEM FOR PREVENTION OF UNAUTHORIZED COPYING

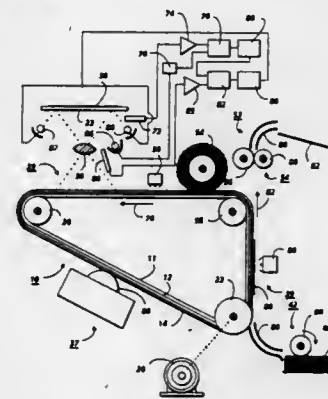
Geoffrey M. Foley, and Robert W. Anderson, both of Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 30, 1986, Ser. No. 868,984

Int. Cl.<sup>4</sup> G03G 21/00

U.S. Cl. 355-3 R

16 Claims



14. Imaging apparatus comprising means to support a web having phosphor particles uniformly distributed on at least one outer surface of said web, said phosphor particles being capable of phosphorescence to emit visible radiation upon excitation by ultraviolet light, means to apply ultraviolet light to said phosphor particles, means adapted to detect said visible radiation emitted by said phosphor particles after said application of said ultraviolet light to said phosphor particles is terminated, and means to disable operation of said imaging apparatus upon detection of said visible radiation emitted by said phosphor particles after said application of said ultraviolet light to said phosphor particles is terminated.

4,791,450

# MULTICOLOR ELECTROPHOTOGRAPHIC REPRODUCTION APPARATUS AND METHOD FOR PRODUCING COLOR ACCENTED COPIES

Michael Mosehauer, Rochester; Jerome G. Spitzner, deceased, late of Byron (by Nona V. Spitzner, administratrix); Michael D. Stoudt, Webster, and Eric K. Zeise, Pittsford, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation of Ser. No. 809,546, Dec. 16, 1985, abandoned.

This application Mar. 20, 1987, Ser. No. 28,804

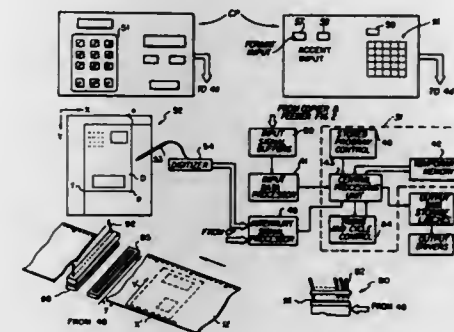
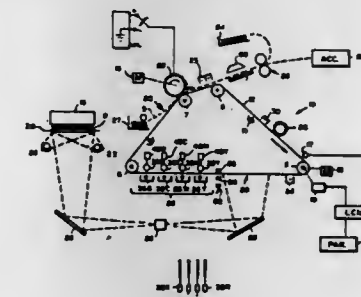
Int. Cl.<sup>4</sup> G03G 15/01

U.S. Cl. 355-4

19 Claims

1. A method for electrophotographically producing copy having selected information with color accenting, the method comprising the steps of;

- (a) generating signals related to the desired color and position of an image area to be color accenting relative to a reference;
- (b) forming on a plurality of image frames of a photoconductive member a corresponding plurality of separate developable latent electrostatic images of the said information to be reproduced on the copy with selected accenting;
- (c) exposing at least one of the image frames to non-image information bearing light modulated by a halftone screen pattern before, during or subsequent to step b) to reduce the charge level on an area corresponding to that for producing said selected information without similarly exposing the image(s) of the same information on another image frame to the same extent;



(e) transferring the developed images in register to a copy sheet.

4,791,451

# COPYING APPARATUS HAVING AUTOMATIC DOCUMENT FEEDER

Akira Hirose, and Yukitaka Nakazato, both of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

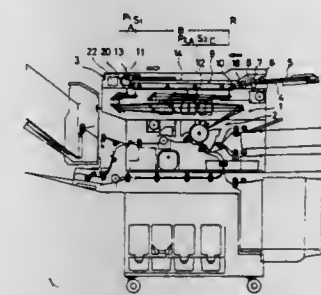
Filed Dec. 8, 1987, Ser. No. 130,214

Claims priority, application Japan, Dec. 11, 1986, 61-293400

Int. Cl.<sup>4</sup> G03G 15/00

U.S. Cl. 355-8

15 Claims



1. A copying apparatus comprising: an automatic document feeder for feeding a document in a document feeding direction; document-size detecting means provided on said automatic document-feeder for detecting a size of the document; a contact glass on which the document is set automatically by said automatic document feeder; stopping position control means for controlling a stopping position of the document on said contact glass depending

on the size of the document detected in said document size detecting means;  
an optical scanning device for scanning the document on said contact glass in a scanning direction which is opposite to the document feeding direction; and  
scanning range control means for controlling a scanning range of said optical scanning device depending on the stopping position of the document.

4,791,452

# IMAGE FORMING APPARATUS HAVING AT LEAST TWO-COLOR IMAGE PRINT FUNCTION AND METHOD FOR CONTROLLING THE SAME

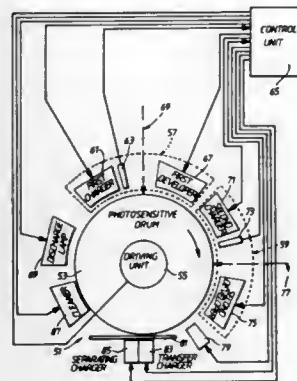
Toshihiro Kasai, and Tatsuya Tsujii, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 21, 1987, Ser. No. 110,862

Claims priority, application Japan, Oct. 28, 1986, 61-254713  
Int. Cl.<sup>4</sup> G03G 15/00

U.S. Cl. 355—14 D

16 Claims



1. An image forming apparatus for forming both single and multi-colored images on an image carrier in response to color image signals, the image forming apparatus comprising:  
first image forming means responsive to a first color image signal and including a first developer for forming the first color image on the image carrier, the first color image having a prescribed potential level;  
second image forming means responsive to a second color image signal and including a second developer for forming the second color image on the image carrier; and  
control means for applying a bias voltage to the second developer for reducing the difference in potential level between the first color image and the second developer when only the first color image signal is received by the apparatus.

4,791,453

# RECORDING APPARATUS

Yasufumi Koseki, Seiichi Suzuki, Utami Soma, and Harufumi Yamashita, all of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Filed Mar. 9, 1987, Ser. No. 23,455

Claims priority, application Japan, Mar. 14, 1986, 61-55128; Mar. 19, 1986, 61-59410; Mar. 19, 1986, 61-59411

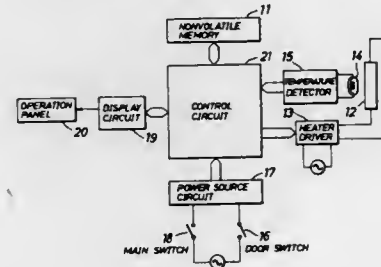
Int. Cl.<sup>4</sup> G03G 21/00

U.S. Cl. 355—14 R

6 Claims

1. A recording apparatus comprising:  
memory means for storing recording conditions already set when a power source is turned off;  
temperature detecting means for detecting a temperature of a fixing device when the power source is turned on;  
means for determining whether the temperature detected by said temperature detecting means is over a predetermined temperature; and  
recording condition set means for initializing the recording

conditions to predetermined values when said detected temperature is below said predetermined temperature, and for reading out and resetting the recording conditions stored in said memory means when said detected temperature is over said predetermined temperature.



thereby recording by an electrophotographic process in accordance with the recording conditions set by said recording condition set means.

4,791,454

# REMOVABLE PHOTOCONDUCTIVE ELEMENT UNIT FOR IMAGE-FORMING APPARATUS

Sadao Takahashi, Tokyo, and Tsuyoshi Deki, Yokohama, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

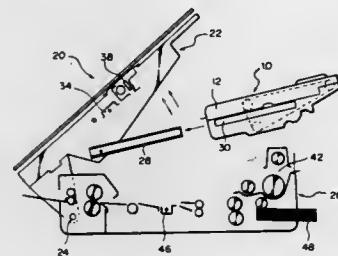
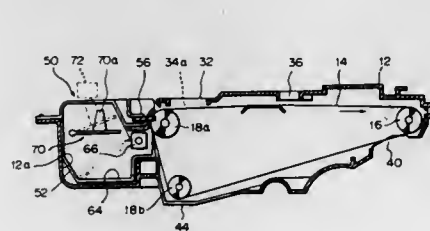
Filed Jun. 5, 1987, Ser. No. 58,854

Claims priority, application Japan, Jun. 5, 1986, 61-129108; Jun. 5, 1986, 61-129109; Jul. 21, 1986, 61-110659[U]

Int. Cl.<sup>4</sup> G03G 21/00

U.S. Cl. 355—15

15 Claims



1. A photoconductive element unit removably mounted in an image-forming apparatus, comprising:  
a rotatable photoconductive element; and  
a cleaning device comprising a cleaning means for removing a developer which remains on said photoconductive element after transfer of an image, and a developer collecting means for collecting the developer which is removed by said cleaning means;  
said cleaning means being removably mounted in the photoconductive element unit;  
wherein said cleaning means comprise a cleaning blade movably held in said cleaning device, a seal member posi-

tion in said cleaning device such that a gap is formed between said seal member and said blade when said cleaning device is mounted in said photoconductor element unit for permitting entry of developer into said cleaning device, and means for moving said cleaning blade so as to reduce the size of said gap when said cleaning device is removed from said photoconductor element unit, whereby developer leakage is minimized.

4,791,455

# COLOR ELECTROPHOTOGRAPHIC APPARATUS AND METHOD OF CLEANING A PHOTSENSITIVE MEDIUM

Hajime Yamamoto, Ibaraki; Hidenori Kunishige, Yawata, and Yaji Takashima, Nishinomiya, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

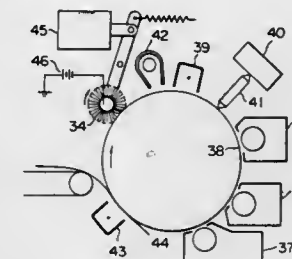
Filed Feb. 10, 1987, Ser. No. 14,691

Claims priority, application Japan, Feb. 13, 1986, 61-29243; Apr. 3, 1986, 61-77151; Aug. 29, 1986, 61-204106; Oct. 2, 1986, 61-234817

Int. Cl.<sup>4</sup> E03G 15/08

U.S. Cl. 355—15

17 Claims



1. A color electrophotographic apparatus, comprising:  
a photosensitive medium;  
a main corona-charger for applying a charge to said photosensitive medium before exposure thereof;  
exposure means for exposing said photosensitive medium after a charge is applied thereto by said main corona-charger;  
a plurality of developing units each having toner of a different color for developing toner images on said photosensitive medium with toner in different colors;  
an image transfer unit for transferring a toner image formed on said photosensitive medium;  
a fur brush which is electrically conductive for cleaning the surface of said photosensitive medium;  
a drive mechanism for moving said fur brush into contact with said photosensitive medium during cleaning and for moving said fur brush out of contact with said photosensitive medium when cleaning is not conducted;  
a D.C. power supply for supplying a D.C. voltage to said fur brush; and  
a corona-charger disposed upstream of said fur brush but downstream of said image transfer unit, for applying a charge to said photosensitive medium after the transfer of the toner images so that toner remaining on said photosensitive medium is uniformly corona-charged.

4,791,456

# PHOTOGRAPHIC PRINTER APPARATUS

Henry F. Hope, and Stephen F. Hope, both c/o Hope Industries, Inc., 5701 Moreland Rd., Willow Grove, Pa. 19090

Filed Apr. 15, 1987, Ser. No. 38,742

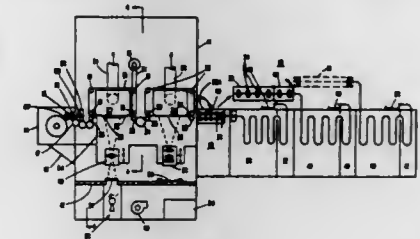
Int. Cl.<sup>4</sup> G03B 27/52

U.S. Cl. 355—28

9 Claims

1. Photographic printer apparatus for making prints from negatives, positives, prints or other material which comprises

dispensing means for dispensing a measured size and type of light sensitive photographic material,  
at least one exposure station means for exposure of said photographic material,



transport means for transporting said photographic material to said station for exposure,  
said transport means includes continuous vacuum support means at the exposure station and guidance means for said material.

4,791,457

# REPRODUCING APPARATUS HAVING MANUAL PAPER FEED FUNCTION

Toshio Shida, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

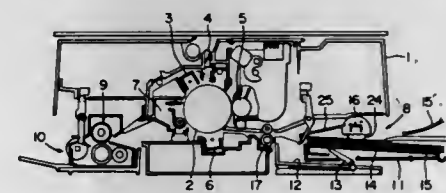
Filed Mar. 4, 1987, Ser. No. 21,418

Claims priority, application Japan, Mar. 11, 1986, 61-53005

Int. Cl.<sup>4</sup> G03G 21/00; B65H 3/06

U.S. Cl. 355—3 SH

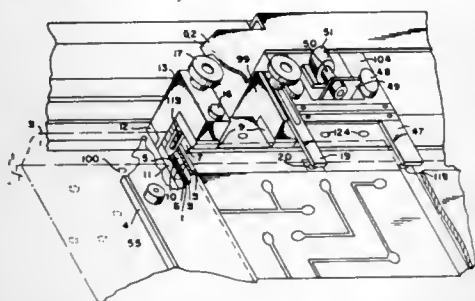
20 Claims



1. In an image reproducing apparatus having an automatic paper feed function and a manual paper feed function, the improvement comprising the combination of:  
a paper tray for holding a plurality of papers which are to be automatically fed from said paper tray on a one-by-one basis;  
paper feed rollers mounted above said paper tray for selectively feeding papers from said paper tray;  
a passage for receiving a manually inserted paper formed between said paper tray and said paper feed rollers;  
a leading end regulating shutter at least partially disposed above said paper tray and downstream of said passage for regulating the leading end of said manually inserted paper;  
operating means coupled to said paper feed rollers for operating said paper feed rollers to feed paper out from said paper tray; and  
energizing means coupled to said operating means and being operable in association with the operation of said paper feed rollers for causing said shutter to escape to clear said passage for said manually inserted paper before said manually inserted paper is fed by said paper feed rollers, to thereby permit said manually inserted paper to be manually fed past said paper feed rollers before being fed into said reproducing apparatus by said paper feed rollers.



**4,791,458**  
**MULTI-PURPOSE APPARATUS FOR THE IMAGING OF PRINTED WIRED BOARDS**  
 Amerigo de Masi, Brandenburgerstr. 62, Eggenbach, Fed. Rep. of Germany  
 Continuation of Ser. No. 929,978, Nov. 13, 1986, abandoned.  
 This application Aug. 18, 1987, Ser. No. 88,012  
 Int. Cl.<sup>4</sup> G03B 27/58  
 U.S. Cl. 355—53 31 Claims

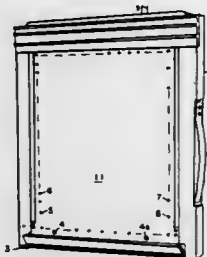


1. A multi-purpose apparatus for the manual and automatic imaging of Printed Wired Boards, comprising:  
 a base frame formed by a group of rectangular tubes and a channel, rigidly attached and parallel to each other differently to suit the various applications of the apparatus and connected:  
 on one side for a manual or automatic operation in processing one panel's breadth;  
 in the middle, for manual or automatic operations to process two different or equal panel's breadth;  
 one group on each side, attached to each other by a conveyor, to process automatically and in line two panels at the same time;  
 one tube of said group being somewhat shorter and also rectangular, is connected transversally to two more tubes of the same height, which in turn are connected to a third one also transversally;  
 attached to said rectangular member tube, on its surface, at least two metallic die strips uniformly interspaced and extending to the whole length of said tube, have rows of die holes used as punch dies to perforate photo-masks before exposure and to align a punching pin, sliding through at least two L-shaped punch block members clamped on said holes by a bolt and thumb screw going through it, an L-shaped member, likewise said punch block members, clamped to the said holes, having a sliding member, in its grooved top surface which has its back end shaped like a fork and attached to its front end, an indexing spring-loaded pin; and a glass resting on said transversal tube members having the same height of said prior die strips.

**4,791,459**  
**PIN REGISTER VACUUM SYSTEM**  
 Morris Hoffman, 19 Grand Ave., Farmingdale, N.Y. 11735  
 Filed Jan. 2, 1987, Ser. No. 143  
 Int. Cl.<sup>4</sup> G03B 27/20

U.S. Cl. 355—91 17 Claims  
 1. An open face vacuum holder with dark slide light shield for holding film under vacuum and will fit into any view camera comprising:  
 two pins located near one end of the holder to register the film having corresponding holes,

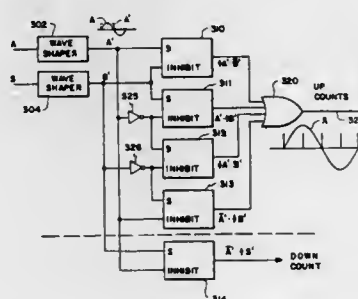
a first spring mounted on one side of the holder to force the holder to bank to the one side,  
 a second spring mounted on one end of the holder,



and means to apply vacuum to hold the film flat on the holder.

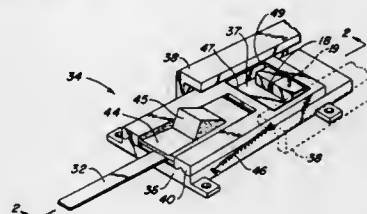
**4,791,460**  
**READOUT FOR A RING LASER ANGULAR RATE SENSOR**

James W. Bergstrom, New Brighton, and Mark W. Weber, Elk River, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.  
 Continuation of Ser. No. 847,379, Apr. 2, 1986, abandoned. This application Mar. 31, 1988, Ser. No. 173,004  
 Int. Cl.<sup>4</sup> G01C 19/64  
 U.S. Cl. 356—350 10 Claims



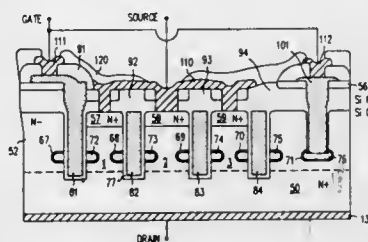
1. A readout apparatus for a laser angular rate sensor having counter-propagating laser beams which exhibit a change in frequency dependent upon rotation rate and direction, said readout apparatus comprising:  
 means for optically combining a portion of each of said beams to form an interference fringe pattern;  
 photodetection means responsive to said interference fringe pattern for providing a first pair of equal amplitude first and second signals substantially in phase quadrature and indicative of said interference fringe pattern impinging on said photodetection means;  
 means for summing said first and second signals and providing a third signal indicative of said sum;  
 means for determining the difference between said first and second signals and providing a fourth signal indicative of said difference; and  
 signal processing means responsive to said first, second, third, and fourth signals for generating a readout output signal having a signal change for substantially each 1/4 of a fringe change passing said photodetector means.

**4,791,461**  
**PORTABLE ANALYZER**  
 Shinichi Kishimoto, Katsuyama; Kenichi Iwase, Joyo; Toshio Miki, Kyoto, and Teiji Tanaka, Joyo, all of Japan, assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.  
 Continuation of Ser. No. 675,485, Nov. 27, 1984, abandoned.  
 This application Oct. 6, 1986, Ser. No. 894,176  
 Int. Cl.<sup>4</sup> G01N 33/52, 21/78  
 U.S. Cl. 356—446 23 Claims



1. An analyzer comprising in combination  
 a housing  
 an optical system comprising a light source, a detector, and one or more means for activating said optical system and generating a signal in response one or more test elements on a support,  
 means for manually moving said support from a first position to a second position corresponding to a point of initiation of an operative condition of said optical system,  
 means biasing said moving means toward said first position for controlling movement of said moving means from said second position to said first position to a point of termination of said operative condition of said optical system, whereby a signal is generated for each test element during said operative condition,  
 means, cooperative with said optical system, for processing said signal, and  
 means, cooperative with said means for processing said signal, for displaying the processed signal.

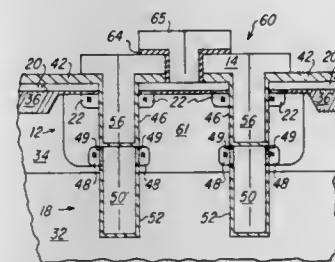
**4,791,462**  
**DENSE VERTICAL J-MOS TRANSISTOR**  
 Richard A. Blanchard, Los Altos, and Adrian I. Cogan, San Jose, both of Calif., assignors to Siliconix Incorporated, Santa Clara, Calif.  
 Filed Sep. 10, 1987, Ser. No. 95,481  
 Int. Cl.<sup>4</sup> H01L 29/78  
 U.S. Cl. 357—23.4 16 Claims



1. A vertical transistor comprising:  
 a highly doped semiconductor substrate of a first conductivity type;  
 an epitaxial layer of a first conductivity type overlying said substrate;  
 one or more conductive gates insulated from said substrate and said epitaxial layer, each of said one or more gates being embedded fully within said epitaxial layer and partially within said substrate, the portions of said epitaxial layer being depleted by action of said one or more gates forming one or more vertical channels; and  
 one or more highly doped regions of a first conductivity

type, each overlying a corresponding one of said one or more channels.

**4,791,463**  
**STRUCTURE FOR CONTACTING DEVICES IN THREE DIMENSIONAL CIRCUITRY**  
 Satwinder S. Malhi, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.  
 Continuation-in-part of Ser. No. 666,715, Oct. 31, 1984, abandoned. This application Nov. 22, 1985, Ser. No. 801,037  
 Int. Cl.<sup>4</sup> H01L 29/78  
 U.S. Cl. 357—23.6 6 Claims



1. An integrated circuit component comprising:  
 a substrate including at least one tenth therein, wherein each trench surrounds a portion of the substrate;  
 each trench being surrounded by substrate trench sides and a substrate trench bottom;  
 a first insulating layer lining at least in part the trench sides and the trench bottom;  
 a first conductive material within each trench;  
 an outer source region, surrounding an associated trench, being situated substantially along the trench sides and contacting the first conductive material at a first location along the trench sides;  
 an inner source region being situated substantially along the trench sides on the portion of the substrate surrounded by the trench and being substantially concentric with a corresponding outer source region, the inner source region contacting the first conductive material at a second location along the trench sides;  
 an outer drain region, surrounding an associated trench and being situated substantially along the trench sides though separated from an associated outer source region so as to define a first channel region between the outer source region and the outer drain region;  
 an inner drain region being situated substantially along the trench sides on the portion of the substrate surrounded by the trench and being substantially concentric with a corresponding outer drain region though separated from the inner source region so as to define a second channel region between the inner source region and the inner drain region;  
 the drain and source regions being of a predetermined carrier type;  
 a second conductive material at least partially within each trench enclosing the first conductive material in an area bound by the second conductive material and the substrate sides and being separated from the channel regions by the first insulating layer so as to provide a gate region for the drain regions and the source regions;  
 a second insulating layer between the first conductive material and the second conductive material;  
 a well region, common to each trench, of the same carrier type as the drain and source regions, within the portion of the substrate surrounded by each trench and within a portion of the substrate around each trench, whereby the first conductive material forms a capacitor with the substrate and the first insulating layer and whereby the first conductive material can be accessed by a circuit connection.

tion which includes the drain regions, the well region, the channel regions and the source regions, thereby allowing access to all capacitor for testing purposes.

**4,791,464**  
**SEMICONDUCTOR DEVICE THAT MINIMIZES THE LEAKAGE CURRENT ASSOCIATED WITH THE PARASITIC EDGE TRANSISTORS AND A METHOD OF MAKING THE SAME**

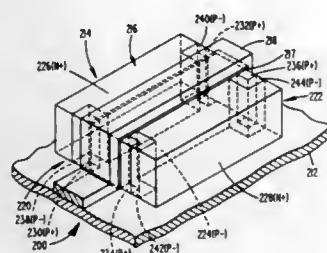
Alfred C. Iprl, Hopewell Township, Mercer County, and Dora Plus, South Bound Brook, both of N.J., assignors to General Electric Company, Schenectady, N.Y.

Filed May 12, 1987, Ser. No. 48,704

Int. Cl.<sup>4</sup> H01L 27/12, 29/78

U.S. Cl. 357—23.7

8 Claims



1. A semiconductor device, comprising an island of semiconductor material disposed on an insulating substrate, said island having a top surface and at least one sidewall;
- a gate insulating layer disposed over said island;
- a gate electrode disposed over said gate insulating layer such that it overlies said top surface and said at least one sidewall;
- a channel region of a first conductivity type disposed in said island under said gate electrode and along said at least one sidewall, said channel region having a substantially uniform first conductivity type concentration along said top surface and along the upper portions of said at least one sidewall;
- source and drain regions of a second conductivity type disposed in said island;
- first regions of a first conductivity type disposed in the portions of said island not subtended by said gate electrode and contacting said source and drain regions to form diodes with said source and drain regions for electrically isolating said drain region from the portion of the channel region along said at least one sidewall; and
- second regions of a first conductivity type disposed in the portions of the island not subtended by said gate electrode to separate said first regions forming diodes with said drain region from the portion of the channel region along said at least one sidewall, said second regions having a higher first conductivity type concentration than said first regions forming diodes with said drain region.

**4,791,465**  
**FIELD EFFECT TRANSISTOR TYPE SEMICONDUCTOR SENSOR AND METHOD OF MANUFACTURING THE SAME**

Tadashi Sakai, Yokohama; Masaki Katsura, Yokosuka; Hideaki Hiraki, Kawasaki; Shigeki Uno, Tokyo; Masaru Shimbo, Yokohama, and Kazuyoshi Furukawa, Kawasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

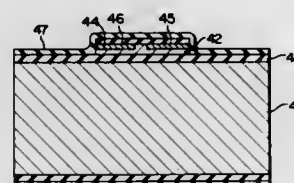
Filed Feb. 20, 1986, Ser. No. 831,314

Claims priority, application Japan, Feb. 20, 1985, 60-33101; Jun. 29, 1985, 60-143790; Nov. 22, 1985, 60-263016

Int. Cl.<sup>4</sup> H01L 29/66

U.S. Cl. 357—25

19 Claims



1. A semiconductor sensor comprising:
  - a first semiconductor substrate of a first conductivity type having one surface and an opposite surface;
  - a second semiconductor substrate of the first conductivity type having one surface and an opposite surface, the one surface thereof being placed in contact with that of said first semiconductor substrate and said first and second semiconductor substrates being directly bonded together;
  - a sensor region formed in one of said first and second semiconductor substrates;
  - a first insulative layer formed on at least said sensor region which is made of one material selected from the group consisting of silicon nitride, silicon oxide, aluminum oxide, tantalum oxide, titanium oxide, zirconium oxide, niobium oxide, and hafnium oxide, and which further comprises a second insulative layer formed on said first insulative layer, and wherein said sensor region has a field effect transistor structure for detecting an ion concentration.

**4,791,466**  
**LINE SCANNER IMAGE SENSOR**

Toshiaki Kato, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Japan

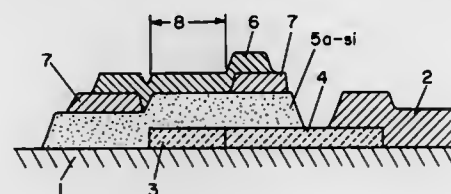
Filed Mar. 19, 1986, Ser. No. 841,170

Claims priority, application Japan, Mar. 20, 1985, 60-57006

Int. Cl.<sup>4</sup> H01L 27/14

U.S. Cl. 357—30

4 Claims



1. A linear scanner comprising:
  - an insulating substrate;
  - a plurality of individual electrodes, each spaced apart in a linear row, disposed on the insulating substrate;
  - a plurality of leads, attached to respective ones of the individual electrodes;
  - a plurality of wires connected to respective ones of the plurality of leads;
  - a layer of photosensitive semiconductive material overlaying the plurality of individual electrodes;

an insulating film overlying the layer of photosensitive semiconductive material and the individual electrodes, said insulating film having a linear window which is positioned to expose essentially only a region of the photosensitive semiconductive material layer directly overlying the plurality of individual electrodes, and being substantially coextensive therewith; and

a common electrode layer overlying the insulating film, overlapping the linear window therein and contacting the layer of photosensitive semiconductive material through the linear window.

**4,791,467**  
**HETEROJUNCTION HGCDE PHOTOVOLTAIC DETECTOR AND ITS PRODUCTION PROCESS**

Daniel Amingual, and Pierre Felix, both of Grenoble, France, assignors to Commissariat A L'Energie Atomique, Paris, France

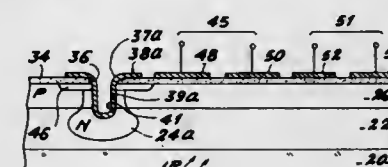
Filed Dec. 18, 1986, Ser. No. 943,557

Claims priority, application France, Jan. 8, 1986, 86 00172

Int. Cl.<sup>4</sup> H01L 27/14, 31/00, 29/161, 29/205

U.S. Cl. 357—30

11 Claims



1. A photovoltaic detector with a planar structure having a first  $Hg_{1-x_1}Cd_{x_1}Te$  monocrystalline semiconductor layer with a first conductivity type,  $x_1$  being a number between 0 and 1, said first semiconductor layer containing a first region of a second conductivity type, an electrical insulant located above the first semiconductor layer and an electric contact element located on the insulant serving to collect the electric signal produced in said first region, wherein a second  $Hg_{1-x_2}Cd_{x_2}Te$  monocrystalline semiconductor layer of the first conductivity type is interposed between the first semiconductor layer and the insulant,  $x_2$  being a number exceeding  $x_1$ , between 0 and 1, said second semiconductor layer containing a second region of the second conductivity type facing and in contact with said first region and wherein the contact element comprises a part traversing said second region and partly penetrating said first region.

**4,791,468**  
**RADIATION-SENSITIVE SEMICONDUCTOR DEVICE**

Arthur M. E. Hoeberechts, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 890,793, Jul. 24, 1986, abandoned, which is a continuation of Ser. No. 692,853, Jan. 16, 1985, abandoned, which is a continuation of Ser. No. 572,591, Jan. 18, 1984, abandoned, which is a continuation of Ser. No. 272,458, Jun. 11, 1981, abandoned. This application Feb. 2, 1988, Ser. No. 153,523

Claims priority, application Netherlands, Jul. 7, 1980, 8003906

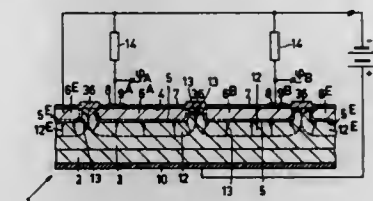
Int. Cl.<sup>4</sup> H01L 27/14, 31/00, 31/14, 29/06

U.S. Cl. 357—30

12 Claims

1. A radiation sensitive semiconductor device comprising a semiconductor body having a substrate, an epitaxial semiconductor layer on said substrate and having a substantially flat surface exposed to radiation during operation, the resistivity of said semiconductor layer being between about 50–200 ohm.cm and the resistivity of said substrate being substantially less than 50 ohm.cm, at least one radiation-sensitive element at said surface, said radiation-sensitive element comprising at least two radiation-sensitive sub-elements forming rectifying junctions with said semiconductor layer, means for separately

applying a reverse bias to said rectifying junctions of each of said sub-elements, the distance between adjacent sub-elements and the thickness of said semiconductor layer being so small that in operation the depletion regions associated with said rectifying junctions extend in a lateral direction parallel to said surface so as to merge, and extend in a vertical direction perpendicular to said surface so as to deplete said semiconductor layer over the greater part of its thickness, the lateral distance



between adjacent sub-elements being at most equal to twice the thickness in the lateral direction of the depletion region located laterally adjacent and associated with each sub-element during operation, each of said radiation-sensitive sub-elements comprising means for detecting a current through said sub-element generated by radiation impinging on said surface, and the surface area between adjacent radiation-sensitive sub-elements and the major part of each of said sub-elements being accessible to said radiation.

**4,791,469**  
**PHOTOELECTRIC CONVERTER**

Tadahiro Ohmi, Sendai, and Nobuyoshi Tanaka, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 625,130, Jan. 27, 1984, Pat. No. 4,686,554.

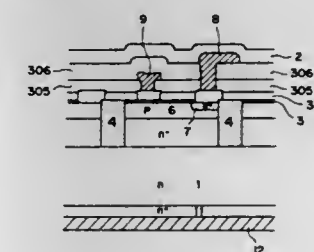
This application Jan. 8, 1987, Ser. No. 1,580

Claims priority, application Japan, Jul. 2, 1983, 58-120751; Jul. 2, 1983, 58-120752; Jul. 2, 1983, 58-120753; Jul. 2, 1983, 58-120754; Jul. 2, 1983, 58-120755; Jul. 2, 1983, 58-120756; Jul. 2, 1983, 58-120757

Int. Cl.<sup>4</sup> H01L 27/14, 31/00

U.S. Cl. 357—30

105 Claims



1. A photoelectric converter, comprising:
  - a transistor including:
    - a first semiconductor region of a first conductivity type, a second semiconductor region of the first conductivity type, and
    - a third semiconductor region of a second conductivity type opposite to the first conductivity type and operatively associated with the first and second semiconductor regions to form the transistor, said third semiconductor region being capable of accumulating photoexcited carriers therein;
  - first reference potential means, disposed connectable to the second semiconductor region;
  - switching means for connecting the second semiconductor region to the first reference potential means;



- (d) second reference potential means connected to the first semiconductor region; and
- (e) bias means for forward biasing the third semiconductor region with respect to the second semiconductor region while the second semiconductor region is not connected to the first reference potential means for readout of the photoexcited carriers in the third semiconductor region and while the second semiconductor region is connected to the first reference potential means for the refreshing; said bias means including means for controlling the potential of the third semiconductor region preferentially to the first and second semiconductor regions.

15. A photoelectric converter according to claim 1, wherein said transistor is provided in a plurality arranged in a matrix comprising rows and columns.

16. A photoelectric converter according to claim 15, wherein said bias means is so connected to the plurality of transistors as to refresh all the transistors at a time.

#### 4,791,470 REVERSE CONDUCTING GATE TURN-OFF THYRISTOR DEVICE

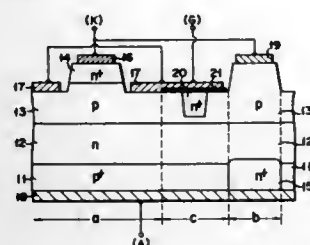
Takashi Shinohe, Kawasaki; Kazuhiko Takigami; Hiromichi Ohashi, both of Yokohama; Tsuneo Ogura, Kamakura, and Masayuki Asaka, Miura, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Continuation of Ser. No. 742,272, Jun. 7, 1985, abandoned. This application Jun. 22, 1987, Ser. No. 63,752

Claims priority, application Japan, Jun. 12, 1984, 59-120361; Dec. 17, 1984, 59-265776

Int. Cl.<sup>4</sup> H01L 29/74

U.S. Cl. 357—38

7 Claims

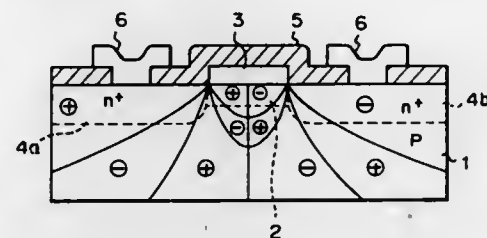


1. A reverse conducting gate turnoff thyristor device comprising:
- a semiconductor wafer;
  - a gate turn-off thyristor section formed in said semiconductor wafer having a gate electrode and constituting a gate turn-off thyristor;
  - a reverse conduction diode section formed in said semiconductor wafer and near said gate turn-off thyristor and constituting a diode connected in antiparallel with said gate turn-off thyristor section;
  - an isolation region which is a p-type layer formed in a region that is sandwiched by said gate turn-off thyristor section and said reverse conduction diode section in said semiconductor wafer;
  - separating means formed by one of a groove and an n-type region provided in said p-type layer of said isolation region; and
  - an insulation film is formed on said, separating means and gate electrode extending over said insulation film.

4,791,471  
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE  
Tsukasa Onodera; Haruo Kawata, and Toshiro Futatsugi, all of Atsugi, Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
Continuation of Ser. No. 783,547, Oct. 3, 1985, abandoned. This application Feb. 16, 1988, Ser. No. 158,043  
Claims priority, application Japan, Oct. 8, 1984, 59-209876; Jul. 11, 1985, 60-152861; Aug. 9, 1985, 60-176752  
Int. Cl.<sup>4</sup> H01L 29/04

U.S. Cl. 357—60

7 Claims



1. A semiconductor integrated circuit device, comprising:
- a compound semiconductor substrate formed of a group III-V compound semiconductor having a zinc blend type crystal structure, the surface of said compound semiconductor substrate being a (110) crystal surface;
  - a plurality of field effect transistors, each including: source and drain regions formed at the surface of said compound semiconductor substrate and positioned such that the direction of a drain current is [001] with respect to said compound semiconductor substrate; and
  - a gate electrode formed directly on the surface of said compound semiconductor substrate and between said source and drain regions, said gate electrode forming a Schottky contact with said compound semiconductor substrate; and
  - an insulating layer formed on said gate electrode and directly on the surface of said compound semiconductor substrate adjacent to said gate electrode, said insulating layer exerting a tensile stress on said compound semiconductor substrate, the stress being applied to said compound semiconductor substrate at a boundary portion between said gate electrode and said insulating layer.

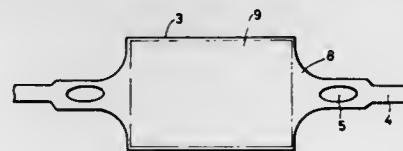
#### 4,791,472 LEAD FRAME AND SEMICONDUCTOR DEVICE USING THE SAME

Susumu Okikawa, Ohme, and Akira Miyai, Musashino, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Continuation of Ser. No. 898,534, Aug. 21, 1986, abandoned.  
This application Feb. 9, 1988, Ser. No. 153,942

Claims priority, application Japan, Sep. 23, 1985, 60-209951  
Int. Cl.<sup>4</sup> H01L 23/48

U.S. Cl. 357—70

2 Claims



1. A semiconductor device comprising a tab, tab suspending leads extended from the side of said tab by way of connection portions located between said tab and tab suspending leads, a pellet bonded to said tab, a plurality of leads disposed at the periphery of said tab, bonding wires in which a plurality of bonding electrodes in the pellet and corresponding leads are wire-bonded to establish electric conduction, and a package in

which at least said pellet, bonding wires and leads near the region connection with said bonding wires are resin-encapsulated, and wherein means are provided in said connection portions for stress relaxation, said means for stress relaxation comprising said connection portions between said tab and suspending leads being progressively widened by way of arcuate portions in a direction toward said tab and wherein the tab suspending leads each comprise a through hole therein located near the connection portions.

#### 4,791,473 PLASTIC PACKAGE FOR HIGH FREQUENCY SEMICONDUCTOR DEVICES

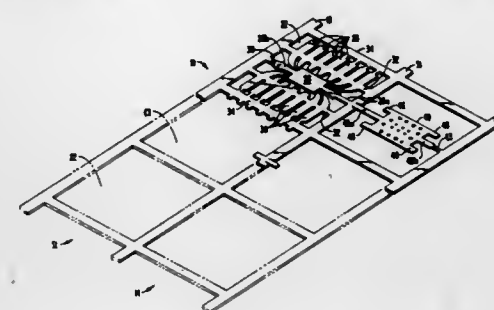
William S. Phyl, Los Altos Hills, Calif., assignor to Fairchild Semiconductor Corporation, Cupertino, Calif.

Filed Dec. 17, 1986, Ser. No. 943,339

Int. Cl.<sup>4</sup> H01L 23/48

U.S. Cl. 357—70

14 Claims



1. An elongate lead frame comprising:
- a plurality of individual frames arranged in a row, each of said frames having attached thereto a paddle, at least one paddle support, and a multiplicity of lead fingers having distal ends arranged in a pattern which circumscribes said paddle;
  - a plurality of ground plane members, wherein each ground plane includes a plurality of bumps arranged in a pattern corresponding to the pattern of the distal ends of the lead fingers; and
  - means for foldably attaching one ground plane member to each individual frame.

4,791,474  
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE  
Yoshihide Sugitara, Tokyo; Hiroaki Ichikawa, Yokohama; Nobutake Matsumura, and Nobuo Sasaki, both of Kawasaki, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan  
Continuation of Ser. No. 861,638, May 7, 1986, abandoned, which is a continuation of Ser. No. 780,243, Sep. 26, 1985, abandoned, which is a continuation of Ser. No. 683,954, Dec. 19, 1984, abandoned, which is a continuation of Ser. No. 174,139, Jul. 31, 1980, abandoned. This application Dec. 8, 1987, Ser. No. 131,323

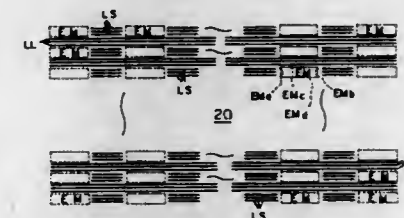
Claims priority, application Japan, Jul. 31, 1979, 54-97623  
Int. Cl.<sup>4</sup> H01L 27/04

U.S. Cl. 357—71

14 Claims

1. A CMOS master slice array, comprising:
- a plurality of CMOS elements disposed in columns and rows;
  - a plurality of first wiring patterns having a first length, disposed in parallel between adjacent ones of said CMOS elements within respective ones of said columns of said CMOS elements;
  - a plurality of second wiring patterns having a second length, the second length being longer than the first length, disposed in parallel between adjacent ones of said columns of said CMOS elements and extending in a direction parallel to the columns;
  - an insulating layer formed on said CMOS elements, said

second wiring patterns, and said first wiring patterns, said insulating layer having a plurality of holes formed therein, and disposed above selected areas of said CMOS elements and said first and second wiring patterns; and



a plurality of aluminum lines, selectively disposed above said plurality of holes and said insulating layer so as to provide desired electrical connections between the selected areas of said CMOS elements.

#### 4,791,475 DIGITAL ANALYZER SYSTEM OF THE SYNCHRONIZING PARAMETERS OF A COLOR VIDEO SIGNAL

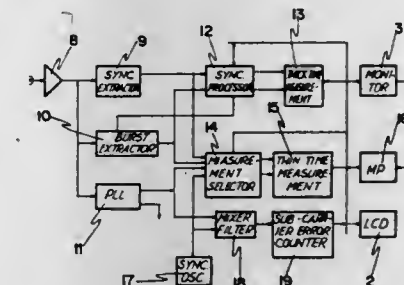
Jose F. Lopez Luz, Madrid, Spain, assignor to Pesa Electronica, S.A., Madrid, Spain

Filed Apr. 8, 1986, Ser. No. 849,461

Claims priority, application Spain, Aug. 6, 1985, 545940  
Int. Cl.<sup>4</sup> H04N 9/62

U.S. Cl. 358—10

5 Claims



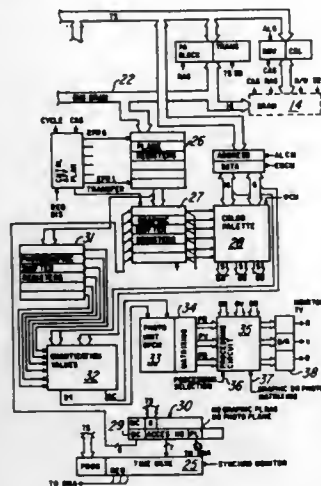
1. A system for digitally analyzing a color video signal comprising:
- (a) means for extracting horizontal synchronizing signals from said video signal;
  - (b) means for extracting a burst signal from said video signal;
  - (c) means for processing said synchronizing signal and said burst signal to generate a plurality of output signals comprising a vertical synchronizing signal, an end-of-field pulse signal (F), a vertical blanking pulse, an equalizing signal (ESC), a burst flag signal, a burst position signal and a burst blanking signal (BB);
  - (d) time measuring means controlled by microprocessor means;
  - (e) multiplexing means coupled to said processing means and controlled by said microprocessor means for selecting one of said output signals or said synchronizing signal as an input signal to said time measuring means;
  - whereby said microprocessor means selects said output signals in sequence for measurement of values of said output signals by said time measuring means; and
  - (f) display means coupled to said microprocessor means for displaying said measured values.

**4,791,476**  
**DEVICE FOR THE COMPOSITION OF COLOR COMPONENT SIGNALS FROM LUMINANCE AND CHROMINANCE SIGNALS AND VIDEO DISPLAY DEVICE COMPRISING THE APPLICATION THEREOF**  
 Gerard Chauvel, Cognac, France, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 18, 1986, Ser. No. 887,583  
 Int. Cl. H04N 11/06

U.S. Cl. 358-13

9 Claims

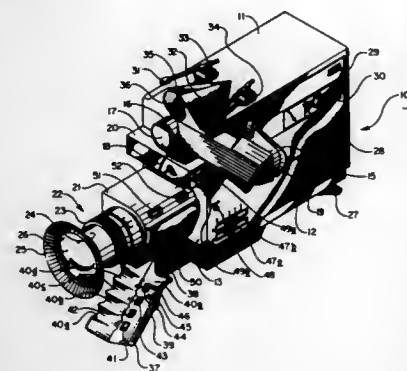


3. A device according to claim 1, characterized in that said means for decoding said luminance and chrominance signals comprise a differential pulse code modulation (DPCM) decoder per colour component to be obtained, each of said decoders comprising an adder (48, 49, 50) of values of quantization of luminance and chrominance obtained by selection after comparison of the value of luminance and chrominance between neighbouring points, and a register (51, 52, 53) controlled by a gate circuit (54) for transferring the signals contained in the corresponding adder to the associated matrixing circuit (43, 44, 46, 45).

**4,791,477**  
**VIDEO RECORDING CAMERA**  
 John M. Blazek, and John R. Tipton, Jr., both of Baltimore, Md., assignors to Leonard Bloom, Towson, Md., a part interest  
 Division of Ser. No. 60,250, Jun. 10, 1987, Pat. No. 4,764,817.  
 This application Apr. 27, 1988, Ser. No. 189,409  
 Int. Cl. H04N 5/76

U.S. Cl. 358-341

18 Claims



1. In a hand-held video recording camera having a lens, an

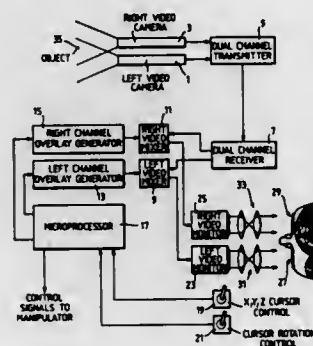
image pickup means operatively arranged to receive image information from the lens for converting the image information into an electric image data output signal, microphonic means operatively arranged to receive sound from a subject or subjects within view of the lens for producing audio signals corresponding to the sound received and means for recording signals representing the image data and audio signals, an improvement comprising a source within the hand-held camera of further audio signals; and audio mixing means within the hand-held camera for mixing the audio signals corresponding to the sound received by said microphone means and to the further audio signals, said audio mixing means having its output coupled to said means for recording signals representing the image data and the audio signals.

**4,791,478**  
**POSITION INDICATING APPARATUS**  
 Colin J. Tredwell, and Donald R. C. Price, both of Kent, England, assignors to GEC Avionics Limited, England  
 Filed Oct. 3, 1985, Ser. No. 783,422  
 Claims priority, application United Kingdom, Oct. 12, 1984, 8425827

Int. Cl. H04N 13/00

U.S. Cl. 358-88

5 Claims



1. An apparatus for indicating the position of an object in a three-dimensional space comprising: imaging means including means for producing two two-dimensional images of a scene including said object from two viewing positions separated by a distance equal to the interocular spacing of an observer, and means for respectively displaying said images at positions separated by said distance for respective viewing by the two eyes of the observer so as to produce a stereoscopic image of said scene; superimposing means for superimposing on said stereoscopic image a stereoscopic image of a cursor including means for superimposing on each of said displayed images a respective one of two two-dimensional images of said cursor; control means including means for varying the respective positions of said cursor images in said images of the scene so as to vary the apparent position of said cursor in said scene; and signal generating means for deriving from said control means signals representing the apparent position of said cursor.

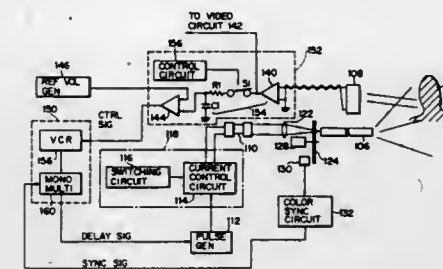
**4,791,479**  
**COLOR-IMAGE SENSING APPARATUS**  
 Hisao Ogiu, and Toshiaki Noguchi, both of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan  
 Filed May 29, 1987, Ser. No. 55,700  
 Claims priority, application Japan, Jun. 4, 1986, 61-128151; Nov. 13, 1986, 61-270461  
 Int. Cl. A61B 1/04, 1/06; H04N 7/18, 9/07  
 U.S. Cl. 358-98

13 Claims

1. A color-image sensing apparatus comprising:  
 light source means for emitting a flashlight;

image sensing means for imaging an object illuminated by said light source means;  
 filter means having at least two filters of respectively different colors for interposition cyclically into an optical path extending from said light source means to said image sensing means;  
 light source control means for detecting when each filter of

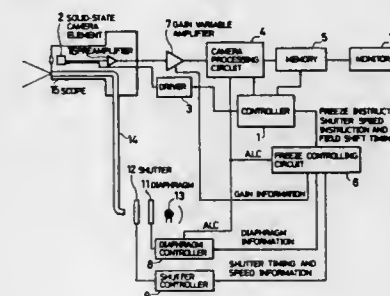
has substantially the same brightness as that of a real-time image for every light intercepting operation of said light intercepting means.



said filter means is interposed in said optical path and causing said light source means to emit said flashlight after a lapse of time after said detection, said time being variable; and  
 signal processing means for synthesizing images of at least two different color components delivered successively from said image sensing means, thereby producing a full-color image.

**4,791,480**  
**ENDOSCOPIC SYSTEM WITH ADJUSTABLE LIGHT SOURCE**  
 Yuuichi Muranaka, Ootawara, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Sep. 11, 1987, Ser. No. 95,267  
 Claims priority, application Japan, Sep. 29, 1986, 61-228230  
 Int. Cl. H04N 7/18; A61B 1/06  
 U.S. Cl. 358-98

7 Claims

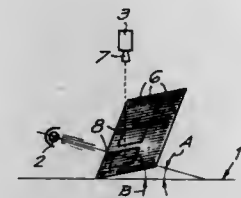


1. An endoscopic system comprising:  
 (a) a light source for continuously irradiating with light an object to be photographed;  
 (b) a solid-state camera element for obtaining image signals from the object;  
 (c) a memory for storing the image signals obtained from said solid-state camera element as predetermined units;  
 (d) display converting means for reading out a unit image corresponding to one of the predetermined units under a freezing state from said memory;  
 (e) intercepting means for intercepting the continuous light from said light source when said display converting means reads units of the frozen image from said memory, such that pulsed light is irradiated onto said object in synchronism with the transferring the image signal corresponding to one of the units from said solid-state camera element; and  
 (f) image adjusting means for adjusting a quantity of light irradiated from said light source such that a frozen image

**4,791,481**  
**METHOD FOR LOCATING WEFT THREAD DEFECTS IN FABRIC**  
 Piet Verdiere, Kortrijk, and Michel Vandeweghe, Wijtachte-Heuveland, both of Belgium, assignors to Picanol N.V., Belgium  
 Filed Jun. 18, 1987, Ser. No. 63,316  
 Claims priority, application Netherlands, Jul. 11, 1986, 8601818  
 Int. Cl. H04N 7/00

U.S. Cl. 358-101

4 Claims



1. A method for locating the depth of weft threads in a woven fabric including the steps of:  
 (a) illuminating the fabric surface with contrast enhancing light;  
 (b) generating a close-up first video image of the illuminated fabric surface located in a first plane relative to the video viewing angle, the image depicting the surface profile of the woven threads, in particular the weft thread;  
 (c) from the video image, determining the distance V between adjacent weft threads;  
 (d) rotating the plane of the fabric relative to the video viewing angle about an axis extending parallel to the weft threads and generating a close-up second video image of the illuminated fabric surface in a second plane;  
 (e) from the second video image determining the distance W between the adjacent weft threads;  
 (f) determining the weft thread depth D according to the formula

$$W = V \cos B + D \sin B.$$

**4,791,482**  
**OBJECT LOCATING SYSTEM**  
 Robert F. Barry, and Samuel Kang, both of Monroeville, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
 Filed Feb. 6, 1987, Ser. No. 11,988  
 Int. Cl. H04N 7/18

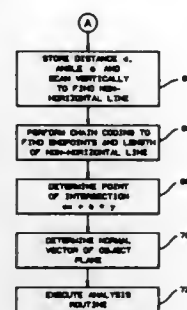
U.S. Cl. 358-107

23 Claims

1. An object location method, comprising the steps of:  
 (a) projecting a light pattern onto the object with a light source;  
 (b) digitizing the light pattern reflected from the object using



a camera, where the camera and the light source are in a known geometric relationship to each other; and



(c) locating and orienting the object in space by determining a normal to a surface of the object.

4,791,483

### ADAPTIVE DIFFERENTIAL PULSE CODE MODULATION VIDEO ENCODER

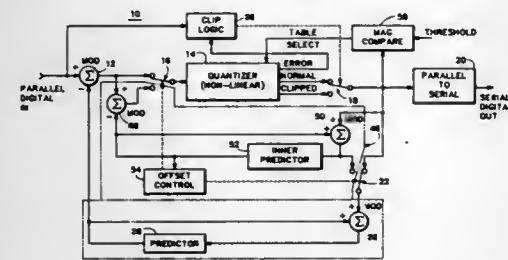
Robert L. Miller, Penn Valley, Calif., assignor to The Grass Valley Group, Inc., Grass Valley, Calif.

Filed Nov. 20, 1987, Ser. No. 123,402

Int. Cl.<sup>4</sup> H04N 7/13, 11/04

U.S. Cl. 358—135

20 Claims



1. An apparatus for directly encoding a sampled composite video signal having a color subcarrier component into a bit reduced serial digital output signal comprising:  
means for nulling out the color subcarrier component from the sampled composite video signal to produce a difference signal having a high probability of values near zero, the difference signal representing information contained in the sampled composite video signal; and  
means for converting the difference signal into the bit reduced serial digital output signal.

4,791,484

### TAPE CARTRIDGE CASE COMPOSITION FOR REDUCING MODULATION NOISE

Sigeo Sasaki, Kyoto, Japan, assignor to Hitachi Maxell, Ltd., Osaka, Japan

Filed Sep. 4, 1986, Ser. No. 903,449

Claims priority, application Japan, Sep. 4, 1985, 60-195174

Int. Cl.<sup>4</sup> G11B 23/02

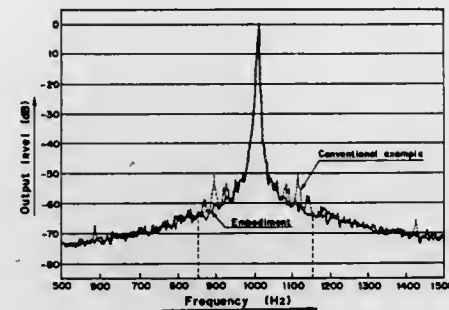
U.S. Cl. 360—132

11 Claims

1. A tape cartridge case formed from a composition which comprises a mixture of:

a plastic base material comprising a polyolefin resin, and  
a filler in an amount of 45 percent to 65 percent by weight of said plastic base material said filler comprising particles of

at least one compound selected from the group consisting of calcium carbonate and barium sulfate,



wherein said tape cartridge case exhibits a dynamic loss of more than  $1 \times 10^9$  dyne/cm<sup>2</sup> within a range of oscillation frequency of from 0.1 Hz to 1000 Hz.

4,791,485

### SYSTEM FOR DETECTING A TRANSMISSION ERROR

Hideo Kuroda, Yokosuka; Naoki Mukawa, Isehara; Makoto Hiraoka, Tokyo; Kichiji Matsuda, Kawasaki; Mitsuo Nishiwaki, and Shuzo Tsugane, both of Tokyo, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation, Tokyo; Fujitsu Limited, Kawasaki and NEC Corporation, Tokyo, all of Japan

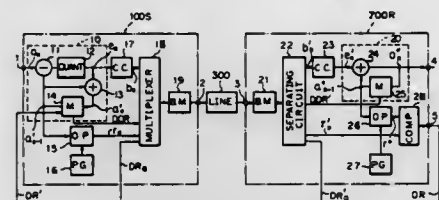
Continuation of Ser. No. 620,516, Jun. 14, 1984, Pat. No. 4,677,480. This application Dec. 19, 1986, Ser. No. 929,435

Claims priority, application Japan, Jun. 16, 1983, 58-106806

Int. Cl.<sup>4</sup> H04N 7/12

U.S. Cl. 358—136

11 Claims



5. An inter-frame encoding/decoding apparatus for encoding television data to be transmitted over a transmission line and for decoding a received signal received over the transmission line from a similar inter-frame encoding/decoding apparatus, comprising:

a first frame memory for storing a first picture frame of the television data;  
encoding means, operatively connected to said first frame memory and to receive the television data, for generating an encoded signal from a difference between the television data and the first frame;

first operation means, operatively connected to said first frame memory and the transmission line, for separating the first picture frame into first bit groups each having a first corresponding number of bits with a predetermined logic level and for calculating first remainders by dividing the first corresponding number in each of the first bit groups by a predetermined value;

decoding means, operatively connected to the transmission line, for decoding the received signal into a second picture frame;

a second frame memory, operatively connected to said decoding means, for storing the second picture frame;

second operation means, operatively connected to said second frame memory, for separating the second picture frame into second bit groups each having a second corre-

sponding number of bits with the predetermined logic level and for calculating second remainders by dividing the second corresponding number in each of the second bit groups by the predetermined value; and  
comparing means, operatively connected to said receiving means and said second operation means, for comparing the first and second remainders to detect a transmission error.

4,791,486

### RECURSIVE IMAGE ENCODING/DECODING USING INTERPOLATION WITHIN VARIABLY SUB-DIVIDED PICTURE AREAS

Hugh Spriggs, Ipswich; Charles Nightingale, Felixstowe, and Roger D. Turkington, Stowmarket, all of England, assignors to British Telecommunications Public Limited Company, United Kingdom

PCT No. PCT/GB86/00060, § 371 Date Oct. 1, 1986, § 102(e) Date Oct. 1, 1986, PCT Pub. No. WO86/04757, PCT Pub. Date Aug. 14, 1986

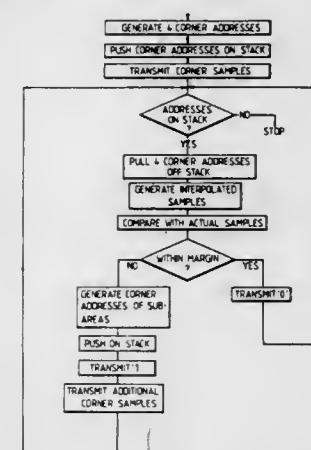
PCT Filed Feb. 3, 1986, Ser. No. 923,827

Claims priority, application United Kingdom, Feb. 5, 1985, 8502924

Int. Cl.<sup>4</sup> H04N 7/12

U.S. Cl. 358—138

29 Claims



1. A method of image transmission comprising repetitively:  
(a) generating an estimate of a picture area by interpolation from selected actual samples thereof to provide estimated samples;  
(b) comparing the estimated samples with the actual samples; and  
(c) if the estimated and actual samples differ by less than a threshold criterion, transmitting picture data representing the said actual samples, and if they do not, notionally dividing the area under consideration into two or more sub-areas and subjecting each sub-area to steps (a), (b) and (c) until a minimum sub-area size is reached.

4,791,487

### PICTURE SIGNAL CONVERSION DEVICE

Susumu Kozuki, Tokyo; Tadayoshi Nakayama, and Chikara Sato, both of Kanagawa, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 24, 1986, Ser. No. 877,899

Claims priority, application Japan, Jun. 28, 1985, 60-143321; Jun. 28, 1985, 60-143322; Jun. 28, 1985, 60-143323; Jun. 28, 1985, 60-143324

Int. Cl.<sup>4</sup> H04N 7/12, 7/01, 5/14

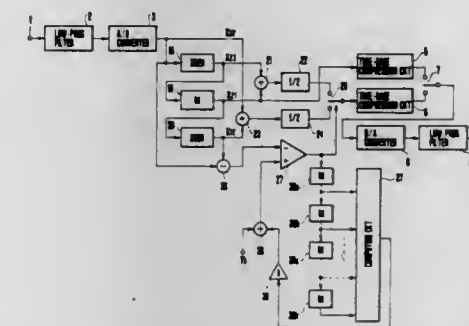
U.S. Cl. 358—140

31 Claims

1. A picture signal conversion device arranged to obtain an interpolation signal by using a scanning line signal corresponding to a predetermined number of scanning lines within one

field period and to convert said first picture signal into a second picture signal which has a greater number of scanning lines than that of said first picture signal, comprising:

(a) first interpolation signal generating means which generates a first interpolation signal for the present field by using a scanning line signal obtained within the present field;  
(b) second interpolation signal generating means which generates a second interpolation signal for the present field by using scanning line signals of other fields;  
(c) correlativity detecting means for detecting correlativity



between scanning line signals of other fields by comparing a difference in signal level between said scanning line signals of the other fields and a threshold level;

(d) output means arranged to selectively output said first or second interpolation signal generated from said first or second interpolation signal generating means, in accordance with the correlativity detected by said correlativity detecting means; and

(e) threshold control means for controlling said threshold level in accordance with a variation of the correlativity detected by said correlativity detecting means within a predetermined period.

4,791,488

### LINE-LOCKED CLOCK SIGNAL GENERATION SYSTEM

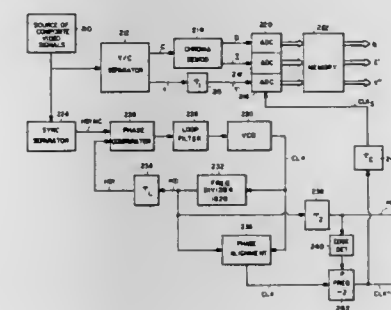
Kazuo Fukazawa, Tokyo, and Toshio Kanenchi, Saitama, both of Japan, assignors to RCA Licensing Corporation, Princeton, N.J.

Filed Aug. 12, 1987, Ser. No. 84,346

Int. Cl.<sup>4</sup> H04N 5/04

U.S. Cl. 358—149

7 Claims



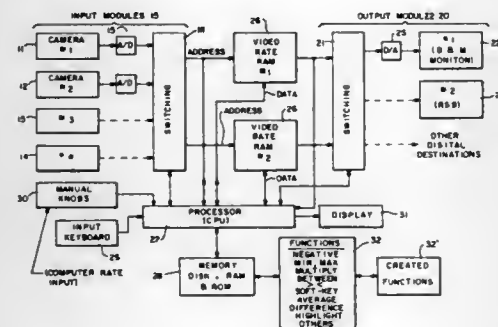
1. A clock signal generation system comprising:  
a source of reference signal having a frequency that is substantially equal to a predetermined frequency;  
a phase locked loop, coupled to said source of reference signal for generating first and second oscillatory signals that are locked in phase to said reference signal, wherein said first oscillatory signal has a nominal frequency of N times said predetermined frequency, N being an integer

greater than 1, and is subject to undesirable variations in frequency between predetermined minimum and maximum values, and said second oscillatory signal has a frequency substantially equal to said predetermined frequency; and signal phase alignment means, coupled to said phase locked loop for compensating for the undesirable variations in frequency of said first oscillatory signal, including: means, responsive to said first oscillatory signal for developing M further oscillatory signals representing M respectively different phases of said first oscillatory signal where M is an integer greater than 1; and means responsive to said second oscillatory signal for continually selecting from among said M further oscillatory signals, an output oscillatory signal having a transition which is approximately coincident with a transition in said second oscillatory signal.

**4,791,489**  
**GENERAL PURPOSE VIDEO SPECIAL EFFECTS SYSTEM AND METHOD THEREFOR**  
Michael Polataick, P.O. Box 20026, Oakland, Calif. 94620  
Filed Mar. 6, 1987, Ser. No. 22,391  
Int. Cl.<sup>4</sup> H04N 5/14

U.S. Cl. 358—160

16 Claims



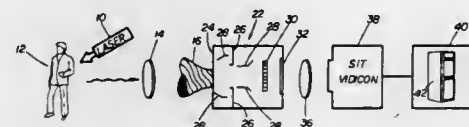
1. A general purpose video special effects system and method using random access memory (RAM) means in combination with one or more input sources, at least one being a video source, and with at least one video output destination comprising the steps of:

- providing a plurality of processing modules each having a predetermined function;
- connecting said modules in accordance with said associated functions to provide a composition of functions which determines said special effects;
- specifying connections representing signal flow between said input source and said processing modules and said output destination and said processing modules;
- pre-computing said special effects for substantially all possible values of permutations of said input sources;
- storing said pre-computations in said RAM means at addresses determined by said values of said input sources; and
- allowing said input sources to drive the address inputs of said RAM and read out said stored pre-computation contents of said RAM, in real time, to said video output destination.

**4,791,490**  
**DETECTOR FOR THREE-DIMENSIONAL OPTICAL IMAGING**  
Frederick K. Knight, Wayland, and Kenneth Kalata, Cambridge, both of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.  
Filed Jul. 2, 1987, Ser. No. 69,388  
Int. Cl.<sup>4</sup> H04N 13/00

U.S. Cl. 358—209

27 Claims

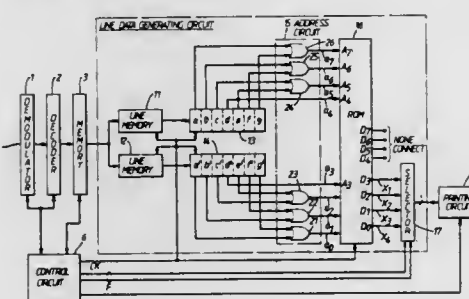


1. Detector for three-dimensional optical imaging comprising:
  - a focusing lens;
  - a fiber optic array configured to receive a two-dimensional image from the lens and to convert the two-dimensional image into a line image;
  - a streak camera responsive to light from the fiber optic array adapted to provide time resolution for light from each fiber of the fiber optic array;
  - a two-dimensional detector to record the light output from the streak camera; and
  - electronic apparatus to store and process information from the two-dimensional detector.

**4,791,491**  
**SUPPLEMENTAL DATA GENERATION FOR COMPLEMENTING ADJACENT LINES OF FACSIMILE DATA**  
Takehiko Minowa, Hino, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan  
Filed Feb. 2, 1987, Ser. No. 9,778  
Claims priority, application Japan, Jan. 31, 1986, 61-17804  
Int. Cl.<sup>4</sup> H04N 1/23, 1/387

U.S. Cl. 358—284

13 Claims



1. In a device for printing characters in a first and a second predetermined pattern on adjacent first and second real data lines, respectively, a method of generating M supplemental data lines comprising supplemental characters for placement between the adjacent real data lines to complement the adjacent real data lines in a curvilinear fashion, said method comprising the steps of:
  - determining a first set of M borders about a group of contiguous characters on the first real data line, each border N being a distance N\*x from the left-most and right-most characters of the group of contiguous characters on the first real data line and a distance N\*y from the lower portion of the first real data line for N=1, 2, . . . , M, x corresponding to the effective horizontal width of the character and y corresponding to the effective vertical height of the character;

determining a second set of M borders about a group of contiguous characters on the second real data line, each border L being a distance L\*x from the left-most and right-most characters of the group of contiguous characters on the second real data line and a distance L\*y from the upper portion of the second real data line for L=1, 2, . . . , M;

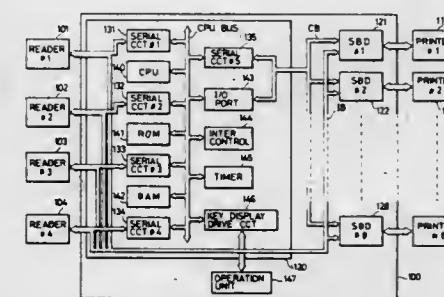
determining the intersecting boundary between the borders N and L, wherein  $L = ((M+1) - N)$  for N=1, 2, . . . , M on each of the M supplemental lines; and,

generating the supplemental characters on each of the M supplemental data lines at the locations determined by the intersecting boundary on each of the M supplemental lines.

**4,791,492**  
**IMAGE PROCESSING SYSTEM**  
Naon Nagashima, Yokohama; Kiyohisa Sugahara, Tokyo, and Masanori Yamada, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Apr. 9, 1984, Ser. No. 598,192  
Claims priority, application Japan, Apr. 12, 1983, 58-63851; Apr. 12, 1983, 58-63852; Aug. 18, 1983, 58-151026  
Int. Cl.<sup>4</sup> H04M 1/00, 1/32, 1/36

U.S. Cl. 358—256

30 Claims



1. An image processing system comprising:
  - generating means for generating digital image signals;
  - plural image forming means for image formation in response to said digital image signals; and
  - transmission means for transmitting the digital image signals generated by said generating means to said plural image forming means,
 wherein said transmission means is provided with plural synchronizing means each for providing synchronization of transmission of said digital image signals to an associated one of said plural image forming means so as to achieve simultaneous image formation by said plural image forming means in response to the same digital image signals, and
  - wherein each of said synchronizing means comprises memory means for storing the digital image signals generated by said generating means.

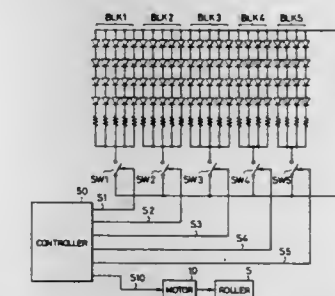
**4,791,493**  
**IMAGE READING APPARATUS WITH ILLUMINATION TIMING CONTROL**  
Makoto Ogura, Hiratsuka; Tatsundo Kawai, Kawasaki; Katsuhiko Yamada, Hiratsuka, and Shinichi Seitoh, Isehara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 757,471, Jul. 22, 1985, abandoned. This application Aug. 19, 1987, Ser. No. 88,486  
Claims priority, application Japan, Jul. 31, 1984, 59-160340  
Int. Cl.<sup>4</sup> H04M 1/024

U.S. Cl. 358—294

5 Claims

1. An image reading apparatus comprising:
  - a photosensor array of photosensors which are arranged in a direction of width of an original and which receive light derived through a surface of the original and convert information borne by the light into electric signals, in

which a period of time from reception of the light by said photosensors until the electric signals are outputted cannot be ignored as compared with a reading scan time when the signals are read from said photosensor array; a light source arranged in the direction of width of the original and divided into a plurality of blocks; and

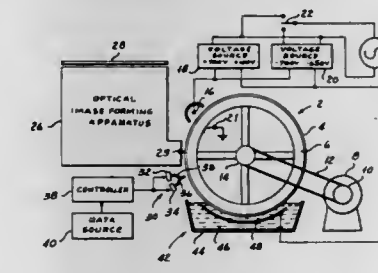


light-on control means for lighting said blocks of said light source for reading the original, beginning prior to initiation of reading of the original, for a time interval greater than said period of time from the time when said photosensors receive the light until the electric signals are outputted.

**4,791,494**  
**MULTIPLE VARIABLE LIGHT SOURCE PRINTER**  
Louis F. Schaefer, Palo Alto, Calif., assignor to Savin Corporation, Stamford, Conn.  
Continuation of Ser. No. 470,733, Mar. 7, 1983, abandoned, which is a continuation of Ser. No. 14,471, Feb. 23, 1979, abandoned. This application Apr. 30, 1984, Ser. No. 605,977  
Int. Cl.<sup>4</sup> H04N 1/23; G03G 21/00

U.S. Cl. 358—300

5 Claims



1. An electrophotographic printer including in combination a photoconductive member, means for charging said member, an array of light emitting diodes optically coupled to respective regions of the charged member, and means for independently exciting said diodes to form a latent electrostatic image on the member, said exciting means including a first group comprising a first number F of conductors, a second group comprising a second number S of conductors, the product FS of the first and second numbers being equal to the number of diodes in the array, means connecting each conductor of the first group to one terminal of S diodes, and means connecting each conductor of the second group to the other terminal of F diodes, the connections being such that concomitant energization of one conductor of the first group and one conductor of the second group excites one diode in the array.



**4,791,495**  
**DIGITAL SIGNAL RECORDING AND REPRODUCING SYSTEM HAVING AN INTERFACE FOR DUBBING A COLOR TELEVISION SIGNAL IN THE COMPONENT FORM**

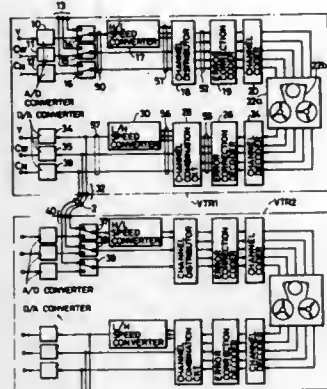
Masao Umemoto, Tokyo; Yoshizumi Eto, Sagami-hara; Shinichi Miyazaki; Hidehiro Kanada, both of Kodaira; Hitoshi Katayama, Nerima, and Yuichi Michikawa, Kasama, all of Japan, assignors to Hitachi Denchi Kabushiki Kaisha and Hitachi Ltd., both of Tokyo, Japan

Filed May 13, 1986, Ser. No. 862,639

Claims priority, application Japan, May 13, 1985, 60-99586  
 Int. Cl.<sup>4</sup> H04N 9/79

U.S. Cl. 358—310

6 Claims



1. A digital signal recording and reproducing system comprising:

- analog-to-digital conversion means for converting a plurality of analog signal components of an analog color television signal in component form to a plurality of digital signal components;
- recording means for recording said plurality of digital signal components on a plurality of channels of a recording medium;
- reproducing means for reproducing said plurality of digital signal components from said plurality of channels of said recording medium;
- digital-to-analog conversion means for converting said plurality of reproduced digital signal components to analog signal components of an analog color television signal in component form; and
- interface means for outputting said reproduced digital signal components corresponding to said analog signal components of said analog color television signal in component form, as signals for dubbing.

**4,791,496**  
**SYSTEM FOR PRESENTING AUDIOVISUAL INFORMATION TO AN AUDIENCE**

Setoaki Kageyama; Yasushi Nakamura; Takashi Kondo, all of Yokohama; Shozo Abe, Kawasaki, and Kazuhiro Mori, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 9, 1986, Ser. No. 849,823

Claims priority, application Japan, Apr. 12, 1985, 60-77884  
 Int. Cl.<sup>4</sup> H04N 5/76

U.S. Cl. 358—342

6 Claims

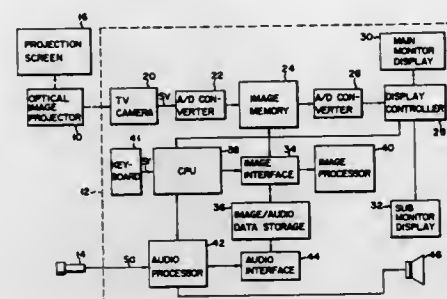
1. An audiovisual information presentation system, which is used together with an optical image projection apparatus for sequentially optically projecting illustrations drawn on paper sheets in advance onto a projection screen when a presentation is made to an audience at a meeting place, and which stores and administers the illustrations on the paper sheets, said system comprising:

image input means for sensing images projected on said

projection screen of said optical image projection apparatus to produce corresponding video image signals;

speech input means for receiving an input speech relating to the images projected on said projection screen and producing audio signals corresponding to each video image signal in a real time manner;

data storage means electrically connected to said image input means and said speech input means and having a memory capacity sufficient to store a plurality of pairs of image and audio data together with index code data, each of said pairs including image data to be displayed and corresponding audio data;



control means, connected to said data storage means, for, in a recording mode, storing in said data storage means the image data input by said image input means together with the corresponding audio data input by said speech input means, and for, in a search mode, retrieving a desired pair of image and audio data from said data storage means when an image already projected on said projection screen is requested again during the presentation; and

reproduction means, connected to said data storage means, for receiving the received pair of image and audio data and electrically reproducing it independent of an optical image displayed on said projection screen.

**4,791,497**  
**APPARATUS FOR RECORDING AND/OR REPRODUCING, IN SUCCESSIVE SLANT TRACKS ON A RECORD TAPE, AT LEAST AN AUDIO SIGNAL AND AN INDEX SIGNAL FOR CONTROLLING TAPE TRANSPORT**

Kenji Nakano; Hiroshi Okada, and Takao Takahashi, all of Tokyo, Japan, assignors to Sony Corp., Tokyo, Japan  
 Filed Jul. 14, 1986, Ser. No. 885,203

Claims priority, application Japan, Jul. 19, 1985, 60-159736;  
 Jul. 22, 1985, 60-161438

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> G11B 5/09, 20/10

U.S. Cl. 360—32

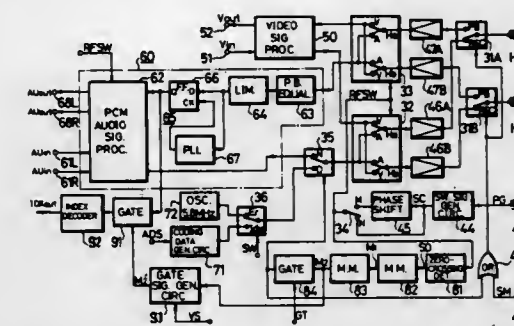
14 Claims

8. An apparatus for recording and/or reproducing, in successive slant tracks on a record tape, an information signal comprised of at least an audio signal and an index signal for use in controlling transportation of tape, comprising:

- audio signal processing means for converting an input audio signal to a digitized form in which the audio data for a predetermined length of time is grouped as a plurality of data blocks;
- transducer means connected to said audio signal processing means for recording and/or reproducing said grouped data blocks containing the digitized audio signal for said predetermined length of time in a first part of a respective slant track on the tape;
- index signal generating means including means for generating a coded index signal to indicate respective input information, means for generating a signal frequency index

signal for controlling tape transportation, and selecting means for alternatively applying said coded index signal and said single frequency index signal to said control means;

index area signal generating means for providing an index area signal in predetermined timed relation to scanning by



said transducer means of said first part of each said slant track; and

control means responsive to said index area signal for supplying said coded index signal to said transducer means for recording by the latter in a second part of said respective slant track which is located adjacent an end of said first part of said respective slant track.

**4,791,498**  
**TIME BASE CORRECTOR**

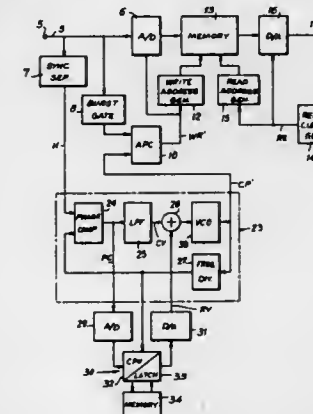
Mitsugu Yoshihiro, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Mar. 26, 1987, Ser. No. 30,473

Claims priority, application Japan, Apr. 11, 1986, 61-83751  
 Int. Cl.<sup>4</sup> H04N 5/95

U.S. Cl. 360—36.2

16 Claims



1. A time base corrector for correcting time base fluctuations in a video signal containing a horizontal synchronizing signal and being reproduced from a recording medium, comprising:

- a write clock generator for generating a write clock signal having said time base fluctuations of the reproduced video signal;
- a memory unit for storing the reproduced video signal in response to the write clock signal; and
- a read clock generator for generating a read clock signal supplied to said memory unit to read the stored reproduced video signal from said memory unit, characterized in that said write clock generator comprises:

voltage controlled oscillator means for generating an oscillating output signal;

frequency divider means for frequency dividing said oscillating output signal to provide a frequency divided output;

phase comparator means for comparing phases of said frequency divided output and said horizontal synchronizing signal of said reproduced video signal to provide a comparison output;

low pass filter means for filtering said comparison output to provide a filtered output;

analog-to-digital converter means for converting said comparison output to digital data;

memory means having a plurality of addresses for storing residual phase error data;

control means supplied with the converted digital data for mixing, in a predetermined ratio, said converted digital data and corresponding residual phase error data read from a selected one of said addresses in said memory means to generate new residual phase error data and to store said new residual phase error data at said selected address;

digital-to-analog converter means for converting said residual phase error data read out from said selected address in said memory means to an analog control voltage; and

adder means for adding together said filtered output of said low pass filter means and said analog control voltage to form a voltage control signal for controlling said voltage controlled oscillator means.

**4,791,499**  
**METHOD AND APPARATUS FOR REPRODUCTION OF VIDEO SIGNALS FROM MAGNETIC TAPE AT A TAPE TRANSPORT SPEED DIFFERING FROM THAT OF RECORDING**

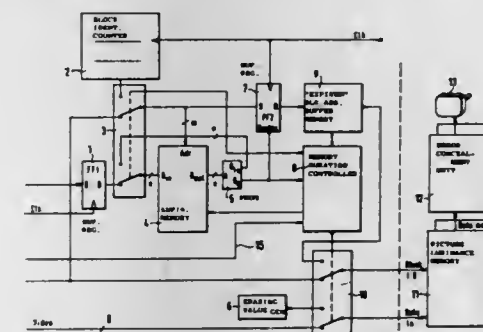
Roland Mester, Darmstadt, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
 Filed Dec. 2, 1986, Ser. No. 936,827

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1985, 3543540

Int. Cl.<sup>4</sup> H04N 5/783

U.S. Cl. 360—10.3

8 Claims



1. Method of reproducing video signals stored on a magnetic tape at a speed differing from the recording speed with the use of picture memory means for storing picture information, said method comprising the steps of:

- determining a maximum storage duration of the picture information in said picture memory means as a function of the tape transport speed to be used in reproduction;
- subdividing the picture information of groups of substantially equal size and assigning an age designation to each group; and
- erasing each said group of picture information in said picture memory as soon as the predetermined storage duration for the particular group has elapsed.

4,791,500

## METHOD AND APPARATUS FOR WRITING INFORMATION ON MAGNETIC DISK WITH SINGLE-GAP MAGNETIC HEAD

Takahiro Miwa, Konan, and Hiroshi Nishikawa, Nagoya, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

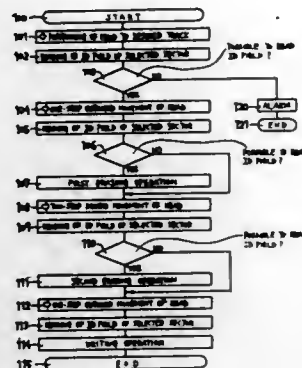
Filed Dec. 15, 1986, Ser. No. 942,072

Claims priority, application Japan, Dec. 18, 1985, 60-285209; Dec. 18, 1985, 60-285211

Int. Cl.<sup>4</sup> G11B 15/04, 5/03

U.S. Cl. 360—60

10 Claims



1. A method of writing information on a magnetic disk having a multiplicity of concentric recording tracks on a recording surface thereof, by means of a single-gap magnetic head which is moved along the recording surface of said magnetic disk in a substantially radial direction of the disk, and is thus positioned at a selected one of said recording tracks, each of said recording tracks having at least one sector each including a sector-identification field storing sector identification data identifying each respective sector, each sector further including a data field on which the information is written, said method comprising:

- a first erasing step comprising positioning said magnetic head at a first erase position of said selected track which is displaced from a centerline of the selected track by a predetermined distance in one of radially inward and outward directions of the disk, causing said magnetic head to read the sector-identification field of a selected one of said at least one sector of the selected track, and then activating said magnetic head to perform a first erasing operation on the data field of said selected sector;
- a second erasing step following said first erasing step, comprising moving said magnetic head from said first erase position to a second erase position of said selected track which is displaced from said centerline by a predetermined distance in the other of said radially inward and outward directions, causing said magnetic head to read the sector-identification field of said selected sector, and then activating said magnetic head to perform a second erasing operation on the data field of said selected sector; and
- a writing step following said second erasing step, comprising moving said magnetic head to said centerline of said selected track, causing said magnetic head to read the sector-identification field of said selected sector, and then activating said magnetic head to write said information on the erased data field of said selected sector.

4,791,501

## MAGNETIC HEAD SUPPORT APPARATUS FOR A TWO-SIDED FLOPPY DISK DRIVE

Takeshi Kumakura, Toshikazu Hayashi, and Kazuo Koike, all of Koriyama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

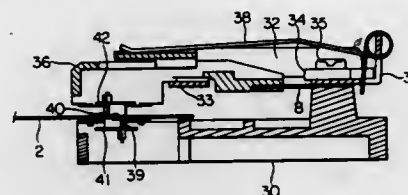
Filed Jun. 30, 1986, Ser. No. 879,955

Claims priority, application Japan, Jul. 3, 1985, 60-144607; Jul. 3, 1985, 60-144609

Int. Cl.<sup>4</sup> G11B 5/54, 21/16

U.S. Cl. 360—105

4 Claims



1. A support apparatus which maintains contact of first and second magnetic heads of a disk drive with a two-sided floppy disk having undulations in its planar surface, said apparatus comprising:

- a carriage having front and rear portions and movable in a radial direction with respect to said two-sided floppy disk;
- an arm rotatably supported by said rear portion of said carriage for rotating between a first position in which a front portion of said arm is remote from said first portion of said carriage and a second position in which said front portion of said arm is in the vicinity of said front portion of said carriage;
- an arm support means for engaging a portion of said arm when said arm is in said second position, thereby preventing rotation of said arm past said second position;
- means for applying a torque to said arm in order to bias said arm in said second position and against said arm support means;
- a first magnetic head supported by said carriage in said front portion thereof;
- a second magnetic head supported by said rotating arm at said front portion thereof and facing said first magnetic head when said arm is in said second position;
- means for supporting said first and second magnetic heads on said carriage and arm, respectively, so as to enable said first and second magnetic heads to move in a direction normal to said planar surface of said two-sided floppy disk in response to said undulations in order that said first and second magnetic heads maintain continuous contact with the surface of said two-sided floppy disk; and
- said means for supporting said first and second magnetic heads including a first means for supporting said first magnetic head having a lesser stiffness than a second means for supporting said second magnetic head.

4,791,502

## APPARATUS FOR POSITIONING A READING-RECORDING HEAD ON A DISC

Sergio Tronzano, Caluso, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Mar. 4, 1987, Ser. No. 21,506

Claims priority, application Italy, Mar. 5, 1986, 67179 A/86

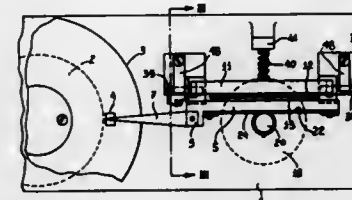
Int. Cl.<sup>4</sup> G11B 5/55, 21/10

U.S. Cl. 360—106

8 Claims

1. Apparatus for positioning a reading-recording head relative to a rotating recording disc, comprising a rotary motor having rotating driving means and mounted on a base member of the apparatus, a carriage for said head moved by said driving means in a radial direction to position said head on said disc, a guide extending parallel to said radial direction and pivotally

mounted on said base, said carriage and said guide each comprising one guiding groove, said grooves being faced to each other and parallel to said direction for accommodating two rolling elements to support and guide said carriage in said radial direction, and biasing means interposed between said



guide and said base to urge the guide against the carriage, said rolling elements being located in said grooves at position spaced apart in opposite directions with respect to said driving means, whereby the thrust of said guide on said carriage arising from said biasing means is absorbed by said driving means.

4,791,503

## MAGNETIC TAPE CARTRIDGE MADE FROM HEAT RESISTANT RESINOUS MATERIAL

Yoshinori Yamamoto, and Muneyoshi Ochi, both of Takatsuki, Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan

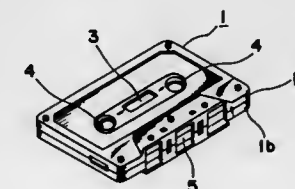
Filed Dec. 24, 1986, Ser. No. 946,026

Claims priority, application Japan, Dec. 26, 1985, 60-293699

Int. Cl.<sup>4</sup> G11B 23/087

U.S. Cl. 360—132

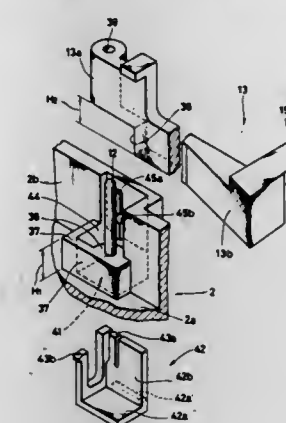
5 Claims



1. A magnetic tape cartridge which comprises a main case made of a resinous material selected from a copolymer comprising repeating units derived from a nitrogen-containing heterocyclic compound and a blend containing a homo- or co-polymer comprising repeating units derived from a nitrogen-containing heterocyclic compound wherein content of the nitrogen-containing compound in the copolymer or blend is from 5 to 30% by weight.

tape is wound and having a front opening across which the tape is guided between the reels, said casing including upper and lower halves respectively defining top and bottom walls of the casing;

- a lid mounted on said casing for movement between an opened position uncovering said front opening and a closed position covering said front opening;
- a pedestal structure in said lower half of the casing having a raised portion which is elevated in respect to said bottom wall for defining a cavity underlying said raised portion and a support surface on said raised portion;
- a mounting pin projecting upwardly from said support surface of the pedestal;
- a lid-locking member pivoted on said mounting pin and including means engageable with said lid for locking said



lid in said closed position, and means engageable by a lock-releasing member of a tape cassette apparatus for pivoting said lid-locking member so as to release said lid for movement to said opened position; said casing further having a detecting hole opening at least through said bottom wall into said cavity under said raised portion of the pedestal structure; and an indicating member movable within said cavity for indicating a characteristic of the tape in the respective tape cassette by the position of said indicating member within said cavity in respect to said detecting hole.

4,791,505

## CYCLIC ACTUATOR LOCK FOR TAPE PLAYER

Kazuki Takai, Toshihiro Ikahata, and Wataru Watanabe, all of Tokyo, Japan, assignors to Clarion Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 563,673, Dec. 20, 1983, abandoned, and a continuation-in-part of Ser. No. 565,059, Dec. 23, 1983, abandoned. This application Sep. 26, 1985, Ser. No. 781,215

Claims priority, application Japan, Dec. 20, 1982, 57-222166; Dec. 23, 1982, 57-225004; Dec. 28, 1982, 57-233035; Dec. 28, 1982, 57-233030

Int. Cl.<sup>4</sup> G11B 15/00

U.S. Cl. 360—137

11 Claims

U.S. Cl. 360—132

9 Claims

1. A tape cassette comprising:

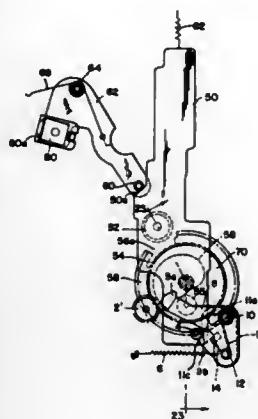
a casing for accommodating a pair of reels around which a

1. In a motor-driven cyclic actuator for a tape player having a rotatably mounted first sector gear having at least one cut-



away portion with the teeth thereof cut away, said first sector gear being rotatably mounted on a frame of said player and being coupled to reciprocatingly drive a mechanical system of said player between two positions thereof, a first drive pinion rotatably mounted on said frame and disposed to drivingly engage said first sector gear and to disengage therefrom when said cutaway portion of said first sector gear is in a position confronting said first drive pinion, releasable locking means for interceptingly arresting said first sector gear in said confronting position thereof, first rotating means for rotating said first sector gear in a given direction from said confronting position thereof to release said locking means and for rotating said first sector gear in said given direction to said confronting position at the end of an actuation cycle so as to be captured in said confronting position thereof by said locking means, and a reciprocatingly mounted power member operably actuated by power member drive means between dormant and extended positions and coupled to operate said locking means from a locked to an unlocked state attendant to motion of said power member in an advancing direction from said dormant to said extended position thereof to initiate a cyclic drive of said first sector gear, the improvement comprising:

- a releasable power member latching means for arresting said power member at said dormant position thereof, said power member drive means including means responsive to release of said power member latching means for operating said power member from said dormant position thereof to said extended position and thereafter back to said dormant position thereof;
- a second drive pinion coupled to said motor to be driven thereby;
- a second sector gear having the teeth thereof removed from a cutaway portion thereof and disposed to be drivingly engaged by said second drive pinion and to be disengaged



therefrom when said second sector gear cutaway portion is in a position confronting said second drive pinion; transfer gear means for continuously coupling said second sector gear to drive said first drive pinion; and second rotating means coupled to said power member and responsive to release of said latching means for urging said second sector gear from said confronting position thereof into meshing driven engagement with said second drive pinion attendant to motion of said power member from said dormant position thereof and for urging said second sector gear to said confronting position of said second sector gear responsively to return of said power member to said dormant position thereof upon disengagement of said second sector gear from said second drive pinion, said transfer gear means being configured to bring said cutaway portion of said first sector gear into a confronting position opposite said first drive pinion when said cutaway portion of said second sector gear is brought to a confronting position opposite said second drive pinion.

#### 4,791,506 TAPE RECORDER WITH STOP DETECTING MECHANISM

Shinsaku Tanaka, Tokyo; Tadao Arata, Inagi, and Kunio Kido, Wako, all of Japan, assignors to Tanashin Denki Co., Ltd., Japan

Filed Dec. 19, 1986, Ser. No. 943,742

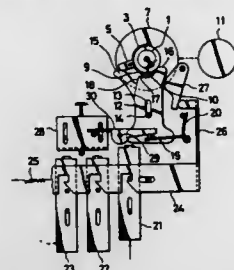
Claims priority, application Japan, Jul. 14, 1986, 61-107602[U]

Int. Cl. G11B 15/48

U.S. Cl. 360-74.2

8 Claims

1. In a tape recorder of the type which includes a reel receiving member, a rotary member connected to be driven to rotate by a motor by way of frictional motion transmitting means for transmitting motion to said reel receiving member and having an engaging portion thereon, a detecting member normally held in contact with said reel receiving member or a rotatable member which is rotated and stopped in synchronism with said reel receiving member such that said detecting member may be urged in a predetermined direction by an urging force caused by a turning force of said reel receiving member or said rotatable member, and an operating member located near said rotary member end having an engaging portion thereon, whereby while said reel receiving member is rotating, said operating member is continuously urged in a predetermined direction by the urging force produced at said detecting member thereby to prevent engagement between said engaging portion of said rotary member end said engaging portion of said operating member, but when the urging force of said detecting member disappears, said engaging portion of said rotary member is engaged with said engaging portion of said operating member to operate said operating member thereby to activate a particular mechanism of said tape recorder, the improvement wherein said rotary member further has a continuous smooth cam face extending around the center of rotation thereof from a radially outermost end of said engaging portion to a radially innermost end of said engaging portion, while said



operating member further has an abutting portion for abutting engagement with said cam face of said rotary member, and a slidably contacting face contiguous to said abutting portion thereof end located such that when said engaging portion of said rotary member is slidably contacted with said slidably contacting face of said operating member, said engaging portion of said operating member is positioned on a locus of rotation of said engaging portion of said rotary member, end wherein said operating member is associated with a movable member which has different positions for a reproduction or recording operating mode and for any other operating mode of said tape recorder such that only while said tape recorder is in the reproduction or recording operating mode, said engaging portion of said operating member is positioned on the locus of rotation of said engaging portion of said rotary member when the urging force of said detecting member disappears, and when said tape recorder is in any other operating mode, said engaging portion of said operating member is positioned at a non-engageable position spaced away from the locus of rotation of said engaging portion of said rotary member, end wherein said rotary member is mounted in a coaxial relationship with said reel receiving member.

#### 4,791,507 APPARATUS FOR REPRODUCING INFORMATION AT VARIABLE SPEEDS FROM A MAGNETIC TAPE

Yoshiaki Doyama, Moriguchi; Kanji Kubo, Hirakata, and Koki Yamada, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

PCT No. PCT/JP85/00259, § 371 Date Dec. 30, 1985, § 102(e)

Date Dec. 30, 1985, PCT Pub. No. WO85/05522, PCT Pub. Date Dec. 5, 1985

PCT Filed May 9, 1985, Ser. No. 817,860

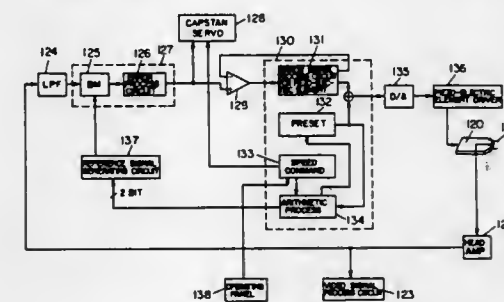
Claims priority, application Japan, May 11, 1984, 59-95001;

Jul. 17, 1984, 59-147801; Sep. 20, 1984, 59-197106

Int. Cl. G11B 5/584, 5/592; H04N 5/783

U.S. Cl. 360-77.15

16 Claims



1. An apparatus for reproducing information signals that have been recorded at adjacent recording tracks disposed at a predetermined track pitch on a magnetic tape, the tape additionally having four kinds of pilot signals that have been recorded sequentially and cyclically over the information signals, said apparatus comprising:

- means for moving the tape at a predetermined feed speed, the means for moving including means for measuring tape speed;
- pickup means for reading the moving tape to generate a pickup output signal, the tape being wound askew around the pickup means, the pickup means including a cylinder which is provided with at least one rotary magnetic head mounted on an electromechanical transducer;
- means responsive to the pickup output signal for generating a video signal corresponding to the recorded information signals;
- means responsive to the pickup output signal for generating a tracking error signal produced in relation to a level difference of crosstalk signals of pilot signals on preceding and following adjacent recording tracks of a recording track that is being read; and
- driving means responsive to the tracking error signal for generating a drive signal to displace the electromechanical transducer during sequential head scanings of the tape, the driving means including waveform generating means for generating a preset voltage waveform having a slope and a center value during each head scanning, the waveform generating means including calculation means for calculating values of  $V_{n+1}$ ,  $SL_{n+1}$  and  $RE_{n+1}$  for the next head scanning, the calculated values fulfilling the following conditions

$$\frac{V_{n+1}}{V_i} = \frac{V_n}{V_i} + \frac{TS_n}{TS_i} - K \left( \text{where } \left| \frac{V_{n+1}}{V_i} \right| \leq \frac{1}{2} \right)$$

$$\frac{SL_{n+1}}{SL_i} = \frac{TS_n}{TS_i} - 1$$

$$[RE_n + 1] RE_{n+1} = RE_n + K - 4m \text{ (where } 1 \leq RE_{n+1} \leq 4)$$

where  $TS_i$  was the magnetic tape feed speed when the information signals and pilot signals were recorded on the tape,  $V_i$  is a voltage necessary to displace said electromechanical trans-

ducer by one track pitch,  $SL_i$  is the slope of the preset voltage waveform necessary to displace said electromechanical transducer by one track pitch during a head scanning,  $TS_n$  is the current magnetic tape feed speed,  $V_n$  is the center value of the preset voltage waveform for the current head scanning,  $RE_n$  is a reference signal for the current head scanning,  $V_{n+1}$  is the center value of the preset voltage waveform necessary for the next head scanning,  $SL_{n+1}$  is the slope of the preset voltage waveform necessary for the next head scanning,  $RE_{n+1}$  is a reference signal for the next head scanning, and  $K$  and  $m$  are integers.

#### 4,791,508 MAGNETIC DISC MEMORY UNIT

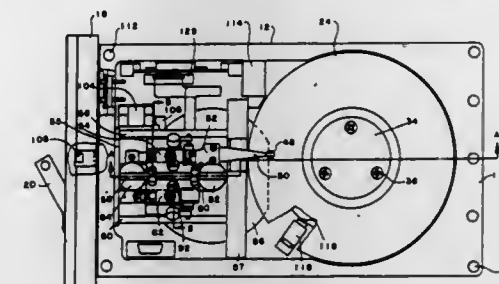
James A. Auger; Carl Bolz, both of Middletown; Bruce Bickford, Chester; Paul Young, Cromwell, and David Johnson, Portland, all of Conn., assignors to Raymond Engineering Inc., Middletown, Conn.

Continuation of Ser. No. 821,101, Jan. 21, 1986. This application Sep. 14, 1987, Ser. No. 96,978

Int. Cl. G11B 17/02, 21/22, 21/08

U.S. Cl. 360-99.12

24 Claims



1. A magnetic disc memory unit comprising: housing means having an inside and an outside; means for rotatably driving said disc supporting means; read/write head means; head carriage means supporting said read/write head means;

- first means for moving said head carriage means and said read/write head means back and forth in a first linear direction between a retracted position and a preselected position relative to a disc mounted on said disc supporting means wherein said first linear direction is radial or parallel to a radial line with respect to a disc mounted on said disc supporting means;
- stepper motor means connected to said first moving means for driving said head carriage means and said read/write head means in said linear direction between said retracted position and said preselected position;
- counter balance assembly means for counter balancing the weight of said head carriage means and said read/write head means;
- second means for moving said counter balance assembly means in a second linear direction, said second linear direction being equal and opposite to said first linear direction wherein said first means for moving is coordinated with said second means for moving;
- said counter balance assembly means having a weight about equal to the weight of said head carriage means and said read/write head means;
- wherein said first means for moving said head carriage means comprises;
- first and second parallel guide rods;
- first and second block means for supporting opposed ends of said first and second parallel guide rods in said housing means;
- second bearing means mounted on said first and second parallel guide rods; and
- said head carriage means being attached to said second

bearing means whereby said carriage means is movable in said first linear direction along and between said first and second guide rods; and wherein said second means for moving said counter balance assembly means comprises; a third guide rod parallel to said first and second guide rods; said third guide rod having opposed ends supported in said first and second block means; third bearing means mounted on said second and third parallel guide rods; and said counter balance assembly means being attached to said third bearing means whereby said counter balance assembly means is movable in said second linear direction along and between said second and third parallel guide rods.

4,791,509

# MULTIPLE-SIZE CASSETTE LOADING MECHANISM

Karl-Heinz Rademacher, Alsbach, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

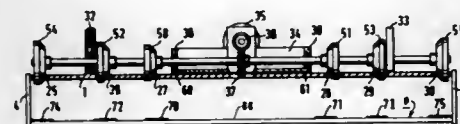
Filed Jul. 30, 1987, Ser. No. 79,829

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1986, 3626939

Int. Cl.<sup>4</sup> G11B 5/008

U.S. Cl. 360—94

5 Claims



1. Automatic tape cassette reciprocation apparatus to load one of a set of generally rectangular magnetic tape cassettes of different widths dimensions into a housing structure (H) after partial insertion of the tape cassette into an opening (O) of the housing structure, and to unload or eject tape cassettes from the housing structure,

- comprising,
- a drive shaft (34) rotatably secured to the housing structure and extending transversely with respect to cassette reciprocation direction (31, 81);
  - a plurality of pairs of drive rollers (50, 51; 52, 53; 54, 55) located on the drive shaft, the rollers of any one pair being spaced from each other by a distance which is approximately of, or slightly smaller than, the width dimension of the respective cassette of the set of cassettes, and the rollers of any pair being located symmetrically with respect to a central axis of symmetry (X—X) parallel to cassette reciprocation direction and which bisects said opening, for engagement with a major surface of the respective cassette in the vicinity of a sidewall (SW) of the cassette, the respective diameters of the roller pairs increasing with increasing distance from said central axis, thereby assuring that, regardless of cassette width, each cassette will be driven adjacent its sidewalls rather than adjacent its tape reels;
  - and drive means (35) coupled to the drive shaft (34) for rotating said drive shaft and hence the plurality of pairs of drive rollers.

# 4,791,510 MAGNETIC TAPE TRANSDUCER APPARATUS FOR USE WITH MULTI-SIZE CASSETTES

Karl-Heinz Rademacher, Alsbach, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

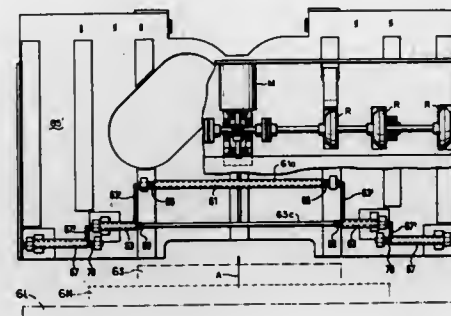
Filed Jul. 30, 1987, Ser. No. 79,819

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1986, 3626941

Int. Cl.<sup>4</sup> G11B 15/00

U.S. Cl. 360—94

10 Claims



1. Cassette tape transducer apparatus having a housing (H) formed with a cassette introduction opening of sufficient size to receive the largest (L) of a set (S, M, L) of at least two differently dimensioned cassettes (S, M, L); cover flap means (1, 3, 7; 61, 63, 67) closing of the cassette introduction opening and pivotable out of a closing position into an open position to permit introduction selectively of each cassette into the housing, said opening defining a plane symmetrically positioned about an axis bisecting said opening and comprising, in accordance with the invention, means for placing any of the cassettes (S, M, L) of the set in the opening only when presented in a position parallel to said plane and centered with respect to said axis, and while opening the cover flap means during an introductory movement of the respective cassette into the housing, wherein the cover flap means includes at least one cover flap which is subdivided into two flap portions (3a, 3b; 7a, 7b; 63a, 63b; 67a, 67b), each portion being positioned symmetrically with respect to said axes; connection means (2, 3c, 63c) coupling said portions together to permit only conjoint movement thereof; and individual locking means (4) locking the flap portions, individually, in closed position for inhibiting introduction of a cassette through said opening into said housing (H), said locking means having engagement elements (4b, 87), each associated with individual flap portions and engageable by a leading edge (6a) of the cassette being introduced into said housing for unlocking an associated one of the flap portions only so that, upon attempted introduction of a cassette in a position that is not parallel with said plane and not symmetrically positioned with respect to said axis, one of said locking means remains unengaged by the leading edge of the cassette and retains said respective cassette flap portion in closed position and prevents opening movement of the other flap portion coupled thereto by said connection means to thereby prevent symmetrical introduction of a cassette into the housing.

# 4,791,511 DISK CARTRIDGE WITH SLIDE DOOR ENGAGEABLE IN EITHER OF TWO ORIENTATIONS

Marvin B. Davis, Colorado Springs, Colo., assignor to Laser Magnetic Storage International Company, Colorado Springs, Colo.

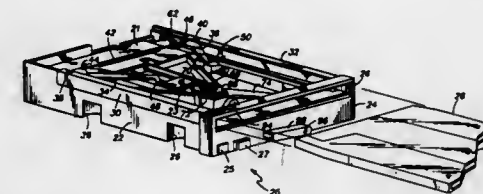
Continuation-in-part of Ser. No. 777,814, Sep. 19, 1985. This

application Aug. 22, 1986, Ser. No. 899,364

Int. Cl.<sup>4</sup> G11B 5/012, 23/02

U.S. Cl. 369—291

10 Claims



1. In a disk cartridge having a cartridge housing adapted for enclosing a disk, and having a door on said cartridge housing movable between an open position wherein, when a disk is enclosed in said cartridge, a surface of the disk is exposed to a read/write head in a disk drive to enable recording and/or reading of data recorded on said disk and a closed position wherein, when a disk is enclosed in said cartridge, the disk surface is not exposed to a read/write head, and bias means carried by said cartridge housing biasing said door to its closed position, wherein said cartridge housing is a generally flat housing having opposite first and second major sides and an edge surface, and wherein said door includes a first surface adjacent to a portion of said cartridge edge surface, the improvement comprising:

a door opening engagement device on said first surface of said door comprising a recess on said first surface of said door, said recess being offset from the plane centered between said first and second sides to be oriented in the upper or lower portion of the door depending on the orientation of said cartridge housing.

4,791,512

# INDEX SIGNAL DETECTING SYSTEM

Takao Takahashi, and Hiroshi Okada, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

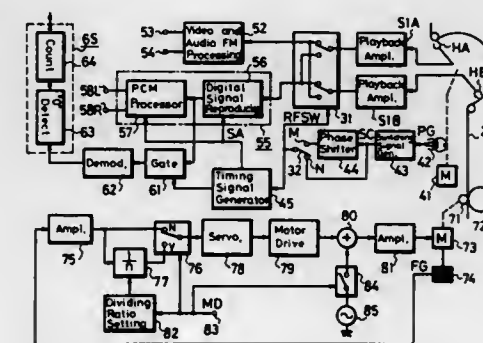
Filed Jul. 28, 1986, Ser. No. 889,833

Claims priority, application Japan, Jul. 26, 1985, 60-166323

Int. Cl.<sup>4</sup> H04N 5/783

U.S. Cl. 360—10.2

7 Claims



1. An index signal detecting system applied to a helical scan type recording apparatus for detecting program search index information recorded on slant tracks of a recording tape, comprising:

(a) a rotary transducing means having a scanning head;

(b) tape driving means for advancing the recording tape in

transducing relation to said rotary transducing means at both a normal recording speed where the scanning head scans along a slant track and a relatively higher speed playback search mode where the scanning head transversely crosses a plurality of the slant tracks;

(c) wobbling means for wobbling during the higher speed playback search mode relative positions of said rotary transducing means and recorded tracks formed on said recording tape in a direction transverse to a scanning direction of the scanning head so as to avoid missing the program search index information; and

(d) an index detecting means connected to said rotary transducing means for deriving the program search index information out of reproduced signals obtained from said rotary transducing means during the higher speed playback search mode.

4,791,513

# BUTTON SHAPED HEAD FOR FLOPPY DISC

Masao Okita, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan

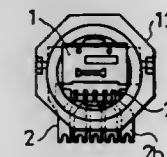
Continuation of Ser. No. 780,575, Sep. 26, 1985, abandoned. This application Feb. 19, 1988, Ser. No. 161,349

Claims priority, application Japan, Sep. 26, 1984, 59-14429[U]

Int. Cl.<sup>4</sup> G11B 5/48, 21/16, 5/127

U.S. Cl. 360—104

6 Claims



1. A method of forming a button shaped magnetic head including an erasing coil and a read/write coil having internal lead wires to be connected to a plurality of terminals, comprising the steps of:

making a metal plate having a planar spring portion attached to a plurality of terminal portions integrally formed thereon by punching out a pattern corresponding to said portions;

insert molding the punched metal plate in a base member of the button shaped magnetic head;

separating the portions of the metal plate so as to form a planar spring and a plurality of separate terminals for the magnetic head, wherein the terminals are separated so as to have internal end portions on an internal side of the base member spaced from and facing opposite the planar spring and their ends on an external side of the base member projecting externally therefrom;

mounting the erasing and read/write coils on the planar spring; and

connecting the internal lead wires of the coils to the respective internal end portions of the terminals on the internal side of the base member.

4,791,514

# MAGNETIC RECORDING DEVICE WITH ROTATING HEAD

Ernst Huijter, Orsay; Jean C. Leheureau, Ste. Genevieve des Bois, and Claude Monlouis, St. Arnould en Yvelines, all of France, assignors to Thomson-CSF, Paris, France

Filed Jul. 28, 1986, Ser. No. 889,882

Claims priority, application France, Jul. 26, 1985, 8511499

Int. Cl.<sup>4</sup> G11B 21/04

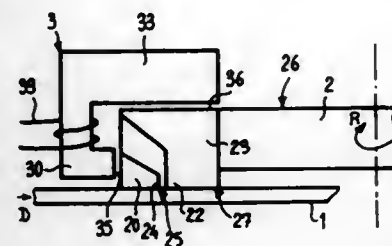
U.S. Cl. 360—108

2 Claims

1. A magnetic recording device having a rotating head comprising:



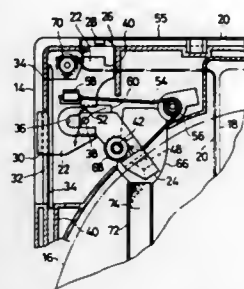
a magnetic recording medium;  
a cylindrical rotating head;  
a fixed magnetic excitation circuit;  
two movable mounted pole pieces on the surface of said cylindrical rotating head wherein said two movable pole pieces are separated by a first gap and are each linked magnetically to a first and a second magnetic circuit wherein each of said first and second magnetic circuit have the shape of a portion of a ring and wherein said first and second magnetic circuit provide a rotation link for the passage of magnetic flux;



said fixed magnetic excitation circuit including an excitation coil which induces a magnetic field in a magnetic circuit having two fixed pole pieces wherein each of said fixed pole pieces are magnetically coupled to said rings by a second and third gap respectively; and wherein said first magnetic circuit is located on a circular surface of said rotating head and wherein said second magnetic circuit and said first gap are located on a plane surface of said rotating head.

**4,791,515**  
**PROTECTING A DISC CARTRIDGE FROM INADVERTENT ACTUATION DURING NONUSE**  
Kimio Tanaka, and Haruo Shiba, both of Nagano, Japan, assignors to TDK Corporation, Japan  
Filed Apr. 16, 1987, Ser. No. 39,676  
Claims priority, application Japan, Apr. 17, 1986, 61-56797[U]

Int. Cl.<sup>4</sup> G11B 23/03, 19/00, 5/82  
U.S. Cl. 360—133

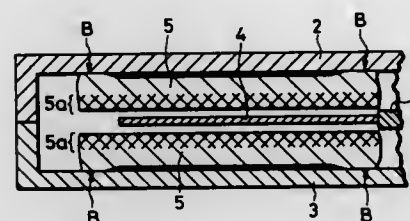


1. A disc cartridge, comprising:
  - a casing comprising an upper cover plate and a lower cover plate joined together to define a space therewithin and having a front end at which said cartridge is inserted into a disc player;
  - a disc rotatably housed in said casing;
  - a shutter for operating at least one window provided in said casing for insertion of a disc driving element of the disc player therethrough into said casing, and for closing said window during non-use of said disc cartridge;
  - a pair of actuators arranged in said casing;
  - a shutter lock element for releasably locking said shutter, said shutter lock element comprising at least one of said actuators;
  - a pair of disc receivers, each arranged in said casing and

operatively connected to one of said actuators to selectively receive a part of a peripheral portion of said disc to hold said disc at a substantially central position in said casing in a thickness direction of said casing, by pivotal movement of said disc receivers;  
connection means for operatively connecting each of said actuators to the corresponding disc receiver;  
said connection means comprising a guide groove provided in one of said actuator and corresponding disc receiver, and a guide pin provided on the other of said actuator and said corresponding disc receiver, said guide pin being positioned within said guide groove and being selectively engagable with said guide groove;  
said actuator or disc receiver provided with said guide groove additionally being formed with a depression situated at a distal end of a surface of said guide groove on a side thereof toward the front end of the casing, said depression enlarging said guide groove to position said surface of said guide groove outside of a locus of pivotal movement of said guide pin during non-use of said disc cartridge, and to carry out delayed actuation of said disc receiver with respect to said actuator, at the time of starting of the disc cartridge;  
elastic means for forcing said actuator and corresponding disc receiver toward said front end of said casing; and  
a position regulating element for stopping movement of said corresponding disc receiver during non-use of said disc cartridge.

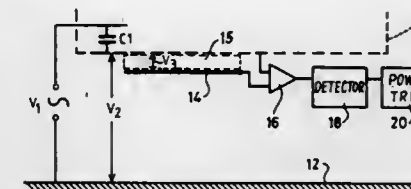
**4,791,516**  
**CLEANING LINER IN A MAGNETIC DISK CARTRIDGE**  
Kunihira Seto, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Oct. 20, 1986, Ser. No. 920,496  
Claims priority, application Japan, Oct. 19, 1985, 60-159623[U]

Int. Cl.<sup>4</sup> G11B 23/03  
U.S. Cl. 360—133



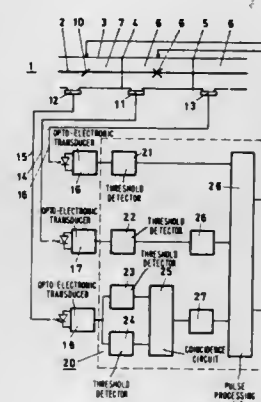
1. A magnetic disk cartridge, comprising:
  - a case having an internal space;
  - a magnetic disk sheet rotatable within said internal space; and
  - liners located in said internal space between upper and lower inner walls of said case and said disk sheet for cleaning said disk sheet, wherein each liner comprises unwoven cloth containing a binder, said binder forming a greater percentage of the total material composition of said liner quantity at a surface of said liner confronting said disk sheet and a lesser percentage towards an interior of said liner.

**4,791,517**  
**DETECTION OF UNSAFE VOLTAGES ON MOBILE EQUIPMENT**  
Jeffrey Park, Stoke Mandeville, England, assignor to Airtech Limited, Buckinghamshire, England  
Filed Sep. 30, 1987, Ser. No. 103,107  
Claims priority, application United Kingdom, Oct. 3, 1986, 8623843  
Int. Cl.<sup>4</sup> H02H 3/00  
U.S. Cl. 361—1



1. Protective means for detecting the existence of an unsafe potential between earth and mobile equipment to which an AC voltage source is applied, comprising an electrically conductive member disposed between the equipment and earth, detecting means for detecting the electric field strength between the mobile equipment and earth at the location of the conductive member, the detecting means detecting the electric field strength irrespective of any earth connection or earth leakage current between the mobile equipment and earth, the detecting means deriving from said electric field strength a signal representative of the potential difference between the mobile equipment and earth, and disconnection means fed by said signal from the detecting means and operative to disconnect the voltage source from the mobile equipment when said signal corresponds to a dangerous potential of the mobile equipment with respect to earth.

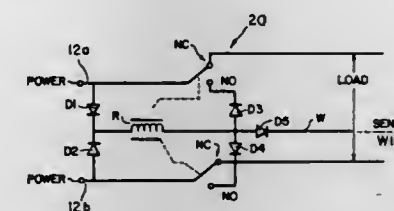
**4,791,518**  
**DEVICE FOR DETECTING INTERFERING ARCS**  
Rudolf Fischer, Riedt-Neerach, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland  
Filed May 26, 1987, Ser. No. 53,746  
Claims priority, application Switzerland, Jun. 9, 1986, 2322/86  
Int. Cl.<sup>4</sup> H02H 3/00  
U.S. Cl. 361—2



11. A device for extinguishing interfering arcs in a normally darkened internal space containing a high-voltage grounding switch, comprising:
  - light detector means for detecting light pulses resulting from electrical arcs in said internal space and producing an output digital signal having an amplitude and a duration

representative of the respective amplitude and duration of said light pulses;  
a first threshold detector which is operatively coupled with said light detector means and which produces a first indicator signal whenever a rate of increase of the amplitude of said light detector means output signal is above a predetermined threshold level;  
a second threshold detector which is operatively coupled with said light detector means and which produces a second indicator signal whenever the amplitude of said light detector means output signal is above a predetermined threshold amplitude level, the duration of said second indicator signal being equal to the time period during which the amplitude of said output signal is above said predetermined threshold amplitude level;  
a coincidence circuit having a first input terminal operatively coupled with said first threshold detector and a second input terminal operatively coupled with said second threshold detector, said coincidence circuit producing a coincidence signal when said first indicator signal is being produced as said second threshold detector begins producing said second indicator signal, the duration of said coincidence signal being equal to the duration of said second indicator signal;  
timing means operatively coupled with said coincidence circuit for monitoring said coincidence signal and, when the duration of said coincidence signal exceeds a predetermined threshold duration value thereby indicating an interfering arc, generating a control signal; and  
means responsive to said control signal for extinguishing said interfering arc.

**4,791,519**  
**SHOCK PROTECTIVE CIRCUIT WITH ELECTRICAL LATCH FOR SMALL APPLIANCES**  
Elmer W. Madsen, Bristol, Conn., assignor to North American Philips Corp., New York, N.Y.  
Continuation of Ser. No. 835,127, Feb. 28, 1986, abandoned.  
This application Sep. 11, 1987, Ser. No. 96,796  
Int. Cl.<sup>4</sup> H02H 3/16  
U.S. Cl. 361—42



1. A shock protection circuit for a small, hand-held electrical appliance having two power wires and a housing comprising:
  - a first set of two opposed diodes being connected between said two power wires and having a common junction between them,
  - conductive sensor means within said housing and connected to said common junction between said opposed diodes to detect the presence of a leakage current within said appliance when said opposed diodes and said power wires are connected to a source of electricity and said appliance comes into contact with a conductive fluid,
  - said conductive sensor means including a sensor wire positioned within said housing such that said sensor wire comes into contact with said conductive fluid when said appliance does, said sensor wire providing a conductor path for said leakage current to flow through,
  - said conductive sensor means including circuit opening means operating in response to said leakage current exceeding a predetermined level and disconnecting said power wires from said source of electricity,

said circuit opening means maintaining said power wires disconnected from said source of electricity as long as said opposed diodes are connected to said source.

4,791,520

# FAULT PROTECTION FOR A MEDIUM VOLTAGE TRANSFORMER BRANCH

Karl Stegmüller, Wiesent, Fed. Rep. of Germany, assignor to Sachsenwerk Aktiengesellschaft, Regensburg, Fed. Rep. of Germany

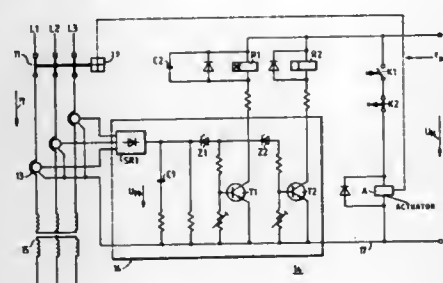
Filed Mar. 9, 1987, Ser. No. 23,414

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 3607675

Int. Cl.<sup>4</sup> H02H 7/04

U.S. Cl. 361—63

13 Claims



1. In a power circuit composed of a main current path and a plurality of parallel branch paths connected in series with the main current path and each containing a winding of a medium voltage transformer, a fault protection system comprising: first and second current interrupter means for switching the current flowing through the paths and for protecting the paths against fault currents, each said interrupter means being bidirectionally switchable between a closed, current conducting, state and an open, current blocking, state, said first interrupter means being connected in one branch path for interrupting fault currents in a first amplitude range and said second interrupter means being connected in the main current path for interrupting fault currents in a second amplitude range, which second amplitude range is higher than the first range and includes short circuit currents; and current monitoring and switching control means connected for monitoring the current in the one branch path and connected to said first interrupter means for maintaining said first interrupter means in the closed state when the current in the one branch is below the first amplitude range, for placing said first interrupter means in the open state in response to the presence of a fault current in the first amplitude range, and for maintaining said first interrupter means in the closed state in response to the presence of a fault current in the second amplitude range.

4,791,521

# METHOD AND APPARATUS FOR REDUCING TRANSIENT NOISE BY PREMAGNETIZATION OF PARASITIC INDUCTANCE

Kenneth W. Ouyang, Huntington Beach, and Timothy G. O'Shaughnessy, Yorba Linda, both of Calif., assignors to Western Digital Corporation, Irvine, Calif.

Filed Apr. 7, 1987, Ser. No. 35,345

Int. Cl.<sup>4</sup> H02H 3/20

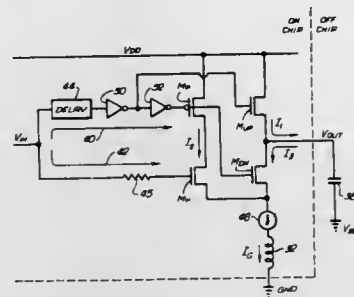
U.S. Cl. 361—91

20 Claims

1. A circuit for reducing transient noise generated by a first electronic device while the first electronic device drives a second electronic device, said second electronic device having a capacitance, said first electronic device having a parasitic inductance, an input terminal for activating the first electronic device and an output terminal for driving the second electronic device, said circuit comprising:  
supply means for supplying a power supply voltage;  
first switching means, operatively coupled to the input ter-

terminal, the supply means and the output terminal, for applying said power supply voltage to said capacitance of said second electronic device prior to activation of said first electronic device, thereby charging said capacitance of said second electronic device;

second switching means, operatively coupled to the input terminal, the supply means and the parasitic inductance, for electrically connecting said power supply voltage to said parasitic inductance of said first electronic device prior to activation of said first electronic device;



third switching means, operatively coupled to the input terminal, the supply means and the parasitic inductance, for electrically disconnecting said power supply voltage from said parasitic inductance of said first electronic device upon activation of said first electronic device; and  
fourth switching means, operatively coupled to the input terminal, the output terminal and the parasitic inductance, for electrically connecting said capacitance of said second electronic device with said parasitic inductance of said first electronic device upon activation of said first electronic device.

4,791,522

# SHORT CIRCUIT PROTECTOR FOR OUTPUT CIRCUITS HAVING SERIES-CONNECTED TRANSISTORS

Sven H. Bergh, Rönninge, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

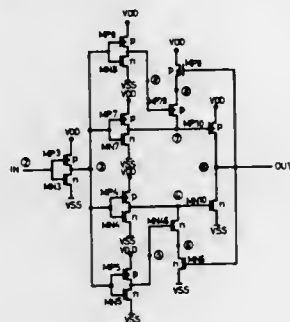
Filed Jun. 23, 1987, Ser. No. 65,393

Claims priority, application Sweden, Jul. 4, 1986, 8603000

Int. Cl.<sup>4</sup> H02H 3/08

U.S. Cl. 361—93

12 Claims



1. An overcurrent-protected buffer circuit comprising:  
two series-connected output stage components generating a circuit output signal at a circuit output between them, the potential of the output signal corresponding to a circuit input signal at a circuit input, the conductive capacity of the output stage components being individually controlled via individual component control inputs of the respective output stage components;  
a first control stage controlled by the circuit input signal,

said first control stage having a first control stage output connected to a component control input of a first of the two series-connected output stage components; and  
overcurrent protectors for at least the first output stage component, including a first protective circuit, said first protective circuit further comprising:

a first of two series-connected protective switch components having a conductive capacity controlled via a component control input coupled to the circuit output, controlling the conductive capacity of the first protective switch component in response to the potential on the circuit output, said first protective switch component being placed in its conductive state solely when the potential on the circuit output substantially deviates, as a consequence of overloading or short circuiting the output, from the potential on the circuit output when overloading or short circuiting are not present and the deviation has a direction signifying current increase through the first output stage component; and

a second series-connected protective switch component having a conductive capacity controlled by a component control input responsive to the circuit input signal, and being placed in its conductive state solely when the circuit input signal is such that the first output stage component is to be conducting, generating the intended circuit output signal corresponding to the circuit input signal;  
wherein said first protective circuit is coupled to the first control stage so that only when both its protective switch components are placed in a conductive stage does the protective circuit form a conductive current path which substantially affects the potential on the output of the first output stage component in a direction such that the conductive capacity of the first output stage component is substantially reduced.

4,791,523

# PROTECTING AN ICEMAKER AGAINST OVERCURRENT DAMAGE

James M. Pick, Elk Grove, and Brian T. Creed, Elmhurst, both of Ill., assignors to Eaton Corporation, Cleveland, Ohio

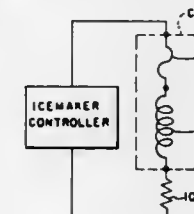
Continuation of Ser. No. 736,222, May 20, 1985, abandoned.

This application Mar. 6, 1987, Ser. No. 22,557

Int. Cl.<sup>4</sup> H02H 5/04

U.S. Cl. 361—104

7 Claims



1. An assembly for a refrigerator icemaker comprising:

(a) an electrically operated coil adapted for actuation of an electromagnetic water fill valve upon normal operating current flow, said coil having a plurality of turns there-through of relatively fine wire having the size chosen such that upon flow of normal operating current therethrough a desired magnetomotive force is produced and upon flow of said normal operating current in excess of a predetermined time, said coil being heating and undergoes successive shorting of windings thereby decreasing the electrical resistance of said coil and increasing current flow therein, said coil operative upon said decreasing resistance for de-actuating a water fill valve

(b) heater means electrically series connected with said coil and operative for heating ice for removal from a tray, said heater means having a greater resistance than said coil and

acting as a voltage divider and a current limiter to prevent coil burnout despite said shorting; and,  
(c) circuit protective means series connected to said heater means and operative upon said coil decreasing resistance for terminating current flow through said heater means.

4,791,524

# ELECTROSTATIC DISCHARGE PROTECTION FOR ELECTRONIC PACKAGES

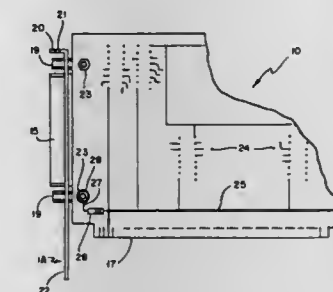
Scott C. Telgen, Rochester, and Joel P. Weidendorf, West Concord, both of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 18, 1987, Ser. No. 121,990

Int. Cl.<sup>4</sup> H05F 3/02

U.S. Cl. 361—212

1 Claim



1. An electronics package, comprising:  
an electronics assembly having a first electrical connector and having an electrically conductive frame;  
an insulating carrier;  
an electronic circuit mounted on said carrier, said circuit having a point of common potential;  
a second electrical connector mounted to said carrier, connected to said circuit, and adapted to mate with said first connector;  
a conductive frame physically attached to said carrier and configured so as to make electrical contact with said conductive frame of said assembly before said second connector makes contact with said first connector, when said carrier is inserted in said assembly;  
a high-value resistor electrically coupled between said point of common potential and said frame of said carrier, said resistor being chosen so as to discharge a static potential in said circuit in a time interval on the order of one second.

4,791,525

# CIRCUIT BREAKER WITH RETAINER FOR FILLER PLATE

William E. Grass, Whitefish Bay, and Donald R. Sladek, Milwaukee, both of Wis., assignors to Eaton Corporation, Cleveland, Ohio

Filed Nov. 2, 1987, Ser. No. 115,692

Int. Cl.<sup>4</sup> H02B 1/04

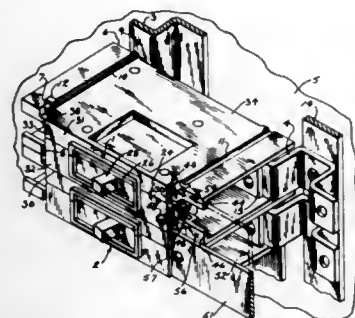
U.S. Cl. 361—363

11 Claims

1. A circuit breaker mounted to support structure in a panel-board, said breaker comprising a molded housing having a frontside with a user-engageable pivoted operating handle extending through said frontside and moveable in an arc in a given plane, said housing being formed by a pair of molded housing sections joined along a parting line lying in a parting plane parallel to said given plane of handle movement along said arc, said frontside of said housing lying in a plane perpendicular to said parting plane, a retainer mounted to a pre-assembled said housing and having a bore extending parallel to said parting plane and perpendicularly to said frontside of said housing, a filler plate mounted to said housing by removable attachment means extending into said bore, said filler plate



extending only from one side of said housing and parallel to said frontside of said housing to cover open areas adjacent said breaker, wherein said retainer comprises a central portion defining said bore, and a pair of arms each extending from said

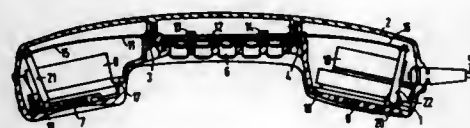


central portion to a respective one of said housing sections, and further wherein said housing includes slot means, and said retainer includes snap-in detent means engaging and nesting in said slot means in snap-in relation.

**4,791,526**  
**MOUNT OF A PRINTED CIRCUIT BOARD ARRANGED IN A BIPARTITE HOUSING**  
Karl Brou, Griesbachzell, and Herbert Hoher, Gernsheim, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed Aug. 14, 1987, Ser. No. 85,369  
Claims priority, application Fed. Rep. of Germany, Sep. 4, 1986, 3630196

Int. Cl.<sup>4</sup> H05K 7/12  
U.S. Cl. 361—398

6 Claims



1. A mount of resiliently elastic, planar printed circuit board in a housing having a curved shape and composed of two parts, comprising at least one resilient fastening element in the form of a shackle, pivotably held on the housing and projecting from one of the housing parts overlapping at least one end region of the printed circuit board in at least one end region of the printed circuit and pressing thereagainst in interlocking fashion, the fastening element having such a length in its fastening region that the printed circuit board is urged into a shape correspondingly adapted to the curved shape of the housing part accepting it.

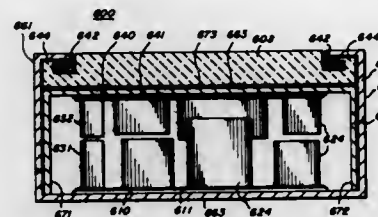
**4,791,527**  
**PORTABLE RADIO TRANSCEIVER HOUSING STRUCTURALLY SUPPORTED BY BATTERY**  
Vernon L. Brown, Barrington, Ill., assignor to Motorola, Inc., Schaumburg, Ill.  
Continuation of Ser. No. 876,022, Jan. 3, 1985, abandoned. This application Sep. 22, 1987, Ser. No. 99,631  
Int. Cl.<sup>4</sup> H05K 9/00

U.S. Cl. 361—424

9 Claims

1. A housing for electronic circuitry, comprising:  
a battery having first and second edges and first and second opposing flat rigid surfaces;  
a U-shaped panel having first and second side portions and a center portion, the first and second side portions of said U-shaped panel attaching to the first and second edges of said battery, respectively, said center portion having inner

and outer opposing surfaces, said U-shaped panel further including a dielectric and circuitry layer bonded to the inner surface of the center portion of said U-shaped panel; electronic circuitry bonded to the circuitry layer on the inner surface of said U-shaped panel; and

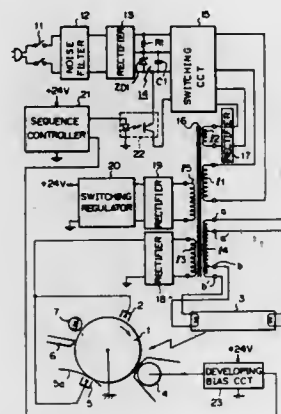


end cap means coupled to said battery and said U-shaped panel, whereby said end cap means, said battery and said U-shaped panel substantially enclose the electronic circuitry.

**4,791,528**  
**POWER SUPPLY DEVICE**  
Koji Suzuki, and Shunichi Komatsu, both of Yokohama, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 872,512, Jan. 10, 1986, abandoned.  
This application Mar. 7, 1988, Ser. No. 170,661  
Claims priority, application Japan, Jan. 13, 1985, 60-127191; Jan. 13, 1985, 60-127192; Jan. 13, 1985, 60-127193  
Int. Cl.<sup>4</sup> H02M 3/34

U.S. Cl. 361—235

15 Claims

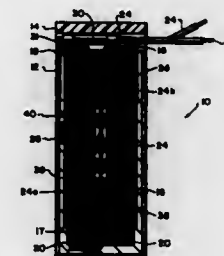


1. A power supply device comprising:  
a transformer having a primary winding and a plurality of secondary windings comprising first and second secondary windings;  
switching means connected to said primary winding of said transformer for switching an input to said primary winding to generate an increased voltage output on said plurality of secondary windings of said transformer;  
first output means for applying a high voltage to a predetermined load in accordance with an output of said first secondary winding;  
second output means connected to said second secondary winding for outputting a predetermined low voltage;  
control means adapted to be supplied thereto with said predetermined low voltage from said second output means as an operation source, said control means producing a control signal for switching the high voltage supplied to said predetermined load from a first high voltage to a second high voltage; and

change means responsive to said control signal for changing the electric power supplied to said primary winding.

**4,791,529**  
**PROTECTED POTTED METALLIZED FILM CAPACITOR**  
George I. Duncan, Glenview, and Stephen L. Phelps, Chicago, both of Ill., assignors to Advance Transformer Company, New York, N.Y.  
Continuation-in-part of Ser. No. 943,478, Dec. 16, 1986, Pat. No. 4,714,979. This application May 1, 1987, Ser. No. 45,923  
Int. Cl.<sup>4</sup> H01G 1/08, 1/11  
U.S. Cl. 361—274

13 Claims



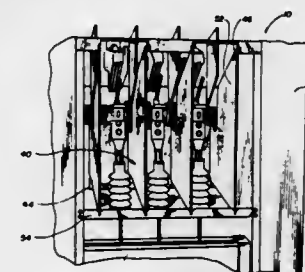
13. An AC capacitor having a protective fault interruptor system, wherein said capacitor includes: a metallized film capacitor section, shopped edges serving as contact points for each plate of said capacitor section, said contact points being spaced apart from one another, said capacitor being connectable to a circuit through electrical leads from said contact points; a case having a cover; potting material within said case at least partially disposed around said capacitor section and firmly securing said capacitor section and a portion of said leads within said case, said leads extending through a wall of said case; and wherein said protective fault interruptor system for said capacitor comprises:

- a fuse;
- a thermal protector connected in series with one of said contact points of said capacitor section and one of said leads extending through said case;
- said fuse and said thermal protector being connected in series with said capacitor section and at least a second of said leads extending through said case; and
- said fuse, said thermal protector, said capacitor section and the connections to said one lead and said second lead all being positioned within said case.

**4,791,530**  
**INSULATING BARRIER SYSTEM FOR SWITCHGEAR**  
Arvudas J. Kalvaitis, Northbrook, and John W. Estey, Glenview, both of Ill., assignors to S&C Electric Company, Chicago, Ill.  
Filed Sep. 1, 1987, Ser. No. 91,624  
Int. Cl.<sup>4</sup> H02B 1/00

U.S. Cl. 361—331

27 Claims



1. A removable barrier arrangement utilized with an enclosure

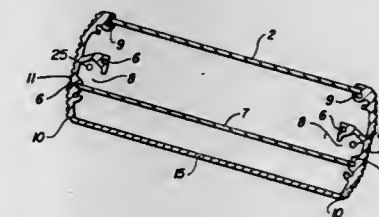
for electrical apparatus, the barrier arrangement comprising:

- a barrier being generally planar and being fabricated from insulating material;
- manually operable means for releasably securing said barrier when said barrier is in a predetermined operating position within said enclosure, said manually operable means comprising first means retained by said barrier and second means cooperating with said first means and being retained by said enclosure; and
- means carried by said enclosure for guiding and supporting said barrier during insertion of said barrier, said guiding and supporting means defining a tapered opening in a plane generally perpendicular to said barrier when said barrier is in said predetermined position, the plane of said tapered opening also being generally perpendicular to the direction of insertion of said barrier.

**4,791,531**  
**EXTRUDED ENCLOSURE FOR ELECTRICAL APPARATUS**  
James L. Jessup, Livonia, Mich., assignor to Tech-S, Inc., Livonia, Mich.

Filed Mar. 9, 1987, Ser. No. 23,840  
Int. Cl.<sup>4</sup> H05K 1/14  
U.S. Cl. 361—395

8 Claims



1. An enclosure for an electrical printed circuit board assembly comprising:

- a. an elongated body portion of substantially U-shaped cross section, further comprising a substantially planar base and a pair of substantially planar vertical side members attached to and substantially perpendicular to said base;
- b. a substantially planar top panel removably engaging the upper edges of both of said pair of vertical side members opposite said base;
- c. a pair of substantially planar end panel members removably engaging the opposing open ends of the combination of said elongated body portion and said top panel;
- d. at least one pair of longitudinally-extending support means disposed on the opposing inner faces of said pair of vertical side members, said support means having a longitudinal axis substantially parallel to said base;
- e. one or more flanges integral to each of said pair of vertical side members of said elongated body portion, said one or more flanges forming with said corresponding vertical side member a longitudinally extending cavity disposed on the opposing inner face of said vertical side member, each of said cavities having a longitudinal axis substantially parallel to said base;
- f. a pair of elongated fasteners contained within said pair of cavities, removably connecting said pair of end panel members, and providing a physical connection location for other such enclosures;
- g. an electrical printed circuit board disposed within said enclosure having a first pair of opposing edges engaging said support means, and a second pair of opposing edges abutting the inner faces of said pair of end panel members;
- h. a multiple-conductor electrical connector electrically connected to said circuit board and protruding in part beyond one of said second pair of opposing edges of said circuit board;

- i. an opening formed in one end panel member of said pair of end panel members, which is located closest to said connector, permitting said connector to protrude through said end panel member; and
- j. second and third openings in each of said pair of end panel members aligned with said cavities in said elongated body portion.

4,791,532

## CAPACITOR ANODE AND METHOD

Didier Gouvernelle, Semblancay, and Daniel Gatesoupe, Joux Les Tours, both of France, assignors to Sprague Electric Company, North Adams, Mass.

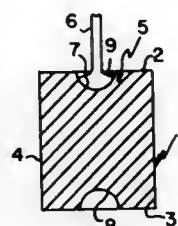
Filed Jun. 5, 1987, Ser. No. 58,472

Claims priority, application France, Jul. 1, 1985, 86 09530

Int. Cl.<sup>4</sup> H01G 9/00

U.S. Cl. 361—529

3 Claims



3. A porous tantalum anode for a tantalum capacitor comprising a sintered porous tantalum pellet on one face of which is added a connection wire which extends into said pellet on an attachment zone, characterized in that said pellet comprises a cavity at said attachment zone which cavity surrounds said wire and is no more than filled with a weld securing said wire to said pellet.

4,791,533

## NATURAL LIGHTING APPARATUS

Tadaaki Hane, Tokyo, Japan, assignor to Shimizu Construction Co., Ltd., Tokyo, Japan

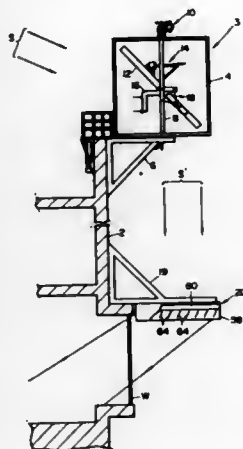
Filed Jun. 24, 1987, Ser. No. 65,841

Claims priority, application Japan, Jun. 24, 1986, 61-147693; Jul. 29, 1986, 61-116591[U]

Int. Cl.<sup>4</sup> F21V 7/00

U.S. Cl. 362—1

6 Claims



1. A natural lighting apparatus comprising:
- a plane mirror having a plane mirror face for reflecting light therefrom in a front direction;
  - a supporting means for supporting the mirror for rotation

about both a first vertical axis parallel to said plane mirror and a second horizontal axis parallel to said plane mirror and perpendicular to the first vertical axis, said supporting means comprising an outer frame and an inner frame supported on the outer frame for rotation about the first vertical axis, said plane mirror being supported on the inner frame to be rotatable about the second horizontal axis;

- a first sensing means for sensing the direction of the light source relative to and about the first vertical axis, and for generating a first signal representative thereof, said first sensing means including a pair of first photosensors for receiving light from the light source to generate the first signal;
- a second sensing means for sensing the direction of the light source relative to and about the second horizontal axis, and for generating a second signal representative thereof, said second sensing means including a pair of second photosensors for receiving light from the light source to generate the second signal;
- an attitude control means for angularly moving the mirror about the first axis in accordance with the first signal from the first sensing means and about the second axis in accordance with the second signal from the second sensing means, thus controlling the attitude of the mirror to reflect light from the light source in a predetermined direction, said attitude control means comprising a light source following lever, mounted to said inner frame for pivotal movement about the second horizontal axis, and a slider link means, connecting the mirror to both the inner frame and the light source following lever, for controlling an angle defined between the mirror and the inner frame about the second horizontal axis to be one half of an angle defined between the inner frame and the light source following lever about the horizontal axis, to thereby reflect light from the light source in the predetermined direction, said first sensing means being mounted to the inner frame, and said second sensing means being mounted to the light source following lever, and wherein said attitude control means comprises a first rotation unit for rotating the inner frame about the first vertical axis, and a second rotation unit for rotating the mirror about the second horizontal axis, wherein the attitude control means further comprises a control unit for comparing the signals from the first photosensors to control the first rotation unit to rotate the inner frame so as to direct the mirror in the first light source direction and for comparing the signals from the second photosensors to control the second rotation unit to rotate the inner frame to direct the mirror in the second light source direction.

4,791,534

## VEHICLE INCLUDING SUBSTANTIALLY TRANSPARENT HIGH MOUNTED STOP LIGHT

Victor L. Lindberg, 242 E. Middle St., Chelsea, Mich. 48118

Filed Aug. 7, 1987, Ser. No. 83,503

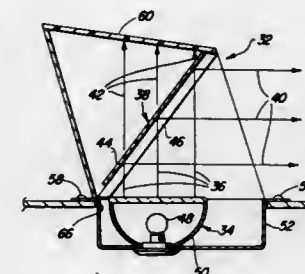
Int. Cl.<sup>4</sup> B60Q 1/26

U.S. Cl. 362—80

11 Claims

1. A vehicle (10) comprising: brake means (20) for braking the vehicle; brake light actuator means for actuating a brake light upon actuation of said brake means (20); a passenger compartment (22) including a driver's position; a rear window (18) located at the rear of the passenger compartment (22) defining a rear view line of vision from behind the driver's position; light projecting means (34) mounted adjacent said rear window (18) at a position offset from said rear view line of vision from said driver's position for projecting a brake light indicating beam (36) upon actuation by said brake light actuator means; and characterized by a semi-transparent beam splitting mirror (38) disposed adjacent said rear window (18) and in said rear view line of vision from said driver's position for reflecting the brake light indicating beams (26) through said rear window (18) while presenting a substantially transparent

window to said rear view line of vision from said driver's position, said mirror (38) reflecting a predetermined wave-



length range of light throughout the entire surface thereof and transmitting substantially all other wavelengths of light there-through.

4,791,535

## SECURITY DEVICE FOR FOG LIGHTS

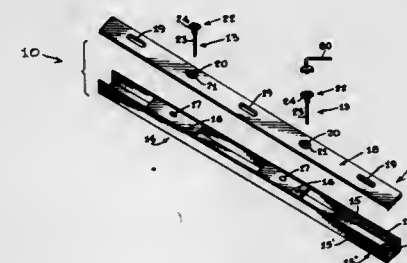
Vincent J. Sciafani, and Daniel Martorano, both of 457 Wilson Blvd., Mineola, N.Y. 11501

Filed Feb. 11, 1988, Ser. No. 154,831

Int. Cl.<sup>4</sup> E05B 65/12; B60Q 1/20

U.S. Cl. 362—82

5 Claims



1. A fog light security apparatus in combination with a plurality of fog lights wherein each of said plurality of fog lights is provided with a downwardly depending threaded stem and a locking nut and said security apparatus comprises: a base unit comprising an elongated guard member including a generally U-shaped rigid channel element having a plurality of plate elements provided with threaded apertures;
- a cover unit comprising a rigid elongated cover plate member dimensioned to fit over the channel element of the base unit and provided with a plurality of elongated apertures that are dimensioned to receive the threaded stems of said plurality of fog lights; and,
  - a securing unit adapted to operatively secure said base unit to said cover plate unit.

4,791,536

## SOUND RESPONSIVE LIGHTED EARRINGS

Darold L. James, 405 6th Ave., Apt. 705, Tacoma, Wash. 98402

Filed Jan. 12, 1988, Ser. No. 142,937

Int. Cl.<sup>4</sup> F21L 15/08

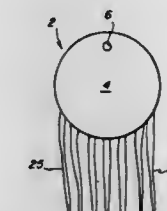
U.S. Cl. 362—104

10 Claims

1. An earring comprising:
- a substantially fault body;
  - an electrical circuit mounted on one face of said body and including:
    - a miniature portable power source;
    - a sound sensor;
    - an audio digitizer which receives signals from said sound sensor and divides said signals into a plurality of

signal bands, each said band falling within a distinct unique range of sound frequencies;

- (4) indicator means for indicating receipt of sound signals by said sound sensor, said indicator means comprising an indicator for each signal band; and



- (5) switch means for controlling activation of said circuit including a first manually-actuable switch and a second switch actuable responsive to orientation; and
- (c) means for releasably connecting said body to a person or object.

4,791,537

## VEHICLE ACCESSORY ASSEMBLY WITH SLIDING DOOR FOR MOUNTING ON A VISOR OR OTHER INTERIOR PANEL

Robert C. Fisher, Rochester; Mark Lobanoff, Troy, and Michael P. Brennan, Rochester Hills, all of Mich., assignors to Irvin Industries, Inc., Rochester Hills, Mich.

Continuation-in-part of Ser. No. 13,656, Feb. 12, 1987, Pat. No.

4,721,310, which is a continuation-in-part of Ser. No. 7,120, Jan.

26, 1987, which is a continuation-in-part of Ser. No. 795,520,

Nov. 6, 1985, Pat. No. 4,681,366, which is a continuation-in-part

of Ser. No. 746,676, Jun. 20, 1985, abandoned, which is a

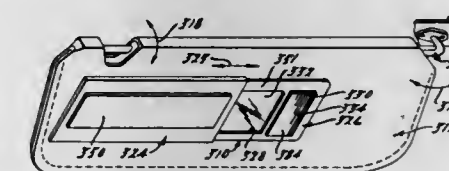
continuation-in-part of Ser. No. 627,280, Jul. 2, 1984,

abandoned. This application Mar. 26, 1987, Ser. No. 30,385

Int. Cl.<sup>4</sup> F21V 33/00

U.S. Cl. 362—135

20 Claims



1. A vehicle accessory assembly adapted for mounting on an interior vehicle panel that is movable between a first panel position and a second panel position, said accessory assembly comprising: an accessory device interconnectable with the interior vehicle panel at a generally fixed location thereon; an accessory door interconnectable with the interior vehicle panel for slidable lateral movement relative to said accessory device generally parallel to the interior vehicle panel between a closed position wherein said accessory device is substantially covered and an open position wherein said accessory device is substantially exposed; power supply means for electrically interconnecting said accessory assembly with a vehicle electrical power source, said accessory device including at least one electrically energizable electric component, said accessory assembly further including switch means electrically interconnected with said power supply means and said electric component for electrically energizing said electric component in response to said movement of said accessory door from said closed position to said open position; said accessory assembly further including disconnect means for disconnecting said accessory assembly from the vehicle electrical power source when the interior vehicle panel is in said first panel position;

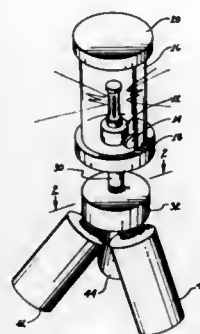


and a selectively operable switch override means selectively overriding said switch means and said disconnect means for selectively preventing said electrical energization of said electric component regardless of the position of said accessory door and regardless of the position of said interior vehicle panel; said electric component including a light source having an electrically energizable lamp and a light lens substantially covering said lamp, said lamp and said lens being located at said first location generally at one side of said accessory device, and said accessory assembly further including a light-conducting means having a light-conducting member extending away from said lamp and said lens to said second location on said accessory device in order to illuminate said accessory device at said second location.

**4,791,538**  
**TRIPOD LANTERN STAND**  
John D. Prest, 1314 5th Ave., Yuma, Ariz. 85362  
Filed Jan. 22, 1988, Ser. No. 147,305  
Int. Cl.<sup>4</sup> F21L 19/00

U.S. Cl. 362-159

17 Claims

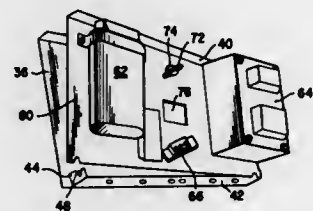


1. A support for a gas fired apparatus, said support comprising in combination:
  - (a) a pedestal;
  - (b) means extending from said pedestal to the gas fired apparatus for supporting the gas fired apparatus and for conveying a flow of gas to the gas fired apparatus;
  - (c) means associated with said pedestal for engaging in a depending relationship each of three detachably attachable gas cylinders, said supporting means, in combination with the gas cylinders, defining a tripod support of the gas fired apparatus; and
  - (d) said engaging means including means for establishing fluid communication between said conveying means and a selected one of the gas cylinders to provide a flow of gas from the selected gas cylinder to the gas fired apparatus.

**4,791,539**  
**LUMINAIRE HAVING QUICK-DISCONNECT ELECTRICAL COMPONENTS**  
Robert L. Ewing, Newark, Ohio, assignor to Manville Corporation, Denver, Colo.  
Filed Sep. 16, 1983, Ser. No. 533,325  
Int. Cl.<sup>4</sup> F21S 13/10; F21V 23/02; H01R 33/00  
U.S. Cl. 362-226

1. In a luminaire having a housing, a lamp socket, a lamp, a reflector and electrical components, the improvement comprising, a support plate fixed to the housing, an electrical plate detachably secured to said support plate, said electrical components being mounted on said electrical plate and removable with said electrical plate and quick-disconnect means comprising a single quarter turn fastener for fastening and detaching said electrical plate from said support plate, said support plate

having notches formed therein and said electrical plate having notches formed therein for engaging the notches in said support plate and thereby aligning said electrical plate relative to said support plate

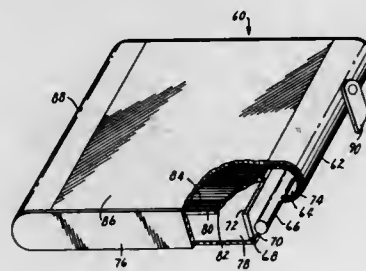


port plate and thereby aligning said electrical plate relative to said support plate

**4,791,540**  
**LIGHT FIXTURE PROVIDING NORMALIZED OUTPUT**  
John F. Dreyer, Jr., and Neal T. Strand, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Filed May 26, 1987, Ser. No. 53,848  
Int. Cl.<sup>4</sup> F21V 5/02

U.S. Cl. 362-331

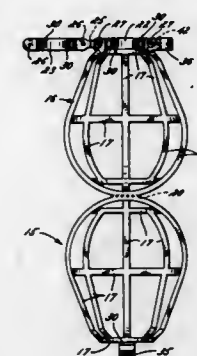
5 Claims



1. A light fixture having normalized light output comprising:
  - a case defining a first optical cavity, said optical cavity having an optical window;
  - a first light source in said optical cavity;
  - a first transparent film having first and second major surfaces in said optical window, said first major surface being smooth and facing into said optical cavity and said second major surface having a plurality of triangular prisms thereon, each of said triangular prisms having a major axis, said major axes of said prisms being parallel to one another;
  - a case defining a second optical cavity having a first input optical window and an output optical window, said second optical cavity input window accepting light exiting said first optical cavity through said first optical cavity optical window; and
  - a second transparent film having first and second major surfaces in said optical window, said second transparent film first major surface being smooth and facing into said second optical cavity and said second transparent film second major surface having a plurality of triangular prisms thereon, each of said triangular prisms having a major axis, said major axes of said prisms being parallel to one another and perpendicular to said major axes of said prisms of said first transparent film.

**4,791,541**  
**PROTECTIVE CAGE FOR A LAMP**  
Louis Simmons, Valparaiso, Ind., assignor to Mc Gill Manufacturing Company, Inc., Valparaiso, Ind.  
Filed Aug. 28, 1987, Ser. No. 90,573  
Int. Cl.<sup>4</sup> F21V 15/00  
U.S. Cl. 362-376

10 Claims



1. A guard for protecting an electrical lamp having a base adapted to be inserted into an electrical socket, said guard being of one-piece construction and being molded of plastic, said guard comprising a hinged cage part and a stationary cage part, a living hinge interconnecting adjacent ends of said cage parts and supporting said hinged cage part to swing between closed and open positions with respect to said lamp, said cage parts enclosing said lamp when said hinged cage part is in said closed position, said hinged cage part exposing said lamp when in said open position and being located to permit said lamp to be removed from said socket and from said stationary cage part, first coacting latch means integral with said cage parts and operable to releasably hold said hinged cage part in said closed position, a collar section integral with the end of said stationary cage part opposite said hinge and shaped to extend around a portion of said socket, a clamp section shaped to extend at least substantially around the remaining portion of said socket, a living hinge connecting said clamp section to said collar section and supporting said clamp section to swing between closed and open positions, said clamp section coacting with said collar section to embrace said socket and hold said guard on said socket when said clamp section is in its closed position, said clamp section exposing said socket when in said open position and being located so as to enable said guard to be pulled away from said socket, and second coacting latch means integral with said collar section and said clamp section and operable to releasably hold said clamp section in its closed position.

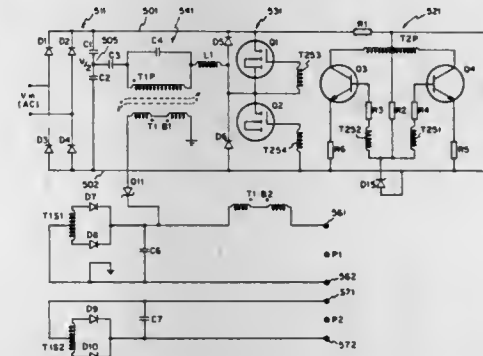
**4,791,542**  
**FERRORESONANT POWER SUPPLY AND METHOD**  
Andrew D. Piaskowski, Brandon, Vt., assignor to RFL Industries, Inc., Brandon, Vt.  
Filed Aug. 3, 1987, Ser. No. 81,300  
Int. Cl.<sup>4</sup> H02M 3/335

U.S. Cl. 363-17

42 Claims

32. A power supply, comprising:
  - a ferroresonant circuit, including a transformer with a core of magnetic material, a primary winding, a secondary winding and reactive means coupled with at least one of said windings;
  - said transformer having a bias winding and a further bias winding;
  - means for applying an alternating voltage to said ferroresonant circuit, said alternating voltage having a frequency that is approximately equal to a resonant frequency of said ferroresonant circuit;

an output circuit coupled to said secondary winding; means for sensing a DC voltage level of said output circuit and for applying a feedback signal to said bias winding in accordance with the sensed DC voltage level; and



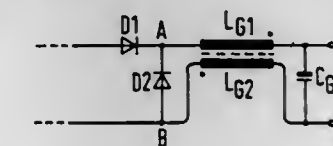
means for sensing a current in said output circuit and for applying a feedback signal to said further bias winding in accordance with the sensed current.

**4,791,543**  
**HIGH POWER SWITCHED POWER SUPPLY**  
P. N. R. Chadwick, Petzenhausen, and Horst Morgott, Diedorf, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Continuation of Ser. No. 012,340, Feb. 9, 1987, abandoned. This application Mar. 3, 1988, Ser. No. 168,592  
Claims priority, application Fed. Rep. of Germany, Feb. 28, 1986, 3606592

U.S. Cl. 363-48

Int. Cl.<sup>4</sup> H02M 1/12

1 Claim

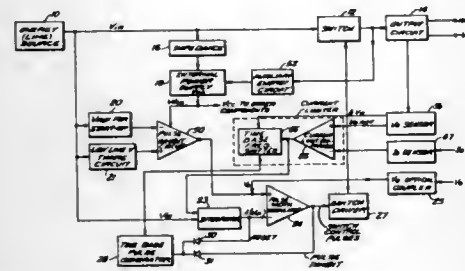


1. In a switched power supply of the type having first and second output terminals, a transformer circuit including a switch element feeding a rectifier circuit followed by a filter circuit, and in which first and second chokes are respectively connected between said rectifier circuit and said first and second output terminals, the improvement wherein said filter circuit comprises:
  - a capacitor connected across said output terminals;
  - a common magnetic core, each of said chokes comprising a strip-shaped winding extending through said core with the strip-shaped winding traversing said core in the same winding sense;
  - said first choke comprising three sub-paths including two outer sub-paths external of said core and connected to said first output terminal and a central sub-path extending through said core;
  - said second choke comprising a strip-shaped band extending through said core and between said outer sub-paths of said first choke; and
  - said outer sub-paths and said strip-shaped band include ends constituting said output terminals and mounting said capacitor.

# 4,791,544 REGULATING CONTROL FOR SINGLE-ENDED SWITCHING POWER SUPPLY

George A. Gauthier, Woodside, and Sol Greenberg, Roslyn, both of N.Y., assignors to Veeco Instruments, Melville, N.Y. Continuation of Ser. No. 47,608, Apr. 28, 1987, abandoned, which is a continuation of Ser. No. 854,660, Apr. 18, 1986, abandoned, which is a continuation of Ser. No. 652,974, Sep. 21, 1984, abandoned. This application Mar. 17, 1988, Ser. No. 169,606

U.S. Cl. 363-49 Int. Cl. H02M 3/335 32 Claims



1. Regulating control means for a single-ended regulated switching power supply operable from an external energy source and of the type having an output circuit connectable to a load to be supplied and a controllable switch to provide output regulation of an electrical output parameter by controlling the duty cycle of the power transferred from the source to the output circuit, the regulating control means comprising: means jointly responsive to the energy source input voltage and the output parameter to be regulated for generating a signal to activate the switch at a given normal repetition rate determined by a time period between initiation of successive periods of switch activation and for a duration determined by the source voltage and the output parameter so as to maintain said output parameter at a desired value; and a start-up circuit for temporarily reducing the duty cycle of the power transferred by the switch, thereby to limit start-up current, said start-up circuit being operative to extend said time period and thereby to reduce the normal repetition rate of said switch activation signal during start-up of the power supply.

# 4,791,545 ZERO-CROSSOVER SCR POWER SUPPLY REGULATOR

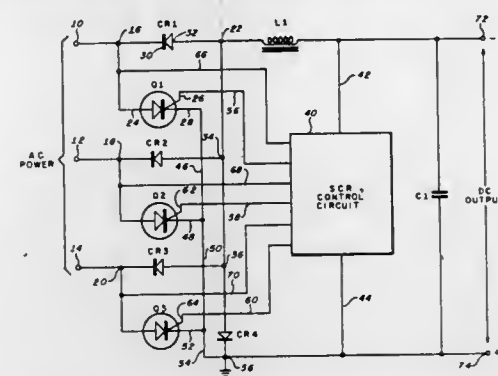
Paul Hinckley, Hicksville, N.Y., assignor to Unisys Corporation, Blue Bell, Pa.

Filed Apr. 20, 1987, Ser. No. 40,020 Int. Cl. H02M 7/162

U.S. Cl. 363-81 11 Claims

11. A zero-crossover control circuit for a polyphase power supply providing a regulated DC output voltage, comprising: means responsive to a transition from a first polarity of an applied AC voltage source to an opposing polarity for providing a current corresponding to at least a portion of said applied AC voltage source, means responsive to said current corresponding to said AC voltage source for providing a pulsed signal of a predetermined polarity, means for providing a first reference bias potential, logic circuit means responsive to a predetermined algebraic difference of said pulsed signal and said reference bias potential for providing an output signal synchronous with said AC voltage source, differentiating circuit means responsive to said synchronous output signal for providing a differentiated output signal to further logic circuit means, and means for providing a second reference bias potential, said further logic circuit means responsive to a predeter-

mined algebraic difference of said differentiated output signal and said second reference bias potential for produc-



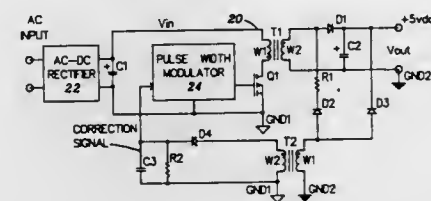
ing a logic signal output indicative of said zero-crossing of said one phase of said applied AC voltage source.

# 4,791,546 VOLTAGE REGULATOR CIRCUIT

David T. Carroll, Sonoma, Calif., assignor to DCI Technology, Sonoma, Calif.

Filed Dec. 23, 1987, Ser. No. 137,787 Int. Cl. H02M 3/24

U.S. Cl. 363-95 9 Claims



1. A voltage regulator comprising: a sense transformer; charging means electrically coupled to said sense transformer for charging said sense transformer to saturation during a charging cycle; clamping means electrically coupled to a first winding of said sense transformer for clamping a voltage across said first winding, during a clamping phase, to a voltage corresponding to an output voltage of a power supply; detecting means coupled to a second winding of said sense transformer for detecting a voltage across said second winding when said voltage across said first winding is clamped, said voltage across said second winding corresponding to said voltage across said first winding, and providing a control voltage; and controlling means for receiving said control voltage and adjusting an input voltage into said power supply.

# 4,791,547 MEASUREMENT AND CONTROL SYSTEM

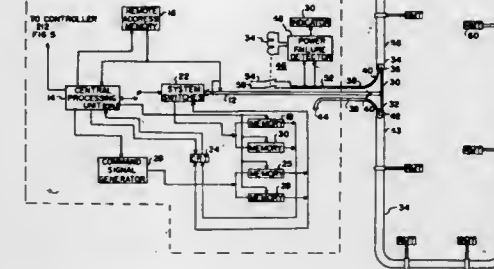
Alan M. Petroff, Huntsville, Ala., assignor to Condor Systems, Inc., Huntsville, Ala.

Division of Ser. No. 473,689, Mar. 9, 1983, Pat. No. 4,530,045, which is a continuation-in-part of Ser. No. 190,036, Sep. 23, 1980, Pat. No. 4,386,409. This application Jul. 15, 1985, Ser. No. 755,062

The portion of the term of this patent subsequent to Jul. 16, 2002, has been disclaimed.

Int. Cl. G06F 15/46

U.S. Cl. 364-138 3 Claims



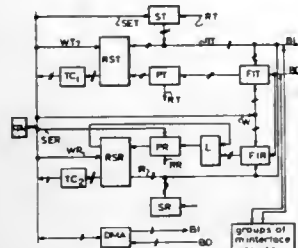
1. A process measurement and control system comprising: an electrically conductive cable comprising an outer positioned conductive cover, first and second pairs of spaced electrical conductors positioned within said cover, and a dielectric material being between said conductors and said cover, said cable extending in a loop commencing at a selected location, passing adjacent to a plurality of spaced process access locations and terminating at said selected location; a source of alternating current power being applied to said first pair of conductors of said cable; a control terminal located at said selected location and comprising: signal generating means for generating recurring sets of address signals, one unique address signal in a set for each of said process access locations, coupling means for connecting said address signals to said second pair of conductors, and discrete periods between succeeding address signals defining a time domain communications channel for an address, first selective coupling means synchronous with said signal generating means for effecting a discrete coupling circuit with said second pair of conductors of said cable for each ordered discrete time space and communications channel, signal application means coupled to said first selective coupling means for providing through said first selective coupling means and on said second pair of conductors of said cable at least one directive signal in at least one time domain communications channel, and signal indicator means for indicating at least one process condition coupled through said first selective coupling means from said second pair of conductors; a plurality of first communications terminals, at least one of said first communications terminals being positioned adjacent to a said process access location, and comprising: power conversion means connected to said first pair of conductors of said cable for providing direct current biasing voltages generally for a said first communications terminal, first selective switching means coupled to said second pair of conductors of said cable and responsive to a said unique address signal for effecting coupling with said

second pair of conductors for a said discrete period and thereby with a selected said communications channel, a plurality of digital storage elements, each being connected through said first selective switching means to said second conductors, a plurality of signal terminals, a plurality of transducer assemblies each of which is responsive to a physical state for providing as an output an analog signal, and wherein at least four of said transducer assemblies are positioned to sense a single physical state, and an analog output from each of said transducers is connected to one of said signal terminals, second selective switching means for sequentially providing signal coupling with each of said plurality of signal terminals, first analog-to-digital conversion means coupled to said second selective switching means for providing, sequentially, digital representations of discrete signals on a plurality of different said signal terminals, and first signal means responsive to sequential signals from said first analog-to-digital conversion means for coupling to a discrete one of said storage elements a digital signal which is a function of a signal on at least one of said signal terminals, and wherein said first signal means includes: comparator means responsive to digital representations of said analog outputs of said at least four transducer assemblies for comparing each said last-named outputs with at least one selected signal and providing, as compared outputs, only outputs which are within a selected range of said selected signal, and averaging means responsive to said compared outputs for providing a digital representation of the averaged said compared outputs to one of said storage elements; a plurality of second communications terminals positioned adjacent to other of said spaced said process access locations than those to which said first communications terminals are adjacent, and comprising: power conversion means connected to said first pair of conductors of said cable for providing direct current bias voltage generally for said second communications terminal, third selective switching means coupled to said second pairs of conductors of said cable and responsive to unique said address signal for effecting coupling with said second pair of conductors for a discrete period and thereby with a selected said communication channel, a plurality of second digital storage elements, each last-named storage element being selectively coupled through said third switching means to said second conductors, a plurality of second signal terminals, fourth selective switching means for sequentially providing a signal coupling with each of said plurality of second signal terminals, and second signal means including digital-to-analog conversion means responsive to a digital signal stored in one of said digital storage elements for providing a signal through said fourth selective switching means to one of said second signal terminals, which last-named signal is a selected function of a digital signal stored in one of said digital storage elements.





electronic processor, comprising a first and a second section adapted to respectively handle transmission and reception interrupt requests generated by interface circuits between a CPU forming said processor and peripheral units bidirectionally connected to the CPU by said interface circuits; the first section comprising a first scanner (ST) adapted to cyclically address, via an input-output address bus (BI), in a scanning operation, all of said interface circuits in groups of  $n$  of said interface circuits, a first priority coder (PT) connected to receive from the  $n$  interface circuits addressed by the first scanner (ST) possible transmission interrupt requests via a data bus (BD) and to generate a first request criterion (RT) for the CPU, as well as an indication of the interface circuit having the highest priority among those requiring the interrupt of each group of  $n$  interface circuits, and a first state register (RST) which is accessible to the CPU and receives from the first scanner (ST) the code of the addressed interface circuit group and from the first priority coder (PT) the indication of the interface circuit having the highest priority, the operation of the first scanner (ST) being halted by the first criterion (RT) and activated again by a first control signal (SET) from the CPU; the second section comprising a second scanner (SR) adapted to cyclically address, via the input-output address bus (BI), groups of  $n$  interface circuits, a request memory (L) connected to receive from the  $n$  interface circuits addressed by the second scanner (SR), via the data bus (BD) the possible reception interrupt requests, a second priority coder (PR) connected to an output of the memory (L) and enabled by a second control signal from the CPU to generate a second request criterion (RR) for the CPU, as well as an indication of



the interface circuit having the highest priority among those requiring the reception interrupt, and a second state register (RSR) that is accessible to the CPU and receives from the second scanner (SR) the code of the addressed interface circuit group and from the second priority coder (PR) the indication of the interface circuit of highest reception priority, the read-out of the second state register (RSR) by the CPU causing the cancellation in the memory (L) of the reception interrupt request generated by the interface circuit whose indication was written in the second state register (RSR), the operation of the second scanner (SR) being interrupted by the second criterion (RR), said first state register (RST) transferring an address of any interface unit of each group scanned by said first scanner (ST) to said CPU after the address of any interface unit of each group scanned by the first scanner (ST) which sends an interrupt request and has the highest priority is loaded into the first state register (RST), said data bus (BD) being connected to a filtering means (FI) addressed by the first scanner (ST) and by the second scanner (SR) and adapted to inhibit the transit of the interrupt requests from interface circuits corresponding to missing and faulty peripheral units, and corresponding to peripheral units that have been disabled by the CPU, said filtering means (FI) comprising a random access memory (RAM) written by the CPU and addressed for being read out by the first and the second scanner (ST, SR) in words of n bits, as well as an inhibiting device (INT) of n gates activated in given order by bits forming a word emitted by the random access memory (RAM) and having inputs connected to n leads forming part of the data bus (BD) and outputs connected to inputs of the first priority coder (PT) and of the request memory (L); the ad-

addressing of the random access memory (RAM) by the first scanner (ST) involving the loading of the signals available at outputs of the inhibiting device (INT) into the first priority coder (PT), the addressing of the random access memory (RAM) by the second scanner (SR) involving the loading of the signals available at an output of the inhibiting device (INT) into the request memory (L).

**4,791,554**

**METHOD AND APPARATUS FOR PREVENTING DEADLOCK IN A DATA BASE MANAGEMENT SYSTEM**  
Atsuhiko Hirota; Takashi Owaki, both of Hitachi; Yasutaka Yamaguchi, Yokohama, and Toshihiro Hayashi, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

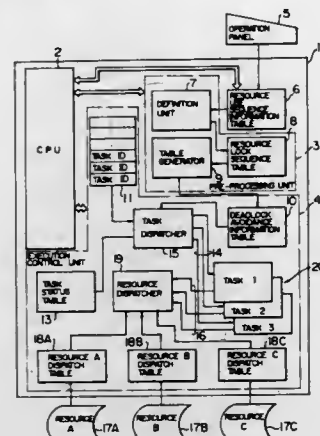
Filed Apr. 7, 1986, Ser. No. 848,484

Claims priority, application Japan, Apr. 8, 1985, 60-73817

Int. Cl.<sup>4</sup> G06F 9/46

U.S. Cl. 364—200

## 14 Claims



1. A method for preventing deadlock in a data base management system of a computer in which a plurality of tasks share a plurality of resources contained in the data base and are parallelly executed, comprising the steps of:

- (a) inputting to the computer a resource use sequence of resources to be used by each task prior to the execution of the tasks;
- (b) performing a preprocessing in the computer in response to a request for a task including:
  - (i) determining possibilities of deadlock between predetermined tasks due to sharing of common resources, between the predetermined tasks based on information from the inputted resource use sequence, prior to the start of execution of the tasks;
  - (ii) preparing a first table which contains the deadlock possibilities;
  - (iii) determining whether a task for which a start request is issued will go into deadlock if execution of the task is started based on the deadlock possibilities information contained in said first table;
  - (iv) delaying the start of execution of the task for which the start request has been issued when it is determined that the task for which the start request has been issued may go into deadlock; and
- (c) starting in the computer the task which issued the start request when it is determined that the task which issued the start request will not go into deadlock.

**4,791,555**

**VECTOR PROCESSING UNIT**

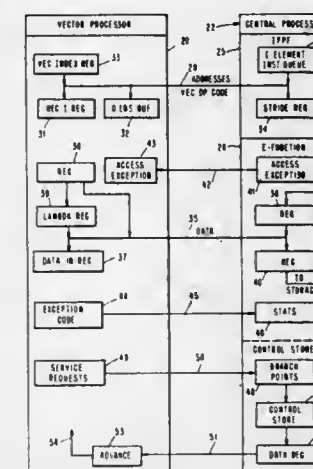
Leslie C. Garcia, Poughkeepsie; David C. Tjon-Pian-Gi, Hopewell Junction; Stuart G. Tucker, and Myron W. Zajac, both of Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.  
Continuation of Ser. No. 544,674, Oct. 24, 1983, abandoned.

**This application Mar. 2, 1987, Ser. No. 21,621**

Int. Cl.<sup>4</sup> G06F 15/16, 15/347

U.S. Cl. 364—200

## 10 Claims



1. A data processing system comprising:  
memory means for storing instruction words and operands;  
a central processing unit (CPU) connected to said memory means for fetching and decoding instructions and controlling execution of instructions, including transfer of operands to and from said memory means, the control of execution of instructions is effected by a CPU clock and microprogram control means connected to said CPU clock for generating periodic execution control signals in synchronism with said CPU clock;  
vector processing means tightly coupled to said CPU for effecting data processing on vector data; and  
interconnection means, connecting said CPU and said vector processing means, including operand transfer lines for transfer of vector data between said CPU and said vector processing means, control lines, status lines for signalling conditions of said vector processor means to said CPU, and a vector timing signal line connected to one of said execution control signals from said microprogram control means, whereby said vector processing means receives periodic execution control signals at the clock rate and is synchronized with said CPU clock on a clock pulse by clock pulse basis during execution of instructions.

**4.791.556**

**METHOD FOR OPERATING A COMPUTER WHICH  
SEARCHES FOR OPERATIONAL SYMBOLS AND  
EXECUTES FUNCTIONS CORRESPONDING TO THE  
OPERATIONAL SYMBOLS IN RESPONSE TO USER  
INPUTTED SIGNAL**

**John V. Vilkaitis, P.O. Box 26, Thomaston, Conn. 06787-0026**

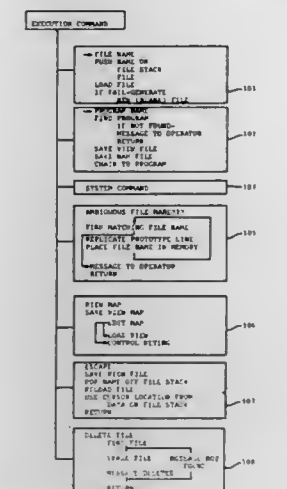
Filed Aug. 29, 1984, Ser. No. 645,933

Int. Cl.<sup>4</sup> G06F 15/00, 3/14

U.S. Cl. 364-200

## 12. Claims

1. A method of operating a computer system having at least a processor, display means, input means, and memory means for storing one or more information files, each of said files containing data and optionally containing a sequence of processor detectable operational symbols intermixing with said data, said method comprising the steps of:
  - A. storing data for:
    - i. defining a number of generic categories of functions



performed by the processor, each of said generic categories of functions has a corresponding generic operation symbol that can be perceived by the user and detected by the processor;

- ii. defining a series of operations to be used by the processor to identify the generic category of each of said generic operational symbol within the context of said files irrespective of the other contents of said files;
  - iii. defining a series of operations to be used by the processor to extract specific elaboration of said generic function from an explicit operational symbol selected by the user;
  - iv. defining a series of operations to be used by said processor to determine whether a specific function corresponding to a given explicit operational symbol is available within said processing means or said information storage means;
  - v. defining a series of operations to be used by said processor to indicate upon said display means a specific selected operational symbol; and thereafter
- B. receiving a user inputted initiation signal;
- C. responding to said initiation signal to cause said processor to retrieve from said memory means, and present on said display means, the content of all or part of a predetermined one of said files, and to display a cursor signal at an initial location in said displayed file; and thereafter



- L. if an execute mode signal is received in step I(2), then, if possible, executing the function corresponding to the detected operational symbol;
- M. whereby said computer system is controlled by user entered text data, or by function calls requiring minimal user input, or by a combination of textual input and such function calls.

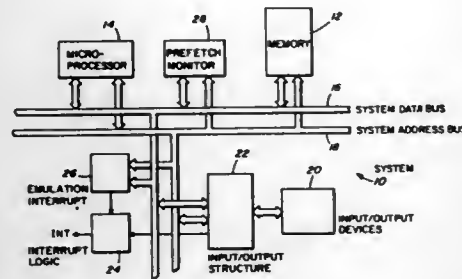
**4,791,557**  
**APPARATUS AND METHOD FOR MONITORING AND CONTROLLING THE PREFETCHING OF INSTRUCTIONS BY AN INFORMATION PROCESSING SYSTEM**

David J. Angel, Hudson, N.H.; Gary A. Cardone, Groton; Mark D. Holbrook, Pepperell, both of Mass.; James P. Moskun, Nashua, N.H., and Bruce Patterson, Andover, Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Filed Jul. 31, 1985, Ser. No. 761,213  
 Int. Cl.<sup>4</sup> G06F 9/42, 9/38

U.S. Cl. 364-200

22 Claims



1. In an information processing system including memory means for storing instructions, processor means responsive to the instructions for performing operations, the processor means including instruction queue means for fetching and storing instructions in advance of execution, the instruction queue means fetching instructions over a system data bus from locations in the memory means in response to substantially sequential addresses generated by an instruction pointer register means, the addresses being issued over an address bus to the memory means, and means responsive to certain of the instructions fetched by the instruction queue means for causing execution of an alternate sequence of instructions, prefetch monitor means, comprising:

means, coupled to the system data bus, for detecting instructions fetched by the instruction queue means which may result in the execution of an alternate sequence of instructions;

means for inhibiting the fetching of a next instruction from the memory means to the processor means, the inhibiting means being coupled to the detecting means and responsive to the operation thereof for inhibiting the fetching of the next instruction when the detecting means detects an instruction which may result in the execution of an alternate sequence of instructions; and

means, coupled to the system data bus and to the detecting means and responsive to the instruction queue fetching operation of the processor means, for substituting null instructions upon the system data bus for storage within the instruction queue means, each of the null instructions being a type of instruction the execution of which prevents the instruction pointer register means from incrementing such that at the completion of the execution of the alternate sequence of instructions and also the null instructions stored within the instruction queue means the address within the instruction pointer register means points to the location in the memory means of the next instruction following the instruction which resulted in the execution of the alternate sequence of instructions.

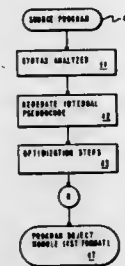
**4,791,558**  
**SYSTEM AND METHOD FOR GENERATING AN OBJECT MODULE IN A FIRST FORMAT AND THEN CONVERTING THE FIRST FORMAT INTO A FORMAT WHICH IS LOADABLE INTO A SELECTED COMPUTER**

Gregory J. Chaitin, Yorktown Heights, N.Y.; Clifford H. Hoagland, Round Rock, and Marc J. Stephenson, Cedar Park, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Feb. 13, 1987, Ser. No. 14,412  
 Int. Cl.<sup>4</sup> G06F 9/44

U.S. Cl. 364-200

12 Claims



1. A system for generating a program object module for a selected computing system from a program source comprising: means for compiling an object module from said program source, said object module having instructions for said computing system arranged in a first format not loadable into said computing system, and means for converting said arrangement of instructions from said first instruction format into a second format loadable into said computing system.

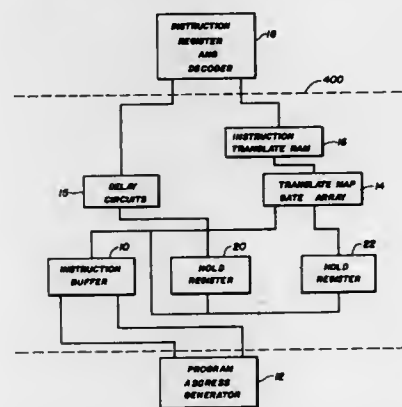
**4,791,559**  
**HIGH-SPEED INSTRUCTION CONTROL FOR VECTOR PROCESSORS WITH REMAPPING**

Larry L. Byers, Apple Valley, Minn., assignor to Sperry Corporation, Blue Bell, Pa.

Continuation-in-part of Ser. No. 809,358, Dec. 16, 1985, abandoned. This application Nov. 10, 1986, Ser. No. 928,931  
 Int. Cl.<sup>4</sup> G06F 15/18, 15/347

U.S. Cl. 364-200

4 Claims



1. An instruction flow control system for a main processor for processing mapped and remapped instructions, mapped instructions being where the address or instructions is not loaded directly into an active control register but is modified prior to loading, remapped instructions being where the instruction is modified at least twice, said instructions including operation codes based on which the determination is made whether to remap said instructions, comprising:

instruction buffer means connected to said main processor for receiving stored program instructions to be remapped; program address generator means connected to the instruction buffer means for fetching the program instructions to be remapped;

map gate array means connected to said instruction buffer means for determining whether certain of said instructions from said instruction buffer are to be mapped or remapped and for instructions to be remapped generating an address including a constant address and a variable address which are indicative of a plurality of operation codes in response to a single remap program instruction being fetched from the instruction buffer means; and

a program instruction translate RAM connected to the output of said map gate array means for decoding each of said constant and said variable address into a plurality of operation code instructions for controlling said main processor, whereby a plurality of operation codes may be generated from a single instruction to be remapped by said map gate array means and said program instruction translate ram.

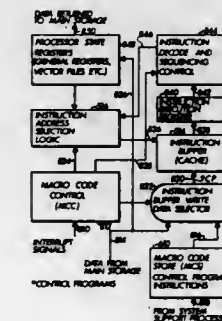
**4,791,560**  
**MACRO LEVEL CONTROL OF AN ACTIVITY SWITCH IN A SCIENTIFIC VECTOR PROCESSOR WHICH PROCESSOR REQUIRES AN EXTERNAL EXECUTIVE CONTROL PROGRAM**

Archie E. Lahti, Fridley; Ralph L. James, Andover, and Larry L. Byers, Apple Valley, all of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Jul. 31, 1985, Ser. No. 761,138  
 Int. Cl.<sup>4</sup> G06F 9/00

U.S. Cl. 364-200

7 Claims



1. In a scientific data processor requiring an external executive control program, said scientific data processor having an activity switch which includes an instruction cache buffer to receive the temporarily store data from a main storage, an instruction address selection logic means connected to said instruction cache buffer and an instruction decode and sequencing control means coupled to said instruction cache buffer, apparatus for controlling said activity switch of said scientific processor at the macro instruction level comprising:

- macro code storage means to store a plurality of macro coded instructions and to provide a source thereof;
- macro code control means responsive to a plurality of interrupt signals from various sources and to provide a plurality of control signals;
- a source of data from a main storage means; and
- an instruction buffer writer data selector means commonly connected to (a), (b) and (c) to selectively receive information from either said (a) or (c) under the control of (b) such that in response to any one of a plurality of interrupt signals to said macro code control means, said macro code control means causes said instruction buffer write data selector means to selectively shift from the receipt of data from said main storage to the receipt of data from said

macro code store means thereby providing macro level control of the activity switch in the scientific processor.

**4,791,561**  
**INTERACTIVE CONSTRUCTION OF MEANS FOR DATABASE MAINTENANCE**

Val J. Huber, Chelmsford, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.

Continuation of Ser. No. 40,702, Apr. 17, 1987, abandoned, which is a continuation of Ser. No. 690,844, Jan. 11, 1985, abandoned, which is a continuation-in-part of Ser. No. 687,809, Dec. 31, 1984, abandoned. This application Mar. 21, 1988, Ser. No. 171,232

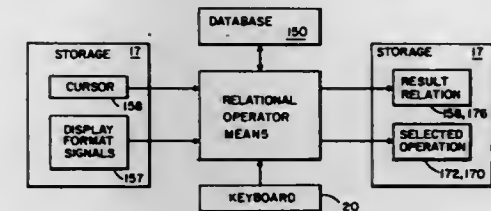
Int. Cl.<sup>4</sup> G06F 15/40

U.S. Cl. 364-300

8 Claims

MICROFICHE APPENDIX INCLUDED

(9 Microfiche, 439 Pages)



1. Method for retrieving from a destination relation in a stored relational database, signals representing record occurrences related to a record occurrence of a starting relation, said method comprising

providing, for a relationship between particular relations in said database, stored signals representing relationship attributes including a specification of a relationship field common to said particular relations,

accessing, responsive to selection of a starting particular relation and a relationship in which said starting relation participates, said stored relationship attribute signals,

generating, responsive to said relationship attributes, generic cursor signals representing a generic cursor defined against the other particular relation as a destination relation,

storing said generic cursor signals in working storage, copying, responsive to a signal representing selection by an operator of a particular record occurrence in the starting relation and to an operation selection signal from the operator, values of said specified relationship field from said particular record occurrence to locations in said generic cursor to form a completed cursor,

accessing in said stored database, responsive to said completed cursor, destination relation record occurrence signals defined by said completed cursor, and

storing said accessed destination relation record occurrence signals in working storage.

**4,791,562**  
**DATA PROCESSING SYSTEM IN WHICH MODULES LOGICALLY "OR" NUMBER SEQUENCES ONTO CONTROL LINES TO OBTAIN THE USE OF A TIME SHARED BUS**

George T. Shima, Tokyo, Japan, assignor to Unisys Corporation, Detroit, Mich.

Filed Dec. 2, 1985, Ser. No. 804,347  
 Int. Cl.<sup>4</sup> G06F 9/46, 7/02

U.S. Cl. 364-200

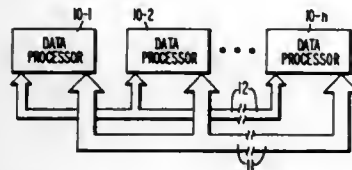
6 Claims

1. A data processing system including: a plurality of data processing modules coupled to a bus and to control lines; each module having a requesting means, coupled to said

control lines, for requesting the use of said bus by sending a sequence of  $N$  binary numbers on said control lines during  $N$  successive cycles, each requesting means including a synchronizing means for synchronizing the sending of said numbers such that the  $i$ th number from all modules are sent in the  $i$ th cycle at the same time, where  $i$  is one thru  $N$ ;

each module including an ORING means, coupled to said control lines, for logically ORING said ith numbers of each sequence as sent by itself and the other modules;

each module having a terminating means, which couples said ORING means to said requesting means, for terminating the sending of its sequence of N numbers if, during any



one of said successive cycles, said logical OR of the numbers on the control lines is greater than twice the number which the module itself is sending; and each module having a signaling means, coupled to said requesting means and said terminating means, for signaling it to send a message on said bus if said logical OR of the numbers on the control lines for each of said N cycles taken separately does not exceed the number which the module itself sends; wherein, each of said N binary numbers that are sent in said N successive cycles is a multibit number, and N is an integer from two to five which is predetermined before said modules request the use of said bus.

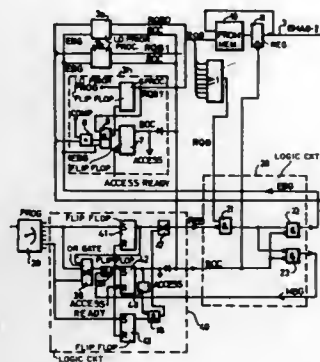
4,791,563  
ARRANGEMENT FOR APPORTIONING PRIORITY  
AMONG CO-OPERATING COMPUTERS

Lars-örjan Kling, Södertälje, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden  
PCT No. PCT/SE85/00429, § 371 Date Jun. 27, 1986, § 102(e)  
Date Jun. 27, 1986, PCT Pub. No. WO86/03606, PCT Pub.  
Date Jun. 19, 1986

PCT Filed Nov. 1, 1985, Ser. No. 882,933  
Claims priority, application Sweden, Dec. 12, 1984, 8406312-2  
Int. Cl.<sup>4</sup> G06F 13/18

U.S. Cl. 364—200

### 5 Claims



1. Apparatus for apportioning priority in a computer including a common bus and processors of two types including a first high-priority type which can determine its priority in relation to processors of a second low-priority type for assigning connection to said common bus, said apparatus allowing the low-priority type to use the bus if the high-priority processor does

not require priority, said apparatus comprising first and second logic circuit means, the first logic circuit means (20) having three inputs including a first input for receiving an input signal (RQB) which signifies a request for access from one of the low-priority processors (3a-3h), a second input for receiving an input signal (REB) which signifies a request for access from the high-priority processor (1) and a third input for receiving an input signal (BOC) which occurs during the entire time that the bus is used, the first logic circuit means (20) having first and second outputs, a signal (EBG) occurring on the first output for assigning the bus a low-priority processor (3a-3h) if only the first input has been activated, a signal (MGB) occurring on the second output for assigning to the bus the high-priority processor while the signal on the first output is inhibited, the second logic circuit means (40) having first and second outputs and first and second inputs, said first output of said second logic circuit means feeding a signal (REB) constituting a request for access from the high-priority processor to the second input of the first logic circuit means, said second output of said second logic circuit means feeding a signal (BOC), indicating that the bus is occupied, to the third input of the first logic circuit means, a signal (REB) occurring on the first output of said second logic circuit means on its activation and denoting at the second input of the first logic circuit means that the high-priority processor desires access, an assigning signal (MBG) then occurring on the second output of the first logic circuit means, the second input of the second logic circuit means on activation receiving a signal for generating a request for access signal for the high-priority processor with delay on the first output of the second logic circuit means so that the signal (EBG) for assigning the bus to a low-priority processor has time to occur, the high-priority processor still having immediate access to the bus after termination of operation of the previously connected low-priority processor.

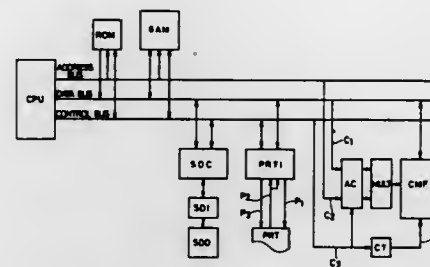
**4,791,564**  
**RANDOM ACCESS MEMORY FILE APPARATUS FOR**  
**PERSONAL COMPUTER WITH EXTERNAL MEMORY**  
**FILE**

**Yasuyuki Takai, Nara, Japan, assignor to Sharp Kabushiki  
Kaisha, Osaka, Japan**  
**Continuation of Ser. No. 728,887, Apr. 30, 1985, abandoned.**

This application Feb. 22, 1988, Ser. No. 161,387  
Claims priority, application Japan, May 7, 1984, 59-91313  
Int. Cl.<sup>4</sup> G06F 13/00

U.S. Cl. 364—200

#### 4 Claims



1. A memory file system for a computer comprising:  
central processing unit (CPU) means for controlling the operation of the computer;  
external sequential access type memory means for storing data in a plurality of sequentially arrayed files, each file including a directory portion and a data portion, each said directory portion storing information identifying the data in the corresponding data portion;  
output means, controlled by said CPU means, for outputting said data;  
first random access memory (RAM) means for storing program instructions to be executed by said computer;  
second random access memory (RAM) means for storing all

of the data in said plurality of files of said external memory means, said second RAM means including a directory section for storing respective addresses of the data stored in each file of said external memory means, and a buffer section for storing particular data to be outputted by said output means; and

means for accessing the data stored in said sequential access type memory means by accessing said second RAM means.

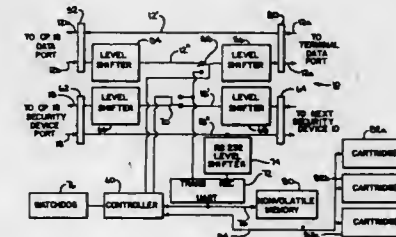
**4,791,565**  
**APPARATUS FOR CONTROLLING THE USE OF**  
**COMPUTER SOFTWARE**

**Michael D. Dunham, Shorewood; Thomas M. Dykstra, Mequon; Donald W. Vahlsing, Grafton, and Paul L. Ehlers, Menasha, all of Wis., assignors to Effective Security Systems, Inc., Milwaukee, Wis.**

Filed Jun. 20, 1984, Ser. No. 622,657  
Int. Cl.<sup>4</sup> G06F 12/14

U.S. Cl. 364—200

## 24 Claims



1. Apparatus for monitoring the use of software in a computer system with respect to at least one selected aspect of such use, said computer system having at least one central processor containing the software, said central processor being accessed by at least one operator terminal connected to said central processor, software in the central processor generating usage indicative of monitored software use conditions for the selected aspect in the computer system, the apparatus employing at least two pre-established levels of occurrences of conditions violative of an usage limit for the selected aspect in exerting restrictions on the use of the monitored software, said apparatus comprising:

receiving means coupled to the central processor for receiving said monitored software usage data from software in the central processor;

memory means containing data establishing the software usage limit for the selected aspect, said memory means containing data establishing the violative condition occurrence levels, said memory means storing violative condition occurrence data arising out of the operation of the computer system and recording data indicative of existing usage of the monitored software;

microprocessor control means coupled to said receiving means and said memory means for determining conditions violative of the usage limit in response to said usage data and whether the occurrence of violative conditions bears a predetermined relationship to a violative condition occurrence level, said control means being set to a first state that permits use of the monitored software in the central processor and or to second state that restricts use of the monitored software, said control means changing from said first state to said second state when the occurrence of violative conditions bears said predetermined relationship, wherein said control means can be reset from the second state to the first state by remotely generated resetting instructions; and

interrupt means coupled to the computer system and said control means, said interrupt means being controlled by said control means for providing an output to the com-

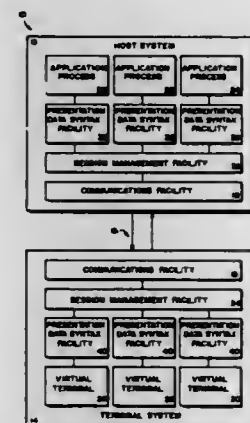
**4,791,566**  
**TERMINAL DEVICE SESSION MANAGEMENT**  
**PROTOCOL**

**Ram Sudama, Concord; Thomas C. Porcher, Stow, both of Mass., and Jerrold S. Leichter, New Haven, Conn., assignors to Digital Equipment Corporation, Maynard, Mass.**

Filed Mar. 27, 1987, Ser. No. 32,152  
Int. Cl.<sup>4</sup> G06F 13/00

U.S. Cl. 364-200

## 23 Claims



1. A session management link for interconnecting a host system having at least one application process to a terminal system having at least one virtual terminal, thereby to effect the transmission of information between a selected virtual terminal and a selected application process, said link including:

A. communications link means between said host and terminal systems for transferring information therebetween;

B. host system session management facility means connected between said application processes and said communications link for transmitting information from said application processes over said communications link, and for generating a plurality of terminal session management commands and transmitting said terminal session management commands over said communications link, one type of said terminal session management command comprising a terminal select session command, each said terminal select session commands identifying a selected interconnection to a virtual terminal; and

C. terminal system session management facility means connected between said communications link and said virtual terminals for receiving said information and said terminal session management commands transmitted from host system session management facility over said communications link, and continually directing to the selected virtual terminal all said information sent after a terminal select session command is received until a next different terminal select session command is received, so that a single terminal select session command directs all of said following information received by said terminal system session management facility means to the selected virtual terminal until said next different terminal select session command for directing said information to a different selected virtual terminal is received.

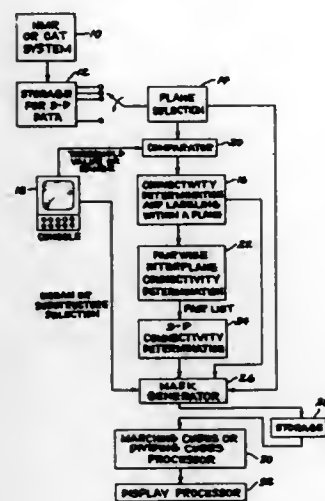


**4,791,567**  
**THREE DIMENSIONAL CONNECTIVITY SYSTEM**  
**EMPLOYING AN EQUIVALENCE SCHEMA FOR**  
**DETERMINING CONNECTED SUBSTRUCTURES**  
**WITHIN A BODY**

Harvey E. Cline, Schenectady; William E. Lorensen, Ballston Lake, and Siegwalt Ludke, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.  
 Filed Sep. 15, 1986, Ser. No. 907,333  
 Int. Cl.<sup>4</sup> G06F 15/62

U.S. Cl. 364-413.13

4 Claims



1. A method for determining, in three dimensions, connected substructures within a body, said method comprising the steps of:

- storing, in memory means three-dimensional signal patterns representing the value of at least one physical property, associated with substructures within said body, at regularly spaced grid locations within said body;
- selecting signal pattern values, from said memory means, which are associated with slices through said body;
- determining connectivity of two-dimensional substructures within each slice independently of connectivity in other slices, said connectivity being indicated by ordered indicia associated with distinct planar substructures;
- determining connectivity of said two-dimensional substructures between adjacent slices, said connectivity being indicated in a pair list of connected substructures;
- permuting a list of said ordered indicia in a memory means in accordance with said pair list, said permutation being carried out only for those pairs which are not already indicated as being connected;
- determining from said permuted list those two-dimensional substructures which are connected.

2. A method for determining equivalence classes of labeled objects from a list of pairs of related objects within a set of such objects, said method comprising the steps of:

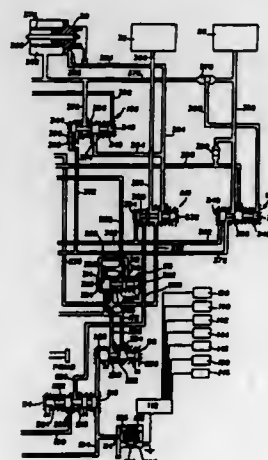
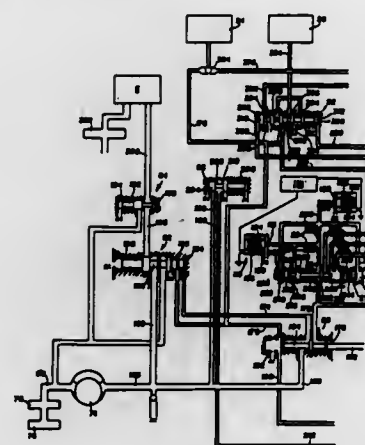
- storing in sequentially accessible memory locations a set of ordered indicia which are in one to one correspondence with said labels as specified in said list of object pairs;
- switching in said memory locations, pairs of ordered indicia corresponding to labels sequentially selected from said list of pairs;
- marking, with a first class indicia, those locations in said memory which contain the same ordered indicia as were present prior to said switching step;
- accessing from said memory an ordered indicia which has not been marked with a class indicia;
- determining from said unmarked ordered indicia a set of related indicia;
- marking said memory locations corresponding to said set of

related indicia with an indicia corresponding to a next class.

**4,791,568**  
**METHOD OF CONTROLLING HYDRAULIC PRESSURE**  
**FOR AN AUTOMATIC TRANSMISSION GEAR SYSTEM**  
 Takeo Hiramatsu; Bonnosuke Takamiya, and Yuichi Tanaka, all of Kyoto, Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Sep. 26, 1985, Ser. No. 780,402  
 Claims priority, application Japan, Sep. 29, 1984, 59-204491  
 Int. Cl.<sup>4</sup> B60K 41/08; F16H 5/40; G05D 16/00  
 U.S. Cl. 364-424.1

6 Claims



1. In a method for feedback controlling a vehicular automatic transmission, in which hydraulic pressure is supplied to a frictional engaging element which engages a rotatable element of a planetary gear set in order to change the actual rotation rate of said rotatable element to converge with a predetermined reference value during a shift from one speed ratio to another, the improvement which comprises setting the hydraulic pressure during the initial stage of gear shifting by:
  - reading, from a memory, data representing a first operating condition of the vehicle at a time immediately after the start of the feedback controlling during a preceding shift, and data representing a first hydraulic pressure supplied to said frictional engaging element at that time;
  - determining a second hydraulic pressure to be supplied to said frictional engaging element immediately before the start of feedback control of a current shift, according to

said first operating condition and said first hydraulic pressure; executing said feedback control; replacing, in said memory, said data representing said first operating condition and said first hydraulic pressure with data representing a second operating condition of said vehicle during the initial stage of said feedback control and a second hydraulic pressure supplied to said frictional engaging element at that time.

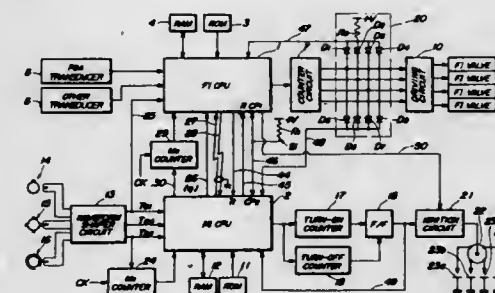
**4,791,569**  
**ELECTRONIC CONTROL SYSTEM FOR INTERNAL**  
**COMBUSTION ENGINES**

Yoshio Suzuki, Wakoh, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 17, 1986, Ser. No. 840,583  
 Claims priority, application Japan, Mar. 18, 1985, 60-52505; Apr. 5, 1985, 60-71101; May 31, 1985, 60-117962; May 31, 1985, 60-117961; May 31, 1985, 60-82838[U]  
 Int. Cl.<sup>4</sup> F02M 51/00

U.S. Cl. 364-431.04

7 Claims



1. In an electronic control system for an internal combustion engine, including fuel supply means for supplying fuel to the engine, and ignition means for igniting a mixture formed by fuel being supplied to the engine from said fuel supply means, the combination comprising a first central processing unit connected with said fuel supply means for controlling the fuel supply to the engine through said fuel supply means, a second central processing unit connected with said ignition means for controlling the ignition of the mixture supplied to the engine through said ignition means, read-write memory means with a backup power source connected to only one of said first and second central processing units and storing first control data used by said first central processing unit for controlling the fuel supply to the engine and second control data used by said second central processing unit for controlling the ignition of the mixture supplied to the engine.

**4,791,570**  
**GUIDE WIRE COMMUNICATION SYSTEM AND**  
**METHOD**

Leigh E. Sherman, North Wales, Pa.; Gary L. Whatcott, Holladay, Utah; Richard M. Dicks, Salt Lake City, Utah, and David C. Madsen, Sandy, Utah, assignors to Eaton-Kenway, Inc., Salt Lake City, Utah

Continuation-in-part of Ser. No. 729,514, May 2, 1985, abandoned. This application Jan. 11, 1986, Ser. No. 873,032  
 Int. Cl.<sup>4</sup> G06F 15/48

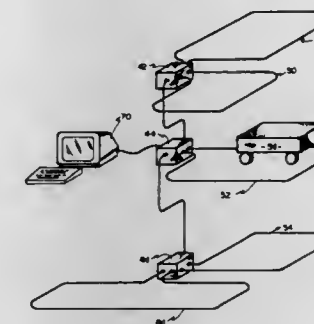
U.S. Cl. 364-436

32 Claims

5. A system for controlling a plurality of unmanned task-performing guide wire related vehicles by exclusive temporary allocation of guide wire length segments whereby the travel paths and tasks performed by the vehicles are strictly controlled and conflict between vehicles is avoided, the system comprising:

a plurality of unmanned task-performing vehicles, each

vehicle comprising vehicle receiver means and vehicle control means; traffic control means by which all vehicles are controlled located at at least one vehicle-remote control site, the traffic control means comprising control transmitter means; guide wire means defining transportation paths along which the vehicles selectively travel, the guide wire means receiving messages from the control transmitter means and communicating the messages to the vehicle receiver means; the traffic control means further comprising means which electronically identify guide wire length segments, means which electronically identify each transportation task to be performed by any vehicle, means which correlate the



transportation task and guide wire length segments needed for carrying out each transportation task, means for reserving the guide wire length segments required for completion of a specific transportation task assigned to one of said vehicles, means causing the traffic control transmitter means to communicate the specific task to the vehicle receiver of said one vehicle and to allocate the reserved guide wire length segments to said one vehicle whereupon the traffic control means cause the one vehicle to perform the specific task using the reserved guide wire length segments, means preventing the specific task and reserved guide wire length segments from being performed and made available, respectively, to a second vehicle during the performance of the specific task and utilization of the reserved guide wire length segments by the said one vehicle.

**4,791,571**  
**ROUTE BUS SERVICE CONTROLLING SYSTEM**  
 Shinichi Takahashi, Tokyo; Hideo Ishii, deceased, late of Kanagawa (by Mariko Ishii, legal representative); Kiyoshi Shimokawa; Takanori Kawahara, both of Hyogo, and Toshiyuki Masita, Tokyo, all of Japan, assignors to Tokyu Corporation and Mitsubishi Denki Kabushiki Kaisha, both of Tokyo, Japan

Filed Oct. 8, 1986, Ser. No. 917,077  
 Claims priority, application Japan, Oct. 29, 1985, 60-245228; Oct. 29, 1985, 60-245229; Oct. 29, 1985, 60-245230; Nov. 5, 1985, 60-247373

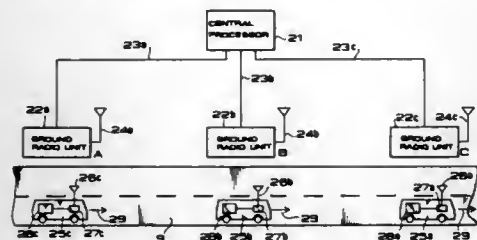
Int. Cl.<sup>4</sup> G06F 15/48; G08G 1/01

U.S. Cl. 364-436

8 Claims

1. A route bus service controlling system for a plurality of buses running along a route between a terminal and a turn point via a plurality of intermediate passage points, said system comprising:
  - ground radio units installed at said plurality of intermediate points and at a terminal passage point and a turn passage point and serving to detect passage of route buses past said passage points and developing information signals indicative of such passage and transmitting said signals;
  - a central service controller for computing overall service information from said signals transmitted by said ground

radio units at the individual passage points, then determining modified service schedules for the specific route buses at the passage points on the basis of the result of such computation, and transmitting the modified service schedules to the route buses by way of said ground radio units; and service information display units in the route buses for displaying the modified service schedules received by way of said ground radio units for the route buses in the individual sections of said bus service route; and



on the basis of said signals transmitted by one ground radio unit with regard to the route bus departed first from the related passage point, the arrival hour of the next route bus and that of the succeeding route bus passing there-through are estimated by said central service controller, and a basic service schedule of each route bus computed from the estimated hour is displayed on the service information display unit installed in each of the route buses.

4,791,572

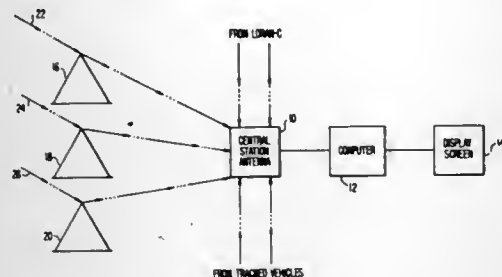
#### METHOD FOR ACCURATELY DISPLAYING POSITIONAL INFORMATION ON A MAP

Lawrence R. Green, III, Carmel, Ind.; John A. Carrott, Pompano Beach, Fla.; Donald R. Gray, Carmel, Ind., and Robert L. Gendler, Lighthouse Point, Fla., assignors to Mets, Inc., Pompano Beach, Fla.

Filed Nov. 20, 1985, Ser. No. 801,612  
Int. Cl.<sup>4</sup> G01S 3/02; G06F 15/50

U.S. Cl. 364-449

12 Claims



1. A method for displaying positional data on a map of a geographical area including the steps of: producing a digitized street or terrain map consisting of digitized data and inputting said digitized data into a computer provided with a display screen, said computer provided at a central station; determining the actual geographical coordinates of a plurality of reference monuments; producing a table of geographical reference coordinates based upon the geographical coordinates of said reference monuments and inputting this map into said computer, said table of geographical reference coordinates referenced to said digitized street or terrain map; producing a table of positional data based upon first actual time delay signals generated by a navigational tracking system and received by said plurality of reference monu-

ments, said first actual time delay signals received by said reference monuments being transmitted to said central station computer at said central station, said central station computer producing a derived set of coordinates of each of said reference monuments based upon said first actual time delay signals;

comparing the actual geographical coordinates of said reference monuments with the derived set of coordinates and determining a first correction factor based upon the difference of said actual and said derived set of coordinates; updating said table of positional data utilizing said first correction factor derived in said comparing step; determining a relative position of a plurality of vehicles in said geographical area by comparing the derived position coordinates of each of said vehicles generated by the receipt of second actual time delay signals from the navigational tracking system by each of said vehicles and the transmission of said second actual time delay signals from each of said vehicles to said central station computer with the actual position coordinates of each of said vehicles, and determining a second correction factor based upon the difference of said actual and said derived set of coordinates;

producing a transparent map layer utilizing said second correction factor derived in said immediately preceding step; receiving, at said central station, vehicular positional information generated by the navigational tracking system for at least one vehicle to be tracked; and displaying said vehicular positional information on said digitized street or terrain map.

4,791,573

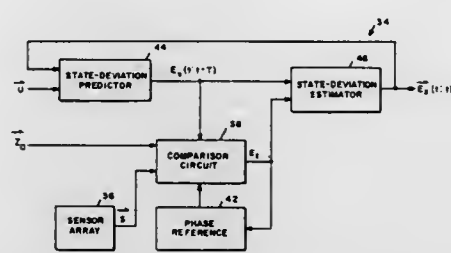
#### STATE-DEVIATION-ESTIMATION CIRCUIT EMPLOYING A PHASE-LOCKED-LOOP PHASE REFERENCE

Paul D. Zemany, Amherst; Kirby A. Smith, Derry, both of N.H., and John A. Smith, Bedford, Mass., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed Sep. 2, 1986, Ser. No. 902,815  
Int. Cl.<sup>4</sup> G05D 1/08; B64G 1/28, 1/36

U.S. Cl. 364-454

28 Claims



1. In a projectile for executing ballistic motion under the influence of gravity, a guidance system for guiding the projectile in accordance with a target-vector indication supplied thereto, the guidance system comprising: A. a movable control surface on the projectile for affecting the motion of the projectile in accordance with the orientation of the control surface; B. a sensor array for sensing enough physical quantities to determine predetermined kinematic variables if the spin orientation of the platform with respect to gravity is known and for generating a sensor outlet representative of the sensed quantities; C. computation means, connected to receive the sensor output and adapted for reception of the target-vector indication, for: (i) establishing a phase reference representing an estimate of the spin phase of the platform with respect to gravity;

- (ii) employing a mathematical model of the platform to calculate a predicted state deviation from an indication of the previous state deviation and to produce a predicted-deviation indication that represents the predicted state deviation;
  - (iii) producing from the sensor output, the predicted-deviation indication, and the target-vector indication a difference output representing the difference between (a) the deviation, from the values indicated by the target-vector indication, of the kinematic variables derived from the sensor array in accordance with the phase reference and (b) the deviation, derived from the predicted-deviation indication, of the kinematic variables from the values indicated by the target vector;
  - (iv) generating from the predicted-deviation indication and the difference output an estimated-deviation output consisting of the predicted-deviation indication adjusted in accordance with the difference output to represent the new deviation in the state of the platform and using the estimated-deviation output as the indication of the previous state deviation in the next calculation of the predicted state deviation; and
  - (v) minimizing any misalignment of the phase reference with the direction of gravity by adjusting the phase reference in accordance with a component of the difference indication that results from misalignment of the phase reference with the direction of gravity, whereby the phase reference tends to be alignment with the force of gravity without the need for additional sensors; and
- D. a direction-control system for moving the control surface so as to control its orientation in accordance with the estimated deviation output.

4,791,574

#### LAND VEHICLE NAVIGATION DEVICE COMPRISING A FILTER UNIT FOR DETERMINING AN OPTIMUM HEADING FROM PRESENTED ORIENTATION SIGNALS, AND FILTER UNIT TO BE USED IN SAID NAVIGATION DEVICE

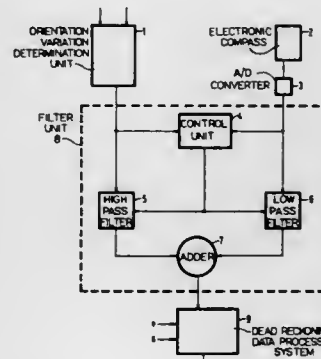
Martinus L. G. Thoone, and Henricus P. M. Krukkert, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 25, 1986, Ser. No. 899,704  
Claims priority, application Netherlands, Aug. 28, 1985, 8502361; Jul. 30, 1986, 8601952

Int. Cl.<sup>4</sup> G01C 17/00

U.S. Cl. 364-457

20 Claims



1. A navigation device for a land vehicle comprising: an electronic compass for measuring the orientation of the vehicle and adapted to produce a first orientation signal by regular sampling of the measured orientation, a measuring unit operating independently of said compass for determining variations in the orientation of the vehicle and adapted to produce second orientation signals from regularly measured samples of the variations in the orientation, and a digital filter unit adapted to

filter received first and second orientation signals, wherein the filter unit comprises a first low-pass filter for filtering first orientation signals received from the electronic compass, a high-pass filter for filtering the second orientation signals received from the measuring unit, a control unit which receives the first and second orientation signals and generates and supplies a first filter parameter control signal to the first low-pass filter and to the high-pass filter to control the filter characteristics thereof, and an output unit responsive to filtered orientation output signals of the first low-pass filter and the high-pass filter to produce from said received filtered orientation signals a weighted vehicle orientation signal which indicates the direction of movement of the vehicle.

4,791,575

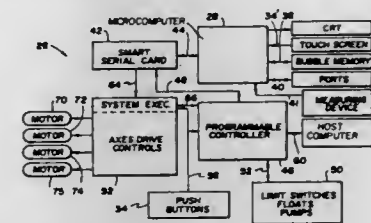
#### METHOD FOR GENERATING AXIS CONTROL DATA FOR USE IN CONTROLLING A GRINDING MACHINE AND THE LIKE AND SYSTEM THEREFOR

Harold G. Watts, Jr., Holden; Michael R. Hanter, West Boylston, and Randy E. Thompson, Shrewsbury, all of Mass., assignors to The Pratt & Whitney Company, Inc., West Hartford, Conn.

Filed Oct. 31, 1986, Ser. No. 925,439  
Int. Cl.<sup>4</sup> G06F 15/46

U.S. Cl. 364-474.36

32 Claims



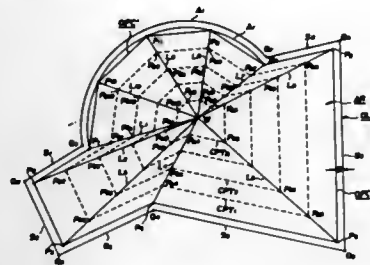
1. A method of generating axis control data for use by first and second drive axis controllers (80, 76) to control first and second drive mechanisms (72, 70) respectively, of a machine tool having a coordinate frame to control machining of a workpiece (10) having a coordinate frame at a machining station, the first drive mechanism moving a work tool relative to the workpiece and the second drive mechanism rotating the workpiece, the method being characterized by the steps of: generating a kinematic model relating the coordinate frame of the workpiece to the coordinate frame of the machine tool; generating a digital signal (108) related to the desired contour of at least one portion (12 or 14) of the workpiece to be machined at the machining station to obtain digitized machining data; determining a differentiable, periodic equation (110) which approximates the machining data; and performing a conversion algorithm (128) with the kinematic model and the differentiable equation to obtain an axis control function (Eqs. 1 and 14) including a position control function for use in providing the axis control data for each of the controlled axes.



4,791,576

## AREA CUTTING METHOD

Kunio Tanaka, and Yasushi Onishi, both of Tokyo, Japan, assignors to Fanuc Ltd, Minamitsuru, Japan  
 PCT No. PCT/JP86/00368, § 371 Date Mar. 16, 1987, § 102(e)  
 Date Mar. 16, 1987, PCT Pub. No. WO87/00649, PCT Pub. Date Jan. 29, 1987  
 PCT Filed Jul. 17, 1986, Ser. No. 36,679  
 Claims priority, application Japan, Jul. 17, 1985, 60-157927  
 Int. Cl.<sup>4</sup> G05B 19/403  
 U.S. Cl. 364-474.29 4 Claims

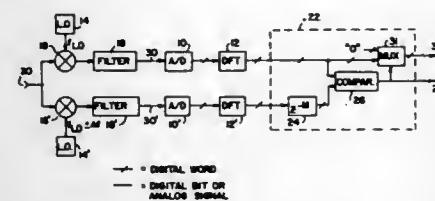


1. An area cutting method for cutting the interior of an area bounded by a closed curve, comprising the steps of:
  - a first step of calculating a centroid of the area bounded by said closed curve;
  - a second step of checking whether said centroid lies inside the area;
  - a third step of checking whether line segments connecting the centroid with respective apices of the area intersect the closed curve if the centroid lies inside the area;
  - a fourth step of partitioning each line segment into a predetermined number of partitions if the centroid lies inside the area and, moreover, none of the line segments intersect the closed curve; and
  - a fifth step of moving a tool along a plurality of closed paths connected by corresponding partitioning points of said line segments.

4,791,577

## FREQUENCY SHIFT FOR REMOVING SPURIOUS SPECTRAL COMPONENTS FROM SPECTRUM ANALYZER OUTPUT

John E. Winter, Los Altos, Calif., assignor to TRW Inc., Redondo Beach, Calif.  
 Filed Oct. 3, 1985, Ser. No. 783,498  
 Int. Cl.<sup>4</sup> H04L 1/22; G01R 23/16; G06F 7/34  
 U.S. Cl. 364-485 12 Claims



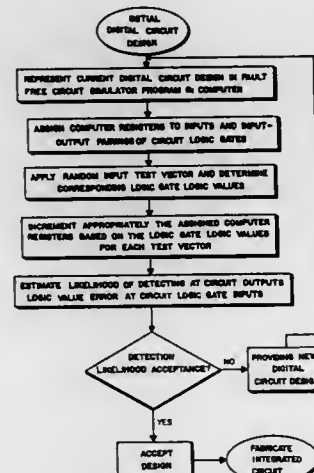
1. Apparatus for suppressing distortion components in the output produced by a spectrum analyzer in response to an input signal, comprising:
  - a first mixer circuit for receiving the input signal and producing a first IF signal having a spectral distribution shifted in frequency from that of the input signal by an amount  $f_{LO}$ ;
  - a second mixer circuit for receiving the same input signal and producing a second IF signal having a spectral distribution shifted from that of the input signal by an amount  $f_{LO} + \Delta f$ ;

and second IF signals, respectively, and producing first and second spectrum output signals which represent spectral components of the first and second IF signals, respectively; and  
 output signal processing means for comparing the spectral components in the first and second spectrum output signals and for suppressing any components in the first spectrum output signal which do not also appear in the second spectrum output signal as components that are offset in frequency by the amount  $\Delta f$  from their respective counterparts in the first spectrum output signal.

4,791,578

## LOGIC GATE SYSTEM DESIGN

Dennis Fazio, Minneapolis, and Thomas J. Harris, Shoreview, both of Minn., assignors to ETA Systems, Inc., St. Paul, Minn.  
 Filed Dec. 30, 1986, Ser. No. 947,612  
 Int. Cl.<sup>4</sup> G06F 15/60, 11/00  
 U.S. Cl. 364-488 12 Claims



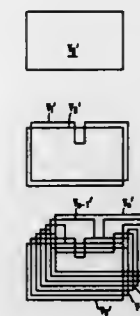
1. A method for designing a circuit system comprising a plurality of logic gates each having a gate input and a gate output with said circuit system having a plurality of system inputs and outputs, said logic gates to be electrically interconnected together at said gate inputs and outputs and to said system inputs and outputs in a selected manner, said method comprising:
  - representing an initial design for said circuit system in a computer system which is capable of determining for this initial design so represented those logic values that will occur at said logic gate outputs in response to selected logic values being provided at said circuit system inputs in said initial design representation;
  - providing a plurality of controllability count registers in said computer system for each of said gate inputs in said initial design representation with each such count register being capable of keeping a total of count increments provided thereto in said computer system, there being a said controllability count register in each said plurality of controllability count registers for each of those logic values which can occur at that said gate input corresponding thereto;
  - providing a plurality of sensitivity count registers in said computer system for each pairing possible of said gate inputs and outputs in each of said logic gates in said initial design representation with each such count register being capable of keeping a total of count increments provided thereto in said computer system, there being a said sensitivity count register in each said plurality of sensitivity

count registers for each gate input and output logic value pair which can occur at that gate input and output pair corresponding thereto;  
 providing in sequence a plurality of sets of logic values in said computer system for said circuit system inputs in said initial design representation;  
 determining in said computer system those logic values that will occur at said logic gate outputs in said initial design representation in response to each set of logic values provided at said circuit system inputs in said initial design representation, as aforesaid;  
 incrementing each said controllability count register by one count if a logic value corresponding thereto appears at its corresponding gate input after each said determining of logic values;  
 incrementing each sensitivity count register by one count if a pair of gate input and output logic values corresponding thereto appears at its corresponding gate input and output pair after each said determining of logic values, but only if gate input logic values occurring at those other said gate inputs of said corresponding logic gate are such that were a change to occur in that gate input logic value of such an appearing pair of gate input and output logic values that there would result a change in that gate output logic value of such appearing pair; and  
 estimating what likelihood exists in such initial design for detecting at some said circuit system output an incorrect logic value occurring at any logic gate input based on total counts occurring in each said controllability count register and in each said sensitivity count register after said plurality of sets of logic values has been provided for said circuit system inputs in said initial design representation, as aforesaid.

4,791,579

## PROCESS AND APPARATUS FOR GRAPHICALLY REPRESENTING A VARIABLE STRUCTURE IN PERSPECTIVE

Walter Kranitzky, Traunstein, Fed. Rep. of Germany, assignor to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany  
 Filed Oct. 15, 1984, Ser. No. 661,179  
 Claims priority, application Fed. Rep. of Germany, Oct. 26, 1983, 3338765  
 Int. Cl.<sup>4</sup> G06F 15/40; H04F 1/266; G06G 7/48; G06K 9/00  
 U.S. Cl. 364-518 18 Claims



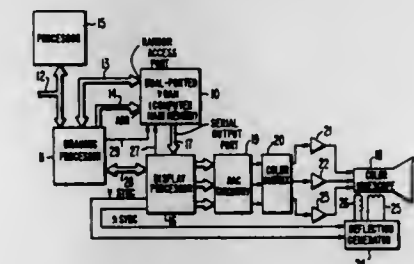
1. A method for generating a perspective representation on a display of a machine tool controller of a variable three-dimensional structure processed by an object, said method comprising the following steps:
  - (a) resolving the structure into a plurality of structure sections and storing a first plurality of coordinates which define said structure sections in a section memory;
  - (b) resolving the object into a plurality of object sections and storing a second plurality of coordinates which define said object sections;
  - (c) superimposing in an image point memory the structure

sections with corresponding ones of the object sections as determined by relative movement between the object and the structure to generate a plurality of modified structure sections;  
 (d) altering the first plurality of coordinates in the section memory to correspond to a plurality of inner contours defined by the modified structure sections;  
 (e) superimposing the modified sections in the image point memory with adjacent ones of the modified sections offset from one another in at least one of two orthogonal directions; and  
 (f) determining and displaying a resulting outer contour defined by the superimposed modified sections of step (e).

4,791,580

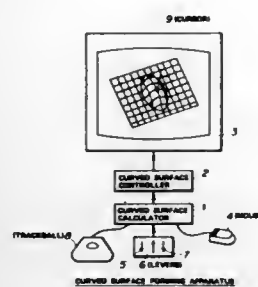
## DISPLAY PROCESSOR UPDATING ITS COLOR MAP MEMORIES FROM THE SERIAL OUTPUT PORT OF A VIDEO RANDOM-ACCESS MEMORY

James V. Sherrill, Knox County, Tenn., and David L. Sprague, Mercer County, N.J., assignors to Technology Inc. 64, Princeton, N.J.  
 Filed Oct. 14, 1986, Ser. No. 918,552  
 Claims priority, application United Kingdom, Jun. 18, 1986, 8614874  
 Int. Cl.<sup>4</sup> G09G 1/16  
 U.S. Cl. 364-521 2 Claims



1. In a system, for providing data representing images for display on a display device, including a random-access memory for storing bit mapped image data and color map memory program data, said random-access memory having a serial output port, said system further including a display processor comprising:
  - a display processor input port coupled to the serial output port of said random access memory;
  - a color map memory having an address input port and a data input/output port;
  - an address generator having an output port for providing address codes and having a control input port;
  - read/write control circuitry coupled to said display processor input port and responsive to data provided by said random access memory, and including:
    - (a) an output port coupled to the control input port of said address generator for controlling sequences of address codes produced thereby;
    - (b) means for selectively coupling said display processor input port or the output port of said address generator to the address input port of said color map memory; and
    - (c) means for selectively coupling said display processor input port to the input/output port of said color map memory when the output port of said address generator is coupled to the address input port of said color map memory, whereby color map memory program data from said random access memory may be written into said color map memory.

**4,791,581**  
**METHOD AND APPARATUS OF FORMING CURVED SURFACES**  
 Akio Ohba, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan  
 Filed Jul. 22, 1986, Ser. No. 888,846  
 Claims priority, application Japan, Jul. 27, 1985, 60-166312; Oct. 24, 1985, 60-238166; Nov. 25, 1985, 60-266575  
 Int. Cl.<sup>4</sup> G06F 15/72  
 U.S. Cl. 364—521 12 Claims



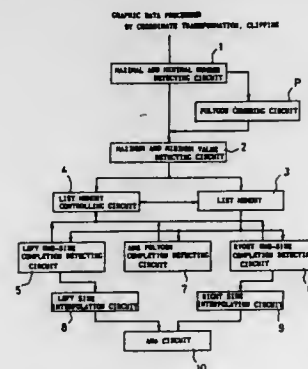
1. A method of interactively generating electronic data which is representative of a curved surface and visually displaying the surface to an operator, wherein the method comprises the following steps of:

- selectively generating data representative of a desired deformation area including an action point on a surface to be deformed;
- selectively determining a vector field function  $F_i$  representative of a relative deformation rate of each point within the deformation area;
- selectively designating a deformation vector  $V_i^*$  representative of a deformation quantity and a deformation direction at the action point within the deformation area;
- electronically calculating a position vector representative of a deformation quantity of a curved surface at each point within the deformation area on the basis of the deformation vector  $V_i^*$  and the vector field function  $F_i$ ;
- electronically calculating a position vector  $P_i^*$  representative of a deformed curved surface on the basis of the position vector representative of the deformation quantity of the curved surface and a position vector  $P_{i-1}^*$  representative of the surface to be deformed;
- visually displaying to an operator the deformed curved surface represented by the position vector  $P_i^*$  from a preselected point of view; and
- repeating steps (a) through (f), while changing the values selected in one or more of steps (a) through (c) until the displayed image attains a shape deemed desirable by the operator.

9. A montage image forming apparatus which comprises:
- face data storing means for electronically storing a plurality of face data each composed of a plane face image data representative of a face image on a two-dimensional plane and a solid face curved surface data representative of three-dimensional face curved surfaces corresponding to the two-dimensional face image;
  - face data selecting means for reading one of the face data from said face data storing means;
  - deformation control parameter setting means for setting deformation control parameters to deform a curved surface;
  - curved surface calculating means, for electronically calculating the selected solid face curved surface data on the basis of the set deformation control parameters to obtain a deformed face curved surface data representative of a deformed face curved surface, and for generating a montage signal obtained by mapping the plane face image onto the deformed face curved surface on the basis of the

selected plane face image data and the deformed face curved surface data, and  
 (e) display means for displaying the montage signal generated by the curved surface calculating means, whereby an operator can input the deformation control parameters to obtain a desired montage image while observing the montage image displayed on said display means.

**4,791,582**  
**POLYGON-FILLING APPARATUS USED IN A SCANNING DISPLAY UNIT AND METHOD OF FILLING THE SAME**  
 Tomoaki Ueda, Kyoto; Takashige Kai; Tatsuhiko Osaka, both of Kusatsu, and Kazuo Nishiguchi, Yasu, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan  
 Filed Sep. 25, 1986, Ser. No. 911,551  
 Claims priority, application Japan, Sep. 27, 1985, 60-215771; Sep. 27, 1985, 60-215772; Sep. 27, 1985, 60-215774; Oct. 1, 1985, 60-218914  
 Int. Cl.<sup>4</sup> G06F 15/72  
 U.S. Cl. 364—522 10 Claims



1. A polygon-filling apparatus for use in a scanning display unit comprising:

- a list memory to store corner number data and apex-data of a polygon, which data have been sequentially transferred thereto, means to obtain a number of apexes of the polygon according to the apex-data, said apexes corresponding respectively to a maximal value and a minimal value along a direction perpendicular to a scanning line, polygon discriminating means to discriminate, based upon said number of maximal and minimal values, whether the polygon is one which marks off one continuous lot on each scanning line or is one which is capable of marking off two or more continuous lots on each scanning line, means to detect apexes from any other apex which corresponds to the maximum value and the minimum value of coordinates in a direction perpendicular to the scanning direction, respectively, based upon apex-data of a polygon which has been discriminated to mark off only one continuous lot on each scanning line by said polygon discriminating means, means to alternatively generate ridge data on the left side and the right side on each scanning line by independently interpolating between data indicative of neighboring apexes chained along the left side and the right side of the polygon, respectively, from the apex having the maximum value to the apex having the minimum value, or generate ridge data on the left side and the right side on each scanning line by independently interpolating between data indicative of neighboring apexes chained along the left side and the right side of the polygon, respectively, from

the apex having the minimum value to the apex having the maximum value, and  
 means to display the scanning line by filling a specific region on each scanning line between points where the scanning line intersects both ridge lines.

**4,791,583**  
**METHOD FOR GLOBAL BLENDING OF COMPUTER MODELED SOLID OBJECTS USING A CONVOLUTION INTEGRAL**  
 Stephen Colburn, Eureka, Ill., assignor to Caterpillar Inc., Peoria, Ill.  
 Filed May 4, 1987, Ser. No. 45,653  
 Int. Cl.<sup>4</sup> G09G 1/02; G06F 15/62  
 U.S. Cl. 364—522 19 Claims

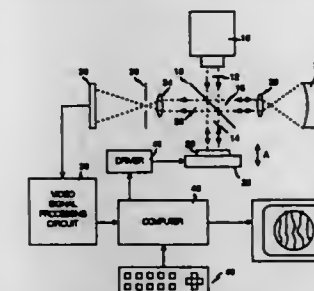


1. A method for generating a set of blended surfaces for a computer representation of a solid model having a set of curvilinear surfaces, comprising the steps of:
- offsetting the curved surfaces of the solid model;
  - generating an octree representation of the solid model;
  - generating a complementary octree representation of the volume outside the solid model;
  - assigning blend radius values to each individual cell of the octree;
  - defining a plurality of rays substantially normal to and intersecting the solid model surface;
  - repetitively solving a convolution integral in an iterative manner at a plurality of locations along each ray, wherein the convolution integral includes a gaussian sphere blending factor with a size responsive to the blend radius assigned to the octree cell;
  - storing the location on each ray at which the solution of the convolution integral is equal to a preselected value, said stored locations defining the set of blended surfaces of the solid model.

**4,791,584**  
**SUB-NYQUIST INTERFEROMETRY**  
 John E. Grelvenkamp, Jr., Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
 Filed Oct. 15, 1986, Ser. No. 918,951  
 Int. Cl.<sup>4</sup> G01B 9/02  
 U.S. Cl. 364—525 24 Claims

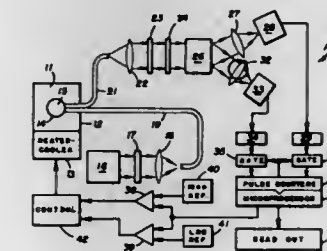
1. A method of surface measurement interferometry, comprising the steps of:
- generating a first beam of coherent light;
  - generating a second beam of coherent light;
  - combining the first and second beams to form an interferogram;
  - measuring the phase of the interferogram at a plurality of sampling locations to form samples of the interferogram, said samples representing phase values modulo  $2\pi$ ; and
  - reconstructing (i.e. removing  $2\pi$  phase discontinuities to

produce) absolute phase values from said samples by adding to or subtracting from said samples multiples of  $2\pi$ , including the step of applying a constraint based upon



a priori knowledge of the absolute phase values to correctly reconstruct the absolute phase values when the absolute phase changes by more than  $\pi$  per sample.

**4,791,585**  
**CRYOGENIC THERMOMETER EMPLOYING MOLECULAR LUMINESCENCE**  
 August H. Maki, Davis, and Mohammad-Reza Taherian, San Carlos, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.  
 Filed Feb. 27, 1985, Ser. No. 706,331  
 Int. Cl.<sup>4</sup> G01J 5/00; G01K 11/00  
 U.S. Cl. 364—557 40 Claims



19. Apparatus for measuring a cryogenic temperature of an environment, the method comprising:
- sensor material adapted to be placed in said environment so that its temperature can be the same as said cryogenic temperature, said sensor material having an excited multiplet state which has a higher energy sublevel state and a lower energy sublevel state, said sensor material having a capability of emitting radiant emissions in the visible or near infrared spectral region from both of the sublevel states when said sensor material is excited, said sublevel states being split by an energy separation in the absence of electric or magnetic fields (zero field splitting), and said zero field splitting being sufficiently great that the radiant emissions from said sublevel states are optically resolvable from each other, the radiant emissions from said sublevel states each having a degree of intensity,
  - means for exciting said sensor material to cause both of said sublevel states of said multiplet state to emit radiant emission,
  - means for generating first and second signals proportional to the degrees of intensity of the radiant emissions from said higher energy and lower energy sublevel states, respectively,
  - means for calculating the temperature of said sensor material from a ratio of said first and second signals.



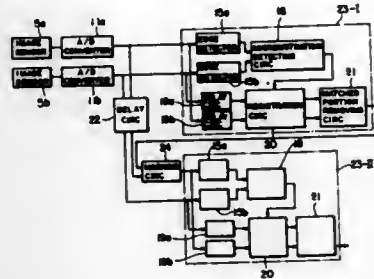
# 4,791,586

## METHOD OF AND APPARATUS FOR CHECKING GEOMETRY OF MULTI-LAYER PATTERNS FOR IC STRUCTURES

Shunji Maeda, Yokohama; Hitoshi Kubota, Fujisawa; Satoru Fushimi, Yokohama; Hiroshi Makihira, Yokohama; Takanori Ninomiya, Yokohama, and Yasuo Nakagawa, Chigasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Dec. 23, 1985, Ser. No. 812,928  
Claims priority, application Japan, Dec. 26, 1984, 59-273052; Mar. 18, 1985, 60-52272

Int. Cl.<sup>4</sup> G06K 9/00  
U.S. Cl. 364-491

30 Claims



1. A method of checking the geometry of multi-layer patterns wherein images of corresponding portions on two of a plurality of identical circuit patterns on a specimen are detected to produce detection signals indicative of the corresponding portions in levels of brightness of the detection signals, and the detection signals are compared with each other to judge an unmatched portion as a defect, said method comprising the steps of:

- registering the two detection signals;
- comparing levels of brightness of the two detection signals to judge that a portion of the detection signal at which the difference in brightness is less than a threshold level is normal and to define the normal portion as a "Don't Care" portion;
- masking the detection signal at the "Don't Care" portion to inhibit the use of the "Don't Care" portion for the following registration and defect judgement;
- sequentially repeating said steps (a) to (c) for each layer of said multi-layer pattern to detect a region finally screened out of said "Don't Care" portion as a defect.

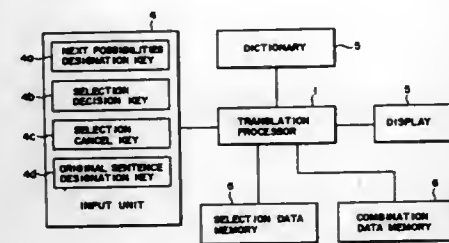
# 4,791,587

## SYSTEM FOR TRANSLATION OF SENTENCES FROM ONE LANGUAGE TO ANOTHER

Miwako Doi, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Dec. 18, 1985, Ser. No. 810,261  
Claims priority, application Japan, Dec. 25, 1984, 59-271808  
Int. Cl.<sup>4</sup> G06F 15/38

U.S. Cl. 364-900

9 Claims



1. A machine translation system comprising:  
display means for displaying an input original sentence and a

translated sentence corresponding to the input original sentence;  
a dictionary for deriving at least one translation possibility of a language of the translated sentence with respect to data of at least one word or phrase of a language of the original sentence;  
an input means for causing an operator to input control data;  
selection data storage means for storing translation possibility selection data; and  
translation processing means having first means for obtaining the translation possibility for every word or phrase in the original sentence by accessing said dictionary, second means for aligning the translation possibilities of each word or phrase which are obtained by said first means, distinguishing a plurality of translation possibilities of an identical word or phrase in the original sentence from other translation possibilities, and displaying on said display means the translation possibility of the word or phrase which is obtained by said first means, third means for selecting, in response to an input at said input means, one of said plurality of translation possibilities of the identical word or phrase which are displayed by said second means on said display means, fourth means for causing said second means to process as a sole translation possibility for a corresponding word or phrase the translation possibility selected by said third means, fifth means for causing said selection data storage means to store the translation possibility selected by said third means substantially in association with a corresponding word or phrase in the original sentence, and sixth means for controlling a display priority order of said plurality of translation possibilities of an identical word or phrase with reference to the data stored in said selection data storage means when said plurality of translation possibilities of the identical word or phrase are displayed on said display means.

# 4,791,588

## MOVABLE APPARATUS DRIVING SYSTEM

Nobuhiko Onda; Kazuo Asakawa; Tadaaki Akita, all of Kawasaki; Hitoshi Komoriya, Machida, and Toru Kamada, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

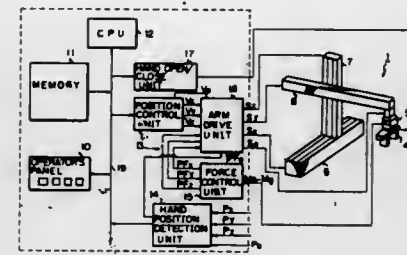
Continuation of Ser. No. 708,545, Mar. 5, 1985, abandoned. This application Jul. 24, 1987, Ser. No. 78,008  
Claims priority, application Japan, Mar. 9, 1984, 59-45045; Aug. 9, 1984, 59-166995; Dec. 11, 1984, 59-261482  
Int. Cl.<sup>4</sup> G05B 13/00

U.S. Cl. 364-513

33 Claims

1. A driving system for a movable apparatus comprising:  
means for driving the movable apparatus;  
first means for detecting environmental information data associated with the movable apparatus and for producing corresponding environmental information data signal outputs, said first means comprising at least one force sensor connected to the movable apparatus for detecting an external force applied thereto and for producing a follow-up displacement command output, means for detecting the current position of the movable apparatus and producing corresponding, detected current position data outputs; and a displacement sensor for detecting the distance, relative to a current position of the movable apparatus, from an obstacle;  
second means responsive to the outputs representing the detected, current position data of the movable apparatus and to target position data defining the target position of movement of the movable apparatus, for producing a displacement command signal output; and  
means responsive to the follow-up displacement command output of said first means and the displacement command

signal output of said second means for producing a composite signal and for supplying the composite signal to said



driving means for driving the movable apparatus to the target position.

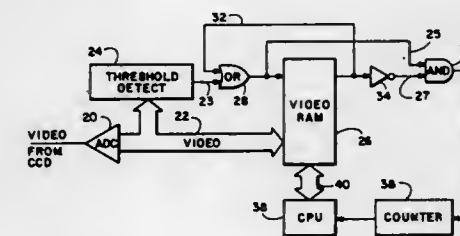
# 4,791,589

## PROCESSING CIRCUIT FOR CAPTURING EVENT IN DIGITAL CAMERA SYSTEM

Stephen F. Blazo, Portland, and Gall W. Marshall, Beaverton, both of Oreg., assignors to Tektronix, Inc., Beaverton, Oreg.  
Filed Oct. 31, 1986, Ser. No. 925,354  
Int. Cl.<sup>4</sup> G06F 3/05, 3/18

U.S. Cl. 364-518

10 Claims



1. A processing circuit in a digital camera adapted to be coupled to a visual display screen and providing a video output representing a photographic image, comprising:

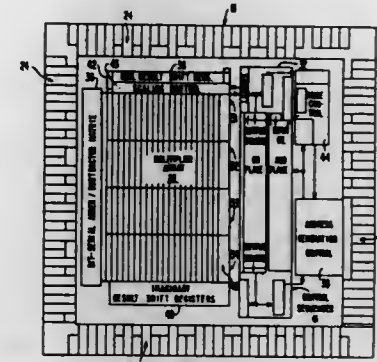
- analog-to-digital converter means associated with said digital camera for converting said video output into video digital signals;
- video memory means for storing a mask comprising a set of digital signals representing a predetermined visual image;
- comparator means for comparing said video digital signals with said mask and for providing an indication when said video digital signals vary with respect to said mask by a predetermined amount; and
- means for storing said video digital signals in a memory when said indication is provided by said comparator means.

4,791,590  
HIGH PERFORMANCE SIGNAL PROCESSOR  
Walter H. Ku, La Jolla, Calif.; Richard W. Linderman, Dayton, Ohio; Paul M. Chan, Ithaca, N.Y., and Peter P. Reusens, Deste Bergin, Belgium, assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Nov. 19, 1985, Ser. No. 799,692  
Int. Cl.<sup>4</sup> G06F 7/34, 7/38

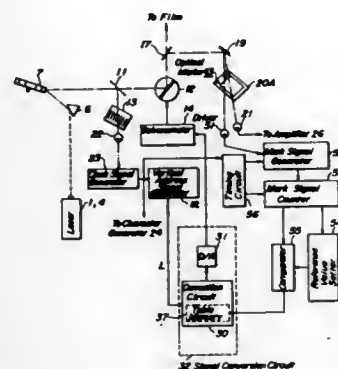
U.S. Cl. 364-726

24 Claims



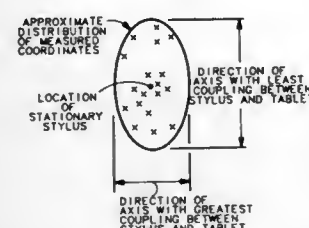
1. A monolithic, autonomous processor chip for selected data processing, said chip including:  
an array of at least 16 bit-serial multipliers;  
a plurality of input/output ports for supplying selected complex data and complex coefficients to said multipliers for multiplication;  
means for receiving and latching complex data and coefficients supplied to said multipliers and for parity checking of the data and coefficients;  
a bit-serial adder/subtractor matrix connected to said multiplier array for combining the multiplier output data results;  
shift register means receiving and temporarily storing signals from said adder/subtractor matrix and for serial to parallel conversion of stored signals for delivery of said stored signals to input/output ports;  
scaling control means for scaling said signals from said adder/subtractor matrix before storage in said shift register means;  
sequencer control means having control outputs connected to said multiplier array, to said adder/subtractor matrix, to said shift register means, and to said scaling control means for controlling internal step-by-step operations of said chip;  
mode controller means connected to said sequencer control means for controlling and selecting the operational modes of said chip and for activating said sequencer control means to provide repetitive sequencing of selected operations, said mode controller being connectable for communication with a host processor; and  
address generator means on said chip and connected to said sequencer control means and to said mode control means for selecting complex data and complex coefficients for multiplication in said multipliers.

**4,791,591**  
**APPARATUS FOR CORRECTING SCANNING RATE**  
**DEVIATION OF A GALVANOMETER AND**  
**CORRECTING METHOD THEREOF**  
 Katsumi Asanuma, Ashigara-Kami, and Hidetoshi Shinada,  
 Ashigara-Kami, both of Japan, assignors to Fuji Photo Film  
 Co., Ltd., Kanagawa, Japan  
 Filed Nov. 13, 1985, Ser. No. 797,552  
 Claims priority, application Japan, Nov. 13, 1984, 59-239026  
 Int. Cl.<sup>4</sup> G01C 25/00; G01D 9/42  
 U.S. Cl. 364—571.04 7 Claims



1. An apparatus for correcting deviation from a constant scanning speed of a galvanometer driven by a linear drive signal, comprising:  
 memory means for storing correction data for zeroing the deviation from a constant scanning speed, means for reading out the correction data in response to an input address signal;  
 first digital-to-analog converting means for converting the correction data into an analog correction signal;  
 second digital-to-analog converting means for converting the input address signal into the linear drive signal; and  
 adder means for summing the linear drive signal and the analog correction signal to derive a non-linear drive signal for the galvanometer which reduces the deviation to zero.

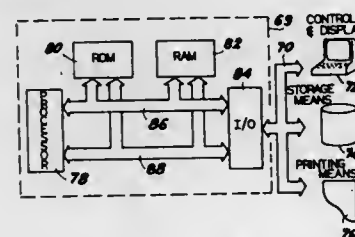
**4,791,592**  
**METHOD AND APPARATUS FOR REDUCING JITTER**  
**IN A DIGITIZER OR OTHER TRANSDUCER**  
 Ken L. Burgess, Ft. Collins, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.  
 Filed Apr. 30, 1986, Ser. No. 857,892  
 Int. Cl.<sup>4</sup> G05B 13/04  
 U.S. Cl. 364—572 3 Claims



1. A method of filtering jitter from measured transducer output values, the method comprising the steps of:  
 (a) transducing a physical phenomenon to produce an unfiltered output;  
 (b) repeatedly measuring the unfiltered output to produce a sequence of unfiltered output values;  
 (c) maintaining a previous filtered output value obtained in accordance with steps (e) and (f) recited below;  
 (d) determining if the most recent unfiltered output value

from step (b) lies within a preselected interval about the previous filtered output value maintained in step (c);  
 (e) subsequent to step (d) and whenever the determination of step (d) is in the negative, discarding the previous filtered output value maintained in step (c) and substituting therefor the most recent unfiltered output value of step (b);  
 (f) subsequent to step (d) and whenever the determination of step (d) is in the affirmative, replacing the previous filtered output value maintained in step (c) with a value equal to a first percentage of the most recent unfiltered value of step (b) added to a second percentage of the previous filtered value maintained in step (c), the first and second percentages summing to one hundred percent and the first percentage varying from zero percent to one hundred percent as the most recent unfiltered value of step (b) changes in value from the value of the previous filtered output value maintained in step (c) to the value of an endpoint of the selected interval of step (d); and  
 (g) subsequent to steps (e) and (f), supplying the filtered value of step (c) as the measured transducer output value.

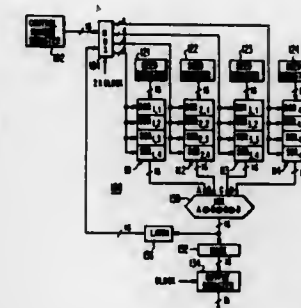
**4,791,593**  
**SYSTEM FOR THE SIMULATION OF AN ELECTRONIC CIRCUIT**  
 Bernard Hennion, les Bonnets 38610, St. Martin d'Uriage, France  
 Filed Mar. 5, 1986, Ser. No. 836,437  
 Claims priority, application France, Mar. 8, 1985, 85 03429  
 Int. Cl.<sup>4</sup> G06F 15/31, 15/60; G06G 7/62  
 U.S. Cl. 364—578 6 Claims



1. A simulation system of an electronic circuit comprising a memory, a processor, a display means, an interface circuit, and data, address and control buses connecting said memory, processor display means and interface circuit, said memory having a first zone containing data for representing the simulated electronic circuit, a second zone containing instructions and a third calculating zone, said electronic circuit being a network having nodes and branches, each branch having at least one electrical component, the state of said electronic circuit being determined by the potential in each node, the processor performing the instructions contained in said second memory zone, said processor

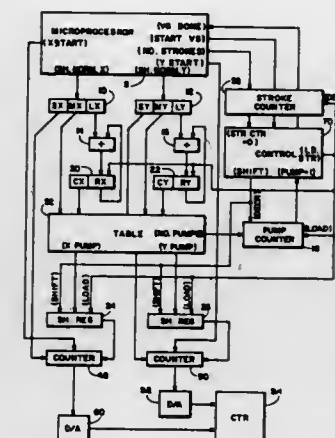
calculating the potential of all the nodes at a fixed time  $T_n$ , wherein  $n$  is an integer between 1 and  $N$ , by solving for each node an implicit equation relative to the potential of said node, by carrying out a series of iterations,  
 calculating, for each node, the difference between the potential calculated for each node after one iteration and the potential of said node obtained after a preceding iteration, comparing said difference with a given threshold,  
 calculating a new iteration if said difference is greater than said threshold, and  
 calculating by the foregoing operations the potential for all the nodes at a further fixed time  $T_{n+1}$ ,  $n$  having a next integer value until said integer value is equal to  $N$ , said display means indicating said potentials at the nodes for use in designing and constructing an actual electronic circuit.

**4,791,594**  
**RANDOM-ACCESS PSEUDO RANDOM NUMBER GENERATOR**  
 Kevin Harney, Brooklyn, N.Y., and Michael Keith, Washington Crossing, Pa., assignors to Technology Inc. 64, Princeton, N.J.  
 Filed Mar. 28, 1986, Ser. No. 845,196  
 Int. Cl.<sup>4</sup> G06F 1/02  
 U.S. Cl. 364—717 12 Claims



1. A digital system for generating a pseudo random number from at least one seed number using a control number said system comprising:  
 means for providing said seed number, said seed number being in multi-bit digital format;  
 means, having an input port coupled to said means for providing said seed number, having a control input terminal and having an output port, for selectively rearranging the order of bits of said seed number responsive to said control number applied to said control input port; and  
 means, coupled to the output port of said means for rearranging, for providing said control number to said control input terminal.

**4,791,595**  
**DIGITAL VECTOR GENERATION WITH VELOCITY CORRECTION BY TABULATION OF COUNTER CONTROL SIGNALS**  
 John C. Dalrymple, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.  
 Filed Jul. 11, 1986, Ser. No. 884,572  
 Int. Cl.<sup>4</sup> G06F 1/02  
 U.S. Cl. 364—719 7 Claims

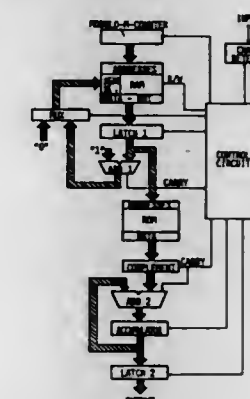


6. An apparatus for generating a vector having an X component and a Y component, on a random-scanned cathode ray

tube, the cathode ray tube having a phosphor screen and an electron beam, the apparatus comprising:

shift normalizing means for forming a first number and a second number, each having a significant part and a fractional part, and the first number corresponding to the X component and the second number corresponding to the Y component of the vector;  
 adding means for adding the fractional part of the first number to a first sum having a fractional part and a carry bit, and adding the fractional part of the second number to a second sum having a fractional part and a carry bit, wherein the initial first and second sums are said fractional parts of said first number and said second number respectively, and thereafter the first and second sums are the respective accumulations of previous such additions;  
 a look-up table for generating sequences of pumps whenever the significant parts of the first number and the second number and the carry bits of the first sum and the second sum are received as input signals, the number of pumps in each said sequence being proportional to the geometric length of the vector; and  
 means for directing the electron beam in accordance with the sequence of pumps generated by the look-up table.

**4,791,596**  
**METHOD OF LINEAR FILTERING**  
 Thomas Harbich, Allmersbach im Tal, Fed. Rep. of Germany, assignor to Aut Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany  
 Filed Jul. 25, 1985, Ser. No. 758,810  
 Claims priority, application Fed. Rep. of Germany, Jul. 25, 1984, 3427349  
 Int. Cl.<sup>4</sup> G06F 7/38  
 U.S. Cl. 364—724.16 9 Claims



1. A method of filtering an input signal by a nonrecursive linear digital filter including the steps of:  
 (a) providing an addressable memory in which the filter system specific step response of the filter is stored;  
 (b) detecting each change in amplitude of said input signal;  
 (c) for each detected change in amplitude, setting one counter of several counters, associated with each respective said change in amplitude, to a starting value and increasing the value by a constant amount at regular time intervals so that the respective counter states represent the time intervals between changes in signal amplitude relative to a reference point in time in units of one clock pulse period;  
 (d) utilizing said counter states to address said addressable memory and to cause readout of the addressed said step responses;  
 (e) weighting each read out step response with the amplitude of the input signal associated with the respective changes in amplitude;  
 (f) accumulating each weighted step response under consid-



eration of its sign in an accumulator, whereby the output signal of the accumulator represents the desired filtered signal; and

(g) repeating step (c) by associating those counters which reach a predetermined counter state corresponding to the time duration of the filter system specific impulse response with subsequently occurring changes in amplitude.

4,791,597

# **MULTIPLIERLESS FIR DIGITAL FILTER WITH TWO TO THE NTH POWER COEFFICIENTS**

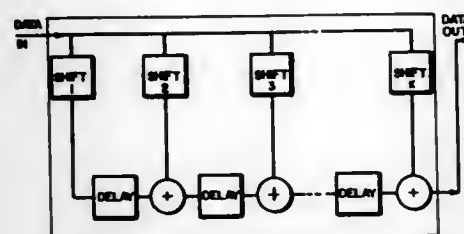
Amihai Miron, Ossining, and David Koo, Briarcliff Manor, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.

Filed Oct. 27, 1986, Ser. No. 923,534

Int. Cl. G06F 15/31

U.S. Cl. 364-724.03

5 Claims



1. A non-recursive digital filter comprising:

at least one stage which includes a basic unit and a plurality of incremental units serially connected thereto;

said basic unit comprising:

a data word input line having at least two taps;

first shift means connected to a first of said taps to receive and shift a data input word on said input line and having an output at which such first shifted data word is produced, the extent of said first shift establishing a coefficient value at said first tap which is an integer power of two;

delay means connected to the output of said first shift means for delaying the first shifted data word;

second shift means connected to a second of said taps to receive and shift said data input word on said input line and having an output at which such second shifted data word is produced, the extent of said second shift establishing a coefficient value at said second tap which is an integer power of two; and

adding means connected to said delay means and to the output of said second shift means for deriving the sum of said delayed first shifted data word and said second shifted data word, such sum being a data output word of said basic unit;

said incremental units increasing the number "k" of taps of said basic unit, the ith of such incremental units ( $2 < i < k$ ) comprising:

delay means for receiving and delaying a data word received at a first input of such ith incremental unit;

ith shift means connected to an ith additional tap on said input line to receive and shift said data input word thereon and having an output at which such shifted data word is produced, the extent of such ith shift establishing a coefficient value at said ith tap which is an integer power of 2; and

adding means connected to said delay means of said incremental unit and to the output of said ith shift means for deriving the sum of said delayed data word received at said first input and said ith shifted data word, such sum being a data output word of said ith incremental unit; said incremental units being serially connected so that the data word received at said first input of a succeeding unit is the data output word of the immediately preceding unit,

the data output word produced by the last unit being the data output word of said stage of said filter.

4,791,598

# **TWO-DIMENSIONAL DISCRETE COSINE TRANSFORM PROCESSOR**

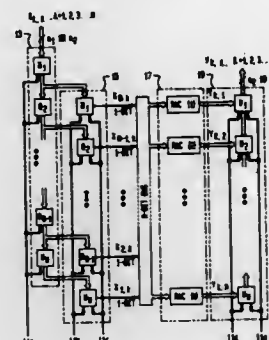
Ming-Lei Liao; Ming-Ting Sun, both of Holmdel, and Lancelot Wu, East Kensington, all of N.J., assignors to Bell Communications Research, Inc., Livingston, N.J.

Filed Mar. 24, 1987, Ser. No. 29,761

Int. Cl. G06F 15/332

U.S. Cl. 364-725

7 Claims



5. An  $N \times 1$  Discrete Cosine Transform (DCT) processor comprising:

an N-stage input register to which a column or row of input data may be applied in bit-serial format,

an N-stage holding register having its stages connected to the corresponding stages of said input register, and means to transfer the contents of said input register in bit-parallel format to said holding register each time the said input register fills up,

distributed arithmetic circuitry connected to said holding register to concurrently compute N vector inner products, said distributed arithmetic circuitry comprising: first stage decimation in frequency circuitry connected to the output of said holding register, said decimation in frequency circuitry comprising means to produce a pair of  $N/2$  bit words from each N-bit word received from said holding register,

said distributed arithmetic circuitry further comprising N RACs each comprising one or more read only memories (ROMs) plus an accumulator, said RACs being connected to the output of said decimation in frequency circuitry, and

an output register having each of its stages connected to the corresponding accumulator of each of said RACs, said output register comprising means to receive said vector inner products from said accumulators in bit-parallel format and means to shift said inner products out in bit-serial format.

4,791,599

# **AUTO-CORRELATION ARRANGEMENT**

Serge Hethuin, Meudon; Hugues Crepin, Velizy, and Jérôme Fauret, Fontenay aux Roses, all of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 12, 1986, Ser. No. 895,967

Claims priority, application France, Aug. 13, 1985, 85 12337

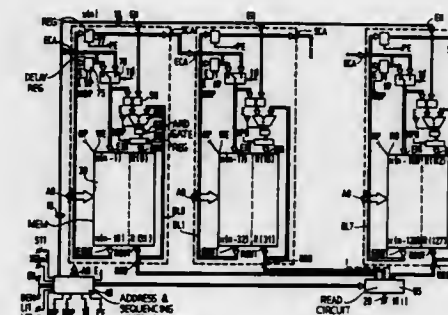
Int. Cl. G06F 15/20, 7/38

U.S. Cl. 364-728.07

8 Claims

1. An auto-correlation apparatus for producing N auto-correlation values  $R(k)$ , ( $k=0, \dots, N-1$ ) of an auto-correlation function of a sequence of digital samples  $x(n)$ , ( $n=-\infty, \dots, 0, \dots, p$ ) of a received input signal, such sample being encoded as

words of "b" binary bits, each value  $R(k)$  being defined by the formula:



$$R(k) = \sum_{n=p-M+1}^{n=p} x(n) \cdot x(n-k)$$

where M is the number of samples from which each value  $R(k)$  is to be determined; such apparatus comprising:

a random access memory for storing at respective addresses therein a plurality of words each of which is a concatenation of a respective one of said digital sample words and a digital word representing a respective one of said auto-correlation values, such memory having a first input and a first output for signal sample words and a second input and second output for auto-correlation words;

processing means having first and second inputs respectively coupled to said first and second outputs of said memory, a third input for receiving signal sample words, and an output coupled to said first input of said memory; such processing means comprising a multiplier for multiplying signal sample words received at the first and third inputs thereof and an adder for adding the products so produced to auto-correlation words received from the second output of said memory so as to derive further auto-correlation words, such further auto-correlation words being supplied by said adder to the second input of said memory for storage therein; and

memory addressing and sequencing means for supplying said received signal sample words to said first and third inputs of said processing means, such addressing and sequencing means providing read and write cycles of address codes to said memory for storing therein and reading out therefrom signal sample words and auto-correlation words in accordance with said formula;

whereby the auto-correlation values  $R(k)$  are stored in said memory and can be read therefrom at the second output thereof, said second output being the output terminal of the auto-correlation apparatus.

4,791,600

# **DIGITAL PIPELINED HETERODYNE CIRCUIT**

Yih-Chyun Jeng, Lake Oswego, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jul. 28, 1986, Ser. No. 890,192

Int. Cl. G06F 7/52

U.S. Cl. 364-754

7 Claims

1. A digital heterodyne circuit comprising:

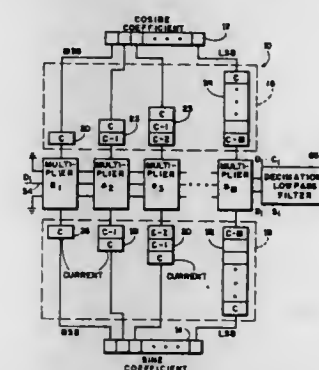
(a) a data input line for receiving a sequence of digitized data signals;

(b) digital sine and co-sine function generator means, each having m outputs for generating m-bit digital coefficients, one bit on each output, a predetermined time intervals as a function of time corresponding to sine  $\omega t$  and co-sine  $\omega t$ , respectively, where  $\omega$  is a predetermined frequency;

(c) m-stage arithmetic means for multiplying said data signals by said digital coefficients; and

(d) delay means connecting said output of said function

generator means for a corresponding stage of said arithmetic means for providing each respective bit of a digital coefficient to each such corresponding stage of said arithmetic means simultaneously with the arrival at each such corresponding stage of a predetermined one of said data signals.



4,791,601

# **PARALLEL MULTIPLIER WITH A MODIFIED BOOTH ALGORITHM**

Shigeru Tanaka, Fujisawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

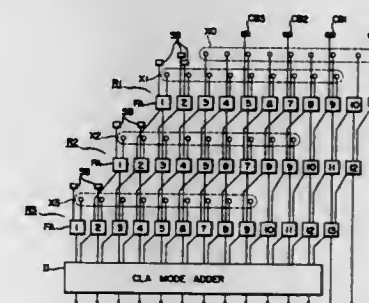
Filed Jul. 22, 1986, Ser. No. 888,080

Claims priority, application Japan, Jul. 23, 1985, 60-162541

Int. Cl. G06F 7/52

U.S. Cl. 364-760

7 Claims



1. A parallel multiplier circuit for forming a product of a binary multiplier value and a binary multiplicand value from a plurality of partial products determined from said binary multiplier and multiplicand values, each of said plurality of partial products corresponding to a different binary bit of said multiplier value such that each of said partial products has a relative significance reflecting the relative bit significance of the corresponding multiplier bit, said parallel multiplier circuit comprising:

a plurality of rows of adder circuits arranged in an order of successively-increasing significance from a lowest-order adder row to a highest-order adder row, the adders in said lowest-order adder row receiving as inputs the two partial products with the lowest relative significance, and the adders in each successively higher order row of adders receiving as inputs the one of the partial products with the next higher relative significance and an output from the adders in the next lower order row of adders,

wherein each of said rows of adders includes at least one carry save adder, and wherein the number of said adders in each of said rows of adders increases from said lowest-order adder row to said highest-order adder row; negative product correcting means for supplying a first correction signal to the ones of said adder rows receiving negative partial-products signals, and for providing a second correction signal as an input to the adders in said lowest-order row of adders; and a final adder coupled to the outputs of said highest order row of adders to form said product.

4,791,602

## SOFT PROGRAMMABLE LOGIC ARRAY

David R. Resnick, Vadnais Heights, Minn., assignor to Control Data Corporation, Minneapolis, Minn.

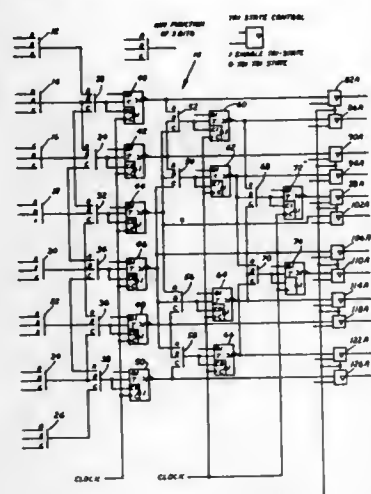
Continuation of Ser. No. 485,060, Apr. 14, 1983, abandoned.

This application Nov. 21, 1986, Ser. No. 935,054

Int. Cl.<sup>4</sup> H03K 19/00; G06F 7/38

U.S. Cl. 364-900

26 Claims



1. A soft programmable logic array for selectively providing every possible function for operating on a set of data input thereto such that any one of said possible functions may be performed in a single pass, having:

an output;  
a plurality of logic ranks each rank having logic inputs, data inputs, and data outputs which are a predetermined function of the inputs, each logic rank being formed of a plurality of configurable functional element means wherein each functional element means has inputs connected to receive data inputs and logic inputs connected to receive configuration logic inputs and outputs connected to provide data output which is the solution to a logic equation (operated on the data inputs) determined by the set of logic inputs received by that functional element means, each of said functional element means also having a plurality of latches equivalent to the number of possible output states for holding a predetermined logic indication of the associated output state corresponding to the logic function implemented,

a plurality of ranks of flip-flop pass-throughs having an input connected to receive a configuration logic datum, in each said rank a flip-flop pass-through is paired to a functional element means, a flip-flop pass-through having an input connected to receive the data output of that one of said logic rank's functional element means and a flip-flop pass-through also having an output connected to a data input of at least one of the functional element means in the succeeding logic rank and connected to the output of said logic array wherein each said flip-flop pass-through may

invert a logic condition and pass that condition through without delay or latch a logic condition until released, depending on the configuration logic datum supplied thereto, and

control means for setting all of said functional elements and flip-flop pass-throughs with individual configuration logic data to cause the array to perform a predetermined logic function on the data input,

wherein the output of each functional element in each preceding logic rank is provided as one input to at least one functional element of a succeeding logic rank and at least one functional element output in each preceding rank is provided to a data input of a plurality of functional elements in a succeeding logic rank.

4,791,603

## DYNAMICALLY RECONFIGURABLE ARRAY LOGIC

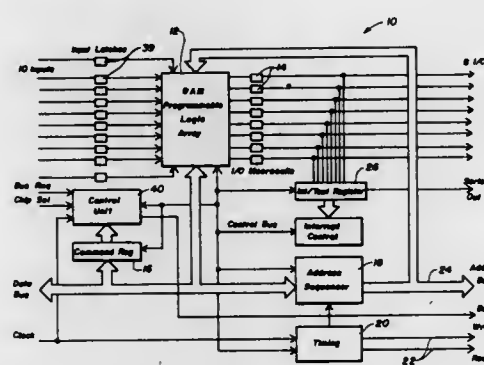
Matthew R. Henry, Albuquerque, N. Mex., assignor to Hoey Inc., Minneapolis, Minn.

Filed Jul. 18, 1986, Ser. No. 886,700

Int. Cl.<sup>4</sup> G06F 7/38; H03K 19/20

U.S. Cl. 364-900

19 Claims



1. A dynamically reconfigurable array logic comprising:  
a RAM programmable logic array comprising an array of bits, each bit comprising a fuse connection between logic elements;  
I/O means coupled to the RAM programmable logic array for logical selection of registered output;  
first register means coupled to the RAM programmable logic array for receiving data and high level commands;  
sequencer means coupled to the RAM programmable logic array for generating addresses, said sequencer means comprising a pair of up/down counters;  
timing means coupled to the RAM programmable logic array for issuing READ and WRITE strobes; and  
second register means coupled to the RAM programmable logic array for monitoring outputs in both a first mode and a second mode.

4,791,604

## SHEET RANDOM ACCESS MEMORY

Richard M. Lienau, 2404 Sebald Ave., Redondo Beach, Calif. 90278, and Kenneth E. Pope, Wagoner, Okla., assignors to Joseph J. Bednarz and Richard M. Lienau, both of Los Angeles, Calif.

Continuation of Ser. No. 580,537, Feb. 15, 1984, abandoned.

This application Jul. 23, 1986, Ser. No. 889,256

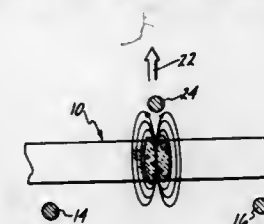
Int. Cl.<sup>4</sup> G11C 11/02

U.S. Cl. 365-9

19 Claims

1. A nonvolatile random access memory comprising:  
a substrate including a plurality of separate magnetically polarizable ferromagnetic domains at a corresponding plurality of distinguishable fixed locations;

fixed drive means for selectively creating a fixed predetermined net magnetic polarization of at least some of said domains within said substrate at a randomly accessed one of said distinguishable fixed locations by aligning at least some of said domains at said fixed location without propagation of a magnetic region within said substrate; and



fixed sensing means for selectively sensing the direction of magnetic polarity of an arbitrarily selected one of said plurality of distinguishable ferromagnetic domains, whereby a true, random, nonvolatile mass memory is provided.

4,791,605

## HYBRID JUNCTION FOR A MAGNETIC BUBBLE MEMORY

Jean-Marc Fedeli; Christine Louis, both of Saint Egreve; Joël Magnin, Saint Martin d'Heres, and Maryse Vabre, Meylan, all of France, assignors to Commissariat à l'Energie Atomique, Paris, France

Filed Jan. 29, 1987, Ser. No. 8,265

Claims priority, application France, Feb. 5, 1986, 86 01574

Int. Cl.<sup>4</sup> G11C 19/08

U.S. Cl. 365-36

7 Claims



1. A hybrid magnetic bubble memory having a sequence of deposited patterns aligned along an easy magnetization axis of a magnetic material of the memory and forming a first propagation track for magnetic bubbles, and a sequence of non-implanted patterns aligned along the same axis and defining a second propagation track along a boundary between an implanted zone and a non-implanted zone, A junction extending between said first and second propagation tracks to enable a magnetic bubble to pass from the first track to the second track and being defined by an overlap zone between said propagation tracks, said overlap zone having a surface of the order of magnitude of the size of a magnetic bubble and forming for each of the propagation tracks a stable position for the magnetic bubble.

4,791,606

## HIGH DENSITY CMOS DYNAMIC CAM CELL

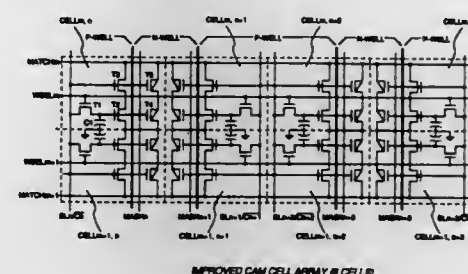
N. Bruce Threewitt, and Simon M. Price, both of Colorado Springs, Colo., assignors to Triad Semiconductors International BV, Colorado Springs, Colo.

Filed Sep. 1, 1987, Ser. No. 92,078

Int. Cl.<sup>4</sup> G11C 15/00

U.S. Cl. 365-49

4 Claims



1. A content addressable memory comprising an array of memory cells arranged in a plurality of rows and a plurality of columns of cells, a bit line for each column of cells, a word line for each row of cells, and a match line for each row of cells; each said cell consisting essentially of:

a dynamic storage element suitable for storing a data bit, an access transistor having a gate electrode coupled to the corresponding word line, said access transistor coupling the corresponding bit line to said dynamic storage element when said access transistor is enabled, and a logic gate coupled to said dynamic storage element, said corresponding bit line, and said corresponding match line, for comparing the contents of said dynamic storage element with a comparand bit on said bit line and for changing the state of said match line if said comparand bit does not match the contents of said dynamic storage element, said logic gate comprising a plurality of transistors including at least one N-channel transistor and one P-channel transistor;

wherein each column of said cells is arranged so that it is symmetrically placed with respect to its neighboring columns; and the transistors in said array are located in alternating P-well and N-well regions, each P-well region and N-well region running the length of said columns and holding all the transistors of corresponding channel type for two neighboring columns of cells.

4,791,607

## GATE ARRAY INTEGRATED CIRCUIT DEVICE AND METHOD THEREOF FOR PROVIDING VARIOUS BIT/WORD CONSTRUCTIONS

Masato Igarashi, Tokyo, and Yoshiyuki Suehiro, Kawasaki, both of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 4, 1985, Ser. No. 804,489

Claims priority, application Japan, Dec. 7, 1984, 59-258594

Int. Cl.<sup>4</sup> G11C 5/10

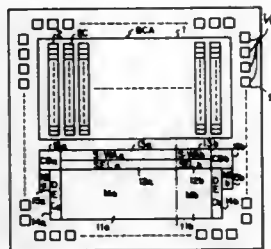
U.S. Cl. 365-51

7 Claims

1. A gate array integrated circuit device comprising:  
a basic cell array region in which a plurality of basic cells are arranged;  
a rectangular memory cell matrix region in which a plurality of memory cells are arranged, said memory cell matrix region having first and second sides, the first side being opposite the second side, and having a third side; and a plurality of peripheral circuits each of which includes address input circuits and decoders for accessing said memory cells, including:  
first and second peripheral circuits arranged along the first and second sides of said rectangular memory cell matrix region, said peripheral circuits connected to at least two independent memories, and each including:

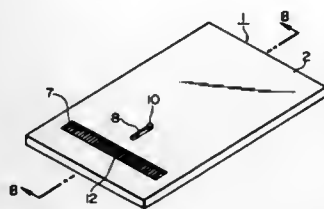


a clock buffer;  
a word decoder; and  
an address register; and



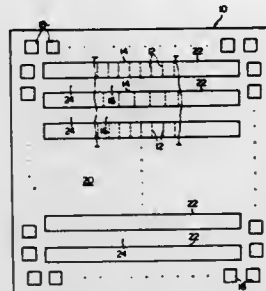
a third peripheral circuit arranged along said third side of said rectangular memory cell matrix region and including:  
a column selector; and  
a sense amplifier.

**4,791,608**  
**MEMORY CARD HAVING SHUTTER PROTECTED TERMINALS**  
Hideo Fushimoto, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 566,554, Dec. 29, 1983, abandoned.  
This application Jul. 28, 1987, Ser. No. 80,233  
Claims priority, application Japan, Jan. 10, 1983, 58-1200  
Int. Cl.<sup>4</sup> G11C 5/04  
U.S. Cl. 365-52 7 Claims



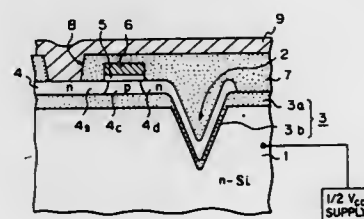
1. A memory card adapted to be removably loaded into electronic equipment, comprising:  
a contact pattern for exchanging information with an external equipment;  
an electrically conductive card-shaped case having an opening in a surface thereof at a position facing a position where said contact pattern is located;  
a shutter member for opening and closing said opening  
a memory element provided in said case and connected to said contact pattern for exchanging information with an external equipment;  
a printed circuit board provided in said case for making an electrical connection with said contact pattern and said memory element; and  
means provided in said case for making an electrical connection with said case and said printed circuit board to ground, static electricity being conducted to said printed circuit board through said case and said electrical connection means by closing said shutter member when said case is in a non-operative status unloaded from said external equipment, to prevent damage to said memory element due to said static electricity.

**4,791,609**  
**SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE**  
Seichi Ito, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan  
Filed Apr. 9, 1987, Ser. No. 36,521  
Claims priority, application Japan, Apr. 9, 1986, 61-82714  
Int. Cl.<sup>4</sup> G11C 5/06  
U.S. Cl. 365-63 5 Claims



1. A semiconductor integrated circuit device comprising  
(a) a plurality of rows of logic cells each composed of a combination of semiconductor elements, the rows of logic cells being spaced apart from each other to define channel areas therebetween, said logic cells being arranged to form a plurality of function blocks each having a predetermined logic function, and  
(b) at least one wiring layer overlying said rows of logic cells and said channel areas, the wiring layer comprising a plurality of inter-cell wiring areas extending along said rows of logic cells and including interconnects between desired ones of the logic cells and inter-block wiring areas extending along said channel areas and including interconnects between desired ones of said function blocks, wherein  
(c) each of said inter-cell wiring areas comprises wiring sections respectively associated with said function blocks and each having a width larger or smaller than at least one predetermined width, and  
(d) the wiring sections forming said inter-cell wiring areas comprise wiring sections having widths within a predetermined range of 50 per cent to 160 per cent of said predetermined width.

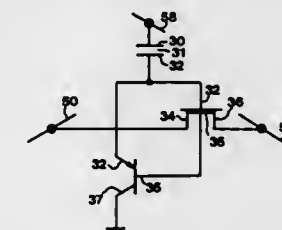
**4,791,610**  
**SEMICONDUCTOR MEMORY DEVICE FORMED OF A SOI-TYPE TRANSISTOR AND A CAPACITOR**  
Yoshihiro Takemae, Minato, Japan, assignor to Fujitsu Limited, Kanagawa, Japan  
Filed May 23, 1986, Ser. No. 866,507  
Claims priority, application Japan, May 24, 1985, 60-111459  
Int. Cl.<sup>4</sup> G11C 11/24, 11/34, 7/00  
U.S. Cl. 365-149 16 Claims



1. A semiconductor memory device comprising:  
a transistor formed in a semiconductor layer which is formed on an insulating layer, said insulating layer being formed

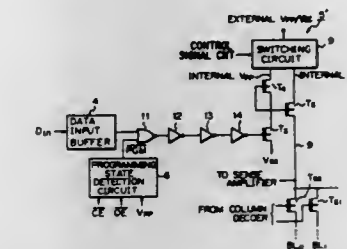
on a well region formed in a semiconductor substrate, said semiconductor substrate being a first conductivity type, said well region being a second conductivity type opposite to said first conductivity type, said transistor having a silicon on insulator structure where said silicon corresponds to said semiconductor layer and said insulator corresponds to said insulating layer; and  
a capacitor composed of a dielectric layer formed from said insulating layer, an upper capacitor electrode formed from said semiconductor layer, and a lower capacitor electrode formed from said well region wherein said dielectric layer is sandwiched between said upper and lower capacitor electrodes; the well region having a reverse bias to that of said substrate and being biased with a voltage at an intermediate level between a first storage voltage and a second storage voltage.

**4,791,611**  
**VLSI DYNAMIC MEMORY**  
Ali G. Eldin, and Mohammed I. Elmasry, both of Waterloo, Canada, assignors to University of Waterloo, Waterloo, Ontario, Canada  
Filed Sep. 11, 1985, Ser. No. 774,981  
Int. Cl.<sup>4</sup> G11C 11/34; H01L 29/80  
U.S. Cl. 365-177 22 Claims



1. Dynamic memory or storage cell, for uses in an integrated circuit chip, wherein:  
the cell includes a cell-substrate, which is doped to a first polarity of conductivity;  
the cell includes a source, a drain, and a channel-diffusion; the channel-diffusion extends between the source and the drain;  
the channel-diffusion is formed as a diffusion into the substrate, and is doped to the opposite polarity of conductivity to the substrate;  
the cell includes a gate;  
the cell is so arranged and disposed that the channel diffusion is sandwiched between the cell-substrate and the gate, whereby the source, drain, channel-diffusion and gate comprise an opposite-polarity-channel junction-gate field-effect transistor (JFET);  
the cell includes an emitter means;  
the cell-substrate, the channel-diffusion, and the emitter means are so arranged and disposed in the cell as to comprise the collector, base, and emitter respectively of a bipolar transistor;  
the cell includes an upper plate, a lower plate, and an insulation means for insulating the two plates;  
the plates and the insulation means are so arranged and disposed in the cell as to comprise a capacitor;  
and the cell includes a voltage-equalizing means for maintaining the gate, the emitter means, and the lower plate always at the same voltage as each other.

**4,791,612**  
**DATA PROGRAMMING CIRCUIT FOR PROGRAMMABLE READ ONLY MEMORY DEVICE**  
Masanobu Yoshida, Kawaguchi, Japan, assignor to Fujitsu Limited, Kanagawa, Japan  
Filed Dec. 17, 1986, Ser. No. 942,895  
Claims priority, application Japan, Dec. 18, 1985, 60-282735; Jan. 21, 1986, 61-008964  
Int. Cl.<sup>4</sup> G11C 7/00  
U.S. Cl. 365-189 5 Claims

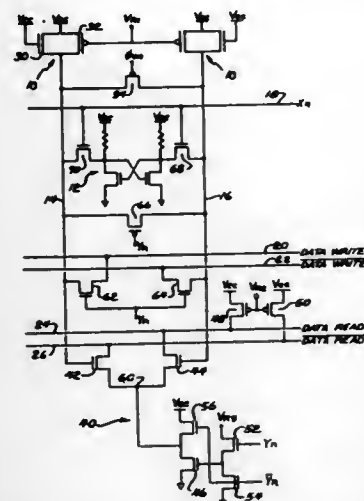


1. A programming circuit for a programmable read only memory device receiving a data signal to be programmed, said circuit comprising:  
means for receiving the data signal;  
a power supply terminal for receiving a first voltage in a read mode and a second voltage as programming voltage which is a higher voltage than said first voltage in a program mode;  
an inverter circuit for inverting said data signal in said program mode, said inverter including a load element and a first transistor having a drain connected to said load element and a gate connected to said means for receiving said data signal; and  
a switching circuit connected between said power supply terminal and said load element for supplying said second voltage to the load element in said program mode and inhibiting a supply of said first voltage to the load element in said read mode.

**4,791,613**  
**BIT LINE AND COLUMN CIRCUITRY USED IN A SEMICONDUCTOR MEMORY**  
Kim C. Hardee, Colorado Springs, Colo., assignor to INMOS Corporation, Colorado Springs, Colo.  
Continuation-in-part of Ser. No. 534,484, Sep. 21, 1983, abandoned. This application Jul. 25, 1984, Ser. No. 633,091  
Int. Cl.<sup>4</sup> G11C 7/00  
U.S. Cl. 365-189 16 Claims

1. In a CMOS integrated circuit device, a memory array and control circuitry therefor comprising:  
a plurality of pairs of column lines;  
a plurality of word lines;  
a plurality of multi-transistor memory cells, each cell including a pair of cross-coupled N-channel transistors and being located at an intersection of, and connected to, a pair of column lines and one said word line;  
a plurality of bias means each connected to a corresponding column line, each said bias means including a P-channel transistor and an N-channel transistor each having its source-drain path coupled between a supply voltage and said corresponding column line, each said bias means serving to limit the current drain to the threshold level of said P-channel transistor as the column line for the particular bias means is pulled toward ground; and  
a voltage reference circuit connected to said supply voltage input and having an output connected to the gates of said

P-channel transistors for each pair of said bias means connected to a pair of column lines, said reference circuit



providing compensation means for reducing the effects of process variations between elements of said device.

#### 4,791,614 SEMICONDUCTOR MEMORY DEVICE HAVING ERRONEOUS WRITE OPERATION PREVENTING FUNCTION

Hideki Arakawa, Yokohama, Japan, assignor to Fujitsu Limited, Kanagawa, Japan

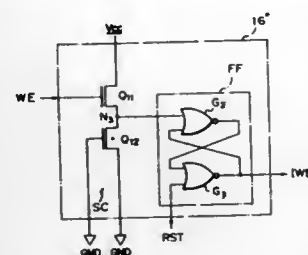
Filed Jun. 17, 1987, Ser. No. 63,035

Claims priority, application Japan, Jun. 20, 1986, 61-144322

Int. Cl.<sup>4</sup> G11C 7/00

U.S. Cl. 365-228

5 Claims



1. A semiconductor memory device comprising: a first power supply terminal means (VCC); a second power supply terminal means (GND); a terminal for receiving a write enable signal (WE); an erroneous write operation preventing circuit (16'), connected to said first and second power supply terminal means and to said terminal, for receiving said write enable signal and generating an internal write enable signal (IWE) for an actual write operation only when a potential of said high power supply terminal means is higher than a predetermined value; and means, connected to said erroneous write operation preventing circuit, for resetting said circuit after receiving said internal write enable signal, said erroneous write operation preventing circuit comprising: an enhancement-type MIS transistor (Q<sub>11</sub>) having a drain connected to said first power supply terminal means, a gate for receiving said write enable signal, and a source; a depletion-type MIS transistor (Q<sub>12</sub>) having a drain con-

nected to the source of said enhancement-type MIS transistor, and a gate and a source thereof connected to said second power supply terminal means; and a flip-flop (FF) having a set terminal connected to the drain of said depletion-type MIS transistor, a reset terminal for receiving an output signal from said resetting means, and an output for generating said internal write enable signal.

#### 4,791,615 MEMORY WITH REDUNDANCY AND PREDECODED SIGNALS

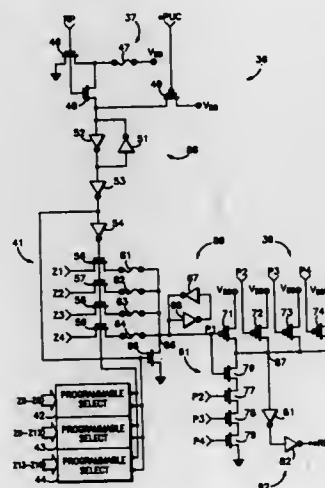
Perry H. Pelley, III, Austin, and Bruce L. Morton, Round Rock, both of Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Dec. 22, 1986, Ser. No. 944,099

Int. Cl.<sup>4</sup> G11C 11/40

U.S. Cl. 365-200

14 Claims



1. A memory having a main array of first-type lines and second-type lines with memory cells located at said intersections, whereby a memory cell is selected by selecting a first-type line and a second-type line, comprising: buffer means for receiving a first address for providing information for selecting a first-type and a second address for providing information for selecting a second-type line; predecoder means, coupled to the buffer means, for performing a predecode on the first address and providing predecode signals representative of said predecode; first normal decoder means, coupled to the predecoder means, for selecting a first-type line from the main array in response to the predecode signals; and programmable redundant decoder means, coupled to the output of the predecoder means, for being programmed to select the redundant first-type line in response to the predecoder signals which select the defective first-type line, wherein the programmable redundant decoder means comprises: logic decoder means having a plurality of inputs, for enabling the redundant first-type line when the plurality of inputs are all at a first logic state; a plurality of coupling transistors, each coupling transistor having a first current electrode for receiving a respective decode signal, a control electrode for receiving a control signal, and a second control signal; and a plurality of fusible links divided into sets of fusible links, said sets of fusible links corresponding to respective inputs of the logic decoder means, each fusible link having a first terminal coupled to the second current electrode of a respective coupling transistor, and a second terminal connected to the input of the logic decoder which corresponds to the set of which it is a member.

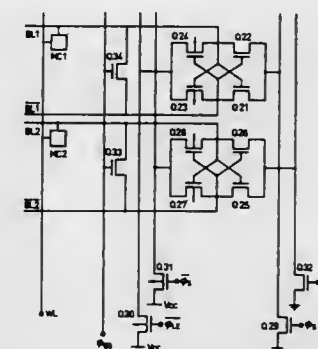
#### 4,791,616 SEMICONDUCTOR MEMORY DEVICE

Masso Taguchi, Sagami, and Yoshihiro Takemae, Tokyo, both of Japan, assignors to Fujitsu Limited, Kanagawa, Japan  
Filed Jun. 27, 1986, Ser. No. 879,782  
Claims priority, application Japan, Jul. 10, 1985, 60-150097; Feb. 4, 1986, 61-021294

Int. Cl.<sup>4</sup> G11C 11/40

U.S. Cl. 365-205

10 Claims



1. A semiconductor memory device comprising: a memory cell array constituted by at least a pair of memory groups; a first bit line pair coupled to a first memory group of the memory groups; a second bit line pair coupled to a second memory group of the memory groups; a first sense amplifier coupled to said first memory group for sensing and amplifying a potential difference in said first bit line pair, said first sense amplifier comprising P-channel transistors; and a second sense amplifier coupled to said second memory group for sensing and amplifying a potential difference in said second bit line pair, said second sense amplifier comprising N-channel transistors, said first and second sense amplifiers being driven with mutually opposite phases.

#### 4,791,617 MOTION SENSING DEVICE

Robert H. Seymour, Grinstead, England, assignor to Geophysical Service Inc., Dallas, Tex.  
Filed Jul. 9, 1987, Ser. No. 71,510  
Int. Cl.<sup>4</sup> H04R 23/00, 1/42; H01L 41/08

U.S. Cl. 367-171

18 Claims

1. An acceleration sensing device, comprising: a housing containing a cavity therein defined by substantially rigid walls and having an opening to the exterior of said housing; a flexible envelope of substantially the same shape as said cavity disposed in said cavity and completely filled with a volume of fluid; plug means adapted to close said cavity opening immediately proximate said flexible envelope, the inner extent of said plug means matching the configuration of said envelope at said opening and in intimate contact therewith; and

pressure responsive means disposed between at least one of said rigid walls and said envelope and adapted to produce



a signal responsive to fluid pressure resulting from acceleration of said fluid within said device.

#### 4,791,618 WELL LOGGING METHOD AND SYSTEM FOR DETECTING STRUCTURAL AND STRATIGRAPHIC GEOLOGICAL MAKE-UP OF SUBSURFACE FORMATIONS

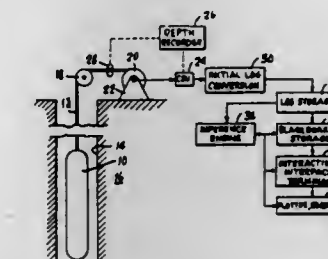
Paul R. Pruchnik, Ridgefield, Conn., assignor to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 834,940, Feb. 28, 1986, abandoned, which is a continuation of Ser. No. 295,365, Aug. 24, 1981, abandoned. This application Apr. 28, 1987, Ser. No. 45,211

Int. Cl.<sup>4</sup> G01V 1/00

U.S. Cl. 367-25

1 Claim



1. A well logging process for dipmeter interpretation comprising the following machine-implemented steps: deriving formation dips based at least on dipmeter logs produced by at least one dipmeter tool passed through at least one borehole traversing subsurface earth formations; providing blackboard storage for said formation dips and for user-selected tokens characterizing subsurface parameters and for relationships between said tokens and for geological rules; processing said formation dips and said user-selected tokens characterizing subsurface parameters by an inference engine operating on the basis of said geological rules each of which comprises (i) a premise made up of tokens, each comprising a geological assertion of fact concerning an attribute of at least one of a well log and a subsurface feature, (ii) the relationship between said tokens, and (iii) a geological conclusion to be derived if the tokens in the premise part of a rule and the relationship therebetween are found in the blackboard storage, wherein the geologi-



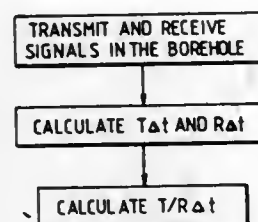
cal conclusion derived from one rule becomes a token for use by another rule; and  
producing a visible record of selected geological characteristics of selected subsurface formations based on said geological conclusions reached by the inference engine on the basis of said geological rules.

#### 4,791,619 METHOD OF DETECTING AND CHARACTERIZING FEATURES IN A BOREHOLE

Olive Y. Lja, Houston, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex.  
Continuation of Ser. No. 910,558, Sep. 22, 1986. This application  
Jan. 26, 1988, Ser. No. 150,473

Int. Cl.<sup>4</sup> G01V 1/40

U.S. Cl. 367—35



1. A method of detecting features in and surrounding a borehole comprising:  
positioning a logging tool in said borehole, said logging tool comprising means for transmitting and receiving sonic waves;  
transmitting sonic waves in said borehole with said transmitting means;  
receiving said sonic waves in said borehole with said receiving means;  
determining a receiver delta-t for said sonic waves;  
determining a transmitter delta-t for said sonic waves;  
comparing said transmitter delta-t and said receiver delta-t for said sonic waves; and  
determining the difference, T/R delta-t, between said transmitter delta-t and said receiver delta-t as a function of borehole position.

4,791,620  
TACTILE HEARING AID  
Hans Leysieffer, Taufkirchen, and Eberhard Zwicker, Icking, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed Mar. 21, 1986, Ser. No. 842,822

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1985, 3510508

Int. Cl.<sup>4</sup> H04B 1/06; H04R 25/00

U.S. Cl. 367—135

23 Claims



1. A device for converting electrical signals into signals tactilely perceivable by a human by contact with a portion of the body comprising:  
an electro-mechanical transducer having a vibratory member consisting of at least one ply of a film of polyvinyl-

dene fluoride piezoelectric material in direct contact with said body portion;  
a carrier for said film, said carrier and said film forming an interrupted ring; and  
electrically conductive coatings on both sides of said film adapted for applying said electrical signals therebetween.

#### 4,791,621 SOLAR CELL POWERED CLOCK HAVING A DECORATIVE PENDULUM

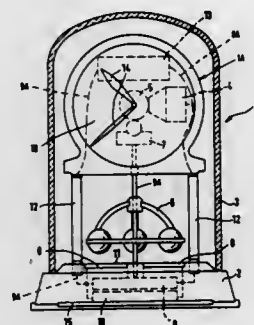
Gerhard Wild, Denningen, and Edgar Haller, Simonswald, both of Fed. Rep. of Germany, assignors to Junghans Uhren GmbH, Schramberg, Fed. Rep. of Germany  
Filed Feb. 27, 1987, Ser. No. 19,658

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 8606358

Int. Cl.<sup>4</sup> G04C 11/02; G04B 17/02, 1/00

U.S. Cl. 368—47

10 Claims



1. A clock comprising:  
a housing containing a dial face and hands, and a clockwise mechanism for driving said hands,  
a support base,  
vertical column means mounting said housing on said base at a location spaced above said base,  
a decorative non-timekeeping pendulum depending downwardly from said housing and disposed within an area between said housing and said base,  
drive means operably connected to said pendulum and said clockworks and including solar cells mounted in said base for generating electrical drive energy, and an electrical storage capacitor disposed in said base and electrically connected to said solar cells, and  
a radio receiver disposed in said base and operably connected to said drive means for receiving coded radio signals indicative of actual time and for delivering to said drive means a time correction signal in accordance with a difference between actual time and the time indicated by said hands.

#### 4,791,622 OPTICAL DATA FORMAT EMPLOYING RESYNCHRONIZABLE DATA SECTORS

Donald W. Clay; Michael J. O'Keeffe; S. Robert Perera; Howard H. Rather, all of Boulder County, and John P. Rundell, Adams County, all of Colo., assignors to Storage Technology Partners 11, Louisville, Colo.

Continuation of Ser. No. 794,212, Nov. 1, 1985, abandoned, Division of Ser. No. 534,037, Sep. 19, 1983, abandoned. This application Jul. 20, 1987, Ser. No. 75,273

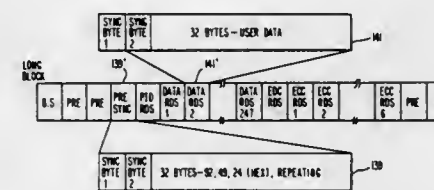
Int. Cl.<sup>4</sup> G11B 20/12

U.S. Cl. 369—59

9 Claims

1. A storage disk with a block format for organizing data written thereon, said storage disk having a multiplicity of concentric data tracks located thereon on which data may be

stored, said block format comprising a plurality of contiguous data blocks of a selected, fixed length, each said block including a selected sequence of sectors including a plurality of resynchronizable sectors each of which have means for limiting a propagation of errors through the data written on said



disk, said limiting means including a means for resynchronizing a clocking signal for said storage disk within predefined intervals of the data written on said disk, said resynchronizing means comprising two sync bytes in each said resynchronizable sector, each said sector having a selected one of a plurality of signal types written therein.

#### 4,791,623 FILE MANAGEMENT SYSTEM FOR USE IN AN OPTICAL DATA STORAGE SYSTEM

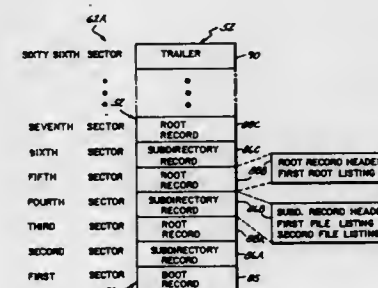
Charles E. Delotte, Colorado Springs, Colo., assignor to Optotech, Inc., Colorado Springs, Colo.

Filed Apr. 3, 1986, Ser. No. 847,484

Int. Cl.<sup>4</sup> G11B 5/76, 5/09

U.S. Cl. 369—59

64 Claims



1. A method for writing files of information data and directory data to an optical disk, including:  
reserving a first directory region;  
writing one or more files of information data to a first information region;  
writing directory data associated with the files of information data written to the first information data region to the first directory region;  
reserving a second directory region which is spaced from the first directory region by an information region;  
writing one or more files of information data to a second information region; and  
writing directory data associated with the files of information data written to the second information region to the second directory region.

#### 4,791,624 DEVICE FOR CENTERING A ROTATING DISK

Bernardus J. Stinesen, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 19, 1986, Ser. No. 945,110

Claims priority, application Netherlands, Dec. 20, 1985, 8503523

U.S. Cl. 369—270

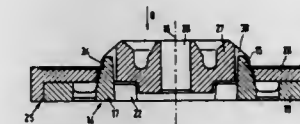
Int. Cl.<sup>4</sup> G11B 17/03

12 Claims

1. A device for centering a disc to be read or recorded while

rotating, said disc having a central disc hole, said device comprising:

a turntable having an axis of rotation and a supporting surface for a disk,  
a plurality of centering parts resiliently connected to said turntable and situated concentrically about said axis of rotation, said centering parts each having a pivot which extends at least substantially tangentially with respect to a circle situated concentrically about the axis of rotation, said centering parts having free ends which can be pivoted resiliently about said pivots and toward the axis of rota-



tion, said centering parts extending above the supporting surface and being situated at least partly in the central disk hole when the disk is in the operating position,  
a pair of connection strips connected to each centering part remote from its free end and extending toward the axis of rotation, each connection strip extending also toward an adjacent connection strip extending from another centering part, each connection strip having an end remote from the pivot and the centering part to which it is connected, each said end of said strip being connected to the end of said adjacent strip.

#### 4,791,625 OPTICAL PICKUP DEVICE USING AN INTERMEDIATE LENS WHICH SLIGHTLY CONVERGES THE LIGHT BEAM

Akira Nakamura, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

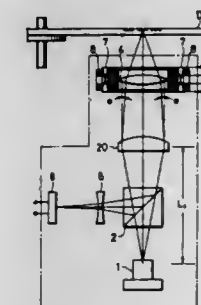
Filed Sep. 10, 1987, Ser. No. 95,021

Claims priority, application Japan, Sep. 18, 1986, 61-220311

Int. Cl.<sup>4</sup> G11B 7/125

U.S. Cl. 369—112

4 Claims

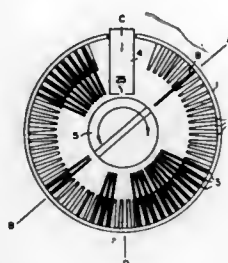


1. An optical pickup device comprising:  
a light beam source,  
objective lens means for focusing a first light beam emitted by said light beam source to cause the same to impinge upon a record medium and for transmitting a reflected light beam coming from the record medium,  
intermediate lens means for causing said first light beam to enter into said objective lens means and for receiving and transmitting said reflected light beam transmitted through said objective lens means, said intermediate lens means being constituted by a single lens element and being opera-

tive to converge said first light beam slightly as compared with a collimated light beam so that spherical aberration induced by said intermediate lens means in said first light beam is cancelled at the objective lens means, beam splitting means for separating the reflected light beam transmitted through said objective lens means and said intermediate lens means from said first light beam, and photodetecting means for detecting the reflected light beam separated by said beam splitting means.

**4,791,626**  
**AUTOMATIC CHANGER FOR PLAYER/RECORDER OF OPTICAL MAGNETIC DISCS AND CARDS**  
Marcel J. H. Staar, Brussels, Belgium, assignor to Staar Development Company S.A., Brussels, Belgium  
Filed Oct. 6, 1987, Ser. No. 105,027  
Claims priority, application Belgium, Oct. 6, 1986, 217263; Dec. 30, 1986, 217657

Int. Cl.<sup>4</sup> G11B 17/24  
U.S. Cl. 369—37



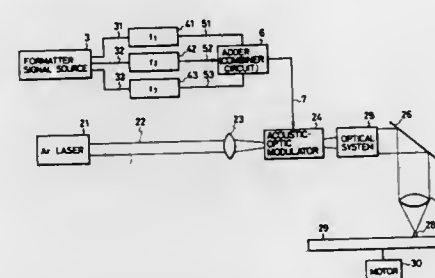
1. A player/recorder apparatus including an automatic changer mechanism for information carriers in the form of cards or discs, said apparatus comprising:  
magazine means for a plurality of information carriers including a fixed arcuate magazine formed about a center and having multiple compartments extending radially from the center,  
player/recorder means for supporting an information carrier in an operating position spaced circumferentially from said magazine means and in a radial plane relative to the center,  
a symmetrical rotary changer means mounted to rotate angularly about an axis substantially coincident with the center and positionable in alignment with any one of said compartments or with the operating position in said player/recorder means,  
said rotary changer means having information carrier transfer means on opposite ends thereof for shuttling an information carrier by movement edgewise in its own plane to and from said rotary changer means through either of the opposite ends thereof between a storage position in a magazine compartment and a transition position on said rotary changer means and between the transition position on said rotary changer means and the operating position in said player/recorder means, said rotary changer means being mounted to rotate angularly through at least 180° to reverse sides of an information carrier supported by said rotary changer means before transfer of an information carrier to said magazine or said player/recorder means from said rotary changer means.

**4,791,627**  
**WOBBLED PIT RECORDING METHOD AND DEVICE OF OPTICAL RECORDING MEDIUM UTILIZING A PLURALITY OF TIME DIFFERENT SIGNAL WAVEFORMS**

Seiji Yonezawa, Hachioji, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 13, 1986, Ser. No. 818,174  
Claims priority, application Japan, Jan. 25, 1985, 60-10854  
Int. Cl.<sup>4</sup> G11B 7/125, 7/095  
U.S. Cl. 369—109

10 Claims



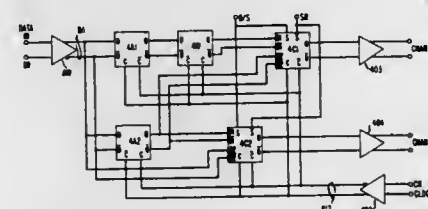
1. A recording method for an optical recording medium on which a pre-pit is recorded by projecting an optical beam modulated by a pre-pit recording signal, comprising the steps of:  
dividing output waveforms from a formatter signal source into a plurality of separate signal waveforms different in time from one another;  
superposing each of the plurality of separate signal waveforms with a different carrier frequency and providing signal outputs indicative thereof;  
modulating the optical beam by the superposed signal outputs; and  
projecting the optical beam onto the recording medium for forming pre-wobbled pre-pits by the modulated optical beam.

**4,791,628**  
**HIGH-SPEED DEMULTIPLEXER CIRCUIT**  
Robert G. Swartz, Tinton Falls, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Labs, Murray Hill, N.J.

Filed Oct. 16, 1987, Ser. No. 109,009  
Int. Cl.<sup>4</sup> H04J 3/02

U.S. Cl. 370—112

9 Claims



1. A 1:M demultiplexer apparatus, where M is an integer equal to or greater than 4, for demultiplexing a multiplexed data signal into M data channels, said demultiplexer apparatus comprising:  
means for generating M phase system clock signals at a frequency which is equal to the input data signal rate divided by M; and  
M sequencer means for decoding said multiplexed data signal into M data channels, each of said M sequencer means being clocked by a different combination of said M

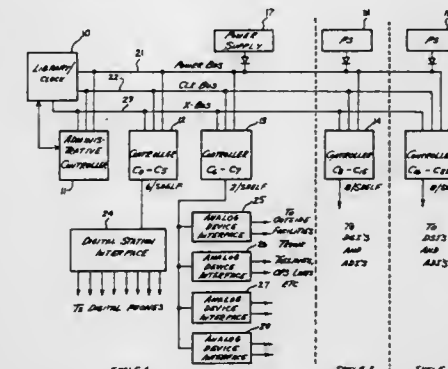
phase system clock signals to select one data channel from said multiplexed data signal.

**4,791,629**  
**COMMUNICATIONS SWITCHING SYSTEM**  
C. A. Burns, Palo Alto, Calif.; Calvin H. DeCoursey, Reno, Nev., and Hans H. Junker, Mountain View, Calif., assignors to IBM Corporation, Santa Clara, Calif.

Filed Jun. 2, 1986, Ser. No. 869,580  
Int. Cl.<sup>4</sup> H04J 3/16

U.S. Cl. 370—85

16 Claims



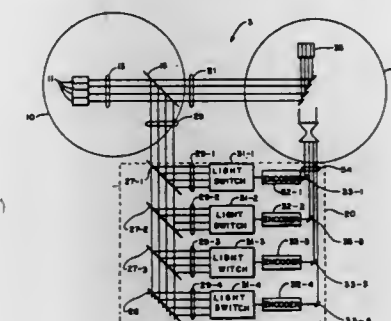
1. A communications switching system for enabling transfer of voice, data and control signals between a plurality of ports, said system comprising:  
a time division multiplexed (TDM) bus for carrying said voice, data and control signals;  
a plurality of homogeneous control means coupled to said TDM bus, each of said control means including processing means and storage means;  
a first group of said control means each controlling a fixed number of digital ports, and for selectively coupling said digital ports to said TDM bus;  
a second group of said control means each controlling a fixed number of analog ports, and for selectively coupling said analog ports to said TDM bus;  
one of said control means having programming for said first and second groups of control means in said storage means, said one control means providing said programming to said first and second groups of control means during initialization of said system;  
at least one of said second group of control means generating a plurality of progress tones for selectively coupling to said TDM bus;  
each of said control means outputting status information of ports controlled by each of said control means on said TDM bus and monitoring said TDM bus for packets requesting data from one of said control means;  
each of said control means establishing a voice path and a data path between a port controlled by one of said control means and a port requesting communication with said one of said control means;  
each of said control means being assigned a fixed number of slots, wherein each control means requests data from other of said control means during assigned time slots an outputs data onto said TDM bus during unassigned time slots.

**4,791,630**  
**METHOD AND APPARATUS FOR OPTICAL COMMUNICATION BY FREQUENCY MODULATION**  
Gordon J. Priatko, Oakland, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 26, 1986, Ser. No. 911,710  
Int. Cl.<sup>4</sup> H04B 91/00

U.S. Cl. 370—3

8 Claims



1. A frequency-modulation (FM) optical communication system comprising  
beam generator means for producing multiple individually monochromatic laser beams of mutually differently frequencies,  
splitter means for splitting at least one of said individually monochromatic beams into reference and signal beams, and  
transmitter means for transmitting information from a first location to a second location, said transmitter means including  
selecting means each for variably selecting one of said signal beams, and  
encoder means for encoding information on those of said signal beams selected by said selecting means,  
said second location including receiver means for detecting said encoded information by heterodyne technique using said reference and signal beams.

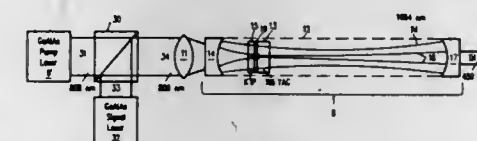
**4,791,631**  
**WIDE TOLERANCE, MODULATED BLUE LASER SOURCE**

Jean-Claude J. E. Baumert, San Jose; Gary C. Bjorklund, Los Altos; Wilfried Lenth, Capitola; William P. Risk, III, Mountain View, and Franklin M. Schellenberg, Cupertino, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 31, 1987, Ser. No. 91,239  
Int. Cl.<sup>4</sup> H01S 3/10

U.S. Cl. 372—22

34 Claims



1. A process for producing a beam of coherent radiation at essentially 459 nm including the step of mixing, in a nonlinear crystal consisting essentially of KTP, two fundamental laser beams, one at essentially 808 nm and the other at essentially 1064 nm.

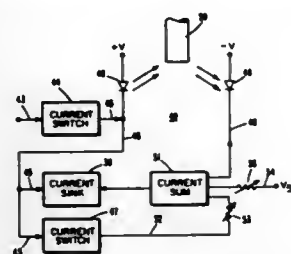


4,791,632

**COMPENSATED LASER DIODE TRANSMITTER**  
David R. Anderson, Murray, and Vaughn J. Jenkins, Bountiful,  
both of Utah, assignors to Sperry Corporation, Blue Bell, Pa.  
Filed Jan. 9, 1987, Ser. No. 1,796  
Int. Cl.<sup>4</sup> H01S 3/13

U.S. Cl. 372-31

11 Claims



1. A compensated laser diode transmitter for high-speed data transmission comprising:

an input current switch for receiving data signals to be transmitted,

a laser diode coupled to the output of said input current switch and responsive to said data signals for energizing said laser diode into a lasing mode for emitting optical signals,

a photodiode mounted in close proximity to said laser diode for generating output signals in response to said optical signals,

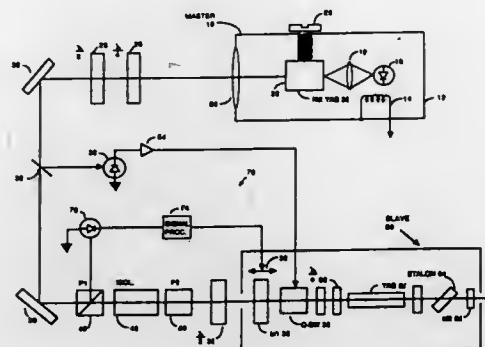
an output node summing circuit connected to the output signals of said photodiode,

a current sink coupled to said laser diode and to said output node of said photodiode and responsive to the current at the output of said photodiode,

threshold current biasing means connected to said output node for setting the threshold current of said laser diode, and

current switch means operable by said data signals and coupled to the output of said input current switch and to said output node of said photodiode for balancing the increase in current from said photodiode to continuously maintain a predetermined threshold level when said laser diode is conducting so that changes in the output power of said laser diode are sensed and instantaneously rebalanced by said input current switch to maintain the power output of said laser diode constant.

said first polarization when the frequency of said probe signal is equal to the frequency of said master laser signal; and



detector means for detecting changes in the amplitude and polarization state of said probe signal resulting from interaction with said master laser oscillator; and  
control means responsive to an output of said detector means for providing the control signal to said tuning means.

4,791,634

**CAPILLARY HEAT PIPE COOLED DIODE PUMPED SLAB LASER**

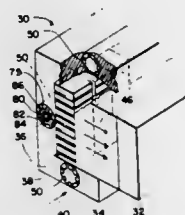
Charles I. Miyake, Kirkland, Wash., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Sep. 29, 1987, Ser. No. 102,394

Int. Cl.<sup>4</sup> H01S 3/04

U.S. Cl. 372-34

21 Claims



1. A cooling apparatus for cooling a diode pumped slab laser with a working fluid having liquid and vapor phases, comprising:

one or more axial capillary evaporators in proximity with the diode pumped slab laser, the evaporators each having an input end and an output end;

liquid conduit means attached to the input end of each of the evaporators for supplying a liquid phase of the working fluid to each of the evaporators; and

vapor conduit means attached to the output end of each of the evaporators for receiving a vapor phase of the working fluid from each of the evaporators.

4,791,635

**HETEROSTRUCTURE SEMICONDUCTOR LASER DIODE**

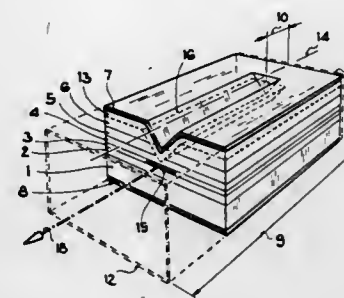
Werner Schairer, Weinsberg, and Jochen Gerner, Wiesloch, both of Fed. Rep. of Germany, assignors to Telefunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany  
Filed Feb. 11, 1987, Ser. No. 13,437

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1986, 3604295

Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-46

6 Claims



1. In a heterostructure semiconductor laser diode having a layer sequence formed on a substrate of one conductivity type (1), with the sequence including a laser-active zone (3) disposed between upper and lower layers (2, 4) of respectively opposite conductivity types, an additional layer (5) of the same conductivity type as the substrate (1) disposed on said upper layer on the side of the layer sequence facing away from the substrate, and a cover layer of the same conductivity type as the substrate disposed on said additional layer, and with said cover layer (6) including an oppositely doped diffused semiconductor region (13) which, in a stripe-shaped surface zone extending perpendicularly to the exit surface of the laser radiation in the area of the plane of symmetry (14) of the layer sequence, and through a v-groove-shaped recess (16) formed in said cover layer, penetrates the boundary plane between the cover layer (6) and the adjacent said additional layer (5) and extends into the said upper layer (4) located thereunder, whereby current flowing in the forward direction of the semiconductor laser diode is confined to a narrow, strip-shaped area (15) of the laser-active layer (3); the improvement wherein: said oppositely doped semiconductor region extends into said upper layer but does not penetrate said active layer; the portion of said narrow, strip-shaped area of the laser-active zone (3) which is beneath said v-groove shaped recess, and hence relevant to the pumping action of the laser, is shorter in its length-wise dimensions than the resonator length (9) of the semiconductor laser diode in that the v-groove-shaped recess (16) is shortened symmetrically in relation to the resonator, thereby making it shorter in its longitudinal dimensions than the resonator length (9); and the laser-active layer (3) is a highly doped layer of one conductivity type.

4,791,636

**SEMICONDUCTOR LASER DEVICE AND A METHOD FOR DRIVING THE SAME**

Saburo Yamamoto; Osamu Yamamoto; Taiji Morimoto, all of Nara; Hiroshi Hayashi, Soraku; Nobuyuki Miyauchi, Nara, and Shigeki Maei, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 28, 1986, Ser. No. 923,953

Claims priority, application Japan, Oct. 30, 1985, 60-245097; Nov. 29, 1985, 60-269598

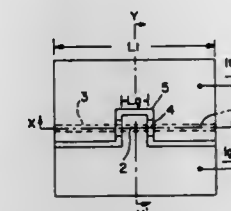
Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-46

7 Claims

4. In a semiconductor laser device comprising a laser-oscillating optical waveguide composed of a control region which functions to absorb light and main regions which function to oscillate laser, said control region being positioned in the cen-

ter portion of said optical waveguide and said main regions being positioned on both ends of said control region, and said laser device further comprises a shunting means by which the amount of current injected into each of said control region and said main regions is controlled in such a manner that when said laser devices achieve low output power



operation, said current flowing to said control region is maintained at a low level whereby said control region becomes a saturable absorption region, and when said laser devices achieve high output power operation, said current flowing to said control region is maintained at a high level.

4,791,637

**GAS LASER GENERATOR**

Masao Kimura, Odawara, Japan, assignor to Amada Company, Limited, Japan

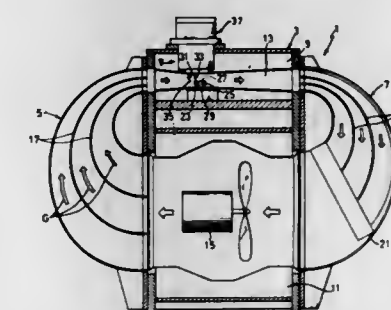
Filed Feb. 25, 1987, Ser. No. 19,136

Claims priority, application Japan, Feb. 25, 1986, 61-038334; Feb. 25, 1986, 61-025050

Int. Cl.<sup>4</sup> H01S 3/03

U.S. Cl. 372-58

6 Claims



1. A gas laser generator comprising:

a frame;

a gas channel having right and left side portions arranged within the frame, through which a gas flows;

mirror means for obtaining a laser beam, defining a resonant cavity having upper and lower portions and being positioned in the left and the right side portions of the gas channel and mutually opposed to one another;

an anode electrode arranged in the lower portion of the resonant cavity;

at least two first cathode electrodes arranged in the upper portion of the resonant cavity in the upstream side of the anode electrode;

at least two second cathode electrodes arranged in the upper portion of the resonant cavity at a predetermined distance away from the first cathode electrodes in the downstream side of the resonant cavity; and

power source means for applying voltages between the anode electrode and the first and the second electrodes, characterized in that a first voltage of a first electric field

between the first cathode electrodes connected to the power source means through a first ballast resistance and the anode electrode and a second voltage of a second electric field between the second cathode electrodes connected to the power source means through a second ballast resistance and the anode electrode are so determined that the second voltage is smaller than the first voltage so that the current flowing in the first electric field may be substantially equal to the current flowing in the second electric field during the electric discharge between the electrodes.

#### 4,791,638 SIGNAL PROCESSING CIRCUIT FOR A TELEPHONE SET

Norikazu Fujie, and Hitoshi Sugiyama, both of Yamanshi, Japan, assignors to Pioneer Electronic Corporation and Pioneer Video Corporation, both of Japan

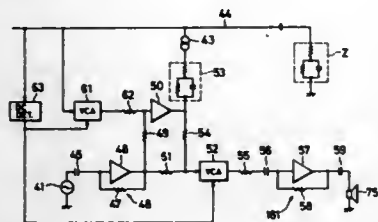
Filed Oct. 13, 1987, Ser. No. 106,692

Claims priority, application Japan, Oct. 13, 1986, 61-243543; Jul. 20, 1987, 62-180802

Int. Cl.<sup>4</sup> H04M 1/58

U.S. Cl. 379—392

3 Claims



1. A signal processing circuit for a telephone set, comprising: signal sending means for sending to a transmission line a sound signal produced from a telephone transmitter; first adding means for adding the signal from said transmission line to said sound signal; inverting means for phase inverting an output signal from said first adding means; an impedance element provided between said transmission line and an output of said inverting means; and second adding means for adding said sound signal to said output signal from said inverting means and supplying the resulting composite signal to a telephone receiver.

#### 4,791,639 COMMUNICATIONS SWITCHING SYSTEM

Michael Affeldt, John A. Barsellotti, and Lester Kirkland, all of Kanata, Canada, assignors to Mitel Corporation, Kanata, Canada

Filed Aug. 6, 1986, Ser. No. 893,950

Claims priority, application Canada, Feb. 18, 1986, 502134

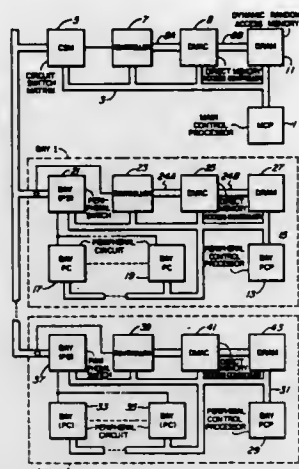
Int. Cl.<sup>4</sup> H04Q 11/04

U.S. Cl. 370—58

20 Claims

20. A communication system, comprised of:  
(a) a main controller, for controlling time and space multiplex switching of voice and data signals;  
(b) one or more peripheral subsystems for transmitting and receiving said voice and data signals to and from a plurality of peripherals connected thereto during predetermined time slot channels, under control of respective peripheral control processors;  
(c) a circuit switch matrix connected to said main controller and said peripheral subsystems, for performing said time and space multiplex switching of said voice and data signals between said peripheral subsystems under control of said main controller; and  
(d) a plurality of communication controller means each connected to said circuit switch matrix, first predetermined ones of said communication controller means also

being connected to respective ones of said peripheral control processors and a further one of said communication controller means also being connected to said main controller, for exchanging message signals between said respective ones of said peripheral control processors and said main controller via said circuit switch matrix in accordance with a bit-oriented data link protocol, during predetermined time shared ones of said time slot channels for each of said peripheral subsystems, whereby error-free transmission and reception of message signals is effected simultaneously with voice and data transmission and reception.



#### 4,791,640 CALL CHARGING ARRANGEMENT

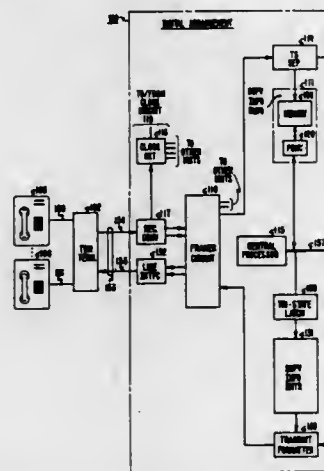
William C. Sand, St. Charles, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Oct. 21, 1985, Ser. No. 789,469

Int. Cl.<sup>4</sup> H04Q 11/04

U.S. Cl. 370—58

24 Claims



1. An arrangement for charging a customer-entered identification number for a call originated from a calling line and extendable to a called destination via a communications channel, said call including supervisory and traffic information, comprising:

means for separating said supervisory information from said call on said channel;  
traffic receiver means for receiving said traffic information including said customer-entered identification number for said call on said channel;  
switching means for switching said call on said channel to said traffic receiver means;  
processor means for controlling said switching means and responsive to predetermined of said supervisory information from said separating means and to said customer-entered identification number from said traffic receiver means for making a record charging said customer-entered identification number for said call; and  
means for communicating said customer-entered identification number to a data base, independent of said arrangement, for returning authorization to charge said number for said call.

#### 4,791,641 PARALLEL PROCESSOR ERROR CHECKING

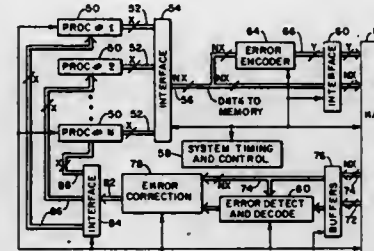
W. Daniel Hillis, Brookline, Mass., assignor to Thinking Machines Corporation, Cambridge, Mass.

Filed Sep. 15, 1986, Ser. No. 907,671

Int. Cl.<sup>4</sup> G06F 11/10

U.S. Cl. 371—38

12 Claims



1. An error correcting system for use with a plurality of digital processors and associated digital memory areas comprising:

a plurality of digital processors;  
a digital memory area for data storage and retrieval;  
a control interface for communicating data between said plurality of digital processors and said digital memory area in a unitary digital word comprising portions from plural ones of said plural processors and for generating a unitary error correcting code as a function of said unitary digital word being written into said memory area from said plurality of processors and for providing error detection and correction as a function said unitary error correction code on said unitary digital word read from said memory area to corresponding ones of said plurality of processors.

#### 4,791,642 BUFFER ERROR RETRY

Michael D. Taylor, and Shen H. Wang, both of San Jose, Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Filed Oct. 17, 1986, Ser. No. 920,819

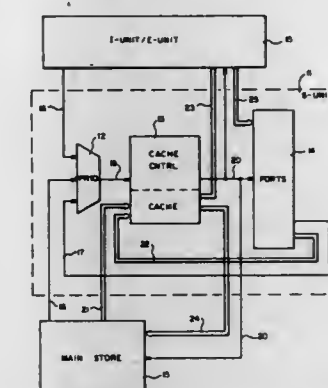
Int. Cl.<sup>4</sup> G06F 11/10

U.S. Cl. 371—38

13 Claims

1. A data processing apparatus having an instruction and operand processing complex that generates resulting data words and associated addresses in response to an instruction, and that generates requests for storage of the resulting data words at locations identified by the addresses, comprising:  
data storage means for storing lines of data at locations identified by addresses, the lines of data each including a plurality of data words;  
error detecting means, connected to receive the requests for storage of resulting data words and coupled to the data

storage means, for detecting errors in a line of data to which the resulting data word is to be stored;  
error correcting means, coupled to the error detecting means and the data storage means, for correcting detected errors in the line of data in the data storage means to which the resulting data word is to be stored;  
port means, connected to receive the resulting data words from the instruction and operand processing complex and



coupled to the data storage means, for staging the resulting data word for transfer to the data storage means; and control means, coupled to the port means and the error detecting means, for controlling transfer of the resulting data word to the data storage means so that the resulting data word is transferred when there are no detected errors, or after detected errors are corrected, in the line of data to which the resulting data word is to be stored.

#### 4,791,643 SINGLE TRACK ORTHOGONAL ERROR CORRECTION SYSTEM

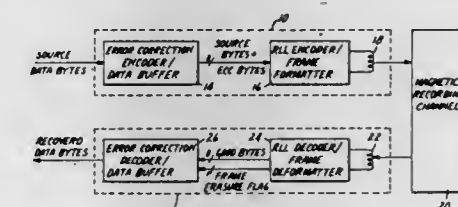
Richard W. Molstad, St. Paul, and Robert J. Youngquist, White Bear Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 29, 1986, Ser. No. 947,409

Int. Cl.<sup>4</sup> G06F 11/10

U.S. Cl. 371—40

21 Claims



1. A system for correcting errors in a serialized stream of digital data, comprising  
means for encoding an input digital signal into a succession of frames containing data words, parity words, cyclical redundancy error check code words corresponding to other words in each frame, and sync words defining the locations of successive frames;  
means for moving said data having a said succession of frames through a data communication system in which errors in said words within said frames may result,  
means for receiving said data having said succession of frames and responsive to a said error check code word for providing an error signal upon determining the presence of an erroneous data or parity word within a given frame, means responsive to a said error signal for operating on other data and parity words for reconstructing a correct



data word corresponding to an erroneous data word and for substituting said reconstructed correct data word in place of said erroneous data word,

wherein said encoding means further comprises

(a) memory means having successive locations for temporarily storing at least a minimum number of data words sequentially occurring in said input digital signal,

(b) means responsive to data words stored at locations selected according to a constant set algorithm for defining at least two sets of data words, each set having only one common data word, the sets thereby being orthogonal to each other and

(c) exclusive-OR logic means responsive to all data words within each of said sets for producing parity words each of which corresponds to one of the sets and which when processed by exclusive-OR logic together with all but one data word of that set can regenerate the remaining data word of that set, and

wherein said means for a reconstructing a correct data word comprises exclusive-OR logic means responsive to the data words and associated parity words of at least one of said orthogonal sets in which said erroneous data word was included.

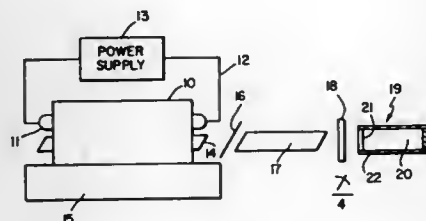
4,791,644

# **LASER SYSTEM INCORPORATING BROAD BAND OPTICAL PHASE CONJUGATION CELL USING STIMULATED BRILLOUIN SCATTERING**

George Dube', Dalton, Pa., assignor to General Electric Company, Binghamton, N.Y.  
 Filed Dec. 31, 1985, Ser. No. 815,325  
 Int. Cl.<sup>4</sup> H01S 3/30

U.S. Cl. 372-3

6 Claims



1. In a laser system with stimulated Brillouin interaction, the combination comprising,

(a) laser means including a lasing medium, a light source for pumping said lasing medium, said lasing medium positioned in a resonant cavity of length L, a retroreflector means included as one of the cavity mirrors, energy extracting means for bringing coherent light out of said cavity in multiple longitudinal modes;

(b) optical phase conjugation retroreflector means to intercept light from the cavity of said laser means including a Stimulated Brillouin Scattering Cell a fluid for producing the Stimulated Brillouin Scattering interaction and for reflecting the impinging light; the pressure of said Brillouin scattering fluid in said cell being such that the Brillouin line width induced in said cell is less than the frequency separation of adjacent longitudinal laser mode spacings from said laser cavity of length L;

(c) said laser output longitudinal mode spacings for a cavity length L being large compared to the Brillouin line widths produced by scattering interactions whereby high scattering reflectivities are achieved even with multiple longitudinal wave laser outputs.

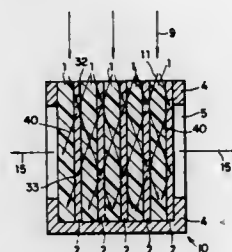
4,791,645

# **LIGHTING DEVICE**

Keiichi F. Komatsubara, Tokorozawa, Japan, assignor to Hitachi, Ltd., Tokyo, Japan  
 Continuation-in-part of Ser. No. 484,849, Apr. 14, 1983, abandoned. This application Apr. 9, 1986, Ser. No. 849,889  
 Claims priority, application Japan, Apr. 19, 1982, 57-63824  
 Int. Cl.<sup>4</sup> H01S 3/30

U.S. Cl. 372-5

13 Claims



1. A lighting device comprising:

first material layers emitting a predetermined electromagnetic wave of spontaneous emission;

second material layers substantially transmitting said electromagnetic wave, each of which is stacked between said first material layers so that interspaces (3) between said first material layers are smaller than  $c \cdot \tau_R$ , where  $c$  is the velocity of said electromagnetic wave and  $\tau_R$  is a time constant of the spontaneous emission; and

means for supplying said first material layers with a predetermined energy so that the spontaneous emission is caused in said first material layers.

4,791,646

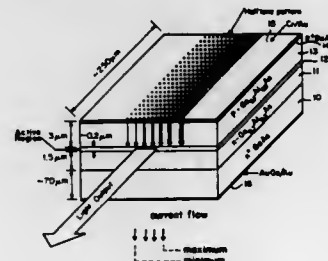
# **METHOD FOR TAILORING THE TWO-DIMENSIONAL SPATIAL GAIN DISTRIBUTION IN OPTOELECTRONIC DEVICES AND ITS APPLICATION TO TAILORED GAIN BROAD AREA SEMICONDUCTOR LASERS CAPABLE OF HIGH POWER OPERATION WITH VERY NARROW SINGLE LOBED FARFIELD PATTERNS**

Christopher P. Lindsey, Pasadena, and Amnon Yariv, San Marino, both of Calif., assignors to California Institute of Technology, Pasadena, Calif.

Continuation of Ser. No. 761,184, Jul. 31, 1985, abandoned. This application Nov. 23, 1987, Ser. No. 129,375  
 Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-44

4 Claims



1. A broad area injection semiconductor laser having a predetermined two-dimensional pattern of injecting and noninjecting contacts over a broad area of said device in which laser the two-dimensional spatial gain profile is tailored over said broad area to conform to a predetermined tailored pattern of varying injection by a predetermined contact pattern of injecting and noninjecting areas over said broad area of said, said

contact pattern being achieved by variation in the fractional surface coverage per unit area of injecting to noninjecting contact, thereby achieving said predetermined pattern of two-dimensional spatial gain profile.

4,791,647

# **SEMICONDUCTOR LASER**

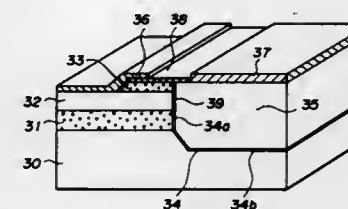
Shigeo Sugou, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jun. 17, 1987, Ser. No. 63,056  
 Claims priority, application Japan, Jun. 17, 1986, 61-141723;  
 Feb. 17, 1987, 62-32410

Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-45

3 Claims



1. In a semiconductor laser, including a semi-insulating substrate, first and second cladding portions, first and second electrodes, and an active region, the improvement wherein:

said first and second cladding portions are formed on said semi-insulating substrate,

said active region is formed between said first and second cladding portions,

said first and second electrodes are respectively provided on said first and second cladding portions,

said active region has a predetermined value of band gap,

said first cladding portion includes a semiconductor layer having a layer value of band gap than said predetermined value and a pair of semi-insulating semiconductor layers respectively formed on top and bottom surfaces of said semiconductor layer and having values of band gaps greater than said larger value, and said active region being disposed in contact with a side surface of said semiconductor layer between said pair of insulating semiconductor layers, and

said second cladding portion is of a reverse conductive type to that of said semiconductor layer and has a value of band gap greater than said predetermined value.

4,791,648

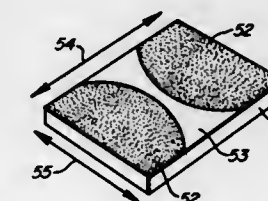
# **LASER HAVING A SUBSTANTIALLY PLANAR WAVEGUIDE**

Bruce A. Vojak, Naperville, Ill., and Sang K. Sheem, Pleasanton, Calif., assignors to Amoco Corporation, Chicago, Ill.

Filed Feb. 4, 1987, Ser. No. 10,643  
 Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-46

20 Claims



1. In a laser comprising an optical cavity which contains an active medium and a substantially planar waveguide to substantially confine the laser light within a plane, wherein said

waveguide is comprised of both high-gain and low-gain regions of the active medium, the improvement which comprises a waveguide which is comprised of varying combinations of said high-gain and low-gain regions along the direction of laser light propagation so that the cumulative gain from one end of the optical cavity to the other varies as a function of position along a line within the plane of said waveguide which is perpendicular to said direction of light propagation, wherein said variation is not periodic in an identically repetitive manner, and wherein said variation is effective to cause some of the lateral modes of the optical cavity to experience a relatively higher gain than the rest of the lateral modes of said optical cavity.

4,791,649

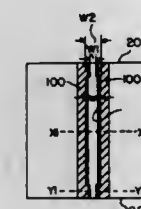
# **SEMICONDUCTOR LASER DEVICE**

Saburo Yamamoto, Taiji Morimoto, Nobuyuki Miyauchi, and Shigeki Mael, all of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 15, 1986, Ser. No. 885,952  
 Claims priority, application Japan, Jul. 17, 1985, 60-158576  
 Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-48

2 Claims



1. In a semiconductor laser device comprising a multi-layered crystal structure containing an active layer for laser oscillation on a V-stripe channeled substrate having a current blocking layer thereon, and regions by means of which carrier within said active layer is prevented from diffusing outside of said active layer disposed facing each other with an optical waveguide therebetween which is formed by the absorption of light by the portions of the current blocking layer which are positioned at both sides of the striped channel, the distance between said regions being narrower than the width of said optical waveguide in the vicinity of both facets and wider than the width of said optical waveguide inside of both facets.

4,791,650

# **PHASED-ARRAY SEMICONDUCTOR LASER APPARATUS**

Kimio Tatsuno, Fuchu, and Yoshito Tsunoda, Mitaka, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 24, 1986, Ser. No. 922,673  
 Claims priority, application Japan, Oct. 25, 1985, 60-237280;  
 Dec. 23, 1985, 60-287729

Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-50

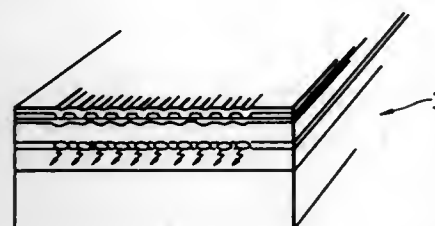
8 Claims

1. A phased-array semiconductor laser apparatus comprising:

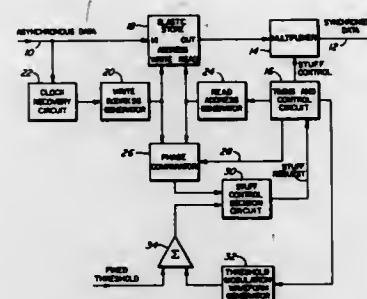
a phased-array semiconductor laser having a plurality of light emitting regions aligned on a single substrate such that the modes of oscillation of each of the plurality of light emitting regions are phase-locked to one another so as to provide an output laser beam which has a far-field pattern of two lobes; and

an optical system for converging the output laser beam from said phased-array semiconductor laser onto a recording medium, said optical system including a half-wave plate disposed in the optical path of a first part of the output

laser beam forming a first one of the two lobes and a polarization beam splitter for combining the first part of the output laser beam from said half-wave plate with a



second part of the laser beam which forms a second one of the two lobes so that a combined laser beam having a far-field pattern of a single lobe is provided for being converged onto the recording medium.



having a period equal to that of the superframe thereby to distribute stuffing among said frames in the superframes.

4,791,651

## SEMICONDUCTOR LASER ARRAY DEVICE

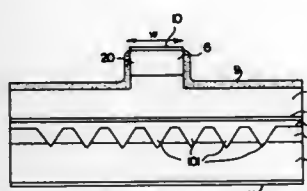
Mototaka Taneya, Nara; Mitsuhiro Matsumoto, and Sadayoshi Matsui, both of Tezumi, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 20, 1987, Ser. No. 52,686

Claims priority, application Japan, May 30, 1986, 61-126725 Int. Cl. H01S 3/19

U.S. Cl. 372-50

3 Claims



1. In a semiconductor laser array device comprising a substrate and an active layer in which a plurality of lasing filaments for laser oscillation is formed by a refractive-index guiding structure, a striped electrode structure constituting a current path is formed on the top of said device, the width of said striped electrode structure being narrower than the overall width of said lasing filaments.

4,791,652

## SYNCHRONIZATION OF ASYNCHRONOUS DATA SIGNALS

James A. McEachern, and Thomas E. Moore, both of Kanata, Canada, assignors to Northern Telecom Limited, Montreal, Canada

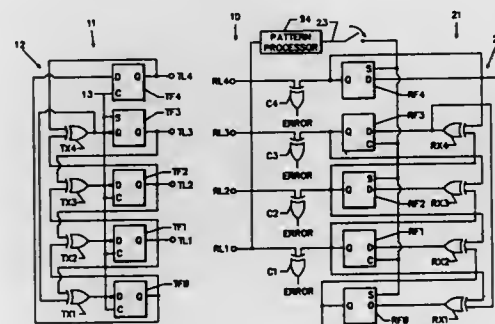
Filed Jun. 4, 1987, Ser. No. 58,010 Int. Cl. H04C 7/04

U.S. Cl. 375-111

15 Claims

1. A method of synchronizing an asynchronous signal to produce a synchronized signal by stuffing the asynchronous signal in dependence upon a stuff request signal produced from a comparison of phases of the asynchronous and synchronized signals, wherein the synchronized signal comprises time division multiplexed frames each including data bits, at least one stuffing opportunity bit, and at least one overhead bit, and a plurality of said frames constitute a superframe in which at least two frames comprise different numbers of data and/or

1. A system comprising:  
receiver means for receiving binary sequences along parallel channels;  
a pseudorandom word generator for generating pseudorandom word sequences, said generator including plural registers, said generator having a characterizing polynomial;  
a pattern processor for providing an injection signal as a function of a pattern received by said receiver means, said pattern processor being coupled to said receiver means; and  
injector means for injecting a bit pattern into said registers in response to said injection signal so that when an incoming pseudorandom word sequence having the same characterizing polynomial as said generator is received by said receiver means, said pseudorandom word generator is synchronized with said incoming pseudorandom word sequence.



4,791,653

## PSEUDORANDOM WORD SEQUENCE SYNCHRONIZER

William J. McFarland, Mountain View, and Richard C. Walker, Palo Alto, both of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 25, 1987, Ser. No. 89,291

Int. Cl. H04L 7/00

U.S. Cl. 375-115

5 Claims

4,791,654

## RESISTING THE EFFECTS OF CHANNEL NOISE IN DIGITAL TRANSMISSION OF INFORMATION

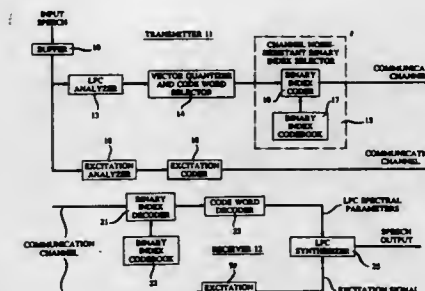
Jose R. B. De Marca, Rio de Janeiro, Brazil, and Nageshally S. Jayant, Gillette, N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jun. 5, 1987, Ser. No. 58,728

Int. Cl. H04B 1/66

U.S. Cl. 375-122

6 Claims



1. A method of the type employing the assigning of binary index codes to codewords representing vector quantized information, for transmission in a communication system characterized in that the assigning includes the steps of picking a first codeword having a high probability of occurrence and low inter-codeword distance during system operation, assigning a first binary index code to the first codeword, finding the nearest neighbor codewords, in terms of some logical proximity of the nearest neighbor codewords to the first codeword, assigning to at least some of the nearest neighbor codewords binary index codes differing from the first binary index code only in any one bit, repeating the foregoing steps as many times as needed for successive residual high probability codewords, while avoiding duplicate assignments until no suitable group of neighboring codewords remain, and assigning residual binary index codes to residual codewords.

4,791,655

## METHOD AND APPARATUS FOR THE INSPECTION OF CONTENTS OF PACKAGED PRODUCTS

Masanori Nagata; Shigeki Imano; Tsugio Kaneoka, and Kiyotoshi Asada, all of Tokyo, Japan, assignors to Fujimori Kogyo Co., Ltd., Tokyo, Japan

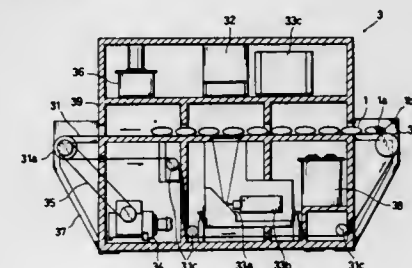
Filed Dec. 24, 1987, Ser. No. 137,687

Claims priority, application Japan, Dec. 29, 1986, 61-310948; Apr. 29, 1987, 62-105749

Int. Cl. G01N 23/06

U.S. Cl. 378-57

6 Claims



3. A packaged product inspection apparatus for assessing the occurrence or non-occurrence of degradation or the degree of degradation of fluid contents (1b) in a packaging container (1a)

) by shaking a package (1) and, then, irradiating it with soft X-rays from outside thereof, which apparatus comprises a shaking unit (2) for shaking the package (1) and a main inspecting unit (3) disposed downstream and independently of said shaking unit (2), said shaking unit (2) comprising a first conveyor belt (21) for conveying said package (1) in a downstream direction, a shaking device (22) for shaking said package (1) in transit and a retaining belt (23) disposed in parallel with said first conveyor belt (21) for supporting the package (1) in transit, and said main inspecting unit (3) comprising a second conveyor belt (31) for receiving the package (1) from said first conveyor (21) of shaking unit (2) and conveying the same in a downstream direction, a soft X-ray irradiation device (32) for irradiating said package (1) on said second conveyor (21) with soft X-rays, and an image display device (33) for displaying an image information from the irradiated package (1), wherein said image display device comprises means for checking the contents (1b) of the package (1) for the occurrence or non-occurrence of degradation or the degree of degradation according to the state of dispersion of the package head space in the image information.

4,791,656

## ONE-BLOCK CALIBRATION METHOD FOR DENSITY GAUGES

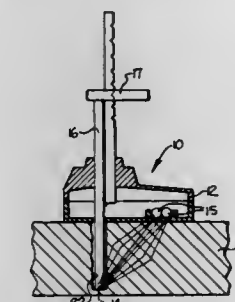
James D. Pratt, Jr., Raleigh, and Ralph L. Ely, Jr., Durham, both of N.C., assignors to Troxler Electronic Laboratories, Inc., Research Triangle Park, N.C.

Filed Apr. 16, 1987, Ser. No. 39,629

Int. Cl. G06F 15/52

U.S. Cl. 378-89

6 Claims



5. A method of calibrating a nuclear density gauge of the type having a gamma source which is positionable at several different source depth positions with respect to a detector to obtain the calibration constants A, B and C of the exponential equation

$$CR = A \exp(-BD) + C$$

where:

CR is the count ratio derived by comparing an accumulated count from a test specimen to a standard count, D is the density of the test specimen, and A, B and C are calibration constants, said method being characterized by reducing the number of experimental count readings required for calibration, and said method comprising the steps of:

- positioning the source at a predetermined source depth position on or in a calibration block of known density and obtaining a count by the detector for a predetermined period of time;
- calculating the count at the corresponding source depth position for at least two other known densities using historically derived relationships between the count obtained from said calibration block of known density to the counts



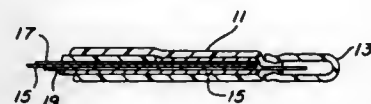
obtained from the calibration blocks of said at least two other known densities; and  
(c) fitting the thus derived counts to said exponential equation to obtain for said source depth position a set of calibration constants A, B and C.

4,791,657  
**INTRAORAL RADIOGRAPHIC FILM PACKET**  
Alan Kirsch, 1080 Squirrel Rd., Jenkintown, Pa. 19046, and Shirley Feinstein, 825 Warfield La., Huntingdon Valley, Pa. 19006

Filed Nov. 6, 1987, Ser. No. 117,808  
Int. Cl.<sup>4</sup> A61B 6/14

U.S. Cl. 378-169

2 Claims



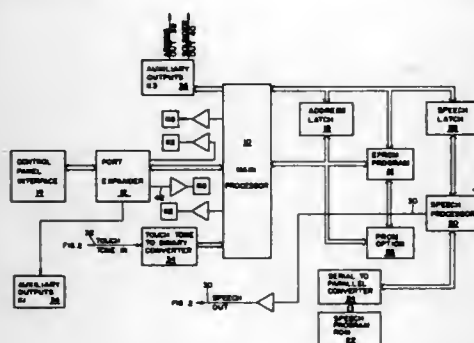
1. An intraoral X-ray film packet for use in dentistry, comprising:
  - a. an outer jacket,
  - b. a substantially rectangular X-ray film chip located within said jacket,
  - c. four corner covers affixed to said jacket enclosing each of the four corners of said film chip, said corner covers including a substantial air space, both latitudinally and longitudinally around the film chip, and
  - d. said film chip being the only element within each corner cover.

4,791,658  
**INTEGRATED ALARM AND TOUCH TONE TELEPHONE SYSTEM**  
Theodore Simon, 35 Melrose Rd., Dix Hills, N.Y. 11746; Lance Weston, Farmingdale, and George P. Berg, Hicksville, both of N.Y., assignors to Theodore Simon, Dix Hills and Barry D. Schweiger, Melville, both of N.Y.

Filed Jul. 9, 1986, Ser. No. 883,709  
Int. Cl.<sup>4</sup> H04M 11/04

U.S. Cl. 379-41

8 Claims



1. An integrated security and Touch Tone telephone system for a premises which allows the security system to be accessed through a Touch Tone telephone comprising:
  - a. an on-premises Touch Tone telephone for the premises for connection by on-premises telephone lines to outside telephone lines during normal usage of the on-premises Touch Tone telephone, with the integrated security and Touch Tone telephone system being coupled by on-premises telephone lines to the on-premises Touch Tone telephone, and to the outside telephone lines;
  - b. a security system for detecting an alarm condition at the premises, such as an unauthorized intrusion or a fire, with

the integrated security and Touch Tone telephone system being coupled to said security system for monitoring the status thereof;

- c. a speech synthesizer for audibly reporting over the on-premises Touch Tone telephone or over the outside telephone lines on the condition of the security system;
- d. a Touch Tone decoder means, coupled by on-premises telephone lines to the on-premises Touch Tone telephone, and to the outside telephone lines, for decoding telephone Touch Tones which are received thereby, to allow a Touch Tone telephone, either the on-premises Touch Tone telephone or other Touch Tone telephones coupled over the outside telephone lines, to be utilized to access and control the security system;
- e. a ring detector means for detecting the presence of a ring signal across the outside telephone lines;
- f. an off-hook detecting means for detecting an off-hook condition of the on-premises telephone which is indicated by a flow of current to the on-premises telephone;
- g. an internal power supply for the on-premises telephone for supplying electrical power thereto independently of the outside telephone lines;
- h. an internal power supply switching means for connecting the on-premises telephone to either the internal power supply or to the outside telephone lines;
- i. a control means for the integrated security and Touch Tone telephone system, said control means controlling said internal power supply switching means to couple the on-premises Touch Tone telephone to the internal power supply during the periods of nonusage of the on-premises Touch Tone telephone, and being responsive to said ring detector means and said off-hook detecting means to control said internal power supply switching means to connect the on-premises Touch Tone telephone to the outside telephone lines in response to said ring detector means detecting the presence of a ring signal across the outside telephone lines, and also in response to said off-hook detecting means detecting an off-hook condition of the on-premises telephone, said control means further including means for detecting inoperative outside telephone lines, said means for detecting inoperative outside telephone lines utilizing said off-hook detecting means for monitoring the connection of the on-premises telephone to the outside telephone lines for continued current flow through the on-premises telephone after connection to the outside telephone lines, indicating operative outside telephone lines, with the lack of continued current flow indicating inoperative outside telephone lines, and the integrated system being responsive to inoperative outside telephone lines to disconnect the on-premises telephone from the outside telephone lines and reconnect it to the internal power supply.

8. A combined security and Touch Tone telephone system for a premises which allows the security system to be accessed through a Touch Tone telephone comprising:

- a. an on-premises Touch Tone telephone for the premises for connection by on-premises telephone lines to outside telephone lines during normal usage of the on-premises Touch Tone telephone, with the integrated security and Touch Tone telephone system being coupled by on-premises telephone lines to the on-premises Touch Tone telephone, and to the outside telephone lines;
- b. a security system for detecting an alarm condition at the premises, such as an unauthorized intrusion or a fire, with the combined security and Touch Tone telephone system being coupled to said security system for monitoring the status thereof;
- c. a telephone answering machine connectable to the outside telephone lines, and a switch means for disconnecting the telephone answering machine from the outside telephone lines;
- d. a Touch Tone decoder means, coupled by on-premises telephone lines to the on-premises Touch Tone telephone,

and to the outside telephone lines, for decoding telephone Touch Tones which are received thereby, to allow a Touch Tone telephone, either the on-premise Touch Tone telephone or other Touch Tone telephones coupled over the outside telephone lines, to be utilized to access and control the security system;

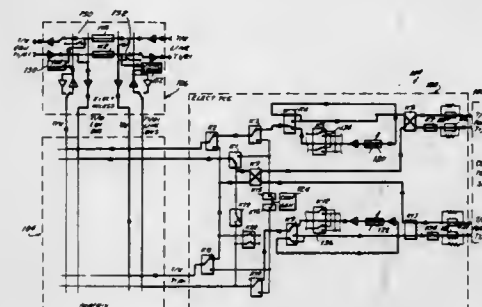
- e. a ring detector means for detecting the presence of a ring signal across the outside telephone lines;
- f. a control means for the combined security and Touch Tone telephone system, said control means being coupled and responsive to said Touch Tone decoder means and also to said ring detector means, and said control means counting the number of ring signals received over the outside telephone lines by which the on-premises telephone is being contacted by an other Touch Tone telephone coupled over the outside telephone lines, and then, after counting a first given number of rings, answering the on-premises telephone by actuating a switching means to allow the user of the other Touch Tone telephone to dial Touch Tone encoded instructions into the integrated system, said telephone answering machine being set to answer the on-premises telephone after a second given number of rings, less that said first given number of rings, and said control means, upon receiving a Touch Tone encoded instruction to disconnect the telephone answering machine, actuating said answering machine switch means to disconnect the telephone answering machine to prevent it from recording signals.

4,791,659  
**REMOTE TEST TELEPHONE LINE ACCESS SYSTEM**  
Alan Ross, Plainview, N.Y., assignor to Domain Systems, Inc., East Farmingdale, N.Y.

Filed Oct. 30, 1986, Ser. No. 925,712  
Int. Cl.<sup>4</sup> H04M 1/24

U.S. Cl. 379-22

16 Claims



1. In a remote test access system for remotely testing an accessed telephone line, said system comprising a telephone test set having an associated test set delay time, and a test set insertion switch means having a test path position and a normal signal path position for switchably inserting said test set into said telephone line in said test path position, said telephone line forming a test path through said test set when said test set is switchably inserted into said telephone line in said test path position and a normal signal path when said test set is switchably disconnected from said telephone line in said normal signal path position, said test set providing an actual test signal over said telephone line through said test path when said test set is switchably inserted therein in said test path position; the improvement comprising means operatively connected to said test set insertion switch means for providing a common fixed reference delay for said telephone line in both said normal signal path position and said test path position, said fixed reference delay providing a fixed delay time for all signals passing over said telephone line, and variable delay means operatively connected to said test set insertion switch means in said test path position for providing a delay for said test signal passing

through said test path, said variable delay means comprising means for varying the delay time associated with a signal passing therethrough for providing a varied delay value capable of providing a matching between said fixed reference delay and the sum of said test set delay associated with the test set inserted in said delay line and said variable delay means varied delay, value, said variable delay means delaying said actual test signal passing through said variable delay means in accordance with said varied delay value of said variable delay means; whereby a test set may be inserted into an accessed telephone line without interrupting the timing on the telephone line for providing errorless testing on said telephone line.

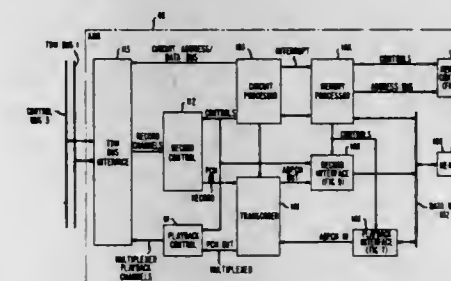
4,791,660  
**VARIABLE DATA COMPRESSION ANNOUNCEMENT CIRCUIT**

Kevin J. Oye, Red Bank, N.J.; Enzo Paterno, Staten Island, N.Y., and Thomas L. Smith, Lincroft, N.J., assignors to American Telephone and Telegraph Company, New York, N.Y. and AT&T Information Systems Inc., Morristown, N.J.

Filed Aug. 27, 1986, Ser. No. 901,003  
Int. Cl.<sup>4</sup> G10L 3/02; H04J 3/02; H04M 3/50

U.S. Cl. 379-88

20 Claims



1. An announcement system for use in conjunction with a communication system, said announcement system comprising a memory, means for storing announcement messages in said memory, each announcement message having a data size and an associated memory storage requirement, said storing means determining said memory storage requirement by using any one of a number of compression factors on each announcement message, and means responsive to a predetermined condition for removing any stored announcement message, revising the determined memory storage requirement of that removed announcement message by using another one of said number of compression factors and storing that removed announcement message having a revised memory storage requirement in said memory.

4,791,661  
**PORTABLE EPROM PROGRAMMING AND DATA TRANSFER APPARATUS**

Stuart G. Donaldson, Kirkland; Hendrik W. Groeneveld, Everett; Christian Klumper, Lynnwood; Robert T. Miller, Seattle; Richard W. Whitbeck, Snohomish, and Robert H. Longnecker, Edmonds, all of Wash., assignors to Global Technology International, Inc., Everett, Wash.

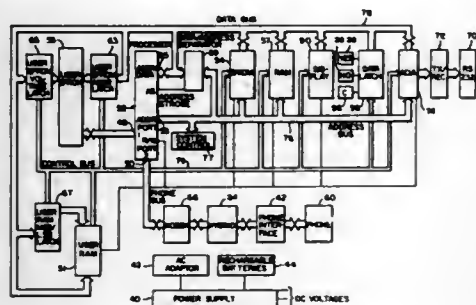
Filed Jul. 1, 1986, Ser. No. 880,791  
Int. Cl.<sup>4</sup> H04M 11/00

U.S. Cl. 379-96

15 Claims

1. A portable apparatus for programming EPROM devices and the like with selected EPROM program information, comprising:
  - means for selectively receiving and releasing an EPROM device to be programmed;
  - means for accepting EPROM program information from,

and for transmitting EPROM program information to, a remote source over telephone lines;  
means for accepting EPROM program information from, and for transmitting EPROM program information to, a local computer means or the like, including another said EPROM programming apparatus, wherein said computer means is separate from said EPROM programming apparatus;  
means for storing EPROM program information;  
means for communicating between said remote source information accepting/transmitting means, said computer



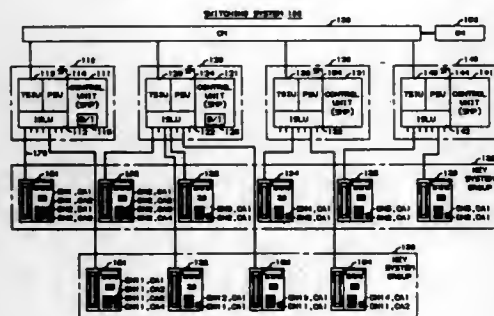
means information accepting/transmitting means, and the EPROM program information storing means;  
means for programming a variety of EPROM devices with selected EPROM program information, wherein said EPROM programming apparatus is characterized by being arranged such that it can be conveniently carried to the site of the EPROM to be programmed; and  
means for verifying the accuracy of EPROM program information already present in the EPROM device to be programmed and for identifying any differences between said EPROM information already present in the EPROM and said selected EPROM program information.

#### 4,791,662 CONTROLLING KEY-SYSTEM GROUPS FROM A DISTRIBUTED CONTROL SWITCHING SYSTEM

David J. Ahnen, Aurora; Charles O. Akaabi, Chicago; Ian D. Bruce, Winfield; Jacqueline C. Kramer, Warrenville; Carolyn D. Larson; Wei-Chen Ni, both of Naperville, and Annetta T. Owens, Aurora, all of Ill., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 23, 1987, Ser. No. 77,531  
Int. Cl.<sup>4</sup> H04Q 5/20; H04M 3/56  
U.S. Cl. 379-158

24 Claims



22. A distributed control switching system connectable to a plurality of terminals,  
said system comprising a plurality of control means each associated with a different subset of said terminals and for

controlling connections to and from its associated subset of said terminals,  
said plurality of terminals including a group of terminals associated with multiple ones of said control means and having a shared directory number,  
a lead one of said multiple control means further comprising means for maintaining busy/idle data for said shared directory number, said lead control means being responsive to calls to and from said shared directory number for reading said data, and  
said multiple control means being responsive to said read data for cooperatively processing said calls and, for the duration of each of said calls, informing said group of terminals of the status of said each call.

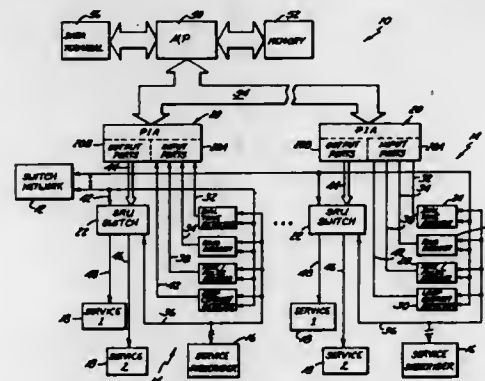
#### 4,791,663 TELEPHONE STATUS RECOGNITION AND BYPASS SYSTEM

David T. Rockne, Shakopee, Minn., and Lowell E. Johnson, Tucson, Ariz., assignors to Telident, Inc., Edina, Minn.  
Continuation of Ser. No. 06/828,774, Feb. 12, 1986, abandoned.  
This application Feb. 22, 1988, Ser. No. 161,254

Int. Cl.<sup>4</sup> H04M 3/42

U.S. Cl. 379-113

15 Claims



1. A telephone status recognition and bypass system for interfacing, at a central office, each of at least one remotely located service subscriber's telecommunication lines to at least a first remotely located peripheral service over a first alternate trunk, and to a switch network at the central office, including: at least one status recognition unit (SRU) including:

signaling monitoring means interfaced to a service subscriber's telecommunication lines at the central office for monitoring signaling of outgoing calls from the service subscriber, and for producing signaling signals representative thereof; and

SRU switch means interfacing the central office switch network, service subscriber's telecommunication lines and first alternate trunk, at the central office, for switchably interconnecting the service subscriber, the switch network, and a first remotely located peripheral service for telecommunications in response to switching control signals; and

control means responsive to the signaling monitoring means for producing switching control signals as a function of the signaling signals, wherein the control means causes the SRU switch means to interconnect the service subscriber to the first remotely located peripheral service over the first alternate trunk, thereby bypassing the central office switch network, when the signaling monitoring means produces signaling signals representative of an outgoing call from the service subscriber to the peripheral service.

#### 4,791,664 SYSTEM FOR SELECTIVELY RECEIVING TELEPHONE CALLS

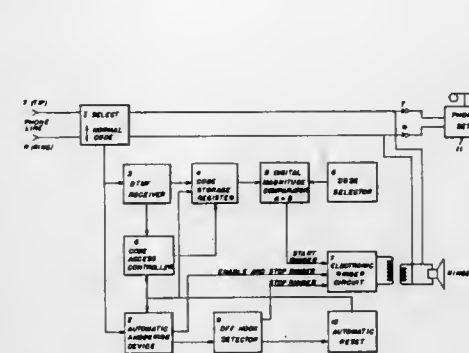
Joseph M. Lutz, 200 St. Andrews Blvd., Apt. 3505, Winter Park, Fla. 32792, and Siegfried G. Hitzler, 206 Skillman Ave., Brooklyn, N.Y. 11211

Filed Sep. 12, 1986, Ser. No. 906,395

Int. Cl.<sup>4</sup> H04M 1/00

U.S. Cl. 379-199

10 Claims



1. A system for selectively receiving incoming telephone calls over a telephone line comprising:

tone decoder means, responsive to an incoming tone pulse present on the telephone line, for outputting a binary coded decimal value corresponding to the frequency of the incoming tone pulse;

code register means, responsive to said decoder means, for sequentially storing a plurality of binary coded decimal values outputted by said decoder means;

code selector means for sequentially storing a plurality of binary coded decimal values input by a subscriber;

comparator means, responsive to said code register means and said code selector means, for comparing the binary coded decimal values stored by said code register means and code selector means and for providing an output signal when said respectively stored values are equal;

ringer means, responsive to said output signal from said comparator means, for alerting a subscriber of the presence of an authorized incoming call;

off-hook detector means, responsive to the presentation of a telephone handset load to said telephone line, for disabling said ringer means upon the connection of said handset load to said line;

call detector means, responsive to the presence of an incoming call, for enabling said tone decoder means and said ringer means by outputting an enable signal; and

mode selector means for connection said call detector means to said telephone line in a privacy mode and connecting said telephone handset of said telephone line in a normal mode, said mode selector means including first and second relay switches operable in said privacy mode for sequentially connecting said tone decoder means to said telephone line in conjunction with a simulated handset load to acknowledge the presence of an incoming call, and connecting said telephone handset to said telephone line to allow a subscriber to answer an authorized call when alerted by said ringer means, said first and second relay switches being activated in response to said enable signal from said call detector means.

#### 4,791,665 INTER-EXCHANGE CARRIER ACCESS SELECTION FEATURE FOR A PBX USER

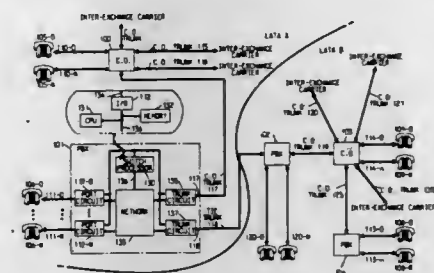
Frank J. Bogart, Boulder, and Nancy K. S. Modisette, Broomfield, both of Colo., assignors to American Telephone and Telegraph Company, AT&T Information Systems, Holmdel, N.J.

Filed Jan. 30, 1987, Ser. No. 9,174

Int. Cl.<sup>4</sup> H04M 3/38, 3/42, 7/14

U.S. Cl. 379-207

12 Claims



1. In a telephone communication system which serves a plurality of stations and which provides access to a plurality of inter-exchange carriers via a telephone central office, a method of providing a calling station with access to one of said inter-exchange carriers, without requiring said calling station to have pre-specified one of said inter-exchange carriers or to have selected one of said inter-exchange carriers at time of inter-exchange call origination, comprising the steps of:

scanning a database in said telephone communication system in response to a calling party at a calling station dialing a called party number on an inter-exchange call origination to select one of said inter-exchange carriers to serve said call origination;

retrieving from said database access code data associated with said one of said inter-exchange carriers and user authorization code associated with said telephone communication system; and

completing a call connection via said telephone central office from said calling party to said selected one of said inter-exchanges carrier using said dialed number and said access code data and said user authorization code.

#### 4,791,666 AUTOMATIC INTERCEPT SYSTEM INTERFACE FOR ELECTROMECHANICAL TELEPHONE CENTRAL OFFICE

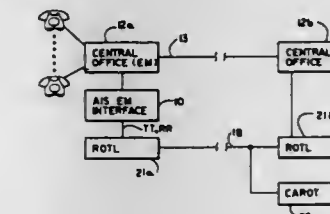
Douglas R. Cobb, Dunwoody; David K. Glisson, Suwannee; Raymond C. Fields, Roswell, and Kenneth L. Cook, Lawrenceville, all of Ga., assignors to The Audichron Company, Atlanta, Ga.

Filed Jun. 19, 1987, Ser. No. 65,018

Int. Cl.<sup>4</sup> H04M 3/52

U.S. Cl. 379-213

36 Claims



1. Apparatus for connecting an electromechanical central office to a remotely located automatic intercept system (AIS) configured for receiving intercepted telephone calls and for providing an intercept message, comprising:



means for receiving a plurality of sleeve leads, said sleeve leads being associated with a plurality of called numbers for which an intercept message is to be delivered when a calling party calls one of said called numbers;

means for continuously scanning said sleeve leads for an incoming call to one of said called numbers and for detecting a seizure condition on a particular one of said sleeve leads receiving said incoming call;

means responsive to a seizure detected by said scanning means for connecting an intercept trunk to said incoming call, said intercept trunk being connected to a facility having an AIS; and

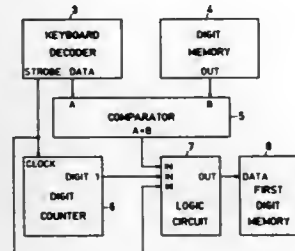
means for transmitting said called number to said AIS to cause said AIS to play back an intercept message corresponding to said called number,

whereby the AIS plays back an intercept message via said intercept trunk to the calling party.

**4,791,667**  
**FIRST DIALED DIGIT DETECTOR AND COMPARATOR**  
Karel Havel, P.O. Box 66, Station M, Toronto, Ontario, Canada  
(M6S 4T2)

Division of Ser. No. 839,526, Mar. 14, 1986, Pat. No. 4,726,059.  
This application Dec. 30, 1987, Ser. No. 139,584  
Int. Cl.<sup>4</sup> H04M 1/26

U.S. Cl. 379-361 2 Claims



1. In a telephone device, the combination comprising:
- a keyboard for successively keying digits of a selective telephone number;
  - a keyboard decoder coupled to said keyboard and having decoder outputs for developing output data unique to the keyed digit and a strobe output for developing a single strobe pulse for each keyed digit that is valid;
  - a memory for storing data representing a reference value, said memory having memory outputs indicative of said reference value;
  - a digit counter coupled to said strobe output for counting said strobe pulses and having a counter output for developing counter signals indicative whether the instant keyed digit is the first keyed digit of the telephone number; and
  - a comparator responsive to said decoder outputs, to said counter output, and to said memory outputs, for comparing, when said counter signals indicate the first keyed digit, said output data with said reference value and for accordingly developing comparison signals indicative whether the first keyed digit of the telephone number is equal to said reference value.

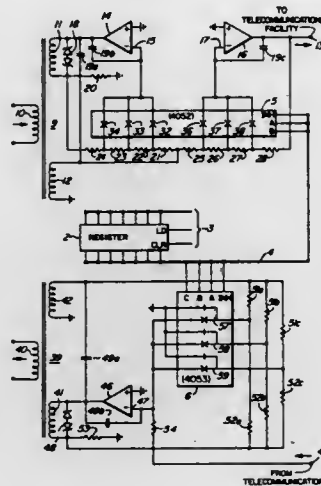
**4,791,668**  
**SELECTABLE IMPEDANCE LINE INTERFACE CIRCUIT**  
Bruce G. Pringle, Nepean, Canada, assignor to Northern Tele-  
com Limited, Montreal, Canada

Filed Sep. 23, 1987, Ser. No. 100,052  
Int. Cl.<sup>4</sup> H04B 3/36

**U.S. Cl. 379—398** **5 Claims**  
**5.** An interface circuit for a.c. coupling a four wire transmission line of any one of n predetermined characteristic imped-

ances with corresponding input and output ports of a telecommunication facility, the interface circuit comprising:

- first, second third amplifiers (46, 14, 16), each having an output and an inverting input;
- a first resistance network (51a, 51b, 51c, 52a, 52b, 52c, 54) including  $2n+1$  resistors, and a second resistance network (20-28) including  $2n+3$  resistors being connected in series between ground and output ports;
- a first transformer (39) including a first winding (40) for connection to a pair of the transmission line wires, a second winding (41) being connected between the output of the first amplifier and ground via a first resistor in the first resistance network, and a third winding (42) being connected between a junction of  $n$  resistors (51a, 51b, 51c) in the first resistor network and ground;
- a first switching device (6) including  $n$  transfer switches (57-59), each including a BREAK portion connected to ground, a MAKE portion connected to the inverting input of the first amplifier, and a MAKE BREAK junction between said portions, each MAKE BREAK junction being connected to corresponding ones of the  $n$  resistors;



n resistors (52a, 52b, 52c) in the first resistor network being connected at a junction of the first resistor and the second winding;

a second transformer (9) including a first winding (10) for connection to another pair of the transmission line wires, a second winding (11) being connected between the output of the second amplifier and ground via a first resistor in the second resistance network, and a third winding (12) being connected to a junction in the second resistance network and ground, said junction being n+1 resistors removed from the first resistor;

a second switching device including first and second groups of n MAKE portions, the first group of n MAKE portions being connected between the inverting input of the second amplifier and respective n junctions of the n+1 resistors, and the second group of n MAKE portions being connected between the inverting input of the third amplifier and respective n junctions of a remaining n+1 resistors of the second resistance network; and

register means being connected to each of the switching devices for controlling states of the respective MAKE and BREAK portions such that any one of n operating interface circuit impedances is selectable.

DECEMBER 13, 1988

ELECTRICAL

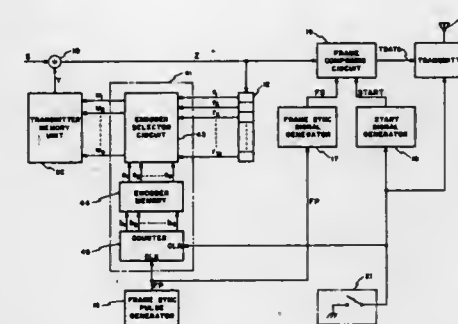
1031

4,791,669  
**ENCRYPTION/DECRYPTION SYSTEM**  
 Kouzou Kage, Tokyo, Japan, assignor to NEC Corporation,  
 Japan

Filed Nov. 24, 1986, Ser. No. 934,408  
Claims priority, application Japan, Nov. 30, 1985, 60-268321;  
Nov. 30, 1985, 60-268322

U.S. Cl. 380-46

U.S. Cl. 380-46 16 Claims



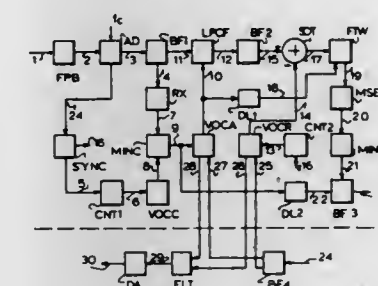
1. An encryption/decryption system for encrypting an input digital signal at a transmitting end of a communications channel and for reproducing the input signal at a receiving end of said channel, said system comprising: at the transmitting end: encrypted signal composing means for combining a randomized coding signal with the input digital signal to form an encrypted signal which is segmented into frames; first register means for storing a predetermined number of bits  $m$  of the encrypted signal output from the composing means and for outputting a plurality of the stored bits in parallel; first memory means for receiving the output from the first register means as an address input and for outputting a corresponding prestored  $n$  bit random number for each of the various input addresses, where  $n$  is an integer which is at least 2; first random number generator means for locally generating a first random number for each frame; and first selecting means for randomly selecting based on said first random number an output from among the  $n$  bit random number data output by the first memory means, to form a frame length of bits of the randomized coding signal; and at the receiving end: second register means for storing  $m$  bits of a received encrypted signal and outputting a plurality of the stored bits in parallel; second memory means for receiving the output from the second register means as an address input and for outputting a corresponding prestored  $n$  bit random number for each of the various input addresses, the stored contents of the first and second memory means being identical; second random number generator means for locally generating a second random number for each frame in sync with a corresponding frame of the encrypted signal; second selecting means, operating the same way as the first selecting means, for selecting based on said second random number an output from among the random number the output by the second memory means, to provide a decoding signal by forming a frame of bits in sync with a corresponding frame of the encrypted signal; and digital signal reproducing means for combining the received encrypted signal with the decoding signal to reproduce the input digital signal.

**4,791,670**  
**METHOD OF AND DEVICE FOR SPEECH SIGNAL**  
**CODING AND DECODING BY VECTOR**  
**QUANTIZATION TECHNIQUES**

**Maurizio Copperi, Venaria, and Daniele Sereno, Vercelli, both of Italy, assignors to Cseit - Centro Studi e Laboratori Telecomunicazioni SpA, Turin, Italy**

Filed Sep. 20, 1985, Ser. No. 779,089  
Claims priority, application Italy, Nov. 13, 1984, 68134 A/84

Claims priority, application Italy, Nov. 13, 1984, 68134 A/84



1. A method of coding and decoding speech signals, comprising the steps of:
- (I) coding speech signals by:
- (a) subdividing each speech signal into a block of samples  $x(j)$ ,
  - (b) subjecting each block of samples  $x(j)$  to linear-prediction inverse filtering with quantized filter coefficient vectors  $a_k(i)$  selected from a codebook of said quantized filter coefficient vectors and with a vector of index  $h_{opt}$  forming an optimum filter which minimizes a spectral-distance function  $d_{sk}$  from among normalized-gain linear-prediction filters, and obtaining a residual signal  $R(j)$  subdivided into residual vectors  $R(k)$ ,
  - (c) comparing each of said residual vectors  $R(k)$  with each vector of a codebook of quantized residual vectors  $R_n(k)$ , thereby obtaining  $N$  difference vectors  $E_n(k)$  where  $(1 \leq n \leq N)$ ;
  - (d) subjecting the  $N$  difference vectors  $E_n(k)$  obtained in step (I) (c) to filtering with a frequency weighting function  $W(z)$  and extracting filtered quantization error vectors  $E_n(k)$  therefrom;
  - (e) automatically computing a mean-square error  $mse_n$  for each of the filtered quantization error vectors extracted in step (I) (d), and
  - (f) forming the coded speech signal from indices  $n_{min}$  of the quantized residual vectors  $R_n(k)$  which have generated a minimum value of the mean-square error  $mse_n$  computed in step (I) (e) and from the index  $h_{opt}$  for each block of samples  $x(j)$ ; and
- (II) decoding coded speech signals by:
- (a) selecting quantized residual vectors  $R_n(k)$  having an index  $n_{min}$  from said codebook of quantized residual vectors  $R_n(k)$ ,
  - (b) subjecting the selected quantized residual vectors of step (II) (a) to a linear-prediction filtering, and
  - (c) supplying as coefficients for the linear-prediction filtering of step (II) (b), vectors  $a_k(i)$  having the index  $h_{opt}$  to thereby obtain quantized digital samples  $x(j)$  of a reconstructed speech signal.

4,791,671

## SYSTEM FOR ANALYZING HUMAN SPEECH

Leonardus F. Willems, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

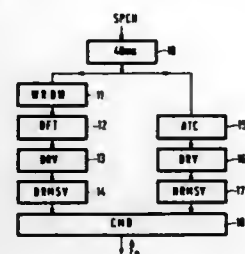
Filed Jan. 15, 1985, Ser. No. 691,594

Claims priority, application Netherlands, Feb. 22, 1984, 8400552

Int. Cl.<sup>4</sup> G10L 5/00

U.S. Cl. 381-49

8 Claims



1. A method of analyzing human speech for determining the pitch of speech segments while using more than one pitch detection algorithm, characterized by comprising the steps of:
  - (a) determining an amplitude spectrum of a speech segment in a first elementary pitch meter, and determining significant peak positions in said spectrum,
  - (b) determining an autocorrelation function and significant peak positions therein in a second elementary pitch meter,
  - (c) utilizing said significant peak positions of the amplitude spectrum and the autocorrelation function, respectively, as input data for selecting a value for the pitch and period, respectively, and determining a sequence of consecutive integral multiples of said value, and the determination of intervals around said value and the multiples thereof, these intervals defining apertures of a mask, said apertures corresponding to harmonic multiplication factors,
  - (d) computing a quality figure for each pitch and period, respectively, in accordance with a criterion indicating the degree to which the significant peak positions and mask apertures match,
  - (e) repeating steps (c) and (d) for consecutive higher values of the pitch and period, respectively, up to a predetermined highest value, to provide a sequence of quality figures associated with these pitch and period values, respectively,
  - (f) selecting a predetermined number of values of said pitch and period, respectively, having the highest quality figures,
  - (g) converting the values for the respective periods into values for pitch, and
  - (h) combining the predetermined numbers of selected values for pitch, and for pitch converted from period, with their associated quality figures to form an estimation of the most likely pitch.

4,791,672

## WEARABLE DIGITAL HEARING AID AND METHOD FOR IMPROVING HEARING ABILITY

James A. Nunley, Phoenix, Ariz.; John W. Steadman, and Perry J. Wechsler, both of Laramie, Wyo., assignors to Audiotone, Inc., Phoenix, Ariz.

Filed Oct. 5, 1984, Ser. No. 658,117

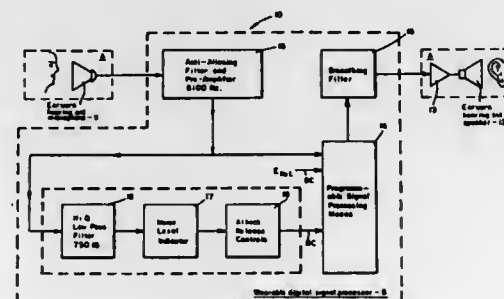
Int. Cl.<sup>4</sup> H04R 25/02, 3/04; G05B 19/00; H04B 15/00

U.S. Cl. 381-68.2

22 Claims

1. A hearing aid adapted to be worn by an individual of impaired hearing ability comprising a hearing aid microphone means for receiving audio signals including speech signals and any noise and for continuously converting the received audio signals to corresponding analog electrical signals; low pass filtering circuit means coupled to receive the analog signals from said microphone means for transmitting only those re-

ceived analog signals falling within a preselected frequency band necessary for good fidelity and intelligibility of the audio signals and rejecting the signals of a frequency higher than the preselected frequency band; circuit means coupled to receive the signals from said low pass filtering circuit means and continuously deriving analog signals representative of the level of any noise present in the received audio signals; a wearable, programmable digital signal processing means having a memory and a plurality of signal input terminals and a signal output terminal, said signal processing means being capable of digitally processing the analog signals coupled thereto in real time and providing processed analog output signals therefrom; means for continuously coupling the signals from said low pass filtering circuit means to a first input terminal for said digital signal processing means; means for continuously coupling the signals from said circuit means providing the signals representative of the level of any noise in the received audio signals to a second input terminal for said digital signal processing means; means for providing an analog signal representative of a reference noise level for the received audio signals and coupling said reference signals to a third input terminal for said digital signal processing means, a signal processing program stored in the processor memory for continuous execution in the digital processor; said program being defined to continuously generate a plurality of adaptive digital filters for processing digital samples of the signals coupled to said first input terminal for said signal processing means to selectively modify the digital



signals including suppressing the noise therein in accordance with changes in the levels of the noise in the samples of the signals coupled to the first input terminal of the signal processor, the program being further defined to continuously compare the signals coupled to the second and third input terminals for said signal processing means and adapting said digital filters for selectively modifying the signals including suppressing the noise therein coupled to said first input terminal based on the comparisons of the noise signals, the program providing continuous analog-to-digital signal conversion of the signals coupled to said first input terminal at a preselected sampling rate to permit each digital sample to be digitally filtered by said signal processor, the timing execution of the digital samples being defined to be sufficiently rapid to completely process each digital sample before the subsequent digital sample occurs, the signal processing means stored program including program steps to convert each of the filtered digital samples to corresponding analog signals appearing at said output terminal for the signal processing means; circuit means coupled to said signal processing means to smooth out said received analog signals for accurately reproducing the electrical signals representative of the intelligible speech signals, and hearing aid speaker means coupled to said circuit means for smoothing out the electrical signals for continuously converting the coupled signals to the corresponding signals having the improved characteristics in accordance with the execution of the stored program.

4,791,673

## BONE CONDUCTION AUDIO LISTENING DEVICE AND METHOD

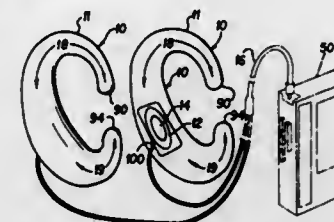
Simeon B. Schreiber, 1214 N. Belgrad Rd., Silver Spring, Md. 20902

Filed Dec. 4, 1986, Ser. No. 937,728

Int. Cl.<sup>4</sup> H04R 1/02, 23/00

U.S. Cl. 381-151

21 Claims



1. A listening device adapted to be removably mounted to a listener's ear so as not to exclude ambient sounds received through an ear canal of the listener's ear, which comprises:
  - (a) a housing shaped substantially in the form of a C comprising:
    - (i) a first portion with a first end integral to said housing adapted to establish a first attachment area to said listener's ear; and
    - (ii) a second portion with a second end integral to said housing adapted to establish a second attachment area to said listener's ear; and
  - (b) speaker means mounted in said housing, which comprises:
    - (i) a speaker assembly having bone conduction means for emitting audible sounds, said speaker assembly disposed so as to be substantially over a mastoid bone of said listener when said housing is mounted to said listener's ear according to said first and second attachment areas; and
    - (ii) suction cup means attached to said speaker assembly for establishing a third attachment area to the head of said listener by a suction action and for transmitting said audible sounds from said bone conduction means through said suction cup means to said mastoid bone of said listener, whereby said listening device transmits said available sounds by bone conducting so as not to exclude ambient sounds received through said ear canal of said listener's ear.

4,791,674

## MICROPHONE SUSPENSION ASSEMBLY

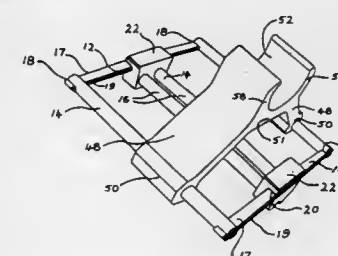
Leslie C. Drever, 8525 Tobias Ave., Apt. 1, Panorama City, Calif. 91402

Filed Oct. 14, 1987, Ser. No. 108,776

Int. Cl.<sup>4</sup> H04R 1/02

U.S. Cl. 381-169

12 Claims



1. An improved shock-resistant microphone suspension assembly, said assembly comprising, in combination:
  - (a) a generally horizontal flat frame comprising a plurality of

spaced longitudinally extending rods, and a plurality of spaced transversely extending flexible resilient bands interconnecting said rods;

- (b) a rod connector releasably connected to at least one of said rods for connection of said frame to a rigid microphone base support;
- (c) a bridge above said rods and having a pair of depending legs connected adjacent their lower ends to said rods, said bridge having a microphone connector for releasably holding a microphone above the remainder of said bridge and above said frame for mechanical shock isolation by said frame.

4,791,675

## VSP CONNECTIVITY PATTERN RECOGNITION SYSTEM

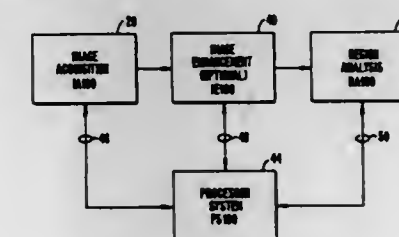
Michael F. Deering, and Neil Hunt, both of Mountain View, Calif., assignors to Schlumberger Systems and Services, Inc., Palo Alto, Calif.

Filed Dec. 31, 1985, Ser. No. 815,476

Int. Cl.<sup>4</sup> G06K 9/00

U.S. Cl. 382-18

15 Claims



1. An image processing system for processing frames of binary pixels, with each frame having N lines,  $1 \leq n \leq N$ , and each line having R pixel positions,  $1 \leq r \leq R$ , the pixels being processed at a pixel scan rate, RP, the frames being processed at a frame rate, RF, a frame of pixels processed during a frame cycle, and a line of pixels processed during a line cycle, each frame including object regions of pixels having a first binary value and a background region of pixels having a second binary value, said system comprising:
  - line delay (LD) means having an LD input port and a set of J LD output ports, where J is a first predetermined integer, for receiving the pixels in a frame and for transferring J pixels, each at the same pixel location in J adjacent lines of said frame, to said J LD output ports;
  - bit packing means, having J BP input ports, each coupled to a respective one of said J LD output ports, and a set of J×KBP output ports, including at least a first and a second BP output port, where K is a second predetermined integer, for transferring pixels from a J×K rectangular region of said frame, including J adjacent lines and K adjacent pixel positions in each line, to said J×K BP output ports;
  - a look up table (LUT), having J×K LUT input ports, each coupled to a respective one of said J×K BP output ports, for generating a LUT output signal encoding a selected functional value of the pixel values received at said LUT input ports and for transferring said functional values to said LUT output ports at the pixel scan rate, RP;
  - region labelling (RL) means, having an RL input coupled to a second BP output port and having an RL output port, said RL means for labelling each connected object region of said frame with a numeric label and for transferring the numeric label of each pixel received to said RL output port; and
  - first multi-statistics gathering (MSG) means, having an increment input port, adapted to receive said LUT output signal, and an index input port coupled to said RL output port and having a plurality of accumulator bins selected





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## DESIGNS

DECEMBER 13, 1988

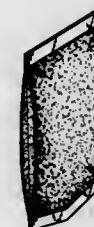
298,880

### INFUSION BAG

William B. Graves, Tarrytown; Raymond J. Laudano, Valley Stream, both of N.Y., and William H. Craig, Ridgefield, Conn., assignors to General Foods Corporation, White Plains, N.Y.

Filed Oct. 2, 1986, Ser. No. 914,756  
Term of patent 14 years

U.S. Cl. D1—102



298,882

### SHOE UPPER

Lawrence Selbiger, Portland, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.

Filed Feb. 16, 1988, Ser. No. 155,762  
Term of patent 14 years

U.S. Cl. D2—314



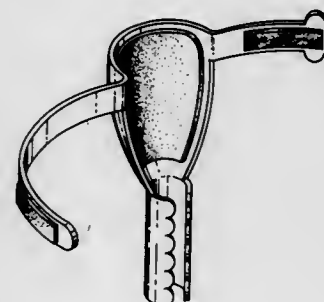
298,881

### HEEL SHIELD

Alice Horton, 8522 S. Throop St., Chicago, Ill. 60620  
Filed Jun. 25, 1986, Ser. No. 878,497

Term of patent 14 years

U.S. Cl. D2—277



298,883

### ANNULAR SHOE CLEATING FOR ARTIFICIAL TURF

Michael L. Tanel, 119 N. 92nd St., Milwaukee, Wis. 53226  
Continuation-in-part of Ser. No. 565,746, Dec. 27, 1983, Pat. No. 4,577,422. This application Dec. 26, 1985, Ser. No. 813,384

Term of patent 14 years

U.S. Cl. D2—320





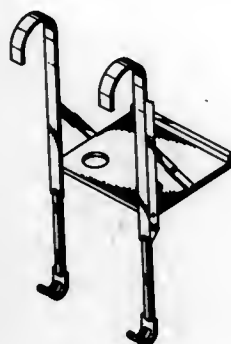
298,884

## PORTABLE AUTO TABLE

Freddie J. Rychlock, 5747 S. Mozart St., Chicago, Ill. 60649  
Filed Nov. 27, 1985, Ser. No. 806,929

Term of patent 14 years

U.S. Cl. D3—40



298,886

## FOLDING GARMENT HANGER

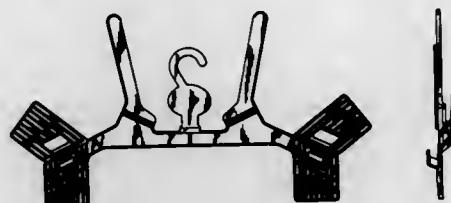
Peter Shalson, London, England, assignor to Braitrim (London) Limited, London, England

Filed Oct. 9, 1986, Ser. No. 917,192

Claims priority, application United Kingdom, Apr. 10, 1986, 1033354

Term of patent 14 years

U.S. Cl. D6—326



298,887

## KITCHEN CABINET FRAME

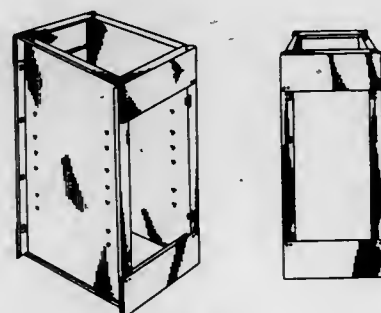
Francisco D. Irace, Rosario, Argentina, assignor to Fabrica Sideral Sociedad De Responsabilidad Limitada, Argentina

Filed Feb. 12, 1986, Ser. No. 833,491

Claims priority, application Argentina, Aug. 20, 1985, 48,367

Term of patent 14 years

U.S. Cl. D6—329



298,885

## GARMENT BAG

Marvin Cooper, New Rochelle, N.Y., assignor to Dynamic Classics, Ltd., New York, N.Y.

Filed Dec. 13, 1985, Ser. No. 808,519

Term of patent 14 years

U.S. Cl. D3—71



298,888

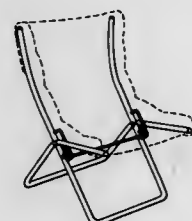
## FOLDING CHAIR

Marks M. Conn, Moorpark, Calif., assignor to Mallin Company, Los Angeles, Calif.

Filed Nov. 14, 1985, Ser. No. 805,141

Term of patent 14 years

U.S. Cl. D6—368



298,889

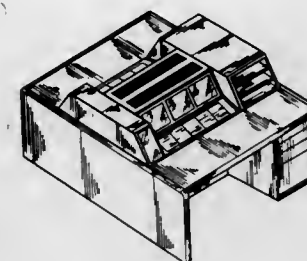
## DESK UNIT

Paul M. LaCour, Ridgewood, N.J., assignor to LaCour Incorporated, Ridgewood, N.J.

Filed Nov. 1, 1985, Ser. No. 794,299

Term of patent 14 years

U.S. Cl. D6—423



298,891

## DISPLAY CABINET

William C. Jackle; Tadeusz Czerkies, both of Chicago, Ill., and Stephen L. Holt, Phoenix, Ariz., assignors to The Niven Marketing Group, Scottsdale, Ariz.

Filed Nov. 15, 1985, Ser. No. 805,078

Term of patent 14 years

U.S. Cl. D6—450



298,890

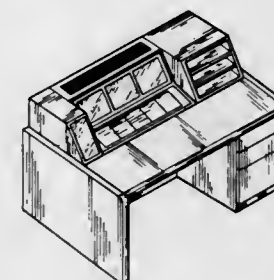
## DESK

Paul M. LaCour, Ridgewood, N.J., assignor to LaCour Incorporated, Ridgewood, N.J.

Filed Nov. 1, 1985, Ser. No. 794,102

Term of patent 14 years

U.S. Cl. D6—426



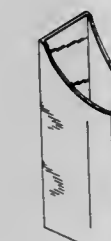
298,892

HOLDER FOR READING MATERIAL OR THE LIKE  
Victor M. Chinchar, Two King James South, 24650 Center Ridge Rd., Westlake, Ohio 44145

Division of Ser. No. 582,270, Feb. 22, 1984, Pat. No. Des. 284,053. This application Feb. 19, 1986, Ser. No. 834,434

Term of patent 14 years

U.S. Cl. D6—475



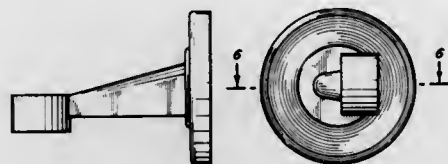
298,893  
VIDEOENDOSCOPIC SUPPORT STAND  
C. Bruce Schwartz, 6594 Mill Creek Rd., The Dalles, Ore.  
97058

Filed Jun. 9, 1986, Ser. No. 872,428  
Term of patent 14 years  
U.S. Cl. D6-479

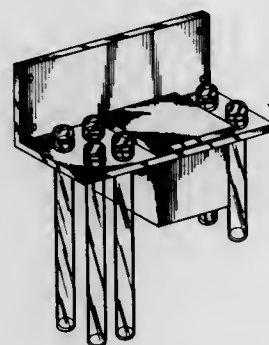


298,895  
COMBINED BATHWARE SUPPORT BRACKET AND  
ESCUTCHEON THEREFOR  
Norton Sharpe, Los Angeles, Calif., assignor to Franklin Brass  
Manufacturing Co., Los Angeles, Calif.

Filed Sep. 10, 1986, Ser. No. 905,566  
Term of patent 14 years  
U.S. Cl. D6-524

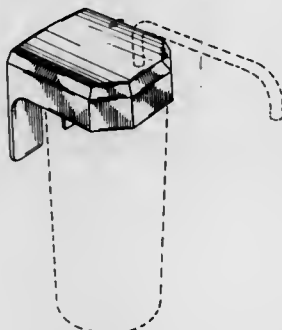


298,896  
HOLDER FOR TOILETRY ARTICLES  
Kenneth Britton, 43 Bluepoint Rd., Highland, N.Y. 12578  
Filed Oct. 28, 1986, Ser. No. 924,589  
Term of patent 14 years  
U.S. Cl. D6-527

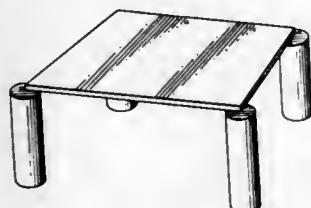


298,897  
BRACKET FOR A LIQUID DISPENSER  
Rodolph C. Blaich, Ashland; James W. Poltras, Holliston, and  
Edwin W. Wlodyka, Ashland, all of Mass., assignors to High-  
land Laboratories, Ashland, Mass.

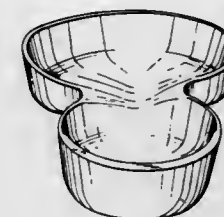
Filed Apr. 1, 1985, Ser. No. 718,651  
Term of patent 14 years  
U.S. Cl. D6-545



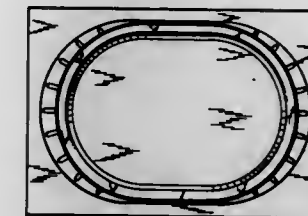
298,894  
TABLE  
Moses R. Schultz, R.D. Box 52, Barto, Pa. 19504  
Division of Ser. No. 510,872, Jul. 5, 1983. This application Feb.  
26, 1986, Ser. No. 836,174  
Term of patent 14 years  
U.S. Cl. D6-484



298,898  
MULTI-LAYERED CEREAL BOWL  
David L. Roshau, 2613 Forrester Way, Eugene, Ore. 97401  
Filed Mar. 10, 1986, Ser. No. 842,394  
Term of patent 14 years  
U.S. Cl. D7-1



298,900  
COMBINED TRAY AND CRADLE  
Jeffrey A. Blum, Somerset, and Jatinder P. Sabhlok, Cranbury,  
both of N.J., assignors to General Foods Corporation, White  
Plains, N.Y.  
Filed Jul. 2, 1986, Ser. No. 881,765  
Term of patent 14 years  
U.S. Cl. D7-3

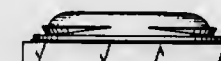
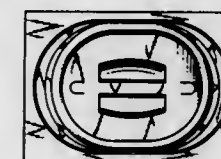


298,901  
MUG  
Thomas P. Shadyac, Los Angeles, Calif., assignor to Punch  
Enterprises, Inc., Falls Church, Va.  
Filed Mar. 24, 1986, Ser. No. 845,794  
Term of patent 14 years  
U.S. Cl. D7-9

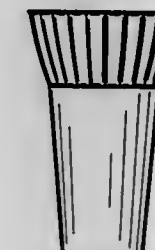


298,899  
COMBINED COVERED TRAY AND CRADLE  
Jeffrey A. Blum, Somerset, and Jatinder P. Sabhlok, Cranbury,  
both of N.J., assignors to General Foods Corporation, White  
Plains, N.Y.

Filed Jul. 2, 1986, Ser. No. 881,764  
Term of patent 14 years  
U.S. Cl. D7-3



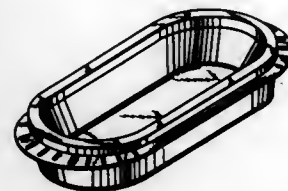
298,902  
DESSERT CUP OR SIMILAR ARTICLE  
James F. Pomroy, St. Paul, Minn., assignor to Plastics, Inc., St.  
Paul, Minn.  
Division of Ser. No. 662,993, Oct. 19, 1984, Pat. No. Des.  
293,992, which is a continuation-in-part of Ser. No. 568,494, Jan.  
5, 1984. This application Aug. 13, 1987, Ser. No. 85,009  
Term of patent 14 years  
U.S. Cl. D7-14





**298,903**  
**MEAL PLATE**  
 Roy Watson, Mt. Kisco, N.Y., and Ernest F. Thomson, Fairfield, Conn., assignors to General Foods Corporation, White Plains, N.Y.

Filed Feb. 19, 1986, Ser. No. 834,466  
 Term of patent 14 years  
 U.S. Cl. D7—21



**298,906**  
**SNOW SHOVEL HEAD**  
 David R. Bonnes, Westerville, Ohio, assignor to The Union Fork & Hoe Company, Columbus, Ohio

Filed Mar. 6, 1987, Ser. No. 22,414  
 Term of patent 14 years  
 U.S. Cl. D8—10



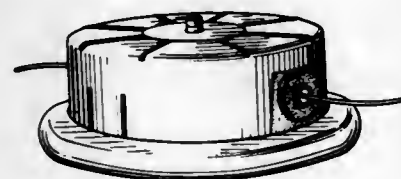
**298,904**  
**PLANT PROTECTED COVER**  
 Frank Mourich, and Linda J. Mourich, both of 402 S. Platt Ave., Red Lodge, Mont. 59068

Filed Jun. 25, 1986, Ser. No. 878,566  
 Term of patent 14 years  
 U.S. Cl. D8—1



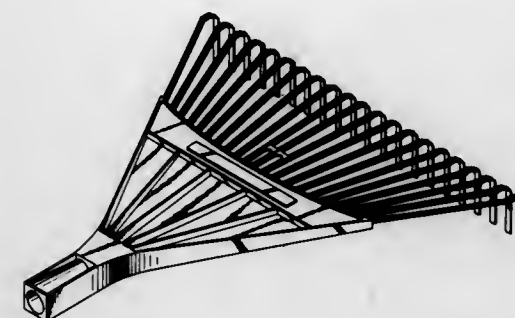
**298,905**  
**ROTARY CUTTING HEAD FOR A LAWN TRIMMER**  
 Thomas G. Petherick, Ganse Voort, N.Y., and Vittorio D'Alessio, Barasso, Italy, assignors to Kadco, Inc., Saratoga, N.Y.

Filed May 23, 1986, Ser. No. 867,275  
 Term of patent 14 years  
 U.S. Cl. D8—8



**298,907**  
**RAKE HEAD**  
 David R. Bonnes, Westerville, Ohio, assignor to The Union Fork & Hoe Company, Columbus, Ohio

Filed Oct. 5, 1987, Ser. No. 104,670  
 Term of patent 14 years  
 U.S. Cl. D8—13



**298,910**  
**BICYCLE FREEWHEEL CORE HOLDER**  
 Angel Rodriguez, Seattle, Wash., assignor to A C International, Santa Fe Springs, Calif.

Filed Mar. 25, 1985, Ser. No. 715,553  
 Term of patent 14 years  
 U.S. Cl. D8—71



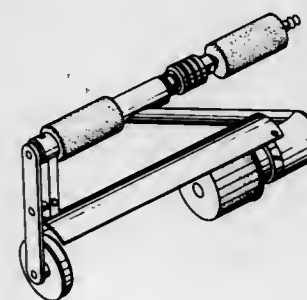
**298,908**  
**POWER TOOL WITH TORQUE INDICATING RING**  
 Donald W. Clemens, Painesville, Ohio, assignor to The Rotor Tool Company, Cleveland, Ohio

Filed Nov. 18, 1985, Ser. No. 805,753  
 Term of patent 14 years  
 U.S. Cl. D8—61



**298,909**  
**AIR ROLLER SANDER**  
 William J. Hartle, 460 Nantucket Dr., Apt. U, Vermillion, Ohio 44089

Filed May 28, 1985, Ser. No. 737,881  
 Term of patent 14 years  
 U.S. Cl. D8—62



**298,911**  
**PROPELLER LOCK**  
 Robert D. Burke, Sr., 22001 Ole Barn Rd., Edmond, Okla. 73034

Filed Apr. 29, 1986, Ser. No. 858,277  
 Term of patent 14 years  
 U.S. Cl. D8—330



298,912

**FINIAL HOLDER FOR CLEANING PAINT ROLLER**  
Theodore F. Pantillo, Sacramento, Calif., assignor to Theodore Eugene Davis and Edward Anthony Pantillo, Sacramento, both of, Calif.

Filed Jun. 16, 1988, Ser. No. 207,598

Term of patent 14 years

U.S. Cl. D8—349



298,914

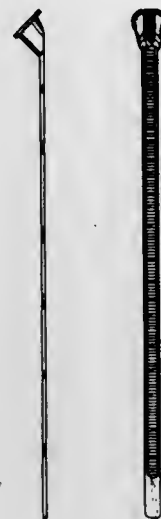
**COMBINED SUPPORT STRAP AND ANCHORING CLAMP**

Charles Thomas Bonifay, Fla., assignor to Albert H. Navaroli, Oak Park, Mich.

Filed May 12, 1986, Ser. No. 863,382

Term of patent 14 years

U.S. Cl. D8—373



298,913

**GASOLINE PUMP NOZZLE LEVER BRACE**  
Bill Rohrs, 14 Geary St., Fairfax, Calif. 94930

Filed Sep. 23, 1987, Ser. No. 100,004

Term of patent 14 years

U.S. Cl. D8—354



298,915

**VERTICALLY ADJUSTABLE VALVE AND PIPE SUPPORT**

Var C. Rowley, 2056 N. Lindsay Rd., and Roger M. Rowley, 3152 E. Ellis St., both of Mesa, Ariz. 85023

Filed Jun. 25, 1987, Ser. No. 66,404

Term of patent 14 years

U.S. Cl. D8—373

298,916  
STAPLE

Marguerite R. Beatty, 5582 Club View Dr., Yorba Linda, Calif. 92686

Filed Feb. 20, 1986, Ser. No. 834,445

Term of patent 14 years

U.S. Cl. D8—390



298,919

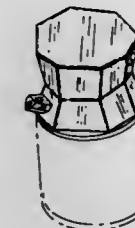
**DISPENSER CAP**

Herman Gee, 774 Potrero, San Francisco, Calif. 94110

Filed Oct. 4, 1985, Ser. No. 784,448

Term of patent 14 years

U.S. Cl. D9—447

298,917  
BOTTLE

Roy N. Krohn, York, Pa., assignor to Sonoco Products Company, Hartsville, S.C.

Filed Oct. 29, 1985, Ser. No. 792,698

Term of patent 14 years

U.S. Cl. D9—399



298,920

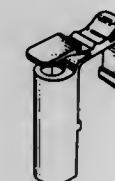
**AEROSOL DISPENSER UNIT FOR ATTACHMENT TO A TOILET SEAT**

Stephen A. Bloom, Miami Beach, Fla., and Marty C. Trent, San Pedro, Calif., assignors to Sitting Pretty, Inc., Miami Beach, Fla.

Filed Nov. 20, 1985, Ser. No. 805,941

Term of patent 14 years

U.S. Cl. D9—448



298,921

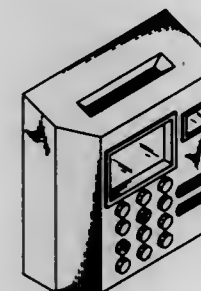
**FULLY AUTOMATIC SYSTEMATIC TIMEKEEPING CLOCK**

Gerald L. Berry, Sr., 3134 Radford Rd., Memphis, Tenn. 38111; Arthur C. Evans, and Wendell L. Berry, both of 1774 First Green St., Memphis, Tenn. 38116

Filed Sep. 11, 1986, Ser. No. 906,187

Term of patent 14 years

U.S. Cl. D10—41

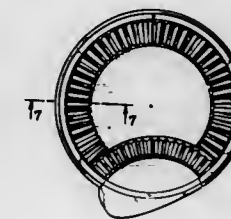
298,918  
CONTAINER LID

John H. Kurz, Scottsdale, Ariz., assignor to Canada Cup, Inc., Toronto, Canada

Filed Sep. 25, 1985, Ser. No. 779,925

Term of patent 14 years

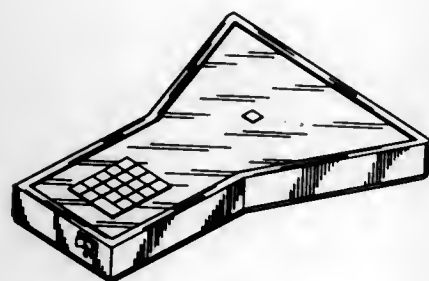
U.S. Cl. D9—435





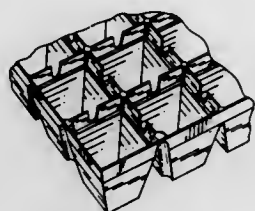
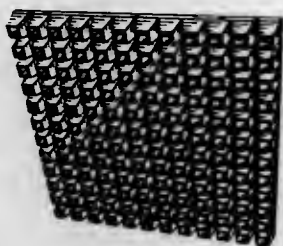
298,922

**SCOREBOARD FOR THE GAME OF DARTS**  
Joseph D. Hinkle, 18906 Conard Ave., Elsinore, Calif. 92530,  
assignor to Joseph D. Hinkle; Joseph J. Lombardi and Ralph  
E. Benham, all of Elsinore, Calif.  
Filed Sep. 9, 1985, Ser. No. 773,872  
Term of patent 14 years  
U.S. Cl. D10—46.1



298,924

**REUSABLE TRAY FOR THE GROWING OF SEEDLINGS**  
Kari Saarinen, Iso-Vimma, Finland, assignor to Lännea Tehtaat  
Oy, Iso-Vimma, Finland  
Filed May 8, 1986, Ser. No. 862,445  
Claims priority, application Italy, Nov. 11, 1985, 875/85  
Term of patent 14 years  
U.S. Cl. D11—155



298,925

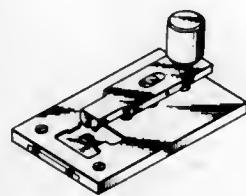
**BABY STROLLER**

Shiroku Nakao, Kanagawa; Yoshiyuki Suzuki, and Hitoshi  
Kato, both of Tokyo, all of Japan, assignors to Combl Co.,  
Ltd., Tokyo, Japan  
Filed Dec. 9, 1986, Ser. No. 939,936  
Claims priority, application Japan, Aug. 18, 1986, 61-32034  
Term of patent 14 years  
U.S. Cl. D12—129



298,923

**HOLDER FOR TESTING AN INTEGRATED CIRCUIT  
CHIP**  
Yoshinobu Sakihara, Los Angeles, Calif., assignor to Vanguard  
Electronics Company, Inc., Gardena, Calif.  
Filed Feb. 4, 1986, Ser. No. 825,804  
Term of patent 14 years  
U.S. Cl. D10—80



298,926

**WIPER BLADE AND FRAME THEREFOR**

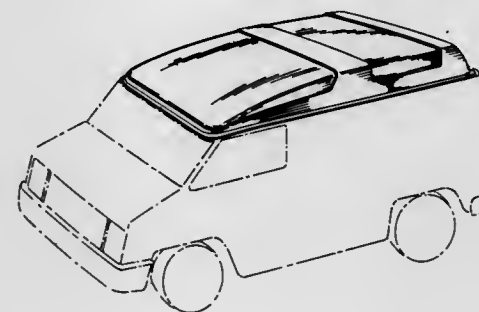
Mark A. Rusanak, 3869 Buchanan Dr., Virginia Beach, Va. 23456  
Filed Jan. 21, 1986, Ser. No. 820,359  
Term of patent 14 years  
U.S. Cl. D12—155



298,927

**VAN TOP**

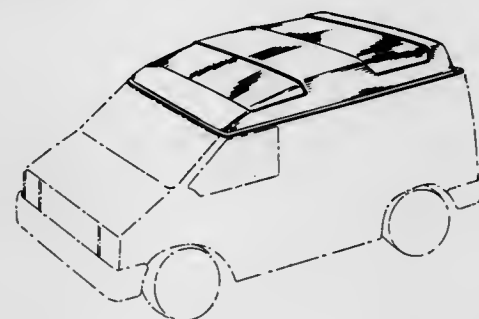
William P. Johnson, Syracuse, and Charles B. Bonifield, War-  
saw, both of Ind., assignors to Coachmen Industries, Inc.,  
Middlebury, Ind.  
Filed Feb. 7, 1986, Ser. No. 827,903  
Term of patent 14 years  
U.S. Cl. D12—156



298,928

**VAN TOP**

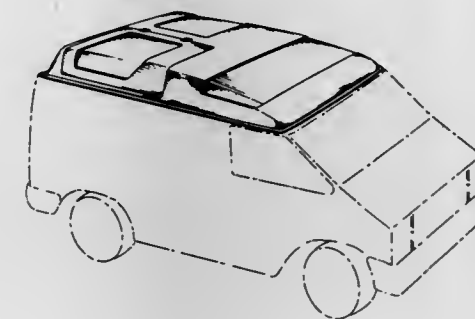
William P. Johnson, Syracuse, and Charles B. Bonifield, War-  
saw, both of Ind., assignors to Coachmen Industries, Inc.,  
Middlebury, Ind.  
Filed Feb. 7, 1986, Ser. No. 827,906  
Term of patent 14 years  
U.S. Cl. D12—156



298,929

**VAN TOP**

William P. Johnson, Syracuse, and Charles B. Bonifield, War-  
saw, both of Ind., assignors to Coachmen Industries, Inc.,  
Middlebury, Ind.  
Filed May 5, 1986, Ser. No. 859,748  
Term of patent 14 years  
U.S. Cl. D12—156



298,930

**TRICYCLE HANDLE BAR**

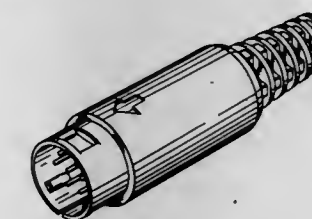
Gordon Most, P.O. Box 49, Seneca, Nebr. 69161  
Filed Oct. 7, 1986, Ser. No. 916,417  
Term of patent 14 years  
U.S. Cl. D12—178



298,931

**ELECTRICAL PLUG**

Shigemi Sekiguchi, Gunma, Japan, assignor to Hosiden Elec-  
tronics Co., Ltd., Osaka, Japan  
Filed Oct. 21, 1985, Ser. No. 789,550  
Claims priority, application Japan, May 31, 1985, 60-22879  
Term of patent 14 years  
U.S. Cl. D13—28



298,932

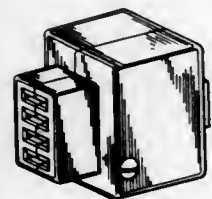
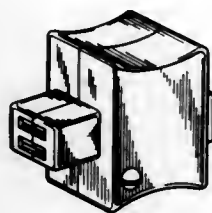
**MODULAR TEST PLUG ADAPTER**

Robert H. Kaickerbocker, Cheshire, and Thomas Stephen M., Torrington, both of Conn., assignors to The Siemon Company, Watertown, Conn.

Continuation-in-part of Ser. No. 634,702, Jul. 26, 1984, Pat. No. D. 290,249. This application Nov. 27, 1985, Ser. No. 806,835. The portion of the term of this patent subsequent to Jun. 9, 2001, has been disclaimed.

Term of patent 14 years

U.S. Cl. D13—28



298,934

**DESK TELEPHONE SET**

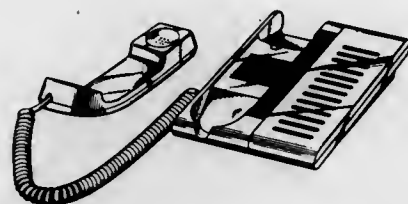
Fumiharu Ohta; Masao Tamura, and Satoshi Watanabe, all of Kanagawa, Japan, assignors to Matsushita Electric Industrial Co., Osaka, Japan

Filed Oct. 15, 1987, Ser. No. 108,872

Claims priority, application Japan, Jun. 23, 1987, 61-25543

Term of patent 14 years

U.S. Cl. D14—53



298,935

**TELEPHONE SET**

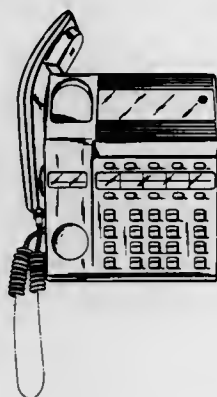
Karl Büchin, Berlin, Fed. Rep. of Germany, assignor to KRONE Aktiengesellschaft, Berlin, Fed. Rep. of Germany

Filed Apr. 7, 1987, Ser. No. 35,302

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1986, 95MR5667NZ

Term of patent 14 years

U.S. Cl. D14—56



298,933

**COMBINED RADIO AND CASSETTE RECORDER**

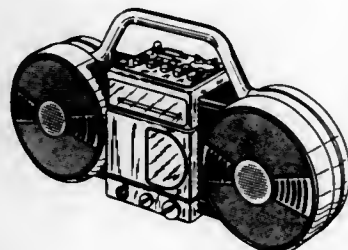
Murray I. C. Camens, 's-Hertogenbosch, and Graham J. Hinde, Nuenen, both of Netherlands, assignors to U.S. Philips Corp., New York, N.Y.

Filed Feb. 4, 1986, Ser. No. 825,850

Claims priority, application Benelux, Aug. 16, 1985, 60293-00

Term of patent 14 years

U.S. Cl. D14—5



298,936

**TELEPHONE SET WITH DISPLAY PANEL AND SPEAKERPHONE**

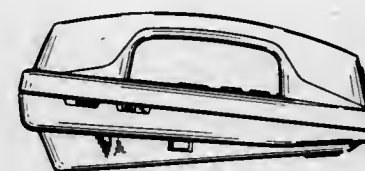
Fumiharu Ohta; Kazumasa Takenaka, and Satoshi Watanabe, all of Kanagawa, Japan, assignors to Matsushita Electric Industrial Co., Osaka, Japan

Filed Jun. 22, 1987, Ser. No. 64,498

Claims priority, application Japan, Mar. 27, 1987, 62-11792

Term of patent 14 years

U.S. Cl. D14—57



298,937

**TELEPHONE SET**

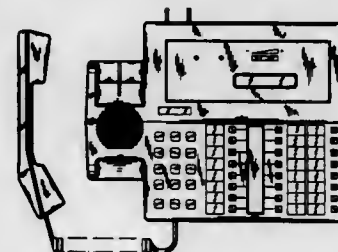
Edward O. Dunstall, London, and Maurice A. B. Newbould, Durham, both of England, assignors to The General Electric Company, p.l.c., England

Filed Oct. 17, 1986, Ser. No. 920,316

Claims priority, application United Kingdom, Apr. 28, 1986, 1033729

Term of patent 14 years

U.S. Cl. D14—58



298,938

**KEY TELEPHONE SET WITH SPEAKER PHONE**

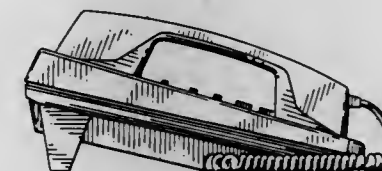
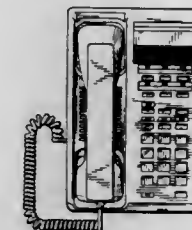
Kenichi Morikawa; Masafuku Akatsu; Tatsuya Kato; Seizo Ohta, and Takeshi Nakatani, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Mar. 12, 1987, Ser. No. 26,343

Claims priority, application Japan, Sep. 12, 1986, 61-36343

Term of patent 14 years

U.S. Cl. D14—58



298,939

**KEY TELEPHONE SET WITH SPEAKERPHONE AND VISUAL DISPLAY PANEL**

Kenichi Morikawa; Masafuku Akatsu; Tatsuya Kato; Seizo Ohta, and Takeshi Nakatani, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Mar. 12, 1987, Ser. No. 26,344

Claims priority, application Japan, Sep. 12, 1986, 61-36344

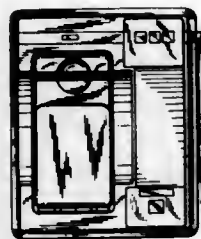
Term of patent 14 years

U.S. Cl. D14—58

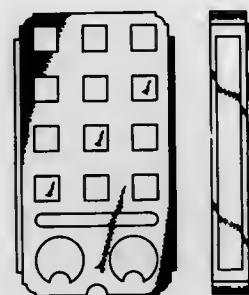




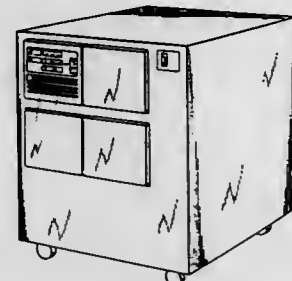
**298,940**  
**COMBINATION CORDLESS HANDSET TELEPHONE AND STAND**  
 Chi-Ming Lau, New Territories, Hong Kong, assignor to Elec & Eltek Company Limited, Kowloon, Hong Kong  
 Filed Jul. 24, 1986, Ser. No. 890,004  
 Claims priority, application United Kingdom, Jan. 24, 1986, 1031820; May 14, 1986, 1034080  
 Term of patent 14 years  
 U.S. Cl. D14—64



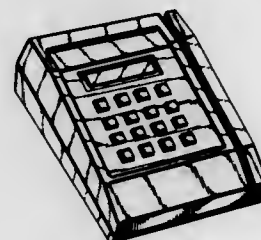
**298,942**  
**TRANSMITTER**  
 Charles T. Pieratt, 1720 New Boston, Texarkana, Tex. 75501  
 Filed Apr. 18, 1986, Ser. No. 856,124  
 Term of patent 14 years  
 U.S. Cl. D14—95



**298,943**  
**CHANNEL EXTENDER FOR DATA PROCESSING SYSTEM**  
 James A. Haager, Tempe, Ariz., and Clifford T. Williams, Poughkeepsie, N.Y., assignors to International Business Machines Corp., Armonk, N.Y.  
 Filed Feb. 11, 1985, Ser. No. 700,353  
 Term of patent 14 years  
 U.S. Cl. D14—102



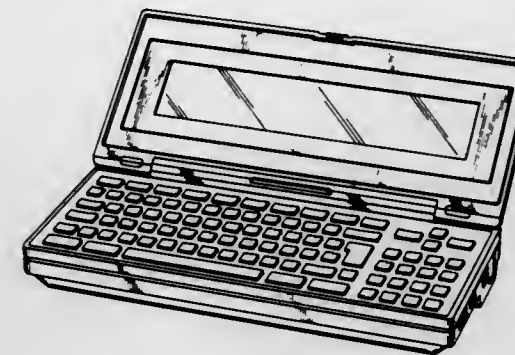
**298,944**  
**CREDIT CARD AUTHORIZATION/DATA CAPTURE TERMINAL**  
 David A. Stark, Apple Valley, Minn., and Laurance F. Plaskan, West Bend, Wis., assignors to DataCard Corporation, Minnetonka, Minn.  
 Filed Feb. 26, 1986, Ser. No. 832,162  
 Term of patent 14 years  
 U.S. Cl. D14—105



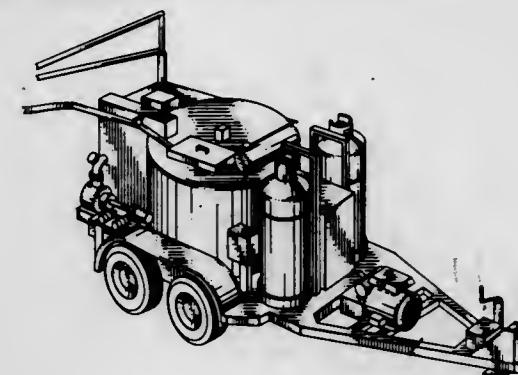
**298,941**  
**REMOTE CONTROL**  
 Brion Eanio, Milan, Italy, assignor to Brionvega S.p.A., Italy  
 Filed Dec. 3, 1985, Ser. No. 804,344  
 Claims priority, application Italy, Jan. 4, 1985, 22080/85[U]  
 Term of patent 14 years  
 U.S. Cl. D14—85



**298,945**  
**HAND HELD COMPUTER**  
 Katsuji Kagayama; Yoshihiko Sugiyama, both of Nara, and Benito Mishiro, Osaka, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Jan. 30, 1986, Ser. No. 824,329  
 Claims priority, application Japan, Sep. 9, 1985, 60-38018  
 Term of patent 14 years  
 U.S. Cl. D14—106



**298,946**  
**PAVEMENT CRACK SEALER MACHINE**  
 Floyd D. Schave, and Roger S. Allshouse, both of Mesa, Ariz., assignors to Craeco, Inc., Chandler, Ariz.  
 Filed Sep. 19, 1986, Ser. No. 909,496  
 Term of patent 14 years  
 U.S. Cl. D15—13



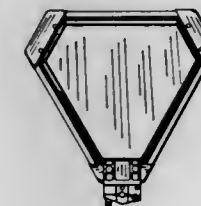
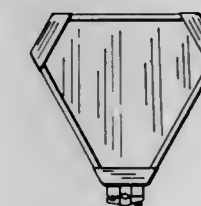
**298,947**  
**SUPPORT MANIFOLD FOR A GLUE DISPENSER**  
 Craig A. Shaw, 359 County Boulevard, Thunder Bay, Ontario, Calif. 7T2  
 Filed Nov. 20, 1985, Ser. No. 805,897  
 Term of patent 14 years  
 U.S. Cl. D15—199



**298,948**  
**DOCUMENT FEEDER**  
 Hideki Ishii, Tokyo, Japan, and Andrew T. Serbinaki, Brooklyn, N.Y., assignors to Ricoh Company, Ltd., Tokyo, Japan  
 Filed Jan. 8, 1986, Ser. No. 817,014  
 Claims priority, application Japan, Jul. 8, 1985, 60-29025  
 Term of patent 14 years  
 U.S. Cl. D16—32



**298,949**  
**ELECTRIC DRUM PAD**  
 Akihiko Fukuoka, Osaka, Japan, assignor to Roland Corporation, Osaka, Japan  
 Filed Oct. 4, 1985, Ser. No. 784,364  
 Claims priority, application Japan, Aug. 26, 1985, 66-36093  
 Term of patent 14 years  
 U.S. Cl. D17—22



298,950

## ELECTRIC DRUM PAD

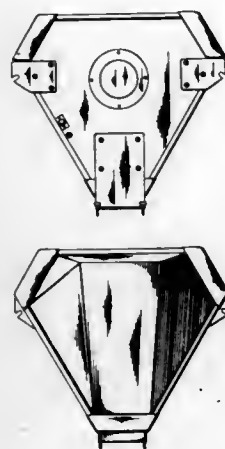
Akihiko Fukuoka, Osaka, Japan, assignor to Roland Corporation, Osaka, Japan

Filed Oct. 4, 1985, Ser. No. 784,546

Claims priority, application Japan, Aug. 26, 1985, 60-36094

Term of patent 14 years

U.S. Cl. D17-22



298,951

## PERCUSSION MUSICAL INSTRUMENT

Richard A. Benson, and Peter A. Scott, both of "Green Hedges" Wrotham Road, Meopham, Kent, DA13 OHW, England

Filed Oct. 8, 1986, Ser. No. 916,859

Claims priority, application United Kingdom, Aug. 23, 1985, 1028801

Term of patent 14 years

U.S. Cl. D17-22



298,952

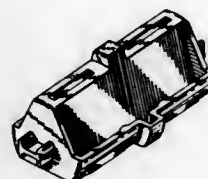
## TAPE CORE MANDREL

Deanis L. Crawford, Roberts, Wis., assignor to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed Jun. 28, 1985, Ser. No. 749,668

Term of patent 14 years

U.S. Cl. D19-67



298,953

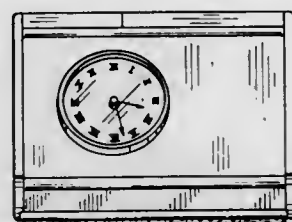
## DESK ORGANIZER

Raymond P. Roberts, P.O. Box 1117, Tulsa, Okla. 74101

Filed Nov. 29, 1985, Ser. No. 807,014

Term of patent 14 years

U.S. Cl. D19-78



298,954

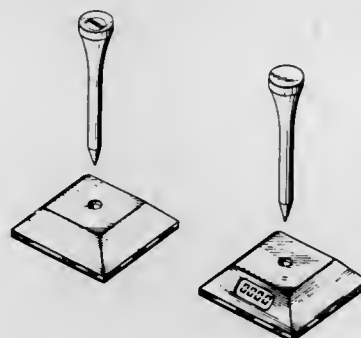
## COMBINED SIMULATIVE PEN, PEN HOLDER AND CLOCK

Patrick R. Doolin, 813 Jacqueline Dr., Huntsville, Ala. 35802

Filed Aug. 13, 1985, Ser. No. 765,085

Term of patent 14 years

U.S. Cl. D19-77



298,955

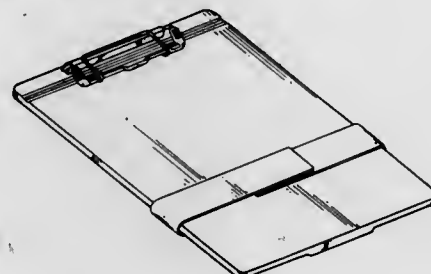
## CLIP BOARD

Alan P. Zovar, 18333 Hatteras St., #28, Tarzana, Calif. 91356

Filed May 28, 1985, Ser. No. 737,713

Term of patent 14 years

U.S. Cl. D19-88



298,956

## ACTIVITY TOY FOR CAR SEAT OR SIMILAR ARTICLE

Christine M. Zinter-Chahin, Orchard Park, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 17, 1986, Ser. No. 920,860

Term of patent 14 years

U.S. Cl. D21-59



298,958

## SOOTHER DOLL

Janice L. Ulbrich, 1333 Bloor Street East, Apartment 617, Mississauga, Ontario, Canada (L4Y 3T6)

Filed Sep. 26, 1985, Ser. No. 780,301

Claims priority, application Canada, Sep. 9, 1985, 09-09-85-3

Term of patent 14 years

U.S. Cl. D21-166



298,959

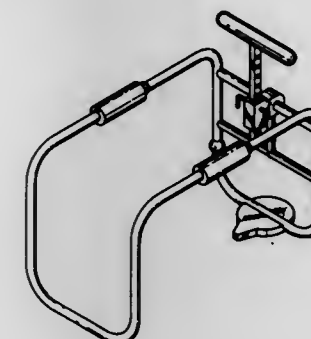
## EXERCISE STAND OR SIMILAR ARTICLE

Jim L. DeGalvez, Rte. 1, Box 233A, Cedar Hill, Mo. 63016

Filed Jul. 27, 1986, Ser. No. 888,840

Term of patent 14 years

U.S. Cl. D21-191



298,957

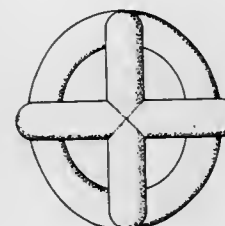
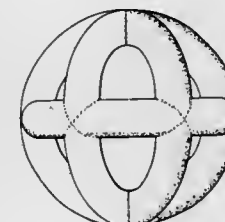
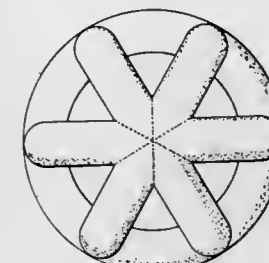
## INFLATABLE TOY VEHICLE

Jack Van, Jr., 4721 James Dr., Metairie, La. 70003

Filed Jul. 26, 1985, Ser. No. 759,195

Term of patent 14 years

U.S. Cl. D21-71



298,960

## DOLL

Mary E. Vela, 8614 Adams Hill Dr., San Antonio, Tex. 78227

Filed Jan. 13, 1986, Ser. No. 818,047

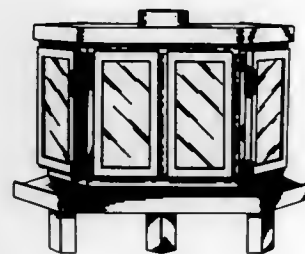
Term of patent 14 years

U.S. Cl. D21-184

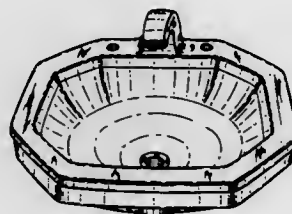




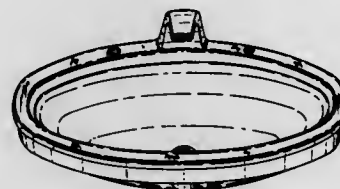
**298,961**  
**WOOD STOVE**  
 Denis Matte, Quebec City, Canada, assignor to F. X. Drolet, Inc., Quebec City, Canada  
 Filed Feb. 27, 1984, Ser. No. 583,622  
 Term of patent 14 years  
 U.S. Cl. D23—350



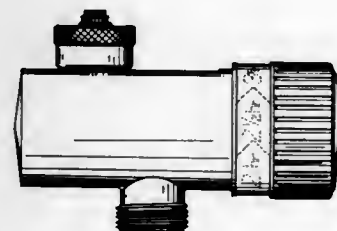
**298,963**  
**LAVATORY**  
 Myron J. Ament, Bethel Park, Pa., assignor to Household Manufacturing, Inc., Prospect Heights, Ill.  
 Filed May 19, 1986, Ser. No. 864,941  
 Term of patent 14 years  
 U.S. Cl. D23—291



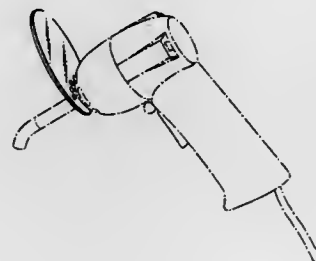
**298,964**  
**LAVATORY**  
 Myron J. Ament, Bethel Park, Pa., assignor to Household Manufacturing, Inc., Prospect Heights, Ill.  
 Filed May 19, 1986, Ser. No. 864,966  
 Term of patent 14 years  
 U.S. Cl. D23—291



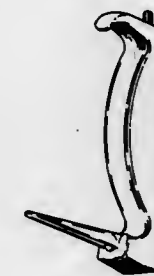
**298,962**  
**WATER TIMER**  
 Kenneth J. Bruninga, Mapleton, Ill., assignor to L. R. Nelson Corporation, Peoria, Ill.  
 Filed Jun. 28, 1985, Ser. No. 749,904  
 Term of patent 14 years  
 U.S. Cl. D23—245



**298,965**  
**COMBINED LIGHT FILTER AND SHIELD FOR A DENTAL CURING LAMP**  
 Joshua Friedman, 13 Fairfield Ct., Ridgefield, Conn. 06877  
 Filed Jun. 5, 1986, Ser. No. 870,857  
 Term of patent 14 years  
 U.S. Cl. D24—16



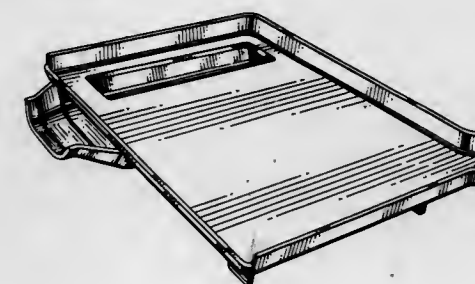
**298,966**  
**NASAL RETRACTOR**  
 Thomas D. Rees, New York, N.Y., assignor to BFW, Inc., Lexington, Ky.  
 Filed Dec. 2, 1985, Ser. No. 803,843  
 Term of patent 14 years  
 U.S. Cl. D24—18



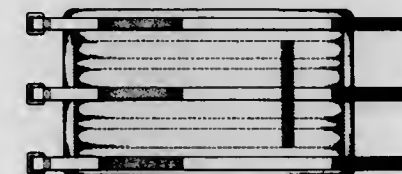
**298,967**  
**SURGICAL STAPLE CARTRIDGE**  
 John V. Hunt, Milford, Ohio, assignor to Ethicon, Inc., Somerville, N.J.  
 Filed Jun. 9, 1986, Ser. No. 872,456  
 Term of patent 14 years  
 U.S. Cl. D24—27



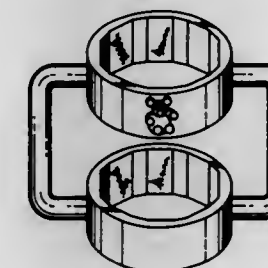
**298,968**  
**PILL COUNTING TRAY**  
 Thomas A. W. McAllister, 1021 Cedarglen Gate, Unit 14, Mississauga, Ontario L5C 3A7, Canada  
 Filed Dec. 20, 1985, Ser. No. 811,581  
 Claims priority, application Canada, Sep. 18, 1985, 18-09-85-5  
 Term of patent 14 years  
 U.S. Cl. D24—31



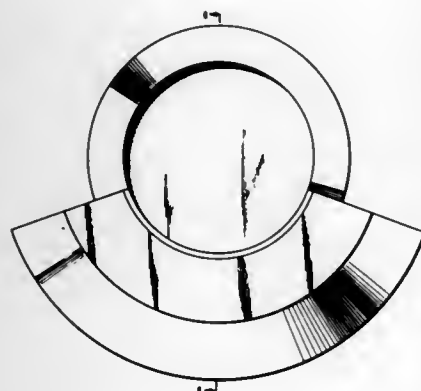
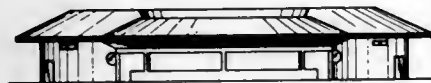
**298,969**  
**THERAPEUTIC PAD**  
 Danny W. Pryor, 731 Elms Walk, #203, Goleta, Calif. 93117  
 Filed Jan. 13, 1986, Ser. No. 817,999  
 Term of patent 14 years  
 U.S. Cl. D24—36



**298,970**  
**BABY BOTTLE HOLDER**  
 Debbie Dirks, Rte. 2, Box 334, Irrigon, Oreg. 97844  
 Filed Jul. 8, 1986, Ser. No. 883,055  
 Term of patent 14 years  
 U.S. Cl. D24—48



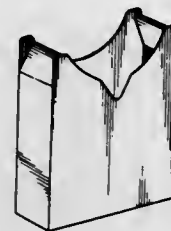
**298,971**  
**MOTOR VEHICLE CLEANING AND RESTORATION BUILDING**  
 Judson L. Smith, 5432 Lighthouse La., Tempe, Ariz. 85283  
 Filed Jun. 11, 1985, Ser. No. 743,631  
 Term of patent 14 years  
 U.S. Cl. D25—31



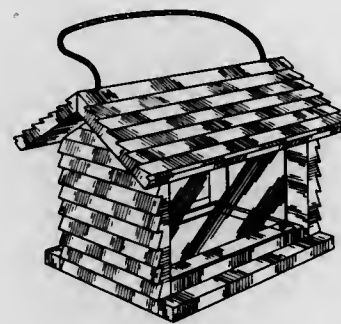
**298,972**  
**LIGHTER HOLDER**  
 Keith R. Schauer, Schamburg, Ill., assignor to K & B Enterprises, Inc., Schamburg, Ill.  
 Filed Jul. 16, 1985, Ser. No. 755,595  
 Term of patent 14 years  
 U.S. Cl. D27—161



**298,973**  
**VIEWING SHIELD**  
 William E. Bigbie, Jr., 1518 Stanley, P.O. Box 2001, Ardmore, Okla. 73402  
 Filed Jun. 17, 1985, Ser. No. 744,975  
 Term of patent 14 years  
 U.S. Cl. D29—18



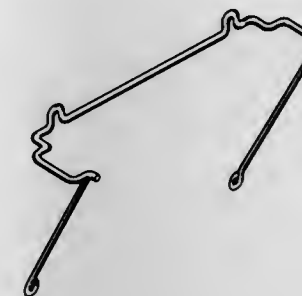
**298,974**  
**BIRD FEEDER**  
 Ray L. Granger, 772 Bird Bay Dr., #204, Venice, Fla. 33595  
 Filed Jul. 10, 1986, Ser. No. 884,269  
 The portion of the term of this patent subsequent to Apr. 7, 2001, has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D30—125



**298,975**  
**TETHERING STAKE**  
 Leonard J. Pantoja, and Juan E. Pantoja, both of 17910 Strickland Ave., Lake Elsinore, Calif. 92530  
 Filed Apr. 10, 1986, Ser. No. 851,371  
 Term of patent 14 years  
 U.S. Cl. D30—154

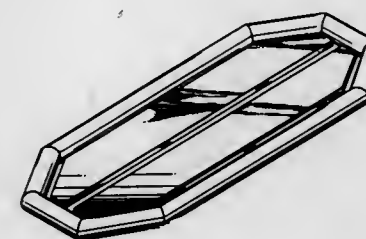


**298,977**  
**PLASTIC GARBAGE BAG HANGER**  
 Charles M. Cook, 10808 Ivanhoe Rd., El Paso, Tex. 79935  
 Filed Feb. 18, 1986, Ser. No. 834,040  
 Term of patent 14 years  
 U.S. Cl. D34—6

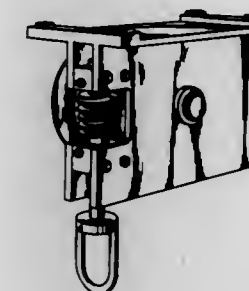


**298,978**  
**VEHICLE RAMP**  
 W. Jeffrey Van Baskirk, P.O. Box 1385, 302 South Leach St., Hobbs, N. Mex. 88240  
 Filed May 19, 1986, Ser. No. 864,904  
 Term of patent 14 years  
 U.S. Cl. D34—32

**298,976**  
**SOCK HOLDER**  
 Martin S. Moore, Jr., 3146 Waits, Forth Worth, Tex. 76109  
 Filed Nov. 21, 1986, Ser. No. 933,779  
 Term of patent 14 years  
 U.S. Cl. D32—61



**298,979**  
**CEILING WINCH**  
 Scott W. Row, 4599 Bogie Rd., Duluth, Ga. 30136  
 Filed Jun. 30, 1986, Ser. No. 880,327  
 Term of patent 14 years  
 U.S. Cl. D34—33





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## LIST OF PATENTEEES

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PATENTS WERE ISSUED ON THE 13TH DAY OF DECEMBER, 1988

NOTE—Arranged in accordance with the first significant character or word of the name  
(in accordance with city and telephone directory practice).

- A. O. Smith Corporation: See—  
Barrett, Fred E., 4,790,289, Cl. 126-362.000.  
Barrett, Fred E., 4,790,291, Cl. 126-362.000.  
Chevalier, James L.; King, Douglas D.; and Pfeffer, John D., 4,790,290, Cl. 126-361.000.  
Eising, John P., 4,790,268, Cl. 122-17.000.  
Aamodt, Robert A.: See—  
Salatin, Timothy; Balch, Thomas C.; Knight, Michael C.; Shesterkin, Michael D.; Van Antwerp, John S.; Lamberty, Paul E.; and Aamodt, Robert A., 4,791,168, Cl. 524-601.000.  
AB Tetra Pak: See—  
Ljungstrom, Tommy; and Sjoestrom, Anders, 4,790,123, Cl. 53-458.000.  
Abe, Shinya: See—  
Yamata, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Katayama, Kouichi; Tsunoda, Hajime; Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, 4,791,105, Cl. 514-134.000.  
Abe, Shozo: See—  
Kageyama, Satoshi; Nakamura, Yasushi; Kondo, Takashi; Abe, Shozo; and Mori, Kazuhiro, 4,791,496, Cl. 358-342.000.  
Abe, Yuji, to NEC Corporation. Semiconductor laser module. 4,790,618, Cl. 350-96.150.  
Abernethy, Robert R. Modular drill jig and method of making same. 4,790,695, Cl. 408-115.00R.  
Abrego, Elsa: See—  
MacDonald, Robert C.; and Abrego, Elsa, 4,790,412, Cl. 187-127.000.  
Accattino, Andrea; and Chiaro, Aldo, to Ing. C. Olivetti & C., S.p.A. Multiple nozzle ink jet dot printer. 4,791,437, Cl. 346-140.00R.  
Ackerman, Bernard: See—  
Bernstein, Robert I.; and Ackerman, Bernard, 4,790,825, Cl. 604-170.000.  
AcroMed Corporation: See—  
Steffee, Arthur D., 4,790,303, Cl. 128-924.00M.  
Adair, John F. Coiled exponential bass/midrange horn loudspeakers. 4,790,408, Cl. 181-152.000.  
Adams, Eric M. Instrument responsive to acceleration forces. 4,790,076, Cl. 33-365.000.  
Adams, George K., III: See—  
Zoltan, Bart J.; Laube, Beth L.; and Adams, George K., III, 4,790,305, Cl. 128-200.230.  
Adams, Kevin M.: See—  
Castaldi, Frank J.; Trofe, Timothy W.; Page, Gordon C.; and Adams, Kevin M., 4,790,940, Cl. 210-611.000.  
Adams, Wilbur R., to Simulators Limited, Inc. Roadway warning system. 4,790,684, Cl. 404-16.000.  
Adee, Raymond A.; Boone, James A.; and Lewallen, Dennis L., to Flex-King Corporation. Field cultivator frame with limiting assembly. 4,790,389, Cl. 172-776.000.  
Adeney, Hilary E.; and Hall, Derrard M., to Dulux Australia Limited. Multi-component coating compositions. 4,791,152, Cl. 523-406.000.  
Adler, Robert, to Zenith Electronics Corporation. Touch control system for controllable apparatus. 4,791,416, Cl. 340-712.000.  
Adolf, Gunther, to Boehringer Ingelheim. Synergistic mixtures of interferons and tumor necrosis factor. 4,791,101, Cl. 514-2.000.  
Adolph Coors Company: See—  
Johansson, Bert E.; and Grims, Conrad M., 4,790,169, Cl. 72-354.000.  
Advance Transformer Company: See—  
Duncan, George I.; and Phelps, Stephen L., 4,791,529, Cl. 361-274.000.  
Advanced Cardiovascular Systems, Inc.: See—  
Mueller, Richard L., Jr.; and Lerohl, Andrew L., 4,790,315, Cl. 128-344.000.  
AECI Limited: See—  
Halliday, Pieter S. J.; and Harris, Allan J., 4,790,891, Cl. 149-2.000.  
Affeldt, Michael; Barsellotti, John A.; and Kirkland, Lester, to Mitel Corporation. Communications switching system. 4,791,639, Cl. 370-58.000.  
Agency of Industrial Science and Technology: See—  
Naito, Hiroshi; Takahashi, Hidemi; Kimura, Minoru; and Sano, Reiji, 4,791,299, Cl. 250-352.000.  
AGFA-GEVAERT AG: See—  
Schmidt, Manfred; and Gebele, Herbert, 4,791,282, Cl. 235-462.000.  
Agri Manufacturing Corporation: See—  
Lack, Frank; and Rustin, Francis R., 4,790,264, Cl. 119-72.500.  
Agtronics Pty. Limited: See—  
Mills, David J., 4,791,430, Cl. 343-837.000.  
Ahern, Steven R.: See—  
McKay, Michael L.; and Ahern, Steven R., 4,790,270, Cl. 123-73.00C.  
Ahnen, David J.; Akanbi, Charles O.; Bruce, Ian D.; Kramer, Jacqueline C.; Larson, Carolyn D.; Ni, Wei-Chen; and Owens, Annetta T., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Controlling key-system groups from a distributed control switching system. 4,791,662, Cl. 379-158.000.  
Ahr, Nicholas A., to Procter & Gamble Company. The Absorbent article having an expanding overwrap. 4,790,839, Cl. 604-367.000.  
Ahrendt, Terry J., to Allied-Signal Inc. Stepper motor shaft position sensor. 4,791,343, Cl. 318-696.000.  
Aida, Kunihiro: See—  
Eimaeda, Shigeru; Aida, Kunihiro; Seto, Shinji; and Suzuki, Takao, 4,790,486, Cl. 241-20.000.  
Aine, Harry E. Thermal mass flow meter and method of making same. 4,790,181, Cl. 73-204.180.  
Ainsworth Nominees Pty. Ltd.: See—  
Smyth, Richard E.; and Tracy, Daniel A., 4,790,537, Cl. 273-143.00R.  
Air-Lok Pool Covers, Inc.: See—  
Phillips, Dwaine, 4,790,037, Cl. 4-499.000.  
Air Products and Chemicals, Inc.: See—  
Sircar, Shivaji, 4,790,858, Cl. 55-26.000.  
Airtel Limited: See—  
Park, Jeffrey, 4,791,517, Cl. 361-1.000.  
Aisin Seiki Kabushiki Kaisha: See—  
Akita, Tokihiko; and Hyodo, Hitoshi, 4,790,403, Cl. 180-176.000.  
Hayashi, Masayuki; and Sasaki, Takumi, 4,790,202, Cl. 74-396.000.  
Mochizuki, Masahiro, 4,790,343, Cl. 137-80.000.  
Oda, Yukihisa; Yasuda, Keiji; and Hamajima, Shigemitsu, 4,790,795, Cl. 464-102.000.  
Okabe, Yoshio; Kobayashi, Yukimori; and Shirai, Eiji, 4,790,796, Cl. 474-110.000.  
Aisin-Warner Kabushiki Kaisha: See—  
Iwatsuki, Tatsuya; Kawamoto, Mutsumi; and Kano, Takenori, 4,790,211, Cl. 74-701.000.  
Ajiki, Yoshio: See—  
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, 4,790,274, Cl. 123-198.00F.  
Ajima, Akio: See—  
Tanouchi, Tadao; Kawamura, Masanori; Ajima, Akio; Mohri, Tetsuya; Hayashi, Masaki; Terashima, Hiroshi; Hirata, Fumio; and Morimura, Takeshi, 4,791,126, Cl. 514-369.000.  
Akada, Yasuaki; Ishikawa, Norio; Egawa, Takeshi; and Taniguchi, Nobuyuki, to Minolta Camera Kabushiki Kaisha. Automatic focus control camera. 4,791,445, Cl. 354-402.000.  
Akanbi, Charles O.: See—  
Ahnen, David J.; Akanbi, Charles O.; Bruce, Ian D.; Kramer, Jacqueline C.; Larson, Carolyn D.; Ni, Wei-Chen; and Owens, Annetta T., 4,791,662, Cl. 379-158.000.  
Akebono Brake Industry Co., Ltd.: See—  
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Akima, Hideo: See—  
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Groenenboom, Cornelis J., 4,791,085, Cl. 502-68.000.  
Alcan International Limited: See—  
Dewing, Ernest W., 4,790,917, Cl. 204-140.000.  
Gesing, Adam J.; Reeve, Martin R.; and Dube, Ghyslain, 4,790,873, Cl. 75-68.00R.  
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Frey, Werner U.; Rometsch, Johannes; Iseli, Karl; and Wild, Peter, 4,791,257, Cl. 200-159.00R.  
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Christ, F. Richard; Pettit, Dean K.; and Day, Jeffrey C., 4,790,846, Cl. 623-6.000.

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Allied-Signal Inc.: See—  
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Bricker, Maureen L.; and Lawson, R. Joe, 4,791,091, Cl. 502-303.000.  
Bunkoczy, Bela, 4,790,472, Cl. 228-171.000.  
Johnson, Duane R., 4,790,208, Cl. 74-548.000.  
Lund, Earl E. A.; Wilson, David P.; Basu, Rajat S.; and Pham, Hang T., 4,790,955, Cl. 252-364.000.  
Shia, George A.; Nalewajek, David; and Pyszczyk, Michael F., 4,791,038, Cl. 429-218.000.  
Steer, John E., 4,790,138, Cl. 60-578.000.  
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Okita, Masao, 4,791,513, Cl. 360-104.000.

Alsobrook, Clarence B.: See—  
Lobb, Jolan F.; Alsobrook, Clarence B.; and Armbruster, Robert G., 4,790,364, Cl. 152-454.000.

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Young, Kenton P.; Colvin, Edward L.; Bowers, Joel A.; and Westlund, Robert W., 4,790,884, Cl. 148-2.000.

Alza Corporation: See—  
Theeuwes, Felix, 4,790,820, Cl. 604-85.000.

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Nakao, Masahiro; Asami, Sumio; Tanaka, Takaharu; Ogura, Kyoichi; Amachi, Teruo; Yoshizumi, Hajime; and Ishigooka, Hiroshi, 4,791,059, Cl. 435-198.000.

Amada Company, Limited: See—  
Kimura, Masao, 4,791,637, Cl. 372-58.000.

Amato, Dennis: See—  
Hegarty, Patrick J.; and Amato, Dennis, 4,790,423, Cl. 198-400.000.

Amarco Ltd.: See—  
Ringel, Michael, 4,790,699, Cl. 409-231.000.

Amdahl Corporation: See—  
Taylor, Michael D.; and Wang, Shen H., 4,791,642, Cl. 371-38.000.

Amemiya, Shinichi: See—  
Miwa, Hirohide; Shimura, Takaki; Yanashima, Tadahiko; and Amemiya, Shinichi, 4,790,321, Cl. 128-660.070.

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Li, Lehmann K.; Warren, Russell F.; Arnoczky, Steven P.; and Bedard, Robert J., 4,790,819, Cl. 604-59.000.

Los, Marinus, 4,791,201, Cl. 546-15.000.

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Fisher, Edward J., 4,791,287, Cl. 250-223.00B.

American Hoechst Corporation: See—  
Caine, R. Scott, 4,790,293, Cl. 126-415.000.

American Maize-Products Company: See—  
Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., 4,790,997, Cl. 426-578.000.

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Pugh, Robert W., Jr.; and Levius, Dezso K., 4,790,810, Cl. 604-8.000.

American Motors Corporation: See—  
Fedele, William E.; and Hutter, Robert B., 4,790,185, Cl. 73-317.000.

Thomas, Robert M., 4,790,206, Cl. 74-502.400.

American National Can Company: See—  
Wilkinson, Harlen E.; and Langseder, Neal E., 4,790,705, Cl. 413-8.000.

American Standard Inc.: See—  
Noah, Lewis R., 4,790,415, Cl. 188-196.00P.

American Telephone and Telegraph Company: See—  
Oye, Kevin J.; Paterno, Enzo; and Smith, Thomas L., 4,791,660, Cl. 379-88.000.

American Telephone and Telegraph Company, AT&T Bell Laboratories: See—  
Ahnen, David J.; Akanbi, Charles O.; Bruce, Ian D.; Kramer, Jacqueline C.; Larson, Carolyn D.; Ni, Wei-Chen; and Owens, Annetta T., 4,791,662, Cl. 379-158.000.  
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Kiehl, Richard A., 4,791,072, Cl. 437-56.000.

Lines, Malcolm E.; Lyons, Kenneth B.; Miller, Anne E.; and Nasau, Kurt, 4,790,619, Cl. 350-96.160.

Sand, William C., 4,791,640, Cl. 370-58.000.

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Swartz, Robert G., 4,791,628, Cl. 370-112.000.

American Telephone and Telegraph Company, AT&T Information Systems: See—  
Bogart, Frank J.; and Modisette, Nancy K. S., 4,791,665, Cl. 379-207.000.

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Amir, Shlomo. Apparatus for stripping an electrical conductor. 4,790,062, Cl. 29-564.400.

Amoco Corporation: See—  
Puskas, Imre; and Cerefe, Steven A., 4,791,226, Cl. 562-487.000.  
Vojak, Bruce A.; and Sheem, Sang K., 4,791,648, Cl. 372-46.000.

AMP Incorporated: See—  
Billman, Timothy B.; and Goodman, Joseph R., 4,790,779, Cl. 439-842.000.

Boucher, Andrew G., Jr., 4,790,173, Cl. 72-446.000.

Kawaguchi, Akira; and Sasaki, Takinori, 4,790,764, Cl. 439-78.000.

Kleiner, Wayne E., 4,790,771, Cl. 439-421.000.

Kreinberg, Earl R., 4,790,760, Cl. 439-55.000.

Weber, Ronald M.; and Van Seyoc, William C., 4,790,763, Cl. 439-65.000.

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Elmqvist, Hakan; Lekholm, Anders; Hedberg, Sven-Erik; and Amundson, David C., 4,790,318, Cl. 128-419.0PG.

Analog Devices, Inc.: See—  
Garde, Douglas, 4,791,551, Cl. 364-200.000.

Lewis, Stephen R.; and Lefton, Scott, 4,791,318, Cl. 307-297.000.

Anami, Kenji: See—  
Shiomi, Toru; and Anami, Kenji, 4,791,382, Cl. 330-264.000.

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Ibanez, Paul; and Merz, Kelvin L., 4,791,243, Cl. 174-45.00R.

Anderlind, Erik T.; and Guillemard, Jean-Pierre, to Compex Expanders S.A.R.L. Method and apparatus for expanding loose fill material, such as expandable polystyrene pellets. 4,790,967, Cl. 264-51.000.

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Anderson, J. Edward C., to Milbar Corporation. Retaining ring tool. 4,790,056, Cl. 29-229.000.

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Foley, Geoffrey M.; and Anderson, Robert W., 4,791,449, Cl. 355-3.00R.

Anderson, Ronald L.; and Rieser, Donald E., to J. I. Case Company. Backhoe bucket transport system. 4,790,084, Cl. 37-117.500.

Anderson, Ronald L., to J. I. Case Company. Implement for moving rocks and the like. 4,790,717, Cl. 414-722.000.

Anderson, Ronald W.: See—  
Hines, Gordon E.; Case, Lee D.; and Anderson, Ronald W., 4,790,697, Cl. 409-133.000.

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Ando, Toshinari; Nishi, Masataka; Takahashi, Yoshikazu; and Shimamoto, Susumu, to Japan Atomic Energy Research Institute; and Sumitomo Elec. Inc. Ltd. Stabilized superconducting wire. 4,791,241, Cl. 174-125.100.

Andres, Johannes: See—  
Wichelhaus, Juergen; Gruber, Werner; and Andres, Johannes, 4,791,164, Cl. 524-514.000.

Ang, Saw T., to Texas Instruments Incorporated. Dual dielectric gate system comprising silicon dioxide and amorphous silicon. 4,791,071, Cl. 437-042.000.

Angel, David J.; Cardone, Gary A.; Holbrook, Mark D.; Moskun, James P.; and Patterson, Bruce, to Wang Laboratories, Inc. Apparatus and method for monitoring and controlling the prefetching of instructions by an information processing system. 4,791,557, Cl. 364-200.000.

Angli Holding B.V.: See—  
De Gruiter, Wilhelmus A. E. M., 4,790,570, Cl. 285-54.000.

Ant Nachrichtentechnik GmbH: See—  
Harbich, Thomas, 4,791,596, Cl. 364-724.160.  
Wermuth, Jurgen, 4,791,385, Cl. 330-278.000.

Aoki, Syozo: See—  
Koboshi, Shigeharu; Kobayashi, Kazuhiro; Miyaoka, Kazuyoshi; Aoki, Syozo; and Takabayashi, Naoki, 4,791,013, Cl. 428-35.300.

Aoki, Takayoshi; Takeda, Masayuki; Suzuki, Chiaki; and Nagatsuka, Ikutaro, to Fuji Xerox Co., Ltd. Magnetic carrier particles for electrophotographic developer. 4,791,041, Cl. 430-108.000.

Aono, Kunitoshi: See—  
Mori, Toshiki; Yamada, Haruyasu; Aono, Kunitoshi; and Maruyama, Masakatsu, 4,791,677, Cl. 382-41.000.

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Appelbaum, Paul. Key-way cover. 4,790,163, Cl. 70-455.000.

Applegate, Robert L.: See—  
Bray, James A.; and Applegate, Robert L., 4,791,003, Cl. 427-28.000.

Apsley, Norman, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Electro-optical device. 4,790,635, Cl. 350-356.000.

Arakawa, Hideki, to Fujitsu Limited. Semiconductor memory device having erroneous write operation preventing function. 4,791,614, Cl. 365-228.000.

Arakawa, Masao: See—  
Okuda, Shigenobu; Iwasaki, Shigeo; Namikoshi, Michio; Arakawa, Masao; and Shimizu, Fusaaki, 4,791,128, Cl. 514-374.000.

Arakawa, Satoshi; Hosoi, Yuichi; Yamazaki, Hisashi; and Ito, Yoshiteru, to Fuji Photo Film Co., Ltd. Process for the preparation of radiation image storage panel. 4,791,009, Cl. 427-64.000.

Araki, Hiroaki: See—  
Honda, Kunihiko; Miura, Toshihiko; and Araki, Hiroaki, 4,791,021, Cl. 428-329.000.

Araki, Toshio, to Pilot Ink Co., Ltd. Mechanism for extruding and retracting a writing member of a writing instrument. 4,790,678, Cl. 401-104.000.

Aramaki, Shinji: See—  
Suzuki, Tetsumi; Murayama, Tetsuo; Ono, Hitoshi; Aramaki, Shinji; and Yokoyama, Michiyo, 4,791,194, Cl. 534-752.000.

Arata, Tadao: See—  
Tanaka, Shinsaku; Arata, Tadao; and Kido, Kunio, 4,791,506, Cl. 360-74.200.

Archibald, William E., to Wilson Foods Corporation. Meat container. 4,790,450, Cl. 220-418.000.

Arco Chemical Company: See—  
Hazbun, Edward A., 4,791,079, Cl. 502-4.000.

ARES, Inc.: See—  
Stoner, Eugene M., 4,790,231, Cl. 89-35.020.

Armand, Bjorn, to Stubben Utveckling AB. Transport device. 4,790,549, Cl. 280-47.180.

Armbruster, Robert G.: See—  
Lobb, Jolan F.; Alsobrook, Clarence B.; and Armbruster, Robert G., 4,790,364, Cl. 152-454.000.

Armco Advanced Materials Corporation: See—  
Daniels, James A.; and Douthett, Joseph A., 4,790,977, Cl. 420-104.000.

Armco Inc.: See—  
Christ, Christy; Campbell, Herbert F.; Fields, Gayle P.; and Burris, James L., 4,790,686, Cl. 405-124.000.

Armell, Richard A., to Drexel Equipment (U.K.) Limited. Centralizing devices for use in bore-holes. 4,790,381, Cl. 166-241.000.

Armstrong World Industries, Inc.: See—  
Becker, Stephen E.; Forry, John S.; Lewicki, Walter J., Jr.; and Ringer, Richard M., 4,791,015, Cl. 428-156.000.

Arnoczky, Steven P.: See—  
Li, Lehmann K.; Warren, Russell F.; Arnoczky, Steven P.; and Bedard, Robert J., 4,790,819, Cl. 604-59.000.

Arnold, Charles M. Combat rapid assembly fuel tank. 4,790,350, Cl. 137-588.000.

Arnold, Kenneth E. Water treating in a vertical series coalescing flume. 4,790,947, Cl. 210-801.000.

Arnold, Wendell R.; Dow, William C.; and Johnson, George W., to Eli Lilly and Company. Fungicidal pyridazines. 4,791,110, Cl. 514-247.000.

Arnt, Sharon M. Shoelace lock. 4,790,048, Cl. 24-117.000.

Aronowitz, Jack L.: See—  
Terminiello, Louis; and Aronowitz, Jack L., 4,790,979, Cl. 422-56.000.

Aroonsakul, Chaovane. Method of treatment for central nervous system diseases such as Alzheimer's disease and Parkinson's disease. 4,791,099, Cl. 514-2.000.

Array Instruments, Inc.: See—  
Wilhelm, William G.; and Crownover, Joseph W., 4,790,438, Cl. 209-573.000.

Artico, Inc.: See—  
Morvant, Artie J., 4,790,088, Cl. 40-124.500.

Asada, Kiyotoshi: See—  
Nagata, Masanori; Imano, Shigeki; Kaneoka, Tsugio; and Asada, Kiyotoshi, 4,791,655, Cl. 378-57.000.

Asahi Kasei Kogyo Kabushiki Kaisha: See—  
Yamamizu, Takafumi, 4,791,183, Cl. 526-261.000.

Asai, Ikuo: See—  
Shimojo, Shunichi; and Asai, Ikuo, 4,790,738, Cl. 425-192.00R.

Asai, Kei: See—  
Matsumoto, Kazuhiro; Asai, Kei; and Yamamoto, Hirohito, 4,790,479, Cl. 239-102.200.

Asaka, Masayuki: See—  
Shinohe, Takashi; Takigami, Katsuhiko; Ohashi, Hiromichi; Ogura, Tsuneo; and Asaka, Masayuki, 4,791,470, Cl. 357-38.000.

Asakawa, Kazuo: See—  
Onda, Nobuhiko; Asakawa, Kazuo; Akita, Tadashi; Komoriya, Hitoshi; and Kamada, Toru, 4,791,588, Cl. 364-513.000.

Asami, Sumio: See—  
Nakao, Masahiro; Asami, Sumio; Tanaka, Takaharu; Ogura, Kyoichi; Amachi, Teruo; Yoshizumi, Hajime; and Ishigooka, Hiroshi, 4,791,059, Cl. 435-198.000.

Asanuma, Katsumi; and Shinada, Hidetoshi, to Fuji Photo Film Co., Ltd. Apparatus for correcting scanning rate deviation of a galvanometer and correcting method thereof. 4,791,591, Cl. 364-571.040.

Asanuma, Nobuyoshi; Kubo, Kanji; and Mitobe, Keiichi, to Honda Giken Kogyo Kabushiki Kaisha. Independent rear suspension for use on motor vehicles. 4,790,560, Cl. 280-701.000.

Asatani, Haruki: See—  
Maki, Takao; Yokoyama, Toshiharu; Nakanishi, Akio; Shioda, Katashi; and Asatani, Haruki, 4,791,235, Cl. 585-806.000.

Asayama, Yoshiaki: See—  
Nishida, Minoru; Inoue, Noriyuki; Asayama, Yoshiaki; and Suzuki, Hiroyoshi, 4,790,286, Cl. 123-571.000.

Ashizawa, Tadaaki: See—  
Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tohru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tadaaki, 4,791,113, Cl. 514-256.000.

Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tohru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tadaaki, 4,791,130, Cl. 514-410.000.

Ashmont, Robert S.; Bibeau, Thomas C.; Livaich, Anthony; and McCormick, Nancy J., to Heublein, Inc. Alcoholic soft ice. 4,790,999, Cl. 426-592.000.

Asper, Jean-Jacques: See—  
Vogeli, Ernst; Asper, Jean-Jacques; Zurcher, Erwin; and Schnyder, Erika, 4,790,036, Cl. 4-233.000.

Astolfi, Pietro, to Pico-Glass S.p.A. Picture frame. 4,790,089, Cl. 40-156.000.

AT&T Information Systems Inc.: See—  
Oye, Kevin J.; Paterno, Enzo; and Smith, Thomas L., 4,791,660, Cl. 379-88.000.

Atkins, Thomas M., to Kelsey Hayes Company. Vehicle anti-lock brake system. 4,790,607, Cl. 303-109.000.

Atkinson, Jay D.: See—  
Willa, David C.; and Atkinson, Jay D., 4,790,504, Cl. 248-183.000.

Atobe, Takashi, to Daiwa Seiko, Inc. Revolution sensor for a spool on a fishing reel. 4,790,492, Cl. 242-84.10M.

Atsumi, Kunio: See—  
Sakagami, Kenji; Atsumi, Kunio; Nishihata, Ken; Yoshida, Takashi; and Fukatsu, Shunzo, 4,791,197, Cl. 540-227.000.

Atsumi, Shinya: See—  
Tobinaga, Motoi; Okumura, Shigeo; Handa, Kenichi; and Atsumi, Shinya, 4,790,279, Cl. 123-417.000.

Attig, Thomas G.; Graham, Anne M.; and Pesa, Frederick A., to Standard Oil Company, The. Process for synthesis of esters from gaseous reactants containing organic hydroxy compounds and mixtures of hydrogen and carbon monoxide. 4,790,963, Cl. 260-410.90R.

Audichron Company, The: See—  
Cobb, Douglas R.; Glisson, David K.; Fields, Raymond C.; and Cook, Kenneth L., 4,791,666, Cl. 379-213.000.

Audiotone, Inc.: See—  
Nunley, James A.; Steadman, John W.; and Wechsler, Perry J., 4,791,672, Cl. 381-68.200.

Auel, RaeAnn M.: See—  
Shakely, Ronald H.; Auel, RaeAnn M.; and Schneider, Alan A., 4,790,925, Cl. 204-415.000.

Auer, Helmut, to Dipl.-Kfm. Cremer, Peter. Take-apart bottle carrier. 4,790,443, Cl. 220-23.400.

Augeri, James A.; Bolz, Carl; Bickford, Bruce; Young, Paul; and Johnson, David, to Raymond Engineering Inc. Magnetic disc memory unit. 4,791,508, Cl. 360-99.120.

Ausimont S.p.A.: See—  
d'Agostino, Riccardo; Cramarossa, Francesco; Fracassi, Francesco; Illuzzi, Francesca; and Caporiccio, Gerardo, 4,791,012, Cl. 428-35.300.

Ausonia S.p.A.: See—  
Clerici, Piero R.; and Casalegno, Italo, 4,791,024, Cl. 428-343.000.

Austin, Charles C., to Silicon Systems, Inc. Level translation circuit. 4,791,323, Cl. 307-475.000.

Austin, Gerald W., to Professional Care Products, Inc. External single-use catheter. 4,790,834, Cl. 604-349.000.

Automotive Products, plc: See—  
Tury, Edward L.; Salzmann, David F.; Leigh-Monstevens, Keith V.; Vander Poorte, John G.; and Peterson, David C., 4,790,204, Cl. 74-483.0PB.

Autospa Corporation: See—  
Barres, Michael J., 4,790,882, Cl. 134-22.180.

Avdel Limited: See—  
Miles, Michael, 4,790,470, Cl. 227-1.000.

Avery International Corporation: See—  
Slobodkin, Yefim, 4,790,805, Cl. 493-355.000.

Avrea, Walter C. Method and apparatus for continuously maintaining a volume of coolant within a pressurized cooling system. 4,790,369, Cl. 165-104.320.

AVX Corporation: See—  
Galvagni, John L.; and Troup, Philip A., 4,791,006, Cl. 427-282.000.

Awtry, Jon; and Heflin, Dennis R. Grain probe. 4,790,198, Cl. 73-864.640.

Ayalon, Israel, to Eyal Engineering & Industrial Co. Ltd. Tow truck. 4,790,710, Cl. 414-563.000.

B F Goodrich Company, The: See—  
Layor, Robert W., 4,791,173, Cl. 525-236.000.

Yu, Simon H., 4,791,189, Cl. 528-355.000.

Baba, Yoshihiko, to Weston Corporation, The. Radar detector/security device for automobiles. 4,791,420, Cl. 342-20.000.

Bacardit, Juan S., to Bendix Espana S.A. Resilient device for the centering and coupling with backlash of two rotary components. 4,790,793, Cl. 464-77.000.



Backe, Bengt S.; and Durham, La Moyne W., to South Bend Lathe, Inc. Method and apparatus for controlling hydraulic systems. 4,790,233, Cl. 91-361.000.

Backs, Leo J. J.: See—  
Heeres, Jan; Backs, Leo J. J.; Thijssen, Jozef B. A.; and Knaeps, Alfonsus G., 4,791,111, Cl. 514-252.000.

Bacroix, Brigitte: See—  
Bussiere, Jean F.; Jen, Cheng-Kuei; Makarow, Irina D.; Bacroix, Brigitte; Lequeu, Philippe H.; and Jonas, John J., 4,790,188, Cl. 73-597.000.

Badham, Keith C. Cultivation tool rear edges. 4,790,388, Cl. 172-375.000.

Badiali, Mario: See—  
Schmidt, Josef; and Badiali, Mario, 4,790,942, Cl. 210-650.000.

Bagley, Jerome R.; and Spencer, H. Kenneth, to BOC Group, Inc., The. N-heterocyclic-N-(4-piperidyl)amides and pharmaceutical compositions and methods employing such compounds. 4,791,112, Cl. 514-252.000.

Bailey, John C.; Foley, Timothy D.; and Botos, Ernest D., to Eveready Battery Company. Dry molded cathode collector for liquid cathode systems. 4,790,969, Cl. 264-105.000.

Bair, Kenneth W., to Burroughs Wellcome Co. Carbocyclic derivatives. 4,791,231, Cl. 564-387.000.

Bair, Kenneth W., to Burroughs Wellcome Co. Carbocyclic derivatives. 4,791,232, Cl. 564-387.000.

Bair, Kenneth W., to Burroughs Wellcome Co. Carbocyclic derivatives. 4,791,233, Cl. 564-387.000.

Baker, Anthony P., to ITT Defense Communications, a Division of ITT Corporation. Liquid crystal switching apparatus. 4,790,633, Cl. 350-347.00V.

Baker, Cynthia: See—  
Kirchhoff, Robert A.; Gilpin, Jo Ann; Baker, Cynthia; and Myers, Michael O., 4,791,182, Cl. 526-221.000.

Baker, Daniel C., to Shell Oil Company. Removal of hydrogen selenide. 4,790,945, Cl. 210-712.000.

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Baker, James B. Pipe manipulator. 4,790,057, Cl. 29-237.000.

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Balkau, Guenter K. W.; Bez, Eckhard; and Farrant, John L., to Commonwealth Scientific and Industrial Research Organization. Reciprocating piston and cylinder machine. 4,790,726, Cl. 417-254.000.

Ballard, Donald E.; and Klappert, Willi, to General Electric Company. Method of manufacturing an amorphous metal transformer core and coil assembly. 4,790,064, Cl. 29-606.000.

Balteau, Patrick; and Peluso, Francesco, to Baxter Travenol Laboratories, Inc. Heat sterilizable plastic container with non-stick interior surfaces. 4,790,815, Cl. 604-29.000.

Bambara, Joseph E.; Frarey, John L.; and Smith, Richard L., to Servo Corporation of America. On-line acoustic detection of bearing defects. 4,790,190, Cl. 73-660.000.

Bancroft Cap Company: See—  
Goldman, Stephen; and Richardson, John, 4,790,033, Cl. 2-195.000.

Bando Chemical Industries, Ltd.: See—  
Onoe, Susumu; and Yamaguchi, Mutsuyuki, 4,790,802, Cl. 474-260.000.

Ueno, Toshihiko; and Daini, Hiroshi, 4,790,466, Cl. 226-74.000.

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Barbaro, Matthew, to Poly-Pak Industries, Inc. Bag with closeable flap and method of manufacturing same. 4,790,670, Cl. 383-62.000.

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Dickman, Robert L.; and Barchek, Douglas A., 4,790,207, Cl. 74-523.000.

Bardaley, H. Brian, to Spencer Wright Industries, Inc. Selective needle tufting machines. 4,790,252, Cl. 112-80.400.

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Barnes, Audrey L.: See—  
Burba, John L., III; and Barnes, Audrey L., 4,790,954, Cl. 252-315.500.

Barnes Engineering Company: See—  
Savoca, Robert C.; and Falbel, Gerald, 4,791,297, Cl. 250-347.000.

Barrera, Raymundo M. Drop rod latch for double-hung gates. 4,790,578, Cl. 292-148.000.

Barras, Michael J., to Autospa Corporation. Flushing and recharging method for the cooling system of an automotive engine. 4,790,882, Cl. 134-22.180.

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Sharp, George P.; and Brown, Thomas W., 4,790,410, Cl. 182-36.000.

Barry, Robert F.; and Kang, Samuel, to Westinghouse Electric Corp. Object locating system. 4,791,482, Cl. 358-107.000.

Barsellotti, John A.: See—  
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Nishizawa, Jun-ichi; Tamamushi, Takashige; and Barsony, Istvan, 4,791,396, Cl. 357-22.000.

Baruch, Ehud: See—  
Givati, Izhak; and Baruch, Ehud, 4,790,680, Cl. 402-68.000.

BASF Aktiengesellschaft: See—  
Bronstert, Klaus; and Wagner, Daniel, 4,791,174, Cl. 525-274.000.

Fischer, Rolf, 4,791,219, Cl. 560-187.000.

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Lausberg, Dietrich; McKee, Graham E.; Taubitz, Christof; Wassmuth, Georg; and Knoll, Manfred, 4,791,158, Cl. 524-156.000.

Mach, Helmut; Vogel, Hans-Henning; and Jahn, Juergen, 4,790,957, Cl. 252-56.00S.

Martin, Roland; and Gramlich, Walter, 4,791,098, Cl. 512-20.000.

Reimann, Horst; Zahradnik, Franz; and Weiss, Hans-Peter, 4,791,027, Cl. 428-407.000.

BASF Corporation: See—  
Riley, Robert E.; and Narayan, Thirumurti, 4,791,148, Cl. 521-159.000.

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Salatin, Timothy; Balch, Thomas C.; Knight, Michael C.; Shesterkin, Michael D.; Van Antwerp, John S.; Lamberty, Paul E.; and Aamodt, Robert A., 4,791,168, Cl. 524-601.000.

Bass, Larry W.: See—  
Lund, Richard B.; and Bass, Larry W., 4,791,211, Cl. 548-260.000.

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Lund, Earl E. A.; Wilson, David P.; Basu, Rajat S.; and Pham, Hang T., 4,790,955, Cl. 252-364.000.

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Leszczak, John, 4,790,440, Cl. 211-11.000.

Batson, Dossie M. Log loading apparatus. 4,790,712, Cl. 414-399.000.

Baubles, Richard C., to Jacobson Mfg. Co., Inc. Floating fastener retainer assembly with removable fasteners. 4,790,701, Cl. 411-85.000.

Bauer, Heinz; Becker, Burkhard; Frohnhaus, Ernst-Reiner; Gedig, Alfred; Klink, Josef; and Koucky, Antonin, to C. Rob Hammerstein GmbH, Firma; and Daimler-Benz AG. Vehicle seat with a longitudinal guide, with an adjustment of height or inclination, and with an attachment for seat belt lock. 4,790,597, Cl. 297-468.000.

Bauer, Karl-Heinz; and Geiss, Viktor, to Prah Elektrofenmechanische Werke Jakob Prah Nachf. GmbH & Co. Mechanical control device. 4,790,199, Cl. 74-48.000.

Bauer Spezialtiefbau GmbH: See—  
Henn, Gunter; Stocker, Manfred; Stotzer, Erwin; Friedrich, Konrad; and Bauer, Thomas, 4,790,689, Cl. 405-240.000.

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Baumert, Jean-Claude J. E.; Bjorklund, Gary C.; Lentz, Wilfried; Risk, William P., III; and Schellenberg, Franklin M., to International Business Machines Corporation. Wide tolerance, modulated blue laser source. 4,791,631, Cl. 372-22.000.

Baumgarten, Klaus; and Hummel, Kurt, to Messerschmitt-Boelkow-Blohm Gesellschaft mit Beschränkter Haftung. Rotary mirror for optical systems. 4,790,639, Cl. 350-486.000.

Baumle, Hubert: See—  
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Baxter, Anthony G. W.; Bostock, Stephen B.; and Greenwood, David, to Canos Kabushiki Kaisha. Water-soluble triazane dyestuffs free from cellulose reactive groups and suitable for use in inks. 4,790,879, Cl. 106-22.000.

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Balteau, Patrick; and Peluso, Francesco, 4,790,815, Cl. 604-29.000.

Carpentier, Alain; and Lane, Ernest, 4,790,843, Cl. 623-2.000.

Skribiski, Robert P., 4,790,831, Cl. 604-282.000.

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Suling, Carlhans; Kausch, Michael; and Dauscher, Rudi, 4,791,187, Cl. 528-60.000.

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Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hansler, Gerd, 4,791,208, Cl. 548-136.000.

Gehring, Reinhold; Klauke, Erich; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,791,212, Cl. 548-362.000.

Hohn, Johann; Meramann, Franz-Josef; Obrecht, Werner; and Szentivanyi, Zolt, 4,791,172, Cl. 525-234.000.

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Erni, Peter; and Kirsch, Gerard, 4,790,980, Cl. 422-186.150.

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Hanson, Gary E.; Kelly, Gar P.; Chan, C. S.; Cowger, Bruce; and Bearas, James G., 4,791,438, Cl. 346-140.00R.

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Becker, Frank S.; and Pawlik, Dieter, to Siemens Aktiengesellschaft. Method for the manufacture of silicon oxide layers doped with boron and phosphorus. 4,791,005, Cl. 427-255.300.

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Becker, Stephen E.; Forry, John S.; Lewicki, Walter J., Jr.; and Ringer, Richard M., to Armstrong World Industries, Inc. Ornamented tile surface covering. 4,791,015, Cl. 428-156.000.

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Beckman Instruments, Inc.: See—  
Macdonald, Scott; and Homberg, William D., 4,790,236, Cl. 92-129.000.

Pfost, Dale R.; Pfost, R. Fred; and Lachenmeier, Eric W., 4,790,183, Cl. 73-290.00V.

Piramoan, Alireza M., 4,790,808, Cl. 494-81.000.

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Capuano, Francis A., Sr.; and Pirano, Vincent J., 4,790,312, Cl. 128-305.000.

Becton Dickinson and Company: See—  
North, Howard L., Jr., 4,790,653, Cl. 356-73.000.

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Lienu, Richard M.; and Pope, Kenneth E., 4,791,604, Cl. 365-9.000.

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Hunter, Pamela A.; Berry, Valerie; Odoro-Yeboah, Joshua; and Orr, Norman A., 4,790,989, Cl. 424-404.000.

Beekner, Franciscus P. M.: See—  
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Harder, Hans E.; Behrens, Klaus; and Kotz, Rainer, 4,790,854, Cl. 623-20.000.

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Krutilla, Michael A.; and Klein, John, 4,790,224, Cl. 83-53.000.

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Liou, Ming-Lai; Sun, Ming-Ting; and Wu, Lancelot, 4,791,598, Cl. 364-725.000.

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Bellofatto, Richard C. Air navigational instrument simulation and instructional aid. 4,790,758, Cl. 434-243.000.

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Harwood, John W., 4,790,909, Cl. 162-301.000.

Roerig, Arnold J.; and Lange, David V., 4,790,908, Cl. 162-199.000.

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Bendix France: See—  
Gautier, Jean-Pierre; and Blot, Jean-Claude, 4,790,235, Cl. 92-128.000.

Kervagoret, Gilbert, 4,790,351, Cl. 137-596.170.

Meynier, Guy, 4,790,413, Cl. 188-18.00A.

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Keuchel, Herbert W., 4,790,736, Cl. 425-66.000.

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Benson, Robert F.: See—  
Wilent, John W.; Benson, Robert F.; and Sparks, Robert A., 4,790,694, Cl. 408-1.00R.

Berg, George P.: See—  
Simon, Theodore; Weston, Lance; and Berg, George P., 4,791,658, Cl. 379-41.000.

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Descamps, Marcel; and Berger, Yves, 4,791,137, Cl. 514-469.000.

Bergh, Sven H., to Telefonaktiebolaget L M Ericsson. Short circuit protector for output circuits having series-connected transistors. 4,791,522, Cl. 361-93.000.

Bergstrom, James W.; and Weber, Mark W., to Honeywell Inc. Read-out for a ring laser angular rate sensor. 4,791,460, Cl. 356-350.000.

Bernard, Coll: See—  
Suire, Rene; Malet, Christian; Speri, Roger J.; and Bernard, Coll, 4,790,851, Cl. 623-16.000.

Bernat, Andre; Delebassee, Denis; Frehel, Daniel; Maffrand, Jean-Pierre; and Vallee, Eric, to Sanofi. Derivatives of the N- $\alpha$ -arylsulfonylaminoacyl-p-aminophenylalaninamides, their preparation process, their use as medicaments and the pharmaceutical compositions containing them. 4,791,102, Cl. 514-19.000.

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Berol Kemi AG: See—  
Allenmark, Stig; Lindstedt, Magnus; and Edebo, Lars, 4,790,978, Cl. 422-28.000.

Berry, Valerie: See—  
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Bertram, Leo; Schemmann, Hugo; and Bukoschek, Romuald L., to U.S. Philips Corp. Drive mechanism for a domestic vibration apparatus. 4,791,327, Cl. 310-41.000.

Beasey, Charles M., to Kolene Corporation. Stop-off composition. 4,790,888, Cl. 148-28.000.

Beth Israel Hospital, Trustees of: See—  
Simon, Morris, 4,790,329, Cl. 128-749.000.

Bethke, Timothy: See—  
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Yoo, Jin S.; Radlowick, Cecelia A.; Karch, John A.; and Bhattacharyya, Alakananda, 4,790,982, Cl. 423-239.000.

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Bibeau, Thomas C.: See—  
Ashmont, Robert S.; Bibeau, Thomas C.; Livaich, Anthony; and McCormick, Nancy J., 4,790,999, Cl. 426-592.000.

Bickford, Bruce: See—  
Augeri, James A.; Bolz, Carl; Bickford, Bruce; Young, Paul; and Johnson, David, 4,791,508, Cl. 360-99.120.

Bier, Mark E.: See—  
Cooks, Robert G.; Bier, Mark E.; Brodbelt, Jennifer S.; Tou, James C.; and Westover, Lemoyne B., 4,791,292, Cl. 250-288.000.

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Biggs, Jane G.; James K. Biggs, Jr., heirs: See—  
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Allred, Jimmie B., III; and Bingham, Richard, 4,790,294, Cl. 128-4.000.

Bioject, Inc.: See—  
Morrow, J. Thomas; and Burns, Marvin, 4,790,824, Cl. 604-143.000.

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Kronen AG Maschinenfabrik. Method and device for inspecting  
empty bottles. 4,790,662, Cl. 356-428.000.

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Harris, Richard W.; Bishop, Frank A.; and Rattlingourd, Glen D.,  
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Klaus, to Dynamit Nobel Aktiengesellschaft. Process for the produc-  
tion of 5-methyltetrazole. 4,791,210, Cl. 548-250.000.

Bissell, Mark A.: See—  
Hensler, Paul L.; and Bissell, Mark A., 4,790,984, Cl. 423-315.000.

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Corp. Method of applying hermetic coating on optical fiber.  
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Baumert, Jean-Claude J. E.; Bjorklund, Gary C.; Lenth, Wilfried;  
Riak, William P., III; and Schellenberg, Franklin M., 4,791,631,  
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Foley, Walter D.; and Blackman, Robert J., 4,791,443, Cl.  
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Kowalski, Alexander; Wilczynski, Joseph; Blankenship, Robert M.;  
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circuit for capturing event in digital camera system. 4,791,589, Cl.  
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Blot, Jean-Claude: See—  
Gautier, Jean-Pierre; and Blot, Jean-Claude, 4,790,235, Cl.  
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Blount, Eugene W.: See—  
Marley, James A.; and Blount, Eugene W., 4,790,335, Cl.  
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indicator. 4,790,811, Cl. 604-27.000.

Bobak, Tadeusz. Display device. 4,791,417, Cl. 340-784.000.

BOC Group, Inc.: See—  
Bagley, Jerome R.; and Spencer, H. Kenneth, 4,791,112, Cl.  
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Kudzman, Linas V.; Spencer, H. Kenneth; and Severnak, Sherry A.,  
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Bockris, John O'M.: See—  
Murphy, Oliver J.; and Bockris, John O'M., 4,790,916, Cl.  
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Speath, Tilman; and Lembeck, Eberhard, 4,790,730, Cl.  
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Schwarzkopf, Gerhart; and Dulat, Bernd, 4,790,493, Cl. 244-3.210.

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Miles Inc. Homogenous specific binding assay reagent system and  
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4,790,772, Cl. 439-439.000.

Boissier, Alain; and Glatigny, Alain, to Matra. Identity document  
difficult to falsify and a process for manufacturing such a document.  
4,790,566, Cl. 283-91.000.

Boitze, Carsten: See—  
Rach, Heinz-Dieter; Frericha, Udo; Klose, Hans-Ulrich; and  
Boitze, Carsten, 4,790,892, Cl. 156-130.700.

Bolz, Carl: See—  
Augeri, James A.; Bolz, Carl; Bickford, Bruce; Young, Paul; and  
Johnson, David, 4,791,508, Cl. 360-99.120.

Bonar Cole Polymers Limited: See—  
Braden, Michael; and Wood, Laurence G., 4,791,150, Cl.  
523-117.000.

Bonice, Jean-Pierre; and Couvrie, Gerard, to Les Cables De Lyon.  
Connection between an optical fiber cable and a junction box.  
4,790,626, Cl. 350-96.200.

Boone, James A.: See—  
Adee, Raymond A.; Boone, James A.; and Lewallen, Dennis L.,  
4,790,389, Cl. 172-776.000.

Booty, Donald J., Jr.: See—  
Booty, Donald J., Sr.; and Booty, Donald J., Jr., 4,790,766, Cl.  
439-122.000.

Booty, Donald J., Sr.; and Booty, Donald J., Jr. Electrical power track  
system. 4,790,766, Cl. 439-122.000.

Bopp, Warren G., to Eaton Corporation. Torsion damping assembly.  
4,790,792, Cl. 464-66.000.

Borner, Alfred. Utensil for cutting food materials. 4,790,488, Cl.  
241-95.000.

Borrelly, Jacques. Sealing device for tubing. 4,790,313, Cl. 128-334.00R.

Bortolin, Bruno; and Dotti, Enrico, to Societa' Cavi Pirelli S.p.A.  
Method and apparatus for cutting optical fibres. 4,790,464, Cl.  
225-2.000.

Bosson, Ann-Britt. Method of Smoothing fabric. 4,790,086, Cl.  
38-144.000.

Bostock, Stephen B.: See—  
Baxter, Anthony G. W.; Bostock, Stephen B.; and Greenwood,  
David, 4,790,879, Cl. 106-22.000.

Boswell, Walter H.; and Hibbard, Richard D. Safety door latch.  
4,790,581, Cl. 292-264.000.

Botos, Ernest D.: See—  
Bailey, John C.; Foley, Timothy D.; and Botos, Ernest D.,  
4,790,969, Cl. 264-105.000.

Boudreaux, Donald P.: See—  
Matrozza, Mark A.; Leverone, Marianne F.; and Boudreaux, Don-  
ald P., 4,790,994, Cl. 426-38.000.

Bourel, Jean; Lebeaupin, Denis; and Schweibel, Olivier, to Stein Heur-  
tey. Automated flexible installation for a rapid thermochemical treat-  
ment. 4,790,750, Cl. 432-239.000.

Bousquet, Jean-Marc; Faubert, Alain; and Vingut, Georges, to Office  
National d'Etudes et de Recherche Aerospatiales. Aerial propellers  
more especially for aircraft propulsive units. 4,790,724, Cl. 416-  
223.00R.

Bousquet, Jean-Marc; and Faubert, Alain, to Office National d'Etudes  
et de Recherche Aerospatiales. Aerial propellers more especially for  
aircraft propulsive units. 4,790,725, Cl. 416-245.00R.

Boucher, Andrew G., Jr., to AMP Incorporated. Shut height adjust-  
ment means in pressing apparatus. 4,790,173, Cl. 72-446.000.

Bowden, Russell; Mauriello, Anthony; and Shah, Hasmukh. Reusable  
injection catheter. 4,790,829, Cl. 604-244.000.

Bowers, Joel A.: See—  
Young, Kenton P.; Colvin, Edward L.; Bowers, Joel A.; and Wes-  
terlund, Robert W., 4,790,884, Cl. 148-2.000.

Bowman, Bradford C., to Hamilton Specialty Bar Division of Slater  
Industries, Inc. Additive for promoting slag formation in steel refin-  
ing ladle. 4,790,872, Cl. 75-10.580.

Boyd, Douglas K.: See—  
Morris, James R.; and Boyd, Douglas K., 4,790,259, Cl.  
118-707.000.

Braden, Michael; and Wood, Laurence G., to Bonar Cole Polymers  
Limited; and London Hospital Medical College, The. Composition  
for use in making bone cement. 4,791,150, Cl. 523-117.000.

Brahim, Haraoubia: See—  
Le Traon, Andre; Brahim, Haraoubia; Pilet, Jean-Claude; De  
Burgat, Michel; Meury, Jean-Loic; and Flore, Le Traon,  
4,791,351, Cl. 324-58.00B.

Brandenstein, Manfred; and Ernst, Horst-Manfred, to SKF GmbH.  
Worm gear. 4,790,203, Cl. 74-424.80R.

Braun, David L.; and Melvin, Donald L., to Minnesota Mining and  
Manufacturing Company. Respiratory mask having a rigid or semi-  
rigid, insert-molded filtration element and method of making.  
4,790,306, Cl. 128-206.120.

Braun, Ernst: See—  
Braun, Gert; and Braun, Ernst, 4,790,425, Cl. 198-731.000.

Braun, Gert; and Braun, Ernst, to Halbach & Braun Industrieanlagen.  
Chain scraper conveyor having centrally guided tension chain and  
catches attached thereto. 4,790,425, Cl. 198-731.000.

Bray, James A.; and Applegate, Robert L., to Weirton Steel Corpora-  
tion. Atomized particle lubrication of cup-shaped can bodies.  
4,791,003, Cl. 427-28.000.

Brecher, Arie. Disposable diaper. 4,790,836, Cl. 604-359.000.

Brennan, Michael P.: See—  
Fisher, Robert C.; Lobanoff, Mark; and Brennan, Michael P.,  
4,791,537, Cl. 362-135.000.

Breu, Karl; and Hoher, Herbert, to Siemens Aktiengesellschaft. Mount  
of a printed circuit board arranged in a bipartite housing. 4,791,526,  
Cl. 361-398.000.

Bricard, Alain: See—  
Guillon, Daniel; and Bricard, Alain, 4,790,900, Cl. 156-441.000.

Bricker, Maurcen L.; and Lawson, R. Joe, to Allied-Signal Inc. Catalyst  
for treatment of exhaust gases from internal combustion engines and  
method of manufacturing the catalyst. 4,791,091, Cl. 502-303.000.

Bridger, Nevill J.; and Turner, Andrew D., to United Kingdom Atomic  
Energy Authority. Electrochemical ion exchange. 4,790,918, Cl.  
204-149.000.

Bridges, Jack E.; Sresty, Guggilam C.; Young, Vincent R.; and Spen-  
cer, Homer L., to ORS Development Corporation. Mineral well  
heating systems. 4,790,375, Cl. 166-60.000.

Bridgestone Corporation: See—  
Fujimaki, Tatsuo; and Oshima, Noboru, 4,791,178, Cl. 525-332.600.

Kadota, Kuninobu, 4,790,366, Cl. 152-343.000.

Tanaka, Atsuo; Okubo, Takao; Ushijima, Takao; and Noguchi,  
Takeaki, 4,790,520, Cl. 267-140.100.

Briot International: See—  
Grandiere, Brigitte, 4,790,643, Cl. 351-45.000.

Britax-Excelsior Limited: See—  
Burleigh, David W.; Czernakowski, Waldemar; and Wetter, Her-  
mann, 4,790,601, Cl. 297-484.000.

British Telecommunications Public Limited Company: See—  
Spriggs, Hugh; Nightingale, Charles; and Turkington, Roger D.,  
4,791,486, Cl. 358-138.000.

Britton, Martin T. Electrical power supply. 4,791,347, Cl. 320-2.000.

Brodelt, Jennifer S.: See—  
Cooks, Robert G.; Bier, Mark E.; Brodelt, Jennifer S.; Tou, James  
C.; and Westover, Lemoine B., 4,791,292, Cl. 250-288.000.

Bronstert, Klaus; and Wagner, Daniel, to BASF Aktiengesellschaft.  
Polymers containing amino groups, their preparation and their use.  
4,791,174, Cl. 525-274.000.

Brooks, Roger, to Controlled Information Corporation. Magnetic  
article surveillance system and method. 4,791,412, Cl. 340-572.000.

Brother Kogyo Kabushiki Kaisha: See—  
Yoshida, Shinji; and Yanagi, Toshiaki, 4,791,344, Cl. 318-567.000.

Brother Kogyo Kabushiki Kaisha: See—  
Miwa, Takahiro; and Nishikawa, Hiroshi, 4,791,500, Cl. 360-60.000.

Brown, Herbert J.; and Stitt, Thomas D., to General Electric Company.  
Speed reducing control system for a polyphase electric motor.  
4,791,341, Cl. 318-809.000.

Brown, Herman: See—  
Walele, Ismail; Brown, Herman; and Esposito, Michael, 4,791,097,  
Cl. 560-112.000.

Brown, Kenneth M.: See—  
Leggett, Hyman, deceased; and Brown, Kenneth M., 4,791,076, Cl.  
501-95.000.

Brown, Larry T.; and Hrovat, Davorin D., to Ford Motor Company.  
Transmission clutch loop transfer control. 4,790,418, Cl. 192-0.032.

Brown, Lawrence B.; Wells, David N.; and Merry, J. Bradford, to  
Chesapeake Laser Systems, Inc. Tracking laser interferometer.  
4,790,651, Cl. 356-4.500.

Brown, Louis R., to TRW Vehicle Safety Systems Inc. Seat belt system.  
4,790,561, Cl. 280-806.000.

Brown, Ross A.; and Davis, Guy M., to TranTek Inc. Shuttle transfer  
system. 4,790,971, Cl. 264-138.000.

Brown, Thomas W.: See—  
Sharp, George P.; and Brown, Thomas W., 4,790,410, Cl.  
182-36.000.

Brown, Vernon L., to Motorola, Inc. Portable radio transceiver hous-  
ing structurally supported by battery. 4,791,527, Cl. 361-424.000.

Browning, Michael R., to Concord St. George Productions Pty. Ltd.  
Entertainment or amusement structure. 4,790,527, Cl. 272-10.000.

Bruce, Charles R.: See—  
Johnson, Irvin D.; and Bruce, Charles R., 4,790,386, Cl.  
166-310.000.

Bruce, Ian D.: See—  
Ahnen, David J.; Akanbi, Charles O.; Bruce, Ian D.; Kramer,  
Jacqueline C.; Larson, Carolyn D.; Ni, Wei-Chen; and Owens,  
Annetta T., 4,791,662, Cl. 379-158.000.

Bruning, John H.; and Siddell, Graham J., to GCA Corporation/Tropel  
Division. Integrated metrology for microlithographic objective  
reducing lens. 4,790,642, Cl. 350-574.000.

Brunner, Hermann; Hauser, Karl H.; and Veith, Werner, to Max-  
Planck-Gesellschaft zur Forderung der Wissenschaften e.V. Reso-  
nance system. 4,791,392, Cl. 333-219.000.

Brunswick Corporation: See—  
Johnson, Clemens A., 4,790,134, Cl. 60-321.000.

Karis, Michael A., 4,790,783, Cl. 440-66.000.

McCormick, Daniel F., 4,790,782, Cl. 440-61.000.

Bryant Grinder Corporation: See—  
Dzwialowski, Victor F.; and Dodd, Walter C., 4,790,545, Cl.  
279-1.00L.

Buchtal Gesellschaft mit beschränkter Haftung: See—  
Bari, Martin, 4,790,110, Cl. 52-173.00R.

Buck, Daniel C.: See—  
Morse, Alfred W.; Buck, Daniel C.; and Grauling, Charles H., Jr.,  
4,791,421, Cl. 342-368.000.

Buentello, Manuel, III: See—  
Janik, Gloria; and Buentello, Manuel, III, 4,791,186, Cl. 528-15.000.

Bugai, John C.: See—  
Gentry, Charles B.; Scanlon, Robert M.; and Bugai, John C.,  
4,790,167, Cl. 72-257.000.

Buhl, Reinhard, to Lemforder Metallwaren AG. Holding ring for seal  
bellows on track rods of motor vehicles. 4,790,681, Cl. 403-134.000.

Bukocek, Romuald L.: See—  
Bertram, Leo; Schemmann, Hugo; and Bukocek, Romuald L.,  
4,791,327, Cl. 310-41.000.

Bulanda, John J.: See—  
Moody, Roy A.; Bulanda, John J.; Levin, Robert F.; Timian,  
Steven S.; and Waltasi, Stephen A., 4,790,225, Cl. 83-100.000.

Bunkoczy, Bela, to Allied Signal Inc. Methods for manufacturing a  
toroidal pressure vessel. 4,790,472, Cl. 228-171.000.

Bunthoff, Dirk: See—  
Mollenhoff, Horst; Rehwinkel, Heiko; and Bunthoff, Dirk,  
4,790,267, Cl. 122-4.00D.

Bunyoz, Yorgi; Rasmussen, Ulrik; and Larsen, Ib, to Flakt AB. Ar-  
rangement for transporting disintegrated particulate solids. 4,790,692,  
Cl. 406-181.000.

Burba, John L., III; and Barnes, Audrey L., to Dow Chemical Com-  
pany, The. Mixed metal hydrosulfide clay adducts as thickeners for  
water and other hydrophilic fluids. 4,790,954, Cl. 252-315.500.

Burckhardt, Urs, to Ciba-Geigy Corporation. Milbemycin derivatives  
and the use thereof in pest control. 4,791,134, Cl. 514-450.000.

Burgdorf, Jochen; and Reinartz, Hans-Dieter, to Alfred Teves GmbH.  
Skid-controlled brake system with master cylinder pistons and with  
plungers supported on stationary transverse member. 4,790,608, Cl.  
303-114.000.

Burgess, Ken L., to Hewlett-Packard Company. Method and apparatus  
for reducing jitter in a digitizer or other transducer. 4,791,592, Cl.  
364-572.000.

Burkart, Susan E.: See—  
Lutomski, Kathryn A.; Burkart, Susan E.; Phillips, Richard B.;  
Roush, David M.; and Turchi, Ignatius J., 4,791,124, Cl.  
514-365.000.

Burkhardt, Norman S., to Intellicard International, Inc. Transaction  
card magnetic stripe emulator. 4,791,283, Cl. 235-438.000.

Burks, Clarence E.: See—  
Burks, Leroy; and Burks, Clarence E., 4,791,400, Cl. 340-59.000.

Burks, Leroy; and Burks, Clarence E. Remote control for engine oil  
level indicator. 4,791,400, Cl. 340-59.000.

Burleigh, David W.; Czernakowski, Waldemar; and Wetter, Hermann,  
to Britax-Excelsior Limited; and Romer-Britax Autogurte GmbH.  
Child's seat for a motor vehicle. 4,790,601, Cl. 297-484.000.

Burlington Industries, Inc.: See—  
Daniel, Vernon T.; and Gettiffe, Jessie, 4,790,155, Cl. 68-205.00R.

Burns, C. A.; DeCoursey, Calvin H.; and Junker, Hans H., to Interna-  
tional Business Machines Corporation. Communications switching  
system. 4,791,629, Cl. 370-85.000.

Burns, Marvin: See—  
Morrow, J. Thomas; and Burns, Marvin, 4,790,824, Cl. 604-143.000.

Burris, James L.: See—  
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James L., 4,790,686, Cl. 405-124.000.

Burroughs Wellcome Co.: See—  
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Bair, Kenneth W., 4,791,232, Cl. 564-387.000.

Bair, Kenneth W., 4,791,233, Cl. 564-387.000.

Batchelor, John F.; Hyde, Richard M.; and Livingstone, David J.,  
4,791,136, Cl. 514-456.000.

Busch, Gerhard. Method and apparatus for separating off individual  
items from a stack of precut strips. 4,790,223, Cl. 83-48.000.

Bushell, Michael J.; and Carr, Robin A. E., to Imperial Chemical  
Industries PLC. Diphenyl ether derivatives and their use as insecti-  
cides. 4,791,139, Cl. 514-721.000.

Bushfield, Harold D., to Olin Fabricated Metal Products, Inc. Electrical  
connecting apparatus. 4,790,780, Cl. 439-887.000.

Bussiere, Jean F.; Jen, Cheng-Kuei; Makarow, Irina D.; Bacroix, Bri-  
gitte; Lequeu, Philippe H.; and Jonas, John J., to Canadian Patents  
and Development Limited. Method of, and an apparatus for, evaluat-  
ing forming capabilities of solid plate. 4,790,188, Cl. 73-597.000.

Busso, Fiorenzo; and Russo, Vincent, to ITT Corporation. Automobile  
seat having retractable protective covering. 4,790,592, Cl.  
297-184.000.

Buttner, Gerhard: See—  
Leikert, Klaus; Rennert, Klaus-Dieter; and Buttner, Gerhard,  
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Byers, Larry L., to Sperry Corporation. High-speed instruction control  
for vector processors with remapping. 4,791,559, Cl. 364-200.000.

Byers, Larry L.: See—  
Lahti, Archie E.; James, Ralph L.; and Byers, Larry L., 4,791,560,  
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Bylin, Robert O.: See—  
Montierth, Garry L.; Bylin, Robert O.; and Scott, Raymond J.,  
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C.P.C. Investment Trust: See—  
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C. Rob Hammerstein GmbH, Firma: See—  
Bauer, Heinz; Becker, Burkhard; Frohnhaus, Ernst-Reiner; Gedig,  
Alfred; Klink, Josef; and Koucky, Antonin, 4,790,597, Cl.  
297-468.000.

Cabrera, Leonel M. Rotary socket wrench. 4,790,218, Cl. 81-57.130.

Caçalloro, Philip A.; and St. Jacques, Joseph A., to General Electric  
Company. Polyester bushing and method of making same. 4,791,247,  
Cl. 174-152.00R.

Caines, R. Scott, to American Hoechst Corporation. Apparatus and  
method for solar heating of water. 4,790,293, Cl. 126-415.000.

Calaby, Lauren F.; and Cooper, David A., to GTE Products Corpora-  
tion. Fiber optic switch. 4,790,621, Cl. 350-96.200.

Calaway, Timothy T. Self-loading and unloading truck trailer assembly.  
4,790,711, Cl. 414-635.000.

Caldwell, Bradley L., to Quaker Oats Company, The. World globe  
geographic area viewer. 4,790,756, Cl. 434-145.000.

California Institute of Technology: See—  
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Caltex Oil (Australia) Pty. Limited: See—  
 Lenny, Leslie M., 4,790,447, Cl. 220-220.000.  
 Cameron Iron Works USA, Inc.: See—  
 Vanderford, Delbert E., Jr., 4,790,379, Cl. 166-208.000.  
 Campanini, Giorgio, to Italtel-Societa Italiana Telecomunicazioni s.p.a. Control unit of input-output interface circuits in an electronic processor. 4,791,553, Cl. 364-200.000.  
 Campanini, Romano: See—  
 Fontana, Antonio; Ferrari, Giovanni; Fabbri, Evro; and Campanini, Romano, 4,790,453, Cl. 222-83.000.  
 Campbell, Bruce D.; Triplett, James T.; and Tylor, Richard E., to Raychem Corp. Methods and apparatus for optical fiber systems. 4,790,617, Cl. 350-96.150.  
 Campbell, Herbert F.: See—  
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 Campbell, James T.: See—  
 Grandfield, John; Campbell, James T.; Gundel, Carl H.; and Shilue, William, 4,791,377, Cl. 328-14.000.  
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 Canavesi, Luigi: See—  
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 Canon Kabushiki Kaisha: See—  
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 Fushikimo, Hideo, 4,791,608, Cl. 365-52.000.  
 Harada, Yoshitake; and Ishizaki, Akira, 4,790,649, Cl. 354-400.000.  
 Kozaki, Susumu; Nakayama, Tadayoshi; and Sato, Chikara, 4,791,487, Cl. 338-140.000.  
 Nagashima, Naoki; Sugahara, Kiyohisa; and Yamada, Masanori, 4,791,492, Cl. 358-256.000.  
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 Ogura, Makoto; Kawai, Tatsundo; Yamada, Katsuhiko; and Seito, Shinichi, 4,791,493, Cl. 358-294.000.  
 Ohmi, Tadashi; and Tanaka, Nobuyoshi, 4,791,469, Cl. 357-30.000.  
 Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Nakagiri, Takashi; Nishimura, Yukuo; and Takimoto, Kiyoshi, 4,790,664, Cl. 356-432.000.  
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 Caputo, Francis A., Sr.; and Piraino, Vincent J., to Becton Dickinson AcuteCare, Inc. Surgical knife. 4,790,312, Cl. 128-305.000.  
 Cardiac, Inc.: See—  
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 Cardone, Gary A.: See—  
 Angel, David J.; Cardone, Gary A.; Holbrook, Mark D.; Moskun, James P.; and Patterson, Bruce, 4,791,557, Cl. 364-200.000.  
 Cardoso, Daniel A., to Tubos e Conexoes Tigre S/A. Sealing system between a metal insert and plastic coupling, and resulting product. 4,790,573, Cl. 285-330.000.  
 Cardwell, William L.; and Hodge, Charles A. Tubular concrete form collar. 4,790,509, Cl. 249-93.000.  
 Carey, Brian R.: See—  
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 Carl-Zeiss-Stiftung: See—  
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 Carlson, Robert L., to Ford Motor Company. Method of forming a counter electrode for an electrochromic optical shutter. 4,790,636, Cl. 350-357.000.  
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 Carpio, Ronald A., to Immos Corporation. Fast method of measuring phosphorus concentration in PSG and BPSG films. 4,791,296, Cl. 250-339.000.  
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 Carrico, Robert J.: See—  
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 Carrier Corporation: See—  
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 Carrott, John A.: See—  
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Carter, David C. M.: See—  
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 Carter, Robert E.; and Stone, Porter, to Piezo Electric Products, Inc. Delayed actuator with visco-elastic timer. 4,791,251, Cl. 200-33.000.  
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 Cassou, Maurice: See—  
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 Cassou, Robert; Cassou, Maurice; and Cassou, Bertrand. Apparatus for dispensing cylindrical capsules. 4,790,451, Cl. 221-233.000.  
 Castaldi, Frank J.; Trofe, Timothy W.; Page, Gordon C.; and Adams, Kevin M., to Radian Corporation. Process for wastewater treatment. 4,790,940, Cl. 210-611.000.  
 Castetter, Thomas L.: See—  
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 Castner, Raymond P.: See—  
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 Cerefece, Steven A.: See—  
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Daniel, Vernon T.; and Gettiffe, Jessie, to Burlington Industries, Inc. Replaceable fluid dye applicator for inert-blanketed regions. 4,790,155, Cl. 68-205.00R.

Daniels, James A.; and Douthett, Joseph A., to Armco Advanced Materials Corporation. Silicon modified low chromium ferritic alloy for high temperature use. 4,790,977, Cl. 420-104.000.

Dankowski, Manfred; Liezer, Thomas; Preacher, Gunter; and Leonhardt, Wolfgang, to Degussa Aktiengesellschaft. Aqueous bleaching agent suspensions containing peroxycarboxylic acid, method for their preparation and use. 4,790,949, Cl. 252-95.000.

Daspit, Ronald A. Method and apparatus for remote under water torch cutting. 4,790,886, Cl. 148-9.00C.

Dataproducts Corporation: See—  
Guiles, Joseph W., 4,791,439, Cl. 346-140.00R.

Dauscher, Rudi: See—  
Suling, Carliana; Kausch, Michael; and Dauscher, Rudi, 4,791,187, Cl. 528-60.000.

Devalos, Manuel R.; and Feldman, Kenneth B. Protective support assembly for an occupant of a vehicle. 4,790,593, Cl. 297-250.000.

David, James J., to Du Pont de Nemours, E. I., and Company. Transition connector. 4,790,775, Cl. 439-579.000.

Davidson, James A.: See—  
Dunn, Richard L.; Lewis, Danny H.; Sander, Thomas W.; Davidson, James A.; Beals, Neil B.; and Gill, Yancy L., 4,790,850, Cl. 623-13.000.

Davies, David W. Apparatus for recognition and termination of ventricular tachycardia and ventricular fibrillation. 4,790,317, Cl. 128-419.00D.

Davis, Guy M.: See—  
Brown, Ross A.; and Davis, Guy M., 4,790,971, Cl. 264-138.000.

Davis, Marvin B., to Laser Magnetic Storage International Company. Disk cartridge with slide door engageable in either of two orientations. 4,791,511, Cl. 369-291.000.

Davis, Ronald G.; Dennis, David S.; Hickman, James S.; and Linch, William J., to General Motors Corporation. Solenoid valve assembly. 4,790,513, Cl. 251-129.210.

Day, George B.; V. Wells, Larry G.; Smith, Timothy D.; and Ross, Ira J., to University of Kentucky Research Foundation, The. Portable curing frame. 4,790,334, Cl. 131-290.000.

Day, Jeffrey C.: See—  
Christ, F. Richard; Pettit, Dean K.; and Day, Jeffrey C., 4,790,846, Cl. 623-6.000.

DCI Technology: See—  
Carroll, David T., 4,791,546, Cl. 363-95.000.

De Dietrich (USA), Inc.: See—  
Lerman, Michael J.; and Zamory, William B., 4,790,518, Cl. 267-64.110.

Dean, Bernard J.: See—  
Gregory, David P.; Dean, Bernard J.; and Postle, Stephen R., 4,791,155, Cl. 524-22.000.

Dean, Thomas E.; and Henrich, William H., to Thomas Industries, Inc. Fluorescent lamp circuit with regulation responsive to voltage, current, and phase of load. 4,791,338, Cl. 315-174.000.

Deaver, Don A., to Tenneco, Inc. Muffler with reverse flow passages. 4,790,409, Cl. 181-265.000.

De Burgat, Michel: See—  
Le Traon, Andre; Brahim, Haraouba; Pilet, Jean-Claude; De Burgat, Michel; Meury, Jean-Loic; and Flore, Le Traon, 4,791,351, Cl. 324-58.00B.

Decelles, Fabien; and Decelles, Pierre. Climbing and descending vehicle. 4,790,548, Cl. 280-5.260.

Decelles, Pierre: See—  
Decelles, Fabien; and Decelles, Pierre, 4,790,548, Cl. 280-5.260.

DeCoursey, Calvin H.: See—  
Burns, C. A.; DeCoursey, Calvin H.; and Junker, Hans H., 4,791,629, Cl. 370-85.000.

Deering, Michael F.; and Hunt, Neil, to Schlumberger Systems and Services, Inc. VSP Connectivity pattern recognition system. 4,791,675, Cl. 382-18.000.

Deger, Kurt W. Parallel coil pin ball flipper solenoid. 4,790,536, Cl. 273-121.00A.

De Grujter, Wilhelmus A. E. M., to Angli Holding B.V. Electrically insulated joint for metal pipes. 4,790,570, Cl. 285-54.000.

Degussa AG: See—  
Dorr, Jürgen; Kleinschmit, Peter; Klingel, Reinhard; and Manner, Reinhard, 4,791,082, Cl. 502-65.000.

Degussa Aktiengesellschaft: See—  
Dankowski, Manfred; Liezer, Thomas; Preacher, Gunter; and Leonhardt, Wolfgang, 4,790,949, Cl. 252-95.000.

Deiotte, Charles E., to Optotech, Inc. File management system for use in an optical data storage system. 4,791,623, Cl. 369-59.000.

Deki, Tsuyoshi: See—  
Takahashi, Sadao; and Deki, Tsuyoshi, 4,791,454, Cl. 355-15.000.

Delebassee, Denis: See—  
Bernat, Andre; Delebassee, Denis; Frebel, Daniel; Maffrand, Jean-Pierre; and Vallee, Eric, 4,791,102, Cl. 514-19.000.

DeLuca, James T.; and Fasano, Michael. Method for clearing epiglottal passages. 4,790,818, Cl. 604-54.000.

De Man, Teunis: See—  
Holemans, Pieter M. J.; Schijf, Robert; Van Putte, Karel P. A. M.; and De Man, Teunis, 4,791,000, Cl. 426-606.000.

De Marca, Jose R. B.; and Jayant, Nugehalli S., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Reducing the effects of channel noise in digital transmission of information. 4,791,654, Cl. 375-122.000.

DeMarco, Thomas. Two compartment industrial dust collector. 4,790,865, Cl. 55-337.000.

DeMarr, Robert A. Super hero cup holder. 4,791,030, Cl. 428-542.400.

de Masi, Amerigo. Multi-purpose apparatus for the imaging of printed wired boards. 4,791,458, Cl. 355-53.000.

De Meglio, PierGiuseppe: See—  
Picciola, Giampaolo; Riva, Mario; De Meglio, PierGiuseppe; and Gentili, Piergiorgio, 4,791,104, Cl. 514-58.000.

Demukai, Noboru: See—  
Sugura, Saburo; Ikeda, Masanobu; and Demukai, Noboru, 4,790,516, Cl. 266-144.000.

Dennis, Jean-Joseph: See—  
Bellet, Jean-Claude; Saucereau, Didier; Denis, Jean-Joseph; and Falaise, Daniel, 4,790,744, Cl. 431-75.000.

Dennis, David S.: See—  
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Derfi: See—  
Schmalholz, Denis, 4,790,896, Cl. 156-392.000.

DeRovira, Dorf A.: See—  
Mason, J. Russell; Kare, Morley R.; and DeRovira, Dorf A., 4,790,990, Cl. 424-438.000.

Dervan, Andrew H.; and Kordomenos, Panagiotis I., to Du Pont de Nemours, E. I., and Company. Chip resistant coating compositions containing epoxy-polyester graft copolymers. 4,791,179, Cl. 525-438.000.

Descamps, Marcel; and Berger, Yves, to Sanofi. Pharmaceutical and veterinary compositions for the treatment of ischemic cardiac disorders. 4,791,137, Cl. 514-469.000.

Despotis, George. Endotracheal intubation device. 4,790,327, Cl. 128-719.000.

Detzer, Rudiger; and Gersch, Dietfried, to Kessler & Luch GmbH. Apparatus for cleaning contaminated surfaces by means of flowing air. 4,790,080, Cl. 34-225.000.

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Mollenhoff, Horst; Rehwinkel, Heiko; and Bunthoff, Dirk, 4,790,267, Cl. 122-4.00D.

Deutsche ITT Industries GmbH: See—  
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Devlin, Michael T.: See—  
Stevenson, David R.; and Devlin, Michael T., 4,791,550, Cl. 364-200.000.

DeVoe, Robert J.: See—  
Mitra, Smarajit; and DeVoe, Robert J., 4,791,045, Cl. 430-281.000.

De Wilde, Johannes: See—  
Sauerwald, Wilhelm A.; De Wilde, Johannes; Van Eerdewijk, Karel J. E.; Beekers, Franciscus P. M.; and Segers, Marinus T. M., 4,791,358, Cl. 324-73.00R.

Dewing, Ernest W., to Alcan International Limited. Refining of lithium-containing aluminum scrap. 4,790,917, Cl. 204-140.000.

Diamond Scientific Co.: See—  
Wieschahn, Gary P.; Giles, Richard E.; and Stevens, David R., 4,791,062, Cl. 435-238.000.

Dick, Edward M. Keyring accessory. 4,790,161, Cl. 70-456.00R.

Dickinson, Ben W. O., III; Dickinson, Robert W.; Jensen, Richard R.; May, Sherman C.; Mackey, Charles S.; and Wilkes, Robert D., Jr., to Dickinson, Ben Wade Oakes, III; and Dickinson, Robert Wayne. Hydraulic drilling apparatus and method. 4,790,394, Cl. 175-61.000.

Dickinson, Ben Wade Oakes, III: See—  
Dickinson, Ben W. O., III; Dickinson, Robert W.; Jensen, Richard R.; May, Sherman C.; Mackey, Charles S.; and Wilkes, Robert D., Jr., 4,790,394, Cl. 175-61.000.

Dickinson, Robert W.: See—  
Dickinson, Ben W. O., III; Dickinson, Robert W.; Jensen, Richard R.; May, Sherman C.; Mackey, Charles S.; and Wilkes, Robert D., Jr., 4,790,394, Cl. 175-61.000.

Dickinson, Robert Wayne: See—  
Dickinson, Ben W. O., III; Dickinson, Robert W.; Jensen, Richard R.; May, Sherman C.; Mackey, Charles S.; and Wilkes, Robert D., Jr., 4,790,394, Cl. 175-61.000.



Dicks, Richard M.; See—  
Sherman, Leigh E.; Whatecott, Gary L.; Dicks, Richard M.; and Maden, David C., 4,791,570, Cl. 364-436.000.

Dickson, LeRoy D., to International Business Machines Corporation. Method and apparatus for copying holographic disks. 4,790,612, Cl. 350-3.690.

Didier, Bernard; See—  
Larcher, Philippe; Irigoien-Guichandut, Francois; Vassy, Daniel; Lemci, Michel; Longepierre, Patrick; and Didier, Bernard, 4,790,564, Cl. 283-69.000.

Diehr, Hans-Joachim; See—  
Forster, Heinar; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hansler, Gerd, 4,791,208, Cl. 548-136.000.

Diekman, Robert L.; and Barchek, Douglas A., to Huff Corporation. Bicycle control lever mounting system. 4,790,207, Cl. 74-523.000.

Diekmann, Bernd; See—  
Tossmann, Armin; and Diekmann, Bernd, 4,790,583, Cl. 292-336.300.

Dieringer, Bruce G.; and Rothrauff, Kenneth E., to Nordson Corporation. Hot melt dispensing apparatus having offset hopper. 4,790,455, Cl. 222-146.200.

Dieter Mann GmbH; See—  
Mann, Dieter; Formoff, Dieter; Ries, Andreas; Klett, Eberhard; and van Suntum, Michael, 4,790,647, Cl. 351-245.000.

Dietiker, Paul; and Johnson, Frederick W., to Honeywell Inc. Slow opening and fast closure gas valve. 4,790,352, Cl. 137-613.000.

Digital Equipment Corporation; See—  
Natusch, Paul J.; Senerchia, David C.; and Henry, John F., Jr., deceased, 4,791,552, Cl. 364-200.000.

Sudama, Ram; Porcher, Thomas C.; and Leichter, Jerrold S., 4,791,566, Cl. 364-200.000.

Digumarthi, Ramaro; See—  
Hamill, James; Digumarthi, Ramaro; Conlon, William; Cheng, Dah Y.; and Chang, Chung-Nan, 4,790,269, Cl. 122-406.0ST.

Dinger, Horst; See—  
Halsig, Andreas; Moosmann, Horst; and Dinger, Horst, 4,790,246, Cl. 102-254.000.

Dipl.-Kfm. Cremer, Peter; See—  
Auer, Helmut, 4,790,443, Cl. 220-23.400.

Director-General of the Agency of Science and Technology, an Organ of the Ministry of International Trade and Industry of Japan; See—  
Murasu, Ichiki; Ohnishi, Toshihiro; and Noguchi, Takanobu, 4,791,177, Cl. 525-328.500.

Dirks, Rolf, to Felten & Guillaume Energietechnik GmbH. Locking mechanism for doors of switching cells. 4,790,158, Cl. 70-139.000.

Dipen Pak Japan Co., Inc.; See—  
Fukushima, Tadao, 4,790,429, Cl. 206-219.000.

Dixon Automatic Tool, Inc.; See—  
Dixon, Paul H., 4,790,427, Cl. 198-803.010.

Dixon, Paul H., to Dixon Automatic Tool, Inc. Apparatus for handling pallet-supported workpieces. 4,790,427, Cl. 198-803.010.

Djuric, Stevan W.; Haack, Richard A.; and Miyashiro, Julie M., to G. D. Searle & Co. Phenylene, furyl, and thienyl leukotriene B<sub>4</sub> analogues. 4,791,133, Cl. 514-438.000.

Dr. Ing. h.c.F. Porsche Aktiengesellschaft; See—  
Muller, Robert; Hoebel, Peter; and Maier, Ulrich, 4,790,210, Cl. 74-665.0GA.

Dr. Johannes Heidenhain GmbH; See—  
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Dodd, Walter C.; See—  
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Doherty, John P. Power wallpaper removal adapter for jigsaws. 4,790,045, Cl. 15-236.010.

Doi, Miwako, to Kabushiki Kaisha Toshiba. System for translation of sentences from one language to another. 4,791,587, Cl. 364-900.000.

Dokmo, Richard C.; See—  
Rosen, Ralph M.; Gebhardt, Terry D.; and Dokmo, Richard C., 4,790,803, Cl. 493-195.000.

Domain Systems, Inc.; See—  
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Dombro, Robert A.; and Kirch, William, to Enron Chemical Corporation. Zirconia-titania-silica tergets and their use as catalyst supports. 4,791,089, Cl. 502-236.000.

Dombrowski, Mitchell P.; and Welch, Robert A. Self-capping needle assembly. 4,790,828, Cl. 604-198.000.

Dominguez, Henri, to Total Compagnie Francaise des Petroles. Immersible electrical coupling. 4,790,768, Cl. 439-320.000.

Donaldson Company, Inc.; See—  
Wagner, Wayne M.; Flemming, Douglas E.; Rocklitz, Gary J.; and Bethke, Timothy, 4,790,574, Cl. 285-419.000.

Donaldson, Stuart G.; Groeneveld, Hendrik W.; Klumper, Christian; Miller, Robert T.; Whitbeck, Richard W.; and Longnecker, Robert H., to Global Technology International, Inc. Portable EPROM programming and data transfer apparatus. 4,791,661, Cl. 379-96.000.

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Giguere, Jean P., 4,790,108, Cl. 49-484.000.

Dopp, Robert B., to Rayovac Corporation. Sealing sleeve. 4,791,034, Cl. 429-27.000.

Dorr, Jürgen; Kleinschmit, Peter; Klingel, Reinhard; and Manner, Reinhard, to Degussa AG. Method of making zeolite castings. 4,791,062, Cl. 502-65.000.

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Dover Corporation; See—  
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Dow Chemical Company, The; See—  
Burba, John L., III; and Barnes, Audrey L., 4,790,954, Cl. 252-315.500.

Childress, David L.; Weaver, John D.; and Tasset, Emmett L., 4,791,081, Cl. 502-62.000.

Cooks, Robert G.; Bier, Mark E.; Brodbelt, Jennifer S.; Tou, James C.; and Westover, Lemoyne B., 4,791,292, Cl. 250-288.000.

Kirchhoff, Robert A.; Gilpin, Jo Ann; Baker, Cynthia; and Myers, Michael O., 4,791,182, Cl. 526-221.000.

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Sorenson, Marius W., 4,790,914, Cl. 204-98.000.

Teot, Arthur S., 4,790,958, Cl. 252-8.553.

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Dow Corning Corporation; See—  
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Dow Corning France S.A.; See—  
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Doyama, Yoshiaki; Kubo, Kanji; and Yamada, Koichi, to Matsushita Electric Industrial Co., Ltd. Apparatus for reproducing information at variable speeds from a magnetic tape. 4,791,507, Cl. 360-77.150.

Drackett Company, The; See—  
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Drage, David J.; Lachenbruch, Roger B.; Drake, Herbert G., Jr.; and Peavey, Jerris H., to Tegal Corporation. Magnetically coupled wafer lift pins. 4,790,258, Cl. 118-500.000.

Drake, Herbert G., Jr.; See—  
Drage, David J.; Lachenbruch, Roger B.; Drake, Herbert G., Jr.; and Peavey, Jerris H., 4,790,258, Cl. 118-500.000.

Drawert, Manfred; and Krause, Horst, to Schering AG. Carboxylated polyamide from isophthalic acid and polyalkylene polyamine. 4,791,169, Cl. 524-608.000.

Draz, Arthur J.; Whitlow, Dana E.; and Blazo, Stephen F., to Tektronix, Inc. Liquid crystal light valve with spatially uniform light transmittance characteristics. 4,791,339, Cl. 315-386.000.

Drennan, George A.; See—  
Bloomquist, Darrel R.; Drennan, George A.; and Opfer, James E., 4,790,921, Cl. 204-192.120.

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Drever, Leslie C. Microphone suspension assembly. 4,791,674, Cl. 381-169.000.

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Dreyer, John F., Jr.; and Strand, Neal T., to Minnesota Mining and Manufacturing Company. Light fixture providing normalized output. 4,791,540, Cl. 362-331.000.

Driesen, Gerald J., to Hart Design & Manufacturing Inc. Discharge manifold for cheese casting machine. 4,790,242, Cl. 99-455.000.

Droke, Edward J., Jr. Apparatus for playing marbles. 4,790,535, Cl. 273-118.00R.

Drutchas, Elaine M., legal representative; See—  
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Drutchas, Gilbert H., deceased (by Drutchas, Elaine M., legal representative), to TRW Inc. Electroviscous fluid control device. 4,790,522, Cl. 267-225.000.

Dube, George, to General Electric Company. Laser system incorporating broad band optical phase conjugation cell using stimulated Brillouin scattering. 4,791,644, Cl. 372-3.000.

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Duerer, Stormy W. Eye shield. 4,790,031, Cl. 2-15.000.

Dufour, Pierre, to Salomon S.A. Golf shoe. 4,790,083, Cl. 36-127.000.

DuLaney, Donald C.; and Lindsay, Robert H., to Lindsay Finishes. Resurfacing compositions and methods. 4,791,159, Cl. 524-297.000.

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Duncan, George I.; and Phelps, Stephen L., to Advance Transformer Company. Protected potted metallized film capacitor. 4,791,529, Cl. 361-274.000.

Dunham, Michael D.; Dykstra, Thomas M.; Vahlsing, Donald W.; and Ehlers, Paul L., to Effective Security Systems, Inc. Apparatus for controlling the use of computer software. 4,791,365, Cl. 364-200.000.

Dunn, C. Lamar; and Turner, David L., to Southeastern Water Conservation Systems, Inc. Renovation of used water from poultry processing plants. 4,790,943, Cl. 210-705.000.

Dunn, Richard L.; Lewis, Danny H.; Sander, Thomas W.; Davidson, James A.; Beals, Neil B.; and Gill, Yancy L., to Richards Medical Company. Prosthetic ligament. 4,790,850, Cl. 623-13.000.

Dunn, William A. E.; and Gowlett, David J., to U.S. Philips Corp. Infrared detectors. 4,791,298, Cl. 250-352.000.

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Van Wijngaarden, Ineke; Kruse, Cornelia G.; Van Hes, Roelof; and Van Der Heyden, Johannes A. M., 4,791,132, Cl. 514-427.000.

DuPlant, Robert L. Gauge pin holder. 4,790,073, Cl. 33-178.00B.

Du Pont de Nemours, E. I., and Company; See—  
Baylor, Charles, Jr., 4,790,919, Cl. 204-182.800.

David, James J., 4,790,775, Cl. 439-579.000.

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Hahn, Marilyn E., 4,790,773, Cl. 439-474.000.

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Dwyer, Anthony F. Dual-rigid-hollow-stem actuators in opposite-phase slurry pump drive having variable pumping speed and force. 4,790,728, Cl. 417-342.000.

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Dynamit Nobel Aktiengesellschaft; See—  
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Dynasac Light Equipment AB; See—  
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Dzewaltowski, Victor F.; and Dodd, Walter C., to Bryant Grinder Corporation. Workpart centering mechanism for a chuck. 4,790,545, Cl. 279-1.00L.

Eastman Kodak Company; See—  
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Foley, Walter D.; and Blackman, Robert J., 4,791,443, Cl. 354-321.000.

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Moschauer, Michael; Spitzer, Jerome G., deceased; Stodt, Michael D.; and Zeise, Eric K., 4,791,450, Cl. 355-4.000.

Sumner, Charles E., Jr.; and Fugate, Eric J., 4,791,224, Cl. 362-421.000.

Weaver, Max A.; Pruett, Wayne P.; and Hilbert, Samuel D., 4,790,188, Cl. 528-288.000.

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Bopp, Warren G., 4,790,792, Cl. 464-66.000.

Grass, William E.; and Sladek, Donald R., 4,791,525, Cl. 361-363.000.

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Ebato, Kazuo; See—  
Kusakawa, Takaji; Ebato, Kazuo; Tohge, Takeya; Noda, Masato; and Kuroda, Yasuhide, 4,790,368, Cl. 164-480.000.

Ebine, Yoshio; See—  
Yokoyama, Yukio; Ebine, Yoshio; and Ito, Toahio, 4,791,423, Cl. 343-700.0MS.

Eckert, Best; Huber, Guido; and Richle, Norbert, to Lonza, Ltd. Process for application of free-flowing material on the inner surface of a tube blank and device for performing the process. 4,790,263, Cl. 118-317.000.

Ecolab Inc.; See—  
Kozio, Dale L., 4,790,666, Cl. 366-165.000.

Econodoc, Inc.; See—  
Chilcote, Elmer F., 4,790,118, Cl. 53-411.000.

Edebo, Lars; See—  
Allanmark, Stig; Lindstedt, Magnus; and Edebo, Lars, 4,790,978, Cl. 422-28.000.

Edmonds, Joseph. Utility carrier. 4,790,559, Cl. 280-655.000.

Edwards, Gary L. Saw guide having pivotal protractor means. 4,790,072, Cl. 30-376.000.

Effective Security Systems, Inc.; See—  
Dunham, Michael D.; Dykstra, Thomas M.; Vahlsing, Donald W.; and Ehlers, Paul L., 4,791,565, Cl. 364-200.000.

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- Ernst, Horst-Manfred: See—  
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- ETA Systems, Inc.: See—  
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- Evans, Louis E., Jr.: See—  
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- Ewing, Robert L., to Manville Corporation. Luminaire having quick-disconnect electrical components. 4,791,539, Cl. 362-226.000.
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- Exxon Research & Engineering Co.: See—  
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- Eyal Engineering & Industrial Co. Ltd.: See—  
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- Faini, Gerard. Ring shank. 4,790,148, Cl. 63-15.700.
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Savoca, Robert C.; and Falbel, Gerald, 4,791,297, Cl. 250-347.000.
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- Fasano, Michael: See—  
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- Fasco Industries, Inc.: See—  
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- Fauret, Jerome: See—  
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- Fedeli, Jean-Marc; Louis, Christine; Magnin, Joel; and Vabre, Maryse, to Commissariat a l'Energie Atomique. Hybrid junction for a magnetic bubble memory. 4,791,605, Cl. 365-36.000.
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- Feldman, Kenneth B.: See—  
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- Felten & Guillaume Energietechnik GmbH: See—  
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- Ferrenberg, Allan J.; and Webber, William T., to Regenic Corporation. Regenerative internal combustion engine. 4,790,284, Cl. 123-543.000.
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- Fields, Raymond C.: See—  
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- Finney, David, to General Electric Company, p.l.c. The. Induction motor drive arrangement. 4,791,340, Cl. 318-809.000.
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Sacco, Tommaso, 4,790,899, Cl. 156-421.000.
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- Fischer, Rolf, to BASF Aktiengesellschaft. Preparation of etherified 3-hydroxyvalerates. 4,791,219, Cl. 560-187.000.
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- Fischer, Rudolf, to BBC Brown Boveri AG. Device for detecting interfering arcs. 4,791,518, Cl. 361-2.000.
- Fischl, Franz H.; and Pickhard, Ewald. Artificial fertilization catheter. 4,790,814, Cl. 604-27.000.
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- Fisons plc: See—  
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- Fitzpatrick, Mark E.: See—  
Graham, Andrew C.; and Fitzpatrick, Mark E., 4,791,322, Cl. 307-475.000.
- Flachenecker, Gerhard: See—  
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- Flickner, Myron D.; and Ali Mohiuddin, Kottapuram M., to International Business Machines Corporation. Method and means for efficiently handling boundary conditions in connected component labeling. 4,791,676, Cl. 382-26.000.
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- Focke & Co. (GmbH & Co.): See—  
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- Foley, Timothy D.: See—  
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- Foley, Walter D.; and Blackman, Robert J., to Eastman Kodak Company. Photographic processor with auxiliary power supply. 4,791,443, Cl. 354-321.000.
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- Carlson, Robert L., 4,790,636, Cl. 350-357.000.
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- Kostun, John D., 4,790,864, Cl. 55-276.000.
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- Schechter, Michael M., 4,790,277, Cl. 123-357.000.
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- Fornoff, Dieter: See—  
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- Forry, John S.: See—  
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- Fowler, David E., to Quadrex HPS Inc. Apparatus for removing PCB's from electrical apparatus. 4,790,337, Cl. 134-109.000.
- Fox, William C.: See—  
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- Fracassi, Francesco: See—  
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- Fradera, Alejandro P. Screw for dental implants. 4,790,753, Cl. 433-174.000.
- Francine d'Organo Synthese: See—  
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- France Implant: See—  
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- Freed, W. Wayne. Fiber reinforced soil and method. 4,790,691, Cl. 405-263.000.
- Freedman, Milton W.; and Tucker, Dan. Multi-probe, hand-held circuit tester. 4,791,376, Cl. 324-555.000.
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- Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., to American Maize-Products Company. Food stuffs containing starch of an amylose extender dull genotype. 4,790,997, Cl. 426-578.000.
- Friedrich, Konrad: See—  
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- Frischkorn, Hans: See—  
Schinzel, Erich; Frischkorn, Hans; and Martini, Thomas, 4,791,205, Cl. 548-106.000.
- Frohnhaus, Ernst-Reiner: See—  
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- Fuchizawa, Tetsuro: See—  
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- Fuentes, Lelia M.: See—  
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- Fugate, Eric J.: See—  
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- Fuji Electric Co., Ltd.: See—  
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- Fuji Photo Film Co., Ltd.: See—  
Aono, Toshiaki; and Shibata, Takeaki, 4,791,042, Cl. 430-203.000.
- Arakawa, Satoshi; Hosoi, Yuichi; Yamazaki, Hisashi; and Ito, Yoshihiro, 4,791,009, Cl. 427-64.000.
- Asanuma, Katsumi; and Shinada, Hidetoshi, 4,791,591, Cl. 364-571.040.
- Fujimoto, Hiroshi; and Sakamoto, Kiichiro, 4,791,444, Cl. 354-324.000.
- Hirai, Hiroyuki; Yabuki, Yoshiharu; and Iwano, Haruhiko, 4,791,048, Cl. 430-372.000.
- Honda, Kunihiko; Miura, Toshihiko; and Araki, Hiroaki, 4,791,021, Cl. 428-329.000.
- Iida, Akihisa, 4,791,304, Cl. 250-563.000.
- Ikedo, Kensuke; and Iwakura, Ken, 4,791,095, Cl. 503-209.000.



- Kawajiri, Kazuhiro; and Tabei, Masatoshi, 4,791,307, Cl. 250-578.000.
- Kojima, Tetsuro; Hirano, Shigeo; and Usui, Hideo, 4,791,049, Cl. 430-544.000.
- Komatsu, Kazunori; and Sato, Tsunehiko, 4,791,032, Cl. 428-694.000.
- Miyakawa, Tadashi; Yanagihara, Kazuhiko; Oishi, Hisao; Takahashi, Tsunehiko; Nakamura, Takeshi; Akimoto, Kazuhiko; and Shioji, Mitsuaki, 4,790,632, Cl. 350-347.00V.
- Murayama, Jin; Tamura, Hiroshi; and Kudoh, Yoshimitsu, 4,791,047, Cl. 430-321.000.
- Nakashima, Hiroshi; and Fukuhara, Sanshiro, 4,790,468, Cl. 226-97.000.
- Ogawa, Akira; and Fukuzawa, Hiroshi, 4,791,050, Cl. 430-506.000.
- Ogawa, Tadashi, 4,791,053, Cl. 430-581.000.
- Sakanoue, Kei; and Hirano, Tsumoru, 4,791,051, Cl. 430-548.000.
- Sano, Shojiro; and Saeki, Keiso, 4,791,094, Cl. 503-209.000.
- Seto, Kunihira, 4,791,516, Cl. 360-133.000.
- Suzuki, Fumiyuki; Tamura, Yoshiaki; and Shiba, Keisuke, 4,791,004, Cl. 427-34.100.
- Suzuki, Yoshiaki; Hayashi, Gouchi; and Tsuboi, Masayoshi, 4,791,023, Cl. 428-336.000.
- Tamagawa, Shigeharu; Koike, Kazuyuki; and Fuchizawa, Tetsuro, 4,791,093, Cl. 503-200.000.
- Fuji Xerox Co., Ltd.: See—
- Aoki, Takayoshi; Takeda, Masayuki; Suzuki, Chiaki; and Nagatsuka, Ikutaro, 4,791,041, Cl. 430-108.000.
- Fujie, Norikazu; and Sugiyama, Hitoshi, to Pioneer Electronic Corporation; and Pioneer Video Corporation. Signal processing circuit for a telephone set, 4,791,638, Cl. 379-392.000.
- Fujii, Norikazu: See—
- Matsura, Masaru; Obata, Akio; Fujii, Norikazu; Nobuhara, Akio; and Fukushima, Danji, 4,791,001, Cl. 426-634.000.
- Fujii, Yoshihumi: See—
- Nakane, Yasuji; and Fujii, Yoshihumi, 4,790,456, Cl. 222-183.000.
- Fujikura, Makoto; Ohno, Toshiyuki; Onuma, Shigeharu; Tamahashi, Kunihiko; Chigasaki, Mitsu; and Shimamura, Yasuo, to Hitachi Ltd.; and Hitachi Chemical Company, Ltd. Multilayered electrophotographic photosensitive member, 4,791,040, Cl. 430-64.000.
- Fujimaki, Tatsuo; and Oshima, Noboru, to Bridgestone Corporation. Rubber composition for use in tire tread comprising a rubber component, carbon black and process oil, 4,791,178, Cl. 525-332.600.
- Fujimori Kogyo Co., Ltd.: See—
- Nagata, Masanori; Imano, Shigeaki; Kaneoka, Tsugio; and Asada, Kiyotoshi, 4,791,655, Cl. 378-57.000.
- Fujimoto, Hiroshi; and Sakamoto, Kiichiro, to Fuji Photo Film Co., Ltd. Waste solution treating apparatus, 4,791,444, Cl. 354-324.000.
- Fujimoto, Koichi: See—
- Ide, Junya; and Fujimoto, Koichi, 4,791,196, Cl. 540-227.000.
- Fujishiro, Masami: See—
- Goto, Toyokichi; and Fujishiro, Masami, 4,790,804, Cl. 493-226.000.
- Fujitsu Limited: See—
- Arakawa, Hideki, 4,791,614, Cl. 365-228.000.
- Hata, Seiichi; Akima, Hideo; Kitagawa, Kiyoshi; Hyodo, Masaya; and Niinomi, Koji, 4,790,420, Cl. 192-111.00A.
- Igarashi, Masato; and Suehiro, Yoshiyuki, 4,791,607, Cl. 365-51.000.
- Ishitsuka, Takeshi; Yamagishi, Yasuo; and Mochizuki, Akihiro, 4,791,039, Cl. 430-2.000.
- Iwase, Hiromichi; Sasaki, Shigeru; Gotoh, Toshiyuki; Toriu, Takashi; and Ozaki, Tohru, 4,791,678, Cl. 382-34.000.
- Kawashima, Masato; and Hashizume, Kyohai, 4,791,448, Cl. 355-3.0FU.
- Kawata, Mitsuya; and Tanizawa, Tetsu, 4,791,320, Cl. 307-446.000.
- Kuroda, Hideo; Mukawa, Naoki; Hiraoka, Makoto; Matsuda, Kiichi; Nishiwaki, Mitsu; and Tsugane, Shuzo, 4,791,485, Cl. 358-136.000.
- Miwa, Hirohide; Shimura, Takaki; Yanashima, Tadahiko; and Amemiya, Shinichi, 4,790,321, Cl. 128-660.070.
- Onda, Nobuhiko; Asakawa, Kazuo; Akita, Tadashi; Komoriya, Hitoshi; and Kamada, Toru, 4,791,588, Cl. 364-513.000.
- Onodera, Tsukasa; Kawata, Haruo; and Futatsugi, Toshiro, 4,791,471, Cl. 357-60.000.
- Sugiura, Yoshihide; Ichikawa, Hiroaki; Matsumura, Nobutake; and Sasaki, Nobuo, 4,791,474, Cl. 357-71.000.
- Taguchi, Masao; and Takemae, Yoshihiro, 4,791,616, Cl. 365-205.000.
- Takemae, Yoshihiro, 4,791,610, Cl. 365-149.000.
- Yoshida, Masanobu, 4,791,612, Cl. 365-189.000.
- Fukamachi, Satoshi; Mitsui, Kenichi; Matsuo, Kunihiko; and Korenaga, Kazumi, to Toyoda Gosei Co., Ltd. Apparatus for manufacturing reinforced hose, 4,790,737, Cl. 425-114.000.
- Fukusawa, Junichi; Ina, Yoshimitsu; and Tsutsumi, Hisao, to Kao Corporation. Method of preventing crazing of cosmetics, 4,791,140, Cl. 514-845.000.
- Fukatsu, Shunzo: See—
- Sakagami, Kenji; Atsumi, Kunio; Nishihata, Ken; Yoshida, Takashi; and Fukatsu, Shunzo, 4,791,197, Cl. 540-227.000.
- Fukazawa, Kazuo; and Kaneuchi, Toshio, to RCA Licensing Corporation. Line-locked clock signal generation system, 4,791,488, Cl. 358-149.000.
- Fukuda, Katsumi: See—
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- Fukuhara, Sanshiro: See—
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- Fukunaga, Masao: See—
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- Fukushima, Danji: See—
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- Fukushima, Shigeyoshi: See—
- Ohta, Takamichi; Izumi, Takashi; Yamazi, Takeshi; and Fukushima, Shigeyoshi, 4,791,019, Cl. 428-304.400.
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- Fukutomi, Naoki: See—
- Kanno, Masao; Fukutomi, Naoki; Iwasaki, Yorio; Kojima, Fujio; and Nakamura, Hidehiro, 4,791,238, Cl. 174-68.500.
- Fukuzawa, Hiroshi: See—
- Ogawa, Akira; and Fukuzawa, Hiroshi, 4,791,050, Cl. 430-506.000.
- Fulkerson, Thomas R.: See—
- Heiser, Richard K.; Fulkerson, Thomas R.; and Hawkins, Royal R., 4,791,549, Cl. 364-167.010.
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- Furukawa Electric Co., Ltd.: See—
- Ohta, Shin-ichiro; Miyazawa, Hidehisa; Tanabe, Etsuo; and Tachigami, Shigeru, 4,790,648, Cl. 350-96.200.
- Furukawa Denki Kogyo Kabushiki Kaisha: See—
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- Furukawa, Kazuyoshi: See—
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- Furukawa, Kiyoshi: See—
- Kato, Hiroshi; Kanemitsuya, Kazuhiko; and Furukawa, Kiyoshi, 4,791,160, Cl. 524-322.000.
- Furukawa, Yoshimi: See—
- Ukai, Norio; Serizawa, Mitsuya; Oyama, Yasuharu; Furukawa, Yoshimi; Ogura, Masami; and Sato, Tsuyoshi, 4,790,551, Cl. 280-91.000.
- Furuya, Toshihiro, to Hitachi, Ltd. Electron beam scanning method and scanning electron microscope, 4,791,294, Cl. 250-310.000.
- Fushimi, Satoru: See—
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- Fushimoto, Hideo, to Canon Kabushiki Kaisha. Memory card having shutter protected terminals, 4,791,608, Cl. 365-52.000.
- Futaba Denshi Kogyo Kabushiki Kaisha: See—
- Morimoto, Kiyoshi; Toki, Hitoshi; and Satoh, Yoshitaka, 4,791,336, Cl. 313-496.000.
- Watanabe, Yoshio; Kitayama, Takeshi; and Kazuo, Shiratori, 4,791,289, Cl. 250-237.00G.
- Futatsugi, Toshiro: See—
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- G. D. Searle & Co.: See—
- Djuric, Stevan W.; Haack, Richard A.; and Miyashiro, Julie M., 4,791,133, Cl. 514-438.000.
- McLaughlin, Kathleen T.; Chorvat, Robert J.; and Prodan, Kathleen A., 4,791,199, Cl. 544-282.000.
- Gabillet, Philippe, to Francaise d'Organo Synthese. Transesterification of methyl methacrylate, 4,791,221, Cl. 560-217.000.
- Gable, Stewart V.: See—
- King, Francis G.; and Gable, Stewart V., 4,790,177, Cl. 73-117.000.
- Gaborski, Roger S.: See—
- Barski, Lori L.; and Gaborski, Roger S., 4,791,679, Cl. 382-55.000.
- Gabriel, Stefan: See—
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- Gabriele, Valentino: See—
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- Gach, Peter P., to Sunbeam Plastics Corporation. Child resistant closure, 4,790,442, Cl. 215-216.000.
- Gack, Helmut; and Kaiser, Gerhard, to Gewerkschaft Eisenhutte Westfalia GmbH. Pipe-driving apparatus, 4,790,395, Cl. 175-102.000.
- Gagnon, Andre; McMillan, Myles; and Gale, P. Michael, to Telemus Electronic Systems, Inc. Method and apparatus for simultaneous instantaneous signal frequency measurement, 4,791,360, Cl. 324-78.00D.
- Gale, P. Michael: See—
- Gagnon, Andre; McMillan, Myles; and Gale, P. Michael, 4,791,360, Cl. 324-78.00D.
- Galichon, Jean P. M.: See—
- Nivelletau de La Bruniere, Patrick M. F.; and Galichon, Jean P. M., 4,790,905, Cl. 162-56.000.
- Galram Technology Industries Ltd.: See—
- Tomer, David, 4,790,523, Cl. 270-37.000.
- Galvagni, John L.; and Troup, Philip A., to AVX Corporation. High accuracy variable thickness laydown method for electronic components, 4,791,006, Cl. 427-282.000.
- Gander, John F.: See—
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- GAO Gesellschaft fur Automation und Organisation mbH: See—
- Mitzel, Wilhelm; Leuthold, Karl-Heinz; and Geier, Josef, 4,790,525, Cl. 271-97.000.
- Gapinski, Richard E.: See—
- Yodice, Richard; and Gapinski, Richard E., 4,791,374, Cl. 324-439.000.
- Garcia, Leslie C.; Tjon-Pian-Gi; David C.; Tucker, Stuart G.; and Zajac, Myron W., to International Business Machines Corporation. Vector processing unit, 4,791,555, Cl. 364-200.000.
- Garde, Douglas, to Analog Devices, Inc. Microprogrammable devices using transparent latch, 4,791,551, Cl. 364-200.000.
- GardenAmerica Corporation: See—
- Ray, Charles A.; and Hobbs, Billy J., Jr., 4,790,481, Cl. 239-204.000.
- Gasquet, Gilbert: See—
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- Gates Rubber Company, The: See—
- Chaffee, Bradley A., 4,790,569, Cl. 285-40.000.
- Gatesoupe, Daniel: See—
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- Gatti, Marco, to Ente Nazionale Per L'Energia Elettrica. Electric line with bundle conductors associated to metal or dielectric cables incorporating optic fibers for telecommunication, 4,791,242, Cl. 174-40.00R.
- Gausman, Theodore J.; and Scheffel, Gary W., to Nupro Company. Low pressure relief valve, 4,790,348, Cl. 137-516.290.
- Gauthier, George A.; and Greenberg, Sol, to Veeco Instruments. Regulating control for single-ended switching power supply, 4,791,544, Cl. 363-49.000.
- Gautier, Jean-Pierre; and Blot, Jean-Claude, to Bendix France. Brake booster unit mounted on a fixed wall of a vehicle and process for assembling such a unit, 4,790,235, Cl. 92-128.000.
- Gawne, George; Green, Peter N.; and Green, William A., to Ward Blenkinsop & Company Limited. 2-hydroxy-3-thioxanthonyloxy-1-propanaminium salts, 4,791,213, Cl. 549-27.000.
- Gazelle Microcircuits, Inc.: See—
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- GCA Corporation/Tropel Division: See—
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- Gebele, Herbert: See—
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- Gebhardt, Terry D.: See—
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- Gebruder Junghans GmbH: See—
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- GEC Avionics Limited: See—
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- Gehrig, Norbert; and Wolfes, Hans, to Mannesmann Rexroth GmbH. Hydraulic apparatus, in particular a 2-way proportional throttle valve, 4,790,511, Cl. 251-30.020.
- Gehring, Donald R.: See—
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- Gehring, Reinhold; Klauke, Erich; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., to Bayer Aktiengesellschaft. 4-Alkenylaminocarbonyl- and 4-alkylaminocarbonyl-1-phenyl-5-pyrazolamines, 4,791,212, Cl. 548-362.000.
- Geier, Josef: See—
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- Geiss, Viktor: See—
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- Gemeinhardt, Hermann; and Korstanje, Hugo P., to Akzo NV. Heat exchanger having fusion bonded plastic tubes/support plate, 4,790,372, Cl. 165-173.000.
- Gendler, Robert L.: See—
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- General Electric Company: See—
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- Brown, Herbert J.; and Stitt, Thomas D., 4,791,341, Cl. 318-809.000.
- Cacaloro, Philip A.; and St. Jacques, Joseph A., 4,791,247, Cl. 174-152.00R.
- Cline, Harvey E.; Lorensen, William E.; and Ludke, Siegwalt, 4,791,567, Cl. 364-413.130.
- Dube, George, 4,791,644, Cl. 372-3.000.
- Faler, Gary R.; and Lynch, Jerry C., 4,791,234, Cl. 568-719.000.
- Ipi, Alfred C.; and Plus, Dora, 4,791,464, Cl. 357-23.700.
- Pressman, Eric, 4,791,145, Cl. 521-98.000.
- Stuart, Alan R., 4,790,133, Cl. 60-226.100.
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- General Electric Company, p.l.c., The: See—
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- General Foods Corporation: See—
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- General Motors Corporation: See—
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- Gentili, Piergiorgio: See—
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- Geophysical Service Inc.: See—
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- Gersch, Dietfried: See—
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- Gesing, Adam J.; Reeve, Martin R.; and Dube, Ghyalain, to Alcan International Limited. Removing inclusions from molten metal, 4,790,873, Cl. 75-68.00R.
- Gettelfinger, Irvin C. Golf putting practice apparatus, 4,790,538, Cl. 273-176.00H.
- Gettiffe, Jessie: See—
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- Gewerkschaft Eisenhutte Westfalia GmbH: See—
- Gack, Helmut; and Kaiser, Gerhard, 4,790,395, Cl. 175-102.000.
- Weirich, Walter; and Grommas, Werner, 4,790,347, Cl. 137-484.200.
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- Gibson, Steven D.: See—
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- Giles, Richard E.: See—
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- Gilpin, Jo Ann: See—
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- Girardin, Jean-Claude, to Portescap. Brush assembly for electric commutator motors, 4,791,331, Cl. 310-248.000.
- Giroflex Entwicklungs AG: See—
- Locher, Hermann, 4,790,598, Cl. 297-325.000.
- Girouard, Ester D. Woman's slip with V-shaped cutouts, 4,790,032, Cl. 2-109.000.
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- Gislaaved Plastindustri AB: See—
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- Givati, Izhak; and Baruch, Ehud, to Shabbar Investments Ltd. Fastener structure for files and multi-purpose clip for use therewith, 4,790,680, Cl. 402-68.000.
- Givens Buoy Lifter Co., Inc.: See—
- Givens, James A., 4,790,784, Cl. 441-40.000.
- Givens, James A., to Givens Buoy Lifter Co., Inc. Life raft, 4,790,784, Cl. 441-40.000.
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- Glaser, Hellmut I.; and Streicher, William L., to Owens-Corning Fiberglass Corporation. Method and apparatus for the manufacture of glass fiber strand roving, 4,790,136, Cl. 57-350.000.
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Gonsa, Kip B. Manual relay valve. 4,790,354, Cl. 137-625.660.

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Goddard, Robert B., to Megapulse Incorporated. Methods of and apparatus for measuring time of arrival of remote Loran-C and related signals and effective time of transmission of local signals at transmitter sites. 4,791,422, Cl. 342-389.000.

Goertzel, Gerald: See—  
Mitchell, Joan L.; Pennebaker, William B.; and Goertzel, Gerald, 4,791,403, Cl. 341-51.000.

Goldman, Paul R., to Goldman, Paul R. Pivoting recliner apparatus and method. 4,790,599, Cl. 297-327.000.

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Goller, Ernst; Walker, Fritz; and Schmid, Franz, to H. Stoll GmbH & Co. Yarn stop motion for textile machines. 4,790,151, Cl. 66-125.00R.

Gontowski, Walter S., Jr., to Cherry Semiconductor Corporation. Cross-coupled latch. 4,791,315, Cl. 307-291.000.

Goodman, Joseph R.: See—  
Billman, Timothy B.; and Goodman, Joseph R., 4,790,779, Cl. 439-842.000.

Goodyear Tire & Rubber Company, The: See—  
Candle, Richard D., 4,791,018, Cl. 428-288.000.

Lobb, Joan F.; Alabrook, Clarence B.; and Armbruster, Robert G., 4,790,364, Cl. 152-454.000.

Portatapi, Steven J.; and Riggs, Robert S., 4,790,719, Cl. 414-786.000.

Sandstrom, Paul H.; Maly, Neil A.; and Marinko, Mark A., 4,790,365, Cl. 152-510.000.

Goppelt, Dieter: See—  
Schmidt, Dieter; and Goppelt, Dieter, 4,790,801, Cl. 474-110.000.

Gordon, Iain C.; and Christopher, Ian, to CJB Developments Ltd. Process and apparatus for the separation of foreign matter from a liquid by flotation. 4,790,944, Cl. 210-706.000.

Gorges, Frederick J., to Bceing Company, The. Roller assembly. 4,790,421, Cl. 193-37.000.

Gormley, David E.: See—  
Hudson, Kenneth H.; Gormley, David E.; Dowdy, James E.; and Vampola, Edward F., 4,791,278, Cl. 235-7.00R.

Gosnell, Calvin B.: See—  
Hawkins, Wallace H.; and Gosnell, Calvin B., 4,790,556, Cl. 280-432.000.

Goto, Sumio: See—  
Karatsu, Makoto; and Goto, Sumio, 4,790,676, Cl. 400-241.100.

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Gotou, Toyokichi; and Fujishiro, Masami, to Newlong Machine Works, Ltd.; and New Pack Company, Ltd. Bag manufacturing apparatus. 4,790,804, Cl. 493-226.000.

Gottneid, David J.: See—  
Friedman, Robert B.; Gottneid, David J.; Paron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., 4,790,997, Cl. 426-578.000.

Gould, Gregory. Sampler of particulate material on a moving belt. 4,790,196, Cl. 73-863.910.

Gouvernelle, Didier; and Gatesoupe, Daniel, to Sprague Electric Company. Capacitor anode and method. 4,791,532, Cl. 361-529.000.

Gowlett, David J.: See—  
Dunn, William A. E.; and Gowlett, David J., 4,791,298, Cl. 250-352.000.

Graco Inc.: See—  
Murphy, Edward P., 4,790,679, Cl. 401-146.000.

Graham, Andrew C.; and Fitzpatrick, Mark E., to Gazelle Microcircuits, Inc. TTL compatible input buffer. 4,791,322, Cl. 307-475.000.

Graham, Anne M.: See—  
Attig, Thomas G.; Graham, Anne M.; and Pesa, Frederick A., 4,790,963, Cl. 260-410.90R.

Graham, W. David, to Owens-Corning Fiberglas Corporation. Decorative panels. 4,791,022, Cl. 428-324.000.

Grama, Louis F.: See—  
Senni, Alfred R.; and Grama, Louis F., 4,791,265, Cl. 219-91.200.

Gramlich, Walter: See—  
Martin, Roland; and Gramlich, Walter, 4,791,098, Cl. 512-20.000.

Granco-Clark, Inc.: See—  
Gentry, Charles B.; Scanlon, Robert M.; and Bugai, John C., 4,790,167, Cl. 72-257.000.

Grandfield, John; Campbell, James T.; Gundel, Carl H.; and Shillue, William, to GTE Government Systems Corporation. Direct frequency synthesizer. 4,791,377, Cl. 328-14.000.

Grandiere, Brigitte, to Briot International. Apparatus for detecting and treating troubles with binocular vision. 4,790,643, Cl. 351-45.000.

Grandvallet, Pierre: See—  
Chamotte, Patrick; Courty, Philippe; Durand, Daniel; Grandvallet, Pierre; and Travers, Christine, 4,791,141, Cl. 518-713.000.

Grant, Laurence R.: See—  
Nason, Elton N.; and Grant, Laurence R., 4,790,127, Cl. 56-330.000.

Grass Valley Group, Inc., The: See—  
Miller, Robert L., 4,791,483, Cl. 358-135.000.

Grass, William E.; and Sladek, Donald R., to Eaton Corporation. Circuit breaker with retainer for filler plate. 4,791,525, Cl. 361-363.000.

Graulung, Charles H., Jr.: See—  
Morse, Alfred W.; Buck, Daniel C.; and Graulung, Charles H., Jr., 4,791,421, Cl. 342-368.000.

Gray, Donald R.: See—  
Green, Lawrence R., III; Carrott, John A.; Gray, Donald R.; and Gendler, Robert L., 4,791,572, Cl. 364-449.000.

Greathouse, William K.; and Martin, Sherman F., to Grumman Aerospace Corporation. Cascade thrust reverser. 4,790,495, Cl. 244-110.00B.

Green, Lawrence R., III; Carrott, John A.; Gray, Donald R.; and Gendler, Robert L., to Meta, Inc. Method for accurately displaying positional information on a map. 4,791,572, Cl. 364-449.000.

Green, Peter N.: See—  
Gawne, George; Green, Peter N.; and Green, William A., 4,791,213, Cl. 549-27.000.

Green, Richard T., Sr. Flexible fishing lure with removable core member. 4,790,100, Cl. 43-42.260.

Green, Robert R.: See—  
Ireland, Kelly D.; and Green, Robert R., 4,790,380, Cl. 166-250.000.

Green, William A.: See—  
Gawne, George; Green, Peter N.; and Green, William A., 4,791,213, Cl. 549-27.000.

Greenberg, Sol: See—  
Gauthier, George A.; and Greenberg, Sol, 4,791,544, Cl. 363-49.000.

Greenwood, David: See—  
Baxter, Anthony G. W.; Bostock, Stephen B.; and Greenwood, David, 4,790,879, Cl. 106-22.000.

Gregory, David P.; Deaa, Bernard J.; and Postle, Stephen R., to Ciba-Geigy AG. Assembly for monitoring ionizing radiation. 4,791,155, Cl. 524-22.000.

Gregory, Robert K. Adjustable depth truss. 4,790,113, Cl. 52-646.000.

Greivenkamp, John E., Jr., to Eastman Kodak Company. Sub-nyquist interferometry. 4,791,584, Cl. 364-525.000.

Grendahl, Dennis T.; and Lippman, Myron E., to Surgidey Corporation. Posterior chamber lens. 4,790,845, Cl. 623-6.000.

Griesbeck, Karl: See—  
Bhaskopf, Reiner; and Griesbeck, Karl, 4,790,662, Cl. 356-428.000.

Griesa, Herbert C., to Pittway Corporation. Water-flow detector. 4,791,414, Cl. 340-606.000.

Griffin, Michael L. Reusable stationery carrier. 4,790,475, Cl. 229-69.000.

Griffiths, Gerald A.: See—  
Ingley, Peter; Watkins, David R.; and Griffiths, Gerald A., 4,790,363, Cl. 152-454.000.

Grilliot, Mary I.: See—  
Grilliot, William L.; and Grilliot, Mary I., 4,790,040, Cl. 5-413.000.

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Litt, Robert B.; and Corliss, John M., 4,790,748, Cl. 432-15.000.

Grims, Conrad M.: See—  
Johansson, Bert E.; and Grims, Conrad M., 4,790,169, Cl. 72-354.000.

Grindle, Daniel E., to Teradyne, Inc. Connecting coaxial cable to connector. 4,790,067, Cl. 29-748.000.

Gro Master Feed, Inc.: See—  
Kleinsasser, Jonathan R.; and Kleinsasser, Dan, 4,790,266, Cl. 119-51.500.

Grobel Research Corporation: See—  
Rialove, David J., 4,791,065, Cl. 436-132.000.

Groenenboom, Cornelis J., to Akzo N.V. Barium titanium oxide-containing fluidizable cracking catalyst composition. 4,791,085, Cl. 502-68.000.

Groeneveld, Hendrik W.: See—  
Donaldson, Stuart G.; Groeneveld, Hendrik W.; Klumper, Christian; Miller, Robert T.; Whitbeck, Richard W.; and Longnecker, Robert H., 4,791,661, Cl. 379-96.000.

Groeschel, Edward C., Jr., to Whirlpool Corporation. Microwave simmering method and apparatus. 4,791,263, Cl. 219-10.55M.

Grommas, Werner: See—  
Weirich, Walter; and Grommas, Werner, 4,790,347, Cl. 137-484.200.

Grosch, Jack F. Rope locking device. 4,790,049, Cl. 24-132.0WL.

Gross, James R.; and Rosenberger, Helmut W. G., to Kendall Company, The. Urine meter. 4,790,837, Cl. 604-322.000.

Gross, Rainer: See—  
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Groschauer, Heinrich K., to Koenig & Bauer Aktiengesellschaft. Offset short inking unit with dampening fluid separation. 4,790,243, Cl. 101-147.000.

Gruber, Werner: See—  
Wichelhaus, Juergen; Gruber, Werner; and Andrea, Johannes, 4,791,164, Cl. 524-514.000.

Gruber, Wilhelm; Langerbeins, Klaus; and Ruppert, Wolfgang, to Rohm GmbH. Oxidative catalyst regeneration. 4,791,080, Cl. 502-52.000.

Grumman Aerospace Corporation: See—  
Greathouse, William K.; and Martin, Sherman F., 4,790,495, Cl. 244-110.00B.

Kohn, Jerome S., 4,790,494, Cl. 244-87.000.

Weick, John M., 4,791,312, Cl. 307-264.000.

GSS General Sea Safety Ltd.: See—  
Niinivaara, Ensi K. J., 4,790,887, Cl. 148-23.000.

GTE Government Systems Corporation: See—  
Grandfield, John; Campbell, James T.; Gundel, Carl H.; and Shillue, William, 4,791,377, Cl. 328-14.000.

GTE Products Corporation: See—  
Calaby, Lauren F.; and Cooper, David A., 4,790,621, Cl. 350-96.200.

Keeffe, William M.; Krasko, Zeya; Karlotski, Robert; and Morris, James C., 4,791,334, Cl. 313-25.000.

Morris, Merle E.; and Senft, Stephen P., 4,791,333, Cl. 313-25.000.

Guiles, Joseph W., to Dataproducts Corporation. Ink jet apparatus with improved reservoir system for handling hot melt ink. 4,791,439, Cl. 346-140.00R.

Guillaume, Jacques: See—  
Clemence, Francois; Guillaume, Jacques; and Hamon, Gilles, 4,791,109, Cl. 514-235.200.

Guillemand, Jean-Pierre: See—  
Anderling, Erik T.; and Guillemand, Jean-Pierre, 4,790,967, Cl. 264-51.000.

Guillon, Daniel; and Bricard, Alain, to Vetrotex Saint-Gobain, c/o Saint Gobain Recherche. Apparatus for producing a fiber winding of varying width. 4,790,900, Cl. 156-441.000.

Gundel, Carl H.: See—  
Grandfield, John; Campbell, James T.; Gundel, Carl H.; and Shillue, William, 4,791,377, Cl. 328-14.000.

Gunter, Peter: See—  
Otfried, Rudolph; and Gunter, Peter, 4,790,244, Cl. 101-231.000.

Guy, Richard. Combination foldable-screen room divider and curio cabinet. 4,790,609, Cl. 312-117.000.

H. Stoll GmbH & Co.: See—  
Goller, Ernst; Walker, Fritz; and Schmid, Franz, 4,790,151, Cl. 66-125.00R.

Ploppa, Jurgen; and Mak, Gerd, 4,790,153, Cl. 66-157.000.

Stoll, Thomas, 4,790,150, Cl. 66-125.000.

Haack, Richard A.: See—  
Djuric, Stevan W.; Haack, Richard A.; and Miyashiro, Julie M., 4,791,133, Cl. 514-438.000.

Haas, Lothar: See—  
Hettich, Gerhard; Haas, Lothar; and Schmid, Hans-Dieter, 4,790,179, Cl. 73-146.500.

Haataja, Bruce A.: See—  
Sandberg, L. Bogue; Haataja, Bruce A.; Jurmo, Douglas C.; Palardy, Robert D.; Story, Frank H.; and Yates, William A., 4,790,966, Cl. 264-39.000.

Haber, Terry M.; and LeMarie, Romeo, to Habley Medical Technology Corporation. Disposable surgical mask having a self-contained supply of anti-bacterial material. 4,790,307, Cl. 128-206.190.

Haber, Terry M.; Foster, Clark B.; and Smedley, William H., to Habley Medical Technology Corporation. Shielded safety syringe. 4,790,827, Cl. 604-198.000.

Haberland, Detlef: See—  
Frenkel, Ferdinand; Haberland, Detlef; and Haltenorth, Helmut, 4,790,616, Cl. 350-96.150.

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Haber, Terry M.; and LeMarie, Romeo, 4,790,307, Cl. 128-206.190.

Haber, Terry M.; Foster, Clark B.; and Smedley, William H., 4,790,827, Cl. 604-198.000.

Haefliger, Walter, to Sandoz Ltd. 2,6-dimethyl-8a-pivaloylamino-9,10-didehydro-ergoline. 4,791,115, Cl. 514-288.000.

Haga, Takahiro: See—  
Kimura, Fumio; Haga, Takahiro; Maeda, Kazuyuki; Shimoharada, Hiroshi; Yoshida, Tsunezo; and Ikeguchi, Masahiko, 4,790,869, Cl. 71-90.000.

Hagiwara, Hideo: See—  
Ito, Akira; Hagiwara, Hideo; and Kaisaku, Tetsuo, 4,790,590, Cl. 296-146.000.

Hahn, Marilyn E., to Du Pont de Nemours, E. I., and Company. Electrical receptacle. 4,790,773, Cl. 439-474.000.

Haining, Michael L. Retractable hypodermic safety syringe. 4,790,822, Cl. 604-110.000.

Hakamada, Ryuichi: See—  
Kuriyama, Toru; and Hakamada, Ryuichi, 4,790,147, Cl. 62-514.00R.

Hakopian, Hakoop: See—  
Mackey, Peter J.; and Hakoopian, Hakoop, 4,791,384, Cl. 364-718.000.

Halbach & Braun Industrieanlagen: See—  
Braun, Gert; and Braun, Ernst, 4,790,425, Cl. 198-731.000.

Hall, Derrard M.: See—  
Adeney, Hilary E.; and Hall, Derrard M., 4,791,152, Cl. 523-406.000.

Halldorsson, Thorsteinn, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschränkter Haftung. Space telescope connected to a star tracker. 4,790,641, Cl. 350-537.000.

Haller, Edgar: See—  
Wild, Gerhard; and Haller, Edgar, 4,791,621, Cl. 368-47.000.

Halliburton Company: See—  
Laurel, David F., 4,790,341, Cl. 137-15.000.

Rankin, E. Edward, 4,790,377, Cl. 166-65.100.

Halliday, Pieter S. J.; and Harris, Allan J., to AECI Limited. Process for the production of a cartridge explosive with entrapped bubbles. 4,790,891, Cl. 149-2.000.

Hallmark Cards, Inc.: See—  
Watkins, John B., 4,790,893, Cl. 156-232.000.

Hallstedt, Lennart, to Dynapac Light Equipment AB. Progressive control. 4,790,200, Cl. 74-517.000.

Halstig, Andreas; Moosmann, Horst; and Dinger, Horst, to Gebruder Junghans GmbH. Fuse. 4,790,246, Cl. 102-254.000.

Haltenorth, Helmut: See—  
Frenkel, Ferdinand; Haberland, Detlef; and Haltenorth, Helmut, 4,790,616, Cl. 350-96.150.

Hamacher, Edward N. Infusion needle. 4,790,830, Cl. 604-274.000.

Hamada, Eiichi; Yoshihara, Toshio; Nakashima, Atsushi; and Kamo, Jun, to Mitsubishi Rayon Co., Ltd. Heat exchanger and blood oxygenating device furnished therewith. 4,791,054, Cl. 435-2.000.

Hamada, Kenji; and Iwakura, Masato, to Honda Giken Kogyo Kabushiki Kaisha. License plate assembly for motorcycles. 4,790,087, Cl. 40-204.000.

Hamajima, Shigemitsu: See—  
Oda, Yukihisa; Yasuda, Keiji; and Hamajima, Shigemitsu, 4,790,795, Cl. 464-102.000.

Hamamura, Hiroyuki; Kawasaki, Hiroyuki; and Watanabe, Taro, to Tone Boring Co., Ltd. Air pressure impact drilling method and apparatus for same. 4,790,391, Cl. 173-57.000.

Hamane, Tokuhito: See—  
Kawazoe, Hiroshi; and Hamane, Tokuhito, 4,790,063, Cl. 29-597.000.

Hamano, Yukio, to Toyota Jidosha Kabushiki Kaisha. Method and system for control of two part type transmission providing limited time for auxiliary transmission overdrive engagement with main transmission speed reduction engagement. 4,790,215, Cl. 74-866.000.

Hamer, R. Richard L.; Halsley, Grover C.; Glamkowski, Edward J.; and Chiang, Yulin, to Hoechst-Roussel Pharmaceuticals, Inc. Memory enhancing and analgesic 1,2,3,4,8,8A-hexahydro-3A,8 (and) 1,3A,8-di (and) trimethylpyrrolol(2,3-B)indoles, compositions and use. 4,791,107, Cl. 514-228.200.

Hamill, James; Digumarthi, Ramarao; Conlon, William; Cheng, Dah Y.; and Chang, Chung-Nan, to International Power Technology, Inc. Method and apparatus for improved start-up procedures in conventional steam power generators and dual fluid cheng cycle engines. 4,790,269, Cl. 122-406.05T.

Hamilton, Harriet W.: See—  
Trivedi, Bharat K.; Moos, Walter; Hamilton, Harriet W.; and Patt, William C., 4,791,103, Cl. 514-46.000.

Hamilton Specialty Bar Division of Slater Industries, Inc.: See—  
Bowman, Bradford C., 4,790,872, Cl. 75-10.580.

Hamilton Standard Controls, Inc.: See—  
Youtz, Stephen E.; and Rose, Edward C., 4,791,258, Cl. 200-302.100.

Hamon, Gilles: See—  
Clemence, Francois; Guillaume, Jacques; and Hamon, Gilles, 4,791,109, Cl. 514-235.200.

Hampeis, Karel; and Gabriel, Stefan, to Sig Schweizerische Industrie-Gesellschaft. Fluidic power-assisted setting device. 4,790,234, Cl. 91-362.000.

Hanada, Yoshiyuki: See—  
Seki, Masafumi; Hanada, Yoshiyuki; and Sugawara, Ryoichi, 4,790,615, Cl. 350-96.120.

Handa, Kenichi: See—  
Tobinaga, Motoi; Okumura, Shigeo; Handa, Kenichi; and Atsumi, Shinya, 4,790,279, Cl. 123-417.000.

Hane, Tadashi, to Shimizu Construction Co., Ltd. Natural lighting apparatus. 4,791,533, Cl. 362-1.000.

Hang, Yong D., to Cornell Research Foundation, Inc. Grape pomace as substrate for microbial production of citric acid. 4,791,058, Cl. 435-144.000.

Hanley, Paul A.; and Plesscher, Robert J. Simulated etched glass window and method. 4,791,010, Cl. 428-34.000.

Hannan, Peter W., to Hazeltine Corporation. Multimode omniantenna with flush mount. 4,791,429, Cl. 343-770.000.

Hannappel, Karl: See—  
Zahn, Artur; and Hannappel, Karl, 4,790,976, Cl. 376-260.000.

Hans Kolbe & Co.: See—  
Lindenmeier, Heinz; and Flachenecker, Gerhard, 4,791,426, Cl. 343-713.000.

Hansen, Anders B. N. Displacement apparatus. 4,790,441, Cl. 212-147.000.

Hansen, Gerhard. Method of molding, filling and sealing a container. 4,790,117, Cl. 53-410.000.

Hansen, Larsin, to Viking-Stavanger A/S. Diver's bag. 4,790,463, Cl. 224-253.000.

Hansen, W. Peter: See—  
Hovorka, George; and Hansen, W. Peter, 4,791,069, Cl. 436-533.000.

Hanson, Gary E.; Kelly, Gar P.; Chan, C. S.; Cowger, Bruce; and Bearss, James G., to Hewlett-Packard Company. Balanced capillary ink jet pen for ink jet printing systems. 4,791,438, Cl. 346-140.00R.

Hanson, Gary E.: See—  
Chan, C. S.; and Hanson, Gary E., 4,791,436, Cl. 346-140.00R.



- Hanson, Jay L., to Thermo King Corporation. Method and apparatus for monitoring a transport refrigeration system and its conditioned load. 4,790,143, Cl. 62-126.000.
- Hanseler, Gerd: See—  
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hanseler, Gerd, 4,791,208, Cl. 548-136.000.
- Hao, Yu-Lee, to Plasmatech Corporation. Depyrogenation of clinical albumin. 4,791,191, Cl. 530-364.000.
- Harada, Hiroshi: See—  
Takeda, Masaru; Nunotaki, Yoshihiro; Harada, Hiroshi; Kawada, Michihiro; and Ishigaki, Masahiro, 4,790,794, Cl. 464-93.000.
- Harada, Yoshihiro; and Ishigaki, Akira, to Canon Kabushiki Kaisha. Automatic focusing apparatus. 4,790,649, Cl. 354-400.000.
- Harbich, Thomas, to Ant Nachrichtentechnik GmbH. Method of linear filtering. 4,791,596, Cl. 364-724.160.
- Hardee, Kim C., to INMOS Corporation. Bit line and column circuitry used in a semiconductor memory. 4,791,613, Cl. 365-189.000.
- Harder, Hans E.; Behrens, Klaus; and Kotz, Rainer, to Howmedica International Inc. Bone prosthesis assembly. 4,790,854, Cl. 623-20.000.
- Haring, Ulrich: See—  
O'Neil, Robert M.; Kristen, Ulrich; and Haring, Ulrich, 4,791,206, Cl. 548-108.000.
- Harmon, Albert D.; and Koella, Ernest, III, to Rockford Manufacturing Company. Apparatus for continuously forming a continuous fabric. 4,790,603, Cl. 300-16.000.
- Harmon, Albert D.; and Koella, Ernest, III, to Rockford Manufacturing Company. A continuous process for making a continuous fabric. 4,790,604, Cl. 300-21.000.
- Harms, Clarence, heir: See—  
Harms, David S., deceased; Harms, Clarence, heir; and Harms, Joan, heir, 4,790,762, Cl. 439-59.000.
- Harms, David S., deceased; Harms, Clarence, heir; and Harms, Joan, heir, to Honeywell Inc. Backplane for a modularly expandable programmable controller. 4,790,762, Cl. 439-59.000.
- Harms, Joan, heir: See—  
Harms, David S., deceased; Harms, Clarence, heir; and Harms, Joan, heir, 4,790,762, Cl. 439-59.000.
- Harney, Kevin; and Keith, Michael, to Technology Inc. 64. Random-access pseudo random number generator. 4,791,594, Cl. 364-717.000.
- Harper, Arthur L., Jr., to Recreation Products of Texas, Inc. Skateboard carrier. 4,790,460, Cl. 224-209.000.
- Harris, Allan J.: See—  
Halliday, Peter S. J.; and Harris, Allan J., 4,790,891, Cl. 149-2.000.
- Harris Corporation: See—  
Mackey, Peter J.; and Hakoopian, Hakoop, 4,791,384, Cl. 364-718.000.
- Harris, Richard W.; Bishop, Frank A.; and Rattlingourd, Glen D., to Sperry Corporation. MSE variable step adaptive filter. 4,791,390, Cl. 333-166.000.
- Harris, Robert S., to Stant Inc. Tank pressure control system. 4,790,349, Cl. 137-587.000.
- Harris, Thomas J.: See—  
Fazio, Dennis; and Harris, Thomas J., 4,791,578, Cl. 364-488.000.
- Harrison, Anthony W., to Lucas Industries public limited company. Railway deceleration controller for brake. 4,790,414, Cl. 188-152.000.
- Hart Design & Manufacturing Inc.: See—  
Driessen, Gerald J., 4,790,242, Cl. 99-455.000.
- Hart, William P.: See—  
Liu, Christopher S.; Hart, William P.; and Kapuscinski, Maria M., 4,790,948, Cl. 252-47.500.
- Harwood, John W., to Beloit Corporation. Two-wire paper forming apparatus. 4,790,909, Cl. 162-301.000.
- Hasegawa, Makoto; Matsuura, Kouji; and Makimoto, Mitsuo, to Matsushita Electric Industrial Co., Ltd. Microwave band frequency synthesizer. 4,791,387, Cl. 331-2.000.
- Hasegawa, Mikio: See—  
Maruyama, Masahiro; Itemadani, Eiji; Mori, Kazuhiro; and Hasegawa, Mikio, 4,790,069, Cl. 29-832.000.
- Hashimoto, Hideo: See—  
Tanaka, Yasunori; Uchino, Yukinori; and Hashimoto, Hideo, 4,791,321, Cl. 307-451.000.
- Hashimoto, Shinichi: See—  
Murakami, Reiji; Hashimoto, Shinichi; Shimino, Mamoru; and Ide, Fumito, 4,790,524, Cl. 271-10.000.
- Hashizume, Kyoei: See—  
Kawashima, Masato; and Hashizume, Kyoei, 4,791,448, Cl. 355-3.0FU.
- Hasselbeck, Richard J.: See—  
Kaminaki, Elton G.; and Hasselbeck, Richard J., 4,790,171, Cl. 72-361.000.
- Hastings, Jerome K.; Bigelow, James H.; and Schultz, Gary, to Eaton Corporation. Electromagnetic hydraulic valve operator. 4,790,353, Cl. 137-625.630.
- Hastings, Jerome K.: See—  
Belhoff, Bruce C.; Hastings, Jerome K.; Juds, Mark A.; and Baran, Michael S., 4,791,361, Cl. 324-126.000.
- Hata, Seichi; Akima, Hideo; Kitagawa, Kiyoshi; Hyodo, Masaya; and Nimomi, Koji, to Fujitsu Limited; and Kabushiki Kaisha Toyoda Jidoshaoki Seisakusho. Inching control system for a vehicle with automatic transmission. 4,790,420, Cl. 192-111.00A.
- Hattori, Kazuhiko; Suzuki, Hideyuki; Yamaguchi, Hiroyuki; and Ogasawara, Takeo, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Revolution speed ratio control system for a continuously variable transmission. 4,790,214, Cl. 74-866.000.
- Hattori, Torao, to Honda Giken Kogyo Kabushiki Kaisha. V belt for power transmission. 4,790,798, Cl. 474-242.000.
- Hausser, Karl H.: See—  
Brunner, Hermann; Hausser, Karl H.; and Veith, Werner, 4,791,392, Cl. 333-219.000.
- Havel, Karel. First dialed digit detector and comparator. 4,791,667, Cl. 379-361.000.
- Havlik, Jaroslav J. Apparatus for extracting hydrocarbons from tar sands. 4,790,910, Cl. 196-112.000.
- Hawkins, Irvin F., Jr.; and Hawkins, Mark C. Apparatus and method for removing a target object from a body passageway. 4,790,812, Cl. 604-22.000.
- Hawkins, Mark C.: See—  
Hawkins, Irvin F., Jr.; and Hawkins, Mark C., 4,790,812, Cl. 604-22.000.
- Hawkins, Royal R.: See—  
Heiser, Richard K.; Fulkerson, Thomas R.; and Hawkins, Royal R., 4,791,549, Cl. 364-167.010.
- Hawkins, Wallace H.; and Gosnell, Calvin B., to Red Arrow International, Inc. Anti-jackknifing apparatus. 4,790,556, Cl. 280-432.000.
- Hayaoka, Tatsuji: See—  
Kato, Shiochi; Shimano, Shizuo; Hayaoka, Tatsuji; and Masui, Akio, 4,791,127, Cl. 514-369.000.
- Hayauchi, Gouchi: See—  
Suzuki, Yoshiaki; Hayauchi, Gouchi; and Tsuboi, Masayoshi, 4,791,023, Cl. 428-336.000.
- Hayauchi, Hiroshi: See—  
Yamamoto, Saburo; Yamamoto, Osamu; Morimoto, Taiji; Hayauchi, Hiroshi; Miyauchi, Nobuyuki; and Maei, Shigeki, 4,791,636, Cl. 372-46.000.
- Hayauchi, Hiroyuki: See—  
Sakimori, Hideharu; Hayauchi, Hiroyuki; Ida, Daijiro; and Takahashi, Seiji, 4,790,709, Cl. 414-416.000.
- Hayauchi, Masaki: See—  
Tanouchi, Tadao; Kawamura, Masanori; Ajima, Akio; Mohri, Tetsuya; Hayauchi, Masaki; Terashima, Hiroshi; Hirata, Fumio; and Morimura, Takeshi, 4,791,126, Cl. 514-369.000.
- Hayauchi, Masayuki; and Sasaki, Takumi, to Aisin Seiki Kabushiki Kaisha. Drive apparatus for power seats. 4,790,202, Cl. 74-396.000.
- Hayauchi, Torahiko, to Rheon Automatic Machinery Company, Ltd. Kneading apparatus for bread dough and the like and a method of controlling the quality thereof during kneading. 4,790,665, Cl. 366-98.000.
- Hayauchi, Toshihiro: See—  
Hirota, Atsuhiko; Owaki, Takashi; Yamaguchi, Yasutaka; and Hayauchi, Toshihiro, 4,791,554, Cl. 364-200.000.
- Hayauchi, Toshikazu: See—  
Kumakura, Takeshi; Hayauchi, Toshikazu; and Koike, Kazuo, 4,791,501, Cl. 360-105.000.
- Hayata, Eiji: See—  
Marumo, Chisato; and Hayata, Eiji, 4,790,859, Cl. 55-68.000.
- Hazbun, Edward A., to Arco Chemical Company. Ceramic membrane for hydrocarbon conversion. 4,791,079, Cl. 502-4.000.
- Hazeltine Corporation: See—  
Hannan, Peter W., 4,791,429, Cl. 343-770.000.
- Hecht, Walter: See—  
Erdelitsch, Herbert; Hecht, Walter; and Rachner, Horst, 4,791,253, Cl. 200-61.270.
- Heckmann, Klaus; Rieger, Walter; and Kroebe, Reinhard, to Kernforschungszentrum Karlsruhe GmbH. Process for the stripping of cesium ions from aqueous solutions. 4,790,960, Cl. 252-631.000.
- Hedberg, Sven-Erik: See—  
Elmqvist, Hakan; Lekholm, Anders; Hedberg, Sven-Erik; and Amundson, David C., 4,790,318, Cl. 128-419.0P0.
- Heeres, Jan; Beckx, Leo J. J.; Thijssen, Jozef B. A.; and Knaeps, Alfonsus G., to Janssen Pharmaceutica, N.V. [4-[4-(4-phenyl-1-piperazinyl)phenoxy)methyl]-1,3-dioxolan-2-yl]methyl]-1H-imidazole and 1H-1,2,4-triazoles having anti-microbial properties. 4,791,111, Cl. 514-252.000.
- Heffron, Allan J., to CM Systems, Incorporated. Monotonic cutting machine. 4,790,698, Cl. 409-200.000.
- Heflin, Dennis R.: See—  
Awtry, Jon; and Heflin, Dennis R., 4,790,198, Cl. 73-864.640.
- Hegarty, Patrick J.; and Amato, Dennis, to Pace Packaging Corporation. Bottle stand up apparatus. 4,790,423, Cl. 198-400.000.
- Heidman, William A., Jr. High level rear brake lamp and alternating directional lamps. 4,791,401, Cl. 340-71.000.
- Heimbach, Klaus-Jürgen: See—  
Hofmann, Dieter; Heimbach, Klaus-Jürgen; Petersein, Helmut; and Munz, Wolf-Dieter, 4,791,017, Cl. 428-216.000.
- Heimerl, Josef: See—  
Beuer, Volker; Heimerl, Josef; and Ranke, Horst, 4,791,301, Cl. 250-397.000.
- Heinrich Kuhn Metallwarenfabrik AG: See—  
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- Heiser, Richard K.; Fulkerson, Thomas R.; and Hawkins, Royal R., to Sundstrand Corporation. Boom control system. 4,791,549, Cl. 364-167.010.
- Helding, Curtis L.; and Larrabee, Carl R. Door push-bar lock-out retainer. 4,790,577, Cl. 292-92.000.
- Helling, Stuart D.: See—  
Chang, Clarence D.; Chen, Nai Y.; Helling, Stuart D.; Tsao, Ying-Yen P.; and Walsh, Dennis E., 4,790,928, Cl. 208-111.000.
- Helmig, Michael A.; and Gander, John F., to Trimrite, Inc. Line trimmer with replaceable cutting blade assembly. 4,790,071, Cl. 30-276.000.

- Helsley, Grover C.: See—  
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- Henderson, Dirk: See—  
Henderson, Don; and Henderson, Dirk, 4,790,508, Cl. 249-11.000.
- Henderson, Don; and Henderson, Dirk. Concrete casting form including retractable core. 4,790,508, Cl. 249-11.000.
- Henderson, Tony R., Sr., to American Telephone and Telegraph Company AT&T Bell Laboratories. Magnetic core apparatus and method of constructing the same. 4,791,395, Cl. 336-210.000.
- Henkel, Günther, to TRW Ehrenreich GmbH & Co. KG. Ball joint. 4,790,682, Cl. 403-140.000.
- Henkel Kommanditgesellschaft auf Aktien: See—  
Frieser, Erich P.; and Jainschig, Alexander, 4,790,951, Cl. 252-162.000.
- Koester, Rita; and von Rybinaki, Wolfgang, 4,790,931, Cl. 209-166.000.
- Kottwitz, Beatrix; von Rybinaki, Wolfgang; and Koester, Rita, 4,790,932, Cl. 209-166.000.
- Wichelhaus, Jürgen; Gruber, Werner; and Andres, Johannes, 4,791,164, Cl. 524-514.000.
- Henn, Gunter; Stocker, Manfred; Stotzer, Erwin; Friedrich, Konrad; and Baner, Thomas, to Bener Spezialtiefbau GmbH. Method and apparatus for producing a support element in the ground. 4,790,689, Cl. 405-240.000.
- Henn, Stefan; and Masas, Rudolf, to Robert Krups Stiftung & Co. KG. Machine for brewing hot beverages. 4,790,240, Cl. 99-282.000.
- Hennion, Bernard. System for the simulation of an electronic circuit. 4,791,593, Cl. 364-578.000.
- Henri Vidal: See—  
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- Henrich, William H.: See—  
Dean, Thomas E.; and Henrich, William H., 4,791,338, Cl. 315-174.000.
- Henry, Beverly A., administratrix: See—  
Natusch, Paul J.; Senerchia, David C.; and Henry, John F., Jr., deceased, 4,791,552, Cl. 364-200.000.
- Henry, John F., Jr., deceased: See—  
Natusch, Paul J.; Senerchia, David C.; and Henry, John F., Jr., deceased, 4,791,552, Cl. 364-200.000.
- Henry, Matthew R., to Honeywell Inc. Dynamically reconfigurable array logic. 4,791,603, Cl. 364-900.000.
- Hensel, Willi; Lange, Jürgen; and Paulus, Reinhard, to Mauser Waldeck AG. Chair having seat and back capable of relative tilting. 4,790,595, Cl. 297-285.000.
- Hensler, Paul L.; and Binell, Mark A., to FMC Corporation. Process for preparing a sodium tripolyphosphate hexahydrate powder. 4,790,984, Cl. 423-315.000.
- Herr Manufacturing Company, Inc.: See—  
McLean, James N.; and McLean, Bruce A., 4,791,269, Cl. 219-121.640.
- Herrmann, Hans-Joachim, to M A N Gutehoffnungshütte GmbH. Multi-blade rotor for a windmill-type apparatus. 4,790,722, Cl. 416-205.000.
- Hethuin, Serge; Crepin, Hugues; and Faure, Jerome, to U.S. Philips Corporation. Auto-correlation arrangement. 4,791,599, Cl. 364-728.070.
- Hettich, Gerhard; Haas, Lothar; and Schmid, Hans-Dieter, to Robert Bosch GmbH. Detector of inflation pressure of tires of a vehicle. 4,790,179, Cl. 73-146.500.
- Heublein, Inc.: See—  
Ashmont, Robert S.; Bibeau, Thomas C.; Livaich, Anthony; and McCormick, Nancy J., 4,790,999, Cl. 426-592.000.
- Heusinkveld, Paul, to Scudder, Ted; and Heusinkveld, Paul. Keyboard for one-hand operation. 4,791,408, Cl. 340-365.00R.
- Hewitt, Alan R., to Starbucks Corporation. System for brewing and serving a hot beverage. 4,790,239, Cl. 99-279.000.
- Hewlett-Packard Company: See—  
Bears, James G.; and Norton, Kenneth A., 4,791,165, Cl. 524-516.000.
- Bloomquist, Darrel R.; Drennan, George A.; and Opfer, James E., 4,790,921, Cl. 204-192.120.
- Burgess, Ken L., 4,791,592, Cl. 364-572.000.
- Chan, C. S.; and Hamon, Gary E., 4,791,436, Cl. 346-140.00R.
- Hanson, Gary E.; Kelly, Gar P.; Chan, C. S.; Cowger, Bruce; and Bears, James G., 4,791,438, Cl. 346-140.00R.
- Leavitt, Steven C.; Lipschutz, David; Lincoln, Stephen E.; Thiele, Karl; and Magnin, Paul A., 4,790,323, Cl. 128-661.090.
- McFarland, William J.; and Walker, Richard C., 4,791,653, Cl. 375-115.000.
- Miller, Robert J., 4,790,880, Cl. 106-22.000.
- Smith, James C.; Mostafa, Hatem E.; and Walsh, William J., 4,791,435, Cl. 346-140.00R.
- Hibbard, Richard D.: See—  
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- Hickman, James S.: See—  
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- Higashi, Chiyokazu; and Tajima, Takayuki, to Kabushiki Kaisha Murashiki Seiko. Magnet catch. 4,790,576, Cl. 292-251.500.
- High, Robert E., to Decuster. Centrifuge incorporating air-lift device. 4,790,806, Cl. 494-26.000.
- Highway Equipment Company: See—  
Wall, George B.; 4,790,484, Cl. 239-655.000.
- Higuchi, Seizma; Oga, Fumemitsu; Ikeda, Masao; and Nakano, Hirohumi, to Nippon Steel Corporation. Method for producing an Sa-based multilayer coated steel strip having improved corrosion resistance, weldability and lacquerability. 4,790,913, Cl. 204-37.300.
- Hilbert, Samuel D.: See—  
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- Hill, Jerry M. Aerial toy. 4,790,788, Cl. 446-61.000.
- Hillenbrand, Ray J.: See—  
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- Hillis, W. Daniel, to Thinking Machines Corporation. Parallel processor error checking. 4,791,641, Cl. 371-38.000.
- Hilly, Claude E.: See—  
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- Himmelstein, Sydney, to S. Himmelstein & Company. Method and apparatus for calibrating a transducer having real and reactive impedance. 4,790,175, Cl. 73-1.00R.
- Hinckley, Paul, to Unisys Corporation. Zero-crossover SCR power supply regulator. 4,791,545, Cl. 363-81.000.
- Hines, Gordon E.; Case, Lee D.; and Anderson, Ronald W., to Hines Industries, Inc. Automatic grinder. 4,790,697, Cl. 409-131.000.
- Hines Industries, Inc.: See—  
Hines, Gordon E.; Case, Lee D.; and Anderson, Ronald W., 4,790,697, Cl. 409-131.000.
- Hirai, Hiroyuki; Yabuki, Yoshiharu; and Iwano, Haruhiko, to Fuji Photo Film Co., Ltd. Color image forming process utilizing substantially water-insoluble basic metal compounds and complexing compounds. 4,791,048, Cl. 430-372.000.
- Hirai, Keiji: See—  
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- Masuzawa, Kunioyoshi; Suzue, Seigo; Hirai, Keiji; and Ishizaki, Takayoshi, 4,791,118, Cl. 514-312.000.
- Hirakawa, Osamu: See—  
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- Hiraki, Hideaki: See—  
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- Hiramatsu, Takeo; Takamiya, Bonnosuke; and Tanaka, Yuichi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Method of controlling hydraulic pressure for an automatic transmission gear system. 4,791,568, Cl. 364-424.100.
- Hirano, Shigeo: See—  
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- Hirano, Tsutomu: See—  
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- Hirao, Tadaaki; and Mackawa, Shigetou, to Mitsubishi Denki Kabushiki Kaisha. Method of fabricating a solid state image sensing device. 4,791,070, Cl. 437-2.000.
- Hiraoka, Makoto: See—  
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- Hirata, Fumio: See—  
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- Hirofumi, Masahiro; and Nakahara, Toshimi, to Sumitomo Electric Industries, Ltd. Stainless steel wire and process for manufacturing the same. 4,791,025, Cl. 428-379.000.
- Hirose, Akira; and Nakazato, Yukioka, to Ricoh Company, Ltd. Copying apparatus having automatic document feeder. 4,791,451, Cl. 355-8.000.
- Hirose Electric Co., Ltd.: See—  
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- Sato, Kenzaku, 4,790,068, Cl. 29-761.000.
- Hirota, Atsuhiko; Owaki, Takashi; Yamaguchi, Yasutaka; and Hayauchi, Toshihiro, to Hitachi, Ltd. Method and apparatus for preventing deadlock in a data base management system. 4,791,554, Cl. 364-200.000.
- Hisamura, Koji: See—  
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- Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tohru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tadaaki, 4,791,130, Cl. 514-410.000.
- Hitachi Chemical Co.: See—  
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- Hitachi Chemical Company, Ltd.: See—  
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- Kasano, Masao; Fukutomi, Naoki; Iwasaki, Yorio; Kojima, Fujio; and Nakamura, Hidehiro, 4,791,238, Cl. 174-68.500.
- Hitachi Condenser Co., Ltd.: See—  
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- Hitachi Denchi Kabushiki Kaisha: See—  
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- Hitachi Ltd.: See—  
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Okikawa, Susumu; and Miyairi, Akira, 4,791,472, Cl. 357-70.000.  
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HMC Patents Holding Co., Inc.: See—  
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Hohn, Johann; Mersmann, Franz-Josef; Obrecht, Werner; and Szentivanyi, Zolt, to Bayer Aktiengesellschaft. Process for the preparation of partially hydrogenated nitrile rubbers, 4,791,172, Cl. 523-234.000.  
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- Holmes, Colm: See—  
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Bergstrom, James W.; and Weber, Mark W., 4,791,460, Cl. 356-350.000.  
Dietiker, Paul; and Johnson, Frederick W., 4,790,352, Cl. 137-613.000.  
Harms, David S., deceased; Harms, Clarence, heir; and Harms, Joan, heir, 4,790,762, Cl. 439-59.000.  
Henry, Matthew R., 4,791,603, Cl. 364-900.000.  
Sewell, Wesley C., 4,790,658, Cl. 356-350.000.  
Honig, Arnold; and Smith, James E., to Syracuse University. Fluorescence microscopy, 4,791,310, Cl. 250-458.100.  
Hope, Henry F.; and Hope, Stephen F. Photographic printer apparatus, 4,791,456, Cl. 355-28.000.  
Hope, Stephen F.: See—  
Hope, Henry F.; and Hope, Stephen F., 4,791,456, Cl. 355-28.000.  
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Shirahata, Isao; Shiga, Shoji; Hori, Hisako; and Jinbo, Takamasa, 4,791,239, Cl. 174-68.500.  
Horst, Paul V. Electric finned-tube baseboard space heater employing a vaporized working fluid, 4,791,274, Cl. 219-341.000.  
Horvath, Stephen R., Jr.: See—  
Clark, Richard J.; and Horvath, Stephen R., Jr., 4,790,454, Cl. 222-136.000.  
Hoshi, Seiji: See—  
Nanno, Ikuo; Nakajima, Atsunobu; Hoshi, Seiji; and Yamamoto, Hiroyoshi, 4,790,628, Cl. 350-247.000.  
Hoshino Gakki Co., Ltd.: See—  
Hoshino, Yoshihiro, 4,790,229, Cl. 84-413.000.  
Hoshino, Yoshihiro, to Hoshino Gakki Co., Ltd. Lug nut for drum head, 4,790,229, Cl. 84-413.000.  
Hosoi, Yuichi: See—  
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Hosokawa, Manabu: See—  
Takakusaki, Nobuyuki; Mizutani, Yohji; Kishida, Nobuhiro; and Hosokawa, Manabu, 4,790,741, Cl. 425-526.000.  
Hosomi, Mamoru: See—  
Yonezawa, Takashi; Yoshizumi, Toshiaki; Hosomi, Mamoru; Onuma, Akiyoshi; and Yamasaki, Ichiro, 4,791,256, Cl. 200-148.00R.  
Hostettler, Fritz. Dental prosthetic from hard, rigid, non-hydrophilic polyurethane elastomer, 4,791,156, Cl. 528-76.000.  
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Yoshikawa, Norio; and Hotta, Tadaaki, 4,791,548, Cl. 364-149.000.  
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Hou, Kenneth C.; Hou, Chung-Jen; and Chen, Haunn-Lin, 4,791,063, Cl. 435-243.000.  
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Howard, Alfred R., Sr. Portable removable gun sight, 4,790,075, Cl. 33-233.000.  
Howmedica International Inc.: See—  
Harder, Hans E.; Behrens, Klaus; and Kotz, Rainer, 4,790,854, Cl. 623-20.000.

- Howmet Turbine Components Corporation: See—  
Lirones, Nick G., 4,790,874, Cl. 75-93.00R.  
Hrovat, Davorin D.: See—  
Brown, Larry T.; and Hrovat, Davorin D., 4,790,418, Cl. 192-0.032.  
Hsieh, Henry L.: See—  
Yeh, Gene H. C.; and Hsieh, Henry L., 4,791,086, Cl. 502-102.000.  
Hsu, Win-Pen, to J. E. Siebel Sons' Company Inc. Apparatus for the production of ethanol and fermented beverages, 4,790,238, Cl. 99-276.000.  
Hubbell Incorporated: See—  
Ehrenfels, Alfred L.; and D'Amato, Michael J., 4,790,765, Cl. 439-96.000.  
Neuroth, David H., 4,791,246, Cl. 174-102.00R.  
Huber, Guido: See—  
Eckert, Beat; Huber, Guido; and Riehle, Norbert, 4,790,263, Cl. 118-317.000.  
Huber, Val J., to Wang Laboratories, Inc. Interactive construction of means for database maintenance, 4,791,561, Cl. 364-300.000.  
Hudson, Kenneth H.; Gormley, David E.; Dowdy, James E.; and Vampola, Edward F. Cash register cover, 4,791,278, Cl. 235-7.00R.  
Huffer, Russell, to Viracon, Inc. Temperable low emissivity and reflective windows, 4,790,922, Cl. 204-192.270.  
Huffman, Walter K.: See—  
Flick, Robert H.; and Huffman, Walter K., 4,791,393, Cl. 335-16.000.  
Huffy Corporation: See—  
Diekmann, Robert L.; and Barchek, Douglas A., 4,790,207, Cl. 74-523.000.  
Hughes Aircraft Company: See—  
Leggett, Hyman, deceased; and Brown, Kenneth M., 4,791,076, Cl. 501-95.000.  
Moss, Gaylord E., 4,790,613, Cl. 350-3.700.  
Hughes, David C.: See—  
Johnsen, Edward L.; and Hughes, David C., 4,791,281, Cl. 235-383.000.  
Hughes, John B., to U.S. Philips Corporation. Electrical filter with adjustable RC product, 4,791,379, Cl. 328-167.000.  
Hughes Tool Company: See—  
Raynor, Vester R.; and Knox, Dick L., 4,790,373, Cl. 165-185.000.  
Huijter, Ernst; Leheureau, Jean C.; and Monlouis, Claude, to Thomson-CSF. Magnetic recording device with rotating head, 4,791,514, Cl. 360-108.000.  
Hulett, Richard H.: See—  
Midgley, John A.; and Hulett, Richard H., 4,791,276, Cl. 219-549.000.  
Hull, Jack W. Yard sign, 4,790,091, Cl. 40-607.000.  
Hummel, Kurt: See—  
Baumgarten, Klaus; and Hummel, Kurt, 4,790,639, Cl. 350-486.000.  
Hun, Park J.: See—  
Mun, Im H.; Young, Jang E.; Hun, Park J.; and Hwan, Suh M., 4,790,146, Cl. 62-441.000.  
Hunt, David A.; and Schwindeman, James A., to PPG Industries, Inc. Herbicidally active aryloxy optionally oxo-substituted indane or tetralin derivatives, 4,790,870, Cl. 71-94.000.  
Hunt, Neil: See—  
Deering, Michael F.; and Hunt, Neil, 4,791,675, Cl. 382-18.000.  
Hunter, Michael R.: See—  
Watts, Harold G., Jr.; Hunter, Michael R.; and Thompson, Randy E., 4,791,575, Cl. 364-474.360.  
Hunter, Pamela A.; Berry, Valerie; Oduro-Yeboah, Joshua; and Orr, Norman A., to Beecham Group p.l.c. Treatment of fungal infections, 4,790,989, Cl. 424-404.000.  
Husky Oil Operations Ltd.: See—  
Toews, Donovan E.; and Toews, Alvin M., 4,790,800, Cl. 474-101.000.  
Hutchings, Richard S., to Drackett Company, The. Aqueous alkali metal halogenite compositions containing a colorant stabilized by NH<sub>4</sub>OH, 4,790,950, Cl. 252-102.000.  
Hutchins, Warwick, to Rock Engineering Pty. Limited. Ground control, 4,790,129, Cl. 57-204.000.  
Hutter, Robert B.: See—  
Fedele, William E.; and Hutter, Robert B., 4,790,185, Cl. 73-317.000.  
Hwan, Suh M.: See—  
Mun, Im H.; Young, Jang E.; Hun, Park J.; and Hwan, Suh M., 4,790,146, Cl. 62-441.000.  
Hyde, Richard M.: See—  
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Hydrolever Company: See—  
Polverari, Paul G., 4,791,254, Cl. 200-81.90M.  
Hyduke, Stanley M. Electronic circuit board testing system and method, 4,791,357, Cl. 324-73.0PC.  
Hyodo, Hitoshi: See—  
Akita, Tokihiko; and Hyodo, Hitoshi, 4,790,403, Cl. 180-176.000.  
Hyodo, Masato: See—  
Kawahara, Hideo; Yoshida, Harunobu; and Hyodo, Masato, 4,791,418, Cl. 340-784.000.  
Hyodo, Masaya: See—  
Hata, Seiichi; Akima, Hideo; Kitagawa, Kiyoshi; Hyodo, Masaya; and Niinomi, Koji, 4,790,420, Cl. 192-111.00A.  
Hypertherm, Inc.: See—  
Sanders, Nicholas A.; and Couch, Richard W., Jr., 4,791,268, Cl. 219-121.570.  
Ibanez, Paul; and Merz, Kelvin L., to Anco Engineers, Inc. Compact device for long stroke energy absorption, 4,791,243, Cl. 174-45.00R.
- Ichikawa, Hiroaki: See—  
Sugiura, Yoshihide; Ichikawa, Hiroaki; Matsumura, Nobutake; and Sasaki, Nobuo, 4,791,474, Cl. 357-71.000.  
ICU Medical, Inc.: See—  
Lopez, George A., 4,790,832, Cl. 604-283.000.  
Ida, Daijiro: See—  
Sakimori, Hideharu; Hayashi, Hiroyuki; Ida, Daijiro; and Takahashi, Seiji, 4,790,709, Cl. 414-416.000.  
Ida, Kazuo: See—  
Minami, Hiroo; and Ida, Kazuo, 4,790,973, Cl. 264-242.000.  
Ida, Takanori: See—  
Sato, Goro; Ogata, Masamitsu; Ida, Takanori; and Masuda, Tatsuo, 4,791,084, Cl. 502-65.000.  
Ide, Fumito: See—  
Murakami, Reiji; Hashimoto, Shimichi; Shimino, Mamoru; and Ide, Fumito, 4,790,524, Cl. 271-10.000.  
Ide, Junya; and Fujimoto, Koichi, to Sankyo Company Limited. Crystalline cephem carboxylic acid addition salt, 4,791,196, Cl. 540-227.000.  
Ide, Takanobu; and Shimoda, Ikuo, to Nissan Motor Company, Limited; and Oiles Industry Company, Limited. Anti-vibration apparatus for mounting a power unit on a supporting body with suppression of vibrations, 4,790,521, Cl. 267-219.000.  
Identsch Corporation: See—  
Van Hove, Michael; Taylor, Geoffrey L.; and Saghatchi, Hamid, 4,790,624, Cl. 350-96.260.  
Iga, Hirofumi: See—  
Kawano, Yukihiko; Juji, Tomihiro; Ono, Toshihiko; Iga, Hirofumi; Ono, Seiichi; and Isobe, Yoshiyuki, 4,790,567, Cl. 285-24.000.  
Igarashi, Masato; and Suenari, Yoshiyuki, to Fujitsu limited. Gate array integrated circuit device and method thereof for providing various bit/word constructions, 4,791,607, Cl. 365-51.000.  
Igarashi, Tadao; and Oogi, Takashi, to Sony Corporation. Tape cassette with lid lock and tape characteristic indicating member, 4,791,504, Cl. 360-132.000.  
Ida, Akihisa, to Fuji Photo Film Co., Ltd. Method and apparatus for scanning a web material in the direction of its width, 4,791,304, Cl. 250-563.000.  
Ida, Masamichi, to Mazda Motor Corporation. Fuel supply cut-off control system for engine of an automotive vehicle, 4,790,275, Cl. 123-325.000.  
Iijima, Makoto, to Kawasaki Electric Wire Co., Ltd. Electric power plug, 4,790,776, Cl. 439-695.000.  
Iimori, Isao; and Otsubo, Kazumi, to Japan Aviation Electronics Industry Limited; and Honda Giken Kogyo Kabushiki Kaisha. Connector housing, 4,790,777, Cl. 439-744.000.  
Iinuma, Kazuhiro, to Kabushiki Kaisha Toshiba. Ultrasonic type blood flow amount measuring apparatus, 4,790,322, Cl. 128-661.100.  
Ikahata, Toshihiro: See—  
Takai, Kazuki; Ikahata, Toshihiro; and Watanabe, Wataru, 4,791,505, Cl. 360-137.000.  
Ikeda, Kensuke; and Iwakura, Ken, to Fuji Photo Film Co., Ltd. Heat-sensitive recording material, 4,791,095, Cl. 503-209.000.  
Ikeda, Masanobu: See—  
Sugiura, Saburo; Ikeda, Masanobu; and Demukai, Noboru, 4,790,516, Cl. 266-144.000.  
Ikeda, Masao: See—  
Higuchi, Seizun; Oga, Tomonari; Ikeda, Masao; and Nakano, Hirohumi, 4,790,913, Cl. 204-37.300.  
Ikeda, Minoru, to Leggett & Platt, Incorporated. Bedding spring assembly, 4,790,038, Cl. 5-247.000.  
Ikeguchi, Masahiko: See—  
Kimura, Fumio; Haga, Takahiro; Maeda, Kazuyuki; Shimoharada, Hiroshi; Yoshida, Tsunezo; and Ikeguchi, Masahiko, 4,790,869, Cl. 71-90.000.  
Illuzzi, Francesca: See—  
d'Agostino, Riccardo; Cramarossa, Francesco; Fracassi, Francesco; Illuzzi, Francesca; and Caporiccio, Gerardo, 4,791,012, Cl. 428-35.300.  
Imagumbai, Masana; Chijiwa, Rikio; and Yamada, Naomi, to Nippon Steel Corporation. Method of producing high tensile-high toughness steel, 4,790,885, Cl. 148-2.000.  
Imai, Masao: See—  
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Imano, Shigeki: See—  
Nagata, Masanori; Imano, Shigeki; Kaneoka, Tsugio; and Asada, Kiyotoshi, 4,791,655, Cl. 378-57.000.  
IMI-TECH Corporation: See—  
Lee, Raymond; Ferro, Gregory A.; and Evan, John, 4,791,275, Cl. 219-469.000.  
Imoto, Katsuyuki; Sano, Hirohisa; and Maeda, Minoru, to Hitachi, Ltd. Optical filter and optical device using same, 4,790,614, Cl. 350-96.120.  
Impact Systems, Inc.: See—  
Typpo, Pekka, 4,791,353, Cl. 324-61.00R.  
Typpo, Pekka M., 4,791,367, Cl. 324-229.000.  
Imperial Chemical Industries PLC: See—  
Bushell, Michael J.; and Carr, Robin A. E., 4,791,139, Cl. 514-721.000.  
Nevin, Alan; and Shirley, Ian, 4,791,028, Cl. 428-421.000.  
Pickering, Anthony; and Thorne, Andrew J., 4,791,181, Cl. 526-190.000.  
INA Walzlagler Schaeffler KG: See—  
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Ina, Yoshimitsu: See—  
Fukazawa, Junichi; Ina, Yoshimitsu; and Tsutsumi, Hisao, 4,791,140, Cl. 514-845.000.

Inahata, Hideki: See—  
Sasaki, Masao; Onodera, Kaoru; and Inahata, Hideki, 4,790,959, Cl. 252-589.000.

Ince, Francis; and Tinker, Alan C., to Fisons plc. Para ethyl amino phenol pharmaceutical compounds. 4,791,216, Cl. 560-39.000.

Industrial Gas and Supply Company: See—  
Glascock, Battle, 4,790,141, Cl. 62-78.000.

Industrial Machine Manufacturing, Inc.: See—  
Moore, Leo M., 4,790,458, Cl. 222-386.000.

Ing, C. Olivetti & C., S.p.A.: See—  
Accattino, Andrea; and Chiaro, Aldo, 4,791,437, Cl. 346-140.00R.

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Ingersoll Cutting Tool Company: See—  
Koblesky, Robert T., 4,790,693, Cl. 407-35.000.

Ingle, Peter; Watkins, David R.; and Griffiths, Gerald A., to SP Tyres UK Limited. Radial motorcycle tires. 4,790,363, Cl. 152-454.000.

Inmos Corporation: See—  
Carpio, Ronald A., 4,791,296, Cl. 250-339.000.

Hardee, Kim C., 4,791,613, Cl. 365-189.000.

Innovative S.A.: See—  
Suire, Rene; Malet, Christian; Speri, Roger J.; and Bernard, Coll, 4,790,851, Cl. 623-16.000.

Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, to Honda Giken Kogyo Kaisha. Valve operating mechanism for internal combustion engine. 4,790,274, Cl. 123-198.00F.

Inoue, Noriyuki: See—  
Nishida, Minoru; Inoue, Noriyuki; Asayama, Yoshiaki; and Suzuki, Hiroyoshi, 4,790,286, Cl. 123-571.000.

Inoue, Shojiro: See—  
Uno, Katsuhiko; Ishikawa, Katsuhiko; and Inoue, Shojiro, 4,790,746, Cl. 431-314.000.

Instance, David J. Labels and manufacture thereof. 4,790,563, Cl. 283-81.000.

Institut Francais Du Petrole: See—  
Chaumette, Patrick; Courty, Philippe; Durand, Daniel; Grandvallet, Pierre; and Travers, Christine, 4,791,141, Cl. 518-713.000.

Intel Corporation: See—  
Krzanich, Brian M., 4,790,920, Cl. 204-192.170.

Leonov, Mark, 4,790,661, Cl. 356-401.000.

Vajdic, Branislav; and Smith, Stephen L., 4,791,326, Cl. 307-571.000.

Intellicard International, Inc.: See—  
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Intelligent Medical Systems, Inc.: See—  
O'Hara, Gary J.; and Phillips, David B., 4,790,324, Cl. 128-664.000.

Intera Company, Ltd.: See—  
Mallen, Ted A.; and Word, Doyle B., 4,790,907, Cl. 162-157.100.

Intermedicat GmbH: See—  
Schwobel, Eckhard; and Baumle, Hubert, 4,790,330, Cl. 128-764.000.

InterMetro Industries Corporation: See—  
Welch, Robert J.; Kolvites, Albert; and White, Robert M., 4,790,610, Cl. 312-218.000.

International Business Machine Corporation: See—  
Eldridge, Jerome M.; Keller, Gary S.; Lee, Francis C.; Nelson, George N.; and Olive, Graham, 4,791,440, Cl. 346-140.00R.

International Business Machines Corporation: See—  
Baumert, Jean-Claude J. E.; Bjorklund, Gary C.; Lenth, Wilfried; Risk, William P., III; and Schellenberg, Franklin M., 4,791,631, Cl. 372-22.000.

Burns, C. A.; DeCoursey, Calvin H.; and Junker, Hans H., 4,791,629, Cl. 370-85.000.

Chaitin, Gregory J.; Hoagland, Clifford H.; and Stephenson, Marc J., 4,791,558, Cl. 364-200.000.

Dickson, LeRoy D., 4,790,612, Cl. 350-3.690.

Flickner, Myron D.; and Ali Mohiuddin, Kottappuram M., 4,791,676, Cl. 382-26.000.

Garcia, Leslie C.; Tjon-Pian-Gi, David C.; Tucker, Stuart G.; and Zajac, Myron W., 4,791,555, Cl. 364-200.000.

Komplin, Steven R., 4,790,672, Cl. 384-125.000.

Mitchell, Joan L.; Pennabaker, William B.; and Goertzel, Gerald, 4,791,403, Cl. 341-51.000.

Phinney, Richard R.; and Strippe, David C., 4,791,261, Cl. 219-10.491.

Rex, Donald K.; and Ruse, James P., 4,790,467, Cl. 226-74.000.

Teigen, Scott C.; and Weidendorf, Joel P., 4,791,524, Cl. 361-212.000.

International Clamp Company: See—  
Miller, Jack E., 4,790,058, Cl. 29-407.000.

International Computer Marketing Corporation: See—  
Reel, James W., 4,790,431, Cl. 206-305.000.

International Flavors & Fragrances Inc.: See—  
Sprecker, Mark A.; Wilson, Stephen R.; Steinbach, Leonard; and O'Rourke, Thomas, 4,791,222, Cl. 560-237.000.

International Power Technology, Inc.: See—  
Hamill, James; Digumartha, Ramarao; Conlon, William; Cheng, Dah Y.; and Chang, Chung-Nan, 4,790,269, Cl. 122-406.05T.

Internationale Octrooi Maatschappij "Octropa" B.V.: See—  
Holemans, Pieter M. J.; Schijf, Robert; Van Putte, Karel P. A. M.; and De Man, Teunis, 4,791,000, Cl. 426-606.000.

Intravascular Surgical Instruments, Inc.: See—  
Kensley, Kenneth R., 4,790,813, Cl. 604-22.000.

Inzhenerny Tsent Truboprovod: See—  
Shahkin, Viktor V.; Kryazhevskikh, Nikolai F.; and Shapovalov, Jury P., 4,790,934, Cl. 210-189.000.

Ipcor Corporation: See—  
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Ipri, Alfred C.; and Plus, Dora, to General Electric Company. Semiconductor device that minimizes the leakage current associated with the parasitic edge transistors and a method of making the same. 4,791,464, Cl. 357-23.700.

Iqbal, Abul: See—  
Jost, Max; Iqbal, Abul; and Rochat, Alain C., 4,791,204, Cl. 548-101.000.

IRECO Incorporated: See—  
Miller, Kenneth A., 4,790,890, Cl. 199-2.000.

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Irigoin-Guichandut, Francois: See—  
Larcher, Philippe; Irigoin-Guichandut, Francois; Vassy, Daniel; Lenci, Michel; Longepierre, Patrick; and Didier, Bernard, 4,790,564, Cl. 283-69.000.

Irikura, Tsutomu; Suzue, Seigo; Murayama, Satoshi; Hirai, Keiji; and Ishizaki, Takayoshi, to Kyorin Pharmaceutical Co., Ltd. Halogenobenzoic acid derivatives and their preparation. 4,791,225, Cl. 562-493.000.

Irvine Industries, Inc.: See—  
Fisher, Robert C.; Lobanoff, Mark; and Brennan, Michael P., 4,791,537, Cl. 362-135.000.

Irvine Sensors Corporation: See—  
Wall, Llewellyn E., 4,791,286, Cl. 250-214.00A.

Isaka, Yoshiharu: See—  
Oguri, Kiyohiko; and Isaka, Yoshiharu, 4,790,273, Cl. 123-196.00W.

Iseli, Karl: See—  
Frey, Werner U.; Rometsch, Johannes; Iseli, Karl; and Wild, Peter, 4,791,257, Cl. 200-159.00R.

Ishida, Nobumasa: See—  
Kondo, Koji; Murakawa, Katuhiko; Ishida, Nobumasa; Ishikawa, Junji; Nomoto, Kaoru; and Ishikawa, Futoshi, 4,790,876, Cl. 106-1.230.

Ishida, Syuichi, to Toyota Gosei Co., Ltd. Impact energy absorbing steering wheel. 4,790,209, Cl. 74-552.000.

Ishida, Tokuji; Ootsuka, Hiroshi; and Mukai, Hiromu, to Minolta Camera Kabushiki Kaisha. Light measuring device. 4,791,446, Cl. 354-408.000.

Ishigaki, Masahiro: See—  
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Ishigooka, Hiroshi: See—  
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Ishiguro, Tatsuya, to Kyowa Medex Co., Ltd. Immunoelectrophoresis method for diagnosing and differentiating cancer using lectins. 4,791,066, Cl. 436-516.000.

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Ishii, Hisao, deceased: See—  
Takahashi, Shinichi; Ishii, Hisao, deceased; Shinkawa, Kiyoshi; Kawahara, Takeshi; and Manita, Toshiyuki, 4,791,571, Cl. 364-436.000.

Ishii, Mariko, legal representative: See—  
Takahashi, Shinichi; Ishii, Hisao, deceased; Shinkawa, Kiyoshi; Kawahara, Takeshi; and Manita, Toshiyuki, 4,791,571, Cl. 364-436.000.

Ishii, Susumu, to Yoshida Kogyo K. K. Pull tab for slide fastener slider. 4,790,050, Cl. 24-429.000.

Ishikawa, Futoshi: See—  
Kondo, Koji; Murakawa, Katuhiko; Ishida, Nobumasa; Ishikawa, Junji; Nomoto, Kaoru; and Ishikawa, Futoshi, 4,790,876, Cl. 106-1.230.

Ishikawa, Junji: See—  
Kondo, Koji; Murakawa, Katuhiko; Ishida, Nobumasa; Ishikawa, Junji; Nomoto, Kaoru; and Ishikawa, Futoshi, 4,790,876, Cl. 106-1.230.

Ishikawa, Katsuhiko: See—  
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Ishikawa, Norio: See—  
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Ishikawajima-Harima Jukogyo Kabushiki Kaisha: See—  
Sato, Yukinori; Watanabe, Takeshi; Nikai, Isao; and Watanabe, Kenji, 4,790,140, Cl. 60-757.000.

Ishitsuka, Takeshi; Yamagishi, Yasuo; and Mochizuki, Akihiro, to Fujitsu Limited. Visible ray-recording hologram material. 4,791,039, Cl. 430-2.000.

Ishizaki, Akira: See—  
Harada, Yoshihiro; and Ishizaki, Akira, 4,790,649, Cl. 354-400.000.

Ishizaki, Takayoshi: See—  
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Masuzawa, Kuniyoshi; Suzue, Seigo; Hirai, Keiji; and Ishizaki, Takayoshi, 4,791,118, Cl. 514-312.000.

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Nakazaki, Youji; and Isobe, Yoshio, 4,790,186, Cl. 73-431.000.

Isobe, Yoshiyuki: See—  
Kawano, Yukihiko; Juji, Tomohiro; Ono, Toshihiko; Iga, Hirofumi; Ono, Seichi; and Isobe, Yoshiyuki, 4,790,567, Cl. 285-24.000.

Italtel-Societa Italiana Telecomunicazioni s.p.a.: See—  
Campanini, Giorgio, 4,791,553, Cl. 364-200.000.

Itemadani, Eiji: See—  
Maruyama, Masahiro; Itemadani, Eiji; Mori, Kazuhiro; and Hasegawa, Mikio, 4,790,069, Cl. 29-832.000.

Ito, Akira; Hagiwara, Hideo; and Katsaku, Tetsuo, to Toyoda Gosei Co., Ltd. Corner bracket of side door for automobile. 4,790,590, Cl. 296-146.000.

Ito, Giichi; Mukai, Kousaku; Shimizu, Yuichi; and Suzuki, Saiju, to NTT Technology Transfer Corporation. Shape measuring instrument. 4,790,660, Cl. 356-376.000.

Ito, Masao: See—  
Nakao, Shinroku; and Ito, Masao, 4,790,528, Cl. 272-73.000.

Ito, Soichi, to NEC Corporation. Semiconductor integrated circuit device. 4,791,609, Cl. 365-63.000.

Ito, Takaaki: See—  
Uranishi, Koji; and Ito, Takaaki, 4,790,283, Cl. 123-519.000.

Ito, Takashi: See—  
Nakagawa, Yasushi; and Ito, Takashi, 4,791,192, Cl. 530-399.000.

Ito, Toshio: See—  
Yokoyama, Yukio; Ebine, Yoshio; and Ito, Toshio, 4,791,423, Cl. 343-700.00S.

Ito, Yoshiteru: See—  
Arakawa, Satoshi; Hosoi, Yuichi; Yamazaki, Hisashi; and Ito, Yoshiteru, 4,791,009, Cl. 427-64.000.

ITT Corporation: See—  
Busso, Fiorenzo; and Russo, Vincent, 4,790,592, Cl. 297-184.000.

ITT Defense Communications, a Division of ITT Corporation: See—  
Baker, Anthony P., 4,790,633, Cl. 350-347.00V.

Iveco Fiat S.p.A.: See—  
Gheddo, Carlo, 4,790,201, Cl. 74-89.150.

Iwabuchi, Koichi: See—  
Watai, Minoru; Nishimuro, Yasukazu; and Iwabuchi, Koichi, 4,790,861, Cl. 55-137.000.

Iwakura, Ken: See—  
Ikeda, Kensuke; and Iwakura, Ken, 4,791,095, Cl. 503-209.000.

Iwakura, Masato: See—  
Hamada, Kenji; and Iwakura, Masato, 4,790,087, Cl. 40-204.000.

Iwano, Haruhiko: See—  
Hirai, Hiroyuki; Yabuki, Yoshiharu; and Iwano, Haruhiko, 4,791,048, Cl. 430-372.000.

Iwasaki, Satoshi; Ueda, Toshihiko; and Kono, Kunihiro, to Minolta Camera Kabushiki Kaisha. Lens system for projecting images of microfilm. 4,790,638, Cl. 350-465.000.

Iwasaki, Shigeo: See—  
Okuda, Shigenobu; Iwasaki, Shigeo; Namikoshi, Michio; Arakawa, Masao; and Shimizu, Fusaaki, 4,791,128, Cl. 514-374.000.

Iwasaki, Yorio: See—  
Kanno, Masao; Fukutomi, Naoki; Iwasaki, Yorio; Kojima, Fujio; and Nakamura, Hidehiro, 4,791,238, Cl. 174-68.500.

Iwase, Hiromichi; Sasaki, Shigeru; Gotoh, Toshiyuki; Torii, Takashi; and Ozaki, Tohru, to Fujitsu Limited. Image processing system. 4,791,678, Cl. 382-54.000.

Iwase, Kenichi: See—  
Kishimoto, Shinichi; Iwase, Kenichi; Miki, Toshio; and Tanaka, Teiji, 4,791,461, Cl. 356-446.000.

Iwata, Eiji: See—  
Usuda, Masashi; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, 4,790,237, Cl. 98-42.160.

Iwata, Yukio; and Matsumoto, Shigenori, to Akebono Brake Industry Co., Ltd. Method of machining a brake caliper. 4,790,221, Cl. 82-1.00C.

Iwatsuki, Tatsuya; Kawamoto, Mutsumi; and Kano, Takenori, to Aisin-Warner Kabushiki Kaisha. Power transmission device for four wheel drive vehicle having an improved differential motion limiting mechanism. 4,790,211, Cl. 74-701.000.

Iyoda, Syozo: See—  
Ubukata, Susumu; Mizutani, Yasukazu; and Iyoda, Syozo, 4,791,329, Cl. 310-68.00C.

Izumi, Takashi: See—  
Ohta, Takamichi; Izumi, Takashi; Yamazi, Takeshi; and Fukushima, Shigeyoshi, 4,791,019, Cl. 428-304.400.

J. C. Pardo and Sons: See—  
Pardo, Warren A.; Pardo, Richard J.; and Gabriele, Valentino, 4,790,667, Cl. 366-311.000.

J. E. Siebel Sons' Company Inc.: See—  
Hsu, Win-Pen, 4,790,238, Cl. 99-276.000.

J. G. Furniture Systems, Inc.: See—  
Behringer, John, 4,790,600, Cl. 297-337.000.

J. I. Case Company: See—  
Anderson, Ronald L.; and Rieser, Donald E., 4,790,084, Cl. 37-117.500.

Anderson, Ronald L., 4,790,717, Cl. 414-722.000.

Jacobs, Robert M., to Xerox Corporation. Dual mode color fuser. 4,791,447, Cl. 355-3.0FU.

Jacobson Mfg. Co., Inc.: See—  
Baubles, Richard C., 4,790,701, Cl. 411-85.000.

Jacobson, Robert G.: See—  
Warren, Frederick E.; Craler, Harvey B.; Jacobson, Robert G.; Kim, Chang H.; and Llewellyn, Edward C., 4,791,356, Cl. 324-73.00R.

Jacoby, John H., to PinFin, Inc. Airflow directional vane for a heatsink. 4,790,374, Cl. 165-185.000.

Jahn, Juergen: See—  
Mach, Helmut; Vogel, Hans-Henning; and Jahn, Juergen, 4,790,957, Cl. 252-56.00S.

Jainischig, Alexander: See—  
Frieser, Erich P.; and Jainischig, Alexander, 4,790,951, Cl. 252-162.000.

James, Darold L. Sound responsive lighted earrings. 4,791,536, Cl. 362-104.000.

James, Ralph L.: See—  
Lahti, Archie E.; James, Ralph L.; and Byers, Larry L., 4,791,560, Cl. 364-200.000.

Jamison, William L. Table top golf game. 4,790,534, Cl. 273-87.200.

Janik, Gloria; and Buontello, Manuel, III, to Dow Corning Corporation. Method for preparing storage stable, one part curable polyorganosiloxane compositions. 4,791,186, Cl. 528-15.000.

Janik, Leon P.: See—  
Raufelsen, Robert; Chace, David A.; and Janik, Leon P., 4,790,055, Cl. 29-156.70R.

Jansen, Hermanus J. Process for the preparation of a disinfectant for water, such as drinking- or swimming-water. 4,790,946, Cl. 210-748.000.

Janssen Pharmaceutica, N.V.: See—  
Heeres, Jan; Backa, Leo J. J.; Thijssen, Jozef B. A.; and Knaeps, Alfonsus G., 4,791,111, Cl. 514-252.000.

Janssen, Robert A., to Ciba-Geigy Corporation. Particulate hydroperoxidized poly-n-vinyl lactam, its preparation and use thereof. 4,791,175, Cl. 525-287.000.

Japan Atomic Energy Research Institute: See—  
Ando, Toshinari; Nishi, Masataka; Takahashi, Yoshikazu; and Shimamoto, Susumu, 4,791,241, Cl. 174-125.100.

Japan Aviation Electronics Industry Limited: See—  
Iimori, Isao; and Otsubo, Kazumi, 4,790,777, Cl. 439-744.000.

Japan Gore-Tex, Inc.: See—  
Shibata, Yoshihiko, 4,790,445, Cl. 220-202.000.

Jarskar, Staffan: See—  
Wittmeyer, Henning; Kellstrom, Magnus; Jarskar, Staffan; and Floderus, Matta, 4,790,543, Cl. 277-25.000.

Jarvenkyla, Jyri; and Holso, Paul, to Oy Uponor AB. Method and device for extrusion of a double wall plastics pipe. 4,790,975, Cl. 264-508.000.

Jayant, Nugehalli S.: See—  
De Marca, Jose R. B.; and Jayant, Nugehalli S., 4,791,654, Cl. 375-122.000.

Jefferies, Roy S.: See—  
O'Connell, John; Webster, Alan; Jefferies, Roy S.; and Trevor-Jones, Hugh, 4,791,280, Cl. 235-382.500.

Jeffrey, Daniel. Space spinner. 4,790,498, Cl. 244-153.00A.

Jen, Cheng-Kuei: See—  
Bussiere, Jean F.; Jen, Cheng-Kuei; Makarow, Irina D.; Bacroix, Brigitte; Lequeu, Philippe H.; and Jonas, John J., 4,790,188, Cl. 73-597.000.

Jenkins, Vaughn J.: See—  
Anderson, David R.; and Jenkins, Vaughn J., 4,791,632, Cl. 372-31.000.

Jeng, Yih-Chyun, to Tektronix, Inc. Digital pipelined heterodyne circuit. 4,791,600, Cl. 364-754.000.

Jensen, Richard R.: See—  
Dickinson, Ben W. O., III; Dickinson, Robert W.; Jensen, Richard R.; May, Sherman C.; Mackey, Charles S.; and Wilkes, Robert D., Jr., 4,790,394, Cl. 175-61.000.

JEOL Ltd.: See—  
Yamada, Mitsuru, 4,791,295, Cl. 250-310.000.

Jepson Burns Corporation, The: See—  
Marrujo, Ralph G., 4,790,496, Cl. 244-122.00R.

Jessup, James L., to Tech-S, Inc. Extruded enclosure for electrical apparatus. 4,791,531, Cl. 361-395.000.

Jeumont-Schneider Corporation: See—  
Pore, Jacques, 4,791,424, Cl. 343-711.000.

Jidosha Kiki Co., Ltd.: See—  
Sonoda, Hirotsugu, 4,790,401, Cl. 180-142.000.

Jimbo, Takamasa: See—  
Shirahata, Isao; Shiga, Shoji; Hori, Hisako; and Jimbo, Takamasa, 4,791,239, Cl. 174-68.500.

Johannes, Peter; Lampe, Lutz; Lampe, Wolfgang; Loreit, Uwe; Neumarker, Gottfried; and Pertsch, Peter, to Kombinat VEB Keramikwerke Hermsdorf. Position responsive control signal generator having relatively movable sensor and magnetic flux concentrators. 4,791,365, Cl. 324-208.000.

Johannessen, Donald D.: See—  
Temple, Robert B.; and Johannessen, Donald D., 4,790,704, Cl. 411-522.000.

Johansson, Bert E.; and Grims, Conrad M., to Adolph Coors Company. Apparatus for doming can bottoms. 4,790,169, Cl. 72-354.000.

Johnke, Bruce L., to South Australian Co-Operative Bulk Handling Limited. Reducing hoop stress in silos. 4,790,111, Cl. 52-197.000.

Johns Hopkins University, The: See—  
Zoltan, Bart J.; Laube, Beth L.; and Adams, George K., III, 4,790,305, Cl. 128-200.230.

Johnsen, Edward L.; and Hughes, David C., to C.P.C. Investment Trust. Encoding and decoding system. 4,791,281, Cl. 235-383.000.



Johnson, Clemens A., to Brunswick Corporation. Outboard motor exhaust tube divider. 4,790,134, Cl. 60-321.000.

Johnson, Daniel C.: See—  
Schoberg, Carl J.; and Johnson, Daniel C., 4,790,434, Cl. 206-387.000.

Johnson, David: See—  
Augeri, James A.; Bolz, Carl; Bickford, Bruce; Young, Paul; and Johnson, David, 4,791,508, Cl. 360-99.120.

Johnson, David R.: See—  
Moll, Norman G.; and Johnson, David R., 4,790,367, Cl. 164-34.000.

Johnson, Duane R., to Allied-Signal Inc. Knob and shaft assembly. 4,790,208, Cl. 74-548.000.

Johnson, Frederick W.: See—  
Dietiker, Paul; and Johnson, Frederick W., 4,790,352, Cl. 379-113.000.

Johnson, George W.: See—  
Arnold, Wendell R.; Dow, William C.; and Johnson, George W., 4,791,110, Cl. 514-247.000.

Johnson, Irvin D.; and Bruce, Charles R., to Marathon Oil Company. Method and means for introducing treatment composition into a well bore. 4,790,386, Cl. 166-310.000.

Johnson & Johnson Ultrasound Inc.: See—  
Perten, Herbert; and Scallion, Ralph, 4,790,320, Cl. 128-661.010.

Johnson, Lowell E.: See—  
Rockne, David T.; and Johnson, Lowell E., 4,791,663, Cl. 379-113.000.

Johnson, Willard L. Filter leaf assembly with bonded spacer and sealer. 4,790,935, Cl. 210-232.000.

Joint Medical Products Corporation: See—  
Nolte, Douglas G., 4,790,852, Cl. 623-18.000.

Jolly, David F. Total elastic support member for use with an orthopedic device. 4,790,855, Cl. 623-32.000.

Jonas, John J.: See—  
Bussiere, Jean F.; Jen, Cheng-Kuei; Makarow, Irina D.; Bacroix, Brigitte; Lequeu, Philippe H.; and Jonas, John J., 4,790,188, Cl. 73-597.000.

Jones, David T. S.; and Jones, Gareth W., to Containers Unlimited. Collapsible carbonated beverage container. 4,790,361, Cl. 150-55.000.

Jones, Gareth W.: See—  
Jones, David T. S.; and Jones, Gareth W., 4,790,361, Cl. 150-55.000.

Jones, Thomas K. Insect actuated novelty device. 4,790,260, Cl. 119-1.000.

Joppien, Hartmut: See—  
Franke, Helga; Franke, Heinrich; Kruger, Hans-Rudolf; Joppien, Hartmut; Baumert, Dietrich; and Giles, David, 4,791,123, Cl. 514-345.000.

Joet, Max; Iqbal, Abul; and Rochat, Alain C., to Ciba-Geigy Corporation. 1,4-diketopyrrolo[3,4-c]pyrrole pigments. 4,791,204, Cl. 548-101.000.

Juda, Mark A.: See—  
Beihoff, Bruce C.; Hastings, Jerome K.; Juds, Mark A.; and Baran, Michael S., 4,791,361, Cl. 324-126.000.

Juhnke, David: See—  
Moore, Larry R.; and Juhnke, David, 4,790,589, Cl. 296-50.000.

Juji, Tomihiro: See—  
Kawano, Yukihiko; Juji, Tomihiro; Ono, Toshihiko; Iga, Hirofumi; Ono, Seiichi; and Isobe, Yoshiyuki, 4,790,567, Cl. 285-24.000.

Jung, Louis L.: See—  
Robert, Dominique D.; and Jung, Louis L., 4,791,217, Cl. 560-55.000.

Junghans Uhren GmbH: See—  
Wild, Gerhard; and Haller, Edgar, 4,791,621, Cl. 368-47.000.

Junker, Hans H.: See—  
Burns, C. A.; DeCoursey, Calvin H.; and Junker, Hans H., 4,791,629, Cl. 370-85.000.

Jurmu, Douglas C.: See—  
Sandberg, L. Bogue; Haataja, Bruce A.; Jurmu, Douglas C.; Pa-lardy, Robert D.; Story, Frank H.; and Yates, William A., 4,790,966, Cl. 264-39.000.

Kaaden, Hans-Heinrich. Apparatus for the manufacture of plastic parts by injection molding or reaction injection molding. 4,790,742, Cl. 425-548.000.

Kaalstad, Oscar; and Reid, Neil G., to Clediac International BV. Rotary drilling device. 4,790,397, Cl. 175-365.000.

Kaar, Richard A. Round collar maker. 4,790,166, Cl. 72-106.000.

Kabushiki Kaisha Asada: See—  
Kaji, Kazumi, 4,790,124, Cl. 53-552.000.

Kabushiki Kaisha Ishida Koki Seisakusho: See—  
Nobutsugu, Hideo, 4,790,398, Cl. 177-1.000.

Kabushiki Kaisha Murakoshi Seiko: See—  
Higashi, Chiyokazu; and Tajima, Takayuki, 4,790,576, Cl. 292-251.500.

Kabushiki Kaisha Okawara Seisakusho: See—  
Noguchi, Tetsuo; Tanaka, Masao; and Nakanishi, Hiroshi, 4,790,487, Cl. 241-79.100.

Kabushiki Kaisha Toshiba: See—  
Doi, Miwako, 4,791,587, Cl. 364-900.000.

Imura, Kazuhiro, 4,790,322, Cl. 128-661.000.

Kageyama, Satoshi; Nakamura, Yasuaki; Kondo, Takashi; Abe, Shozo; and Mori, Kazuhiro, 4,791,496, Cl. 358-342.000.

Kan, Masahiro, 4,791,375, Cl. 324-552.000.

Kasai, Toshihiro; and Tanji, Tatsuya, 4,791,452, Cl. 355-14.00D.

Kuriyama, Toru; and Hakamada, Ryuichi, 4,790,147, Cl. 62-514.00R.

Minowa, Takehiko, 4,791,491, Cl. 358-284.000.

Murakami, Reiji; Hashimoto, Shinichi; Shimino, Mamoru; and Ide, Fumito, 4,790,524, Cl. 271-10.000.

Muranaka, Yauichi, 4,791,480, Cl. 358-98.000.

Noji, Osamu, 4,790,135, Cl. 60-327.000.

Sakai, Tadaaki; Katsura, Masaki; Hiraki, Hideaki; Uno, Shigeki; Shimbo, Masaru; and Furukawa, Kazuyoshi, 4,791,465, Cl. 357-25.000.

Shinohe, Takashi; Takigami, Katsuhiko; Ohashi, Hiromichi; Ogura, Tsuneo; and Asaka, Masayuki, 4,791,470, Cl. 357-38.000.

Tanaka, Shigeru, 4,791,601, Cl. 364-760.000.

Tanaka, Yasunori; Uchino, Yukinori; and Hashimoto, Hideo, 4,791,321, Cl. 307-451.000.

Tsunashima, Yoshitaka; Yamada, Keisaku; and Kashio, Takako, 4,791,074, Cl. 437-160.000.

Tsuzuki, Naohisa, 4,791,368, Cl. 324-301.000.

Kabushiki Kaisha Toyota Jidoshokki Seisakusho: See—  
Hata, Seiichi; Akima, Hideo; Kitagawa, Kiyoshi; Hyodo, Masaya; and Ninomi, Koji, 4,790,420, Cl. 192-111.00A.

Kabushiki Kaisha Toyota Chuo Kenkyusho: See—  
Hattori, Katsuhiko; Suzuki, Hideyuki; Yamaguchi, Hiroyuki; and Ogasawara, Takeo, 4,790,214, Cl. 74-866.000.

Kadin, Saul B., to Pfizer Inc. 1,3-dicarboxamidooxindoles as analgesic and antiinflammatory agents. 4,791,129, Cl. 514-411.000.

Kadin, Saul B., to Pfizer Inc. Analgesic and antiinflammatory 1-acyl-2-oxindole-3-carboxamides. 4,791,131, Cl. 514-418.000.

Kadota, Kuninobu, to Bridgestone Corporation. Pneumatic radial tire for heavy duty vehicle. 4,790,366, Cl. 152-543.000.

Kagawa, Fukashi: See—  
Tanaka, Haruhiko; Kagawa, Fukashi; and Nakashima, Kouji, 4,791,143, Cl. 521-89.000.

Tanaka, Haruhiko; Kagawa, Fukashi; and Nakashima, Kouji, 4,791,147, Cl. 521-134.000.

Kage, Kouzou, to NEC Corporation. Encryption/decryption system. 4,791,669, Cl. 380-46.000.

Kage, Masashi: See—  
Suzuki, Akira; Watanabe, Norio; and Kage, Masashi, 4,790,939, Cl. 210-608.000.

Kageyama, Satoshi; Nakamura, Yasuaki; Kondo, Takashi; Abe, Shozo; and Mori, Kazuhiro, to Kabushiki Kaisha Toshiba. System for presenting audiovisual information to an audience. 4,791,496, Cl. 358-342.000.

Kahkipuro, Matti, to Kone Elevator GmbH. Elevator motor control. 4,791,346, Cl. 318-805.000.

Kai, Takashige: See—  
Ueda, Tomoaki; Kai, Takashige; Osaka, Tatsuhiko; and Nishiguchi, Kazuo, 4,791,582, Cl. 364-522.000.

Kaibara, Makoto: See—  
Yokouchi, Akira; Fukuda, Katsumi; Kuriyama, Keiichi; Kaibara, Makoto; and Watanabe, Masahiro, 4,790,144, Cl. 62-156.000.

Kaisaku, Tetsuo: See—  
Ito, Akira; Hagiwara, Hideo; and Kaisaku, Tetsuo, 4,790,590, Cl. 296-146.000.

Kaiser, Gerhard: See—  
Gack, Helmut; and Kaiser, Gerhard, 4,790,395, Cl. 175-102.000.

Kaiser, William J.: See—  
Logothetis, Eleftherios M.; Kaiser, William J.; and Vassell, William C., 4,790,924, Cl. 204-412.000.

Kaji, Kazumi, to Kabushiki Kaisha Asada; and Coil Master Kogyo Kabushiki Kaisha. Article packaging apparatus. 4,790,124, Cl. 53-552.000.

Kajima Corporation: See—  
Matsui, Nobuyuki; Yokota, Shinichi; Otsuka, Kazuo; Mizote, Shu-hei; Yoshida, Tadashi; Nonaka, Hachiro; and Okumura, Tautomu, 4,790,531, Cl. 272-565.05S.

Kajimoto, Nobuyuki: See—  
Kanemura, Yoshinobu; Sasagawa, Katsuyoshi; Imai, Masao; Nagata, Teruyuki; and Kajimoto, Nobuyuki, 4,791,185, Cl. 528-73.000.

Kajiwaru, Akiharu: See—  
Yamatsa, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwaru, Akiharu; Katayama, Kouichi; Tsunoda, Hajime; Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, 4,791,105, Cl. 514-134.000.

Kalata, Kenneth: See—  
Knight, Frederick K.; and Kalata, Kenneth, 4,791,490, Cl. 358-209.000.

Kalinowski, Richard, to Combustion Engineering, Inc. Furnace front wall seals. 4,790,542, Cl. 277-12.000.

Kaloff, Hans: See—  
Schulte, Bernhard; Tischer, Werner; Waldenrath, Werner; and Kaloff, Hans, 4,791,016, Cl. 428-220.000.

Kalsi, Manmohan S.: See—  
Larronde, Michael L.; Kalsi, Manmohan S.; and Rao, M. Vikram, 4,790,393, Cl. 175-40.000.

Kalvaitis, Arvydas J.; and Estey, John W., to S&C Electric Company. Insulating barrier system for switchgear. 4,791,530, Cl. 361-331.000.

Kamada, Toru: See—  
Onda, Nobuhiko; Asakawa, Kazuo; Akita, Tadashi; Komoriya, Hitoshi; and Kamada, Toru, 4,791,588, Cl. 364-513.000.

Kamata, Atsuo: See—  
Sumida, Susumu; Kamata, Atsuo; and Yoshii, Fuyuki, 4,790,791, Cl. 464-17.000.

Kaminaki, Elton G.; and Hasselbeck, Richard J., to Stolle Corporation. The Upstacker reject apparatus. 4,790,171, Cl. 72-361.000.

Kamo, Jun: See—  
Hamada, Eiichi; Yoshihara, Toshio; Nakashima, Atushi; and Kamo, Jun, 4,791,054, Cl. 435-2.000.

Kan, Kazunori: See—  
Ohashi, Takahisa; Kan, Kazunori; Ueyama, Noboru; Sada, Isao; Miyama, Akimasa; and Watanabe, Kiyoshi, 4,791,198, Cl. 540-354.000.

Kan, Masahiro, to Kabushiki Kaisha Toshiba. Apparatus for detecting degradation of an arrester. 4,791,375, Cl. 324-552.000.

Kanada, Hidehiro: See—  
Umamoto, Masuo; Eto, Yoshizumi; Miyazaki, Shinichi; Kanada, Hidehiro; Katayama, Hitoshi; and Michikawa, Yuichi, 4,791,495, Cl. 358-310.000.

Kanada, Hiroshi, to Matsushita Electric Works, Ltd. Telephone modular jack. 4,790,769, Cl. 439-344.000.

Kanebo, Ltd.: See—  
Marumo, Chisato; and Hayata, Eiji, 4,790,859, Cl. 55-68.000.

Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: See—  
Ohashi, Takahisa; Kan, Kazunori; Ueyama, Noboru; Sada, Isao; Miyama, Akimasa; and Watanabe, Kiyoshi, 4,791,198, Cl. 540-354.000.

Kanemitsu, Kazuhiko: See—  
Kato, Hiroshi; Kanemitsu, Kazuhiko; and Furukawa, Kiyoshi, 4,791,160, Cl. 524-322.000.

Kanemura, Yoshinobu; Sasagawa, Katsuyoshi; Imai, Masao; Nagata, Teruyuki; and Kajimoto, Nobuyuki, to Mitsui Toatsu Chemicals, Incorporated. High-refractivity plastic lens resin formed from a polyisocyanate and a polythiol. 4,791,185, Cl. 528-73.000.

Kaneoka, Tsugio: See—  
Nagata, Masanori; Imano, Shigeki; Kaneoka, Tsugio; and Asada, Kiyotoshi, 4,791,655, Cl. 378-57.000.

Kaneuchi, Toshio: See—  
Fukazawa, Kazuo; and Kaneuchi, Toshio, 4,791,488, Cl. 358-149.000.

Kang, Samuel: See—  
Barry, Robert F.; and Kang, Samuel, 4,791,482, Cl. 358-107.000.

Kanno, Masao; Fukutomi, Naoki; Iwasaki, Yorio; Kojima, Fujio; and Nakamura, Hidehiro, to Hitachi Chemical Company, Ltd. High-density wired circuit board using insulated wires. 4,791,238, Cl. 174-68.500.

Kanno, Yoshiaki; Nakamoto, Katsuya; and Sumitani, Jiro, to Mitsubishi Denki Kabushiki Kaisha. Fuel supply control apparatus for internal combustion engine. 4,790,282, Cl. 123-493.000.

Kano, Takenori: See—  
Iwatsuki, Tatsuya; Kawamoto, Mutsumi; and Kano, Takenori, 4,790,211, Cl. 74-701.000.

Kao Corporation: See—  
Fukasawa, Junichi; Ina, Yoshimitsu; and Tsutsumi, Hisao, 4,791,140, Cl. 514-845.000.

Kapuscinski, Maria M.: See—  
Liu, Christopher S.; Hart, William P.; and Kapuscinski, Maria M., 4,790,948, Cl. 252-47.500.

Karala, Ilkka, to Valmeyer Oy. Method for measuring the properties of a composition consisting of a liquid and solid particles and apparatus used in the method. 4,791,305, Cl. 250-574.000.

Karatsu, Makoto; and Goto, Sumio, to Showa Denko Kabushiki Kaisha. Printer ribbon and film used for preparation thereof. 4,790,676, Cl. 400-241.100.

Karch, John A.: See—  
Yoo, Jin S.; Radlowski, Cecelia A.; Karch, John A.; and Bhattacharyya, Alakananda, 4,790,982, Cl. 423-239.000.

Kare, Morley R.: See—  
Mason, J. Russell; Kare, Morley R.; and DeRovira, Dorf A., 4,790,990, Cl. 424-438.000.

Karlotski, Robert: See—  
Keeffe, William M.; Krasko, Zeya; Karlotski, Robert; and Morris, James C., 4,791,334, Cl. 313-25.000.

Karl, Michael A., to Brunswick Corporation. Marine propulsion combination with improved cooling. 4,790,783, Cl. 440-66.000.

Kasai, Toshihiro; and Tsujii, Tatsuya, to Kabushiki Kaisha Toshiba. Image forming apparatus having at least two-color image print function and method for controlling the same. 4,791,452, Cl. 355-14.00D.

Kasarauskas, Paul M.: See—  
Manduley, Flavio M.; Kasarauskas, Paul M.; Lilly, Norman R.; and Teran, Kenneth A., 4,790,120, Cl. 53-468.000.

Kashio, Takako: See—  
Tsunashima, Yoshitaka; Yamada, Keisaku; and Kashio, Takako, 4,791,074, Cl. 437-160.000.

Kasper, Joseph G.: See—  
Field, Bruce F.; and Kasper, Joseph G., 4,790,402, Cl. 180-169.000.

Kasuda, Takashi, to Pegasus Sewing Machine Mfg. Co., Ltd. Needle driving apparatus for sewing machine. 4,790,253, Cl. 112-221.000.

Katalistiks International, Inc.: See—  
Yoo, Jin S.; Radlowski, Cecelia A.; Karch, John A.; and Bhattacharyya, Alakananda, 4,790,982, Cl. 423-239.000.

Kataoka, Sachiro, to Nissan Motor Company, Limited. Seat belt system. 4,790,405, Cl. 180-268.000.

Kataoka, Toshiya: See—  
Umehara, Kazuhiro; and Kataoka, Toshiya, 4,790,280, Cl. 123-422.000.

Katayama, Hitoshi: See—  
Umamoto, Masuo; Eto, Yoshizumi; Miyazaki, Shinichi; Kanada, Hidehiro; Katayama, Hitoshi; and Michikawa, Yuichi, 4,791,495, Cl. 358-310.000.

Katayama, Kouichi: See—  
Yamatsa, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwaru, Akiharu; Katayama, Kouichi; Tsunoda, Hajime;

Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, 4,791,105, Cl. 514-134.000.

Kato, Hiroshi; Kanemitsu, Kazuhiko; and Furukawa, Kiyoshi, to Mitsubishi Cable Industries, Ltd. Flame-retardant resin compositions. 4,791,160, Cl. 524-322.000.

Kato, Shoichi; Shimano, Shizuo; Hayano, Tatsuji; and Masui, Akio, to Nippon Kayaku Kabushiki Kaisha. Alkanesulfonate derivatives and their use as insecticides, acaricides or nematocides. 4,791,127, Cl. 514-369.000.

Kato, Takeshi: See—  
Takamatsu, Shigeki; Taguchi, Yoshio; and Kato, Takeshi, 4,790,510, Cl. 249-117.000.

Kato, Toshiaki, to Fuji Electric Co., Ltd. Line scanner image sensor. 4,791,466, Cl. 357-30.000.

Katoh, Katsunori: See—  
Kida, Shuji; Nakayama, Noritaka; Katoh, Katsunori; Tanaka, Takako; Nakagawa, Satoshi; and Masuda, Kosaku, 4,791,052, Cl. 430-558.000.

Katoh, Masaki: See—  
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaki, 4,790,274, Cl. 123-198.00F.

Katsura, Masaki: See—  
Sakai, Tadashi; Katsura, Masaki; Hiraki, Hideaki; Uno, Shigeki; Shimbo, Masaru; and Furukawa, Kazuyoshi, 4,791,465, Cl. 357-25.000.

Katz, Frances R.: See—  
Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., 4,790,997, Cl. 426-578.000.

Kausch, Michael: See—  
Suling, Carl Hans; Kausch, Michael; and Dauscher, Rudi, 4,791,187, Cl. 528-60.000.

Kawada, Haruki: See—  
Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Nakagiri, Takashi; Nishimura, Yukuo; and Takimoto, Kiyoshi, 4,790,664, Cl. 356-432.000.

Kawada, Michihiro: See—  
Takeda, Masaru; Nunotaki, Yoshihiro; Harada, Hiroshi; Kawada, Michihiro; and Ishigaki, Masahiro, 4,790,794, Cl. 464-93.000.

Kawaguchi, Akira; and Sasaki, Takinori, to AMP Incorporated. Electrical power terminal for circuit boards. 4,790,764, Cl. 439-78.000.

Kawaguchi, Richard S. Boot carrier. 4,790,462, Cl. 224-250.000.

Kawahara, Hideo; Yoshida, Harunobu; and Hyodo, Masato, to Taliq Corporation. Signal light. 4,791,418, Cl. 340-784.000.

Kawahara, Takeshi: See—  
Takahashi, Shinichi; Ishii, Hisao, deceased; Shinkawa, Kiyoshi; Kawahara, Takeshi; and Manita, Toshiyuki, 4,791,571, Cl. 364-436.000.

Kawai Gakki Seisakusho Co. Ltd.: See—  
Takahashi, Fumitaka, 4,790,757, Cl. 434-209.000.

Kawai, Tatsundo: See—  
Ogura, Makoto; Kawai, Tatsundo; Yamada, Katsuhiko; and Seitoh, Shinichi, 4,791,493, Cl. 358-294.000.

Kawajiri, Kazuhiro; and Tabei, Masatoshi, to Fuji Photo Film Co., Ltd. Method for reading out charges in solid-state image pickup unit. 4,791,307, Cl. 250-578.000.

Kawamoto, Mutsumi: See—  
Iwatsuki, Tatsuya; Kawamoto, Mutsumi; and Kano, Takenori, 4,790,211, Cl. 74-701.000.

Kawamura, Masanori: See—  
Tanouchi, Tadao; Kawamura, Masanori; Ajima, Akio; Mohri, Tetsuya; Hayashi, Masaki; Terashima, Hiroshi; Hirata, Fumio; and Morimura, Takeshi, 4,791,126, Cl. 514-369.000.

Kawano, Hirotohi: See—  
Usui, Toshifumi; Yamada, Kinaku; Osawa, Tadao; and Kawano, Hirotohi, 4,790,178, Cl. 73-118.200.

Kawano, Toru; and Mishima, Hidehiko, to Mazda Motor Corporation. Line pressure control system for automatic transmission. 4,790,217, Cl. 74-868.000.

Kawano, Yukihiko; Juji, Tomihiro; Ono, Toshihiko; Iga, Hirofumi; Ono, Seiichi; and Isobe, Yoshiyuki, to Kawasumi Laboratories, Inc. Connector for plasmapheresis bag. 4,790,567, Cl. 285-24.000.

Kawasaki Electric Wire Co., Ltd.: See—  
Iijima, Makoto, 4,790,776, Cl. 439-695.000.

Kawasaki, Hiroyuki: See—  
Hamamura, Hiroyuki; Kawasaki, Hiroyuki; and Watanabe, Taro, 4,790,391, Cl. 173-57.000.

Kawashima, Masato; and Hashizume, Kyohai, to Fujitsu Limited. Heat roller fixing device for an electrophotographic printing apparatus. 4,791,448, Cl. 355-3.0FU.

Kawasumi Laboratories, Inc.: See—  
Kawano, Yukihiko; Juji, Tomihiro; Ono, Toshihiko; Iga, Hirofumi; Ono, Seiichi; and Isobe, Yoshiyuki, to Kawasumi Laboratories, Inc. 4,790,567, Cl. 285-24.000.

Kawata, Haruo: See—  
Onodera, Tsukasa; Kawata, Haruo; and Futatsugi, Toshiro, 4,791,471, Cl. 357-60.000.

Kawata, Mitsuya; and Tanizawa, Tetsu, to Fujitsu Limited. Bipolar-MISFET compound inverter with discharge transistor. 4,791,320, Cl. 307-446.000.

Kawazoe, Hiroshi; and Hamane, Tokuhito, to Matsushita Electric Industrial Co., Ltd. Method and apparatus for fabricating armature of flat motor. 4,790,063, Cl. 29-597.000.

Kayser, Michael: See—  
Stoltzfuss, Jürgen; Gross, Rainer; Schramm, Matthias; Thomas, Gunter; Kayser, Michael; and Pelster, Bernd, 4,791,122, Cl. 514-344.000.



Kazuhito, Kimura: See—  
Tanaka, Akito; and Kazuhito, Kimura, 4,790,476, Cl. 232-1.00D.

Kazuo, Shiratori: See—  
Watanabe, Yoshio; Kitayama, Takeshi; and Kazuo, Shiratori, 4,791,289, Cl. 250-237.00G.

Keady, Patricia B., to TSI Incorporated. Condensation nucleus counter. 4,790,650, Cl. 356-37.000.

Keast, Edward. Concealed window lock. 4,790,582, Cl. 292-288.000.

Koeffe, William M.; Krasko, Zey; Karlotaki, Robert; and Morris, James C., to GTE Products Corporation. Metal-halide lamp having heat redistribution means. 4,791,334, Cl. 313-25.000.

Keith, Michael: See—  
Harney, Kevin; and Keith, Michael, 4,791,594, Cl. 364-717.000.

Keller, Arnold: See—  
Eagelbrecht, Eckart; Nieder, Elmar; and Keller, Arnold, 4,790,853, Cl. 623-20.000.

Keller, Gary S.: See—  
Eldridge, Jerome M.; Keller, Gary S.; Lee, Francis C.; Nelson, George N.; and Olive, Graham, 4,791,440, Cl. 346-140.00R.

Kellstrom, Magnus: See—  
Wittmeyer, Henning; Kellstrom, Magnus; Jarska, Staffan; and Floderus, Matts, 4,790,543, Cl. 277-25.000.

Kelly, Gar P.: See—  
Hanson, Gary E.; Kelly, Gar P.; Chan, C. S.; Cowger, Bruce; and Bearra, James G., 4,791,438, Cl. 346-140.00R.

Kelsey Hayes Company: See—  
Athias, Thomas M., 4,790,607, Cl. 303-109.000.

Kemp, Christian F., to Raychem GmbH. Expandable seal. 4,790,544, Cl. 277-34.000.

Kendall Company, The: See—  
Gross, James R.; and Rosenberg, Helmut W. G., 4,790,837, Cl. 604-322.000.

Kendrick, Larry N.: See—  
Savage, William A.; and Kendrick, Larry N., 4,790,383, Cl. 166-297.000.

Kennedy, John F., to University of Iowa Research Foundation. Helicoidal ramp dropshaft. 4,790,355, Cl. 138-37.000.

Kenney, Kenneth R., to Intravascular Surgical Instruments, Inc. Method and apparatus for surgically removing remote deposits. 4,790,813, Cl. 604-22.000.

Kernforschungszentrum Karlsruhe GmbH: See—  
Heckmann, Klaus; Rieger, Walter; and Kroebe, Reinhard, 4,790,960, Cl. 252-631.000.

Kerr, Tore: See—  
Landt, Karl-Erik; and Kerr, Tore, 4,790,841, Cl. 604-408.000.

Kervagoret, Gilbert, to Bendix France. Solenoid valve. 4,790,351, Cl. 137-56.170.

Kessinger, Richard C.: See—  
Council, Jerry W.; and Kessinger, Richard C., 4,790,060, Cl. 29-523.100.

Kessler & Luch GmbH: See—  
Detzer, Rudiger; and Gersch, Dietfried, 4,790,080, Cl. 34-225.000.

Ketelhoff, Johannes; Kanne, Hans W.; and Schroder, Erhard, to D.I.S. Versand Service GmbH. Laminating device for manufacturing identification cards. 4,790,901, Cl. 156-498.000.

Keuchel, Herbert W., to Benoit, John E., a part interest. Apparatus for centrifugal fiber spinning with pressure extrusion. 4,790,736, Cl. 425-66.000.

Keulemans, Cornelis N. M.; and Rozendaal, Adrianus, to Lever Brothers Company. Process and apparatus for the interesterification of a triglyceride oil and products therefrom. 4,790,962, Cl. 260-410.700.

Kida, Shuji; Nakayama, Noritaka; Katoh, Katsumori; Tanaka, Takako; Nakagawa, Satoshi; and Masuda, Kosaku, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic light-sensitive material. 4,791,052, Cl. 430-558.000.

Kidd Farm Machinery Limited: See—  
Paul, Nicholas J., 4,790,489, Cl. 241-101.00A.

Kido, Kunio: See—  
Tanaka, Shinsaku; Arata, Tadao; and Kido, Kunio, 4,791,506, Cl. 360-74.200.

Kiehl, Richard A., to American Telephone and Telegraph Company. AT&T Bell Laboratories. Method for making a complementary device containing MODFET. 4,791,072, Cl. 437-56.000.

Kikkoman Corporation: See—  
Matsura, Masaru; Obata, Akio; Fujii, Norikazu; Nobuhara, Akio; and Fukushima, Danji, 4,791,001, Cl. 426-634.000.

Killpack, Ronald E. Carpet laying tool and method of use. 4,790,059, Cl. 29-451.000.

Kim, Chang H.: See—  
Warren, Frederick E.; Crisler, Harvey B.; Jacobson, Robert G.; Kim, Chang H.; and Llewellyn, Edward C., 4,791,356, Cl. 324-73.00R.

Kim, Jonathan J.; Venkateswaram, Viswanathan; and Kujawa, Randolph, to Stemcor Corporation. Method and apparatus to produce a hot fluidizing gas. 4,790,966, Cl. 423-639.000.

Kim, Jonathan J.; and Myles, Thomas A., to Stemcor Corporation. Near-net shape fused cast refractories and process for their manufacture by rapid melting/controlled rapid cooling. 4,791,077, Cl. 501-105.000.

Kimokida, Riginos. Liquid sampling apparatus. 4,790,197, Cl. 73-864.650.

Kimura, Fumio; Haga, Takahiro; Maeda, Kazuyuki; Shimoharada, Hiroshi; Yoshida, Tamezo; and Ikeguchi, Masahiko, to Ishihara Sangyo Kaisha Ltd. Sulfonamide compounds and salts thereof, herbicidal compositions containing them. 4,790,869, Cl. 71-80.000.

Kimura, Masao, to Amada Company, Limited. Gas laser generator. 4,791,637, Cl. 372-58.000.

Kimura, Minoru: See—  
Naito, Hiroshi; Takahashi, Hidemi; Kimura, Minoru; and Sano, Reiji, 4,791,299, Cl. 250-352.000.

Kinameri, Kanji; and Munakata, Chusuke, to Hitachi, Ltd. Scanning photon microscope for simultaneously displaying both the amplitude and phase distributions of ac photovoltage or photocurrents. 4,791,288, Cl. 250-226.000.

King, Douglas D.: See—  
Chevalier, James L.; King, Douglas D.; and Pfeffer, John D., 4,790,290, Cl. 126-361.000.

King, Francis G.; and Gable, Stewart V., to Ford Motor Company. Shifting control for automated manual transmission shifter. 4,790,177, Cl. 73-117.000.

Kinley, John S.: See—  
Kleist, Robert A.; Farb, Norman E.; and Kinley, John S., 4,790,674, Cl. 400-121.000.

Kirch, William: See—  
Dombro, Robert A.; and Kirch, William, 4,791,089, Cl. 502-236.000.

Kirchhoff, Robert A.; Gilpin, Jo Ann; Baker, Cynthia; and Myers, Michael O., to Dow Chemical Company. Copper salts as catalysts for monomers having at least one cyclobutane group. 4,791,182, Cl. 526-221.000.

Kirchner, Hans-Gert; and Wahle, Bernd, to Wolff Walzrode AG. Process for the purification of products of regenerated cellulose. 4,790,044, Cl. 8-151.000.

Kirk, Gregory L.; Mewborn, Jeffrey D.; and Parish, David M., to Resonac, Inc. Conformable head or body coil assembly for magnetic imaging apparatus. 4,791,372, Cl. 324-318.000.

Kirkland, Lester: See—  
Alfeldt, Michael; Barsellotti, John A.; and Kirkland, Lester, 4,791,639, Cl. 370-58.000.

Kirsch, Alan; and Feinstein, Shirley. Intraoral radiographic film packet. 4,791,657, Cl. 378-169.000.

Kirsch, Gerard: See—  
Erni, Peter; and Kirsch, Gerard, 4,790,980, Cl. 422-186.150.

Kishida, Nobuhiro: See—  
Takamaki, Nobuyuki; Mizutani, Yohji; Kishida, Nobuhiro; and Hosokawa, Manabu, 4,790,741, Cl. 425-526.000.

Kishimoto, Shinichi; Iwase, Kenichi; Miki, Toshio; and Tanaka, Teiji, to Syntex (U.S.A.) Inc. Portable analyzer. 4,791,461, Cl. 356-446.000.

Kit, Eliezer: See—  
Tsinober, Arkady; Teitel, Meir; and Kit, Eliezer, 4,790,187, Cl. 73-432.100.

Kitagawa, Kiyoshi: See—  
Hata, Seichi; Akima, Hideo; Kitagawa, Kiyoshi; Hyodo, Masaya; and Niinomi, Koji, 4,790,420, Cl. 192-111.00A.

Kitayama, Takeshi: See—  
Watanabe, Yoshio; Kitayama, Takeshi; and Kazuo, Shiratori, 4,791,289, Cl. 250-237.00G.

Kitner, William M.: See—  
Baker, Franklin W., 4,790,416, Cl. 190-111.000.

Klaiber, Eberhard, to Krone Aktiengesellschaft. Connector bank for cable wires, in particular of telephone cables. 4,790,770, Cl. 439-395.000.

Klappert, Willi: See—  
Ballard, Donald E.; and Klappert, Willi, 4,790,064, Cl. 29-606.000.

Klauke, Erich: See—  
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hansler, Gerd, 4,791,208, Cl. 548-136.000.

Gehring, Reinhold; Klauke, Erich; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,791,212, Cl. 548-362.000.

Klayman, Daniel L.: See—  
Lin, Ai J.; Klayman, Daniel L.; and Milhous, Wilbur K., 4,791,135, Cl. 514-450.000.

Klein, John: See—  
Krutilla, Michael A.; and Klein, John, 4,790,224, Cl. 83-53.000.

Klein, Laurence R.; and Plummer, Walter A., III, to Zippertubing Co., The. Releasable flexible conductive jacket. 4,791,236, Cl. 174-36.000.

Kleiner, Wayne E., to AMP Incorporated. Wire trap terminal. 4,790,771, Cl. 439-421.000.

Kleinsasser, Dan: See—  
Kleinsasser, Jonathan R.; and Kleinsasser, Dan, 4,790,266, Cl. 119-51.500.

Kleinsasser, Jonathan R.; and Kleinsasser, Dan, to Gro Master Feed, Inc. Feeder for animals. 4,790,266, Cl. 119-51.500.

Kleinschmit, Peter: See—  
Dorr, Jürgen; Kleinschmit, Peter; Klingel, Reinhard; and Manner, Reinhard, 4,791,082, Cl. 502-65.000.

Kleist, Robert A.; Farb, Norman E.; and Kinley, John S., to Printronix, Inc. Impact printer having wear-resistant platings on hammer springs and pole piece tips. 4,790,674, Cl. 400-121.000.

Klett, Eberhard: See—  
Mann, Dieter; Fornoff, Dieter; Riea, Andreas; Klett, Eberhard; and van Santum, Michael, 4,790,647, Cl. 351-245.000.

King, Lars-Olof, to Telefonaktiebolaget LM Ericsson. Arrangement for apportioning priority among co-operating computers. 4,791,563, Cl. 364-200.000.

Klingel, Reinhard: See—  
Dorr, Jürgen; Kleinschmit, Peter; Klingel, Reinhard; and Manner, Reinhard, 4,791,082, Cl. 502-65.000.

Klingler, Kenneth J. Three-point hitch stabilizer. 4,790,557, Cl. 280-460.00A.

Klink, Josef: See—  
Bauer, Heinz; Becker, Burkhard; Frohnhaus, Ernst-Reiner; Gedig, Alfred; Klink, Josef; and Kousky, Antonin, 4,790,597, Cl. 297-468.000.

Klinner, Wilfred E., to National Research Development Corporation. Crop harvesting apparatus and methods. 4,790,128, Cl. 56-364.000.

Klose, Hans-Ulrich: See—  
Rach, Heinz-Dieter; Frerichs, Udo; Klose, Hans-Ulrich; and Boltze, Carsten, 4,790,892, Cl. 156-130.700.

Klotz, Brian L.: See—  
Klotz, James M.; and Klotz, Brian L., 4,791,008, Cl. 427-397.700.

Klotz, James M.; and Klotz, Brian L., to Coatings for Industry, Inc. Coating compositions and method for improving the properties of coated substrates. 4,791,008, Cl. 427-397.700.

Klumper, Christian: See—  
Donaldson, Stuart G.; Groeneveld, Hendrik W.; Klumper, Christian; Miller, Robert T.; Whitbeck, Richard W.; and Longnecker, Robert H., 4,791,661, Cl. 379-96.000.

KMS Fusion, Inc.: See—  
Mayer, Frederick J., 4,790,735, Cl. 425-1.000.

Knaeps, Alfonsus G.: See—  
Heeres, Jan; Backx, Leo J. J.; Thijssen, Jozef B. A.; and Knaeps, Alfonsus G., 4,791,111, Cl. 514-252.000.

Knapp, Karl E.: See—  
Sichangrist, Porponth; and Knapp, Karl E., 4,790,883, Cl. 136-258.000.

Knecht, Thomas A.; and Romo, Mark G., to Rosemount Inc. Silicon side by side coplanar pressure sensors. 4,790,192, Cl. 73-721.000.

Knight, Frederick K.; and Kalata, Kenneth, to Massachusetts Institute of Technology. Detector for three-dimensional optical imaging. 4,791,490, Cl. 358-209.000.

Knight, Michael C.: See—  
Salatin, Timothy; Balch, Thomas C.; Knight, Michael C.; Shesterkin, Michael D.; Van Antwerp, John S.; Lamberty, Paul E.; and Asmodi, Robert A., 4,791,168, Cl. 524-601.000.

Knight, Robert L. Odor-proof disaster pouch. 4,790,051, Cl. 27-28.000.

Knoll, Manfred: See—  
Lausberg, Dietrich; McKee, Graham E.; Taubitz, Christof; Wassmuth, Georg; and Knoll, Manfred, 4,791,158, Cl. 524-156.000.

Knox, Dick L.: See—  
Raynor, Vester R.; and Knox, Dick L., 4,790,373, Cl. 165-185.000.

Koatsu Gas Kogyo Co., Ltd.: See—  
Ohki, Shinji, 4,791,285, Cl. 235-449.000.

Kobayashi, Kazuhiro: See—  
Koboshi, Shigeharu; Kobayashi, Kazuhiro; Miyaoaka, Kazuyoshi; Aoki, Syozo; and Takabayashi, Naoki, 4,791,013, Cl. 428-35.300.

Kobayashi, Yukimori: See—  
Okabe, Yoshio; Kobayashi, Yukimori; and Shirai, Eiji, 4,790,796, Cl. 474-110.000.

Koblesky, Robert T., to Ingersoll Cutting Tool Company. Interfitting on-edge inserts for milling cutters. 4,790,693, Cl. 407-35.000.

Koboshi, Shigeharu; Kobayashi, Kazuhiro; Miyaoaka, Kazuyoshi; Aoki, Syozo; and Takabayashi, Naoki, to Konishiroku Photo Industry Co., Ltd. Housing pack for photographic processing solution. 4,791,013, Cl. 428-35.300.

Koella, Ernest, III: See—  
Harmon, Albert D.; and Koella, Ernest, III, 4,790,603, Cl. 300-16.000.

Harmon, Albert D.; and Koella, Ernest, III, 4,790,604, Cl. 300-21.000.

Koenig & Bauer Aktiengesellschaft: See—  
Fischer, Christian M. M.; and Stork, Detlef F., 4,790,245, Cl. 101-375.000.

Grosshauser, Heinrich K., 4,790,243, Cl. 101-147.000.

Koester, Rita; and von Rybinski, Wolfgang, to Henkel Kommanditgesellschaft auf Aktien. Surfactant mixtures as collectors for the flotation of non-sulfidic ores. 4,790,931, Cl. 209-166.000.

Koester, Rita: See—  
Kottwitz, Beatrix; von Rybinski, Wolfgang; and Koester, Rita, 4,790,932, Cl. 209-166.000.

Koga, Hiroshi: See—  
Sato, Haruhiko; Koga, Hiroshi; Dan, Takashi; and Onuma, Etsuro, 4,791,209, Cl. 548-242.000.

Kohn, Jerome S., to Grumman Aerospace Corporation. Aircraft empennage with fixed trailing edge horizontal stabilizer. 4,790,494, Cl. 244-87.000.

Kohn, Hideki: See—  
Yamamoto, Etsuji; and Kohn, Hideki, 4,791,369, Cl. 324-312.000.

Kohsai, Tadashi: See—  
Moriuchi, Yosuke; and Kohsai, Tadashi, 4,790,193, Cl. 73-756.000.

Koike, Kazuo: See—  
Kumakura, Takeshi; Hayashi, Toshikazu; and Koike, Kazuo, 4,791,501, Cl. 360-105.000.

Koike, Kazuyuki: See—  
Tamagawa, Shigehisa; Koike, Kazuyuki; and Fuchizawa, Tetsuro, 4,791,093, Cl. 503-200.000.

Kojima, Fujio: See—  
Kanno, Masao; Fukutomi, Naoki; Iwasaki, Yorio; Kojima, Fujio; and Nakamura, Hidehiko, 4,791,238, Cl. 174-68.300.

Kojima, Tetsuro; Hirano, Shigeo; and Usui, Hideo, to Fuji Photo Film Co., Ltd. Silver halide photographic material containing a compound having an oxidation-reduction moiety and timing group. 4,791,049, Cl. 430-544.000.

Kokta, Bohuslav V., to Novacor Chemicals Ltd. Bonded composites of cellulose fibers polyethylene. 4,791,020, Cl. 428-326.000.

Kokusai Denshin Denwa Kabushiki Kaisha: See—  
Yamamoto, Shu; and Mochizuki, Kiyofumi, 4,790,655, Cl. 356-345.000.

Kolchinsky, Abel E., to Parker-Hannifin Corporation. Proportional valve. 4,790,345, Cl. 137-269.000.

Kolene Corporation: See—  
Bessey, Charles M., 4,790,888, Cl. 148-28.000.

Kolvitsa, Albert: See—  
Welch, Robert J.; Kolvitsa, Albert; and White, Robert M., 4,790,610, Cl. 312-218.000.

Kolze, Barbara J.: See—  
Kolze, Lawrence A.; and Kolze, Barbara J., 4,790,346, Cl. 137-331.000.

Kolze, Lawrence A.; and Kolze, Barbara J. Fluid control valve. 4,790,346, Cl. 137-331.000.

Komatsu, Kazunori; and Sato, Tsunehiko, to Fuji Photo Film Co., Ltd. Magnetic recording media and process of fabricating. 4,791,032, Cl. 428-694.000.

Komatsu, Shunichi: See—  
Suzuki, Koji; and Komatsu, Shunichi, 4,791,528, Cl. 361-235.000.

Komatsubara, Keiichi F., to Hitachi, Ltd. Lighting device. 4,791,645, Cl. 372-5.000.

Kombinat Polygraph "Werner Lamberz" Leipzig: See—  
Otfried, Rudolph; and Gunter, Peter, 4,790,244, Cl. 101-231.000.

Kombinat VEB Keramische Werke Hermdorf: See—  
Johannes, Peter; Lampe, Lutz; Lampe, Wolfgang; Loreit, Uwe; Neumarker, Gottfried; and Pertsch, Peter, 4,791,365, Cl. 324-208.000.

Komoriya, Hitoshi: See—  
Onda, Nobuhiko; Asakawa, Kazuo; Akita, Tadashi; Komoriya, Hitoshi; and Kamada, Toru, 4,791,588, Cl. 364-513.000.

Komplin, Steven R., to International Business Machines Corporation. Pressed sleeve bearing. 4,790,672, Cl. 384-125.000.

Kon, Masahiro: See—  
Sumino, Tatsuo; Ohtake, Yasutomo; Nakamura, Hiroki; Kon, Masahiro; Mori, Naomichi; and Nakajima, Kazuo, 4,791,061, Cl. 435-178.000.

Kondo, Hiroshi: See—  
Yotsuya, Hiroshi; Kondo, Hiroshi; Sakurai, Kaoru; Murakami, Harunori; and Murakami, Hajime, 4,791,425, Cl. 343-713.000.

Kondo, Koji; Murakawa, Katuhiko; Ishida, Nobumasa; Ishikawa, Junji; Nomoto, Kaoru; and Ishikawa, Futoshi, to Nippondenso Co., Ltd. Chemical copper-plating bath. 4,790,876, Cl. 106-1.230.

Kondo, Takashi: See—  
Kageyama, Satoshi; Nakamura, Yasushi; Kondo, Takashi; Abe, Shozo; and Mori, Kazuhiro, 4,791,496, Cl. 358-342.000.

Kone Elevator GmbH: See—  
Kahkipuro, Matti, 4,791,346, Cl. 318-805.000.

Koniczka, John L.: See—  
Baker, Gerald J.; Bansal, Arun K.; Koniczka, John L.; and Kuntz, David A., 4,791,002, Cl. 426-641.000.

Konishiroku Photo Industry Co., Ltd.: See—  
Kida, Shuji; Nakayama, Noritaka; Katoh, Katsumori; Tanaka, Takako; Nakagawa, Satoshi; and Masuda, Kosaku, 4,791,052, Cl. 430-558.000.

Koboshi, Shigeharu; Kobayashi, Kazuhiro; Miyaoaka, Kazuyoshi; Aoki, Syozo; and Takabayashi, Naoki, 4,791,013, Cl. 428-35.300.

Koseki, Yasufumi; Suzuki, Seichi; Soma, Utami; and Yamashita, Harufumi, 4,791,453, Cl. 355-14.00R.

Sasaki, Masao; Onodera, Kaoru; and Inahata, Hideki, 4,790,959, Cl. 252-589.000.

Shida, Toshio, 4,791,457, Cl. 355-3.05H.

Konoma, Kunihiko: See—  
Iwasaki, Satoshi; Ueda, Toshihiko; and Konoma, Kunihiko, 4,790,638, Cl. 350-465.000.

Koo, David: See—  
Miron, Amihai; and Koo, David, 4,791,597, Cl. 364-724.030.

Kooriyama, Tsutomu: See—  
Takahashi, Minoru; Tokuda, Hiroatsu; Suzuki, Tadao; Takada, Masumi; and Kooriyama, Tsutomu, 4,790,182, Cl. 73-204.210.

Kordomenos, Panagiotis I.: See—  
Dervan, Andrew H.; and Kordomenos, Panagiotis I., 4,791,179, Cl. 525-438.000.

Korenaga, Kazumi: See—  
Fukamachi, Satoshi; Mitsui, Kenichi; Matsuo, Kunihiko; and Korenaga, Kazumi, 4,790,737, Cl. 425-114.000.

Korf Engineering GmbH: See—  
Mathews, Waldemar, 4,790,517, Cl. 266-156.000.

Korstanje, Hugo F.: See—  
Gemeinhardt, Hermann; and Korstanje, Hago P., 4,790,372, Cl. 165-173.000.

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Kosowsky, Lester H.: See—  
Raber, Peter E.; and Kosowsky, Lester H., 4,791,427, Cl. 343-754.000.

Kostun, John D., to Ford Motor Company. Compact engine air/cleaner with integrated components. 4,790,864, Cl. 55-276.000.

Kottwitz, Beatrix; von Rybinski, Wolfgang; and Koester, Rita, to Henkel Kommanditgesellschaft auf Aktien. N-alkyl and N-alkenyl aspartic acids as co-collectors for the flotation of non-sulfidic ores. 4,790,932, Cl. 209-166.000.



Kotz, Rainer: See—  
Harder, Hans E.; Behrens, Klaus; and Kotz, Rainer, 4,790,854, Cl. 623-20.000.

Koucky, Antonia: See—  
Bauer, Heinz; Becker, Burkhard; Frohnhaus, Ernst-Reiner; Gedig, Alfred; Klink, Josef; and Koucky, Antonia, 4,790,597, Cl. 297-468.000.

Kowalski, Alexander; Wilczynski, Joseph; Blankenship, Robert M.; and Chou, Cheun-Shyong, to Rohm and Haas Company, Multilobals, 4,791,151, Cl. 523-201.000.

Koziol, Dale L., to Ecobal Inc. Low-shear, cyclonic mixing apparatus and method of using, 4,790,666, Cl. 366-165.000.

Kozma, William, to Litton Systems, Inc. Ring laser gyroscope curved blade flexure and support ring assembly and method, 4,790,657, Cl. 356-350.000.

Kozuki, Susumu; Nakayama, Tadayoshi; and Sato, Chikara, to Canon Kabushiki Kaisha. Picture signal conversion device, 4,791,487, Cl. 358-140.000.

Kraatz, Gerald A.: See—  
Nelson, Walter A., Jr.; and Kraatz, Gerald A., 4,791,270, Cl. 219-125.100.

Kraftwerk Union Aktiengesellschaft: See—  
Zahn, Artur; and Hannappel, Karl, 4,790,976, Cl. 376-260.000.

Kramer, Charles F., to Steel Heddle Mfg., Inc. Harness frame slat and heddle, 4,790,357, Cl. 139-91.000.

Kramer, Jacqueline C.: See—  
Ahnen, David J.; Akanbi, Charles O.; Bruce, Ian D.; Kramer, Jacqueline C.; Larson, Carolyn D.; Ni, Wei-Chen; and Owens, Annetta T., 4,791,662, Cl. 379-158.000.

Kramer, Martin; and Tripiet, Dominique, to Hoechst Aktiengesellschaft. Novel polypeptides with a blood coagulation-inhibiting action, processes for their preparation and isolation, their use and agents containing them, 4,791,100, Cl. 514-12.000.

Kranitzky, Walter, to Dr. Johannes Heidenhain GmbH. Process and apparatus for graphically representing a variable structure in perspective, 4,791,579, Cl. 364-518.000.

Krase, Horst: See—  
Drawert, Manfred; and Krase, Horst, 4,791,169, Cl. 524-608.000.

Krako, Zeyta: See—  
Keeffe, William M.; Krako, Zeyta; Karlottki, Robert; and Morris, James C., 4,791,334, Cl. 313-25.000.

Kreinberg, Earl R., to AMP Incorporated. Power distribution adapter, 4,790,760, Cl. 439-55.000.

Kress, Kenneth, to Primages, Inc. Method and apparatus for determining halt of tape feed in a tape cartridge for a printer, 4,790,677, Cl. 400-249.000.

Kristen, Ulrich: See—  
O'Neil, Robert M.; Kristen, Ulrich; and Haring, Ulrich, 4,791,206, Cl. 458-108.000.

Kroebel, Reinhard: See—  
Heckmann, Klaus; Rieger, Walter; and Kroebel, Reinhard, 4,790,960, Cl. 252-631.000.

Krol, George S., to Memorial Hospital for Cancer and Allied Diseases. Apparatus useful in magnetic resonance imaging, 4,791,371, Cl. 324-318.000.

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Klaiber, Eberhard, 4,790,770, Cl. 439-395.000.

Kroy, Christa, 4,791,244, Cl. 174-52.100.

Krones AG Hermann Kronseder Maschinenfabrik: See—  
Bachkopf, Reiner; and Griesbeck, Karl, 4,790,662, Cl. 356-428.000.

Kruger, Hans-Rudolf: See—  
Franke, Helga; Franke, Heinrich; Kruger, Hans-Rudolf; Joppien, Hartmut; Baumert, Dietrich; and Giles, David, 4,791,123, Cl. 514-345.000.

Krukkert, Henricus P. M.: See—  
Thoonse, Martinus L. G.; and Krukkert, Henricus P. M., 4,791,574, Cl. 364-457.000.

Kruse, Cornelia G.: See—  
Van Wijngaarden, Ineke; Kruse, Cornelia G.; Van Hea, Roelof; and Van Der Heyden, Johannes A. M., 4,791,132, Cl. 514-427.000.

Krutilla, Michael A.; and Klein, John, to Belcan Corporation. Traveling gap conveyor cutting method and apparatus, 4,790,224, Cl. 83-53.000.

Kryazhevskikh, Nikolai F.: See—  
Shishkin, Viktor V.; Kryazhevskikh, Nikolai F.; and Shapovalov, Yuri P., 4,790,934, Cl. 210-189.000.

Krzanich, Brian M., to Intel Corporation. Method for depositing an  $\text{Al}_2\text{O}_3$  cap layer on an integrated circuit substrate, 4,790,920, Cl. 204-192.170.

Ku, Hao: See—  
Steichen, Dale S.; and Ku, Hao, 4,790,952, Cl. 252-186.390.

Ku, Walter H.; Linderman, Richard W.; Chau, Paul M.; and Reusens, Peter P., to Cornell Research Foundation, Inc. High performance signal processor, 4,791,590, Cl. 364-726.000.

Kubo, Kanji: See—  
Asanuma, Nobuyoshi; Kubo, Kanji; and Mitobe, Keiichi, 4,790,560, Cl. 280-701.000.

Doyama, Yoshiaki; Kubo, Kanji; and Yamada, Koichi, 4,791,507, Cl. 360-77.150.

Kubota, Hitoshi: See—  
Maeda, Shengji; Kubota, Hitoshi; Fushimi, Satoru; Makihira, Hiroshi; Ninomiya, Takanori; and Nakagawa, Yasuo, 4,791,586, Cl. 364-491.000.

Kuckes, Arthur F. Subterranean target location by measurement of time-varying magnetic field vector in borehole, 4,791,373, Cl. 324-346.000.

Kudoh, Yoshimitsu: See—  
Murayama, Jin; Tamura, Hiroshi; and Kudoh, Yoshimitsu, 4,791,047, Cl. 430-321.000.

Kudza, Linas V.; Spencer, H. Kenneth; and Severnak, Sherry A., to BOC Group, Inc., The. 4-phenyl-4-(N-phenylamido) piperidine derivatives and pharmaceutical compositions and method employing such compounds, 4,791,121, Cl. 514-326.000.

Kudza, Linas V.: See—  
Lin, Bor-Sheng; Kudza, Linas V.; and Spencer, H. Kenneth, 4,791,120, Cl. 514-326.000.

Kuehl, Guenter H.: See—  
Chu, Pochen; Kuehl, Guenter H.; and Landis, Michael E., 4,791,088, Cl. 502-232.000.

Kufu, James C.; and Semken, Robert S., to Thermonics Incorporated. Thermal fixture for testing integrated circuits, 4,791,364, Cl. 324-158.00F.

Kuhn, Jacques, to Heinrich Kuhn Metallwarenfabrik AG. Cooking vessel, 4,790,292, Cl. 126-390.000.

Kujawa, Randolph: See—  
Kim, Jonathan J.; Venkateswaran, Viswanathan; and Kujawa, Randolph, 4,790,986, Cl. 423-659.000.

Kumakura, Takeshi; Hayashi, Toshikazu; and Koike, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Magnetic head support apparatus for a two-sided floppy disk drive, 4,791,301, Cl. 360-105.000.

Kunishige, Hidenori: See—  
Yamamoto, Hajime; Kunishige, Hidenori; and Takashima, Yuji, 4,791,455, Cl. 355-15.000.

Kunne, Hans W.: See—  
Kettelhoit, Johannes; Kunne, Hans W.; and Schroeder, Erhard, 4,790,901, Cl. 156-498.000.

Kuno, Hideo: See—  
Usuda, Masaaki; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, 4,790,237, Cl. 98-42.160.

Kuno, Toshio: See—  
Usuda, Masaaki; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, 4,790,237, Cl. 98-42.160.

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Usuda, Masaaki; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, 4,790,237, Cl. 98-42.160.

Kuntz, David A.: See—  
Baker, Gerald J.; Bansal, Arun K.; Konieczka, John L.; and Kuntz, David A., 4,791,002, Cl. 426-641.000.

Kuntz, David H., to Medical Engineering Corporation. Ureteral stent, 4,790,809, Cl. 604-8.000.

Kuo, James R.; Carey, Brian R.; and Moran, Timothy G., to Fairchild Semiconductor Corp. Bipolar transistor switching enhancement circuit, 4,791,313, Cl. 307-268.000.

Kuo, James R.; and Moran, Timothy G., to Fairchild Semiconductor Corporation. Oscillation-free, short-circuit protection circuit, 4,791,314, Cl. 307-270.000.

Kuo, Ming-Chuan. Dental floss applicator, 4,790,336, Cl. 132-325.000.

Kurimoto, Munehito: See—  
Okada, Yosuke; and Kurimoto, Munehito, 4,790,331, Cl. 128-772.000.

Kuriyama, Keiichi: See—  
Yokouchi, Akira; Fukuda, Katsumi; Kuriyama, Keiichi; Kaibara, Makoto; and Watanabe, Masahiro, 4,790,144, Cl. 62-156.000.

Kuriyama, Toru; and Hakamada, Ryuichi, to Kabushiki Kaisha Toshiba. Helium cooling apparatus, 4,790,147, Cl. 62-514.00R.

Kuroda, Hideo; Mukawa, Naoki; Hiraoka, Makoto; Matsuda, Kiichi; Nishiwaki, Mitsuo; and Tsugane, Shuzo, to Nippon Telegraph & Telephone Public Corporation; Fujitsu Limited; and NEC Corporation. System for detecting a transmission error, 4,791,485, Cl. 358-136.000.

Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tohru; Ohnawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tadashi, to Kyowa Hakko Kogyo Kabushiki Kaisha. Mitomycin derivatives as antileukemia agents, 4,791,113, Cl. 514-256.000.

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Kuroda, Yasuhide: See—  
Kusakawa, Takaji; Ebato, Kazuo; Tohge, Takeya; Noda, Masato; and Kuroda, Yasuhide, 4,790,368, Cl. 164-480.000.

Kurth, Josef; Mathey, Christoph; and Wissinger, Waldemar, to Dynamit Nobel AG. Process for the manufacture of a launching tube for missiles, 4,790,970, Cl. 264-130.000.

Kusakawa, Takaji; Ebato, Kazuo; Tohge, Takeya; Noda, Masato; and Kuroda, Yasuhide, to Nippon Yakin Kogyo Co. Ltd.; and Talako Kusakawa. Method of manufacturing thin metal sheet directly from molten metal and apparatus for manufacturing same, 4,790,368, Cl. 164-480.000.

Kyokuchi, Sato; and Tooru, Kayatani, to OM Industrial Co., Ltd. Safety plastic filler neck cap, 4,790,449, Cl. 220-288.000.

Kyorin Pharmaceutical Co., Ltd.: See—  
Irikura, Tsutomu; Suzue, Seigo; Murayama, Satoishi; Hirai, Keiji; and Ishizaki, Takayoshi, 4,791,225, Cl. 562-493.000.

Masuzawa, Kuniyoshi; Suzue, Seigo; Hirai, Keiji; and Ishizaki, Takayoshi, 4,791,118, Cl. 514-312.000.

Kyoritsu Co., Ltd.: See—  
Usuda, Masaaki; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, 4,790,237, Cl. 98-42.160.

Kyowa Gas Chemical Industry Co., Ltd.: See—  
Nagai, Haruo; Suzuki, Tetsuo; and Sato, Kazuhiro, 4,791,184, Cl. 526-323.200.

Kyowa Hakko Kogyo Kabushiki Kaisha: See—  
Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tohru; Ohnawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tadashi, 4,791,113, Cl. 514-256.000.

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Kyowa Medex Co., Ltd.: See—  
Ishiguro, Tatsuya, 4,791,066, Cl. 436-516.000.

L. & C. Steinmuller GmbH: See—  
Leikert, Klaus; Rennert, Klaus-Dieter; and Buttner, Gerhard, 4,790,743, Cl. 431-8.000.

Labavia-S.G.E.: See—  
Charbonnier, Marc; and Durand, Michel, 4,791,330, Cl. 310-105.000.

LaCanne, Michael E.: See—  
Sturdevant, Ronald P.; and LaCanne, Michael E., 4,790,767, Cl. 439-125.000.

Lachenbruch, Roger B.: See—  
Drage, David J.; Lachenbruch, Roger B.; Drake, Herbert G., Jr.; and Peavey, Jerris H., 4,790,258, Cl. 118-300.000.

Lachenmeier, Eric W.: See—  
Pfost, Dale R.; Pfost, R. Fred; and Lachenmeier, Eric W., 4,790,183, Cl. 73-290.00V.

Lack, Frank; and Rustin, Francis R., to Agri Manufacturing Corporation. Animal waterers for snap-on assembly with water pipe, 4,790,264, Cl. 119-72.500.

Lahti, Archie E.; James, Ralph L.; and Byers, Larry L., to Unisys Corporation. Macro level control of an activity switch in a scientific vector processor which processor requires an external executive control program, 4,791,560, Cl. 364-200.000.

L'Air Liquide: See—  
Gerard, Marhic, 4,791,266, Cl. 219-121.480.

Lake, Ronald J.: See—  
Narasimhan, Sundaram L.; Lake, Ronald J.; and Larson, Jay M., 4,790,473, Cl. 228-206.000.

Lakin, Bryan L., to Fasco Industries, Inc. Multi-piece rotor for dynamoelectric machine, 4,791,328, Cl. 310-42.000.

Lamberty, Paul E.: See—  
Salatin, Timothy; Balch, Thomas C.; Knight, Michael C.; Shesterkin, Michael D.; Van Antwerp, John S.; Lamberty, Paul E.; and Aamodt, Robert A., 4,791,168, Cl. 524-601.000.

Lampel, di Giovanni Ferrari & C. s.n.c.: See—  
Fontana, Antonio; Ferrari, Giovanni; Fabbri, Evro; and Campanini, Romano, 4,790,453, Cl. 222-83.000.

Lampe, Lutz: See—  
Johannes, Peter; Lampe, Lutz; Lampe, Wolfgang; Loreit, Uwe; Neumarker, Gottfried; and Pertsch, Peter, 4,791,365, Cl. 324-208.000.

Lampe, Wolfgang: See—  
Johannes, Peter; Lampe, Lutz; Lampe, Wolfgang; Loreit, Uwe; Neumarker, Gottfried; and Pertsch, Peter, 4,791,365, Cl. 324-208.000.

Landis, Michael E.: See—  
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Lane, Ernest: See—  
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Lange, David V.: See—  
Roerig, Arnold J.; and Lange, David V., 4,790,908, Cl. 162-199.000.

Lange, Jürgen: See—  
Hensel, Willi; Lange, Jürgen; and Paulus, Reinhard, 4,790,595, Cl. 297-285.000.

Langer, Salomon, to Synthelabo. Pharmaceutical composition for treatment of obesity, 4,791,119, Cl. 514-317.000.

Langerbeins, Klaus: See—  
Gruber, Wilhelm; Langerbeins, Klaus; and Ruppert, Wolfgang, 4,791,080, Cl. 502-92.000.

Langseder, Neal E.: See—  
Wilkinson, Harlen E.; and Langseder, Neal E., 4,790,705, Cl. 413-8.000.

Lantz, Andre; and Michaud, Pascal, to Societe Atochem. Process for the preparation of 1,1,2,2-tetrahydroperfluoroalkanol and their esters, 4,791,223, Cl. 560-266.000.

LaPointe, Rudolph H. Antenna mount for vehicle, 4,791,431, Cl. 343-906.000.

Larocher, Philippe; Irigoin-Guichandut, Francois; Vassy, Daniel; Lenci, Michel; Longepierre, Patrick; and Didier, Bernard, to Morpho Systems. Automatic fingerprint identification system including process and apparatus for matching fingerprints, 4,790,564, Cl. 283-69.000.

Larrabee, Carl R.: See—  
Helding, Curtis L.; and Larrabee, Carl R., 4,790,577, Cl. 292-92.000.

Larsson, Michael L.; Kalsi, Manmohan S.; and Rao, M. Vikram, to NL Industries, Inc. Valve for drilling fluid telemetry systems, 4,790,393, Cl. 175-40.000.

Larsen, Ib: See—  
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Larson, Carolyn D.: See—  
Ahnen, David J.; Akanbi, Charles O.; Bruce, Ian D.; Kramer, Jacqueline C.; Larson, Carolyn D.; Ni, Wei-Chen; and Owens, Annetta T., 4,791,662, Cl. 379-158.000.

Larson, Jay M.: See—  
Narasimhan, Sundaram L.; Lake, Ronald J.; and Larson, Jay M., 4,790,473, Cl. 228-206.000.

Larson, Erik, to Safe Bridge AB. Alarm system, 4,791,410, Cl. 340-550.000.

La See, Jack C. Cam adjustment device, 4,790,106, Cl. 49-252.000.

Laser Magnetic Storage International Company: See—  
Davis, Marvin B., 4,791,511, Cl. 369-291.000.

Laoson, Jean J. Planetary gear assemblies, 4,790,213, Cl. 74-740.000.

Laube, Beth L.: See—  
Zoltan, Bart J.; Laube, Beth L.; and Adams, George K., III, 4,790,305, Cl. 128-200.230.

Laudenberger, Martin: See—  
Faltermeier, Bernd; and Laudenberger, Martin, 4,790,663, Cl. 356-432.000.

Laurel Bank Machines Co. Ltd.: See—  
Egashira, Masaaki, 4,790,526, Cl. 271-315.080.

Laurel, David F., to Halliburton Company. Hydrant and components thereof, 4,790,341, Cl. 137-15.000.

Lausberg, Dietrich; McKee, Graham E.; Taubitz, Christof; Wassmuth, Georg; and Knoll, Manfred, to BASF Aktiengesellschaft. Thermoplastic molding materials containing a polyester and a polycarbonate, 4,791,158, Cl. 524-156.000.

Lawson, R. Joe: See—  
Bricker, Maureen L.; and Lawson, R. Joe, 4,791,091, Cl. 502-303.000.

Moser, Mark D.; and Lawson, R. Joe, 4,791,087, Cl. 502-227.000.

Laver, Robert W., to B F Goodrich Company, The. Tire tread rubber compositions, 4,791,173, Cl. 525-236.000.

Layh, Hans-Dieter. Rotor for motor tachogenerator, 4,791,332, Cl. 310-268.000.

LBB Associates: See—  
Lugo, John, 4,790,241, Cl. 99-352.000.

Leavitt, Steven C.; Lipschutz, David; Lincoln, Stephen E.; Thiele, Karl; and Magnia, Paul A., to Hewlett-Packard Company. Flow imaging detector, 4,790,323, Cl. 128-661.090.

Lebeaupin, Denis: See—  
Bourel, Jean; Lebeaupin, Denis; and Schweibel, Olivier, 4,790,750, Cl. 432-239.000.

Le Bris, Jean: See—  
Erman, Marko; Hily, Claude E.; and Le Bris, Jean, 4,790,659, Cl. 356-369.000.

Leduc, Michele: See—  
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Leduc, Rene; and Leduc, Michele. Aircraft pilot-training apparatus, 4,790,755, Cl. 434-37.000.

Lee, Arnold S. Automatic arterial blood pressure recorder, 4,790,325, Cl. 128-677.000.

Lee, Francis C.: See—  
Eldridge, Jerome M.; Keller, Gary S.; Lee, Francis C.; Nelson, George N.; and Olive, Graham, 4,791,440, Cl. 346-140.00R.

Lee, Raymond; Ferro, Gregory A.; and Evan, John, to IMI-TECH Corporation. High temperature compliant roll particularly adapted for xerography, 4,791,275, Cl. 219-469.000.

Lee, Sae D.; and Palac, Kazimir, to Zenth Electronics Corporation. Means and method for manufacture for a high-resolution color cathode ray tube, 4,790,785, Cl. 445-45.000.

Lefton, Scott: See—  
Lewis, Stephen R.; and Lefton, Scott, 4,791,318, Cl. 307-297.000.

Leggett, Hyman, deceased (by Leggett, Sally S., Administrator); and Brown, Kenneth M., to Hughes Aircraft Company. Graphite fiber reinforced silica matrix composite, 4,791,076, Cl. 501-95.000.

Leggett & Platt, Incorporated: See—  
Ikeda, Minoru, 4,790,038, Cl. 5-247.000.

Leggett, Sally S., Administrator: See—  
Leggett, Hyman, deceased; and Brown, Kenneth M., 4,791,076, Cl. 501-95.000.

Lehigh University: See—  
Vanderhoff, John W.; Mical, Fortunato J.; El-Aasser, Mohamed S.; and Tseng, Chi-Ming, 4,791,162, Cl. 524-458.000.

Lehmberg, Robert H., to United States of America, Navy. Incoherent laser system for producing smooth and controllable spatial illumination profiles, 4,790,627, Cl. 350-162.120.

Lehureau, Jean C.: See—  
Huijer, Ernst; Lehureau, Jean C.; and Monlouis, Claude, 4,791,514, Cl. 360-108.000.

Leichter, Jerrold S.: See—  
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**Makovec, Francesco:** See—  
Rovati, Luigi; Makovec, Francesco; Chiste, Rolando; and Senin, Paolo, 4,791,215, Cl. 558-415.000.

**Malet, Christian:** See—  
Suire, Rene; Malet, Christian; Speri, Roger J.; and Bernard, Coll, 4,790,851, Cl. 623-16.000.

**Malhi, Satwinder S.,** to Texas Instruments Incorporated. Structure for contacting devices in three dimensional circuitry. 4,791,463, Cl. 357-23.600.

**Malinowski, Stephen A.;** and **George, Douglas C.** Support stand for reading material. 4,790,506, Cl. 248-441.100.

**Mallen, Ted A.;** and **Word, Doyle B.,** to Intera Company, Ltd. Synthetic fiber. 4,790,907, Cl. 162-157.100.

**Mallicoat, Samuel W.,** to Tektronix, Inc. Line scan graphic recorder and method for intensity control via medium velocity assessment. 4,791,433, Cl. 346-1.100.

**Maly, Neil A.:** See—  
Sandstrom, Paul H.; Maly, Neil A.; and Marinko, Mark A., 4,790,365, Cl. 152-510.000.

**Manduley, Flavio M.;** **Kasarauskas, Paul M.;** **Lilly, Norman R.;** and **Teran, Kenneth A.,** to Pitney Bowes Inc. Method of and mailer for delivery of replacement units and return of replaced units. 4,790,120, Cl. 53-468.000.

**Manfredi, Walter,** to Lema S.R.L. Die and backing block assembly with quick release fastening means. 4,790,739, Cl. 425-192.00R.

**Manita, Toshiyuki:** See—  
Takahashi, Shinichi; Ishii, Hisao, deceased; Shinkawa, Kiyoshi; Kawahara, Takeshi; and Manita, Toshiyuki, 4,791,571, Cl. 364-436.000.

**Mann, Dieter;** **Fornoff, Dieter;** **Ries, Andreas;** **Klett, Eberhard;** and **van Suntum, Michael,** to Dieter Mann GmbH. Examination unit. 4,790,647, Cl. 351-245.000.

**Manner, Reinhard:** See—  
Dorr, Jurgen; Kleinschmit, Peter; Klingel, Reinhard; and Manner, Reinhard, 4,791,082, Cl. 502-65.000.

**Mannesmann Rexroth GmbH:** See—  
Gehrig, Norbert; and Wolfiges, Hans, 4,790,511, Cl. 251-30.020.

**Manson, Blair R.** Cat scratching post and exercise center. 4,790,265, Cl. 119-29.000.

**Mansy, Samir A.,** to Proctor & Gamble Company. The. Liquid hypochlorite bleach containing optical brightener solubilized by amine oxide. 4,790,953, Cl. 252-187.260.

**Manville Corporation:** See—  
Ewing, Robert L., 4,791,539, Cl. 362-226.000.

**Sadler, Thomas H.,** 4,790,799, Cl. 474-268.000.

**Marathon Oil Company:** See—  
Johnson, Irvin D.; and Bruce, Charles R., 4,790,386, Cl. 166-310.000.

**Marin, Carlo;** and **Pozzati, Giovanni,** to Societa' Cavi Pirelli S.p.A. Electric cable with stranded conductor filled with water blocking compound and with extruded insulation. 4,791,240, Cl. 174-23.00C.

**Marinko, Mark A.:** See—  
Sandstrom, Paul H.; Maly, Neil A.; and Marinko, Mark A., 4,790,365, Cl. 152-510.000.

**Markobrad, David B.:** See—  
Weipert, Eugene A.; and Markobrad, David B., 4,790,956, Cl. 252-538.000.

**Marks, Harold L.** Remote control valve operator. 4,790,514, Cl. 251-129.030.

**Marley, James A.;** and **Blount, Eugene W.** Tobacco curer. 4,790,335, Cl. 131-304.000.

**Marquette, Stuart H.** Knee stabilizer. 4,790,299, Cl. 128-80.00C.

**Marriott, Joseph W.** Kick pad for removing debris from footwear. 4,790,122, Cl. 52-173.00R.

**Marrujo, Ralph G.,** to Jepsen Burns Corporation. The. Aircraft seat with flexible lumbar panel. 4,790,496, Cl. 244-122.00R.

**Marshall, Gail W.:** See—  
Blazo, Stephen F.; and Marshall, Gail W., 4,791,589, Cl. 364-518.000.

**Marteau d'Autry, Eric.** Process and device for calibrating a sampling and metering pipette. 4,790,176, Cl. 73-1.00H.

**Martin, Roland;** and **Gramlich, Walter,** to BASF Aktiengesellschaft. 2-methyl-3-(p-methylphenyl)propionitrile, preparation and use thereof as scent. 4,791,098, Cl. 512-20.000.

**Martin, Sherman F.:** See—  
Greathouse, William K.; and Martin, Sherman F., 4,790,495, Cl. 244-110.00B.

**Martini, Thomas:** See—  
Schinzel, Erich; Frischkorn, Hans; and Martini, Thomas, 4,791,205, Cl. 548-106.000.

**Martorano, Daniel:** See—  
Sclafani, Vincent J.; and Martorano, Daniel, 4,791,535, Cl. 362-82.000.

**Marumo, Chisato;** and **Hayata, Eiji,** to Kanebo, Ltd. Method of separating gaseous mixture. 4,790,859, Cl. 55-68.000.

**Maruyama, Masahiro;** **Itemadani, Eiji;** **Mori, Kazuhiro;** and **Hasegawa, Mikio,** to Matsushita Electric Industrial Co., Ltd. Method and apparatus for mounting electronic parts. 4,790,069, Cl. 29-832.000.

**Maruyama, Masakatsu:** See—  
Mori, Toshiki; Yamada, Haruyasu; Aono, Kunitoshi; and Maruyama, Masakatsu, 4,791,677, Cl. 382-41.000.

**Marx, Ralph H.** Dynamic splinting component. 4,790,300, Cl. 128-84.00C.

**Mascellani, Giuseppe:** See—  
Bianchini, Pietro; and Mascellani, Giuseppe, 4,791,195, Cl. 536-21.000.

**Maschinenfabrik Hilma GmbH, Firma:** See—  
Wendland, Wilfried, 4,790,174, Cl. 72-481.000.

**Mason, J. Russell;** **Kare, Morley R.;** and **DeRovira, Dorf A.,** to Monell Chemistry Senses Center. Mammalian livestock feed, Mammalian livestock feed additive, and methods for using same. 4,790,990, Cl. 424-438.000.

**Massachusetts Institute of Technology:** See—  
Knight, Frederick K.; and Kalata, Kenneth, 4,791,490, Cl. 358-209.000.

**Massip, Antonio:** See—  
Maid, Olaf; Meyer, Lutz; Massip, Antonio; and Muschenborn, Wolfgang, 4,790,889, Cl. 148-333.000.

**Mastrorardo, Patrick;** and **Liu, Fu-Jung,** to Mastrorardo, Patrick. Dual and single audio disc box storage tray. 4,790,926, Cl. 206-309.000.

**Masuda, Kosaku:** See—  
Kida, Shuji; Nakayama, Noritaka; Katoh, Katsunori; Tanaka, Takako; Nakagawa, Satoshi; and Masuda, Kosaku, 4,791,052, Cl. 430-558.000.

**Masuda, Tatsuo:** See—  
Sato, Goro; Ogata, Masamitsu; Ida, Takanori; and Masuda, Tatsuo, 4,791,084, Cl. 502-65.000.

**Masui, Akio:** See—  
Kato, Shoichi; Shimano, Shizuo; Hayaoka, Tatsumi; and Masui, Akio, 4,791,127, Cl. 514-369.000.

**Masuzawa, Kuniyoshi;** **Suzue, Seigo;** **Hirai, Keiji;** and **Ishizaki, Takayoshi,** to Kyorin Pharmaceutical Co., Ltd. Quinolonecarboxylic acid derivatives and their preparation. 4,791,118, Cl. 514-312.000.

**Mather, Bruce C.;** **Fox, William C.;** **Peel, Harry H.;** and **Wenzel, Dennis J.,** to Nippon Colin Co., Ltd. Method and apparatus for determining pulse rate. 4,790,326, Cl. 128-689.000.

**Mathews, Waldemar,** to Korf Engineering GmbH. Apparatus for the direct reduction of sulphurous iron ores. 4,790,517, Cl. 266-156.000.

**Mathey, Christoph:** See—  
Kurth, Josef; Mathey, Christoph; and Wissinger, Waldemar, 4,790,970, Cl. 264-130.000.

**Mathis, Michael S.** Toy figure having adjustably movable joints. 4,790,789, Cl. 446-378.000.

**Matra:** See—  
Boissier, Alain; and Glatigny, Alain, 4,790,566, Cl. 283-91.000.

**Matrozza, Mark A.;** **Leverone, Marianne F.;** and **Boudreaux, Donald P.,** to Microlife Technics, Inc. Method for inhibiting psychotropic bacteria in cream or milk based products using a pediococcus. 4,790,994, Cl. 426-38.000.

**Matsuda, Kiichi:** See—  
Kuroda, Hideo; Mukawa, Naoki; Hiraoka, Makoto; Matsuda, Kiichi; Nishiwaki, Mitsuo; and Tsugane, Shuzo, 4,791,485, Cl. 358-136.000.

**Matsui, Nobuyuki;** **Yokota, Shinichi;** **Otsuka, Kazuo;** **Mizote, Shuhei;** **Yoshida, Tadashi;** **Nonaka, Hachiro;** and **Okumura, Tsutomu,** to Kajima Corporation. Indoor ski slope and apparatus for making snow thereon. 4,790,531, Cl. 272-565.0SS.

**Matsui, Sadayoshi:** See—  
Taneya, Mototaka; Matsumoto, Mitsuhiro; and Matsui, Sadayoshi, 4,791,651, Cl. 372-50.000.

**Matsumoto, Kazuhiro;** **Asai, Kei;** and **Yamamoto, Hirohito,** to Omron Tateisi Electronics Co. Oscillating construction for an ultrasonic atomizer inhaler. 4,790,479, Cl. 239-102.200.

**Matsumoto, Mitsuhiro:** See—  
Taneya, Mototaka; Matsumoto, Mitsuhiro; and Matsui, Sadayoshi, 4,791,651, Cl. 372-50.000.

**Matsumoto, Shigenori:** See—  
Iwata, Yukio; and Matsumoto, Shigenori, 4,790,221, Cl. 82-1.00C.

**Matsumura, Nobutake:** See—  
Sugiura, Yoshihide; Ichikawa, Hiroaki; Matsumura, Nobutake; and Sasaki, Nobuo, 4,791,474, Cl. 357-71.000.

**Matsuoka, Kunihiko:** See—  
Fukamachi, Satoshi; Mitsui, Kenichi; Matsuoka, Kunihiko; and Korenaga, Kazumi, 4,790,737, Cl. 425-114.000.

**Matsuoka, Takao,** to Somar Corporation. Laminater. 4,790,895, Cl. 156-353.000.

**Matsushita Electric Industrial Co.:** See—  
Yokoe, Tohru; Shimizu, Masahiro; and Takenouchi, Mariko, 4,791,680, Cl. 382-56.000.

**Matsushita Electric Industrial Co., Ltd.:** See—  
Doyma, Yoshiaki; Kubo, Kanji; and Yamada, Koichi, 4,791,507, Cl. 360-77.150.

**Hasegawa, Makoto;** **Misaizu, Kouei;** and **Makimoto, Mitsuo,** 4,791,387, Cl. 331-2.000.

**Kawazoe, Hiroshi;** and **Hamane, Tokuhito,** 4,790,063, Cl. 29-597.000.

**Maruyama, Masahiro;** **Itemadani, Eiji;** **Mori, Kazuhiro;** and **Hasegawa, Mikio,** 4,790,069, Cl. 29-832.000.

**Mori, Toshiki;** **Yamada, Haruyasu;** **Aono, Kunitoshi;** and **Maruyama, Masakatsu,** 4,791,677, Cl. 382-41.000.

**Naruo, Noboru;** **Tokumitsu, Syuzo;** **Fukunaga, Masao;** and **Zaizen, Katsunori,** 4,790,862, Cl. 55-210.000.

**Takahashi, Koushiro,** 4,791,415, Cl. 340-701.000.

**Uno, Katsuhiko;** **Ishikawa, Katsuhiko;** and **Inoue, Shojiro,** 4,790,746, Cl. 431-314.000.

**Yamamoto, Hajime;** **Kuniyoshi, Hidenori;** and **Takashima, Yuji,** 4,791,455, Cl. 355-15.000.

**Yokouchi, Akira;** **Fukuda, Katsumi;** **Kuriyama, Keiichi;** **Kabara, Makoto;** and **Watanabe, Masahiro,** 4,790,144, Cl. 62-156.000.

**Matsushita Electric Works, Ltd.:** See—  
Kanada, Hiroshi, 4,790,769, Cl. 439-344.000.

**Matsushita, Mitsuru:** See—  
Yokoyama, Keisshi; Matsushita, Mitsuru; Ohtsuka, Tetsuya; and Okazaki, Yuji, 4,791,267, Cl. 219-121.690.

**Matsuura, Masaru;** **Obata, Akio;** **Fujii, Norikazu;** **Nobuhara, Akio;** and **Fukushima, Danji,** to Kikkoman Corporation. Method for grinding soybeans and method for producing tofu. 4,791,001, Cl. 426-634.000.

**Mattox, Robert J.:** See—  
Nagy, Andrew G.; and Mattox, Robert J., 4,791,073, Cl. 437-67.000.

**Maurer, Fritz:** See—  
Forster, Heinz; Diehr, Hans-Joachim; Maurer, Fritz; Klauke, Erich; Eue, Ludwig; Santel, Hans-Joachim; Schmidt, Robert R.; Reinecke, Paul; and Hansler, Gerd, 4,791,208, Cl. 548-136.000.

**Maurice, Francois.** Active matrix display screen with drain resistance and processes for producing this screen. 4,790,630, Cl. 350-334.000.

**Mauriello, Anthony:** See—  
Bowden, Russell; Mauriello, Anthony; and Shah, Hasmukh, 4,790,829, Cl. 604-244.000.

**Mauro, Poppi,** to Poppi S.p.A. Kiln for firing ceramic materials such as tiles and the like. 4,790,749, Cl. 432-59.000.

**Mausser Waldeck AG:** See—  
Hensel, Willi; Lange, Jurgen; and Paulus, Reinhard, 4,790,595, Cl. 297-285.000.

**Max-Planck-Gesellschaft zur Forderung der Wissenschaften e.V.:** See—  
Brunner, Hermann; Hauser, Karl H.; and Veith, Werner, 4,791,392, Cl. 333-219.000.

**Maxwell, James;** and **Raabe, Rodney,** to Siemens Energy & Automation, Inc. Sliding spring latch. 4,790,579, Cl. 292-175.000.

**May, Sherman C.:** See—  
Dickinson, Ben W. O., III; Dickinson, Robert W.; Jensen, Richard R.; May, Sherman C.; Mackey, Charles S.; and Wilke, Robert D., Jr., 4,790,394, Cl. 175-61.000.

**Mayer, Frederick J.,** to KMS Fusion, Inc. Materials processing using chemically driven spherically symmetric implosions. 4,790,735, Cl. 425-1.000.

**Mayer, James L.;** and **Russell, William K.,** to Mayer, James L. Dispenser for solid and powdered detergent. 4,790,981, Cl. 422-263.000.

**Mayer, Klaus,** to VDO Adolf Schindling AG. Touch panel switch operating arrangement. 4,791,252, Cl. 200-52.00R.

**Mazda Motor Corporation:** See—  
Iida, Masamichi, 4,790,275, Cl. 123-325.000.

**Kawano, Toru;** and **Mishima, Hidehiko,** 4,790,217, Cl. 74-868.000.

**Nishikawa, Kazuo,** 4,790,992, Cl. 425-206.000.

**Sakimori, Hideharu;** **Hayashi, Hiroyuki;** **Ida, Daijiro;** and **Takahashi, Seiji,** 4,790,709, Cl. 414-416.000.

**Mazer Chemicals, Inc.:** See—  
Weipert, Eugene A.; and Markobrad, David B., 4,790,956, Cl. 252-538.000.

**Mc Gill Manufacturing Company, Inc.:** See—  
Simmons, Louis, 4,791,541, Cl. 362-376.000.

**McClure, Gerald B.;** and **McPhee, William A.,** to Dresser Industries, Inc. Method and apparatus for perforating subsurface earth formations. 4,790,385, Cl. 166-299.000.

**McConnell, Sylvia J.** Device for handling a wheelchair. 4,790,716, Cl. 414-678.000.

**McCormick, Daniel F.,** to Brunswick Corporation. Balanced marine surfacing drive. 4,790,782, Cl. 440-61.000.

**McCormick, Nancy J.:** See—  
Ashmont, Robert S.; Bibeau, Thomas C.; Livaich, Anthony; and McCormick, Nancy J., 4,790,999, Cl. 426-592.000.

**McCrae, Richard J.:** See—  
Levinson, Frank H.; Soni, Pravin; Tanous, Adam C.; McCrae, Richard J.; and Ostasiuk, Mark, 4,790,622, Cl. 350-96.200.

**McDaniels, Paul T.,** to World Color Press, Inc. Machine and process for organizing publications for distribution in a postal system. 4,790,119, Cl. 53-411.000.

**McEachern, James A.;** and **Moore, Thomas E.,** to Northern Telecom Limited. Synchronization of asynchronous data signals. 4,791,652, Cl. 375-111.000.

**McFarland, William J.;** and **Walker, Richard C.,** to Hewlett-Packard Company. Pseudorandom word sequence synchronizer. 4,791,653, Cl. 375-115.000.

**McGinn, Michael,** to Motorola, Inc. Class B clamp circuit. 4,791,325, Cl. 307-340.000.

**McGuire, Thomas B.;** and **Holmes, Charles M., Jr.,** to Square D Company. Switching ac voltage regulator. 4,791,348, Cl. 323-263.000.

**McIntyre, Roger C.;** and **Smith, James W.** Grading machine. 4,790,439, Cl. 209-667.000.

**McKay, Michael L.;** and **Ahera, Steven R.,** to Orbital Engine Company Proprietary Limited. Direct fuel injected engine. 4,790,270, Cl. 123-73.00C.

**McKee, Graham E.:** See—  
Lausberg, Dietrich; McKee, Graham E.; Taubitz, Christof; Wassmuth, Georg; and Knoll, Manfred, 4,791,158, Cl. 524-156.000.

**McLaughlin, Kathleen T.;** **Chorvat, Robert J.;** and **Prodan, Kathleen A.,** to G. D. Searle & Co. Process for antiarrhythmic 1,3-diazabicyclo[4.0.0]dec-2-en-4-ones. 4,791,199, Cl. 544-282.000.

**McLean, Bruce A.:** See—  
McLean, James N.; and McLean, Bruce A., 4,791,269, Cl. 219-121.640.

**McLean, James N.;** and **McLean, Bruce A.,** to Herr Manufacturing Company, Inc. Method of fabricating a spline drive. 4,791,269, Cl. 219-121.640.

**McMillan, Myles:** See—  
Gagnon, Andre; McMillan, Myles; and Gale, P. Michael, 4,791,360, Cl. 324-78.00D.

**McPhee, William A.:** See—  
McClure, Gerald B.; and McPhee, William A., 4,790,385, Cl. 166-299.000.

**McPherson, Samuel.** Mole trap. 4,790,102, Cl. 43-86.000.

**McQueen, Robert W.:** See—  
Schellstede, Herman J.; McQueen, Robert W.; and Peters, Alan D., 4,790,384, Cl. 166-298.000.

**Mecca, John.** Variable blind. 4,791,011, Cl. 428-34.000.

**Medic, Nikolaj:** See—  
Winsel, August; Staab, Rudolf; and Medic, Nikolaj, 4,790,915, Cl. 204-98.000.

**Medical Engineering Corporation:** See—  
Kuntz, David H., 4,790,809, Cl. 604-8.000.

**Trick, Robert E.,** 4,790,298, Cl. 128-79.000.

**Megapulse Incorporated:** See—  
Goddard, Robert B., 4,791,422, Cl. 342-389.000.

**Mehrgardt, Soenke;** and **Theus, Ulrich,** to Deutsche ITT Industries GmbH. Monolithic integrated digital-to-analog converter. 4,791,406, Cl. 341-144.000.

**Mehta, Jawahar L.;** and **Saldeen, Tom G. P.,** to University of Florida. Method and compositions for the treatment of thrombotic episodes. 4,790,988, Cl. 424-94.640.

**Meiki Co., Ltd.:** See—  
Shimojo, Shunichi; and Asai, Ikko, 4,790,738, Cl. 425-192.00R.

**Meiko Electronics Co., Ltd.:** See—  
Wada, Tatsuo; Yamashita, Keizo; Tsuyama, Tasuku; and Yamamoto, Teruaki, 4,790,902, Cl. 156-630.000.

**Melvin, Donald L.:** See—  
Braun, David L.; and Melvin, Donald L., 4,790,306, Cl. 128-206.120.

**Memorex Incorporated:** See—  
Shmidt, Isolf; and Badiali, Mario, 4,790,942, Cl. 210-650.000.

**Memorial Hospital for Cancer and Allied Diseases:** See—  
Krol, George S., 4,791,371, Cl. 324-318.000.

**Mendenhall, Charles A.** Toy tracked vehicle. 4,790,546, Cl. 280-1.11R.



- Mercado, Romeo L.; and Robb, Paul N., to Lockheed Missiles & Space Company, Inc. Color-corrected catadioptric systems. 4,790,637, Cl. 350-444.000.
- Merck & Co., Inc.: See—  
Salzman, Thomas N.; Fuentes, Lelia M.; and Shinkai, Ichiro, 4,791,207, Cl. 548-110.000.
- Merrill, Duane F.: See—  
Traver, Frank J.; and Merrill, Duane F., 4,791,163, Cl. 524-506.000.
- Merritt, John H., III, to New Holland Inc. Feed rollers for round baler net dispenser. 4,790,125, Cl. 53-587.000.
- Merry, J. Bradford: See—  
Brown, Lawrence B.; Wells, David N.; and Merry, J. Bradford, 4,790,651, Cl. 356-4.500.
- Mermann, Franz-Josef: See—  
Hohn, Johann; Mermann, Franz-Josef; Obrecht, Werner; and Szentivanyi, Zolt, 4,791,172, Cl. 525-234.000.
- Merz, Kevin L.: See—  
Ibáñez, Paul; and Merz, Kevin L., 4,791,243, Cl. 174-45.00R.
- Messerschmitt-Boelkow-Blohm Gesellschaft mit Beschränkter Haftung: See—  
Baumgarten, Klaus; and Hummel, Kurt, 4,790,639, Cl. 350-486.000.
- Halderson, Thorstein, 4,790,641, Cl. 350-537.000.
- Mester, Roland, to Robert Bosch GmbH. Method and apparatus for reproduction of video signals from magnetic tape at a tape transport speed differing from that of recording. 4,791,499, Cl. 360-10.300.
- Metoku, Yoshiharu: See—  
Nobiraki, Koji; Metoku, Yoshiharu; Urugami, Hisato; Tamaki, Toshitaka; Yoshimura, Keiji; and Otsuka, Kazuhiko, 4,790,863, Cl. 55-276.000.
- Mets, Inc.: See—  
Green, Lawrence R., III; Carrott, John A.; Gray, Donald R.; and Gendler, Robert L., 4,791,572, Cl. 364-449.000.
- Meury, Jean-Loic: See—  
Le Traon, André; Brahim, Haroubia; Pilet, Jean-Claude; De Barga, Michel; Meury, Jean-Loic; and Flore, Le Traon, 4,791,351, Cl. 324-58.00B.
- Mewborne, Jeffrey D.: See—  
Kirk, Gregory L.; Mewborne, Jeffrey D.; and Parish, David M., 4,791,372, Cl. 324-318.000.
- Meyer, Lutz: See—  
Maid, Olaf; Meyer, Lutz; Masip, Antonio; and Muschenborn, Wolfgang, 4,790,889, Cl. 148-333.000.
- Meyers, Richard P., to Dana Corporation. Universal joint alignment checking tool. 4,790,079, Cl. 33-517.000.
- Meyler, Guy, to Bendix France. Multiple disc brake. 4,790,413, Cl. 188-18.00A.
- Micale, Fortunato J.: See—  
Vanderhoff, John W.; Micale, Fortunato J.; El-Aasser, Mohamed S.; and Tseng, Chi-Ming, 4,791,162, Cl. 524-458.000.
- Michand, Pascal: See—  
Lantz, André; and Michand, Pascal, 4,791,223, Cl. 560-266.000.
- Michigan Technological University, Board of Control of: See—  
Sandberg, L.; Bogue, Haataja, Bruce A.; Jurnu, Douglas C.; Palardy, Robert D.; Story, Frank H.; and Yates, William A., 4,790,966, Cl. 264-39.000.
- Michikawa, Yuichi: See—  
Umemoto, Masuo; Eto, Yoshizumi; Miyazaki, Shinichi; Kanada, Hidehiro; Katayama, Hitoshi; and Michikawa, Yuichi, 4,791,495, Cl. 358-310.000.
- MicroLife Technics, Inc.: See—  
Matrozza, Mark A.; Leverone, Marianne F.; and Boudreaux, Donald P., 4,790,994, Cl. 426-38.000.
- Microphase Corporation: See—  
Chippetta, Joseph F., 4,791,380, Cl. 329-179.000.
- Middleworth Engineering & Manufacturing, Inc.: See—  
Middleworth, Tommy A., 4,790,399, Cl. 180-6.200.
- Middleworth, Tommy A., to Middleworth Engineering & Manufacturing, Inc. Steering mechanism for a zero turning radius vehicle. 4,790,399, Cl. 180-6.200.
- Middleton, Delores S.: See—  
Lim, Edmund H.; and Middleton, Delores S., 4,790,540, Cl. 273-309.000.
- Midgley, John A.; and Hulett, Richard H., to Raychem Corporation. Elongate electrical assemblies. 4,791,276, Cl. 219-349.000.
- Midwest Conveyor Company, Inc.: See—  
Summa, Gareth D., 4,790,247, Cl. 104-172.200.
- Mieno, Toshiyuki; Nakajima, Toyohi; Nagao, Akira; Suzuki, Yukihiko; and Tanaka, Akira, to Honda Giken Kogyo Kabushiki Kaisha. Method of and apparatus for controlling ignition timing in internal combustion engine. 4,790,281, Cl. 123-425.000.
- Miki, Toshio: See—  
Kishimoto, Shinichi; Iwase, Kenichi; Miki, Toshio; and Tanaka, Teiji, 4,791,461, Cl. 356-446.000.
- Mikach, Robert R. Gaseous contaminant dosimeter with diffusive material for regulating mass uptake. 4,790,857, Cl. 55-16.000.
- Mikulecky, Harvey W., to RTE Corporation. Sensor-tripper apparatus for a circuit interrupter. 4,791,394, Cl. 335-174.000.
- Milber Corporation: See—  
Anderson, J. Edward C., 4,790,056, Cl. 29-229.000.
- Miles Inc.: See—  
Bogdanaki, Robert C.; Carriero, Robert J.; and Christner, James E., 4,791,053, Cl. 435-7.000.
- Miles, Michael, to Avdel Limited. Fastener installation apparatus. 4,790,470, Cl. 227-1.000.
- Milhou, Wilbur K.: See—  
Lin, Ai J.; Klayman, Daniel L.; and Milhou, Wilbur K., 4,791,135, Cl. 514-450.000.
- Miller, Alan; and Staromlynaka, Jacqueline, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in her Britannic Majesty's Government of the. Bistable liquid crystal in a fabry-perot etalon. 4,790,634, Cl. 350-347.00V.
- Miller, Anne E.: See—  
Lines, Malcolm E.; Lyons, Kenneth B.; Miller, Anne E.; and Nassau, Kurt, 4,790,619, Cl. 350-96.160.
- Miller, Jack E., to International Clamp Company. Clamp. 4,790,058, Cl. 29-407.000.
- Miller, James A.: See—  
Rybicki, Matthew A.; Miller, James A.; and Biggs, Ted A., deceased, 4,791,405, Cl. 341-158.000.
- Miller, Jess J. Removable protective vehicle windshield screen. 4,790,591, Cl. 160-370.200.
- Miller, John, Jr. Ice fishing signal and reporting device. 4,790,099, Cl. 43-17.000.
- Miller, Kenneth A., to IRECO Incorporated. Packaged emulsion explosives and methods of manufacture thereof. 4,790,890, Cl. 199-2.000.
- Miller, Mark L.: See—  
Gleason, Joseph D.; and Miller, Mark L., 4,791,007, Cl. 427-282.000.
- Miller, Robert J., to Hewlett-Packard Company. Ink-jet printing compositions containing macrocyclic polyethers. 4,790,880, Cl. 106-22.000.
- Miller, Robert L., to Grass Valley Group, Inc., The. Adaptive differential pulse code modulation video encoder. 4,791,483, Cl. 358-135.000.
- Miller, Robert T.: See—  
Donaldson, Stuart G.; Groeneveld, Hendrik W.; Klumper, Christian; Miller, Robert T.; Whitbeck, Richard W.; and Longnecker, Robert H., 4,791,661, Cl. 379-96.000.
- Miller, Robert W. Articulated motorcycle carrier. 4,790,713, Cl. 414-462.000.
- Mills, David J., to Agrionics Pty. Limited. Ultrasonic antenna. 4,791,430, Cl. 343-837.000.
- Minami, Hiroo; and Ida, Kazuo, to Yoshida Kogyo K. K. Method of making injection-molded slide fastener sliders. 4,790,973, Cl. 264-242.000.
- Mine Safety Appliances Company: See—  
Shakely, Ronald H.; Auel, RaeAnn M.; and Schneider, Alan A., 4,790,925, Cl. 204-415.000.
- Minigrip Inc.: See—  
Boeckmann, Hugo, 4,790,126, Cl. 53-451.000.
- Minka, Floyd D. Electric power system. 4,791,349, Cl. 323-266.000.
- Minnesota Mining and Manufacturing Company: See—  
Braun, David L.; and Melvin, Donald L., 4,790,306, Cl. 128-206.120.
- Dreyer, John F., Jr.; and Strand, Neal T., 4,791,540, Cl. 362-331.000.
- Mitra, Samarjit; and DeVoe, Robert J., 4,791,045, Cl. 430-281.000.
- Molstad, Richard W.; and Youngquist, Robert J., 4,791,643, Cl. 371-40.000.
- Minolta Camera Kabushiki Kaisha: See—  
Akada, Yasuaki; Ishikawa, Norio; Egawa, Takeshi; and Taniguchi, Nobuyuki, 4,791,445, Cl. 354-402.000.
- Ishida, Tokuji; Ootsuka, Hiroshi; and Mukai, Hiromu, 4,791,446, Cl. 354-408.000.
- Iwasaki, Satoshi; Ueda, Toshihiko; and Konoma, Kunihiko, 4,790,638, Cl. 350-465.000.
- Minowa, Takehiko, to Kabushiki Kaisha Toshiba. Supplemental data generation for complementing adjacent lines of facsimile data. 4,791,491, Cl. 358-284.000.
- Minroc Technical Promotions Ltd.: See—  
Sweeney, Peter J., 4,790,390, Cl. 173-17.000.
- Miron, Amihai; and Koo, David, to North American Philips Corporation. Multiplexed FIR digital filter with two to the Nth power coefficients. 4,791,597, Cl. 364-724.030.
- Misazu, Kouei: See—  
Hasegawa, Makoto; Misazu, Kouei; and Makimoto, Mitsuo, 4,791,387, Cl. 331-2.000.
- Minaki, Hideo; and Ueda, Shigeru, to Toyo Jozo Kabushiki Kaisha. Highly sensitive enzymatic assay method. 4,791,057, Cl. 435-26.000.
- Mise, Noritoshi, to Takeda Chemical Industries, Ltd. Color-forming composition. 4,791,096, Cl. 503-216.000.
- Mishima, Hidehiko: See—  
Kawano, Toru; and Mishima, Hidehiko, 4,790,217, Cl. 74-868.000.
- Mitchell, Joan L.; Pennebaker, William B.; and Goertzel, Gerald, to International Business Machines Corporation. Log encoder/decoder system. 4,791,403, Cl. 341-51.000.
- Mitel Corporation: See—  
Alfeldt, Michael; Barsellotti, John A.; and Kirkland, Lester, 4,791,639, Cl. 370-58.000.
- Mitobe, Keichi: See—  
Asanuma, Nobuyoshi; Kubo, Kanji; and Mitobe, Keichi, 4,790,560, Cl. 280-701.000.
- Mitra, Samarjit; and DeVoe, Robert J., to Minnesota Mining and Manufacturing Company. Photosensitizers and polymerizable compositions with azanich bases and iodonium salts. 4,791,045, Cl. 430-281.000.
- Mitsubishi Cable Industries, Ltd.: See—  
Kato, Hiroshi; Kanemitsu, Kazuhiko; and Furukawa, Kiyoshi, 4,791,160, Cl. 524-322.000.

- Mitsubishi Chemical Industries Limited: See—  
Maki, Takao; Yokoyama, Toshiharu; Nakanishi, Akio; Shioda, Katsuki; and Asatani, Haruki, 4,791,235, Cl. 585-806.000.
- Suzuki, Tetsumi; Murayama, Tetsuo; Ono, Hitoshi; Aramaki, Shinji; and Yokoyama, Michio, 4,791,194, Cl. 534-752.000.
- Mitsubishi Denki Kabushiki Kaisha: See—  
Hirao, Tadashi; and Mackawa, Shigetoshi, 4,791,070, Cl. 437-2.000.
- Kanno, Yoshiaki; Nakamoto, Katsuya; and Sumitani, Jiro, 4,790,282, Cl. 123-493.000.
- Kumakura, Takeshi; Hayashi, Toshiharu; and Koike, Kazuo, 4,791,501, Cl. 360-105.000.
- Nishida, Minoru; Inoue, Noriyuki; Asayama, Yoshiaki; and Suzuki, Hiroyoshi, 4,790,286, Cl. 123-571.000.
- Niwayama, Kazuhiko, 4,790,620, Cl. 350-96.200.
- Okamoto, Takashi, 4,791,342, Cl. 318-569.000.
- Sasaki, Takeo, 4,790,276, Cl. 123-339.000.
- Shiomi, Toru; and Anami, Kenji, 4,791,382, Cl. 330-264.000.
- Takahashi, Shinichi; Ishii, Hisao, deceased; Shinkawa, Kiyoshi; Kawahara, Takeshi; and Manita, Toshiyuki, 4,791,571, Cl. 364-436.000.
- Yokoyama, Keishi; Matsushita, Mitsuru; Ohtsuka, Tetsuya; and Okazaki, Yuji, 4,791,267, Cl. 219-121.690.
- Yonezawa, Takashi; Yoshizumi, Toshiaki; Hosomi, Mamoru; Onuma, Akiyoshi; and Yamasaki, Ichiro, 4,791,256, Cl. 200-148.00R.
- Mitsubishi Jidosha Kogyo Kabushiki Kaisha: See—  
Hiramatsu, Takeo; Takamiya, Bonnosuke; and Tanaka, Yuichi, 4,791,568, Cl. 364-424.100.
- Mitsubishi Rayon Co., Ltd.: See—  
Hamada, Eiichi; Yoshihara, Toshiro; Nakashima, Atushi; and Kamo, Jun, 4,791,054, Cl. 435-2.000.
- Mitsui, Kenichi: See—  
Fukamachi, Satoshi; Mitsui, Kenichi; Matsuo, Kunihiko; and Korenaga, Kazumi, 4,790,737, Cl. 425-114.000.
- Mitsui Toatsu Chemicals, Incorporated: See—  
Kanemura, Yoshinobu; Sasagawa, Katsuyoshi; Imai, Masao; Nagata, Teruyuki; and Kajimoto, Nobuyuki, 4,791,185, Cl. 528-73.000.
- Mitsuyama, Masuhiro. Document file. 4,790,474, Cl. 229-1.50R.
- Mitzel, Wilhelm; Leuthold, Karl-Heinz; and Geier, Josef, to GAO Gesellschaft für Automation und Organisation mbH. Apparatus and a method for separating sheet material. 4,790,525, Cl. 271-97.000.
- Miura, Toshihiko: See—  
Honda, Kunihiko; Miura, Toshihiko; and Araki, Hiroaki, 4,791,021, Cl. 428-329.000.
- Miwa, Hirohide; Shimura, Takaki; Yanashima, Tadahiko; and Amemiya, Shinichi, to Fujitsu Limited. Method of displaying stream lines of an inhomogeneous flowing medium and a device therefor. 4,790,321, Cl. 128-660.070.
- Miwa, Takahiro; and Nishikawa, Hiroshi, to Brother Kogyo Kabushiki Kaisha. Method and apparatus for writing information on magnetic disk with single-gap magnetic head. 4,791,500, Cl. 360-60.000.
- Miyairi, Akira: See—  
Okikawa, Susumu; and Miyairi, Akira, 4,791,472, Cl. 357-70.000.
- Miyakawa, Tadashi; Yanagihara, Kazuhiko; Oishi, Hisao; Takahashi, Tsunehiko; Nakamura, Takeshi; Akimoto, Kazuhiko; and Shioji, Mitsuki, to Fuji Photo Film Co., Ltd.; and Sharp Kabushiki Kaisha. Liquid crystal device having the microlenses in correspondence with the pixel electrodes. 4,790,632, Cl. 350-347.00V.
- Miyake, Charles I., to Spectra-Physics, Inc. Capillary heat pipe cooled diode pumped slab laser. 4,791,634, Cl. 372-34.000.
- Miyake, Hideharu: See—  
Sugano, Takuo; and Miyake, Hideharu, 4,790,903, Cl. 156-643.000.
- Miyake, Kazutoshi: See—  
Yamanaka, Motosuke; Miyake, Kazutoshi; Suda, Shinji; Ohhara, Hideto; and Ogawa, Toshiaki, 4,791,202, Cl. 546-121.000.
- Yamanaka, Motosuke; Miyake, Kazutoshi; Suda, Shinji; Ohhara, Hideto; and Ogawa, Toshiaki, 4,791,203, Cl. 546-121.000.
- Miyama, Akimasa: See—  
Ohashi, Takehisa; Kan, Kazunori; Ueyama, Noboru; Sada, Isao; Miyama, Akimasa; and Watanabe, Kiyoshi, 4,791,198, Cl. 540-354.000.
- Miyaoka, Kazuyoshi: See—  
Koboshi, Shigeharu; Kobayashi, Kazuhiro; Miyaoka, Kazuyoshi; Aoki, Syozo; and Takabayashi, Naoki, 4,791,013, Cl. 428-35.300.
- Miyashiro, Julie M.: See—  
Djuric, Stevan W.; Haack, Richard A.; and Miyashiro, Julie M., 4,791,133, Cl. 514-438.000.
- Miyauchi, Nobuyuki: See—  
Yamamoto, Saburo; Yamamoto, Osamu; Morimoto, Taiji; Hayashi, Hiroshi; Miyachi, Nobuyuki; and Maci, Shigeki, 4,791,636, Cl. 372-46.000.
- Miyazaki, Shinichi: See—  
Umemoto, Masuo; Eto, Yoshizumi; Miyazaki, Shinichi; Kanada, Hidehiro; Katayama, Hitoshi; and Michikawa, Yuichi, 4,791,495, Cl. 358-310.000.
- Miyazawa, Hidehisa: See—  
Ohta, Shin-ichiro; Miyazawa, Hidehisa; Tanabe, Etsuo; and Taguchi, Shigeru, 4,790,648, Cl. 350-96.200.
- Mizota, Teruhiko: See—  
Okonogi, Shigeo; Tomita, Mamoru; Tomimura, Toshiro; Tamura, Yoshitaka; and Mizota, Teruhiko, 4,791,193, Cl. 530-416.000.
- Mizote, Shuhei: See—  
Matsui, Nobuyuki; Yokota, Shinichi; Otsuka, Kazuo; Mizote, Shuhei; Yoshida, Tadashi; Nonaka, Hachiro; and Okumura, Tsutomu, 4,790,531, Cl. 272-565.05S.
- Mizuki, Hideyuki: See—  
Nakayama, Muneco; Uehara, Akira; Sago, Hiroyoshi; and Mizuki, Hideyuki, 4,790,262, Cl. 118-52.000.
- Mizuno, Junji: See—  
Nakanishi, Yutaka; Yamada, Toshihiko; and Mizuno, Junji, 4,790,745, Cl. 431-88.000.
- Mizutani, Yasukazu: See—  
Ukuba, Susumu; Mizutani, Yasukazu; and Iyoda, Syozo, 4,791,329, Cl. 310-68.00C.
- Mizutani, Yohji: See—  
Takakasaki, Nobuyuki; Mizutani, Yohji; Kishida, Nobuhiro; and Hosokawa, Manabu, 4,790,741, Cl. 425-526.000.
- Mobil Oil Corporation: See—  
Chu, Pochen; Kuehl, Guenter H.; and Landis, Michael E., 4,791,088, Cl. 502-232.000.
- Pistner, Timothy W., 4,790,437, Cl. 206-554.000.
- Quigley, M. Scott; and Seal, Henry A., 4,790,933, Cl. 210-96.100.
- Sinnokrot, Ali A., 4,790,180, Cl. 73-153.000.
- Mobile Oil Corporation: See—  
Chang, Clarence D.; Chen, Nai Y.; Helling, Stuart D.; Tsao, Ying-Yen P.; and Walsh, Dennis E., 4,790,928, Cl. 208-111.000.
- Mochizuki, Akihiro: See—  
Ishitsuka, Takeshi; Yamagishi, Yasuo; and Mochizuki, Akihiro, 4,791,039, Cl. 430-2.000.
- Mochizuki, Kiyofumi: See—  
Yamamoto, Shu; and Mochizuki, Kiyofumi, 4,790,655, Cl. 356-345.000.
- Mochizuki, Masahiro, to Aisin Seiki Kabushiki Kaisha. Pressure regulator. 4,790,343, Cl. 137-80.000.
- Modiactte, Nancy K. S.: See—  
Bogart, Frank J.; and Modiactte, Nancy K. S., 4,791,665, Cl. 379-207.000.
- Mohri, Tetsuya: See—  
Tanouchi, Tadao; Kawamura, Masanori; Ajima, Akio; Mohri, Tetsuya; Hayashi, Masaki; Terashima, Hiroshi; Hirata, Fumio; and Morimura, Takeshi, 4,791,126, Cl. 514-369.000.
- Molins PLC: See—  
Clarke, Peter A.; and Carter, David C. M., 4,790,422, Cl. 198-347.000.
- Moll, Norman G.; and Johnson, David R., to Dow Chemical Company, The. Methods for preparing a formed cellular plastic material pattern employed in metal casting. 4,790,367, Cl. 164-34.000.
- Mollenhoff, Horst; Rehwinkel, Heiko; and Bunthoff, Dirk, to Deutsche Babcock Werke Aktiengesellschaft. Arrangement for burning fuels in a fluidized bed with an augmented solids circulation in a combustion chamber of a steam generator. 4,790,267, Cl. 122-4.00D.
- Molstad, Richard W.; and Youngquist, Robert J., to Minnesota Mining and Manufacturing Company. Single track orthogonal error correction system. 4,791,643, Cl. 371-40.000.
- Monell Chemistry Senses Center: See—  
Mason, J. Russell; Kare, Morley R.; and DeRovira, Dorf A., 4,790,990, Cl. 424-438.000.
- Monlouis, Claude: See—  
Huijer, Ernst; Leheureau, Jean C.; and Monlouis, Claude, 4,791,514, Cl. 360-108.000.
- Montanari, Paolo; and Sala, Olegio, to Riva Calzoni S.p.A. Quick-coupling connector group for pipes, piles or the like. 4,790,571, Cl. 285-86.000.
- Montgomery, Carlos E.; Zitterich, Craig L.; and Holloman, Ricky M., to Otis Engineering Corporation. Well testing apparatus. 4,790,378, Cl. 166-66.000.
- Monticelli, Dennis M.; and Wright, John W., to National Semiconductor Corporation. High speed current amplifier buffer circuit. 4,791,383, Cl. 330-265.000.
- Montierth, Garry L.; Bylin, Robert O.; and Scott, Raymond J. Heating and insulation arrangement for a network of installed pipes and method. 4,791,277, Cl. 219-535.000.
- Moutrose, Robert E.: See—  
Ostrum, James V.; Springer, Gary C.; Weller, Kenneth G.; Richard, John E.; and Moutrose, Robert E., 4,790,448, Cl. 220-270.000.
- Moody, Roy A.; Bulanda, John J.; Levin, Robert F.; Timian, Steven S.; and Waltast, Stephen A., to Panduit Corp. Dispenser of discrete cable ties provided on a continuous ribbon of cable ties. 4,790,225, Cl. 83-100.000.
- Moore, Larry R.; and Juhnke, David. Removable pivotable tailgate. 4,790,589, Cl. 296-50.000.
- Moore, Leo M., to Industrial Machine Manufacturing, Inc. Follower plate seal. 4,790,458, Cl. 222-386.000.
- Moore, Thomas E.: See—  
McEachern, James A.; and Moore, Thomas E., 4,791,652, Cl. 375-111.000.
- Moos, Walter: See—  
Trivedi, Bharat K.; Moos, Walter; Hamilton, Harriet W.; and Patt, William C., 4,791,103, Cl. 514-46.000.
- Moosmann, Horst: See—  
Halsig, Andreas; Moosmann, Horst; and Dinger, Horst, 4,790,246, Cl. 102-254.000.
- Moran, Timothy G.: See—  
Kuo, James R.; Carey, Brian R.; and Moran, Timothy G., 4,791,313, Cl. 307-268.000.
- Kuo, James R.; and Moran, Timothy G., 4,791,314, Cl. 307-270.000.



Morell, Joseph: See—  
Benoit, Louis; Nerrack, Bernard; Morell, Joseph; and Petri, Roland, 4,790,081, Cl. 36-50.000.  
Morgan, Carey C. Apparatus for cutting various forms out of a picture frame mat or the like. 4,790,222, Cl. 82-1.300.  
Morgan Construction Company: See—  
Simmons, Thomas E., 4,790,673, Cl. 384-147.000.  
Morgott, Horst: See—  
Chadwick, P. N. R.; and Morgott, Horst, 4,791,543, Cl. 363-48.000.  
Mori, Kazuhiro: See—  
Kageyama, Satoshi; Nakamura, Yasuaki; Kondo, Takashi; Abe, Shozo; and Mori, Kazuhiro, 4,791,496, Cl. 358-342.000.  
Maruyama, Masahiro; Itemadani, Eiji; Mori, Kazuhiro; and Hasegawa, Mikio, 4,790,069, Cl. 29-832.000.  
Mori, Kei. Optical conductor cable supporting stand for a light ray radiation device used in medical treatment. 4,790,500, Cl. 248-49.000.  
Mori, Masahito; So, Masaaki; and Tomoyasu, Hirohide, to Sunstar Giken Kabushiki Kaisha. Bonding agent and resin composition. 4,791,214, Cl. 556-423.000.  
Mori, Naomichi: See—  
Sumino, Tatsuo; Ohtake, Yasutomo; Nakamura, Hiroki; Kon, Masahiro; Mori, Naomichi; and Nakajima, Kazuo, 4,791,061, Cl. 435-178.000.  
Mori, Toshiaki; Yamada, Haruyasu; Aono, Kunitoshi; and Maruyama, Masahito, to Matsushita Electric Industrial Co., Ltd. Image signal processor. 4,791,677, Cl. 382-41.000.  
Morimoto, Kiyoshi; Toki, Hitoshi; and Satoh, Yoshitaka, to Futaba Denchi Kogyo Kabushiki Kaisha. Fluorescent composition and fluorescent luminous device. 4,791,336, Cl. 313-496.000.  
Morimoto, Makoto: See—  
Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tooru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tadashi, 4,791,113, Cl. 514-256.000.  
Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tooru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tadashi, 4,791,130, Cl. 514-410.000.  
Morimoto, Taiji: See—  
Yamamoto, Saburo; Yamamoto, Osamu; Morimoto, Taiji; Hayashi, Hiroshi; Miyachi, Nobuyuki; and Mae, Shigeki, 4,791,636, Cl. 372-46.000.  
Yamamoto, Saburo; Morimoto, Taiji; Miyachi, Nobuyuki; and Mae, Shigeki, 4,791,649, Cl. 372-48.000.  
Morimura, Takeshi: See—  
Tanouchi, Tadao; Kawamura, Masanori; Ajima, Akio; Mohri, Tetsuya; Hayashi, Masaki; Terashima, Hiroshi; Hirata, Fumio; and Morimura, Takeshi, 4,791,126, Cl. 514-369.000.  
Moriwaga Milk Industry Co., Ltd.: See—  
Okonogi, Shigeo; Tomita, Mamoru; Tomimura, Toshio; Tamura, Yoshitaka; and Mizota, Teruhiko, 4,791,193, Cl. 530-416.000.  
Moriwaga, Yousuke; and Kohnai, Tadashi, to Terumo Kabushiki Kaisha. Pressure transducer apparatus. 4,790,193, Cl. 73-756.000.  
Morpho Systems: See—  
Larcher, Philippe; Irigoien-Guichandut, Francois; Vassy, Daniel; Leuci, Michel; Longepierre, Patrick; and Didier, Bernard, 4,790,564, Cl. 283-69.000.  
Morris, Donald H.; and Shea, Daniel M., to Rockwell International Corporation. Blade assembly. 4,790,721, Cl. 416-96.00A.  
Morris, James C.: See—  
Keefe, William M.; Krasko, Zeyar; Karloski, Robert; and Morris, James C., 4,791,334, Cl. 313-25.000.  
Morris, James R.; and Boyd, Douglas K., to Genesis Systems Group, Ltd. Tool for robotic application of liquid to a work surface. 4,790,259, Cl. 118-707.000.  
Morris, Merle E.; and Seft, Stephen P., to GTE Products Corporation. Electric lamp with internal conductive reflector forming part of the circuitry thereof. 4,791,333, Cl. 313-25.000.  
Morrisey, Brian J. Tool for the precise movement of machines. 4,790,507, Cl. 248-651.000.  
Morrow, J. Thomas; and Burns, Marvin, to Bioject, Inc. Non-invasive hypodermic injection device. 4,790,824, Cl. 604-143.000.  
Morrow, Lawrence R.; DeGue, Michael G.; and Whittington, Lawrence E., to Texaco Inc. Alkylated oxidized lignins as surfactants. 4,790,382, Cl. 166-274.000.  
Morse, Alfred W.; Buck, Daniel C.; and Grauling, Charles H., Jr., to Westinghouse Electric Corp. Transmit-receive module for phased-array antennas. 4,791,421, Cl. 342-368.000.  
Morse, Hugh B.; and Ciolino, John V. Sanitary foodstuff dispenser with baffle. 4,790,457, Cl. 222-185.000.  
Mortenson, Carl N., to Magline, Inc. Two-wheeled hand truck construction. 4,790,547, Cl. 280-47.270.  
Morton, Bruce L.: See—  
Pelley, Perry H., III; and Morton, Bruce L., 4,791,615, Cl. 365-200.000.  
Mortant, Artie J., to Artico, Inc. Permanent photographic memorial marker. 4,790,088, Cl. 40-124.500.  
Mosehauer, Michael; Spitzner, Jerome G., deceased (by Spitzner, Nona V., administratrix); Stoudt, Michael D.; and Zeise, Eric K., to Eastman Kodak Company. Multicolor electrophotographic reproduction apparatus and method for producing color accented copies. 4,791,430, Cl. 355-4.000.  
Moseley, Mark R. Child carry device. 4,790,459, Cl. 224-159.000.  
Moer, Mark D.; and Lawson, R. Joe, to UOP Inc. Trimetallic reforming catalyst. 4,791,087, Cl. 502-227.000.  
Moskun, James P.: See—  
Angel, David J.; Cardone, Gary A.; Holbrook, Mark D.; Moskun, James P.; and Patterson, Bruce, 4,791,557, Cl. 364-200.000.

Moss, Gaylord E., to Hughes Aircraft Company. Holographic display panel for a vehicle windshield. 4,790,613, Cl. 350-3.700.  
Mosseri, Remy; and Sadoc, Jean-Francois. Educational building game. 4,790,759, Cl. 434-403.000.  
Mostafa, Hatem E.: See—  
Smith, James C.; Mostafa, Hatem E.; and Walsh, William J., 4,791,435, Cl. 346-140.00R.  
Motion Designs, Inc.: See—  
Okamoto, James, 4,790,553, Cl. 280-242.0WC.  
Motor Wheel Corporation: See—  
Stalter, Robert J., Sr., 4,790,605, Cl. 301-37.0CM.  
Motorola, Inc.: See—  
Brown, Vernon L., 4,791,527, Cl. 361-424.000.  
Hodapp, Stephen, 4,791,324, Cl. 307-530.000.  
Lin, Paul T., 4,791,075, Cl. 437-209.000.  
McGinn, Michael, 4,791,325, Cl. 307-540.000.  
Nagy, Andrew G.; and Mattox, Robert J., 4,791,073, Cl. 437-67.000.  
Pelley, Perry H., III; and Morton, Bruce L., 4,791,615, Cl. 365-200.000.  
Rybicki, Mathew A.; Miller, James A.; and Biggs, Ted A., deceased, 4,791,405, Cl. 341-158.000.  
Mueller, Richard L., Jr.; and Lerohl, Andrew L., to Advanced Cardiovascular Systems, Inc. Perfusion dilatation catheter and method of manufacture. 4,790,315, Cl. 128-344.000.  
Mukai, Hiromu: See—  
Ishida, Tokuji; Ootsuka, Hiroshi; and Mukai, Hiromu, 4,791,446, Cl. 354-408.000.  
Mukai, Kousaku: See—  
Ito, Gichi; Mukai, Kousaku; Shimizu, Yuichi; and Suzuki, Saiju, 4,790,660, Cl. 356-376.000.  
Mukawa, Naoki: See—  
Kuroda, Hideo; Mukawa, Naoki; Hiraoaka, Makoto; Matsuda, Kiichi; Nishiwaki, Mitsuo; and Tsugane, Shuzo, 4,791,485, Cl. 358-136.000.  
Mukoyama, Yoshiyuki: See—  
Nishizawa, Hiroshi; Sakata, Touichi; and Mukoyama, Yoshiyuki, 4,791,157, Cl. 524-108.000.  
Muller, Peter E.: See—  
Pleuse, Harald; and Muller, Peter E., 4,791,142, Cl. 521-50.000.  
Muller, Robert; Hoebel, Peter; and Maier, Ulrich, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Bearing of an idler gear of an all-wheel transfer transmission. 4,790,210, Cl. 74-665.0GA.  
Mun, Im H.; Young, Jang E.; Hun, Park J.; and Hwan, Suh M., to Sam Sung Electronics Co., Ltd. Refrigerator. 4,790,146, Cl. 62-441.000.  
Munakata, Chusuke: See—  
Kinameri, Kanji; and Munakata, Chusuke, 4,791,288, Cl. 250-226.000.  
Mundus, Friedhelm; and Voss, Hans-Ludwig, to Windmoller & Holzer. Apparatus for winding up a web section without using a core. 4,790,491, Cl. 242-68.400.  
Munroe, John E., to Eli Lilly and Company. 1-Carbacephalosporin antibiotics. 4,791,106, Cl. 514-210.000.  
Munz, Wolf-Dieter: See—  
Hofmann, Dieter; Heimbach, Klaus-Jurgen; Petersein, Helmut; and Munz, Wolf-Dieter, 4,791,017, Cl. 428-216.000.  
Murakami, Hajime: See—  
Yotsuya, Hiroshi; Kondo, Hiroshi; Sakurai, Kaoru; Murakami, Harunori; and Murakami, Hajime, 4,791,425, Cl. 343-713.000.  
Murakami, Harunori: See—  
Yotsuya, Hiroshi; Kondo, Hiroshi; Sakurai, Kaoru; Murakami, Harunori; and Murakami, Hajime, 4,791,425, Cl. 343-713.000.  
Murakami, Manabu: See—  
Yamatsa, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Katayama, Kouichi; Tsunoda, Hajime; Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, 4,791,105, Cl. 514-134.000.  
Murakami, Reiji; Hashimoto, Shinichi; Shimino, Mamoru; and Ide, Fumito, to Kabushiki Kaisha Toshiba. Sheet supplying apparatus. 4,790,524, Cl. 271-10.000.  
Murakawa, Katuhiko: See—  
Kondo, Koji; Murakawa, Katuhiko; Ishida, Nobumasa; Ishikawa, Junji; Nomoto, Kaoru; and Ishikawa, Futoshi, 4,790,876, Cl. 106-1.230.  
Muranaka, Yuuichi, to Kabushiki Kaisha Toshiba. Endoscopic system with adjustable light source. 4,791,480, Cl. 358-98.000.  
Murase, Ichiki; Ohmishi, Toshihiro; and Noguchi, Takanobu, to Director-General of the Agency of Science and Technology, an Organ of the Ministry of International Trade and Industry of Japan. Conjugated polymer film and pyrolyzed product thereof. 4,791,177, Cl. 525-328.500.  
Murata, Hajime, to Yazaki Corporation. Lighting method for vacuum fluorescent display with reduced flickering. 4,791,337, Cl. 315-169.100.  
Murata Kikai Kabushiki Kaisha: See—  
Uchida, Hiroshi, 4,790,131, Cl. 57-281.000.  
Murayama, Jin; Tamura, Hiroshi; and Kudoh, Yoshimitsu, to Fuji Photo Film Co., Ltd. Color solid image pickup element. 4,791,047, Cl. 430-321.000.  
Murayama, Satoshi: See—  
Irikura, Tsutomu; Suzue, Seigo; Murayama, Satoshi; Hirai, Keiji; and Ishizaki, Takayoshi, 4,791,225, Cl. 562-493.000.  
Murayama, Tetsuo: See—  
Suzuki, Tetsumi; Murayama, Tetsuo; Ono, Hitoshi; Aramaki, Shinji; and Yokoyama, Michiyo, 4,791,194, Cl. 534-752.000.

Murphy, Arthur T.: See—  
Linnell, Thomas D.; Murphy, Arthur T.; and Young, Frederick J., 4,791,391, Cl. 333-184.000.  
Murphy, Edward P., to Graco Inc. Power paint brush with flow restrictor and removable brush head. 4,790,679, Cl. 401-146.000.  
Murphy, Oliver J.; and Bockris, John O'M., to Texas A&M University System, The. One-unit photo-activated electrolyzer. 4,790,916, Cl. 204-129.000.  
Murphy, Patrick E.: See—  
Schrenk, David J.; and Murphy, Patrick E., 4,791,036, Cl. 429-178.000.  
Muschenborn, Wolfgang: See—  
Maid, Olaf; Meyer, Lutz; Massip, Antonio; and Muschenborn, Wolfgang, 4,790,889, Cl. 148-333.000.  
Myers, Michael O.: See—  
Kirchhoff, Robert A.; Gilpin, Jo Ann; Baker, Cynthia; and Myers, Michael O., 4,791,182, Cl. 526-221.000.  
Myles, Thomas A.: See—  
Kim, Jonathan J.; and Myles, Thomas A., 4,791,077, Cl. 501-105.000.  
Myslicki, Robert J., to General Motors Corporation. Hinge bushing adjustment means for a hinge assembly. 4,790,047, Cl. 16-386.000.  
Nagahiro, Kenichi: See—  
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaki, 4,790,274, Cl. 123-198.00F.  
Nagai, Haruo; Suzuki, Tetsuo; and Sato, Kazuhiro, to Kyowa Gas Chemical Industry Co., Ltd. Methacrylic resin molding material and method for production thereof. 4,791,184, Cl. 526-323.200.  
Nagao, Akira: See—  
Mieno, Toshiyuki; Nakajima, Toyohi; Nagao, Akira; Suzuki, Yukihiko; and Tanaka, Akira, 4,790,281, Cl. 123-425.000.  
Nagashima, Nao; Sugishima, Kiyohisa; and Yamada, Masanori, to Canon Kabushiki Kaisha. Image processing system. 4,791,492, Cl. 358-256.000.  
Nagashima, Yoshitake, to Canon Kabushiki Kaisha. Solid-state image pick-up apparatus having variable magnification of image sizes by changing the image sensor address range. 4,791,308, Cl. 250-578.000.  
Nagata, Masanori; Imano, Shigeki; Kanoka, Tsugio; and Asada, Kiyotoshi, to Fujimori Kogyo Co., Ltd. Method and apparatus for the inspection of contents of packaged products. 4,791,655, Cl. 378-57.000.  
Nagata, Teruyuki: See—  
Kanemura, Yoshinobu; Saegawa, Katsuyoshi; Imai, Masao; Nagata, Teruyuki; and Kajimoto, Nobuyuki, 4,791,185, Cl. 528-73.000.  
Nagatsuka, Ikutaro: See—  
Aoki, Takayoshi; Takeda, Masayuki; Suzuki, Chiaki; and Nagatsuka, Ikutaro, 4,791,041, Cl. 430-108.000.  
Nagou, Satoshi; and Nakamura, Shunichi, to Tokuyama Soda Kabushiki Kaisha. Microporous film and process for production thereof. 4,791,144, Cl. 521-90.000.  
Nagy, Andrew G.; and Mattox, Robert J., to Motorola Inc. Trench isolation method for semiconductor devices. 4,791,073, Cl. 437-67.000.  
Naito, Genpei, to Nissan Motor Company, Limited. Control system for limited-slip differential gear unit associated with wheel-spinning preventive traction control system. 4,790,404, Cl. 180-197.000.  
Naito, Hiroshi; Takahashi, Hidemi; Kimura, Minoru; and Sano, Reiji, to Agency of Industrial Science and Technology. Infrared ray sensing device. 4,791,299, Cl. 250-352.000.  
Nakagawa, Satoshi: See—  
Kida, Shuji; Nakayama, Noritaka; Katoh, Katsunori; Tanaka, Takako; Nakagawa, Satoshi; and Masuda, Kosaku, 4,791,052, Cl. 430-558.000.  
Nakagawa, Yasuo: See—  
Maeda, Shunji; Kubota, Hitoshi; Fushimi, Satoru; Makihiro, Hiroshi; Ninomiya, Takanori; and Nakagawa, Yasuo, 4,791,586, Cl. 364-491.000.  
Nakagawa, Yasushi; and Ito, Takashi, to Takeda Chemical Industries, Ltd. Chemically modified protein with polyethyleneglycol. 4,791,192, Cl. 530-399.000.  
Nakagiri, Takashi: See—  
Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Nakagiri, Takashi; Nishimura, Yukuo; and Takimoto, Kiyoshi, 4,790,664, Cl. 356-432.000.  
Nakahara, Toshimi: See—  
Hiromori, Masahiro; and Nakahara, Toshimi, 4,791,025, Cl. 428-379.000.  
Nakajima, Atsunobu: See—  
Nanno, Ikuo; Nakajima, Atsunobu; Hoshi, Seiji; and Yamamoto, Hiroyoshi, to Seiko Instruments & Electronics Ltd. Apparatus for actuating objective lens. 4,790,628, Cl. 350-247.000.  
Nakajima, Kazuo: See—  
Sumino, Tatsuo; Ohtake, Yasutomo; Nakamura, Hiroki; Kon, Masahiro; Mori, Naomichi; and Nakajima, Kazuo, 4,791,061, Cl. 435-178.000.  
Nakajima, Toyohi: See—  
Mieno, Toshiyuki; Nakajima, Toyohi; Nagao, Akira; Suzuki, Yukihiko; and Tanaka, Akira, 4,790,281, Cl. 123-425.000.  
Nakamoto, Katsuya: See—  
Kanno, Yoshiaki; Nakamoto, Katsuya; and Sumitani, Jiro, 4,790,282, Cl. 123-493.000.  
Nakamoto, Kouji: See—  
Yamatsa, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Katayama, Kouichi; Tsunoda, Hajime; Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, 4,791,105, Cl. 514-134.000.

Nakamura, Akira, to Sony Corporation. Optical pickup device using an intermediate lens which slightly converges the light beam. 4,791,625, Cl. 369-112.000.  
Nakamura, Hidehiro: See—  
Kanno, Masao; Fukutomi, Naoki; Iwasaki, Yorie; Kojima, Fujio; and Nakamura, Hidehiro, 4,791,238, Cl. 174-68.500.  
Nakamura, Hiroki: See—  
Sumino, Tatsuo; Ohtake, Yasutomo; Nakamura, Hiroki; Kon, Masahiro; Mori, Naomichi; and Nakajima, Kazuo, 4,791,061, Cl. 435-178.000.  
Nakamura, Kenji. Resealable dispenser-container. 4,790,436, Cl. 206-449.600.  
Nakamura, Shunichi: See—  
Nagao, Satoshi; and Nakamura, Shunichi, 4,791,144, Cl. 521-90.000.  
Nakamura, Takeshi: See—  
Miyakawa, Tadashi; Yanagihara, Kazuhiko; Oishi, Hideo; Takahashi, Tanehiko; Nakamura, Takeshi; Akimoto, Kazuhiko; and Shioji, Mitsuaki, 4,790,632, Cl. 350-347.00V.  
Nakamura, Yasuaki: See—  
Kageyama, Satoshi; Nakamura, Yasuaki; Kondo, Takashi; Abe, Shozo; and Mori, Kazuhiro, 4,791,496, Cl. 358-342.000.  
Nakane, Yasuji; and Fujii, Yoshitami, to Three Bond Co., Ltd. Material supply equipment for viscous fluid pressure feed system. 4,790,456, Cl. 222-183.000.  
Nakanishi, Akio: See—  
Maki, Takao; Yokoyama, Toshiharu; Nakanishi, Akio; Shioda, Katashi; and Asatani, Haruki, 4,791,235, Cl. 585-806.000.  
Nakanishi, Hiroshi: See—  
Noguchi, Tetsuo; Tanaka, Masao; and Nakanishi, Hiroshi, 4,790,487, Cl. 241-79.100.  
Nakanishi, Yutaka, to Toyotomi Kogyo Co., Ltd. Oil gauge for cartridge-type oil tank. 4,790,184, Cl. 73-317.000.  
Nakanishi, Yutaka; Yamada, Toshihiko; and Mizuno, Junji, to Toyotomi Kogyo Co., Ltd. Automatic fire-extinguishing device for oil burner. 4,790,745, Cl. 431-88.000.  
Nakano, Hirobumi: See—  
Higuchi, Seizun; Oga, Tomonari; Ikeda, Masao; and Nakano, Hirobumi, 4,790,913, Cl. 204-37.300.  
Nakano, Kenji; Okada, Hiroshi; and Takahashi, Takao, to Sony Corp. Apparatus for recording and/or reproducing in successive slant tracks on a record tape, at least an audio signal and an index signal for controlling tape transport. 4,791,497, Cl. 360-32.000.  
Nakao, Masahiro; Asami, Sumio; Tanaka, Takaharu; Ogura, Kyoichi; Amachi, Tetsuo; Yoshizumi, Hajime; and Ishigooka, Hiroshi, to Sutory Limited. Process for preparing lipase. 4,791,059, Cl. 435-198.000.  
Nakao, Shinroku; and Ito, Masao, to Combi Co., Ltd. Training device for rehabilitation. 4,790,528, Cl. 272-73.000.  
Nakashima, Atsushi: See—  
Hamada, Eiichi; Yoshihara, Toshio; Nakashima, Atsushi; and Kamo, Jun, 4,791,054, Cl. 435-2.000.  
Nakashima, Hiroshi; and Fukuhara, Sanhiro, to Fuji Photo Film Co., Ltd. Floating type web guiding device. 4,790,468, Cl. 226-97.000.  
Nakashima, Kouji: See—  
Tanaka, Haruhiko; Kagawa, Fukashi; and Nakashima, Kouji, 4,791,143, Cl. 521-89.000.  
Tanaka, Haruhiko; Kagawa, Fukashi; and Nakashima, Kouji, 4,791,147, Cl. 521-134.000.  
Nakayama, Muneco; Uehara, Akira; Sago, Hiroyoshi; and Mizuki, Hideyuki, to Tokyo Denchi Kagaku Co., Ltd. Thin-film coating apparatus. 4,790,262, Cl. 118-52.000.  
Nakayama, Noritaka: See—  
Kida, Shuji; Nakayama, Noritaka; Katoh, Katsunori; Tanaka, Takako; Nakagawa, Satoshi; and Masuda, Kosaku, 4,791,052, Cl. 430-558.000.  
Nakayama, Tadayoshi: See—  
Kozuki, Susumu; Nakayama, Tadayoshi; and Sato, Chikara, 4,791,487, Cl. 358-140.000.  
Nakazaki, Youji; and Ito, Yoshio, to Yazaki Corporation. Device for mounting a terminal to an electric indicator. 4,790,186, Cl. 73-431.000.  
Nakazato, Yukitaka: See—  
Hirose, Akira; and Nakazato, Yukitaka, 4,791,451, Cl. 355-8.000.  
Nalewajek, David: See—  
Shia, George A.; Nalewajek, David; and Pyszczyk, Michael F., 4,791,038, Cl. 429-218.000.  
Namikoshi, Michio: See—  
Okuda, Shigenobu; Iwasaki, Shigeo; Namikoshi, Michio; Arakawa, Masao; and Shimizu, Fusaaki, 4,791,128, Cl. 514-374.000.  
Nanno, Ikuo; Nakajima, Atsunobu; Hoshi, Seiji; and Yamamoto, Hiroyoshi, to Seiko Instruments & Electronics Ltd. Apparatus for actuating objective lens. 4,790,628, Cl. 350-247.000.  
Nanri, Takeshi: See—  
Ando, Masao; Nanri, Takeshi; and Sho, Mikio, 4,791,262, Cl. 219-10.510.  
Narasimhan, Sundaram L.; Lake, Ronald J.; and Larson, Jay M., to Eaton Corporation. Process for welding a cast iron wear member to a cam follower. 4,790,473, Cl. 228-206.000.  
Narayan, Thirumurti: See—  
Riley, Robert E.; and Narayan, Thirumurti, 4,791,148, Cl. 521-159.000.  
Naruo, Noboru; Tokumitsu, Syuzo; Fukunaga, Masao; and Zaizen, Katsunori, to Matsushita Electric Industrial Co., Ltd. Air cleaning machine. 4,790,862, Cl. 55-210.000.  
Nason, Elton N.; and Grant, Laurence R. Berry harvester. 4,790,127, Cl. 56-330.000.



Nason, Frederic L. Laboratory slide. 4,790,640, Cl. 350-534.000.  
 Nassau, Kurt: See—  
 Lines, Malcolm E.; Lyons, Kenneth B.; Miller, Anne E.; and Nassau, Kurt, 4,790,619, Cl. 330-96.160.  
 National Research Development Corporation: See—  
 Klinner, Wilfred E., 4,790,128, Cl. 56-364.000.  
 National Semiconductor Corporation: See—  
 Monticelli, Dennis M.; and Wright, John W., 4,791,383, Cl. 330-265.000.  
 Natuech, Paul J.; Senerchia, David C.; and Henry, John F., Jr., deceased (by Henry, Beverly A., administratrix), to Digital Equipment Corporation. Apparatus and method for addressing semiconductor arrays in a main memory unit on consecutive system clock cycles. 4,791,552, Cl. 364-200.000.  
 Nawaki, Masaru: See—  
 Tagami, Tomoyuki; and Nawaki, Masaru, 4,791,319, Cl. 307-441.000.  
 NCR Corporation: See—  
 Willa, David C.; and Atkinson, Jay D., 4,790,504, Cl. 248-183.000.  
 NEC Automation, Ltd.: See—  
 Watal, Minoru; Nishimuro, Yasukazu; and Iwabuchi, Koichi, 4,790,861, Cl. 55-137.000.  
 NEC Corporation: See—  
 Abe, Yuji, 4,790,618, Cl. 350-96.150.  
 Ito, Soichi, 4,791,609, Cl. 365-63.000.  
 Kage, Kouzou, 4,791,669, Cl. 380-46.000.  
 Kuroda, Hideo; Mukawa, Naoki; Hiraoka, Makoto; Matsuda, Kiichi; Nishiwaki, Mitsuo; and Tsugane, Shuzo, 4,791,485, Cl. 358-136.000.  
 Nozue, Hiroshi, 4,791,302, Cl. 250-491.100.  
 Saito, Susumu; Yonezawa, Masamoto; and Utsumi, Kazuaki, 4,791,078, Cl. 501-136.000.  
 Sugou, Shigeo, 4,791,647, Cl. 372-45.000.  
 Yokoyama, Yukio; Ebine, Yoshio; and Ito, Toshio, 4,791,423, Cl. 343-700.000.  
 Nelson, George N.: See—  
 Eldridge, Jerome M.; Keller, Gary S.; Lee, Francis C.; Nelson, George N.; and Olive, Graham, 4,791,440, Cl. 346-140.000.  
 Nelson, Gunner E., to Ethyl Corporation. Synthesis of sodium aluminum hydride. 4,790,985, Cl. 423-644.000.  
 Nelson, Thomas L., to Du Pont de Nemours, E. I., and Company. Process for making a false twisted differential tension yarn. 4,790,132, Cl. 57-284.000.  
 Nelson, Walter A., Jr.; and Kraatz, Gerald A., to Ferranti Sciacry, Inc. Gas tungsten arc welding machine with infinite rotating welding head and torch tilt. 4,791,270, Cl. 219-125.100.  
 Nerrinck, Bernard: See—  
 Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, 4,790,081, Cl. 36-50.000.  
 Neumann, Alfred; and Ploesser, Willi, to Rohm GmbH. Method for handling reaction mixtures containing hydrogen fluoride. 4,791,227, Cl. 562-521.000.  
 Neumann, Hans-Jürgen; and Weber, Wolfram, to Fresenius AG. Centrifuge arrangement. 4,790,807, Cl. 494-45.000.  
 Neumarker, Gottfried: See—  
 Johannek, Peter; Lampe, Lutz; Lampe, Wolfgang; Loreit, Uwe; Neumarker, Gottfried; and Pertsch, Peter, 4,791,365, Cl. 324-208.000.  
 Neuroth, David H., to Hubbell Incorporated. Power cable useful in seismic testing. 4,791,246, Cl. 174-102.000.  
 Nevin, Alan; and Shirley, Ian, to Imperial Chemical Industries PLC. Polymer coatings. 4,791,028, Cl. 428-421.000.  
 New Holland Inc.: See—  
 Merritt, John H., III, 4,790,125, Cl. 53-587.000.  
 New Pack Company, Ltd.: See—  
 Gotou, Toyokichi; and Fujishiro, Masami, 4,790,804, Cl. 493-226.000.  
 New Zealand Milk Products, Inc.: See—  
 Swartz, Marsha L., 4,790,998, Cl. 426-585.000.  
 Newlong Machine Works, Ltd.: See—  
 Gotou, Toyokichi; and Fujishiro, Masami, 4,790,804, Cl. 493-226.000.  
 Ni, Wei-Chen: See—  
 Ahnen, David J.; Akanbi, Charles O.; Bruce, Ian D.; Kramer, Jacqueline C.; Larson, Carolyn D.; Ni, Wei-Chen; and Owens, Annetta T., 4,791,662, Cl. 379-158.000.  
 Nichols, William O. Multi-stage venturi ejector and method of manufacture thereof. 4,790,054, Cl. 29-156.70R.  
 Nieder, Elmar: See—  
 Engelbrecht, Eckart; Nieder, Elmar; and Keller, Arnold, 4,790,853, Cl. 623-20.000.  
 Nielsen, Donald R., to PPG Industries, Inc. Herbicidally active substituted phenoxo or phenylthio benzoxazolone (or benzthiazolone) compounds. 4,790,868, Cl. 71-88.000.  
 Niggemann, Richard E., to Sundstrand Corporation. Heat exchanger apparatus for electrical components. 4,790,370, Cl. 165-104.330.  
 Nightingale, Charles: See—  
 Spriggs, Hugh; Nightingale, Charles; and Turkington, Roger D., 4,791,486, Cl. 358-138.000.  
 Niimiya, Ensi K. J., to GSS General Sea Safety Ltd. Additive for use in underwater arc-welding. 4,790,887, Cl. 148-23.000.  
 Niinomi, Koji: See—  
 Hata, Seichi; Akima, Hideo; Kitagawa, Kiyoshi; Hyodo, Masaya; and Niinomi, Koji, 4,790,420, Cl. 192-111.00A.

Nikai, Isao: See—  
 Sato, Yukinori; Watanabe, Takeshi; Nikai, Isao; and Watanabe, Kenji, 4,790,140, Cl. 60-757.000.  
 Nikaido, Hideyasu, to Sumitomo Metal Mining Co. Ltd. Lead frame for IC having a wire bonding part composed of multi-layer structure of iron containing alloy, refractory metal and aluminum. 4,791,031, Cl. 428-620.000.  
 Ninomiya, Takanori: See—  
 Maeda, Shunji; Kubota, Hitooshi; Fushimi, Satoru; Makihira, Hiroshi; Ninomiya, Takanori; and Nakagawa, Yasuo, 4,791,586, Cl. 364-491.000.  
 Nippon Colin Co., Ltd.: See—  
 Mather, Bruce C.; Fox, William C.; Peel, Harry H.; and Wenzel, Dennis J., 4,790,326, Cl. 128-689.000.  
 Nippon Kayaku Kabushiki Kaisha: See—  
 Kato, Shoichi; Shimano, Shizuo; Hayaoka, Tatsumi; and Masui, Akio, 4,791,127, Cl. 514-369.000.  
 Nippon LSI Card Co., Ltd.: See—  
 Ohki, Shinji, 4,791,285, Cl. 235-449.000.  
 Nippon Oil Co., Ltd.: See—  
 Makino, Masaharu; and Satoh, Hisatake, 4,791,170, Cl. 525-54.500.  
 Nippon Piston Ring Co., Ltd.: See—  
 Urano, Shigeru; and Hirakawa, Osamu, 4,790,875, Cl. 75-241.000.  
 Nippon Sheet Glass Co., Ltd.: See—  
 Seki, Masafumi; Hanada, Yoshiyuki; and Sugawara, Ryoichi, 4,790,615, Cl. 350-96.120.  
 Yotsuya, Hiroshi; Kondo, Hiroshi; Sakurai, Kaoru; Murakami, Harunori; and Murakami, Hajime, 4,791,425, Cl. 343-713.000.  
 Nippon Steel Corporation: See—  
 Higuchi, Seizun; Oga, Tomonari; Ikeda, Masao; and Nakano, Hirobumi, 4,790,913, Cl. 204-37.300.  
 Imagumbai, Masana; Chijiwa, Rikio; and Yamada, Naomii, 4,790,885, Cl. 148-2.000.  
 Nippon Telegraph & Telephone Corp.: See—  
 Yokoyama, Yukio; Ebine, Yoshio; and Ito, Toshio, 4,791,423, Cl. 343-700.000.  
 Nippon Telegraph & Telephone Public Corporation: See—  
 Kuroda, Hideo; Mukawa, Naoki; Hiraoka, Makoto; Matsuda, Kiichi; Nishiwaki, Mitsuo; and Tsugane, Shuzo, 4,791,485, Cl. 358-136.000.  
 Nippon Yakin Kogyo Co., Ltd.: See—  
 Kusakawa, Takaji; Ebato, Kazuo; Tohge, Takeya; Noda, Masato; and Kuroda, Yasuhide, 4,790,368, Cl. 164-480.000.  
 Nippondenso Co., Ltd.: See—  
 Kondo, Koji; Murakawa, Katuhiko; Ishida, Nobumasa; Ishikawa, Junji; Nomoto, Kaoru; and Ishikawa, Futoshi, 4,790,876, Cl. 106-1.230.  
 Nishi, Kohichi; Yamaguchi, Kunihisa; and Turukawa, Ikuya, to Ricoh Company, Ltd. Multi-focus camera. 4,791,441, Cl. 354-195.120.  
 Nishi, Masataka: See—  
 Ando, Toshinari; Nishi, Masataka; Takahashi, Yoshikazu; and Shinamoto, Susumu, 4,791,241, Cl. 174-125.100.  
 Nishida, Minoru; Inoue, Noriyuki; Asayama, Yoshiaki; and Suzuki, Hiroyoshi, to Mitsubishi Denki Kabushiki Kaisha. EGR control device for internal combustion engine. 4,790,286, Cl. 123-571.000.  
 Nishiguchi, Kazuo: See—  
 Ueda, Tomoaki; Kai, Takahige; Osaka, Tatsuhiko; and Nishiguchi, Kazuo, 4,791,582, Cl. 364-522.000.  
 Nishihata, Ken: See—  
 Sakagami, Kenji; Atsumi, Kunio; Nishihata, Ken; Yoshida, Takashi; and Fukatsu, Shunzo, 4,791,197, Cl. 540-227.000.  
 Nishikawa, Hiroshi: See—  
 Miwa, Takahiro; and Nishikawa, Hiroshi, 4,791,500, Cl. 360-60.000.  
 Nishikawa, Kazuo, to Mazda Motor Corporation. Injection molding apparatus for making fiber-reinforced articles. 4,790,992, Cl. 425-206.000.  
 Nishimura, Yukuo: See—  
 Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Nakagiri, Takashi; Nishimura, Yukuo; and Takimoto, Kiyoshi, 4,790,664, Cl. 356-432.000.  
 Nishimuro, Yasukazu: See—  
 Watal, Minoru; Nishimuro, Yasukazu; and Iwabuchi, Koichi, 4,790,861, Cl. 55-137.000.  
 Nishiwaki, Mitsuo: See—  
 Kuroda, Hideo; Mukawa, Naoki; Hiraoka, Makoto; Matsuda, Kiichi; Nishiwaki, Mitsuo; and Tsugane, Shuzo, 4,791,485, Cl. 358-136.000.  
 Nishizawa, Hiroshi; Sakata, Touichi; and Mukoyama, Yoshiyuki, to Hitachi Chemical Co. Polyetheramide-imide polymer composition. 4,791,157, Cl. 524-108.000.  
 Nishizawa, Jun-ichi; Tamamushi, Takashige; and Barsony, Istvan, to Nishizawa, Jun-ichi; Tamamushi, Takashige; and Research Development Corporation. Color image sensor. 4,791,396, Cl. 357-22.000.  
 Nissan Motor Company, Limited: See—  
 Ide, Takanobu; and Shimoda, Ikuo, 4,790,521, Cl. 267-219.000.  
 Kataoka, Sachiro, 4,790,405, Cl. 180-268.000.  
 Naito, Genpei, 4,790,404, Cl. 180-197.000.  
 Tanaka, Atsuo; Okubo, Takao; Ushijima, Takao; and Noguchi, Takeshi, 4,790,520, Cl. 267-140.100.  
 Nitta Co., Ltd.: See—  
 Nobiraki, Koji; Metoku, Yoshiharu; Urugami, Hisato; Tamaki, Toshitaka; Yoshimura, Keiji; and Otsuka, Kazuhiko, 4,790,863, Cl. 55-276.000.  
 Nivellean de La Bruniere, Patrick M. F.; and Galichon, Jean P. M., to Societe Tag Pulp Industries S.A. Process for the pulping of lignocel-

lulose materials with alkali or alkaline earth metal hydroxide or salt and a solvent. 4,790,905, Cl. 162-56.000.  
 Niwayama, Kazuhiko, to Mitsubishi Denki Kabushiki Kaisha. Optical coupling device for a photo-semiconductor element and an optical fiber. 4,790,620, Cl. 350-96.200.  
 NL Industries, Inc.: See—  
 Larronde, Michael L.; Kalsi, Manmohan S.; and Rao, M. Vikram, 4,790,393, Cl. 175-40.000.  
 NL Petroleum Products Limited: See—  
 Fuller, John, 4,790,396, Cl. 175-249.000.  
 Noah, Lewis R., to American Standard Inc. Hydropneumatic brake actuator arranged to maintain a constant brake shoe clearance. 4,790,415, Cl. 188-196.00P.  
 Nobile, John. Bicycle fairs and mounting means therefor. 4,790,555, Cl. 280-289.00S.  
 Nobiraki, Koji; Metoku, Yoshiharu; Urugami, Hisato; Tamaki, Toshitaka; Yoshimura, Keiji; and Otsuka, Kazuhiko, to Nitta Co., Ltd. Air cleaner. 4,790,863, Cl. 55-276.000.  
 Nobuhara, Akio: See—  
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 Noda, Masato: See—  
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 Nogoya University: See—  
 Takushima, Takashige, 4,790,656, Cl. 356-349.000.  
 Noguchi, Takanobu: See—  
 Murase, Ichiki; Ohnishi, Toshihiro; and Noguchi, Takanobu, 4,791,177, Cl. 525-328.500.  
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 Tanaka, Atsuo; Okubo, Takao; Ushijima, Takao; and Noguchi, Takeshi, 4,790,520, Cl. 267-140.100.  
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 Noguchi, Toshiaki: See—  
 Ogiu, Hisao; and Noguchi, Toshiaki, 4,791,479, Cl. 358-98.000.  
 Noiles, Douglas G., to Joint Medical Products Corporation. Sleeves for affixing artificial joints to bone. 4,790,852, Cl. 623-18.000.  
 Noji, Osamu, to Kabushiki Kaisha Toshiba. Steady operation method for hydraulic machine operating at variable speed. 4,790,135, Cl. 60-327.000.  
 Nomix Manufacturing Co. Limited: See—  
 Gill, David C., 4,790,483, Cl. 239-224.000.  
 Nomoto, Kaoru: See—  
 Kondo, Koji; Murakawa, Katuhiko; Ishida, Nobumasa; Ishikawa, Junji; Nomoto, Kaoru; and Ishikawa, Futoshi, 4,790,876, Cl. 106-1.230.  
 Nonaka, Hachiro: See—  
 Matsui, Nobuyuki; Yokota, Shinichi; Otsuka, Kazuo; Mizote, Shuhei; Yoshida, Tadashi; Nonaka, Hachiro; and Okumura, Tsutomu, 4,790,531, Cl. 272-365.00S.  
 Noone, Sean; Quinlan, Michael; and O'Connell, Denis, to Noone, Sean. Photoelectric control unit with cooling chamber. 4,791,290, Cl. 250-239.000.  
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 Nordson Corporation: See—  
 Dieringer, Bruce G.; and Rothrauff, Kenneth E., 4,790,455, Cl. 222-146.200.  
 Pleuse, Harold; and Muller, Peter E., 4,791,142, Cl. 521-50.000.  
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 Madsen, Elmer W., 4,791,519, Cl. 361-42.000.  
 Miron, Amihai; and Koo, David, 4,791,597, Cl. 364-724.030.  
 North, Howard L., Jr., to Becton Dickinson and Company. Housing for a flow cytometry apparatus with particle unclogging feature. 4,790,653, Cl. 356-73.000.  
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 Rennie, Alan G., 4,790,480, Cl. 239-125.000.  
 Northern Telecom Limited: See—  
 McEachern, James A.; and Moore, Thomas E., 4,791,652, Cl. 375-111.000.  
 Pringle, Bruce G., 4,791,668, Cl. 379-398.000.  
 Norton, Kenneth A.: See—  
 Bearss, James G.; and Norton, Kenneth A., 4,791,165, Cl. 524-516.000.  
 Novacor Chemicals Ltd.: See—  
 Kokta, Bohuslav V., 4,791,020, Cl. 428-326.000.  
 Nozue, Hiroshi, to NEC Corporation. Semiconductor wafer for providing a plurality of semiconductor chips through electron-beam lithography. 4,791,302, Cl. 250-491.100.  
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 Ito, Giichi; Mukai, Kousaku; Shimizu, Yuichi; and Suzuki, Saiju, 4,790,660, Cl. 356-376.000.  
 Nunley, James A.; Steadman, John W.; and Wechsler, Perry J., to Audiotone, Inc. Wearable digital hearing aid and method for improving hearing ability. 4,791,672, Cl. 381-68.200.  
 Nunotaki, Yoshihiro: See—  
 Takeda, Masaru; Nunotaki, Yoshihiro; Harada, Hiroshi; Kawada, Michihiko; and Ishigaki, Masahiro, 4,790,794, Cl. 464-93.000.  
 Nupro Company: See—  
 Gausman, Theodore J.; and Scheffel, Gary W., 4,790,348, Cl. 137-516.290.

Nuwick, Inc.: See—  
 O'Brien, Mary, 4,790,747, Cl. 431-325.000.  
 N.V. Bekeart S.A.: See—  
 Lievens, Hugo; and Coppens, Wilfried, 4,790,165, Cl. 72-38.000.  
 Obata, Akio: See—  
 Matsuura, Masaru; Obata, Akio; Fujii, Norikazu; Nobuhara, Akio; and Fukushima, Danji, 4,791,001, Cl. 426-634.000.  
 Obrecht, Werner: See—  
 Hohn, Johann; Mersmann, Franz-Josef; Obrecht, Werner; and Szentivanyi, Zsolt, 4,791,172, Cl. 525-234.000.  
 O'Brien, Mary, to Nuwick, Inc. Consumable candle wick and method of making a consumable candle wick. 4,790,747, Cl. 431-325.000.  
 Occidental Chemical Corporation: See—  
 Saran, Mohan S., 4,790,983, Cl. 423-315.000.  
 Ochi, Muneyoshi: See—  
 Yamamoto, Yoshinori; and Ochi, Muneyoshi, 4,791,503, Cl. 360-132.000.  
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 Noone, Sean; Quinlan, Michael; and O'Connell, Denis, 4,791,290, Cl. 250-239.000.  
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 Oda, Yukihisa; Yasuda, Keiji; and Hamajima, Shigemitsu, to Aisin Seiki Kabushiki Kaisha. Connection construction of turning angle detector. 4,790,795, Cl. 464-102.000.  
 Odoro-Yeboah, Joshua: See—  
 Hunter, Pamela A.; Berry, Valerie; Odoro-Yeboah, Joshua; and Orr, Norman A., 4,790,989, Cl. 424-404.000.  
 Oe, Haruki: See—  
 Touma, Kiyoshi; Oe, Haruki; and Suzuki, Akira, 4,791,442, Cl. 354-234.100.  
 Office National d'Etudes et de Recherche Aeronautiques: See—  
 Bousquet, Jean-Marc; Faubert, Alain; and Vingut, Georges, 4,790,724, Cl. 416-223.00R.  
 Bousquet, Jean-Marc; and Faubert, Alain, 4,790,725, Cl. 416-245.00R.  
 Oga, Tomonari: See—  
 Higuchi, Seizun; Oga, Tomonari; Ikeda, Masao; and Nakano, Hirobumi, 4,790,913, Cl. 204-37.300.  
 Ogasawara, Takeo: See—  
 Hattori, Katsuhiko; Suzuki, Hideyuki; Yamaguchi, Hiroyuki; and Ogasawara, Takeo, 4,790,214, Cl. 74-866.000.  
 Ogata, Masamitsu: See—  
 Sato, Goro; Ogata, Masamitsu; Ida, Takanori; and Masuda, Tatsuo, 4,791,084, Cl. 502-65.000.  
 Ogawa, Akira; and Fukuzawa, Hiroshi, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 4,791,050, Cl. 430-506.000.  
 Ogawa, Tadashi, to Fuji Photo Film Co., Ltd. Silver halide photographic material. 4,791,053, Cl. 430-581.000.  
 Ogawa, Toshiaki: See—  
 Yamanaka, Motosuke; Miyake, Kazutoshi; Suda, Shinji; Ohhara, Hideto; and Ogawa, Toshiaki, 4,791,202, Cl. 546-121.000.  
 Yamanaka, Motosuke; Miyake, Kazutoshi; Suda, Shinji; Ohhara, Hideto; and Ogawa, Toshiaki, 4,791,203, Cl. 546-121.000.  
 Ogiu, Hisao; and Noguchi, Toshiaki, to Olympus Optical Co., Ltd. Color-image sensing apparatus. 4,791,479, Cl. 358-98.000.  
 Ogura, Ken, to Oki Electric Industry Co., Ltd. Process for forming mask patterns of positive type resist material with trimethylsilylnitrile. 4,791,046, Cl. 430-296.000.  
 Ogura, Kyoichi: See—  
 Nakao, Masahiro; Asami, Sumio; Tanaka, Takaharu; Ogura, Kyoichi; Amachi, Teruo; Yoshizumi, Hajime; and Ishigooka, Hiroshi, 4,791,059, Cl. 435-198.000.  
 Ogura, Makoto; Kawai, Tatsundo; Yamada, Katsuhiko; and Seito, Shinichi, to Canon Kabushiki Kaisha. Image reading apparatus with illumination timing control. 4,791,493, Cl. 358-294.000.  
 Ogura, Masami: See—  
 Ukai, Norio; Serizawa, Mitsuya; Oyama, Yasuharu; Furukawa, Yoshimi; Ogura, Masami; and Sato, Tsuyoshi, 4,790,551, Cl. 280-91.000.  
 Ogura, Tsuneo: See—  
 Shinohe, Takashi; Takigami, Katsuhiko; Ohashi, Hiromichi; Ogura, Tsuneo; and Asaka, Masayuki, 4,791,470, Cl. 357-38.000.  
 Oguri, Kiyohiko; and Isaka, Yoshiharu. Vertical engine for walk behind lawn mower. 4,790,273, Cl. 123-196.00W.  
 Oh, Yong K.: See—  
 Fare, Louis R.; Oh, Yong K.; Taylor, Dean P.; and Widger, Jennifer B., 4,791,064, Cl. 435-252.300.  
 O'Hara, Gary J.; and Phillips, David B., to Intelligent Medical Systems, Inc. Method and apparatus for measuring internal body temperature utilizing infrared emissions. 4,790,324, Cl. 128-664.000.  
 Ohashi, Hiromichi: See—  
 Shinohe, Takashi; Takigami, Katsuhiko; Ohashi, Hiromichi; Ogura, Tsuneo; and Asaka, Masayuki, 4,791,470, Cl. 357-38.000.  
 Ohashi, Takehisa; Kan, Kazunori; Ueyama, Noboru; Sada, Isao; Miyama, Akimasa; and Watanabe, Kiyoshi, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Beta-lactam compound and preparation. 4,791,198, Cl. 540-354.000.  
 Ohba, Akio, to Sony Corporation. Method and apparatus of forming curved surfaces. 4,791,581, Cl. 364-521.000.  
 Ohhara, Hideto: See—  
 Yamanaka, Motosuke; Miyake, Kazutoshi; Suda, Shinji; Ohhara, Hideto; and Ogawa, Toshiaki, 4,791,202, Cl. 546-121.000.



- Yamanaka, Motosuki; Miyake, Kazutoshi; Suda, Shinji; Ohhara, Hideto; and Ogawa, Toshiaki, 4,791,203, Cl. 546-121.000.
- Ohkawa, Kazuhiro; and Yamazaki, Tarou, to Toshiba Silicone Co., Ltd. Process for producing pressure-sensitive electroconductive sheet. 4,790,968, Cl. 264-104.000.
- Ohki, Shinji, to Katsuo Gas Kogyo Co., Ltd.; and Nippon LSI Card Co., Ltd. Read/write method by a non-contact system and between a storage substrate and read/write unit. 4,791,285, Cl. 235-449.000.
- Ohmi, Tadashi; and Tanaka, Nobuyoshi, to Canon Kabushiki Kaisha. Photoelectric converter. 4,791,469, Cl. 357-30.000.
- Ohnishi, Toshihiro: See—
- Murase, Ichiki; Ohnishi, Toshihiro; and Noguchi, Takanobu, 4,791,177, Cl. 525-328.500.
- Ohno, Toshiyuki: See—
- Fujikura, Makoto; Ohno, Toshiyuki; Onuma, Shigeharu; Tamahashi, Kunihiro; Chigasaki, Mitsuo; and Shimamura, Yasuo, 4,791,040, Cl. 430-64.000.
- Ohsawa, Yutaka: See—
- Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tohru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tadashi, 4,791,113, Cl. 514-256.000.
- Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tohru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tadashi, 4,791,130, Cl. 514-410.000.
- Ohta, Shin-ichiro; Miyazawa, Hidehisa; Tanabe, Etsuo; and Tachigami, Shigeru, to Furukawa Electric Co., Ltd., The Closure for cable connector. 4,790,648, Cl. 350-96.200.
- Ohta, Takamichi; Izumi, Takashi; Yamazaki, and Fukushima, Shigeyoshi, to Toyo Tire & Rubber Company Limited. Polyurethane foam interior finishing material having facing and process for preparing the same. 4,791,019, Cl. 428-304.400.
- Ohtake, Yasutomo: See—
- Sumino, Tatsuo; Ohtake, Yasutomo; Nakamura, Hiroki; Kon, Masahiro; Mori, Naomichi; and Nakajima, Kazuo, 4,791,061, Cl. 435-178.000.
- Ohtsuka, Tetsuya: See—
- Yokoyama, Keishi; Matsushita, Mitsuru; Ohtsuka, Tetsuya; and Okazaki, Yuji, 4,791,267, Cl. 219-121.690.
- Ohwaki, Shinji: See—
- Yoshimoto, Masato; and Ohwaki, Shinji, 4,791,026, Cl. 428-397.000.
- Oiles Industry Company, Limited: See—
- Ide, Takanobu; and Shimoda, Ikuo, 4,790,521, Cl. 267-219.000.
- Oishi, Hisao: See—
- Miyakawa, Tadashi; Yanagihara, Kazuhiko; Oishi, Hisao; Takahashi, Tsunehiko; Nakamura, Takeshi; Akimoto, Kazuhiko; and Shioji, Mitsuki, 4,790,632, Cl. 350-347.000.
- Oji Paper Company, Ltd.: See—
- Eimada, Shigeru; Aida, Kunihiro; Seto, Shinji; and Suzuki, Takao, 4,790,486, Cl. 241-20.000.
- Okabe, Yoshio; Kobayashi, Yukimori; and Shirai, Eiji, to Aisin Seiki Kabushiki Kaisha. Free piston type auto-tensioner. 4,790,796, Cl. 474-110.000.
- Okada, Hiroshi: See—
- Nakano, Kenji; Okada, Hiroshi; and Takahashi, Takao, 4,791,497, Cl. 360-32.000.
- Takahashi, Takao; and Okada, Hiroshi, 4,791,512, Cl. 360-10.200.
- Okada, Yosuke; and Kurimoto, Munehito, to Sherwood Medical Company. Method for placement of catheter in a blood vessel. 4,790,331, Cl. 128-772.000.
- Okamoto, James, to Motion Designs, Inc. Lightweight wheelchair having swing-away footrest assembly. 4,790,553, Cl. 280-242.0WC.
- Okamoto, Takashi, to Mitsubishi Denki Kabushiki Kaisha. Numerical control device. 4,791,342, Cl. 318-569.000.
- Okazaki, Yuji: See—
- Yokoyama, Keishi; Matsushita, Mitsuru; Ohtsuka, Tetsuya; and Okazaki, Yuji, 4,791,267, Cl. 219-121.690.
- O'Keeffe, Michael J.: See—
- Clay, Donald W.; O'Keeffe, Michael J.; Perera, S. Robert; Rather, Howard H.; and Rundell, John P., 4,791,622, Cl. 369-59.000.
- Oki Electric Industry Co., Ltd.: See—
- Ogura, Ken, 4,791,046, Cl. 430-296.000.
- Tomikawa, Arifumi; and Yasukawa, Nihiko, 4,790,417, Cl. 190-102.000.
- Okikawa, Susumu; and Miyairi, Akira, to Hitachi, Ltd. Lead frame and semiconductor device using the same. 4,791,472, Cl. 357-70.000.
- Okita, Masao, to Alps Electric Co., Ltd. Button shaped head for floppy disc. 4,791,513, Cl. 360-104.000.
- Okonogi, Shigeo; Tomita, Mamoru; Tomimura, Toshio; Tamura, Yoshitaka; and Mizota, Teruhiko, to Morinaga Milk Industry Co., Ltd. Process for producing bovine lactoferrin in high purity. 4,791,193, Cl. 530-416.000.
- Okubo, Takao: See—
- Tanaka, Atsuo; Okubo, Takao; Ushijima, Takao; and Noguchi, Takeshi, 4,790,520, Cl. 267-140.100.
- Okuda, Shigenobu; Iwasaki, Shigeo; Namikoshi, Michio; Arakawa, Masao; and Shimizu, Fusaaki, to Sankyo Company Limited. Rhizoxin esters and salts, their pharmaceutical use as anti-tumor agents. 4,791,128, Cl. 514-374.000.
- Okumura, Shigeo: See—
- Tobinaga, Motoki; Okumura, Shigeo; Handa, Kenichi; and Atsumi, Shinya, 4,790,279, Cl. 123-417.000.
- Okumura, Tsutomu: See—
- Matsui, Nobuyuki; Yokota, Shinichi; Otsuka, Kazuo; Mizote, Shuhei; Yoshida, Tadashi; Nonaka, Hachiro; and Okumura, Tsutomu, 4,790,531, Cl. 272-565.0SS.
- Oldenettel, Jayne L., to Boeing Company, The. Printed wire circuit board and its method of manufacture. 4,791,248, Cl. 174-68.500.
- Olin Corporation: See—
- Winter, Joseph; and Pryor, Michael J., 4,790,623, Cl. 350-96.230.
- Olin Fabricated Metal Products, Inc.: See—
- Bushfield, Harold D., 4,790,780, Cl. 439-887.000.
- Olive, Graham: See—
- Eldridge, Jerome M.; Keller, Gary S.; Lee, Francis C.; Nelson, George N.; and Olive, Graham, 4,791,440, Cl. 346-140.00R.
- Olry, Pierre, to Societe Europeenne De Propulsion. Process for manufacturing homogeneously needled three-dimensional structures of fibrous material. 4,790,052, Cl. 28-110.000.
- Olsen, James H. Wire cutter including clipped wire retaining means. 4,790,070, Cl. 30-134.000.
- Olympus Optical Co., Ltd.: See—
- Ogiu, Hisao; and Noguchi, Toshiaki, 4,791,479, Cl. 358-98.000.
- Tashiro, Yoshio, 4,790,295, Cl. 128-6.000.
- OM Industrial Co., Ltd.: See—
- Kyokuichi, Sato; and Tooru, Kayatani, 4,790,449, Cl. 220-288.000.
- Omron Tateisi Electronics Co.: See—
- Matsumoto, Kazuhiro; Asai, Kei; and Yamamoto, Hirohito, 4,790,479, Cl. 239-102.200.
- Yoshikawa, Norio; and Hotta, Tadaaki, 4,791,548, Cl. 364-149.000.
- Onda, Nobuhiko; Asakawa, Kazuo; Akita, Tadashi; Komoriya, Hitoshi; and Kamada, Toru, to Fujitsu Limited. Movable apparatus driving system. 4,791,588, Cl. 364-513.000.
- Onda, Takanori, to Honda Giken Kogyo Kabushiki Kaisha. Auto-decompression system for engines. 4,790,271, Cl. 123-182.000.
- Onderwaater, Henk G.: See—
- Focke, Heinz; and Onderwaater, Henk G., 4,790,333, Cl. 131-283.000.
- O'Neil, Robert M.; Kristen, Ulrich; and Haring, Ulrich, to Ciba-Geigy Corporation. Triazole-organodithiophosphate reaction product additives for functional fluids. 4,791,206, Cl. 548-108.000.
- Onishi, Yasushi: See—
- Tanaka, Kunio; and Onishi, Yasushi, 4,791,576, Cl. 364-474.290.
- Ono, Hideki: See—
- Yamatsa, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Katayama, Kouichi; Tsunoda, Hajime; Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, 4,791,105, Cl. 514-134.000.
- Ono, Hitoshi: See—
- Suzuki, Tetsumi; Murayama, Tetsuo; Ono, Hitoshi; Aramaki, Shinji; and Yokoyama, Michio, 4,791,194, Cl. 534-752.000.
- Ono Pharmaceutical Co., Ltd.: See—
- Tanouchi, Tadao; Kawamura, Masanori; Ajima, Akio; Mohri, Tetsuya; Hayashi, Masaki; Terashima, Hiroshi; Hirata, Fumio; and Morimura, Takeshi, 4,791,126, Cl. 514-369.000.
- Ono, Seiichi: See—
- Kawano, Yukihiko; Juji, Tomishiro; Ono, Toshihiko; Iga, Hirofumi; Ono, Seiichi; and Isobe, Yoshiyuki, 4,790,567, Cl. 285-24.000.
- Ono, Toshihiko: See—
- Kawano, Yukihiko; Juji, Tomishiro; Ono, Toshihiko; Iga, Hirofumi; Ono, Seiichi; and Isobe, Yoshiyuki, 4,790,567, Cl. 285-24.000.
- Onoda Cement Company, Ltd.: See—
- Yamamoto, Masahiro, 4,790,485, Cl. 239-707.000.
- Onodera, Kaoru: See—
- Sasaki, Masao; Onodera, Kaoru; and Inahata, Hideki, 4,790,959, Cl. 252-589.000.
- Onodera, Tsukasa; Kawata, Haruo; and Futatsugi, Toshiro, to Fujitsu Limited. Semiconductor integrated circuit device. 4,791,471, Cl. 357-60.000.
- Onoe, Susumu; and Yamaguchi, Mutsuyuki, to Bando Chemical Industries, Ltd. Power transmission belt. 4,790,802, Cl. 474-260.000.
- Onozuka, Kazutaka: See—
- Usuda, Masashi; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, 4,790,237, Cl. 98-42.160.
- Onuma, Akiyoshi: See—
- Yonezawa, Takashi; Yoshizumi, Toshiaki; Hosomi, Mamoru; Onuma, Akiyoshi; and Yamasaki, Ichiro, 4,791,256, Cl. 200-148.00R.
- Onuma, Etsuro: See—
- Sato, Haruhiko; Koga, Hiroshi; Dan, Takashi; and Onuma, Etsuro, 4,791,209, Cl. 548-242.000.
- Onuma, Shigeharu: See—
- Fujikura, Makoto; Ohno, Toshiyuki; Onuma, Shigeharu; Tamahashi, Kunihiro; Chigasaki, Mitsuo; and Shimamura, Yasuo, 4,791,040, Cl. 430-64.000.
- Oogi, Takashi: See—
- Igarashi, Tadao; and Oogi, Takashi, 4,791,504, Cl. 360-132.000.
- Ootsuka, Hiroshi: See—
- Ishida, Tokuji; Ootsuka, Hiroshi; and Mukai, Hiromu, 4,791,446, Cl. 354-408.000.
- Opfer, James E.: See—
- Bloomquist, Darrel R.; Drennan, George A.; and Opfer, James E., 4,790,921, Cl. 204-192.120.
- Opocin A.P.A.: See—
- Bianchini, Pietro; and Mascellani, Giuseppe, 4,791,195, Cl. 536-21.000.
- Opsis AB: See—
- Unes, Leif; and Wallin, Svante, 4,790,652, Cl. 356-45.000.
- Optotech, Inc.: See—
- Deiotte, Charles E., 4,791,623, Cl. 369-59.000.

- Orbital Engine Company Proprietary Limited: See—
- McKay, Michael L.; and Ahern, Steven R., 4,790,270, Cl. 123-73.00C.
- Orient Chemical Industries, Ltd.: See—
- Yamanaka, Shunichiro, 4,791,153, Cl. 523-453.000.
- O'Rourke, Thomas: See—
- Sprecker, Mark A.; Wilson, Stephen R.; Steinbach, Leonard; and O'Rourke, Thomas, 4,791,222, Cl. 560-237.000.
- Orr, Norman A.: See—
- Hunter, Pamela A.; Berry, Valerie; Odoro-Yeboah, Joshua; and Orr, Norman A., 4,790,989, Cl. 424-404.000.
- ORS Development Corporation: See—
- Bridges, Jack E.; Sresty, Guggilam C.; Young, Vincent R.; and Spencer, Homer L., 4,790,375, Cl. 166-60.000.
- Ortho Diagnostic Systems Inc.: See—
- Hovorka, George; and Hansen, W. Peter, 4,791,069, Cl. 436-533.000.
- Ortho Pharmaceutical Corporation: See—
- Pascone, John M., 4,791,218, Cl. 560-158.000.
- Press, Jeffery B., 4,791,117, Cl. 514-300.000.
- Press, Jeffery B.; Sanfilippo, Pauline; and Urbanski, Maud, 4,791,200, Cl. 544-369.000.
- Osaka, Tatsuhiko: See—
- Ueda, Tomoaki; Kai, Takashige; Osaka, Tatsuhiko; and Nishiguchi, Kazuo, 4,791,582, Cl. 364-522.000.
- Osawa, Tadao: See—
- Usui, Toshifumi; Yamada, Kinsaku; Osawa, Tadao; and Kawano, Hiroto, 4,790,178, Cl. 73-118.200.
- O'Shaughnessy, Timothy G.: See—
- Ouyang, Kenneth W.; and O'Shaughnessy, Timothy G., 4,791,521, Cl. 361-91.000.
- Oshima, Noboru: See—
- Fujimaki, Tatsuo; and Oshima, Noboru, 4,791,178, Cl. 525-332.600.
- Ostasiuk, Mark: See—
- Levinson, Frank H.; Soni, Pravin; Tanous, Adam C.; McCrae, Richard J.; and Ostasiuk, Mark, 4,790,622, Cl. 350-96.200.
- Ostrum, James V.; Springer, Gary C.; Weller, Kenneth G.; Richard, John E.; and Montrose, Robert E., to Liberty Diversified Industries. Container and lid with tamper evident closure. 4,790,448, Cl. 220-270.000.
- Otfried, Rudolph; and Gunter, Peter, to Kombinat Polygraph "Werner Lamberz" Leipzig. Suction system for sheet guiding cylinders in printing machines. 4,790,244, Cl. 101-231.000.
- Otis Engineering Corporation: See—
- Montgomery, Carlos E.; Zitterich, Craig L.; and Holloman, Ricky M., 4,790,378, Cl. 166-66.000.
- Ottinghaus, Friedrich W.: See—
- Schulte, Siegfried; Boing, Manfred; and Ottinghaus, Friedrich W., 4,790,772, Cl. 439-439.000.
- Otsubo, Kazumi: See—
- Iimori, Isao; and Otsubo, Kazumi, 4,790,777, Cl. 439-744.000.
- Otsuka, Kazihiko: See—
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- Patt, William C.: See—
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- Pehr, Harold T. Vial dispenser. 4,790,452, Cl. 221-303.000.
- Pelle, Ralph D. Exercise and training device. 4,790,529, Cl. 272-93.000.
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- Pelster, Bernd: See—
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- Penetrators, Inc.: See—
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- Pennebaker, William B.: See—
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- Peters, Alan D.: See—  
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- Petroff, Alan M., to Condor Systems, Inc. Measurement and control system. 4,791,547, Cl. 364-138.000.
- Pettit, Dean K.: See—  
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- Pfaffmann, George D., to Tocco, Inc. Method and apparatus for retaining a valve seat insert. 4,791,259, Cl. 219-10.430.
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- Pfizer Inc.: See—  
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- Kadin, Saul B., 4,791,129, Cl. 514-411.000.
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- Phillips Petroleum Company: See—  
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- Phy, William S., to Fairchild Semiconductor Corporation. Plastic package for high frequency semiconductor devices. 4,791,473, Cl. 357-70.000.
- Piaskowski, Andrew D., to RFL Industries, Inc. Ferroresonant power supply and method. 4,791,542, Cl. 363-17.000.
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- Picciola, Giampaolo; Riva, Mario; De Meglio, PierGiuseppe; and Gentili, Piergiorgio, to Maggioni-Winthrop S.p.A. Dihydrobenzothio-phenone and thiochromane aminoalcohols. 4,791,104, Cl. 514-58.000.
- Pick, James M.; and Creed, Brian T., to Eaton Corporation. Protecting an icemaker against overcurrent damage. 4,791,523, Cl. 361-104.000.
- Pickering, Anthony; and Thorne, Andrew J., to Imperial Chemical Industries PLC. Rate-moderated group transfer polymerization. 4,791,181, Cl. 526-190.000.
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- Pico-Glass S.p.A.: See—  
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- Piepenbreier, Ernst; and Trost, Josef, to Thyssen Industrie AG. Dual gimbal coupling. 4,790,248, Cl. 105-131.000.
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- PinFin, Inc.: See—  
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- Pinol, Augusto C.: See—  
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- Yoshino, Toshikazu, 4,791,044, Cl. 430-270.000.
- Pioneer Video Corporation: See—  
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- Piper, Robert J.; and Homann, Helmut F. Antenna and method for fabricating same. 4,791,432, Cl. 343-916.000.
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- Piramo, Alireza M., to Beckman Instruments, Inc. Composite material centrifuge rotor. 4,790,808, Cl. 494-81.000.
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- Plummer, Walter A., III: See—  
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- Polatnick, Michael. General purpose video special effects system and method therefor. 4,791,489, Cl. 358-160.000.
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- Poly-Pak Industries, Inc.: See—  
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- Primages, Inc.: See—  
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- Proffitt, David F.: See—  
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- Pruett, Wayne P.: See—  
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- Pryor, Michael J.: See—  
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- Quadrex HPS Inc.: See—  
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- Caldwell, Bradley L., 4,790,756, Cl. 434-145.000.
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- Quinn, Ronald E., to United States of America, Air Force. Aircraft engine outer duct mounting device. 4,790,137, Cl. 60-226.100.
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- Radian Corporation: See—  
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- Radlowski, Cecelia A.: See—  
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- Ramot University Authority for Applied Research & Industrial Development Ltd. Tel Aviv University: See—  
Tsinober, Arkady; Teitel, Meir; and Kit, Eliezer, 4,790,187, Cl. 73-432.100.
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Coffman, Paul M., 4,790,972, Cl. 264-152.000.
- Ramsey, Dean L. Conveyor belt guide rollers. 4,790,428, Cl. 198-840.000.
- Rand, Michael. Visual display system with triangular cells. 4,790,629, Cl. 350-321.000.
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- Rankin, E. Edward, to Halliburton Company. Side entry sub well logging apparatus and method. 4,790,377, Cl. 166-65.100.
- Rao, M. Vikram: See—  
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- Raszewski, Lewis R., to Crowell Corporation, The. Packaging combination. 4,790,433, Cl. 206-329.000.
- Rathbone, Thomas, to BOC Group plc, The. Air separation. 4,790,866, Cl. 62-22.000.
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- Ray, Ranjit: See—  
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- Raycon Texttron Inc.: See—  
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- RCA Licensing Corporation: See—  
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- Reaser, Howard W.: See—  
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- Recreation Products of Texas, Inc.: See—  
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- Rector, Lloyd V. Bubble making system having rigid bow members. 4,790,787, Cl. 446-15.000.
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- Reel, James W., to International Computer Marketing Corporation. Carrying case for storing a computer and a printer operatively connected thereto. 4,790,431, Cl. 206-305.000.
- Rees, Michael. Tackle box assembly. 4,790,432, Cl. 206-315.110.
- Reeve, Martin R.: See—  
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- Regenic Corporation: See—  
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- Rehwinkel, Heiko: See—  
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- Reich, Beth A. Baby comforter. 4,790,042, Cl. 5-437.000.
- Reichner, Philip, to Westinghouse Electric Corp. Cell and current collector feed arrangement for solid oxide electrochemical cell combinations. 4,791,035, Cl. 429-31.000.
- Reid, Neil G.: See—  
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- Reid, Philip L. Security system for electrical appliances and other items with electrical circuitry. 4,791,409, Cl. 340-539.000.
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- Reinecke, Erich, to WABCO Westinghouse Fahrzeugbremsen GmbH. Apparatus for the measurement and/or regulation of a braking force and/or of a braking torque. 4,790,606, Cl. 303-103.000.
- Reinecke, Paul: See—  
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- Renfrow, John L. Collapsible oil spillage recovery system. 4,790,936, Cl. 210-242.300.
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- Rennie, Alan G., to Northern Engineering Industries plc. Liquid fuel atomiser. 4,790,480, Cl. 239-125.000.
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- Sieglwart, John T., Jr., 4,790,554, Cl. 280-236.000.
- Research Corporation Limited: See—  
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- Resonex, Inc.: See—  
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- MacKinnon, Barry A., 4,791,370, Cl. 324-318.000.
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- Reusens, Peter P.: See—  
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- RFL Industries, Inc.: See—  
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- Rheon Automatic Machinery Company, Ltd.: See—  
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- Rhone-Poulenc Chimie: See—  
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- Rhone-Poulenc Specialites Chimiques: See—  
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- Richard, John E.: See—  
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- Richardson, John: See—  
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- Ricoh Company, Ltd.: See—  
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- Riebel, Hans-Jochem: See—  
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- Rieser, Donald E.: See—  
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- Ringer, Richard M.: See—  
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- Risk, William P., III: See—  
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- Rislove, David J., to Grobel Research Corporation. Ethanol sensitive solid. 4,791,065, Cl. 436-132.000.
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- Roach, James L. Retrofit turbocharger booster. 4,790,139, Cl. 60-602.000.
- Robb, Paul N.: See—  
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- Robert Bosch GmbH: See—  
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- Mester, Roland, 4,791,499, Cl. 360-10.300.
- Rademacher, Karl-Heinz, 4,791,509, Cl. 360-94.000.
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- Robert, Dominique D.; and Jung, Louis L., to Universite Louis Pasteur. Sulphur derivatives of para-methoxycinnamic acid, processes for their production, dermo-pharmaceutical and cosmetic compositions containing them and applications. 4,791,217, Cl. 560-55.000.
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- Roberts, Rustin: See—  
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- Rock Engineering Pty. Limited: See—  
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- Rockford Manufacturing Company: See—  
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- Harmon, Albert D.; and Koella, Ernest, III, 4,790,604, Cl. 300-21.000.
- Rocklitz, Gary J.: See—  
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- Rockne, David T.; and Johnson, Lowell E., to Telident, Inc. Telephone status recognition and bypass system. 4,791,663, Cl. 379-113.000.
- Rockwell International Corporation: See—  
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- Rodgers, Colin, to Sundstrand Corporation. Leading edges for diffuser blades. 4,790,720, Cl. 415-211.000.
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- Roen, Ralph M.; Gebhardt, Terry D.; and Dokmo, Richard C., to T. C. Manufacturing Company, Inc. Method of making bottom gusset bag pad arrangement for liquid containers. 4,790,803, Cl. 493-195.000.
- Roeig, Arnold B.; and Lange, David V., to Beloit Corporation. Extended nip press belt guide and method. 4,790,908, Cl. 162-199.000.
- Rogers, Alfred M., to Thomson Industries, Inc. Split roller bearing assembly. 4,790,671, Cl. 384-44.000.
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- Neumann, Alfred; and Ploesser, Willi, 4,791,227, Cl. 562-521.000.
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- Rojef Distributors, Inc.: See—  
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- Romer-Britax Autogurte GmbH: See—  
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- Romo, Mark G.: See—  
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- Rose, Steven A.; and Birken, Irving. Electrical box support bracket. 4,790,505, Cl. 248-205.100.
- Rosemount Inc.: See—  
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- Knecht, Thomas A.; and Romo, Mark G., 4,790,192, Cl. 73-721.000.
- Sittler, Fred C.; and Toy, Adrian C., 4,791,398, Cl. 338-25.000.
- Rosen, Jeffrey M. Holder for a guitar slide and pick. 4,790,232, Cl. 84-329.000.
- Rosenberg, Helmut W. G.: See—  
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- Rosenberg, Lior. Self-locking pin device particularly useful for internally fixing bone fractures. 4,790,304, Cl. 128-92.00Y.
- Ross, Alan, to Domain Systems, Inc. Remote test telephone line access system. 4,791,659, Cl. 379-22.000.
- Ross, Ira J.: See—  
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- Rossi, Pier P.: See—  
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- Rossmann, Michael, to Rossmann Research. Thrust coupling for a vehicle. 4,790,085, Cl. 37-231.000.
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- Rothrauff, Kenneth E.: See—  
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- Roux, Cynthia G.: See—  
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- Ruppel, Remy: See—  
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- Ruppert, Wolfgang: See—  
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- Ruse, James P.: See—  
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- Russo, Vincent: See—  
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- Rustin, Francis R.: See—  
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- S&C Electric Company: See—  
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- S. C. Johnson & Son, Inc.: See—  
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- S. Himmelstein & Company: See—  
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- Sacco, Tommaso, to Firestone Tire & Rubber Company, The. Automatic transverse splicing device for assembling tires. 4,790,899, Cl. 156-421.000.
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- Saegusa, Shigeru, to Usui Kokusai Sangyo Kabushiki Kaisha. Clamp for disposing and securing small-diameter pipe. 4,790,502, Cl. 248-74.100.
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- Saga Petroleum a.s.: See—  
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- St. Jacques, Joseph A.: See—  
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- Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Nakagiri, Takashi; Nishimura, Yukuo; and Takimoto, Kiyoshi, to Canon Kabushiki Kaisha. Device and method for measuring optical properties. 4,790,664, Cl. 356-432.000.
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- Sakai, Tadashi; Katsura, Masaki; Hiraki, Hideaki; Uno, Shigeki; Shimbo, Masaru; and Furukawa, Kazuyoshi, to Kabushiki Kaisha Toshiba. Field effect transistor type semiconductor sensor and method of manufacturing the same. 4,791,465, Cl. 357-25.000.
- Sakamoto, Kiichiro: See—  
Fujimoto, Hiroshi; and Sakamoto, Kiichiro, 4,791,444, Cl. 354-324.000.



- Sakanoue, Kei; and Hirano, Tsumoru, to Fuji Photo Film Co., Ltd. Silver halide color photographic material comprising a polymeric magenta coupler and a phenolic cyan coupler. 4,791,051, Cl. 430-548.000.
- Sakata, Tetsuichi: See—  
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- Sakimori, Hideharu; Hayashi, Hiroyuki; Ida, Daijiro; and Takahashi, Seiji, to Mazda Motor Corporation. Article picking up mechanism. 4,790,709, Cl. 414-416.000.
- Sakurai, Kaoru: See—  
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- Sakurai, Kenichi; and Ueda, Kazutoshi, to Yamaha Hatsudoki Kabushiki Kaisha. Crankcase vent system. 4,790,287, Cl. 123-573.000.
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Montanari, Paolo; and Sala, Oneglio, 4,790,571, Cl. 285-86.000.
- Salatin, Timothy; Balch, Thomas C.; Knight, Michael C.; Shesterkin, Michael D.; Van Antwerp, John S.; Lambert, Paul E.; and Aamodt, Robert A., to BASF Corporation, Inmont Division. Polyurethane resins in water-dilutable basecoats having low flash and quick-drying characteristics. 4,791,168, Cl. 524-601.000.
- Saldeen, Tom G. P.: See—  
Mehta, Jawahar L.; and Saldeen, Tom G. P., 4,790,988, Cl. 424-94.640.
- Saleh, Ramzi Y.: See—  
Wachs, Israel E.; Saleh, Ramzi Y.; and Chersich, Claudio C., 4,791,092, Cl. 502-350.000.
- Salomon S.A.: See—  
Benoit, Louis; Nerrinck, Bernard; Morell, Joseph; and Petrini, Roland, 4,790,081, Cl. 36-50.000.
- Dufour, Pierre, 4,790,083, Cl. 36-127.000.
- Salzmann, David F.: See—  
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- Salzmann, Thomas N.; Fuentes, Lelia M.; and Shinkai, Ichiro, to Merck & Co., Inc. Enantioselective process for producing 1-betamethylcarbamene antibiotic intermediates. 4,791,207, Cl. 548-110.000.
- Sam Sung Electronics Co., Ltd.: See—  
Mun, Im H.; Young, Jang E.; Hun, Park J.; and Hwan, Suh M., 4,790,146, Cl. 62-441.000.
- Sand, William C., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Call charging arrangement. 4,791,640, Cl. 370-58.000.
- Sandberg, L. Bogue; Haataja, Bruce A.; Jurmu, Douglas C.; Palardy, Robert D.; Story, Frank H.; and Yates, William A., to Michigan Technological University, Board of Control of. Method for forming a pallet with deep drawn legs. 4,790,966, Cl. 264-39.000.
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Dunn, Richard L.; Lewis, Danny H.; Sander, Thomas W.; Davidson, James A.; Beals, Neil B.; and Gill, Yancy L., 4,790,850, Cl. 623-13.000.
- Sanders Associates, Inc.: See—  
Zemany, Paul D.; Smith, Kirby A.; and Smith, John A., 4,791,573, Cl. 364-454.000.
- Sanders, Nicholas A.; and Couch, Richard W., Jr., to Hypertherm, Inc. Arc plasma torch and method using contact starting. 4,791,268, Cl. 219-121.570.
- Sanderson, Stephen N. Low profile keyboard device and system for recording and scoring music. 4,790,230, Cl. 84-462.000.
- Sandoz Ltd.: See—  
Haefliger, Walter, 4,791,115, Cl. 514-288.000.
- Pfaffli, Paul, 4,791,116, Cl. 514-288.000.
- Sandstrom, Paul H.; Maly, Neil A.; and Marinko, Mark A., to Goodyear Tire & Rubber Company. The. Tire compounds containing syndiotactic-1,2-polybutadiene. 4,790,365, Cl. 152-510.000.
- Sanfilippo, Pauline: See—  
Press, Jeffery B.; Sanfilippo, Pauline; and Urbanski, Maud, 4,791,200, Cl. 544-369.000.
- Sanford, Norman A.; and Mahapatra, Amaresh, to Polaroid Corporation. Channel waveguide modulator. 4,791,388, Cl. 332-7.510.
- Sangamo Weston, Inc.: See—  
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- Sankyo Company Limited: See—  
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- Okuda, Shigenobu; Iwasaki, Shigeo; Namikoshi, Michio; Arakawa, Masao; and Shimizu, Fusaaki, 4,791,128, Cl. 514-374.000.
- Sano, Hirohisa: See—  
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- Sano, Reiji: See—  
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- Sano, Shojiro; and Sasaki, Keiso, to Fuji Photo Film Co., Ltd. Recording sheet. 4,791,094, Cl. 503-209.000.
- Sanofoi: See—  
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- Descamps, Marcel; and Berger, Yves, 4,791,137, Cl. 514-469.000.
- Sanshin Kogyo Kabushiki Kaisha: See—  
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- Santel, Hans-Joachim: See—  
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- Gehring, Reinhold; Klauke, Erich; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,791,212, Cl. 548-362.000.
- Santorio, Eugene A. Digitizer pen caddy. 4,791,249, Cl. 178-18.000.
- Santrade Ltd.: See—  
Schermtzki, Konrad, 4,790,257, Cl. 118-227.000.
- Saran, Mohan S., to Occidental Chemical Corporation. High absorptivity sodium tripolyphosphate. 4,790,983, Cl. 423-315.000.
- Sasagawa, Katsuyoshi: See—  
Kanemura, Yoshinobu; Sasagawa, Katsuyoshi; Imai, Masao; Nagata, Teruyuki; and Kajimoto, Nobuyuki, 4,791,185, Cl. 528-73.000.
- Sasaki, Masao; Onodera, Kaoru; and Inahata, Hideki, to Konishiroku Photo Industry Co., Ltd. Dispersion. 4,790,959, Cl. 252-589.000.
- Sasaki, Nobuo: See—  
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- Sasaki, Shigeru: See—  
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- Sasaki, Sigeo, to Hitachi Maxell, Ltd. Tape cartridge case composition for reducing modulation noise. 4,791,484, Cl. 360-132.000.
- Sasaki, Takeo, to Mitsubishi Denki Kabushiki Kaisha. Idling revolution control device for internal combustion engine. 4,790,276, Cl. 123-339.000.
- Sasaki, Takinori: See—  
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- Sasaki, Takumi: See—  
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Kozuki, Susumu; Nakayama, Tadayoshi; and Sato, Chikara, 4,791,487, Cl. 358-140.000.
- Sato, Goro; Ogata, Masamitsu; Ida, Takanori; and Masuda, Tatsuo, to Catalysts & Chemicals Industries Co., Ltd. Hydrocarbon catalytic cracking catalyst compositions and method therefor. 4,791,084, Cl. 502-65.000.
- Sato, Haruhiko; Koga, Hiroshi; Dan, Takashi; and Onuma, Etsuro, to Chugai Seiyaku Kabushiki Kaisha. Furobenzoxazole derivatives. 4,791,209, Cl. 548-242.000.
- Sato, Kazuhiro: See—  
Nagai, Haruo; Suzuki, Tetsuo; and Sato, Kazuhiro, 4,791,184, Cl. 526-323.200.
- Sato, Kensaku, to Hirose Electric Co., Ltd. Electrical connector assembly machine. 4,790,066, Cl. 29-747.000.
- Sato, Kensaku, to Hirose Electric Co., Ltd. Termination tool. 4,790,068, Cl. 29-761.000.
- Sato, Tsunehiko: See—  
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- Sato, Tsutomu: See—  
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- Sato, Tsuyoshi: See—  
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- Sato, Yukinori; Watanabe, Takeshi; Nikai, Isao; and Watanabe, Kenji, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha. Liner cooling construction for gas turbine combustor or the like. 4,790,140, Cl. 60-757.000.
- Satoh, Hisatake: See—  
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- Satoh, Shu; and Evans, Louis E., Jr., to Varian Associates, Inc. Vaporizer system for ion source. 4,791,273, Cl. 219-271.000.
- Satoh, Yoshitaka: See—  
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- Saucereau, Didier: See—  
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- Sauerwald, Wilhelm A.; De Wilde, Johannes; Van Eerdewijk, Karel J. E.; Beenker, Franciscus P. M.; and Segers, Marinus T. M., to U.S. Philips Corporation. Integrated circuits, carriers therefor and testing apparatus and method for the foregoing. 4,791,358, Cl. 324-73.00R.
- Saukatis, John C., to Hoechst Celanese Corporation. Fluorocarbon polymer compositions and methods. 4,791,166, Cl. 524-544.000.
- Saukatis, John C., to Hoechst Celanese Corporation. Autoxidizable fluorocarbon polymer compositions and methods. 4,791,167, Cl. 524-544.000.
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- Savage, William A.; and Kendrick, Larry N., to Conoco Inc. Method and apparatus for multi-zone casing perforation. 4,790,383, Cl. 166-297.000.
- Savin Corporation: See—  
Schaefer, Louis F., 4,791,494, Cl. 358-300.000.
- Savoca, Robert C.; and Falbel, Gerald, to Barnes Engineering Company. Yaw sensing conical scanner horizon sensor. 4,791,297, Cl. 250-347.000.
- Scallion, Ralph: See—  
Perten, Herbert; and Scallion, Ralph, 4,790,320, Cl. 128-661.010.
- Scanflavour A/S: See—  
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- Scanlon, Robert M.: See—  
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- Scarborough, W. W.: See—  
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- Schaefer, Louis F., to Savin Corporation. Multiple variable light source printer. 4,791,494, Cl. 358-300.000.
- Schairer, Werner; and Gerner, Jochen, to Telefunken Electronic GmbH. Heterostructure semiconductor laser diode. 4,791,635, Cl. 372-46.000.
- Schallner, Otto: See—  
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- Schanb, Robert G., to Upjohn Company. The. Method for treating or preventing deep vein thrombosis using lipoxigenase inhibitors. 4,791,138, Cl. 514-510.000.
- Schechter, Michael M., to Ford Motor Company. Self-adjusting fuel injection system. 4,790,277, Cl. 123-357.000.
- Schedl, Siegfried; Eppinger, Hermann; and Schuler, Volker, to Paulaner-Savator-Thomasebrau AG. Process for the production of alcohol-free, yeast white beer. 4,790,993, Cl. 426-13.000.
- Scheffel, Gary W.: See—  
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- Schellenberg, Franklin M.: See—  
Baumert, Jean-Claude J. E.; Bjorklund, Gary C.; Lenth, Wilfried; Riak, William P., III; and Schellenberg, Franklin M., 4,791,631, Cl. 372-22.000.
- Schellstedt, Herman J.; McQueen, Robert W.; and Peters, Alan D., to Penetrators, Inc. Hydraulic well penetration apparatus and method. 4,790,384, Cl. 166-298.000.
- Schemmann, Hugo: See—  
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- Schering AG: See—  
Drawert, Manfred; and Krase, Horst, 4,791,169, Cl. 524-608.000.
- Schering Akt.: See—  
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- Schermtzki, Konrad, to Santrade Ltd. Apparatus for the production of fiber web reinforced plastic laminates. 4,790,257, Cl. 118-227.000.
- Schiff, Robert: See—  
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- Schinz, Erich; Frischkorn, Hans; and Martini, Thomas, to Hoechst Aktiengesellschaft. Bisbenzoxazolylnaphthalenes containing sulfonate or sulfonamide groups, a process for their preparation and their use. 4,791,205, Cl. 548-106.000.
- Schleef, Raymond R.: See—  
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- Schlosser, Craig J.; and Reaser, Howard W., to Dana Corporation. Centrifugal axle speed governor. 4,790,278, Cl. 123-376.000.
- Schlumberger Systems and Services, Inc.: See—  
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- Schlumberger Technology Corporation: See—  
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- Pruchnik, Paul R., 4,791,618, Cl. 367-25.000.
- Schlupp, Johannes: See—  
Bison, Gunter; Schlupp, Johannes; Winterscheid, Josef; and Thewalt, Klaus, 4,791,210, Cl. 548-250.000.
- Schmalholz, Denis, to Derfi. Manual control device for taping articles such as notably bunches of cables. 4,790,896, Cl. 156-392.000.
- Schmid, Franz: See—  
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- Schmid, Hans-Dieter: See—  
Hettich, Gerhard; Haas, Lothar; and Schmid, Hans-Dieter, 4,790,179, Cl. 73-146.500.
- Schmidt, Dieter; and Goppelt, Dieter, to INA Walzlager Schaeffler KG. Mechanic-hydraulic actuating element for a belt tightener. 4,790,801, Cl. 474-110.000.
- Schmidt, Manfred; and Gebele, Herbert, to AGFA-GEVAERT AG. System for automatically charging and discharging X-ray film sheets into and from cassettes and a cassette for use in the system. 4,791,282, Cl. 235-462.000.
- Schmidt, Richard, to Coloplast A/S. Bag of plastic film for collecting discharges from human or animal bodies via drains. 4,790,833, Cl. 604-317.000.
- Schmidt, Robert R.: See—  
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- Gehring, Reinhold; Klauke, Erich; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,791,212, Cl. 548-362.000.
- Schnapp, Abraham. Expandable cube toy. 4,790,714, Cl. 446-486.000.
- Schneider, Alan A.: See—  
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- Schneider, Rudolf, to Erowa AG. Measuring apparatus to determine the dimensions of an object in three dimensions. 4,790,078, Cl. 33-503.000.
- Schnyder, Erika: See—  
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- Schoberg, Carl J.; and Johnson, Daniel C., to Liberty Diversified Industries. Data cartridge storage and handling system. 4,790,434, Cl. 206-387.000.
- Schramm, Matthias: See—  
Stoltefuss, Jürgen; Gross, Rainer; Schramm, Matthias; Thomas, Gunter; Kayser, Michael; and Pelster, Bernd, 4,791,122, Cl. 514-344.000.
- Schreiber, Simeon B. Bone conduction audio listening device and method. 4,791,673, Cl. 381-151.000.
- Schrenk, David J.; and Murphy, Patrick E., to Duracell Inc. Anode conductor for alkaline cells. 4,791,036, Cl. 429-178.000.
- Schroder, Erhard: See—  
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- Schweco Heinz Schuermans GmbH & Co.: See—  
Tonemann, Armin; and Diekmann, Bernd, 4,790,583, Cl. 292-336.300.
- Schuler, Volker: See—  
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- Schulte, Bernhard; Tischer, Werner; Waldenrath, Werner; and Kaloff, Hans, to Bayer Aktiengesellschaft. Stretched polycarbonate films filled with carbon black. 4,791,016, Cl. 428-220.000.
- Schulte-Elektrotechnik GmbH & Co. KG: See—  
Schulte, Siegfried; Boing, Manfred; and Ottinghaus, Friedrich W., 4,790,772, Cl. 439-439.000.
- Schulte, John P.: See—  
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- Schulte, Siegfried; Boing, Manfred; and Ottinghaus, Friedrich W., to Schulte-Elektrotechnik GmbH & Co. KG. Electric connecting terminal. 4,790,772, Cl. 439-439.000.
- Schultz, Gary: See—  
Hastings, Jerome K.; Bigelow, James H.; and Schultz, Gary, 4,790,353, Cl. 137-625.650.
- Schwartzman, Everett H. Integral spring flexure for use with high speed rotating shafts. 4,790,700, Cl. 409-233.000.
- Schwarzkopf, Gerhart; and Dulst, Bernd, to Bodenseewerk Gerate-technik GmbH. Device for measuring the roll rate or roll attitude of a missile. 4,790,493, Cl. 244-3.210.
- Schweibel, Olivier: See—  
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- Schweiger, Barry D.: See—  
Simon, Theodore; Weston, Lance; and Berg, George P., 4,791,658, Cl. 379-41.000.
- Schwindeman, James A.: See—  
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- Schwirtlich, Ingo; and Woditsch, Peter, to Bayer Aktiengesellschaft. Strip-shaped films of metals, a process and an apparatus for the production thereof and the use thereof. 4,790,871, Cl. 75-65.02M.
- Schwobel, Eckhard; and Baumele, Hubert, to Intermedicat GmbH. Blood withdrawal device with safety valve and cylindrical container. 4,790,330, Cl. 128-764.000.
- Sclafani, Vincent J.; and Martorano, Daniel. Security device for fog lights. 4,791,535, Cl. 362-82.000.
- Sciavo S.p.A.: See—  
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- Scott, Thomas P.; and Todd, Jerry, Sr. Shoreline breakwater for coastal waters. 4,790,685, Cl. 405-30.000.
- Scripps Clinic and Research Foundation: See—  
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- Scudder, Ted: See—  
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- Seal, Henry A.: See—  
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- Sealy, Incorporated: See—  
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- Segal, Daniel A. Sexual stimulation apparatus. 4,790,296, Cl. 128-51.000.
- Segal, Milton. Fire hydrant valve actuator. 4,790,342, Cl. 137-68.100.
- Segers, Marinus T. M.: See—  
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- Seidenbusch, Heinz, to Siemens Aktiengesellschaft. Equipment quick-connect terminal for connecting electrical conductors to electrical equipment. 4,790,778, Cl. 439-811.000.
- Seiko Instruments & Electronics Ltd.: See—  
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- Seitoh, Shinichi: See—  
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- Seki, Masafumi; Hanada, Yoshiyuki; and Sugawara, Ryoichi, to Nippon Sheet Glass Co., Ltd. Demultiplexing and/or multiplexing optical circuit. 4,790,615, Cl. 350-96.120.
- Semiconductor Energy Laboratory Co., Ltd.: See—  
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Senken, Robert S.: See—  
Kufis, James C.; and Senken, Robert S., 4,791,364, Cl. 324-158.00F.  
Senerchia, David C.: See—  
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Sewell, Wesley C., to Honeywell Inc. Dither signal remover for a dithered ring laser angular rate sensor, 4,790,658, Cl. 356-350.000.  
Sexton, John M. Dual mode air purifier and method, 4,790,860, Cl. 55-59.000.  
Seyed-Yagooobi, Jamal, to Westvaco Corporation. Viscometric thermometer, 4,790,668, Cl. 374-54.000.  
Seymour, Robert H., to Geophysical Service Inc. Motion sensing device, 4,791,617, Cl. 367-171.000.  
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Shakely, Ronald H.; Anel, RacAnn M.; and Schneider, Alan A., to Mine Safety Appliances Company. Electrochemical gas sensor, 4,790,925, Cl. 204-415.000.  
Shapovalov, Yuri P.: See—  
Shishkin, Viktor V.; Kryazhevskikh, Nikolai F.; and Shapovalov, Yuri P., 4,790,934, Cl. 210-189.000.  
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Tagami, Tomoyuki; and Nawaki, Masaru, 4,791,319, Cl. 307-441.000.  
Takai, Yasuyuki, 4,791,564, Cl. 364-200.000.  
Taneya, Mototaka; Matsumoto, Mitsuhiro; and Matsui, Sadayoshi, 4,791,651, Cl. 372-50.000.  
Tejiooka, Hiroshi, 4,790,077, Cl. 33-447.080.  
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Morris, Donald H.; and Shea, Daniel M., 4,790,721, Cl. 416-96.00A.  
Sheem, Sang K.: See—  
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Sheeter, Eric. Stepping vehicle, 4,790,400, Cl. 180-8.600.  
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Van Broekhoven, Johannes A. M., 4,791,190, Cl. 528-483.000.  
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Sherman, Thomas E., to Preformed Line Products Company. Cable suspension assembly with grounding mechanism, 4,791,237, Cl. 174-40.00R.  
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Okada, Yosuke; and Kurimoto, Munehito, 4,790,331, Cl. 128-772.000.  
Weichselbaum, Edwin G., 4,790,308, Cl. 128-207.180.  
Shesterkin, Michael D.: See—  
Selatin, Timothy; Balch, Thomas C.; Knight, Michael C.; Shesterkin, Michael D.; Van Antwerp, John S.; Lamberty, Paul E.; and Aamodt, Robert A., 4,791,168, Cl. 524-601.000.  
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Shibata, Yoshihiko, to Japan Gore-Tex, Inc. Cap for containers used to store volatile liquids, 4,790,445, Cl. 220-202.000.  
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Shiffesaw, Tesema D. Resilient chair, 4,790,596, Cl. 297-287.000.  
Shiga, Nobuo, to Sumitomo Electric Industries, Ltd. Digital phase-locked loop with random walk filter, 4,791,386, Cl. 331-1.00A.  
Shiga, Shoji: See—  
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Grandfield, John; Campbell, James T.; Gundel, Carl H.; and Shillue, William, 4,791,377, Cl. 328-14.000.  
Shima, George T., to Unisys Corporation. Data processing system in which modules logically "OR" number sequences onto control lines to obtain the use of a time shared bus, 4,791,562, Cl. 364-200.000.  
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Fujikura, Makoto; Ohno, Toshiyuki; Onuma, Shigeharu; Tamahashi, Kunihiko; Chigasaki, Mitsuo; and Shimamura, Yasuo, 4,791,040, Cl. 430-64.000.  
Shimao, Shizuo: See—  
Kato, Shoichi; Shimano, Shizuo; Hayaoka, Tatsumi; and Masui, Akio, 4,791,127, Cl. 514-369.000.  
Shimbo, Masaru: See—  
Sakai, Tadashi; Katsura, Masaki; Hiraki, Hideaki; Uno, Shigeki; Shimbo, Masaru; and Furukawa, Kazuyoshi, 4,791,465, Cl. 357-25.000.  
Shimino, Mamoru: See—  
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Shimizu Construction Co., Ltd.: See—  
Hane, Tadashi, 4,791,333, Cl. 362-1.000.  
Shimizu, Fusaaki: See—  
Okuda, Shigenobu; Iwasaki, Shigeo; Namikoshi, Michio; Arakawa, Masao; and Shimizu, Fusaaki, 4,791,128, Cl. 514-374.000.  
Shimizu, Kiyoshi: See—  
Usuda, Masashi; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, 4,790,237, Cl. 98-42.160.  
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Yokoe, Tohru; Shimizu, Masahiro; and Takenouchi, Mariko, 4,791,680, Cl. 382-56.000.  
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Ito, Gilchi; Mukai, Kouzaku; Shimizu, Yuichi; and Suzuki, Saiju, 4,790,640, Cl. 356-376.080.  
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Kamura, Fumio; Haga, Takahiro; Maeda, Kazuyuki; Shimoharada, Hiroshi; Yoshida, Tsuneo; and Ikeguchi, Masahiko, 4,790,869, Cl. 71-90.000.  
Shimojo, Shunichi; and Asai, Ikuro, to Meiki Co., Ltd. Injection mold having rotatable stamper holding ring, 4,790,798, Cl. 425-192.00R.

Shimura, Takaki: See—  
Miwa, Hirohide; Shimura, Takaki; Yanashima, Tadahiko; and Amemiya, Shinichi, 4,790,321, Cl. 128-660.070.  
Shinada, Hidetoshi: See—  
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Shinkai, Ichiro: See—  
Salzmann, Thomas N.; Fuentes, Lelia M.; and Shinkai, Ichiro, 4,791,207, Cl. 548-110.000.  
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Shiryo Corporation: See—  
Suzuki, Akira; Watanabe, Norio; and Kage, Masashi, 4,790,939, Cl. 210-608.000.  
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Maki, Takao; Yokoyama, Toshiharu; Nakanishi, Akio; Shioda, Katsushi; and Asatani, Haruki, 4,791,235, Cl. 585-806.000.  
Shioji, Mitsuaki: See—  
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Cunningham, Wells C., 4,791,171, Cl. 525-100.000.  
Shirahata, Isao; Shiga, Shoji; Hori, Hisako; and Jinbo, Takamasa, to Furukawa Denki Kogyo Kabushiki Kaisha. Multilayer printed wiring board and method for producing the same, 4,791,239, Cl. 174-68.500.  
Shirai, Eiji: See—  
Okabe, Yoshio; Kobayashi, Yukimori; and Shirai, Eiji, 4,790,796, Cl. 474-110.000.  
Shirley, Ian: See—  
Nevin, Alan; and Shirley, Ian, 4,791,028, Cl. 428-421.000.  
Shishkin, Viktor V.; Kryazhevskikh, Nikolai F.; and Shapovalov, Yuri P., to Inzhenerny Tsent Truboprovod. Apparatus for filtering fluid medium, 4,790,934, Cl. 210-189.000.  
Shively, Nina; and Cordes, Peter. Wind and boom direction indicating device, 4,790,255, Cl. 114-97.000.  
Shmidt, Iosif; and Badiali, Mario, to Membrex Incorporated. Filtration method and apparatus, 4,790,942, Cl. 210-650.000.  
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Ando, Masao; Nanri, Takeshi; and Sho, Mikio, 4,791,262, Cl. 219-10.510.  
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Karatsu, Makoto; and Goto, Sumio, 4,790,676, Cl. 400-241.100.  
Shull, Kiva Y. Pillow for ritual circumcisions and method, 4,790,041, Cl. 543-1.000.  
Shultz, William L., Jr. Comparative mechanical fault detection apparatus and clamp, 4,790,191, Cl. 73-661.000.  
Sibeud, Jean-Paul, to Renault Vehicules Industriels. Engine brake clutch including electrical brake, 4,790,212, Cl. 74-710.500.  
Sichanugrist, Porponth; and Knapp, Karl E. Low light level solar cell, 4,790,883, Cl. 136-258.000.  
Sicari, Francesco; Rossi, Pier P.; and Canavesi, Luigi, to SNIA Viscosa Societa' Nazionale Industria Applicazioni Viscosa S.p.A. Process for preparing  $\alpha,\omega$ -dicarboxylic acids, 4,791,228, Cl. 562-531.000.  
Siddell, Graham J.: See—  
Bruning, John H.; and Siddell, Graham J., 4,790,642, Cl. 350-574.000.  
Siegal, Burton L.: See—  
Ernest, Richard C.; and Siegal, Burton L., 4,790,093, Cl. 40-661.000.  
Siegl, Walter O.; and Chattha, Mohinder S., to Ford Motor Company. Corrosion inhibiting aqueous compositions comprising metal-chelating diphenolamine compounds, 4,790,878, Cl. 106-14.150.  
Siegwart, John T., Jr., to Research Corporation. Pulley shift assembly, 4,790,554, Cl. 280-236.000.  
Siemens Aktiengesellschaft: See—  
Becker, Frank S.; and Pawlik, Dieter, 4,791,005, Cl. 427-255.300.  
Birkle, Siegfried; Sezi, Recai; and Feucht, Hans-Dieter, 4,791,176, Cl. 525-326.500.  
Brau, Karl; and Hoher, Herbert, 4,791,526, Cl. 361-398.000.  
Chadwick, P. N. R.; and Morgott, Horst, 4,791,543, Cl. 363-48.000.  
Elmqvist, Hakan; Lekholm, Anders; Hedberg, Sven-Erik; and Amundson, David C., 4,790,318, Cl. 128-419.0PG.  
Frenkel, Ferdinand; Haberland, Detlef; and Haltenorth, Helmut, 4,790,616, Cl. 350-96.150.  
Lenz, Michael, 4,791,381, Cl. 330-84.000.  
Leysieffer, Hans; and Zwicker, Eberhard, 4,791,620, Cl. 367-135.000.  
Seidenbusch, Heinz, 4,790,778, Cl. 439-811.000.  
Winnerl, Josef; Reczek, Werner; and Pribyl, Wolfgang, 4,791,316, Cl. 307-296.00R.  
Winnerl, Josef; and Reczek, Werner, 4,791,317, Cl. 307-296.00R.  
Siemens Energy & Automation, Inc.: See—  
Maxwell, James; and Raabe, Rodney, 4,790,579, Cl. 292-175.000.  
Sig Schweizerische Industrie-Gesellschaft: See—  
Hampeja, Karel; and Gabriel, Stefan, 4,790,234, Cl. 91-362.000.  
Signoretto, Roberto. Method and apparatus for correlating photographic film, 4,791,279, Cl. 235-375.000.

Silfverskiold, Krister. Device for and method of dynamic splinting, 4,790,301, Cl. 128-87.00A.  
Silicon Systems, Inc.: See—  
Austin, Charles C., 4,791,323, Cl. 307-475.000.  
Siliconix Incorporated: See—  
Blanchard, Richard A.; and Cogan, Adrian I., 4,791,462, Cl. 357-23.400.  
Simonsen, Per A.; and Eide, Gunnar H., to Saga Petroleum a.s. Method for providing a tubular node in a framework truss structure such as offshore platforms for oil drilling and production, 4,790,172, Cl. 72-368.000.  
Simmons, Louis, to Mc Gill Manufacturing Company, Inc. Protective cage for a lamp, 4,791,541, Cl. 362-376.000.  
Simmons, Thomas E., to Morgan Construction Company. Rock neck bearing assembly and inner bearing component therefor, 4,790,673, Cl. 384-147.000.  
Simon, Morris, to Beth Israel Hospital, Trustees of. Adjustable biopsy localization device, 4,790,329, Cl. 128-749.000.  
Simon, Theodore; Weston, Lance; and Berg, George P., to Simon, Theodore; and Schweiger, Barry D. Integrated alarm and touch tone telephone system, 4,791,658, Cl. 379-41.000.  
Simpson, Eric E.: See—  
Payne, Richard D.; and Simpson, Eric E., 4,791,309, Cl. 290-40.000.  
Simpson, Paul A. Scooter, 4,790,550, Cl. 280-87.04A.  
Simulators Limited, Inc.: See—  
Adams, Wilbur R., 4,790,684, Cl. 404-16.000.  
Sinnokrot, Ali A., to Mobil Oil Corporation. Method for determining fluid characteristics of subterranean formations, 4,790,180, Cl. 73-153.000.  
Sircar, Shivaji, to Air Products and Chemicals, Inc. Fractionation of multicomponent gas mixtures by pressure swing adsorption, 4,790,858, Cl. 55-26.000.  
Sittler, Fred C.; and Toy, Adrian C., to Rosemount Inc. Thin film platinum resistance thermometer with high temperature diffusion barrier, 4,791,398, Cl. 338-25.000.  
Sivak, Michael: See—  
Flannagan, Michael J.; and Sivak, Michael, 4,791,399, Cl. 340-71.000.  
Sizto, N. Chung; and Roux, Cynthia G., to Syntex (U.S.A.) Inc. Calibration device for heterogeneous immunoassay, 4,791,056, Cl. 435-7.000.  
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Ljungstrom, Tommy; and Sjostrom, Anders, 4,790,123, Cl. 53-458.000.  
Skard, Halldor. Ski pole handle device, 4,790,562, Cl. 280-821.000.  
SKF GmbH: See—  
Brandenstein, Manfred; and Ernst, Horst-Manfred, 4,790,203, Cl. 74-424.80R.  
Skibowski, Hubert, to Dover Corporation. Apparatus for selective combination of at least one first stationary pipeline for liquids with a plurality of second stationary pipelines, 4,790,568, Cl. 285-28.000.  
Skribiski, Robert P., to Baxter Travenol Laboratories, Inc. Torque-control catheter, 4,790,831, Cl. 604-282.000.  
Sladek, Donald R.: See—  
Grass, William E.; and Sladek, Donald R., 4,791,525, Cl. 361-363.000.  
Slobodkin, Yefim, to Avery International Corporation. For constant pressure in line-web crush-scoring, 4,790,805, Cl. 493-355.000.  
Slocumb Industries, Inc.: See—  
Cunningham, Phillip J.; Slocumb, Leon F., Jr.; and Wilkie, George, 4,790,107, Cl. 49-383.000.  
Slocumb, Leon F., Jr.: See—  
Cunningham, Phillip J.; Slocumb, Leon F., Jr.; and Wilkie, George, 4,790,107, Cl. 49-383.000.  
Slovak, Petr, to Ceske vysoké uceni technice v Praze. Stimulator for hemodialysis, 4,790,319, Cl. 128-419.00R.  
Slyker, Richard W., to Vetco Gray Inc. Tapered wedge packoff assembly for a casing hanger, 4,790,572, Cl. 285-140.000.  
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Thomas, Evan G.; Smalley, Edmund W.; and Cook, Kane D., 4,791,043, Cl. 430-256.000.  
Smedley, William H.: See—  
Haber, Terry M.; Foster, Clark B.; and Smedley, William H., 4,790,827, Cl. 604-198.000.  
Smith, James C.; Mostafa, Hatem E.; and Walsh, William J., to Hewlett-Packard Company. Thermal inkjet printhead temperature control, 4,791,435, Cl. 346-140.00R.  
Smith, James E.: See—  
Honig, Arnold; and Smith, James E., 4,791,310, Cl. 250-458.100.  
Smith, James W.: See—  
McIntyre, Roger C.; and Smith, James W., 4,790,439, Cl. 209-667.000.  
Smith, John A.: See—  
Zemany, Paul D.; Smith, Kirby A.; and Smith, John A., 4,791,573, Cl. 364-454.000.  
Smith, Kirby A.: See—  
Zemany, Paul D.; Smith, Kirby A.; and Smith, John A., 4,791,573, Cl. 364-454.000.  
Smith, Richard L.: See—  
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Smith, Stephen L.: See—  
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Smith, Thomas L.: See—  
Oye, Kevin J.; Paterno, Enzo; and Smith, Thomas L., 4,791,660, Cl. 379-88.000.

Smith, Timothy D.: See—  
Day, George B., V.; Wells, Larry G.; Smith, Timothy D.; and Ross, Ira J., 4,790,334, Cl. 131-290.000.

SmithKline Beckman Corporation: See—  
Fare, Louis R.; Oh, Yong K.; Taylor, Dean P.; and Widger, Jennifer B., 4,791,064, Cl. 435-232.300.

Smyth, Richard E.; and Tracy, Daniel A., to Ainsworth Nominees Pty. Ltd. Multi-size reel symbols. 4,790,537, Cl. 273-143.00R.

SNIA Viscosa Societa' Nazionale Industria Applicazioni Viscosa S.p.A.: See—  
Sicliari, Francesco; Rossi, Pier P.; and Canavesi, Luigi, 4,791,228, Cl. 562-531.000.

So, Masaaki: See—  
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Societa' Cavi Pirelli S.p.A.: See—  
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Marin, Carlo; and Pozzati, Giovanni, 4,791,240, Cl. 174-23.00C.

Societe Atochem: See—  
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Societe Civile de Recherches Metallurgiques: See—  
Charlon, Jean-Pierre; and Gasquet, Gilbert, 4,790,823, Cl. 604-136.000.

Societe Europeenne De Propulsion: See—  
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Societe Tag Pulp Industries S.A.: See—  
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Soma, Utami: See—  
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Somar Corporation: See—  
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Soni, Pravin: See—  
Levinson, Frank H.; Soni, Pravin; Tanous, Adam C.; McCrae, Richard J.; and Ostasiuk, Mark, 4,790,622, Cl. 350-96.200.

Sonobe, Toshimitsu, to Thomas & Betts Corporation. Cassette connector with pivot mechanism. 4,790,761, Cl. 439-59.000.

Sonoda, Hirotsugu, to Jidosha Kiki Co., Ltd. Steering force controller for power steering apparatus. 4,790,401, Cl. 180-142.000.

Sony Corporation: See—  
Igarashi, Tadao; and Oogi, Takashi, 4,791,504, Cl. 360-132.000.

Nakamura, Akira, 4,791,625, Cl. 369-112.000.

Nakano, Kenji; Okada, Hiroshi; and Takahashi, Takao, 4,791,497, Cl. 360-32.000.

Ohba, Akio, 4,791,581, Cl. 364-521.000.

Takahashi, Takao; and Okada, Hiroshi, 4,791,512, Cl. 360-10.200.

Yoshihiro, Mitsugu, 4,791,498, Cl. 360-36.200.

Sorensen, Stig, to Scanflavour A/S. Process for sterilizing spices. 4,790,995, Cl. 426-302.000.

Sorensen, Marius W., to Dow Chemical Company. The Electrolysis process using concentric tube membrane electrolytic cell. 4,790,914, Cl. 204-98.000.

South Australian Co-Operative Bulk Handling Limited: See—  
Johinke, Bruce L., 4,790,111, Cl. 52-197.000.

South Bend Lathe, Inc.: See—  
Backe, Bengt S.; and Durham, La Moyne W., 4,790,233, Cl. 91-361.000.

Southeastern Water Conservation Systems, Inc.: See—  
Dunn, C. Lamar; and Turner, David L., 4,790,943, Cl. 210-705.000.

SP Tyres UK Limited: See—  
Ingle, Peter; Watkins, David R.; and Griffiths, Gerald A., 4,790,363, Cl. 152-454.000.

Spaeth, Tilman; and Lembecke, Eberhard, to Bodenseeek Geratetechnik GmbH. Heatable diaphragm pump for gases. 4,790,730, Cl. 417-373.000.

Sparks, Robert A.: See—  
Wilent, John W.; Benson, Robert F.; and Sparks, Robert A., 4,790,694, Cl. 408-1.00R.

Spector, George: See—  
Vernon, James J.; and Spector, George, 4,790,585, Cl. 294-51.000.

Spectra-Physics, Inc.: See—  
Miyake, Charles I., 4,791,634, Cl. 372-34.000.

Speer, Lane L., to Scarborough, W. W. Technique for sanitizing toilet seats. 4,790,039, Cl. 4-233.000.

Spencer, H. Kenneth: See—  
Bagley, Jerome R.; and Spencer, H. Kenneth, 4,791,112, Cl. 514-252.000.

Kudzman, Linas V.; Spencer, H. Kenneth; and Severnak, Sherry A., 4,791,121, Cl. 514-326.000.

Lin, Bor-Sheng; Kudzman, Linas V.; and Spencer, H. Kenneth, 4,791,120, Cl. 514-326.000.

Spencer, Homer L.: See—  
Bridges, Jack E.; Sresty, Guggilam C.; Young, Vincent R.; and Spencer, Homer L., 4,790,375, Cl. 166-60.000.

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Suire, Rene; Malet, Christian; Speri, Roger J.; and Bernard, Coll., 4,790,851, Cl. 623-16.000.

Speronello, Barry K., to Engelhard Corporation. Hydrotreating process using porous mullite. 4,790,929, Cl. 208-216.00P.

Sperry Corporation: See—  
Anderson, David R.; and Jenkins, Vaughn J., 4,791,632, Cl. 372-31.000.

Byers, Larry L., 4,791,559, Cl. 364-200.000.

Harris, Richard W.; Bishop, Frank A.; and Rattlingourd, Glen D., 4,791,390, Cl. 333-166.000.

Spitzner, Jerome G., deceased: See—  
Mosehauer, Michael; Spitzner, Jerome G., deceased; Stoudt, Michael D.; and Zeise, Eric K., 4,791,450, Cl. 355-4.000.

Spitzner, Nona V., administratrix: See—  
Mosehauer, Michael; Spitzner, Jerome G., deceased; Stoudt, Michael D.; and Zeise, Eric K., 4,791,450, Cl. 355-4.000.

Sprague, David L.: See—  
Sherrill, James V.; and Sprague, David L., 4,791,580, Cl. 364-521.000.

Sprague Electric Company: See—  
Gouvernelle, Didier; and Gatesoupe, Daniel, 4,791,532, Cl. 361-529.000.

Vig, Ravi, 4,791,311, Cl. 307-10.00R.

Sprecker, Mark A.; Wilson, Stephen R.; Steinbach, Leonard; and O'Rourke, Thomas, to International Flavors & Fragrances Inc. Process for preparing dihydromyrcenol and dihydromyrcenyl acetate. 4,791,222, Cl. 560-237.000.

Spriggs, Hugh; Nightingale, Charles; and Turkington, Roger D., to British Telecommunications Public Limited Company. Recursive image encoding/decoding using interpolation within variably subdivided picture areas. 4,791,486, Cl. 358-138.000.

Springer, Gary C.: See—  
Ostrum, James V.; Springer, Gary C.; Weller, Kenneth G.; Richard, John E.; and Montrose, Robert E., 4,790,448, Cl. 220-270.000.

Spurgeon, Edgar E.: See—  
Ferrell, Richard A.; and Spurgeon, Edgar E., 4,790,406, Cl. 180-287.000.

Square D Company: See—  
McGuire, Thomas B.; and Holmes, Charles M., Jr., 4,791,348, Cl. 323-263.000.

Roof, Richard W., 4,791,350, Cl. 323-284.000.

Yin, Simon, 4,791,250, Cl. 200-17.00R.

Sresty, Guggilam C.: See—  
Bridges, Jack E.; Sresty, Guggilam C.; Young, Vincent R.; and Spencer, Homer L., 4,790,375, Cl. 166-60.000.

Staab, Rudolf: See—  
Winsel, August; Staab, Rudolf; and Medic, Nikolaj, 4,790,915, Cl. 204-98.000.

Staar Development Co., S.A.: See—  
Staar, Marcel J. H., 4,791,411, Cl. 340-568.000.

Staar, Marcel J. H., 4,791,626, Cl. 369-37.000.

Staar, Marcel J. H., to Staar Development Co., S.A. Manual free-access vending machine. 4,791,411, Cl. 340-568.000.

Staar, Marcel J. H., to Staar Development Company S.A. Automatic changer for player/recorder of optical magnetic discs and cards. 4,791,626, Cl. 369-37.000.

Staff Co., Ltd.: See—  
Todokoro, Masatoshi, 4,790,790, Cl. 446-408.000.

Staffel, Hermann: See—  
Eggert, Ulrich; and Staffel, Hermann, 4,790,216, Cl. 74-866.000.

Stahlecker, Fritz; and Stahlecker, Hans. Spinning unit piecing process for producing feed spools. 4,790,130, Cl. 57-261.000.

Stahlecker, Hans: See—  
Stahlecker, Fritz; and Stahlecker, Hans, 4,790,130, Cl. 57-261.000.

Stalter, Robert J., Sr., to Motor Wheel Corporation. Vehicle wheel with ornamental plastic overlay. 4,790,605, Cl. 301-37.00C.

Stanadyne, Inc.: See—  
Raufisen, Robert; Chace, David A.; and Janik, Leou P., 4,790,055, Cl. 29-156.70R.

Standard Oil Company, The: See—  
Attig, Thomas G.; Graham, Anne M.; and Pesa, Frederick A., 4,790,963, Cl. 260-410.90R.

Staniulis, Mark T.: See—  
Pellet, Regis J.; Coughlin, Peter K.; Staniulis, Mark T.; Long, Gary N.; and Rabo, Jule A., 4,791,083, Cl. 502-64.000.

Stanley Works, The: See—  
Williams, Edward A., 4,790,696, Cl. 408-241.00R.

Stant Inc.: See—  
Harris, Robert S., 4,790,349, Cl. 137-587.000.

Starbucks Corporation: See—  
Hewitt, Alan R., 4,790,239, Cl. 99-279.000.

Staromlynska, Jacqueline: See—  
Miller, Alan; and Staromlynska, Jacqueline, 4,790,634, Cl. 350-347.00V.

Stauss, Paul, to Zenith Electronics Corporation. Factory fixture frame for an in-process tension mask color cathode ray tube. 4,790,786, Cl. 445-68.000.

Steadman, John W.: See—  
Nunley, James A.; Steadman, John W.; and Wechsler, Perry J., 4,791,672, Cl. 381-68.200.

Steed, Ivan V., to Steed Signs Pty., Limited. Game. 4,790,565, Cl. 283-85.000.

Steed Signs Pty., Limited: See—  
Steed, Ivan V., 4,790,565, Cl. 283-85.000.

Steel Heddle Mfg., Inc.: See—  
Kramer, Charles F., 4,790,357, Cl. 139-91.000.

Steele, Duane F., to Ford Motor Company. Swashplate compressor for air conditioning systems. 4,790,727, Cl. 417-269.000.

Steer, John E., to Allied-Signal Inc. Master cylinder fast fill valving mechanism with ramp. 4,790,138, Cl. 60-578.000.

Steffee, Arthur D., to AcroMed Corporation. Apparatus and method for securing bone graft. 4,790,303, Cl. 128-924.00M.

Stegmuller, Karl, to Sachsenwerk Aktiengesellschaft. Fault protection for a medium voltage transformer branch. 4,791,520, Cl. 361-63.000.

Steichen, Dale S.; and Ku, Hao, to Clorox Company. The Alkyl monoperoxy succinic acid precursors and method of synthesis. 4,790,952, Cl. 252-186.390.

Stein Heurtey: See—  
Bourel, Jean; Lebeaupin, Denis; and Schweibel, Olivier, 4,790,750, Cl. 432-239.000.

Steinbach, Leonard: See—  
Sprecker, Mark A.; Wilson, Stephen R.; Steinbach, Leonard; and O'Rourke, Thomas, 4,791,222, Cl. 560-237.000.

Stemcor Corporation: See—  
Kim, Jonathan J.; Venkateswaran, Viswanathan; and Kujawa, Randolph, 4,790,986, Cl. 423-659.000.

Kim, Jonathan J.; and Myles, Thomas A., 4,791,077, Cl. 501-105.000.

Stephenson, Marc J.: See—  
Chaitin, Gregory J.; Hoagland, Clifford H.; and Stephenson, Marc J., 4,791,558, Cl. 364-200.000.

Stetter, Jorg: See—  
Gehring, Reinhold; Klauke, Erich; Schallner, Otto; Stetter, Jorg; Santel, Hans-Joachim; and Schmidt, Robert R., 4,791,212, Cl. 548-362.000.

Stevens, David R.: See—  
Wieschahn, Gary P.; Giles, Richard E.; and Stevens, David R., 4,791,062, Cl. 435-238.000.

Stevenson, David R.; and Devlin, Michael T., to Rational. Higher order language-directed computer. 4,791,550, Cl. 364-200.000.

Stewart, Gary M., to Sealy, Incorporated. Borderwire hinge clip. 4,790,519, Cl. 267-106.000.

Steyr-Daimler Puch AG: See—  
Freudenschuss, Otto, 4,790,731, Cl. 417-490.000.

Stillman, Neil W. Liquid treating electrolytic cell. 4,790,923, Cl. 204-268.000.

Stines, Joseph R., to Vance Products Incorporated. Pressure gauge and system. 4,790,821, Cl. 604-98.000.

Stinesen, Bernardus J., to U.S. Philips Corporation. Device for centering a rotating disk. 4,791,624, Cl. 369-270.000.

Stitt, Thomas D.: See—  
Brown, Herbert J.; and Stitt, Thomas D., 4,791,341, Cl. 318-809.000.

Stocker, Charles T.: See—  
Roush, Thomas M.; and Stocker, Charles T., 4,790,996, Cl. 426-458.000.

Stocker, Manfred: See—  
Henn, Gunter; Stocker, Manfred; Stotzer, Erwin; Friedrich, Konrad; and Bauer, Thomas, 4,790,689, Cl. 405-240.000.

Stocker, Raymond, to Ford Motor Company. Cable flexible joint. 4,790,205, Cl. 74-500.500.

Stoll, Kurt. Gripping device. 4,790,587, Cl. 294-119.300.

Stoll, Thomas, to H. Stoll GmbH & co. Flat knitting machine. 4,790,150, Cl. 66-123.000.

Stolle Corporation, The: See—  
Kaminski, Elton G.; and Hasselbeck, Richard J., 4,790,171, Cl. 72-361.000.

Stoltzfuss, Jurgen; Gross, Rainer; Schramm, Matthias; Thomas, Gunter; Kayser, Michael; and Pelster, Bernd, to Bayer Aktiengesellschaft. Circulation active novel 5-aryldihydropyridines. 4,791,122, Cl. 514-344.000.

Stone, Porter: See—  
Carter, Robert E.; and Stone, Porter, 4,791,251, Cl. 200-33.00R.

Stoner, Eugene M., to ARES, Inc. Lightweight belt link for telescoped ammunition and belt formed therefrom. 4,790,231, Cl. 89-35.020.

Stoner, John M., Jr., to Emhart Industries, Inc. Collar for hand tools. 4,790,586, Cl. 294-57.000.

Storage Technology Partners 11: See—  
Clay, Donald W.; O'Keeffe, Michael J.; Perera, S. Robert; Rather, Howard H.; and Rundell, John P., 4,791,622, Cl. 369-59.000.

Stork, Detlef F.: See—  
Fischer, Christian M. M.; and Stork, Detlef F., 4,790,245, Cl. 101-375.000.

Story, Frank H.: See—  
Sandberg, L. Bogue; Haataja, Bruce A.; Jurmu, Douglas C.; Palardy, Robert D.; Story, Frank H.; and Yates, William A., 4,790,966, Cl. 264-39.000.

Stotzer, Erwin: See—  
Henn, Gunter; Stocker, Manfred; Stotzer, Erwin; Friedrich, Konrad; and Bauer, Thomas, 4,790,689, Cl. 405-240.000.

Stoudt, Michael D.: See—  
Mosehauer, Michael; Spitzner, Jerome G., deceased; Stoudt, Michael D.; and Zeise, Eric K., 4,791,450, Cl. 355-4.000.

Stover, Ernest L. Implement holder. 4,790,461, Cl. 224-241.000.

Strand, Neal T.: See—  
Dreyer, John F., Jr.; and Strand, Neal T., 4,791,540, Cl. 362-331.000.

Streicher, William L.: See—  
Glaser, Hellmut I.; and Streicher, William L., 4,790,136, Cl. 57-350.000.

Stridh, Kent. Apparatus for automatically packing products in packages. 4,790,116, Cl. 53-244.000.

Strippe, David C.: See—  
Phinney, Richard R.; and Strippe, David C., 4,791,261, Cl. 219-10.491.

Strobl, Thomas J. Combined golfing umbrella and golf ball retriever structure. 4,790,338, Cl. 135-16.000.

Stuart, Alan R., to General Electric Company. High bypass ratio counterrotating turbofan engine. 4,790,133, Cl. 60-226.100.

Stubinen Utveckling AB: See—  
Armand, Bjorn, 4,790,549, Cl. 280-47.180.

Sturdevant, Ronald P.; and LaCanne, Michael E., to Prestolite Wire Corporation. Electrical connector for a distributorless ignition system. 4,790,767, Cl. 439-125.000.

Sud Finanz S.A.: See—  
Godbecker, Heinz, 4,790,053, Cl. 29-42.000.

Suda, Shinji: See—  
Yamanaka, Motosuke; Miyake, Kazutoshi; Suda, Shinji; Ohhara, Hideto; and Ogawa, Toshiaki, 4,791,202, Cl. 546-121.000.

Yamanaka, Motosuke; Miyake, Kazutoshi; Suda, Shinji; Ohhara, Hideto; and Ogawa, Toshiaki, 4,791,203, Cl. 546-121.000.

Sudama, Ram; Forcher, Thomas C.; and Leichter, Jerrold S., to Digital Equipment Corporation. Terminal device session management protocol. 4,791,566, Cl. 364-200.000.

Suchiro, Yoshiyuki: See—  
Igarashi, Masato; and Suchiro, Yoshiyuki, 4,791,607, Cl. 365-51.000.

Sugano, Takuo; and Miyake, Hideharu, to University of Tokyo. Intermittent etching process. 4,790,903, Cl. 156-643.000.

Sugawara, Ryoichi: See—  
Seki, Masafumi; Hanada, Yoshiyuki; and Sugawara, Ryoichi, 4,790,615, Cl. 350-96.120.

Sugaya, Tooru: See—  
Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tooru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tada-shi, 4,791,113, Cl. 514-256.000.

Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tooru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tada-shi, 4,791,130, Cl. 514-410.000.

Sugishima, Kiyohisa: See—  
Nagashima, Nao; Sugishima, Kiyohisa; and Yamada, Masanori, 4,791,492, Cl. 358-256.000.

Sugiura, Saburo; Ikeda, Masanobu; and Demukai, Noboru, to Daido Tokushuko Kabushiki Kaisha. Reactor for iron making. 4,790,516, Cl. 266-144.000.

Sugiura, Yoshihide; Ichikawa, Hiroaki; Matsumura, Nobutake; and Sasaki, Nobuo, to Fujitsu Limited. Semiconductor integrated circuit device. 4,791,474, Cl. 357-71.000.

Sugiyama, Hitooshi: See—  
Fujie, Norikazu; and Sugiyama, Hitooshi, 4,791,638, Cl. 379-392.000.

Sugou, Shigeo, to NEC Corporation. Semiconductor laser. 4,791,647, Cl. 372-45.000.

Suire, Rene; Malet, Christian; Speri, Roger J.; and Bernard, Coll., to France Implant; and Innovatque S.A. Method for manufacturing surgical implants at least partially coated with a layer of a metal compound, and implants manufactured according to said method. 4,790,851, Cl. 623-16.000.

Suling, Carlhan; Kauch, Michael; and Dauscher, Rudi, to Bayer Aktiengesellschaft. Linear polyurethane elastomers, and a process for the preparation thereof. 4,791,187, Cl. 528-60.000.

Sumida, Susumu; Kamata, Atsuo; and Yoshii, Fuyuki, to Daihatsu Diesel Mfg. Co., Ltd. Ring-shaped coupling. 4,790,791, Cl. 464-17.000.

Sumino, Tatsuo; Ohtake, Yasutomo; Nakamura, Hiroki; Kon, Masahiro; Mori, Naomichi; and Nakajima, Kazuo, to Hitachi Plant Engineering & Construction Co., Ltd. Immobilization of microorganisms by entrapment. 4,791,061, Cl. 435-178.000.

Sumitani, Jiro: See—  
Kanno, Yoshiaki; Nakamoto, Katsuya; and Sumitani, Jiro, 4,790,282, Cl. 123-493.000.

Sumitomo Elec. Inc. Ltd.: See—  
Ando, Toshinari; Nishi, Masataka; Takahashi, Yoshikazu; and Shimamoto, Susumu, 4,791,241, Cl. 174-125.100.

Sumitomo Electric Industries, Ltd.: See—  
Hiromori, Masahiro; and Nakahara, Toshimi, 4,791,025, Cl. 428-379.000.

Shiga, Nobuo, 4,791,386, Cl. 331-1.00A.

Sumitomo Metal Mining Co. Ltd.: See—  
Nikaido, Hideyasu, 4,791,031, Cl. 428-620.000.

Summa, Gareth D., to MidWest Conveyor Company, Inc. Trolley stop for power and free conveyors. 4,790,247, Cl. 104-172.200.

Sumner, Charles E., Jr.; and Fugate, Eric J., to Eastman Kodak Company. Process for preparation of an oxyacetic acid/hydroxyethyl ether compound. 4,791,224, Cl. 562-421.000.

Sun, Ming-Ting: See—  
Liou, Ming-Lei; Sun, Ming-Ting; and Wu, Lancelot, 4,791,598, Cl. 364-725.000.

Sunbeam Plastics Corporation: See—  
Gach, Peter P., 4,790,442, Cl. 215-216.000.

Sundblom, Leif J.; and Rogers, Daniel D., to Allon Laboratories, Inc. Surgical cassette proximity sensing and latching apparatus. 4,790,816, Cl. 604-31.000.

Sundstrand Corporation: See—  
Heiser, Richard K.; Fulkerson, Thomas R.; and Hawkins, Royal R., 4,791,549, Cl. 364-167.010.

Niggemann, Richard E., 4,790,370, Cl. 165-104.330.

Rodgers, Colin, 4,790,720, Cl. 415-211.000.



Sunstar Giken Kabushiki Kaisha: See—  
Mori, Masahito; So, Masaaki; and Tomoyasu, Hirohide, 4,791,214, Cl. 556-423.000.  
Suntory Limited: See—  
Nakao, Masahiro; Asami, Sumio; Tanaka, Takaharu; Ogura, Kyoi-chi; Amachi, Teruo; Yoshizumi, Hajime; and Ishigooka, Hiroshi, 4,791,059, Cl. 435-198.000.  
Surgidey Corporation: See—  
Grendahl, Dennis T.; and Lippman, Myron E., 4,790,845, Cl. 623-6.000.  
Surti, Tyrone N. Universal ribbon cartridge, 4,790,675, Cl. 400-208.000.  
Suzaki, Yukihiko: See—  
Mieno, Toshiyuki; Nakajima, Toyohi; Nagao, Akira; Suzuki, Yukihiko; and Tanaka, Akira, 4,790,281, Cl. 123-425.000.  
Suzue, Seigo: See—  
Irikura, Tsutomu; Suzue, Seigo; Murayama, Satoshi; Hirai, Keiji; and Ishizaki, Takayoshi, 4,791,225, Cl. 562-493.000.  
Masuzawa, Kuniyoshi; Suzue, Seigo; Hirai, Keiji; and Ishizaki, Takayoshi, 4,791,118, Cl. 514-312.000.  
Suzuki, Akira; Watanabe, Norio; and Kage, Masashi, to Shinryo Corporation: Method of improving SVI of mixed liquor in aeration tank, 4,790,939, Cl. 210-608.000.  
Suzuki, Akira: See—  
Touma, Kiyoshi; Oe, Haruki; and Suzuki, Akira, 4,791,442, Cl. 354-234.100.  
Suzuki, Chiaki: See—  
Aoki, Takayoshi; Takeda, Masayuki; Suzuki, Chiaki; and Nagatsuka, Ikutaro, 4,791,041, Cl. 430-108.000.  
Suzuki, Fumiyuki; Tamura, Yoshiaki; and Shiba, Keisuke, to Fuji Photo Film Co., Ltd. Process for forming multilayered coating film, 4,791,004, Cl. 427-54.100.  
Suzuki, Hideyuki: See—  
Hattori, Katsuhiko; Suzuki, Hideyuki; Yamaguchi, Hiroyuki; and Ogasawara, Takeo, 4,790,214, Cl. 74-866.000.  
Suzuki, Hiroyoshi: See—  
Nishida, Minoru; Inoue, Noriyuki; Asayama, Yoshiaki; and Suzuki, Hiroyoshi, 4,790,286, Cl. 123-571.000.  
Suzuki Jidosha Kogyo Kabushiki Kaisha: See—  
Umehara, Kazuhiro; and Kataoka, Toshiya, 4,790,280, Cl. 123-422.000.  
Suzuki, Koji; and Komatsu, Shunichi, to Canon Kabushiki Kaisha. Power supply device, 4,791,528, Cl. 361-235.000.  
Suzuki, Saiju: See—  
Ito, Gūchi; Mukai, Kousaku; Shimizu, Yuichi; and Suzuki, Saiju, 4,790,660, Cl. 356-376.000.  
Suzuki, Seichi: See—  
Kosaki, Yasufumi; Suzuki, Seichi; Soma, Utami; and Yamashita, Harufumi, 4,791,453, Cl. 355-14.00R.  
Suzuki, Tadao: See—  
Takahashi, Minoru; Tokuda, Hiroatsu; Suzuki, Tadao; Takada, Masumi; and Kooriyama, Tsutomu, 4,790,182, Cl. 73-204.210.  
Suzuki, Takao: See—  
Eimaeda, Shigeru; Aida, Kunihiko; Seto, Shinji; and Suzuki, Takao, 4,790,486, Cl. 241-20.000.  
Suzuki, Takeshi: See—  
Yamatsa, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akihito; Katayama, Kouichi; Tsumoda, Hajime; Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, 4,791,105, Cl. 514-134.000.  
Suzuki, Tetsumi; Murayama, Tetsuo; Ono, Hitoshi; Aramaki, Shinji; and Yokoyama, Michio, to Mitsubishi Chemical Industries, Ltd. AZO compound photoreceptor having naphthol substituents, 4,791,194, Cl. 534-752.000.  
Suzuki, Tetsuo: See—  
Nagai, Haruo; Suzuki, Tetsuo; and Sato, Kazuhiro, 4,791,184, Cl. 526-323.200.  
Suzuki, Tokio; and Sato, Tsutomu, to Alpine Electronics Inc. Apparatus including a pair of angularly spaced sensors for detecting angle of rotation of a rotary member, 4,791,366, Cl. 324-208.000.  
Suzuki, Yoshiaki; Hayashi, Gouichi; and Tsuboi, Masayoshi, to Fuji Photo Film Co., Ltd. Infrared absorbent and optical material using the same, 4,791,023, Cl. 428-336.000.  
Suzuki, Yoshio, to Honda Giken Kogyo Kabushiki Kaisha. Electronic control system for internal combustion engines, 4,791,569, Cl. 364-431.040.  
Swanson, Randy G. Vehicle mounted ram-air powered aerator for live fish containers, 4,790,964, Cl. 261-121.200.  
Swartz, Marsha L., to New Zealand Milk Products, Inc. Beverage cloud based on a whey protein-stabilized lipid, 4,790,998, Cl. 426-585.000.  
Swartz, Robert G., to American Telephone and Telegraph Company, AT&T Bell Labs. High-speed demultiplexer circuit, 4,791,628, Cl. 370-112.000.  
Sweeney, Peter J., to Minroc Technical Promotions Ltd. Valveless down-the-hole drill, 4,790,390, Cl. 173-17.000.  
SWF Auto-Electric GmbH: See—  
Erdelitsch, Herbert; Hecht, Walter; and Rachner, Horst, 4,791,253, Cl. 200-61.270.  
Syntex (U.S.A.) Inc.: See—  
Clark, Robin D., 4,791,108, Cl. 514-233.200.  
Kishimoto, Shinichi; Iwase, Kenichi; Miki, Toshio; and Tanaka, Teiji, 4,791,461, Cl. 356-446.000.  
Sizto, N. Chung; and Rous, Cynthia G., 4,791,056, Cl. 435-7.000.  
Synthelabo: See—  
Langer, Salomon, 4,791,119, Cl. 514-317.000.

Syracuse University: See—  
Honig, Arnold; and Smith, James E., 4,791,310, Cl. 250-458.100.  
Szentivanyi, Zsolt: See—  
Hohn, Johann; Mersmann, Franz-Josef; Obrecht, Werner; and Szentivanyi, Zsolt, 4,791,172, Cl. 525-234.000.  
T. C. Manufacturing Company, Inc.: See—  
Roen, Ralph M.; Gebhardt, Terry D.; and Dokmo, Richard C., 4,790,803, Cl. 493-195.000.  
Tabei, Masatoshi: See—  
Kawajiri, Kazuhiro; and Tabei, Masatoshi, 4,791,307, Cl. 250-578.000.  
Tachigami, Shigeru: See—  
Ohta, Shin-ichiro; Miyazawa, Hidehisa; Tanabe, Etsuo; and Tachigami, Shigeru, 4,790,648, Cl. 350-96.200.  
Tachikawa Corporation: See—  
Tsuchida, Kazuo, 4,790,226, Cl. 83-208.000.  
Tagami, Tomoyuki; and Nawaki, Masaru, to Sharp Kabushiki Kaisha. Semiconductor device with redundancy circuit and means for activating same, 4,791,319, Cl. 307-441.000.  
Taguchi, Masao; and Takemae, Yoshihiro, to Fujitsu Limited. Semiconductor memory device, 4,791,616, Cl. 365-205.000.  
Taguchi, Yoshio: See—  
Takamatsu, Shigeki; Taguchi, Yoshio; and Kato, Takeshi, 4,790,510, Cl. 249-117.000.  
Taherian, Mohammad-Reza: See—  
Maki, August H.; and Taherian, Mohammad-Reza, 4,791,585, Cl. 364-557.000.  
Tajima, Takayuki: See—  
Higashi, Chiyokazu; and Tajima, Takayuki, 4,790,576, Cl. 292-251.500.  
Takabayashi, Naoki: See—  
Koboshi, Shigeharu; Kobayashi, Kazuhiro; Miyaoka, Kazuyoshi; Aoki, Syozo; and Takabayashi, Naoki, 4,791,013, Cl. 428-35.300.  
Takada, Masumi: See—  
Takahashi, Minoru; Tokuda, Hiroatsu; Suzuki, Tadao; Takada, Masumi; and Kooriyama, Tsutomu, 4,790,182, Cl. 73-204.210.  
Takagi, Kazunori: See—  
Yamamoto, Hideo; and Takagi, Kazunori, 4,790,407, Cl. 181-141.000.  
Takahashi, Fumitaka, to Kawai Gakki Seisakusho Co., Ltd. Instrument for practicing multiplication, 4,790,757, Cl. 434-209.000.  
Takahashi, Hideharu, to Sahshin Kogyo Kabushiki Kaisha. Lubricating construction for marine propulsion device of water jet type, 4,790,781, Cl. 440-38.000.  
Takahashi, Hidemi: See—  
Naito, Hiroshi; Takahashi, Hidemi; Kimura, Minoru; and Sano, Reiji, 4,791,299, Cl. 250-352.000.  
Takahashi, Koushiro, to Matsushita Electric Industrial Co., Ltd. Digital driving type color display device, 4,791,415, Cl. 340-701.000.  
Takahashi, Minoru; Tokuda, Hiroatsu; Suzuki, Tadao; Takada, Masumi; and Kooriyama, Tsutomu, to Hitachi, Ltd. Hot wire air flow meter, 4,790,182, Cl. 73-204.210.  
Takahashi, Sadao; and Deki, Tsuyoshi, to Ricoh Company, Ltd. Removable photoconductive element unit for image-forming apparatus, 4,791,454, Cl. 355-15.000.  
Takahashi, Seiji: See—  
Sakimori, Hideharu; Hayashi, Hiroyuki; Ida, Daijiro; and Takahashi, Seiji, 4,790,709, Cl. 414-416.000.  
Takahashi, Shinichi; Ishii, Hisao, deceased (by Ishii, Mariko, legal representative); Shinkawa, Kiyoshi; Kawahara, Takeshi; and Manita, Toshiyuki, to Tokyu Corporation; and Mitsubishi Denki Kabushiki Kaisha. Route bus service controlling system, 4,791,571, Cl. 364-436.000.  
Takahashi, Takao; and Okada, Hiroshi, to Sony Corporation. Index signal detecting system, 4,791,512, Cl. 360-10.200.  
Takahashi, Takao: See—  
Nakano, Kenji; Okada, Hiroshi; and Takahashi, Takao, 4,791,497, Cl. 360-32.000.  
Takahashi, Tsunehiko: See—  
Miyakawa, Tadashi; Yanagihara, Kazuhiko; Oishi, Hisao; Takahashi, Tsunehiko; Nakamura, Takeshi; Akimoto, Kazuhiko; and Shioji, Mitsuaki, 4,790,632, Cl. 350-347.00V.  
Takahashi, Yoshikazu: See—  
Ando, Toshinari; Nishi, Masataka; Takahashi, Yoshikazu; and Shimamoto, Susumu, 4,791,241, Cl. 174-125.100.  
Takai, Kazuki; Ikahata, Toshihiro; and Watanabe, Wataru, to Clarion Co., Ltd. Cyclic actuator lock for tape player, 4,791,505, Cl. 360-137.000.  
Takai, Yasuyuki, to Sharp Kabushiki Kaisha. Random access memory file apparatus for personal computer with external memory file, 4,791,564, Cl. 364-200.000.  
Takakusaki, Nobuyuki; Mizutani, Yohji; Kishida, Nobuhiro; and Hosokawa, Manabu, to Toyo Seikan Kaisha, Ltd. Apparatus for preparing heat-set plastic hollow vessel, 4,790,741, Cl. 425-526.000.  
Takamatsu, Shigeki; Taguchi, Yoshio; and Kato, Takeshi, to Toyota Jidosha Kabushiki Kaisha. Slush mold, 4,790,510, Cl. 249-117.000.  
Takamiya, Bonnosuke: See—  
Hiramatsu, Takeo; Takamiya, Bonnosuke; and Tanaka, Yuichi, 4,791,568, Cl. 364-424.100.  
Takashima, Yuji: See—  
Yamamoto, Hajime; Kunishige, Hidenori; and Takashima, Yuji, 4,791,455, Cl. 355-15.000.  
Takeda Chemical Industries, Ltd.: See—  
Mise, Noritoshi, 4,791,096, Cl. 503-216.000.  
Nakagawa, Yasushi; and Ito, Takashi, 4,791,192, Cl. 530-399.000.

Takeda, Masaru; Nunotaki, Yoshihiro; Harada, Hiroshi; Kawada, Michihiro; and Ishigaki, Masahiro, to Toyo Tire & Rubber Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Flexible shaft coupling for transmission of high torque loads, 4,790,794, Cl. 464-93.000.  
Takeda, Masayuki: See—  
Aoki, Takayoshi; Takeda, Masayuki; Suzuki, Chiaki; and Nagatsuka, Ikutaro, 4,791,041, Cl. 430-108.000.  
Takemae, Yoshihiro, to Fujitsu Limited. Semiconductor memory device formed of a SOI-type transistor and a capacitor, 4,791,610, Cl. 365-149.000.  
Takemae, Yoshihiro: See—  
Taguchi, Masao; and Takemae, Yoshihiro, 4,791,616, Cl. 365-205.000.  
Takenaka Corporation: See—  
Usuda, Masashi; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, 4,790,237, Cl. 98-42.160.  
Takenouchi, Mariko: See—  
Yokoe, Tohru; Shimizu, Masahiro; and Takenouchi, Mariko, 4,791,680, Cl. 382-56.000.  
Takigami, Katsuhiko: See—  
Shinohe, Takashi; Takigami, Katsuhiko; Ohashi, Hiromichi; Ogura, Tsuneo; and Asaka, Masayuki, 4,791,470, Cl. 357-38.000.  
Takimoto, Kiyoshi: See—  
Saito, Kenji; Eguchi, Ken; Kawada, Haruki; Tomida, Yoshinori; Nakagiri, Takashi; Nishimura, Yukuo; and Takimoto, Kiyoshi, 4,790,664, Cl. 356-432.000.  
Talako Kusakawa: See—  
Kusakawa, Takaji; Ebato, Kazuo; Tohge, Takeya; Noda, Masato; and Kuroda, Yasuhide, 4,790,368, Cl. 164-480.000.  
Taliq Corporation: See—  
Kawahara, Hideo; Yoshida, Harunobu; and Hyodo, Masato, 4,791,418, Cl. 340-784.000.  
Tamagawa, Shigehisa; Koike, Kazuyuki; and Fuchizawa, Tetsuro, to Fuji Photo Film Co., Ltd. Heat-sensitive recording sheet, 4,791,093, Cl. 503-200.000.  
Tamahashi, Kunihiko: See—  
Fujikura, Makoto; Ohno, Toshiyuki; Onuma, Shigeharu; Tamahashi, Kunihiko; Chigasaki, Mitsuo; and Shimamura, Yasuo, 4,791,040, Cl. 430-64.000.  
Tamaki, Toshitaka: See—  
Nobiraki, Koji; Metoku, Yoshiharu; Uragami, Hisato; Tamaki, Toshitaka; Yoshimura, Keiji; and Otsuka, Kazuhiko, 4,790,863, Cl. 55-276.000.  
Tamamushi, Takashige: See—  
Nishizawa, Jun-ichi; Tamamushi, Takashige; and Barsony, Istvan, 4,791,396, Cl. 357-22.000.  
Tamura, Hiroshi: See—  
Murayama, Jin; Tamura, Hiroshi; and Kudoh, Yoshimitsu, 4,791,047, Cl. 430-321.000.  
Tamura, Yoshiaki: See—  
Suzuki, Fumiyuki; Tamura, Yoshiaki; and Shiba, Keisuke, 4,791,004, Cl. 427-54.100.  
Tamura, Yoshitaka: See—  
Okonogi, Shigeo; Tomita, Mamoru; Tomimura, Toshio; Tamura, Yoshitaka; and Mizota, Teruhiko, 4,791,193, Cl. 530-416.000.  
Tanabe, Etsuo: See—  
Ohta, Shin-ichiro; Miyazawa, Hidehisa; Tanabe, Etsuo; and Tachigami, Shigeru, 4,790,648, Cl. 350-96.200.  
Tanaka, Akira: See—  
Mieno, Toshiyuki; Nakajima, Toyohi; Nagao, Akira; Suzuki, Yukihiko; and Tanaka, Akira, 4,790,281, Cl. 123-425.000.  
Tanaka, Akito; and Kazuhito, Kimura, to Glory Kogyo Kabushiki Kaisha. Money-collecting device, 4,790,476, Cl. 232-1.00D.  
Tanaka, Atsuo; Okubo, Takao; Ushijima, Takao; and Noguchi, Takeshi, to Nissan Motor Co., Ltd.; and Bridgestone Corporation. Vibration insulating device with flexible diaphragm between radially outer gas chamber and radially inner liquid chamber, 4,790,520, Cl. 267-140.100.  
Tanaka, Haruhiko; Kagawa, Fukashi; and Nakashima, Kouji, to Shell Oil Company. Composition for non-crosslinked foam, 4,791,143, Cl. 521-89.000.  
Tanaka, Haruhiko; Kagawa, Fukashi; and Nakashima, Kouji, to Shell Oil Company. Non-crosslinked foam, 4,791,147, Cl. 521-134.000.  
Tanaka, Kimio; and Shiba, Haruo, to TDK Corporation. Protecting a disc cartridge from inadvertent actuation during nonuse, 4,791,515, Cl. 360-133.000.  
Tanaka, Kunio; and Onishi, Yasushi, to Fanuc Ltd. Area cutting method, 4,791,576, Cl. 364-474.290.  
Tanaka, Masao: See—  
Noguchi, Tetsuo; Tanaka, Masao; and Nakanishi, Hiroshi, 4,790,487, Cl. 241-79.100.  
Tanaka, Nobuyoshi: See—  
Ohmi, Tadashi; and Tanaka, Nobuyoshi, 4,791,469, Cl. 357-30.000.  
Tanaka, Shigeru, to Kabushiki Kaisha Toshiba. Parallel multiplier with a modified booth algorithm, 4,791,601, Cl. 364-760.000.  
Tanaka, Shinaku; Arata, Tadao; and Kido, Kunio, to Tanashin Denki Co., Ltd. Tape recorder with stop detecting mechanism, 4,791,506, Cl. 360-74.200.  
Tanaka, Takaharu: See—  
Nakao, Masahiro; Asami, Sumio; Tanaka, Takaharu; Ogura, Kyoi-chi; Amachi, Teruo; Yoshizumi, Hajime; and Ishigooka, Hiroshi, 4,791,059, Cl. 435-198.000.

Tanaka, Takako: See—  
Kida, Shuji; Nakayama, Noritaka; Katoh, Katsunori; Tanaka, Takako; Nakagawa, Satoshi; and Masuda, Kosaku, 4,791,052, Cl. 430-558.000.  
Tanaka, Teiji: See—  
Kishimoto, Shinichi; Iwase, Kenichi; Miki, Toshio; and Tanaka, Teiji, 4,791,461, Cl. 356-446.000.  
Tanaka, Yasunori; Uchino, Yukinori; and Hashimoto, Hideo, to Kabushiki Kaisha Toshiba; and Tosbec Computer System Co., Ltd. CMOS output circuit device, 4,791,321, Cl. 307-451.000.  
Tanaka, Yuichi: See—  
Hiramatsu, Takeo; Takamiya, Bonnosuke; and Tanaka, Yuichi, 4,791,568, Cl. 364-424.100.  
Tanashin Denki Co., Ltd.: See—  
Tanaka, Shinsaku; Arata, Tadao; and Kido, Kunio, 4,791,506, Cl. 360-74.200.  
Taneya, Mototaka; Matsumoto, Mitsuhiro; and Matsui, Sadayoshi, to Sharp Kabushiki Kaisha. Semiconductor laser array device, 4,791,651, Cl. 372-50.000.  
Taniguchi, Nobuyuki: See—  
Akada, Yasuaki; Ishikawa, Norio; Egawa, Takeshi; and Taniguchi, Nobuyuki, 4,791,445, Cl. 354-402.000.  
Tanizawa, Tetsu: See—  
Kawata, Mitsuya; and Tanizawa, Tetsu, 4,791,320, Cl. 307-446.000.  
Tanouchi, Tadao; Kawamura, Masanori; Ajima, Akio; Mohri, Tetsuya; Hayashi, Masaki; Terashima, Hiroshi; Hirata, Fumio; and Morimura, Takeshi, to Ono Pharmaceutical Co., Ltd. Rhodanine derivatives, process for their preparation, and aldose reductase inhibitor containing the rhodanine derivatives as active ingredients, 4,791,126, Cl. 514-369.000.  
Tanous, Adam C.: See—  
Levinson, Frank H.; Soni, Pravin; Tanous, Adam C.; McCrae, Richard J.; and Ostasiuk, Mark, 4,790,622, Cl. 350-96.200.  
Tarantino, John L. Shellfish trap, 4,790,103, Cl. 43-102.000.  
Tash, George. Drain pipe plug device, 4,790,356, Cl. 138-93.000.  
Tashiro, Yoshio, to Olympus Optical Co., Ltd. Endoscope having transparent resin sealing layer, 4,790,295, Cl. 128-6.000.  
Tasset, Emmett L.: See—  
Childress, David L.; Weaver, John D.; and Tasset, Emmett L., 4,791,081, Cl. 502-62.000.  
Tate, John L. Knotting device, 4,790,575, Cl. 289-17.000.  
Tatsuno, Kimio; and Tsunoda, Yoshito, to Hitachi, Ltd. Phased-array semiconductor laser apparatus, 4,791,650, Cl. 372-50.000.  
Taubitz, Christof: See—  
Lausberg, Dietrich; McKee, Graham E.; Taubitz, Christof; Wassmuth, Georg; and Knoll, Manfred, 4,791,158, Cl. 524-156.000.  
Taybl, Christa, to Krone Aktiengesellschaft. Casing, particularly a junction-box casing for telecommunications engineering, 4,791,244, Cl. 174-52.100.  
Taylor, Dean P.: See—  
Fare, Louis R.; Oh, Yong K.; Taylor, Dean P.; and Widger, Jennifer B., 4,791,064, Cl. 435-252.300.  
Taylor, Geoffrey L.: See—  
Van Hove, Michael; Taylor, Geoffrey L.; and Saghatchi, Hamid, 4,790,624, Cl. 350-96.260.  
Taylor, John A., to Separation Dynamics, Inc. Fluid decontamination system, 4,790,941, Cl. 210-639.000.  
Taylor, Michael D.; and Wang, Shen H., to Amdahl Corporation. Buffer error retry, 4,791,642, Cl. 371-38.000.  
Taylor, Thomas C.; and Cerna, Peter. Aerospace for attachment to space vehicle system, 4,790,499, Cl. 244-161.000.  
TDK Corporation: See—  
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Tech-S, Inc.: See—  
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Technimed Corporation: See—  
Terminiello, Louis; and Aronowitz, Jack L., 4,790,979, Cl. 422-56.000.  
Techno-Instruments Investments Ltd.: See—  
Holtzman, Abraham M.; and Relis, Joseph, 4,790,912, Cl. 204-15.000.  
Technology Inc. 64: See—  
Harney, Kevin; and Keith, Michael, 4,791,594, Cl. 364-717.000.  
Sherrill, James V.; and Sprague, David L., 4,791,580, Cl. 364-521.000.  
Tegal Corporation: See—  
Drage, David J.; Lachenbruch, Roger B.; Drake, Herbert G., Jr.; and Peavey, Jerris H., 4,790,258, Cl. 118-500.000.  
Teigen, Scott C.; and Weidendorf, Joel P., to International Business Machines Corporation. Electrostatic discharge protection for electronic packages, 4,791,524, Cl. 361-212.000.  
Teijin Limited: See—  
Yoshimoto, Masato; and Ohwaki, Shinji, 4,791,026, Cl. 428-397.000.  
Teitel, Meir: See—  
Tsinober, Arkady; Teitel, Meir; and Kit, Eliezer, 4,790,187, Cl. 73-432.100.  
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Blazo, Stephen F.; and Marshall, Gail W., 4,791,589, Cl. 364-518.000.  
Dalrymple, John C., 4,791,595, Cl. 364-719.000.  
Draz, Arthur J.; Whitlow, Dana E.; and Blazo, Stephen F., 4,791,339, Cl. 315-386.000.  
Hollister, Allen L., 4,791,484, Cl. 341-122.000.  
Jeng, Yih-Chyun, 4,791,600, Cl. 364-734.000.  
Mallicoat, Samuel W., 4,791,433, Cl. 346-1.100.



- Telefonaktiebolaget L M Ericsson: See—  
Bergh, Sven H., 4,791,522, Cl. 361-93.000.  
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Kling, Lars-Olof, 4,791,563, Cl. 364-200.000.  
Telefunken Electronic GmbH: See—  
Schairer, Werner; and Gerner, Jochen, 4,791,635, Cl. 372-46.000.  
Telefunken Electronic Systems, Inc.: See—  
Gagnon, Andre; McMillan, Myles; and Gale, P. Michael, 4,791,360, Cl. 324-78.00D.  
Telident, Inc.: See—  
Rockne, David T.; and Johnson, Lowell E., 4,791,663, Cl. 379-113.000.  
Temos, Uis J., to Contour Seats, Inc. Modular stadium seating and assembly method. 4,790,594, Cl. 297-248.000.  
Temple, Robert B.; and Johannesen, Donald D., to Allied-Signal Inc. Retainer assembly. 4,790,704, Cl. 411-522.000.  
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Field, Bruce F.; and Kasper, Joseph G., 4,790,402, Cl. 180-169.000.  
Teonco, Inc.: See—  
Deaver, Don A., 4,790,409, Cl. 181-265.000.  
Teot, Arthur S., to Dow Chemical Company, The. Chemical method of ferric ion removal from acid solutions. 4,790,958, Cl. 252-8.553.  
Teradyne, Inc.: See—  
Grindley, Daniel E., 4,790,067, Cl. 29-748.000.  
Terakia, Antonio E., 4,790,584, Cl. 294-1.100.  
Teran, Kenneth A.: See—  
Manduley, Flavio M.; Kasaruskas, Paul M.; Lilly, Norman R.; and Teran, Kenneth A., 4,790,120, Cl. 53-468.000.  
Terahima, Hiroshi: See—  
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Terino, Edward. Malar implant and method of inserting the prosthesis. 4,790,849, Cl. 623-11.000.  
Terminello, Louis; and Aronowitz, Jack L., to Technimed Corporation. Test strip and fixture. 4,790,979, Cl. 422-56.000.  
Terumo Kabushiki Kaisha: See—  
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Terzi, Dario, to Terzi Stampi S.n.c. di Dario Terzi & C. Cup-cap combination for soft drink cans. 4,790,444, Cl. 220-90.200.  
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Lin, Jiang-Jen; and Speranza, George P., 4,791,230, Cl. 564-159.000.  
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Liu, Christopher S.; Hart, William P.; and Kapuscinski, Maria M., 4,790,948, Cl. 252-47.500.  
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Texas Instruments Incorporated: See—  
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Chauvel, Gerard, 4,791,476, Cl. 358-13.000.  
Malhi, Satinder S., 4,791,463, Cl. 357-23.600.  
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Theeuwes, Felix, to Alza Corporation. Parenteral agent dispensing equipment with drug releasing member. 4,790,820, Cl. 604-85.000.  
Theodor Groz & Soehne: See—  
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Thirion, Terry R. Acoustic drum. 4,790,228, Cl. 84-411.00R.  
Thomas & Betts Corporation: See—  
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Thomas, Evan G.; Smalley, Edmund W.; and Cook, Kane D., to HMC Patents Holding Co., Inc. Positive photoresist stripping composition. 4,791,043, Cl. 430-256.000.  
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Thomas, Robert M., to American Motors Corporation. Lost motion link. 4,790,206, Cl. 74-502.400.  
Thomas, William A. Aircraft brake shipping container. 4,790,430, Cl. 206-303.000.  
Thompson, Floyd M., to CRC-Evans Pipeline International, Inc. Capstan drive assembly for filler wire in electric arc welding. 4,791,271, Cl. 219-136.000.  
Thompson, Michael B.; and Torrence, Robert J., to Eaton Corporation. Superheat control of air conditioning system incorporating fuel cooler. 4,790,145, Cl. 62-212.000.  
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Tonsmann, Armin; and Diekmann, Bernd, to Schueco Heinz Schuer-mann GmbH & Co. Actuating arrangement for window casement or door leaf fittings. 4,790,583, Cl. 292-336.300.  
Tooru, Kayatani: See—  
Kyokuichi, Sato; and Tooru, Kayatani, 4,790,449, Cl. 220-288.000.  
Torii, Takashi: See—  
Iwase, Hiromichi; Sasaki, Shigeru; Gotoh, Toshiyuki; Torii, Takashi; and Ozaki, Tohru, 4,791,678, Cl. 382-54.000.  
Torrence, Robert J.: See—  
Thompson, Michael B.; and Torrence, Robert J., 4,790,145, Cl. 62-212.000.  
Toebac Computer System Co., Ltd.: See—  
Tanaka, Yasunori; Uchino, Yukinori; and Hashimoto, Hideo, 4,791,321, Cl. 307-451.000.  
Toshiba Silicone Co., Ltd.: See—  
Ohkawa, Kazuhiro; and Yamazaki, Tarou, 4,790,968, Cl. 264-104.000.  
Total Compagnie Francaise des Petroles: See—  
Dominguez, Henri, 4,790,768, Cl. 439-320.000.  
Tou, James C., to Dow Chemical Company, The. Mass spectrometer sampling system for a liquid stream. 4,791,291, Cl. 250-288.000.  
Tou, James C.: See—  
Cooks, Robert O.; Bier, Mark E.; Brodbelt, Jennifer S.; Tou, James C.; and Westover, Lemoyne B., 4,791,292, Cl. 250-288.000.  
Touma, Kiyoshi; Oe, Haruki; and Suzuki, Akira, to Copal Company Limited. Camera shutter using an electrostrictive strain element as a driving source. 4,791,442, Cl. 354-234.100.  
Touyama, Tsukuo: See—  
Wada, Tatsuo; Yamashita, Keizo; Touyama, Tsukuo; and Yamamoto, Teruaki, 4,790,902, Cl. 156-630.000.  
Toy, Adrian C.: See—  
Sittler, Fred C.; and Toy, Adrian C., 4,791,398, Cl. 338-25.000.  
Toyo Jozo Kabushiki Kaisha: See—  
Mizaki, Hideo; and Ueda, Shigeru, 4,791,057, Cl. 435-26.000.  
Toyo Seikan Kaisha, Ltd.: See—  
Takakusaki, Nobuyuki; Mizutani, Yohji; Kishida, Nobuhiro; and Honokawa, Manabu, 4,790,741, Cl. 425-526.000.  
Toyo Tire & Rubber Company Limited: See—  
Ohta, Takamichi; Izumi, Takashi; Yamazaki, Takeshi; and Fukushima, Shigeo, 4,791,019, Cl. 428-304.400.  
Takeda, Masaru; Nunotaki, Yoshihiro; Harada, Hiroshi; Kawada, Michihiro; and Ishigaki, Masahiro, 4,790,794, Cl. 464-93.000.  
Toyota Gosei Co., Ltd.: See—  
Fukamachi, Satoshi; Mitsui, Kenichi; Matsuo, Kunihiro; and Korenaga, Kazumi, 4,790,737, Cl. 425-114.000.  
Ishida, Syuichi, 4,790,209, Cl. 74-552.000.  
Ito, Akira; Hagiwara, Hideo; and Kaisaku, Tetsuo, 4,790,590, Cl. 296-146.000.  
Toyota Koki Kabushiki Kaisha: See—  
Tsuzuki, Sadaki; and Uemura, Satoru, 4,790,426, Cl. 198-741.000.  
Toyota Jidosha Kabushiki Kaisha: See—  
Hamano, Yukio, 4,790,215, Cl. 74-866.000.  
Takamatsu, Shigeaki; Taguchi, Yoshio; and Kato, Takeshi, 4,790,510, Cl. 249-117.000.  
Takeda, Masaru; Nunotaki, Yoshihiro; Harada, Hiroshi; Kawada, Michihiro; and Ishigaki, Masahiro, 4,790,794, Cl. 464-93.000.  
Uraniishi, Koji; and Ito, Takaaki, 4,790,283, Cl. 123-519.000.  
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Yotsuya, Hiroshi; Kondo, Hiroshi; Sakurai, Kaoru; Murakami, Harunori; and Murakami, Hajime, 4,791,425, Cl. 343-713.000.  
Toyota, Sumio, to Yoshida Kogyo K.K. Tape feed apparatus. 4,790,469, Cl. 226-129.000.  
Toyotomi Kogyo Co., Ltd.: See—  
Nakanishi, Yutaka, 4,790,184, Cl. 73-317.000.  
Nakanishi, Yutaka; Yamada, Toshihiko; and Mizuno, Junji, 4,790,745, Cl. 431-88.000.  
Tracy, Daniel A.: See—  
Smyth, Richard E.; and Tracy, Daniel A., 4,790,537, Cl. 273-143.00R.  
TranTek Inc.: See—  
Brown, Ross A.; and Davis, Guy M., 4,790,971, Cl. 264-138.000.  
Traver, Frank J.; and Merrill, Duane F., to General Electric Company. Silicone adhesive and organic adhesive emulsions. 4,791,163, Cl. 524-506.000.  
Travers, Christine: See—  
Chaumette, Patrick; Courty, Philippe; Durand, Daniel; Grandvallet, Pierre; and Travers, Christine, 4,791,141, Cl. 518-713.000.  
Tredwell, Colin J.; and Price, Donald R. C., to GEC Avionics Limited. Position indicating apparatus. 4,791,478, Cl. 358-88.000.  
Trentelman, Jackson P.: See—  
Chang, Zung-Sing; and Trentelman, Jackson P., 4,790,867, Cl. 65-356.000.  
Trevor-Jones, Hugh: See—  
O'Connell, John; Webster, Alan; Jefferies, Roy S.; and Trevor-Jones, Hugh, 4,791,280, Cl. 235-382.500.  
Triad Semiconductors International BV: See—  
Threewitt, N. Bruce; and Price, Simon M., 4,791,606, Cl. 365-49.000.  
Trick, Robert E., to Medical Engineering Corporation. Penile prosthesis and method. 4,790,298, Cl. 128-79.000.  
Trimrite, Inc.: See—  
Helming, Michael A.; and Gander, John F., 4,790,071, Cl. 30-76.000.  
Tripier, Dominique: See—  
Kramer, Martin; and Tripier, Dominique, 4,791,100, Cl. 514-12.000.  
Triplett, James T.: See—  
Campbell, Bruce D.; Triplett, James T.; and Tylor, Richard E., 4,790,617, Cl. 350-96.150.  
Trivedi, Bharat K.; Moss, Walter; Hamilton, Harriet W.; and Patt, William C., to Warner-Lambert Company. 2,N'-disubstituted adenosines, derivatives and methods of use. 4,791,103, Cl. 514-46.000.  
Trofe, Timothy W.: See—  
Castaldi, Frank J.; Trofe, Timothy W.; Page, Gordon C.; and Adams, Kevin M., 4,790,940, Cl. 230-611.000.  
Tronzano, Sergio, to Ing. C. Olivetti & C., S.p.A. Apparatus for positioning a reading-recording head on a disc. 4,791,502, Cl. 360-106.000.  
Trost, Josef: See—  
Piepenbreier, Ernst; and Trost, Josef, 4,790,248, Cl. 105-131.000.  
Troup, Philip A.: See—  
Galvagni, John L.; and Troup, Philip A., 4,791,006, Cl. 427-282.000.  
Troxler Electronic Laboratories, Inc.: See—  
Pratt, James D., Jr.; and Ely, Ralph L., Jr., 4,791,656, Cl. 378-89.000.  
Trusty, Robert D., to Cardmatic, Inc. Card dispenser. 4,790,435, Cl. 206-39.500.  
TRW Cam Gears Ltd.: See—  
Warr, Roland A.; and Rogers, Peter R., 4,790,074, Cl. 33-199.00R.  
TRW Ehrenreich GmbH & Co. KG: See—  
Henkel, Gunther, 4,790,682, Cl. 403-140.000.  
TRW Inc.: See—  
Clarke, Stanley P., 4,790,654, Cl. 356-310.000.  
Drutchas, Gilbert H., deceased, 4,790,522, Cl. 267-225.000.  
Winter, John E., 4,791,577, Cl. 364-485.000.  
TRW Vehicle Safety Systems Inc.: See—  
Brown, Louis R., 4,790,561, Cl. 280-806.000.  
Tsao, Ying-Yen P.: See—  
Chang, Clarence D.; Chen, Nai Y.; Hellring, Stuart D.; Tsao, Ying-Yen P.; and Walsh, Dennis E., 4,790,928, Cl. 208-111.000.  
Tseng, Chi-Ming: See—  
Vanderhoff, John W.; Micale, Fortunato J.; El-Aasser, Mohamed S.; and Tseng, Chi-Ming, 4,791,162, Cl. 524-458.000.  
TSI Incorporated: See—  
Keady, Patricia B., 4,790,650, Cl. 356-37.000.  
Tsinober, Arkady; Teitel, Meir; and Kit, Eliezer, to Ramot University Authority for Applied Research & Industrial Development Ltd. Tel Aviv University. Probe for determining local shear stress. 4,790,187, Cl. 73-432.100.  
Tsuboi, Masayoshi: See—  
Suzuki, Yoshiaki; Hayaishi, Gouchi; and Tsuboi, Masayoshi, 4,791,023, Cl. 428-336.000.  
Tsuchida, Kazuo, to Tachikawa Corporation. Apparatus for cutting blind slats. 4,790,226, Cl. 83-208.000.  
Tsuwane, Shuzo: See—  
Kuroda, Hideo; Mukawa, Naoki; Hirnoka, Makoto; Matsuda, Kiichi; Nishiwaki, Mitsuo; and Tsugane, Shuzo, 4,791,485, Cl. 358-136.000.  
Tsujii, Tatsuya: See—  
Kasai, Toshihiro; and Tsujii, Tatsuya, 4,791,452, Cl. 355-14.00D.  
Tsujioaka, Hiroshi, to Sharp Kabushiki Kaisha. Ruler for fixed-distance movement. 4,790,077, Cl. 33-447.000.  
Tsukishima, Takashige, to Nogoya University. Dual homodyne detection system to measure asymmetric spectrum by using angle mirrors. 4,790,656, Cl. 356-349.000.  
Tsunashima, Yoshitaka; Yamada, Keisaku; and Kashio, Takako, to Kabushiki Kaisha Toshiba. Method of manufacturing a semiconductor apparatus. 4,791,074, Cl. 437-160.000.  
Tsunoda, Hajime: See—  
Yamatsa, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwaru, Akiharu; Katayama, Kouichi; Tsunoda, Hajime;



- Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, 4,791,105, Cl. 514-134.000.
- Tsunoda, Yoshito: See—  
Tatsuno, Kimio; and Tsunoda, Yoshito, 4,791,650, Cl. 372-50.000.
- Tsutsumi, Hideo: See—  
Fukasawa, Junichi; Ina, Yoshimitsu; and Tsutsumi, Hideo, 4,791,140, Cl. 514-845.000.
- Tsuzuki, Naohisa, to Kabushiki Kaisha Toshiba. Automatic magnetic field measuring apparatus using NMR principles. 4,791,368, Cl. 324-301.000.
- Tsuzuki, Sadaaki; and Uemura, Satoru, to Toyota Koki Kabushiki Kaisha. Transfer apparatus. 4,790,426, Cl. 198-741.000.
- Tubos e Conexoes Tigre S/A: See—  
Cardozo, Daniel A., 4,790,373, Cl. 285-330.000.
- Tucker, Dan: See—  
Freedman, Milton W.; and Tucker, Dan, 4,791,376, Cl. 324-555.000.
- Tucker, Stuart G.: See—  
Garcia, Leslie C.; Tjon-Pian-Gi, David C.; Tucker, Stuart G.; and Zajac, Myron W., 4,791,555, Cl. 364-200.000.
- Turchi, Ignatius J.: See—  
Lutomski, Kathryn A.; Burkart, Susan E.; Phillips, Richard B.; Roush, David M.; and Turchi, Ignatius J., 4,791,124, Cl. 514-363.000.
- Turkington, Roger D.: See—  
Spriggs, Hugh; Nightingale, Charles; and Turkington, Roger D., 4,791,486, Cl. 358-138.000.
- Turner, Abner B., to Westinghouse Electric Corp. Dry ash handling system for an incinerator. 4,790,250, Cl. 110-165.00A.
- Turner, Andrew D.: See—  
Bridger, Nevill J.; and Turner, Andrew D., 4,790,918, Cl. 204-149.000.
- Turner, David L.: See—  
Dunn, C. Lamar; and Turner, David L., 4,790,943, Cl. 210-705.000.
- Turner, Howard W., to Exxon Chemical Patents Inc. New polymerization catalyst. 4,791,180, Cl. 526-160.000.
- Turner, William C. Method of cladding tubing and plate products. 4,790,471, Cl. 228-131.000.
- Turukawa, Ikuya: See—  
Nishi, Kohichi; Yamaguchi, Kunihisa; and Turukawa, Ikuya, 4,791,441, Cl. 354-195.120.
- Tury, Edward L.; Salzmann, David F.; Leigh-Monstevens, Keith V.; Vander Poorte, John G.; and Peterson, David C., to Automotive Products, plc. Electric shift apparatus. 4,790,204, Cl. 74-483.0PB.
- Tussing, Gerald J.: See—  
Reinhardt, Richard A.; and Tussing, Gerald J., 4,790,751, Cl. 433-29.000.
- Twerdochlib, Michael, to Westinghouse Electric Corp. Method for eliminating sensor drift in a vibration monitoring system. 4,790,189, Cl. 73-660.000.
- Twerdochlib, Michael: See—  
Bellowa, James C.; and Twerdochlib, Michael, 4,790,194, Cl. 73-661.530.
- Tyenda, Eugene J. Method of preparing dimensionally stable, flexible urethane foam and the foam produced thereby. 4,791,146, Cl. 521-114.000.
- Taylor, Richard E.: See—  
Campbell, Bruce D.; Triplett, James T.; and Taylor, Richard E., 4,790,617, Cl. 350-96.150.
- Typo, Pekka, to Impact Systems, Inc. Scanning combination thickness and moisture gauge for moving sheet material. 4,791,353, Cl. 324-61.00R.
- Typo, Pekka M., to Impact Systems, Inc. Contacting thickness gauge for moving sheet material. 4,791,367, Cl. 324-229.000.
- Uebakata, Susumu; Mizutani, Yasukazu; and Iyoda, Syozo, to Uebakata, Susumu. Motor protector mounting structure for enclosed electric compressors. 4,791,329, Cl. 310-68.00C.
- Uchida, Hiroshi, to Murata Kikai Kabushiki Kaisha. Spinning winder. 4,790,131, Cl. 57-281.000.
- Uchino, Yukinori: See—  
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- Ueda, Kazutoshi: See—  
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- Ueda, Shigeru: See—  
Mizaki, Hideo; and Ueda, Shigeru, 4,791,057, Cl. 435-26.000.
- Ueda, Tomoaki; Kai, Takahige; Oaka, Tatsuhiko; and Nishiguchi, Kazuo, to Daikin Industries, Ltd. Polygon-filling apparatus used in a scanning display unit and method of filling the same. 4,791,582, Cl. 364-522.000.
- Ueda, Tohihiko: See—  
Iwazaki, Satoru; Ueda, Tohihiko; and Konoma, Kunihiko, 4,790,638, Cl. 350-465.000.
- Uehara, Akira: See—  
Nakayama, Muneco; Uehara, Akira; Sago, Hiroyoshi; and Mizuki, Hideyuki, 4,790,262, Cl. 118-52.000.
- Uemura, Satoru: See—  
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- Ueno, Hideo: See—  
Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tohru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tada-ashi, 4,791,113, Cl. 514-256.000.
- Kuroda, Tokuyuki; Hisamura, Koji; Sugaya, Tohru; Ohsawa, Yutaka; Ueno, Hideo; Morimoto, Makoto; and Ashizawa, Tada-ashi, 4,791,130, Cl. 514-410.000.
- Ueno, Tohihiko; and Daini, Hiroshi, to Bando Chemical Industries, Ltd. Pin tractor. 4,790,466, Cl. 226-74.000.
- Ueyama, Noboru: See—  
Ohashi, Takahisa; Kan, Kazunori; Ueyama, Noboru; Sada, Isao; Miyama, Akimasa; and Watanabe, Kiyoshi, 4,791,198, Cl. 540-354.000.
- Ukai, Norio; Serizawa, Mitsuya; Oyama, Yasuharu; Furukawa, Yoshimi; Ogura, Masami; and Sato, Tsuyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Steering system for motor vehicle. 4,790,531, Cl. 280-91.000.
- Umehara, Kazuhiro; and Kataoka, Tohiya, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Ignition apparatus. 4,790,280, Cl. 123-422.000.
- Umemoto, Masuo; Eto, Yoshizumi; Miyazaki, Shinichi; Kanada, Hidehiro; Katayama, Hitoshi; and Michikawa, Yuichi, to Hitachi Denchi Kabushiki Kaisha; and Hitachi Ltd. Digital signal recording and reproducing system having an interface for dubbing a color television signal in the component form. 4,791,495, Cl. 358-310.000.
- Uneu, Leif; and Wallin, Svante, to Opsis AB. Method and apparatus for determining parameters of gaseous substances. 4,790,652, Cl. 356-45.000.
- Union Carbide Corporation: See—  
Pellet, Regis J.; Coughlin, Peter K.; Stanulis, Mark T.; Long, Gary N.; and Rabo, Julie A., 4,791,083, Cl. 502-64.000.
- Union Oil Company of California: See—  
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- Unisys Corporation: See—  
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- Lahti, Archie E.; James, Ralph L.; and Byers, Larry L., 4,791,560, Cl. 364-200.000.
- Shima, George T., 4,791,562, Cl. 364-200.000.
- United Kingdom Atomic Energy Authority: See—  
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- United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in her Britannic Majesty's Government of the: See—  
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- United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: See—  
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- United States of America: See—  
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- Army: See—  
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- Energy: See—  
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- Priatko, Gordon J., 4,791,630, Cl. 370-3.000.
- Navy: See—  
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- U.S. Philips Corp.: See—  
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- Dunn, William A. E.; and Gowllett, David J., 4,791,298, Cl. 250-352.000.
- Erman, Marko; Hily, Claude E.; and Le Bris, Jean, 4,790,659, Cl. 356-369.000.
- Hethuin, Serge; Crepin, Hugues; and Fauret, Jerome, 4,791,599, Cl. 364-728.070.
- Hoeberechts, Arthur M. E., 4,791,468, Cl. 357-30.000.
- Hughes, John B., 4,791,379, Cl. 328-167.000.
- Sauerwald, Wilhelm A.; De Wilde, Johannes; Van Eerdewijk, Karel J. E.; Beekker, Franciscus P. M.; and Segers, Marinus T. M., 4,791,358, Cl. 324-73.00R.
- Stinesen, Bernardus J., 4,791,624, Cl. 369-270.000.
- Thoon, Martinus L. G.; and Krukkert, Henricus P. M., 4,791,574, Cl. 364-457.000.
- Willems, Leonardus F., 4,791,671, Cl. 381-49.000.
- United Technologies Corporation: See—  
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- Universal Maschinenfabrik Dr. Rudolf Schieber GmbH & Co.: See—  
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- Universal Maschinenfabrik: See—  
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- Universite de Rennes I: See—  
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- Universite Louis Pasteur: See—  
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- University of California, The Regents of the: See—  
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- University of Florida: See—  
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- University of Iowa Research Foundation: See—  
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- University of Kentucky Research Foundation, The: See—  
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- University of Michigan, The: See—  
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- University of Nebraska, The Board of Regents of the: See—  
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- University of Tokyo: See—  
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- University of Waterloo: See—  
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- Uno, Katsuhiko; Ishikawa, Katsuhiko; and Inoue, Shojiro, to Matsushita Electric Industrial Co., Ltd. Vaporizing fuel burner. 4,790,746, Cl. 431-314.000.
- Uno, Shigeki: See—  
Sakai, Tadashi; Katsura, Masaki; Hiraki, Hideaki; Uno, Shigeki; Shimbo, Masaru; and Furukawa, Kazuyoshi, 4,791,465, Cl. 357-25.000.
- UOP Inc.: See—  
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- Upjohn Company, The: See—  
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- Uragami, Hisato: See—  
Nobiraki, Koji; Motoku, Yoshiharu; Uragami, Hisato; Tamaki, Tohitaka; Yoshimura, Keiji; and Otsuka, Kazuhiko, 4,790,863, Cl. 55-276.000.
- Uranishi, Koji; and Ito, Takasaki, to Toyota Jidosha Kabushiki Kaisha. Fuel tank. 4,790,283, Cl. 123-519.000.
- Urano, Shigeru; and Hirakawa, Osamu, to Nippon Piston Ring Co., Ltd. Abrasion resistant sintered alloy. 4,790,875, Cl. 75-241.000.
- Urbanski, Maud: See—  
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- Ushijima, Takao: See—  
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- Usuda, Masashi; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, to Takenaka Corporation; and Kyoritsu Co., Ltd. Damper. 4,790,237, Cl. 98-42.160.
- Usui, Hideo: See—  
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- Usui Kokusai Sangyo Kabushiki Kaisha: See—  
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- Usui, Toshifumi; Yamada, Kinsaku; Osawa, Tadao; and Kawano, Hirotohi, to Hitachi, Ltd. Intake structure of internal combustion engine with bypass intake passage for mounting air flow meter. 4,790,178, Cl. 73-118.200.
- Utsumi, Kazuki: See—  
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- Vabre, Maryse: See—  
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- Vaccaro, Joseph P., to Carrier Corporation. Rotary cylinder configuration and method to control slot dimensions during direct weld attachment to the shell. 4,790,733, Cl. 418-63.000.
- Vadasz, Jeffery L., to Rojef Distributors, Inc. Silicone emulsion polishes and their formulation. 4,790,877, Cl. 106-3.000.
- Vahlsing, Donald W.: See—  
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- Vajdic, Branislav; and Smith, Stephen L., to Intel Corporation. Current controlled solid state switch. 4,791,326, Cl. 307-571.000.
- Valco: See—  
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- Vallee, Eric: See—  
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- Valmey Oy: See—  
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- Vampola, Edward F.: See—  
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- Van Antwerp, John S.: See—  
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- Van Broekhoven, Johannes A. M., to Shell Oil Company. Removal of palladium compound catalyst residues from polymer ketones. 4,791,190, Cl. 528-483.000.
- Vance Products Incorporated: See—  
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- Vanderford, Delbert E., Jr., to Cameron Iron Works USA, Inc. Well-head hanger. 4,790,379, Cl. 166-208.000.
- Van Der Heyden, Johannes A. M.: See—  
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Coffey, Fred S.; Allen, Thomas W.; and Wille, James E., 4,790,906, Cl. 162-156.000.  
Willems, Leonardus F., to U.S. Philips Corporation. System for analyzing human speech, 4,791,671, Cl. 381-49.000.  
Williams, Edward A., to Stanley Works, The. Chuck key mounting and ejector arrangement, 4,790,696, Cl. 408-241.00R.  
Wills, David C.; and Atkinson, Jay D., to NCR Corporation. Display support mechanism, 4,790,504, Cl. 248-183.000.  
Wills, Leslie J., to Commonwealth Scientific and Industrial Research Organization. Droplet stream alignment for jet printers, 4,791,434, Cl. 346-75.000.  
Wilson, David P.: See—  
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Wilson Foods Corporation: See—  
Archibald, William E., 4,790,450, Cl. 220-418.000.  
Wilson, Ian L. W.; Clark, William G., Jr.; and Radford, Kenneth C., to Westinghouse Electric Corp. Process for securing a turbine blade, 4,790,723, Cl. 416-220.00R.  
Wilson, Kenneth M.: See—  
Colwill, John C.; and Wilson, Kenneth M., 4,790,302, Cl. 128-92.0YZ.  
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Sprecker, Mark A.; Wilson, Stephen R.; Steinbach, Leonard; and O'Rourke, Thomas, 4,791,222, Cl. 560-237.000.  
Windmere Corporation: See—  
Thaler, Arnold; and Yip, P. C., 4,791,272, Cl. 219-222.000.  
Windmoller & Holscher: See—  
Mundus, Friedhelm; and Voss, Hans-Ludwig, 4,790,491, Cl. 242-68.400.  
Winfield, Nicholas: See—  
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Winter, Joseph; and Pryor, Michael J., to Olin Corporation. Optical fiber cable assemblies. 4,790,623, Cl. 350-96.230.

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Wittmeyer, Henning; Kellstrom, Magnus; Jarskar, Staffan; and Floderus, Mats, to Aktiebolaget SKF. Sealing device governed by centrifugal force. 4,790,543, Cl. 277-25.000.

Wittwer, Fritz; and Tomka, Ivan, to Warner-Lambert Company. Molded hydrophilic polymer. 4,790,881, Cl. 106-189.000.

Wixon, Harold E., to Colgate-Palmolive Company. Softening and anti-static nonionic detergent composition with sulfosuccinamate detergent. 4,790,856, Cl. 8-137.000.

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Wolf, Gilbert. Fuel system. 4,790,285, Cl. 123-549.000.

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Kirchner, Hans-Gert; and Wahle, Bernd, 4,790,044, Cl. 8-151.000.

Wolffes, Hans. See—

Gehrig, Norbert; and Wolffes, Hans, 4,790,511, Cl. 251-30.020.

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Woods, Randall L. Intraocular lens implant having eye focusing capabilities. 4,790,847, Cl. 623-6.000.

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Mallen, Ted A.; and Word, Doyle B., 4,790,907, Cl. 162-157.100.

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Liou, Ming-Lei; Sun, Ming-Ting; and Wu, Lancelot, 4,791,598, Cl. 364-725.000.

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Xerox Corporation. See—

Casilio, Leonello, 4,790,580, Cl. 292-262.000.

Foley, Geoffrey M.; and Anderson, Robert W., 4,791,449, Cl. 355-3.00R.

Jacobs, Robert M., 4,791,447, Cl. 355-3.0FU.

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Hirai, Hiroyuki; Yabuki, Yoshiharu; and Iwano, Haruhiko, 4,791,048, Cl. 430-372.000.

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Yamada, Hideo. See—

Usuda, Masashi; Shimizu, Kiyoshi; Iwata, Eiji; Yamada, Hideo; Onozuka, Kazutaka; Kuno, Toshio; Kuno, Hideo; and Kuno, Yukio, 4,790,237, Cl. 98-42.160.

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Yamada, Koichi. See—

Doyama, Yoshiaki; Kubo, Kanji; and Yamada, Koichi, 4,791,507, Cl. 360-77.150.

Yamada, Kouji. See—

Yamatsa, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Katayama, Kouichi; Tsunoda, Hajime; Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, 4,791,105, Cl. 514-134.000.

Yamada, Masanori. See—

Nagashima, Nao; Sugishima, Kiyohisa; and Yamada, Masanori, 4,791,492, Cl. 358-256.000.

Yamada, Mitsuru, to JEOL Ltd. Method and apparatus for automatically correcting astigmatism of scanning electron microscope or the like. 4,791,295, Cl. 250-310.000.

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Imagumbai, Masana; Chijiwa, Rikio; and Yamada, Naomichi, 4,790,885, Cl. 148-2.000.

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Ishitsuka, Takeshi; Yamagishi, Yasuo; and Mochizuki, Akihiro, 4,791,039, Cl. 430-2.000.

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Onoe, Susumu; and Yamaguchi, Mutsuyuki, 4,790,802, Cl. 474-260.000.

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Sakurai, Kenichi; and Ueda, Kazutoshi, 4,790,287, Cl. 123-573.000.

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Yamamoto, Etsuji; and Kohno, Hideki, to Hitachi, Ltd. Method of measuring magnetic field error of an NMR imaging apparatus and of correcting distortion caused by the error. 4,791,369, Cl. 324-312.000.

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Yamamoto, Hideo; and Takagi, Kazunori, to Pioneer Electronic Corporation. Resonance-compensated speaker system for vehicle. 4,790,407, Cl. 181-141.000.

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Yamamoto, Hiroyoshi. See—

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Yamamoto, Masahiro, to Onoda Cement Company, Ltd. Gun head for powder painting. 4,790,485, Cl. 239-707.000.

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Yamamoto, Saburo; Yamamoto, Osamu; Morimoto, Taiji; Hayashi, Hiroshi; Miyauchi, Nobuyuki; and Maei, Shigeki, to Sharp Kabushiki Kaisha. Semiconductor laser device and a method for driving the same. 4,791,636, Cl. 372-46.000.

Yamamoto, Saburo; Morimoto, Taiji; Miyauchi, Nobuyuki; and Maei, Shigeki, to Sharp Kabushiki Kaisha. Semiconductor laser device. 4,791,649, Cl. 372-48.000.

Yamamoto, Shu; and Mochizuki, Kiyofumi, to Kokusai Denshin Denwa Kabushiki Kaisha. System for measuring laser spectrum. 4,790,655, Cl. 356-345.000.

Yamamoto, Teruaki. See—

Wada, Tatsuo; Yamashita, Keizo; Touyama, Tasuku; and Yamamoto, Teruaki, 4,790,902, Cl. 156-630.000.

Yamamoto, Yoshinori; and Ochi, Muneyoshi, to Hitachi Maxell, Ltd. Magnetic tape cartridge made from heat resistant resinous material. 4,791,503, Cl. 360-132.000.

Yamanaka, Motosuke; Miyake, Kazutoshi; Suda, Shinji; Ohhara, Hideto; and Ogawa, Toshiaki, to Eisai Co., Ltd. 5-(6-imidazo(1,2-a)pyridyl)pyridine derivatives. 4,791,202, Cl. 546-121.000.

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Yamanaka, Sahunichiro, to Orient Chemical Industries, Ltd. Molding resin composition. 4,791,153, Cl. 523-453.000.

Yamasaki, Ichiro. See—

Yonezawa, Takashi; Yoshizumi, Toshiaki; Hosomi, Mamoru; Onuma, Akiyoshi; and Yamasaki, Ichiro, 4,791,256, Cl. 200-148.00R.

Yamashita, Harufumi. See—

Koseki, Yasufumi; Suzuki, Seichi; Soma, Utami; and Yamashita, Harufumi, 4,791,453, Cl. 355-14.00R.

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Yamatsa, Isao; Suzuki, Takeshi; Abe, Shinya; Nakamoto, Kouji; Kajiwara, Akiharu; Katayama, Kouichi; Tsunoda, Hajime; Murakami, Manabu; Ono, Hideki; and Yamada, Kouji, to Eisai Co., Ltd. Therapeutic and preventive agent containing dolichol. 4,791,105, Cl. 514-134.000.

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Homma, Masaji; and Yamauchi, Hitoshi, 4,790,894, Cl. 156-230.000.

Yamazaki, Hisashi. See—

Arakawa, Satoshi; Hosoi, Yuichi; Yamazaki, Hisashi; and Ito, Yoshiteru, 4,791,009, Cl. 427-64.000.

Yamazaki, Shunpei, to Semiconductor Energy Laboratory Co., Ltd. Liquid crystal device with ferroelectric liquid crystal adapted for unipolar driving. 4,790,631, Cl. 350-336.000.

Yamazaki, Tarou. See—

Ohkawa, Kazuhiro; and Yamazaki, Tarou, 4,790,968, Cl. 264-104.000.

Yamazi, Takeshi. See—

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Yanagi, Toshiaki. See—

Yoshida, Shinji; and Yanagi, Toshiaki, 4,791,344, Cl. 318-567.000.

Yanagihara, Kazuhiko. See—

Miyakawa, Tadashi; Yanagihara, Kazuhiko; Oishi, Hisao; Takahashi, Tsunehiko; Nakamura, Takeshi; Akimoto, Kazuhiko; and Shioji, Mitsuaki, 4,790,632, Cl. 350-347.00V.

Yanashima, Tadahiko. See—

Miwa, Hirohide; Shimura, Takaki; Yanashima, Tadahiko; and Amemiya, Shinichi, 4,790,321, Cl. 128-660.070.

Yang, Fu-Hsiung. Baggage zipper locking device. 4,790,156, Cl. 70-68.000.

Yariv, Amnon. See—

Lindsey, Christopher P.; and Yariv, Amnon, 4,791,646, Cl. 372-44.000.

Yashima, Minoru, to Yashima Works, Ltd. Thermostatic oven. 4,790,288, Cl. 126-190.000.

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Yashima, Minoru, 4,790,288, Cl. 126-190.000.

Yasuda, Keiji. See—

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Sandberg, L. Bogue; Haataja, Bruce A.; Jurmu, Douglas C.; Palardy, Robert D.; Story, Frank H.; and Yates, William A., 4,790,966, Cl. 264-39.000.

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Murata, Hajime, 4,791,337, Cl. 315-169.100.

Nakazaki, Youji; and Isobe, Yoshio, 4,790,186, Cl. 73-431.000.

Yeh, Gene H. C.; and Hsieh, Henry L., to Phillips Petroleum Company. Olefin polymerization. 4,791,086, Cl. 502-102.000.

Yeung, Kwok K. See—

Sheiman, Mark I.; Yeung, Kwok K.; and Chan, Teresa H., 4,791,067, Cl. 436-513.000.

Yin, Lo I., to QTR Corporation. Miniature gamma camera. 4,791,300, Cl. 230-363.00R.

Yin, Simon, to Square D Company. Trip-free, three-link switch assembly. 4,791,250, Cl. 200-17.00R.

Yip, P. C. See—

Thaler, Arnold; and Yip, P. C., 4,791,272, Cl. 219-222.000.

Yodice, Richard; and Gapinski, Richard E., to Lubrizol Corporation, The. Acid sensor. 4,791,374, Cl. 324-439.000.

Yoffe, Meir. Point-landing method for non vertical take off and landing flying objects. 4,790,497, Cl. 244-115.000.

Yokoe, Tohru; Shimizu, Masahiro; and Takenouchi, Mariko, to Matsushita Electric Industrial Co. Image data converter. 4,791,680, Cl. 382-56.000.

Yokota, Shinichi. See—

Matsui, Nobuyuki; Yokota, Shinichi; Otsuka, Kazuo; Mizote, Shuhei; Yoshida, Tadashi; Nonaka, Hachiro; and Okumura, Tsutomu, 4,790,531, Cl. 272-565.05S.

Yokouchi, Akira; Fukuda, Katsumi; Kuriyama, Keiichi; Kaibara, Makoto; and Watanabe, Masahiro, to Matsushita Electric Industrial Co., Ltd. Defrosting control apparatus for a temperature control system. 4,790,144, Cl. 62-156.000.

Yokoyama, Keishi; Matsushita, Mitsuru; Ohtsuka, Tetsuya; and Okazaki, Yuji, to Mitsubishi Denki Kabushiki Kaisha. Method of forming identifying indicium on cathode ray tubes. 4,791,267, Cl. 219-121.690.

Yokoyama, Michio. See—

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Yokoyama, Yukio; Ebine, Yoshio; and Ito, Toshio, to NEC Corporation, and Nippon Telegraph & Telephone Corp. Shorted microstrip antenna with multiple ground planes. 4,791,423, Cl. 343-700.0MS.

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Yonezawa, Seiji, to Hitachi, Ltd. Wobbled pit recording method and device of optical recording medium utilizing a plurality of time different signal waveforms. 4,791,627, Cl. 369-109.000.

Yonezawa, Takashi; Yoshizumi, Toshiaki; Hosomi, Mamoru; Onuma, Akiyoshi; and Yamasaki, Ichiro, to Mitsubishi Denki Kabushiki Kaisha. Insulated nozzle for use in an interrupter. 4,791,256, Cl. 200-148.00R.

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York Technology Limited. See—

Fellows, Andrew T.; and Channon, Nicholas D., 4,790,465, Cl. 225-2.000.

Yoshida, Harunobu. See—

Kawahara, Hideo; Yoshida, Harunobu; and Hyodo, Masato, 4,791,418, Cl. 340-784.000.

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Ishii, Susumu, 4,790,050, Cl. 24-429.000.

Minami, Hiroo; and Ida, Kazuo, 4,790,973, Cl. 264-242.000.

Yoshida Kogyo K. K. See—

Toyota, Sumio, 4,790,469, Cl. 226-129.000.

Yoshida, Masanobu, to Fujitsu Limited. Data programming circuit for programmable read only memory device. 4,791,612, Cl. 365-189.000.

Yoshida, Shinji; and Yanagi, Toshiaki, to Brother Kogyo Kabushiki Kaisha. Motor control apparatus for a sewing machine. 4,791,344, Cl. 318-567.000.

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Sakagami, Kenji; Atsumi, Kunio; Nishihata, Ken; Yoshida, Takashi; and Fukatsu, Shunzo, 4,791,197, Cl. 540-227.000.

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Kimura, Fumio; Haga, Takahiro; Maeda, Kazuyuki; Shimoharada, Hiroshi; Yoshida, Tsunezo; and Ikeguchi, Masahiko, 4,790,869, Cl. 71-90.000.

Yoshihara, Toshio. See—

Hamada, Eiichi; Yoshihara, Toshio; Nakashima, Atushi; and Kamo, Jun, 4,791,054, Cl. 435-2.000.

Yoshihara, Mitsugu, to Sony Corporation. Time base corrector. 4,791,498, Cl. 360-36.200.

Yoshii, Fuyuki. See—

Sumida, Susumu; Kamata, Atsuo; and Yoshii, Fuyuki, 4,790,791, Cl. 464-17.000.

Yoshikawa, Norio; and Hotta, Tadaaki, to Omron Tateisi Electronics Co. Discrete time control apparatus. 4,791,548, Cl. 364-149.000.

Yoshimoto, Masato; and Ohwaki, Shinji, to Teijin Limited. Synthetic polymer multifilament yarn useful for bulky yarn and process for producing the same. 4,791,026, Cl. 428-397.000.

Yoshimura, Keiji. See—

Nobiraki, Koji; Metoku, Yoshiharu; Urugami, Hisato; Tamaki, Toshiaki; Yoshimura, Keiji; and Otsuka, Kazuhiko, 4,790,863, Cl. 55-276.000.

Yoshino, Toshiakazu, to Pioneer Electronic Corporation. Disk type information recording medium. 4,791,044, Cl. 430-270.000.

Yoshizumi, Hajime. See—

Nakao, Masahiro; Asami, Sumio; Tanaka, Takaharu; Ogura, Kyoichi; Amachi, Tetsuo; Yoshizumi, Hajime; and Ishigooka, Hiroshi, 4,791,059, Cl. 435-198.000.

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Young, David E. Device for diagnosis and treatment of urinary incontinence. 4,790,328, Cl. 128-748.000.

Young, Frederick J. See—

Linnell, Thomas D.; Murphy, Arthur T.; and Young, Frederick J., 4,791,391, Cl. 333-184.000.

Young, Jang E. See—

Mun, Im H.; Young, Jang E.; Hun, Park J.; and Hwan, Suh M., 4,790,146, Cl. 62-441.000.

Young, Kenton P.; Colvin, Edward L.; Bowers, Joel A.; and Westlund, Robert W., to Aluminum Company of America. Aluminum-lithium flat rolled product and method of making. 4,790,884, Cl. 148-2.000.

Young, Paul. See—

Augeri, James A.; Bolz, Carl; Bickford, Bruce; Young, Paul; and Johnson, David, 4,791,508, Cl. 360-99.120.

Young, Vincent R. See—

Bridges, Jack E.; Sresty, Guggilam C.; Young, Vincent R.; and Spencer, Homer L., 4,790,375, Cl. 166-60.000.

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Molstad, Richard W.; and Youngquist, Robert J., 4,791,643, Cl. 371-40.000.

Youtz, Stephen E.; and Rose, Edward C., to Hamilton Standard Controls, Inc. Sealed enclosure for electrical circuitry in moist environment. 4,791,258, Cl. 200-302.100.

Yu, Simon H., to B. F. Goodrich Company, The. Terminally unsaturated macromolecular monomers of polyactones and copolymers thereof. 4,791,189, Cl. 528-355.000.

Zahn, Artur; and Hannappel, Karl, to Kraftwerk Union Aktiengesellschaft. Device for installing dry PDD lances and for flushing out lance-housing tubes in boiling water reactors. 4,790,976, Cl. 376-260.000.



- Zahradnik, Franz: See—  
Reimann, Horst; Zahradnik, Franz; and Weiss, Hans-Peter, 4,791,027, Cl. 428-407.000.
- Zaizen, Katsunory: See—  
Naruo, Noboru; Tokumitsu, Syuzo; Fukunaga, Masao; and Zaizen, Katsunory, 4,790,862, Cl. 55-210.000.
- Zajac, Myron W.: See—  
Garcia, Leslie C.; Tjon-Pian-Gi, David C.; Tucker, Stuart G.; and Zajac, Myron W., 4,791,555, Cl. 364-200.000.
- Zamory, William B.: See—  
Lerman, Michael J.; and Zamory, William B., 4,790,518, Cl. 267-64.110.
- Zehntel, Inc.: See—  
Raymond, Douglas W.; and Winfield, Nicholas, 4,791,359, Cl. 324-73.00R.
- Zehntel Incorporation: See—  
Warren, Frederick E.; Crisler, Harvey B.; Jacobson, Robert G.; Kim, Chang H.; and Llewellyn, Edward C., 4,791,356, Cl. 324-73.00R.
- Zeise, Eric K.: See—  
Moeschauer, Michael; Spitzner, Jerome G., deceased; Stoudt, Michael D.; and Zeise, Eric K., 4,791,490, Cl. 353-4.000.
- Zemany, Paul D.; Smith, Kirby A.; and Smith, John A., to Sanders Associates, Inc. State-deviation-estimation circuit employing a phase-locked-loop phase reference. 4,791,573, Cl. 364-454.000.
- Zenith Electronics Corporation: See—  
Stauss, Paul, 4,790,786, Cl. 445-68.000.
- Zenith Electronics Corporation: See—  
Adler, Robert, 4,791,416, Cl. 340-712.000.
- Lee, See D.; and Palac, Kazimir, 4,790,785, Cl. 445-45.000.
- Zippertubing Co., The: See—  
Klein, Laurence R.; and Plummer, Walter A., III, 4,791,236, Cl. 174-36.000.
- Zirpe, Wilhelm, to Robert Bosch GmbH. Brake equipment for a hydraulic vehicle brake system. 4,790,729, Cl. 417-363.000.
- Zitterich, Craig L.: See—  
Montgomery, Carlos E.; Zitterich, Craig L.; and Holloman, Ricky M., 4,790,378, Cl. 166-66.000.
- Zoltan, Bart J.; Laube, Beth L.; and Adams, George K., III, to Johns Hopkins University. The. Medication delivery system. 4,790,305, Cl. 128-200.230.
- Zundel, Daniel. Tube-type heat exchanger. 4,790,371, Cl. 165-163.000.
- Zurcher, Erwin: See—  
Vogeli, Ernst; Asper, Jean-Jacques; Zurcher, Erwin; and Schnyder, Erika, 4,790,036, Cl. 4-233.000.
- Zwicker, Eberhard: See—  
Leysieffer, Hans; and Zwicker, Eberhard, 4,791,620, Cl. 367-135.000.
- 501 Laboratorios Del Dr. Esteve: See—  
Constansa, Jordi F.; Pinol, Augusto C.; and Corominas, Juan P., 4,791,114, Cl. 514-256.000.

## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 13TH DAY OF DECEMBER, 1988

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- Abe, Hiroshi, to Asahi Seiko Kabushiki Kaisha. Coin counting and dispensing apparatus. Re. 32,799, Cl. 453-32.000.
- Asahi Seiko Kabushiki Kaisha: See—  
Abe, Hiroshi, Re. 32,799, Cl. 453-32.000.
- Bayer Aktiengesellschaft: See—  
Peters, Robert; Schulte, Klaus; Sachs, Hanns I.; and Kasperek, Peter, Re. 32,801, Cl. 523-315.000.
- Chan, Tsiu C.: See—  
Han, Yu-Pin; and Chan, Tsiu C., Re. 32,800, Cl. 437-27.000.
- Han, Yu-Pin; and Chan, Tsiu C., to SGS-Thomson Microelectronics, Inc. Method of making mosfet by multiple implantations followed by a diffusion step. Re. 32,800, Cl. 437-27.000.
- Kasperek, Peter: See—  
Peters, Robert; Schulte, Klaus; Sachs, Hanns I.; and Kasperek, Peter, Re. 32,801, Cl. 523-315.000.
- Nat Shipping Bagging Services Limited: See—  
Van Der Wal, Jan; and Nederpel, Gerardus L., Re. 32,798, Cl. 53-418.000.
- Nederpel, Gerardus L.: See—  
Van Der Wal, Jan; and Nederpel, Gerardus L., Re. 32,798, Cl. 53-418.000.
- Peters, Robert; Schulte, Klaus; Sachs, Hanns I.; and Kasperek, Peter, to Bayer Aktiengesellschaft. Process and apparatus for the preparation of mixtures of isocyanate and water which are stable for a short time for glueing particulate material in particular chips, fibers or the like. Re. 32,801, Cl. 523-315.000.
- Sachs, Hanns I.: See—  
Peters, Robert; Schulte, Klaus; Sachs, Hanns I.; and Kasperek, Peter, Re. 32,801, Cl. 523-315.000.
- Schulte, Klaus: See—  
Peters, Robert; Schulte, Klaus; Sachs, Hanns I.; and Kasperek, Peter, Re. 32,801, Cl. 523-315.000.
- SGS-Thomson Microelectronics, Inc.: See—  
Han, Yu-Pin; and Chan, Tsiu C., Re. 32,800, Cl. 437-27.000.
- Van Der Wal, Jan; and Nederpel, Gerardus L., to Nat Shipping Bagging Services Limited. Method of material distribution and apparatus for use in the method. Re. 32,798, Cl. 53-418.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

- Bell Telephone Laboratories, Incorporated: See—  
Mallos, James B., B1 4,346,376, Cl. 340-712.000.
- Darwood, James R., to Fortel, Inc. Telephone answering system with remote playback. B1 3,903,369, 12-13-88, Cl. 379-77.000.
- Douchy, Michel; Tranchant, Jean-Louis; and Jehan, Michel, to Vallourec. Manufacture of a composite tubular product. B1 4,486,227, 12-13-88, Cl. 75-53.000.
- Fortel, Inc.: See—  
Darwood, James R., B1 3,903,369, Cl. 379-77.000.
- Greenwood, Eugene C. Heart rate counter with digital storage and numerical readout. B1 3,717,140, 12-13-88, Cl. 128-689.000.
- Jehan, Michel: See—  
Douchy, Michel; Tranchant, Jean-Louis; and Jehan, Michel, B1 4,486,227, Cl. 75-53.000.
- Mallos, James B., to Bell Telephone Laboratories, Incorporated. Touch position sensitive surface. B1 4,346,376, 12-13-88, Cl. 340-712.000.
- McCreary Tire & Rubber Company: See—  
McGaughey, Robert S., B1 3,520,747, Cl. 156-153.000.
- McGaughey, Robert S.; and Simboli, Paul, B1 3,646,651, Cl. 29-130.000.
- McGaughey, Robert S., to McCreary Tire & Rubber Company. Method of making structural members of layers of corrosion resistant coatings and fibrous material. B1 3,520,747, 12-13-88, Cl. 156-153.000.
- McGaughey, Robert S.; and Simboli, Paul, to McCreary Tire & Rubber Company. Abrasion and corrosion resistant composite structural materials and the like. B1 3,646,651, 12-13-88, Cl. 29-130.000.
- Schatz, Vernon L. Universal funds transfer and identification card. B1 4,001,590, 12-13-88, Cl. 235-379.000.
- Simboli, Paul: See—  
McGaughey, Robert S.; and Simboli, Paul, B1 3,646,651, Cl. 29-130.000.
- Tranchant, Jean-Louis: See—  
Douchy, Michel; Tranchant, Jean-Louis; and Jehan, Michel, B1 4,486,227, Cl. 75-53.000.
- Vallourec: See—  
Douchy, Michel; Tranchant, Jean-Louis; and Jehan, Michel, B1 4,486,227, Cl. 75-53.000.
- Wallshein, Melvin. Multi-stranded coiled orthodontic arch wire. B1 1,030,332, 12-13-88, Cl. 433-20.000.
- Wallshein, Melvin. Multi-stranded coiled orthodontic arch wire. B1 1,030,593, 12-13-88, Cl. 433-20.000.

## LIST OF DESIGN PATENTEEES

- A C International: See—  
Rodriguez, Angel, 298,910, Cl. D8-71.000.
- Akatsu, Masafuku: See—  
Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,938, Cl. D14-58.000.
- Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,939, Cl. D14-58.000.
- Allshouse, Roger S.: See—  
Schave, Floyd D.; and Allshouse, Roger S., 298,946, Cl. D15-13.000.
- Ament, Myron J., to Household Manufacturing, Inc. Lavatory. 298,963, 12-13-88, Cl. D23-291.000.
- Ament, Myron J., to Household Manufacturing, Inc. Lavatory. 298,964, 12-13-88, Cl. D23-291.000.
- AVIA Group International, Inc.: See—  
Selbiger, Lawrence, 298,882, Cl. D2-314.000.
- Beatty, Marguerite R. Staple. 298,916, 12-13-88, Cl. D8-390.000.
- Benham, Ralph E.: See—  
Hinkle, Joseph D., 298,922, Cl. D10-46.100.
- Benson, Richard A.; and Scott, Peter A. Percussion musical instrument. 298,951, 12-13-88, Cl. D17-22.000.
- Berry, Gerald L., Sr.; Evans, Arthur C.; and Berry, Wendell L. Fully automatic systematic timekeeping clock. 298,921, 12-13-88, Cl. D10-41.000.
- Berry, Wendell L.: See—  
Berry, Gerald L., Sr.; Evans, Arthur C.; and Berry, Wendell L., 298,921, Cl. D10-41.000.
- BFW, Inc.: See—  
Rees, Thomas D., 298,966, Cl. D24-18.000.
- Bigbie, William E., Jr. Viewing shield. 298,973, 12-13-88, Cl. D29-18.000.
- Blaich, Rudolph C.; Poitras, James W.; and Wlodyka, Edwin W., to Highland Laboratories. Bracket for a liquid dispenser. 298,897, 12-13-88, Cl. D6-545.000.

Bloom, Stephen A.; and Trent, Marty C., to Sitting Pretty, Inc. Aerosol dispenser unit for attachment to a toilet seat. 298,920, 12-13-88, Cl. D9-448.000.

Blum, Jeffrey A.; and Sabhlok, Jatinder P., to General Foods Corporation. Combined covered tray and cradle. 298,899, 12-13-88, Cl. D7-3.000.

Blum, Jeffrey A.; and Sabhlok, Jatinder P., to General Foods Corporation. Combined tray and cradle. 298,900, 12-13-88, Cl. D7-3.000.

Bonifield, Charles B.: See—  
Johnson, William P.; and Bonifield, Charles B., 298,927, Cl. D12-156.000.  
Johnson, William P.; and Bonifield, Charles B., 298,928, Cl. D12-156.000.  
Johnson, William P.; and Bonifield, Charles B., 298,929, Cl. D12-156.000.

Bonnes, David R., to Union Fork & Hoe Company, The. Snow shovel head. 298,906, 12-13-88, Cl. D8-10.000.

Bonnes, David R., to Union Fork & Hoe Company, The. Rake head. 298,907, 12-13-88, Cl. D8-13.000.

Braitrim (London) Limited: See—  
Shalson, Peter, 298,886, Cl. D6-326.000.

Briovvega S.p.A.: See—  
Ennio, Brion, 298,941, Cl. D14-85.000.

Britton, Kenneth. Holder for toiletry articles. 298,896, 12-13-88, Cl. D6-527.000.

Bruninga, Kenneth J., to L. R. Nelson Corporation. Water timer. 298,962, 12-13-88, Cl. D23-245.000.

Buchin, Karl, to KRONE Aktiengesellschaft. Telephone set. 298,935, 12-13-88, Cl. D14-56.000.

Burke, Robert D., Sr. Propeller lock. 298,911, 12-13-88, Cl. D8-330.000.

Camens, Murray I. C.; and Hinde, Graham J., to U.S. Philips Corp. Combined radio and cassette recorder. 298,933, 12-13-88, Cl. D14-5.000.

Canada Cup, Inc.: See—  
Kurz, John H., 298,918, Cl. D9-435.000.

Chinchar, Victor M. Holder for reading material or the like. 298,892, 12-13-88, Cl. D6-475.000.

Clemens, Donald W., to Rotor Tool Company, The. Power tool with torque indicating ring. 298,908, 12-13-88, Cl. D8-61.000.

Coachmen Industries, Inc.: See—  
Johnson, William P.; and Bonifield, Charles B., 298,927, Cl. D12-156.000.  
Johnson, William P.; and Bonifield, Charles B., 298,928, Cl. D12-156.000.  
Johnson, William P.; and Bonifield, Charles B., 298,929, Cl. D12-156.000.

Combi Co., Ltd.: See—  
Nakao, Shinroku; Suzuki, Yoshiyuki; and Kato, Hitoshi, 298,925, Cl. D12-129.000.

Conn, Marks M., to Mallin Company. Folding chair. 298,888, 12-13-88, Cl. D6-368.000.

Cook, Charles M. Plastic garbage bag hanger. 298,977, 12-13-88, Cl. D34-6.000.

Cooper, Marvin, to Dynamic Classics, Ltd. Garment bag. 298,885, 12-13-88, Cl. D3-71.000.

Crafco, Inc.: See—  
Schave, Floyd D.; and Allshouse, Roger S., 298,946, Cl. D15-13.000.

Craig, William H.: See—  
Graves, William B.; Laudano, Raymond J.; and Craig, William H., 298,880, Cl. D1-102.000.

Crawford, Dennis L., to Minnesota Mining and Manufacturing Company. Tape core mandrel. 298,952, 12-13-88, Cl. D19-67.000.

Czerkies, Tadeusz: See—  
Jackle, William C.; Czerkies, Tadeusz; and Holt, Stephen L., 298,891, Cl. D6-450.000.

D'Alessio, Vittorio: See—  
Petherick, Thomas G.; and D'Alessio, Vittorio, 298,905, Cl. D8-8.000.

DataCard Corporation: See—  
Stark, David A.; and Plaskan, Lorraine F., 298,944, Cl. D14-105.000.

DeGalvez, Jim L. Exercise stand or similar article. 298,959, 12-13-88, Cl. D21-191.000.

Dirks, Debbie. Baby bottle holder. 298,970, 12-13-88, Cl. D24-48.000.

Doolin, Patrick R. Combined simulative pen, pen holder and clock. 298,954, 12-13-88, Cl. D19-77.000.

Dunstall, Edward O.; and Newbould, Maurice A. B., to General Electric Company, p.l.c., The. Telephone set. 298,937, 12-13-88, Cl. D14-58.000.

Dynamic Classics, Ltd.: See—  
Cooper, Marvin, 298,885, Cl. D3-71.000.

Elec & Eltek Company Limited: See—  
Lau, Chi-Ming, 298,940, Cl. D14-64.000.

Ennio, Brion, to Briovvega S.p.A. Remote control. 298,941, 12-13-88, Cl. D14-85.000.

Ethicon, Inc.: See—  
Hunt, John V., 298,967, Cl. D24-27.000.

Eugene, Theodore: See—  
Puntillo, Theodore F., 298,912, Cl. D8-349.000.

Evans, Arthur C.: See—  
Berry, Gerald L., Sr.; Evans, Arthur C.; and Berry, Wendell L., 298,921, Cl. D10-41.000.

F. X. Drolet, Inc.: See—  
Matte, Denis, 298,961, Cl. D23-350.000.

Fabrica Sideral Sociedad De Responsabilidad Limitada: See—  
Irace, Francisco D., 298,887, Cl. D6-329.000.

Franklin Brass Manufacturing Co.: See—  
Sharpe, Norton, 298,895, Cl. D6-524.000.

Friedman, Joshua. Combined light filter and shield for a dental curing lamp. 298,965, 12-13-88, Cl. D24-16.000.

Fukuoka, Akihiko, to Roland Corporation. Electric drum pad. 298,949, 12-13-88, Cl. D17-22.000.

Fukuoka, Akihiko, to Roland Corporation. Electric drum pad. 298,950, 12-13-88, Cl. D17-22.000.

Gee, Herman. Dispenser cap. 298,919, 12-13-88, Cl. D9-447.000.

General Electric Company, p.l.c., The: See—  
Dunstall, Edward O.; and Newbould, Maurice A. B., 298,937, Cl. D14-58.000.

General Foods Corporation: See—  
Blum, Jeffrey A.; and Sabhlok, Jatinder P., 298,899, Cl. D7-3.000.  
Blum, Jeffrey A.; and Sabhlok, Jatinder P., 298,900, Cl. D7-3.000.  
Graves, William B.; Laudano, Raymond J.; and Craig, William H., 298,880, Cl. D1-102.000.  
Watson, Roy; and Thomson, Ernest F., 298,903, Cl. D7-21.000.

Granger, Ray L. Bird feeder. 298,974, 12-13-88, Cl. D30-125.000.

Graves, William B.; Laudano, Raymond J.; and Craig, William H., to General Foods Corporation. Infusion bag. 298,880, 12-13-88, Cl. D1-102.000.

Haager, James A.; and Williams, Clifford T., to International Business Machines Corp. Channel extender for data processing system. 298,943, 12-13-88, Cl. D14-102.000.

Hartle, William J. Air roller sander. 298,909, 12-13-88, Cl. D8-62.000.

Highland Laboratories: See—  
Blais, Rudolph C.; Poitras, James W.; and Wlodyska, Edwin W., 298,897, Cl. D6-545.000.

Hinde, Graham J.: See—  
Camens, Murray I. C.; and Hinde, Graham J., 298,933, Cl. D14-5.000.

Hinkle, Joseph D., to Hinkle, Joseph D.; Lombardi, Joseph J.; and Benham, Ralph E. Scoreboard for the game of darts. 298,922, 12-13-88, Cl. D10-46.100.

Holt, Stephen L.: See—  
Jackle, William C.; Czerkies, Tadeusz; and Holt, Stephen L., 298,891, Cl. D6-450.000.

Horton, Alice. Heel shield. 298,881, 12-13-88, Cl. D2-277.000.

Hosiden Electronics Co., Ltd.: See—  
Sekiguchi, Shigemi, 298,931, Cl. D13-28.000.

Household Manufacturing, Inc.: See—  
Ament, Myron J., 298,963, Cl. D23-291.000.  
Ament, Myron J., 298,964, Cl. D23-291.000.

Hunt, John V., to Ethicon, Inc. Surgical staple cartridge. 298,967, 12-13-88, Cl. D24-27.000.

International Business Machines Corp.: See—  
Haager, James A.; and Williams, Clifford T., 298,943, Cl. D14-102.000.

Irace, Francisco D., to Fabrica Sideral Sociedad De Responsabilidad Limitada. Kitchen cabinet frame. 298,887, 12-13-88, Cl. D6-329.000.

Ishii, Hideki; and Serbinski, Andrew T., to Ricoh Company, Ltd. Document feeder. 298,948, 12-13-88, Cl. D16-32.000.

Jackle, William C.; Czerkies, Tadeusz; and Holt, Stephen L., to Niven Marketing Group, The. Display cabinet. 298,891, 12-13-88, Cl. D6-450.000.

Johnson, William P.; and Bonifield, Charles B., to Coachmen Industries, Inc. Van top. 298,927, 12-13-88, Cl. D12-156.000.

Johnson, William P.; and Bonifield, Charles B., to Coachmen Industries, Inc. Van top. 298,928, 12-13-88, Cl. D12-156.000.

Johnson, William P.; and Bonifield, Charles B., to Coachmen Industries, Inc. Van top. 298,929, 12-13-88, Cl. D12-156.000.

K & B Enterprises, Inc.: See—  
Schauer, Keith R., 298,972, Cl. D27-161.000.

Kadco, Inc.: See—  
Petherick, Thomas G.; and D'Alessio, Vittorio, 298,905, Cl. D8-8.000.

Kagayama, Katsuji; Sugiyama, Yoshihiko; and Mishi, Benito, to Matsushita Electric Industrial Co., Ltd. Hand held computer. 298,945, 12-13-88, Cl. D14-106.000.

Kato, Hitoshi: See—  
Nakao, Shinroku; Suzuki, Yoshiyuki; and Kato, Hitoshi, 298,925, Cl. D12-129.000.

Kato, Tatsuya: See—  
Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,938, Cl. D14-58.000.  
Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,939, Cl. D14-58.000.

Knickerbocker, Robert H.; and Thomas Stephen M., to Siemon Company, The. Modular test plug adapter. 298,932, 12-13-88, Cl. D13-28.000.

Krohn, Roy N., to Sonoco Products Company. Bottle. 298,917, 12-13-88, Cl. D9-399.000.

KRONE Aktiengesellschaft: See—  
Buchin, Karl, 298,935, Cl. D14-56.000.

Kurz, John H., to Canada Cup, Inc. Container lid. 298,918, 12-13-88, Cl. D9-435.000.

L. R. Nelson Corporation: See—  
Bruninga, Kenneth J., 298,962, Cl. D23-245.000.

LaCour Incorporated: See—  
LaCour, Paul M., 298,889, Cl. D6-423.000.  
LaCour, Paul M., 298,890, Cl. D6-426.000.

LaCour, Paul M., to LaCour Incorporated. Desk unit. 298,889, 12-13-88, Cl. D6-423.000.

LaCour, Paul M., to LaCour Incorporated. Desk. 298,890, 12-13-88, Cl. D6-426.000.

Lannen Tehtaast Oy: See—  
Saarinen, Kari, 298,924, Cl. D11-155.000.

Lau, Chi-Ming, to Elec & Eltek Company Limited. Combination cordless handset telephone and stand. 298,940, 12-13-88, Cl. D14-64.000.

Laudano, Raymond J.: See—  
Graves, William B.; Laudano, Raymond J.; and Craig, William H., 298,880, Cl. D1-102.000.

Lombardi, Joseph J.: See—  
Hinkle, Joseph D., 298,922, Cl. D10-46.100.

Mallin Company: See—  
Conn, Marks M., 298,888, Cl. D6-368.000.

Matsushita Electric Industrial Co.: See—  
Ohta, Fumiharu; Tamura, Masao; and Watanabe, Satoshi, 298,934, Cl. D14-53.000.  
Ohta, Fumiharu; Takenaka, Kazumasa; and Watanabe, Satoshi, 298,936, Cl. D14-57.000.

Matsushita Electric Industrial Co., Ltd.: See—  
Kagayama, Katsuji; Sugiyama, Yoshihiko; and Mishi, Benito, 298,945, Cl. D14-106.000.

Matte, Denis, to F. X. Drolet, Inc. Wood stove. 298,961, 12-13-88, Cl. D23-350.000.

McAllister, Thomas A. W. Pill counting tray. 298,968, 12-13-88, Cl. D24-31.000.

Minnesota Mining and Manufacturing Company: See—  
Crawford, Dennis L., 298,952, Cl. D19-67.000.

Mishi, Benito: See—  
Kagayama, Katsuji; Sugiyama, Yoshihiko; and Mishi, Benito, 298,945, Cl. D14-106.000.

Moore, Martin S., Jr. Sock holder. 298,976, 12-13-88, Cl. D32-61.000.

Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, to NEC Corporation. Key telephone set with speaker phone. 298,938, 12-13-88, Cl. D14-58.000.

Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, to NEC Corporation. Key telephone set with speakerphone and visual display panel. 298,939, 12-13-88, Cl. D14-58.000.

Most, Gordon. Tricycle handle bar. 298,930, 12-13-88, Cl. D12-178.000.

Mourich, Frank; and Mourich, Linda J. Plant protected cover. 298,904, 12-13-88, Cl. D8-1.000.

Mourich, Linda J.: See—  
Mourich, Frank; and Mourich, Linda J., 298,904, Cl. D8-1.000.

Nakao, Shinroku; Suzuki, Yoshiyuki; and Kato, Hitoshi, to Combi Co., Ltd. Baby stroller. 298,925, 12-13-88, Cl. D12-129.000.

Nakatani, Takeshi: See—  
Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,938, Cl. D14-58.000.  
Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,939, Cl. D14-58.000.

Navaroli, Albert H.: See—  
Thomas, Charles, 298,914, Cl. D8-373.000.

NEC Corporation: See—  
Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,938, Cl. D14-58.000.  
Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,939, Cl. D14-58.000.

Newbould, Maurice A. B.: See—  
Dunstall, Edward O.; and Newbould, Maurice A. B., 298,937, Cl. D14-58.000.

Niven Marketing Group, The: See—  
Jackle, William C.; Czerkies, Tadeusz; and Holt, Stephen L., 298,891, Cl. D6-450.000.

Ohta, Fumiharu; Tamura, Masao; and Watanabe, Satoshi, to Matsushita Electric Industrial Co. Desk telephone set. 298,934, 12-13-88, Cl. D14-53.000.

Ohta, Fumiharu; Takenaka, Kazumasa; and Watanabe, Satoshi, to Matsushita Electric Industrial Co. Telephone set with display panel and speakerphone. 298,936, 12-13-88, Cl. D14-57.000.

Ohta, Seizo: See—  
Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,938, Cl. D14-58.000.  
Morikawa, Kenichi; Akatsu, Masafuku; Kato, Tatsuya; Ohta, Seizo; and Nakatani, Takeshi, 298,939, Cl. D14-58.000.

Pantoja, Juan E.: See—  
Pantoja, Leonard J.; and Pantoja, Juan E., 298,975, Cl. D30-154.000.

Pantoja, Leonard J.; and Pantoja, Juan E. Tethering stake. 298,975, 12-13-88, Cl. D30-154.000.

Petherick, Thomas G.; and D'Alessio, Vittorio, to Kadco, Inc. Rotary cutting head for a lawn trimmer. 298,905, 12-13-88, Cl. D8-8.000.

Pieratt, Charles T. Transmitter. 298,942, 12-13-88, Cl. D14-95.000.

Plaskan, Lorraine F.: See—  
Stark, David A.; and Plaskan, Lorraine F., 298,944, Cl. D14-105.000.

Plastics, Inc.: See—  
Pomroy, James F., 298,902, Cl. D7-14.000.

Poitras, James W.: See—  
Blais, Rudolph C.; Poitras, James W.; and Wlodyska, Edwin W., 298,897, Cl. D6-545.000.

Pomroy, James F., to Plastics, Inc. Dessert cup or similar article. 298,902, 12-13-88, Cl. D7-14.000.

Pryor, Danny W. Therapeutic pad. 298,969, 12-13-88, Cl. D24-36.000.

Punch Enterprises, Inc.: See—  
Shadyac, Thomas P., 298,901, Cl. D7-9.000.

Puntillo, Edward Anthony: See—  
Puntillo, Theodore F., 298,912, Cl. D8-349.000.

Puntillo, Theodore F., to Eugene, Theodore; and Puntillo, Edward Anthony. Final holder for cleaning paint roller. 298,912, 12-13-88, Cl. D8-349.000.

Quaker Oats Company, The: See—  
Zinter-Chahin, Christine M., 298,956, Cl. D21-59.000.

Rees, Thomas D., to BFW, Inc. Nasal retractor. 298,966, 12-13-88, Cl. D24-18.000.

Ricoh Company, Ltd.: See—  
Ishii, Hideki; and Serbinski, Andrew T., 298,948, Cl. D16-32.000.

Roberts, Raymond P. Desk organizer. 298,953, 12-13-88, Cl. D19-78.000.

Rodriguez, Angel, to A C International. Bicycle freewheel core holder. 298,910, 12-13-88, Cl. D8-71.000.

Rohrs, Bill. Gasoline pump nozzle lever brace. 298,913, 12-13-88, Cl. D8-354.000.

Roland Corporation: See—  
Fukuoka, Akihiko, 298,949, Cl. D17-22.000.  
Fukuoka, Akihiko, 298,950, Cl. D17-22.000.

Roshau, David L. Multi-layered cereal bowl. 298,898, 12-13-88, Cl. D7-1.000.

Rotor Tool Company, The: See—  
Clemens, Donald W., 298,908, Cl. D8-61.000.

Row, Scott W. Ceiling winch. 298,979, 12-13-88, Cl. D34-33.000.

Rowley, Roger M.: See—  
Rowley, Var C.; and Rowley, Roger M., 298,915, Cl. D8-373.000.

Rowley, Var C.; and Rowley, Roger M. Vertically adjustable valve and pipe support. 298,915, 12-13-88, Cl. D8-373.000.

Rusnak, Mark A. Wiper blade and frame therefor. 298,926, 12-13-88, Cl. D12-155.000.

Rychlock, Freddie J. Portable auto table. 298,884, 12-13-88, Cl. D3-40.000.

Saarienen, Kari, to Lannen Tehtaast Oy. Reusable tray for the growing of seedlings. 298,924, 12-13-88, Cl. D11-155.000.

Sabhlok, Jatinder P.: See—  
Blum, Jeffrey A.; and Sabhlok, Jatinder P., 298,899, Cl. D7-3.000.  
Blum, Jeffrey A.; and Sabhlok, Jatinder P., 298,900, Cl. D7-3.000.

Sakihara, Yoshinobu, to Vanguard Electronics Company, Inc. Holder for testing an integrated circuit chip. 298,923, 12-13-88, Cl. D10-80.000.

Schauer, Keith R., to K & B Enterprises, Inc. Lighter holder. 298,972, 12-13-88, Cl. D27-161.000.

Schave, Floyd D.; and Allshouse, Roger S., to Crafco, Inc. Pavement crack sealer machine. 298,946, 12-13-88, Cl. D15-13.000.

Schultz, Moses R. Table. 298,894, 12-13-88, Cl. D6-484.000.

Schwartz, C. Bruce. Videoendoscopic support stand. 298,893, 12-13-88, Cl. D6-479.000.

Scott, Peter A.: See—  
Benson, Richard A.; and Scott, Peter A., 298,951, Cl. D17-22.000.

Sekiguchi, Shigemi, to Hosiden Electronics Co., Ltd. Electrical plug. 298,931, 12-13-88, Cl. D13-28.000.

Selbiger, Lawrence, to AVIA Group International, Inc. Shoe upper. 298,882, 12-13-88, Cl. D2-314.000.

Serbinski, Andrew T.: See—  
Ishii, Hideki; and Serbinski, Andrew T., 298,948, Cl. D16-32.000.

Shadyac, Thomas P., to Punch Enterprises, Inc. Mug. 298,901, 12-13-88, Cl. D7-9.000.

Shalson, Peter, to Braitrim (London) Limited. Folding garment hanger. 298,886, 12-13-88, Cl. D6-326.000.

Sharpe, Norton, to Franklin Brass Manufacturing Co. Combined bathware support bracket and escutcheon therefor. 298,895, 12-13-88, Cl. D6-524.000.

Shaw, Craig A. Support manifold for a glue dispenser. 298,947, 12-13-88, Cl. D15-199.000.

Siemon Company, The: See—  
Knickerbocker, Robert H.; and Thomas Stephen M., 298,932, Cl. D13-28.000.

Sitting Pretty, Inc.: See—  
Bloom, Stephen A.; and Trent, Marty C., 298,920, Cl. D9-448.000.

Smith, Judson L. Motor vehicle cleaning and restoration building. 298,971, 12-13-88, Cl. D25-31.000.

Sonoco Products Company: See—  
Krohn, Roy N., 298,917, Cl. D9-399.000.

Stark, David A.; and Plaskan, Lorraine F., to DataCard Corporation. Credit card authorization/data capture terminal. 298,944, 12-13-88, Cl. D14-105.000.

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Suzuki, Yoshiyuki: See—  
Nakao, Shinroku; Suzuki, Yoshiyuki; and Kato, Hitoshi, 298,925, Cl. D12-129.000.

Takenaka, Kazumasa: See—  
Ohta, Fumiharu; Takenaka, Kazumasa; and Watanabe, Satoshi, 298,936, Cl. D14-57.000.

Tamura, Masao: See—  
Ohta, Fumiharu; Tamura, Masao; and Watanabe, Satoshi, 298,934, Cl. D14-53.000.

Tanel, Michael L. Annular shoe cleating for artificial turf. 298,883, 12-13-88, Cl. D2-320.000.

Thomas, Charles, to Navaroli, Albert H. Combined support strap and anchoring clamp. 298,914, 12-13-88, Cl. D8-373.000.

Thomas Stephen M.: See—  
Knickerbocker, Robert H.; and Thomas Stephen M., 298,932, Cl. D13-28.000.



## LIST OF DESIGN PATENTEES

- Thomson, Ernest F.: See—  
 Watson, Roy; and Thomson, Ernest F., 298,903, Cl. D7-21.000.  
 Trent, Marty C.: See—  
 Bloom, Stephen A.; and Trent, Marty C., 298,920, Cl. D9-448.000.  
 Ulbrich, Janice L. Soother doll. 298,958, 12-13-88, Cl. D21-166.000.  
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 Bonnes, David R., 298,906, Cl. D8-10.000.  
 Bonnes, David R., 298,907, Cl. D8-13.000.  
 U.S. Philips Corp.: See—  
 Camens, Murray I. C.; and Hinde, Graham J., 298,933, Cl. D14-5.000.  
 Van, Jack, Jr. Inflatable toy vehicle. 298,957, 12-13-88, Cl. D21-71.000.  
 Van Buskirk, W. Jeffrey. Vehicle ramp. 298,978, 12-13-88, Cl. D34-32.000.  
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 Sakihara, Yoshinobu, 298,923, Cl. D10-80.000.
- Vela, Mary E. Doll. 298,960, 12-13-88, Cl. D21-184.000.  
 Watanabe, Satoshi: See—  
 Ohta, Fumiharu; Tamura, Masao; and Watanabe, Satoshi, 298,934, Cl. D14-53.000.  
 Ohta, Fumiharu; Takenaka, Kazumasa; and Watanabe, Satoshi, 298,936, Cl. D14-57.000.  
 Watson, Roy; and Thomson, Ernest F., to General Foods Corporation. Meal plate. 298,903, 12-13-88, Cl. D7-21.000.  
 Williams, Clifford T.: See—  
 Haager, James A.; and Williams, Clifford T., 298,943, Cl. D14-102.000.  
 Wlodyka, Edwin W.: See—  
 Blaich, Rudolph C.; Poitras, James W.; and Wlodyka, Edwin W., 298,897, Cl. D6-545.000.  
 Zinter-Chahin, Christine M., to Quaker Oats Company, The. Activity toy for car seat or similar article. 298,956, 12-13-88, Cl. D21-59.000.  
 Zovar, Alan P. Clip board. 298,955, 12-13-88, Cl. D19-88.000.

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- Bennett, Cecilia L. D. Miniature rose plant 'My Sunshine'. 6,453, 12-13-88, Cl. 8.000.  
 Bennett, Cecilia L. D. Miniature rose plant 'Sitting Pretty'. 6,454, 12-13-88, Cl. 9.000.  
 Bennett, Cecilia L. D. Miniature rose plant 'Fat 'N Sassy'. 6,455, 12-13-88, Cl. 7.000.  
 Bennett, Cecilia L. D. Miniature rose plant 'Cheer Up'. 6,456, 12-13-88, Cl. 10.000.  
 Chrysanthemum Breeders Association, N.V.: See—  
 van der Jagt, Martinus, 6,465, Cl. 74.000.  
 van der Jagt, Martinus, 6,466, Cl. 74.000.  
 van der Jagt, Martinus, 6,467, Cl. 78.000.  
 Golden King Holdings, Inc.: See—  
 Simoons, Adrien, 6,460, Cl. 88.000.  
 Jackson & Perkins Co.: See—  
 Warriner, William A., 6,463, Cl. 11.000.  
 Karniel, Mordechai, to Zanzivivai-Ferrara S.r.l. Grapevine variety, *Vitis vinifera*, producing seedless grapes with a long shelf-life, named King Husainy. 6,464, 12-13-88, Cl. 47.000.  
 Lucas, George A., Sr. Grapevine, "Flamed Globe". 6,458, 12-13-88, Cl. 47.000.  
 Moore, Ralph S., to Sequoia Nursery. Miniature rose plant. 6,468, 12-13-88, Cl. 26.000.  
 Salt Weeds: See—  
 Yensen, Nicholas P., 6,459, Cl. 89.000.
- Yensen, Nicholas P., 6,461, Cl. 89.000.  
 Sequoia Nursery: See—  
 Moore, Ralph S., 6,468, Cl. 26.000.  
 Simoons, Adrien, to Golden King Holdings, Inc. *Ficus benjamina* plant named Golden King. 6,460, 12-13-88, Cl. 88.000.  
 Stirnadel, Alfred, to Stirnadel-Schwab, Marianne. Euphorbia plant cv. Stiloga. 6,462, 12-13-88, Cl. 68.000.  
 Stirnadel-Schwab, Marianne: See—  
 Stirnadel, Alfred, 6,462, Cl. 68.000.  
 van der Jagt, Martinus, to Chrysanthemum Breeders Association, N.V. Chrysanthemum Golden Refla. 6,465, 12-13-88, Cl. 74.000.  
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 Warriner, William A., to Jackson & Perkins Co. Rose plant Jacpaw. 6,463, 12-13-88, Cl. 11.000.  
 Weeks, O. L. Rose plant named 'Party Time'. 6,457, 12-13-88, Cl. 11.000.
- Yensen, Nicholas P., to Salt Weeds. Saltgrass plant named Yensen 2. 6,459, 12-13-88, Cl. 89.000.  
 Yensen, Nicholas P., to Salt Weeds. Saltgrass plant named Yensen 1. 6,461, 12-13-88, Cl. 89.000.  
 Zanzivivai-Ferrara S.r.l.: See—  
 Karniel, Mordechai, 6,464, Cl. 47.000.

## CLASSIFICATION OF PATENTS

ISSUED DECEMBER 13, 1988

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2	607	4,790,091	CLASS 63	65 ZM	4,790,871	29	4,790,265	90	4,790,340
15	4,790,031	661	4,790,092	68 R	4,790,873	51.5	4,790,266	CLASS 136	
109	4,790,032		4,790,093	93 R	4,790,874	72.5	4,790,264	258	4,790,883
195	4,790,033	CLASS 42		241	4,790,875			CLASS 137	
207	4,790,034	50	4,790,094	356	4,790,867	CLASS 81	4 D	4,790,267	15
	4,790,035	73	4,790,095			3.09	4,790,220	17	4,790,268
233	4,790,036	94	4,790,096	75.2	4,790,149	57.13	4,790,218	406 ST	4,790,269
499	4,790,037			125	4,790,150	63	4,790,219		80
		CLASS 43		125 R	4,790,151			CLASS 123	112
247	4,790,038	4	4,790,097	149 R	4,790,152	CLASS 82	73 C	4,790,270	269
413	4,790,040	7	4,790,098	157	4,790,153	1 C	4,790,221	182	4,790,271
431	4,790,041	17	4,790,099	221	4,790,154	1.3	4,790,222	188 B	4,790,272
437	4,790,042	42.26	4,790,100	CLASS 68				196 W	4,790,273
		42.37	4,790,101	205 R	4,790,155	CLASS 83	48	4,790,274	516.29
		44.85	4,790,104			48	4,790,223	325	4,790,275
		86	4,790,102	CLASS 70		53	4,790,224	339	4,790,276
		102	4,790,103			100	4,790,225	357	4,790,277
137	4,790,836	CLASS 8		68	4,790,156	208	4,790,226	376	4,790,278
151	4,790,043	CLASS 47		95	4,790,157	CLASS 84	417	4,790,279	417
	4,790,044	84	4,790,105	139	4,790,158			422	4,790,280
		CLASS 49		232	4,790,159	322	4,790,227	425	4,790,281
236.01	4,790,045	252	4,790,106	331	4,790,160	329	4,790,232	493	4,790,282
250.21	4,790,046	383	4,790,107	452	4,790,162	411 R	4,790,228	519	4,790,283
		484	4,790,108	455	4,790,163	413	4,790,229	543	4,790,284
		CLASS 51		456 R	4,790,161	462	4,790,230	549	4,790,285
386	4,790,047	CLASS 52				CLASS 89	571	4,790,286	91
117	4,790,048	79.4	4,790,109	88	4,790,868	35.02	4,790,231	573	4,790,287
132 WL	4,790,049	173 R	4,790,110	90	4,790,869	CLASS 91		190	4,790,288
429	4,790,050			94	4,790,870	361	4,790,233	361	4,790,289
		CLASS 27				362	4,790,234	362	4,790,290
28	4,790,051	197	4,790,111	8	4,790,164	CLASS 92	128	4,790,235	390
		460	4,790,112	38	4,790,165			415	4,790,293
		646	4,790,113	106	4,790,166	CLASS 98	129	4,790,236	2
110	4,790,052	707	4,790,114	257	4,790,167			4	4,790,294
		CLASS 53		331	4,790,168	42.16	4,790,237	6	4,790,295
42	4,790,053	234	4,790,115	354	4,790,169	CLASS 99		51	4,790,296
130	4,790,054	244	4,790,116	361	4,790,171	276	4,790,238	69	4,790,297
156.7 R	4,790,055	446	4,790,117	368	4,790,172	279	4,790,239	79	4,790,298
		411	4,790,118	441	4,790,173	282	4,790,240	80 C	4,790,299
229	4,790,056	418	4,790,119	488	4,790,174	352	4,790,241	84 C	4,790,300
237	4,790,057	451	4,790,120	1 H	4,790,176	455	4,790,242	87 A	4,790,301
407	4,790,058	458	4,790,121	1 R	4,790,175			92 Y	4,790,304
451	4,790,059	468	4,790,122	117	4,790,177	CLASS 101		92 YZ	4,790,302
525.1	4,790,060	478	4,790,123	118.2	4,790,178	147	4,790,243	200.23	4,790,305
563	4,790,061	486	4,790,124	146.5	4,790,179	231	4,790,244	206.12	4,790,306
564.4	4,790,062	552	4,790,125	153	4,790,180	375	4,790,245	206.19	4,790,307
597	4,790,063	587		204.18	4,790,181	CLASS 102		207.18	4,790,308
606	4,790,064	CLASS 55		204.21	4,790,182	254	4,790,246	303 R	4,790,309
723	4,790,065	16	4,790,857	290 V	4,790,183	CLASS 104		303.1	4,790,310
747	4,790,066	26	4,790,858	317	4,790,184	172.2	4,790,247		4,790,311
748	4,790,067	26	4,790,859		4,790,185	CLASS 105		305	4,790,312
761	4,790,068	59	4,790,860	431	4,790,186	131	4,790,248	334 R	4,790,313
832	4,790,069	68	4,790,861	432.1	4,790,187	CLASS 106		341	4,790,314
		137	4,790,862	597	4,790,188	14.15	4,790,277	344	4,790,315
134	4,790,070	210	4,790,863	660	4,790,189	22	4,790,278	355	4,790,316
276	4,790,071	276	4,790,864	661	4,790,190	CLASS 107		419 D	4,790,317
376	4,790,072	337	4,790,865	721	4,790,191	1.23	4,790,276	419 PG	4,790,318
		CLASS 33		756	4,790,193	3	4,790,277	419 R	4,790,319
178 B	4,790,073	330	4,790,127	861.53	4,790,194	14.15	4,790,278	660.07	4,790,320
199 R	4,790,074	364	4,790,128	861.77	4,790,195	189	4,790,279	661.01	4,790,321
233	4,790,075	CLASS 57		863.91	4,790,196	CLASS 108		661.10	4,790,322
365	4,790,076	204	4,790,129	864.64	4,790,198	51.3	4,790,249	664	4,790,323
447	4,790,077	261	4,790,130	864.65	4,790,197	CLASS 110		664	4,790,324
503	4,790,078	281	4,790,131			165 A	4,790,250	677	4,790,325
517	4,790,079	284	4,790,132	CLASS 74		165 R	4,790,251	689	4,790,326
		350	4,790,136	48	4,790,199	CLASS 112		719	4,790,327
225	4,790,080	CLASS 60		89.15	4,790,201	80.4	4,790,252	748	4,790,328
		226.1	4,790,133	396	4,790,202	221	4,790,253	749	4,790,329
50	4,790,081	321	4,790,134	424.8 R	4,790,203	222	4,790,254	764	4,790,330
119	4,790,082	327	4,790,135	500.5	4,790,205	CLASS 114		772	4,790,331
127	4,790,083	327	4,790,135	502.4	4,790,206	97	4,790,255	924 M	4,790,303
		578	4,790,138	517	4,790,207	352	4,790,256		
117.5	4,790,084	602	4,790,139	523	4,790,208	CLASS 118		175	4,790,332
231	4,790,085	757	4,790,140	548	4,790,209	52	4,790,262	283	4,790,333
		CLASS 62		552	4,790,210	227	4,790,263	290	4,790,334
144	4,790,086	22	4,790,866	665 GA	4,790,211	317	4,790,265	304	4,790,335
		78	4,790,141	701	4,790,212	500	4,790,258		
124.5	4,790,088	115	4,790,142	740	4,790,213	707	4,790,259	CLASS 131	
156	4,790,089	126	4,790,143	866	4,790,214	CLASS 119		325	4,790,336
204	4,790,087	156	4,790,144		4,790,215	1	4,790,260	CLASS 134	
300	4,790,090	212	4,790,145	CLASS 75	4,790,217	14.02	4,790,261	22.18	4,790,882
		441	4,790,146	10.58	4,790,872	16	4,790,338	109	4,790,337
		514 R	4,790,147	53	4,486,227	65	4,790,339	104.32	4,790,369

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4,790,374	33 R	4,791,251	418	4,790,450	237 G	4,791,289	34	4,790,544	540	4,791,325
CLASS 166	52 R	4,791,252	CLASS 221	239	4,791,290	4,791,291	CLASS 279	571	4,791,326	
60	61.27	4,791,253	233	4,790,451	288	4,791,292	1 L	4,790,545		
63.1	81.9 M	4,791,254	303	4,790,452	302	4,791,293	CLASS 280	41	4,791,327	
66	144 R	4,791,255	CLASS 222	310	4,791,294	4,791,295	1.11 R	4,790,546	42	4,791,328
68	148 R	4,791,256	83	4,790,453	339	4,791,296	5.26	4,790,548	42 C	4,791,329
208	159 R	4,791,257	146.2	4,790,455	347	4,791,297	47.18	4,790,549	105	4,791,330
241	302.1	4,791,258	183	4,790,456	352	4,791,298	47.27	4,790,547	248	4,791,331
250			185	4,790,457	363 R	4,791,299	87.04 A	4,790,550	268	4,791,332
274			386	4,790,458	397	4,791,300	91	4,790,551		
297			159	4,790,459	458.1	4,791,301	230	4,790,552	117	4,790,609
298			37.3	4,790,460	491.1	4,791,302	236	4,790,554	218	4,790,610
299			98	4,790,461	492.1	4,791,303	242 WC	4,790,553	306	4,790,611
310			129	4,790,462	563	4,791,304	432	4,790,556		
379			140	4,790,463	574	4,791,305	460 A	4,790,557	25	4,791,333
CLASS 172			149	4,790,464	578	4,791,306	481	4,790,558	318	4,791,334
375			182.8	4,790,465		4,791,307	486	4,790,559	496	4,791,335
776			192.12	4,790,466		4,791,308	806	4,790,561		
CLASS 173			192.17	4,790,467			821	4,790,562		
17			268	4,790,468						
57			412	4,790,469						
CLASS 174			415	4,790,470						
23 C			39.5	4,790,471						
36			219	4,790,472						
40 R			303	4,790,473						
45 R			305	4,790,474						
52.1			309	4,790,475						
68.5			315.11	4,790,476						
73.1			329	4,790,477						
102 R			387	4,790,478						
125.1			449	4,790,479						
152 R			554	4,790,480						
CLASS 175										
20			89	4,790,481						
40			111	4,790,482						
61			216 PP	4,790,483						
102			254 R	4,790,484						
249										
365										
CLASS 177										
1			166	4,790,485						
CLASS 178			573	4,790,486						
18			667	4,790,487						
CLASS 180										
6.2			96.1	4,790,488						
8.6			189	4,790,489						
142			232	4,790,490						
169			242.3	4,790,491						
176			321.71	4,790,492						
197			484	4,790,493						
268			608	4,790,494						
287			611	4,790,495						
CLASS 181			639	4,790,496						
141			650	4,790,497						
152			705	4,790,498						
265			706	4,790,499						
CLASS 182			712	4,790,500						
36			801	4,790,501						
129										
CLASS 187										
127			11	4,790,502						
CLASS 188			147	4,790,503						
18 A			216	4,790,504						
152			10.43	4,791,259						
196 P			10.491	4,791,260						
CLASS 190			10.51	4,791,261						
11			10.55 M	4,791,262						
102			10.61 R	4,791,263						
CLASS 192			69 W	4,791,264						
0.032			91.2	4,791,265						
70.18			121.48	4,791,266						
111 A			121.57	4,791,267						
CLASS 193			121.64	4,791,268						
37			121.69	4,791,269						
CLASS 196			125.1	4,791,270						
112			136	4,791,271						
CLASS 198			222	4,791,272						
347			271	4,791,273						
400			341	4,791,274						
457			469	4,791,275						
731			535	4,791,276						
741			549	4,791,277						
803.01										
840			23.4	4,790,443						
CLASS 199			30.2	4,790,444						
2			219	4,790,445						
CLASS 200			220	4,790,446						
17 R			270	4,790,447						
			288	4,790,448						

## CLASSIFICATION OF PATENTS

CLASS 338	23	4,791,398	3 R	4,791,448	395	4,791,531	171	4,791,617	146	4,790,679	CLASS 425
CLASS 340	59	4,791,400	3 SH	4,791,449	396	4,791,532	47	4,791,621	68	4,790,680	1
71	4,791,399	4	4,791,450	424	4,791,533	4,791,532	CLASS 342	37	4,791,626	134	4,790,735
74	4,791,401	8	4,791,451	529	4,791,534	4,791,533	CLASS 349	59	4,791,632	140	4,790,736
365 R	4,791,402	14 D	4,791,452	80	4,791,535	4,791,534	37	4,791,626	134	4,790,681	114
539	4,791,403	15	4,791,453	104	4,791,536	4,791,535	109	4,791,627	372	4,790,682	192 R
550	4,791,404	28	4,791,454	135	4,791,537	4,791,536	112	4,791,628	16	4,790,683	396
568	4,791,405	53	4,791,455	159	4,791,538	4,791,537	270	4,791,629	30	4,790,684	526
572	4,791,406	91	4,791,456	226	4,791,539	4,791,538	291	4,791,630	124	4,790,685	548
604	4,791,407	CLASS 356	4,791,457	331	4,791,540	4,791,539	CLASS 370	30	4,790,686	13	CLASS 426
606	4,791,408	4.5	4,790,651	376	4,791,541	4,791,540	3	4,791,630	124	4,790,687	13
701	4,791,409	37	4,790,650	446	4,791,542	4,791,541	58	4,791,631	128	4,790,688	302
712	4,791,410	75	4,790,652	17	4,791,543	4,791,542	3	4,791,632	140	4,790,689	308
784	4,791,411	43	4,790,653	48	4,791,544	4,791,543	85	4,791,633	182	4,790,690	458
CLASS 341	51	4,791,403	4,790,654	89	4,791,545	4,791,544	112	4,791,634	240	4,790,691	578
51	4,791,403	4,791,403	4,790,655	95	4,791,546	4,791,545	38	4,791,635	262	4,790,692	585
68	4,791,404	4,791,404	4,790,656	CLASS 363	4,791,547	4,791,546	40	4,791,636	263	4,790,693	592
122	4,791,405	369	4,790,657	CLASS 364	4,791,548	4,791,547	38	4,791,637	181	4,790,694	606
144	4,791,406	376	4,790,658	138	4,791,549	4,791,548	40	4,791,638	115 R	4,790,695	634
158	4,791,407	401	4,790,659	149	4,791,550	4,791,549	3	4,791,639	241 R	4,790,696	641
CLASS 342	1	4,791,419	4,790,660	167.01	4,791,551	4,791,550	3	4,791,640	35	4,790,697	CLASS 427
20	4,791,420	428	4,790,661	200	4,791,552	4,791,551	22	4,791,641	115 R	4,790,698	28
368	4,791,421	446	4,790,662	432	4,791,553	4,791,552	52	4,791,642	241 R	4,790,699	54.1
389	4,791,422	CLASS 357	4,790,663	446	4,791,554	4,791,553	31	4,791,643	115 R	4,790,700	64
CLASS 343	700 MS	4,791,423	4,790,664	CLASS 358	4,791,555	4,791,554	32	4,791,644	241 R	4,790,701	255.3
711	4,791,424	22	4,791,466	446	4,791,556	4,791,555	44	4,791,645	133	4,790,702	282
713	4,791,425	23.4	4,791,467	446	4,791,557	4,791,556	45	4,791,646	200	4,790,703	397.7
754	4,791,426	23.6	4,791,468	446	4,791,558	4,791,557	46	4,791,647	231	4,790,704	CLASS 428
758	4,791,427	23.7	4,791,469	446	4,791,559	4,791,558	46	4,791,648	233	4,790,705	34
770	4,791,428	25	4,791,470	446	4,791,560	4,791,559	46	4,791,649	233	4,790,706	4,791,010
837	4,791,429	30	4,791,471	446	4,791,561	4,791,560	48	4,791,650	233	4,790,707	4,791,011
906	4,791,430	38	4,791,472	446	4,791,562	4,791,561	50	4,791,651	233	4,790,708	4,791,012
916	4,791,431	60	4,791,473	446	4,791,563	4,791,562	58	4,791,652	233	4,790,709	4,791,013
CLASS 346	1.1	4,791,433	4,791,474	446	4,791,564	4,791,563	58	4,791,653	233	4,790,710	4,791,014
75	4,791,434	71	4,791,475	446	4,791,565	4,791,564	58	4,791,654	233	4,790,711	4,791,015
140 R	4,791,435	10	4,791,476	446	4,791,566	4,791,565	58	4,791,655	233	4,790,712	4,791,016
CLASS 347	3.69	4,790,612	4,791,477	446	4,791,567	4,791,566	58	4,791,656	233	4,790,713	4,791,017
3.7	4,790,613	107	4,791,478	446	4,791,568	4,791,567	58	4,791,657	233	4,790,714	4,791,018
96.12	4,790,614	136	4,791,479	446	4,791,569	4,791,568	58	4,791,658	233	4,790,715	4,791,019
96.15	4,790,615	138	4,791,480	446	4,791,570	4,791,569	58	4,791,659	233	4,790,716	4,791,020
96.15	4,790,616	140	4,791,481	446	4,791,571	4,791,570	58	4,791,660	233	4,790,717	4,791,021
96.16	4,790,617	142	4,791,482	446	4,791,572	4,791,571	58	4,791,661	233	4,790,718	4,791,022
96.16	4,790,618	144	4,791,483	446	4,791,573	4,791,572	58	4,791,662	233	4,790,719	4,791,023
96.20	4,790,619	146	4,791,484	446	4,791,574	4,791,573	58	4,791,663	233	4,790,720	4,791,024
96.20	4,790,620	148	4,791,485	446	4,791,575	4,791,574	58	4,791,664	233	4,790,721	4,791,025
96.23	4,790,621	150	4,791,486	446	4,791,576	4,791,575	58	4,791,665	233	4,790,722	4,791,026
96.26	4,790,622	152	4,791,487	446	4,791,577	4,791,576	58	4,791,666	233	4,790,723	4,791,027
96.33	4,790,623	154	4,791,488	446	4,791,578	4,791,577	58	4,791,667	233	4,790,724	4,791,028
96.36	4,790,624	156	4,791,489	446	4,791,579	4,791,578	58	4,791,668	233	4,790,725	4,791,029
162.12	4,790,625	158	4,791,490	446	4,791,580	4,791,579	58	4,791,669	233	4,790,726	4,791,030
247	4,790,626	160	4,791,491	446	4,791,581	4,791,580	58	4,791,670	233	4,790,727	4,791,031
321	4,790,627	162	4,791,492	446	4,791,582	4,791,581	58	4,791,671	233	4,790,728	4,791,032
334	4,790,628	164	4,791,493	446	4,791,583	4,791,582	58	4,791,672	233	4,790,729	4,791,033
336	4,790,629	166	4,791,494	446	4,791,584	4,791,583	58	4,791,673	233	4,790,730	4,791,034
347 V	4,790,630	168	4,791,495	446	4,791,585	4,791,584	58	4,791,674	233	4,790,731	4,791,035
356	4,790,631	170	4,791,496	446	4,791,586	4,791,585	58	4,791,675	233	4,790,732	4,791,036
357	4,790,632	172	4,791,497	446	4,791,587	4,791,586	58	4,791,676	233	4,790,733	4,791,037
444	4,790,633	174	4,791,498	446	4,791,588	4,791,587	58	4,791,677	233	4,790,734	4,791,038
465	4,790,634	176	4,791,499	446	4,791,589	4,791,588	58	4,791,678	233	4,790,735	4,791,039
484	4,790,635	178	4,791,500	446	4,791,590	4,791,589	58	4,791,679	233	4,790,736	4,791,040
537	4,790,636	180	4,791,501	446	4,791,591	4,791,590	58	4,791,680	233	4,790,737	4,791,041
574	4,790,637	182	4,791,502	446	4,791,592	4,791,591	58	4,791,681	233	4,790,738	4,791,042
CLASS 351	45	4,790,643	4,791,503	446	4,791,593	4,791,592	58	4,791,682	233	4,790,739	4,791,043
45	4,790,644	133	4,791,504	446	4,791,594	4,791,593	58	4,791,683	233	4,790,740	4,791,044
90	4,790,645	135	4,791,505	446	4,791,595	4,791,594	58	4,791,684	233	4,790,741	4,791,045
119	4,790,646	137	4,791,506	446	4,791,596	4,791,595	58	4,791,685	233	4,790,742	4,791,046
156	4,790,647	139	4,791,507	446	4,791,597	4,791,596	58	4,791,686	233	4,790,743	4,791,047
245	4,790,648	141	4,791,508	446	4,791,598	4,791,597	58	4,791,687	233	4,790,744	4,791,048
CLASS 354	195.12	4,791,441	4,791,509	446	4,791,599	4,791,598	58	4,791,688	233	4,790,745	4,791,049
234.1	4,791,442	42	4,791,510	446	4,791,600	4,791,599	58	4,791,689	233	4,790,746	4,791,050
321	4,791,443	63	4,791,511	446	4,791,601	4,791,600	58	4,791,690	233	4,790,747	4,791,051
324	4,791,444	91	4,791,512	446	4,791,602	4,791,601	58	4,791,691	233	4,790,748	4,791,052
400	4,790,649	104	4,791,513	446	4,791,603	4,791,602	58	4,791,692	233	4,790,749	4,791,053
402	4,790,650	212	4,791,514	446	4,791,604	4,791,603	58	4,791,693	233	4,790,750	4,791,054
408	4,791,446	235	4,791,515	446	4,791,605	4,791,604	58	4,791,694	233	4,790,751	4,791,055
CLASS 355	356	4,790,651	4,791,516	446	4,791,606	4,791,605	58	4,791,695	233	4,790,752	4,791,056
3 FU	4,791,447	363	4,791,517	446	4,791,607	4,791,606	58	4,791,696	233	4,790,753	4,791,057
CLASS 356	1	4,790,652	4,791,518	446	4,791,608	4,791,607	58	4,791,697	233	4,790,754	4,791,058
CLASS 357	2	4,790,653	4,791,519	446	4,791,609	4,791,608	58	4,791,698	233	4,790,755	4,791,059
CLASS 358	3	4,790,654	4,791,520	446	4,791,610	4,791,609	58	4,791,699	233	4,790,756	4,791,060
CLASS 359	4	4,790,655	4,791,521	446	4,791,611	4,791,610	58	4,791,700	233	4,790,757	4,791,061
CLASS 360	5	4,790,656	4,791,522	446	4,791,612	4,791,611	58	4,791,701	233	4,790,758	4,791,062
CLASS 361	6	4,790,657	4,791,523	446	4,791,613	4,791,612	58	4,791,702	233	4,790,759	4,791,063
CLASS 362	7	4,790,658	4,791,524	446	4,791,614	4,791,613	58	4,791,703	233	4,790,760	4,791,064
CLASS 363	8	4,790,659	4,791,525	446	4,791,615	4,791,614	58	4,791,704	233	4,790,761	4,791,065
CLASS 364	9	4,790,660	4,791,526	446	4,791,616	4,791,615	58	4,791,705	233	4,790,762	4,791,066
CLASS 365	10	4,790,661	4,791,527	446	4,791,617	4,791,616	58	4,791,706	233	4,790,763	4,791,067
CLASS 366	11	4,790,662	4,791,528	446	4,791,618	4,791,617	58	4,791,707	233	4,790,764	4,791,068
CLASS 367	12	4,790,663	4,791,529	446	4,791,619	4,791,618	58	4,791,708	2		



## CLASSIFICATION OF PATENTS

243	4,790,758	CLASS 441	303	4,791,091	89	4,791,143	399	4,791,192	159	4,791,230	
403	4,790,759	40	4,790,784	350	4,791,092	90	4,791,144	416	4,791,193	387	4,791,231
CLASS 435				CLASS 503		114	4,791,145	CLASS 534		4,791,232	
2	4,791,054	45	4,790,785	200	4,791,093	134	4,791,147	752	4,791,194	719	4,791,234
7	4,791,055	68	4,790,786	209	4,791,094	159	4,791,148	CLASS 536		CLASS 568	
	4,791,056			216	4,791,095			21	4,791,195	806	4,791,235
26	4,791,057				4,791,096			CLASS 540		CLASS 585	
144	4,791,058	15	4,790,787	CLASS 512		111	4,791,149	227	4,791,196	CLASS 604	
178	4,791,061	61	4,790,788	20	4,791,098	117	4,791,150	354	4,791,197		
198	4,791,059	378	4,790,789	CLASS 514		315	Re.32,801	282	4,791,198		
238	4,791,062	408	4,790,790	2	4,791,099	406	4,791,152	369	4,791,199		
243	4,791,063	486	4,790,714		4,791,101	453	4,791,153		4,791,200		
252.3	4,791,064				4,791,100	456	4,791,154				
296	4,791,060	32	Re.32,799	12	4,791,102						
CLASS 436				46	4,791,103						
132	4,791,065			58	4,791,104						
513	4,791,067	17	4,790,791	134	4,791,105						
516	4,791,066	66	4,790,792	210	4,791,106						
518	4,791,068	77	4,790,793	228.2	4,791,107						
533	4,791,069	93	4,790,794	233.2	4,791,108						
		102	4,790,795	235.2	4,791,109						
CLASS 437				247	4,791,110						
2	4,791,070			252	4,791,111						
27	Re.32,800	101	4,790,800	317	4,791,112						
56	4,791,072	110	4,790,801	326	4,791,113						
67	4,791,073			344	4,791,114						
042	4,791,071	211	4,790,797	345	4,791,115						
160	4,791,074	242	4,790,798	365	4,791,116						
209	4,791,075	268	4,790,802	369	4,791,117						
		CLASS 439		374	4,791,118						
				374	4,791,119						
55	4,790,760	195	4,790,803	374	4,791,120						
59	4,790,761	226	4,790,804	374	4,791,121						
	4,790,762	355	4,790,805	374	4,791,122						
65	4,790,763			374	4,791,123						
78	4,790,764			374	4,791,124						
96	4,790,765	26	4,790,806	374	4,791,125						
122	4,790,766	45	4,790,807	374	4,791,126						
125	4,790,767	81	4,790,808	374	4,791,127						
320	4,790,768			374	4,791,128						
344	4,790,769	95	4,791,076	374	4,791,129						
395	4,790,770	105	4,791,077	374	4,791,130						
421	4,790,771	136	4,791,078	374	4,791,131						
439	4,790,772			374	4,791,132						
474	4,790,773			374	4,791,133						
551	4,790,774			374	4,791,134						
579	4,790,775	4	4,791,079	374	4,791,135						
695	4,790,776	52	4,791,080	374	4,791,136						
744	4,790,777	62	4,791,081	374	4,791,137						
811	4,790,778	64	4,791,082	374	4,791,138						
842	4,790,779	65	4,791,083	374	4,791,139						
887	4,790,780	68	4,791,084	374	4,791,140						
		102	4,791,086	374	4,791,141						
38	4,790,781	227	4,791,087	374	4,791,142						
61	4,790,782	232	4,791,088	374	4,791,143						
66	4,790,783	236	4,791,089	374	4,791,144						
		263	4,791,090	374	4,791,145						

## CLASSIFICATION OF DESIGNS

D1—	102	298,880		545	298,897		373	298,914	D13—	28	298,931		D16—	32	298,948		350	298,961
D2—	277	298,881		1	298,898		390	298,915	D14—	5	298,932		D17—	22	298,949		16	298,965
	314	298,882		3	298,899		399	298,916		53	298,933				298,950		18	298,966
D3—	40	298,883		9	298,900		435	298,917		56	298,934		D19—	67	298,951		27	298,967
	71	298,884		14	298,901		447	298,918		57	298,935			77	298,952		31	298,968
D4—	326	298,885		21	298,902		448	298,919		58	298,936		D20—	78	298,953		36	298,969
	329	298,886		21	298,903		448	298,920			298,937			88	298,954		48	298,970
	368	298,887		1	298,904		461	298,921			298,938		D21—	88	298,955		48	298,971
	423	298,888		8	298,905		461	298,922			298,939			166	298,956		125	298,972
	426	298,889		10	298,906		80	298,923			298,940		D22—	171	298,957		18	298,973
	475	298,890		13	298,907		155	298,924			298,941			184	298,958		154	298,974
	479	298,891		61	298,908		155	298,925			298,942		D23—	191	298,959		61	298,975
	484	298,892		62	298,909		156	298,926			298,943			245	298,960		6	298,976
	479	298,893		71	298,910		156	298,927			298,944			291	298,961		32	298,977
	524	298,894		330	298,911			298,928			298,945				298,962		33	298,978
	527	298,895		349	298,912			298,929			298,946				298,963			
				354	298,913		178	298,930			298,947				298,964			

## CLASSIFICATION OF PLANTS

P—	7	6,455		10	6,456		26	6,468		68	6,462		78	6,467		89	6,459
	8	6,453		11	6,457		47	6,458		74	6,465			88	6,460		
	9	6,454			6,463			6,464			6,466						

GEOGRAPHICAL INDEX  
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
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Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
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Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
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Florida	12	Nevada	32	Virgin Islands	52
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(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

01 :	4,790,554	4,790,352	4,790,857	4,791,604	4,791,380	4,791,436
	4,790,716	4,790,356	4,790,880	4,791,629	4,791,427	4,791,438
	4,790,850	4,790,388	4,790,883	4,791,630	4,791,439	17 : 4,790,048
	4,790,987	4,790,394	4,790,897	4,791,631	4,791,508	4,790,093
	4,791,211	4,790,416	4,790,904	4,791,642	4,791,519	4,790,119
	4,791,547	4,790,430	4,790,927	4,791,646	4,791,556	4,790,126
02 :	4,790,378	4,790,438	4,790,938	4,791,653	4,791,618	4,790,145
04 :	4,790,090	4,790,446	4,790,952	4,791,674	10 : 4,790,075	4,790,161
	4,790,256	4,790,457	4,790,981	4,791,675	4,790,107	4,790,175
	4,790,300	4,790,459	4,790,998	4,791,676	4,790,132	4,790,191
	4,790,369	4,790,482	4,791,030	3,717,140	4,790,919	4,790,225
	4,790,471	4,790,499	4,791,056	3,903,369	4,790,109	4,790,233
	4,790,472	4,790,505	4,791,062	4,790,094	4,790,189	4,790,285
	4,790,475	4,790,506	4,791,068	4,790,163	4,790,194	4,790,316
	4,790,585	4,790,530	4,791,076	4,790,169	4,790,195	4,790,327
	4,790,588	4,790,540	4,791,108	4,790,386	4,790,231	4,790,345
	4,790,711	4,790,553	4,791,236	4,790,462	4,790,309	4,790,346
	4,790,760	4,790,559	4,791,243	4,790,569	4,790,311	4,790,370
	4,790,923	4,790,596	4,791,250	4,790,799	4,790,332	4,790,375
	4,791,007	4,790,609	4,791,276	4,790,937	4,790,337	4,790,427
	4,791,073	4,790,613	4,791,277	4,791,006	4,790,350	4,790,432
	4,791,323	4,790,617	4,791,313	4,791,274	4,790,387	4,790,461
	4,791,343	4,790,621	4,791,314	4,791,283	4,790,397	4,790,529
	4,791,538	4,790,622	4,791,322	4,791,296	4,790,467	4,790,533
	4,791,672	4,790,624	4,791,323	4,791,311	4,790,508	4,790,535
05 :	4,790,033	4,790,629	4,791,326	4,791,392	4,790,591	4,790,536
	4,790,100	4,790,637	4,791,348	4,791,606	4,790,593	4,790,646
	4,791,278	4,790,640	4,791,353	4,791,613	4,790,658	4,790,683
06 :	4,790,049	4,790,645	4,791,356	4,791,622	4,790,685	4,790,693
	4,790,060	4,790,653	4,791,357	4,791,623	4,790,812	4,790,705
	4,790,067	4,790,654	4,791,359	4,791,665	4,790,840	4,790,762
	4,790,073	4,790,657	4,791,363	09 : 4,790,055	4,790,877	4,790,766
	4,790,086	4,790,661	4,791,364	4,790,120	4,790,979	4,790,774
	4,790,091	4,790,674	4,791,367	4,790,232	4,790,988	4,790,780
	4,790,096	4,790,694	4,791,370	4,790,241	4,790,994	4,790,785
	4,790,103	4,790,700	4,791,372	4,790,255	4,791,272	4,790,786
	4,790,181	4,790,703	4,791,376	4,790,555	4,791,349	4,790,813
	4,790,183	4,790,713	4,791,383	4,790,623	4,791,355	4,790,835
	4,790,218	4,790,720	4,791,389	4,790,765	4,791,412	4,790,837
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	4,790,236	4,790,747	4,791,417	4,790,852	13 : 4,790,043	4,790,865
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	4,790,269	4,790,808	4,791,440	4,790,967	4,790,417	4,790,997
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	4,790,299	4,790,820	4,791,489	4,791,125	4,790,767	4,791,091
	4,790,307	4,790,826	4,791,521	4,791,129	4,791,036	4,791,093
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4,790,118	4,790,139	4,790,751	4,791,403	4,791,600	4,790,572
4,790,138	4,790,167	4,791,284	4,791,407	4,790,063	4,790,578
4,790,219	4,790,177	4,791,414	4,791,408	4,790,125	4,790,668
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4,790,684	4,790,409	4,790,515	4,791,545	4,790,586	4,790,940
4,790,704	4,790,418	4,790,518	4,791,555	4,790,594	4,790,945
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4,791,106	4,790,547	4,790,701	4,791,584	4,790,763	4,790,972
4,791,110	4,790,561	4,790,825	4,791,594	4,790,771	4,791,071
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4,791,341	4,790,607	4,790,928	4,791,659	4,790,858	4,791,154
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4,790,392	4,790,735	4,791,107	4,790,155	4,791,035	4,791,463
4,790,484	4,790,792	4,791,112	4,790,335	4,791,064	4,791,615
4,790,558	4,790,828	4,791,117	4,790,339	4,791,079	4,791,619
4,790,715	4,790,864	4,791,120	4,790,496	4,791,151	4,790,059
4,790,717	4,790,874	4,791,121	4,790,612	4,791,162	4,790,095
4,790,789	4,790,878	4,791,124	4,790,687	4,791,287	4,790,611
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4,791,135	4,790,192	4,790,494	4,790,695	4,791,413	4,791,003
4,791,191	4,790,306	4,790,495	4,790,719	4,790,148	4,791,395
4,791,300	4,790,402	4,790,546	4,790,736	4,790,435	4,790,070
4,791,421	4,790,424	4,790,580	4,790,748	4,791,428	4,790,106
4,791,477	4,790,434	4,790,633	4,790,805	4,790,072	4,790,134
4,791,673	4,790,448	4,790,642	4,790,839	4,790,141	4,790,228
4,790,045	4,790,557	4,790,670	4,790,868	4,790,314	4,790,242
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4,790,758	4,791,352	4,790,942	4,791,173	Re 32,800	4,790,908
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4,791,334	4,791,602	4,791,067			

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298,943	298,969	298,927	298,900	298,909	298,964
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298,971	298,932	298,929	298,880	298,911	298,942
298,888	298,965	298,957	298,885	298,953	298,960
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298,901	298,920	298,902	298,903	298,882	298,976
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298,913	298,979	298,959	298,956	298,898	298,910
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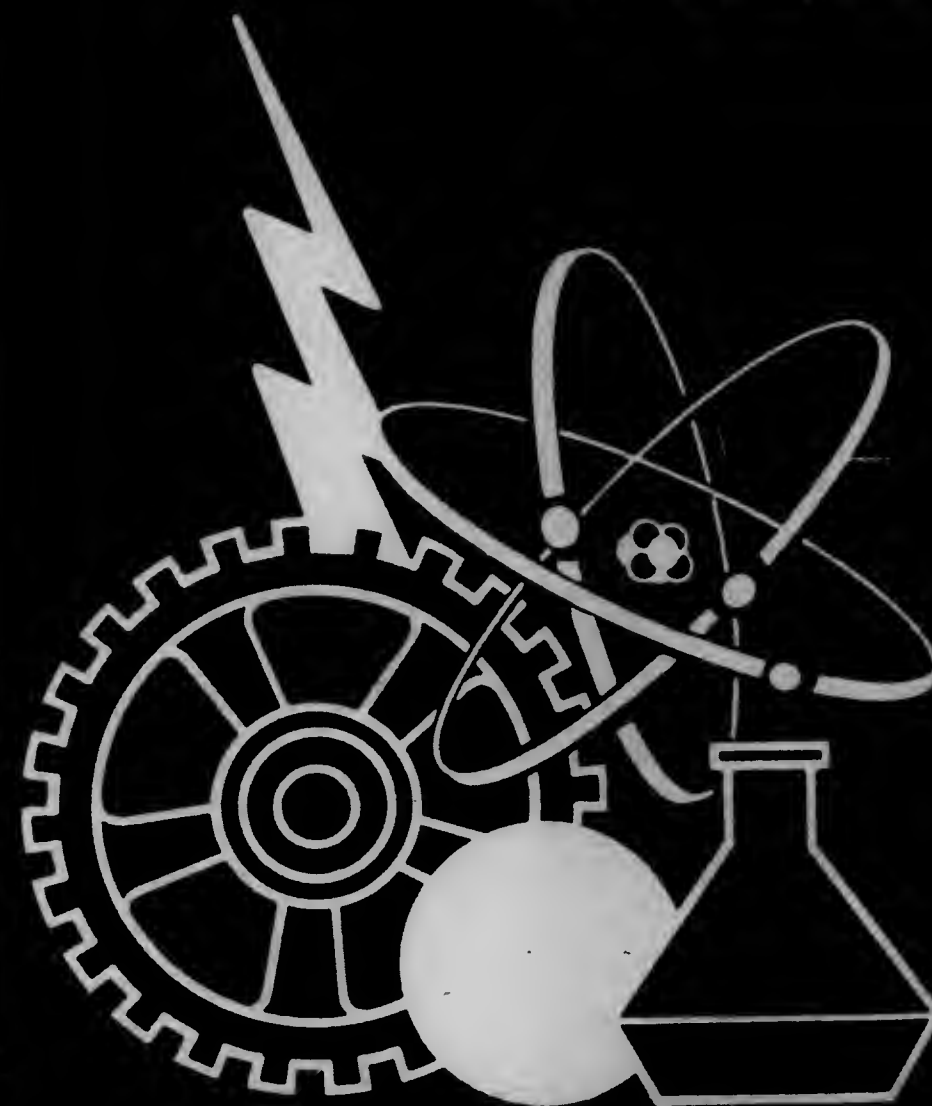
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## PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Oct. 1, 1988, and was announced in the *Official Gazette* at 1094 O.G. 2 on Sept. 6, 1988.

Domestic PCT fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date when Japan is elected under PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Danish declaration under PCT Article 64 (1)(a), that Denmark shall not be bound by PCT Chapter II, as from Nov. 1, 1988, was announced at 1095 O.G. 2 on Oct. 4, 1988.

The withdrawal of the Norwegian declaration under PCT Article 64(1)(a), that Norway shall not be bound by PCT Chapter II, as from Jan. 1, 1989, was announced at 1096 O.G. 34 on Nov. 22, 1988.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

Transmittal fee: . . . . .	170.00
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—Corresponding prior U.S. national application filed: . . . . .	350.00
—Supplemental search fee, per additional invention . . . . .	140.00
European Patent Office as Searching Authority . . . . .	1160.00
Preliminary examination fee	

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U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)		
—Search fee paid to USPTO as Searching Authority . . . . .		
—Additional examination fee, per additional invention . . . . .	125.00	
—Searching Authority not the USPTO . .	570.00	
—Additional examination fee, per additional invention . . . . .	190.00	
International fees		
Basic fee: . . . . .	485.00	
Basic Supplemental fee (for each page over 30): . . . . .	10.00	
Designation fee per country or region for the first 10 national or regional offices: . . . . .	120.00	
Designation fee for 11th and subsequent designations: . . . . .	No Charge	
Handling fee: . . . . .	150.00	

U.S. National Stage fees		
	Small Entity	Non-small Entity
U.S. Patent and Trademark Office was Preliminary Examining Authority (IPEA)		
USPTO was ISA but not IPEA . . . . .	150.00	300.00
USPTO was neither ISA nor IPEA . . . . .	170.00	340.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) . . . . .	225.00	450.00
—For each independent claim in excess of 3 . . . . .	25.00	50.00
—For each claim in excess of 20 . . . . .	17.00	34.00
—For each application containing a multiple dependent claim . . . . .	6.00	12.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 . . . . .	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 . . . . .	26.00	26.00

Oct. 26, 1988. DONALD J. QUIGG,  
Assistant Secretary and  
Commissioner of Patents  
and Trademarks.

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct.

DECEMBER 20, 1988

U.S. PATENT AND TRADEMARK OFFICE

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5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on December 17, 1985, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,558,466 through 4,559,645  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . \$ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . \$ 225.00  
By other than a small entity . . . . . \$ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . \$ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . \$ 55.00  
By other than a small entity . . . . . \$ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . \$ 500.00"

Notice of Expiration of Patents  
Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th or 12th anni-

versary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED OCTOBER 2, 1988,  
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,473,925	06/397,430	10/2/84
4,473,927	06/472,518	10/2/84
4,473,929	06/389,398	10/2/84
4,473,933	06/427,002	10/2/84
4,473,944	06/331,165	10/2/84
4,473,948	06/416,862	10/2/84
4,473,957	06/579,780	10/2/84
4,473,964	06/359,484	10/2/84
4,473,966	06/383,541	10/2/84
4,473,978	06/291,359	10/2/84
4,473,981	06/220,518	10/2/84
4,473,990	06/225,335	10/2/84
4,474,002	06/271,974	10/2/84
4,474,003	06/374,233	10/2/84
4,474,017	06/415,065	10/2/84
4,474,021	06/460,882	10/2/84
4,474,028	06/508,343	10/2/84
4,474,033	06/501,123	10/2/84
4,474,043	06/407,271	10/2/84
4,474,050	06/482,956	10/2/84
4,474,053	06/411,528	10/2/84
4,474,055	06/398,948	10/2/84
4,474,066	06/477,083	10/2/84
4,474,067	06/436,243	10/2/84
4,474,079	06/426,454	10/2/84
4,474,086	06/403,523	10/2/84
4,474,089	06/412,569	10/2/84
4,474,093	06/497,827	10/2/84
4,474,096	06/440,605	10/2/84
4,474,099	06/403,965	10/2/84
4,474,103	06/419,200	10/2/84
4,474,106	06/365,220	10/2/84
4,474,108	06/380,134	10/2/84
4,474,112	06/471,576	10/2/84
4,474,117	06/372,010	10/2/84
4,474,119	06/557,806	10/2/84
4,474,120	06/352,072	10/2/84
4,474,133	06/301,485	10/2/84
4,474,135	06/422,726	10/2/84
4,474,137	06/403,917	10/2/84
4,474,147	06/329,574	10/2/84
4,474,148	06/398,600	10/2/84
4,474,162	06/471,371	10/2/84
4,474,165	06/426,896	10/2/84
4,474,169	06/349,765	10/2/84
4,474,182	06/308,101	10/2/84
4,474,189	06/286,237	10/2/84
4,474,190	06/357,281	10/2/84
4,474,194	06/429,800	10/2/84
4,474,195	06/382,410	10/2/84
4,474,198	06/416,071	10/2/84
4,474,200	06/410,001	10/2/84
4,474,201	06/410,002	10/2/84
4,474,222	06/526,009	10/2/84
4,474,226	06/305,388	10/2/84
4,474,248	06/370,851	10/2/84
4,474,249	06/426,437	10/2/84
4,474,253	06/561,960	10/2/84
4,474,254	06/439,395	10/2/84
4,474,255	06/484,950	10/2/84
4,474,257	06/417,178	10/2/84
4,474,263	06/447,245	10/2/84
4,474,269	06/384,197	10/2/84
4,474,272	06/465,297	10/2/84
4,474,277	06/447,663	10/2/84
4,474,284	06/378,559	10/2/84
4,474,287	06/326,036	10/2/84
4,474,294	06/484,285	10/2/84

Patent Number	Serial Number	Issue Date	Patent Number	Serial Number	Issue Date
4,474,296	06/433,663	10/2/84	4,474,740	06/434,778	10/2/84
4,474,297	06/454,997	10/2/84	4,474,747	06/409,291	10/2/84
4,474,300	06/418,581	10/2/84	4,474,760	06/506,764	10/2/84
4,474,301	06/508,608	10/2/84	4,474,774	06/462,243	10/2/84
4,474,303	06/374,250	10/2/84	4,474,776	06/466,801	10/2/84
4,474,305	06/502,982	10/2/84	4,474,792	06/326,852	10/2/84
4,474,308	06/428,718	10/2/84	4,474,796	06/463,545	10/2/84
4,474,318	06/423,453	10/2/84	4,474,808	06/439,100	10/2/84
4,474,322	06/441,120	10/2/84	4,474,836	06/482,152	10/2/84
4,474,331	06/424,345	10/2/84	4,474,854	06/456,966	10/2/84
4,474,332	06/338,814	10/2/84	4,474,862	06/550,658	10/2/84
4,474,354	06/417,432	10/2/84	4,474,892	06/466,798	10/2/84
4,474,357	06/400,734	10/2/84	4,474,896	06/480,699	10/2/84
4,474,359	06/315,437	10/2/84	4,474,897	06/514,985	10/2/84
4,474,369	06/372,695	10/2/84	4,474,903	06/382,638	10/2/84
4,474,371	06/337,871	10/2/84	4,474,907	06/506,992	10/2/84
4,474,373	06/353,646	10/2/84	4,474,920	06/424,660	10/2/84
4,474,377	06/410,445	10/2/84	4,474,925	06/448,684	10/2/84
4,474,383	06/459,339	10/2/84	4,474,938	06/520,043	10/2/84
4,474,385	06/497,993	10/2/84	4,474,953	06/416,242	10/2/84
4,474,387	06/355,521	10/2/84	4,474,965	06/413,851	10/2/84
4,474,388	06/529,263	10/2/84	4,474,966	06/336,197	10/2/84
4,474,396	06/386,042	10/2/84	4,474,974	06/487,800	10/2/84
4,474,405	06/453,265	10/2/84	4,474,984	06/332,152	10/2/84
4,474,411	06/318,142	10/2/84	4,474,993	06/372,458	10/2/84
4,474,412	06/309,778	10/2/84	4,474,994	06/417,314	10/2/84
4,474,413	06/436,665	10/2/84	4,475,001	06/476,060	10/2/84
4,474,428	06/322,339	10/2/84	4,475,012	06/403,590	10/2/84
4,474,440	06/286,710	10/2/84	4,475,013	06/377,333	10/2/84
4,474,444	06/318,337	10/2/84	4,475,016	06/420,806	10/2/84
4,474,458	06/420,811	10/2/84	4,475,029	06/471,158	10/2/84
4,474,463	06/412,825	10/2/84	4,475,038	06/369,256	10/2/84
4,474,470	06/229,356	10/2/84	4,475,056	06/286,072	10/2/84
4,474,476	06/405,562	10/2/84	4,475,062	06/598,358	10/2/84
4,474,481	06/357,994	10/2/84	4,475,063	06/275,909	10/2/84
4,474,482	06/379,515	10/2/84	4,475,068	06/287,153	10/2/84
4,474,487	06/362,184	10/2/84	4,475,074	06/456,437	10/2/84
4,474,489	06/478,853	10/2/84	4,475,075	06/311,392	10/2/84
4,474,491	06/331,660	10/2/84	4,475,076	06/394,481	10/2/84
4,474,500	06/418,570	10/2/84	4,475,090	06/410,610	10/2/84
4,474,505	06/490,181	10/2/84	4,475,102	06/264,398	10/2/84
4,474,510	06/434,476	10/2/84	4,475,108	06/405,139	10/2/84
4,474,512	06/305,681	10/2/84	4,475,116	06/417,894	10/2/84
4,474,513	06/270,490	10/2/84	4,475,117	06/234,089	10/2/84
4,474,514	06/358,710	10/2/84	4,475,132	06/341,964	10/2/84
4,474,519	06/332,545	10/2/84	4,475,140	06/469,905	10/2/84
4,474,524	06/375,955	10/2/84	4,475,141	06/573,101	10/2/84
4,474,526	06/315,438	10/2/84	4,475,146	06/514,633	10/2/84
4,474,527	06/392,278	10/2/84	4,475,151	06/439,056	10/2/84
4,474,529	06/477,174	10/2/84	4,475,157	06/323,265	10/2/84
4,474,537	06/574,170	10/2/84	4,475,160	06/334,926	10/2/84
4,474,539	06/403,053	10/2/84	4,475,173	06/299,281	10/2/84
4,474,546	06/469,381	10/2/84	4,475,196	06/241,047	10/2/84
4,474,552	06/292,167	10/2/84	4,475,208	06/340,022	10/2/84
4,474,576	06/403,659	10/2/84	4,475,210	06/352,614	10/2/84
4,474,589	06/483,393	10/2/84	4,475,211	06/417,753	10/2/84
4,474,596	06/380,003	10/2/84	4,475,220	06/340,771	10/2/84
4,474,598	06/507,818	10/2/84	4,475,228	06/325,233	10/2/84
4,474,608	06/471,118	10/2/84	4,475,229	06/354,083	10/2/84
4,474,610	06/487,691	10/2/84	4,475,232	06/435,079	10/2/84
4,474,614	06/466,294	10/2/84	4,475,233	06/309,849	10/2/84
4,474,615	06/396,503	10/2/84	4,475,235	06/336,946	10/2/84
4,474,625	06/422,661	10/2/84			
4,474,631	06/445,048	10/2/84			
4,474,636	06/490,040	10/2/84			
4,474,637	06/276,900	10/2/84			
4,474,641	06/362,582	10/2/84			
4,474,660	06/523,389	10/2/84			
4,474,665	06/306,218	10/2/84			
4,474,667	06/446,998	10/2/84			
4,474,680	06/474,776	10/2/84			
4,474,685	06/363,322	10/2/84			
4,474,689	06/326,729	10/2/84			
4,474,703	06/421,499	10/2/84			
4,474,714	06/514,326	10/2/84			
4,474,721	06/470,396	10/2/84			
4,474,723	06/487,637	10/2/84			

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,620,196, Re. S.N. 262,916, Filed Oct. 26, 1988, Cl. 346/11, METHOD AND APPARATUS FOR HIGH RESOLUTION INK JET PRINTING, Carol H. Hertz, et al., Owner of Record: *Inventors*, Attorney or Agent: Bernard J. Lacomis, Ex. Gp.: 216

4,620,965, Re. S.N. 262,462, Filed Oct. 25, 1988, Cl. 422/46, HOLLOW FIBER TYPE ARTIFICIAL

LUNG, Hiromichi Fukusawa, et al., Owner of Record: *Terumo Kabushiki T/A Terumo Corp.*, Tokyo, Japan, Attorney or Agent: Thomas Langer, Ex. Gp.: 181

4,653,553, Re. S.N. 264,626, Filed Oct. 31, 1988, Cl. 141/114, AGRICULTURAL BAG LOADING MACHINE, Larry B. Cox, et al., Owner of Record: *Rand Farms System Inc.*, Attorney or Agent: William R. Laney, Ex. Gp.: 243

4,720,561, Re. S.N. 264,866, Filed Oct. 31, 1988, Cl. 524/862, PREPARATION OF METAL ALKYLs, Donald C. Bradley, et al., Owner of Record: *Secretary of State for Defense in Her Majesty's Government of the United Kingdom and Northern Ireland*, Attorney or Agent: Ellsworth H. Mosher, Ex. Gp.: 151

4,739,177, Re. S.N. 262,408, Filed Oct. 25, 1988, Cl. 250/574, LIGHT SCATTERING PARTICLE DETECTOR FOR WAFER PROCESSING EQUIPMENT, Peter Borden, Owner of Record: *High Yield Technology, Mountain View, Calif.*, Attorney or Agent: Nathan N. Kallman, Ex. Gp.: 255

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

4,142,101, Reexam. No. 90/001,637, Requested: Nov. 15, 1988, Cl. 250/363, LOW INTENSITY X-RAY AND GAMMA-RAY IMAGING DEVICE, Lo I. Yin, Owner of Record: *NASA, Washington, D.C.*, Attorney or Agent: R. F. Sandler, Ex. Gp.: 250, Requester: Owner

4,315,261, Reexam. No. 90/001,635, Requested: Nov. 9, 1988, Cl. 343/18, RADAR SIGNAL DETECTOR, Richard K. Mosher, Owner of Record: *Controlonics Corp., Littleton, Mass.*, Attorney or Agent: C. L. Gagnebin, Ex. Gp.: 220, Requester: R. E. Hattis, Chicago, Ill.

4,658,892, Reexam. No. 90/001,636, Requested: Nov. 9, 1988, Cl. 165/133, HEAT-TRANSFER TUBES WITH GROOVED INNER SURFACE, Yoshihiro Shinohara, et al., Owner of Record: *Hitachi Cable Ltd., Tokyo, Japan*, Attorney or Agent: Unknown, Ex. Gp.: 340, Requester: Owner

4,695,287, Reexam. No. 90/001,638, Requested: Nov. 16, 1988, Cl. 8/471, CAYAN DYE-DONOR ELEMENT USED IN THERMAL DYE TRANSFER, Steven Evans, et al., Owner of Record: *Eastman Kodak Co., Rochester, N.Y.*, Attorney or Agent: Joshua G. Levitt, Ex. Gp.: 150, Requester: Poms, Smith, et al., Los Angeles, Calif.

## Erratum

## Patent Term Extension - Lopid

In the Patent Term Extension published at 1095 OG 16 (Oct. 11, 1988) the correct Patent Number is 3,674,836.

## Service by Publication

A petition to cancel the registration identified below having been filed, and the notice of such proceedings

sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Worldwide Telex Inc., New York, N.Y., Reg. No. 1,322,562, for the mark "W T I WORLDWIDE TEL-EX INC.", Canc. No. 16,563.

Snow Bird, Inc., Indianapolis, Ind., Reg. No. 978,263, for the mark "SNOW BIRD", Canc. No. 16,902.

Health Quest, Inc., Northampton, Mass., Reg. No. 1,309,449, for the mark "HEALTH QUEST INC." and design, Canc. No. 16,971.

The Cherry Chip Co., Cherry Hill, N.J., Reg. No. 1,229,854, for the mark "I OWE YOU. . ." and design, Canc. 17,269.

Wheel Imports, Inc., Canton, Conn., Reg. No. 1,214,773 for the mark "MAGNA BAG", Canc. No. 16,999.

ERMA S. BROWN,  
Administrator

of the Trademark Trial  
and Appeal Board.

For JEFFREY M. SAMUELS,  
Assistant Commissioner  
for Trademarks.

## Service by Publication

A petition to cancel each of the registrations identified below having been filed, and the notice of such proceedings sent by registered mail to each registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrants listed herein, their assigns or legal representatives, shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Easy Eggs Corp., Whitesboro, N.Y., Reg. No. 859,025, for the mark "FROZEN EASY EGGS FARM FRESH WHOLE EGGS PASTEURIZED", Canc. No. 16,912.

Peters Meat Products, Inc., Plymouth, Minn., Reg. No. 917,781, for the mark "PORKETTES", Canc. No. 16,959.

The 3R Trading Co., Inc., San Francisco, Calif., Reg. No. 1,309,277 for the mark "JAZZ", Canc. No. 17,130.

ERMA S. BROWN,  
Administrator

of the Trademark Trial  
and Appeal Board.

For JEFFREY M. SAMUELS,  
Assistant Commissioner  
for Trademarks.

Filing of Papers During Unscheduled Closings  
of the Patent and Trademark Office

When the Patent and Trademark Office is officially closed by Executive Order of the President or by the Office of Personnel Management for an entire day because of some unscheduled event, such as adverse weather conditions, the Patent and Trademark Office will consider that day as a "federal holiday within the District of Columbia" under 35 U.S.C. §21. Any action or fee due that day will be considered as timely for the purposes of, e.g., 35 U.S.C. §§119, 133 and 151, if the action is taken, or fee paid, on the next succeeding business day on which the Patent and Trademark Office is open.

When the Patent and Trademark Office is open for business during any part of a business day between 8:30



a.m. and 5:00 p.m., papers are due on that day even though the Office may be officially closed for some period of time during the business day because of an unscheduled event. The procedures of 37 CFR 1.8 or 1.10 may be used, as appropriate, for the filing of papers. On any day the Office is open for at least part of the day, papers may also be deposited up to midnight in any boxes which are provided by the Patent and Trademark Office under 37 CFR 1.6(c).

Information regarding whether or not the Office is officially closed on any particular day may be obtained by calling (703)-557-INFO.

Nov. 18, 1988

DONALD J. QUIGG,  
*Assistant Secretary and  
Commissioner of Patents  
and Trademarks.*

## PATENT NOTICES

## Certificates of Correction for the Week of Dec. 20, 1988

D. 297,470	4,720,865	4,743,682	4,757,406
4,443,681	4,720,918	4,743,704	4,757,615
4,589,934	4,724,051	4,743,791	4,757,658
4,613,501	4,724,749	4,743,852	4,757,833
4,628,043	4,724,842	4,744,089	4,757,885
4,629,022	4,725,008	4,744,467	4,758,012
4,632,477	4,730,834	4,744,979	4,758,133
4,636,624	4,731,590	4,745,068	4,758,169
4,644,524	4,732,160	4,745,264	4,758,649
4,649,595	4,732,371	4,745,904	4,758,662
4,670,080	4,732,582	4,745,993	4,758,737
4,670,569	4,732,933	4,747,156	4,758,966
4,677,358	4,734,111	4,747,954	4,759,018
4,685,162	4,734,390	4,748,249	4,759,162
4,685,255	4,734,709	4,749,007	4,759,237
4,686,037	4,736,437	4,749,558	4,759,350
4,691,352	4,737,611	4,750,052	4,759,546
4,692,147	4,738,598	4,750,452	4,759,923
4,693,555	4,739,013	4,751,147	4,760,485
4,695,144	4,739,423	4,751,806	4,761,256
4,696,051	4,739,788	4,752,043	4,761,723
4,698,328	4,739,877	4,752,197	4,761,949
4,698,680	4,740,231	4,752,494	4,762,022
4,700,217	4,740,956	4,752,518	4,762,639
4,700,266	4,741,624	4,752,544	4,762,986
4,700,267	4,741,971	4,752,661	4,763,627
4,701,096	4,742,028	4,753,296	4,763,858
4,702,393	4,742,035	4,754,218	4,764,858
4,702,892	4,742,223	4,754,382	4,765,208
4,711,896	4,742,307	4,754,785	4,765,827
4,712,844	4,742,661	4,755,077	4,766,067
4,715,437	4,742,760	4,755,567	4,766,246
4,716,647	4,743,048	4,755,901	4,766,507
4,718,075	4,743,293	4,755,912	4,766,725
4,718,096	4,743,301	4,756,062	4,766,731
4,718,541	4,743,489	4,756,204	4,768,334
4,720,692	4,743,630	4,756,980	

## Erratum

In the notice of Certificate of Correction appearing at 1091 OG 29, delete Patent No. 4,718,074, the number was erroneously mentioned and should be corrected to read —4,718,075—.

## SPECIAL BOXES FOR MAIL

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Amendment	
Box OED	Mail for the Office of Enrollment and Discipline.
Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Request for Reexamination.
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TRADEMARK APPLICATION	New trademark application and associated papers and fees.

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Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin—Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247



## PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF November 19, 1988

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
<b>CHEMICAL EXAMINING GROUPS</b>	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	2-10-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	9-3-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-4-87
BIOTECHNOLOGY, GROUP 180—S. N. ZAHARNA, Acting Director	1-17-86
<b>ELECTRICAL EXAMINING GROUPS</b>	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	1-20-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	7-31-86
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	2-15-85
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	6-8-87
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	2-27-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	1-28-87
DESIGN, GROUP 290—K. L. CAGE, Director	1-3-86
<b>MECHANICAL EXAMINING GROUPS</b>	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	11-10-87
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—VACANT, Director	6-19-87
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—VACANT, Director	1-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	4-16-87
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-4-88

Expiration of patents: The patents within the range of numbers indicated below expire during November 1988, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents . . . . . Numbers 3,616,463 to 3,624,838, inclusive  
Plant Patents . . . . . None

1097 OG 58

## REEXAMINATIONS

DECEMBER 20, 1988

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B2 3,820,292 (967th)

BUILDING STRUCTURE

John R. Fitzpatrick, Islington, Canada, assignor to Campcore Inc.

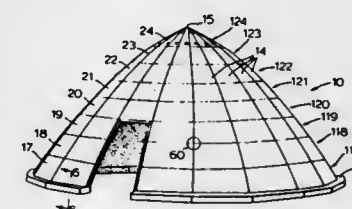
Reexamination Request No. 90/001,208, Apr. 6, 1987.

Reexamination Certificate B1 3,820,292, issued Jun. 28, 1984. Continuation of Ser. No. 84,318, Oct. 27, 1970, abandoned. This

application Apr. 6, 1987, Ser. No. 255,643

Int. Cl.<sup>4</sup> E04B 1/32

U.S. Cl. 52—81



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-12 is confirmed.

1. A peaked segmented building structure comprising:  
a base;  
a plurality of similar, upwardly convergent and inwardly sloping adjacent sectors, each supported by said base, all sectors being divided into segmental panels at their intersections with a plurality of vertically spaced, hypothetical horizontal planes, the segmental panels defined between each two adjacent horizontal planes constituting a ring of segmental panels, each segmental panel being flat and having the shape of a trapezoid of which the top and bottom edges are parallel and the two side edges are equal in length and convergent, the acute angle between the bottom edge and each side edge diminishing from one segmental panel to the segmental panel next above it, thereby to give each sector a slight outward bulge, the lowermost ring of segmental panels defining a polygon at its contact with the base;

the profile of said slight outward bulge of each sector lying between a straight line and the critical curve line for the sector, and being different from either; said last-mentioned characteristic of the profile being assured by first choosing an actual profile for each sector, by then calculating for each segmental panel in a sector its weight and length and the location of its gravitational center, by then sequentially balancing moment arms about one end of each segmental panel in order to determine the ratios between the tangents of the angles defined between the panels and the horizontal which will place the sector of segmental panels in static equilibrium from the base to the peak, by then using trail-and-error to find the set of angles which (a) satisfies the said ratios, and (b) yields the same peak-to-base angle as occurs with the actual segmental panels for which the weights, lengths and gravitational centers were determined, and finally by ensuring that the actual profile defined by the actual segmental panels lies within and is straighter than the static equilibrium profile calculated as above recited.

B1 4,166,968 (968th)

ELECTRICALLY ISOLATED BRUSH HOLDER

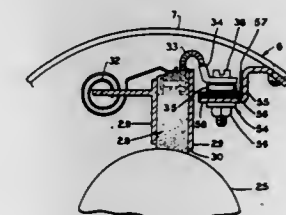
Robert N. Prittle, Aurora, Ohio, assignor to Lear Siegler, Inc., Santa Monica, Calif.

Reexamination Request No. 90/001,246, May 26, 1987.

Reexamination Certificate for Patent No. 4,166,968, issued Sep. 4, 1979, Ser. No. 815,504, Jul. 14, 1977.

Int. Cl.<sup>4</sup> H02K 13/00

U.S. Cl. 310—239



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1, 4, 5 and 8 are cancelled.

Claims 2 and 6 are determined to be patentable as amended.

Claims 3 and 7, dependent on an amended claim, are determined to be patentable.

- [1. An improved dynamoelectric machine of the type having a housing, a rotatable commutator within the housing, a brush which contacts the commutator, an electrically conductive brush holder attached to the housing and supporting the brush, a brush pigtail connected to the brush, and a lead for connection with the pigtail at a junction, wherein the improvement comprises an assembly attached to the brush holder which supports the junction between the brush pigtail and the lead of a stator, said support assembly including a first insulator which electrically isolates the junction from the brush holder and a second insulator which electrically isolates the pigtail from the brush holder.]

B1 4,640,464 (969th)

ROLLER MILL CONTROL SYSTEM

Richard L. Musto, Homewood, and Mark R. Dunn, Wilmette, both of Ill., assignors to Combustion Engineering, Inc., Windsor, Conn.

Reexamination Request No. 90/001,236, May 8, 1987.

Reexamination Certificate for Patent No. 4,640,464, issued Feb. 3, 1987, Ser. No. 669,145, Nov. 7, 1984.

Filed May 8, 1987, Ser. No. 669,145

Int. Cl.<sup>4</sup> B02C 25/00

U.S. Cl. 241—34

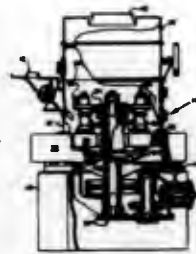
AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1-6 are cancelled.

- [1. In the combination of a roller mill operative for grinding material therewithin and feeder means operative for feeding to the roller mill the material to be ground therewithin, the roller

mill including a mill motor for driving the roller mill and a classifier for classifying material ground in the roller mill, the improvement comprising a control system for effecting control over the rate of feed of material to the roller mill in accordance with the rate of output of ground material being demanded from the roller mill, said control system comprising: to the

- a. demand sensing means mounted in juxtaposed relation to the path of flow of ground material being discharged from the roller mill in the form of output therefrom, said demand sensing means including sensing means and a fuel indicating controller connected in circuit relation with said sensing means and having a manually set set point, said sensing means being operative to sense the output of ground material being demanded from the roller mill, said fuel indicating controller being operative to generate a signal representative of the output of ground material being demanded from the roller mill as sensed by said sensing means;
- b. feed control means operative for controlling the rate of feed of material to the roller mill, said feed control means being connected in circuit relation with said demand sensing means for receiving said signal from said fuel indicating controller, said feed control means in response to said signal received thereby from said fuel indicating controller being operative to effectuate any changes in the rate of feed of material to the roller mill that may be required in order to conform to the rate of feed of material to



the roller mill to the rate of output of ground material being demanded from the roller mill as changes occur in the rate of output of ground material being demanded from the roller mill;

- c. airflow measuring means operative to measure the airflow through the roller mill, said airflow measuring means including interconnected in circuit relation one with another a roller mill airflow sensor and a pressure transmitter and an airflow indicating controller having a self-corrected set point and a control linkage and a fan damper and linearization means, said airflow measuring means being connected in circuit relation with said demand sensing means for receiving said signal from said fuel indicating controller, said airflow measuring means in response to said signal received thereby from said fuel indicating controller being operative through the manipulation of said control linkage and said fan damper to effectuate as established by said airflow indicating controller any changes in the amount of airflow through the roller mill that may be required in order to maintain the desired air-to-solids ratio in the roller mill as changes occur in the rate of output of ground material being demanded from the roller mill that result in changes being made by said feed control means in the rate of feed of material to the roller mill;

pressure measuring means operative to measure the differential pressure across the roller mill, said pressure measuring means including interconnected in circuit relation one with another a roller mill pressure sensor and a pressure transmitter and a pressure indicating controller having a self-correcting set point and linearization means, said pressure measuring means being connected in circuit relation with said demand sensing means for receiving said signal from said fuel indicating controller, said pressure measuring means in response to said signal received thereby from said fuel indicating controller being operative to effectuate as established by said pressure indicating controller any changes in the value of the differential pressure across the roller mill that may be required in order to maintain the desired differential pressure across the roller mill as changes occur in the rate of output of ground material being demanded from the roller mill;

- e. mill motor control means operative for controlling the speed of the mill motor;
- f. classifier control means operative for controlling the mode of operation of the classifier; and
- g. feed forward circuit means including differentiation means and summation means, said feed forward circuit means being connected in circuit relation with said mill motor control means and said classifier control means such that said summation means is connected in circuit relation with both said mill motor control means and said classifier control means and said differentiation means is connected in circuit relation with said summation means and therethrough to said mill motor control means and said classifier control means, said feed forward circuit means further being connected in circuit relation with said demand sensing means for receiving said signal from said fuel indicating controller, said feed forward circuit means being operative when said signal evidences the occurrence of a rapid change in demand per unit time of the output of ground material being demanded from the roller mill to effectuate as established by said differentiation means and said summation means an anticipation and modulation of the speed of the mill motor as well as the operation of the classifier to prevent the roller mill from being subjected to a condition wherein there occurs either an overfeeding of the roller mill or an underfeeding of the roller mill relative to the rate of feed of material to the roller mill that is required in order to conform to the rate of feed of material to the roller mill to the rate of output of ground material being demanded from the roller mill.]

the roller mill to the rate of output of ground material being demanded from the roller mill as changes occur in the rate of output of ground material being demanded from the roller mill;

## REISSUES

DECEMBER 20, 1988

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

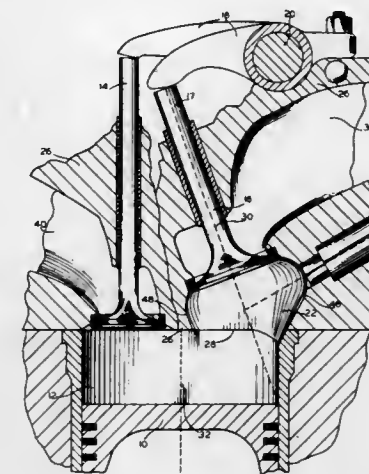
Re. 32,802

TWO-CYCLE ENGINE WITH IMPROVED SCAVENGING  
Herbert E. Kline, Claverack, N.Y., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Original No. 4,616,605, dated Oct. 14, 1986, Ser. No. 688,070, Dec. 31, 1984. Application for reissue Jul. 7, 1987, Ser. No. 71,734

Int. Cl. F02B 75/02; F02D 39/04  
U.S. Cl. 123—65 VD

78 Claims



18. A two-cycle internal combustion engine, comprising
  - (a) an engine block containing at least one cylinder cavity defined in part by a cylindrical sidewall;
  - (b) a piston mounted for reciprocal movement within said cylinder cavity;
  - (c) an engine head positioned across one end of said cylinder cavity to define a cylinder cavity end wall, said head containing an open combustion chamber communicating directly with said cylinder cavity through a combustion chamber outlet opening contained in said cylinder cavity end wall, said combustion chamber outlet opening being radially offset with respect to the central axis of said cylinder cavity and immediately adjacent one portion of the perimeter of said end wall;
  - (d) at least one inlet valve and one exhaust valve mounted within said head, said inlet valve being positioned within said combustion chamber; and
  - (e) valve actuating means for operating said inlet and exhaust valves in timed sequence with said piston motion to produce two cycle engine operation including a scavenging period during which said valves are both open to produce a reverse-return-flow of scavenging air through said cylinder cavity; wherein the location of said inlet valve within said combustion chamber is selected and said combustion chamber is shaped in parts with predetermined differing radii of curvature such that air admitted into said combustion chamber by said inlet valve is collected and directed into a converged, single column, collimated air stream passing through said combustion chamber outlet opening into said cylinder cavity axially along and closely adjacent the axial portion of said cylindrical sidewall which extends axially away from said one portion of the perimeter of said end wall, and wherein said opening is shaped and is sufficiently large in size to cause said collimated air stream to proceed axially along said axial portion of said cylindrical sidewall and to have a sufficient flow area and flow velocity to remain unbroken and substantially collimated until it reaches said piston and to cause said scaveng-

ing air stream to sweep the internal solid surfaces of said cylinder cavity.

Re. 32,803

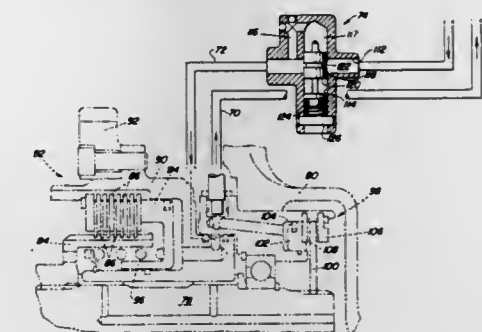
HYDRAULIC CIRCUIT FOR ACTIVATING A CLUTCH AND A THROTTLE VALVE USED IN THE CIRCUIT  
Hans-Jorg Hille, Otterstadt; and Sabah Halabiya, Edingen, both of Fed. Rep. of Germany, assignors to Deere & Company, Moline, Ill.

Original No. 4,567,971, dated Feb. 4, 1986, Ser. No. 462,280, Jan. 31, 1983. Application for reissue Aug. 17, 1987, Ser. No. 85,837

Claims priority, application European Pat. Off., Jun. 23, 1982, 82303288.3

Int. Cl. F16D 25/14, 67/04  
U.S. Cl. 192—12 C

4 Claims



4. A hydraulic circuit for activating both a clutch and a brake associated with a power take-off shaft, said clutch having a plurality of interacting drive plates and driven plates, said hydraulic circuit comprising:

- (a) a hydraulic piston positioned in said clutch for frictionally causing said drive plates to contact said driven plates;
- (b) a source of pressurized fluid;
- (c) a first conduit connecting said source of pressurized fluid to said hydraulic piston;
- (d) a second conduit connecting said brake to a fluid reservoir;
- (e) a four-way, two position control valve positioned across both said first and second conduits, said control valve being movable between a first position wherein pressurized fluid is directed both from said source to said hydraulic piston and from said brake to said reservoir, and a second position wherein pressurized fluid is directed both from said source to said brake and from said hydraulic piston to said reservoir; and
- (f) a two-way two position throttle valve positioned across said first conduit between said control valve and said hydraulic piston, said throttle valve including a valve body having a through bore formed therein which is intersected by a transverse bore, said through bore being connected at one end to said control valve and at an opposite end to said hydraulic piston, [and a flow passage connecting said through bore to one end of said transverse bore,] a spool valve positioned in said transverse bore having a pair of spaced apart grooves formed in the periphery thereof, one of said grooves being larger than said other groove, and a spring positioned in said transverse bore and acting on one end of said spool valve for urging said spool valve to a first position wherein said larger



groove is aligned with said through bore to permit unrestricted fluid flow from said control valve to said hydraulic piston, and [when a rise in pressure occurs in said through bore, it is conveyed through said flow passage] a flow passage connecting said through bore to one end of said transverse bore for conveying a rise in pressure in said through bore to an end of said spool valve opposite said spring to force said spool valve against said spring thereby aligning said smaller groove with said through bore to throttle fluid flow from said control valve to said hydraulic piston.

Re. 32,804

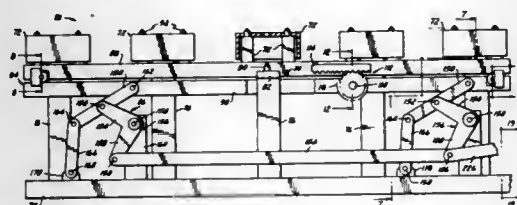
## WORKPIECE TRANSFER

Arthur C. Mason, Warren, Mich., assignor to Lamb Technicon Corp., Warren, Mich.  
Original No. 4,669,607, dated Jun. 2, 1987, Ser. No. 764,224, Aug. 9, 1985. Application for reissue Dec. 18, 1987, Ser. No. 134,501

Int. Cl.<sup>4</sup> B65G 25/02

U.S. Cl. 198—774

27 Claims



12. A multiple station workpiece transfer comprising: a plurality of longitudinally spaced apart fixed stations having workpiece supports constructed and arranged to receive and support workpieces, a shuttle having a generally horizontally reciprocable workpiece carrier constructed and arranged to underlie the workpieces and to be movable generally horizontally to extended and retracted positions relative to said stations, shuttle lifting means constructed and arranged to generally vertically raise said shuttle to a first position wherein the workpieces are received on said carrier and disengaged from and raised sufficiently above said supports to clear them when said carrier is extended generally horizontally to advance the workpieces carried thereby relative to the stations and to generally vertically lower said shuttle to a second position wherein the workpieces are received on said supports and the said carrier is disengaged from and lowered sufficiently below the workpieces to clear them when said carrier is moved generally horizontally to retract it with respect to the stations, said shuttle lifting means comprising longitudinally spaced apart lifts disposed adjacent to said shuttle, each said lift comprising a mechanism having a displaceable fulcrum, a long link pivotally carried by said fulcrum and pivotally connected to said shuttle at a first distance from the point at which said long link is pivotally carried by said fulcrum, said fulcrum being disposed such that said long link extends generally horizontally when said shuttle is half way between said first and second positions, a pivot fixed with respect to the stations, a short link pivotally carried by said fixed pivot and being pivotally connected to said long link at a point which is a second distance from said fixed pivot and a third distance from said pivotal connection of said long link to said shuttle, said second and third distances each being at least substantially equal to one-half said first distance, said fixed pivot being disposed immediately adjacent the generally vertical path of travel of said pivotal connection of said long link to said shuttle and adjacent the midpoint of such vertical path between said first and second positions of said shuttle such that when said shuttle is in said first position said pivotal connection thereof with said long link is above said fixed pivot and when said shuttle is in said second position said pivotal connection thereof with said long link is below said fixed pivot, and a drive means operably connected to the short links of all of said lifts to rotate said short link of each lift on its associated fixed pivot and constructed and arranged to

simultaneously actuate all of said lifts in unison to generally vertically raise and lower said shuttle.

Re. 32,805

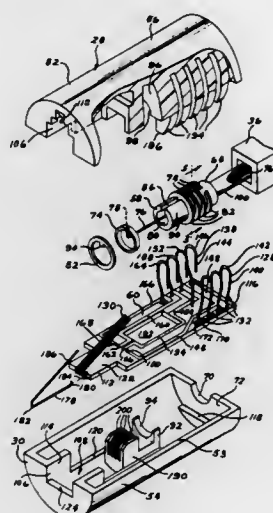
## ROTATABLE ELECTRICAL CONNECTOR FOR COILED TELEPHONE CORD

Anthony R. Engelmire, 14 Greenway Dr., Mechanicsburg, Pa. 17055, and William H. Nold, 7829 Wolf Pen Branch Rd., Prospect, Ky. 40059  
Original No. 4,583,797, dated Apr. 22, 1986, Ser. No. 743,500, Jun. 11, 1985. Application for reissue Nov. 18, 1986, Ser. No. 933,560

Int. Cl.<sup>4</sup> H01R 35/00

U.S. Cl. 439—26

46 Claims



1. A low friction rotatable electrical connector for use with a coiled telephone cord, said connector comprising:
  - a. a hollow insulated housing of generally cylindrical form that is split longitudinally into a base portion and a cover portion, and assembly means for holding the base and cover portions together, and a circular opening in at least one end wall of the cylindrical housing;
  - b. and a cylindrical rotor assembly of insulating material having a journal at one end that is rotatably mounted within the said circular opening so the rotor assembly may rotate freely relative to the hollow housing, the rotor assembly being a hollow cylindrical member having a single longitudinal split in the wall of the cylinder;
  - c. a plurality of continuous conductive rings mounted along the length of the rotor assembly and separated by a plurality of insulating washers, where there is a washer positioned between each adjacent pair of conductive rings to serve as a spacer between the rings, each conductive ring including a separate insulating conductor on the underside thereof for extending through the longitudinal split of the rotor extending out from the rotor through the hollow journal to an external termination means;
  - d. a plurality of spring wire contact elements mounted within the said base portion of the housing in a parallel array, each spring wire contact element having a portion biased into continuous wiping contact with one of the said continuous conductive rings for making a reliable electrical connection between the relatively movable hollow housing and its rotor assembly;
  - e. each of said plurality of spring wire contact elements being of hairpin shape, the said cover portion of the connector housing having a plurality of partitions to provide means to stabilize and space the contact elements apart [ ];
  - f. the plurality of spring wire contact elements has one group

extending vertically upwardly from the base portion to be at one side of said rotor assembly and a second group extending vertically upwardly from the base portion to be at the opposite side of said rotor assembly, so that said rotor assembly is positioned between the two groups of spring wire contact elements when the connector is assembled; and, g. the two groups of spring wire contact elements are formed by

a series of common pairs of spring wire contact elements, where each common pair of contact elements engages a separate one of said continuous conductive rings on the opposite sides thereof.

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## PLANT PATENTS

GRANTED DECEMBER 20, 1988

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,469

### MINIATURE ROSE PLANT NAMED WOW

Leslie E. Strawn, 10422 Morningside Ave., Garden Grove, Calif. 92648

Filed Jun. 19, 1986, Ser. No. 876,206  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—7

1 Claim

1. A new and distinct variety of miniature rose plant, hardy, dwarf, bushy, upright, rounded, much branched habit, substantially as illustrated and described, characterized by buds and flowers which are in a color hue similar to Anne Cocker (Floribunda — non-patented) and giving the coloring effect of bright orange and resembling Tiger Butter (Miniature — U.S. Plant Pat. No. 5,329) in form and size, having buds and flowers of a distinct and unusual appearance as compared to other miniature rose plants; said flowers being fully double, unique in an ovoid form and further characterized by its vigor, abundance of bloom and foliage and ease of propagation from soft wood cuttings and by budding.

6,470

### ROSE PLANT NAMED KOH-SAI

Seizo Suzuki, Tokyo, Japan, assignor to The Conard-Pyle Company, West Grove, Pa.

Filed Feb. 10, 1987, Ser. No. 13,038  
Claims priority, application Japan, Feb. 24, 1986, 61-1808  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—20

1 Claim

1. A new and distinct variety of Hybrid Tea rose plant characterized by the following combination of characteristics:  
(a) when mature is upright, erect and well-branched,  
(b) exhibits a vigorous growth habit,  
(c) forms regular very glossy dark green foliage,  
(d) continuously forms attractive fully double long-lasting blossoms which are brilliant scarlet red with a luminous yellow center, and  
(e) is very resistant to powdery mildew;  
substantially as herein shown and described together with the parts thereof.

6,471

### NECTARINE

James W. Taylor, Dinuba, Calif., assignor to Ito Packing, Inc., Reedley, Calif.

Filed Dec. 9, 1986, Ser. No. 939,873  
Int. Cl.<sup>4</sup> A01H 5/03

U.S. Cl. Plt.—41

1 Claim

1. A new and distinct variety of nectarine tree with fruit of the yellow fleshed cling type, substantially as herein shown and described, particularly as to the novelty of the deep red coloring of the fruit with a very waxy surface that produces a brilliant deep red color at commercial harvest time, with good sugar content and well balanced acid content resulting in an excellent flavor, and further having a round shape and depressed apex along with very firm flesh making the fruit particularly resistant to bruising; furthermore, the round shape and depressed apex along with the very firm flesh make the fruit very resistant to bruising.

6,472

### PEACH TREE ("AMPARO")

Chris F. Zaiger, 537 Rosemore Ave.; Gary N. Zaiger, 1907 Elm Ave.; Leith M. Gardner, 1207 Grimes Ave., and Grant G. Zaiger, 2121 Elm Ave., all of Modesto, Calif. 95351

Filed Apr. 13, 1987, Ser. No. 37,639  
Int. Cl.<sup>4</sup> A01H 5/03

U.S. Cl. Plt.—43

1 Claim

1. A new and distinct variety of peach tree, as illustrated and described, characterized by its large size, vigorous, upright growth and a productive and regular bearer of very firm, yellow flesh, freestone fruit with good flavor and eating quality; the fruit is further characterized by being nearly uniform in size throughout the tree, holding firm on the tree for 7-10 days after shipping ripe, having very good shipping and storage quality and having a high degree of attractive red skin color.

6,473

### HIBISCUS ROSA-SINENSIS CV. MONORA

Jesus Zamora, 940 W. Hollyvale, Azusa, Calif. 91702

Filed Apr. 24, 1986, Ser. No. 855,332  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—54

1 Claim

1. A new and distinct selection of *Hibiscus rosa-sinensis* as substantially shown and described herein, that is characterized particularly as a novelty by the unique combination of large white single flowers, floriferous habit, dark green foliage, compact growth habit and high rooting percentages during propagation.

6,474

### ALSTROEMERIA VARIETY 'STARONIC'

Jacob van An del, Aalsmeer, Netherlands, assignor to Van Staav-eren, B.V., Aalsmeer, Netherlands

Filed Mar. 9, 1987, Ser. No. 23,762  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. The new and distinctive Alstroemeria and the parts thereof, substantially as herein shown and described, particularly distinguished by the large size and light purple coloring of its flowers, by its vigorous and rapid growth habit, and by its good winter production.

6,475

### LILY NAMED 'SWAN SONG'

Edward A. McRae, Boring, Oreg., assignor to Melridge, Inc., Gresham, Oreg.

Filed Mar. 9, 1987, Ser. No. 23,772  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinctive variety of Oriental hybrid lily plant and the parts thereof, substantially as herein shown and described, characterized by its unique upright to semi-upright flower orientation, the pure white unspotted flower coloration, and the excellence of its flower form; by its high resistance to disease, its tolerance of virus, and its versatility both as a garden plant and as a cut flower producer from precooled bulbs forced under glass out-of-season.



6,476

## LILY NAMED PINK PIXIE

Edward A. McRae, Boring, Oreg., assignor to Melridge, Inc.,  
Gresham, Oreg.

Filed Mar. 9, 1987, Ser. No. 23,779

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Pkt.—68

1 Claim

1. The new and distinctive variety of Asiatic hybrid lily and parts thereof, substantially as herein shown and described, particularly characterized by the deep pink principal coloration of the tepals with a cream-colored throat portion in the center of the flower, and by its short, abundantly leaved silhouette.

6,480

## AFRICAN VIOLET PLANT NAMED NASSAU

Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg,  
Fed. Rep. of Germany

Filed Mar. 4, 1987, Ser. No. 21,788

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Pkt.—69

1 Claim

1. A new and distinct cultivar of African violet named Nassau, as described and illustrated, and particularly characterized by its single, violet-blue flowers; strong, upright flower stems that curve toward the center to form a bouquet above the leaves, profuse flowering, vigorous growth habit, flowering 9–10 weeks after potting, and its long-lasting and non-dropping flowers.

6,481

## CHRYSANTHEMUM NAMED REGARD

Martinus van der Jagt, Ter Aar, Netherlands, assignor to Chrysanthemum Breeders Association, N.V., Curacao, Netherlands  
Antilles

Filed Jan. 15, 1987, Ser. No. 3,601

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Pkt.—74

1 Claim

1. A new and distinct cultivar of Chrysanthemum named REGARD, as described and illustrated in the foregoing specification and accompanying drawings.

6,482

## CHRYSANTHEMUM NAMED "BRONZE REPIN"

Martinus van der Jagt, Ter Aar, Netherlands, assignor to Chrysanthemum Breeders Assoc., N.V., Curacao, Netherlands  
Antilles

Filed Feb. 25, 1987, Ser. No. 19,183

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Pkt.—74

1 Claim

1. A new and distinct cultivar of Chrysanthemum named Bronze Repin, as described and illustrated in the foregoing specification and accompanying drawings.

6,483

## CHRYSANTHEMUM NAMED "RECORD"

Martinus Van Der Jagt, Ter Aar, Netherlands, assignor to Chrysanthemum Breeders Association, N.V., Curacao, Netherlands  
Antilles

Filed Jan. 15, 1987, Ser. No. 3,544

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Pkt.—80

1 Claim

1. A new and distinct cultivar of Chrysanthemum named Record, as described and illustrated in the foregoing specification and accompanying drawings.

6,484

## POINSETTIA PLANT NAMED CHRISTMAS BLUSH

James D. Radebaugh, 1106 Bentley Rd., Freeland, Md. 21053

Filed Mar. 12, 1987, Ser. No. 25,205

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Pkt.—86

1 Claim

1. A new and distinct cultivar of Poinsettia named Christmas Blush, as illustrated and described, and particularly characterized by its salmon bract color, which fades on maturity to a salmon-orange color, with the bracts being bicolored during the maturing process.

6,477

## ANIGOZANTHOS PLANT NAMED BUSH FLAME

Mervyn L. Turner, Moabulk, Australia, assignor to Biotech  
Plants Pty. Ltd., Somersby, Australia

Filed Apr. 3, 1987, Ser. No. 33,780

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Pkt.—68

1 Claim

1. A new and distinct cultivar of Anigozanthos named Bush Flame, as described and illustrated, and parts thereof.

6,478

## ANIGOZANTHOS PLANT NAMED BUSH RANGER

Mervyn L. Turner, Moabulk, Australia, assignor to Biotech  
Plants Pty. Ltd., Somersby, Australia

Filed Apr. 3, 1987, Ser. No. 33,811

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Pkt.—68

1 Claim

1. A new and distinct cultivar of Anigozanthos plant named Bush Ranger, as described and illustrated, and parts thereof.

6,479

## AFRICAN VIOLET PLANT NAMED ROXANNA

Reinhold Holtkamp, Sr., Werther Strasse 112, D4294 Isselburg,  
Fed. Rep. of Germany

Filed Mar. 4, 1987, Ser. No. 21,789

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Pkt.—69

1 Claim

1. A new and distinct cultivar of African violet named Roxanna, as described and illustrated, and particularly characterized by its single mainly white flowers with red-purple centers and edges with additional petals occasionally appearing in the center; strong, upright flower stems that curve toward the center to form a bouquet above the leaves; profuse flowering; vigorous growth habit, flowering 8–10 weeks after potting, and its long-lasting and non-dropping flowers.

## PATENTS

GRANTED DEC. 20, 1988

## ERRATA

For CLASS	See PATENT NO.
005-447	4,791,687
227-019	4,791,707
073-152	4,791,797
600-036	4,791,911
264-138	4,792,047
128-715	4,792,145
356-037	4,792,199
409-178	4,792,248
549-329	4,792,610
341-133	4,792,786
341-156	4,792,787
341-015	4,792,788
341-089	4,792,793
341-143	4,792,794

## PATENTS

GRANTED DECEMBER 20, 1988

### GENERAL AND MECHANICAL

4,791,681

#### HEALTH CARE GARMENT AND POCKET THEREON

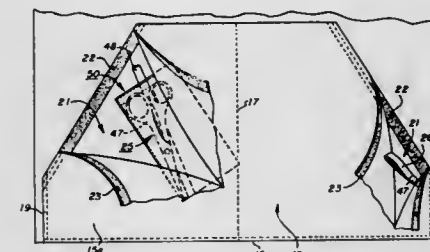
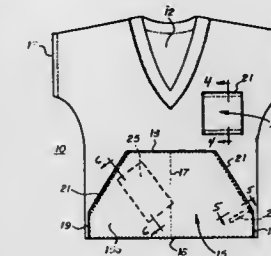
Tracy C. Dean, P.O. Box 5745, Odessa, Tex. 79764

Filed Aug. 24, 1987, Ser. No. 88,283

Int. Cl.<sup>4</sup> A41D 1/18, 27/20; A41B 1/00

U.S. Cl. 2—106

7 Claims



1. A health care personnel garment comprising a blouse or top having a neck opening, a body opening, arm openings and a straight hemline encircling the body opening, a pouch pocket formed by a first pocket panel coextensive along a bottom edge with the hemline in the front of the blouse or top, the side edges of the first pocket panel extending upward from the hemline parallel to the side seams of the blouse for a distance, then the side edges of the first pocket panel extending diagonally inward and upward towards a position intermediate the front of the blouse and terminating into a horizontal top edge of the first pocket panel, said first pocket panel secured along its upward side edges and top edge to the blouse, said inward and upward diagonal side edges forming the pouch pocket entrances, a reinforcing strip extending upward from and integral with said bottom edge of the first pocket panel, said bottom edge secured integrally with the hemline thereby forming a reinforced bottom in the pouch pocket; said pouch pocket having a concealed inner pocket orientated along a line which is coextensive with the fold of the groin of the wearer, said inner pocket formed by a second pocket panel having a reinforcing panel at the lower end secured to the blouse, side edges of the pocket panel secured to the blouse and an unattached upper edge providing the entrance for the concealed pocket.

4,791,682

#### GLOVE FOR ATTACHMENT TO SELF-SERVICE FUEL PUMP

Thomas E. Herr, 11595 Hemlock, Overland Park, Kans. 66210, and Susan H. McCormick, 18101 Dearborn, Stillwell, Kans. 66085

Filed May 27, 1987, Ser. No. 54,942

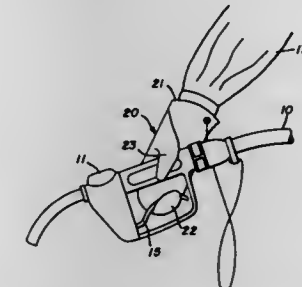
Int. Cl.<sup>4</sup> A41D 19/00

U.S. Cl. 2—160

20 Claims

1. A glove for self-service dispensing of gasoline from an associated pump having a dispensing hose and nozzle, said

glove comprising: an outer glove body of waterproof, gasoline resistant and wear resistant material; an inner liner of fabric material disposed within said glove body and fixedly secured thereto; and coupling means for securing said glove body to the associated pump hose or nozzle, said coupling means in-



cluding an elongated, flexible, electrically insulating member secured at one end thereof to the glove body, and electrically insulating attachment means secured to said elongated member at the other end thereof and adapted to be secured to the associated hose or nozzle.

4,791,683

#### HUNTER'S GLOVE

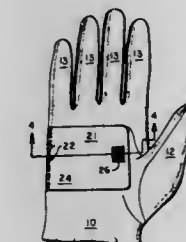
Jerry W. Agee, Rte. 1, Box 362, Paragould, Ark. 72450

Filed Dec. 10, 1987, Ser. No. 131,031

Int. Cl.<sup>4</sup> A41D 19/00

U.S. Cl. 2—161 A

4 Claims



1. A glove fabricated of compliant thermally insulative material comprising:

- (1) a palm portion, a back portion, thumb and finger portions,
- (2) an aperture substantially centered within said palm portion,
- (3) a first border of hook and loop type attachment material disposed upon said palm portion and surrounding a substantial portion of said aperture,
- (4) a flap having a size and configuration to occlude said aperture and uniformly contact said first border, said flap being attached to the glove at a site opposite the thumb portion and having a lower surface adapted to face the palm portion, and an upper surface directed away from the palm portion, said flap being foldable about its site of attachment to enable said upper surface to lie in contact with said back portion,
- (5) a second border of hook and loop type attachment material disposed upon the lower surface of said flap in a manner to interengage said first border, and
- (6) fastening means which enable said flap to be secured upon said back portion.



4,791,684

## EAR HELD EARMUFF

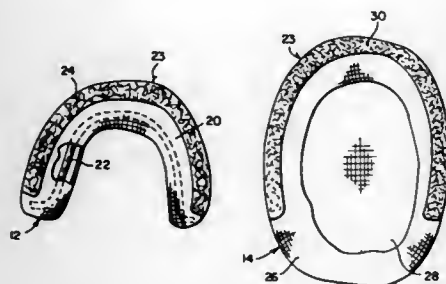
Arnold Schwartz, 226-26 Union Turnpike, Bayside, N.Y. 11364

Filed Nov. 5, 1987, Ser. No. 116,915

Int. Cl.<sup>4</sup> A41D 21/00

U.S. Cl. 2-209

5 Claims



1. An ear held earmuff which comprises:

- (a) an outer muff member sized to cover the outer ear of a person;
- (b) a thick inner securement member removably attached to said outer muff member and placed over the helix of an outer ear of a person so as to bias the outer ear of the person away from the skull of the person and be held between the outer ear of the person and the skull of the person so that the ear held earmuff is more securely fitted to the person; and
- (c) means for removably attaching said outer muff member to said inner securement member to protect the outer ear of the person against the cold weather.

4,791,685

## VENTILATED PROTECTIVE GARMENT

Frederick P. Mailbauer, 5600 Paint Valley, Rochester, Mich. 48064

Filed Mar. 25, 1987, Ser. No. 29,976

Int. Cl.<sup>4</sup> A41D 1/06

U.S. Cl. 2-227

11 Claims



1. A garment for protecting a wearer from moisture comprising:

moisture impervious substantially inelastic plastic in the form of a bifurcated tube of the trousers type having a body portion including a crotch and leg portions, said garment having a plurality of parallel lines of a plurality of slits in an area of said garment where said wearer is least likely to come into contact with wet surfaces in the environment, said area also being an area where substantial stretch is needed, said slits being spaced so as to open into diamond shaped apertures which provide both stretch and ventilation of said garment.

5. A pants type garment comprising: a first elongated sheet

of moisture resistant material including a plurality of longitudinal slits arranged in adjacent rows, said first sheet forming a front area of said garment; a second elongated sheet of moisture resistant material, said second sheet forming a rear area of said garment, said first and second sheets being secured together along portions of their periphery to form said garment with apertures for a wearers legs and torso; said longitudinal slits tending to open under pressure of said wearers body causing said first sheet of said garment to increase in width providing a garment of variable size conforming to dimensions of said wearer, said open slits providing for passage of air to cool said wearer and carry off moisture from interior of said garment while said second sheet provides a barrier to moisture entering said garment from outside said garment.

9. A pants liner for protecting a wearer from moisture which has soaked outer clothing comprising:

moisture impervious substantially inelastic plastic in the form of a bifurcated tube having body, crotch and leg portions, said pants liner having a plurality of parallel lines each containing a plurality of slits, said lines of slits being adjacent an inseam of said liner, said slits being spaced so as to open into diamond shaped apertures which provide both stretch and ventilation of said liner.

4,791,686

## DEVICE FOR AUTOMATIC RINSING OF PRIVATE PARTS AFTER DEFECACTION AND/OR URINATION OF PHYSICALLY DISABLED PERSONS

Harusige Taniguchi, and Kyoko Taniguchi, both of 4-432, Ikebukuro, Toshima-ku, Tokyo, Japan

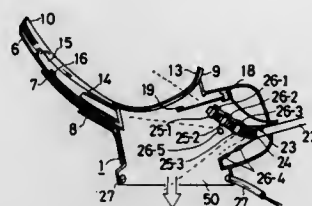
Filed Apr. 22, 1986, Ser. No. 855,170

Claims priority, application Japan, Apr. 27, 1985, 60-91743; Jun. 11, 1985, 60-125138

Int. Cl.<sup>4</sup> A61H 35/00

U.S. Cl. 4-448

10 Claims



1. A device for automatically rinsing private parts of a user's body after the urination and/or defecation comprising a main body including in turn means for temporarily securing the user's body to the device while covering private parts inclusive of an opening for urination and an opening for defecation, an inlet port for introducing a rinsing liquid for rinsing the private parts, and a drainage port for discharging the used rinsing liquid with discharge materials out of the main body; said main body including means for sensing urination and/or defecation; means for discriminating defecation and urination from each other on the basis of output signals from said sensing means, and means for releasing the rinsing liquid for a predetermined time towards the private parts inclusive of the openings for urination and/or defecation on the basis of the results of discrimination by said discriminating means, wherein said rinsing liquid releasing means includes a resilient nozzle provided to said inlet port and means for deviating said resilient nozzle towards the opening for defecation and towards the opening for urination, and said means for deviating the resilient nozzle comprises iron segments secured to said nozzle and electromagnets secured to the main body for selectively attracting the iron segments thereto.

4,791,687

## MATTRESS WITH SUPPORT

Yukio Iwase, Utsunomiya, Japan, assignor to Prince Sewing Machine Co., Ltd., Tokyo, Japan

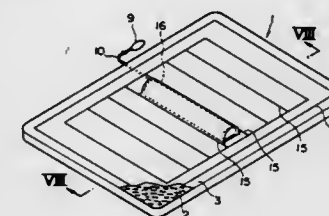
Filed Jul. 28, 1987, Ser. No. 78,768

Claims priority, application Japan, Oct. 21, 1986, 61-161201[U]; Oct. 21, 1986, 61-161202[U]

Int. Cl.<sup>4</sup> A47C 27/18

U.S. Cl. 5-447

6 Claims



1. A mattress comprising:

- a mattress body including a fabric case and a pad contained therein, said body being formed so as to have predetermined breadth and length; and
- an elongated support having a hollow soft structure and disposed at a generally lengthwise mid portion of said body so as to extend in a direction of the breadth of said body, said support including fluid supplying means attached thereto for supplying fluid to an interior of said support, said support being interposed between said pad and that portion of said fabric case constituting the top of said body; said fabric case and said pad being quilted to surround said support to thereby prevent said support from being shifted.

4,791,688

## JET PUMP MACERATOR PUMP SEWAGE HANDLING SYSTEM

C. K. Krishnakumar, Lombard, and P. A. Saigh, Morton Grove, both of Ill., assignors to Chamberlain Manufacturing Corporation, Elmhurst, Ill.

Continuation of Ser. No. 808,156, Dec. 12, 1985, abandoned.

This application Aug. 7, 1987, Ser. No. 83,606

Int. Cl.<sup>4</sup> E03D 9/10

U.S. Cl. 4-319

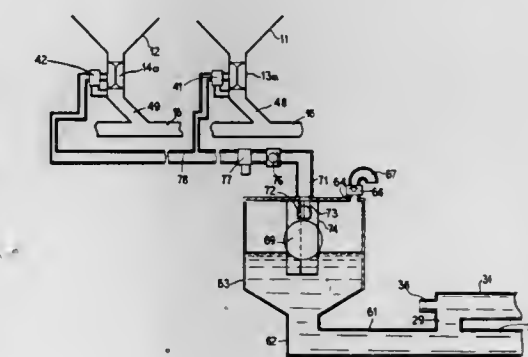
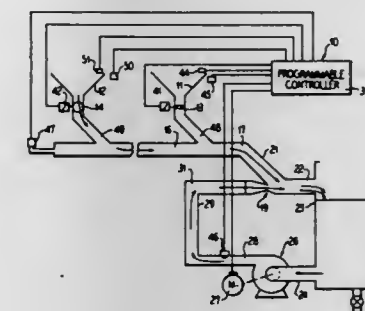
6 Claims

1. A toilet system for a mobile unit comprising at least one toilet bowl mounted on the unit, a bowl discharge pipe connected to said bowl, an evacuation valve mounted in said bowl discharge pipe, a transfer manifold pipe to which said bowl discharge pipe is connected, a non-clogging jet pump connected to said transfer manifold, a tank connected to said non-clogging jet pump, a macerator pump with an input port connected to said tank and an output port connected to said non-clogging jet pump, an air induction valve mounted in said manifold pipe, and a toilet flush valve;

wherein said non-clogging jet pump comprises a first inlet passage, a second inlet passage and an outlet passage connected to said first and second inlet passages and a reduced cross-sectional portion between said first inlet passage and said outlet passage to form a venturi so as to apply suction to said second inlet passage when fluid flows between said first inlet passage and said outlet passage, wherein said inlet port of said macerator pump is connected to a lower portion of said tank, wherein said outlet passage of said non-clogging jet pump is connected to an upper portion of said tank;

means for controlling said toilet system including a flush control to energize a flushing of the toilet system, a means for controlling said toilet flush valve, a means for controlling said evacuation valve, a pressure sensor mounted on the output port side of the macerator pump for sensing the

discharge pressure of the macerator pump, and means for controlling said air induction valve after flushing has



occurred to allow high speed air to be drawn through said transfer manifold pipe.

4,791,689

## MECHANISM FOR FILLING AND DISCHARGING A TOILET TANK

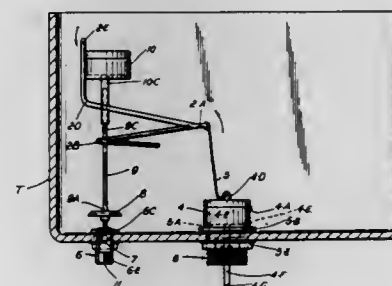
Manuel Garcia De Couto, Calle Tepuy, Residencia Trigal Apto. 9-A Parque Humboldt, Caracas, Venezuela 9791993

Filed Jun. 10, 1987, Ser. No. 61,132

Int. Cl.<sup>4</sup> E03D 1/36

U.S. Cl. 4-366

4 Claims



1. Apparatus for filling a toilet tank with water and discharging the water therefrom, comprising:

- a valve base for fastening to a toilet tank, the valve base having a hollow passage therethrough opening vertically into the toilet tank at one end for supplying water to the toilet tank from the one end of the hollow passage when the valve base is fastened to the toilet tank;
- a valve plug in the hollow passage for closing the hollow passage to the supply of water from the hollow passage

when pulled vertically toward the one end of the hollow passage;  
 an axle connected at one end to the valve plug;  
 an axle floater on the opposite end of the axle for pulling the valve plug vertically toward the one end of the hollow passage when the toilet tank is full water;  
 a buoy base for discharging water from the toilet tank when fastened thereto;  
 a discharge buoy for closing the buoy base until pulled from the buoy base, and then floating on the water in the toilet tank back to the buoy base as the water in the toilet tank is discharged therefrom;  
 a pulling chain connected to the discharge buoy at one end; and  
 a command lever connected to the opposite end of the pulling chain and engaging the axle for tilting by a command handle on the outside of the toilet tank, whereby to pull the discharge buoy base and tilt the axle, the valve plug then allowing the supply of water from the hollow passage.

4,791,690

## COMBINATION DRILL BIT AND SOCKET DRIVE ASSEMBLY

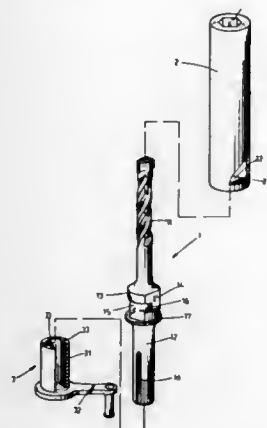
Huang Kuang-Wu, No. 84 Syh Wei Rd., Syhr Guel Li, Doon Nan Jenn, Yun Lin Shiann, Taiwan

Filed Apr. 20, 1987, Ser. No. 39,694

Int. Cl. B25F 3/00

U.S. Cl. 7-138

3 Claims



1. A combination drill and socket drive assembly comprising:

- a drill shaft including a front drill bit for drilling a hole, a rear section for attachment to the chuck of an electric drill and an intermediate section;
- a main socket for enclosing the drill bit, the main socket being provided with a seat at one end for engaging a nut and a D-shaped recess at the other end;
- the intermediate section including means permitting detachable engagement of the main socket to the drill shaft, whereby the main socket is engaged to the drill shaft when the assembly is used for socket driving a nut and the main socket is completely removed from the drill shaft when the drill bit is used for drilling a hole;
- a crank for permitting manual rotation of the drill shaft; and
- the crank and rear section being provided with cooperating detachable engagement means.

4,791,691  
 WASHING MACHINE AND METHOD OF WASHING CLOTHES

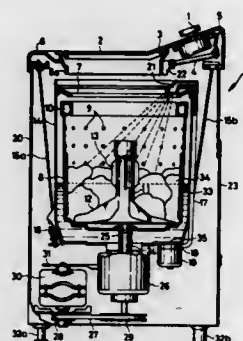
Soolchi Fukuzawa, Hitachi, and Tamotu Shikamori, Jyuou, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 25, 1986, Ser. No. 855,936

Claims priority, application Japan, Apr. 25, 1985, 60-87412  
 Int. Cl. D06F 13/02

U.S. Cl. 8-159

5 Claims



1. A method of washing clothes in a clothes washing machine, the method comprising the steps of:  
 placing a predetermined amount of clothes into a washing tub means of the washing machine;  
 supplying an amount of washing liquid into said washing tub means which is 3-8 times larger than that of the clothes to be washed in a weight ratio to prevent the clothes from floating on and up in the washing liquid and thereby promoting friction along with expansion and contraction of the clothes;  
 rotating an agitator means provided in said washing tub machine means;  
 recirculating the washing liquid from said washing tube means;  
 supplying the circulating washing liquid into said washing tub means; and  
 spraying the recirculated washing liquid on the clothes so as to enhance a washing of the clothes.

4,791,692

## STUDS FOR ARTICLES OF FOOTWEAR

Roy S. Collins, "Inchgarth", 111 Moor Hall Drive, Four Oaks, Sutton Coldfield, West Midlands, England

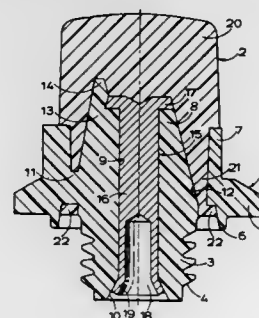
Filed Jun. 5, 1987, Ser. No. 58,518

Claims priority, application United Kingdom, Jun. 6, 1986, 8613733

Int. Cl. A43C 15/16

U.S. Cl. 12-142 P

5 Claims



1. A method of making a stud for an article of footwear comprising a first moulding step of forming an attachment

portion comprising an externally screw-threaded spigot for engagement with a complementary screw-threaded socket in securement of the stud to an article of footwear and a second moulding step of forming a ground-engaging boss moulded on to the attachment portion, the attachment portion being moulded of a relatively hard and inflexible plastics material and being formed to present means for engagement by a tool for assisting in screwing the stud spigot tightly into a socket and the boss being moulded of a material that is more flexible and resilient, the attachment portion being formed to comprise a collar bounding a chamber from within which a central stiffening support projects axially beyond the collar in the direction away from the spigot, the spigot being formed with an axially-extending passage which opens out into said chamber and the boss-forming material in the second moulding step being caused to envelop the central support and fill said chamber and form a plug within the passage in the spigot to interlock the boss moulding with the attachment portion.

4,791,693

## CORN SILKING APPARATUS

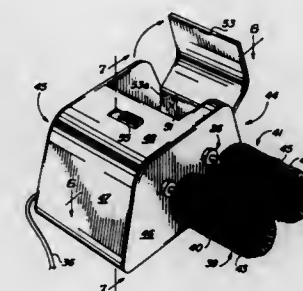
Billy J. Kvaternik, Rte. 6, Box 2551, West Monroe, La. 71291

Filed Oct. 27, 1986, Ser. No. 923,437

Int. Cl. A23N 12/00; A46B 13/02

U.S. Cl. 15-3.17

4 Claims



1. An apparatus for removing corn silk from an ear of corn comprising:

- a molded housing having a front panel and a rear panel;
- a drive shaft journaled for rotation in said front panel, with one end of said drive shaft projecting through said front panel;
- an idler shaft journaled for rotation in said front panel in spaced, substantially parallel relationship with respect to said drive shaft, with one end of said idler shaft projecting through said front panel;
- a drive gear carried by said drive shaft and an idler gear carried by said idler shaft, said idler gear provided in meshing relationship with said drive gear and both said drive gear and said idler gear located in said housing;
- a drive brush mounted on said one end of said drive shaft and an idler brush mounted on said one end of said idler shaft, said drive brush and said idler brush positioned in spaced, substantially parallel relationship with respect to each other;
- drive means located in said housing, said drive means coupled to said drive shaft, whereby said drive brush and said idler brush are caused to rotate in opposite directions responsive to operation of said drive means; and
- a storage compartment provided in said molded housing behind said idler shaft and beside said drive means.

4,791,694

## CLEANING AND WAXING TOOL FOR AUTOMOBILES, VANS, ETC.

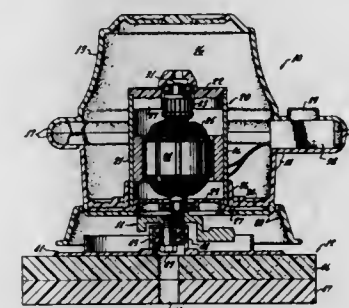
Sam S. Itaya, Pasadena, and Robert E. Burglin, Orange, both of Calif., assignors to Waxing Corporation of America, Inc., Orange, Calif.

Filed May 22, 1987, Ser. No. 53,960

Int. Cl. B60S 3/06; A46B 13/00

U.S. Cl. 15-97 R

33 Claims



1. A hand-held orbital automobile polisher, which comprises:

- a housing having handle means close-coupled thereto whereby the operator grasps the polisher closely adjacent the housing, and moves the polisher to the desired regions of the automobile or other object to be polished;
- an electric motor mounted in said housing;
- a counterweight mounted on the shaft of said motor, and a pad assembly rotatably connected to said counterweight at a point offset from said motor shaft;
- the axis of rotation of said pad assembly relative to said counterweight being substantially parallel to the axis of said motor shaft;
- characterized in that the overall weight of said polisher is in the range of about four pounds to about eight pounds, and further characterized in that the rotational speed of said motor, and the constructions and masses and mounting points of said counterweight and said pad assembly, are such that the net centrifugal force generated by said counterweight and said pad assembly is in the range of about 10 pounds to about 18 pounds.

4,791,695

## ARTIST'S BRUSH

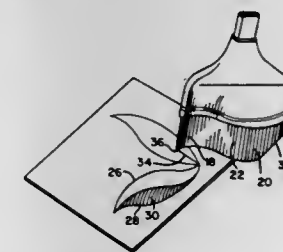
Evelyn K. Kephart, 813 Logan Blvd., Hollidaysburg, Pa. 16648

Filed Jul. 13, 1987, Ser. No. 72,541

Int. Cl. A46B 9/02

U.S. Cl. 15-160

11 Claims



5. An artist's brush configured for the reproduction of repetitive patterns, said brush including a handle with a paint applying element thereon, said paint applying element projecting from said handle and terminating in an elongate outer edge remote from said handle, said paint applying element having



opposed side edges, said outer edge terminating in opposite ends at said opposed side edges, said outer edge including a pair of elongate portions, one adjacent each side edge, one of said portions being of an arcuate configuration with a smooth transition length between said portions, said paint applying element, for a length thereof along said arcuate configuration portion, being progressively shorter toward the adjacent side edge and defining an outer edge section extending at an arcuate angle to a linear continuation of the remainder of said outer edge.

4,791,696

## WINDSCREEN WIPER SYSTEM

Graham Durtal, 106, Cowper Rd., Hanwell, London W7 1EJ, England

Filed Jan. 27, 1988, Ser. No. 148,815

Claims priority, application United Kingdom, Jan. 28, 1987, 8701809

Int. Cl. B60S 1/22

U.S. Cl. 15—250.23

7 Claims



1. A windshield wiper system comprising a drive shaft, a windshield wiper arm mounted at one end on the drive shaft for reciprocal pivotal movement therewith and a windshield wiper blade articulated to the other end of the arm, wherein a link extending substantially at right angles to the surface of the windshield is pivotally connected to both the arm and the blade so as to provide an articulated connection therebetween, a control lever is pivotally connected at one end to the link between the pivots for the arm and the blade, a cam surface is associated with the drive shaft and a cam follower is provided, for cooperation with the cam surface, mounted on the other end of the control lever, the arrangement being such that the cam follower follows the cam surface during pivotal movement of the arm and varies the position of the control lever with respect to the arm to move the blade generally longitudinally of the arm.

4,791,697

## WIPER ARM FOR CURVED WINDSHIELD

Timothy J. Fry, Spring Valley, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 5, 1987, Ser. No. 104,159

Int. Cl. A47L 1/00

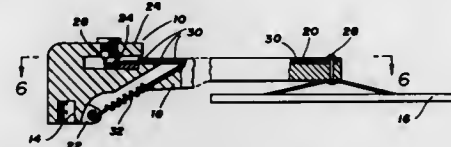
U.S. Cl. 15—250.2

1 Claim

1. A vehicle wiper arm of the type that is subjected to substantial up and down deflections relative to the vehicle as said arm is driven by a drive mechanism to sweep a wiper blade over the surface of a vehicle windshield, said wiper arm comprising:

a main body fixed at the back end to said drive mechanism and mounting said wiper blade at the front end, whereby said main body is flexed up or down as said arm is so

driven to create a deflection force that increases the wiping pressure in said blade proportional to said deflection, a slider bar fixed at the front end to said main body, but otherwise free to slide relative to said main body, so that as said main body flexes up or down, the back end of said slider bar will slide relative to said main body, a curved ramp fixed to the back end of said slider bar, a tension spring joined between the back end of said slider bar and said vehicle at such an angle that the major component of the force of said spring acts normal to said slider bar to pull said slider bar and said main body toward said windshield to add to said wiping pressure while the minor component of said spring acts along the length of said slider bar, with said spring relaxing as said slider bar



moves relative to said arm main body with upward deflection of said arm and stretching with downward deflection of said arm, and, a spring loaded ball on said arm main body engageable with said curved ramp so as to provide a force acting in opposition to the minor force component of said tension spring, whereby, as said arm deflects up and down, the contribution to wiping pressure of the arm main body will increase as the contribution to wiping pressure of said moving slider bar and the major force component of said tension spring decreases, with the minor force of said tension spring being substantially canceled out by said curved ramp and said spring loaded ball, so that total wiping pressure on said blade will remain more nearly constant.

4,791,698

## WIPER WITH WIPER ARM SWEEPING ANGLE CHANGER

Yukiho Murata, Kanagawa, Japan, assignor to Nissan Motor Company, Ltd., Yokohama, Japan

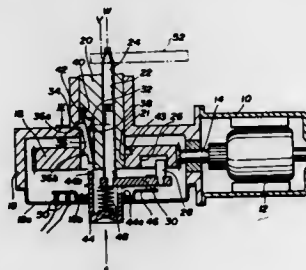
Filed Sep. 11, 1987, Ser. No. 95,073

Claims priority, application Japan, Sep. 24, 1986, 61-225495

Int. Cl. B60S 1/08, 1/24

U.S. Cl. 15—250.13

12 Claims



1. A wiper comprising:

a case;  
an output gear housed in said case and rotatable about its axis;  
an output shaft extending perpendicular to said output gear and having one end to which a motor arm is secured;  
a wiper arm assembly including a connecting rod which has one end pivotally connected to a free end of said motor arm;  
first means for transmitting rotation of said output gear to said output shaft;

a bushing having an eccentric bore through which said output shaft is rotatably received, said bushing being rotatably received in said case;  
second means for locking said bushing to one of said case and said output gear while changing relative angular positioning between said bushing and said output gear; and  
a push button arranged on said case and actuating said second means when manipulated.

4,791,699

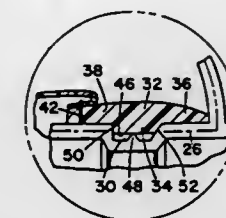
## HAND VACUUM CLEANER

John F. Sovis, Coldwater, Mich.; Robert M. Smith, Copley, Ohio, and George H. Bramhall, Boulder, Colo., assignors to Royal Appliance Manufacturing Co., Cleveland, Ohio  
Division of Ser. No. 670,553, Nov. 9, 1984, Pat. No. 4,633,543.  
This application Jun. 24, 1986, Ser. No. 878,050

Int. Cl. A47L 5/26

U.S. Cl. 15—344

3 Claims



1. A hand-held vacuum cleaner having a housing, rotating brush and selectively-separable bag assembly;  
said housing including a bag attachment collar having a recessed slot area;  
said bag assembly including an elastomeric retaining ring having a sealing and retaining bead for reception in said recessed slot area, said ring including a lead-on flange and a bag assembly attachment flange, said bead depending radially inwardly from said flanges and being positioned generally intermediate of said flanges whereby said bag assembly is positively sealed during cleaner operation to substantially preclude passing of dust particles.

4,791,700

## FRESNEL LENS ILLUMINATOR FOR VACUUM CLEANER

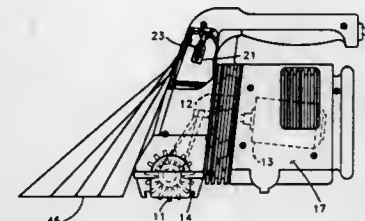
James E. Bigley, Warren, Ohio, and Lee R. Estelle, Rochester, N.Y., assignors to The Scott Fetzer Company, Cleveland, Ohio

Filed Dec. 29, 1987, Ser. No. 139,018

Int. Cl. A47L 9/30

U.S. Cl. 15—324

7 Claims



5. A vacuum cleaner having a housing forming an inlet nozzle, an electric light bulb in the housing, a lens carried on the housing for focusing light from the bulb onto a work area immediately adjacent the area underlying the nozzle, the lens having a plurality of arcuate prisms each substantially concentric to a common imaginary axis, the light bulb being supported

in the housing above said axis whereby the light rays passing through said prisms are all directed downwardly towards said immediately adjacent work area.

4,791,701

## UTILITY TOOL FOR ROTISSERIE SPITS

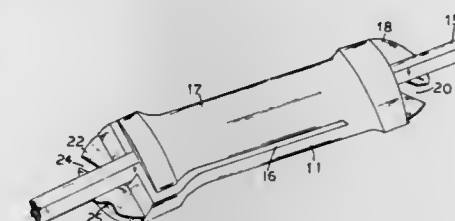
Leslie G. Dutchburn, 7 De Vere Gardens, Toronto, Ontario, Canada M5M 3E4

Filed Aug. 21, 1987, Ser. No. 87,766

Int. Cl. B25G 3/20

U.S. Cl. 16—111 R

14 Claims



1. A utility tool comprising an elongated body member, a transverse slot formed in said body member and extending from one end to a short distance from the other end of said body member said transverse slot separating said body member into a cantilever portion and a base portion, a through bore formed in said base portion and extending offset from and parallel to the longitudinal axis of said body member, and said bore being in communication with said slot over the entire length of said slot, said cantilever portion having a flat inner surface tangential to said through bore.

4,791,702

## CARRYING HANDLE

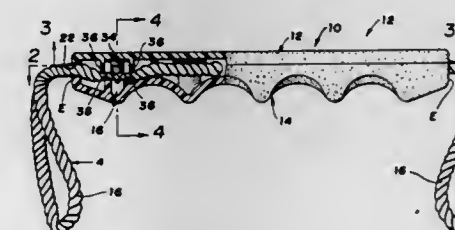
Harry D. McVey, Pendleton, Ind., assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 29, 1988, Ser. No. 161,956

Int. Cl. H01M 2/10

U.S. Cl. 16—114 B

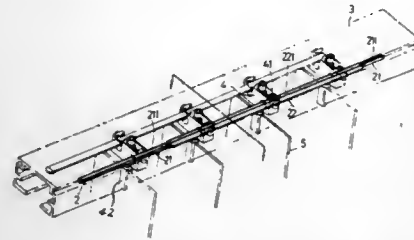
7 Claims



1. A carrying handle including (1) a discontinuous rope having a central portion and two unconnected end portions positioned proximate one another and said central portion so as to provide a pair of loops for engaging an article to be carried, and (2) a handgrip tightly engaging said central portion and said ends between said loops so as to retain said rope against relative movement with respect to said handgrip and to prevent extraction of said ends therefrom incident to carrying forces exerted on said loops, said handgrip comprising first and second members mating one to the other so as to engage and retain said rope substantially immovably therebetween:  
said first member comprising a plurality of receptacles each having a pair of opposing walls defining a slot therebetween for receiving and retaining said rope extending

longitudinally therethrough, said walls each including a pocket intermediate the ends of said slot and opposite a like pocket in the opposing wall; and  
 said second member comprising, (a) a plurality of tapering retainer pins each projecting into a said slot between said opposing pockets so as to penetrate, spread and wedge said rope tightly into said pockets on either side of said pin, and (b) a pair of opposing ribs on opposite sides of each said pin extending substantially transverse the longitudinal direction of said slot and pressing on said rope at said slot ends so as to pinch said rope between said ribs and the bottom of said slot.

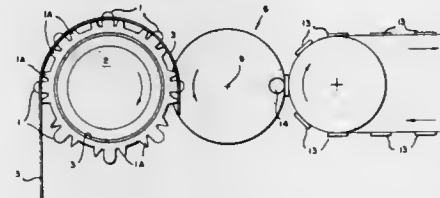
4,791,703  
**LENGTH ADJUSTABLE CENTER ROD STRUCTURE FOR A VERTICAL SHUTTER DRAPE**  
 A-Shen Chang, No. 15, Lane 494, Fu Chien Rd., Fu Hsing Ts'un, Fu Hsing Hsiang, Changhua Hsien, Taiwan  
 Filed Jul. 7, 1987, Ser. No. 71,546  
 Int. Cl.<sup>4</sup> A47H 1/022  
 U.S. Cl. 16-94 D 4 Claims



1. A structure for supporting vertical shutter blades from an over-head track, comprising  
 a center rod located in said over-head track, said center rod comprising at least one inner hollow tube and an outer hollow tube telescoped together with each said inner hollow tube extending inside said outer hollow tube, wherein a straight quasi-U-shaped trough is provided along each said hollow tube, and said U-shaped troughs cause the telescoped hollow tubes to rotate integrally as said center rod,  
 a plurality of sliding elements, each said sliding element having a rotatable sleeve axle with a respective quasi-U-shaped tongue on an inner side of its sleeve axle, each said sliding element being attached on said center rod by engaging its respective quasi-U-shaped tongue in the quasi-U-shaped trough of a respective one of said telescoping hollow tubes of said center rod, each said sliding element having a shutter blade axle for supporting a respective one of said vertical shutter blades, wherein said shutter blade axle of each said sliding element rotates when its sleeve axle is rotated,  
 wherein said sliding elements can move freely along said center rod, and said shutter blade axles of said sliding elements can be driven to rotate by rotating said center rod.

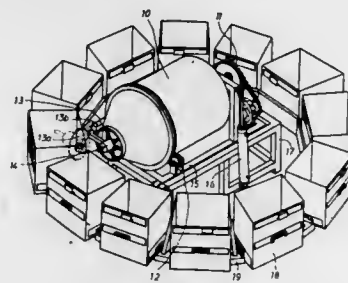
4,791,704  
**AUTOMATIC TRANSFER APPARATUS**  
 Gregory A. Chapman, Epping, Australia, assignor to Lindholst & Co. (Australia) Pty. Limited, New South Wales, Australia  
 Filed Feb. 18, 1987, Ser. No. 16,092  
 Claims priority, application Australia, Feb. 18, 1986, PH4661  
 Int. Cl.<sup>4</sup> A22C 21/00 7 Claims  
 U.S. Cl. 17-11  
 1. A transfer arrangement for transferring poultry carcasses from one conveyor to another spaced apart conveyor comprising:

a rotatably mounted plate;  
 means for rotating said plate whereby said plate will rotate about a rotational mounting;  
 a plurality of sector members, each being pivotally mounted to said plate at a position spaced apart and offset from said rotational mounting of said plate;  
 means for imparting rotational movement from said plate to said sector members; and  
 means for at least one of limiting and controlling pivotal movement of said sector members relative to one another and to their pivotal mounting to said plate;



said sector members each being mounted to said plate for pivotal movement relative to one another and to the plate upon rotation of said plate, each of said sector members successively moving from a first position and spacing relative to adjacent sector members to a second position, said sector members in said second position being spaced further apart from adjacent sector members than said sector members in said first position, the spacing of adjacent sector members in said second position differing from the spacing of adjacent sector members in said first position by a distance equal to a distance between said rotational mounting of said plate and the pivotal mounting of said sector members.

4,791,705  
**MACHINE FOR MEAT TREATMENT AND MACERATION, WITH AUTOMATIC LOADING AND UNLOADING**  
 Narciso L. Corominas, Besalu, Spain, assignor to Metalquimia, S.A., Girona, Spain  
 Filed May 21, 1987, Ser. No. 52,422  
 Claims priority, application Spain, May 22, 1986, 555230  
 Int. Cl.<sup>4</sup> A22C 9/00 7 Claims  
 U.S. Cl. 17-25



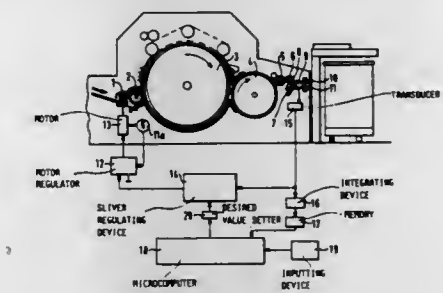
1. An apparatus for meat treatment and maceration with automatic loading and unloading comprising:  
 a large hollow drum;  
 a loading and unloading aperture at one end of said drum;  
 means integrated on the wall of the drum for regulating temperature of meat contained in the drum;  
 means to produce alternate stages of variable duration of vacuum and pressure inside said drum;  
 a fixed support structure;  
 a tilting frame having one end pivotally mounted on said support structure and an opposite end rotatable support-

ing a rear end of said drum on an axis of rotation thereof coinciding with the symmetrical axis of said drum;  
 roller support means mounted on said tilting frame near said one end thereof for supporting said drum on the outer surface thereof for rotation about said axis of rotation;  
 means for tilting said tilting frame about the pivotal end thereof for raising and lowering the rear end of said drum between a lowered position for loading said drum through the aperture therein, a fully raised position for unloading said drum through the aperture thereof, and an intermediate treating position for treating meat within said drum;  
 drive means for rotating said drum about said axis of rotation;  
 a door engageable over said aperture for closing and opening said aperture;  
 door support arm means pivotally mounted on said tilting frame;  
 door support mean connected to said door support arm means and rotatably connected to said door for allowing rotation of said door with respect to said support arm and tilting frame about said axis of rotation of said drum;  
 means to move said door into and from the closed position in a hermetically sealed relationship against said aperture;  
 door locking means mounted on said door for locking said door in said hermetically sealed relationship against said aperture;  
 hopper means engageable with said aperture when said door is in the open position for feeding meat into said drum when said drum is in the loading position;  
 hopper support means supporting said hopper for movement between a nonloading position spaced from said drum and a loading position wherein said hopper is positioned adjacent said drum when said drum is in the loading position for feeding meat in said hopper into said drum;  
 an annular container support structure surrounding said drum and being rotatable in a substantially horizontal plane around said drum;  
 a plurality of containers supported in spaced relationship on said annular structure, each container having an open top;  
 means for rotating said annular structure with said containers thereon in intermittent steps to position one of said containers in a container-emptying position for emptying meat in said container into said hopper when said hopper is in the loading position, and for positioning said empty container into a next succeeding position wherein the open top thereof is under said aperture in said drum when said drum is in said unloading position with said door in said open position; and  
 lifting and tilting means engageable with each container for raising and tilting said container for emptying meat therein into said hopper when in the loading position and returning said container to said annular structure after emptying thereof.

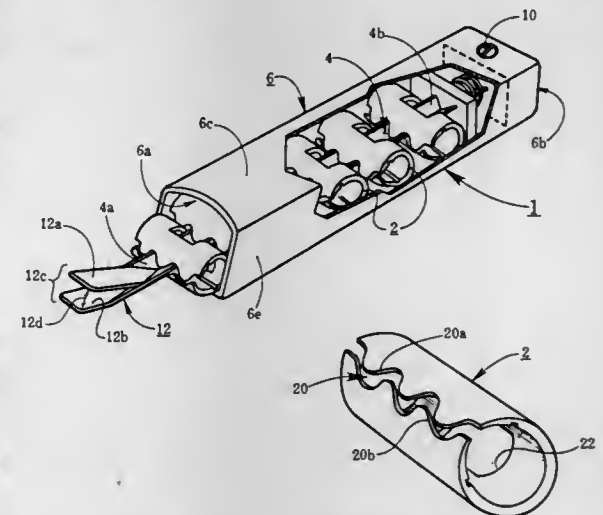
4,791,706  
**METHOD AND APPARATUS FOR EVENING THE SLIVER PRODUCED BY A CARD**  
 Wolfgang Wienen; Ulrich Hoffmann, both of Aachen, and Heinrich Rake, Aachen-Laurensberg, all of Fed. Rep. of Germany, assignors to Trützschler GmbH & Co. KG, Mönchengladbach, Fed. Rep. of Germany  
 Filed May 21, 1987, Ser. No. 52,591  
 Claims priority, application Fed. Rep. of Germany, May 24, 1986, 3617528; Feb. 5, 1987, 3703450  
 Int. Cl.<sup>4</sup> D01G 23/06, 15/00; D01H 5/42 7 Claims  
 U.S. Cl. 19-105  
 1. In a method of evening a sliver produced by a carding machine in which a predetermined output rate and draft are set; including the steps of determining the actual weight of a predetermined sliver length by weighing; determining the difference between the actual sliver weight and a desired sliver weight; as a function of said difference altering the draft corre-

sponding to a predetermined sliver thickness; the improvement comprising the steps of

- measuring momentary actual thicknesses of the running sliver at a card output for a determined time period or sliver length and generating mechanical signals representing said momentary actual sliver thicknesses;
- converting said mechanical signals to first electric signals;
- combining said first electric signals into a second electric signal constituting an average of the first electric signals



4,791,707  
**CLIP APPLICATOR, SPREADABLE CLIPS AND METHOD FOR APPLYING THE CLIPS**  
 Wilson H. Tacker, Box 265, RD-1, Mystic, Conn. 06355  
 Filed Aug. 26, 1986, Ser. No. 900,385  
 Int. Cl.<sup>4</sup> A61B 17/00 23 Claims  
 U.S. Cl. 227-19

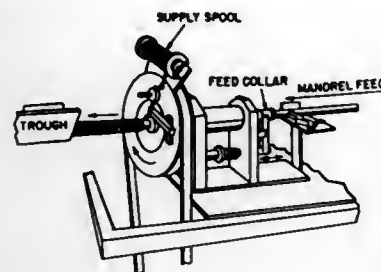


1. A manual applicator for the application of spreadable surgical clips, comprising:  
 a clip magazine having a clip discharge end and dimensioned and configured to releasably retain within the magazine a plurality of spreadable clips;  
 a spreader mounted on said clip magazine by a rail member,



at least part of the rail member being disposed between the spreader and the discharge end of the magazine to receive spreadable clips from the magazine and carry said clips on the rail member for guided movement of the clips thereon and onto the spreader, the spreader and the rail member each being dimensioned and configured to permit sliding movement thereof of the clips; and  
biasing means mounted on the applicator to urge the spreadable clips from the clip magazine towards the spreader; the spreader having an inlet section disposed adjacent to the discharge end of the magazine and a discharge tip which is wider in the clip-spreading direction than its inlet section, thereby providing the spreader with a wedge-shaped profile which diverges in the clip-spreading direction, whereby dislodgement of the spreadable clips from the clip magazine onto the spreader spreads the dislodged clip for ejection of it over the discharge tip of the spreader.

**4,791,708**  
**ABRASION AND HYDROLYSIS RESISTANT JOINING MEANS FOR FABRIC SEAMS**  
H. Dana Smolens, Norristown, Pa., assignor to Asten Group, Inc., Charleston, S.C.  
Continuation of Ser. No. 582,784, Feb. 23, 1984, abandoned.  
This application Jan. 16, 1986, Ser. No. 874,640  
Int. Cl.<sup>4</sup> F16G 3/14  
U.S. Cl. 24—33 C **8 Claims**

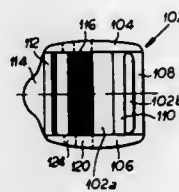


1. Means for joining the ends of a flat woven heat sensitive industrial fabric into an endless papermaker's belt, said means comprising at least two fabric connecting elements, having a heat set temperature different from the heat set temperature of the interwoven threads of said flat woven industrial fabric and greater than 400° F., and a joining element, each of said connecting elements being a preformed and heat set coil of polyetheretherketone continuous filament having a preformed and heat set final height dimension which is no greater than the maximum thickness of the final finished papermaker's belt, whereby the connecting elements are secured to the respective ends of the flat woven fabric and are intermeshed to form a passage way for receiving the joining element therethrough and establishing the endless papermaker's belt, said connecting elements being heat set and preformed prior to use as a connecting element so as to avoid damage to said fabric from heat setting.

**4,791,709**  
**STRAP FASTENER**  
Gerhard Fildan, Dieselstrasse 20, D-7250 Leonberg, Fed. Rep. of Germany  
Division of Ser. No. 855,099, Apr. 22, 1986, Pat. No. 4,712,280.  
This application Jan. 3, 1987, Ser. No. 57,752  
Claims priority, application Fed. Rep. of Germany, Apr. 26, 1985, 8512411[U]; Apr. 30, 1985, 8512710[U]  
Int. Cl.<sup>4</sup> A44B 11/10  
U.S. Cl. 24—171 **6 Claims**

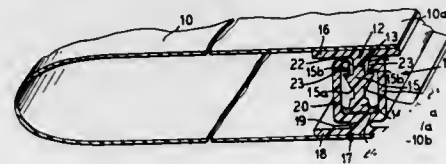
1. A buckle for a strap which comprises a rectangular body formed with a window defined by a planar rectangular frame with a fixed bar at an edge of said body, and a pair of guide walls extending generally perpendicularly to said fixed bar,

and at least one movable bar in said window parallel to said fixed bar and defining therewith a gap into which a strap can be passed and which can clamp said strap against said fixed bar, said movable bar being provided at its ends with wedge-shaped formations tapering toward the fixed bar, said walls being formed with lateral slots respectively receiving said wedge-shaped formations with clearance and tapered correspondingly toward the fixed bar with substantially the same angle of taper as that of said formations and such that movement of said formations in the respective slots in a direction opposite the



direction of taper thereof increases play between the formations and the slots whereas movement of said formations in the respective slots in an opposite direction wedges said formations without play in said slots, said movable bar being wider between said walls than said formations in said directions, said movable bar being provided with longitudinal flutes along an external surface thereof between said walls and which run transversely to said directions, said wedge-shaped formations being provided with flutes along external surfaces thereof which run transversely to said directions.

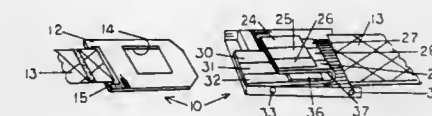
**4,791,710**  
**SELF-ALIGNING CLOSABLE EXTRUDED PROFILE PLASTIC FASTENER AND METHOD**  
Robert S. Nocek, Stamford, Conn.; Paul A. Tilman, New City, N.Y.; George Rasko, Fair Lawn, N.Y., and Steven Ausmit, New York, N.Y., assignors to Minigrip, Inc., Orangeburg, N.Y.  
Filed Mar. 23, 1987, Ser. No. 29,268  
Int. Cl.<sup>4</sup> A44B 19/14  
U.S. Cl. 24—587 **9 Claims**



1. A non-reopening extruded plastic profile fastener of substantial length, comprising:  
complementary male and female profiles extending along the length of the fastener and which are constructed and arranged to be pressed into interlocked relation;  
said male profile having a rib head of generally arrow shaped cross section providing interlocking shoulders, and said female profile having a complementary groove receiving said head and having opposed hooks for interlocking engaging said shoulders;  
said male profile movable toward the female profile into respective first and second positions, said profiles being in said position during stacking and handling to maintain the profiles in alignment;  
means extending along the length of the fastener for retaining the interlocked profiles substantially against separation after said head is fully received in said groove in said second position; and  
overrideable means extending along the length of the fastener

for initially permitting said head to rest against said hooks in said position and restraining said profiles against movement to said second position and interlocking and also restraining the profiles against lateral displacement holding them in alignment so that the fastener can be handled as an assembly with the profiles aligned for interlocking, but not interlocked until said overrideable means are overridden and the profiles pressed from said first position into permanently interlocked relation in said second position.

**4,791,711**  
**CHILD RESISTANT BUCKLE FOR SEAT BELT RESTRAINTS**  
Wilbur R. Adams, Terre Haute, Ind., assignor to Simulators Limited, Inc., Terre Haute, Ind.  
Filed Nov. 27, 1987, Ser. No. 126,234  
Int. Cl.<sup>4</sup> A44B 11/25  
U.S. Cl. 24—633 **9 Claims**

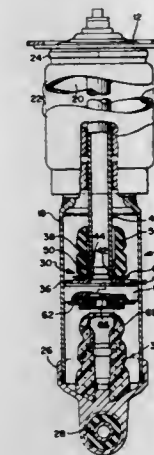


1. A child resistant buckle for personal restraints, comprising:  
a male section having a generally flat body provided with a central opening therein; and  
a complementary female section having:  
(1) a first opening on the top thereof;  
(2) a multi-part release button disposed inside said female section and operable through said opening;  
(3) a second, slot-like opening on the inner end of said female section for receiving said male section therein in locking engagement; and  
(4) a plurality of upwardly biased retaining means normally disposed in said central opening of said male section to lock and retain the buckle in closed position, and a plurality of connecting means, each extending between one part of said multi-part release button and a corresponding retaining means,  
each part of said release button being adapted to release the corresponding section of the retaining means only when that corresponding part of the release button is actuated, said male section of the buckle being released only when all parts of said release button are actuated simultaneously.

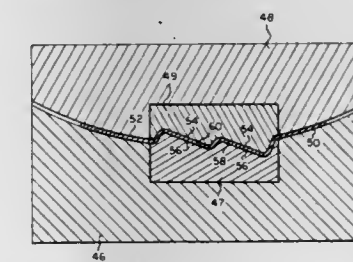
**4,791,712**  
**MODULAR PISTON WITH HIGH STRENGTH TENSILE JOINT AND METHOD OF MANUFACTURE**  
Joel R. Wells, Huber Heights, and James M. Fees, Dayton, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.  
Continuation-in-part of Ser. No. 902,506, Sep. 2, 1986, abandoned. This application Feb. 2, 1988, Ser. No. 151,457  
Int. Cl.<sup>4</sup> B23P 15/10; F16J 1/12  
U.S. Cl. 29—156.5 R **10 Claims**

1. A method of manufacturing a modular piston assembly adapted to be stroked in a damper unit from (1) a cylindrical hollow piston rod with a predetermined thickness and with upper and lower ends and (2) a shell like piston having a large diameter cylindrical main body and a hollow small diameter cylindrical neck extending upwardly from a centralized area of the main body comprising the steps of locating a predetermined position on said piston rod from one of said ends and adjacent to the other of said ends, forming an annular retention groove of a predetermined design depth in said piston rod which corresponds to said predetermined position and which elongates said piston rod to a predetermined design length and terminating in an abutment end for engaging an interior surface

of said cylindrical main body for maintaining alignment between said piston and said rod, inserting one end of said piston rod within said neck of said piston so that said retention groove is surrounded by said neck, subsequently deforming a groove into said neck concentric with said retention groove in said



**4,791,713**  
**FAN BLADE FABRICATION SYSTEM**  
Neil E. Robb, Jackson, Mich., assignor to Airmaster Fan Company, Jackson, Mich.  
Continuation of Ser. No. 787,041, Oct. 15, 1985. This application Feb. 10, 1987, Ser. No. 13,155  
Int. Cl.<sup>4</sup> B23P 15/04  
U.S. Cl. 29—156.8 B **3 Claims**



1. The method of forming a sheet metal fan blade to be attached to a hub wherein the hub is planar having a generally radially disposed notch defined therein defining an opening substantially perpendicular to the hub plane and having front and rear sides, the blade being elongated having a central axis, an outer end region, an inner end region, a concave-convex transverse cross section at the outer end region, a hub connection at the inner end region, and leading and trailing lateral edges, the blade hub connection being defined of the blade material including a front planar portion, an elongated transition portion and a rear planar portion, the hub connection having a longitudinal axis defined by the transition portion and substantially parallel to the blade axis, the hub connection from and rear planar portions being separate and parallel to each other and angularly related to the blade inner end region, defining a blade angle, the blade being formed in a die set having opposed complementary concave and convex surfaces,

a central portion and guide means for positioning a blade blank therebetween by engaging the blade lateral edges, the die set central portion having a configuration forming the blade hub connection, comprising the steps of

- (a) determining the desired air flow characteristics of a blade having a given blade angle,
- (b) laterally positioning the blade blank between the die sets such that the formed hub connection will be positioned relative to the blade lateral edges to produce a blade having the desired air flow characteristics,
- (c) closing the die set to deform the blade blank to form the fan blade configuration,
- (d) inserting the blade hub connection into the hub notch with the transition portion extending through the notch and the front planar portion engaging the hub front side and the rear planar portion engaging the hub rear side, and
- (e) affixing the hub connection planar portions to the engaged hub side.

4,791,714

#### PROCESS FOR ASSEMBLING A FLY WHEEL AND AN IGNITION COIL TO AN ENGINE USING AN ASSEMBLING JIG

Teruo Yoshioka; Shoji Nakano, and Yutaka Sato, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

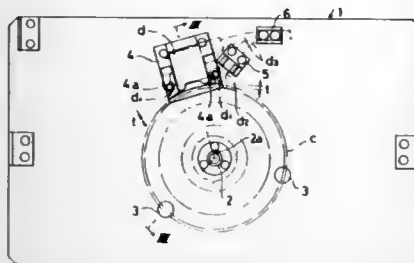
Filed Jul. 20, 1987, Ser. No. 75,469

Claims priority, application Japan, Jul. 21, 1986, 61-169777; Jul. 21, 1986, 61-169778

Int. Cl.<sup>4</sup> B23P 15/00

U.S. Cl. 29—156.4 R

1 Claim



1. A process for assembling a fly wheel and an ignition coil to an engine, said engine having said fly wheel assembled to an end portion of a crankshaft of said engine, said engine having said ignition coil assembled to an engine main body to face a circumferential surface of said fly wheel, said fly wheel having a magnet, said process comprising:

- setting said fly wheel and said ignition coil on a set jig;
- leaving a comparatively large space between said fly wheel and said ignition coil so that the two are not influenced by a magnetic force between the magnet and the ignition coil;
- moving said set jig to a delivery position;
- moving an assembling jig having two holding means for holding said fly wheel and for holding said ignition coil to said delivery position;
- moving said fly wheel and said ignition coil, placed on said set jig, to said holding means;
- maintaining the space between said fly wheel and said ignition coil while moving said fly wheel and said ignition coil to said two holding means;
- moving said assembling jig to an assembling position where said engine is placed in position;
- assembling said fly wheel to said end portion of said crankshaft;
- bringing said ignition coil to approach said fly wheel; and
- assembling said ignition coil to said engine main body to be located at its normal facing position in relation to said fly wheel.

4,791,715

#### METHOD AND APPARATUS FOR ASSEMBLY OF CASSETTE PULLEY

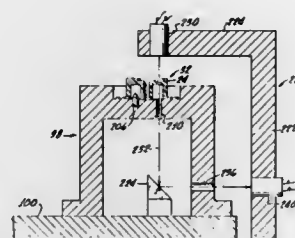
Benjamin Lovelace, Santa Ana, Calif., assignor to Cimco, Inc., Costa Mesa, Calif.

Filed Apr. 3, 1987, Ser. No. 33,677

Int. Cl.<sup>4</sup> B23Q 3/00; B21D 53/26

U.S. Cl. 29—464

25 Claims



4. In the assembly of parts wherein first and second parts are required to have a predetermined relative rotational orientation about an orientation axis for the assembly, and wherein a first one of the parts has a hole therethrough and is loaded upon a support and held in any one of a group of different orientations about the orientation axis, and wherein said support has a hole that is aligned with the hole in said first part when said first part is in at least one of said orientations, a method of effecting relative orientation of the first and second parts for assembly comprising the steps of:

- sensing occurrence of alignment of the hole in the part with the hole in the support, thereby sensing if the part on the support has one orientation or another, and
- controlling relative orientation of the first and second parts according to the sensed alignment of said holes.

4,791,716

#### METHOD AND APPARATUS FOR SECURING A CONNECTOR TO A PIPE

Mathias Konrad, Lohmar, Fed. Rep. of Germany, assignor to Jean Walterscheid GmbH, Fed. Rep. of Germany

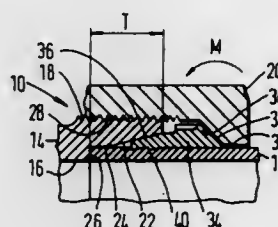
Filed Mar. 27, 1987, Ser. No. 31,993

Claims priority, application Fed. Rep. of Germany, Mar. 27, 1986, 3610427

Int. Cl.<sup>4</sup> B23P 19/04

U.S. Cl. 29—520

1 Claim



1. A method of securing a connector to a first end of an

axially elongated pipe having a uniform diameter outside surface, the connector comprises a body having an axially extending frusto-conical entry bore having an angle of conicity axially alignable with the pipe, a clamping ring having radially inwardly directed cutting teeth for engaging the outside surface of the pipe adjacent the first end thereof and having an outer frusto-conical surface sealingly engageable with the entry bore of the body and an angle of conicity corresponding to the angle of conicity of the connector, and a retainer ring engageable with the body and the clamping ring for securing the pipe to the body; the method comprising a pre-assembly operation and a final assembly operation wherein the pre-assembly operation comprises the steps of locating the clamping ring around an end portion of the pipe adjacent to and spaced axially from the one end of the pipe and axially pressing the clamping ring and the first end of the pipe into a frusto-conical entry bore of a pre-assembly body member having an angle of conicity corresponding to the angle of conicity of the connector with an axial force sufficient for cutting the teeth of the clamping ring into engagement with the pipe and for contacting the first end of the pipe with a stop surface in the pre-assembly body member with the stop surface extending transversely of the axis of the pipe with by turning the retaining ring 1.5 turns thereby causing the clamping ring to move an axial distance inserting a support member on the pre-assembly body member axially into the pipe into the axially extending region of the cutting teeth on the clamping ring for maintaining the first end of the pipe free of deformation transverse to the axial direction thereof while cutting the teeth into the pipe, and removing the pre-assembly body member from the pipe for completing the pre-assembly operation, the final assembly operation comprises the steps of inserting the pipe and attached clamping ring into the entry bore of the connector body and applying an axial force to the clamping ring by engagement of the retainer ring with the body so that the axial force is less than the axial force applied to the clamping ring during the pre-assembly steps for preventing further cutting of the clamping ring teeth into the pipe while permitting radially inward deformation of the pipe and applying the axial force only until an increase in torque is apparent.

4,791,717

#### INTERDIGITAL FILTER APPARATUS AND METHOD FOR CONSTRUCTION

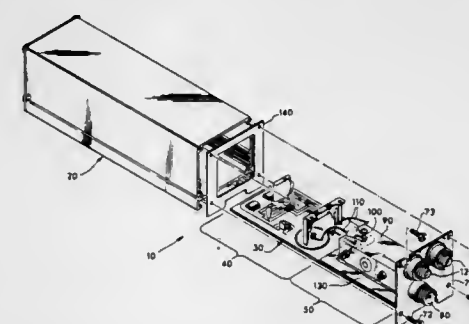
Dale L. Hemmie, Burlington, Iowa, assignor to Conifer Corporation, Burlington, Iowa

Filed Sep. 30, 1987, Ser. No. 102,726

Int. Cl.<sup>4</sup> H01P 11/00; H05K 5/06

U.S. Cl. 29—600

5 Claims



1. An integrated down converter interdigital filter apparatus receptive of a microwave signal for producing an electrical output signal in a predetermined bandwidth corresponding to said microwave signal comprising:

- (a) a watertight housing, said watertight housing comprising:
- (b) a housing having one end open, and
- (c) means for engaging said open end of said housing to provide a watertight seal,

a printed circuit board, a down converter located on said board, an interdigital filter also located on said board, said interdigital filter comprising:

- (a) a ground plane conductive surface formed on said board,
- (b) a conductive rectangular housing having its bottom open, said housing having said open bottom affixed to said conductive surface in order to fully enclose the interior of said housing,
- (c) a plurality of elements spatially located in said housing for filtering said microwave signal in said predetermined bandwidth,
- (d) means connected through said housing for interconnecting said microwave signal with the nearest element of said plurality of elements, means connected through said housing and connected to the element farthest from the aforesaid element connected to said microwave signal for interconnecting the filtered signal in said bandwidth from said interdigital filter to the input of said down converter, and means connected to the output of said down converter for delivering said electrical signal output from said watertight housing.

5. A method for construction of an interdigital filter apparatus on the down converter printed circuit board for producing an electrical output signal in a predetermined bandwidth corresponding to the microwave signal input, said method comprising the steps of:

- forming a conductive ground plane surface on said printed circuit board containing the down converter,
- cutting four sides of the housing for the interdigital filter from sheet metal as a single piece, said step of cutting also including the cutting of element connection holes, tuning screw holes, and two signal access holes,
- forming the aforesaid cut piece containing said cut four sides into a rectangular housing having two elongated sides, an elongated top, and one end, said formed housing having an open elongated bottom and one open end,
- cutting one end of said housing for the interdigital filter from sheet metal as a single piece, the aforesaid step of cutting also including the cutting of the microwave connector hole, the rivet holes, and the printed circuit holder slots,
- forming the aforesaid piece containing said cut end of said housing by bending the edges perpendicularly to said center portion,
- forming a plurality of tubular elements for said interdigital filter, each of said tubular elements having a formed annular region on one end thereof,
- affixing said annular region of each of said plurality of tubular elements in said cut element connection holes of said formed rectangular housing,
- mounting the tuning screws for each element in said cut tuning screw holes of said formed rectangular housing,
- affixing said cut end piece of said housing to said open end of said formed housing, and
- affixing the open elongated bottom of said formed housing to said formed conductive ground plane surface of said printed circuit board.

4,791,718

#### METHOD FOR ASSEMBLING A MAGNETIC HEAD

Kouji Takahashi, Nagano, Japan, assignor to Kabushiki Kaisha Sankyo Seiki Seisakusho, Nagano, Japan

Filed Sep. 25, 1986, Ser. No. 911,620

Claims priority, application Japan, Sep. 27, 1985, 60-214338

Int. Cl.<sup>4</sup> G11B 5/127

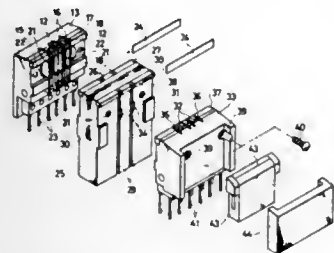
U.S. Cl. 29—603

7 Claims

1. A method for assembling a magnetic head, comprising: fitting into a first core holder a first block of wear-resistant material, said first block having a first face that is even with a first face of said core holder on which a medium is to slide, said first block also having a second face that is even with a second face of said first core holder;



fitting into a second core holder a second block of wear-resistant material, said second block having a first face that is even with a first face of said second core holder on which said medium is to slide and a second face that is even with a second face of said second core holder; forming at least a first groove in said second face of each of



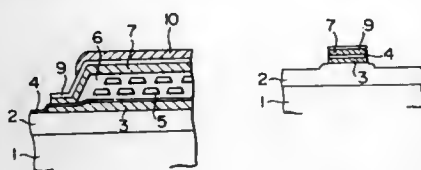
said first and second core holders, said first groove continuing through said first and second blocks of said wear-resistant material to respective first faces thereof; inserting a core in each of said first grooves; and combining said second face of said first block with said second face of said second block with a gap therebetween defined by an interposed gap spacer.

#### 4,791,719 METHOD OF MANUFACTURING A THIN-FILM MAGNETIC HEAD

Tetsuo Kobayashi, Kanagawa; Yukihisa Tsukada, Odawara; Shinji Narihige, Mito, and Shinichi Hara, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Division of Ser. No. 684,300, Dec. 20, 1984, abandoned. This application Jan. 8, 1987, Ser. No. 1,440  
Claims priority, application Japan, Dec. 22, 1983, 58-242882  
Int. Cl.<sup>4</sup> G11B 5/127

U.S. Cl. 29-603

19 Claims



1. A method of manufacturing a thin-film magnetic head for recording information in a magnetic recording medium comprising the steps of:

- forming a first magnetic layer over a non-magnetic substrate,
- forming a gap layer over said first magnetic layer,
- forming a conductor coil covered with an insulation layer over said gap layer,
- forming a second magnetic layer over said gap layer and said insulation layer, a magnetic gap being formed between said first and second magnetic layers at a tip portion facing a recording medium, and said second magnetic layer being connected to said first magnetic layer at an end portion opposite to said tip portion,
- forming a mask made of metal oxide over said second magnetic layer, and
- forming said second magnetic layer, said gap layer, and said first magnetic layer respectively at said tip portion into a predetermined shape by etching using said mask made of metal oxide, wherein at least said gap layer and said first magnetic layer are formed into said predetermined shape by dry etching after forming a photoresist layer over said second magnetic layer except at said tip portion.

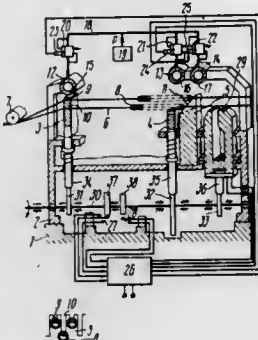
#### 4,791,720 APPARATUS FOR ORIENTING MAGNETIC CORES DURING FABRICATION OF MEMORY MATRICES

Algimantas J. Fedaravichius; Antanas L. Sudintas, both of Kaunas; Vladimir S. Kondratiev, Moscow, and Kazimeras M. Ragulskis, Kaunas, all of U.S.S.R., assignors to Kaunasskii Politechnicheskii Institut, Kaunas, U.S.S.R.

Filed Aug. 14, 1987, Ser. No. 85,365  
Int. Cl.<sup>4</sup> H01F 41/08

U.S. Cl. 29-737

4 Claims



1. An apparatus for orienting magnetic cores during fabrication of memory matrices comprising:

- a housing;
- a mechanism for moving and separating said magnetic cores accommodated inside said housing;
- a unit for orienting the magnetic cores accommodated inside said housing for moving and separating the magnetic cores;
- coordinate lines having the magnetic cores threaded thereon and arranged in a plane above said mechanism for moving and separating the magnetic cores and above the unit for orienting the magnetic cores;
- a distribution comb of said mechanism for moving and separating the magnetic cores ensuring variation in the position of said coordinate lines, arranged in a plane perpendicular to said plane of arrangement of said coordinate lines and turned relative to said coordinate lines to an angle other than 90°; said distribution comb having teeth and recesses, and said teeth facing the side of said coordinate lines;
- a guide comb of said mechanism for moving and separating the magnetic cores ensuring variation in the position of said coordinate lines and spaced at a distance from said distribution comb in a plane perpendicular to said plane of arrangement of said coordinate lines and turned relative to said coordinate lines to an angle other than 90°; said guide comb having teeth and recesses of said guide comb, and said teeth facing the side of said coordinate lines;
- a comb for separating the magnetic cores of said mechanism for moving and separating the magnetic cores disposed after said guide comb in a plane perpendicular to said plane of arrangement of said coordinate lines and turned relative to said coordinate lines to an angle other than 90°; said comb for separating having teeth and recesses of said comb for separating the magnetic cores, and said teeth facing the side of said coordinate lines and having bevels facing the side of said guide comb;
- a magnetic head of said unit for orienting the magnetic cores disposed after said comb for separating the magnetic cores in a plane perpendicular to said plane of arrangement of said coordinate lines and turned relative to said coordinate lines to an angle other than 90°;
- a unit for pneumatically conveying the magnetic cores of said mechanism for moving and separating the magnetic cores disposed in close proximity to said coordinate lines;
- a control unit connected to said magnetic head and unit for pneumatically conveying the magnetic cores; and

a programming mechanism disposed inside said housing and ensuring the movement of said distribution and guide combs and said magnetic head in a direction perpendicular to said plane of arrangement of said coordinate lines; said magnetic head and unit for pneumatically conveying the magnetic cores being connected to said control unit.

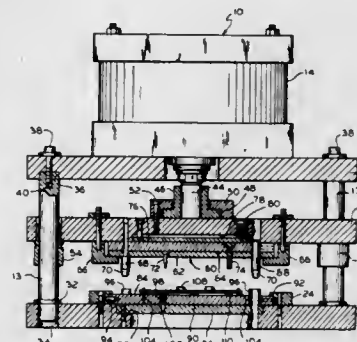
#### 4,791,721 SINGULATION SYSTEM FOR PRINTED CIRCUIT BOARDS

William N. Anderson, Highland Park, and Thomas G. Anderson, Mundelein, both of Ill., assignors to Wand Tool Company, Wheeling, Ill.

Filed Feb. 19, 1987, Ser. No. 16,352  
Int. Cl.<sup>4</sup> H05K 3/00

U.S. Cl. 29-829

13 Claims



1. A singulation system to be used in a press-like mechanism for the production of a plurality of planar disposed assemblies, said system including at least one initially unitary large planar board-like workpiece, a multiplicity of components assembled and mounted in a predetermined array on at least two adjacent substantially co-planar portions of said workpiece, slot means substantially separating said at least two portions of said workpiece, integral means intersecting said slot means and interconnecting said at least two portions of said workpiece, and an interchangeable die means mounted in said press-like mechanism and adapted to accept and operate on said integral means of said at least one planar workpiece to separate said at least two portions of said workpiece into at least two discrete individual independent board means all being subsequent to the assembly and mounting of said components on said initially unitary workpiece.

#### 4,791,722 METHOD OF DESIGNING AND MANUFACTURING CIRCUITS USING UNIVERSAL CIRCUIT BOARD

Grady A. Miller, Jr., Grand Prairie, Tex., assignor to LTV Aerospace and Defense Co., Dallas, Tex.  
Continuation-in-part of Ser. No. 754,862, Jul. 12, 1985, abandoned. This application Dec. 23, 1986, Ser. No. 945,222  
Int. Cl.<sup>4</sup> H01K 3/10

U.S. Cl. 29-850

3 Claims



1. A method of designing and manufacturing a circuit on a circuit board, the method comprising the steps of:  
(a) placing removable wire insulator lancer terminals into predetermined holes in the circuit board and connecting

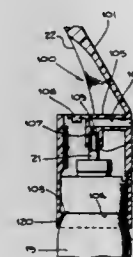
- first wires between certain ones of the insulator lancer terminals;
- removing the lancer terminals and the first wires;
- placing socket contact terminals into the predetermined holes; and
- connecting second wires between certain ones of the socket contact terminals.

#### 4,791,723 DISPOSABLE COMBINATION RAZOR AND SHAVING CREAM DISPENSER WITH MOVABLE CAP

Jeff A. Jacobson, 409 Emerald Bay, Laguna Beach, Calif. 92651  
Continuation-in-part of Ser. No. 819,696, Jan. 17, 1986, abandoned. This application Mar. 6, 1987, Ser. No. 22,665  
Int. Cl.<sup>4</sup> B26B 19/44

U.S. Cl. 30-41

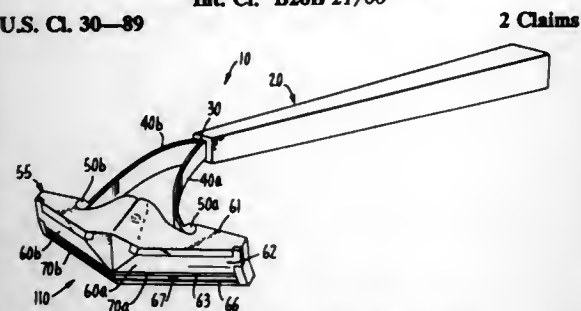
20 Claims



1. In a disposable combination razor and shaving cream dispenser having a razor blade assembly at top and a pressurized shaving cream dispenser at bottom, said dispenser being sealed at the top by sealing means with a valve stem extending downwardly through said sealing means into fluid communication with the pressurized contents of said dispenser, the razor blade assembly being part of a cap for the dispenser, the improvement comprising:

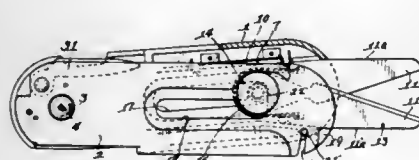
said cap having a lower portion mounted to the top of said sealing means, said cap having a recessed portion below the outer planar surface of said cap and rearwardly of said cap of a size for insertion of the finger of an operator and movable downwardly with respect to said sealing means upon downward pressure of a finger of an operator in said recessed portion, said cap having a passageway therein with a first generally vertical leg portion receiving the upper end of said valve stem therein and a second leg portion extending from said first leg portion and both integral and in fluid communication therewith, said cap having an upper portion extending upwardly and outwardly from the lower portion thereof terminating in the razor blade assembly removably holding a razor blade thereon in a manner exposing a sharp edge of said razor blade on one side of said cap, said second leg portion opening at a point exterior of said cap below said upper portion and remote from said razor blade and valve stem moving means associated with both said valve stem and said passageway in said cap to depress said valve stem and eject shaving cream under pressure from said dispenser and out of said second leg portion to the exterior of said cap, said first and second leg portions providing the sole path of travel of said cream from said dispenser out of said opening.

**4,791,724**  
**WEDGE SHAPED RAZOR APPARATUS**  
 Jack Dumas, 14111 Occidental Rd., Sebastopol, Calif. 95472  
 Filed Jun. 4, 1987, Ser. No. 57,988  
 Int. Cl.<sup>4</sup> B26B 21/00  
 U.S. Cl. 30—89



1. A razor apparatus for use in shaving comprising:  
 an elongated handle having a pair of arms fixedly attached to said handle;  
 dual razor heads which engage said pair of arms, said razor heads forming a wedge shape;  
 wherein said razor apparatus is convertible from said wedge shape to a straight edge;  
 wherein said arms engage and are fixedly attached to said handle at a common point and whereafter each of said arms flare outward from the others; and  
 wherein said arms have an arcuate shape.

**4,791,725**  
**SHEATHED SCISSORS**  
 Hidefumi Amagaya, Tokyo, Japan, assignor to Plus Corporation, Tokyo, Japan  
 Filed Mar. 30, 1987, Ser. No. 31,606  
 Claims priority, application Japan, Dec. 3, 1986, 61-186608[U]  
 Int. Cl.<sup>4</sup> B26B 13/00  
 U.S. Cl. 30—154

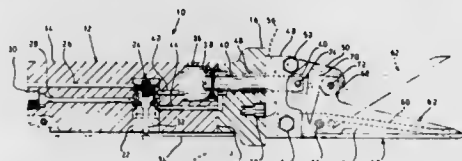


1. A pair of scissors comprising: a pair of handles, first pivot means for pivotally connecting said pair of handles together, a pair of blades, second pivot means for pivotally connecting together said pair of blades, sliding means for mounting said blades between said handles for movement between a retracted and an extended position, a spring engaging said blades to bias said blades to the open position when said blades are in the extended position, and projections on each one of said pair of handles engageable with a respective one of said blades for operating said blades about said second pivot means when said handles are pivoted with respect to each other about said first pivot means.

**4,791,726**  
**FLUID OPERATED SHEARS**  
 Harrison A. Alley, Jr., Knox County, Tenn., assignor to Acaloc Corporation, Oak Ridge, Tenn.  
 Filed Oct. 5, 1987, Ser. No. 104,845  
 Int. Cl.<sup>4</sup> B26B 15/00  
 U.S. Cl. 30—228

1. A hand-held, fluid-operated shears unit for providing substantial cutting force without undue force being applied by a user of said shears unit, which comprises:  
 an elongated body member, said body member having a

rearward portion including a rearward end, and a forward portion including a forward end, said body member provided with an internal cylindrical surface defining a cylinder for receiving a reciprocable piston, said cylinder provided with a forward port and a rearward port;  
 a pair of support plates carried by said forward end;  
 a first blade attached to at least one of said support plates, and a second blade pivotally attached to at least one of said support plates, said second blade positioned on a pivot member to cooperate with said first blade to provide a cutting action when said second blade is pivoted toward said first blade;  
 a piston slidably positioned within said cylinder of said body member for reciprocation between a forward position and a rearward position;  
 a piston rod, said forward body portion provided with a channel to slidably receive said piston rod, said piston rod having a rearward end attached to said piston, and a forward end extending from said forward end of said forward body portion;

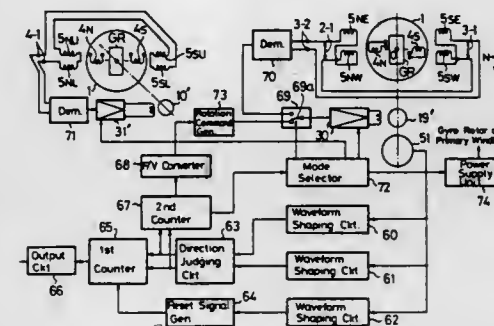


linkage means for pivotally attaching said forward end of said piston rod to said second blade whereby reciprocation of said piston rod within said channel causes said second blade to pivot with respect to said first blade;  
 a master valve mounted within said body member, said master valve having a plurality of ports and a slidable valve stem, one of said valve ports being in communication with said forward port of said cylinder, a second of said valve ports being in communication with said rearward port of said cylinder, a third of said valve ports being in communication with a source of pressurized fluid, and a fourth of said valve ports being in communication with a vent from said body member; and  
 master valve actuating means for selectively moving said valve stem thereby causing said source of pressurized fluid to be in communication, through said second and third valve ports, to said rearward port of said cylinder whereby said second blade is pivotally moved into engagement with said first blade to effect cutting action therebetween.

**4,791,727**  
**GYRO APPARATUS**  
 Takeshi Hojo, Takafumi Nakaiishi, and Mikio Morohoshi, all of Kuroiso, Japan, assignors to Kabushiki Kaisha Tokyo Keiki, Tokyo, Japan  
 Continuation-in-part of Ser. No. 871,922, Jun. 9, 1986, abandoned. This application Oct. 20, 1987, Ser. No. 110,427  
 Claims priority, application Japan, Jun. 10, 1985, 60-125868  
 Int. Cl.<sup>4</sup> G01C 19/38  
 U.S. Cl. 33—325

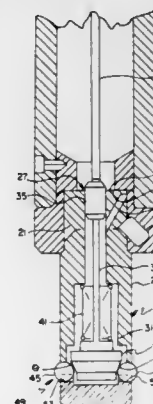
1. In a gyro apparatus comprising, a binnacle, a gyro with a spin axis which is substantially horizontal, a supporting apparatus for supporting said gyro from said binnacle with three degrees of freedom, a north-seeking apparatus for providing a north-seeking action to said gyro, a follow-up ring which follows-up said gyro around its vertical axis, an azimuth servo motor for rotating said follow-up ring with a deviation signal generated around the vertical axis of said gyro relative to said follow-up ring through a servo amplifier, and a transmitting apparatus for transmitting the azimuth angle of said spin axis relative to said binnacle to the outside of said gyro, said gyro apparatus being characterized in that said transmitting apparatus comprises an

incremental-type encoder having a reference angular position transmitting means, a first counter apparatus which is made operable by an output signal of said incremental-type encoder, a second counter apparatus whose reference value is preset to the total number of pulses per one revolution of said follow-up ring supplied from said incremental-type encoder, a mode selector, a rotation command generator, and a relay apparatus connected to said rotation command generator and to receive the deviation signal around the vertical axis, said rotation



command generator being connected to said second counter apparatus to generate a voltage necessary to rotate said follow-up ring at a desired rotation speed, said mode selector being connected to said second counter apparatus to produce a switching signal which is supplied to said relay apparatus, whereby before starting the gyro apparatus, said follow-up ring is rotated one revolution by the voltage from said rotation command generator to reset said first counter apparatus to a reference value.

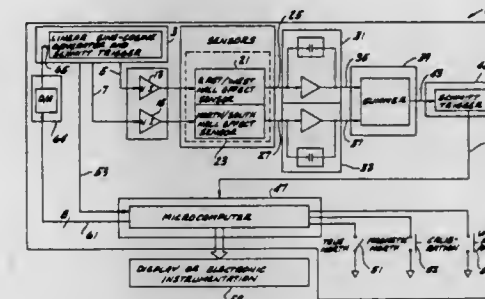
**4,791,728**  
**DIMENSIONING HEAD FOR PLUG GAGE**  
 Richard G. Van Sickle, Sterling Heights, and George Bour, Holly, both of Mich., assignors to GTE Valeron Corporation, Troy, Mich.  
 Filed Apr. 17, 1987, Ser. No. 39,410  
 Int. Cl.<sup>4</sup> G01B 5/12  
 U.S. Cl. 33—178 R



1. A plug gage of the type comprising a combination dimensioning head and detector, said dimensioning head comprising an elongated cylindrically shaped housing with a longitudinal axis and having an open end and a closed end, a gaging member mounted in said housing for movement along the longitudinal axis, said gaging member being normally biased toward the closed end and having a gage contacting portion projecting toward the open end,

a pair of balls adapted to move and contact surfaces to be dimensioned exterior to said housing, said housing having a pair of stationary guide surfaces projecting in a direction transverse to the longitudinal axis, each guide surface forming a V-groove and being adapted to guide a respective ball, said gaging member being moveable in an axial direction and having outwardly facing non-rotatable arcuate surfaces, said pair of outwardly facing arcuate surfaces converging toward the closed end at a predetermined angle to the longitudinal axis, each of said respective balls being contacted by a respective guide surface and a respective arcuate surface, each V-groove presenting a pair of parallel lines of contact and each arcuate surface presenting a single line of contact with a respective ball, whereby said gaging member moves toward the open end as said balls are urged inwardly when contacting surfaces exterior to the housing during engaging.

**4,791,729**  
**ELECTRONIC COMPASS AND METHOD**  
 Raymond A. Suda, 7000 Pernod, St. Louis, Mo. 63139  
 Filed Apr. 22, 1987, Ser. No. 41,205  
 Int. Cl.<sup>4</sup> G01C 17/30  
 U.S. Cl. 33—356



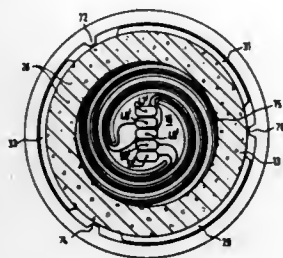
1. An electronic compass comprising:  
 means for generating a control signal;  
 means responsive to the control signal for producing reference signals having a frequency established by the control signal;  
 means for phase shifting the reference signals to generate an output signal shifted by a phase shift which is a function of the angle between a reference heading of the compass and the direction of the magnetic flux lines of the earth's magnetic field in a local area; and  
 means for monitoring the frequency of one of the reference signals, for varying the control signal to thereby cause reference signals having a predetermined frequency, and for measuring the phase shift between the monitored reference signal and the output signal to calculate the angle between the heading of the compass and the direction of the magnetic flux lines of the earth's magnetic field in a local area.

**4,791,730**  
**DIRECTION SENSING DEVICE**  
 Michael J. Gill, Milford-on-Sea, England, assignor to Brookes & Gatehouse, Hampshire, Great Britain  
 Filed Feb. 13, 1987, Ser. No. 14,721  
 Claims priority, application United Kingdom, Feb. 13, 1986, 8603591  
 Int. Cl.<sup>4</sup> G01C 17/38  
 U.S. Cl. 33—361

19. A directional sensing device, comprising:  
 a receptacle having an inside surface of generally annular



shape, said inside surface having at least one projection extending therefrom;  
 a liquid at least partially filling said receptacle;  
 a generally annularly shaped direction sensor received in said receptacle and buoyed by said liquid, said direction sensor comprising:  
 a base;  
 an alignment member having at least one flexible spiral shaped portion extending from said receptacle to said base, said alignment member resisting rotational movement by said base;  
 a fluxgate attached to said base having a magnetically permeable core;



drive coil means wound around a first portion of said magnetically permeable core; and  
 first and second orthogonally disposed sensor coil means wound around a second portion of said magnetically permeable core; and  
 a float attached to said base for buoying said direction sensor in said liquid, said float having a peripheral surface, said peripheral surface having at least one rib attached thereto, such that said at least one rib of said float and said at least one projection of said receptacle cooperate to restrain said base from rotational movement exceeding a predetermined maximum.

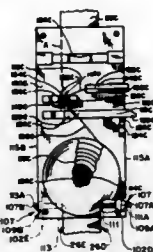
**4,791,731**  
**VERTICAL SURFACE INSTALLING DEVICE**  
 John Dickinson, 8400 Flame Vine Ave. N., Seminole, Fla. 33543, and Peter Warhurst, 894 Del Robles Dr., Clearwater, Fla. 33546

Continuation-in-part of Ser. No. 26,473, Mar. 16, 1987, abandoned, which is a continuation of Ser. No. 753,001, Jul. 8, 1985, Pat. No. 4,649,652, which is a continuation-in-part of Ser. No. 582,387, Feb. 22, 1984, Pat. No. 4,527,338. This application Dec. 30, 1987, Ser. No. 139,620

The portion of the term of this patent subsequent to Jul. 9, 2002, has been disclaimed.

Int. Cl.<sup>4</sup> B25H 7/00  
 U.S. Cl. 33—528

6 Claims



1. A device for installing an article on a vertical surface, said device comprising:

- a base;
- a first longitudinal member connected to said base;
- a second longitudinal member slidable longitudinally relative said first member;
- means for establishing said second longitudinal member in a

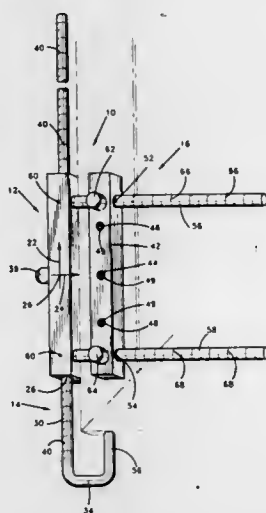
telescopic relationship with said first longitudinal member enabling the distal end of said second longitudinal member to be varied in vertical height relative to said base;  
 a template frame secured to said second member;  
 a plurality of punches disposed in said frame;  
 a mounting plate having a first end and a second end with said first end being slidably and pivotally secured to said first longitudinal member;  
 a retractable measuring device connected to said mounting plate for measuring laterally relative to said first longitudinal member;  
 a spirit level secured to said first end of said mounting plate for permitting in use the ascertainment and maintenance of the device in a vertical position;  
 an adjusting means for adjusting said level in order to correct said level for error such that in use said longitudinal members are vertically positioned on the vertical surface; and  
 locking means for locking the relative position between said first and second longitudinally extending members, enabling an operator to position said template frame a predetermined distance vertically above said base with said template frame being located in contact with the vertical surface to form an aperture in the vertical surface upon depression of at least one of said plurality of punches to install the article on the vertical surface thereby.

**4,791,732**  
**ADJUSTABLE MARKING GAUGE**  
 Jack A. Bruno, Jr., 866 Trailwood Dr., Boardman, Ohio 44512, and Frank J. Popovich, 9100 N. Lima Rd., Poland, Ohio 44514

Filed Jul. 23, 1987, Ser. No. 76,746  
 Int. Cl.<sup>4</sup> B23B 49/02

U.S. Cl. 33—578

17 Claims



1. An adjustable marking gauge especially adapted to determine where openings should be formed in workpieces, comprising:

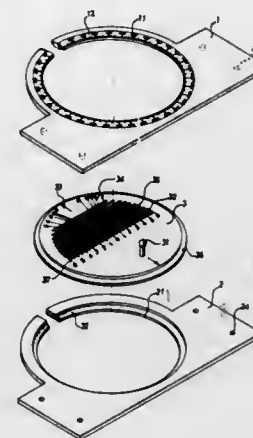
- a block having a bore therethrough, the bore defining a longitudinal axis;
- a first measuring means for measuring distances along the longitudinal axis of the bore, the first measuring means being in the form of a slide arm having markings formed thereon, the markings indicating how far the slide arm is positioned from a predetermined point on the block, the slide arm being disposed within the bore for movement therethrough; and
- a second measuring means for measuring distances along an axis perpendicular to the longitudinal axis of the bore, the

second measuring means being connected to the block and slideable relative thereto.

**4,791,733**  
**STUDENT'S MULTI-FUNCTION PROTRACTOR**  
 Shih C. Pan, and Ching P. Tseng, both of Tai Chung, Taiwan, assigns to Huey Bao Co., Ltd., Taiwan  
 Filed Jul. 22, 1987, Ser. No. 76,772  
 Int. Cl.<sup>4</sup> B43L 13/02

U.S. Cl. 33—403

1 Claim



1. A student's multi-functional protractor used for drawing different geometric figures comprising:

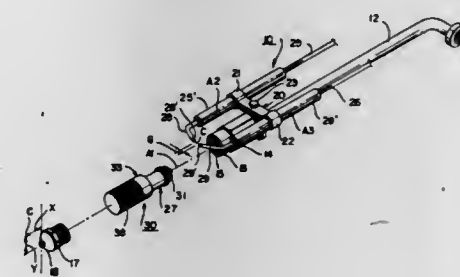
- (a) an upper base and a lower base respectively set with at least four protuberances and at least four recesses on corresponding positions of a back face of said upper base and a front face of said lower base, said protuberances of said upper base being configured for engagement within said recesses of said lower base, each of said upper and lower bases having a circular central circumference;
- a first circular scaling extension being extended along an upper portion of said circular central circumference of said upper base, said first scaling extension having a thickness less than that of said circular central circumference of said upper base, said first circular scaling extension having a 360 degree scale thereon; and
- correspondingly, a second circular extension being extended along a lower portion of said circular central circumference of said lower base, said second circular extension having a thickness also less than the thickness of said circular central circumference of said lower base, so that when said upper and lower bases are engaged together, an annular cavity is created between said upper and lower bases;
- (b) a rotatable middle transparent plate including a protruding circumferential flange extending radially outward from a middle of a circumference of said middle plate, said protruding circumferential flange being configured for engagement within said annular cavity formed by said upper and lower bases, said protuberances of said upper base engaging said recesses of said lower base so that said upper and lower bases are held together and said protruding circumferential flange is free to frictionally rotate within said annular cavity; and
- (c) said middle plate having (1) a plurality of parallel grooves with different lengths passing therethrough, said grooves being set on one side of a central point of said middle plate, (2) a rotating knob on the other side of said central point, (3) a plurality of angle-indicating lines located on said one side, said lines extending radially from said central point toward said circumference of said middle plate, and (4) two indication arrows perpendicular to said grooves, one of said arrows located on said one side and the other of said arrows located on said other side so

that said arrows are located on an imaginary diametric line passing through said central point and said rotating knob, said pluralities of grooves and angle-indicating lines capable of being used with said indication arrows and said 360 degree scale on said first circular scaling extension in order to draw different geometric figures.

**4,791,734**  
**GAP SETTING TOOL FOR OIL BURNER IGNITER ELECTRODES**  
 Leonard S. Wojtkowiak, Haddon Heights, N.J., assignor to Retrofit Specialties, Inc., Haddon Heights, N.J.  
 Filed Sep. 1, 1987, Ser. No. 91,921  
 Int. Cl.<sup>4</sup> G01B 3/30

U.S. Cl. 33—652

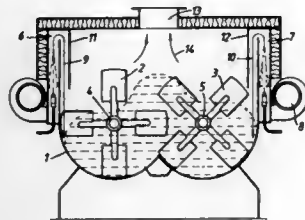
12 Claims



1. A tool for setting a spark gap between the free ends of the tips of a pair of electrodes for igniting a fuel discharge from the outlet of a discharge nozzle removably threaded into a seated position in a threaded opening at the end of a fuel supply pipe, said tool comprising:

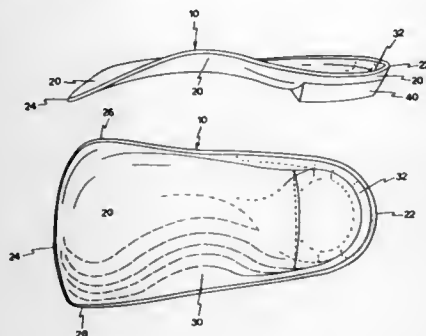
- a shank having a smooth cylindrical portion at one end and a threaded portion at the other end for engaging said threaded opening of the fuel supply pipe;
- stop means adjacent the inner end of said threaded portion and extending radially outward for abutting said fuel supply pipe when said nozzle has been removed and said tool is threaded into a seated position in said threaded opening of the fuel supply pipe;
- a handle connected to said cylindrical portion of the shank, said handle and said shank forming an elongated tool body; and,
- shoulder means adjacent to said one end of the shank, said shoulder means including an annular face facing toward said other end of the shank and extending radially to a diameter substantially greater than the diameter of said smooth cylindrical shank portion, and inner and outer opposing walls extending transversely to said annular face to define an annular concave groove in said annular face for holding the ends of the tips of said electrodes in a seated position relative to each other as said body is rotated about its longitudinal axis with said threaded portion in engagement with the threads of said fuel supply opening, the position of said concave groove relative to said stop means being such that when said tool is in its said seated position said outer groove wall holds said seated tip ends radially against said inner groove wall to set said spark gap at a preselected width and the center of said spark gap at preselected radial and axial distances relative to the center of said fuel outlet when said nozzle has a preselected axial length relative to said end of the fuel supply pipe and is in its said seated position in place of said tool, said inner groove wall having a diameter such that said spark gap is set at said preselected width when said tip ends are in said seated position against said inner groove wall.

**4,791,735**  
**METHOD FOR DRYING OR COOLING PARTICULATE MATERIALS, AND AN ARRANGEMENT IN A MIXING MACHINE**  
 Halvor Forberg, Hagabakken 2 Hegdal, N-3250 Larvik, Norway  
 Filed Jun. 27, 1986, Ser. No. 879,861  
 Claims priority, application Norway, Jul. 3, 1985, 852668  
 Int. Cl. F26B 11/12  
 U.S. Cl. 34—181 2 Claims



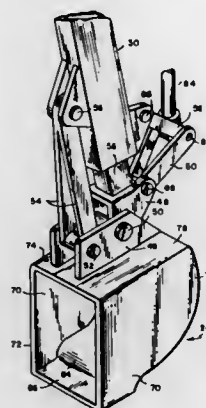
1. A machine for mixing particulate materials, comprising: a mixing chamber having side walls, end walls, and a bottom; a pair of vane assemblies, each comprising a multiplicity of vanes mounted on horizontally oriented shafts within said mixing chamber and adapted for opposed rotation, said vanes being movable downwardly adjacent the chamber wall; means adjacent said chamber and said side walls parallel to said shafts for introducing a gaseous medium to the interior of said chamber, comprising an elongated chamber forming an elongated passageway extending substantially the length of each of the chamber said walls, said passageway being open downwardly along the length of said passageway for guiding said gaseous medium upwardly along at least a portion of the outside of said chamber side wall and then downwardly along the inside of said chamber side wall, said channel communicating with a source of gaseous medium.

**4,791,736**  
**SKI BOOT ORTHOTIC**  
 Kevin Phillips, 1018 Clinton St., Philadelphia, Pa. 19107  
 Filed Jun. 26, 1987, Ser. No. 67,020  
 Int. Cl. A43B 5/04, 13/38, 7/14  
 U.S. Cl. 36—117 14 Claims



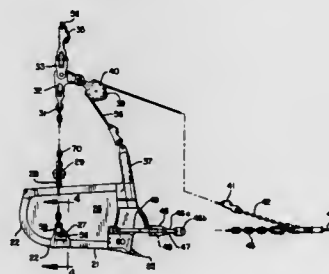
1. A custom fit ski boot orthotic device which eliminates foot misalignment and efficiently transfers energy from a skier's foot to the edges of a ski, said device comprising:  
 a base formed of a substantially rigid material, said base holding a skier's foot almost static within the ski boot;  
 an arch portion formed in said base, said arch portion shaped so as to be shallower than the skier's actual arch; and  
 a heel support means attached to said base portion for providing a small amount of heel lift.

**4,791,737**  
**EXCAVATOR**  
 Aldo Morelli, 25 Rockwood Ter., Jamaica Plain, Mass. 02130  
 Division of Ser. No. 855,328, Apr. 24, 1986, Pat. No. 4,725,187.  
 This application Jun. 25, 1987, Ser. No. 66,824  
 Int. Cl. E02F 5/02  
 U.S. Cl. 37—103 1 Claim



1. A backhoe for an excavator, comprising an arcuate back wall, a rectilinear top wall connected at one edge to the upper edge of the arcuate back wall and disposed at an acute angle thereto, a rectilinear stiffening web connected at one edge to the lower edge of the arcuate back wall, said stiffening web being disposed at an obtuse angle to the arcuate back wall, a rectilinear lip plate disposed at the other edge of the stiffening web at an obtuse angle to the stiffening web and parallel to the rectilinear top wall, said lip plate extending forwardly beyond the forward edge of the top wall and parallel thereto, transversely-disposed cheek plates attached to the opposite ends of the back wall and top wall, said cheek plates having rectilinear upper edges extending along the opposite ends of the top wall, arcuate edges extending along the opposite ends of the arcuate back wall and rectilinear inclined edges extending from the forward edges of the lip plate to the forward edge of the top wall, said inclined forward edges being disposed at obtuse angles with respect to the top wall and acute angles with respect to the lip plate, and transversely-spaced hinge plates affixed to the top of the top wall for pivotally mounting to the backhoe to a supporting boom.

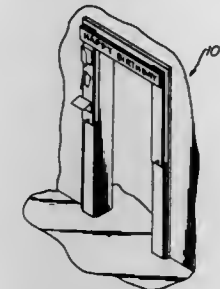
**4,791,738**  
**DRAGLINE BUCKET**  
 Terry L. Briscoe, Portland, Oreg., assignor to ESCO Corporation, Portland, Oreg.  
 Filed Jun. 22, 1987, Ser. No. 65,052  
 Int. Cl. E02F 3/48  
 U.S. Cl. 37—116 21 Claims



1. A bucket having drag, hoist and dump lines connected thereto comprising a unitary body having side, rear and bottom walls, said bottom walls terminating in a forward lip

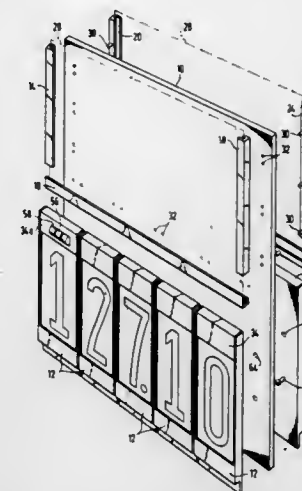
equipped with excavating teeth constituting the bucket tip, said bottom wall adjacent said rear wall being contoured to form a heel, said tip and heel providing the contact areas for supporting the bucket in a static condition, each of said sidewalls at the forward end thereof being equipped with a hitch providing a horizontal pivot axis for a drag chain connected to said bucket, said body having a design center of gravity located:

- along a line connecting said center of gravity and said tip and making an angle of at least 90° with a line between said tip and said horizontal pivot axis,
- along a line connecting said center of gravity and said tip and making an angle of from about 25° to about 30° with a line between said tip and said heel, and
- so as to put from about 60% to about 50% of the bucket weight on said heel with the remainder on said tip whereby said bucket has an increasing pull-to-tip characteristic.



**4,791,740**  
**DECORATIVE DISPLAY ARCH**  
 John B. Ferrari, 114 South Osborne Ave., Margate, N.J. 08402  
 Filed Aug. 13, 1986, Ser. No. 896,497  
 Int. Cl. G09F 1/10  
 U.S. Cl. 40—124 5 Claims

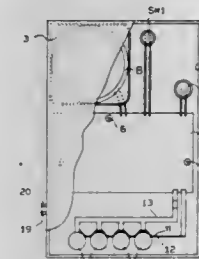
**4,791,739**  
**PRICE BOARD**  
 Norbert Hetzer, Lobbach, Fed. Rep. of Germany, assignor to Esselte Meto International GmbH, Fed. Rep. of Germany  
 Filed Apr. 27, 1987, Ser. No. 42,869  
 Claims priority, application Fed. Rep. of Germany, Apr. 28, 1986, 3614351  
 Int. Cl. G09F 3/20  
 U.S. Cl. 40—5 4 Claims



1. Price board comprising a holder for carriers for representing multi-digit price information and/or other article information made up of individual characters, characterized in that at least the carriers for representing the individual characters at the points of the price information are cassette (12) which are connectable to the holder (10) on both sides of the holder and each of which contains a complete set of all characters to be represented with them, said cassettes including rear sides with securing elements formed thereon for connecting said cassettes to said holder and which are insertable into corresponding complementarily formed securing means in the holder, said securing elements are formed on two diagonally opposite corner points of an imaginary rectangle on the rear side of the cassettes and the two remaining corner points of the rectangle on the rear side of the cassettes are formed with recesses to facilitate connection of cassettes to both sides of said holder.

1. A display device for framing a door, window and the like, for mounting on a wall or support surface and for supporting articles and the like in a decorative manner, the display comprising: a face section, two leg sections pivotally attached at opposite ends of the face section, the leg sections pivotable in adjacent parallel planes with respect to one another and with respect to the face section, means for adjusting the position of attachment of each leg section with respect to the ends of the face section comprising a slot formed in the face section and attachment means on the leg section engaged in and movable along the length of the slot, the means for adjusting permitting the attachment means to slide relative to the ends of the face section to adjust the width between the two leg sections whereby the leg and face sections are adaptable to the dimensions of a door, window and the like as desired, and means for mounting the leg sections and the face section flush to a support surface adjacent the door, window and the like.

**4,791,741**  
**CARD WITH BUILT-IN RECORD/PLAYBACK CAPABILITY**  
 Takenori Kondo, Gifu, Japan, assignor to Torio Electronics Co., Ltd., Gifu, Japan  
 Filed Sep. 3, 1987, Ser. No. 92,867  
 Claims priority, application Japan, Jan. 19, 1987, 62-10685  
 Int. Cl. G09F 1/00  
 U.S. Cl. 40—124.1 6 Claims



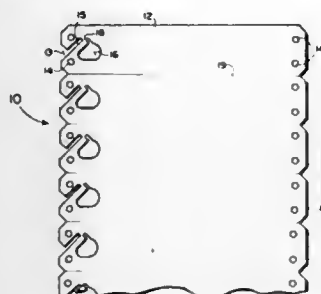
1. Card comprising:  
 (a) means for storing audio information picked up by a microphone,  
 (b) means for generating sound including a speaker,  
 (c) means for producing a mode selection signal corresponding to any one of a record mode and a playback mode,  
 (d) control means for selectively setting any one of the record and playback modes according to the mode selection signal from the producing means; converting the audio signal from the microphone from analog to digital



(e) a card board on which the microphone, speaker, and each means are mounted.

**4,791,742**  
**TRACTOR FEED PLANT LABELS**

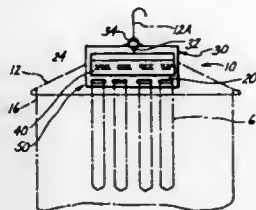
Gary L. Stover, Ormond Beach, Fla., assignor to Economy Label Sales Co., Inc., Daytona Beach, Fla.  
Filed May 18, 1967, Ser. No. 50,339  
Int. Cl.<sup>4</sup> G09F 3/100



1. A plant labeling tag to permit feeding said tag through a printer without catching or snagging thereof and suitable for being supplied in a roll comprising:  
an elongate body portion having a first and second end;  
said first and second ends each having printer sprocket drive holes therethrough;  
said first end having a plant stem attaching opening adjacent thereto;  
a lead-in slit formed in said first end and extending from said first end toward said opening;  
an easily broken web between an inner end of said lead-in slit and said opening; and  
means for lightly joining a plurality of said body portions to form said roll.

4,791,743  
WEARING APPAREL DEVICE AND METHOD OF USING  
SAME

**Bernard L. Kleinke, 12903 Texana St., San Diego, Calif. 92129**  
**Filed Nov. 6, 1987, Ser. No. 117,505**  
**Int. Cl.<sup>4</sup> G09F 3/00**  
**U.S. Cl. 40—322** **13 Claims**



1. A wearing apparel coordinator for a jacket and trouser clothing hanger having a support hook thereon comprising: plate means having a loop affixed to said plate means at a top portion thereof for surrounding the support hook of the clothing hanger to support said plate means from the hanger in a vertical depending manner in a plane substantially parallel to the plane of the hanger, enclosed within

a jacket supported on the hanger, and for permitting the displacement of said plate means away from the hanger to allow a user to remove or replace a pair of trousers off of or onto the hanger while maintaining said plate means attached to and supported by the hanger, said loop being dimensioned to cause said plate means to be positioned near the support hook in a position exposed at least partially to the view of the user while the jacket encloses said plate means, said plate means having support means for attaching releasably a group of neckties or the like in a pre-determined spaced apart manner; and garment indicia means disposed adjacent to said support means for displaying to the user an apparel coordination scheme to assist the user in selecting coordinated garments to be worn with a jacket and trousers or the like supported on the clothing hanger and corresponding to each individual necktie being attached to said plate means at an individual necktie location.

**4,791,744**  
**ADJUSTABLE PRICE DISPLAY**

John S. Skalski, Hanover Park, Ill., assignor to Thomas A. Schatz & Co., Morton Grove, Ill.  
Continuation of Ser. No. 489,706, Apr. 29, 1983, abandoned.  
This application Nov. 20, 1984, Ser. No. 674,342  
Int. Cl.<sup>4</sup> G09F 3/04

	21	22	23	24	25	26	+ 2	27
COLD-DEER	1.89	1.99	2.09	2.19	2.29	2.39		
BROODING	1.99	2.10	2.20	2.30	2.40	2.50		
STEAK-EE	2.65	2.80	2.99	3.13	3.28	3.43		
GRASS-EE	1.65	1.70	1.85	1.95	2.05	2.15		
SHRIMP-EE	1.99	2.10	2.20	2.30	2.40	2.50		
SEA-FOOD	2.09	2.19	2.29	2.39	2.49	2.59		
PIZZA-EE	2.55	2.65	2.75	2.85	2.95	3.05		

+ 2

1. In a rear illuminated device for displaying prices of articles, said device including a housing, a light source in the rear of the housing, a front frame mounted on the housing which has a plurality of horizontal rows of windows, each of said windows being adapted to display one rear illuminated numeral of the piece of an article, film strip carrier means mounted in the housing, there being a film strip carrier in closely spaced cooperating relationship with each window, and each said carrier cooperating with the front frame to define a guide slot in which a section of a film strip is held effectively flat in the window, and a film strip supported on each carrier for endwise movement through a guide slot, each section of film strip being adapted to display one of the numerals from 1 through 0 in the window, the improvement comprising:

each film strip carrier has a transverse slot laterally centered in a window immediately within and parallel to a transverse margin thereof; and each film strip has indexing holes aligned with one of said transverse slot,, said holes being so associated with the film strip sections that when a hole is moved from one end of said one of said transverse slots to the other it moves the film strip by one section and centers a section in the window, said holes being adapted to receive a stylus for moving the film strip.

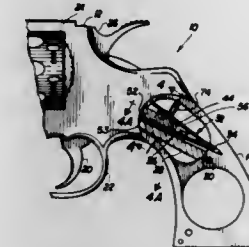
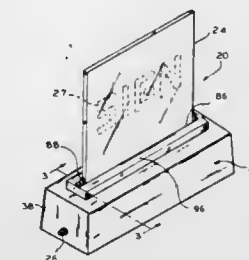
**4,791,745**  
**BLACK LIGHT DISPLAY SYSTEM**

Mac R. Pohn, 803 Green Bay Rd., Highland Park, Ill. 60035  
Filed Mar. 20, 1987, Ser. No. 28,678  
Int. Cl.<sup>4</sup> G09F 13/18

**U.S. Cl. 40—546** **9 Claims**  
1. An attention getting device comprising a lamp base housing a source of ultraviolet light, an opening formed in said housing over said source of said ultraviolet light whereby light

4,791,747  
SAFETY ASSEMBLY FOR A HAND GUN  
Walter Pastor, 1100 NE. 182 St., North Miami Beach, Fla.  
33162

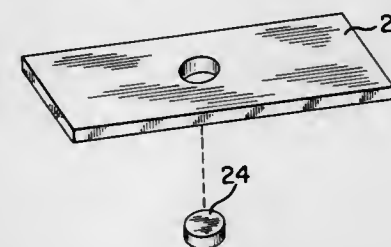
Continuation-in-part of Ser. No. 014,724, Feb. 3, 1987,  
abandoned. This application Dec. 10, 1987, Ser. No. 131,077  
Int. Cl.<sup>4</sup> F41C 17/08



pressed through said opening and into engagement with said fastener means, said latch means including a portion of said sheet material which is cut into a shape of a first cam surface leading to a first catch surface, and said fastener means including a cantilever arm having a second cam surface and a second catch surface, said first and second cam surfaces coming together to deflect said cantilever arm, said first and second catch surfaces engaging each other after said cam surfaces pass each other.

4,791,746  
**VANDAL RESISTANT DISPLAY UNITS**  
 Robert M. Coronato, Huntington Station, N.Y., assignor to  
 P.T.L. Equipment Co., Inc., Huntington, N.Y.  
 Filed Dec. 23, 1983, Ser. No. 664,888  
 Int. Cl.<sup>4</sup> G09F 3/04

U.S. Cl. 40-547 9 Claims



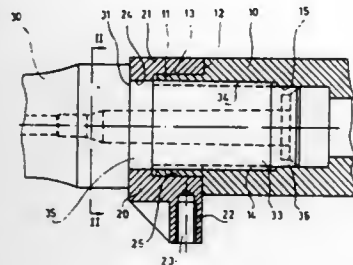
1. A display device component comprising:  
a plate having a passage therethrough opening into first and second opposite surfaces of said plate, said plate having a display indicium on said first surface thereof; and  
an integral light-transmissive element fixedly secured in said passage and having a first lensed surface adjacent said plate first surface, a second lensed surface adjacent said plate second surface, and a body portion extending between said first and second lensed surfaces, said passage being stepped in said plate, said body portion having flat surface adjacent said second lensed surface in abutting relation to the step of said passage, said first lensed surface being convex with respect to said body portion and said second lensed surface being convex with respect to said body portion.

4,791,748  
**RECOIL LUG AND RECEIVER FOR A GUN**  
 Martti Leskinen, Jyväskylä, Finland, assignor to Sako-Valmet  
 Oy, Finland

Filed Jul. 14, 1987, Ser. No. 72,895  
Claims priority, application Finland, Jul. 15, 1986, 862946  
Int. Cl.<sup>4</sup> F41C 21/22

U.S. Cl. 42—75.02 16 Claims  
1. A gun component, comprising  
a receiver for receiving a barrel of a gun, and

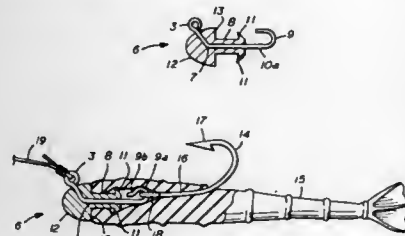
a recoil lug, by which said receiver is arranged to be fastened to a stock of the gun, said receiver and recoil lug being formed as two separate pieces and formed to be fastenable to one another by a tight force fit, and



said receiver and recoil lug each comprising respective contact surfaces for contacting the barrel of the gun, wherein said respective contact surfaces are formed on inner circumferential surfaces of said receiver and recoil lug.

**4,791,749**  
**FISHING LURE ASSEMBLY**  
Jack Stazo, 10606 N. Evers, Houston, Tex. 77024  
Filed Sep. 21, 1987, Ser. No. 98,567  
Int. Cl.<sup>4</sup> A01K 85/00  
U.S. Cl. 43—42.29

21 Claims



14. In an artificial fishing lure assembly the combination comprising:

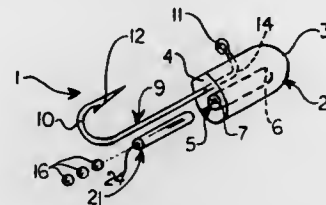
- (a) a soft flexible lure body having a front, a center and a tail;
- (b) a leadhead having a generally rounded forward head, an eye rigidly attached near the front of said head, a shank rigidly attached to and extending from the rear of said head for insertion into said lure body, and attachment means for releasably attaching a fish hook or hooks to said leadhead; and
- (c) at least one fish hook having a fish hook eye and fish hook shank for insertion into said lure body, said fish hook eye being releasably engageable with said attachment means.

**4,791,750**  
**FISHING LURE WITH INTERNAL RATTLE**  
Roy M. Gammill, P.O. Box 136, Oak Grove, La. 71263  
Filed Mar. 15, 1988, Ser. No. 168,242  
Int. Cl.<sup>4</sup> A01K 85/00  
U.S. Cl. 43—42.31

21 Claims

1. A fishing lure with internal rattle, comprising a body portion having at least one hook provided therein; a cavity provided in said body portion; a non-magnetic metal capsule fitted in said cavity; and at least one nonmagnetic, substantially

spherical metal ball having a diameter which is less than the diameter of said capsule disposed in said capsule, whereby said



ball rolls in said capsule to cause a rattling noise when said fishing lure is retrieved.

**4,791,751**  
**ADJUSTABLE BAIT-RECEIVING FISHING LURE**  
Gilbert W. Franklyn, 1260 Comyn Rd., N.W., Poulsbo, Wash. 98370  
Filed Jul. 27, 1987, Ser. No. 78,108  
Int. Cl.<sup>4</sup> A01K 83/06  
U.S. Cl. 43—44.6

21 Claims



1. An adjustable fishing lure for receiving baits of different size and, when attached to a fishing line and drawn through water, for interacting with the water in various manners, said adjustable fishing lure comprising:

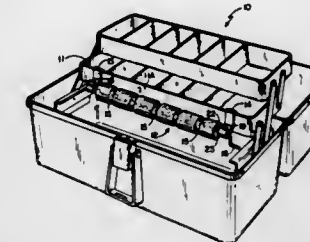
- a first bait-contacting member;
- a second bait-contacting member, said first and second bait-contacting members being for cooperatively engaging the bait;
- a lure guide member for cooperatively interacting with the water through which said fishing lure is drawn; and
- means for adjustably connecting both said first bait-contacting member and said second bait-contacting member in relation to said lure guide member, allowing said first and second bait-contacting members to cooperatively engage baits of different size and further allowing the interaction between said guide member and the water to be varied.

**4,791,752**  
**FISHING TACKLE STORING SPINDLE**  
Timothy J. Van Kampen, 1551 Birmingham St., St. Paul, Minn. 55106  
Filed Aug. 21, 1987, Ser. No. 87,871  
Int. Cl.<sup>4</sup> A01K 97/00  
U.S. Cl. 43—54.1

20 Claims

1. A fishing tackle storing apparatus comprising: a fishing tackle box, one or more trays for accommodating fishing tackle, means mounting the trays on the box for selected movement between an up position and a down position within the box, a rotatable spindle located adjacent one of said trays, said spindle including an elongated cylindrical member upon which fish line and leaders can be wrapped, bracket means mounting said spindle on one of said trays said bracket means having arm means extended downwardly and outwardly from said one of

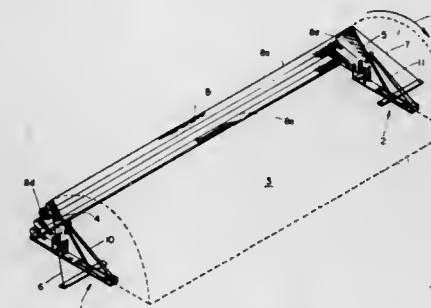
the trays to locate the spindle adjacent and at a level lower than said one of the trays thereby allowing the spindle to be located within the body when the trays are in the down position, said spindle having means rotatably mounted on the



bracket means whereby the spindle is rotatable about its longitudinal axis so that fish line can be wrapped about said spindle and located within said tackle box adjacent said one of the trays.

**4,791,753**  
**ANIMAL CAPTURING APPARATUS**  
Richard C. Fuhrman, 1212 W. Flamingo, Seabrook, Tex. 77586  
Filed Sep. 28, 1987, Ser. No. 101,743  
Int. Cl.<sup>4</sup> A01M 23/02  
U.S. Cl. 43—63

5 Claims



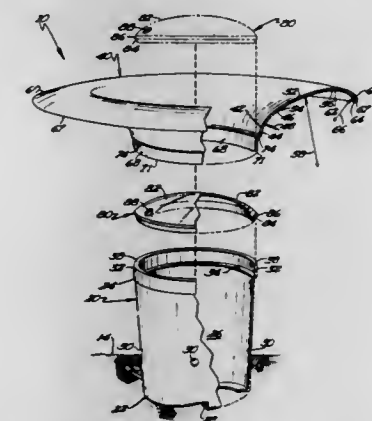
1. Apparatus for capturing birds and other animals comprising:

- first and second mounting plates adapted for anchoring to the ground at preselected spaced intervals;
- first and second elongated carrier poles the proximal ends of which are pivotally attached to said first and second mounting plates, respectively, and the distal ends of which are movable from first positions, in which said carrier poles lie parallel to each other against the ground on one side of said mounting plates, to second positions in which said carrier poles lie parallel to each other against the ground on the opposite side of said mounting plates;
- a semi-cylindrical net one longitudinal edge of which is affixed along the ground in a substantially straight line between said distal ends of said carrier poles, when in said first positions, the other longitudinal edge of which is fixed between said distal ends of said carrier poles so that upon movement of said carrier poles from said first positions to said second positions said net is moved from a stowed position along the ground to deployment in a semi-cylinder configuration to envelope said birds and other small animals underneath said net; and
- propelling means for attachment to said carrier poles for selectively propelling said carrier poles between said first and second positions, said propelling means including at least one elastic cord attached to at least one of said carrier poles, said elastic cord being placed in tension, when said one of said carrier poles is in said first position biasing said

one of said carrier poles toward said second position; said propelling means also including lofting means engageable with said elastic cord, when said one of said carrier poles is in said first position, so that the portion of said elastic cord near said one of said carrier poles is inclined, relative to the ground, placing a vertical force component on said carrier pole for initiating movement thereof from said first to said second position.

**4,791,754**  
**PLANT ASSISTING DEVICE**  
George H. Demara, Jr., Rte. 2, Bovey, Minn. 55709  
Filed Jul. 13, 1987, Ser. No. 72,766  
Int. Cl.<sup>4</sup> A01G 13/02  
U.S. Cl. 47—29

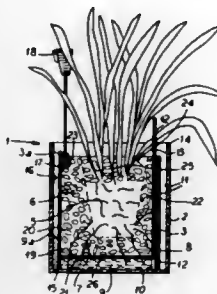
20 Claims



1. Device for assisting the growth of a plant such as a tomato plant, with the plant having a root portion growing in soil, a stalk portion having a height, and an upper growth portion, comprising, in combination: a lower tubular section having a passageway, with the tubular section having a first end and a second end, with the first end of the tubular section having means for insertion into and support by the soil including a flange, with the passageway permitting growth of the stalk portion of the plant upwardly therethrough and being of a height effective to surround a substantial portion of the height of the stalk portion; a collar for providing a gradually outwardly curving continuous support to the upper growth portion of the plant, with the collar helping to reduce breakage of the plant from bending due to the weight of the plant and to direct water inwardly toward the plant, with the collar being connected to and extending generally radially outward from the second end of the tubular section, with the collar comprising, in combination: a first arcuate section having a first end, a second end, a radius, and a shape, with the first end of the first arcuate section connected tangentially to the second end of the tubular section, with the first arcuate section extending upwardly and outwardly from the tubular section; a second arcuate section having a first end, a second end, and a radius, with the first end of the second arcuate section extending radially outwardly and continuously from the second end of the first arcuate section, with the radius of the second arcuate section being larger than the radius of the first arcuate section, with the second arcuate section extending upwardly and outwardly from the first arcuate section to a highest point a third arcuate section having a first end, a second end, and a radius, with the radius of the third arcuate section being smaller than the radius of the second arcuate section, with the first end of the third arcuate section connected to and extending radially outwardly, downwardly, and continuously from the second end of the second arcuate section; and an outer rim extending from the second end of the third arcuate section for reinforcement of the arcuate sections.

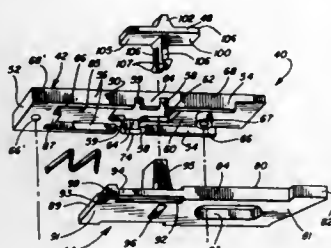


4,791,755  
**SUBSTRATE FOR A CULTIVATED PLANT**  
 Hans-Ulrich Bilstein, Meisencweg 22A, D-4300 Essen 17, Fed. Rep. of Germany  
 Filed Nov. 18, 1986, Ser. No. 932,197  
 Claims priority, application Fed. Rep. of Germany, Nov. 19, 1985, 3540963  
 Int. Cl.<sup>4</sup> A01G 9/02  
 U.S. Cl. 47—66 17 Claims



1. In a planter for a cultivated plant, particularly a house plant for home and office, comprising substrate in the form of a moist material which supplies moisture and an earth or humus root ball which provides a nutrient material for said plant, said substrate being filled into a pot-shaped container, the improvement wherein said moist material surrounding said root ball comprises a mixture of clay bodies and broken lava pieces of a particle size of 4 to 8 mm and cellular or foamed plastic material pieces of a particle size of 4 to 6 mm, which surround directly said root ball and are mixed with each other such that the volumetric ratio of the sum of clay bodies and broken lava pieces to foamed plastic pieces is 3:1.

4,791,756  
**LATCH FOR PIVOTAL SASH WINDOW**  
 Harold Simpson, Hazel Crest, Ill., assignor to Ashland Products Company, Chicago, Ill.  
 Filed Mar. 11, 1988, Ser. No. 166,669  
 Int. Cl.<sup>4</sup> E05D 15/22  
 U.S. Cl. 49—175 4 Claims



1. In a pivotal-type window sash installed in the main jamb frame of a double-hung window assembly having opposed, vertically extending guide rails to enable vertical reciprocal sliding movement of the sash in the main jamb frame while cooperatively engaged with the guide rails, the sash having a header, a base and a pair of stiles cooperatively connected together at adjacent extremities thereof to form a miter-jointed, rectangular sash frame; a latch mechanism operatively installed internally of the sash frame to said header, said latch mechanism manually operable from externally of the sash frame for releasing the latch mechanism to permit pivotal movement of the window sash, said latch mechanism comprising:

A. a housing having a planar upper wall with a slot opening therein, passageways provided at opposite ends of said

wall opening to the upper surface thereof, and opposing side wall formations depending from said planar wall along opposite longitudinal edges of the planar wall, a pair of said side wall formations having flange formations at the extremities thereof;

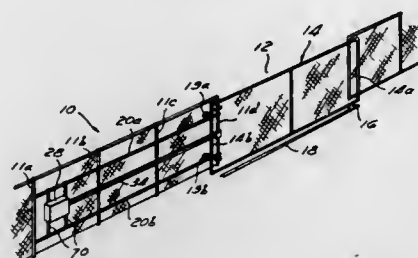
B. a latch bolt slidably installed in said housing between said side wall formations supported on said flange formations below said planar wall, said bolt having an end segment protruding beyond an end of said housing for engaging in a guide rail for releasably locking the said frame against pivotal movement relative to the master jamb frame, the bolt being installed under spring tension normally urging said end segment into locking position relative to a guide rail;

C. a rigid post formed on the latch bolt and extending through the slot in said planar wall for manually sliding the bolt against said spring tension for retracting said end segment from a guide rail;

D. said housing secured to an interior surface of said header by fastener means extending through the header into said passageways and said end segment of the latch bolt extending through an opening in a stile into operative engagement with a guide rail;

E. a pocket formed beneath said upper wall and defined by a rear wall of said housing and a surface of said latch bolt opposite said protruding end segment, respective oppositely-facing flanges disposed on said rear wall and said latch bolt surface to at least partially close-off said pocket, and a spring positioned and retained in said pocket by said flanges.

4,791,757  
**ROLLER GATE OPENER**  
 Paul F. Orlando, 1811 Kanola Rd., La Habra Heights, Calif. 90631  
 Filed Jul. 9, 1987, Ser. No. 71,758  
 Int. Cl.<sup>4</sup> E05F 11/00  
 U.S. Cl. 49—360 15 Claims



1. Apparatus for opening and closing a generally planar gate or other such closure of the type which slides or rolls edgewise across an opening in a building, fence, or other such structure, said apparatus comprising:

a motor including a surrounding housing;

means for mounting said motor housing on said structure at a location horizontally spaced from said opening slightly greater than the horizontal length of said closure so that said closure can be fully opened without reaching said housing;

an elongated guide having one end fixed to said housing; a bracket for fixing the other end of the guide to said structure adjacent to said opening so that the guide when so mounted extends horizontally on said structure, said guide having a profile such that it can extend between said structure and the closure when the closure is in open position;

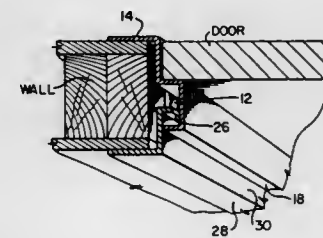
a pulley rotatably mounted on said bracket;

a trolley slidably mounted on said guide;

a drive element secured to said trolley and extending in a

loop on said guide from said motor and said pulley with said element being in driven relation with said motor so that said trolley can be moved horizontally along said guide in closure opening or closing directions; and connector means for connecting said trolley to an end of said closure in a manner to accommodate relative vertical movement between the moving closure and the fixed guide as said closure is rolled horizontally by said trolley.

4,791,758  
**EXPANDABLE PREHANGABLE SPLIT DOOR FRAME**  
 Gunther H. Bauer, Port Coquitlam, and David J. Buck, Delta, both of Canada, assignors to Windor Manufacturing Ltd., Port Coquitlam, Canada  
 Filed Jul. 28, 1987, Ser. No. 78,532  
 Int. Cl.<sup>4</sup> E06B 1/04  
 U.S. Cl. 49—505 6 Claims



1. A door frame, comprising:

(a) a hinge jamb comprising first and second hinge jamb members;

(b) a strike jamb comprising first and second strike jamb members; and,

(c) a header comprising first and second header members; wherein:

(d) said hinge jamb first member comprises a channel for slidably receiving a lipped segment of said hinge jamb second member, said hinge jamb first member channel having a lipped cover for engaging said hinge jamb second member lipped segment to limit movement of said hinge jamb members relative to one another without connection between said hinge jamb members;

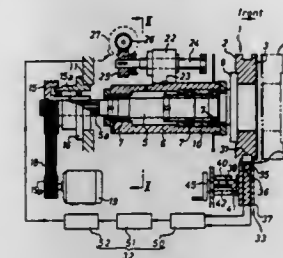
(e) said strike jamb first member comprises a channel for slidably receiving a lipped segment of said strike jamb second member, said strike jamb first member channel having a lipped cover for engaging said strike jamb second member lipped segment to limit movement of said strike jamb members relative to one another without connection between said strike jamb members; and,

(f) said header first member comprises a channel for slidably receiving a lipped segment of said header second member, said header first member channel having a lipped cover for engaging said header second member lipped segment to limit movement of said header members relative to one another without connection between said header members.

4,791,759  
**GRINDING WHEEL POSITION DETECTING MEANS FOR SURFACE GRINDING MACHINE**  
 Kazuharu Komata, Ikeda, Japan, assignor to Daisyo Seiki Kaisha, Osaka, Japan  
 Filed Jun. 15, 1987, Ser. No. 61,525  
 Claims priority, application Japan, Mar. 23, 1987, 62-68505  
 Int. Cl.<sup>4</sup> B24B 49/00  
 U.S. Cl. 51—165.87 6 Claims

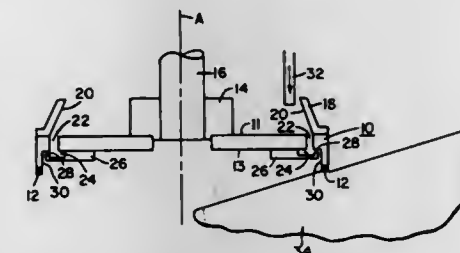
1. In a surface grinding machine wherein a super-grain grinding wheel composed of a base metal fastened to a longitudinal end portion of a rotating shaft and a super-grain layer provided on a longitudinal end face of said base metal is utilized for a grinding surface; a grinding wheel position detect-

ing means comprising: an annular groove formed in an outer peripheral surface of the base metal, said annular groove having a cross section partially defined by a pair of longitudinally spaced edges with at least one of said edges normal to the axis of rotation of said shaft, and a sensor for detecting a longitudi-



nal position of the annular groove is located near said one edge of said groove and spaced radially outwardly from and facing said outer peripheral surface of said base metal, whereby the position of said grinding wheel is detected by sensing movement in the position of said one edge of the annular groove.

4,791,760  
**GRINDING WHEEL COOLANT DISTRIBUTOR**  
 Burton A. Noll, Painted Post, N.Y., assignor to Corning Glass Works, Corning, N.Y.  
 Filed Jul. 9, 1987, Ser. No. 71,294  
 Int. Cl.<sup>4</sup> B24B 55/02  
 U.S. Cl. 51—267 12 Claims

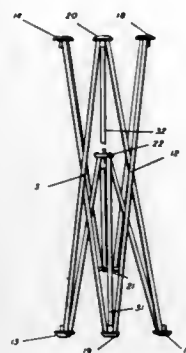


1. A method of distributing a coolant to the active abrasive face of a grinding wheel which comprises: delivering a coolant from a single fixed inlet to a frusto-conical surface on one side of the grinding wheel, applying centrifugal force to said coolant to flow the same radially-outwardly along said frusto-conical surface, flowing said coolant from said frusto-conical surface through passages in said grinding wheel to an annular groove formed on an opposite side of the grinding wheel, and utilizing centrifugal force to distribute said coolant in a uniform thin film flow from said groove to said active abrasive face of the grinding wheel.

4,791,761  
**LOCKABLE DISPLAY FRAME**  
 John W. Goodie, Temple Hills, Md., assignor to John Goodie Associates, Inc., Brandywine, Md.  
 Filed Sep. 30, 1982, Ser. No. 430,006  
 Int. Cl.<sup>4</sup> E04B 2/74  
 U.S. Cl. 52—109 17 Claims

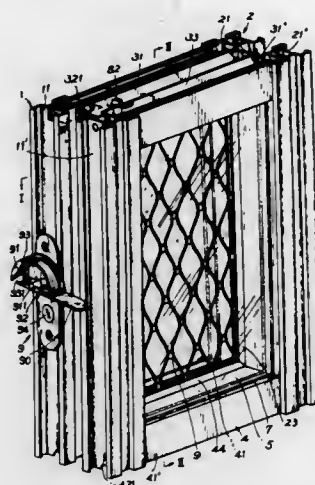
1. A collapsible, articulated structural section which is movable between a stable erect configuration and a collapsed configuration, said structure comprising: a first plurality of pivot means disposed to be spaced from each other and generally in a first plane in said erect

configuration, and to be substantially adjacent each other in said collapsed configuration; a second plurality of pivot means disposed to be spaced from each other and generally in a second plane in said erect configuration and to be substantially adjacent each other in said collapsed configuration; a plurality of pivotally interconnected side links for connecting said first plurality of pivot means with said second plurality of pivot means, each of said side links being connected with one of said first plurality of pivot means and one of said second plurality of pivot means; first and second face pivot means; and a first and a second plurality of face links, each of said first plurality of face links pivotally connected with said first face pivot means and with one of said first pivot means, and each of said second plurality of face links pivotally connected with said second face pivot means and with one of said second pivot means; each of said first plurality of face links crossing, but unconnected to one of said second plurality of face links; said first face pivot means being located closer to said second pivot means than it is to said first pivot means when said structural section is in said collapsed configuration; and



a first locking component associated with said first face pivot means, and a second locking component associated with said second face pivot means, said first and second locking components comprising means, upon manual actuation, for holding said first and second face pivot means adjacent each other and to thereby hold said structural section in said stable erect configuration; and wherein said first locking component comprises means defining a through-extending opening in said first face pivot means, and wherein said second locking component comprises a central shaft extending from said second face pivot means towards said first face pivot means and having a free end on a portion thereof remote from said second face pivot means, said free end including a shaft terminating portion dimensioned to fit in said first face pivot means opening, and a rotatable locking member on the end of said shaft terminating portion, said rotatable locking member mounted to said shaft by means providing rotation thereof from a first position in-line with said shaft end termination so that it can pass through said first face pivot means opening, to a second position not in-line with said shaft end termination so that said locking member engages said first face pivot means on an opposite end thereof from said second face pivot means.

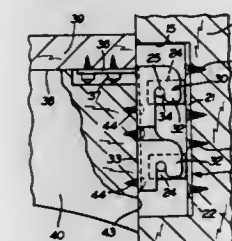
4,791,762  
NOISE AND BURGLAR PREVENTIVE DOOR AND WINDOW APPARATUS  
Min-Su Hwang, P.O. Box 10160, Taipei, Taiwan  
Filed Jan. 2, 1987, Ser. No. 56,778  
Int. Cl.<sup>4</sup> E06B 9/00, 7/12  
U.S. Cl. 52—171 2 Claims



1. A door and window apparatus comprising:
  - a first longitudinal frame having a pair of longitudinal columns symmetrically secured with each other and being integrally formed, a pair of recess portions vertically cut respectively on a top and a lower portion of said frame, each said longitudinal column formed with a longitudinal groove for inserting a glass sheet as sealed by a sealing gasket sealing an aperture between the glass sheet and the groove;
  - a second longitudinal frame having a pair of longitudinal columns symmetrically secured with each other and projectively corresponding to said pair of columns of said first frame, a pair of recess portions vertically cut on a top and a lower portion of said second frame, each said column formed with a longitudinal groove for inserting a glass sheet as sealed by a gasket in commensuration with said longitudinal groove of said first frame; an upper transverse frame having a pair of beams symmetrically secured with each other and integrally formed and engageable with two upper recess portions formed on said first and second columns, plural screw grooves longitudinally formed across the length of the beams for receiving plural screws for securing said first and second frames with said upper frame as packed by a packing means, each beam having a horizontal groove formed thereunder for inserting a glass sheet therein as sealed by the sealing gasket;
  - a lower transverse frame having a pair of beams symmetrically secured with each other and projectively corresponding to the two beams of said upper frame and engageable with two lower recess portions of two said columns, plural screw grooves longitudinally formed across the length of the beams for receiving plural screws for securing the two frames with said lower frame as packed by a packing means, each beam having a horizontal groove formed thereon for inserting a glass sheet therein as sealed by said gasket;
  - two glass sheets of which one sheet is inserted into the respective grooves formed in two outer beams and two outer columns, while the other sheet is inserted into the respective grooves of two inner beams and inner columns;
  - a reinforcing grating intermediately formed between two said glass sheets and among all said frames; and
  - a suction valve fluidically communicated with a vacuum

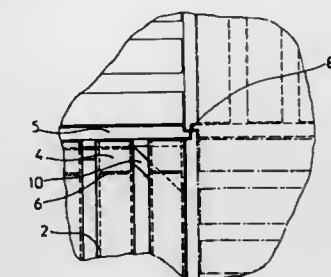
chamber defined between said two glass sheets and among all said frames adapted to suck air by a vacuum pump to obtain a vacuum in said vacuum chamber; the improvement which comprises: said reinforcing grating having its four sides respectively mounted in a first socket formed inside the first longitudinal frame, a second socket formed inside the second longitudinal frame, a third socket formed inside the upper transverse frame, and a fourth socket formed inside the lower transverse frame, whereby upon an assembly of the first and second longitudinal frames and of the upper and lower transverse frames, said reinforcing grating is secured among said frames and two said glass sheets; and said suction valve having a venting port formed in said upper transverse frame and fluidically communicated with said vacuum chamber between two glass sheets, a plug operatively sealing said port, a threaded bolt rotatably mounted in a valve body having a cap formed on a top portion of said bolt for operating the plug, and an outlet tube bypassed from said valve body for connecting a suction hose directing to a vacuum pump.

center post of a spiral staircase, channel shaped hook engaging means including a base portion and a pair of channel arms extending from the base, said hook engaging means including means for attaching said channel base to the riser of a spiral



staircase, each of said channel arms including a pair of downwardly opening hook members adapted to engage the pins with the hook receiving member, and means for attaching the hook engaging member to a stair tread of a spiral staircase.

4,791,763  
PANEL SYSTEM FOR A CLEAN ROOM  
Constantin Koutzaroff, 31, avenue de la Marne, 06100 Nice, France  
Filed Aug. 4, 1987, Ser. No. 81,483  
Claims priority, application France, Nov. 7, 1986, 86 15650  
Int. Cl.<sup>4</sup> E04C 2/42  
U.S. Cl. 52—180 20 Claims

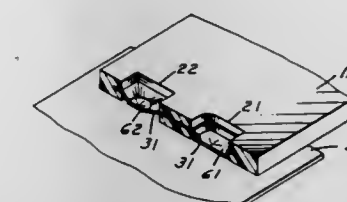


1. A panel for a raised floor of a clean room comprising a pair of spaced apart, elongated spacer bars each having a row of spacers facing the other spacer bar, open ended tubes each having one end slipped over a spacer of one spacer bar and the other end slipped over a corresponding spacer of the other spacer bar, wherein the tubes are spaced from each other to allow airflow through the panel, each spacer bar further having an interlock at its longitudinal ends for interlocking with interlocks of other such panels when the panels are assembled into a raised floor comprising a plurality of adjacent panels where the bars of one panel are perpendicular to those of adjacent panels, and each spacer bar further having a flange beneath the spacers for supporting an airflow regulating register.

4,791,764  
STAIR TREAD SUPPORT  
Dwain Hicks, 1251 Third St., S.W., New Philadelphia, Tuscarawas County, Ohio 44622  
Filed Sep. 14, 1987, Ser. No. 96,619  
Int. Cl.<sup>4</sup> E04F 11/00  
U.S. Cl. 52—187 5 Claims

1. Stair tread support construction for a spiral staircase including an elongated hook receiving member adapted to be mounted on the center post of a spiral staircase, a pair of arms extending from the hook receiving member, each of said arms including a pair of pin means adapted to be engaged by hook means, means for attaching said hook receiving member to the

4,791,765  
SYNTHETIC MATERIAL STRUCTURAL BODY PANEL  
Francis E. Noggle, Royal Oak, Mich., assignor to Ford Motor Company, Dearborn, Mich.  
Filed Dec. 28, 1981, Ser. No. 334,675  
Int. Cl.<sup>4</sup> E04C 2/32; B23K 11/10; B32B 27/06  
U.S. Cl. 52—309.2 28 Claims



1. A structural body panel comprising a first panel comprising synthetic material having an aperture extending entirely through the thickness thereof, and a metal attachment plate molded into said synthetic material spanning said aperture remote from a first surface of said first panel, said metal attachment plate being attached to a second structural body panel adjacent said first surface of said first panel, a portion of said synthetic material of said first panel being sandwiched between said metal attachment plate and said second panel.

4,791,766  
METALLIC FRAMING FIRE-STOP  
John D. Egri, II, 5200 Moore Rd., Lincoln, Calif. 95648  
Filed Sep. 10, 1987, Ser. No. 94,848  
Int. Cl.<sup>4</sup> E04C 1/00 7 Claims

1. A metallic fire-stop for use with metallic studs wherein said studs are formed with a spaced opening, said fire-stop comprises a metallic plate-like member formed of a finite length defined by parallel first linear longitudinal surfaces to define a width of said fire-stop, and each of said first surfaces terminating in a pair of tapered transition shoulders, and second surfaces spaced beyond said first surfaces, and each of said shoulders positioned between said first surfaces and said second surfaces, and

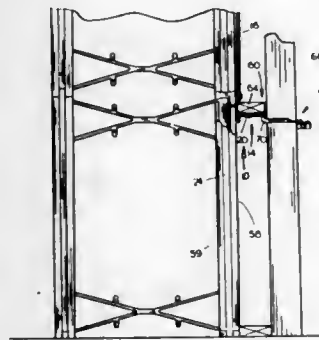


said second surfaces terminating in end surfaces to define a main body of said fire-stop, and



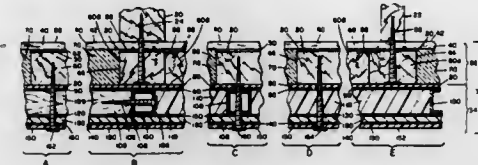
locking tab means secured into each end surface projecting longitudinally outwardly thereof for inter-engagement with said openings in said metallic studs.

**4,791,767**  
**WALE CLAMP**  
Patrick E. Boeshart, R.R. 1, Box 134, Sioux City, Iowa 51108  
Filed Dec. 3, 1987, Ser. No. 128,220  
Int. Cl.<sup>4</sup> C04B 2/00  
U.S. Cl. 52-426 12 Claims



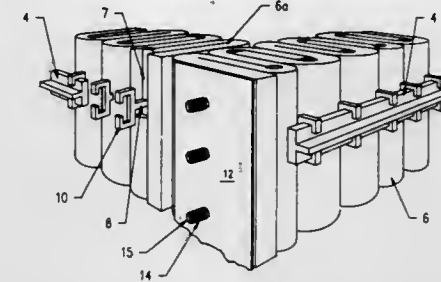
1. A wale clamp for a poured-concrete wall form system, comprising:  
a main body having a vertical wall and a horizontal wall;  
operable camming means pivotally connected to said vertical wall and spaced above said horizontal wall, including a cam surface for selective engagement with a wale positioned on said horizontal wall;  
means connected to said horizontal wall and operable independently of said camming means for holding a wale against said vertical wall and between same camming means and the horizontal wall; and  
means on said vertical wall for removably attaching said clamp to the wall form system.

**4,791,768**  
**COMPOSITE STRUCTURE FOR MOBILE CARRIAGES AND METHOD OF CONSTRUCTION THEREOF**  
Johnnie R. Crean, 29263 Country Hills Rd., San Juan Capistrano, Calif. 92675  
Filed Jul. 7, 1987, Ser. No. 69,973  
Int. Cl.<sup>4</sup> E04B 1/74  
U.S. Cl. 52-309.11 21 Claims



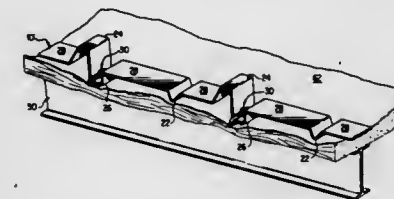
1. A composite structure for mobile carriages comprising:  
an interior paneling having a finished planar first surface, an opposite thereto planar second surface and a thickness therebetween;  
wood framing having a planar first surface, an opposite thereto planar second surface and a thickness and a traverse surface therebetween, said first surface of said wood framing being bonded to a small portion of said second surface of said interior paneling thereby leaving a large remaining surface area of said second surface of said interior paneling spaced away from said wood framing;  
an insulating first substance abutted against said traverse surface of said wood framing and said second surface of said interior paneling;  
an exterior paneling having a finished planar first surface, an opposite thereto planar second surface and a thickness therebetween;  
a pliable first substrate having a pliant planar first surface, an opposite thereto pliant planar second surface and a thickness therebetween, said first surface of said first substrate being bonded to said second surface of said exterior paneling;  
metal framing having a planar first surface, an opposite thereto planar second surface and a thickness therebetween, said first surface of said metal framing being bonded to a small portion of said second surface of said first substrate thereby leaving a large remaining surface area of said second surface of said first substrate spaced away from said metal framing;  
a pliable second substrate having a pliant planar first surface, an opposite thereto pliant planar second surface and a thickness therebetween, said second surface of said metal framing being bonded to a small portion of said first surface of said second substrate thereby leaving a large remaining surface area of said first surface of said second substrate spaced away from said metal framing, said large remaining surface area of said first surface of said second substrate opposing said large remaining surface area of said second surface of said first substrate thereby forming a first space bounded by said second surface of said first substrate, said first surface of said second substrate and said metal framing;  
an insulating second substance enclosed in and approximately filling said first space;  
said second surface of said wood framing being fastened to a small portion of said second surface of said second substrate thereby leaving a large remaining surface area of said second surface of said second substrate spaced away from said wood framing, thereby forming a second space bounded by said large remaining surface area of said second surface of said second substrate, said large remaining surface area of said second surface of said interior paneling and said wood framing, and  
wherein said insulating first substance is enclosed in and approximately fills said second space.

**4,791,769**  
**MOVABLE HEAT CHAMBER INSULATING STRUCTURE**  
Thomas M. Miller, North Olmsted, Ohio, assignor to ELTECH Systems Corporation, Boca Raton, Fla.  
Continuation-in-part of Ser. No. 602,197, Apr. 19, 1984, abandoned. This application Mar. 13, 1985, Ser. No. 711,387  
Int. Cl.<sup>4</sup> E04B 1/38  
U.S. Cl. 52-511 55 Claims



1. An insulation assembly for retaining heat in a heat zone, said assembly having an inner ceramic fiber hot face, which assembly comprises:  
ceramic fiber insulation in folded, form-stable condition;  
support means in interengagement with said insulation;  
frame means adjacent said insulation;  
linking means engaging said support means with said frame means in movable engagement; and  
adjustable compression means broadly abutting against said insulation.

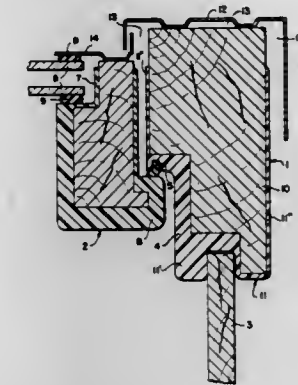
**4,791,770**  
**SUBPURLIN AND ATTACHMENT ASSEMBLY**  
John R. Bell, III, Germantown, and Robert E. Hodges, Jr., Memphis, both of Tenn., assignors to AMCA International Corporation, Hanover, N.H.  
Continuation-in-part of Ser. No. 794,076, Nov. 1, 1985, Pat. No. 4,676,042. This application Jun. 29, 1987, Ser. No. 67,535  
The portion of the term of this patent subsequent to Jun. 30, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> E04D 1/34  
U.S. Cl. 52-543 8 Claims



1. A subpurlin for interconnecting a structural member and a panel, comprising:  
a load sustaining elongate member carrying the entire load between the panel and the structural member to support the panel on the structural member, said elongate member defining a plurality of first cell rib areas, each lying in a first plane with each first cell rib area having an aperture formed therethrough, a plurality of second cell rib areas lying in a second plane spaced from said first plane, and spanner sections interconnecting the first and second cell rib areas, the spanner sections lying in a third plane positioned between the first and second planes, said first, second and third planes being parallel, the first and third planes being sufficiently separated to permit thermal insulation to be effectively installed between the subpurlin and

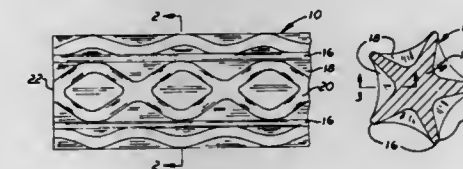
structural member when the subpurlin is secured to the structural member at the first cell rib areas.

**4,791,771**  
**WINDOW MEMBER**  
Kristian Hangaard, Gelsted, and Knud E. Nissen, Hornslyd, both of Denmark, assignors to V. Kann Rasmussen Industri A/S, Soborg, Denmark  
Filed Jun. 29, 1987, Ser. No. 67,483  
Claims priority, application Denmark, Jul. 3, 1986, 3165/86  
Int. Cl.<sup>4</sup> E04C 2/38  
U.S. Cl. 52-656 12 Claims



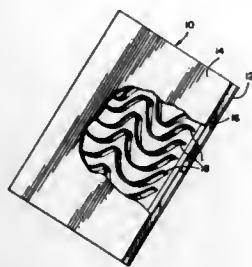
1. A window frame member comprising a core made from wood or a wood-based material and having an external side intended to face outside air and an internal side intended to face inside air, and a covering of a plastics material molded on the core, wherein the improvement comprises the arrangement on the external side of the frame member of a weather protective shield defining together with the frame member an internal space ventilated by the outside air and the application of the covering to the core so as to offer a high degree of impermeability to vapor solely on the internal side of the member.

**4,791,772**  
**CONCRETE REINFORCING BAR SUPPORT**  
Frank R. Potucek, 2049 Range Rd., Clearwater, Fla. 33575  
Filed May 1, 1987, Ser. No. 45,097  
Int. Cl.<sup>4</sup> E04C 5/03  
U.S. Cl. 52-738 2 Claims



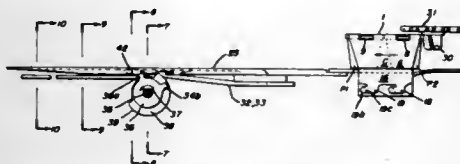
1. An elongated reinforcing bar for use in concrete comprising:  
a central core,  
five tapered fins projecting radially outwardly from the central core,  
a cup between each fin,  
a plurality of longitudinally spaced raised surface areas projecting upwardly from each cup,  
the distance between a distal end of each fin and its proximal end joinder with the central core being greater than half the radius of the bar and,  
each of said raised surface areas having a cup shape.

**4,791,773**  
**PANEL CONSTRUCTION**  
 Lawrence H. Taylor, P.O. Box 49-58 - 48th St. Station, Union City, N.J. 07087  
 Filed Feb. 2, 1987, Ser. No. 9,519  
 Int. Cl.<sup>4</sup> E04C 2/54  
 U.S. Cl. 52-790



1. An internally spaced supported vacuum panel comprising: a pair of substantially parallel facing panel sheets having edges, a plurality of internal spacers for said panel sheets, said internal spacers including a continuous undulating wave form rigidized vertical metal ribbon with a top and a bottom having at least two strips of interrupted slits running parallel the top and the bottom of said vertical metal ribbon, undulating rows formed by the interrupted slits lying one above another in a contoured wave form so that each adjacent row produces a wave form of opposite contour to another adjacent row, said internal spacers being spaced apart, placed inbetween and connected to said panel sheets; and peripheral vertical support spacer members connecting the substantially parallel facing sheets providing an airtight seal to provide a vacuum, whereby when said panel is placed in the vacuum the panel is rigidified and an insulation effect is created in proportion to a degree of vacuum provided, and the slit configuration with the opposing contoured rows being forced together in firm support position with respect to the panels, said vacuum causing the panel sheets to compress the internal spacers and bring the opposite contour wave form of adjacent rows into play as further support.

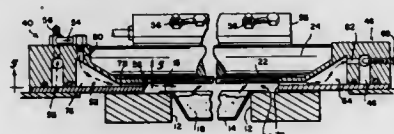
**4,791,774**  
**APPARATUS FOR INTERLOCKING A PAIR OF PANELS**  
 Rodney K. Calvert, Dunwoody, Ga., assignor to The Mead Corporation, Dayton, Ohio  
 Filed Dec. 24, 1987, Ser. No. 138,495  
 Int. Cl.<sup>4</sup> B65B 27/04, 21/24, 7/24  
 U.S. Cl. 53-48



1. Apparatus for interlocking a first panel with a second panel, said first panel having a locking strip with at least one locking slit having a locking edge and said strip being foldably joined along an edge thereof to said first panel a second panel having at least one locking element integrally formed with an edge of said second panel and having a body portion and an anchoring tab foldably joined to said body portion, said apparatus comprising an elongated locking beam having a longitudinal locking groove formed along one surface thereof, means for moving said panels along said beam and adjacent said groove, a rotatable strip folder mounted on a rotatable shaft disposed in transverse relation to said beam and arranged to engage and fold said strip into said locking groove so as to move its aperture out of the plane of said first panel, a rotatable

tab folder mounted on said shaft and arranged to engage and fold said anchoring tab out of the plane of said body portion of said locking element, an abutment disposed in said locking groove downstream from said strip folder and said tab folder for engaging and folding said anchoring tab into an acute angular relation to said body portion of said locking element, a pair of guides disposed on opposite sides of said beam for moving said panels toward each other thereby to cause said locking element to move into said locking slit and to cause said anchoring tab to engage said locking edge of said locking slit.

**4,791,775**  
**PACKAGING DEVICE**  
 Glen Raque, and Edward A. Robinson, both of Louisville, Ky., assignors to Raque Food Systems, Inc., Louisville, Ky.  
 Filed Apr. 28, 1987, Ser. No. 41,860  
 Int. Cl.<sup>4</sup> B65B 31/04, 31/02  
 U.S. Cl. 53-510

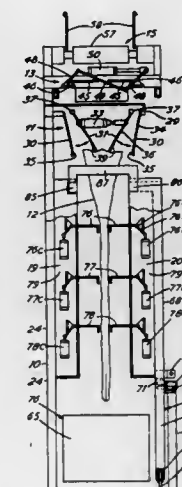


1. An apparatus for packaging an item in a controlled atmosphere enclosure, the apparatus comprising, means for continuously conveying a series of containers along a path, the path having sequentially oriented first and second portions, and defining a first side border and an opposite side border, means for introducing a continuously moving covering material over said path of continuously conveyed containers such that a space is created between said continuously conveyed containers and said continuously moving covering material, means disposed substantially adjacent said first border for continuously applying a vacuum only in said first portion of said path to said space above said continuously conveyed containers, first means disposed substantially adjacent said second border for continuously introducing a gas into said space above said continuously conveyed containers in both said first portion and in said second portion of said path, means for mating and sealing said continuously conveyed containers with a corresponding section of said continuously moving covering material in said second portion of said path to form a controlled atmosphere environment in the enclosure.

**4,791,776**  
**METHOD AND APPARATUS FOR FILLING A BAG WITH INDIVIDUAL PACKS OF ARTICLES OR PRODUCE**  
 Raymond W. Jackman, and Anthony C. Monk, both of Braintree, Great Britain, assignors to W. J. Morray Engineering Limited, Braintree, United Kingdom  
 Filed Aug. 25, 1987, Ser. No. 89,416  
 Claims priority, application United Kingdom, Sep. 3, 1986, 8621259

Int. Cl.<sup>4</sup> B65B 5/00  
 U.S. Cl. 53-570  
 1. A machine for filling a bag or sack with individual packs of produce or articles, comprising a main frame fitted with a bag clamp for supporting a bag in an upright position with the mouth thereof open at the top of the bag, a conveyor operable to feed the packs into a bag held in the bag clamp, a plurality of constriction means mounted on the frame below the bag clamp and each operable to at least partially

flatten a bag held in the bag clamp to form a plurality of constrictions of the interior of the bag at spaced intervals along the length of the bag whereby packs fed into the bag are supported initially on the walls of the bag at the uppermost constriction, and control means for releasing each of the constriction means in sequence by releasing in turn the constriction means which is uppermost to permit the packs to drop in several stages into the lower portion of the bag,



wherein said constriction means are housed in two opposing constrictor units arranged below the bag clamp, one of the constrictor units being fixed and the other constrictor unit being movable between an operating position in which it is in opposing relationship to the fixed constrictor unit so that a bag on the bag clamp is suspended between the constrictor units and an offset position in which the movable constrictor unit is displaced to one side of the fixed constrictor unit.

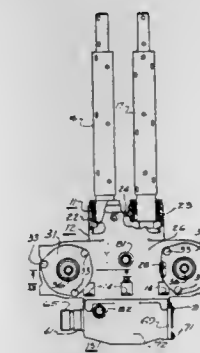
**4,791,777**  
**LEG NETS**  
 Elise J. Secane, 1506 Powell La., Redlands, Calif. 92373  
 Filed Oct. 8, 1986, Ser. No. 916,759  
 Int. Cl.<sup>4</sup> B68C 5/00  
 U.S. Cl. 54-81



1. A leg net assembly positionable about the leg portion of an animal to prevent insects from contacting the leg, said leg net assembly comprising: a central, generally cylindrical, loose fitting body portion, said central body portion being formed of a tulle type relatively stiff, light weight synthetic mesh material having a fine mesh size generally between about 1/16 and 1/8 inch, said fine mesh cylindrical body portion further being bloused to have sufficient fullness and being caused by said blousing and by said relative stiffness of said material

to stand away from the leg of the animal to thereby prevent insects which may land on said central loose fitting body portion from being able to contact the leg of the animal while allowing free air circulation and movement and bending of the leg within said body portion; and upper and lower supports, said upper and lower supports each being formed of a knit, high stretch material and being attached to upper and lower ends, respectively of said central generally cylindrical body, said supports being snugly positionable about the leg of the animal to secure said leg net assembly to the leg of the animal, said upper support being a multiple layer knit cuff which is positionable about an upper leg portion of the animal in a non-restrictive manner while providing sufficient support to retain said upper end of said central mesh body portion about the upper portion of the leg of the animal while providing a high level of comfort to the animal, said lower support being a single layer knit sock which is positionable about a lower leg portion of the animal in a non-restrictive manner to hold said lower end of said central mesh body portion down about the lower leg portion of the animal.

**4,791,778**  
**CORN HEAD GEAR BOX**  
 Ronald E. Wilson, Lee's Summit, Mo., assignor to Deutz-Allis Corporation, Milwaukee, Wis.  
 Filed Feb. 3, 1988, Ser. No. 151,953  
 Int. Cl.<sup>4</sup> A01D 45/02, 69/00  
 U.S. Cl. 56-106



1. A gear box for a corn head of a combine comprising a first casing having a top wall, a bottom wall, a front wall, a back wall and a pair of laterally opposite side walls, said walls defining a hollow interior cavity and first and second pairs of aligned openings in said front and back walls, respectively, a pair of parallel snapping roll shafts extending in a fore and aft direction on axes defining a horizontal plane a bearing mounted in each of said first and second pairs of openings and rotatably supporting said snapping roll shafts a pair of parallel gathering chain sprocket shafts, a pair of vertical openings in said top wall, a pair of closures for said vertical openings releasably secured to said top wall and each presenting a central vertical hole a bearing in each of said vertical holes rotatably mounting said sprocket shafts on laterally spaced vertical axes spaced laterally outward of said snapping roll shafts, respectively, a second casing releasably secured to the rear wall of said first casing and having a top wall, a bottom wall, a rear wall and a pair of laterally spaced side walls defining an interior pocket open at its front, and



horizontally aligned openings in said lateral side walls, an input shaft extending through said aligned openings in said lateral side walls, a pair of bearings mounted in said aligned openings in said lateral side walls rotatably supporting said input shaft on horizontal axis transverse to said snapping roll shafts and transverse to said sprocket shafts, first power transmitting gearing on said input shaft and snapping roll shafts operable to transmit torque from said input shaft to said snapping roll shafts and second power transmitting gearing on said snapping roll shafts and said sprocket shafts operable to transmit torque from said snapping roll shafts to said sprocket shafts.

4,791,779

## LEAF-BAGGER

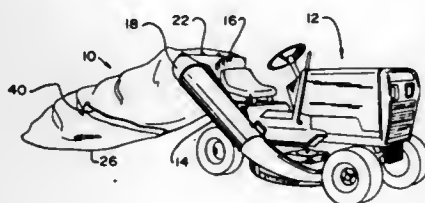
Joel A. Hoffman, 405 Jones St., Old Hickory, Tenn. 37138

Filed Aug. 25, 1987, Ser. No. 89,089

Int. Cl.<sup>4</sup> A01D 34/70

U.S. Cl. 56—202

4 Claims



1. A leaf bagger, connected to an undercarriage leaf vacuum mechanism of a lawn tractor, comprising:

a leaf conduit; said conduit rigidly affixed to a vertically disposed support frame; said support frame being structurally housed in a vertically disposed support surface; said support frame being rigidly affixed to said tractor structure;

said leaf conduit having an upwardly disposed terminal thereon, said upwardly disposed terminal having a leaf bag adapter circumferentially affixed thereto;

said leaf conduit, support frame, and support surface being, in combination, disposed to the rear of a tractor unit such that said leaf conduit extends transversely from said upwardly disposed leaf conduit adapter to said tractor undercarriage vacuum mechanism;

a leaf receptacle bag; said leaf receptacle bag affixed to said vertically disposed support surface; said leaf receptacle bag having a leaf conduit orifice disposed proximate to said support surface; said leaf conduit extending through such that leaves are blown, by the action of said leaf vacuum mechanism, into said leaf receptacle bag;

said leaf receptacle bag forming thereby an oblique angle with said leaf conduit and thereby dragged behind the lawn tractor; said conduit depositing leaves within said leaf receptacle bag; said leaves becoming deposited at the lower, rearward portion thereof through the action of gravity and through the action of the tractor device moving over the earth and dragging the bag; whereby, leaves are propelled in a transverse, upward motion by the tractor mechanism, thence into said receptacle bag and downward, along a slope formed by the interior of said leaf bag receptacle, to a rear-lower portion thereof;

said leaf receptacle bag has an air outlet; said air outlet disposed along the upper surface thereof, whereby excess air from said leaf vacuum device escapes from said leaf receptacle bag;

said air outlet is a mesh strip, said mesh strip being disposed to the upper layer of said receptacle bag; said air outlet strip being disposed along a longitudinal axis of said leaf bag receptacle; whereby said leaf receptacle bag is partially inflated with air from said tractor leaf vacuum unit, with the further result that air flows stream like along said

longitudinal axis of said leaf receptacle bag, carrying therewith leaves, which subsequently fall to the bottom of said leaf receptacle bag as said air moves through said longitudinally disposed air outlet; said air outlet strip is disposed only along an upper one half portion of said leaf receptacle bag, as measured longitudinally along the bag, from bottom to top; said receptacle bag has fastening means deployed transversely across a bottom portion thereof whereby said receptacle bag may be emptied by restoring said fastening means; said fastening means is a hook and loop strip fastening means.

4,791,780

## ROOF RAKE

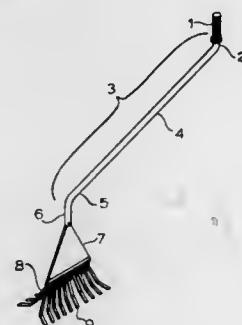
David X. Phillips, 101 S. Kentucky, Amarillo, Tex. 79106

Filed Mar. 2, 1987, Ser. No. 22,053

Int. Cl.<sup>4</sup> A01D 7/06

U.S. Cl. 56—400.04

1 Claim



1. A reversible raking device comprising:

an elongated rigid handle having a substantially straight intermediate portion and oppositely curved upper and lower end portions defining an oblong S-shape; a hand grip provided on said upper end portion; and a rake head attached to said lower end portion; said rake head including a plurality of teeth arranged in two adjacent rows; each of said teeth having a downwardly extending portion and a free end portion; the free end portions of said teeth of one row extending laterally outwardly in an opposite direction from said teeth of the other row;

whereby said device enables a user to rake material on either the left or right side of said user in a forward sweeping type motion by grasping said intermediate portion and said hand grip to provide a rotating motion of said rake head.

4,791,781

## METHOD AND APPARATUS FOR FALSE TWISTING YARN IN OPENED SPINNERS

Tek T. Phoa, Bergscheld 39, B-4730 Raeren, Belgium, and Joachim Lünenschloss, Schloss-Schonastrasse 81, 5100 Aachen, Fed. Rep. of Germany

Filed Apr. 3, 1987, Ser. No. 34,335

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611383

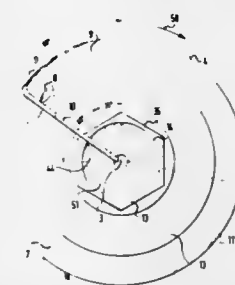
Int. Cl.<sup>4</sup> D01H 1/135, 7/892

U.S. Cl. 57—417

35 Claims

1. A method of varying the false twist imparted to a yarn as it is being formed in an open-end rotor spinning device to minimize the unevenness imparted by wrapper yarns picked up as the yarn formation passes through the fiber receiving zone

of the rotor, said method comprising reducing the false twist imparted to the yarn being formed as it passes through the fiber



receiving zone and increasing the false twist imparted to the yarn being formed as it passes outside the fiber receiving zone.

4,791,782

## FLUID OUTLET DUCT

Bernard E. Seed, Nottingham, England, assignor to Rolls-Royce plc, London, England

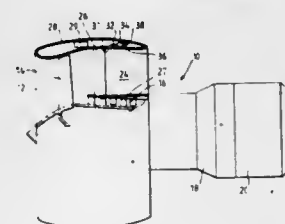
Filed Jul. 22, 1987, Ser. No. 76,711

Claims priority, application United Kingdom, Aug. 27, 1986, 8620736

Int. Cl.<sup>4</sup> F02K 3/04

U.S. Cl. 60—226.1

10 Claims



1. A fluid outlet duct system from a heat exchanger of a gas turbine engine, the fluid outlet duct having a width and a total flow area, the system comprising:

a first plenum chamber and a plurality of second plenum chambers, the first plenum chamber having means for receiving fluid from the heat exchanger, the plurality of second plenum chambers being arranged across the width of the fluid outlet duct, the plurality of second plenum chambers having means for receiving fluid from the first plenum chamber, each of the second plenum chambers having an associated exit nozzle for discharging the fluid, the exit nozzle of each of the second plenum chambers being located in a casing of the gas turbine engine, the exit nozzle of each of the second plenum chambers having a flow area, each of the second plenum chambers having valve means, the valve means being arranged to vary the flow of fluid into each of the second plenum chambers, the total flow area of the fluid outlet duct being at least the sum of the flow areas of the exit nozzles of the second

plenum chambers for which the valve means are open whereby the valve means may vary the total flow area of the fluid outlet duct to obtain relatively high exit velocities for the fluid discharging from each of the exit nozzles of the second plenum chambers to give good thrust recovery.

4,791,783

## CONVERTIBLE AIRCRAFT ENGINE

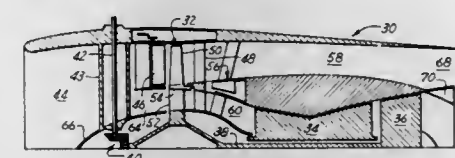
Robert E. Neitzel, Marblehead, Mass., assignor to General Electric Company, Lynn, Mass.

Filed Nov. 27, 1981, Ser. No. 325,156

Int. Cl.<sup>4</sup> F02K 1/38, 1/46, 3/02

U.S. Cl. 60—262

11 Claims



1. A gas turbine aircraft engine having a compressor, a combustor, a high pressure turbine, a low pressure turbine, and means for transferring power from the low pressure turbine, is provided with apparatus that enables engine operation in either a turbobfan or turboshaft mode of operation, said apparatus comprising:

power transfer means that can be selectively powered by the low pressure turbine to provide power for a turboshaft mode of operation;

a split fan having an outer portion and an inner portion separated by a rotating shroud, said split fan being powered by the low pressure turbine;

an inlet guide vane for varying airflow to the outer portion of the split fan for the purpose of increasing airflow through the fan outer portion during the turbobfan mode of operation and, when rotated to a substantially closed position, decreasing airflow through the fan outer portion during the turboshaft mode of operation;

a bypass duct for receiving a bypass airflow accelerated by the fan outer portion; and

a mixer wherein the bypass airflow is mixed with core engine flow in an engine tailpipe thereby providing fuel consumption improvement during the turbobfan mode of operation and further providing increased power output and reduced residual thrust during the turboshaft mode of operation.

4,791,784

## INTERNAL BYPASS GAS TURBINE ENGINES WITH BLADE COOLING

John E. Minardi, Hans P. von Ohain, and Maurice O. Lawson, all of Dayton, Ohio, assignors to University of Dayton, Dayton, Ohio

Continuation-in-part of Ser. No. 745,964, Jan. 17, 1985, abandoned. This application Apr. 16, 1987, Ser. No. 39,053

Int. Cl.<sup>4</sup> F02K 3/02

U.S. Cl. 60—262

2 Claims

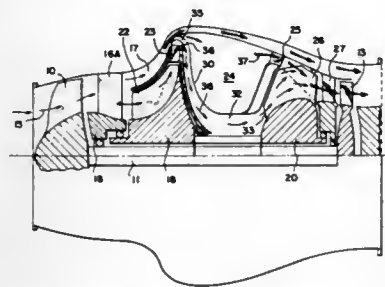
1. In a gas turbine engine having a compressor section, a combustion section, and a mixed-flow turbine, the improvement comprising:

a turbine hub, means mounting said hub for rotation,

a plurality of solid turbine blades extending generally radially from said hub and extending generally axially along said hub from a forward end of said hub toward a rearward end thereof,

each of said turbine blades having an axially forwardly extending cold air inlet portion positioned closely adja-

cent said hub and further having a hot air inlet reaction portion positioned radially outwardly and axially rearwardly of said cold air inlet portion, said blades having outer edges which taper from a minimum diameter at said cold air inlet portion radially outwardly and axially rearwardly therefrom to a substantially maximum diameter at said hot gas inlet reaction portion, the volume defined by the spaces between adjacent said blades increasing along the axial length of said blades from



a minimum at said cold air inlet portions to a substantially greater volume at said hot gas inlet reaction portions, said blades having common gas outlet portions at the trailing edges thereof, means for applying cold bypass air from said compressor section exclusively to said cold air inlet portions of said blades, and means for applying hot gases from said combustion section exclusively to said hot gas inlet reaction portions of said blades.

4,791,785

**REMOVAL OF PARTICULATE MATERIAL FROM A GAS**  
John C. Hudson, Shok Thantrey, and Ian M. Jackson, all of Boston, England, assignors to Porous Element Heating Limited, Lincolnshire, England

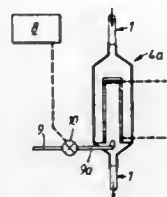
Filed Feb. 27, 1987, Ser. No. 20,087

Claims priority, application United Kingdom, Feb. 28, 1986, 8605058

Int. Cl. F01N 3/02

U.S. Cl. 60—303

43 Claims



1. Apparatus for removing combustible particles from a first gas comprising:

- a housing having an inlet for the first gas and an outlet;
- a filter element mounted within the housing for trapping the particles in the first gas as it flows through the housing, said filter element being generally cylindrical and having an annular wall through which in use the first gas will flow substantially radially from the exterior thereof to the interior thereof, means closing one end of said element, the other end of said element being open to permit the first gas to flow from the interior thereof to the outlet of the housing, said element being made of electrically-conductive material;

means for connecting said element to an electrical power supply for heating said element to a temperature at which

the particles trapped thereby will combust for regeneration of said element;

auxiliary gas supply means for supplying an auxiliary combustion-supporting gas to the interior of said element when said element is connected to said electrical power supply, said auxiliary gas supply means comprising an outlet end portion arranged in the region of said open end of said element for directing said auxiliary gas into the interior of said element; and

wherein, in the region of said open end of said element, the flow path for gas therefrom is shaped relative to said outlet portion of said auxiliary gas supply means so that supply of the auxiliary gas to the interior of said element will substantially prevent flow of said first gas through said element.

4,791,786

**FREE-PISTON MOTOR WITH HYDRAULIC OR PNEUMATIC ENERGY TRANSMISSION**

Paulinus F. Stuyvenberg, Schiedam, Netherlands, assignor to De Rotterdamse Droogdok Maatschappij, Rotterdam, Netherlands

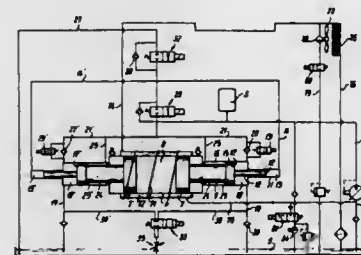
Filed Jul. 20, 1987, Ser. No. 75,618

Claims priority, application Netherlands, Jul. 25, 1986, 8601931

Int. Cl. F02B 71/04

U.S. Cl. 60—595

15 Claims



1. Apparatus for driving a member, such as a wheel, pulley, rod or similar member, comprising at least one rotary or linear motor which is coupled to said member and which is driven by a pressurized fluid, particularly a hydraulic motor or similar hydraulic apparatus, which on one side is in communication via a pipe with at least one accumulator for a pressurized fluid, particularly a liquid, and on the other side with an outlet leading to a reservoir for said liquid, and further comprising at least one free-piston unit consisting of a cylinder with at least one free piston which is slidable to-and-fro therein and which delimits a space within the cylinder in such a manner that on the expansion stroke of the piston, during which the latter is displaced in the other direction, the volume of the space is increased while on the compression stroke of the piston, during which the latter is displaced in the one direction, the volume of the space is reduced, while means are provided for the admission and discharge of a gas into and out of said space respectively, together with means for heating the gas compressed in said space by the compression stroke of the piston, the latter being connected to a member of general plunger-like shape which is adapted to slide to-and-fro inside at least one stationarily mounted chamber member, at least two parts of different diameters of the periphery of the plunger-shaped member making sliding fits with parts of the inside wall of the chamber member, while the plunger-shaped member has three substantially radial surfaces each of which delimits within the chamber member a substantially closed chamber whose capacity gradually varies as the piston makes its expansion and compression strokes, of which surfaces a first radial surface delimits a first or plunger chamber which is in communication with a source of pressurized fluid, and a second radial surface delimits a second or displacement chamber which is in communication

4,791,788

**METHOD FOR OBTAINING IMPROVED TEMPERATURE REGULATION WHEN USING LIQUID HELIUM COOLING**

Michael B. Simmonds, Del Mar, and Ronald E. Sager, Carlsbad, both of Calif., assignors to Quantum Design, Inc., San Diego, Calif.

Filed Aug. 24, 1987, Ser. No. 87,465

Int. Cl. F17C 13/02

U.S. Cl. 62—49

5 Claims

via a nonreturn valve with the reservoir and is connected via a second nonreturn valve to the accumulator, so that during the stroke of the piston whereby the capacity of the second chamber is increased liquid is drawn out of the reservoir into this chamber and during the other, opposite stroke of the piston whereby the capacity of the second chamber is reduced this liquid is forced out of said chamber in order to load the accumulator, and the third radial surface has a smaller operative area than the first radial surface and delimits substantially inside the chamber member a third chamber, while its capacity increases and decreases respectively during the expansion and compression strokes of the piston, characterized in that the first or plunger-chamber is in communication with said source of pressurized fluid through an operable valve member so that by opening said valve member the piston makes its compression stroke and the third chamber is solely in open communication with said accumulator.

4,791,787

**REGENERATIVE THERMAL ENGINE**

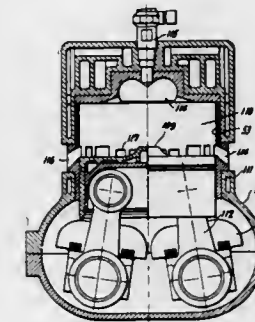
Marius A. Paul, and Ana Paul, both of 969 La Paz, Placentia, Calif. 92670

Filed Dec. 5, 1985, Ser. No. 805,184

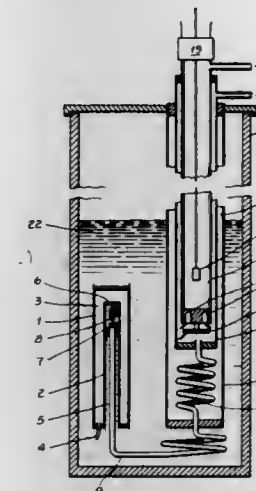
Int. Cl. F02B 33/44

U.S. Cl. 60—605.1

22 Claims



1. A compound rotary-reciprocal engine comprising:
  - a. a high pressure, two-cycle reciprocator component having a single cylinder, with at least one piston reciprocally movable in the cylinder with a predetermined displacement volume, the piston and cylinder forming in part a combustion chamber for combustion of gases, intake port means for introducing air into the cylinder and exhaust port means for removing combustion gases from the cylinder;
  - b. a medium pressure, positive displacement rotary component in integral combination with said reciprocator component, said rotary component having a unitary compressor segment with an air intake and a compressed air exit in direct communication with said intake port means of the reciprocator component and an expander segment with a combustion gas exit and a combustion gas intake in direct communication with said exhaust port means of said reciprocator component, wherein the intake port means and the compressed air exit form a compressed air passage and the exhaust port means and combustion gas intake form a combustion gas passage, each passage having a volume less than the displacement volume of the reciprocator component; and,
  - c. a fuel injection means for injecting fuel into said cylinder of said reciprocator component.



1. In a system for drawing a cooling medium from a liquid phase supply of the cooling medium for passage through a thermally insulated chamber surrounding a region to establish a stable thermal environment in the region over a range of cryogenic temperatures, an improved method for controlling the flow of the medium through the chamber comprising the steps of:

- defining a first capillary in communication with the liquid phase supply;
- defining a second capillary having an inner diameter larger than the inner diameter of the first capillary and an inlet extremity in communication with the first capillary, and an outlet extremity in communicating with the insulated chamber;
- thermally insulating the first capillary and the inlet extremity of the second capillary; and
- applying heat to the first capillary to selectively adjust the temperature of the first capillary to a selected one of a plurality of temperature including a first temperature sufficient to vaporize the cooling medium as the cooling medium passes through the first capillary but not to significantly restrict the flow of the cooling medium therethrough and a second temperature sufficient to vaporize the cooling medium as the cooling medium passes through the first capillary and to significantly restrict the flow of the cooling medium therethrough.

4,791,789

**AUTOMATIC SELF-COOLING DEVICE FOR BEVERAGE CONTAINERS**

John J. Wilson, 637 A Baden Ave., South San Francisco, Calif. 94080

Filed Nov. 6, 1987, Ser. No. 118,413

Int. Cl. F25D 7/00

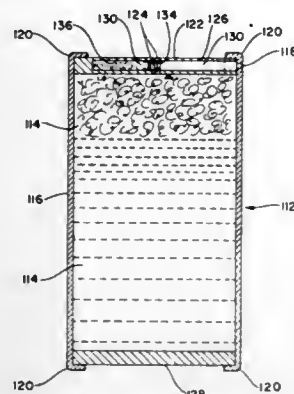
U.S. Cl. 62—293

12 Claims

1. A self-cooling device for insertion in a beverage container or the like, comprising a refrigerant vessel means for holding a pressurized evaporative refrigerant comprising upright sidewalls terminating in upper and lower rims, a first plug hermetically sealing

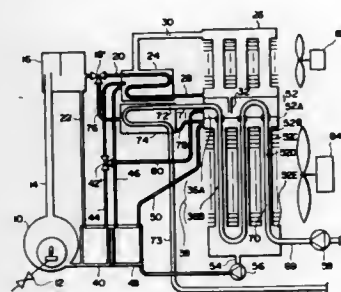


a lower end of said vessel, a second plug hermetically sealing the upper end of said vessel, a vent hole being formed in said sidewall near said upper end adjacent to said upper plug;  
 a metering orifice for regulating the rate of escape of said refrigerant from said vessel formed axially through said upper plug;  
 an automatic pressure actuated means for releasing said refrigerant comprising a plug cylinder formed radially at least partially through said second upper end plug intersecting said metering orifice, a pressure actuated piston



positioned in and movable in said cylinder, a piston groove formed around said piston whereby when said container is slightly pressurized, said pressure is transmitted to said piston via said vent hole, positioning said piston at a closed position in said cylinder where said groove is beyond said orifice, but when said container is depressurized upon opening, compressed air in said cylinder ejects said piston to an open position where said groove adjoins said orifice allowing said refrigerant to expand into said beverage in said container and self-cool said device, and cooling said beverage.

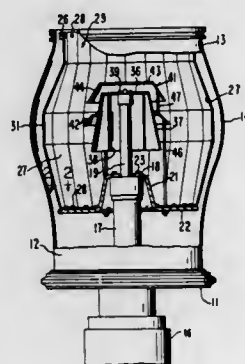
**4,791,790**  
**AIR-COOLED ABSORPTION-TYPE WATER COOLING AND HEATING APPARATUS**  
 Shinji Tongu, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan  
 Filed Dec. 24, 1987, Ser. No. 137,675  
 Int. Cl.<sup>4</sup> F25B 15/00  
 U.S. Cl. 62-476



1. An air-cooled absorption-type water cooling and heating apparatus, comprising:
  - a high-temperature regenerator having a heating source for heating a dilute solution;
  - a separator for separating said dilute solution heated by said high-temperature regenerator into refrigerant vapor and an intermediate-concentration solution;
  - a high-temperature heat exchanger for subjecting said intermediate-concentration solution to heat exchange with said

dilute solution flowing into said high-temperature exchanger;  
 first change-over means adapted to introduce said refrigerant vapor introduced from said separator into a low-temperature regenerator during cooling and into a water heating device during heating;  
 second change-over means adapted to introduce said intermediate-concentration solution from said high-temperature heat exchanger into said low-temperature regenerator to generate a condensed solution during cooling and into a first spraying mechanism during heating;  
 a condenser for condensing said refrigerant vapor from said low-temperature regenerator into a liquid refrigerant during cooling so as to be supplied to said first spraying mechanism;  
 a low-temperature heat exchanger by which a condensed solution flowing in from said low-temperature regenerator is subjected to heat exchange with said dilute solution entering said high-temperature heat exchanger so as to be cooled;  
 a second spraying mechanism which receives the supply of said condensed solution from said low-temperature heat exchanger during cooling and receives the supply of said liquid refrigerant from said water heating device during heating;  
 a first cold/hot water heat exchanger through which cold or hot water is allowed to flow, externally surrounding means being disposed around an outer periphery of said first cold/hot water heat exchanger with a fixed interval therebetween; and  
 a second cold/hot water heat exchanger through which said cold or hot water is allowed to flow,  
 wherein said first spraying mechanism is adapted to spray said condensed solution or said liquid refrigerant onto an outer surface of said first cold/hot water heat exchanger, said second spraying means is adapted to be capable of spraying said condensed solution or said liquid refrigerant onto an inner surface of said externally surrounding means so as to obtain a dilute solution, an outer surface of said externally surrounding means is capable of being air-cooled, and a circulation pump is provided to pressure-feed said dilute solution to said low-temperature heat exchanger.

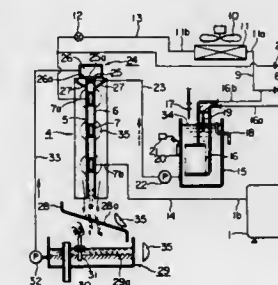
**4,791,791**  
**CRYOSORPTION SURFACE FOR A CRYOPUMP**  
 Christopher M. Flegel, Santa Rosa, and John R. Porter, Napa, both of Calif., assignors to Varian Associates, Inc., Palo Alto, Calif.  
 Filed Jan. 20, 1988, Ser. No. 146,000  
 Int. Cl.<sup>4</sup> B01D 8/00  
 U.S. Cl. 62-55.5



1. A cryogenic pump for removing gaseous species from a chamber, comprising:

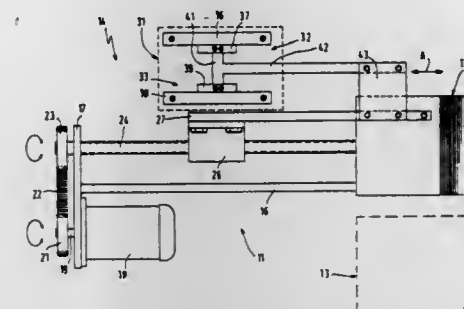
a first stage having an inlet opening at one end thereof for gaseous communication with the chamber and a generally cylindrical pumping surface maintained at a first temperature for removing a portion of the gaseous species, a second stage positioned coaxially within the first stage and having a pumping surface maintained at a temperature lower than the first temperature for removing an additional portion of the gaseous species, and a plurality of baffle members spaced axially apart between the first and second stages for shielding the pumping surface of the second stage from direct exposure to the inlet opening while permitting substantially unimpeded flow of the gaseous species from the inlet opening to the second stage, said second stage including surfaces of reticulated vitreous carbon.

**4,791,792**  
**ICE MAKING MACHINE**  
 Nobutaka Naruse, and Shozo Ogata, both of Toyoake, Japan, assignors to Hoshizaki Electric Co., Ltd., Toyoake, Japan  
 Filed Sep. 18, 1986, Ser. No. 909,104  
 Claims priority, application Japan, Sep. 27, 1985, 60-212284  
 Int. Cl.<sup>4</sup> F25C 5/10  
 U.S. Cl. 62-135



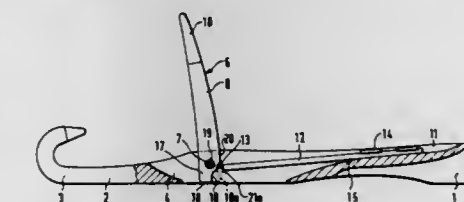
1. An ice making machine comprising:
  - an ice making section having an evaporator connected in heat exchange relation therewith;
  - an ice making water tank adapted for storing ice making water supplied in circulation to said ice making section during the ice making cycle;
  - a harvesting water tank adapted for storing harvesting water supplied to said ice making section during the harvesting cycle;
  - a compressor for supplying refrigerant gas to said evaporator;
  - means provided in said harvesting water tank for sensing the upper water level limit of the harvesting water;
  - a water feed valve for feeding water to said harvesting water tank;
  - control means including an ice making cycle sensing means adapted for sensing that the machine is in the ice making cycle thereof, said control means being connected to said means for sensing the upper water level limit and to said water feed valve for controlling the operation of said upper limit sensing means and said water feed valve; and
  - said water feed valve being opened only during the ice making cycle when said ice making cycle sensing means and said upper limit sensing means issue an AND output.

**4,791,793**  
**DEVICE FOR THE OFFSET CONTROL OF THE NEEDLE BEDS OF A FLAT-BED KNITTING MACHINE**  
 Ernst Goller, Reutlingen; Jürgen Ploppa, Pfullingen, and Bertram Glaumer, Reutlingen, all of Fed. Rep. of Germany, assignors to H. Stoll GmbH & Co., Fed. Rep. of Germany  
 Filed Sep. 3, 1987, Ser. No. 92,545  
 Claims priority, application Fed. Rep. of Germany, Sep. 10, 1986, 3630818  
 Int. Cl.<sup>4</sup> D04B 7/00  
 U.S. Cl. 66-69



1. A device for the offset control of the needle beds of a flat-bed knitting machine, comprising:
  - servomotor means connected to one of the needle beds for offsetting one needle bed relative to another needle bed; and
  - a position control circuit connected to said one needle bed and to said servomotor means for controlling the servomotor, said position control circuit including an actual value transducer device for providing a set point/actual value comparison; said actual value transducer device including:
    - a high resolution incremental transducer, the high resolution of which is many times finer than the needle gauge of the needles of the needle beds, said incremental transducer having reference marks corresponding at least to the needle gauge intervals of the needle beds; and
    - an absolute value transducer the resolution of which is at least the same as, but preferably higher than the distance of the reference marks of the incremental transducer.

**4,791,794**  
**LATCH NEEDLE FOR STITCH FORMING TEXTILE MACHINES**  
 Wolfgang Schmoll, Haigerloch-Owingen, Fed. Rep. of Germany, assignor to Theodor Groz & Söhne & Ernst Beckert Nadelfabrik Commandit-Gesellschaft, Albstadt-Ebingen, Fed. Rep. of Germany  
 Filed Jan. 21, 1988, Ser. No. 146,699  
 Claims priority, application Fed. Rep. of Germany, Jan. 24, 1987, 3702019  
 Int. Cl.<sup>4</sup> D04B 35/04  
 U.S. Cl. 66-121



1. A latch needle for stitch forming textile machines, wherein said needle has a longitudinal direction and comprises:
  - a needle shank having first and second ends, said needle

shank having a latch slot formed therein extending in the longitudinal direction, said latch slot including a bearing location, said needle shank having a transversely extending pivot axis at said bearing location, and said needle shank further having a groove-like depression which extends from said latch slot toward said second end; a needle hook attached to said first end of said shank; a latch having first and second portions and first and second ends, said latch being pivotally mounted in said latch slot so that said latch is pivotal around the transversely extending pivot axis, said latch including a latch spoon in said first portion located to cooperate with said needle hook, said first portion of said latch extending from a position adjacent said bearing location to said first end of said latch and said second portion of said latch extending from said position adjacent said bearing location to said second end of said latch, said latch further having an upper face, a frontal face, a contact surface, and a contact-free surface, wherein said frontal face, said contact surface and said contact-free surface are all disposed in said second portion of said latch, said frontal face is disposed at said second end of said latch, and said contact surface and said contact-free surface are disposed between said frontal face and said upper surface; and an elongate spring element having first and second ends, wherein said first end is attached to said needle shank in said groove-like depression and said second end is freely disposed in said latch slot; and wherein said latch is movable between a closed position in which said latch spoon cooperates with said needle hook and said second end of said spring element contacts said contact surface and said spring element biases said latch in a first pivoting direction, a completely open position in which said upper face of said latch engages said spring element and said spring element biases said latch in a second pivoting direction opposite to said first pivoting direction, and an intermediate position which is between said closed position and said completely open position, said intermediate position being defined as the position where said second end of said spring element contacts said contact surface, but said spring element no longer biases said latch, whereby said latch is freely pivotable from said intermediate position toward said completely open position until its upper face comes into contact with said spring element.

4,791,795

## VEHICLE ANTI-THEFT DEVICE

Edward J. Burgess, 52 Glendale Grove, Glasheen Road, Cork, and Timothy J. O'Sullivan, 3 Halcon Drive, Silversprings Tivoli, Cork, both of Ireland

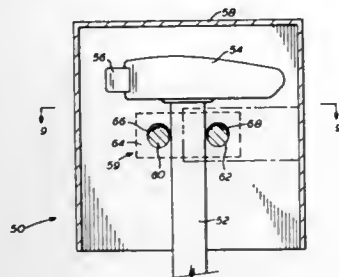
Filed Jan. 9, 1987, Ser. No. 60,103

Claims priority, application Ireland, Jul. 23, 1986, 1955/86

Int. Cl.<sup>4</sup> F16H 57/00

U.S. Cl. 70—202

12 Claims



1. A vehicle anti-theft device for a vehicle having a gear lever extending from a base, comprising:  
a removable housing for receiving and enclosing the gear

lever having a pair of opposed holes in mutual register therein to engage a retaining element;  
a housing retaining element including a bolt extendable through said holes and adapted to cooperate with the gear lever; and  
means for releasably locking the retainer element to the housing to inhibit movement of the gear lever including a barrel lock fixedly attached to the housing and adapted to lock the bolt in position to inhibit movement of the gear lever.

4,791,796

## TOOL FOR COLD FORGING TUBULAR MEMBERS

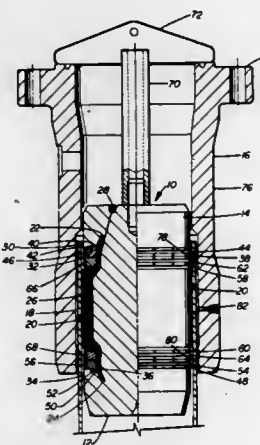
David L. Ford, Houston, Tex., assignor to Cameron Iron Works USA, Inc., Houston, Tex.

Filed Oct. 28, 1987, Ser. No. 114,422

Int. Cl.<sup>4</sup> B23D 17/00

U.S. Cl. 72—62

7 Claims



1. A tool for forging tubular members comprising  
a cylindrical body having a passage extending from its upper end and exiting at an intermediate position on its outer surface,  
an upwardly facing shoulder surrounding the lower portion of said body,  
a short downwardly facing flange on the upper exterior of said body and having its inner surface spaced radially outward from the exterior of the body,  
a short upwardly facing flange on the lower exterior of said body and having its inner surface spaced radially outward from the exterior of the body,  
a packer assembly surrounding said body and including a resilient sleeve,  
means securing the ends of the sleeve in sealed relationship to the exterior of said body within said flanges,  
a first upper expandable anti-extrusion ring surrounding the upper end of said sleeve,  
a first lower expandable anti-extrusion ring surrounding the lower end of said sleeve,  
a second upper expandable anti-extrusion ring surrounding the upper end of said sleeve immediately abutting the lower surface of said first upper anti-extrusion ring, and  
a second lower expandable anti-extrusion ring surrounding the lower end of said sleeve immediately abutting the upper surface of said first lower anti-extrusion ring.

4,791,797

## DENSITY NEUTRON SELF-CONSISTENT CALIPER

William C. Paske, Pearland; Paul F. Rodney, Spring, and Ray A. Roeder, Houston, all of Tex., assignors to NL Industries, Inc., New York, N.Y.

Continuation of Ser. No. 843,043, Mar. 24, 1986, abandoned.

This application Feb. 17, 1988, Ser. No. 161,227

Int. Cl.<sup>4</sup> E21B 49/00; G01N 5/00

U.S. Cl. 73—152

21 Claims



1. A system for determining the caliber of a borehole during drilling operations in an earth formation, comprising:  
first means adapted to make a first measurement of a first physical characteristic of an interior property of said formation;  
second means adapted to make a second measurement of a second physical characteristic of an interior property of said formation, said second physical characteristic being different from said first physical characteristic;  
means for determining the lithology of said formation; and  
means to compare said first and second measurements and to initiate an iteration process based at least in part upon the said determined lithology, to determine a self-consistent borehole caliber.

4,791,798

## APPARATUS FOR PRODUCING BASE MATERIAL FOR ALUMINUM FOIL

Tsuguichi Manabe, and Kohei Takase, both of Niigama, Japan, assignors to Sumitomo Heavy Industries, Ltd., Tokyo, Japan

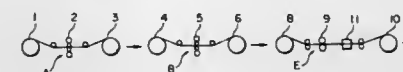
Filed May 20, 1987, Ser. No. 52,648

Claims priority, application Japan, May 21, 1986, 61-114665

Int. Cl.<sup>4</sup> B21B 1/30; C21D 8/02, 9/60

U.S. Cl. 72—202

2 Claims



1. An apparatus for producing aluminum strips which are used as the base material of aluminum foils, said apparatus comprising: a hot roughing mill, a cold finish rolling mill arranged downstream of said hot roughing mill; and a slitting and annealing apparatus comprising an uncoiler for uncoiling aluminum web which has been finished-rolled and coiled by said finish rolling mill, a multislitter for slitting the uncoiled aluminum web into a plurality of aluminum strips and an annealer disposed downstream of and in line with said multi-slit-

ter for annealing said slitted aluminum strips continuously passing therethrough.

4,791,799

## STRUCTURAL-SHAPE STEEL ROLLING MILL AND METHOD OF OPERATING SAME

Georg Engel, Kaarst, and Dietmar Kosak, Neuss, both of Fed. Rep. of Germany, assignors to SMS Schloemann-Siemag Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

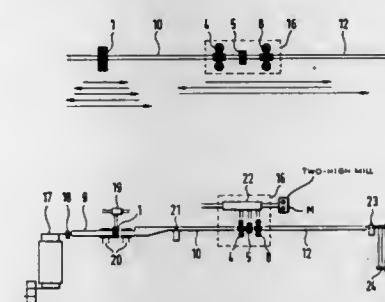
Filed Aug. 17, 1987, Ser. No. 86,762

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1986, 3627729

Int. Cl.<sup>4</sup> B21B 1/14, 13/10

U.S. Cl. 72—225

6 Claims



1. In a structural-shape steel rolling mill with a two-high reversing rough-rolling mill, at least one universal working rolling mill and at least one flanging edging rolling mill comprising a reversing tandem rolling mill group and a universal finishing rolling mill provided at the outlet end of said structural-shape steel rolling mill, the improvement wherein said reversing tandem rolling mill group located downstream of said reversing rough-rolling mill has one of said universal working rolling mills, one of said flanging edging rolling mills and said universal finishing rolling mill.

4,791,800

## ROLL FORMING PROCESS AND APPARATUS FOR MAKING RIBS IN STRIP MATERIAL

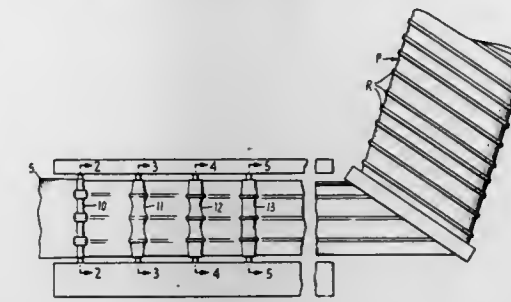
Robert D. Alexander, Fremont, Calif., assignor to Pacific Roller Die Co., Inc., Hayward, Calif.

Filed Oct. 26, 1987, Ser. No. 113,248

Int. Cl.<sup>4</sup> B21D 5/14, 13/10

U.S. Cl. 72—180

11 Claims



1. A roll forming process for making ribs in strip material to produce helical ribbed pipe and comprising the steps:  
roll forming at least one longitudinal area of curvature between two longitudinal flat areas,  
said flat areas having a width more narrow than said area of curvature, said longitudinal area of curvature being bowed downwardly from its center toward said longitudinal flat areas;



progressively roll forming said longitudinal areas of curvature into areas of lesser curvature and lesser arcuate length separated by ribs, each rib comprising a longitudinal flat area of narrower width and longitudinal side areas of relative flatness, then roll forming said areas of lesser curvature to longitudinal areas of relative flatness separated by substantially rectangular ribs; whereby strip material is initially gathered in longitudinal areas of curvature for use in forming the sides of one or more ribs with little or no thinning of the strip material.

4,791,801

# REVERSIBLE FUEL ASSEMBLY GRID TAB REPAIR TOOL

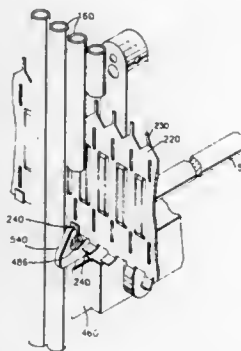
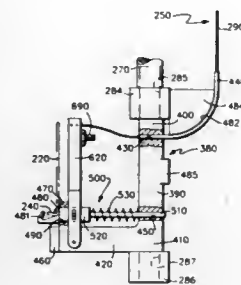
Arthur W. Kramer, Murrysville Boro, and Vytantas J. Mickus, Monroeville Boro, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Aug. 3, 1987, Ser. No. 80,928

Int. Cl.<sup>4</sup> G21C 19/00; B21D 9/00

U.S. Cl. 72-387

17 Claims



6. A fuel assembly grid tab repair tool for bending a grid tab attached to a grid strap surrounding a bundle of fuel rods, the grid strap connected to a fuel assembly grid, comprising:

- (a) a generally L-shaped frame having a first leg having a first end and a second end and having a second leg perpendicular to the first leg, the first leg having a first bore and a second bore therethrough parallel with the second leg, the second leg having a third bore therethrough aligned with the longitudinal axis of the second bore, the second leg having an anvil surface on the terminal end thereof;
- (b) an elongated member having one end slidably extending through the second bore and the third bore;
- (c) a hook-shaped, grid tab bending member connected to another end of said elongated member for bending the grid tab against the anvil surface;
- (d) positioning means connected to said frame, said positioning means capable of matingly abutting an edge of the grid

strap for positioning said tab bending member opposite the grid tab;

- (e) a lever member pivotally connected to said frame and attached to said elongated member for slidably urging said elongated member into the second bore and into the third bore, said lever member capable of urging said tab bending member against the grid tab when a force is applied against said lever member and when said tab bending member is positioned opposite the grid tab, said tab bending member exerting a bending moment on the grid tab when said tab bending member is urged against the grid tab, whereby the grid tab bends when said elongated member is urged against the grid tab by the pivoting action of said lever member; and
- (f) biasing means interposed between said frame and said tab bending member for biasing said tab bending member away from the anvil surface.

4,791,802

# INSTALLATION FOR THE REPAIR AND CHECKING OF VEHICLE BODIES

Germain Celette, 67, rue Maugiron, Vienne, Isere, France

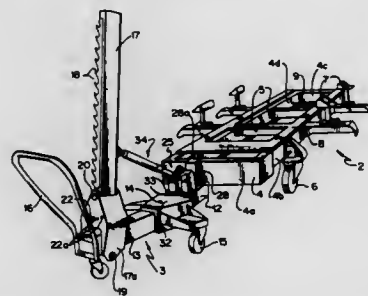
Filed Jun. 17, 1987, Ser. No. 63,169

Claims priority, application France, Jun. 17, 1986, 86 09143

Int. Cl.<sup>4</sup> B21D 1/12

U.S. Cl. 72-447

14 Claims



1. In an apparatus for the repair and checking of vehicle bodies, of the type including a bench having a rectangular frame and traction means having means for attachment to the bench, the improvement comprising:

- a plurality of tubular elongated members defining said frame, including a first pair of members extending in a parallel spaced relation defining first and second sides of said frame and a second pair of members extending between said first and second members defining third and fourth sides of said frame, at least one of said members having a projection near a lower surface thereof, said traction means including a base portion with connecting means mounted on said base portion near one end thereof and adapted for engagement with said projection on said one tubular member and locking means carried by said base near said one end and constructed and arranged for movement between locking and unlocking positions, said locking means when moved to said locking position engaging an outer surface of said one member near the top thereof, urging said one member into engagement with said connecting means, and means for maintaining said locking means at said locking position.

4,791,803

# DIE-CHANGE DEVICE FOR A MULTI-STAGE FORMING MACHINE

Joseph Broquet, Wahlen, Switzerland, and Raymond Schoenenberger, Rosnau, France, assignors to Hatebur Umformmaschinen AG, Switzerland

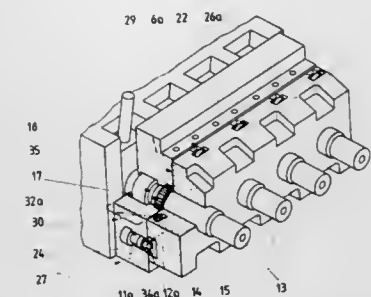
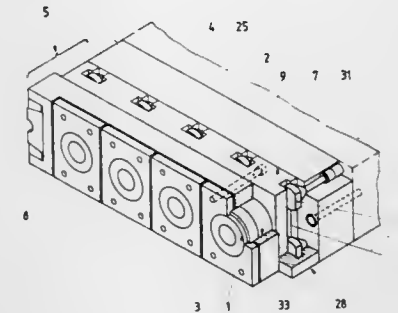
Filed Nov. 12, 1986, Ser. No. 930,339

Claims priority, application Switzerland, Nov. 28, 1985, 5089/85

Int. Cl.<sup>4</sup> B21D 37/04

U.S. Cl. 72-481

6 Claims



1. In a multi-stage forming machine for non-cutting shaping with cooperative male and female dies (13, 1 respectively) having respective longitudinal center axes, the male and female dies being in rows in respective male-die and female-die blocks, (14, 5), the forming machine having clamping means for clamping the male-die and female-die blocks (14, 5) into the forming machine, the improvement in the clamping means for clamping the male-die block (14) into the forming machine, comprising:

- a mounting plate (24) mounted on the forming machine and having one side for receiving a clamping face (29) of the male-die block (14), an opposite side, and coupling and clamping element means (35) respectively aligned with the longitudinal center axes of the male dies (13) when the clamping face (29) of the male-die block (14) is received on the one side of the mounting plate (24), each coupling and clamping element means (35) comprising:
- a hollow piston (16) guided through the mounting plate (24) for axial relative displacement away from the one side of the mounting plate (24), and having one end at the one side of the mounting plate (24);
- pressure-medium means (38) in the mounting plate (24) for so relatively displacing the hollow piston (16);
- bayonet fastening means (17) comprising a connecting sleeve (36) on the one end of the hollow piston (16) for joining the hollow piston (16) to a sleeve counterpiece (37) on one, rear end of the male die (13) at the clamping face (29) of the male-die block (14);
- an adjusting wedge (18) at the opposite side of the mounting plate (24) displaceable relative to the mounting plate (24) in the wedge direction thereof; and
- a thrust piece (19) relatively displaceable in the hollow piston (16) in a direction corresponding to the relative

displacement of the hollow piston (16) for engaging the one, rear end of the male die (13) at one end and the adjusting wedge at the opposite end when the bayonet fastening means (17) is joined to the sleeve counterpiece (37) of the male die (13) and the pressure medium means (38) has displaced the hollow piston (16) away from the one side of the mounting plate (24).

4,791,804

# METHOD OF TESTING A COLD GAS FOR THE PRESENCE OF A HAZARDOUS GAS

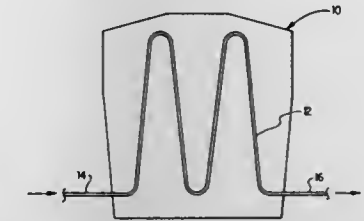
Helmuth W. Kutta, Richardson, and Orville C. Morrison, Dunsmuir, both of Tex., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 13, 1987, Ser. No. 107,195

Int. Cl.<sup>4</sup> G01N 33/00

U.S. Cl. 73-23

18 Claims



1. A method for testing a gas at a temperature below about -10 degrees F for the presence of a hazardous gas, said method comprising:

- (a) passing a quantity of said gas through a tubing positioned in a garment and near the inner surface of said garment so that body heat of a wearer of said garment is transferred to said gas flowing through said tubing to heat said quantity of gas with said body heat of said wearer of said garment; and
- (b) analyzing a portion of said heated quantity of gas for the presence of said hazardous gas.

4,791,805

# FUEL TANK LEAK DETECTION APPARATUS

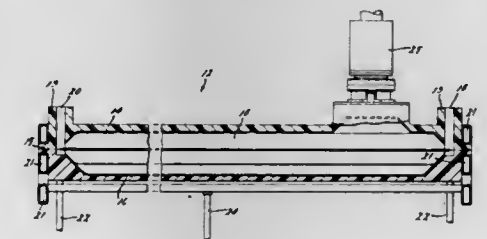
Donald C. Gates, Troy, Mich., assignor to Expertek, Inc., Detroit, Mich.

Filed Jun. 7, 1985, Ser. No. 742,462

Int. Cl.<sup>4</sup> G01M 3/20

U.S. Cl. 73-40.7

22 Claims

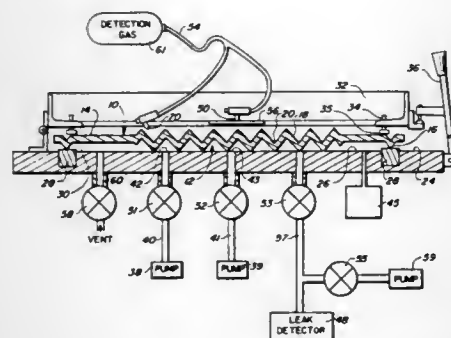


1. A method for detecting leaks in a fuel tank comprising the steps of loading said fuel tank into a substantially rigid vacuum chamber substantially conforming to the shape of said fuel tank;

- closing and sealing said vacuum chamber;
- sealing all ports of said fuel tank;
- evacuating said vacuum chamber;
- scavenging said vacuum chamber with filtered air;
- reducing the air pressure in said vacuum chamber rapidly by a first high-volume vacuum means, comparing the pres-

sure in said vacuum chamber with preset pressure of a second high-sensitivity vacuum means, and opening said second vacuum means to said vacuum chamber and closing said first vacuum means to said vacuum chamber when the pressure in said vacuum chamber is equal to the pressure in said second vacuum means; injecting a pressurized test gas into said fuel tank; and sensing the output of said second vacuum means with a test gas sensing means.

**4,791,806**  
**LEAK DETECTION SYSTEM**  
James H. Wade, P.O. Box 2556, Castro Valley, Calif. 94546  
Filed Oct. 23, 1987, Ser. No. 112,993  
Int. Cl.<sup>4</sup> G01M 3/20  
U.S. Cl. 73-40.7 15 Claims



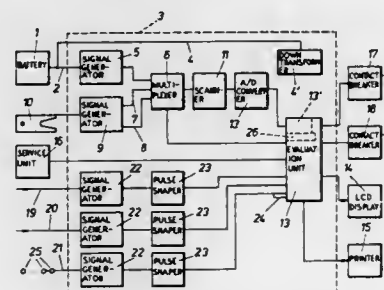
1. Apparatus for detecting leaks in a plate, such as a pasteurization plate, having an inner body portion defining a plurality of ribs and channels, an outer body portion disposed about said inner body portion, and a separating rib positioned between said body portions and extending continuously circumferentially about said inner body portion, said device comprising:  
a support for said plate, said support defining a support surface and a gasket extending outwardly from said support surface, said gasket adapted to engage the separating rib of said plate along the entire length of said separating rib with at least some of the plate inner body portion being spaced from said support surface;  
a member engageable with said plate on the side of said plate disposed away from said support surface for urging said separating rib and gasket together to form a seal therebetween whereby a substantially gas-tight chamber is formed between said inner body portion and said support surface, said member defining an open interior portion in at least partial registry with the plate inner portion whereby said plate inner portion is in communication with ambient atmosphere on the side of the plate disposed away from said support surface and whereby said plate may be manually accessed through said member open interior portion;  
vacuum pump means for pumping air from said chamber to form a vacuum within said chamber;  
means positionable within said member open interior portion and selectively moveable relative to said plate within said member open interior portion for directing a gas against the plate on the side of said plate disposed away from said support surface; and  
gas sensing means for sensing the presence of said gas in air pumped from said substantially gas-tight chamber.

**4,791,807**  
**APPARATUS FOR DETERMINING THE RELATIVE HARDNESS AND ABRASION RESISTANCE OF INDUSTRIAL FILM COATINGS AND LININGS**  
S. John Oechale, 3595 Netherfield Rd., Philadelphia, Pa. 19129  
Filed Nov. 4, 1986, Ser. No. 926,536  
Int. Cl.<sup>4</sup> G01N 3/46  
U.S. Cl. 73-78 6 Claims



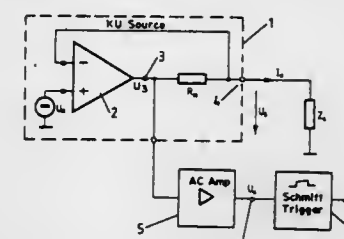
1. An apparatus for testing the relative hardness and abrasion resistance of industrial film coatings and linings, comprising:  
(a) a rigid handle having upper and lower surfaces;  
(b) an elongated, flat and flexible spring blade of predetermined length and spring constant;  
(c) means rigidly removably attaching said spring blade at one end to said handle and above the lower surface of said handle;  
(d) at least two points on said lower handle surface defining an acute angle with respect to said spring blade; and  
(e) a scoring stylus rigidly, dependently attached to the other end of said flexible spring blade.

**4,791,808**  
**METHOD OF DIAGNOSIS OF MULTI-CYLINDER INTERNAL COMBUSTION ENGINES AND MEANS FOR CARRYING OUT THE METHOD**  
Gerald Lackner, Graz, and Karl Simbürger, Kalsdorf, both of Austria, assignors to AVL Gesellschaft für Verbrennungskraftmaschinen und Messtechnik mbH. and Prof. Dr. Dr. h.c. Hans List, both of, Austria  
Filed Nov. 24, 1987, Ser. No. 124,586  
Claims priority, application Austria, Nov. 25, 1986, 3151/86  
Int. Cl.<sup>4</sup> G01M 15/00  
U.S. Cl. 73-117.3 22 Claims



1. A method, comprising the following steps:  
suppressing ignition of a multi-cylinder internal combustion engine;  
obtaining measurements of cylinder-specific operating characteristics of said engine;  
numbering said measurements;  
ceasing suppression of said ignition; and  
identifying said measurements with respective cylinders.

**4,791,809**  
**CIRCUIT ARRANGEMENT TO DETECT SIGNALS INDICATING A CHANGE IN CURRENT THROUGH A NEEDLE LIFT SENSOR OF AN INJECTION NOZZLE IN COMBUSTION ENGINES, WHICH IS CONNECTED TO A CONSTANT DIRECT VOLTAGE SUPPLY**  
Karl H. Schmidt, Vienna, Austria, assignor to Voest-Alpine Friedmann Gesellschaft M.B.H., Linz, Austria  
PCT No. PCT/AT86/00014, § 371 Date Nov. 17, 1986, § 102(e)  
Date Nov. 17, 1986, PCT Pub. No. WO86/05235, PCT Pub. Date Sep. 12, 1986  
PCT Filed Feb. 19, 1986, Ser. No. 933,221  
Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508335  
Int. Cl.<sup>4</sup> F02B 49/00  
U.S. Cl. 73-119 A 9 Claims

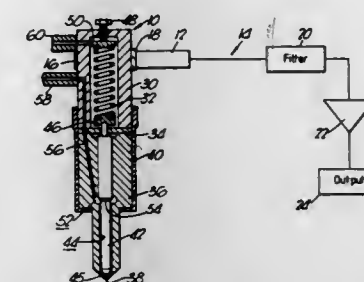


1. A control pulse generating circuit responsive to the position of a valve needle for indicating the position of the needle in a combustion engine fuel injector comprising:  
a reference voltage source; a regulating operational amplifier having a minus (-) input, a plus (+) input and a regulated output (3) supplying a regulating voltage, said reference voltage source being coupled to said plus (+) input; a sensing resistor connected at one end to said regulating output (3) and supplying a source voltage ( $U_s$ ) at the other end which defines a regulated voltage source output (4), said other end of said sensing resistor connected to said minus (-) input;  
a needle sensor, having a sensor impedance  $Z_s$ , operatively connected in a fuel injector such that the sensor impedance of said needle sensor changes between the open position of the valve needle of the fuel injector and the closed position of the valve needle of the fuel injector, said sensor being connected to said source output at the other end of said sensing resistor, to receive the source voltage and consuming a sensor current,  $I_s$ ;  
a band pass amplifier having an amplifier input and an amplifier output, said amplifier input being connected to said regulating output (3) having a voltage ( $U_3$ ), which is responsive to said sensor current, whereby an amplified voltage ( $U_6$ ) is provided to said amplifier output; and  
a Schmitt trigger, having a trigger input and a trigger output, said trigger input being coupled to said amplifier output to receive the amplified voltage ( $U_6$ ) so that the trigger output has pulses ( $U_4$ ) of varying width indicating the position of the valve needle of the fuel injector.

**4,791,810**  
**FLOW MONITORING**  
Charles F. Old, Wantage, and Christopher B. Scruby, Botley, both of England, assignors to United Kingdom Atomic Energy Authority, London, England  
Filed Apr. 17, 1987, Ser. No. 39,271  
Claims priority, application United Kingdom, May 1, 1986, 8610671  
Int. Cl.<sup>4</sup> G01M 15/00  
U.S. Cl. 73-119 A 3 Claims

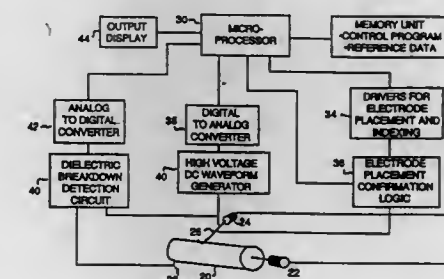
1. An injector monitoring apparatus, including a broad-band ultrasonic transducer sensitive to ultrasonic waves of frequencies throughout the range 100 kHz to 1 MHz, means for acoustically coupling the transducer to an injector, means for ampli-

fying noise signals from the transducer, for filtering out noise signals below a cut-off frequency of 100 kHz, and for generating an output signal representing the noise signals from the



transducer throughout a broad frequency band above the cut-off frequency, and means responsive to the output signal for indicating fluid flow through the injector.

**4,791,811**  
**DEPOSIT THICKNESS MEASUREMENT**  
James G. Barbee, San Antonio, Tex., assignor to Southwest Research Institute, San Antonio, Tex.  
Filed Jul. 29, 1987, Ser. No. 79,685  
Int. Cl.<sup>4</sup> G01M 15/00  
U.S. Cl. 73-119 R 7 Claims



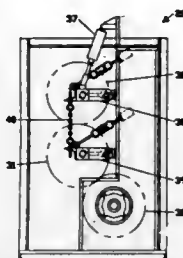
5. A method for determining the thickness of a layer of insulative material deposited on the surface of a metal tube, comprising the steps of:  
placing a first electrode in contact with the surface of said insulative layer at a plurality of locations on said layer;  
electrically coupling a second electrode with said conductive surface;  
creating a voltage between said first and second electrodes at each of said locations, said voltage being increased in a time-dependent, step-wise linear manner during the time that said first electrode is positioned at each location;  
measuring the voltage between said first and second electrodes at each said location and producing a plurality of output signals in response thereto;  
detecting dielectric breakdown of the deposit at each said location and correlating said output signal with the dielectric breakdown of said insulative deposit and producing a plurality of data signals corresponding to the voltage between said first and second electrodes at which point said dielectric breakdown occurred for each said location; and  
correlating said plurality of data signals with the thickness of the deposit at each said data point.



4,791,812  
**YARN INSPECTION SYSTEM**  
 Robert A. Kirby, Columbia, and Clifton L. Davis, Lagoff, both of S.C., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Sep. 8, 1983, Ser. No. 530,331  
 Int. Cl.<sup>4</sup> G01L 5/04  
 U.S. Cl. 73—160

12 Claims



8. In a yarn inspection system, comprising a source of yarn; a defect detector; a take-up stand; and a yarn repository; said source of yarn comprising multiple yarn packages, whereby during operation of said system yarn from said packages travels a yarn path as a yarn sheet past said detector, thence is conveyed to tow and passes through said take-up stand to said yarn repository; the improvement comprising:

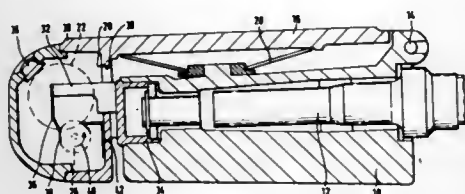
said take-up stand comprising a first roll, a second roll adjacent to said first roll, and a third roll adjacent to said second roll and remote from said first roll, at least one of said rolls being driven by a motor, each of said rolls being positioned for contact with any roll adjacent thereto with said yarn passing therebetween when said system is operational, said rolls being displaceable; roll displacement means comprising a first pivot arm connected to one of said rolls, means to rotate said first pivot arm and thus displace the roll to which it is connected, and a second pivot arm connected to a second of said rolls and to the first pivot arm, whereby rotation of said first pivot arm causes said second pivot arm to rotate and thus displace the roll to which it is connected; and a switch, said switch being closed when said rolls are positioned for contact with at least one other roll, said switch opening when said rolls are displaced to stop the driving motor.

4,791,813  
**APPARATUS FOR THE MEASUREMENT OF THE ENERGY EXPENDITURE AT AN OPERATING MEMBER**  
 Horst G. Kiffe, Vogelbeeweg 19, 7730 Villingen-Schwenningen, Fed. Rep. of Germany

Filed Aug. 28, 1987, Ser. No. 90,692  
 Claims priority, application Fed. Rep. of Germany, Sep. 17, 1986, 3631626

Int. Cl.<sup>4</sup> A61B 5/22; G01D 9/00  
 U.S. Cl. 73—379

9 Claims



1. Apparatus for measuring the energy expenditure at an operating member in contact with an actuating member in the form of a spring, of which the flexing movements are transmitted through a transmission assembly to a mechanical counting device, summed by it and displayed in energy units, wherewith

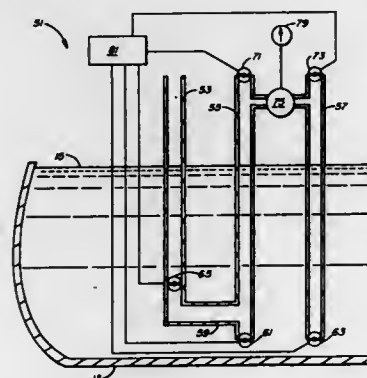
the transmission assembly includes a control member which works together with a control gear driving the counting device, of which the reverse motion is hindered by a ratchet device thereby characterized in that through the control member as small as desired flexing movements of the actuating member are transmittable to the control gear moving the control gear, such that the control gear engages the control member rotating the control gear, driving the counting device and displaying the energy expenditure in energy units.

4,791,814  
**SYSTEM AND METHOD FOR DETECTING LIQUID LEAKAGE IN STORAGE TANKS**  
 Victor W. Nee, South Bend, Ind., assignor to Environment and Safety, Inc., Santa Clara, Calif.

Filed Nov. 20, 1987, Ser. No. 123,323  
 Int. Cl.<sup>4</sup> G01N 3/26

U.S. Cl. 73—49.2

7 Claims

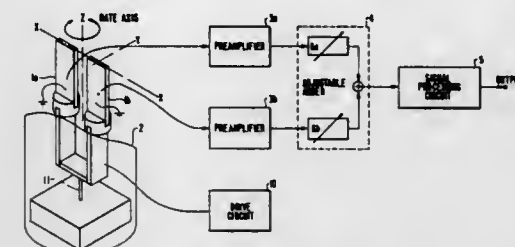


1. A method for detecting liquid leakage in underground storage tanks comprising the steps of:

- providing first, second and third vertically-disposed tubular members with the lower ends of the first and second tubular members connected by a fourth tubular member;
- submerging the lower ends of the first, second and third vertical-disposed tubular members in liquid in a storage tank and venting the upper ends of the first, second and third tubular members to the atmosphere within the tank so that the liquid level within the tubular members equals the liquid level within the tank;
- blocking flow through the lower end of the fourth tubular member;
- then closing the submerged end of the second tubular member while leaving the lower end of the third tubular member open to allow liquid to flow in and out of that open end and closing the upper ends of the second and third tubular members to prevent gas-flow communication between the interiors of the second and third tubular members and the atmosphere in the tank;
- sensing differentials in gas pressure between the interiors of the second and third tubular members with a differential pressure transducer and, thereby, indicating changes in the liquid level in the tank due to leakage.

4,791,815  
**CYCLICALLY DRIVEN GYRO AND ADJUSTING SYSTEM THEREFOR**  
 Hiroshi Yamaguchi, Kadoma; Sazushi Kimura, Toyonaka, and Yoshitake Hayashi, Kawachinagano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
 Filed Apr. 3, 1987, Ser. No. 33,761  
 Claims priority, application Japan, Apr. 11, 1986, 61-84534; May 29, 1986, 61-123907  
 Int. Cl.<sup>4</sup> G01P 9/04, 21/00  
 U.S. Cl. 73—505

3 Claims



- A cyclically driven gyro comprising: a pair of mass elements which are symmetrically driven cyclically in opposite directions with respect to each other;
- a pair of deflection detection means which independently detect forces acting on said pair of mass elements in response to an input angular rate and output deflection detection signals;
- an adjustable addition means which adds said deflection detection signals with a desired ratio and outputs an added signal said adjustable addition means being constituted so that contribution rates of said deflection detection signals with respect to the added signal vary in linkage in such manner that when one of the contribution rates is increased the other of the contribution rates decreases so as to keep a total gain of said adjustable addition means constant; and
- a signal processing circuit which processes said added signal to generate an output signal in proportion to the input angular rate.

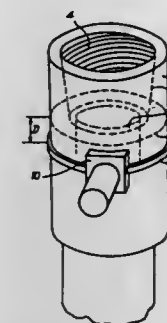
4,791,816  
**DEVICE FOR DETERMINING WHEN A THREADED TUBE JOINT WITH SCREW LIMITING STOP IS PROPERLY MADE UP**  
 Didier Grare, and Hervé Salkin, both of Aulnoye-Aymeries, France, assignors to Vallourec, Paris, France  
 Division of Ser. No. 785,397, Oct. 8, 1985, Pat. No. 4,700,576.  
 This application Aug. 27, 1987, Ser. No. 90,230  
 Claims priority, application France, Oct. 8, 1984, 84 15403  
 Int. Cl.<sup>4</sup> G01B 7/18

U.S. Cl. 73—761

3 Claims

- A device for determining when a threaded joint for steel tubes having a male element with external threads and a screw limiting stop and a female element with corresponding internal threads and a corresponding screw limiting stop is properly made up, said device comprising a strain gauge and means for applying said gauge on the external surface of said female

element beyond said screw limiting stop in the direction of the middle of the tube section comprising the female element, the

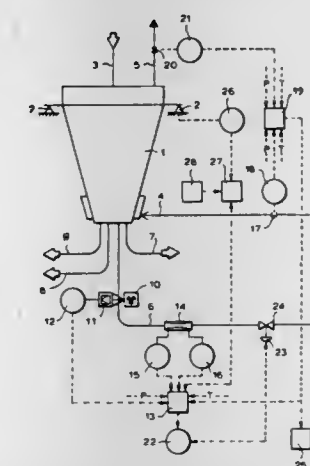


gauge measuring longitudinal deformations of the surface of said female element.

4,791,817  
**METHOD OF DETERMINATION AND MONITORING OF FUEL MASS STREAM**  
 Theodor Albertz, Kirchhellen; Theo Von Tolkecz, and Hans R. Baumann, both of Essen, all of Fed. Rep. of Germany, assignors to Krupp-Koppers GmbH, Essen, Fed. Rep. of Germany  
 Continuation-in-part of Ser. No. 571,518, Jan. 17, 1984, abandoned. This application Jul. 2, 1986, Ser. No. 881,102  
 Claims priority, application Fed. Rep. of Germany, Jan. 21, 1983, 3301936; May 5, 1983, 3316368

Int. Cl.<sup>4</sup> G01F 1/74  
 U.S. Cl. 73—861.04

3 Claims



- A method of determination and monitoring of a fuel mass stream supplied for partial oxidation of fine-grain up to pulverized fuel to a gasifier, with the utilization of a radiometric density measurement of the fine-grain up to pulverized fuel conveyed by a gaseous medium and a volume stream measurement, the method comprising the steps of determining a total density  $\rho_{tot}$  of a fuel stream conveyed by a fluidizing gas in an outlet conduit of a fuel bin with the aid of a radiometric density measurement; subsequently determining a total volume stream  $q_{vol}$  of said stream by a differential pressure measurement; determining a difference between volume streams of a fluidizing gas supplied to the fuel bin  $q_{gas\ supplied}$  and discharged from the latter  $q_{gas\ discharged}$  by differential pressure measurements; determining a volume stream of the fluidizing gas  $q_{gas}$  by deducting from said difference a volume stream of a gas part

$q'_{gas}$  required for filling of a space volume of a discharge fuel from the fuel bin in accordance with the following equation:

$$q'_{gas} = (q_{gas\text{ supplied}} - q_{gas\text{ discharged}}) - q'_{gas}$$

determining the volume stream of the gas part  $q'_{gas}$  in accordance with the following equation:

$$q'_{gas} = q'_{mK} \times \frac{\rho_{gas(b)}}{\rho_K}$$

wherein  $\rho_K$  is the density of the fuel,  $\rho_{gas(b)}$  is operational density of the fluidizing gas at a pressure and temperature in the fuel bin, and  $q'_{mK}$  is the fuel volume stream determined by weighing in the fuel bin; and determining from a density of the fluidizing gas  $\rho_{gas}$  as a material-dependent constant and from the thus obtained values the fuel mass stream  $q_{mK}$  in accordance with the following equation:

$$q_{mK} = (\rho_{fuel} q_{fuel}) - (\rho_{gas} q_{gas})$$

#### 4,791,818 CANTILEVER BEAM, INSERTABLE, VORTEX METER SENSOR

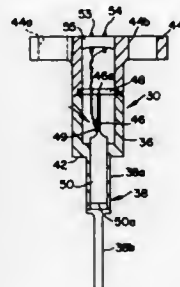
Paul M. Wilde, Long Beach, Calif., assignor to ITT Corporation, New York, N.Y.

Filed Jul. 20, 1987, Ser. No. 75,796

Int. Cl. G01F 1/32

U.S. Cl. 73-861.24

8 Claims



1. A vortex fluid flowmeter comprising:  
housing means having a conduit for fluid flow therethrough, said housing means including a bluff body extending through said housing means into said conduit; receptacle means being formed in said bluff body and having shoulder means;  
sensor body means having bearing means forming a bearing surface, said sensor body means being receivable within said receptacle means with said bearing surface on said shoulder means, said sensor body means having a hollow interior portion;  
means for securing said sensor body means to said housing means;  
first beam means affixed to said sensor body means in general alignment therewith and having a vane portion extending into said conduit for contact with the fluid flow therein, said first beam means having an at least partially hollow portion;  
second beam means in spaced relation within the at least partially hollow portion of said first beam means, said second beam means being secured to said sensor body means at a point adjacent the bearing surface; and  
flexure sensing means secured to said second beam means for providing a signal indicative of the flexing of said first beam means upon flow of fluid through said conduit, said flexure sensing means includes a bar-shaped strain gage beam member having one end fixed to said second beam means and the other end, being a free end, fixed by a

flexible link member secured to an interior wall portion of said sensor body means, and electrical sensing means located on the elongated portion of said bar shaped beam member.

#### 4,791,819 METHOD AND APPARATUS FOR MAKING COMPARATIVE ACOUSTIC MEASUREMENTS

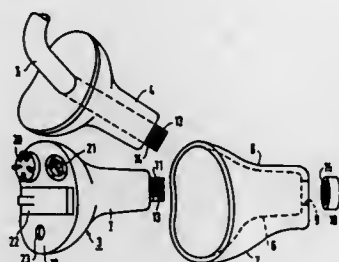
Bernad Goschke, Hessdorf-Hannbert, and Peter Nasaler, Eckental, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Apr. 9, 1987, Ser. No. 36,390  
Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3614131

Int. Cl. H04R 29/00

U.S. Cl. 73-865.8

1 Claim



1. The method for identifying and testing a hearing aid suitable for an auditory canal of the ear of a hearing-impaired person on the basis of an acoustic comparison between an in-the-ear hearing aid and a behind-the-ear hearing aid by using an ear adapter, comprising the following steps:

- constructing a single optoplastic ear adapter (7) which has an outside contour which has the shape of said auditory canal of said ear, said adapter having a hollow interior (6) that encloses a sound-diverting opening (9),
- alternately inserting said in-the-ear hearing aid (3) as a first insert part and a coupling means for said behind-the-ear hearing aid (24) as a second insert part into the hollow interior of said optoplastic ear adapter (7) such that said in-the-ear hearing aid of said behind-the-ear hearing aid is in acoustic communication with said sound-diverting opening,
- inserting said optoplastic ear adapter together with said in-the-ear hearing aid or together with said coupling means for said behind-the-ear hearing aid into said auditory canal of said ear,
- making an acoustic measurement with one hearing aid;
- removing the first or second insert part from the optoplastic ear adapter (7) and inserting the second or first insert part of the other hearing aid, into said optoplastic ear adapter (7),
- making an acoustic measurement with the other hearing aid,
- and comparing the acoustic measurements made with the in-the-ear hearing aid and the behind-the-ear hearing aid.

#### 4,791,820 APPARATUS MODULE FOR COLLECTION OF VOLATILES FROM TEST SAMPLE

Lowell J. Lawrence; Scott R. Hamann; Abbe L. Kesterson, all of Lexington, Ky., and Luis O. Rufo, Berkeley, Calif., assignors to Pharmacology & Toxicology Research Laboratory, Lexington, Ky.

Filed Jul. 31, 1987, Ser. No. 80,621

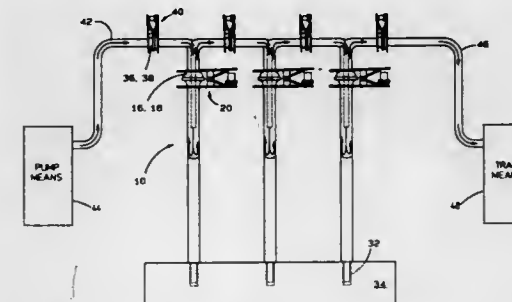
Int. Cl. G01N 1/26

U.S. Cl. 73-863.21

10 Claims

1. An apparatus module for collection of volatiles from a test sample, comprising:

transparent vessel means for holding a test sample;  
vapor collection adapter means for sealingly engaging and closing said vessel means;  
means for sealingly connecting said module in series with another module holding a test sample; and  
means for mounting said vessel means so as to substantially



avoid any obstruction to the passage of light to said test sample in said vessel means;  
whereby volatiles produced over time by the test samples in said module and said another module may be collected and analyzed, and the test sample in said module may be periodically analyzed substantially without disturbing the test sample in said another module in said series.

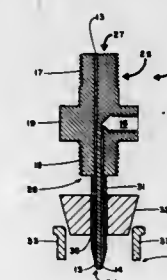
#### 4,791,821 SAMPLE INJECTION MEANS

R. Wilson Spencer, P.O. Box 22586, Houston, Tex. 77227  
Continuation-in-part of Ser. No. 720,166, Apr. 5, 1985, Pat. No. 4,651,574. This application Mar. 17, 1987, Ser. No. 26,824  
The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.

Int. Cl. G01N 1/10

U.S. Cl. 73-864.74

8 Claims



1. A sample injection means, comprising a single vented needle having a unitary body, said body having an upper end and a lower end, a needle shaft extending from said lower end, said shaft having a tip thereon, an injection passageway running axially through said body and communicating between the exterior of said upper end and the exterior of said tip, and a vent passageway, running through said body and communicating between an endpoint located on the exterior of said tip and the exterior of said body above said endpoint and below the exterior of said upper end, when in use said upper end being connected to a valve and said lower end being connected to a receptacle for receiving samples.

#### 4,791,822 CELL ASSEMBLY FOR DETERMINING CONDUCTIVITY AND PERMEABILITY

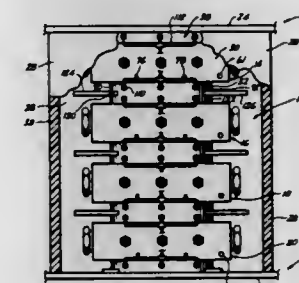
Glenn S. Penny, Duncan, Okla., assignor to Stim Lab, Inc., Duncan, Okla.

Filed May 20, 1987, Ser. No. 52,458

Int. Cl. E21B 43/267

U.S. Cl. 73-865.6

11 Claims



1. A cell assembly for determining the conductivity and permeability of proppants in simulated subterranean formations, the cell assembly comprising a plurality of vertically stacked cell units, and comprising:

- a plurality of cell body members, each cell body member having a passageway extending therethrough, a fluid inlet port formed in one end thereof and a fluid outlet port formed in an opposed end thereof, the inlet and outlet ports communicating with the passageway;
- a plurality of lower piston members, each lower piston member having an upper portion and an opposed lower portion, the lower piston member connected to one of the cell body members such that the upper portion extends a selected distance into a lower portion of the passageway thereof, and the lower portion extends outwardly from the cell body member;
- first shim means disposed within the passageway of each cell body member adjacent the upper portion of the lower piston member extending therein for forming a fluid-tight seal with the cell body member;
- second shim means disposed within an upper portion of the passageway of each cell body member for forming a fluid-tight seal with the cell body member, the second shim means disposed in a substantially parallel, spatial relationship with the first shim means in the passageway so that a proppant pack cavity is formed therebetween in each cell body member; and

an upper piston member having an upper portion and an opposed lower portion, the lower portion of the upper piston member positionable in the upper portion of the passageway in an abutting relationship with the second shim means in the uppermost disposed cell body member such that the upper portion thereof extends outwardly from the uppermost cell body member, the upper piston member vertically movable within the passageway of the uppermost cell body member in response to force imparted thereto, the plural cell units vertically stacked so that each cell body member below the uppermost cell body member is engaged by the lower portion of the lower piston member thereabove, such lower piston member being positionable in the upper portion of the passageway in an abutting relationship with the second shim means disposed therein, the upper piston member extensive from the uppermost cell body member and the lower piston member connected to the lowermost cell body member cooperating to receive compressive force thereon to impart compressive force throughout the cell units.



4,791,823

## VOLTAGE DETECTOR APPARATUS

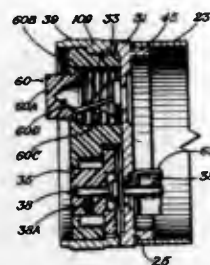
Robert A. Williams, 2721 White Settlement Rd., Fort Worth, Tex. 76107

Filed Jul. 13, 1987, Ser. No. 72,998

Int. Cl.<sup>4</sup> F16H 35/18; G05G 1/10; G01D 13/12

U.S. Cl. 74—10.8

4 Claims



1. Apparatus for turning a knob of a device, comprising:
  - a housing member having first and second ends, mount means secured to said first end of said housing member with a front side facing outward thereof,
  - a knob having a stem extending from one end and a gear means, with teeth, secured to and extending radially outward from said knob,
  - an aperture formed through said mount means for receiving said stem of said knob with said knob located on the front side of said mount means near one edge thereof,
  - a generally cylindrical shaped face member having an inner side secured to the front side of said mount means and an outer side facing outward thereof,
  - said face member having an opening formed therethrough for receiving said knob and said gear means such that said knob may be viewed in said opening from the outer side of said face member with said opening of said face member extending to one edge thereof such that a portion of said gear means is accessible from said one edge of said face member,
  - an annular member located around said face member and supported by said face member for rotation in opposite directions relative to said face member,
  - said annular member having gear teeth which mesh with the teeth of said gear means for causing said gear means and hence said knob to rotate when said annular member is rotated relative to said face member.

4,791,824

## HYDRAULIC ASSISTED MACHINE

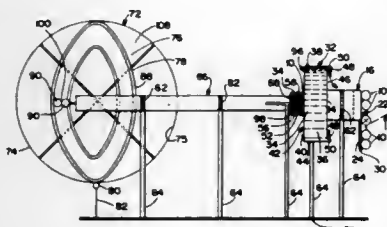
Neculai A. Nicolau, Athens, Ga., assignor to Delphin Corporation, Washington, D.C.

Filed Jan. 28, 1987, Ser. No. 7,573

Int. Cl.<sup>4</sup> F16H 25/08; F15B 15/10

U.S. Cl. 74—55

29 Claims



1. A hydraulically assisted power transfer device comprising:
  - a first reservoir cylinder having a rigid base and an axial aperture formed in said rigid base, a resilient force receiving

ing surface on the opposite end thereof from said base, and a sidewall connecting said base and said force receiving surface;

a second reservoir, having a base with an axial aperture, a force transferring surface disposed at the opposite end thereof from said base, and a sidewall connecting said base and said force transferring surface wherein said first and second reservoirs together define a closed fluid container, wherein said axial aperture of said base of said first reservoir is in fluid connection with said axial aperture of said base of said second reservoir and wherein said second reservoir has a smaller diameter than said first reservoir; power conversion means for converting rotational force into reciprocating force wherein the reciprocating output of said power conversion means is mechanically connected to said force receiving surface of said first reservoir.

4,791,825

## TRANSAXLE

Roland L. von Kaler, Tecumseh, Mich., assignor to Tecumseh Products Company, Tecumseh, Mich.

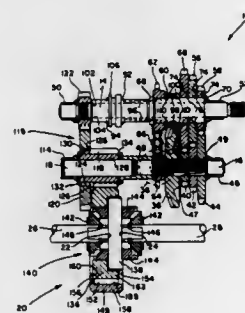
Division of Ser. No. 395,800, Jul. 6, 1982, Pat. No. 4,480,501.

This application Jul. 27, 1984, Ser. No. 634,957

Int. Cl.<sup>4</sup> F16H 3/08

U.S. Cl. 74—371

10 Claims



1. In a transmission including a housing, a shaft journaled in said housing and having an axially disposed groove in the outer surface thereof, a plurality of forward gears and a reverse gear freely journaled on said shaft and having respective key-engaging slots in respective bores therein, a key member selectively slideable in said axially disposed groove and having an end portion yieldably biased radially outwardly from said shaft outer surface, said key member end portion having separate engagements with respective said key-engaging slots of said forward gears then said key member is axially shifted to thereby drivingly engage a selected forward gear to said shaft, and shift means for axially sliding said key member in said axially disposed groove, the improvement comprising:

said reverse gear being separately engageable by said key member end portion engaging its key-engaging slot, and a neutral gear position collar member disposed on said shaft in abutment against said reverse gear and one of said forward gears, and having key-receiving detent means in a bore therein, said key-receiving means being formed to receive said end portion of said key member therein when said key member is shifted between said reverse gear and said forward gears, thereby maintaining said key member in a positive neutral position on said shaft.

4,791,826

## GEARSHIFT KNOB JOINING ARRANGEMENT

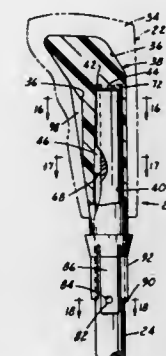
William L. Behrens, Troy, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.

Filed Nov. 19, 1987, Ser. No. 122,871

Int. Cl.<sup>4</sup> G05G 1/06, 9/12

U.S. Cl. 74—473 R

3 Claims



1. An arrangement for joining a handgrip knob of plastic material to a metal gearshift lever rod comprising:

a metal lever rod having a circular cross-section and formed with a uniform rectangular cross-sectioned linear keyway extending axially from the rod upper free end a predetermined minimal distance, said keyway having opposed parallel sides and a base such that the linear juncture of each said side with said cylindrical surface defining an axially extending sharpened cutting edge;

said handgrip knob in the form of a sub-assembly including an outer hollow plastic grip member enclosing an inner plastic core member, means attaching said inner and outer members together in fixed relation;

said inner core member having an axially extending tubular portion defining a downwardly opening blind bore having a closed end formed with a stop button, said stop button located a predetermined axial distance from said bore opening, said stop button defining a substantially concentric space intermediate said bore closed end and said stop button;

said blind bore formed with a rectangular cross-sectioned linear key extending upwardly a predetermined axial distance from its initial lower terminus, located intermediate the bore open and closed ends, to its upper terminus, located at said bore closed end, said linear key having parallel side portions and a crest defining a plane parallel to the principal axis of said blind bore;

the junctures of each said key side portion with the internal surface of said bore defining an axially extending internal fillet, each said fillet being uniformly tapered from a maximum chordal distance at said key lower terminus to a minimum chordal distance at said key upper terminus;

said key sized at said lower terminus to readily accept and align said rod keyway after said rod upper free end being slidably inserted in said bore, and whereby upon continued axial force being exerted driving said rod toward said bore closed end causing said pair of keyway sharpened cutting edges to deform and cut their associated fillets such that upon said rod free end abutting against said stop button said rod keyway cutting edges and said bore key fillets tightly wedged so as to be locked in an interference fit manner obviating relative rotational movement between said rod and said core member.

4,791,827

## CAM DEVICE FOR PRESSURE REGULATING VALVE

Shigeo Takahashi, Aichi, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

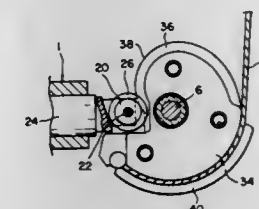
Filed Sep. 29, 1986, Ser. No. 912,539

Claims priority, application Japan, Sep. 30, 1985, 60-216975

Int. Cl.<sup>4</sup> F16H 53/00

U.S. Cl. 74—567

12 Claims



1. A cam apparatus for a pressure regulating valve including:
  - a roller having a roller surface and being rotatably supported at an end of a plunger of the pressure regulating valve;
  - a plate cam having a cam surface in contact with said roller;
  - a wire for rotating said plate cam;
  - said plate cam further comprising at least two side plates coaxially disposed and secured to each other, at least one of the side plates having a hub portion bent from the side plate at a central portion thereof for rotatably supporting the plate cam on a support axle, one of said cam surface and said roller surface being a concave circumferential surface and the other of said cam surface and said roller surface being a convex circumferential surface;
  - said plates forming a circumferentially extending groove for receiving said wire wound therein on a remaining circumferential portion of the plates other than the cam surface for rotating the plate cam.

4,791,828

## CRANK HANDLE APPARATUS

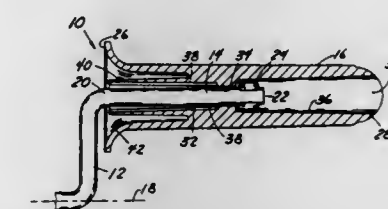
Paul S. Kaye, Racine, Wis., assignor to Lewisan Products, Inc., Racine, Wis.

Filed Mar. 7, 1988, Ser. No. 165,182

Int. Cl.<sup>4</sup> G05G 1/00

U.S. Cl. 74—545

19 Claims



1. Crank handle apparatus for turning about a main axis comprising:

- a rod extending along an axis substantially parallel to the main axis from a proximal end to a distal end, the rod of first cross-section and having protrusion means near the distal end which extend radially beyond the first cross-section;
- a handle rotatably mounted on the rod with an inner end near the proximal end, an opposite outer end, and a passageway receiving the rod and including in series:
  - a proximal portion extending from the inner end having a keyway means therealong dimensioned to receive the protrusion means during assembly,
  - a middle retaining portion ending the keyway, and
  - a distal portion of second cross-section larger than the

middle portion to accommodate therein the protrusion means in any rotational position.

4,791,829

## FLYWHEEL WITH DYNAMIC DAMPER

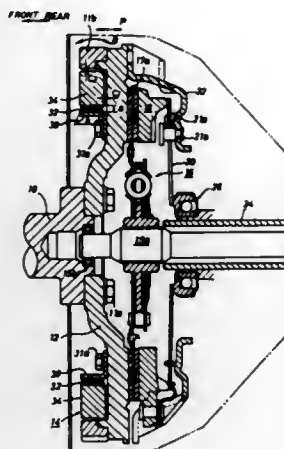
Hirotsuka Fukushima, Hirakata, and Toru Hamada, Takatsuki, both of Japan, assignors to Kabushiki Kaisha Daikin Seisakusho, Osaka, Japan

Continuation of Ser. No. 835,920, Mar. 4, 1986, abandoned. This application Oct. 19, 1987, Ser. No. 112,009

Claims priority, application Japan, Mar. 19, 1985, 60-55023 Int. Cl.<sup>4</sup> F16F 15/10

U.S. Cl. 74—574

8 Claims



1. A flywheel in combination with a dynamic damper having an elastic member, said elastic member having a shape and being formed from a material which can dampen all the vibrations transmitted from a crank shaft to the flywheel, said dynamic damper is fixed to an engine side face of the flywheel which is rigidly fastened to the engine crank shaft, and an annular weight having a specified mass, said annular weight being floatingly supported, at an inner peripheral face, through the elastic member so as not to contact with the flywheel, the elastic member being a solid annular rubber ring which is continuous over the entire inner circumferential periphery of the weight.

4,791,830

## BALANCER OF RECIPROCATING MACHINE

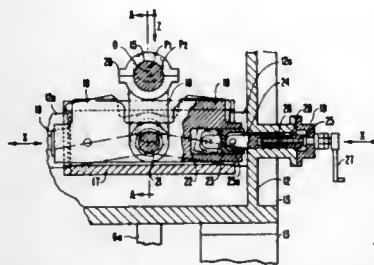
Michimori Yamamoto, Shozo Tashiro, Satoshi Sakane, Toshiro Morita, Hiroshi Shiota, Tadashi Rokkaku, and Keiichi Katayama, all of Hiroshima, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 17, 1986, Ser. No. 945,294

Claims priority, application Japan, Feb. 17, 1986, 61-30936 Int. Cl.<sup>4</sup> B30B 5/00

U.S. Cl. 74—603

7 Claims



1. In a balancer for balancing the unbalanced inertia force of

a reciprocating machine of the type including a reciprocating member for converting rotary motion into reciprocating motion by the use of a first crank mechanism, said balancer including at least one supporting balance weight on a reciprocating portion of a second crank mechanism for said balancer that has an eccentric setting angle shifted 180° in phase with respect to the eccentric angle of the first crank mechanism, the improvement comprising:

at least one adjusting weight having a first end supported by said reciprocating portion of said second crank mechanism; an adjusting weight supporting means for rotatably supporting a second end of said adjusting weight with respect to a stationary portion of a body frame; and weight support position altering mechanism means fixedly mounted on said stationary portion of said body frame for selectively altering the position of support of said second end of said adjusting weight by said adjusting weight supporting means and thereby for adjusting the distance between the positions of support at said first and second ends of said adjusting weight.

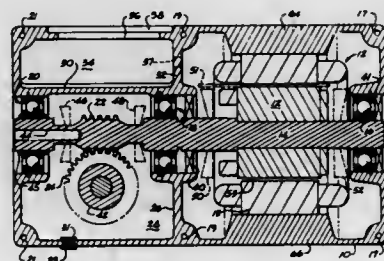
4,791,831

GEARMOTOR, HOUSING AND ASSOCIATED METHOD  
Edward Behnke, Taylors, S.C., and Joseph E. Dickey, Columbus, Ind., assignors to Reliance Electric Company, Greenville, S.C.

Filed Oct. 11, 1985, Ser. No. 786,600  
Int. Cl.<sup>4</sup> F16H 57/02, 1/12

U.S. Cl. 74—606 R

32 Claims



1. An integral gearmotor, comprising:  
a unitary sealable housing formed with two facing members which extend the full longitudinal length of said housing and are joined along a longitudinal axis of said housing, said facing member defining a longitudinal bore of substantially constant diameter for supporting a common shaft and bearings therefor in coaxial alignment, and said housing further defining at least two interior chambers substantially separated by a wall, such wall having at least one opening therein for establishing a passage between such two chambers;  
a motor having a rotor assembly said motor being received substantially in one of said two chambers of said unitary housing;  
stator locating means and respective stator windings supported thereon situated in said one of said two chambers, with said stator locating means supported on inside walls of said unitary housing such that said stator windings supported thereon cooperate with said rotor assembly;  
a common shaft, axial with said motor and extending outwardly therefrom, from said one chamber, and through said wall opening, so as to extend substantially the length of said housing and so as to simultaneously reside in both of said two chambers of said housing, and be disposed within said rotor assembly and attached thereto;  
a first gear secured to said common shaft along an extended portion thereof in the other of said housing chambers;  
a plurality of bearing assemblies axially spaced within said

unitary housing, for rotatably supporting said common shaft at respective points near each end thereof and at a point between said first gear and said rotor assembly, and for limiting axial movement of said common shaft;  
an output shaft; and  
a second gear received in said other housing chamber and operatively engaged with said first gear and drivingly coupled with said output shaft so as to drive said output shaft upon turning of said first gear.

4,791,832

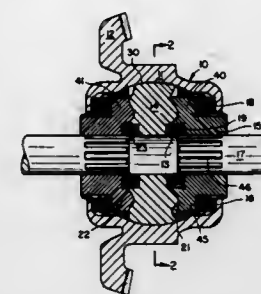
## CAGED HELICAL GEAR DIFFERENTIAL

Thomas M. McCaw, 512 Lingle Ave., Lafayette, Ind. 47901  
Filed Dec. 5, 1985, Ser. No. 805,312

Int. Cl.<sup>4</sup> F16H 1/38

U.S. Cl. 74—715

17 Claims



10. A torque proportioning differential comprising a differential case enclosing first and second helical face side gears coaxially mounted in meshing engagement with a plurality of helical pinions, a pinion cage, said pinion cage being separate from said differential case, said pinion cage having stubs extending radially off the outer diameter thereof, said stubs engaging said differential case for nonrotatively connecting said pinion cage to said differential case, said pinion cage having two sides, each of said sides having an annular channel therein, the helical faces of said first and second helical face gears extending respectively into said annular channels, said pinion cage having holes, the axes of said holes extending substantially perpendicular to the axis of rotation of said side gears, said holes opening into said annular channels in said sides of said pinion cage, and said helical pinions being mounted in said holes in said pinion cage for rotation therein.

4,791,833

## REDUCTION GEAR MECHANISM FOR MOTOR-DRIVEN DRILL INCORPORATING SPEED CHANGING MECHANISM

Yasuharu Sakai, Shinichi Segawa, and Tadashi Yasui, all of Kyoto, Japan, assignors to Japan Storage Battery Co., Ltd., Kyoto, Japan

Continuation of Ser. No. 754,489, Jul. 12, 1985, abandoned. This application Jun. 30, 1987, Ser. No. 68,755

Claims priority, application Japan, Jul. 16, 1984, 59-143291; Oct. 11, 1984, 59-213225

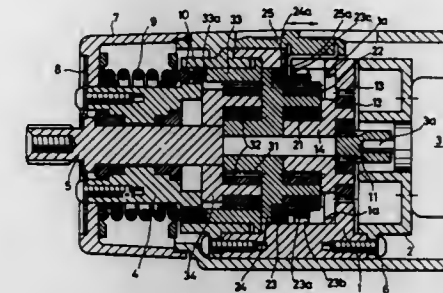
Int. Cl.<sup>4</sup> F16H 3/44

U.S. Cl. 74—769

4 Claims

1. In a reduction gear mechanism with a speed changing mechanism for a motor-driven drill including a gear case, at least one planetary speed reducer comprising a sun gear to which rotation of an electric motor is transmitted, a plurality of planet gears arranged around said sun gear and engaged with said sun gears, an internal gear internally engaged with said planet gear, and a planet gear holding plate which rotatably supports said planet gears on one side thereof and has an output shaft on the other side thereof, the improvement wherein:  
said internal gear of at least one planetary speed reducer comprises a slidably mounted cylindrical internal gear, said cylindrical gears comprising a set of internal gear

teeth engaged with said planet gear and a set of outer gear teeth, an annular groove being formed in an outer surface of said internal gear;  
said planet gear holding plate has a set of gear teeth engaged with said internal gear teeth of said internal gear in a first position of said internal gear to allow said internal gear to rotate with said planet gear holding plate;  
a separate set of fixed teeth is fixed to a structure within which said sun gear rotates, and said set of outer gear teeth of said internal gear is engaged in a second position of said



internal gear with said fixed teeth to rotatably lock said internal gear,  
and wherein there is provided a lever for sliding said internal gear between said first and second position, said lever extending in a semicircle around said internal gear, said gear case extending circumferentially around said internal gear, said lever being pivotally mounted to said gear case, and said lever having pins on opposite sides thereof passing through windows in said gear case and slidably received in said annular groove at opposed points around the circumference of said internal gear.

4,791,834

## PRESSURE METERING CORK EXTRACTOR

George J. Federighi, 70 - 13th St., San Francisco, Calif. 94103  
Filed Nov. 3, 1986, Ser. No. 926,336

Int. Cl.<sup>4</sup> B67B 7/08

U.S. Cl. 81—3.2

6 Claims



1. In a device for extracting a cork from a bottle or the like, the device having a needle proportioned for penetration through the cork and defining a fluid passage, a pressurized fluid container containing a first volume of said fluid in liquid form and a second volume of said fluid in gaseous form, said gaseous volume of said fluid being at the upper region of said container when said device including said container and said needle are in an upright operating orientation, a valve connected between the pressurized fluid container and the needle



passage and control means for selectively opening the valve to admit pressurized fluid into the bottle through the needle passage, the improvement comprising:

said valve being a metering valve having means for releasing only a predetermined volume of said pressurized fluid into said needle passage in response to each opening of said valve, and wherein said valve has a fluid inlet situated within said first volume of fluid in when said device is at said upright operating orientation whereby said valve receives said fluid from said container in liquid form.

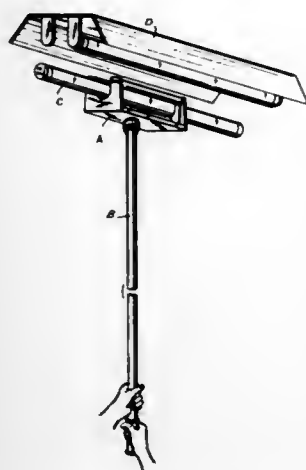
**4,791,835**  
**DEVICE FOR INSTALLING OR REMOVING**  
**FLUORESCENT TUBES FROM LIGHTING FIXTURES**  
Henry M. Unger, Weston, and Michael Vorobyov, Bethel, both of Conn., assignors to Unger Licensing Ltd., Mount Vernon, N.Y.

Continuation-in-part of Ser. No. 57,297, Jan. 1, 1987. This application Mar. 16, 1988, Ser. No. 168,980

Int. Cl.<sup>4</sup> B25B 13/00

U.S. Cl. 81—53.12

7 Claims



1. A device for use in installing and removing fluorescent tubes from a lighting fixture, comprising:

- a cylindrical post having means for rigidly attaching said cylindrical post to a pole;
  - a cradle journaled on said cylindrical post for relative rotational movement between said post and said cradle;
  - a gear rigidly affixed to said post at an end thereof extending through said cradle;
  - a complementary mating gear rigidly affixed to a shaft journaled for rotation in said cradle and having its axis extending perpendicular to the longitudinal axis of said cylindrical post;
  - frictional drive rollers rigidly affixed to said shaft for rotation in unison therewith;
  - means carried by said cradle for detachably holding a fluorescent tube within said cradle and in frictional engagement with said drive rollers; and
  - friction producing means interposed between said cylindrical post and said cradle, said friction producing means permitting rotation of said post relative to said cradle when said cradle is held against rotational movement and promoting rotational movement of said cradle in unison with rotational movement of said post when said cradle is freed from rotational restraint;
- whereby, at the times said cradle is rotationally restrained, rotation of said cylindrical post and said pole will produce rotational movement of said frictional drive rollers about their longitudinal axis, and will in turn produce rotational movement of said fluorescent tube about its longitudinal axis within said cradle.

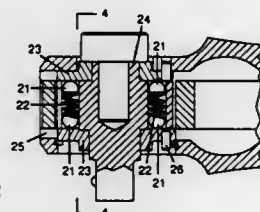
**4,791,836**  
**RATCHET MECHANISM**  
Marcel P. D'Haem, New Hartford, and Pradip K. Paul, Whitesboro, both of N.Y., assignors to Chicago Pneumatic Tool Company, Utica, N.Y.

Filed Apr. 1, 1987, Ser. No. 34,083

Int. Cl.<sup>4</sup> B25B 13/46

U.S. Cl. 81—57.39

3 Claims



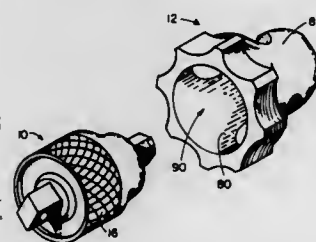
1. An improved ratcheting mechanism for use in a ratchet wrench having a housing, a crankshaft within the housing, a ratcheting yoke driven by the crankshaft, and a shank spindle driven by a ratchet pawl, said ratchet said being driven by the ratcheting yoke, the improvement comprising a plurality of springs, each mounted in a through hole in the shank spindle, a ball located at each end of the springs, and non-rotatable washers abutting the balls and mounted between the housing yoke and the shank spindle on respective sides of the spindle.

**4,791,837**  
**SPEED WRENCH AND HAND GRIP COMBINATION**  
Harvey M. Main, P.O. Box 376, South Fork, Colo. 81154  
Filed Oct. 16, 1986, Ser. No. 919,838

Int. Cl.<sup>4</sup> B25B 13/46

U.S. Cl. 81—63.1

16 Claims



1. In a tool adapted to rotatably drive a work piece wherein said tool includes a casing which mounts a drive mechanism having a drive member that projects axially from one side of the casing and that is adapted to selectively engage the work piece whereby rotation of said casing rotates said work piece, the improvement comprising a drive head rigidly attached to said tool and projecting axially from said casing on a second side thereof opposite said drive member, said drive head having a raised surface generally in a plane transverse to the common axis of said drive member and said drive head and having a plurality of flat exterior sides oriented along exterior planes which are parallel to said common axis, at least some of said exterior sides being parallel to one another, said drive head having an axial cavity formed in said raised surface, said cavity having a plurality of flat interior sidewalls oriented along interior planes which are parallel to said common axis, a bail member, extending across said casing on the second side thereof with said bail member having radial edges attached to an outer edge area of said casing, said casing, said bail member and said drive head being formed of an integral one-piece construction, and a hand grip sized to receive said tool in nested relation, said hand grip comprising a shell having an outer surrounding sidewall which engages said casing in a nested state and a cap portion rigidly attached to said sur-

rounding sidewall, said cap portion having an axial opening configured and oriented to mateably receive said drive head in the nested state whereby said hand grip may be rotate said work piece.

**4,791,838**  
**APPARATUS AND METHOD FOR DETERMINING**  
**TORQUE, PRESENTING DIGITAL TORQUE READOUT**  
**AND AUTOMATIC CYCLING AND TERMINATION OF**  
**WRENCH OPERATION IN A TORQUE WRENCH**  
**SYSTEM**

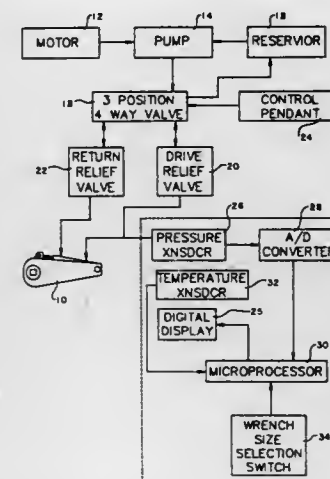
John H. F. Bickford, Middletown; Jesse R. Meisterling, East Hampton, both of Conn.; Milton O. Smith, Bethel, Wash., and Geoffrey F. Kosciak, Stevensville, Mich., assignors to Raymond Engineering Inc., Middletown, Conn.

Continuation-in-part of Ser. No. 869,178, May 30, 1986. This application Nov. 12, 1986, Ser. No. 930,342

Int. Cl.<sup>4</sup> B25B 21/00

U.S. Cl. 81—467

31 Claims



1. Apparatus for automatic cycling and termination of operation of a fluid powered torque wrench supplied with operating fluid from a pump, including:

- first control means for selecting a desired level of torque to be applied to a fastening element by the torque wrench;
- second control means connected to said first control means to receive a first signal from said first control means commensurate with said desired level of torque and initiate a tightening cycle of operation of the wrench;
- monitoring means for monitoring the pressure of the operating fluid in said wrench and generating a second signal commensurate with the torque imposed on a fastening element by said wrench;
- comparator means to compare said first and second signals and deliver a third signal to said second control means to interrupt the operation of the wrench; and
- said first control means analyzing the pressure history of the tightening cycle of operation of the wrench to initiate another cycle of tightening operation or terminate the tightening operation.

**4,791,839**  
**APPARATUS AND METHOD FOR DETERMINING**  
**TORQUE AND PRESENTING DIGITAL TORQUE**  
**READOUT IN A TORQUE WRENCH SYSTEM**

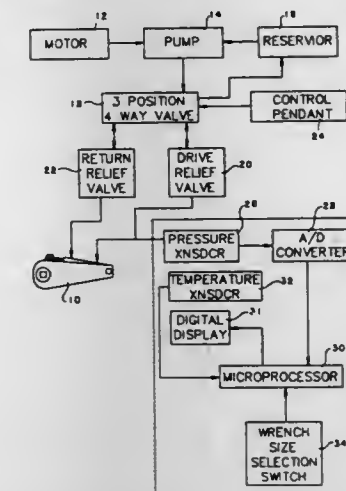
John H. Bickford, Middletown; Jesse R. Meisterling, Hampton, both of Conn., and Milton O. Smith, Bethel, Wash., assignors to Raymond Engineering Inc., Middletown, Conn.

Filed May 30, 1986, Ser. No. 869,178

Int. Cl.<sup>4</sup> B25B 23/144

U.S. Cl. 81—479

17 Claims



1. An apparatus for determining torque and representing digital torque readout in a torque wrench system, the torque wrench system including a fluid powered torque wrench supplied by fluid from a pump and further comprising:

- pressure sensing means for sensing the pressure level of the pump and generating a pressure level voltage signal;
- converter means for converting said pressure level voltage signal from an analog signal to a digital signal;
- microprocessor means for receiving said converted digitized pressure level voltage signal;
- temperature sensing means for sensing the temperature of the pressure sensing means, and for generating a temperature compensation signal to said microprocessor means;
- wrench size selector switch means for delivering a wrench size signal to said microprocessor means wherein said wrench size signal is based on the size of the wrench used in the wrench system; and
- digital display means associated with said microprocessor means wherein said microprocessor means processes said pressure level voltage signal, temperature compensation signal and wrench size signal and wherein said microprocessor generates a digital output of the real time torque level of the torque wrench, said real time torque level being displayed on said digital display means.

**4,791,840**  
**METAL CUTTING WITH HIGH PRESSURE COOLANT**  
William M. De Rosier, Enfield, Conn., and Frederick D. Parker, Springfield, Mass., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 29, 1984, Ser. No. 584,675

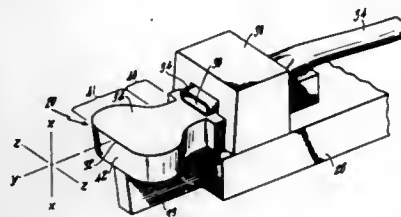
Int. Cl.<sup>4</sup> B23B 3/00

U.S. Cl. 82—1 C

4 Claims

1. The method of turning an undercut groove in a metal workpiece with a cutting tool bit having an undercut shank and a cutting edge formed by the intersection of a rake surface and a relief surface wherein the material tends to be removed by the tool bit moving relative to the workpiece with a first continuous chip length when an ordinary flood coolant process is used, characterized by directing a flow of liquid coolant

substantially parallel to the rake surface of the tool bit and into the groove toward the vicinity of the cutting edge, to impact the material being removed; wherein the coolant has a pressure



greater than 690 kPa (100 psig) and a volume sufficient to cause the material being removed to fracture into material pieces having a second chip length shorter than the first chip length, to thereby prevent chips from packing in the groove.

4,791,841

## CHUCKING DEVICE

François C. Pruvot, La Conversion; Laurent R. Coste, and Alain G. Rebetez, both of Moutier, Switzerland, assignors to Tornos-Beckler SA, Fabrique de Machines Moutier, Moutier, Switzerland

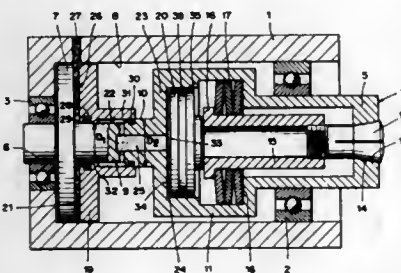
Filed Aug. 18, 1986, Ser. No. 897,090

Claims priority, application Switzerland, Aug. 19, 1985, 3555/85

Int. Cl.<sup>4</sup> B23B 19/02, 31/30

U.S. Cl. 82—30

6 Claims



1. A device for chucking a workpiece or a bar of material in a machine-tool, comprising:

a support frame;  
a spindle arrangement rotatably mounted within said frame about an axis; and

control means on said frame for controlling said chucking; wherein said spindle arrangement comprises:

a spindle body rotatably supported about said axis within said frame;  
a chuck member and a socket member coaxially mounted within said body for relative displacement along said axis between an open position and a closed position;  
a chucking spring urging said chuck and socket members towards the closed position; and  
a hydropneumatic driving means selectively activated for urging said chuck and socket members towards the open position against a thrust of said chucking spring; and

wherein said driving means comprises in said rotatable spindle arrangement:

a pneumatic chamber;  
primary and secondary hydraulic chambers; and  
communication passages within said spindle body for providing communication between said hydraulic chambers;

and said driving means further comprises:  
feeding means for feeding said pneumatic chamber with

pressurized pneumatic fluid, said feeding means comprising at least one fixed conduit through said frame, and an air passage of a predetermined clearance between said at least one conduit and said spindle arrangement.

4,791,842

## PIPE MACHINING APPARATUS

Peter K. Olson, Buffalo Grove, Ill., assignor to E. H. Wachs Company, Wheeling, Ill.

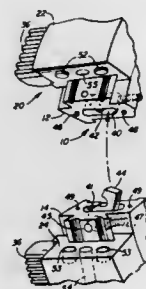
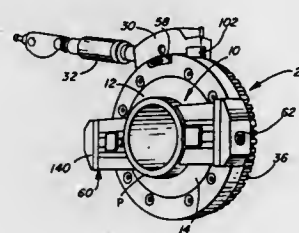
Division of Ser. No. 918,293, Oct. 14, 1986, Pat. No. 4,762,038.

This application Feb. 29, 1988, Ser. No. 162,136

Int. Cl.<sup>4</sup> B23B 5/16

U.S. Cl. 82—4 C

2 Claims



1. A pipe machining apparatus having a rotatable tool carrier mounting a tool head with a movable tool slide, and means attachable to a pipe or the like for movably supporting the tool carrier including two semiannular sections and means for securing said sections together in abutting relation with the improvement therein comprising, a pair of connection devices operable from the side of the sections and having components at the end of each semiannular section, said connection devices each comprising a recess at the adjacent ends of the semiannular sections, a pin positioned in one recess with an exposed part, a pivoted latch member positioned in a second recess and extending outwardly therefrom, yieldable means urging the latch member to a retracted position to enable insertion of the latch member into the recess having the pin, and a movable member exposed to the side of the semiannular section having the recess with the pin and extending into the recess having the pin for engagement with the latch member whereby advance of the movable member pivots the latch member into locking engagement with the exposed part of said pin.

4,791,843

## BULLET PUNCH

Fox J. Herrington, Holcomb, and Richard A. Holland, Canandaigua, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Nov. 2, 1987, Ser. No. 115,324

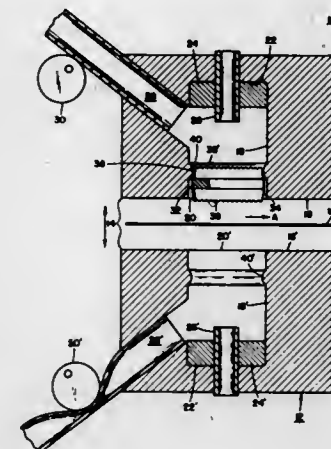
Int. Cl.<sup>4</sup> B26D 5/12, 7/18

U.S. Cl. 83—100

5 Claims

1. An apparatus for sequentially punching holes in an ad-

vancing continuous web of a film material; comprising a first housing including a recess having an open end facing towards one side of said film web; a second housing in coaxial alignment with said first housing, said second housing including a recess having an open end facing towards the opposite side of said film web, a narrow gap between the facing housings facilitating conveyance of said film web therebetween; a projectile being supported for movement in said recesses between said first and second housings and through the film web in said gap; cutting means at both ends of said projectile for punching holes into said film web upon passage therethrough; selectively energizable electromagnet means in each of said recesses for magnetically attracting said projectile; vacuum means communicating with the interior of each said recess for aspirating material punched out of said film web by said projectile; pneumatic means communicating with each said recess introducing a pressurized medium into said recess for rapidly propelling said projectile in a reciprocating motion between said recesses



to cause said cutting means at each end of said projectile to alternately punch an accurately sized hole in said film web during rapid passage through said film web; means for energizing one of said electromagnet means for magnetically attracting said projectile in one end position in the recess in said first housing; means for concurrently applying a vacuum in said recess for aspirating material punched out by said projectile; said control means deenergizing said electromagnet means and releasing said vacuum upon a predetermined advance of said film web and for conducting said pressurized medium into said recess in said first housing for propelling said projectile through said film web into the recess in said second housing; said control means concurrently activating a vacuum communicating with the recess in said second housing for aspirating the material punched out of said film web, and activates the electromagnet means in the recess in said second housing for magnetically restraining said projectile in the end position therein.

4,791,844

## KNOCKOUT DEVICE FOR PUNCHING A WORK PLATE IN A PRESS-MACHINE

Keitaro Yonezawa, Amagasaki, Japan, assignor to Kabushiki Kaisha KOSMEK, Hyogoken, Japan

Filed Dec. 24, 1987, Ser. No. 137,813

Claims priority, application Japan, Dec. 26, 1986, 61-314774

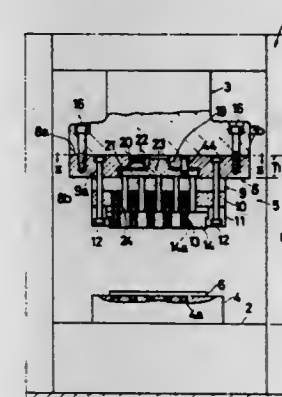
Int. Cl.<sup>4</sup> B21D 45/04, 28/34; B26F 1/14

U.S. Cl. 83—133

6 Claims

1. A knockout device for punching a work plate in a press-machine, including a plurality of punches fixed to the underside of a base plate through a punch fixation plate and a punch support plate so as to protrude downwardly, which device comprising, in combination:

- a work fixation plate fitted to the punches vertically slidably;
- a cylinder chamber of a hydraulic knockout cylinder formed in an upper portion of the base plate;
- an actuation-plate guide hole formed in an lower portion of the base plate;
- a piston provided vertically slidably in the cylinder chamber;
- a knockout actuation-plate provided vertically slidably in the actuation-plate guide hole;
- a plurality of knockout pins passed vertically slidably through both the punch fixation plate and the punch support plate;
- said work fixation plate being adapted to be actuated downwardly by the downward movement of the piston



through the knockout actuation-plate and the knockout pins so as to knock out downwardly the punched work plate frictionally engaged to the punches;

(h) said cylinder chamber of the hydraulic knockout cylinder being disposed at an eccentric position offset toward the periphery of the actuation-plate guide hole relative to the center thereof;

(i) a linear guide hole formed upwardly from the central portion of an upper plane of the actuation-plate guide hole in communication thereto;

(j) a linear guide boss formed so as to protrude upwardly from a central portion of the knockout actuation-plate; and

(k) said linear guide boss being fitted vertically slidably into the linear guide hole so as to be guided thereby.

4,791,845

## STRAIGHT LINE SHEAR

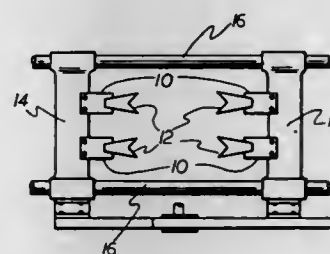
Douglas W. Wright, Tariffville, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.

Filed Apr. 29, 1987, Ser. No. 43,912

Int. Cl.<sup>4</sup> C03B 5/38

U.S. Cl. 83—150

2 Claims

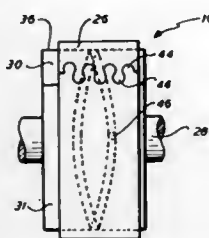


1. A straight line shear comprising:  
a carriage supporting at least one shear blade assembly



a drop guide assembly associated with each of said shear blade assemblies, said drop guide assembly including:  
 a drop guide holder,  
 a drop guide and  
 cylindrical, smooth guide pin means secured to said drop guide holder,  
 said carriage including thru-bores having bushing means having a cylindrical thru-bore for slidably receiving said cylindrical, smooth guide pin means, said bushing means having  
 a cylindrical portion at one end adapted to be press fit into a carriage thru-bore and  
 a remaining outer portion having an enlarged threaded diameter for receiving a threaded socket whereby the bushing means is extended and can be pulled from the thru-bore by a suitable hand tool.

**4,791,846**  
**OSCILLATING FREE WHEELING RESILIENT COVER FOR ROTARY DIE-CUTTING ANVIL**  
 Alan D. Kirkpatrick, Martinsville, N.J., assignor to Robud Company, Pine Brook, N.J.  
 Filed Oct. 23, 1987, Ser. No. 112,816  
 Int. Cl.<sup>4</sup> B26D 7/20  
 U.S. Cl. 83—659 12 Claims

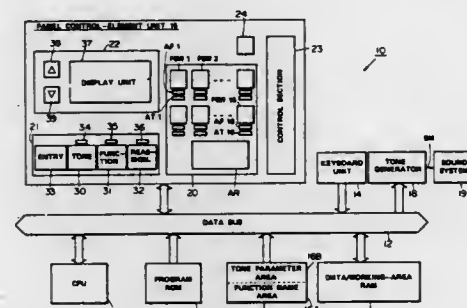


1. Anvil structure for rotary die cutting apparatus comprising:  
 an anvil head suitable for mounting on a rotatable shaft, said anvil head having a peripheral surface and an axis of rotation which is coaxial with the axis of rotation of said shaft;  
 die blanket means mounted with respect to said anvil head such as to permit both longitudinal and transverse relative movement between said peripheral surface of said anvil head and said die blanket means; and  
 means cooperating with said anvil head and said die blanket means for effecting said transverse relative movement between said peripheral surface of said anvil head and said die blanket means.

**4,791,847**  
**PARAMETER SETTING SYSTEM FOR ELECTRONIC MUSICAL INSTRUMENT**  
 Tetsuo Nishimoto, Hamamatsu, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan  
 Filed Mar. 17, 1987, Ser. No. 27,222  
 Claims priority, application Japan, Mar. 18, 1986, 61-61095  
 Int. Cl.<sup>4</sup> G10H 1/02  
 U.S. Cl. 84—1.21 14 Claims

1. A parameter setting system for an electronic musical instrument for setting one or more of plural parameters each for determining a characteristic of a tone which is generated by a tone generating means incorporated in the electronic musical instrument, said parameter setting system comprising:  
 one or more manually operable members;  
 first memory means for storing the plural parameters in such an arrangement that each of the stored parameters can be designated by identification data;  
 data generating means having first manual control means for

generating data whose value is determined by a manual operation of said first manual control means;  
 second memory means having one or more addresses corresponding respectively to said one or more operable members;  
 writing means responsive to a manual operation of each of said operable members for writing said data generated by said data generating means into a respective one of said addresses of said second memory means, as said identification data;



parameter setting means for bringing each of those of the plural parameters in said first memory means designated by the identification data contained in a corresponding one of said addresses of said second memory means into a desired condition;  
 tone generating means for generating a tone signal having characteristics determined by said parameters contained in said first memory means; and  
 feeding means for feeding the parameters contained in said first memory means to the tone generating means so that the tone generated by the tone generating means has the characteristics determined by said fed parameters.

**4,791,848**  
**SYSTEM FOR FACILITATING INSTRUCTION OF MUSICIANS**  
 Kenneth L. Blum, Jr., 2310 Brightleaf Way, Baltimore, Md. 21209  
 Filed Dec. 16, 1987, Ser. No. 133,655  
 Int. Cl.<sup>4</sup> G10G 1/02, 3/04; G09B 15/00; G10H 3/12  
 U.S. Cl. 84—453 9 Claims

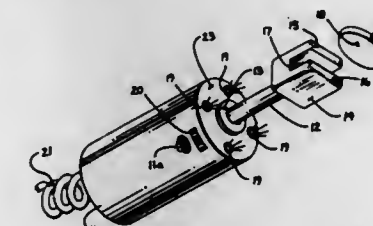
1. In a system for facilitating instruction of musicians in playing of a stringed instrument of the type having a plurality of pickup heads, strings and frets such as a guitar, the system including a recorder, an improvement comprising a plurality of frequency counters, individual ones of said frequency counters being coupled to respective ones of said pickup heads and responsive to signals therefrom resulting from playing of the instrument for developing signals corresponding to musical notes being played respectively on each string, respective multipliers coupled to respective ones of said counters and responsive to output therefrom for developing signals in separated respective bands whereby respective ones of the strings can be identified, and interface means coupled to said multipliers and responsive to output therefrom for supplying input to said recorder.

6. In a system for facilitating instruction of musicians in the playing of a musical instrument, the system having a recorder for storing signals representing musical notes to be played and time values thereof and display means for providing a visual indication of the musical notes to be played, an improvement comprising a Fourier transform circuit coupled to said recorder and responsive output therefrom for developing signals representative of the musical notes to be played, a plurality of dividers coupled to said Fourier transform circuit and responsive to output therefrom for separating the output into respective bands, a plurality of frequency counters individually cou-

pled to respective ones of said dividers and responsive to output therefrom for developing fret and string identifying signals and demultiplexing means coupled to said frequency counters and responsive to the signals therefrom for controlling energization of the display means.

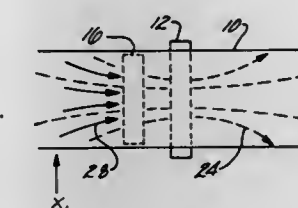
9. An input device for use in conjunction with an input stringed instrument of the type having a plurality of strings and

a counter positioned on said housing to count revolutions of said torquing means



and switch means positioned on said housing to energize an included electrical motor positioned within said housing to rotate said axial shaft and said torquing means in response thereto.

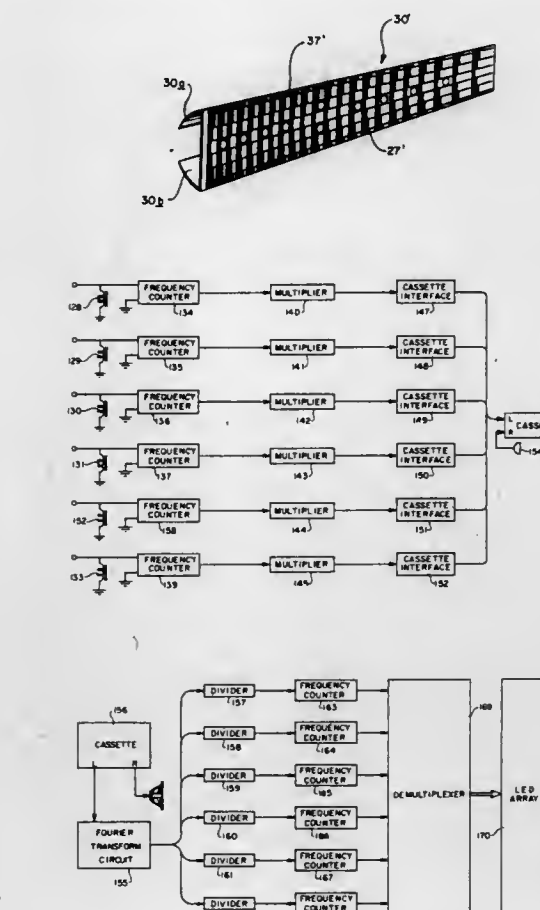
**4,791,850**  
**ELECTROMAGNETIC LAUNCHING SYSTEM FOR LONG-RANGE GUIDED MUNITIONS**  
 Michael A. Minovitch, 2832 St. George St., Apt. 6, Los Angeles, Calif. 90027  
 Filed Jan. 23, 1986, Ser. No. 835,878  
 Int. Cl.<sup>4</sup> F41F 1/02  
 U.S. Cl. 89—8 60 Claims



1. A weapon system for launching projectiles within the Earth's atmosphere to distant targets comprising:  
 a projectile;  
 an accelerating tube;  
 means for evacuating said accelerating tube;  
 an evacuated canister containing said projectile;  
 means for transferring said projectile from said evacuated canister into said evacuated accelerating tube; and  
 means for accelerating said projectile through said evacuated tube by electromagnetic forces to hit a distant target.

**4,791,851**  
**GUN FOR FIRING TELESCOPED AMMUNITION**  
 Eugene M. Stoner, Palm City, Fla., assignor to Area, Inc., Fort Clinton, Ohio  
 Continuation of Ser. No. 58,627, Jun. 2, 1987, abandoned, which is a continuation of Ser. No. 773,585, Sep. 9, 1985, abandoned.  
 This application Dec. 24, 1987, Ser. No. 139,132  
 Int. Cl.<sup>4</sup> F41D 10/08  
 U.S. Cl. 89—156 10 Claims

1. A gun for firing cylindrically-shaped, telescoped ammunition, the gun comprising:  
 (a) a receiver;  
 (b) a gun barrel and means detachably connecting rearward end regions of the barrel to forward regions of the receiver;  
 (c) a shell chamber having formed longitudinally there-through a cylindrical, telescoped shell-holding aperture sized to receive a cylindrical, telescoped shell having a projectile and a shell casing and means mounting the chamber in the receiver rearwardly of the barrel for linear sliding movement in a direction orthogonal to the bore



a plurality of frets, the device comprising an array of switch means and a sheet, said array of switch means being carried in or on said sheet, wherein said sheet has a plurality of apertures therein through which the frets may extend, said switch means being so distributed that individual ones of said switch means will be positioned beneath each of the strings in vicinity of each of the frets whenever the sheet is positioned on the instrument.

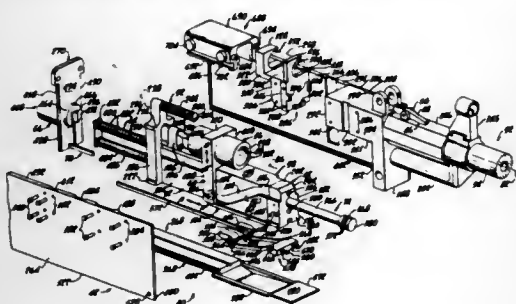
**4,791,849**  
**MOTORIZED STRING TUNING APPARATUS**  
 Rory R. Kelley, Box 182, Midkiff, Tex. 79755  
 Filed Jan. 19, 1988, Ser. No. 145,413  
 Int. Cl.<sup>4</sup> G10G 7/02  
 U.S. Cl. 84—458 4 Claims

1. A motorized string tuning apparatus for use in torquing pegs of associated string musical instruments comprising, an elongated cylindrical housing formed with a forward and rear end face,  
 an axial driven shaft extending axially outwardly from within said forward face at one end and formed at said other end with a torquing means for receiving and torquing said peg,

axis of the barrel between a shell-loading position in which the shell-holding aperture is out of axial alignment with the bore through the barrel and a shell firing position in which the shell-holding aperture is axially aligned with the barrel bore;

(d) a chamber carrier and means mounting the chamber carrier in the receiver for axial sliding movement between a forwardmost, battery position and a rearwardmost position;

(e) means for interconnecting the chamber with the chamber carrier so as to cause the chamber to be in the shell loading position when the chamber carrier is in the rearwardmost positions and to be in the shell firing position when the carrier is in the forwardmost, battery position;



(f) means responsive to firing of the gun for causing movement of the chamber carrier from the forwardmost, battery position to the rearwardmost position;

(g) means responsive to actuation of a trigger for loading a shell into the chamber aperture when the chamber is in the shell loading position and for simultaneously pushing a fired shell casing forwardly out of said chamber;

(h) means responsive to actuation of the loading means for causing the chamber carrier to move from its rearwardmost position back to its forwardmost position; and

(i) means for causing firing of a shell held in the chamber aperture when the chamber is in the shell firing position.

4,791,852

## MOBILE MORTAR FIRING UNIT

Michel Frand, Veltzy, and Rene Donnard, Gelsolsheim, both of France, assignors to Thomson-Brandt Arments, Paris and Lohr, S.A., Hagenbieten, both of France

PCT No. PCT/FR86/00350, § 371 Date Jan. 12, 1987, § 102(e) Date Jan. 12, 1987, PCT Pub. No. WO87/02446, PCT Pub. Date Apr. 23, 1987

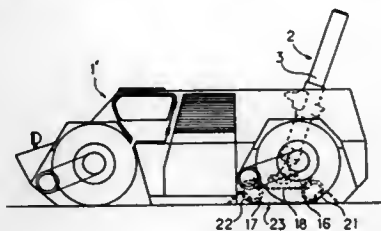
PCT Filed Oct. 14, 1986, Ser. No. 72,266

Claims priority, application France, Oct. 14, 1985, 85 15294

Int. Cl. F41F 1/02, 19/02

U.S. Cl. 89—40.02

9 Claims



1. A mobile mortar carrier, comprising in combination, a carrier vehicle having a chassis, downwardly displaceable and upwardly retractable suspension means connected between said carrier and said chassis, a mortar,

mortar mounting means for mounting said mortar, a base plate located below said mortar mounting means, elastic coupling means located below said mortar, and being connected to said chassis and to said base plate, so that said elastic coupling means acts as a shock absorber when said chassis is displaced downwardly by a recoil of said mortar, and said base plate makes contact with the ground.

4,791,853

## WEAPON AIMING SYSTEM FOR USE IN A TANK

Allan Gardam, Newburgh, United Kingdom, assignor to Pilkington P.E. Limited, United Kingdom

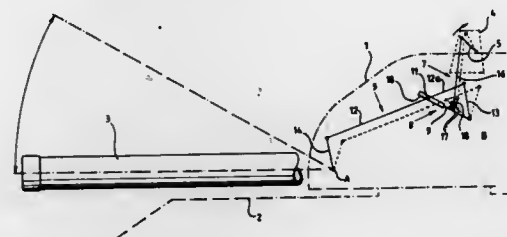
Filed Dec. 7, 1987, Ser. No. 129,639

Claims priority, application United Kingdom, Dec. 12, 1986, 8629747

Int. Cl. F41G 3/16

U.S. Cl. 89—41.19

10 Claims



1. An aiming system for an angularly movably mounted weapon, the system comprising in combination;

a movable mirror for tracking the line of the weapon; a linkage connecting the mirror with the weapon, the linkage being effective to transfer movement between the weapon and the mirror;

at least two parallelogram linkage sets included in the linkage, each set comprising a connecting link joining two parallel arms; and

a slider crank positioned in the system and forming a first side of a variable triangle of links in the system, the second side of which variable triangle being formed by one parallel arm of said two parallel arms of one of said two parallelogram linkage sets, the third side of which variable triangle being formed by at least part of the connecting link joining said one parallel arm with the other parallel arm of said one parallelogram linkage set;

wherein upon angular movement of the weapon, the ratio of angular movement imparted through the linkage between the weapon and the mirror is 2:1.

4,791,854

## HYDRAULIC PISTON AND CYLINDER ARRANGEMENT IN WHICH THE OUTER WALL OF THE PISTON ROD IS FREE FROM FLUID

Damir Banicevic, 124 Ruby Street, Winnipeg, Manitoba, Canada R3G 2C9

Continuation-in-part of Ser. No. 797,952, Nov. 14, 1985, abandoned. This application Mar. 2, 1987, Ser. No. 20,908

Claims priority, application Canada, Nov. 14, 1984, 467846

Int. Cl. F01B 25/26

U.S. Cl. 92—5 R

11 Claims

1. A hydraulic piston and cylinder arrangement comprising a cylinder having an outer wall defining a bore therein, an end plug fixed to said outer wall at one end thereof, a stem fixed relative to said end plug and extending along the bore centrally

thereto and providing a bearing surface externally of the stem and coaxial to said bore, a piston comprising a sleeve having an inner and outer surface such that the inner surface coaxially surrounds said bearing surface and is spaced therefrom by a first gap so as to define therewith a first annular chamber and such that the outer surface lies coaxially inwardly of said bore and is spaced therefrom by a second gap so as to define therewith a second annular chamber, an end closing member on said sleeve and a bearing member including a seal carried by and extending from said sleeve to cooperate with said bearing surface whereby to bridge said first gap and support the sleeve in axial sliding movement relative to said bearing surface, head means on an end of the stem remote from the end plug having a seal there around for cooperating with said inner surface to close said first chamber and to define with said end closing member a third chamber, closure means on an end of said outer wall remote from said end plug defining a seal there around for cooperating with said outer surface, said stem comprising a first tube having one end mounted in said end plug and carrying said head means on an opposed end thereof, a second tube mounted inside the first tube, the second tube extending from an outer surface of the end plug so as to define first channel means in said stem for communicating fluid to and from the end thereof remote from the end plug so as to communicate fluid only to said third chamber and second channel means defined in an annular space between said first tube and said



second tube including an annular cavity in said end plug surrounding said second tube and closed by an end plate on said end plug, and including at least one radial hole in said first tube at said opposed end for communicating fluid only to and from said first chamber at a position therein adjacent said head means whereby the application of fluid under pressure to said first channel means causes an expansion stroke of said piston relative to said cylinder and the application of fluid under pressure to said second channel means causes a retraction stroke of said piston relative to said cylinder, said bearing member having an inner cylindrical surface surrounding and closely adjacent the bearing surface of the stem and an annular recess surrounding the stem in an end surface of the bearing member closing said first annular chamber, said annular recess defining a recess cylindrical surface at a position of increased radial spacing from said stem than said inner cylindrical surface and a base surface spaced axially of said end surface of the bearing member, said first and second channel means, said end plug, said bearing member and said stem being arranged such that said second annular chamber is free from fluid whereby said outer surface of said piston sleeve remains free from said fluid.

4,791,855

## CYLINDER LOCKING DEVICE

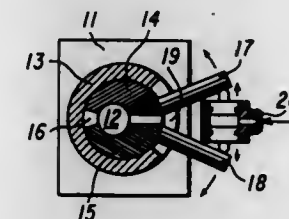
Akio Matsui, Gifu, Japan, assignor to Pubot Giken Co., Ltd., Aichi, Japan

Continuation-in-part of Ser. No. 710,245, Mar. 11, 1985, abandoned. This application Oct. 23, 1986, Ser. No. 922,364

Int. Cl. F15B 15/26

U.S. Cl. 92—24

6 Claims



1. A cylinder locking device comprising:

(a) a housing, having a bore, through which passes a piston rod, said piston rod being parallel to an axis of said bore but being displaced from a centerline of said bore;

(b) a pair of locking elements, each having an outer curved surface with a radius corresponding to a radius of said bore of said housing and each having an inner semicircular groove with a radius corresponding to a radius of said piston rod, said groove being displaced from a centerline of said locking elements so as to partially encircle said piston rod parallel to its axis, said locking elements each having a center of rotation eccentric to the centerline of said piston rod, each of said locking elements being relieved on either side of said semicircular groove by first and second facing margins so as not to be in contact with each other on both sides of said semicircular groove when disposed between said housing and said piston rod;

(c) a pair of levers, one lever being attached to each locking element and protruding from said housing; wherein rotational movement of said levers in opposite directions causes each said locking elements to eccentrically rotate in opposite directions to bindingly engage said piston rod and lock said piston rod into place.

4,791,856

## SINGLE ACTING HYDRAULIC ACTUATOR WITH VARIABLE RETURN FORCE

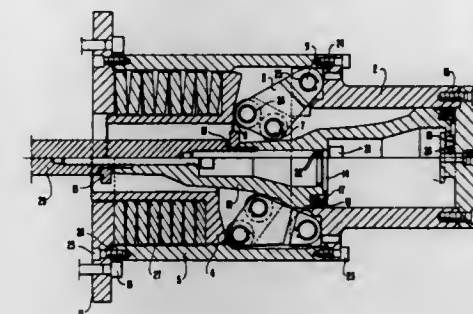
Edgar Heim, Lingesund; Kurt Sande, Fredrikstad, and Staaland, Tørbjrn, Nedenes, all of Norway, assignors to Skarpenord Control Systems A/S, Rjukan, Norway

Filed Jun. 22, 1987, Ser. No. 64,607

Int. Cl. F16J 1/10

U.S. Cl. 92—84

3 Claims

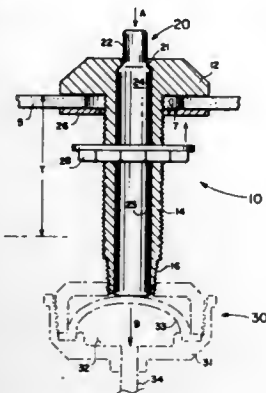


1. A single acting hydraulic actuator with variable return force for controlling the movement of a valve spindle of a valve, said actuator comprising:



a cylinder having therein a piston member including a piston and a piston rod to be connected to the valve spindle; means for supplying pressurized hydraulic fluid into said cylinder to act on said piston member to move said piston member within said cylinder from a released position to an activated position; a housing connected to said cylinder and containing a spring mechanism including a spring and a spring guide member abutting said spring; and variable reduction means for, upon movement of said piston member within said cylinder from said released position to said activated, causing compression movement of said spring by a distance less than the distance of said movement of said piston member, and for, upon stopping the supply of said pressurized fluid, causing released energy of said spring to return said piston member from said activated position to said released position, said reduction means comprising an outer surface of said piston rod having faces inclined at various angles of inclination to the direction of movement of said piston member, a plurality of single arm levers positioned at locations equally spaced about the outer circumference of said piston member, each said lever being rotatably mounted at a first end thereof within said housing, each said lever having at a second end thereof a spring guide roller abutting an inner end face of said spring guide member, and each said lever having adjacent said spring guide roller thereof a piston rod roller abutting said outer surface of said piston rod, whereby upon said movement of said piston member said faces of various angles of inclination contact said piston rod rollers to pivot said levers about said first ends thereof and move said spring guide rollers over said inner end face of said spring guide member.

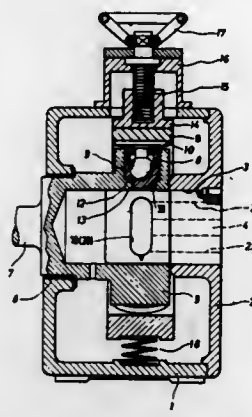
4,791,857  
AIR VALVE PUSH BUTTON ADAPTER  
Frederick M. Farmer, 4364 Real Ct., Orlando, Fla. 32808-2230  
Filed Sep. 17, 1987, Ser. No. 99,299  
Int. Cl. F12B 19/00  
U.S. Cl. 92-98 R 4 Claims



1. An adapter for mounting a diaphragm-type push button control, for remote actuation of a water metering valve to countertops or lavatories having a range of thicknesses and through openings having a range of diameters, said control having a threaded opening comprising:  
a circular cap portion having a diameter greater than the maximum of said range of diameters;  
a threaded cylindrical shank concentrically attached at a proximal end thereof to said cap portion, said cap portion and said shank having a cylindrical axial opening there-through, a distal end of said shank having a reduced diameter portion threaded to fit said threaded opening of said control for attaching said shank to said control, said shank

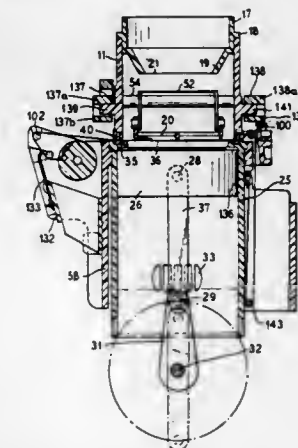
having a length greater than the maximum of said range of thicknesses;  
a faucet nut having a diameter greater than the maximum of said range of diameters threadably disposed on said threaded shank;  
a centering ring disposed on said shank for centering said shank in an opening; and  
a rod disposed in said axial opening having a push button portion on a first end thereof extending from said cap portion and a second end bearing on a diaphragm in said control when said distal end of said shank is attached to said control whereby pushing of said push button portion depresses said diaphragm.

4,791,858  
PISTON MACHINE  
Gerhard Nonnenmacher, Kornthal, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
Filed Nov. 23, 1987, Ser. No. 123,894  
Claims priority, application Fed. Rep. of Germany, Dec. 9, 1986, 3641955  
Int. Cl. F01B 1/06, 13/06  
U.S. Cl. 92-12.1 7 Claims



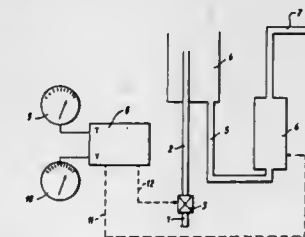
1. In a piston machine, particularly radial piston machine, comprising a control element for a rotor which has bores in which pistons move under the action of said control element, said control element in the region of each of said bores having a high-pressure control chamber (19) and a low-pressure control chamber (20), and control passages (21,22) which are in communication with said high-pressure and low-pressure control chambers, each chamber having, at a front side thereof, as viewed in the direction of rotation of said rotor, a pre-control means (24,25), the improvement comprising an additional passage (27,29) formed in said control element for each of said control chambers, said additional passage being laterally offset relative to a respective control chamber and extending from a place located between neighboring control chambers, said place defining an inner dead center or an outer dead center of said control element, said additional passage (27) which extends from the outer dead center (AT) being in communication with said high-pressure control chamber (19) and the additional passage (29) which extends from the inner dead center (IT) being in communication with said low-pressure control chamber (20), each additional passage having a port (26, 28) which becomes periodically and for a short time connected to a respective one of said bores (8) of said rotor (5) before the communication of said bores with said pre-control means (24, 25) is established.

4,791,859  
COFFEE BREWER  
Alan M. King, 465 Cote St. Antoine Rd., Westmount, Quebec, Canada H3Y 2K1  
Filed Aug. 27, 1987, Ser. No. 90,160  
Int. Cl. A47J 31/24, 31/00  
U.S. Cl. 99-289 R 14 Claims



1. A beverage brewing machine comprising in combination,  
(a) an upper brewing chamber adapted to receive hot water and a beverage material and having an open lower end,  
(b) a lower chamber with an open upper end normally in registration and sealed with said open lower end,  
(c) a reusable filter mounted between said upper and lower chambers and said chambers normally clamping said filter therebetween,  
(d) a reciprocable piston mounted in said lower chamber for forcing air through said filter into said upper chamber and for withdrawing brewed beverage through said filter,  
(e) means for separating and sealing said upper and lower chambers so as to unclamp said filter,  
(f) means for moving said filter from between said upper and lower chambers,  
(g) means for removing the used beverage material from said filter while said upper and lower chambers are separated, and  
(h) means for returning said filter between said upper and lower chamber.

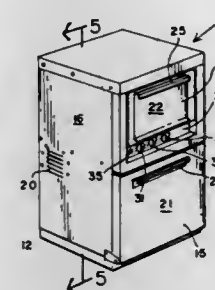
4,791,860  
EQUIPMENT FOR SUPPLYING HOT WATER  
Jan J. Verheijen, Helloo, Netherlands, assignor to Verheijen, B.V., Heerhugowaard, Netherlands  
Filed May 1, 1987, Ser. No. 44,705  
Claims priority, application Netherlands, May 1, 1986, 8601122  
Int. Cl. A23F 3/00, 5/00; A47J 31/00, 31/56  
U.S. Cl. 99-323.3 11 Claims



1. Apparatus for supplying hot water for preparing hot drinks, comprising:  
a heating unit, provided with an inlet for cold water and an

outlet for hot water, for heating a predetermined volume of water to a predetermined temperature;  
an intake pipe, one end of which is connected to said inlet of the heating unit and the other end of which is connected to a water supply line, for supplying water to said heating unit;  
a first intake valve installed in said intake pipe for controlling the flow of fluid therethrough;  
a discharge pipe connected to the outlet of said heating unit for discharging water;  
a control unit for supplying control signals to both the heating unit and to the first intake valve;  
quantity of water selection means for selecting a quantity of water and delivering a signal corresponding to the selected quantity to said control unit;  
temperature of water selection means for a selecting temperature of water corresponding to a desired end temperature of the heated water, and delivering a signal corresponding to the selected temperature to said control unit;  
said control unit controlling the heater unit and the first intake valve so that a first proportionate volume of hot water having a high temperature is supplied from said heater unit through said discharge pipe, and, after switching off said heater unit, a second proportionate volume of cold water is delivered through said discharge pipe to obtain said selected quantity of water having said desired end temperature.

4,791,861  
PIZZA STORAGE AND BAKE UNIT  
Steven G. Weinkle, Miami, and Louis A. Weinkle, Coral Gables, both of Fla., assignors to Pizza Enterprises, Inc., Coral Gables, Fla.  
Filed Feb. 6, 1987, Ser. No. 11,626  
Int. Cl. A21B 1/00  
U.S. Cl. 99-357 4 Claims



1. A combination pizza oven and refrigeration storage unit comprising, in combination,  
a housing having a pair of sidewalls, a rear wall, a top and a bottom,  
a pizza oven proportioned to fit within an upper portion of said housing, said pizza oven having a door at a front portion, said pizza door being hinged at a lower portion to drop down and stop means for securing the said pizza door,  
a refrigeration unit at a lower portion of said housing, said refrigeration unit having a forward sealed door, said door being pivoted along a horizontal axis, said horizontal axis being positioned at a lower portion of the refrigeration door to open forwardly and downwardly to thereby become a work tray,  
a dead air space between the oven unit and the refrigeration unit, said dead air space having a recess entering into and reducing the effective rear portion of the refrigerator in a recessed area,  
refrigeration condenser coils positioned along the rear wall and opposed to the refrigerator,

and insulation means on all walls to thereby refrigerate the unit and heat the unit in insulated relationship each to the other, and a refrigeration compressor is positioned in the oven and the refrigerator unit to thereby maximize the dead air space between the two thermally distinct refrigerator and oven units.

4,791,862

## ELECTRIC TOASTER

Erich Hoffmann, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Robert Krups Stiftung & Co. KG, Solingen, Fed. Rep. of Germany

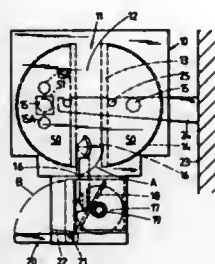
Filed May 15, 1987, Ser. No. 50,761

Claims priority, application Fed. Rep. of Germany, Nov. 23, 1985, 3541425

Int. Cl.<sup>4</sup> A47J 37/08

U.S. Cl. 99—385

17 Claims



1. A toaster for slices of bread and other goods, comprising a housing defining a chamber for goods to be toasted; means for heating the goods in said chamber, including at least one infrared radiation emitting halogen lamp in said housing and reflector means for directing radiation which issues from said lamp against the goods in said chamber; and heat storing means including at least one panel which transmits infrared radiation and is interposed between said lamp and said chamber, said panel and said reflector means defining a compartment which confines said lamp and is at least substantially sealed from said chamber.

4,791,863

## SYSTEM FOR CONTROLLING THE NIP PRESSURE PROFILE IN A ROLL PRESS

Harri Vihitälä, Jyväskylä, Finland, assignor to Valmet Paper Machinery Inc., Finland

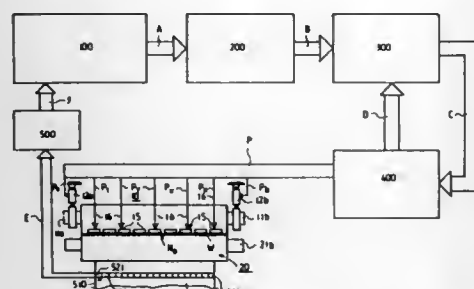
Filed Aug. 14, 1987, Ser. No. 85,358

Claims priority, application Finland, Feb. 23, 1987, 870774

Int. Cl.<sup>4</sup> B30B 3/04, 15/26

U.S. Cl. 100—35

15 Claims



1. In a method for controlling the pressure profile or transverse distribution of pressure applied to a web passing through an adjustable nip formed between a zone-adjustable device and a counter-member, said zone-adjustable device including a first number (K) of separately adjustable loading means actuated by

a first number (K) of separately adjustable actual pressure zones, including the steps of generating a first number (K) of pressure zone set values, inputting said first number (K) of pressure zone set values to regulating means for regulating the pressures of said first number (K) of actual pressure zones in accordance with the values of said first number (K) of pressure zone set values, the improvement comprising an improved method for generating said first member (K) of pressure zone set values, comprising the steps of:

inputting a profile or distribution of setting zone set values corresponding to a desired pressure profile or transverse pressure distribution in the nip into a zone conversion means, said setting zone set value profile or distribution comprising a second number (N) of setting zone set values for a corresponding second number (N) of setting zones; said second number (N) of setting zones being substantially greater than said first number (K) of separately adjustable actual pressure zones ( $N > K$ ) of said zone-adjustable device; and

converting said second number (N) of the setting zone set values input into said zone conversion means into said first number (K) of pressure zone set values on the basis of a mathematical model of the adjustable nip so that the deviation of the pressure profile or transverse pressure distribution applied to the web passing through the nip from the setting zone set value profile or distribution is substantially minimized.

4,791,864

## DRAINAGE SYSTEM FOR EXPRESSING FIBROUS MATERIALS

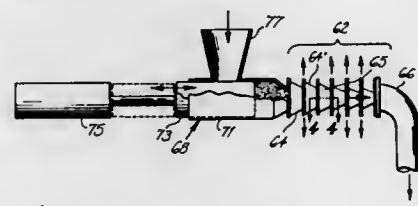
Peter W. Mansfield, Holmes Beach, Fla., assignor to The Duppe Company, Germantown, Ohio

Filed Jul. 20, 1987, Ser. No. 75,396

Int. Cl.<sup>4</sup> B30B 9/14

U.S. Cl. 100—117

13 Claims



1. A drainage system for expressing liquids and fluids from fibrous materials comprising:

a plurality of spaced apart compression elements retained in position in a side-by-side arrangement forming a fluid escape slot between each said compression element; each said compression element having a longitudinal passageway therethrough, each said passageway having an inlet and an outlet and forming a continuous compression conduit longitudinally through said drainage system; said compression conduit having an inlet and an outlet generally forming an intake and an exit, respectively, for said drainage system; said intake for receiving fibrous materials under pressure and said exit for discharging expressed fibrous materials; each said passageway tapering inwardly from said passageway inlet to said passageway outlet; each said slot sized to allow expressed liquid to flow radially outwardly therethrough from said passageways as the fibrous material is forceably urged through said compression conduit.

4,791,865

## BALE DISCHARGE MECHANISM FOR PLUNGER TYPE AGRICULTURAL BALERS

Adrianus Naaktgeboren, Zedelgem, Belgium, assignor to Ford New Holland, Inc., New Holland, Pa.

Filed Oct. 20, 1987, Ser. No. 111,378

Claims priority, application European Pat. Off., Oct. 24, 1986, 86201861.1

Int. Cl.<sup>4</sup> B30B 9/30, 15/32

U.S. Cl. 100—218

14 Claims



1. In an agricultural baler comprising a bale case having a discharge end and a plunger reciprocable in the bale case for, in use of the baler, forming crop material into bales and moving said bales along the bale case towards the discharge end thereof for ultimate discharge therefrom, an improvement which comprises:

bale-discharge means associated with the bale case and operable to engage a formed or partially formed bale in the bale case and move it therealong towards the discharge end thereof independently of the operation of the plunger; and

wherein the bale-discharge means comprises reciprocable and retractable bale-engaging means associated with at least one wall of the bale case and which are operable, during one stroke of reciprocation, in an operative mode to engage a formed or partially formed bale in the bale case and move it therealong towards the discharge end thereof and, in an inoperative mode, to disengage said bale.

4,791,866

## SPEED CONTROL METHOD FOR PRINTING PRESS AND PRINTING PRESS PRACTICING THE METHOD

Hiroshi Kanno; Toshio Endo, both of Shirosaki; Kellchi Miyakawa, and Masao Takano, both of Miyagi, all of Japan, assignors to Ricoh Co., Ltd., Tokyo, Japan

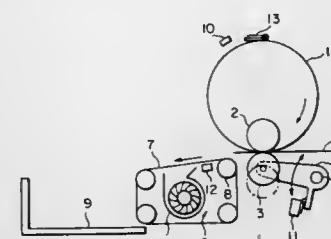
Filed Sep. 1, 1987, Ser. No. 91,781

Claims priority, application Japan, Sep. 9, 1986, 61-213497; Sep. 10, 1986, 61-213581

Int. Cl.<sup>4</sup> B41F 15/08, 33/00; B41L 13/16

U.S. Cl. 101—118

5 Claims



1. A speed control method for a printing press having a rotating plate cylinder with a master clamped on the outer circumferential surface of said plate cylinder and a press roller spaced apart from the outer circumferential surface of said plate cylinder for pushing a printing paper sheet, which is fed from a paper feeding device, against the outer circumferential surface of said plate cylinder, comprising the steps of:

providing a predetermined reference value of rotation speed of said plate cylinder;

providing a selection means for setting a value for actual rotation speed operation of said plate cylinder; comparing a selected actual rotation speed with said predetermined reference value and providing a first speed lowering output signal when the set value exceeds said predetermined reference value; rotating said plate cylinder in response to said first speed lowering output signal at a speed at least as low as said predetermined reference value; measuring the number of complete rotations of said plate cylinder and providing an output indicating the end of each of said rotations; incrementing in an increased stepwise manner the rotation speed of said plate cylinder based upon said complete rotation indication; and stopping said increased incremented speed of said plate cylinder when the actual speed of rotation of said plate cylinder equals said set rotation speed.

4,791,867

## APPARATUS FOR POSITIONING THE CYLINDER IN A ROTARY PRINTING PRESS

Antonio Deregibus, Balzola, Italy, assignor to Officine Meccaniche G. Cerutti S.p.A., Casale Monferrato (AL), Italy

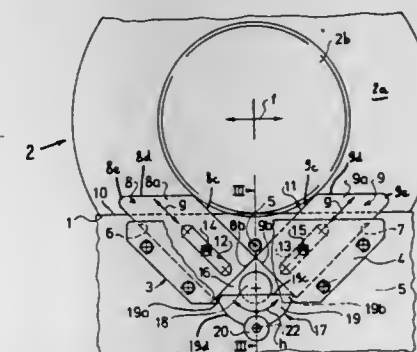
Filed Mar. 27, 1986, Ser. No. 844,862

Claims priority, application Italy, Mar. 27, 1985, 20094 A/85

Int. Cl.<sup>4</sup> B41F 13/00; F16C 23/10

U.S. Cl. 101—212

14 Claims



13. Apparatus for positioning a printing cylinder of the type having a larger-diameter central portion and coaxial first and second stubs extending axially beyond the central portion, comprising first and second carriers respectively having coplanar first and second supporting surfaces along which the corresponding stubs can roll relative to said carriers, each of said carriers further having elongated guide means; a pair of stops provided on each of said carriers and having end portions extending upwardly beyond the respective surface and defining for the corresponding stub a seat wherein the stub is held against rolling movement along the respective surface, at least one stop of each pair being reciprocable along the guide means of the corresponding carrier and being movable to an inoperative position in which its end portion does not extend upwardly beyond the respective surface so that the corresponding stub is then free to roll along the corresponding carrier, the stops of each pair having mutually inclined faces bounding the respective seat and diverging in a direction upwardly and away from the respective surface when the end portion of the movable stop extends upwardly beyond such surface; and means for moving said movable stops relative to the corresponding carriers, said moving means comprising a shaft rotatably journaled in each of said carriers and an eccentric cam mounted on the shaft, said movable stops having followers which abut the respective cams, each of said shafts being rotatable between a first position in which the end portion of the respective movable stop assumes its inoperative position and at least one



second position in which the cam maintains the end portion of the respective movable stop at a level above the respective surface.

**4,791,868**  
**SHIFT-OVER DEVICE FOR CONTROLLING THE**  
**TURNING DRUM GRIPPERS OF A ROTARY SHEET**  
**PRINTING PRESS**

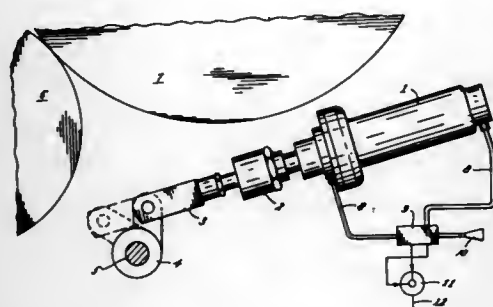
Kurt Dittliff, Steinberg, and Heinrich Ochs, Siantal, both of Fed. Rep. of Germany, assignors to M.A.N.-Roland Druckmaschinen, Offenbach am Main, Fed. Rep. of Germany  
Filed Oct. 22, 1987, Ser. No. 112,257

Claims priority, application Fed. Rep. of Germany, Oct. 22, 1986, 8628072[U]

Int. Cl.<sup>4</sup> B41F 21/04

U.S. Cl. 101—230

3 Claims



1. A shift-over device for controlling the turning drum grippers of a rotary sheet printing press optionally changeable for one-side printing or two-side printing and having a relatively rotatable gripper opening cam and an axially movable gripper turning cam, said device comprising, in combination, a rotatable switching shaft carrying a stop arm, adjustable stop means mounted on the press frame for engaging said stop arm and limiting the rotation of said switching shaft in opposite directions, means including a first crank arm secured to said switching shaft and carrying a lash lever coupled to said gripper opening cam for relatively rotating said gripper opening cam incident to oscillations of said switching shaft, means including a second crank arm secured to said switching shaft and coupled to a push arm having face cams engageable with push rods connected to said gripper turning cam for axially shifting said gripper turning cam incident to oscillations of said switching shaft, and control means for oscillating said switching shaft and stop arm between said adjustable stop means.

**4,791,869**  
**PHASE ADJUSTING APPARATUS FOR SHEET-FED**  
**PRINTING PRESS**

Shigeo Furukawa, Higashikatsushika, Japan, assignor to Komori Printing Machinery Co., Ltd., Tokyo, Japan  
Filed Nov. 30, 1987, Ser. No. 126,278

Int. Cl.<sup>4</sup> B41F 7/06

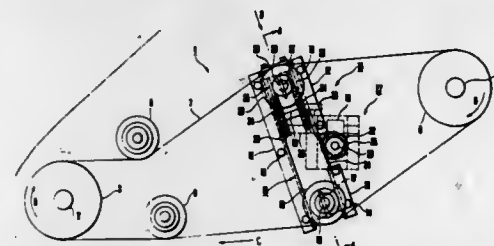
U.S. Cl. 101—232

3 Claims

1. A phase adjusting apparatus for a sheet-fed printing press for adjusting a relative phase in a rotational direction between a paper sheet feeder and a printing apparatus which are coupled through a chain, comprising:

- a frame;
- a sprocket which is in contact with said chain from the inside toward a tension side of said chain;
- a slide member, mounted on said frame through rails, for supporting said sprocket through a short shaft such that said slide member is movable along the longitudinal direction corresponding to a direction perpendicular to an extension direction of the tension side of said chain;
- slide member driving means for moving said slide member in the longitudinal direction wherein said slide member com-

prises a thin-walled portion at an upper portion thereof, a slide block having stepped screw holes, spring pins fitted in said stepped screw holes, and adjusting screws threadably engaged with said stepped holes and engaging with upper ends of said spring pins, said spring pins being surrounded by said spring members; and



a tension sprocket supported on said slide member through a short shaft and in contact with said chain from the inside toward a slack side of said chain, said tension sprocket being biased by a spring member so that the chain is tensioned.

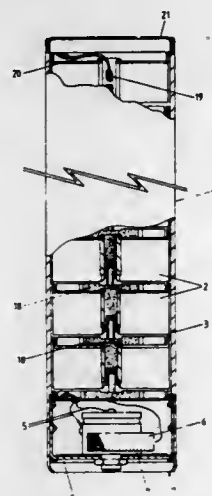
**4,791,870**  
**PYROTECHNIC ASSEMBLY**  
Geoffrey M. Simpson, Nottingham, United Kingdom, assignor to Haley & Weller Limited, Draycott, England  
Filed Apr. 4, 1984, Ser. No. 633,266

Claims priority, application United Kingdom, Apr. 5, 1983, 8309218

Int. Cl.<sup>4</sup> F42B 4/26

U.S. Cl. 102—342

9 Claims



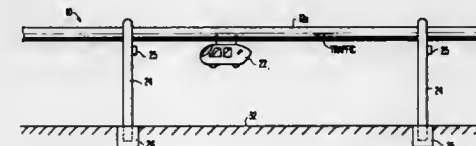
1. A pyrotechnic assembly comprising an outer tubular launching tube sealed at one end with an end cover, and a plurality of pyrotechnic elements mounted in a stack formation therein, each element having a main pyrotechnic charge and having a propellant charge positioned between itself and the next element to propel the element out of the one end of the tube, wherein each element includes a pyrotechnic delay charge for igniting its propellant charge whereby the propellant charges are ignited at predetermined intervals, and wherein each element includes a further pyrotechnic delay charge to delay the ignition of the main pyrotechnic charge until a predetermined time after ignition of its propellant charge.

**4,791,871**  
**DUAL-MODE TRANSPORTATION SYSTEM**  
Jack U. Mowil, 3111 Furman La. #202, Alexandria, Va. 22306  
Filed Jun. 20, 1986, Ser. No. 876,926

Int. Cl.<sup>4</sup> B61B 3/00

U.S. Cl. 104—94

20 Claims



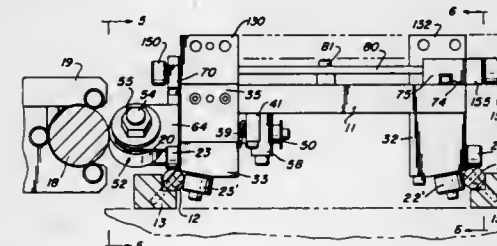
1. A dual-mode transportation system comprising a guideway and a dual-mode vehicle having a first mode of operation in which said dual-mode vehicle travels along said guideway, said dual-mode vehicle having a second mode of operation in which said dual-mode vehicle travels along a roadway; wherein said dual-mode vehicle carries its own engaging means for engaging said guideway when the dual-mode vehicle is operating in the first mode of operation; and wherein said engaging means comprises a retractable dolly which is retracted when said dual-mode vehicle is not operating in the first mode of operation, said dual-mode vehicle comprising a roof having a surface and recess means located adjacent to said surface for receiving said retractable dolly when said retractable dolly is retracted, said retractable dolly extending from said recess means when said engaging means engages said guideway.

**4,791,872**  
**VEHICLE AND TRACK SYSTEM**  
Terrance E. McGinn, Sellersville, Pa., assignor to PSI, Telford, Pa.  
Filed Mar. 30, 1987, Ser. No. 31,352

Int. Cl.<sup>4</sup> B61B 13/12

U.S. Cl. 104—166

15 Claims



1. A vehicle for use in a vehicle and track system having an elongated track and rotating drive shaft extending along and parallel to the track, comprising:

- a vehicle body having a top side, a bottom side and a lateral side,
- support wheel means on the bottom side of said vehicle body constructed and arranged to ride on said track and support said vehicle thereon,
- drive wheel means including
- a drive wheel mounted on said vehicle body to extend from said lateral side of said vehicle body into driving contact with a rotating drive shaft adjacent said lateral side,
- means mounting said drive wheel for movement about a horizontal axis between a drive position in which said vehicle is driven along said track at a high speed and a vehicle accumulation position in which said vehicle is maintained in a stopped position in contact with another vehicle means on said track, and

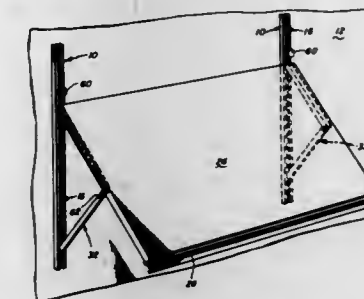
vehicle speed control means including means for actuating said drive wheel between said two position thereof.

**4,791,873**  
**MULTIPURPOSE ADJUSTABLE DESK-TOP**  
Kevin Towfigh, 14 Felton St., Waltham, Mass. 02154  
Continuation of Ser. No. 223,804, Jan. 9, 1981. This application  
Jul. 11, 1983, Ser. No. 512,188

Int. Cl.<sup>4</sup> A47F 5/12

U.S. Cl. 108—10

8 Claims



1. A retractable work surface system comprising: a pair of vertically-extending, laterally spaced elongate standards, each standard defining a longitudinal channel having a rear wall, a pair of spaced sidewalls extending forwardly from the rear wall, said channel having a forwardly facing restricted opening formed along its length and at the forward region thereof, the restricted opening being defined by a pair of flanges extending inwardly toward each other from the forward end of the sidewalls; means enabling each standard to be secured in an upright position without presenting any obstruction in the channel; an upper yoke slidable in each channel; a lower yoke slidable in each channel; means for releasably securing each of said yokes in any position along its respective channel; an upper link associated with each standard, the upper link being pivoted at one end to the upper yoke; a lower link associated with each standard, the lower link being pivoted at one end to the lower yoke; each of the upper links being pivoted to its associated lower link at a common pivot located forwardly of the pivotal connection between the links and their respective yokes; a table secured to the upper links for movement therewith and to connect the linkages for movement in unison with each other; said linkages being movable between a vertical position in which the upper and lower links are in longitudinal alignment with each other and in which at least portions of the upper and lower links are received within the channels in the standards.

**4,791,874**  
**CHAIN STITCH MACHINE**  
Kengo Shiomi, Tokyo, Japan, assignor to Tokyo Juki Industrial Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 696,697, Jan. 31, 1985, abandoned. This application Nov. 19, 1986, Ser. No. 931,897

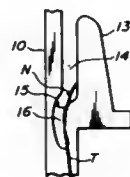
Int. Cl.<sup>4</sup> D05B 1/20, 73/12

U.S. Cl. 112—162

2 Claims

1. In a device adapted to be secured to the frame of a sewing machine for use in sewing a sequence of idle chain stitches into a seal on the lower side of a cloth, the device includes a throat plate having a needle locating opening through which a needle is extendible and a retainer for holding a free end of the sequence of idle chain stitches, the throat plate being characterized by having guide means for guiding the idle chain stitches, said guide means being adjacent to said needle locating open-

ing and adapted to guide the sequence of the idle chain stitches in such a manner that the sequence of idle chain stitches is penetrated by the needle sewing a seam when the sequence of idle chain stitches is engaged by said retainer during operation of a sewing machine, said guide means comprising a guide

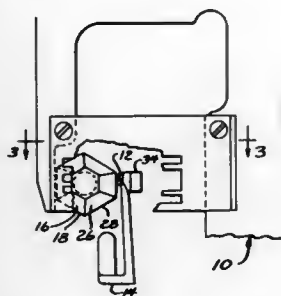


groove formed adjacent to the needle locating opening, said guide groove having surface means defining an engaging portion formed on an inner edge portion thereof, said engaging portion preventing the sequence of idle chain stitches from being moved vertically from said guide groove.

**4,791,875**  
**NEEDLE GUARD FOR SEWING MACHINE**  
Manfred Ackermann, Elmhurst, Ill., assignor to Union Special Corporation, Chicago, Ill.  
Filed Jul. 22, 1987, Ser. No. 76,517  
Int. Cl. D05B 55/06

U.S. Cl. 112-227

10 Claims



1. A needle guard for sewing machines, comprising: a reciprocating needle; a looper; a guard member positioned adjacent a lower end of the needle during reciprocation thereof, said guard member having a plurality of separate faces projecting a different distance towards the needle when selectively positioned to face the needle; and means for selectively positioning one of said faces towards the needle.

**4,791,876**  
**AUTOMATIC NEEDLE THREAD SUPPLY CONTROL SYSTEM**

Toshio Sasaki, and Masao Ogawa, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan  
Filed Feb. 19, 1987, Ser. No. 16,332

Claims priority, application Japan, Feb. 22, 1986, 61-37898; Oct. 22, 1986, 61-25133

Int. Cl. D05B 49/00

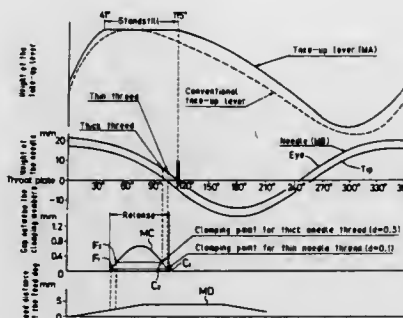
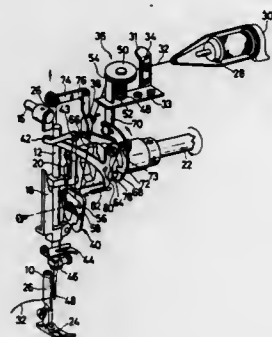
U.S. Cl. 112-241

12 Claims

1. An automatic needle thread supply control system for use in a sewing machine having a needle thread supply source, an endwise reciprocating needle with an eye, a feed member operating in synchronism with the reciprocation of the needle for imparting a feed motion to a work fabric, a take-up member movable between a first position where the needle thread is slackened to a maximum thread slack amount and a second

position where the needle thread is taken up to a maximum thread take-up amount, and a needle thread supply path extending from the needle thread supply source through the take-up member to the eye of the needle, said automatic needle thread supply control system comprising;

thread securing means operative in synchronism with the reciprocation of said needle for securing said maximum thread take-up amount of the needle thread during a specific period which starts at a time determined so as to at least partly overlap with the period of said feed motion and terminates at a time when the eye of said needle is lowered near to the surface of a bed,



thread supply stopping means operative to permit and check the supply of the needle thread which is drawn out from said needle thread supply source as said fabric is fed by said feed member, and control means operative in synchronism with the reciprocation of said needle for controlling the timing and the period of operation of said thread supply stopping means according to the thickness of said fabric being sewn or the thickness of the needle thread being used so that said thread supply stopping means permits the supply of the needle thread during said specific period.

**4,791,877**  
**FEED CONTROL DEVICE FOR AN ELECTRONICALLY CONTROLLED ZIGZAG SEWING MACHINE**

Fujio Horie, Nagoya, and Kenji Matsubara, Inuyama, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Nov. 16, 1987, Ser. No. 121,237

Claims priority, application Japan, Nov. 15, 1986, 61-272666

Int. Cl. D05B 3/02

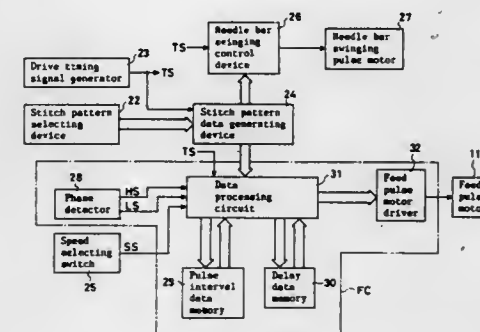
U.S. Cl. 112-456

9 Claims

1. A feed control device for an electronically controlled zigzag sewing machine including a needle reciprocated up and down by a main motor with a variable speed, feed means directly driven by a pulse motor for feeding a work fabric in

synchronization with the vertical motion of said needle, pulse motor driving means for driving said pulse motor in response to a command pulse train of the number of pulses corresponding to a feed stroke of said work fabric, a thread take-up member driven in synchronization with the vertical motion of said needle in order to take-up the tread loop formed in the eye of the needle, and speed setting means for setting the speed of said main motor; said feed control device comprising:

pulse train generating means for generating said command pulse train according to a pulse train pattern predeter-



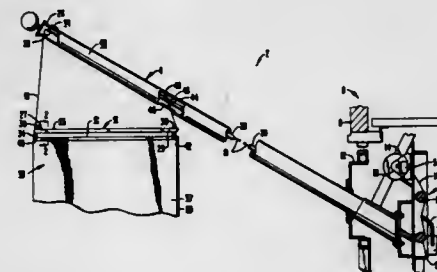
mined depending on the speed of said main motor and the number of pulses corresponding to the feed stroke of said work fabric; and

pulse train generation control means for controlling the start of operation of said pulse train generating means according to the speed of said main motor so that the vertical motion phase of said needle at the end of generation of said command pulse train by said pulse train generating means may be delayed with increasing speed of said main motor.

**4,791,878**  
**FLAGPOLE ASSEMBLY**  
Kenton A. Lewis, Oakland, Calif., assignor to C. E. Toland & Son, Oakland, Calif.  
Filed May 29, 1987, Ser. No. 55,665  
Int. Cl. G09F 17/00

U.S. Cl. 116-173

18 Claims



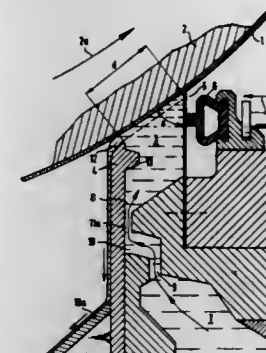
1. A flagpole assembly for mounting to a support comprising a hollow pole, including a base end, a tip and an exit opening at the tip, mounted to the support; an anchor at a chosen position along the pole; a winch; a halyard having first and second ends, the first end connected to the winch, the halyard extending from the winch along the interior of the pole and through the exit opening; a flag having an inner edge; first and second guides secured to the flag along the inner edge for movably mounting the flag to the halyard to allow the flag to move freely along the halyard;

means for substantially fully extending the inner edge of the flag at least when the inner edge is adjacent the pole; and the halyard extending from the exit opening, past the first guide, past the second guide and to the anchor, so that winding and paying out the halyard onto and from the winch raises and lowers the flag.

**4,791,879**  
**APPARATUS FOR COATING RUNNING WEBS**  
Dan Eklund, Kausalainen, and Sivert Westergaard, Järvenpää, both of Finland, assignors to Oy Wartala Ab, Helsinki, Finland  
Continuation of Ser. No. 729,467, May 1, 1985, abandoned. This application Oct. 8, 1986, Ser. No. 917,256  
Claims priority, application Finland, May 11, 1984, 841899  
Int. Cl. B05C 5/02

U.S. Cl. 118-50

16 Claims



1. A coater for coating a running paper or cardboard web, comprising wall means defining a coating chamber having an inlet end and an opposite outlet end, the chamber having an inlet opening at its inlet end for introducing coating substance into the chamber and being open against the web at its outlet end, the wall means including a web entrance wall that bounds the chamber in the upstream direction with respect to the path of movement of the web and is spaced from the web so as to define a slot for the web to enter the chamber, and a back wall structure that bounds the chamber in the opposite, downstream direction, said back wall structure including a doctor member that engages the web for forming a coating layer on the web, and the coater also comprising supply means connected to the inlet opening of the coating chamber for delivering pressurized coating substance into the coating chamber, the supply means including an inlet conduit which terminates at said inlet opening and which defines a flow path along which coating substance that is delivered into the coating chamber passes, the flow path having at least one sharp change of direction a short distance upstream of the inlet opening, the slot defined between the web entrance wall and the web being sufficiently narrow to limit the flow of coating substance from the coating chamber and thereby maintain the coating substance in the coating chamber under pressure, and the distance between the web entrance wall and the doctor member at the outlet end of the chamber being such that, at normal web running speed, the web moves from the entrance wall to the doctor member in a time of at most 0.3 s, the inlet opening being positioned to introduce coating substance into the coating chamber at a position that is closer to the web entrance wall than to the back wall structure, whereby the flow of coating substance in the coating chamber is, at a position close to the web entrance wall, divided into two branches, of which a first branch follows the web in its running direction toward the back wall structure and a second branch, which is of a considerably greater volume flow rate than the first branch, flows out from the coating chamber through the slot.



4,791,880

# DEVICE FOR DEVELOPING TREATMENT OF SEMICONDUCTOR MATERIALS

Selichiro Aigo, 3-15-13, Negishi, Daito-ku, Tokyo, Japan

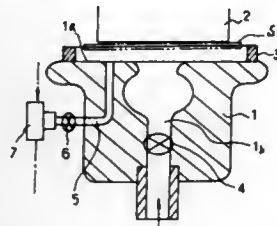
Filed May 19, 1987, Ser. No. 51,335

Claims priority, application Japan, May 19, 1986, 61-114448

Int. Cl.<sup>4</sup> B05C 3/09, 3/18

U.S. Cl. 118—50

5 Claims



1. An apparatus for developing semi-conductor materials comprising:

a cup-shaped basin having a center portion and an annular flat upper portion, said center portion having a liquid inlet passage, said inlet passage having an upper end; and a chuck positioned above said basin, said chuck having a lower end surface for attracting and supporting, under vacuum, the semi-conductor material to be developed; and

a ring provided on said upper portion of said basin to temporarily store developing liquid supplied to said upper portion, said ring having a diameter larger than the size of said semi-conductor material; and

a first automatically operable valve provided in said liquid inlet passage located below said upper end of said liquid inlet passage; and discharge means communicating with said basin for discharging developing liquid.

4,791,881

# GRAVURE COATING DEVICE

Takashi Iwasaki, Samukawa, Japan, assignor to Yasui Seiki Co., Ltd., Tokyo, Japan

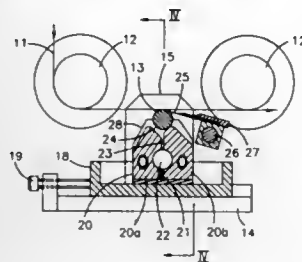
Filed Aug. 11, 1986, Ser. No. 895,304

Claims priority, application Japan, Sep. 6, 1985, 60-136404

Int. Cl.<sup>4</sup> B05C 1/08

U.S. Cl. 118—244

7 Claims



1. A gravure coating device for applying a coating to a first side of a longitudinally traveling continuous web comprising:

a. a pair of spaced apart extension rollers rotating about transverse axes, contacting a second side of said web and advancing said web in a manner that said web is substantially unbowed between said extension rollers;

b. a gravure roll for applying coating to said first side of said web, tangentially contacting said web first side from beneath said web, intermediate said extension rollers, said

second side of said web at and proximate said gravure roll being unrestrained;

c. a doctor blade for wiping excess coating from said gravure roll prior to contact between said gravure roll and said web, said doctor blade being pivotally rotatable about an axis generally parallel with the axis of rotation of said gravure roll, to move against or away from said gravure roll about said pivot;

d. a nozzle for applying said coating material to said gravure roll at a position generally diametrically opposite and below said position of gravure roll-web contact, said nozzle comprising:

i. a pair of transversely elongated nozzle blocks below and generally parallel with the axis of rotation of said gravure roll, said nozzle blocks being closely spaced one to another and having transversely extending, respectively diverging surfaces defining a trough-like nozzle outlet, said respective diverging surfaces being at substantially a common angle respecting a throat of said nozzle with said trough-like nozzle outlet communicating with said nozzle throat, said diverging surface of said nozzle block first proximately encountered by said gravure roll surface as said gravure roll rotates being further from said gravure roll surface at a point of closest approach therebetween than a corresponding diverging surface of said nozzle block of said pair secondly approached by said gravure roll surface as said gravure roll rotates, said diverging surfaces extending towards said web and terminating at surface extremities which are separated from said web less than diameter of said gravure roll, with a portion of said gravure roll being interposed between said diverging surface extremities;

ii. said nozzle throat being defined by space between said respective nozzle blocks and being separated from said gravure roll by said diverging surfaces;

iii. said nozzle blocks including respective mutually facing recesses defining a coating reservoir communicating with said nozzle throat and separated from said gravure roll by said nozzle throat and said diverging surfaces;

iv. means interposed between said respective nozzle blocks at mutually facing surfaces thereof, for spacing said nozzle blocks apart to define said nozzle throat intermediate said reservoir and said nozzle outlet;

v. means for transversely confining said coating material within said nozzle along the axial length of said gravure roll, said coating confining means closely fitting about the periphery of said gravure roll and said diverging surfaces of said nozzle block, said nozzle throat and said nozzle reservoir, to retain said coating material in the coating reservoir, the nozzle throat and a trough defined by said respective diverging planar surfaces within a selected axial region between respective ones of said confining means; said confining means extending from said respective nozzle blocks towards said traveling continuous web to define, with said gravure roll and said nozzle blocks, a confined trough-like coating bath within which said coating emanating from said nozzle throat is applied to a lower said gravure roll.

4,791,882

# LOOSELY MOUNTED OUTER SLEEVE MEMBER WITH BIASING MEANS

Yuji Enoguchi, Higashiosaka; Masashi Yamamoto, and Toshiya Natsuhara, both of Amagasaki, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Oct. 7, 1987, Ser. No. 105,245

Claims priority, application Japan, Oct. 8, 1986, 61-240030; Feb. 19, 1987, 62-37374; Aug. 13, 1987, 62-203306

Int. Cl.<sup>4</sup> G03G 15/08

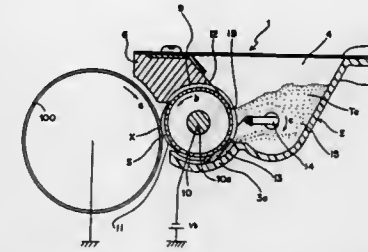
U.S. Cl. 118—653

12 Claims

1. A developing device disposed adjacently to a rotatably arranged electrostatic latent image support member, which comprises:

a rotatably disposed developing roller confronting said electrostatic latent image support member;

a cylindrically formed flexible outer sleeve member having a peripheral length longer than that of said developing roller and loosely mounted therearound;



first means for biasing said outer sleeve member against said developing roller to form a slack of said outer sleeve member at a location confronting said electrostatic latent image support member; and second means for forming a toner layer on external surface of said outer sleeve member.

4,791,883

# DISPOSABLE LITTER BOXES

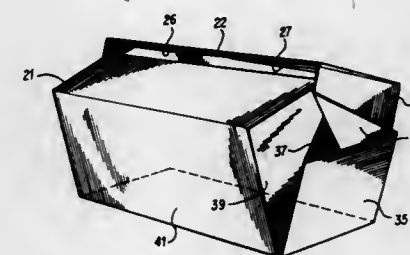
Donald L. Lehman, 1341 Jefferson Blvd., Hagerstown, Md. 21740; Richard G. Lutzke, 9082 Tomstown Rd., Waynesboro, Pa. 17268, and Robert W. Belchler, Jr., Baltimore, Md., assignors to Donald L. Lehman, Hagerstown, Md. and Richard G. Lutzke, Waynesboro, Pa.

Filed Mar. 26, 1987, Ser. No. 30,381

Int. Cl.<sup>4</sup> B65D 5/54; A01K 29/00

U.S. Cl. 119—1

17 Claims



1. A disposable litter container for waste absorbent material comprising a foldable box which is convertible from a closed configuration to an open tray in which the absorbent material is retained during use, said tray having a bottom, side walls, opposite end walls, and upper edges, each of said side walls having a first pair of fold lines which are vertically oriented and parallel with one another in generally equally spaced relationship to said opposite end walls, said first pair of fold lines extending from the bottom to said upper edges of said tray, a second pair of fold lines extending across said bottom of said tray and between and in general alignment with each of said first pair of fold lines, each of said side walls having a third pair of spaced fold lines extending upwardly and outwardly in opposite directions along said side walls toward said opposite end walls from adjacent said bottom and proximate to said first fold lines to said upper edges of said tray at points spaced adjacent said opposite end walls, said tray being foldable about said second pair of fold lines with said side walls being simultaneously folded generally outwardly relative to said bottom about said first and third pairs of fold lines so as to form said closed configuration of said foldable box wherein the absor-

bent material is enclosed with said end walls are in overlying relationship with one another.

4,791,884

# LAYING NEST FOR DOMESTIC FOWL AND METHOD FOR COLLECTING EGGS

Daniel Cassuto, Mobile Post, Jerusalem Hills, Village Ofrat, Israel (90906)

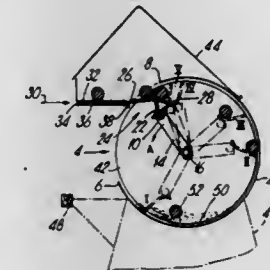
Filed May 28, 1987, Ser. No. 54,914

Claims priority, application Israel, Jun. 10, 1986, 79074

Int. Cl.<sup>4</sup> A01K 31/16

U.S. Cl. 119—48

11 Claims



1. A laying nest for domestic fowl with automatic egg collection, comprising:

a housing consisting of a substantially horizontal, at least in part substantially cylindrical drum-like structure provided with a window-like opening extending at least along a portion of its length;

a rotatable rake located within said housing and mounted for rotation through at least 360° about an axis which is substantially concentric with the axis of said substantially cylindrical drum-like structure, said rake being provided with a tine portion comprised of a plurality of tines that are disposed along a line substantially parallel to but spaced from the axis of rotation of said rake, said tine portion, when said rake is rotating, sweeping out a layer of the housing interior corresponding in depth to the length of said tines, and,

a stationary counter-rake attached to said housing and having a tine portion comprised of a plurality of inwards-pointing tines, said counter-rake tine portion penetrating the path of sweep of said rotating tine portion.

4,791,885

# WHALE HARNESS

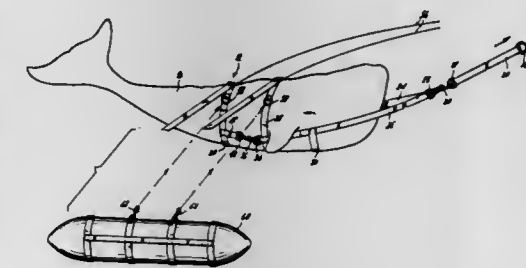
Michael I. Sandlofer, 610 City Island Ave., City Island, N.Y. 10464

Filed Jun. 27, 1985, Ser. No. 750,009

Int. Cl.<sup>4</sup> A62B 35/00

U.S. Cl. 119—96

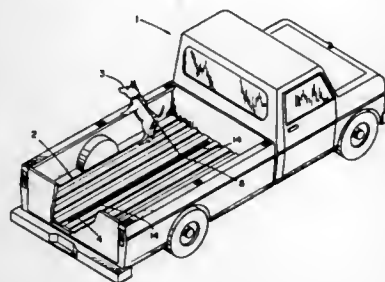
1 Claim



1. A method of returning a beached cetacean to water deep enough for the mammal to swim in comprising the steps of:

attaching a harness about the marine mammal at a position behind the mammal's flippers but in front of its tail; tightening the harness about the marine mammal without inhibiting movement of the marine mammal's tail; towing the mammal substantially forwardly into deep water; and supporting the marine mammal's chin during towing to keep its spout above water during towing; and releasing the marine mammal from the harness.

**4,791,886**  
**METHOD AND APPARATUS FOR RESTRAINING AN ANIMAL ON A VEHICLE**  
Edward A. Anderson, Houston, Tex., assignor to E A Squared, Inc., Houston, Tex.  
Filed Jul. 9, 1987, Ser. No. 71,485  
Int. Cl.<sup>4</sup> A01K 3/00  
U.S. Cl. 119—120 8 Claims

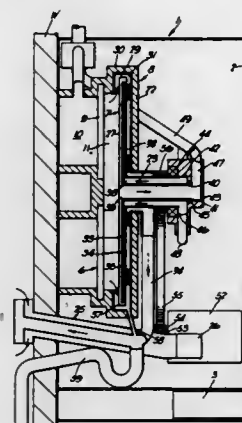


1. An animal restraining device incorporating a vehicle cargo surface comprising:  
a slotted track member extending along and within a channel formed in said cargo surface, the slotted track member being secured within the channel;  
slider means engagable within the slotted track member; retention means defined by the slotted track member for restraining the slider means from leaving the slotted track member in all directions except along the longitudinal axis of the slotted track member; and  
a flexible strand connected at one end to the slider means whereby the length of the strand is selected such that an animal attachable to the opposite end of the strand may roam the vehicle cargo surface but is prevented from leaving the vehicle cargo surface.

**4,791,887**  
**BOILER WITH ROTATABLE HEAT EXCHANGER**  
Terence L. Wainington, Stroud, and Ian W. Eames, Sheffield, both of England, assignors to Caradon Mira Limited, England  
Filed Jul. 27, 1987, Ser. No. 78,583  
Claims priority, application United Kingdom, Aug. 1, 1986, 8618899  
Int. Cl.<sup>4</sup> F22B 5/00  
U.S. Cl. 122—11 20 Claims

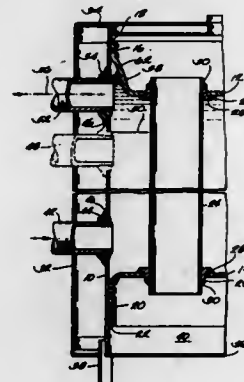
1. A boiler comprising an enclosure including a burner assembly and defining a combustion chamber, a disc-shaped heat exchanger arranged in said combustion chamber between said burner assembly and an end wall of said combustion chamber for rotation about an axis, said heat exchanger having front and rear walls defining heat exchange surfaces facing said burner assembly and said end wall respectively, turbulator means on said end wall for promoting shear and turbulence of combustion products flowing over said rear wall, means for circulating fluid to be heated through said heat exchanger, and drive

tion products flowing over said rear wall, means for circulating fluid to be heated through said heat exchanger, and drive



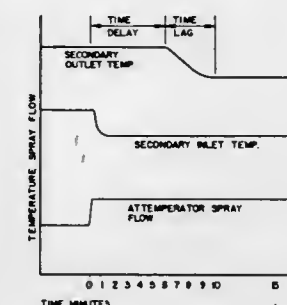
means for rotating said heat exchanger relative to said turbulator means about said axis.

**4,791,888**  
**WATER HEATER TANK CONSTRUCTION**  
Otto Z. Vago, Burns, Tenn., assignor to State Industries, Inc., Ashland City, Tenn.  
Filed Sep. 11, 1987, Ser. No. 95,434  
Int. Cl.<sup>4</sup> F22B 5/00  
U.S. Cl. 122—17 2 Claims



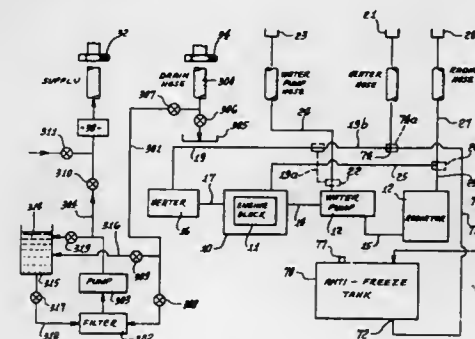
1. A water heater tank construction comprised of a tank shell having a tank top member and a tank bottom member mounted therein to provide a water tight space therein, a cold water outlet mounted in lower portion of said tank shell, said tank top member having an upwardly extending flange welded to said tank shell, said flange having a deformed portion extending inwardly from the main body of the flange to provide a space between said shell and said deformed portion, and a hot water outlet mounted in the upper portion of said tank shell with at least a portion of said outlet extending into said space provided by said deformed portion of said flange.

**4,791,889**  
**STEAM TEMPERATURE CONTROL USING A MODIFIED SMITH PREDICTOR**  
Theodore N. Matko, Chesterland; Robert S. Rand, Painesville, both of Ohio; Thomas D. Russell, Georgetown, Tex.; Thomas J. Scheff, Chesterland, Ohio, and Robert R. Walker, deceased, late of Euclid, Ohio (by Dorothy H. Walker, executrix), assignors to The Babcock & Wilcox Company, New Orleans, La.  
Filed Apr. 2, 1987, Ser. No. 34,122  
Int. Cl.<sup>4</sup> F22G 5/00  
U.S. Cl. 122—479 R 5 Claims



1. A steam temperature controller comprising:  
a feedforward predictor for presetting an expected secondary superheater inlet temperature with a boiler load and for generating a secondary superheater inlet temperature cascade controller set point;  
a first modifier means for correcting said expected first temperature for the deviation between a firing rate required for the boiler load and an actual firing rate;  
a second modifier means for correcting said expected inlet temperature for deviation of an air flow rate required for the firing rate for the boiler load and an actual air flow rate;  
a third modifier means for correcting said expected inlet temperature for reheat temperature control;  
a feedback correction control means for final correction; and  
a cascade control means responsive to said inlet temperature for providing rapid process loop response to predictable intermediate process control points.

**4,791,890**  
**ENGINE COOLING SYSTEM POWER FLUSH WITH FLUSH LIQUID FILTERING AND RECIRCULATION**  
Gerald Miles, Fullerton; Rainer H. Labus, Burbank, and James R. Grebe, Fullerton, all of Calif., assignors to Wynn Oil Company, Fullerton, Calif.  
Filed Apr. 2, 1987, Ser. No. 33,576  
Int. Cl.<sup>4</sup> F28G 9/00; B08B 9/02; F01P 11/06  
U.S. Cl. 123—41.14 9 Claims

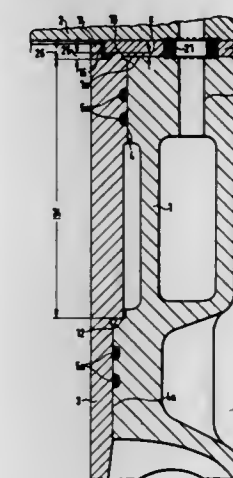


1. In combination with an internal combustion engine cool-

ing system that includes a liquid coolant heat radiator and liquid coolant pump, flushing apparatus comprising:

(a) first means to produce a pressurized flow of flushing liquid and entrained gas bubbles,  
(b) a series of flow ports selectively connectible to different points in said system, utilizing appropriate adaptors and  
(c) control means operable to direct said flow from said first means and via said ports in different modes relative to said radiator and to coolant passages in the engine, the improvement comprising:  
(d) filter means having an intake to receive said flow after it passes through at least one of the engine and radiator and to filter the received flow,  
(e) means including a pump having an intake operatively connected with the filter means to receive filtered flow therefrom, and having a discharge directly connected to said first means,  
(f) and additional means for removing air bubbles from the flow re-supplied to said first means, said additional means including a tank having an inlet to directly receive the flow from the pump, and wherein the flow is allowed to release air bubbles to atmosphere, the filter means being outside liquid in the tank, and including a line connecting the tank to the filter means to pass liquid from the tank to the filter means intake,  
(g) said additional means including additional lines to directly and controllably supply the flow, after it passes through at least one of the engine and radiator, to each of:  
(i) the filter means intake, and  
(ii) said tank.

**4,791,891**  
**RECIPROCATING PISTON ENGINE**  
Heribert Kubis, Nuremberg, and Josef Winter, Rednitzhembach, both of Fed. Rep. of Germany, assignors to MAN Nutzfahrzeuge GmbH, Munich, Fed. Rep. of Germany  
Filed Mar. 20, 1987, Ser. No. 28,602  
Claims priority, application Fed. Rep. of Germany, Mar. 26, 1986, 3610147  
Int. Cl.<sup>4</sup> F02F 11/10  
U.S. Cl. 123—41.84 5 Claims



1. In a reciprocating piston engine having cooperating parts including a cylinder block, at least one cylinder head that can be securely tightened to said cylinder block, and at least one replaceable cylinder liner, whereby in each cylinder liner there is slideably disposed a respective piston and a combustion chamber is provided that is delimited by said cylinder head, said cylinder liner, and said piston, with said cylinder liner being supported on said cylinder block via a liner shoulder, and with that end face of said liner shoulder that faces said cylinder



head being provided with a first raised edge portion in that portion of said end face contiguous to said combustion chamber, and also being provided with a radially outwardly open recess, which has a base, in the remaining portion of said liner shoulder end face, with the latter further being provided in said recess region with a circumferential second raised portion that is directed toward said cylinder head, whereby a continuous plate-like cylinder head gasket, made of solid metal, is disposed in said recess between said cylinder head and said cylinder block, the improvement in combination therewith wherein:

only said second raised portion, and not said base of said recess, extends and includes a projection having a penetration depth for a distance, in the direction toward said cylinder head, as well as being located above said base of said recess and via only said projection for a distance of penetration depth relative to as well as beyond an end face of said cylinder block that faces said cylinder head; and wherein said cylinder head gasket has a defined compressive strength of the gasket with full surface seal support exclusively between said cylinder head and said cylinder block, and said second raised portion is matched with said cylinder head gasket in such a way that when said cylinder head is secured to said cylinder block, said gasket is always stressed beyond the yield point and is positively interlocked with said second raised portion due to plastic deformation at a quantitatively regulated pressure force dependent exclusively upon flow limit of the gasket in a region of said projection whereas gasket regions to the left and right thereof have no engagement with the cylinder liner, with said penetration of said second raised portion into said cylinder head gasket being completed as soon as a remaining portion of said gasket comes into contact with said end face of said cylinder block, and with said cylinder head gasket having such a stress/strain characteristic that once said yield point is exceeded, a maximum, substantially constant compressive strength deformation range exists for an always reliable sealing of said combustion chamber while enduring dimensional manufacturing tolerances of cooperating parts as well as tolerances in cylinder head tightening.

4,791,892

## TWO-STROKE ENGINE

Roger M. Hall, 445 Ashmore Road, Ashmore, Queensland, Australia

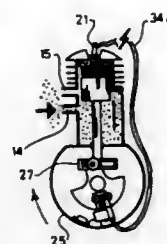
Filed Mar. 19, 1987, Ser. No. 27,834

Claims priority, application Australia, Mar. 21, 1986, PH5144; Nov. 14, 1986, PH8964

Int. Cl.<sup>4</sup> F01L 11/00

U.S. Cl. 123—47 R

18 Claims



1. A single cylinder two stroke engine comprising: a single piston housing; a piston located in the piston housing; a transfer port; an inlet port in the piston housing; a connecting rod integral with or otherwise secured to the piston; a crankcase located adjacent to the piston housing and sealed therefrom; a crankshaft in the crankcase; pivotal connection means between the crankshaft and connecting rod; a magnet located in the crankshaft; ignition means mounted inside the crankcase adjacent the crankshaft for passage of the magnet by the ignition means to effect firing of the engine.

4,791,893  
VALVE TRAIN ARRANGEMENT FOR MULTI-VALVE ENGINE

Shigeo Muranaka, Yokosuka; Shigeru Kamegaya, Tokyo, and Yutaka Matayoshi, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

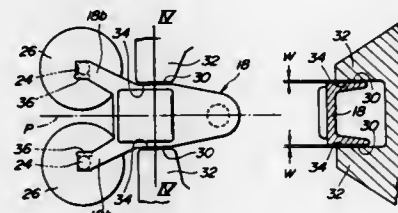
Filed Jul. 9, 1987, Ser. No. 71,242

Claims priority, application Japan, Jul. 11, 1986, 61-105726[U]

Int. Cl.<sup>4</sup> F01L 1/18, 1/26

U.S. Cl. 123—90.4

5 Claims



1. A valve train arrangement for a multi-valve internal combustion engine, comprising: a cylinder head; pivot means mounted on said cylinder head; two valve stems; a cam for operating said valve stems; a cam follower pivotally mounted at one end on said pivot means and having at the other end two fingers operatively engaged with said cam for transmitting motion of said cam to said valve stems; a pair of guide arms provided to said cylinder head in such a manner as to interpose therebetween said cam follower; said cam follower having on opposite sides thereof sliding faces; said guide arms having guiding faces respectively matched with said sliding faces in such a manner that a clearance (W) is provided between each of matched pairs of said guiding faces and said sliding faces; said fingers of said cam follower being provided with integral flanges which depend downwardly on the inboard sides of said valve stems; and a clearance (C<sub>1</sub>) being defined between matched pairs of said flanges and said valve stems, said flanges each having a chamfered end of which a guiding edge most remote from a corresponding one of said fingers is arranged so that a clearance (C<sub>2</sub>) is provided between said guiding edge and a corresponding one of said valve stems, said clearances (C<sub>1</sub>), (C<sub>2</sub>) and (W) being set so as to satisfy the relationship C<sub>2</sub> > W > C<sub>1</sub>.

4,791,894

## RECIPROCATING PISTON ENGINE

Ambrose White, 713 Avenue G, Kentwood, La. 70444

Continuation-in-part of Ser. No. 686,451, Dec. 26, 1984, Pat. No. 4,608,951. This application Jul. 2, 1986, Ser. No. 881,336

The portion of the term of this patent subsequent to Sep. 2, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> F01L 1/34

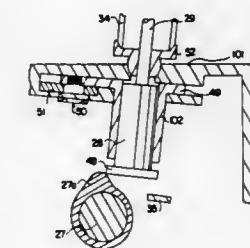
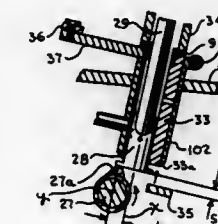
U.S. Cl. 123—90.16

17 Claims

1. In combination, apparatus comprising a piston engine wherein a piston having a crown side and a side opposite said crown side to which an end of a piston is attached while the other is operatively engaged with a drive shaft and the piston reciprocated within a cylinder to drive the engine, a fuel injector means for the introduction of fuel into the cylinder, an intake valve open to an air source such that air can be taken into the cylinder and the fuel burned, a sprocket operatively engaged with said drive shaft, a cam shaft, a sprocket operatively engaged with said cam shaft, and a timing chain operatively engaged with the sprockets of said drive shaft and said

cam shaft to provide synchronization between the rotation of said drive shaft and said cam shaft during operation of the engine,

a cam surface, a cam follower, an eccentric member surrounding said cam follower adjustably movable in relation therewith, and means associated with said cam follower



wherein, when the eccentric member is moved to or away from the axis of the cam shaft to shift the position of the cam follower, the up and down movement and cut off point of the intake valve is effected in timed relationship with the charging of a cylinder to effectively control intake.

4,791,895

## ELECTRO-MAGNETIC-HYDRAULIC VALVE DRIVE FOR INTERNAL COMBUSTION ENGINES

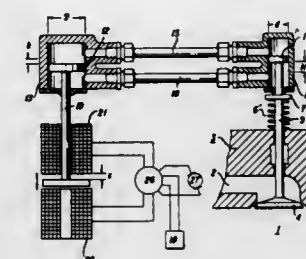
Gabriel Tittler, Rösraht, Fed. Rep. of Germany, assignors to Interatom GmbH, Bergisch-Gladbach, Fed. Rep. of Germany Division of Ser. No. 827,290, Feb. 6, 1986, abandoned. This application May 18, 1987, Ser. No. 52,188

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1985, 3534388

Int. Cl.<sup>4</sup> F01L 9/02

U.S. Cl. 123—90.12

5 Claims



1. Valve drive for a combustion engine with a hydraulic transmission system between a control member and a valve, comprising means for stepping up the hydraulic transmission, the valve having a first cylinder wherein a first piston displaceable by the control member slides and a second cylinder tightly connected by at least one line to said first cylinder and having a second piston slidable therein for moving the valve, the

diameter of said first cylinder being larger than the diameter of said second cylinder, said first and said second cylinder and said at least one line forming a closed system, a first electromagnet excitable in accordance with operating parameters of the combustion engine, and armature means connected to said first piston and pullable by said first electromagnet for electrically generating and electrically controlling force for moving the valve.

4,791,896

## WATER COOLED SCAVENGED CRANKCASE TYPE OTTO INTERNAL COMBUSTION ENGINE

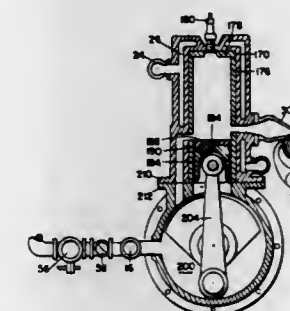
Howard Bidwell, 56 Aldrich St., Granby, Mass. 01033

Continuation-in-part of Ser. No. 15,853, Feb. 17, 1987, which is a continuation-in-part of Ser. No. 5,023, Jan. 20, 1987, which is a continuation-in-part of Ser. No. 874,491, Jun. 16, 1986, which is a continuation-in-part of Ser. No. 821,342, Jan. 22, 1986, which is a continuation-in-part of Ser. No. 623,499, Jun. 22, 1984, abandoned, which is a continuation-in-part of Ser. No. 402,970, Jul. 29, 1982, Pat. No. 4,484,444. This application Mar. 12, 1987, Ser. No. 25,071

Int. Cl.<sup>4</sup> F02B 75/08

U.S. Cl. 123—193 CH

1 Claim



1. An improved combustion chamber of an internal combustion engine comprising in combination: a cylinder defining the chamber, an intake passage communicating with the chamber, an exhaust passage communicating with the chamber, a piston slidable within the cylinder, the wall and head of the cylinder having removable ceramic liners facing toward the chamber, the totality of the head of the piston facing toward the chamber having a removable ceramic liner the wall lining extending throughout the major portion of the cylinder length.

4,791,897

## STEEL LAMINATE TYPE CYLINDER HEAD GASKET

Tsunekazu Udagawa, Ichikawa, Japan, assignor to Ishikawa Gasket Co., Ltd., Tokyo, Japan

Filed Jul. 6, 1987, Ser. No. 69,668

Claims priority, application Japan, Apr. 21, 1987, 62-60439[U]

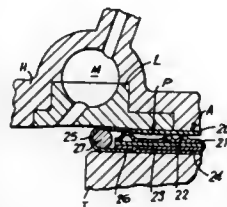
Int. Cl.<sup>4</sup> F02F 11/00

U.S. Cl. 123—193 CH

8 Claims

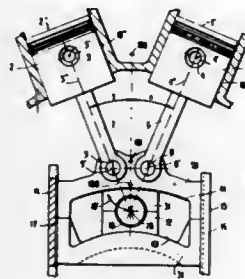
1. A steel laminate type cylinder head gasket to be installed in an internal combustion engine having a cylinder block with a cylinder bore, a cylinder head with an auxiliary combustion chamber and a mouth plate attached to the cylinder head for defining the auxiliary combustion chamber, said gasket having at least one first sealing area around the cylinder bore and at least one second sealing area adjacent the first sealing area, on which the mouth plate is placed, said second sealing area being defined by a curved outer line corresponding to a part of a

contour of the mouth plate and an inner line corresponding to a part of a contour of the cylinder bore, said gasket comprising: a first plate including at least one curved first bead situated outside the second sealing area and adjacent to the curved outer line, said first bead having two outer ends located at the first sealing area adjacent the cylinder bore, at least one second bead, said second bead intercrossing the outer



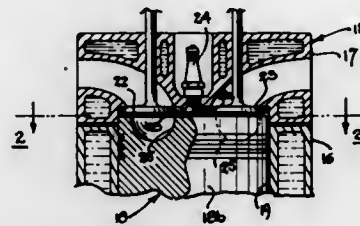
end of the first bead and extending at least partly along the cylinder bore in the first sealing area, and at least two third beads, each third bead extending between the first and second beads so that the outer end of the first bead is located close to the cylinder bore relative to the third bead, and at least one second plate situated adjacent to the first plate to form the steel laminate gasket.

**4,791,898**  
**V-ENGINE WITH YOKE**  
Michael E. Jayne, Belchertown, Mass., assignor to R P & M Engines, Inc., Amherst, Mass.  
Filed Dec. 2, 1986, Ser. No. 937,021  
Int. Cl.<sup>4</sup> F02B 75/32  
U.S. Cl. 123—197 AC 16 Claims



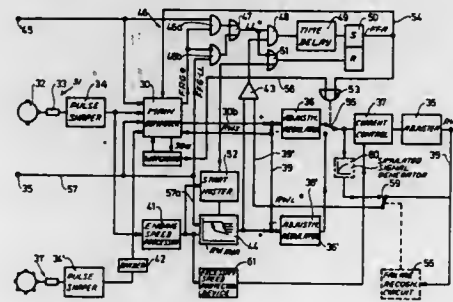
1. An engine having a crankshaft disposed within a crankcase and comprising:  
at least a pair of cylinder means, each cylinder means having an axis;  
said axes each being orthogonally disposed with respect to an axis of said crankshaft,  
the axes of said pair of cylinder means being angularly disposed in V configuration with respect to each other substantially to define a plane;  
a master yoke assembly means engaging opposite sides of said crankcase mounted for movement orthogonal with respect to the axis of the crankshaft and in a direction in said plane and lying between said axes;  
a piston means disposed within each of said cylinder means for movement along said axis of said cylinder means;  
first means connecting each of said piston means to the master yoke assembly means for movement of said piston means relative to the master yoke assembly means; and  
second means connecting the master yoke assembly means to the crankshaft for movement of said crankshaft relative to said master yoke assembly means.

**4,791,899**  
**ACOUSTIC DETONATION SUPPRESSION IN INTERNAL COMBUSTION ENGINE**  
Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406  
Filed Jan. 23, 1987, Ser. No. 6,481  
Int. Cl.<sup>4</sup> F02F 3/26  
U.S. Cl. 123—279 6 Claims



1. In the combustion chamber of an internal combustion engine having a piston slidably mounted in a cylinder, said piston having a top surface, such cylinder having a head which is directly opposite the top surface of the piston when it is in its top dead center position, there being a clearance volume between the top of the piston and the cylinder head, means for attenuating acoustical waves generated in said cylinder comprising:  
an odd number of sockets forming a part of the top surface of the piston,  
a thin slit being formed between the cylinder head and the top surface of the piston with the piston in its top dead center position such that substantially all of the clearance volume between the cylinder head and the top of the piston with the piston in said position is contained within said sockets;  
said sockets forming acoustical chambers between which acoustical waves travel in random fashion through said slit with the piston in top dead center thereby attenuating the acoustical waves.

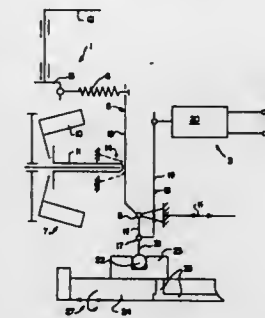
**4,791,900**  
**SAFETY AND EMERGENCY DRIVING METHOD FOR AN INTERNAL COMBUSTION ENGINE WITH SELF-IGNITION AND AN ARRANGEMENT FOR THE PERFORMANCE OF THIS METHOD**  
Rainer Buck, Tamm; Werner Fischer, Ditzingen; Hermann Kull, Stuttgart; Albrecht Sieber, Ludwigsburg, and Wolf Wessel, Obberriexingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
Filed Jul. 14, 1986, Ser. No. 885,166  
Claims priority, application Fed. Rep. of Germany, Aug. 31, 1985, 3531198  
Int. Cl.<sup>4</sup> F22B 21/24  
U.S. Cl. 123—359 15 Claims



1. A safety and emergency driving control method for an internal combustion engine with self-ignition used to power a motor vehicle, comprising the steps of continuously monitor-

ing various operating parameters of the engine, including generating respective signals indicative at least of gas pedal position, engine operating speed, brake actuation, and actual control rod displacement; evaluating such signals, including determining simultaneous occurrence of a modified idling operation condition and of a predetermined minimum value of the actual control rod displacement signal; and controlling the operation of the engine on the basis of said evaluation step, including controlling the control rod displacement in a predetermined manner in the absence of such simultaneous occurrence, and switching, in the presence of such a simultaneous occurrence, to another regulation branch which controls the control rod displacement in accordance with a minimum value characteristic line of the control rod displacement.

**4,791,901**  
**RPM GOVERNOR FOR FUEL INJECTION PUMPS**  
Franz Eheim, deceased, late of Stuttgart, Fed. Rep. of Germany (by Helga Eheim, legal representative), assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
Filed Jul. 29, 1985, Ser. No. 759,784  
Claims priority, application Fed. Rep. of Germany, Aug. 22, 1984, 3430797  
Int. Cl.<sup>4</sup> F02M 39/00  
U.S. Cl. 123—373 18 Claims

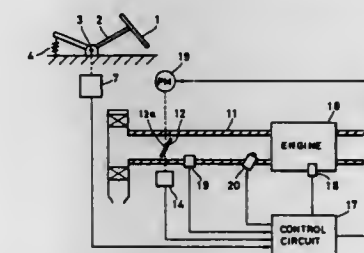


1. An rpm governor for fuel injection pumps of internal combustion engines, comprising a housing, an adjustable support, a tensioning lever having first and second arms each of which are pivotable about a stationary shaft in said housing supported on said adjustable support, said first arm of said tensioning lever being engaged by an rpm signal transducer counter to a variable force of a governor spring, a transmission lever including third and fourth arms arranged to pivot about a pivot shaft supported on said second arm of said tensioning lever, said pivot shaft further adapted to follow an adjusting movement of said tensioning lever, said third arm of said transmission lever arranged to transmit adjusting movement to a quantity control member of said injection pump and said fourth arm of said transmission lever arranged to be engaged by an adjusting member which further includes an electrical adjusting motor which serves to correct an injection quantity and said motor adapted to be triggered by an electrical control unit which possesses engine and environmental parameters.

**4,791,902**  
**THROTTLE VALVE CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE**  
Yoshikazu Ishikawa, and Kouji Yamaguchi, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Jul. 15, 1987, Ser. No. 73,655  
Claims priority, application Japan, Jul. 16, 1986, 61-168844; Jul. 16, 1986, 61-168846; Jul. 16, 1986, 61-168849  
Int. Cl.<sup>4</sup> F02D 9/08, 41/14  
U.S. Cl. 123—399 6 Claims

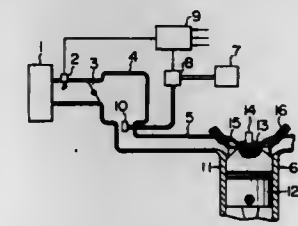
1. A throttle valve control system for controlling an opening

of a throttle valve disposed in an air induction system of an internal combustion engine, comprising:  
engine speed detection means for detecting a rotational speed of said internal combustion engine;  
pressure detection means for detecting an actual pressure in an intake pipe of said air induction system, downstream of said throttle valve;  
throttle valve opening detection means for detecting an actual throttle valve opening of said throttle valve;  
first setting means for setting a target throttle valve opening to attain a minimum fuel consumption rate of said internal combustion engine, in accordance with said rotational speed detected by said engine speed detection means;  
second setting means for setting a target pressure in the intake pipe to attain the minimum fuel consumption rate of



said internal combustion engine, in accordance with said rotational speed detected by said engine speed detection means; and  
drive means, for driving said throttle valve to an opening value selected to reduce a difference between said actual pressure in the intake pipe detected by said pressure detection means and said target pressure in the intake pipe set by said second setting means when said actual throttle opening detected by said throttle valve opening detection means is in an allowable range determined about said target throttle valve opening, and for driving said throttle valve to an opening value selected to reduce a difference between said actual throttle valve opening and said target throttle valve opening when said actual throttle valve opening is not in said allowable range.

**4,791,903**  
**FUEL SUPPLY SYSTEM FOR INTERNAL-COMBUSTION ENGINE**  
Mamoru Fujieda, Ibaraki, and Yoshihide Oyama, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Continuation of Ser. No. 474,033, Mar. 10, 1983, abandoned.  
This application Nov. 30, 1987, Ser. No. 126,344  
Claims priority, application Japan, Mar. 10, 1982, 57-32514  
Int. Cl.<sup>4</sup> F02M 39/00  
U.S. Cl. 123—472 5 Claims



1. A fuel supply system for an internal-combustion engine, the fuel supply system comprising:  
fuel supply means;  
an intake-air passage connected through an intake valve to a combustion chamber defined by a cylinder and a piston, said intake-air passage having a volume between the fuel



supply means and the intake valve means equal to a volume of the cylinder at a lowest point of a stroke of the piston, wherein the fuel supply means is disposed in a portion of said intake-air passage at such a position that the relationship between a volume  $V_{IN}$  of said intake-air passage extending from the fuel supply means to said intake valve and a volume  $V_{COM}$  of said combustion chamber determined at the lowest point of the stroke of the piston satisfies the following condition:

 $V_{IN}=0.7 \text{ to } 1.2 V_{COM}$ 

whereby air present between a vicinity of the intake valve and the fuel supply means is sucked in in accordance with a progress of the intake stroke of the internal combustion engine, with the fuel supplied by the fuel supply means being concentrated at an end of the intake stroke in a vicinity of an ignition plug disposed in an upper part of the cylinder.

**4,791,904**  
**METHOD FOR ASSURING EMERGENCY DRIVING**  
**FUNCTIONS FOR A VEHICLE HAVING A DIESEL**  
**ENGINE**

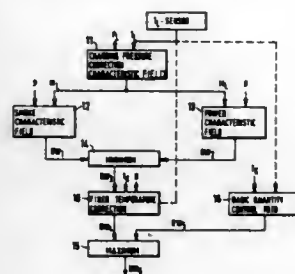
Hermann Grieshaber, Stuttgart; Peter Schueler, Leonberg, and Jürgen Wietelmann, Hirschlanden, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Oct. 20, 1987, Ser. No. 111,365  
Claims priority, application Fed. Rep. of Germany, Nov. 4,  
1986, 3637510

U.S. Cl. 123—479 Int. Cl.<sup>4</sup> F02M 39/00

U.S. Cl. 123-479

#### 4 Claims



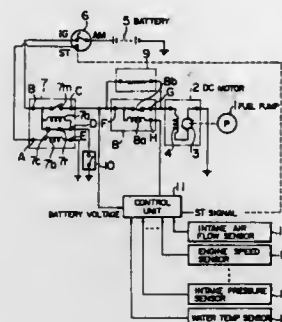
1. Method for assuring emergency driving functions with a diesel engine when the fuel temperature sensor fails, the diesel engine being equipped with a charging-air blower and a charging-air temperature sensor, the method comprising: performing a fuel temperature dependent correction of such functions which are dependent upon the fuel temperature  $T_K$  by taking the temperature data of the charging air as a basis, the functions including: start control path, starting speed, idle speed, control path correction, and basic quantity control; and, the temperature correction with the charging air temperature ( $T_L$ ) being performed within definite temperature limits such that all functions corresponding to a fuel temperature of  $T_K = +20^\circ \text{C}$ . are fulfilled at a charging air temperature of  $T_L \geq 0^\circ \text{C}$ . and all functions corresponding to a fuel temperature of  $T_K = -10^\circ \text{C}$ . are fulfilled at a charging air temperature of  $T_L < 0^\circ \text{C}$ .

4,791,905  
CONTROL APPARATUS FOR A VEHICLE ENGINE  
ELECTRIC FUEL PUMP

Kouchi Furuta Nagoya; Naofumi Fukue; Taku Meguruma,  
both of Hiroshima, and Masato Iwaki, Higashihiroshima, all  
of Japan, assignors to Nippondenso Co., Ltd., Aki and Mazda  
Motor Corporation, Kariya, both of Japan  
Filed Mar. 31, 1986, Ser. No. 846,076  
Claims priority, application Japan, Apr. 2, 1985, 60-70672  
Int. Cl.<sup>4</sup> F02M 39/00

U.S. Cl. 123—497

## 10 Claims



1. A control apparatus for an electric fuel pump of a vehicle with an internal combustion engine, comprising:

- a battery power source;
- motor means for operating said fuel pump in response to power from said power source;
- resistor means provided between said power source and said motor means;
- switch means connected between said power source and said motor means in parallel with said resistor means;
- engine condition detecting means for detecting an engine condition value related to a required fuel quantity of said engine;
- voltage detecting means for detecting a voltage condition value of said power source;
- switch control means having at least one reference value set beforehand in correspondence to said engine condition value, said switch control means controlling said switch means by comparing said engine condition value with said reference value such that when a relationship between said engine condition value and said reference value represents a condition in which said required fuel quantity corresponding to said engine condition value is larger than a reference required fuel quantity corresponding to said reference value, said switch means is closed, and when said relationship represents a condition in which said required fuel quantity corresponding to said engine condition value is equal to or less than said reference required fuel quantity, said switch means is opened; and
- reference value changing means for changing, when said voltage condition of said power source is lower than a predetermined setting value, said reference value in said switch control means in a direction in which said engine condition value changes with a decrease in said required fuel quantity.

4,791,906

**DEVICE FOR REGULATING THE PRESSURE OF A  
FLUID SUPPLIED TO AN INTERNAL COMBUSTION  
ENGINE FROM A FLUID PRESSURE SOURCE**

**André Ecomard, Marly Le Roi, France, assignor to Institut  
Français Du Pétrole, Neuilly-Malmaison, France**

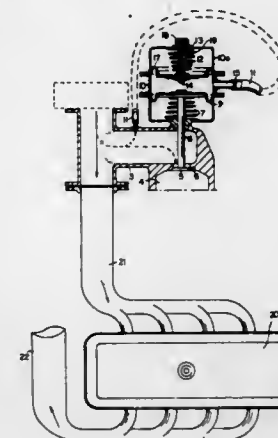
Division of Ser. No. 767,988, Aug. 21, 1965, Pat. No. 4,658,587,  
which is a division of Ser. No. 533,900, Sep. 20, 1963, Pat. No.  
4,552,169. This application Dec. 30, 1966, Ser. No. 947,718

**Claims priority, application France, Jan. 21, 1980, 80 01370**

**Int. Cl.<sup>7</sup> F02D 23/00**

U.S. CL 123-564

### 5 Claims



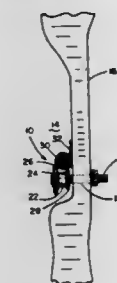
1. In combination with an internal combustion engine and a source of fluid pressure connected to the internal combustion engine via an air intake line, a system for regulating fluid pressure in the air intake line, the system including a bypass conduit opening to the atmosphere, the system comprising: a valve having a valve stem and disposed for connecting the air intake line to the bypass conduit, a downstream port in the intake line downstream of the source of fluid pressure, a pressure controller connected to both the valve and the valve stem, the pressure controller including a housing and a pair of movable walls therein defining a chamber therebetween with first and second spring means for biasing the respective movable walls toward one another so as to vary the volume of the pressure chamber formed therebetween, means for connecting the valve stem to one of said movable walls wherein the valve is biased to the closed position by the first spring means, means for connecting the downstream port to a first calibrated aperture in the fluid pressure chamber wherein as the pressure in the air intake rises so does the pressure in the pressure chamber, an additional calibrated aperture carried by the other movable wall, the additional calibrated aperture forming a passageway which is movable between a first position wherein the aperture is open to the atmosphere and a second position wherein the aperture is blocked, the aperture being biased toward the first position by said second spring means, whereby when the pressure in the air intake increases to a level sufficient to overcome the bias of the spring means the second aperture is closed allowing the pressure in the fluid pressure chamber to open the valve and relieve pressure in the air intake of the engine.

**4,791,907**  
**FISHING ARROW REST FOR ARCHERY BOW**  
 Wilbur E. Corley, 727 Holiday La., Claremore, Okla. 74017  
 Filed Jan. 30, 1987, Ser. No. 9,388  
 Int. Cl.<sup>4</sup> F41D 10/00; F41B 5/00

U.S. CL. 124-41 A

#### 4 Claim

(a) a threaded support means adapted to threadably engage to a threaded arrow rest hole provided in the arrow window of an archery bow and further adapted to extend essentially perpendicularly into the window area of the



archery bow, wherein the end of said threaded support means directed into the window area of the archery bow is further adapted to retain a roller; and

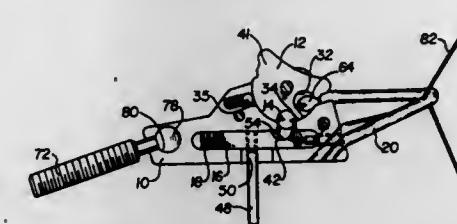
(b) a roller means operatively attached to said threaded support means and held adjacent to the archery bow in the window area such as to revolve around an axis essentially perpendicular to the archery bow substantially without

lateral displacement, wherein said roller means further comprises a pair of rubber O-rings of two different diameters mounted on the outer perimeter of said roller means wherein the larger diameter O-ring is mounted to the outside of the smaller diameter O-ring such that the arrow shaft makes rolling contact with each O-ring as the arrow is launched.

4,791,908  
BOWSTRING RELEASE MECHANISM  
Mario A. Pellis, Mouille Point, South Africa, assignor to Pro  
Line Company, Hastings, Mich.  
Filed Sep. 17, 1987, Ser. No. 97,849  
Int. Cl.<sup>4</sup> F41B 5/00; F41C 17/00  
U.S. Cl. 124—35 A 6 Claims

U.S. CL 124-35 A

### 6 Claims



1. In a bowstring release mechanism comprising a body member, a latch member mounted on the body member for movement relative thereto and from a cocked position, the latch member being formed to grasp and hold a cord by a portion thereof upon movement to the cocked position and to release a cord so held upon movement from the cocked position, and sear means carried by the body member for releasably maintaining the latch member in the cocked position, the sear means being manually operable to release the latch member for movement from the cocked position, the improvement wherein the sear means comprises a sear detent movable to and from a cocking position in which it engages the latch member to hold the latch member in its cocked position, a sear actuator movable in opposite directions between first and second sear positions and a neutral position intermediate the first and second sear positions, and biasing means urging the sear actuator in one of said opposite directions, the sear actuator being movable in the other of said opposite directions by application of manual pressure against the urging of the biasing means, the sear actuator being formed to urge the sear detent to its cocking position when the latch member is moved to its cocked position and the sear actuator is moved from its neutral position.

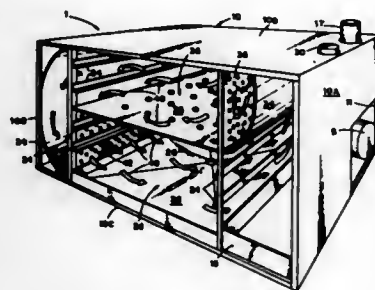
tion to one of its first and second sear positions, whereby to hold the latch member in its cocked position, and to permit the sear detent to move from its cocking position when the sear actuator is moved from one of its first and second sear positions to its neutral position, whereby to release the latch member from its cocked position.

**4,791,909**  
**SMOKER OVEN**  
Charles W. Kalthoff, 809 Emory Church Rd., Knoxville, Tenn. 37922

Filed Sep. 2, 1987, Ser. No. 92,068  
Int. Cl.<sup>4</sup> A23B 4/04

U.S. Cl. 126—21 A

6 Claims



1. A smoker oven for smoking and cooking food through the medium of heated, smoke laden air circulated repeatedly by food contained within said smoker oven, the smoker oven comprising:

- a housing having at least uppermost and lowermost substantially separate cooking chambers configured to form a vertical stack in said housing;
- means defining an inlet and an outlet end for each chamber, heating means for heating air inside said housing, said heating means being disposed adjacent the outlet end of said lowermost cooking chamber;
- smoking means for generating smoke within said housing to mix with said air to form heated, smoke laden air;
- means for circulating said heated, smoke laden air within said housing, said circulating means comprising a fan means disposed adjacent the inlet end of said uppermost cooking chamber;
- means for directing the flow of circulating heated, smoke laden air horizontally through said uppermost cooking chamber and thence serially through said lowermost cooking chamber such that said heated, smoke laden air moves in essentially opposite horizontal directions within said uppermost and lowermost cooking chambers; and
- means for baffling the flow of heated, smoke laden air into each cooking chamber so that said heated, smoke laden air is substantially uniformly distributed into each cooking chamber.

**4,791,910**  
**SOLAR HEAT COLLECTOR**  
Masaharu Ishida, Shizuoka, and Isamu Yamamoto, Hamamatsu, both of Japan, assignors to Yazaki Corporation, Tokyo, Japan  
Continuation of Ser. No. 323,302, Nov. 20, 1981, abandoned.  
This application Jun. 21, 1984, Ser. No. 622,403  
Int. Cl.<sup>4</sup> F24J 2/56

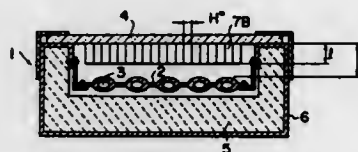
U.S. Cl. 126—450

6 Claims

- 1. A solar heat collector comprising:
- an outer box having an open upper portion for receiving the solar rays;
- a heat insulating material laid on the entire bottom and inner side wall surfaces of said outer box for preventing the heat loss through said bottom and side walls of said outer box;
- an absorber plate provided in said outer box and having a passage for a heat collecting liquid, said absorber plate

being covered by a selective absorption surface which is adapted to absorb said solar rays, convert said solar rays into thermal energy and transfer said thermal energy to said heat collecting liquid, while preventing re-radiation of said thermal energy from said selective absorption surface;

a transparent sheet mounted on said open upper portion of said outer box adapted to allow said solar rays to pass therethrough while preventing convection heat loss from said absorber plate and protecting said absorber plate against contamination and damage caused by external factors; and

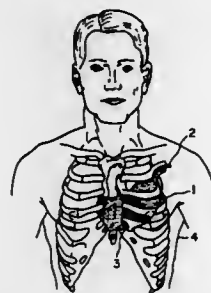


a convection loss preventing structure disposed between said absorber plate and said transparent sheet and made of a fluoroplastics film capable of transmitting solar radiation rays including visible and near-infrared rays as well as infrared rays therethrough, said convection loss preventing structure having a height which is about  $\frac{1}{4}$  of the interval between said transparent sheet and said absorber plate and extending above and over substantially the entire area of said absorber plate while making contact at its upper end with said transparent sheet such as to leave between the lower end thereof and said absorber plate a clearance which is about  $\frac{1}{4}$  of said interval between said absorber plate and said transparent sheet.

**4,791,911**  
**METHOD OF CARDIAC RECONSTRUCTIVE SURGERY**  
George J. Magovern, Pittsburgh, Pa., assignor to Allegheny-Singer Research Institute, Pittsburgh, Pa.  
Filed Jun. 2, 1986, Ser. No. 869,240  
Int. Cl.<sup>4</sup> A61B 19/00

U.S. Cl. 600—36

7 Claims



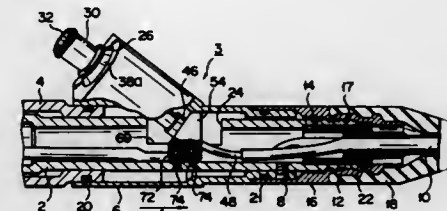
1. A method of cardiac reconstructive surgery, comprising the steps of:

- (a) dissecting the latissimus dorsi from its origin and insertion while maintaining the neurovascular bundle intact;
  - (b) directing the resultant dissected latissimus dorsi into the left hemithorax;
  - (c) grafting at least a portion of said latissimus dorsi to at least one locus of cardiac muscle;
  - (d) positioning a pacer onto the right atrium;
  - (e) positioning a first epicardial lead near said neurovascular bundle of the latissimus dorsi; and
  - (f) positioning a second epicardial lead near said locus;
- whereby contraction of the latissimus dorsi and cardiac pacing may be synchronized.

**4,791,912**  
**ENDOSCOPE**  
Yoshio Tashiro, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Japan  
Continuation-in-part of Ser. No. 923,039, Oct. 24, 1986, abandoned. This application Dec. 2, 1987, Ser. No. 127,563  
Claims priority, application Japan, Oct. 25, 1985, 60-239014; Oct. 30, 1985, 60-243374

Int. Cl.<sup>4</sup> A61B 1/00  
U.S. Cl. 128—4

20 Claims

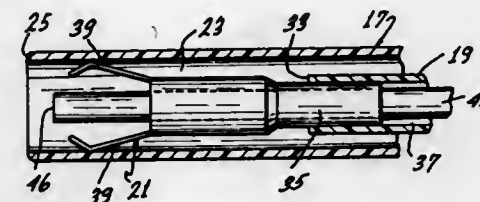


- 1. An endoscope, comprising:
- an insertion section;
- an operation section;
- a channel duct disposed in the insertion section, the channel duct having a distal end and a proximal end;
- a support tube located in the operation section and having a notch;
- a mouthpiece socket connected to the proximal end of the channel duct;
- a channel mouthpiece, one end of which is detachably connected to the mouthpiece socket and another end of which is formed with an opening;
- a cover member surrounding the periphery of the notch and having an opening through which the channel mouthpiece is inserted; and
- a support member fixed in the notch and having retaining means adapted to engage the mouthpiece socket.

**4,791,913**  
**OPTICAL VALVULOTOME**  
Patrick M. Maloney, El Toro, Calif., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.  
Filed Dec. 14, 1987, Ser. No. 132,150  
Int. Cl.<sup>4</sup> A61B 1/06

U.S. Cl. 128—6

12 Claims



- 1. An instrument comprising:
- an elongated control handle having a passage extending therethrough;

an elongated, flexible catheter body having at least one lumen and a distal end;

means for coupling the catheter body to the control handle;

an elongated flexible member extending into said lumen and having a distal end portion;

a tool coupled to the distal end portion of the flexible member, said tool being sized to be received in said lumen and being capable of performing a medical task within a patient;

an elongated flexible image transmitting member extending through the passage and into the lumen;

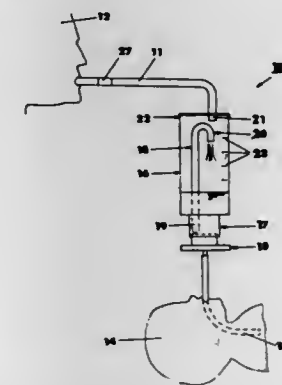
a position controller mounted for sliding movement along the control handle; and

means for drivingly coupling the position controller to the flexible members so that the axial positions of the tool and the image transmitting member can be adjusted with respect to the distal end of the catheter body.

**4,791,914**  
**ENDOTRACHEAL DEVICE**  
Stephen C. May, 15-A Yester Oaks Cir., Greensboro, N.C. 27408  
Filed Apr. 24, 1987, Ser. No. 41,980  
Int. Cl.<sup>4</sup> A61B 1/26

U.S. Cl. 128—10

3 Claims



1. An endotracheal device comprising: an endotracheal tube, one end of said endotracheal tube joined to a flange member, a cylindrical fluid receptacle, said receptacle having a socket at the bottom end for receiving said flange member, a receptacle conduit, said conduit contained within said receptacle and said receptacle conduit extending from said socket terminating within said socket and spaced from said endotracheal tube, said conduit having an inverted J-shaped upper end, said receptacle having a cap at the top end opposite said socket, a suction pipe, said suction pipe passing through said cap in fluid communication with said receptacle, said suction pipe positioned vertically above and spaced from said receptacle conduit, a fluid absorbing filter, said filter attached to said suction pipe whereby applying suction to said suction pipe causes fluid to be drawn through said endotracheal tube for containment in said fluid receptacle.

**4,791,915**  
**ULTRASOUND THERAPY DEVICE**  
Edward J. Barsotti, Batavia, and Richard D. Hance, Elburn, both of Ill., assignors to Dynawave Corporation, Geneva, Ill.  
Continuation-in-part of Ser. No. 912,566, Sep. 29, 1986, abandoned. This application Jul. 2, 1987, Ser. No. 70,608  
Int. Cl.<sup>4</sup> A61H 1/00

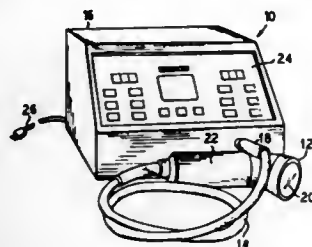
U.S. Cl. 128—24 A

21 Claims

- 1. An ultrasound device for therapeutic application of ultrasound energy to a patient, comprising:
- a transducer means for placement in contact with a patient;
- a base unit connected for transmitting electrical signals to said transducer means;



control means on said base unit for selectively controlling the transmission of signals to said transducer means; display means for showing the state of said control means and the electrical signal transmitted to said transducer means; means for connecting said base unit to AC electrical power; a control circuit in said base unit and connected to said control means and said display means, said control circuit including: an amplifier means for energizing said transducer means;



a phase detector connected to monitor the phase difference between the current and voltage at said transducer means; and  
a programmed controller means connected to said phase detector and to said amplifier means for changing output power levels of said transducer means depending on the phase difference,  
whereby the phase difference varies as different tissues of the patient are coupled to said transducer means.

#### 4,791,916 SUSPENDED KNEE BRACE HAVING LIMITED RANGE OF MOTION HINGE

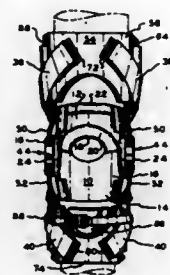
Juan B. Paer, Spring Arbor, Mich., assignor to Camp International, Inc., Jackson, Mich.

Filed May 4, 1987, Ser. No. 45,589

Int. Cl.<sup>4</sup> A61F 5/00, 5/04

U.S. Cl. 128—80 C

11 Claims



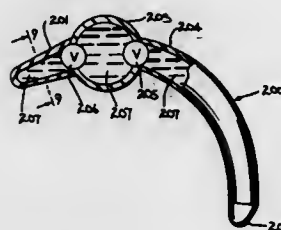
1. A knee brace characterized by its stability of positioning upon the leg utilizing the knee structure for locating and suspending the brace comprising, in combination, a flexible knee cage, said knee cage being formed of a flexible elastomeric material of a U-configuration having an open rear portion, upper, lower and central regions, an outer surface, an inner surface and right and left lateral portions, a continuous circumference patella receiving opening defined in said cage central region, first tension means affixed to said cage upper region for drawing said cage upper region into firm engagement with the upper edge of the knee, second tension means affixed to said cage lower region for drawing said cage lower region into firm engagement with the lower edge of the knee, a condyle pad defined upon each cage lateral portion adapted to support a lateral portion of the knee, a hinge mounted upon each condyle pad adjacent said cage outer surface, an upper cuff located above said cage adapted to encircle the wearer's thigh, a lower

cuff located below said cage adapted to encircle the wearer's leg below the knee, right and left lateral portions defined upon said upper and lower cuffs, said first tension means comprising first and second straps each having a lower end attached to a cage upper region lateral portion and an upper end attached to said upper cuff, and said second tension means comprising third and fourth straps each having an upper end attached to a cage lower region lateral portion and a lower end attached to said lower cuff, each hinge including a body and elongated upper and lower arms pivotally mounted upon said body and extending therefrom, said hinge's upper arms being fixed to said upper cuff's lateral portions, and said hinge's lower arms being fixed to said lower cuff's lateral portions.

4,791,917  
PENILE PROSTHESIS  
Roy P. Finney, Tampa, Fla., assignor to Medical Engineering Corporation, Racine, Wis.  
Division of Ser. No. 313,729, Oct. 22, 1981, Pat. No. 4,378,792, which is a division of Ser. No. 150,231, May 15, 1980, Pat. No. 4,318,396. This application Jan. 21, 1983, Ser. No. 459,776  
Int. Cl.<sup>4</sup> A61F 5/00

U.S. Cl. 128—79

2 Claims



1. An implantable penile prosthesis for implanting completely within a patient's penis comprising at least one elongated member having a flexible distal forward section for implantation within the pendulous penis, said forward section being constructed to rigidize upon being filled with pressurizing fluid; a proximal, rearward section adapted to be implanted within the root end of the penis, said rearward section containing a fluid reservoir chamber; externally operable pump means in said member for transferring fluid under pressure to said flexible distal forward section of said member for achieving an erection; and valve means positioned within said member which open when said pump is operated so that fluid is forced from said pump through said valve means into said flexible distal forward section of said member.

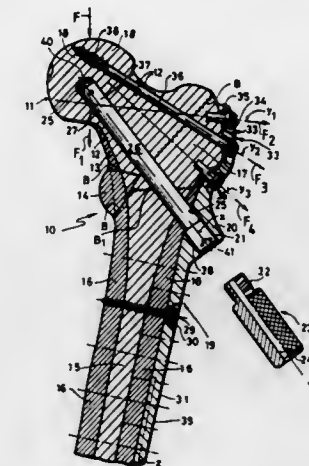
4,791,918  
FEMORAL-NECK IMPLANT  
Christoph Von Hasselbach, Armstr. 41, 4300 Essen-Borbeck, Fed. Rep. of Germany  
Filed Sep. 26, 1986, Ser. No. 912,998  
Claims priority, application Fed. Rep. of Germany, Sep. 28, 1985, 3534747  
Int. Cl.<sup>4</sup> A61F 5/24

U.S. Cl. 128—924 K

4 Claims

1. A femoral-neck implant comprising: an elongated plate formed with a row of holes and adapted to fit against a femur below a trochanter thereof; respective corticalis screws traversing said holes in said plate and securing said plate to the femur below the trochanter; a stiff upper concave portion unitary with and extending from said plate and adapted to fit generally complementarily over said trochanter, said portion having three holes; respective tension-force-resisting spongiosa screws arrayed nonparallel to one another in a fanlike array, traversing said holes in said concave portion, and reaching from said

portion into the head and through the neck to the femur to secure the portion to the trochanter; an internally threaded body formed on said plate at a junction thereof with said portion, having a surface turned toward the femur which is flush with surfaces of the femur and of said portion turned toward said femur, the spongiosa screw of the hole closest to the shaft being generally parallel thereto and the other spongiosa screws being at increasingly large angles with the shaft with the spongiosa screw of the hole furthest from the shaft crossing and



lying next to the shaft in the trochanter, the screw thread of said body having an axis forming an obtuse angle with said plate; and  
a smooth-surfaced cylindrical shaft extending along said axis generally below the fanlike array of spongiosa screws and having a lower end provided with a male screw thread adapted to be threaded into the screw thread of said body, said cylindrical shaft being receivable slidably in a bore extending below said trochanter and into the neck and head of the femur, the tension force resistance of said spongiosa screws relating said shaft from bending stresses.

4,791,919  
SURGICAL INSTRUMENTS  
Martin A. Elloy, North Yorkshire, and Robert Johnson, Merseyside, both of England, assignors to Chas F Thackray Limited, Leeds, England  
Filed Jan. 24, 1986, Ser. No. 822,035

Claims priority, application United Kingdom, Jan. 25, 1985, 8501907  
Int. Cl.<sup>4</sup> A61F 5/04

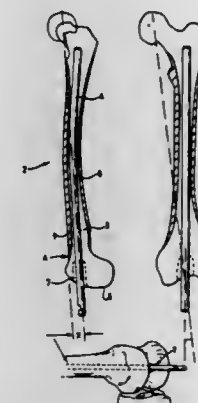
U.S. Cl. 128—92 VW

17 Claims

1. A set of instruments for use in the surgical implantation of a knee prosthesis, the set including:  
a femoral alignment rod having a first blunt end for insertion within the medulla of a femur through an access hole located between the femoral condyles, and a second end opposite said first end, the length of the rod between said two ends being sufficient with respect to the particular femur undergoing surgery, and the rod being sufficiently flexible, to allow said second end to protrude from said access hole whilst said first end is located within the medulla at least beyond the lesser trochanter, the rod also being sufficiently resilient and the access hole being sufficiently larger than the diameter of the rod to impose no physical constraint thereon, such that once the rod is fully inserted within the medulla as aforesaid, the portion of the rod located within the medulla contacts the inner walls of the bone defining the medulla, whereby the portion of the rod which protrudes from the access hole is allowed to extend linearly along an axis the position of which is

dictated by points of contact within the medulla between the rod and the inner walls of the medulla; and  
an angle adaptor comprising an elongate body portion having fixation means for rigidly fixing the adaptor to the femur, which elongate member includes means for slidably and rotatably accommodating the protruding end of the alignment rod with the alignment rod forming an acute angle in the medio-lateral plane with the body portion.

16. A femoral alignment rod for insertion within the medulla of a femur during surgical implantation of a knee prosthesis, the alignment rod being of intact integral unitary construction, and having a first blunt end for insertion within the medulla of the femur through an access hole located between the femoral



condyles, and a second end opposite said first end, the length of the rod between said two ends being sufficient, with respect to the particular femur undergoing surgery, and the rod being sufficiently flexible, to allow said second end to protrude from said access hole whilst said first end is located within the medulla at least beyond the lesser trochanter, the rod also being resilient and the access hole being sufficiently larger than the diameter of the rod to impose no physical constraint thereon, such that once the rod is fully inserted within the medulla as aforesaid, the portion of the rod located within the medulla contacts the inner walls of the bone defining the medulla, whereby the portion of the rod which protrudes from the access hole is allowed to extend linearly along an axis the position of which is dictated by points of contact within the medulla between the rod and the inner walls of the medulla.

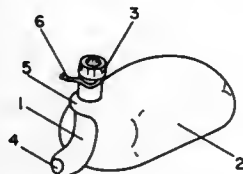
4,791,920  
TRACHEOSTOMY CANNULA  
Dario Fauza, Rua Marcondesia No. 301, 04645 - Sao Paulo SP, Brazil  
PCT No. PCT/BR86/00016, § 371 Date May 8, 1987, § 102(e) Date May 8, 1987, PCT Pub. No. WO87/01293, PCT Pub. Date Mar. 12, 1987  
PCT Filed Aug. 21, 1986, Ser. No. 82,714  
Claims priority, application Brazil, Sep. 9, 1985, 8504438  
Int. Cl.<sup>4</sup> A61M 16/00

U.S. Cl. 128—207.15

8 Claims

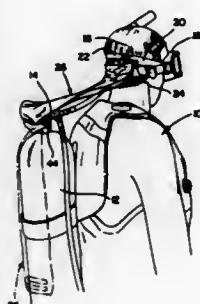
1. A tracheostomy device for introduction into the trachea of a patient to form an artificial airway through the patient's throat, comprising:  
a hollow tube having proximal and distal end portions and a bend intermediate of said end portions so as to form first and second portions of said tube respectively including said proximal and distal end portions of said tube, said proximal end portion having a radius slightly larger than that of said first portion of said tube and said distal end portion being arranged for insertion through a tracheal stoma and into a tracheal lumen of the patient's throat such that said second portion of said tube extends in a first

direction within the tracheal lumen when said first portion extends through the tracheal stoma;  
an inflatable cuff;  
means for adhering said inflatable cuff to said tube and for



directing said cuff when inflated such that said cuff extends within the tracheal lumen of the patient's throat only in a second direction substantially opposite to said first direction; and  
means for inflating and deflating said cuff.

**4,791,921**  
**KELP SHIELD FOR DIVER WORN EQUIPMENT**  
Charles R. Robinson, Bakersfield, Calif., assignor to Michael D. Shackelford, Bakersfield, Calif.  
Filed Jan. 5, 1987, Ser. No. 58,779  
Int. Cl.<sup>4</sup> A62B 7/04  
U.S. Cl. 128—201.27



1. A kelp shield for preventing kelp from becoming entangled about a piece of diver's underwater equipment supported and projecting outward from a diver's first body portion above which a second body portion of the diver is disposed, said shield including a vertically elongated flexible panel having an upper end and a lower end, body portion encircling supportive strap means for securement about said second body portion, means securing said upper end to an intermediate portion of said strap means with said panel disposed generally normal to said intermediate portion, the lower end of said panel being adapted to lengthwise overlap at least a portion of said underwater equipment, said lower end of said flexible panel including transverse strap means supported therefrom, the last-mentioned strap means including opposite end portions from opposite sides of which coacting thistle-type fastener strips are supported, said strips being releasably engageable with last-mentioned strap means for securement about a valve body carried by the upper end of a tank by breathing air supported from said first body portion.

**4,791,922**  
**GAS FLOW CONTROL APPARATUS FOR AN ANAESTHESIA SYSTEM**

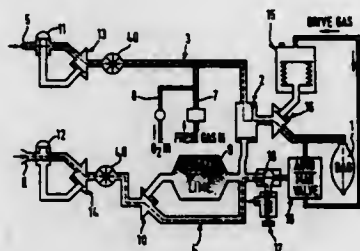
David Lindsay-Scott, Lodeve, France; Malcolm K. Sykes, Iffley, England; Basil R. Sagg, Oxford, England, and Paul J. Tyrrell, Oxon, England, assignors to Pealco Limited, Abingdon, United Kingdom  
PCT No. PCT/GB86/00206, § 371 Date Feb. 11, 1987, § 102(e) Date Feb. 11, 1987, PCT Pub. No. WO86/05992, PCT Pub. Date Oct. 23, 1986

PCT Filed Apr. 11, 1986, Ser. No. 2,618  
Claims priority, application United Kingdom, Apr. 12, 1985, 8509413

Int. Cl.<sup>4</sup> A62B 7/10

U.S. Cl. 128—205.28

11 Claims



1. Apparatus for controlling the flow of gas to or from a patient in an anaesthesia system, said apparatus comprising a reservoir bag, a selector valve means operable in a first condition to connect said bag to said first flow passage, in a second condition to connect said bag to said second flow passage, and in a third condition to connect said bag to both of said first and second flow passages, said first and second flow passages being arranged in parallel and each being adapted to be connected at the end thereof remote from the selector valve means to a patient, said first passage comprising first one-way valve means selectively operable to prevent the back-flow of gas into said passage from the patient and communicating with an inlet for the supply of fresh gas, and said second flow passage comprising second one-way valve means selectively operable to prevent the flow of gas from said second flow passage to the patient and a selectively bypassable carbon dioxide absorbing means, there being a spill valve arranged to release gases from the second flow passage, wherein means are provided to control said conditions of the selector valve means and the selective operation of said first and second one-way valve means whereby desired modes of operation of the apparatus may be selected.

**4,791,923**  
**TRACHEAL TUBES**

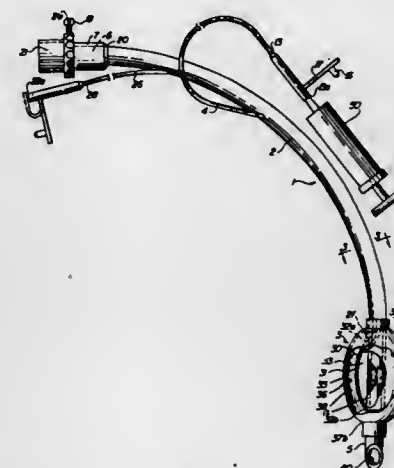
Seymour W. Shapiro, Lowell, Ind., assignor to Bivona Surgical Instruments, Inc., Gary, Ind.  
Continuation of Ser. No. 850,428, Apr. 8, 1986, abandoned, which is a continuation of Ser. No. 582,064, Feb. 21, 1984, abandoned. This application Dec. 11, 1986, Ser. No. 941,574  
Int. Cl.<sup>4</sup> A61M 16/00

U.S. Cl. 125—207.15

8 Claims

1. A tracheal tube for insertion into the trachea of a patient for enabling positive pressure ventilation of the respiratory tract to be carried out said tracheal tube comprising:  
an elongated tube having an outer surface, a proximal end portion and a distal end portion, the interior of said tube defining an airway between its end portions;  
a cuff mounted on said outer surface of said elongated tube near its distal end portion, said cuff including an inner inflatable member and an outer inflatable member, said inner inflatable member affixed to and encircling a portion of said elongated tube, and said outer inflatable member positioned over said inner inflatable member in surround-

ing relationship and affixed to and encircling a portion of said elongated tube;  
inner member inflation means including an inner inflation tube having a proximal end and distal end, said inner inflation tube having its proximal end connectable to a source of positive pressure and its distal end communicating with the interior of said inner member for communicating the interior of said inner member with the source of positive pressure for creating a constant positive pressure within said inner member for semi-permanently inflating said inner member within said outer member thereby extending said outer member into sealing engagement with the walls of a trachea when the trachea is at its smallest diameter;  
outer member inflation means including an outer inflation tube having a proximal end and a distal end, said outer inflation tube having its distal end communicating with the interior of said outer member; and



connecting means on said elongated tube near its proximal end, said connecting means being constructed and arranged to communicate the interior of said elongated tube with at least one source of gas for positive pressure ventilation of the respiratory tract, and said connecting means defining coupling means for receiving the proximal end of said outer inflation tube in communication with the interior of the elongated tube whereby the interior of said outer member is communicated through said outer inflation tube with the interior of said elongated tube for inflating and deflating the outer inflatable member relative to its extended condition in accordance with the increasing and decreasing airway pressure in the interior of said elongated tube to permit adjustment of said outer inflatable member to the trachea's diameter when said diameter is greater than its smallest diameter.

**4,791,924**  
**LENS FORCEPS AND METHOD OF USE THEREOF**  
Charles D. Kelman, 269 Grand Central Parkway, Floral Park, N.Y. 11005

Filed Jan. 2, 1987, Ser. No. 57,276

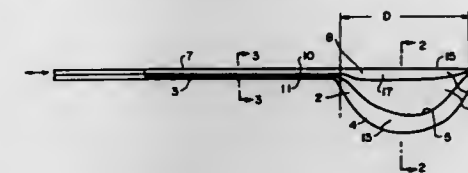
Int. Cl.<sup>4</sup> A61B 17/00

U.S. Cl. 128—303 R

12 Claims

1. Lens forceps for extractive removal from the interior of an eye through a corneal incision of a surgically severed individual segmental lens portion, which comprises  
a manually manipulatable eye lens size clamp of two relatively longitudinally movable parts, including a longitudinal scoop clamp part having a scoop handle provided with a generally crescent shaped longitudinal scoop forwardly extending from the scoop handle and defining an upwardly open receiving trough of conforming size and shape to the corresponding perimetric profile of such a

segmental lens portion for receiving such a lens portion therein, and a longitudinal cover clamp part having an overlay handle provided with a longitudinal scoop cover forwardly extending from the overlay handle, the scoop clamp part and cover clamp part being cooperatively arranged for manually controlled relative longitudinal movement therebetween an, in one position of such



movement, manually controlled removable coactive stationary engagement of the overlay handle with the scoop handle and corresponding positioning of the scoop cover in overlying covering relation with the scoop and forming therewith a confining cage for clamped captive retention of such a lens portion therein for permitting removal thereof from the eye through the corneal incision.

**4,791,925**  
**RING REMOVAL TOOL**  
Dennis M. Mitterer, 632 Fourth St., Lancaster, Pa. 17603  
Filed Oct. 13, 1987, Ser. No. 100,103  
Int. Cl.<sup>4</sup> A61B 17/00  
U.S. Cl. 128—303 R

9 Claims



1. A ring removal tool comprising:  
a pair of handles pivotally joined intermediate their ends; spring means fixed between said handles biasing them to a first closed position; and  
a generally cylindrical ring engaging head integral with and extending normal to a plane defined by said handles, said head being formed by arcuate flanges on like ends of said handles, said head flanges together defining a hollow finger receiving inner cylindrical surface and an outer ring engaging surface tapering away from said handles whereby the tool head can be closed about a finger and moved coaxially therealong to be slipped beneath a cut ring and the handles compressed to exert force to spread the ring sufficiently to allow it to be removed axially along the finger without making further contact therewith.



4,791,926  
METHOD OF CONTROLLING LASER ENERGY  
REMOVAL OF PLAQUE TO PREVENT VESSEL WALL  
DAMAGE

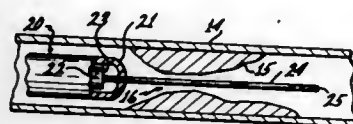
Stephen M. Fry, Del Mar, Calif., assignor to Baxter Travenol  
Laboratories, Inc., Deerfield, Ill.

Filed Nov. 10, 1987, Ser. No. 119,167

Int. Cl.<sup>4</sup> A61B 17/36

U.S. Cl. 128—303.1

16 Claims



1. A laser delivery system, comprising:  
a catheter adapted to be advanced within a vessel to a position in which a distal end of the catheter is in proximity with a targeted lesion;  
at least one laser delivery fiber extending within the catheter to the distal end through which to propagate laser energy toward the lesion; and  
a laser energy sensor adapted to be placed in a monitoring position beyond the lesion and sense laser energy propagated through the laser delivery fibers that passes beyond the lesion;  
whereby the output of the sensor can be used to control the propagation of laser energy through the fiber in order to subject the lesion to laser energy without damaging the vessel wall beyond the lesion; and  
wherein the laser energy sensor includes a sensor fiber extending within the catheter and beyond the distal end to a position sufficiently beyond the distal end to extend through an opening in the lesion to the monitoring position.

4,791,927  
DUAL-WAVELENGTH LASER SCALPEL BACKGROUND  
OF THE INVENTION

Eva L. Menger, Madison, N.J., assignor to Allied Corporation,  
Morris Township, Morris County, N.J.

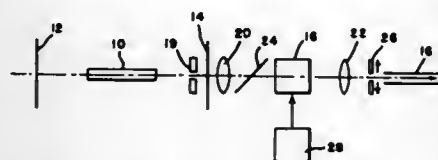
Continuation-in-part of Ser. No. 813,751, Dec. 26, 1985,

abandoned. This application Jul. 1, 1987, Ser. No. 68,688

Int. Cl.<sup>4</sup> A61B 17/36

U.S. Cl. 128—303.1

20 Claims



1. A dual-wavelength laser system for both cutting and coagulating tissue, comprising, in combination:  
(a) a single source of a beam of coherent radiation having a first wavelength, which wavelength is such that a beam of coherent radiation from said single source is effective for cauterizing bleeding blood vessels through photocoagulation, and said single source being selected from the group of lasers having a fundamental wavelength of 500–800 nm.  
(b) means for selectively doubling the wavelength of the beam of coherent radiation from said single source to a second wavelength beam of coherent radiation, said second wavelength being in the range of 250–400 nm such that the beam is effective for cutting tissue by photoablation with little light penetration or scattering and consequently little lateral spread of heat damage; and  
(c) beam delivery means for directing at least one of the

respectively selected said beams of coherent radiation onto a target.

4,791,928  
ROTARY SCALPEL METHOD

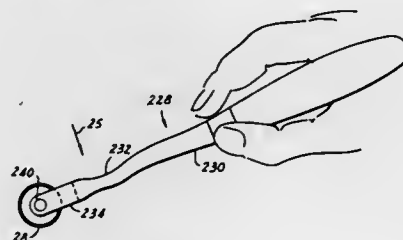
Joseph J. Berke, 3333 E. Jefferson, Detroit, Mich. 48207, and  
George H. Muller, 2921 Overridge Dr., Ann Arbor, Mich. 48104

Filed Sep. 24, 1982, Ser. No. 422,847

Int. Cl.<sup>4</sup> A61B 17/32

U.S. Cl. 128—305

8 Claims



8. A completely manual method of making a surgical incision in free tissue comprising moving a freely rotatable circular scalpel blade across an area of the free tissue and along a line thereon where the incision is required at a desired incision depth wherein the circular scalpel blade is rotated solely by friction between the blade and the tissue in which the incision is required.

4,791,929  
BIOABSORBABLE COATING FOR A SURGICAL  
ARTICLE

Peter K. Jarrett, Trumbull; Donald J. Casey, Ridgefield, and  
Leonard T. Lehmann, Danbury, all of Conn., assignors to  
American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 910,598, Sep. 23, 1986,

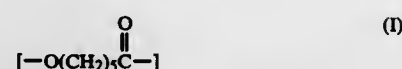
abandoned. This application Mar. 24, 1988, Ser. No. 172,601

Int. Cl.<sup>4</sup> A61L 17/00

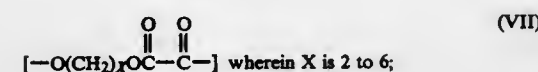
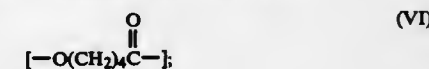
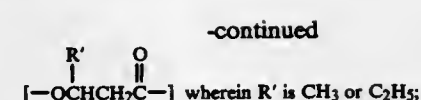
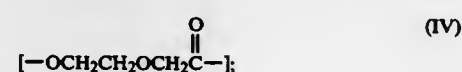
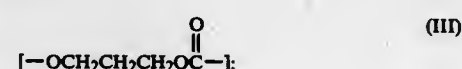
U.S. Cl. 128—335.5

26 Claims

1. A surgical article having knot security and improved knot repositioning characteristics, the article comprising a strand, the strand having a bioabsorbable coating, the coating comprising a random copolymer, from about 50 to 85 percent by weight of the copolymer consisting of linkages of formula (I):



and the remaining linkages comprising at least one of the formulas (II) to (VIII):



and



4,791,930  
COOLER FOR HUMAN TISSUE FOR USE DURING  
HYPERTHERMIA TREATMENT AGAINST CANCER

Hirotsuke Suzuki, Tokorozawa, and Satoru Kobayashi, Hitaka,  
both of Japan, assignors to Junkosha Co., Ltd., Tokyo, Japan

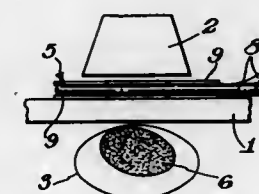
Filed Oct. 18, 1983, Ser. No. 543,109

Claims priority, application Japan, Oct. 25, 1982, 57-162214

Int. Cl.<sup>4</sup> A61F 7/00

U.S. Cl. 128—399

4 Claims



1. A combination microwave heater and cooling device for use in heat treatment of cancerous tumors, the cooling device being disposed between said microwave heater and adjacent said cancerous region to be treated, the cooling device including at least one tube through which a refrigerant is circulated, the tube comprising a porous, expanded polytetrafluoroethylene resin having interconnecting pores.

4,791,931  
DEMAND PACEMAKER USING AN ARTIFICIAL  
BARORECEPTOR REFLEX

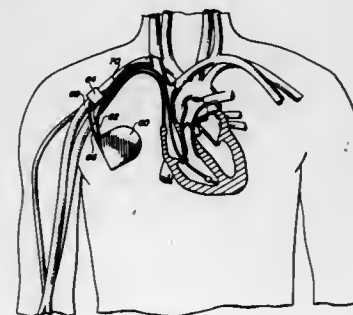
John B. Slate, Los Angeles, Calif., assignor to Pacemaker Infu-  
sion, Ltd., Sylmar, Calif.

Filed Aug. 13, 1987, Ser. No. 85,421

Int. Cl.<sup>4</sup> A61N 1/36

U.S. Cl. 128—419 PG

22 Claims



1. A cardiac pacemaker for stimulating a heart to beat at a

rate which is variable in response to physiological need, comprising:

- (V) a pulse generator for generating periodic electrical pulses at a rate determined by a rate input signal supplied to said pulse generator;
- (VI) a pacing lead for delivering said periodic electrical pulse generated by said pulse generator to said heart;
- (VII) means for sensing arterial blood pressure and generating a signal indicative of arterial blood pressure; and
- means for generating said rate input signal in response to said signal indicative of arterial blood pressure.

4,791,932  
EXTRACORPOREAL SENSING MODULE

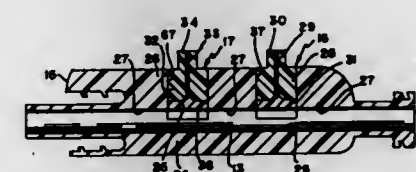
Gary S. Margules, Miami, Fla., assignor to Cordis Corporation,  
Miami, Fla.

Filed Mar. 5, 1986, Ser. No. 836,241

Int. Cl.<sup>4</sup> A61B 5/00

U.S. Cl. 128—632

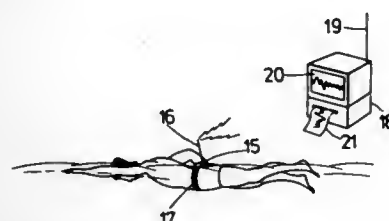
11 Claims



1. An extracorporeal sensing module for use in monitoring parameters of body fluids, comprising:  
a tube-like housing provided with inlet and outlet end portions for respective attachment with body fluid supply and discharge means;  
a lumen internally of said housing and extending longitudinally thereof for defining a fluid flow path in communication with said body fluid supply and discharge means, said lumen having an internal surface that is generally cylindrical and of substantially the same diameter throughout its longitudinal extent so that said lumen internal surface defines a substantially isodiametric fluid flow path; and  
a convex sensor membrane longitudinally spaced along and forming a part of said housing, said convex sensor membrane being constructed of polymeric material that is longitudinally spaced along said generally cylindrical internal surface, said polymeric material convex sensor membrane having a bottom surface which forms an inside surface thereof that is a flush portion of said generally cylindrical and substantially isodiametric lumen internal surface that defines the substantially isodiametric fluid flow path such that said fluid flow path defined by said substantially isodiametric lumen internal surface is unobstructed throughout its longitudinal extent, said flush portion bottom surface being contiguous with adjacent surfaces of said lumen internal surface, said convex sensor membrane having tapering ends, said contiguous flush portion bottom surface of the convex sensor membrane being reduced in cross-section toward and being confluent with said adjacent surfaces of the lumen.

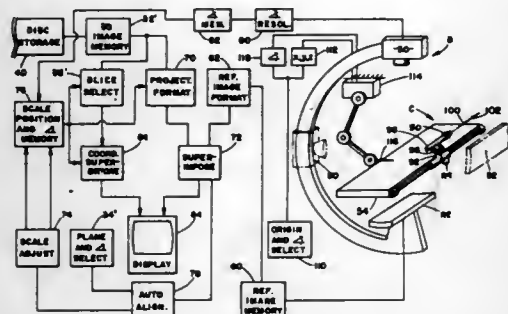
4,791,933  
**RADIO ELECTROCARDIOGRAPHY FOR A LIVING  
 BODY MOVING IN THE WATER**  
 Toshio Asai, Uchinadamachi; Yasuhiro Nakaya, Futakuchima-  
 chi, and Yasuaki Onodera, Seitamaiken, all of Japan, assignors  
 to Fukuoka Denso Co., Ltd., Tokyo, Japan  
 Continuation of Ser. No. 742,820, Jun. 10, 1965, abandoned.  
 This application Feb. 19, 1967, Ser. No. 16,964  
 Claims priority, application Japan, Jun. 11, 1964, 59-120381  
 Int. Cl.<sup>7</sup> A61B 5/04

U.S. Cl. 123—640 1 Claim



1. A method of diagnosing the heart condition of a living body during exercise in water comprising the steps of:
  - (a) providing at least one suction disc having mounted thereon a hermetically sealed electrode surrounded by an annular body surface adherent strip, said sealed electrode being in non-contacting circumferential relationship with said annular strip;
  - (b) placing said suction disc with said hermetically sealed electrode on a living body to be moving in the water, the disc being held firmly to the moving body by vacuum forces effected from the suction disc and adhesive forces effected circumferentially around said sealed electrode due to said adherent strip;
  - (c) detecting an electrocardiac signal from said hermetically sealed electrode while said body is moving in the water;
  - (d) leading the detected electrocardiac signal from the electrode through lead wires to a radio transmitter mounted on the living body;
  - (e) receiving the radio-transmitted electrocardiac signal by a receiver; and
  - (f) recording an electrocardiograph derived from the signal received by the receiver.

**4,791,934**  
**COMPUTER TOMOGRAPHY ASSISTED**  
**STEREOTACTIC SURGERY SYSTEM AND METHOD**  
**Carl J. Brunnett, Willoughby, Ohio, assignor to Picker International, Inc., Highland Heights, Ohio**  
**Filed Aug. 7, 1986, Ser. No. 894,317**  
**Int. Cl.<sup>4</sup> A61B 6/00**  
**U.S. Cl. 128—653** **17 Claims**



1. A clinical method in which a surgical instrument is pre-

cisely positioned relative to an internal region of the subject in advance of an invasive procedure, the method comprising:

- imaging a volume of the subject to locate a structure within the subject precisely and producing three dimensional diagnostic mapping data indicative thereof;
- transferring the subject to a clinical treatment station at which the invasive procedure is to be performed, imaging the patient to relocate the structure within the patient relative to the treatment station by generating a two dimensional calibration reference image through the imaged volume that includes the structure prior to instituting the invasive procedure;
- configuring an analogous two dimensional image from the three dimensional diagnostic mapping data;
- comparing the calibration reference and diagnostic data two dimensional images to determine the relative orientation between the patient and the three dimensional mapping data; and,

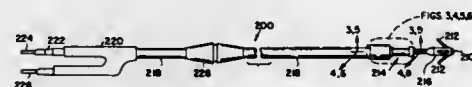
in accordance with the comparing step, moving and orienting the surgical instrument to position the surgical instrument relative to the imaged volume for invasive treatment of the located structure.

4,791,935

**OXYGEN SENSING PACEMAKER**

**Michael D. Baudiso, Coon Rapids; Michael D. de Franco, Blaine; Joseph F. Lassar, Coon Rapids; Dennis A. Brunwell, Bloomington, all of Minn.; Gene A. Borazin, Camarillo, Calif., and Jeffrey A. Schweitzer, Minneapolis, Minn., assignors to Medtronic, Inc., Minneapolis, Minn.**

Filed Aug. 15, 1986, Ser. No. 896,695  
Int. Cl.<sup>4</sup> A61N 1/00



1. An implantable lead comprising:
  - a sensor capsule having an interior, an exterior surface, a proximal end and a distal end, said sensor capsule comprising a unitary conductive sensor body extending the length of said sensor capsule and exposed to the exterior of said sensor capsule at the proximal and distal ends of said sensor capsule, said sensor capsule further comprising a transparent tubular member, surrounding said sensor body, said tubular member allowing passage of light into the interior of said sensor capsule;
  - electronic circuitry means for sensor capsule;
  - electronic circuitry means for sensing a physiologic parameter of the blood by sensing light reflected from said blood, said circuitry means mounted within the interior of said sensor capsule and electrically coupled to said sensor body;
  - first electrical conductor having a proximal end and a distal end, the distal end of said first conductor coupled to said sensor body at the proximal end of said sensor capsule exterior to the interior of said sensor capsule, the proximal end of said first conductor extending proximally from said sensor capsule;
  - second electrical conductor, insulated from said first circuitry means;
  - third electrical conductor having a proximal end and a distal end, the proximal end of said third conductor electrically coupled to said sensor body at the distal end of said sensor capsule exterior to the interior of said sensor capsule, the distal end of said third conductor extending distally from said sensor capsule;
  - electrode coupled to said third conductor; and
  - elongated insulative lead body enclosing said first and second electrical conductors.

DECEMBER 20, 1988

## GENERAL AND MECHANICAL

1155

ond conductors, said sensor capsule and said third conductor, said electrode exposed to the exterior of said insulative lead body.

4,791,936

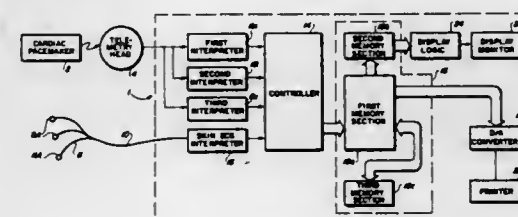
**APPARATUS FOR INTERPRETING AND DISPLAYING  
CARDIAC EVENTS OF A HEART CONNECTED TO A  
CARDIAC PACING MEANS**

Jeffery D. Snell, Northridge; Brian M. Mann, Los Angeles, and  
Jason A. Sholder, Canoga Park, all of Calif., assignors to  
Stemco-Pacesetter, Inc., Sylmar, Calif.

Continuation-in-part of Ser. No. 701,795, Feb. 15, 1985, Pat. No.  
4,596,255, which is a continuation of Ser. No. 440,149, Nov. 8,  
1982, abandoned. This application Jun. 20, 1986, Ser. No.  
876,612

The portion of the term of this patent subsequent to Jun. 24,  
2003, has been disclaimed.

Int. Cl.<sup>4</sup> A61B 5/04

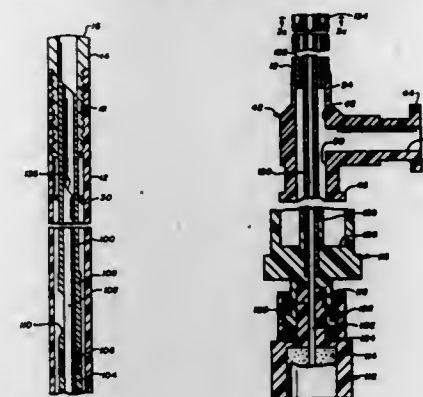


4. An apparatus for displaying cardiac events of a heart connected to an implanted cardiac pacemaker of a patient, said apparatus comprising:  
telemetry head means for receiving telemetered information from said implanted pacemaker;  
controller means coupled to said telemetry head means via channel means for synchronizing in time the telemetered information received over the channel means, and for processing a plurality of sets of information contained within said telemetered information in parallel while maintaining the synchronization therebetween, said controller means generating command signals representative of the information contained in each of said sets of information and the synchronization therebetween;  
said channel means including means for transferring to said controller means from said telemetry head means each of said plurality of sets of information in a way that maintains the identity of each set of information, each set of information including information relating to the pacemaker and events sensed by the pacemaker;  
memory means for storing said command signals; and  
display means responsive to said command signals stored in said memory means for simultaneously displaying a synchronized representation of the information derived from a selected plurality of said sets of information received through said telemetry head means and said channel means.

4,791,937  
TRANSENDOSCOPIC NEEDLE  
Ku Pen Wang, 11006 Nacirra Ln., Stevenson, Md. 21153  
Filed Aug. 19, 1986, Ser. No. 897,936  
Int. Cl.<sup>4</sup> A61B 5/00

- U.S. Cl. 128—752** **17 Claims**  
1. A biopsy specimen securing device comprised of an outer flexible catheter having distal and proximal ends, said distal end including a protective hub secured thereto, a hollow needle reciprocally mounted within said hollow catheter so as to be axially movable between a first extended and a second retracted position, said needle having proximal and distal ends, means defining a lateral opening into said hollow needle, control means secured to said needle for controlling the axial

movement thereof, said control means being spaced interiorly of said outer catheter thereby defining an annular space therebetween along the length of said device, and sealing means for providing a rolling seal along the outer surface of the needle,



between said lateral opening and the distal end of said needle relative to the inner surface of said catheter so that a fluid passageway is defined by the hollow interior of said catheter and said hollow needle through said lateral opening means.

4,791,938  
**CAPILLARY BLOOD COLLECTOR AND METHOD**  
 Nanci Van Valkenburg, 2149 Lark Ct. S., Wichita, Kans. 67209  
 Filed Nov. 16, 1987, Ser. No. 121,418  
 Int. Cl.<sup>4</sup> A61B 5/00  
 U.S. Cl. 128—763 20 Claims



1. A capillary blood collector comprising a collection tube having a tube top; an inner collar circumferentially disposed around the inside of said collection tube in proximity to said tube top;
- a bowl having a level bottom with a bowl opening;
- a capillary tube secured to said bowl bottom and communicating with said bowl opening;
- at least on leg supported by said bowl in a depending relationship, said leg having an inner leg face and an outer leg face, said leg having a structure defining a lower recess and an upper recess on said outer leg face; and said leg removably connects to said inner collar such that said capillary tube extends into said collection tube.



4,791,939  
**STYLET FOR USE WITH AN IMPLANTABLE PACING LEAD**  
 Germain Maillard, La Chaux-de-Fonds, France, assignor to Nivarox-FAR S.A., Le Locle, Switzerland  
 Filed Jun. 25, 1986, Ser. No. 878,540  
 Claims priority, application France, Jun. 27, 1985, 85 09986  
 Int. Cl.<sup>4</sup> A61N 1/00  
 U.S. Cl. 128—786 10 Claims



1. For use with an implantable pacing lead of the type having a hollow elongated conductor of coiled wire forming continuous turns, a stylet, removably insertable in said hollow conductor, and comprising:

a flexible, straight filament having a proximal end and a distal end;  
 a blunting tip secured at the distal end of said filament; and  
 a manipulation knob secured at the proximal end of said filament; and wherein:

said tip has an ogival shape which is symmetrical about a longitudinal axis of the tip from a front end to a rear end of the tip;

the tip is provided with a cavity which is symmetrical about said longitudinal axis and which has a front portion, in an area proximate to the front end of said tip, and a rear portion extending from said front portion to said rear end of said tip, said rear portion having a cross-section, taken in a plane perpendicular to said longitudinal axis, larger than a cross-section, taken in a plane perpendicular to said longitudinal axis, of said front portion, and the cross-section of said front portion of said cavity corresponding to a cross-section, taken in a plane perpendicular to said longitudinal axis, of said distal end of said filament, said distal end of said filament being secured in said front portion of said cavity; and

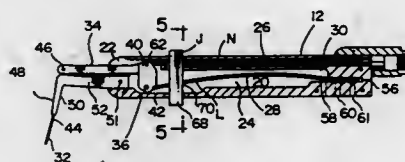
the shape of said tip comprises, from the front end to the rear end: a rounded nose portion; a frusto-conical portion having a narrow front end, which smoothly emerges with said nose portion, and a broader rear end.

4,791,940  
**ELECTRONIC PERIODONTAL PROBE WITH A CONSTANT FORCE APPLIER**  
 John W. Hirschfeld, Charles H. Gibbs, and James G. Lee, all of Gainesville, Fla., assignors to Florida Probe Corporation, Gainesville, Fla.  
 Filed Feb. 2, 1987, Ser. No. 9,523  
 Int. Cl.<sup>4</sup> A61B 5/10  
 U.S. Cl. 128—776 13 Claims

1. A periodontal depth probe for measuring pocket depth comprising:

(a) a probe body;  
 (b) a rigid probe tip for insertion into the periodontal pocket, which is pivotally connected to a movable arm, where

said movable arm is pivotally connected to the probe body; and



(c) a sleeve partially ensheathing said probe tip said sleeve being fixed to said probe body, the probe tip being reciprocable in the bore in said sleeve.

4,791,941  
**ATHLETIC MOUTH GUARD**  
 Quinton A. Schaefer, Strongsville, Ohio, assignor to Gator Corporation, Strongsville, Ohio  
 Filed Jun. 12, 1987, Ser. No. 61,086  
 Int. Cl.<sup>4</sup> A61F 5/56  
 U.S. Cl. 128—861 2 Claims

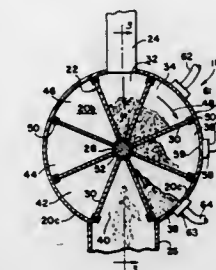


1. A method of attaching a mouth guard to a bar of a face guard for a helmet, where the mouth guard is adapted to protect the upper and lower teeth of an athlete, the method of attaching comprising:

providing a U-shaped mouth guard having an upper portion adapted to surround the upper teeth between outer and inner thin peripheral walls and having a lower portion with relatively inner and outer thick peripheral walls surrounding the lower teeth, said guard connected to an elongated connecting strap having a free end having an oblong opening;

looping the free end of the strap over the bar of the face guard and passing the mouth guard bar through the oblong opening to provide a secure connection of the mouth guard to the bar.

4,791,942  
**PROCESS AND APPARATUS FOR THE EXPANSION OF TOBACCO**  
 Frederic L. Rickett, Chester; Peder M. Pedersen, and Eugene Glock, both of Richmond, all of Va., assignors to The American Tobacco Company, Hopewell, Va.  
 Filed Aug. 1, 1986, Ser. No. 892,005  
 Int. Cl.<sup>4</sup> A24B 3/18  
 U.S. Cl. 131—291 18 Claims



1. The process of expanding tobacco including the steps of  
 (a) adjusting the moisture content of cut tobacco;  
 (b) placing the cut tobacco in a gaseous or liquid environment consisting essentially of steam or carbon dioxide and pressurizing the cut tobacco in said environment;  
 (c) substantially simultaneously depressurizing and drying the cut tobacco; and  
 (d) reordering the dried tobacco.

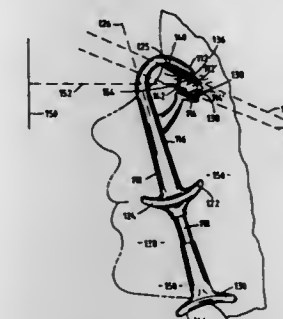
4,791,943  
**CIGARETTE FILTER UNIT AND METHOD FOR THE PRODUCTION THEREOF**  
 Alois Kupper, Morges, and Serge Veluz, Echichens, both of Switzerland, assignors to Baumgartner Papiers S.A., Crissier, Switzerland  
 Filed Aug. 22, 1986, Ser. No. 899,473  
 Claims priority, application Switzerland, Aug. 26, 1985, 3665/85  
 Int. Cl.<sup>4</sup> A24D 3/04, 3/02  
 U.S. Cl. 131—339 25 Claims

1. A cigarette filter unit within which are arranged sections of different designs which alternate consecutively and are surrounded by a wrapping strip, characterized in that arranged between each two filter elements, in axial alignment with each other in the flow section of the filter unit, is at least one partition, each partition comprising at least two areas of differing porosities defined by porosity openings, the size of the porosity openings in one area having a greater cross-section than the porosity openings in another area, and each of said at least two areas made of a material which allows smoke to pass and preferably filters it.

4,791,944  
**EYELASH CURLER**  
 Robert F. Stein, 271 Paradise Cove, Malibu, Calif. 90265  
 Continuation-in-part of Ser. No. 837,530, Mar. 7, 1986. This application Jun. 22, 1987, Ser. No. 65,415  
 Int. Cl.<sup>4</sup> A45D 2/42  
 U.S. Cl. 132—217 12 Claims

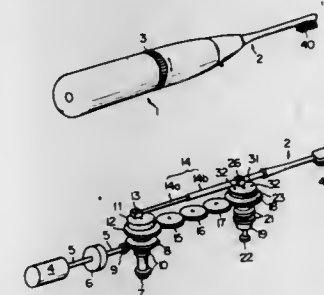
1. A curler for eyelashes, comprising:  
 an upper jaw for placement on top of said eyelashes;  
 a lower jaw for placement under said eyelashes;  
 a means for aligning said upper jaw on top of said eyelashes and said lower jaw under said eyelashes;  
 a means for butting said upper and lower jaws together having:  
 a sleeve coupled to one of said upper and lower jaws;  
 a plunger slidably mounted in said sleeve and coupled to the other of said upper and lower jaws;

a grip axis, said plunger sliding along said grip axis inside said sleeve;  
 first and second finger grips mounted on opposite sides of said grip axis and coupled to one of said sleeve and said plunger; and  
 a thumb grip coupled to the other of said sleeve and said plunger spaced from said upper and lower jaws;



said upper and lower jaws curling said eyelashes when butted together;  
 said upper jaw is curved to substantially match the arch of an open eyelid having said eyelashes and has a jaw axis;  
 said jaw axis and said grip axis intersect defining a vertical plane; and  
 a neck coupling one of said sleeve and said plunger to said upper jaw at said vertical plane.

4,791,945  
**POWER OPERATED TOOTHBRUSH**  
 Toshio Moriyama, 802-14, Higashi Koiso, Ohtsomachi, Nakagun, Kanagawaken, Japan  
 Filed Dec. 13, 1979, Ser. No. 103,351  
 The portion of the term of this patent subsequent to Jul. 20, 2001, has been disclaimed.  
 Int. Cl.<sup>4</sup> A45D 44/18  
 U.S. Cl. 132—84 R 4 Claims



1. A power operated toothbrush including a handle having a motor therein, a toothbrush member including bristles on one end thereof, a pair of eccentric cranks positioned within said handle spaced longitudinally of the toothbrush member including portions secured to the toothbrush member at the spaced apart locations therealong and means for driving the eccentric cranks from the motor to impart at least one of a circular orbital motion and arcuate reciprocal motion to the toothbrush bristles, said drive means for the eccentric cranks including means for selectively varying the eccentricity of one of the cranks to selectively produce the circular orbital motion and arcuate reciprocal motion of the toothbrush bristles.

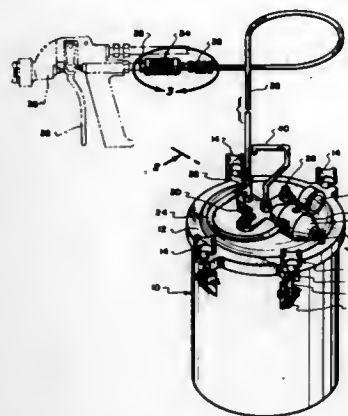
**4,791,946**  
**ALTERNATING SELECTABLE CLEANING FLUID TO AIR PURGING SYSTEM**

James E. Cavanaugh, and Robert D. Hetherington, both of Sunland, Calif., assignors to Blaks Manufacturing Company, Franklin Park, Ill.

Filed Jul. 16, 1987, Ser. No. 73,986  
Int. Cl.<sup>4</sup> B08B 3/10

U.S. Cl. 134—99

8 Claims



1. A purging system for cleaning passageways in fluid delivery systems such as paint spray guns, and the like, comprising: storage tank means for storing and supplying a cleaning solvent to a fluid delivery system; coaxial hose means connected to said storage tank means; connecting means for connecting said coaxial hose means to said fluid delivery system to be purged; an in-line valve means in said coaxial hose means for alternately selecting flow through said coaxial hose means from an inner conduit to an outer conduit and back; said in-line valve means comprising: tubular means connected in line with said coaxial hose means having coaxial inlet passageways and an outlet passageway; sleeve means slideably mounted on said tubular means; said sleeve means slideable on said tubular means to alternately connect said coaxial inlet passageways to said outlet passageway so that a fluid delivery system connected to said coaxial hose means may be quickly alternated between purging fluid and purging air; delivery means for delivering said cleaning solvent to one of said conduits of said coaxial hose; air pressure supply means connected to supply air under pressure to the other of said conduits in said coaxial hose; whereby a fluid delivery system connected to said coaxial hose means may be alternately purged with a cleaning solvent and air under pressure.

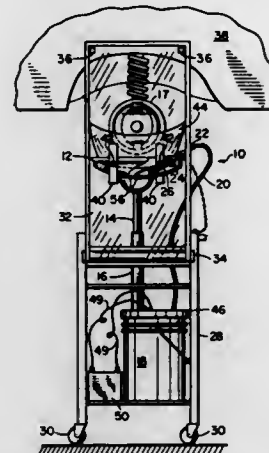
**4,791,947**  
**AUTOMOTIVE PARTS CLEANING DEVICE WITH ASBESTOS RESIDUE COMPARTMENT**  
George Holzberger, Rte. 55, LaGrangeville, N.Y. 12540  
Filed May 11, 1987, Ser. No. 48,259  
Int. Cl.<sup>4</sup> B08B 3/04

U.S. Cl. 134—123

7 Claims

1. A device for cleaning brake drums and clutches and storing residue asbestos from said cleaning comprising: a catch basin moveable between an extended and retracted position; a container, communicating with said catch basin through a conduit, one end of said conduit secured to and opening

into said latch basin, the other end of said conduit disposed within the container; a hose, one end of which is secured to a pump, the other end of said hose adapted to receive a cleaning implement. pump means for drawing liquid from the container through a pipe within the container, a predetermined distance from the bottom of said container, and dispensing the liquid through the hose and out of the end adapted to receive the cleaning implement; a moveable stand adapted to receive said cleaning device; a transparent shield capable of extension and retraction, one end of said shield secured to the stand the other free end

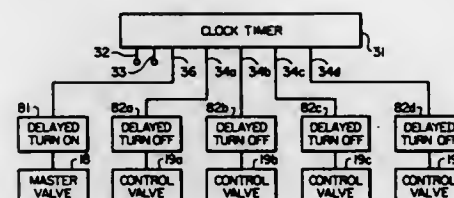


of the shield having at least one magnet therein for securing said free end to the workpiece whereby the user is shielded from the workpiece and cleaning device, the secured end of the shield being attached to a take up roller; a least two vertical compartments within the shield and located toward the center of said shield each compartment containing a basin magnet for securing the shield to the catch basin; and an apron on the side of the shield adapted to face the work piece, said apron secured along one end to the shield the other end of said apron being free for insertion into the basin.

**4,791,948**  
**SPRINKLER CONTROL SYSTEM**  
John J. Bayat, 3501 Cashill Blvd., Reno, Nev. 89509  
Continuation-in-part of Ser. No. 124,722, Nov. 24, 1987, which is a continuation-in-part of Ser. No. 849,470, Apr. 8, 1986, Pat. No. 4,708,162. This application Feb. 24, 1988, Ser. No. 159,728  
Int. Cl.<sup>4</sup> A01G 27/00

U.S. Cl. 137—1

3 Claims



1. In a sprinkler control system for controlling the delivery of pressurized water from a supply line to a plurality of outlet lines connected to individual sections of a sprinkler system: a manifold having an inlet port and a plurality of outlet ports, a main valve connected to the inlet port for delivery of pressur-

ized water from the supply line to the manifold, a plurality of control valves connected to respective ones of the outlet ports for controlling the delivery of pressurized water from the manifold to the outlet lines, and means for sequentially operating the master valve and the control valves in such manner that the master valve is opened after a control valve is opened and is closed before the control valve is closed.

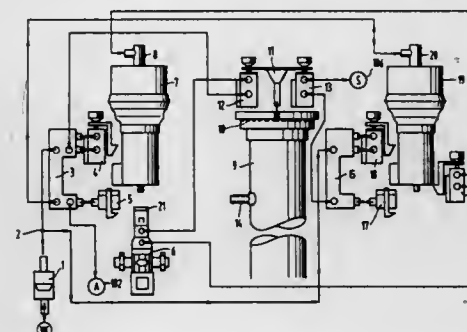
**4,791,949**  
**METHOD OF DISCHARGING SEWAGE BY VACUUM AND CONTROL APPARATUS FOR CARRYING THE METHOD INTO EFFECT**

Wolfgang Tank, Uetersen, Fed. Rep. of Germany, assignor to Oy Wartsila Ab, Helsinki, Finland  
Filed Aug. 24, 1987, Ser. No. 88,661  
Claims priority, application Fed. Rep. of Germany, Aug. 29, 1986, 3629484

Int. Cl.<sup>4</sup> E03F 1/00

U.S. Cl. 137—1

15 Claims



1. A method of operating a vacuum sewer system that comprises a sewage valve, a sewage collecting tank upstream of the sewage valve, and a sewage pipe downstream of the sewage valve and under partial vacuum, said method comprising: (a) opening the sewage valve and admitting a predetermined quantity of sewage into the sewage pipe from the sewage collection tank; (b) closing the sewage valve, and, if insufficient air for transportation of sewage was admitted into the sewage pipe by way of the sewage valve while the sewage valve was open; (c) opening a secondary air valve and admitting air into the sewage pipe upstream of the sewage admitted in step (a) and then closing the secondary air valve.

**4,791,950**  
**PRESSURE LIMITING VALVE**  
Harry E. Pedersen, Nordborg, Denmark, assignor to Danfoos A/S, Nordborg, Denmark  
Filed Dec. 14, 1987, Ser. No. 132,876  
Claims priority, application Fed. Rep. of Germany, Jan. 21, 1987, 3701572

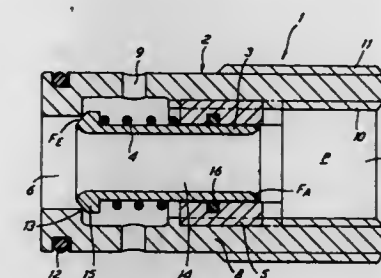
Int. Cl.<sup>4</sup> G05D 16/00

U.S. Cl. 137—115

17 Claims

1. A pressure limiting valve, comprising a housing having wall means defining an interior chamber, an inlet aperture opening to said chamber, an outlet aperture opening to said chamber in axial spaced relationship to the opening of the inlet aperture to the chamber and a discharge passage opening to the chamber axially between the opening of the inlet and outlet apertures to the chamber, a valve element movable in one direction within the chamber from a first position blocking fluid communication between both of said apertures and the discharge passage to a second position permitting fluid communication between at least one of said apertures and the discharge passage, spring means acting between the valve element and the housing for resiliently retaining the valve

element in its first position, the valve element having a pressure engaging first surface which with pressure applied thereagainst acts to move the valve element in the same direction that the

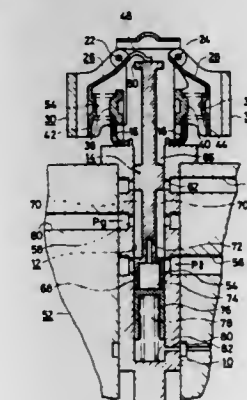


spring means acts to move the valve element, and an oppositely disposed pressure engaging second surface that is larger than the pressure engaging first surface.

**4,791,951**  
**GOVERNOR FOR HYDRAULICALLY CONTROLLED AUTOMATIC TRANSMISSION**  
Kazuyoshi Hiraiwa, Hamamatsu; Yoshiaki Shimizu, Hamakita, and Koichi Hayasaka, Fujisawa, all of Japan, assignors to Rhythm Motor Parts M.F.G. Co., Ltd., Shizuoka, Japan  
Filed Sep. 2, 1987, Ser. No. 92,379  
Claims priority, application Japan, Sep. 3, 1986, 61-207299  
Int. Cl.<sup>4</sup> G05D 13/38

U.S. Cl. 137—56

7 Claims



1. A governor for causing governor hydraulic pressure to be generated only after a rotational speed thereof reaches a predetermined breakpoint speed to hydraulically control an automatic transmission, said governor comprising: a sleeve operatively connectable to the automatic transmission for being rotated by the output thereof, said sleeve having opposite ends, a sleeve hole extending therein and open to one of said ends, an entrance port communicable with a hydraulic pressure line through which hydraulic line pressure is supplied to the governor, and an exit port through which the governor hydraulic pressure is discharged when the breakpoint speed is reached during rotation of said sleeve by the automatic transmission; a flyweight rotatably supported on said one of said ends of said sleeve, said flyweight being swung outwardly with respect to said one of the ends of said sleeve under centrifugal force as the rotational speed of said sleeve is increased;



a spool extending in an axial direction and slidably mounted to said sleeve in said spool hole, said spool operatively connected to said flyweight for being slid in said spool hole along said axial direction by said flyweight as said flyweight is swung outwardly once the breakpoint speed of said sleeve has been attained, and said spool having a pressure adjusting means for placing said entrance port in a degree of open communication with said exit port that corresponds to the amount said spool is slid in said spool hole;

a feedback hydraulic pressure chamber disposed in series with said spool along said axial direction thereof, said feedback hydraulic pressure chamber operatively connected to said exit port for allowing the governor hydraulic pressure to be fed thereto, and said feedback hydraulic pressure chamber in operative communication with said spool in a manner in which the governor hydraulic pressure fed thereto results in a force transmitted to the spool that acts on said spool in a second direction opposite to the direction in which the spool is slid by said flyweight;

a spring enclosing chamber disposed in series with said spool along said axial direction thereof, said spring enclosing chamber closed to said feedback hydraulic pressure chamber and open to the atmosphere outside the governor; and

a spring enclosed in said spring enclosing chamber and operatively connected to said spool for exerting a preload on said spool in said second direction that establishes said breakpoint speed.

4,791,952

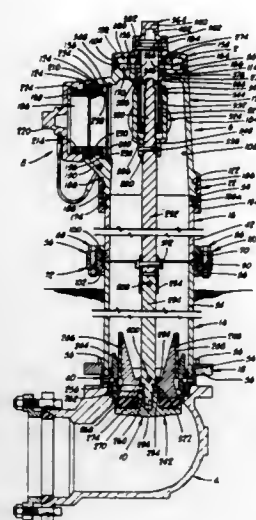
## HYDRANT AND COMPONENTS THEREOF

David F. Laurel, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jan. 22, 1988, Ser. No. 146,983

Int. Cl.<sup>4</sup> E03B 9/04; F16K 43/00

U.S. Cl. 137—272



10. A nozzle assembly for a hydrant having a valve stem and a valve, comprising:

a hydrant head including a support wall in which a nozzle receptacle is defined, said nozzle receptacle including an opening and a retaining wall extending radially inwardly into said opening from said support wall, said retaining wall including an inner surface bounding the diameter of a throat through said opening of said nozzle receptacle and said retaining wall further including an interior surface extending radially outwardly from said inner surface and facing the interior of said hydrant head;

a nozzle, including:

an inlet portion including an outer surface disposed adjacent said inner surface of said retaining wall and further

including an inner surface defining an inlet opening into said nozzle; and

an outlet portion extending coaxially from said inlet portion, said outlet portion including an inner surface defining an outlet opening from said nozzle in communication with said inlet opening of said nozzle; and

a retainer ring, including:

a connector wall including an outer surface connected adjacent said inner surface of said inlet portion of said nozzle and further including an inner surface defining a communicating opening communicating the interior of said hydrant head through said inlet opening of said nozzle to said outlet opening of said nozzle; and

a flange extending outwardly from said connector wall and abutting said interior surface of said retaining wall and facing the valve stem, said flange adapted to receive a tool with which to turn said retainer ring for assembling and disassembling said nozzle assembly.

4,791,953

## REGULATOR AND SHUT-OFF VALVE FOR CORROSIVE MEDIA

Rütger Berchem, Gelsenkirchen, Fed. Rep. of Germany, assignor to B + S Metallpraxis Gesellschaft für Metallformgebung m.b.H., Gelsenkirchen, Fed. Rep. of Germany

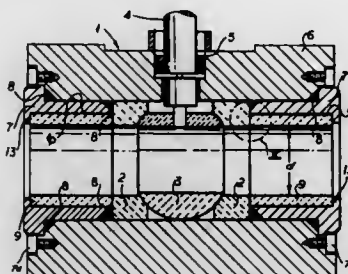
Filed Jan. 20, 1988, Ser. No. 145,833

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1987, 3702063

Int. Cl.<sup>4</sup> F16L 7/00

U.S. Cl. 137—375

6 Claims



1. In a regulator and shut-off valve for a corrosive media, particularly for a wet chlorine containing gas and a chloride ion containing fluid, comprising a pressure resistant housing and a shut-off member held between at least two seat rings, said housing having a passage for said corrosive media, said seat rings being supported in said housing and contacting said shut-off member under tension, the improvement wherein said housing is made of titanium or a titanium alloy, at least one sintered ceramic wear sleeve is located on the circumference of said passage in said housing and said wear sleeve is inserted in said housing with a radial play and with an axial play so that a space is formed between the outer circumference of said wear sleeve and said housing, said space being connected with the passage cross section of said wear sleeve by a compensating gap.

4,791,954

## SELF-REGULATED PRESSURE CONTROL VALVE

Yoshihiko Hasegawa, Hyogo, Japan, assignor to TLV Co., Ltd., Hyogo, Japan

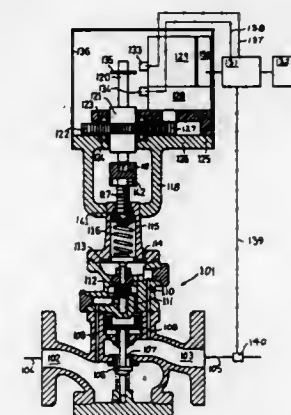
Continuation-in-part of Ser. No. 770,845, Aug. 29, 1985, abandoned. This application Aug. 11, 1987, Ser. No. 84,441

Claims priority, application Japan, Oct. 2, 1984, 59-207779

Int. Cl.<sup>4</sup> G05D 16/00

U.S. Cl. 137—487.5

9 Claims



1. A self-regulated pressure control valve comprising:

a pressure control valve;

pressure setting means for establishing a set pressure;

pressure regulating means having a pressure regulating element which is movable for regulating a controlled pressure of said pressure control valve;

driving means for driving said pressure regulating means to move said pressure regulating element;

position data means for relating the position of said pressure regulating element to the controlled pressure of said pressure control valve based on a predetermined functional relationship between the position of the pressure regulating element and the controlled pressure; and

control means connected to said position data means for controlling the operation of said driving means on the basis of a set pressure established by said pressure setting means and the predetermined functional relationship between the position of the pressure regulating element of said pressure regulating means and the controlled pressure so that the pressure regulating element of said pressure regulating means is shifted to a position to regulate the controlled pressure to the set pressure.

4,791,955

## MODULATING PRESSURE OPERATED PILOT RELIEF VALVE

Raymond G. Relp, Cook, Ill., assignor to Dresser Industries, Inc., Dallas, Tex.

Continuation of Ser. No. 534,594, Sep. 22, 1983, Pat. No. 4,615,356. This application May 19, 1986, Ser. No. 864,665

The portion of the term of this patent subsequent to Oct. 7, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> G05D 16/00

U.S. Cl. 137—488

7 Claims

1. A pilot valve for sensing product pressure communicated to an inlet of a main valve and venting said product pressure at pressure levels above a predetermined level, said main valve including an inlet and outlet and a main valve piston reciprocally mounted in said main valve engaging said main valve inlet at a predetermined set point pressure, said main valve further including a head volume on a side of said main valve piston opposite said main valve inlet, said pilot valve comprising:

a pilot valve body;

said pilot valve body including a pilot chamber and a re-

duced diameter chamber communicating with said pilot chamber;

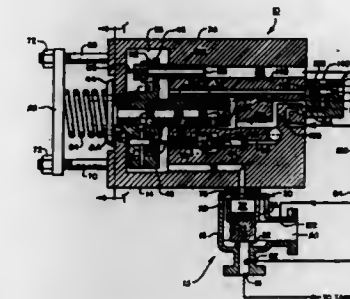
a compound differential area pilot piston with a transverse surface extending within said pilot chamber and a reduced body portion extending into said reduced diameter chamber for reciprocal movement therein, said pilot piston reduced body portion including an end defining a pressure surface, said pressure surface and said reduced diameter chamber defining a pressure chamber;

first passage means for communicating said pilot chamber and said head volume;

second passage means for communicating said pilot chamber with said outlet of said main valve;

third passage means for communicating said pressure chamber with said inlet of said main valve;

first valve means for controlling fluid flow through said second passage means, said first valve means in a closed



position in a balanced mode of the main valve and actuable by said pilot piston to an open position upon movement by said pilot piston a distance proportional to a predetermined increase in product pressure;

second valve means for controlling fluid flow through said third passage means, said second valve means in an open position in the balanced mode of the main valve and actuable by said pilot piston to a closed position prior to opening of said first valve means upon movement by said pilot piston said distance proportional to said predetermined increase in product pressure, whereby said pilot chamber is isolated from said inlet chamber followed by venting of said pilot chamber; and

biasing means for biasing said pilot piston out of engagement with said first valve means and into engagement with said second valve means, whereby upon venting said pilot chamber, said biasing means returns said pilot piston to the balanced mode position.

4,791,956

## CONSTANT FLOW VALVE

Naoya Kominami, Yokohama; Ikao Yokoyama, and Yuzi Shimanuki, both of Nobeoka, all of Japan, assignors to Asahi Yukizai Kogyo Co., Ltd., Miyazaki, Japan

Filed Sep. 28, 1987, Ser. No. 101,500

Int. Cl.<sup>4</sup> F16K 17/32

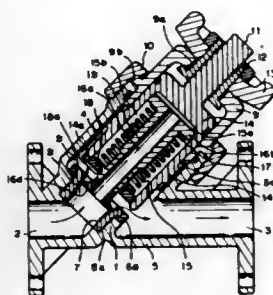
U.S. Cl. 137—503

6 Claims

1. A constant flow valve comprising:

a valve casing having a flow passage including an inlet flow passage and an outlet flow passage, said flow passage having a partition arranged between the inlet flow passage and the outlet passage which defines a curve in the flow passage, a chamber having an axis arranged at an angle to the axis of the inlet flow passage and located between the inlet flow passage and the outlet flow passage, and an opening communicating the inlet flow passage with the chamber and having an inner diameter which is gradually reduced from the downstream side toward the upstream side thereof;

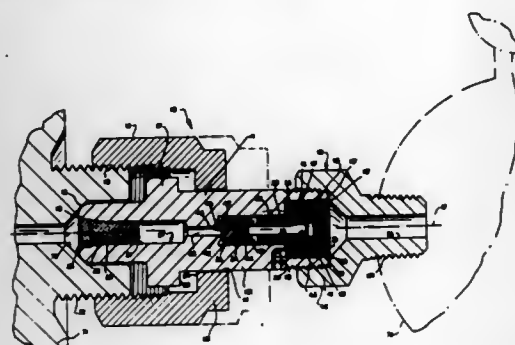
a cylinder arranged coaxially with the opening, and able to move forward and backward in the direction of the axis thereof and having a sealing surface at the lower end thereof which is pressed against a valve seat of the opening when the cylinder is moved in the forward direction; a cap attached to the valve casing and supporting the cylinder;



a piston type valve plug slidably fitted in the cylinder and having an internal through hole communicating with the opening, the valve plug being arranged coaxially with the opening and being sized to define an orifice between the opening and the end of the valve plug at all slidable positions of the valve plug; and  
spring means arranged between the piston type valve plug and the cylinder, to bias the valve plug away from the opening.

**4,791,957**  
**STEM REGULATOR**  
Albert Ross, Elyria, Ohio, assignor to Western/Scott Fetzer Company, Westlake, Ohio  
Filed Mar. 17, 1987, Ser. No. 26,755  
Int. Cl.<sup>4</sup> F16K 31/122  
U.S. Cl. 137-505.12

1 Claim

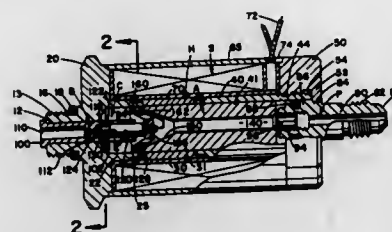


1. In combination, a stem pressure regulator and a second pressure regulator mounted on said stem regulator, the stem regulator including an inlet nipple having an inlet and an outlet and a central passage for conducting gases from the inlet to the outlet, an annular seat surrounding said central passage at a plane transverse to the passage, piston means slidably disposed in the nipple, the piston means having at a first end a seat area adapted to seal the annular seat, and at an opposite end having a face substantially larger than said annular seat, resilient spring means in said nipple urging said piston means away from said annular seat, second passage means for conducting fluid passing through said annular seat to said face, the piston means being arranged in a manner wherein the force of gas pressure on said face opposes the force of the spring means and closes said piston seat area against said annular seat when gas pressure on said face exceeds the gas pressure at the nipple inlet by a predetermined value, the nipple having a convex nose at its inlet end, a generally circular exterior downstream of said nose

and a shoulder between said nose and circular exterior extending radially beyond said circular exterior, a coupling nut assembled over said circular exterior, said nut having threads for coupling with a cylinder valve and a shoulder engageable with said nipple shoulder, the pitch diameter of the nut threads being greater than the diametral extent of the nipple shoulder, tightening of said nut thread on said cylinder valve causing abutment of said shoulders and sealing engagement of said nose with the cylinder valve, threaded coupling means on an outlet end of said nipple, said second regulator being mounted to said nipple by said threaded coupling means, the coupling means being of sufficient strength to support said second regulator on the stem regulator in normal service and the nut including the threads thereof being of sufficient strength to support both said stem regulator and said second regulator on the cylinder valve in normal service whereby the stem regulator serves to couple the second regulator to the cylinder valve while being adapted to improve the accuracy of control of the second regulator and extend the service life of the second regulator by reducing the pressure levels to which the second regulator is exposed.

**4,791,958**  
**SOLENOID CONTROLLED FLUID VALVE**  
Robert W. Brundage, 135 Paradise Rd., Painesville, Ohio 44077  
Continuation of Ser. No. 563,760, Dec. 21, 1983, abandoned, which is a continuation-in-part of Ser. No. 378,133, May 14, 1982, abandoned. This application Jun. 2, 1987, Ser. No. 58,644  
Int. Cl.<sup>4</sup> F16K 31/06; G05D 7/06  
U.S. Cl. 137-528

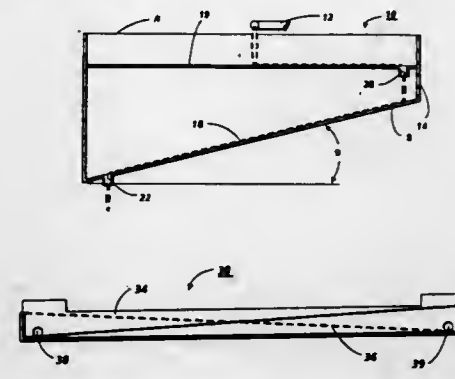
10 Claims



1. An electrically controlled flow valve comprising in combination:  
a. a housing having an elongated cavity with a pressure inlet port at one end defined by a valve seat and an outlet port at the other end;  
b. a valve element having a valve seat engaging surface movable in said cavity;  
c. a magnetically permeable armature movable in said housing;  
d. a solenoid coil surrounding the housing;  
e. said housing including a magnetically permeable armature attracting sleeve and a magnetically nonpermeable sleeve between said magnetic permeable sleeves;  
f. one end of said armature slightly overlapping the end of said attracting sleeve and the other end substantially overlapping the end of the supporting sleeve whereby when said solenoid is energized, the magnetic force on said armature biases said valve element relative to said valve seat;  
g. an axial passage in said armature;  
h. threaded means between said armature and said valve element for adjusting the initial maximum overlap of the armature with the magnetically permeable attracting sleeve.

**4,791,959**  
**RELEASE AGENT MANAGEMENT SYSTEM FOR A HEATED FUSER ROLL**  
William M. Schwarz, Jr., Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.  
Filed Jul. 17, 1987, Ser. No. 74,654  
Int. Cl.<sup>4</sup> E03B 11/00  
U.S. Cl. 137-561 A

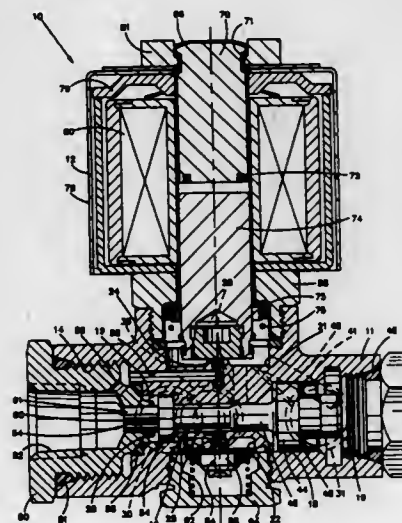
11 Claims



1. A release agent transport apparatus that assures uniform distribution of release agent material onto a metering member in a heated roll fuser device regardless of machine tilt, comprising: an upstanding integral and stationary housing member having an inlet adapted to receive release agent material and an outlet for the exiting of said release agent material, at least two integral races positioned within said housing member and adapted to transport said release agent material from said inlet to said outlet, and wherein one of said at least two races is positioned substantially horizontal with respect to the direction perpendicular to the paper path of the machine and a second race in communication with one end of said one of said at least two races and positioned in an inclined fashion between said inlet and outlet of said housing member.

**4,791,960**  
**SEMI-PILOT OPERATED FOUR-WAY VALVE**  
John E. Ellison, Mayfield Heights, Ohio, assignor to Parker Hannifin Corporation, Cleveland, Ohio  
Filed Jul. 22, 1987, Ser. No. 76,501  
Int. Cl.<sup>4</sup> F15B 13/043  
U.S. Cl. 137-596.17

4 Claims

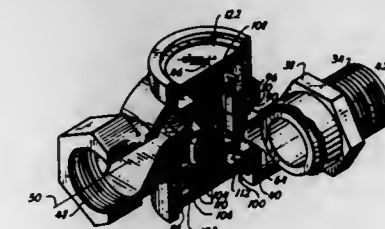


1. A semi-pilot operated four-way valve, comprising a valve body having a stepped cylindrical bore extending

along a horizontal axis and including a pilot valve bore and piston bore adjacent a central bore, an inlet port in said valve body in normally open fluid communication with said pilot valve bore, an exhaust port in said valve body in fluid communication with said central bore, normally closed and normally open pilot valve seats in said pilot valve bore, a first cylinder port in said valve body in fluid communication with said pilot valve bore, a pilot valve in said pilot valve bore moveable between positions closing said normally open and normally closed pilot valve seats, said pilot valve being biased to a position closing said normally closed pilot valve seat in response to fluid pressure applied at said inlet port, a pilot valve piston in said pilot valve piston bore having a stem slidably received in said central bore and engageable with said pilot valve for moving said pilot valve to a position closing said normally open pilot valve seat, an upper vertical bore in said valve body having a first direct-operated valve seat therein in fluid communication with said inlet port, a lower vertical bore in said valve body having a second direct-operated valve seat therein in fluid communication with said central bore, a second cylinder port in said valve body in fluid communication with said upper bore, said pilot valve piston bore being in fluid communication with said upper bore, a magnetically actuated solenoid plunger operable to move upper and lower valves relative to said upper and lower valve seats thereby alternately connecting said first and second cylinder ports with said inlet and exhaust ports for changing fluid flow through said valve, spring means for biasing said upper valve relative to said first direct valve seat, and a valve holder supporting said lower valve relative to said second direct valve seat, said valve holder being coupled to said upper valve for movement therewith, said upper valve being a normally closed valve, said first direct valve seat being formed in said upper vertical bore in said valve body, said lower valve being a normally open valve cooperative with said second direct valve seat formed in said lower vertical bore in said valve body, said valve holder comprising a unitary element having a circular recess at the lower portion thereof for support of a lower valve disc and a pair of spaced upwardly extending legs, said legs straddling said central bore and engageable with said upper valve for movement therewith.

**4,791,961**  
**FLUID JOINT SWIVEL COUPLING**  
Leonard R. Nitzberg, Knoxville, Tenn., and Paul D. Carmack, Tipp City, Ohio, assignors to Helix Enterprises, Inc., Knoxville, Tenn.  
Continuation-in-part of Ser. No. 107,947, Oct. 13, 1987. This application Mar. 25, 1988, Ser. No. 173,362  
Int. Cl.<sup>4</sup> F16L 37/28  
U.S. Cl. 137-614.04

22 Claims



1. A fluid swivel joint coupling having a body member including an inlet portal, an outlet portal and a diverted fluid



passageway therebetween, a first connecting member pivotably connected to and in flow communication with a first of the portals for rotation about a first swivel axis passing through the first portal and the body member, a second connecting member pivotably connected to and in flow communication with the second of the portals for rotation about a second swivel axis passing through the second portal and the body member, means for connecting said first connecting member to a rigid conduit, said second connecting member having a diverted fluid passageway including a longitudinal axis extending through a third portal, means for connecting said second connecting member to a flexible conduit with the third portal in flow communication therewith so that fluid may flow through the swivel joint between the rigid conduit and the flexible conduit, the longitudinal axis of the second connecting member being disposed relative to the first and second swivel axes such that said longitudinal axis is never in that plane which passes through the first swivel axis and is parallel to the second swivel axis.

**4,791,962**  
**FLUID VALVE WITH PROTECTED VALVE CLOSING SEAL**

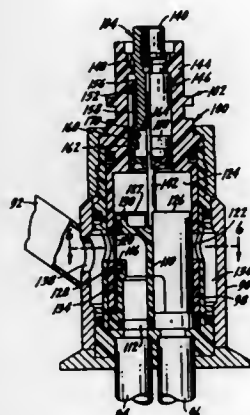
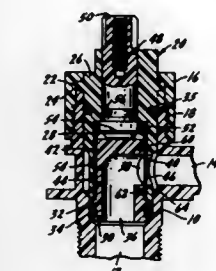
Alfred M. Moen, Destin, Fla., assignor to Stanadyne, Inc., Windsor, Conn.

Filed Apr. 29, 1988, Ser. No. 187,970

Int. Cl.<sup>4</sup> F16K 11/078

U.S. Cl. 137—625.17

18 Claims



1. Fluid valve means for use within a valve fixture such as a kitchen faucet, lavatory faucet or shower tub control including a body, a seal support positioned within said body and connected thereto, said seal support having inlet and outlet means, said body having discharge means in alignment with said seal support outlet means,

a space defined between an interior wall of said body and an exterior wall of said seal support, a piston movable within said space and being in substantial contact with the interior wall of said body and the exterior wall of said seal support, said piston having an opening movable into alignment with said discharge means and outlet means to pro-

vide a water passage from said inlet means to said discharge means, said discharge means and outlet means having a relative size and configuration so as to effect no substantial pressure differential when water flows there-through,

and valve closing seal means extending peripherally about said seal support outlet means and in contact with the interior of said piston.

**4,791,963**  
**FLEXIBLE TUBE WITH MUTUALLY PARALLEL, RING-SHAPED FLUTES AND AXIAL SUPPORT**

Heinz Gronert, Emmering; Johann Benisch, Herraching; Johann Pichler, Steinkirchen, and Reinhard Gropp, Neuenburg-Arnach, all of Fed. Rep. of Germany, assignors to Witzemann GmbH Metallschlauch-fabrik Pforzheim, Pforzheim, Fed. Rep. of Germany

PCT No. PCT/EP86/00049, § 371 Date Jul. 15, 1986, § 102(e) Date Jul. 15, 1986, PCT Pub. No. WO86/04660, PCT Pub. Date Aug. 14, 1986

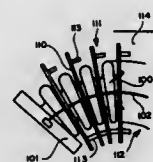
PCT Filed Feb. 1, 1986, Ser. No. 897,523

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1985, 3503689; Jun. 22, 1985, 3522334; Dec. 18, 1985, 3544884

Int. Cl.<sup>4</sup> F16L 27/10, 51/02

U.S. Cl. 138—110

14 Claims



1. Flexible thin-walled tube (1, 100) with mutually parallel ring-shaped flutes (105), end connectors (101) and longitudinal support means which hold said connectors against changes in axial spacing and which are securely joined to said connectors in the direction of at least one of: pull, pressure, and against which the tube is at least indirectly braced,

wherein the longitudinal support means include at least two cables (4, 5; 102) extending generally parallel to the tube, arranged symmetrically about the tube axis and located externally of the tube and guiding said tube in radial direction;

and including spacers (3, 104) determining the relative position between the tube and said cables and holding the cables at intervals along the length of the tube, said spacers including rings (104) which, each, comprise ring segments (106, 107) captively enclosing the tube and retaining said cables, the ring segments being formed with aligned holes (109) at respective ends and through which the cables (102) are placed to hold the ring segments in opposed position, in pairs, and thereby form said rings.

**4,791,964**  
**MULTIPLE CONDUCTOR FLUID HANDLING DUCT FOR AN AUTOMOBILE VEHICLE**

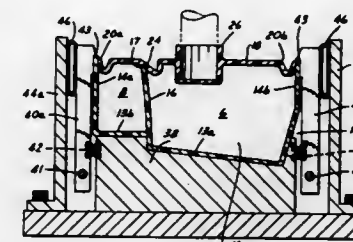
Larry J. Van Kirk, Saline, and Ronald L. Waterloo, Ann Arbor, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Oct. 30, 1986, Ser. No. 925,040

Int. Cl.<sup>4</sup> F16L 9/18

U.S. Cl. 138—115

3 Claims



1. A multiple channel fluid handling duct for an automotive vehicle comprising:

- a channel section having a base and integral, upstanding, interior and exterior wall elements; and
- a closure cap which is friction welded to each of said wall elements of said channel section, with said duct having a longitudinal axis running generally parallel to said base and to said wall elements.

**4,791,966**  
**WRAPPED, ELONGATED STOCK**

Heinz Ellentrop, Wipperfurth, Fed. Rep. of Germany, assignor to HEW-Kabel Heinz Ellentrop KG, Wipperfurth, Fed. Rep. of Germany

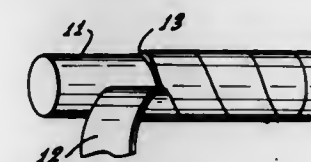
Filed Apr. 11, 1983, Ser. No. 483,549

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1982, 3214447

Int. Cl.<sup>4</sup> F16L 11/12

U.S. Cl. 138—154

11 Claims



1. A conductor or cable having a cover comprising a helically wrapped, and thereby stretched, ribbon made of an unsintered powdery or granular synthetic, not amenable to working from a melt but having high temperature resistivity and being thicker in a central portion with tapering edges of reducing thickness and smooth surface, said ribbon having a thickness in its central area from 30 to 200 micrometers and a thickness at the edge region of 5 micrometers and less, adjacent loops of the wrapping overlapping at adjoining tapering edges, thermal sinter treatment subsequent to wrapping having caused fusing of the overlapping edges to result in an overall approximately smooth surface.

**4,791,967**  
**DEVICE FOR DETERMINING THE LOCATION OF A WARP BREAK THREAD IN WEAVING LOOMS USING DROP WIRES**

Michel Vandeweghe, Wijtschate-Hewelland, and Dirk Gryson, Dikkekens-Ieper, both of Belgium, assignors to Picanol N.V., Belgium

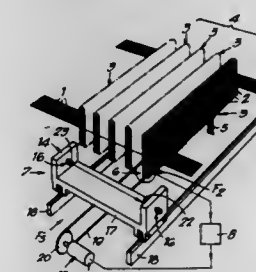
Filed Feb. 13, 1987, Ser. No. 14,778

Claims priority, application Netherlands, Feb. 14, 1986, 8600372

Int. Cl.<sup>4</sup> D03D 51/28

U.S. Cl. 139—353

13 Claims



**4,791,965**  
**CO-EXTRUDED TUBE**

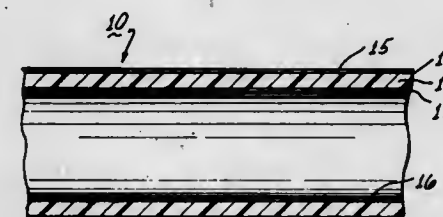
Gerald E. Wynn, El Cajon, Calif., assignor to James Hardie Irrigation, Inc., Laguna Niguel, Calif.

Filed Feb. 13, 1987, Ser. No. 14,796

Int. Cl.<sup>4</sup> F16L 9/14

U.S. Cl. 138—146

31 Claims



1. A tube, comprising:

- an elongated, tubular core composed of a first polymeric composition, the core having an outer core surface and an inner core surface; and
- a sheath disposed over the outer core surface and a liner disposed over the inner core surface, at least one of which sheath and liner is composed of a second polymeric composition having broader molecular weight distribution than the first polymeric composition, provided that said core comprises at least about 94% of the total volume of said core, said sheath and said liner.

1. An apparatus for electrically detecting and locating a broken warp thread in a weaving loom including a plurality of drop wires arranged to be associated with the warp threads of a loom so that, upon loss of tension in a warp thread due to breakage a drop wire drops from a normal high to a low position, comprising:

- means for generating a broken warp electrical signal when a drop wire drops to a low position;
- a movable drop wire locator arranged to traverse a locator path adjacent said drop wires;
- means for moving said locator along its locator path in response to said broken warp electrical signal;

means associated with the locator for detecting and indicating the position of the drop wire.

4,791,968

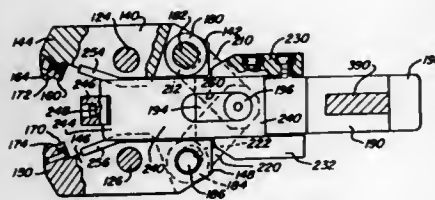
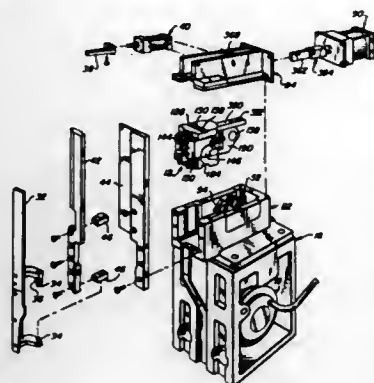
**HEAD FOR SEALLESS STRAPPING MACHINE**  
Timothy B. Pearson, Antioch, Ill., assignor to Signode Corporation, Glenview, Ill.

Filed Dec. 14, 1987, Ser. No. 132,415

Int. Cl. B21F 9/02

U.S. Cl. 140-93.2

8 Claims



7. In a strapping head for a strapping machine, in which a sealless connection is made in two overlapped layers of a tensioned loop of steel strap, a combination comprising:

- (a) a pair of notching jaws mounted in the strapping head for pivotal movement about parallel notching jaw axes, each notching jaw having a driving end and a working end respectively on opposite sides of one of the notching jaw axes, the notching jaws being pivotable between opened positions and closed positions
- (b) a notching yoke mounted in the strapping head for movement longitudinally between a withdrawn position and an extended position, the notching yoke having driving end and a working end, the notching yoke being adapted to be driven to and withdrawn from the extended position;
- (c) a notching cutter holder mounted in the strapping head for movement longitudinally in relation to movement of the notching yoke;
- (d) a pair of notching cutters provided respectively with cutting edges and mounted to the notching cutter holder in spaced relation to each other;
- (e) means connecting the notching cutter holder to the notching yoke so as to allow lost motion between the cutter holder and the notching yoke;
- (f) means linking the notching jaws to the notching yoke so as to cause the notching jaws to pivot from the opened positions to the closed positions upon movement of the notching yoke from the withdrawn position to the extended position and so as to cause the notching jaws to pivot from the closed positions to the opened positions upon movement of the notching yoke from the extended position to the withdrawn position;

the notching cutters cooperating with the working ends of the notching jaws and being adapted to notch opposite edges of

such layers when the notching yoke is driven to its extended position, whereby such edges can be so notched after such slots have interlocked.

4,791,969

**CEILING HANGING DEVICE**

Dean A. Cinque, 80 Broadway, Hillsdale, N.J. 07642

Continuation of Ser. No. 871,871, Jun. 6, 1986, abandoned. This application Dec. 14, 1987, Ser. No. 132,674

Int. Cl. B21F 7/00

U.S. Cl. 140-118

4 Claims



1. An apparatus for securing wire and for enabling wire to be delivered to a remote location, said apparatus comprising:

- a hollow handle;
- means for extending the length of said hollow handle;
- an aperture in said handle to enable a wire to be located within the hollow interior thereof;
- a blade portion affixed to one end of the handle;
- said blade portion having a base portion affixed directly to said handle;
- said base portion being a generally circular shape and having a hollow central portion so as to enable said wire to be manually forced upwardly through said handle and through said base portion;
- an angled blade portion affixed to said base portion, said blade portion extended radially outward from said base portion;
- said blade portion having a working portion formed therein;
- said working portion being defined between a first wall portion formed by a first U-shaped extension of the blade formed at the end of the blade remote from said base portion and a second wall portion formed by a second U-shaped extension on said blade at a point located between said first wall portion and said base;
- said second wall portion being located at an angle with respect to said first wall portion, said second portion defining thereby an angled working surface between the blade and said first wall portion and said working surface adapted to support a wire to tighten same as said blade is rotated.

4,791,970

**VENEER LATHES HAVING VENEER THICKNESS SENSOR AND THICKNESS CONTROL**

Donald C. Walser, Surrey, and Michael R. Clarke, West Vancouver, both of Canada, assignors to Forentek Canada Corp., Vancouver, British Columbia, Canada

Filed Dec. 7, 1987, Ser. No. 130,093

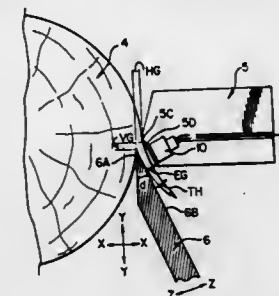
Int. Cl. B27B 1/00; B27L 5/02

U.S. Cl. 144-213

37 Claims

18. In a veneer lathe of the type including means for supporting and rotating a bolt of wood about its longitudinal axis and an assembly of a veneer peeling knife and pressure nose bar with the knife and nose bar in predetermined spaced relationship relative to one another, and which assembly is supported on a carriage that moves toward the bolt during peeling veneer in ribbon form from the outside of said bolt as the latter is

rotated, the improvement comprising sensor means carried by said nose bar and operative to detect and provide an output signal in response to variations in said predetermined spacing of the knife and nose bar and proportioned to the magnitude of



4,791,971

**PNEUMATIC TRACTOR TIRE**

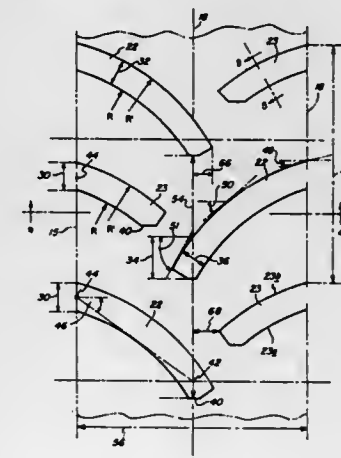
Betty J. Shinn, East Haven, Conn., assignor to The Armstrong Rubber Co., New Haven, Conn.

Filed May 11, 1987, Ser. No. 48,625

Int. Cl. B60C 11/03

U.S. Cl. 152-209 B

14 Claims



1. A pneumatic tire for tractors and like vehicles comprising a ground surface-engaging tread portion surrounding a reinforcing carcass, said tread portion comprising:

- (a) a first set of long lugs and a first set of short lugs alternately disposed about the circumferential periphery of the tread, each lug of said first set of long and short lugs emanating from the same lateral edge of said tread and extending axially inward therefrom, the spacing of said alternately disposed lugs about said circumferential periphery of the tread being such that void space exists in the tread between each alternating lug, the emanation point of each long or short lug along the lateral tread edge being substantially equally spaced apart along said lateral edge from the emanation point of the next alternating lug;
- (b) a second set of long lugs and a second set of short lugs being identical to said first set of long lugs and said first set of short lugs but opposite in hand, alternately disposed about the circumferential periphery of the tread and emanating from the other lateral edge of said tread and extend-

ing axially inward therefrom, the alternating circumferential disposition of said second set of long lugs and said second set of short lugs being offset relative to the disposition of said first set of long lugs and said first set of short lugs such that, across the tread width, an emanating point for a short lug along one lateral tread edge is substantially directly opposite an emanating point for a long lug along the other lateral tread edge; wherein (i) each said lug has a leading edge and a trailing edge (ii) each said lug is smoothly curved along its length from its emanating point at a tread edge to its terminating point axially inward thereof, the direction of axially inward curvature being in the direction of intended tire rotation; (iii) the radius of curvature from the leading edge of each long lug and the leading edge of each short lug are substantially the same, the radius of curvature of the trailing edge of each long lug and the trailing edge of each short lug are substantially the same, and the radius of curvature of said trailing edge is greater than that of said leading edge; (iv) each said long lug terminates axially inward a short distance across the tread centerline and each said short lug terminates axially inward a short distance before said centerline; and (v) for a point along the length of the trailing edge of said lugs, the curvature angle formed between a line tangent to said point and a line, through said point, perpendicular to the centerline, increases as said point progresses axially inward.

4,791,972

**FILLER RING FOR A VEHICLE WHEEL AND TIRE ASSEMBLY**

Alfred Duchow, Hohenhameln; Dietmar Haack, Springe; Udo Frerichs, Langenhagen; Werner Flobbe, Neustadt a. Rhge., and Heinz-Dieter Rach, Garbsen, all of Fed. Rep. of Germany, assignors to Continental Aktiengesellschaft, Hanover, Fed. Rep. of Germany

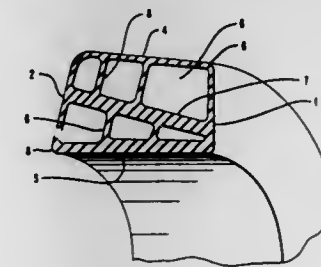
Filed Mar. 13, 1987, Ser. No. 25,487

Claims priority, application Fed. Rep. of Germany, Mar. 14, 1986, 8607101[U]

Int. Cl. B60B 21/02; B60C 15/02

U.S. Cl. 152-398

10 Claims



1. In filler ring for a vehicle wheel and pneumatic tire assembly where the beads of the tire are mounted on the radially inner periphery of a wheel rim next to essentially radially inwardly extending rim flanges, with said filler ring covering a space located axially inwardly of a given rim flange, the improvement wherein:

said filler ring comprises at least two different planes of circumferential hollow chambers, with these different planes being separated as spaced from one another via a predetermined cross-sectional contour and with said different planes of hollow chambers being superimposed on one another in a radial direction, and with each of said different planes of hollow chambers being provided with at least two hollow chambers successively arranged in an axial direction in each of said different planes overall having a total of up to six hollow chambers in each said filler ring, said predetermined cross-sectional contour of the filler ring assuring that even during slight movements



of the tire bead under extreme driving conditions that the filler ring is kept from breaking away radially inwardly at specific locations and thus fully maintains the sealing effect thereof.

4,791,973

## REINFORCING PLYS FOR TIRES

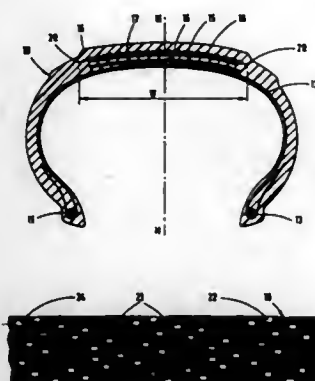
Jack A. Davison, Luxembourg, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio  
Filed Jan. 25, 1988, Ser. No. 148,264

Claims priority, application United Kingdom, Apr. 14, 1987, 8708977

Int. Cl.<sup>4</sup> B60C 9/18

U.S. Cl. 152—526

11 Claims



1. A pneumatic tire comprising a radial ply carcass, a tread disposed radially outwardly of the crown region of the carcass, a belt assembly interposed between the tread and the crown region of the carcass in circumferential surrounding relation to the carcass, whereby the belt assembly includes at least two plies each of which comprises cords of high modulus material extending parallel to one another, and making opposed angles with respect to the mid-circumferential plane of the tire, whereby each of the belt plies has a respective width approximately equal to that of the tread, and disposed radially outwardly of the belt assembly is an overlay ply comprising at least one layer of textile reinforcing elements which are substantially parallel to one another and to the mid-circumferential plane of the tire, the textile reinforcing elements of the overlay ply comprising successively aligned cord sections arranged in parallel rows each having a length in the range of between  $\frac{1}{4}$  and  $\frac{1}{2}$  of the corresponding circumferential development of the tire, the cord sections in each row having substantially equal length, and being separated circumferentially by interruptions having a width such that the total width of the interruptions per circumferentially extending row of cords is less than 4% of the corresponding circumferential development of the tire.

4,791,974

METHOD AND AN APPARATUS FOR PRODUCING SHAPED BODIES FROM PARTICULATE MATERIAL  
Aage B. Larsen, Roskilde, Denmark, assignor to Dansk Industri Syndikat A/S, Hørlev, Denmark

Filed May 18, 1987, Ser. No. 50,385

Int. Cl.<sup>4</sup> B22D 15/24

U.S. Cl. 164—7.1

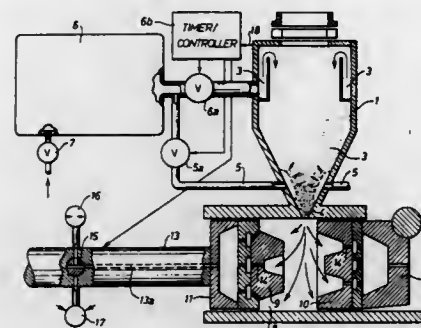
11 Claims

1. In a method of producing a shaped body from particulate material, said method comprising:

- providing a mold chamber having an internal shape corresponding to the external shape of said body and being substantially closed except for openings for the escape of air used in transfer step c below,
- providing a supply chamber having an outlet connected

in a substantially fluid-tight manner to an inlet of said mold chamber,

- placing in said supply chamber a portion of said particulate material, and establishing and maintaining an increased air pressure in a region of said supply chamber having said portion of said particulate material between itself and said outlet to cause the transfer of said particulate material from said supply chamber into said mold chamber, said pressure being gradually or stepwise in-



creased during the major part of the period of said transfer in dependence on a predetermined program, the improvement wherein said mold chamber has at least one air-permeable wall, and wherein said method further includes, during a major part of the period of maintaining said increased pressure in said region, applying vacuum to the outside of said at least one air-permeable wall in said mold chamber.

4,791,975

## PROCESS OF FLASKLESS SAND CASTING

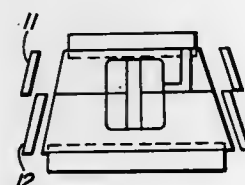
Thomas E. Wuepper, Alger, and Terry L. Franklyn, Nunica, both of Mich., assignors to CMI International, Inc., Southfield, Mich.

Filed Mar. 19, 1987, Ser. No. 28,122

Int. Cl.<sup>4</sup> B22C 9/02, 21/02

U.S. Cl. 164—29

4 Claims



1. A method for forming a flaskless sand cavity casting cake having a drag portion and a cope portion with a pattern in a flask formed of aligned cope and drag frame sections, comprising the steps of:

- forming the drag portion of the cake by positioning the drag frame section upon a substantially horizontal support plate upon which a drag pattern half is arranged, filling it with sand, covering the sand filling with a cover board and then inverting the drag frame section;
- forming the cope portion of the cake by positioning the cope frame section upon the drag frame section in alignment therewith and surrounding a cope pattern half and filling the cope section with sand;
- applying a considerable pressure against the upper surface of the sand filling in the cope and the lower surface of the sand filling in the drag to compact the sand therebetween to form a relatively hard sand cake which is tightly

wedged against the interior walls of the cope and drag frame sections;

- next, forming an open casting cavity by temporarily removing the cope from the drag and then removing the pattern halves and repositioning the cope upon the drag for aligning the cope and drag cavity halves formed therein;
- laterally expanding both of the cope and drag frame sections by temporarily separating adjacent wall portions of each of said sections at preselected locations in the walls such that said sections move substantially equidistantly from said cope and drag portions of the cake defining the sections sufficiently to release the cake from the frame section walls of both the cope and the drag frame sections;
- relatively moving the released cake and flask for removing the sand cake out of the flask for subsequent casting of molten metal in the sand cake cavity.

4,791,976

## METHOD OF MAKING DUAL GRAPHITE STRUCTURED PIPE

Andrew B. Malizio, and Robert W. Jennings, both of Shelby, Ala., assignors to United States Pipe and Foundry Company, Birmingham, Ala.

Filed May 11, 1987, Ser. No. 48,278

Int. Cl.<sup>4</sup> B22D 27/00

U.S. Cl. 164—58.1

9 Claims



1. The method of making a centrifugally cast heavy wall iron pipe having a monolithic wall, said monolithic wall comprising an outer portion containing nodular graphite, and an inner wall containing flake and quasi-flake graphite, comprising the steps of making a molten mass of iron suitable for casting in a cooled metal mold in the conventional DeLavaud process, admitting said molten mass to a metal mold, rotating said metal mold to form a centrifugally cast molten mass, and chilling said centrifugally molten mass to form said pipe with said monolithic wall, said pipe having between about 0.01% by weight and 0.03% by weight of magnesium, and between 0.004% by weight and 0.006% by weight of sulfur.

4,791,977

## COUNTERGRAVITY METAL CASTING APPARATUS AND PROCESS

George D. Chandley, Amherst, N.H., assignor to Metal Casting Technology, Inc., Milford, N.H.

Filed May 7, 1987, Ser. No. 47,907

Int. Cl.<sup>4</sup> B22D 18/06

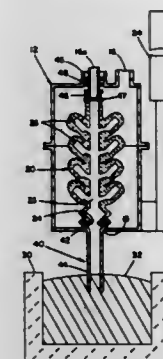
U.S. Cl. 164—63

11 Claims

1. A method of counter-gravity casting molten metal in a mold of gas permeable material contained in a sealed chamber and having a fill passage therein communicating laterally below its upper end with cavity means of said mold, comprising the steps of:

- communicating a lower portion of said fill passage with a supply of molten metal to be cast;
- providing in the upper end of said fill passage a first pressure sufficiently lower than the pressure on said supply of

molten metal to cause the molten metal to fill said passage and maintain it full; and simultaneously providing in said chamber externally of said



mold a second pressure higher than said first pressure and sufficiently lower than the pressure on said supply of molten metal to insure fillout of said other cavity means by molten metal flowing thereto from said fill passage.

4,791,978

## GAS PERMEABLE STOPPER ROD

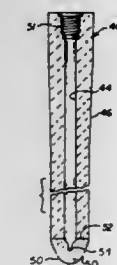
Mark K. Flasher, Tervuren, Belgium, assignor to Vesuvius Crucible Company, Pittsburgh, Pa.

Filed Nov. 25, 1987, Ser. No. 125,636

Int. Cl.<sup>4</sup> B72D 11/10

U.S. Cl. 164—437

24 Claims

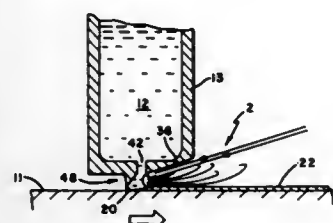


1. A refractory stopper rod for use in casting molten metal comprising:

- a co-pressed and fired body portion and an integral porous nose section of refractory grain compositions which are bonded together along an interface region by a carbon bond during firing, said nose section having an exterior surface adapted to be in contact with the molten metal and having a controlled pore size defined by voids between adjacent grains, said stopper rod having bore means adapted to introduce a pressurized gas to an interior surface of said nose section whereby, in use, the pressurized gas permeates the pores of said nose section and exits said pores to enter the molten metal as a fine dispersion of bubbles emitted from the exterior surface of said nose section.

**4,791,979**  
**GAS ASSISTED NOZZLE FOR CASTING METALLIC STRIP DIRECTLY FROM THE MELT**  
 Howard H. Liebermann, Succasunna, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.  
 Continuation of Ser. No. 888,099, Jul. 18, 1986, abandoned, which is a continuation of Ser. No. 682,734, Dec. 17, 1984, abandoned. This application Mar. 2, 1988, Ser. No. 166,738  
 Int. Cl.<sup>4</sup> B22D 11/06  
 U.S. Cl. 164—463

12 Claims



1. A method for casting metallic strip, said method comprising the steps of:

- directing a stream of molten metal from an orifice of a nozzle onto a movable quench surface to form a melt puddle, said stream being defined by an upstream surface and a downstream surface, in the direction of movement of said quench surface, and opposed side surfaces;
- constraining the upstream and opposed side surfaces of said stream, with surfaces associated with the nozzle, to control at least a portion of the shape of the melt puddle;
- metering molten metal flow from the orifice by constraining with gas pressure the downstream surface of the molten metal stream; and
- solidifying metal from said melt puddle to produce a metallic strip.

7. An apparatus for casting metallic strip, said apparatus comprising:

- a movable quench surface for deposition thereon of molten metal for solidification into a strip;
- a nozzle arranged relative to said quench surface and having an orifice defined therein for directing a stream of molten metal onto said quench surface, said nozzle comprising an upstream constraint surface for constraining an upstream portion of the molten metal stream to be deposited on said quench surface, and side constraint surfaces for constraining two, opposed side portions of molten metal stream to be deposited on said quench surface; and,
- gas pressuring means arranged opposite said upstream constraint means for supplying gas under pressure to effect metering of molten metal flow from the orifice.

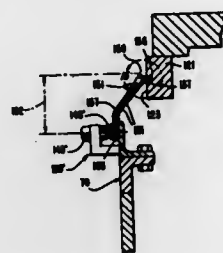
**4,791,980**  
**SEALING ARRANGEMENT FOR AIR PREHEATER**  
 Donald K. Hagar, Emmaus; Curtis V. Kennedy, Whitehall, both of Pa., and Garnold Townsend, Waterford, Ohio, assignors to Eagleair, Inc., Bethlehem, Pa.  
 Division of Ser. No. 657,010, Oct. 2, 1984, Pat. No. 4,673,026.  
 This application Apr. 3, 1987, Ser. No. 33,779  
 Int. Cl.<sup>4</sup> F28D 19/04  
 U.S. Cl. 165—9

16 Claims

1. A circumferential seal for an air preheater, the air preheater having a housing portion and a drum portion containing a set of heat exchanging elements, the drum portion having oppositely disposed circular edges, the housing portion having pair of annular surfaces disposed adjacent to but not normally engaging the circular edges of the drum so as to form a gap therebetween, said air preheater portions being movable with respect to each other to effect exchange of heat between a gas discharge duct of a fuel burning device and an air intake passage thereof, one of said air preheater portions being for mounting a circumferential seal, the other of said air preheater

portions including a sealing surface, the circumferential seal comprising:

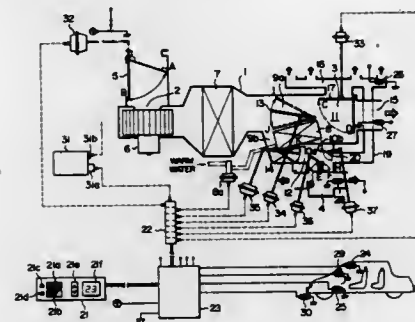
- an elongated circumferential seal body which has a length, a basal side edge and a distal side edge, said basal and distal side edge extending along said length;
- said circumferential seal body being composed of at least one sealing strip of a thin, fluid impermeable flexible metallic material;
- said circumferential seal body including means, adjacent said basal side edge, for rigidly and fixedly mounting said circumferential seal body on one of said preheater portions to extend generally between at least one circular edge of the drum portion and at least one annular surface of the housing portion;



- said seal body including means for allowing said sealing strip to yieldably ride over the sealing surface of the other of the air preheater portions when the air preheater portions are moving relative to each other during operation of the air preheaters;
- said distal side edge of said seal body being a free edge which is disposed opposite said basal side edge;
- said sealing strip including a sharp distal bend adjacent to but spaced from said distal side edge of said seal body to direct said distal side edge toward face-to-face confronting engagement with the sealing surface of the air preheater portion other than the air preheater portion on which said circumferential seal body is mounted.

**4,791,981**  
**AIR CONDITIONING APPARATUS FOR AUTOMOTIVE VEHICLES**  
 Toohikazu Ito, Ibaraki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan  
 Filed Jan. 5, 1987, Ser. No. 374  
 Claims priority, application Japan, Jan. 8, 1986, 591/86  
 Int. Cl.<sup>4</sup> F25B 29/00; G05D 23/00  
 U.S. Cl. 165—22

6 Claims

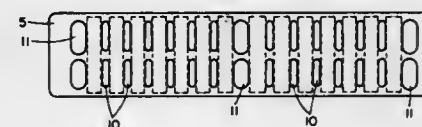


4. In a vehicle air conditioning apparatus having a casing with a lower outlet opening at a floor area of a vehicle, an upper air outlet defining a defroster outlet adjacent a vehicle window and a vent outlet opening into a passenger-occupied

space in the vehicle, and means for blowing air through the casing which is divided into first main and auxiliary streams in which cooler air can selectively flow around a heater core and second main and auxiliary streams in which heated air can selectively flow from said heater core a first means for selectively mixing in a first conditioned air passageway connected with the upper air outlet opening and said vent outlet opening the first main stream of cooled air with the second auxiliary stream of heated air, and second means for selectively and said vent outlet opening mixing in a second conditioned air passageway connected with the lower outlet opening the first auxiliary stream of cooled air with the second main stream of heated air, and a selective connecting means for selectively closing said first conditioned air passageway from the upper air outlet opening, the improvement comprising a communication passage connecting the second conditioned air passageway and the defroster outlet, and a door in the communication passage movable between an open and closed position for selectively admitting air from the second conditioned air passageway to the defroster outlet independently of said means for selectively connecting said first conditioned air passageway with said upper air outlet to provide conditioned air to said defroster outlet when said selective connecting means closes the defroster outlet to permit independent temperature control of conditioned air through the defroster outlet and the lower outlet.

**4,791,982**  
**RADIATOR ASSEMBLY**  
 Leopold Meyerhofer, Echling, Fed. Rep. of Germany, assignor to MAN Nutzfahrzeuge GmbH, Fed. Rep. of Germany  
 Filed Apr. 6, 1987, Ser. No. 35,592  
 Claims priority, application Fed. Rep. of Germany, May 14, 1986, 3616307  
 Int. Cl.<sup>4</sup> F28D 1/00  
 U.S. Cl. 165—38

8 Claims



1. A radiator comprising two headers and a bank of tubes joining the two headers together to enable coolant to flow between the headers and to be cooled in the tubes, said two headers including an upper header having a lower tube plate facing said bank of tubes and a lower header having an upper tube plate facing said bank of tubes, said tubes comprising small tubes with the same bore cross section and a number of larger tubes with a larger bore cross section for lowering the resistance of coolant flow between the headers, each of said small and larger tubes extending between said lower and upper tube plates and having inlets on the opposite ends of the tubes being in the same plane of the respective tube plate, whereby coolant normally flows through both the small and larger tubes, said small and larger tubes are arranged in at least two parallel rows, there being at least one of said larger tubes in each said row of tubes and the sum bore cross section of all of said larger tubes is equal to 0.1 to 0.3 times the sum bore cross section of the smaller tubes.

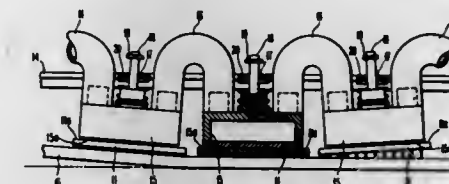
**4,791,983**  
**SELF-ALIGNING LIQUID-COOLING ASSEMBLY**  
 Edward A. Nicol, and George J. Adrian, both of San Diego, Calif., assignors to Unisys Corporation, Detroit, Mich.  
 Filed Oct. 13, 1987, Ser. No. 108,367  
 Int. Cl.<sup>4</sup> F28F 7/00  
 U.S. Cl. 165—80.4

11 Claims

1. A liquid cooled assembly of IC packages on a printed circuit board, wherein said packages have respective heat

dissipating surfaces which are at different heights and different angles relative to each other, and wherein the cooling portion of said assembly comprises:

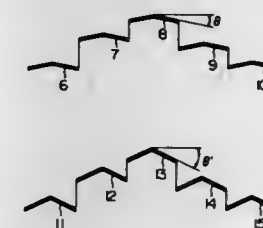
- an input manifold and an output manifold, for carrying a liquid, which are spaced apart on said board, such that said IC packages lie there between;
- multiple beams, each of which is attached to said manifolds and overlies several IC packages;
- each beam having holes which are proximately aligned with those packages which it overlies;
- respective liquid cooling jackets for said IC packages, with each jacket having a heat absorbing face;



hoses which carry liquid from said input manifold through said jackets to said output manifold; each jacket including a guide post, which passes through a respective one of said holes in said beams, and a retainer that keeps the post in the hole; each post being loosely fitted in its hole such that the heat absorbing face of the corresponding cooling jacket can move up and down and tilt to coincide with said heat dissipating surface of an IC package; and respective springs, which are compressed between each of said cooling jackets and the beams to which those jackets are attached, that force each heat absorbing face against a respective heat dissipating surface.

**4,791,984**  
**HEAT TRANSFER FIN**  
 Toshio Hatada, Tsachura; Tomihisa Ooschi; Yoshifumi Kuwagi, both of Ibaraki; Shigeo Sugimoto, Ushiku, and Junichi Kaneko, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Apr. 24, 1987, Ser. No. 42,253  
 Claims priority, application Japan, Apr. 25, 1986, 61-94515  
 Int. Cl.<sup>4</sup> F28D 1/04  
 U.S. Cl. 165—151

2 Claims

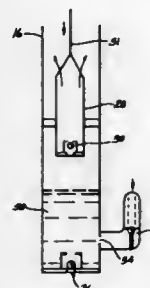
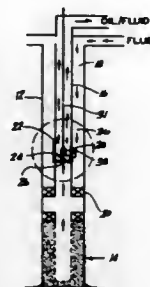


1. A heat transfer tube comprising: a base plate mounted on a heat exchanger through fin collars; and louvers formed on said base plate, each louver being cut and raised from a surface of said base plate and having a length extending in a direction that crosses a direction of the flow of a fluid across said surface of said base plate, each louver having longitudinal end portions and a longitudinal central portion disposed therebetween; each louver being shaped such that an area of the louver in the vicinity of the longitudinal central portion thereof projected in the direction of the flow of said fluid is larger than an area of the louver in the vicinity of each of said longitudinal end portions thereof projected in the direction of the flow of said fluid, wherein a section of each louver in a plane parallel to the direction of the flow of said fluid has an angled configuration,



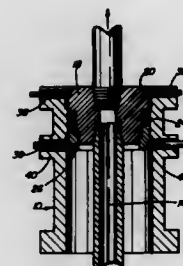
and the angle of the section of each louver in the vicinity of the longitudinal central portion thereof is larger than the angle of the section of the louver in each of said longitudinal end portions of said louver.

**4,791,985**  
**SYSTEM TO PROPORTION ASSISTING FLUIDS IN A WELL**  
 Simon C. Flores Bermudez, Edo. Monagas, Venezuela, assignor to Lagoven, S.A., Caracas, Venezuela  
 Filed Sep. 11, 1987, Ser. No. 95,569  
 Int. Cl.<sup>4</sup> E21B 43/00  
 U.S. Cl. 166—68 4 Claims



1. A system for improving the recovery of viscous crude oil from a deep well comprising:  
 a well casing;  
 a production tube located within the well casing and defining therewith an annular space having a fluid column therein;  
 means for pumping oil in a first direction from a subsurface deposit located within said production tube, said pumping means includes a piston mounted within said production tube, an oil inlet below said piston and defining therewith a pumping chamber between the piston and the inlet, an oil outlet above said oil inlet and means for reciprocating said piston within said production tube in a first and second direction so that oil enters through said inlet when said piston moves in said first direction and exits through said outlet when said piston moves in said second direction;  
 conduit means for communicating said annular space with said pumping chamber between the piston and the inlet; and  
 metering means located within said conduit means for selectively communicating said annular space with said pumping chamber when said piston moves in said first direction and blocking said conduit means when said piston moves in said second direction.

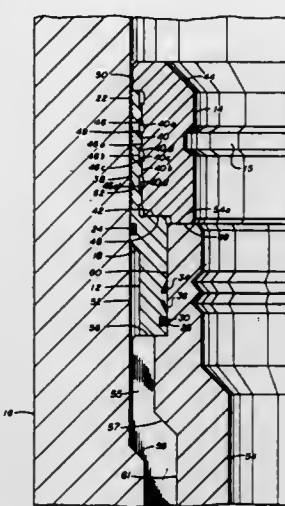
**4,791,986**  
**TUBING HANGER**  
 Aldon J. Vallet, 10512a-17 Avenue, Edmonton, Alberta, Canada, T6J 5B5  
 Filed Jun. 15, 1987, Ser. No. 61,863  
 Claims priority, application Canada, Sep. 9, 1986, 517773  
 Int. Cl.<sup>4</sup> E21B 33/04  
 U.S. Cl. 166—85 3 Claims



1. A combined tubing spool and tubing hanger assembly for use in servicing oil and gas wells, said assembly comprising:  
 a tubing spool for connection to the upper end of a well casing, said spool including an internal annular portion of reduced diameter with respect to the remainder of the internal surface of said spool and sized to allow said tubing hanger to pass therethrough;  
 means for locating said tubing hanger in said reduced diameter portion of said spool;  
 means for releasably securing said tubing hanger in said spool, comprising a plurality of circumferentially spaced recesses in the side wall of said hanger and a corresponding plurality of locking pins positioned in the wall of said spool above said reduced diameter portion of said tubing spool and being engageable with said recesses to prevent movement of said hanger in said spool;  
 an annular, resilient packing element on said hanger and adapted to engage and seal against said annular portion of reduced diameter in said spool;  
 means on said hanger for expanding said resilient packing element into sealing engagement with said spool; and  
 means located in the wall of said spool for actuating said expanding means;  
 said actuating means comprising a plurality of dogpins having conical inner ends, said dogpins being circumferentially spaced about the wall of said spool positioned below said reduced diameter portion thereof and directed radially inwardly thereof;

said hanger locating means, releasable securing means and expander actuating means being operable from outside of said tubing and hanger assembly.

**4,791,987**  
**WELLHEAD SEAL**  
 Thomas G. Cassidy, Katy, and Steven D. Gallioa, Houston, both of Tex., assignors to Cameron Iron Works USA, Inc., Houston, Tex.  
 Filed Apr. 30, 1987, Ser. No. 44,410  
 Int. Cl.<sup>4</sup> E21B 33/04  
 U.S. Cl. 166—85 11 Claims



1. An annular wellhead seal comprising  
 a seal ring having a central body with an inner upwardly facing shoulder, an upper outer rim extending above central body and a lower rim extending below the central body, said central body having a central bore, said shoulder defining an annular surface intersecting the outer rim at an angle and extending substantially from the outer rim to the central bore of the central body,  
 said upper rim having external projections providing a gripping surface and an internal tapered camming surface,  
 said lower rim having internal flexible metal sealing means, and  
 an actuating ring position within said upper rim and having an external tapered camming surface mating with the internal tapered camming surface of said upper rim, the tapered camming surfaces being positioned so that downward movement of said actuating ring forces said upper rim outwardly to cause said external gripping surface projections to engage an inner sealing surface surrounding said upper rim in tight gripping engagement.

**4,791,988**  
**PERMANENT ANCHOR FOR USE WITH THROUGH TUBING BRIDGE PLUG**  
 William L. Trevillion, Houston, Tex., assignor to Halliburton Company, Duncan, Okla.  
 Filed Mar. 23, 1987, Ser. No. 29,004  
 The portion of the term of this patent subsequent to Jun. 9, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> E21B 33/124  
 U.S. Cl. 166—285 16 Claims

1. A method of placing a concrete plug in a tubular member which is located in a well so that well fluids are blocked by the plug and where such well fluids interfere with curing of the concrete plug, the method comprising the steps of:  
 (a) running into the cased well an elongate bridge plug assembly having an upwardly facing basket with a re-

tracted position and an expanded position adapted to receive and hold curable material for forming a concrete plug;  
 (b) setting the bridge plug assembly at a desired depth in the cased well by expanding a double pivot, three link toggle means having plural articulated serrated teeth adapted to engage the well tubular member to support the bridge plug assembly against pressure from above or below in the surrounding well tubular member, wherein said toggle means pivots at said pivots to grippingly engage the well tubular member;  
 (c) operating the bridge plug assembly basket to an expanded position;  
 (d) placing curable materials in the upwardly facing basket and curing the materials to form concrete;  
 (e) during curing, forming a well fluid flow path across the bridge plug assembly, the flow path utilizing an upstanding flow pipe selectively opened and closed by a valve means at the upper end thereof;  
 (f) during curing of the curable materials to form concrete, opening the valve means to enable fluid flow along the flow path; and  
 (g) after curing, closing the valve means to prevent fluid flow along the flow path, thereby completely plugging the cased well.



14. A bridge plug assembly adapted to be placed in a tubular member well to isolate and controllably block fluid flow thereacross, the assembly comprising:  
 (a) an elongate flow pipe;  
 (b) valve means at the top end of said flow pipe;  
 (c) double pivot, three link toggle means supported by said flow pipe for expansion to engage a surrounding well tubular member;  
 (d) upwardly facing basket means supported by said flow pipe having:  
 (1) a closed and collapsed position around said flow pipe; and  
 (2) an expanded position facing upwardly to receive curable materials therein;  
 (e) said flow pipe and said valve means defining a flow path from below said basket means to above said basket means wherein said valve means opens or closes the flow path; and  
 (f) first and second co-acting mean supported by said flow path for telescoping movement therebetween for  
 (1) expanding said toggle means to engage the well tubular member;  
 (2) expanding said basket means; and  
 (3) opening said valve means.

4,791,989

**LOW FLUID LOSS SALT SATURATED CEMENT SLURRIES, ADDITIVES AND METHODS**

Lance E. Brothers, Nimsakah, and John F. Burkhalter, Duncan, both of Okla., assigns to Halliburton Company, Duncan, Okla.

Division of Ser. No. 912,757, Sep. 25, 1986, Pat. No. 4,742,094.  
This application Jan. 29, 1988, Ser. No. 150,123

Int. Cl.<sup>4</sup> C08L 97/00

U.S. Cl. 166—293

9 Claims

1. A method of cementing a conduit in a well bore penetrating a subterranean formation comprising introducing a low fluid loss, low viscosity aqueous salt saturated cement slurry into the annulus between said conduit and said well bore and allowing said slurry to set, said slurry being comprised of hydraulic cement, salt saturated water present in an amount sufficient to form a pumpable slurry, and a fluid loss reducing complex present in said slurry in an amount in the range of from about 0.25% to about 2% by weight of dry cement comprised of the reaction product formed by admixing (i) polyethyleneimine having a molecular weight above about 50,000 and (ii) sulfonated organic compounds comprising an admixture of lignosulfonic acid salts having Na, Ca, or NH<sub>4</sub> as the associated cation, together with naphthalene sulfonic acid condensed with formaldehyde having a molecular weight above about 5,000, the ratio by weight of said polyethyleneimine to said sulfonated compounds in said complex, being in the range of from 1:1.4 to about 7.5:1, and the ratio by weight of said lignosulfonic acid salts to said naphthalene sulfonic acid condensed with formaldehyde in said complex being in the range of from about 1:5 to about 5:1, said reaction product being formed prior to admixture of said complex with either said hydraulic cement or with any substantial portion of said salt in said saturated water.

4,791,990

**LIQUID REMOVAL METHOD SYSTEM AND APPARATUS FOR HYDROCARBON PRODUCING**

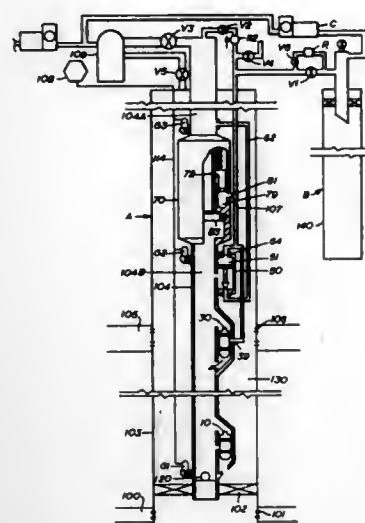
Mahmoud Amani, P.O. Box 8584, Wichita, Kans. 67206

Filed May 27, 1986, Ser. No. 867,191

Int. Cl.<sup>4</sup> E21B 34/10, 43/12

U.S. Cl. 166—311

38 Claims



1. A system for controlling the operation of a liquid disposal cycle and the operation of a production cycle of a hydrocarbon producing well, comprising:

- a pressurized gas source to provide the necessary pressure to force an accumulated liquid from a well tubing disposed within a well into a casing of a hydrocarbon producing well for disposal;
- a supply line connected to said pressurized gas source and

extending in a well annulus from the surface of said well, and connected to said well tubing below the surface of the earth;

a controller which initiates the steps of production and disposal cycles of said hydrocarbon producing well in response to a pressure differential between predetermined locations within said well tubing, said controller having valve actuating means to actuate a series of valve means to closed or open positions;

a first valve means controlling the flow of pressurized gas from the pressurized gas source into said supply line, said first valve means being actuated to its open or closed positions by said controller;

a second valve means, controlling the flow of said pressurized gas from said supply line to the top of said well tubing, said second valve means being actuated to its open or closed positions by said controller;

check valve means to prevent back flow of gas from said well tubing to said supply line;

a third valve means controlling the flow of vent gas from said supply line to the atmosphere, said third valve means also being actuated to its open or closed position by said controller;

a fourth valve means controlling the flow of produced fluids through said well tubing of said hydrocarbon producing well at the surface;

pressure transmitting means transmitting pressure data within the well tubing to said controller;

data processing means which processes the said transmitted pressure data to determine the frequency and duration of said liquid disposal and production cycles of the hydrocarbon producing well, and accordingly operate said valve actuating means of said controller to start or stop said cycles;

a flow control valve connected to the well tubing below the surface of said well, said flow control valve being biased to an open position to allow well fluid production there-through, and being moved to a closed position, when fluid pressure in said supply line exceeds a predetermined pressure, said control valve thereby blocking the upward flow of well fluids in the well tubing;

an equalizing means connected to said well tubing to equalize fluid pressure on both sides of said flow control valve before opening said flow control valve, said equalizing means further comprising:

a housing having a flowway therethrough with an inlet communicating with the well tubing below said flow control valve and an outlet communicating with a bypass conduit leading to the well tubing above a closure means of said flow control valve;

a cooperable valve member and valve seat, to control the flow of fluid through said flowway;

a dome gas chamber connected to said supply line, the pressure in said supply line being in equilibrium with the pressure in said dome gas chamber;

pressure responsive means connected to said cooperable valve member, and exposed on one side to the tubing pressure and on the other side to the dome gas pressure, so that when the pressure inside said supply line is reduced, said equalizing means opens to permit passage of well fluid to said bypass conduit to equalize fluid pressure on both sides of said closure means of said flow control valve;

choke means in said dome gas chamber to provide a dampening effect during valve opening by restricting the flow of fluids from said dome gas chamber;

an injection control valve means to control the order of succession of the closing of said flow control valve and gas injection into the lower portion of the well tubing below said flow control valve;

check valve means connecting to an outlet of said injection control valve means to prevent back flow of fluid from well tubing into said supply line;

a passageway in the well tubing through which fluid may be

forced from the well tubing into a casing annulus when the well tubing pressure exceeds a predetermined amount; check valve means connected to an outlet of said passageway to prevent back flow of fluid from casing annulus into the well tubing; and

pressure regulating means to regulate pressure in said supply line to maintain said equalizing means in closed position during the production cycle of said hydrocarbon producing well.

7. A method of removing accumulated liquids from a hydrocarbon producing well having a casing with perforations at a producing formation and perforations at a water bearing formation, said casing further having a string of well tubing disposed within it, the method of liquid removal comprising:

(a) sealing off a portion of said casing between a lower hydrocarbon producing formation and an upper water bearing formation,

(b) producing well fluids comprising hydrocarbon fluids and secondary fluids through said well tubing;

(c) providing a flow control valve connected to said well tubing below the surface of the well, said flow control valve being normally open to allow well fluid production therethrough, and when said flow control valve is closed, to block the upward flow of well fluids in the well tubing from below said flow control valve;

(d) providing a supply conduit having a smaller internal diameter than said well tubing to supply pressurized gas from a pressurized gas source to the well tubing, said supply conduit extending in the casing annulus of said producing well and communicating with said well tubing through a port means below flow control valve;

(e) providing a passageway connected to said well tubing, through which liquid can be forced from said well tubing into the casing annulus;

(f) providing check valve means connected to said well tubing below said passageway to prevent downward flow of secondary fluids into the hydrocarbon producing formation;

(g) monitoring the pressure differential within said well tubing during hydrocarbon fluid production to a sales line;

(h) actuating said flow control valve to its closed position when said pressure differential inside said well tubing exceeds a predetermined amount;

(i) injecting pressurized gas through said supply conduit into the well tubing below the closed closure means of said flow control valve to pressurize the fluid therein;

(j) forcing the secondary fluids from the well tubing through said passageway to the casing annulus with said pressurized gas to remove said secondary fluid from said well tubing and to displace said secondary fluids into a water bearing formation above the hydrocarbon producing formation;

(k) monitoring the reduction of differential pressure inside said well tubing due to the removal of said secondary fluid from the tubing;

(l) stopping the flow of said pressurized gas into said supply conduit to stop fluid removal when the pressure differential in said well tubing is reduced to a desired level;

(m) connecting an upper portion of said well tubing to said supply conduit to relieve the pressure inside said supply conduit into said upper portion of said well tubing;

(n) reducing the differential pressure across the closure means of said flow control valve;

(o) opening said flow control valve; and

(p) opening said well tubing to surface facilities for production.

10. A fluid pressure actuated flow control valve, connected to a well tubing to control fluid flow through said well tubing, comprising:

- (a) a tubular housing having a bore therethrough;
- (b) a valve closure member moving between open and closed positions;
- (c) a longitudinal operator tube telescopically moveable in a

housing bore for controlling the movement of said valve closure member;

(d) resilient urging means for biasing said operator tube in a first direction to open said valve closure member; and

(e) pressure responsive means for moving said operator tube in a second direction, opposite said first direction, to close said valve closure member in response to fluid pressure transmitted to said pressure responsive means from the surface of said well through a supply conduit extending in a casing annulus.

4,791,991

**SUBSURFACE WELL SAFETY VALVE WITH HYDRAULIC STRAINER**

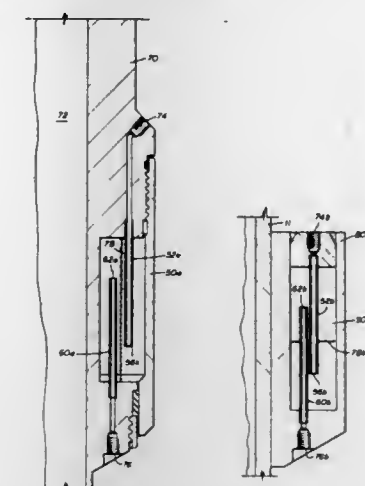
Arthur J. Morris, Magnolia, and Jeffrey L. Kierlemaier, Stafford, both of Tex., assigns to Camco, Incorporated, Houston, Tex.

Filed Mar. 7, 1988, Ser. No. 164,697

Int. Cl.<sup>4</sup> E21B 34/10

U.S. Cl. 166—319

5 Claims



1. In combination with a subsurface safety valve for controlling fluid flow through a well conduit and including a housing having a bore and a valve closure member moving between open and closed positions for controlling fluid flow through the bore, a flow tube telescopically moving in the housing for controlling the movement of the valve closure member, biasing means for moving the tubular member in a direction to close the valve and a hydraulic piston and cylinder assembly for actuating the valve closure member, of a hydraulic strainer comprising,

means defining a closed chamber positioned above the hydraulic piston and cylinder assembly,

means defining an inlet fluid passageway having first and second ends, said first end adapted to receive hydraulic control fluid through a control line from the well surface, said second end extending into the chamber,

means defining an outlet fluid passageway having first and second ends, said first end of said outlet fluid passageway extending into the chamber, and the second end of said outlet fluid passageway connected in fluid communication to the top of the hydraulic piston and cylinder assembly, the second end of the inlet fluid passageway being positioned away from the first end of the outlet fluid passageway for allowing debris to accumulate in the chamber and protect the piston and cylinder assembly.



**4,791,992**  
**HYDRAULICALLY OPERATED AND RELEASED**  
**ISOLATION PACKER**

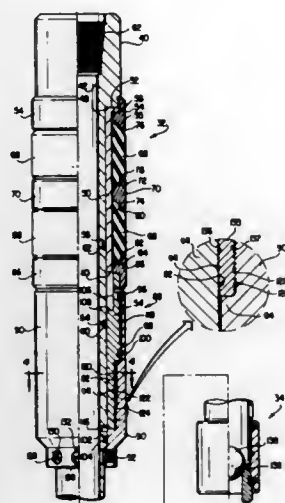
Donald R. Greenlee, Cedar Hill, and Michael W. Pitta, Midland, both of Tex., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Aug. 18, 1987, Ser. No. 86,569

Int. Cl.<sup>4</sup> E21B 33/128, 33/13

U.S. Cl. 166—387

38 Claims



1. A hydraulically operated isolation packer adapted for use in sealing a hydrocarbon production casing, comprising:  
a mandrel having a bore therethrough for carrying hydraulic fluids, and a port in said mandrel for carrying said fluids for operating said packer;  
elastomeric means encircling said mandrel and adapted to expand in response to a pressure applied thereto for sealing said packer within said production casing;  
a piston responsive to a first fluid pressure communicated by said port for moving said piston such that said elastomeric means is expanded; and  
means for locking said piston such that said elastomeric means remains expanded, said locking means being responsive to a second higher fluid pressure communicated by said port for releasing said piston to thereby allow said elastomeric means to contract and permit movement of said packer within said casing.

30. A method for setting a packer in a production casing, comprising the steps of:

fixing the packer to a tubing string so as to communicate fluid pressure from the tubing string to the packer;  
lowering the tubing string and the packer fixed thereto to a desired location within the casing;  
pressurizing the tubing string with a hydraulic fluid to a first pressure for ratcheting a locking arrangement and causing an elastomeric element of said packer to expand and seal and lock said packer in a sealed condition in the casing;  
removing the first pressure from the tubing string;  
pressurizing the tubing string with a hydraulic fluid to a second higher pressure for releasing said locking arrangement and the seal of said packer from the casing; and  
withdrawing the tubing string and said packer fixed thereto from the casing.

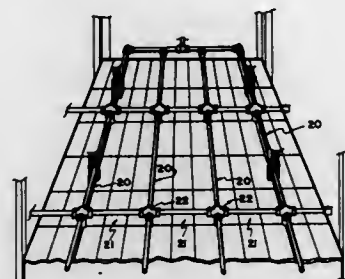
**4,791,993**  
**FIRE PROTECTION SYSTEM**

Jeremiah M. Carran, 1212 Madison Dr., Yardley, Pa. 19067  
Filed Sep. 30, 1987, Ser. No. 102,713

Int. Cl.<sup>4</sup> A62C 35/00

U.S. Cl. 169—16

9 Claims



1. A building fire protection system comprising a plurality of pipe fittings, each having four equiangularly-disposed inlet openings, the inlet openings being interconnected within the fittings, conduits having end portions adapted to fit within the inlet openings interconnecting the inlet openings of adjacent fittings thereby providing a substantially rectangular grid of conduits and fittings with the fittings positioned at the intersections of perpendicularly-disposed conduits throughout the grid;

means connecting the conduits of the grid to a common source of fire-extinguishing liquid under pressure whereby each fitting is supplied with fire-extinguishing liquid at substantially equal pressure and by plural liquid flow paths to each fitting;

each fitting further having a downwardly-directed outlet communicating with said inlets, there being a spray orifice in said outlet.

**4,791,994**  
**BOOK/PAINTING/TREASURE/EQUIPMENT SAVER**

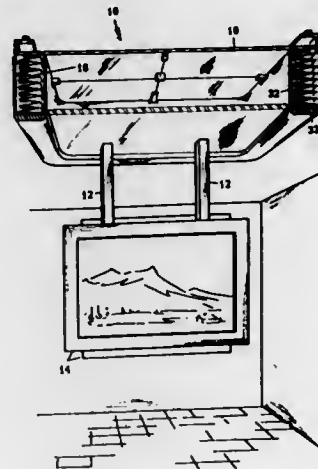
I-Chang Ho, 6958 Grovespring Dr., Rancho Palos Verdes, Calif. 90274

Filed Dec. 5, 1986, Ser. No. 938,601

Int. Cl.<sup>4</sup> A62C 2/02

U.S. Cl. 169—48

20 Claims



2. A protective curtain assembly for protecting an article of value against damage, said assembly comprising:  
a base plate located above said article;

a fire resistant curtain attached at one end to the perimeter of said base plate;  
a casing, releasably attached to said base plate, within which said curtain is stored when not deployed; and  
means for deploying said curtain such that in its deployed state it surrounds said article.

**4,791,996**  
**AGRICULTURAL TRACTOR WITH LIGHTWEIGHT**  
**FRAME AND FRONT AND REAR WHEELS FORMING**  
**SUBSTANTIALLY CONTINUOUS WHEEL PATH**

Cornelis van der Lely, 7 Briischenrain, Zug, Switzerland

PCT No. PCT/NL83/00036, § 371 Date May 4, 1984, § 102(e)

Date May 4, 1984, PCT Pub. No. WO84/01336, PCT Pub. Date Apr. 12, 1984

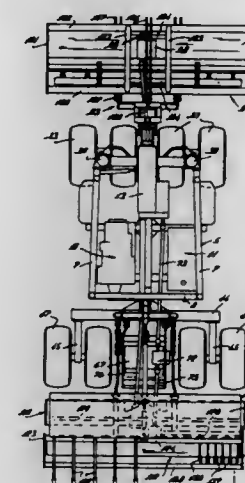
PCT Filed Sep. 27, 1983, Ser. No. 611,040

Claims priority, application Netherlands, Sep. 27, 1982, 8203727

Int. Cl.<sup>4</sup> A01B 33/00

U.S. Cl. 172—47

11 Claims



1. An agricultural tractor for seedbed preparation which comprises an engine having a power rating between sixty and one hundred kilowatts; a lightweight frame which supports said engine, the tractor's drive train and an operator cab, the tractor's structural components including said frame having a weight which is between twenty-five hundred and four thousand kilograms arranged so that the tractor has a power-to-weight ratio which is 0.02 kilowatts per kilogram or higher; a plurality of front and rear wheels for supporting said frame, each of said wheels having low pressure tires thereon each of the same size and having ground contacting surfaces which are at least forty centimeters in width, said front and rear wheels being aligned such that in a front elevational view said front tires are offset to one side of said rear tires wherein the tracks of said front and rear wheels form a wheel path which is substantially continuous in width with the major thickness of each said tire being visible from the front so that the underlying soil is compacted to a relatively minor degree over a relatively extended total width of all said heels; and at least one power take-off shaft to which power driven agricultural machines are connectable.

**4,791,997**  
**PIPE HANDLING APPARATUS AND METHOD**

Igor Krasnov, Houston, Tex., assignor to Vetco Gray Inc., Houston, Tex.

Filed Jan. 7, 1988, Ser. No. 142,105

Int. Cl.<sup>4</sup> E21B 19/06, 19/16

U.S. Cl. 175—57

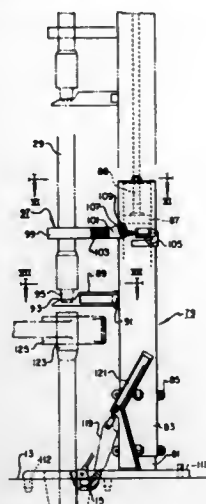
7 Claims

1. A manual tiller, mulcher, weeder tool comprising, a generally horizontal top frame member, an elongated handle connected to and extended generally vertically upwardly from said top frame member, a plurality of tines connected to said top frame member and extended generally vertically downwardly therefrom in generally parallel spaced apart relation, each of said tines including an elongated shank having top and bottom ends and a generally diamond-shaped head on said bottom end each said head including a pair of downwardly diverging top edges and a pair of sharpened downwardly converging bottom edges, and having a width greater than the diameter of said shank, a cleaning plate having a plurality of holes positioned for alignment with each of said tine shanks, said shanks extending through said cleaning plate holes whereby said cleaning plate is vertically slidable on said shanks between a lowered position above and adjacent said tine heads, and an elevated position above and spaced from said tine heads, the diameter of the holes in said cleaning plate each being less than the width of the respective one of the tine heads mounted to that one of said shanks passing through that particular one of the holes in the cleaning plate, and compression spring means mounted on said tine shanks and operative to urge said cleaning plate toward the lowered position.

1. In a drilling rig having a rig floor through which a string of drill pipe made up of a plurality of stands extends, each stand having a threaded pin on the bottom, a derrick, (a power drive stem) adapted to be secured to an upper end of the string of drill pipe for rotating the string of drill pipe, a set of blocks carried by the derrick for raising and lowering the drive stem, and elevator means carried by the blocks for movement therewith below the drive stem for engaging and lifting one of the

stands of drill pipe, an improved apparatus for assisting in connecting the stands of drill pipe to the drive stem, comprising in combination:

- lifting means mounted to the rig floor and vertically movable between a lower position and an upper position;
- a supporting arm mounted to the lifting means for vertical movement therewith; and



receptacle means on the supporting arm for receiving the threaded pin of one of the stands of drill pipe when placed therein by the elevator means and blocks, allowing the lifting means to raise the supporting arm and the stand of drill pipe relative to the elevator means and blocks into engagement with the drive stem for connection.

4,791,998

#### METHOD OF AVOIDING STUCK DRILLING EQUIPMENT

W. Brent Hemphins, San Francisco, Calif.; Roger H. Kingsborough, Kingwood, Tex.; Wesley E. Lohoc, Harvey, La., and Conroy J. Nini, Midland, Tex., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 756,307, Jul. 15, 1985, abandoned. This application Nov. 26, 1986, Ser. No. 935,510

Int. Cl.<sup>4</sup> E21B 7/00, 7/04

U.S. Cl. 175—61

17 Claims

1. A method of utilizing multivariate statistical analysis of a multiplicity of measured well drilling variables to decrease the probability of sticking a drill string during the drilling of a well bore which comprises:

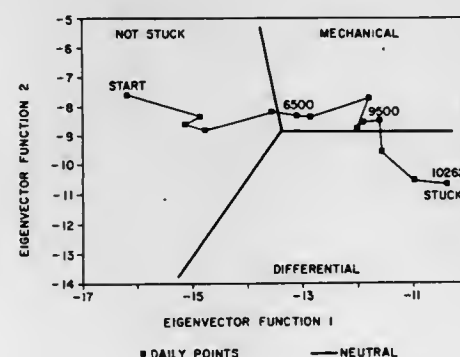
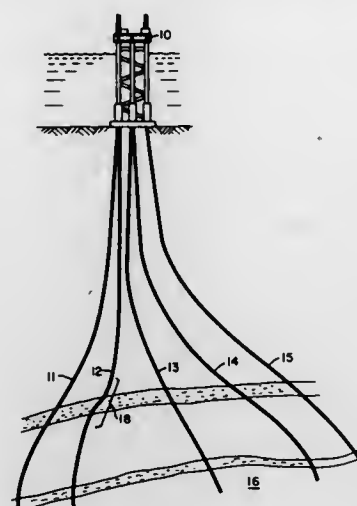
- recording in matrix form a similar multiplicity of measured variables at given depths in each of a multiplicity of wells, including at least two classes of wells elected as members of groups comprising wells wherein the drill string (1) did not stick, and (2) did stick

determining for each well within said matrix a vector formed by the sum of the contributions of the eigenvector values for each measured variable in said multiplicity of measured variables,

recording the mean value of the group of well vectors in each of said group (1) and (2) wells formed by their individual group matrices,

then in drilling said well bore summing the products of the contribution to each eigenvector value multiplied by each of the corresponding measured variable of said multiplicity of variables at the current depth of a drilling well to form the coordinates of the current well vector of said drilling well at said current depth, relative to said mean values of each of said two groups of wells, plotting said current drilling well vector relative to said mean values of said at least two groups of wells to indicate

the probable location of said well vector due to current drilling conditions in said well bore, modifying at least one condition in said drilling well by changing the value of at least one of said measured variables within a physically feasible range for said variable to indicate the effect of so modifying said variable to decrease the probability of sticking a drill string in said well



by moving said current drilling well vector away from the mean of said stuck well vectors; and continuing the drilling of said well bore using the changed value of said measured variable with improved probability that the well vector will move away from said mean of said group of stuck wells toward the mean of said group of wells that did not stick.

4,791,999

#### WELL DRILLING APPARATUS

Bjarne E. Skele, Kristiansand, Norway, assignor to Maritime Hydraulics A.S., Kristiansand, Norway

Continuation-in-part of Ser. No. 609,883, May 14, 1984, Pat. No. 4,593,773. This application Feb. 11, 1986, Ser. No. 828,334

Claims priority, application Norway, Jan. 25, 1984, 840285

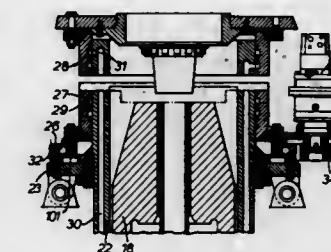
Int. Cl.<sup>4</sup> E21B 19/16, 3/02

U.S. Cl. 175—85

6 Claims

1. A well drilling apparatus of the type suspended from a travelling block of a derrick for movement upwardly and downwardly with a drill string to perform drilling and round trip operations, said apparatus including:

an upper unit comprising drive means for rotating a hollow drive shaft connectable to said drill string; means retaining said upper unit against rotation; a pipe handler apparatus comprising: a link hanger from which two links support an elevator, and a torque wrench for connecting and disconnecting said drive shaft and drill string;



mounting means for allowing said pipe handler apparatus to independently rotate relative to said upper unit to any angular position or desired number of revolutions; and swivel means for transferring operating fluids such as compressed air and hydraulic fluid, between said upper unit and said pipe handler apparatus.

4,792,000

#### METHOD AND APPARATUS FOR WELL DRILLING

Gregg S. Perkin, Kingwood, Tex., and Duane D. Papke, Alberta, Canada, assignors to Oil Patch Group, Inc., Calgary, Canada

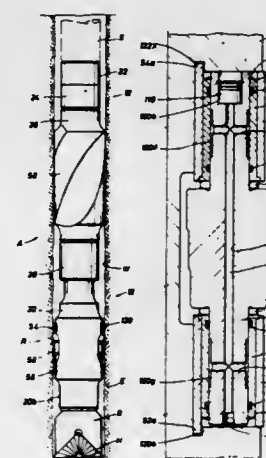
Division of Ser. No. 892,315, Aug. 4, 1986, Pat. No. 4,751,138.

This application Jun. 25, 1987, Ser. No. 66,234

Int. Cl.<sup>4</sup> E21B 10/30

U.S. Cl. 175—228

4 Claims



1. A mounting apparatus for a roller cutter on a reamer rotary drilling tool, including:

- a cylindrical shaft having first and second ends and a roller cutter mounted between said ends;
- a pair of bearing blocks for providing rotational support for said shaft, one of said bearing blocks mounted on said first end of said shaft and the other of said bearing blocks mounted on said second end of said shaft, said shaft movable axially relative to said bearing blocks when positioned therein;
- each of said bearing blocks having a projection extending outwardly from said roller cutter and along the longitudinal axis of said shaft for being received in a complementary groove formed on the drilling tool facing the roller cutter

to prevent radial outward movement of said bearing block from the drilling tool; means on each of said bearing blocks for releasably securing of said bearing blocks with the drilling tool; at least one resilient C-shape claim secured about said shaft between said roller cutter and one of the bearing blocks after the bearing block is releasably secured to the drilling tool for locating the roller cutter on the shaft spaced from said one of the bearing blocks.

4,792,001

#### ROTARY DRILL BIT

Djurre H. Zijlaling, Rijswijk, Netherlands, assignor to Shell Oil Company, Houston, Tex.

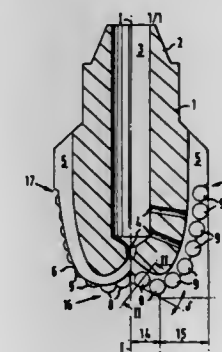
Filed Feb. 9, 1987, Ser. No. 12,920

Claims priority, application United Kingdom, Mar. 27, 1986, 8607701

Int. Cl.<sup>4</sup> E21B 10/46

U.S. Cl. 175—329

17 Claims



1. A rotary drill bit for deephole drilling in subsurface earth formations, the bit suitable to be coupled to the lower end of a drill string, said bit body having a center region near a central axis of rotation and an outer region further removed from the central axis; and a plurality of cutting elements protruding from the bit body, said cutting elements comprising a front layer of interbonded abrasive particles, wherein the cutting elements located in the center region of the bit comprise a thicker abrasive front layer than those in the outer region of the bit.

4,792,002

#### PROPORTIONATE ROCKER BALANCE

William Ward, 3101 Jefferson, Costa Mesa, Calif. 92626

Filed Sep. 23, 1987, Ser. No. 100,289

Int. Cl.<sup>4</sup> G01G 19/00, 23/14, 1/18

U.S. Cl. 177—200

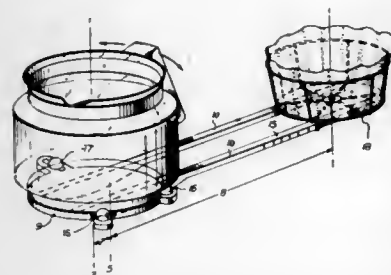
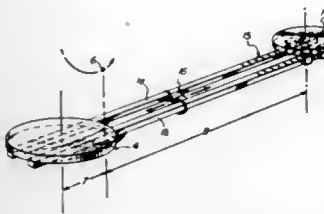
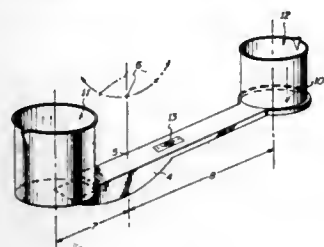
12 Claims

1. A proportionate balance, for the proportionate weighing of two components, comprising:

- a one piece horizontal beam;
- a first support means, affixed to one end of the horizontal beam, for supporting a first component;



a second support means, affixed to the other end of the horizontal beam, for supporting a second component; and



a fulcrum of generally arcuate profile, projecting convexly downwardly from and attached to the horizontal beam in between the first and second support means.

4,792,003

## SPAN ADJUSTING DEVICE FOR WEIGHER

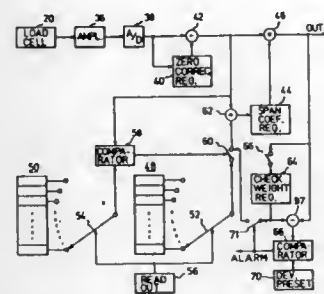
Takashi Hirano, Kobe, and Michio Taguchi, Tatsuno, both of Japan, assignors to Yamato Scale Company, Limited, Japan Division of Ser. No. 822,906, Jan. 27, 1986, Pat. No. 4,703,815.

This application Mar. 26, 1987, Ser. No. 30,704

Int. Cl.<sup>4</sup> G01G 19/40, 19/52, 23/14

U.S. Cl. 177—25,14

5 Claims



1. An automatic span correcting device for a weigher, comprising a load detector coupled to said weigher for providing a weight signal indicative of the weight of product placed on said weigher, arithmetic means for calculating a span correction coefficient from said weight signal and nominal weight value of said product, correction memory means for storing said calculated span correction coefficient, and a multiplier for multiplying said weight signal by the calculated span correc-

tion coefficient to effect span correction; wherein said device further comprises

reference memory means for storing a reference output value of said multiplier resulting from previously placing a check weight on the weigher, means for generating an alarm signal when the deviation between the value of said multiplier output corresponding to the check weight and the reference output value exceeds a predetermined value, means responsive to said alarm signal for supplying the reference output value to said arithmetic means for causing it to calculate a new span correction coefficient from said reference output value and said weight signal corresponding to the check weight, and means for correcting the calculated span correction coefficient stored in said correction memory means with said new span correction coefficient.

4,792,004

## WEIGHT SCALE FOR A HYDRAULIC LOADER AND RELATED METHOD

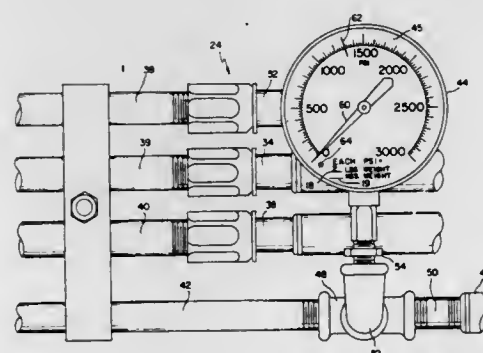
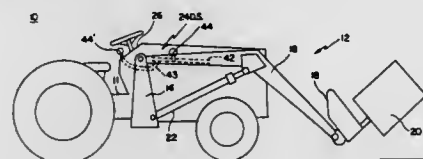
Richard Sheffield, Rt. 2, Box 1077, Ft. Gibson, Okla. 74434

Filed Sep. 25, 1987, Ser. No. 101,362

Int. Cl.<sup>4</sup> G01G 19/10, 5/04

U.S. Cl. 177—141

3 Claims



1. A weight scale for a loader operated by a hydraulic system and incorporated on an operator controlled vehicle, comprising:

- (a) a hydraulic line for operating the loader; and
- (b) a gauge in pressure communication with the hydraulic line, said gauge being directly responsive to changes in hydraulic pressure in the hydraulic line and visually indicating the changes in pressure thereon, the gauge including:
  - (i) a movable pointer adjustable to a tare weight of the loader with which the gauge is used,
  - (ii) a dial having a series of indicia representing different pressures, and
  - (iii) a predetermined calibration factor for converting the pressure indicated to a weight value,

wherein, when an object is lifted by the loader, a pressure is visually indicated on the dial by the pointer, which can be converted by the operator of the vehicle to the weight value based on the calibration factor for said loader.

4,792,005

## SCALE AND FLEXURE ASSEMBLY

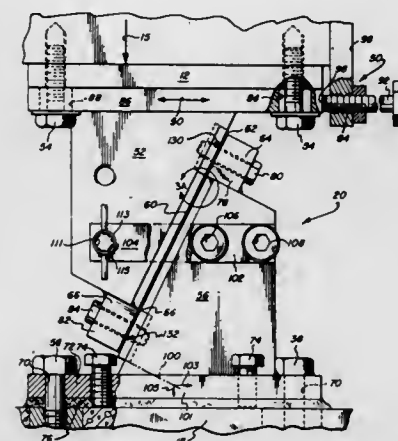
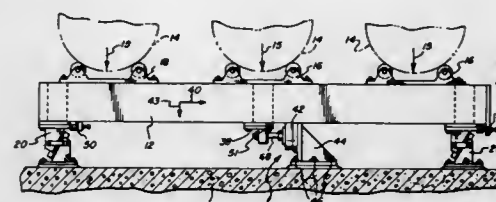
Detlef Olzog, Norwalk, Conn., assignor to The A. H. Emery Company, New Canaan, Conn.

Filed Dec. 22, 1987, Ser. No. 136,853

Int. Cl.<sup>4</sup> G01G 3/08, 5/04

U.S. Cl. 177—229

24 Claims



1. A flexure assembly for mounting a load-receiving platform to a fixed base, said base having associated therewith a force sensing device for coupling to said platform, said assembly comprising at least one flexure member including a stack of at least two flexible leaves, said stack being rigidly coupled along a first side thereof to said platform, said stack being rigidly coupled along an opposite side thereof to said base, said stack being inclined from the vertical and being sufficiently rigid to support said platform from said base, said stack further being sufficiently flexible to tend to deflect and traverse a slight arc in response to a loading force being applied to said platform by receiving a load thereon, each of said leaves having a substantially planar shape when in a nondeflected state and lying in substantially parallel planes when in the nondeflected state, whereby said force sensing device can be coupled to said platform along a substantially horizontal axis to thereby render an indication of the magnitude of said load.

4,792,006

## DRIVE SHAFT COUPLING

Clemens Nienhaus, Theo Buthe, both of Lohmar, and Felix Mikecka, Siegburg, all of Fed. Rep. of Germany, assignors to Jean Walterscheid GmbH, Lohmar, Fed. Rep. of Germany

Filed Sep. 22, 1987, Ser. No. 99,478

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1986, 3632550

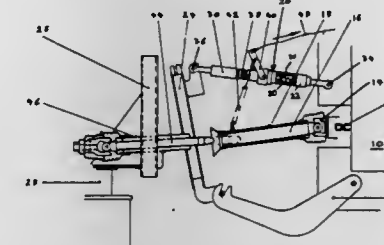
Int. Cl.<sup>4</sup> B62D 49/06

U.S. Cl. 180—53.3

3 Claims

1. A coupling device for connecting power take off means of a tractor to a driven shaft of an implement to be powered by the tractor power take off means comprising an upper guide member having a first part pivotally connectable to the tractor and a second part connectable to the implement, said first and said second parts being telescopically connected together and

resiliently biased axially apart; a drive shaft driven by the tractor power take off means and being engageable, when the tractor is connected to the implement by said guide member, with the driven shaft of the implement; locking means on said guide member selectively operable to lock said first and said second parts thereof against relative axial movement; an actuating lever arm carried by said guide member for selective operation of said locking means, said lever arm being movable between an extended position in which said locking means is



inoperative and a retracted position in which said locking means is operative; and resiliently biased support means extending between said lever arm and said drive shaft, said support means resiliently suspending said drive shaft from said guide member when said guide member is disconnected from the implement and said lever arm is in its extended position, and not resiliently suspending said drive shaft when said guide member is connected to the implement, said drive shaft is engaged with the implement driven shaft and said lever arm is in its retracted position.

4,792,007

## MECHANISM FOR STEERING FRONT AND REAR WHEELS OF FOUR-WHEEL VEHICLE

Masaru Abe, Masami Ogura, and Tsuyoshi Sato, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

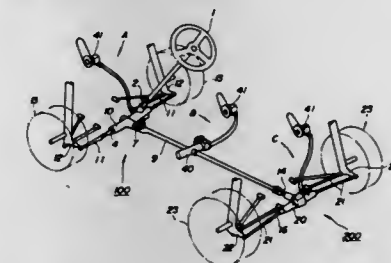
Continuation-in-part of Ser. No. 10,177, Feb. 2, 1987, Pat. No. 4,758,012. This application Aug. 24, 1987, Ser. No. 88,908

Claims priority, application Japan, Aug. 22, 1986, 61-196702

Int. Cl.<sup>4</sup> B62D 5/00

U.S. Cl. 180—140

7 Claims

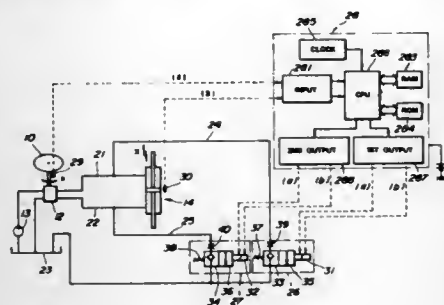


1. A mechanism for steering the front and rear wheels of a four-wheel-steerable vehicle, comprising:

- a front wheel steering device operatively coupled to a steering wheel and having at least a rack-and-pinion gear mechanism having a nonlinear gear ratio which improves vehicle maneuverability;
- a rear wheel steering device;
- a linkage shaft operatively connecting said front wheel steering device and said rear wheel steering device to each other; and
- at least one steering force assisting device disposed in a steering force transmitting path comprising said front

wheel steering device, said rear wheel steering device, and said linkage shaft.

**4,792,008**  
**FULL HYDRAULIC POWER STEERING SYSTEM**  
 Takashi Hosotani, Kawasaki, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan  
 Filed Apr. 8, 1987, Ser. No. 35,767  
 Claims priority, application Japan, Apr. 10, 1986, 61-82835  
 Int. Cl.<sup>4</sup> B62D 3/14, 5/06  
 U.S. Cl. 180—142 **8 Claims**

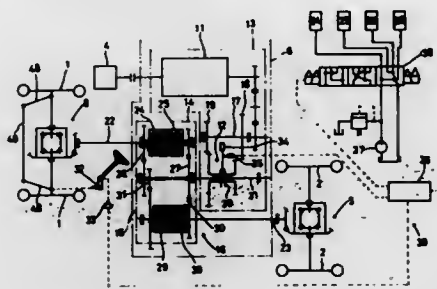


1. A full hydraulic power steering system for a vehicle having a steerable wheel, comprising:  
 a hydraulic actuator having a stationary part fixed to the vehicle and a movable part movable relative to said stationary part, said movable part being operatively connected to said wheel;  
 a steering wheel mounted on said vehicle;  
 a steering unit operated by said steering wheel;  
 a hydraulic fluid line operatively connecting said steering unit and said hydraulic actuator;  
 drain line means connected to a portion of said hydraulic fluid line for conveying a part of the fluid in the hydraulic line into a drain tank;  
 valve means disposed in said drain line means for selectively opening and closing said drain line means;  
 first sensor means for sensing a steering wheel angle assumed by said steering wheel and for providing information based thereon;  
 second sensor means for sensing an actual value for displacement of said movable part of the hydraulic actuator relative to said stationary part of the same and for providing information based thereon; and  
 control means for calculating turning speed of the steering wheel and for controlling said valve means in accordance with the information from said first and second sensors in such a manner that when the turning speed of the steering wheel is not higher than a predetermined low level, said valve means keeps said drain line means closed.

**4,792,009**  
**FOUR WHEEL DRIVE VEHICLE**  
 Hirofumi Iritani, Sakai, Japan, assignor to Kubota Ltd., Osaka, Japan  
 Filed Oct. 27, 1987, Ser. No. 113,155  
 Claims priority, application Japan, Dec. 22, 1986, 61-305976  
 Int. Cl.<sup>4</sup> B62D 17/34  
 U.S. Cl. 180—233 **7 Claims**

1. A four wheel drive vehicle comprising:  
 an engine,  
 front wheels and rear wheels driven by said engine, said front wheels being dirigible,  
 propelling drive transmission means for producing at least two, high and low, speeds,  
 a front wheel change speed mechanism for receiving power from said propelling drive transmission means and producing a plurality of speeds, said front wheel change

speed mechanism including a first switching means for selecting between the plurality of speed to be produced by said front wheel change speed mechanism,  
 a rear wheel change speed mechanism for receiving power from said propelling drive transmission means and producing a plurality of speeds, said rear wheel change speed mechanism including a second switching means for selecting between the plurality of speeds to be produced by said rear wheel change speed mechanism, and  
 control means for controlling said first and second switching means, said control means receiving information regard-

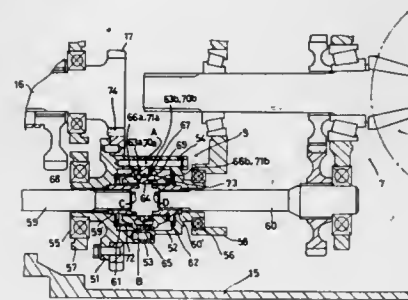
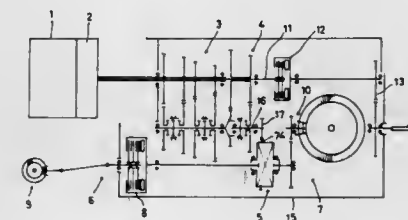


ing change speed positions of said propelling drive transmission means and steering positions of said front wheels, wherein said control means is operable in response to the change speed positions of said propelling drive transmission means to control said first and second switching means to select a speed mode in which said front wheels are driven faster than said rear wheels when a steering angle of said front wheels exceeds a predetermined angle, and to select a speed mode in which said front wheels and said rear wheels are driven at substantially the same speed when the steering angle of said front wheels is below said predetermined angle.

**4,792,010**  
**FOUR WHEEL DRIVE VEHICLE**  
 Yuichi Kitao, Ashiya, and Akio Inamori, Izumi, both of Japan, assignors to 501 Kabota, Ltd., Osaka, Japan  
 Filed Apr. 13, 1987, Ser. No. 37,858  
 Claims priority, application Japan, Jul. 11, 1986, 61-163988; Jul. 11, 1986, 61-163989; Jul. 11, 1986, 61-163990  
 Int. Cl.<sup>4</sup> B60K 17/34, 23/08  
 U.S. Cl. 180—233 **4 Claims**

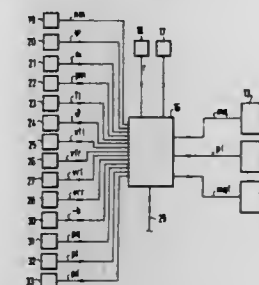
1. A four wheel drive vehicle comprising:  
 an engine (1),  
 transmission means (2, 3, 4) connected to the engine,  
 a front wheel drive mechanism (6) and a rear wheel drive mechanism (7) driven by a drive output from the transmission means, the front wheel and rear wheel drive mechanisms driving front wheels at a lower speed than rear wheels, and  
 an automatic switching mechanism (5) for selectively providing a two wheel drive mode and a four wheel drive mode, the automatic switching mechanism including:  
 an input portion (A) connected to the transmission means,  
 a first output portion (C) having a first output shaft (59) connected to the front wheel drive mechanism,  
 a second output portion (D) having a second output shaft (60) subjected to a rotational load, and  
 clutch means mounted between said input portion (A) and said output portions (C, D) and having:  
 a center section having a center clutch member (53) and a cam member (64) constituting a relatively rotatably supported outer and inner ring construction, said center clutch member (53) defining clutch teeth (63a, 63b) on opposite end faces thereof, said center cam member (64) defining cam teeth (66a, 66b) on opposite end faces

thereof, said center clutch member (53) being fixed to said input portion (A),  
 a first side member and a second side member (68, 69) mounted on said first and second output portions (C, D), respectively, and opposed to each other across said center section, said first and second side members defining clutch teeth (70a, 70b) on faces thereof opposed to said center section for meshing with said clutch teeth of said center clutch member with spaces defined therebetween in a peripheral direction, and cam teeth (71a, 71b) on the faces thereof opposed to said center section for meshing with said cam teeth of said center cam member without spaces in said peripheral direction, said first side member (68) and/or said second side member (69) being relatively unrotatably slidable on said first output portion (C) and/or said second output portion (D), and means (72) for biasing said first side member (68) and/or



said second side member (69) toward said center section, said cam teeth of the center cam member and said cam teeth of said first and/or said second side members being mutually mountable with relative rotation between said center section and said first and/or second side members, thereby to disengage said clutch teeth of said side members from said clutch teeth of said center clutch member,  
 wherein said clutch means is operable to disconnect said first output shaft (59) from said input portion (A) when said input portion (A) rotates at a lower speed than said first output shaft (59) at a time said vehicle is driven by said engine with power transmission occurring from said input portion (A) to said output portions (C and/or D), and when said input portion (A) rotates at a higher speed than said first output shaft (59) at a time the vehicle is braked by said engine with power transmission occurring from said output portions (C and/or D) to said input portion (A).

**4,792,011**  
**ARRANGEMENT FOR THE CONTROL OF THE FORCE-TRANSMISSION OF A FOUR-WHEEL DRIVE VEHICLE**  
 Norbert Stelter, Weissach, and Rainer Wuest, Wiernsheim, both of Fed. Rep. of Germany, assignors to Dr. h.c.F. Ing. Porsche AG, Stuttgart, Fed. Rep. of Germany  
 Continuation of Ser. No. 787,439, Oct. 15, 1985, abandoned.  
 This application Jan. 13, 1988, Ser. No. 147,011  
 Claims priority, application Fed. Rep. of Germany, Oct. 12, 1984, 3437436  
 Int. Cl.<sup>4</sup> B60K 17/34  
 U.S. Cl. 180—233 **40 Claims**



37. A system for the control of the force transmission onto the axle means of a four-wheel drive motor vehicle, comprising a main driving axle means provided with a cross differential means, an auxiliary driving axle means driven by way of a longitudinal clutch means continuously controllable by an adjusting means, a control apparatus which receives input signals from an engine rotational speed measuring means, from at least one of a drive pedal pick-up means, throttle valve angle pick-up means, charging air pressure pick-up means, charging air temperature pick-up means and pick-up means corresponding to velocities of wheels at said auxiliary driving axle means, said control apparatus including means for determining a driving velocity from input signals received by at least one of said pick-up means, said control apparatus including means for producing a control signal for controlling the adjusting means of the longitudinal clutch means in such a manner that it is in a first functional relationship with a traction force of at least one of the wheels at the auxiliary driving axle means, the traction force of the wheels at the auxiliary driving axle means being determined by multiplication of an amount of a desired traction force of all wheels with a distribution factor, said amount of a desired traction force of all wheels being determined from at least two of said input signals and said driving velocity by way of a second functional relationship, and said distribution factor being determined from the amount of the desired traction force of all wheels and from at least one of the input signals by way of a first performance graph means.

**4,792,012**  
**ANTI TORQUE SHOCK CONTROL DEVICE AND METHOD ENGAGING TORQUE TRANSMITTING CLUTCH BETWEEN VEHICLE WHEELS WHEN TRANSMISSION IS SHIFTED FROM NON DRIVE RANGE TO DRIVE RANGE**

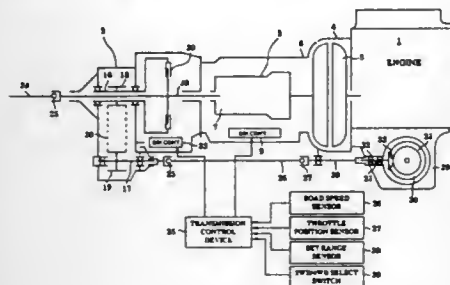
Kunio Morisawa, Hideki Yasue, Kagenori Fukumura, Kenichi Yoshizawa, and Yasunari Nakamura, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan  
 Division of Ser. No. 8,323, Jan. 29, 1987, Pat. No. 4,729,450.  
 This application Dec. 21, 1987, Ser. No. 135,451  
 Claims priority, application Japan, Jul. 25, 1987, 61-176468  
 Int. Cl.<sup>4</sup> B60K 23/08 **4 Claims**

1. For a power transmission system for a vehicle comprising a pair of front and a pair of rear wheels, a transmission mechanism, and a selectively engagable clutch for being selectively at



least partially engaged for controlling said vehicle between two wheel drive operation and four wheel drive operation; an anti torque shock control device, comprising:

- (a) a first means for detecting whether or not shift range of said transmission mechanism is a vehicle non driving range or a vehicle driving range; and



- (b) a second means for controlling said clutch to be at least partially engaged, when shift range of said transmission mechanism, as detected by said first means, alters from a vehicle non driving range to a vehicle driving range.

4,792,013

## VOCAL MUFFLER

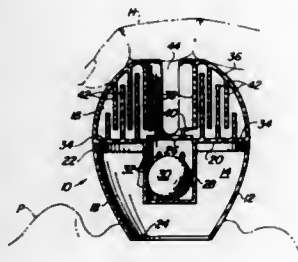
Carter R. Boynton, 6820 Town Harbor Blvd., #3624, Boca Raton, Fla. 33433

Filed Sep. 8, 1987, Ser. No. 93,832

Int. Cl.<sup>4</sup> F01N 7/00

U.S. Cl. 181-242

13 Claims



1. A vocal muffler for use by a human person, comprising a member having an exterior wall defining a chamber and provided with a first port opening to atmosphere and adapted to be placed over the mouth of a vocalizing person, said wall having a second port open to atmosphere and spaced from the first port, a valve cage within said chamber and supported by said wall adjacent to the second port, a valve movable in the cage in response to exhalation of said vocalizing person into the chamber through the first port to close the second port and movable upon inhalation by said person to open the second port, and said wall having further port means communicating the chamber to atmosphere in bypassing relation to the second port for conducting exhaled air out of the chamber during closure of the second port.

4,792,014

TAIL PIPE FOR DRAFTING ENGINE EXHAUST GAS  
Lin Shin-Seng, No. 48, Alley 34, Lane 165, Chung-San E. Rd., Sec. 3, Chung-Li City, Taoyuan Hsien, Taiwan

Filed Dec. 24, 1987, Ser. No. 138,646

Int. Cl.<sup>4</sup> F01N 1/12, 1/14

U.S. Cl. 181-280

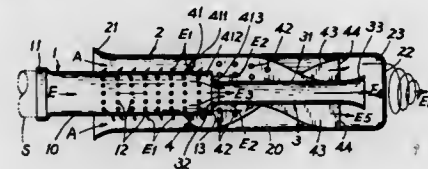
3 Claims

1. A tail pipe for drafting engine exhaust gas comprising:  
a front pipe formed as a cylindrical hollow pipe portion having a front opening end secured to an engine exhaust

silencer, having a middle and rear portion of the cylindrical hollow pipe portion drilled with plural perforations therethrough;

an outer pipe formed as a cylindrical hollow pipe portion having a diameter larger than that of said front pipe jacketed outside said middle and rear portion of said front pipe, having a front trumpet flange expanding frontwardly from a front end of said outer pipe, and a rear contraction edge arcuately formed on a rear end of said outer pipe to define a rear opening thereof;

a central pipe having a diameter smaller than that of said front pipe following a rear end opening of said front pipe, having a rear trumpet portion formed on a rear end of said central pipe proximate to the rear opening of said outer pipe; and



plural swirl plates helically secured between the central pipe and the outer pipe along a longitudinal axis of said central pipe, each swirl plate having a front L-shaped fin formed on a front end of each said swirl plate securing the rear portion of said front pipe between said outer pipe and said central pipe, whereby upon a discharge of an engine exhaust gas into said front pipe, the exhaust gas is dissipated into a first side stream discharged through said perforations of said front pipe into an annular space defined between said outer pipe and said front pipe, a central stream is rearwardly directed into said central pipe for a converging-diverging flow and an intermediate stream including an annular flow of the first side stream is directed into the swirl plates forming an eddy flow to draft the central stream for efficiently releasing the exhaust gas from the engine silencer and cylinder.

4,792,015

## AUTOMATIC ESCAPE LADDER

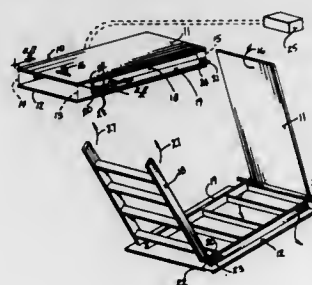
Raymond Brudi, 1031 Pine Island Rd., Cape Coral, Fla. 3390

Filed Oct. 6, 1987, Ser. No. 104,936

Int. Cl.<sup>4</sup> E06C 9/10; E04F 11/06

U.S. Cl. 182-18

5 Claims



1. An automatic escape ladder apparatus for use in combination with overhanging projections of building structures wherein said apparatus comprises,  
a foldable ladder means positionable within a cabinet-like structure for securement within said overhanging projections wherein said cabinet-like structure includes a top plate, a bottom plate, a forward wall, a rear wall, and adjoining side walls, and said top plate pivotally mounted to said rear wall;  
and

said bottom plate fixedly secure to said ladder, and energizable means to release said ladder from within said cabinet-like structure wherein said energizable means includes at least one solenoid means secured to at least one side wall wherein said solenoid means include piston means extending through an opening in said ladder means bottom portion to secure said means ladder within said cabinet-like structure in a first position, and wherein said energizable means is electrically associated to a first alarm to effect energization of said energizable means upon activation of said fire alarm to release said ladder means for enabling extending of said ladder means in a second position,

and means to enable grasping of said top plate to enable pivoting of said top plate relative to said cabinet-like structure to gain access to said released ladder wherein said foldable ladder comprises a bottom portion and a top portion.

4,792,016

## LADDER SECURING DEVICE

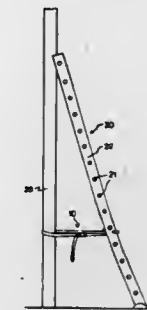
Daryl E. Ingalsbe, Blair, Nebr.; David L. Ingalsbe, Northfield, Minn., and Arlen G. Bourn, Omaha, Nebr., assignors to Independent Technologies, Inc., Omaha, Nebr.

Filed Nov. 17, 1987, Ser. No. 122,020

Int. Cl.<sup>4</sup> E06C 5/36

U.S. Cl. 182-107

20 Claims



1. A ladder sensing device for quickly securing a ladder having rails and rungs to a utility pole or the like comprising:

- (a) first flexible and elongated strap means having opposite ends, said strap means having a flexible and planar body structure of a predetermined width;
- (b) adjustable, quick-release strap securement means operative on said first strap means, said quick-release means having a lever;
- (c) second flexible and elongated strap means having opposite ends and having a flexible planar body structure of the same said predetermined width, one said end being attached to said quick-release strap securement means; and
- (d) a pair of rigid hook means being constructed and arranged to engage the rails of a ladder from an interior position, one said hook means being attached to one end of said first flexible strap means and said second hook means being attached to the end of said second flexible strap means opposite said quick-release strap securement means, each said hook means having an opened hook portion and a strap securement portion disposed generally perpendicular thereto, said strap securement portion for securing said first and second strap means in a planar configuration, whereby said device when placed about a utility pole and with said hook means attached to the rails of a ladder easily and quickly secures a ladder to a utility pole or the like by pulling the end of said first flexible strap means opposite said attached hook means by adjustably securing said first flexible strap means in said quick-release strap securement means and whereby said device is easily and

quickly disengaged by means of activating said quick-release means lever.

4,792,017

## ADJUSTABLE SUPPORT FOR LADDERS, SCAFFOLDS AND THE LIKE

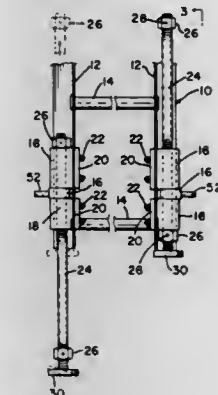
Thomas S. Grove, 53 Kevin Dr., York, Pa. 17404

Filed May 9, 1988, Ser. No. 191,610

Int. Cl.<sup>4</sup> E06C 7/44

U.S. Cl. 182-204

10 Claims



1. An elongated longitudinally-adjustable load-supporting unit comprising in combination, an externally-threaded elongated member of uniform diameter, an internally-threaded member having threads complementary to the external threads of said elongated member, and coengageable therewith for a limited portion of the length of said elongated member, said internally-threaded member being bifurcated and the parts thereof being pivotally-connected for separate movement of said parts, spring means interconnected to said parts in a manner to urge said parts firmly together to effect threaded coengagement of the internal threads thereof with the external threads of said elongated member, and means operable in opposition to said spring means to spread the internally-threaded portions of said parts into a spaced relationship sufficient to permit free relative longitudinal movement between said members.

4,792,018

## SYSTEM FOR SECURITY PROCESSING OF RETAILED ARTICLES

David R. Humble, Deerfield Beach; David L. Gentzler, Boynton Beach, and Steven J. Tildetzke, Coconut Creek, all of Fla., assignors to CheckRobot Inc., Deerfield Beach, Fla.

Continuation-in-part of Ser. No. 628,913, Jul. 9, 1984, Pat. No. 4,676,343. This application Jun. 12, 1985, Ser. No. 742,757

Int. Cl.<sup>4</sup> G07C 11/00

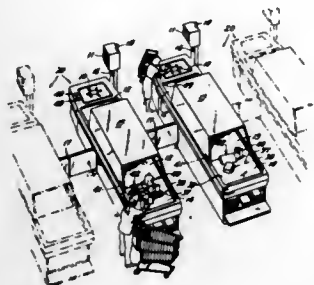
U.S. Cl. 186-61

17 Claims

1. A system for processing articles selected for purchase and bearing distinct identification codes, said system comprising:

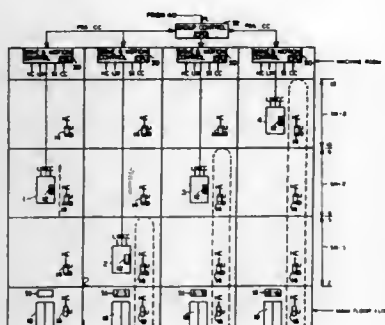
- (a) code reader means for generating an output signal indicative of such article identification code;
- (b) conveyor means for receipt and transport of such article;
- (c) sentry means for defining an inlet to a security zone extending along a portion of said conveyor means, said sentry means including sensor means for generating an output signal jointly indicative of entry of said article into said security zone and of a first measurable characteristic of said article;
- (d) control means for selective movement of said conveyor means in respective article acceptance and article rejection senses, said control means being operable
1. for storage, for each of a plurality of such articles, of a

signal indicative of a predetermined value of said first article characteristic correlated with such article identification code,



- II. for response to said code reader means output signal for comparison of such stored signal with said output signal of said sentry means, and
- III. for operation of said conveyor means selectively in response to the results of said comparison.

**4,792,019**  
**CONTIGUOUS FLOOR CHANNELING WITH UP HALL CALL ELEVATOR DISPATCHING**  
 Joseph Bittar, and Kandasamy Thangavelu, both of Avon, Conn., assignors to Otis Elevator Company, Farmington, Conn.  
 Filed Feb. 12, 1988, Ser. No. 157,543  
 Int. Cl.<sup>4</sup> B66B 1/20  
 U.S. Cl. 187—125 3 Claims



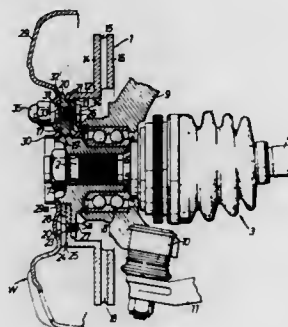
1. An elevator comprising a plurality of cars for transporting passengers from a main floor to a plurality of contiguous floors above or below the main floor; car call means for entering car calls for each car; indicating means at the main floor for indicating the intended floor stops for a car; car motion control means for moving each car; car position means for providing a position signal indicating the location of the car; door control means for controlling the opening and closing of the doors on each car; and a controller for providing signals that control the operation of the motion control, the door control means and the indicating means in response to the position signal and car calls, characterized in that:

said controller comprises signal processing means providing signals:

for dividing the floors in the building into a plurality of sectors less than or equal to the plurality of cars, each

- sector comprising one or more contiguous floors, the sectors being contiguous with each other;
- for assigning a sector exclusively to one of the cars during a cycle of a cyclical assignment sequence that assigns a sector exclusively to one car during one cycle according to a preset sector order and a preset car order as a car approaches a particular position relative to the main floor for receiving passengers at the main floor;
- for allowing a car to move away from the main floor in response to car calls only if the car calls are to floors in the sector assigned to the car;
- for indicating on the indicating means the floors in a sector assigned to a car;
- for assigning a different sector to said one car if car calls meeting preset criteria are not made to floors in the sector after the sector is assigned to the car;
- for assigning an up hall call to a car having a coincident car call from the main floor;
- for assigning an up hall call made in a lower portion of the building and not coincident with a car call made at the main floor only to a car dispatched to or about to be dispatched to a sector in the remaining portion of the building;
- for assigning to a car an up hall call in said remaining portion of the building and not coincident with a car call made at the main floor, said car being selected on the criterion that the car has been or is about to be dispatched to the sector containing the floor on which the up hall has been made or to a sector above said sector; and
- for selecting said car from all other cars meeting said criterion on the basis that relative to said other cars the car would be assigned to the up hall call if none of said other cars were assigned to sectors.

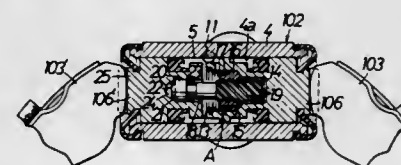
**4,792,020**  
**VEHICLE WHEEL ASSEMBLY**  
 Shinichiro Okumura, and Yasushi Suganuma, both of Wako, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Dec. 15, 1987, Ser. No. 133,467  
 Claims priority, application Japan, Dec. 19, 1986, 61-196605  
 Int. Cl.<sup>4</sup> F16D 65/12  
 U.S. Cl. 188—18 A 8 Claims



1. A vehicle wheel assembly of the type which includes a brake disc and a wheel secured for rotation with a hub mounted to an axle, comprising:
- a brake disc having a cylindrical portion concentrically surrounding said hub and a mounting flange extending radially inward from one end of said cylindrical portion, said hub having a flange extending radially outward and opposed to said mounting flange, a wheel having a plurality of circumferentially spaced mounting seats contacting said mounting flange over substantially the entire radial region thereof, an aperture through each of said mounting seats and axially aligned with corresponding apertures in

said brake disc mounting flange and said hub flange, means extending through each of said axially aligned apertures and adapted to tighten said wheel assembly by pressing each of said mounting seats against one of a plurality of pressure-receiving portions of said wheel assembly, said pressure-receiving portions of said wheel assembly being located on a diameter substantially equal to the outer diameter of said cylindrical portion of said brake disc, and a recess being provided between the outer periphery of each of said pressure receiving portions of said assembly and the cylindrical portion of said brake disc for allowing bending of said pressure receiving portions inward in the axial direction of said hub.

**4,792,021**  
**SELF-COMPENSATING DEVICE FOR A DRUM BRAKE**  
 Genichiro Fukuzawa, Ueda, and Isao Idesawa, Tonbu, both of Japan, assignors to Nissin Kogyo Kabushiki Kaisha, Nagano, Japan  
 Filed Mar. 25, 1983, Ser. No. 478,774  
 Claims priority, application Japan, Mar. 26, 1982, 57-48251; Apr. 13, 1982, 57-61388; May 31, 1982, 57-80058  
 Int. Cl.<sup>4</sup> F16D 51/52, 65/38, 13/60  
 U.S. Cl. 188—79.62 14 Claims



1. In a self-compensating device for a drum brake of the type including a first member and a second member which together define a hydraulic chamber in a wheel cylinder and are slidably but non-rotatably arranged relative to one another so that brake shoes are actuated by displacement of the first and second members away from one another which is initiated by hydraulic pressure introduced into the hydraulic chamber, the improvement comprising:

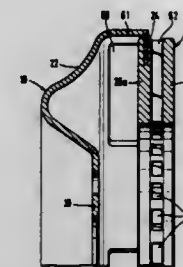
an adjustment nut disposed in one of the first and second members so as not to be rotated relative to the latter, said adjustment nut being adapted to detachably abut against an abutment face formed on said one of the members,

a spring means for urging the adjustment nut toward said abutment face and for preventing rotation of said adjustment nut relative to one of said first and second members,

an adjustment rod threadably fitted through the adjustment nut, said adjustment rod including a multithread screw formed on a part thereof for assuring threadable engagement with the adjustment nut, and

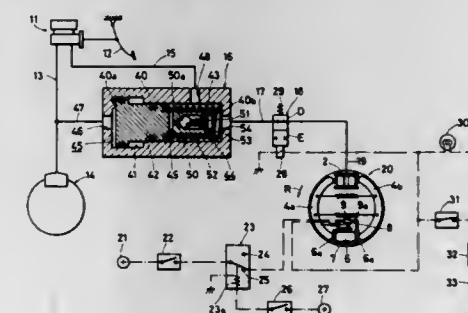
a clutch member integrally secured to one end of the adjustment rod and rotatably supported in a clutch bore formed in the other one of the first and second members to cooperate with a clutching face formed on the inner wall of said clutch bore at the deepest part thereof, said clutch member being adapted to come in frictional engagement with the clutching face when the clutch member is thrust toward the clutching face by hydraulic pressure exceeding a predetermined level in the hydraulic chamber and when the clutch member is thrust toward the clutching face under the influence of resilient force imparted by a return spring extended between both the brake shoes.

**4,792,022**  
**BRAKE DISC ARRANGEMENT FOR AN INTERNALLY STRADDLING DISC BRAKE, IN PARTICULAR FOR AUTOMOTIVE VEHICLES**  
 Rudolf Thiel, Frankfurt am Main, Fed. Rep. of Germany, assignor to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany  
 Filed Oct. 6, 1986, Ser. No. 915,726  
 Claims priority, application Fed. Rep. of Germany, Oct. 3, 1985, 3535290  
 Int. Cl.<sup>4</sup> F16D 65/10, 65/78; B21H 1/02; B22D 19/00  
 U.S. Cl. 188—218 XL 4 Claims



1. A brake disc arrangement for an internally straddling type disc brake for an automotive vehicle comprising, a cast brake ring having an axis and having two opposed friction surfaces, at least two spaced apart connecting elements distributed along the periphery of the cast brake ring, a one piece brake disc carrier having a main body having an axis coaxial with the axis of said ring and including at least two axially projecting connecting sections, each of the connecting sections of the brake disc carrier projecting away from said main body in the direction of the axis of said main body extends across a space formed between the spaced apart connecting elements, each connecting section fastened to the connecting elements on opposite sides of the space across which it extends.

**4,792,023**  
**BRAKE CONTROL METHOD AND APPARATUS FOR A VEHICLE**  
 Hideyuki Morimoto, and Ryoichi Tanaka, both of Kanagawa, Japan, assignors to Fuji Heavy Industries, Ltd. and Nippon Air Brake Co., Ltd., both of Japan  
 Continuation of Ser. No. 797,941, Nov. 14, 1985, abandoned.  
 This application Jul. 8, 1987, Ser. No. 71,563  
 Claims priority, application Japan, Nov. 16, 1984, 59-241740; Apr. 25, 1985, 60-90493  
 Int. Cl.<sup>4</sup> B60T 11/28  
 U.S. Cl. 188—353 4 Claims



1. A brake control apparatus of the drum brake type for a vehicle comprising:
- (a) a brake apparatus in which a brake friction means comprising a leading shoe and a trailing shoe is pressed to a



frictional surface of a rotator rotated with a wheel by a supply of pressurized fluid on the basis of a driver's operation;

(b) conduit means for supplying said pressurized fluid to said brake apparatus from a master cylinder;

(c) a valve arranged in said conduit means, being closed by an external instruction and prohibiting at least a fluid flow from said brake apparatus side towards said master cylinder side for holding the braking force;

(d) detecting means for detecting one directional movement of said brake friction means due to a backward rotational force of a wheel and another directional movement of said brake friction means due to a forward rotational force of said wheel during pressing of said brake friction means to said frictional surface of said rotator, said brake friction means being able to move within a predetermined range in accordance with the torque of said wheel; and

(e) valve drive means for closing said valve in accordance with the detection of said one directional movement by said detecting means, and for opening said valve in accordance with the detection of said other directional movement by said detecting means; said brake apparatus further includes a stationary anchor having a through hole, and said detecting means includes a slide anchor slideably fitted in said through hole movable between a first position and a second position, said leading shoe and said trailing shoe being engaged with said slide anchor to move said slide anchor between said first and second positions, respectively, and an electrical switch for detecting the movement of said slide anchor from said first position to said second position, and said valve being of the electromagnetic type, being closed in said second position and opened in said first position by the detecting output of said electrical switch, said brake apparatus further includes a spring extending between a stationary part and said leading shoe, said leading shoe being always pushed to said slide anchor by said spring, so that said slide anchor is forcibly put in said first position and said electrical switch is stably maintained at the off state wherein said slide anchor is moved to said second position against said spring with the torque of said wheel when said vehicle is stopped by the braking force on an upwardly inclined roadway, and said apparatus includes a parking switch, a door switch and a warning means which are connected in series with said electrical switch, said parking switch being actuated in response to operation of the parking brake of the vehicle, said door switch being actuated in response to the opening-closing operation of the door of the vehicle, and said warning means being energized to warn the driver that the parking brake is not applied when said door is opened without operating the parking brake and said valve is closed by the closing of said electrical switch.

4,792,024

#### CHANGING CADDY INCLUDING A REMOVABLE CHANGING PAD FOR AN INFANT

Kenneth P. Morton, East Aurora; Daniel J. D'Arcy, Lancaster, and Merry S. Riehm, Buffalo, all of N.Y., assignors to The Quaker Oats Company, Chicago, Ill.

Filed Oct. 9, 1987, Ser. No. 107,647

Int. Cl. A45C 9/00; A45F 4/06; A47D 13/00

U.S. Cl. 190-1

16 Claims

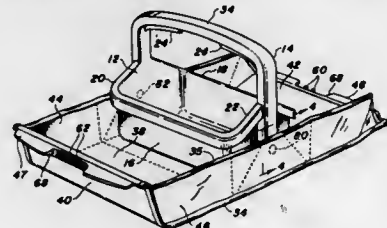
1. A changing caddy for carrying the items necessary to change an infant and providing a changing pad, comprising:

a basket having a generally upstanding U-shaped handle attached to a generally rectangular body having four sides;

a changing pad comprising a quilted assembly of a moisture resistant layer, a resilient padding layer, and an outer layer, said pad having a plurality of fold lines for causing the pad to assume the shape of the outside configuration of the basket when folded, said pad comprising first and second sides and first and second ends; and

means on the said basket and means on said pad for remov-

ably attaching said first and second ends of said pad in place adjacent to said handle and for removably attaching



said first and second sides of said pad to two of said four sides of said body.

4,792,025

#### CADDY LUGGAGE

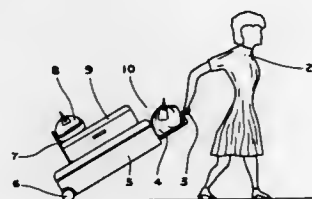
Robert E. Thomas, 650 Floyd Ave., Chula Vista, Calif. 92010

Filed Mar. 4, 1988, Ser. No. 164,086

Int. Cl. A45C 13/26, 13/36, 13/38, 5/14

U.S. Cl. 190-18 A

18 Claims



1. A luggage and caddy combination for containing items of personal property of a traveler and for carrying other pieces of luggage, which comprises:

a generally parallelepipedic container defined by opposite first and second faces, first and second opposite sides, a top and a bottom;

rolling means for rotatively supporting said container, said rolling means being attached to said container about a first axis parallel and proximate to the intersection of said first face and bottom;

a generally planar shelf having one edge rotatively secured to said second face about a second axis parallel and proximate to the intersection of said bottom and second face, said shelf being movable from a stowed position generally parallel to said second face to at least one deployed position generally orthogonal with said second face;

a support structure having one end secured to said container, an opposite second end shaped and dimensioned to form a handle at a first location near the top of the container, and an extensible section between said first and second end, said section having means for extending said second end to at least one other location above and apart from said top along a plane generally parallel and proximate to the plane of said first face; and

means for locking said support structure in each of said locations.

4,792,026

#### APPARATUS FOR LOCKING A CARRYING CASE

Gary S. Dimmick, Pittsburgh, and Scott G. Lockerman, Sewickley, both of Pa., assignors to Lockman Products Company, Inc., Pittsburgh, Pa.

Filed Jul. 27, 1987, Ser. No. 78,107

Int. Cl. A45G 13/18

U.S. Cl. 190-101

10 Claims

1. A carrying case comprising,

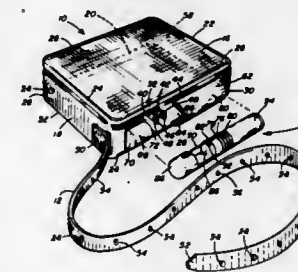
a pair of side panels positioned in overlying relation to form a compartment,

said side panels having pivotally connected sections to permit relative movement of said side panels to open and close said compartment,

closure means extending around said side panels for connecting said side panels to close said compartment,

an actuator movable on said closure means between a closed position and an open position to connect and disconnect said side panels to close and open said compartment,

a locking device including a locking pin movable between a locked position and an unlocked position,



an elongated body portion attached to one of said side panels adjacent said closure means,

said body portion having a closed end and an open end with an internal cavity extending between said closed and open ends for removably receiving and supporting said locking device on said side panel,

said open end portion being in juxtaposition with said actuator when said compartment is in said closed position, and said locking pin being engageable with said actuator when said compartment is in said closed position to prevent opening of said compartment when said pin is in said closed position and to secure said locking device to said respective side panel.

4,792,027

#### CONTROL SYSTEM FOR A CLUTCH FOR A VEHICLE

Hiroya Ohkuno, Koganei, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

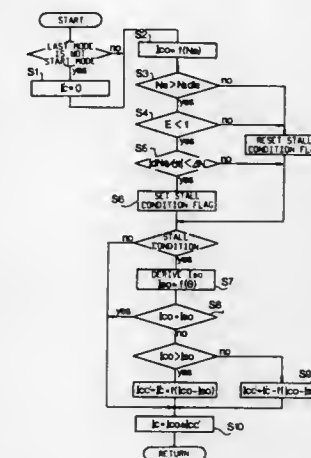
Filed Jun. 19, 1987, Ser. No. 65,028

Claims priority, application Japan, Jun. 28, 1986, 61-152544

Int. Cl. B60K 41/02; F16D 27/16, 37/02

U.S. Cl. 192-0.032

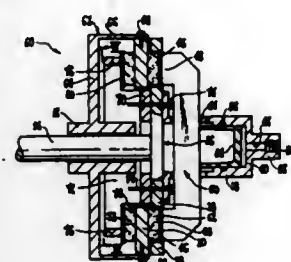
3 Claims



4,792,029

## CLUTCH ARRANGEMENT

Axel G. Andre, 19 Brougham Avenue, Croydon, Victoria, Australia  
 PCT No. PCT/AU85/00074, § 371 Date Dec. 5, 1985, § 102(e)  
 Date Dec. 5, 1985, PCT Pub. No. WO85/04696, PCT Pub.  
 Date Oct. 24, 1985  
 PCT Filed Apr. 4, 1985, Ser. No. 808,450  
 Claims priority, application Australia, Apr. 5, 1984, PG4424  
 Int. Cl.<sup>4</sup> F16D 13/60, 19/00  
 U.S. Cl. 192—85 AA 21 Claims



1. A clutch arrangement for co-axial shaft members including a drive or input shaft member and a driven or output shaft member; the arrangement having a disc concentrically mountable on one of the shaft members for rotation with the one shaft member; a plate member mountable on the other shaft member for rotation therewith and so as to extend at least diametrically of the other shaft member in substantially parallel relation with the disc, the plate member having at least two openings there-through each axially in line with the disc; a respective axially extending, force applying arm located in each said opening of the plate member and each having an end thereof projecting from its opening beyond a face of the plate member remote from the disc; a frame member located adjacent said remote face of the plate member and having integrally inter-connected radially extending arms, each arm of the frame member being integral with a said end of a respective force applying arm such that the frame member rigidly interconnects each of the force applying arms; and a plurality of pairs of friction pads angularly spaced circumferentially of the disc, the pads of each pair being operatively mounted adjacent respective faces of the disc and axially in line with a respective said force applying arm such that on application of an axial force to the frame member, each axially extending force applying arm is movable with the frame member in the direction of said force to directly engage one pad of its pair and to cause the other pad of its pair to react against an associated backing means so that the pads of each pair move relative to the disc from one to the other of two relative positions, in a first of which positions the pads of each pair grip the disc, and in the second of which positions the pad releases the disc; the disc being rotatable with each of the plate member, the force applying arms and the frame member with the pads in their first position, and rotatable relative to each of the plate member, the force applying arms and the frame member with the pads in their second position.

4,792,030

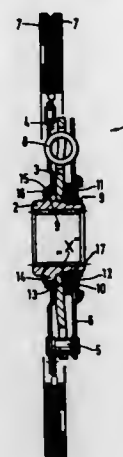
## HUB FOR CLUTCH DISCS OF FRICTION CLUTCHES IN MOTOR VEHICLES

Lothar Huber, Bühl, and Hermann Langeneckert, Appenweiler, both of Fed. Rep. of Germany, assignors to Luk Lamellen und Kupplungsbau GmbH, Bühl, Fed. Rep. of Germany  
 Continuation of Ser. No. 825,460, Feb. 3, 1986, abandoned. This application Apr. 15, 1987, Ser. No. 38,432  
 Int. Cl.<sup>4</sup> F16D 3/14

U.S. Cl. 192—106.2 23 Claims

1. A composite structural element, particularly a hub for a clutch disc for use in a friction clutch of a motor vehicle, comprising an annular female component; a male component extending through said female component and having first and

second shoulders flanking said female component to hold said components against axial movements relative to each other, said male component including at least one upset portion which defines one of said shoulders; and means for transmitting torque between said components, including protuberances provided on at least one of said components and extending substantially radially of said female component, and other of



said components having sockets for said protuberances, said sockets and said protuberances cooperating with said shoulders to rigidly connect said components to each other and to hold said components against angular movement relative to each other and said sockets being defined by portions of said other component which are displaced by and disposed between said protuberances.

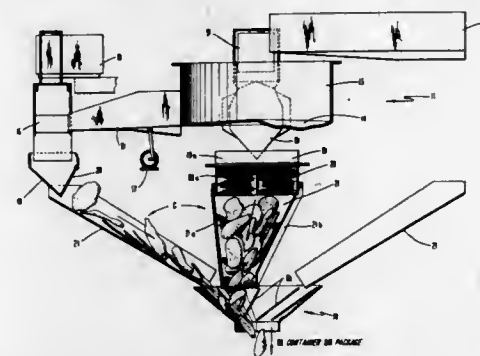
4,792,031

## FILLER COLLAR FOR MULTIPLE SCALE WEIGHING SYSTEM

William L. Warner, Grayson, and William A. Hadden, Conyers, both of Ga., assignors to Kliklok Corporation, Decatur, Ga.  
 Filed Sep. 21, 1983, Ser. No. 534,576  
 Int. Cl.<sup>4</sup> B65G 11/00

U.S. Cl. 193—2 R

14 Claims



1. An improved product filler collar, comprising: an upper funnel portion having a substantially continuous surface for receiving multiple charges of bulk solid product; a neck portion connected to said funnel portion and defining a mouth; and guide ribs disposed in spaced relationship along an inner surface of said funnel portion, said ribs effectively and efficiently directing and controlling product flow from a

plurality of separate sources to eliminate bridging and swirling and decrease the residence time of the charges within the filler collar.

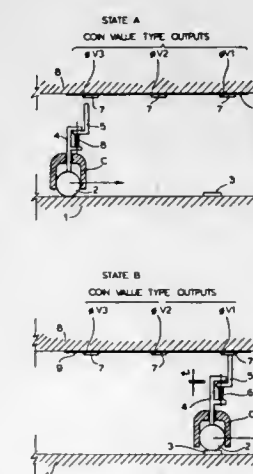
4,792,032

## MECHANICAL TIMING DEVICE ELECTRONIC UPGRADING MECHANISM

Sol Shapiro, Willowdale, Canada, assignor to Systron Electronic Systems Inc., Downsview, Canada  
 Filed Jun. 27, 1986, Ser. No. 879,341  
 Int. Cl.<sup>4</sup> G07F 5/10

U.S. Cl. 194—243

10 Claims



1. A timing device incorporating electronic upgrading means the timing device having a coin track, having alternative abutting cam surfaces on said coin track, and a clock winding pawl carried by a coin carriage mechanism of a coin carrier mechanism, the timing device further comprising an electrical coin sensing means which is spaced from the cam surfaces a first distance and spaced from the coin track a second distance for detection of actuation of said clock winding pawl carried by the coin carriage mechanism of said coin carrier mechanism; the cumulative dimension of the diameter of a coin and the winding pawl, being greater than said first distance and less than said second distance, wherein the actuation of said clock winding pawl is caused by a coin placed in said coin carriage mechanism and wound into contact with the alternative abutting cam surfaces disposed within the timing device, such abutment of the coin and the alternative abutting cam surfaces raising the winding pawl and providing an electrical contact between said winding pawl and said electrical coin sensing means, the coin sensing means having at least one contact thereon, each contact dedicated to the denomination of a coin; wherein said electrical coin sensing means is connected to a programmable electronic digital timing control and display device, whereby the electronic upgrading means which is installed within the timing device thereby provides clocking and flagging functions within said timing device.

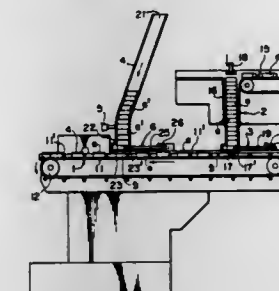
4,792,033

## APPARATUS AND METHOD FOR SUPPLYING ARTICLES TO A CONVEYOR

Yasuo Iwata; Osamu Tokunaga; Hisasi Kuga, all of Chiba, and Toshikide Kohata, Tokyo, all of Japan, assignors to Tokyo Automatic Machinery Works, Ltd. and Japan Tobacco Inc., both of Tokyo, Japan  
 Filed Dec. 15, 1987, Ser. No. 133,351  
 Claims priority, application Japan, Dec. 25, 1986, 61-312565  
 Int. Cl.<sup>4</sup> B65G 43/00

U.S. Cl. 198—357

14 Claims



1. A method for supplying articles to a conveyor comprising the steps of:  
 (a) feeding primary articles from a primary supply, seriatim, to a conveyor;  
 (b) driving said conveyor at a first speed consistent with the rate at which primary articles are fed to the conveyor so that primary articles are uniformly spaced on said conveyor;  
 (c) detecting the presence of a predetermined number of supply articles in a supplemental supply;  
 (d) increasing the speed of said conveyor to produce space on said conveyor sufficient to receive said predetermined number of supplemental articles; and  
 (e) feeding said predetermined number of supplemental articles, seriatim, to said conveyor so that said supplemental articles are uniformly spaced on the conveyor with the same spacing as the primary articles on the conveyor.

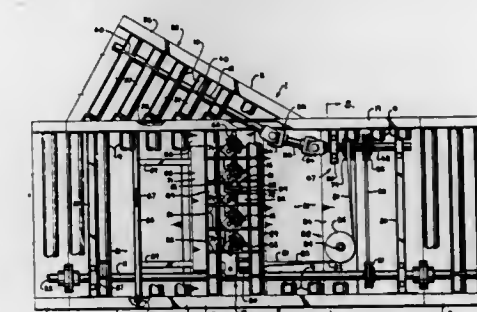
4,792,034

## TWISTED FLAT BELT DRIVE FOR LINE SHAFT CONVEYORS

Hendrik Leemkull, Pickerington, Ohio, assignor to Versa Corporation, Mount Sterling, Ohio  
 Continuation-in-part of Ser. No. 769,421, Aug. 26, 1985, abandoned. This application May 7, 1987, Ser. No. 47,906  
 Int. Cl.<sup>4</sup> B65G 47/46

U.S. Cl. 198—372

26 Claims



1. A twisted flat belt drive mechanism to transfer rotation from one shaft to another shaft, said mechanism comprising:  
 (a) a first shaft supported to rotate about a first shaft axis of rotation;

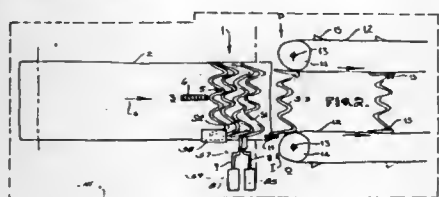


- (b) a second shaft supported to rotate about a second shaft axis of rotation, said second shaft being oriented nonparallel to said first shaft;
- (c) motor means drivingly connected to said first shaft to rotate same;
- (d) a pair of idler rollers supported generally between said first and second shafts to rotate about a common idler axis of rotation; and
- (e) an endless flat belt forming opposite end loops connected by opposite runs of said belt, said end loops drivingly engaging said first and second shafts respectively to transfer rotation from said first shaft to said second shaft, and said runs of said belt engaging respective ones of said idler rollers intermediate said end loops to change the direction of said belt in passing from said first shaft to said second shaft; and wherein
- (f) said flat belt has an inner surface and an opposite outer surface; and
- (g) said runs of said belt are twisted as said runs approach said idler rollers such that only said outer surface engages both of said idler rollers.

**4,792,035**  
**COIL SPRING FEEDING APPARATUS OR MACHINE**  
 Herbert E. Turner, and Lynn C. Turner, both of Auckland, New Zealand, assigns to Frank L. Wells Company, Kenosha, Wis.

Filed Jul. 24, 1981, Ser. No. 286,698  
 Int. Cl.<sup>4</sup> B65G 37/00  
 U.S. Cl. 198—463.6

17 Claims



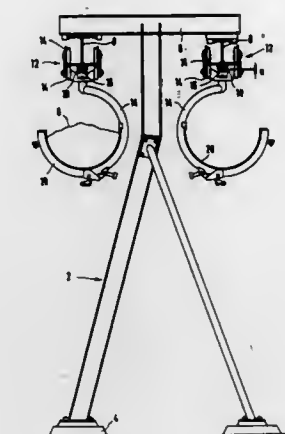
1. A coil spring feeding device for mattress frame springs, said device including a first conveyor adapted for moving springs along a path toward a pickup position, a stop spear and a separator spear mounted, with respect to the path of coil spring movement, upstream of said pickup position, said stop spear and separator spear being selectively moveable into and out of said path, said stop spear and separator spear having tips thereof substantially spaced from one another a predetermined distance, magnetic holding means located stationarily in said pickup position for releasable one-at-a-time holding of the coil springs, and a second conveyor including picker means for engaging the opposite ends of a coil spring releasably held by said holding means and for stripping the coil spring from the holding means, said second conveyor extending from said pickup position such that said first conveyor moves the springs along said path to against said stop spear located in said path, said separator spear thereafter moving into said path to trap a spring between said spaced tips, whereupon said stop spear withdraws from the path and the previously trapped spring is magnetically attracted to said holding means in the pickup position where the spring is releasably held until stripped therefrom by said picker means of said second conveyor, said stop spear thereafter again moving into said path and said separator spear withdrawing from said path so as to commence another cycle.

**4,792,036**  
**TRANSPORTING DEVICE OF THE CONVEYOR BELT TYPE**

Götz Heidelberg, Am Hügel 16, D-8136 Percha, Fed. Rep. of Germany  
 Continuation of Ser. No. 662,269, Oct. 18, 1984, abandoned.  
 This application Jun. 26, 1987, Ser. No. 68,817  
 Claims priority, application Fed. Rep. of Germany, Oct. 20, 1983, 3338199

Int. Cl.<sup>4</sup> B65G 35/00  
 U.S. Cl. 198—619

8 Claims



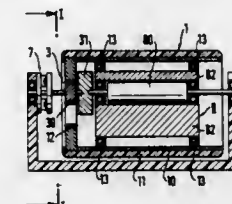
1. In a transporting device for transporting material along a transport path, comprising individual transporting belt sections for accommodating the material to be transported, a plurality of trolleys equipped with wheels and movable along the transport path for carrying the transporting belt sections, said trolleys being spaced in the longitudinal direction of the transport path and provided for each transporting belt section, and electric driving means for driving the trolleys along the transport path, the improvement comprising:

belt support means suspended from the individual trolleys and including upwardly concave belt support portions for supporting the respective transporting belt sections; connecting bars provided between the belt support portions of the belt support means extending in the longitudinal direction of the respective transporting belt section underlying the belt sections along the transport path, said connecting bars being effective for limiting belt sag between adjacent of said belt support means; and said electrical driving means is operative as a synchronous linear motor comprising a traveling wave stator arranged at the transport path and attracting permanent magnets arranged in series on the trolleys below and opposite the traveling-wave stator with an air-gap between the traveling-wave stator and the pole faces of the attracting permanent magnets, the attracting permanent magnets being held at said air-gap space from the traveling-wave stator by means of the trolley wheels being relieved in response to the attracting magnetic forces between the permanent magnets and the traveling-wave stator, from at least a substantial part of the carrying forces arising in the weight of the respective transporting belt section and the material to be transported.

**4,792,037**  
**DRIVE ROLLER UNIT**  
 Thomas Haber, Iffeldorf, Fed. Rep. of Germany, assignor to Bavaria Cargo Technologie GmbH, Munich, Fed. Rep. of Germany  
 Filed Feb. 25, 1988, Ser. No. 160,427  
 Claims priority, application Fed. Rep. of Germany, Jul. 21, 1987, 3724126

Int. Cl.<sup>4</sup> B65G 13/06  
 U.S. Cl. 198—788

12 Claims



1. In a drive roller unit for driving an article on a conveyor track, comprising a drive roller having a gear means thereon, an electric motor means operable to drive the drive roller in rotation, a transmission means connecting the electric motor means to the drive roller and including a drive gear adapted to be driven by the electric motor means and meshing with said gear means non-rotatably disposed on the drive roller, and means for displacing the roller relative to a base means between a lowered rest position and a raised drive position in which it is in engagement with the underside of a said article to be driven, the axis of rotation of the drive gear being stationary relative to said base means, the improvement that the drive roller is substantially in the form of a hollow circular cylinder, the electric motor means and the transmission means are disposed in the interior of the hollow-cylindrical drive roller, the electric motor means has a rotor coupled to the drive gear for driving same, the electric motor has a stator arrangement providing a circular-cylindrical outside circumferential surface which is arranged in eccentric relationship with respect to the axis of rotation of the drive gear and surrounds the rotor, thereby to provide said means for displacing the roller between its rest and operative positions, the hollow-cylindrical drive roller is mounted rotatably on said outside circumferential surface of said stator arrangement concentrically relative thereto, and disposed non-rotatably on the inside of the hollow-cylindrical drive roller and in concentric relationship therewith is an internal ring gear forming said gear means meshing with the drive gear which is eccentric with respect thereto and adapted to be driven thereby in the same direction.

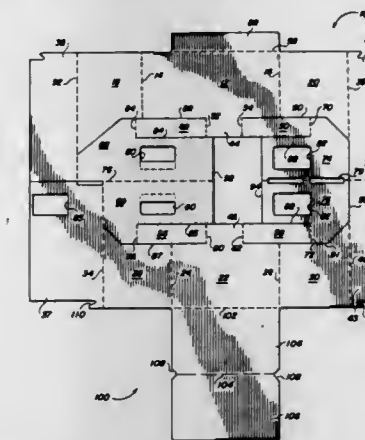
**4,792,038**  
**BASKET-TYPE CARRIER FOR ARTICLES OF VARIOUS SIZES**  
 Leonard M. Cooper, West Monroe, La., assignor to Manville Corporation, Denver, Colo.  
 Filed Nov. 30, 1987, Ser. No. 126,519  
 Int. Cl.<sup>4</sup> B65D 75/00

U.S. Cl. 206—180

12 Claims

1. A basket-type article carrier, comprising:  
 a bottom panel having side edges;  
 side panels foldably connected to the side edges of the bottom panel, the side panels having end edges;  
 end panels foldably connected to the end edges of the side panels;  
 riser panels connected to the end panels centrally of the end panels;  
 a center support panel connected to and extending between the riser panels;  
 at least one partition strap extending between the center support panel and each side panel to divide the carrier on either side of the center support panel into cells for receiving articles to be carried, the cells having a depth corre-

sponding to the distance between the center support panel and the side panels and a width corresponding to the distance between the end panel and the partition straps nearest thereto;  
 the partition straps being connected by fold lines to the center support panel and to the associated side panel; and

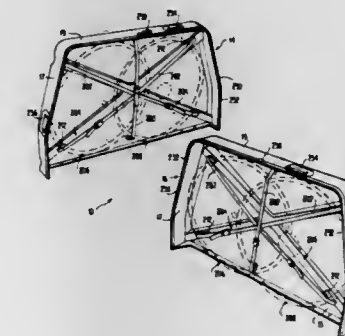


the distance between one of the end panels on one side of the center support panel and the nearest partition strap being substantially less than the distance between one of the end panels on the other side of the center support panel and the nearest partition strap, whereby one of the cells of the carrier is substantially wider than other cells of the carrier.

**4,792,039**  
**CARRIER FOR STORING AND TRANSPORTING A BICYCLE**  
 Lynford Dayton, P.O. Box 24, Terryville, Conn. 06787  
 Filed May 11, 1987, Ser. No. 48,426  
 Int. Cl.<sup>4</sup> B65D 85/68

U.S. Cl. 206—304

13 Claims



1. A bicycle carrier for storing and transporting a partially disassembled bicycle with its wheels disconnected from its frame, said frame having a front fork portion, a rear end portion and a sprocket portion, said carrier comprising:  
 an enclosure which includes a base section, a left side section, and a right side section;  
 said base section being generally rigid and horizontal;  
 frame-mounting means on the base section for detachably

mounting the bicycle frame in an upright orientation, the frame-mounting means including a forward frame-engaging means for engaging the front fork portion of the bicycle frame, a rear frame-engaging means for engaging the rear end portion of the bicycle frame, and a swinging means pivotally mounted on the base section and supporting one of said frame-engaging means to permit different spacings between the forward and rear frame-engaging means;

said left side section being rigid and having a vertical sidewall;

said right side section being rigid and having a vertical sidewall;

means for detachably and pivotally connecting each of the side sections to the base section; and

wheel-mounting means on at least one of the sidewalls for detachably mounting at least one bicycle wheel thereon.

**4,792,040**  
**COMBINATION MOTORCYCLE COVER AND RAIN GEAR WITH STORAGE POUCH**  
 Henry C. Wagstaff, III, 28 McFall Rd., Apalachin, N.Y. 13732  
 Filed Oct. 2, 1987, Ser. No. 103,608  
 Int. Cl.<sup>4</sup> A41D 3/00; B60J 11/00; B62J 19/00; A45C 15/00  
 U.S. Cl. 206—223 10 Claims



1. A new and improved combination motorcycle cover and rain gear, comprising:

storage pouch means;

a first storage compartment means on a first side of said storage pouch means;

a second storage compartment means on a second side of said storage pouch means;

motorcycle cover means formed from a flexible material folded within said first storage compartment means, and attached thereto; and

a rain suit formed from a flexible material folded within said second storage compartment means, and attached thereto.

**4,792,041**  
**SHIPPING CONTAINER FOR OUTBOARD MOTOR**  
 John M. Grigby, Marietta, Ga., assignor to North American Container Corporation, Mableton, Ga.  
 Filed Dec. 1, 1987, Ser. No. 126,659  
 Int. Cl.<sup>4</sup> B65D 85/68

U.S. Cl. 206—319 20 Claims

1. A container for supporting a large outboard motor during shipment, comprising:

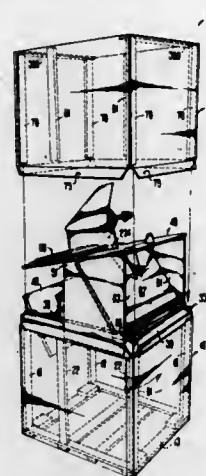
a bottom box to enclose the powerhead end of the motor;

a frame connected to the lower end of the bottom box;

a motor mount frame connected to the upper end of the bottom box, adapted to receive and support the motor;

a gear case pad having a pair of depending side wings which connect the gear case pad to the motor mount frame;

an exhaust housing pad extending at an angle upwardly from the motor mount frame towards the gear case pad; and

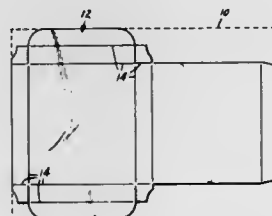
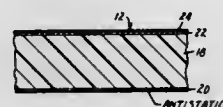


a top box to cover the gear case pad, the top box connected at its lower end to the upper end of the bottom box.

**4,792,042**  
**TRANSPARENT BOX FOR PROTECTING AGAINST DAMAGE FROM ELECTROSTATIC DISCHARGE AND SHEET MATERIAL TO BE CUT INTO A BOX BLANK FOR FORMING SAME**  
 Stephen C. Koehn, Round Rock, and Ricky A. Plantz, Georgetown, both of Tex., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
 Filed Nov. 24, 1987, Ser. No. 124,984  
 Int. Cl.<sup>4</sup> B65D 81/24

U.S. Cl. 206—328

25 Claims



1. A sheet material adapted to be cut into a box blank adapted to be formed into a box to protect electronic components from electrostatic discharge by folding said box blank along fold lines in said box blank, comprising:

an electrically insulating, transparent, polymeric sheet;

a continuous, transparent, electrically conductive layer disposed on at least one surface of said polymeric sheet;

said polymeric sheet having grooves on a first surface of said box blank forming said fold lines;

said sheet material, when cut into said box blank and folded into said box, having sufficient stiffness to enable said box to hold its shape.

13. A box for protecting electronic components from electrostatic discharge, formed from a box blank comprising:

an electrically insulating, transparent, polymeric sheet;

a continuous, transparent, electrically conductive layer disposed on at least one surface of polymeric sheet;

said polymeric sheet having grooves on first surface of said box blank forming said fold lines;

said box blank, when folded into said box, having sufficient stiffness to enable said box to hold its shape.

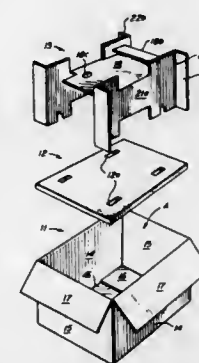
**4,792,043**  
**SHIPPING UNIT FOR NON-RIDING LAWN MOWER OR THE LIKE**

John T. Holladay, Pinson, Tenn., assignor to Packaging Corporation of America, Evanston, Ill.

Filed Feb. 1, 1988, Ser. No. 150,997  
 Int. Cl.<sup>4</sup> B65D 81/16

U.S. Cl. 206—349

7 Claims



1. A shipping unit for a product such as a non-riding mower having a collapsible handle, said unit comprising an outer container formed of corrugated fibreboard material for accommodating the mower with the handle thereof in a collapsed mode, said outer container including a bottom section, side sections extending upright from the periphery of said bottom section and adapted to embrace the accommodated mower, and closure means disposed at upper portions of said side sections for overlying the accommodated mower; a base pad disposed within said outer container and supportingly engaged by said bottom section, said base pad and bottom section being in substantially coincident relation; and an inner packing of unitary construction for engaging and stabilizing the accommodated mower, said inner packing being formed of corrugated fibreboard material, and including a central segment in spaced overlying relation with said base pad, and opposed upright side segments angularly disposed relative to said central segment and extending substantially upwardly from said base pad to said closure means when the latter is disposed in overlying relation with respect to the accommodated mower, each side segment including a first portion recessed from an adjacent side section, and second portions extending angularly from opposed peripheral segments of said first portion, each second portion spanning the distance between said first portion and the adjacent side section of said outer container.

**4,792,044**  
**MAGNETIC TAPE PANCAKE PACKAGE**  
 Yoshito Nishizawa, and Shigeo Kamata, both of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Japan  
 Continuation of Ser. No. 888,361, Jul. 23, 1986, abandoned. This application Dec. 28, 1987, Ser. No. 140,940  
 Claims priority, application Japan, Aug. 2, 1985, 60-118895[U]

Int. Cl.<sup>4</sup> B65D 85/67

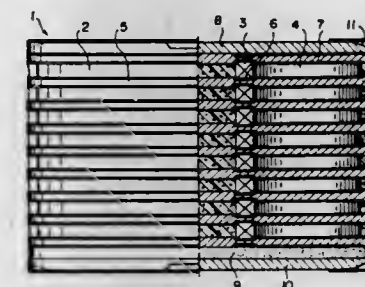
U.S. Cl. 206—394

6 Claims

1. A magnetic tape pancake package for stacking a plurality of magnetic tape pancakes which each include a hub having a width slightly larger than the width of a magnetic tape, the

magnetic tape having a predetermined length, the magnetic tape being wound around the hub, said magnetic tape pancake being adapted for stacking in the axial direction of the hub, wherein the improvement comprises a plurality of spacers, one disposed between each of said magnetic tape pancakes to form a stack, additional spacers being disposed at the top and bottom of said stack, each of said spacers having a body with a disk-like shape having a diameter larger than corresponding diameters of said magnetic tape pancakes and having an annular recess at a predetermined radial location on both sides of said disk;

each said annular recess being disposed to snugly receive the hub of one of said plurality of magnetic tape pancakes so as to prevent lateral movement thereof relative to each respective said spacer when in a stack;



each said annular recess being shallower than half the width of said hub such that, when in a stack, adjacent ones of said spacers are spaced apart such that neighboring ones of said spacers in said stack are not in supporting contact; each of said spacers in said stack, other than the bottom most spacer, being substantially entirely supported by an adjacent lower one of said plurality of magnetic tape pancakes;

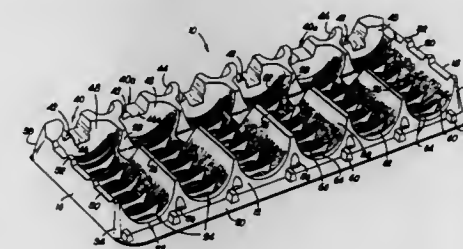
each said spacer, in a region radially outward of said annular recess, having a substantially flat region which, when said spacer is in said stack, closely contacts the magnetic tape of an adjacent one of said magnetic tape pancakes to prevent disturbance of the winding of the magnetic tape; said magnetic tape pancakes, when in a stack with said spacers, being wrapped snugly with a film.

**4,792,045**  
**FLUORESCENT TUBE DUNNAGE**  
 David E. Creaden, Lawrence, Kans., assignor to The Lawrence Paper Company, Lawrence, Kans.  
 Continuation of Ser. No. 895,507, Aug. 11, 1986, Pat. No. 4,705,170. This application Sep. 8, 1987, Ser. No. 93,712  
 The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B65D 85/42

U.S. Cl. 206—419

7 Claims



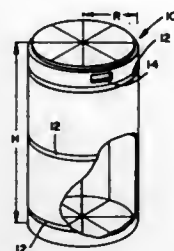
1. A fluorescent tube support comprising:

an integral body formed from thin synthetic resin sheet



material, said body having generally concavo-convex walls presenting a number of elongated, open-top, parallel, juxtaposed concave tube-receiving regions with corresponding convex underside wall surfaces and elongated, axially extending top walls between adjacent tube-receiving regions, each of said generally concavo-convex walls including a wall section for engaging a fluorescent tube disposed immediately below the corresponding tube-receiving region, the thickness of said top walls being greater than the thickness of said wall sections; and spacer means carried by said tube support for preventing complete nesting of plural supports and to define substantially uniform, elongated, laterally extending spaces between adjacent interfitted supports for insertion of automatic dispensing equipment therebetween.

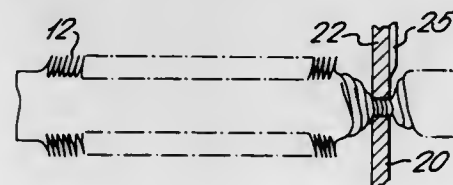
**4,792,046**  
**CONTAINER FORMED FROM FLAT SHEET OF FOAM PLASTIC**  
Paul A. Taylor, 979 Woodland Ave., San Leandro, Calif. 94597  
Filed Sep. 24, 1987, Ser. No. 100,403  
Int. Cl. A B65D 8/04  
U.S. Cl. 206—523 3 Claims



1. A cylindrical container formed from a generally flat sheet of foamed plastic material comprising:
  - (a) a three dimensional sheet of foamed plastic material having a length dimension determined by the outer circumference of the container to be formed from said sheet, a width dimension determined by the height of the container to be formed from said sheet, and a depth dimension determined by the radius of the cylindrical container to be formed from said sheet,
  - (b) said depth dimension of said sheet being formed into a plurality of triangular end sectors with the sides of said sectors having a dimension equal to the radius of said cylindrical container to be formed,
  - (c) said triangular sectors being formed at the width dimension of said sheet and at each side of said sheet of foamed plastic material,
  - (d) said sectors being identical isosceles triangular sector forms with the legs thereof being said radius of said cylindrical container and the arcuate base being an arc of said circumference of said container to be formed,
  - (e) the number of said triangular sectors being determined by the flexibility of said foamed plastic material and the total base dimension of said sectors being said length of said sheet of foamed plastic material,
  - (f) said triangular sectors having a finite dimension parallel to said width dimension of said sheet at each side of said sheet,
  - (g) said sides of said triangular sectors being in engagement with each other along said finite dimension to form a complete top and complete bottom for said cylindrical container when so formed,
  - (h) said triangular sectors along said finite dimension including,
    - a tongue extension along one side leg of said sectors,

- a cutout portion defining a groove along the opposite legs of said sectors,
- and a tongue and a groove on opposite legs of adjacent sectors adapted to mate with each other when said sectors are folded against each other to form a complete cylindrical container,
- (i) the surface of said generally flat sheet on the side thereof having said sectors being formed with a groove extending the width of said sheet at the intersection of said legs of adjacent sectors and the base thereof, said grooves being adapted to permit said sector legs to engage each other to form said complete top and bottom of said cylindrical container,
- (j) said generally flat sheet of plastic material containing mating formed surfaces at said length ends of said three dimensional sheet, said mating surfaces including a cutout portion at one end and a protruding portion at the other end, said portions adapted to mate with each other to form said generally flat sheet into said cylindrical container form,
- (k) and the outside surfaces of said sectors in said width dimension being formed with an indented portion at one end and protruding portion at the other end, said indented and protruding portions being adapted to mate with similarly formed portions of other similarly formed cylindrical containers when aligned end-to-end at said outside surfaces.

**4,792,047**  
**PROCESS OF FORMING AN END CLOSURE**  
John D. Wood, Jason R. Ware, and Alan N. Syrop, all of Cambridge, England, assignors to Devro, Inc., Somerville, N.J.  
Filed Oct. 9, 1984, Ser. No. 659,059  
Claims priority, application European Pat. Off., May 10, 1984, 84303163.4  
Int. Cl. A A22C 13/00; B65D 85/08  
U.S. Cl. 264—138 7 Claims

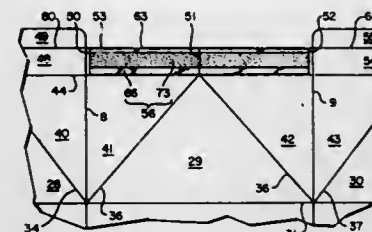
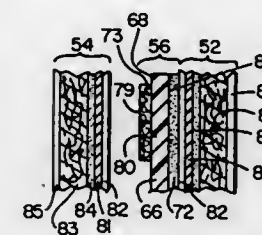


1. A process of forming an end closure for a stick (10) of shirred tubular collagen food casing, the process comprising twisting the free end (14) of the casing to form a neck (16) and heating the neck (16) of twisted casing to a temperature in the range of 40° C. to 200° C. and pressing the neck (16) to form a seal.

**4,792,048**  
**GABLE-TOP CONTAINER**  
Gregory R. Wyberg, St. Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Continuation-in-part of Ser. No. 036,922, Apr. 10, 1987. This application Dec. 14, 1987, Ser. No. 132,157  
Int. Cl. A B65D 5/70  
U.S. Cl. 206—631.3 22 Claims

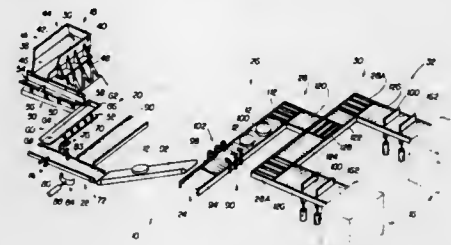
1. A sheet material blank for constructing a sealed gable-top container with a thermoplastic inner surface coating responsive to a container sealing process, said blank comprising:
  - (a) a container body having sides, a bottom and a top;
  - (b) an extensible pouring spout including a substantially triangular end panel connected to said container body top, first and second foldback panels, said first foldback panel connected to said container body top and to at least one lateral edge of said first triangular end panel, and said

- second foldback panel connected to said container body top and to the other lateral edge of said triangular end panel, a first roof wing panel adjoining said first foldback panel and connected thereto, a second roof wing panel adjoining said second foldback panel and connected thereto; and
- (c) at least one stiffening fillet overlying a portion of and bonded to the inner surface of at least one of said pouring spout panels for simultaneously stiffening said overlain panel to transfer applied opening forces therealong for opening at a controlled low opening force, said fillet comprising:



- a strip of material resistant to the temperature and pressure of said container sealing process;
- a first layer of adhesive attached to a first surface of said strip and to said inner surface of said at least one said panel for bonding said strip thereto; and
- an adhesive web including a controlled release adhesive delaminably attached to the opposite surface of said strip and adapted to bond by said container sealing process to another of said pouring spout panels wherein said opening forces transmitted along said strip delaminate said adhesive web from said opposite surface of said strip.

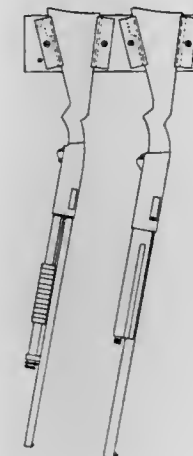
**4,792,049**  
**SYSTEM AND PROCESS FOR SORTING AND CONVEYING ARTICLES**  
Dennis W. Janolck, and John I. Schneider, both of Louisville, Ky., assignors to Carrier Vibrating Equipment, Inc., Louisville, Ky.  
Filed Dec. 22, 1986, Ser. No. 943,955  
Int. Cl. A B07C 5/00  
U.S. Cl. 209—556 18 Claims



1. A system for sorting and conveying articles consisting of

- discarded tires and debris of various sizes from one site to at least one delivery site comprising:
- means for receiving articles in bulk and dispensing articles therefrom;
- conveyor means for receiving articles from the bulk receiving means and singularizing, separating the articles, and conveying the articles away from the bulk receiving means to the at least one delivery site;
- means for measuring at least one dimension of the articles;
- ejector means operatively associated with the measuring means for ejecting articles having a measured dimension outside a predetermined range;
- means for accumulating the articles into groups of a predetermined size; and,
- means for controlling the discharge of article groups from the system to the at least one delivery site.

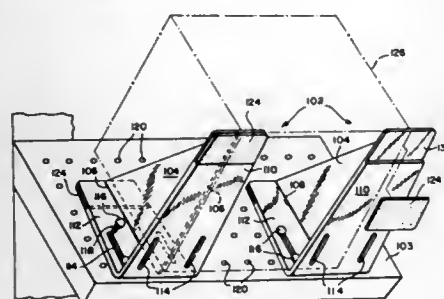
**4,792,050**  
**GUN RACK**  
Glen D. Allen, 7709 Flintrock Rd., North Little Rock, Ark. 72116  
Filed Feb. 22, 1988, Ser. No. 158,796  
Int. Cl. A A47F 7/00  
U.S. Cl. 211—64 1 Claim



1. A gun rack for hanging guns comprised of a rectangular base plate on which are mounted wedge shaped pieces by means of bolts having lock nuts, said rectangular base plate of determined thickness drilled to receive screws for mounting said plate, additionally drilled to receive first and second wedge mounting bolts, drilled round hole to receive said first bolt, slotted on back to form recess for said first bolt head, said recess to prevent bolt from turning and to be at a depth and width equal to the height and width of the bolt head, elongated hole and elongated recess for said second wedge mounting bolt for width adjustment between said bolts, said bolts threaded ends extending outward 90 degrees from said plate for supporting wedge pieces, said first bolt supporting first and second wedge piece, said second bolt supporting third and fourth wedge pieces, said first and second wedge pieces being rectangular in shape of determined thickness having notch cut at top face side to receive rifle sling swivel, having a felt covered angled surface at one corner cut from said notch to bottom end and drilled for mounting on said first bolt, said pieces joining face to face, their respective angled surfaces forming first one-half of a gunstock shape conforming dovetail wedge, third wedge piece and fourth wedge pieces being rectangular in shape of determined thickness having a felt covered angled surface at one corner cut from bottom end to top end and drilled for mounting on said second bolt, said fourth wedge piece being rotated 180 degrees about its horizontal axis and joined face to face with said third wedge piece their respective

angled surfaces forming second one-half of the said dovetail wedge, said bolt ends and said nuts being capped with previously fired shell casings cut to required length, a plurality of said dovetail wedges being made in manner described, said base plate being of determined length to accommodate plurality of said dovetail wedges.

**4,792,051**  
**REVERSIBLE SHELF DIVIDER**  
 Byron R. Miller, Springboro, Ohio, assignor to The Mead Corporation, Dayton, Ohio  
 Filed Feb. 11, 1988, Ser. No. 154,700  
 Int. Cl.<sup>4</sup> A47F 5/00  
 U.S. Cl. 211-184 7 Claims

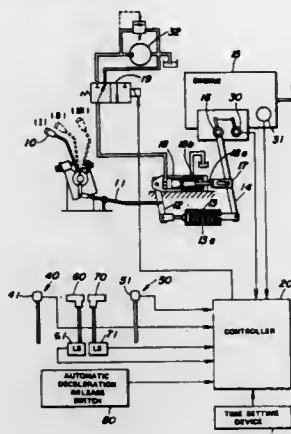


1. A reversible shelf divider comprising: a divider member having a length edge of a first dimension and a width edge of a second lesser dimension; a first combination slide/stop member connected to said length edge and extending at right angles thereto, said first combination slide/stop member extending the full length of said divider member and projecting on each side of said divider member; a second combination slide/stop member connected to said width edge and extending at right angles thereto, said second combination slide/stop member extending the full width of said divider member and projecting on each side of said divider member; and aperture means formed in both projecting sides of said first and second combination slide/stop members for receiving fastener means to secure either said first or said second combination slide/stop member to a shelf whereby said reversible shelf divider can present a stop height of either said first dimension or said second dimension.

**4,792,052**  
**APPARATUS FOR CONTROLLING THE NUMBER OF REVOLUTIONS OF AN ENGINE**  
 Junji Okada, Kazuo Hoshi, both of Hiratsuka; Kentaro Nakamura, Fujisawa, and Kazuo Kubo, Hiratsuka, all of Japan, assignors to Kabushiki Kaisha Komatsu Selsakusho, Japan  
 Filed Aug. 4, 1986, Ser. No. 893,013  
 Claims priority, application Japan, Dec. 17, 1985, 60-283768  
 Int. Cl.<sup>4</sup> B66C 15/00  
 U.S. Cl. 212-162 16 Claims

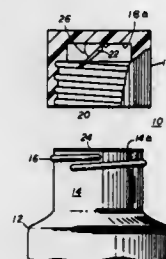
1. An apparatus for controlling the number of revolutions of an engine of a construction machine in which said engine is operated at a constant high speed when working is performed, comprising: a grip sensor including an electrical capacitance type proximity switch incorporated in a gripping portion of a control lever adapted to control actuation of a working tool on the construction machine, said sensor adapted to detect the approach of an operator of the construction machine toward the gripping portion of said control lever; control means for outputting a deceleration signal in response to an output signal from the grip sensor when the operator does not approach the gripping portion in order

to reduce the current number of revolutions of the engine to a level lower than the number of revolutions of the engine at said high speed; and



driving means for reducing the number of revolutions of the engine to a level of the last-mentioned lower one in response to the deceleration signal from said control means.

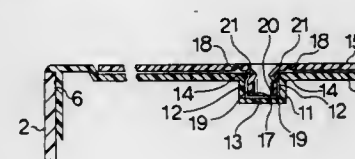
**4,792,053**  
**TAMPER-INDICATING CONTAINER WITH ANGULARLY MOVABLE TIME**  
 Edward J. Towns, Convent Station; Edward M. Brown, Livingston, both of N.J., and William M. Lester, Del Ray Beach, Fla., assignors to TBL Development Corporation, Livingston, N.J.  
 Filed Nov. 12, 1982, Ser. No. 441,112  
 Int. Cl.<sup>4</sup> B65D 53/04  
 U.S. Cl. 215-250 16 Claims



1. A tamper-indicating container comprising: (a) a vessel for article containment and having an access opening; (b) a closure member having means for supporting said closure member for first sense rotative movement relative to said vessel into securement therewith and in circumscribing relation to said access opening of said vessel and for second different rotative sense movement for release from such securement, said closure member providing visibility therethrough; (c) sealing means in secured relation to said access opening for closing same and including a telltale and; (d) means depending from an upper interior surface of said closure member and inaccessible therethrough for travel with said closure member relative to said telltale in engaged non-rupturing relation to said telltale in the course of said closure member first sense movement and for travel with said closure member in engaged rupturing relation to said telltale in the course of said closure member second different sense movement.

10. A container closure comprising: (a) a closure member having means for supporting said closure member for first sense rotative movement relative to a container into securement therewith and in circumscribing relation to an access opening of said container and for second different rotative sense movement for release from such securement, said closure member providing visibility therethrough; and (b) means dependent from an upper interior surface of said closure member and inaccessible therethrough for travel with said closure member and supported for deflection relative to said closure member in said first sense rotative movement of said closure and having orientation relative to said closure member for such deflection in said first sense movement of said closure member and for tearing a sealing member disposed across said container access opening in the course of said second different sense rotative movement of said closure member.

**4,792,054**  
**TAMPER-EVIDENT CLOSURE FOR DISPENSERS**  
 Craig C. Weidman, Wooster, Ohio, assignor to Weatherchem Corporation, Twinsburg, Ohio  
 Filed Aug. 13, 1987, Ser. No. 84,877  
 Int. Cl.<sup>4</sup> B65D 51/18  
 U.S. Cl. 222-23 6 Claims

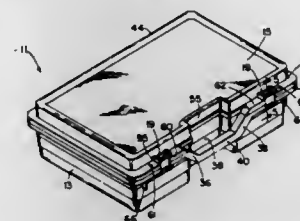


1. In a dispenser end closure having a hermetically sealed base, a rotor, means pivotally connecting the base to the rotor, the pivot means having an axis of rotation, the base and rotor having top surfaces; the base and rotor having webs with means defining respective dispensing apertures therein, the rotor dispensing aperture means being alignable with the base dispensing aperture means by pivotal movement of the rotor with respect to the base about the axis of the pivot means, said pivot means slidably retaining the base and rotor in a close superposed relationship, frangible means formed on at least one of said base, rotor and pivot means, the frangible means being adapted to tear when an attempt is made to separate the rotor and base, wherein said pivot means comprises a snap-fit pivotable connection between a female pocket formed in the base and an annular male protrusion formed in the rotor, the male protrusion having an opening through which a portion of the base radially inward of the pocket is visible.

**4,792,055**  
**SHIPPING CONTAINER FOR EDUCATIONAL MATERIALS AND THE LIKE**  
 Jay M. Schupack, Bellevue, Wash., and Alan Biggs, Victoria, Canada, assignors to Comprehensive Health Education Foundation, Seattle, Wash.  
 Filed Sep. 30, 1987, Ser. No. 102,880  
 Int. Cl.<sup>4</sup> A65D 25/28  
 U.S. Cl. 220-94 A 8 Claims

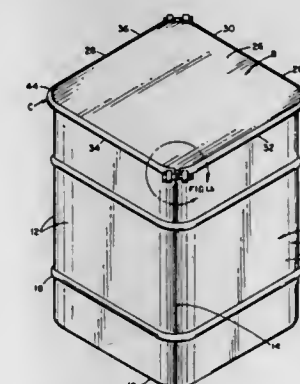
1. A container, comprising: a lower body portion, open at the top thereof, which defines a volume for placement of articles therein, the body portion including a first circumferential rib which extends outwardly from the exterior surface of the body portion in the vicinity of the upper edge thereof; an upper lid portion, movably secured to the body portion, forming a top for the body portion, said lid portion including a second circumferential rib in the vicinity of the lower edge thereof, wherein the first and second circum-

ferential ribs abut each other when the lid portion is closed on the body portion and have similar dimensions, wherein the body portion and the lid portion include an indented portion in the respective front walls thereof, extending substantially from the top to the bottom of the container;



means formed from an extension of the first circumferential rib extending across said indented portion, forming a handle for the container; and means for clamping the lid portion to the body portion.

**4,792,056**  
**DRUM AND CLOSURE APPARATUS**  
 Martin J. Tiernan, Solon, Ohio, assignor to Drum Parts, Inc., Cleveland, Ohio  
 Filed Nov. 20, 1987, Ser. No. 123,200  
 Int. Cl.<sup>4</sup> B65D 45/32  
 U.S. Cl. 220-320 5 Claims



1. A closure apparatus for an associated generally rectangular container having rounded corners, the associated container having an associated removable lid to allow filling and emptying of the associated container, the associated lid having peripheral edges that selectively mate with peripheral edges on the associated container, said closure apparatus comprising: first and second bands, each band having a first and second leg portion disposed in generally perpendicular relation and extending from and defining a first fully included rounded corner adapted for operative engagement with the peripheral edge of an associated container rounded corner, said first and second leg portion adapted for operative engagement with the peripheral edges of the associated container; first and second outer ends defined at distal portions of respective first and second leg portions, said outer ends disposed angularly inward from its respective leg portion at an angle approximately 45° and in the same plane as said first and second leg portions, said ends defining approximately one-half of second and third rounded corners; and means for selectively fastening said first and second bands together adapted to clampingly engage the associated container with the removable lid.



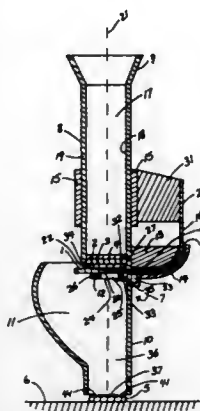
**4,792,057**  
**METHOD AND APPARATUS FOR DISPENSING FLAT DISCS**

Frank A. Miner, North Olmstead, and George J. Coghill, Bratenahl, both of Ohio, assignors to The Franklin George Co., Inc., Cleveland, Ohio

Filed Aug. 12, 1985, Ser. No. 764,765  
 Int. Cl.<sup>4</sup> B65G 59/00

U.S. Cl. 221—187

66 Claims



1. A dispenser for individual ones of flat discs onto a surface in proximity to a second adjacent disc of the same size and shape, comprising:

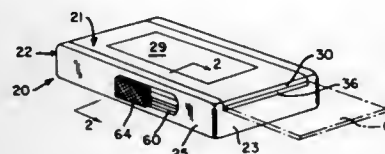
a housing having a passageway therein and having an opening at a bottom end of the passageway for chips to pass thereout onto a surface; and means, including multiple thin prongs distributed around the passageway opening, radially adjacent thereto and below the opening, and having underside faces to contact said surface, to space said housing above said surface when the prong faces are in contact with said surface, and having a substantial gap between adjacent ones of said prongs, with said gap having a vertical height greater than the thickness of the discs to be dispensed, and with sufficient distance between said adjacent prongs to allow the edge of said second adjacent disc to be in a partially overlapping relationship with said housing without contacting said housing when the prongs are in contact with said surface, and wherein the shortest distance between adjacent ones of said prongs is greater than the largest of any linear dimension of said surface contacting faces of said adjacent prongs.

**4,792,058**  
**BUSINESS CARD DISPENSER**  
 Robert J. Parker, 805 E. Moler Ave., Martinsburg, W. Va. 25401

Filed May 4, 1987, Ser. No. 45,474  
 Int. Cl.<sup>4</sup> B65D 83/12; B65H 1/04

U.S. Cl. 221—232

16 Claims



16. A dispensing apparatus for sequentially dispensing a plurality of cards such as business or calling cards comprising a case having a closure portion and a body portion, said body portion of said case having first and second end walls, spaced side walls and a bottom wall, an elongated slot formed along

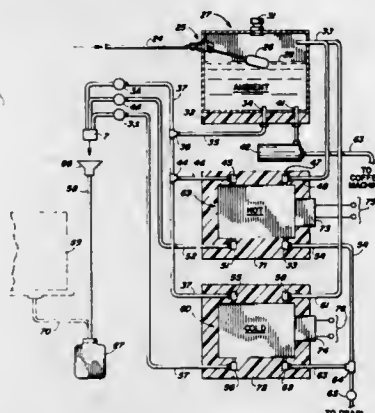
said first end wall of said base through which the cards are selectively dispensed, card support means movably housed within said body portion of said case and being of a size to extend substantially between said first and second end walls and said side walls thereof, guide means for securing said card support means within said body portion of said case, resilient means mounted between said card support means and said bottom wall for urging said card support means upwardly therefrom, an ejector means slideably disposed within said body portion of said case, said ejector means having a generally planar body portion which is slideably oriented with respect to and adjacent one of said side walls of said body portion, said ejector means including a depending ejector ledge which extends perpendicular from said body portion outwardly toward said opposite side wall of said body portion of said case and along said rear wall of said body portion of said case, an opening in said one of said side walls, push button means connected to said body portion of said ejector means through said opening in said one of said side walls, a first inwardly extending support means integrally formed with said one of said side walls adjacent said opening therein, said ejector means having a slotted opening in said body portion through which said support means is oriented, and at least one outwardly extending flange element integrally formed with said body portion and extending through said opening in said one of said side walls of said body portion of said case, and resilient means mounted over said support means and said flange element for urging said ejector means inwardly of said case.

**4,792,059**  
**SEALED HOT, COLD AND ROOM TEMPERATURE PURE WATER DISPENSER**  
 James M. Kerner, Chico; Carl Palmer, La Habra, and Kenneth A. Betts, Chico, all of Calif., assignors to United States Thermoelectric Corporation, Chico, Calif.

Filed Feb. 4, 1987, Ser. No. 10,772  
 Int. Cl.<sup>4</sup> B67D 3/00, 5/58, 5/62

U.S. Cl. 222—67

12 Claims



1. Apparatus for dispensing purified water, comprising in combination:

- (a) sealed holding tank means for holding water at room temperature and means for delivering purified water into the holding tank means;
- (b) a first delivery tube coupled between a first dispensing port and the holding tank means, and first valve means for controlling flow of water through the first dispensing port;
- (c) microfilter venting means for filtering minute bacteria, particles, and the like from any air vented into the holding tank;
- (d) sealed hot water tank means for heating and storing water;

- (e) a second delivery tube coupled between a second dispensing port and the hot water tank means, and second valve means for controlling flow of hot water through the second dispensing port;
- (f) first feed tube means for gravity feeding room temperature water from the holding tank means into the hot water tank means;
- (g) a first vent tube coupled between the top of the hot water tank means and the top of the holding tank means;
- (h) sealed cold water tank means for cooling and storing water;
- (i) a third delivery tube coupled between a third dispensing port and the cold water tank means, and third valve means for controlling flow of cooled water through the third dispensing port, the first, second, and third dispensing ports being below the level of water in the holding tank means;
- (j) second feed tube means for gravity feeding room temperature water from the holding tank means into the cold water tank means;
- (k) a second vent tube coupled between the top of the cold water tank means and the top of the holding tank means;
- (l) means for supporting the holding tank means above the hot water tank means and the cold water tank means, whereby purified water is isolated from airborne bacteria and other contaminants in the apparatus;
- (m) first, second, and third actuating buttons remote from the first, second, and third dispensing ports, and linking means for operatively connecting the first, second, and third actuating buttons to the first, second, and third valve means, respectively, wherein each of the first, second, and third valve means includes a section of flexible tubing and means for pinching off the section of flexible tubing, and wherein the linking means includes, for each actuating button, a spring engaging that button and deformable by depressing that button, an elongated linking member connected to the spring and the pinching means for pinching off the section of flexible tube when that button is not depressed, and for unpinching the section of flexible tube by depressing that button, wherein the first, second, and third buttons are disposed in a button recess in a front panel of a housing of the apparatus located above a dispensing recess, the first, second, and third dispensing ports being located at the top of the dispensing recess, the button recess having a lower surface having a slope of approximately fifteen degrees and limiting downward movement of the first, second, and third actuating buttons, each linking member extending directly downward from the corresponding actuating button to the corresponding pinching means.

**4,792,060**  
**DISPOSABLE OR REUSABLE CONTAINER FOR FLOWABLE MATERIAL**  
 Werner F. Brogli, Im Oberen Letten, CH-4202, Duggingen, Switzerland  
 Filed Jul. 21, 1986, Ser. No. 888,530  
 Claims priority, application Fed. Rep. of Germany, Jul. 22, 1985, 3526113

Int. Cl.<sup>4</sup> B65D 35/08

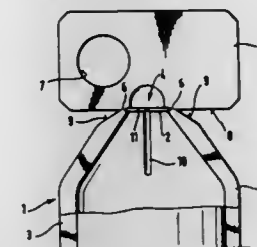
U.S. Cl. 222—107

3 Claims

1. A disposable and reusable container for flowable products in powdered, granular, liquid or other form, made from a single stiff but flexible blank of coated carton material which is formed by inwardly bulging a center section of the initially flat blank, and simultaneously raising and outwardly bulging oppositely disposed side sections of the flat blank and connectedly superimposing the side edges and flanges thereof so that at least at one location the superimposed side edges and flanges form at least one discharge opening which communicates with a normally closed separable tongue, characterized in that:

- a. said separable tongue is enlarged to form a gripping flange

- means in the area of the discharge opening for the container,
- b. said enlarged gripping flange means is formed with respect to the discharge opening width and the width of the superimposed flanges,
- c. said enlarged gripping flange means includes at least one



fingerhole therein to assist in separating the separable tongue from the container, and

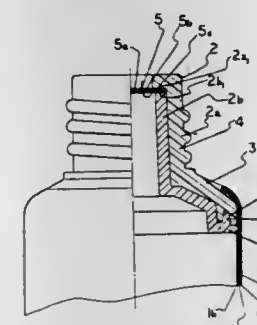
- d. at least one first groove is provided generally parallel to the longitudinal line of the container in at least one of the raised and outwardly bulging oppositely disposed side sections to facilitate the emptying of the container during use thereof.

**4,792,061**  
**COLLAPSIBLE TUBE WITH MEMBRANE CAP**  
 Hirotaka Nishida, Osaka, Japan, assignor to Taisei Kako Co., Ltd., Osaka, Japan  
 Filed Jun. 23, 1986, Ser. No. 877,526  
 Claims priority, application Japan, Nov. 19, 1984, 59-169975

Int. Cl.<sup>4</sup> B65D 35/08

U.S. Cl. 222—107

16 Claims



1. A collapsible tube, comprising:

- a cylindrical body formed of a laminated sheet, said laminated sheet including a metallic layer, an inside synthetic resin layer laminated onto an inside surface of said metallic layer and an outside synthetic resin layer laminated onto an outside surface of said metallic layer;
- a head formed of synthetic resin and including a shoulder member fixed on said cylindrical body and a mouth member integrally formed on said shoulder member and having an upper end opening, said head being formed of an inside layer member and an outside layer member bonded to said inside layer member outside of said inside layer member, one of said inside layer member and said outside layer member being formed of a waterproof synthetic resin material, the other of said inside layer member and said outside layer member being formed of a gas-impermeable synthetic resin material, said outside layer member having a receiving seat surface at said opening facing inward of said mouth member, said inside layer member

having an upper end surface facing outward of said mouth member;

a membrane cap closing said opening, said membrane cap being formed of a thin laminated sheet including an aluminum sheet having an inward surface facing inward of said mouth member and an outward surface facing outward of said mouth member, a synthetic resin film laminated on said outward surface of said aluminum sheet, and an adhesive resin film laminated on said inward surface of said aluminum sheet, a circumferential edge portion of said laminated sheet being fitted between said upper end surface of said inside layer member and said receiving seat surface of said outside layer member, said synthetic resin film being welded to said outside layer member;

said synthetic resin film being attached to said receiving seat surface;

said inside synthetic resin layer of said cylindrical body being of the same class of synthetic resin materials as the synthetic resin material of said outside layer member of said head, said inside synthetic resin layer of said cylindrical body being of a different class of synthetic resin materials as the inside layer member of said head;

said cylindrical body being integrally connected to said head, with the attachment between the same class of synthetic resin materials of said inside synthetic resin layer of said cylindrical body and said outside layer member of said head being a gas-impermeable attachment, the attachment between the different classes of synthetic resin materials of said inside synthetic resin layer of said cylindrical body and said inside layer member of said head being a gas-permeable attachment; and

said head having a flange member at a lower end thereof on said inside layer member, said flange member extending radially outwardly beneath a lower end surface of said outside layer member, one of said flange and said lower end surface having a ring-shaped concave portion extending perpendicularly from a plane containing said radially outwardly extending flange member and into fitting close engagement with a ring-shape convex portion of the other of said flange and said lower end surface, said concave portion and said concave portion being closely engaged with each other, with the attachment between said outside and inside layer members of said head being a gas-impermeable attachment.

4,792,062

**PACKAGE FOR TWO PRESSURIZED RECEPTACLES**  
Antonia Goncalves, Grosley, France, assignor to L'Oréal, Paris, France

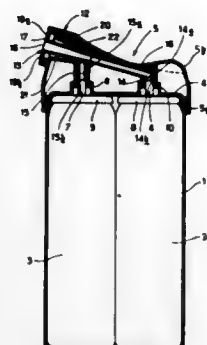
Filed May 8, 1987, Ser. No. 47,122

Claims priority, application France, May 9, 1986, 86 06693

Int. Cl.<sup>4</sup> B65D 83/06

U.S. Cl. 222—135

5 Claims



1. In a package for first and second pressurized receptacles of the aerosol can type, each of said first and second receptacles comprising a cylindrical body whose upper part is closed

by a valve cup carrying a dispensing valve having an outlet, and said pressurized receptacles being substantially of equal height, said package comprising:

- (a) an enclosure of oval cross-section surrounding the bodies of said receptacles;
  - (b) a rider which joins the two valve cups of said receptacles; and
  - (c) a dispensing member having a base and comprising an actuation region, and means defining first and second outlet orifices and first and second channels in said dispensing member, said first channel being connected to said first valve outlet and to said first outlet orifice and said second channel being connected to said second outlet orifice and to said second valve outlet,
- the improvement wherein
- (d) the base of the dispensing member is integrally fastened to the enclosure;
  - (e) the dispensing member comprises at least one deformable region which connects said base to said actuation region;
  - (f) said actuation region comprises first and second conduits, each of which defines at least one part of a respective one of said first and second channels connected to the outlet orifices;
  - (g) each of said first and second conduits is slidably received inside a duct means carried by said rider;
  - (h) each said duct means is arranged opposite a respective one of said first and second dispensing valves; and
  - (i) each of said first and second conduits is arranged to open the said dispensing valve opposite which it is situated, by sliding in its associated duct means under the effect of a movement of the actuation region imposed by a user;
- said base of said dispensing member being integrally fastened to the closure by a snap-fastening.

4,792,063

**FOLLOWER PLATE ASSEMBLY**

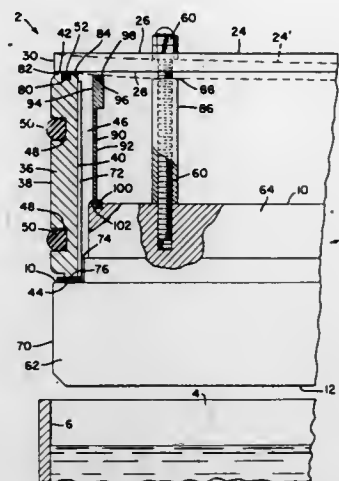
Leo M. Moore, Chesterfield, Va., assignor to Industrial Machine Manufacturing, Inc., Richmond, Va.

Filed Dec. 18, 1987, Ser. No. 134,743

Int. Cl.<sup>4</sup> B67D 5/62

U.S. Cl. 222—146.5

17 Claims



1. A follower plate assembly shaped to fit inside a container having an inner wall comprising:

- a bottom plate including an upper boundary surface and a lower boundary surface and having at least one aperture therethrough, said bottom plate including means associated therewith useful in providing for heating said bottom plate when said follower plate assembly is in operation;
- at least one top plate spaced from said bottom plate and

having an upper boundary and a lower boundary, said top plate including an outer peripheral portion;

a cylindrical member having an outer surface, an inner surface, an upper surface, and a lower surface, said cylindrical member being positioned between said bottom plate and said top plate, such that said upper surface is adjacent said lower boundary and said lower surface is adjacent but not in contact with said upper boundary surface, to form a cavity formed by said bottom plate, said top plate, and said cylindrical member, and said cylindrical member including means engaging said outer surface for sealing an interface between said inner wall of said container and said outer surface of said cylindrical member when said follower plate assembly is inserted into said container;

means engaging said upper surface and said lower boundary to form first means for sealing said cavity at an interface between said cylindrical member and said top plate;

means positioned between said lower surface and said upper boundary surface to form second means for sealing said cavity at an interface between said cylindrical member and said bottom plate, said second means including a plurality of stacked metallic slip rings including an uppermost slip ring which engages said lower surface and a lowermost slip ring which engages said upper boundary surface; and

means engaging said top plate and said bottom plate for urging said top plate towards said bottom plate to actuate said first means and said second means.

4,792,064

**LIQUID SOAP DISPENSER**

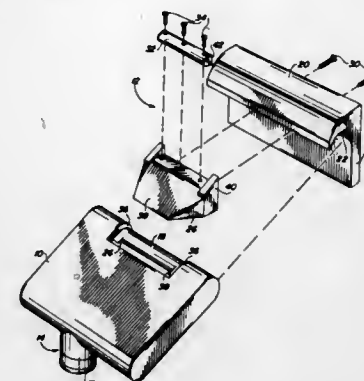
John L. Loesel, Jr., San Marino, and Daniel W. Ashcraft, Torrance, both of Calif., assignors to The Dial Corporation, Phoenix, Ariz.

Filed Aug. 12, 1986, Ser. No. 895,838

Int. Cl.<sup>4</sup> B67D 5/06; B65D 37/00

U.S. Cl. 222—181

18 Claims



1. A liquid dispenser and associated wall mounting assembly for dispensing liquid soaps, disinfectants and similar products, comprising:

- a flexible and resilient reservoir for a liquid to be dispensed, the reservoir is provided with an outlet means through which liquid in the reservoir is dispensed therefrom; and
- a wall mounting means to which the reservoir is releasably secured, the wall mounting means comprising a J-shaped bracket having a securing means for securing the bracket to a wall, the bracket is further provided with a protruding means that operationally engages the reservoir, and the reservoir is provided with a cylindrical portion that is releasably secured in the inner curve of said J-shaped bracket;

whereby a user presses the reservoir against the protruding means compressing the reservoir and pressurizing liquid in

the reservoir so that liquid in the reservoir is dispensed through the outlet means.

4,792,065

**COMPOSITE EJECTING PISTON WITH CHAMBER**  
Dieter Soehnlein, Kaufering; Josef Neuhörl, Untermeitingen, and Armin Hoffmann, Germering, all of Fed. Rep. of Germany, assignors to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

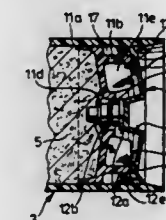
Filed May 8, 1987, Ser. No. 47,763

Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615659

Int. Cl.<sup>4</sup> B67D 5/42; G01F 11/00

U.S. Cl. 222—387

8 Claims



1. Device for dispensing a plastic mass comprising a composite piston for ejecting or dispensing the plastic mass from a substantially cylindrically-shaped receptacle wherein the improvement comprises that said composite piston includes a piston head having a central axis extending in the direction for ejecting the plastic mass from the receptacle and said piston head having a disc-like wall member extending transversely of the central axis and said wall member having a first face arranged to be directed against the plastic mass and an oppositely facing second face, said composite piston includes a plate-like pressure component extending transversely of the central axis and located on the second face side of said piston head, said pressure component having a first surface and a second surface extending transversely to the central axis with the first surface facing the second face of said piston head and said second surface facing in the opposite direction, said piston head and pressure component being spaced apart in the direction of the central axis for at least a part of the second face of said piston head and the first surface of said pressure component for forming a chamber therebetween, said piston head and pressure component being displaceable within the receptacle between an insertion position and a locked position, said disc-like wall member having an opening therethrough in the insertion position for flow of the mass into said chamber from the first face side of said disc-like wall member and said pressure component including means for sealing said opening in said disc-like wall member when said piston head and pressure component are in the locked position, said pressure component has at least one venting channel therethrough in communication with the ambient atmosphere in the insertion position of said piston and said venting channel being sealed by said piston head in the locked position of said composite piston.

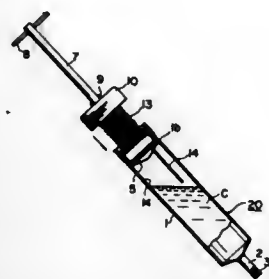


4,792,066

## CHEMICAL LIQUID INJECTOR

Naohiko Kobayashi, Tondabayashi, Japan, assignor to Pan American Trading Co., Ltd., Tokyo, Japan  
PCT No. PCT/JP86/00448, § 371 Date Jun. 12, 1987, § 102(c)  
Date Jun. 12, 1987, PCT Pub. No. WO87/02404, PCT Pub. Date Apr. 23, 1987

PCT Filed Sep. 3, 1986, Ser. No. 69,631  
Claims priority, application Japan, Oct. 15, 1985, 60-158289[U]; Mar. 17, 1986, 61-60435; Apr. 28, 1986, 61-64978[U]  
Int. Cl.<sup>4</sup> B67D 5/42; E02D 5/18  
U.S. Cl. 222—387 6 Claims



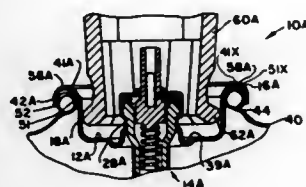
1. A chemical liquid injector which comprises a cylindrical injector casing having at its front end a nozzle and at the open rear end means for receiving a cap, a piston slidably received in the injector casing, a cap detachably mounted on the injector casing at the open rear end thereof, a piston rod secured to the rear end of said piston and projecting through a hole in the cap, a coiled spring interposed along said rod between the piston and the cap for urging the piston forward, means for locking the coiled spring in its compressed state, at least one air-escape groove formed in the interior surface of the injector casing which extends lengthwise of the casing from its open end to the position where the piston head will lie when the piston is held at its fully retracted position in the casing, the nozzle of the injector casing having threadably attached thereto a mouthpiece, the mouthpiece comprising an inner body made of synthetic resin and having a plurality of lugs protrusively provided on its outer peripheral surface and a sheath similarly made of synthetic resin and fitting closely to the inner body, the sheath having a slit extending along the entire length thereof, small holes for receiving the lugs, and a plurality of thin projections formed on the interior surface of the sheath and extending its axial direction.

4,792,067

## MOUNTING CUP

James E. Greenebaum, II, Highland Park, Ill., assignor to Pittway Corporation, Cary, Ill.

Filed May 13, 1985, Ser. No. 733,207  
Int. Cl.<sup>4</sup> B65D 83/14  
U.S. Cl. 222—402.1 26 Claims



1. An improved mounting cup for sealing with a container of an aerosol dispensing device, the container having an annular bead extending about an opening in the container with the annular bead having an inner surface contour, comprising in combination:

a metallic mounting cup comprising a central area, a side-

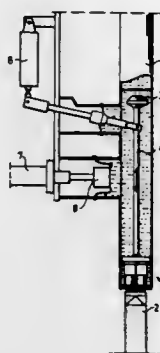
wall and a peripheral rim with said sidewall interconnecting said central area and said peripheral rim;  
said peripheral rim having an inner region contour being substantially different from the inner surface contour of the annular bead of the container for allowing only a portion of said inner region contour of said peripheral rim to contact the inner surface contour of the annular bead when said mounting cup is disposed upon the container;  
said inner region contour of said peripheral rim being deformed when said mounting cup is crimped to the annular bead of the container to reform said inner region contour of said peripheral rim to be substantially the same as the inner surface contour of the annular bead to provide a seal engagement between said mounting cup and the container; and  
said crimping of said mounting cup to the annular bead of the container being accomplished solely by an outward radial expansion of said sidewall of said mounting cup to reform said inner region contour of said peripheral rim to be substantially the same as the inner surface contour of the annular bead to provide said sealing engagement between said mounting cup and the container.

4,792,068

## NOZZLE WITH AT LEAST ONE OPENING THAT CAN BE CLOSED OFF

Lars Trygg, Grangårde, Sweden, assignor to PKI Verpackungssysteme GmbH, Düsseldorf, Fed. Rep. of Germany  
Filed Oct. 15, 1987, Ser. No. 108,519

Claims priority, application Sweden, Oct. 29, 1986, 8604611  
Int. Cl.<sup>4</sup> B67D 3/00; F16K 25/00  
U.S. Cl. 222—512 10 Claims



1. In a nozzle with at least one opening that can be closed off, and especially a nozzle for packaging machines, including those that handle liquid products, the nozzle including a valve body in the form of a piston that moves back and forth between a retracted position wherein it leaves the opening free and an advanced position wherein it completely closes off the opening, the improvement wherein the piston is axially divided or slit, the nozzle further including a guide (14) for the piston (9) that has at least two positioning surfaces that operate in conjunction with two essentially opposite surfaces on the piston and precisely position it in the nozzle opening (10), and a tensioning component (13) that forces the halves of the piston apart and tight against the walls of the nozzle opening.

4,792,069

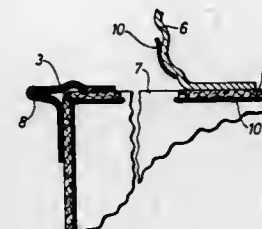
## POURING EDGE ON PACKING CONTAINERS

Hans Nantia, Trelleborg, and Ingemar Ohlsson, Malmö, all of Sweden, assignors to Tetra Pak International AB, Lund, Sweden

Continuation of Ser. No. 880,876, Jul. 1, 1986, abandoned. This application Oct. 9, 1987, Ser. No. 106,898  
Claims priority, application Sweden, Jul. 2, 1985, 8503281  
Int. Cl.<sup>4</sup> B67D 3/00

U.S. Cl. 222—527

9 Claims



1. A packing container of the type formed of a flexible packing material with an upper wall delimited by folding lines and provided with a pouring opening adjacent one of the folding lines, the packing container including an outer surface provided with a pouring edge assembly comprising:

- a pouring edge strip formed of a resilient material and including two opposing ends and at least one strip fold line intermediate the ends, the pouring edge strip being attached to the outer surface of the packing container at a position along a part of the folding line adjacent the pouring opening with one end of the strip being attached to the outer surface of the packing container between the pouring opening and the adjoining folding line and the opposing end of the strip being attached to the outer surface of the packing container below the adjoining folding line, the pouring edge strip being attached to the packing container only at the opposing ends of the pouring edge strip, the strip fold line of the pouring edge strip intermediate the ends defining a projecting pouring edge extending in the direction of the adjoining folding line; and
- a cover strip closing the opening and covering the pouring edge strip when the packing container is in an unopened condition, the part of the pouring edge strip intermediate the ends being under tension when the packing container is in the unopened condition to create a spreading force on the intermediate part to help force the projecting pouring edge into an outwardly projecting position when the cover strip is removed.

4,792,070

## TUBES FOR CASTING MOLTEN METAL

Jean Dausan; Gérard Dausan, both of Metz, and André Dausan, Longeville-les-Metz, all of France, assignors to Dausan et Compagnie, Wolpp, France

Continuation of Ser. No. 800,167, Nov. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 523,285, Aug. 15, 1983, abandoned. This application Aug. 14, 1987, Ser. No. 85,184  
Claims priority, application Switzerland, Aug. 23, 1982, 4992/82

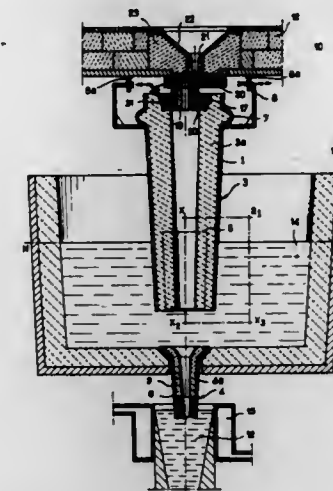
Int. Cl.<sup>4</sup> B22D 41/08

U.S. Cl. 222—606

8 Claims

1. A casting tube for liquid metal, comprised by a thin sheet-metal cladding and an internal unfired lining of heat-insulating material comprising inorganic particles which are embedded in an organic binder, said inorganic particles being sinterable under the action of the heat of the liquid metal as it flows within said tube, the upper end of said casting tube being attached in an air-tight manner to the discharge outlet of a first vessel for containing molten metal, the lower end of the casting tube being immersed in molten metal in a second vessel located downstream with respect to said first vessel, and a tubular

unfired reinforcement member embedded within the lining material and covered on all its faces with the lining material, said tubular reinforcement member extending to at least the full depth of that portion of the casting tube which is in contact with the molten metal in the second vessel, the reinforcement member comprising a layer of finely divided material com-



4,792,071

## GARMENT DISPLAY DEVICE

Afra B. Scarpa, and Tobia Scarpa, both of Trevignano, Italy, assignors to Benetton S.p.A., Ponzano Veneto, Italy  
Filed Jun. 9, 1987, Ser. No. 60,035

Claims priority, application Italy, Mar. 17, 1987, 21140 B/87[U]

Int. Cl.<sup>4</sup> A41H 5/01

U.S. Cl. 223—68

4 Claims



1. A garment-display hanger, comprising:  
a tubular structure adapted to stand on a floor and including at least one generally upright tubular element;  
an upper garment support mounted on said element and shiftable vertically thereon, said upper garment support including means defining shoulders for supporting shoulder regions of a garment adapted to hang from said upper garment support; and

a lower garment support vertically shiftable on said tubular element and spaced below said upper garment support, said lower garment support including:

a central cylindrical body surrounding said tubular element and shiftable vertically along and rotatable about said tubular element,

means for fixing said central cylindrical body to said tubular element,

a pair of tubular members rigid with said central cylindrical body and extending generally perpendicular to said tubular element in opposite directions away from said central cylindrical body,

respective pads guided on said tubular members, each of said pads having a rod received slidably in the respective tubular member, and an enlarged head on the respective rod engageable with the garment,

a respective spring in each of said tubular members braced against the respective pad and urging said pads away from said central cylindrical body to permit said pads to accommodate automatically to the size of the garment engaged thereby, and

means for limiting the displacement of said pads outwardly by said springs, and wherein

said means for fixing said central cylindrical body to said tubular element includes:

an elastically deformable bushing received between said central cylindrical body and said tubular element, and

a screw member threaded into said body and bearing upon said bushing to clamp said body and said bushing against said tubular element;

said enlarged heads are each covered with a fabric-gripping material, and

said means for limiting the displacement of said pads includes:

a slot formed in each of said rods, and

a respective screw member threaded into each of said members and engaging in the respective slot.

4,792,072

## CYCLE SURFBOARD CARRIER

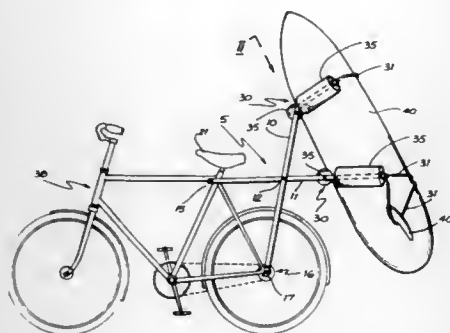
John E. Gibson, Seaforth, Australia, assignor to Kalmson Pty, Limited, Seaforth, Australia

Filed Oct. 6, 1987, Ser. No. 107,578

Int. Cl.<sup>4</sup> B62J 7/00

U.S. Cl. 224—32 A

7 Claims



1. A carrier to transport a surfboard or similarly shaped article on a bicycle, comprising:

a pair of elongated members hinged to each other and crossing each other at a location along their lengths, one of said members having an end attachable immediately beneath a seat of the bicycle and the other of said members having an end attachable to an axle of a rear wheel of the bicycle so that the members when so attached to the bicycle project rearwardly therefrom, each of said elongated members having a free end spaced distal from said location; and padded substantially V-shaped

portions formed on said free ends so as to receive an edge of a surfboard, each of said free ends being formed to support resilient means for engaging around the surfboard when fitted on the carrier to hold the surfboard firmly in position in said padded portions, said V-shaped portions being arranged relative to each other so that when said elongated members are attached to the bicycle, the surfboard project forwardly and upwardly relative to the bicycle and an upper end of the surfboard extends clear of a head of a rider when the rider is riding the bicycle.

4,792,073

## SKI CARRIER

Jeffrey M. Jacober, 2 Round Hill Ct., East Greenwich, R.I. 02818

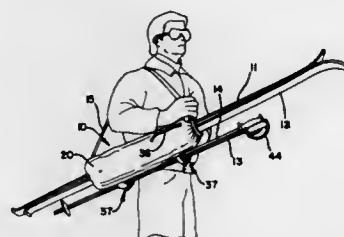
Continuation of Ser. No. 025,027, Mar. 12, 1987, abandoned.

This application Apr. 13, 1988, Ser. No. 183,396

Int. Cl.<sup>4</sup> A45C 71/00; B65D 69/00; A63C 11/02

U.S. Cl. 224—202

15 Claims



1. A ski carrier in the form of a ski binder cover constructed of flexible material, comprising:

a tubular body member of flexible material, said body having a preselected circumference of a size adapted to be received around bindings of a pair of skis to protectively cover same, said flexible material body member having a ski binding covering area and having oppositely positioned open ends adapted to receive a pair of skis therethrough;

one of said open ends is fixedly restricted in circumference so as to be adapted to permit the passing of a pair of ski boards therethrough but prevent the passing of ski bindings affixed to such ski boards therethrough;

the other of said open ends being of a circumference that is openable and closeable between an open orientation and a closed orientation that provides a substantially fixedly restricted circumference, said open orientation being adapted to selectively permit the passing of ski bindings affixed to such ski boards therethrough while said closed orientation selectively prevents passing of ski bindings through said openable and closeable circumference;

carrier means affixed to and extending from said tubular body member of flexible material at locations that are respectively generally proximate to said oppositely positioned open ends of said tubular body member;

said tubular body member of flexible material includes anti-theft locking cable-receiving means for locking said tubular body member of flexible material to a fixed base and for preventing removal of skis from said ski carrier by simultaneously locking said other open end in its said substantially fixedly restricted closed orientation;

said tubular body member of flexible material further includes releasable fastener means for permitting longitudinal opening of said tubular body member of flexible material in a longitudinal direction so that the ski carrier is adapted to receive a portion of a ski that includes ski binding members; and

said anti-theft locking cable-receiving means includes a locking cable-engaging member on said releasable fastener means and a locking cable-receiving member on said tubular body member of flexible material, said locking cable-receiving member being secured to said tubular body member of flexible material at a location generally at said other open end and generally adjacent to the location of said locking cable-engaging member when said releasable fastener means is in a fully closed orientation.

4,792,074

## ARRANGEMENT AND THE STEPWISE ADVANCE OF BAND MATERIAL WITH TWO OPPOSITELY DRIVEN FEED ROLLERS

Alfred Bareis, Udingen, and Klaus Goebel, Rechberghausen, both of Fed. Rep. of Germany, assignors to L. Schuler GmbH, Goepfingen, Fed. Rep. of Germany

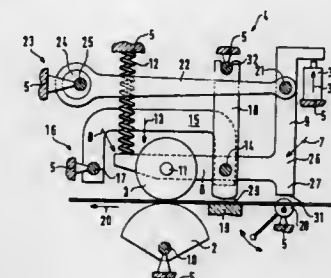
Filed Jul. 13, 1987, Ser. No. 72,749

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1986, 3623647

Int. Cl.<sup>4</sup> B65H 20/04

U.S. Cl. 226—149

8 Claims



1. An arrangement for the stepwise feeding of band material, comprising two oppositely driven feed roller means, a first one of said feed roller means being locally fixedly supported and a second feed roller means being alternately movable by a lifting means toward the first feed roller means or away from the latter into a return position at the point in time of reversal of the direction of rotation of at least one of the feed roller means, the second feed roller means being rotatably supported in a rocker means, said lifting means including a guide element engaging at one end of the rocker means and a spring force storage means engaging at the other end of the rocker means disposed opposite with respect to the axis of the second feed roller means, the direction of action of the spring force storage means being in the direction of the abutment of the second feed roller means at the first feed roller means, guide means engaging at the rocker means between the second feed roller means and the point of engagement of the guide element at the rocker means near one end of the guide means, said guide means being locally fixedly and rotatably supported with its other end approximately at the height of the center of the second feed roller means, a pressure device operatively connected with the guide means which in the return position of the second feed roller means is operable to be pressed against a locally fixed counter member under interposition of the band material for purposes of holding the band material during the return move-

ment of the first feed roller means, a connecting rod engaging at the guide element at a point spaced with respect to the point of engagement thereof at the rocker means, the connecting rod being operable to be driven by way of an eccentric means in a locally fixed bearing support substantially parallelly to the rocker means and extending in the direction thereof.

4,792,075

## APPARATUS FOR PULLING FORWARD OR HOLDING BACK MOVING METAL STRIPS

Norbert Umlauf, Haferkamp 64, 5800 Hagen, Fed. Rep. of Germany

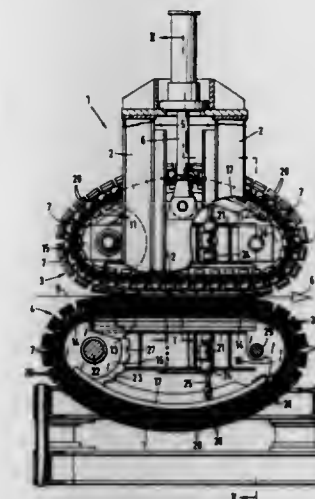
Filed Feb. 26, 1986, Ser. No. 833,815

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1985, 85103072

Int. Cl.<sup>4</sup> B65H 20/00

U.S. Cl. 226—172

17 Claims



1. In apparatus for exerting a drag upon a moving metal strip, said apparatus comprising two oppositely disposed endless conveyor chain systems, each of said systems comprising conveyor chain means extending around an endless path, at least one chain wheel for controlling the movement of each of said chain means around said path, said chain means of each of said systems including a plurality of coupled roller units, and first guide means for guiding said roller units along a straight drag-applying zone of the endless path in each of said conveyor chain systems with the drag-applying zone having an inlet end and an outlet end relative to the moving metal strip, said apparatus further comprising means mounting said systems with said drag-applying zones of each of said systems being adjacent each other and means for clamping said strip between said roller units of said systems in said drag-applying zones to allow said systems to exert said drag thereon, the improvement comprising second guide means in each of said systems, said second guide means guiding said roller units along another zone of the endless path extending from the outlet end to the inlet end of said drag-applying zone, said second guide means extending in the direction of the endless path between the inlet and outlet ends of said drag-applying zone thereof and said second guide means being curved along the full extent thereof in the direction of the endless path from the outlet end to the inlet end of the drag-applying zones, said first and second guide means guiding said chain means around each of said endless paths, and said second guide means located at the outlet end of said drag-applying zone providing guidance for said chain means and being free of driving engagement with said chain means.



4,792,076

## WEB TRANSPORTING APPARATUS

Roland Grander, Vordemwald, Switzerland, assignor to GRA-PHA-Holding AG, Hergiswil, Switzerland

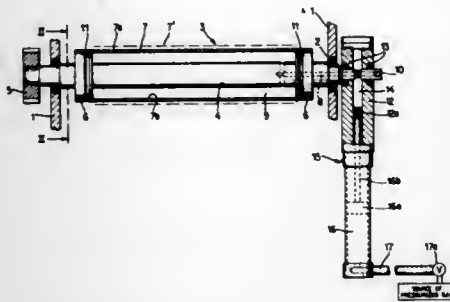
Filed Jun. 11, 1987, Ser. No. 61,866

Claims priority, application Switzerland, Jul. 21, 1986, 2915/86

Int. Cl. B65H 20/02, 75/24

U.S. Cl. 226-175

9 Claims



1. Web transporting apparatus comprising a roll including an elastically deformable hollow cylindrical shell having a web-engaging external surface and two end portions, and end walls in sealing engagement with said end portions so that the shell and the end walls define a liquid-containing internal compartment; regulating means for varying the diameter of said shell, including means for varying the pressure of liquid in said compartment; and means for maintaining the liquid in said compartment at a pressure which is selected by said regulating means, said regulating and maintaining means including hydro-pneumatic transducer means having a hydraulic cylinder and piston unit forming part of one of said regulating and maintaining means and a pneumatic cylinder and piston unit forming part of the other of said regulating and maintaining means.

4,792,077

## APPARATUS FOR STAPLING AND CREASING PAPER ARTICLES IN TRANSIT

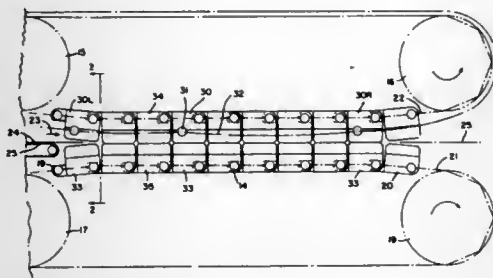
Hans G. Faltin, York, Pa., assignor to Custom-Bilt Machinery, Inc., York, Pa.

Filed Apr. 27, 1987, Ser. No. 42,747

Int. Cl. B42C 1/00

U.S. Cl. 227-81

29 Claims



1. In apparatus for stapling paper articles while the articles are moving along a common transit path, improved staple forming and inserting means comprising in combination, a stapler link carried by and cyclically movable relative to a chain assembly that travels repetitively about a continuous closed path including said transit path, said stapler link including a movable wire handling mechanism movable by a cam arm extending from the link, said wire handling mechanism having clip means for receiving and retaining a length of wire, and a die for forming a staple from the wire, said apparatus including first cam surface means engageable with the cam arm

for drawing the clip means into the die to bend the wire and form a staple, and second cam surface means engageable with the cam arm for pushing said staple from said stapler link into the paper articles.

4,792,078

## DEVICE FOR CONTROLLING CONCENTRATION AND TEMPERATURE OF FLUX

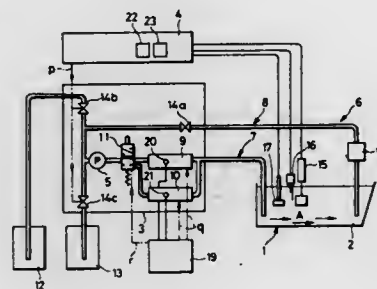
Kiyohachi Takahashi, 1-14-21, Musashidai, Fuchu-shi, Tokyo, Japan

Filed Jun. 11, 1987, Ser. No. 60,461

Int. Cl. B23K 3/00

U.S. Cl. 228-8

6 Claims



1. A device for controlling the temperature of a flux provided separately from a flux tank of an automatic soldering apparatus, said device comprising:

- a circulation system which consists of a flux tank, a pump and supplying and returning paths connected between the tank and the pump and which circulates said flux by driving said pump;
- reservoirs for a flux stock solution and a diluent, respectively, which are each connected to said circulation system;
- a heating means and/or a cooling means provided in said supplying path of said circulation system;
- a temperature controlling mechanism which adjusts the operation of said heating means and/or said cooling means in association with a temperature sensor which is incorporated into said heating means and/or said cooling means; and
- a filter which is connected to said returning path of said circulation system.

4,792,079

## APPARATUS FOR ULTRASONIC WIRE BONDING

Manfred Bansemir, Dresden, German Democratic Rep., assignor to VEB Elektromat Dresden, Dresden, German Democratic Rep.

Filed Dec. 8, 1987, Ser. No. 130,053

Claims priority, application German Democratic Rep., Feb. 25, 1987, 3001486

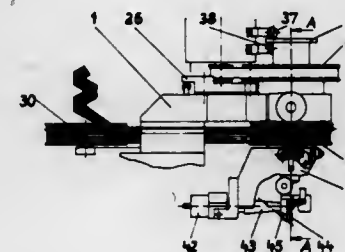
Int. Cl. B23K 20/10

U.S. Cl. 228-1.1

9 Claims

1. An apparatus for ultrasonic wire bonding comprising:
- (a) a bonding head including
    - (i) an ultrasonic generator,
    - (ii) a sonotrode having an axis and a foot which defines a weld surface, and
    - (iii) gripping means for advancing a bonding wire to said sonotrode and for severing the bonding wire, said bonding head being movable vertically in the direction of said sonotrode axis and rotatably about an axis parallel to the sonotrode axis and passing approximately through the weld surface at the foot of the sonotrode;
  - (b) a cylindrical piece concentric with the axis of rotation of

- said bonding head and having a lower end face to which the bonding head is attached, said cylindrical piece have an eccentrically disposed bore running parallel to the axis of rotation of said bonding head, said bore having an axis;
- (c) bushing means for firmly holding said cylindrical piece;
- (d) flange means at an upper end of said cylindrical piece for engaging first drive means so as to vertically move said bonding head, said flange means having an eccentrically disposed bore running parallel to the axis of rotation of said bonding head;
- (e) radial bearing means for receiving said bushing means, said radial bearing means being adjustable without play, said radial bearing means including a ball-bearing cage, bearing balls and an inner race member with an upper end face and a lower end face, to permit longitudinal movement of said bushing means without play and such that said bearing means operates as a two-row angular-contact ball bearing;



- (f) drum means for accommodating electrical leads for the bonding head, said drum means being attached to the lower end face of the inner race member;
- (g) a toothed-belt pulley affixed to the upper end face of said inner race member;
- (h) a first rod eccentrically mounted on the drum means;
- (i) two rollers mounted on the bonding head and resting against said first rod;
- (j) a second rod mounted on the toothed-belt pulley;
- (k) a lever pivotally mounted with respect to said pulley;
- (l) spring means for holding a radial orientation of said lever with respect to the rotational axis of the bonding head;
- (m) transverse lug means on said lever for limiting the range of movement of said second rod;
- (n) fixed detent means for limiting rotational movement of the lever in one direction; and
- (o) a microscope objective screwed into a lower region of said bore in said cylindrical piece.

4,792,080

## APPARATUS FOR REBUILDING VEHICLE AXLES

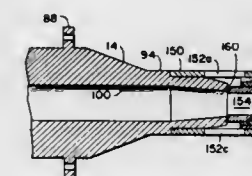
William J. Ferrari, 1315 Washington Blvd., Pittsburgh, Pa. 15068

Filed Jun. 27, 1986, Ser. No. 879,602

Int. Cl. B23P 7/00; B23K 31/00

U.S. Cl. 228-49.3

8 Claims



1. A jig for use in replacing an outer bearing surface in a vehicle axle having on a spindle a pair of coaxial, axially spaced apart bearing surfaces, one of the pair being an inner bearing

surface and the other the outer bearing surface, the jig comprising, a unitary one piece substantially cylindrical member having at one end an internal cylindrical surface means sized to slidably fit onto said inner bearing surface, the other end of the jig having an internal cylindrical surface means for supporting and aligning an outer bearing surface replacement part to be welded to the axle, and windows in the cylindrical member opening on the spacing between the bearing surfaces providing external access means for welding the outer bearing surface replacement part to the axle.

4,792,081

## EXTRUDED CONTAINER WITH DISSIMILAR METAL WELDING INSERT

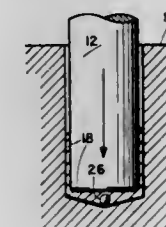
Gordon E. Kaye, Garrison, N.Y., assignor to Duracell Inc., Bethel, Conn.

Filed Sep. 13, 1982, Ser. No. 416,798

Int. Cl. B23K 28/02

U.S. Cl. 228-115

1 Claim



1. A method for forming an aluminum container having a dissimilar metal insert inserted in the external surface thereof comprising:

- a. placing a solid spherical dissimilar metal insert in an extrusion die, said die having a conical or centrally depressed region therein;
- b. positioning an aluminum slug above said metal insert; and
- c. lowering a punch into the die so as to deform said aluminum slug into a container configuration; and
- d. also thereby causing the external surface of said aluminum container to bond to said dissimilar metal insert by deforming the aluminum so that it flows around a major diameter of the insert whereby the insert is chemically and physically bonded to the external surface of said aluminum container and wherein a portion of said metal insert is externally exposed for welding thereto.

4,792,082

## ENCLOSED ANIMAL LITTER BOX

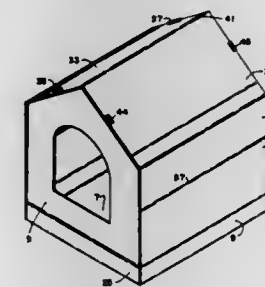
Gaylord L. Williamson, Box 349, Newell, S. Dak. 57760

Filed Mar. 3, 1987, Ser. No. 22,233

Int. Cl. B65D 5/35; A01K 29/00

U.S. Cl. 229-103

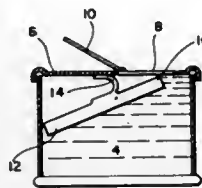
1 Claim



1. A method of constructing a box, comprising the steps of:

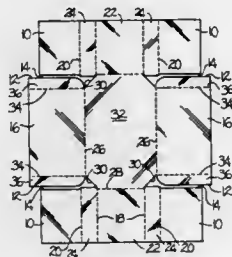
- (a) forming a sheet of a relatively stiff, foldable material into a substantially rectangular planform;
- (b) designating a substantially rectangular perimeter on the sheet so as to delineate a rectangular bottom member having an integrally adjacent front end flap, an integrally adjacent rear end flap, an integrally adjacent right side flap, an integrally adjacent left side flap, a roof panel, the roof panel being integrally formed between the right side flap and the left side flap, the roof panel being compatibly dimensioned so as to fit snugly along the front end flap and the rear end flap, the roof panel residing in at least one plane displaced somewhat above the bottom member, the front end flap, the rear end flap, the right side flap and the left side flap each possessing a substantially rectangular sheet-like extension, the sheetlike extensions serving as corner reinforcing members for the box, the sheet-like extensions adjacent to the left side flap and the right side flap being formed so as to have end tabs such that, after the sheet-like extensions are folded into the box so as to form the corner reinforcement members, the end tabs may be inserted into mating orifices within the roof panels so as to be parallel to the front end flap and the rear end flap, thereby securing the roof panel above the bottom member of the box;
- (c) folding the front end flap, the rear end flap, the right side flap, and the left side flap upwardly so as to form a four sided container having four corners, the corners being defined by an intersection of adjacent, abutting flaps, the roof panel being foldably inserted into the box after the front end flap, the rear end flap, the left side panel and the right side panel are folded inwardly so as to be enclosed within a volume defined by the crease zones and the bottom member;
- (d) securing each of the corners at the intersection so as to form a substantially rigid, permanently shaped container.

**4,792,083**  
**DRINKING TUBES AND COVERS FOR BEVERAGE CONTAINERS AND BEVERAGE CONTAINERS INCORPORATING THE SAME**  
 Zion Yassar, Doar Na Shimshon, Moshay Tarom 2, Israel  
 Filed Nov. 30, 1987, Ser. No. 126,704  
 Int. Cl.<sup>4</sup> B65D 77/28  
 U.S. Cl. 229—103.1 **5 Claims**



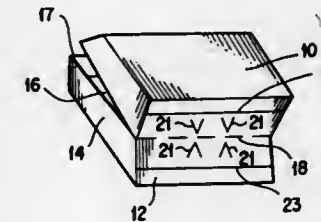
1. A cover for a beverage container, said cover being of a type having a sealing, tear-out tab which may be pulled to rupture a closure thereof for providing access through a formed opening to the container, said cover having a drinking tube attached to an underside thereof, said tube comprising a resilient appendage in the form of a strip attached at one end thereof to the drinking tube at a point intermediate opposing ends of said tube, said tube having a length substantially equal to a diameter of said cover, and the distance from the point of attachment of said strip to one end of said tube being less than the length of the formed opening in said cover, another end of said strip being attached in an area spaced from said tear-out tab to the underside of said cover in a flexed state to resiliently bias said one end of said tube against said closure.

**4,792,084**  
**PAPERBOARD CONTAINER WITH ANGLED CORNERS**  
 Dale M. Dreeszen, Yakima, Wash., assignor to Longview Fibre Company, Longview, Wash.  
 Continuation of Ser. No. 832,413, Feb. 24, 1986, abandoned.  
 This application Feb. 24, 1987, Ser. No. 18,870  
 Int. Cl.<sup>4</sup> B65D 5/22  
 U.S. Cl. 229—109 **2 Claims**



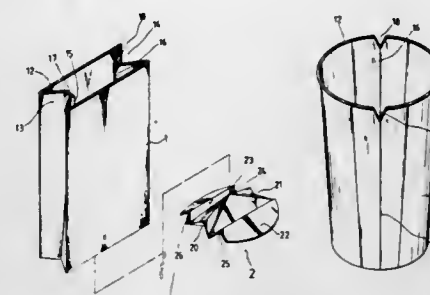
1. A blank for a paperboard carton, comprising:
- (a) a substantially rectangular, one-piece, carton-forming blank of foldable material having four corners,
- (b) corner panels (10) at the four corners of the blank separated from adjacent first middle panels (16) along each of one pair of opposite sides of the blank by two spaced pairs of two substantially parallel spaced inner cut lines (12) and outer cut lines (14) extending inwardly from said one pair of opposite sides of the blank and defining a first middle panel (16) between the inner cut lines (12) of the pairs of cut lines and separated from adjacent second middle panels (22) along each of the other pair of opposite sides of the blank by two spaced pairs of substantially parallel spaced inner score lines (18) and outer score lines (20) extending inwardly from said other pair of opposite sides of the blank and defining between the inner score lines (18) of the pairs of score lines a second middle panel (22) and defining between the score lines (18, 20) of each pair an angle corner panel (24), each of the inner (12) and outer (14) cut lines and inner (18) and outer (20) score lines having inner and outer ends,
- (c) a score line (26) extending between the inner ends of the inner cut lines (12) of the two pairs of spaced cut lines (12, 14) and defining the inner end of the associated first middle panel (16),
- (d) a score line (28) interconnecting the inner ends of the inner score lines (18) of the two spaced pairs of score lines at each of the other pair of opposite sides of the blank and defining the inner end of the associated second middle panel (22),
- (e) a cut line (30) extending obliquely between the inner ends of the two spaced cut lines (12, 14) of each pair of cut lines, the width of each angle corner panel (24) between the associated inner and outer score lines (18, 20) being substantially the same as the length of the associated cut line (30), and
- (f) the score lines (26, 28) forming the inner ends of the first and second middle panels (16, 22) and the obliquely extending cut lines (30) defining the periphery of a central, bottom panel (32),
- (g) the inner end of each of the angle corner panels (24) terminating inwardly of the inner end of the associated corner panel (10) and inwardly of the score line (28) defining the inner end of the associated second middle panel (22), whereby the inner end of each angle corner panel (24) abuts the outer edge of the associated oblique cut line (30) when the blank is folded to form a carton.

**4,792,085**  
**BUCKLE-PROOF CLAMSHELL CONTAINER**  
 John S. Waring, III, 1708 Winding Ridge Dr., Richmond, Va. 23233, and Gary E. Pluff, 2701 Forbes Dr., Prince George, Va. 23875  
 Filed Jan. 9, 1987, Ser. No. 1,797  
 Int. Cl.<sup>4</sup> B65D 5/42  
 U.S. Cl. 229—114 **19 Claims**



1. In a clamshell type container having a top portion, a bottom portion, two side portions and a back panel portion separating said top portion from said bottom portion along a single hinge line having a midpoint halfway between said two side portions, said back panel portion having a central region which extends from the midpoint of said single hinge line about one-half of the distance from said midpoint to said side portion, the improvement comprising:
- intersecting, non-coextensive diagonal incisions formed in said back panel in said central region, both above and below, and for less than the entire length of, said hinge line, said diagonal incisions being so formed that any two thereof will touch one another at a point that lies approximately on said single hinge line, whereby permanent buckling of the back panel is avoided when said top portion is pivoted about said hinge line to open said container.

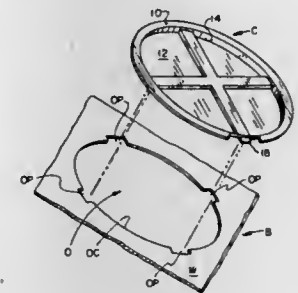
**4,792,086**  
**FOLDABLE CARDBOARD CUP**  
 Gwo-Cherng Chen, 35-43, An Hsi Li, Chia Li Chen, Tainan Hsien, Taiwan  
 Filed Aug. 31, 1987, Ser. No. 90,882  
 Int. Cl.<sup>4</sup> B65D 3/28  
 U.S. Cl. 229—117 **1 Claim**



1. A foldable cardboard cup comprising:
- a wall having a top edge folded into a projecting rim, a bottom formed into a groove, two wall folding means for providing a flattened rectangular shape when the wall is folded and for providing a conical wall when the wall is unfolded, and notch means for preventing fracture of the wall when the wall is folded and for use as a mouth when the wall is unfolded, the two wall folding means having wall folding lines for providing a foldable wall portion, the foldable wall portion being tapered and extending from a wider portion at the top edge of the wall to a more narrow portion at the bottom of the wall, the two notch

means being respectively arranged along the top edge of the wall at each of the two wall folding means, and a base having an edge fitted in the groove of the wall, the base having base folding means for providing a flattened base when the base is folded and for providing a conical base when the base is unfolded, the base folding means including two angular parts to facilitate folding of the wall foldable portion and folding lines capable of forming two inverted V-shaped parts when the base is folded, the base folding means cooperating with the wall folding means to provide a flattened rectangular shape when the wall and base are folded and to provide a conical cup when the wall and base are unfolded.

**4,792,087**  
**REMOVABLE COVER FOR BULK CONTAINER**  
 Raymond L. Russell, Cedar Falls, Iowa, assignor to Container Corporation of America, Clayton, Mo.  
 Filed Jan. 25, 1988, Ser. No. 147,545  
 Int. Cl.<sup>4</sup> B65D 43/02  
 U.S. Cl. 229—125.15 **13 Claims**



1. A removable, molded plastic cover for closing a container wall opening that includes a circular center portion and a plurality of circumferentially spaced projections extending radially outward therefrom, said cover comprising:
- (a) a generally flat annular rim;
- (b) an integral, circular, center panel spaced downwardly a slight distance from said rim and having its outer edge joined to an inner edge of said rim by a relatively short, cylindrical flange;
- (c) a plurality of radially extending ribs joined to said center panel and said cylindrical flange to reinforce said center panel;
- (d) a plurality of relatively flat lock tabs projecting radially outward from said center panel under said rim;
- (e) said lock tabs being of the same general shape as, but slightly smaller than, said wall opening projections to permit insertion of the former into the latter;
- (f) said lock tabs being spaced from said rim to define therebetween grooves adapted to receive portions of said container wall, so that when said cover is placed in said opening and rotated, said cover will be locked in snug engagement with said container wall.

**4,792,088**  
**INDESTRUCTIBLE MAILBOX**  
 Raymond Bonnell, Rte. 1, Box 240B, Bunker Hill, Ill. 62014  
 Filed Feb. 18, 1988, Ser. No. 156,004  
 Int. Cl.<sup>4</sup> B65D 91/00  
 U.S. Cl. 232—17 **6 Claims**

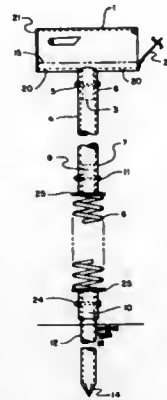
1. A sturdy mailbox and support, comprising:

(1) a cylindrical mailbox shell closed at one end having a hinged door at the other end, also having a cylindrical annular base flange located on the bottom thereof;

(2) a top pipe stem having an upper end attached to the shell



- annular base flange by a first attaching bolt and a lower end;  
 (3) a spring stem having an upper end attached to the lower end of the top pipe stem by a second attaching bolt and a lower end;

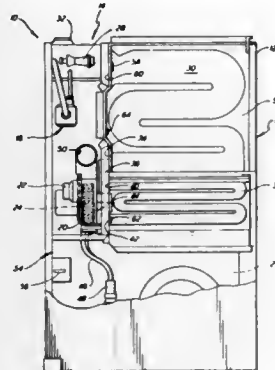


- (4) a bottom anchor post pipe stem having an upper end attached to the lower end of the spring stem and a lower, pointed end for driving into the ground.

**4,792,089**  
**SELF-CORRECTING MICROPROCESSOR CONTROL SYSTEM AND METHOD FOR A FURNACE**  
 Gary W. Ballard, Indianapolis, Ind., assignor to Carrier Corporation, Syracuse, N.Y.  
 Division of Ser. No. 802,272, Nov. 26, 1985, Pat. No. 4,706,881.  
 This application Aug. 21, 1987, Ser. No. 87,737  
 Int. Cl.<sup>4</sup> F24D 5/10

U.S. Cl. 236-11

4 Claims



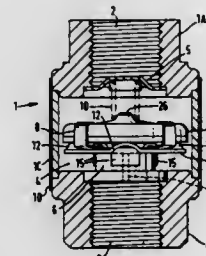
1. In a gas-fired furnace including  
 a housing having a combustion air inlet and an exhaust gas outlet,  
 a combustion means in said housing in communication with said combustion air inlet for receiving a flow of combustion air and for burning a mixture of combustion air and fuel,  
 a fuel supply means in said housing and connected to said combustion means for supplying flow of fuel to said combustion means,  
 a heat exchanger means in said housing in communication with said combustion means and said exhaust gas outlet for delivering a flow of a combusted fuel air mixture therethrough, and  
 a blower means in said housing in communication with said combustion means and said heat exchanger means for providing a flow of combustion air through said combus-

tion air inlet and said combustion means and a flow of a combusted fuel air mixture through said heat exchanger means and said exhaust gas outlet,  
 a self-correcting microprocessor control system, comprising:  
 an air delivery passage in said housing for delivering a flow of air to be heated over said heat exchanger means,  
 a circulating air means in said housing for circulating a flow of air to be heated through said air delivery passage, and  
 a temperature-sensing means in said air delivery passage for sensing the temperature of the air to be heated as it flows over said heat exchanger means and for generating an air delivery increase signal when the temperature of the air to be heated exceeds a predetermined temperature value,  
 a microprocessor control means for receiving said air delivery increase signal and generating in response thereto a circulating control signal to said circulating air means, said circulating air means further providing in response to said received circulating control signal an increase in circulation of the air to be heated over said heat exchanger means, thereby to lower the temperature of the air to be heated below said predetermined temperature value,  
 said temperature-sensing means being further capable of generating an insufficient circulating air flow signal when the temperature of the air to be heated remains above said redetermined temperature value after said circulating air means provides an increase in circulation air;  
 said microprocessor control means further being capable of receiving said insufficient circulating air flow signal and generating in response thereto a termination signal to said fuel supply means, and  
 said fuel supply means being capable of terminating the flow of fuel to said combustion means in response to receiving said termination signal.

**4,792,090**  
**THERMOSTATIC STEAM TRAPS**  
 Keith Dewhurst, Stroud, United Kingdom, assignor to Spirax Sarco Limited, United Kingdom  
 Division of Ser. No. 855,280, Apr. 24, 1986, Pat. No. 4,681,256.  
 This application Jul. 8, 1987, Ser. No. 71,169  
 Int. Cl.<sup>4</sup> F16T 1/02

U.S. Cl. 236-56

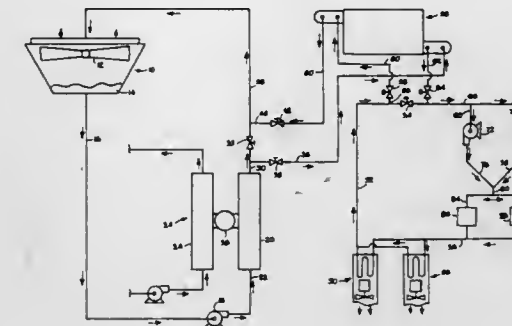
5 Claims



1. A thermostatic steam trap comprising:  
 a passageway for fluid flow;  
 two connections constituting opposite ends of the passageway;  
 a valve seat disposed in the passageway;  
 a temperature-responsive element comprising a housing which carries a valve closure element which is movable relatively to the housing, in response to temperature changes, into and out of cooperation with the valve seat to close and open the trap;  
 a spacer element which is movable relative to the valve seat and is disposed between the valve seat and the housing to maintain a predetermined distance between the valve seat and the housing; and  
 resilient means acting between the housing and an abutment

which is fixed with respect to the passageway to bias the housing and the spacer element towards the valve seat.

**4,792,091**  
**METHOD AND APPARATUS FOR HEATING A LARGE BUILDING**  
 George Martinez, Jr., P.O. Box 1141, Gonzales, La. 70737  
 Filed Mar. 4, 1988, Ser. No. 164,139  
 Int. Cl.<sup>4</sup> F25D 3/08; F24H 1/22  
 U.S. Cl. 237-19 10 Claims

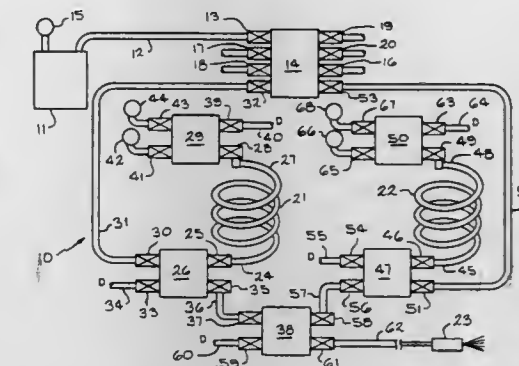


1. A method for conserving energy in the operation of a heating and air conditioning system in a large building, the air conditioning system having a condenser and the building having heating coils therein which are heated by hot water comprising:  
 a. directing water heated by the condenser of the air conditioner to a heat exchanger,  
 b. directing water supplied to heating coils in the building to said heat exchanger,  
 c. effecting a heat exchange between said water heated by said air conditioner condenser and said water supplied to said heating coils,  
 d. directing said water heated by said condenser from said heat exchanger to a cooling tower,  
 e. returning water from said cooling tower to said condenser,  
 f. directing reheat water from said heat exchanger to said heating coils in said building and flowing said reheat water therethrough, and  
 g. returning said reheat water from said heating coils to said heat exchanger.

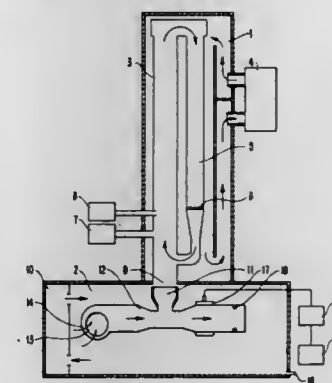
**4,792,092**  
**PAINT COLOR CHANGE SYSTEM**  
 Michael D. Elbertson, Sylvania, and Raymond G. Plummer, Toledo, both of Ohio, assignors to The DeVilbiss Company, Toledo, Ohio  
 Filed Nov. 18, 1987, Ser. No. 122,312  
 Int. Cl.<sup>4</sup> B05B 5/02, 15/02; B05D 1/04, 5/06  
 U.S. Cl. 239-3 13 Claims

10. A method for selectively supplying different color electrically conductive coating material to an electrostatic coating applicator comprising the steps of:  
 (a) supplying a predetermined quantity of coating material from a grounded coating material supply through a first electrically insulating hose to a first reservoir;  
 (b) cleaning and drying said first hose to form a voltage block between such supply and said first reservoir;  
 (c) supplying coating material from said first reservoir through a second electrically insulating hose to the coating applicator;  
 (d) simultaneously with supplying coating material from said first reservoir to the coating applicator, supplying coating material from a grounded coating material supply through a third electrically insulating hose to a second reservoir;

- (e) cleaning and drying said third hose to form a voltage block between such supply and said second reservoir; and  
 (f) supplying coating material from said second reservoir through a fourth electrically insulating hose to the coating applicator.



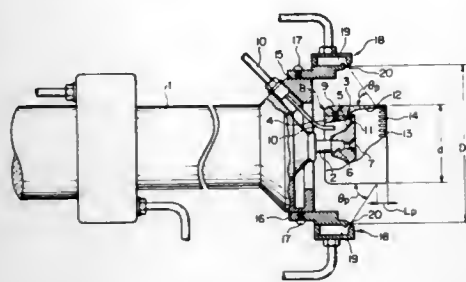
**4,792,093**  
**ARTIFICIAL SNOW WETTING APPARATUS**  
 Nagaichi Suga, Taro Mori, and Yoshio Sasho, all of Tokyo, Japan, assignors to Suga Test Instruments Co., Ltd., Tokyo, Japan  
 Filed Mar. 2, 1988, Ser. No. 163,112  
 Claims priority, application Japan, Mar. 4, 1987, 62-49797  
 Int. Cl.<sup>4</sup> A01G 15/00  
 U.S. Cl. 239-14.2 13 Claims



1. An artificial snow making apparatus including means for changing artificial snow generated therein to wet snow, comprising:  
 a vertical inner cylinder;  
 an outer tank around said inner cylinder;  
 an air velocity adjusting duct means connected between a top portion of said inner cylinder and an intermediate portion of said inner cylinder for causing air to flow from the top portion of said inner cylinder to said intermediate portion and to flow upwardly in said inner cylinder, said duct means including means therein for adjusting the velocity of the air flowing therethrough for thereby adjusting the velocity of the air flowing in said inner cylinder;  
 a cloud making machine and a seeding device connected directly to said vertical inner cylinder at positions between the top portion and said intermediate portion thereof;  
 a cooling unit disposed inside said outer tank for cooling air in said outer tank for cooling said inner cylinder;

a test chamber located below a lower portion of said inner cylinder;  
 air channel means disposed in said test chamber and in fluid communication with said lower end of said inner cylinder for receiving snow generated in said inner cylinder;  
 a blower means connected to said air channel means for circulating air from said test chamber in a flow direction along an air flow path through said air channel means and for blowing snow generated in said inner cylinder through said air channel means along said air flow path;  
 a temperature and humidity control means connected to said air channel means for drawing air from said test chamber and adjusting the temperature and humidity thereof to a temperature and humidity higher than the temperature and humidity of snow generated in said inner cylinder, whereby snow generated in said inner cylinder is changed to wet snow as it passes through said air channel means.

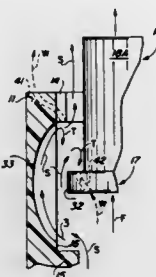
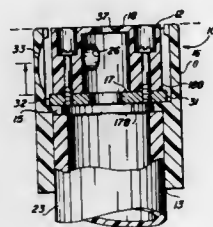
**4,792,094**  
**ROTATING SPRAYING TYPE COATING APPARATUS**  
 Kazuyuki Tachi, Chikashi Okuda, Katsunori Yamada, Yoichi Oyama, and Shoichi Suzuki, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan  
 Filed Aug. 26, 1986, Ser. No. 900,413  
 Claims priority, application Japan, Aug. 26, 1985, 60-187980; Dec. 25, 1985, 60-200150[U]  
 Int. Cl.<sup>4</sup> B05B 5/04  
 U.S. Cl. 239—106 5 Claims



1. A rotating spraying type coating apparatus, comprising:  
 a rotating drive device having a rotary shaft,  
 a substantially cylindrical spraying head attached to the rotary shaft of said rotating drive device, said spraying head having a base end of the side of said rotary shaft and top end on the side of an article to be coated,  
 a paint supplying passage connected to said spraying head, paint radiating means for radiating paint particles and mounted at the top end of said spraying head, and  
 air jetting means comprising at least one pair of air jetting openings having a sufficiently small length between inner walls thereof, relative to the circumference length of the spraying head and provided on both sides of said spraying head, prolongations of central axes of said at least one pair of air jetting openings intersecting said outer circumferential wall of said spraying head at a predetermined angle, for jetting air locally on the outer circumferential wall of said spraying head and for spreading said locally jetted air in the circumferential direction along the whole outer circumferential wall to form air streams having a circumferential velocity component in addition to an axial velocity component, said axial velocity component being largest at the locally air-jetted portion on the outer circumferential wall and smaller at a portion farther therefrom and said circumferential velocity component being smallest at the locally air-jetted portion and the larger at a portion farther therefrom, so as to enable said air streams to wrap said paint particles as soon as said paint particles leave said spraying head and to form said paint particles into a coating pattern substantially of a dumbbell or elongated shape composed of two portions joined together, each of said

portions having a large axial velocity component and having a part with more paint particles than a remaining part therein.

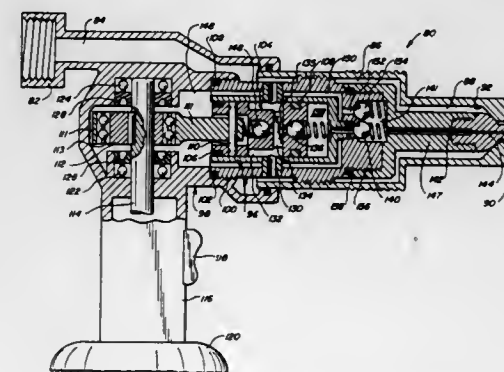
**4,792,095**  
**BUFFERED, FLUID DISPENSING NOZZLE UNIT**  
 Paul J. Pristo, 1045 E. Curry Pl., Tempe, Ariz. 85281, and Joseph H. Fagan, 1505 N. Hayden Rd., #6, Scottsdale, Ariz. 85257  
 Filed Apr. 16, 1987, Ser. No. 38,998  
 Int. Cl.<sup>4</sup> B05B 15/10, 3/06; E04H 3/20; B08B 3/02  
 U.S. Cl. 239—204 2 Claims



1. A hydraulically actuated nozzle unit, including  
 (a) a housing having  
 (i) first and second open ends,  
 (ii) a cylindrical inner wall,  
 (iii) first shoulder means attached to and inwardly extending from said inner wall, and  
 (iv) second shoulder means spaced apart from said first shoulder means and inwardly extending from said inner wall;  
 (b) annular means interposed in said housing between said first and second shoulder means for captive slidable displacement therebetween;  
 (c) cylindrical conduit means connected to and extending away from said annular means toward said second end of said housing and having  
 (i) an upper end having an outer cylindrical wall spaced apart from said inner wall of said housing and said second shoulder means, and  
 (ii) a lower end contacting said annular means, said annular means and conduit means being displaced in said housing between at least two operative positions,  
 (iii) a first operative position with said annular means contacting said first shoulder means and without fluid flowing under pressure into said first end of said housing and against said annular means, and  
 (iv) a second operative position with fluid flowing under pressure into said first end of said housing and against said annular means, said upper end of said conduit means extending through said second open end of said housing, and said annular means contacting said second shoulder means,  
 said fluid flow against said annular means producing a displace-

ment force causing said annular means to move in a direction of travel from said first to said second operative position and to impact said second shoulder means,  
 said annular means and inner wall being shaped and dimensioned to permit fluid flow intermediate said annular means and inner wall, and  
 said outer wall of said conduit means and said inner wall of said housing  
 (d) at least one elongate groove formed in said cylindrical inner wall of said housing intermediate said first and second shoulder means, said groove having  
 (i) a lower end through which a portion of said fluid flowing under pressure into said housing enters said groove, and  
 (ii) an upper end from which fluid flowing through said groove toward said second shoulder means exits said groove,  
 said groove being shaped and dimensioned such that when said annular means and conduit means are intermediate said first and second operative positions, said portion of said fluid flowing into said groove  
 (iii) initially flows away from said outer cylindrical wall of said cylindrical conduit means, and  
 (iv) flows through said upper end beneath said second shoulder means toward said outer cylindrical wall and generally perpendicular to the direction of travel of said annular means and conduit means from said first to said second operative position,  
 said flow of fluid from said upper end of said groove  
 (v) causing fluid flow intermediate said annular means and said second shoulder means to generate buffer pressure resisting movement of said annular means from said first to said second operative position, and  
 (vi) reducing said impact force of said annular means against said second shoulder means.

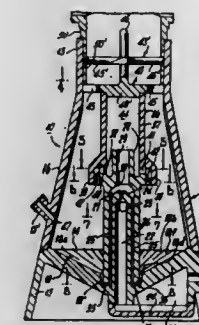
**4,792,096**  
**HOSE NOZZLE WITH HIGH PRESSURE PUMP**  
 T. Jack Gregory, 1932 Weiss La., Pennsgrove, Calif. 94951  
 Filed Dec. 14, 1987, Ser. No. 132,367  
 Int. Cl.<sup>4</sup> B05B 15/02, 9/04  
 U.S. Cl. 239—113 8 Claims



1. A hose nozzle with a high pressure booster pump comprising:  
 a nozzle body;  
 means forming an internal pump cylinder in said body;  
 a supply line pressure flow passageway in said body radially outward of said pump cylinder;  
 an inlet port opening into said flow passageway;  
 a piston slidably mounted for reciprocation in said pump cylinder;  
 seals around said piston at opposite ends thereof;  
 a pump inlet duct communicating laterally between said line pressure flow passageway and said pump cylinder at a

location therein intermediate and seals throughout reciprocation of said piston;  
 a load duct extending radially into said piston from the outer surface thereof intermediate said seals;  
 a load port in said piston communicating with said load duct and opening axially through the head of said piston;  
 a one-way check valve in said load port enabling flow in one direction only from said load duct through the head of said piston;  
 a nozzle outlet opening from said body;  
 a restricted high pressure duct extending generally axially through said body from the head of said cylinder to said nozzle outlet; and  
 means for reciprocating said piston.

**4,792,097**  
**NON-SPUTTERING NEBULIZER**  
 Carl P. Kremer, Jr.; Ann S. Kremer, both of Darien, Conn., and Henry Tom, La Honda, Calif., assignors to Mallinckrodt, Inc., St. Louis, Mo.  
 Filed Mar. 31, 1987, Ser. No. 32,381  
 Int. Cl.<sup>4</sup> A61M 11/00; B05B 7/30  
 U.S. Cl. 239—338 12 Claims



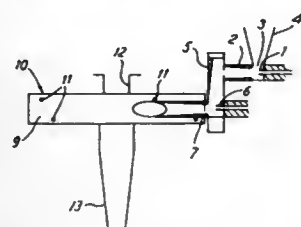
1. A nebulizer comprising a housing having a mist outlet, an aspirating structure including a nozzle having a base portion at one end thereof within the housing and a nozzle outlet for the discharge of gas under pressure within the housing at an end of the nozzle opposite the base portion, the nebulizer further comprising a sidewall and an inverted frusto-conical bottom wall disposed about the base portion of the nozzle away from the nozzle outlet, the bottom wall forming a liquid reservoir that drains towards the base portion of the aspirating structure, the nebulizer further including a well below said bottom wall for collecting and concentrating liquid between the outer wall of the well and the aspirating structure to avoid sputtering of liquid prior to substantially complete discharge of liquid from the nebulizer, said well having a well rim that defines the bottom edge of said bottom wall, the aspirating structure further including at least one passageway peripherally located with respect to said nozzle, said passageway being located below said well rim, said passageway communicating with the well for the aspiration of liquid from the well in response to gas discharged from said nozzle to form a mist.

**4,792,098**  
**IMPROVED IMPACT PLATE GRINDING MILL HAVING REDUCED MILLING GAS CONSUMPTION**  
 Andrew J. Haddow, Cleveland, England, assignor to Tioxide Group PLC, London, England  
 Filed Oct. 6, 1987, Ser. No. 104,985  
 Claims priority, application United Kingdom, Nov. 29, 1986, 8628586  
 Int. Cl.<sup>4</sup> B02C 19/06  
 U.S. Cl. 241—5 11 Claims

1. A mill for grinding powder material comprising a powder



inlet to introduce powder material into a gas, a first jet nozzle for supplying said gas, a first venturi axially in-line with said first jet nozzle and spaced therefrom by said powder inlet, an impact mill surface mounted at a reflective angle to the axis of said first jet nozzle and said first venturi for altering the direction of flow of said powder material entrained in said gas, a second jet nozzle for a gas spaced from said impact mill surface



and having a longitudinal axis transverse to the direction of the altered flow downstream from said impact mill surface, a cylindrical chamber having a circumferential wall and having outlets for exhaust gas and powder material and feeding means extending through said circumferential wall comprising a second venturi axially in line with said second jet nozzle to introduce powder material into said cylindrical chamber.

4,792,099

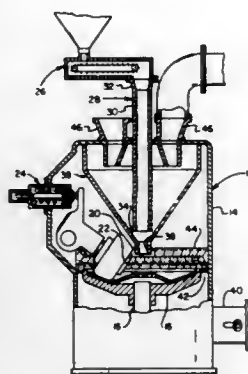
**PULVERIZER AUXILIARY LUBRICATION SYSTEM**  
Edward A. Hatch, Granby, and Clemens J. Skalka, Simsbury, both of Conn., assignors to Combustion Engineering, Inc., Windsor, Conn.

Filed Apr. 29, 1987, Ser. No. 43,786

Int. Cl. B02C 15/04, 25/00

U.S. Cl. 241-30

23 Claims



1. In a pulverizer having a lubricant reservoir, internal pump means, an upper shaft bearing and lower shaft bearings, the improvement of a lubrication system for supplying lubrication to the upper shaft bearing and the lower shaft bearings of the pulverizer, said lubrication system comprising:

- external pump means;
- first means connecting said external pump means in fluid flow relation to the lubricant reservoir for supplying lubricant from the lubricant reservoir to said external pump means;
- motor means coupled to said external pump means so as to be operative to drive said external pump means;
- sensing means mounted in juxtaposed relation to the lubricant reservoir so as to be operative to sense the temperature of the lubricant in the lubricant reservoir, said sensing means further being operative to generate a signal when the temperature of the lubricant in the lubricant reservoir reaches a preset value, said sensing means being connected in circuit relation with said motor means for transmitting the signal generated by said sensing means to said motor

means such that when received by said motor means the signal generated by said sensing means is operative to energize said motor means to drive said external pump means for purposes of effecting the withdrawal of lubricant from the lubricant reservoir;

c. second means connecting said external pump means in fluid flow relation to the upper shaft bearing and to the lower shaft bearings of the pulverizer for supplying the lubricant withdrawn from the lubricant reservoir by said external pump means to the upper shaft bearing and to the lower shaft bearings of the pulverizer so as to provide lubrication thereto; and

f. third means connecting the upper shaft bearing and the lower shaft bearings in fluid flow relation to the lubricant reservoir for returning the lubricant supplied by said external pump means to the upper shaft bearing and to the lower shaft bearings therefrom to the lubricant reservoir.

4,792,100

#### APPARATUS AND METHOD FOR CONTINUOUS SPOOLING

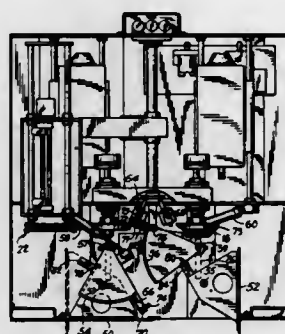
David Pepe, Meriden, Conn., assignor to Davis Electric Wallingford Corporation, Wallingford, Conn.

Filed Jan. 19, 1988, Ser. No. 145,067

Int. Cl. B65H 67/052

U.S. Cl. 242-25 A

13 Claims



1. A power driven dual shaft, parallel axis take-up having an alternately driven take-up spool mounted on each of said shafts which comprises:

- an outer protective door for each of said spools, each said door being pivotally supported for movement between a closed position to provide frontal protection, and an open position to permit access to the respective spool; and
- an inner protective door pivotally mounted between each outer door and its respective spool for pivotal movement from a first frontal protective position between each spool and the respective door and a second protective position between said spools, said outer and inner protective doors being sequentially operative to provide selective access to the spools and protective shielding therebetween.

4,792,101

**PROCESS FOR UNWINDING A THREAD FROM A REEL IN LOOMS, AND ARRANGEMENT USED THEREFOR**  
Philippe Van Bogaert, Brussels; Frank Ampe, Leffinge-Middelkerke, and Jozef Verhulst, Zillebeke, all of Belgium, assignors to Picanol N.V., Belgium

Filed Dec. 8, 1986, Ser. No. 938,887

Claims priority, application Netherlands, Dec. 9, 1985, 8503385; Belgium, Nov. 25, 1986, 2/61091

Int. Cl. B65H 49/02, 59/00

U.S. Cl. 242-54 R

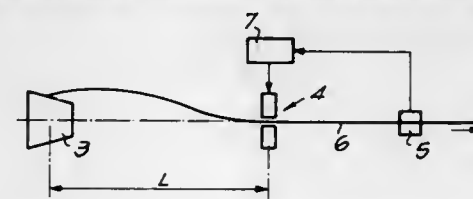
21 Claims

1. A process for unwinding a thread from a reel used in a

weaving loom wherein the maximum stress in said thread during unwinding is reduced, comprising the steps of:

- guiding said thread through a thread guide that is movable relative to the reel so as to effect adjustment of the distance between the guide and the reel;
- positioning said thread guide at a first distance relative to said reel and unwinding thread from the reel through the guide by a weaving loom;
- determining the tension of said thread between said thread guide and loom while it is unwound from the reel by the loom;
- adjusting the distance of said thread guide relative to said reel during weaving by the loom in response to the tension determination so that the thread guide is always positioned so as to minimize the stress variation in the thread during unwinding.

11. In an apparatus for unwinding a thread from a reel used in a weaving loom wherein the variation in stress of said thread during unwinding is minimized, said apparatus including a reel



upon which said thread is wound, a thread guide positioned at a distance from said reel, said thread being pulled through said thread guide as it is pulled from said reel; the improvement comprising:

- means for adjusting said distance of said thread guide from said reel;
- means for determining the variation in tension of said thread and generating a thread tension signal; and
- a processing unit having means providing communication between said tension determining device, said processing unit, and said adjusting mechanisms, said processing unit arranged to receive said thread tension signal and, in response to said thread tension signal, to generate a thread guide distance signal that corresponds to a distance between the thread guide and the reel whereat stress variation in the thread during its unwinding from the reel is minimized, said adjusting means being arranged to receive said thread guide distance signal and to position the thread guide at said distance in response to said thread guide distance signal.

4,792,102

#### PAPER TOWEL DISPENSER

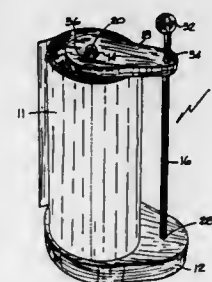
Douglas M. Olson, 1980 Galeana St., Aurora, Colo. 80010

Filed Dec. 18, 1987, Ser. No. 134,880

Int. Cl. B65H 19/00

U.S. Cl. 242-55.54

17 Claims



4. An apparatus for vertically dispensing a roll of paper towels and the like, the roll defining a hollow interior which is axially aligned about an axis of the roll, the roll also having two ends, one of which faces upwardly and one of which faces

downwardly when the roll is installed on said apparatus, said apparatus comprising:

- a base;
- a first upright rod-like member for maintaining a roll installed thereon in an upright position, said first rod-like member having a proximal end and a distal end with said proximal end attached to said base; the roll being installed on said first rod-like member so that said first rod-like member is positioned within the hollow interior of the roll;
- a second upright rod-like member having a proximal end and a distal end with said proximal end attached to said base, said second rod-like member being sufficiently spaced from said first rod-like member to permit the roll of paper towels to be installed on said first rod-like member; and
- gravity brake means having a first end defining a first bore which is sized and configured to slidably receive said first rod-like member to secure said brake means in a braking position, said brake means also having a second end defining a second bore, said second bore slidably receiving said second rod-like member so that said brake means is slidably engaged to and rotatable about said second rod-like member, said brake means being slidably engaged to and rotatable about said second rod-like member so that said brake means is capable of being slidably lifted off said distal end of said first rod-like member and rotated about said second rod-like member to enable the roll to be removed from said first rod-like member and replaced with a new roll, said brake means also defining an underside surface so that when said brake means is in the braking position, said underside surface frictionally engages the upwardly facing end of the roll under the force of gravity to stop the roll from rotating and unrolling after a paper towel has been torn from the roll.

4,792,103

#### DEVICE FOR SPLICING TWO WEBS OF MATERIAL EACH ORIGINATING FROM A ROLL

Habertus J. Schoonderbeek, KK Beuningen, Netherlands, assignor to Stork Brabant B.V., An Borsmeer, Netherlands

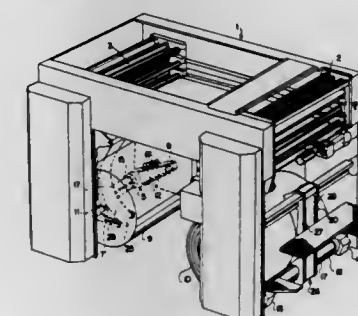
Filed Feb. 9, 1987, Ser. No. 12,030

Claims priority, application Netherlands, Feb. 11, 1986, 8600336

Int. Cl. B65H 19/14, 16/06

U.S. Cl. 242-58.1

5 Claims

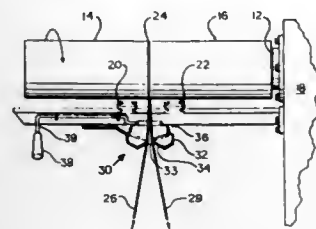


1. An apparatus for splicing and feeding a web of material comprising

- a supporting frame which includes a horizontal upper frame part and two downwardly-extending vertical frame parts, two web roll holding units, each web roll holding unit comprising a horizontal pivot shaft rotatably mounted in one of said vertical frame parts and two arms non-rotatably and slidably mounted on the pivot shaft for horizontal displacement along the pivot shaft, each arm having a free end that includes a rotatably mounted chuck for supporting, together with the chuck on the other arm of the roll holding unit, a web roll,
- drive means for pivoting each said pivot shaft,
- two drive belt units, each drive belt unit being mounted

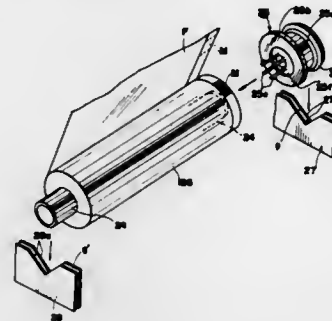
stationarily in a vertical plane between the two arms of a web roll holding unit and each drive belt unit comprising a main drive belt arranged to as to cooperate with a portion of the outer circumference of a web roll for rotationally driving the web roll,  
 drive means for each main drive belt,  
 a web splicing unit for connecting the trailing end of the web of one of the web rolls to the leading end of the web of the other web roll when both said trailing end and said leading end are stationary, and  
 web accumulating means accommodated in the horizontal upper frame part for accumulating the web supplied from the web splicing unit and for feeding the web therefrom to web working means located downstream of the web accumulating means.

**4,792,104**  
**APPARATUS FOR FORMING YARN TRANSFER TAILS**  
 John E. Tate, Greensboro, N.C., assignor to Southridge Corporation, Greensboro, N.C.  
 Filed May 7, 1987, Ser. No. 47,665  
 Int. Cl.<sup>4</sup> B65H 54/02  
 U.S. Cl. 242—18 PW 2 Claims



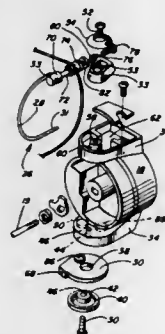
1. An apparatus for simultaneously winding yarn on multiple winding tubes comprising:  
 means for rotatably mounting at least two abutting winding tubes;  
 means for rotating said winding tubes;  
 means for feeding at least one yarn strand to each of said winding tubes;  
 reciprocating guide means associated with said mounting means for guiding said yarn strands across said winding tubes to build yarn packages on said winding tubes; and  
 transfer tail forming means positioned adjacent said reciprocating guide means and comprising:  
 a fixed yarn guide element for initially engaging said yarn strands and having a yarn guide surface therein with diverging sides extending generally outwardly and defining an opening between the outer ends thereof, said diverging sides continuously diverging along the entire yarn engaging length thereof and said diverging sides being joined at the rear of the guide surface by a web;  
 a pivotably movable yarn guide element cooperatively associated with said fixed yarn guide element, said pivotably movable yarn guide element having a V-shaped front portion and being adapted to pivot from a first position wherein the V-shaped front portion of the movable yarn guide element is behind the web of said yarn guide surface to a second position wherein at least part of said V-shaped front portion is spaced apart from and in front of said yarn guide surface of said fixed yarn guide element; and  
 means for pivoting said pivotably movable yarn guide element from said first to said second position;  
 whereby during the course of movement from said first to said second position said movable yarn guide element urges at least one yarn strand outwardly along each diverging side of said yarn guide surface so as to helically wind a transfer tail onto each of said winding tubes.

**4,792,105**  
**FILM ROLL MOUNTING ASSEMBLY**  
 Chiharu Imaseki, Yokohama, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
 Filed Jun. 9, 1987, Ser. No. 59,928  
 Claims priority, application Japan, Jun. 18, 1986, 61-93036[U]  
 Int. Cl.<sup>4</sup> B65H 16/06  
 U.S. Cl. 242—68.4 9 Claims



1. A film roll mounting assembly for a printer comprising:  
 a hollow cylindrical core sleeve having an inside, an inner space and at least one open end;  
 a roll film wound on said core sleeve with said open end projecting out from a side end of said roll film;  
 a spool member attached to said open end of said core sleeve and including a positioning member in contact with said side end of said roll film, and a recess formed on said positioning member to receive said open end of said core sleeve, said recess having a base and the depth of said recess being greater than the length of said projecting open end of said core sleeve so as to leave a gap between said core sleeve and the base of said recess, and a holding member for holding said core sleeve concentric with said spool member; and  
 means for positioning said spool member, said spool member being rotatable together with said core sleeve to supply the film.

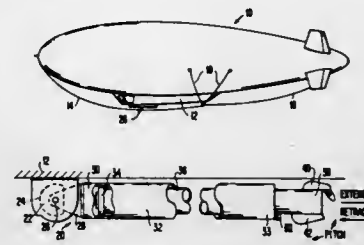
**4,792,106**  
**MAGNETIC BAIL**  
 Lorens G. Hlava, Tulsa, Okla., assignor to Zebco Corporation, Tulsa, Okla.  
 Filed Jul. 20, 1987, Ser. No. 75,441  
 Int. Cl.<sup>4</sup> A01K 89/01  
 U.S. Cl. 242—84.2 G 12 Claims



1. An improved fishing reel of the type having a line-carrying spool, a rotor housing, a crank handle for rotating the rotor housing about an axis, a bail-carried on a bail arm, and means mounting the bail arm for movement relative to the rotor housing selectively between a cast position wherein line can be paid out of the spool and a retrieve position wherein line can be

directed onto the spool as the rotor housing is operated by the crank handle, the improvement comprising:  
 cooperating mutually attractive means on the bail arm and rotor housing for magnetically urging movement of the bail arm selectively towards each of the cast and retrieve positions and for maintaining the bail arm in each of the cast and retrieve positions,  
 whereby the bail arm is positively maintained in each of the cast and retrieve positions.

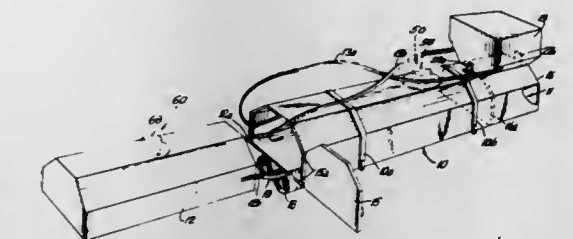
**4,792,107**  
**AIRSHIP TELESCOPIC BOOM**  
 James A. Fernz, and Claude W. Engelke, both of Wichita, Kans., assignors to The Boeing Company, Seattle, Wash.  
 Filed Jul. 31, 1986, Ser. No. 891,302  
 Int. Cl.<sup>4</sup> B64F 1/12  
 U.S. Cl. 244—115 9 Claims



1. A telescopic boom for an airship, said boom comprising:  
 a housing recessed in said airship, said housing having a vertical axis and an opening through the surface of said airship generally coaxial with said vertical axis;  
 a mounting plate including an annular portion disposed in said housing for rotation about said vertical axis and an integral flange portion extending through the opening of said housing;  
 a tubular arm having first and second axial ends, said first end being secured to said flange portion for pivotal movement about a horizontal axis perpendicular to said vertical axis;  
 an extension arm having first and second ends and being coaxially disposed in said tubular arm for selective reciprocal, axial telescopic movement through the second end thereof;  
 pulley means operatively disposed in said tubular arm proximate said first end thereof and operatively connecting said tubular and extension arms for reciprocally moving said extension arm;  
 annular gear means fixed to the annular portion of said mounting plate;  
 means in said housing operatively engaging said annular gear means for selectively rotating said mounting plate around said vertical axis;  
 a gear fixed to the first end of said tubular arm for pivotal movement therewith;  
 worm gear means disposed in said housing and operatively engaging said gear for selectively rotating said tubular arm about said horizontal axis; and  
 means in said airship connected to said pulley means, rotating means and worm gear means for controlling the operation thereof to selectively extend, rotate and pivot said boom.

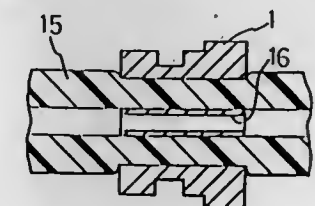
**4,792,108**  
**SPACE STATION**  
 Stephen M. Ball, 813 Broadway, New York, N.Y. 10003  
 Filed Jul. 24, 1986, Ser. No. 889,003  
 Int. Cl.<sup>4</sup> B64G 1/46, 1/64  
 U.S. Cl. 244—159 2 Claims  
 1. As structure for a space station, the combination comprising a pair of compartments, one larger than the other and in

which the other is nested for transport aloft in a space shuttle or the like, the compartments being tethered together while so nested and when later separated to facilitate manipulation relative to each other when in space, and means for mounting the two compartments in spaced relation to each other aloft, comprising telescoping pole means detached from the compartments and contracted during transport aloft, the said telescoping pole means being of a contracted length not substantially greater than that of the larger compartment, the said telescoping pole means being expanded when aloft and attached at opposite ends to the two compartments, the telescoping pole means



being of an expanded length, between opposite ends, of a substantial multiple of the contracted length to provide one of said compartments with a desired artificial gravitational force when the station is rotated at a moderate rotational velocity about an axis intermediate said compartments.

**4,792,109**  
**HOSE INTERMEDIATE RETAINER**  
 Masato Hattori, Nagoya, Japan, assignor to Toyoda Gosei Co., Ltd., Nishikasugai, Japan  
 Filed Oct. 26, 1987, Ser. No. 112,442  
 Claims priority, application Japan, Oct. 28, 1986, 61-165480  
 Int. Cl.<sup>4</sup> F16L 5/00  
 U.S. Cl. 248—56 6 Claims



1. A retainer for retaining an intermediate portion of a hose, comprising:  
 a deformable metal tubular member having two axially opposite ends through which an axial bore thereof opens, so that said metal tubular member may be slid onto a hose to achieve a position in which some of the hose protrudes from one end of the tubular member and some of the hose protrudes from another end of the tubular member;  
 a radially extending flange means provided on said tubular member so as to extend in a circumferential direction relative to the longitudinal axis of the tubular member;  
 a plurality of axially extending groove means which are spaced from one another in said circumferential direction



and divide said flange means into a plurality of flange segments, said tubular member thereby being caused to be radially thinner in at least some first places where said groove means are located than in at least some second places where said flange means is not broached by said groove means;

said tubular member being subject to being radially inwardly crushed by squeeze-forming deformation in said first places, thereby bringing said flange segments closer together in said circumferential direction and radially, constricting said axial bore, for securing said tubular member in place on the hose; and

said tubular member further including means defining an external, radially outwardly-opening circumferential groove at an intermediate location axially spaced from both of said ends of said tubular member whereby a fastener may be accommodated to said tubular member for fastening said retainer to other structure.

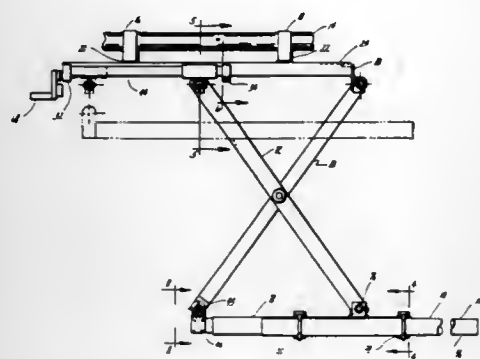
**4,792,110**  
**TOOLING SUPPORT APPARATUS WITH LINEAR BOOM**

Irvin D. Bond, 1027 Allen Rd., Clarkston, Mich. 48016  
Filed Jul. 31, 1987, Ser. No. 80,420

Int. Cl.<sup>4</sup> F16M 5/00

U.S. Cl. 248—651

6 Claims



1. Tooling support apparatus, comprising:  
a support;

an elongated tooling boom having a first end and an opposite second end, the first end being adapted to support tooling means;

structure connecting the second end of the boom to the support for adjusting the distance between the support and the boom to relocate the position of the tooling means, said structure comprising:

a first scissor arm having an upper end and a lower end;  
a second scissor arm having an upper end and a lower end;

a first pivot means pivotally connecting the upper end of the first scissor arm to the support;

second pivot means pivotally connecting the lower end of the first scissor arm to the boom;

third pivot means connecting the upper end of the second scissor arm to the support;

fourth pivot means connecting the lower end of the second scissor arm to the boom;

fifth pivot means connecting the first scissor arm to the second scissor arm; and

first means for moving the first scissor arm and the second scissor arm with respect to one another so as to move the lower ends of the first scissor arm and the second scissor arm with respect to the support, whereby the boom is raised or lowered depending upon the

motion of the upper end of the first scissor arm with respect to the upper end of the second scissor arm.

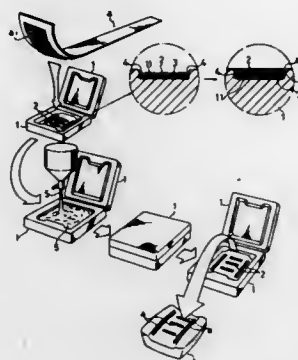
**4,792,111**  
**FORMING DIE FOR FORMING A VEHICLE SEAT FOAM CUSHION MEMBER WITH A PILE-TYPE FASTENER**  
Katsumi Taguchi, Akiyama, Japan, assignor to Tachi-S Co., Tokyo, Japan

Filed Apr. 21, 1987, Ser. No. 40,620

Int. Cl.<sup>4</sup> B29C 33/14

U.S. Cl. 249—83

8 Claims



1. A forming die for forming a vehicle seat foam cushion member integrally on its surface with at least one of a first pile-type fastener adapted to be engageable with at least one of a second pile-type fastener provided on a back surface of a top cover member associated with the seat, said forming die comprising:

at least one recessed groove formed in an inner wall of said forming die;

a base plate frictionally secured in said recessed groove by resilient means; and,

means integrally fixed to said base plate, which is releasably securable to pile of said pile-type fastener.

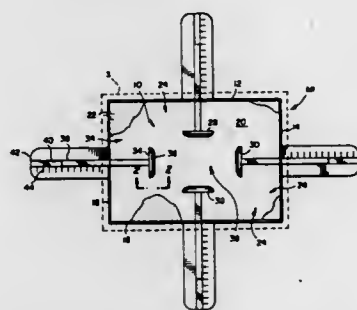
**4,792,112**  
**MOLD FOR FORMING CONTAINER ADAPTER**  
Kenneth D. Corby, and Luke T. Faulstick, both of Rochester, N.Y., assignors to Eastman Kodak Corporation, Rochester, N.Y.

Filed Aug. 14, 1987, Ser. No. 85,450

Int. Cl.<sup>4</sup> B28B 7/02

U.S. Cl. 249—155

12 Claims



1. A mold for transforming a heated plastic sheet into an adapter intended to restrain a received article from moving inside a container larger than the article, the adapter including a base configured to fit snugly within the container and a plurality of projections on the base that are spaced from each

other to receive the article snugly therebetween, said mold comprising:

means including side and bottom walls defining a cavity with peripheral and medial regions for operatively positioning the plastic sheet for formation for the adapter, said bottom wall being perforated to facilitate creation of a pressure differential on opposite surface of the plastic sheet; and

means disposed in said cavity peripheral region and moveable toward and away from said cavity medial region for selectively locating the projections on the adapter base, said locating means in said peripheral region including at least one projection-forming member slideably mounted on each of at least two of said side walls for selective movement toward and away from said medial region.

**4,792,113**  
**FLUID FLOW CONTROL VALVE**  
Paul G. Eidsmore, Scotts Valley, Calif., assignor to Integrated Flow Systems, Inc., Scotts Valley, Calif.

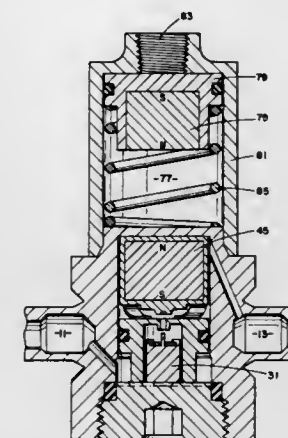
Continuation-in-part of Ser. No. 675,825, Nov. 28, 1984, Pat. No. 4,624,443, which is a continuation-in-part of Ser. No. 398,845, Jul. 16, 1982, abandoned. This application Nov. 24, 1986, Ser. No. 933,780

The portion of the term of this patent subsequent to Nov. 25, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> F16K 31/08

U.S. Cl. 251—65

3 Claims



1. An apparatus for inhibiting the excess flow of fluid under pressure therethrough and for manually restoring flow controlling operation thereof without fluid seals on flexible members interposed between fluid under pressure therewith and the environment, the apparatus comprising:

a body having an aperture between a vertically-aligned lower first chamber and upper second chamber for fluid flow therethrough from the first chamber to the second chamber, said aperture having a sealing face on the side thereof within the first chamber;

a fluid inlet coupled to the first chamber at a location in the lower region thereof remote from the aperture, and a fluid outlet coupled to the second chamber;

an element vertically disposed and slidably positioned within the first chamber intermediate the fluid inlet and the aperture and freely slidable vertically therein for movement between a normally-open reset position away from engagement with the aperture and a sealing position in contact with the aperture to form a fluid-tight seal therewith without any intervening resilient means for urging the element away from the sealing position, said element providing fluid passages of selected cross-sectional area from the fluid inlet to the aperture for imparting self-actuated moving force to the element to move the element to the sealing position in contact with the aperture in

response to fluid under pressure flowing through said selected cross-sectional area momentarily in excess of a selected flow rate;

an actuator disposed for vertical movement through the aperture for selectively repositioning the element in the first chamber to its reset position therein from the second chamber;

control means including a magnet interposed between first and second biasing means for vertical sliding movement within the second chamber to selectively alter the position of the actuator, said first and second biasing means urging said control means away from the aperture to permit fluid under pressure at said fluid inlet to maintain said element in said sealing position closing said aperture following momentary excess rate of flow of the fluid under pressure; and,

a magnet disposed outside the body to interact in direct alignment and in magnetic repulsion with the magnet of the control means for altering the position of the control means within the second chamber to apply force to the actuator.

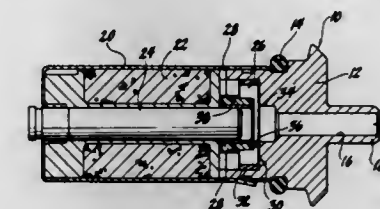
**4,792,114**  
**VACUUM REGULATOR VALVE UNIT**  
Joseph Fornuto, Rochester; James R. Gaffney, Penfield, and Thaddeus J. Grey, Rochester, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 7, 1987, Ser. No. 83,754

Int. Cl.<sup>4</sup> F16K 31/06

U.S. Cl. 251—129.16

3 Claims



1. A vacuum regulator valve unit comprising a valve body and a coil assembly defining a chamber, said valve body having an air inlet passage opening into said chamber, a washer overlying said valve body within said chamber, said washer having an air inlet port aligned with said passage and defining a valve seat surrounding said port, said coil assembly supporting a shaft projecting into said chamber, a valve member mounted loosely on said shaft within said chamber, said valve member sliding on said shaft into and out of engagement with said valve seat in response to energization and deenergization of said coil assembly, and wherein said valve body has a peripheral annular ledge that cambers said washer to assure full engagement of said washer with said valve body at the perimeter of said port.

**4,792,115**  
**COUPLING WITH FUSIBLE ACTUATOR MEMBER**  
Paul R. Jindra, Brooklyn, and Edward D. Gailley, Mentor, both of Ohio, assignors to Tuthill Corporation, Cleveland, Ohio

Filed Mar. 16, 1988, Ser. No. 168,690

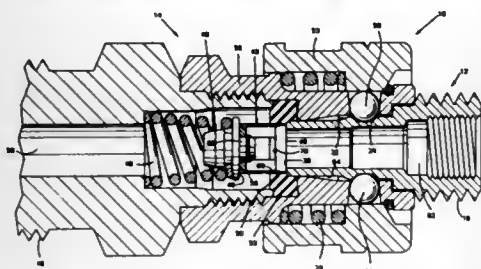
Int. Cl.<sup>4</sup> F16L 37/28

U.S. Cl. 251—149.6

17 Claims

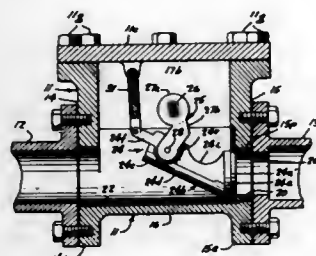
1. A coupling for use in connecting a pair of conduits in fluid communication, said coupling comprising a plug assembly adapted to be connected with one of the conduits, a socket assembly adapted to be connected with another of the conduits, said plug and socket assemblies being interconnectable to connect the conduits in fluid communication, a first one of said assemblies including a valve member movable along its central axis between a closed condition blocking fluid flow through said first one of said assemblies and an open condition in which

said valve member is ineffective to block fluid flow through said first one of said assemblies, spring means for urging said valve member toward the closed condition, a heat fusible actuator member connected to said valve member for movement therewith, said actuator member extending axially outwardly from one end of said valve member and having an axially outer end portion which is engageable with a second one of said



assemblies to transmit force from the second one of said assemblies to said valve member to move said valve member from the closed condition to the open condition upon interconnection of said assemblies, said actuator member being fusible upon exposure to excessive heat to release said valve member for movement from the open condition to the closed condition under the influence of said spring means while said assemblies are interconnected.

**4,792,116**  
**SANDBLASTING NOZZLE AND CONTROL VALVE ASSEMBLY**  
George H. Haber, Jr., 807 Moores Ln., New Castle, Del. 19720  
Filed Feb. 9, 1988, Ser. No. 154,107  
Int. Cl. F16K 31/53; F16L 58/10  
U.S. Cl. 251—229 20 Claims

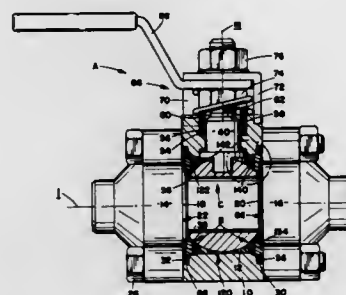


1. A control valve assembly to be disposed in immediately adjacent communication with a discharge nozzle of a sandblasting abrasive cleaning system or the like, comprising a valve housing defining an elongated valve chamber extending along a longitudinal center axis therethrough between opposite inlet and discharge ends of the housing and chamber, inlet and outlet passage means for connecting the inlet end to a supply conduit for delivering an abrasive stream of pressurized fluid and sand to said valve chamber and for communicating said discharge end with the discharge nozzle, a well formation on said housing defining a lateral compartment communicating with said valve chamber, valve seat means at the discharge end of the valve chamber having a circular passage concentric with said center axis communicating with the nozzle and encircled by a truncated conical seating surface, a pivot valve member supported for movement into and from said valve chamber having a generally cylindrical valve head formed about an axis of revolution coinciding with said center axis when located in closed position and providing a beveled surface to conform to and seat tightly against said seating surface to close said passage, the valve member including an elongated stem portion extending in said closed position from said valve head toward

said end cavity along a path inclined to said center axis, an operating shaft journaled in said well formation, a handle for rotating the shaft, and a first linkage yoke member mounted at one end thereof on said shaft and connected at its other end to said stem portion at an end opposite said valve head, for moving the valve member between an open position and said closed position, a second linkage member pivoted at one end to said housing and at another end to said valve member, the yoke member and second linkage member directly upward from the valve seat in a vertical direction within the valve housing being located and shaped to tilt the valve member while concurrently moving it arcuately about the shaft upon shaft rotation to retract the valve member substantially fully into said lateral compartment to said open position disposing said entire stem portion substantially parallel to said center axis and parallel to the inlet and outlet passage means to effect said moving of the valve member therefrom to said closed position.

**4,792,117**  
**MATERIAL FOR VALVE SEATS**  
Kazuhisa Kubota, Yamanashi, Japan, assignor to Kitz Corporation, Tokyo, Japan  
Filed Apr. 9, 1987, Ser. No. 36,661  
Int. Cl. C08L 27/18; F16K 1/14  
U.S. Cl. 251—315 3 Claims  
1. A valve seat prepared from a resin composition consisting of a blend of powders of 97 to 70% by weight of polytetrafluoroethylene and 3 to 30% by weight of a copolymer of tetrafluoroethylene and perfluoroalkylvinylether.

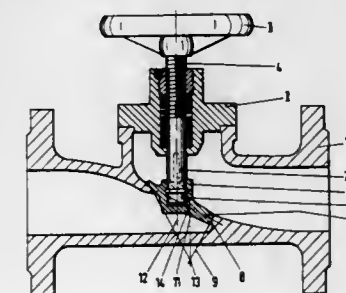
**4,792,118**  
**LOW DEAD SPACE RING**  
Edward M. Yusko, Jr., and Peter C. Williams, both of Cleveland Heights, Ohio, assignors to Whitey Co., Highland Hts., Ohio  
Continuation of Ser. No. 828,751, Feb. 12, 1986. This application Jun. 18, 1987, Ser. No. 64,108  
Int. Cl. F16K 5/06  
U.S. Cl. 251—315. 1 Claim



1. A ball valve comprising:  
a body having a central passageway;  
a ball member including a fluid flow opening therethrough, said ball member being positioned in said passageway and mounted for selective rotation between valve open and closed positions to control fluid flow through said valve, said ball member further including a radius of curvature on an outer wall surface;  
a radially inward extending shoulder in said passageway disposed circumferentially thereof on one side of and generally facing said ball member;  
a radially inward extending bearing surface in said passageway disposed circumferentially thereof on one side of said ball member, said bearing surface generally facing said shoulder;  
a composite seat member assembly positioned axially in said passageway on one side of said ball member between said shoulder and bearing surface for fluid-sealing engagement

with said ball member, said seat member assembly including:  
a seat ring adapted for elastic flexure generally toward and away from the associated bearing surface and including a central opening, a first surface generally facing said shoulder, a second surface abutting said bearing surface, and a third surface facing said ball member for sealing engagement with said ball member outer wall surface, said seat ring third surface being contoured and having a radius of curvature in an unstressed, unassembled condition greater than the radius of said ball member;  
a disc spring having a central opening and a generally frustoconical configuration in an unstressed condition interposed between said seat ring and said shoulder;  
a dead space ring formed an impregnated material providing substantial rigidity to limit cold flow of said ring into the passageway as said ball member is rotated between open and closed positions, said material having low coefficient of friction properties to facilitate rotation of said ball member without substantially increasing the amount of torque required to rotate said ball member relative to the torque required to rotate the ball member in the absence of said dead space ring, said dead space ring including a first curvilinear surface closely engaging said ball member, a second surface generally facing said shoulder, an outer smoothly contoured surface in close mating receipt by said passageway, said dead space ring further including an open ended arcuate cutout extending through a side wall thereof from an inner edge adapted to closely receive an associated actuating stem therein wherein said dead space ring substantially fills said central passageway; and,  
said ball member and composite seat member assembly being sized so that when assembled said seat ring is flexed away from said bearing surface and stressed to have a radius of curvature at said seat ring third surface generally equivalent to said ball member radius of curvature and is disposed in sealing engagement with said ball member over the extent of said seat ring third surface, said disc spring being stressed toward a flattened condition for continuously urging the third surface of said seat rings toward engagement with said ball member.

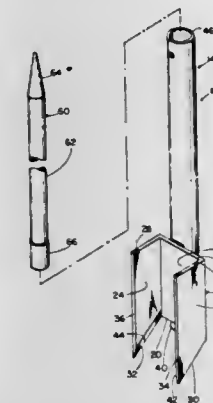
**4,792,119**  
**VALVE**  
Alois Illy, Limburgerhof; Günter Alberti, Frankenthal, and Karlheinz Felerlein, Abenberg, all of Fed. Rep. of Germany, assignors to Klein, Schanzlin & Becker Aktiengesellschaft, Frankenthal, Fed. Rep. of Germany  
Filed Mar. 18, 1987, Ser. No. 27,614  
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1986, 3609772  
Int. Cl. F16K 1/36  
U.S. Cl. 251—333 15 Claims



1. A valve comprising a housing; a seat in said housing; a linearity movable valving disposed in said housing; and moving means actuable to move said element in said housing toward and away from engagement with said seat, said moving means including a stem having a first axis which is inclined with reference to said seat, said seat having a tapered sealing

face engageable by said element, constituting a portion of a conical surface and surrounding a seat area, the conical surface having an apex and a second axis, and said stem being actuable to exert upon said element a stem force having a line of action intersecting said seat area at a first location disposed at a first distance from said apex, said second axis intersecting said seat area at a second location disposed at a lesser second distance from said apex.

**4,792,120**  
**POST REMOVING DEVICE**  
Roy B. Egnas, 11330 Madison Ave. NE., Bainbridge Island, Wash. 98110  
Filed Nov. 20, 1987, Ser. No. 123,217  
Int. Cl. E21B 19/00  
U.S. Cl. 254—30 4 Claims



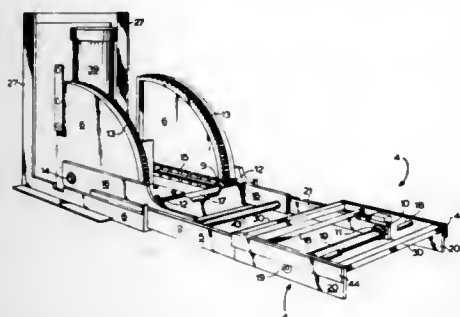
1. Pulling and extracting device for posts, poles and the like, comprising:  
(a) a tool portion including a post engagement member having a back wall and spaced apart side walls extending outwardly from said back wall such that a generally U-shaped tool body is defined having upper edge means and lower edge means, said tool body further including post engaging teeth means attached to the lower edge means of said back wall and extending downwardly below said lower edge means,  
(b) elongated, hollow handle means secured to said back wall of said tool body and having an upper and a lower end and extending upwardly from said tool body and including metal slug means inside said handle near the lower end thereof, and  
(c) slide bar hammer means adapted to be inserted in said handle means and to be hammered against said metal slug means for driving said tool portion downwardly and to drive said teeth means into said post, said slide bar hammer also serving as a lever extension of said handle for prying said post upwardly when the teeth means have been engaged therewith.

**4,792,121**  
**LIFTER**  
Dulin L. Annas, Sr., Hickory, and Richard M. Teague, Taylorsville, both of N.C., assignors to Anteg, Inc., Hickory, N.C.  
Filed Dec. 11, 1987, Ser. No. 131,459  
Int. Cl. B66F 7/12  
U.S. Cl. 254—95 11 Claims

1. A device for lifting and positioning heavy objects comprising:  
(a) a frame;  
(b) an arm moving rack gear disposed on the frame;  
(c) an arm having first and second terminal portions the first



- terminal portion rotatively affixed to the arm moving rack gear or the frame;
- (d) an arm moving pinion gear rotatively affixed to the arm's first terminal portion in mechanical engagement with the arm moving rack gear adapted to move the arm from a lateral to an upstanding position and from the upstanding to the lateral position upon rotation of the arm moving pinion gear in a predetermined direction;
- (e) a foot device rotatively affixed to the arm's second terminal portion;
- (f) a foot pinion gear rotatively affixed to the second terminal portion of the arm and fixedly attached to the foot adapted to rotate the foot when the second pinion gear is rotated;
- (g) a foot control pinion gear non-rotatively attached to the frame; and,



- (h) an elongated member having first and second terminal portions, both of which include a rack gear, the rack gear of the first terminal portion of the elongated member being mechanically engaged with the foot control pinion gear and the rack gear of the second terminal portion of the elongated member being mechanically engaged with the foot pinion gear so that when the arm moving pinion gear rotates and moves the arm, the rack gear on the first terminal portion of the elongated member pushes the elongated member towards the foot, thereby causing the rack gear on the second terminal portion of the elongated member to rotate the foot pinion gear and the foot and to maintain the foot essentially stable and horizontal regardless of the position of the arm.

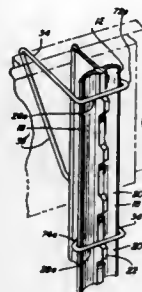
4,792,122

## FENCE BRACKET

Thomas J. Smart, 640 Industrial Dr., Cary, Ill. 60013  
Continuation-in-part of Ser. No. 934,164, Nov. 21, 1986, abandoned, which is a continuation-in-part of Ser. No. 887,385, Jul. 21, 1986, Pat. No. 4,688,769. This application Jun. 24, 1987, Ser. No. 65,884  
Int. Cl.<sup>4</sup> E04H 17/14

U.S. Cl. 256-68

14 Claims



1. A fence bracket for mounting adjacent fence rails in fixed relation on a generally upright fence post of the type having

protrusions longitudinally spaced along the post, where the post includes a longitudinal axis and first and second spaced flanges disposed on opposite sides of the longitudinal axis, comprising:

- first and second fingers disposed in planes transverse to the longitudinal axis of the post and extending around a portion of the fence post, each having a hooked portion and wherein the hooked portion of the first finger is disposed over and engages one of the flanges of the fence post and the hooked portion of the second finger is disposed over and engages the other of the flanges and wherein at least one of the fingers is engageable with one of the protrusions to limit movement of the bracket longitudinally with respect to the post; and
- means disposed between the first and second fingers for supporting overlapping ends of the adjacent fence rails including first and second support members extending transversely of the longitudinal axis and joined to the first and second fingers, respectively, and a connecting member disposed at an angle with respect to the longitudinal axis of the post extending between and joined to the support members.

4,792,123

## METALLURGICAL PLANT

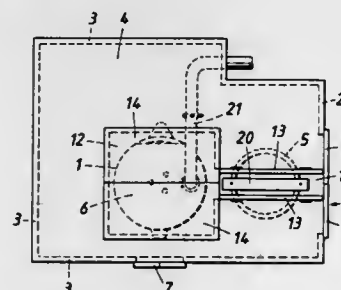
Peter Moser, Linz; Alfred Weber, St. Georgen; Aglas Johann, Hofkirchen; Johann Popersahatzky, Neufurth, and Georg Stastny, St. Georgen, all of Austria, assignors to Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Apr. 3, 1987, Ser. No. 33,752

Claims priority, application Austria, Apr. 30, 1986, 1164/86  
Int. Cl.<sup>4</sup> C21C 5/38

U.S. Cl. 266-142

1 Claim



1. A metallurgical plant comprising:

- (a) a metallurgical vessel having an open top and being mounted for tilting about a horizontal axis extending in a predetermined direction,
- (b) a cover adapted to be pivotally moved between an open position exposing the open vessel top and a closed position closing the open vessel top,
- (c) actuating means for lifting the cover from the open vessel top and for pivotally moving the cover along a predetermined path from the closed to the open position to permit the vessel to be charged,
- (d) a charging box for charging the vessel,
- (e) two crane ropes suspending the charging box and spaced from each other in alignment in the direction of the horizontal tilting axis of the metallurgical vessel,
- (f) an enclosure surrounding the vessel and the cover in the open and closed positions, the enclosure comprising
- (1) a side wall extending transversely to the horizontal tilting axis and having a charging opening through which the charging box suspended from the two crane ropes is adapted to be laterally moved into the enclosure to a charging position over the vessel, the side wall and the vessel defining a space therebetween for accommodating the charging box in a waiting position in which

the charging box clears the predetermined path for movement of the cover between the open and closed positions so that the cover is moved between the open and closed positions while said charging box is in the waiting position in said enclosure, and

- (2) a top wall extending over the vessel from the side wall, the top wall defining an elongate top wall opening extending in the direction of the horizontal tilting axis of the metallurgical vessel and adapted to receive the two aligned crane ropes as the charging box is laterally moved into the enclosure, the elongate top wall opening communicating with the side wall charging opening and extending at least as far as a vertical center-line of the metallurgical vessel,
- (g) first and second shutter means selectively operable to close the charging and top wall openings, respectively said first and second shutter means defining an elongated, minimally open slot capable of receiving and closely surrounding the aligned crane ropes of the charging box so as to minimize the escape of flue gases from the vessel during charging,
- (h) exhaust means extending on an underside of the top wall and having exhaust openings along the elongated top wall slot, and
- (i) air-blasting means arranged on the underside of the top wall and operable to produce an air blast across the elongated top wall slot.

4,792,124

## SUB-LANCE INSTALLATION FOR CARRYING OUT MEASUREMENTS AND/OR TAKING SAMPLES IN A METALLURGICAL FURNACE

Petrus C. H. Zoaneveld, Heemskerk, Netherlands, assignor to Hoogovens Groep B.V., IJmuiden, Netherlands

Filed Feb. 10, 1988, Ser. No. 154,295

Claims priority, application Netherlands, Feb. 16, 1987, 8700371

Int. Cl.<sup>4</sup> C21C 5/28

U.S. Cl. 266-226

9 Claims



1. Sub-lance installation for performing at least one of carrying out measurements and taking samples in a metallurgical furnace, having

- (a) an elongate tubular lance having a vertical longitudinal axis, an upper end and a lower end and being rotatable about said longitudinal axis,
- (b) a carriage to which said lance is attached at its upper end and by which said lance is movable vertically so as to bring said lower end into an operational location in the furnace for at least one of measurement and sample-taking,
- (c) means causing rotation of said lance about its longitudinal axis comprising a helical guide system which imparts said

rotation to the lance, said helical guide system comprising a guide for the lance and at least one pair of guide elements in the form of mutually cooperating projection and recess at least one of which is helical and one of which is on the lance and the other of which is on said guide for the lance, said rotation of the lance being caused by cooperative action of said projection and recess upon relative movement of the lance and the guide.

4,792,125

## CONSUMABLE LANCE

Evan L. Hand, Sr., Hummelstown, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Aug. 24, 1987, Ser. No. 88,449

Int. Cl.<sup>4</sup> C21C 5/48

U.S. Cl. 266-266

9 Claims



1. A consumable lance for injecting a gas into a molten metal bath, said lance comprising:

- (a) a longitudinal structural support assembly encased within a protective refractory covering,
- (b) a plurality of longitudinal gas conduits within said refractory covering and radially spaced about said structural support assembly,
- (c) a lower end portion adapted to be immersed into and consumed by said molten metal bath, and
- (d) an upper end portion having a manifold system for discharging said gas into the molten metal bath through said conduits

where the longitudinal structural assembly (a) includes a closed innermost longitudinal structural member extending between the lower end portion (c) and the upper end portion (d) a series of circular spacer members spaced along the length of said closed innermost longitudinal structural member and a plurality of longitudinal bar members radially spaced about said closed innermost longitudinal structural member between adjacent gas conduits and fastened to the periphery of said circular spacer members.

4,792,126

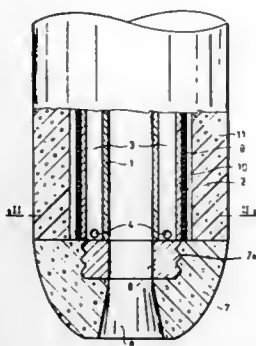
**BLOW LANCE FOR TREATING MOLTEN METAL IN METALLURGICAL VESSELS**

Gabor Nagy, Miskolc; Zoltan Szonyi, Budapest; Lajos Mityok; Istvan Pragy, both of Miskolc, and Jozsef Zambo, Budapest, all of Hungary, assignors to Vasipari Kutato es Fejlesztó Vállalat, Hungary

Continuation of Ser. No. 854,740, Apr. 21, 1986, abandoned, which is a continuation of Ser. No. 712,999, Mar. 18, 1985, abandoned. This application Mar. 12, 1987, Ser. No. 24,882 Int. Cl.<sup>4</sup> C21C 5/48

U.S. Cl. 266—270

11 Claims



1. A blow lance for treating molten metal in metallurgical vessels comprising a concentric metal pipe structure enclosed within a refractory ceramic covering, said pipe structure and said ceramic covering defining a space therebetween, said metal pipe structure being formed of inner and outer metal pipes, and ducting means for forming coolant ducts between said inner and outer pipes and a heat-resistant elastic layer consisting of an elastic fibrous material and excluding any binder material, said elastic layer being positioned in said space which is between an outer surface of said outer pipe and an inner surface of said refractory covering.

4,792,127

**FRICTION DAMPER**

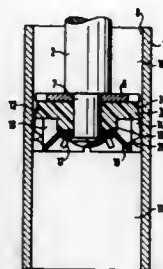
Bernd Körting, Adenau, Fed. Rep. of Germany, assignor to Stabilus GmbH, Koblenz-Neuendorf, Fed. Rep. of Germany Filed Aug. 6, 1987, Ser. No. 82,796

Claims priority, application Fed. Rep. of Germany, Aug. 16, 1986, 3627816

Int. Cl.<sup>4</sup> F16F 7/08; D06F 37/20

U.S. Cl. 267—64.15

24 Claims



1. A friction damper comprising an outer part (1) having a cavity (10, 11) limited by an internal cylindrical surface (8), a core part (2) telescopically movable in relation to the outer part (1) in the direction of an axis of the cylindrical surface (8) and a friction piston construction group (3) on the core part (2), which group (3) is in frictional engagement with the cylindrical inner surface (8) of the outer part (1), wherein the improvement comprises said friction piston construction group (3) comprising a plurality of friction elements (13) distributed

about said axis, the friction elements (13) being formed by skirt segments (13) of a pot-shaped friction piston (3a) which are separated from one another by slots (14) and are integral with a common basic body (12) of the pot-shaped friction piston (3a), said friction elements (13) being stressed by a radially acting spring system (20) into frictional engagement with the inner surface (8), and said radially acting spring system (20) being formed by at least one star spring (20) having a central part (15) and plurality of spring tongues (16), said central part (15) lying on the inner side of the basic body (12) of the pot-shaped friction piston (3a) and said spring tongues (16) acting radially against the skirt segments (13) of the pot-shaped friction piston (3a).

4,792,128

**NO GROW GAS SPRING**

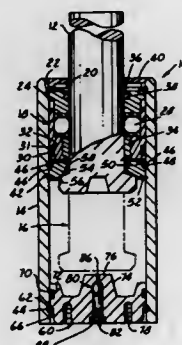
David M. Holley, Whitmore Lake, Mich., assignor to Power Components, Inc., Redford, Mich.

Filed Mar. 8, 1988, Ser. No. 165,517

Int. Cl.<sup>4</sup> F16F 9/34

U.S. Cl. 267—118

9 Claims



1. A gas spring having a rod which can be moved to compress a gas therein comprising: a cylinder tube defining at least in part a gas chamber, a piston rod slidably received in said cylinder tube, movable between extended and retracted positions, and constructed and arranged to compress a gas within said chamber when moving from its extended position toward its retracted position, a stop ring removably received in said tube, encircling said rod, and bearing on said rod when said rod is in its extended position to provide a positive stop limiting the extent to which said rod can be extended by compressed gas in the chamber, a first retainer releasably retaining said stop ring in said tube so that said stop ring cannot be forced out of said tube by said rod bearing thereon when moved to its extended position by compressed gas in the chamber, an end cap removably received in said tube adjacent one end thereof, spaced from said rod when in its extended position and in cooperation with said tube defining at least in part the gas chamber, a second retainer removably received in said tube and releasably retaining said end cap so that it cannot be forced out of said tube by compressed gas in the chamber, and a filler valve received in said end cap, communicating with the chamber and constructed and arranged to be normally closed when the chamber is filled with compressed gas during normal use of the gas spring.

4,792,129

**RADIATOR FIXTURING DEVICE**

Frederic H. LePrevost, Jr., 315 Myra Pl., Clinton, Iowa 52732 Filed Mar. 7, 1988, Ser. No. 164,975

Int. Cl.<sup>4</sup> B25B 1/00

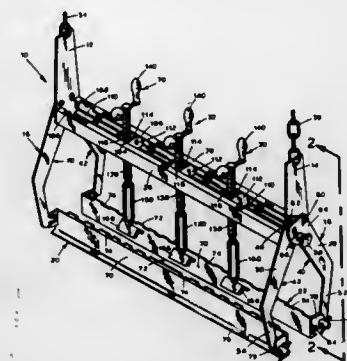
U.S. Cl. 269—46

25 Claims

1. A fixturing apparatus for mounting a radiator tank to a radiator header for radiators including either brass tanks re-

quiring soldering of plastic tanks secured by crimped integral header tabs against a gasket in a peripheral header through, said apparatus comprising:

a pair of like opposed spaced arm assemblies each including individual arms forming a general bow configuration with respective top and bottom ends and adapted to be suspended from any suitable overhead support, respective means on said arm assemblies for effecting movement of said bottom ends towards and away from each other,



respective means on said arm assemblies for locking said arms in any selected position of movement, a pair of opposed parallel rails defining radiator supporting surfaces carried by said bottom ends, opposed parallel channel beams operably disposed above and parallel to said rails, a manually operated screw clamp assembly removably slidably disposed intermediate said beams and including a crank handle and a radiator tank engaging pad, and pressure measuring means with pressure indicating indicia on said screw clamp assembly.

4,792,130

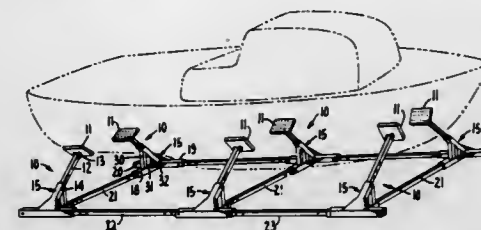
**ADJUSTABLE SUPPORT SYSTEM FOR MARINE CRAFT**

John C. Ardent, 840 Wedgewood Dr., Pittsburg, Calif. 94565 Continuation-in-part of Ser. No. 852,579, Apr. 16, 1986, abandoned, which is a continuation of Ser. No. 638,254, Aug. 6, 1984, abandoned. This application Jan. 13, 1987, Ser. No. 2,946

Int. Cl.<sup>4</sup> B23Q 3/00

U.S. Cl. 269—296

8 Claims



1. A system to support marine craft comprising a plurality of support apparatus each in turn comprising:

- (a) an essentially flat surface pad member for contact with the hull of the marine craft;
- (b) a longitudinally adjustable extension member, said extension member being adjustably engaged at one end to a T-shaped base and connected pivotally at the other end to the surface pad member; and
- (c) said T-shaped base, in turn comprising:
  - (i) a receptacle member disposed at an acute angle relative to the plane of the T-shaped base which telescopically engages said extension member at the end of said extension member remote from the end pivotally connected to said

surface pad member, and characterized as fixedly engaging and retaining said extension member at a given orientation;

- (ii) at least one strut capable of engaging with at least an opposing T-shaped base; and
- (iii) at least one brace member vertically disposed between said strut and said receptacle member, said brace being capable of bearing vertical loads, fixedly engaging and supporting said receptacle member, said plurality of support apparatus arranged such that marine craft which contacts the surfaces of said support device is supported in a stationary manner.

4,792,131

**OFF-LINE IMAGE FIXING APPARATUS**

Noboru Akiyama, Iwatsuki, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan

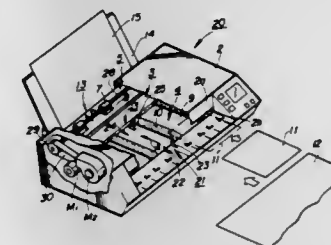
Filed Oct. 14, 1987, Ser. No. 108,817

Claims priority, application Japan, Oct. 24, 1986, 61-253493

Int. Cl.<sup>4</sup> B65H 7/08

U.S. Cl. 271—7

11 Claims



1. An off-line image fixing apparatus comprising: paper inlet means formed at the front of the apparatus body; paper conveyance passageway means extending from the paper inlet means toward heating means disposed at a rearward portion backward within the apparatus body; paper conveyor means disposed in the passageway means immediately after the paper inlet means; paper jam sensor means disposed at substantially the center of the width of the passageway means for sensing paper jamming which may occur in the passageway means; feed sensor means disposed at a position in the paper inlet means corresponding to substantially the center of the width of the passageway means for sensing the presence of a sheet of copying paper; and control means for in a normal state continuously driving the paper conveyor means backwardly to discharge back from the paper inlet means of the apparatus body a sheet of copying paper inserted from the inlet means, and for driving the conveyor means in accordance with a paper sensing signal from the feed sensor means or both the feed sensor means and the jam sensor means to thereby convey a sheet of unfixed copying paper inserted from the inlet means through the passageway means to the heating means.

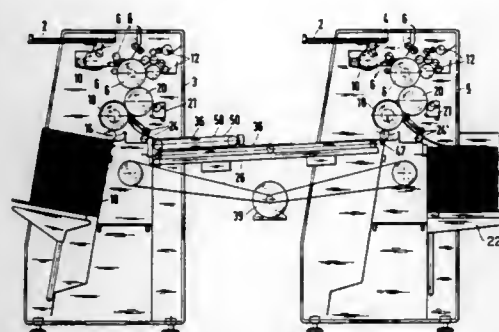


**4,792,132**  
**SHEET FEEDER AND INVERTER APPARATUS FOR SHEET-PROCESSING MACHINES, PREFERABLY FOR TWO OFFSET PRINTING MACHINES DISPOSED IN TANDEM**

Hans J. Jahme, Weisbaden, Fed. Rep. of Germany, assignor to Neue Rotoprint GmbH, Berlin, Fed. Rep. of Germany  
 Filed Feb. 19, 1987, Ser. No. 16,572  
 Claims priority, application Fed. Rep. of Germany, Feb. 20, 1986, 3605535

Int. Cl.<sup>4</sup> B65H 5/02  
 U.S. Cl. 271-186

7 Claims



1. A sheet feeder and inverter apparatus for feeding sheets between the discharge of a first sheet processing machine and the entry of a second sheet processing machine and for selective operation with or without inversion during such feeding comprising first and second conveyor belt system respectively positioned so that each extends parallel to the other and are disposed one above the other defining a gap therebetween in which the sheets can be fed by one of said first or second conveyor belt systems from said first machine in the direction of said second machine; said first conveyor belt system being the upper most one of said conveyor belt systems and including a plurality of sheet grippers which close in the vicinity of said first conveyor belt system remote from the second and lowermost of said conveyor belt systems and open in the vicinity of said first conveyor belt system oriented toward said second conveyor belt system; and wherein said first and second conveyor belt systems, respectively, include separate entry and exit paths with the entry path of each being alternately locatable relative to the discharge of said first machine, said first and second conveyor belt systems being pivotally movable relative to said first machine and being adjustable in common in such a manner that the sheets emerging from said first machine are fed either onto said first conveyor belt system and underneath said sheet grippers remote from said second conveyor belt system or directly onto said second conveyor belt system.

**4,792,133**  
**SUBSTITUTE GROUND SURFACE MATERIAL**  
 Paul Hawkins, Leicester, and John D. Dachtler, Isle of Wight, both of England, assignors to En-tout-cas plc, Syston, England  
 Filed Dec. 8, 1986, Ser. No. 939,540  
 Claims priority, application United Kingdom, Jan. 14, 1986, 8600735

Int. Cl.<sup>4</sup> A63J 3/00; A63K 1/00; C09K 3/18  
 U.S. Cl. 272-3

9 Claims

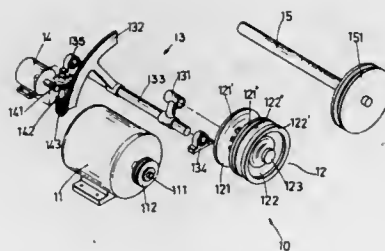
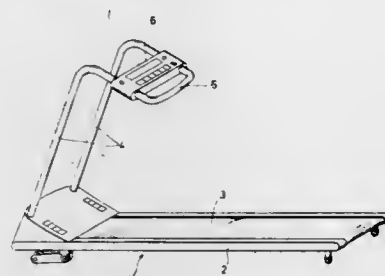
9. A recreational or sports area having a surface formed of a substitute ground surface material comprising sand or other particulate or granular mineral material treated with a binder comprising synthetic polymeric material selected from the group consisting of ethylene vinyl acetate, polystyrene, nylon, polypropylene and polyvinyl chloride, dispersed or dissolved in an oil or similar compound selected from the group consisting of latices, alginates, molasses and combinations thereof, said oil or similar compound having a viscosity such that it is

substantially non-fluid at ambient temperatures so as to produce an inert, discrete material permanently capable of being raked when laid in a layer upon a substrate, wherein said material is laid in a layer upon a substrate.

**4,792,134**  
**TREADMILL WITH IMPROVED ADJUSTING MECHANISM**

Chao Y. Chen, No. 585, San-Feng Rd., Feng-Yuan City, Taiwan  
 Filed Nov. 16, 1987, Ser. No. 121,355  
 Int. Cl.<sup>4</sup> A63B 23/06; F16H 9/12  
 U.S. Cl. 272-69

5 Claims



1. A treadmill having a base frame with a first and a second portion, an endless belt rotatably mounted on the base frame, a pair of upright posts each having an upper and a lower end, the upright posts being secured on the first portion of the base frame, an instrument mounted integrally between the upper ends of the posts, a handle portion secured to the instrument, a speed adjustable driving mechanism mounted within the first portion of said base frame for driving said endless belt at a variable speed, and a slope adjustable mechanism mounted below said base frame and being operative to vary the slope of the base frame, wherein said speed adjustable driving mechanism comprises:

- a driving motor having an output shaft;
- a driven shaft associated with said endless belt;
- a speed variable V-belt drive mechanism in connection with said output shaft and said driven shaft, said V-belt drive mechanism including a transmission shaft which is parallel to said output shaft and said driven shaft therebetween and which can be displaced laterally within a limited distance toward said output shaft or said driven shaft, two pairs of cone-shaped discs mounted coaxially on said transmission shaft, each of said pairs of said discs having a fixed disc and a slideable disc adjacent to said slideable disc of the other said pair of said discs, said slideable discs sliding mutually upon displacement of said transmission shaft, a first pulley mounted on said output shaft, a second pulley mounted on said driven shaft, a first V-belt passing over said first pulley and one of said pairs of cone-shaped discs, and a second V-belt passing over said second pulley and the other one of said pairs of said cone-shaped discs; and
- means for displacing said transmission shaft, including a

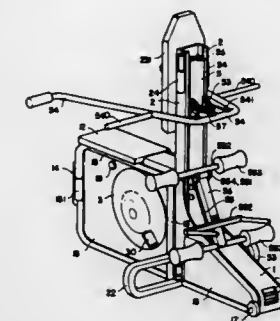
crank shaft in parallel with said transmission shaft, a crank arm interconnecting said transmission shaft and said crank shaft, a first reversible motor for driving said crank shaft, and a gear transmission mechanism interengaging said crank shaft and said first reversible motor.

**4,792,135**  
**COMPOUND MULTI-FUNCTION GYM BENCHES**  
 Chin Chin-Sen, 5th Fl., No. 9, Lane 180, Kuang Fu South Road, Taipei, Taiwan

Filed Aug. 3, 1987, Ser. No. 81,132  
 Int. Cl.<sup>4</sup> A63B 21/00

U.S. Cl. 272-134

10 Claims



1. A gym set, comprising:
- (a) a frame mountable on a support surface;
  - (b) a seat mounted on the frame for a user to sit on;
  - (c) means for adjusting the position of the seat relative to the frame;
  - (d) bicycling means mounted on the frame below the seat for enabling a seated user in adjusted position to perform a bicycling-type exercise, including a main wheel turnable about an axis, resistance means for resisting turning movement of the main wheel, and foot pedals operatively connected to the main wheel for turning the same against the resisting action of the resistance means;
  - (e) a support column supported by the frame and having walls bounding an upright channel;
  - (f) a weight column reciprocally movable in and lengthwise along the upright channel; and
  - (g) a handlebar assembly mounted on the weight column for joint movement therewith, said handlebar assembly including weight support holders for supporting a desired quantity of weights, and handlebar arms extending from the weight column to either side of the support column to enable the seated user performing a bicycling-type exercise to grasp the handlebar arms of the handlebar assembly and also lift and lower the weights supported thereon.

**4,792,136**  
**CONVERTIBLE BOWLING ALLEY**  
 David Dulisse, 30 Bluefields Ln., Blauvelt, N.Y. 10913  
 Filed Aug. 25, 1987, Ser. No. 89,079  
 Int. Cl.<sup>4</sup> A63D 5/00

U.S. Cl. 273-51

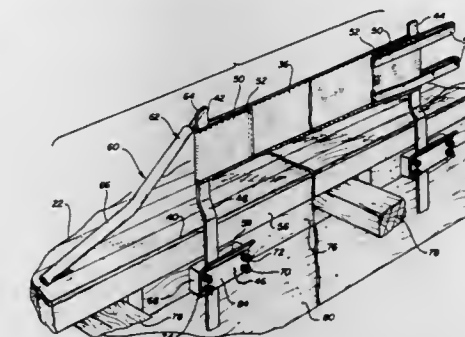
15 Claims

1. A bowling alley comprising:
- (a) a bowling lane bed including an approach and foul line at one end, a pin deck at the other end and a plurality of lane bed support members below said bed;
  - (b) a pair of elongated gutters abutting each side of said bowling lane bed;
  - (c) deflection means removably disposed longitudinally along both sides of said lane bed outside of said gutters for deflecting a bowling ball rolled down said lane, to thereby prevent said ball from falling into said gutters, said deflection means extending along at least a portion of each side of said lane bed between said foul line and said pin deck;
  - (d) upright pin members at each end of each of said deflec-

tion means, each of said members removably disposable at its lower end in a pin clamping means located below the lane bed and between the gutter and lane bed, each of said deflection means being removably supported substantially vertically above said lane bed by said pin members;

(e) said pin clamping means mounted to a lane bed support member, said clamping means having at least one slot slidably engageable with said pin member;

(f) at least one end of each of said deflection means, said

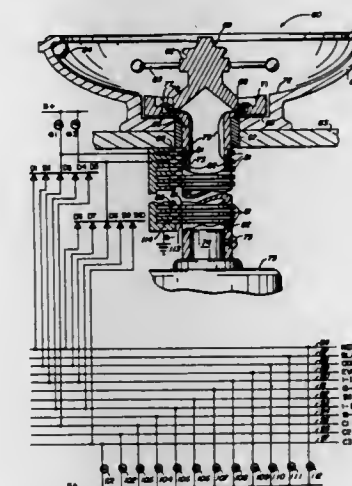


pin clamping means has a plurality of slots slidably engageable with said respective pin member whereby the tension in the deflection means between said respective pin members can be selectively increased or decreased by selection of an appropriate slot into which to insert said pin member;

whereby said bowling alley can serve as a conventional alley when said deflection means and said pin members are removed and can serve as a carom bowling alley when said deflection means are supported in place.

**4,792,137**  
**MONITORING AND INDICATING APPARATUS FOR USE IN THE GAME OF ROULETTE**  
 Ian C. McKechnie, 8524 N. 50th Pl., Scottsdale, Ariz. 85253  
 Filed May 23, 1983, Ser. No. 497,194  
 Int. Cl.<sup>4</sup> A63B 71/06  
 U.S. Cl. 273-138 A

1 Claim



1. A game of roulette comprising:

a translucent flat playing surface forming a layout illustrating the same numbers, number groups and color groups as identified on a conventional roulette playing surface ar-

ranged in given sequence, color groups, number groups and columns,  
 lighting means positioned underneath said surface for individually illuminating said numbers, color groups, number groups and columns,  
 a solid state clock means,  
 a counting means driven by said clock means at a speed faster than the eye can follow,  
 means for electrically connecting the lighting means of corresponding numbers, color groups, number groups and columns of said layout with said counting means,  
 a first switching means for connecting said clock means to said counting means for actuation of said counting means, and  
 a second switching means for disconnecting said clock means from said counting means for randomly leaving illuminated winning number, color groups, number groups and column.

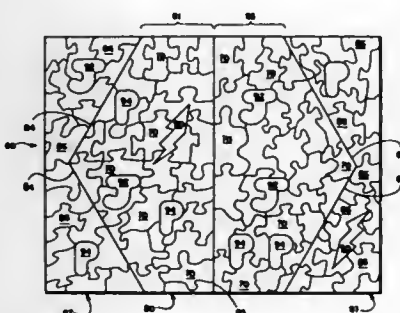
4,792,138

## JIGSAW PUZZLE GAME

Kirk W. Watkins, 185 E. Parkwood Rd., Decatur, Ga. 30030  
 Continuation-in-part of Ser. No. 699,685, Feb. 8, 1985, Pat. No. 4,669,734. This application Dec. 11, 1986, Ser. No. 940,724  
 Int. Cl.<sup>4</sup> A63F 9/10

U.S. Cl. 273-157 R

19 Claims



1. A game to be played by a number of players comprising: a separate jigsaw puzzle for each player, each jigsaw puzzle having a number of interlocking pieces,  
 and scoring means associated with each puzzle, said scoring means assigning a first score to the player to first complete predetermined portions of any one puzzle and a less favorable score greater than zero for subsequent completions of the same portion, said scoring means identifying the potential scores remaining for completing predetermined puzzle portions, whereby the extent to which a given player has completed his associate puzzle and the potential scores remaining for completing predetermined puzzle portions identified by said scoring means affect the play of others seeking to maximize their score.

4,792,139

## GOLF CLUB HEAD

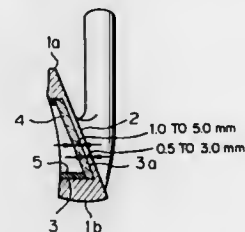
Yoichi Nagasaki; Itsushi Nagamoto; Toyohiko Tadokoro, and Masaki Fujimura, all of Hamamatsu, Japan, assignors to Yamaha Corporation, Japan  
 Continuation-in-part of Ser. No. 821,029, Jan. 21, 1986. This application Aug. 15, 1986, Ser. No. 897,611  
 Claims priority, application Japan, Sep. 9, 1985, 60-199034; Sep. 27, 1985, 60-214297; Dec. 5, 1985, 60-187462[U]  
 Int. Cl.<sup>4</sup> A63B 53/04

U.S. Cl. 273-167 H

5 Claims

1. An improved golf club head comprising:  
 a main body constructed of metal and having a face side section providing a planar face side surface for striking golf balls, said main body having a rear opening extending

therein towards said face side surface to an end wall provided by a rear side surface of said face side section,  
 a planar fiber reinforced plastic plate of substantially uniform thickness fixed to said end wall parallel to said face side surface, and



means within said opening in the form of an open frame for engaging said fiber reinforced plastic plate about a circumferential portion thereof and holding same against said face side surface.

4,792,140

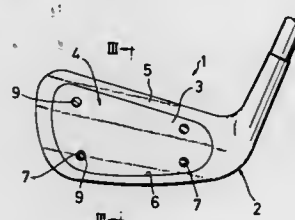
## IRON TYPE GOLF CLUB HEAD

Tetsuo Yamaguchi, and Takeshi Iwanaga, both of Kobe, Japan, assignors to Sumitomo Rubber Industries, Ltd., Kobe, Japan  
 Filed Mar. 27, 1984, Ser. No. 593,837  
 Claims priority, application Japan, Mar. 28, 1983, 58-53338; Mar. 28, 1983, 58-53339

Int. Cl.<sup>4</sup> A63B 53/04

U.S. Cl. 273-173

20 Claims



1. An iron type golf club head, comprising: a head proper made of metal; and a member fabricated from a resin material which possesses a compression Young's modulus value lower than that of steel, and occupying at least the central part of a golf ball striking face of said head wherein said ball striking face of said member is not provided with face grooves and is formed to be flat and smooth.

4,792,141

## GOLF BALL COVER COMPOSITION

Francisco M. Llort, Dighton, Mass., assignor to Acushnet Company, New Bedford, Mass.  
 Filed Apr. 20, 1987, Ser. No. 40,292  
 Int. Cl.<sup>4</sup> A63B 37/12; C08L 7/00, 9/00, 19/00  
 U.S. Cl. 273-235 R

15 Claims

1. A golf ball comprising a core and a cover wherein the cover is formed from a composition comprising about 97 to about 60 parts balata and about 3 to about 40 parts by weight polyoctenylene rubber based on 100 parts by weight polymer in the composition, the polyoctenylene having a trans polyoctenylene content of at least about 50%.

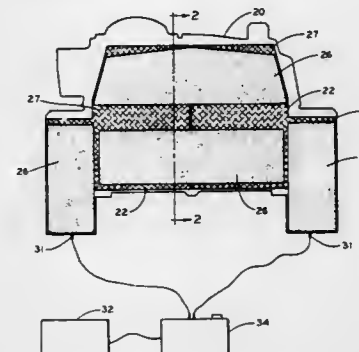
4,792,142

## THERMAL TARGET DEVICE

Robert M. Davies, 1855 Waltham Rd., Columbus, Ohio 43221  
 Filed Nov. 13, 1987, Ser. No. 120,111  
 Int. Cl.<sup>4</sup> F41J 1/00

U.S. Cl. 273-348.1

8 Claims



1. A simulated military target comprising, in combination, a supporting frame having a predetermined shape simulating at least one planar silhouette of a likeness of a military target; a heating element mounted on said supporting frame in a predetermined planar configuration providing a thermal image simulating a predetermined thermal image of said military target; said heating element comprising a pair of planar electrical conducting busses disposed in spaced parallel relationship to one another, the planar surface of each of said busses facing the other provided with an electrical conducting material distributed over said planar surface to provide a source of current over a surface area generally similar in configuration to said supporting frame, and means forming a resistance element disposed in electrically conducting relationship between opposing portions of said conducting surfaces of said busses to form a predetermined thermal image representing the thermal image of a military target; and electrical leads operatively connected to each of said busses at a location remote from the area having said resistance element and to a supply of electrical power for providing electrical current to the conductive material distributed over the surface of said busses.

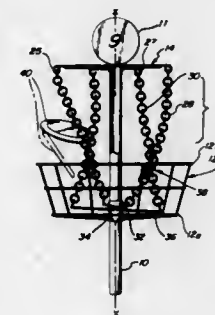
4,792,143

## FLYING DISC ENTRAPMENT ASSEMBLY

Edward E. Headrick, 4388-A Hill Rd., Lakeport, Calif. 95453  
 Filed Dec. 15, 1987, Ser. No. 132,397  
 Int. Cl.<sup>4</sup> A63B 67/06

U.S. Cl. 273-400

22 Claims



1. An entrapment assembly for use in a flying disc game for arresting and trapping a flying disc thrown against the assembly comprising:  
 (a) an upright post;  
 (b) an upwardly opening annular basket mounted symmetrically on the post at an intermediate location;  
 (c) a circular support bracket mounted at the top of the post;

(d) a first ring surrounding the post and disposed within the basket;  
 (e) a plurality of outside chains having the upper ends thereof attached to the support bracket at spaced annular positions around the periphery thereof, and the lower ends thereof attached to the first ring at spaced annular positions around the periphery thereof, the outside chains being adapted to absorb kinetic energy of the disc and reduce its velocity;  
 (f) a second ring surrounding the post within the basket and having a diameter greater than the first ring; and  
 (g) a plurality of inside chains having the upper ends thereof attached to the support bracket at spaced annular positions intermediate the distance between the periphery thereof and the post, and the lower ends attached at the spaced annular positions around the periphery of the second ring, the periphery of the first ring having a smaller circumference than the circumference defined by the points of attachment of the upper ends of the inside chains to the support bracket, the second ring having a circumference at least as great as the circumference defined by the points of attachment of the upper ends of the inside chains to the support bracket, whereby the inside chains extend through the outside chains intermediate the distance between support bracket and the second ring.

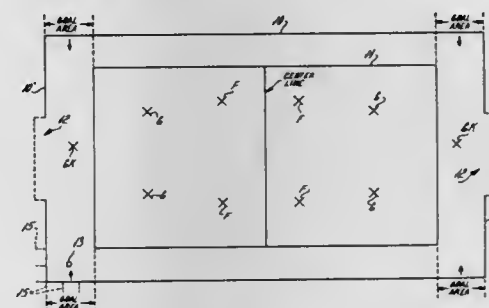
4,792,144

## METHOD OF PLAYING A SPORT

Edward LaDue, 321 W. 78th St., New York, N.Y. 10024  
 Continuation of Ser. No. 9,994, Feb. 7, 1979, abandoned. This application May 1, 1987, Ser. No. 45,030  
 Int. Cl.<sup>4</sup> A63B 67/18

U.S. Cl. 273-411

1 Claim



1. In a field sport played on a field with a playing object and in which opposing teams comprise a plurality of field players and in which the playing field is rectangular and is surrounded by a vertical wall spaced from the rectangular playing field thereby providing out-of-bounds areas between the field and the vertical wall, the method of playing comprising the players or any one of them moving the playing object within the playing field, said one player passing the playing object by projecting the playing object to the surface of the vertical wall outside the playing field to bounce the playing object off the vertical surface back onto the playing field while remaining within the playing field, the players continuing in play and they or any of the players moving while the playing object is outside the playing field to intercept the playing object when it reenters the playing field, said players continuing play with the playing object without interruption after its re-entry onto the playing field from the surface of the upstanding wall, the players restricting themselves within the playing field while the playing object is projected to the surface of the vertical wall, bounces off the wall and re-enters the playing field to avoid injury within the areas between the playing field and the vertical wall and to avoid penalties for being out-of-bounds.



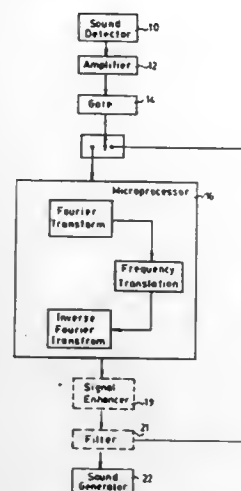
4,792,145

**ELECTRONIC STETHOSCOPE SYSTEM AND METHOD**  
Lawrence Eisenberg, New York, N.Y., and Michael Eisenberg, Cambridge, Mass., assignors to Sound Enhancement Systems, Inc., New York, N.Y.

Continuation-in-part of Ser. No. 795,059, Nov. 5, 1985, abandoned. This application Oct. 6, 1986, Ser. No. 914,027  
Int. Cl. A61B 7/04

U.S. Cl. 128—715

18 Claims



1. A method for enhancing acoustic vibrations having frequency components that are not within the auditory range or the human ear comprising:

detecting an input acoustic vibrational waveform within a first frequency range having frequency components that are not within the auditory range of the human ear, said frequency components having an intercomponent tonal relationship;

converting said detected input acoustic vibrational waveform into an input electrical signal;

performing a Fourier transform operation upon said input electrical signal, whereby an input frequency spectrum signal is obtained comprising frequency components, each frequency component comprising frequency, phase and amplitude elements, the frequencies of the frequency components comprising the a first inter-component frequency relationship and the phases of the frequency components comprising a first inter-component phase relationship;

translating said input frequency spectrum signal in the time scale from said first frequency range to a second frequency range by multiplying said frequencies of the input frequency spectrum signal by a time scale compression factor, said frequency components of the translated frequency spectrum signal having a second inter-component frequency relationship and second inter-component phase relationship equivalent to the first inter-component frequency relationship and first inter-component phase relationship;

performing an inverse Fourier transform operation on said translated frequency spectrum signal whereby an output electrical signal is obtained; and

converting said output electrical signal into an output vibrational waveform having frequency components that are within the auditory range or the human ear and in which the inter-component tonal relationship is maintained.

10. An apparatus for enhancing acoustic vibrations having frequencies that are not within the auditory range of the human ear comprising:

means for detecting an input acoustic vibrational waveform within a first frequency range having frequencies that are

not within the auditory range of the human ear, said frequencies having an inter-component tonal relationship; means for converting said detected input acoustic vibrational waveform to an input electrical signal;

means for performing a Fourier transform operation upon said input electrical signal whereby an input frequency spectrum is obtained having a plurality of frequency components, each frequency component having frequency, phase and amplitude elements, the frequencies of the frequency components comprising a first inter-component frequency relationship and the phases of the frequency components comprising a first inter-component phase relationship;

means for translating said frequency components of the input frequency spectrum to a frequency range within the auditory range of the human ear by multiplying said frequencies by a time scale compression factor, said frequency components of the translated frequency spectrum having a second inter-component frequency relationship and second inter-component phase relationship equivalent to said first inter-component frequency relationship and first inter-component phase relationship;

means for performing an inverse Fourier transform operation upon the translated frequency spectrum whereby an output electrical signal is obtained; and

means for converting said output electrical signal into an output acoustic vibrational waveform, said output acoustic vibrational waveform having frequencies that are within the auditory range of the human ear and in which the inter-component total relationship is maintained.

4,792,146

**RADIALLY COMPLIANT - ZERO NET THERMAL RADIAL TAPER MECHANICAL FACE SEAL**

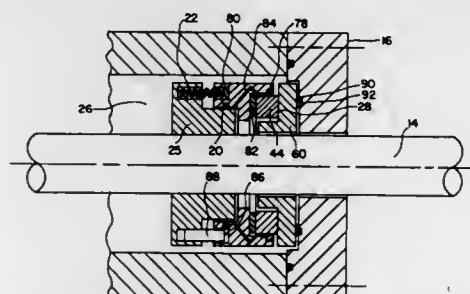
Alan O. Lebeck, Albuquerque, and Lionel A. Young, Edgewood, both of N. Mex., assignors to University of New Mexico, Albuquerque, N. Mex.

Filed Feb. 17, 1987, Ser. No. 15,852

Int. Cl. F16J 15/34

U.S. Cl. 277—26

18 Claims



1. A radially compliant face seal ring for use in a mechanical face seal, when provided, wherein said mechanical face seal comprises a housing, a rotating shaft, said radially compliant face seal ring, an opposing ring which is opposite to and contacts said face seal ring to provide a parallel face, sealed fluid to provide a sealed pressure, urging means to provide a spring pressure, and balancing means to provide a balance ratio, and wherein said radially compliant face seal ring is made of a low Young's modulus material and comprises an axial ring length which is approximately described by the equation:

$$\left[ \frac{6[p_0(B-1) + p_2]\Delta r r_c^2}{E\phi_{\text{compliance}}} \right]^{\frac{1}{2}}$$

wherein  $p_0$  is the sealed pressure of the seal,  $B$  is the balance ratio of the seal,  $p_2$  is the spring pressure of the seal,  $\Delta r$  is the

face width of the seal,  $r_c$  is the radius to the centroid of said face seal ring,  $E$  is the Young's modulus of said radially compliant face seal ring, and  $\phi_{\text{compliance}}$  is the maximum angular difference to which said radially compliant face seal ring can comply with said opposing ring while remaining in contact with said opposing ring.

4,792,147

**MECHANICS CREEPER**

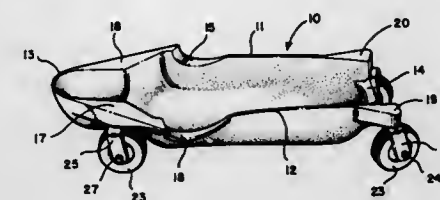
Robin F. Wissing, P.O. Box 904, Fairburn, Ga. 30213

Continuation of Ser. No. 18,047, Feb. 24, 1987, abandoned. This application May 9, 1988, Ser. No. 191,418

Int. Cl. B25H 5/00

U.S. Cl. 280—32.6

8 Claims



1. A mechanics creeper, comprising a molded, smoothly contoured body shell with upturned peripheral edges curving smoothly upwardly from the bottom of the shell and terminating above the bottom of the shell, the peripheral edges extending upwardly from the bottom of the shell at least half the depth of a user lying therein and extending protectively about the lower periphery of the user's head and torso; a plurality of wheel mounting means for removably mounting wheel means to the body shell, said mounting means positioned so that wheel means mounted thereby will have their wheels located outwardly of the upturned peripheral edges of the body shell and so that with wheel means mounted, the body shell is completely supported by said wheel means above the surface upon which the wheel means rest for rolling movement over said surface and without the wheel means mounted, the body shell is free to slide; by reason of its smoothly contoured molded body and smoothly upwardly curved peripheral edges, over or through the material upon which it rests.

4,792,148

**SEMI-TRAILER TRUCK**

John C. Hintz, P.O. Box 1021, Eau Claire, Wis. 54702

Filed Aug. 11, 1987, Ser. No. 84,395

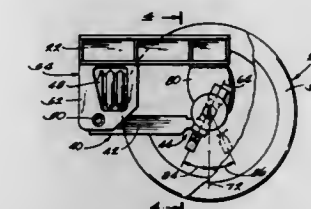
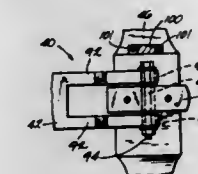
Int. Cl. B62D 13/06

U.S. Cl. 280—81 A

12 Claims

1. A semi-trailer for a truck-tractor including a front axle, said semi-trailer comprising a frame supported for over-the-road travel by independent first and second axle assemblies respectively including first and second transverse axle members having opposite outer end portions, each of said outer end portions carrying a road engaging wheel; said first axle member being stationary and spaced at least ten feet in front of said second axle member; said second axle member being spaced rearwardly from the truck-tractor front axle at least the minimum distance required by government regulations; means interconnecting said wheels of said second axle assembly so they steer together; and

means independent of said first axle assembly for causing said wheels on said second axle assembly to track the



wheels of said first axle assembly during turning of said semi-trailer in both the forward and reverse directions.

4,792,149

**PEDAL-POWERED GOLF CART**

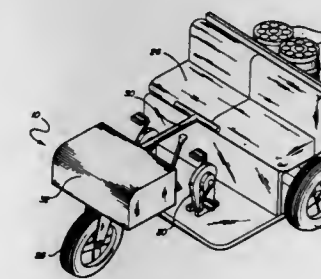
Al L. Harmon, 5731 N. 210th Ave., Le Roy, Mich. 49655

Filed Jun. 19, 1987, Ser. No. 63,825

Int. Cl. B62K 13/04

U.S. Cl. 280—231

10 Claims



1. A pedal-powered golf cart comprising: a snag-free drive train including: two pedal assemblies each having a chain adapted to rotate an input shaft; a transmission operatively connected to the input shaft and adapted to provide at least two gear ratios; and a rotatable drive shaft operatively connected to the output of the transmission and to a pair of drive wheels for rotation thereof; a pair of seats, each separately positionable with respect to the pedal assemblies; and a directing wheel disposed so as to control the direction of travel of said golf cart wherein said pedal assemblies are operatively connected to the input shaft by means of drive chains having a longitudinal axis disposed at an angle to the horizontal to minimize snagging.

4,792,150

## BICYCLE FRAME

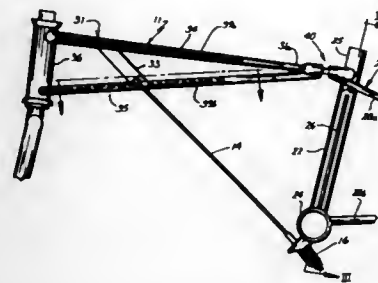
Mark L. Groendal, Kentwood, Mich., and Robert E. Shook, Huntington Beach, Calif., assignors to Greendale Bicycle Company, Grand Rapids, Mich.

Filed May 26, 1987, Ser. No. 54,270

Int. Cl.<sup>4</sup> B60K 9/00

U.S. Cl. 280—275

18 Claims



1. A bicycle having a frame, a pair of wheels supporting said frame and a pedal crankshaft journaled to said frame for manually propelling one of said wheels, said frame comprising:

- a rear frame member including a generally vertical center post positioned within an imaginary, generally vertical plane extending along a longitudinal axis of said bicycle;
- a front frame member including a generally horizontal crossbar means positioned within said generally vertical, longitudinal plane;

flex means for flexibly interconnecting said frame members so as to allow vertical relative flexing of said frame members generally along said generally vertical, longitudinal plane but so as to minimize relative flexing of said frame members out of said generally vertical, longitudinal plane; one of (1) said center post, (2) said crossbar means and (3) both said center post and said crossbar means including integral stiffening means for minimizing twisting and lateral bending of same out of said generally vertical, longitudinal plane.

4,792,151

## SELF-ALIGNING, SELF-LOCKING AND SELF-LEVELING TRAILER HITCH ASSEMBLY

Sam H. Feld, 616 Riverside Dr., West Richland, Wash. 99352

Filed Aug. 13, 1987, Ser. No. 84,828

Int. Cl.<sup>4</sup> B62D 53/00; B60D 1/06

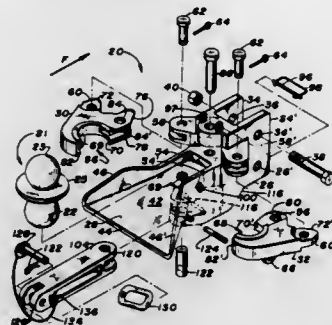
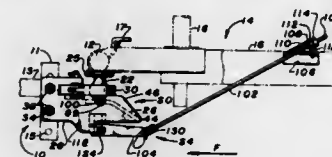
U.S. Cl. 280—406 A

18 Claims

1. A trailer hitch for hitching a trailer having a downwardly extending coupling element to a towing vehicle, the hitch comprising:

- a housing; means for mounting the housing on the vehicle;
- a ramp for slidably engaging the coupling element of the trailer, the ramp being affixed to the housing and sloping downwardly and rearwardly from the housing away from the vehicle, the ramp flaring from a narrower neck proximate the housing to a distal lip at least about twice as wide as the neck, the ramp having means for guiding the coupling elements;
- two laterally opposed jaws pivotally mounted on the housing for horizontal movement about substantially vertical axes, the jaws having opposing recesses which together define a socket forwardly of the neck of the ramp for snugly receiving the coupling element of the trailer when the jaws are closed and the jaws further comprising locking arms with holes which are vertically aligned when the jaws are closed;
- means for automatically closing the jaws around the coupling element responsive to movement of the coupling element into the socket between the jaws; and

pin means cooperating with said holes in the jaws for automatically locking the jaws around the coupling element



by downward vertical movement responsive to gravity as the jaws become closed.

4,792,152

## GOLF BAG CARRIER

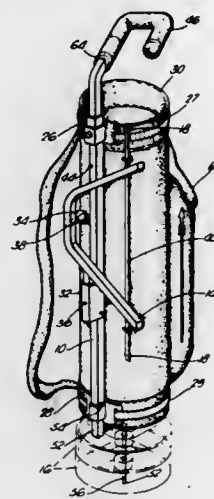
Declan T. Carolan, Kinnegad, Ireland, assignor to Rempir Enterprises Limited, Mullingar, Ireland

Filed Nov. 6, 1986, Ser. No. 927,441

Int. Cl.<sup>4</sup> B62B 1/12

U.S. Cl. 280—47.26

15 Claims



1. A golf bag carrier which is convertible between an operational mode and a storage mode, comprising:

- a spine;
- a telescopic handle engageable with the spine;
- attachment means at the upper and lower ends of the spine for attaching the spine to a golf bag;
- a wheel frame to which a pair of wheels may be removably attached; and
- quick release wheel frame securing means, including two securing spigots on the wheel frame and a socket on the spine, for detachably securing the wheel frame to the spine in first and second configurations wherein a first spigot of the two spigots on the wheel frame is removably

engageable with the socket on the spine in the first configuration with the wheel frame extended for operation, and the second spigot on the wheel frame is removably engageable with the socket on the spine in the second configuration with the wheel frame juxtaposed to the spine for storage.

4,792,153

## TRAILER HITCH

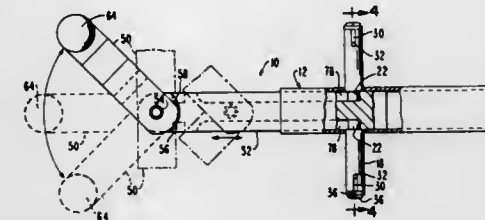
Emmanuel Galdes, 1130 Channing Ave., Palo Alto, Calif. 94301

Filed Sep. 5, 1986, Ser. No. 903,623

Int. Cl.<sup>4</sup> B60D 1/14

U.S. Cl. 280—478 B

1 Claim



1. A trailer hitch comprising:

- a tubular housing adapted to be secured to a towing vehicle, the housing having a rear open end;
- a hitch bar shiftably mounted in the housing and movable relative thereto in opposed directions past said open end from a first operative position in which the hitch bar is in the housing to a second operative position in which the hitch bar is at least partially out of the housing, said hitch bar comprising a front segment and a rear segment;
- means pivotally mounting the rear segment on the front segment at the rear end of the latter for pivotal movement through an angle of 90° on each side of the longitudinal center line about a generally vertical axis when the pivot means is spaced rearwardly of said open end of the housing and when the hitch bar is in the second operative position;
- a hitch ball mounted on the rear end of said rear segment; means cooperable with the housing and the hitch bar for locking the hitch bar to the housing when the hitch bar is in said first and second operative positions, the front segment of said hitch bar having a pair of opposed side surfaces, each side surface having an elongated recess therein extending longitudinally of the front segment of the hitch bar, the rear end of the recess being defined by a cam surface and the front end of the recess being defined by a lateral stop, there being a bolt shiftably carried by each side of the housing respectively, each bolt being spring biased inwardly of the housing and having an inner end portion receivable within the corresponding recess, the bolts being axially aligned and defining at least a part of said locking means, there being a sleeve for each bolt, respectively, each sleeve having a pair of open ends, one end of each sleeve being aligned with and surrounding a corresponding hole in the side of the housing, spring means within each sleeve, respectively, for biasing the bolt inwardly;
- a stop means on the outer end of each bolt, respectively, for releasably holding the bolt in a retracted condition, each sleeve having an outer, longitudinal slot therein, there being a pin receivable in the slot, the pin being secured to the respective bolt; and
- means for manually pulling the pin out of the sleeve and into engagement with the outer end face of the corresponding sleeve to hold the corresponding bolt retracted from said housing.

4,792,154  
COUPLING

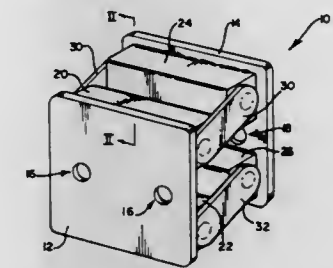
Gerrit Kerst, and Hendrik Kerst, both of Transvaal, South Africa, assignors to Breiko (Proprietary) Limited, South Africa  
Continuation of Ser. No. 794,446, Nov. 4, 1985, Pat. No. 4,641,852. This application Jul. 22, 1986, Ser. No. 888,185  
Claims priority, application South Africa, Nov. 16, 1984, 84/8966

The portion of the term of this patent subsequent to Oct. 20, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B60D 1/00

U.S. Cl. 280—489

9 Claims



1. A trailer coupling comprising at least one torque element which is resiliently yieldable under torque, which is arranged to permit relative vertical movement between a draughting vehicle and a trailer, and which is further adapted to resist such relative movement to thereby damp the relative movement, and two attachment plates, one for attaching the coupling to the draughting vehicle and the other for attaching the coupling to a trailer, the attachment plates being spaced apart from each other with the torque element positioned between them, the torque element being fast with one of the attachment plates and being operatively associated with the other attachment plate by means of a linkage.

4,792,155

## SAFETY BINDING APPARATUS FOR MONOSKIS

Bertrand Besnier, Annecy, France, assignor to Salomon S. A., Annecy, France

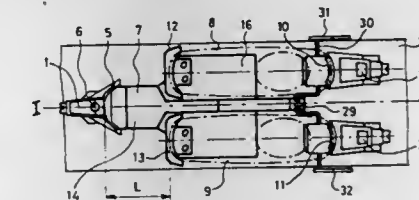
Filed Mar. 9, 1987, Ser. No. 23,704

Claims priority, application France, Mar. 10, 1986, 86 03854

Int. Cl.<sup>4</sup> A63C 9/00

U.S. Cl. 280—607

42 Claims



1. Adaptor element for a monoski safety binding comprising: (a) means for simultaneously releasing two ski boots from a binding system on the adaptor element; and (b) means for freeing both released boots relative to one another and relative to said adaptor element while freeing the adaptor element from the monoski.



4,792,156

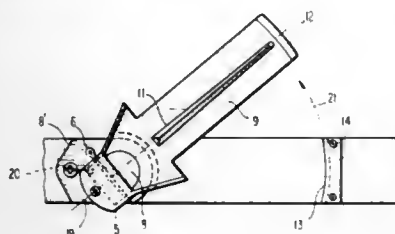
**SAFETY BINDING FOR CROSS-COUNTRY SKIING**

Jean Hue, Annecy, France, assignor to Salomon, S.A., Annecy, France

Continuation of Ser. No. 816,962, Jan. 8, 1986, abandoned, which is a continuation of Ser. No. 482,370, Apr. 5, 1983, abandoned. This application Jun. 24, 1987, Ser. No. 63,770 Claims priority, application France, Aug. 4, 1982, 82 06434 Int. Cl.<sup>4</sup> A63C 9/081

U.S. Cl. 280—615

30 Claims



14. An assembly for holding a boot having a heel and a sole to a ski, said assembly comprising:

- (a) means for attaching the front end of the boot to said ski while permitting the elevation of the heel off of said ski;
- (b) means for laterally retaining the boot against lateral pivoting with respect to the ski, wherein said lateral retaining means is positioned in the metatarsal region of a foot inserted in said boot, wherein said lateral retaining means is adapted to cooperate with the sole of said boot; and
- (c) means for permitting lateral pivoting of said boot to a plurality of positions whatever the elevation of said heel of said boot with respect to said ski, wherein said lateral retaining means, and said attaching means together comprise: means for permitting the heel to be raised above said ski when said heel laterally pivots to said plurality of positions, and means for laterally retaining said heel at the level of the top of the ski against further lateral pivoting from one of said plurality of positions during lateral pivoting of said boot to said plurality of positions.

4,792,157

**SAFETY SKI BINDING**

Karl Stritzl, and Henry Freisinger, both of Vienna, Austria, assignors to TMC Corporation, Bear, Austria

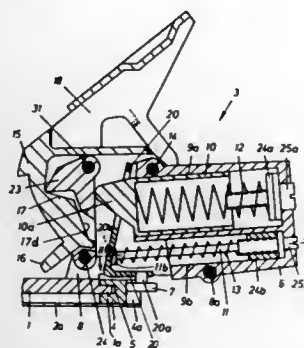
Filed Oct. 3, 1986, Ser. No. 914,875

Claims priority, application Austria, Oct. 3, 1985, 2855/85

Int. Cl.<sup>4</sup> A63C 9/08

U.S. Cl. 280—618

8 Claims



1. In a safety ski binding comprising a sole plate pivotally supported on a ski-fixed pivot pin in a horizontal plane, however, is secured against lifting off from the ski, said sole plate having a front jaw at its front end and a heel holder provided

with a housing at its rear end, said heel holder having a sole holder pivotally supported on said housing which can be pivoted upwardly about a transversely extending axle against the force of a first pressure spring provided on said housing and which carries a roller loaded by at least one further pressure spring on a control lever, with which roller is associated a cam surface arranged on a ski-fixed member, the improvement comprising wherein said control lever has an opening there-through for facilitating passage of a nose of a piston loaded by said first pressure spring, which piston engages exclusively only one locking lever for yieldingly resisting elevational release of said sole holder.

4,792,158

**EMERGENCY LOCKING DEVICE FOR AN EXTRACTABLE STRAP IN A VEHICLE SAFETY BELT**

Sture R. Andersson, Nacka, Sweden, assignor to Allied Engineering Company, Luxembourg, Luxembourg

PCT No. PCT/SE86/00491, § 371 Date Jul. 27, 1987, § 102(e)

Date Jul. 27, 1987, PCT Pub. No. WO87/02630, PCT Pub.

Date May 7, 1987

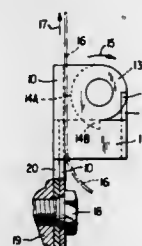
PCT Filed Oct. 24, 1986, Ser. No. 83,857

Claims priority, application Sweden, Oct. 25, 1985, 8505045

Int. Cl.<sup>4</sup> B60R 22/36

U.S. Cl. 280—806

18 Claims



1. An emergency locking device for an extractable strap of a safety belt for a vehicle having a driving direction comprising:

- a base plate;
- a pivoted locking means movable between an idle position and a locking position, said locking means not being in contact with said strap when in said idle position and forcing said strap against said base plate so that the strap is locked between said base plate and said locking means when in said locking position;
- a bearing shaft for attachment to said vehicle and disposed transverse to the driving direction thereof, said locking means being rotatable about said bearing shaft;
- a blocking means for maintaining said locking means in said idle position and being capable of being disabled so that said locking means is moved to said locking position when said locking means is rotated about said bearing shaft; and
- an actuating means for moving said locking means from said idle position to said locking position when said locking means is rotated about said bearing shaft, whereby said locking means rotates around said bearing shaft only when the vehicle is subject to a very heavy deceleration and suspends operation of said blocking means so that said locking means is released and can be moved to said locking position by said actuating means.

4,792,159

**SNOW SKI TRANSPORTING DEVICE**

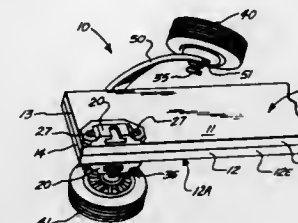
Charles C. Garvey, Jr., 7336 Hurst St., New Orleans, La. 70118, and Mitchell E. Winegart, 4512 Heasmer Ave., Metairie, La. 70002

Continuation of Ser. No. 644,053, Aug. 23, 1984, Pat. No. 4,666,184. This application May 19, 1987, Ser. No. 52,708

Int. Cl.<sup>4</sup> A63C 10/02

U.S. Cl. 280—814

10 Claims



1. A snow ski carrier for transporting a pair of skis having front and tail end portions, and an upper surface comprising:
  - a. a pair of wheel attachment receptacle means, each carried respectively and independently by each ski at the tail end portion and on said upper surface of each said ski;
  - b. a pair of wheel means for providing a rolling surface that can engage the ground near the wheel attachment receptacle means when the front end portion of the skis are used by a skier during transportation of the skis;
  - c. disconnectable holding means for maintaining the wheel means in an engaged position with the receptacle means during transporting of the skis; and
  - d. the wheel attachment receptacle means being carried respectively by each separate ski when the user is skiing and the wheels are removed.

4,792,160

**STRUCTURE FOR PIPE FITTINGS**

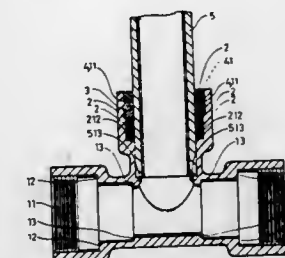
Bling-Yih Hwang, No. 89, Lin Yen South Road, Lin Yen Shian, Kaohsiung Hsien, Taiwan

Filed Dec. 7, 1987, Ser. No. 129,288

Int. Cl.<sup>4</sup> F16L 35/00

U.S. Cl. 285—39

1 Claim



1. A system for connecting pipes together comprising:
  - a pipe fitting having at least two passage components, each said passage component being provided with a passage hole therethrough and including (a) a distal female-threaded, cylindrical portion, (b) an intermediate cylindrical portion ending in a first blocking edge and (c) a proximal cylindrical portion ending in a second blocking edge, said first blocking edge having a smaller diameter than said female-threaded portion and said second blocking edge having a smaller diameter than said first blocking edge and the pipe such that the pipe is inserted past said first blocking edge and abuts said second blocking edge; and
  - a plurality of anti-leak gaskets which are sized to fit around

the pipe and inside of said intermediate portion, an innermost one of said gaskets abutting said first blocking edge; a metal ring which is sized to fit around the pipe and inside of said intermediate portion and which abuts an outermost one of said gaskets; and

a male-threaded ring sized to be threadably received completely within said distal female-threaded portion and around the pipe, said male-threaded ring including a distal circumferential end surface in which notches are provided for the reception of a turning tool whereby said male-threaded ring is threadably advanced completely into said female-threaded portion to press against said metal ring which in turn presses against said gaskets to expand said gaskets between the pipe and said intermediate portion to unite and seal the pipe to said pipe fitting.

4,792,161

**STRUCTURE FOR CONNECTING ENDS OF EXHAUST PIPES**

Masayoshi Usui, Numazu, Japan, assignor to Usui Kokusai Sangyo Kaisha, Ltd., Shizuoka, Japan

Filed Mar. 1, 1988, Ser. No. 162,497

Int. Cl.<sup>4</sup> F16L 21/02

U.S. Cl. 285—45

5 Claims



1. A structure for connecting ends of exhaust pipes comprising:
  - an annular elastic sealing member with heat resistance which is interposed between two overlapping surfaces of two cylinders in a temporally compressed manner; outwardly-projecting annular projection means each of which is disposed on said surfaces of said cylinders at the portions which do not overlap each other;
  - a first coil spring member which is disposed at an adjustable interval above said surface of said cylinder, and two ends of which are secured to said annular projection means;
  - a second coil spring member two ends of which are secured to two final coils of said first coil spring respectively, and which is disposed over the outer portion of said first coil spring in such a manner that the coil wire of said second coil spring is alternately disposed in close contact between the coil wire of said first coil spring.

4,792,162

**PROTECTIVE DEVICE FOR QUICK CONNECT COUPLING**

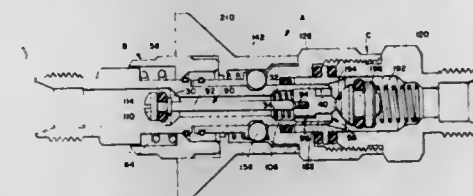
Richard J. Medvick, Shaker Heights, Ohio, assignor to Swagelok Quick Connect Co., Hudson, Ohio

Filed Dec. 23, 1986, Ser. No. 945,836

Int. Cl.<sup>4</sup> F16L 11/12

U.S. Cl. 285—45

1 Claim



1. A protective device for a quick connect coupling of the type including a male body portion having a stem portion and

a first sleeve at one end thereof, a female body portion having a receiving member dimensioned to closely receive the male stem portion and means for selectively locking the male stem portion therein, the protective device comprising:

a movable releasing sleeve disposed at one end of said female body portion, said releasing sleeve being spring biased axially toward a first axial position, said first position retaining the male stem portion in the receiving member, said releasing sleeve being shiftable toward a second axial position releasing the male stem portion from the receiving member; and,

a generally rigid flange defined on an axially outermost end of said releasing sleeve and movable therewith, said flange having a generally radially outward tapering conformation for adding rigidity and bulk thereto, said flange including an axially inward extending recess area adapted to closely receive the first sleeve of the male body portion therein, and said flange extending axially beyond and radially outward from an outermost end of said receiving member in both of said releasing sleeve first and second axial positions.

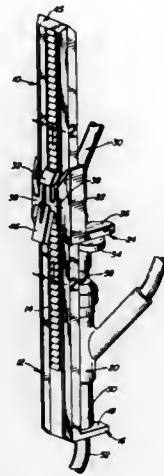
4,792,163

**SECONDARY LOCK FOR MEDICAL TUBE COUPLING**  
Lee K. Kulle, Mundelein, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed May 13, 1987, Ser. No. 49,751  
Int. Cl.<sup>4</sup> F16L 37/08

U.S. Cl. 285—88

9 Claims



1. A secondary lock for preventing separation of a pair of connected tubular members, which comprises:

an elongated body which carries a toothed rack; a first transversely extending retention member carried adjacent one end of said body; and a sliding member slideably mounted on said body for longitudinal movement therealong, said sliding member carrying a second transversely extending retention member, each of said retention members being proportioned to grip and retain one of said tubular members; means for engaging said rack to permit said sliding member to be moved toward said first member but not away from said first member, said engaging means being disengageable to permit said sliding member to be moved away from said first member; and said body carrying, adjacent its end opposed to said one end, means preventing the removal of said sliding member by passing it across said opposed end.

4,792,164

**ROTARY JOINT FOR STATIONARY SIPHON**

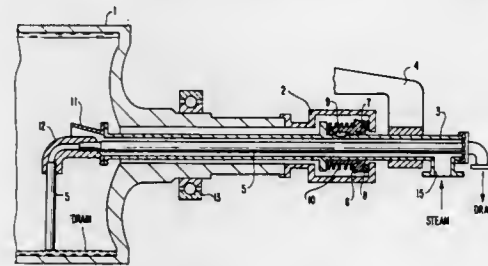
Sadayoshi Suemitsu, Hiroshima, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 24, 1987, Ser. No. 18,288

Claims priority, application Japan, Feb. 21, 1986, 61-36553  
Int. Cl.<sup>4</sup> F16L 39/04

U.S. Cl. 285—134

7 Claims



1. In an assembly including a frame, a roll having an axial end and an inner wall defining a cavity into which steam is introduced and which is rotatably supported by said frame, a stationary siphon extending from said cavity to discharge therefrom drain resulting from condensation of said steam, and a rotary joint for enabling relative rotation between said roll and said siphon, the improvement comprising:

said rotary joint including a main body fixed to said axial end of said roll and rotatable therewith;

a supporting pipe for introducing steam into said cavity, said supporting pipe being nonrotatably fixed to and supported by said frame, and said supporting pipe extending through said main body to said cavity;

said stationary siphon comprising a siphon line extending through said supporting pipe and being firmly and nonrotatably supported thereby, said siphon line having an inner end extending to a position adjacent said inner wall of said roll;

said rotary joint further including a tubular member sealingly mounted on the outer periphery of said supporting pipe, said tubular member being movable axially of said supporting pipe and immovable circumferentially thereof, said tubular member having a portion shaped as a part of a sphere;

a seal member interposed between a surface of said main body and said spherical portion of said tubular member; and

means urging said spherical portion of said tubular member into sealing engagement with said seal member and said seal member into sealing engagement with said surface.

4,792,165

**PUSH LATCH DEVICE**

Tamotsu Nishimura, Yao, Japan, assignor to Futaba Kinzoku Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Sep. 17, 1987, Ser. No. 97,764

Int. Cl.<sup>4</sup> E05C 19/02

U.S. Cl. 292—19

7 Claims

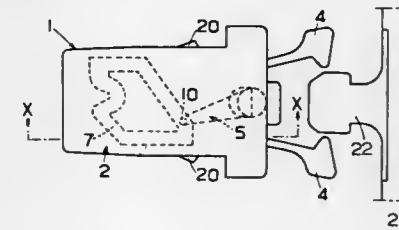
1. A push latch device comprising:

a case including an annular guide passageway having a substantially V-shaped stoppage portion formed in the inner surface of the side wall, said case having an opening formed in one end thereof;

a slider inserted in said case while being elastically biased toward the outside of said case so as to be inwardly and outwardly slidable with respect to said case, said slider having a tip portion provided with a connecting member a main body, a support hole formed in one side surface of said main body extending through said body, a surface of said support hole on the side of said opening of said case being made flat, and a spring accommodation hole formed

lengthwise, of said main body and a communicating with said support hole;

a guide lever including: a guide member which is vertically provided at the tip of an arm disposed on said one side surface of said slider standing vis-a-vis with said guide passageway and moves along said passageway; and a support spindle protrusively provided at a proximal end of said arm provided on the surface opposite to the surface



provided with said guide member, said support spindle having a flat receiving surface inclined to a centerline plane of said arm; and

a push spring interposed between a distal end inner surface of said case and said slider in such a state that said push spring is accommodated in said spring accommodation hole, said push spring having its one end which impinges upon a support surface of said guide lever.

4,792,166

**DEVICE FOR LOCKING DETACHABLE ROOF IN MOTOR VEHICLE**

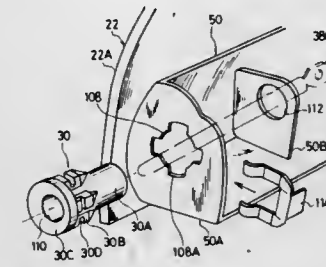
Daiichi Shiraishi, Seto, and Shingo Satoh, Sagami-hara, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Mar. 19, 1987, Ser. No. 27,953

Claims priority, application Japan, Mar. 20, 1986, 61-063556  
Int. Cl.<sup>4</sup> E05C 9/04

U.S. Cl. 292—36

20 Claims



1. A device for locking a detachable roof in a motor vehicle, comprising:

first and second levers rotatably mountable to said detachable roof in contact with each other in a manner to be rotatable in synchronism with each other in directions opposite to each other;

first and second lock pins axially, linearly, movably supportable on said detachable roof by means of guides mountable at positions opposite to each other on said detachable roof with the first and second levers interposed therebetween, said first and second lock pins being connected to the first and the second levers, respectively, through connecting mechanisms, and insertable at forward ends thereof into lock holes formed in a motor vehicle body and opposed to the lock pins; and

a control lever connected to one of the first and second levers to rotate the same, wherein at least one of said guides is insertable into a mounting hole of said detachable roof in an axial line of the lock pin and supported thereby; cross sections of the mounting hole and said guide to be

inserted into the mounting hole are of such shapes respectively that said guide can take a plurality of fixed positions around the center axis of the mounting hole determined by the interfitted cooperation of the mounting hole and said guide, whereby a guide hole for guiding the lock pin in the guide is made eccentric with the center axis of the mounting hole.

4,792,167

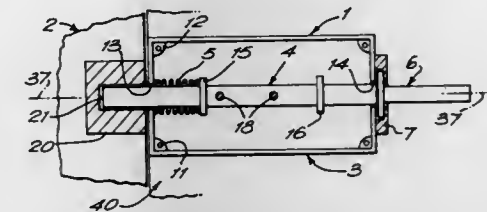
**RELEASABLE BOLT DEVICES FOR SECURING DOORS**  
James C. King, "Fourwinds", 19 Bath Road, Frome, Somerset, and Michael A. Cooper, Dinas Crest, Melbury Abbas, Shaftesbury, Dorset, both of England

Filed Nov. 4, 1986, Ser. No. 927,244

Int. Cl.<sup>4</sup> E05B 39/02; E05C 1/02

U.S. Cl. 292—179

12 Claims



1. A releasable bolt device for use in combination with a bolt keeper to secure a door comprising a support structure, an elongate bolt member mounted on the support structure for slidable movement relative thereto along a path coextensive with the longitudinal axis of the bolt member, between a door-securing position in said bolt keeper and a door-releasing position withdrawn from said bolt keeper, biasing means for urging the bolt member away from said door-securing position, a frangible keep member and means for retaining the keep member in place whereby it obstructs movement of the bolt member by the biasing means in a direction away from the door-securing position, the frangible member being weakened locally so that it may be deliberately broken at that locality by manual force applied to it, releasing said bolt member and allowing the bolt member to move out of its door-securing.

4,792,168

**PATIO DOOR BLOCK**

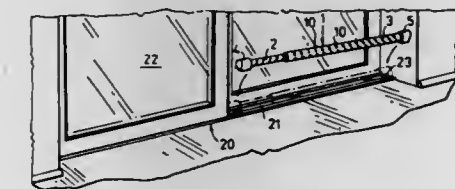
Robert Kardosh, 3 Ardway Crescent, Goelph, Canada, N1E 4L4

Filed Apr. 24, 1987, Ser. No. 43,253

Int. Cl.<sup>4</sup> E05C 19/18

U.S. Cl. 292—288

5 Claims



1. An adjustable safety block assembly for traversing an opening for a sliding door, comprising:

a first tubular member having a first series of circumferentially distributed axially extending rows of holes circumscribing its tube wall, the hole of the first series being spaced in uniform intervals from axially adjacent holes and being axially staggered in uniform intervals relative to circumferentially adjacent holes;

a second tubular member engaging the first tubular member



in sliding telescopic relation and having a second series of circumferentially evenly distributed holes, the holes of the second series being axially staggered relative to circumferentially adjacent holes in uniform intervals equal to the fraction obtained by dividing the length of the interval of axial staggering of holes in the first series by the number of holes in the second series;

locking means inserted through aligned holes of the first and second series respectively for retaining the tubular members in mutually fixed relation to form a rigid bar; and caps mounted on opposite ends of the rigid bar, each cap being provided with a groove extending axially relative to the tubular members for engaging a lip of a runner of a sliding door for limiting lateral displacement of the safety block from the opening for the sliding door.

**4,792,169**  
**OPEN LOWER SASH VENTILATION SAFETY LOCK**  
William E. Petry, 331 Hyde Ave., Council Bluffs, Iowa 51501  
Filed Sep. 26, 1983, Ser. No. 335,709  
Int. Cl. E05C 17/30

U.S. Cl. 292—305

5 Claims



1. An open window lock for a double-hung window system, the system having a frame, an upper sash and a lower sash, the lock comprising: a lapping assembly comprising upper and lower vertically extending elongated lappers having lapping first end portions, each of said lappers having a second end portion adapted to be mounted on window elements, upper and lower mountings attached to the second

end portions respectively of said upper and lower lappers, portions of said lappers that are in the close vicinity of said lapping end portions defining stoppable portions, a stop assembly comprising said stoppable portions and a shiftable stop, said shiftable stop being operably correlated with said stoppable portions for releasably stopping upward movement of said lower lapper with respect to said upper lapper, said lower mounting having opening means extending therethrough for receiving screw means to attach said lower mounting to said lower sash, said upper mounting having opening means extending vertically and horizontally therethrough for receiving screw means for attaching said upper mounting to said window frame and to said upper sash respectively, whereby said upper sash is anchored to said frame for preventing a burglar from lowering said upper sash for access of a screwdriver to remove screw means from said upper mounting.

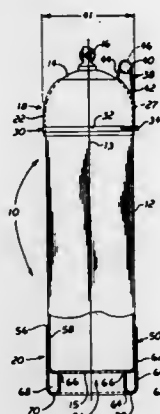
**4,792,170**  
**AIR TANK HANDLE ASSEMBLY**  
Lamar H. Gipson, 12220 SW. 132 Ct.; William P. Batina, 12220 SW. 132 Ct., and Paul H. Vernon, 12220 SW. 132 Ct., all of Miami, Fla. 33186

Filed Jun. 29, 1987, Ser. No. 67,558

Int. Cl. B65D 25/28, 63/18

U.S. Cl. 294—31.2

19 Claims



1. A handle assembly for a generally cylindrical compressed air tank having a longitudinal axis, said assembly comprising: a substantially annular mounting piece that includes an outer perimeter and a central opening formed therein for receiving an axial section of said air tank, means for releasably fastening said mounting piece to the received section of said air tank, and handle means attached to said mounting piece and disposed entirely within the outer perimeter of said mounting piece to facilitate manipulation of said air tank.

**4,792,171**  
**DEVICE FOR MANEUVERING LARGE CAPACITY BAGS FILLED WITH POWDERED OR GRANULAR MATERIALS**

Jean-Pierre Lamy, Paris, France, assignor to Mecaroute S.A., Boulogne-Billancourt, France

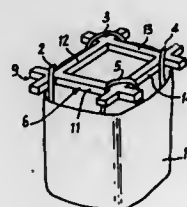
Filed Sep. 2, 1987, Ser. No. 92,261

Claims priority, application France, Sep. 3, 1986, 86 12378

Int. Cl. B65D 33/14, 90/20

U.S. Cl. 294—68.3

5 Claims



5. An arrangement for transporting powdered or granular materials, comprising:

- (a) a substantially flat rigid element (6; 16) defined by at least four hollow, intersecting tubes (11-14) disposed in a square with each tube being open at opposite ends thereof for receiving fork elements of a forklift truck, said tube ends extending beyond the intersections of the tubes to define four X-shaped support lugs (10), and
- (b) a large capacity bulk bag (1; 20) having four lifting strap loops (2-5) securely fastened to an upper edge of the bag and equally spaced from one another around said edge, said strap loops being individually disposed over said

support lugs such that the bag is exclusively vertically suspended by and hangs downwardly below the rigid element.

**4,792,172**  
**GRIPPING AND LIFTING CLAMP FOR PIPES AND CYLINDRICAL OBJECTS OF LARGE DIMENSIONS**  
Paolo Montanari, San Lazzaro, and Oneglio Sala, Bologna, both of Italy, assignors to Riva Calzoni S.P.A., Via Emilia Ponente, Italy

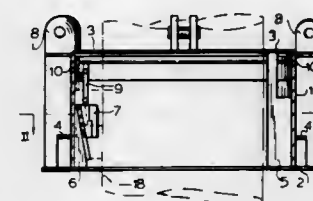
Filed Mar. 30, 1987, Ser. No. 32,320

Claims priority, application Italy, Mar. 28, 1986, 19915 A/86; Mar. 20, 1987, 47754 A/87

Int. Cl. E21B 19/10

U.S. Cl. 294—102.2

8 Claims



1. A gripping and lifting clamp for a cylindrical object, comprising:

an annular body adapted to surround an object to be gripped and lifted;

means forming a plurality of guides spaced apart around an inner wall of said body and inclined downwardly and inwardly thereon;

respective jaws slidable along said guides and each including:

a member having a side turned toward said object and formed with a vertically extending undercut groove opening toward said object, and a side turned toward the respective guide and inclined downwardly and inwardly to slide along said guide,

a vertical row of gripping projections slidably received in said groove and individually engageable with said object, said projections being provided in a plurality of groups, and

respective crossbars affixed to said member below each group to said gripping projections for supporting same against downward movement upon engagement with said object and lifting to said body;

suspending means on said body for enabling the raising and lowering thereof;

a ring moveable on said body upwardly and downwardly; respective links articulated to said jaws and connected to said ring for displacement of said jaws by said ring; and controllable actuating members on said body acting upon said ring for displacing same to retract said jaws from said object and to displace said jaws into engagement with said object whereby said gripping projections engage said object and take up weight of the object.

**4,792,173**  
**FLUID ACTUATED LIMB**  
James F. Wilson, Durham, N.C., assignor to Duke University, Durham, N.C.

Filed Oct. 30, 1987, Ser. No. 115,243

Int. Cl. B25J 15/12, 18/06; B66C 1/46; F15B 15/10

U.S. Cl. 294—119.3

30 Claims

1. A fluid actuated limb comprising:

an elongate flexible core member adapted to be secured at one end to a support;

a first plurality of flexible elongate tubes extending substantially parallel to said core member and being radially spaced therefrom around substantially the entire circum-

ference of said core member, said first plurality of tubes being adapted for longitudinal extension and contraction in response to increases and decreases, respectively, in fluid pressure applied thereto;

a second plurality of flexible elongate tubes being radially spaced from said core member and helically wrapped around substantially the entire length thereof in a first helical direction, said second plurality of tubes being adapted for longitudinal extension and contraction in response to increases and decreases, respectively, in fluid pressure applied thereto; and

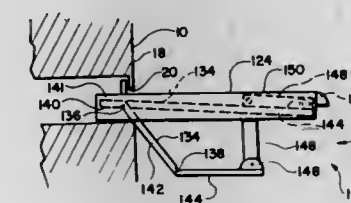


a third plurality of flexible elongate tubes being radially spaced from said core member and helically wrapped around substantially the entire length thereof in a second helical direction opposite to said first helical direction, said third plurality of tubes being adapted for longitudinal extension and contraction in response to increases and decreases, respectively, in fluid pressure applied thereto; whereby said limb may be selectively actuated to effect movement including extension and contraction, bending, right hand and left hand twisting, and desired combinations thereof.

**4,792,174**  
**SNACK TRAY FOR AUTOMOBILE**  
Yoshihiko Shioda, 1422 Eastcrest Dr., #101, Charlotte, N.C. 28205  
Continuation-in-part of Ser. No. 930,779, Nov. 14, 1986, abandoned. This application Jul. 21, 1987, Ser. No. 76,073  
Claims priority, application Japan, Nov. 16, 1985, 60-176704  
Int. Cl. B60R 7/06

U.S. Cl. 296—37.12

5 Claims



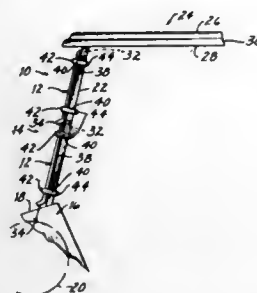
1. In combination with an automobile having a dashboard with an opening formed in said dashboard, a snack tray assembly slidably received within said opening to be selectively drawn outwardly from said dashboard into a cantilevered use position and pushed within said dashboard into a storage position, said snack tray assembly comprising:

a generally flat main body member having at least one hole formed therein and disposed in substantially horizontal disposition in said opening for substantially horizontal movement between said use and storage positions, and

a generally flat bottom support member having a plurality of sections articulatable with respect to one another, said support member being affixed movably to said main body member for articulated movement of said support member automatically into an operative position wherein one section of said support member is disposed beneath said hole of said main body member in spaced generally parallel relation thereto when said main body member is moved to its use position to support snack items, drink containers, and the like received within said hole and for articulated movement of said support member automatically into an

inoperative position in nested relation with said main body member when said main body member is moved to its storage position for receipt with said main body member within said dashboard.

**4,792,175**  
**WINDSHIELD ASSEMBLY FOR GOLF CARTS**  
Curtis E. Gerber, Tampa, Fla., assignor to Tampa G Manufacturing Co., Tampa, Fla.  
Filed Mar. 3, 1987, Ser. No. 20,962  
Int. Cl.<sup>4</sup> B60J 1/02  
U.S. Cl. 296—79



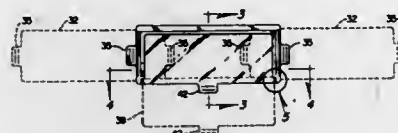
1. A window assembly for a golf cart having a roof structure with depending side rims, the roof structure being supported above by spaced apart upstanding roof supports affixed between a golf cart hood and the roof structure to define a front window opening, comprising in combination:

a plurality of window panes, each said window pane having a width appreciably wider than a distance between the spaced apart upstanding roof supports and including an integrally formed and transparent substantially planar portion with an inner and outer surface and an upper inwardly turned edge, a lower outwardly turned edge, and a pair of opposing side edges, said upwardly turned edge including a width narrower than the distance between said upstanding roof supports to allow said upwardly turned edge to fit between the upstanding roof supports;

means for removably affixing said opposing side edges of each said window pane to the respective upstanding roof supports, said window panes being positioned one above another with said planar portions substantially coplanar and said lower outwardly turned edge of the upper said window pane mating against said upper inwardly turned edge of the lower said window pane to prevent precipitation from flowing therethrough, said means for removably affixing said window panes to the upstanding roof supports comprising fastener means affixed to said opposing side edges of each of said window panes for removable fastening with corresponding fasteners mounted along a front edge of the upstanding roof supports; and means for securing said window panes removed from about the window opening and stacked in parallel relationship one on top of another to a position underneath the roof structure, said means for securing said stacked window panes underneath said roof structure comprising a plurality of straps affixed to the lowermost said window pane of said stacked window panes and to said roof structure allowing removal of said stacked window panes from underneath said roof structure.

**4,792,176**  
**EXTENSION UNIT FOR SUN VISOR**  
Fred Karford, 3520 E. 17th St., Idaho Falls, Id. 83401  
Filed May 7, 1987, Ser. No. 46,731  
Int. Cl.<sup>4</sup> B60J 3/02  
U.S. Cl. 296—97.8

11 Claims



1. In a sun visor for vehicles wherein the visor is disposed for extension across the windshield area of the vehicle and is pivotal about a horizontal axis to shield occupants of the vehicle from the glare of the sun, the improvement comprising:

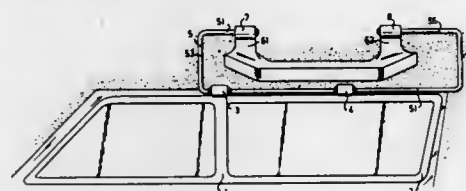
a sun visor extension unit including a support frame of generally rectangular configuration having opposed surfaces and means for attaching one of said surfaces to a surface of said sun visor;

a lateral visor extension panel of flat generally rectangular configuration disposed between said opposed surfaces of said unit, said unit including a horizontal guide passage between said opposed surfaces for lateral advancement of said extension panel away from said unit through one of said opposite ends of said unit, said extension panel having grasping means at opposite ends of said extension panel whereby to require positive manual engagement and movement in a horizontal direction of said extension panel through said guide passage; and

a light-diminishing glare shield normally disposed in superimposed relation to said extension panel, said glare shield being of flat, generally rectangular configuration, said unit having guide means frictionally engaging said glare shield to normally retain it in the superimposed position with respect to said extension panel, said guide means including a downwardly opening guide slot for downward vertical extension of said shield beyond the lower edge of said sun visor, grasping means on said shield engageable by an occupant of the vehicle to adjustably position said shield different extended distances downwardly and away from said unit and beyond the lower edge of said sun visor, and limit stop means interposed between said glare shield and guide means to limit the movement of said glare shield a maximum extended distance away from said unit in a downward direction.

**4,792,177**  
**SUN VISOR FOR A VEHICLE SIDE WINDOW**  
E. Gunnar Svensson, Malung, Sweden, assignor to Autopart Sweden AB, Malung, Sweden  
Filed Oct. 1, 1987, Ser. No. 103,747  
Claims priority, application Sweden, Oct. 7, 1986, 8604266  
Int. Cl.<sup>4</sup> B60J 3/02  
U.S. Cl. 296—152

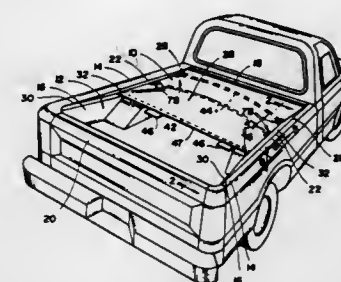
2 Claims



1. A sun visor for a vehicle side window, in which the sun visor (1) is pivotally affixed to a courtesy handle (6) in the vehicle, the courtesy handle (6) having hinge sleeves (7, 8) to support complementary pivot axes (54, 55) in the sun visor (1).

**4,792,178**  
**TRUCK TONNEAU COVER ASSEMBLY**  
Paul G. Kokx, Sylvan Lake, Mich., assignor to Rolltop, Inc., Sylvan Lake, Mich.  
Filed Aug. 19, 1987, Ser. No. 87,145  
Int. Cl.<sup>4</sup> B60P 7/04  
U.S. Cl. 296—98

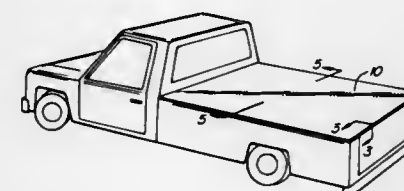
20 Claims



1. A truck tonneau cover assembly for opening and closing a truck bed of the type having side walls defining lateral sides, a front wall, and a rear tailgate, the tonneau cover assembly comprising: a pair of elongated guides respectively mountable on the truck bed sides so as to extend forwardly and rearwardly generally between the front wall and the tailgate; each guide having an elongated groove extending along its length and an inwardly oriented restricted slot into the groove; each mounted guide having a front end where the groove and slot thereof extend outwardly in a forward direction and also having a rear end; the mounted guides each having an intermediate portion; said intermediate portions of the mounted guides being located closer to each other than the front ends of the guides; a storage roll mountable adjacent the front wall; a flexible sheet like cover having enlarged side edges that are respectively received within the grooves of the guides with the cover closely extending through the restricted slots so as to be supported for movement by the guides in a sealed relationship; the cover having a front edge that is rolled up on the storage roll to store the cover and open the truck bed; the cover having a rear edge that is pulled rearwardly to unroll the stored cover and thereby close the truck bed; bendable slats that extend laterally between the side edges of the cover with longer lengths than the spacing between the intermediate portions of the mounted guides; and means extending generally from one mounted guide to the other mounted guide and operable to bow the slats upwardly upon rearward slat movement along the guides in order to curve the closed cover upwardly so as to shed water.

**4,792,179**  
**TONNEAU COVER ATTACHING SYSTEM**  
Michael C. Stevens, 1717-6 Solano Way, Concord, Calif. 94520  
Filed Mar. 21, 1986, Ser. No. 842,255  
Int. Cl.<sup>4</sup> B60J 7/10  
U.S. Cl. 296—100

2 Claims



1. A cover assembly for a vehicle cargo bed, the cargo bed

having four sidewalls defining a quadrilateral opening, comprising:

a collapsible cover defining a substantially quadrilateral periphery, the cover being of sufficient size to enclose the quadrilateral opening with the cover periphery extending slightly therebeyond, the cover having a flexible, relatively flat plastic strip hingedly attached to and extending substantially continuously around the cover periphery, the strip having a predetermined thickness;

a plurality of L-shaped rigid rails; and

means for fixedly attaching the rails to an inside of the four sidewalls with each of the sidewalls having at least one rail attached at the inside thereof, the attached rails each forming an outwardly facing, rigid gap above and adjacent to the quadrilateral opening of sufficient size for the strip to be inserted and removably held therein when the cover stretchably encloses the quadrilateral opening.

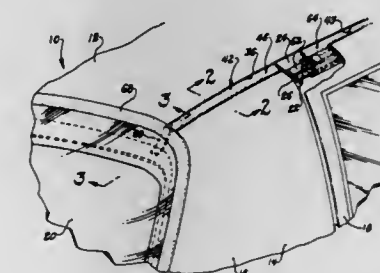
**4,792,180**  
**VEHICLE BODY ROOF CONSTRUCTION AND MOLDING**

Lawrence J. Jacobsen, St. Clair Shores, and Fred F. Kleinert, Utica, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Feb. 2, 1987, Ser. No. 10,241  
Int. Cl.<sup>4</sup> B60D 25/06

U.S. Cl. 296—210

1 Claim



1. A roof construction for a vehicle body having a door, comprising,

a roof panel having a generally rectilinear lateral edge flange continuous along the outer edge thereof with a forward portion and a rearward portion, the forward portion thereof defining an opening for the door and having a weatherstrip for sealing the door opening when closing movement of the door carries the door into proximity with the lateral edge flange, thereby defining a gap between the door and the lateral edge flange;

a rear quarter panel having a sail portion with a lateral edge flange;

means attaching the lateral edge flange of the sail portion with the rearward portion of the lateral edge flange of the roof panel, thereby defining a gap generally colinear with the gap flange of the roof panel, said gap having a bottom wall and spaced apart side walls;

a molding for filling the gap, said molding having a longitudinal extending central body having an upper surface adapted to bridge across the gap between the roof panel and the sail portion, longitudinal continuous extending lips along each side edge of the central body and reaching downwardly toward the bottom wall, said lips having a width greater than the maximum spacing between the laterally spaced side walls of the gap and being flexible to yield upon insertion of the molding into the gap so that the gap is fully filled, and said central body of the molding having a generally planar bottom surface;

adhesive means acting between the bottom surface of the molding and the bottom wall of the gap;

a rear window opening defined by the roof panel and the sail portion of the rear quarter panel and having a window



panel mounted therein and a window reveal molding surrounding the window panel;  
and said molding for filling the gap having a tongue at the forward end extending beneath the weatherstrip and a tongue at the rearward end extending beneath the window reveal molding to further attach the molding to the vehicle body.

4,792,181

# FOLDABLE ARMCHAIR WITH ADJUSTABLE BACKREST AND FOOTREST

Jean-Paul Guichon, Pratz, France, assignor to Grosfillex S.A.R.L., Oyonnax, France

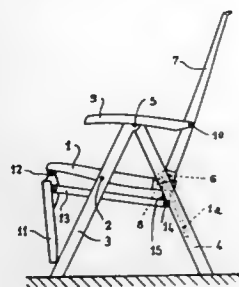
Filed Jul. 28, 1987, Ser. No. 78,672

Claims priority, application France, Aug. 7, 1986, 86 11604

Int. Cl.<sup>4</sup> A47C 4/00

U.S. Cl. 297-28

5 Claims



1. A foldable armchair including adjustable backrest and footrest which are pivotally connected to the forward and rear portions of a seat so as to be extendable from and collapsible with respect thereto in which the improvement comprises, a pair of spaced longitudinally connecting elements disposed beneath the seat and extending generally between the forward and rear portions thereof, said connecting elements having first ends of said connecting elements to said footrest, a pair of crank means having upper and lower ends, second pivot means for pivotally connecting said lower end of said crank means to said rear ends of said connecting elements, the backrest having upper and base portions, third pivot means for pivotally connecting said crank means to the seat adjacent the rear portion thereof and to the backrest adjacent the base portion thereof, a pair of spaced stop means formed along and extending from and in substantial alignment with said base portion of the backrest, said upper ends of each of said crank means including a bearing surface face which is selectively engageable with said pair of spaced stop means of the backrest, said bearing surface faces having a configuration so as to be drivingly engaged by said stop means when the backrest is pivoted to extend away from the seat but which permits the free rotational movement of the backrest when the backrest is pivoted so as to be collapsible with respect to the seat.

4,792,182

# ADJUSTABLE FOLDING SAFETY CHAIR

Whitney G. McLeod, Gunther Islands, Eureka, Calif. 95501

Filed Sep. 5, 1986, Ser. No. 904,135

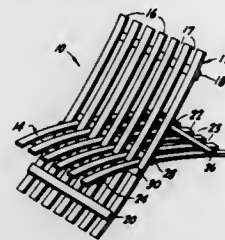
Int. Cl.<sup>4</sup> A47C 4/00

U.S. Cl. 297-55

5 Claims

1. An adjustable folding safety support, comprising:  
(a) a first longitudinal section having rear and front sides and first and second opposite ends and comprising longitudinally extending, spaced slats defining continuous spaces therebetween and further comprising first and second spaced supporting cross members located respectively proximate the first and second opposite ends, thereby

defining an uninterrupted intermediate region of continuous slat spaces therebetween;  
(b) a second longitudinal section having front and rear sides and comprising an intermediate transverse array of slots for receiving the spaced continuous slats of the first section for sliding movement of said first section along said uninterrupted continuous intermediate region thereof;  
(c) the first section forming a seat between the first end thereof and the second section and forming a leg between the second end thereof and the second section for supporting the chair; and  
(d) first and second spaced transverse cross bars joined



respectively to the rear and front of the second section on opposite sides of the transverse array of slots for slidably receiving the slats of the first section therebetween and thereby permitting pivotal movement of the first and second sections from a first folded position with the first and second sections closely adjacent and a second spaced position with the upper and lower cross bars of said section abutting the respective rear and front sides of the first section thereby preventing the first and second sections from being pivoted further apart;  
(e) whereby sliding movement of said first section relative to said second section adjusts the length of the seat relative to the leg.

4,792,183

# DESK FOR USE IN AUTOMOBILES

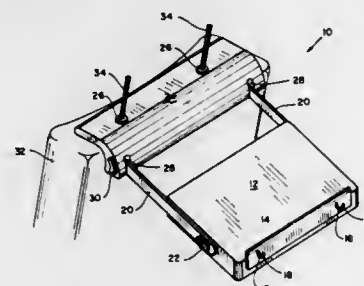
William R. Townsend, III, 19W 071 18th St., Lombard, Ill. 60148

Filed Oct. 29, 1987, Ser. No. 114,041

Int. Cl.<sup>4</sup> A47B 83/02

U.S. Cl. 297-163

1 Claim



1. A desk for use in automobiles having seats provided with head rests secured by support rods, comprising:  
an elongated base having an arcuate upper surface;  
a pair of spaced circular apertures formed through said elongated base;  
a compression fitting in each of said circular apertures for securing said elongated base to the head rest support rods on an automobile seat;  
a pair of arms adjustably pivotally mounted at opposite ends of said elongated base;  
a first pair of cam locks at each end of said base for securing said arms in adjusted position;

4,792,185

# SEAT DEVICE

Yoshitoshi Oshikawa, Ayase, Japan, assignor to Ikeda Bussan Co., Ayase, Japan

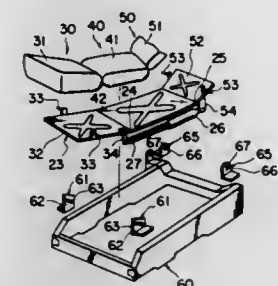
Filed Jun. 10, 1987, Ser. No. 60,145

Claims priority, application Japan, Jun. 12, 1986, 61-136993

Int. Cl.<sup>4</sup> A47C 3/00

U.S. Cl. 297-284

5 Claims



a planar desk surface pivotally mounted between said pair of arms;  
a second pair of cam locks on an end of each of said arms pivotally mounting and securing said planar desk surface for selective angular adjustment;  
each of said first and second pair of cam locks having a transversely extending circular shaft mounted for manual rotation between locked and unlocked positions, a handle secured to one end of said circular shaft, a cam lobe on an opposite end of said shaft, and a resilient block mounted for abutment with said cam lobe in said locked position;  
an edge strip secured to a leading edge of said planar desk surface;  
a pair of spaced curved slots formed through said edge strip; and  
a screw extending through each of said curved slots securing said edge strip to said leading edge of said planar desk surface for selective extension and retraction.

4,792,184

# CONTAINER HOLDER FOR A VEHICLE

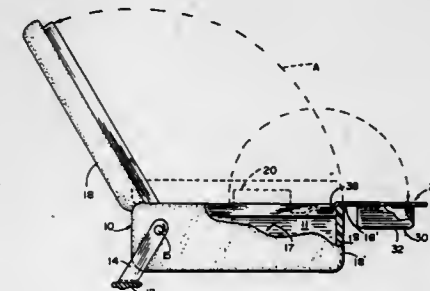
Kenneth M. Lindberg, Holland; Ronald A. Dykstra, Rockford, and Danny B. Larsen, Holland, all of Mich., assignors to Prince Corporation, Holland, Mich.

Filed Dec. 22, 1986, Ser. No. 944,989

Int. Cl.<sup>4</sup> A47C 7/62

U.S. Cl. 297-194

4 Claims



1. A vehicle armrest and container holder assembly comprising:  
an armrest for mounting to a vehicle said armrest including a storage housing;  
a container holder including a container supporting element extending in a generally horizontal plane for use, said element including means defining an aperture of adjustable dimensions for engaging the sidewalls of a beverage container wherein said means defining an aperture comprises an aperture formed through said element and a plurality of sector-shaped members pivotally mounted to said element and bias means for urging said sector-shaped members toward a position tending to enclose said aperture, said when a container is inserted into said aperture, said sector-shaped members engage the side of the container for removably holding the container; and  
means for mounting said container supporting element to said housing for movement between a stored position at least partially within said housing and a use position extended from said housing and further including slide means extending between each of said sectors and said element for coupling each of said sector-shaped members to said element.

4,792,186

# VALVE FOR CONTROLLING TWO-WAY FLOW

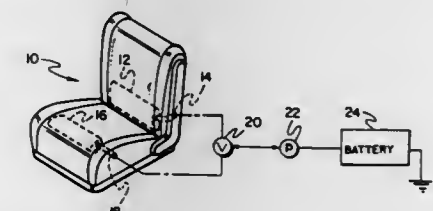
Gary H. Benjamin, Kenton, and Harry O. Jones, Findlay, both of Ohio, assignors to Cooper Tire & Rubber Company, Findlay, Ohio

Filed Nov. 16, 1987, Ser. No. 121,829

Int. Cl.<sup>4</sup> A97C 7/42

U.S. Cl. 297-284

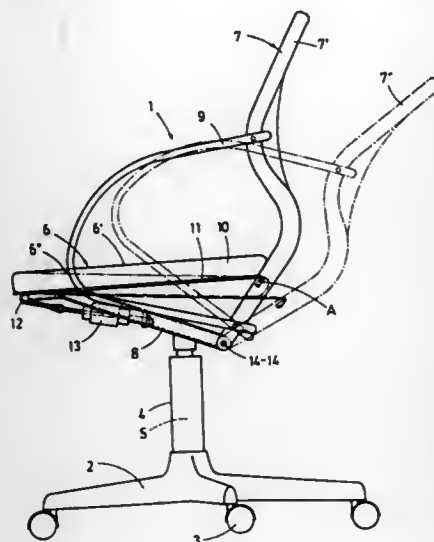
31 Claims



21. Apparatus for controlling the rigidity of a seat, comprising an inflatable bladder located in said seat, an electrically-operated reversible air pump, and a valve for controlling the flow of air into and out of said bladder, said valve including:  
a housing defining a bore extending therethrough, said bore terminating in first and second counterbore end portions defining a narrowed central portion therebetween and first and second junction areas connecting said first and second counterbore portions, respectively, with said central portion;  
said housing further defining a first port extending through

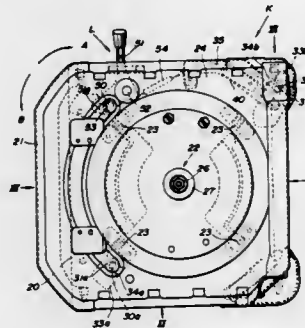
said housing and opening into said central portion of said bore;  
 a resilient sealing member disposed within said bore, said member having enlarged first and second ends positioned respectively in sealing contact within said first and second counterbore portions to seal said bore, said sealing member further being normally positioned in sealing contact with said junction areas to seal said central portion from said counterbore portions;  
 means for longitudinally moving said sealing member within said bore to move one of said enlarged portions away from one of said junction areas while deforming an opposite one of said enlarged portions further into sealing contact with a corresponding one of said junction areas;  
 said housing further defining a second port extending through said housing and opening into both of said first and second counterbore portions at or near said junction areas; and  
 actuator means connected to said longitudinal moving means for enabling an operator to cause longitudinal movement of said sealing member, whereby longitudinal movement of said sealing member in either direction opens a fluid flow path from said first to said second port; said apparatus further comprising a first air line connecting said bladder and said first port, and a second air line connecting said air pump and said second port.

**4,792,187**  
**PIVOT MECHANISM FOR SEATS**  
 Simon Desanta, Hollen im Lohden, D-8430 Gutersloh 12, Fed. Rep. of Germany  
 Filed Jul. 16, 1987, Ser. No. 74,701  
 Int. Cl.<sup>4</sup> A47C 3/00  
 U.S. Cl. 297—300 3 Claims



1. In pivot mechanism for height-adjustable seats having a seat and a back attached to an underframe, the back being pivotally mounted to the underframe for forward and rearward swinging movement about a horizontal axis, and tension spring means yieldably resisting said rearward movement; the improvement in which said spring means extend and act between a forward end of the underframe and said back and are secured to said back above said horizontal axis, and a seat resting on and supported by said spring means, said spring means and seat being swingable downwardly about said forward end of the underframe upon rearward swinging movement of said back about said axis.

**4,792,188**  
**SWIVEL SEAT FOR VEHICLE**  
 Hattuo Kawashima, Kozai, Japan, assignor to Fujii Kiko Company, Limited, Tokyo, Japan  
 Filed Sep. 17, 1985, Ser. No. 776,829  
 Claims priority, application Japan, Sep. 21, 1984, 59-142228[U]  
 Int. Cl.<sup>4</sup> A47C 3/18; B60N 1/02  
 U.S. Cl. 297—349 7 Claims

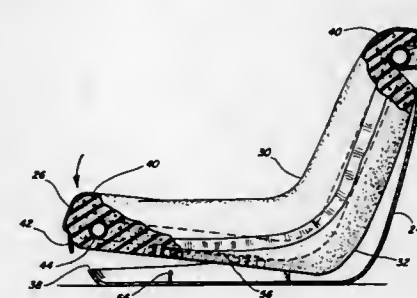


1. A swivel seat comprising:  
 a stationary component secured to a floor;  
 a pivotal component supporting a seat cushion for rotation therewith and pivotably supported directly above said stationary component, said pivotal component being pivotable between a first normal position and second pivoted position displaced by a predetermined angle from said first position;  
 latching means for restricting movement of said pivotal component away from said stationary component at said first normal position of said pivotal component, said latching means including a first member secured to said stationary component, and a second member, secured to said pivotal component and engageable to said first member at least at said first normal position; and  
 a third member secured to said stationary component and having a first surface and a fourth member secured to said pivotal component and having a second surface, said first surface coming into contact with said second surface so that said third and fourth members restrict downward displacement of said pivotal component toward said stationary component, due to a load on said pivotal component, said third and fourth members cooperating with each other to raise said pivotal component to a predetermined highest position and cooperating with said latching means to restrict deformation of said pivotal component so as to maintain said pivotal component substantially in parallel to said stationary component at least at said first normal position.

**4,792,189**  
**SEAT ASSEMBLY**  
 John S. Shovar, 4103 W. Lombard, Davenport, Iowa 52804  
 Filed Feb. 4, 1988, Ser. No. 152,108  
 Int. Cl.<sup>4</sup> A47C 7/02  
 U.S. Cl. 297—452 3 Claims

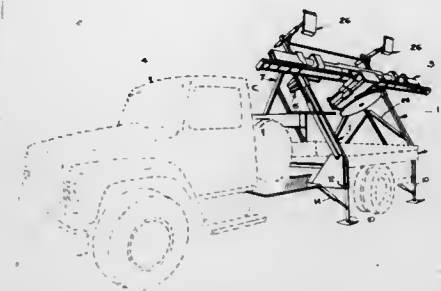
1. A seat assembly, comprising  
 a foam cushion assembly including a foam cushion and a rigid internal framework molded integrally within said cushion, said cushion having front, back and side portions and a lip extending entirely around said side portion, said framework being located within said cushion in sufficient proximity to said side portion to substantially maintain the shape, size and configuration of said side portion and said cushion lip;  
 a rigid shell in juxtaposition with the back portion of said

cushion, said shell having bracket means for rotatably engaging said cushion assembly framework, said shell also having a peripheral edge configured to substantially uniformly align and mate with said cushion lip;



a cover member overlying the front portion of said cushion and having a free peripheral section extending between said cushion lip and said shell edge; and  
 means to maintain said shell and foam cushion in coupled juxtaposition and to thereby hold the peripheral section of said cover between said cushion lip and said shell edge.

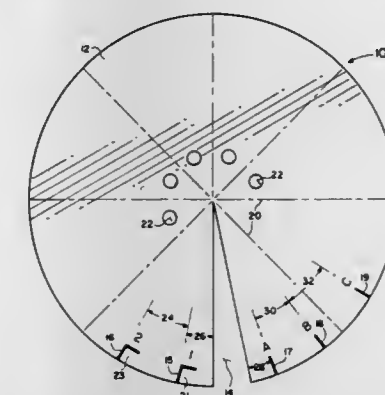
**4,792,190**  
**MACHINE FOR CUTTING CURBSTONES, SIDEWALKS OR THE LIKE**  
 René Bertrand, 720 St-Jacques, St-Jean, Quebec, Canada J3B 2M7  
 Filed Jul. 30, 1987, Ser. No. 79,436  
 Int. Cl.<sup>4</sup> E01C 23/09  
 U.S. Cl. 299—41 28 Claims



1. A machine including a powered truck-like vehicle having a support base and an apparatus mounted on the base for cutting a drive-in passage across a curbstone, a sidewalk or the like, said apparatus comprising:  
 two spaced parallel booms mounted at one end on said base; a pair of rail-structure-holding heads slidably mounted each on one of said booms, and means for displacing said heads along said booms;  
 an elongated main rail structure extending between said heads, said main rail structure including an elongated upper suspension member having a non-circular cross section and a longitudinal axis;  
 means mounting said main rail structure on said heads for oscillation of said rail structure about said longitudinal axis, said main rail structure mounting means comprising: pillow blocks each having a rotary cylinder, said pillow blocks being each mounted on one of said heads; said cylinders being formed with bores therethrough of non-circular cross section; wherein said rail structure suspension member slidably extends through said non-circular bore for rotation with said cylinders;  
 operative means interconnecting at least one of said heads and the respective pillow-block cylinder for oscillating

said suspension member, and thus said rail structure, about said longitudinal axis;  
 a saw carrier and means, solid with said saw carrier, for mounting said saw carrier on said oscillatable rail structure and for displacing said saw carrier thereon along a first direction parallel to said longitudinal axis; and  
 a saw mounted on said carrier, and wherein said carrier includes first means for displacing said saw on said carrier in a second direction perpendicular to said first direction.

**4,792,191**  
**AUTOMOBILE WHEEL PROTECTOR**  
 Frederick M. Farmer, 4364 Real Ct., Orlando, Fla. 32808  
 Filed Jun. 15, 1987, Ser. No. 61,588  
 Int. Cl.<sup>4</sup> B05C 11/00  
 U.S. Cl. 301—37 R 11 Claims



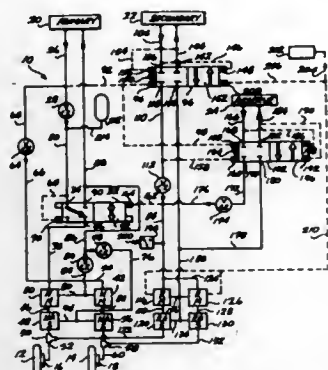
1. A hand-held protector for a vehicle wheel comprising: a disc cut from thin, flexible sheet stock, said disc having a radial cut from a center thereof to the periphery thereof; a plurality of radial slits spaced apart from each other in a first circumferential direction from said radial cut; at least one tab for engaging a selected one of said radial slits to thereby form said disc into a cone, said tab cut into said periphery of said disc adjacent and spaced apart from said radial cut in a second circumferential direction, said engaged slit selected to thereby produce a cone having a desired base diameter and whereby other base diameters are selectable.

**4,792,192**  
**AUTOMATIC BRAKE SOURCE SELECT SYSTEM**  
 Nils Treltane, Bothell, Wash., assignor to The Boeing Company, Seattle, Wash.  
 Filed Feb. 11, 1988, Ser. No. 155,162  
 Int. Cl.<sup>4</sup> B60T 15/16  
 U.S. Cl. 303—13 30 Claims

1. A brake source select system, for selecting one of a plurality of separate sources to provide pressurized fluid to a brake system according to a preferred priority, so that if one or more sources having a higher priority fails, a source that is next in preferential priority is selected, comprising:  
 (a) a plurality of differential fluid pressure actuated valves, each valve having at least one inlet port, at least one outlet port, at least one select port through which a pressurized fluid may be applied to cause the valve to provide fluid communication between the inlet port and the outlet port and at least one deselect port through which a pressurized fluid may be applied to cause the valve to block fluid communication between the inlet port and the outlet port, one valve being associated with each of the sources of pressurized fluid;  
 (b) a plurality of source lines, each connecting one of the sources of pressurized fluid in fluid communication with the inlet port of the valve associated with that source;



- (c) a plurality of supply lines, each connecting the outlet port of one of the valves in fluid communication with the brake system;
- (d) a plurality of activation lines, each connecting one of the sources in fluid communication with one of said select ports of the valve associated with said one source; and
- (e) a plurality of deactivation lines, each connecting one of the sources having a higher priority in fluid communication with one of said deselect ports of the valves associated with sources having a lower priority, pressurized fluid provided by said higher priority sources causing each of the valves associated with the sources of lower priority to block fluid flow between their inlet port and outlet port, loss of fluid pressure due to failure of one or more sources of higher priority resulting in the source of next lower priority that has not failed being selected to provide pressurized fluid to the brake system.



tion with one of said deselect ports of the valves associated with sources having a lower priority, pressurized fluid provided by said higher priority sources causing each of the valves associated with the sources of lower priority to block fluid flow between their inlet port and outlet port, loss of fluid pressure due to failure of one or more sources of higher priority resulting in the source of next lower priority that has not failed being selected to provide pressurized fluid to the brake system.

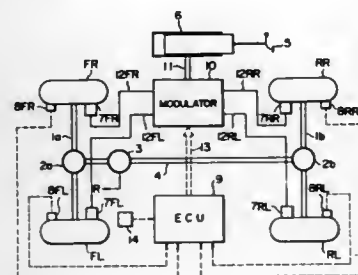
#### 4,792,193 ANTI-SKID CONTROL SYSTEM FOR MOTOR VEHICLES

Yoshio Takahashi, Ohmiya, and Hiroyuki Yoshizawa, Hasuda, both of Japan, assignors to Akebono Brake Industry Co., Ltd., Tokyo, Japan

Filed Oct. 1, 1987, Ser. No. 103,365  
Claims priority, application Japan, Oct. 7, 1986, 61-237232  
Int. Cl.<sup>4</sup> B60T 8/78

U.S. Cl. 303—100

1 Claim



1. An anti-skid control system for a motor vehicle having a direct-coupled 4WD system and a drive system other than a direct-coupled 4WD system; comprising:
- means for switching said drive system from said direct-coupled 4WD system to the drive system other than a direct-coupled 4WD system, and vice versa;
- first means for detecting whether the drive system of the motor vehicle is switched to the direct-coupled 4WD system; and
- second means adapted, when the first means has detected that the drive system is switched to the direct-coupled 4WD system for setting up brake pressure reduction start-

ing points in the anti-skid control system to come earlier than when the drive system is switched to that other than the direct-coupled 4WD system; said second means comprising:

- means for calculating a wheel speed;
- means for setting up a reference wheel speed on the basis of said wheel speed in such a manner as to follow said wheel speed with a predetermined speed difference therebetween and to vary with a predetermined constant gradient of deceleration when a deceleration of said wheel speed goes beyond a predetermined level; and
- means for setting up said predetermined speed difference smaller when the drive system of the motor vehicle is switched to the direct-coupled 4WD system than when said drive system is switched to that other than the direct-coupled 4WD system.

4,792,194

#### ANTILOCK BRAKE DEVICE FOR VEHICLES

Tsutomu Hayashi, Tokyo; Takeshi Kawaguchi, and Tetsuo Tsuchida, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

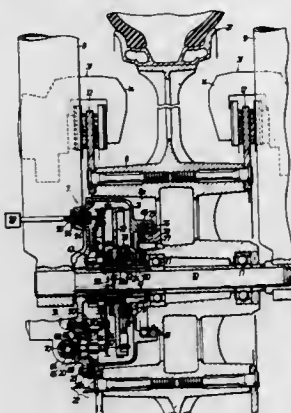
Continuation of Ser. No. 731,565, May 6, 1985, abandoned. This application Feb. 13, 1987, Ser. No. 15,557

Claims priority, application Japan, May 9, 1984, 59-92456; May 30, 1984, 59-109832; Oct. 26, 1984, 59-225397

Int. Cl.<sup>4</sup> B60T 8/40

U.S. Cl. 303—116

54 Claims



1. An antilock brake device for a vehicle having a suspension for mounting a wheel, comprising
- an axle mounted to the suspension;
- a wheel hub rotatably mounted about said axle and having an enlarged recess on a first side thereof about said axle;
- a hydraulic brake system;
- a deceleration sensor including a flywheel positioned within said recess of said wheel hub about said axle, said flywheel being positioned concentrically about said axle;
- a transmission coupled with the wheel hub and said deceleration sensor and positioned within said recess of said wheel hub about said axle; and
- a hydraulic modulator coupled with said hydraulic brake system and with said deceleration sensor.

4,792,195

#### DRAWER SUPPORT SYSTEM

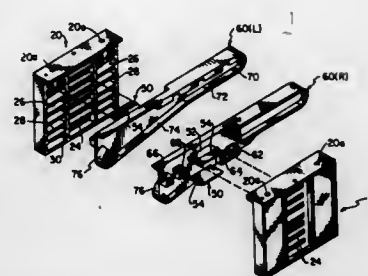
David L. Adriaansen, Arlington, and David L. Evans, Acton, both of Mass., assignors to Kidde Holding, Inc., Saddlebrook, N.J.

Filed Aug. 6, 1987, Ser. No. 82,871

Int. Cl.<sup>4</sup> A47B 57/00

U.S. Cl. 312—245

24 Claims



1. In an under cabinet storage system, a support subsystem for supporting storage enclosures under a cabinet comprising: a pair of brackets mounted in spaced, opposed relationship under a cabinet, each bracket having a plurality of vertically spaced, horizontal slots, and a column of stabilizing boxes formed on either side of said slots;
- a first pair of guide members disposed between said brackets and constructed to engage and retain one of said storage enclosures therebetween, each guide member having upper and lower spaced tongue means engaged within respective ones of said slots of a respective one of said brackets to releasably retain said guide member on said one bracket, and forward and rear lug means disposed on either side of said tongue means engaged within respective ones of said stabilizing boxes, said forward and rear lug means being within boxes on opposites sides of said slots, said tongue means being positioned so that said upper tongue means is above said lug means and said lower tongue means is below said lug means.

4,792,196

#### INTERNAL STRUCTURE HOLOGRAPHY

Gli Raviv, Chicago; Michel E. Marhic, Evanston, and Max Epstein, Highland Park, all of Ill., assignors to Northwestern University, Evanston, Ill.

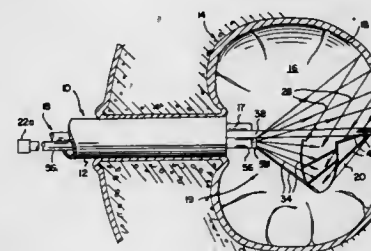
Division of Ser. No. 518,440, Jul. 29, 1983, Pat. No. 4,643,513.

This application Dec. 30, 1986, Ser. No. 947,702

Int. Cl.<sup>4</sup> G03H 1/02; G02B 23/26, 6/22; A61B 1/06

U.S. Cl. 350—3.6

17 Claims



1. An apparatus for laser holographic examination of the internal features of cavities and passageways of a structure comprising:
- laser means capable of generating at least one beam external to said structure;
- laser beam waveguide means comprising a multilayer fiber for simultaneously performing as a single mode laser reference beam waveguide and as an object beam waveguide,

and said waveguide means coupled to said lasing means for conducting at least one said laser beam generated external to said structure through multiple layers of the multilayer fiber to said cavities and passageways of said structure to provide an internal laser beam from each of at least two different layers of the multilayer fiber to form at least two internal laser beams for illuminating said internal features for hologram formation;

means for establishing a laser object beam from one of said internal laser beams within said structure;

means for establishing a laser reference beam from another of said internal laser beams within said structure;

recording means capable of obtaining a laser hologram within said structure; and

placement means for placing said recording means within said structure and for recovering said recording means from said structure.

4,792,197

#### FABRICATION METHOD AND EQUIPMENT FOR DIFFRACTION GRATINGS

Hiroaki Inoue; Shinji Tsuji, both of Hachioji; Hiroyoshi Matsumura, Saitama, and Akira Arimoto, Musashimurayama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

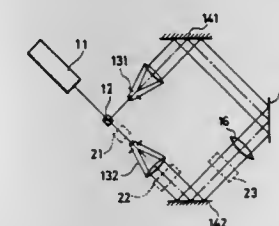
Filed Jul. 18, 1986, Ser. No. 886,818

Claims priority, application Japan, Jul. 19, 1985, 60-158169

Int. Cl.<sup>4</sup> G02B 5/32; G03H 1/04

U.S. Cl. 350—3.7

14 Claims



1. In a method of fabricating a diffraction grating on materials by dividing a laser beam into at least two light beams, mixing them together so that said at least two light beams interfere to form an interference pattern, and by utilizing a photochemical reaction of which the rate changes or properties change depending upon the distribution of intensity of light in the interference pattern, the improvement wherein at least one of said at least two light beams is delayed over a portion of the light beam by a given amount causing pattern fringes to shift over at least a portion of the pattern.

4,792,198

#### METHOD AND APPARATUS FOR ROTATING ONE OR MORE MIRRORS IN A BEAM SCANNING SYSTEM

Gregory J. Sherwood, Silver Spring, Md., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Jun. 18, 1987, Ser. No. 64,318

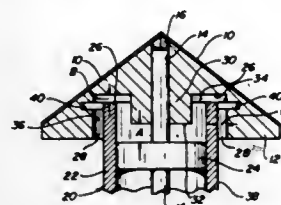
Int. Cl.<sup>4</sup> G02B 26/10

U.S. Cl. 350—6.7

14 Claims

1. Apparatus for rotating one or more mirrors in a beam scanning system, comprising:
- a drive motor,
- a drive spindle, operatively connected to said drive motor, for rotation by said motor,
- a spindle support arrangement, including a generally cylindrical spindle housing and a bearing mounted within said housing a predetermined distance from an open end thereof, said spindle extending through said spindle housing and said bearing and out of said open end of said spindle housing, and
- a mirror support wheel mounted on said spindle for rotation

therewith, said mirror support wheel defining a generally annular counter bore for receiving said open end of said spindle housing thereinto, said mirror support wheel further defining a central spindle engaging portion which is radially inward of said annular counter bore, said central



spindle engaging portion having an inner surface facing said bearing and spaced therefrom by a distance which is sufficient to substantially reduce the Bernoulli effect pressure drop in the region within said spindle housing adjacent the side of said bearing facing said inner surface when said mirror support wheel is rotated by said spindle.

4,792,199

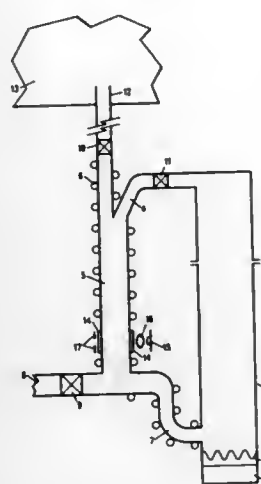
**SYSTEM FOR DETECTION OF EXTREMELY SMALL PARTICLES IN A LOW PRESSURE ENVIRONMENT**  
Peter G. Borden, Palo Alto, Calif., assignor to High Yield Technology, Mountain View, Calif.

Filed Oct. 27, 1987, Ser. No. 114,277

Int. Cl.<sup>4</sup> G01N 1/00

U.S. Cl. 356—37

8 Claims



1. A system for detecting extremely small particles in a low pressure environment comprising:  
a vapor column including an oil reservoir containing diffusion pump oil;  
a saturation column coupled to said vapor column and to said low pressure environment, said vapor column and saturation column being coupled to form a loop;  
means for heating and vaporizing said oil to form oil vapors that rise in said vapor column;  
cooling means coupled to said saturation column for condensing and supersaturating and forming liquid droplets of said oil vapors thereby providing a pumping action in the saturation column so that no backflow of oil vapors into said low pressure environment occurs; and  
optical detection means disposed adjacent to said saturation column for detecting said droplets as they descend in said saturation column.

4,792,200

**ARRAY OF COUPLED OPTICAL WAVEGUIDES**  
Markus-Christian Amann, Munich; Bernhard Stegmüller, Augsburg, and Franz Kappeler, Puchheim, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

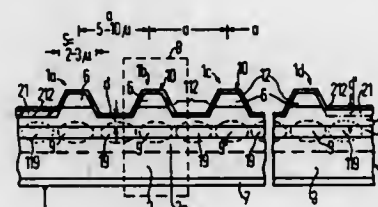
Filed Apr. 1, 1987, Ser. No. 32,599

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1986, 3611167

Int. Cl.<sup>4</sup> G02B 6/12

U.S. Cl. 350—96.12

11 Claims



3. An array of coupled metal clad ridge waveguide lasers, comprising:

- a semiconductor body including a plurality of layers, said plurality of layers including an optically transmissive laser-active first layer and a second semiconductor layer located above said laser-active first layer; and
- a plurality of substantially parallel metal clad ridge waveguide lasers formed in said semiconductor body for conducting TE mode waves, said metal clad ridge waveguide lasers including individual ridge-shaped waveguides, said ridge-shaped waveguides include portions forming upper portions of said ridge-shaped waveguides and ohmic contacts, regions between said ridge-shaped waveguides being free of said portions forming upper portions of said waveguides and having a reduced thickness sufficient to cause TM-type leakage waves laterally of said ridge-shaped waveguides to optically couple neighboring ones of said waveguides, said neighboring waveguides being spaced from one another a predetermined distance, and
- a continuous metal cladding layer extending above and in contact with said portions forming upper portions of said ridge-shaped waveguides, said metal cladding layer forming ohmic contacts with said upper portions, said continuous metal cladding layer extending above said regions between said waveguides.

4,792,201

**OPTICAL DEFLECTOR DEVICE**

Makoto Suzuki, Nagoya, and Akihiro Suzuki, Nishio, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

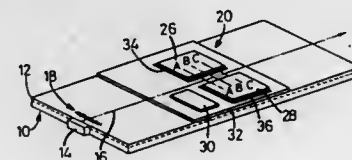
Filed Apr. 6, 1987, Ser. No. 34,049

Claims priority, application Japan, Apr. 9, 1986, 61-81580

Int. Cl.<sup>4</sup> G02F 1/29

U.S. Cl. 350—96.14

9 Claims



1. An optical deflector device for deflecting light rays, comprising:

a substrate having an electro-optical effect and capable of guiding the light rays therethrough;  
a buffer layer formed on one of opposite major surfaces of said substrate; and  
a plurality of deflection electrodes formed on said buffer layer to produce an electric field within said substrate, so that the light rays passing through said substrate are deflected in response to a change in the distribution of a refractive index of said substrate according to a controlled deflection voltage applied to said deflection electrodes, said deflection electrodes comprising first electrode means having a first potential and disposed on a first portion of said buffer layer, and second electrode means having a second potential different from said first potential and disposed on a second portion of said buffer layer;  
said buffer layer having at least one continuous groove formed through a thickness thereof so as to surround one of said first and second portions thereof and thereby isolate said first and second portions from each other.

4,792,202

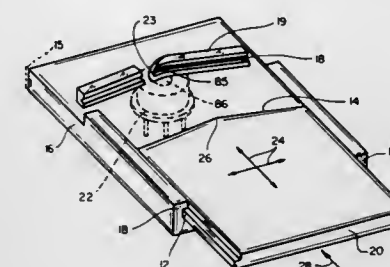
**BUS OPTICAL FIBER INCLUDING LOW MODE VOLUME LIGHT SOURCE OPTIMALLY ALIGNED**  
Joseph Zucker, Foster City; Frank H. Levinson, Redwood City, and Ralf A. Narciso, La Honda, all of Calif., assignors to Raychem Corp., Menlo Park, Calif.

Filed Jul. 29, 1987, Ser. No. 79,546

Int. Cl.<sup>4</sup> G02B 6/26, 6/28, 6/02; G02F 6/10

U.S. Cl. 350—96.16

17 Claims



1. A distribution optical fiber network, comprising:  
a multimode optical fiber;  
N side taps disposed serially on the fiber, N being an integer greater than 1;  
means for injecting an optical signal into the fiber such that an initial distribution of light modes supported by the fiber from light emitted by the injecting means is lower than an equilibrium light mode distribution for the fiber.

4,792,203

**OPTICAL FIBER DISTRIBUTION APPARATUS**  
Calvin G. Nelson, Northborough, Mass., and Mark Anton, Minneapolis, Minn., assignors to ADC Telecommunications, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 821,234, Jan. 22, 1986, abandoned, which is a continuation-in-part of Ser. No. 776,822, Sep. 17, 1985, abandoned. This application Sep. 12, 1986, Ser. No. 906,804

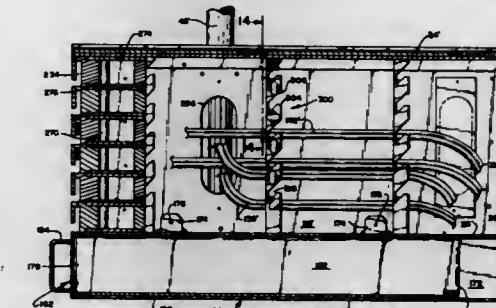
Int. Cl.<sup>4</sup> G02B 6/00, 6/36

U.S. Cl. 350—96.20

29 Claims

1. Distribution apparatus for cross connecting first optical fibers from a trunk cable to second optical fibers from a plurality of distribution cables, said apparatus comprising:  
a housing having members which define a storage space;  
a tray for receiving a length of each of said first and second optical fibers;  
means for movably attaching said tray to said housing wherein said tray may be moved between a storage posi-

tion in said storage space and an access position generally outside said storage space; and  
means, contained within said storage space, for interconnecting one of said first fibers from said trunk cable to one of said second fibers from one of said distribution cables, said



interconnecting means including a third pigtail optical fiber, first means for connecting said third fiber to said one first fiber from said trunk cable and second means for connecting said third fiber to said one second fiber of said one distribution cable, said third fiber also including a length being received and stored in said tray.

4,792,204

**PROCESS AND APPARATUS FOR ELIMINATION OF TOLERANCE DEPENDENT VARIATIONS OF A SELECTABLE SPACING BETWEEN COMPONENTS IN OPTICAL COMMUNICATION EQUIPMENT**

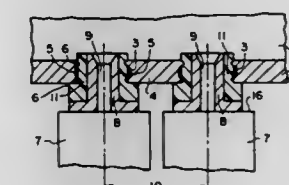
Heinz Prauer, Munich, Fed. Rep. of Germany; Alfred H. Johnson, Poughkeepsie, N.Y.; Dietmar Schulz, Munich, and Peter Pohl, Krailling, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany and IBM Corp., Armonk, N.Y.

Filed Jun. 8, 1987, Ser. No. 59,719

Int. Cl.<sup>4</sup> G02B 6/36

U.S. Cl. 350—96.20

9 Claims



6. Apparatus for substantially eliminating tolerance dependent variations of spacing between at least two components arranged in parallel to each other, said components each being provided with a flange-type neck, and which are respectively fixed with said neck at right angles to their longitudinal extension in a U-shaped recess of a wall of a casing provided for jointly holding at least two of said components, comprising:  
A plurality of necks each covered with a layer of a deformable plastic and soft material relative to a material of which said necks are comprised; whereby each of the said necks is adapted to be pressed at right angles to the longitudinal extension of said necks in between lateral walls of said U-shaped recesses, which walls include at least one projecting rib running parallel to said walls, such that at least one of said projecting ribs at one side of each neck is pressed at right angles to the longitudinal extension of said necks into the deformable plastic material a lesser amount than is the rib located on the other side of the said neck,



thereby obtaining said spacing with respect to the adjacent component.

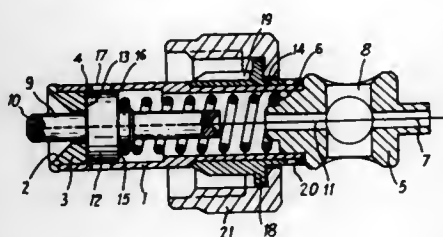
**4,792,205**  
**FERRULE OF A CONNECTOR FOR SINGLE-MODE OPTICAL FIBERS WITH POLARIZATION MAINTENANCE AND THE PROCESS FOR ITS ADJUSTMENT**

Huan B. Yin, Paris, and Norbert Valade, Le Blanc Mesnil, both of France, assignors to Radiall Industrie, Remy-Sous-Bois, France

Filed May 13, 1987, Ser. No. 50,497  
Claims priority, application France, May 15, 1986, 86 06993  
Int. Cl.<sup>4</sup> G02B 6/36

U.S. Cl. 350—96.20

3 Claims



1. A ferrule of a connector for single-mode optical fibers with polarization maintenance, comprising a tubular outer body which comprises, at its front end a wall having a conical profile, a cylindrical inner element inside which an optical fiber can be immobilized, particularly by gluing, said inner element protruding from said end of the outer body, said outer body comprising radial holes for the insertion of devices such as piercers for mechanically centering the inner element in the outer body, said ferrule characterized by the fact that it comprises a socket (18) attached in rotation about said body (1) and means (20) for immobilizing said socket, preferably by gluing, on said body, said socket being furthermore supplied with an indexing reference (19).

**4,792,206**  
**METHOD AND APPARATUS FOR ALIGNING FIBER OPTIC CABLES**

Eugene Skuratovsky, Mayfield Heights, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Jun. 1, 1987, Ser. No. 57,189

Int. Cl.<sup>4</sup> G02B 6/38

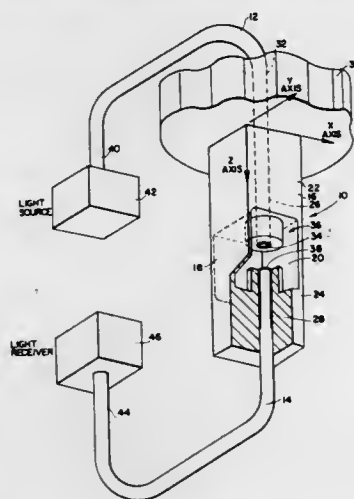
U.S. Cl. 350—96.21

12 Claims

1. Apparatus in a displacement sensor for aligning the end of a first optical fiber cable adjacent the end of a second optical fiber cable along one axis of a co-ordinate set of axes comprising:

a dual cantilever beam member having a first portion and a second portion displaceable relative to said first portion, said beam member retaining said first and second optical fiber cables in a spaced apart relationship and permitting said second optical fiber cable to be displaced relative to said first optical fiber cable along one axis of said co-ordinate set of axes while preventing displacement of said second optical fiber cable relative to said first optical fiber cable along the other axes of said co-ordinate set of axes and wherein a portion of said one end of said first optical fiber cable and a portion of said one end of said second optical fiber cable are blocked preventing the transmission of light therethrough to increase displacement sensitivity; and

means for retaining said first beam member portion stationary during displacement of said second beam member



portion and said second optical fiber cable relative thereto.

**4,792,207**  
**SINGLE MODE FIBER OPTIC SINGLE SIDEBAND MODULATOR AND METHOD OF FREQUENCY SHIFTING USING SAME**

Herbert J. Shaw, Stanford; Robert C. Youngquist, and Janet L. Brooks, both of Mountain View, all of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

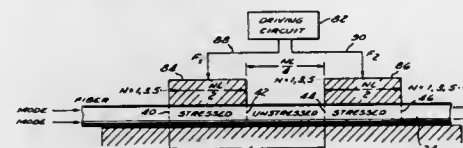
Division of Ser. No. 556,636, Nov. 30, 1983, Pat. No. 4,684,215.  
This application May 15, 1987, Ser. No. 50,762

The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> G02B 6/02, 5/30; G02F 1/11

U.S. Cl. 350—96.29

3 Claims



1. A fiber optic frequency shifter, comprising:  
a single optical fiber for guiding light having a wavelength, said fiber having two predetermined modes of propagation, each of said modes having a different propagation velocity, said fiber having a beat length for said two predetermined modes at said wavelength of said light;  
a member in contact with said single fiber; and  
a generator connected to drive said member to apply force to said fiber to produce a traveling stress wave in said fiber such that said traveling stress wave propagates longitudinally along a continuous length of said single fiber with a predetermined wavelength, said continuous length comprising plural beat lengths of said fiber, the predetermined wavelength of said traveling stress wave selected in accordance with the beat length for said two predetermined modes of said fiber to cause cumulative coupling of light from one of said modes to the other of said modes through said plural beat lengths, said traveling stress wave interacting with the light to cause the coupled light to be shifted in frequency.

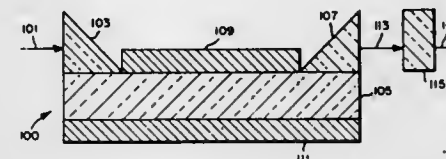
3. A method of frequency shifting, comprising:

introducing an optical signal into an optical fiber;  
driving a member in contact with said fiber such that a traveling stress propagates axially along a continuous length of said fiber, said stress interacting with said optical signal along said length of said fiber to cause said frequency shifting; and  
guiding said optical signal within said fiber during said interacting of said stress and said optical signal to prevent said optical fiber from escaping said fiber.

**4,792,208**  
**OPTICAL ARTICLE EXHIBITING A HIGH LEVEL OF SECOND ORDER POLARIZATION SUSCEPTIBILITY**  
Abraham Ulman, Rochester; David J. Williams; Thomas L. Penner, both of Fairport; Douglas R. Robello, Webster; Jay S. Schildkraut, Rochester; Michael Scozzafava, Rochester, and Craig S. Willand, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 28, 1987, Ser. No. 101,888  
Int. Cl.<sup>4</sup> G02B 6/00; B29D 11/00; G03C 5/00  
U.S. Cl. 350—96.34

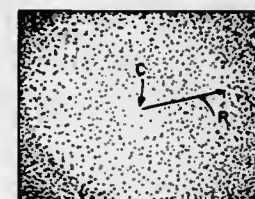
31 Claims



1. An optical article containing, for the transmission of electromagnetic radiation, a medium exhibiting a second order polarization susceptibility greater than  $10^{-9}$  electrostatic units comprised of polar aligned noncentrosymmetric molecular dipoles having an electron donor moiety linked through a conjugated  $\pi$  bonding system to an electron acceptor moiety to permit oscillation of the molecular dipole between a lower polarity ground state and a higher polarity excited state, characterized in that the electron acceptor moiety is a sulfonyl moiety.

**4,792,209**  
**PROJECTION SCREEN**  
Curtis S. Laine, 1068 Chatsworth St., N., St. Paul, Minn. 55103, and Ronald G. Dow, 7740 Sierra Parkway, N., Brooklyn Park, Minn. 55444  
PCT No. PCT/US87/01301, § 371 Date Oct. 1, 1987, § 102(e) Date Oct. 1, 1987, PCT Pub. No. WO87/07398, PCT Pub. Date Dec. 3, 1987  
Continuation-in-part of Ser. No. 868,712, May 30, 1986, abandoned. This PCT application Jun. 1, 1987, Ser. No. 130,117  
Int. Cl.<sup>4</sup> G03B 21/56  
U.S. Cl. 350—117

29 Claims



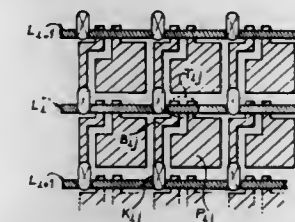
1. Projection screen apparatus for displaying a projected image comprising:  
a compensating layer on a backing means, said compensating layer having a varied reflectivity pattern for compensating for predetermined projected bright spot variations in light intensity levels generated by an image projector having variations imperceptible to human observers and detectable by reproduction of an image on the apparatus.

**4,792,210**  
**ACTIVE MATRIX DISPLAY SCREEN WITH TRANSISTOR SOURCES CONNECTED TO ADJACENT ADDRESSING LINES AND PROCESSES FOR MAKING THIS SCREEN**

Francois Maurice, 125 Boulevard de la Corniche, 22700 Perros Guirec, France

Filed Jan. 27, 1987, Ser. No. 7,081  
Claims priority, application France, Jan. 27, 1986, 86 01084  
Int. Cl.<sup>4</sup> G02F 1/133; G09G 3/36  
U.S. Cl. 350—334

7 Claims



1. Active matrix display screen comprising a first plate on which are deposited conductive blocks (Pij), control transistors (Tij) having a drain (D), a gate (G) and a source (S) and addressing conductive lines (Li) able to be connected to a line control circuit (CCL), the gates (G) of said transistors (Tij) being connected to said addressing lines (Li) and the drains (D) to said blocks (Pij), a second plate comprising addressing conductive columns (Cj) covering said blocks (Pij) of the first plate, and a liquid crystal inserted between said first and second plates, said screen being characterized by the fact that the source (S) of said transistor (Tij) whose gate (G) is connected to said addressing line (Li) of position i is connected to the adjacent addressing line (Li+1) of position i+1 by a resistance (Rij).

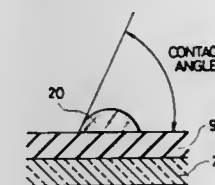
**4,792,211**  
**FERROELECTRIC LIQUID CRYSTAL ELECTRO-OPTICAL DEVICE HAVING HIGH WATER REPELLENT ALIGNMENT LAYER**

Takamasa Harada; Masaaki Taguchi; Sadaaki Shimoda, and Koukichi Ito, all of Tokyo, Japan, assignors to Selko Instruments & Electronics Ltd., Tokyo, Japan

Filed Sep. 17, 1986, Ser. No. 908,345  
Claims priority, application Japan, Sep. 18, 1985, 60-205652  
Int. Cl.<sup>4</sup> G02F 1/13

U.S. Cl. 350—341

15 Claims



1. A ferroelectric liquid crystal electro-optical device comprising: two opposed plates having electrodes, the inner surface of one of said two plates having a uniaxial alignment characteristic and the inner surface of the other of said two plates having a high water repellent alignment layer with a random alignment characteristic, the high water repellent alignment layer having a contact angle of at least 80° with respect to a water droplet; and ferroelectric liquid crystal sandwiched between said two plates.

7. A ferroelectric liquid crystal electro-optical device comprising: a liquid crystal layer composed of ferro-electric liquid

crystal molecules each having a molecular axis; a first alignment layer disposed in contact with the liquid crystal and having a uni-axial alignment characteristic effective to align the molecular axes of liquid crystal molecules immediately adjacent to the first alignment layer in a predetermined direction parallel to the liquid crystal layer; a second alignment layer opposed to the first alignment layer and in contact with the liquid crystal layer, the second alignment layer having a random homogeneous alignment characteristic and a water repellency characteristic defined in terms of a water contact angle of more than 70° jointly effective to align the molecular axes of liquid crystal molecules immediately adjacent to the second alignment layer in either of two orientation directions oppositely inclined relative to the predetermined direction in parallel to the liquid crystal layers; and means for applying an electric field to the liquid crystal molecules to switch between the two orientation directions.

4,792,212

## LIQUID CRYSTAL SWITCHING DEVICE

Anthony P. Baker, New York, N.Y., assignor to ITT Defense Communications, A Division Of ITT Corporation, Nutley, N.J.

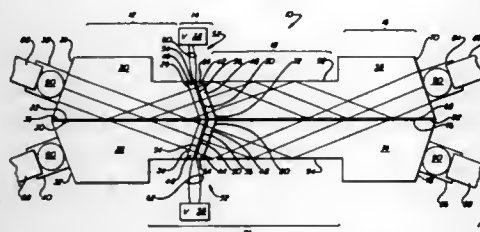
Filed Sep. 30, 1986, Ser. No. 913,808

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> G02F 1/133

U.S. Cl. 350—347 V

14 Claims



1. A liquid crystal switching device; said device comprises: means for splitting an incident light beam into first and second polarized components; means, disposed normal to the path of said polarized components, for controllably reorienting the polarization of said polarized components; means, disposed in said path of said polarized components, for recombining said polarized components whereby said polarized components can be selectively directed to one of two different output ports; means for redirecting said polarized components toward said polarized component recombining means; and a comparatively narrower segment and a comparatively wider segment, said redirecting means being disposed along said comparatively narrower segment.
10. A liquid crystal switching device; said device comprises: means for splitting an incident light beam into first and second polarized components; means, disposed normal to the path of said polarized components, for controllably reorienting the polarization of said polarized components; means, disposed in said path of said polarized components, for recombining said polarized components whereby said polarized components can be selectively directed to one of two different output ports; means, associated with said incident light beam splitting means, for bidirectionally conveying a light signal thereto; and means associated with said polarized component recombining means for bidirectionally conveying a light signal associated therewith.

4,792,213

## THERMAL IMAGING DEVICE

Cyril Hillsam, Plimmer, England, assignor to The General Electric Company, p.l.c., United Kingdom

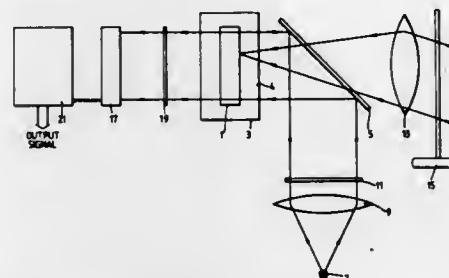
Filed Aug. 4, 1986, Ser. No. 892,953

Claims priority, application United Kingdom, Aug. 12, 1985, 8520172

Int. Cl.<sup>4</sup> G02F 1/13

U.S. Cl. 350—351

10 Claims



1. A thermal imaging device, comprising:
  - (a) a thermo-optic conversion element including a compensated cholesteric liquid crystal mixture of two cholesteric liquid crystals, one with a left-handed twist, and the other with a right-handed twist, said mixture having a composition such that said twists cancel at a compensation temperature, whereby said mixture has infinite pitch at said compensation temperature;
  - (b) means for maintaining said compensated liquid crystal mixture substantially at said compensation temperature;
  - (c) means for directing onto said compensated liquid crystal mixture thermal radiation from a field of view to be imaged, so that said thermal radiation causes changes in alignment of said compensated liquid crystal mixture; and
  - (d) means responsive to said alignment for producing an image of said field of view.

4,792,214

## OPTICAL MAGNIFYING SYSTEM: 10 X LOUPE

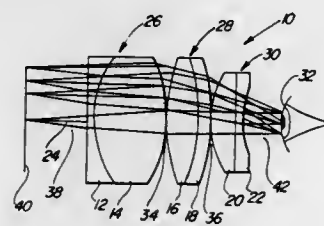
David R. Wickholm, and Donald J. Strittmatter, both of Tucson, Ariz., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Nov. 28, 1986, Ser. No. 935,889

Int. Cl.<sup>4</sup> G02B 25/00, 11/18, 11/26

U.S. Cl. 350—410

10 Claims



1. An optical magnifying system comprising:
  - a primary lens (12), said primary lens (12) being a negative planar-concave lens disposed a predetermined working distance from an object being viewed and defining an optical axis (24);
  - a secondary lens (14), said secondary lens (14) being a positive biconvex lens disposed adjacent said primary lens (12) and centered with respect to said optical axis (24);
  - a tertiary lens (16), said tertiary lens (16) being positive biconvex lens disposed adjacent said secondary lens (14)

such that said secondary lens (14) is disposed between said tertiary lens (16) and said primary lens (12) and centered with respect to said optical axis (24);

a quaternary lens (18), said quaternary lens (18) being a negative concave-convex lens disposed adjacent said tertiary lens (16) such that said tertiary lens (16) is disposed between said quaternary lens (18) and said secondary lens (14) and centered with respect to said optical axis (24);

a quinary lens (20), said quinary lens (20) being a positive convex-planar lens disposed adjacent said quaternary lens (18) such that said quaternary lens (18) is disposed between said quinary lens (20) and said tertiary lens (16) and centered with respect to said optical axis (24); and

a sextary lens (22), said sextary lens (22) being a negative planar-concave lens disposed adjacent said quinary lens (20) such that said quinary lens (20) is disposed between said sextary lens (22) and said quaternary lens (18) and centered with respect to said optical axis (24), said primary (12), secondary (14), tertiary (16), quaternary (18), quinary (20) and sextary (22), lenses having surfaces shaped to focus upon said object such that an image is formed at infinity at 10 power magnification.

4,792,215

## ZOOM LENS

Shigetada Sato, Tokyo, Japan, assignor to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

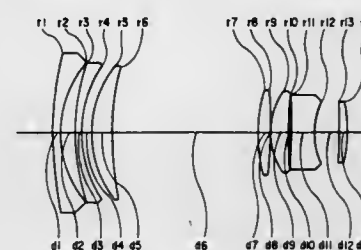
Filed Jan. 9, 1984, Ser. No. 569,466

Claims priority, application Japan, Feb. 2, 1983, 58-15885

Int. Cl.<sup>4</sup> G02B 15/00

U.S. Cl. 350—426

3 Claims



1. A zoom lens comprising a front diverging lens group and a rear converging lens group which are mechanically movable for variable power, said front diverging lens comprising a first lens of negative meniscus which is convex toward an object, a second negative lens, and a third lens of positive meniscus which is convex toward the object, said rear converging lens comprising a fourth positive lens, a fifth positive lens, a sixth negative lens, and a seventh positive lens, there being an aperture disposed more closely than said rear group to the object and movable with said rear group, said zoom lens satisfying the following conditions:

$$\frac{1}{f_1, 2 \left( \frac{1}{n_1 f_1} + \frac{1}{n_1 f_2} \right)} > 1.80 \quad (1)$$

$$11.20 > \frac{|f_1|}{f_T} > 0.90$$

$$1.10 > \frac{f_3}{|f_1|} > 0.75$$

$$0.55 > \frac{|f_6|}{f_{II}} > 0.35$$

$$0.050 > \frac{l_2}{f_T} > 0.025$$

-continued

$$0.25 > \frac{e}{f_T} > 0.15 \quad (6)$$

where

$f_T$ : the combined focal length of the entire lens system at a maximum focal length,

$f_F$ : the combined focal length of the front group,

$f_R$ : the combined focal length of the rear group,

$f_1, 2$ : the combined focal length from the first to the second lens,

$f_1, f_2, f_3, f_6$ : the focal lengths of the first, second, third, and sixth lenses,

$n_1, n_2$ : the refractive indexes of the first and second lenses with respect to d-line,

$l_2$ : the air gap between the second and third lenses, and

$e$ : the distance between a principal point of the front group closer to the image and a principal point of the rear group closer to the object at a maximum focal length, and wherein

F = 36-68.5 F number 1:4.1  
Angle of view  $2\omega = 64.4^\circ - 34.6^\circ$

	$r_i$	$d_i$	$n$	$v$
1	99.624	1.980	1.80610	40.9
2	28.483	3.806		
3	57.036	1.880	1.80440	39.6
4	30.041	2.645		
5	29.662	5.459	1.80518	25.4
6	71.946	38.826-4.256		
7	38.060	2.583	1.69350	50.8
8	-134.118	0.100		
9	21.700	4.890	1.69350	50.8
10	225.222	0.560		
11	-218.543	6.040	1.80518	25.4
12	16.260	6.682		
13	-256.292	2.131	1.64769	33.8
14	-37.060			

$$\frac{1}{f_1, 2 \left( \frac{1}{n_1 f_1} + \frac{1}{n_2 f_2} \right)} = 1.883$$

$$\frac{|f_1|}{f_T} = 0.963$$

$$\frac{f_3}{|f_1|} = 0.899$$

$$\frac{|f_6|}{f_{II}} = 0.467$$

$$\frac{l_2}{f_T} = 0.039$$

$$\frac{e}{f_T} = 0.177$$

4,792,216

## PHOTOGRAPHIC LENS SYSTEM

Yoshinobu Kado, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 25, 1985, Ser. No. 748,500

Claims priority, application Japan, Jul. 2, 1984, 59-137569

Int. Cl.<sup>4</sup> G02B 9/34

U.S. Cl. 350—432

6 Claims

1. A photographic lens system, comprising from the object side to the image side:
  - a first lens component of a positive meniscus lens element convex to the object side;
  - a second lens component of a bi-concave lens element;
  - a third lens component of a bi-convex lens element; and



a fourth lens component of a negative meniscus lens element concave to the object side; wherein the object side surface of the fourth lens component is aspheric and whose radius of curvature decreases in accordance with the increase of the height from the optical axis of the lens system, while all of the other surfaces excepting for the object side surface of the fourth lens component are spherical, and wherein the lens system fulfills the following conditions:

$$0.22 < f_3/f_{12} < 0.29$$

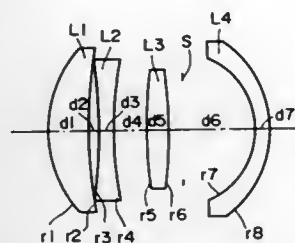
$$1.10f < -f_4 < 1.35f$$

$$0.78f < r_4 < 0.90f$$

$$0.088f < d_1 < 0.11f$$

$$0.033f < d_3 < 0.050f$$

$$1.68 < Nd_1 < 1.75$$



$$1.78 < Nd_3 < 1.81$$

$$1.0f < -r_6 < 1.28f$$

wherein,

$f_3$  represents the focal length of the third lens component;  
 $f_{12}$  represents the compound focal length of the first and second lens components;  
 $f_4$  represents the focal length of the fourth lens component;  
 $r_4$  represents the radius of curvature of the image side surface of the second lens component;  
 $r_6$  represents the radius of curvature of the image side surface of the third lens component;  
 $d_1$  represents the axial thickness of the first lens component;  
 $d_3$  represents the axial thickness of the third lens component;  
 $Nd_1$  represents the refractive index of the first lens component;  
 $Nd_3$  represents the refractive index of the third lens component; and  
 $f$  represents the focal length of the whole lens system.

4,792,217

#### PROJECTION LENS SYSTEM

Takayuki Yoshioka, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 20, 1987, Ser. No. 51,624

Claims priority, application Japan, Dec. 9, 1986, 61-291559  
 Int. Cl.<sup>4</sup> G02B 13/18, 9/60

U.S. Cl. 350—432

3 Claims

1. A projection lens system comprising: in order from a screen side, a first lens unit having a positive focal length, a second lens unit having a negative focal length, a third lens unit having a positive focal length, a fourth lens unit having a positive focal length and a fifth lens unit having a negative focal length and a concave surface directed toward the screen side, said first and second lens units being made of plastic, at least one lens surface of said third and fourth lens units being aspherical, said fifth lens unit being made of plastic

and at least one lens surface of said fifth lens unit being aspherical, said system meeting the following conditions:

$$(1) 0.29f < |r_9| < 0.44f$$

$$(2) 0.2 < \psi_1 < 0.9$$

$$(3) -0.6 < \psi_2 < -0.1$$

$$(4) 0.7 < \psi_3 < 1.0$$

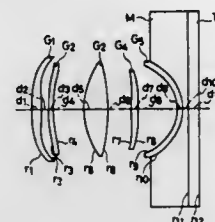
$$(5) 0 < \psi_4 < 0.5$$

$$(6) (dN/dT)_1 < -1.0 \times 10^{-4} \text{ and } (dN/dT)_2 < -1.0 \times 10^{-4},$$

where

$f$  is the overall focal length of said lens system;

$r_9$  is the radius of curvature of a screen-side lens surface of said fifth lens unit;



$\psi_1$  is the refractive power of the first lens unit;  
 $\psi_2$  is the refractive power of the second lens unit;  
 $\psi_3$  is the refractive power of the third lens unit;  
 $\psi_4$  is the refractive power of the fourth lens unit;  
 $(dN/dT)_1$  is the variation of refractive index with temperature of said first lens unit; and  
 $(dN/dT)_2$  is the variation of refractive index with temperature of said second lens unit;  
 an overall refractive power  $\psi$  of said lens system being expressed as a unit 1.

4,792,218

#### PROJECTION LENS FOR HIGH DEFINITION TV

Yasuo Nakajima, Ibaraki; Yoshiharu Yamamoto, Toyonaka, and Yoshitomi Nagaoka, Neyagawa, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

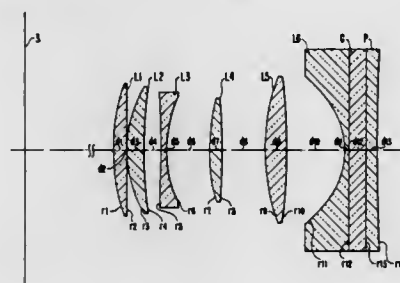
Filed Dec. 30, 1987, Ser. No. 139,451

Claims priority, application Japan, Jan. 8, 1987, 62-2380

Int. Cl.<sup>4</sup> G02B 13/18, 9/62

U.S. Cl. 350—432

15 Claims



1. A projection lens for projecting on a screen an enlargement of an image appearing on a cathode ray tube (CRT), comprising, successively in a direction from the screen end to the CRT end: a first lens having a positive optical power and a convex surface facing the screen; a second lens having a positive optical power and a meniscus shape; a third lens having a negative optical power and bi-concave surfaces; a fourth lens having a positive optical power; a fifth lens having a positive optical power and bi-convex surfaces; and a sixth lens having a negative optical power and an aspheric concave surface facing said fifth lens, wherein the projection lens satisfies the following condition:

$$2.5 \leq f_o/f \leq 5$$

$$0.45 \leq d_8/d_{10} \leq 1.0$$

$$v_2 \geq 50$$

$$v_3 \leq 38$$

where:  $f$  is a focal length of the overall projection lens system;  
 $f_o$  is a combined focal length of the first, second and third lenses;  $d_8$  is a distance between the fourth and fifth lenses;  $d_{10}$  is a distance between the fifth and sixth lenses; and  $v_2$  and  $v_3$  are respectively Abbe numbers of the second and third lenses.

4,792,219

#### LARGE APERTURE LONG FOCUS MACRO LENS SYSTEM

Shin-ichi Mihara, Tokyo, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

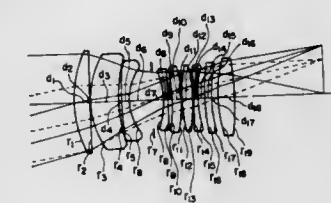
Filed Jul. 15, 1986, Ser. No. 885,647

Claims priority, application Japan, Jul. 18, 1985, 60-157052

Int. Cl.<sup>4</sup> G02B 9/64

U.S. Cl. 350—463

7 Claims



1. A large aperture long focus-macro lens system comprising, in the order from the object side, a first lens group having positive refractive power as a whole, a stop, a second lens group having positive refractive power as a whole, and a third lens group, consisting of a negative lens unit and one biconvex lens, said large aperture long focus macro lens system being arranged to advance the lens system as a whole, when focusing on an object at a short distance, in the state that said first lens group, said stop and said second lens group are advanced integrally at the same time as varying the airspace in respect to said third lens group, said large aperture long focus macro lens system being further arranged to fulfill the conditions (1) through (5) shown below:

$$(1) -0.4\phi < \phi_{III} < 0.4\phi$$

$$(2) 0.33 < (\Delta_{12} - \Delta_3)/\Delta_{12} < 0.85 (\Delta_3 > 0)$$

$$(3) 0.7\phi < \Delta_A < 1.8\phi$$

$$(4) 0.6\Delta < -\phi_A < 1.7\phi$$

$$(5) n_A > n_B$$

where, reference symbol  $\phi$  represents the refractive power of the lens system as a whole, reference symbol  $\phi_{III}$  represents the refractive power of the third lens group, reference symbol  $\Delta_{12}$  represents the advancing amount of the first lens group, the stop and the second lens group, reference symbol  $\Delta_3$  represents the advancing amount of the third lens group, reference symbol  $\phi_A$  represents the refractive power of a positive lens in the third lens group, reference symbol  $\phi_B$  represents the refractive power of a negative lens on the object side in the third lens group; reference symbol  $n_A$  represents the refractive index of the positive lens in the third lens group, and reference symbol  $n_B$  represents the refractive index of the negative lens on the object side in the third lens group.

4,792,220

#### SHIFTABLE OUTSIDE REARVIEW MIRROR FOR USE ON VEHICLES

Miroslaw Janowicz, Schöneberg, Feuergrasse 46, 1000 Berlin 62, Fed. Rep. of Germany

PCT No. PCT/DE86/00098, § 371 Date Aug. 20, 1986, § 102(e)  
 Date Aug. 20, 1986, PCT Pub. No. WO86/05148, PCT Pub.  
 Date Sep. 12, 1986

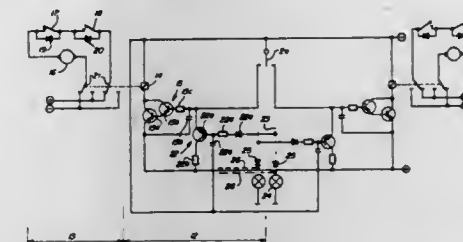
PCT Filed Mar. 7, 1986, Ser. No. 910,218

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1985, 3508348; Oct. 4, 1985, 3535931

Int. Cl.<sup>4</sup> G02B 5/08; H01H 3/16, 9/00

U.S. Cl. 350—637

4 Claims



2. A shiftable outside mirror for use on a vehicle having a turn signal lever arm and switch means operable to shift said mirror, wherein the improvement comprises:

said switch means being pivotally mounted on said turn signal lever arm, pivotal relative to said turn signal lever arm in a plane substantially parallel to the plane of motion of said turn signal lever arm from a rest position to an activated position in which the mirror is shifted;  
 said switch means being movable with said turn signal lever arm when in said rest position such that only a turn signal is actuated;  
 said switch means being movable with said turn signal lever arm when in said activated position such that said mirror is shifted and said turn signal is actuated;  
 said switch means having a longitudinal axis which in its rest position is essentially a continuation of the longitudinal axis of said turn signal lever arm;  
 said turn signal lever arm having an end portion and said switch means having an end portion being formed to interfittingly engage each other, with spring means engaging both end portions;  
 said end portion of said switch means comprising two opposed, curved tongue portions surrounding said end portion of the turn signal lever arm; and  
 an elastic cover covering the interfitting engagement of said switch means and said turn signal lever arm.

1. A shiftable outside mirror for use on a vehicle having a turn signal lever arm and switch means operable to shift said mirror, wherein the improvement comprises:

said switch means being pivotally mounted on said turn signal lever arm, pivotal relative to said turn signal lever arm in a plane substantially parallel to the plane of motion of said turn signal lever arm from a rest position to an activated position in which the mirror is shifted;  
 said switch means being movable with said turn signal lever arm when in said rest position such that only a turn signal is actuated;  
 said switch means being movable with said turn signal lever arm when in said activated position such that said mirror is shifted and said turn signal is actuated;  
 said switch means having a longitudinal axis which in its rest position is essentially a continuation of the longitudinal axis of said turn signal lever arm;  
 said turn signal lever arm having an end portion and said switch means having an end portion being formed to interfittingly engage each other, with spring means engaging both end portions;  
 said end portion of said switch means comprising two

opposed, curved tongue portions surrounding said end portion of the turn signal lever arm; and at least one of said tongue portions having an end that is provided with at least one electrical contact, said turn signal lever arm adjacent said tongue portion is also provided with at least one electrical contact, said electrical contact on said tongue portion and said electrical contact on said turn signal lever arm engaging upon pivoting of said switch means.

4,792,221

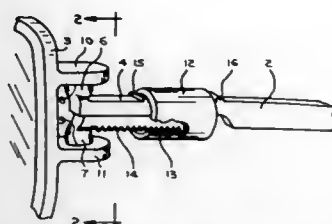
## VERTICAL PLANE ADJUSTING MECHANISM FOR EYEGLASSES

Gerald R. Parks, Chris R. Dawson, and John Dondero, all of Chula Vista, Calif., assignors to John R. Gregory, Chula Vista, Calif.

Filed Jan. 25, 1988, Ser. No. 148,273  
Int. Cl.<sup>4</sup> G02C 5/14

U.S. Cl. 351-120

7 Claims



1. In a pair of eyeglasses having two lateral earpieces pivotally connected to opposite sides of the lens frame, a mechanism for adjustably tilting said frame in relation to each earpiece which comprises:

the end of said earpiece which is pivotally connected to the frame being longitudinally split into a first arm forming an integral extension of said earpiece, and a second arm slidingly and contiguously attached to said first arm; first means for pivotally connecting said first arm to the frame; second means for pivotally connecting said second arm to the frame; and means for adjustably moving said second arm toward said frame in relation to, and independently from, said first arm.

4,792,222

## PAD SYSTEM FOR A SPECTACLE FRAME

Norbert Labenz, Hemmingen, and Heinz Neef, Stuttgart, both of Fed. Rep. of Germany, assignors to Marwitz & Hauser GmbH, Stuttgart, Fed. Rep. of Germany

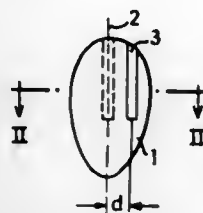
Filed Mar. 19, 1987, Ser. No. 27,950

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1986, 3609130

Int. Cl.<sup>4</sup> G02C 5/12

U.S. Cl. 351-136

10 Claims



1. A pad system for a spectacle frame comprising:

a pad arm attached to the spectacle frame in the region of the root of the nose of the wearer;

a pad having a longitudinal pad axis and having a pad cross section transverse to said axis, said pad cross section hav-

ing a cross-sectional longitudinal pad axis, said pad having a blind hole formed therein so as to be offset from said longitudinal pad axis;

said hole having a hole cross section of non-circular configuration and having a cross-sectional longitudinal hole axis corresponding to said hole cross section;

said cross-sectional longitudinal pad axis and said cross-sectional longitudinal hole axis conjointly defining an acute angle  $\alpha$ ; and,

said pad arm having an end portion with a non-circular arm cross section corresponding to the non-circular hole cross section so as to permit said pad to be pushed onto said pad arm for engaging the same therewith while preventing a rotation of said pad relative to said pad arm.

4,792,223

## OPTICAL DEVICE

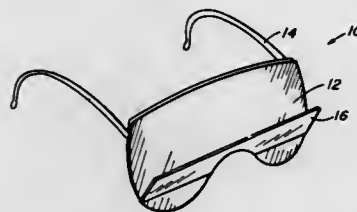
Richard L. Axelbaum, 232 Third St., Davis, Calif. 95616

Filed Nov. 25, 1987, Ser. No. 125,171

Int. Cl.<sup>4</sup> G02C 1/00; G02B 27/14

U.S. Cl. 351-158

6 Claims



1. An optical device for delivering a first and second image to a viewer, comprising:

at least one semi-transparent primary lens member for initially transmitting at least some portion of available light to said viewer, and initially reflecting some portion of available light away from said viewer; and

a generally reflective secondary image mirror member attached to said primary lens portion, said secondary image mirror member aligned to reflect at least some portion of said reflected available light back towards said primary lens.

4,792,224

## PHOTOCHROMIC COMPOUND AND ARTICLES CONTAINING THE SAME

Patricia L. Kwiatkowski, Akron, and David A. Hunt, Copley, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

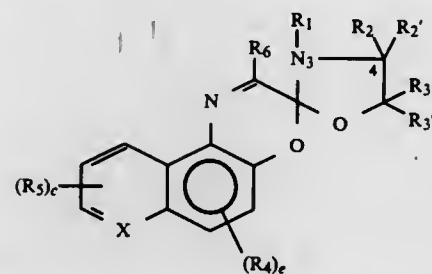
Continuation-in-part of Ser. No. 935,904, Nov. 28, 1986, abandoned. This application May 14, 1987, Ser. No. 50,266

Int. Cl.<sup>4</sup> G02B 5/23; C07D 265/00

U.S. Cl. 351-163

19 Claims

1. A compound represented by the following graphic formula:



wherein:

(a) R<sub>1</sub> is selected from the group consisting of C<sub>1</sub>-C<sub>8</sub> alkyl, C<sub>2</sub>-C<sub>5</sub> alkenyl, phenyl, benzyl, and mono- and di-sub-

stituted phenyl, said phenyl substituents being selected from C<sub>1</sub>-C<sub>4</sub> alkyl and C<sub>1</sub>-C<sub>5</sub> alkoxy;

(b) R<sub>2</sub>, R<sub>2</sub>', R<sub>3</sub> and R<sub>3</sub>' are each selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>1</sub>-C<sub>4</sub> alkoxyalkyl, phenyl, and mono- and di-substituted phenyl, said phenyl substituents being selected from C<sub>1</sub>-C<sub>4</sub> alkyl and C<sub>1</sub>-C<sub>5</sub> alkoxy; or R<sub>2</sub> and R<sub>2</sub>' or R<sub>3</sub> and R<sub>3</sub>' combine to form a C<sub>3</sub>-C<sub>6</sub> cycloalkyl;

(c) R<sub>4</sub> and R<sub>5</sub> are each selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>1</sub>-C<sub>5</sub> alkoxy, phenyl, phenoxy, mono- and di-substituted phenoxy, nitro, cyano, C<sub>1</sub>-C<sub>4</sub> monohaloalkyl, C<sub>1</sub>-C<sub>4</sub> polyhaloalkyl, C<sub>1</sub>-C<sub>4</sub> alkylsulfonyl, trihaloacetyl, benzoyl, benzoyloxy, and C<sub>1</sub>-C<sub>4</sub> acyloxy, said phenoxy substituents being selected from electron donating and electron withdrawing groups;

(d) R<sub>6</sub> is selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>5</sub> alkoxy, C<sub>1</sub>-C<sub>5</sub> alkoxy-C<sub>1</sub>-C<sub>5</sub> alkoxy, phenoxy, benzoyloxy, mono- and di-substituted phenoxy, halogen, C<sub>1</sub>-C<sub>5</sub> thioalkoxy, thiophenoxy, thiobenzoyloxy, mono- and di-substituted phenyl and C<sub>1</sub>-C<sub>6</sub> dialkylamino, said phenoxy substituents being selected from electron donating and electron withdrawing groups, and said phenyl substituents being selected from C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>1</sub>-C<sub>2</sub> alkoxy and C<sub>1</sub>-C<sub>2</sub> dialkylamino groups;

(e) X is nitrogen or carbon; and

(f) the letters "c" and "e" are numbers from 0 to 4 and 0 to 2 respectively.

4,792,225

## DEVELOPING APPARATUS

Keiji Itaya, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 661,561, Oct. 16, 1984, abandoned.

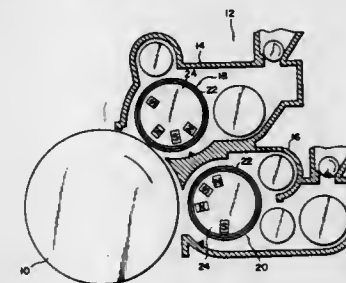
This application Aug. 31, 1987, Ser. No. 91,331

Claims priority, application Japan, Oct. 26, 1983, 58-200226

Int. Cl.<sup>4</sup> G03G 15/01, 15/09

U.S. Cl. 355-3 DD

7 Claims



1. A developing apparatus comprising:

vessel means provided near an object of development and including at least two vessels, said vessels containing respective and different magnetic developers;

at least one developing roller respectively held in each of said vessels so that each of said developers is delivered by a different developing roller, each of said developing rollers including a cylindrical rotatable nonmagnetic sleeve and a magnetic roller disposed within the sleeve having a plurality of magnets by which to attract said respective magnetic developers to the surface of the sleeve, each of said plurality of magnets having a polarity opposite to that of adjacent magnets;

means for preventing the production of a magnetic flux between said developing rollers which causes a magnetic field acting in the normal direction of the surface of the sleeve of each said roller that is stronger than a magnetic field acting in the circumferential direction of each said sleeve, said means for preventing including means for mounting said magnetic rollers so that said magnetic rollers are spaced apart a distance less than a distance at which the magnets of each said magnetic roller are spaced apart from one another and so that the polarity of the

magnets facing each other from the adjacent developing rollers is identical; and means for rotating the sleeve of each roller one by one.

4,792,226

## OPTICAL FINGERPRINTING SYSTEM

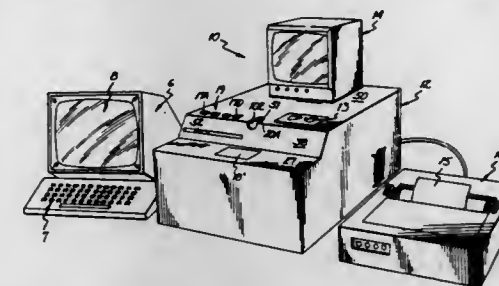
Glenn M. Fishbine, Eden Prairie; Eric W. Lavee, Eagan; James M. Kaufman, Eden Prairie; Theodore D. Klein, Mound, and William T. Warner, Eden Prairie, all of Minn., assignors to C.F.A. Technologies, Inc., St. Louis Park, Minn.

Filed Feb. 27, 1987, Ser. No. 20,326

Int. Cl.<sup>4</sup> G06K 9/24, 9/32

U.S. Cl. 356-71

16 Claims



1. An optical fingerprinting system including: slap print prism means for receiving a plurality of fingers and for providing an optical slap fingerprint image of the fingers; a plurality of individual finger prism means having differently sized finger-receiving grooves, for receiving an individual finger and for providing an optical individual fingerprint image of the finger; sensor means for imaging fingerprint images and for providing fingerprint information representative of the images; slap/individual fingerprint image selection means for selectively causing the slap fingerprint image from the slap print prism means or an individual fingerprint image from a selected individual finger prism means to be propagated to the sensor means; prism trolley means for mounting the plurality of individual finger prism means with respect to the slap/individual fingerprint image selection means, and for causing an individual fingerprint image from a selected one of the individual finger prism means to be propagated to the sensor means by the slap/individual fingerprint image selection means; and memory means coupled to the sensor means for storing the fingerprint information representative of the imaged fingerprint image.

4,792,227

## APPARATUS FOR MEASURING THE REFRACTIVE INDEX OF A SUBSTRATE FOR AN OPTICAL RECORDING MEDIUM AND METHOD OF MEASURING THE SAME

Akihiko Yoshizawa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Mar. 3, 1987, Ser. No. 21,286

Claims priority, application Japan, Mar. 3, 1986, 61-45931

Int. Cl.<sup>4</sup> G01N 21/21, 21/41

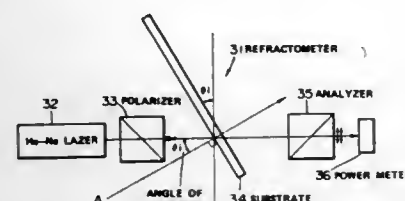
U.S. Cl. 356-128

5 Claims

1. An apparatus for measuring a refractive index of a substrate for an optical recording medium comprising: a light source generating a light beam of a substantially single wavelength; a polarizing means linearly polarizing said light beam; an angle setting means for setting an oblique angle of incidence, wherein said linearly polarized light beam, having passed through said polarizing means, is incident at the oblique angle of incidence upon a flat plate-shaped plane



- of said substrate for an optical recording medium to have the refractive index measured;
- a light analyzing means arranged on at least one of a transmitted light side and a reflected light side of said substrate and held in a crossed Nichol state with said polarizing means;
- a light receiving means receiving said light beam having passed through said light analyzing means;



- a varying means for relatively varying the direction of said linear polarized light with said angle of incidence kept constant while maintaining the crossed Nichol state between said light analyzing means and said polarizing means; and
- comparing means for comparing an output of the light receiving means for the varied angle in the polarized direction with a theoretical formula in order to determine the refractive index of said substrate.

4,792,228

#### POSITION ERROR SENSING AND FEEDBACK APPARATUS AND METHOD

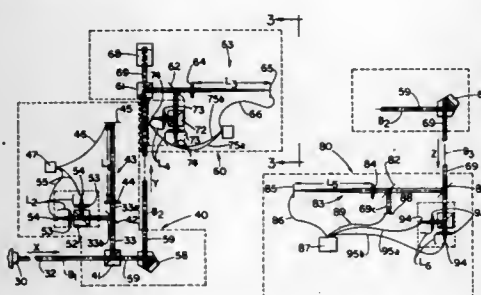
James L. Haffner, Cincinnati, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio

Filed Aug. 20, 1987, Ser. No. 87,693

Int. Cl.<sup>4</sup> G01B 11/27

U.S. Cl. 356—138

31 Claims



1. A position error sensing and feedback apparatus for a positioning device having a working piece which is moved along a rectilinear multi-ordinate system, said apparatus comprising:

- (a) a laser source for providing a highly polarized laser beam of a predetermined wavelength, said laser source being supported at a predetermined position relative said rectilinear positioning device, and said beam being fixedly directed substantially parallel to one of the axes of said rectilinear system;
- (b) means for measuring positional errors of said working piece by receiving and processing said laser beam, said error measuring means comprising means for splitting the highly polarized laser beam to direct portions thereof to a plurality of error detecting devices, said error detecting devices including a first detector for measuring translational deviation of said measuring means relative to said polarized beam and, therefore, relative one or more of the individual axes of said rectilinear system, a second detector for measuring angular deviation of said measuring

- means polarized beam and, therefore, relative one or more of said axes, and a third detector for measuring roll deviation of said measuring means relative said polarized beam about said beam along the axis of transmission;
- (c) feedback means for communicating detected translational, angular and rotational deviations to a control unit of said rectilinear positioning device to enable selective correction of said deviations and to thereby provide improved positional accuracy of said working piece.

4,792,229

#### DEVICE FOR MIXING DISPERSE STREAMS BEFORE THEY ENTER A CATALYST BED

Heinz Frohnert, Bottrop; Hans-Juergen Ullrich, Bochum, and Helmut Meier, Essen, all of Fed. Rep. of Germany, assignors to Veba-Oel Entwicklungs-Gesellschaft mbH, Gelsenkirchen, Fed. Rep. of Germany

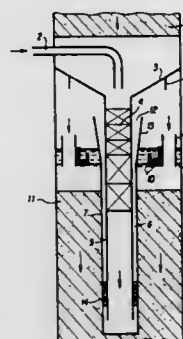
Filed Jun. 30, 1987, Ser. No. 68,188

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1986, 3622177

Int. Cl.<sup>4</sup> B01F 5/00; B01J 8/04

U.S. Cl. 366—336

11 Claims



1. A device for mixing gas/vapor streams containing disperse liquid components in a column-type fixed bed reactor, comprising:

- a conical collecting plate covering the entire cross section of said column-type reactor and having an outlet at the apex thereof, wherein the gas/vapor streams are collected on the concave side of said plate,
- a mixing pipe adjoining the apex of said collecting plate, an outer pipe surrounding said mixing pipe and forming an annular space between said mixing pipe and outer pipes, said outer pipe being closed-off below said mixing pipe, whereby the gas/vapor streams passing through said mixing pipe reverse direction and subsequently pass through said annular space,
- a disk-shaped distributor disposed in the reactor below said collecting plate and above said fixed bed and adjoining said outer pipe and the reactor wall,
- a diffuser for reducing the pressure drop within said mixing device, said diffuser adjoining said outer pipe above said distributor, said diffuser comprising an open upwardly facing conical segment, and
- an annular space bounded by the convex side of said collecting plate, said distributor, said diffuser and the reactor wall, whereby the gas/vapor streams pass through said annular space and then pass through said distributor.

4,792,230

#### METHOD AND APPARATUS FOR MEASURING ULTRASHORT OPTICAL PULSES

Kazunori Naganuma, Katsuta, and Juichi Noda, Mito, both of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

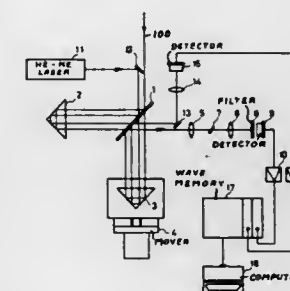
Filed Sep. 8, 1987, Ser. No. 93,653

Claims priority, application Japan, Sep. 8, 1986, 61-211100; Mar. 27, 1987, 62-73547

Int. Cl.<sup>4</sup> G01B 9/02

U.S. Cl. 356—345

27 Claims



1. A method for measuring ultrashort optical pulses, which are repetitive pulses at a fixed time interval, comprising the steps of:
- splitting a light beam to be measured into two beams;
- directing the two beams through different paths to provide a relative path length difference therebetween;
- recombining said two beams;
- doubling said recombined beam to produce a second-harmonic beam;
- processing said doubled beam to obtain spectra distributed at an interval of an interference fringe of a fundamental wave  $\omega_0$ ;
- obtaining a spectrum near DC from among said spectra and calculating an intensity shape  $I(t)$  therefrom; and
- obtaining a spectrum near  $2\omega_0$  from said spectra and calculating a pulse phase therefrom.

4,792,231

#### LASER SPECKLE IMAGING

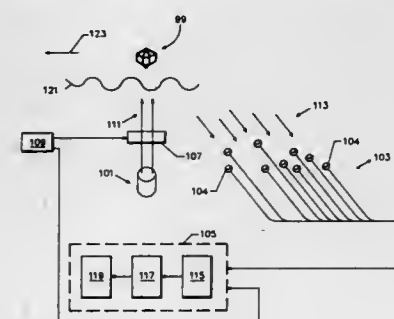
David L. Fried, 325 Liberty La., Placentia, Calif. 92670

Filed Jun. 25, 1987, Ser. No. 66,861

Int. Cl.<sup>4</sup> G01B 9/02

U.S. Cl. 356—354

10 Claims



1. A system comprising:
- detector means for determining at least one spatial frequency component of an incident laser speckle distribution, said detector means including at least a first detector and a second detector;
- scanning means for scanning a target with a first laser illumination pattern with a spatially periodic component in a first direction so as to produce reflections which in turn

- yield laser speckle distributions at said detector means; and
- statistical means for determining the phase difference between at least two spatial frequency components of the image of said target from a series of distributions determined by said detector means.

4,792,232

#### METHOD AND APPARATUS FOR DETECTION OF UNDESIRABLE SURFACE DEFORMITIES

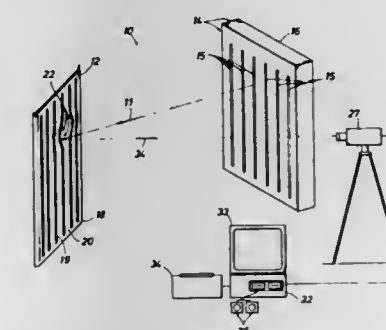
John D. Jobe, and Allen E. Lepley, both of Houston, Tex., assignors to Shell Oil Company, Houston, Tex.

Filed May 18, 1987, Ser. No. 50,435

Int. Cl.<sup>4</sup> G01B 11/24; G06K 9/00

U.S. Cl. 356—394

7 Claims



1. A method of detecting undesirable deformities in a surface, comprising the steps of:
- projecting a light pattern having at least one edge onto said surface from a light pattern source;
- receiving at a light pattern receiver a reflected light pattern from said surface;
- converting said reflected light pattern into an array of pixels, each pixel having a value representing the intensity of light received from a portion of the reflected light pattern;
- evaluating the value of said pixels to define at least one edge of said reflected light pattern;
- forming a fitted curve through said at least one edge of said reflected light pattern;
- measuring the amount of deviation of said at least one edge from said fitted curve; and
- quantifying the amount of deviation of said at least one edge from said fitted curve, to the amount of undesirable deformity in said surface.

4,792,233

#### FLOW CELL FOR PARTICLE SCANNER

Philip A. Irvine, Round Corner, Australia, assignor to Commonwealth Scientific and Industrial Research Organisation, Campbell, Australia

PCT No. PCT/AU86/00263, § 371 Date May 27, 1987, § 102(e) Date May 27, 1987, PCT Pub. No. WO87/01451, PCT Pub. Date Mar. 12, 1987

PCT Filed Sep. 5, 1986, Ser. No. 84,822

Claims priority, application Australia, Sep. 9, 1985, PH2344

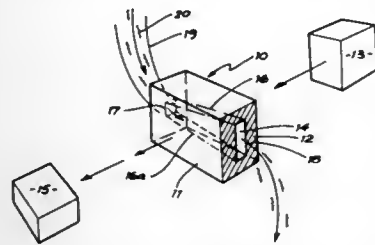
Int. Cl.<sup>4</sup> G01N 21/05, 15/02, 15/10

U.S. Cl. 356—440

3 Claims

1. A flow cell having a body defining a passage through which a fiber-containing fluid can be caused to flow in a first direction, said body having two opposite walls defining sides of said passage, said walls being parallel to each other and transparent to radiation whereby fibers in said fluid can be illuminated and viewed by radiation travelling in a second direction through said walls and said fluid, each of said walls lying in a first plane, said passage being further defined by a

pair of opposite diverging flat surfaces each lying in a second plane, said first planes being at right angles to said second planes, said second planes being parallel to said second direction of said radiation and being at an angle to said first direction of said fluid flow thereby forming a tapered passage having a first smaller end and a second larger end, said passage having



a width which increases uniformly and progressively from said first end to said second end, said passage having an inlet at said first end and an outlet at said second end, said flow of fluid in said tapered passage acting to produce a couple which rotates ends of said fibers towards said diverging flat surfaces of said passage and thus rotates said fibers to a larger angle to said direction of flow.

4,792,234

## PORTABLE CONCRETE BATCH PLANT

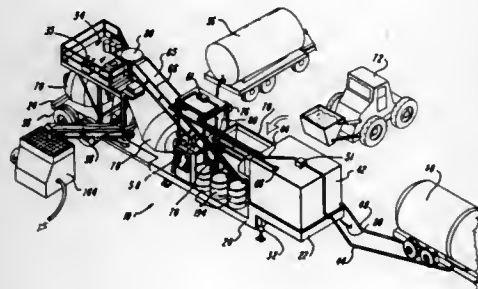
Jerome J. Doherty, Berthoud, Colo., assignor to Port-A-Pour, Inc., Berthoud, Colo.

Filed Jan. 6, 1986, Ser. No. 816,421

Int. Cl. B28C 7/16, 7/06, 5/18

U.S. Cl. 366—14

1 Claim



1. A mobile concrete batch plant for providing a continuous supply of concrete to a construction site, said plant comprising: a mobile trailer bed with a longitudinal axis and having an upstream end and a downstream end; an enclosed cement storage bin mounted on the upstream end of said trailer bed in fixed position; an enclosed cement weigh hopper mounted on said trailer bed in fixed position downstream from said storage bin, said hopper having means for discharging its contents; air ducts connecting said bin and said hopper; filtering means for removing cement dust from the air in said bin and said hopper; air pressure means for transferring cement to said cement storage bin and from said storage bin to said cement weigh hopper; means for weighing the contents of said cement weigh hopper; an aggregate weigh hopper mounted on said trailer bed in fixed position downstream from said storage bin, said aggregate weigh hopper having means for discharging its contents;

means for weighing the contents of said aggregate weigh hopper;

two concrete mixing drums mounted in fixed longitudinal alignment with each other on said downstream end of said trailer bed with one mixing drum upstream of the other mixing drum and each mixing drum having a mouth for receiving a charge including cement, aggregate, and water, and for discharging finished concrete, each of said drums having a fixed longitudinal axis of rotation extending through said mouth which lays in a common, vertical, longitudinally extending plane that is generally parallel to said longitudinal axis of said trailer bed, said mouth being elevated relative to the horizontal, and each of said drums having means for rotating them about said axis for mixing said charge to produce concrete;

a trough-shaped endless belt charging conveyor mounted in fixed position on said trailer bed and in communication with said hoppers for receiving cement and aggregate therefrom and delivering it to said mixing drums, said conveyor being inclined upwardly from an upstream end to a downstream end above and parallel to said axis of said upstream mixing drum;

a cement loading plow attached to the bottom of the cement weight hopper, said plow having an upstream-pointing wedge tip having a pair of spaced parallel sides extending downstream, said plow having a clearance over said conveyor large enough to allow free passage of the conveyor under the plow and small enough to prevent aggregate from passing between said plow and said conveyor to separate the aggregate into two parallel streams, with cement being discharged onto the conveyor between said aggregate streams;

a plurality of containers for storage of admixture; means for selectively delivering said admixture to the mixing drums;

a pivotally mounted, trough-shaped load diverter having an upper and a lower end, said diverter being rotatable to align its upper and with the charging conveyor for receiving the charge therefrom and to align its lower end with the mouth of either of the mixing drums for delivering the charge thereto;

means for directing the charge from the downstream end of said conveyor into said diverter;

means for rotating said diverter into alignment with the charging conveyor and a first selected one of said mixing drums;

means for introducing measured amounts of water into said first selected drum;

means for discharging finished concrete from a second selected one of said drums while said first selected drum is receiving a charge; and

vertically and horizontally pivotable discharge conveyor means in communication with said mixing drums for receiving finished concrete.

4,792,235

## GASEOUS FLUID SUPPLY SYSTEM FOR A VESSEL

Kermit D. Paul, Bethlehem, Pa., assignor to Fuller Company, Bethlehem, Pa.

Filed Sep. 21, 1987, Ser. No. 99,264

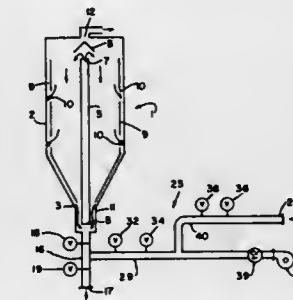
Int. Cl. B01F 13/02

U.S. Cl. 366—107

4 Claims

1. In an apparatus for blending particulate material including a vertically oriented vessel having a centrally mounted vertical lift pipe having a material inlet near the bottom of the vessel and a material outlet near the top of the vessel, said vessel having an inlet for gaseous fluid near the bottom whereby gaseous fluid under pressure is supplied to the bottom of the vessel for entraining material in the vessel and conveying said material through the vertical lift pipe from its inlet to its outlet for discharge into the top of the vessel, an improved gaseous fluid supply system comprising a first source of gaseous fluid capable of providing gas at a pressure sufficient to circulate

material in the vessel through said lift pipe but insufficient to overcome an initial head of material in the vessel encountered at start-up of the apparatus; and conduit means flow connecting said first source to the inlet for gaseous fluid of said vessel; a second source of gaseous fluid flow connected to said conduit means for pressurizing said conduit means to a predetermined pressure sufficient to overcome an initial head of material in said vessel; and control means for regulating the supply of gaseous fluid from said first source and said second source to said conduit means and from said conduit means to the inlet for gaseous fluid of said vessel; said control means including a first valve mounted in said conduit between said first and second



source of gaseous fluid under pressure and said inlet for gaseous fluid for controlling the supply of gaseous fluid from said conduit to said inlet for gaseous fluid; and a second valve positioned between said second source of gaseous fluid under pressure and said conduit means for controlling the flow of gaseous fluid under pressure from said second source to said conduit; said second valve being adopted to close when the pressure in the conduit reaches said predetermined maximum pressure and said first valve is adapted to be opened at start-up of the blender after said predetermined maximum pressure is reached while gaseous fluid continues to be supplied to said conduit from said first source.

4,792,236

## MULTI-CANISTER TINTER WITH LOST-MOTION COUPLING

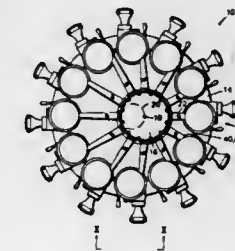
Robert Heinis, Totowa; James C. Skene, Old Bridge, and Ronald Smith, Short Hill, all of N.J., assignors to Red Devil, Inc., Union, N.J.

Filed May 21, 1987, Ser. No. 52,381

Int. Cl. B01F 07/00

U.S. Cl. 366—245

4 Claims



1. A paint tinter comprising: said paint tinter including a canister; an impeller within said canister; a cap fittable onto an upper end of said canister; said cap including an inner member having a guide centrally disposed therein; a crank shaft rotatably fitted through said guide; a plate affixed at a lower end of said crank shaft;

first and second means for lost-motion connection from first and second opposed ends of said plate to said impeller; a crank affixed to an upper end of said crank shaft; said plate and said crank shaft capturing said inner member therewith; a drive arm; means for connecting a first end of said drive arm to a distal end of said crank for providing rotation thereto; means for preventing disconnection of said means for connecting, whereby said inner member, said crank and said drive arm form a unitary assembly; means for lost-motion connection between distal ends of said plate and said impeller; means for rotating said first end of said drive arm; hingeable means for connecting a second end of said drive arm to said means for rotating; said means for lost-motion connection permitting free disconnection of said plate from said impeller; and said hingeable means including means for permitting said drive arm and said cap to be hinged as an assembly, whereby a top of said canister is exposed.

4,792,237

## AGITATING BLADE STRUCTURE OF SOIL STABILIZING APPARATUS

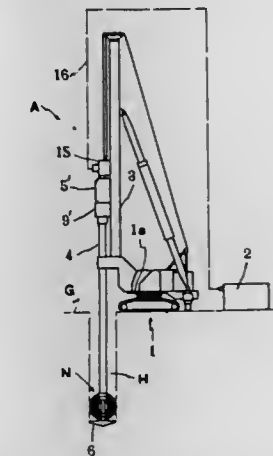
Mituo Hara, 3-9, 1-chome, Miyako-machi, Oita-shi, Japan

Filed Dec. 5, 1986, Ser. No. 938,697

Int. Cl. B01F 7/16; B28C 5/08

U.S. Cl. 366—296

6 Claims



1. In a soil stabilizing apparatus, improved means for drilling and agitating soil comprising: (a) a plurality of concentric rotary shafts adapted to be positioned substantially vertically to the ground surface and comprising an inner rotary shaft and an outer rotary shaft, (b) means for rotating said inner and outer rotary shafts in opposite directions relative to each other, (c) a plurality of agitating blades concentrically mounted on said rotary shafts, said agitating blades comprising a first agitating blade which is fixedly secured to the inner rotary shaft and a second agitating blade which is fixedly secured to the outer rotary shaft, said first agitating blade and said second agitating blade being rotatable in opposite directions relative to each other corresponding to the rotation of said inner and outer rotary shafts, the locus of rotation of one of the agitating blades being radially outside the locus of rotation of the other agitating blade, and (d) a cutting blade disposed below said agitating blades, said cutting blade being connected to the bottom end of said inner rotary shaft for rotation with said inner rotary shaft.



4,792,238

**CONTINUOUS DISPERSION APPARATUS HAVING MULTI-STEP DISPERSION CHAMBERS**

Yoshihisa Yoneyama, and Yasuo Iwasaki, both of Shizuoka, Japan, assignors to Pola Kasei Kogyo Kabushiki Kaisha, Shizuoka, Japan

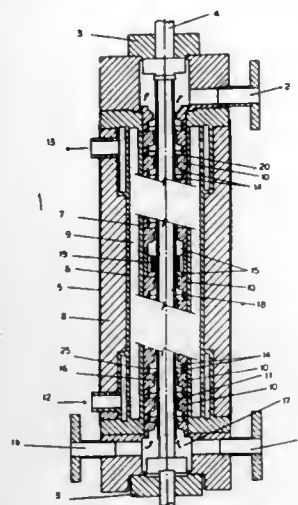
PCT No. PCT/JP85/00506, § 371 Date May 9, 1986, § 102(e) Date May 9, 1986, PCT Pub. No. WO86/01742, PCT Pub. Date Mar. 27, 1986

PCT Filed Sep. 11, 1985, Ser. No. 871,429

Claims priority, application Japan, Sep. 11, 1984, 59-188940 Int. Cl.<sup>4</sup> B01F 7/16, 15/06

U.S. Cl. 366—307

8 Claims



1. A continuous dispersion apparatus comprising:
  - a cylindrical structure having two ends with a sealing assembly on both ends thereof provided with at least one inlet for introducing materials and an outlet for a dispersion product;
  - a rotary shaft extending in the cylindrical structure in a lengthwise direction along a central axis thereof, said rotary shaft extending beyond both ends of said cylindrical structure and having a circumferential surface;
  - a plurality of dispersion chambers each having an inlet and outlet, said chambers being positioned within said cylindrical structure and being arranged along the rotary shaft for dispersing a starting material current from the inlet in the dispersed chambers and for discharging a dispersed product the outlet thereof;
  - a starting material-supplying chamber positioned within the cylindrical structure at one end thereof and having a space defined by at least the circumference of the cylindrical structure, said chamber permitting passage of the materials introduced from the at least one inlet;
  - a plurality of aligned distance collars extending along the cylindrical body, said dispersion chambers being arranged on the circumference of the rotary shaft from one end to the other end thereof and along the central axis, each of the dispersion chambers consisting of a space defined by the circumferential surface of the rotary shaft and adjacent distance collars, the distance collars being fixed to an inner wall of the cylindrical structure and forming together with the circumferential surface of the rotary shaft an annular slit which constitutes a passage for the starting material current supplied from the starting material-supplying chamber;
  - a rotary blade provided in each of the dispersion chambers and having shearing edges, said rotary blade being fixed to the rotary shaft and extending therefrom generally at a right angle to the lengthwise direction of the rotary shaft; and
  - at least one rectifying chamber provided along the cylindrical

cal structure between at least two of the dispersion chambers, said rectifying chamber having a plurality of small gaps which constitute passageways for the starting material current,

whereby said starting material current travels through said at least one inlet, said starting material-supplying chamber, at least one dispersion chamber wherein said current has turbulent flow and then through said rectifying chamber wherein said current has a laminar flow and then through another dispersion chamber wherein said current again has a turbulent flow and then through said outlet in order to produce the dispersed product.

4,792,239

**FLEXIBLE CASE HANGING DEVICE**

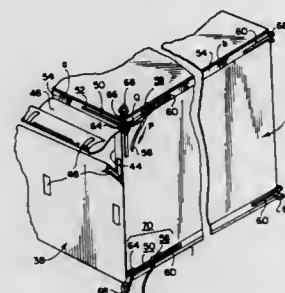
Hiroshi Hamada; Takamitsu Watanabe, and Mitharu Suzuki, all of Tokyo, Japan, assignors to Kawasaki Kisen Kaisha, Hyogo, Japan

Filed Jan. 7, 1988, Ser. No. 141,371

Claims priority, application Japan, Jan. 8, 1987, 62-623[U] Int. Cl.<sup>4</sup> B65D 33/14

U.S. Cl. 383—22

5 Claims



1. A flexible case hanging device comprising a belt member having one end fixed to a side edge along one edge of a corner of a case and a free end anchored by a buckle provided on a side edge along the other edge of the corner, and an annular body provided at a vertex of said corner, part of said belt member passing through said annular body to form a loop of the belt member, which is adjustable into smaller sizes by pulling said free end of the belt member.

4,792,240

**EXTRUDED ZIPPER STRIPS FOR BAGS**

Steven Ausnit, New York, N.Y., assignor to Minigrip, Inc., Orangeburg, N.Y.

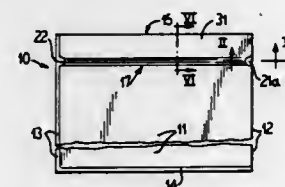
Continuation of Ser. No. 812,467, Dec. 23, 1983, abandoned.

This application Oct. 6, 1987, Ser. No. 106,920

Int. Cl.<sup>4</sup> B65D 33/24

U.S. Cl. 383—63

22 Claims



1. A bag having confronting bag body wall panels, opposite side edges, a bottom end and a top end, and including:
  - a reclosable zipper sandwiched between said wall panels and extending between side edges adjacent to said top end;
  - said zipper comprising a continuous length of extruded

profiled plastic strip having a plurality of spaced parallel profile parts and being folded upon itself to provide two parallel strip portions extending from a fold; one of said strip portions being attached to one of said wall panels and the other strip portion being attached to the other of said wall panels; the profile parts on said one strip portion being releasably interlockable with the profile parts on said other strip portion for closing said top end of the bag; said fold being located at one of said side edges; and a spot seal securing said strip portions together at said fold.

4,792,241

**DUAL DRAW TAPE BAG AND METHOD OF MANUFACTURE**

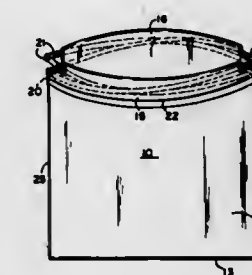
Kevin Broderick, Victor; Vernon C. Catchman, Palmyra; Fox J. Herrington, Holcomb; Shirley K. Johnston, Sodus Point, all of N.Y.; Robert H. Olson, Beaufort, S.C., and Donald Stell, Palmyra, N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Sep. 24, 1987, Ser. No. 100,648

Int. Cl.<sup>4</sup> B65D 33/28

U.S. Cl. 383—75

6 Claims



1. A dual draw tape bag which comprises:
  - a front wall and a back wall of flexible sheet material joined to each other along the edges of the bag;
  - tubular channels extending along opposed transverse top edges of said front wall and said back wall, respectively, said channels defining an open mouth for the bag, each of said channels having openings at the opposite ends of said top edges of the bag; and
  - a pair of tapes extending through each of said channels, one of the ends of each of said tapes being attached to the opposite side edges of the bag beneath the openings in said channels and the other ends of said tapes extending through the respective openings at the other ends of said channels so that the tapes in the channels cross whereby when the tapes are pulled, the top of the bag is drawn tightly together.

4,792,242

**TIGHT BEARING SUITABLE FOR EXCEPTIONALLY HEAVY DUTY CONDITIONS**

Franco Colanzi, and Angelo Vignotto, both of Turin, Italy, assignors to RIV-SKF Officine di Villar Perosa S.p.A., Turin, Italy

Filed Jan. 25, 1988, Ser. No. 148,079

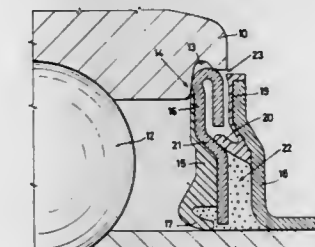
Claims priority, application Italy, Jan. 28, 1987, 67047 A/87 Int. Cl.<sup>4</sup> F16C 33/72, 33/76, 33/80

U.S. Cl. 384—482

5 Claims

1. Tight bearing suitable for exceptionally heavy duty conditions which comprises: a side screen of plate composition having an external face; external and internal bearing rings wherein said external ring restrains said side screen and said internal ring forms a labyrinth seal against said side screen; a material selected from the group consisting of plastic and elastomer materials including a lip portion which creates friction on the internal ring; and external plate having an internal face, said external plate integral with the internal ring and

forming a labyrinth seal with the external ring; a layer selected from the group consisting of plastic and elastomer materials



lining the internal face of the external plate; and at least one lip formed by said layer forming an essentially axial seal against the external face of the side screen plate.

4,792,243

**BEARING**

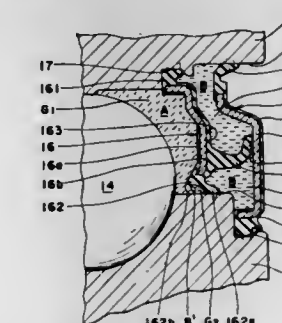
Masamichi Takeuchi, and Junichi Nakajima, both of Osaka, Japan, assignors to Koyo Seiko Co., Ltd., Osaka, Japan

Filed May 21, 1987, Ser. No. 52,056

Claims priority, application Japan, May 24, 1986, 61-119602 Int. Cl.<sup>4</sup> F16C 33/78, 33/74; F16J 15/32, 15/40

U.S. Cl. 384—486

3 Claims



1. A bearing comprising:
  - inner and outer raceway rings positioned one inside the other;
  - a plurality of rolling members positioned between the outer and inner raceway rings and spaced a distance from each other in a circumferential direction of the outer and inner rings;
  - inner and outer seal members positioned in at least one side of any one of the outer and inner raceway rings, said inner seal members defining a first space in cooperation with the rolling members and the inner and outer raceway rings, said outer seal members defining a second space in cooperation with the inner seal members and the inner and outer rings, said second space being positioned between the inner and outer seal members;
  - a first grease contained in the first space; and
  - a second grease contained in the second space, said first grease having properties different from said second grease.

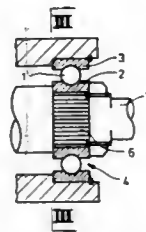
4,792,244

## CERAMIC BEARING CONSTRUCTION

Yuko Yamashita, Tokorozawa; Yuji Masumoto, Kokubunji; Takao Kimura, Tanashi; Katsutoshi Nishida; Koichi Inoue, both of Yokohama; Kazuo Rokkaku, Osaka, and Hiroaki Takebayashi, Osaka, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha; Kabushiki Kaisha To-shiba and Koyo Seiko Kabushiki Kaisha, all of Japan  
Filed Mar. 11, 1988, Ser. No. 166,894  
Claims priority, application Japan, Apr. 13, 1987, 62-90375  
Int. Cl.<sup>4</sup> F16C 19/04

U.S. Cl. 384—492

4 Claims



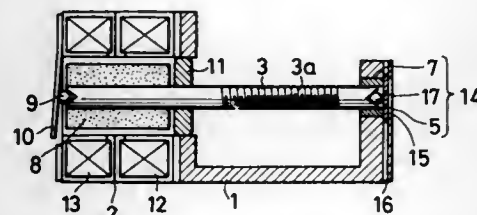
1. A ceramic bearing construction comprising ceramic inner and outer races, a plurality of balls or rollers interposed between said inner and outer races, a metal shaft having an outer diameter slightly greater than an inner diameter of said ceramic inner race and grooves on an inner periphery of said ceramic inner race and/or on an outer periphery of said metal shaft, the ceramic inner race being shrinkage-fitted over the metal shaft and being securely held in position.

4,792,245

## BEARING DEVICE

Takamichi Fuke; Kazuyoshi Ozawa; Atsushi Masuda; Osamu Shigenai, all of Furukawa, and Kunihiro Gunji, Miyagi, all of Japan, assignors to Alps Electric Co., Ltd., Japan  
Filed Sep. 24, 1987, Ser. No. 101,128  
Claims priority, application Japan, Dec. 15, 1986, 61-191671[U]  
Int. Cl.<sup>4</sup> F16C 19/10, 17/08; B21D 53/10  
U.S. Cl. 384—610

4 Claims



1. In a bearing device for rotationally supporting a shaft rotatable about a shaft axis, said shaft having a first end, a second end opposite said first end, and a given outer diameter, said bearing device including first bearing means supporting said first end of said shaft and second bearing means supporting said second end of said shaft, the improvement comprising:  
a base at said first end of said shaft having a through hole extending through said base from a first opening on an outer first side of said base to a second opening on an inner second side of said base in an axial direction along said shaft axis, and a retainer opening formed in a transverse direction perpendicular to said axial direction such that said retainer opening intersects said through hole in said base at a position near to said outer first side of said base; said shaft having said first end formed with an axial bearing surface in said axial direction at said first end; said first bearing means formed as a slide bearing press fitted

into said through hole in said base and having an inner diameter fitting said outer diameter of said shaft and aligned with said second bearing means in coaxial alignment, so as to allow rotation of said shaft supported in said slide bearing and said second bearing means;

said slide bearing extending from said inner second side of said base through said through hole to the position of said transverse retainer opening;  
means in conjunction with said second bearing means for providing an axial compression force on said shaft at said second end thereof; and

a retaining member inserted into said retainer opening in said base, said retaining member and said retainer opening having corresponding shapes such that said retaining member is seated in said retainer opening and positioned across said through hole wherein said axial bearing surface at said first end of said shaft is pressed into bearing contact with said retaining member by said axial compression force,

whereby during assembly said slide bearing is press fitted into said through hole in said base and a final sizing operation of the inner diameter of said slide bearing can be performed through said first opening on said outer first side of said through hole to properly size and align said slide bearing with said second bearing means for precise coaxial support of said shaft.

4. A method of forming a bearing device for rotationally supporting a shaft rotatable about a shaft axis, said shaft having a first end, a second end opposite said first end, and a given outer diameter, said bearing device including first end, and a means supporting said first end of said shaft and second bearing means supporting said second end of said shaft,

the improved method comprising:

providing a base at said first end of said shaft having a through hole extending through said base from a first opening on an outer first side of said base to a second opening on an inner second side of said base in an axial direction along said shaft axis, and a retainer opening formed in a transverse direction perpendicular to said axial direction such that said retainer opening intersects said through hole in said base at a position near to said first side of said base;

forming said shaft with an axial bearing surface in said axial direction at said first end;

forming said first bearing means by press fitting a slide bearing into said through hole in said base, said slide bearing having an inner diameter fitting said outer diameter of said shaft and aligned with said second bearing means in coaxial alignment and having a length in said axial direction extending from said second side of said base through said through hole to the position of said transverse retainer opening;

performing a final sizing operation of said inner diameter of said slide bearing, after said slide bearing has been press fitted into said through hole, by inserting a cutting tool through said first opening on said outer first side of said base, so as to precisely size and coaxial align said slide bearing with said second bearing means for precise rotational support of said shaft;

assembling said shaft to said second bearing means including providing an axial compression force on said shaft at said second end; and

inserting a retaining member into said retainer opening in said base to position said retaining member across said through hole wherein the axial bearing surface at said first end of said shaft is pressed by said axial compression force into bearing contact with said retaining member.

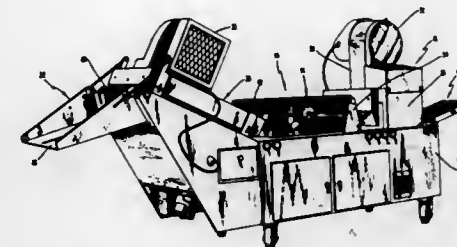
4,792,246

## APPARATUS FOR RAISED PRINTING

Christopher K. Van Pelt, Venice, Fla., assignor to Therm-O-Type Corporation, Nokomis, Fla.  
Continuation of Ser. No. 433,701, Oct. 12, 1982, abandoned.  
This application Oct. 11, 1984, Ser. No. 659,859  
Int. Cl.<sup>4</sup> B41J 3/02

U.S. Cl. 400—120

5 Claims



1. In an apparatus for producing raised printing on ink-printed sheets of paper material which includes:  
an infeed section for receiving ink-printed sheets containing tacky ink,  
a powder-pickup station including:  
a container of thermography powder,  
means for conveying said sheets past said container in a manner such that powder is applied to upper printed surfaces of said sheets and adheres to tacky ink thereon, and  
means for removing excess powder from said sheets,  
a heating section comprising:  
an upper heater for directing heat downwardly,  
a temperature-resistant perforated conveyor having a flight traveling beneath said upper heater, said conveyor arranged to convey said sheets from said powder-pickup station past said upper heater, the improvement comprising means for resisting curling of the sheets including a lower heater disposed beneath said conveyor for directing heat upwardly so that said sheets are heated simultaneously from above and below to melt and expand said powder, and to produce a substantially uniform heating of the sheets for resisting curling of the sheets and jamming of said sheets in said heating section.

4,792,247

## ARMATURE SUPPORTING STRUCTURE OF A PRINT HEAD

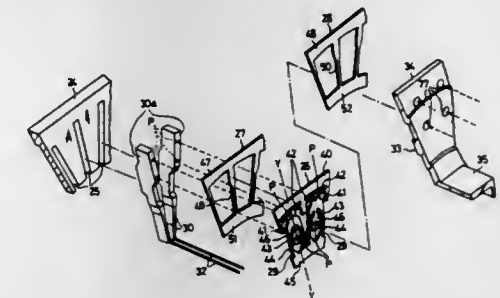
Atsuo Sakaida, Gifu; Yoshihumi Suzuki, Ena, and Shigeki Kato, Chiryu, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan  
Filed Jul. 30, 1987, Ser. No. 79,640  
Claims priority, application Japan, Jul. 31, 1986, 61-180435  
Int. Cl.<sup>4</sup> B41J 3/12

U.S. Cl. 400—124

13 Claims

1. A print head comprising:  
a plurality of armatures;  
resilient supporting means for swingably supporting the armatures;  
a plurality of printing elements coupled individually to the armatures and serving to perform printing operation in response to the swinging action of the armatures; and  
electromagnetic means capable of operating so as to swing the armatures in one direction for the printing operation, said resilient supporting means including torsion bars coupled to the armatures in a first position along the longitudinal direction of the armatures, and leaf spring members

coupled to the armatures in a second position different from the first position, along the longitudinal direction of



the armatures, and each having an arm portion bendable in the longitudinal direction of the armatures.

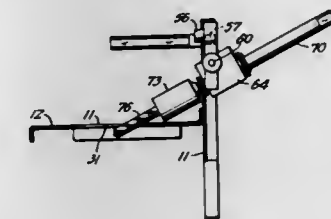
4,792,248

## INSTALLATION TOOL FOR COIN BOX DROP

Leonard Mercurio, Dix Hills, N.Y., assignor to Set-O-Matic, Inc., Farmingdale, N.Y.  
Filed Dec. 11, 1987, Ser. No. 131,564  
Int. Cl.<sup>4</sup> B23C 1/20

U.S. Cl. 409—178

3 Claims



1. An improved tool for machining a planar wall of an existing structure, said structure including said wall and a second wall disposed at right angles thereto, said second wall having existing openings therein, said tool comprising: a relatively fixed attaching element, a support element pivotally secured to said attaching element for limited pivotal movement with respect thereto, and a rotating shaft element journaled for rotation within said support element; said attaching element including means thereon selectively engaging at least some of said openings in said second wall to orient said attaching element in fixed relation thereto, engagement serving to position said rotating shaft element within another of said openings in said second wall with a first end thereof overlying said first wall, and a second end projecting outwardly of said first wall element for engagement with prime mover; said first end having a cutting tool thereon; whereby, upon rotation of said rotary shaft element, and the pivoting of said support element relative to said attaching element, said tool may cut an opening in said first wall of predetermined elongated configuration.

4,792,249

## VACUUM PAPER TRANSPORT SYSTEM FOR PRINTER

Roy J. Lahr, Los Angeles, Calif., assignor to Creative Associates Limited Partnership, Los Angeles, Calif.  
Continuation of Ser. No. 778,293, Sep. 20, 1985, abandoned, which is a continuation of Ser. No. 570,738, Jan. 16, 1984, abandoned. This application Jul. 10, 1986, Ser. No. 883,849  
Int. Cl.<sup>4</sup> B41J 13/00

U.S. Cl. 400—578

40 Claims

1. A paper transport arrangement for a printer, the paper transport arrangement being of the type wherein a sheet of paper is received from a supply and transported across a prede-



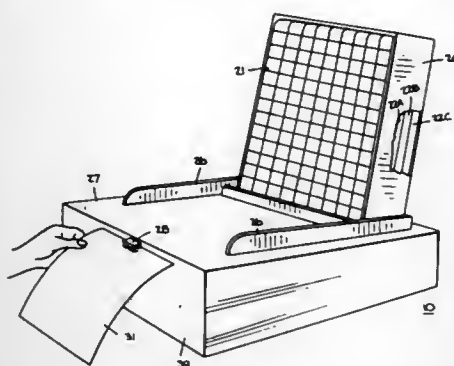
terminated print zone where printing may occur, the paper transport arrangement comprising:

vacuum roller means for grasping the sheet of paper and transporting the sheet of paper across the predetermined print zone, said vacuum roller means having an axis of rotation and a plurality of apertures on a surface thereof, said vacuum roller means adapted to be coupled to a supply of reduced air pressure thereby to provide a reduced air pressure at said apertures which attracts and holds the sheet of paper;

flexible vacuum conveyor means arranged to transport the paper in a direction which is essentially orthogonal to said axis of rotation of said vacuum roller means, said flexible vacuum conveyor means adapted to be coupled to the supply of reduced air pressure and having a plurality of apertures on a surface thereof thereby to provide a reduced air pressure at said apertures which attracts the sheet of paper, said vacuum conveyor means being arranged on the other side of the predetermined print zone from said vacuum roller means;

printing support means for supporting the sheet of paper during printing arranged in said predetermined print zone; and

vacuum chamber means arranged in the vicinity of said predetermined print zone and intermediate of said vacuum roller means and said flexible vacuum conveyor means, said vacuum chamber means adapted to be coupled to the



supply of reduced air pressure and having a plurality of apertures on a surface thereof thereby to provide a reduced air pressure at said apertures which holds the sheet of paper in the vicinity of said predetermined print zone; said flexible vacuum conveyor means further comprising a plurality of flexible cells arranged in a predetermined array configuration, said flexible cells being adapted to receive said reduced air pressure, each of said flexible cells being at least partially isolated pneumatically from others of said flexible cells, said flexible vacuum conveyor means comprising a base means having a closed loop configuration so as to form a belt, and further being adapted to hold said flexible cells in said predetermined array configuration, said flexible cells on said flexible conveyor base means being provided with respectively associated valve means for adjusting a pneumatic impedance through which said reduced air pressure is conducted to said apertures on said surface of said flexible vacuum conveyor means in response to the presence of the sheet of paper adjacent to said valve means, the presence of a sheet of paper reducing said pneumatic impedance to permit increased communication between said apertures and said reduced air pressure;

said vacuum chamber means being in vacuum communication with said vacuum roller means, and there further being provided first seal means on said vacuum chamber means for forming a seal which substantially prevents air leakage at said surface of said vacuum roller means.

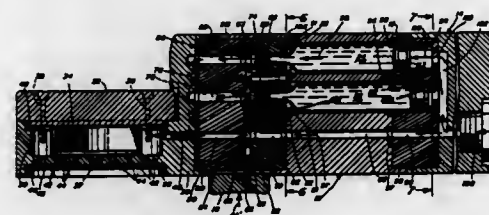
#### 4,792,250 SHAMPOOING APPARATUS

Robert B. Turner, Brockton, Mass., assignor to Bobbie's Automatic Hair Shampooer, Inc., North Quincy, Mass.  
Continuation of Ser. No. 660,307, Oct. 12, 1984, Pat. No. 4,674,902. This application Dec. 3, 1986, Ser. No. 937,547  
The portion of the term of this patent subsequent to Jan. 23, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> A46B 11/02

U.S. Cl. 401-43

23 Claims



21. A shampooing apparatus comprising: a body, a dispensing head, means supporting the dispensing head from the body, a capsule containing a hair treatment liquid and including an outlet nozzle and means for expelling the liquid from the outlet nozzle of the capsule under force, said body having means for supporting the capsule, a pressurized water line in the body and coupling to the dispensing head, and means coupling the pressurized water from said line to the capsule expelling means so as to force the hair treatment liquid from the outlet nozzle of the capsule to the dispensing head.

#### 4,792,251 SMOOTH DRIVE LIPSTICK CONTAINER

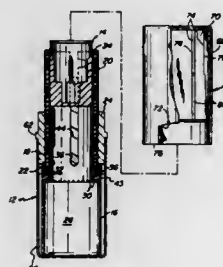
Kenneth F. Ryder, Prospect, Conn., assignor to Bridgeport Metal Goods Manufacturing Co., Bridgeport, Conn.

Filed Apr. 9, 1986, Ser. No. 849,810

Int. Cl.<sup>4</sup> A45D 40/06; B43K 21/08

U.S. Cl. 401-74

23 Claims



1. A lipstick container comprising:

- (a) a metal inner body member having a lower knob portion and an upper tubular portion;
  - (i) said tubular portion having at least one longitudinally extending slot formed therethrough;
- (b) an outer sleeve at least partially surrounding said tubular portion of said inner body member and mounted thereon for relative rotation thereabout;
  - (i) said outer sleeve having at least one spiral groove on its interior surface adjacent said tubular portion;
  - (ii) said outer sleeve having an outwardly extending flange at one end thereof;
- (c) friction ring means seated on said external flange, said ring means having an inner circumference engaging at least a portion of an outer surface of said outer sleeve and operatively connected between said inner body member and said outer sleeve, said inner circumference being slightly less than the outer circumference of said outer sleeve to achieve an interference fit for providing a radial

force on the outer sleeve whereby an approximately constant torque is required to enable relative rotation therebetween;

- (d) a slideable cup adapted to carry a lipstick mass, said cup received in said tubular portion and having at least one post extending through said at least one longitudinal slot in said tubular portion and into said at least one spiral groove in said outer sleeve whereby relative rotation between said inner body member and said outer sleeve moves said slideable cup between a protracted position and a retracted position; and

two pairs of outwardly extending feet on the outer circumference of said friction ring means for operatively connecting said inner body member and said outer sleeve.

#### 4,792,252 LIQUID APPLICATOR DEVICE

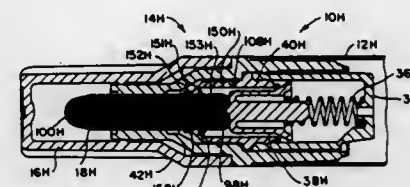
Leon V. Kremer, Crystal Lake; Ronald E. Kieras, Algonquin, and Michael G. Knickerbocker, McHenry, all of Ill., assignors to Pittway Corporation, Cary, Ill.

Continuation-in-part of Ser. No. 741,537, Jun. 5, 1985, abandoned, and a continuation-in-part of Ser. No. 706,100, Feb. 27, 1985, abandoned. This application Feb. 25, 1986, Ser. No. 832,658

Int. Cl.<sup>4</sup> B43K 5/08, 8/00

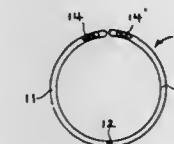
U.S. Cl. 401-206

21 Claims



1. A liquid applicator device for applying a liquid from a liquid container to a surface, comprising in combination; a valve having a valve element and a valve seal; said valve element being movable between a closed position wherein said valve element engages said valve seal and an open position wherein said valve element is displaced from said valve seal; a valve closure having a first and a second end with an internal closure cavity extending therebetween; a surface applicator having a longitudinal length terminating in a proximal end and a distal end; said surface applicator being disposed in said internal closure cavity of said valve closure; means connecting said valve closure to said valve with said proximal end of said surface applicator being disposed proximate said valve element and with said distal end of said surface applicator extending external said second end of said valve closure; means connecting said first end of said valve closure to said liquid container for enabling the flow of the liquid from the liquid container to said surface applicator when said valve element is disposed in said open position; and a tubular portion slidably receiving said surface applicator for forming a liquid seal between said proximal end and said distal end of said surface applicator during movement of said surface applicator parallel to said longitudinal length of said surface applicator; and a resilient plastic extending portion unitary with said valve seal for flexibly mounting said tubular portion within said internal closure cavity of said valve closure to maintain the liquid seal between said tubular portion and said surface applicator during deformation of said surface applicator perpendicular to the longitudinal length thereof.

4,792,253  
BINDER RING HAVING SLIP-ON FOLIO STOPS  
Ralph S. Jacobson, 131-1909 Salton Road, Abbotsford, British Columbia, Canada  
Continuation-in-part of Ser. No. 923,580, Oct. 27, 1986, abandoned. This application Aug. 31, 1987, Ser. No. 91,332  
Int. Cl.<sup>4</sup> B42F 13/16, 13/26; A44B 15/00; A47G 29/10  
U.S. Cl. 402-20 3 Claims



1. An improved binder ring which impedes folio sheets from sliding off the ends of the ring sections, said binder ring having a pair of semi-circular ring sections with hinge means attached to one end of each of said ring sections whereby said ring sections are connected together and may rotate between an open position at which the other ends of said ring sections are spaced apart and a closed position at which said other ends are fitted together in press fit contact so that said sections form a closed, substantially circular binder ring, the improvement comprising:

folio stops which are detachably attachable, respectively, to said other ends of said ring sections whereby when said folio stops are detachably attached to said other ends of said ring sections, folio sheets being held on said ring sections are impeded from sliding off said other ends of said ring sections.

#### 4,792,254 ELECTRIC FENCE CLIP

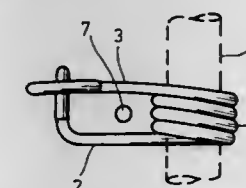
Conrad M. Platten, Gisborne, New Zealand, assignor to Wrightson NMA Limited, Gisborne, New Zealand  
Filed Jun. 8, 1987, Ser. No. 59,744

Claims priority, application New Zealand, Jul. 28, 1986, 216999

Int. Cl.<sup>4</sup> F16B 7/06

U.S. Cl. 403-48

6 Claims



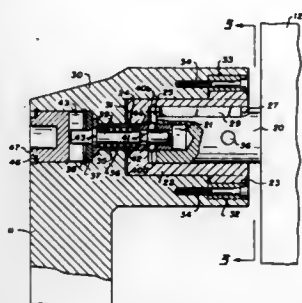
1. A unitary fence clip formed from a resilient wire, said clip comprising: a fence standard or post engaging substantially helical coil region having a helical axis, said coil region having at least one complete loop; a first arm extending from one end of said coil region; a second arm extending from the other end of said coil region, said first and second arms being substantially normal to a plane which includes said helical axis; said first arm including as a distal region at least a partly formed loop and said second arm including an end region engageable in said at least partly formed loop to bring said first and second arms into engagement with each other, said first and second arms requiring both squeezing to-

gether against the resilience of said coil region and prying apart in a direction parallel to said helical axis to enable entry of said first and second arms into said engagement with each other and retention of said engagement owing to a bias thus created in two directions; said first and second arms in said engagement defining a closed zone between said arm and said coil region through which a fence wire or the like is locatable; said squeezing together of said arms tending to tighten at least part of said coil region so as to enhance grip on a fence standard or post received through said coil region, pulling apart of said arms opposite to said squeezing tending to reduce said grip to allow for fitting of said coil region on a fence standard or post of appropriate cross-sectional dimension.

**4,792,255**  
**COUPLING ASSEMBLY**  
James McArthur, Coquitlam, and Steven E. Hodge, Burnaby, both of Canada, assignors to Med-Ex Diagnostics of Canada Inc., Coquitlam, Canada  
Filed Sep. 29, 1987, Ser. No. 102,452  
Int. Cl.<sup>4</sup> B25G 3/18

U.S. Cl. 403—325

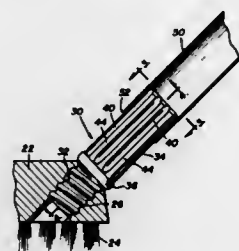
3 Claims



1. An improved coupling assembly comprising:  
a hub shaft having an axial aperture;  
a sleeve having a closed end positioned over said hub shaft and mounted thereto for movement with said hub shaft, said sleeve having an axial aperture in said closed end aligned with said axial aperture of said hub shaft, said sleeve being longer than said shaft hub to define an internal radial groove separating said axial apertures;  
a member connectable to said hub shaft having a connecting portion comprising a cavity adapted to fit over said sleeve, said cavity containing a centrally located longitudinal projecting member for insertion through said axial apertures of said sleeve and said hub shaft, said projecting member having an axial bore extending therethrough with an actuating member slidable within said axial bore engaging radially extendable locking means in said projecting member to bias said locking means outwardly of the projecting member for engagement in said internal radial groove thereby preventing axial movement between said connectable member and said hub shaft, said actuating means having a narrowed section for selective alignment with said locking means so that said locking means is able to move inwardly of the projecting member out of the internal radial groove thereby releasing said connectable member for axial movement with respect to said hub shaft, said actuating means normally being biased by spring means to a position in which said locking means are engaged in said internal radial groove; and  
groove and key means between said connectable member and said sleeve to prevent rotation of said connectable member about said sleeve when said locking means are engaged in said internal radial groove.

**4,792,256**  
**IMPLEMENT WITH CONNECTOR JOINING HANDLE TO WORKING HEAD**  
Douglas R. Batchelor, Chicago, Ill., assignor to Libman Broom Company, Arcola, Ill.  
Filed Dec. 10, 1986, Ser. No. 940,084  
Int. Cl.<sup>4</sup> B25G 3/28; F16B 99/00  
U.S. Cl. 403—296

10 Claims

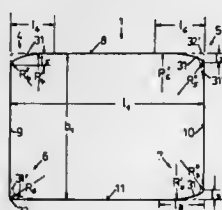


1. A metallic connector for joining the end of a tubular metal handle to an implement head:  
the connector comprising a generally cylindrical body having an externally threaded portion at one end adapted to be threadably inserted into an internally threaded hole in an implement head;  
an externally fluted cylindrical portion at the other end of the cylindrical body, with said flutes being located axially of the body and spaced apart from adjacent flutes;  
the fluted cylindrical portion having between adjacent flutes a convex curved surface constituting a segment of a cylindrical surface;  
the fluted portion being sized to be forced into and having a diameter slightly larger than the internal diameter of the end of a tubular metal handle, having an interior surface, with a tight friction fit so that other fastening means is not required; and  
stop means between the fluted portion and the threaded portion limiting the distance which the fluted portion can be forced into the end of a tubular handle.

**4,792,257**  
**SET OF PAVING STONES, PARTICULARLY SET OF CONCRETE PAVING STONES**  
Hans Rinniger, Kisslegg, Fed. Rep. of Germany, assignor to Hans Rinniger u. Sohn GmbH u. Co., Kisslegg, Fed. Rep. of Germany  
Filed Sep. 11, 1987, Ser. No. 95,190  
Claims priority, application Fed. Rep. of Germany, Sep. 12, 1986, 252

Int. Cl.<sup>4</sup> E01C 5/00  
U.S. Cl. 404—41

13 Claims



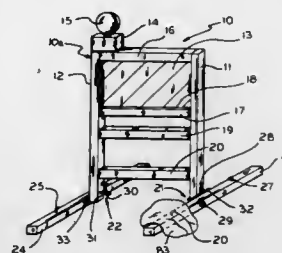
1. A paving-stone set for construction of garden layouts, paths and the like, comprising:  
a generally square paving-stone, a larger, generally rectangular paving-stone, and a smaller, generally rectangular paving-stone,  
each of the paving-stones having generally planar side faces, generally planar upper and lower faces, corners at respec-

tive intersections of said side faces, and respective top and bottom transitional regions at intersections of said planar side faces with said upper face and said lower face, wherein at least two of said side faces have a clothoid shaped surface extending along a portion of each one of said at least two side faces to a respective nearest one of said corners, each said clothoid shaped surface being a curve having a respective radius of curvature decreasing constantly in a direction towards said nearest one of said corners.

**4,792,258**  
**COLLAPSIBLE WARNING BARRICADE APPARATUS**  
LeRoy L. Goff, Addison, Ill., assignor to Warning Lites of Illinois, Inc., Addison, Ill.  
Filed Aug. 3, 1987, Ser. No. 80,654  
Int. Cl.<sup>4</sup> E01F 9/01, 13/00

U.S. Cl. 404—6

14 Claims



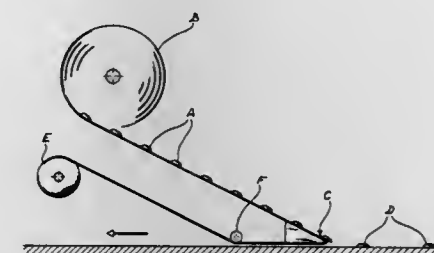
1. A collapsible warning barricade apparatus for restricting and blocking access to a designated area by vehicular and pedestrian traffic, in which at least an upstanding portion of the apparatus is capable of fully collapsing toward and being maintained in a substantially ground surface-hugging position upon impact from said traffic, without damage to same, as well as is capable of collapsing into a substantially flat position for transportation and/or storage, said collapsible warning barricade apparatus comprising:  
a barricade member capable of being positioned in a substantially upright position,  
signaling means operably attached to said barricade member for warning said vehicular and pedestrian traffic of the location of said restricted area;  
barricade support means operably and pivotally attached to said barricade member by pivot means for alternatively supporting said barricade member in a substantially restrained upright position atop said ground surface, and permitting said barricade member to pivotally rotate downwardly to said ground surface-hugging position upon impact from a moving vehicle, said barricade support means including bias means operably interposed between it and said barricade member, for further maintaining said barricade member in said substantially restrained upright position, said pivot means enabling said barricade member to pivot upon impact from said moving vehicle, upon overcoming said bias means, towards repositioning said barricade member to its said substantially ground surface-hugging position without substantial relocation of said barricade support means, said barricade member further being of such a construction so as to remain substantially intact, so as to preclude damage to same, as a result of said impact;  
automatic locking means operably positioned between said barricade member and said barricade support means for automatically locking said barricade member into its collapsed position, upon impact from said moving vehicle, relative to said barricade support means to preclude against inadvertent migration, rebounding and repositioning of said barricade member from its said substantially ground surface-hugging position, so as to further preclude damage to said barricade member, as well as to further allow the tires of said moving vehicle to roll over said repositioned barricade member without impact damage to said barricade member, thereby enabling redeployment and reuse of said apparatus while obviating the need for replacement of said barricade member, and further precluding impact damage to the undercarriage of said moving vehicle as well as precluding injury to pedestrians, while alternatively providing a locked substantially flat profile for transportation and/or storage of the barricade apparatus.

damage to said barricade member, as well as to further allow the tires of said moving vehicle to roll over said repositioned barricade member without impact damage to said barricade member, thereby enabling redeployment and reuse of said apparatus while obviating the need for replacement of said barricade member, and further precluding impact damage to the undercarriage of said moving vehicle as well as precluding injury to pedestrians, while alternatively providing a locked substantially flat profile for transportation and/or storage of the barricade apparatus.

**4,792,259**  
**METHOD AND APPARATUS FOR DEPOSITING PREARRANGED RETROREFLECTING ELEMENTS ONTO A ROAD SURFACE**  
Helmut Eigenmann, Via Dufour 3, CH 6900 Lugano, Switzerland  
Filed Dec. 17, 1986, Ser. No. 942,647  
Claims priority, application Switzerland, Dec. 18, 1985, 05386/85

Int. Cl.<sup>4</sup> E01C 23/16  
U.S. Cl. 404—73

3 Claims



1. Method for precise depositing prearranged retroreflective road marking elements onto a road surface comprising:  
a. prepositioning a plurality of retroreflective elements, having a detaching surface on their underside, in a predetermined orientation and spaced a predetermined distance on a conveyor sheet having an adhesive surface contacting the elements;  
b. downwardly advancing said sheet to a zone in the vicinity of the road surface while maintaining said retroreflective elements in said predetermined orientation and distance, and moving said sheet at a predetermined speed longitudinally above the road surface; and  
c. detaching and depositing said retroreflective elements in the desired spacing on an adhesive road surface at said predetermined speed, while maintaining said orientation by drawing said conveyor sheet over an angled blade adjacent the road surface, so that the retroreflective elements adhere to the road surface by an adhesive.

**4,792,260**  
**TUNNEL-WAVE GENERATOR**  
Charles E. Sauerbier, 212 Country Hills Ln., Arroyo Grande, Calif. 93420  
Filed May 27, 1987, Ser. No. 54,521  
Int. Cl.<sup>4</sup> A63B 69/00

U.S. Cl. 405—79

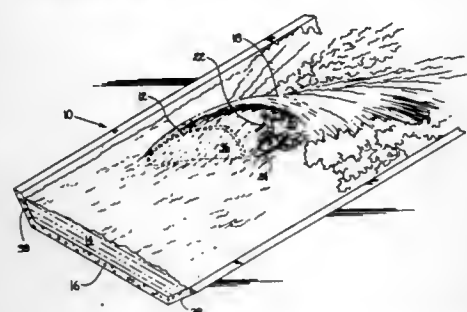
21 Claims

1. A wave-forming means for forming a tunnel wave on the surface of a body of water, comprising:  
a. generator hull means being partially submerged in said body of water, moving therethrough in a direction of motion, and having an area of shaped face thereon having width and length thereof, said shaped face:  
1. having concave curvature in sections both parallel and normal to said surface;



2. facing generally in said direction and having:

A. an inclination with respect to said surface and said direction; and



B. an attitude with respect to said direction; and  
b. means of propelling said wave forming means in said direction.

4,792,261

## MINE ROOF SUPPORTS

Tom C. Bithell, Chorley, England, assignor to Gullick Dobson Limited, Wigan, England

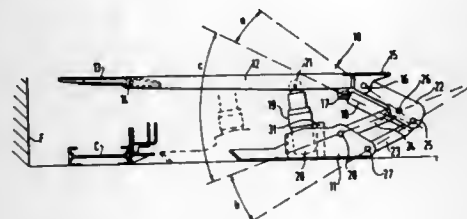
Filed Mar. 27, 1987, Ser. No. 30,528

Claims priority, application United Kingdom, Apr. 1, 1986, 8607932

Int. Cl.<sup>4</sup> E21D 15/44, 17/02

U.S. Cl. 405—293

12 Claims



1. A mine roof support, comprising:

a mine floor engaging base having a front and a rear, said base including elongate spaced-apart floor engaging members extending parallel to one another from said front to said rear;

a mine roof engaging canopy;

first hydraulic jack means connected to said base and said canopy for urging said canopy upwardly into load bearing contact with said mine roof;

connecting means extending between said two spaced apart floor engaging members for connecting said floor engaging members together, said connecting means being disposed behind said first hydraulic jack means towards said rear;

linkage means at said rear of said base and disposed behind said connecting means for pivotally connecting said base and said canopy;

second hydraulic jack means pivotally connected between said canopy and said linkage means and disposed behind said connecting means towards said rear for providing even distribution of load along said base;

pivotal connection means connected to said canopy behind said connecting means towards said rear for pivotally connecting said second hydraulic jack means to said canopy.

4,792,262

## PROCESS FOR STRENGTHENING GEOLOGICAL FORMATIONS

Manfred Kappa, Gladbach; Max Mann, Odenthal; Peter Vehlewald, Leichlingen; Frank Meyer; Hans-Ernst Mehesch, both of Essen; Wolfgang Cornely, Gladbeck, and Birgit Riecks, Essen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Filed Aug. 20, 1986, Ser. No. 898,452

Claims priority, application Fed. Rep. of Germany, Sep. 11, 1985, 3532387

Int. Cl.<sup>4</sup> E02D 3/12; C08G 18/76

U.S. Cl. 405—264

6 Claims

1. A process for strengthening geological formations in underground mining or other operations which comprises introducing into the formation to be strengthened, a polyurethane-forming reaction mixture comprising

(a) a polyisocyanate component and

(b) a polyol component comprising a mixture of

(i) an organic polyhydroxyl compound having an OH number of about 100 to 600 and

(ii) about 0.1 to 5% by weight, based on the total quantity of component (b), of a dihydric alcohol having a molecular weight of 62 to about 150.

4,792,263

## CARRIER FOR LARGE CAPACITY SINGLE OVERHEAD PNEUMATIC TUBE SYSTEM

Michael J. Podoll, Marion, Iowa, assignor to Inter Innovation LeFebure Manufacturing Corporation, Cedar Rapids, Iowa

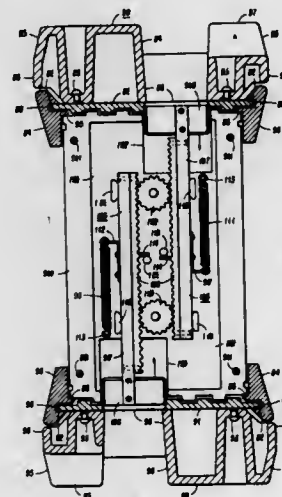
Division of Ser. No. 875,923, Jun. 19, 1986, Pat. No. 4,715,750.

This application Sep. 21, 1987, Ser. No. 98,939

Int. Cl.<sup>4</sup> B65G 51/06

U.S. Cl. 406—189

10 Claims



1. A carrier for use in a rectangular pneumatic tube system, the carrier being a generally rectangular, normally closed container for transport of articles through the system, the carrier comprising: a pair of parallel opposite end walls constituting covers for the carrier, each cover being slidable in either of two opposite directions from a closed to an open position for access to the interior of the carrier; locking means for locking each of the covers in its closed position; and unlocking means for each cover, the unlocking means for each cover being operatively exposed through a pair of apertures through the other cover.

4,792,264

## SINGLE BIT REAMER

Dieter Kress, Aalen, and Friedrich Hilberich, Leuchheim, both of Fed. Rep. of Germany, assignors to Masel Fabrik für Präzisionswerkzeuge Dr. Kress KG, Aalen, Fed. Rep. of Germany

Continuation of Ser. No. 773,577, Sep. 23, 1985, abandoned, and a continuation of Ser. No. 456,808, Jan. 10, 1983, abandoned.

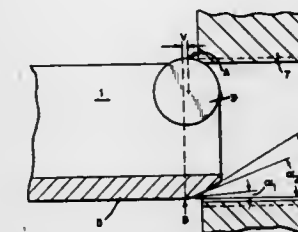
This application Aug. 4, 1987, Ser. No. 82,973

Claims priority, application Fed. Rep. of Germany, Jan. 15, 1982, 3201137

Int. Cl.<sup>4</sup> B23B 41/00

U.S. Cl. 408—199

6 Claims



1. In a single bit reamer adapted to be advanced in a predetermined direction of advance relative to a workpiece, while exerting a cutting force thereon, but free of being supported by any bore sleeve or floating holder, said single bit reamer having a cutter head rotating about a central axis, said cutter head having a cutter head periphery, the improvement comprising:

a bit of a predetermined diameter between 5 and 8 mm with a circular cutting edge, and being fastened to said cutter head, said bit having an extreme point furthest removed from said central axis in a radial direction, and

first and second guide members positioned on said cutter head at first and second respective prearranged distances about said periphery,

each of said guide members having an outermost edge parallel to said central axis of said cutter head, each of said outermost edges having a frontmost point, as viewed in said predetermined direction,

each of said outermost points of said guide members lagging said extreme point of said cutting bit by a preselected distance of about 0.4 mm in said direction of advance of said reamer,

each of said guide members further having a first slanted edge extending from the respective one of said outermost points towards said workpiece, inclined at a first angle less than 10° to said respective one of said outermost edges,

each of said guide members further having a second slanted edge immediately preceding said first slanted edge in the direction of advance of said cutting tool, said second edge being inclined at a second angle inclined between 15° and 25° to the respective one of said outermost edges,

whereby said single bit engages the workpiece first, and is thereafter temporarily displaced, together with said cutter head, from a central position thereof in one radial direction during operative advancement of said cutter head in said workpiece, but when it comes into contact with one of the slanted edges of one of said guide members, said single bit is displaced in another radial direction, until the frontmost point of each guide member, and the extreme point of said bit furthest removed from the central axis are all engaged with the workpiece, and the cutter head is thereby centered.

4,792,265

## ENGINE BORING AND SURFACING MACHINE

Donald B. Rotter, and David Engnell, both of County of King, Wash., assignors to Rotter Manufacturing Company, Kent, Wash.

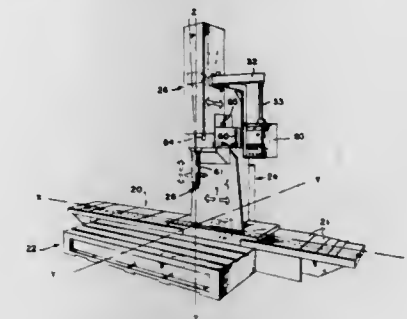
Continuation of Ser. No. 622,074, Jun. 19, 1984, abandoned.

This application Jan. 9, 1987, Ser. No. 4,809

Int. Cl.<sup>4</sup> B23B 47/00

U.S. Cl. 408—237

10 Claims



1. A power tool comprising:

a rigid, elongated base unit defining a straight horizontal travel path, said base unit having a forward side and a rearward side located on opposite transverse sides of said travel path, a rigid work table fixed forwardly of said travel path to be stationary relative to said base unit for receiving a workpiece;

a traveling support unit engaging said base unit and guided and power driven for selective powered movement along said path, said support unit having an upper horizontal support surface spaced above said base unit;

a power head unit normally resting with its weight bearing against said support surface and having an output spindle with a vertical feed axis which is located forwardly of the travel path and support unit and depends over said work table so that the spindle is offset from the support unit in a forward direction which is transverse to said travel path, said power head unit being adapted to selectively receive a tool on said spindle and to be selectively moved bodily forwardly or rearwardly in a horizontal plane over said upper support surface so that said feed axis responsively moves in a plane which is transverse to said travel path; and

clamping means for selectively clamping said power head unit downwardly against said support surface.

4,792,266

## ROTARY FINISHING TOOL

Lawrence E. Willis, 5428 Odell, St. Louis, Mo. 63139

Filed Mar. 27, 1987, Ser. No. 31,940

Int. Cl.<sup>4</sup> B23C 1/20

U.S. Cl. 409—182

13 Claims

1. A rotary finishing tool, comprising:

(a) power means for providing power for operating the rotary finishing tool,

(b) a housing for the power means,

(c) a finishing bit operatively connected to the power means, the finishing bit having at least one radius cutting surface,

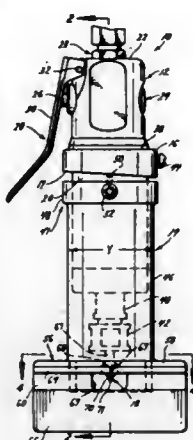
(d) guide means for guiding the rotary finishing tool along an edge of a workpiece, the guide means including:

(1) a base member, the base member operatively associated with the power means housing for telescoping axial movement between the base member and the power means housing,

(2) a guide member associated with the base member, the guide member including a guide member portion, the guide member portion defining a plane substantially perpendicular to the rotational axis of the finishing bit, and

another guide member portion, the other guide member portion defining another plane substantially parallel to the rotational axis of the finishing bit, the guide member portions, providing proper orientation between the rotary finishing tool and the workpiece, whereby both the one guide member portion and the other guide member portion are arranged for sliding contact with the workpiece, and

- (e) axial adjustment means for providing axial adjustment of the finishing bit, the axial adjustment means including cam means for providing axial adjustment of the finishing bit as the base member telescopes axially with respect to the power means housing,
- (f) the cam means providing a cam surface, the cam means rotatively associated with the power means housing,



- (g) the power means housing including shoulder means operatively associated with the cam means,
- (h) a retaining means for retaining the cam means in a desired position,
- (i) another retaining means for retaining the guide means in a desired axial relationship with the power means housing,
- (j) a projection from the guide means projecting towards the cam surface and in operative contact with the cam surface such that rotation of the cam means and thus the cam surface to thereby vary the cam surface portion in operative contact with the projection provides for relative axial, telescopic adjustment between the guide means and power means housing thereby adjusting the operative relationship between the finishing bit and the guide members.

4,792,267

## CARRIAGE FOR A MACHINE TOOL

Robert J. Warner, Waukesha County, Wis., assignor to Kearney & Trecker Corporation, West Allis, Wis.

Filed Feb. 9, 1987, Ser. No. 12,686

Int. Cl.<sup>4</sup> B23C 1/00; B23B 39/02

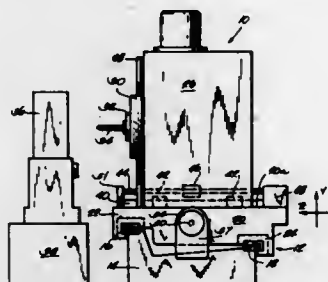
U.S. Cl. 409—235

13 Claims

1. In a machine tool, apparatus for movably supporting a work performing member, said apparatus comprising:
- discrete first and second ways, each having a planar load bearing surface and said first way being located forward of said second way;
- a base means for supporting the ways in spaced-apart parallel relationship with a first axis, and for maintaining the load bearing surfaces of the first and second ways in horizontal orientations at first and second levels, respectively, above a generally horizontal surface supporting the apparatus and work performing member, the first level being greater than the second level;
- a saddle carrying the work performing member positioned for movement along the ways and connected to receive

thrust forces directed against the member in the course of machining operations;

load bearing means joined to the saddle for transmitting a substantial portion of the combined weight of the saddle



and work performing member to the load bearing surfaces of both the first and second ways; and

means joined to the saddle for transmitting substantially more of said thrust forces received by the saddle to the first way than to the second way.

4,792,268

## APPARATUS FOR SUPPORTING VEHICLES AND THE LIKE

Earl D. Smith, Scottsdale, Ariz., assignor to Dallas Smith Engineering Corp., Phoenix, Ariz.

Continuation of Ser. No. 903,906, Sep. 4, 1986, abandoned,

which is a continuation of Ser. No. 576,560, Feb. 3, 1984, abandoned, which is a continuation-in-part of Ser. No. 519,388,

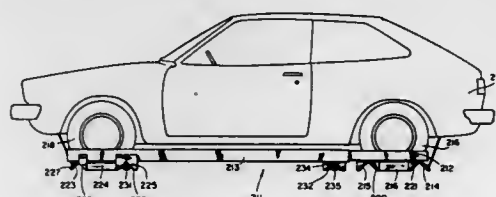
Aug. 1, 1983, Pat. No. 4,597,712. This application Nov. 13, 1987,

Ser. No. 120,704

Int. Cl.<sup>4</sup> B60P 3/07

U.S. Cl. 410—9

19 Claims



1. An apparatus for supporting a vehicle having a front wheel and a rear wheel on the same side of the vehicle, which comprises:

an arm assembly sized to extend longitudinally adjacent both the front and the rear wheel on the same side of the vehicle;

a first pair of wheel supports connected to and extending horizontally perpendicular to said arm assembly, said wheel supports both positioned below and one positioned fore and the other position aft the center of the front wheel, said first pair of wheel supports together with said arm assembly defining a generally U-shaped opening, each of said first pair of wheel supports including a first end connected with said arm assembly and a second end spaced from said arm assembly, the second ends of said first pair of wheel supports being free from one another on the side of the wheel opposite said arm assembly, whereby said first pair of wheel supports can be positioned with respect to the front wheel by moving said apparatus laterally toward the vehicle;

a second pair of wheel supports connected to and extending horizontally perpendicular to said arm assembly, said wheel supports both positioned below and one positioned fore and the other positioned aft the center of the rear wheel, said second pair of wheel supports together with

said arm assembly defining a generally U-shaped opening, each of said second pair of wheel supports including a first end connected with said arm assembly and a second end spaced from said arm assembly, the second ends of said second pair of wheel supports being free from one another on the side of the wheel opposite said arm assembly, whereby said second pair of wheel supports can be positioned with respect to the rear wheel by moving said apparatus laterally toward the vehicle;

adjustment means for adjusting the distance between said first and second pairs of wheel supports to accommodate different distances between the front and rear wheels of a vehicle;

attachment means for attaching said arm assembly to the vehicle; and

support receiving means associated with said arm assembly for receiving an external support member to permit support of the vehicle by support of said arm assembly and said pairs of wheel supports.

4,792,270  
AUTOMATIC RENTAL SAFE-DEPOSITING BOX SYSTEM

Kakuo Yoshida, Osaka, Japan, assignor to Itoki Co., Ltd., Osaka, Japan

Continuation of Ser. No. 589,417, Mar. 14, 1984, abandoned.

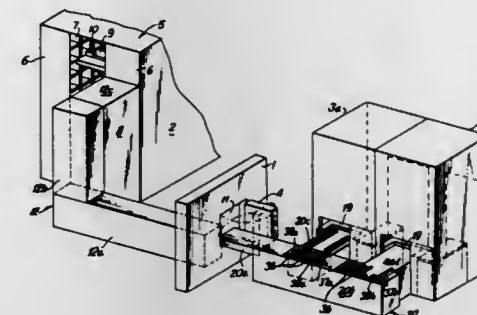
This application Jun. 23, 1986, Ser. No. 879,527

Claims priority, application Japan, Mar. 16, 1983, 56-42316; Apr. 11, 1983, 58-53674

Int. Cl.<sup>4</sup> B65G 65/00

U.S. Cl. 414—273

5 Claims



4,792,269

## CONTAINER SECURING DEVICE

Thomas H. Engle, Clayton, N.Y., assignor to General Signal Corporation, Stamford, Conn.

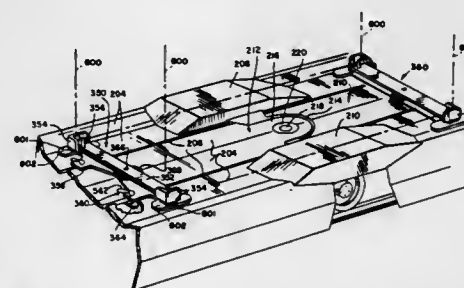
Continuation-in-part of Ser. No. 776,764, Sep. 16, 1985,

abandoned. This application Apr. 6, 1987, Ser. No. 37,140

Int. Cl.<sup>4</sup> B61D 45/00

U.S. Cl. 410—53

4 Claims



1. A self-contained container securing device for a rail car having a deck extending longitudinally comprising:

an upper member extending transversely of the car deck and

having a first pair of spaced corner members for receiving

two corners of a container to be secured to the car;

a lower member extending transversely of the car deck;

slidably adjustable means for fastening the lower member to

said deck at any point along its length; and

interconnecting means including (a) means for pivotally

interconnecting the upper and lower members so as to

permit the upper member and the container to swivel with

respect to the lower member and the car deck; and (b)

means for resiliently interconnecting the upper and lower

members to allow for the deflection of the upper member

with respect to the lower member in the car deck in re-

sponse to forces imposed on the container as the car travels on a curve.

1. In an automated system for storing and retrieving safety deposit boxes including a chamber provided with an opening and door means for sealing said opening, a storage unit disposed in said chamber having a plurality of storage locations arranged in matrix like form for receiving safety deposit boxes, a plurality of private compartments located outside of said chamber and motorized transport means for transporting said safety deposit boxes between said storage locations and said private compartments in a fully automated manner, an improved control system comprising in combination a reception data terminal located in an area remote from said private compartments and said chamber for receiving reception serial numbers and box codes corresponding to safety deposit boxes stored in said storage unit, a plurality of user's data terminals one of which is located in each of said private compartments for receiving said reception serial numbers, user's private codes, and storage and retrieval commands, and means for electrically controlling said transport means coupled to said reception data terminal and said plurality of user's data terminals including first memory means for permanently retaining the private codes and box codes of system users, second memory means for temporarily retaining said reception serial numbers and said box codes input to said reception data terminal, means for comparing (1) box codes stored in said first memory means with box codes input to said reception data terminal to produce the box codes as a preparatory signal when coincidence therebetween is detected, said comparing means further comparing (2) reception serial numbers retained in said second memory with reception serial numbers input to said user's terminals and (3) private codes retained in said first memory with private codes input to said user's terminals to produce a coincident signal upon detection of coincidence therebetween in the comparisons of (2) and (3), said control means allowing said transport means to carry out a preparatory operation for selective transfer of a preselected box to an intermediate storage area in said storage unit in response to said preparatory signal, said control means further allowing selective transfer of the preselected box from said storage unit to a predetermined private compartment in response to said coincident signal.

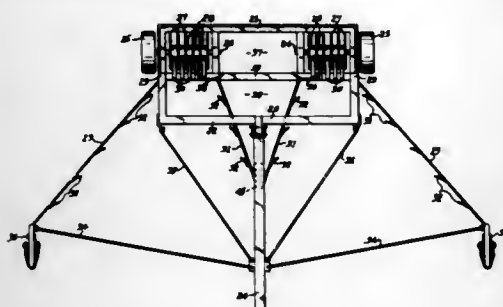


4,792,271  
GOLF BALL RETRIEVER  
Fred A. Akel, 55 S. Roscoe Blvd., Ponte Vedra Beach, Fla.  
32082

Filed Sep. 15, 1986, Ser. No. 907,028  
Int. Cl.<sup>4</sup> B60P 1/00.  
U.S. Cl. 414-440

U.S. Cl. 414-440

### 13 Claims



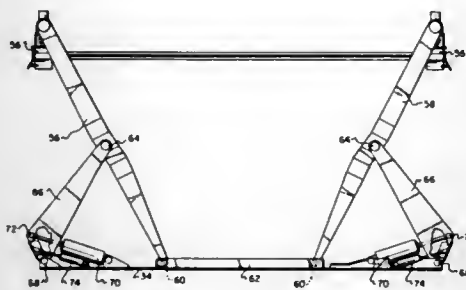
1. A golf ball retrieving apparatus comprising a frame supported by a rear axle means and two spaced ground engaging rear wheels mounted to opposite end portions of said axle means, two elongated outside deflecting members having free forward end portions and positioned slightly above ground level and extending forward and diverging laterally outward from the outer portion of said frame, two spaced ground engaging wheels supporting respective forward end portions of said deflecting members, a plurality of spaced generally rigid disc members mounted on said axle means between and laterally spaced inwardly from said rear wheels and adapted to turn respectively with said rear wheels, said disc members having a diameter less than the diameter of said rear wheels thereby spacing the outer edges of said disc members upwardly from the ground so that said outer edges do not engage the ground, a plurality of spaced, stationary fingers extending inwardly in the spaces between adjacent disc members with their fixed ends forward of said disc members and their free ends between said disc members, and basket means located forward of said disc members adapted to catch balls stripped from between adjacent disc members by said fingers.

4,792,272  
CONTAINER HANDLING APPARATUS  
Norman D. Oswald, Duncanville; Carl M. Franklin, Valley Mills; Marc H. Gutzler, Duncanville, and Harry S. Mankey, Dallas, all of Tex., assignors to Standard Manufacturing Company, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 868,196, May 23, 1986,  
abandoned, which is a continuation of Ser. No. 569,604, Jan. 10,  
1984, abandoned. This application Mar. 2, 1987, Ser. No. 20,855  
Int. CL<sup>4</sup> B60P 3/00

U.S. CL. 414-458

## 16 Claims



1. A container handling apparatus comprising:  
a parallel pair of elongated side frames;

a cross frame connecting the side frames at one end; the side frames being normally disconnected at the other end, so a container can be received between the two side frames;

a plurality of wheels supporting the side frames and the cross frames;

four lift mechanisms for attachment to a container;

four secondary lift arms, two of the secondary lift arms mounted to each of the side frames, each of the two secondary lift arms mounted to the same side frame having an upper end moving in the same vertical plane as the upper end of another secondary lift arm and each having a lower end laterally spaced from said upper end for movement in parallel overlapping vertical planes with the lower end of said other secondary lift arm mounted on the same side frame;

means for pivotally connecting the upper end of each secondary lift arm to one of the lift mechanisms;

four primary lift arms;

means for pivotally connecting one end of each primary lift arm to the midpoint of a corresponding one of the secondary lift arms;

means pivotally connecting the other end of each primary lift arm to one of the parallel side frames;

each primary lift arm having a length one-half as long as each secondary lift arm;

a cam follower mounted on the lower end of each of the secondary lift arms;

a plurality of cams for guiding each of the cam followers along one of the side frames; and

power means for rotating the primary lift arms about the pivot connections to the side frames to cause the upper ends of the secondary lift arms to move vertically to raise and lower the lift mechanisms and the container.

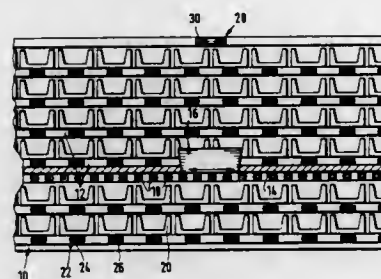
**4,792,273**  
**METHOD AND APPARATUS FOR DOCUMENTLESS**  
**ORDER PICKING OF GOODS**  
**Dieter Specht, Wermelskirchen, Fed. Rep. of Germany, assignor**  
**to Interroll Fordertechnik GmbH & Co. KG, Wermelskir-**  
**chen, Fed. Rep. of Germany**

Claims priority, application Fed. Rep. of Germany, Jul. 26, 1985. 3526868

U.S. Cl. 414-786

Int. Cl.<sup>4</sup> B65G 1/00

#### 4 Claims



1. A method for manual documentless selection of a plurality of different types of store room items for filling an order of said items by an order picker, said store room comprising a plurality of storage passages and each storage passage having a plurality of storage locations, each said storage location being for storing a plurality of predetermined type of said items, and being provided with a selectively variable optical quantity display signal and a manually actuatable acknowledgement switch for signaling selection of said items from the corresponding storage location, said method comprising for each type of store room item in said order, the steps of:

DECEMBER 20, 1988

## GENERAL AND MECHANICAL

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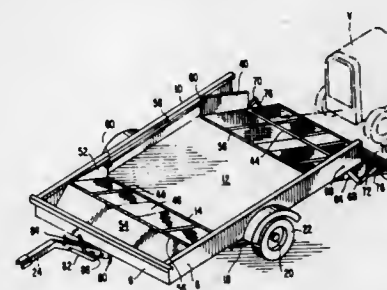
generating a first optical location signal indicating a passage for selection of at least one item in said order;  
generating a second optical location signal indicating a storage location in said passage for selection of said at least one item in said order;  
actuating the optical quantity display signal at the indicated storage location indicating the quantity of items to be selected therefrom;  
actuating the acknowledgement switch at said indicated storage location for signaling selection of the indicated quantity of items therefrom;  
extinguishing the quantity signal after actuation of said acknowledgement switch at the storage location;  
generating a direction signal for directing the order picker along a minimum distance route to the storage location for the next item required for said order.

4,792,274  
UTILITY TRAILER INCLUDING AUTOMATIC  
TAILGATE ASSEMBLY  
Robert E. Cockram, 718 Gilman St., Box 275, Sheffield, Iowa  
50475

Filed Apr. 30, 1987, Ser. No. 44,295  
Int. Cl.<sup>4</sup> B65G 67/02

U.S. Cl. 414-537

## 21 Claims



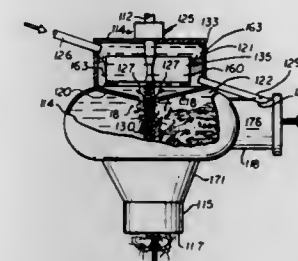
1. A utility trailer, comprising a trailer body having a trailer bed and spaced sidewalls extending along opposite sides of said trailer bed and upwardly beyond the plane of said trailer bed to define an open end at one end of said trailer body, trigger means pivotally connected to said trailer bed for pivotal movement between a first and a second position relative to said trailer bed, said trigger means including load receiving surface means extending outwardly from said trailer bed between said spaced sidewalls and substantially in the plane of said trailer bed when said trigger is in said first position, a ramp means pivotally connected to said trailer bed in spaced relation to said trigger means for pivotal movement between a third and a fourth position relative to said trailer bed, said ramp means extending upwardly relative to the trailer bed and substantially perpendicular thereto across the open end of said body between said sidewalls to close said open end when said ramp means is in the third position and being inclined downwardly from the pivotal connection with said trailer bed when said ramp means is in the fourth position, and drive means mounted on said trailer body, said drive means being connected to said ramp means and also connected for operation by said trigger means, said drive means operating to move said ramp means from said fourth to said third position in response to movement of said trigger means from said second to said first position.

**4,792,275**  
**PUMP CONSTRUCTION**  
Harry P. Weinrib, Chicago, Ill., assignor to Eddy Pump Corporation, Lincolnwood, Ill.

Filed Dec. 24, 1986, Ser. No. 946,307  
The portion of the term of this patent subsequent to Jun. 24,  
2003, has been disclaimed.  
Int. Cl.<sup>4</sup> F01D 1/08

U.S. CL 415-53 R

## 25 Claims



19. A method of pumping fluids comprising the steps of: rotating a vortex generating means within a pump casing, causing fluid to flow annularly in a belt of positive pressure between the pump casing and a pump outlet, forming a nucleus of fluid in a generally ellipsoidal shape with an upper conical section above the generating means and a lower conical section below the vortex generating means, forming a rotating vortex column of fluid initially to travel down to the throat of the pump inlet from the lower conical section into the ambient fluid, swirling ambient fluid to rotate about the vortex column and to travel in an upward direction through the pump inlet, and discharging the swirling ambient fluid through a pump discharge while the fluid is flowing with a helical twist thereto.

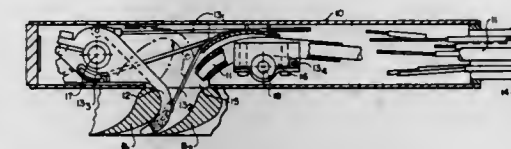
22. A vortex generator for forming a nucleus of liquid, said vortex generator comprising:  
a central hub having a rotational axis therethrough,  
a plurality of blades projecting radially outwardly from the hub,  
said blades being substantially identical in shape,  
said blades defining passageways therebetween having upper open ends and lower open ends to allow fluid to flow vertically between the blades and in said passageways.

**4,792,276**  
**TURBOMACHINERY DEBRIS REMOVER**  
Donald F. Krawiec, Pittsburgh; Robert J. Kraf, North Huntingdon, and Robert J. Houser, Monroeville, all of Pa., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 22, 1987, Ser. No. 99,812  
Int. Cl.<sup>4</sup> F01B 25/26

U.S. Cl. 415-118

### 10 Claims



**1. A debris remover apparatus comprising:**  
**a housing means including a flexible hollow hose, said hous-**  
**ing means defining an opening;**  
**first mounting means attached inside of said housing means**

adjacent to said opening, said first mounting means having an elongated first shaft disposed adjacent to said opening; grappling finger means attached to said first mounting means, said finger means being mounted on said first shaft for controlled pivotal movement on said first shaft whereby a portion of said grappling finger means is rotatable between a position inside of said housing means to a position outside of said housing means, said grappling finger means also being mounted on said first shaft for controlled translational movement along the axis of said first shaft;

second mounting means attached inside of said housing means adjacent to said opening, said second mounting means having an elongated second shaft disposed adjacent to said opening;

fiberoptic viewing means in said housing means and having one end mounted on said second mounting means, said one end being mounted for controlled translational movement along the axis of said second shaft, said one end of said fiberoptic viewing means being positioned with respect to said housing means so that it points in a direction out of said opening and the other end of said fiberoptic viewing means extends along said flexible hollow hose to the outer end thereof;

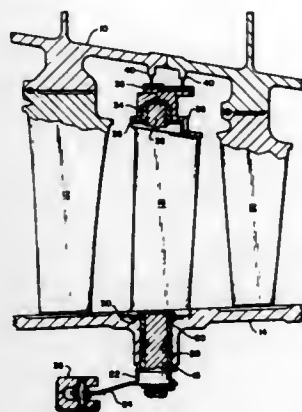
whereby said housing means can be manipulated by an operator to be positioned at a desired point near debris under visual control and, thereafter, said grappling finger means can be moved out through said opening to engage said debris and to move it into the inside of said housing means for removal.

**4,792,277**  
**SPLIT SHROUD COMPRESSOR**  
Richard H. Dittmer, Jr., Old Saybrook; Harry G. Freschlin, Manchester, and Alex Kurti, West Hartford, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jul. 8, 1987, Ser. No. 70,996  
Int. Cl.<sup>4</sup> F04D 29/46

U.S. Cl. 415—160

8 Claims



1. A compressor for a gas turbine engine comprising:  
a multi-stage compressor rotor;  
an axially split compressor case surrounding said rotor;  
at least one stage of a plurality of variable pitch stator vanes, each vane rotatably secured to said case, each vane longitudinally restrained by said case;  
a plurality of inner shroud segments, each segment extending through an arc of between 45 degrees and 180 degrees;  
a seal land secured to the inner surface of each segment;  
a knife edge seal secured to said rotor and sealing against each of said seal lands;

said stator vanes each rotatably secured to a shroud segment; and  
constraint means for longitudinally with respect to said vane constraining each of said shroud segments from inward movement toward said rotor on only those stator vanes located adjacent to the ends of each shroud segment.

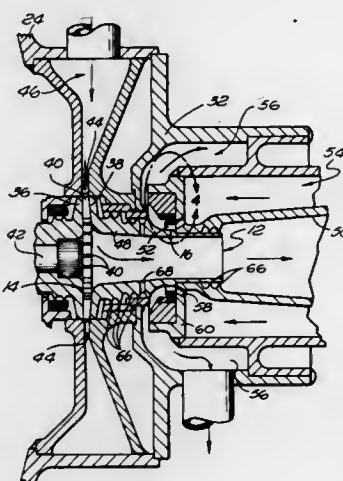
**4,792,278**  
**TURBOCOOLER WITH MULTISTAGE TURBINE WHEEL**

Terence P. Emerson, Hermosa Beach, Calif., assignor to Allied-Signal, Inc., Los Angeles, Calif.

Filed Aug. 14, 1987, Ser. No. 85,904  
Int. Cl.<sup>4</sup> F04D 29/58

U.S. Cl. 415—178

13 Claims



1. A turbocooler, comprising:  
a multistage turbine wheel having at least first and second sets of turbine vanes formed hereon;  
an output shaft rotatable with said turbine wheel;  
a load driven by said output shaft;  
means for supplying a first gas stream into driving interaction with said first set of vanes to rotatably drive said turbine wheel and to reduce the temperature of said first gas stream; and  
means for supplying a second gas stream into driving relation with said turbine wheel and to reduce the temperature of said second gas stream, said multistage turbine wheel comprising an elongated hollow and generally cylindrical hub, a set of radial flow vanes formed generally at one end of said hub to define said first set of vanes, and a set of axial flow vanes formed about the exterior of said hub in axially spaced relation to said radial flow vanes, said axial flow vanes defining said second set of vanes.

**4,792,279**  
**VARIABLE PITCH PROPELLER**  
Robert M. Bergeron, Whithers Grove, Derry, N.H. 03838  
Filed Sep. 4, 1987, Ser. No. 93,016  
Int. Cl.<sup>4</sup> B63H 1/06

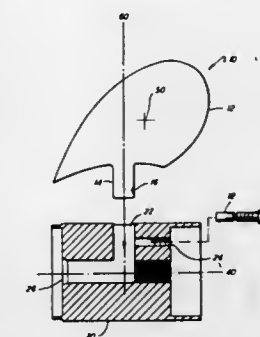
U.S. Cl. 416—89

1 Claim

1. An automatic variable pitch variable diameter marine propeller comprising:  
a central hub defining rotation axis, said central hub having three exhaust ports extending longitudinally there-through, three radial bores interdigitated with said ports, each of said radial bores receiving one of three propeller blade shafts, and three guide pin bores each receiving one of three guide pins, each of said guide pin bores being

parallel to said propeller rotation axis and intersecting perpendicularly with a said radial bore;  
three propeller blades, each of said blades comprising a said blade shaft and a blade portion, said blade shaft being attached to said blade portion at one end and extending away from said blade portion into a said radial bore, said blade shaft being capable of rotation within said radial bore about an axis of pitch rotation, said axis of pitch rotation being normal to said axis of propeller rotation, said blade shaft having a helical groove in its periphery to receive a said guide pin, said blade portion being configured and attached to said blade shaft such that force due to water pressure on said blade portion defines a center of pressure which is located remote from the axis of pitch rotation;

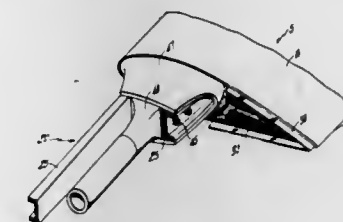
each of said guide pins passing through a said guide pin bore and being received by said helical groove wherein, said helical groove defines pitch of the associated said propeller blade by controlling its rotation within said radial bore about its axis of pitch rotation; and  
synchronization means to synchronize the varying pitches of the propeller blades, comprising a ring rotatably mounted on said central hub, and attachment means locating said propeller blades relative to the ring; wherein  
said rotation of said propeller blade shaft in said radial bore about said axis of pitch rotation to change the pitch of its propeller blade is accompanied by a change in diameter of



said propeller, said changes in pitch and diameter are restricted by the limited rotation of said blade shaft within said radial bore defined by the length of the helical groove and the interaction of said guide pin therewith;  
centrifugal force acting on said propeller blades due to rotation of said propeller about said propeller rotation axis tends to move propeller blades radially outwardly, to increase propeller diameter, said increased diameter being controlled by said guide pins interacting with said helical groove and resulting in an accompanying increase in pitch of said propeller blade,  
said force due to water pressure on said propeller blades, when said propeller is rotating about said propeller rotation axis, acting at said center of pressure tends to cause said propeller blade to rotate within said radial bore about said axis of pitch rotation, to tend to cause propeller blades to move inwardly, to decrease propeller diameter, toward said central hub as controlled by said guide pins interacting with said helical groove with an accompanying decrease in pitch of said propeller blades;  
forces tending to increase pitch and diameter resulting from centrifugal force are opposed by forces tending to reduce pitch and diameter resulting from force due to water pressure acting on said propeller blades such that when these pitch and diameter changing forces are balanced against each other a desired propeller pitch and diameter for existing operating conditions is produced.

**4,792,280**  
**HELICOPTER ROTOR FLEXBEAM**  
Eric G. Olsen, Woodbury, and Thomas G. Campbell, Cheshire, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.  
Filed Apr. 27, 1987, Ser. No. 43,057  
Int. Cl.<sup>4</sup> B64C 27/38  
U.S. Cl. 416—134 A

16 Claims



1. A flexbeam of enhanced out-of-plane, in-plane and torsional flexibility, for mounting a helicopter rotor blade to a hub therefore, said flexbeam being characterized by:  
first and second generally parallel, spaced beams adapted for accommodating therebetween, a pitch change shaft disposed generally parallel thereto and generally coplanar therewith;  
each of said beams including an inboard root end, an outboard tip end and adjacent inboard and outboard regions disposed therebetween:  
said inboard region being of a first geometry and having a first characteristic stiffness which, under dynamic operating conditions, renders said inboard region more compliant than said outboard region in an out-of-plane mode of vibration; and  
said outboard region being of a second geometry and having a second characteristic stiffness which, under dynamic operating conditions, renders said outboard region more compliant than said inboard region in in-plane and torsional modes of vibration, whereby the natural frequencies of vibration of said flexbeam in said in-plane and out-of-plane modes may be spaced from one another, below the range of frequencies of rotor rotation.

**4,792,281**  
**WIND TURBINE PITCH CONTROL HUB**  
Clint Coleman, Warren, Vt., assignor to Northern Power Systems, Inc., Moretown, Vt.  
Filed Nov. 3, 1986, Ser. No. 926,463  
Int. Cl.<sup>4</sup> F03D 7/04

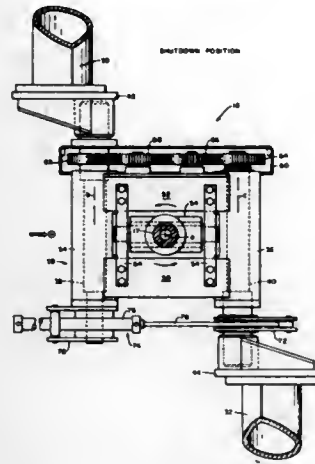
U.S. Cl. 416—156

2 Claims

1. A variable pitch control wind turbine hub comprising  
a housing defining a pair of parallel, spaced blade pitch axis in a plane intersected by the rotor axis approximately midway between said pitch axes,  
a pair of blade axles journaled in said housing for at least partial rotation about the respective pitch axes,  
a gear train connected transversely between said pitch axes for directly coupling said blade axles for counterrotation to carry the blade cyclic loads and make the pitch angles of both blades interdependent,  
each blade axle having a radially extending crank arm,  
a linear actuator interconnecting said crank arms for controllably varying the relative displacement as a function of blade loading and having a cylinder pivotally connected to one crank arm and a piston rod pivotally connected to the other crank arm,  
said linear actuator being separate from and not acting directly on said gear train, for biasing said blade axles to a nominal starting pitch angle and for carrying the blade collective loads for positively determining pitch angle in operation,



a pair of circular blade mounting flanges each defining a blade mounting flange plane, and



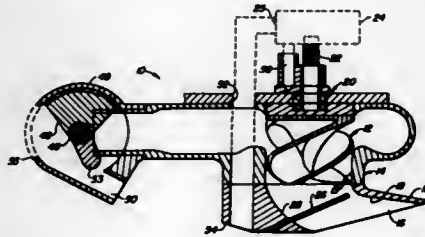
means for connecting each mounting flange eccentrically to the respective blade axle such that the flange plane is transverse to the pitch axis with the center of the blade flange offset therefrom.

#### 4,792,282 LIQUID PUMP

Robert L. Jordan, Klamath, Calif., assignor to A. Janet Jordan, Klamath, Calif., a part interest  
Filed Jun. 3, 1987, Ser. No. 57,391  
Int. Cl. F04F 5/00

U.S. Cl. 416-176

12 Claims



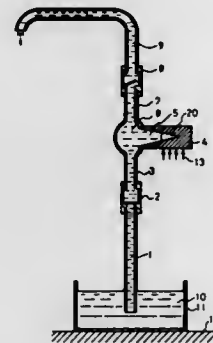
1. A liquid pump comprising:  
a housing having a suction port, a discharge nozzle and a fluid passage extending between the suction port and the discharge nozzle; a rotatable impeller in the housing across the fluid passage, said impeller having a conical hub and one or more helical blades on the hub for causing a flow of fluid through said fluid passage as the impeller rotates in one direction relative to the housing, each blade having a leading edge; and means coupled with the impeller for rotating the same in said direction, the leading edge of each blade having a negative radial rake and a positive radial rake, each blade having a negative radial rake and a positive radial rake at locations on the blade spaced from its leading edge, each blade having a positive axial rake wherein each blade has the negative radial rake near the central axis of the impeller and the positive radial rake near the outer periphery of the impeller.

#### 4,792,283 HEAT-DRIVEN PUMP

Kenji Okayasu, 20-15, Mukai-machi, Gyouda-shi, Saitama, Japan  
Filed Jun. 22, 1987, Ser. No. 65,322  
Claims priority, application Japan, Jun. 23, 1986, 61-144783  
Int. Cl. F04B 19/24

U.S. Cl. 417-52

7 Claims



1. A heat-driven pump for transporting liquid by a function of bubbles produced by vaporization and condensation of the liquid under heating, said pump comprising:  
a liquid charging portion having a sequence of an inlet pipe, an inlet-side check valve, and a charging pipe;  
a bubble forming portion connected to said liquid charging portion for vaporizing and condensing the liquid; and  
a liquid discharging portion connected to said bubble forming portion and having a sequence of a discharging pipe, an outlet-side check valve and an outlet pipe;  
said bubble forming portion comprising:  
a vapor-liquid exchange chamber formed between said charging pipe and said discharging pipe by expanding the cross section of said pipes to have a volume greater than the possible maximum volume of a bubble in said chamber; and  
a heating portion fixed to only one side of said vapor-liquid exchange chamber for receiving heat supplied from outside and having a liquid cavity therein which communicates with said vapor-liquid exchange chamber;  
a bubble being generated and developed to drive the liquid to cause the interface of the bubble and liquid to be moved along the internal surface of said liquid cavity to form a thin liquid layer on the internal surface of said liquid cavity to realize a vaporization from said thin liquid layer, wherein the developed bubble is expanded by the received heat into said vapor-liquid exchange chamber, a corresponding volume of liquid in said vapor-liquid exchange chamber is accordingly discharged, the expanded bubble is displaced upwardly by buoyancy exerted on the bubble to cause a deformation of the bubble, an amount of new liquid is introduced into said liquid cavity, and said bubble is eliminated by cooling by said introduced new liquid, so that a successive pumping of the liquid is carried out.

#### 4,792,284 DEVICE FOR CREATING AND EXPLOITING A PRESSURE DIFFERENCE AND THE TECHNICAL APPLICATION THEREOF

Paul W. Straub, Schlösslistr. 2, Frauenkappelen CH-3202, Switzerland; John H. Stark, Grundbachstr., Wattenwil CH-3135, Switzerland, and Michel Vermot, Flachsreen 93 c, Vinelz CH-3234, Switzerland

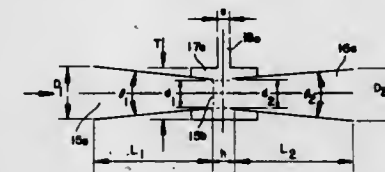
PCT No. PCT/CH86/00132, § 371 Date May 19, 1987, § 102(e) Date May 19, 1987, PCT Pub. No. WO87/01770, PCT Pub. Date Mar. 26, 1987

PCT Filed Sep. 19, 1986, Ser. No. 57,927  
Claims priority, application Switzerland, Sep. 21, 1985, 4605/85; Jul. 3, 1986, 2674/86

Int. Cl. F04F 5/44; F04B 23/04

U.S. Cl. 417-77

5 Claims



1. Apparatus for extracting energy from a flowing fluid consisting of a split double cone perfused in an axial direction by a fluid medium, characterized in that the double cone is composed of two hollow cone trunks arranged axially with their smaller faces opposed to one another and having diameters  $d_1$  and  $d_2$  at a distance  $h$  and surrounded at the region of their smallest diameter by a coaxial cylindric tube with a connecting socket at its mantle surface at which a reduced pressure is produced wherein the aperture angles of the cones are between 1 and 10 degrees and fulfill the condition

$$F = (1 + \sin \theta_1)^2 \cdot \sin^2 \theta_2 < 0.02$$

$\theta_1$  representing the aperture angle of the entrance cone and  $\theta_2$  representing the aperture angle of the exit cone wherein the proportion of the smallest diameter  $d_1$  to the widest diameter  $d_2$  of the cones is between 1:1.5 and 1:200, and where  $d_1$  represents the smallest diameter of the entrance cone, the two cone trunks are split at a line downstream from the virtual section circle of the two cones by the distance  $h/2$ , the smaller end of the exit cone being cut by the length  $h$ , so that the free distance between the two cones is  $h$ , the smallest diameter of the exit cone trunk is

$$d_2 = d_1 + h \cdot \frac{(D_2 - d_1)}{(L_2 + h)}$$

where  $D_2$  represents the greatest diameter and  $L_2$  the length of the exit cone trunk and where  $h$  is between 0.001 and 20  $d_1$ .

#### 4,792,285 INJECTION PUMP

Allen F. Chapman, Great Hill Pond Rd., Portland, Conn. 06480, and Peter Honnert, 32 Harding St., Wethersfield, Conn. 06109  
Filed Oct. 27, 1982, Ser. No. 437,112  
Int. Cl. F02M 39/00

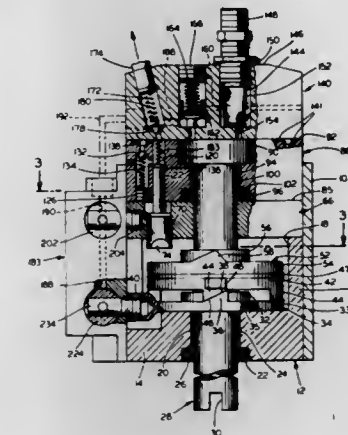
U.S. Cl. 417-206

16 Claims

1. A two-stage fuel injection pump assembly comprising:  
a. a body;  
b. a pump block mounted within said body and defining to one side thereof a drive mechanism section therewithin, said block having a pump chamber disposed to the opposite side thereof, and a plurality of piston cylinders extending therethrough and disposed thereabout on axes that are generally parallel to a central axis of said block;  
c. a corresponding plurality of injection pistons slidably mounted for reciprocal movement within said cylinders;  
d. sealing means for segregating said pump chamber and said

drive mechanism section against the passage of liquid therebetween;

e. a rotary pump member seated within said pump chamber of said block and providing therewith a pumping section;  
f. driven means within said drive mechanism section operatively connected for reciprocation of said pistons and rotation of said pump member;



g. distributor means disposed to said opposite side of said pump block and adapted to cooperate therewith to distribute fuel to said pumping section, from said pumping section to said cylinders, and from said cylinders outwardly of said pump assembly, whereby said assembly is operable to receive and distribute fuel through said pumping section, and said drive mechanism section thereof can be lubricated independently of said pumping section and of the fuel passing therethrough.

#### 4,792,286

#### BLOWER-VACUUM APPARATUS

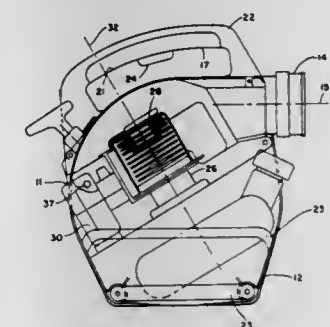
James Gassen, Charlotte, N.C., assignor to Textron Inc., Providence, R.I.

Filed Jul. 23, 1987, Ser. No. 77,109

Int. Cl. F04B 35/00, 35/06

U.S. Cl. 417-234

4 Claims



1. A blower-vacuum unit having a volute housing including a volute opening, a power unit, a centrifugal fan and a handle on the top of the housing, the handle having a rear section adapted to receive an operator's hand, the improvement comprising:

a tangential volute opening having an axis which passes through the rear section of the handle, said power unit having a cylinder with a cylinder axis which is inclined 50 to 70 degrees from the axis of the volute opening and when said axis is projected to intercept the handle, said axis will intercept the rear portion of the handle.

4,792,287

**WOBBLE DRIVEN AXIAL PISTON PUMP**

Norbert Alane, Schwieberdingen, and Heinz Leiber, Oberriexingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

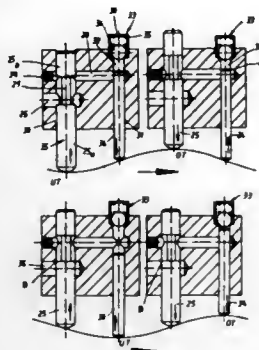
Filed Jun. 17, 1987, Ser. No. 62,976

Claims priority, application Fed. Rep. of Germany, Sep. 16, 1986, 3631408

Int. Cl.<sup>4</sup> F04B 1/14, 35/04, 39/08

U.S. Cl. 417—269

16 Claims



1. An axial piston pump which is driven by a motor for pumping a viscous medium, comprising a wobble element (42) which is set into rotation via said motor, at least one feed piston (24), in a first piston bore (31), at least one control piston (25) in a second piston bore (30), said at least one feed piston and said at least one control piston being offset by substantially 90° from a related control piston in a circumferential direction with the same radial distance from a linear axis of the wobble element reciprocated by said wobble element, a transverse line (28) that communicates between said first and second piston bore, and which communicates with said first piston bore for feeding a medium to be pumped to said control piston.

4,792,288

**ENCAPSULATED COMPRESSOR**

Bernd Gromoll, Baisersdorf-Hagenau, and Peter Galden, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

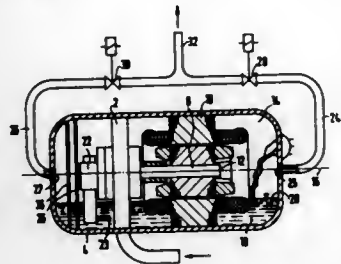
Filed Oct. 2, 1987, Ser. No. 104,172

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1986, 3640650

Int. Cl.<sup>4</sup> F04B 49/00

U.S. Cl. 417—278

5 Claims



1. An encapsulated, oil-lubricated compressor including a crankshaft, said compressor being rotatable about the axis of said crankshaft, which compressor comprises:

- (a) a housing having an interior to encapsulate said compressor;
- (b) an oil sump located in said interior;

- (c) said interior being in fluid communication with said compressor;
- (d) two gas lines, each of said two gas lines including a connecting opening to said interior;
- (e) said two gas lines being connected to a common manifold; and
- (f) at least one shutoff valve being arranged between said manifold and said two gas lines;
- (g) said connecting openings of said two gas lines being connected to said housing opposite to one another such that an imaginary line extending between said connecting openings coincides at least approximately with the axis of said crankshaft.

4,792,289

**RECIPROCATING PUMP FOR CRYOGENIC FLUIDS**

Willi Nieratschker, Ammerbuch, Fed. Rep. of Germany, assignor to Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt e.V., Bonn, Fed. Rep. of Germany

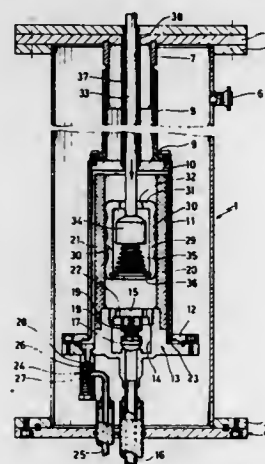
Filed Jun. 17, 1987, Ser. No. 63,125

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1986, 3621727

Int. Cl.<sup>4</sup> F04B 3/00, 15/08

U.S. Cl. 417—259

7 Claims



1. In a reciprocating pump for cryogenic fluids having a pump cylinder in which a piston is oscillatingly displaceable in a sealed state, and an inlet valve and an outlet valve, the improvement comprising:
- an annular channel surrounding the pump cylinder on the outer side and forming an outlet flow path for the compressed cryogenic fluid delivered by the pump to balance the radially directed fluid forces acting on said pump cylinder;
  - said pump cylinder being made of a material which has good sliding and self-lubricating properties and a thermal expansion coefficient which is larger than that of said piston;
  - the dimensions of said pump cylinder and said piston being selected that said piston sealingly contacts the inside wall of said pump cylinder at operating temperature; and
  - said outlet valve being arranged at the downstream end of said annular channel.

4,792,290

**WAVE ACTUATED PUMP APPARATUS**

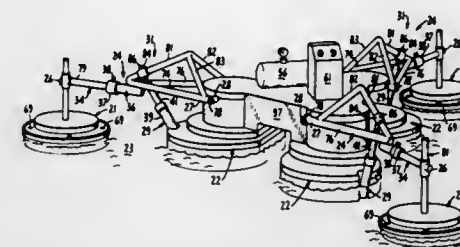
John L. Berg, P.O. Box 1282, Vallejo, Calif. 94590

Filed Apr. 29, 1987, Ser. No. 44,067

Int. Cl.<sup>4</sup> F04B 35/00

U.S. Cl. 417—332

26 Claims



2. Wave actuated pump apparatus, comprising pump and main floats positionable in horizontally spaced relation on a body of liquid, an elongated member having an end secured to said pump float and an opposite end pivotally attached to said main float whereby said member is subject to angular displacement relative to said main float as said floats are displaced vertically with respect to each other in response to wave action in said body of liquid, and a linearly actuatable pump having opposite ends pivotally secured to said member and said main float and formed for pumping a fluid upon movement of said ends toward and away from each other in response to said angular displacement of said member relative to said main float.

4,792,291

**VISCOUS DAMPED VALVE FOR HYDRAULIC PUMP**

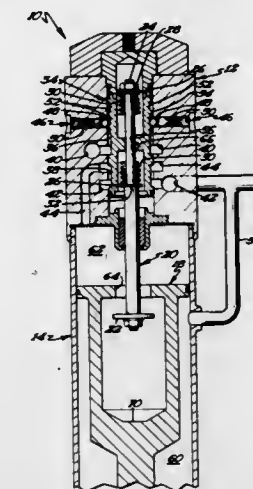
Daniel J. Kvinge, St. Louis Park, and Frederick A. Powers, Maple Grove, both of Minn., assignors to Graco Inc., Minneapolis, Minn.

Filed Sep. 9, 1987, Ser. No. 94,682

Int. Cl.<sup>4</sup> F04B 17/00; F01L 31/02

U.S. Cl. 417—404

1 Claim



1. In a hydraulic piston pump having a motor and gravity biased ball checks to control the flow of fluid in and out of the pump, and a spool valve for controlling flow of hydraulic fluid to said motor of the pump, the improvement comprising means for delaying the switchover of said spool valve for a period of time sufficient to allow said ball checks to seat under the force of gravity only said spool valve being viscous damped and closed centered and comprising:

- a trip rod;
- a spool slideably mounted over said trip rod and having first and second chambers separated by a wall having an orifice through which said trip rod passes, said orifice being sized so as to allow shifting of said spool at a rate sufficient to allow said ball checks to close under the influence of gravity;
- detent means for locating said spool in either first or second positions; and
- at least one spring mounted between said trip rod and said wall so as to absorb the impact of said trip rod relative to said spool and to store energy in said spring to assist in the shifting of said spool past said detent means.

4,792,292

**INK PUMP SYSTEM**

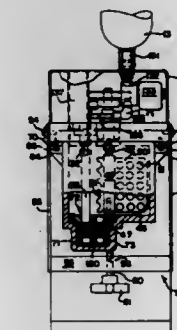
Reinhard Gaenzle, Schaumburg, Ill., assignor to Tamco-Tool, Inc., Schaumburg, Ill.

Filed Sep. 25, 1987, Ser. No. 101,372

Int. Cl.<sup>4</sup> F04B 23/02, 39/02; B41F 31/00

U.S. Cl. 417—440

10 Claims

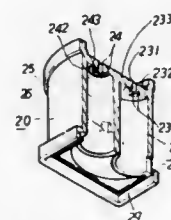
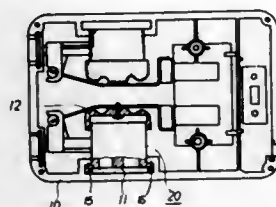


1. In an ink pump system for pump ink comprising:
- a frame;
  - an ink reservoir mounted on said frame having an outlet in said ink reservoir for discharging ink from said reservoir and an inlet for the return of recirculated ink;
  - an ink solvent reservoir mounted on said frame;
  - means for transferring solvent from said solvent reservoir to said ink reservoir; and
  - means for controlling the transfer of said solvent to said ink reservoir in order to maintain the ink contained in said ink reservoir at a substantially constant predetermined viscosity;
- the improvement comprising:
- a seal-less gear pump housing located within said ink reservoir so as to be submerged in the ink contained therein, said pump housing having a fluid pumping chamber therein, an inlet in said chamber communicating with said ink reservoir for admitting ink from said reservoir into said chamber, an outlet from said chamber for discharging ink from said chamber to said outlet in said ink reservoir, a first gear rotatably mounted within said chamber, a second gear rotatably mounted within said chamber in meshing engagement with said first gear, and power input means for driving one of said first and second gears whereby said gears rotate in opposite directions to pump ink through said chamber from said inlet opening to said outlet opening; and
  - wherein said ink reservoir has a sump and said gear pump housing is removably disposed in said sump.



4,792,293  
**AIR PUMP ASSEMBLY FOR A FISH BOWL**  
 Chiao-Ming Wang, Taichung Hsien, Taiwan, assignor to Melko  
 Pet Corporation, Taichung Hsien, Taiwan  
 Filed Sep. 21, 1987, Ser. No. 98,947  
 Int. Cl.<sup>4</sup> F04B 39/10, 45/00  
 U.S. Cl. 417-571

2 Claims



1. An improved air pump assembly for a fish bowl comprising:

- (a) a pump casing having an interior wall and provided with a first recess defined by opposed inwardly directed flanges; and
- (b) a one-piece pump stock including a base portion configured for disposition within the first recess to securely attach the pump stock to the interior wall of the casing, a second recess formed in the base portion, a rubber cushion disposed within the second recess, a pump cell disposed opposite the base portion, a pump diaphragm enclosing the pump cell, an intake chamber, an intermediate air chamber, and a discharge chamber, which chambers are disposed adjacent each other and collectively define a hollow cylindrical body, the intake and intermediate chambers being each provided with an air passage for communicating with the common pump cell, the air passage of the intake chamber on the side of the pump cell being defined by a first projecting ring for receiving a first cap-shaped diaphragm therein, and the air passage of the intermediate cell on the side of the intermediate chamber being partially defined by a second projecting ring for receiving a second cap-shaped diaphragm therein, which diaphragms define one-way valves for controlling air flow in a direction from the intake chamber through the pump cell and into the intermediate chamber.

4,792,294  
**TWO-STAGE SCREW AUGER PUMPING APPARATUS**  
 John C. Mowll, 640 Sanders Ct., Gurnee, Ill. 60031  
 Filed Apr. 11, 1986, Ser. No. 850,801  
 Int. Cl.<sup>4</sup> F04C 2/16

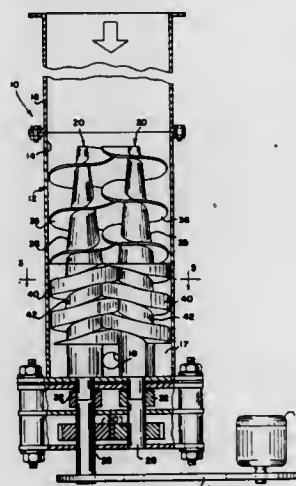
8 Claims

1. A two-stage pumping apparatus, comprising:
- a pump housing defining a material infeed opening in an orientation for gravity infeed of material into said pumping apparatus, and at least one material discharge opening;
  - a pair of auger means extending within said pump housing, said auger means being rotatable together about respective parallel axis for moving material through said housing generally axially of said auger means from said material infeed opening downstream to said material discharge

opening, each of said auger means having a free, upstream end,

said pump housing defining said material infeed opening in an orientation relative to said auger means whereby said gravity infeed of material is in a direction generally axially of said pair of auger means, said infeed opening being aligned with the parallel axes of said auger means so that material moving through said infeed opening moves substantially along said parallel axes,

each said auger means comprising first stage and second-stage helical flight means respectively intermeshed with the first-stage and second-stage flight means of the other one of said auger means, whereby rotation of said pair of



auger means moves material axially thereof, said flight means of each auger means being configured to provide a two-stage pumping action within said housing, including a first, upstream non-positive displacement pumping provided by said intermeshed first stage flight means, and a second, downstream, downstream positive displacement pumping provided by said second stage flight means, said first-stage flight means acting to create a net positive suction head at an interface of said first and second stage flight means, and

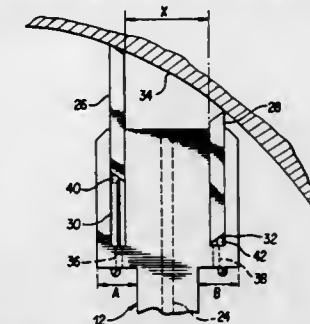
means for rotatably driving said pair of auger means independently of said intermeshed flight means, including drive coupling means operatively connected with said auger means generally at the downstream ends thereof.

4,792,295  
**VARIABLE VOLUME ROTARY VANE PUMP-MOTOR UNITS**  
 Benjamin N. Joyce, Sr., Rte. #6, Box 260, Bassett, Va. 24055  
 Filed Mar. 5, 1987, Ser. No. 22,239  
 Int. Cl.<sup>4</sup> F01C 1/344, 19/04

14 Claims

1. An improved means for sealing a rotary device wherein sealing contact between a rotating element and an inner surface of an outer sleeve is desired comprising a rotary element including an enlarged head thereon, a seal means mounted on

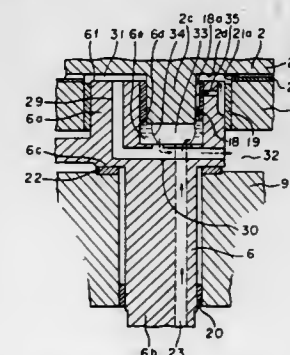
said head, said seal means and said rotary element each urged radially outward towards said inner surface by means of fluid



pressure existing within said device and acting upon each of said enlarged head and said seal means.

4,792,296  
**SCROLL COMPRESSOR WITH PRESSURE-EQUALIZING PASSAGE AND GAS VENT CONDUIT IN MAIN SHAFT**  
 Northide Kobayashi; Tadashi Kimura; Tsutomu Inaba, and Masahiro Sugihara, all of Wakayama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Oct. 20, 1987, Ser. No. 110,273  
 Claims priority, application Japan, Oct. 27, 1986, 61-256404  
 Int. Cl.<sup>4</sup> F04C 18/04, 29/02  
 U.S. Cl. 418-55

6 Claims



1. A scroll compressor which comprises:
- a stationary scroll having a base plate and a wrap plate projecting from surface of said base plate;
  - an orbiting scroll having a base plate, a wrap plate projecting from a surface of said base plate and a scroll shaft extending from the other surface thereof, both the wrap plates being combined with each other to form a compression chamber;
  - a main shaft provided with an eccentric recess to receive said scroll shaft of the orbiting scroll so as to drive the same through an orbiting scroll bearing;
  - a thrust bearing for supporting the lower surface of said base plate of the orbiting scroll;
  - a bearing supporter means including a main bearing for supporting said main shaft;
  - a first space containing said stationary scroll, said orbiting scroll and said bearing supporter means;
  - an oil feeding passage formed in said main shaft so as to vertically extend from the lower end thereof which opens in a reservoir at the bottom of a shell to said eccentric recess formed at the upper end of the main shaft;
  - a second space formed between the lower surface of said scroll shaft of the orbiting scroll and the bottom surface of said eccentric recess of the main shaft;
  - a third space defined by the upper surface of a large diameter portion of the main shaft, the lower surface of the base

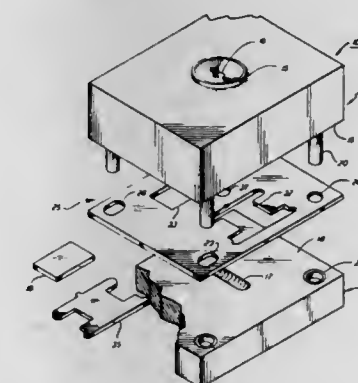
plate of said orbiting scroll and the inner circumferential surface of said thrust bearing;

an oil groove formed in said orbiting scroll bearing so as to communicate said second space at the lower part with said third space at the upper part so that oil in said reservoir is lifted by a centrifugal action caused by the revolution of said main shaft to thereby lubricate said bearing parts, wherein a pressure-equalizing passage for communicating said second space with said third space and a gas-vent conduit whose one end is open to said second space and the other end is open to said first space, are formed in the large diameter portion of said main shaft.

4,792,297  
**INJECTION MOLDING APPARATUS**  
 Jerome L. Wilson, 24 Spring St., Endicott, N.Y. 13760  
 Filed Sep. 28, 1987, Ser. No. 101,746  
 Int. Cl.<sup>4</sup> B29C 45/36

U.S. Cl. 425-192 R

13 Claims



1. In an injection mold having a stationary member and a movable member that are arranged to move between an open and a closed position and sprue means for feeding molten material between said members, the improvement comprising at least one flat plate having parallelly disposed top and bottom surfaces, said plate being insertable between the mold members when said members are in an open position, said plate having a contoured part defining hole passing through its top and bottom surfaces for receiving molten material therein said hole outlines a part to be molded, supporting means attached to one of the mold members for removably suspending the plate between the mold members and permitting the members to close against said plate to close both sides of the part defining hole whereby molten metal can be fed into said part defining hole to form said part.

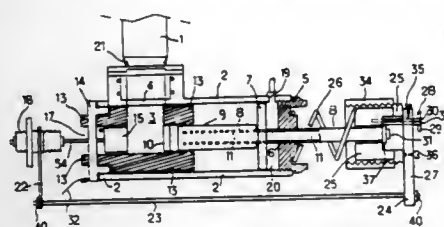
4,792,298  
**MACHINE FOR AUTOMATICALLY MEASURING PORTIONS OF DOUGH**  
 Claude Tastet, Ilot des Bordes, 64940 Moumour, France  
 Filed Jan. 16, 1987, Ser. No. 4,109  
 Int. Cl.<sup>4</sup> A21C 5/00

U.S. Cl. 425-239

10 Claims

1. Machine for automatically measuring dough portions comprising a circular tank (1) placed on a cylindrical and hollow body (2) placed on a supporting table, which tank (1) communicates with the body (2) by means of a large opening (4), which body (2) has its rear end closed by a circular piece (5) possessing a shoulder and comprising a center hole (6) for the passage of a shaft (8), which carries inside the body (2) a piston (7) and further forward an ejecting piston (9), which shaft (8) passes on the outside through a coil spring (26), and has its rear end which carries a spring retainer (25), on which moves a sheath 34, which limits the forward movement of the ejecting piston (9), characterized by that a chamber (3) of the

body (2) is defined in the back by the ejecting piston (9) and in the front by a measuring piston (15), which moves back into a jacket (13) under the pressure of the dough which accumulates in said chamber (3), and the rearward movement of the measuring piston (15) triggers by means of a pilot valve (16) the entry of compressed air through an opening (19) placed in the back of the body (2) in a chamber (20), which causes a forward displacement of the piston (7) of the shaft (8) and of the eject-



ing piston (9), which ejecting piston (9) detaches a dough portion, then pushes it into a passage (17), the latter being freed from the measuring piston (15), which is carried along by the rearward movement of the body of a jack (18) which follows the movement of its support (22) driven by a bar (23), which connects a mobile assembly positioned in the back of the body (2) and by the rearward movement of the piston rod (54) of the same jack (18), both movements adding their speed.

4,792,299

**BISCUIT CUTTER AND COOPERATIVE MOLD**

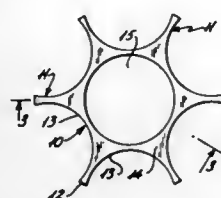
Charles N. McCaffrey, P.O. Box 2001, Hattiesburg, Miss. 39401

Filed Sep. 1, 1987, Ser. No. 91,669

Int. Cl.<sup>4</sup> B29C 69/00; A21C 11/10

U.S. Cl. 425—289

13 Claims



1. A biscuit cutter for cutting dough comprising a body portion having upper and lower surfaces, said body portion defining at least one generally cylindrical inner wall defining an open cavity therein, said upper section of said inner wall being generally circular in cross section, said lower section of said inner wall tapering continuous and arcuately outwardly from said upper section to said lower surface of said body portion, said lower section being annular in cross section, said lower surface of said body portion being defined by a plurality of linear cutting edges which intersect with one another at a plurality of spaced points, said inner wall being continuous and smooth throughout said upper and lower sections whereby the dough is cut into substantially circular shapes.

4,792,300

**ATOMIZING BURNER**

Hideo Kawamura, Fujisawa, Japan, assignor to Izasa Motors Limited, Tokyo, Japan

Filed Jul. 24, 1987, Ser. No. 77,208

Claims priority, application Japan, Aug. 6, 1986, 61-183406

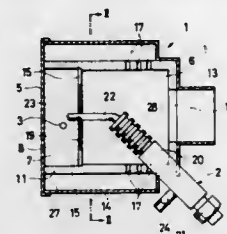
Int. Cl.<sup>4</sup> F23D 11/44

U.S. Cl. 431—247

7 Claims

1. A burner comprising a combustion cylinder defining an atomizing chamber and a combustion chamber separated by a partition having at least one opening therethrough, a fuel

injection port of an atomizer opening into said atomizing chamber, said atomizer opening into said atomizing chamber, said atomizer penetrating said partition and extending through said combustion chamber from a corner portion on the downstream side of said combustion cylinder, ignition means provided in said atomizing chamber to effect combustion, an outer cylinder so arranged as to form an annular air introducing path



which surrounds the outer periphery of said combustion cylinder, and air introducing holes formed in said combustion cylinder tilted along the line of an air stream passing along said annular air introducing path, said air introducing holes being tilted at different tilting angles to provide means for introducing air into the combustion chamber smoothly and uniformly and to generate microswirls in the combustion cylinder.

4,792,301

**METHOD AND FURNACE APPARATUS FOR CONTINUOUSLY HEATING STEEL BLANKS**

Daiming Pan, No. 1 Bldg. 40, Guchenguan Road, Shijingshan District, Beijing, China

Continuation-in-part of Ser. No. 845,306, Mar. 29, 1986,

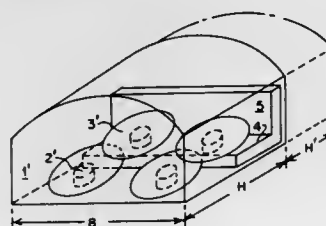
abandoned. This application Sep. 2, 1987, Ser. No. 92,241

Claims priority, application China, Apr. 1, 1985, 85102032

Int. Cl.<sup>4</sup> F27B 9/40

U.S. Cl. 432—52

3 Claims



1. A continuous operation intermittent flame furnace of the type using a plurality of types of fuels as an energy source for heating steel blanks, comprising:

(a) a confined chamber having a floor, rear, front and side walls; and

(b) an adjustable refractory bed wall composed of fire bricks arranged as a vertical partition extending across the chamber in front of said rear wall and arranged as a horizontal bed supported upon the chamber floor, and extending towards said front wall, the volume of said bed wall comprising 8 to 16% of said chamber volume.

4,792,302

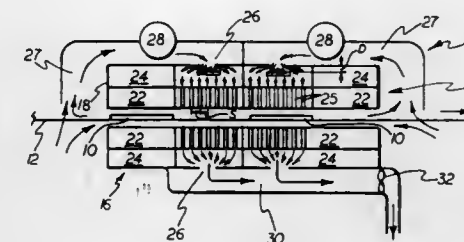
**CONTINUOUS SOLDER REFLOW SYSTEM**

Michael C. Baker, Wilmington, and W. James Hall, Newton Corner, both of Mass., assignors to Dynapert-HTC Corporation, Farmington, Conn.

Filed Nov. 3, 1987, Ser. No. 116,186

Int. Cl.<sup>4</sup> F27B 9/28

U.S. Cl. 432—59



1. A continuous solder reflow system comprising an oven including a plurality of pairs of upper and lower non-focused infrared heater panels spaced to define a heating zone, conveyor means for conveying product to be reflow soldered through said heating zone, each of said heater panels including a casing open at the bottom, and an insulating block supported within said bottom opening and spaced from the top surface thereof, at least one of the upper panels additionally including a plurality of equally spaced and sized holes extending from the top surface to the bottom surface of said insulating block, and an air intake opening in the top surface of said casing, means for forcing air through said air intake opening into said casing, valve means including a flat body portion at least as large as said air intake opening with a plurality of holes extending therethrough, and means for mounting said body portion below said air intake to define an annular opening between said top surface and said valve body portion, the ratio of the area of said annular opening and the area of said valve body holes being adjusted to define a uniform pressure throughout said casing above said insulating block so that a uniform volume of air will flow through each of said holes in the insulating block.

4,792,303

**AIR CIRCULATION AND EXHAUST CONTROL SYSTEM FOR COMMERCIAL OVENS**

G. Wayne Stewart, Plano; Bill E. Davis, Irving; William M. Thomas, Garland; Michael J. Doble, Plano, and Carlos Bacigalupe, The Colony, all of Tex., assignors to Stewart Systems, Inc., Plano, Tex.

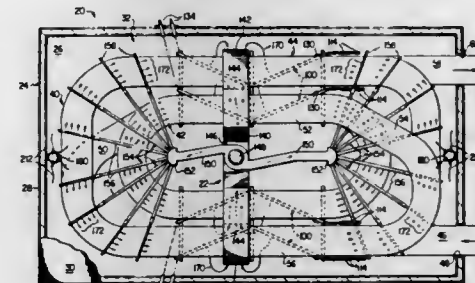
2 Claims Division of Ser. No. 936,160, Dec. 1, 1986, Pat. No. 4,726,766.

This application Sep. 28, 1987, Ser. No. 101,840

Int. Cl.<sup>4</sup> F23J 5/00; F27B 9/00

U.S. Cl. 432—72

17 Claims



1. A heated air circulation and exhaust control system for an oven comprising: means forming an oven enclosure defining an oven interior; conveyor means for transporting food products through the oven interior along a predetermined spiral path having relatively elongated side portions and curved end portions; inlet apertures situated adjacent the side portions within the oven interior for receiving heated gases; discharge tubes having outlet apertures situated within the oven interior adjacent to the conveyor path at the curved end portions; and circulation means coupling said inlet apertures to said discharge tubes for causing the flow of heated gases from the inlet aperture to the outlet apertures of the discharge tubes to heat the food products on the conveyor in the curved end portions.

4,792,304

**CATCH MECHANISM FOR A DENTAL HANDPIECE**

Werner Schuss, Heppenheim; Thomas Bierbaum, Wegma, both of Fed. Rep. of Germany, and Thomas Muther, Orpund, Switzerland, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

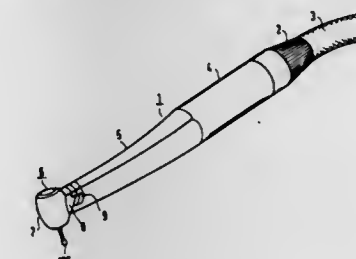
Filed Aug. 26, 1986, Ser. No. 900,619

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1985, 3530424

Int. Cl.<sup>4</sup> A61C 1/08

U.S. Cl. 433—126

24 Claims



1. A catch mechanism for releasably connecting a head part to a gripping part of a dental handpiece, said head part having a head housing with a neck having a shank, said gripping part



containing a guide sleeve with an axial bore for receiving the shank, said shank and guide sleeve having coacting anti-twist elements to prevent relative rotation therebetween, said catch mechanism including one of said head part and gripping part having at least one stop surface, the other of said head part and gripping part having a catch member for each stop surface movable radially from a first position engaging said stop surface to a second position disengaged from said stop surface to disengage the latching connection, and a separate actuation element being carried on the gripping part adjacent the head housing having a portion moving radially relative to the guide sleeve and shank to shift the catch member to the second position to disengage the stop surface.

4,792,305

# COLLIMATED KNITTING PATTERN INSTRUCTION PANEL

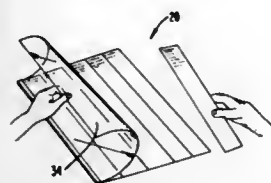
Elizabeth D. O'Donnell, 8954 Acorn La., Santa Rosa, Calif. 95405

Filed Aug. 8, 1986, Ser. No. 894,796

Int. Cl.<sup>4</sup> G09B 19/20

U.S. Cl. 434—95

22 Claims



1. A collimated knitting pattern instruction panel for instructing a user in creation of knitwear having patterns thereon which are formed into columns, wherein the knitwear consists of a plurality of rows of yarn each of which having at least two groups of stitching configurations, with each of the groups of stitching configurations defining a portion of a particular one of the patterns, and wherein further a plurality of a particular one of the groups of stitching configurations from one of the columns on the knitwear, said collimated knitting pattern instruction panel, comprising

at least two separate elongated panel members, each of said panel members having two horizontal edges and two side edges, with at least one of said side edges of a first one of said panel members being in juxtaposition with one of said side edges of a second one of said panel members, wherein each of said panel members has a plurality of rows of alphanumeric characters with each of said rows being knitting pattern instructions for a particular one of the groups of stitching configurations, whereby said knitting pattern instructions for one of the columns of knitwear patterns are collimated into one of said panel members.

4,792,306

# INSTRUCTIONAL DEVICE FOR TEACHING DENTAL X-RAY TECHNIQUES

Shannon Duplantis, 3701 James Dr., Metairie, La. 70003

Filed Sep. 25, 1987, Ser. No. 101,191

Int. Cl.<sup>4</sup> G09B 23/28

U.S. Cl. 434—264

20 Claims

1. An instructional device for teaching dental x-ray techniques, the device comprising:

a simulated mouth comprising:

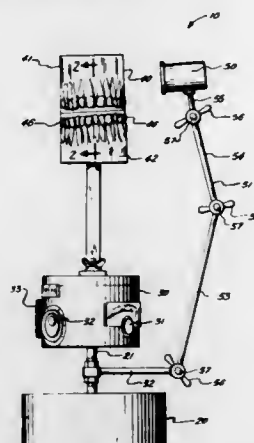
a simulated mandible;

a simulated maxilla;

simulated teeth on the simulated maxilla and simulated mandible; and

means for moving the simulated maxilla relative to the simulated mandible, wherein x-ray film placed in the

simulated mouth may be viewed by a person's naked eye when the simulated mouth is closed; and a simulated x-ray cone; and



means for allowing movement of the x-ray cone relative to the simulated mouth.

4,792,307

# ELECTRICAL CONTACT AND TERMINAL ASSEMBLY

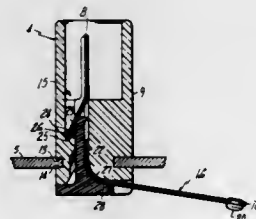
Kenneth W. Stewart, Sr., Columbus, Miss., assignor to United Technologies Electro Systems, Inc., Columbus, Miss.

Filed Nov. 14, 1986, Ser. No. 930,824

Int. Cl.<sup>4</sup> H01R 39/00

U.S. Cl. 439—26

14 Claims



1. A contact and terminal assembly which comprises: an insulative block member defining an area for the receipt of an electrical conductor and including a block member curved surface; a conductor mounted within the area defined by the block member, said conductor having a terminal end and a contact end extending outside the block member; a securing member having a securing member curved surface sized to coact with the block member curved surface such that the conductor may be secured therebetween, said surfaces engaging the conductor to bend the conductor such that the contact end of the conductor extends from the block member and extends at an acute angle to the terminal end of the conductor, said surfaces defining the amount of the angle and when secured, said conductor is configured to conform to at least one curved surface; and means to affix the securing member to the insulative block to secure the conductor therebetween.

4,792,308

# ELECTRICAL CONNECTOR

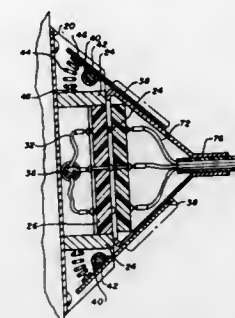
Raymond L. Johnson, R 4 Box 326, Texarkana, Ark. 75502

Filed Aug. 25, 1987, Ser. No. 89,161

Int. Cl.<sup>4</sup> H01R 13/62

U.S. Cl. 439—35

9 Claims



1. An improved apparatus for electrically connecting a first cable to a second cable, comprising: a first unit including a first contact plate having a number of first contact elements thereon, and means electrically connecting said first contact elements to conductors in the first cable; and a second unit including a second contact plate having a number of second contact elements thereon corresponding to said number of first contact elements and means electrically connecting said second contact elements to conductors in the second cable; and spring biased means pivotally mounted to said first unit for urging said second contact elements of said second unit against said first contact elements of said first unit wherein said spring biased means comprises a pair of flap members pivotally mounted to said first unit, and said second unit includes two rear-side faces which gives the second unit a wedge-shaped appearance and are adapted to be contacted by said flap members, whereby a secure electrical connection is achieved between said first and second cables without positively locking the first unit to the second unit by urging the second contact elements of the second unit against the first contact elements of the first unit.

4,792,309

# ELECTRICAL PLUG WITH MOLDED ON PRONGS AND DETACHABLE WIRE LOOPS

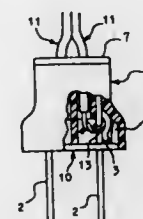
Alan C. Chu, 3901 Doubleday Dr., Richland, Mich. 49083

Continuation-in-part of Ser. No. 752,636, Jul. 5, 1985, abandoned. This application Mar. 12, 1987, Ser. No. 25,188

Int. Cl.<sup>4</sup> H01R 4/00, 19/04

U.S. Cl. 439—695

5 Claims



1. An electrical plug comprising: (a) a plug body molded integrally with conductive prongs; (b) a wire loop tied at the bare end of a respective electrical wire detachably slipped onto each of said prongs;

(c) a spring clamp formed on each of said prongs tightly clamped onto a respective one of said wire loops; and (d) a cover detachably secured onto said plug body by integrally molded wedges.

4,792,310

# CONNECTOR HAVING FILTERING FUNCTION

Toshio Hori, Fukui, and Yasuo Fujiki, Takefu, both of Japan, assignors to Murata Manufacturing Co., Ltd., Kyoto, Japan

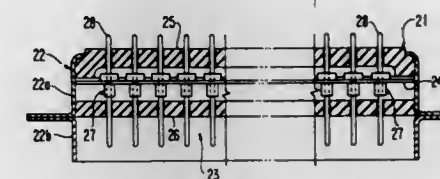
Filed Apr. 9, 1985, Ser. No. 721,632

Claims priority, application Japan, Apr. 11, 1984, 59-53813[U]

Int. Cl.<sup>4</sup> H01R 13/66

U.S. Cl. 439—620

12 Claims



1. A connector having a filtering function comprising: an electrically conductive shell; plate means for radiating heat comprising at least one electrically conductive and heat radiating plate disposed within said shell and electrically connected thereto, said plate having a plurality of holes therein; a feed through element means, mounted in each of said holes, for performing the functions of a varistor and a capacitor in absorbing abnormal voltages and eliminating noise, respectively, said feed through element means dielectric body and being connected to said plate, said outer surface of said dielectric body being cylindrical with one end thereof having a diameter sized to pass through said holes and the other end thereof having a stepped portion of larger diameter than said one end, said other end being mounted with said outer electrode on said stepped portion in contact with said plate; and an inner electrode mounted within said opening on an inner surface of said dielectric body; and a central conductor electrically connected to said inner electrode for connecting said feed through element means to a mating electrical connector, said central conductor passing through and extending from either side of said opening in said dielectric body.

4,792,311

# ELECTRICAL PLUG AND SOCKET HAVING REPLACEABLE OVERCURRENT PROTECTION DEVICE WITH SAFETY LATCH MEANS

Jeng-Shyong Wu, No. 133, Tungahing Rd., Toufun, Maullii, Taiwan

Division of Ser. No. 693,015, Jan. 18, 1985, abandoned. This application Dec. 16, 1986, Ser. No. 942,505

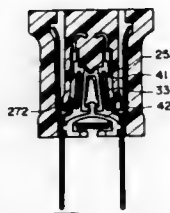
Int. Cl.<sup>4</sup> H01R 13/68

U.S. Cl. 439—622

5 Claims

1. An electrical plug and socket comprising: a housing of insulated material having either a front opening or a front and rear opening, the opening or openings forming a recess or through channel in the housing; a pair of metallic prongs seated in and projecting out from the front of the housing; a pair of conductors positionable in the housing from one of the rear and bottom of the housing; an overcurrent protection device with connecting elements, said connecting elements connecting a terminal of each conductor to a terminal of a respective prong, said over-

current protection device having a safety latch means in the form of a securing body pressing the connecting elements of the overcurrent protecting device against the terminals of the conductors and the prongs, the entire



securing body and overcurrent protection device being inserted and removable through the front opening of said housing, wherein the securing body consists of two members including an upper member of an open loop shape seated on top of a lower member.

**4,792,312**  
**ADAPTOR FOR EFFECTING A TIGHT BEND IN A COAXIAL CABLE**

Hiromi Yasumoto, Iruma, Japan, assignor to Junkosha Co., Ltd., Tokyo, Japan

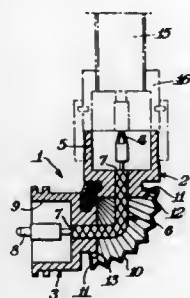
Filed Aug. 31, 1987, Ser. No. 91,540

Claims priority, application Japan, Nov. 29, 1986, 61-185420[U]

Int. Cl.<sup>4</sup> H01E 25/00

U.S. Cl. 439—640

4 Claims



1. An adaptor for effecting a small radius-of-curvature bend in a relatively large diameter coaxial cable comprising a central, bellows-like protective element having two ends, said bellows-like protective element connected at each of its ends to a coaxial connector for external attachment to a relatively large diameter coaxial cable, each connector attached internally to a flexible, relatively small diameter coaxial cable which extends from one said connector to the other said connector through said bellows-like protective element, when said adaptor is connected to said large diameter coaxial cable the outer conductor of said large diameter coaxial cable maintained in electrical contact with the outer conductor of said small diameter coaxial cable and the inner conductor of said large diameter coaxial cable maintained in electrical contact with the inner conductor of said small diameter coaxial cable through said bellows-like protective element, said large diameter coaxial cable and said small diameter coaxial cable having matched characteristic impedances, whereby, because of the bellows-like element and the relatively small diameter of the flexible coaxial cable within the adaptor, a small radius-of-curvature effective bend in the relatively large diameter coaxial cable assembly is achieved.

**4,792,313**  
**MARINE DRIVE LOWER GEARCASE WITH NON-CAVITATING DRAIN PLUG LOCATION**

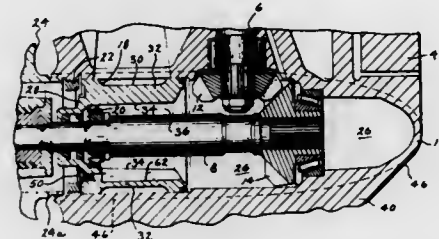
Gary L. Meisenburg, Fond du Lac, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Mar. 31, 1988, Ser. No. 175,844

Int. Cl.<sup>4</sup> B63H 21/24

U.S. Cl. 440—76

11 Claims



3. A marine drive comprising a lower gearcase with a vertical drive shaft driving a horizontal propeller shaft in a torpedo housing and having a propeller mounted on said propeller shaft at the rear of said torpedo housing, said torpedo housing having an internal cavity holding lubricant, a removable drain plug in said torpedo housing at the rear thereof for draining said lubricant upon removal of said plug.

**4,792,314**  
**MARINE DRIVE WITH FLOATING SPIDER DIFFERENTIAL ASSEMBLY**

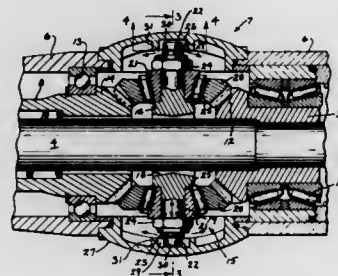
Daniel F. McCormick, Oshkosh, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed Feb. 26, 1988, Ser. No. 160,811

Int. Cl.<sup>4</sup> B63H 5/10

U.S. Cl. 440—81

7 Claims



1. In a dual propeller marine drive, the combination comprising:  
(a) a drive housing (6),  
(b) a pair of shafts (4, 8) rotatable about a common axis (5),  
(c) said shafts having respective input and output bevel gears (12, 14) thereon,  
(d) a transversely extending spider (16) disposed between said bevel gears and with said spider including:  
(1) a central body portion forming a hub (17), which has a walled opening (18) receiving one of said shafts (4) therethrough,  
(2) and a plurality of spindles (19) extending radially outwardly from said hub and with said spindles terminating in tip portions (22) and carrying spider gears (20) meshing with said bevel gears,  
(e) and mounting means (29, 25) for mounting said spider for free floating movement so that said spider is pivotable in a direction longitudinally of said axis and is shiftable transversely of said axis.

**4,792,315**  
**DRIVE SHAFT ASSEMBLY FOR OUTBOARD MOTOR**

Wallace R. Karrach, 6850 N. Glen Shore Dr., Milwaukee, Wis. 53209; Kennedy K. McElroy, 1718 Hazelwood, Lindenhurst, Ill. 60046, and Steven R. McNeill, 3808 Glen Flora, Waukegan, Ill. 60085

Filed Dec. 29, 1986, Ser. No. 947,106

Int. Cl.<sup>4</sup> B63H 23/34

U.S. Cl. 440—83

21 Claims



9. A drive shaft assembly for a marine propulsion device, said drive shaft assembly comprising a lower drive shaft having an integral threaded upper end and a lower end including means for transmitting power to a propeller and further comprising an upper drive shaft having an integral threaded lower end, one of said threaded lower end of said upper drive shaft and said threaded upper end of said lower drive shaft being threadably engaged into the other of said threaded lower end of said upper drive shaft and said threaded upper end of said lower drive shaft.

**4,792,316**  
**SURFBOARD PROTECTIVE TIP**

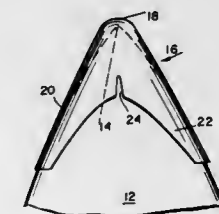
David Skedeleaki, and Eric Arakawa, both of Box 30374, Honolulu, Hi. 96820

Filed Apr. 10, 1987, Ser. No. 37,190

Int. Cl.<sup>4</sup> A63C 15/05

U.S. Cl. 441—74

17 Claims



1. In combination with a surfboard of the type having a sharply angled forward tip portion, means for affording protection to the user of the surfboard during surging from injury upon contact with said tip portion while not altering the performance characteristics of the surfboard, said means comprising a relatively soft, resilient, silicone tip cover of generally V-shaped configuration, having a rounded exterior nose portion and rearwardly extending, substantially trough-shaped wing portions which intersect at a juncture defined by a pair of forwardly directed slots, said tip cover being fixedly secured to said tip portion of said surfboard.

**4,792,317**  
**METHOD FOR MAKING A MAGNETIC SHIELD**

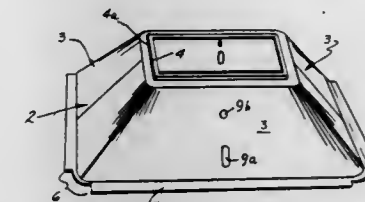
John L. Sipama, Wyoming, Mich., assignor to Center Manufacturing Inc., Byron Center, Mich.

Filed Jun. 30, 1986, Ser. No. 879,948

Int. Cl.<sup>4</sup> H01J 29/06; B23P 23/00

U.S. Cl. 445—23

9 Claims



1. A method for forming a television tube magnetic shield or like thin metal parts having a truncated pyramidal configuration comprising:  
blanking a pair of "lazy C" shaped blanks from a strip of relatively thin metal;  
forming said blanks around a truncated pyramidal form so that their ends edges overlap, said form having smooth, rounded corners and generally flat sides in a vertical direction; forming a peripheral flange on said thus formed truncated pyramidal member by bending the outer edge of said truncated pyramidal member outwardly; welding the overlapping edges of said blanks so as to substantially eliminate any open space between said overlapping portions.  
8. For use in a television tube, a truncated pyramidal magnetic shield of thin, low carbon metal comprising:  
two generally C-shaped metal halves, each defining one-half of a truncated pyramidal configuration, having overlapping edge portions continuously welded together at least at and along the seam edges to minimize the possibility of any gaps or spaces between said overlapping edge portions; and  
each of said sides of said truncated pyramidal member being generally flat and planar in configuration and joining each other at smooth, rounded corners.

**4,792,318**  
**DEVICE FOR WARM PRESS FORMING A PLATE-LIKE MEMBER INTO A SHADOW MASK FOR A COLOR CATHODE RAY TUBE**

Masanori Igaki, Himeji; Sigeo Yoneyama, Yokosuka; Yoshimichi Hori, Yokohama, and Takayuki Satoh, Chigasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 15, 1987, Ser. No. 49,968

Claims priority, application Japan, May 19, 1986, 61-114199

Int. Cl.<sup>4</sup> H01J 9/46

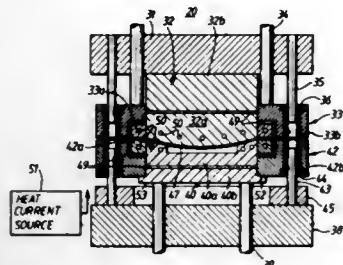
U.S. Cl. 445—66

1 Claim

1. A device for warm press-forming a plate-like member into a shadow mask for a color cathode ray tube comprising:  
a mold for applying pressure to the plate-like member, including an upper mold section having a punch of a defined shape for pressing the plate-like member and a clamp for holding the plate-like member during the forming process, a lower mold section opposite to the upper mold section, having a die interacting with the punch for molding the plate like member into the defined shape, and a knockout for removing the mask from the die, each of the punch, clamp, die and knockout including a heated portion in contact with the plate-like member and a unheated portion;  
a plurality of guide pins for slidably connecting the punch and clamp and for slidably connecting the die and knockout.



out, said guide pins passing through said unheated portions of said clamp and said die;



insulation means between the heated portions and the unheated portions of the punch, clamp, die and knockout, respectively; and heating means in each of the heated portions.

4,792,319

**BUILDING BLOCKS**

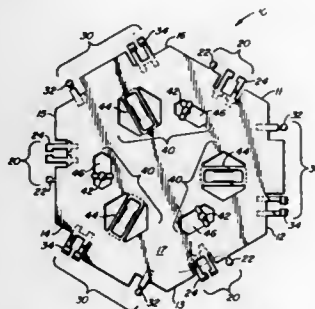
Daniel E. Svagerho, 69 Lovell Ave., Mill Valley, Calif. 94041

Filed Jul. 8, 1987, Ser. No. 71,011

Int. Cl.<sup>4</sup> A63H 33/06

U.S. Cl. 446-104

14 Claims



1. A model building system comprising:  
a plurality of flat, generally hexagonal members each having six edge portions and a first surface;  
piece connector fastening means carried on three alternate edge portions of each of said hexagonal members, each piece connector conditioned for releasable engagement with the piece connector of another hexagonal member to join said members in edge-to-edge engagement;  
unit connector fastening means carried on the three alternate edge portions of each of said hexagonal members not occupied by said piece connectors, each unit connector conditioned for releasable engagement with the unit connector of another hexagonal member to join said members in edge-to-edge engagement; and  
face connector fastening means carried on each of said hexagonal members first surface, each face connector conditioned for releasable engagement with the face connector of another hexagonal member to join said members in face-to-face engagement;  
wherein said piece connectors are not engageable with said unit connectors or said face connectors, and said unit connectors are not engageable with said face connectors.

4,792,320

**COMPOSITE TUBULAR STRUCTURE**

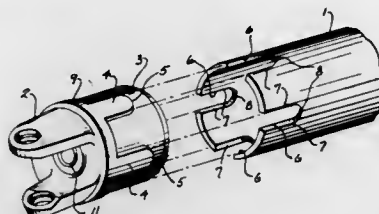
Herbert W. Nickel, Germantown, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis.

Continuation of Ser. No. 777,191, Sep. 18, 1985, abandoned. This application Jul. 17, 1987, Ser. No. 75,234

Int. Cl.<sup>4</sup> F16C 3/00

U.S. Cl. 464-181

7 Claims



5. A composite tubular structure, comprising a fiber reinforced resin tubular member, a yoke secured to an end of the tubular member and including a sleeve disposed in lapping relation with an end of said tubular member, a plurality of longitudinal circumferentially spaced ribs on said sleeve, said ribs projecting radially outward from said sleeve, said end of said tubular member having a plurality of longitudinal circumferentially spaced slots to receive the corresponding ribs and having tongue disposed between each pair of adjacent slots, said slots opening at said end of the tubular member and extending completely through the wall of said tubular member, said tongues being in contiguous overlapping relation with said sleeve, and clamping means disposed on the outer surface of said tubular member and said sleeve and extending across the joint therebetween.

4,792,321

**RADIAL BALL TORQUE LIMITER**

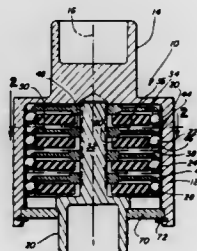
Mark S. Lundquist, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jun. 22, 1987, Ser. No. 64,682

Int. Cl.<sup>4</sup> F16D 7/06

U.S. Cl. 464-35

5 Claims



1. A device which may be assembled readily to meet operating requirements by stacking of two or more caged ball assemblies comprising:  
a housing with a wall defining an internal cylindrical cavity;  
a shaft rotatable independently of said housing and extending into said cylindrical cavity centrally thereof;  
a plurality of said caged ball assemblies positioned within said cylindrical cavity between said shaft and said wall in side-by-side relation, each of the caged ball assemblies having a generally annular cage with a hub connected thereto; said cylindrical cavity having a length axially of said shaft to receive two or more of said caged ball assemblies;  
a splined connection between each of said hubs and said shaft;  
a plurality of rows of fixed alternating teeth and ball-receiving

ing recesses on the inner surface of said wall with there being sufficient rows to have one row individually aligned with a caged ball assembly;  
a plurality of balls movably retained by each of the annular cages and positioned in the ball-receiving recesses; and  
a plurality of annular members associated one with each caged ball assembly and positioned interiorly thereof to engage the radially inner surfaces of the balls and yieldably resist radially inward movement of the balls.

4,792,323

**CHAIN GUIDE**

Heinz Flaig, Bochum, Fed. Rep. of Germany, assignor to Mannesmann AG, Düsseldorf, Fed. Rep. of Germany

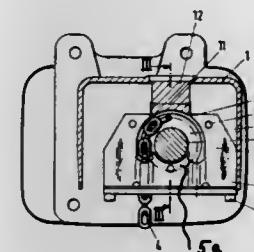
Filed Jul. 21, 1987, Ser. No. 76,028

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1986, 3624793

Int. Cl.<sup>4</sup> B62J 13/00; F16H 57/02

U.S. Cl. 474-144

2 Claims



1. Chain guide for a chain on and in relation to a sprocket wheel, having a shaft comprising:  
a housing;  
a pair of substantially flat complementary guide shells situated in and fastened to the housing, the shells being interconnected and made as press parts and having, when put together, a pair of vertically extending cross shaped grooves; a plane of partitioning being in a plane of rotation of the sprocket wheel;  
guide noses above the grooves and facing each other across a narrowing gap and above a portion of the shaft of the sprocket wheel;  
the sprocket wheel having a groove, the diameter of its bottom is a little smaller than said gap; and  
means for closing the gap independently from the shells and their connection.

4,792,322

**CHAIN TIGHTENER**

Dieter Goppelt, Munchaurach, and Dieter Schmidt, Nurnberg, both of Fed. Rep. of Germany, assignors to INA Walzlager Schaeffler KG, Fed. Rep. of Germany

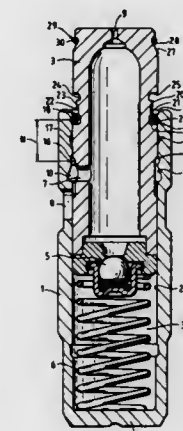
Filed Oct. 15, 1987, Ser. No. 109,284

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1986, 3636919

Int. Cl.<sup>4</sup> F16H 7/12

U.S. Cl. 474-136

18 Claims



1. A chain tightener with a dampening piston guided in a housing and axially acted upon by a spring means in the chain tightening direction, and a radially resilient stop ring which cooperates with recesses of the housing and the dampening piston and limits its stroke while allowing a return movement of the dampening direction opposite to the chain tightening direction wherein the housing (1) has a receiving groove (10) and the dampening piston (3) has an insert edge (25) for the stop ring (26) wherein during the sliding of the dampening piston (3) into the housing (1), the insert edge (25) shifts the stop ring (26) until the latter radially snaps into the receiving groove (10), a locking groove (18) for the stop ring (26) is provided at the dampening piston (3) which is defined by a stop end face (19) and by a stop ramp (20) wherein the stop ramp (20) fits under the stop ring (26) snapped in the receiving groove (10), the stop end face (19) shifts the stop ring (26) under the action of the spring means (6) out of the receiving groove (10) into an index notch (11) of the housing (1) and at the end of a return stroke (H), the stop ring (26) disposed in the index notch (11) abuts against the stop ramp (20).

4,792,324

**FRICION DRIVE BELT COMPOSED OF TWO CABLES AND A PLURALITY OF SPACERS**

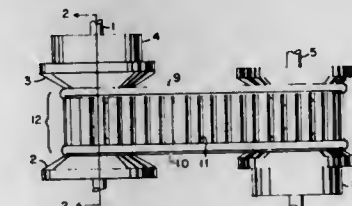
Ronald O. Whitaker, 4719 Squire Dr., Indianapolis, Ind. 46241

Filed Dec. 14, 1981, Ser. No. 330,457

Int. Cl.<sup>4</sup> F16G 1/00

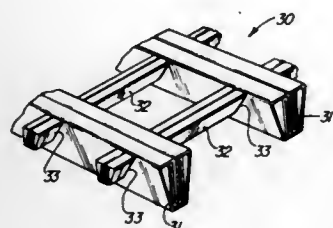
U.S. Cl. 474-237

2 Claims

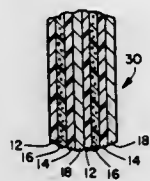


1. A continuously variable friction drive having a pair of driving sheaves, a pair of driven sheaves, and a belt operatively associated with said sheaves;  
said belt comprising two parallel cables and a plurality of spacers;  
each of said cables having an inner surface in contact with said spacer and an outer surface diametrically opposed said inner surface; and  
said drive being adapted for causing said outer surfaces of said cables to engage said sheaves.

**4,792,325**  
**METHOD AND APPARATUS FOR MANUFACTURING**  
**CARDBOARD PALLETS**  
 Joachim G. Schmidtke, 1510 Horseshoe Dr., Ortonville, Mich.  
 48462  
 Filed Sep. 29, 1986, Ser. No. 912,468  
 Int. Cl.<sup>4</sup> B05C 1/00  
 U.S. Cl. 493—334 10 Claims

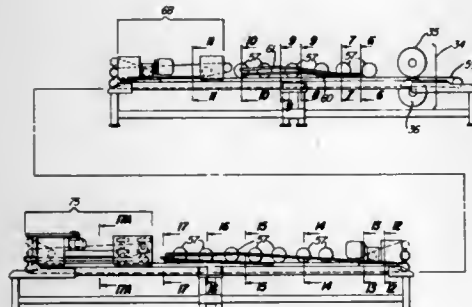


**4,792,326**  
**RAPIDLY DISINTEGRATING PAPER TUBES**  
 Richard R. Tews, Outagamie County, Wis., assignor to Kimberly-Clark Corporation, Neenah, Wis.  
 Filed Mar. 30, 1987, Ser. No. 32,833  
 Int. Cl.<sup>4</sup> A61F 13/20; B27N 5/02; B65D 3/04; F16L 11/00  
 U.S. Cl. 604—11 27 Claims

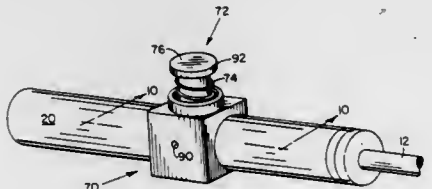
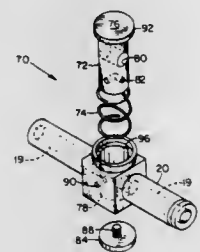


1. A wound tube, that has the strength and stiffness required for a tampon applicator tube and that will rapidly disintegrate in water comprising a plurality of layers of paper, binder and superabsorbent.

**4,792,327**  
**LIPECTOMY CANNULA**  
 Barry Swartz, 8070 Pimlico La., Boerne, Tex. 78006  
 Continuation-in-part of Ser. No. 100,084, Sep. 23, 1987, which is a continuation-in-part of Ser. No. 907,505, Sep. 15, 1986, Pat. No. 4,735,605. This application Oct. 16, 1987, Ser. No. 109,769. The portion of the term of this patent subsequent to Oct. 4, 2005, has been disclaimed.  
 Int. Cl.<sup>4</sup> A61B 17/22; A61M 1/00  
 U.S. Cl. 604—22 18 Claims



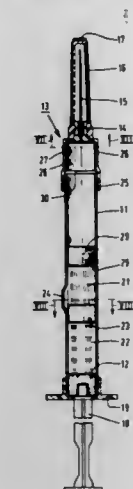
1. A method of making a cardboard pallet including the steps of:  
 (a) manufacturing a plurality of stringers having openings therein to receive a runner using a continuous process including the steps of:  
 (i) perforating and scoring a blank at a number of predetermined positions to provide a predetermined series of fold lines, and openings therein,  
 (ii) progressively folding said blank at fold lines by moving said blank past a plurality of curvilinear rod means,  
 (iii) applying adhesive to said blank at predetermined areas while said blank is being folded, and  
 (iv) curing said adhesive,  
 (b) manufacturing a plurality of runners for insertion into said stringers using the steps of:  
 (i) perforating and scoring a blank at number of predetermined positions to provide a predetermined series of fold lines,  
 (ii) progressively folding said blank at said fold lines by moving said blank past a series of curvilinear rod means,  
 (iii) applying adhesive to said blank at predetermined areas while said blank is being folded, and  
 (iv) curing said adhesive,  
 (c) inserting said runners into said openings in said stringers to form said cardboard pallet.



1. An improved lipectomy cannula comprising:  
 handle means having a cavity running therethrough, having a cylindrical void therein, and having a vent hole communicating with said void;  
 an outer tube having distal and proximate ends, and having a first longitudinal slot, said outer tube being open at said proximate end, and said proximate end of said outer tube attached to said handle means;  
 an inner tube having distal and proximate ends, and having a second spiral slot, said inner tube located within said outer tube, said inner tube being open at said proximate end, and

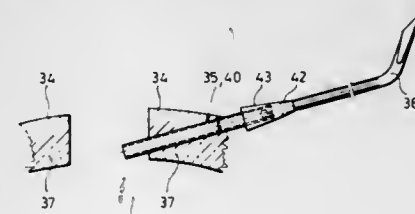
said proximate end of said inner tube attached to said handle means;  
 vacuum means coupled to said inner tube for creating suction within said inner tube;  
 said spiral and longitudinal slots each having rounded cutting edges along their length to remove fat lobules by tearing in conjunction with said vacuum means;  
 motor means coupled to said inner tube for rotating said inner tube; and  
 a cylindrical member linearly reciprocable in said void having primary and secondary channels running, through, said cylindrical member being essentially the size of said cylindrical void in said handle means whereby, when said cylindrical member is reciprocated in said void to a first position, said secondary channel fluidly communicates said inner tube to said vent hole, venting said inner tube to ambient pressure, and simultaneously obstructing said cavity leading to said vacuum means, retaining negative pressure in said vacuum means, and whereby, when said cylindrical member is reciprocated in said void to a second position, said primary channel aligns with said cavity, fluidly communicating said inner tube to said vacuum means and simultaneously obstructing said vent hole.

**4,792,329**  
**MULTI-COMPARTMENT SYRINGE**  
 Johan C. Schreuder, Amsterdam, Netherlands, assignor to Duphar International Research B.V., Weesp, Netherlands  
 Filed Jun. 24, 1986, Ser. No. 877,734  
 Claims priority, application Netherlands, Jun. 27, 1985, 8501847  
 Int. Cl.<sup>4</sup> A61M 5/00  
 U.S. Cl. 604—90 14 Claims



1. A multi-compartment syringe for separate storage of at least two different substances to be prevented from being in contact with each other except for a period of time immediately prior to use, one of said substances being disposed at a foremost position in said syringe, said syringe comprising:  
 a hollow substantially cylindrical ampoule which is open at both ends,  
 a plunger to which a plunger rod is connected and which is movable in the ampoule from an initial position at one end of the ampoule toward another end thereof and seals said ampoule,  
 a sealing stopper having dimensions such that the sealing stopper can be provided in a sealing manner in said ampoule and so as to be movable in the ampoule in order to be able to separate the substance disposed at said foremost position in the ampoule from a front end of the ampoule, at least one rotationally symmetrical separating stopper means provided in the ampoule between said plunger and said sealing stopper and being movable therein, the circumference of said separating stopper means before use of the syringe adjoining the inner wall of the ampoule in a sealing manner and keeping the different substances present in the ampoule separated from each other, and  
 a needle holder comprising:  
 (a) a collar connected to the front end of the ampoule in a sealing manner,  
 (b) a neck having an injection needle sealably attached thereto and covered by a needle guard to keep the needle in a sterile condition, said needle guard comprising a bacteria filter,  
 (c) a hollow, substantially cylindrical shaft disposed between said collar and said neck, the shaft being proportioned so that the space bounded by the inner wall of the shaft and the rear face of the neck has one of (i) substantially the same circumference as and (ii) a slightly larger circumference than the inner wall of the ampoule and is at least longer than the sealing stopper, and  
 (d) a needle holder by-pass means in the inner wall of the shaft through which injection liquid behind the sealing stopper can reach the injection needle when, during use of the syringe, the sealing stopper is moved forward into the shaft of the needle holder, said syringe being characterized in that an ampoule by-pass means is formed in the

**4,792,328**  
**METHOD AND APPARATUS FOR ASPIRATING**  
**SECRETED FLUIDS FROM A WOUND**  
 Walter Beck, Obere Häslibachstr. 87, CH-8700-Küssnacht; Siegfried Berger, Wernau, and Heinz-Peter Werner, Mainz, all of Fed. Rep. of Germany, assignors to Walter Beck and Margrit Werner, both of, Fed. Rep. of Germany  
 Division of Ser. No. 618,828, Jun. 8, 1984, Pat. No. 4,661,093.  
 This application Jan. 20, 1987, Ser. No. 4,485  
 Claims priority, application Fed. Rep. of Germany, Jun. 11, 1983, 3321151  
 Int. Cl.<sup>4</sup> A61M 31/00  
 U.S. Cl. 604—51 3 Claims

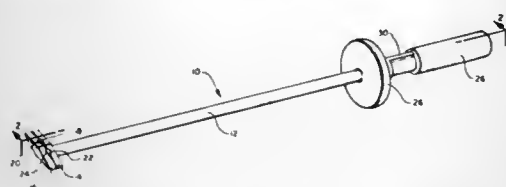


1. The method for placing a drain in a wound, comprising the steps of:  
 (a) introducing a sterile sleeve into the tissue adjacent the wound from the wound side of the tissue;  
 (b) pushing said sterile sleeve outward through the tissue toward a body surface defining an outward surface of the tissue in such a manner that a forward end of said sleeve projects above said body surface and a rear end of said sleeve still lies in the wound;  
 (c) introducing said drain into the wound through the forward end of said sleeve projecting above said body surface;  
 (d) withdrawing said sleeve outwardly from the tissue.



wall of the ampoule, which by-pass means has a length at least as great as that of the separating stopper means, and through which by-pass means, during use of the syringe, liquid behind the separating stopper means can reach the substance in front of the separating stopper means and can mix with said substance or can dissolve it, but which by-pass means, before use of the syringe, is sealed from the liquid present behind said separating stopper means by means of the separating stopper means, and the ampoule, before use of the syringe, comprises an empty space which is not filled with substance and which is bounded on the rear and lateral sides by the front face of the sealing stopper and the inner wall of the ampoule, and which on its front is in open communication with the space in the shaft of the needle holder, said empty space in the ampoule being at least as long as the distance from the front face of the plunger when said plunger is in its initial position at said one end of the ampoule to the rear end of said ampoule by-pass means.

**4,792,330**  
**COMBINATION CATHETER AND DUCT CLAMP**  
**APPARATUS AND METHOD**  
Harrison M. Lazarus, Salt Lake City, and Dixon A. Ford, Farmington, both of Utah, assignors to Lazarus Medical Innovations, Inc., Salt Lake City, Utah  
Filed Jul. 13, 1987, Ser. No. 72,796  
Int. Cl.<sup>4</sup> A61B 17/00  
U.S. Cl. 604—174



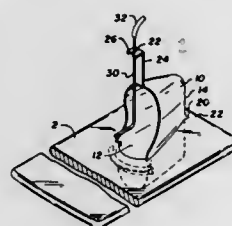
1. A surgical apparatus for inserting a catheter into an anatomical duct and for thereafter clamping the duct around the catheter, said apparatus comprising:  
a stationary member comprising at a distal end thereof a first clamping member having a first clamping surface;  
a sliding member comprising at a distal end thereof a second clamping member having a second clamping surface, said sliding member being longitudinally slidable relative to said stationary member to accommodate selective movement of said second clamping surface from a first clamping position to a second clamping position, said first and second clamping surfaces each comprising a groove such that the grooves of said clamping surfaces cooperatively define an opening therebetween for receiving said catheter such that the apparatus does not occlude said catheter when held in said opening; and  
means for releasably biasing said sliding member at said first clamping position, and for releasing said sliding member to accommodate movement of said sliding member to said second clamping position, such that said catheter may be clamped by said apparatus when in said first clamping position so as to secure said catheter for insertion into said duct, and such that thereafter said catheter may be released and said duct clamped around said catheter when said apparatus is in the second clamping position.

**4,792,331**  
**DEVICE FOR OBTAINING AND ADMINISTERING**  
**UNILAMELLAR LIPOSOMES**  
Jean Philippot, St Clement La Riviere, and Jean-Pierre Liantard, Montpellier, both of France, assignors to Centre National de la Recherche Scientifique and Institut National de la Sante et de la Recherche Medicale, both of Paris, France  
PCT No. PCT/FR84/00221, § 371 Date Jun. 6, 1985, § 102(e) Date Jun. 6, 1985, PCT Pub. No. WO85/01440, PCT Pub. Date Apr. 11, 1985  
PCT Filed Oct. 5, 1984, Ser. No. 742,467  
Claims priority, application France, Oct. 6, 1983, 83 16239  
Int. Cl.<sup>4</sup> A61M 5/00  
U.S. Cl. 604—187



1. A device for obtaining unilamellar liposomes comprising: means for forming a solution of lipids, a detergent selected from the group consisting of octylglucosides, and a pharmaceutically active substance;  
means for taking an aliquot quantity of said solution;  
permeable and/or semipermeable membrane partitions for eliminating said detergent by dialysis with polymers in the form of beads; and  
means for administering to patients the resulting solution free of detergent.

**4,792,332**  
**APPARATUS FOR COLONIC IRRIGATION**  
Toby Linsel, 4125 East Pender Street, Burnaby, British Columbia, Canada (V5C 2M2)  
Filed Feb. 24, 1987, Ser. No. 17,984  
Int. Cl.<sup>4</sup> A61M 3/00  
U.S. Cl. 604—276



1. A user operated device for colonic irrigation comprising: a board to be received on a lavatory and to receive a person undergoing treatment, said board having a generally triangular opening with an outwardly curved base;  
a resilient hood having only the front open, the hood being removably connected to said board by virtue of said hood being resiliently deformable to fit within the opening in the board, said hood tapering from the open front end to the closed back end to match the shape of the generally triangular opening, said hood having a section extending below forming an exit opening therethrough;  
means to locate the hood in the opening comprising recesses on each side of the hood, and able to engage the board;  
an abutment on the exterior of the closed back end of the hood to contact the upper surface of the board;  
a bracket extending upwardly from the hood to receive an L-shaped tube able to communicate a supply of liquid to the user;  
a recess in the distal end of the bracket able to releasably and slideably grip the tube in a way that leaves lower end of

the tube moveable in all directions except that said tube is being restricted in its movement towards the hood because of contact with the base of said bracket;  
an abutment on the underside of the board, adjacent the outwardly curved base of the generally triangular opening.

**4,792,333**  
**UNIT DOSE DRUG PACKAGE AND ADMINISTERING**  
**DEVICE**  
Samuel W. Kidder, Wheaton, Md., assignor to Strawdow, Inc., Wheaton, Md.  
Filed Nov. 4, 1986, Ser. No. 926,666  
Int. Cl.<sup>4</sup> A61M 37/00  
U.S. Cl. 604—83

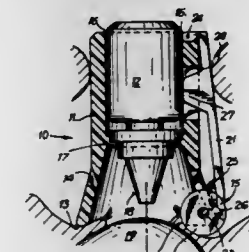


1. A device for containing and orally administering as solid substance comprising:  
tubular means having opposite ends and first and second portions integrally formed with said tubular means for containing the solid substance and for delivering the solid substance to a user's oral cavity with a fluid that is drawn through said tubular means from one of said ends to the other of said ends;  
said tubular means having supporting and confining means separating said first portion and said second portion for supporting the solid substance adjacent said other of said ends and for confining the substance in said first portion, said supporting and confining means including a passageway therethrough for free fluid flow and said second portion having end portion means for allowing direct immersion of said second portion within a reservoir of a fluid that is to be drawn into and through said tubular means; and  
said ends being hermetically sealed such that the solid substance is sealed within said tubular means when said device is used as a package; and said ends being openable such that fluid flows between each of said ends through said supporting and confining means when said device is used as an administering device, whereby said device remains a package until said ends are opened whereupon said device is used as an administering device for delivering the solid substance contained within the device directly into the user's mouth.

**4,792,334**  
**OCCULAR TREATMENT APPARATUS**  
Daniel Py, 22 Ferncliff Terr., Short Hills, N.J. 07078  
Filed Nov. 6, 1987, Ser. No. 118,388  
Int. Cl.<sup>4</sup> A61H 33/04  
U.S. Cl. 604—301

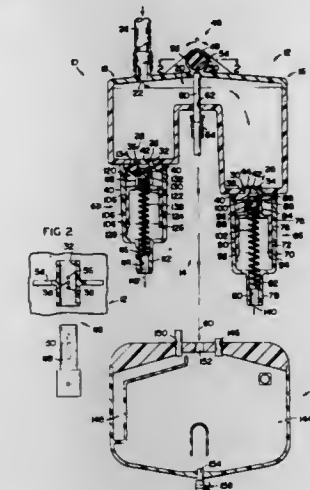
1. An ocular treatment apparatus for applying liquid medicament from a reservoir comprising: a tubular housing with a first open end adapted to conform to the shape of the facial area surrounding the eye socket, said housing being constructed and arranged to receive a reservoir of liquid medicament, said housing including sighting means for orienting an eye, and displacement means supported by said housing proximate

said first open end at a position diametrically opposed to said sighting means, said displacement means being adapted to



evert a lower eyelid so that liquid medicament from the reservoir is easily and safely applied to the ocular cul de sac.

**4,792,335**  
**PRESSURE CONTROLLED VALVE APPARATUS**  
Carl C. Goosen, and Bernard T. Goosen, both of 2415 Shoreham Rd., Orlando, Fla. 32803  
Filed Feb. 11, 1987, Ser. No. 13,375  
Int. Cl.<sup>4</sup> A61M 1/00  
U.S. Cl. 604—323



1. A pressure controlled valve apparatus for use with a catheter to selectively control fluid flow therefrom comprising a fluid reservoir coupled to the catheter through an inlet port including a primary fluid reservoir chamber to receive fluid from the catheter having a primary outlet formed in the lower portion thereof and a fluid flow control including a primary control valve selectively movable between a first and second position, said primary control valve disposed to seal said primary outlet when in said first position and to unseal said primary outlet when in said second position in response to a first predetermined pressure to release fluid from the catheter and said primary fluid reservoir chamber, said primary control valve comprises an outer hollow substantially cylindrical valve element including a lower valve bias seat formed therein and an inner hollow substantially cylindrical valve element including an upper valve bias seat formed therein, said inner hollow substantially cylindrical valve element movable between a first and second position disposed in spaced relationship relative to said outer hollow valve element to cooperatively form a substantially cylindrical fluid flow feed channel therebetween such that fluid flow through said substantially cylindrical fluid flow feed channel maintains said inner hollow substantially cylindrical valve element in said second position until said

primary fluid reservoir chamber is empty, and a bias means operative disposed in said lower valve bias seat and said upper valve bias seat to normally maintain said inner hollow valve element in said first position, flow through said primary control valve holds said inner valve element in the second position by capillary force created by fluid flow through said fluid flow channel and thereafter when fluid from the primary valve ceases to occur.

**4,792,336**  
**FLAT BRAIDED LIGAMENT OR TENDON IMPLANT**  
**DEVICE HAVING TEXTURIZED YARNS**  
 Robert A. Hlavacek, New Haven; Barry L. Dumican, and Edward J. McCusker, both of Fairfield, all of Conn., assignors to American Cyanamid Company, Stamford, Conn.  
 Filed Mar. 3, 1986, Ser. No. 835,493  
 Int. Cl.<sup>4</sup> A61F 2/08  
 U.S. Cl. 623—13 1 Claim

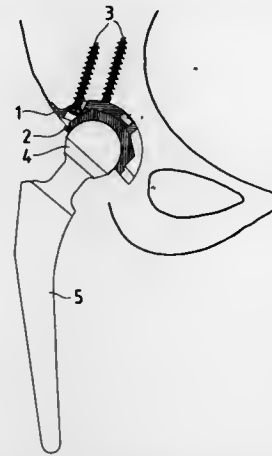


1. A flat braided ligament or tendon implant device having a length to width ratio of greater than one, comprising a plurality of fibers, the majority of the fibers being in a direction essentially parallel to the implant length, the braid having about 5 to 25 carrier and up to about 10 warp yarns, wherein the yarns are texturized, and said implant having an absorbable component comprising from about 10 to 100 percent of a copolymer, the copolymer having glycolic acid ester and from about 20 to 40 percent by weight of trimethylene carbonate linkages, and the remainder of said implant, if any, having a nonabsorbable component.

**4,792,337**  
**ACETABULUM PART FOR A TOTAL HIP PROSTHESIS**  
 Maurice E. Müller, Bern, Switzerland, assignor to Protek AG, Bern, Switzerland  
 Filed Oct. 6, 1987, Ser. No. 104,953  
 Claims priority, application Switzerland, Oct. 16, 1986, 04141/86; Nov. 7, 1986, 04467/86  
 Int. Cl.<sup>4</sup> A61F 2/32  
 U.S. Cl. 623—22 24 Claims

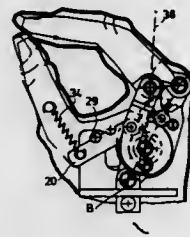
1. An acetabulum part for a total hip prosthesis comprising the combination of  
 a metallic anchoring shell in the shape of a cap having a rim, a substantially spherical convex outer surface facing the pelvic bone and a concave interior surface;  
 means defining a plurality of slots passing through said shell, said through-slots being elongated along longitudes of a sphere conforming to said spherical surface and said through-slots being dimensioned to provide sufficient area for the introduction and implantation of bone graft material therein.  
 means defining a plurality of holes located between an equatorial line about said spherical surface and the pole of said spherical surface;  
 a plurality of anchoring screws shaped and dimensioned to pass outwardly through said holes and into the pelvis for adhesive-free primary anchoring of said shell in the pelvic bone; and  
 a socket insert having an exterior surface shaped to conform

to the interior surface of said shell so that said socket is non-rotatably received in said shell in the absence of an



adhesive and an interior surface shaped to receive a synthetic femur head for substantially friction-free, undisturbed movement of said femur head therein.

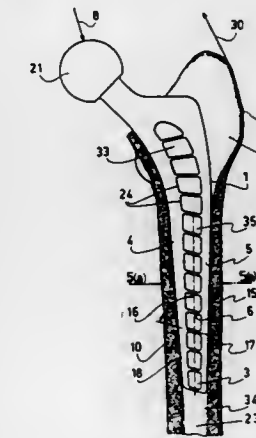
**4,792,338**  
**ARTIFICIAL HAND**  
 Gustav Rennerfelt, Lidingö, Sweden, assignor to Centri Gum-mifabrik AB, Järfälla, Sweden  
 Filed Oct. 15, 1986, Ser. No. 919,046  
 Claims priority, application Sweden, Oct. 15, 1986, 8504780  
 Int. Cl.<sup>4</sup> A61F 2/54  
 U.S. Cl. 623—64 6 Claims



1. A hand prosthesis comprising a palm member, index finger means pivotably connected to said palm member for pivoting round a finger turning point, a thumb rigidly attached to said palm member in a position opposing the pivotal movement of the index finger means and having a length and location corresponding to those of a natural hand, and arranged within said palm member,  
 a carcase to which said palm member is pivotably connected round a wrist turning point and adapted to be attached to a forearm,  
 electric motor means provided at said plan member oriented perpendicular to said forearm and being positioned slightly below the juncture of said thumb and said palm, said electric motor means being provided with gear means,  
 a link assembly extending from said wrist turning point to said finger turning point, to a turning point provided on said index finger means spaced from said finger turning point, an additional link and from there back to said carcase,  
 a finger drive link operatively connected between said link assembly and said gear means to move, upon rotation of said electric motor means, said link assembly so as to move said index finger means relative to said thumb in a natural

gripping movement pattern such that when said index finger means is rotating round said finger turning point in one direction said finger turning point is concomitantly rotated round said wrist turning point in an opposite direction, and  
 said link assembly comprising said additional link pivotably mounted at one end thereof to said finger drive link and at an opposite end to said carcase round a further turning point spaced from said wrist turning point, whereby said finger drive link is pivotably mounted to said gear means at one end thereof and to said index finger means round a turning point spaced from said finger turning point at its opposite end.

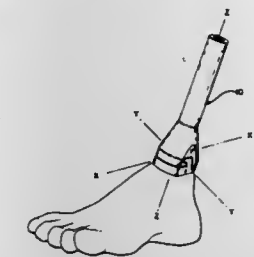
**4,792,339**  
**SELF-LOCKING STEMMED COMPONENT FOR A JOINT ENDO-PROSTHESIS**  
 Slobodan Tepi, Davos, Switzerland, assignor to Laboratorium für Experimentelle Chirurgie, Forschungsinstitut, Davos, Switzerland  
 PCT No. PCT/EP85/00251, § 371 Date Jan. 8, 1987, § 102(e) Date Jan. 8, 1987, PCT Pub. No. WO86/06954, PCT Pub. Date Dec. 4, 1986  
 PCT Filed May 23, 1985, Ser. No. 5,444  
 Int. Cl.<sup>4</sup> A61F 2/36, 2/28, 2/30  
 U.S. Cl. 623—23 11 Claims



1. A self-locking stem for a joint prosthesis for insertion into

the medullary canal of a tubular bone, said stem having proximal and distal ends, a neutral axis, and medial and lateral lobes extending from said proximal end to said distal end and adapted to be pressed against the inner cortex of the medullary canal; and connecting means connecting said medial and lateral lobes, said connecting means being responsive to a bending moment on said stem to increase the distance between said lobes in a direction transverse to the neutral axis.

**4,792,340**  
**PROSTHETIC ANKLE**  
 Alan L. Aulie, Indianola, Wash., and Ernest M. Burgess, 9 Brook Bay, Mercer Island, Wash. 98040, assignors to Ernest M. Burgess, Seattle, Wash.  
 Filed Jul. 27, 1987, Ser. No. 78,512  
 Int. Cl.<sup>4</sup> A61F 2/66, 2/64  
 U.S. Cl. 623—49 7 Claims



1. A prosthetic ankle providing movement under loading as a prosthetic ankle comprising a monolithic polymeric tubular member having an upper elongated shank portion having an axial centerline and a lower flexure joint, said flexure joint including a rearward pivot post positioned rearwardly of the axial centerline of the shank portion and formed in the shape of an axially short column intended to take high reversing axial loads and an entrapment kerf, the entrapment kerf allowing relatively free movement of flexure about z, y and x axis of rotation, defined respectively as axial rotation, dorsi and plantar flexion, and inversion and eversion, within precise stop limits and providing resistance to axial rotation during dorsi-flexion.



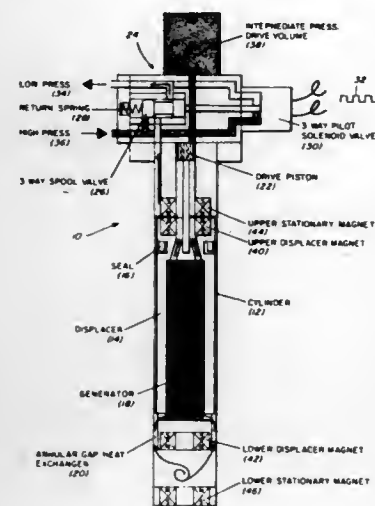


**4,792,346**  
**METHOD AND APPARATUS FOR SNUBBING THE**  
**MOVEMENT OF A FREE, GAS-DRIVEN DISPLACER IN**  
**A COOLING ENGINE**

Domenico S. Sarcia, 114 Sunset Rd., Carlisle, Mass. 01741  
 Filed Mar. 3, 1987, Ser. No. 21,258  
 Int. Cl.<sup>4</sup> F25B 9/00

U.S. Cl. 62-6

18 Claims



1. A method for snubbing the movement of a free, gas-driven displacer in a cooling engine as the displacer approaches top dead center and bottom dead center of its cycle said method comprising the steps of:

- (1) generating a magnetic repulsion snubbing force between the displacer and the displacer containing cylinder of the cooling engine as the displacer moves in one direction in the cylinder; and,
- (2) generating another magnetic repulsion snubbing force between the displacer and the displacer containing cylinder of the cooling engine as the displacer moves in an opposite direction within the cylinder.

**4,792,347**  
**METHOD FOR COATING OPTICAL WAVEGUIDE**  
**FIBER**

Charles W. Demeka; Glimory Kar, both of Painted Post, N.Y., and Thomas O. Menash, Norcross, Ga., assignors to Corning Glass Works, Corning, N.Y.

Filed Sep. 25, 1986, Ser. No. 911,479  
 Int. Cl.<sup>4</sup> C03C 25/02; C03B 25/00; B05D 5/06

U.S. Cl. 65-3.11

1 Claim

1. In a method for applying a protective organic coating to a glass optical fiber wherein the glass fiber as drawn from a glass preform is transported through a liquid coating die having a fiber inlet, a fiber outlet, and a liquid reservoir containing an organic coating liquid, the liquid coating die providing a liquid coating on the fiber, wherein the liquid coating is thereafter cured to provide the protective organic coating, wherein the coating die is operated under a condition such that a downwardly drawn meniscus is formed in the surface of the coating material at the point of entry of the optical fiber into the coating liquid, and wherein bubble inclusions in the coating are reduced by reducing air entrainment into the coating liquid by the fiber, the improvement wherein:

- (a) the step of reducing air entrainment into the coating liquid comprises the step of passing the fiber through a fiber conditioning chamber positioned adjacent to and connected with the fiber inlet to the liquid reservoir, the chamber comprising a cylindrical channel through which the fiber is downwardly drawn into the reservoir, the chamber further comprising a gas inlet into which a purge

gas is introduced, said gas being caused to flow upwardly in the cylindrical channel to provide countercurrent gas flow with respect to the downward direction of fiber draw; and

- (b) the purge gas is carbon dioxide.

**4,792,348**  
**METHOD OF FORMING GLASS BONDED JOINT OF**  
**BETA-ALUMINA**

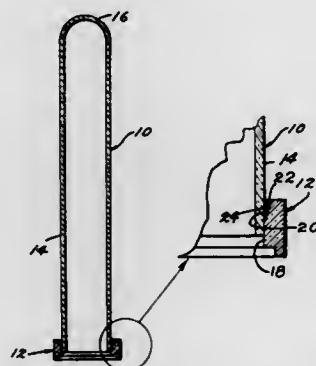
Alina V. Pekarsky, Willowdale, Canada, assignor to Powerplex Technologies, Inc., Downsview, Canada

Filed Mar. 2, 1987, Ser. No. 20,354

Int. Cl.<sup>4</sup> C03B 23/20, 33/08, 9/42; C03C 27/00

U.S. Cl. 65-36

4 Claims



1. A method of producing a joint between a body of beta-alumina and a body of alpha-alumina with a glass bonding agent devoid of coupling additives capable of being heated when subjected to microwave energy, wherein the glass bonding agent is applied in the form of a solid body to a surface of said beta-alumina body and a surface of said alpha-alumina body which comprises

subjecting said beta-alumina body and said alpha-alumina body with said glass body engaged to said surfaces thereof to microwave energy from a microwave source so as to heat said beta-alumina body by microwave energy for a time period sufficient to enable the heat generated in said beta-alumina body to be conducted to said glass body and said alpha-alumina body and heat the glass body to a temperature above the glass deformation point, and allowing the bodies to cool to solidify the glass body in intimately penetrating relation to the surfaces of the beta-alumina and alpha-alumina engaged thereby so that the glass body forms a bond between the beta-alumina body and the alpha-alumina body characterized by a fusion of the glass within the engaged beta-alumina and alpha-alumina,

the time period to which the bodies are subjected to microwave energy being not substantially longer than that required to heat the glass to said deformation point of the glass.

**4,792,349**  
**FERTILIZER VALUES FROM GALVANIZER WASTE**  
 Joe R. Trimm, Killen, and Louis A. Stumpe, Florence, both of Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.

Filed Nov. 3, 1987, Ser. No. 116,190

Int. Cl.<sup>4</sup> C05D 9/00

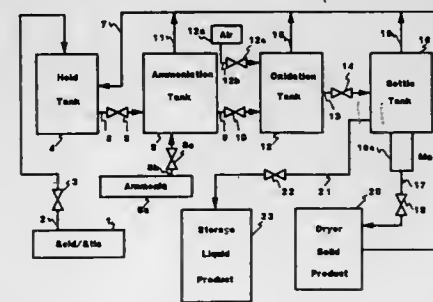
U.S. Cl. 71-31

17 Claims

1. A process for winning valuable agricultural micronutrient values from hazardous materials normally derived from galvanizer waste by-products, said hazardous materials selected from the group consisting of spent sulfuric acid, iron sulfate,

zinc sulfate, and mixtures thereof, and said micronutrient values comprising elemental iron and zinc, which process comprises the steps of:

- (a) securing as feedstock to said process, aqueous media comprising iron sulfate and selected from the group consisting of spent sulfuric acid containing from about 1 to about 3 percent, by weight, of Fe, and from about 2 to about 6 percent, by weight, Zn, an aqueous solution or slurry prepared from iron sulfate containing from about 1 to about 10 percent, by weight, Fe, an aqueous solution or slurry prepared from iron sulfate and zinc sulfate, said aqueous solution or slurry prepared from said iron sulfate and/or zinc sulfate containing from about 1 to about 10 percent, by weight, of Fe, and/or from about 1 to about 10 percent, by weight, Zn said amounts of Fe and Zn being essentially in dependent and inversely proportional relationship to one another, and mixtures thereof;
- (b) introducing at least a portion of said feedstock secured in step (a) supra into first reactor means;
- (c) introducing into said first reactor means ammoniating media, said ammoniating media selected from the group consisting of anhydrous ammonia, aqueous ammonia, and mixtures thereof, for a time and in predetermined quantity sufficient to raise the pH of the materials therein up to the range of from about 9 to about 11 and to result in the partial ammoniation thereof;
- (d) maintaining the temperature of the materials in said first reactor means in the range of from about 20° C. to about 100° C. during said partial ammoniation in step (c) supra;



- (e) removing at least a portion of the resulting partially ammoniated material from said first reactor means and introducing same into second reactor means;
- (f) introducing into said second reactor means oxidizing media, said oxidizing media selected from the group consisting of air, oxygen, and mixtures thereof and contacting said portion of said resulting partially ammoniated material introduced therein with said oxidizing media for a time and in quantities sufficient only to result in the conversion of from about 67 percent to about 75 percent of the total Fe in said partially ammoniated material to Fe+++;
- (g) subsequently discontinuing the contacting of said material in said second reactor means with substantial additional quantities of said oxidizing media;
- (h) reacting autogenously, the material resulting from the contact in said second reactor means of said partially ammoniated material with said oxidizing media from step (f) supra, for a period of time sufficient to allow for the substantially complete reaction of the unoxidized ferrous hydroxide with the ferric oxide to thereby result in the formation of magnetite;
- (i) introducing at least a portion of the substantially reacted material from step (h) supra into gravity type liquid/solids containing separation means;
- (j) subjecting the material juxtaposed at least the lower region of said separation means to the influence of substan-

tial magnetic flux to thereby enhance the gravitational separation of the magnetite therein;

- (k) removing from said separation means the liquid portion, said liquid portion containing greater than about 90 percent, by weight, of the zinc and less than about 1 percent, by weight, of the iron originally contained in said feedstock; and
- (l) removing from said separation means the solids containing portion, said solids containing portion containing greater than about 99 percent, by weight, of the iron and less than about 10 percent, by weight, of the zinc originally contained in said feedstock.

**4,792,350**  
**METHOD OF GRANULATING WATER SOLUBLE**  
**FERTILIZER WITH HIGH KIESERITE CONTENT**

Karl-Richard Löblich, Barsinghausen; Günter Bruns, Wessnigen, and Gerd Penschel, Burgdorf, all of Fed. Rep. of Germany, assignors to Kali & Salz Aktiengesellschaft, Kassel, Fed. Rep. of Germany

Filed May 27, 1987, Ser. No. 54,949

Claims priority, application Fed. Rep. of Germany, May 28, 1986, 3618058

Int. Cl.<sup>4</sup> C05G 3/00; C05D 5/00

U.S. Cl. 71-11

8 Claims

1. A method of granulating of water soluble fertilizers which contain kieserite with a mass content of between 25 and 100% and which have primary particles within a very wide grain spectrum with a fraction of at least 20% under 0.09 mm, the method comprising the steps of providing a granulating material including kieserite; applying to the granulated material moisturizing liquid; prior to or during applying the moisturizing liquid, adding to the granulating material soluble and/or somewhat colloidal soluble substances from the class of mono-, di- and polysaccharide and/or their simple hydrophilic derivatives in solid form or in a solution in which they provide a main part, in a dose of between 0.1 and 5% dry mass relative to a dry weight of the fresh granulated material; forming the granules; and drying the granules after their formation to a residual moisture of 1 to 6% of kieserite mass contained in them.

**4,792,351**  
**HYDROMETALLURGICAL PROCESS FOR PRODUCING**  
**IRREGULAR MORPHOLOGY POWDERS**

Walter A. Johnson, Towanda; Nelson E. Kopetz, Sayre, and Joseph E. Ritsko, Towanda, all of Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Jan. 4, 1988, Ser. No. 140,517

Int. Cl.<sup>4</sup> B22F 9/24

U.S. Cl. 75-0.5 A

9 Claims

1. A process comprising:

- (a) forming an aqueous solution containing the metal values of iron, cobalt, nickel and molybdenum, said metals being present in a predetermined ratio,
- (b) forming from said solution a reducible solid material selected from the group consisting of salts of said metals, oxides of said metals, hydroxides of said metals and mixtures thereof, and
- (c) reducing said material at a temperature below the melting point of any of the metals to form unalloyed irregular shaped metallic powder particles suitable for conversion to a maraging steel alloy.



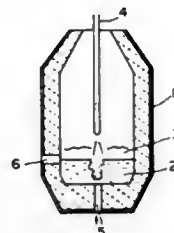
**4,792,352**  
**METHOD FOR MANUFACTURING STEEL THROUGH SMELTING REDUCTION**

Akichi Ozeki, Kenzo Yamada, and Katsuhiko Iwasaki, all of Tokyo, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed May 1, 1987, Ser. No. 45,624  
 Int. Cl.<sup>4</sup> C21C 7/00

U.S. Cl. 75—59.22

17 Claims



1. A method for manufacturing steel through smelting reduction which comprises the steps of: providing molten metal comprising iron containing 0.05 to 1.0% carbon in a converter-type reaction vessel; charging continuously iron ore and coal onto the molten metal while (i) stirring gas, at a rate of 0.05 to 1.0 Nm<sup>3</sup>/min/T where T represents one ton of molten metal, and (ii) oxygen gas, are being blown onto the molten metal to reduce the iron ore; and discharging slag product and molten steel product.

**4,792,353**  
**ALUMINUM OXIDE-METAL COMPOSITIONS**  
 Bruce M. Kramer, Washington, D.C.; David M. Dombrowski, Milford, Ohio; Dennis Gonseth, Chemin Des Rannaux, Switzerland; Minyang Yang, Hopedale, Mass., and Stephen P. Kohler, Derry, N.H., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Oct. 10, 1986, Ser. No. 917,577  
 Int. Cl.<sup>4</sup> C22C 29/12

U.S. Cl. 75—235

5 Claims

1. A consolidated metal-ceramic composite comprising a first phase consisting essentially of particles more than 50 volume percent aluminum oxide of a size less than 0.1 mm uniformly distributed in a second matrix phase, said second matrix phase consisting essentially of (a) a first metal, selected from the group consisting of nickel, cobalt and mixtures thereof, (b) titanium carbide coating said aluminum oxide and (c) less than about 30 percent by weight of a third component that renders titanium carbide more soluble in said first metal, said second matrix phase being non-reactive with aluminum oxide and containing titanium carbide primarily concentrated at an interface between the first and second phase in a sufficient amount to prevent a chemical reaction at said interface during consolidation at the liquidus temperature of said second matrix phase.

**4,792,354**  
**WATER AND OIL REPELLENT HAVING EXCELLENT DESOILING PROPERTIES**

Masashi Matsuo, and Masayuki Tamura, both of Yokohama, Japan, assignors to Asahi Glass Company Ltd., Tokyo, Japan

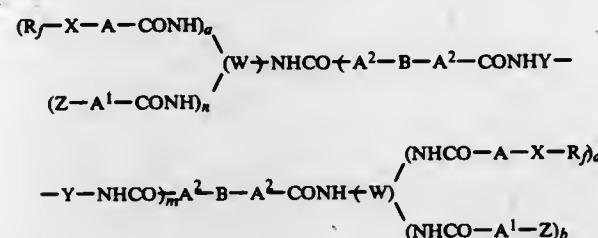
Filed Feb. 5, 1987, Ser. No. 11,241  
 Claims priority, application Japan, Feb. 5, 1986, 61

U.S. Cl. 106—2

1 Claim

1. A water and oil repellent having excellent desoiling properties composed of a compound comprising at least two terminal segments and an intermediate segment connecting the terminal segments and having a molecular weight of from 800 to 20,000, each terminal segment containing at least one poly-

fluoroalkyl group connected by a —CONH— linking group, said intermediate segment being a urethane oligomer containing at least two —CONH— linking groups and a hydrophilic molecular chain, and said terminal segments and intermediate segment being connected by an additional —CONH— linking group, wherein the compound having a molecular weight of from 800 to 20,000 is a compound having the formula:



wherein R<sub>f</sub> is a perfluoroalkyl group of the formula C<sub>n</sub>F<sub>2n+1</sub>, X is —R—, CON(R<sup>1</sup>)—Q— or —SO<sub>2</sub>N(R<sup>1</sup>)—Q—, each of A<sup>1</sup> and A<sup>2</sup> is —O—, —S— or —N(R<sup>2</sup>)—, Z is a monovalent organic group, a is an integer of from 1 to 5, b is an integer of from 0 to 4, a+b is an integer of from 1 to 5, W is a t-valent organic residue obtained by removing the t —NCO groups from a t-functional isocyanate compound having t —NCO groups, wherein t is an integer of a+b+1, B is a bivalent organic residue obtained by removing the two —A<sup>2</sup>—H groups from a hydrophilic molecular chain-containing bifunctional polyvalent active hydrogen compound, provided B may have another organic group bonded by A<sup>2</sup>, Y is a bivalent organic residue obtained by removing the two —NCO groups from a bifunctional isocyanate compound, provided Y may have another organic group bonded by a —NHCO— group, m is an integer of from 1 to 50, r is a bivalent alkylene group, R<sup>1</sup> is hydrogen atom or a lower alkyl group, Q is a bivalent alkylene group, R<sup>2</sup> is a hydrogen atom or a monovalent organic group, or Z and R<sup>2</sup> may form a ring.

**4,792,355**  
**CORROSION INHIBITING AQUEOUS, ACIDIC COMPOSITIONS COMPRISING METAL-CHELATING OMICRON-HYDROXYBENZYLAMINE COMPOUND**  
 Walter O. Siegl, Dearborn, and Mohinder S. Chhatra, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

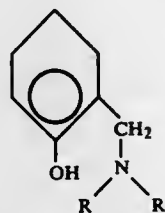
Filed Jan. 20, 1987, Ser. No. 5,181

Int. Cl.<sup>4</sup> C04B 9/02; C07C 87/28, 91/30, 93/14

U.S. Cl. 106—14.15

9 Claims

1. An aqueous, acidic composition useful to deposit a corrosion inhibiting coating on a metal substrate, said composition (1) having a pH of between about 2 and about 4.5 and (2) consisting essentially of at least about dispersible metal-chelating compound selected from compounds having the general chemical formula:



wherein R is selected from hydroxy ethyl and hydroxy propyl moieties which may be substituted with a non-interfering functionality and R' is H, alkyl, aryl or hydroxy alkyl.

**4,792,356**  
**WATER-DILUTABLE PRINTING INK BINDER SYSTEM AND USE THEREOF AS PRINTING INK**

Albert Rudolph, Wiesbaden, and Helmut Eckes, Eppstein, both of Fed. Rep. of Germany, assignors to Hoechst AG, Fed. Rep. of Germany

Filed Oct. 28, 1986, Ser. No. 924,355

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1985, 3538549

Int. Cl.<sup>4</sup> C09D 11/08

U.S. Cl. 106—30

13 Claims

1. A water-dilutable printing ink binder system based on a binder in the form of a clear and stable, dilute, ammoniacal or amine-containing solution, the binder being a product of reacting a natural resin acid and formaldehyde in at least one stage, the amount of (100% strength) formaldehyde being 1 to 25% by weight, based on the natural resin acid, and the reaction having been carried out under atmospheric or superatmospheric pressure in the absence or in the presence of 0.1 to 2% by weight of a Lewis acid catalyst.

**4,792,357**

**PAINT**

Kurt E. G. Bier, 63, Randersgade, 2100 Copenhagen, Denmark  
 Continuation of Ser. No. 760,726, Jul. 22, 1985, abandoned. This application Oct. 22, 1987, Ser. No. 120,191

Claims priority, application PCT Int'l Appl., Nov. 21, 1984, PCT/DK84/00111; Nov. 22, 1983, PCT/DK83/00110

Int. Cl.<sup>4</sup> C08L 91/00, 1/08

U.S. Cl. 106—83

14 Claims

1. A water-based pigmented paint exhibiting the property of substantially preventing dissolution of water-soluble organic or inorganic colored substances present on a surface to which said paint is applied, said paint composition comprising:

- a pigment, said pigment being present in said paint composition in an amount of on the order of at least about 5% by weight;
- a filler, said filler being present in said paint composition on the order of from about 20 to about 70% by weight, based on the weight of said composition; and
- an aqueous phase containing a water-soluble salt, or a mixture of water-soluble salts, in an amount of at least about 10% (weight/volume) of said aqueous phase.

**4,792,358**

**INORGANIC COATING COMPOSITIONS**

Toshiro Kimura, Osaka; Gilchi Okuno, Ashiya; Yukikazu Moritsu, Nishinomiyu, and Koji Yamada, Kashiwara, all of Japan, assignors to Okuno Chemical Industry Co., Ltd., Osaka, Japan

Filed Apr. 6, 1987, Ser. No. 34,963

Claims priority, application Japan, May 26, 1986, 61-120823

Int. Cl.<sup>4</sup> C04B 14/20, 12/04

U.S. Cl. 106—84

8 Claims

1. An inorganic coating composition consisting essentially of (a) about 100 parts by weight (based on solids) of a binder component prepared by thermally dissolved about 10 to about 40 parts by weight of fine particles of silica in about 100 parts by weight (based on solids) of potassium silicate and (b) about 15 to about 100 parts by weight of pearl luster pigment.

**4,792,359**

**DURABLE PHOSPHATE CERAMIC STRUCTURES AND THEIR PREPARATION**

Jeffery L. Barrall, and Robert C. Garman, both of Lancaster, Pa., assignors to Armstrong World Industries, Inc., Lancaster, Pa.

Filed Nov. 13, 1987, Ser. No. 120,049

Int. Cl.<sup>4</sup> C04B 9/06, 9/11, 12/02, 28/34

U.S. Cl. 106—85

33 Claims

1. A composition comprising a phosphate ceramic structure made by (A) contacting a compressible phosphatereactive substrate with an aqueous phosphoric acid solution, and (B)

applying pressure to compact the compressible phosphate reactive substrate while a chemical reaction takes place in the substrate to form the phosphate ceramic structure, further providing that the said compressible phosphate reactive substrate comprises: calcium silicate; a metal oxide selected from the group consisting of: calcium oxide, aluminum oxide, zinc oxide, and magnesium oxide; and a nonreactive matrix of (1) fiber or (2) fiber and a binder wherein the fiber is present in an amount effective to make the substrate compressible.

**4,792,360**

**WORKABLE CEMENT COMPOSITION OF LOW WATER CONTENT CONTAINING A HYDROXYALKYL (METH)ACRYLATE POLYMER**

Richard A. Pierce, Tipton T. Masterson, and David A. Grilli, all of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jan. 30, 1987, Ser. No. 67,915

Int. Cl.<sup>4</sup> C04B 24/00

U.S. Cl. 106—90

26 Claims

1. A cement composition having improved workability comprising cement and a polymer of a hydroxyalkyl (meth)acrylate or a copolymer thereof with another hydroxyalkyl (meth)acrylate or with sulfoethyl methacrylate.

**4,792,361**

**CEMENTITIOUS COMPOSITE FRICTION COMPOSITIONS**

David D. Double, Annapolis; Randall P. Bright, Bowie, and Sean Wise, Millersville, all of Md., assignors to Cemcom Corp., Larchmont, Md.

Filed Aug. 8, 1986, Ser. No. 894,815

The portion of the term of this patent subsequent to May 19, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> C04B 14/00, 14/02

U.S. Cl. 106—97

10 Claims

1. In a friction composition comprising a hydraulic cement matrix and friction modifying substance, the improvements which comprise utilizing as the matrix a high strength hydraulic cement which when cured exhibits a compressive strength of at least 15,000 psi and a flexural strength of at least 1,500 psi, and utilizing as the friction modifying substance at least one of each of the following classes of materials: fibers, dry lubricants and fillers; which composition better retains its effectiveness at the temperatures encountered in normal service and permits more extended service use as compared with friction materials in which the matrix is a phenolic resin or a lower strength hydraulic cement.

**4,792,362**

**PROCESS FOR PRODUCING LOW-VISCOSITY STARCH DISPERSIONS**

Klaus Heidel, Marl, Fed. Rep. of Germany, assignor to Huel's Aktiengesellschaft, Marl, Fed. Rep. of Germany

Continuation of Ser. No. 866,538, May 23, 1986, abandoned.

This application Jan. 22, 1988, Ser. No. 147,597

Claims priority, application Fed. Rep. of Germany, May 23, 1985, 3518464

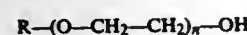
Int. Cl.<sup>4</sup> C13L 1/08; C08B 30/00

U.S. Cl. 127—71

13 Claims

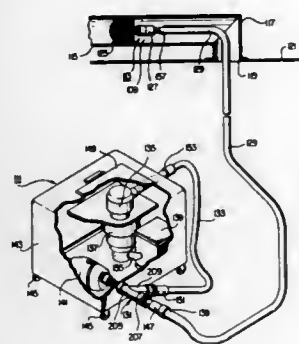
1. In a process for producing an aqueous starch dispersion comprising mixing starch and water to form a mixture of

water and discrete unpasted, gelatinized starch granules, and heating and homogenizing the resultant mixture, the improvement comprising adding to the mixture a tenside of the formula



wherein R is alkyl or alkenyl of 6-20 carbon atoms, and n is 3 to 30, in an amount whereby the temperature at which the mixture otherwise pastes is increased.

**4,792,363**  
**VENT CLEANING SYSTEM**  
Smead P. Franklin, Jr., 220 Glenn Dr., Hurst, Tex. 76053, and Edgar R. Johnson, 1202 E. French, Temple, Tex. 76501  
Filed Feb. 1, 1988, Ser. No. 151,017  
Int. Cl.<sup>4</sup> A47L 5/38; B08B 1/04  
U.S. Cl. 134—8



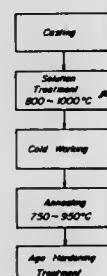
1. An apparatus for removing dust from a vent of the type forming an angle with a vent opening and having a vent diameter, comprising:

- a flexible tubular conduit having a conduit diameter substantially less than said vent diameter for allowing said tubular conduit to be passed through said angle in said vent and an intake opening at one end and an exhaust opening at the opposite end;
- a flexible shaft located within said flexible tubular conduit and extending substantially between said intake opening and said exhaust opening;
- a brush coupled to said flexible shaft at approximately said intake opening of said flexible tubular conduit, said brush having a plurality of flexible bristles located externally of said flexible tubular conduit, and having a brush diameter substantially greater than said conduit diameter of said flexible tubular conduit, wherein said brush is adapted in diameter to substantially occlude said vent substantially obstructing the flow of air therethrough;
- motor means, coupled to said flexible shaft at approximately said exhaust opening of said flexible tubular conduit, for rotating said flexible shaft causing said brush to dislodge said dust from said vent; and
- vacuum means for entraining said dust dislodged by said brush and drawing said dust from said intake opening of said flexible tubular conduit to said exhaust opening of said flexible tubular conduit.

**4,792,364**  
**PAINT DETACKIFICATION**  
Shu-Jen W. Huang, Schaumburg, Ill., assignor to Nalco Chemical Company, Naperville, Ill.  
Filed Jan. 12, 1987, Ser. No. 61,833  
The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.  
Int. Cl.<sup>4</sup> C02F 1/56

U.S. Cl. 134—38 10 Claims  
1. A paint spray booth paint detackifying composition comprising a paint detackifying amount of a melamine-formaldehyde resin-polyvinyl alcohol polymer mixture in the water of a paint spray booth collection system.

**4,792,365**  
**PRODUCTION OF BERYLLIUM-COPPER ALLOYS AND ALLOYS PRODUCED THEREBY**  
Yosuke Matsui, Handa; Shuhei Ishikawa, Yono, and Takaharu Iwadachi, Handa, all of Japan, assignors to NGK Insulators, Ltd., Japan  
Filed Nov. 13, 1987, Ser. No. 120,543  
Claims priority, application Japan, Nov. 13, 1986, 61-268743; Nov. 13, 1986, 61-268744  
Int. Cl.<sup>4</sup> C22F 1/08; C22C 9/06  
U.S. Cl. 148—12.7 C 12 Claims



1. A process for producing beryllium-copper alloys, which comprises the steps of obtaining a cast ingot by melting an alloy comprising of from 0.05 to 2.0% by weight of Be, from 0.1 to 10.0% by weight of at least one kind of Co and Ni, and the balance being substantially Cu, subjecting the thus obtained cast ingot to a solution treatment at a temperature range from 800° to 1,000° C., cold working, annealing at a temperature range from 750° to 950° C., said annealing temperature being lower than the solution treating temperature, and then an age hardening treatment, such that the difference between the solution treating temperature and the annealing temperature is in a range from 20° to 200° C.

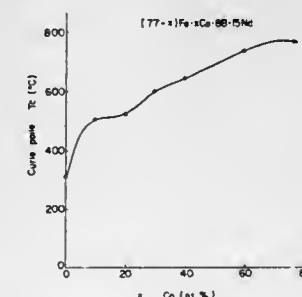
**4,792,366**  
**Patent Not Issued For This Number**

**4,792,367**  
**IRON-RARE EARTH-BORON PERMANENT**  
Robert W. Lee, Troy, Mich., assignor to General Motors Corporation, Detroit, Mich.  
Continuation-in-part of Ser. No. 520,170, Aug. 4, 1983, abandoned. This application Mar. 17, 1986, Ser. No. 840,011  
Int. Cl.<sup>4</sup> H01F 1/00  
U.S. Cl. 148—104 7 Claims



1. A method of making an iron-rare earth metal permanent magnet comprising hot pressing magnetically isotropic particles of an amorphous or finely crystalline material having a grain size less than about 500 nanometers and comprising, on an atomic percent basis, 50 to 90 percent of transition metal, at least 60 percent of which is iron, 10 to 50 percent of rare earth metal, at least 60 percent of the total of which is neodymium and/or praseodymium, and at least one percent boron, at an elevated temperature and pressure for a time sufficient to consolidate the particulate material into a fully densified body and cooling the body, whereby the resulting hot pressed body is magnetically anisotropic and has a coercivity of 1,000 Oersteds or greater at room temperature.

**4,792,368**  
**MAGNETIC MATERIALS AND PERMANENT MAGNETS**  
Masato Sagawa, Nagakakyō; Setsuo Fujimura, Kyoto, and Yutaka Matsuura, Ibaraki, all of Japan, assignors to Sumitomo Special Metals Co., Ltd., Osaka, Japan  
Filed Jul. 25, 1983, Ser. No. 516,841  
Claims priority, application Japan, Sep. 27, 1982, 57-166663; Jan. 19, 1983, 58-5813; Mar. 8, 1983, 58-37897; Mar. 8, 1983, 58-37899; May 14, 1983, 58-84858; May 14, 1983, 58-84860; May 31, 1983, 58-94876  
The portion of the term of this patent subsequent to Jul. 22, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> H01F 1/04  
U.S. Cl. 148—302 40 Claims

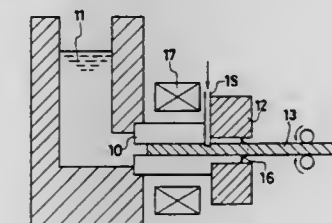


1. An anisotropic magnetic material having a mean crystal grain size of at least about 1 micron and an intrinsic coercivity of at least 1 kOe, and having a maximum energy product of at least 10 MGOe upon sintering, said material consisting essentially of, by atomic percent, 12-20 percent R wherein R is at least one element selected from the group consisting of Nd, Pr, La, Ce, Tb, Dy, Ho, Er, Eu, Sm, Gd, Pm, Tm, Yb, Lu and Y and wherein at least 50% of R consists of Nd and/or Pr, 5-18

percent B, and the balance being at least 62 percent Fe, in which Co is substituted for Fe in an amount greater than zero and not exceeding 25 percent of the material, at least 50 vol % of the entire material is occupied by a ferromagnetic compound having an (Fe,Co)-B-R type tetragonal crystal structure and a higher Curie temperature than a corresponding ferromagnetic Fe-B-R base compound containing no Co.

2. A sintered anisotropic permanent magnet having a maximum energy product of at least 10 MGOe and consisting essentially of, by atomic percent, 12-20 percent R wherein R is at least one element selected from the group consisting of Nd, Pr, La, Ce, Tb, Dy, Ho, Er, Eu, Sm, Gd, Pm, Tm, Yb, Lu and Y and wherein at least 50% of R consists of Nd and/or Pr, 5-18 percent B, and the balance being at least 62 percent Fe, in which Co is substituted for Fe in an amount greater than zero and not exceeding 25 percent of the magnet and said permanent magnet has a higher Curie temperature than a corresponding ferromagnetic Fe-B-R base compound containing no Co.

**4,792,369**  
**COPPER WIRES USED FOR TRANSMITTING SOUNDS OR IMAGES**  
Takashi Ogata, Toda; Masanori Kato, Tokyo; Yoshio Kawasumi, Toda; Chikara Tominaga, Tokyo, and Kanji Tanaka, Ohita, all of Japan, assignors to Nippon Mining Co., Ltd., Tokyo, Japan  
Filed Jul. 30, 1987, Ser. No. 80,336  
Claims priority, application Japan, Feb. 19, 1987, 62-34434; Jun. 26, 1987, 62-157565; Jun. 26, 1987, 62-157566  
Int. Cl.<sup>4</sup> C22C 9/00; C22F 1/08  
U.S. Cl. 148—404 6 Claims



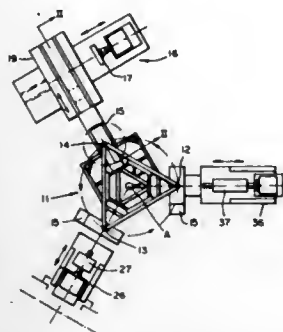
1. A copper wire used for recording or transmitting sounds or images, said copper wire consisting of copper containing not more than 0.5 ppm silver and not more than 0.5 ppm sulfur.

**4,792,370**  
**TIRE BUILDING METHOD EMPLOYING DETACHABLE TRANSFER BOX**  
Anthony G. Goodfellow, Maghull near Liverpool, United Kingdom, assignor to Apsley Metals Limited, United Kingdom  
Filed Aug. 5, 1987, Ser. No. 81,745  
Claims priority, application United Kingdom, Aug. 12, 1986, 8619617  
Int. Cl.<sup>4</sup> B290 30/08  
U.S. Cl. 156—111 7 Claims

1. A method of manufacture of a pneumatic tire in which an annular component is accurately located in a transfer box and other tire components are arranged coaxially of the annular component and assembled thereto while said component is held in the box, the box being attachable to a conveyor means and having location means whereby said box is accurately locatable on the conveyor means, the box also being detachable and separable from the conveyor means and being accurately locatable at a tire building station, said method including the steps of moving the transfer box by the conveyor means between a plurality of tire building stations; detaching and separating said box from the conveyor means at at least one of said stations;



transferring the box from the conveyor means to said at least one station;  
accurately locating the box at said station for pick-up of a tire component;



releasing the box from its location, and returning the box with component in situ to the conveyor means;  
and accurately relocating the box on the conveyor means for subsequent conveyance to another tire building station.

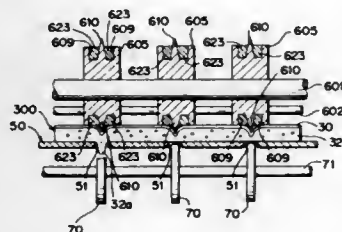
#### 4,792,371 METHOD OF AND APPARATUS FOR FORMING TRIM COVER

Akihiro Miyota, and Hidetaka Shinoda, both of Saitama, Japan, assignors to Tokyo Seat Corporation Limited, Asaka, Japan  
Filed Oct. 27, 1987, Ser. No. 114,158

Claims priority, application Japan, Oct. 27, 1986, 61-256522; Sep. 29, 1987, 61-245650

Int. Cl.<sup>4</sup> B32B 31/08, 31/18, 31/22  
U.S. Cl. 156—131

24 Claims



1. A method of forming trim cover, comprising the steps of:
  - a. feeding an assembly of a sheet of covering material and wadding material, with a covering material side of said assembly facing upward, onto support means for receiving and supporting said assembly thereon, said support means being provided with at least one hole of a desired predetermined shape;
  - b. pressing downwardly a portion of said assembly substantially positionally corresponding to said at least one hole of said support means to cause the same portion of said assembly to be dented and a portion of said wadding material of said assembly positionally corresponding to said at least one hole of said support means to be protruded downwardly from said support means through said at least one hole of said support means;
  - c. cutting said downwardly protruded portion of said wadding material of said assembly, while still pressing downwardly the same portion of said assembly to further cause the same portion of said assembly to be dented;
  - d. advancing said assembly to a backing sheet laminating station; and
  - e. sticking a sheet of backing material onto the wadding material side of said assembly by means of backing sheet sticking means, while pressing against said backing sheet

sticking means the same portion of said assembly to continue to cause the same portion of said assembly to be dented, whereby a finished product having at least one indent of a predetermined shape appreciated as an ornamental pattern therein may be produced.

#### 19. An apparatus for forming trim cover comprising: a frame;

support means carried by said frame for receiving and supporting thereon an assembly of wadding material and a sheet of covering material, with the covering material side of said assembly being turned upward, said support means being provided with at least one hole;

means carried by said frame and located next to said support means and for sticking a sheet of backing material onto the wadding material side of said assembly;

means carried by said frame and located above said support means and backing sheet sticking means and for advancing said assembly while pressing downwardly a portion of said assembly substantially positionally corresponding to said at least one hole of said support means, said assembly advancing and pressing means including at least first and second pressure rollers, each of which is provided with a circumferential projection, said first pressure roller is located above said support means in a manner such that said circumferential projection of said first pressure roller aligns with said at least one hole of said support means, so that said circumferential projection of said first pressure roller can press downwardly the portion of said assembly positionally corresponding to said at least one hole of said support means to cause the same portion to be dented by rotation of said first pressure roller to cause a portion of said wadding material of said assembly positionally corresponding to said at least one hole of said support means to be protruded downwardly from said support means through said at least one hole of said support means;

cutter means carried by said frame in a manner to be located below said at least one hole of said support means and for cutting the portion of said wadding material of said assembly which is protruded downwardly from said support means through said at least one hole of said support means by said circumferential projection of said first pressure roller; and

said second pressure roller is located above said backing sheet sticking means in a manner such that said circumferential projection of said second pressure roller can press downwardly said assembly, which is sent into a space between said second pressure roller and said backing sheet sticking means, at the same portion as said circumferential projection of said first pressure roller did, and when said sticking means sticks said backing sheet onto the wadding material side of said assembly, said circumferential projection of said second pressure roller presses against said backing sheet sticking means the portion of said assembly while indenting the portion of said assembly.

#### 4,792,372 AUTOMATIC SIDEWALL SERVICER

Joseph H. Alexander; Stanley L. Radcliffe; Martin N. Robertson, all of Summit County; Eugene A. Bator, and John E. Anderson, both of Portage County, all of Ohio, assignors to General Tire, Inc., Akron, Ohio

Filed Jul. 24, 1987, Ser. No. 77,705

Int. Cl.<sup>4</sup> B29C 30/08

U.S. Cl. 156—394.1

25 Claims

1. A servicer for supplying a cut-to-length strip of unvulcanized rubber tire building material to a tire building drum, comprising:

- (a) a rigid framework mountable on a generally horizontal surface adjacent a tire building drum which is rotatable about a fixed axis;
- (b) a first roll mounted within the framework in a let-off position for rotation about an axis which is parallel to the rotational axis of the drum, the first roll having spirally

wrapped thereon, a continuous strip of unvulcanized rubber tire building material separated by a protective liner;

(c) a second roll mounted within the framework in a take-up position for rotation about an axis which is parallel to the rotational axis of the drum, the second take-up being empty and in aligned, liner receiving relation with the first let-off roll

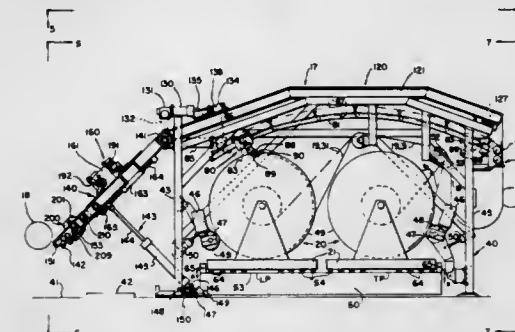
(d) means for rotating the rolls in synchronized relation;

(e) means coacting with the rolls for moving them to and from the let-off and take-up positions and for clamping them firmly in said positions;

(f) means for moving a strip of material, separated from the liner adjacent the second take-up roll, along a pathway in synchronized relation with the rotation of the rolls, the pathway being of sufficient length to cause at least partial relaxation of stress built-up in the material during wrapping of the material on the first let-off roll, the pathway terminating at a point which is vertically above the rolls at the front of the framework closest the drum;

(g) a discharge tray aligned with the pathway for receiving material therefrom, the tray having a proximal end pivotally mounted adjacent the termination of the pathway and a free distal end which is longitudinally spaced from the proximal end;

(h) means for rotating the distal end of the tray from a retracted position adjacent the framework to an extended position adjacent the drum;



- (i) at least one applicator roll mounted adjacent the distal end of the tray for rotating freely about an axis which is parallel to the rotational axis of the drum;
- (j) means mounting the applicator roll on the tray for rotation to and from the drum when the distal end of the tray is adjacent the drum;
- (k) means carried by the tray between the ends thereof for cutting material on the tray, including (I) an ultrasonic cutter which is angularly disposed to the plane of the tray to cut the material crosswise at an angle, the included angle between the intersecting planes of the tray and angular cut, measured downstream of the cutter, relative to the movement of the material on the tray, being an acute angle, (II) a cutting anvil extending normally of the tray, the material generally resting against the anvil during the cutting thereof, the anvil having a sloped head closest the material, the slope of the head being similar to the angular disposition of the cutter, (III) laterally extending rows of freely rotatable rollers upstream and downstream of the anvil for supporting the material immediately upstream and downstream of the anvil, and (IV) means mounting the cutter, anvil, and rows of rollers immediately upstream and downstream of the anvil, for unitary limited movement longitudinally of the tray;
- (l) means carried by the tray between the cutter and applicator roll for finally aligning cut-to-length material on the tray for discharge therefrom to the drum; and
- (m) a sensor for monitoring movement of material on the tray and pathway for a period sufficient to cut the

material to length and discharge the cut material from the tray, when the sensor decides that the material downstream of the cutter is of the desired length for cutting.

#### 4,792,373 HEAT SEALING APPARATUS

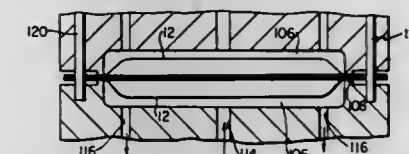
Paul K. Hsieh; Jan-Ichi Meguro, both of Huntington Beach; William A. Stark, and Arne L. Solberg, both of Costa Mesa, all of Calif., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jun. 18, 1985, Ser. No. 746,232

Int. Cl.<sup>4</sup> B32B 31/20, 31/04

U.S. Cl. 156—497

7 Claims



3. Apparatus for heat sealing in conjunction a pair of plastic strips each formed with a series of regularly spaced transverse pockets separated by web portions to form two integral mirror image side-by-side cuvette belts, comprising:

first and second coacting heat sealing dies each having heating surfaces for sealing the strips together extending around openings adapted to receive said pockets with one said pocket in each opening and each said pocket spaced within the respective opening,  
means for engaging said web portions of said strips for aligning said strips with respect to one another and with respect to said openings, and  
means for introducing cooling fluid into said openings so that it flows over the surfaces of said pockets for cooling the pockets received therein during heat sealing, said openings being defined by cavities in said dies and there being provided in the base of each cavity, a central entry aperture for the introduction of cooling fluid and exit apertures adjacent each end for the outflow of the cooling fluid.

#### 4,792,374 APPARATUS FOR FUSION JOINING PLASTIC PIPE

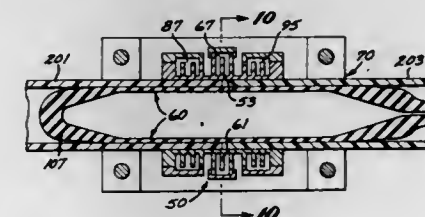
Kent A. Rianda, Huntington Beach, Calif., assignor to Georg Fischer AG, Schaffhausen, Switzerland

Filed Apr. 3, 1987, Ser. No. 34,895

Int. Cl.<sup>4</sup> B29C 65/02

U.S. Cl. 156—503

14 Claims



1. An apparatus for fusion joining first and second, substantially axially abutted piping system component connection ends, comprising:

support means, internal to the subject first and second piping system ends, for controllably producing an outwardly radial force against the inside surfaces of the subject first and second ends over a region that is longitudinally

greater than a melt region which includes the interface and terminal portions of the subject ends; and heat enabling means (1) for surrounding the subject first and second piping system ends over a thermally controlled region extending longitudinally and bilaterally beyond the melt region which is substantially centrally located therein, and (2) for enabling a longitudinally differentiated thermal driving of the thermally controlled region in which the melt region is heated at least to its material softening point while the bilateral, longitudinally adjacent portions of the thermally controlled region are affirmatively maintained at temperatures lower than the softening point, said heat enablement means cooperating with said internal support means and the unmelted portions of the subject first and second ends to contain the melt region, said heat enabling means comprising:

- (a) a longitudinally centrally located annular channel for receiving material softening hot forced fluid and for separating the melt region from the received forced fluid, said centrally located annular channel thermally transferring thermal energy to said melt region; and
- (b) thermally conductive fins internal to said centrally located channel.

4,792,375

## STRUCTURE OF THE AUTOMATIC TAPE CUTTER/STICKER

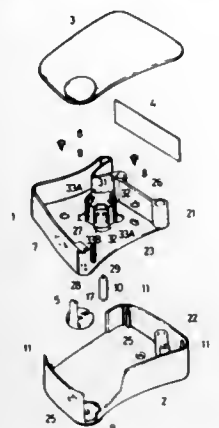
Shuh-Chia Lin, No. 5, Alley 35, Lane 4, An Lé Road, Chungho, Taipei Hsien, Taiwan

Continuation-in-part of Ser. No. 746,979, Jun. 20, 1985, abandoned. This application Mar. 9, 1987, Ser. No. 23,476

Int. Cl.<sup>4</sup> B32B 31/00, 31/18

U.S. Cl. 156—510

4 Claims



1. An automatic tape cutter/sticker comprising a main shell body, a bottom body shell below the main shell body and to which the main shell body is pivoted, a rotary cutting knife rotatably supported in the bottom body shell; an annular tube inside the main shell body the annular tube comprises four arc-shaped tube plates which are placed so as to together define the annular tube, and the annular tube having a central X-shaped fixing axis radially inside the annular tube; the outer diameter of the tube defined by the four tube plates is slightly smaller than a diameter of a center hole inside a roll of tape to be placed on the tube; the fixing axis having legs which define four concave portions equally spaced around the fixing axis and projecting from the main shell body above the main shell body, the four concave portions being in two pairs, with alternate concave portions being paired; radially outward of the first pair of concave portions are respective first ones of the arc-shaped tube plates of a first height above the main shell body; the first tube plates are of a material to provide an outward expansion force; the tops of the first tube plates above the main shell body are provided with respective first flanges

which extend radially outwardly from the fixing axis and which are at said first height above the main shell body that is selected to be used to fit-on a greater width tape; radially outward of the second of the pairs of concave portions are respective second ones of the arc-shaped tube plates which are of a second height above the main shell body shorter than said first height and also are of a material to provide an outward expansion force; the tops of the second tube plates above the main shell body are provided with respect second flanges, which extend radially outwardly from the fixing axis and which are at said second height above the main shell body that is selected to be used to fit on a narrower width tape.

4,792,376

## APPARATUS FOR THE SUBLIMATION PRINTING OF KEYBOARD CAPS

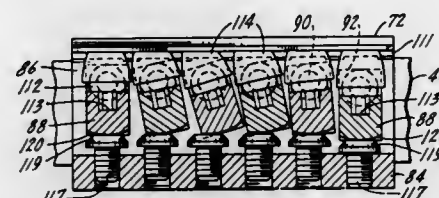
Ronald S. Denley, Woodstock, Ill., assignor to Oak Industries Inc., Rancho Bernardo, Calif.

Filed Jul. 27, 1987, Ser. No. 78,255

Int. Cl.<sup>4</sup> B44C 1/00; B30B 31/00, 5/00; D06P 5/00

U.S. Cl. 156—540

10 Claims



1. An apparatus for printing keyboard keycaps including a fixture for holding multiple keycaps in an essentially keyboard profile, said fixture including means supporting said keycaps in separately movable rows each having multiple keycaps, each row of keycaps being supported on said fixture for both pivotal movement and up and down translational movement, means for moving the separately movable segments from an essentially keyboard profile into an essentially planar printing profile, printing means including an air inflatable heated bladder positioned to apply heat and pressure to a legend carrying medium positioned upon the keycaps to transfer the legends from the medium to the individual keycaps.

4,792,377

## FLUX GROWTH OF SODIUM BETA" ALUMINA

Bruce S. Dunn, Los Angeles, and Peter E. D. Morgan, Thousand Oaks, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Feb. 9, 1987, Ser. No. 12,198

Int. Cl.<sup>4</sup> C30B 9/12, 15/02

U.S. Cl. 156—624

21 Claims

1. A method for growing crystals of alkali-beta" alumina and an alkali ion source; producing a melt comprising a high valence agent to lower the eutectic temperature, beta" alumina and an alkali ion source; heating said melt mixture to a temperature below the decomposition temperature of beta" alumina and an alkali ion source; heating said melt mixture to a temperature below the decomposition temperature of beta" alumina to form a homogeneous melt of alkali-beta" alumina; cooling the homogeneous melt of alkali-beta" alumina at a sufficient rate to form a crystal of alkali-beta" alumina.

4,792,378

## GAS DISPERSION DISK FOR USE IN PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION REACTOR

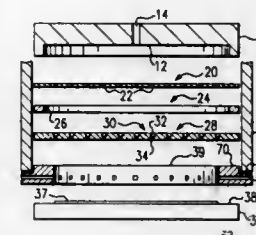
Alan D. Rose, Wylie, Tex., and Robert M. Kennedy, III, Taylors, S.C., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 15, 1987, Ser. No. 132,305

Int. Cl.<sup>4</sup> B44C 1/22; B05B 5/02; C23C 14/00; C03C 15/00

U.S. Cl. 156—643

22 Claims



16. A method of dispersing a gas in a chemical vapor transport system exhibiting a gas pressure gradient, comprising the steps of:

separating a gas inlet chamber area which exhibits said pressure gradient from a slice processing area by a barrier for restricting the flow of gas from the inlet chamber area to the slice processing area such that in the high gas pressure areas there is a higher restriction than in low gas pressure areas.

4,792,379

## APPARATUS FOR RECAPING A TIRE WITH A FLEXIBLE SEGMENTED MOLD

Arthur W. Magee, Richardson; Richard D. Shockley, Dallas, and Michael E. Crawford, Irving, all of Tex., assignors to Long Mile Rubber Company, Dallas, Tex.

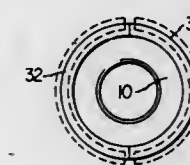
Division of Ser. No. 601,543, Apr. 18, 1984, Pat. No. 4,588,460.

This application Jan. 31, 1986, Ser. No. 825,684

Int. Cl.<sup>4</sup> B29D 30/58

U.S. Cl. 156—909

18 Claims



1. Apparatus for recapping tires utilizing uncured rubber and a prepared tire carcass, comprising:

an arcuate segmented elastomeric mold having a negative contour of a desired tread pattern formed on one side thereof comprised of ribs operable to extend downwardly into a layer of uncured rubber built-up around the tire carcass, said segmented mold having a predefined length and at least two free ends that are operable to abut and form a band when said ribs are fully imbedded in said layer of uncured rubber;

means for securing said segmented mold around a circumferential surface of said built-up tire carcass with a gap between said free ends and said ribs partially imbedded into said uncured rubber; and

means for applying an external force radially inwardly to said segmented mold so that said ribs are forced into said uncured rubber during curing until said free ends of said mold abut.

4,792,380

## FASTENING OF A PROFILE BAR TO AN ADJUSTMENT SPINDLE IN A HEAD BOX

Tapani Tuomikoski, Jyväskylä, Finland, assignor to Valmet Oy, Finland

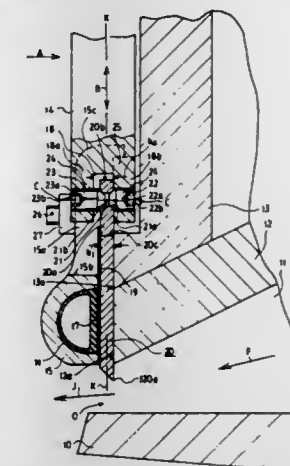
Filed Dec. 10, 1987, Ser. No. 130,888

Claims priority, application Finland, Dec. 12, 1986, 865085

Int. Cl.<sup>4</sup> D21F 1/02

U.S. Cl. 162—344

13 Claims



1. In a headbox of a paper machine, comprising a profile bar at a discharge opening of the headbox and at least one adjustment spindle for adjusting profile of the profile bar which in turn determines transverse profile of the discharge opening, a fastening arrangement for the profile bar to the at least one adjustment spindle, comprising

a pair of recesses disposed on opposite sides of the profile bar,

a recess provided in an end of the at least one adjustment spindle facing toward the discharge opening,

means for interconnecting the profile bar with the at least one adjustment spindle, being shaped substantially complementary to said profile bar recesses and extending into said adjustment spindle recess,

said profile bar being aligned with the at least one adjustment spindle when interconnected therewith by said interconnecting means,

wherein the profile bar comprises a center plane, the adjustment spindle comprises an axial center plane, and said center plane of the profile bar substantially coincides with said axial center plane of the adjustment spindle, and

wherein said interconnecting means comprise first and second screws having ends shaped substantially complementary to respective profile bar recesses.

4,792,381

## CLOSED AND COMPACT PRESS SECTION OF A PAPER MACHINE WITH DOUBLE S SHAPED PATH OR MIRROR IMAGE THEREOF

Juhani Pajula, Jyväskylä, Finland, assignor to Valmet Oy, Finland

Filed Sep. 11, 1987, Ser. No. 96,397

Claims priority, application Finland, Sep. 12, 1986, 863713

Int. Cl.<sup>4</sup> D21F 3/04

U.S. Cl. 162—360.1

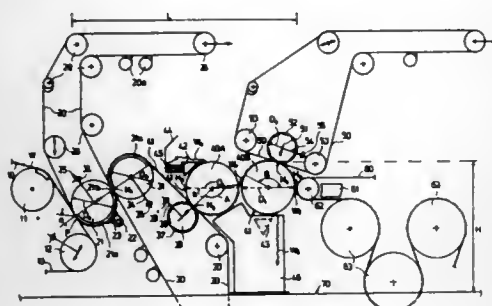
24 Claims

1. An essentially closed press section of a paper machine for removing water from a paper web passing therethrough, said press section comprising a compact press roll combination arranged to form several press nips between which the web is guided to run principally supported by roll surfaces without substantially long free draws,

wherein said press section comprises, in combination and in



the following order in a running direction of the web through said press section,  
 first and second press section rolls forming a first press nip and two felts passing through said first press nip, a first of said two felts being a pick-up felt for moving the web from a pick-up point to said first press nip and a second of said two felts moving the web after the same passes through said first nip,  
 a first smooth-surfaced, center roll and means forming a second press nip with said first center roll at a point on its lower circumference, said second felt running through said second press nip,  
 a second smooth-surfaced, center roll having a circumference located a discrete distance from the circumference of said first center roll such that said first and second center rolls do not form a nip with one another,



the paper web being led essentially along a path shaped substantially as an S or a mirror image thereof around said two press suction rolls and also around said two center rolls, so that both sides of the web are pressed against the smooth surface of a respective roll, and means forming a third press nip with said second center roll at a point on its upper circumference thereof, and a third press felt being guided through said third press nip, with the web being detached from the smooth surface of said second center roll after said third press nip and directed to a drying section of the paper machine, and said first and second press suction rolls and center rolls being arranged to lead the web thereabout essentially along said path shaped substantially as a double S or a mirror image thereof through said press section.

#### 4,792,382 PROCESS FOR REMOVING DUST FROM DRY COOLED COKE

Kurt Lorenz, Hattingen; Horst Dungs, Herne; Klaus Mron-gowius, Recklinghausen, and Jost-Wilfried Gehrhardt, Meer-bach, all of Fed. Rep. of Germany, assignors to Firma Carl Still GmbH & Co. KG, Fed. Rep. of Germany

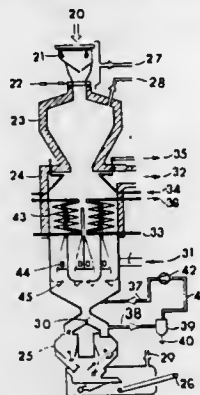
Continuation-in-part of Ser. No. 763,448, Aug. 7, 1985, abandoned. This application Dec. 1, 1986, Ser. No. 936,183  
 Claims priority, application Fed. Rep. of Germany, Aug. 9, 1984, 3429292; Feb. 8, 1986, 3604061  
 Int. Cl.<sup>4</sup> C10B 39/02

U.S. Cl. 201-3

5 Claims

1. A process for removing dust from coke using a dust free flushing gas after it is first dry cooled to about 200° C. in a dry cooling zone of a cooling chamber, comprising removing the dry cooled coke from the dry cooling zone by directing the dry cooled coke through a brief free falling movement towards a discharge lock at a lower end of the cooling chamber while injecting the dust free flushing gas into the free falling coke in a direction which is parallel to the direction of movement of the free falling coke, drawing the flushing gas through the free falling coke above the discharge lock and entraining dust which is stirred up in the coke during the brief free falling movement, withdrawing the flushing gas and entrained dust

from the cooling chamber above the discharge lock and separating the entrained dust from the flushing gas to form a dust



free flushing gas once again and injecting said dust free flushing gas into the free falling coke as it is removed from the dry cooling zone of the cooling chamber.

#### 4,792,383 POLYMER COMPOSITIONS AND ALKALINE ZINC ELECTROPLATING BATHS AND PROCESSES

William I. Willis, North Royalton, Ohio, assignor to McGraw-Hill, Inc., Cleveland, Ohio

Filed Oct. 27, 1987, Ser. No. 114,098  
 Int. Cl.<sup>4</sup> C25D 3/22, 3/24; C08L 79/04; C08G 73/06  
 U.S. Cl. 204-55.3

53 Claims

1. A polymeric composition which comprises the reaction product of  
 (A-1) at least one nitrogen-containing heterocyclic compound;  
 (A-2) at least one alkanolamine  
 (A-3) an epihalohydrin, glycerolhalohydrin or mixtures thereof; and  
 (A-4) at least one amino compound containing at least one N-H group.  
 10. An aqueous alkaline electroplating bath suitable for producing bright metallic zinc deposits comprising a source of zinc ions and from about 0.01 to about 20 grams per liter of bath, of the polymeric composition of claim 1.

#### 4,792,384 METHOD AND APPARATUS FOR OPERATING A FUEL CELL IN COMBINATION WITH AN ELECTROCHEMICAL CELL TO PRODUCE A CHEMICAL PRODUCT

Alexander H. Levy, Bloomfield, and Kenneth Lipman, West Hartford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

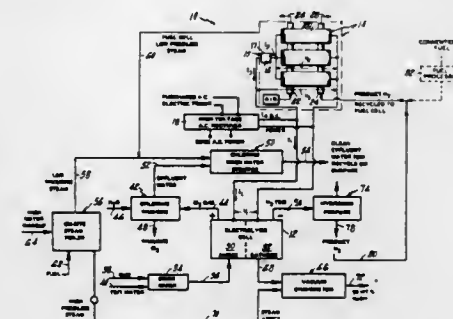
Continuation of Ser. No. 501,237, Jun. 3, 1983, abandoned. This application Mar. 20, 1987, Ser. No. 27,040  
 Int. Cl.<sup>4</sup> C25B 1/02, 15/00; H01M 8/06

U.S. Cl. 204-129

14 Claims

1. An apparatus for carrying out an electrochemical process which comprises:  
 an electrochemical electrolysis cell which uses input electrical power at a first voltage and a first current to produce a chemical product and hydrogen;  
 at least one fuel cell which utilizes hydrogen to produce output electrical power at a second voltage which is independent of the voltage of the electrochemical cell and a second current;  
 means for supplying the hydrogen produced by the electrolysis cell to the fuel cell for consumption of at least a portion of the hydrogen by the fuel cell; and,  
 regulator means responsive to the power produced by the fuel cell and to the hydrogen available to the fuel cell for

supplying output power received from the fuel cell as input power at the first voltage to the electrochemical cell, said means being electrically connected to the fuel cell and the electrochemical cell and said means employing a direct current converter having gated switch means which intermittently passes current for regulating the



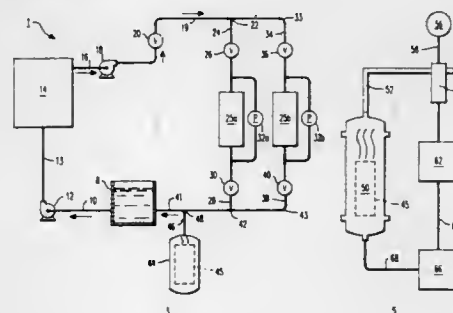
electrical power received from the fuel cell by intermittently flowing current between the fuel cell and the electrolysis cell through the gated switch means to adjust the current and voltage supplied by the fuel cell so that the voltage change across said regulator means is equal to the different between the first voltage and the second voltage.

#### 4,792,385 ELECTROLYTIC DECONTAMINATION APPARATUS AND ENCAPSULATION PROCESS

Thomas S. Snyder, Oakmont, and Alexander P. Murray, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 3, 1987, Ser. No. 116,088  
 Int. Cl.<sup>4</sup> C25F 1/00, 7/00  
 U.S. Cl. 204-140

30 Claims



1. A method for removing radioactive ions from a solution in order to regenerate the solution and to prepare the ions for disposal, comprising the steps of circulating the solution through a permeable electrode to plate the ions thereon, wherein said electrode is made from a material that forms a gas when incinerated and then incinerating the plated electrode to reduce the volume thereof.

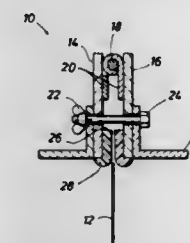
#### 4,792,386 METHOD AND APPARATUS FOR INSTALLING A LARGE, PLANAR, DELICATE MEMBRANE IN AN ELECTROLYSIS CELL

James W. McMichael, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jan. 13, 1986, Ser. No. 818,465  
 Int. Cl.<sup>4</sup> C25B 9/00

U.S. Cl. 204-279

4 Claims



1. Apparatus for installing a rectangular sheet membrane in an electrolysis cell formed of facing halves openable to define slot in the cell, comprising:  
 (a) first and second similar marginal releasable clamps fastenable to a sheet membrane at opposing edges, each of said clamps including adjustable lock means on said clamps to releasably lock said clamps;  
 (b) axially hollow elongate transport spool means having a lengthwise slot sized to receive one of said clamps axially therein while holding the sheet in the slot to thereby anchor one edge of the sheet membrane, and further enabling the sheet membrane to be rolled around said spool means exposing a second marginal edge parallel to said spool means and wherein said remaining clamp is enabled to be releasably clamped on the second and exposed marginal edge of the sheet membrane.

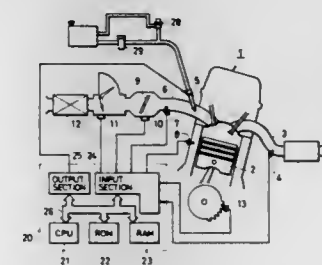
#### 4,792,387 AIR-FUEL RATIO DETECTING DEVICE

Toshiyuki Ishihara; Takeshi Kamiya; Yutaka Nakayama, and Tetsuo Yamada, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan

Filed Jun. 21, 1985, Ser. No. 747,607  
 Claims priority, application Japan, Aug. 3, 1984, 59-164098  
 Int. Cl.<sup>4</sup> G01N 27/46

U.S. Cl. 204-425

5 Claims



1. An air-fuel ratio detecting device comprising:  
 a detecting element section having two elements arranged in opposition to one another and disposed in a chamber in which an exhaust gas flows, each of said elements being made of an oxygen-ion-conductive solid electrolyte provided with porous electrodes on its opposite surfaces;  
 theoretical air-fuel ratio detecting means for detecting a theoretical air-fuel ratio to produce a theoretical air-fuel ratio signal indicative of whether an air-fuel ratio is in a lean region or in a rich region;  
 air-fuel ratio signal detecting means, employing one of said two elements in said detecting element section as an oxy-

gen sensing element and the other as an oxygen pumping element, for controlling one of an electromotive force of said oxygen sensing element and a pumping current flowing in said oxygen pumping element, wherein an air-fuel ratio signal corresponding to the air-fuel ratio in each of lean and rich regions of said air-fuel ratio is produced; and actual air-fuel ratio signal detecting means receiving said theoretical air-fuel ratio signal produced by said theoretical air-fuel ratio detecting means and said air-fuel ratio signal produced by said air-fuel ratio signal detecting for deriving an actual air-fuel ratio signal corresponding to an actual air-fuel ratio over an entire range of air-fuel ratios in accordance with said theoretical air-fuel ratio signal and said air-fuel ratio signal, wherein a polarity of said air-fuel ratio signal produced by said air-fuel ratio signal detecting means is inverted in accordance with a value of said theoretical air-fuel ratio signal.

**4,792,388**  
**ELECTROLYSIS METHOD OF ELECTROLYZING HALIDES**

Orozio de Nora, Milan, Italy, assignor to Orozio de Nora Technologies, Inc., Houston, Tex.  
Division of Ser. No. 544,111, Oct. 20, 1983, abandoned, which is a division of Ser. No. 382,691, May 27, 1982, Pat. No. 4,468,311, which is a division of Ser. No. 102,629, Dec. 11, 1979, Pat. No. 4,343,690. This application Dec. 21, 1987, Ser. No. 136,192  
Claims priority, application Italy, Aug. 3, 1979, 24919 A/79  
Int. Cl.<sup>4</sup> C25B 1/14

U.S. Cl. 204—98

12 Claims



1. In a method of generating halogen by electrolyzing an aqueous halide solution carried out in a cell comprising an ion permeable diaphragm, oppositely charged gas and liquid permeable electrodes extending along and in contact with opposite sides of said diaphragm, at least one of said electrodes comprising a porous layer of particles of a conductive electrocatalytic material, bonded to one side of said diaphragm, and current distributing means pressed against said porous layer by compressing means, the improvement consisting in that said current distributing means comprises a resilient compressible electro-conductive metal fabric being capable of being compressed in the direction of the diaphragm and to exert an elastic reaction force towards the diaphragm at a multiplicity of pressure points and capable to transfer excess resilient force acting on one or more pressure points to other neighbouring pressure points in a lateral direction along a major dimension of the mat whereby compressing pressure can be effectively distributed over the entire surface of the layer, said mat being open to permit flow of electrolyte through it, means slideable with respect to the mat to compress the mat toward the diaphragm and a rigid support on the other side of the flexible diaphragm to restrain diaphragm displacement.

**4,792,389**  
**PROCESS TO PRODUCE LIGHT PRODUCTS AND FUEL OILS FOR CONVENTIONAL USE FROM HEAVY METAL- AND SULFUR-RICH CRUDE OIL RESIDUES**  
Werner Frohn; Dieter Bohlmann; Hermann Franke; Werner Zimmermann; Helmut Lommer; Eberhard Höpfner; Horst Lindner; Reinhard Matthey; Henner Müller; Hans Poppen; Hartmut Schütter, all of Schwedt/Oder, and Detlev Dietrich, Vierraden, all of German Democratic Rep., assignors to VEB Petrochemisches Kombinat Schwedt, German Democratic Rep.; Toyo Engineering Corporation and Mitsui Coke Co., Ltd., both of Tokyo, Japan  
Filed May 1, 1987, Ser. No. 45,909  
Claims priority, application German Democratic Rep., Jun. 10, 1986, 291132

Int. Cl.<sup>4</sup> C10G 51/02  
U.S. Cl. 208—76 2 Claims

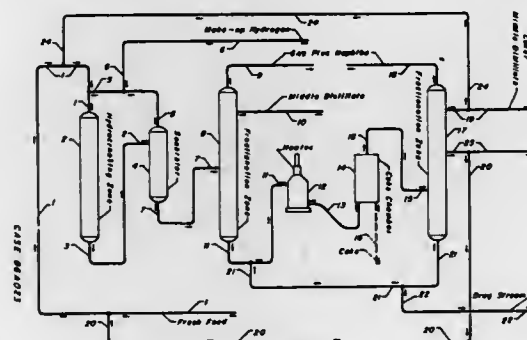
1. In a two stage process for producing light oil products and conventionally usable fuel oils by the thermal conversion of heavy metal and sulfur-rich crude oil residues, the improvement comprising thermally cracking the residues in a first and a second cracking stage, wherein the residue remaining in the first cracking stage after separation of conversion products is employed as feed to the second cracking stage and the first cracking stage operates at a pressure of about 1 MPa and a temperature of about 425° C. and the second cracking stage operates at a pressure of about 0.1 MPa and a temperature of about 25° C. lower than that of the first stage and with 15 wt. % steam injection in said second stage, said steam wt. % being based on the feed to the second stage, the retention time in the first cracking stage being about 20 minutes and the retention time in the second cracking stage being about three times that of the first cracking stage.

**4,792,390**  
**COMBINATION PROCESS FOR THE CONVERSION OF A DISTILLATE HYDROCARBON TO PRODUCE MIDDLE DISTILLATE PRODUCT**

Darrell W. Staggs, Crystal Lake; Laurence O. Stine, Western Springs, and Te-Yu M. Chen, Arlington Heights, all of Ill., assignors to UOP Inc., Des Plaines, Ill.  
Filed Sep. 21, 1987, Ser. No. 98,838  
Int. Cl.<sup>4</sup> C10G 65/12, 69/06

U.S. Cl. 208—50

27 Claims



1. A process for the conversion of an aromatic-rich, distillable gas oil charge stock which is essentially free from asphaltic hydrocarbons and possesses an aromatic hydrocarbon concentration greater than about 20 volume percent to selectively produce large quantities of high quality middle distillate while minimizing hydrogen consumption which process comprises the steps of:

(a) reacting said charge stock with hydrogen, in a catalytic hydrocracking reaction zone, at hydrocracking conditions including a maximum catalyst bed temperature in the range of about 600° F. (315° C.) to about 850° F. (454° C.) selected to convert at least a portion of said charge stock to lower-boiling hydrocarbon products including middle

distillate and to convert at least 10 volume percent of the aromatic hydrocarbon compounds contained in said charge stock to provide an increased concentration of paraffin hydrocarbon compounds in the resulting hydrocracking reaction zone effluent;

- (b) separating said resulting hydrocracking reaction zone effluent to provide a middle distillate product stream and a paraffin-rich hydrocarbonaceous stream boiling at a temperature greater than about 700° F. (371° C.);
- (c) recovering said middle distillate product stream;
- (d) reacting said paraffin-rich hydrocarbonaceous stream recovered in step (b) in a thermal coking zone at mild thermal coking conditions including an elevated temperature from about 750° F. (399° C.) to about 950° F. (510° C.), a pressure from about 10 psig (69 kPa gauge) to about 150 psig (1034 kPa gauge) and a combined feed ratio from about 1 to about 2 to provide a thermal coking zone effluent wherein said combined feed ratio is defined as total volume of liquid charged per volume of fresh hydrocarbon charge;
- (e) separating said thermal coking zone effluent to provide a fraction boiling in the range from about 300° F. (149° C.) to about 700° F. (371° C.) and a distillable hydrocarbonaceous stream boiling in the range from about 700° F. (371° C.) to about 1000° F. (538° C.); and
- (f) recycling at least a portion of said distillable hydrocarbonaceous stream boiling in the range from about 700° F. (371° C.) to about 1000° F. (538° C.) recovered in step (e) to said catalytic hydrocracking reaction zone in step (a).

**4,792,391**  
**FLOATING RECYCLE PAN AND PROCESS FOR EBULLATED BED REACTORS**

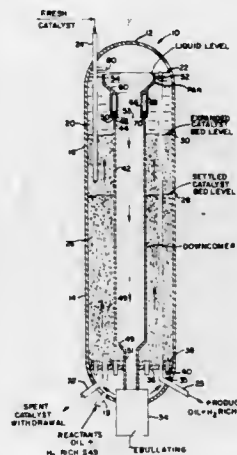
Jeffrey A. Cox, Warrenville, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Jun. 11, 1987, Ser. No. 61,533

Int. Cl.<sup>4</sup> C10G 45/16

U.S. Cl. 208—108

6 Claims

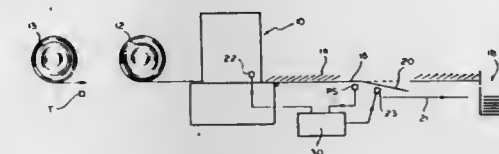


1. A hydrotreating process, comprising the steps of: feeding a hydrotreating catalyst into an ebullated bed reactor; partially filling said ebullated bed reactor to a level defining a liquid level below the top of said reactor with a feed comprising oil and hydrogen-rich gases; raising said level of said feed by activating an ebullating pump and concurrently ebullating, contacting, and mixing said feed with said catalysts; floating a tubular pan upon said feed partially below said level in said reactor and at least partially above a downcomer to allow said pan to rise in response to said rising of

said liquid level for facilitating flow of said feed to said downcomer; directing said feed substantially downwardly through said pan and said downcomer in said ebullated bed reactor; and mixing and contacting said oil and said hydrogen-rich gases with said catalyst to produce hydrotreated oil.

**4,792,392**  
**DUMP GATE CONTROL SYSTEM**  
Brian Belgian, Witton Gilbert, England, assignor to Ben Johnson & Company Limited, York, England  
Filed Aug. 8, 1986, Ser. No. 894,697  
Claims priority, application United Kingdom, Aug. 13, 1985, 8520302

Int. Cl.<sup>4</sup> B07C 5/02, 5/36  
U.S. Cl. 209—3.3 10 Claims



1. In or for a high-speed printing press comprising a plurality of reels, wherein a first of said reels provides paper for said printing press until paper from a second of said reels is joined in a splice to the paper from said first reel, at which time said second reel provides paper to said printing press, said printing press having a conveyor system for carrying printed copy from the press to stacking means and the conveyor system including a dump gate section for rejecting a marred copy containing said splice, a control system for controlling the dump gate section, said control system comprising: detecting means for detecting a marker carried by said marred copy in a succession of printed copies being conveyed by said conveyor system; counter means for starting to count in response to said detecting means; means responsive to each successive printed copy passing a predetermined point along said conveyor system to actuate the counter means; and dump gate actuating means responsive once a predetermined number of said passing printed copies has been counted by said counter means to open the dump gate, and further responsive once a further predetermined number of said printed copies has been counted as passing to close the dump gate.

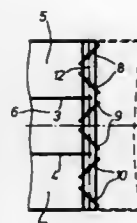
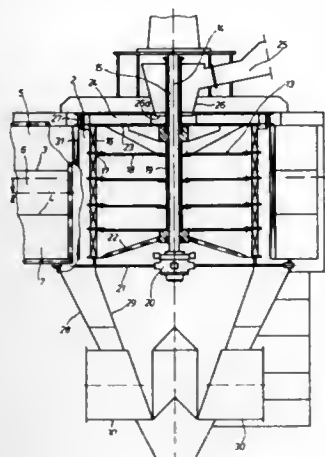
**4,792,393**  
**SPIRAL AIR SIFTER HAVING AIR REGULATION**  
Gotthardt Blaszyk; Hubert Eickholt, both of Beckum; Otto Heinemann, Ennigerloh; Norbert Bredenholter, Oelde; Ludger Kimmeyer, Beckum; Peter Tiggesbaumker, Oelde; Michael von Seebach, and Heinrich Henne, both of Ennigerloh, all of Fed. Rep. of Germany, assignors to Krupp Polysius AG, Beckum, Fed. Rep. of Germany  
Filed Jun. 19, 1987, Ser. No. 63,689  
Claims priority, application Fed. Rep. of Germany, Jul. 3, 1986, 3622413

Int. Cl.<sup>4</sup> B07B 4/04, 11/02  
U.S. Cl. 209—135 11 Claims

- 1. In a sifter:
  - (a) a housing provided with spiral sifting air delivery means having an inlet and outlet opening tangentially into a sifting chamber, a hopper for removal of coarse material, and at least one outlet for removal of sifting air containing fine material;
  - (b) a rotor having rotor blades on its periphery and rotatable about a vertical axis, said rotor having in the region of one end thereof an opening for the escape of the sifting air containing fine material; and
  - (c) means for delivering material to be sifted to the upper

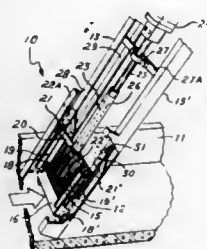


end of the rotor and for deflecting the material which is moved outwards by the rotor, so that the material to be sifted passes downwards through an annular sifting chamber; the improvement comprising:



- (d) partition means dividing said spiral delivery means into at least two channels lying one above the other from which sifting air flows into the sifting chamber at different heights, and
- (e) regulating means for individually setting the quantity and speed of the sifting air delivered through each of said channels.

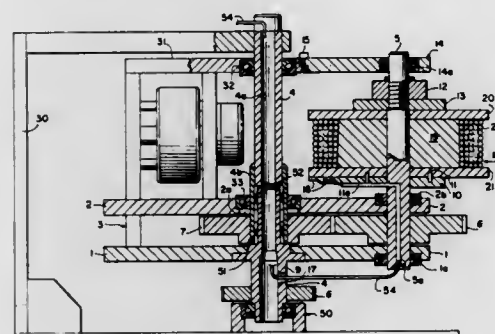
**4,792,394**  
**BAR SCREENING APPARATUS**  
Stanley P. Rudzinski, Chicago, Ill., assignor to Rudz Enterprises, Inc., Ill.  
Continuation-in-part of Ser. No. 784,226, Oct. 4, 1985, abandoned. This application Sep. 18, 1986, Ser. No. 908,828  
Int. Cl.<sup>4</sup> B01D 35/16  
U.S. Cl. 210—159 28 Claims



1. A solids screening apparatus comprising a flow channel for directing a solids containing liquid flow stream along a predetermined path corresponding substantially to the longitu-

dinal axis of said flow channel, a bar screen transversely mounted at a predetermined location in said flow channel, said bar screen including a plurality of bars each having an upstream face with a leading upstream edge on one side thereof and a trailing downstream edge on the other side thereof, means for mounting said bars in parallel spaced relation to each other to define elongated liquid flow openings therebetween, and said bars each being supported by said mounting means such that the lines of intersection of said upstream faces with a horizontal plane each is disposed at an acute angle to the longitudinal axis of said flow channel at said predetermined location with the leading edge of each bar being in substantial alignment with the trailing edge of an adjacent bar when viewed along said longitudinal axis.

**4,792,395**  
**HIGH SPEED COUNTERCURRENT CENTRIFUGE FOR REMOVAL ATTACHMENT OF CHROMATOGRAPHIC COLUMNS THERETO, AND CHROMATOGRAPHIC COLUMN FOR THE SAME**  
David Y. W. Lee, 105 Highland Dr., Chapel Hill, N.C. 27514  
Filed Aug. 14, 1987, Ser. No. 86,320  
Int. Cl.<sup>4</sup> B01D 15/08  
U.S. Cl. 210—198.2 7 Claims

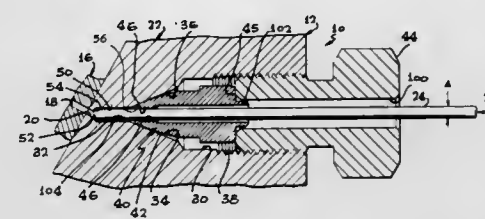


1. An apparatus for high speed countercurrent chromatography comprising:
- a frame including a first bottom plate mounted for rotation about a pipe extending between said first bottom plate and a top supporting plate of said frame, a fixed portion of said top supporting plate surrounding said pipe and extending outward therefrom to at least one side being fixed by a connecting member to said first bottom plate, a detachable portion of said top supporting plate being releasably attached to said fixed portion;
  - releasing means for releasably mounting said detachable portion to said fixed portion;
  - a shaft, parallel to and spaced apart from said pipe, extending rotatably between said first bottom plate and said detachable portion, said shaft extending through a bore of a bearing section in said detachable portion;
  - a plate-shaped column holder rigidly fixed to and extending radially away from said shaft, said column holder having means for receiving a spool on a radially extending surface thereof in a manner which prevents rotation of the spool with respect to said shaft and said column holder;
  - means for rotating said frame about said pipe;
  - means for transmitting the rotation of said frame to said shaft;
  - a second bottom plate fixed to said frame below said first bottom plate, said pipe including a first section extending through said first and second bottom plates, said first section of said pipe being rotatable with respect to said first bottom plate but not with respect to said second bottom plate, and a second section between said top supporting plate and above said first bottom plate, said top

supporting plate and said first section of said pipe being rotatable with respect to said second section of said pipe, said second section extending through and being rotatable with respect to said second bottom plate and said shaft extending through said second bottom plate; and wherein said rotating and transmitting means collectively comprise:

- a sun gear fixed to and extending radially away from said pipe, positioned between said first and second bottom plates; and
- a planetary gear fixed to and extending radially away from said shaft, positioned between said first and second bottom plates, and said planetary gear meshing with said sun gear.

**4,792,396**  
**MULTI-SIZE INJECTOR PORT SYSTEM**  
Richard Gundelfinger, Cotati, Calif., assignor to Rheodyne Incorporated, Cotati, Calif.  
Filed Nov. 3, 1987, Ser. No. 116,387  
Int. Cl.<sup>4</sup> B01D 15/08  
U.S. Cl. 210—198.2 8 Claims



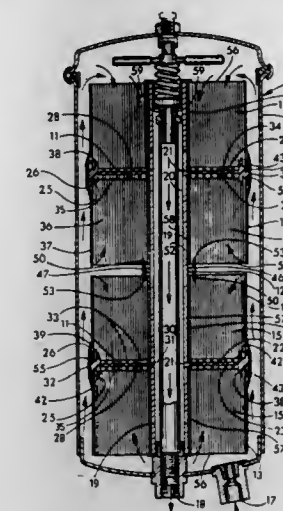
8. A method for enabling the installation of a second tube of a larger diameter and then a first tube of a smaller diameter in a frame of a chromatographic analyzing system comprising:
- forming a tube coupling hole in said frame, with a cylindrical inner hole portion of substantially said first diameter, a tapered middle hole portion, and an outer hole portion;
  - projecting the end portion of a second tube of said second diameter through a second ferrule, pressing the tip of said second tube against said tapered hole portion at a location spaced outwardly from said inner hole portion, and pressing a tapered forward portion of said second ferrule against said tapered hole portion to seal said second ferrule to said coupling hole and to said second tube;
  - removing said second tube and second ferrule from said hole;
  - projecting the end portion of a first tube of said first diameter through a first ferrule, pressing the end portion of said first tube deeply into said inner hole portion and pressing said first ferrule against said tapered hole portion to seal said first ferrule to said coupling hole and to first tube.

**4,792,397**  
**FILTER APPARATUS WITH SEALING COLLECTOR AND FLOW CONTROL ELEMENT**  
Harold O. Rasmussen, Bonita, Calif., assignor to Harvard Corporation, Evansville, Wis.  
Filed Jun. 9, 1987, Ser. No. 60,115  
Int. Cl.<sup>4</sup> B01D 25/02, 29/48  
U.S. Cl. 210—314 28 Claims

1. A pressurized axial flow filter apparatus for filtering fluids comprising:
- (a) a container with an inlet and an outlet port;
  - (b) a centrally located flow path having at least one receiving port for receiving filtered fluid which is to be transported out of the container outlet port;
  - (c) at least one filter element which encircles the centrally located flow path, each filter element including wound layers of tissue through which the fluid passes, and a periphery; and
  - (d) at least one fluid collector which encircles the centrally

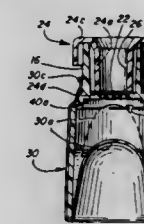
located flow path adjacent the receiving ports and which directs filtered fluid from the adjacent filter elements inwardly to the receiving ports, the fluid collector including:

- (i) a substantially flat portion having two sides of which at least one faces a filter element end from which filtered fluid is received, an inner margin which defines a centrally disposed opening through which the centrally located flow path axially passes, and an outer perimeter;
- (ii) an annular ring portion which projects axially from each side of the substantially flat portion which faces a filter element exit end, each annular ring portion extending into the adjacent filter element end between



- those layers of tissue which are disposed inwardly a few layers from the filter element periphery, so that the first seal is formed by each annular ring portion with the adjacent filter element end, the first seal separating the filtered fluid from any unfiltered fluid; and
- (iii) a rigid outer retention ring which projects axially from the outer perimeter of the substantially flat portion on each side which faces a filter element exit end, the rigid outer retention ring including one inside surface for each adjacent filter element, each inside surface abutting against the outer periphery of the adjacent filter element so that a second seal is formed which provides for further separation of the filtered fluid from the unfiltered fluid.

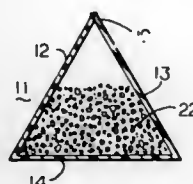
**4,792,398**  
**MANUAL VACUUM FILTRATION DEVICE**  
Vernon W. Klein, Kansas City, Mo., assignor to Marion Laboratories, Inc., Kansas City, Mo.  
Filed Aug. 10, 1987, Ser. No. 84,029  
Int. Cl.<sup>4</sup> B01D 29/00  
U.S. Cl. 210—406 14 Claims



1. A liquid filtration device comprising, in combination, a

housing having upper and lower ends and defining an internal chamber opening outwardly of said housing, said housing further defining a liquid specimen receiving chamber at its upper end adapted for flow communication with said internal chamber, a filter element interposed between and exposed to said specimen receiving chamber and said internal chamber, said filter element being characterized as substantially impervious to air flow therethrough when wetted by liquid but enabling flow of specimen liquid therethrough when subjected to vacuum within said internal chamber, and elastic means mounted on said housing so as to traverse said outward opening of said internal chamber so as to displace air from said internal chamber and create a vacuum therein upon wetting of said filter element and release of said elastic means.

**4,792,399**  
**LIQUID COLLECTING AND RETAINING DEVICE**  
Glen K. Haney, 110 Wynneville Pkwy., Peachtree City, Ga. 30269, and Victor Kramer, Atlanta, Ga., assignors to Glen Kyle Haney, Jonesboro, Ga.  
Filed Aug. 3, 1987, Ser. No. 80,807  
Int. Cl. C02F 1/40  
U.S. Cl. 210-484  
14 Claims



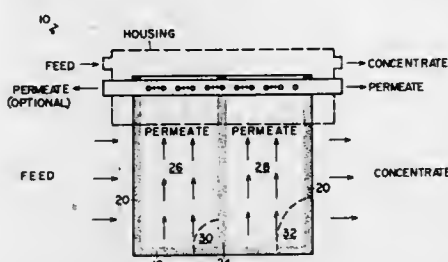
1. A liquid collecting and retaining member for use in the treatment of liquid spills comprising a tubular casing member of thermoplastic, non-woven, absorbent material that is porous to liquids but substantially non-porous to granular solid matter, said casing member having a triangular cross-section, a filling material contained within said casing, said filling material being capable of collecting and retaining liquid that passes through said casing, and means closing the ends of said casing member.

**4,792,400**  
**INSOLUBLE VINYL LACTAM CLARIFIERS**  
James Dougherty, N. Haledon, N.J.; Harold O. Locke, Easton, Pa.; Fulvio J. Vara, Chester, N.J.; Robert B. Login, Oakland, N.J., and Terry E. Smith, Morristown, N.J., assignors to GAF Corporation, Wayne, N.J.  
Filed Mar. 9, 1987, Ser. No. 23,338  
Int. Cl. C08F 26/10; C08J 3/28; B01D 39/10  
U.S. Cl. 210-500.1  
21 Claims

1. The process of subjecting a normally solid, water insoluble vinyl lactam polymer containing between about 0.5 and about 10% non-cross-linked and/or unsaturated sites to irradiation with radiant energy at a dosage level between about 0.05 and 20 megarads or its equivalent.

17. The process of filtering a liquid through a filter bed of the irradiated polymer of claim 1.

**4,792,401**  
**SPIRAL WOUND MEMBRANE MODULE AND METHOD OF MANUFACTURE AND USE**  
Todd A. Truex, Charlestown, and Clyde W. Fulk, Jr., Haverhill, both of Mass., assignors to Koch Membrane Systems, Inc., Wilmington, Mass.  
Filed Jan. 3, 1988, Ser. No. 202,711  
Int. Cl. B01D 13/00  
U.S. Cl. 210-644  
12 Claims



1. A high flux, spiral wound membrane module which comprises:

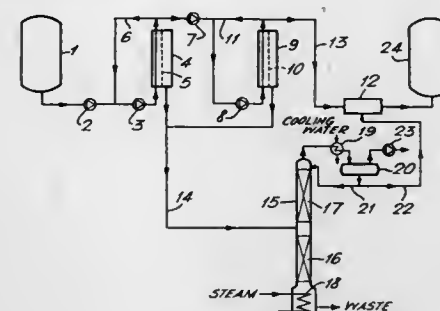
- a housing having a one and other end;
- a central tube having a one and other end and within the housing and characterized by a passageway means therein for the collection of permeate;
- a membrane leaf means spirally wound about the central tube and which comprises a first and second membrane sheet and a porous sheet between said membrane sheets to form a single permeate radial flow compartment, the outer axial edge and radial side edges of the membrane sealed to form a membrane leaf with the inner axial edge in a permeate flow communication with said permeate collection passageways;
- spacer means between the spirally wound membrane leaf means to define a flow channel means;
- feed inlet means to provide for the introduction of a pressurized feed stream at the one end of the housing and to flow axially in the flow channel means;
- concentrate outlet means to provide for the withdrawal of a concentrate stream at the other end of the housing; and
- permeate outlet means to provide for the withdrawal of a permeate stream from the central tube, the improvement which comprises: means for providing a substantially wrinkle-free membrane leaf means sufficient to provide for the separate radial flow of the permeate in each compartment into the passageway means of the central tube to restrict the axial flow of permeate and to provide for a more favorable permeate pressure distribution in the outer low process pressure corner portion of the leaf means including two or more separate sealed radial permeate flow compartments within said membrane leaf means.

6. In a method for the separation of a fluid feed stream by a high flux, spiral wound ultrafiltration membrane module into a permeate stream and a concentrate stream which method comprises:

- flowing a feed stream to be separated into one end and axially across the surface of a spirally wound membrane leaf;
- withdrawing an axially flowing concentrate stream at the other end of the membrane leaf;
- flowing a permeate stream radially within a single sealed compartment of the membrane leaf to a central tube permeate collection means; and
- withdrawing a permeate stream from the central tube permeate collection means, the improvement which comprises: providing a substantially wrinkle-free membrane leaf means including, two or more separate sealed permeate

flow compartments in the membrane leaf into the permeate collection means to reduce the membrane area of the membrane leaf means in which the permeate back pressure in the area is greater than the pressure of the feed stream and flowing the permeate stream radially within said two or more separate sealed permeate flow compartments sufficient to reduce substantially membrane wrinkling and membrane seam leaks.

**4,792,402**  
**CONCENTRATION OF ALCOHOLIC BEVERAGES**  
Richard Fricker, Derby, England, assignor to A.G. (Patents) Limited, London, England  
Continuation of Ser. No. 667,484, Oct. 5, 1984, abandoned. This application Nov. 24, 1986, Ser. No. 933,979  
Claims priority, application United Kingdom, Feb. 9, 1983, 8303611  
Int. Cl. B01D 13/00  
U.S. Cl. 210-651  
9 Claims



1. A method for concentrating beer which comprises subjecting the beer to reverse osmosis to form a beer concentrate, said reverse osmosis using a membrane which allows the passage of water therethrough and is at least partially permeable to alcohol and volatile flavor components of the beer but is impermeable to dissolved solids, subjecting the permeate from said reverse osmosis to distillation to separate therefrom alcohol and volatile flavor components of the beer which have passed through the membrane, and combining the separated alcohol and volatile flavor components with beer concentrate from reverse osmosis.

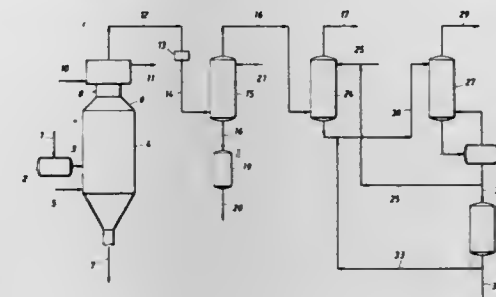
**4,792,403**  
**METHOD OF REMOVING ORGANIC IMPURITIES FROM AQUEOUS SOLUTION OF HYDROGEN PEROXIDE**  
Shizuo Togo, Ichikawa; Yasuo Sugihara, Yokkaichi, and Takaki Ikebe, Tokyo, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan  
Filed Jul. 31, 1987, Ser. No. 80,013  
Claims priority, application Japan, Aug. 6, 1986, 61-183369  
Int. Cl. C01B 15/02  
U.S. Cl. 210-692  
8 Claims

1. A method of removing organic impurities from an aqueous solution of hydrogen peroxide, which comprises bringing an aqueous solution of hydrogen peroxide containing organic impurities into contact with a halogen-containing porous resin having a true specific gravity in the wet state of 1.1 to 1.3.

**4,792,404**  
**DESALINATION OF SALINE WATER**  
Raymond J. Swedo, Mt. Prospect, and Joseph J. Zupancic, Bensenville, both of Ill., assignors to Allied-Signal Inc., Morristown, N.J.  
Filed Mar. 28, 1988, Ser. No. 174,272  
Int. Cl. B01D 13/00  
22 Claims

1. A process for the desalination of a saline water feedstream in the presence of an added chlorine-containing compound which comprises contacting said feedstream with the upstream face of a chlorine-resistant semipermeable membrane comprising a porous support backing material having composited thereon an interfacial polymerized condensation product resulting from the condensation reaction of a diaryl methylene monomer containing at least one amine radical on each aryl nucleus and an aromatic carboxylic acid chloride at separation conditions and recovering the resultant desalinated water downstream subsequent to passage through said membrane.

**4,792,405**  
**REMOVAL OF HYDROGEN SELENIDE LIQUIDS**  
Daniel C. Baker, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.  
Filed May 8, 1987, Ser. No. 47,397  
The portion of the term of this patent subsequent to Dec. 13, 2005, has been disclaimed.  
Int. Cl. C02F 1/62; B01D 53/14  
U.S. Cl. 210-721  
43 Claims



1. A process for removing hydrogen selenide from a liquid stream which comprises treating the stream with a disulfide or polysulfide to oxidize the selenide to elemental selenium.

11. A process for the purification of a gas stream containing hydrogen selenide and acidic gases which comprises (1) contacting the gas stream with an aqueous scrubbing solution to remove at least some of the hydrogen selenide; (2) contacting the aqueous scrubbing solution with a disulfide or a polysulfide to oxidize the hydrogen selenide to elemental selenium; and (3) treating the gas stream from (1) with a liquid sorbent for the absorption of acidic gases.

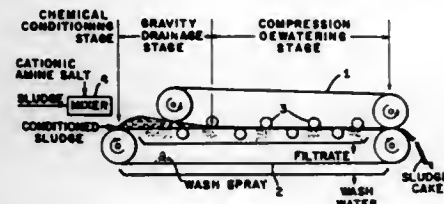
**4,792,406**  
**METHOD FOR DEWATERING A SLURRY USING A TWIN BELT PRESS WITH CATIONIC AMINE SALTS**  
Stephan J. Allenson; Michael L. Braden, both of Richmond, and Jack A. Banik, Sugar Land, all of Tex., assignors to Nalco Chemical Company, Naperville, Ill.  
Filed May 23, 1988, Ser. No. 197,494  
Int. Cl. C02F 11/14; B01D 37/06  
U.S. Cl. 210-734  
18 Claims

1. A method for dewatering a slurry of solid particles suspended in a liquid using a twin belt press dewatering system, which includes a mixing drum and twin belt press, comprising the following steps:

- feeding said slurry of solid particles into said dewatering system;
- feeding a cationic amine salt solution into said dewatering



system at a point just prior to said mixing drum, said cationic amine salt being a latex copolymer of acrylamide and dimethylaminoethylmethacrylate sulfuric acid salt having a mole ratio in the range between about 30:70 to 70:30;



mixing said cationic amine salt solution with said slurry of solid particles in said mixing drum; and feeding the cationic amine salt solution/slurry mixture to said twin belt press, whereby said slurry of solid particles is dewatered.

4,792,407

**OXIDATION OF ORGANIC COMPOUNDS IN WATER**  
Jack D. Zeff, Marina Del Rey, and Erika Lettis, Canoga Park, both of Calif., assignors to Ultrox International, Santa Ana, Calif.

Continuation of Ser. No. 934,693, Nov. 25, 1986, abandoned.  
This application Feb. 18, 1988, Ser. No. 161,328

Int. Cl.<sup>4</sup> C02F 1/32, 1/78

U.S. Cl. 210—748

7 Claims

1. A method of oxidizing halogenated and/or partially oxygenated hydrocarbon constituents in aqueous solution comprising simultaneously exposing said aqueous solution to an amount of ozone, hydrogen peroxide and ultraviolet radiation sufficient to substantially reduce said constituents in the solution.

4,792,408

**METHOD AND APPARATUS FOR ENHANCING CHEMICAL REACTIONS AT SUPERCRITICAL CONDITIONS**

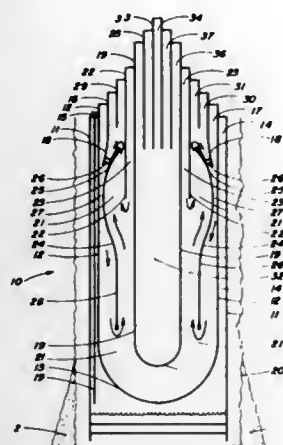
James A. Titmas, Kent, Ohio, assignor to James A. Titmas Associates Incorporated, Akron, Ohio

Filed Apr. 13, 1987, Ser. No. 37,622

Int. Cl.<sup>4</sup> C02F 1/02, 1/72; B01D 23/00, 29/00

U.S. Cl. 210—747

33 Claims



1. A method of processing a continuously flowing fluid material comprising the steps of feeding the fluid to the top of a hydraulic downdraft column; conducting the fluid from the bottom of the hydraulic downdraft column into a reaction

chamber; maintaining the pressure in the reaction chamber at approximately the pressure necessary to create supercritical water conditions; heating the fluid in the reaction chamber to maintain the temperature of the fluid above the temperature necessary to create supercritical water conditions; said heat and pressure causing a chemical reaction to take place in the reaction chamber resulting in a processed fluid of lower specific gravity; recirculating a portion of the processed fluid in the reaction chamber; conducting the remainder of the processed fluid to the bottom of a hydraulic updraft column whereby the pressure at the bottom of the updraft column causes the remainder of the processed fluid to rise therein; and removing the remainder of the processed fluid from the top of the updraft column.

4,792,409

**FABRIC SOFTENERS**

Rudolf W. Sherman, Knutsford, and Philip J. Stainer, Lach Dennis, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation of Ser. No. 258,994, Apr. 30, 1981, abandoned, which is a continuation of Ser. No. 952,649, Oct. 19, 1978, abandoned. This application Dec. 16, 1985, Ser. No. 808,374  
Claims priority, application United Kingdom, Oct. 22, 1977, 44062

Int. Cl.<sup>4</sup> D06M 13/46, 13/02

U.S. Cl. 252—8.6

5 Claims

1. A water-free fabric softener liquid concentrate consisting essentially of a fatty quaternary ammonium salt which contains at least one long chain alkyl group of 8 to 30 carbon atoms and an oil or substantially water-insoluble compound having oily/fatty properties and comprising a mineral oil, said concentrate having a viscosity in the range of about 15 to 40 seconds, measured at 20° C. in No. 4 Ford Cup, and said concentrate capable of being dispersed/emulsified in cold water at a temperature of 5° to 30° C.

4,792,410

**LUBRICANT COMPOSITION SUITABLE FOR MANUAL TRANSMISSION FLUIDS**

James J. Schwind, Willowick, and Craig D. Tipton, Perry, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio

Filed Dec. 22, 1986, Ser. No. 946,407

Int. Cl.<sup>4</sup> C10M 135/10

U.S. Cl. 252—38

17 Claims

1. A lubricant mixture suitable for a manual transmission fluid comprising:

- a boronated overbased alkali metal or alkaline earth metal salt selected from the group consisting of sulfonates, phenates, oxylates, carboxylates and mixtures thereof;
  - a friction modifier selected from the group consisting of fatty phosphites, fatty acid amides, borated fatty epoxides, fatty amines, glycerol esters and their borated derivatives, borated alkoxyated fatty amines, sulfurized olefins and mixtures thereof;
  - and an oil of lubricating viscosity.
6. The lubricant mixture of claim 1 wherein the sulfonate contains an aromatic nucleus.

4,792,411

**DIOXOLANES AND THIO ANALOGS, DERIVATIVES THEREOF AND LUBRICANTS AND FUELS CONTAINING SAME**

Reed H. Walah, Mentor, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Dec. 29, 1986, Ser. No. 947,170

Int. Cl.<sup>4</sup> C10M 105/72

U.S. Cl. 252—45

21 Claims

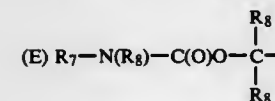
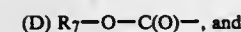
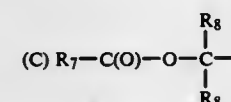
1. A lubricating oil composition comprising a major amount

of an oil of lubricating viscosity and a minor amount of an oil soluble or dispersible compound of the formula



wherein each X is independently oxygen or sulfur and the substituents R<sub>1</sub>-R<sub>6</sub> are each independently selected from the group consisting of

- hydrogen,
- hydrocarbyl,



wherein R<sub>7</sub> is hydrocarbyl and each R<sub>8</sub> is independently hydrogen or hydrocarbyl.

4,792,412

**HIGH TEMPERATURE STABLE AQUEOUS BRINE FLUIDS VISCOSIFIED BY POLYVINYLPIRROLIDONE**  
Israel J. Hellwell, Princeton, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 413,571, Aug. 31, 1982, abandoned.

This application Oct. 15, 1987, Ser. No. 107,912

Int. Cl.<sup>4</sup> C09K 7/02

U.S. Cl. 252—8.514

15 Claims

1. An aqueous brine fluid comprising:
- one or more vinylpyrrolidone homopolymers present in a concentration of about 1.5% by weight of said fluid; and
  - at least about 30% by weight of said fluid being a salt of calcium bromide.

4,792,413

**NOVEL CLEANING COMPOSITION FOR REMOVAL OF PCBs**

James E. Nash, Dellwood, and Kurt E. Heikkila, Circle Pines, both of Minn., assignors to Capsule Environmental Engineering, Inc., St. Paul, Minn.

Continuation of Ser. No. 920,275, Oct. 17, 1986, abandoned, which is a continuation-in-part of Ser. No. 689,336, Jan. 7, 1985, abandoned. This application Nov. 20, 1987, Ser. No. 123,373

Int. Cl.<sup>4</sup> C11D 3/44, 7/52

U.S. Cl. 252—111

2 Claims

1. A composition for PCB clean-up comprising:

Constituent	Weight %
Solvent mixture	about 58.0
Monobutyl Ether Ethylene Glycol	about 6.5
Cyclohexanol	about 4.0
Potassium Tall Oil	about 13.0
Monoethanolamine	about 8.0
Sulfonic Acid (neutralized)	about 8.0
Sodium Metasilicate Pentahydrate	about 0.5
Tetrapotassium Pyrophosphate	about 2.5

said solvent mixture consists of: 6.2% C<sub>8</sub>, 67.5% C<sub>10</sub>, 10.3%

C<sub>11</sub> and 0.7% C<sub>12</sub> alkyl benzenes, 15.0% indanes and tetralines and balance other aromatic hydrocarbons.

4,792,414

**CLEANING AGENT FOR OPTICAL SURFACES**

Kai C. Su; Leslie F. Stebbins, both of Roswell, Ga., and Rajkumar P. Bhatia, Arlington, Tex., assignors to Alcon Laboratories, Inc., Fort Worth, Tex.

Continuation of Ser. No. 858,399, May 1, 1986, Pat. No. 4,670,060, which is a continuation of Ser. No. 662,775, Oct. 19, 1984, Pat. No. 4,613,379, Division of Ser. No. 470,181, Feb. 28, 1983, Pat. No. 4,493,783, Continuation-in-part of Ser. No. 255,861, Apr. 20, 1981, abandoned. This application May 4, 1987, Ser. No. 46,673

The portion of the term of this patent subsequent to Jun. 2, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B08B 11/00, 7/00; C11D 3/14, 17/08

U.S. Cl. 252—174.17

11 Claims

1. A sterile, ophthalmic composition for cleaning a contact lens comprising: an effective amount of a particulate polymer for removal of proteinaceous and lipid deposits on said contact lens, the particulate polymer selected from the group consisting of organic polymers, polysiloxane polymers, and mixtures thereof, the particulate polymer comprising particles which have a particle size in the range of from about one micron to about six hundred microns, the particulate polymer having a Rockwell hardness in the range of from about R30 to about M105, or a Shore hardness in the range of from about A15 to about D100; and a carrier in which said particulate polymer is suspended, said carrier being compatible with ocular tissue and having a viscosity sufficient to keep the particulate polymer in suspension to provide a sterile, ophthalmic composition.

4,792,415

**QUATERNARY AMMONIUM SALTS OF ANIONIC GUMS**

George T. Colegrove, San Diego, Calif., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 13, 1987, Ser. No. 37,656

Int. Cl.<sup>4</sup> C09K 3/00

U.S. Cl. 252—308

7 Claims

1. A fully derivatized quaternary ammonium salt of an anionic gum, which is S-194 or S-130, wherein the quaternary ammonium compound contains a single alkyl or alkenyl substituent of 13-24 carbon atoms or two alkyl or alkenyl substituents of 12-24 carbon atoms per substituent, and the ethylene oxide substituted analogs thereof.

4,792,416

**SUBSTANCE AND PROCESS FOR CONVERTING WASTE COOKING OIL INTO LIQUID SOAP**

Kazuo Shimizu, Kasukabe, Japan, assignor to Mimasu Oil Chemical Co., Ltd., Tokyo, Japan

Filed Jan. 2, 1987, Ser. No. 56,772

Claims priority, application Japan, Dec. 29, 1986, 61-310121

Int. Cl.<sup>4</sup> C11D 13/00, 9/30, 17/08

U.S. Cl. 252—369

7 Claims

1. A process for converting waste cooking oil to detergent, comprising contacting a waste cooking oil with a composition comprising greater than 50% of an amine derivative, from 0.5 to 30% of a surface active agent, an alkali metal salt and/or an alkali hydroxide, wherein the pH of the composition is adjusted to 10 or higher and adding water in amounts sufficient to form a liquid detergent.

4,792,417

**STAINLESS STEELS STRESS CORROSION INHIBITORS**  
 Franco Mixia, Milan; Franco Rivetti, Schio; Ugo Romano, Vimercate; Luigi Rivola, San Donato Milanese, and Giuseppe Ciaraldi, Piacenza, all of Italy, assignors to Enichem Sintesi S.p.A., Palermo, Italy

Filed Dec. 19, 1986, Ser. No. 943,682

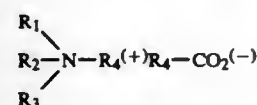
Claims priority, application Italy, Dec. 19, 1985, 23288 A/85  
 Int. Cl.<sup>4</sup> C23F 11/14

U.S. Cl. 252—392

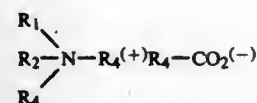
5 Claims

1. A composition of matter for inhibition of stress corrosion of stainless steels in contact with aqueous and/or polar organic solutions which contain chloride ions and optionally cuprous ions, comprising an aqueous or polar organic solution of a member selected from the group consisting of quaternary ammonium alkylcarbonates and quaternary ammonium benzylcarbonates.

5. The composition according to claim 1 wherein the quaternary ammonium alkyl- or benzylcarbonates have the general formula:



or



wherein:  $R_1$  is a linear or branched, saturated or unsaturated alkyl radical containing from 1 to 30 carbon atoms;  $R_2$  and  $R_3$  are alkylaryl radicals or benzyl radicals, optionally bearing one or more substituents on their ring, or which have, individually, the same meaning as of  $R_1$ ,  $R_4$  being an alkyl radical of from 1 to 4 carbon atoms, or benzyl radical.

4,792,418

**METHOD OF EXTRACTION AND PURIFICATION OF POLYUNSATURATED FATTY ACIDS FROM NATURAL SOURCES**

David Rubin, and Elyah J. Rubin, both of San Diego, Calif., assignors to Century Laboratories, Inc., Port Washington, N.Y.

Continuation-in-part of Ser. No. 765,498, Aug. 14, 1985, abandoned. This application Dec. 19, 1985, Ser. No. 810,550  
 Int. Cl.<sup>4</sup> C09F 5/00, 5/10

U.S. Cl. 260—412

33 Claims

1. A method for separating a substantially pure mixture of (all-Z)-5,8,11,14,17-eicosapentaenoic acid (EPA) and (all-Z)-4,7,10,13,16,19-docosahexaenoic acid (DHA) from marine animal oil, using only reaction conditions sufficiently mild to avoid degradation of the EPA and DHA, consisting essentially of the steps of:

- (1) extracting a mixture of polyunsaturated free fatty acids, or methyl or ethyl esters thereof from the oil,
- (2) mixing said fatty acids or esters with urea and a polar organic solvent, the solvent being present in a quantity sufficient to dissolve the urea and the fatty acids or esters, and the urea being present in a quantity sufficient to form a coordination complex with all of the fatty acids or esters capable of being complexed by the urea;
- (3) removing the precipitate which forms after said mixing step and recovering the filtrate;
- (4) removing remaining solvent and urea from the filtrate to obtain pure fatty acids or esters;
- (5) forming a solution by dissolving the pure fatty acids or esters in an organic solvent;

- (6) gradually cooling the solution until a first precipitate forms and removing said first precipitate;
- (7) removing sufficient solvent from the filtrate remaining after the precipitate is removed to substantially reduce the volume and increase the concentration of the solution;
- (8) gradually cooling the solution until a second precipitate forms and removing said second precipitate;
- (9) removing sufficient solvent from the filtrate remaining after the second precipitate is removed to substantially reduce the volume and increase the concentration of the solution;
- (10) gradually cooling the filtrate until a separate liquid or solid phase forms and removing said separate phase; and
- (11) retaining the remaining liquid phase containing a mixture of substantially pure EPA and DHA.

4,792,419

ETHER SULFONATES

Robert Pierr, Ratingen-Hoesel, and Alfred Meffert, Monheim, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany  
 Filed Aug. 24, 1984, Ser. No. 644,482

Claims priority, application Fed. Rep. of Germany, Sep. 1, 1983, 3331513

Int. Cl.<sup>4</sup> C07C 143/02

U.S. Cl. 260—513 R

11 Claims

1. An ether sulfonate which is the aqueous alkali metal hydroxide treated reaction product of sulfur trioxide and either an unsaturated  $C_{10}$ - $C_{20}$  fatty alkyl  $C_1$ - $C_6$  lower alkyl ether or an unsaturated fatty alkyl polyoxyalkyl lower alkyl ether of the formula  $R-O(C_nH_{2n}O)_x-R^1$  (I) wherein R is an oleyl, palmitoleyl, or linoleyl group, n is an integer of from 2 to 4, x is an integer of from 0 to 30, and  $R^1$  is a  $C_1$ - $C_6$  lower alkyl group.

4,792,420

**PURIFICATION OF CARBOXYLIC ACID ANHYDRIDES**  
 Nabli Rizkalla, River Vale, N.J., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 24, 1985, Ser. No. 758,632

Int. Cl.<sup>4</sup> C07C 51/573

U.S. Cl. 260—546

2 Claims

1. A process for the purification of carboxylic acid anhydride contaminated with halogen and halide values to reduce the quantity of said values in said carboxylic acid anhydrides, which comprises treating said carboxylic acid anhydrides with a gaseous stream comprising hydrogen and carbon monoxide, said hydrogen being in admixture with 5-80% of carbon monoxide, in the presence of an insoluble Group VIII noble metal catalyst in supported form and thereafter separating said gaseous stream from the treated carboxylic acid anhydrides and feeding said separated gaseous stream to the reaction from which said contaminated carboxylic acid anhydrides have been derived.

4,792,421

**OXYGEN MOISTENING APPARATUS PROVIDED WITH A FLOW RATE ADJUSTING AND METERING DEVICE**  
 Oreste Stori, Salo', Italy, assignor to Slo S.p.A.-Societa' per L'industria Dell'Ossigeno e di Altri Gas, Milan, Italy

Filed Jun. 11, 1987, Ser. No. 60,442

Claims priority, application Italy, Jun. 11, 1986, 22231/86[U]  
 Int. Cl.<sup>4</sup> A61M 51/00

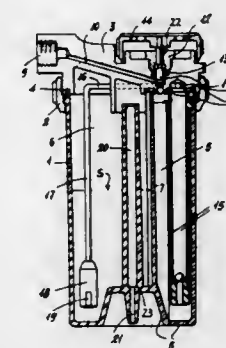
U.S. Cl. 261—122

3 Claims

1. An oxygen moistening apparatus provided with a flow rate adjusting and measuring device, said apparatus comprising:

- (a) an at least partially transparent container the inside of which is tightly divided into two discrete chambers by means of a partition wall effective to be tightly closed by a cover member provided with an inlet hole to be coupled to an oxygen delivery pipe communicating, through a first

channel formed in said cover member, with an outlet hole opening to the first of said two chambers;  
 (b) a flow rate measuring device housed in said first chamber for flow of oxygen therethrough communicating through a second channel formed in said cover member with an elongated dipping tube having a free end, said elongated dipping tube extending in the second of the two chambers with the free end located close to the bottom of said container;



- (c) a collecting tube extending from the bottom of said second chamber, one end of said collecting tube being free and opening close to said cover member and the other end of said collecting tube opening outwardly at a hole formed through the bottom of said container;
- (d) a member connected to said other end of said collecting tube for coupling to a moistened oxygen delivery pipe; and
- (e) a manually operated shut off valve mounted on said cover member for adjusting the oxygen flow rate from said inlet hole to said outlet hole of said apparatus.

4,792,422

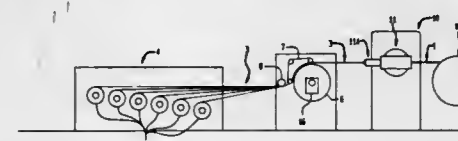
**METHOD OF MAKING AN OPTICAL FIBER CABLE**  
 Kenneth E. Cornelson, Overland Park, and Michael E. McGuire, Shawnee Mission, both of Kans., assignors to Ericsson, Inc., Overland Park, Kans.

Division of Ser. No. 687,601, Dec. 31, 1984. This application  
 Feb. 9, 1987, Ser. No. 12,753

Int. Cl.<sup>4</sup> B05D 7/20; B32B 1/06

U.S. Cl. 264—1.5

9 Claims



7. A method for assembling optical fibers in a buffer tube that is used to make an optical fiber cable, comprising the steps of:
  - passing plural optical fibers in a spaced, parallel fashion into frictional engagement with a capstan with equal tension in each fiber to thereby maintain uniform overall lengths of fibers;
  - gathering the fibers into a random pattern after they have passed over the capstan;
  - extruding a buffer tube around the gathered fibers; and
  - injecting a filling material into the buffer tube as it is being extruded.

4,792,423

**METHOD FOR MAKING SOLID ROCKET PROPELLANT**  
 Preston S. Craig, and Gordon S. Oakley, both of Huntsville, Ala., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jul. 13, 1987, Ser. No. 73,260

Int. Cl.<sup>4</sup> C06B 21/00

U.S. Cl. 264—3.1

1 Claim

1. A method of making a solid rocket motor comprising:
  - (a) molding separate strips of binder, fuel and oxidizer;
  - (b) forming said strips into propellant having a predetermined shape and having a predetermined burn rate that varies across the propellant shape;
  - (c) curing said shaped propellant; and
  - (d) encasing said shaped propellant in a rocket casing.

4,792,424

**METHOD OF INJECTION MOLDING PVC PRODUCTS**  
 Henricus G. M. Loman, 43, Andorpweg, Wierden 7641 EK, Netherlands

PCT No. PCT/NL85/00002, § 371 Date Sep. 10, 1985, § 102(e)  
 Date Sep. 10, 1985, PCT Pub. No. WO85/03027, PCT Pub. Date Jul. 18, 1985

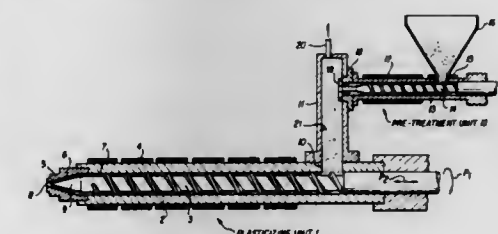
PCT Filed Jan. 10, 1985, Ser. No. 776,114

Claims priority, application Netherlands, Jan. 10, 1984, 8400062

Int. Cl.<sup>4</sup> B29C 45/48, 45/50, 45/63

U.S. Cl. 264—102

3 Claims



1. The method of injection molding PVC products from powdered raw material while employing an injection molding machine of a two stage cascade type having an upper plasticizing double screw extruder and a lower injection apparatus having one injection screw, wherein the raw material is subjected to a pre-jellifying treatment during forced transportation of the powdered raw material through the upper plasticizing screw extruder unit in which it is heated and brought to an agglomerated state in a relatively short time, subjecting the plasticized material to a vacuum while passing through the lower injection unit.

4,792,425

**METHOD OF MAKING A WINDSHIELD AND LEAF SCREEN ASSEMBLY**

William R. Weaver, Toledo, Ohio, assignor to Libbey-Owens-Ford Co., Toledo, Ohio

Division of Ser. No. 812,727, Dec. 23, 1985, abandoned. This application May 15, 1987, Ser. No. 50,724

Int. Cl.<sup>4</sup> B29C 45/14

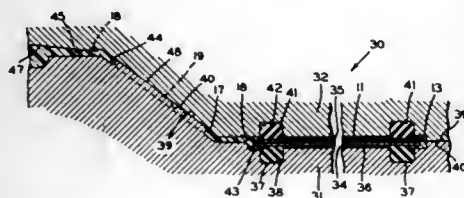
U.S. Cl. 264—252

4 Claims

1. A method of producing a window assembly including at least one transparent sheet having a first gasket member adhered to the peripheral portion thereof and a leaf screen formed as a second gasket member integral with said first gasket member, said first and second gasket members completely encapsulating the peripheral edge of said sheet, said method including the steps of:
  - (a) positioning said sheet of transparent material within the interior of a mold chamber formed by at least two cooperating mold sections;



(b) said mold sections provided with a gasket shaping portion which cooperates with a first peripheral portion of the sheet to define a first gasket forming cavity corresponding to a first gasket member to be formed and cooperating with a second peripheral portion of the sheet to define a second gasket forming cavity corresponding to a second gasket member to be formed;



(c) injecting into the first and second gasket forming cavities a curable composition, curing said composition in contact with the sheet such that it adheres thereto to produce the first and second gasket members; and  
(d) removing the window assembly from the mold chamber.

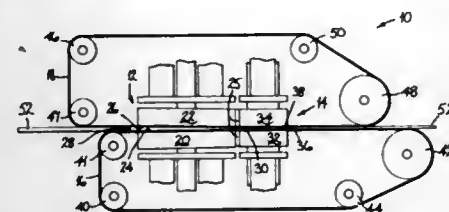
#### 4,792,426 PRECISION CONTROL OF THE THICKNESS OF HEAT-SOFTENABLE MATERIAL

Anthony T. Grentorex, Syston; Joseph Robbins, Bradgate View; Ernest A. Toon, Wigton Magna, and David A. Thompson, Sibley, all of England, assignors to USM Corporation, Farmington, Conn.

Division of Ser. No. 866,646, May 27, 1986, abandoned. This application Nov. 6, 1987, Ser. No. 119,302  
Claims priority, application United Kingdom, May 28, 1985, 8513345

Int. Cl.<sup>4</sup> B29C 43/22  
U.S. Cl. 264—284

10 Claims



1. A process for precision controlling the thickness of a sheet of a compressible, heat-softenable material which comprises:  
a. heating the material equally on both sides to bring it to a heat-softened condition;  
b. compressing the material while in the heat-softened condition to a thickness less than the desired thickness; and  
c. expanding the material to the desired thickness while cooling the material equally on both sides to below its softening point by passing it between parallel cooling plates spaced apart by the desired thickness.

#### 4,792,427 METHOD FOR MAKING LIGHT-TRANSMITTING SLATS FOR BLIND

John F. Reeves, Brown Deer, Wis., assignor to Nanik Division Wausau Metals Corporation, Wausau, Wis.

Division of Ser. No. 879,270, Jan. 27, 1986, abandoned, which is a continuation of Ser. No. 494,427, May 13, 1983, abandoned. This application Apr. 9, 1987, Ser. No. 36,302

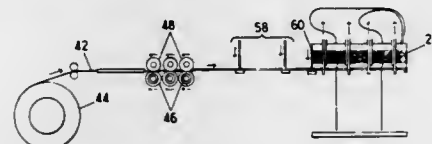
Int. Cl.<sup>4</sup> B29C 43/22, 53/04; B32B 3/26, 31/12  
U.S. Cl. 264—285

13 Claims

1. A method for making a light, thin thermoplastic slat for use in a decorative window blind having a plurality of slats

supported in parallel relation and adapted to be rotated about their longitudinal axes, the method comprising the steps of:

(a) preparing a strip of flexible and resilient planar thermoplastic material of not more than about 1/16 inch thickness, having selected light-transmitting qualities;  
(b) deforming the planar strip into a permanent V-shaped transverse cross-sectional configuration, in which first and second portions of the strip correspond to two sides of a V intersecting at an angle of 90° to 160°, which is stiff and will not sag when supported by spaced blind slat supporting means, by continuously directing the strip lengthwise



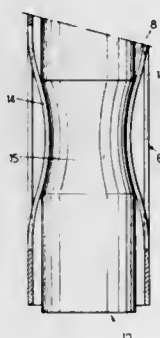
between the apex of a male forming member and a pair of female forming members spaced on either side of the male forming member in opposed relation and bending the strip without the application of heat over the apex of the male member having a radius forming of not more than 1/4 inch to exceed the elastic limit of the strip material over the radius to provide a strip which will have first and second portions extending on either side of a bend at the desired angle of 90° to 160° after the strip material has exhibited characteristic return toward its undeformed state due to memory.

4,792,428  
NUCLEAR FUEL ASSEMBLY WITH A FREE END GRID  
Jean-Noël Canat, Lyons, and Joël Pla, Villeurbanne, both of France, assignors to Framatome, Courbevoie and Compagnie Generale Des Matieres Nucleaires, Velizy-Villa Couhlay, both of, France

Filed Aug. 27, 1987, Ser. No. 90,054  
Claims priority, application France, Aug. 28, 1986, 86 12172  
Int. Cl.<sup>4</sup> G21C 3/34

U.S. Cl. 376—440

6 Claims



1. In a nuclear reactor having a vessel for containment of a coolant, a core in said vessel arranged to be traversed by said coolant and comprising a plurality of mutually adjacent up-standing nuclear fuel assemblies,

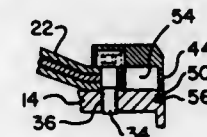
a nuclear fuel assembly comprising:  
a bundle of a plurality of fuel elements, each having a metal sheath closed at its ends by end plugs consisting of an upper end plug and a lower end plug,  
a structure for maintaining and supporting said bundle of fuel elements in parallel relationship, said structure having an upper end piece and a lower end piece rigidly connected together by tie rods, and a plurality of spacing grids

spaced apart along the tie rods and defining cells disposed at nodal points of a regular network for retaining said fuel elements, said plurality of spacing grids comprising:  
two end grids comprising an upper end grid and a lower end grid, one of said upper end grid and lower end grid being connected to the respective ones of the upper end plugs and lower end plugs of all said fuel elements and secured to the tie rods, and the other of said end grids being connected to the other of the end plugs of each fuel element and slidably received by said tie rods, and  
a plurality of intermediate grids secured to the tie rods and slidably received by the fuel elements,  
whereby the bundle of fuel elements can extend and retract from that one of said end grid which is secured to the tie rods whilst being maintained and supported by the structure.

4,792,429  
SPRING RETENTION CAP  
Stephen C. Hatfield, Granby, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.  
Filed Aug. 24, 1987, Ser. No. 88,435  
Int. Cl.<sup>4</sup> G21C 3/32

U.S. Cl. 376—446

5 Claims



1. In a spring retention cap for a nuclear fuel assembly with an upper end fitting having a leaf spring assembly of a given width and including at least one spring retention fastener, the improvement comprising:

a body for engaging the end fitting,  
two plane exterior surfaces defining a corner of said body, a base transverse to said corner of said body,  
a slot in said base spaced from and extending substantially parallel to said two plane exterior surfaces,  
an inwardly directed flange formed by a portion of said base and extending inwardly from said plane exterior surfaces to define a slot opening slightly larger than the given width of said leaf spring assembly,  
and means for securing said retention cap in position with an end of said leaf spring assembly and a spring retention fastener covered thereby.

4,792,430  
ALUMINUM ANODE ALLOY  
Ralph L. Horst, New Kensington, Pa., assignor to Aluminum Company of America, Alcoa Center, Pa.  
Filed Jul. 24, 1987, Ser. No. 77,590  
Int. Cl.<sup>4</sup> C22C 21/00

U.S. Cl. 420—548

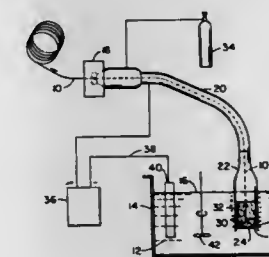
13 Claims

1. An aluminum alloy comprising:  
about 0.03 to 0.20 percent tin,  
about 0.03 to 0.07 percent gallium,  
about 0.002 to 0.006 percent silicon,  
the remainder being aluminum which is at least as pure as 99.995 percent, and impurities, and  
said impurities including not more than about 10 parts per million iron, 10 parts per million zinc and 2 parts per million lead.

4,792,431  
PRODUCTION OF INTERMETALLIC PARTICLES  
Charles E. Eckert, Plum Boro, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.  
Continuation-in-part of Ser. No. 812,982, Dec. 24, 1985, Pat. No. 4,689,199, which is a continuation of Ser. No. 654,736, Sep. 27, 1984, abandoned. This application Aug. 25, 1987, Ser. No. 90,825  
The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> C22C 1/00

U.S. Cl. 420—590

21 Claims



1. A process for forming one or more intermetallic compounds comprising the steps:

(a) providing a chamber having a discharge opening positioned within a molten media;  
(b) introducing into said chamber a gas comprising an ionizable gas under sufficient pressure to provide an interior molten media surface substantially at said chamber's discharge region;  
(c) providing a plasma within said chamber, said plasma substantially extending at least from said interior molten media surface to a site within said chamber and spaced from said interior media surface; and  
(d) providing to said site within said chamber material comprising one or more constituents reactable with each other or with one or more constituents in said media, or both, to produce one or more intermetallic compounds and converting said material into superheated spray substantially within said plasma and carried toward said interior molten media surface.

4,792,432  
METHOD FOR PERFORMING A LIQUID ANALYSIS  
AND AN ANALYTICAL ELEMENT FOR USE IN THE  
METHOD

Veijo Ikonen, Halujärventie, Finland, assignor to Orion-yhtymä Oy, Espoo, Finland

Filed Feb. 3, 1987, Ser. No. 10,385  
Claims priority, application Finland, Feb. 4, 1986, 860509  
Int. Cl.<sup>4</sup> G01N 9/30, 33/06

U.S. Cl. 422—72

18 Claims

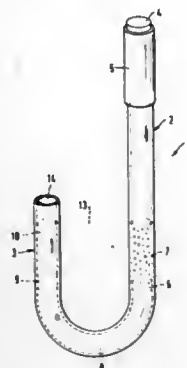
1. An analytical device for analyzing colloidal liquid substances whereby a liquid sample is moved within said device consisting essentially of in combination:

(a) a descending hollow, tubular-shaped arm communicating at its lower portion with at least one ascending hollow, tubular-shaped arm, said arms forming a continuous U-shaped tubular system of substantially uniform diameter;  
(b) sample introduction means at the top end of said descending arm for the introduction of a liquid sample;  
(c) filter means located within said arms through which said liquid sample passes;  
(d) means providing a reaction zone within said ascending arm wherein said liquid sample undergoes reaction; and  
(e) means providing a detection zone within said ascending arm for detecting a reaction.

13. A method for analyzing colloidal liquid substances which comprises the steps of:

(a) introducing a sample of a liquid substance into the

- end of the descending arm of the analytical device of claim 1;
- (b) applying centrifugal force to said device to cause said liquid sample to move;
- (i) from said sample introduction means to said filter means to remove from said liquid sample, undesirable particulate material;



- (ii) from said filter means to said reaction zone wherein said liquid sample undergoes a reaction with components in said zone;
- (iii) from said reaction zone to said detection zone, and
- (c) detecting and measuring the reaction which occurred in said reaction zone.

**4,792,433**  
**CO GAS DETECTING DEVICE AND CIRCUIT FOR DRIVING THE SAME**

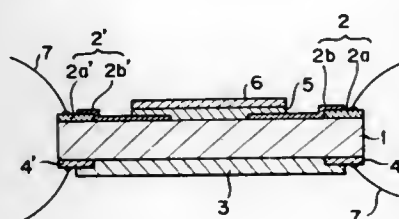
Masaki Katsura, Yokosuka, and Masayuki Shiratori, Kawasaki, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Continuation of Ser. No. 525,485, Aug. 22, 1983. This application Sep. 4, 1986, Ser. No. 903,839

Claims priority, application Japan, Aug. 27, 1982, 57-147788; Nov. 30, 1982, 57-208480

Int. Cl.<sup>4</sup> G01N 27/16  
U.S. Cl. 422-98

16 Claims



1. A CO gas detecting device comprising:
- a CO gas sensor provided with a gas sensitive member comprising an oxide semiconductor whose resistance value is changed when contacted with a reducing gas, a pair of electrodes provided on said gas sensitive member, and a catalyst layer comprising one or more catalyst metals selected from the group consisting of Pt, Pd and Rh and at least one carrier selected from the group consisting of  $Al_2O_3$ ,  $ZrO_2$  and  $SiO_2$ , provided on said gas sensitive member; and
- a reference sensor substantially without sensitivity to CO gas provided with a gas sensitive member comprising an oxide semiconductor whose resistance value is changed when contacted with a reducing gas, a pair of electrodes provided on said gas sensitive member, and an insulative catalyst layer comprising Ag and at least one carrier

selected from the group consisting of  $Al_2O_3$ ,  $ZrO_2$  and  $SiO_2$ , provided on said gas sensitive member

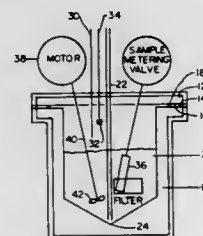
wherein said catalyst layers of each of said sensors comprise said catalyst metals in an amount of from about 0.05 to 20 wt. % based on the catalyst carrier in a thick film of from 10 to 50  $\mu m$  and from about 1 to 90 wt. % based on the catalyst carrier in a thin film of from about 5 to 1000 nm, such that the amounts of said catalyst metals are below levels at which the electroconductivity of said layers hampers measurement of said resistance value.

**4,792,434**  
**SAMPLE PREPARATION CHAMBER WITH MIXER/GRINDER AND SAMPLE ALIQUOT ISOLATION**

Andre Metzger, (Le Verger), 12 Rue de Saules, 68300 St. Louis, France; Peter Grimm, Brunnmatt Str. 22, CH 4402 Frenken-dork, Switzerland; Andre J. Nohl, 479 Wheller Rd., Menlo Park, Calif. 94025, and Vance J. Nau, 22404 Riverside Dr., Cupertino, Calif. 95014

Filed Dec. 16, 1986, Ser. No. 942,198  
Int. Cl.<sup>4</sup> B01F 7/22; B01L 3/00; B28C 5/08  
U.S. Cl. 422-100

14 Claims



1. A sample preparation chamber for allowing samples of different compositions to be prepared for assay comprising:
- a container having a bottom and walls with at least one region which is lower than all other regions in said bottom, said bottom having a configuration that tends to cause gravity to drive sample in said container to said at least one lower region;
- means for mixing non-homogeneous mixtures;
- a fill/empty tube entering said container and having an inlet/outlet port located at said at least one lower region; and
- sample metering means coupled to said container for isolating a known volume of sample from sample in said container and for allowing said known volume to be released back into said container.

**4,792,435**  
**OXYGEN GENERATING SYSTEM**

Masahiko Nakajima, Tokyo, Japan, assignor to Nakajima Dokosho Company Limited, Tokyo, Japan

Filed Mar. 24, 1988, Ser. No. 843,024

Claims priority, application Japan, Mar. 24, 1985, 60-58931

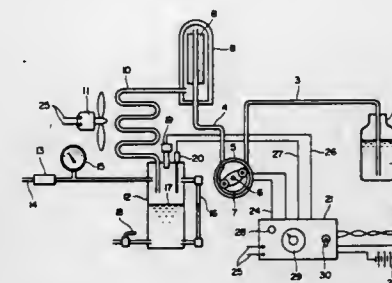
Int. Cl.<sup>4</sup> G05D 16/04; F28D 21/00

U.S. Cl. 422-110

1 Claim

1. An oxygen generating system for continuously generating oxygen gas by the exothermic catalytic decomposition of an aqueous hydrogen peroxide comprising:
- a catalyst having a platinum group catalyst component carried on a highly porous sintered ceramic support of a large pore size;
- a reaction chamber including means for preheating said chamber and having a heat insulating circumferential wall having the catalyst held therewithin, said heat insulating circumferential wall thermally insulating a reaction region from an external atmosphere,
- means for supplying highly concentrated aqueous hydrogen peroxide from a reservoir to said reaction chamber at a restricted and controlled flow rate; and

a control device having a pressure sensor for detecting the pressure of the oxygen gas generated through the exothermic decomposition of the aqueous hydrogen peroxide by



said catalyst and means for controlling the operation of said means for supplying the aqueous hydrogen peroxide based on detection signal from said pressure sensor whereby said predetermined temperature is maintained.

**4,792,436**  
**HYDROCARBON CONVERTER FURNACE**

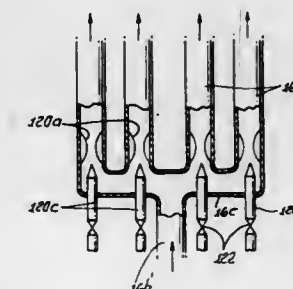
Frank W. Tsai, San Marino, Calif., assignor to Kinetics Technology International, Monrovia, Calif.

Filed May 8, 1987, Ser. No. 47,210

Int. Cl.<sup>4</sup> C10G 9/20

U.S. Cl. 422-111

6 Claims



1. A hydrocarbon converter furnace having an upper convection heating section and a lower radiant heating section, and tubing extending through said sections to convey a fluid hydrocarbon feed and steam in sequence through the convection and radiant heating sections, wherein the tubing comprises:

- (a) a common feed section and multiple branches extending therefrom in the radiant section of the furnace, each of said branches having an inlet in fluid communication with the feed section so that hydrocarbon and steam flow from the feed section into each of said branches,
- (b) valve means in each of said branches for controlling the rates of flow of hydrocarbon and steam in said branches to reduce differential coking therein,
- (c) said branches extending generally upright and in relative to said radiant heating section of the furnace, the feed section including a downcomer and a U-shaped section, both extending in said radiant section of the furnace and through which hot feed hydrocarbon and steam are fed upwardly to said branches,
- (d) said branches having main extents in said radiant section, and said valve means including control valves in each of said branches having an opening and having separately movable stoppers movable lengthwise of and within the branches for increasing or decreasing the flow rates of hydrocarbon and steam through the opening of the con-

trol values in the main extents of said branches in said radiant section,

- (e) said stoppers including nozzle means for controllably introducing dilution steam therethrough into the branches, said nozzle means including separately adjustable valves to separately control the amount of dilution steam fed to each of said branches through the nozzle means of each stopper to thereby minimize differential coking in the branches.

**4,792,437**  
**APPARATUS FOR THE SEPARATION OF SOLID PARTICULATES FROM A GASEOUS EFFLUENT**

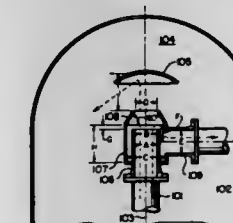
William P. Hettinger, Jr., Russell; Steven W. Murray, Ashland, both of Ky.; Ricky L. Adkins, Huntington, W. Va.; Billy T. Fritz, Ashland, Ky.; James R. Riggs, Kenova, W. Va., and Paul W. Walters, Ashland, Ky., assignors to Ashland Oil, Inc., Ashland, Ky.

Continuation of Ser. No. 618,641, Jun. 8, 1984. This application Sep. 4, 1986, Ser. No. 904,084

Int. Cl.<sup>4</sup> B01J 4/00, 38/00

U.S. Cl. 422-147

8 Claims



1. Apparatus for separating particulates from a mixture of vapors and the particulates comprising the combination of:

- A. a disengaging chamber;
- B. a riser having an open outlet end positioned to deliver a major portion of the particles axially into said disengaging chamber;
- C. an annular shroud surrounding the open end of said riser to define therewith an annular separation chamber, said annular shroud comprising at an end thereof downstream of said open end of said riser a nozzle shaped means which is open and positioned to function as a nozzle when directing flow of the particulates, from said riser to said disengaging chamber whereby reentry of particulates into said annular separation chamber is lessened; and
- D. at least one cyclone separator means in open fluid communication with said shroud positioned to receive vapors and a residue of particulates from the mixture and separate the residue of particulates from the vapors.

**4,792,438**  
**ROTARY TYPE OZONIZER**

Kuniaki Horikoshi, Kiryu, Japan, assignor to Inpal Co., Ltd., Kiryu and Toyo Element Industry Co., Ltd., Kawasaki, both of Japan

Filed Nov. 20, 1987, Ser. No. 123,580

Claims priority, application Japan, Nov. 25, 1986, 61-280229

Int. Cl.<sup>4</sup> B01J 19/08; C01B 13/11

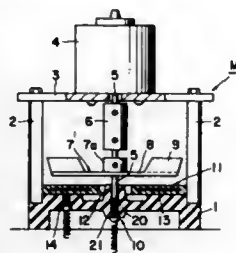
U.S. Cl. 422-186.13

7 Claims

1. A rotary type ozonizer, comprising: a base; a disk-shaped stationary electrode provided horizontally on said base; a rotary electrode equipped with a plurality of air driving blades and disposed in vertically opposing relationship relative to said



stationary electrode to form between the two electrodes an electric discharge clearance; motor means for driving said



rotary electrode in rotation; and means for applying a high voltage between said stationary and rotary electrodes.

4,792,439

#### PROCESS FOR DECREASING THE CONTENT OF NITROGEN OXIDES IN FLUE GASES

Michael Schneider, Ottobrunn-Riemerling; Hans J. Wernicke, Geretried; Karl Kochloeff, Bruckmühl/Henfeld, and Gerd Maletz, Landshut, all of Fed. Rep. of Germany, assignors to Sud-Chemie Aktiengesellschaft, Munich, Fed. Rep. of Germany

Division of Ser. No. 895,404, Aug. 11, 1986. This application May 7, 1987, Ser. No. 47,797

Claims priority, application Fed. Rep. of Germany, Aug. 13, 1985, 3529060; Sep. 10, 1985, 3532226

Int. Cl.<sup>4</sup> B01J 8/00; C01B 21/00

U.S. Cl. 423—239

17 Claims

1. A process for reductively decreasing the content of nitrogen oxide in flue gases that contain sulfur oxides, the process comprising contacting the flue gases with a catalyst and with  $\text{NH}_3$ , which is employed as a reductant, said catalyst comprising at least one metal selected from the group consisting of titanium, zirconium, vanadium, tungsten, molybdenum and cerium in the form of one or more of their oxides and a silicate with a layer structure comprising acid-activated, but not yet X-ray amorphous kaolin whose crystalline layer structure is partly retained, the acid activation increasing the BET surface area at least 15% in terms of the BET surface area of the kaolin before acid activation, and the atomic ratio of the silicon in the acid-activated kaolin to the metal in the oxide being between 0.2 to 50, wherein the process is conducted at a temperature of 350° C. to 600° C., wherein the metal in the catalyst is present in an amount of 0.1 to 80% by weight, with the acid-activated kaolin accounting for the rest of the catalyst weight.

4,792,440

#### PROCESS FOR DESULPHURIZATION OF FLUE GAS

Carsten Nielsen, Kongerslev; Ejler L. Holm, Gistrup; Jens P. Sandeman, and Hanne F. Madsen, both of Aalborg, all of Denmark, assignors to Aalborg Vaerft A/S, Aalborg, Denmark

Filed Nov. 26, 1986, Ser. No. 935,173

Claims priority, application Denmark, Nov. 28, 1985, 5528/85; Nov. 17, 1986, 5487/86

Int. Cl.<sup>4</sup> B01J 8/00; C01B 17/00

U.S. Cl. 423—244

17 Claims

1. A process for desulphurization of flue gas generated during the combustion of sulphur-containing fuel in a combustion furnace, said process comprising the steps of adding fresh alkaline absorption agent selected from among oxides and hydroxides of calcium, magnesium and the alkali metals, to flue gas in a flue gas channel leading from said combustion furnace for desulphurization of the flue gas outside of said combustion furnace, and separating from the flue gas the reaction product formed by said adding of fresh alkaline absorption agent, said addition of said absorption agent is done in dry form at

a primary insert point after adjustment by a heat exchanger means of the relative water content of the flue gas by adjustment of the temperature of the flue gas so that the flue gas temperature becomes 5°–50° C. above the dew-point,

additional fresh, absorption agent is added in dry form at a secondary point which, in the flow direction of the flue gas, is before said heat exchanger means, said absorption agent is added in molar excess, with respect to S in the flue gas, and

a mixture containing reaction product and unreacted absorption agent after separation from the flue gas is recirculated for mixture with the dewpoint-adjusted flue gas.

4,792,441

#### AMMONIA SYNTHESIS

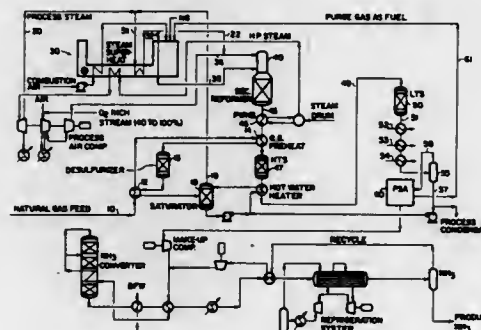
Shoon-I Wang; Nitia M. Patel, both of Allentown; Shivaji Sir-car, Wescosville, all of Pa., and Rodney J. Allam, Guildford, England, assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 19, 1988, Ser. No. 145,782

Int. Cl.<sup>4</sup> C01C 1/04

U.S. Cl. 423—359

14 Claims



1. In the production and recovery of ammonia synthesis gas, the method which comprises: providing a hydrocarbon vapor stream rich in methane and substantially free of sulfur compounds;

(b) dividing said stream into a minor portion comprising less than 45% by volume of said stream and a major portion;

(c) subjecting said minor portion to catalytic steam reforming at elevated temperature and pressure, thereby producing a primary reformat;

(d) subjecting said major portion to oxidative reforming in admixture with the obtained primary reformat by catalytic reaction

with an oxygen-enriched air stream containing 30–35% oxygen by volume, thereby producing a secondary reformat comprised principally of hydrogen, nitrogen and carbon oxides and containing a minor amount of contaminants including methane and argon; the hydrogen content of said secondary reformat being less than that providing a 3:1 mol ratio of hydrogen to nitrogen in said secondary reformat;

(e) subjecting said secondary reformat to a water gas shift reaction whereby contained carbon monoxide is converted to carbon dioxide and thereby also producing a further quantity of hydrogen, such that the  $\text{H}_2/\text{N}_2$  mol ratio in the shift reaction product is approximately 3:1;

(f) removing carbon dioxide from the shift reacted secondary reformat by passing the same at superatmospheric pressure through a first bed of solid particulate adsorbent selective in retention of carbon dioxide, thereby producing a hydrogen-rich product effluent freed of carbondioxide;

(g) passing said hydrogen-rich effluent into and through a

second bed of solid particulate adsorbent selective in retention of carbon monoxide and methane as opposed to hydrogen and nitrogen and recovering from said second bed a mixture of hydrogen and nitrogen in approximately 3:1 molar ratio and containing less than 25% of impurities on a dry basis.

4,792,442

#### METHOD AND COMPOSITION FOR PREVENTION AND TREATMENT OF ORAL DISEASE

Perry A. Ratcliff, 7125 E. Lincoln Dr., Scottsdale, Ariz. 85253  
Continuation of Ser. No. 017,241, Dec. 29, 1986, Pat. No. 4,696,811, which is a continuation of Ser. No. 846,342, Mar. 21, 1986, abandoned, which is a continuation of Ser. No. 636,027, Jul. 30, 1984, abandoned, and a continuation of Ser. No. 947,079, Dec. 29, 1986, Pat. No. 4,689,215, Ser. No. 846,342, Ser. No. 636,027, This application Jul. 22, 1987, Ser. No. 76,487

The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> A61K 7/20, 33/20

U.S. Cl. 424—53

2 Claims

1. A method for reducing dental plaque, said method comprising the step of killing and reducing the number of streptococcus mutans to a 99% level by topical application within the oral cavity for a period of ten seconds of a solution containing stabilized chlorine dioxide in a concentration in the range of 0.005% to 0.2% including the step of irrigating gingival crevices with the solution of stabilized chlorine dioxide.

4,792,443

#### SKIN BLEACHING PREPARATIONS

Vito G. Filomeno, Mt. Arlington, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 811,602, Dec. 20, 1985, Pat. No. 4,692,261. This application May 29, 1987, Ser. No. 55,677

Int. Cl.<sup>4</sup> A62K 7/135

U.S. Cl. 424—62

8 Claims

1. A skin bleaching skin preparation, excluding detergent bars, comprising:

- (a) hydroquinone in amounts of about 1% to about 5% by weight of the total composition; and
- (b) tertiary butyl hydroquinone in amounts of about 0.1% to about 0.5% by weight of the total composition.

4,792,444

#### COSMETIC COMPRISING FLUOROALKYL (METH)ACRYLATE COPOLYMERS

Junichi Fukasawa, Yokohama; Yutaka Yasuda, Kaizuka; Yuji Sato, Tokyo, and Jun Shida, Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jun. 6, 1986, Ser. No. 871,649

Claims priority, application Japan, Jun. 14, 1985, 60-129613; Jul. 11, 1985, 60-152755

Int. Cl.<sup>4</sup> A61K 7/021, 7/027, 7/48, 31/78

U.S. Cl. 424—63

16 Claims

1. A cosmetic composition comprising

- (a) from 5 to 80 percent by weight of a cosmetically acceptable volatile oil component having a boiling point of not higher than 280° C.;
- (b) from 0.1 to 50 percent by weight, based on the weight of said volatile oil component, of at least one copolymer of

- (i) a first monomer selected from the group consisting of fluoroalkyl acrylates and fluoroalkyl methacrylates and
- (ii) a second monomer selected from the group consisting of  $\text{C}_8$ – $\text{C}_{22}$  alkyl acrylates and  $\text{C}_8$ – $\text{C}_{22}$  alkyl methacrylates, the weight ratio of said second monomer to said first monomer being in the range of from 10:1 to 1:5, said copolymer being dissolved in said volatile oil, and
- (c) the balance is one or more conventional ingredients for cosmetics.

4,792,445

#### HIGHLY STABLE FREE IODINE IODOPHOR COMPOSITIONS, PROCESS FOR PREPARING SAME AND PROCESS FOR USING SAME

Mario Flores Rivera, calle San Salvador #457, San Salvador, El Salvador

Continuation of Ser. No. 744,666, Jun. 14, 1985, abandoned, which is a continuation of Ser. No. 549,106, Nov. 7, 1983, abandoned. This application May 6, 1987, Ser. No. 47,511  
Int. Cl.<sup>4</sup> A01N 59/12; A61K 31/74; C11D 3/48

U.S. Cl. 424—78

16 Claims

1. A highly stable free iodine iodophor composition comprising, in admixture:

- (a) an ether-nonyl polyglycol ethoxylate having an ethylene oxide mole number greater than 4 and up to 30;
- (b) elemental iodine;
- (c) potassium iodide; and
- (d) an agriculturally acceptable liquid carrier or diluent, wherein the weight ratio of elemental iodine to potassium iodide is in the range of about 1:1.01 to 1:1.05, wherein the weight ratio of the ether-nonyl polyglycol ethoxylate to the combined weight of the elemental iodine and the potassium iodide is about 3:1 to 20:1 and wherein the agriculturally acceptable carrier or diluent is water.

4,792,446

#### PRODUCTION OF ANTIBODY CATALYSTS

Peter S. Kim, Brookline, Mass., and Neville R. Kallenbach, Philadelphia, Pa., assignors to Igen, Inc., Rockville, Md.

Filed Jun. 23, 1986, Ser. No. 877,273

Int. Cl.<sup>4</sup> A61K 39/00; C07F 9/40, 9/65; C12P 39/00

U.S. Cl. 424—85.8

24 Claims

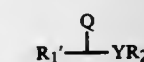
1. Process for producing an antibody catalyst for a chemical reaction, which comprises:

- (1) identifying a substrate represented by formula



for said reaction;

- (2) selecting a hapten represented by formula



wherein X represents nuclei O, S, N, and C and associated bonds which comprise the catalytically active portion of the substrate molecule and Y represents nuclei N, C, and P and associated bonds which comprise the catalytically active portion of the hapten molecule and X and Y are related to each other in that Y has a higher valence state and one or more bonds than X, and wherein Q is selected from the group of substituents consisting of (a) a positive charge, (b) a negative charge, (c) polarity, (d) non-polarity, and (e) substantial bulk bonded to Y wherein  $R_1$ ,  $R_2$ ,  $R_1'$  and  $R_2'$  represent the residual chemical groups of the substrate and hapten which do not participate in the catalytic events, and  $R_1$  and  $R_1'$ , and  $R_2$  and  $R_2'$  are, respectively substantially similar to each other which corresponds to said substrate;

- (3) stimulating an immune response by said hapten; and
- (4) isolating antibodies from said immune response which are catalytically active for said chemical reaction.

**4,792,447**  
**ANTI-IMMUNOGLOBULIN TOXIN CONJUGATES**  
**USEFUL IN THE TREATMENT OF B CELL TUMORS**  
 Jonathan W. Uhr, and Ellen S. Vitetta, both of Dallas, Tex., assignors to Board of Regents, The University of Texas System, Austin, Tex.

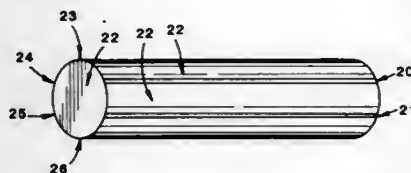
Continuation-in-part of Ser. No. 286,090, Jul. 23, 1981, abandoned. This application May 27, 1983, Ser. No. 498,754  
 Int. Cl.<sup>4</sup> A61K 39/395, 39/44; C07K 15/00, 17/00  
 U.S. Cl. 424—85,91 8 Claims

1. A method of therapeutic intervention in the treatment of B cell tumors in a mammalian host exhibiting a B cell tumor, the method comprising:

- administering to said host a therapeutically effective amount of an antibody-toxin conjugate, said conjugate consisting of:
- an antibody specific for immunoglobulin isotype IgD, and
- one or more toxin molecules coupled to the antibody;
- the amount of antibody-toxin conjugate effective to promote B cell tumor regression.

**4,792,448**  
**GENERIC ZERO ORDER CONTROLLED DRUG**  
**DELIVERY SYSTEM**  
 Gautam R. Ranade, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Filed Jan. 11, 1987, Ser. No. 61,925  
 Int. Cl.<sup>4</sup> A23K 1/18; A61K 9/44  
 U.S. Cl. 424—438 32 Claims



11. A bolus for oral administration into the reticulum or rumen of a ruminant mammal, said bolus being retained in said rumen or reticulum and releasing one or more active substances into the environment of said rumen or reticulum at a substantially constant rate over a prolonged period of time, which comprises said active agent or substances homogeneously dispersed in a matrix and contained by means of an all-covering essentially impermeable wall or coating except for one or more strips of removed wall or coating from the side of said bolus.

**4,792,449**  
**METHOD FOR DRUG ADMINISTRATION**  
 Robert K. Ausman, Long Grove, Ill.; Mark Adams; Gerardo Caballero, both of Milwaukee, Wis.; Rahim Hamid, Wauwatosa, Wis.; Norman E. Hoffman, Wales, Wis.; Edward J. Quebbeman, Brookfield, Wis.; William J. Schulte, Wauwatosa, Wis.; Robert Thomson, New Berlin, Wis.; Julie Whipple, Milwaukee, Wis.; and Steven D. Weitman, Irving, Tex., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Jan. 28, 1987, Ser. No. 7,890  
 Int. Cl.<sup>4</sup> A61K 9/68; A23D 5/00; A23G 3/00  
 U.S. Cl. 424—440 11 Claims

5. A method for providing a cyclosporine drug to a patient in a form suitable to be swallowed by the patient, comprising the steps of:

- a. dissolving the cyclosporine drug in a lipid solution; and
- b. dissolving the resulting cyclosporine-lipid solution in chocolate.

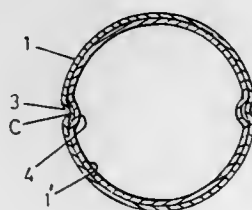
**4,792,450**  
**DEVICE FOR CONTROLLED RELEASE DRUG**  
**DELIVERY**  
 Agis F. Kydonieus, Kendall Park, N.J., and Bret Berner, New York, N.Y., assignors to Hercon Laboratories Corporation, South Plainfield, N.J.

Continuation-in-part of Ser. No. 849,670, Apr. 9, 1986, which is a continuation-in-part of Ser. No. 671,850, Nov. 15, 1984, abandoned. This application Jan. 18, 1986, Ser. No. 875,824  
 Claims priority, application European Pat. Off., Nov. 15, 1985, 85308327.7

Int. Cl.<sup>4</sup> A61K 9/00; A61L 15/03  
 U.S. Cl. 424—449 23 Claims

1. A device for the controlled release and delivery of pharmacologically active agent, comprising a gelled vinyl layer and a pharmacologically active agent uniformly dispersed in the layer in a pharmacologically effective amount, said gelled vinyl layer comprising a polyvinyl chloride resin, a primary plasticizer for the polyvinyl chloride resin, and an organic, nonvolatile gel forming additive in an amount sufficient to form a gel.

**4,792,451**  
**MEDICINAL CAPSULE**  
 Myung K. Kim, Seoul, Rep. of Korea, assignor to Su-Heung Capsule Co., Ltd., Kyungki, Rep. of Korea  
 Filed Jan. 19, 1987, Ser. No. 64,012  
 Claims priority, application Rep. of Korea, Dec. 20, 1986, 86-20833[U]  
 Int. Cl.<sup>4</sup> B65B 1/00; B65D 6/12, 1/24, 83/04  
 U.S. Cl. 424—453 3 Claims



1. A medicinal capsule having an inside surface and an outside surface, comprising:

- a cap member containing a first circumferential slot formed on the inside surface of the upper portion thereof,
- at least one raised member formed on the inside surface of the lower portion of said cap member,
- a body member containing a second circumferential slot formed on the outside surface of the upper portion thereof for slidably locking said first circumferential slot of the cap member during final locking, and
- at least one connecting member formed on the outside surface of said second circumferential slot of the body member and extending internal to said body member for slidably locking with said raised member of the cap member, said connecting member having a larger radius of curvature than the raised member of the cap for forming a space therebetween, whereby, when the cap member and body member are preliminarily locked prior to final locking, the medicinal capsule is not deformed.

**4,792,452**  
**CONTROLLED RELEASE FORMULATION**  
 John R. Howard, and Peter Timmins, both of Merseyside, United Kingdom, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

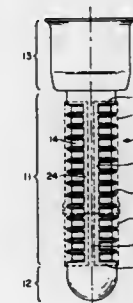
Filed Jul. 28, 1987, Ser. No. 78,505  
 Int. Cl.<sup>4</sup> A61K 9/30

U.S. Cl. 424—475 20 Claims  
 1. A controlled release pharmaceutical formulation from which a pharmaceutical of a basic character is released at a controlled rate irrespective of the pH of the environment, consisting essentially of a pharmaceutical of a basic character, a pH-dependent polymer which is a salt of alginic acid, in an amount of from about 15 to about 45% by weight of the formulation, said salt of alginic acid having a viscosity of within the range of from about 4 to about 500 centipoises in 1% solution at 25° C.; a pH-independent hydrocolloid gelling agent having a viscosity within the range of from about 50 to about 100,000 centipoises in 2% solution at 20° C., in an amount within the range of from about 3 to about 35% by weight of the formulation, and binder, said formulation being free of calcium ion.

**4,792,453**  
**HARD COATED SUGARLESS CHEWING GUM**  
 Michael A. Reed, Evanston; Mansukh M. Patel, Downers Grove, and Vasek J. Kures, Willow Springs, all of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.  
 Filed May 4, 1987, Ser. No. 46,665  
 Int. Cl.<sup>4</sup> A23G 3/30

U.S. Cl. 426—5 47 Claims  
 1. A hard coated sugarless chewing gum comprising a sugarless chewing gum center and a sugarless hard coating comprising hydrogenated isomaltulose, said gum center having a water content of less than about 2.5 weight percent based on the weight of the gum center.

**4,792,454**  
**CONTAINER FOR FERMENTATION**  
 Jean Lemoine, Le Vesinet, France, assignor to Millipore Corporation, Bedford, Mass.  
 Continuation of Ser. No. 888,537, Jul. 21, 1986, abandoned. This application Sep. 23, 1987, Ser. No. 99,644  
 Claims priority, application France, Jul. 22, 1985, 85 11183  
 Int. Cl.<sup>4</sup> C12G 1/06  
 U.S. Cl. 426—8 12 Claims



1. A container for fermentation of a non-foamy wine within a bottle comprising:

- a body having an inner cavity adapted to be filled with yeast;
- said body including first and second means for providing fluid communication between said inner cavity and the exterior of said body, said first fluid communication means including hydrophilic membrane filter means disposed on said body and said second fluid communication means including hydrophobic membrane filter means disposed on said body; and
- each of said hydrophilic and hydrophobic membrane filter

means being of a pore size to retain within said body yeast when inserted therein.

**4,792,455**  
**METHOD FOR PRESERVING FRUITS AND**  
**VEGETABLES**  
 Ottmar Tallafus, Am Himmelreich 14, 6967 Buchen 1, Fed. Rep. of Germany  
 Filed Nov. 10, 1986, Ser. No. 928,867  
 Claims priority, application Fed. Rep. of Germany, Nov. 12, 1985, 3540033  
 Int. Cl.<sup>4</sup> A23B 7/144 7 Claims

1. A method for preserving fresh fruits and vegetables, especially geophytes and mushrooms, comprising: preparing said fresh fruits and vegetables so as to be ready for consumption, then refrigerating and packaging the fruits and vegetables into a flexible wall container and then introducing pure oxygen into said container in such a manner that essentially no gas other than oxygen is present therein and then sealing the container with the fruits or vegetables contained therein in an oxygen atmosphere under atmospheric pressure.

**4,792,456**  
**ACCELERATED PROOFING OF REFRIGERATED**  
**DOUGHS**  
 Edward Katz, and Douglas A. Edmonson, both of St. Louis County, Mo., assignors to Anheuser-Busch Companies, Inc., St. Louis, Mo.  
 Filed Oct. 24, 1986, Ser. No. 922,524  
 Int. Cl.<sup>4</sup> A21D 10/00 14 Claims

1. A method of accelerating the proofing of raw dough products containing a chemical leavening system consisting of a particulate acidulant component and a particulate component which produces CO<sub>2</sub> when contacted by the acidulant component and in which the particles of one of the components are encapsulated to minimize premature reaction between the components, which raw dough products are to be stored in sealed containers and refrigerated comprising the steps of:

- (a) forming the dough product at a forming temperature of not more than about 70° F. at which proofing of the dough product is suppressed,
- (b) placing the formed dough product in a container and artificially heating the container with a heat source of a temperature of about 110°-130° F. until the formed dough product in the container attains an average temperature of about 80°-90° F.,
- (c) proofing the dough within the container at the average temperature until the container is internally sealed by the proofing of the dough product and the internal pressure reaches at least about 10 psi in the container, and
- (d) refrigerating the heated dough product in the internally sealed container.

**4,792,457**  
**METHOD FOR MANUFACTURING INDIVIDUALLY**  
**WRAPPED MEAT SLICES**  
 Miro A. Brna, Park Ridge; Robert G. Walker, Glenview, and Charles Kukla, Broadview, all of Ill., assignors to Kraft, Inc., Glenview, Ill.

Filed Dec. 19, 1986, Ser. No. 944,415  
 Int. Cl.<sup>4</sup> A22C 11/00 9 Claims

1. A method for continuously manufacturing individually wrapped, single slice, firm bodied meat products comprising the steps of

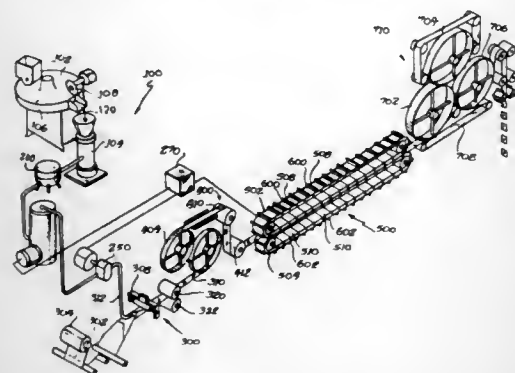
- preparing a viscous, heat settable, non-syneresing meat emulsion, comprising from about 25 to about 65 percent total solids and from about 35 to about 75 percent water, said solids comprising at least about 5 percent protein, at least about 5 percent animal or vegetable fat, and up to



about 5 percent by weight of a heat settable starch having a gelation temperature in the range of from about 80° F. to about 180° F., based on the total weight of the meat product emulsion,

continuously forming a longitudinally sealed packaging material tube from a substantially gas impervious packaging material, continuously introducing the meat emulsion into the packaging material tube,

continuously flattening the meat emulsion and packaging material tube and enclosed heat-settable meat emulsion prior to gelation of said starch to a thickness in the range of from about 1/16th to about 3/16th inch and a width of from about 2 to about 5 inches, to provide a flattened, continuously advancing, non-synersing meat emulsion containing, substantially gas impervious film tube, continuously repetitively displacing the viscous heat settable meat emulsion from a cross sealing zone of the continu-



ously advancing flattened packaging material tube and transversely sealing the packaging material tube to provide a successive plurality of sealed packages each containing the meat emulsion in sheet form, and continuously repetitively heating the respective meat emulsion of each of said successive plurality of sealed packages while compressing at least two opposing sides of each of the sealed packages to gel said starch and pasteurize and heat-set the meat emulsion contained in each sealed package, said compressing being carried out by subjecting the meat emulsion to a compressive force of at least about 5 pounds per square inch, applied by substantially flat, opposed parallel surfaces, while heat-setting the emulsion, to provide a plurality of flat, firm bodied, form-stable, heat coagulated single slice meat products each intimately surrounded by and in conforming contact with a surrounding, sealed, substantially gas impermeable package formed of said packaging material.

4,792,458

#### FOOD STUFFS CONTAINING STARCH OF A DULL SUGARY-2 GENOTYPE

Robert B. Friedman, Chicago, Ill.; David J. Gottneid, Griffith, Ind.; Eugene J. Faron, Schererville, Ind.; Frank J. Pustek, Munster, Ind., and Frances R. Katz, Crown Point, Ind., assignors to American Maize-Products Company, Stamford, Conn.

Filed Jul. 2, 1987, Ser. No. 69,260  
Int. Cl. A23L 1/04, 1/195

U.S. Cl. 426—578

9 Claims

1. A thickened foodstuff for canning comprising a foodstuff, water and having as an essential ingredient therein an effective amount of a natural thin-thick starch, said starch extracted from a starch bearing plant having a dull sugary-2 genotype, said starch providing no effective thickening characteristics to said foodstuff before canning while providing effective thickening characteristics to said foodstuff after canning.

#### 4,792,459 PROCESS AND APPARATUS FOR PRODUCING VODKA

Manfred Krause, Box 7, D-6501 Bodenheim, Fed. Rep. of Germany

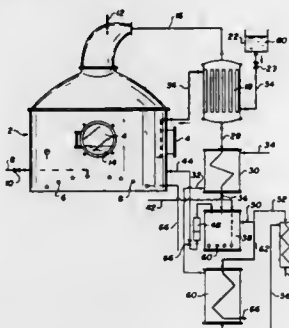
Continuation of Ser. No. 605,002, Apr. 27, 1984, abandoned.

This application Apr. 28, 1987, Ser. No. 48,462

Int. Cl. C12G 3/10, 3/06; B01D 3/00, 5/00

U.S. Cl. 426—592

1 Claim



1. A continuous process for producing vodka comprising the steps of combining a liquid base having an alcohol content of more than 40% by volume with water including minerals normally present in natural water to form a solution having an alcohol content of about 4.5% by volume, heating the solution to generate a vapor having a higher alcohol content than the liquid base, condensing the vapor and bringing it in thermal contact with the liquid base to thereby transfer heat from the vapor to the liquid base and raise the temperature of the latter while condensing the vapor into a distillate; flowing the distillate into a mixing chamber; flowing an amount of the solution into the mixing chamber at a rate selected so that the resulting mixture in the chamber has an alcohol content of about 40% by volume and includes the minerals which are present in the water added to the liquid base to thereby impart a distinct flavor to the resulting vodka, and intimately mixing the distillate and the solution in the chamber.

4,792,460

#### METHOD FOR PRODUCTION OF POLYSILANES AND POLYGERMANES, AND DEPOSITION OF HYDROGENATED AMORPHOUS SILICON, ALLOYS THEREOF, OR HYDROGENATED AMORPHOUS GERMANIUM

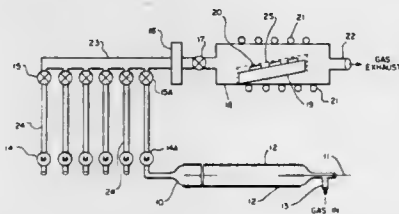
Ting L. Chu, and Shirley S. Chu, both of Dallas, Tex., assignors to Electric Power Research Institute, Inc., Palo Alto, Calif.

Filed Jul. 15, 1986, Ser. No. 885,916

Int. Cl. B05D 3/06

U.S. Cl. 427—35

10 Claims



1. A process for depositing hydrogenated amorphous silicon films onto a substrate comprising the steps of producing a gaseous polysilane-containing stream by exposure of a gaseous mixture comprising monosilane and inert gas at substantially atmospheric pressure to electric discharge in a first reaction zone

and contacting said polysilane-containing stream with said substrate in a second reaction zone separated from said first zone under conditions sufficient to deposit hydrogenated amorphous silicon film thereon.

4,792,461

#### METHOD OF FORMING A PHOTOMASK MATERIAL

Yachiro Watakabe, and Shuichi Matsuda, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

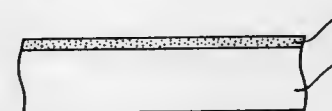
Division of Ser. No. 837,356, Mar. 6, 1986, This application Jun. 22, 1987, Ser. No. 64,392

Claims priority, application Japan, Aug. 30, 1985, 60-192814

Int. Cl. B05D 3/06

U.S. Cl. 427—38

10 Claims



1. A method of forming a photomask material on a transparent substrate, suitable for use in manufacturing a semiconductor device, comprising the steps of: depositing on said transparent substrate a film of a silicide of an oxidized transition metal.

4,792,462

#### METHOD OF APPLYING INSULATING MATERIAL TO WINDINGS IN ELECTRICAL MACHINERY

William R. Smith, Gallatin, Tenn.; Marvin W. Sheets, Los Gatos, Calif., and Paul W. Greenlee, Hendersonville, Tenn., assignors to General Electric Company, Fort Wayne, Ind.

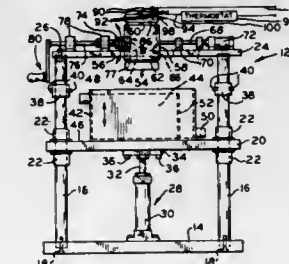
Continuation of Ser. No. 563,761, Dec. 21, 1983, abandoned.

This application Nov. 26, 1985, Ser. No. 801,901

Int. Cl. B05D 3/14, 3/02, 1/18

U.S. Cl. 427—49

23 Claims



1. A method of coating insulation on a winding comprising a plurality of turns of wire disposed in slots of a magnetic core wherein a portion of the winding protrudes from opposite ends of the core wherein the insulation is formed from a liquid insulating material characterized by having a first viscosity level at a first temperature range, by having a viscosity level less than the first viscosity level at a second temperature range higher than the first temperature range, by gelling at a third temperature range above the second temperature range and thereby having a viscosity level greater than the first viscosity level, and by curing at sufficiently high temperatures, the method comprising:

immersing the portion of the winding protruding from a first end of the core in a bath of the liquid electrical insulating material, while the windings are at a temperature in the second temperature range, to adhere insulating material to the immersed portion of the winding, and removing the winding from the bath; then inverting the core and winding to position the first

protruding portion of the winding above the core while maintaining the viscosity of the material adhering to the winding sufficiently low, due to the temperature of the windings being in the second temperature range, to cause some of the adhered material to flow down into the slots of the core;

repeating the steps of immersing and inverting until the insulating material coats at least a portion of the winding in the slots of the core and flows through the slots to the other end of the core;

then repeatedly immersing the first-protruding portion of the winding into liquid electrical insulating material to adhere insulating material to the first protruding portion while raising the temperature of the adhered material to the third temperature range to increase the viscosity of the adhered material sufficiently to cause the insulating material to build up on the first protruding portion of the winding and form a significantly thicker coating thereon than is formed on the portion of the winding within the slots; and

then curing the insulated material coated on the winding.

4,792,463

#### METHOD OF PRODUCING FERROELECTRIC THIN FILM

Masaru Okada, 21 Banchi, Kandajin-cho, Kasugai-city, Aichi-prefecture, and Katsuhiko Tomita, Kyoto, both of Japan, assignors to Masaru Okada, Aichi and Horiba, Ltd., Kyoto, both of Japan

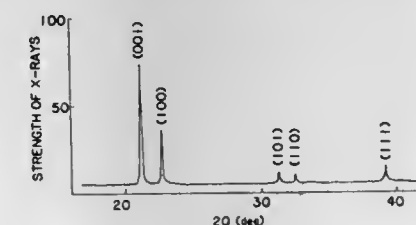
Filed Sep. 3, 1986, Ser. No. 903,134

Claims priority, application Japan, Sep. 17, 1985, 60-205653

Int. Cl. B05D 5/12; C23C 16/40

U.S. Cl. 427—126.3

7 Claims



1. A method of producing a ferroelectric film by chemical vapor deposition, which comprises:

providing a gaseous mixture containing oxygen and a gaseous raw material selected from the group consisting of (A), (B) and (C), wherein (A) is at least one member selected from the group consisting of alkyl lead and alkyl bismuth, and at least one member selected from the group consisting of alcoholates of titanium, zirconium, silicon, germanium and niobium, (B) is alkyl lead and alkyl germanium, and (C) is alkyl bismuth and alkyl lead, said oxygen being present in said gaseous mixture in an amount which is at least sufficient to oxidize the components of said (A), (B) or (C); and

reacting said oxygen and gaseous raw material at a pressure of not more than about atmospheric pressure on a substrate having a temperature which is at least sufficient to oxidize the components of said (A), (B) or (C), to form on said substrate a film, having a thickness of 1 to 30 μm, selected from the group consisting of PbTiO<sub>3</sub>, PbZrO<sub>3</sub>, PbZrTiO<sub>3</sub>, Pb<sub>2</sub>Ge<sub>3</sub>O<sub>11</sub>, Bi<sub>12</sub>TiO<sub>20</sub>, Bi<sub>12</sub>PbO<sub>19</sub>, Bi<sub>12</sub>SiO<sub>20</sub>, Bi<sub>12</sub>GeO<sub>20</sub>, Pb<sub>2</sub>Bi<sub>4</sub>Ti<sub>5</sub>O<sub>18</sub> and PbBi<sub>2</sub>Nb<sub>2</sub>O<sub>9</sub>.

4,792,464

## CORROSION COATING COMPOSITION

Irvin W. Martenson, 782 Shadow Grove Rd., Brea, Calif. 92670

Filed Jan. 1, 1987, Ser. No. 56,378

Int. Cl.<sup>4</sup> B05D 1/02

U.S. Cl. 427-156

11 Claims

1. The method of temporarily protecting metal surfaces against corrosion which comprises:

a. coating the surface of the metal surface with an anti-corrosion coating composition consisting essentially of:

(1) an aqueous film former comprising 40 to 60 weight percent solids in water with the solids consisting of a terpolymer of from 75 to 90 percent of polyvinyl butyral, from 9 to 25 percent polyvinyl alcohol and from 0.1 to 5 percent polyvinyl acetate;

(2) a sufficient quantity of a hydroxyalkyl cellulose ester in a sufficient quantity to impart thixotropic properties to said coating composition;

(3) an corrosion inhibitor mixture comprising from 0.1 to 2 weight percent of an inhibitor selected from the class consisting of aromatic triazoles, monoethanolamine benzoate and 2-ethyl,1-(N,N-dodecyl hydroxyethyl)amine ethylimadazoline dispersed in a plasticizer for said polyvinyl butyral resin; and

(4) from 0.5 to 2 weight percent morpholine;

b. exposing the coated metal object to a corrosive environment; and

c. removing the coating metal object from the corrosive environment and peeling the coating from the metal to expose a metal object free of corrosion.

7. A corrosion inhibiting coating comprising:

d. an aqueous film former comprising 40 to 60 weight percent solids in water with the solids consisting of a terpolymer of from 75 to 90 percent polyvinyl butyral, from 9 to 25 percent polyvinyl alcohol and from 0.1 to 5 percent polyvinyl acetate;

e. a sufficient quantity of a hydroxyalkyl cellulose ester in a sufficient quantity to impart thixotropic properties to said coating composition;

f. a corrosion inhibitor mixture comprising from 0.1 to 2 weight percent of an inhibitor selected from the class consisting of aromatic triazoles, monoethanolamine benzoate and 2-ethyl,1-(N,N-dodecyl hydroxyethyl)amine ethylimadazoline dispersed in a plasticizer for said polyvinyl butyral resin; and

g. from 0.5 to 2 weight percent morpholine.

4,792,465

## PROCESS FOR MAKING SURFACE MODIFIED U.V. STABILIZED PVC ARTICLES

Joseph Silbermann, Old Bridge, and Michael T. Burchill, Cranbury, both of N.J., assigns to M&amp;T Chemicals Inc., Woodbridge, N.J.

Continuation-in-part of Ser. No. 945,595, Dec. 23, 1986. This application Jul. 23, 1987, Ser. No. 76,648

Int. Cl.<sup>4</sup> B05D 3/00

U.S. Cl. 427-160

8 Claims

1. A process of making a U.V. stabilized PVC article wherein the surface region of the article is modified with a U.V. stabilizer and the treated surface is substantially free of residual stabilizer thereon, which comprises the steps of:

(a) applying a solution of a U.V. stabilizer in a solvent which is capable of swelling said PVC but is otherwise non-aggressive thereto; and

(b) displacing residual stabilizer solution present on said thus-treated surface by a liquid which is non-miscible with said solvent.

4,792,466

## METHOD OF MAKING PANELS OF MICROPOROUS THERMAL INSULATION

Joseph A. McWilliams, Drottwich; Derek E. Morgan, Malvern, and James D. J. Jackson, Kidderminster, all of United Kingdom, assigns to Micropore International Limited, Drottwich, United Kingdom

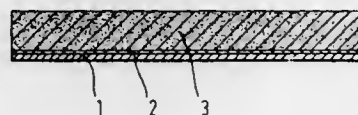
Filed May 5, 1987, Ser. No. 46,279

Claims priority, application United Kingdom, May 14, 1986, 8611785

Int. Cl.<sup>4</sup> B29C 41/32; B32B 5/02

U.S. Cl. 427-177

7 Claims



1. A method of manufacturing a panel of microporous thermal insulation material, which method comprises the steps of: applying a film of polyvinyl acetate emulsion to a substantially rigid non-porous substrate; allowing the polyvinyl acetate to become dry to the touch; and compacting powdery microporous thermal insulation material against the film so as to cause the insulation material to consolidate and to bond to the substrate so as to form a panel.

4,792,467

## METHOD FOR VAPOR PHASE DEPOSITION OF GALLIUM NITRIDE FILM

Andreas A. Melas, Burlington, Mass., and Norbert Braunagel, Karlsruhe, Fed. Rep. of Germany, assigns to Morton Thiokol, Inc., Chicago, Ill.

Division of Ser. No. 880,760, Jul. 1, 1986, Pat. No. 4,740,606.

This application Aug. 17, 1987, Ser. No. 86,748

Int. Cl.<sup>4</sup> C23C 16/30, 16/34

U.S. Cl. 427-248.1

9 Claims

1. A method for depositing a gallium nitride film on a substrate, comprising the steps of:

A. selecting as a source compound an adduct of the formula:



wherein each R is independently selected from alkyl having from 1 to about 4 carbon atoms;

B. conveying said source compound to a deposition chamber containing said substrate;

C. maintaining said source compound in the gaseous phase in said deposition chamber; and

D. decomposing said source compound in said deposition chamber, thereby depositing gallium nitride on said substrate.

4,792,468

## METHOD OF FORMING REFRACTORY MASSES FROM COMPOSITIONS OF MATTER OF SPECIFIED GRANULOMETRY

Pierre Robyn, Nivelles; Léon-Philippe Mottet, Tarcienne, and Pierre Deschepper, Marcinelle, all of Belgium, assigns to Glaverbel, Brussels, Belgium

Filed Dec. 2, 1985, Ser. No. 803,782

Claims priority, application United Kingdom, Jan. 26, 1985, 8502008

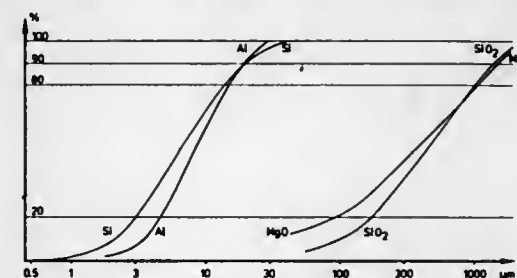
Int. Cl.<sup>4</sup> C04B 35/02, 35/60, 35/62

U.S. Cl. 427-422

16 Claims

1. A process of forming a substantially crack-free refractory mass on a surface, which process comprises spraying against

the surface a mixture of refractory particles and oxidisable particles which react exothermically with oxygen to generate sufficient heat to soften or melt at least the surfaces of the refractory particles and so bring about formation of the refractory mass, and causing the sprayed mixture to be heated sufficiently to cause the oxidisable particles to undergo such exothermic reaction, characterised in that the granulometry of the



particles which are sprayed in the mixture is such that the mixture has refractory and oxidizable particles of 80% grain size and of 20% grain size, the mean of the 80% and 20% grain sizes of the refractory particles is greater than the mean of the 80% and 20% grain sizes of the oxidizable particles and that the size range spread factor of the refractory particles is at least 1.2, the size range spread factor of the refractory particles being equal to:

$$\frac{2(G_{80} - G_{20})}{G_{80} + G_{20}}$$

where  $G_{80}$  is the 80% grain size of the refractory particles, and  $G_{20}$  is the 20% grain size of the refractory particles.

4,792,469

## ELECTROLESS GOLD PLATING SOLUTION

Masahiro Saito; Hideyuki Takami, both of Osaka; Makoto Sato, Hirakata, and Masayuki Kiso, Nagareyama, all of Japan, assigns to C. Uyemura &amp; Co., Ltd., Osaka, Japan

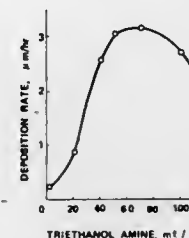
Filed Oct. 24, 1986, Ser. No. 923,135

Claims priority, application Japan, Oct. 25, 1985, 60-239150

Int. Cl.<sup>4</sup> B05D 1/18; B22F 7/00

U.S. Cl. 427-443.1

15 Claims



1. An alkaline electroless gold plating solution comprising: a gold salt,

an amine borane reducing agent,

an amine compound in an amount of from 10 to 200 ml/liter, elemental lead from a lead salt in an amount of from 0.1 to 100 ppm, and

an alkaline hydroxide in an amount of from 10 to 100 grams/liter.

10. A method of electroless gold plating which comprises: conducting electroless gold plating on a workpiece by using an alkaline electroless gold plating solution comprising, elemental gold to form a gold salt in an amount of from 1 to 10 grams/liter,

an amine borane reducing agent in an amount of from 1 to 20 grams/liter,

an amine compound selected from the group consisting of trialkonal amines and ethyleneamines, elemental lead from a lead salt in an amount of from 10 to 100 ppm, and an alkaline hydroxide in an amount of from 10 to 100 grams/liter, wherein a gold plated film having a lemon yellow appearance and high throwing power is obtained on said workpiece at a high deposition rate.

4,792,470

## TWISTED BOXBOARD FURNITURE

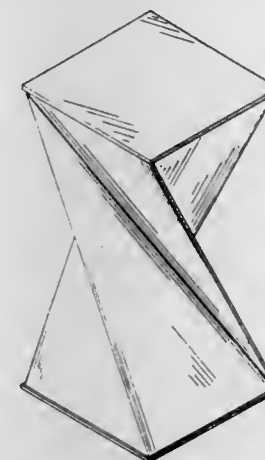
Harold E. Clark, 136 Glenbrook Ct., Hendersonville, N.C. 28739

Filed Apr. 21, 1987, Ser. No. 40,615

Int. Cl.<sup>4</sup> A47B 13/00

U.S. Cl. 428-12

1 Claim



1. A flat, collapsed form having eight right triangular regions, six of said regions each being defined by an edge and two intersecting creases, and two of said right triangular regions being defined by two edges and a crease, each said right triangular region including a triangular glued region which shares a side with the facing such triangular, glued region of an adjacent right triangular region, said shared side being a said crease, said facing triangular glued regions being glued together.

4,792,471

## BODY WRAP CAMOUFLAGE STRIP FOR HUNTERS

Ben R. Lee, Coffeeville, Ala.

Filed Sep. 4, 1987, Ser. No. 93,280

Int. Cl.<sup>4</sup> F41H 3/00

U.S. Cl. 428-17

4 Claims

1. A camouflage wrapping strip for random body wrapping about an outdoorsman; said camouflage wrapping strip comprising:

an elongated strip of flexible material, a plurality of mutually engageable fasteners at longitudinally spaced locations along the strip for mutual attachment at overlapping points by given fasteners, and artificial foliage elements affixed to said strip over the length thereof whereby, the strip may be wrapped about the body of the outdoorsman and fitted to itself at given cross-overs of the strip defined by said mutually engageable

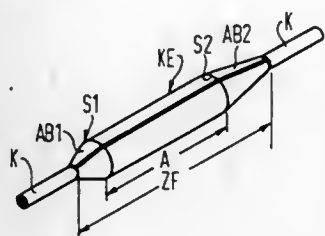


fasteners to loosely couple said strip temporarily to itself or the clothing of said body thereby effectively breaking



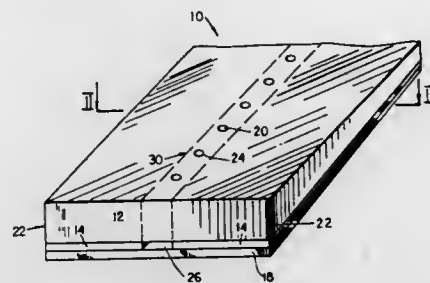
up the outline of the outdoorsman and providing a three-dimensional camouflage effect.

**4,792,472**  
**WRAP-AROUND CABLE SLEEVE LINER AND METHOD OF MAKING**  
Hans J. Meltach, Schwerte, Fed. Rep. of Germany, assignor to RXS Schrumpftechnik-Garnturen GmbH, Fed. Rep. of Germany  
Filed Jun. 16, 1987, Ser. No. 62,679  
Claims priority, application Fed. Rep. of Germany, Jun. 19, 1986, 3620522  
Int. Cl.<sup>4</sup> H02G 15/08; H01B 13/26  
U.S. Cl. 428—35.9 16 Claims



1. A wrap-around cable sleeve liner comprising a blank made of an outer smooth covering sheet cohering to a corrugated sheet, each of the sheets being of the same size and being a sandwich sheet of a plurality of layers of material, the blank being cut from a large area panel of the two cohering sheets to a desired size with corrugations of the corrugated sheet running along one edge and terminating at the ends of said blank, two lines of indentations being provided in the corrugations, said lines extending substantially parallel to the ends of the blank and extending at an angle to the corrugations of the corrugated sheet to form a bend line adjacent each end of the blank so that the ends of the liner can be bent on said bend lines to be adapted to different diameters of cables introduced into the wrap-around cable sleeve liner.

**4,792,473**  
**SELF ADHESIVE WALLBOARD TAPE**  
Ralph F. Vitale, East Haven, Conn., assignor to Endura Tape, Inc., Clinton, Conn.  
Filed Oct. 31, 1986, Ser. No. 925,226  
Int. Cl.<sup>4</sup> B32B 7/06, 7/12  
U.S. Cl. 428—40 7 Claims



1. A self adhesive wallboard tape comprising:  
a paper tape substrate suitable for bonding with gypsum compound and perforated with longitudinally spaced holes in about the center of said substrate, an adhesive coating on one side of said substrate spaced from a point beginning at each edge of said substrate to a point from about 0 inches (0 mm) to about  $\frac{1}{4}$  inch (6.35 mm) from the outside circumference of said longitudinally spaced holes, whereby the center portion of said substrate is adhesive free.

**4,792,474**  
**OPTICAL MEMORY ELEMENT**  
Yoshiteru Murakami, Nishinomiya; Akira Takahashi, Nara; Yoshikazu Fujii, Nara; Hiroyuki Katayama, Nara, and Kenji Ohta, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Sep. 18, 1986, Ser. No. 908,716  
Claims priority, application Japan, Sep. 24, 1985, 60-211660  
Int. Cl.<sup>4</sup> B32B 3/02, 9/00; G01D 15/10, 9/00  
U.S. Cl. 428—64 12 Claims  
1. An optical memory element comprising:  
a substrate;  
a recording medium layer; and  
a dielectric layer made of an aluminum silicon nitride film.

**4,792,475**  
**COMPOSITE JOINT PAD FOR SYNTHETIC RESIN PANEL**  
Alfred A. Blea, W. Bloomfield, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.  
Filed Oct. 16, 1987, Ser. No. 109,015  
Int. Cl.<sup>4</sup> F16B 5/02  
U.S. Cl. 428—137 2 Claims

1. In a composite joint pad designed to clamp a synthetic resin panel to a workpiece comprising:  
a metal bushing in the form of a plate portion formed with a central annular raised embossment terminating in a tubular stem portion extending normally to said plate like portion and having an internally threaded bore;  
said bushing plate portion enclosed within a fiber reinforced composite structural joint pad such that said raised embossment defines an exposed portion terminating in an arcuate rim first extremity located a predetermined axial distance outwardly from one bonding face of said pad and said stem portion free end defining a second extremity extending a predetermined distance outwardly from the opposite face of said pad,  
a synthetic resin panel having one mating surface and an opposite free surface, said panel mating surface bonded to

said pad bonding surface and formed with a circular opening therein into which said central embossment exposed extremity extends such that said embossment arcuate rim is located flush with said panel opposite free surface; whereby said panel opposite free surface is adapted to be secured in flush relation to a workpiece surface having a



fastener hole aligned on the axis of said stem portion through bore, a threaded fastener extending through said workpiece panel hole and into threaded engagement with said stem bore wherein said embossment arcuate rim extremity is in flush metal-to-metal abutment with said workpiece surface thereby obviating fastener clamping forces being applied to said synthetic resin panel.

**4,792,476**  
**LOW THERMAL EXPANSION RESIN MATERIAL AND COMPOSITE SHAPED ARTICLE**  
Shun-ichi Numata; Koji Fujisaki; Noriyuki Kinjo; Junichi Imaizumi, all of Hitachi, and Yoshikatsu Mikami, Shinjohate, all of Japan, assignors to Hitachi, Ltd. and Hitachi Chemical Co., both of Tokyo, Japan  
Division of Ser. No. 636,736, Aug. 1, 1984, Pat. No. 4,690,999.  
This application Jul. 24, 1987, Ser. No. 77,390  
Claims priority, application Japan, Aug. 1, 1983, 58-139438; Aug. 19, 1983, 58-152351  
Int. Cl.<sup>4</sup> B32B 5/02, 15/02, 15/08, 27/06  
U.S. Cl. 428—209 21 Claims

1. A composite shaped article comprising an inorganic material bonded with a low thermal expansion resin material shaped into one body, said resin material comprising a polyimide having as chemical structural unit at least one aromatic ring which can rotate around its molecular axis but has no flexibility at another direction, said polyimide having a molecular chain oriented so as to have a substantially linear structure on a plane by stretching a film, fiber or coating of the polyimide or a precursor thereof uniaxially or biaxially with a stretcher and exhibiting a linear thermal coefficient of  $3 \times 10^{-5}$  to  $4 \times 10^{-7}$  K<sup>-1</sup>.

10. In a multi-layer wiring board comprising layers of a wiring insulating film and a wiring, the improvement wherein the wiring insulating film is made from a low thermal expansion resin material comprising a polyimide having as a chemical structural unit at least one aromatic ring which can rotate around its molecular axis but which has no flexibility in either direction and which is bonded at para positions, said polyimide having a molecular chain oriented so as to have a substantially linear structure on a plane by stretching a film of the polyimide or a precursor thereof uniaxially or biaxially with a stretcher and exhibiting a linear thermal coefficient of  $3 \times 10^{-5}$  to  $4 \times 10^{-7}$  K<sup>-1</sup>.

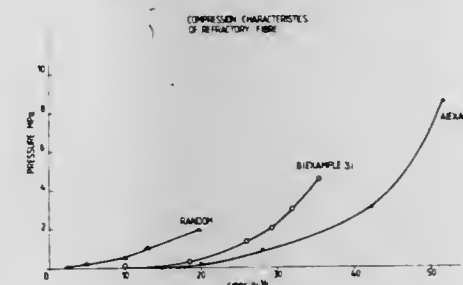
16. In a floppy disk comprising a base plate and an information recording layer formed on the base plate, the improvement wherein the base plate is made from a low thermal expansion resin material comprising a polyimide having as a chemical structural unit at least one aromatic ring which can rotate around its molecular axis but which has no flexibility in another direction and which is bonded at para positions, said polyimide having a molecular chain oriented so as to have a substantially linear structure on a plane by stretching a film of

the polyimide or a precursor thereof uniaxially or biaxially with a stretcher and exhibiting a linear thermal expansion coefficient of  $3 \times 10^{-5}$  to  $4 \times 10^{-7}$  K<sup>-1</sup>.

**4,792,477**  
**LAMINATE OF MODIFIED POLYCARBONATE RESIN AND MODIFIED POLYOLEFIN RESIN**  
Masahide Ochiai, Yokohama, Japan, assignor to Mitsubishi Petrochemical Company Limited, Tokyo, Japan  
Filed Oct. 15, 1987, Ser. No. 108,725  
Claims priority, application Japan, Oct. 16, 1986, 61-240853  
Int. Cl.<sup>4</sup> B32B 7/02  
U.S. Cl. 428—216 16 Claims

1. A thermoplastic resin laminate, comprising a modified aromatic polycarbonate resin containing (a) functional groups selected from aliphatic hydroxyl groups, carboxyl groups and epoxy groups in a copolymerized form and a modified polyolefin resin containing (b) functional groups selected from the above group of functional groups and being different from the above functional groups (a) in a copolymerized form, the contents of the functional groups (a) and (b) being each  $5 \times 10^{-5}$  to  $5 \times 10^{-1}$  mol/100 g.

**4,792,478**  
**INORGANIC OXIDE FIBRES AND THEIR PRODUCTION**  
Michael D. Taylor, Chester; Martyn H. Stacey, Northwich; Jeffrey S. Kenworthy, Guisborough Cleveland, and Stuart S. Boffey, Crewe, all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England  
Filed Jun. 16, 1986, Ser. No. 874,999  
Claims priority, application United Kingdom, Jun. 21, 1985, 8515765  
Int. Cl.<sup>4</sup> B32B 9/00; D02G 3/00  
U.S. Cl. 428—221 14 Claims



1. A fibre product comprising a plurality of essentially aligned inorganic oxide fibres of mean diameter less than 5 microns, a proportion of which fibres do not extend the entire length of said fibre product wherein a degree of non-alignment of some of the fibres provides for limited fibre intertwining conferring lateral cohesion upon the product and wherein said fibre product can be compressed to increase the volume fraction of fibres therein to greater than 0.25 without undue breakage of the fibres as denoted by a fall to below 50% in the specific tensile strength of the product.

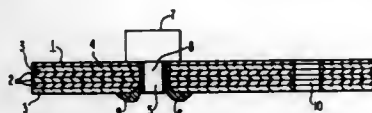
# 4,792,479 PUNCHABLE EPOXY BASED LAMINATING COMPOSITIONS

Joseph R. Marchetti, deceased, late of Hempfield Twp., Westmoreland County, Pa. (by Laura J. Marchetti, administratrix); Fred E. Hickman, III, Derry, N.H., and Wilbur R. Thomas, Hampton, S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 30, 1986, Ser. No. 890,591  
Int. Cl.<sup>4</sup> B32B 5/06, 17/10; H05K 1/00

U.S. Cl. 428—236

15 Claims



1. A prepreg comprising a porous substrate of paper, glass and mixtures thereof, impregnated with a solution, then dried and cured to the B-stage, where said solution comprises:
  - (A) about 2 to about 25% by weight, based on total solids, of an oligomer having at least two carboxylic acid groups, polymerized from an unsaturated fatty acid having at least 10 carbon atoms;
  - (B) up to about 20% by weight, based on total solids, phenolic resin;
  - (C) epoxy resin in an amount from about 0 to about 20% excess equivalents of epoxide groups;
  - (D) up to about 2% by weight, based on total solids, of a catalyst; and
  - (E) about 10 to about 90% by weight, based on total solution weight, of an organic solvent.

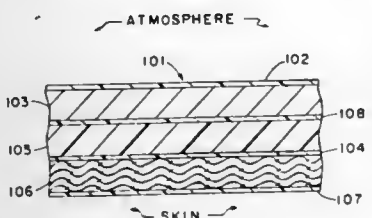
# 4,792,480 LAMINATE MATERIAL FOR USE IN PROTECTIVE CLOTHING

Paul X. Freund, 315 E. Grandview Ave., Zelienople, Pa. 16063; Sheridan J. Rodgers, R.D. #2 James Dr., Ellwood City, Pa. 16117, and Christopher J. Kairys, 3854 Dolphin Dr., Allison Park, Pa. 15101

Filed Sep. 14, 1987, Ser. No. 95,682  
Int. Cl.<sup>4</sup> B32B 27/00

U.S. Cl. 428—286

10 Claims



1. A laminate material suitable for use as protective clothing comprising:
  - a. a first layer of flame retardant heat sealable thermoplastic film;
  - b. a second layer bonded to said first layer comprising a pliable cloth substrate;
  - c. a third layer that is impermeable to toxic agents and bonded through a flame retardant thermoplastic film layer to said second layer;
  - d. a fourth layer comprising a material reflective to radiant heat and bonded through a flame retardant thermoplastic film layer to said third layer; and
  - e. a fifth layer of flame retardant, substantially radiant heat

transparent and light transparent, heat sealable, thermoplastic film bonded to said fourth layer.

# 4,792,481 REINFORCED PLASTIC

James E. O'Connor, Jon F. Geibel, and William H. Beaver, all of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Nov. 28, 1986, Ser. No. 936,041  
Int. Cl.<sup>4</sup> D04H 1/58; B05D 3/02

U.S. Cl. 428—288

33 Claims

1. A process comprising:
  - a. providing a supply of high molecular weight poly(arylene sulfide ketone) resin, as characterized below by inherent viscosity, T<sub>g</sub> and T<sub>m</sub>, in form of particles, said resin having an inherent viscosity greater than 0.55 dl/g, a glass transition temperature, T<sub>g</sub>, in the range of from 125° to 165° C., and a melting temperature, T<sub>m</sub>, in the range of from 300° to 500° C., a measureable melt flow rate of less than about 1000 g/10 minutes, and a calcium content from about 50 to about 10,000 ppm by weight based on elemental calcium, said particles being suspended in a slurry liquid to form a slurry;
  - b. providing a supply of a reinforcement in continuous form selected from the group consisting of a strand, a roving and a yarn, the fiber of which is stable at the melting temperature of said resin;
  - c. impregnating the reinforcement with said particles by passing said reinforcement through the slurry to form a resin-impregnated reinforcement;
  - d. heating the resin-impregnated reinforcement to a temperature sufficient to evaporate the slurry liquid and to soften the resin;
  - e. subjecting the heated resin-impregnated reinforcement to a compressive force to consolidate the resin and the fiber reinforcement to form a fiber-reinforced continuous thermoplastic matrix; and
  - f. cooling said matrix to a temperature below the softening temperature of the resin.

# 4,792,482 MIRROR LAMINATES

Roger J. Leach, Surry, United Kingdom, assignor to Chelsea Artisans Limited, Surrey, United Kingdom  
Division of Ser. No. 799,117, Nov. 4, 1985, Pat. No. 4,726,860.  
This application Jan. 13, 1988, Ser. No. 143,444

Claims priority, application United Kingdom, Mar. 12, 1984, 8406377; Sep. 21, 1984, 8424008

Int. Cl.<sup>4</sup> B32B 3/26

U.S. Cl. 428—311.5

7 Claims

1. A mirror laminate comprising a mirror comprising a transparent sheet a face of which is provided with a reflective coating, said mirror being bonded to a substantially rigid backing board or other support surface with a porous layer interposed between said mirror and said support surface, said porous layer being bonded to at least one of said mirror and said support surface by means of solvent based adhesive and said porous layer comprising a woven or non-woven fibrous mat, web or felt the fibre content of which largely or wholly comprises synthetic fibres, said mat, web or felt being from 0.5 mm to 5 mm in thickness and permitting extraction of adhesive solvent vapour through the exposed edges of the layer by suction from a bond line between said layer and either the mirror or the support surface.

# 4,792,483 MAGNETIC RECORDING MEDIUM Akira Miyake, Kyoto, and Mikio Kishimoto, Osaka, both of Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan Filed Mar. 20, 1987, Ser. No. 28,565 Claims priority, application Japan, Mar. 20, 1986, 61-63172 Int. Cl.<sup>4</sup> G11B 5/70

U.S. Cl. 428—323

6 Claims

1. A magnetic recording medium comprising a substrate and a magnetic layer formed thereon which contains hexagonal system ferrite magnetic powder in a volume percentage of not larger than 35% based on the total volume of the magnetic layer, wherein the powder has a platelet size of 0.05 to 0.2 μm, wherein the magnetic layer has a porosity of not smaller than 20% by volume and wherein the pores contain a lubricant.

# 4,792,484 COMPOSITION, PROCESS FOR PRODUCING THE SAME AND MULTI-LAYER STRUCTURE Tobeh Moritani, Kurashiki, Japan, assignor to Kuraray Co., Ltd., Kurashiki, Japan Filed May 13, 1987, Ser. No. 49,676 Claims priority, application Japan, May 15, 1986, 61-112373 Int. Cl.<sup>4</sup> B32B 5/16

U.S. Cl. 428—323

8 Claims



1. A composition comprising a matrix of an ethylene-vinyl alcohol (EVOH) copolymer having dispersed therein a granular drying agent in a particulate state, wherein among the dispersed grains of drying agent, the volume-area average diameter of the grains having a long diameter of at least 10 μm is not greater than 30 μm and the ratio of EVOH to said drying agent ranges from 97:3 to 50:50.

# 4,792,485 ELECTROSTATIC RECORDING SHEET Takeshi Kono, Shizuoka, Japan, assignor to Fujl Photo Film Co., Ltd., Kanagawa, Japan Filed Mar. 23, 1988, Ser. No. 172,179 Claims priority, application Japan, Mar. 24, 1987, 62-70007 Int. Cl.<sup>4</sup> B32B 5/16

U.S. Cl. 428—327

8 Claims

1. An electrostatic recording sheet comprising at least a support, a conductive layer provided on the support, and a dielectric layer provided on the conductive layer, said dielectric layer containing polypropylene particles.

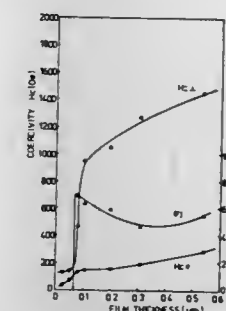
# 4,792,486 PERPENDICULAR MAGNETIC RECORDING MEDIUM Yasuo Ishizaka, Noboru Watanabe, Kazuo Kimura, all of Yokohama, and Eiichiro Imaoka, Sagami-hara, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan Continuation of Ser. No. 842,470, Mar. 21, 1986, abandoned. This application Apr. 4, 1988, Ser. No. 176,832 Claims priority, application Japan, Mar. 28, 1985, 60-64629; Jul. 17, 1985, 60-157906; Jul. 17, 1985, 60-157907 Int. Cl.<sup>4</sup> G11B 5/66

U.S. Cl. 428—336

3 Claims

1. A perpendicular magnetic recording medium on which a signal is recorded and from which the signal is reproduced by

a magnetic head, said perpendicular magnetic recording medium comprising:  
a recording medium base;  
a lower layer formed on the recording medium base; and  
an upper layer formed on the lower layer, said upper layer being made of cobalt-chromium,



said lower layer being formed of a sputtered magnetic material which includes cobalt, chromium and at least one of niobium in a range of 2 to 10 at% and tantalum in a range of 1 to 10 at% so that said lower layer has an in-plane coercivity in a range of 10 to 220 Oe said lower layer including a layer which is substantially magnetically-isotropic.

# 4,792,487 INK JET RECORDING MEDIUM COMPRISING (A) WATER EXPANSIBLE COLLOIDAL CLAY (B) SILICA AND (C) WATER INSOLUBLE SYNTHETIC BINDER Herbert H. Schnbring, Island Pond, Vt.; Donald R. Spalding, Whitefield, N.H., and Kenneth A. Pollart, Neenah, Wis., assignors to James River Corporation of Virginia, Richmond, Va. Filed Mar. 12, 1987, Ser. No. 24,832 Int. Cl.<sup>4</sup> C08K 3/36, 3/34; B41M 5/00

U.S. Cl. 428—342

12 Claims

1. An ink jet recording medium comprising a substrate material consisting essentially of 100 parts by weight of a pigment composed of 70 to 90 parts by weight of a water-expansive colloidal clay of the montmorillonite type and 10 to 30 parts by weight of a finely divided silica having a surface area of at least 250 m<sup>2</sup>/g and an oil absorption value greater than about 175 g/100 g and 5 to 20 parts by weight of a water insoluble synthetic resin binder.

# 4,792,488 HIGH OXYGEN BARRIER COEXTRUDED FILM Henry G. Schirmer, Spartanburg, S.C., assignor to W. R. Grace & Co., Duncan, S.C. Division of Ser. No. 786,930, Oct. 11, 1985. This application Dec. 18, 1987, Ser. No. 136,175 Int. Cl.<sup>4</sup> B32B 27/00

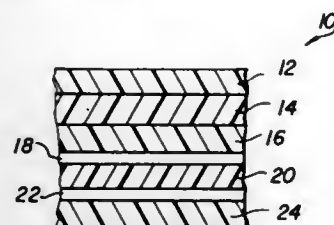
U.S. Cl. 428—349

20 Claims

1. A coextruded multi-layer thermoplastic film comprising:
  - (a) a layer comprising vinylidene chloride copolymer;
  - (b) a layer comprising ethylene vinyl alcohol copolymer;
  - (c) an intermediate layer disposed between said vinylidene chloride copolymer and ethylene vinyl alcohol copolymer layers and comprising an adhesive polymeric material;
  - (d) fourth and fifth layers disposed on the respective surfaces of the vinylidene chloride copolymer and ethylene vinyl alcohol copolymer layers opposite said intermediate layer, either of said fourth and fifth layers comprising an adhesive polymeric material, and the other of said fourth or fifth layers comprising a copolymer of ethylene; and



(e) sixth and seventh layers disposed on the outside of said fourth and fifth layers, said sixth and seventh layers se-



lected from the group consisting of polyolefins and copolymers of ethylene.

**4,792,489**  
**SYNTHETIC FIBERS HAVING UNEVEN SURFACES AND A METHOD OF PRODUCING SAME**  
Hiroshi Kakuchi; Setsuo Fukuhara, both of Kanagawa; Michinobu Fujiwara, Chiba; Hiroshi Maeda, Tokyo; Yutaka Shirakashi, Tokyo; Osamu Asakura, Tokyo; Yoshihiro Yoneda, Tokyo; Tetsuo Noda, Tokyo, and Naoyuki Fujita, Tokyo, all of Japan, assignors to Aderans Co., Ltd., Japan  
Filed Dec. 15, 1986, Ser. No. 941,351  
Claims priority, application Japan, Dec. 27, 1985, 60-298137; Dec. 27, 1985, 60-298138  
Int. Cl.<sup>4</sup> D02G 3/00  
U.S. Cl. 428—400 11 Claims



1. A synthetic fiber formed of polyamide having an uneven surface structure consisting of ridges and recesses on the surface of said fiber, in which said uneven surface structure is comprised of a pattern formed in the entire external circumference of the fiber such that (i) each pair of adjacent recesses have their respective bottoms spaced apart from each other at an interval of about 3 to 30  $\mu$ , as measured along the external circumference of the fiber in a plane normal to a longitudinal axis of the fiber, (ii) the apex to bottom distance of any ridge as measured in a direction normal to the longitudinal axis of the fiber is about 0.2 to 2  $\mu$ , and (iii) about 0.2 to 3 ridges are present per 10  $\mu$  along said external circumference in said plane.

**4,792,490**  
**COMPACTED AGGLOMERATES OF POLYMER LATEX PARTICLES**  
Hideo Yasui, Kobe; Yasuhiro Miki, Himeji, and Wataru Okada, Kobe, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan  
Filed Apr. 8, 1987, Ser. No. 35,795  
Claims priority, application Japan, Apr. 8, 1986, 61-80338  
The portion of the term of this patent subsequent to Aug. 30, 2005, has been disclaimed.  
Int. Cl.<sup>4</sup> B32B 27/06; C08F 6/22  
U.S. Cl. 428—407 14 Claims

1. Coagulated grains having their component latex particles compacted therein without being fused to each other, which are formed by the steps of  
(A) into a polymer latex manufactured by emulsion polymer-

ization or suspension polymerization, adding a coagulant at a temperature lower than the softening temperature at which the latex particles adhere to each other by fusion, dispersing and scattering said coagulant as minute volumes in said polymer latex, before said coagulant is dissolved and diffused into said polymer latex;  
(B) allowing the coagulant to dissolve and diffuse into said latex from the scattered minute volumes of coagulant, so that the latex particles are coagulated on the surfaces of the minute volumes of said coagulant which serve as centers for coagulated grains which grow from inside out, thereby forming spherical coagulated grains of an arbitrary range of sizes filled with regularly arranged latex particles;  
(C) separating said coagulated grains from said polymer latex;  
(D) immersing the separated coagulated grains in water, while holding the temperature of said coagulated grains at a temperature lower than the softening temperature of the latex particles and;  
(E) thereafter, drying the coagulated grains at a temperature lower than the softening temperature of the latex particles.

**4,792,491**  
**GASKETS**  
Alan Atkinson, Rochdale; Katryna Dearden, and Janet Lancaster, both of Littleborough, all of England, assignors to T & N Materials Research Limited, Manchester, England  
Continuation-in-part of Ser. No. 800,907, Nov. 25, 1985, abandoned, and a continuation of Ser. No. 536,977, Sep. 9, 1983, abandoned. This application Nov. 26, 1986, Ser. No. 935,486  
Claims priority, application United Kingdom, Oct. 1, 1982, 8228156; European Pat. Off., Sep. 26, 1983, 83305728.4; Canada, Sep. 27, 1983, 437666; Australia, Sep. 28, 1983, 19664/83; Japan, Sep. 30, 1983, 58-182966; South Africa, Sep. 30, 1983, 83/7336; Spain, Sep. 30, 1983, 526146  
Int. Cl.<sup>4</sup> B05D 5/00  
U.S. Cl. 428—408 10 Claims

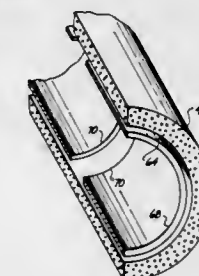
1. A method of making a gasket from exfoliated graphite, including the steps of:  
(a) coating the gasket with a finely powdered exfoliated graphite release agent followed by  
(b) pressing the coating with pressure sufficient to bond the release agent into the surface of the gasket, and simultaneously embossing the coated gasket to form a pattern of relatively raised regions surrounded by predominantly interconnected depressed regions.

**4,792,492**  
**ABSORPTION OF ADDITIVES INTO POLYMER SURFACES FROM SOLUTION**  
Gim F. Lee, Jr., Albany, N.Y., assignor to General Electric Company, Selkirk, N.Y.  
Continuation of Ser. No. 520,241, Aug. 4, 1983, abandoned. This application Jul. 31, 1987, Ser. No. 80,625  
Int. Cl.<sup>4</sup> B32B 9/04; B05D 3/02  
U.S. Cl. 428—411.1 24 Claims

1. A process for incorporating an additive into the polymeric surface of a molded article comprising a polyphenylene ether resin product, comprising the steps of:  
(a) contacting said article having at least one said polymeric surface with a solution of an additive dissolved in a miscible blend of two or more liquids, at least one of which is a solvent for the polyphenylene ether resin product and additive and at least one of which is a nonsolvent or poorer solvent for the polyphenylene ether resin and additive;  
(b) continuing the contact for a period of time sufficient for the polyphenylene ether resin product surface to absorb an effective amount of the additive; and  
(c) drying the liquid from the polymer surface to obtain an article having the additive incorporated in the surface,

wherein the additive is selected from among light stabilizers, heat stabilizers, antioxidants, colorants, antistatics agents, flame retardant agents, smoke suppressants, foaming agents, electrical conductivity additives, lubricants, and resins and wherein the at least one solvent for the polyphenylene ether resin product has a boiling point which is lower than that of the at least one nonsolvent or poorer solvent for the polyphenylene ether resin and additive.

**4,792,493**  
**CORROSION RESISTANT COATING AND LINER COMBINATION**  
Richard L. Bertram, 8577 Wonderland Ave., Hollywood, Calif. 90046, and Vernie L. Belcher, 1851 Redondela Dr., Rancho Palos Verdes, Calif. 90732  
Filed Oct. 7, 1986, Ser. No. 916,172  
Int. Cl.<sup>4</sup> B32B 27/00  
U.S. Cl. 428—424.8 7 Claims



1. A coating for material susceptible to corrosive deterioration by contact with elements, comprising:  
a. a layer of polyurethane material bonded to an exposed surface of said material susceptible to corrosive deterioration; and  
b. a polyethylene layer bonded to said layer of polyurethane and substantially separate from said material.

**4,792,494**  
**USE OF MODIFIED POLYETHYLENE FOR FINISHING GLASS SURFACES**  
Erich Ruf, Essen, Fed. Rep. of Germany, assignor to Th. Goldschmidt AG  
Filed Aug. 4, 1987, Ser. No. 81,479  
Claims priority, application Fed. Rep. of Germany, Aug. 27, 1986, 3629167  
Int. Cl.<sup>4</sup> B32B 17/10, 31/00  
U.S. Cl. 428—426 4 Claims

1. A glass object having a surface coating, wherein the coating comprises modified polyethylene of an average molecular weight of 500 to 10,000, said modified polyethylene having at least one laterally bound group of the formula

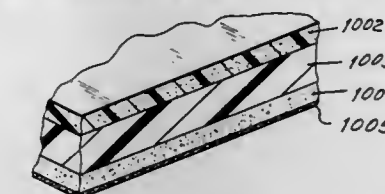


wherein  $\text{R}^1$  and  $\text{R}^2$  are the same or different and represent lower alkyl with 1 to 4 carbon atoms or its salts with aliphatic carboxylic acids of 1 to 3 carbon atoms, and  $n=2$  or 3.

**4,792,495**  
**FUSIBLE INK SHEET**  
Makoto Taniguchi; Seichi Hayashi; Katsumori Takei, and Hitoshi Fukushima, all of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan  
Filed Apr. 22, 1986, Ser. No. 854,649  
Claims priority, application Japan, Apr. 22, 1985, 60-85666; May 23, 1985, 60-111258; Jun. 14, 1985, 60-129554; Jun. 19, 1985, 60-133631  
Int. Cl.<sup>4</sup> B41M 5/26  
U.S. Cl. 428—484 13 Claims

1. A fusible ink sheet for heat transfer printing, comprising: a substrate;

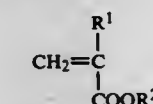
a heat fusible color layer including an ink dispersed therein, the ink layer disposed on the substrate; and  
a top layer including between about 85 and 99 parts by weight of carnauba wax, and between about 1 and 15 parts



by weight of ethylene vinyl acetate copolymer, the ethylene vinyl acetate copolymer having a melt index between about 100 and 900 and between about 10 and 30% by weight of vinyl acetate, the top layer disposed on the color layer.

**4,792,496**  
**THERMAL TRANSFER RECORDING MEDIUM**  
Kunihiko Koshizuka; Shigehiro Kitamura, and Takao Abe, all of Hino, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan  
Filed Aug. 6, 1987, Ser. No. 83,264  
Claims priority, application Japan, Aug. 18, 1986, 51-192602  
Int. Cl.<sup>4</sup> B41M 5/26 7 Claims

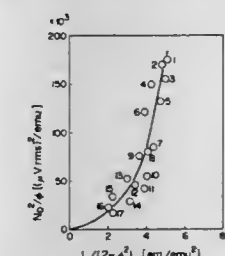
1. A thermal transfer recording medium having a colorant layer containing a heat-fusible substance, a colorant, a polyoxyethylene type compound and a copolymer compound formed on a support, said copolymer compound comprising a copolymer of an  $\alpha$ -olefin and an acrylic acid derivative represented by the formula (I):



wherein  $\text{R}^1$  represents a hydrogen atom or a methyl group and  $\text{R}^2$  represents a straight or branched alkyl group having 1 to 8 carbon atoms, or vinyl acetate, with the content of the above acrylic acid derivative and vinyl acetate as a monomer unit being 10% or more and having a melt flow index of 8 to 40 G/10 min.

**4,792,497**  
**MAGNETIC RECORDING MEDIA FOR LONGITUDINAL RECORDING**  
Hiroyuki Suzuki, Kawasaki; Yoshihiro Shiroishi, Hachioji; Sadao Hishiyama, Sayami; Tomoyuki Ohno, Kokubunji; Kazuetsu Yoshida, Kodaira; Shyuichi Kojima, Odawara; Susumu Funamoto, Odawara; Yasuaki Kitazaki, Odawara; Sakae Ohta, Odawara, and Hajime Aoi, Tachikawa, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jan. 28, 1988, Ser. No. 149,480  
Claims priority, application Japan, Jan. 29, 1987, 62-17171  
Int. Cl.<sup>4</sup> H01F 10/00 8 Claims

1. A magnetic recording medium for longitudinal recording



provided with a magnetic layer formed on a nonmagnetic substrate either directly or through an underlayer, which is characterized in that (A) said magnetic layer comprises a single metal species of Co, Ni or Fe or an alloy containing Co, Ni or Fe as major constituent and in that (B) the values of both (1) the maximum torque  $L$  represented by the product of a magnetic anisotropy energy  $K_u$  (as measured by setting the axis of rotation in the plane of the magnetic recording medium) and a magnetic layer volume  $v$  and (2) the magnetic flux  $\phi$  represented by the product of a saturation magnetization  $M_s$  and a magnetic layer volume  $v$  are in the range defined by  $0 < L/(2\pi\phi^2) < 4 \times 10^5$  (erg/cm<sup>2</sup>).

4,792,498

## PICTURE-REPRODUCING DEVICE

Michael Schliot, Schorndorf, Fed. Rep. of Germany, assignor to Standard Elektrik Lorenz A.G., Stuttgart, Fed. Rep. of Germany

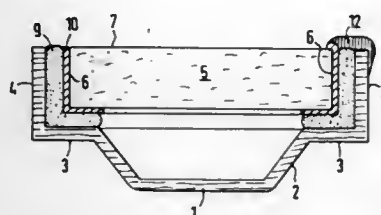
Filed Jan. 4, 1987, Ser. No. 58,192

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1986, 3620052

Int. Cl.<sup>4</sup> H01J 29/22

U.S. Cl. 428—595

10 Claims



1. A picture-reproducing device, comprising:
  - a flat glass faceplate with a luminescent layer applied to its inside;
  - a metallic tray-shaped back case with an outwardly protruding bottom;
  - a continuous flange formed about said back case parallel to and adjacent the inside of said faceplate;
  - an extension formed about said flange, perpendicular to the surface of the flange and parallel to edges of the faceplate and extending to an outside surface of the faceplate; and
  - a joint for permanently joining the flange and the extension to the faceplate.

4,792,499

**ZN-AL HOT-DIP GALVANIZED STEEL SHEET HAVING IMPROVED RESISTANCE AGAINST SECULAR PEELING AND METHOD FOR PRODUCING THE SAME**  
Yoshio Shindou, Motoo Kabeya, and Katashi Saito, all of Kimitsu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Feb. 19, 1987, Ser. No. 16,715

Claims priority, application Japan, Feb. 21, 1986, 61-34992

Int. Cl.<sup>4</sup> B32B 15/01

U.S. Cl. 428—659

4 Claims

1. A Zn-Al hot dip galvanized steel sheet having an improved resistance against secular peeling of a galvanized layer, wherein said steel sheet has a galvanized layer consisting of from more than 0.3 wt % to 10 wt % of Al, from 0.2 wt % to 1.0 wt % of Sb, a total of less than 0.02 wt % of impurities including Pb and Sn, and the balance being Zn and wherein the Al segregates in said galvanized layer and forms an eutectic with the Sb, thereby rendering said galvanized layer resistant to intergranular corrosion and to secular peeling.

4,792,500

## ELECTROLUMINESCENCE ELEMENT

Kiyooki Kojima, Tokyo, Japan, assignor to Clarion Co., Ltd., Tokyo, Japan

Filed Aug. 17, 1987, Ser. No. 86,366

Claims priority, application Japan, Aug. 22, 1986, 61-196591

Int. Cl.<sup>4</sup> B32B 9/00; H01J 1/62

U.S. Cl. 428—690

4 Claims



1. A field electroluminescence element comprising:
  - an insulative substrate;
  - a first insulative layer formed on said insulative substrate and having a planar surface, said first insulative layer having extending from said surface into the interior of said layer a plurality of transparent conducting regions forming a first set of spaced-apart electrodes embedded in said layer;
  - a second planar insulative layer disposed on said first insulative layer;
  - a luminescent layer disposed on said second insulative layer surface;
  - a third insulative layer disposed on said luminescent layer; and
  - a second set of spaced-apart transparent electrodes disposed on said third insulative layer, said second set of electrodes being opposed to and disposed across the first set of electrodes.

4,792,501

## MULTILAYERED ARTICLE INCLUDING CRYSTALLIZATION INHIBITING LAYER AND METHOD FOR FABRICATING SAME

David D. Allred, Troy; Jesus Gonzalez-Hernandez, Rochester, and On Van Nguyen, Sterling Heights, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

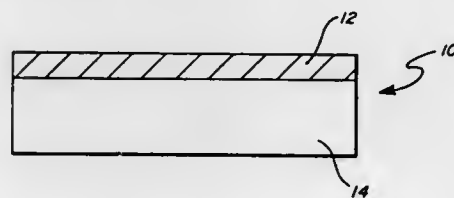
Continuation of Ser. No. 734,293, May 15, 1985, abandoned.

This application Dec. 21, 1987, Ser. No. 135,772

Int. Cl.<sup>4</sup> B32B 9/00, 19/00

U.S. Cl. 428—699

15 Claims



1. A multilayered article including a layer of amorphous, crystallizable material, said material characterized by a given

temperature for the onset of crystallization in the bulk thereof, said article comprising:

- a layer of said amorphous crystallizable material of less than 200 Angstroms thickness formed from a material chosen from the group consisting of: tellurium, selenium, germanium, arsenic, silicon, tellurium based materials, selenium based materials, germanium based materials, arsenic based materials, silicon based materials, or combinations thereof; and,
  - a layer of crystallization inhibiting material on a first surface of said layer of amorphous crystallizable material, said inhibiting material chosen from the group consisting of: germanium based materials, silicon based materials, boron based materials, silicon oxides, silicon nitrides, germanium oxides, germanium nitrides, silicate glasses, borosilicate glasses, or combinations thereof;
- the interface between said layer of crystallizable material and said layer of crystallization inhibiting material being distinct; whereby the crystallization temperature for the layer of amorphous crystallizable material is increased over the bulk crystallization temperature.

4,792,502

## APPARATUS FOR PRODUCING NITROGEN

John C. Trocciola, Glastonbury, and Leslie L. VanDine, Manchester, both of Conn., assignors to International Fuel Cells Corporation, South Windsor, Conn.

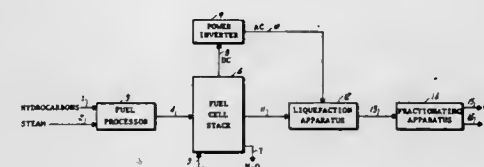
Division of Ser. No. 930,827, Nov. 14, 1986, Pat. No. 4,767,606.

This application Sep. 24, 1987, Ser. No. 100,794

Int. Cl.<sup>4</sup> H01M 8/06

U.S. Cl. 429—19

1 Claim



1. An apparatus for the production of nitrogen from air, comprising:
  - a fuel cell for providing electrical energy and a stream of oxygen depleted, nitrogen enriched cathode exhaust,
  - means for liquifying the cathode exhaust to form a mixture of liquid nitrogen and liquid oxygen, and
  - means for separating the mixture to produce a stream of nitrogen product and a stream of oxygen by-product.

4,792,503

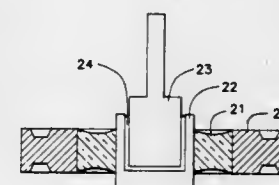
**MULTI-FUNCTIONAL HERMETIC SEAL FOR NON-AQUEOUS ELECTROCHEMICAL CELLS**  
William J. Eppley, Skippack, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 25, 1988, Ser. No. 148,311

Int. Cl.<sup>4</sup> H01M 2/30

U.S. Cl. 429—181

14 Claims



1. An improved sealing construction for the pin terminal of

4,792,504

## LIQUID CONTAINING POLYMER NETWORKS AS SOLID ELECTROLYTES

Gerhart Schwab, and Mei-Tsu Lee, both of Chillicothe, Ohio, assignors to MHB Joint Venture, Dayton, Ohio

Filed Sep. 18, 1987, Ser. No. 98,356

Int. Cl.<sup>4</sup> H01M 6/16

U.S. Cl. 429—192

8 Claims

1. A two phase solid polymeric electrolyte comprising a continuous network of crosslinked polyethylene oxide and an ionic conducting phase which includes a metal salt and a dipolar aprotic solvent wherein said polyethylene oxide is cross-linked by reaction with a polyacrylate crosslinking agent in an amount of about 1 to 10 parts crosslinking agent per 100 parts polyethylene oxide and said aprotic solvent is selected from the group consisting of propylene carbonate, gamma-butyrolactone, 1,3-dioxolane, 2-methyl-tetrahydrofuran, dimethyl ethers of glycols, and glymes, and said salt is a lithium salt, said solvent having a dielectric constant of at least 6.

4,792,505

## ELECTRODES MADE FROM MIXED SILVER-SILVER OXIDES

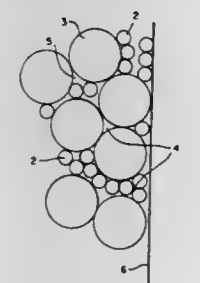
Hilary Moyes, Penn Hills Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Dec. 14, 1987, Ser. No. 133,588

Int. Cl.<sup>4</sup> H07M 4/34

U.S. Cl. 429—219

13 Claims



1. An iron-silver battery, comprising a case and a cover, within which are disposed at least one silver electrode, at least one iron electrode, at least one separator between the electrodes where the separator is made of a material resistant to chemical attack by alkaline electrolyte, and means for making electrical connections to the respective electrodes, the improvement characterized in that the silver electrode consists essentially of a sintered silver particle body that is 50% to 70% porous, supported by at least one current collector having an



least a surface material of nickel, where a major portion by weight of the sintered silver particle body are particles produced by sintering elemental silver particles having a size of from 47 microns to 175 microns diameter and a minor portion by weight of the sintered silver particle body are particles produced by sintering Ag<sub>2</sub>O particles having a small size of from 3 microns to 45 microns diameter, to provide a sintered body with small particles disposed between large particles, effecting a closely packed yet porous mass, where the sintered particles substantially retain their original size, and the nickel in the current collector is effective to allow silver in the silver electrode to oxidize primarily to Ag<sub>2</sub>O rather than to AgO, upon charging the silver electrode.

**4,792,506**  
**POLYMERIZABLE COMPOSITIONS CONTAINING IODONIUM PHOTOINITIATORS AND PHOTSENSITIZERS THEREFOR**

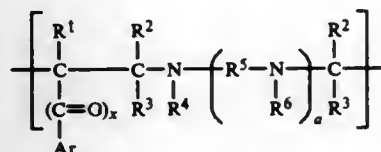
Robert J. Devoe, and Smarajit Mitra, both of St. Paul, Minn., assigns to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Sep. 19, 1986, Ser. No. 909,823  
Int. Cl.<sup>4</sup> G03C 1/76

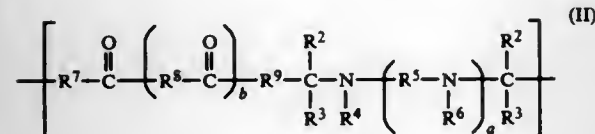
U.S. Cl. 430—281

21 Claims

1. A photopolymerizable composition comprising an ethylenically unsaturated vinyl polymerizable material, an iodonium photoinitiator, and a polymeric photosensitizer for said photoinitiator, said polymeric photosensitizer containing a photosensitizationally effective amount of repeating units of either of the formulae:



and



wherein

a is selected from the group consisting of 0 or 1, x is selected from the group consisting of 1 and 2, b is selected from the group consisting of 0 and 1, R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are independently selected from the group consisting of H, alkyl, aryl, alkaryl and aralkyl groups, R<sup>4</sup> and R<sup>5</sup> are independently selected from the group consisting of alkyl, aryl, alkaryl and aralkyl groups, and wherein R<sup>4</sup> and R<sup>5</sup> together may form a bivalent organic group, along with atoms from R<sup>3</sup> and the nitrogen atoms attached to R<sup>5</sup>, selected from the group consisting of a heterocyclic group or bis-heterocyclic group, R<sup>6</sup> is a divalent organic group or chemical bond, R<sup>7</sup> and R<sup>9</sup> are independently selected from the group consisting of alkylene, arylene, alkarylene and heteroarylene group, or a monosubstituted nitrogen atom wherein the substitution on said nitrogen is selected from H, alkyl, aryl, alkaryl, or aralkyl, and R<sup>8</sup> is selected from a chemical bond and from the group consisting of alkylene, arylene, alkarylene and heteroarylene groups.

**4,792,507**  
**ELECTROPHOTOGRAPHIC MEMBER WITH SURFACE LAYER HAVING FLUORINE RESIN POWDER AND FLUORINE GRAFT POLYMER**

Toshiyuki Yoshihara, Mitaka; Masaaki Hiro, Kanagawa, and Tomohiro Kimura, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 16, 1987, Ser. No. 26,176  
Claims priority, application Japan, Mar. 18, 1986, 61-58153; Mar. 5, 1987, 62-51774; Mar. 11, 1987, 62-54096  
Int. Cl.<sup>4</sup> G03G 5/14

U.S. Cl. 430—58

20 Claims

1. An electrophotographic photosensitive member having a photosensitive layer on an electroconductive substrate, which includes a surface layer containing a binder, a fluorine type resin powder and a fluorine type graft polymer.

8. An electrophotographic photosensitive member according to claim 1, wherein said photosensitive layer has a laminated structure of a charge generation layer and a charge transport layer, and the charge transport layer is laminated on the charge generation layer.

**4,792,508**  
**ELECTROPHOTOGRAPHIC PHOTOCONDUCTIVE IMAGING MEMBERS WITH CIS, TRANS PERYLENE ISOMERS**

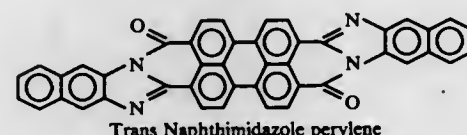
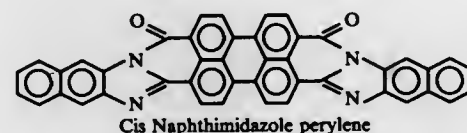
Peter M. Kazmaier; Richard A. Burt; Ah-Mee Hor, and Cheng-Kao Hsiao, all of Mississauga, Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Jun. 29, 1987, Ser. No. 69,544  
Int. Cl.<sup>4</sup> G03G 5/14

U.S. Cl. 430—59

23 Claims

1. An improved layered photoresponsive imaging member comprised of a supporting substrate; a photogenerator layer comprised of cis and trans naphthalene imidazole perylene component of the following formula;



and an aryl amine hole transport layer dispersed in a resinous binder.

**4,792,509**  
**LIGHT RECEIVING MEMBER FOR USE IN ELECTROPHOTOGRAPHY**

Shigeru Shirai, Shiga; Keisshi Saitoh, Nagahama; Takayoshi Arai, Nagahama; Minoru Kato, Nagahama, and Yasushi Fujioka, Nagahama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1987, Ser. No. 10,001  
Claims priority, application Japan, Feb. 4, 1986, 61-22546; Feb. 5, 1986, 61-24604  
The portion of the term of this patent subsequent to Apr. 19, 2005, has been disclaimed.  
Int. Cl.<sup>4</sup> G03G 5/085

U.S. Cl. 430—64

17 Claims

1. A light receiving member for use in electrophotography comprising a substrate for electrophotography and a light receiving layer constituted by a charge injection inhibition layer formed of a polycrystal material containing silicon atoms as the main constituent atoms and an element for controlling

the conductivity which functions to prevent a charge from being injected from the side of the substrate, a photoconductive layer formed of an amorphous material containing silicon atoms as the main constituent atoms and a surface layer formed of an amorphous material containing silicon atoms, carbon atoms and hydrogen atoms, the amount of the hydrogen atoms contained in the surface layer being in the range from 41 to 70 atomic %.

**4,792,510**  
**ELECTROPHOTOGRAPHIC ELEMENT WITH SILICIDE TREATED POROUS AL<sub>2</sub>O<sub>3</sub> SUBLAYER**

Masafumi Kumano; Yasuyuki Shindoh, both of Sendai; Yutaka Sano, Kawasaki; Koichi Haga, Ohkawara, and Akihiro Fuse, Shibata, all of Japan, assignors to Ricoh Co., Ltd., Tokyo and Ricoh Research Institute of General Electronics, Miyagi, both of Japan

Continuation of Ser. No. 857,905, Apr. 30, 1986, abandoned.  
This application Dec. 30, 1987, Ser. No. 142,286  
Claims priority, application Japan, May 17, 1985, 60-106346; May 28, 1985, 60-114568

U.S. Cl. 430—65

Int. Cl.<sup>4</sup> G03G 5/14, 5/082

9 Claims



1. A photosensitive material for electrophotography having, on a substrate, an amorphous silicon layer comprising silicon atoms as the matrix and containing at least one of hydrogen atoms, halogen atoms and heavy hydrogen atoms, and being characterized by being provided with a porous aluminum oxide layer positioned between said substrate and said amorphous silicon layer, said porous aluminum oxide layer having its surface treated with a silicide material.

**4,792,511**  
**ELECTROPHOTOGRAPHIC ZINC OXIDE-RESIN BINDER LITHOGRAPHIC PRINTING PLATE PRECURSOR**

Eiichi Kato; Ryosuke Itakura; Hidefumi Sera, and Kazuo Ishii, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 13, 1987, Ser. No. 25,696  
Claims priority, application Japan, Mar. 14, 1986, 61-54991  
Int. Cl.<sup>4</sup> G03G 5/087

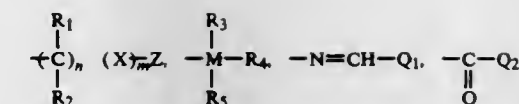
U.S. Cl. 430—87

12 Claims

1. An electrophotographic lithographic printing plate precursor obtained from an electrophotographic photoreceptor comprising a conductive support having provided thereon at least one photoconductive layer containing photoconductive zinc oxide and a resin binder, said printing plate precursor being capable of producing a lithographic printing plate by a process involving forming an electrophotographic image on said photoconductive layer followed by subjecting said photoconductive layer to an oil-desensitization treatment, wherein said resin binder comprises a resin containing at least one functional group represented by formula



capable of forming a carboxyl group upon decomposition by an oil-desensitization treatment wherein L is selected from the group consisting of



and —NH—OH, wherein R<sub>1</sub> and R<sub>2</sub> are each selected from the group consisting of a hydrogen atom or an aliphatic group; X represents an aromatic group; Z is selected from the group consisting of a hydrogen atom, a halogen atom, a trihalomethyl group, an alkyl group, —CN, —NO<sub>2</sub>, —SO<sub>2</sub>R<sub>6</sub>, wherein R<sub>6</sub> represents a hydrocarbon group, —COOR<sub>7</sub>, wherein R<sub>7</sub> represents a hydrocarbon group, and —OR<sub>8</sub>, wherein R<sub>8</sub> represents a hydrocarbon group; n and m are each 0, 1, or 2, provided that when both n and m represent 0, z is not hydrogen; R<sub>3</sub>, R<sub>4</sub>, and R<sub>5</sub> are each selected from the group consisting of a hydrocarbon group and —OR<sub>9</sub>, wherein R<sub>9</sub> represents a hydrocarbon group; M is Si, Sn, or Ti; and Q<sub>1</sub> and Q<sub>2</sub> each represent a hydrocarbon group.

**4,792,512**  
**METHOD OF DEVELOPING ELECTROSTATIC IMAGES USING TWO COMPONENT DEVELOPER AND AC CHARGING**

Satoshi Hameda, Hachioji; Takashi Itoh, Tokyo; Ken Nakamura, and Makoto Tomono, both of Hino, all of Japan, assignors to Konishiroku Photo Industry, Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 833,439, Feb. 24, 1986, Pat. No. 4,675,267, which is a continuation of Ser. No. 588,095, Mar. 9, 1984, abandoned, which is a division of Ser. No. 349,999, Feb. 18, 1982, Pat. No. 4,430,220. This application Jun. 19, 1987, Ser. No. 64,211

Claims priority, application Japan, Feb. 25, 1981, 56-25390; Feb. 25, 1981, 56-25391; Feb. 25, 1981, 56-25392; Feb. 25, 1981, 56-25393; Mar. 9, 1981, 56-32417; Mar. 9, 1981, 56-32418; Mar. 9, 1981, 56-32419; Mar. 9, 1981, 56-32420; Mar. 9, 1981, 56-32421; Mar. 9, 1981, 56-32422

The portion of the term of this patent subsequent to Jun. 23, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> G03G 13/08, 13/09, 13/22

U.S. Cl. 430—102

8 Claims

1. A method for developing an electrostatic latent image on the surface of an electrostatic image support member which comprises:

- forming an electrostatic latent image on said surface of the electric image support member,
- transferring electrostatically charged developer which comprises a toner and a magnetic carrier which is coated with an insulating resin on the surface of a developer transfer member into a developing region by the relative movement between a magnet positioned in said developer transfer member and said developer transfer member, and
- applying an a.c. field between said electrostatic image support member and said developer transfer member so as to develop said electrostatic latent image in accordance with a non-contact developing system.

**4,792,513**  
**POSITIVELY CHARGED TONER COMPOSITIONS**

Robert J. Gruber, Pittsford, and Robert A. Nelson, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

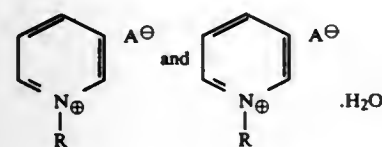
Filed May 4, 1987, Ser. No. 45,641  
Int. Cl.<sup>4</sup> G03G 9/00

U.S. Cl. 430—110

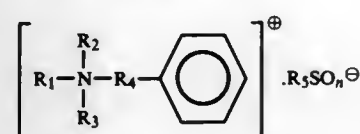
31 Claims

1. A positively charged electrostatic toner composition comprised of resin particles exhibiting a peak value weight molecular weight in each of the molecular weight regions of from about 5,000 to about 80,000, and from about 100,000 to about 2,000,000 as determined by gel permeation chromatography, pigment particles; a wax component with a weight average molecular weight of from about 500 to about 10,000; and a

charge enhancing additive selected from the group consisting of alkyl pyridinium halides, organic sulfonate compositions and organic sulfate compositions of the following formulas:



wherein R is a hydrocarbon group containing from about 8 to about 22 carbon atoms, and A is an anion;



wherein R<sub>1</sub> is an alkyl group of from about 12 carbon atoms to about 22 carbon atoms, R<sub>2</sub> and R<sub>3</sub> are independently selected from alkyl groups containing from about 1 carbon atom to about 5 carbon atoms, R<sub>4</sub> is an alkylene group of from about 1 carbon atom to about 5 carbon atoms, R<sub>5</sub> is a tolyl group or an alkyl group of from about 1 carbon atom to about 3 carbon atoms, and n is the number 3 or 4; distearyl dimethyl ammonium methyl sulfate, behenyl trimethyl ammonium methyl sulfate, and distearyl methyl ethyl ammonium ethyl sulfate.

4,792,514

## LIGHT-SENSITIVE MATERIAL

Taku Nakamura, and Kozo Sato, both of Kanagawa, Japan, assignors to Fujl Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 10, 1986, Ser. No. 917,744

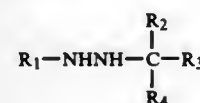
Claims priority, application Japan, Oct. 11, 1985, 60-226084

Int. Cl.<sup>4</sup> G03C 1/06, 1/40

U.S. Cl. 430-138

17 Claims

1. A light-sensitive material comprising a support having provided thereon a light-sensitive layer containing at least a light-sensitive silver halide, a polymerizable compound, a color image forming substance, and a hydrazine derivative represented by formula (I)



wherein

R<sub>1</sub> represents a monovalent group derived from a substituted or unsubstituted aromatic ring or aromatic heterocyclic ring; R<sub>2</sub> and R<sub>3</sub> each represents a substituted or unsubstituted aryl group; and R<sub>4</sub> represents a hydrogen atom or a substituted or unsubstituted alkyl, aryl, alkoxy, carbonyl, or carbamoyl group,

in which the color image forming substance is immobilized by imagewise exposure to light followed by heat development, whereby the color image forming substance is immobilized through polymerization or cross-linking of the polymerizable compound, under conditions substantially not containing water, wherein said silver halide forms a latent image upon exposure to light, and thus formed latent image acts as a catalyst to cause an oxidation-reduction between the silver halide and said hydrazine derivative.

4,792,515

## ERASABLE DIAZOTYPE MATERIAL

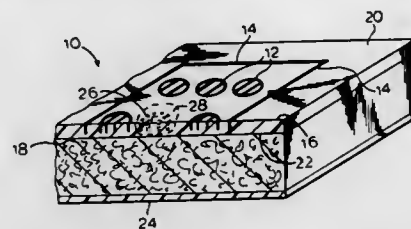
Peter Muller; Henry Mustacchi, both of Port Washington, and George Schmitz, Roslyn Heights, all of N.Y., assignors to Andrews Paper & Chemical Co., Inc., Port Washington, N.Y.

Filed Jan. 8, 1987, Ser. No. 1,393

Int. Cl.<sup>4</sup> G03C 1/52; B32B 9/04

U.S. Cl. 430-160

6 Claims



1. An erasable diazotype reproduction material, which comprises:
  - a base sheet having affixed to at least one surface thereof a coating which consists essentially of a mixture of polyvinylacetate resin and a compound selected from the group consisting of oxidized polyethylene, and a paraffin wax;
  - said coating having a lower zone in contact with and bonded directly to the base sheet and an upper zone distal to the base sheet;
  - said upper zone having dispersed therein diazotype components comprising a light-sensitive diazonium compound, an azo coupling compound and a pH stabilizing acid.

4,792,516

## PHOTOSENSITIVE COMPOSITION

Minoru Toriumi; Hiroshi Shiraishi, both of Hachioji; Ryotaro Irie, Tokyo, and Shigeru Koibuchi, Hitachi, all of Japan, assignors to Hitachi Chemical Company, Tokyo, Japan

Filed Jan. 5, 1987, Ser. No. 373

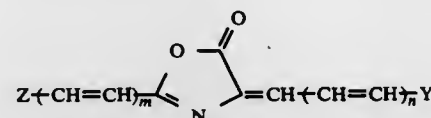
Claims priority, application Japan, Jan. 9, 1986, 61-1331

Int. Cl.<sup>4</sup> G03C 1/60, 1/727

U.S. Cl. 430-196

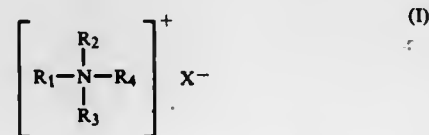
7 Claims

1. A photosensitive composition comprising an admixture containing
  - (a) an aromatic azide compound represented by the formula:



wherein Z and Y are independently an aromatic substituent or a heterocyclic substituent, at least one of said aromatic substituents or heterocyclic substituents having a photosensitive azido group; and n and m are independently 0 or 1,

- (b) an alkali-soluble polymer and
- (c) an alkylammonium compound represented by the formula:



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are independently a straight- or branched-chain alkyl group having 1 to 7 carbon atoms or

at least one hydrogen atom of said alkyl group being substituted by an alkoxy group having 1 to 5 carbon atoms; and X is a chlorine, bromine or iodine atom or a hydroxyl group; (a), (b) and (c) being present in amounts sufficient to provide a negative type photoresist film.

4,792,517

## LUMINATE FOR THE FORMATION OF BEAM LEADS FOR IC CHIP BONDING

Gerald W. Klein, Pittsford; Robert C. McConkey, Rochester; Michel F. Molair, Rochester, and John M. Noonan, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jul. 24, 1987, Ser. No. 77,714

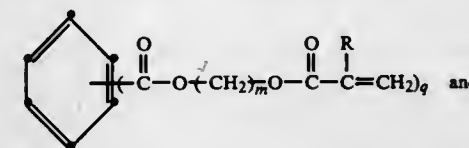
Int. Cl.<sup>4</sup> G03C 1/94, 1/68

U.S. Cl. 430-275

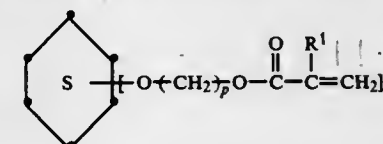
5 Claims

1. A laminate, adapted for manufacturing frames of metal beam leads that are bonded to integrated circuit chips, said laminate comprising

- (a) a flexible metal strip,
- (b) a layer of a first resist adhered to one surface of said metal strip, and
- (c) a layer of a second resist adhered to the opposite surface of said metal strip, wherein said second resist is a negative-working resist which comprises
  - (1) a polymeric binder having a glass transition temperature of at least 150° C.,
  - (2) a photopolymerizable monomer mixture comprising a monomer having the structural formula



a monomer having the structural formula



wherein q is 2, 3 or 4, b is 1 or 2, m and p are integers of from 1 to 10, and R and R<sup>1</sup> are individually H or CH<sub>3</sub>, and

(3) a photoinitiator composition.

4,792,518

## SILVER HALIDE COLOR REVERSAL REFLECTION PRINT SENSITIVE MATERIAL

Shigeru Kuwashima; Akio Mitsui, and Masaru Sano, all of Kanagawa, Japan, assignors to Fujl Photo Film Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 37,130, Apr. 10, 1987, which is a continuation of Ser. No. 767,207, Aug. 19, 1985. This application

Apr. 22, 1988, Ser. No. 186,715

Claims priority, application Japan, Aug. 17, 1984, 59-172030

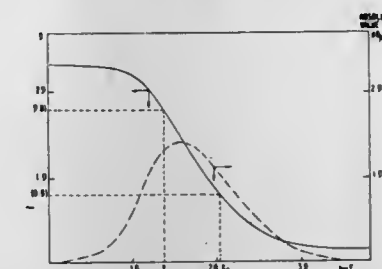
Int. Cl.<sup>4</sup> G03C 1/46, 1/08, 1/06, 5/50

U.S. Cl. 430-505

12 Claims

1. A silver halide color reversal reflection print photosensitive material having at least one blue-sensitive layer, at least one green-sensitive layer and at least one red-sensitive layer on a support, wherein in all the characteristic curves of said color sensitive layers, the fluctuation width of the point-gammas at each of points within the exposure range corresponding to a developed color density of from 1.8 to 0.8 is within  $\pm 15\%$  of the average value of the point-gammas in said exposure range, and the absolute value of the point-gamma at each of points

within the exposure range corresponding to a developed color density of from 0.3 to 0.2 is 0.3 or more, at least one of the color-sensitive layers comprising two or more silver halide



emulsion layers having different sensitivities with respect to each other, in which the emulsion layer having the lowest sensitivity is a monodispersed emulsion layer.

4,792,519

## METHOD FOR THE MONITORING AND CONTROL OF MICROBIAL POPULATIONS

James W. Blackburn, Knoxville, and Gary S. Sayler, Blaine, both of Tenn., assignors to International Technology Corporation, Martinez, Calif. and University of Tennessee Research Corporation, Knoxville, Tenn.

Filed Mar. 5, 1985, Ser. No. 708,249

Int. Cl.<sup>4</sup> C12Q 1/68; C12N 1/00

U.S. Cl. 435-6

5 Claims

1. A method for the monitoring and control of a mixed microbial population having at least one critical subpopulation, said method comprising:

- determining an optimum level for said subpopulation;
- determining at least one controlled variable which can be adjusted to alter the level of said subpopulation;
- obtaining a representative sample of the microbial population;
- treating said sample to free nucleic acids in the microbial population and to produce single-stranded sample nucleic acids;
- contacting said sample nucleic acids with a labelled probe having a nucleotide sequence substantially complementary to a nucleotide sequence in the nucleic acids in the subpopulation under conditions such that said labelled probe hybridizes to form duplexes with said sample nucleic acids which have a predetermined degree of complementarity, said degree of complementarity being such that the amount of duplexes formed corresponds to the level of the critical subpopulation;
- detecting the amount of duplexes by monitoring the labelled probe in said duplexes;
- calculating the level of said subpopulation from the detected amount of duplexes; and
- adjusting said controlled variable to bring the level of said subpopulation toward the optimum level.

4,792,520

## METHODS AND KITS FOR IDENTIFYING MUTAGENIC AGENTS AND MOLECULAR MUTATIONS IN DNA IN MAMMALIAN CELLS

Peter J. Stambrook, Cincinnati, Ohio, and Jay A. Tischfield, Augusta, Ga., assignors to University of Cincinnati, Cincinnati, Ohio and Medical College of Georgia Research Institute, Augusta, Ga.

Filed Feb. 16, 1984, Ser. No. 580,876

Int. Cl.<sup>4</sup> C12Q 1/68, 1/02, 1/04

U.S. Cl. 435-6

71 Claims

1. A method of identifying a mutagenic agent which induces base substitution mutation in DNA in mammalian cells comprising the steps of





**4,792,528**  
**METHODS FOR OBTAINING MONOCLONAL ANTIBODIES USEFUL IN ENHANCED SENSITIVITY IMMUNOASSAYS**

Robert E. Canfield; Paul H. Ehrlich, both of New York, N.Y., and William R. Moyle, Piscataway, N.J., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.

Continuation of Ser. No. 728,853, Apr. 30, 1985, which is a continuation of Ser. No. 380,959, May 21, 1982, Pat. No. 4,514,505. This application Feb. 19, 1987, Ser. No. 16,213. The portion of the term of this patent subsequent to Apr. 30, 2002, has been disclaimed.

Int. Cl.<sup>4</sup> G01N 33/537, 33/561, 33/577

U.S. Cl. 436—515

2 Claims

1. A method for obtaining at least two monoclonal antibodies specific for an antigen, each of which binds to a different antigenic site on the antigen, the monoclonal antibodies being characterized by imparting enhanced sensitivity when incorporated into immunoassays for the antigen comprising:

- preparing and separately recovering a plurality of monoclonal antibodies which bind to the antigen;
- screening the monoclonal antibodies so recovered by gel electrophoresis to identify monoclonal antibodies which bind to different antigenic sites on the antigen and which are capable of forming a stable complex which includes the antigen and the monoclonal antibodies by preparing mixtures containing at least two of the monoclonal antibodies recovered in step (a), treating each such mixture in the presence of the antigen so as to form stable complexes between the antigen and those monoclonal antibodies which bind to different antigenic sites on the antigen, detecting the complexes so formed and thereby identifying the monoclonal antibodies; and
- recovering the monoclonal antibodies so identified and thereby obtaining antibodies which impart enhanced sensitivity when incorporated into immunoassays for the antigen.

**4,792,529**  
**IMMUNOASSAY OF FREE KAPPA LIGHT CHAINS FOR THE DETECTION OF MULTIPLE SCLEROSIS**

Richard A. Rudick; Robert M. Herndon, and Jean M. Bidlack, all of Rochester, N.Y., assignors to University of Rochester, Rochester, N.Y.

Filed Oct. 18, 1985, Ser. No. 789,269

Int. Cl.<sup>4</sup> G01N 33/534, 33/53, 33/68

U.S. Cl. 436—542

7 Claims

1. In the diagnosis of multiple sclerosis by detecting components of the cerebrospinal fluid of a patient, the improvement which comprises directly determining by a quantitative immunoassay the quantity of free kappa light chains in the cerebrospinal fluid by combining the free kappa light chains in the fluid with antiserum specific thereto, and from the quantity determined diagnosing whether said patient has multiple Sclerosis.

**4,792,530**  
**PROCESS FOR BALANCING FORWARD AND REVERSE CHARACTERISTIC OF THYRISTORS**

Andres Nilarp, Rancho Palo Verde, Calif., assignor to International Rectifier Corporation, Los Angeles, Calif.

Filed Mar. 30, 1987, Ser. No. 32,483

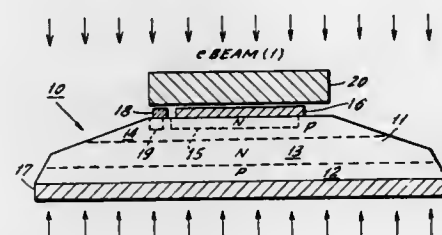
Int. Cl.<sup>4</sup> H01L 21/26, 29/74

U.S. Cl. 437—6

9 Claims

1. The process of treating a thin, flat power thyristor wafer to balance the forward and reverse leakage currents at elevated temperature and to balance the forward and reverse blocking voltages at room temperature; said wafer having a large area bottom major surface, a small area top major surface, a beveled peripheral surface forming said major surfaces, and at least two planar junctions extending parallel to said top and bottom major surfaces; said process comprising the electron beam

irradiation of said wafer through said bottom surface and from the bottom of said wafer with a first total radiation dose, and the electron beam irradiation of only the silicon lying below



said peripheral surface through the top of said peripheral surface and from the top of said wafer with a second total radiation dose at least 5 times greater than said first dose.

**4,792,531**  
**SELF-ALIGNED GATE PROCESS**

Sanehiko Kakihana, San Francisco, Calif., assignor to Menlo Industries, Inc., San Francisco, Calif.

Filed Oct. 5, 1987, Ser. No. 105,650

Int. Cl.<sup>4</sup> H01L 21/265, 21/44, 21/48

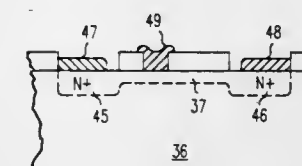
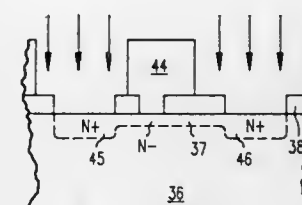
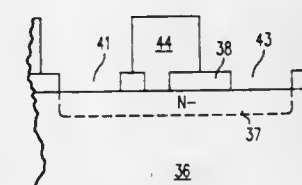
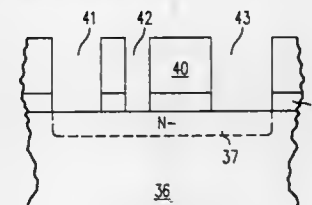
U.S. Cl. 437—41

5 Claims

1. A process for producing a field effect semiconductor device in a body of semiconductor material, comprising the steps of:

- forming a region of first conductivity type extending into said body from a surface;
- applying a dielectric layer on said surface above said first region;
- applying a first layer of resist on said dielectric layer;
- patterning said first layer of resist to define a source implant area, a drain implant area and the location for a gate and removing the resist material in said defined locations to expose the surface of said dielectric layer in said defined locations;
- removing the dielectric material in said exposed areas to define on said surface of said body the locations for said gate, source implant area and drain implant area;
- removing said first resist;
- applying a second layer of resist, and patterning said second layer of resist to permit removal of said resist from said source implant area and said drain implant area;
- removing said second resist in said patterned areas to expose on said surface said source implant area and said drain implant area;

subjecting said exposed areas to ion implantation to form a drain region and a source region in said body; removing said second resist;



annealing said body to activate the implanted ions; and forming a gate on said surface in said gate defined location.

**4,792,532**  
**SEMICONDUCTOR DEVICE AND PROCESS FOR PRODUCING THE SAME, AND TAPE CARRIER USED IN SAID PROCESS**

Hideya Ohtani, Aichi; Toshimitsu Momoi, Higashimurayama; Eiichi Ooi, Kawagoe; Shuhei Sakuraba, Kodaira; Masayuki Morita, Tokyo, and Yoshiaki Wakashima, Kawasaki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 29, 1986, Ser. No. 946,951

Claims priority, application Japan, Dec. 25, 1985, 60-290520 Int. Cl.<sup>4</sup> H01L 23/48

U.S. Cl. 437—206

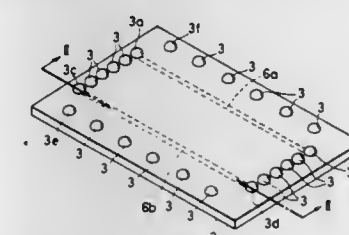
9 Claims

1. A method for producing a semiconductor device comprising:

- preparing a tape carrier including an insulation tape having a longitudinal shape on which a plurality of tape carrier units each having a wiring pattern with a plurality of leads are formed with a constant interval therebetween, control signal input leads of adjacent tape carrier units being

linked via a short circuit by use of a conductive lead, at least a trunk lead being disposed along an entire length of the tape, and each lead branched from the trunk lead being linked by a short circuit to a lead of a corresponding tape carrier unit;

preparing semiconductor pellets, each pellet having at least a control signal input pad electrode formed in the vicinity of one edge of each said semiconductor pellet and at least a pad electrode formed in the vicinity of another edge opposing said one edge;



effecting a simultaneous multipoint bonding, by use of a wireless bonding, between a plurality of leads of the tape carrier and a plurality of pad electrodes of each of the semiconductor pellets, after preparing the tape carrier and after preparing the semiconductor pellets; and effecting an operation test on at least one of the semiconductor pellets in a state where a control signal is applied to the control signal input lead of the tape carrier and a power voltage is applied to the trunk lead, after effecting the simultaneous multipoint bonding.

**4,792,533**  
**COPLANAR DIE TO SUBSTRATE BOND METHOD**

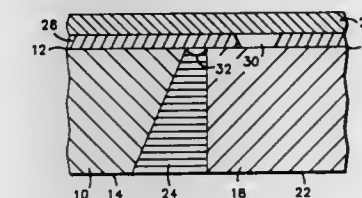
James E. Drye, Mesa, and Steven L. Post, Tempe, both of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Mar. 13, 1987, Ser. No. 25,687

Int. Cl.<sup>4</sup> H01L 21/56, 21/60

U.S. Cl. 437—213

14 Claims



1. A method for achieving coplanarity in bonding die to substrates in multichip modules comprising the steps of:

- providing a silicon wafer having a first surface and a second surface;
- etching die openings into said silicon wafer;
- providing a plurality of die, each having a first surface and a second surface, said plurality of die to be bonded to said silicon wafer;
- disposing and aligning said plurality of die in said die openings of said silicon wafer so that said first surface of said silicon wafer and said first surfaces of each member of said plurality of die face in the same direction and lie in a common plane;
- applying a glass slurry to said silicon wafer and said plurality of die so that said glass slurry penetrates between each member of said plurality of die and said silicon wafer;
- firing said silicon wafer including said plurality of die and said glass slurry until said glass slurry becomes solid;



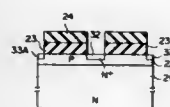
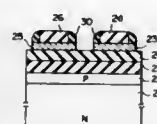
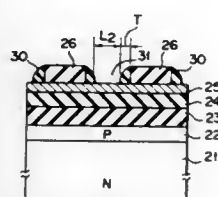
adhering and pressing a polyimide film to said first surface of said silicon wafer including said plurality of die; and curing said film.

**4,792,534**  
**METHOD OF MANUFACTURING A SEMICONDUCTOR DEVICE INVOLVING SIDEWALL SPACER FORMATION**  
Hitoshi Tsuji; Tiharu Kato, both of Yokohama, and Kiyoshi Takao, Ebara, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 15, 1986, Ser. No. 942,076  
Claims priority, application Japan, Dec. 25, 1985, 60-295063  
Int. Cl.<sup>4</sup> H01L 21/308

U.S. Cl. 437-229

5 Claims



1. A method of manufacturing a semiconductor device, comprising the steps of:  
forming at least one insulating film on a semiconductor body;  
forming a metal first mask layer on said insulating film;  
forming an insulating second mask layer on said first mask layer;  
forming a resist film on said insulating second mask layer and patterning said resist film to form a resist;  
patterning said insulating second mask layer by etching using said patterned resist as a mask;  
forming a coating film on the resultant structure;  
etching said coating film to be left on at least one side wall of said patterned second mask layer;  
patterning said metal first mask layer, by etching using the residual coating film and said patterned second mask layer as masks; and  
patterning said insulating film by etching, using said patterned metal first mask layer as a mask.

**4,792,535**  
**UV-TRANSMITTING GLASSES**  
Gerald J. Fine, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

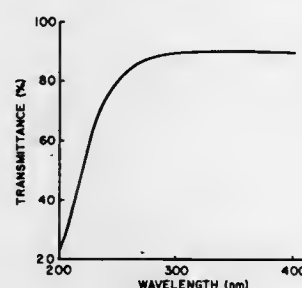
Filed Sep. 2, 1987, Ser. No. 92,765  
Int. Cl.<sup>4</sup> C03C 3/091, 4/08, 3/11

U.S. Cl. 501-66

1 Claim

1. An ultraviolet transmitting glass article consisting essentially, in weight percent, of about 58-62% SiO<sub>2</sub>, 15-18% B<sub>2</sub>O<sub>3</sub>, 11.5-14.5% Al<sub>2</sub>O<sub>3</sub>, 1-2.5% Li<sub>2</sub>O, 5.5-6.5% Na<sub>2</sub>O, 0-2.0%

K<sub>2</sub>O, and 0-0.6% Cl, the article having a thermal expansion coefficient (0°-300° C.) in the range of 56-62×10<sup>-7</sup>/°C. and



an ultraviolet transmittance, in 1 mm cross section, of at least 80% at a wavelength of 254 nm.

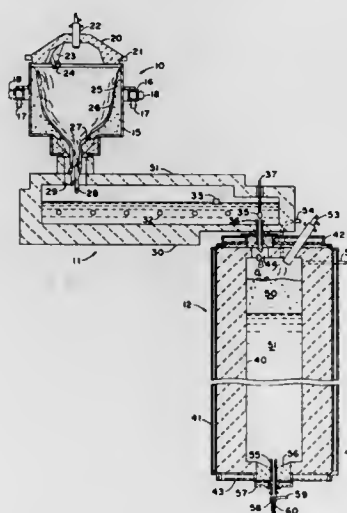
**4,792,536**  
**TRANSPARENT INFRARED ABSORBING GLASS AND METHOD OF MAKING**

George A. Pecoraro, Lower Burrell, and Larry J. Shelestak, West Deer Township, Allegheny County, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jun. 29, 1987, Ser. No. 67,504  
Int. Cl.<sup>4</sup> C03C 3/087

U.S. Cl. 501-70

32 Claims



1. A method of manufacturing soda-lime-silica flat glass in a continuous process including feeding raw materials to a melting operation that includes separate liquefying and refining stages, passing from the melting operation to a flat glass forming operation a continuous stream of molten glass having at least 0.45 percent by weight iron expressed as Fe<sub>2</sub>O<sub>3</sub>, forming the glass into a flat glass product in the forming operation, melting the raw materials in a thin layer in the liquefying stage while controlling oxidation-reduction conditions in that stage and in subsequent stages so as to yield a glass having at least 35 percent of the iron in the ferrous state expressed as FeO and which when formed into a flat glass product of suitable thickness exhibits the combination of luminous transmittance of at least 65 percent and infrared transmittance of no more than 15 percent.

23. A soda-lime-silica glass article having a composition consisting essentially of, on a weight basis: 66 to 75% SiO<sub>2</sub>, 12-20% Na<sub>2</sub>O, 7-12% CaO, 0-5% MgO, 0-4% Al<sub>2</sub>O<sub>3</sub>, 0-3% K<sub>2</sub>O, 0.45-1% Fe<sub>2</sub>O<sub>3</sub>, 0-1.5% total of CeO<sub>2</sub>, TiO<sub>2</sub>, V<sub>2</sub>O<sub>5</sub> or

MoO<sub>3</sub>, at least 50 percent of the iron being in the ferrous state expressed as FeO, less than 0.02 percent by weight sulfur expressed as SO<sub>3</sub>, and exhibiting luminous transmittance of at least 65 percent and total solar infrared transmittance of no more than 15 percent at a selected thickness.

**4,792,537**  
**DIELECTRIC CERAMIC COMPOSITION FOR HIGH FREQUENCIES**

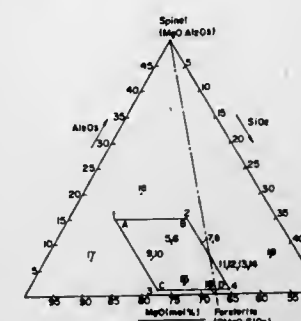
Hiroshi Tamura, Kyoto, and Djuniadi A. Sagala, Nagaokakyo, both of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Continuation-in-part of Ser. No. 884,017, Jul. 10, 1986, abandoned. This application Mar. 13, 1987, Ser. No. 25,508  
Claims priority, application Japan, Jul. 13, 1985, 60-154726; Apr. 11, 1986, 61-84465; Apr. 30, 1986, 61-101518

Int. Cl.<sup>4</sup> C04B 35/04, 35/10, 35/14

U.S. Cl. 501-118

1 Claim



1. A dielectric ceramic composition for high frequencies consisting essentially of a basic composition expressed by the general formula:



wherein x, y and z are mole percentage of the respective components,  $x+y+z=100$ ,  $65 \leq x \leq 77$ ,  $1 \leq y \leq 15$ , and  $8 \leq z \leq 34$ , and an exclusive additive of 0.1 to 10.0 wt % Li<sub>2</sub>O, said basic composition having a set of x, y and z falling within an area defined by a polygon ABCD encompassed by the points A, B, C and D in FIG. 1, the sets of x, y and z at the vertexes A, B, C and D of said polygon being as follows:

	x	y	z
A	77	15	8
B	65	15	20
C	77	1	22
D	65	1	34

**4,792,538**  
**SPALL RESISTANT CHROME-ALUMINA REFRACTORY BRICK**

Stanley R. Pavlica, Irwin, and Dwight S. Whittemore, Bethel Park, both of Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Sep. 30, 1987, Ser. No. 103,114  
Int. Cl.<sup>4</sup> C04B 35/10, 35/12, 35/48

U.S. Cl. 501-127

4 Claims

1. A refractory composition for forming a spalling resistant and slag resistant brick consisting essentially of about 15 to 90 percent by weight of a fused chrome-alumina grain, 5 to 25 percent by weight chromic oxide, up to 30 percent by weight of a zirconia-containing grain, and the balance alumina.

**4,792,539**  
**PROCESS FOR PRODUCING CLAY DERIVATIVES HAVING A POROUS STRUCTURE AND NOVEL CLAY DERIVATIVES OBTAINED BY THE PROCESS**

Shoji Yamanaka; Makoto Hattori, both of Hiroshima, and Yuji Suzuki, Sakura, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Jun. 4, 1986, Ser. No. 870,411  
Claims priority, application Japan, Jun. 20, 1985, 60-134726; Jun. 20, 1985, 60-134727

Int. Cl.<sup>4</sup> C04B 33/13

U.S. Cl. 501-144

5 Claims

1. A process for producing a clay derivative having a porous structure comprising:

hydrolyzing a metal alkoxide, deflocculating the resulting hydrolyzate with an inorganic acid selected from the group consisting of hydrochloric acid, sulfuric acid and nitric acid to obtain a hydrous metal oxide sol containing fine particles of the hydrous metal oxide having a size of from 10 to 1,000 angstroms, and reacting the resulting hydrous metal oxide sol with an aqueous suspension of smectite under agitation.

**4,792,540**  
**ALKALI METAL LACTAMATE**  
Jozef J. M. Bongers, Stein (L.), and Albert A. Van Geenen, Brunssum, both of Netherlands, assignors to Stamicarbon B.V., Geleen, Netherlands

Filed Mar. 19, 1987, Ser. No. 27,839  
Claims priority, application Netherlands, Mar. 19, 1986, 8600698

Int. Cl.<sup>4</sup> B01J 31/02

U.S. Cl. 502-167

8 Claims

1. Process for preparing a catalyst based on an alkali metal lactamate, characterized in that

a.1 an alkali metal alcoholate, whether or not in the corresponding alcohol, derived from an alcohol with 1-3 carbon atoms, which alcohol has a boiling point lower than 100° C., together with a higher alcohol which is isopropanol or an aliphatic or aromatic alcohol with 4-18 carbon atoms, which higher alcohol has a boiling point of 80° C. to 250° C. or  
a.2 an alkali metal alcoholate, whether or not in the corresponding alcohol, which is isopropanol or an aliphatic or aromatic alcohol with 4-18 carbon atoms, which higher alcohol has a boiling point of 80° C. to 250° C., and  
b. a lactam are brought to a temperature between 60° C. and 150° C. and alcohol is removed by distillation.

**4,792,541**  
**HYDROTREATING CATALYSTS COMPRISING SUPPORTED, MIXED METAL SULFIDE OF IRON PROMOTED MO AND W AND THEIR USES**

Teh C. Ho, Bridgewater; Archie R. Young, Montclair; Allan J. Jacobson, Princeton, and Russell R. Chianelli, Somerville, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Division of Ser. No. 687,538, Dec. 28, 1984, Pat. No. 4,632,747. This application Aug. 21, 1986, Ser. No. 898,647

The portion of the term of this patent subsequent to Feb. 14, 2001, has been disclaimed.

Int. Cl.<sup>4</sup> B01J 31/22

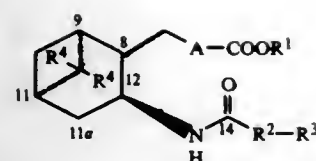
U.S. Cl. 502-167

18 Claims

1. As a composition of matter, a supported catalyst obtained by compositing a pre-selected quantity of support material with one or more precursor salts and heating said composite at elevated temperature of at least about 150° C., in the presence of sulfur and under oxygen-free conditions for a time sufficient to form said catalyst, wherein said precursor salt contains a tetrathiometalate anion of Mo, W or mixture thereof and a cation of divalent iron which is chelated by at least one neutral, nitrogen-containing polydentate ligand.



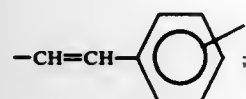




wherein

symbol A represents

- (i) a group of general formula:  $-\text{CH}_2\text{CH}_2-(\text{CH}_2)_m-$
- (ii) a group of general formula:  $\text{cis}-\text{CH}=\text{CH}-(\text{CH}_2)_m-$
- (iii) a group of general formula:  $-\text{CH}_2\text{O}-(\text{CH}_2)_m-$
- (iv) a group of general formula:  $-\text{S}-(\text{CH}_2)_m-$  (wherein m represents an integer of from 1 to 6) or
- (v) a group of general formula:



R<sup>1</sup> represents a hydrogen atom or a straight or branched alkyl group of from 1 to 12 carbon atom(s);

R<sup>2</sup> represents a bond or a straight or branched alkylene or alkenylene group of from 1 to 10 carbon atom(s) unsubstituted or substituted by at least one of hydroxy group, amino group, halogen atom or phenylthio group;

R<sup>3</sup> represents

(i) a phenyl, phenoxy or phenylthio group unsubstituted or substituted by at least one of straight or branched alkyl or alkoxy group of from 1 to 6 carbon atom(s), halogen atom or hydroxy group,

(ii) a straight or branched alkyl, alkenyl or alkynyl group of from 1 to 6 carbon atom(s) unsubstituted or substituted by at least one of hydroxy group,

(iii) a cycloalkyl, cycloalkyloxy or cycloalkylthio group of from 4 to 7 carbon atoms unsubstituted or substituted by at least one of straight or branched alkyl group of from 1 to 6 carbon atom(s), halogen atom or hydroxy group,

(iv) a naphthyl, indolyl or indanyl group; and

R<sup>4</sup> represents a hydrogen atom or a methyl group; with proviso that R<sup>2</sup> represents said alkylene or alkenylene group of from 1 to 10 carbon atom(s) wherein the carbon atom neighbored with R<sup>3</sup> in R<sup>2</sup> has no substituents, where R<sup>3</sup> represents a phenoxy, phenylthio, cycloalkyloxy or cycloalkylthio group unsubstituted or substituted; and cyclodextrin clathrates thereof and non-toxic salts thereof wherein R<sup>1</sup> represents a hydrogen atom.

4,792,551

#### 9-ANTHRYLOXYAMINOALKANES AND RELATED COMPOUNDS AS ANTI-INFLAMMATORY AND ANALGETIC AGENTS

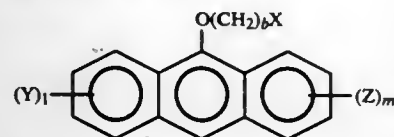
Peter H. Nelson, Los Altos; Stefan H. Unger, Palo Alto, both of Calif., and Thomas R. Thieme, Independence, Oreg., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Jul. 15, 1983, Ser. No. 514,112

Int. Cl.<sup>4</sup> A61K 31/135, 31/205

U.S. Cl. 514-651

1. A compound of the formula:



and the pharmaceutically acceptable acid addition salts thereof, wherein:

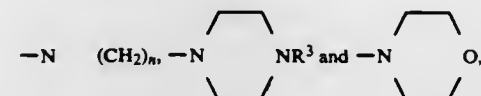
(III)

Y and Z are each independently halo, alkyl or alkoxy; l and m are each independently integers of 0-4;

b is an integer of 2-12; and

x is selected from the group consisting of:

$-\text{NR}^1\text{R}^2$ ,  $-\text{NR}^1(\text{CH}_2\text{CH}_2\text{OH})$ ,



in which

R<sup>1</sup> and R<sup>2</sup> are each independently H, alkyl or cycloalkyl;

R<sup>3</sup> is H, alkyl or  $\text{CH}_2\text{CH}_2\text{OH}$ ; and

n is an integer of 3-7.

15. A method of preventing, reducing or inhibiting inflammation which method comprises administering to a mammal in need of such treatment a therapeutically effective amount of a compound of claim 1 or a pharmaceutically acceptable acid addition salt thereof.

4,792,552

#### WATER-SOLUBLE ADDUCT OF NORFLOXACIN

Haim Simionovitch, L'etzion, Israel, assignor to Abic Ltd., Israel

Filed Sep. 11, 1987, Ser. No. 96,398

Claims priority, application Israel, Oct. 30, 1986, 80459

Int. Cl.<sup>4</sup> A61K 31/495; C07D 401/14

U.S. Cl. 514-254

7 Claims

1. Nicotinic acid: Norfloxacin adduct.

6. A method for the treatment of bacterial infections which comprised the administration of a therapeutic effective amount of an adduct according to claim 1.

4,792,553

#### DIENE DERIVATIVES AND VASODILATORS CONTAINING THE SAME

Shin Hattori, Yokohama; Makoto Takai, Hachioji; Toshio Wakabayashi, Tama; Yasuji Suwabe, Kawasaki, and Syozo Miyaoka, Tama, all of Japan, assignors to Terumo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 3, 1987, Ser. No. 10,477

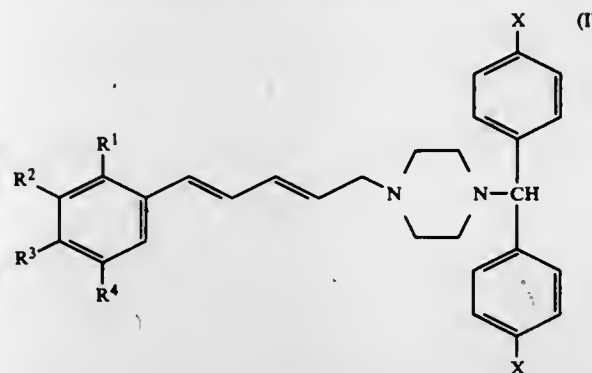
Claims priority, application Japan, Feb. 4, 1986, 61-22506

Int. Cl.<sup>4</sup> A61K 31/495; C07D 295/06

U.S. Cl. 514-255

23 Claims

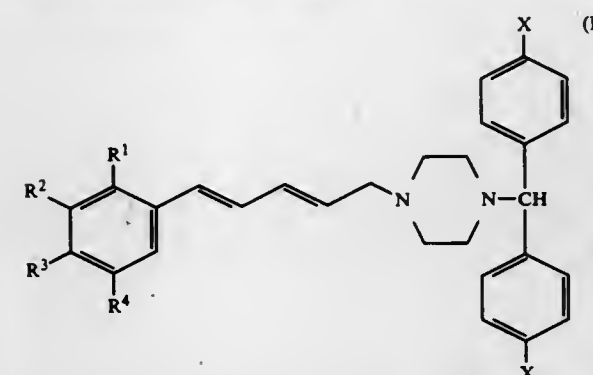
1. A diene compound represented by the formula



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are the same or different and each represents a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkoxy group, and X represents a hydrogen atom or a halogen atom.

17. A method for treating cerebrovascular, coronary vascular or peripheral vascular disturbances in a mammalian organism comprising administering to a mammalian organism in

need of such treatment a sufficient amount of a diene compound represented by the formula



wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are the same or different and each represents a hydrogen atom or a C<sub>1</sub>-C<sub>4</sub> alkoxy group, and X represents a hydrogen atom or a halogen atom.

4,792,554

#### PYRIDINE COMPOUNDS, PHARMACEUTICAL COMPOSITIONS, THEIR USE IN ALLERGY THERAPY

Ulrich Elben, Wiesbaden; Hristo Anagnostopoulos, Tannusstein, and Robert R. Bartlett, Darmstadt, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Nov. 21, 1986, Ser. No. 933,532

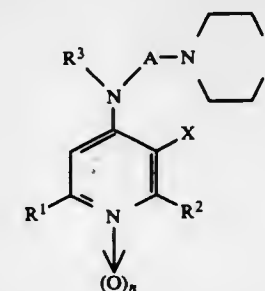
Claims priority, application Fed. Rep. of Germany, Nov. 23, 1985, 3541428

Int. Cl.<sup>4</sup> A61K 31/495, 31/44; C07D 295/12

U.S. Cl. 514-255

19 Claims

1. A pyridine compound of the formula I



in which

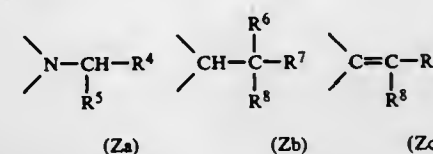
R<sup>1</sup> and R<sup>2</sup> independently of each other represent hydrogen or alkyl having from 1 to 4 carbon atoms,

R<sup>3</sup> represents hydrogen or alkyl having up to 2 carbon atoms and

A represents alkylene having 2 to 4 carbon atoms,

n is 0 or 1,

Z is a group of the formula Za, Zb, or Zc



in which either

R<sup>4</sup> is hydrogen and

R<sup>5</sup> is phenyl or cinnamyl or

R<sup>4</sup>, R<sup>5</sup>, R<sup>7</sup> and R<sup>8</sup> independently of each other are pyridyl, phenyl or phenyl which is substituted by up to 2 equal or

different substituents from the group halogen and alkoxy having up to 2 carbon atoms,

R<sup>6</sup> is hydrogen or hydroxy and

X is hydrogen, a cyano, amino or nitro group or the group  $-\text{CO}-\text{R}^9$ , in which R<sup>9</sup> is hydroxy or alkoxy having from 1 to 4 carbon atoms,

and the physiologically tolerable salts of these compounds.

18. A method of treating a patient suffering from an allergically conditioned disease, which comprises administering to a person suffering from such disease an effective amount of a pharmaceutical composition containing as an essential ingredient an effective amount of at least one compound of the formula I as claimed in claim 1 or a physiologically tolerable salt thereof or a combination thereof.

4,792,555

#### PHOSPHOLIPASE A<sub>2</sub> INHIBITORS

William H. McGregor, Malvern, and Joseph Y. Chang, Berwyn, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

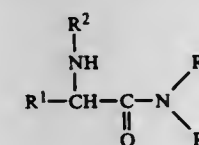
Filed Mar. 20, 1987, Ser. No. 28,638

Int. Cl.<sup>4</sup> A61K 31/495, 31/40, 31/445, 31/47, 31/55; C07D 295/10, 401/12, 471/00

U.S. Cl. 514-255

12 Claims

1. A compound having the formula



wherein

R<sup>1</sup> is lower alkyl, lower alkoxy, lower alkyl, phenyl C<sub>1-3</sub> alkoxy, lower alkyl, aralkoxy, lower alkyl or indol-2-yl, lower alkyl;

R<sup>2</sup> is hydrogen, lower alkyl or biphenyl lower alkyl; or

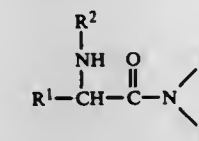
R<sup>1</sup> and R<sup>2</sup> taken together form a pyrrolidine or piperidine ring;

R<sup>3</sup> is hydrogen or lower alkyl;

R<sup>4</sup> is alkyl of 10-20 carbon atoms, cycloalkyl of 10-20 carbon atoms or phenylalkyl of 10-16 carbon atoms; or

R<sup>3</sup> and R<sup>4</sup> taken together are decahydroisoquinolin-2-yl, 3,5-dimethylpiperazin-1-yl or 3,3,5-trimethylhexahydroazepin-1-yl, with the provisos that (i) at least one of the pair, R<sup>1</sup> and R<sup>2</sup> or R<sup>3</sup> and R<sup>4</sup> must be taken together to form a heterocyclic ring as hereinbefore defined and (ii) that when R<sup>1</sup> and R<sup>2</sup> taken together form a pyrrolidine ring, R<sup>4</sup> is other than alkyl of 10-20 carbon atoms; or a pharmaceutically acceptable salt thereof.

11. A method for treating inflammatory conditions which comprises administering to a subject in need thereof an anti-inflammatory effective amount of a compound having the formula



wherein

R<sup>1</sup> is lower alkyl, lower alkoxy, lower alkyl, phenyl C<sub>1-3</sub> alkoxy, lower alkyl, aralkoxy, lower alkyl or indol-2-yl, lower alkyl;

R<sup>2</sup> is hydrogen, lower alkyl or biphenyl lower alkyl; or

R<sup>1</sup> and R<sup>2</sup> taken together form a pyrrolidine or piperidine ring;

R<sup>3</sup> is hydrogen or lower alkyl;  
R<sup>4</sup> is alkyl of 10-20 carbon atoms, cycloalkyl of 10-20 carbon atoms or phenylalkyl of 10-16 carbon atoms; or  
R<sup>3</sup> and R<sup>4</sup> taken together are decahydroisoquinolin-2-yl, 3,5-dimethylpiperazin-1-yl or 3,3,5-trimethylhexadecapin-1-yl, with the proviso that at least one of the pair R<sup>1</sup> and R<sup>2</sup> or R<sup>3</sup> and R<sup>4</sup> must be taken together to form a heterocyclic ring as hereinbefore defined; or a pharmaceutically acceptable salt thereof.

4,792,556

## NAPHTHALENE ANTI-PSORIATIC AGENTS

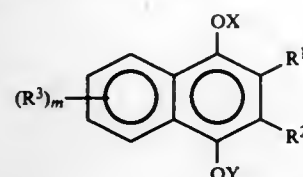
D. V. K. Murthy, Cupertino; Michael C. Venuti, San Francisco, and John M. Young, Redwood City, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 773,912, Sep. 9, 1985, abandoned. This application Apr. 28, 1986, Ser. No. 856,929. Int. Cl.<sup>4</sup> A61K 31/22, 31/275, 31/415, 31/44; C07C 69/35, 121/15

U.S. Cl. 514-256

18 Claims

1. A compound of the formula



wherein:

R<sup>1</sup> and R<sup>2</sup> are the same and are lower alkoxy of one to six carbon atoms or phenoxy optionally substituted by one or two lower alkyl of one to four carbon atoms, lower alkoxy of one to four carbon atoms or halo;

R<sup>3</sup> is lower alkyl of one to six carbon atoms, lower alkoxy of one to six carbon atoms, or halo and m is 0, 1 or 2 or R<sup>3</sup> is phenyl optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halo, lower acyl, lower acyloxy, cyano, nitro, amino, and lower acylamino, phenyl-lower-alkyl wherein the phenyl is optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halo, lower acyl, lower acyloxy, cyano, nitro, amino, and lower acylamino, phenyl-lower-alkoxy wherein the phenyl is optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halo, lower acyl, lower acyloxy, cyano, nitro, amino, and lower acylamino; phenyl-lower-alkyl wherein the phenyl is optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halo, lower acyl, lower acyloxy, cyano, nitro, amino, and lower acylamino; or heterocyclic aryl selected from the group consisting of thiapyran, benzothiapyran, furyl, pyrrolyl, imidazolyl, pyrazolyl, pyridinyl, pyrimidinyl, indolyl, quinolinyl, and imidazolyl wherein the heterocyclic aryl is optionally substituted by one or more substituents selected from the group consisting of lower alkyl, lower alkoxy, halo and cyano and the pharmaceutically acceptable acid addition salts thereof; and m is 1 and n is 0, 1 or 2; and one of X or Y is C(O)W and the other X or Y is hydrogen

wherein

W is alkyl of one to seven carbon atoms, phenyl or benzyl optionally substituted with one or two lower alkyl of one

to four carbon atoms, lower alkoxy of one to four carbon atoms or halo.

17. A composition in a form suitable for topical administration for treating the condition of psoriasis which composition comprises a pharmaceutically acceptable carrier and a psoriasis relieving amount of a compound of claim 1.

4,792,557

## 2,4-DIAMINO-5-[4-AMINO (OR DIMETHYLAMINO)-3,5-DIMETHOXYBENZYL]-PYRIMIDINE AND ANTIBACTERIAL COMPOSITION THEREOF

Ivan Kompis, Oberwil; Gérald Rey-Bellet, Basle, and Guido Zanetti, Füllinsdorf, all of Switzerland, assignors to Hoffman-La Roche Inc., Nutley, N.J.

Division of Ser. No. 706,227, Feb. 27, 1985, Pat. No. 4,659,818, which is a division of Ser. No. 279,106, Jan. 30, 1981, Pat. No. 4,515,948, which is a continuation of Ser. No. 63,292, Aug. 2, 1979, abandoned, which is a continuation of Ser. No. 795,828, May 11, 1977, abandoned, which is a continuation of Ser. No. 504,416, Sep. 4, 1974, abandoned. This application Jan. 14, 1987, Ser. No. 3,095

Claims priority, application Switzerland, Sep. 12, 1973, 13057/73; Jul. 22, 1974, 10063/74

Int. Cl.<sup>4</sup> A61K 31/505

U.S. Cl. 514-275

11 Claims

1. An antibacterial composition comprising 2,4-diamino-5-[4-amino-3,5-dimethoxybenzyl]pyrimidine or a pharmaceutically acceptable acid addition salt thereof and a compatible pharmaceutical carrier.

5. An antibacterial composition comprising 2,4-diamino-5-[4-(dimethylamino)-3,5-dimethoxybenzyl]pyrimidine, or a pharmaceutically acceptable acid addition salt thereof, and a pharmaceutically compatible carrier material.

4,792,558

## CASTANOSPERMINE FOR INHIBITING TUMOR METASTASIS

Sai P. Sunkara; Barry L. Rhinehart, and Paul S. Liu, all of Cincinnati, Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed May 29, 1987, Ser. No. 55,589

Int. Cl.<sup>4</sup> A61K 31/44

U.S. Cl. 514-299

8 Claims

1. A method for inhibiting the formation of tumor metastases comprising administering an amount, which is safe and sufficient to inhibit the formation of tumor metastases, of castanospermine or a pharmaceutically acceptable salt thereof to a patient having melanoma, breast cancer, lung cancer or prostate cancer.

4,792,559

## 1,2,3,4-TETRAHYDROQUINOLINE SUBSTITUTED 5-AMINOPENTANENITRILE COMPOUNDS AND THEIR USE AS CALCIUM MODULATORS

Gilbert Regnier, Chateaux Malabry; Yves-Michel Gargouil, Paris, and Jean-Paul Vilaine, Le Plessis Robinson, all of France, assignors to ADIR et Compagnie, Neuilly-sur-Seine, France

Filed Sep. 25, 1986, Ser. No. 911,483

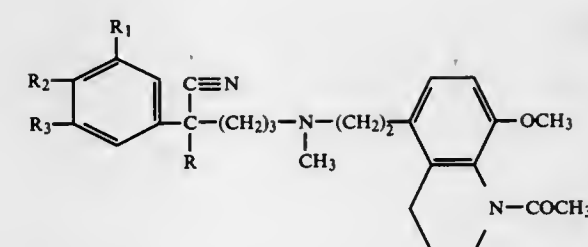
Claims priority, application France, Oct. 4, 1985, 8514756

Int. Cl.<sup>4</sup> C07D 215/26; A61K 31/47

U.S. Cl. 514-311

8 Claims

1. A compound selected from the group consisting of: a 5-aminopentanenitrile compound of the formula:



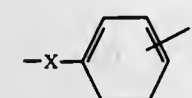
in which:

R<sub>1</sub> is selected from the group consisting of hydrogen, trifluoromethyl, and methoxy;

R<sub>2</sub> and R<sub>3</sub>, which are the same or different, are each selected from the group consisting of hydrogen and methoxy, or R<sub>2</sub> and R<sub>3</sub> together represent a radical selected from the group consisting of



R is selected from the group consisting of straight-chain and branched alkyl containing 3 to 15 carbon atoms, inclusive, and a radical of the formula:



in which:

X is selected from the group consisting of S and SO<sub>2</sub> and Z is selected from the group consisting of hydrogen and methyl;

and physiologically-tolerable acid addition salts thereof.

8. A method for treating a living animal body afflicted with disorders requiring modulators of transmembrane and intracellular movements of calcium comprising the step of administering to the said living animal an amount of a compound of claim 1 which is effective for the alleviation of the said condition.

4,792,560

## QUINOLINE HYDROXAMATES AND THEIR USE AS MODULATORS OF ARACHIDONIC ACID METABOLIC PATHWAYS

Fu-chih Huang, Leonia, N.J., assignor to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

Continuation-in-part of Ser. No. 719,199, Apr. 3, 1985,

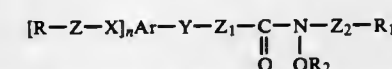
abandoned. This application Feb. 19, 1986, Ser. No. 830,798

Int. Cl.<sup>4</sup> A61K 31/47; C07D 215/14

U.S. Cl. 514-311

12 Claims

1. A compound of the formula:



and pharmaceutically acceptable salts thereof wherein

Ar is phenyl;

Y is O or CR<sub>3</sub>R<sub>4</sub>;

X is O or CR<sub>3</sub>R<sub>4</sub>;

Z and Z<sub>1</sub> are independently a chemical bond or an alkylene chain having up to 6 carbon atoms in the principal chain and up to a total of 10 carbon atoms;

Z<sub>2</sub> is a chemical bond or an alkylene chain or a mono-substituted alkylene chain containing up to 6 carbon atoms in the principal chain and up to a total of 10 carbon atoms and the substituents are hydrogen, C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>1</sub>-C<sub>5</sub> alkoxy, or C<sub>1</sub>-C<sub>5</sub> carbalkoxy;

R is quinolyl;

R<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>3</sub>-C<sub>5</sub> cycloalkyl, phenyl or quinolyl;

R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are each hydrogen or C<sub>1</sub>-C<sub>5</sub> alkyl; and n is an integer from 0-2, with the proviso that when n=0,

R<sub>1</sub> is quinolyl.

12. A method of treating hypersensitive disease, inflammatory conditions or allergic responses in a mammal comprising the administration to said mammal of a therapeutically effective amount of a compound according to claim 1.

4,792,561

## CARBOSTYRIL DERIVATIVES AS COMBINED THROMBOXANE SYNTHETASE AND CYCLIC-AMP PHOSPHODIESTERASE INHIBITORS

Keith A. M. Walker, Los Altos Hills; John J. Bruno, Redwood City, and Gregory R. Martinez, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

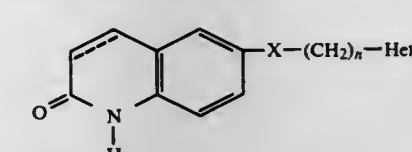
Filed May 29, 1986, Ser. No. 868,845

Int. Cl.<sup>4</sup> C07D 401/06, 401/10, 401/12; A61K 31/47

U.S. Cl. 514-312

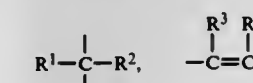
14 Claims

1. A compound of the formula:



or a pharmaceutically acceptable acid addition salt or ester thereof, wherein:

X is chosen from the group consisting of:



in which

R<sup>1</sup> is H when R<sup>2</sup> is OH, or R<sup>1</sup> is phenyl or phenyl lower alkyl when R<sup>2</sup> is H or OH, wherein the phenyl radical is optionally monosubstituted with lower alkyl, lower alkoxy, hydroxy, trifluoromethyl or halogen, or R<sup>1</sup> and R<sup>2</sup> taken together represents oxo, alkylidene having 1-6 carbon atoms or optionally substituted benzylidene wherein the phenyl radical of the benzylidene group is optionally monosubstituted with lower alkyl, lower alkoxy, hydroxy, trifluoromethyl or halogen;

R<sup>3</sup> is H or alkyl having 1-6 carbon atoms, R<sup>4</sup> is H and R<sup>3</sup> and R<sup>4</sup> are either cis or trans to each other, or R<sup>3</sup> and R<sup>4</sup> taken together represent a covalent bond;

n is an integer from 0-3;

Het is 1-imidazolyl; and the dotted line represents an optional covalent bond.

4,792,562

## N-(PYRROL-1-YL)PYRIDINAMINES HAVING MEMORY ENHANCING ACTIVITY

Richard C. Effland; Joseph T. Klein, and Kevin J. Kapples, all of Bridgewater, N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

Continuation-in-part of Ser. No. 804,430, Dec. 4, 1985, Pat. No. 4,752,610. This application Nov. 12, 1986, Ser. No. 926,593

The portion of the term of this patent subsequent to Jun. 21, 2005, has been disclaimed.

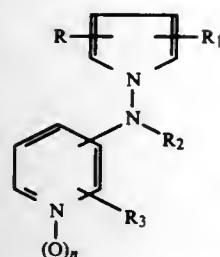
Int. Cl.<sup>4</sup> C07D 401/02; A61K 31/44

U.S. Cl. 514-343

12 Claims

1. A compound of the formula





where n is 0 or 1; R is hydrogen or loweralkyl; R<sub>1</sub> is formyl; R<sub>2</sub> is hydrogen, loweralkyl, arylloweralkyl, phenyl, nitrophenyl, cyanophenyl, trifluoromethylphenyl, or aminophenyl; and R<sub>3</sub> is hydrogen, NO<sub>2</sub>, NH<sub>2</sub>, halogen, or loweralkyl; or pharmaceutically acceptable acid addition salts thereof.

12. A method of treating a patient in need of memory enhancement which comprises administering to the patient an effective memory enhancing amount of a compound as defined in claim 1.

4,792,563

## INSECTICIDAL ETHERS

Alan J. Whittle, Twyford, United Kingdom, assignor to Imperial Chemical Industries PLC, London, England

Filed Oct. 6, 1987, Ser. No. 105,024

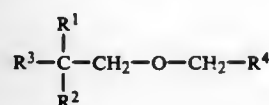
Claims priority, application United Kingdom, Oct. 16, 1986, 8624831

Int. Cl.<sup>4</sup> C07D 213/62, 213/28, 213/72; C07C 43/02

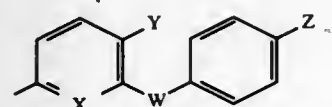
U.S. Cl. 514—345

5 Claims

1. A compound of formula (I):



wherein R<sup>4</sup> represents a group of the formula:



wherein W represents oxygen, the methylene group or nitrogen bearing a hydrogen atom, X represents nitrogen or carbon bearing a hydrogen atom and Y and Z are each selected from hydrogen and halogen R<sup>3</sup> is selected from fluoromethyl and difluoromethyl, and either (a) R<sup>1</sup> and R<sup>2</sup> represent alkyl of one, two, three or four carbon atoms, or (b) R<sup>1</sup> and R<sup>2</sup> taken together with the adjacent carbon atom form a cycloalkyl ring of four, five or six carbon atoms.

3. A compound selected from the group consisting of:  
1,1-difluoro-2,2-dimethyl-3-(4-fluoro-3-phenoxybenzyloxy)-propane,

1,1-difluoro-2,2-dimethyl-3-(3-phenoxybenzyloxy)-propane,  
1,1-difluoro-2,2-dimethyl-3-(4-fluoro-3-benzylbenzyloxy)-propane,  
1,1-difluoro-2,2-dimethyl-3-[(6-phenoxy-2-pyridyl)-methoxy]propane,  
1,1-difluoro-2,2-dimethyl-3-(3-phenylamino-4-fluoro-benzyloxy)propane,  
1-fluoro-2,2-dimethyl-3-(4-fluoro-3-phenoxybenzyloxy)-propane,  
1-fluoro-2,2-dimethyl-3-(3-phenoxybenzyloxy)propane.

4,792,564  
METHOD OF TREATMENT AND PREVENTION OF  
CEREBRAL VASOSPASMS

David R. Harder, Hartland, and John G. Gross, Elm Grove, both of Wis., assignors to The Medical College of Wisconsin, Inc., Milwaukee, Wis.

PCT No. PCT/US86/00552, § 371 Date Aug. 28, 1986, § 102(e) Date Aug. 28, 1986, PCT Pub. No. WO87/05508, PCT Pub. Date Sep. 24, 1987

PCT Filed Mar. 14, 1986, Ser. No. 907,772  
Int. Cl.<sup>4</sup> A61K 31/44

U.S. Cl. 514—355

4 Claims

1. A method of treating cerebral vasospasm which comprises administering to an animal in need thereof by injection into a blood vessel an amount of nicorandil that is safe and effective to treat said cerebral vasospasm.

4,792,565

PYRAZOLECARBONYLAMINE DERIVATIVES AND  
AGRICULTURAL AND HORTICULTURAL FUNGICIDES  
CONTAINING SAID COMPOUNDS

Hitoshi Shimotori, Tutomu Ishii, Hideo Yamazaki, Toshiaki Kuwatsuka, all of Yokohama; Yuji Yanase, Kamakura, and Yoshinori Tanaka, Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Apr. 16, 1987, Ser. No. 38,971

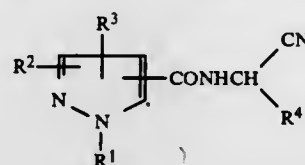
Claims priority, application Japan, Apr. 24, 1986, 61-93328; Jun. 18, 1986, 61-139981; Nov. 5, 1986, 61-262018

Int. Cl.<sup>4</sup> A01N 43/56; C07D 231/14, 231/16, 403/12

U.S. Cl. 514—406

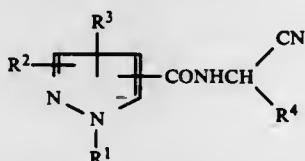
7 Claims

1. A pyrazole derivative of general formula (I):



wherein R<sup>1</sup> is an alkyl group having 1 to 12 carbon atoms, a haloalkyl group having 1 to 6 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, a haloalkenyl group having 2 to 6 carbon atoms or a phenyl group, R<sup>2</sup> and R<sup>3</sup> are each a hydrogen or halogen atom, an alkyl group having 1 to 6 carbon atoms, a haloalkyl group having 1 to 6 carbon atoms, an alkoxy group having 1 to 6 carbon atoms, an alkoxyalkyl group having 2 to 6 carbon atoms or a phenyl group, and R<sup>4</sup> is an alkyl group having 1 to 6 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, a haloalkenyl group having 2 to 6 carbon atoms, a phenyl group, or a heterocyclic aromatic group selected from the group consisting of a furyl group, a thienyl group, 2-pyrrole group and 3-pyrrole group which may be unsubstituted or substituted with a halogen atom or a lower alkyl group having 1 to 4 carbon atoms.

7. An agricultural and horticultural fungicidal composition comprising (a) a fungicidally effective amount of a pyrazole derivative of general formula (I):



wherein R<sup>1</sup> is an alkyl group having 1 to 12 atoms, a haloalkyl group having 1 to 6 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, a haloalkenyl group having 2 to 6 carbon atoms or a phenyl group, R<sup>2</sup> and R<sup>3</sup> are each a hydrogen or halogen atom, an alkyl group having 1 to 6 carbon atoms, a

haloalkyl group having 1 to 6 carbon atoms, an alkoxy group having 1 to 6 carbon atoms, an alkoxyalkyl group having 2 to 6 carbon atoms or a phenyl group, and R<sup>4</sup> is an alkyl group having 1 to 6 carbon atoms, an alkenyl group having 2 to 6 carbon atoms, a haloalkenyl group having 2 to 6 carbon atoms, a phenyl group, or a heterocyclic aromatic group selected from the group consisting of a furyl group, a thienyl group, a 2-pyrrole group and a 3-pyrrole group which may be unsubstituted or substituted with a halogen atom or a lower alkyl group having 1 to 4 carbon atoms, as an active ingredient, and (b) a carrier and/or an adjuvant.

4,792,566

IN-VIAL DEPOSITION OF  
7-(DIMETHYLAMINOMETHYLENE)AMINO-9α-  
METHOXYMITOSANE

Murray A. Kaplan, Syracuse, N.Y.; Dolatrai M. Vyas, Madison, Conn.; Nagasawa R. Palepu, Liverpool, N.Y., and Chih-Ming J. Chen, Stanhope, N.J., assignors to Bristol-Myers Company, New York, N.Y.

Continuation-in-part of Ser. No. 705,243, Feb. 25, 1985, abandoned. This application May 14, 1986, Ser. No. 863,202

Int. Cl.<sup>4</sup> A61K 31/40

U.S. Cl. 514—410

18 Claims

1. A process for the in-vial deposition of 7-(dimethylaminomethylene)amino-9α-methoxymitosane in sterile unit dosage form which comprises introducing a solution of 7-(dimethylaminomethylene)amino-9α-methoxymitosane in tertiary-butanol into a sterile vial and thereafter removing the tertiary-butanol.

4,792,567

ACARICIDAL ARYL ARYLTHIEN-2-YL ETHERS

Susan E. Burkart, Trenton; Cesar Rodriguez, Cranbury; David M. Roush, Princeton, all of N.J., and Richard B. Phillips, Diamond Bar, Calif., assignors to FMC Corporation, Philadelphia, Pa.

Filed Jun. 9, 1987, Ser. No. 60,188

Int. Cl.<sup>4</sup> A01N 43/02; C07F 7/02; C07D 409/00, 333/08

U.S. Cl. 514—422

6 Claims

1. An acaricidal compound of the formula



in which R and R<sup>1</sup> are independently selected from hydrogen, halogen, lower alkyl, lower alkoxy, and N(CO<sub>2</sub>C<sub>2</sub>H<sub>5</sub>)(CH<sub>2</sub>C<sub>6</sub>H<sub>11</sub>); and R<sup>2</sup> and R<sup>3</sup> are each independently selected from the group consisting of phenyl which may be substituted with halogen, lower alkyl, lower alkoxy, trifluoromethyl, or dimethylpyrrolyl and thienyl which may be substituted with lower alkyl or trimethyl silyl, with the proviso that at least one of R<sup>2</sup> and R<sup>3</sup> is other than phenyl or alkyl-phenyl.

4,792,568

ARYL PYRROLES AS USEFUL ANTIALLERGY  
COMPOUNDS

Joseph Auerbach, Brooklyn, N.Y., assignor to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

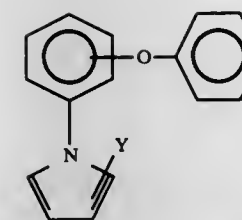
Filed Apr. 14, 1986, Ser. No. 851,989

Int. Cl.<sup>4</sup> A61K 31/40; C07D 207/325

U.S. Cl. 514—423

10 Claims

1. A therapeutic composition for treating allergic condition in a mammal comprising:  
an inert pharmaceutically acceptable carrier; and a compound of the formula



and its pharmaceutically acceptable salts, wherein Y is H, C<sub>1-6</sub> alkanoyl, C<sub>1-6</sub> alkyl or C<sub>1-6</sub> alkenyl containing one double bond not attached directly to the pyrrole, wherein the alkyl may be substituted with hydroxy or C<sub>1-6</sub> alkoxy and the alkenyl may be substituted with carb-C<sub>1-6</sub> alkoxy.

4,792,569

ANTICONVULSANT PHENETHYL SULFAMATES

Bruce E. Maryanoff, New Hope, and Samuel O. Nortey, Lamont, both of Pa., assignors to McNeilab, Inc., Spring House, Pa.

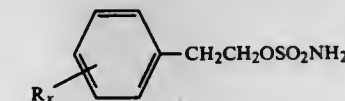
Filed Aug. 27, 1987, Ser. No. 89,880

Int. Cl.<sup>4</sup> A61K 31/255; C07C 143/68

U.S. Cl. 514—517

18 Claims

1. A sulfamate of the following formula (I):



wherein,  
R is independently alkyl, halo, alkoxy, CF<sub>3</sub> or nitro; and x is 0, 1, 2 or 3.

4,792,570

3- AND 4-BIPHENYLOXYAMINOALKANES AND  
RELATED COMPOUNDS AS ANTI-INFLAMMATORY  
AND ANALGETIC AGENTS

Peter H. Nelson; James P. Dunn, both of Los Altos; Stefan H. Unger, Palo Alto, all of Calif., and Thomas R. Thieme, Independence, Oreg., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

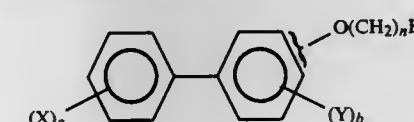
Filed Apr. 6, 1984, Ser. No. 597,790

Int. Cl.<sup>4</sup> A61K 31/205, 31/135

U.S. Cl. 514—651

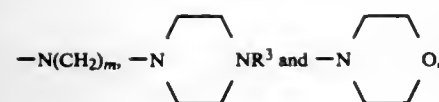
34 Claims

1. A method of preventing, reducing or inhibiting inflammation which method comprises administering to a mammal in need of such treatment a therapeutically effective amount of a compound of the formula:



or a pharmaceutically acceptable acid addition salt thereof, wherein:

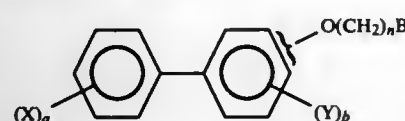
a is an integer of 0-3;  
b is an integer of 0-2;  
n is an integer of 3-12; each X and each Y are independently —halo, —R<sup>1</sup>, —alkoxy, or —phenyl; and  
B is selected from the group consisting of:  
—NR<sup>1</sup>R<sup>2</sup>, —NR<sup>1</sup>(CH<sub>2</sub>CH<sub>2</sub>OH),



in which

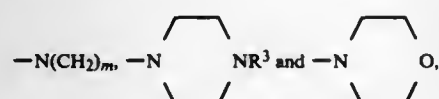
R<sup>1</sup> and R<sup>2</sup> are independently H, alkyl or cycloalkyl;  
R<sup>3</sup> is H, alkyl or —CH<sub>2</sub>CH<sub>2</sub>OH; and  
m is an integer of 3–8.

18. A method of preventing, reducing or inhibiting localized inflammation and associated pain, which method comprises administering topically to a mammal in need of such treatment a compound of the formula:



and the pharmaceutically acceptable acid addition salts thereof, wherein:

a is an integer of 0–3;  
b is an integer of 0–2;  
n is an integer of 3–12;  
each X and each Y are independently —halo, —R<sup>1</sup>, —alkoxy, or —phenyl; and  
B is selected from the group consisting of:  
—NR<sup>1</sup>R<sup>2</sup>, —NR<sup>1</sup>(CH<sub>2</sub>CH<sub>2</sub>OH),



in which

R<sup>1</sup> and R<sup>2</sup> are independently H, alkyl or cycloalkyl;  
R<sup>3</sup> is H, alkyl or —CH<sub>2</sub>CH<sub>2</sub>OH; and  
m is an integer of 3–8.

4,792,571

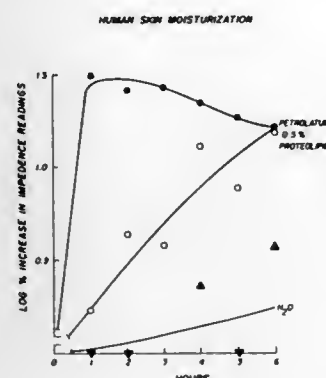
## PROTEOLIPID COMPOUNDS

John R. Schiltz, Ramsey, N.J., and Peter M. Elias, Muir Beach, Calif., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jan. 2, 1986, Ser. No. 815,491

Int. Cl.<sup>4</sup> C07K 3/02; A61K 7/48; G01N 33/50, 33/92  
U.S. Cl. 514—773

4 Claims



1. A method for enhancing the humectancy of mammalian skin, epidermal tissue and hair which comprises topically ap-

plying thereto an effective amount of at least one proteolipid compound.

4,792,572

## NOVEL PARTICULATE EXPANDABLE STYRENE POLYMERS HAVING SHORT MINIMUM MOLDING TIMES AND METHOD FOR PREPARING SAME

Thomas B. White, Keller, and James J. Uebelhart, Hurst, both of Tex., assignors to Textstyrene Plastics, Inc., Fort Worth, Tex.

Filed Feb. 25, 1988, Ser. No. 160,197

Int. Cl.<sup>4</sup> C08G 9/22

20 Claims

U.S. Cl. 521—57

1. A method for preparing particulate expandable styrene polymers having a coating of a distilled acetylated monoglyceride comprising:

introducing the particulate expandable styrene polymer into a mixing vessel;  
preparing an emulsion of the distilled acetylated monoglyceride, water and a suitable surfactant;  
adding an effective amount of the emulsion to the particulate expandable styrene polymer with mixing; and  
removing the excess water from the particulate expandable styrene polymer.

4,792,573

## PREPARATION OF ULTRA-HIGH MOLECULAR WEIGHT POLYESTER

Gerald Cohn, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Apr. 1, 1988, Ser. No. 176,554

Int. Cl.<sup>4</sup> C08J 9/28; G08G 63/02

20 Claims

U.S. Cl. 521—604

1. A process for preparing ultra-high molecular weight polyester resin which comprises: (1) dissolving a polyester prepolymer in a suitable organic solvent; (2) recovering the polyester prepolymer from the organic solvent to produce a porous, fibrous mass of the polyester prepolymer; and (3) solid state polymerizing the porous, fibrous mass at an elevated temperature to produce the ultra-high molecular weight polyester resin.

4,792,574

## STABLE, LOW VISCOSITY POLYMER/POLYISOCYANATE DISPERSION MADE USING A MACROMOLECULAR MONOMER AND A FUNCTIONAL MONOMER

Phillip T. Berkowitz, Woodbridge, Conn., assignor to Olin Corporation, Cheshire, Conn.

Filed Jan. 25, 1988, Ser. No. 147,470

The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> C08G 18/14

24 Claims

U.S. Cl. 521—137

1. A stable polymer/polyisocyanate dispersion comprising:  
(a) a polyisocyanate and  
(b) a polymer which is a reaction product of an ethylenically unsaturated macromolecular monomer, a functional monomer, and at least one other ethylenically unsaturated monomer.

4,792,575

## METHOD FOR MANUFACTURING POLYURETHANE FOAM

Shoji Takao; Hideo Yamashita; Katsuyoshi Suetsugu; Yasunori Toyama, and Kazuki Sasaki, all of Yokohama, Japan, assignors to Imperial Chemical Industries PLC, London, England  
Filed Jan. 16, 1987, Ser. No. 4,071

Claims priority, application Japan, Jan. 31, 1986, 61-18220

Int. Cl.<sup>4</sup> C08G 18/30

2 Claims

U.S. Cl. 521—157

1. In a method for manufacturing polyurethane foam by mixing (a) polyisocyanate, (b) polyol, (c) blowing agent, (d) catalyst and, as required (e) surface active agent, filler, or other such additive, the improvement wherein the polyisocyanate (a) is a prepolymer with isocyanate end groups produced from polyester polyol and a blended polyisocyanate component comprising 45–95 weight % of diphenylmethane diisocyanate and 55–5 weight % of a polymethylene polyphenyl polyisocyanate with a functionality of 3 or more, the use of a polyester polyol rather than polyether polyol in the preparation of said prepolymer providing a polyurethane foam having improved adhesion to vinyl chloride resins.

4,792,576

## PRODUCTION OF POLYURETHANE MOLDINGS BY THE REACTION INJECTION MOLDING PROCESS

Nell H. Nodelman, Pittsburgh, Pa., assignor to Mobay Corporation, Pittsburgh, Pa.

Filed Jul. 23, 1987, Ser. No. 76,827

Int. Cl.<sup>4</sup> C08J 9/04; C08G 18/28; B29C 45/14

11 Claims

U.S. Cl. 521—174

1. A process for the production of polyurethane moldings by reacting a reaction mixture comprising  
(a) an organic polyisocyanate  
(b) a compatible polyol blend comprising  
(i) at least one polyether polyol having an hydroxyl functionality of from 2 to 8, and a molecular weight of from 350 to below 1800, and  
(ii) at least one hydroxyl functional organic material containing from 2 to 8 hydroxyl groups and having a molecular weight below 350, components (i) and (ii) being used in a weight ratio of component (b) (i) to (b) (ii) of from about 10:1 to about 1:10, and  
(iii) no more than 45% by weight based on the weight of component (b) of an active hydrogen containing compound having a molecular weight of 1800 or more, said reaction mixture being processed as a one-shot system by the RIM process at an isocyanate index of from about 70 to about 130.

11. A polyurethane molding made according to the process of claim 1.

4,792,577

## STAIN-RESISTANT NO-MIX ORTHODONTIC ADHESIVE

Albert C. Chen, East Brunswick, N.J.; David L. Siegfried, Langhorne, and Donald S. Mueller, Newtown, both of Pa., assignors to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.

Filed Jul. 16, 1987, Ser. No. 74,108

Int. Cl.<sup>4</sup> A61K 5/06; C08L 33/08

7 Claims

U.S. Cl. 523—118

1. An orthodontic adhesive composition that becomes reactive and sets to a stain resistant material when a layer of one component is placed in contact with a layer of the other component, which consists essentially of:

(a) a first component having a relatively low viscosity and which contains an acrylic or methacrylic diester of ethoxylated bisphenol-A, an acrylic or methacrylic diester of an alkanediol, and benzyl acrylate or methacrylate; and  
(b) a second component containing a filler and an acrylic or methacrylic diester of ethoxylated bisphenol-A, an acrylic or methacrylic diester of an alkanediol, and benzyl meth-

acrylate or acrylate, said filler being present in an amount within the range of from about 50 to about 80 weight percent of said second component, wherein, one of said first and second components contains a peroxide catalyst and the other of said components contains a tertiary amine activator for said peroxide catalyst.

4,792,578

## RESIN-BONDED TAPHOLE MIX

Gustav O. Hughes, Dravosburg, and George H. Criss, Bethel Park, both of Pa., assignors to Dresser Industries, Inc., Dallas, Tex.

Filed Oct. 16, 1986, Ser. No. 919,352

Int. Cl.<sup>4</sup> C08K 3/34, 3/22

9 Claims

U.S. Cl. 523—140

1. A slow setting resin-bonded taphole mix consisting essentially of substantially uniform admixture of a refractory grog and a bonding composition consisting essentially of a low volatile high softening point phenolic resin, a solvent having a boiling point above about 550° F. for said resin, and a clay.

4,792,579

## STABILIZED OXYMETHYLENE COPOLYMER COMPOSITION

Seinosuke Satoh, Kurashiki, and Minoru Hamada, Narashino, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Feb. 19, 1988, Ser. No. 157,617

Int. Cl.<sup>4</sup> C08K 5/11

19 Claims

U.S. Cl. 524—145

1. A stabilized moldable oxymethylene copolymer composition having improved long-term hot water resistance and long-term heat aging characteristics comprising a blend of an oxymethylene copolymer and an alkaline earth metal salt of an ester of a tribasic inorganic acid of an organic carboxylic acid monoester of an alcohol having two or more hydroxyl groups, as a stabilizer.

4,792,580

## HIGH SOLID COATINGS CONTAINING TITANATES AND SILANES

Jyotindra K. Doshi, Alsip, Ill., assignor to The Sherwin-Williams Company, Cleveland, Ohio  
Division of Ser. No. 772,965, Sep. 4, 1985. This application Jan. 5, 1988, Ser. No. 141,368

Int. Cl.<sup>4</sup> C08K 5/24

11 Claims

U.S. Cl. 524—261

1. A process for reducing the viscosity of a high solid coating composition which process comprises incorporating into the high solid coating composition an effective viscosity reducing amount of at least one hydrolyzable silane and an effective viscosity reducing amount of at least one titanate ester, wherein the high solid coating composition has a pigment volume concentration of at least 20% and comprises an inert, volatile solvent component and non-volatile component, wherein the non-volatile component consists essentially of:

(a) an organic film-forming vehicle having active hydrogen or epoxy functionality;  
(b) a crosslinker for the film-forming vehicle; and  
(c) at least one extender pigment.

4,792,581

## RUBBER COMPOSITION

Takeo Kondo, Tokyo; Yuichiro Kushida, Gunma, and Yasushi Abe, Tokyo, all of Japan, assignors to Denki Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 29, 1986, Ser. No. 947,330

Claims priority, application Japan, Dec. 28, 1985, 60-293532

Int. Cl.<sup>4</sup> C08L 23/26, 33/04, 23/06; C08K 3/04

U.S. Cl. 524—523

29 Claims

1. A rubber composition comprising a cross-linked blend



containing a mixture of from 50 to 95% by weight of an acrylic elastomer, from 5 to 50% by weight of polyethylene and carbon black in an amount of from about 40 to 300 parts by weight per 100 parts by weight of the total amount of acrylic elastomer and polyethylene.

4,792,582

# POLYETHYLENE GLYCOL ETHER FOAM INHIBITORS, EMULSIFIERS, AND STABILIZERS FOR POLYMERS

Rainer Hoefer, Dueseldorf; Alfred Meffert, Monheim; Robert Ploer, Ratingen-Hoesel; Bernd Wegmann, Haan, and Uwe Held, Hilden, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Dueseldorf, Fed. Rep. of Germany

Filed Aug. 11, 1986, Ser. No. 895,077

Claims priority, application Fed. Rep. of Germany, Aug. 24, 1985, 3530302

Int. Cl.<sup>4</sup> C08K 5/06

U.S. Cl. 524—378

22 Claims

1. A method of emulsifying, or emulsion-stabilizing, or foam-inhibiting, or a combination thereof of an aqueous polymer dispersion or latex comprising incorporating therein an emulsifying effective, or emulsion-stabilizing effective or foam-inhibiting effective, or a combination thereof amount of at least one compound of the formula



Wherein:

R<sub>1</sub> is a straight or branched chain C<sub>8-18</sub>-alkyl or C<sub>8-18</sub>-alkenyl;

R<sub>2</sub> is a C<sub>4-8</sub>-alkyl; and

n is an average number between 7 and 100.

4,792,583

# RUBBER BLENDS

Asbert Y. Coran, Akron, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 814,476, Dec. 30, 1985, abandoned.

This application Jun. 29, 1987, Ser. No. 67,194

Int. Cl.<sup>4</sup> C08K 3/04; C08L 7/00, 9/00; C08I 13/00

U.S. Cl. 524—504

6 Claims

1. A mixture consisting essentially of from 5-80 weight percent of monoolefin rubber and from 95-20 weight percent unvulcanized high-diene hydrocarbon rubber wherein the monoolefin rubber is largely non-crystalline, contains from about 0.1 to 10.0 weight percent, based on the monoolefin rubber, of pendent acid groups and is dispersed in the high-diene hydrocarbon rubber in particulate form with particles which have a weight average diameter below about 10 μm or are substantially all less than about 50 μm in diameter.

4,792,584

# ADHESIVE COMPOSITIONS

Toshinori Shiraki, Yamato; Yasuo Hattori, and Masao Karouji, both of Yokohama, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan

Filed Apr. 23, 1987, Ser. No. 41,403

Claims priority, application Japan, May 2, 1986, 61-101133; Jul. 21, 1986, 61-169792

Int. Cl.<sup>4</sup> C08K 5/13

U.S. Cl. 524—77

22 Claims

1. An adhesive composition comprising 100 parts by weight of a block copolymer (a) consisting of at least one polymer block composed mainly of a vinyl aromatic hydrocarbon and at least one polymer block composed mainly of butadiene in which

- (i) the vinyl aromatic hydrocarbon content [S] is 10 to 30% by weight,
- (ii) the 1,2-vinyl content of butadiene portion [V] is 20 to 50%, and
- (iii) the relationship between said vinyl aromatic hydrocar-

bon content [S] and said 1,2-vinyl content of butadiene portion [V] satisfies the formula:

$$40 \leq [S] + [V] \leq 70$$

and 40 to 200 parts by weight of a tackifier (b).

4,792,585

# THERMOPLASTIC RESIN COMPOSITION

Kazuhiko Yamamoto, Yokkaichi; Kenji Nobuhara, Suzuka; Hideo Mizuno, Yokkaichi; and Atsuko Yanagawa, Mie, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd., Tokyo, Japan

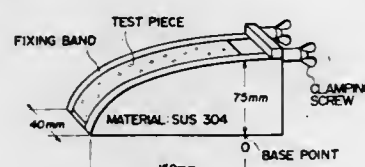
Filed Dec. 1, 1987, Ser. No. 127,047

Claims priority, application Japan, Dec. 10, 1986, 61-294526

Int. Cl.<sup>4</sup> C08L 69/00

U.S. Cl. 525—67

6 Claims



1. A thermoplastic resin composition consisting essentially of:

- (A) 20 to 80% by weight of a polycarbonate having a viscosity-average molecular weight of 14,000 to 27,000,
- (B) 10 to 70% by weight of a maleimide resin obtained by polymerizing 95 to 35 parts by weight of a monomer mixture consisting of 10 to 70% by weight of a maleimide compound, 25 to 80% by weight of an aromatic alkenyl compound, 5 to 40% by weight of an alkenyl cyanide compound and 0 to 50% by weight of a monomer copolymerizable with said compounds, in the presence of 5 to 65 parts by weight of at least one rubber-like polymer selected from the group consisting of an ethylene-propylene-nonconjugated diene rubber, an ethylene-propylene rubber and an acrylic rubber, and
- (C) 5 to 70% by weight of a styrene resin obtained by polymerizing 95 to 20 parts by weight of a monomer mixture consisting of 5 to 40% by weight of an alkenyl cyanide compound, 10 to 95% by weight of an aromatic alkenyl compound and 0 to 70% by weight of at least one other alkenyl monomer copolymerizable with said compounds, in the presence of 5 to 80 parts by weight of a rubbery polymer.

4,792,586

# IMPACT STRENGTH OF POLYPHENYLENE ETHER-LINEAR POLYESTER ARTICLES

Choong Y. Han, Evansville, Ind., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 21, 1986, Ser. No. 933,429

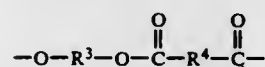
Int. Cl.<sup>4</sup> C08L 53/00

U.S. Cl. 525—88

15 Claims

1. A molded article of high impact strength prepared by the method which comprises the steps of:

- (A) preparing an intimate blend comprising about 20-60% by weight of at least one polyphenylene ether; about 25-65% of at least one linear polyester comprising at least 30 structural units of the formula



wherein each of R<sup>3</sup> and R<sup>4</sup> is a divalent aliphatic, alicyclic or aromatic radical containing about 2-10 carbon atoms;

about 1-10% of at least one polyisocyanate or masked polyisocyanate and about 2-20% of at least one elastomeric impact modifier;

- (B) molding said blend at a temperature within the range of about 250°-350° C. to produce said molded article; and
- (C) annealing said molded article at a temperature above the glass transition temperature of said polyester, for a time effective to increase the impact strength thereof.

4,792,587

# RESIN COMPOSITION WHICH EXHIBITS ANISOTROPISM WHEN MELTED

Toshio Kanoe, Fuji; Tsuneyoshi Okada, Kawasaki, and Kenji Hijikata, Fuji, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

Filed Mar. 16, 1987, Ser. No. 26,361

Claims priority, application Japan, Mar. 24, 1986, 61-65456

Int. Cl.<sup>4</sup> C08L 67/02, 75/04, 77/10, 77/12, 83/04

U.S. Cl. 525—131

20 Claims

1. A resin composition which exhibits anisotropism when melted, comprising two components uniformly mixed with each other which following injection molding is capable of exhibiting a tensile strength and a flexural strength which exceeds that of each of the two components when separately injection molded, the first component being a resin which has no flexible skeleton and a rigid skeleton selected from the group consisting of polyester, polyesteramide, polyamide, polyazomethine, polyurethane, polysiloxane, and polyphosphazene, and mixtures of the foregoing, and exhibits anisotropism when melted, and the second component being a resin which has a rigid skeleton selected from the group consisting of polyester, polyesteramide, polyamide, polyazomethine, polyurethane, polysiloxane, and polyphosphazene, and mixtures of the foregoing, and a flexible skeleton selected from the group consisting of polyarylate, polyalkylene terephthalate, polycarbonate, polyethersulfone, polyacrylate, and mixtures of the foregoing.

4,792,588

# POLYETHYLENE COMPOSITION

Michiharu Suga, Iwakuni; Hideo Ishikawa, Obtake; Yoshinori Akana, Iwakuni; Junichi Yoshitake, Kasuga, and Masayuki Kondoh, Iwakuni, all of Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

PCT No. PCT/JP86/00325, § 371 Date Apr. 17, 1987, § 102(e) Date Apr. 17, 1987, PCT Pub. No. WO87/00184, PCT Pub. Date Jan. 15, 1987

PCT Filed Jun. 26, 1986, Ser. No. 19,317

Claims priority, application Japan, Jun. 27, 1985, 60-141321; Mar. 3, 1986, 61-44201

Int. Cl.<sup>4</sup> C08L 23/04, 23/06

U.S. Cl. 525—240

8 Claims

1. A polyethylene composition characterized in that:
  - (1) said composition is produced by a multistage polymerization process in which in the presence of a Ziegler-type catalyst formed from (A) a highly active titanium catalyst component comprising magnesium, titanium and halogen as essential components and (B) an organoaluminum compound catalyst component, ethylene or ethylene and a small amount of an alpha-olefin are polymerized in at least one polymerization step to form ultrahigh-molecular-weight polyethylene having an intrinsic viscosity of at least 12 dl/g, and ethylene or ethylene and a small amount of an alpha-olefin are polymerized in the presence of hydrogen in another polymerization step to form low-molecular-weight to high-molecular-weight polyethylene having an intrinsic viscosity of 0.1 to 5 dl/g,
  - (2) said ultrahigh-molecular-weight polyethylene has an intrinsic viscosity, measured in decalin at 135° C., of at least 12 dl/g, and said low-molecular-weight to high-molecular-weight polyethylene has an intrinsic viscosity, measured in decalin at 135° C., of 0.1 to 5 dl/g,
  - (3) the proportion of said ultrahigh-molecular-weight poly-

ethylene is in the range of 20 to 95% by weight based on the total weight of said ultrahigh-molecular-weight polyethylene and said low-molecular-weight to high-molecular-weight polyethylene, and

- (4) said polyethylene composition consists substantially of said ultrahigh-molecular-weight polyethylene and said low-molecular-weight to high-molecular-weight polyethylene and has an intrinsic viscosity [η]<sub>c</sub>, measured in decalin at 135° C., of 10 to 50 dl/g.

4,792,589

# RUBBER VULCANIZATION AGENTS OF SULFUR AND OLEFIN

Howard A. Colvin, Tallmadge, and Charles L. Bull, Jr., Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Division of Ser. No. 896,688, Aug. 15, 1986, Pat. No. 4,739,036. This application Feb. 4, 1987, Ser. No. 10,876

Int. Cl.<sup>4</sup> C08C 19/20

U.S. Cl. 525—343

5 Claims

1. A process for preparing a rubbery vulcanizate comprising: (1) mixing a major proportion of a rubbery material having a available unsaturation selected from the group consisting of natural and synthetic polyisoprenes, polybutadienes, polychloroprenes, copolymers of isobutylene and isoprene, copolymers of butadiene-1,3 and styrene and copolymers of butadiene-1,3 and acrylonitrile with from 0.5 to about 12% by weight based on the weight of said rubbery material of an adduct of sulfur and at least one olefin; said adduct of sulfur and at least one olefin is prepared according to the process comprising: (a) admixing sulfur and at least one olefin, water, a dispersing agent and a basic catalyst wherein the weight ratio of sulfur to olefin is from 1:1 to 50:1 and the weight ratio of water to sulfur plus olefin is from 2.5:1 to 60:1; (b) heating the mixture to 120° to 200° C. with agitation for a sufficient time to form the granular vulcanizing agent; (c) cooling and isolating the granular vulcanizing agent and; (2) vulcanizing the rubbery material sulfur adduct mixture.

4,792,590

# ALIPHATIC-AROMATIC POLYAMIDIMIDES CONTAINING POLYAMIDES

Wilfried Zecher, Leverkusen, and Klaus Reinking, Wermelskirchen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 766,501, Aug. 19, 1985, abandoned. This application Jul. 2, 1987, Ser. No. 48,803

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1984, 3431859

Int. Cl.<sup>4</sup> C08L 77/00

U.S. Cl. 525—424

19 Claims

1. A thermoplastic injection-moldable composition comprising 10 to 99.8%, by weight of the composition, of a polyamidimide condensation product, prepared at a temperature of from 0° to 400° C., from a mixture consisting essentially of a diisocyanate, a polycarboxylic acid anhydride and a lactam or a first polyamide, where the diisocyanate is a diisocyanate derived from isophorone; toluene diisocyanate; m-phenylenediisocyanate; 4,4'-diisocyanatodiphenylmethane; 4,4'-diisocyanatodiphenylether; naphthylene-1,5-diisocyanate; p-phenylenediisocyanate; 4,4'-diisocyanato-diphenyl-dimethylmethane; 4,4'-diisocyanatodicyclohexylmethane; an aliphatic diisocyanate containing two to twelve carbon atoms or mixtures thereof and 0.2 to 90%, by weight of the composition, of a second polyamide.

4,792,591

## PROCESS FOR REDUCING THE HALOGEN CONTENT OF HALOGEN-CONTAINING POLYCARBOSILANES AND POLYSILANES

Alfred Rengstl, Reischach, and Andrea Schmidhuber, Mehrling, both of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Fed. Rep. of Germany

Filed May 19, 1987, Ser. No. 51,927

Claims priority, application Fed. Rep. of Germany, Jun. 20, 1986, 3620635

Int. Cl.<sup>4</sup> C08F 283/00

U.S. Cl. 525—477

9 Claims

1. A process for reducing the halogen content of polysilanes and/or polycarbosilanes containing halogen bonded directly to silicon atoms comprising reacting in solution or suspension polysilanes and/or polycarbosilanes with hexamethyldisilazane.

4,792,592

## PROCESS FOR REDUCING SHEETING DURING POLYMERIZATION OF ALPHA-OLEFINS

Bernard D. Fuls, Victoria, Tex.; Steven P. Sawin; Collin D. Aikman, both of Charleston, and John M. Jenkins, III, South Charleston, all of W. Va., assignors to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 650,571, Sep. 14, 1984, Pat. No. 4,532,311, which is a continuation of Ser. No. 247,990, Mar. 26, 1981, abandoned. This application May 6, 1985, Ser. No. 730,958

The portion of the term of this patent subsequent to Jan. 30, 2002, has been disclaimed.

Int. Cl.<sup>4</sup> C08F 2/34

U.S. Cl. 526—62

9 Claims

1. In a method for polymerization of one or more alpha-olefins in a fluidized bed reactor in the presence of a catalyst prone to cause sheeting, the improvement which comprises maintaining the static electric charge in said reactor at the site of possible sheet formation below a static voltage level which would otherwise permit sheeting to occur, by means for creating areas of localized field strength within said reactor for the promotion of electrical discharge to ground.

4,792,593

## NOVEL ACRYLAMIDE ACRYLATE COPOLYMERS

Donald N. Schulz, Annandale; Enock Berluche, Phillipsburg; John J. Maurer, New Providence, and Jan Bock, Bridgewater, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

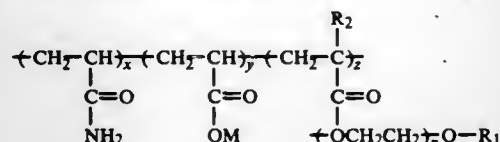
Filed Nov. 5, 1987, Ser. No. 116,893

Int. Cl.<sup>4</sup> C08F 30/04

U.S. Cl. 526—240

10 Claims

1. A water soluble terpolymer having the formula:



wherein R<sub>1</sub> is selected from the group consisting of C<sub>1</sub> to C<sub>20</sub> alkyl groups, C<sub>6</sub> to C<sub>20</sub> aryl groups and C<sub>6</sub> to C<sub>30</sub> alkylaryl groups; R<sub>2</sub> is hydrogen or methyl group, n is about 1 to 60; y is about 2.0 to about 35.0 mole %, and x is about 65.00 to about 98.00 mole %, z is about 0.1 to about 3.0 mole % and n is about 1 to about 60 and M is a metal cation selected from the group consisting of Groups IA, IIA, IB and IIB of the Periodic Table of Elements, wherein said terpolymer has an intrinsic viscosity of about 1 to about 25.

4,792,594

## TETRAFLUOROETHYLENE COPOLYMERS

Subhash V. Gangal, and Satish C. Malhotra, both of Parkersburg, W. Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 739,860, May 31, 1985, Pat. No. 4,636,549, which is a continuation-in-part of Ser. No. 663,466, Oct. 18, 1984, abandoned, which is a continuation-in-part of Ser. No. 489,305, Apr. 28, 1983, abandoned, which is a

continuation-in-part of Ser. No. 449,499, Dec. 13, 1982, abandoned. This application Dec. 30, 1986, Ser. No. 947,847

Int. Cl.<sup>4</sup> C08F 14/18

U.S. Cl. 526—253

3 Claims

1. A tetrafluoroethylene polymer consisting essentially of polymerized units of tetrafluoroethylene and from 0.004% to less than 0.5 percent by weight of total polymer weight of a copolymerizable monomer of the formula CF<sub>3</sub>—(CF<sub>2</sub>)<sub>3</sub>—CH=CH<sub>2</sub> present in an amount which does not cause the melt viscosity to be less than about 1 × 10<sup>8</sup> PaS at 380° C.

4,792,595

## NARROW MWD ALPHA-OLEFIN COPOLYMERS

Charles Cozewith, Westfield; Shiaw Ju, Edison, and Gary W. Verstrate, Matawan, all of N.J., assignors to Exxon Research &amp; Engineering Co., Florham Park, N.J.

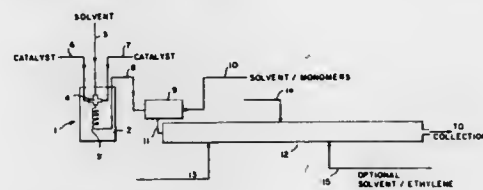
Division of Ser. No. 504,582, Jun. 15, 1983, Pat. No. 4,540,753.

This application Jun. 17, 1985, Ser. No. 745,873

Int. Cl.<sup>4</sup> C08F 10/14, 293/00

U.S. Cl. 526—348

83 Claims



1. Copolymer of ethylene and at least one other alpha-olefin monomer, said copolymer having an average ethylene composition and comprising intramolecularly heterogeneous copolymer chains wherein at least two portions of an individual intramolecularly heterogeneous chain, each portion comprising at least 5 weight percent of said chain, differ in composition from one another by at least 5 weight percent ethylene, wherein said copolymer has an intermolecular compositional dispersity such that 95 weight percent of said copolymer chains have a composition 15 weight percent or less different from said average ethylene composition, and wherein said copolymer has a weight average molecular weight of from about 2,000 to about 1,000,000, and a MWD characterized by at least one of a ratio of  $\bar{M}_w/\bar{M}_n$  of less than 2 and a ratio of  $\bar{M}_z/\bar{M}_w$  of less than 1.8, said copolymer having been produced from a polymerization reaction mixture which at initiation of polymerization comprises catalyst, ethylene and said at least one other alpha-olefin monomer.

4,792,596

## CONTINUOUS PROCESS FOR PREPARING ORGANOPOLYSILOXANES CONTAINING TRIORGANOSILOXY TERMINAL UNITS

Ralph Ottlinger, Murnau, and Willi Streckel, Mehrling-Od, both of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Aug. 12, 1987, Ser. No. 84,224

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632875

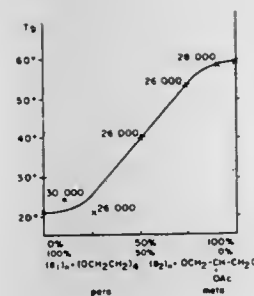
Int. Cl.<sup>4</sup> C08G 77/06

U.S. Cl. 528—14

1 Claim

1. A continuous method for preparing organopolysiloxanes

having triorganosiloxy terminal units, which comprises introducing an organopolysiloxane mixture containing cyclic organopolysiloxanes and organo(poly)siloxanes having triorganosiloxy terminal groups into a tube reactor that has been heated to 80° C. and which contains a static catalyst bed, in which the catalyst is selected from the group consisting of acid activated montmorillonite, aluminum silicates having a molecular sieve structure, sulfonated carbon, acid activated carbon black and cation-exchange polymers having sulfonyl groups as the ion exchange elements, and thereafter recovering an organopolysiloxane whose composition is different from that of the organo(poly)siloxane having triorganosiloxy terminal groups which has been introduced into the reactor; in which the temperature of the contents of the reactor in the area between one-third and two-thirds of the distance between the point where the organopolysiloxane mixture enters the reactor and the point where the resultant organopolysiloxane composition leaves the reactor, is at least 50° C. below the temperature which is immediately prior to the point where the resultant organopolysiloxane composition leaves the reactor.



4,792,597

## MELT-PROCESSABLE POLYESTERAMIDES HAVING PARA-LINKED, SUBSTITUTED-PHENYLENE RADICALS

Russell A. Gaudiana, Merrimack, N.H.; Howard G. Rogers, Weston, and Roger F. Sinta, Woburn, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 28, 1987, Ser. No. 138,062

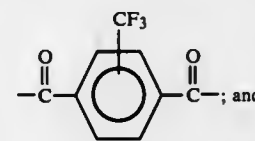
Int. Cl.<sup>4</sup> C08G 69/44

U.S. Cl. 528—183

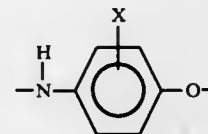
11 Claims

1. A melt-processable polyesteramide capable of forming an anisotropic melt phase at a temperature of approximately 260° C. or lower, comprising as essential units, repeating units (I) and (II) wherein:

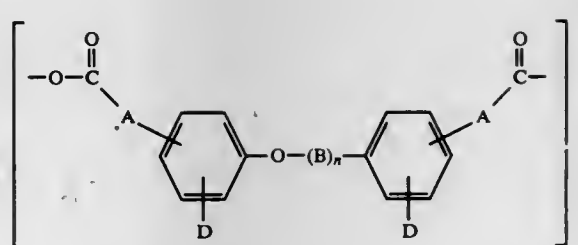
(I) is a repeating unit of the formula



(II) is a repeating unit of the formula



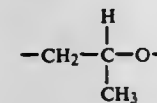
wherein X is alkyl, alkoxy, trifluoromethyl, halogen or nitro.



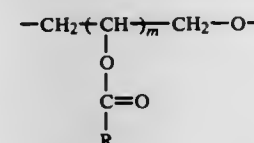
wherein

A represents a direct bond or A represents (C<sub>1-12</sub>)alkylene in the ortho-, meta- or para-position in the phenylring, and wherein

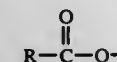
B represents B<sub>1</sub> or B<sub>2</sub> where B<sub>1</sub> is —CH<sub>2</sub>—CH<sub>2</sub>—O— with n > 2, —CH<sub>2</sub>—CH<sub>2</sub>—CH<sub>2</sub>—O— or



with n ≥ 2, and B<sub>2</sub> is



with n = 1 and wherein m = 1, 2, 3 or 4 and wherein R is (C<sub>1-20</sub>)alkyl or substituted phenyl, or wherein



is a (co)(poly)ester group of one or more identical or different hydroxy carboxylic acid units, and D = H, CH<sub>3</sub> or OCH<sub>3</sub> in the ortho-, meta- or para-position in the phenylring, with a molecular weight of 2,000 to 140,000 and with the units of formula I in homo- or copolymeric arrangement the polymer having terminal monocarboxylic acid anhydride residues or free carboxylic acid groups.

4,792,598

## POLY-DICARBOXYLIC ACID ANHYDRIDES AND POLYMERIC ANHYDRIDES THEREFROM

Gerd Ziegast, Liestal, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Filed Sep. 29, 1986, Ser. No. 912,281

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1985, 3535169

Int. Cl.<sup>4</sup> C08G 67/04

U.S. Cl. 528—206

13 Claims

1. A poly-dicarboxylic acid anhydride, containing structural units of formula



4,792,599

## BIOCOMPATIBLE POLYESTERS

Aziz A. Durrani, London, England, assignor to Biocompatibles Ltd., London, England  
PCT No. PCT/GB87/00533, § 371 Date Mar. 3, 1988, § 102(e)  
Date Mar. 3, 1988, PCT Pub. No. WO88/00956, PCT Pub.  
Date Feb. 11, 1988

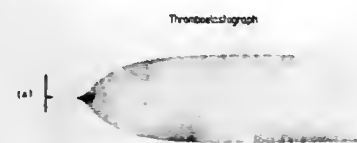
PCT Filed Jul. 28, 1987, Ser. No. 162,337

Claims priority, application United Kingdom, Jan. 28, 1986,  
8618334

Int. Cl. C08G 63/66; A61L 27/00, 31/00

U.S. Cl. 528—272

19 Claims



1. A biocompatible polyester comprising repeating units derived from glycerophosphorylcholine or glycerophosphorylethanolamine and at least one di- or poly-functional acid or reactive derivative thereof.

4,792,600

## PROCESS FOR THE PREPARATION OF COPOLY(ARYLENE SULFIDE) WITH AROMATIC NITRO COMPOUND CATALYST

Mark Rule; David R. Fagerburg, and Joseph J. Watkins, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 9, 1987, Ser. No. 118,572

Int. Cl. C08G 75/14

U.S. Cl. 528—389

14 Claims

1. A process for producing a copoly(arylene sulfide) corresponding to the structure:



wherein A is a divalent substituted or unsubstituted aromatic radical, x is in the range of 0.5 to 0.001 and n is at least 200, comprising reacting a mixture of a diiodoaromatic compound and elemental sulfur in the presence of a catalytic amount of an aromatic nitro compound corresponding to the structure:



wherein R is a monovalent aromatic moiety at a polymer producing temperature.

4,792,601

## MONOCLONAL ANTIBODY TO MULLERIAN INHIBITING SUBSTANCE

Patricia K. Donahoe, Weston; Gerald P. Budzik, Waltham, and Meredith Mudgett-Hunter, Hyde Park, all of Mass., assignors to The General Hospital Corporation, Boston, Mass.  
Division of Ser. No. 353,089, Mar. 1, 1982, Pat. No. 4,487,833.

This application Oct. 1, 1984, Ser. No. 656,482

Int. Cl. G01N 33/53; A61K 39/395; C12P 21/00; C12N 15/00,  
5/00

U.S. Cl. 530—387

3 Claims

1. A composition consisting essentially of a monoclonal antibody against MIS.

4,792,602

## ADAPTORS, AND SYNTHESIS AND CLONING OF PROINSULIN GENES

Saran A. Narang, Ottawa, Canada, and Ray J. Wu, Ithaca, N.Y., assignors to Cornell Research Foundation, Inc., Ithaca, N.Y.

Continuation of Ser. No. 275,161, Jun. 19, 1981. This application  
Dec. 16, 1983, Ser. No. 562,045

Int. Cl. C07H 5/12; C12N 15/00

U.S. Cl. 536—27

6 Claims

1. A synthetic adaptor oligodeoxynucleotide, useful for retrieving and trimming genes from replicable DNA, comprising:

- a recognition site for restriction endonucleases comprising Hph I and Mbo II, and
  - from 1 to 7 additional nucleotides downstream of the recognition site,
- said adaptor being ligatable to a preselected DNA molecule and by varying the number of additional nucleotides (b) being adapted to allow controlled trimming of 7 to 1 base pairs from the end of said preselected DNA molecule.

4,792,603

## METHOD OF PRODUCING A POLYETHER PREPOLYMER

Takeo Saegusa, Kyoto; Jiro Horikawa, Ehime; Masahiro Niwano, Ehime, and Takenobu Kanazawa, Ehime, all of Japan, assignors to Sumitomo Chemical Co., Ltd., Osaka, Japan  
Division of Ser. No. 673,636, Nov. 21, 1984, abandoned. This application Oct. 2, 1986, Ser. No. 914,515

Claims priority, application Japan, Nov. 22, 1983, 58-220185;  
Feb. 27, 1984, 59-037151

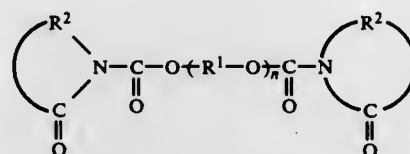
The portion of the term of this patent subsequent to Mar. 17,  
2004, has been disclaimed.

Int. Cl. C07D 207/00, 211/36; C08G 69/14

U.S. Cl. 540—451

3 Claims

1. A method for producing a polyether prepolymer of the formula:



wherein R<sup>1</sup> is an aliphatic hydrocarbon residual group having 2 to 6 carbon atoms, and R<sup>2</sup> is an aliphatic hydrocarbon residual group having 3 to 12 carbon atoms, comprising reacting a poly(oxyalkylene) having two terminal hydroxy groups and having a number of average molecular weight of 1,000 to 3,000, with an N-chlorocarbonyl lactam in an amount of 0.6 to 1.5 equivalents to the hydroxy group in said poly(oxyalkylene) in the absence of any of a solvent or a dehydrochlorinating agent at a temperature of 10° to 120° C.

4,792,604

## MANUFACTURE OF HALOALKYL LACTAMS

David J. Tracy, Lincoln Park, and Thomas Rizzo, Bloomfield, both of N.J., assignors to GAF Corporation, Wayne, N.J.

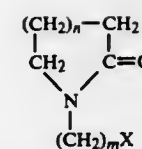
Filed Mar. 20, 1987, Ser. No. 28,362

Int. Cl. C07D 207/263, 211/76, 223/10

U.S. Cl. 540—485

13 Claims

1. In the process for synthesizing a haloalkyl lactam having the formula



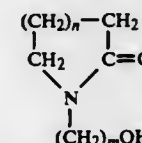
wherein

n is an integer having a value of from 1 to 3;

m is an integer having a value of 1 to 2 and

X is chlorine or bromine

by reacting a hydroxyalkyl lactam having the formula



where m and n are as defined above, with at least a molar equivalent of SOX<sub>2</sub> wherein X is chlorine or bromine wherein the improvement comprises adding said hydroxyalkyl lactam to said SOX<sub>2</sub> under anhydrous conditions, in the absence of an inert solvent and at a temperature sufficient to retain SOX<sub>2</sub> in the liquid state; removing SO<sub>2</sub> by-product and any unreacted SOX<sub>2</sub> reactant under vacuum at a temperature not greater than 10° above the boiling point of the SOX<sub>2</sub> compound; subjecting the remaining product solution to vacuum distillation and recovering said product.

4,792,605

## 1,4-BENZOXAZIN-3-ONE-6-(AMINO OR NITRO) INTERMEDIATES

Eiki Nagano, Nishinomiya; Toru Haga, Takarazuka; Ryo Sato, and Kouichi Morita, both of Toyonaka, all of Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan  
Division of Ser. No. 756,251, Jul. 18, 1985, Pat. No. 4,640,707.

This application Oct. 2, 1986, Ser. No. 914,496

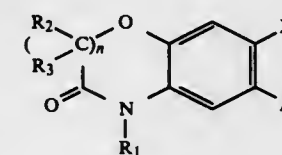
Claims priority, application Japan, Jul. 23, 1984, 59-152721;  
Aug. 3, 1984, 59-164020; Sep. 20, 1984, 59-198245

Int. Cl. C07D 265/36

U.S. Cl. 544—105

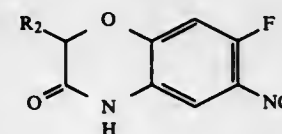
6 Claims

1. A compound of the formula:



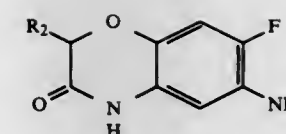
wherein R<sub>1</sub> is a C<sub>3</sub>-C<sub>4</sub> alkenyl group, R<sub>2</sub> is a hydrogen atom or a methyl group, R<sub>3</sub> is a hydrogen atom, X is a hydrogen atom or a fluorine atom, n is 1 and A is —NH<sub>2</sub> or a nitro group.

5. A compound of the formula:



wherein R<sub>2</sub> is a hydrogen atom or a methyl group.

6. A compound of the formula:



wherein R<sub>2</sub> is a hydrogen atom or a methyl group.

4,792,606

## PROCESS FOR THE PREPARATION OF DIMERIC AROMATIC ACYL CYANIDES

Reinhard Lantzech, Wuppertal, and Hermann-Dieter Krall, Duesseldorf, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
Filed Jul. 16, 1987, Ser. No. 74,384

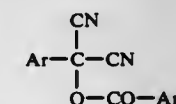
Claims priority, application Fed. Rep. of Germany, Aug. 5,  
1986, 3626411

Int. Cl. C07D 401/12, 405/12, 403/12, 409/12, 417/12, 213/46,  
213/57, 239/34, 239/26, 277/30, 333/38, 307/54, 317/60,  
319/08; C07C 121/62, 121/68

U.S. Cl. 544—296

6 Claims

1. In a process for the preparation of a dimeric aromatic acyl cyanide of the formula



in which

Ar is phenyl, naphthyl, pyridyl, thiazolyl, pyrimidinyl, thienyl or furyl which is in each case optionally substituted by halogen, alkyl, alkoxy, halogenoalkyl, hydroxyl, halogenoalkoxy, alkylthio, amino, halogenoalkylthio, nitro, cyano, alkylsulfonyl, halogenoalkylsulfonyl, optionally halogen-substituted alkylendioxy, alkoxyalkyl, halogenoalkoxyalkyl, carboxyl, carbalkoxy or alkoxy-N=CH—,

comprising reacting an acyl halide of the formula



in which

Hal is fluorine, chlorine or bromine, with an alkali metal cyanide the improvement comprising conducting the reaction in a two-phase system comprising water and a water-immiscible or only sparingly water-miscible aliphatic ketone, and in the presence of a phase-transfer catalyst selected from the group consisting of tetrabutylammonium bromide, triethylbenzylammonium chloride, octyltrimethylammonium chloride, dimethyldodecylbenzylammonium chloride, tetramethylammonium chloride and tetrabutylammonium chloride.

4,792,607

## 5-FLUORO-3,4-DIHYDRO-2,4-DIOXO-N-(3-INDOLYL)-1(2H)-PYRIMIDINECARBOXAMIDES

Ryo Yoshizawa, Yokosuka; Masatoshi Kawashima, Yokohama, and Hitochi Yano, Kawasaki, all of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Apr. 2, 1987, Ser. No. 33,497

Claims priority, application Japan, Apr. 2, 1986, 61-74297;  
Feb. 3, 1987, 62-21727

Int. Cl. C07D 403/02

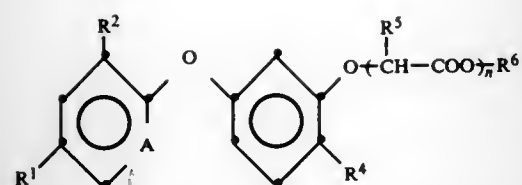
U.S. Cl. 544—310

5 Claims

1. A compound of the formula

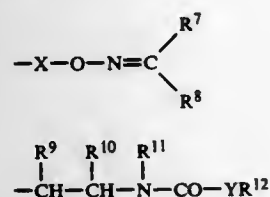






wherein

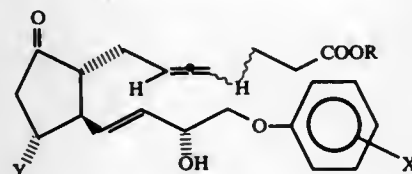
A is CR<sup>3</sup> or N,  
R<sup>1</sup> is halogen or trifluoromethyl,  
R<sup>2</sup> and R<sup>3</sup> independently of each other are hydrogen, halogen, nitro or cyano,  
R<sup>4</sup> is halogen, nitro or cyano,  
R<sup>5</sup> is hydrogen or C<sub>1-3</sub>-alkyl,  
n is 0 or 1,  
R<sup>6</sup> is one of the following groups  
(a)-(b)



R<sup>7</sup> is C<sub>1-6</sub>-alkyl,  
R<sup>8</sup> is C<sub>1-6</sub>-alkyl or C<sub>1-6</sub>-alkoxy,  
R<sup>7</sup> and R<sup>8</sup> together with the carbon atom to which they are attached are a C<sub>5-7</sub>-cycloalkane ring,  
X is methylene, ethylene or ethylidene,  
R<sup>9</sup> and R<sup>10</sup> independently of each other are hydrogen or C<sub>1-4</sub>-alkyl,  
R<sup>11</sup> is hydrogen or methyl,  
R<sup>12</sup> is C<sub>1-4</sub>-alkyl or Z-chloroethyl, and  
Y is oxygen or sulphur.

**4,792,617**  
**11-SUBSTITUTED-16-PHENOXY AND 16-SUBSTITUTED PHENOXY-PROSTAGLANDIN ACID DERIVATIVES**  
Gary F. Cooper, Menlo Park; John H. Fried, Palo Alto, and L. David Waterbury, San Mateo, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.  
Continuation of Ser. No. 635,970, Jul. 31, 1984, abandoned. This application Feb. 27, 1987, Ser. No. 18,766  
Int. Cl.<sup>4</sup> C07C 177/00

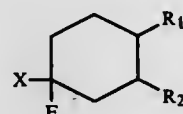
U.S. Cl. 560-53  
1. A compound of the formula



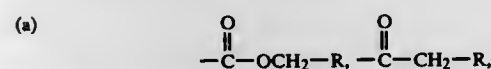
or a racemic mixture thereof, wherein:

R is hydrogen, lower alkyl or a pharmaceutically acceptable, non-toxic salt of the compound wherein R is hydrogen;  
X is hydrogen, halo, trifluoromethyl, lower alkyl or lower alkoxy;  
Y is lower alkyl; and  
the wavy lines represent the α or β configuration with the proviso that when one wavy line is α the other is β.

**4,792,618**  
**FLUORINATED CARBOXYLIC COMPOUNDS**  
Joseph F. Bieron, Tonawanda, and David Y. Tang, E. Amherst, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.  
Continuation-in-part of Ser. No. 604,272, May 2, 1984, Pat. No. 4,517,372. This application Dec. 12, 1984, Ser. No. 680,695  
Int. Cl.<sup>4</sup> C07C 69/75, 49/303, 121/46, 53/44  
U.S. Cl. 560-127  
11 Claims  
1. A gem-dihalocyclohexane compound of the formula

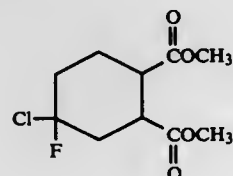


wherein X is chlorine or fluorine and R<sub>1</sub> and R<sub>2</sub> are independently selected from the group consisting of —H, —CH<sub>2</sub>OH, —COF, —COCl, —CF<sub>3</sub>, —CN,



and —CH<sub>2</sub>CH<sub>2</sub>R, wherein R is —H or alkyl of 1-4 carbon atoms; with the proviso that at least one of R<sub>1</sub> and R<sub>2</sub> is other than —H.

8. A compound of the formula



**4,792,619**  
**PROCESS FOR PRINTING OR DYEING CELLULOSE-CONTAINING TEXTILE MATERIAL: NOVEL QUATERNARY AMMONIUM SALT FROM SULPHO-SUCCINIC ACID MIXED DI-ESTER FOR DYE FOAM STABILITY**  
Hans-Ulrich Berendt, Allschwil, and Martin Kuhn, Dornach, both of Switzerland, assignors to Ciba-Gelby Corporation, Ardsley, N.Y.  
Division of Ser. No. 46,971, May 6, 1987, Pat. No. 4,741,739. This application Feb. 22, 1988, Ser. No. 158,974  
Claims priority, application Switzerland, May 16, 1986, 1989/86  
Int. Cl.<sup>4</sup> C07C 149/20, 143/90; C11D 1/28  
U.S. Cl. 560-151  
6 Claims  
1. A quaternary ammonium salt which is obtainable by condensation of  
(A) a sulfonated asymmetric succinic acid diester which has as ester groups a halohydrin group and an etherified polyalkylene glycol group, with  
(B) a tertiary amine-substituted N-alkylamide of ethylenically unsaturated aliphatic monocarboxylic or dicarboxylic acid.

**4,792,620**  
**CARBONYLATION CATALYSTS**  
Frank E. Paulik, St. Louis; Arnold Hershman, Frontenac; Walter R. Knox, Town & Country, all of Mo., and James F. Roth, Allentown, Pa., assignors to BP Chemicals Limited, London, England  
Division of Ser. No. 541,845, Oct. 14, 1983, Pat. No. 4,690,912, which is a continuation-in-part of Ser. No. 248,777, Mar. 30, 1981, which is a continuation-in-part of Ser. No. 824,577, Aug. 15, 1977, abandoned, which is a continuation of Ser. No. 391,103, No. 2,413, Mar. 12, 1970, Pat. No. 3,769,329, which is a continuation-in-part of Ser. No. 701,637, Jan. 30, 1968, abandoned, which is a continuation-in-part of Ser. No. 628,581, Apr. 5, 1967, abandoned, said Ser. No. 391,103, is a continuation-in-part of Ser. No. 263,332, Jun. 15, 1972, Pat. No. 3,813,428, which is a continuation of Ser. No. 752,794, Aug. 15, 1968, abandoned, which is a continuation-in-part of Ser. No. 628,581, Apr. 5, 1967, abandoned, said Ser. No. 391,103, is a continuation-in-part of Ser. No. 128,519, Mar. 26, 1971, Pat. No. 3,769,326, which is a continuation of Ser. No. 2,377, Jan. 12, 1970, abandoned, which is a continuation-in-part of Ser. No. 628,581, Apr. 5, 1967, abandoned. This application Mar. 3, 1987, Ser. No. 21,384  
The portion of the term of this patent subsequent to Oct. 30, 1990, has been disclaimed.  
Int. Cl.<sup>4</sup> C07C 67/36, 51/10

U.S. Cl. 560-232  
3 Claims  
1. A process for the carbonylation of a reactant selected from the group consisting of alkyl esters and ethers, by reacting the same with carbon monoxide, which comprises effecting said carbonylation in the presence of a solution containing a rhodium compound and a promoter substance selected from the group consisting of iodine and an iodine compound at a temperature of from 50° C. to 400° C. at a carbon monoxide partial pressure of 1 psig to 15,000 psig.

**4,792,621**  
**METHOD FOR CONTINUOUS PRODUCTION OF AROMATIC CARBOXYLIC ACID**  
Kenneth J. Abrams, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.  
Filed Jul. 28, 1986, Ser. No. 890,128  
Int. Cl.<sup>4</sup> C07C 51/265

U.S. Cl. 562-414  
4 Claims  
1. In a method for the continuous production of an aromatic carboxylic acid product in a pressurized oxidation reactor by liquid-phase, exothermic oxidation of an aromatic alkyl feed with an oxygen-containing gas, in the presence of an oxidation catalyst and in an aqueous monocarboxylic C<sub>2</sub> to C<sub>6</sub> aliphatic acid solvent medium, wherein the heat generated during the course of the oxidation is removed from the reactor by vaporization of a portion of the reaction medium and water, wherein the resulting vapors are condensed in part in a reflux loop externally of the oxidation reactor to produce a condensate and a gaseous phase, and wherein at least a portion of the condensate is returned to the oxidation reactor, the improvement comprising a method for controlling within desired limits the concentration of water in the oxidation reactor, which comprises:

partitioning the vapors into a parallel condensate having a relatively lesser water-to-solvent weight ratio and a vapor phase having a relatively greater water-to-solvent weight ratio;  
returning the partial condensate directly to the oxidation reactor as a direct reflux stream;  
withdrawing the vapor phase from the reflux loop as a vapor stream;  
subjecting the withdrawn vapor stream to heat exchange while decreasing the vapor stream pressure to less than the oxidation reactor pressure to thereby produce an aqueous aliphatic acid stream having a water-to-solvent

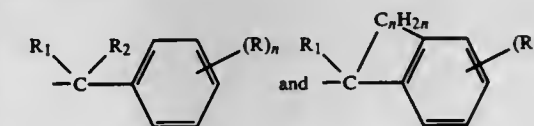
weight ratio greater than that of the direct reflux stream; and  
combining a predetermined portion of the aqueous aliphatic acid stream with the aromatic alkyl feed upstream of the oxidation reactor as an indirect recycle stream, the predetermined portion being sufficient to thereby control the concentration of water in the oxidation reactor within the aforesaid desired limits therefor.

**4,792,622**  
**PROCESS FOR PREPARATION OF SECONDARY AMINE**  
Yukinaga Yokota, Osaka; Yuzi Sawamoto, Wakayama; Hideki Taniguchi, Wakayama, and Kazuhiko Okabe, Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan  
Filed Nov. 21, 1986, Ser. No. 934,230  
Claims priority, application Japan, Dec. 25, 1985, 60-296112  
The portion of the term of this patent subsequent to Nov. 25, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> C07C 85/08, 85/06

U.S. Cl. 564-398  
9 Claims  
1. A process for preparing a secondary amine, which comprises the steps of reacting an alcohol or an aldehyde with a primary amine in the presence of a catalyst of copper, nickel and a metal element selected from the group consisting of platinum, palladium, ruthenium and rhodium, at a pressure of from atmospheric pressure to 5 kg/cm<sup>2</sup>G and at a temperature of from 50° to 250° C.; removing water produced in the reaction; and separating the secondary amine from a product mixture.

**4,792,623**  
**META-PHENYLENE DIAMINES**  
Kwok K. Sun, North Haven, Conn., assignor to The Dow Chemical Company, Midland, Mich.  
Continuation-in-part of Ser. No. 332,534, Dec. 21, 1981, abandoned. This application Sep. 27, 1982, Ser. No. 424,347  
Int. Cl.<sup>4</sup> C07C 87/50, 87/64

U.S. Cl. 564-315  
12 Claims  
1. A m-phenylenediamine having (a) at least one, and not more than two, of the positions ortho to the amino groups substituted by a member selected from benzyl groups having the formulae:



wherein R<sub>1</sub> is selected from the class consisting of hydrogen and lower alkyl, R<sub>2</sub> is lower alkyl, C<sub>n</sub>H<sub>2n</sub> is alkylene having from 2 to 5 carbon atoms in the chain, R is an inert substituent selected from the group consisting of alkyl, aralkyl, aryl, cycloalkyl, halogen, nitro, alkoxy, alkylmercapto, and cyano, n is an integer from 0 to 5, and m is an integer from 0 to 4; and (b) a member selected from the group consisting of hydrogen and lower alkyl attached to the nuclear carbon atoms ortho to the amino groups which do not carry one of said benzyl groups.

**4,792,624**  
**PROCESS FOR POLYMERIC MDA, RECYCLE OF FINISHED POLYMERIC MDA**  
Richard Hatfield, Jr., Pasadena; Howard R. Steele, Baytown, and Nirad N. Shah, Houston, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.  
Filed Feb. 26, 1987, Ser. No. 19,168  
Int. Cl.<sup>4</sup> C07C 85/24

U.S. Cl. 564-333  
10 Claims  
1. In a process for the preparation of a polyamine mixture comprising di(aminophenyl)methane and oligomeric poly-

methylene polyphenyl polyamines by the acid catalyzed reaction of aniline with formaldehyde to sequentially form a mixture comprising aminobenzylamines which latter subsequently rearrange with heat to form a reaction product comprising said polyamine mixture, the improvement which comprises adding an aniline free mixture of di(aminophenyl) methanes and oligomeric polymethylene polyphenyl polyamines to said sequentially formed aminobenzylamine mixture comprising at least 40 percent by weight of said aminobenzylamines prior to their said rearrangement to said polyamine mixture.

8. A continuous process for the preparation of a polyamine mixture comprising di(aminophenyl)methanes and oligomeric polymethylene polyphenyl polyamines which process comprises the steps of:

- intimately intermixing at a temperature of about 0° C. to about 55° C., rapidly flowing streams of aqueous aniline hydrochloride and aqueous formaldehyde in the proportions of about 1.6 to about 8 moles of aniline per mole of formaldehyde, at the entry port of a continuous tubular reactor to form initially a mixture comprising aminobenzylamines;
- continuously passing said mixture from (a) through an intermediate cooling reaction zone wherein said aminobenzylamines can increase to at least about 40 percent by weight;
- continuously removing reaction mixture from said cooling zone at a rate corresponding to that at which reaction mixture is fed to said cooling zone;
- continuously passing said mixture from (c) through a rearrangement zone at a temperature of from about 60° C. to about 200° C. thereby forming said polyamine mixture;
- continuously removing said polyamine mixture from (d) at a rate corresponding to that at which the reaction mixture was fed into said rearrangement zone;
- continuously passing said mixture from (e) to a neutralizing zone causing said hydrochloric acid component to be neutralized followed by distilling aniline and water from said polyamine mixture to produce an essentially aniline free polyamine mixture comprising said di(aminophenyl)methane and said oligomeric polymethylene polyphenyl polyamines;
- continuously removing said polyamine mixture from step (f) at a rate to correspond with that at which the reaction mixture was fed into said neutralizing and distilling zones;
- passing a major portion of said polyamine mixture product to storage while recycling a minor proportion to a subsequent step (b) described above in such proportions that said recycle polyamine comprises from about 1 to about 40 percent by weight based on the combined initial weights of aniline, aniline hydrochloride and formaldehyde; and
- repeating steps (a) to (h) so as to continually pass said major proportion of polyamine mixture to storage while recycling the minor proportion back to step (b).

4,792,625

**PROCESS FOR THE REDUCTION OF ORGANIC COMPOUNDS USING ALKALI FORMATE SALTS**  
Harold Wiener, Jerusalem; Shmuel Vandel, Rishon LeZion, and Yoel Samson, Jerusalem, all of Israel, assignors to Yissum Research Development Company, Jerusalem, Israel  
Filed Jul. 9, 1987, Ser. No. 71,643  
Claims priority, application Israel, Jul. 31, 1986, 79573  
Int. Cl. C07C 5/02, 85/11

U.S. Cl. 564—416 10 Claims

1. A three phase method for reducing water insoluble organic compounds containing reducible nitro groups or reducible carbon-carbon unsaturated bonds comprising contacting an organic phase containing said water insoluble organic compounds which are to be reduced with an aqueous solution of a potassium formic acid salt which serves as hydrogen donor in the presence of a solid heterogeneous palladium on carbon hydrogenation catalyst and in the absolute absence of a phase transfer catalyst or any surface active agent, wherein the water

to formate molar ratio is about 0.5:1 to about 3:1 and the pH is greater than 7.

4,792,626

**PRODUCTION OF AROMATIC DIAMINO COMPOUNDS USING A MODIFIED RANEY CATALYST**

Dieter Becher, Dormagen; Udo Birkenstock, Ratingen; Eckart Waldau, Düsseldorf, and Harro Witt, Kuden, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany  
Filed Oct. 10, 1986, Ser. No. 917,449  
Claims priority, application Fed. Rep. of Germany, Oct. 19, 1985, 3537247

U.S. Cl. 564—422 4 Claims

1. A process for the production of aromatic diamines in which an aromatic dinitro compound is hydrogenated in the presence of a modified Raney catalyst which modified Raney catalyst is the product of an alloy treated with an alkali material which alloy is made up of

- 50-95 wt % aluminum,
- 4-45 wt % nickel and/or cobalt and
- 1-46 wt % of at least one modifying metal selected from the first, fourth, fifth, sixth, seventh and eighth subgroups of the Periodic Table of Elements

with the percentages totalling 100 wt % in which the hydrogenation is carried out at a temperature of from 170° to 250° C. and pressure of from 15 to 50 bar in the absence of an auxiliary solvent.

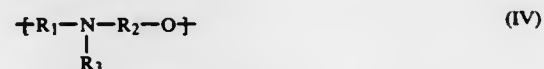
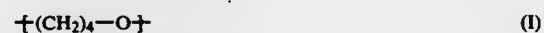
4,792,627

**PROCESS FOR PRODUCING POLYETHER POLYOL AND A PRODUCT**

Atsushi Aoshima, Yokohama; Sholchiro Tomomura, Fuji; Hiroyuki Fukui, Fuji, and Hisaya Imai, Fuji, all of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan  
Continuation of Ser. No. 716,656, Mar. 27, 1985. This application Dec. 22, 1986, Ser. No. 944,354  
Claims priority, application Japan, Mar. 28, 1984, 59-58485; Nov. 16, 1984, 59-240481; Nov. 21, 1984, 59-244340; Nov. 21, 1984, 59-244345; Mar. 8, 1985, 60-44679  
Int. Cl. C07C 85/24, 87/20

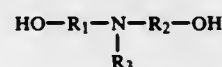
U.S. Cl. 564—487 7 Claims

1. A polyether glycol comprising the constituent unit represented by the formula (I) shown below copolymerized randomly with the constituent unit (IV) shown below, with a molar ratio of the unit (I) to the unit (IV) being 99:1 to 5:1, having an average molecular weight of 500 to 10,000, with the molecule being terminated at both ends with hydroxyl groups:



wherein R<sub>1</sub> and R<sub>2</sub> are selected from the group consisting of —(CH<sub>2</sub>)<sub>n</sub>— (wherein n is an integer of 2 to 4), —CH(CH<sub>3</sub>)C—H<sub>2</sub>— and —CH<sub>2</sub>CH<sub>2</sub>—O—CH<sub>2</sub>—CH<sub>2</sub>—, and R<sub>3</sub> is selected from the group consisting of a hydrogen atom, alkyl groups having 1 to 4 carbon atoms and —(CH<sub>2</sub>)<sub>2</sub>—OH.

2. A process for producing a nitrogen containing polyether polyol which comprises copolymerizing tetrahydrofuran with a polyhydric alcohol having the structural formula



wherein R<sub>1</sub> and R<sub>2</sub> are selected from the group consisting of —(CH<sub>2</sub>)<sub>n</sub>— (wherein n is an integer of 2 to 4), —CH(CH<sub>3</sub>)C—H<sub>2</sub>— and —CH<sub>2</sub>CH<sub>2</sub>—O—CH<sub>2</sub>—CH<sub>2</sub>—, and R<sub>3</sub> is selected from the group consisting of a hydrogen atom, alkyl groups having 1 to 4 carbon atoms, and —(CH<sub>2</sub>)<sub>2</sub>—OH, with the use of a heteropoly-acid and/or its salt as a catalyst, the amount of said polyhydric alcohol being less than 4-fold moles of the heteropoly-anion, and allowing 0.1 to 15 molecules of water per one heteropoly-anion to exist in the catalyst phase.

4,792,628

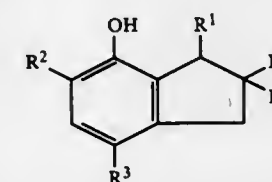
**INDANE DERIVATIVES AND SALTS THEREOF**

Yasuo Oshiro, Hiraki Ueda, and Kazuyuki Nakagawa, all of Tokushima, Japan, assignors to Otsuka Pharmaceutical Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 585,607, Mar. 2, 1984, abandoned. This application Apr. 16, 1987, Ser. No. 39,779

Claims priority, application Japan, Mar. 4, 1983, 58-36429; Oct. 11, 1983, 58-190269; Dec. 29, 1983, 58-245875  
Int. Cl. C07C 87/457

U.S. Cl. 564—428 35 Claims

1. Indane derivatives and their salts represented by the general formula (I),



wherein R<sup>1</sup> is an amino group which may have lower alkyl groups as the substituents, a hydroxylimino group, an alkanoylamino group having 1 to 10 carbon atoms which may have halogen atoms as the substituents, a lower alkylsulfonylamino group, a phenylsulfonylamino group which may have lower alkyl groups as the substituents on the phenyl ring, a benzoylamino group having lower alkyl groups as the substituents on the phenyl ring, or a phenyl-lower alkylamino group having hydroxyl groups or lower alkyl groups as the substituents on the phenyl ring; R<sup>2</sup> is a hydrogen atom, a lower alkyl group, a halogen atom, a nitro group, an amino group, an amino-lower alkyl group, a lower alkanoylamino group, a lower alkanoylamino-lower alkyl group which may have halogen atoms as the substituents, a lower alkylthio group, a 1-piperidinesulfonyl group, or a lower alkenyl group; R<sup>3</sup> is a hydrogen atom, a lower alkyl group, or a halogen atom; R<sup>4</sup> and R<sup>5</sup> are the same or different from each other, and are each a hydrogen atom, or a lower alkyl group; provided that when R<sup>1</sup> is a hydroxylimino group, then both R<sup>2</sup> and R<sup>3</sup> should not be hydrogen atoms at the same time.

4,792,629

**ALKYLATION OF AMINE COMPOUNDS**

Kuo-Hua Chao, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.  
Filed Feb. 24, 1987, Ser. No. 17,501  
Int. Cl. C07C 85/00

U.S. Cl. 564—463 17 Claims

1. A process for the liquid phase oligomerization of alkylamines to produce longer carbon chain alkylamines which process comprises contacting said alkylamines at oligomerization reaction conditions with a catalyst mixture comprising a first component selected from a ruthenium carbonyl, a ruthenium-compound capable of being converted to a carbonyl under oligomerization conditions and mixtures thereof and a second compound having the general formula (cyclopentadienyl)<sub>n</sub>MY<sub>4-n</sub> wherein M is zirconium, hafnium or titanium, Y is individually selected from the group consisting of hydrogen, C<sub>1</sub>-C<sub>5</sub> alkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>1</sub>-C<sub>25</sub> metaloalkyl and halogen, n

4,792,630

**PROCESS FOR PREPARING AMINOACETALDEHYDE DIALKYL ACETALS**

Akira Taisha; Takeo Kawabata, both of Osaka; Takehiko Kakimoto, and Kazumasa Hirata, both of Gifu, all of Japan, assignors to Nippon Gosei Kagaku Kogyo Kabushiki Kaisha, Japan  
Filed Feb. 13, 1987, Ser. No. 14,666  
Claims priority, application Japan, Feb. 13, 1986, 61-30158  
Int. Cl. C07C 85/04

U.S. Cl. 564—474 6 Claims

1. Process for preparing an aminoacetaldehyde dialkyl acetal, which comprises reacting a halogenoacetaldehyde dialkyl acetal with ammonia or an alkylamine in an aqueous medium in the simultaneous presence, from the start of the reaction, of a hydroxide of an alkali metal or of an alkaline earth metal, distilling the resulting reaction mixture to recover the thereby produced aminoacetaldehyde dialkyl acetal in the form of an aqueous solution as distilled product, and purifying the recovered distilled product acetal aqueous solution by adding thereto an organic solvent having a boiling point of about 60° to 150° C. and selected from the group consisting of aliphatic hydrocarbons, alicyclic hydrocarbons, aromatic hydrocarbons and hydrocarbon halides, as azeotropic removal solvent, and azeotropically removing the attendant water from the resulting mixture in the presence of said azeotropic removal solvent to provide such purified acetal product substantially free of attendant water and of such removal solvent.

4,792,631

**PREPARATION OF DI-TERT-BUTYLETHYLENEDIAMINE**

Herbert Mueller, Frankenthal, and Walter Mesch, Ludwigshafen, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Filed Jan. 28, 1987, Ser. No. 7,787  
Claims priority, application Fed. Rep. of Germany, Jan. 29, 1986, 3602527

U.S. Cl. 564—489 14 Claims

1. A process for preparing di-tert-butylethylenediamine by reacting tert-butylamine with glyoxal to form di-tert-butylglyoxaldimine and water and subsequently hydrogenating the diimine, which comprises

- carrying out the reaction of tert-butylamine with glyoxal in the presence of a hydrocarbon phase,
- separating the hydrocarbon with the reaction product from water, and
- catalytically hydrogenating the reaction product at a temperature of from 50°-150° C. in the hydrocarbon phase.

4,792,632

**BISACYLPHOSPHINE OXIDES, THE PREPARATION AND USE THEREOF**

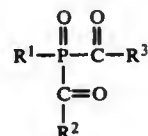
Klaus Ellrich, Munich, and Christian Herzig, Seefeld, both of Fed. Rep. of Germany, assignors to ESPE Fabrik Pharmazeutischer Präparate GmbH, Oberbayern, Fed. Rep. of Germany  
Division of Ser. No. 801,339, Nov. 25, 1985, Pat. No. 4,737,593.  
This application Nov. 17, 1987, Ser. No. 121,803  
Claims priority, application Fed. Rep. of Germany, Nov. 27, 1984, 34432213

U.S. Cl. 568—15 10 Claims

1. A method of polymerizing a photopolymerizable compo-

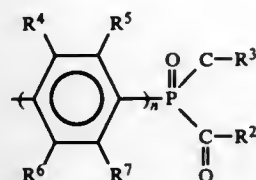


sition comprising adding a bisacylphosphine oxide having the formula



wherein

R<sup>1</sup> stands for a straight-chain or branched C<sub>1-18</sub> alkyl radical, a cyclohexyl, cyclopentyl, phenyl, naphthyl, or biphenyl radical, a cyclopentyl, cyclohexyl, phenyl, naphthyl or biphenyl radical substituted by F, Cl, Br, I, C<sub>1-12</sub> alkyl and/or C<sub>1-12</sub> alkoxy, an S or N-containing 5-membered or 6-membered heterocyclic ring, or a radical of the formula:



wherein

n is 1 or 2, and

R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup> and R<sup>7</sup> are H, C<sub>1-4</sub> alkyl, C<sub>1-4</sub> alkoxy, F, Cl or Br;

R<sup>2</sup> and R<sup>3</sup>, which are the same or different, stand for a cyclohexyl, cyclopentyl, phenyl, naphthyl, or biphenyl radical

a cyclopentyl, cyclohexyl, phenyl, naphthyl or biphenyl radical substituted by F, Cl, Br, I, C<sub>1-4</sub> alkyl and/or C<sub>1-4</sub> alkoxy, or

an S or N-containing 5-membered or 6-membered heterocyclic ring; or

R<sup>2</sup> and R<sup>3</sup> are joined to form a ring containing 4 to 10 carbon atoms and being optionally substituted by 1 to 6 C<sub>1-4</sub> alkyl radicals as a photoinitiator to a photopolymerizable composition and exposing the thus obtained mixture to light.

4,792,633

#### PREPARATION OF ORTHO-(ALKYL- OR ARYLTHIO)PHENOLS

Paul W. Wojtkowski, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

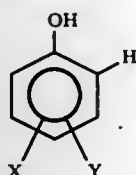
Filed May 19, 1986, Ser. No. 864,226

Int. Cl.<sup>4</sup> C07C 148/02

U.S. Cl. 568—46

17 Claims

1. A process for the preparation of ortho(alkylthio- or arylthio)phenols wherein the alkylthio- and arylthio- moieties are of the formula RS- which comprises reacting a corresponding phenol having the formula



wherein

X and Y are independently selected from the group consisting of H, OH, C<sub>1-6</sub> alkyl, OR<sub>1</sub>, Cl, F, I, Br, aryl or aryl substituted with C<sub>1-6</sub> alkyl, OR<sub>1</sub>, Cl, F, I or Br, or when

X and Y are on adjacent carbon atoms, they may be taken together to form CH=CH-CH=CH; and

R<sub>1</sub> is C<sub>1-6</sub> alkyl or phenyl;

provided that X and Y cannot simultaneously be OH, and when X or Y is OH and the other is hydrogen, the OH cannot be in the para position;

with a compound selected from the group consisting of alkyl or aryl disulfides having the formula (RS)<sub>2</sub>

wherein R is C<sub>1-6</sub> alkyl or aryl wherein aryl is unsubstituted or substituted with one or more substituents selected from the group consisting of C<sub>1-6</sub> alkyl, Cl, F, I, Br, OR<sub>1</sub>, aryl where R<sub>1</sub> is C<sub>1-6</sub> alkyl or phenyl

provided that when R is C<sub>4-6</sub> alkyl, the carbon bonded to the heteroatom must be substituted by one or two hydrogen atoms; or (alkylthio- or arylthio)phenols, or mixtures of the foregoing wherein the alkylthio- and arylthio- moieties are of the formula RS- and the phenol moieties correspond to Formula I above in the presence of an aluminosilicate having catalytically active acidic sites.

4,792,634

#### PROCESS FOR THE PREPARATION OF ARYL SULFIDES

Mark Rule, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 20, 1987, Ser. No. 87,332

Int. Cl.<sup>4</sup> C07C 148/00

U.S. Cl. 568—58

11 Claims

1. A method for preparing aromatic sulfides, consisting essentially of: reacting a mixture of an iodoaromatic compound, said compound having a single iodine ring substituent and elemental sulfur at a temperature above about 150° C.

4,792,635

#### SYMMETRIC BENZOPHENONES SUBSTITUTED BY GROUPS CONTAINING FLUORINE

Albrecht Marhold, Leverkusen; Erich Klauke, Odenthal, and Ernst Kysela, Bergisch-Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 19, 1985, Ser. No. 713,513

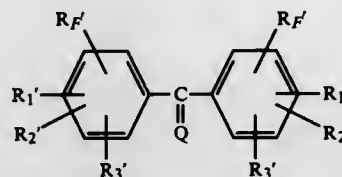
Claims priority, application Fed. Rep. of Germany, Mar. 28, 1984, 3411326

Int. Cl.<sup>4</sup> C07C 49/80

U.S. Cl. 568—332

2 Claims

1. A symmetric benzophenone substituted by a fluorine containing group of the formula



in which R' represents CF<sub>3</sub> in the 3- and 3'-position, R<sub>1</sub>' represents hydrogen, R<sub>2</sub>' represents hydrogen, and R<sub>3</sub>' represents halogen.

4,792,636

#### PROCESS OF RECOVERING ALDEHYDES

John R. Hensman, Letchworth; Andrew J. Roberts, Milton Keynes, and George E. Harrison, Billericay, all of England, assignors to Davy McKee (London) Limited, London, England

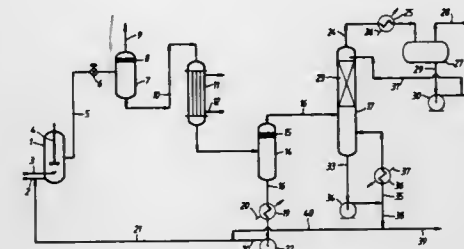
Filed Jun. 30, 1987, Ser. No. 68,172

Claims priority, application United Kingdom, Jul. 1, 1986, 8616037

Int. Cl.<sup>4</sup> C07C 45/78

U.S. Cl. 568—492

14 Claims



1. A process for the recovery of a C<sub>7</sub> to C<sub>17</sub> aldehyde, optionally substituted with one or more ether or ester groups, from an organic liquid hydroformylation product medium obtained by rhodium catalysed homogeneous liquid phase hydroformylation of a C<sub>6</sub> to C<sub>16</sub> olefin optionally substituted with one or more ether or ester groups which liquid medium contains (i) a rhodium complex hydroformylation catalyst containing rhodium in complex combination with carbon monoxide and with a ligand, (ii) excess ligand, (iii) at least one C<sub>7</sub> to C<sub>17</sub> aldehyde optionally substituted with one or more ether or ester group and (iv) aldehyde condensation products in addition to dissolved carbon monoxide and hydrogen, which process comprises:

- degassing said liquid hydroformylation medium to produce a degassed liquid hydroformylation medium that is substantially free from dissolved carbon monoxide;
- passing the degassed liquid hydroformylation medium through an evaporation zone maintained under temperature and pressure conditions conducive to evaporation of said at least one C<sub>7</sub> to C<sub>17</sub> aldehyde thereby to effect evaporation of said at least one C<sub>7</sub> to C<sub>17</sub> aldehyde substantially in the absence of carbon monoxide;
- recovering from the evaporation zone a liquid catalyst-containing stream;
- cooling the catalyst-containing stream exiting the evaporation zone;
- recovering a vaporous stream from the vaporization zone containing (i) at least one C<sub>7</sub> to C<sub>17</sub> aldehyde optionally substituted with one or more ether or ester groups, (ii) ligand and (iii) a minor amount of said aldehyde condensation products;
- passing said vaporous stream to a fractionation zone thereby to effect fractionation of the vaporous stream substantially in the absence of carbon monoxide;
- recovering from said fractionation zone (i) a vaporous product stream containing said at least one C<sub>7</sub> to C<sub>17</sub> aldehyde, and (ii) a liquid bottom stream containing said ligand and aldehyde condensation products; and
- recycling said cooled catalyst-containing stream of step (d) and at least a part of the material of said liquid bottom stream of step (g) to said hydroformylation zone.

4,792,637

#### PROCESS FOR THE PREPARATION OF VINYL ETHERS

Giuseppe Messina, Alghero; Mario D. Moretti, Sassari; Salvatore R. Sanna, Sorso; Giovanni Soma, and Pier G. Cabras, both of Sassari, all of Italy, assignors to Enichem Anic SpA, Palermo, Italy

Filed Jul. 17, 1987, Ser. No. 74,560

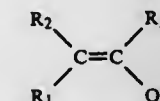
Claims priority, application Italy, Jul. 30, 1986, 21313 A/86; Dec. 18, 1986, 22745 A/86

Int. Cl.<sup>4</sup> C07C 41/01, 41/28

U.S. Cl. 568—626

14 Claims

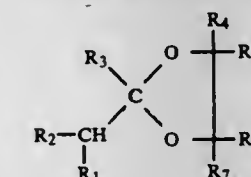
1. A process for preparing a vinyl ether of general formula I



wherein

R<sub>1</sub> and R<sub>2</sub> are selected from the group consisting of hydrogen or a primary, secondary or tertiary alkyl group, R<sub>3</sub> is selected from the group consisting of hydrogen, a primary alkyl, phenyl, or phenyl substituted with up to 3 substituents, which may be the same or different, and which are inert toward boric acid esters and permit vaporization of the dioxolane compounds of formula II at a temperature below 400° C., or R<sub>2</sub> and R<sub>3</sub>, taken together, represent a polymethylene chain containing from 3 to 10 carbon atoms wherein one or more hydrogen atoms may be replaced by methyl or ethyl groups, and

R is selected from the group consisting of a primary, secondary or tertiary alkyl group, said process comprising reacting a dioxolane compound of formula II



wherein R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are as defined above, and R<sub>4</sub>, R<sub>5</sub>, R<sub>6</sub> and R<sub>7</sub>, each independently, are selected from the group consisting of hydrogen or an alkyl group, with a boric acid ester of formula III



wherein R is as defined above, in the vapor phase, at a temperature of between 100° and 400° C., and in the presence of a catalyst consisting of acidic oxides.

4,792,638

#### ISOLATION PROCESS OF 2-CHLOROETHYL VINYL ETHER

Tsuyoshi Matsumoto; Toshiyuki Fukudome, and Masaaki Tachida, all of Ichihara, Japan, assignors to Nisso Maruzen Chemical Co., Ltd., Tokyo, Japan

Filed Mar. 23, 1988, Ser. No. 173,737

Claims priority, application Japan, Apr. 3, 1987, 62-82600

Int. Cl.<sup>4</sup> C07C 41/34, 41/28

U.S. Cl. 568—682

1 Claim

1. An isolation process of 2-chloroethyl vinyl ether having a high purity from the thermal decomposition mixture of 1,1-di(2-chloroethoxy)ethane, which comprises the following procedures:

- separating the fraction consisting mainly of 2-chloroethyl vinyl ether and partially of 2-chloroethanol from the said thermal decomposition mixture;
- acidifying the said fraction, then without separating the

above two compounds, reacting the said 2-chloroethanol with a part of the 2-chloroethyl vinyl ether at a temperature below 100° C. to 1,1-di(2-chloroethoxy)ethane, and making the said fraction consist of 2-chloroethyl vinyl ether and 1,1-di(2-chloroethoxy)ethane;  
(3) isolating 2-chloroethyl vinyl ether from 1,1-di(2-chloroethoxy)ethane by rectification.

4,792,639

# PROCESS FOR THE PRODUCTION OF METHYL ETHERS FROM BRANCHED MONOOLEFINS

Divakaran Maslamani, Morristown; George S. Hammond, Madison, and Andriappan K. S. Murthy, Lake Hiawatha, all of N.J., assignors to Allied-Signal, Inc., Morris Township, N.J. Division of Ser. No. 781,163, Sep. 30, 1985, Pat. No. 4,709,101. This application Aug. 27, 1987, Ser. No. 90,175

The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> C07C 41/06

U.S. Cl. 568—697

13 Claims

1. In an improved process for the production of methyl ethers of the type in which methanol is reacted with a branched monoolefin in the presence of a catalytically effective amount of an effective acid catalyst, the improvement comprising:

- reacting said methanol with said branched monoolefin in the presence of a polymerization inhibiting amount of one or more diols to form a mixture comprising the methyl ether; and
- separating said methyl ether from said diols by nonazeotropic distillation to provide methyl ether substantially free of said diols.

4,792,640

# HYDROCARBYLOXY MAGNESIUM HALIDES

Vijay C. Mehta, Gastonia, N.C., assignor to Lithium Corporation of America, Gastonia, N.C.

Continuation-in-part of Ser. No. 853,496, Apr. 18, 1986. This application Mar. 13, 1987, Ser. No. 25,416

Int. Cl.<sup>4</sup> C07C 31/30

U.S. Cl. 568—851

24 Claims

1. A process for making solid organometallic hydrocarbyloxymagnesium halides comprising:

- reacting activated magnesium metal with an alkyl halide of the formula R'X, in which R' is a radical containing 1 to 20 carbon atoms, in a dry inert hydrocarbon medium, under a dry inert atmosphere at a temperature of at least 40° C. to produce a compound of the formula R'MgX in which R' and X have the meanings ascribed to them herein; and
- reacting the R'MgX compound with at least one mole of a monohydric alcohol of the general formula ROH wherein R is an alkyl, aryl, cycloalkyl or alkylaryl group containing 1 to 18 carbon atoms per mole of magnesium metal at a temperature of at least 40° C. to produce an ether free compound ROMgX in which R is an alkyl group of 1 to 18 carbon atoms.

4,792,641

# PROCESS FOR PREPARING IODINATED AROMATIC COMPOUNDS

Mark Rule; Donald W. Lane; Thomas H. Larkins, and Gerald C. Tustin, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 25, 1987, Ser. No. 29,899

Int. Cl.<sup>4</sup> C07C 17/12, 17/24

U.S. Cl. 570—202

13 Claims

1. A process for isomerizing or transiodinating a mono-, di-, or tri-iodoaromatic compound selected from the group consisting of benzene, biphenyl, naphthalene, anthracene, thiophene, benzothiophene, pyridine and benzopyridine, comprising contacting said iodoaromatic compound with a non-acid zeolite

catalyst, wherein the iodine present in said iodoaromatic compound is redistributed among the molecules of said iodoaromatic compound to form an isomerized or transiodinated product.

4,792,642

# PROCESS FOR PREPARING IODINATED AROMATIC COMPOUNDS

Mark Rule; Gerald C. Tustin; Donald L. Carver, and Jerry S. Fanver, all of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 25, 1987, Ser. No. 29,898

Int. Cl.<sup>4</sup> C07C 17/15, 21/24

U.S. Cl. 570—203

14 Claims

1. A process for mono- or di-iodinating an aromatic compound selected from the group consisting of biphenyl, naphthalene, anthracene, thiophene, benzothiophene, pyridine and benzopyridine which comprises reacting an iodine source with said aromatic compound in the presence of oxygen over a non-acid zeolite catalyst at a temperature from about 100° C. to about 500° C. wherein said non-acid zeolite catalyst contains an effective amount of an oxidation catalyst comprising at least one member selected from the group consisting of manganese, iron, copper, chromium, vanadium, molybdenum, arsenic, antimony, cobalt and boron in the oxide, salt or acid form.

4,792,643

# CATALYST AND PROCESS FOR 1,1,1,2-TETRAFLUOROETHANE BY VAPOR PHASE REACTION

Igor Sobolev, Orinda, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

Filed Jun. 16, 1987, Ser. No. 62,655

Int. Cl.<sup>4</sup> C07C 17/20, 17/04, 17/00, 19/02

U.S. Cl. 570—168

24 Claims

1. A process for the manufacture of 1,1,1,2-tetrafluoroethane which comprises:

- contacting a haloethylene of the formula CX<sub>2</sub>=CHX in which the X's are chlorine or bromine or a combination thereof, with hydrogen fluoride in a vapor phase reaction at elevated temperature in the presence of a catalyst prepared by:
  - codepositing hexavalent chromium oxide and a compound of a transition metal selected from the group consisting of titanium, zirconium, vanadium, molybdenum and manganese on alumina; and
  - contacting the product of step (i) with hydrogen fluoride to fluorinate at least a substantial portion thereof; to form a product mixture; and
- recovering from said product mixture 1,1,1,2-tetrafluoroethane.

4,792,644

# PREPARATION OF HALOGENATED BENZENE DERIVATIVES

Toshio Hironaka; Kazuhiko Sekizawa, and Yukihiko Tsutsumi, all of Yamaguchi, Japan, assignors to Tosoh Corporation, Yamaguchi, Japan

Filed Jun. 18, 1987, Ser. No. 63,385

Claims priority, application Japan, Jun. 18, 1986, 61-140140

Int. Cl.<sup>4</sup> C07C 17/10, 25/00

U.S. Cl. 570—208

13 Claims

1. A process for preparing para-substituted halogenated benzene derivatives comprising subjecting a benzene derivative to halogenation by reacting the benzene derivative with elementary halogen in the liquid phase in the presence of a catalyst comprising a zeolite possessing the main pores which have the opening formed of a 12-membered oxygen ring; wherein at least one quaternary ammonium salt is present in the reaction system.

## ELECTRICAL

4,792,645

# PROCESS FOR PRODUCING ELECTROCONDUCTIVE FIBROUS SHAPED-ARTICLES

Yukimichi Nakao, Yatabe; Kyoji Kaeriyama, Tsuchiura; Yoshio Suda, Hachioji; Tomoyuki Imai, Yatabe; Osamu Oze, Kure, and Nanao Horishiki, Hiroshima, all of Japan, assignors to The Agency of Industrial Science & Technology and Toda Kogy Corp., both of Tokyo, Japan

Filed Aug. 28, 1985, Ser. No. 770,095

Claims priority, application Japan, Sep. 3, 1984, 59-184069; Mar. 6, 1985, 60-44019; Mar. 6, 1985, 60-44020

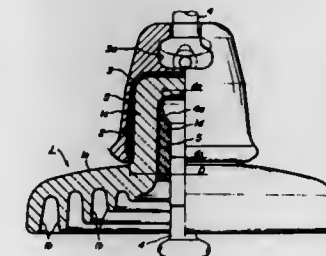
Int. Cl.<sup>4</sup> B32B 15/14; C23C 28/02; D06M 11/18; D21H 1/20; H01B 5/14

U.S. Cl. 174—126.4

28 Claims

15. Electroconductive fibrous shaped-article prepared by a process comprising the steps of:

- preparing a palladium hydrosol by treating an aqueous solution of a palladium (II) salt with a reductant in the presence of at least a cationic surfactant, an anionic surfactant, a non-ionic surfactant or a mixture thereof;
- soaking a water-absorptive fibrous shaped-article in the form of paper or non-woven fabrics having the capacity to allow said palladium hydrosol to penetrate into the inner portion of the paper or non-woven fabric being soaked;
- removing said soaked shaped-article from said palladium hydrosol and treating said soaked shaped-article by either:
  - drying said soaked shaped-article; or
  - washing said soaked shaped-article with water, or
  - washing said soaked shaped-article with water and drying said washed soaked shaped-article; and
- chemical plating said treated soaked shaped-articles of step (c), thereby obtaining electroconductive fibrous shaped-articles.



formed on the central part thereof, a metal cap with an inside diameter D fitted on and cemented to the outer surface of the core of the insulating member, and a metal pin cemented to the inside of the pin-receiving hole the cemented part of the pin in the pin-receiving hole having a large-diameter portion with an

outside diameter d<sub>2</sub> and a rod portion with an outside diameter d<sub>1</sub>, the inside diameter D of the metal cap and the outside diameters d<sub>1</sub> and d<sub>2</sub> of the metal pin satisfying conditions of

$$(d_2 - d_1)/d_1 \leq 0.5$$

$$(D - d_2)/d_2 \leq 1.8.$$

4,792,648

# TELEMATIC RECEPTION TERMINAL

Fumihiro Ogasawara, Yamato, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

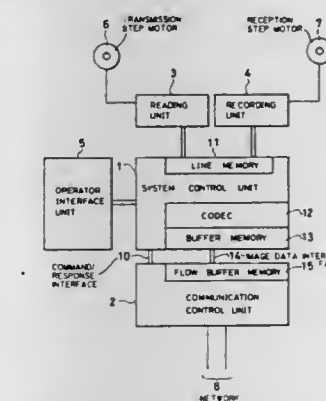
Filed Oct. 22, 1987, Ser. No. 111,279

Claims priority, application Japan, Oct. 22, 1986, 61-249426

Int. Cl.<sup>4</sup> H04L 17/02, 17/16

U.S. Cl. 178—4

5 Claims



4,792,646

# CERAMIC WIRING BOARD AND ITS PRODUCTION

Eyo Enomoto, Oogaki, Japan, assignor to Ibiden Kabushiki Kaisha, Oogaki, Japan

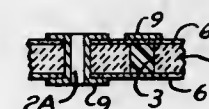
Division of Ser. No. 839,730, Mar. 14, 1986, Pat. No. 4,715,117. This application Sep. 16, 1987, Ser. No. 97,452

Claims priority, application Japan, Apr. 3, 1985, 60-69196

Int. Cl.<sup>4</sup> H05K 1/00

U.S. Cl. 174—68.5

4 Claims



1. A ceramic wiring board comprising a ceramic substrate having a plurality of holes arranged regularly with a given pitch, at least one hole selected from said plurality of holes being filled with at least one electrical insulating material selected from the group consisting of a heat resistance resin and a mixture thereof with a filler and being unclaimed, and a conductor circuit produced by a plating process being formed on the surface of said substrate and in at least one hole of through-holes of said substrate.

4,792,647

# SUSPENSION INSULATOR

Akihiro Watanabe, Hashima; Hiroshi Nozaki, Nagoya, and Mitsuharu Okamoto, Kuwana, all of Japan, assignors to NGK Insulators, Ltd., Nagoya, Japan

Filed Apr. 15, 1988, Ser. No. 182,250

Claims priority, application Japan, Apr. 28, 1987, 62-105702

Int. Cl.<sup>4</sup> H01B 17/08

U.S. Cl. 174—182

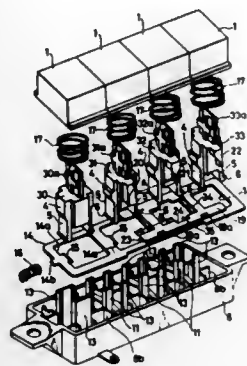
1 Claim

1. A suspension insulator, comprising an insulating member having an annular shed with a cylindrical core formed at a central portion thereof, the core having a pin-receiving hole

1. A method for controlling the timing of sending a response to a command received from a transmitter, said command is of the kind which is transmitted from said transmitter to a receiver at the end of transmitting a unit of information to send, such as a page boundary command, comprising the steps of: receiving said command from said transmitter; determining whether or not the remaining number of page attribute management function blocks possessed by said receiver is larger than or equal to a predetermined number, said remaining number of page attribute management function blocks being incremented intermittently; and sending a response to said transmitter immediately if said remaining number thus determined has been found to be larger than or equal to said predetermined number; otherwise, holding said response until said remaining number becomes larger than or equal to said predetermined number.

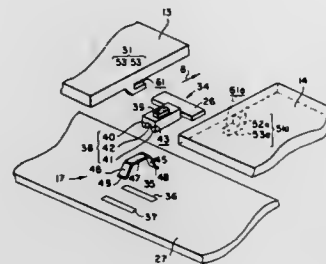
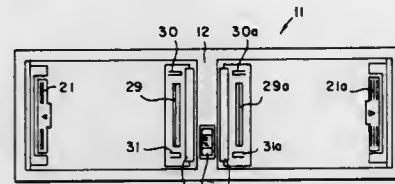


**4,792,649**  
**MULTIPLE PUSH-BUTTON SWITCH ARRANGEMENT**  
 Tsuyoshi Wada, Yawata, Japan, assignor to Matsushita Seiko Co., Ltd., Osaka, Japan  
 Continuation-in-part of Ser. No. 9,347, Jan. 30, 1987, abandoned. This application Nov. 24, 1987, Ser. No. 124,502  
 Claims priority, application Japan, Jan. 31, 1986, 61-20855; Feb. 18, 1986, 61-34695; Apr. 24, 1986, 61-95386  
 Int. Cl.<sup>4</sup> H01H 9/20  
 U.S. Cl. 200—5 E 3 Claims



1. A multiple push-button switch arrangement comprising:
  - (a) a box-shaped casing made of synthetic resin and having an upper opening;
  - (b) a plurality of sets of fixed and movable contacts disposed within a lower portion of the casing;
  - (c) a plurality of movable stems made of synthetic resin, at least parts of the stems extending in the casing, each stem holding a respective set of the fixed and movable contacts in mutual electric contact when the stem is depressed and out of contact when the stem is retracted;
  - (d) a plurality of push buttons mounted on upper ends of the stems respectively;
  - (e) means for locking a set of the contacts in contact when its respective stem is depressed and for unlocking that set and moving its contacts out of contact when another stem is depressed comprising an interlink plate made of synthetic resin, the interlink plate being inserted through the upper opening into the casing and placed in a position where the interlink plate extends horizontally, the interlink plate being urged horizontally;
  - (f) means for preventing the contacts of at least two of the sets from being simultaneously locked in contact comprising a simultaneous lock prevention plate made of synthetic resin, the simultaneous lock prevention plate being inserted through the upper opening into the casing and placed in a position where the simultaneous lock prevention plate extends horizontally on the interlink plate; and
  - (g) posts projecting from a bottom wall of the casing in a direction along which the stems are movable, the stems having side projections respectively, the simultaneous lock prevention plate extending outward of the posts and being movable horizontally, the simultaneous lock prevention plate having a groove, wherein the distance between the groove and an edge of the simultaneous lock prevention plate is smaller than the distance between the side projections on the adjacent stems.

**4,792,650**  
**MODULE MOUNTING SYSTEM**  
 Masahiro Iwai, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan  
 Filed Jul. 24, 1987, Ser. No. 77,242  
 Claims priority, application Japan, Jul. 24, 1986, 61-174823; Jul. 31, 1986, 61-181698  
 Int. Cl.<sup>4</sup> H01H 9/20  
 U.S. Cl. 200—50 A 4 Claims



1. In an electronic device capable of mounting a pair of electronic components each including a locking groove, a mounting system comprising operation means having an engaging member to be engaged with said locking groove in each of said components mounted on the electronic device, said operation means providing a locking position to make said engaging member fit in said locking grooves simultaneously and a plurality of unlocking positions for unlocking one of said components selectively, said operation means shutting off power supply to the electronic device when set at any of the unlocking positions, or supplying power to the electronic device when set at the locking position.

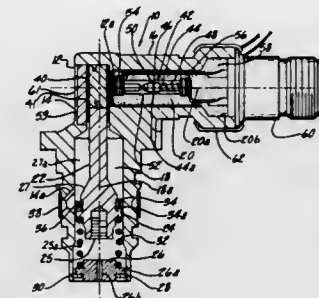
**4,792,651**  
**PRESSURE DIFFERENTIAL BYPASS SENSOR SWITCH WITH MAGNETIC THERMAL LOCKOUT**  
 James C. Whiting, High Point, N.C., assignor to Facet Enterprises, Incorporated, Tulsa, Okla.  
 Filed Nov. 23, 1987, Ser. No. 123,707  
 Int. Cl.<sup>4</sup> H01H 35/38  
 U.S. Cl. 200—82 E 13 Claims

1. A sensor switch for measuring fluid pressure differential of a fluid between a first location in a fluid system which is at low pressure and a second location in the fluid system which is at high pressure, said sensor switch comprising:
  - housing means for locating said sensor switch in said fluid system;
  - a reciprocable piston sealingly and slidably mounted in said housing means, said reciprocable piston being exposed at one end to said low pressure in said fluid system, said reciprocable piston being exposed at its other end to said high pressure in said fluid system, said pressure differential in said fluid system thereby resulting in said piston being fluidically biased in a first direction;
  - biasing means located in said housing means for biasing said reciprocable piston in a second direction that is opposite to said first direction, said piston having a net biasing in said second direction when said fluid pressure differential

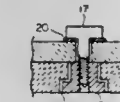
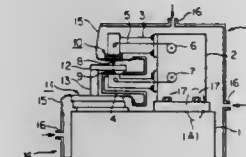
in said fluid system is less than a first predetermined value, said piston having a net biasing in said first direction when said fluid pressure differential in said fluid system exceeds said first predetermined value;

a permanent magnet attached to said reciprocable piston, said permanent magnet being reciprocable with said reciprocable piston between a first and a second position in said housing means, said permanent magnet being at said first position when said differential fluid pressure in said fluid system is less than said first predetermined value, said permanent magnet being at said second position when said differential fluid pressure in said fluid system is equal to a second predetermined value;

said first coil and which is connected in series with said first coil; said first and second coils being of generally circular shape and being disposed in an arrangement symmetrical relative to said center of said inductor; wherein said first coil and said at least one second coil of said inductor comprise six coils of circular shape and arranged side-by-side around a circumference, two neighbouring coils having opposite winding directions, respectively; wherein said six coils arranged on the circumference constitute peripheral coils, and wherein said assembly includes, in addition, two central coils surrounded by said peripheral coils and wound in semi-circles, said central coils having opposite winding directions, respectively, and having straight sides which are opposite each other.

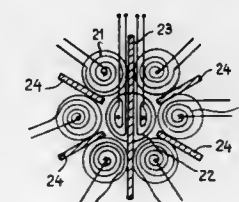


**4,792,653**  
**ELECTRICAL DISCHARGE MACHINING APPARATUS INCLUDING A SHIELD FOR PREVENTING DEFORMATION BY TEMPERATURE**  
 Shoji Futamura, Kawasaki, Japan, assignor to Institute of Technology Precision Electrical Discharge Works, Japan  
 Filed May 13, 1987, Ser. No. 50,494  
 Claims priority, application Japan, May 14, 1986, 61-110327; May 14, 1986, 61-110328  
 Int. Cl.<sup>4</sup> B23H 7/02  
 U.S. Cl. 219—69 R 6 Claims



- an electrical switch actuatable by a magnetic field, said electrical switch being attached to said housing means at a location in which said permanent magnet can only actuate said electrical switch when said permanent magnet is substantially at said second position in said housing means; and
- a thermal ferrite material fixedly attached to said housing means adjacent said permanent magnet when said permanent magnet is at said second position in said housing means, said thermal ferrite material having a predetermined Curie temperature, said thermal ferrite material preventing said electrical switch from being actuated when said thermal ferrite material is at a temperature below said Curie temperature.

**4,792,652**  
**ELECTRIC INDUCTION COOKING APPLIANCE WITH REDUCED HARMONIC EMISSION**  
 Michel Seguy, Avon, and Michel Bisson, Nemours, both of France, assignors to Electricite de France - Service National, Paris, France  
 Filed Feb. 4, 1987, Ser. No. 10,615  
 Claims priority, application France, Dec. 10, 1986, 86 17273  
 Int. Cl.<sup>4</sup> H05B 6/44  
 U.S. Cl. 219—10,493 2 Claims



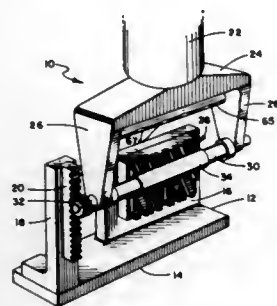
1. Induction heating assembly for an electric induction cooking appliance and comprising a support for a vessel to be heated and at least one flat inductor having a center, connectable to a current-supplying frequency converter; said inductor being constituted by a first coil, having a first winding direction, and by at least one second coil which is formed of at least one turn having a second winding direction opposite to that of

1. An electrical discharge machining apparatus comprising: an electrode; a column supporting said electrode; a work table for support of a workpiece machining being formed by an electrical discharge between said electrode and said workpiece, said column being formed of non-magnetic materials, wherein said non-magnetic materials includes ceramics.

**4,792,654**  
**METHOD AND APPARATUS FOR MANUFACTURING SLOW-WAVE STRUCTURES FOR TRAVELING-WAVE TUBES**  
 Mannel A. Trujillo, Buena Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Nov. 4, 1987, Ser. No. 116,927  
 Int. Cl.<sup>4</sup> B23H 1/00, 9/00  
 U.S. Cl. 219—69 V 27 Claims

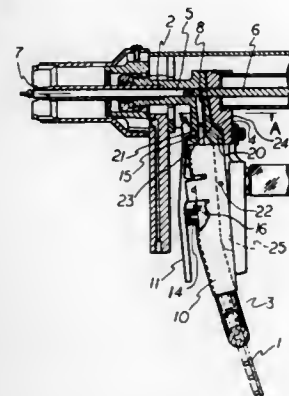
1. Apparatus for machining tubular objects comprising:
  - a base for attachment to an electrical discharge machine, said base having a mounting surface carrying an electrode thereon with the electrode having a face, said face having recessed portions therein and terminating in a planar electrode front surface;
  - a ram movably mounted with respect to said base along an axis parallel to said electrode face;
  - a mandrel rotatably mounted on said ram so that the axis of

rotation of said mandrel is parallel to said electrode face; and



means interconnecting said base and said mandrel so that as said ram moves along said axis said mandrel rotates in a plane parallel to said electrode face.

**4,792,655**  
**STUD WELDING SYSTEM FEEDING DEVICE**  
Donald H. Ettinger, Royal Oak, Mich., assignor to Emhart Industries, Inc., Farmington, Conn.  
Filed Oct. 20, 1987, Ser. No. 110,998  
Int. Cl.<sup>4</sup> B23K 9/20  
U.S. Cl. 219—98 2 Claims



1. In a device for arc welding headed studs to a work surface wherein headed studs are fed serially from a feed tube through a receiver to a stud retaining collet, the improvement which comprises:

- a feed tube connector assembly comprising a connector which surrounds said feed tube;
- a receiver insert pivotally mounted on said connector, said insert being shaped to fit into said receiver and provide a portion of a continuing passageway for said studs, a lever pivotally mounted to said connector, said lever having a lip which fits into a slot in said receiver to secure said assembly thereto and a spring attached to said connector and said lever adapted to bias said lip into said slot.

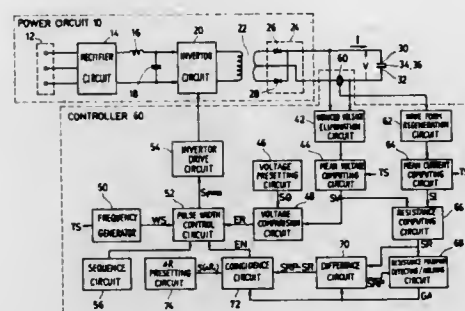
**4,792,656**  
**INVERTOR TYPE DC RESISTANCE WELDING MACHINE**

Mitsuo Namiki, Urawa, and Keiji Nishizawa, Nagareyama, both of Japan, assignors to Miyachi Electric Company, Noda, Japan

Filed Sep. 11, 1987, Ser. No. 95,108  
Claims priority, application Japan, Sep. 17, 1986, 61-218856; Oct. 18, 1986, 61-247895  
Int. Cl.<sup>4</sup> B23K 11/24

U.S. Cl. 219—110

5 Claims



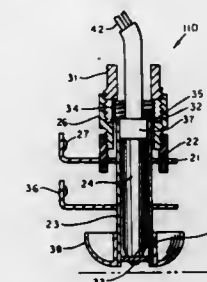
5. A DC resistance welding machine including a first rectifier circuit for rectifying a commercial AC voltage into a DC voltage, a converting circuit for converting said DC voltage into a pulse-shaped voltage having a predetermined high-frequency, a welding transformer for transforming said pulse-shaped high-frequency voltage, and a second rectifier circuit for rectifying said pulse-shaped high-frequency voltage into a DC weld voltage, said DC weld voltage being applied to workpieces to be welded between electrodes so that a DC weld current for a resistance welding is supplied to said electrodes and said workpieces, said welding machine comprising:

- a voltage detection means for detecting said DC weld voltage;
- a voltage reference means for presetting a reference weld voltage to a constant value;
- a means for comparing the detected DC weld voltage which said reference weld voltage and producing an error signal representative of the comparison error;
- a control means responsive to said error signal for generating a control signal which is supplied to the converting circuit for controlling the pulse width of said pulse-shaped voltage at the rate of said predetermined high-frequency so as to maintain said DC weld voltage applied between said electrodes at a constant value during a welding operation;
- a current detection means for detecting said DC weld current;
- a resistance computing means for computing the value of the resistance between said electrodes on the basis of the detected values of said DC weld voltage and of said DC weld current;
- a resistance reference means for presetting a reference drop of resistance to a value within a specific range;
- a monitor means for monitoring the change in the computed value of said resistance for detecting the resistance maximum and thereby detecting when the drop in said resistance from said maximum reaches said reference drop of resistance to produce a timing signal, and
- a termination means responsive to said timing signal for terminating the operation of said inverter to stop the supply of said weld current to said workpieces.

**4,792,657**  
**TORCH SUPPORT FOR PLASMA CUTTING SYSTEM**  
James A. Conley, 280 Meadow St., Meadville, Pa. 16335  
Continuation-in-part of Ser. No. 895,495, Aug. 11, 1986, abandoned, which is a continuation of Ser. No. 713,045, Mar. 18, 1985, Pat. No. 4,633,055. This application Apr. 24, 1987, Ser. No. 42,058  
Int. Cl.<sup>4</sup> B23K 9/00

U.S. Cl. 219—121.39

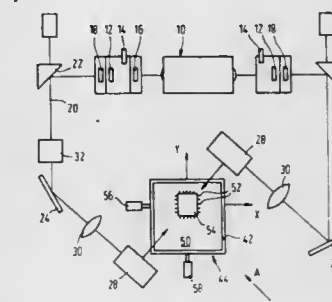
11 Claims



1. A support for a plasma cutting torch comprising an upper bracket bearing and a torch tube, said torch tube having a bearing fixed in its lower end, a torch slidably receivable in said torch tube resting on said bearing, said upper bracket bearing adapted to be attached to a plasma cutting system and to support said torch tube, said torch having a tip, a ski cup on the lower end of said torch tube adapted to be moved over work supported on said plasma cutting system whereby said tip of said torch is maintained in a predetermined relation to work supported on said system.

**4,792,658**  
**DEVICE FOR SOLDERING ELECTRONIC STRUCTURAL ELEMENTS OF A CIRCUIT PLATE BAR**  
Lutz Langhans, Starnberg; Friedrich Meyer, Berg, and Johannes Drake, Paderborn, all of Fed. Rep. of Germany, assignors to Nixdorf Computer AG, Fed. Rep. of Germany  
Filed Nov. 12, 1986, Ser. No. 930,139  
Claims priority, application Fed. Rep. of Germany, Nov. 11, 1985, 3539933  
Int. Cl.<sup>4</sup> B23K 26/00

U.S. Cl. 219—121.63



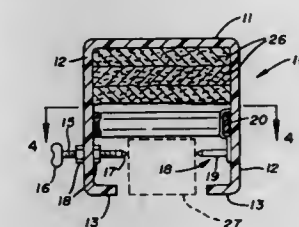
1. A device for soldering simultaneously at least two connecting elements of an electronic structural element on a circuit plate bar comprising a workpiece support, a laser for producing the soldering energy, at least two soldering beams provided with at least approximately equal intensity, in the path of which is arranged at any given time an optic for focusing and aligning the soldering beams on the soldering spots, and means for the production of a relative movement between the soldering beams and a workpiece support, characterized in that the device further comprises a pair of semi-reflecting

mirrors (12) for closing both longitudinal ends of a resonator of the laser (10) utilized for producing both soldering beams (20), a control device (48), and the means for production of the relative movement between the soldering beams and the workpiece support comprises a deflecting device (28) having at least two independently adjustable mirrors (38, 40), wherein the control device (48) controls adjustment of the independently adjustable mirrors (38, 40) so as to provide operational deflection of the respective soldering beams (20).

**4,792,659**  
**GARAGE DOOR OPENER HEATER**  
Paul H. Thomas, 5930 Richard Dr., NW, Warren, Ohio 44483  
Filed May 22, 1987, Ser. No. 52,916  
Int. Cl.<sup>4</sup> H05B 3/56

U.S. Cl. 219—201

5 Claims

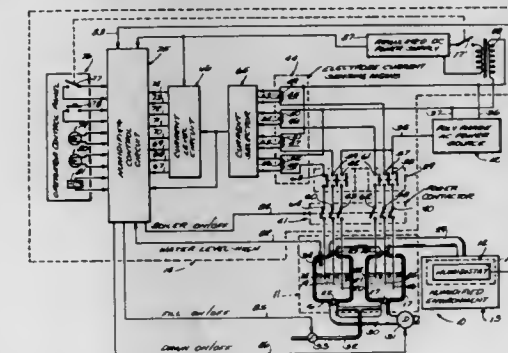


1. A garage door opener heater comprising an elongated channel enclosure, said channel enclosure comprising a top portion, oppositely disposed wall portions, and returned lips extending from free edges of said oppositely disposed walls, a heating strip within said channel enclosure, means for connecting said heating strip to a power source, means for securing said heating strip in abutting relation on said oppositely disposed walls, a band of insulation in said elongated channel enclosure abutting said top portion and spaced in relation to said heating strip, means on said elongated channel for securing same to a garage door opener drive track and means for isolating the interior of said elongated channel enclosure around said garage door drive track.

**4,792,660**  
**HUMIDIFIER CONTROLLER HAVING AUTOMATIC OVER-CURRENT CORRECTING MEANS**  
Stephen E. Cooley, and Martin J. Jensen, both of Madison, Wis., assignors to Carnes Company, Inc., Verona, Wis.  
Filed Mar. 21, 1986, Ser. No. 842,780  
Int. Cl.<sup>4</sup> H05B 1/02

U.S. Cl. 219—295

11 Claims



1. A controller for controlling the operation of a steam humidifier having an electrode boiler, said controller comprising:



first control means responsive to the electrode current through the electrode boiler for initiating a corrective cycle when the electrode current exceeds a predetermined threshold;

second control means responsive to initiation of said corrective cycle for disabling operation of the electrode boiler when the successive initiations of a predetermined number of said corrective cycles fails to reduce the electrode current below said predetermined threshold; and

third control means responsive to the electrode current for measuring the time required for the electrode current to decrease between an upper predetermined substantially constant current level and a lower predetermined substantially constant current level and for providing a control effect when said time is less than a predetermined time period.

4,792,661

**ELECTRIC HEATING APPARATUS FOR REGULATING THE TEMPERATURE OF A PLURALITY OF LIQUIDS**  
Gerhard Schmidtschen, Sachsenheim, and Mathias Muller, Oberstenfeld, both of Fed. Rep. of Germany, assignors to Durr Dental GmbH & Co KG, Bietigheim-Bissingen, Fed. Rep. of Germany

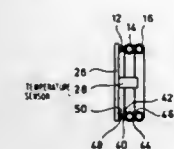
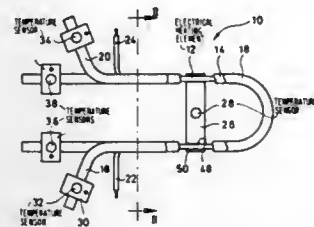
Filed Mar. 17, 1986, Ser. No. 840,002

Claims priority, application Fed. Rep. of Germany, Mar. 16, 1985, 3509609

Int. Cl.<sup>4</sup> H05B 1/02; F24H 1/14

U.S. Cl. 219—301

13 Claims



1. Apparatus for adjusting the temperature of a plurality of liquids, comprising temperature adjusting means having a corresponding plurality of separate flow paths, a pump arrangement for circulating the liquids through said separate flow paths of said temperature adjusting means and comprising means for maintaining predetermined temperature differences between the liquids, characterized in that the temperature adjusting means includes a single temperature controlling member (12) and a number of pipes (14, 16) which correspond in number to the number of separate flow paths for the liquids of which the temperatures are to be adjusted, the temperature controlling member (12) and the pipes (14, 16) being interconnected in heat conducting manner such that the total thermal impedance between the first (14) of said pipes and the temperature controlling member (12) integrated from the inlet end to the outlet end of said first pipe differs from the corresponding total thermal impedance of at least a second (16) of said pipes, in that said first (14) of the pipes is located directly in heat conducting manner on the temperature controlling member (12) and said at least a second of said pipes is carried by said first (14) of said pipes in a heat conducting manner, the thermal impedance defined between said at least a second (16) of the pipes and the temperature controlling member (12) being thus formed by said first (14) of the pipes.

4,792,662

**SHEET ELECTRICAL HEATING ELEMENT**

Hiroshi Kitagaki, Kusatsu; Seichi Takagawa, and Katuma Shinagawa, both of Settsu, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

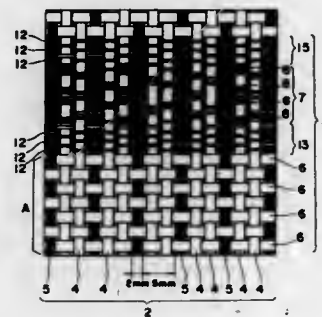
Filed Mar. 25, 1987, Ser. No. 29,967

Claims priority, application Japan, Sep. 2, 1986, 61-135357[U]

Int. Cl.<sup>4</sup> H05B 3/34

U.S. Cl. 219—545

7 Claims



1. A sheet electrical heating element comprising: warp yarns which are constituted of a plurality of warp electrically conductive yarns disposed at predetermined intervals and a plurality of warp electrically non-conductive yarns, at least one of which is disposed in each of said intervals between the warp electrically conductive yarns; and weft yarns which are constituted of a plurality of adjacent weft electrically non-conductive yarns and a weft woven electrode having a predetermined length in the warp direction, the weft woven electrode being constituted of weft electrically conductive yarns forming a fancy twill weave together with the warp yarns, said weft electrically conductive yarns being constituted of a core yarn, an inner strip of copper foil which is spirally coiled around the core yarn in one direction, and an outer strip of copper foil which is spirally coiled on the inner strip of copper foil in the opposite directions so as to cross strip of copper foil in the opposite direction so as to cross the inner strip of copper foil.

4,792,663

**FLEXIBLE THERMOSENSITIVE WIRE HAVING A BARRIER LAYER FOR DRY-CLEANING SOLVENT AND A MOISTURE-PERMEABLE LAYER**

Yoshio Kishimoto, Hirakata, and Tomiharu Hosaka, Yahata, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

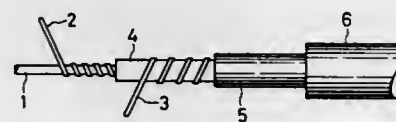
Filed Oct. 24, 1986, Ser. No. 923,082

Claims priority, application Japan, Oct. 25, 1985, 60-239859; Mar. 20, 1986, 61-62254

Int. Cl.<sup>4</sup> H05B 1/02

U.S. Cl. 219—549

24 Claims



1. In a flexible thermosensitive wire which comprises a core strand, a pair of electrodes in a spaced relation to each other, and a thermosensitive polymer layer formed between the paired electrodes and covering the core strand, the improvement comprising: a solvent barrier layer, which is permeable to

moisture formed to cover the thermosensitive polymer layer and one of the paired electrodes formed on the thermosensitive polymer layer, and an outermost moisture-permeable layer of a soft polymer material which has a better vapor permeability than the barrier layer and is resistant to a dry-cleaning solvent formed to cover the barrier layer; and a separation layer separating said barrier layer and said thermosensitive polymer layer and one of the paired electrodes wound around said thermosensitive polymer layer thereby preventing direct contact between said barrier layer and said thermosensitive polymer layer whereby the wire has a high dry-cleaning resistance.

4,792,664

**CLOSURE COUNTER**

Walter Schwab, Gröbenzell, Fed. Rep. of Germany, assignor to Chibret Pharmazeutische GmbH, Munich, Fed. Rep. of Germany

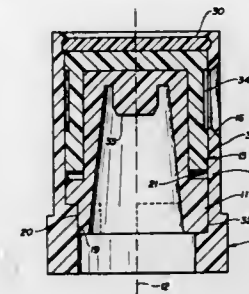
Filed Dec. 24, 1986, Ser. No. 946,263

Claims priority, application Fed. Rep. of Germany, Jan. 24, 1986, 3602119

Int. Cl.<sup>4</sup> B65D 55/12; G06M 1/02

U.S. Cl. 235—103

5 Claims



1. A closure counter for counting how many times a screw cap closure has been closed and opened, said closure counter being back in an initial position after N closing and opening operations, comprising: an open-bottomed housing (10) having a longitudinal axis (12); an open-bottomed cap-shaped counting unit (11) arranged in the housing (10) for rotation about the longitudinal axis (12) of the housing unit (10), said rotation relative to the housing (10) being limited to a fraction 1/N of one full rotation; a display unit (13) arranged between the housing (10) and the counting unit (11) and arranged for rotation about the longitudinal axis (12) of the housing unit (10) relative to the counting unit (11), said rotation of the display unit (13) relative to the counting unit (11) being allowed by a ratchet (14) in only one direction, and being limited to 1/N of one full rotation; and a sliding fit between the housing (10) and the display unit (13).

4,792,665

**STEP COUNTER**

Gerhard Rühlemann, Uttenreuth, Fed. Rep. of Germany, assignor to Kasper & Richter Feinmechanischer Apparatebau, Uttenreuth, Fed. Rep. of Germany

Filed Dec. 19, 1986, Ser. No. 943,495

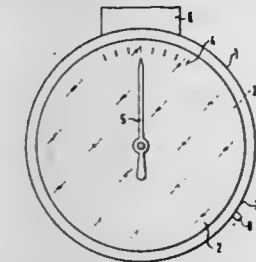
Int. Cl.<sup>4</sup> G01C 22/00

U.S. Cl. 235—105

8 Claims

1. An instrument for determining an average step length of and a distance traveled by a walking or running user person, comprising:

a support means;  
first scale means on the support means for determining the distance traveled by the user person;  
second scale means on the support means for setting an average step length of the user person, the second scale means including a marking corresponding to a preselected standard average step length;  
third scale means on the support means for determining an actual average step length of the user person, the first and third scale means including markings corresponding to a preselected standard travel distance and a preselected standard average step length, respectively, and the first and third scale means being calibrated with progressively increasing indicia in opposite directions;  
indicator means mounted on the support means for movement relative to the first and third scale means;  
a movable member mounted on the support means for movement in response to each step of the user person and connected to the indicator means for moving the indicator means;  
setting means on the support means for setting the standard



average step length and the average step length of the user person on the second scale means;  
limiting means on the support means connected to the setting means and responsive to the setting of the setting means on the second scale means, for limiting the extent of movement of the movable member; and  
drive means on the support means connected to the movable member and the indicator means and responsive to the movement of the movable member for moving the indicator means relative to the first and third scale means in proportion to the setting of the setting means on the second scale means so that when the preselected distance has been traveled by the user person with the setting means set at the standard average step length marking on the second scale means, the position of the indicator means on the third scale means indicates the average step length of the user person, to provide an appropriate value for setting the setting means on the second scale means, and so that when an unknown distance is then traveled by the user person with the setting means set at the provided value on the second scale means, the indicator means indicates the actual distance traveled on the first scale means.

4,792,666

**BAR CODE READER WITH COMPENSATION FOR SIGNAL VARIATION ON DIFFERENT SCAN LINES**  
Craig D. Cherry, Eugene, and P. Guy Howard, Junction City, both of Oreg., assignors to Spectra-Physics, Inc., San Jose, Calif.

Filed Sep. 30, 1986, Ser. No. 913,729

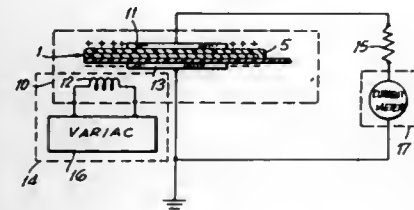
Int. Cl.<sup>4</sup> G06K 7/14

U.S. Cl. 235—466

10 Claims

1. In a laser bar code scanner having a laser generating a beam, scanning means for moving the beam along more than one scan line, and a received signal amplifier for processing the signal received from the beam after reflecting off a bar code being read, an improved signal detection system, comprising:

beam position detector means for detecting the position of the laser beam in a scanning sequence, and gain switching means for adjusting the gain of the received signal amplifier in accordance with the beam's position in the scanning sequence and with predetermined information



tion regarding different signal strengths that can be expected at different beam positions in the scanning sequence, whereby a more uniform signal can be achieved in bar code reading on multiple scan lines.

#### 4,792,667 METHOD AND APPARATUS FOR AUTHENTICATING DOCUMENTS UTILIZING POLED POLYMERIC MATERIAL

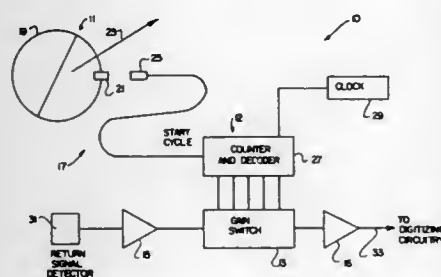
Daniel Y-J. Chen, Springfield, Va., assignor to SICPA Holding, S.A., Glarus, Switzerland

Filed Mar. 27, 1987, Ser. No. 31,995

Int. Cl.<sup>4</sup> G06K 19/00

U.S. Cl. 235—488

12 Claims



1. A method for authenticating documents utilizing the ferroelectric properties exhibited by polymeric materials, comprising the steps of:

- affixing a poled polymeric material to a first surface of a document substrate, thereby forming a document sandwich with obverse and reverse sides;
- physically stimulating said polymeric material;
- detecting a level of current flow between said obverse and reverse sides of said document sandwich, said level of current flow and its polarity is indicative of the polarized state of the polymeric material;
- electrically comparing said current flow to a fixed reference;
- activating an indicating device if said current flow substantially equals said fixed reference.

#### 4,792,668 APPARATUS FOR DETECTING FOCUSING STATE OF OBJECTIVE LENS

Akira Akashi; Akira Ishizaki; Yasuo Suda, all of Yokohama; Ichiro Ohnuki, Tokyo; Keiji Ohtaka, Tokyo, and Takeshi Koyama, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

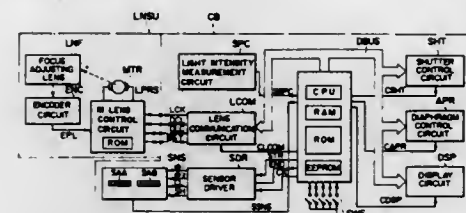
Filed Dec. 2, 1986, Ser. No. 936,746

Claims priority, application Japan, Dec. 5, 1985, 60-272563; Dec. 5, 1985, 60-272564; Dec. 5, 1985, 60-272565; Dec. 5, 1985, 60-272566

Int. Cl.<sup>4</sup> G03B 3/00

U.S. Cl. 250—201

10 Claims



- An apparatus for detecting a focusing state of an objective lens, comprising:
  - light intensity forming optical means for forming light intensity distributions concerning images whose relative positional relationship changes with the focusing state of the objective lens;
  - sensing means having a plurality of sensors for sensing said light intensity distributions to produce first and second signals relating to the light intensity distributions;
  - signal processing means for relatively shifting the first and second signals by determining correlation information and producing a focusing signal for the objective lens in accordance with the correlation information; and
  - altering means for altering a displacement range within which the first and second signals are relatively displaced.

#### 4,792,669 FOCUS DETECTING DEVICE HAVING TWO SELECTIVELY MOVABLE LENSES

Ichiro Ohnuki, Tokyo; Yasuo Suda, Yokohama; Akira Ishizaki, Yokohama; Akira Akashi, Yokohama; Keiji Ohtaka, and Takeshi Koyama, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

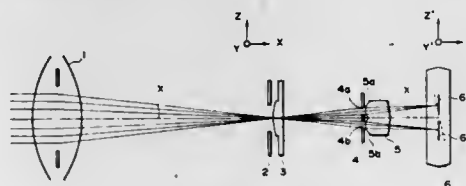
Filed Dec. 30, 1986, Ser. No. 947,822

Claims priority, application Japan, Jan. 10, 1986, 61-003004; Jan. 10, 1986, 61-003006

Int. Cl.<sup>4</sup> G01J 1/20

U.S. Cl. 250—201

9 Claims



- A device for detecting the focus adjustment state of an objective lens, comprising:
  - a field lens disposed near the predetermined imaging plane of the objective lens;
  - imaging means for re-forming a plurality of images from a light beam emerging from said field lens;
  - a sensor for sensing the light intensity distribution of the plurality of images re-formed by said imaging means and producing information about the focus adjustment state of

the objective lens based on the relative position of the plurality of images;  
(d) a member having a support surface on which said field lens means is movable, wherein movement of said field lens on said support surface facilitates the directing of the light beam emerging from the objective lens to said imaging means.

connection terminals disposed in spaced groups on a marginal portion of said substrate, the spacing between respective con-



#### 4,792,670 METHOD OF MANUFACTURING PHOTOSENSORS

Masaki Fukaya, Yokohama; Toshiyuki Komatsu, Yamato; Tatsumi Shoji, Hiratsuka; Masaru Kamio, Atsugi, and Nobuyuki Sekimura, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

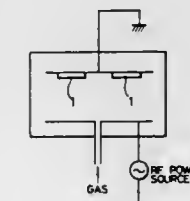
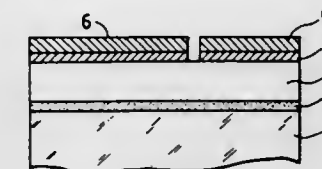
Division of Ser. No. 24,701, Mar. 11, 1987, Pat. No. 4,763,010, which is a continuation of Ser. No. 749,632, Jun. 28, 1985, abandoned. This application Mar. 10, 1988, Ser. No. 169,467

Claims priority, application Japan, Jul. 19, 1984, 59-148648; Jul. 31, 1984, 59-158656; Jul. 31, 1984, 59-158657; Jul. 31, 1984, 59-158658

Int. Cl.<sup>4</sup> H01L 31/18; B05D 3/06

U.S. Cl. 250—211 R

1 Claim



- A method of manufacturing a photosensor comprising the steps of:
  - depositing directly on a substrate a lowest photoconductive layer having a refractive index not larger than 3.2 for a light of a wavelength 6328 Å by way of glow discharge decomposition process using a first discharge power; and
  - depositing one or more photoconductive layers having refractive indexes different from the refractive index of the lowest layer by way of a glow discharge decomposition process using a second discharge power less than the first discharge power.

#### 4,792,671 PHOTOSENSOR ARRAY HAVING GROUPED ELECTRODES

Yuichi Masaki, Kawasaki; Seiji Kakimoto, Yokohama; Katsunori Terada, Tokyo, and Nobuyuki Sekimura, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 717,795, Mar. 29, 1985. This application Sep. 2, 1987, Ser. No. 93,149

Claims priority, application Japan, Apr. 16, 1984, 59-74909

Int. Cl.<sup>4</sup> H01J 40/14

U.S. Cl. 250—211 R

2 Claims

- A photosensor array comprising a substrate, a plurality of common electrodes and a plurality of separate electrodes disposed facing said common electrodes, said common electrodes and said separate electrodes being disposed on said substrate, wherein said common electrodes have respective electrical

#### 4,792,672 DETECTOR BUFFER BOARD

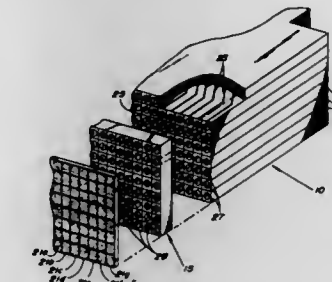
Charles E. Schmitz, Irvine, Calif., assignor to Gramman Aerospace Corporation, Bethpage, N.Y.

Continuation-in-part of Ser. No. 907,408, Sep. 15, 1986, which is a continuation-in-part of Ser. No. 722,776, Apr. 12, 1985, Pat. No. 4,618,763. This application Mar. 23, 1987, Ser. No. 34,143

Int. Cl.<sup>4</sup> H01L 27/14; H05K 1/14; H01J 40/14

U.S. Cl. 250—211 R

24 Claims



13. A detector buffer board for use in an infrared detection system comprising:

- a non-conductive substrate having a plurality of conductive regions extending therethrough, said conductive regions having first portions connectable to individual elements of a detector array segment, and second portions, disposed opposite said first portions and connectable to conductors formed on a multi-layer module, said layers being disposed transverse the plane of said substrate.

#### 4,792,673 GRATICULE ILLUMINATOR FOR AN IMAGE INTENSIFIER

Francis G. Blackler, Dorchester, England, assignor to U.S. Philips Corporation, New York, N.Y.

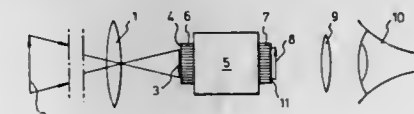
Continuation of Ser. No. 639,974, Aug. 10, 1984. This application Oct. 3, 1986, Ser. No. 142,080

Claims priority, application United Kingdom, Aug. 10, 1983, 8321484

Int. Cl.<sup>4</sup> H01J 31/50; F41G 1/32

U.S. Cl. 250—213 VT

7 Claims



- In a graticule illumination system for use with an intensifying night sight, said system including the combination of an image intensifier tube having a phosphor screen on which an intensified output image is displayed in a first color character-



tic of the phosphor, a graticule for superimposing a graticule image on said output image, and means for illuminating said graticule with light of a second color contrasting with the first color, the improvement therein comprising said graticule having a light diffusing pattern on a transparent plate, said pattern intercepting the light of said output image, and said graticule illumination means producing a predetermined brightness of said pattern greater than the output image brightness obtained when the sight is used to observe scenes having a first level of brightness, and less than the output image brightness obtained when the sight is used to observe scenes having a second level of brightness, the brightness of said second level being greater than the brightness of said first level, said graticule pattern appearing in said second color when observing first level brightness scenes but appearing as a black pattern when observing second level scenes.

4,792,674

# OPTICAL HEAD ASSEMBLY AND ELEMENT HOLDER WITH POSITIONAL ADJUSTMENT

Shizuo Hirano, Saitama, Japan; assignor to Pioneer Electronic Corporation, Tokyo, Japan

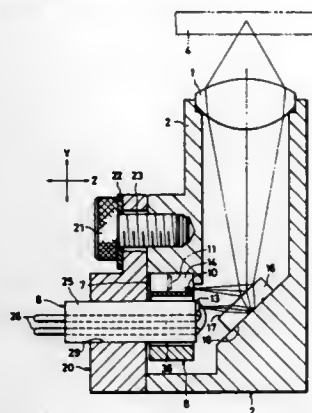
Filed Jul. 31, 1987, Ser. No. 80,133

Claims priority, application Japan, Jul. 31, 1986, 61-180967; Jul. 31, 1986, 61-180968

Int. Cl. G11B 7/00

U.S. Cl. 250-216

6 Claims



1. An optical head assembly for recording and/or reading information on/from a surface of a disk (4), comprising:

- a hollow, cylindrical first holder member (3, 6),
- an intermediate member (20) adjustably mounted to the first holder member for planar movement in X and Y directions relative thereto, and having a Z axis aperture (29) extending therethrough,
- a second holder member (8) extending through the aperture and guided for adjustable, axial, linear movement therein,
- a laser (10) mounted to an inner portion of the first holder member,
- a quadrant photodiode (13) mounted to an inner end of the second holder member,
- a partially reflective prism (16) mounted within the first holder member for directing light emitted from the laser onto the disk surface via a focusing objective lens (1) mounted in an end of the first holder member cylinder, and for directing light reflected from the disk surface onto the photodiode,
- means (21-23) for enabling the adjustment of the intermediate member (20), and attendant the second holder member and photodiode mounted thereto, in the X and Y directions to a position whereat a reflected beam of laser light is centered on the photodiode, and
- means (28, 30, 31) for enabling the axial adjustment of the second holder member in the Z axis direction to a position

whereat the beam of reflected light incident on the photodiode is focused.

4,792,675

# DIFFUSED SURFACE RADIANT ENERGY RECEIVER

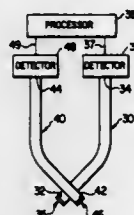
Richard H. Laughlin, Richardson, Tex., assignor to Varo, Inc., Garland, Tex.

Filed Feb. 6, 1987, Ser. No. 11,628

Int. Cl. G01B 11/26

U.S. Cl. 250-227

18 Claims



1. Apparatus for receiving and sensing radiant energy, comprising:

- first and second optical fibers each having a receiving end disposed to receive radiant energy and a transmitting end;
- first and second diffusing surfaces for receiving radiant energy disposed on respective receiving ends of said first and second optical fibers, said first and second surfaces disposed in intersecting planes;
- each diffusing surface transmitting a portion of the radiant energy impinging thereon as a predetermined function of the angle of incidence of said energy to said surface; and
- a first and second detector to receive said portions of radiant energy from said transmitting ends of said first and second optical fibers respectively and determining the angle of incidence of said radiant energy from said portions based on said function.

4,792,676

# GYRO APPARATUS WITH A VIBRATION PORTION

Takeshi Hojo, and Takafumi Nakaishi, both of Kuroiso, Japan, assignors to Kabushiki Kaisha Tokyo Koki, Tokyo, Japan

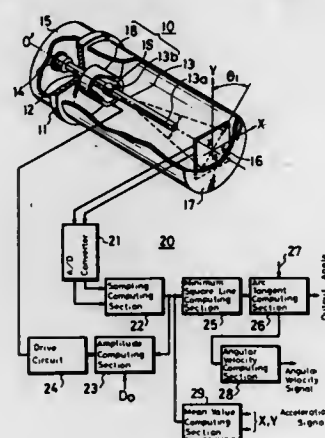
Filed Oct. 20, 1986, Ser. No. 920,503

Claims priority, application Japan, Oct. 22, 1985, 60-235831

Int. Cl. G01D 5/34; H01J 5/16; G01C 1/10

U.S. Cl. 250-231 GY

13 Claims



- A gyro apparatus comprising:
  - a base table;
  - a vibration member having a vibration portion with a circular-shaped cross-section;

4,792,678

# PHOTOELECTRIC ANGLE MEASURING DEVICE

Alfons Spies, Seebuck, Fed. Rep. of Germany, assignor to Dr. Johannes Heldenhain GmbH, Traunreut, Fed. Rep. of Germany

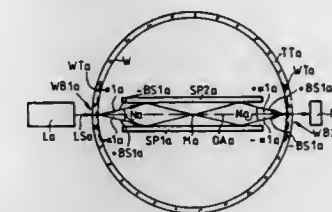
Filed Oct. 2, 1987, Ser. No. 103,905

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1986, 3633574

Int. Cl. G01D 5/34

U.S. Cl. 250-231 SE

15 Claims



- a support provided in said base table for supporting one end of said vibration member so as to vibrate said vibration portion of said vibration member relative to said base table;
- a drive apparatus fixed to said base table for vibrating said vibration portion in a direction in a manner such that said direction of vibration of said vibration portion is conserved to be constant with respect to inertial space regardless of the existence or absence of angular rotation which is applied to said base table around an axis direction (0-0') of said vibration member;
- a displacement detecting apparatus for detecting displacements of said vibration portion in two mutually perpendicular x and y directions which are both perpendicular to said axis direction (0-0') of said vibration member; and
- a computing apparatus which is supplied with an output signal from said displacement detecting apparatus which computes a vibrating direction of said vibration portion relative to said base table.

4,792,677

# SYSTEM FOR USE WITH A UTILITY METER FOR RECORDING TIME OF ENERGY USE

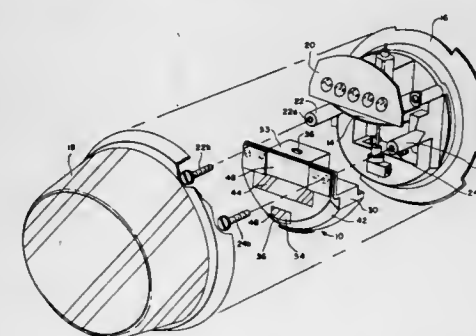
Cree A. Edwards, Belmont, and Larsh M. Johnson, San Francisco, both of Calif., assignors to Domestic Automation Company, Inc., Foster City, Calif.

Filed Aug. 29, 1986, Ser. No. 902,161

Int. Cl. G08C 19/02; G01D 5/34

U.S. Cl. 250-231 SE

18 Claims



- A system for use with a watt-hour meter having a rotatable disc for recording energy use, comprising:
  - a housing configured to fit within the meter below the disc and securable therein;
  - sensor means located within said housing for detecting rotation of the disc and generating a signal in response thereto;
  - an optical sensor port in the top surface of said housing through which said sensor means may detect rotation of the disc;
  - circuit means within said housing for processing and storing said signal for calculating time of energy use information; and
  - communication circuit means within said housing for optically transmitting said time of energy use information to a location external of the meter.

4,792,679

# APPARATUS FOR INCREMENTAL LENGTH MEASUREMENT HAVING AN INCLINED SLOT OVER THE LIGHT SOURCE

Marcel Bissegger, Safnern, Switzerland, assignor to Saphirwerk Industrie Produkte, Brugg, Switzerland

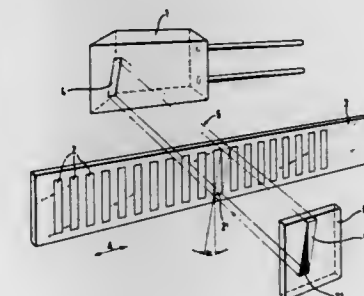
Filed Feb. 2, 1987, Ser. No. 9,756

Claims priority, application Switzerland, Feb. 7, 1986, 500/86

Int. Cl. G01D 5/36

U.S. Cl. 250-237 G

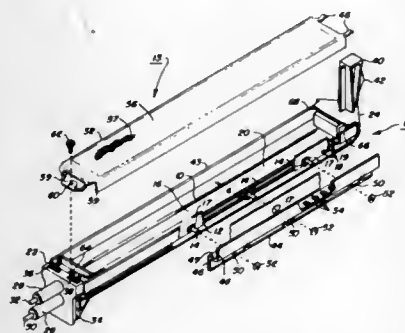
9 Claims



- Apparatus for incremental length measurement comprising:
  - a light emitting diode;
  - a member formed with a slot constituting an aperture for directing from said diode a focussed light

beam having an elongated cross section corresponding to the shape of said slot, said member being mounted with said aperture directly on said diode, a transparent scale engaging said member and bearing regular comparatively opaque graduation lines arranged in series along said scale, means for effecting relative sliding movement between said engaged diode and scale whereby said scale transverses said aperture so that said beam encounters said graduation lines in succession, said aperture being located in an angularly displaced relationship with said graduation lines whereby said light beam is inclined relative to said graduation lines, and photosensitive receiving means comprising a column of receiving units located to receive said beam after passing through said scale and with said column extending substantially parallel to said graduation lines, said angularly displaced relationship being such that said beam of light moves, during said relative movement, transversely of and periodically along said column of receiving units to activate said receiving units selectively for signal formation depending on the position of said scale relative to said aperture.

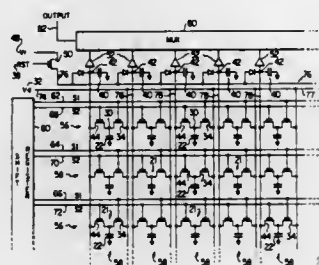
**4,792,680**  
**CORONA DEVICE HAVING A BERYLLIUM COPPER SCREEN**  
Joseph H. Lang, Webster; David J. McEwen, Palmyra, and John J. Meyer, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.  
Filed Jan. 12, 1987, Ser. No. 2,100  
Int. Cl.<sup>4</sup> H01T 19/00; G03G 15/02  
U.S. Cl. 250—325 7 Claims



1. A corona charging device for charging a moving charge retentive surface during operation, said charging operation producing a corona byproduct deleterious to said charge retentive surface, effecting said charge retentive surface between operations when said charge retentive surface is stationary to cause a defect in the charge retentivity characteristics of said charge retentive surface, said corona charging device comprising:

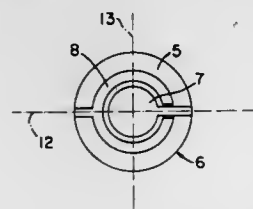
- insulative support means;
- coronode means supported on said support means, closely adjacent and generally parallel to a surface to be charged;
- a first voltage source, connected to said coronode means for driving said coronode means to a corona generating condition;
- a screen supported on said support means between said coronode means and said surface;
- a second voltage source, connected to said screen for driving said screen to a potential approximating the desired potential on said surface;
- said screen fabricated of a beryllium copper alloy having the characteristic of non-adsorption of said material deleterious to said charge retentive surface during operation, and consequently having the characteristic of not desorbing said deleterious material between operations.

**4,792,681**  
**INFRARED DETECTOR ARRAYS**  
Charles M. Hanson, Richardson, Tex., assignor to Varo, Inc., Garland, Tex.  
Filed Oct. 23, 1986, Ser. No. 922,415  
Int. Cl.<sup>4</sup> H01L 37/02  
U.S. Cl. 250—338.2 26 Claims



1. A switched-capacitor infrared detector array, comprising: a plurality of ferroelectric capacitors disposed in a plurality of rows and columns, first switch means selectively connecting each ferroelectric capacitor to a detection voltage source, second switch means selectively connecting each ferroelectric capacitor with a reference capacitor, said reference capacitor having first been charged by temporary connection to a reference voltage source, said first switch means in each row being connected in common, said second switch means in each row being connected in common, means for each column for reading a voltage on a selected one of said ferroelectric capacitors in said column.

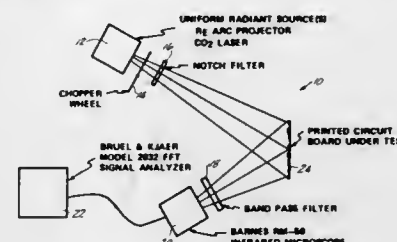
**4,792,682**  
**PYROELECTRIC INFRARED TEMPERATURE COMPENSATED DETECTOR**  
Yasushi Endou; Hisao Takahashi, and Tetsuaki Kon, all of Fukushima, Japan, assignors to Kureha Kaisha Kabushiki Kaisha, Tokyo, Japan  
Continuation-in-part of Ser. No. 707,177, Mar. 1, 1985, abandoned, which is a continuation of Ser. No. 438,608, Nov. 2, 1982, abandoned. This application Jul. 21, 1986, Ser. No. 888,681  
Claims priority, application Japan, Nov. 15, 1981, 56-177743  
Int. Cl.<sup>4</sup> G01J 5/00  
U.S. Cl. 250—338.3 12 Claims



1. A pyroelectric infrared radiation detector comprising: a housing; a pyroelectric film element disposed in the housing; a window in said housing permitting infrared radiation to fall on a surface of the film element; the film element being divided into an infrared radiation detection area and a temperature compensation area; the film element in said infrared radiation detection area having a light-transmissive electrically conductive film electrode defining a first electrode disposed on the surface of the film element exposed to incident infrared radiation and the film element in the compensation area having a light-reflective electrically conductive electrode defining

a second electrode disposed on the surface of the film element exposed to incident infrared radiation; and a third electrode being disposed on another surface of the pyroelectric film element on which the infrared radiation is not incident; each of said first and second electrodes being disposed on the surface of the film in each of four equal quarters of the film element around the center of the film element.

**4,792,683**  
**THERMAL TECHNIQUE FOR SIMULTANEOUS TESTING OF CIRCUIT BOARD SOLDER JOINTS**  
David B. Chang, Tustin; Michael F. Berg, Fruita; James E. Drummond, Oceanside, and Lee Mickelson, Long Beach, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.  
Filed Jan. 16, 1987, Ser. No. 4,009  
Int. Cl.<sup>4</sup> G01N 21/71, 25/72  
U.S. Cl. 250—341 36 Claims



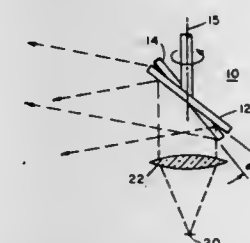
1. An apparatus for inspecting the electronic integrity of an exposed solder joint connected to conductive traces comprising:

- (a) a radiation source for flood-heating the exposed solder joint and connecting conductive traces and surrounding board to heat the exposed solder joint and the exposed connecting traces;
- (b) an infrared detector for detecting the infrared radiation emitted from said exposed solder joint and for generating a signal corresponding to the intensity of the detected infrared radiation;
- (c) conversion means to convert the signals from the infrared detector into machine-readable inspection information;
- (d) memory means for storing the machine-readable inspection information and the machine-readable standard information depicting an infrared profile of a substantially identical solder joint connected to conductive traces of good electronic integrity; and
- (e) means to compare the machine-readable inspection information against the machine-readable standard information to quantify differences in the infrared profile of the solder joint under test and a similar solder joint of good electronic integrity.

**4,792,684**  
**DUAL FIELD HORIZON SCANNER**  
Robert C. Savoca, Ridgefield, Conn., assignor to Barnes Engineering Company, Shelton, Conn.  
Filed Mar. 26, 1987, Ser. No. 31,435  
Int. Cl.<sup>4</sup> G01J 5/08  
U.S. Cl. 250—347 11 Claims

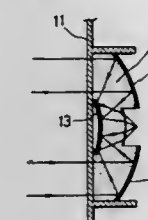
1. A horizon sensor for providing pitch and roll attitude information of an orbiting body by sensing the discontinuity of optical radiation in a scanned field of view between a reference body and outer space from a single conical scanner comprising: scanning means for simultaneously scanning two concentric conical paths through said field of view about the same axis of rotation of the orbiting body using the same scanning means, phase displacement means in said scanning means for displacing the phase of said conical paths with respect to

each other about the axis of rotation of said orbiting body, and a common detector means having optical radiation applied



thereto from said scanning means such that said detector means views two instantaneous fields of view simultaneously so as to generate detector signals used to determine pitch and roll attitude information.

**4,792,685**  
**PHOTOELECTRIC SENSOR**  
Masami Yamakawa, Kenel Hakuyodai Apt. 14-301, Kashio-cho 757, Totsuka-Ku, Yokohama-Shi, Japan  
Filed Apr. 29, 1987, Ser. No. 43,946  
Int. Cl.<sup>4</sup> G02B 17/00; G01J 5/08  
U.S. Cl. 250—353 8 Claims



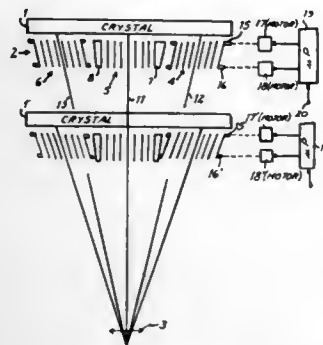
1. A photoelectric sensor comprising: a transparent optical body having a front surface to receive incident light and a rear surface, said front surface having a first region and a second, larger window region to admit light into said transparent optical body, said rear surface having a convex outer region and a central recess region to receive a photoelectric element; a concave mirror adjacent to said concave outer region of said rear surface to reflect toward said first region of said front surface light transmitted through said window region of said front surface; and a second mirror located adjacent to said first region of said front surface to reflect toward said photoelectric element light received from said concave mirror.

**4,792,686**  
**COLLIMATOR FOR TOMOGRAPHY**  
Gilles Karcher, Nancy; Max Amor, Vandoeuvre; Roger Niddam, Le Rancy, and Jean-Pierre Villemot, Nancy, all of France, assignors to Medicorp Research Laboratories Corporation, Boca Raton, Fla.  
Continuation of Ser. No. 821,498, Jan. 22, 1986, abandoned. This application Sep. 16, 1987, Ser. No. 98,730  
Claims priority, application France, Jan. 28, 1985, 85 01120  
Int. Cl.<sup>4</sup> G01T 1/666; G21K 1/02  
U.S. Cl. 250—363 S 4 Claims

1. Collimator for tomoscintigraphy, which is to be placed in front of the sensitive crystal of a gamma camera, of the type comprising a plurality of adjacent parallel tubes to be traversed lengthwise by the radiation from the organ under observation, characterized in that it is constituted by several juxtaposed sets



of tubes, each set of tubes having the direction of its tubes selectively oriented toward the same organ under observation via orientation means for controlling the orientation, this direction corresponding to that of the tube placed substantially in



the center of the set, so as to define, for each set, an incidence angle corresponding to a scintigraphic image of the organ under observation, so as to permit with each step of rotation of the gamma camera, selective registration of information corresponding to as many images as there are sets in the collimator.

4,792,687

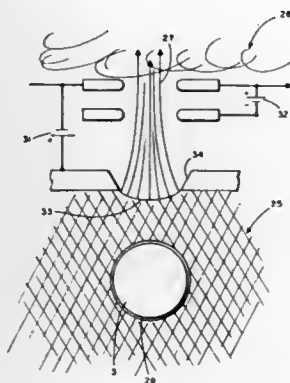
## FREEMAN ION SOURCE

Richard M. Mobley, 40 Upper River Rd., Ipswich, Mass. 01938  
Filed Apr. 30, 1987, Ser. No. 44,448

Int. Cl.<sup>4</sup> H01J 27/00

U.S. Cl. 250-423 R

7 Claims



1. An ion source, comprising in combination an arc chamber having an extraction slit; a straight filament supported within said arc chamber near said extraction slit and aligned therewith; means for applying a magnetic field within said arc chamber parallel to said filament; a filament power supply adapted to heat said filament to electron-emitting temperatures; an arc power supply adapted to maintain an arc discharge within said arc chamber by applying a negative polarity to said filament with respect to said arc chamber; an extraction electrode outside said arc chamber and aligned with said extraction slit; a power supply adapted to apply a negative polarity to said extraction electrode with respect to said arc chamber, whereby positive ions in said arc discharge may be extracted through said extraction slit; said filament having surfaces so arranged that substantially no normal to any said surface passes through said extraction slit, whereby substantially no negative ions formed at said surfaces pass through said extraction slit.

4,792,688

## DIFFERENTIALLY PUMPED SEAL APPARATUS

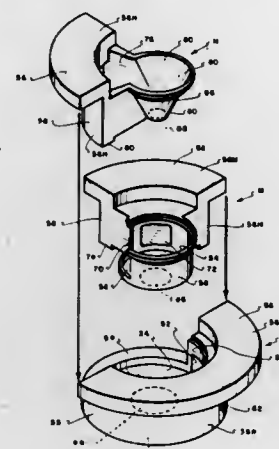
Lydia J. Young, Palo Alto, Calif., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Jun. 15, 1987, Ser. No. 62,038

Int. Cl.<sup>4</sup> G21K 5/08

U.S. Cl. 250-441.1

5 Claims



4. A differentially pumped seal apparatus for use in a particle beam lithography system comprising:  
vacuum pumping means,

a rough port nozzle including a first cylindrical part of a sector of a cylinder with a horizontal conical sleeve with a centrally located aperture therein and with a [relatively large] gas channel located radially in said first cylindrical part,

a medium port nozzle including a second cylindrical part of a sector of a cylinder with a conical sleeve and a centrally located aperture therein and with a [relatively large] gas channel located radially in said second cylindrical part, and

a high port nozzle including a third cylindrical part as a sector of a cylinder with a conical sleeve and a centrally located aperture therein and with a [relatively large] gas channel located radially in said third cylindrical part, said rough port nozzle, medium port nozzle and said high port nozzle together forming a cylinder with chambers having zones of vacuum with the highest vacuum being in the high port nozzle when said channels of each said rough port, medium port and high port nozzles are connected to said vacuum pumping means.

4,792,689

## METHOD FOR OBTAINING A RATIO MEASUREMENT FOR CORRECTING COMMON PATH VARIATIONS IN INTENSITY IN FIBER OPTIC SENSORS

John I. Peterson, Falls Church, Va., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

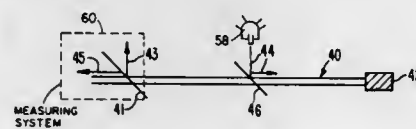
Continuation of Ser. No. 796,782, Nov. 12, 1985, abandoned.

This application Nov. 24, 1987, Ser. No. 129,387

Int. Cl.<sup>4</sup> G01N 21/64

U.S. Cl. 250-458.1

8 Claims



1. A fiber optic sensing system for measuring the concentration of an analyte, said system comprising:

an optical fiber having a first end and a second end;  
a light source for illuminating said optical fiber, at said first end or between said first and second ends, with illumination light of a first wavelength region directed toward said second end of said optical fiber;

a sensor optically connected to said second end of said optical fiber, said sensor including a mixture of a first and a second indicator dye, said first indicator dye, when illuminated by said light of said first wavelength region, emitting light of a second wavelength region at an intensity sensitive to the concentration of the analyte to be measured, said second indicator dye, when illuminated by said light of said first wavelength region, emitting light of a third wavelength region at an intensity insensitive to the concentration of the analyte to be measured, said first, second and third wavelength regions differing from each other and being essentially non-overlapping;

means for spatially separating light of said first wavelength region reflected by said sensor into second end of said optical fiber from said light of said second and third wavelength regions emitted by said indicator dyes;

means for measuring the ratio of the intensities of said second and third wavelength regions with respect to each other, thereby producing a corrected signal corresponding to the concentration of the analyte to be measured, said measuring means including means for spatially separating light of said second and third wavelength regions from each other.

4,792,690

## ULTRAVIOLET LASER BEAM MONITOR USING RADIATION RESPONSIVE CRYSTALS

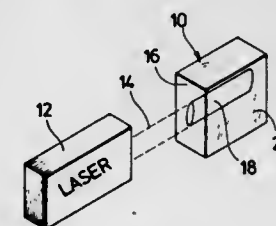
Michael P. McCann, Oliver Springs, and Chung H. Chen, Knoxville, both of Tenn., assignors to University of Tennessee Research Corporation, Knoxville, Tenn.

Filed Aug. 21, 1987, Ser. No. 88,076

Int. Cl.<sup>4</sup> G01J 5/48

U.S. Cl. 250-474.1

17 Claims



1. A method for monitoring an ultraviolet laser beam comprising the steps of:

providing a substantially transparent crystal adapted to produce a color pattern in the body of the crystal when ultraviolet radiation is directed therethrough;

positioning the crystal within the path of the ultraviolet laser beam;

exposing the crystal to the ultraviolet laser beam to produce a color pattern in the crystal wherein the color pattern produced is three-dimensional and corresponds to the spatial distribution of the laser beam transmitted through the crystal;

exposing the crystal and color pattern to light so as to illuminate the color pattern; and

observing the light from said crystal and color pattern to determine preselected spatial distribution characteristics of the laser beam that passed through the crystal.

4,792,691

## METHOD FOR RECORDING AND REPRODUCING A RADIATION IMAGE, RADIATION IMAGE STORAGE PANEL, PHOTOSTIMULABLE PHOSPHORS AND METHOD FOR OBTAINING SAID STIMULABLE PHOSPHORS

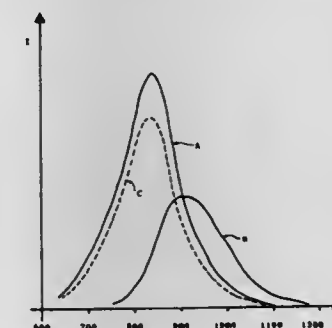
Romano Morlotti, Ferrara/Savona, and Florian Krawietz, Albstadt-Mare/Savona, both of Italy, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 30, 1987, Ser. No. 68,642

Claims priority, application Italy, Jul. 9, 1986, 21069 A/86  
Int. Cl.<sup>4</sup> G01T 1/10; C09K 1/22

U.S. Cl. 250-484.1

17 Claims



1. A method for recording and reproducing a radiation image comprising the steps of (i) causing a phosphor, which can be stimulated by light radiation, to absorb a radiation passing through an object, (ii) stimulating said phosphor with light radiation to release the stored energy as fluorescent light, and (iii) detecting said fluorescent light with light detecting means, characterized by the fact that said stimulating radiation is in the range of visible light and the detected fluorescent light is in the range of the infrared radiation.

4,792,692

## DENTAL IRRADIATION APPARATUS

Wolf-Dietrich Herold, and Karlfried Lucks, both of Seefeld, Fed. Rep. of Germany, assignors to Espe Stiftung & Co. Produktions-Und Vertriebs KG, Seefeld, Fed. Rep. of Germany

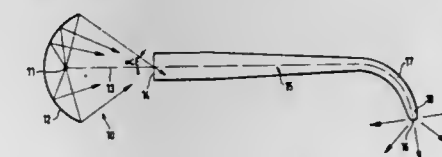
Filed Apr. 2, 1987, Ser. No. 33,370

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1986, 3611132

Int. Cl.<sup>4</sup> G21K 1/06

U.S. Cl. 250-504 H

11 Claims



1. A dental irradiation apparatus comprising a lamp for producing a convergent beam of radiation having an angle of convergence approximately 30° or less with respect to the optical axis defined by said lamp, and an optical waveguide having an entrance surface disposed in said beam and an exit surface adapted to be oriented with respect to a location to be irradiated, the waveguide being conically shaped over a substantial part of its length with a diameter decreasing from said entrance surface to said exit surface.

4,792,693

## STEP-AND-REPEAT EXPOSURE METHOD

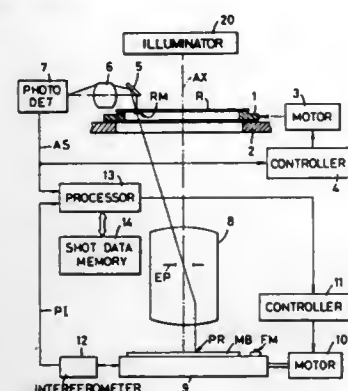
Atrushi Yamaguchi, Chigasaki, and Shinichi Hasegawa, Yokohama, both of Japan, assignors to Nikon Corporation, Tokyo, Japan

Continuation of Ser. No. 906,744, Sep. 12, 1986, abandoned. This application Feb. 10, 1988, Ser. No. 157,127

Claims priority, application Japan, Sep. 19, 1985, 60-207276  
Int. Cl.<sup>4</sup> G01B 11/27

U.S. Cl. 250-548

4 Claims



1. A method for repeatedly stepping a substrate held on a two-dimensionally movable stage relative to a mask placed in a radiation beam to form an image of said mask at different shot areas positioned on said substrate relative to an origin of a two-dimensional coordinate system, comprising the steps of: providing a reference mark means on said movable stage at a predetermined position; measuring a position of said movable stage when said reference mark means is aligned with a detection center of an alignment optical system provided to observe said substrate through said mask; supplying shot data representing positions of said shot areas relative to said origin of said coordinate system; aligning said mask with said detection center of said alignment optical system; determining a corrected origin of said coordinate system at a corrected position in accordance with the measured position of said movable stage; and repeatedly stepping said movable stage in accordance with said shot data to form said shot areas at positions represented by said shot data relative to said corrected origin, respectively.

4,792,694

## METHOD AND APPARATUS FOR OBTAINING THREE DIMENSIONAL DISTANCE INFORMATION STEREO VISION

Makoto Shioya, Tokyo; Motohisa Funabashi, Sagami, and Takashi Nishiyama, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 17, 1986, Ser. No. 853,231

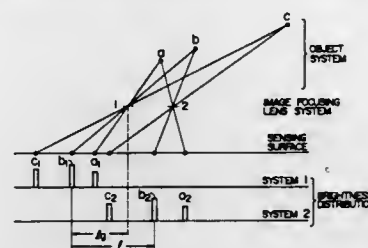
Claims priority, application Japan, Apr. 17, 1985, 60-80159  
Int. Cl.<sup>4</sup> G01C 11/12

U.S. Cl. 250-558

28 Claims

1. A method, of obtaining three-dimensional distance information, comprising the steps of: forming images of an object system on an image sensing surface by using at least three image focusing systems so that at least three object images of the object system are formed on respective image sensing areas; correlating the image point of an object point which are formed on said respective image sensing areas by said image focusing systems by using a relationship which exists between the geometrical positional relationships among said image points and the geometrical positional relationships among said image focusing systems themselves

and between said image focusing systems and said image sensing areas; and obtaining the three-dimensional distance information of said object point by using information relating to the positions of at least two of the corresponding image points on the image sensing areas and information relating to the geometrical positional relationship between said two corresponding image points and the image focusing systems, wherein said correlating of the image points comprises allocating the object images formed on said respective image sensing areas to respective imaginary planes which are superimposed with a spatial relationship corresponding to the spatial relationship of said image focusing systems, and detecting those image points on the imaginary planes which lie on the same straight line.



## CONTACT-FREE MEASURING APPARATUS HAVING AN F-THETA-CORRECTED, CATADIOPTRIC OBJECTIVE AND METHOD FOR USING THE SAME

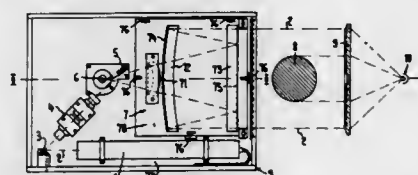
Brian Blandford, London, England, assignor to Zumbach Electronic AG, Orpund, Switzerland

Filed Jul. 14, 1986, Ser. No. 885,874

Claims priority, application Switzerland, Jul. 24, 1985, 03219/85  
Int. Cl.<sup>4</sup> G01N 21/86; H01J 3/14

U.S. Cl. 250-560

11 Claims



1. An apparatus for contact-free measurement of an object by means of a telecentric light beam scanning said object, comprising a light source for emitting a light beam, means for deflecting this light beam with an angular velocity, optical means having an optical axis, for transforming said deflected light beam into said telecentric scanning light beam substantially in the direction of said optical axis for scanning said object, said optical means comprising an F-theta corrected objective comprising a meniscus lens adjacent said means for deflecting said beam, the radii of curvature of said meniscus lens effecting a refraction depending on the angle of deflection of said beam, and two catadioptric elements at the side of said meniscus lens opposite to said means for deflecting the light beam, the dimension of each of said catadioptric elements in a direction perpendicular to the optical axis exceeding the dimension of said meniscus lens, reflecting means on each of said catadioptric elements for said beam, said deflected light beam being thereby transformed into a telecentric light beam of which the scanning velocity is proportional to said angular velocity.

4,792,696

## METHOD AND AN APPARATUS FOR DETERMINING SURFACE SHAPE UTILIZING OBJECT SELF-SHADOWING

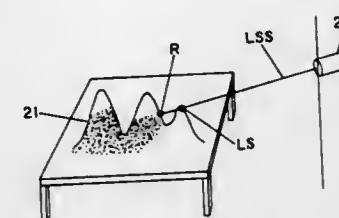
John R. Kender, Leonia, N.J., and Earl M. Smith, New York, N.Y., assignors to Trustees of Columbia University in the City of New York, Morningside Heights, N.Y.

Filed Jun. 5, 1987, Ser. No. 58,914

Int. Cl.<sup>4</sup> G01N 21/86; G01B 11/24

U.S. Cl. 250-560

8 Claims



1. A method of determining the shape of a surface comprising: illuminating the surface sequentially from locations along a first path and along a second path intersecting said first path at a peak point directly above said surface; said paths defining four reference directions; locating said light source at a plurality of positions of said first and second paths to illuminate the surface from said plural positions along differing slopes with respect to said surface, for each of said four reference directions; said light source illuminating all of said surface only at said peak point; photographing said surface with a binary image camera at each of said plurality of positions of said light source along said first and second paths, said binary image camera having as its binary image output a digital matrix whose pixel elements correspond to a plurality of points on said surface, said pixel elements assuming a binary value if a corresponding photographed point on said surface is in shadow and an opposite binary value if a corresponding photographed point on said surface is illuminated, said binary image output having coordinate means superimposed thereon for locating any of said pixel elements of said matrix; outputting each of said binary images of said surface for the plurality of fixed positions of said light source to processing means for storage therein; identifying and recording by said process means, for each of said points on said surface, for each of said four reference directions, the last shadower slope LSS, the failing shadower slope FSS, the last shadower LS and the failing shadower FS, assigning infinite upper and lower bounds to each of the plurality of said points on said surface except a reference point; assigning said reference point upper and lower bounds of zero, calculating new upper and lower bounds for each of said plurality of points and its respective last and failing shadowers such that the upper bound of each of said plurality of points must be less than the upper bound of its last shadower minus the quantity of the distance between said point and its last shadower multiplied by the last shadower slope and the lower bound of each said plurality of points must be greater than the lower bound of its failing shadower minus the quantity of the distance between said point and its failing shadower multiplied by the failing shadower slope and the upper bound of the failing shadower of each of said plurality of points must be less than the upper bound of said point added to the quantity of the distance between said failing shadower and said point multiplied by the failing shadower slope, and the lower

bound of the last shadower of each of said plurality of points must be greater than the lower bound of said point added to the quantity of the distance between said last shadower and said point multiplied by the last shadower slope, repeating said calculation until the upper and lower bounds of each of the plurality of said points and its last and failing shadowers does not change with respect to a prior calculated value; averaging the upper and lower bounds of each of said plurality of points and its last and failing shadowers; and outputting said average of the plurality of points as the shape of said surface.

4,792,697

## SUPPORT DEVICE CONTROLLED IN DEPENDENCE ON THE MOVEMENT OF A HELMET WITH RESPECT TO A SURROUNDING STRUCTURE

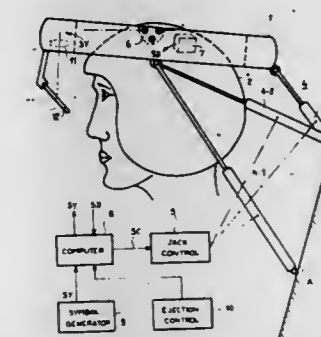
Guy Le Parquier, and Jean L. Pastre, both of Paris, France, assignors to Thomson-CSF, Paris, France

Filed Sep. 11, 1987, Ser. No. 95,473

Claims priority, application France, Sep. 12, 1986, 86 12816  
Int. Cl.<sup>4</sup> G01V 9/04

U.S. Cl. 250-561

7 Claims



1. A support device controlled in dependence on the movement of a helmet with respect to a surrounding structure, wherein said device is constituted by a support element placed at a distance from the helmet and mechanically decoupled from said helmet, and position-control means for maintaining a predetermined reference position-location of said support element with respect to said helmet in order to utilize the device for supporting equipment normally mounted on the helmet, said position-control means being constituted by: means for detecting the position-location of the support element with respect to the helmet; a set of jacks for mechanically coupling the support element to the structure; computing means for controlling the jacks and having the function of computing from the signals detected by said detection means the errors in positioning of the support element with respect to the helmet and of generating corresponding control signals for actuating the jacks and cancelling said errors.



4,792,698

**SENSING LOCATION OF AN OBJECT WITH LINE IMAGE PROJECTION AND ROTATION**

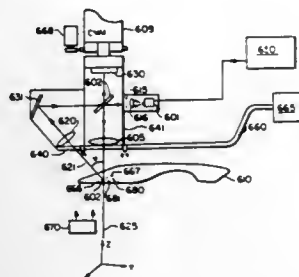
Timothy R. Pryor, Tecumseh, Canada, assignor to Diffracto Ltd., Windsor, Canada

Continuation of Ser. No. 811,410, Dec. 20, 1985, abandoned, which is a continuation of Ser. No. 461,685, Jan. 27, 1983, Pat. No. 4,574,199. This application Apr. 2, 1987, Ser. No. 33,928

Int. Cl.<sup>4</sup> G01N 21/86

U.S. Cl. 250—561

16 Claims



1. An apparatus for sensing the location of an object comprising:

- a projection means for projecting a line of light onto a surface of the object adjacent a feature of the object;
- a light detector means for detecting light;
- an imaging means for imaging the projected line of light from an angle offset from a projection axis of the projected line of light onto said light detector means;
- a rotation means for rotating the projected line of light on the surface of the object such that the projected line of light intersects the feature; and
- a location detecting means for detecting the location of the imaged line of light on said light detector means and hence a distance to the object as well as a location of one point of the feature of the object.

4,792,699

**FIBER OPTIC PHOTOELECTRIC SENSOR WITH LIQUID REMOVING MEANS**

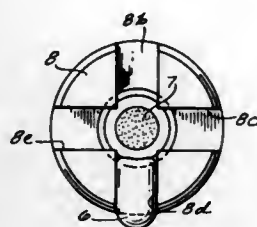
Eugene F. Duncan, Wauwatosa, Wis., assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 928,756, Nov. 10, 1986, abandoned. This application Oct. 22, 1987, Ser. No. 110,604

Int. Cl.<sup>4</sup> G01N 15/06

U.S. Cl. 250—577

17 Claims



1. In a fiber optic photoelectric sensor having a housing enclosing photoelectric means and fiber optic cable means having a local end portion mounted on said housing in operative relation to said photoelectric means therein and a remote end portion exposing optical fiber ends mounted in operative relation to an object to be sensed, said remote end portion being in a wet environment such as near a workpiece or tool that is being sprayed or flowed with liquid coolant which produces an ambient mist or splash at said remote end portion that accumulates or condenses as a liquid mass or drop on said

remote end portion tending to interfere with passage of light signals thereat, the improvement comprising:

- liquid removing means at said remote end portion of said fiber optic cable means for causing said liquid mass to flow away from said ends of said optical fibers at said remote end portion so as to prevent such accumulation of said liquid as to significantly interfere with the passage of light signals therethrough.

4,792,700

**WIND DRIVEN ELECTRICAL GENERATING SYSTEM**

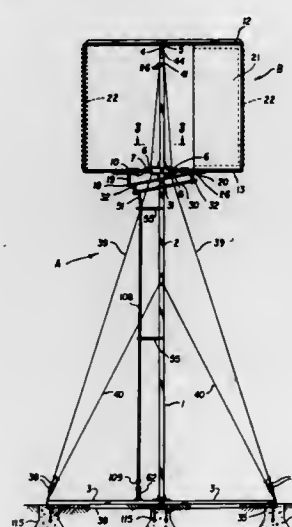
Joe L. Ammons, 1617 Lawson La., Amarillo, Tex. 79106

Filed Apr. 14, 1987, Ser. No. 38,240

Int. Cl.<sup>4</sup> F03D 9/00

U.S. Cl. 290—55

8 Claims



1. Conversion apparatus for changing wind energy to electrical energy comprising:

- first conversion means for converting wind energy to rotary mechanical energy;
- second conversion means for converting said rotary mechanical energy to reciprocating mechanical energy;
- third conversion means for converting said reciprocating mechanical energy to hydraulic energy;
- fourth conversion means for converting said hydraulic energy to rotary mechanical energy and;
- fifth conversion means for converting said rotary mechanical energy to electrical energy.

4,792,701

**FAILURE COMPENSATION CIRCUIT WITH THERMAL COMPENSATION**

Thomas E. Olon, Fairview, and Francis J. Zelina, Lake City, both of Pa., assignors to American Sterilizer Company, Erie, Pa.

Filed Apr. 1, 1987, Ser. No. 33,543

Int. Cl.<sup>4</sup> H05B 41/30

U.S. Cl. 307—11

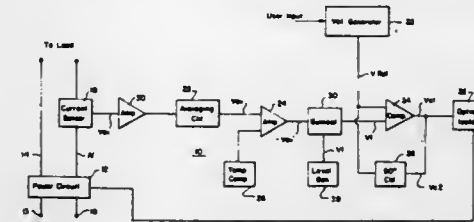
16 Claims

1. A failure compensation circuit for automatically reducing the output voltage of a power supply when one or more lamps fail, said compensation circuit comprising:

- means for generating a control signal representative of the voltage to be supplied to the lamps;
- power supply means for supplying voltage to the lamps in response to said control signal; and
- means for producing an input signal representative of the current delivered to the lamps, said current decreasing in response to each lamp failure;

said means for generating a control signal being responsive to said input signal for adjusting said control signal such

power switching devices through a contact mechanism to said rails for conducting return current to said rails, said noise signal grounding circuit comprising:  
an electrical shield surrounding said power switching device;



that when said current decreases said voltage supplied to the lamps is automatically reduced.

4,792,702

**SWITCH FOR IONTOPHORESIS CATION AND ANION**

Kazumi Masaki, Osaka, Japan, assignor to Ken Hayashibara, Okayama, Japan

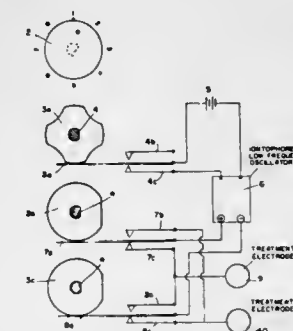
Filed Oct. 7, 1987, Ser. No. 105,328

Claims priority, application Japan, Oct. 11, 1986, 61-241855

Int. Cl.<sup>4</sup> H01R 3/06; A61N 1/30; H01H 47/00

U.S. Cl. 307—112

4 Claims



1. A switch directed to use in a low-frequency oscillator to iontophorese 6-[2-[(5-bromo-2-pyridyl) amino] vinyl]-1-ethyl-2-picolinium iodide into the scalp, comprising:  
an on/off switch to control a power circuit of an iontophoretic low-frequency oscillator;  
a selector switch to reverse an output current from said iontophoretic low-frequency oscillator in such manner that a positive potential and a negative potential energize an electrode containing 6-[2-[(5-bromo-2-pyridyl) amino] vinyl]-1-ethyl-2-picolinium iodine at a duration ratio of 1:2 or 1:3 during one selection cycle; and  
a rotary member actuating said on/off- and selector-switches when turned.

4,792,703

**EARTHED CIRCUIT FOR AN ELECTRIC RAILWAY CAR**

Shigeru Koyama, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 6, 1986, Ser. No. 915,715

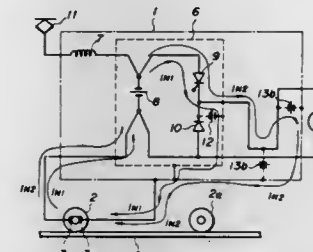
Claims priority, application Japan, Oct. 30, 1985, 60-241307

Int. Cl.<sup>4</sup> H02J 7/34

U.S. Cl. 307—14

14 Claims

1. An electric railway car noise signal grounding circuit which reduces the amount of noise and switching transients that are impressed on rails over which said railway car runs, said noise signal grounding circuit for use with an electric railway car which includes a car body, a drive current circuit, power switching devices in said drive current circuit for controlling drive current and a return circuit connecting said



4,792,704

**SCALED VOLTAGE LEVEL TRANSLATOR CIRCUIT**

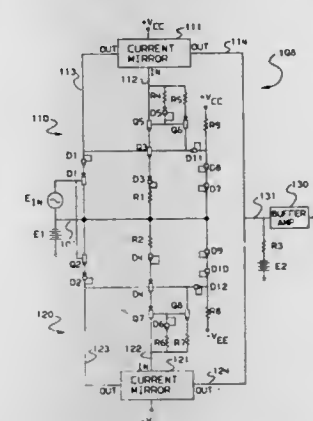
Kenneth G. Lobb, Rochester; Timothy J. Schmerbeck, Kasson; Brian A. Schuelke, Rochester, all of Minn., and Manning O. Sutton, San Francisco, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 1, 1987, Ser. No. 45,348

Int. Cl.<sup>4</sup> H03K 5/08, 6/00

U.S. Cl. 307—264

15 Claims

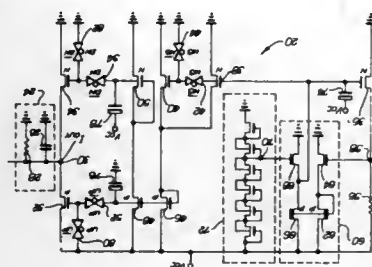


1. A circuit for translating an input signal voltage in series with an input reference voltage to an output signal voltage in series with an output reference voltage with respect to a ground potential, comprising:

- a current mirror having an input and first and second outputs;
- a first shift network coupled to said first current-mirror output and to said input signal voltage for translating said input signal voltage in a first direction by a predetermined amount to produce a shifted signal voltage;
- a second shift network including an input-dropping resistor, said second shift network being coupled to said current-mirror input and to said first shift network for translating said shifted signal voltage in a direction opposite said first direction and by said predetermined amount so as to produce a replica of said input signal voltage across said input-dropping resistor;

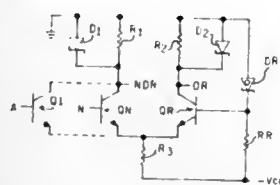
an output-dropping resistor coupled to said second current-mirror output, and further coupled in series with said output reference voltage, said output-dropping resistor being matched to said input-dropping resistor for producing said output voltage thereacross.

**4,792,705**  
**FAST SWITCHING CHARGE PUMP**  
Kenneth W. Onyang, Huntington Beach, and Melvin Marmet, Placentia, both of Calif., assignors to Western Digital Corporation, Irvine, Calif.  
Filed Mar. 14, 1986, Ser. No. 839,505  
Int. Cl.<sup>4</sup> H01L 27/10; H03L 1/00; H03K 3/354  
U.S. Cl. 307—296 R **14 Claims**



1. A high speed charge pump comprising:  
a reference field effect transistor for conducting a reference current;  
a capacitor for storing a gate biasing charge therein which is proportional to the value of the reference current;  
gate voltage generating means, coupled to the gate of the reference field effect transistor, for generating a gate biasing voltage thereat corresponding to the reference current being conducted by the reference field effect transistor;  
an output field effect transistor having a gate of larger capacitance than the gate of the reference field effect transistor, the output field effect transistor being connected such that it is a current-mirroring replica of the reference field effect transistor; and  
switch means, interposed between the capacitor and the gate of the output field effect transistor, for selectively applying the gate biasing charge of the capacitor to the gate of the output field effect transistor to thereby switch the output field effect transistor on.

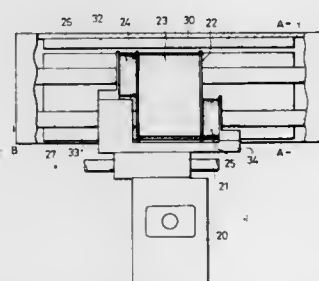
**4,792,706**  
**ECL GATES USING DIODE-CLAMPED LOADS AND SCHOTTKY CLAMPED REFERENCE BIAS**  
Kevin M. Owens, and Bobby D. Strong, both of Garland, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.  
Filed Dec. 16, 1986, Ser. No. 942,326  
Int. Cl.<sup>4</sup> H03K 19/086  
U.S. Cl. 307—455 **20 Claims**



1. A logic circuit which comprises:  
(a) first and second semiconductor devices having collector

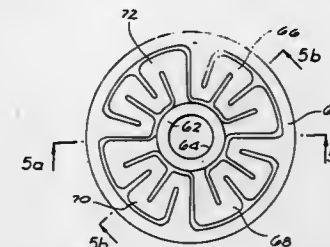
electrodes, control electrodes and emitter electrodes, said emitter electrodes connected to a common node,  
(b) a source of voltage coupled to said emitter electrodes,  
(c) a reference voltage source coupled to said collector electrodes, and  
(d) threshold voltage setting means coupled across said source of voltage and said reference voltage source including a first Schottky diode and a first resistor in series therewith, the junction of said first Schottky diode and said first resistor being coupled to said control electrode of said first semiconductor device to provide a threshold voltage equal to the forward bias voltage of the first Schottky diode,  
(e) logic signal input means connected to the control electrode of said second semiconductor device,  
(f) first output means connected to one of the collector electrodes of one of said semiconductor devices;  
(g) first means for setting high and low output levels of said first output means, said first level setting means including a parallel connected combination of a second diode and a second resistor coupled between said reference voltage source and the collector connected to said first output means, to provide a difference in high and low output levels equal to the forward bias of the second diode.

**4,792,707**  
**DISK TRACKING DEVICE**  
Yasushi Katanuma, Furukawa, Japan, assignor to Alps Electric Co., Ltd., Japan  
Filed May 4, 1987, Ser. No. 46,029  
Claims priority, application Japan, Aug. 12, 1986, 61-187839  
Int. Cl.<sup>4</sup> H02K 33/00; G11B 21/02  
U.S. Cl. 310—12 **5 Claims**



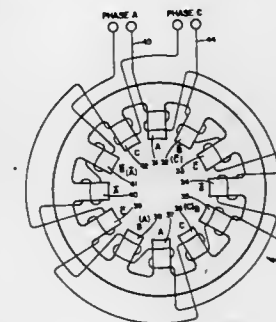
1. In a tracking device including a linear motor having a driving coil which is moved relative to a driving magnet extending over a predetermined range of movement of the driving coil in a longitudinal direction, a speed sensor having a detection coil which is moved relative to a detection magnet extending over said predetermined range of movement, a moving member having the driving coil fixed to one side thereof so that it can be reciprocated in the longitudinal direction over the predetermined range together with said driving coil upon application of a driving current thereto, the improvement wherein:  
said detection magnet is positioned in parallel with said driving magnet on the same one side of said moving member; and  
said speed sensor includes first and second coils mounted on respective opposite sides of the driving coil in said longitudinal direction on said same one side of said moving member and electrically connected to each other so as to cancel any induced voltage due to a magnetic field generated by proximity to said driving magnet, wherein at least one of said first and second coils functions as said detection coil.

**4,792,708**  
**FORCE MOTOR, MULTIPLE, PARALLEL ELEMENT LINEAR SUSPENSION**  
Kent R. Boyer, Valencia, Calif., assignor to HR Textron, Inc., Valencia, Calif.  
Filed Nov. 23, 1987, Ser. No. 124,005  
Int. Cl.<sup>4</sup> H02K 33/00; F16K 31/08; G05D 16/00  
U.S. Cl. 310—15 **9 Claims**



1. A suspension system for a linear force motor having a moveable armature comprising:  
a plurality of discs each defining a central opening therethrough and have a peripheral rim;  
first spacer members at said peripheral rim disposed between adjacent ones of said discs;  
second spacer members at said opening disposed between adjacent ones or said discs;  
a holder means for receiving and securing said discs and said first spacer members at the peripheral rim thereof;  
hub means received within said central openings through said discs for securing said discs and said second spacer members at said opening; and  
means for securing said hub means on said armature.

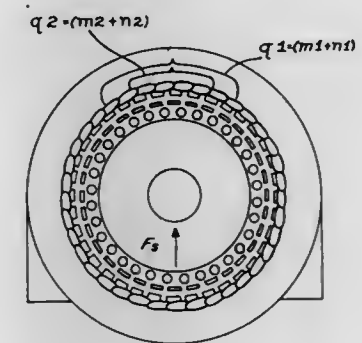
**4,792,709**  
**WINDING FOR OPERATION OF A THREE-PHASE STEPPING MOTOR FROM A TWO-PHASE DRIVE**  
Robert C. Smith, Hartford, Conn., and Gary E. Horst, Manchester, Mo., assignors to The Superior Electric Company, Bristol, Conn.  
Filed Mar. 18, 1987, Ser. No. 27,297  
Int. Cl.<sup>4</sup> H02K 37/04  
U.S. Cl. 310—49 R **21 Claims**



1. A three-phase stepping motor adapted to be driven from a two-phase drive, comprising:  
(a) a moving member magnetically interacting with a stationary member;  
(b) the stationary member having first, second, and third sets of poles, each pole having thereon a coil for magnetic energization thereof;  
(c) the coils on the first set of poles and one-half of the coils on the third set of poles being connected to one phase of the drive; and  
(d) the coils on the second set of poles and the other half of

the coils on the third set of poles being connected to the other phase of the drive.

**4,792,710**  
**CONSTRUCTION OF ELECTRICAL MACHINES**  
Stephen Williamson, Tilehurst, England, assignor to National Research Development Corporation, London, England  
Filed Feb. 20, 1987, Ser. No. 17,074  
Claims priority, application United Kingdom, Feb. 20, 1986, 8604221  
Int. Cl.<sup>4</sup> H02K 5/16  
U.S. Cl. 310—90.5 **13 Claims**



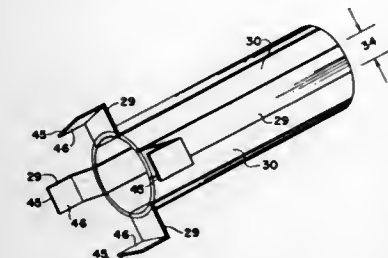
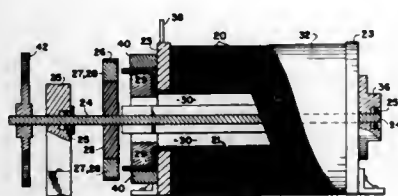
1. A polyphase cylindrical electrical machine including a non-salient stator, a rotor and an air-gap therebetween, together with a winding energisable to apply alternating current to exert at least two magnetic fields to rotate about the machine axis to provide a non-rotating force in a selected direction radially of the machine axis, the fields rotating in the same direction and having pole numbers differing by two, the fields being exerted by said current at one frequency to act directly and radially on the machine rotor with said non-rotating force.

**4,792,711**  
**ELECTRIC GENERATOR FOR INDUCING CURRENT IN THE FIELD COIL**  
Berry E. Smith, Jr., Star Rte. 1, Box 3921, Tallahassee, Fla. 32304  
Filed May 27, 1987, Ser. No. 54,722  
Int. Cl.<sup>4</sup> H02K 16/02  
U.S. Cl. 310—114 **15 Claims**

1. An electric generator including a stationary field coil, a rotatable armature, and a stationary cage of magnetically conductive material positioned between the coil and the armature; said coil comprising a plurality of turns of electrically conductive wire in an electrically nonconductive frame with a tubular passageway therethrough; said armature comprising a rotatable shaft, a wheel structure mounted on said shaft with an even number of permanent magnets mounted on the circumference thereof in an arrangement alternating polarity, said wheel being positioned adjacent to but outside of said field coil; said cage comprising a plurality of elongated linear strips of thin magnetically conductive material equally spaced in cylindrical arrangement parallel to the central axis of the cylinder and



extending through the tubular core of said field coil and outwardly to a position adjacent the magnets on said wheel, with



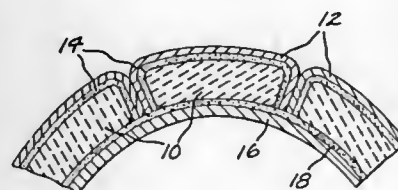
said strips being spaced apart such that at any instant all of said strips are conducting the same polarity from said magnets.

#### 4,792,712 ROTOR HAVING MAGNETS WITH ENCLOSING SHELLS

Vijay K. Stokes, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.  
Division of Ser. No. 677,448, Dec. 3, 1984, Pat. No. 4,724,348.  
This application Nov. 16, 1987, Ser. No. 121,210  
Int. Cl.<sup>4</sup> H02K 21/14

U.S. Cl. 310—156

6 Claims



1. A rotatable assembly for a dynamoelectric machine having means for reducing release of magnet material particles from said assembly, comprising:

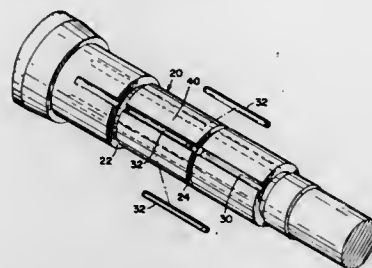
- a flux ring, for providing a medium of distribution for magnetic flux;
- a plurality of magnet assemblies disposed about the outer circumference of said flux ring, each said assembly including a generally bar-shape body of permanently magnetizable material, a shell at least partially surrounding said body said shell comprising a nonmagnetic foil located adjacent to the outer surface and to both lateral surfaces of said bar shaped body and attached thereto by an adhesive material so as to reduce release of particles shed from the outer surface and both lateral surfaces of said body; and means fastening said plurality of magnet assemblies to said flux ring so that said magnet assemblies are situated adjacent to each other and so that the outer surfaces of said magnet assemblies form the curved surface of a cylinder.

#### 4,792,713 LAMINATION TO ROTOR SHAFT RETENTION METHOD UTILIZING SPRING PINS

Timothy J. Bush, Champlin, Minn., assignor to Onan Corporation, Minneapolis, Minn.  
Filed Oct. 16, 1987, Ser. No. 109,104  
Int. Cl.<sup>4</sup> H02K 15/02

U.S. Cl. 310—217

26 Claims



1. A lamination stack device used with a prime mover, the prime mover being a shaft, the lamination stack device comprising:

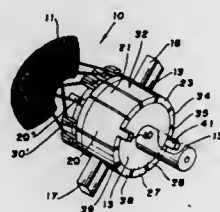
- (a) a pin means including a plurality of elongated, resilient spring pin members; and
- (b) a plurality of laminates; each of said laminates having an inner edge defining an opening for receiving the shaft; said laminates cooperating such that said laminates can be stacked one adjacent to another in series; each of said laminates including notch means in said inner edges thereof for receiving said pin means; wherein said pin means are received in said notch means and in axially extending groove means in the shaft, said pin means cooperating with the shaft and the inner edges of said plurality of laminates, when said laminates are stacked, to prevent relative rotational slippage therebetween.

#### 4,792,714 COMMUTATOR WITH NON-UNIFORM BARS AND EQUALLY SPACED HOOKS

Donald C. Schlieter, Hilton, N.Y., assignor to General Motors Corporation, Detroit, Mich.  
Filed Feb. 1, 1988, Ser. No. 151,226  
Int. Cl.<sup>4</sup> H02K 13/04

U.S. Cl. 310—234

5 Claims



1. A commutator for an electric motor having an armature with a winding and a pair of diametrically opposed brushes contacting the commutator, the commutator comprising, in combination:

- a first even number of commutator segments insulated from each other and arranged in a circular pattern, the commutator segments carrying a second even number, two greater than the first even number, of commutator hooks adapted for the attachment of the winding, the commutator hooks being circularly arranged and evenly spaced from each other in their circular arrangement, a diametrically opposing pair of the commutator segments each subtending an arc sufficient for and carrying two of the commutator hooks, and each commutator segment be-

tween the two diametrically opposed commutator segments subtending an arc smaller than the arcs subtended by the diametrically opposed pair of the commutator segments but sufficient for and carrying one of the commutator hooks; and

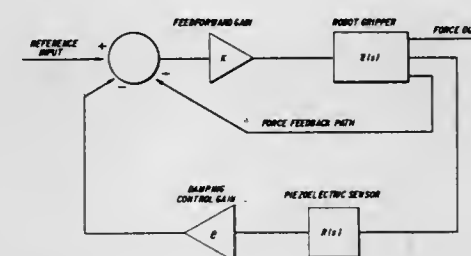
circumferential indexing means formed in each of the diametrically opposed commutator segments, whereby the armature may be rotationally oriented with respect to the diametrically opposed commutator segments during armature winding.

#### 4,792,715 ROBOT GRIPPER CONTROL SYSTEM USING PVDF PIEZOELECTRIC SENSORS

Michael F. Barsky, 301 Wall St.; Douglas K. Linder, 510 Sunrise Dr., both of Blacksburg, Va. 24060, and Richard O. Claus, Rte. 3, Christiansburg, Va. 24073  
Filed Nov. 16, 1987, Ser. No. 121,645  
Int. Cl.<sup>4</sup> H01L 41/08

U.S. Cl. 310—316

14 Claims U.S. Cl. 313—113



1. In a robot gripper system comprising a gripper mechanism used to engage an object, a motor for operating the gripper mechanism, force sensor means for providing a force signal proportional to the amount of force applied by the gripper mechanism to the object, and a control circuit that receives the force signal and controls the gripper motor, the improvement comprising:

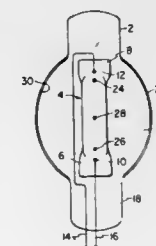
- a further sensor means for producing a rate-of-force signal proportional to the rate of the application of the gripper force to the object; and
- circuit means for providing said rate-of-force signal as a negative feedback to said control circuit.

#### 4,792,716 ENERGY-EFFICIENT ELECTRIC DISCHARGE LAMP WITH REFLECTIVE COATING

Peter Walsh, Stirling, N.J., assignor to Duro-Test Corporation, North Bergen, N.J.  
Filed Oct. 29, 1981, Ser. No. 316,228  
Int. Cl.<sup>4</sup> H01J 5/16, 61/40; H01K 1/26, 1/30

U.S. Cl. 313—113

10 Claims



1. An energy-efficient electric discharge lamp comprising: means for producing a plasma volume of an ionizable medium, said plasma emitting electromagnetic energy dis-

tributed in a line spectrum and including energy at at least one more luminous line and energy at at least one less luminous line, energy at said lines resulting from electron transitions that share a common upper energy level; and means adjacent said plasma volume producing means having thereon a coating formed by a plurality of layers of films having at least two different indices of refraction for selectively transmitting energy at said more luminous line from said plasma volume and for selectively reflecting spectral line energy at said less population at said common upper energy level and thereby enhance electron transitions producing energy at said more luminous line.

#### 4,792,717 WIDE ANGLE WARNING LIGHT

Robert A. Ferenc, Middletown, Conn., assignor to Whelen Technologies, Inc., Chester, Conn.  
Filed Apr. 21, 1983, Ser. No. 487,033  
Int. Cl.<sup>4</sup> H01J 5/16

13 Claims



1. A wide angle light source comprising: means defining a reflector, said reflector defining means including:

- a first end section, said first end section having a concave reflective surface which defines a first portion of a paraboloid of revolution about a first axis, said concave reflective surface of said first end section extending inwardly from an arcuate forward edge;
- a second end section, said second end section having a concave reflective surface which defines a second portion of said paraboloid of revolution, said second end section defining a second axis parallel to said first axis, said concave reflective surface of said second end section extending inwardly from an arcuate forward edge which is coplanar with said arcuate forward edge of said first end section; and
- a linear intermediate section having a concave reflective surface, said intermediate section being integral with and extending between said end sections, said intermediate sections having a rear wall which interconnects a pair of parallel side wall portions, said rear wall at least in part defining said concave reflective surface of said intermediate section and having a profile which is a parabola having a focal point defining a straight line intersecting said first and second axes, said side wall portions of said intermediate section defining a pair of parallel linear forward edges which are co-planar with said arcuate forward edges;

lens means adapted to be secured to said reflector defining means, said lens means and reflector defining means cooperating to form a chamber bounded in part by said concave reflective surfaces, said lens means having a light transmissive portion which is provided with a plurality of parallel spaced apart surface irregularities for dispersing light over an angle, said light transmissive portion of said lens means being disposed at a first side of the plane defined by said arcuate and linear forward edges of said reflector sections; and

an elongated light emitter centrally supported from said reflector defining means so as to be positioned in said chamber, said light emitter having an axis, said light emit-

ter axis being oriented generally parallel to said reflector defining means intermediate section forward edges, said light emitter axis being positioned at the second side of said plane defined by said reflector defining means arcuate and linear forward edges.

4,792,718

## CATHODE RAY DISPLAY TUBES

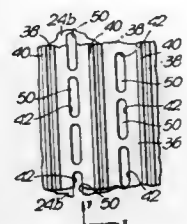
Alan G. Knapp, Crawley, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 27, 1987, Ser. No. 89,807

Claims priority, application United Kingdom, Sep. 29, 1986, 8623386

Int. Cl.<sup>4</sup> H01J 31/48, 43/04

U.S. Cl. 313—399



1. A cathode ray display tube comprising means for producing an electron beam, a channel plate electron multiplier for producing at its output side current multiplied electron beams in response to the electron multiplier being scanned by the electron beam over its input side, the channel plate electron multiplier comprising a stack of a plurality of apertured dynodes, the apertures of the dynodes being aligned to provide channels through the stack, a phosphor screen comprising repeating groups of phosphor elements and colour selection means operable to direct selectively the electron beams from the channel multiplier onto the respective phosphor elements, wherein the exits of the apertures in the final dynode at the side thereof adjacent the colour selection means are elongate in shape and oriented substantially parallel to one another.

4,792,719

## EDGE-BONDED BIMETAL COMPENSATOR FOR SHADOW MASK

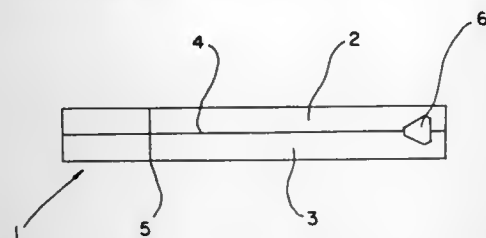
Jacob L. Ornstein, Reidsville, N.C., assignor to GTE Products Corporation, Stamford, Conn.

Filed Aug. 31, 1987, Ser. No. 91,145

Int. Cl.<sup>4</sup> H01J 29/07, 29/82

U.S. Cl. 313—405

4 Claims



1. A compensator for a shadow mask for a color television picture tube comprising an elongated bimetal support member comprising a high expansion austenitic stainless steel alloy extending the length and half the width of the support member and a low expansion age hardenable stainless steel alloy extending the length and half the width of the support member, the two alloys being edge bonded to each other, the support member having been age hardened after formation of the support member to increase the yield strength of the age hardenable stainless steel alloy at least about 50% over the yield strength

of the age hardenable stainless steel alloy prior to age hardening.

4,792,720

## COLOR CATHODE RAY TUBE

Shigeo Takenaka; Eiichi Kamohara, and Takashi Nishimura, all of Fukaya, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

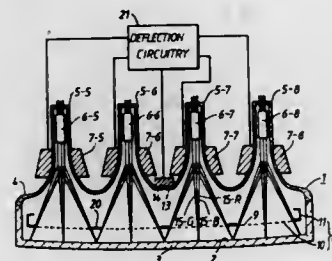
Filed Dec. 8, 1986, Ser. No. 939,002

Claims priority, application Japan, Dec. 9, 1985, 60-274959

Int. Cl.<sup>4</sup> H01J 29/07; H01Q 1/00

U.S. Cl. 313—409

8 Claims



1. In a color cathode ray tube with a single screen containing a plurality of elemental screen areas, comprising:  
a screen provided with a plurality of phosphors emitting colors, said screen being formed by a plurality of elemental screen areas;

electron gun means positioned facing and corresponding to said respective elemental screen areas, said electron gun means having a plurality of elemental electron gun for generating a plurality of electron beams for successively scanning each respective elemental screen area corresponding thereto;

a shadow mask assembly positioned facing said screen, said shadow mask assembly including elemental effective regions facing and corresponding to said elemental screen areas, said elemental effective regions having a number of apertures through which said electron beams pass and at least one non-effective region adjacent said elemental effective regions;

at least one signal source arranged on or close to said non-effective region or boundaries of said elemental screen areas to generate a predetermined signal by an impingement of said electron beams on said source; and  
signal receiving means positioned facing said shadow mask assembly to detect said signal from said signal source, wherein the operation of said scanning is based on the detected signal controlling each successive horizontal scanning operation of said plural elemental electron guns, wherein when an electron beam emitted from one of said electron beams impinges on said signal source, said signal generated by said signal source is detected by said signal receiving means, the scanning operation of the electron beam of said one elemental electron gun is stopped, and the scanning operation of another of said plural elemental electron guns is triggered and said another elemental electron gun scans the elemental screen area corresponding to said another elemental electron gun.

4,792,721

## CATHODE-RAY TUBE WITH ELECTROSTATIC DEFLECTION

Kentaro Oku, Kokubunji; Masanori Maruyama, Tokorozawa; Masakazu Fukushima, Tokyo, and Shinichi Kato, Mobara, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

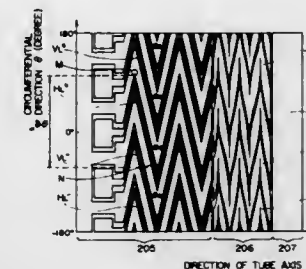
Filed Apr. 17, 1987, Ser. No. 39,275

Claims priority, application Japan, Apr. 18, 1986, 61-87924

Int. Cl.<sup>4</sup> H01J 29/62, 29/70

U.S. Cl. 313—432

7 Claims



1. A cathode-ray tube comprising:  
an electron beam generating means provided at one end of the tube for emitting an electron beam;  
a target provided at the other end of the tube; and  
a group of electrodes provided on an inner wall of the tube for focusing and deflecting the electron beam emitted from said electron beam generating means, said electrode group including at least first and second electrode means toward the other end of the tube from the one end thereof in this order, said first electrode means having a lead portion for supplying an electric potential to said second electrode means, said lead portion extending along an axis of the tube with a zigzag form in which an angle  $\angle MZN$  of a concave apex M and a convex apex N adjacent thereto with reference to the tube axis Z as viewed from the side of said electron beam generating means is not smaller than

4,792,722

## CATHODE RAY TUBE HAVING A FLAT FACEPLATE ATTACHED BY A COMPLIANT PRESSURE BONDED SEAL

Leslie H. Francis, Horley, England, assignor to U.S. Philips Corporation, New York, N.Y.

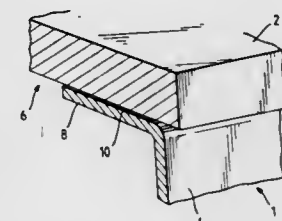
Filed Feb. 13, 1987, Ser. No. 14,512

Claims priority, application United Kingdom, Feb. 21, 1986, 8604321

Int. Cl.<sup>4</sup> H01J 29/86

U.S. Cl. 313—477 R

5 Claims



1. A cathode ray tube having an envelope comprising a metal rear housing having a wall portion defining an opening and a substantially flat glass faceplate which extends over the opening and is sealed in a vacuum-tight manner to the surface of a flange on the rear housing extending around the opening by means of a compliant pressure bonded seal between the faceplate and the flange and comprising a pressure deformable

material, characterised in that the flange of the rear housing projects inwardly of the opening and has an edge within said opening.

4,792,723

## DISPERSIVE TYPE ELECTROLUMINESCENT PANEL AND METHOD OF FABRICATING SAME

Masami Igarashi; Yoshinori Kato, and Yoshimi Kamiyo, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Japan

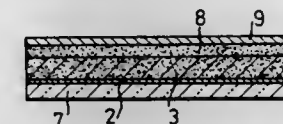
Continuation of Ser. No. 616,724, Jun. 4, 1984, abandoned. This application Apr. 22, 1987, Ser. No. 42,610

Claims priority, application Japan, Jun. 4, 1983, 58-98769

Int. Cl.<sup>4</sup> H05B 33/26, 33/10

U.S. Cl. 313—503

8 Claims



1. In a dispersive type electroluminescent panel of the type having a transparent base plate, a transparent first electrode formed on one side of the base plate, a layer of phosphor applied to the first electrode, and a second electrode disposed opposite to the first electrode in contact with the layer of phosphor therebetween,

the improvement comprising said base plate being flexible and made from a synthetic resin, and said second electrode being formed by a conductive layer in contact with said phosphor layer and a low resistance layer adhered to the conductive layer forming an external side of said second electrode, wherein said conductive layer consists substantially only of conductive fine particles which are in contact with one another three dimensionally to form electrically conductive paths such that said conductive layer has a sheet resistance in the range of from 5 to 50 ohms/square, said conductive fine particles being provided to penetrate into minute gaps in the surface of said phosphor layer in order to form a close, continuous electrical contact between said phosphor layer and said second electrode for an even emission of light.

4,792,724

## GAS MIXTURES FOR SPARK GAP CLOSING SWITCHES

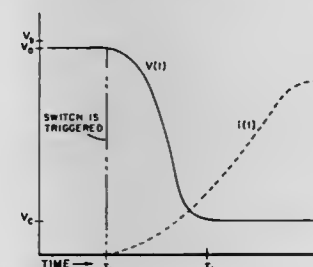
Loucas G. Christophorou, Oak Ridge; Dennis L. McCorkle, Knoxville, and Scott R. Hunter, Oak Ridge, all of Tenn., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 20, 1987, Ser. No. 16,904

Int. Cl.<sup>4</sup> H05B 37/02

U.S. Cl. 313—637

6 Claims



1. A spark gap closing switch having two electrodes and disposed between said electrodes of said switch a gas mixture comprising a first gas component that attaches strongly to electrons at low energies, said attachment being exclusively



nondissociative and decreasing with increasing gas temperature, and a second gas component that has low molecular weight, is nonreacting and increases the electron drift velocity within said switch.

4,792,725

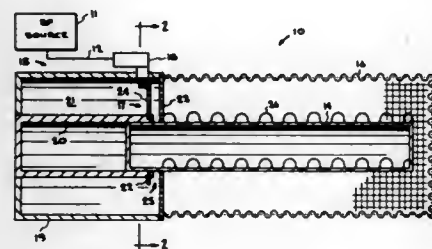
**INSTANTANEOUS AND EFFICIENT SURFACE WAVE EXCITATION OF A LOW PRESSURE GAS OR GASES**  
Donald J. Levy, Berkeley, and Samuel M. Berman, San Francisco, both of Calif., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Dec. 10, 1985, Ser. No. 807,089

Int. Cl.<sup>4</sup> H01J 29/00

U.S. Cl. 315—39

18 Claims



1. A fluorescent lamp illumination system for substantially instantaneously providing partial ionization of a low pressure fill of gas or mixture of gases in a tube and subsequent continuous excitation of said low pressure gas or gases in a surface wave mode for emitting light along the length of the tube, comprising:

- a source of rf energy;
- a fill of a permanent, particular volume of low pressure inert gas or gases and mercury vapor;
- an elongated cylindrical tubular discharge container for confining said fill therein and having first and second closed ends and a cylindrical wall that is optically transparent to visible radiation, said wall having an inner surface and an outer surface, said container being permanently sealed to contain said fill, the inner surface of said discharge container being coated with phosphor said fill being in direct contact with said phosphor;
- coupling means having a predetermined impedance and responsive to rf energy from said rf source to couple the energy to said fill to both ionize at least a portion of said fill to create a weakly ionized plasma and to deliver the rf energy in a surface wave mode to energize the fill to sustain the plasma, a majority of the energy being delivered through said wall to an area near said inner surface to thereby instantaneously ionize and substantially continuously excite said fill so that the majority of mercury atoms of the mercury vapor near said inner surface produce u.v. photons that interact with the phosphor to produce visible light, said container having said first closed end mounted within said coupling means with the remainder of said container extending from said coupling means, said closed second end being remote and external to said coupling means, said rf energy being delivered solely and only to said first end of said container, said rf energy being well-defined surface waves;
- rf energy transmitting means having a predetermined impedance for transmitting rf energy from said source to said coupling means; and
- an rf shield around said container;
- said coupling means having a predetermined impedance such that the total impedance of the combination of said coupling means, said rf shield, and said discharge container, when said fill is continuously ionized and excited, is matched to said predetermined impedance of said rf energy transmitting means, said predetermined coupling

means impedance being partially matched to said rf energy transmitting means impedance when said fill is un-ionized, said partial matching being sufficient to instantly weakly ionize said fill upon application of rf energy from said source to said coupling means.

4,792,726

**FLUORESCENT LAMP UNIT WITH INTEGRAL BALLAST HOUSING**

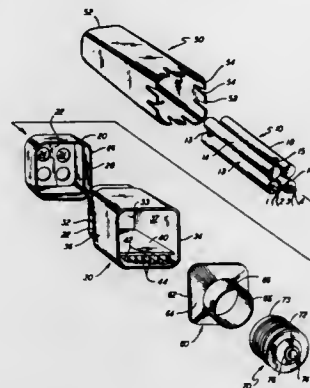
Harish F. Gandhi, Salem, Mass., assignor to North American Philips Corporation, New York, N.Y.

Filed Sep. 24, 1987, Ser. No. 100,687

Int. Cl.<sup>4</sup> H01J 7/44

U.S. Cl. 315—52

7 Claims



1. A lamp unit of the type comprising fluorescent tube means having wire leads extending therefrom, a lamp base to which at least some of said leads are connected, and a ballast housing between said tube means and said base, said ballast housing comprising a forward end toward said tube means, a rearward end toward said lamp base, and a circumferential wall extending therebetween, said wall substantially defining a primary cavity having therein an inductive stabilization ballast through which one of said leads is wired, characterized in that said housing further comprises a major partition bridging said circumferential wall, and a plurality of minor partitions extending between said major partition and said wall, at least some of said minor partitions defining individual wire conduits therebetween, said conduits extending between said forward end and said rearward end, at least some of said conduits having respective wire leads therein.

4,792,727

**SYSTEM AND METHOD FOR OPERATING A DISCHARGE LAMP TO OBTAIN POSITIVE VOLT-AMPERE CHARACTERISTIC**

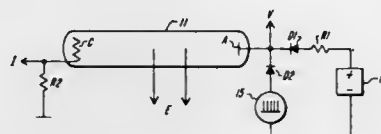
Valery A. Godyak, Bradford, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Oct. 5, 1987, Ser. No. 104,185

Int. Cl.<sup>4</sup> H05B 37/00

U.S. Cl. 315—176

20 Claims



1. A system for controlling a gas discharge lamp to provide a positive voltage-current characteristic to permit stable lamp operation without a ballast, said system comprising, means coupled to said lamp and defining a first source of power to

provide electron heating, without in itself providing ionization, of the lamp gas, and means also coupled to said lamp and defining a second pulsed source of power having an average output power substantially less than the first source output power to provide ionization of the lamp gas and having a duty cycle substantially less than unity.

4,792,728

**CATHODOLUMINESCENT GARNET LAMP**

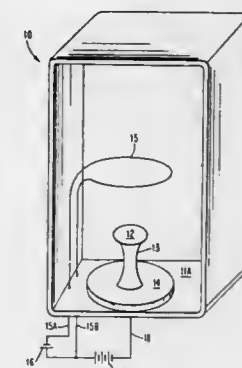
Ifay F. Chang, Chappaqua; Ronald I. Feigenblatt, Dobbs Ferry; Webster E. Howard, Yorktown Heights, all of N.Y., and Eugene I. Gordon, Convent Station, N.J., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 10, 1985, Ser. No. 743,190

Int. Cl.<sup>4</sup> H01J 1/62

U.S. Cl. 315—169.3

16 Claims



1. An intense light source comprising a coating means to inhibit light transmission from regions of said crystal: an evacuated chamber formed by one or more walls, a self-supporting garnet crystal in said evacuated chamber, a relatively massive heat sink in heat conducting relation to said crystal, excitation means located in said chamber for exciting said garnet crystal simultaneously over a substantial portion of a surface of said crystal, with electromagnetic radiation from many directions, and a light transmitting region in at least one wall of said chamber for transmitting light emitted by said garnet crystal.

4,792,729

**FLUORESCENT LAMP BRIGHTNESS CONTROL**

Robert M. Peters, Fort Wayne, Ind., assignor to Lyall Electric, Inc., Kendallville, Ind.

Filed Jul. 31, 1986, Ser. No. 891,312

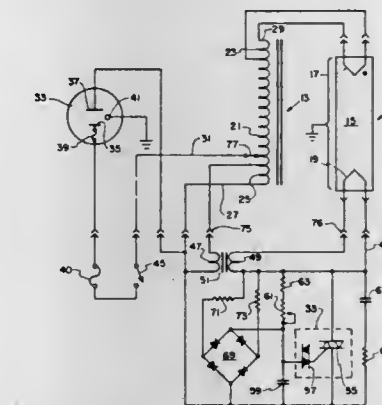
Int. Cl.<sup>4</sup> H05B 41/392

U.S. Cl. 315—200 R

13 Claims

1. A rapid start type fluorescent lamp system comprising: an elongated fluorescent lamp with low voltage filaments at opposite ends thereof; a step-up autotransformer having a primary circuit and a plurality of secondary circuits, the primary circuit adapted to be energized by line voltage, one secondary circuit for providing a high voltage between lamp ends to initiate lamp operation and thereafter providing an inductive impedance limiting lamp current, a second secondary circuit for energizing one of the low voltage filaments, and a third secondary circuit for energizing the other low voltage filament; a thermal protection device responsive to autotransformer temperature for opening the primary circuit when the autotransformer temperature exceeds a predetermined value; a phase control circuit

comprises a bilateral solid state gate controlled switching device connecting the lamp to said one secondary circuit for selectively controlling lamp current and, therefore, also controlling lamp intensity and a relaxation oscillator connected in controlling relation to the gate of the switching device; isolating means comprises a transformer having a Primary winding and a secondary winding with a 1:1 winding turns ratio



for coupling the second secondary circuit and the one low voltage filament without shunting the phase control circuit; a printed circuit board having a plurality of leads extending therefrom to be crimp connected to other leads in the lamp system including at least leads to the lamp and leads to the autotransformer; and an on-off switch to be connected in series with the primary circuit, the phase control circuit, on-off switch, and isolating means being permanently connected to the printed circuit board.

4,792,730

**CIRCUIT FOR INTERRUPTING ARC DISCHARGE IN A GAS-DISCHARGE VESSEL**

Mintcho S. Mintchev, Sofia; Svetoslav A. Savov, Komplex Mladost, and Emil I. Kretey, Sofia, all of Bulgaria, assignors to VMEI "Lenin", Sofia, Bulgaria

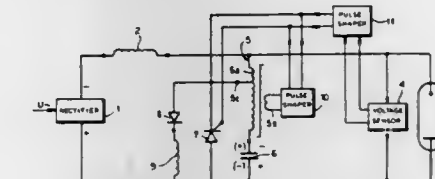
Filed Dec. 30, 1985, Ser. No. 814,683

Claims priority, application Bulgaria, Dec. 29, 1984, 68215

Int. Cl.<sup>4</sup> H05B 41/36

U.S. Cl. 315—209 SC

1 Claim



1. A circuit for quenching a transition from a glow discharge to an arc discharge in a gas-discharge vessel for surface treatment of industrial materials with the glow discharge from said gas-discharge vessel, comprising: a gas discharge vessel having an anode and a cathode; a series network of a rectifier and a first choke continuously connected directly in parallel across said anode and said cathode of said gas-discharge vessel for applying a glow-discharge-sustaining direct current thereto; a saturating transformer having a tapped primary winding

connected in a series connection with a capacitor, said series connection being connected directly across said series network and said anode and cathode of said gas-discharge vessel, said saturating transformer further having a secondary winding;

a thyristor having a gate, an anode connected with a positive terminal of said rectifier and a cathode connected with a tap of said primary winding located closer to a terminal of the primary winding connected to said cathode of said vessel than to a terminal of the primary winding connected to the anode of said vessel;

a series network of a diode and a second choke connected across said anode and cathode of said thyristor with an anode of said diode being connected to said tap whereby the series network of the diode and the second choke is connected in parallel to said thyristor for rapid restoration of a voltage across the anode and cathode of said vessel upon termination of the discharge;

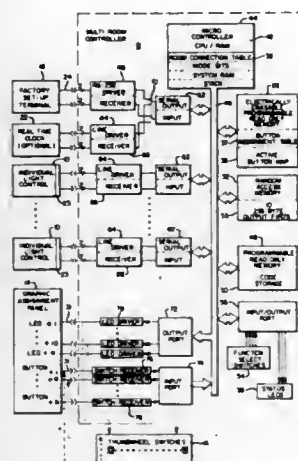
a control pulse shaper having an input connected to said secondary winding and an output connected to a gate and the cathode of said thyristor for rendering said thyristor conductive upon a drop in voltage sensed by said transformer as a voltage difference between a voltage across said capacitor and a voltage across said anode and cathode of said gas-discharge vessel and representing a transition from a normal glow discharge to an arcing condition in said vessel, thereby impressing upon said vessel a voltage inversion to quench said arc discharge;

a voltage sensor connected across said anode and cathode of said gas-discharge vessel and responsive to a development of an excess voltage thereacross; and

another control pulse shaper having an input connected to said voltage sensor and an output connected to the gate and cathode of said thyristor for triggering said thyristor into conduction upon a detection of said excess voltage by said voltage sensor.

#### 4,792,731 MULTI-ROOM CONTROLLED FOR INDIVIDUAL LIGHT CONTROLS

Gordon W. Pearlman, and Steven B. Carlson, both of Portland, Oreg., assignors to Lightolier Incorporated, Secaucus, N.J.  
Filed Mar. 16, 1987, Ser. No. 26,529  
Int. Cl.<sup>4</sup> G01R 22/00; H05B 37/00  
U.S. Cl. 315—316 15 Claims

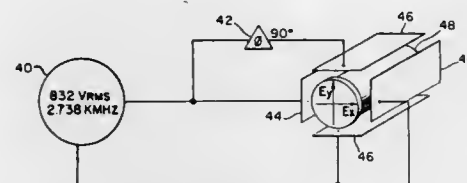


1. A multi-room controller for controlling a plurality of individual light controls, each light control adapted to control directly lighting within an associated room of a partitionable space and to respond to other light controls that can indirectly control the lighting, comprising:  
assignment means operable for linking individual light con-

trols in a group for control by each individual control within the group; and  
controller means in communication with each individual control and responsive to operation of the assignment means for enabling each individual light control within the group of linked controls upon activation to control the lighting within the rooms associated with the group, the lighting thereby responsive to each of the linked individual light controls.

#### 4,792,732 RADIO FREQUENCY PLASMA GENERATOR

James P. O'Loughlin, Albuquerque, N. Mex., assignor to United States of America as represented by the Secretary of the Air Force, Washington, D.C.  
Filed Jun. 12, 1987, Ser. No. 60,881  
Int. Cl.<sup>4</sup> H01J 1/00 5 Claims



1. A plasma generator comprising:  
a container for containing a gaseous material;  
an RF generator;  
circularly-polarized field producing means coupled to said RF generator and introducing a circularly-polarized electric field within said container to form a neutral plasma within said container;  
said neutral plasma having a predetermined and substantially uniform electron energy level established throughout the interior volume of said container;  
said uniform electron energy level being established by the magnitude and frequency of said circularly-polarized electric field being related in accordance with a first equation:

$$J = 0.5(eE_s/\omega)^2/m$$

where:

J=said uniform electron energy level in joules,  
 $E_s$ =the magnitude of said electric field in volts per meter,  
 $\omega$ =the frequency of said electric field in radians per second,  
 $m$ =the electron mass in kilograms,  
and  $e$ =the electron charge in coulombs;  
and by the mean free path of electrons in said neutral plasma being determined in accordance with a second equation:

$$mfp \geq 4J/eE_s$$

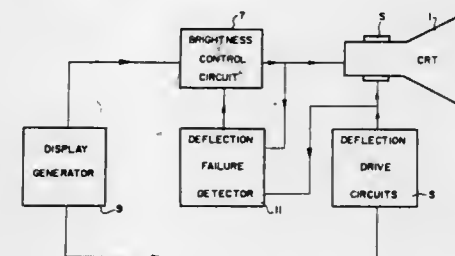
where:

mfp=the mean free path of electrons in said neutral plasma in meters,  
J=said uniform electron energy level in joules,  
and  $e$ =said electron charge in coulombs.

#### 4,792,733 CATHODE RAY TUBE DISPLAY ARRANGEMENTS

Martin W. Redfern, Maldstone, England, assignor to GEC Avionics Limited, England  
Filed Feb. 18, 1987, Ser. No. 15,921  
Claims priority, application United Kingdom, Feb. 28, 1986, 8605030

Int. Cl.<sup>4</sup> H01J 29/52  
U.S. Cl. 315—386 12 Claims

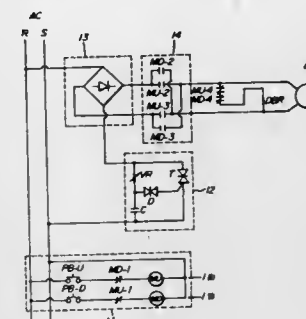


1. A CRT display arrangement comprising: a CRT; deflection means for deflecting an electron beam produced by an electron gun of the CRT across a display screen of the CRT; electronic storage means having a respective storage location for each of a plurality of discrete portions of a display area of the CRT screen; means for storing in each said storage location a value indicative of the temperature in the corresponding portion of said display area due to impact thereon of said electron beam; and means for controlling the electron beam in dependence on the contents of said storage means so as to prevent excessive heating of a said portion of the display screen.

#### 4,792,734 STEPLESS SPEED CHANGE ELECTRIC CHAIN BLOCK

Hisatsugu Watanabe, Yamanashi, Japan, assignor to Kabushiki Kaisha Kito, Yamanashi, Japan  
Filed May 26, 1987, Ser. No. 53,785

Claims priority, application Japan, May 23, 1986, 61-78725[U]  
Int. Cl.<sup>4</sup> H02P 3/16; B66D 1/12  
U.S. Cl. 318—269 2 Claims



1. A stepless speed change electric chain block including: a DC motor for driving a load sheave, comprising a phase control circuit having a variable resistor, a capacitor, a two-way trigger diode, an alternating current source, and a triode AC switch for receiving alternating current from said alternating current source to control the phase of said alternating current, a full-wave-rectifier for receiving alternating current from said phase control circuit to convert said alternating current into direct current which is supplied into the DC motor, mechanical brake means provided in a transmission between said DC motor and said load sheave for braking rotation of the load sheave in a lowering direction, an operating circuit including a

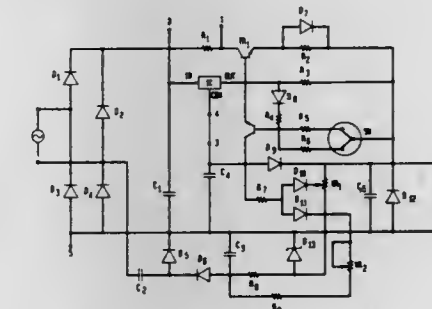
lifting circuit having a lifting operation switch, a normally closed contact pair of a lowering operation relay and a lifting operation relay connected in series and a lowering circuit having a lowering operation switch, a normally closed contact pair of a lifting operation relay and a lowering operation relay connected in series, and a normal and reverse rotating circuit including normally opened contact pairs of said lifting operation relay and normally opened contact pairs of said lowering operation relay, and further comprises a series circuit having a dynamic brake resistor connected in series to said normally closed contact pair of said lifting operation relay and said normally closed contact pair of said lowering operation relay, said series circuit is connected in parallel with said DC motor.

2. A stepless speed change electric chain block including: a DC motor for driving a load sheave, comprising a phase control circuit having a variable resistor, a capacitor, a two-way trigger diode, a source of alternating current, and a triode AC switch for receiving alternating current from said alternating current source to control the phase of said alternating current, a full-wave-rectifier for receiving alternating current from said phase control circuit to convert said alternating current into direct current which is supplied into the DC motor, and mechanical brake means provided a transmission between said DC motor and said load sheave for braking rotation of the load sheave in a lowering direction, wherein said mechanical brake means comprises a cam support rotatably and axially slidably fitted on a load sheave shaft, a retainer disc fitted on said load sheave shaft axially slidably but nonrotatably relative thereto, a brake receiving disc fitted on the load sheave shaft axially slidably but nonrotatably relative thereto, a ratchet wheel rotatably fitted on a boss of the brake receiving disc, a pawl pivotally mounted on a stationary member of the block and urged into engagement with the ratchet wheel by resilient means, an intermediate driven gear fitted on said cam support axially slidably but against rotation thereto, a resiliently urging means for holding said ratchet wheel through said retainer disc, said brake receiving disc and the intermediate driven gear, and brake releasing cam members received in cam grooves each formed in one side of said cam support and having a sloped bottom to change its depth, thereby causing said brake releasing cam members to move into deeper positions in the cam grooves when the cam support is rotated in a lifting direction, and into shallower positions in the cam grooves when the cam support is rotated in a lowering direction.

#### 4,792,735 APPARATUS FOR ADJUSTING TORQUE AND SPEED OF A DENTIST HANDPIECE D.C. MOTOR

In-Suk Kim, Samik Apt 10-615 Chungdam-dong 134-21, Gangnam-gu, Seoul, Rep. of Korea  
Filed Jul. 2, 1987, Ser. No. 69,291  
Int. Cl.<sup>4</sup> G05B 5/00 1 Claim

U.S. Cl. 318—317



1. An adjustable torque D.C. motor control circuit apparatus



for controlling the torque of small medical motors at a constant speed, said apparatus comprising:

- a source of positive and negative D.C. potential;
- a three terminal regulating circuit connected to said source of D.C. potential and having one input connected to said D.C. source, an output connected to said motor and a common terminal;
- a first capacitor and resistor means connected between said common terminal and said source of D.C. potential;
- feedback means connected between said motor and said first capacitor and resistor means for sensing the increased current load on said motor and for increasing the voltage to said common terminal of said three terminal regulating circuit to increase the output voltage of said IC circuit;
- first variable resistor means connected to said first capacitor and resistor means for controlling the discharge of said first capacitor and resistor means and thereby controlling the speed of said motor;
- a second variable resistor means also connected to said first resistor and capacitor means for controlling the speed of said motor, said second variable resistor means comprising a foot step control of variable resistor;
- IC protection means connected between said first capacitor and resistor means and the common terminal of said IC circuit for protecting said IC circuit from a sudden surge of current if an overload occurs on said motor;
- a load resistor  $R_1$  connected across the input and output terminals of said IC regulating circuit;
- a second capacitor and resistance means connected across said load resistance  $R_1$ ;
- transistor switch means connected to said second capacitor and resistance means, the output of said transistor switch means being connected between said common terminal of said IC regulating circuit and said first capacitor and resistance means,

wherein a change of potential across said load resistor  $R_1$  above a certain predetermined value will cause said transistor switching means to electrically disconnect the common terminal of said IC regulating circuit to said first capacitor resistance means.

4,792,736

## CONTROL APPARATUS FOR ELECTRIC VEHICLES

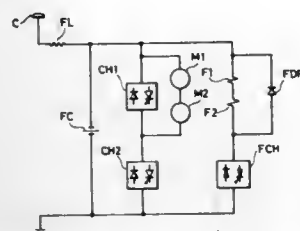
Yoshiji Jimbo, and Seiki Amikura, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 22, 1987, Ser. No. 52,882

Int. Cl.<sup>4</sup> H02P 7/06

U.S. Cl. 318—338

6 Claims



1. A control apparatus for an electric vehicle, comprising: at least one traction motor having an armature and a field winding for driving the electric vehicle;
- first chopper means, connected in parallel with the armature, for controlling a current flowing therethrough in the forward direction by an on-off operation thereof and for enabling current to flow freely in the reverse direction, the second chopper means being subjected to the on-off operation only during a braking operation mode of the electric vehicle; and
- second chopper means, connected in series with the parallel connection of the armature and the first chopper means, for controlling a current flowing therethrough in the forward direction by an on-off operation thereof and for

enabling current to flow freely in the reverse direction, the second chopper means being subjected to the on-off operation only during a powering operation mode of the electric vehicle,

whereby in the braking operation mode an armature current is circulated through the first chopper means when the first chopper means is turned on, and is made to flow through the second chopper means in the reverse direction when the first chopper means is turned off, and in the powering operation mode the armature current is made to flow through the second chopper means when the second chopper means is turned on, and is circulated through the first chopper means in the reverse direction when the second chopper means is turned off.

4,792,737

## CIRCUIT FOR CONTROLLING THE MOTION OF A MOVING OBJECT

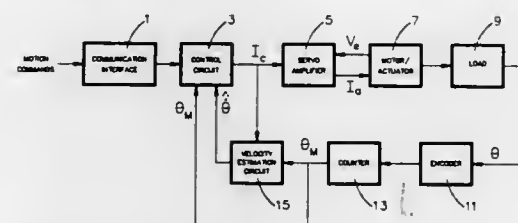
Kenneth W. Goff, and Gary E. Chizever, both of Abington, Pa., assignors to Performance Controls, Inc., Horsham, Pa.

Filed Jun. 15, 1987, Ser. No. 62,189

Int. Cl.<sup>4</sup> G05B 5/01

U.S. Cl. 318—615

30 Claims



1. In an apparatus for control of the motion of an object, the object being moved by an electric motor, the apparatus including means for sensing the position of the object, the motor being controlled by a control current which is dependent, at least in part, on a velocity feedback signal, the improvement comprising means for sampling the control current, means for measuring the actual position of the object, means for multiplying the control current by a motor model constant, the output of the multiplying means being connected to the input of a first integrating means, the output of the first integrating means being connected to the input of a second integrating means, the output of the second integrating means being connected to a means for comparing the output of the second integrating means with the output of the measuring means, means for multiplying the output of the comparing means by a first constant, and for adding the resulting product signal to the input of the second integrating means, the output of the latter multiplying means being permanently connected to the input of the second integrating means, means for multiplying the output of the comparing means by a second constant, and for adding the resulting product signal to the input of the first integrating means, wherein the output of the first integrating means comprises the input signal which is the estimated velocity of the object.

4,792,738

## MACHINE POSITION SENSING DEVICE

Etsuo Yamazaki, and Hitoshi Matsumura, both of Hachioji, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP86/00060, § 371 Date Sep. 11, 1986, § 102(e) Date Sep. 11, 1986, PCT Pub. No. WO86/05009, PCT Pub. Date Aug. 28, 1986

PCT Filed Feb. 12, 1986, Ser. No. 912,520

Claims priority, application Japan, Feb. 13, 1985, 60-25694

Int. Cl.<sup>4</sup> G05B 7/02

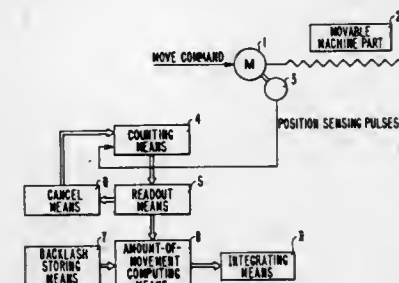
U.S. Cl. 318—630

1 Claim

1. A device for sensing the position of a movable machine

part, which is driven by a motor, through use of pulses available from a position sensor mounted on the motor directly or indirectly, said device comprising:

- counting means for counting the pulses from the position sensor;
- readout means for reading out the count value of the counting means at predetermined time intervals;
- cancel means for cancelling the contents of the counting means by a value equal to the count value read out by the readout means;
- backlash amount storage means for storing an amount of backlash;
- amount-of-movement computing means for computing the actual amount of movement of the movable machine part for each said predetermined time interval on the basis of the count value read out by the readout means and the amount of backlash;
- integrating means for integrating the amount of movement computed by the amount-of-movement computing means; and
- wherein said amount-of-movement computing means comprising:



- backlash discharge storage means for storing a backlash discharge value relative to the movement of the movable machine part in a predetermined direction;
- backlash discharge adding means for adding the stored value of the backlash discharge storage means and the count value read out by the readout means;
- subtracting means for subtracting the amount of backlash from the output value of the adding means;
- first polarity discriminating means for discriminating the polarity of the output of the adding means;
- second polarity discriminating means for discriminating the polarity of the output of the subtracting means;
- amount-of-movement outputting means for outputting either one of the outputs of the adding means and the subtracting means to the integrating means in dependence upon the results of discrimination by the first and second polarity discriminating means; and
- updating means for updating the stored value of the backlash discharge storage means on the basis of the results of discrimination by the first and second polarity discriminating means, the output of the adding means, the amount of backlash, and a present value.

4,792,739

## HIGH-ACCURACY POSITION DETECTION APPARATUS

Ritaka Nakamura, and Akihiko Kuroiwa, both of Fuchu, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 6, 1987, Ser. No. 104,987

Claims priority, application Japan, Jan. 9, 1987, 62-1728; Feb. 16, 1987, 62-31406

Int. Cl.<sup>4</sup> G05B 5/01

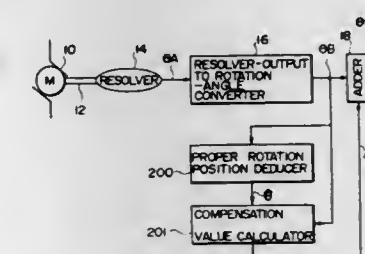
U.S. Cl. 318—661

14 Claims

1. A high-accuracy position detection apparatus comprising: position detection means for detecting a position signal indicating a position of an object which is periodically and repetitively moved;

coupling means for coupling said object to said position detection means with an eccentricity;

coupling eccentricity detection means, connected to said position detection means, for detecting an eccentricity signal, corresponding to an eccentricity resulting from the coupling of said coupling means, from the position detection signal; and



true position signal synthesizer means, connected to said position detection means and said coupling eccentricity detection means, for combining the position signal with the eccentricity signal, to provide a true position signal, which indicates a true position of said object and is independent of the coupling eccentricity of said coupling means.

4,792,740

## THREE-PHASE INDUCTION MOTOR WITH SINGLE PHASE POWER SUPPLY

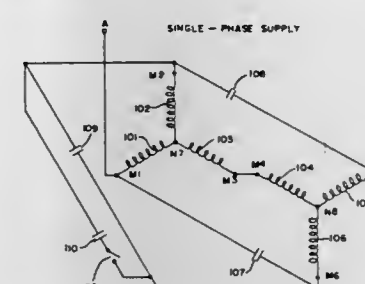
Otto J. M. Smith, 612 Euclid Ave., Berkeley, Calif. 94708

Filed Aug. 14, 1987, Ser. No. 85,981

Int. Cl.<sup>4</sup> H02P 7/48

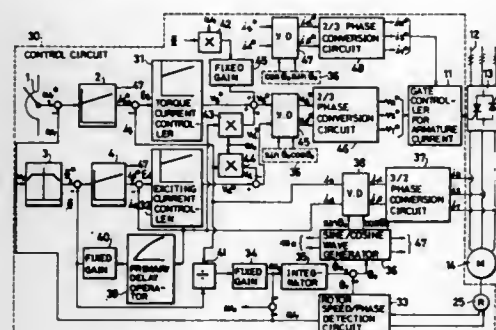
U.S. Cl. 318—768

44 Claims



1. A three-phase induction machine with at least four different machine terminals, said machine having 6 windings comprising two sets of three windings with each pair of windings from each set disposed together to have voltages in phase, and with each pair of windings spaced 120 electrical degrees from another, each set being connected in a symmetrical configuration to provide three set terminals in each configuration, one of the said set terminals in a first set being directly connected to one of said set terminals in the other set, whereby said 6 windings have said four terminals remaining which are said machine terminals, one set having first and fourth terminals and the other set having second and third machine terminals, a two-terminal single-phase supply, the first of said machine terminals being connected to the first of said machine terminals being connected to the first terminal of said single-phase supply, the second of said machine terminals being connected to the second terminal of said single-phase supply, and a first capacitor connected between the third machine terminal and said first terminal of said single-phase supply to substantially produce three different phases of currents in said windings with said single-phase supply.

**4,792,741**  
**CONTROL UNIT FOR NON-CIRCULATING CURRENT TYPE CYCLOCONVERTER**  
 Takayoshi Matsuo, Hyogo, and Kenta Kawasaki, Gifu, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed May 11, 1987, Ser. No. 47,475  
 Claims priority, application Japan, May 12, 1986, 61-108252  
 Int. Cl.<sup>4</sup> H02P 5/40  
 U.S. Cl. 318—800 10 Claims

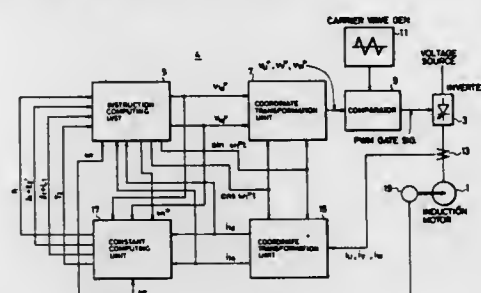


1. A control unit for a cycloconverter of noncirculating current type, which is composed of a speed control means for adjusting rotational speed of a motor as a load, a magnetic flux control means to control a magnetic flux produced in an exciting means of the motor, and a gate control means to control switching of a gate of a commutation means of the cycloconverter on noncirculating current type, said control unit comprising:

- a rotor speed/phase detection circuit for detecting rotor speed and rotor phase, means connected to said rotor speed/phase detection circuit for determining slip frequency from rotor speed, and an integrator for converting slip frequency to slip phase;
- sine/cosine wave generating means for outputting sine/cosine waves as secondary magnetic flux directional signals based on secondary magnetic flux phase, said sine/cosine wave generating means being connected to said rotor phase/speed detection circuit and to said integrator for receiving the deviation between said rotor phase and said slip phase;
- a torque current control means connected to said speed control means and to the output of the cycloconverter for receiving as input deviation between a torque current set value supplied from said speed control means and a torque current feedback value obtained from the output current of the cycloconverter, and for outputting definite torque voltage adjusted value based on the deviation;
- an exciting current control means for receiving as input deviation between an exciting current set value supplied from said magnetic flux control means and an exciting current feedback value obtained from the output current, and for outputting a definite exciting voltage adjusted value based on the deviation;
- a current set value conversion means connected to said speed control means and to said magnetic flux control means and to said sine/cosine wave generating means for converting the torque current set value and the exciting current set value into an alternating current set value, and for outputting the alternating current set value to said gate control means; and
- a voltage set value conversion means connected to said torque current control means and to said exciting current control means and to said sine/cosine wave generating means for converting the output of said torque current control means and the output of said exciting current control means into an alternating voltage set value, and

for outputting the alternating voltage set value to said gate control means.

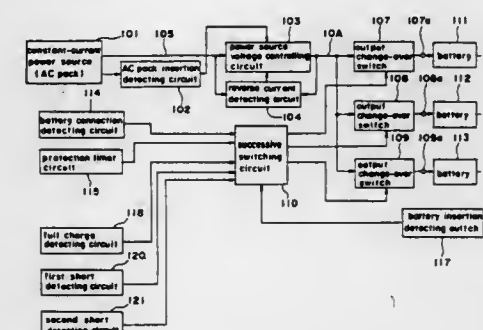
**4,792,742**  
**CONTROL APPARATUS FOR AN INVERTER WITH SELF-ADJUSTMENT FUNCTION OF CONTROL CONSTANTS**  
 Noboru Fujimoto, Hitachi, and Toohiaki Okuyama, Tokai, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed May 5, 1987, Ser. No. 46,157  
 Claims priority, application Japan, May 9, 1986, 61-106469  
 Int. Cl.<sup>4</sup> H02P 5/40 6 Claims  
 U.S. Cl. 318—805



1. A control apparatus for an inverter, which feeds an induction motor with output AC voltage of variable voltage magnitude and variable frequencies, which output voltage is obtained by converting AC voltage supplied by an AC voltage source on the basis of a vector control, comprising:

- current detecting means for detecting a primary current flowing through the induction motor;
- inverter gate control means responsive to an output voltage reference signal for producing gate signals for operating the inverter to control the output AC voltage thereof; for first coordinate transformation means producing the output voltage reference signal by converting an excitation voltage component reference and a torque voltage component reference by means of a coordinate transformation, in which there are used phase references depending on a frequency reference of said output AC voltage of the inverter;
- second coordinate transformation means for producing an excitation current component and a torque current component by converting a primary current detected by said current detecting means by means of a coordinate transformation, in which said phase references are used;
- instruction computing means for producing the references for the excitation voltage component and the torque voltage component and the phase references on the basis of at least one of the excitation current component and the torque current component of the detected primary current and instructions for the excitation current component and a speed of the induction motor, by using motor constants of the induction motor provided in advance therein; and
- constant determining means for calculating the motor constants on the basis of the primary current detected under the condition for a preliminary testing operation of the induction motor that the voltage reference for the excitation component and the torque component, the frequency of the output AC voltage of the inverter add the slip frequency of the induction motor are maintained at desired values necessary for calculating the respective motor constants and readjusting the motor constants provided in said instruction computing means on the basis of the calculation result.

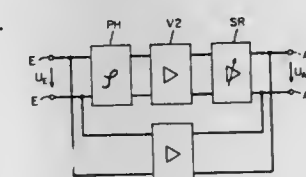
**4,792,743**  
**CHARGING DEVICE**  
 Kazuhiro Tsujino, Matsubara, and Seiji Koyabu, Nara, both of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan  
 Filed Nov. 14, 1986, Ser. No. 930,490  
 Claims priority, application Japan, Nov. 15, 1985, 60-176417[U]; Nov. 15, 1985, 60-176429[U]; Jun. 11, 1986, 61-135423; Jul. 15, 1986, 61-108163[U]; Jul. 16, 1986, 61-167057  
 Int. Cl.<sup>4</sup> H02J 7/04  
 U.S. Cl. 320—15 13 Claims



1. A battery charging device comprising:

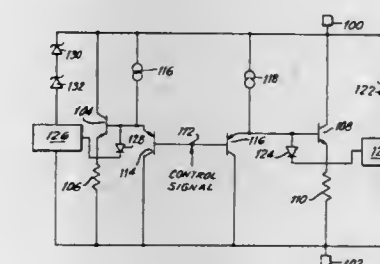
- a constant current source;
- a plurality of battery circuit lines for connecting each of a plurality of batteries, respectively, to the constant current source to be charged thereby;
- a plurality of switch circuits for controlling the supply of current from the constant current source to each of the respective battery circuit lines;
- a full-charge detection means of detecting upon connection to a battery a fully charged state of the battery;
- a short-circuit detection circuit for determining whether a battery is short-circuited by measuring voltage level at a connection terminal of the battery at a selected time after said constant current source is connected thereto;
- a switching control circuit means for switching said battery circuit line switch circuits one after another to successively connect each of said plurality of batteries to said constant current source to be charged, said switching control circuit means operating upon detection of one of a battery fully charged state and a short-circuited battery condition; and
- a source voltage control circuit means for maintaining source voltage of the switching control circuit means when a battery connection terminal is short-circuited, including a series transistor connected in circuit between the constant current source and the battery circuit lines and a circuit including a control transistor connected to the series transistor and a Zener diode connected between the base of the control transistor and the constant current source to control the conducting condition of the series transistor in response to output voltage of the constant current source such that said source voltage control circuit means operates to drive said control transistor to a non-conducting condition to disconnect said constant current source from said battery circuit lines upon a drop in voltage due to connection of a short-circuited battery, said short-circuit detection circuit and said switching control circuit means being connected to said constant current source at a side of said control transistor connected to said constant current source so as to maintain connection of source voltage thereto and sustain operation of said short-circuit detection circuit and said switching control circuit means to disconnect said short-circuited battery from said constant current source and connect another battery to be charged.

**4,792,744**  
**ARRANGEMENT FOR SHIFTING THE PHASE OF A SIGNAL PASSED THROUGH TWO PARALLEL BRANCHES WITH ONE BRANCH HAVING A PHASE SHIFTING NETWORK**  
 Pery Antoine, Villingen-Schwenningen, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, Villingen, Fed. Rep. of Germany  
 Filed Jul. 22, 1987, Ser. No. 76,365  
 Claims priority, application Fed. Rep. of Germany, Jul. 23, 1986, 3624854  
 Int. Cl.<sup>4</sup> H03H 11/20  
 U.S. Cl. 323—217 8 Claims



1. A circuit arrangement for shifting the phase of a signal, comprising: two parallel branches for conveying said signal in each branch; a phase-shifting network in one of said two branches for applying a constant phase shift to said signal when passing through said one of the two branches; and means in one of said branches for controlling the amplitude of said signal and inverting the polarity of said signal.

**4,792,745**  
**DUAL TRANSISTOR OUTPUT STAGE**  
 Robert C. Dobkin, San Jose, Calif., assignor to Linear Technology Corporation, Milpitas, Calif.  
 Filed Oct. 28, 1987, Ser. No. 114,439  
 Int. Cl.<sup>4</sup> G05F 1/46  
 U.S. Cl. 323—269 9 Claims



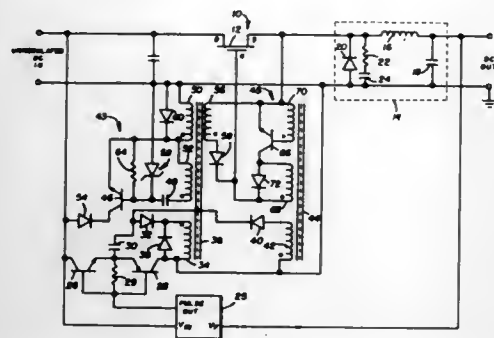
1. A circuit for conducting current between an input terminal and an output terminal in response to a control signal, said circuit comprising: at least first and second transistors, each adapted to conduct a current between said input and output terminals; and means connected to said first and second transistors for



individually adjusting the current conducted by each of said first and second transistors as a function of the voltage differential between said input and output terminals, whereby said first and second transistors conduct current between said input and output terminals over different ranges of voltage differentials.

**4,792,746**  
**NON-DISSIPATIVE SERIES VOLTAGE SWITCHING**  
**REGULATOR HAVING IMPROVED SWITCHING SPEED**  
 Elliot Josephson, Woodside, and Frederick S. Parker, Ben Lomond, both of Calif., assignors to Astec Components, Ltd., Santa Clara, Calif.

Filed May 11, 1987, Ser. No. 48,215  
 Int. Cl.<sup>4</sup> G05F 1/56; H02M 3/156  
 U.S. Cl. 323—290 14 Claims



1. In a switching regulator having output filter means for generating a smoothed output voltage from an unregulated input DC voltage, transistor switch means for periodically coupling an unregulated input DC voltage to said output filter means, and means for developing a periodic waveform having a duty cycle determined by said output voltage, said transistor switch means coupling said input voltage to said output filter means during the on portion of said duty cycle to regulate said output voltage, the improvement comprising:

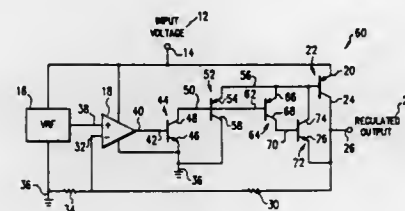
first regenerative circuit means comprising a blocking oscillator, said means responsive to said periodic waveform changing state to the on portion of said duty cycle for developing a first signal of increasing magnitude, said switch means turning on in response to said first signal to couple said input voltage to said output filter means; and second regenerative circuit means comprising a blocking oscillator, said means responsive to said periodic waveform changing state to the off portion of said duty cycle for developing a second signal of increasing magnitude and having a polarity opposite to said first signal, said transistor switch means turning off in response to said second signal.

**4,792,747**  
**LOW VOLTAGE DROPOUT REGULATOR**  
 James E. Schroeder, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jul. 1, 1987, Ser. No. 68,979  
 Int. Cl.<sup>4</sup> G05F 5/00  
 U.S. Cl. 323—303 14 Claims

1. A low dropout regulator for generating a desired output voltage comprising:  
 an input for receiving an input voltage in excess of the desired output voltage;  
 an output for generating the desired output voltage;  
 a first current control element operable to conduct a current between said input and said output;  
 first control circuitry for controlling the current through said first current control element when said input voltage

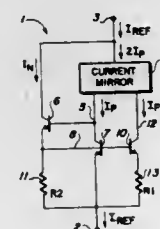
exceeds the desired output voltage by less than a predetermined voltage; and



second control circuitry including a NPN transistor for controlling the current through said first current control element when said input voltage exceeds said desired output voltage by at least said predetermined voltage.

**4,792,748**  
**TWO-TERMINAL TEMPERATURE-COMPENSATED**  
**CURRENT SOURCE CIRCUIT**  
 David M. Thomas, Rodney T. Burt, and Robert M. Stitt, II, all of Tucson, Ariz., assignors to Burr-Brown Corporation, Tucson, Ariz.

Filed Nov. 17, 1987, Ser. No. 121,652  
 Int. Cl.<sup>4</sup> G05F 3/26  
 U.S. Cl. 323—312 19 Claims

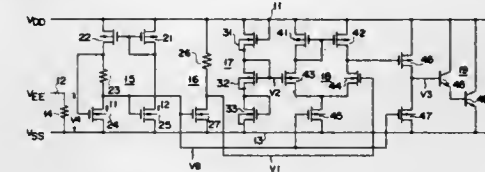


11. A two-terminal constant current source comprising in combination:

- first and second terminals;
- first current source means coupled between the first and second terminals for receiving only a positive temperature coefficient current from the first terminal and supplying only the positive temperature coefficient current to the second terminal, the first current source means receiving and supplying no current other than the positive temperature coefficient current;
- second current source means coupled between the first and second terminals for receiving only a negative temperature coefficient current from the first terminal and supplying only the negative temperature coefficient current to the second terminal, the second current source means receiving and supplying no current other than the negative temperature coefficient current;
- means for selectively controlling the magnitudes of the positive and negative temperature coefficient currents, to thereby control a temperature coefficient of a constant total current equal to the sum of the positive and negative temperature coefficient currents flowing through the first and second terminals, the constant total current being the only current flowing through either of the first and second terminals.

**4,792,749**  
**POWER SOURCE VOLTAGE DETECTOR DEVICE**  
**INCORPORATED IN LSI CIRCUIT**  
 Nobutaka Kitagawa, and Makoto Ito, both of Kawasaki, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 31, 1987, Ser. No. 32,244  
 Claims priority, application Japan, Mar. 31, 1986, 61-71142;  
 Sep. 30, 1986, 61-231878  
 Int. Cl.<sup>4</sup> G05F 3/16  
 U.S. Cl. 323—314 5 Claims



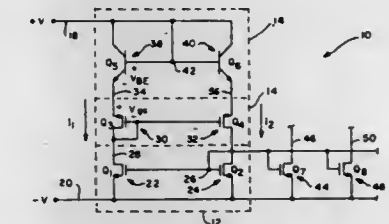
- A voltage regulating circuit comprising:  
 a first node applied with a first power source voltage;  
 a second node applied with a second power source voltage;  
 a third node connected to said second node through a first resistive element;  
 bias voltage generating means, inserted between said first and third nodes, for generating a predetermined bias voltage, said bias voltage generating means comprising:  
 a first MOS transistor of a first conductive type channel, a source of which is connected to said first node,  
 a second MOS transistor of the first conductive type channel, a source of which is connected to said first node, a gate of which is connected to a gate of said first MOS transistor, said gate of said second MOS transistor being connected to a drain thereof,  
 a resistor having one end connected to a drain of said first MOS transistor,  
 a third MOS transistor of a second conductive type channel, a drain of which is connected to said third node, a source of which is connected to the other terminal of said resistor, and a gate of which is connected to one end of said resistor, and  
 a fourth MOS transistor of the second conductive type channel, a source of which is connected to said second node, a drain of which is connected to said drain of said first MOS transistor, and a gate of which is connected to the other terminal of said resistor;

reference voltage generating means for generating a reference voltage, said reference voltage generating means being arranged such that a second resistive element and a fifth MOS transistor having a gate applied with the predetermined bias voltage generated by said bias voltage generating means are inserted in series between said first and third nodes;  
 voltage dividing means for dividing a voltage between said first and third nodes, to output a divided output voltage, said voltage dividing means being arranged such that a plurality of MOS transistors are inserted in series between said first and third nodes;  
 voltage comparing means, arranged between said first and third nodes, for comparing the reference voltage with the divided output voltage output from said voltage dividing means; and  
 current path means including at least a bipolar transistor, a collector-emitter path of which is inserted between said first and third nodes and a base of which receives an output from said voltage comparing means for limiting a current flowing through said first resistive element so as to generate a predetermined voltage drop across the first resistive element;

wherein a voltage applied across the first and second nodes is regulated and a predetermined voltage appears between said first and third nodes.

**4,792,750**  
**RESISTORLESS, PRECISION CURRENT SOURCE**  
 Raymond C. Yan, Daly City, Calif., assignor to Teledyne Industries, Inc., Mountain View, Calif.

Filed Apr. 13, 1987, Ser. No. 37,867  
 Int. Cl.<sup>4</sup> G05F 3/16  
 U.S. Cl. 323—315 24 Claims

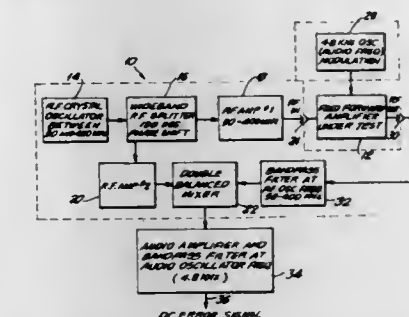


1. Apparatus for providing a precision reference current level, said apparatus comprising:

- first means for providing first and second current paths for the transfer of respective currents, said first means establishing a predetermined relationship between the level of current transferred through said first and second current paths;
- second means, coupled to said first and second current paths, for defining a first transistor active area dependant current/voltage drop relationship at respective points in said first and second current paths; and
- third means, coupled to said first and second current paths, for defining a second transistor active area dependant current density/voltage drop relationship at said respective points in said first and second current paths, wherein said first and second transistor active area dependant current density/voltage drop relationships define a pair of current levels satisfying the predetermined relationship of said first means and the voltage drops of said second and third means are of equal magnitude and opposite relative polarity and wherein said second transistor active area dependant current density/voltage drop relationship is discontinuous with respect to said first current density/voltage drop relationship.

**4,792,751**  
**APPARATUS FOR FIELD TESTING THE**  
**PERFORMANCE OF A FEEDFORWARD AMPLIFIER**  
 Robert M. Blumenkranz, Brea, and John O. Roberts, Jr., Santa Ana, both of Calif., assignors to General Instrument Corporation, New York, N.Y.

Filed Dec. 23, 1985, Ser. No. 812,744  
 Int. Cl.<sup>4</sup> G01R 27/00, 19/00, 21/00, 23/00  
 U.S. Cl. 324—57 N 3 Claims



1. An apparatus for testing the performance of a feedforward amplifier, said test apparatus comprising a source of an RF test signal, a source of an audio-frequency test signal, a mixer

having first and second inputs and an output, phase shift means coupled to the output of said RF test signal source for producing a phase shifted RF test signal and a non-phase shifted RF test signal, means for respectively applying said non-phase-shifted RF test signal and said audio-frequency test signal to first and second inputs of the feedforward amplifier under test, means for applying the output of the feedforward amplifier under test and said phase-shifted RF test signal to said first and second mixer inputs, respectively, and error signal measuring means operatively connected to the output of said mixer, whereby the level of said error signal represents the level of modulation of the radio frequency signal by said audio-frequency signal and thus the distortion of the feedforward amplifier under test.

#### 4,792,752 SENSOR FOR MEASURING PARTIAL PRESSURES OF GASES

Gerhard-Ludwig Schlechtriemen, Lübeck; Werner Weppner, Stuttgart, and Helmut Schubert, Leonberg, all of Fed. Rep. of Germany, assignors to Dräger AG and Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.v., both of, Fed. Rep. of Germany

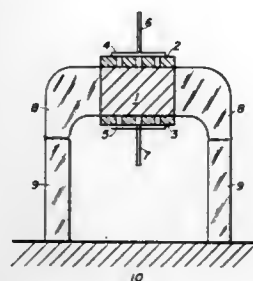
Filed Dec. 9, 1986, Ser. No. 940,483

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1985, 3543818

Int. Cl.<sup>4</sup> G01N 27/00

U.S. Cl. 324—71.1

7 Claims



1. A sensor for measuring partial pressures of oxygen in a mixture of gases, comprising: a sensor element of an ion-conducting solid electrolyte of single phase tetragonal zirconium dioxide which is formed by an addition of about 2-3 mol % of yttrium oxide ( $Y_2O_3$ ) to zirconium dioxide; a first electrode engaged with said sensor element; a second electrode engaged with said sensor element spaced from said first electrode whereby said first and second electrode are used for measuring an electrically measurable quantity.

#### 4,792,753 LOCAL AREA NETWORK PROTOCOL ANALYZER

Kiyoshi Iwai, Tokyo, Japan, assignor to Nippon Board Computer Co., Ltd., Tokyo, Japan

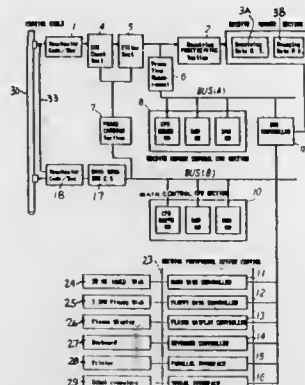
Filed Feb. 19, 1987, Ser. No. 16,280

Claims priority, application Japan, Feb. 21, 1986, 61-36797  
Int. Cl.<sup>4</sup> G01R 31/02; H04J 3/16, 3/02

U.S. Cl. 324—73 R 10 Claims

1. A local area network protocol analyzer for analyzing packets running in a coaxial cable of a local area network, said analyzer comprising:  
an interchangeable code/decoder, said code/decoder being operatively connected to said coaxial cable and adapted to decode a packet received from the coaxial cable into a clock signal and a serial data signal;  
a receive signal processing section, said receive signal processing section receiving the serial data signal and adapted to convert the serial data signal into parallel data;  
a receive memory section having a receiving data memory section, said receiving data memory section receiving and

storing the parallel data from the receive signal processing section;  
a receive memory control section, said receive memory control section controlling said code/decoder, said receive signal processing section and said receive memory section;  
a first bus, said first bus communicating with said receive memory control section;  
a bus controller, said bus controller communicating with said first bus and said receive memory section;  
a second bus, said second bus communicating with said bus controller, wherein said bus controller selectively allows communication between the buses and between the receive memory section;  
an output/input section, said output/input section being connected to said second bus and being adapted to display



the parallel data in the receiving data memory section and to allow input of instructions to control the analyzer;  
main control section, said main control section communicating with said second bus, whereby all operations of the analyzer may be controlled;  
said receive signal processing section including a control counter for controlling an address where the parallel data is stored in the receiving data memory section, said counter counting after each store operation;  
and said receive memory section including a managing data memory section under the control of which for each packet a memory address pointer indicating where the packet is stored is maintained, a packet length is measured and a packet time interval is measured whereby the data from said receive data memory section is analyzed relative to the packet length and packet time interval from said managing data memory section.

#### 4,792,754 DEVICE FOR PRODUCTION OF A TACHOMETRY SIGNAL OF INFINITE RESOLUTION AND WITHOUT RIPLE FROM AN INDUCTIVE POSITION SENSOR

Michel Pourcelin, Muret, France, assignor to Regie Nationale Des Usines Renault; La Telemecanique Electrique and Bertrand Petico, all of Creteil, France

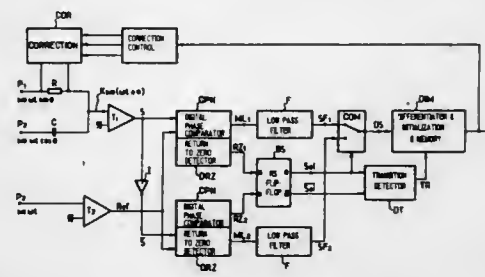
Filed Dec. 16, 1986, Ser. No. 942,372

Claims priority, application France, Dec. 16, 1985, 85 18629  
Int. Cl.<sup>4</sup> G01P 3/48

U.S. Cl. 324—166 4 Claims

1. A device for production of a tachometry signal of infinitely fine resolution and without ripple from an inductive position sensor fed by a sinusoidal reference signal and supplying two phase signals, comprising:  
a resistance-capacitance circuit tuned to the frequency of the reference signal, said resistance-capacitance circuit connected to said two phase signals and supplying a sinusoidal signal whose phase angle is proportional to a rotation of the sensor;

digitizing means connected to said resistance-capacitance circuit and said sinusoidal reference signal for converting said sinusoidal signal and said sinusoidal reference signal to first and second digital signals;  
inverter means connected to said digitizing means for producing a third digital signal which is the inverse of said first digital signal;  
a plurality of digital phase comparators connected to said digitizing means, each generating a square-wave width modulation signal and consisting of a circuit of simple flip-flops which produce a corresponding square-wave width modulation signal beginning with each transition from a determined direction of an input signal and ending with each transition from a determined direction of said second digital signal, said input signal being said first digital signal in at least one digital phase comparator and being said third digital signal in at least one additional digital phase comparator;



each digital phase comparator having associated therewith a return to zero detector consisting of another flip-flop circuit which produces a corresponding return to zero signal when there occurs a transition in the input signal to begin the square-wave width modulation signal while the square-wave width modulation signal is already being produced;  
a storage flip-flop which produces a selection signal in response to said return to zero signals;  
a plurality of low pass filters each receiving one square-wave modulation signal to produce a filtered signal;  
an electronic switch controlled by the selection signal to sample from each of the filtered signals a second half of each cycle to obtain a single sawtooth signal; and  
a single differentiator with means for elimination of discontinuities for generating an outgoing tachometry signal from said single sawtooth signal.

#### 4,792,755 PROCESS AND APPARATUS FOR THE NON-DESTRUCTIVE EXAMINATION OF FERROMAGNETIC BODIES HAVING SECTIONS OF SURFACE ADJOINING EACH OTHER ALONG EDGES AND/OR AT CORNERS

Gerhard Hüscherlath, Laufach-Frohnhofen, and Ekkehard Reh-fus, Hürth, both of Fed. Rep. of Germany, assignors to Nukem GmbH, Hanau, Fed. Rep. of Germany

Filed Jul. 11, 1986, Ser. No. 884,364

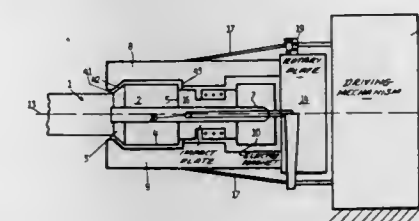
Claims priority, application Fed. Rep. of Germany, Jul. 16, 1985, 3525376

Int. Cl.<sup>4</sup> G01N 27/83; G01R 33/06

U.S. Cl. 324—225 11 Claims

1. A method for non-destructively examining at least corners or edges or radially symmetric ferromagnetic bodies rotatable about an axis of symmetry thereof, said corners or edges contoured along the axial direction of said body, comprising the steps of:  
producing a static magnetic field in said body;  
measuring in a first measuring phase, to obtain first measured stray flux values, magnetic stray fields extending outside said body along the axial direction of said body on or over at least a section of a contoured edge or corner surface of

said body and also situated at a location so that other sections of said edge or corner surface of said body can be measured as a result of changes in relative position between said body and said location;  
storing first measured values of said stray flux measurements as compensation values with reference to said location at which said measurements arise along said section of said surface;  
rotating said body so that said other sections of said contoured edge or corner surface are successively positioned at said location;



measuring in a second measuring phase a plurality of stray fluxes of said other sections of said edge or corner surface of said body to obtain second measured stray flux values; subtracting said second measured stray flux values measured at said other sections of said edge or corner surface from said compensation value allocated to said location to obtain difference values;  
comparing said difference values with predetermined threshold values; and  
indicating a structural fault exists when said difference values are of greater magnitude than said predetermined threshold values, wherein stray fields due to edge or corner contours are compensated.

#### 4,792,756 METHOD AND APPARATUS FOR MEASURING AXIALLY EXTENDING DEFECTS IN FERROMAGNETIC ELEMENTS

Clive C. Lam; Marvin Milewicz, and James E. Bradfield, all of Houston, Tex., assignors to PA Incorporated, Houston, Tex.

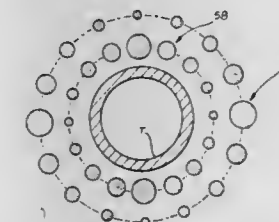
Continuation of Ser. No. 999,060, Apr. 11, 1984, abandoned.

This application May 4, 1987, Ser. No. 45,311

The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> G01N 27/72, 27/82; G01R 33/12

U.S. Cl. 324—232 23 Claims



1. Apparatus for determining the extent of axially-extending defects in an element during axial movement of the element, comprising:  
means transversely spaced from the element for applying a first magnetizing field along a portion of the axially moving element;  
a first fixed electrical conductor means transversely spaced from the axially moving element and having a first sinusoidally-shaped conductor cross-sectional distribution around the element for applying a fluctuating magnetic



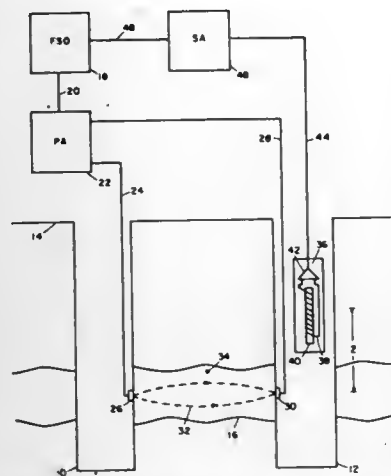
field to the portion of the axially moving element in addition to the first magnetizing field;  
 a second fixed electrical conductor means having a second sinusoidally-shaped conductor cross-sectional distribution around the element of a different phase from the first sinusoidally-shaped conductor distribution for cooperating with the first conductor means for applying the fluctuating magnetic field of a substantially constant magnitude; means traversely spaced from the axially moving element for detecting the driven field induced in the portion of the axially moving element by the fluctuating magnetic field; means for comparing a phase angle of the fluctuating magnetic field to a phase angle of the driven field; and means for correlating the difference between the phase angles of the fluctuating magnetic field and the driven field to determine the extent of defects in the axially moving element.

**4,792,757**  
**OIL WELL LOGGING TOOLS MEASURING PARAMAGNETIC LOGGING EFFECT FOR USE IN OPEN BOREHOLES AND Cased WELL BORES**  
 William B. Vail, III, Bothell, and Paul B. Schwinberg, Seattle, both of Wash., assignors to Paramagnetic Logging, Inc., Woodinville, Calif.  
 Continuation of Ser. No. 720,943, Apr. 8, 1985, Pat. No. 4,656,422, and a continuation-in-part of Ser. No. 387,198, Jun. 10, 1982, Pat. No. 4,528,508. This application Apr. 6, 1987, Ser. No. 35,084

The portion of the term of this patent subsequent to Apr. 7, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> G01R 33/20

U.S. Cl. 324—303

4 Claims



1. Apparatus for remote detection and volumetric measurement of at least a portion of a remote petroleum reservoir in a geological formation whereby said apparatus is located on the surface of the earth and vertically above said remote petroleum reservoir, and comprising

means for causing A.C. current at a frequency substantially equal to the Larmor frequency of the nucleons contained within said portion of the remote petroleum reservoir to flow through the geological formation whereby an A.C. magnetic field is applied to the remote petroleum reservoir to place a portion of the petroleum reservoir into a state of nuclear magnetic resonance which therefore causes a change in the paramagnetism of the portion of the remote petroleum reservoir thereby resulting in a change in the earth's magnetic field in the vicinity of said portion of the petroleum reservoir which also causes a change in the magnetic field on the surface of the earth above the petroleum reservoir, said means comprising two or more elec-

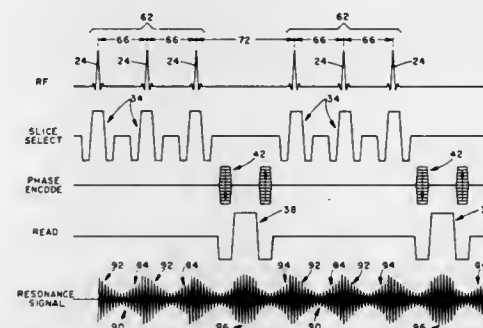
trodes in electrical contact with the surface of the earth for conducting current thru the formation, and means on the surface of the earth for simultaneously measuring the resulting change in the earth's magnetic field above said remote petroleum reservoir to provide an indication of the presence or absence of petroleum and other fluids such as water within said portion of the petroleum reservoir.

**4,792,758**  
**STEADY-STATE ECHO MAGNETIC RESONANCE IMAGING**

William Sattin, Cleveland Hts., Ohio, assignor to Picker International, Inc., Highland Hts., Ohio  
 Filed Nov. 19, 1987, Ser. No. 122,773  
 Int. Cl.<sup>4</sup> G01R 33/20

U.S. Cl. 324—309

19 Claims

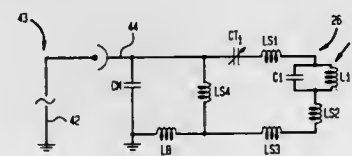


1. A method of magnetic resonance imaging comprising:
  - (a) establishing a steady state resonance condition;
  - (b) intermittently permitting a steady state echo to occur by interrupting the radio frequency pulses;
  - (c) sampling magnetic resonance data during the echo;
  - (d) maintaining the steady state condition by applying radio frequency pulses with an interpulse interval that is shorter than the sample relaxation time;
  - (e) repeating steps (b), (c), and (d) with a plurality of magnetic field gradients to collect a plurality of magnetic resonance data samplings; and,
  - (f) transforming an image representation from the plurality of samplings.

**4,792,759**  
**MULTI-FREQUENCY SURFACE PROBE**  
 Hanan Keren, Kfar Saba, and Itzhak Linnenberg, Netanya, both of Israel, assignors to Elscint Ltd., Haifa, Israel  
 Filed Jul. 29, 1987, Ser. No. 78,895  
 Int. Cl.<sup>4</sup> G01R 33/20

U.S. Cl. 324—322

11 Claims



1. A multi-frequency tuned surface probe comprising:
  - sampling coil means for transmitting and receiving RF pulses and signals,
  - shield cable means for transferring said pulses and said signals to and from said sampling coil means,
  - tuning capacitor means in series in said sampling coil means for tuning said probe to a first desired resonant frequency,

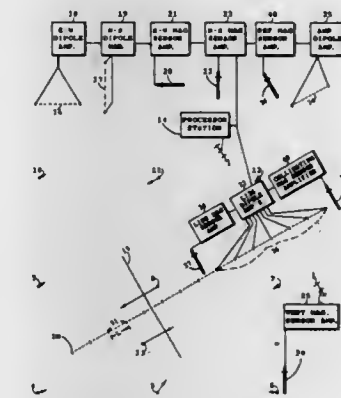
at least one parallel tuned circuit in series in said sampling coil for tuning said probe to another desired resonant frequency, matching capacitor means coupled between the shielded cable and the shield, and said sampling coil means coupled to the shield of the said shielded cable through coupling coil means.

**4,792,761**  
**GEOPHYSICAL PROSPECTING WITH COLLIMATED MAGNETOTELLURIC FIELDS**  
 Thomas C. King, Rte. 2 Box 59, San Saba, Tex. 76877, and Byron T. Arnason, 4104 Honeycomb Rock Cl., Austin, Tex. 78731

Filed Apr. 6, 1987, Ser. No. 34,737  
 Int. Cl.<sup>4</sup> G01V 3/08

U.S. Cl. 324—350

15 Claims



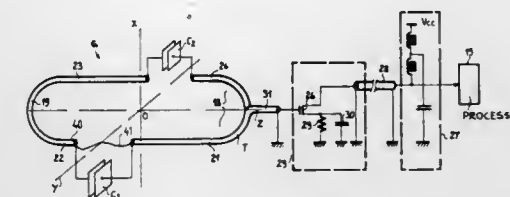
**4,792,760**  
**RECEPTION ANTENNA FOR OPTICAL IMAGE FORMATION DEVICE USING NUCLEAR MAGNETIC RESONANCE**

Hervé Jacob, Gif-Sur-Yvette, and Jean Bussari, Athis, both of France, assignors to Thomson-CGR, Paris, France  
 Filed Feb. 4, 1987, Ser. No. 10,638  
 Claims priority, application France, Jul. 2, 1986, 86 01722

Int. Cl.<sup>4</sup> G01R 33/20

U.S. Cl. 324—322

9 Claims



1. A reception antenna for an optical image formation device using nuclear magnetic resonance by which a body is subjected to a constant magnetic field and to a radio-frequency excitation from an emitting antenna causing a resonance of the oscillation of the magnetic moments of the particles of said body and wherein as soon as said radio-frequency excitation ceases, a measurement is made of the resonant signal emitted by said body when the magnetic moments of the particles tend to become realigned with said constant magnetic field, said reception antenna including a means for symmetrization in order to receive said resonance signal and to provide for the transformation of the impedance of said reception antenna in order to transmit said resonance signal wherein said means for symmetrization and transformation comprises:
  - a conductive loop which is frequency tuned by at least one capacitor means arranged symmetrically in said conductive loop;
  - a reception circuit for receiving a signal induced in said conductive loop wherein said reception circuit provides for said impedance transformation and wherein said reception circuit is connected to the terminals of one of said at least one capacitor means and wherein said conductive loop includes a first section comprising a portion of a high frequency line and a second section in series connection to said first section;

wherein said portion of said high frequency line has a ground conductor which is a part of said conductive loop and a core conductor which is connected in order to conduct said resonance signal wherein said core conductor is connected to a terminal of said second section of said loop and to said reception circuit providing said impedance transformation.

4. An electromagnetic geophysical survey method for a survey line comprising:
  - measuring the variations in the earth's electrical field parallel to the survey line at a plurality of points along the survey line;
  - simultaneously measuring the variations in the earth's magnetic field horizontally and orthogonal to the direction of the survey line at at least one point in the vicinity of the survey line;
  - simultaneously taking a collimating electric field measurement of the variations of the earth's electric field by a dipole consisting of two electrodes in contact with the earth on or parallel to the survey line;
  - transforming the measured variations in the magnetic field and electrical field into frequency components;
  - calculating the cross-power of the data from each of the measurements, and stacking the resulting complex products in a cross-power matrix;
  - calculating as a function of frequency the impedance at each point, the impedance being ratio between two elements of the cross-power matrix;
  - numerator of the ratio is the cross-power of the line electric field data for each dipole with the collimating electric field data; and
  - the denominator of the ratio is the cross-power of the line magnetic field data with the collimating electric field data.

**4,792,762**  
**BATTERY CHECK SYSTEM**  
 Michihiro Shiina, Shigenori Goto, Junichi Iwamoto, all of Oh-miya, and Hisashi Hamada, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Japan  
 Filed Aug. 24, 1987, Ser. No. 88,940  
 Claims priority, application Japan, Aug. 28, 1986, 61-130293[U]

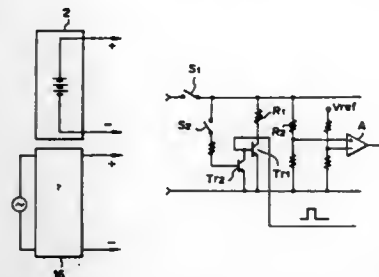
Int. Cl.<sup>4</sup> G01N 27/46

U.S. Cl. 324—426

2 Claims

1. A battery check system for a device which can be supplied with power either from a battery pack or from a D.C. plug adapted to be connected to an A.C. source by way of an

AC/DC converter, the battery pack and the D.C. plug being adapted to be selectively mounted on a power supply mounting portion of the device, characterized in that the battery check system is provided with a large current load check mode for checking the supply voltage under a large load condition and a small current load check mode for checking the supply



voltage under a small load, and there is provided a mode switching means for setting the mode of the battery check system to the large current load check mode when the battery pack is mounted on the power supply mounting portion of the device and to the small current load check mode when the D.C. plug is mounted on the said power supply mounting portion.

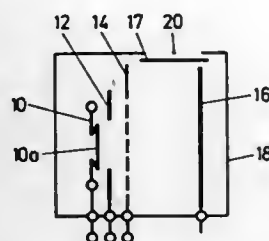
4,792,763

**HOT CATHODE IONIZATION PRESSURE GAUGE**  
Günther Haas, Garching, Fed. Rep. of Germany, assignor to Max-Planck-Gesellschaft Zur Förderung Der Wissenschaften e.V., Fed. Rep. of Germany  
Filed Jul. 13, 1987, Ser. No. 72,672  
Claims priority, application Fed. Rep. of Germany, Aug. 25, 1986, 3628847

Int. Cl.<sup>4</sup> G01L 21/32

U.S. Cl. 324-462

18 Claims



1. A hot cathode ionization pressure gauge with the following electrodes arranged at a mutual distance from one another in the stated sequence along an axis (A):

- a cathode (10) consisting of a tungsten wire at least 0.5 mm thick and which has a middle, active portion (10a),
- a plane control electrode (12) of diaphragm form arranged at a close distance from and parallel to the active portion (10a) of the cathode (10) and having an elongated opening with which the active portion of the cathode is in alignment,
- a plane accelerating electrode (14) arranged at a distance from and parallel to the control electrode (12) and having a series of parallel slit-shaped apertures (22) extending perpendicularly to the longitudinal direction of the active cathode portion (10a), and
- a plane, plate-shaped ion collector electrode (16) parallel to the control electrode (14), the cathode (10) forming on both sides of the active portion (10a) a wire loop which insulates the active portion thermally from the ends of the cathode wire.

4,792,764

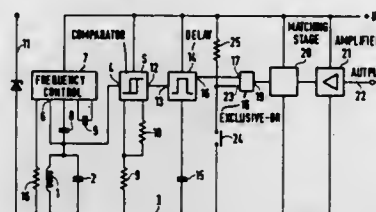
# NONCONTACT ELECTRONIC SWITCHING ARRANGEMENT

Heinz Walker, Küssmersbrunn, and Hans-Dieter Riedel, Erlangen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany  
Continuation of Ser. No. 498,586, May 26, 1983, abandoned.  
This application Oct. 21, 1986, Ser. No. 921,890  
Claims priority, application Fed. Rep. of Germany, Jun. 9, 1982, 3221888

Int. Cl.<sup>4</sup> G01N 27/00; G08B 13/16

U.S. Cl. 328-5

7 Claims



1. An electronic noncontact switching device responsive to external objects comprising:
  - a resonator circuit with an output point for generating a signal having a voltage amplitude damped by said external objects, and a resonance frequency, said resonator circuit being connected between said output point and ground;
  - a condenser for exciting said resonator circuit connected to said resonator circuit at said output point;
  - an oscillator whose frequency is controlled according to said resonance frequency and is connected through said condenser to said resonator circuit; and
  - an evaluation circuit connected to said output point for detecting said voltage amplitude.

4,792,765

# LASER RESONATOR WITH HIGH ASPECT RATIO GAIN REGION AND AZIMUTHALLY SYMMETRIC FRESNEL NUMBER

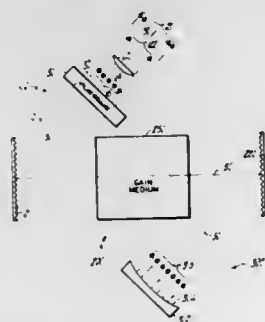
David C. Smith, Glastonbury, Conn., and Kurt E. Oughston, Madison, Wis., assignors to United Technologies Corporation, Hartford, Conn.

Filed Sep. 19, 1986, Ser. No. 909,370

Int. Cl.<sup>4</sup> H01S 3/05, 3/086, 3/083

U.S. Cl. 330-4.3

4 Claims

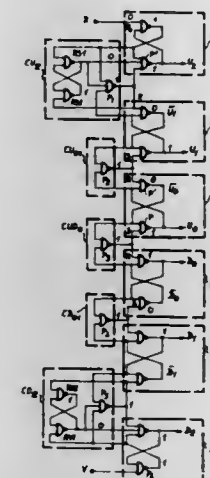


1. An unstable optical resonator for amplifying optical radiation having a diverging wavefront comprising:
  - a feedback region terminating at a feedback mirror having a feedback mirror surface for reflecting optical radiation in a feedback pass and containing an outcoupling aperture located in an outcoupling plane;
  - a gain region containing means for producing an inverted state in a gain medium, said gain region having a non-circular cross section and said diverging wavefront having an azimuthally anisotropic electric field in said gain region; and
  - a back region terminating in a back mirror having a back mirror surface oriented to reflect optical radiation in an output pass back toward said feedback region; in which each of said regions has a feedback pass Fresnel number and an output pass Fresnel number; characterized in that said resonator further includes at least one means for changing the cross section of an optical wavefront incident thereon; and said regions have dimensions related to one another and to the wavelength of said optical radiation such that a total collimated cavity Fresnel number at said outcoupling aperture is substantially azimuthally symmetric.

4,792,767

# PHASE AND FREQUENCY DETECTOR AND USE OF THIS DETECTOR IN A PHASE-LOCK LOOP

Michel Lazarus, Gif sur Yvette, and Michel Frances, Massy, both of France, assignors to Thomson-CSF, Paris, France  
Filed Apr. 28, 1987, Ser. No. 43,465  
Claims priority, application France, May 13, 1986, 86 06860  
Int. Cl.<sup>4</sup> H03L 7/00, 7/06; H03K 5/26  
U.S. Cl. 331-1 A 11 Claims



4,792,766

# METHOD OF CONTROLLING TEMPERATURE IN PUSH-PULL AUDIO OUTPUT CIRCUITS AND TEMPERATURE CONTROL CIRCUIT

Reinhard Wieschhoff, Hildesheim; Andreas Rinse, Westfeld, and Hubertus Pagany, Hildesheim, all of Fed. Rep. of Germany, assignors to Blaupunkt-Werke GmbH, Hildesheim, Fed. Rep. of Germany

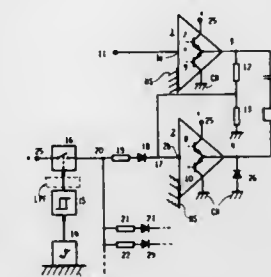
Filed Jun. 18, 1987, Ser. No. 64,086

Claims priority, application Fed. Rep. of Germany, Jul. 5, 1986, 3622713

Int. Cl.<sup>4</sup> H03F 1/52

U.S. Cl. 330-298

15 Claims



1. Temperature controlled push-pull audio output stage, particularly for vehicular radios, having means (11) for supplying an audio signal; a first audio amplifier (1) having a first input terminal (1a) connected to said audio signal supply means, and a first output terminal (3); means (12,13) for supplying said audio signal, phase shifted by 180°; a second audio amplifier (2) having a second input terminal (2b) connected to said phase shift signal supplying means, and a second output terminal (4); a reproducing transducer (6) connected between said first and second output terminals (3,4) and comprising, in accordance with the invention means (14) for sensing, and being responsive to the operating temperature of said first and second amplifiers and providing a high-temperature signal if the operating temperature exceeds a predetermined level; and control means (25,16,19,18,17) coupled to one (2) of said amplifiers, and being responsive to said high-temperature signal for controlling said one amplifier into saturated condition to reduce the amplitude of audio power delivered to said transducer and thereby decrease the heating of said amplifiers.

4,792,768

# FAST FREQUENCY SETTLING SIGNAL GENERATOR UTILIZING A FREQUENCY LOCKED-LOOP

Raymond L. Fried, Liberty Lake, and David M. Hoover, Otis Orchards, both of Wash., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Nov. 6, 1987, Ser. No. 118,118

Int. Cl.<sup>4</sup> H03L 7/00

U.S. Cl. 331-11

5 Claims

1. A frequency-locked loop signal generator for generating an output signal having a controllably selectable frequency, comprising:
  - voltage controlled oscillator means for generating an output signal having a frequency that is controllably variable over a predetermined frequency range;
  - delay line voltage discriminator means coupled to the output of said voltage controlled oscillator means for detecting a change in the frequency of said output signal and providing an error signal having a magnitude representing said frequency change, said error signal being coupled to said

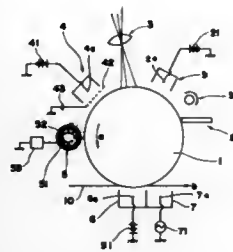




**4,792,775**  
**METHOD FOR THE FORMATION OF OUTLINE IMAGES CORRESPONDING TO THE PERIPHERAL OUTLINES OF DOCUMENT'S IMAGES**  
 Tateki Oka, Toyokawa; Naoki Toyoshi, Toyohashi, and Tomoaki Yokoyama, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Azuchi, Japan  
 Filed Feb. 19, 1987, Ser. No. 16,717  
 Claims priority, application Japan, Feb. 21, 1986, 61-37829; May 2, 1986, 61-102588; Sep. 19, 1986, 61-223246  
 Int. Cl.<sup>4</sup> G03G 15/00

U.S. Cl. 355—77

8 Claims



1. A method for forming by photocopying an outline of an image, said method comprising:
  - a first step of charging an electrostatic latent image bearing member to a predetermined surface potential and charge polarity;
  - a second step of irradiating the charged electrostatic latent image bearing member to thereby form a positive electrostatic image thereon having an image portion with a surface potential corresponding to said predetermined surface potential and a non-image portion having a substantially lower surface potential;
  - a third step of recharging the thus irradiated electrostatic latent image bearing member with a scorotron charger having a grid by applying a voltage to the grid with the same polarity as the polarity of the predetermined surface potential of said first step and a value slightly lower than the surface potential of the image portion for raising the potential of the non-image portion; and
  - a fourth step of developing the electrostatic latent image formed in said third step with a reversal development by using a toner charged to a polarity the same as the first step of charging and a voltage lower than the potential to which the non-image portion has been raised by the grid voltage of said third step.

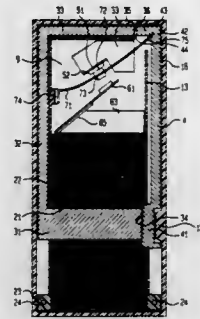
**4,792,776**  
**MINIATURIZED ELECTROMAGNETIC RELAY FOR SWITCHING HIGH VOLTAGES**  
 Klaus Lueneburger, Evansville, Ind., assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Filed Sep. 24, 1987, Ser. No. 100,693  
 Int. Cl.<sup>4</sup> H01H 51/22

U.S. Cl. 335—80

14 Claims

1. An electromagnetic relay comprising:
  - (a) a base body having at least a generally flat bottom side;
  - (b) a coil arranged on that base body having an axis oriented parallel to said bottom side;
  - (c) an angled core having at least two legs perpendicular to each other, both extending along a common plane parallel to said bottom side, a first core leg being disposed axially within said coil and a second core leg extending outside the coil and perpendicular to said leg, at least the first core leg having a free end;
  - (d) an armature resting against the free end of said first core leg and adaptively shaped to rock thereon and another movable free end portion forming a working air gap between it and a portion of the angled core, the armature also extending parallel to said bottom side;
  - (e) a contact assembly having at least one movable contact mounted on a contact spring and at least one counter-contact element, said at least one movable contact and said at least one counter-contact element each electrically connected to a terminal; and
  - (f) said contact spring having a first end rigidly secured, an accurate central portion generally longitudinally located

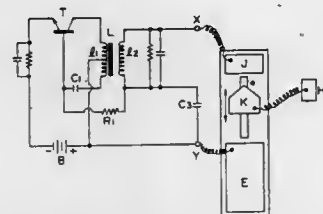
tween it and a portion of the angled core, the armature also extending parallel to said bottom side;



between its first and second ends directly carrying the one movable contact, and the second end connected to the movable end portion of the armature whereby energizing the coil attracts and moves the armature in a first direction and exerts a compressional force against the second end of the contact spring to control the deflection of the central portion of the spring so as to move the at least one movable contact in a second direction different than said first direction toward said at least one counter-contact element.

**4,792,777**  
**VARIABLE WATER RESISTOR FOR CONTROLLING THE APPLICATION OF A THERAPEUTIC VOLTAGE TO THE HUMAN BODY**  
 Kazumi Masaki, Osaka, Japan, assignor to Ken Hayachibara, Okayama, Japan  
 Filed Aug. 26, 1987, Ser. No. 89,955  
 Claims priority, application Japan, Aug. 31, 1986, 61-203954  
 Int. Cl.<sup>4</sup> H01C 10/02

U.S. Cl. 338—80 3 Claims

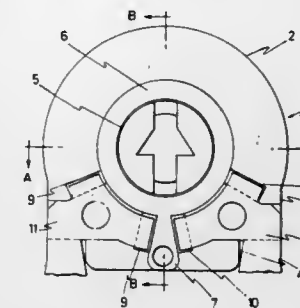


1. A variable water resistor for controlling the application of a therapeutic voltage to a human body, comprising:
  - two fixed electrodes provided at a predetermined interval, said fixed electrodes being connected with an output terminal of a low-frequency oscillator that generates said therapeutic voltage;
  - a sliding electrode slidable along with said fixed electrodes, said sliding electrode being connected with a therapeutic electrode that is placed on the skin of the human body during therapy; and
  - said fixed electrodes and sliding electrode being soaked in water to form a variable water resistor when in use.

**4,792,778**  
**POTENTIOMETER**  
 Jose C. L. Arriazu, Tudela, Spain, assignor to Navarra De Componentes Electronicos, S.A. (NACESA), Tudela, Spain  
 Filed Feb. 24, 1987, Ser. No. 18,343  
 Claims priority, application Spain, Nov. 25, 1986, 86/03166  
 Int. Cl.<sup>4</sup> H01C 10/34

U.S. Cl. 338—174

3 Claims

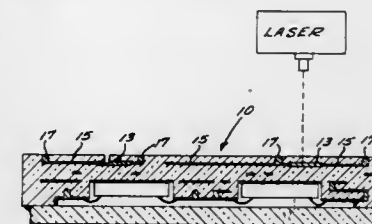


1. A potentiometer comprising:
  - (a) a frame having a circular crown-shaped depression on an inner face of a base portion;
  - (b) a slider-holder being guided by said depression, said slider-holder having a lateral projection which will butt against a projection on said depression for limiting rotation of said slider-holder;
  - (c) a slider connected to an angular projection on said slider-holder by means of pivots, said slider having a circular shape encompassing slightly more than 180° of said circle, said slider comprising two oval segments;
  - (d) a resistance track contacting said oval segments and bending said segments into a circular shape, said resistance track having a projection extending into a corresponding depression in said frame for restraining said track from rotating; and
  - (e) a collector attached to said slider-holder, said slider having two projections for contacting said collector.

**4,792,779**  
**TRIMMING PASSIVE COMPONENTS BURIED IN MULTILAYER STRUCTURES**  
 Ramona G. Pond, Downey; William A. Vitriol, Anaheim, and Raymond L. Brown, Riverside, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.  
 Continuation of Ser. No. 910,109, Sep. 19, 1986, abandoned. This application Apr. 18, 1988, Ser. No. 183,521  
 Int. Cl.<sup>4</sup> H01C 10/00

U.S. Cl. 338—195

11 Claims



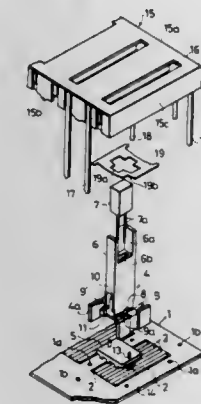
1. A process for trimming a passive circuit component formed within a hybrid multilayer circuit structure, comprising the steps of:
  - forming a buried passive circuit component between two dielectric layers of hybrid multilayer circuit structure;
  - processing the multilayer circuit structure to provide a fired

structure having a buried passive circuit component disposed between two fired dielectric layers thereof; and selectively trimming the buried passive circuit component through at least one fired dielectric layer.

**4,792,780**  
**SLIDING OPERATION TYPE ELECTRIC PART**  
 Kisaburo Takahashi, Miyagi, Japan, assignor to Alps Electric Co., Ltd., Japan  
 Filed Jun. 30, 1987, Ser. No. 79,690  
 Claims priority, application Japan, Sep. 10, 1986, 61-137944[U]; Sep. 10, 1986, 61-137945[U]  
 Int. Cl.<sup>4</sup> H01C 1/12

U.S. Cl. 338—202

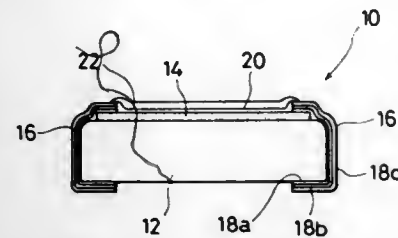
3 Claims



1. A sliding operation type electric part comprising:
  - a horizontal base plate made of insulating material and have conductive patterns formed on an upper surface thereof;
  - a frame made of an insulating material mounted on said base plate having a horizontal upper wall provided with a lower surface thereof spaced vertically from the upper surface of said base plate, said frame having a plurality of slits formed through said upper wall which are in parallel and spaced laterally apart from each other;
  - a plurality of slider holders slidably mounted in the space between said upper wall of said frame and said base plate having respective operation knobs with illuminated ends which project through said slits to an upper side of said frame so that said knobs can be operated to move the respective slider holders longitudinally on the respective conductive patterns formed on the upper surface of said base plate,
  - wherein said frame includes, for each of said slits, a pair of conductive plates provided on said lower surface of said upper wall, each of said conductive plates extending longitudinally on a respective side of said slit, and
  - wherein each of said slider holders includes a first slider holder to which said knob is mounted, a light emitting member mounted on the illuminated end of said knob having a pair of terminals extending downward through said knob toward said first slider holder, a pair of first sliders mounted on an upper side of said first slider holder and extending in electrical contact slidably with the pair of conductive plates, respectively, connecting portions buried in said knob connecting said first sliders to said terminals of said light emitting member, respectively, a second slider holder mounted on a lower side of said first slider holder, a second slider carried on said second slider holder and extending on a lower side thereof in electrical contact slidably with a respective conductive pattern on said base plate, and linking means for physically uniting said first and second slider holders in one body.



**4,792,781**  
**CHIP-TYPE RESISTOR**  
 Tetsumo Takahashi; Etsuka Miyachi; Masayuki Yoshida; Shunichi Kumagai, and Akio Sasaki, all of Tokyo, Japan, assignors to TDK Corporation, Japan  
 Filed Feb. 17, 1987, Ser. No. 15,282  
 Claims priority, application Japan, Feb. 21, 1986, 61-36627; Mar. 3, 1986, 61-44090; Jan. 12, 1987, 62-4473  
 Int. Cl.<sup>4</sup> H01C 1/012  
 U.S. Cl. 338—307 29 Claims

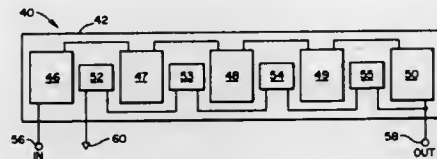


1. A chip resistor comprising:  
 a chip-like insulating substrate;  
 a resistance element arranged on at least one surface of said substrate;  
 an end electrode made of a metal film deposited on each of side end surfaces of said substrate according to a thin film deposition technique, said end electrode being integrally formed into a substantially C-shape so as to continuously and thoroughly cover each of said side end surfaces and be connected to said resistance element.
20. A process for manufacturing a chip resistor comprising the steps of:  
 providing a punched insulating substrate material which has a plurality of slit-like apertures formed in parallel with one another at predetermined intervals and a plurality of bar-like sections provided between respective adjacent two said slit-like apertures and formed integral with one another;  
 forming a resistance element on each of predetermined positions of an upper surface of each of said bar-like sections of said substrate material according to a thick film deposition technique;  
 depositing end electrodes on each of side end surfaces of each of said bar-like sections of said substrate material in a manner to positionally correspond to each of said resistance element according to a thin film deposition technique, said end electrodes each being integrally formed into a substantially C-shape so as to continuously and thoroughly cover each of said side end surfaces and be connected to said resistance element;  
 separating said bar-like sections from one another; and  
 dividing each of said separated bar-like sections into chip-like substrate units to obtain said chip resistor.

**4,792,782**  
**APPARATUS AND METHOD FOR PROVIDING IMPROVED RESISTIVE RATIO STABILITY OF A RESISTIVE DIVIDER NETWORK**  
 Robert W. Hammond, 15014 73rd Ave. W., Edmonds, Wash. 98020  
 Continuation of Ser. No. 778,964, Sep. 23, 1985, abandoned. This application Mar. 16, 1987, Ser. No. 26,156  
 Int. Cl.<sup>4</sup> H01C 7/06, 3/10  
 U.S. Cl. 338—309 19 Claims

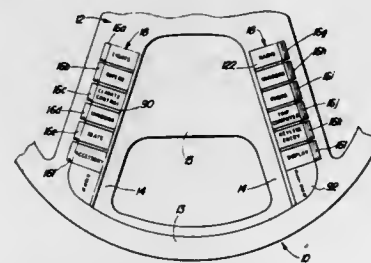
1. A resistive network, comprising:  
 a substrate;  
 a first resistive element disposed on said substrate having two interconnected portions substantially equal in power dissipation in response to an applied voltage, one of said

portions connectible to an input terminal and the other of said portions connectible to an output terminal;  
 a second resistive element disposed on said substrate substantially



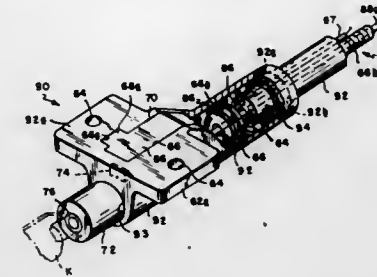
tially equidistant between said one and the other portions of said first resistive element, said second resistive element having one end connectible to a ground terminal and a second end connectible to said output terminal.

**4,792,783**  
**VEHICULAR FUNCTION CONTROLLER HAVING ALTERABLE FUNCTION DESIGNATORS**  
 James P. Burgess, Camarillo, Calif., and Thomas R. Wheeler, West Bloomfield, Mich., assignors to Electro-Mechanical Products, Rochester, Mich.  
 Filed May 7, 1986, Ser. No. 860,547  
 Int. Cl.<sup>4</sup> B60Q 3/00  
 U.S. Cl. 340—22 16 Claims



1. A control system for use by an operator of a vehicle for actuating a plurality of vehicular functions located remotely from the operator, said system comprising:  
 (A) a plurality of discrete switches disposed upon the steering control of said vehicle, each switch adapted to selectively control a plurality of remotely located functions and each switch providing tactile feedback to the user;  
 (B) discrete display means associated with, and in close proximity to each of said plurality of switches, each display means adapted to selectively provide a plurality of alterable function designators that specify the particular function being controlled by the associated switch;  
 (C) control means including a microprocessor and adapted to:  
 (1) receive signals indicative of the activation of each of said switches,  
 (2) determine which alterable function designator is to be appropriately displayed in conjunction with each of said switches,  
 (3) activate the display means of said appropriate designator, and  
 (4) provide control signals in response to the activation of each of said switches; and,  
 (D) means adapted to receive the control signals and distribute said signals to the appropriate function which is to be controlled, whereby each switch is adapted to operate in cooperation with the control means so as to control a plurality of said vehicular functions, and the display means associated with each switch is adapted to display which of said functions is being controlled at a given time.

**4,792,784**  
**AUTOMOBILE SECURITY SYSTEM**  
 Neil B. Kaplan, 92A Beach St., Cohasset, Mass. 02025  
 Filed Dec. 19, 1986, Ser. No. 944,665  
 Int. Cl.<sup>4</sup> B60R 25/00  
 U.S. Cl. 340—63 17 Claims

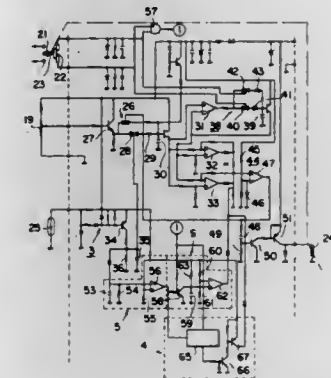


1. Vehicle security apparatus of the type including a tubular housing; a lock barrel having a rotary lock cylinder that controls a retractable latch, said barrel being slidably received in the housing bore and movable between an unlocked extended position and a locked retracted position within the bore; a spring positioned in the housing bore and which biases the barrel toward its extended position and detent means for establishing the extended and retracted positions of the barrel by engagement with the latch; said detent means including a first detent section that engages the latch when the latch is extended an appreciable distance from the barrel; a second detent section that engages the latch when the latch is extended a lesser distance from the barrel; and means permitting rotation of the barrel within said housing to a release position when the barrel is not in its locked position so that the latch no longer engages the detent means whereby the barrel can be pulled entirely out of the housing, said permitting means comprising a ramp-like third detent section extending laterally from the second detent section substantially to the wall of said bore, said third section slidably receiving said latch when the barrel is positioned axially in said bore to locate the latch opposite said third section and the barrel is rotated to slide said latch along the third section to the wall of said bore.

**4,792,785**  
**TURN SIGNAL CANCELLING APPARATUS FOR USE IN VEHICLES**  
 Miyamaru Yukio, Tokyo; Kaoru Hatanaka, Saitama; Shigeo Kawada, Saitama, and Yasuo Shibata, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Sep. 14, 1982, Ser. No. 417,878  
 Claims priority, application Japan, Sep. 16, 1981, 56-145773  
 The portion of the term of this patent subsequent to Sep. 6, 2000, has been disclaimed.  
 Int. Cl.<sup>4</sup> B60Q 1/34, 1/00  
 U.S. Cl. 340—73 10 Claims

1. A turn signal cancelling apparatus for use in a motorcycle having a turning handlebar, comprising:  
 speed detecting means for providing a speed signal responsive to a speed of said motorcycle;  
 handlebar turning angle detecting means for providing an output signal responsive to a turning angle of said handlebar;  
 switch means for controlling a pair of blinker lamps, said switch means being manually operable by a driver of the motorcycle, and having selectable positions including a neutral position and a pair of operative positions for selectively activating said blinker lamps, said switch means providing a selection signal responsive to the selection of said positions;  
 electrical returning means for driving said switch means to

return from one of said operative positions to said neutral position;  
 time measuring means for receiving said speed signal and said selection signal so as to provide an output signal responsive to the time elapsed after said blinker lamp has been activated under the condition that the speed of said motorcycle is higher than a predetermined speed;  
 distance measuring means for receiving said speed signal and said selection signal so as to provide an output signal responsive to a distance covered by said motorcycle after said blinker lamp has been activated under the condition that the speed of said motorcycle is lower than said predetermined speed;  
 said speed detecting means selectively actuates said time measuring means or said distance measuring means;

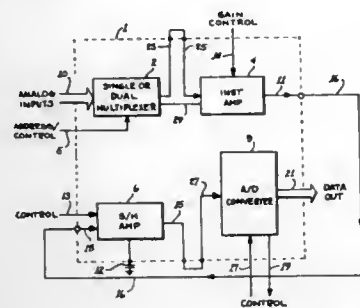


said electrical returning means being operatively connected with said turning angle detecting means, said time measuring means and said distance measuring means, and operating to drive said switch means upon receipt of at least one of said output signals of said turning angle detecting means, said time measuring means and said distance measuring means;  
 said turning angle detecting means comprises a return angle detecting means for detecting a return angle of said handlebar by comparing the turning angle of said handlebar with a maximum turning angle of said handlebar after said blinker lamp has been activated; and  
 said return angle detecting means has a peak holding circuit for holding the maximum turning angle of the handlebar.

**4,792,786**  
**SURFACE-MOUNTED SINGLE PACKAGE DATA ACQUISITION SYSTEM**  
 Charles H. Lewis, Fife; James P. Edgar, Edinburgh, both of Scotland, and Heinz-Juergen Metzger, Pflanzhausen, Fed. Rep. of Germany, assignors to Burr-Brown Limited, Livingston, Scotland  
 Continuation of Ser. No. 894,063, Aug. 7, 1986. This application Mar. 2, 1988, Ser. No. 166,735  
 Claims priority, application United Kingdom, Mar. 5, 1986, 8610893  
 Int. Cl.<sup>4</sup> H03M 1/00 5 Claims

1. A data acquisition system physically packaged for surface mounting, said system comprising:  
 (a) a first integrated circuit chip means for selectively receiving, in response to a control signal, one of n pairs of analog signal inputs and generating a resultant analog signal;  
 (b) a second integrated circuit chip means for amplifying said analog signal;  
 (c) a third integrated circuit chip means for temporarily storing said amplified analog signal;  
 (d) a fourth integrated circuit chip means for converting said

amplified analog signal into a digital signal for proportionate value; and  
 (e) a single substrate of non-conducting material, said single substrate measures less than two (2) inches on a side, said substrate being used for mounting said first, second, third and fourth integrated circuit chip means, said first, second, third, and fourth integrated circuit chip means being provided with bonding pads, said single substrate being provided with peripheral bonding pads and substrate conductors, said first, second, third, and fourth integrated circuit chip means being electrically interconnected using wire-bonding methods to said substrate conductors and to said substrate bonding pads, said peripheral bonding pads forming part of a leadless chip carrier for surface mounting said data acquisition system to a next higher level of packaging integration.

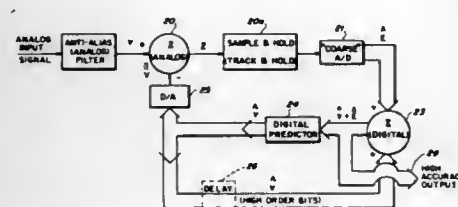


**4,792,787**  
**WIDE DYNAMIC RANGE ANALOG-TO-DIGITAL CONVERTER USING LINEAR PREDICTION**  
 Jeffrey M. Speiser, Harper J. Whitehouse, and William H. McKnight, all of San Diego, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 4, 1987, Ser. No. 10,675  
 Int. Cl. H03M 3/04

U.S. Cl. 341—156

4 Claims



1. In a system for indicating the relative physical displacement between first and second members, one of which is reciprocally movable along a given path through multiple positions with respect to the other member, which positions include a first position at one end of the normal travel of said one member, a last position at the opposite end of the normal travel, and a transition position in between said first and last positions:

- at least two parallel encoding tracks provided on said first member, each of said tracks being encoded to form a series of distinct sections extending generally in the direction of said given path, with the respective sections thereof being located in accordance with a predetermined pattern that differs from the pattern of the encoded sections of any other track; and
- a position sensor including at least two probes mounted on said second member in communication, respectively, with said encoding tracks, each probe being adapted to discriminate between successive sections of the corresponding track as said one member moves from position to position;
- said position sensor being operative to produce a family of at least two separate binary signals the present states of which depend, respectively, on which encoded sections of said tracks said probes last communicated with, whereby the state of each of said signals will change each time the corresponding probe senses a different encoded section as said one member moves from position to position, and the predetermined patterns of the respective tracks being so selected that said family of binary signals will change states at least once as said one member moves from any one of said positions to the next position and such state changes occur in a first predetermined repetitive sequence so long as said one member is moving in a direction from either end position toward its transition position, a second predetermined repetitive sequence different than said first sequence so long as said one member is moving in a direction away from its transition position toward either end position, and a third unique sequence different than either said first or second sequence when said one member is moving through a predetermined limited portion of its travel that includes its transition position.

4,792,788

## POSITION INDICATING SYSTEM

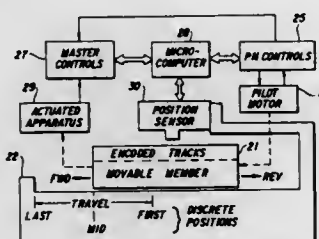
Ajith K. Kumar, Erie, Pa., assignor to General Electric Company, Erie, Pa.

Filed Nov. 23, 1987, Ser. No. 124,138

Int. Cl. H03M 1/22

U.S. Cl. 341—15

20 Claims



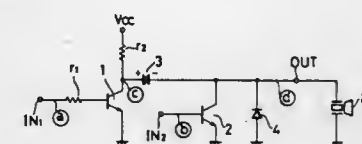
**4,792,789**  
**ALARM DRIVING SIGNAL GENERATOR**  
 Yoshiaki Matsumuro, Shizuoka, Japan, assignor to Yazaki Corporation, Japan

Filed Jul. 17, 1987, Ser. No. 74,563

Int. Cl. G08B 3/00

U.S. Cl. 340—384 E

5 Claims



1. An alarm driving signal generator for driving a voltage actuated buzzer in response to an alarm signal, which comprises:

- a capacitor having a first terminal connected to a supply voltage via a resistor and a second terminal connected to the alarm buzzer;
- a first switching element connected to the first terminal of said capacitor, for intermittently discharging said capacitor in response to the alarm signal; and
- a second switching element connected to the second terminal of said capacitor, for intermittently charging said capacitor in accordance with a time constant in response to a clock signal having a frequency higher than that of the alarm signal, after said capacitor has been discharged by said first switching elements, to activate the alarm buzzer in response to voltage intermittently charged on the second terminal of said capacitor.

**4,792,790**  
**IDENTIFICATION DEVICE IN THE FORM OF A TAG-LIKE STRIP AFFIXABLE TO AN ARTICLE AND METHOD FOR ITS MANUFACTURE**

Max E. Reeb, Mozartstr. 29, D-7320 Göppingen, Fed. Rep. of Germany

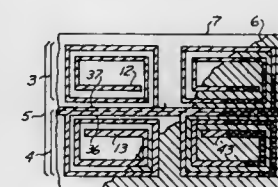
Continuation of Ser. No. 598,086, Jan. 31, 1984, abandoned. This application Sep. 18, 1986, Ser. No. 908,901

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1982, 3221500

Int. Cl. G08B 13/18

U.S. Cl. 340—572

58 Claims



1. An identification device in the form of a flat tag-like construction affixable to an object, comprising:

- a flexible planar, nonconductive substrate;
- a longitudinally extending central conductive path affixed to said substrate including a perforation substantially oriented through the center thereof forming a foldline about which said substrate and said central path may be folded;
- a conductive first element, in electrical communication with said central path, comprising an inductive element formed of flat, connected, conductive paths affixed to said substrate and disposed on one side of said foldline;
- a conductive second element, in electrical communication with said central path, affixed to said substrate on an opposite side of said foldline and registered relative to said first conductive element;
- a dielectric element disposed over at least a portion of one of

said conductive elements; said first and said second conductive elements forming upon the folding over of said substrate about said foldline, in a manner to place said first and said second conductive elements in an opposing aligned relation, a resonant circuit comprising inductive and capacitive elements.

4,792,791

## LUBRICANT OIL MONITORING SYSTEM AND METHOD OF MONITORING LUBRICANT OIL QUALITY

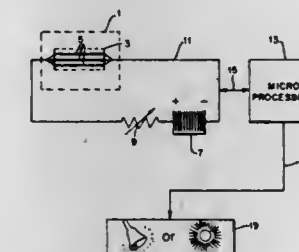
Divna Cipris, Millburn; Thirumalai G. Palanisamy, Morristown, and Arthur T. Walsh, Morris Plains, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 30, 1987, Ser. No. 67,983

Int. Cl. G08B 21/00

U.S. Cl. 340—603

9 Claims



1. A sensor system for in-situ monitoring of lubricant oil quality comprising:

- sensor means comprising a sensor element located in-situ in contact with lubricant oil employed in a combustion motive environment for supplying an electrical signal indicative of the condition of said lubricant oil, said sensor element being a conductive filament, film or foil, with said filament, film or foil being either free standing or supported by a substantially non-corroding, electrically insulating material made of ceramic or plastic, and said sensor element being constructed such that either one of multiple filaments, films or foils are provided, each having different characteristics from the other such that a respective one will break at correspondingly progressive stages of lubricant deterioration;
- power supply means electrically connected to said sensor means for supplying a current thereto;
- measuring means connected electrically to said sensor means and to said power supply means in a manner completing a circuit for measuring current flow from said sensor means; and
- indicator means connected to said measuring means for providing a perceptible indication upon receipt of a signal from said measuring means when an electrical signal from said sensor element exceeds predetermined parameters, whereby degradation of lubricant oil beyond acceptable levels can be determined as a result of degraded oil causing the change in current from said sensor means to a level beyond said predetermined parameters.

4,792,792

## ANTI-THEFT SYSTEM FOR AN AUTOMOTIVE VEHICLE

Harold F. Costino, 183 Bay 54th St., Brooklyn, N.Y. 11214

Filed Feb. 4, 1987, Ser. No. 10,723

Int. Cl. B60R 25/10

U.S. Cl. 340—64

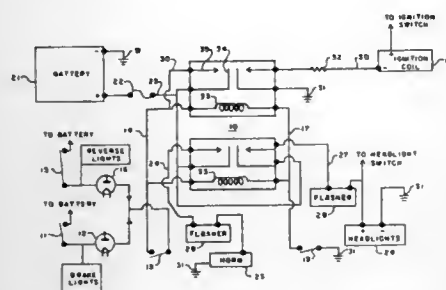
5 Claims

1. An anti-theft system for an automotive vehicle having operational components including a storage battery, electrical ignition coil, headlights, horn, brake lights, reverse lights, and



chassis-grounded electrical distribution system, said anti-theft system, comprising:

- a first circuit employing relay means having a coil activated by a positive flow of twelve volt direct current from the automotive vehicle's brake and/or reverse lights circuits, said current having passed through a first SPST activate switch, said coil being negatively grounded through a second SPST switch which is either hidden or key-activated;
- a second circuit which grounds the spark from the automobile ignition coil to the chassis of the automobile upon activation of said relay means, thereby disabling the ignition of said automobile.



- a third circuit controlled by said relay means, which provides current from the automobile's battery to the automobile's horn;
- a fourth circuit controlled by said relay means, which provides current from the automobile's battery to the automobile's headlights;
- a fifth circuit controlled by said relay means and providing current from the automobile's battery to activate said relay means in a manner bypassing the brake and reverse light circuits, thereby rendering said first SPST switch useless and causing said second SPST switch to be the only means for turning off the horn and headlights and re-starting the automobile.

4,792,793

### CONVERTING NUMBERS BETWEEN BINARY AND ANOTHER BASE

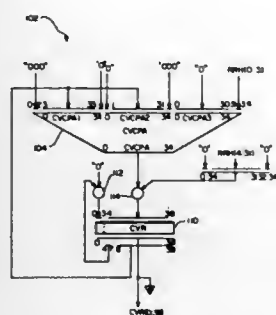
Stephen J. Rawlinson, Sunnyvale, and Jongwen Chion, San Jose, both of Calif., assignors to Amdahl Corporation, Sunnyvale, Calif.

Filed May 28, 1987, Ser. No. 55,184

Int. Cl.<sup>4</sup> H03M 7/00

U.S. Cl. 341—89

13 Claims



1. Apparatus operative in a first mode for converting a decimal number to a binary number and operative in a second mode for converting a binary number to a decimal number, each of the decimal numbers being represented as a sequence of BCD digits, the apparatus being for use in association with a data processing system having a plurality of functional units

for performing arithmetic and logical operations, having a control means for generating a plurality of control signals to operate the functional units and having a clock signal, the control means updating the control signals once each clock cycle, the apparatus comprising:

- a register having a first group of bits and having an input and an output;
- a three-input adder having a first input coupled to a version of the first group of bits in the register output shifted left by one bit, a second input coupled to a version of the first group of bits in the register output shifted left by three bits and a third input;
- means operative in the first mode for iteratively providing to the third input as right-justified 4-bit binary numbers successive high- to low-order digits of the decimal number on successive cycles in a first series of the clock cycles;
- means operative in the first mode for initializing the register prior to the first series of the clock cycles;
- means operative in the first mode for loading the first group of bits in the register with the output of the adder on each of the first series of the clock cycles to iteratively convert the decimal number to binary;
- means operative in the second mode for calculating a first product by multiplying the operand by a first multiplicand substantially equal to  $10^{-m}$ , where  $m$  is an integer between 1 and  $n-1$ , inclusive, the first product having an integer part and a fractional part, and for placing the fractional part in the first group of bits in the register prior to a series of  $m$  of the clock cycles; and
- means operative in the second mode for latching the input of the register to the output of the register on each of the series of  $m$  of the clock cycles to iteratively generate as the integer part of successive adder outputs the  $m$  low-order digits of the decimal number, one digit per clock cycle.

4,792,794

### DIFFERENTIAL PULSE CODE MODULATION SYSTEM WITH NEUTRALIZATION OF DIRECT CURRENT INFORMATION

Jürgen Heitmann, Alsbach-Hähnlein, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Fed. Rep. of Germany  
PCT No. PCT/DE84/00267, § 371 Date Sep. 3, 1985, § 102(e)  
Date Sep. 3, 1985, PCT Pub. No. WO85/03177, PCT Pub. Date Jul. 18, 1985

PCT Filed Dec. 8, 1984, Ser. No. 775,511

Int. Cl.<sup>4</sup> A03M 3/04; H04N 7/13

U.S. Cl. 341—143

13 Claims

Decimal	Code word
+115	L111
+90	L110
+64	L101
+39	L011
+15	0111
+4	0110
+1	0011
0	0101
-1	L100
-4	L001
-15	L000
-39	0100
-64	0010
-90	0001
-115	0000
Synch word	L010

1. Differential pulse code modulation system, wherein an analog signal is converted into binary digital words of a constant length and the digital words are fed through a recording or transmission channel with a high-pass characteristic, the band-width of the analog signal being limited to such an extent that the highest frequency of the analog signal is smaller than

half of the sampling frequency which is used for the analog-digital conversion, comprising code converting means for providing digital words which pertain to the analog signal difference "Zero" and to a range of relatively small positive and negative signal differences adjacent to the signal difference "Zero", with the same number of "0" bits and "1" bits, while the digital words pertaining to the remaining signal differences in a given range of the analog signal include an unequal number of "0" bits and "1" bits, the order of minority bits in consecutive positive and negative digital words changing substantially linearly with the values of the remaining analog signal differences, and the positive and negative digital words having the same absolute value being complementary.

4,792,795

### ELECTRO-MECHANICAL LOCOMOTIVE BELL RINGING APPARATUS FOR QUICK AND EASY REPLACEMENT OF EXISTING PNEUMATIC BELL RINGING SYSTEMS

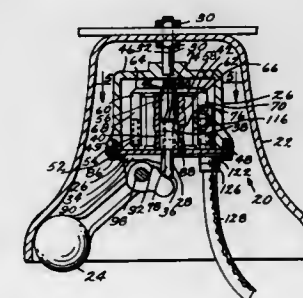
Roderick F. Foran, 202 Reade Street, Moncton, N.B., Canada E1 C6S6

Continuation-in-part of Ser. No. 729,948, May 2, 1985, abandoned. This application Nov. 26, 1986, Ser. No. 935,530

Int. Cl.<sup>4</sup> G10K 1/063

U.S. Cl. 340—395

10 Claims



1. Bell ringing apparatus for use with a railway locomotive bell and striker, said apparatus comprising:
  - a housing defining a first opening therein;
  - means in operative relationship with said housing for attaching said housing to said bell;
  - means attached to said housing adjacent to said first opening for rotatably supporting said striker with a predetermined portion of said striker positioned beneath said first opening;
  - a first ferromagnetic core member supported by said housing and defining a substantially axially aligned bore extending through the entire length of said core member and in alignment with said first opening;
  - an electrical coil supported by said housing and defining a substantially axially aligned central opening receiving said first core member therein;
  - a second ferromagnetic core member positioned within said central opening, said second core member of predetermined length to extend above an upper boundary of said central opening when said second core member contacts said first core member;
  - an inverted U-shaped ferromagnetic armature supported by said second core member, said armature defining a substantially horizontal member having opposed ends and further defining first and second substantially vertical members extending downwardly from said opposed ends, respectively, and adjacent to the exterior of said coil;
  - a rod member projecting downwardly from said second core member, through said bore and through said first opening for contacting said predetermined portion of said striker; and
  - means in operative relationship with said coil for selectively energizing and de-energizing said coil in a predetermined

manner whereby said striker is moved to sound said bell by movement of said rod member against the striker.

4,792,796

### ELECTRONIC ALARM APPARATUS

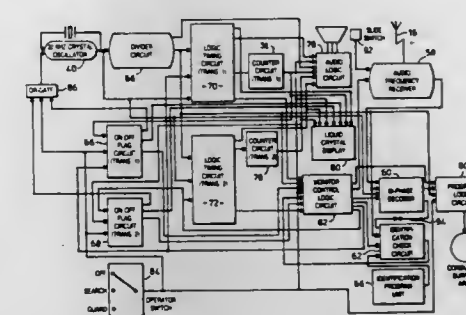
Leroy Bradshaw, Hamilton; John B. Henson, Thornhill, and Paul I. Waterhouse, Lynden, all of Canada, assignors to R.J.S. Security & Tracking Systems Corporation, Toronto, Canada  
Filed Feb. 10, 1987, Ser. No. 13,025

Claims priority, application Canada, Nov. 20, 1986, 523462

Int. Cl.<sup>4</sup> G08B 1/08

U.S. Cl. 340—539

21 Claims



1. In apparatus for monitoring the presence or absence of a common coded radio frequency signal within a given area, monitoring means including electronic circuit means for receiving said coded radio frequency signal, and at least one transmitting means associated with said monitoring means including electronic circuit means for producing and transmitting said coded radio frequency signal periodically in predetermined spaced apart time intervals; said monitoring means including: electronic circuit means for programming said transmitting means to produce and transmit said coded radio frequency signal in said predetermined spaced apart time intervals; for identifying said coded radio frequency signal received with said associated transmitting means; and electronic circuit means and alarm means for indicating failure of reception of said common coded radio frequency signal.

4,792,797

### SMOKE DETECTOR HAVING VARIABLE LEVEL SENSITIVITY

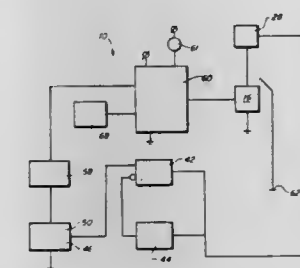
William P. Tanguay, Downers Grove, and James McCrink, Lisle, both of Ill., assignors to Seatt Corporation, Downers Grove, Ill.

Filed Mar. 5, 1987, Ser. No. 22,099

Int. Cl.<sup>4</sup> G08B 17/10

U.S. Cl. 340—628

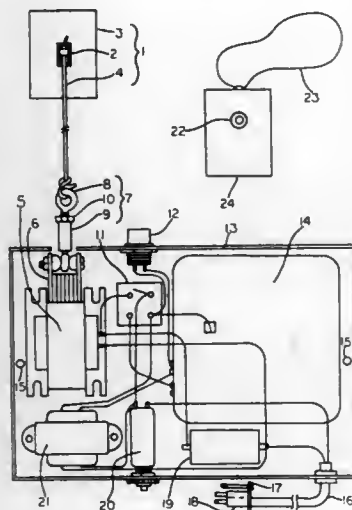
17 Claims



1. A smoke detector comprising: means for sensing smoke levels and generating a signal characteristic of said smoke levels;

means for generating an alarm signal responsive to said sensing means detecting a predetermined smoke level; means for user testing the operability of said smoke detector, said testing means comprising a single user actuated element adapted to cause generation of said alarm signal; and means for temporarily diminishing the sensitivity of said smoke detector by increasing in said sensing means the magnitude of said predetermined smoke level causing generation of said alarm signal, said single user element further adapted to actuate said diminishing means.

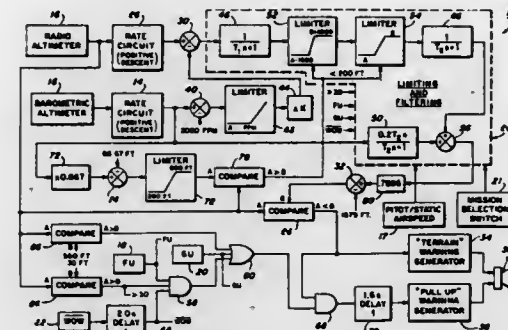
**4,792,798**  
**REMOTE CONTROL SYSTEM FOR PULL-CORDS**  
 Robert F. Wilowski, 74 Hickory Hill Rd., Simsbury, Conn. 06070  
 Filed Apr. 2, 1987, Ser. No. 33,214  
 Int. Cl.<sup>4</sup> H04Q 9/14; H01H 47/18  
 U.S. Cl. 340—696



1. A remote control system for operating a pull cord associated with a wall-mounted pull cord station which has a two-position switch normally maintained in a first position and activating the pull cord station in a second position, comprising:

- a solenoid having a plunger which moves when the solenoid is energized;
- an adjustable linkage connected to said plunger and movable therewith;
- a radio receiver for receiving transmitted radio frequency signals and energizing said solenoid in response thereto;
- a portable, battery powered radio transmitter for transmitting radio frequency signals and being actuated by means of a push button; and
- a portable, self-contained housing adapted to be mounted on a wall so as to be located proximate to the pull cord station, the housing having therein said solenoid and said receiver; wherein, said pull cord is attached at one end to said switch and at a second end to said linkage, so that when the transmitter is actuated a signal is transmitted to said receiver causing the solenoid to become energized whereby the plunger moves the linkage to pull said pull cord, whereby said switch is moved from said first position to said second position.

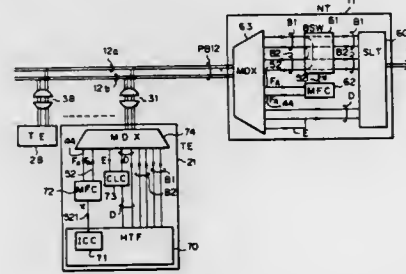
**4,792,799**  
**AIRCRAFT TERRAIN CLOSURE WARNING SYSTEM WITH DESCENT RATE BASED ENVELOPE MODIFICATION**  
 Michael M. Grove, Kirkland, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.  
 Continuation of Ser. No. 704,365, Feb. 22, 1985, abandoned.  
 This application Jun. 12, 1987, Ser. No. 62,368  
 Int. Cl.<sup>4</sup> G08B 23/00  
 U.S. Cl. 340—970



1. A ground proximity warning system for a tactical aircraft comprising:  
 means responsive to a signal representative of the altitude of the aircraft above ground and to a signal representative of the terrain closure rate of the aircraft for generating a closure rate warning when the terrain closure rate is excessive according to a predetermined relationship for the altitude at which the aircraft is flying;  
 means responsive to the descent rate of the aircraft for providing a signal representative of the descent rate of the aircraft; and  
 means responsive to said descent rate signal for reducing the possibility of nuisance closure rate warnings by altering said predetermined relationship as a function of the descent rate to increase the closure rate at which a warning is given as the descent rate increases.

**4,792,800**  
**LOCAL COMMUNICATION SYSTEM AMONG ISDN TERMINAL EQUIPMENTS**  
 Masanobu Fujioke, Yoshikazu Ikeda, and Nobuo Furuya, all of Tokyo, Japan, assignors to Kobusai Denzsin Denwa Co., Ltd., Tokyo, Japan  
 Filed Jul. 8, 1986, Ser. No. 883,402  
 Claims priority, application Japan, Aug. 1, 1985, 60-168582  
 Int. Cl.<sup>4</sup> H04Q 11/04

U.S. Cl. 340—825.05



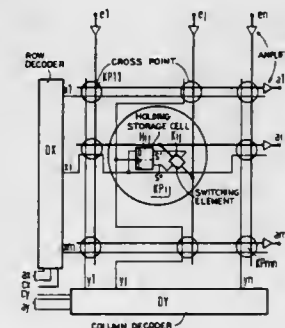
1. A local communication system among ISDN terminal equipment comprising:

a plurality of terminal equipment, each of said terminal equipment including a requesting means;  
 a network termination unit terminating a subscriber line from a network, said network termination unit including a switching means;  
 a passive bus connecting the plurality of terminal equipment to the network termination unit, the passive bus having a two-way communication function containing two two-way circuit-switched communication channels,  
 signals on the passive bus being transferred to said network termination unit and said terminal equipment in two directions of transmission according to a predetermined frame structure including bits for the two two-way circuit-switched communication channels,  
 a multiframe being configured on the passive bus by combining a predetermined number of frames together by utilizing an auxiliary framing bit in each frame,  
 said switching means for coupling two-way circuit-switched communication channels on the passive bus to establish a loop-backed connection for a local communication among the terminal equipment through the network termination unit and for coupling the passive bus with the subscriber line to establish a connection for an external communication,  
 said requesting means for requesting the loop-backed connection for the local communication and the connection for the external communication selectively, by controlling the auxiliary framing bits of the frames in the multiframe, wherein  
 when the loop-backed connection is requested by one of the terminal equipment, the switching means in the network termination unit changes the connection from the external communication into the loop-backed connection.

**4,792,801**  
**BROADBAND SIGNAL SPACE COUPLING DEVICE**  
 Roediger Hofmann, Gilching, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Filed Sep. 17, 1986, Ser. No. 908,240  
 Claims priority, application Fed. Rep. of Germany, Sep. 23, 1985, 3533915

Int. Cl.<sup>4</sup> H04Q 3/00; H03K 19/20  
 U.S. Cl. 340—825.79

2 Claims



1. Broadband signal switching apparatus, comprising:  
 a crosspoint matrix including intersecting column lines, row lines, column selection lines and row selection lines;  
 a row selection decoder including outputs connected to said row selection lines and including a row address input and a clock input;  
 a column selection decoder including outputs connected to said column selection lines and including a column address input and a clock input;  
 a plurality of storage cells each located at a respective intersection and each comprising a complementary metal-oxide semiconductor (CMOS) D flip-flop which includes

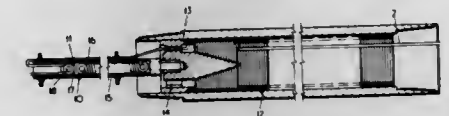
a D input connected to a respective row selection line, a clock input connected to a respective column selection line and an output; and  
 a plurality of switches, each of said switches located at a respective intersection and connected to the respective row and column lines and connected to and operated by the output of the respective flip-flop,  
 each of said storage cells comprising cross-coupled CMOS inverters, one of which has its input connected to the appertaining decoder output of the one selection decoder via a CMOS transfer gate which, in turn, like a further CMOS transfer gate inserted into the feedback path leading to this input of the one CMOS transfer inverter, has its input charged with the output signal of the appertaining decoder output of the other selection decoder and has its other input charged with the negated output signal of said decoder output.

**4,792,802**  
**TELEMETRY SYSTEM FOR BOREHOLE DRILLING**  
 Alan Meadows, Stretton, England, assignor to Coal Industry (Patents) Limited, London, England  
 Filed May 5, 1987, Ser. No. 46,114

Claims priority, application United Kingdom, May 16, 1986, 8612008

Int. Cl.<sup>4</sup> G01V 1/00  
 U.S. Cl. 340—856

9 Claims



1. A telemetry system for borehole drilling comprising an effectively continuous length of hardwire arranged to extend along a drill string located in a borehole electrical signal control equipment being situated outside the borehole and probe means being situated within the borehole, the hardwire extending between the electrical signal control means and the probe means, the effectively continuous length of hardwire including a store of hardwire constituted by a wound hollow coil of hardwire situated adjacent to the probe means, and wherein the coil is bonded to the inside wall of the drill pipe section.

**4,792,803**  
**TRAFFIC MONITORING AND REPORTING SYSTEM**  
 Peter A. Madnick, 627 Valley Oak La., and Russell W. Sherwood, 1798 Allepo Ct., both of Thousand Oaks, Calif. 91360  
 Filed Jun. 8, 1987, Ser. No. 59,769

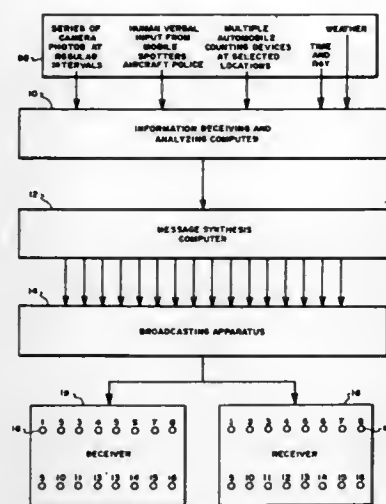
Int. Cl.<sup>4</sup> G08G 1/09  
 U.S. Cl. 340—905

3 Claims

1. A traffic monitoring and reporting system comprising:  
 a plurality of sensors, each said sensor located at a designated location and designed to produce an output based upon traffic conditions at its designated location;  
 an information receiving and analyzing computer, said output of each said sensor to be transmitted to and received by said information receiving and analyzing computer, said information receiving and analyzing computer to generate results based on said output of each said sensor, said results being organized into a plurality of different zones within an overall geographical area;  
 a message synthesis computer to receive the results of said information receiving and analyzing computer, said message synthesis computer to produce a plurality of different messages, each said message to be specially oriented to one of said zones;  
 transmitting of the output of said message synthesis computer to a broadcasting means, said broadcasting means

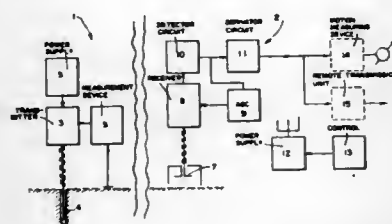


for transmitting of said different messages by radio waves; and



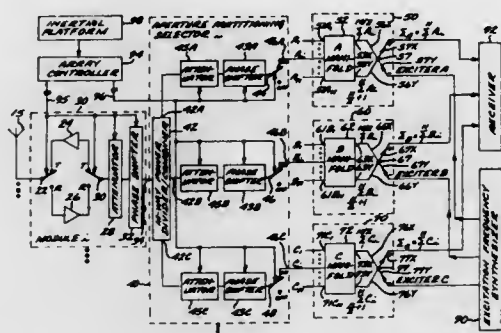
a plurality of receivers, each said receiver to be adapted to be located within a vehicle with therebeing a plurality of vehicles, each said receiver having means to individually select and announce any one of said messages.

**4,792,804**  
**APPARATUS FOR DETECTING A BODY IN MOTION ON THE GROUND OF A PROTECTED AREA**  
Roberto Rubecchini, Arezzo Ar, Italy, assignor to Dei-Dispositivi Elettronici Industriali Di Rubecchini Roberto, Arezzo, Italy  
Filed May 1, 1987, Ser. No. 44,476  
Claims priority, application Italy, May 2, 1986, 9385 A/86  
Int. Cl. G01S 13/04  
U.S. Cl. 342-27 17 Claims



1. Apparatus for detecting a body in motion on the ground of a protected area, comprising:
  - (a) transmitter means for transmitting radio frequency electromagnetic signals including at least a fully buried transmitting antenna, shielded for inhibiting a radio frequency radiation in the air;
  - (b) receiver means for receiving said signals including at least a receiving antenna fully shielded to the air and placed at a known distance from said transmitter means;
  - (c) automatic gain control means coupled to said receiver means for adjusting the sensitivity thereof to an average level of an input signal;
  - (d) detector means for detecting amplitude variations of the input signal, for driving said automatic gain control means and for discriminating fast variations due to a body in motion on the ground from slow variations due to physical effects in the ground.

**4,792,805**  
**MULTIFUNCTION ACTIVE ARRAY**  
Egidio Miglia, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
Filed Apr. 28, 1987, Ser. No. 43,406  
Int. Cl. H01Q 3/22  
U.S. Cl. 342-372 20 Claims



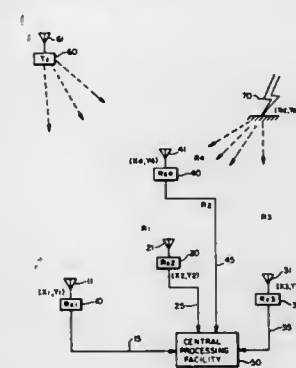
1. An array system for providing a plurality of array subapertures, comprising:
  - an array of N spaced radiative elements forming a radiative aperture;
  - N aperture partitioning selector devices respectively coupled one to a respective radiative element for dividing said radiative aperture into M or fewer subapertures, comprising:
    - an M-way power divider device having M device ports and a radiative element port coupled to said radiative element, said divider device adapted to divide the power of signals received at said radiative element into M component signals of substantially equal power at said device ports; and
    - means for selectively connecting said respective device ports of said power divider device to a corresponding partition port of said selector device;
  - M manifold apparatus having N manifold ports, each of said ports respectively connected to a corresponding partition port of said N aperture partitioning selectors, said manifold apparatus comprising means for combining the respective component signals at said corresponding partition ports of said N selector devices and providing a respective subaperture signal at an output port of each of said M manifold apparatus;
  - an array system controller coupled to said selector devices for controlling said means for selectively connecting said device ports to control the partitioning of said aperture into M or fewer subapertures, each subaperture comprising the radiative elements selectively connected to said respective manifold apparatus; and
  - a receiver responsive to said M subaperture signals to provide a selected partitioned aperture function.

**4,792,806**  
**LIGHTNING POSITION AND TRACKING METHOD**  
Rodney B. Bent, Indialantic, and Paul W. Casper, West Melbourne, both of Fla., assignors to Atlantic Scientific Corporation, Melbourne, Fla.  
Continuation-in-part of Ser. No. 339,789, Jan. 15, 1982, Pat. No. 4,543,580. This application Aug. 19, 1985, Ser. No. 766,466  
The portion of the term of this patent subsequent to Sep. 24, 2002, has been disclaimed.  
Int. Cl. G01S 1/44, 1/24  
U.S. Cl. 342-465 10 Claims

1. A method for detecting emissions from a source of electrical radiation in an atmosphere and providing an indication of

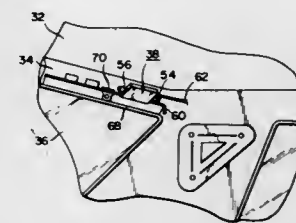
the geographic position of said source, said method comprising the steps of:

- (a) stationing at least three non collinear receivers at known geographic locations, each receiver being positioned in spaced relation to the other receivers;
- (b) encoding a signal at each receiver representative of the time of arrival of an emission from said source in relation to a common timing source;



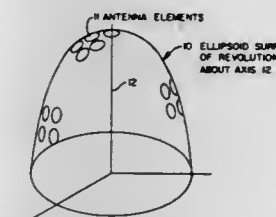
- (c) transmitting each encoded signal from each of said three receivers to a central facility; and thereafter
- (d) processing at said central facility said encoded signals for deriving the position of said source irrespective of whether said emission occurred within or outside a perimeter bounded by said spaced-apart receivers.

**4,792,807**  
**AUTOMOBILE ANTENNA SYSTEM**  
Junzo Ohe, and Hiroshi Kondo, both of Aichi, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
Filed Mar. 25, 1986, Ser. No. 843,630  
Claims priority, application Japan, Mar. 27, 1985, 60-64690  
Int. Cl. H01Q 1/32  
U.S. Cl. 343-712 5 Claims



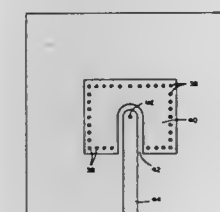
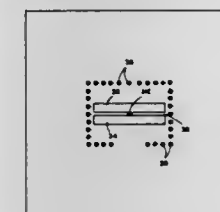
1. An automobile antenna system for detecting high-frequency surface currents induced on the automobile body by broadcast waves, said antenna system comprising:
  - high frequency pickup means including an electromagnetically shielded case, the case having an opening at one end, and a loop antenna having a longitudinal side and disposed within the case so that the longitudinal side of said loop antenna faces the opening in the case; and
  - mounting means for mounting said high frequency pickup means so that the opening in the case faces an edge surface of an edge-molding mounting retainer of the automobile body, the edge-molding mounting retainer being separated from a windshield frame of the automobile body; said high frequency pickup means being provided for detecting surface currents induced on the edge-molding mounting retainer which concentratedly flow along, the edge surface of the edge-molding mounting retainer.

**4,792,808**  
**ELLIPSOID DISTRIBUTION OF ANTENNA ARRAY ELEMENTS FOR OBTAINING HEMISPHERIC COVERAGE**  
Robert C. Hildebrand, Indialantic, Fla., assignor to Harris Corp., Melbourne, Fla.  
Filed Dec. 14, 1982, Ser. No. 449,661  
Int. Cl. H01Q 21/00  
U.S. Cl. 343-853 16 Claims



1. An antenna comprising:
  - a curved three dimensional surface having a rate of change of slope which is non uniform over said surface and the projected area of which is substantially uniform hemispherical or near hemispherical; and
  - an array of antenna elements distributed over said three dimensional surface in an arrangement which provides an effective radiation profile corresponding to the projected area of said surface.

**4,792,809**  
**MICROSTRIP TEE-FED SLOT ANTENNA**  
Roland A. Gilbert, Milford, N.H., and Darrel F. Sedivec, Lawrence, Mass., assignors to Sanders Associates, Inc., Nashua, N.H.  
Filed Apr. 28, 1986, Ser. No. 856,874  
Int. Cl. H01Q 13/18  
U.S. Cl. 343-770 9 Claims

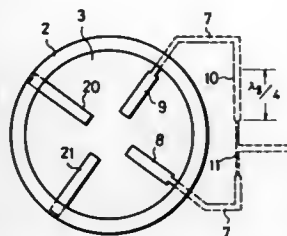


6. A tee-fed slot antenna, comprising:
  - a single board with opposing sides and having electrically conductive layers on said opposing sides and a dielectric layer intermediate said electrically conductive layers;
  - said board having a portion of said electrically conductive layer on one side thereof removed to form two non-conducting areas separated by a conducting area;
  - means for connecting said electrically conductive layers to form a cavity about said two non-conducting areas;
  - said board also having a portion of said electrically conductive layer on the other side thereof remove to form an

elongated entranceway extending into said cavity from one edge thereof; and  
 a planar transmission line disposed in the entranceway to feed energy to this cavity with said transmission line extending to and electrically connected to said conducting area intermediate said two-non-conducting areas.

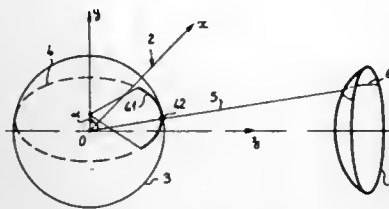
**4,792,810**  
**MICROWAVE ANTENNA**  
 Keiji Fukuzawa, Chiba; Fumihito Ito, Tokyo, and Shinobu Tsunamatsu, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan  
 Filed Jul. 22, 1986, Ser. No. 888,117  
 Claims priority, application Japan, Jul. 23, 1985, 60-162650; Mar. 20, 1986, 61-63176; Mar. 20, 1986, 61-63177; Mar. 20, 1986, 61-63178

Int. Cl.<sup>4</sup> H01Q 1/38, 13/08  
 U.S. Cl. 343-778 24 Claims



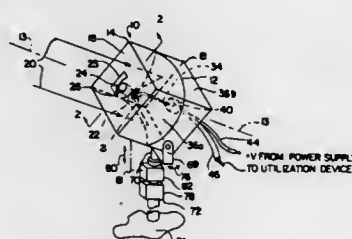
1. A suspended line feed type planar antenna having a substrate sandwiched between a pair of conductive surfaces, each of said surfaces having a plurality of spaced openings defining radiation elements, a plurality of said openings having a pair of excitation probes formed perpendicularly to each other in a common plane, on said substrate, in alignment with said openings, and means for connecting signals received at said pair of excitation probes to a suspended line in phase with each other.

**4,792,811**  
**DEVICE FOR REFLECTING THE ELECTROMAGNETIC WAVES OF A POLARIZATION AND A METHOD OF CONSTRUCTION OF SAID DEVICE**  
 Claude Aubry, Gryguy; Jean Bouko, Villemeillon, and Serge Drabowitch, Chateaux Malabry, all of France, assignors to Thomson-CSF, Paris, France  
 Filed Apr. 16, 1986, Ser. No. 852,557  
 Claims priority, application France, Apr. 19, 1985, 85 06006  
 Int. Cl.<sup>4</sup> H01Q 19/14  
 U.S. Cl. 343-781 CA 11 Claims



1. A microwave reflector having metallic surfaces and non-metallic surfaces, said metallic surfaces being positioned for perfectly reflecting the waves of a first polarization and partly transmitting the waves of a second polarization orthogonal to said first polarization, wherein the metallic surfaces are located at the intersections of the reflector surface with a series of lines which pass through a focal point 0 of said reflector and through a horizontal circle included in a sphere having a center at said focal point 0.

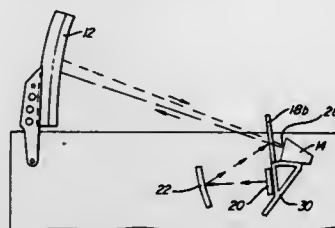
**4,792,812**  
**MICROWAVE EARTH STATION WITH EMBEDDED RECEIVER/TRANSMITTER AND REFLECTOR**  
 Wayne R. Rinehart, P.O. Box 53, Concord, Calif. 94520  
 Filed Sep. 30, 1985, Ser. No. 782,028  
 Int. Cl.<sup>4</sup> H01Q 19/14  
 U.S. Cl. 343-781 R 32 Claims



1. In a microwave receiving/transmitting earth station of the type having a reflector dish in a shape concentrating intercepted rays of a microwave signal beam at a focal point on the axis of the dish, a feed horn located thereat and the dish being alternatively adapted to emit a beam of microwave signals supplied to the feed horn located at the focal point, together with means connecting the feed horn to a utilization device/-source of microwaves; the combination of:

- (a) a layer of thin, microwave reflective material forming said reflector dish, said dish having a front and a back;
- (b) a first mass of material substantially transparent to said microwave beam and having a discrete surface portion in a shape matching said front of said layer of thin microwave reflective material layer, said first mass projecting beyond said focal point by an amount sufficient to encompass said feed horn and thereby provide the sole support therefor and spacing thereof from said dish;
- (c) a second mass of said transparent material, said second mass having a particular surface portion in a shape matching said back of the dish; and
- (d) means integrating said layer, said first mass of transparent material, and said second mass of transparent material into a composite unit having said layer reinforcedly supported between said first and second masses.

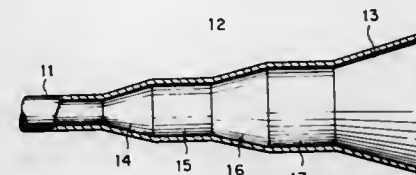
**4,792,813**  
**ANTENNA SYSTEM FOR HYBRID COMMUNICATIONS SATELLITE**  
 Harold A. Rosen, Santa Monica, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
 Filed Aug. 14, 1986, Ser. No. 896,533  
 Int. Cl.<sup>4</sup> H01Q 19/14  
 U.S. Cl. 343-781 P 23 Claims



1. An antenna reflector system, comprising:  
 a first reflector for reflecting radio frequency signals having a first linear polarization; and  
 a second reflector for reflecting radio frequency signals having a second linear polarization different than orthogonal to said first linear polarization;  
 said first and second reflectors intersecting each other along a common axis and being angularly offset relative to each other about said common axis;

the direction of said first linear polarization being parallel to said common axis, the direction of said second linear polarization being perpendicular to said common axis.

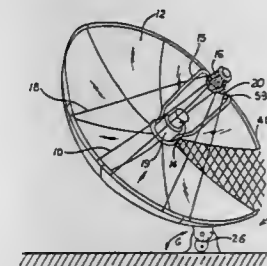
**4,792,814**  
**CONICAL HORN ANTENNA APPLICABLE TO PLURAL MODES OF ELECTROMAGNETIC WAVES**  
 Takashi Ebisui, Kanagawa, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Jul. 28, 1987, Ser. No. 78,669  
 Claims priority, application Japan, Oct. 23, 1986, 61-252405; Oct. 23, 1986, 61-252406  
 Int. Cl.<sup>4</sup> H01Q 13/00  
 U.S. Cl. 343-786 6 Claims



1. A plural mode horn antenna having a desired mode of electromagnetic wave generating portion for generating a desired mode(s) of electromagnetic wave(s) out of plural modes of electromagnetic waves in a position between a feed waveguide located on a base end side and a conical horn located on a fore end side, said plural mode horn antenna comprising

- a first tapered waveguide connected to the fore end side of said feed waveguide and expanding at a predetermined certain angle while defining an inner peripheral surface of a truncated cone from an inside diameter thereof equal to the inside diameter of said feed waveguide up to an inside diameter certain times as large as a predetermined wavelength of the frequency of an electromagnetic wave of a mode to be generated;
- a first straight cylindrical waveguide connected to the fore end side of said first tapered waveguide and extending forward in the form of a cylindrical inner peripheral surface having an inside diameter larger than 1.22 times the wavelength of a minimum frequency of a high frequency band to which the electromagnetic wave of said mode to be generated belongs, smaller than 1.7 times the wavelength of the maximum frequency of said high frequency band, and smaller than 1.22 times the wavelength of a maximum frequency of a low frequency band;
- a second tapered waveguide connected to the fore end side of said first straight cylindrical waveguide and expanding at a certain angle while defining an inner peripheral surface of a truncated cone from an inside diameter thereof equal to the inside diameter of said first straight cylindrical waveguide up to an inside diameter thereof certain times as large as a predetermined wavelength of a frequency different from that of said mode of electromagnetic wave; and
- a second straight cylindrical waveguide connected between the fore end side of said second tapered waveguide and the base end side of said conical horn and having an inside diameter certain times as large as said predetermined wavelength of the frequency different from that of said mode of electromagnetic wave, said inside diameter of said second straight cylindrical waveguide being larger than 1.22 times the wavelength of a minimum frequency of said low frequency band, smaller than 1.7 times the wavelength of the maximum frequency of said low frequency band, and larger than 1.7 times the wavelength of the minimum frequency of said high frequency band.

**4,792,815**  
**RECEPTION SYSTEM FOR SATELLITE SIGNALS**  
 Roger F. G. Moisson, 4875 SW. 28th Ave., Fort Lauderdale, Fla. 33312  
 Continuation-in-part of Ser. No. 679,897, Dec. 10, 1984, abandoned. This application Aug. 20, 1986, Ser. No. 898,092  
 Int. Cl.<sup>4</sup> H01Q 15/20  
 U.S. Cl. 343-915 28 Claims



1. A system for selectively receiving signals from satellites in earth orbit, comprising:

- parabolic reflector means to focus said signals from a particular satellite on receptive means located at a focal region defined by the curvature of said reflector means;
- receptive means operatively connected to said reflective means for receiving said signals for ultimate conversion to intelligible information;
- said reflector means including a plurality of petals rotatably joined at a common polar axis by axial joint means, each said petal being a radial segment of a paraboloid and said petals overlapping one another when folded;
- said petals each having a concave reflective surface, a convex surface, an outer rim that is substantially an arc of a circle, a polar axial element forming a component of said axial joint means, a leading edge and a trailing edge each extending from an end of said arc to said axial element; each of said rotatable petals further including petal shape retaining means extending substantially radially from said axial element substantially to said rim and contained within the concavity of said paraboloid for maintaining the parabolic shape at any degree of rotation for effective signal focus;
- reflector support means connected to said reflector means for supporting said reflector in position;
- and reversible petal rotation means operatively connected to said petals for rotating said petals relative to one another to increase overlapping to reduce reflective surface and signal and also to reduce overall dimensions in a folded position for storage in a first rotational direction and to reduce overlapping and increase reflective surface for forming a larger portion of said paraboloid for increased signal in a second rotational direction.

**4,792,816**  
**DEVICE FOR TRANSPORTING PHOTSENSITIVE MATERIAL PAST AN IMAGING LINE IN TEXT AND GRAPHICS IMAGE SETTING APPARATUS**  
 John A. Kennedy, Jr., Ridge, N.Y., assignor to Dr. Ing. Rudolf Hell GmbH, Kiel, Fed. Rep. of Germany  
 Filed Sep. 22, 1986, Ser. No. 910,368  
 Int. Cl.<sup>4</sup> G01D 9/42  
 U.S. Cl. 346-108 9 Claims

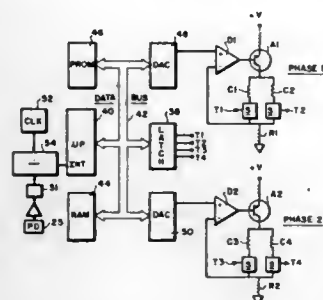
1. Image setting apparatus for producing a two-dimensional image on photosensitive material, said apparatus comprising, in combination:

- (a) means for transporting said photosensitive material past an imaging line to provide a variable first dimension of said two-dimensional image on said photosensitive material, said imaging line extending in a direction perpendicular to said transport direction;



lar to the direction of transport of said photosensitive material, said transporting means comprising:

- (1) at least one driving roller in contact with said photosensitive material;
- (2) a stepper motor mechanically coupled to rotate said driving roller, stepwise rotation of said driving roller causing an advance of said photosensitive material by an amount which deviates a fixed amount from a nominal amount, said nominal amount being equal to the desired longitudinal resolution of said image and said fixed amount being determined at least in part by the dimensional tolerances of said driving roller, said stepper motor having first and second phases, with at least two coils in each phase; and
- (3) controllable circuit means connected to said coils of said stepper motor for rotating said motor in microsteps upon command, a plurality of said microsteps causing an advance of said photosensitive material by approximately said nominal amount, said circuit means comprising:
  - (i) memory means having stored at sequential addressable locations therein digital signals representative of a current waveform to be applied to said coils for causing stepping of said motor;
  - (ii) microprocessor means for incrementally developing sequential address signals which are applied to said memory means for causing readout of the digital signals stored therein, said microprocessor means



initially calculating an address correction factor and then using said address correction factor for determining the incremental change between said sequential addresses which are applied to said memory means;

- (iii) controlled means responsive to said microprocessor means and coupled to said coils for causing current to flow through selected ones of said coils in response to said digital signals readout from said memory;
- said controllable current means thereby permitting correction of small repeatable errors in the advance of said photosensitive material and permitting said motor to be advanced in accordance with any desired resolution;
- (b) a controllable source of electromagnetic radiation ("EMR") for producing a modulated EMR beam; and
  - (c) scanning means for converting said EMR beam into a scanning beam such that a focused beam spot moves repeatedly in a linear direction across said photosensitive material on said imaging line to provide the other dimension of said two-dimensional image on said photosensitive material.

5. Image setting apparatus for producing a two-dimensional image on photosensitive material, said apparatus comprising, in combination:

- (a) means for transporting said photosensitive material past an imaging line to provide a variable first dimension of said two-dimensional image on said photosensitive material, said imaging line extending in a direction perpendicular

lar to the direction of transport of said photosensitive material, said transporting means comprising:

- (1) at least one driving roller in contact with said photosensitive material;
- (b 2) a stepper motor mechanically coupled to rotate said driving roller, stepwise rotation of said driving roller causing an advance of said photosensitive material by a preset nominal amount of said variable first dimension, said stepper motor having first and second phases, with at least two coils in each phase; and
- (3) controllable circuit means connected to said coils of said stepper motor for rotating said motor in microsteps upon command, a plurality of said microsteps causing an advance of said photosensitive material by approximately said nominal amount, said circuit means comprising:
  - (i) a voltage source providing a potential drop between two terminals;
  - (ii) a first sense resistor connected between one of said voltage source terminals and said coils of said first phase;
  - (iii) a second sense resistor connected between said one voltage source terminal and said coils of said second phase;
  - (iv) first current control means connected in series with the other of said voltage source terminals, said coils of said first phase and said first sense resistor, said first current control means having a first control input;
  - (v) second current control means connected in series with said other voltage source terminal, said coils of said second phase and said second sense resistor, said second current control means having a second control input;
  - (vi) controllable switch means, connected in series with each of the coils of said stepper motor, for selectively switching the current through each coil on and off;
  - (vii) a first differential amplifier having two inputs and an output, said output being connected to said first control input and one of said inputs being connected to receive the voltage across said first sense resistor;
  - (viii) a second differential amplifier having two inputs and an output, said output being connected to said second control input and one of said inputs being connected to receive the voltage across said second sense resistor;
  - (ix) memory means having stored at sequential addressable locations therein digital signals representative of a current wave form to be applied to said coils for causing stepping of said motor;
  - (x) microprocessor means for incrementally developing sequential address signals which are applied to said memory means for causing readout of the digital signals stored therein, said microprocessor means initially calculating an address correction factor and then using said address correction factor for determining the incremental change between said sequential addresses which are applied to said memory means;
  - (xi) digital-to-analog conversion means responsive to said digital signals read-out of said memory means and connected to the other inputs of said first and second differential amplifiers, for applying a controlled voltage to each input; and
  - (xii) switch control means, connected to said controllable switch means, for selectively switching the current to each coil on and off;
- (b) a controllable source of electromagnetic radiation ("EMR") for producing a modulated EMR beam; and
- (c) scanning means for converting said EMR beam into a scanning beam such that a focused beam spot moves repeatedly in a linear direction across said photosensitive material on said imaging line to provide the other dimension of said two-dimensional image on said photosensitive material.

4,792,817

## INK JET PRINTING SYSTEMS

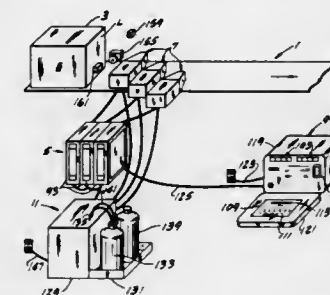
Howard H. Barney, Berkeley, Calif., assignor to Diagraph Corporation, Herrin, Ill.

Continuation of Ser. No. 723,153, Apr. 15, 1985, abandoned, which is a continuation of Ser. No. 527,479, Aug. 29, 1983, abandoned. This application Apr. 14, 1986, Ser. No. 851,347

Int. Cl.<sup>4</sup> B05C 5/02; B05B 1/02

U.S. Cl. 346—140 R

16 Claims



1. A system for ink jet printing of messages on objects being fed forward one after another in a predetermined path, said system comprising:

- a plurality of ink jet printheads positioned adjacent said path to print the messages on the articles as they travel forward in said path;
- each printhead comprising a plurality of ink jets arranged in a matrix and adapted for ejection of drops of ink across a gap to a surface of an object travelling by the printhead to print dots on said surface in patterns forming selected characters for said messages;
- means for supplying ink to the jets;
- a plurality of electrically actuated valve means, one for each jet, each adapted for electrical operation for ejection of a drop of ink from the respective nozzle,
- a terminal including a keyboard for entering message data,
- a message bank having a microcomputer interconnected with the terminal for processing data received from the terminal and storing the data for a plurality of messages,
- a plurality of controllers, one for each printhead, each including a microcomputer interconnected with the bank for processing data for a selected message received from the bank and storing the data,
- means for effecting transfer of data for a selected message from the bank to a selected controller for storage in that controller,
- each controller having an output circuit interconnected with the microcomputer thereof and with the respective printhead for receiving output of data for the selected message from that microcomputer and converting the data to driving signals for the printhead valve means for actuating the latter to print the selected message,
- wherein each jet comprises:
  - an elongate tubular member having an outlet nozzle constituting a valve seat at one end thereof, said seat having an orifice for ejection of drops of ink,
  - said tubular member having an ink chamber therein for holding ink under pressure for delivery through the orifice, said chamber being defined by the valve seat and by means sealing against escape of ink from the chamber,
  - a valve stem extending longitudinally in said tubular member having a valve member at its end toward the seat engageable with the seat to block flow of ink through the orifice in the seat,
  - the valve stem being movable longitudinally in said tubular jet member for closing the valve member against the seat and for opening it for ejection of a drop of ink through the orifice,

said ink supply means supplying the ink chambers of said tubular jet members with ink under pressure, and plurality of solenoids, one for each jet, each connected to a respective valve stem for actuating the latter, said system having mounting means for the tubular jet members comprising an ink manifold for holding ink under pressure, said manifold having a front wall and back wall spaced from each other and defining therebetween a manifold chamber for holding ink under pressure, said walls having a plurality of holes receiving the tubular jet members with the latter extending through the holes in the back wall across the manifold chamber into the holes in the front wall, each tubular jet member being sealed in the holes and having a lateral port in communication with the manifold chamber for feeding ink from the manifold chamber to the ink chamber in the tubular jet member.

4,792,818

## THERMAL DROP-ON-DEMAND INK JET PRINT HEAD

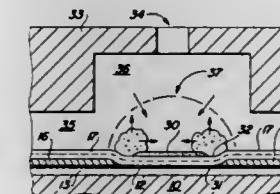
Jerome M. Eldridge, Los Gatos; Francis C. Lee, San Jose; James O. Moore, San Jose, and Graham Olive, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 12, 1987, Ser. No. 61,841

Int. Cl.<sup>4</sup> G01D 15/18

U.S. Cl. 346—140 R

4 Claims

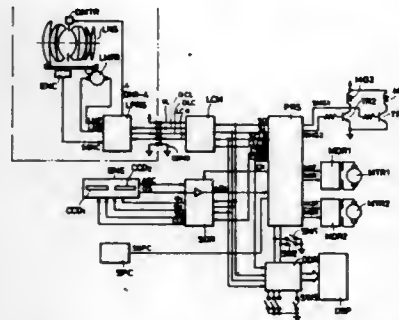


1. A thermal drop-on-demand ink jet print head comprising: a nozzle adjacent to a heating means with a marking fluid between;

whereby upon connection of an electrical signal to energize said heating means bubble formation occurs in said marking fluid adjacent said heating means and a drop of ink is ejected from said nozzle, the improvement comprising: said heating means comprising a resistive element having a predetermined area; and

heat delay means covering a predetermined fractional part of said predetermined area of said resistive element, said predetermined fractional part of said resistive element covered by said heat delay means being spaced from the peripheral edges of said resistive element, whereby, upon connection of an electrical signal to energize said resistive element, nucleation occurs at a predetermined location on said resistive element and formation of said bubble proceeds in a predetermined direction whereby inertial energy of said bubble formation is directed toward said nozzle to thereby focus said energy in said predetermined direction and eject said drop of ink in a more energy-efficient manner.

**4,792,819**  
**CAMERA HAVING AUTOMATIC FOCUSING DEVICE**  
**Akira Akashi, Yokohama, Japan, assignor to Canon Kabushiki**  
**Kaisha, Tokyo, Japan**  
 Filed Jan. 7, 1968, Ser. No. 141,713  
 Claims priority, application Japan, Jan. 12, 1967, 62-004570;  
 Jan. 12, 1967, 62-004571; Jan. 12, 1967, 62-004572  
 Int. Cl.<sup>4</sup> G03B 3/00  
 U.S. Cl. 354—400 25 Claims



1. A camera having an automatic focusing device comprising:

- (a) a focus detection circuit for detecting a state of focusing of an image forming optical system;
- (b) a driving circuit for driving said image forming optical system between a first in-focus position where said image forming optical system is focused on a first object and a second in-focusing position where said image forming optical system is focused on a second object, said first and second in-focus positions being detected by said focus detection circuit;
- (c) discrimination means for discriminating whether one or said first and second in-focus positions is beyond a driving limit of said image forming optical system; and
- (d) prohibiting means for prohibiting the driving of said image forming optical system to an intermediate position between said first and second in-focus positions when said discrimination means has discriminated that one of said first and second in-focus positions is beyond a driving limit of said image forming optical system.

4,792,820  
CAMERA WITH AUTOMATIC FOCUS AND EXPOSURE  
CONTROL MEANS  
Toshio Norita, Sakai; Nobuyuki Taniguchi, Nishinomiya; Tokuji  
Ishida, Daito; Toshihiko Kurasaki, Sakai, and Masataka  
Hamada, Osaka, all of Japan, assignors to Minoita Camera  
Kabushiki Kaisha, Osaka, Japan  
Filed Sep. 11, 1986, Ser. No. 905,974  
Int. Cl.<sup>4</sup> G03B 3/10, 7/091

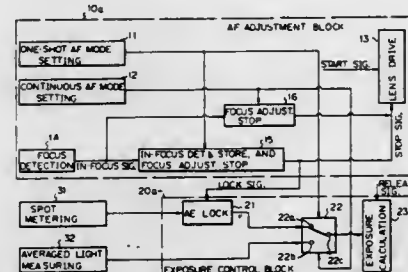
U.S. Cl. 354-402 42 Claims

1. A camera with an automatic focus and exposure (AF and AE) control means, comprising:
- means for detecting a focusing condition of an objective lens attached to the camera to produce a focusing signal indicative of the detected focusing condition;
  - means for selecting either a first operation mode or a second operation mode;
  - means, operatively connected to said detecting means and said selecting means, for focusing the objective lens in accordance with the focusing signal to produce an in-focus signal when the in-focus condition of the objective lens is established, the operation of the focusing means being interrupted after the in-focus condition has once been established when the first operation mode is selected, and the operation of the focusing means being repeated in accordance with the focusing signal even if an out-of-focus condition is detected again after the in-focus condition is established when the second operation mode is selected.

tion has once been established when the second operation mode is selected;

first light measurement means for measuring light from a first measuring area corresponding to a focus detection area to produce a first light measuring signal indicative of an intensity of light measured, the light from the focus detection area being received by the detecting means for detecting the focusing condition of the objective lens;

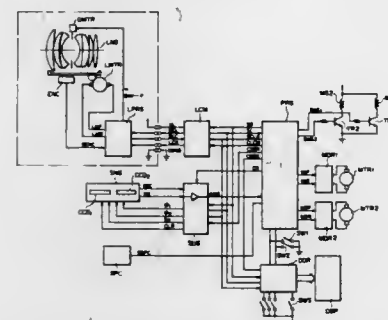
second light measurement means for measuring light coming from a second measuring area larger than the first measuring area to produce a second light measuring signal indicative of an intensity of light measured; and



exposure control means, operatively connected to said first and second light measurement means, said selecting means and said focusing means, for controlling exposure amount on the basis of the first light measuring signal produced when the in-focus signal is produced in the condition in which the first operating mode is selected, and for controlling exposure amount on the basis of the second light measuring signal independently of the in-focus signal in the condition in which the second operation mode is selected.

**4,792,821**  
**AUTO-FOCUS APPARATUS IN A CAMERA**  
**Akira Akashi, Yokohama, Japan, assignor to Canon Kabushiki**  
**Kaisha, Tokyo, Japan**  
**Filed Dec. 24, 1987, Ser. No. 137,810**  
**Claims priority, application Japan, Jan. 12, 1987, 62-4585**  
**Int. Cl.<sup>4</sup> G03B 3/00**

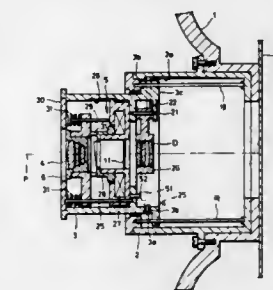
**U.S. Cl. 354—402** **7 Claims**



1. A camera having an auto-focus apparatus, including:
- (a) a focus detecting circuit for detecting the focus state of an imaging optical system and outputting a focus signal representative of the focus state;
  - (b) a first judging circuit for judging on the basis of said focus signal whether said focus signal is of a value representative of in-focus;
  - (c) a driving circuit for effecting the driving of said imaging optical system based on said focus signal when the judgement of in-focus is not done by said first judging circuit;

- (d) a second judging circuit for judging how much the focus signal judged as to whether in-focus or not by said first judging circuit deviates from the value representative of in-focus when the driving of said imaging optical system based on said focus signal is effected, said second judging circuit being adapted to judge in-focus when said focus signal does not so much deviate from the value representative of in-focus; and
- (e) discriminating means for discriminating whether the driving of said imaging optical system based on the focus signal by said driving circuit is proper and inhibiting the judgement by said second judging circuit when said imaging optical system is not properly driven.

**4,792,822**  
**CAMERA WITH CHANGEABLE FOCAL LENGTH**  
**Kazuhiro Akiyama; Takao Koda; Masao Shoji; Toshio Yodhida,**  
**and Masayoshi Hirai, all of Saitama, Japan, assignors to Fuji**  
**Photo Film Co., Ltd., Kanagawa, Japan**  
**Filed Dec. 15, 1987, Ser. No. 133,728**  
**Claims priority, application Japan, Dec. 15, 1986, 61-298522**  
**Int. Cl.<sup>4</sup> G03B 3/10, 5/00**  
**U.S. Cl. 354—403** **4 Claims**



1. A camera having an automatic focusing device which has a taking lens system changeable in focal length between at least first and second focal lengths and which allows close-up photography when said taking lens system is changed to have said second focal length, said camera comprising:
- movable means by which at least a part of said taking lens system is supported for axial movement;
  - mechanical shifting means actuated by an electric motor for axially moving said movable member to change said taking lens system so as to have said first or said second focal length;
  - means allowing said electric motor to rotate excessively after said axial movement of said movable member to change said taking lens system so as to have said second focal length, thereby moving axially said part of said taking lens system so as to change said taking lens system suitable for close-up photography; and
  - focusing range changing means that coact with said means for changing a focusing range of said automatic focusing device to a range suitable for said close-up photography.

4,792,823

**CAMERA AND CAMERA SYSTEM**

Akihiko Fujino, Sakai; Masaaki Nakai, Kawachinagano, and Hiroshi Ootsuba, Sakai, all of Japan, assignors to Minoita Camera Kabushiki Kaisha

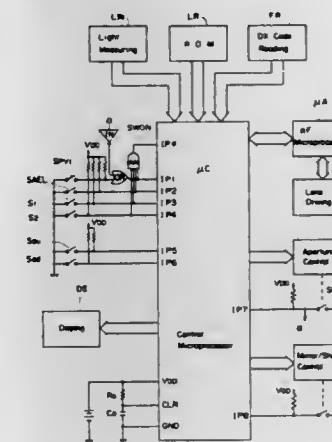
Continuation of Ser. No. 73,842, Jul. 15, 1987, which is a continuation of Ser. No. 878,269, Jun. 25, 1986, abandoned. This application Dec. 22, 1987, Ser. No. 139,061

Claims priority, application Japan, Jun. 27, 1985, 60-141598; Jun. 27, 1985, 60-141599; Jun. 27, 1985, 60-141600; Jun. 28, 1985, 60-143801; Jul. 1, 1985, 60-145336; Jul. 2, 1985, 60-145402; Jul. 2, 1985, 60-145403; Jul. 12, 1985, 60-145443

Int. Cl.<sup>4</sup> G03B 7/00

U.S. Cl. 354-446

36 Claims



1. A camera system including a camera body and an objective lens for photographing, mountable on the camera body, comprising:
- a preview operating member;
  - a release operating member;
  - means for starting an exposure operation of the camera system in response to operation of the release operating member;
  - means for stopping down an aperture diaphragm of the objective lens to a predetermined aperture value in response to operation of the preview operating member;
  - means for discriminating whether the stopping down operation is being performed;
  - means for measuring light transmitted through the objective lens to produce a light measuring signal relative to the measured light;
  - means for correcting the light measuring signal in accordance with a difference between a light measuring signal measured when the aperture diaphragm is fully opened and a light measuring signal measured when the aperture diaphragm is stopped down by the stopping down means; and
  - means for controlling the correcting means to operate the correcting means when the discriminating means detects that the stopping down operation is being performed.

4,792,824

**ELECTROSTATIC COPYING APPARATUS HAVING  
REDUCED SIZE AND COMPLEXITY**

Nobuhiko Kozuka, Suita, Japan, assignor to Mitä Industrial Co.,  
Ltd., Osaka, Japan

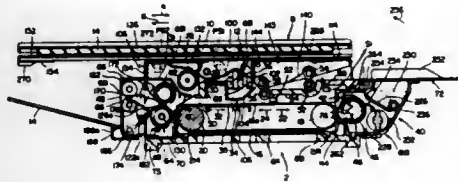
Filed Oct. 20, 1986, Ser. No. 920,535

Claims priority, application Japan, Nov. 6, 1985, 60-247204  
Int. Cl.<sup>4</sup> G03G 15/00

- U.S. Cl. 355—3 BE** **24 Claims**
1. An electrostatic copying apparatus comprising:  
a photosensitive material-supporting means movable in a  
predetermined direction or a direction opposite thereto;



a photosensitive material disposed on at least a part of the surface of the photosensitive material-supporting means and having a length in said direction substantially equaling or exceeding a maximum copiable length;  
an image-forming means for forming an image on the surface of the photosensitive material, the image-forming means including a corona discharger, disposed in a discharging zone, for uniformly charging the surface of the photosensitive material to a selected polarity during image formation and for applying corona discharge to the back of a copying paper sheet during image transfer whereby said



corona discharger serves as a charging corona discharger and a transfer corona discharger;  
means for conveying a copying paper sheet in said opposite direction through said discharging zone; and  
means for moving the photosensitive material-supporting means in said predetermined direction during formation of an image by the image-forming means on the surface of the photosensitive material and for moving the material-supporting means in said opposite direction during transfer of the image formed on the surface of the photosensitive material to a copying paper sheet.

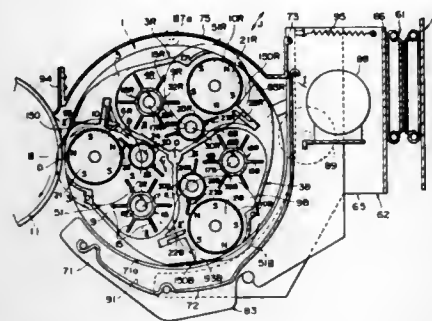
#### 4,792,825 ROTARY DEVELOPING DEVICE FOR IMAGE-FORMING APPARATUS

Takeshi Saito, Tokyo, and Hiromitsu Takagaki, Yokohama, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Sep. 18, 1987, Ser. No. 98,607  
Claims priority, application Japan, Sep. 20, 1986, 61-223211; Sep. 20, 1986, 61-223212; Sep. 20, 1986, 61-223213; Sep. 20, 1986, 61-144835[U]; Sep. 20, 1986, 61-144840[U]  
Int. Cl.<sup>4</sup> G03G 15/09

U.S. Cl. 355—300

5 Claims



1. A rotary developing device for an image-forming apparatus, comprising:  
a developing unit having at least a developing section for developing an electrostatic latent image formed on an image carrier which is supported by a body of said image-forming apparatus; and  
a unit carrier for supporting said developing unit and slidably supported by said body;  
when said developing unit is pulled out together with said unit carrier from a predetermined position which is de-

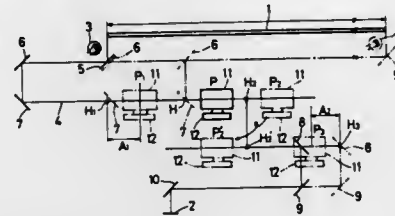
fined in said apparatus body, said developing unit remaining rotatably supported by said unit carrier.

#### 4,792,826 OPTICAL DEVICE FOR COPYING MACHINE WITH INVERSION OF PRINCIPAL POINT OF OPTICAL SYSTEM

Takashi Suzuki, Omiya, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Aug. 26, 1987, Ser. No. 89,423  
Claims priority, application Japan, Sep. 27, 1986, 61-227174  
Int. Cl.<sup>4</sup> G03G 15/04; G03B 27/34  
U.S. Cl. 355—8

5 Claims



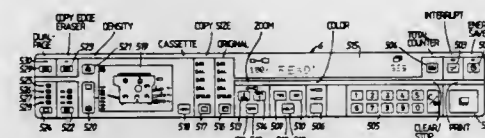
1. An optical device for copying machines with copy enlarging and reducing, comprising in combination:  
a movable light source for illuminating a document on an original mount;  
a plural number of mirrors for leading reflected light from said document to a predetermined light path, part of said mirrors being movable along said light path;  
an optical system having an asymmetrical lens construction located in a midway position along said light path;  
a sensitive material surface for forming an image of said document thereon for exposure through said optical system; and  
an inverting drive means for switching said optical system from a position where said optical system has a principal point on the side of said original mount at a time of at least maximum copy enlarging to a position where said optical system has said principal point on the side of said sensitive material at a time of at least minimum copy reducing.

#### 4,792,827 DISPLAY DEVICE

Masahiko Ogura, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 26, 1986, Ser. No. 879,191  
Claims priority, application Japan, Jun. 28, 1985, 60-142117  
Int. Cl.<sup>4</sup> G03G 15/00  
U.S. Cl. 355—14 C

7 Claims



1. A display device for use in an image forming apparatus, comprising:  
detection means for detecting a condition of an image forming apparatus;  
display means for normally displaying a condition message representing the condition of said image forming apparatus on the basis of the detection by said detection means;  
processing means for: (1) selectively causing a first message to be displayed on said display means, said first message providing a prompt for user related to an operation of said image forming apparatus, (2) selectively causing a second

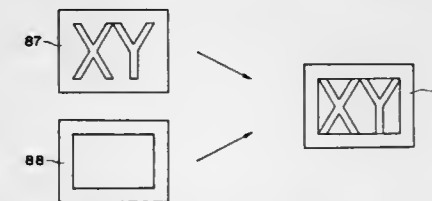
message to be displayed on said display means, said second message providing a procedure for performing said operation represented by said first message of said image forming apparatus, and (3) selectively causing a third message to be displayed on said displaying means, said third message providing a prompt for a user related to an operation, different from said operation identified by said first message, of said image forming apparatus.

#### 4,792,828 IMAGE FORMING APPARATUS FOR FORMING A PLURALITY OF IMAGE FROM DIFFERENT ORIGINALS ON ONE TRANSFER SHEET

Takashi Ozawa, Ichikawa; Yasuyoshi Yamamoto, Tokyo; Masashi Ohashi, Tokyo; Akiyoshi Kimura, Tokyo; Nobukazu Sasaki, Tokyo; Toshiro Kasamura, Yokohama; Atsushi Kubota, Machida; Tatsuya Shiratori, Yokohama; Toshihiko Kusumoto, Tokyo; Michiro Koike, Kawasaki; Ken Tanabe, Yokohama, and Hidetoshi Tanaka, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 29, 1986, Ser. No. 890,411  
Claims priority, application Japan, Aug. 10, 1985, 60-176148  
Int. Cl.<sup>4</sup> G03G 15/00  
U.S. Cl. 355—14 R

26 Claims



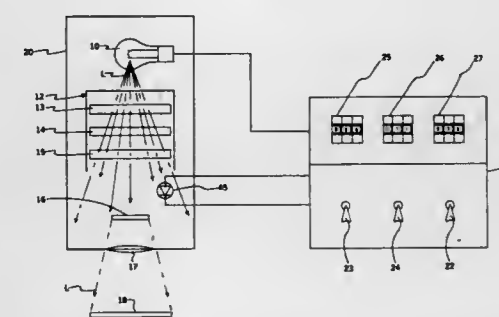
1. An image forming apparatus capable of effecting plural image forming operations on one transfer sheet, comprising:  
image transfer means for transferring an image on the transfer sheet;  
image magnification changing means for changing the magnification of the image to be transferred onto the transfer sheet; and  
control means for controlling said magnification changing means in accordance with the deformation of the transfer sheet during an image forming operation on the transfer sheet.

#### 4,792,829 LIGHT-EXPOSURE CONTROL UNIT

Alexander D. Firmani, 6 Williams Ct., Newark, Del. 19702

Filed Apr. 3, 1986, Ser. No. 847,740  
Int. Cl.<sup>4</sup> G03B 27/80  
U.S. Cl. 355—38

17 Claims



1. An improved exposure control unit for a photographic printer having a light source, an adjustable magnification fac-

tor, an adjustable lens aperture, an adjustable color filter, support means for the negative which is to be printed and support means for the material to be exposed, said exposure control unit improvements comprising:

- a photovoltaic cell mounted to receive color-filtered light from said source unchanged by said negative;
- circuit means in direct association with said photovoltaic cell for generating current within said photovoltaic cell and converting said current into an output voltage directly proportional to the intensity of the filtered light impinging upon said photovoltaic cell;
- first adjustable means for modifying the proportionality of said output voltage directly proportional to light intensity from said circuit means, said first adjustable means providing adjustment according to the range of said exposure control unit;
- a precision reference voltage source;
- second adjustable means providing a first variable multiple of said precision reference voltage, said second adjustable means providing adjustment according to the magnification factor of said photographic printer;
- voltage divider means associated to divide the output of said second adjustable means by a predetermined factor;
- third adjustable means in circuit association with the output of said voltage divider means for providing a second variable multiple of the divided voltage from said second adjustable means, said third adjustable means providing adjustment according to the speed factor of the sensitive material being exposed;
- integrating means providing a voltage ramp output representing the integral of its input current wherein the magnitude of said input current hence the slope of said voltage ramp output is manually variable by fourth adjustable means and automatically variable by a voltage representing light intensity from the output of said first adjustable means, said fourth adjustable means providing adjustment according to the desired density factor;
- comparator means in circuit association with the output of said integrating means and the output of said third adjustable means for terminating the exposure period, therefore said light source, when said output of said integrating means is equal to the output of said third adjustable means;
- momentary switch means for initiating or terminating said exposure period therefore said light source;
- first flip flop means for retaining the current status of said exposure control unit responsive to said momentary switch means and said comparator means output;
- means for creating pulses synchronous with the zero crossover region of the alternating power source energizing said exposure control unit;
- buffer amplifier means for energizing relay means in circuit association with said light source;
- second flip flop means responsive to said first flip flop means and to said pulses synchronous with said zero crossover region of said alternating power source, having complementary outputs for controlling said buffer amplifier means, and, switching means controlling the charging and discharging of a capacitor in circuit association with said integrating means.

#### 4,792,830 METHOD FOR DETECTING DEFOCUSED PHOTOGRAPHIC IMAGES AND PHOTOGRAPHIC PRINTING DEVICE

Fumio Matsumoto, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

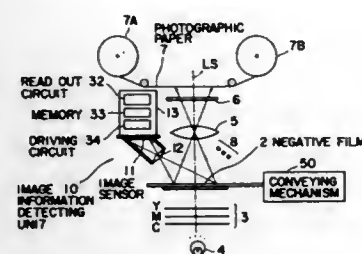
Filed Dec. 4, 1987, Ser. No. 129,117  
Claims priority, application Japan, Dec. 5, 1986, 61-289865  
Int. Cl.<sup>4</sup> G03B 27/52, 27/32

U.S. Cl. 355—55

9 Claims

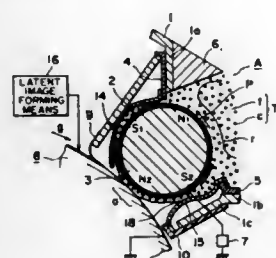
1. A system for detecting defocused photographic images comprising an image sensor which receives light either trans-

mitted through or reflected from photographic images recorded on a photographic film in a large number of picture elements arranged in row and column, a photometric spot forming means which forms larger photometric spots by synthetically processing the image information signals detected by said image sensor in the form of cells and smaller photometric



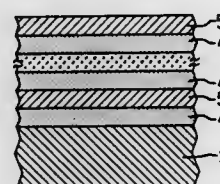
spots corresponding to said larger photometric spots in row and column, and a defocused image detecting means which obtains density values of said photographic images at said larger and smaller photometric spots, and judges the degree of blurredness of said photographic images based on the characteristic distribution of said photometric spots.

**4,792,831**  
**DRY-TYPE DEVELOPING APPARATUS WITH ELASTIC SHEET**  
Kenichi Takeda, Yokohama, and Kazuo Kagiura, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Oct. 21, 1987, Ser. No. 110,785  
Claims priority, application Japan, Oct. 24, 1986, 61-254293  
Int. Cl.<sup>4</sup> G03G 15/08  
U.S. Cl. 355—3 DD 17 Claims



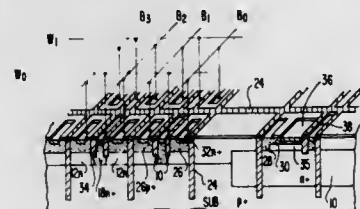
1. A dry-type developing apparatus, comprising:
  - a developer container for accommodating a magnetic developer, said developer container being provided with an opening;
  - developer carrying means, disposed in the opening, for carrying the magnetic developer out of said developer container, said developer carrying member including magnetic field generating means which is provided with magnetic field generating portions having different polarities arranged in a direction of carrying the magnetic developer; and
  - a continuous elastic sheet including a contact portion for contacting the magnetic developer carried out of said developer container by said developer carrying means and having upstream and downstream fixed portions which are respectively fixed to said developer container at positions upstream and downstream of the contact portion with respect to movement of the magnetic developer.

**4,792,832**  
**SUPERLATTICE SEMICONDUCTOR HAVING HIGH CARRIER DENSITY**  
Toshio Baba; Takashi Mizutani, and Masaki Ogawa, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan  
Continuation of Ser. No. 624,333, Jun. 25, 1984, Pat. No. 4,695,857. This application Apr. 24, 1987, Ser. No. 43,046  
Claims priority, application Japan, Jun. 24, 1983, 58-113801; Jul. 26, 1983, 58-136128; Jul. 26, 1983, 58-136129; Aug. 31, 1983, 58-159813; Aug. 31, 1983, 58-159815; Aug. 31, 1983, 58-159816  
The portion of the term of this patent subsequent to Sep. 22, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> H01L 29/267, 29/205, 29/207  
U.S. Cl. 357—16 6 Claims



1. A superlattice type semiconductor having a multilayered structure of alternately piled first and second layers, said first layers being made of a semiconductor which does not involve aluminum, a combination of arsenic and phosphorus, a combination of arsenic and antimony and a combination of silicon and germanium as elements, each of said first layers having a thickness with a range from 5 Å to 100 Å and having an N-type impurity doped region sandwiched by impurity-free regions, said impurity-free regions contacting said second layers, said second layers being impurity-free and made of a material having an electron affinity smaller than said semiconductor and each of said second layers having a thickness within a range from 5 Å to 100 Å.

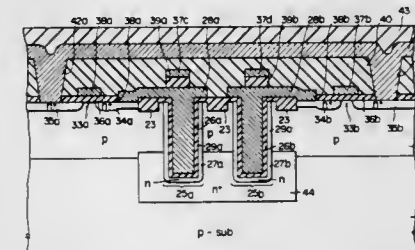
**4,792,833**  
**JUNCTION-SHORTING TYPE SEMICONDUCTOR READ-ONLY MEMORY HAVING INCREASED SPEED AND INCREASED INTEGRATION DENSITY**  
Toshitaka Fukushima, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan  
Filed Nov. 24, 1986, Ser. No. 933,866  
Claims priority, application Japan, Nov. 28, 1985, 60-267896  
Int. Cl.<sup>4</sup> H01L 29/72, 49/00, 27/04, 27/10  
U.S. Cl. 357—86 24 Claims



1. A junction-shortening type semiconductor programmable read only memory having a plurality of word lines, a plurality of bit lines intersecting the plurality of word lines, and memory cells formed at the intersections of the word lines and the bit lines, said memory cell comprising:
  - a semiconductor substrate having a first conductivity type;
  - a pair of first regions, having a second conductivity type opposite the first conductivity type, formed on said substrate;
  - first dielectric isolation means, surrounding said pair of first

- regions and contacting said substrate, for isolating said pair of first regions;
- a second region, formed between said pair of first regions and contacting said substrate having a higher doping concentration than said pair of first regions, and doped with a dopant having the second conductivity type, and dividing said pairs of first regions, said second region forming a lead to connect said divided pair of first regions to respective ones of the word lines;
- a third region, formed in the surface of said divided pairs of first regions doped with a dopant having the first conductivity type; and
- a fourth region, formed in the surface of said third region forming a junction therebetween, and covering said third region, doped with a dopant having the second conductivity type, one of the bit lines connected to said fourth region and one of the word lines connected to said second region, the junction between said third region and said fourth region being selectively destroyed by applying a current from one of the bit lines to one of the word lines.

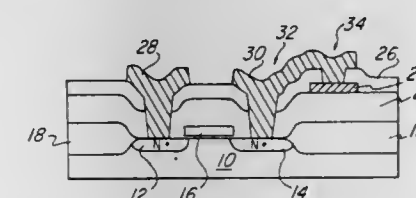
**4,792,834**  
**SEMICONDUCTOR MEMORY DEVICE WITH BURIED LAYER UNDER GROOVE CAPACITOR**  
Yukimasa Uchida, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Continuation of Ser. No. 834,519, Feb. 28, 1986, abandoned, which is a continuation of Ser. No. 681,542, Dec. 14, 1984, abandoned. This application Feb. 1, 1988, Ser. No. 150,505  
Claims priority, application Japan, Jan. 20, 1984, 59-7957  
Int. Cl.<sup>4</sup> H01L 29/78  
U.S. Cl. 357—23.6 4 Claims



1. A semiconductor memory device comprising:
  - (a) a semiconductor body comprising (i) a semiconductor substrate of a first conductivity type, (ii) a semiconductor layer of said first conductivity type formed on said semiconductor substrate, and (iii) a buried layer of a second conductivity type formed at an interface between said semiconductor substrate and said semiconductor layer;
  - (b) a plurality of transfer transistors each comprising (i) source and drain regions which are formed in a surface region of said semiconductor layer so as to be electrically isolated from each other and (ii) a gate electrode which is formed on a portion of said semiconductor layer between said source and drain regions; and
  - (c) a plurality of trench capacitors each comprising (i) a groove formed so as to extend from said surface region of said semiconductor layer to a depth at least as deep as the upper surface of said buried layer, (ii) an impurity diffusion region of said second conductivity type acting as one electrode of said trench capacitor and formed to be fully surrounded by the portion of said semiconductor layer and said buried layer which define said groove, (iii) an insulation film formed on said groove and acting as a dielectric of said trench capacitor, and (iv) a conductive layer acting as the other electrode of said trench capacitor formed on said insulation film and extending from a bottom portion of said groove to at least a level above an opening of said groove, said impurity diffusion region being applied with an electric potential by said buried

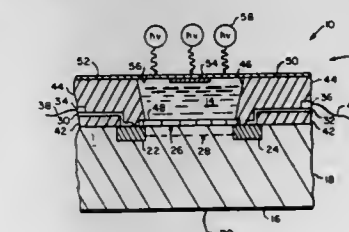
layer, one of said source and drain regions of each transfer transistor being in buried contact with said other electrode of one of said trench capacitors and the other of said source and drain regions of each transfer transistor being connected to a bit line.

**4,792,835**  
**MOS PROGRAMMABLE MEMORIES USING A METAL FUSE LINK AND PROCESS FOR MAKING THE SAME**  
Stephen P. Sacarisen, Garland; Gene E. Blankenship, Richardson; Rajiv R. Shah, Plano; Toan Tran; David J. Myers, both of Dallas; Johnson J. Lin, Plano, and Steve Thompson, Richmond, all of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.  
Filed Dec. 5, 1986, Ser. No. 938,226  
Int. Cl.<sup>4</sup> H01L 29/78, 21/00; B44C 1/22; C23F 1/02  
U.S. Cl. 357—23.6 20 Claims



8. A fuse link in a MOS or CMOS device formed over a face of a semiconductor body, comprising:
  - a layer of multi-level oxide over the face of a semiconductor body;
  - a refractory metal fuse layer formed over a field oxide region of the multi-level oxide having a fuse segment with a resistance less than about 200 ohms integral with and between two spaced apart expanded regions; and
  - an interlevel passivation layer over said fuse layer; an electrical contact integral with the MOS or CMOS device and extending through said passivation layer for contacting said fuse segment and carrying fusing current to said fusing segment.

**4,792,836**  
**ION-SENSITIVE PHOTODETECTOR**  
Kenneth P. Quinlan, Newton, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.  
Filed Dec. 1, 1986, Ser. No. 936,195  
Int. Cl.<sup>4</sup> H01L 27/14, 31/00, 27/02  
U.S. Cl. 357—30 1 Claim



1. A photodetector, said photodetector comprising:
  - a planar substrate of a semiconductor material being doped;
  - a metallic layer, said metallic layer being deposited upon a bottom surface of said substrate, said metallic layer having a common lead attached thereon;
  - a source, said source being located within said substrate and having a surface coplanar with said substrate, said source



- being substantially rectangular shaped in cross-section, said source being doped opposite than said substrate;
- a drain, said drain being located within said substrate and opposite to said source and parallel thereto, said drain having a surface coplanar with said substrate, said drain being shaped substantially like said source, said drain being doped the same as said source;
  - an ion-sensitive layer, said ion-sensitive layer being deposited on a top surface of said substrate and overlapping said source and said drain, said ion-sensitive layer being electrically non-conductive;
  - a source current conductor connected to said source, said source current conductor having a source lead connected thereto;
  - a drain current conductor connected to said drain, said drain current conductor having a drain lead connected thereto;
  - an insulating layer deposited on said top surface of said substrate, said insulating layer overlapping said source, said drain, and said substrate, and having an opening therethrough, said conductors being deposited upon said insulating layer;
  - an encapsulating layer, said encapsulating layer having a well therethrough and having a bottom surface on said ion-sensitive layer, said encapsulating layer in contact with said insulating layer, said conductors, said source, and said drain;
  - a photoactive layer, said photoactive layer being placed within said well of said encapsulating layer, said photoactive layer being responsive to a band of wavelengths of light, a response being directly related to the intensity of said light;
  - a window, said window positioned over said well and in contact with a top surface of said encapsulating layer, said window sealing said photoactive layer within said well and allowing light to pass therethrough; and
  - a gate electrode, said electrode being deposited on said window over said well and having a gate electrode lead attached thereto.

4,792,837

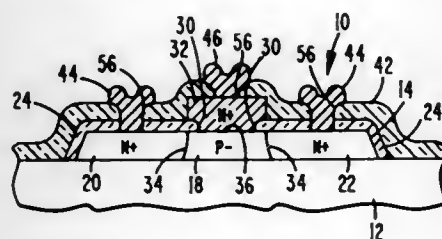
**ORTHOGONAL BIPOLAR TRANSISTOR**  
Victor Zazza, Montvale, N.J., assignor to GE Solid State Patents, Inc., Somerville, N.J.

Filed Feb. 26, 1986, Ser. No. 833,074

Int. Cl.<sup>4</sup> H01L 29/72, 27/12, 29/04, 29/06

U.S. Cl. 357-35

7 Claims



1. An orthogonal bipolar transistor comprising:
  - (a) a thin first layer of single crystalline silicon having a substantially planar surface, a first region of a first conductivity type, extending from said surface, and a second region of a second conductivity type extending from said surface contiguous with said first region so as to form a PN junction that extends to said surface; and
  - (b) a second layer of silicon of said second conductivity type on said surface and arranged to form a PN junction with only said first region, said PN junction being spaced from said second region
  - (c) an emitter electrode contact to the second layer;
  - (d) a base electrode contact to the first region of the first layer; and

- (e) a collector electrode contact to the second region of the first layer.

4,792,838

**GATE TURN-OFF THYRISTOR**

Yasuhide Hayashi, Yokohama; Kouki Matsue, Tama, and Yoshiyuki Takita, Tokyo, all of Japan, assignors to Kabushiki Kaisha Meidensha, Tokyo, Japan

Continuation of Ser. No. 749,206, Jun. 27, 1985, abandoned.

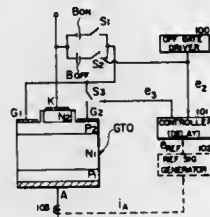
This application Aug. 7, 1987, Ser. No. 83,706

Claims priority, application Japan, Jul. 16, 1984, 59-147093

Int. Cl.<sup>4</sup> H01L 29/74; H03K 5/13, 17/60

U.S. Cl. 357-38

8 Claims



1. A gate turn-off thyristor having an anode electrode, a cathode electrode, first and second gate electrodes placed on the opposite sides of said cathode electrode, and a drive circuit for turning said thyristor on to cause an anode current flow through said anode electrode, said drive circuit including means for generating a first electrical signal to said first gate electrode and a second electrical signal to said second gate electrode after a substantial time delay relative to the first electrical signal for tuning said thyristor off to interrupt the anode current flow, said drive circuit means generating the first electrical signal to said first gate electrode to start a storage period and the second electrical signal to said second gate electrode to terminate the storage period a time after the second electrical signal is generated, said time being shorter than the substantial time delay, said drive circuit means including a signal generator for generating the first electrical signal to the first gate electrode, and a delay circuit coupled to said signal generator for converting the first electrical signal to the second electrical signal delayed relative to the first electrical signal.

4,792,839

**SEMICONDUCTOR POWER CIRCUIT BREAKER STRUCTURE OBVIATING SECONDARY BREAKDOWN**  
Helmut Strack, and Helmut Herberg, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 810,437, Dec. 17, 1985, abandoned.

This application Dec. 21, 1987, Ser. No. 136,449

Claims priority, application Fed. Rep. of Germany, Dec. 27, 1984, 3447513

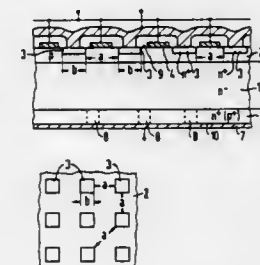
Int. Cl.<sup>4</sup> H01L 29/74

U.S. Cl. 357-38

8 Claims

1. A switching transistor having a semiconductor body including a first surface and a second surface comprising:
  - (a) a first zone of a first conductivity type having a predetermined doping concentration level and a thickness between the first surface and the second surface;
  - (b) a second zone of a second conductivity type abutting the first zone and the first surface of the semiconductor body, the second zone having a higher doping concentration level than the first zone;
  - (c) a plurality of electrically paralleled emitter zones embedded into the second zone at the first surface of the semiconductor body, the emitter zones each being of the first conductivity type and having a higher doping concentration level than the second zone;
  - (d) each of the emitter zones having a width that is less than

- 30 microns and each proximate pair of emitter zones having a spacing distance between them;
- (e) the spacing distance being less than the thickness of the first zone; and



- (f) a fourth zone of the first conductivity type doped to higher concentration level than the first zone, abutting the first zone and located on the second surface of the semiconductor body.

4,792,840

**RESISTOR INTEGRATED ON A SEMICONDUCTOR SUBSTRATE**

Bruno Nadd, Ollieres, France, assignor to Thomson-CSF, Paris, France

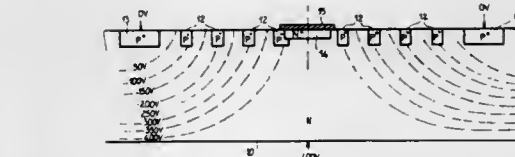
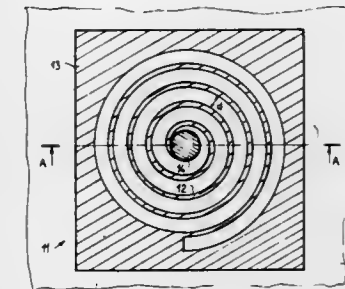
Filed Apr. 1, 1987, Ser. No. 32,561

Claims priority, application France, Apr. 4, 1986, 86 04858

Int. Cl.<sup>4</sup> H01L 27/02, 29/40, 29/06

U.S. Cl. 357-51

4 Claims



1. A resistor integrated on a semiconductor substrate of a first conductivity type having a first face and a second face and connected between a terminal on the first face and a metallization on the second face, the resistor comprising:
  - a first region of a second conductivity type formed into the substrate from said first face, said first region including at least a spiral-shaped portion;
  - a second highly doped region of the first conductivity type being formed at the center of the spiral-shaped portion of the first region and contacting the substrate, and
  - a conductive stud formed on said first face connecting the second region with an inner portion of the spiral-shaped portion of the first region;
 wherein said terminal comprises an outer portion of the spiral-shaped portion of the first region.

4,792,841

**SEMICONDUCTOR DEVICES AND A PROCESS FOR PRODUCING THE SAME**

Kouichi Nagasawa, Kunitachi; Yoshio Sakai, Hachioji; Osamu Minato, Kodaira; Toshiaki Masuhara, Tokyo, and Satoshi Meguro, Kodaira, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

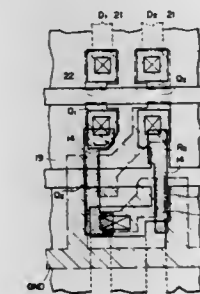
Continuation of Ser. No. 288,466, Jul. 30, 1981, abandoned. This application Jul. 24, 1984, Ser. No. 634,037

Claims priority, application Japan, Aug. 15, 1980, 55-111705

Int. Cl.<sup>4</sup> H01L 29/04

U.S. Cl. 357-59

29 Claims



1. A static random access memory semiconductor device formed on a semiconductor material comprising:
  - a word line extending over said semiconductor material;
  - a pair of data lines extending over said semiconductor material;
  - a power supply line extending over said semiconductor material;
  - a peripheral circuit comprising complementary MISFETs; and
  - at least one memory cell fabricated in a surface region of said semiconductor material, said memory cell including first, second, third and fourth transistors, and a pair of load resistors, each of said transistors being of an insulated gate field effect type and having source and drain semiconductor regions formed in said semiconductor material and a gate;
  - each of said gates of said first and second transistors being electrically connected to said drain semiconductor region of the other of said first and second transistors;
  - one of said pair of load resistors being connected between the drain semiconductor region of said first transistor and said power supply line, and the other of said pair of load resistors being connected to the drain semiconductor region of said second transistor and said power supply line;
  - said third transistor being electrically coupled between said drain semiconductor region of said first transistor and one of said pair of data lines so that a current path from the source semiconductor region of the third transistor to the drain semiconductor region of the third transistor is formed between said drain semiconductor region of the first transistor and said one of said pair of data lines, said gate of said third transistor being formed as a part of said word line;
  - said fourth transistor being electrically coupled between said drain semiconductor region of said second transistor and the other of said pair of data lines so that a current path from the source semiconductor region of the fourth transistor to the drain semiconductor region of the fourth transistor is formed between said drain semiconductor region of said second transistor and the other of said pair of data lines, said gate of said fourth transistor being formed as another part of said word line;
  - said gates of said first and second transistors being respectively formed in first and second strips, of electrically conducting materials of a first level, which are extended

on an insulating film formed over said semiconductor material;  
said power supply line being formed of a third strip, of polycrystalline silicon of a second level, which is extended on an insulating film formed over said semiconductor material; and  
said pair of load resistors being respectively formed in polycrystalline silicon of the second level as branches of said third strip, said polycrystalline silicon of the second level as branches of said third strip is formed integrally with said third strip forming said power supply line.

4,792,842

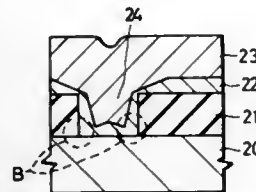
# SEMICONDUCTOR DEVICE WITH WIRING LAYER USING BIAS SPUTTERING

Yoshio Honma, Nishitama; Sukeyoshi Tsunekawa, Tokorozawa; Natsuki Yokoyama, Mitaka, and Hiroshi Morisaki, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Continuation of Ser. No. 756,256, Jul. 18, 1985, abandoned. This application Nov. 24, 1987, Ser. No. 129,393

Claims priority, application Japan, Jul. 18, 1984, 147510/84  
Int. Cl.<sup>4</sup> H01L 23/48

U.S. Cl. 357-71

21 Claims



12. A semiconductor device comprising at least an insulating film formed on a substrate, at least one contact hole formed in a desired portion of said insulating film, the at least one contact hole having a side wall surface, the side wall surface having a lower portion adjacent a bottom surface of the contact hole and an upper portion adjacent an upper surface of the insulating film, the upper portion of the side wall surface extending to an upper edge adjacent the upper surface of the insulating film, a first wiring layer continuously formed on at least said side wall surface and said bottom surface of said contact hole, and a second wiring layer covering said first wiring layer and extending from said contact hole to said insulating film, said first wiring layer having a film thickness at the lower portion of the side wall surface of said contact hole that is greater than the film thickness at the upper portion of said side wall surface, said first wiring layer being a wiring layer formed by bias sputtering.

4,792,843

# DATA CARRIER HAVING AN INTEGRATED CIRCUIT AND METHOD FOR PRODUCING SAME

Yahya Haghighi-Tehrani, Winzerer Str. 98, 8000 München 40, and Joachim Hoppe, Breisacher Str. 1, 8000 München 80, both of Fed. Rep. of Germany

Continuation of Ser. No. 752,072, filed as PCT EP84/00315, Oct. 9, 1984, published as WO85/02046, May 9, 1985, abandoned.

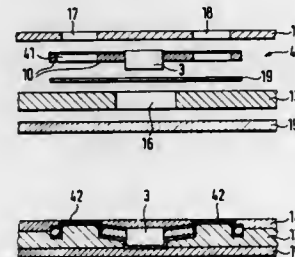
This application Oct. 13, 1987, Ser. No. 106,890  
Claims priority, application Fed. Rep. of Germany, Oct. 24, 1984, 3338597

Int. Cl.<sup>4</sup> G06K 19/06; H01L 23/30; G11C 11/34  
U.S. Cl. 357-72

4 Claims

1. A multilayer data carrier, such as a laminated card, comprising:  
a core layer including at least one recess;  
upper and lower cover layers on opposite sides of the core layer, at least said upper layer including at least one aperture;  
an IC module for processing electrical signals;  
a flexible, filmlike substrate having at least one recess;  
at least one contact pad having an integral contact surface

area and a lead for connecting the IC module with an external device; said contact pad contact surface area and said lead comprising a thin, electrically conductive coating, said contact pad disposed on the substrate and said lead disposed at least in part on the substrate;  
said IC module disposed in the at least one recess of the substrate;  
said substrate embedded between the core and cover layers in such a way that the IC module is located in the recess



in the core layer and the contact surface is located in said at least one aperture in the upper cover layer;  
said flexible substrate being deformed with portions of the substrate carrying the contact pad disposed so that the contact surface is flush with the surface of the upper cover layer and other portions of the substrate carrying the lead which establishes the contact to the IC module being deformed as by bending into a median plane of the data carrier.

4,792,844

# PRESSURE CONTACT SEMICONDUCTOR DEVICE

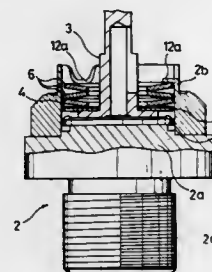
Mitsuo Ohdate, Itami, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 751,670, Jul. 3, 1985, abandoned. This application Jul. 20, 1987, Ser. No. 75,218

Claims priority, application Japan, Jul. 5, 1984, 59-102590[U]  
Int. Cl.<sup>4</sup> H01L 23/42, 23/02

U.S. Cl. 357-79

2 Claims



1. A semiconductor device, which comprises:  
a support member;  
a semiconductor element mounted on said support member;  
an elastic body with an upper elastic body end and a lower elastic body end, said elastic body contacting said semiconductor element at said lower elastic body end, said elastic body providing pressure on said semiconductor element, and said elastic body forcing said semiconductor element into pressure contact with said support member;  
a cylindrical body with a lower cylindrical body end and an upper cylindrical body end that has a top, said cylindrical body containing said semiconductor element and said elastic body in a container area, and said cylindrical body being fixed to said support member at said lower cylindrical body end; and

a plurality of folded curved projections on said top of said upper cylindrical body end, said curved projections being formed so as to be in contact with said elastic body at said upper elastic body end, said curved projections being formed by folding at least three points of said top of said upper cylindrical body end into said container area while said elastic body applied constant pressure to said semiconductor element.

4,792,845

# COLOR VIDEO SIGNAL PHASE DETECTOR

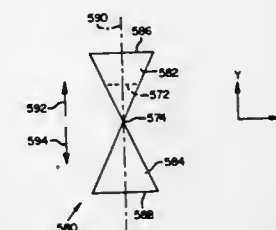
John L. Judge, Hillsboro, Oreg., assignor to Magni Systems, Inc., Beaverton, Oreg.

Filed Feb. 20, 1987, Ser. No. 17,314

Int. Cl.<sup>4</sup> H04N 17/02

U.S. Cl. 358-10

30 Claims



1. In a system for processing a color video signal representing plural video image scan lines and including for each of them a color synchronization burst signal and a horizontal synchronization pulse, a method of measuring the phase characteristics of the color video signal, comprising:

detecting a first transition between amplitude levels of the horizontal synchronization pulse of one of the scan lines represented by the color video signal;  
upon detection of the first transition, triggering a gated oscillator to provide a first continuous-wave reference signal having a phase characteristic that is defined relative to the horizontal synchronization pulse of the one scan line and is independent of the horizontal synchronization pulses of the other scan lines; and  
mixing the first continuous-wave reference signal with the color synchronization burst signal corresponding to the one scan line to generate a signal corresponding to the phase displacement between the continuous-wave reference signal and the color synchronization burst signal.

16. In a system which measures the phase angle between the horizontal synchronization pulse and the color synchronization burst signal of a color video signal, a method of displaying the value of the phase angle on a video monitor display screen, comprising:

selecting on the display screen of the video monitor a reference location which corresponds to a predetermined phase angle; and  
forming on the display screen a line image extending across a first axis passing through the reference location, the line image being separated from the reference location by a distance which is proportional to the phase angle and having a length which is proportional the phase angle.

4,792,846

# COMPONENT TELEVISION TIMING CORRECTOR

Bruce J. Penny, Portland, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Jun. 26, 1987, Ser. No. 66,667

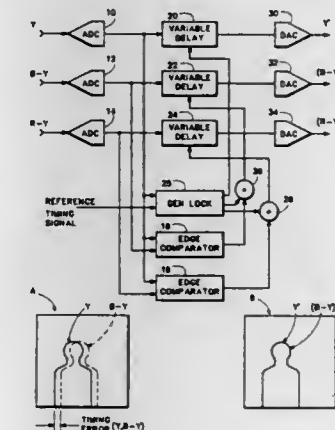
Int. Cl.<sup>4</sup> H04N 9/44, 9/77

U.S. Cl. 358-17

10 Claims

1. A component television timing corrector comprising:  
means for determining for the program material content of a color television signal time differences between each color component signal of the color television signal and a

reference timing signal, the color component signals being separately processed along different paths; and



means for delaying each color component signal according to the time difference for that color component to provide delayed color component signals that are in time coincidence.

4,792,847

# METHOD FOR AUTOMATICALLY SETTING SIGNAL PROCESSING CONDITIONS IN IMAGE INPUT/OUTPUT SYSTEM

Osamu Shimazaki, Hitoshi Urabe, and Takao Shigaki, all of Kaisei, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 30, 1986, Ser. No. 924,818

Claims priority, application Japan, Nov. 9, 1985, 60-251571  
Int. Cl.<sup>4</sup> H04N 1/40, 1/46

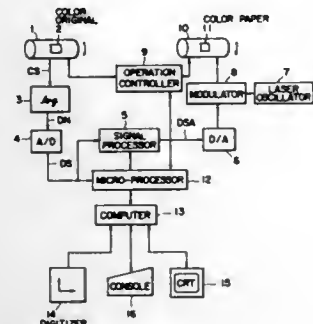
U.S. Cl. 358-80

11 Claims

1. A method for automatically setting signal processing conditions for respective colors in an image input/output system where a color original is read for color separation by an image input device, input density signals from the input device are inputted to a signal processing section to be processed in gradation for each color, and then the processed density signals are inputted to an image output device, wherein conditions of said original in the form of optional parameters are selected from a set of options and characteristic point parameters which are selected by designating characteristic points on the original to be processed are selected as auxiliary

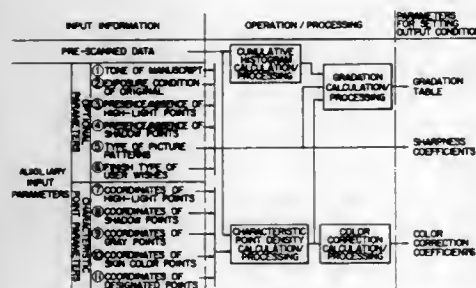


storage means for storing the billing information received by said second receiving means, said information to be recovered by the headend office in order to bill each subscriber for the channels that were supplied to the television receiver.



Filed Aug. 4, 1987, Ser. No. 81,189  
Int. Cl.<sup>4</sup> H04N 7/10, 11/00

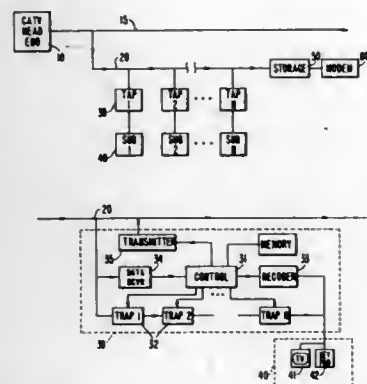
## 17 Claims



**4,792,848**

Steve Nussrallah, Alpharetta, and James Farmer, Lilburn, both  
of Ga., assignors to Scientific-Atlanta, Inc., Atlanta, Ga.  
Filed Dec. 2, 1986, Ser. No. 936,788  
Int. Cl.<sup>4</sup> H04N 7/10

## 20 Claims



at least another of said data processors being selectively dedicated during a requesting session to receive said command signals from said server data processor, and deter-

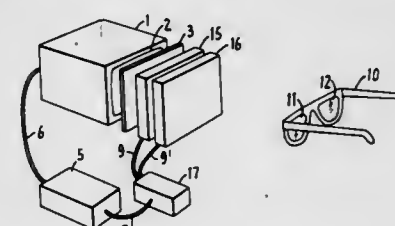
## 1449

4,792,850

**Lenny Liptoh, Greenbrae; Arthur Berman, San Jose; Lawrence D. Meyer, Mill Valley, and James L. Ferguson, Atheyton, all of Calif., assignors to SteroGraphics Corporation, San Rafael, Calif.**

Filed Nov. 25, 1987, Ser. No. 125,402  
Int. Cl.<sup>4</sup> H04N 13/04

### 31 Claims



- (a) a pair of surface mode liquid crystal cells having orthogonal rub axes;
- (b) a linear polarizer having an absorption axis bisecting the orthogonal rub axes; and;
- (c) a driver electrically coupled to the cells, and capable of driving the cells so that when one cell in the pair is in a higher voltage state, the other cell in the pair is in a lower voltage state.

## 4.792.851

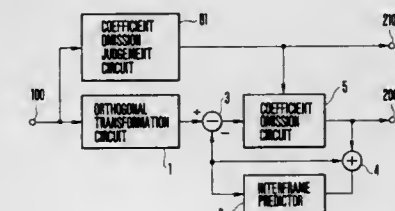
**Takashi Mochizuki, Tokyn, Japan, assignor to NEC Corpora-  
tion, Japan**

**Filed Sep. 21, 1987, Ser. No. 99,091**

Claims priority, application Japan, Sep. 25, 1986, 61-227647; Oct. 17, 1986, 61-246657; Oct. 27, 1986, 61-256131; Oct. 30, 1986, 61-256936; Oct. 30, 1986, 61-256937

Int. Cl.<sup>4</sup> H04N 7/133, 7/137

## 18 Claims



1. An encoding/decoding method of a motion image signal, wherein, in an encoder, a difference between an orthogonal transformation coefficient obtained by orthogonally transforming an input image signal of a current frame and a current frame transformation coefficient predicted by the orthogonal

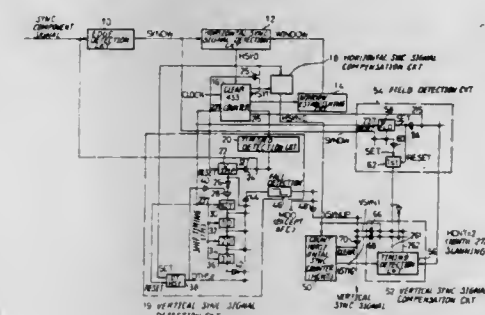
4.792.852

Sadayuki Narusawa, Hamamatsu, Japan, assignor to Nippon  
Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Sep. 17, 1986, Ser. No. 908,189

Claims priority, application Japan, Sep. 25, 1985, 60-211972  
Int. Cl.<sup>4</sup> H04N 5/08

#### 4 Claims



a circuit for providing a vertical synchronizing signal when

the sample levels detected by said signal level detection circuit over a predetermined number of successive horizontal scanning periods correspond to a predetermined signal level pattern and the respective horizontal scanning periods have been identified by said horizontal synchronizing signal detection circuit.

4,792,853

## VIDEO SIGNAL PROCESSING DEVICES

Yoshiichi Yamagishi, Tokyo, and Makoto Takayama, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

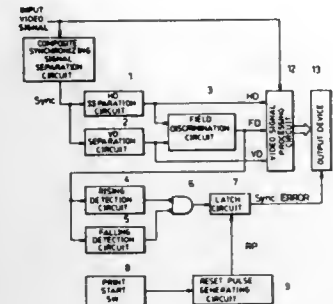
Filed Apr. 25, 1986, Ser. No. 855,733

Claims priority, application Japan, May 15, 1985, 60-103072; May 20, 1985, 60-105895

Int. Cl.<sup>4</sup> H04N 5/08

U.S. Cl. 358—153

17 Claims



1. A device for processing video signals having horizontal and vertical synchronizing signal components which define video fields, said device comprising:

- first signal separation means for separating horizontal synchronizing components from applied video signals;
- second signal separation means for separating vertical synchronizing signal components from said applied video signals;
- field discrimination signal generating means connected to receive the horizontal and vertical synchronizing signal components separated by said first and second signal separation means and to produce in response thereto, field discrimination signals each having a characteristic which corresponds, respectively, to an associated video field; and
- detection means connected to the output of said field discrimination signal generating means, said detection means being operative to produce an output signal when said field discrimination signals deviate from a predetermined pattern.

4,792,854

## APPARATUS FOR TEMPORALLY PROCESSING A VIDEO SIGNAL

William F. Glenn, Fort Lauderdale, Fla., assignor to New York Institute of Technology, Old Westbury, N.Y.

Continuation of Ser. No. 947,979, Dec. 31, 1986, abandoned, which is a division of Ser. No. 661,656, Oct. 17, 1984, Pat. No. 4,652,909, which is a continuation-in-part of Ser. No. 597,482, Apr. 6, 1984, which is a continuation-in-part of Ser. No. 483,126, Apr. 8, 1983, Pat. No. 4,628,344, which is a continuation-in-part of Ser. No. 418,055, Sep. 14, 1982, Pat. No. 4,517,597. This application Jan. 29, 1988, Ser. No. 153,580

Int. Cl.<sup>4</sup> H04N 5/14

U.S. Cl. 358—160

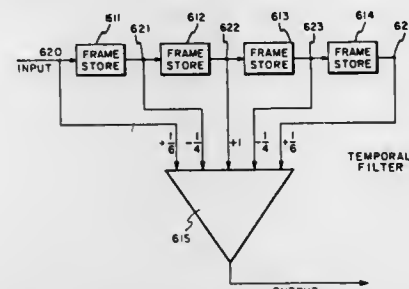
2 Claims

1. Apparatus for receiving frames of an input video signal and temporally processing the video signal, comprising: a string of at least three frame store devices connected in series arrangement;

means for applying said video signal to the first frame store device of said series string;

a combining circuit having at least four weighted inputs;

means for applying the outputs of said frame store devices and said input video signal to said combining circuit, at least two of said frame store device outputs being applied with a negative weight, and at least some of said frame store device outputs being applied with a positive weight;



the number of frame store devices in the string and the weightings of said combining circuit being selected such that the output of said combining circuit has an increased temporal response with respect to all other temporal frequencies, as compared to said input video signal, in the temporal frequency range around approximately 10 Hertz, whereby the temporal frequency response is enhanced in the range in which the human eye has maximum responsiveness.

4,792,855

## NOISE REDUCING CIRCUIT FOR VIDEO SIGNAL

Masaji Yoshida, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Yokohama, Japan

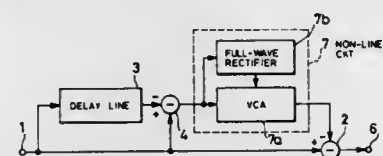
Filed Feb. 12, 1988, Ser. No. 155,539

Claims priority, application Japan, Feb. 13, 1987, 62-31118

Int. Cl.<sup>4</sup> H04N 5/213

U.S. Cl. 358—167

5 Claims



- A noise reducing circuit for a video signal, comprising:
  - a delaying means for delaying said video signal;
  - a first subtracting means for subtracting an output signal of said delaying means from said video signal;
  - a full-wave rectification circuit means for full-wave rectifying said output signal from said first subtracting means;
  - a gain control circuit means for controlling an amplitude of said output signal from said first subtracting means in accordance with an output signal from said full-wave rectification circuit means; and
  - a second subtracting means for subtracting an output signal of said gain control circuit from said video signal thereby producing an output signal of said noise reducing circuit.

4,792,856

## SAMPLED DATA MEMORY SYSTEM AS FOR A TELEVISION PICTURE MAGNIFICATION SYSTEM

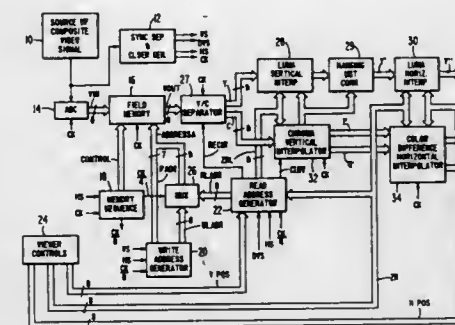
Shinichi Shiratsuchi, Yokohama, Japan, assignor to RCA Licensing Corporation, Princeton, N.J.

Filed Apr. 14, 1987, Ser. No. 38,258

Int. Cl.<sup>4</sup> H04N 5/262

U.S. Cl. 358—180

7 Claims



- Circuitry for time-expansion of video signals, occurring as a sequence of field intervals, comprising:
  - a source of sampled data video signal;
  - memory means, coupled to said source, having a sufficient number of sample storage cells to hold M sample values;
  - memory write address signal generating means, coupled to said memory means, for conditioning said memory means to store, during a first time interval, M samples representing one field of said video signal, where M is a positive number;
  - memory read address signal generating means, coupled to said memory means, for conditioning said memory means to provide, during a second time interval, N of said stored samples, where N is a positive number less than M; and
  - means, coupled to said memory means and responsive to the N samples provided thereby for generating M samples of a time-expanded video signal;
 wherein said first and second time intervals each span an amount of time approximately equal to one field interval of said video signal and the beginning of said second time interval is delayed by an amount of time less than one field interval of said video signal relative to the beginning of said first time interval.

4,792,857

## LIQUID CRYSTAL TELEVISION

Ryoichi Akiyama, Kawasaki, Japan, assignor to Stanley Electric Co., Ltd., Tokyo, Japan

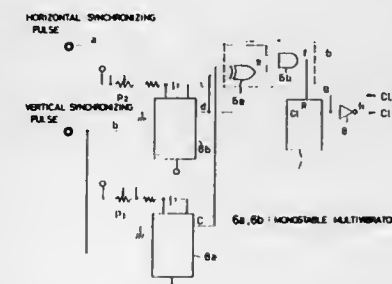
Filed Feb. 26, 1988, Ser. No. 161,162

Claims priority, application Japan, Dec. 4, 1987, 62-305541

Int. Cl.<sup>4</sup> H04N 5/70

U.S. Cl. 358—236

1 Claim



- In a liquid crystal television interlacing a liquid crystal display panel of matrix drive in an odd field and an even field

separately, the improvement comprising two multivibrators different in time constant with a vertical synchronizing pulse inputted as a trigger signal therefor, a detection circuit for generating a field detection pulse only at the time of the odd field or the even field according to output pulses of said multivibrators and a horizontal synchronizing pulse, thus driving an odd gate of said liquid crystal display panel and an even gate according to the field detection pulse.

4,792,858

## OPTICAL SCANNING SYSTEM HAVING A ROTATABLE PLATEN ASSEMBLY AND METHOD FOR LOADING SAME

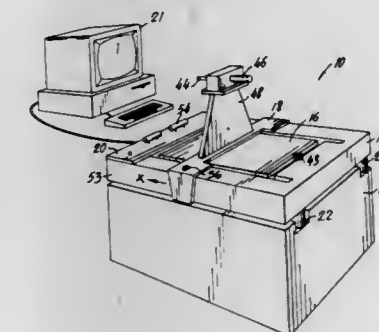
Robert M. Landsman, Huntington Station, N.Y., assignor to Powers Chemco, Inc., Glen Cove, N.Y.

Filed Jun. 5, 1987, Ser. No. 58,807

Int. Cl.<sup>4</sup> H04N 1/10, 1/04

U.S. Cl. 358—293

15 Claims



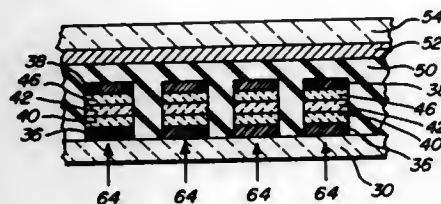
- An optical scanning system comprising:
  - a base having at least one support surface;
  - a platen assembly mounted on said base and having two platens, each platen having an image area, the platen assembly being movable between first and second positions to selectively locate one of said platens in an orientation for scanning the image area of said one platen;
  - a scanner providing a coherent scanning beam tracing scan lines in a first direction across the image area of said one platen; and
  - means for transporting the scanner relative to the base to cause the scanning beam to move in a second direction across the image area of said one platen to trace a series of mutually displaced scan lines thereon.
- A method for loading a sheet into a scanning system having a vacuum platen and a scanner, the platen having a first face for holding a sheet to be imaged and being rotatable between a first position for loading the sheet onto the first face and a second position for imaging the sheet, the scanner being movable out of the platen's path of rotation, comprising the steps of:
  - moving automatically the scanner out of the platen's path of rotation;
  - raising automatically a sheet to the first face of the vacuum platen and holding the sheet to the first face of the platen with a vacuum force while the platen is in the first position; and
  - rotating automatically the platen to bring the sheet to the second position.



**4,792,859**  
**DIGITIZING WAND ADAPTED FOR MANUAL AND AUTOMATIC OPERATION**  
 Guy Wicker, Rochester Hills; Louis D. Swartz, Holly; Daniel H. O'Donnell, Rochester Hills; John A. Heslip, Northville; Vincent D. Cannella, Birmingham; Olivier Prache, Ann Arbor; Mark H. McCormick-Goodhart, Birmingham, and Marvin C. Barnes, Troy, all of Mich., assignors to Ovonix Imaging Systems, Inc., Troy, Mich.

Filed Feb. 9, 1987, Ser. No. 12,414  
 Int. Cl. H04N 1/028, 1/12  
 U.S. Cl. 358—294

2 Claims



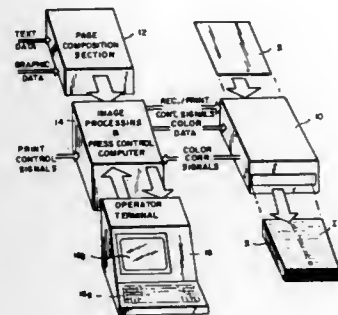
1. A digitizer adapted to generate detectable electrical signals corresponding to an image on an image-bearing member comprising:

an elongated digitizing wand, said wand sized and shaped for portable use and adapted to be manually moved across and thereby scan an image-bearing member; said wand including a photoresponsive array of light sensitive elements, each light sensitive element including at least one layer of amorphous silicon alloy material including hydrogen and fluorine; each light sensitive element adapted to receive light from a corresponding small area portion of said image-bearing member and generate a detectable signal representative of the amount of received light; a base station, said station including: means for receiving said image-bearing member; means for removably supporting said portable wand; and drive means for providing relative motion between said member and said wand at a preselected rate of speed, whereby said digitizer is adapted to manually as well as automatically scan an image-bearing member.

**4,792,860**  
**THERMODYNAMIC PRINTING METHOD AND MEANS**  
 Manfred R. Kuehrie, Walden, Rte. 103A, New London, N.H. 03257

Filed Feb. 27, 1987, Ser. No. 19,780  
 Int. Cl. H04N 1/23  
 U.S. Cl. 358—300

53 Claims



1. A method of printing on a printing medium a variable thickness ink dot pattern representing an original image in response to an incoming digital data stream comprising the steps of:

A. forming printing means having a printing surface;  
 B. defining in the printing means a multiplicity of discrete,

independently electrically chargeable capacitor microcells adjacent to said printing surface;

C. activating selected ones of the microcells in accordance with the incoming data stream so that the activated microcells are geometrically related to the dots in the pattern to be printed;

D. depositing electrical charges on the microcells selected for activation at controlled, variable coulombic charge levels to create at said printing surface localized electrical fields of various strengths that are proportional to the print densities desired for said related data in the pattern to be printed;

E. contacting said printing surface with a voltage sensitive ink in liquid form whereby the ink, under the influence of said fields, is deposited on said printing surface only at the locations of said microcells selected for activation, with the thickness of each said ink deposit being proportional to the strength of the field at that microcell thereby to form a variable-thickness ink pattern on the said printing surface; and

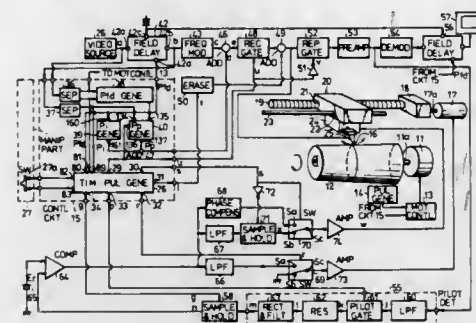
F. transferring said ink pattern to said printing medium to provide a faithful hardcopy reproduction of said original image.

**4,792,861**  
**VIDEO SIGNAL RECORDING APPARATUS WITH TRACK CENTERING USING CROSSTALK DETECTION AND THIRD ODD MULTIPLE FIELD RECORDING**  
 Shigeru Kawase, Tokyo; Hisao Kinjo, Yokohama; Yoshio Mizuno, Kamakura, and Katsuyuki Shudo, Yokohama, all of Japan, assignors to Victor Company of Japan, Ltd., Kanagawa, Japan

Filed Dec. 15, 1986, Ser. No. 942,086  
 Claims priority, application Japan, Mar. 28, 1986, 61-71560  
 Int. Cl. H04N 9/79, 5/781

U.S. Cl. 358—313

23 Claims



1. A video signal recording apparatus for recording an input composite video signal which is to be recorded on closed loop tracks which are successively formed on a rotary recording medium, said input composite video signal including at least picture information and a synchronizing signal, said video signal recording apparatus comprising:

recording and reproducing means for recording and reproducing the input composite video signal on and from the rotary recording medium which undergoes one revolution in one field of the input composite video signal, said input composite video signal using horizontal and vertical scan in conformance with a 2:1 interlaced scanning;

feeding means for intermittently feeding said recording and reproducing means;

driving circuit means for supplying a driving signal for driving and controlling said feeding means;

gating means for passing and supplying to said recording and reproducing means as an output signal of said gating means said input composite video signal in a recording mode, and for passing and supplying as an output signal of said gating

means a reproduced signal which is reproduced from the rotary recording medium by said recording and reproducing means in a reproducing mode;

track position detecting means for obtaining an actual track pitch between an intended track which is to be newly formed on the rotary recording medium and an adjacent pre-recorded track adjacent to the intended track when said recording and reproducing means is scanning the intended track based on a signal component which is reproduced as crosstalk from the adjacent pre-recorded track and for supplying to said driving circuit means an error signal which is obtained by comparing the actual track pitch and a predetermined track pitch; and

control means for controlling operating timings of said gating means and said driving circuit means,

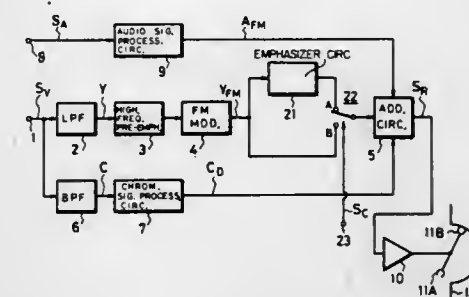
said control means generating control signals based on said input composite video signal and supplying the control signals to said gating means and said driving circuit means to record a signal amounting to one field on each track of the rotary recording medium so that out of two mutually adjacent tracks making up a track pair, a signal related to one of odd and even fields out of signals which are related to two consecutive fields and constitute a picture is recorded on one track of the track pair and a signal related to another of even and odd fields out of signals which are related to two consecutive fields and constitute a picture is recorded on another track of the track pair to thereby record signals amounting to one frame on the track pair, the two signals recorded on the track pair having a time difference of M fields which is three or more odd integral multiple of one field.

**4,792,862**  
**APPARATUS FOR RECORDING A FREQUENCY MODULATED VIDEO SIGNAL WITH SELECTIVE EMPHASIS OF ITS LOW FREQUENCY COMPONENTS**  
 Yoichi Tsusue, Tokyo, and Kolchi Goto, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Nov. 14, 1986, Ser. No. 930,423  
 Claims priority, application Japan, Dec. 5, 1985, 60-274178  
 Int. Cl. H04N 5/782

U.S. Cl. 358—330

10 Claims



1. An apparatus for recording on a record medium a video signal which includes luminance and chrominance signal components, and which may have a relatively wide frequency band or a relatively narrow frequency band, said apparatus comprising:

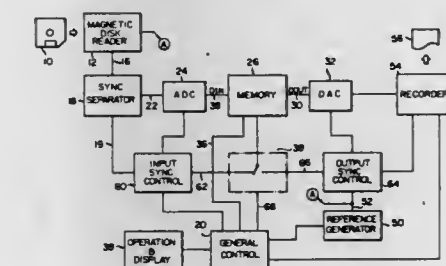
means for separating said luminance and chrominance signal components from a video signal; frequency modulating means receiving the separated luminance signal component and providing a frequency-modulated luminance signal; emphasis means receiving said frequency-modulated luminance signal and emphasizing low frequency components thereof to provide an emphasized frequency-modulated luminance signal; selecting means for selecting, as a luminance signal to be recorded, said frequency-modulated luminance signal from said frequency-modulated means when said video signal has said relatively wide frequency band, or said emphasized frequency-

cy-modulated luminance signal from said emphasis means when said video signal has said relatively narrow frequency band; and recording means for recording on said record medium said luminance signal which is selected to be recorded.

**4,792,863**  
**APPARATUS FOR RECORDING STILL IMAGE WITH RANDOM NOISE MINIMIZED**  
 Hitooshi Urabe, Kaisei, Japan, assignor to Fuji Photo Film Co. Ltd., Kanagawa, Japan  
 Filed Dec. 19, 1986, Ser. No. 943,935  
 Claims priority, application Japan, Dec. 21, 1985, 60-286910  
 Int. Cl. H04N 5/76

U.S. Cl. 358—335

5 Claims



1. Apparatus for recording a still image on an image recording medium, comprising:

input means for repeatedly receiving video signals representing one particular still image;  
 memory means for storing data representative of said received video signals and having a storage capacity of at least one frame of video data;  
 recording means responsive to data read out from said memory means for recording a still image represented by said data on an image recording medium;  
 control means for controlling said memory means and said recording means, including:  
 means for repeatedly writing data representative of said repeatedly received video signals into said memory means to be stored therein, and  
 means for repeatedly reading data stored in said memory means out to said recording means for recording on said image recording medium;  
 said recording means thereby repeatedly superimposing said still image on said image recording medium in response to said repeated writing and reading of said data into and out of said memory means.

**4,792,864**  
**APPARATUS FOR DETECTING RECORDED DATA IN A VIDEO TAPE RECORDER FOR AUDIENCE RATING PURPOSES**

Fumio Watanabe, Zama, and Yoshikazu Itoh, Tokyo, both of Japan, assignors to Video Research Limited, Tokyo, Japan  
 Filed Jun. 27, 1986, Ser. No. 879,800  
 Claims priority, application Japan, Sep. 3, 1985, 60-196487  
 Int. Cl. H04N 5/782, 5/91, 7/10

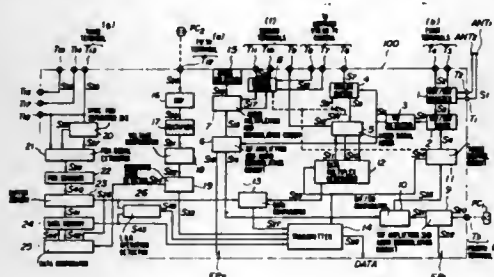
U.S. Cl. 358—335

1 Claim

1. Apparatus for detecting recorded and reproduction states of a video tape recorder for supplying audience rate data therefrom, comprising:

a meter connected to a video tape recorder;  
 a first pickup coil coupled to the video tape recorder for detecting an audio intermediate frequency signal from said video tape recorder;  
 a second pickup coil coupled to the video tape recorder for detecting an erase signal from said video tape recorder;

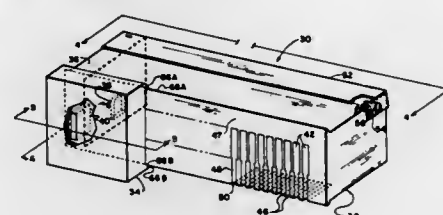
means including a first terminal on said meter connected to an antenna terminal of said video tape recorder for supplying boosted television signals to the video tape recorder; means including a second terminal on said meter connected with an external input terminal of said video tape recorder for supplying video and audio signals to the video tape recorder; means including a third terminal on said meter connected to an external output terminal of said video tape recorder for receiving video and audio signals from said video tape recorder; means including a fourth terminal on said meter connected to said first pickup coil for receiving audio intermediate frequency signals from said video tape recorder; means including a fifth terminal on said meter connected to said second pickup coil for receiving erase signals from said video tape recorder; said means for supplying boosted television signals to the video tape recorder comprising a booster boosting television signals input from an external antenna and supplying the boosted signals to said first terminal and to a tuner in said meter; said tuner supplying output video intermediate frequency signals and channel data; video intermediate frequency detecting automatic gain control means for receiving the output signals from said tuner and producing output video signals; audio intermediate frequency amplifying audio demodulating means receiving said video signals from said video intermediate frequency detecting automatic gain control



means and producing output audio signals at said second terminal and output audio intermediate frequency signals; data generating means for generating calendar data consisting of year, month, day, hour and minute and for memorizing channel data produced by said tuner; video signal adding means coupled to said data generating means for supply of channel and calendar data therefrom to said second terminal during the vertical flyback line erasing period of the video signal input from said video intermediate frequency detecting automatic gain control means; a second audio intermediate frequency amplifying audio demodulating means for receiving and amplifying video tape recorder audio intermediate frequency signals at said fourth terminal; tuner scanning controlling means receiving the outputs of said first and second audio intermediate frequency amplifying audio demodulating means for scanning said outputs and selecting stations on said tuner which coincide with selected stations on the video tape recorder and supplying the channel data to said data generating means; data extracting means for extracting and memorizing channel and calendar data from said video signal input at said third terminal; data comparing means receiving channel and calendar data from said extracting means, and channel and calendar data from said data generating means for comparing both data and, when they coincide producing an output signal representing reproduced information; recorded picture detecting means processing the erase signal

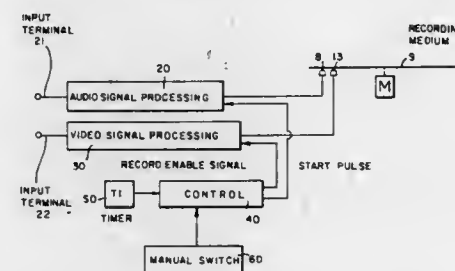
of said video tape recorder at said fifth terminal and detecting recorded picture information; and transmitter means for receiving recorded picture information from said recorded picture detecting means, reproduced information from said data comparing means and channel and calendar data from said data generating means and delivering the same as audience rate data to a telephone circuit.

**4,792,865**  
**DISK CONTAINER SUPPORTING A DETACHABLE MEMORY**  
Hans-Peter Baumeister, Churchville, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.  
Division of Ser. No. 644,097, Aug. 24, 1984, Pat. No. 4,652,939.  
This application Jan. 2, 1987, Ser. No. 213  
Int. Cl.<sup>4</sup> G11B 23/03, 23/34  
U.S. Cl. 358—342 5 Claims



1. A memory module for use with a magazine containing a plurality of magnetic disks, said module comprising:  
a memory device for storing data concerning the contents of the magnetic disks;  
a container for holding said memory device;  
means disposed on the container for mating with the magazine and for supporting said container for movement relative to the magazine between a plurality of positions adjacent to the magazine; and  
means for locking said container in a particular one of said positions.

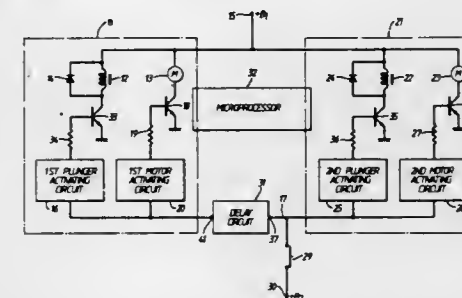
**4,792,866**  
**STILL PICTURE RECORDING APPARATUS**  
Hitoshi Hirobe, and Kaoru Adachi, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed Nov. 20, 1987, Ser. No. 123,289  
Claims priority, application Japan, Nov. 20, 1986, 61-275243  
Int. Cl.<sup>4</sup> H04N 5/781, 5/907, 5/92  
U.S. Cl. 360—10.1 6 Claims



1. A still picture recording apparatus, comprising:  
a video signal processing circuit receiving a video input signal of a still picture and converting the input signal into an FM video signal;  
an audio signal processing circuit receiving an audio input signal pertinent to said video signal and compressing the time base of the audio input signal;  
a magnetic head means and a magnetic disk on which output

signals of said video signal processing circuit and said audio signal processing circuit are recorded by said magnetic head means; and  
a control circuit connected to a manual switch for actuating said audio signal processing circuit from the time of actuation of said manual switch and actuating said video signal processing circuit at a time delayed by a predetermined period relative to the time of actuation of said manual switch.

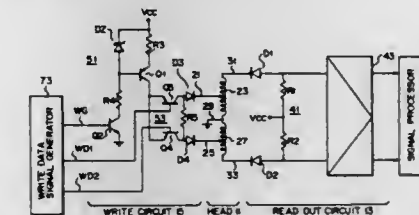
**4,792,867**  
**SYNCHRONIZING CIRCUIT FOR DUBBING APPARATUS**  
Yuji Komori, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan  
Filed Sep. 16, 1986, Ser. No. 907,968  
Claims priority, application Japan, Sep. 20, 1985, 60-207904  
Int. Cl.<sup>4</sup> G11B 5/86 4 Claims



1. A synchronizing circuit for a dubbing apparatus comprising:  
a single dubbing command key, said dubbing apparatus being responsive to manual activation of said single dubbing command key and being capable of dubbing a playback signal played back from a playback unit to a recording unit;  
a power source for supplying a driving current;  
a potential source associated with the single dubbing command key for supplying a prescribed potential;  
first setting means for setting the playback unit in a playback mode, said first setting means including a first triggering means for triggering the playback unit into a prescribed state to start the playback mode, said triggering occurring in response to activation by a first switching transistor, and a first driving means for driving the playback unit during the playback mode after the playback unit is triggered by the first triggering means, said first driving means being activated by a second switching transistor;  
first activating means, including a first plunger activating circuit and a first motor activating circuit, said first switching transistor being biased to activate by said first plunger activating circuit, for activating the first setting means, the first activating means applying the driving current from the power source to the first setting means in response to the prescribed potential applied from the potential source;  
second setting means for setting the recording unit in a recording mode, said second setting means including a second triggering means for triggering the recording unit into a prescribed state to start the recording mode, said triggering occurring in response to activation by a third switching transistor, and a second driving means for driving the recording unit during the recording mode after the recording unit is triggered by the second triggering means, said second driving means being activated by a fourth switching transistor;  
second activating means, including a second plunger activating circuit and a second motor activating circuit, said third switching transistor being biased to activate by said

second plunger activating circuit and said fourth switching transistor being biased to activate by said second motor activating circuit, for activating the second setting means, the second activating means applying the driving current from the power source to the second setting means in response to the prescribed potential applied from the potential source; and  
means for delaying the supply of the prescribed potential to one of the first and second activating means when the prescribed potential is first applied to the other of the activating means.

**4,792,868**  
**RECORDING/REPRODUCING DEVICE WITH MEANS FOR SWITCHING INDUCTANCE OF SUCH DEVICE FOR USE IN A FLOPPY DISK APPARATUS**  
Hisami Ozaki, Fuji, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Sep. 12, 1986, Ser. No. 906,745  
Claims priority, application Japan, Sep. 30, 1985, 60-216425  
Int. Cl.<sup>4</sup> G11B 5/17, 5/02 5 Claims



1. A recording/reproducing device for a magnetic recording apparatus, comprising:  
a read/write transducer having an inductance for recording data onto a magnetic recording medium and reading the data from the magnetic recording medium; and  
means for switching an inductance of the read/write transducer between an upper value for reading the data and a lower value for recording the data, said switching means including:  
a coil on the read/write transducer including first and second grounded coil portions, each portion including a tap thereon,  
a read circuit connected to the first and second coil portions for generating read signals representative of the flux changes on the recording medium, and  
a write circuit connected to the taps of the first and second coil portions for providing write currents corresponding to the data to be recorded to the first and second coil portions, said write circuit including means for selectively supplying a predetermined current to the first coil portion or the second coil portion through the tap thereof.

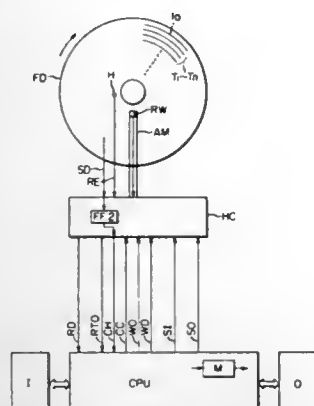
**4,792,869**  
**ELECTRONIC APPARATUS FOR PROPER HANDLING OF INTERCHANGEABLE MEMORY**  
Takayuki Fujita, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 591,989, Mar. 21, 1984, abandoned, which is a continuation of Ser. No. 217,824, Dec. 18, 1980, abandoned, which is a continuation of Ser. No. 27,725, Apr. 6, 1979, abandoned. This application Mar. 26, 1987, Ser. No. 31,173  
Claims priority, application Japan, Apr. 14, 1978, 53-44463  
Int. Cl.<sup>4</sup> G11B 5/02, 5/09, 5/54 6 Claims

1. An electronic apparatus using a removable external mem-



ory device for storing a file of data to be processed and control data associated with said data to be processed, said external memory device being provided with a recording track, wherein said file of data and said control data are recorded in mutually different locations of said recording track, comprising:

detection means for detecting that a said removable external memory device is removed from said apparatus and that a said memory device is again mounted thereon;  
head means disposed facing said removable external memory device;



first control means for causing said head means to read out said control data recorded on said recording track when said detection means detects the said mounting of said removable external memory device on said apparatus;  
storage means for storing said control data read out from said recording track by said head means under control of said first control means; and  
second control means for identifying predetermined data of said file of data recorded on said recording track of said removable external memory device in accordance with said control data stored in said storage means, and for controlling the reading out of the identified data.

4,792,870

# METHOD AND APPARATUS FOR TRACK ACCESSING USING A PREDICTED STATE VECTOR

Denis Pinson, Thoiry, France, assignor to Bull S.A., Paris, France

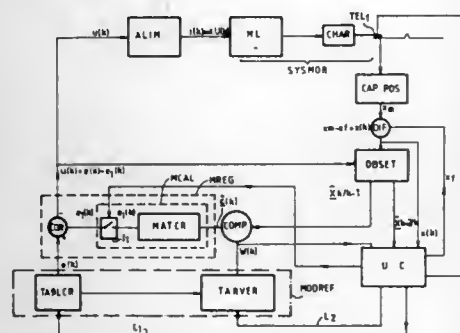
Filed Feb. 11, 1987, Ser. No. 13,585

Claims priority, application France, Feb. 14, 1986, 86 02022

Int. Cl.<sup>4</sup> G11B 21/08, 5/55, 13/02

U.S. Cl. 360—78.14

6 Claims



1. A method for displacing a system (SYSMOB) that is movable with respect to a carrier (DISC) of data recorded on a plurality of tracks, the system being moved by an electric

motor (ML) supplied with voltage/current by a supply generator (ALIM) controlled in turn by a control voltage  $u(k)$  and including at least one data reading/writing head  $TEL_1$  displaced on a given path from a departure track A to an arrival track B, the position  $x_m(k)$  of the head ( $TEL_1$ ) on the path being measured at predetermined sampling instants  $kT$  by a position pickup (CAPPOS), comprising

- (1) at each predetermined sampling instant  $kT$ , the value of the state vector  $\hat{x}_{k/k-1}$  indicating the position and speed of the head ( $x, \dot{x}$ ) at that instant is predicted, as a function of the measured position  $x_m(k-1)$  of the head and of the control voltage  $u(k-1)$ , which are considered at the preceding sampling instant  $(k-1)T$ ;
- (2) the predicted state vector  $\hat{x}_{k/k-1}$  is compared with a reference state vector  $W(k)$  indicating the reference position and speed which the head ( $TEL_1$ ) must have at the predetermined sampling instant  $kT$ ; and
- (3) the control voltage  $u(k)$  is calculated as a function of a reference control voltage  $e(k)$  of the motor at the predetermined sampling instant  $kT$  and of the difference  $e(k)$  between the predicted state vector  $\hat{x}_{k/k-1}$  and the reference state vector  $W(k)$ .

4,792,871

# CASSETTE LOADING APPARATUS WITH DIFFERENTIAL GEAR PROVIDING THREE FUNCTIONS

Heinrich Hütter, Tulla, Austria, assignor to U.S. Phillips Corporation, New York, N.Y.

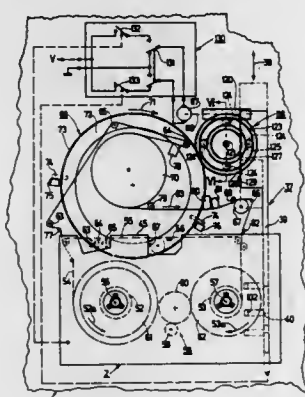
Filed Jul. 25, 1986, Ser. No. 891,000

Claims priority, application Austria, Aug. 6, 1985, 2304/85

Int. Cl.<sup>4</sup> G11B 5/027

U.S. Cl. 360—85

4 Claims



1. A recording and/or playback unit for magnetic tape housed in a cassette of the type out of which a tape is drawn, said unit comprising

- a cassette holder device movable between a loading position, in which the cassette can be inserted into the holder, and an operational position, in which the cassette occupies an operational position;
- a tape scanning device;
- a tape threading device for drawing the tape out of a cassette when in the operational position and for wrapping the tape around the scanning device, said threading device being movable between an unthreaded position, in which it engages behind the magnetic tape housed in the cassette, and a threaded position, in which it holds the tape wrapped around the scanning device after the tape has been drawn out of the cassette,

at least one tape run operating device movable between at least two operational positions and operative in at least one of its operational positions to carry out at least one

tape run function when the cassette is in its operational position,  
a differential gear which can be driven in opposed directions of rotation by a motor and has at least two outputs, the differential gear via one output displacing the cassette holder between its loading position and its operational position and via at least one further output displacing the tape threading device and the tape run operating device.

4,792,873

# MECHANISM FOR OPENING AND CLOSING THE SHUTTER OF A DISC CASSETTE

Tsukasa Uehara, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

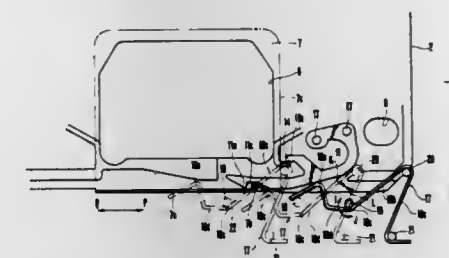
Filed Nov. 12, 1986, Ser. No. 929,616

Claims priority, application Japan, Nov. 12, 1985, 60-252043; Nov. 12, 1985, 60-252044

Int. Cl.<sup>4</sup> G11B 17/03, 15/675

U.S. Cl. 360—99.06

15 Claims



4,792,872

# HOLDER STRUCTURE IN A CASSETTE PLAYER

Yasuyuki Nakanishi, Kyoto, and Toshiyuki Ushiba, Osaka, both of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

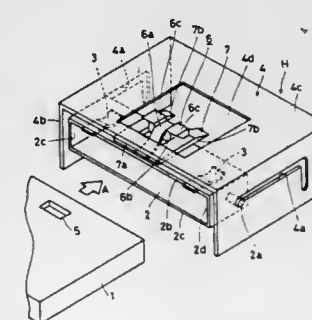
Filed Mar. 11, 1987, Ser. No. 24,697

Claims priority, application Japan, Mar. 11, 1986, 61-55459; Mar. 11, 1986, 61-55462

Int. Cl.<sup>4</sup> G11B 15/66

U.S. Cl. 360—96.5

6 Claims



1. A cassette holder structure in an information recording and/or reproducing apparatus operable with the use of a cassette containing an information carrier medium, which structure comprises:

- a support structure;
- a cassette holder supported by said support structure for movement between a first position, at which the cassette holder is ready to receive a cassette housing an information carrier medium, and a second position at which information can be recorded on or reproduced from said information carrier medium contained in said cassette;
- a detent member defined in and juxtapositioned to a front edge of said cassette;
- a generally elongated elastic releaseable catch member carried by said cassette holder and resiliently engageable with said detent member defined in said cassette; and
- a finger assembly secured to said support structure to be engaged with said elastic releaseable catch member to disengage said catch member from said detent member in the cassette when said cassette holder is moved to said first cassette receiving position, but to be disengaged from said elastic releaseable catch member so that said catch member will engage said detent member in the cassette when said cassette holder with the cassette inserted therein is moved a predetermined distance from said cassette receiving first position towards said second information recording and/or reproducing position.

4,792,874

# STABILIZER DEVICE HAVING AN EDGE CONFIGURATION FOR STABILIZING THE INTERFACE BETWEEN A TRANSDUCER AND A MOVING MEDIUM

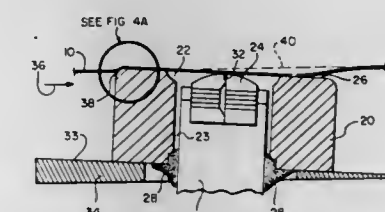
John C. MacDonald, II, and Rodney D. Wagner, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 26, 1987, Ser. No. 19,468

Int. Cl.<sup>4</sup> G11B 5/60

U.S. Cl. 360—102

6 Claims



1. A stabilizer device for stabilizing the movement of a storage medium supported in a nominal plane and advanced in

a predetermined direction in relation to a transducer, said device comprising:

- a stabilizing block having a cavity in which the transducer is supported on a side of said block facing the advancing storage medium;
- a smoothly rounded leading edge on said side of the block facing the advancing storage medium;
- a circumferential flat air bearing surface around said cavity on said side of the stabilizing block facing said medium, said flat air bearing surface intersecting said rounded leading edge and generating a sharp transition at the intersection therewith that forms an abrupt angular termination of the rounded leading edge at its junction with the flat air bearing surface; and
- means for disposing said stabilizing block at an angle with respect to the nominal plane of the storage medium so that said rounded edge contacts the medium and deflects the medium from the nominal plane over said sharp transition and upon the transducer.

4,792,875

#### GIMBAL SPRING FOR FLOATING TYPE MAGNETIC HEAD

Hidetschi Ohdaira, Nagaoka, Japan, assignor to Alps Electric Co., Ltd., Japan

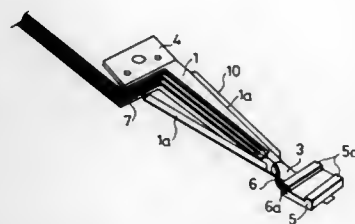
Filed Aug. 25, 1987, Ser. No. 89,682

Claims priority, application Japan, Oct. 3, 1986, 61-152243[U]

Int. Cl.<sup>4</sup> G11B 5/48

U.S. Cl. 360—104

2 Claims



1. In a gimbal spring for supporting a floating type magnetic head at a distal end thereof extending lengthwise in one horizontal direction from a mounting member at an opposite end thereof, said gimbal spring including a flexure member at said distal end thereof and a load beam having one end mounted to said mounting member and its other end supporting said flexure member, wherein said magnetic head has an upper surface which is mounted to said flexure member of said gimbal spring and a lower surface which is placed in contact with a magnetic medium disposed in a horizontal plane in a downward direction from said gimbal spring,

the improvement in said gimbal spring comprising:

- said load beam having lateral edges extending widthwise in a transverse horizontal direction perpendicular to said one horizontal direction, and respective bent portions each formed at a respective one of said lateral edges projecting on a lower side of said load beam in said downward direction, which is the same direction said lower surface of said magnetic head faces, in order to obtain a thin profile for the structure of said load beam and magnetic head;
- said bent portions extending along the length of said load beam near said flexure member but spaced a given distance therefrom; and
- a reinforcing plate secured to an upper side of said load beam, opposite from said lower side, substantially across said distance between the ends of said bent portions and said flexure member.

4,792,876

#### CAPSTAN CLEANER FOR VIDEO CASSETTE PLAYER/RECORDER

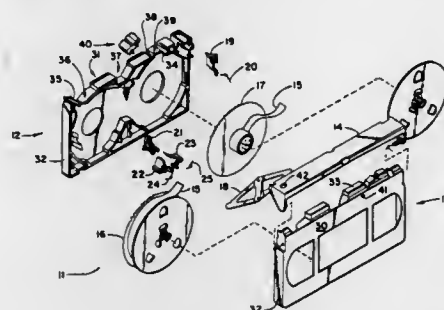
Randall W. Cook, Palo Alto, and Bryan K. Clark, Sunnyvale, both of Calif., assignors to Tandy Corporation, Fort Worth, Tex.

Filed Jan. 8, 1987, Ser. No. 58,960

Int. Cl.<sup>4</sup> G11B 5/10, 5/127, 5/41

U.S. Cl. 360—128

8 Claims



1. Cleaning apparatus for a player/recorder for video cassettes conforming in shape and size to a preselected standard, said player/recorder including a capstan positioned to be in the region of the perimeter of such a video cassette when said video cassette is inserted into said player/recorder, said cleaning apparatus comprising:

- a housing conforming in shape and size to said preselected standard, said housing comprised of first and second side walls joined by a peripheral wall a surface portion of which assumes a position adjacent to said capstan when said housing is inserted into said player/recorder in place of such a video cassette;
- a cartridge with an absorbent pad fixed thereto, said pad adapted to clean the capstan of the player/recorder;
- a cavity in said housing adjacent to said surface portion and open through said first side wall to receive said cartridge in a snug fit, said cavity communicating with said surface portion through a slot to permit passage of said absorbent pad, and containing an access hole in said second side wall; and,
- two reels adapted to be inserted into spindles of the player/recorder.

4,792,877

#### ELECTRIC MOTOR ARMATURE CURRENT CONTROL CIRCUIT

Dennis P. Thornton, Centerville, Ohio, assignor to General Motors Corporation, Detroit, Mich.

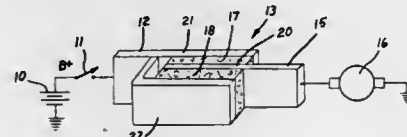
Continuation of Ser. No. 086,019, Aug. 17, 1987, abandoned.

This application Mar. 31, 1988, Ser. No. 180,670

Int. Cl.<sup>4</sup> H02H 7/08

U.S. Cl. 361—24

4 Claims



1. An electric motor armature current control circuit comprising, in combination:

- an electric motor having a field and an armature with armature windings;
- an electric power supply;
- a motor protection device connected in series with the

motor armature windings and electric power supply, whereby any armature winding current also flows through the motor protection device, the motor protection device comprising (a) a first polymer PTC element connected in electrical series with the motor armature windings, the first polymer PTC element having a resistance effective to generate heat with armature winding current flow therethrough and characterized by a first trip temperature higher than the maximum expected ambient temperature to which the first polymer PTC element is to be exposed in motor operation, above said first trip temperature said resistance increases greatly from a low resistance to a high resistance, the heat generated by normal armature current being effective to raise the temperature of said element above the first trip temperature and the resulting high resistance being effective to reduce electric current therethrough sufficiently as to make the first polymer PTC element self regulating at the first trip temperature, and (b) a second polymer PTC element connected in electrical parallel with said first element and in thermal contact therewith for being maintained at least at the first trip temperature, the second polymer PTC element having a resistance effective to generate heat with armature winding current flow therethrough and characterized by a second trip temperature sufficiently higher than said first trip temperature and requiring an excessive armature winding current to raise the temperature of said second element to the second trip temperature, and above said second trip temperature said second element resistance increases greatly from a low resistance lower than that of the first polymer PTC element and essentially negligible in its effect on the armature winding current to a high resistance protectively limiting the armature winding current, the first polymer PTC element also having, at the second trip temperature, a high resistance protectively limiting the armature winding current, whereby the protective device limits excessive armature winding current after a period of time independent of ambient temperature.

4,792,878

#### HEAT DISSIPATING HOUSING FOR A CIRCUIT COMPONENT

Bernhard Baselmeyer, Munich, and Herbert Prussas, Reichertshausen/Ilm, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

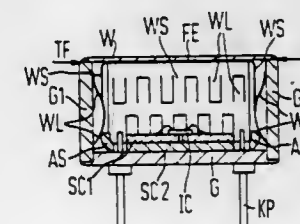
Filed Aug. 25, 1986, Ser. No. 900,111

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1985, 3531136

Int. Cl.<sup>4</sup> H05K 7/20

U.S. Cl. 361—383

10 Claims



1. A heat dissipating housing with a circuit component giving off heat in operation, such as a driver chip where the housing consists of at least two parts, namely a bottom tub and a cover having a substantially planar cover surface, a frame-shaped planar portion of this planar cover serving as a bearing surface onto a substantially likewise planar bearing surface of sidewalls of the bottom tub, the bearing surface of the sidewalls lastly being fastened to

the frame-shaped planar portion by, for example, welding or soldering,

at least parts of an outer surface of the cover consisting entirely of metal, as well as other outer surfaces of the housing, such as outer surfaces of some of the sidewalls and cooled in operation by a fluid cooling medium, at least a part of the dissipated heat being conducted from the circuit component via a stiff heat conducting body and via a good heat conductor element comprising elastic material to the cover, and

at least one good heat-conducting spring structure with feather tongues bracing itself in several lateral gaps between the heat conducting body on the one hand and at least two of the sidewalls of the bottom tub on the other hand, namely at least one spring structure each into the two substantially parallel lateral gaps between the heat conducting body on the one hand and two mutually opposite sidewalls on the other hand, in a manner expanding by means of its feather tongues so that the spring structures adhere in each instance by friction forces at the inner surfaces of these sidewalls as well as at the heat conducting body; for example, the housing being a housing for a 200 Mbit/sec light emitting module with optical plug and driver chip as well as with a light emitting diode applied in a secondary housing of the housing where this secondary housing is applied to one of the sidewalls of the bottom tub between the optical plug and the circuit component, characterized in that

the element (FE) and the spring structures (WS/WL) including their feather tongues (WL) jointly form a single cohering spring unit (FE/WL/WS) which is produced from a single piece of spring plate with a centerpart (FE) and with resilient, lateral parts (WS) comprising the feather tongues (WL),

the good heat conductor cover (W) is connected firmly and heat conducting with the center part (FE) of the spring unit (FE/WS/WL), and

the geometric dimensions, the spring forces and the friction forces of the spring unit (FE/WS/WL) are selected so that, after the cover (W) has been placed on the bottom tub (G, G1), but before the final attachment of the frame-shaped portion of the cover (W) to the bearing surface (TF) of the sidewalls (G1) of the bottom tub (G), the spring unit (FE/WS/WL) forms a centering retention—at least a certain resiliently yielding one—of the cover (W), which makes difficult or prevents a displacement of the cover (W) relative to the sidewalls (G1) of the bottom tub (G).

4,792,879

#### MOUNTING STRUCTURE FOR ELECTRIC AND ELECTRONIC CIRCUIT ELEMENTS

Otto Banknecht, Meckenbeuren; Norbert Lichte, Schlier, and Karl-Heinz Warken, Weingarten, all of Fed. Rep. of Germany, assignors to I F M Electronic GmbH, Essen, Fed. Rep. of Germany

Continuation of Ser. No. 723,798, Apr. 16, 1985, abandoned.

This application Aug. 24, 1987, Ser. No. 89,042

Claims priority, application Fed. Rep. of Germany, Apr. 17, 1984, 3414480

Int. Cl.<sup>4</sup> H05K 9/00

U.S. Cl. 361—424

5 Claims

1. An electrical contactless switch, comprising:

- a casing;
- a flexible strip-like insulating carrier, including a first part having conductive strips provided thereon, and a flexible extension along a common edge from said first part with an electrically conductive layer coated thereon;
- electronic components mounted on a component side of said first part of said carrier and being electrically connected by said conductive strips to form a circuit of said contactless switch;
- said first part of said carrier being folded into folds in accor-



dion fashion to form a compact assembly, with vertices of said folds being parallel to said common edge of said first part and said extension; and  
said extension being wrapped around said assembly in the



form of a wrapping, with an axis of said wrapping being parallel to said vertices of said folds to form an electrical shield for said assembly;  
wherein said wrapping with said assembly is inserted into said casing.

4,792,880

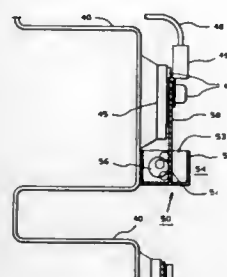
## TERMINAL MODULE

Robert L. Cather, Wilkins Township, Allegheny County, and James F. Sutherland, Plum Borough, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Continuation of Ser. No. 914,855, Oct. 3, 1986, abandoned. This application Nov. 12, 1987, Ser. No. 120,738

Int. Cl.<sup>4</sup> H05K 5/02

U.S. Cl. 361-426

10 Claims



1. A termination frame having a terminal strip mounted thereon with the terminal strip having a plurality of spaced terminals projecting therefrom, and a terminal module mounted on at least one of said terminals, said terminal module comprising:

a printed circuit board, said board having a plurality of extending blades,  
at least one electrical component mounted on said printed circuit board,  
potted component means enclosing a portion of said printed circuit board including said electrical component mounted on said printed circuit board, said blades freely protruding from said potted component means, said potting means being a potting shell enclosing said components and an encapsulating material within said shell and encapsulating said components,  
electrical conductor means on at least one surface of said printed circuit board and said blades for defining a plurality of circuit points to which said electrical component is connected and for making electrical connections between respective ones of said circuit points and the conductor means on respective ones of said blades; and  
said blades being mounted on respective terminals of the terminal strip so that the terminal module is supported on said terminal strip by said blades and the electrical conductor means on said blades are electrically connected to said terminals of the terminal strip wherein the blades of the circuit board extend across the face of the terminal strip and the potted portion of the printed circuit board is along and adjacent to one edge of the terminal strip.

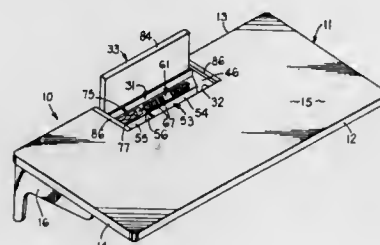
4,792,881  
WORK SURFACE WITH POWER AND COMMUNICATION MODULE

Harold R. Wilson, Holland, and Allen B. Belka, Wayland, both of Mich., assignors to Haworth, Inc., Holland, Mich.  
Continuation of Ser. No. 699,117, Feb. 7, 1985, Pat. No. 4,654,756. This application Mar. 27, 1987, Ser. No. 32,107  
The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> H02B 1/20

U.S. Cl. 361-428

6 Claims



1. In combination, an upright space-divider wall panel, and a work surface structure detachably mounted on said wall panel so as to project generally horizontally outwardly from one side of said wall panel in generally cantilevered relationship relative thereto, said work surface structure having a horizontally extending platelike top member with a substantially planar upper working surface, the top member being of substantially rectangular configuration and including front and rear edges and a pair of end edges extending therebetween, said work surface structure comprising:

a power module means secured to said top member adjacent to and extending longitudinally along said rear edge for providing electrical power for electrical equipment adapted to be supported on said top member;  
an upwardly-oriented access opening associated with said power module means, said access opening being adjacent said rear edge and horizontally elongated generally parallel therewith;  
cover means pivotally supported relative to said top member for movement between (1) a closed position wherein it closes off said access opening and is substantially flush with said upper working surface and (2) an open position wherein said access opening is exposed;  
said module means including a housing which is secured to and projects downwardly relative to said top member and defines therein a main compartment which is disposed below and accessible through said access opening, said housing being horizontally elongated generally parallel with said rear edge;  
said module means including an electrical power unit removably secured to said housing and having a wall which mounts thereon a plurality of electrical receptacles, said wall and the electrical receptacles thereon being accessible solely from said main compartment, said wall being spaced downwardly from said cover means and being sloped upwardly as it projects rearwardly so as to face both upwardly and forwardly for increased accessibility and visibility of the receptacles mounted thereon when the cover means is in its open position; and  
said main compartment as defined within said housing defining an open space in front of said wall and extending downwardly below said receptacles for storing cables therein.

4,792,882

## BIKE BRAKE LIGHT

Pierre Guevremont, 78 Rusholme Road, Toronto, Ontario M6J 3H6, Canada

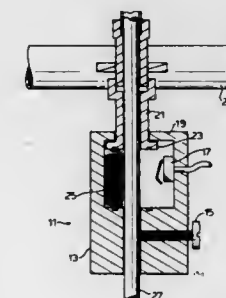
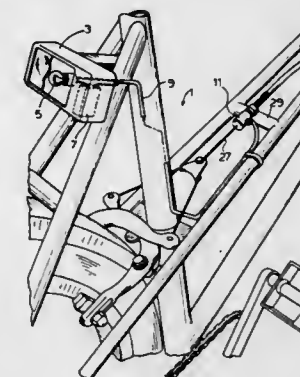
Filed May 26, 1987, Ser. No. 53,752

Int. Cl.<sup>4</sup> B62J 6/00

U.S. Cl. 362-72

6 Claims

1. A bicycle having a cable controlled brake and a brake light circuit operated by said cable controlled brake, said circuit comprising a brake light, an electrical power supply for operating said brake light, and a circuit opening and closing arrangement at least part of which is mountable to and movable with said cable and including switching means for opening and closing said circuit, said switch means being covered by and operated internally of a protective housing to activate said power supply when applying said brake, said switch means further comprising a switch member supported within a first cable mounting member with said switch member being laterally offset from said cable and a second cable mounting member for lateral transfer of movement from said cable to said switch member.



4,792,883

## RUNNERS BATON BAT

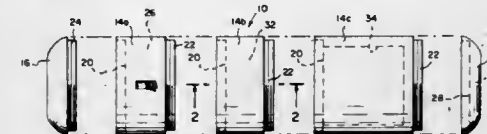
Archie W. Ackerman, George Spector, 233 Broadway, RM 3815, and George Spector, 233 Broadway, RM 3815, both of New York, N.Y. 10007

Filed Jul. 20, 1987, Ser. No. 75,649

Int. Cl.<sup>4</sup> F21L 7/00

U.S. Cl. 362-102

1 Claim



1. A baton for a runner comprising:  
(a) a plurality of interchangeable lightweight cylindrical segments, each of said segments having internal threads at

one end and external threads at the other end so that said internal threads of one of said segments can engage with said external threads of another of said segments;

(b) a first end cap having external threads to engage with said internal threads of one of said segments at one side of said baton;

(c) a second end cap having internal threads to engage with said external threads of another of said segments at the other side of said baton so as to complete said baton thus allowing said runner to hold said baton in a hand, wherein said first end cap is transparent and said segment engaging said first end cap includes a built-in flashlight thereon, wherein said second end cap includes a compartment for holding a key therein, wherein one of said segments includes a leaded weight inside to increase the upper body strength of said runner, wherein one of said segments includes a compartment for holding various items therein, wherein one of said segments includes:

(d) a take up spool spring biased and rotatably positioned within said segment;

(e) a belt wrapped around said spool and extending outwardly from said segment; and

(f) a hook and loop pile fastener, one portion of said hook and loop pile fastener attached to the free end of said belt while the other portion of said hook and loop pile fastener is attached to the opposite side of said segment so that said belt can be wrapped around the waist of said runner, and attached to said opposite side of said segment allowing said baton to hang vertically therefrom.

4,792,884

## ILLUMINATED VANITY MIRROR VISOR

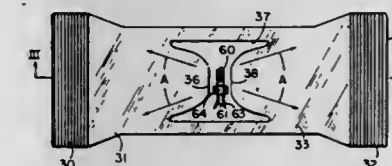
Michael J. Suman, and Wesley D. Merzban, both of Holland, Mich., assignors to Prince Corporation, Holland, Mich.

Filed Oct. 19, 1987, Ser. No. 109,948

Int. Cl.<sup>4</sup> F21V 33/00, 7/04, 9/00

U.S. Cl. 362-135

24 Claims



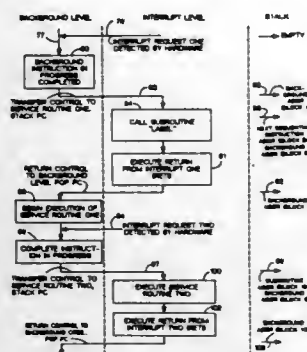
1. A light-transmitting housing for use in connection with an illuminated vanity mirror, said housing comprising:

a generally rectangular integrally molded body of light-transmissive material including lenses formed on opposite ends thereof with surfaces extending along a first surface of said body, said body further including light reflective facet means behind each of said lens means and formed in a surface of said body opposite said first surface, said body further including gap means formed centrally therein and having generally curved facing spaced edges for permitting the positioning of a light source in alignment between said edges, wherein each of said edges includes a surface which is rounded in a plane extending orthogonally to said curved edges bordering said gap means and communicating with said facet means and each of said lens means by means of integral legs such that light from a substantially point light source positioned in said gap between said opposed surfaces will be efficiently transmitted for radiation outwardly from said lens means.





- currently being executed by the processor at the time the first interrupt request occurred;
- identifying the location address whereat the code for servicing the first interrupt request is being stored;
  - at the location identified in step (c) above, executing in said processor a set of commands which adjusts the state of the processor to accept a second interrupt request on the single priority interrupt level and arranging the addresses in steps (b) and (c) in a stack with the address in step (c) being first in the stack;
  - go to the first address listed in the stack of step d and begin to execute the code for servicing the first interrupt request;
  - accepting a second interrupt request on said single interrupt priority level;
  - temporarily putting aside the processing of the code in step (a);



- executing all the codes for servicing the second interrupt request;
- following the execution of the codes in step (h), executing a second command which causes the processor to go to the address where the partially processed code of step (g) is located and completing the execution of the code which services the first interrupt request; and
- executing a third command which causes the processor to go to the second address listed in the stack of step (d) and continue the execution of the background routine.

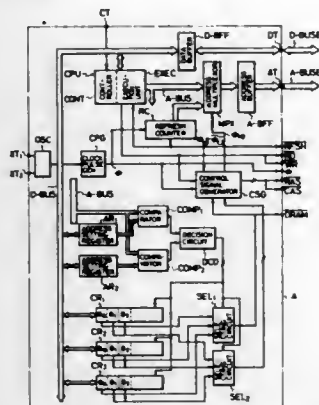
#### 4,792,891 DATA PROCESSOR

Shiro Baba, Tokorozawa, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 20, 1985, Ser. No. 799,795  
Claims priority, application Japan, Nov. 26, 1984, 59-248109  
Int. Cl. G06F 13/00

U.S. Cl. 364-200

10 Claims



1. A data processor formed on a single semiconductor substrate to be externally coupled to a memory having address

terminals and data terminals, said data processor comprising: address bus lines to which an address signal including a plurality of bits is applied, said address signal defining an address in said memory;

data bus lines to be coupled to said data terminals of said memory such that either data to be read from said memory or data to be fed to said memory is applied to said data bus lines;

external address terminals coupled to said address bus lines via an address switching circuit and to be coupled to said address terminals of said memory;

a register for storing attributive data corresponding to an attribute of said memory;

a control circuit responsive to said attributive data of said register for discriminating whether or not said attributive data indicates that said memory should be addressed according to an address multiplexing system, according to which a first part of said plurality of bits of said address signal and a second part of said plurality of bit of said address signal are delivered to said address terminals of said memory, individually, and for generating an output signal for controlling said address switching circuit; and

said address switching circuit being responsive to said output signal of said control circuit for delivering said address signal according to said address multiplexing system to said external address terminals when said attributive data indicates that said memory should be addressed according to said address multiplexing system.

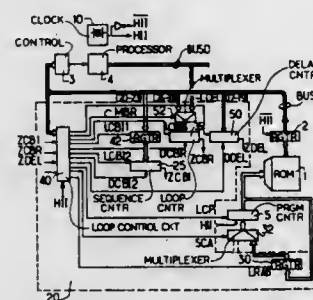
#### 4,792,892 DATA PROCESSOR WITH LOOP CIRCUIT FOR DELAYING EXECUTION OF A PROGRAM LOOP CONTROL INSTRUCTION

Lac Mary, Bures sur Yvette, and Bahman Barazesh, Paris, both of France, assignors to Telecommunications Radioelectriques et Telephoniques T.R.T., Paris, France

Continuation of Ser. No. 682,227, Dec. 17, 1984, abandoned.  
This application May 1, 1987, Ser. No. 48,481  
Claims priority, application France, Dec. 30, 1983, 83 21104  
Int. Cl. G06F 9/40

U.S. Cl. 364-200

7 Claims



1. A data processor for executing a program of instructions stored in a program memory and which are addressed by a program counter connected to the program memory, such processor including a loop circuit for controlling execution of a loop control instruction in said program calling for the execution N times of a loop sequence of "i" instructions, said loop circuit comprising a loop counter controlled by a repetition code in the loop control instruction to count the number of executions of said loop sequence and to deliver a loop completion signal when such count corresponds to said repetition code, such signal enabling the program counter to continue on to the remainder of the program; characterized in that said loop circuit further comprises:

- a loop sequence instruction counter of the sequential instructions in said loop and responsive to a loop length code in said loop control instruction to deliver an end-of-sequence signal upon each completion of said loop;
- a first register for loading the address of the initial instruction in said loop into said program counter and responsive

to each of said end-of-sequence signals to again refresh said program counter with such initial loop instruction address; and

a delay counter responsive to a delay code in said loop control instruction to count execution of a number "D" of succeeding instructions in said program after said loop control instruction before enabling said first register to load the address of said initial loop instruction into said program counter, delaying execution of the loop control instruction until completion of said number "D" of succeeding instructions in said program;

whereby execution of said loop control instruction is delayed so as to permit said data processor to initialize further registers therein for carrying out pipeline calculations in accordance with the instructions in said program loop.

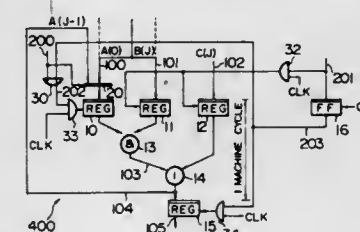
#### 4,792,893 SELECTIVELY RECURSIVE PIPELINED PARALLEL VECTOR LOGICAL OPERATION SYSTEM

Takayuki Nakagawa, Kokubunji, and Koichiro Omoda, Sagami-hara, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 1, 1985, Ser. No. 782,534  
Claims priority, application Japan, Oct. 3, 1984, 59-206216  
Int. Cl. G06F 7/48

U.S. Cl. 364-200

8 Claims



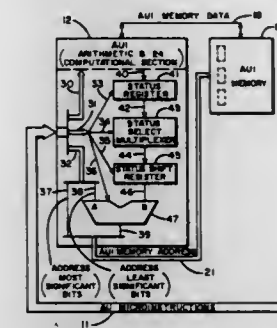
1. A vector logical operation apparatus, comprising: first and second register means for sequentially receiving first and second sets of vector elements, respectively, which first and second sets of vector elements are supplied in pairs on the same sequential clock periods;
- third register means for holding bit signals;
- a plurality of first gate means connected to said first and third register means in a bitwise manner each for performing a first bitwise logical operation on bit signals provided from said first register means and said third register means;
- a plurality of second gate means connected to said second register means and said plurality of first gate means in a bitwise manner each for performing a second bitwise logical operation on bit signals provided from said second register means and said plurality of first gate means;
- feed back means connected to said plurality of second gate means for supplying the outputs of said plurality of second gate means to said third register means in a bitwise manner; and
- control means connected to said third register means for ordering said third register means to receive an applied initial data signal on or before supply of a pair of the first vector element of the first set and the first vector element of the second set and to repeatedly receive the outputs of said plurality of second gate means provided by said feed back means on sequential clock periods each clock period being one clock period later after receipt of a pair of vector elements by said first and second register means; wherein said plurality of first and second gate means are fast enough so that the outputs of said plurality of second gate means at the end of each clock period fully responds to vector elements held by said first to third register means at the beginning of each clock period.

#### 4,792,894 ARITHMETIC COMPUTATION MODIFIER BASED UPON DATA DEPENDENT OPERATIONS FOR SIMD ARCHITECTURES

Ray E. Artz, Apple Valley; Richard J. Martin, Eagan, and Vincent E. Splett, Burnsville, all of Minn., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Mar. 17, 1987, Ser. No. 26,913  
Int. Cl. G06F 15/16  
U.S. Cl. 364-200

3 Claims



1. A single instruction, multiple data processing system for operating on an algorithm that employs a plurality of data dependent constants comprising:
  - (a) microinstruction means for supplying micro-instructions for implementing said algorithm;
  - (b) a plurality of data stream input means;
  - (c) a plurality of data processing means each of which is coupled to its own one of said data stream input means and comprises:
    - (1) addressable memory means for storing a plurality of predefined table values of said data dependent constants which are accessible for use by its own one of said data processing means after being obtained thereby via addressing of said addressable memory means; and
    - (2) addressing means comprising input means and output means for accessing said data dependent constants for use in processing said algorithm, said input means being coupled to a said microinstruction means, to its own one of said data stream input means and to said addressable memory means for addressing a memory address of said addressable memory means as specified by microinstructions from said microinstruction means and the data stream from its own one of said data stream input means, wherein the data stream from its own one of said data stream input means causes a modification of the address that would have been addressed as a function of said microinstructions received by said input means from said microinstruction means in the absence of said data stream, and output means coupled to said addressable memory means for receiving the addressed one of said table values of said data dependent constants from said addressable memory means.

#### 4,792,895 INSTRUCTION PROCESSING IN HIGHER LEVEL VIRTUAL MACHINES BY A REAL MACHINE

Peter H. Tallman, Wappingers Falls, N.Y., assignor to International Business Machines Corp., Armonk, N.Y.

Continuation of Ser. No. 635,388, Jul. 30, 1984, abandoned. This application Aug. 4, 1987, Ser. No. 82,966  
Int. Cl. G06F 9/44

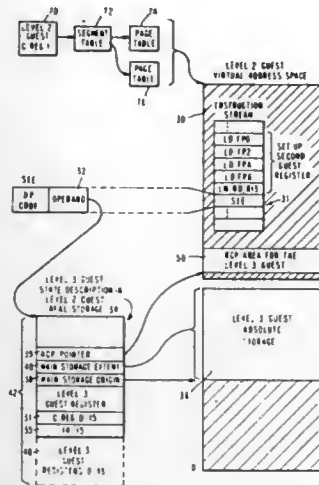
U.S. Cl. 364-200

6 Claims

1. In a computer system having a real machine, multiple levels of virtual machines in different storage modes in which said real machine and a low level virtual machine use the same

architecture, storage including pages having storage keys, reference and change preservation bytes, tables describing said virtual machines and a privileged instruction, having an operand, which initiates hardware that is capable of mapping only non iteratively between two levels of virtual and real machines, and that provides for said real machine to enter a predetermined virtual machine processing mode, the method of processing instructions in higher level virtual machines by said real machine, comprising the steps of:

intercepting said privileged instruction in one of said low level virtual machines indicating that instruction processing is required in a higher level virtual machine having the same or different architecture than said real machine,



creating from said tables describing said low level and said higher level virtual machines a non-nested, software-combined composite table in said real machine, following said privileged instruction, that identifies and describes said higher level virtual machine, and  
reissuing said privileged instruction, in which said operand of said privileged instruction is said composite table for identifying and describing said higher level virtual machine, in which the description is free of any fault condition, directly to said real machine so that processing may continue within said higher level machine using said composite table.

#### 4,792,896 STORAGE CONTROLLER EMULATOR PROVIDING TRANSPARENT RESOURCE SHARING IN A COMPUTER SYSTEM

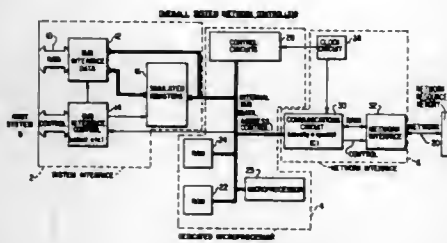
William M. Maclean, Milton; Edward G. Agnew, Campbellville, and Richard C. Madter, Puslinch, all of Canada, assignors to 516277 Ontario Limited, Ontario, Canada

Filed Nov. 29, 1983, Ser. No. 556,130

Int. Cl.<sup>4</sup> G06F 13/12

U.S. Cl. 364—200

6 Claims



6. A microprocessor controlled mass storage controller

simulator for coupling a single microprocessor functioning as a central processing unit in a host microcomputer system, the host system normally being coupled by a mass storage controller to a local resource memory means, to a network having at least one network resource memory means connected to means for transmitting and receiving data from the mass storage controller simulator comprising

a system interface means for transferring input and output commands and data to and from the host microcomputer system, such commands and data normally being used by the mass storage controller to control operation of the local resource memory means;

a dedicated microprocessor means coupled to the system interface means for emulating the interface between the microcomputer system and the mass storage controller by receiving the input and output commands and data from the microcomputer system and generating responses thereto in the same manner as the mass storage controller, said dedicated microprocessor means comprising a microprocessor chip for executing instructions, a Random Access Memory (RAM) means for buffering data to be transferred between the system interface and the network interface and for storing temporary control information; control circuitry for generating control and select signals to selectively coordinate the operation of the dedicated microprocessor with the RAM, system interface and network interface, and a clock generating circuitry coupled to said control circuitry for controlling data transfers of the dedicated microprocessor; and

a network interface coupled to the dedicated microprocessor means and coupled with the network means for transmitting and receiving data to transfer data to and from the network resource memory means in response to commands from the dedicated microprocessor means.

#### 4,792,897 ADDRESS TRANSLATION UNIT FOR TRANSLATION OF VIRTUAL ADDRESS TO REAL ADDRESS USING TRANSLATION TABLES OF MULTI-LEVEL HIERARCHICAL STRUCTURE

Shizuo Goto, and Toyohiko Kagimasa, both of Hachioji, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

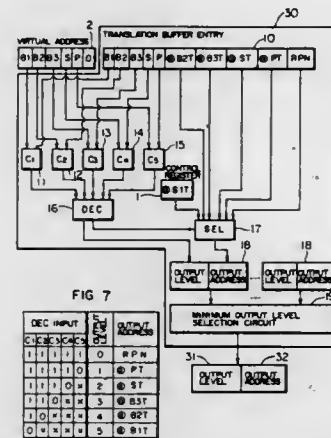
Filed Oct. 2, 1985, Ser. No. 783,084

Claims priority, application Japan, Oct. 3, 1984, 59-206219

Int. Cl.<sup>4</sup> G06F 12/10

U.S. Cl. 364—200

4 Claims



1. An address translation unit for use in a system having means translating a virtual address to a real address by using a group of address translation tables having a hierarchical structure, wherein entries of each address translation table except that of a highest level each indicate a start address of an address translation table of a next adjacent level, wherein entries

of each address translation table of the highest level indicate a real address and wherein each virtual address has plural address parts corresponding to different levels of said group of address translation tables and each indicating a location of an entry within one of said address translation tables of a corresponding level, said address translation unit comprising:

a translation look-aside buffer for holding entries each comprising of (1) an address pair consisting of a virtual address and a corresponding real address, and (2) a group of start addresses for the address translation tables required to be accessed for translation of the virtual address of that entry to the corresponding real address;

select means connected to said translation look-aside buffer and responsive to an applied virtual address for searching the entries of said translation look-aside buffer for an entry which has a virtual address having the largest number of consecutive address parts, starting from an address part corresponding to the lowest level, which coincide with corresponding address parts of the applied virtual address, including means for providing a real address within the entry when all of the address parts of the entry coincide with the address parts of the applied virtual address and for providing, from said entry having the largest number of coinciding address parts, that one of the group of start addresses within the entry which is the start address of an address translation table having the higher level next to a highest level among levels corresponding to consecutive coincident address parts, when all address parts of the entry and the applied virtual address do not coincide; and translation means responsive to the applied virtual address and said one start address from said select means for translating the applied virtual address by accessing said address translation tables, starting from that one having said one start address and based upon address parts of the applied virtual address corresponding to a level equal to or larger than the next level.

#### 4,792,898 METHOD AND APPARATUS FOR TEMPORARILY STORING MULTIPLE DATA RECORDS

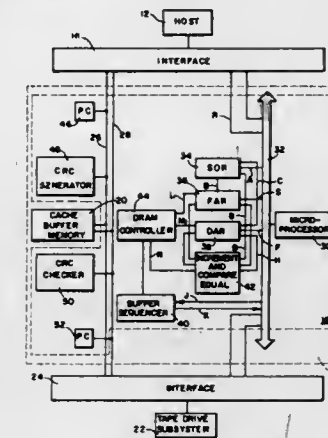
Donald F. McCarthy, 5541 S. Kline St., Littleton, Colo. 80127; Bradley E. Whitney, 308 Biscayne Ct., Lafayette, Colo. 80026; Patricia G. Orban, 105 S. Yarrow St., Lakewood, Colo. 80226; Randy A. Fout, 507 Backer, Longmont, Colo. 80501, and Leslie A. Magor, 1359 Caledonia Cir., Louisville, Colo. 80027

Filed Sep. 26, 1986, Ser. No. 912,511

Int. Cl.<sup>4</sup> G06F 7/00

U.S. Cl. 364—200

6 Claims



1. A system for transferring a data record of an unspecified bit length into or out of a cache memory coupled between a host computer and a data storage device, whereby valid data including other such data records contained within the cache

memory is incapable of being overwritten by a transferring of the data record into the cache memory, comprising:

cache manager means, including a microprocessor and microprocessor bus means, for controlling the cache memory;

first register means coupled between said microprocessor bus means and the cache memory for storing start-of-record address, said start-of-record address defining an address within the cache memory beyond which new data cannot be stored without overwriting the valid data;

second register means coupled between said microprocessor bus means and the cache memory for storing a fill address; third register means coupled between said microprocessor bus means and the cache memory for storing a drain address;

means, coupled to said second and third register means, for incrementing said fill and drain addresses stored therein, said fill address contained in said second register means being incremented as each bit of data contained within the data record to be transferred into the cache memory is transferred into the cache memory, each such incrementation yielding a new fill address, and said drain address contained in said third register means being incremented as each bit of data contained within the data record to be transferred out of the cache memory is transferred out of the cache memory, each such incrementation yielding a new drain address;

means, coupled to said first, second, and third register means, for selectively comparing said start-of-record, fill, and drain addresses stored therein, said comparing means comparing, during transfer of the data record into the cache memory, said fill address contained in said second register means to a selected one of either said start-of-record address contained in said first register means or said drain address contained in said third register means, and, during transfer of the data record out of the cache memory, to said drain address contained in said third register means, whereupon a first indication is sent from said comparing means to the host computer, during transfer of the data record into the cache memory, that a buffer full condition exists either when said fill address contained in said second register means is equal to said start-of-record address contained in said first register means or to said drain address contained in said third register means, or a second indication is sent from said comparing means to the host computer, during a transfer of the data record out of the cache memory, that a buffer empty condition exists when said fill address contained in said second register means is equal to said drain address contained in said third register means;

means for generating a cyclic redundancy check character for input to the cache memory appended to the data record being transferred into the cache memory;

means for generating a STOP bit for input to the cache memory appended to said appended cyclic redundancy check character; and

data bus means coupling the host computer, data storage device, and cache memory for transfer of data therebetween.

#### 4,792,899 MICROPROCESSOR SUPPORT INTEGRATED CIRCUIT

Ira Miller, Tempe, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 2, 1987, Ser. No. 1

Int. Cl.<sup>4</sup> G05F 3/20; G10L 5/00; G04B 1/00

U.S. Cl. 364—200

2 Claims

1. A single chip microprocessor support integrated circuit for providing multiple functions of a computer keyboard interface, comprising:  
a voltage regulator for providing a plurality of regulated voltages at respective outputs in response to an operating potential supplied thereto;

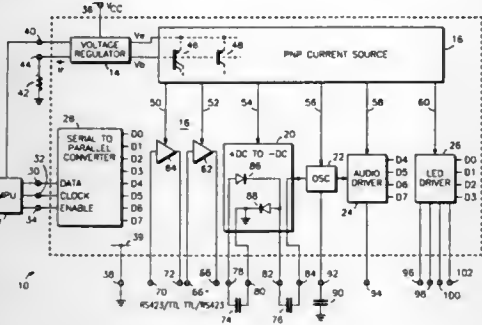


a resistor externally coupled to said voltage regulator at a first terminal for establishing a predetermined and substantially constant reference current;

current source means coupled to said voltage regulator for providing a plurality of distributed output currents at respective outputs the magnitudes of which are ratioed with respect to said reference current;

first driver circuit means coupled to respective outputs of said current source means for providing a plurality of output currents at respective outputs in response to a plurality of digital data control signals being supplied thereto, said output currents being level shifted in magnitude with respect to currents supplied thereto from said current source means;

second driver circuit means coupled to said current source means for providing an output current having a



pseudologarithmic transfer characteristic in response to receiving digital data control signals and an oscillatory signal supplied thereto;

a converter circuit responsive to serially supplied data for providing said digital data control signals in parallel to said first and said second driver circuits;

an oscillator coupled to said current source means for providing said oscillatory signal, said oscillator including a capacitor coupled externally thereto at a second terminal; and

circuit means coupled to said current source means and receiving an oscillatory signal from said oscillator for providing a negative voltage from a positive voltage supply, said circuit means including both a pair of PN diodes of opposite polarity formed in the integrated circuit and a pair of capacitors externally coupled thereto at a pair of respective terminals.

#### 4,792,900 ADAPTIVE FILTER FOR DUAL ENERGY RADIOGRAPHIC IMAGING

Richard A. Sones, Cleveland Hts., and Karen L. Lauro, S. Euclid, both of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio

Filed Nov. 26, 1986, Ser. No. 935,282  
Int. Cl. G06F 15/42

U.S. Cl. 364-413.23

21 Claims

1. A medical diagnostic imaging apparatus for producing soft tissue and bone specific basis images from dual energy radiation data, the apparatus comprising:

a radiation source for producing at least higher energy and lower energy radiation;

a radiation detection means for separately detecting the higher and lower energy radiation traversing a selected region of interest and for producing digital electronic values indicative of the intensity of higher and lower energy radiation received thereby;

a higher energy image memory means operatively connected with the detection means for storing the higher energy radiation intensity indicative digital electronic

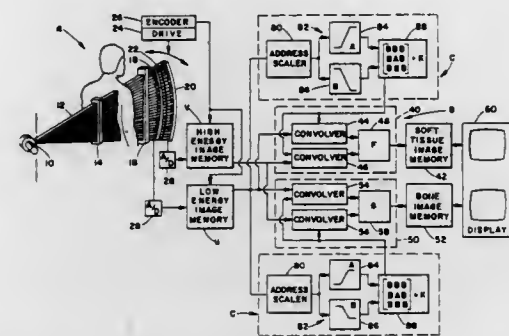
pixel values for each pixel for a higher energy image representation of the region of interest;

a lower energy image memory means operatively connected with the detection means for storing the lower energy radiation intensity indicative digital electronic pixel values for each pixel for a lower energy image representation of the region of interest;

a first convolver means for convolving a first filter function pixel by pixel with the digital values of the higher energy image representation and for convolving the first filter function pixel by pixel with the digital values of the lower energy image representation;

a first filter function altering means for correspondingly adjusting a characteristic of the first filter function in accordance with the digital value of each pixel of at least one of the higher and lower energy image representations;

a first transform means for transforming convolved values of corresponding pixels of the higher and lower energy representations into a digital gray scale value of a corresponding pixel of a soft tissue specific basis image;



a soft tissue image memory means operatively connected with the first transform means for storing the gray scale values of the soft tissue basis image;

a second convolver means for convolving a second filter function with the digital values of the higher energy image representation and convolving the second filter function with the digital values of the low energy image representation;

a second filter function altering means for correspondingly adjusting a characteristic of the second filter function in accordance with the digital value of each pixel of at least one of the high and low energy image representations; and,

a second transform means for transforming convolved values of corresponding pixels of the higher and lower energy image representations from the second convolver means into a digital gray scale value of a corresponding pixel of a bone specific basis image.

#### 4,792,901 METHOD FOR CONTROLLING AMT SYSTEM INCLUDING AFTER TRANSMISSION GEAR CHANGE FUEL CONTROL

William J. Mack, Warren, and Robert R. Smyth, Bloomfield Hills, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Filed May 15, 1986, Ser. No. 863,651  
Int. Cl. B60K 41/00

U.S. Cl. 364-424.1

17 Claims

1. A method for controlling a vehicle automatic mechanical transmission system for devices having an operator actuated

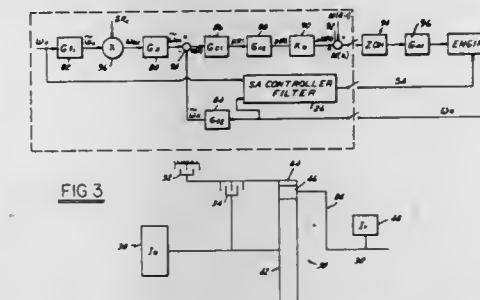
throttle pedal, a throttle-controlled engine, a transmission having a plurality of gear ratio combinations selectively engageable between a transmission input shaft and a transmission output shaft, said transmission input shaft being operatively connected to said engine by means of a selectively engageable and disengageable friction coupling, said automatic mechanical transmission system comprising an information processing unit having means for receiving a plurality of input signals including (1) an input signal indicative of the rotational speed of the engine; and (2) an input signal indicative of the operator's setting of the throttle pedal, said processing unit including means for processing said input signals in accordance with a program for generating output signals whereby said transmission system is operated in accordance with said program including a command output signal for control of the engine throttle device, and means associated with said transmission system effective to actuate said transmission system to effect engagement of said gear ratio combinations in response to said output signals from said processing units,

said processing unit have a first state in which said command output signals to said engine throttle device generally equal said input signal indicative of operators setting of the throttle pedal, a second state wherein said command output signals to said engine throttle device have a value determined by said processing unit independently of the value of said input signal indicative of operators setting of

#### 4,792,902 ENGINE IGNITION TIMING FOR A CLUTCH ENGAGEMENT CONTROL SYSTEM

Davorin Hrovat; Charles Heermann, both of Dearborn, and William E. Tobler, Willis, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Dec. 12, 1985, Ser. No. 808,186  
Int. Cl. B60K 41/02; F02P 5/145; F16D 43/286  
U.S. Cl. 364-424.1 4 Claims



1. A method for controlling the operation of a powertrain that includes a spark ignition internal combustion engine, a multiple speed ratio transmission, means for commanding the speed ratios at which the transmission operates, a hydraulic clutch and a solenoid-operated valve that engages and disengages the clutch in accordance with a duty cycle applied to the solenoid, comprising:

producing a signal representing a commanded speed ratio  $SR_c$ ;

producing signals representing transmission output speed  $\omega_o$  and engine speed  $\omega_e$ ;

producing a commanded engine speed signal  $\omega_{ec}$  from the relationship  $\omega_{ec} = SR_c \cdot \omega_o$ ;

producing an engine speed error signal  $\Delta\omega_e$  from the relationship  $\Delta\omega_e = \omega_{ec} - \omega_e$ ;

producing a duty cycle change signal  $\Delta M(k)$  from the engine speed error signal;

producing a current duty cycle signal  $M(k)$  by adding the current duty cycle change signal to a previous duty cycle signal  $M(k-1)$ ;

engaging or disengaging the clutch by applying to the solenoid-operated valve the current duty cycle signal;

retarding the engine ignition with respect to a nominal engine spark ignition according to the following relationship:

$$SA = K_1 [I_e \omega_e d/dt(SR_c)] + K_2 (\Delta\omega_e) + K_3 d/dt(\Delta\omega_e)$$

wherein  $d/dt$  is the differential with respect to time,  $I_e$  is the rotational inertia of the engine about the axis of the engine shaft, and  $K_1$ ,  $K_2$  and  $K_3$  are gain constants.

#### 4,792,903 MICROPROCESSOR CONTROLLED POST EJECTION SEQUENCER

Walter R. Peck, and James W. Duncan, both of Asheville, N.C., assignors to Universal Propulsion Company, Inc., Phoenix, Ariz.

Filed Jul. 22, 1985, Ser. No. 757,802  
Int. Cl. B64D 25/10

U.S. Cl. 364-425

22 Claims

1. In an aircraft ejection seat, the combination comprising: a parachute and means carried by the seat to deploy the parachute;

left and right pitot tubes carried by the seat;

means carried by the seat to sense ejection of the seat from the aircraft;

a pair of redundant housings carried by the seat;

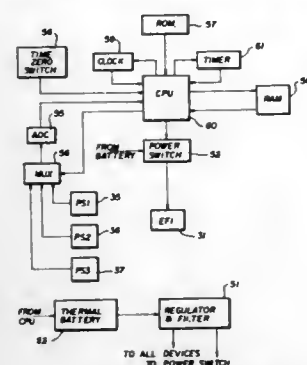
each one of said pair of housings including therein a microprocessor controlled sequencer (MCS);

the throttle pedal and a third state wherein the processing unit is in transition from said second to said first state, the method of operating in said third state characterized by: sensing the current value of the command output signal to the engine throttle device and the value of the input signal indicative of operators setting of the throttle pedal, if the command output signal to the engine throttle device is greater than or equal to the input signal indicative of throttle pedal position, setting the value of the command signal to the engine throttle device equal to the input signal indicative of throttle pedal position, and if the current value of the command output signal to the engine throttle device is less than the current value of the input signal indicative of throttle pedal, setting the value of the command output signal to the lesser of the current value of the input signal indicative of throttle pedal position and a calculated minimal command output signal value related to current engine speed and thereafter increasing the value of the command output to the engine throttle device until such value equals the then current value of the input signal indicative of throttle pedal position.

each said MCS including means to activate said means to deploy said parachute, pressure sensor means to sense the pressures detected by said left and right pitot tubes and to sense the ambient pressure local to said seat and to produce signals proportional to said three sensed pressures of said pitot tubes and ambient pressures, data storage means, battery means, switch means, and control means;

each said data storage means including ROM memory means in which data corresponding to preset control functions and system performance have been previously stored, and said data storage means further comprising RAM memory for active use during an escape sequence with the data in said ROM memory together with data produced by said pressure sensor means corresponding to said left and right pitot tube and to the local ambient pressures to continuously optimize operation of an escape sequence as it occurs;

each of said MCS control means being operative indepen-



dently of its companion redundant MCS control means to cause said optimum operation and parachute deployment after seat/ejectee ejection from the aircraft when said MCS determines one or both of:

- A. the seat/ejectee mass is moving at a speed equal to or less than a predetermined speed that is safe for parachute deployment at the prevailing altitude and that the altitude of the seat/ejectee mass above sea level is below a predetermined safe altitude; and
- B. a time delay has elapsed, which time delay was set by the MCS to the minimum value for safe parachute deployment for a normal ejection based upon the pressure, altitude and airspeed measured by the pressure sensors in the MCS;
- each said MCS including means to make said determinations based upon said three pressure signals, the data stored in said data storage means, the elapsed time of operation of said switch means, and utilizing the electrical power in said battery means; and
- each said switch means being operated at the time of ejection of said seat from the aircraft.

4,792,904

**COMPUTERIZED FLIGHT INSPECTION SYSTEM**

Frederick G. Reinagel, Buffalo, and Allen B. Johnson, North Tonawanda, both of N.Y., assignors to LTV Aerospace and Defense Company, Dallas, Tex.

Continuation-in-part of Ser. No. 65,075, Jun. 17, 1987, abandoned, which is a continuation-in-part of Ser. No. 946,124, Dec. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 699,333, Feb. 7, 1985, abandoned. This application Jan. 6, 1988, Ser. No. 140,875

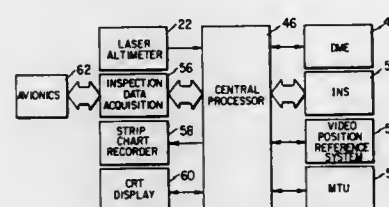
Int. Cl.<sup>4</sup> G06F 15/50

U.S. Cl. 364-429

1. A computerized flight inspection system for providing an accurate reference location with respect to a runway for an

aircraft having an inertial navigation system, said flight inspection system comprising:

- selected indicia disposed on at least one end of an airport runway;
- video scanning means disposed within said aircraft for scanning said selected indicia in a line generally perpendicular to said aircraft's line of flight and for generating an output indicative of the scanned video pattern;
- memory means for storing a reference video pattern;

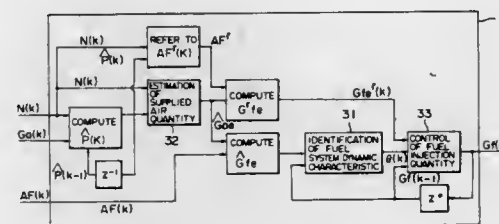


correlator means coupled to said video scanning means and said memory means for correlating said scanned video pattern and said reference video pattern;  
altimeter means for measuring the altitude of said aircraft and for generating a signal indicative thereof; and  
processor means coupled to said correlator means and said altimeter means for generating correction data for said inertial navigation system in response to said correlation and said altitude measurement.

4,792,905  
**METHOD OF FUEL INJECTION CONTROL IN ENGINE**  
 Teruji Sekozawa, Machida; Makoto Shioya, Tokyo; Hiroatsu  
 Tokuda, Katsuta; Motohisa Funabashi, Sagamihara, and  
 Mikihiko Onari, Kokubanji, all of Japan, assignors to Hita-  
 chi, Ltd., Tokyo, Japan  
 Continuation of Ser. No. 635,411, Jul. 30, 1984, abandoned. This  
 application May 12, 1986, Ser. No. 861,996  
 Claims priority, application Japan, Aug. 8, 1983, 58-144620  
 Int. Cl.<sup>4</sup> F02M 51/00

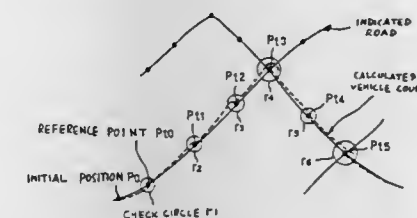
U.S. Cl. 364-431.05

### 1 Claim



1. In an engine control apparatus in which a quantity of fuel injected by fuel injection means is controlled to maintain a desired air-fuel ratio wherein said engine control apparatus operates in response to an output from an air-fuel ratio sensor sensing the air-fuel ratio between quantities of air and fuel to be

4,792,907  
**VEHICLE NAVIGATION SYSTEM**  
**Motozo Ikeda, Kariya; Hiroyasu Fukaya, Nagoya, and Tomihisa Sakai, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**  
**Filed Oct. 15, 1987, Ser. No. 108,911**  
**Claims priority, application Japan, Nov. 17, 1986, 61-273747**  
**Int. Cl.<sup>4</sup> G06F 15/50**  
**U.S. Cl. 364—449**  
**5 Claims**



1. A vehicle navigation system comprising:
  - (a) means for detecting traveling conditions of a vehicle;
  - (b) means for calculating a present position of the vehicle on the basis of the detected vehicle traveling conditions;
  - (c) means for holding data representing preset reference points located at intersections and at unforked straight roads, data representing whether the respective preset reference points are located at the intersections or at the unforked straight roads, and data representing distances between the adjacent preset reference points;
  - (d) means for determining a target reference point toward which a vehicle is traveling, the target reference point being selected from the preset reference points;
  - (e) means for determining whether or not the target reference point is located at an intersection or at an unforked straight road;
  - (f) means for, in cases where the target reference point is located at an intersection, detecting curvature of motion of the vehicle while the calculated vehicle position remains in a check range around the target reference point;
  - (g) means for, in cases where the target reference point is located at the intersection, forcibly setting the calculated vehicle position, at which the detected curvature of motion of the vehicle is maximized, to the target reference point;
  - (h) means for detecting a distance traveled by the vehicle from a preceding reference point which the vehicle passed last; and
  - (i) means for, in cases where the target reference point is located at an unforked straight road, forcibly setting the calculated vehicle position, at which the vehicle traveled distance equals a distance between the target reference point and the preceding reference point, to the target reference point while the calculated vehicle position remains in said check range around the target reference point.

4,792,908  
METHOD FOR CONTROLLING THE MOONEY  
VISCOSITY OF COMPOUNDED RUBBER  
FORMULATIONS  
Herbert L. Brantley, Jr., Akron, Ohio, assignor to The Firestone  
Tire & Rubber Company, Akron, Ohio  
Filed Mar. 25, 1986, Ser. No. 843,534  
Int. Cl.<sup>4</sup> G06F 15/46

at U.S. Cl. 364-473

## 12 Claims

1. A method for obtaining a vulcanizable rubber formulation of controlled uniform viscosity properties in the uncured state containing synthetic rubber comprising the steps of:  
determining the Mooney viscosity,  $MV_a$  of the synthetic

4,792,906

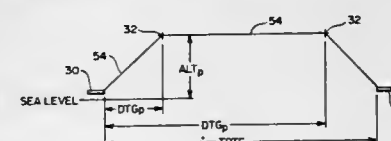
**NAVIGATIONAL APPARATUS AND METHODS FOR  
DISPLAYING AIRCRAFT POSITION WITH RESPECT TO  
A SELECTED VERTICAL FLIGHT PATH PROFILE**

**Ethmer W. King, Federal Way; David S. Yotsunye; Robert C.  
Kircher, Jr., both of Renton, and Mohammed R. Radfar,  
Kirkland, all of Wash., assignors to The Boeing Company,  
Seattle, Wash.**

Filed Aug. 29, 1986, Ser. No. 902,417  
Int. Cl.<sup>4</sup> G06F 15/50

U.S. Cl. 364-433

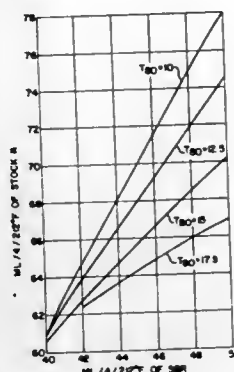
## 14 Claims



1. A method of generating an informational profile for guiding an aircraft flight, the method comprising the steps of:
  - a. providing information concerning locations of an earlier position  $P_1$  and a later position  $P_4$ , as well as aircraft first operating parameters for conducting a climb from the earlier position  $P_1$  and aircraft second operating parameters for conducting a descent to the later position  $P_4$ ;
  - b. calculating a location of an upper descent position  $P_3$  from the later position  $P_4$  as a function of a projected distance to be flown by the aircraft when descending to position  $P_4$  in accordance with the aircraft second operating parameters;
  - c. calculating a location of an upper climb position  $P_2$  from earlier position  $P_1$  as a function of a projected distance to be flown by the aircraft when climbing to the upper climb position  $P_2$  from position  $P_1$  in accordance with the aircraft first operating parameters;
  - d. generating the informational profile which is defined by a climb portion including positions  $P_1$  and  $P_2$ , a descent portion including positions  $P_3$  and  $P_4$ , and an intermediate portion including positions  $P_2$  and  $P_3$ ; and
  - e. guiding said aircraft based on the generated informational profile.



rubber from which the vulcanizable rubber formulation is to be prepared;  
determining the relaxation time,  $T_{80}$ , of the synthetic rubber from which the vulcanizable rubber formulation is to be prepared;  
calculating from  $MV_a$  and  $T_{80}$  the Mooney viscosity,  $MV_b$ , of the vulcanizable rubber formulation which is to be prepared from said synthetic rubber;



selecting those synthetic rubbers having  $MV_a$  and  $T_{80}$  values within a predetermined range of values calculated to produce a vulcanizable rubber formulation compounded with said synthetic rubbers, the  $MV_b$  of which is within a desired, preselected uniform range; and  
compounding said selected synthetic rubber with carbon black and other conventional rubber compounding agents to produce the vulcanizable rubber formulation of  $MV_b$  within said predetermined range of values.

4,792,909

## BOOLEAN LOGIC LAYOUT GENERATOR

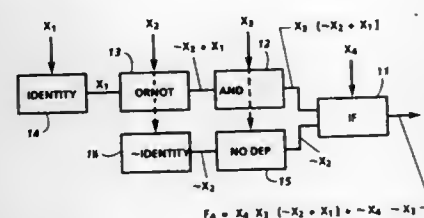
Bertrand P. Serlet, Palo Alto, Calif., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 7, 1986, Ser. No. 848,523

Int. Cl.<sup>4</sup> H03K 19/20

U.S. Cl. 364—491

6 Claims



1. A method for reducing the size of binary decision tree representations of boolean expressions on integrated circuits having ordered inputs, said method comprising the steps of:  
decomposing each boolean expression into its sub-expressions based on the ordering of said inputs, such that each term of said decomposed expression introduces a respective one of said inputs;  
factoring the input introduced by each term of said decomposed expression and the complement of that input from said term, whereby each term is converted into a pair of partial functions such that

$$F = x \cdot F_1 + \sim x \cdot F_0$$

where:

$F$  = any given term of the decomposed expression,

$x$  = the input introduced by said given term, and  
 $F_1$  and  $F_0$  = the partial expressions of said given term;  
testing the partial functions of each term of said decomposed expression to determine which of the following conditions is true:

Test	Conclusion if True	Operator Indicated
$F_1 = F_0 = 1$ or $0$	$F = 1$ or $F = 0$	Constant
$F_1 = \sim F_0 = 1$ or $0$	$F = x$ or $F = \sim x$	Identity
$F_1 = 1$	$F = x + F_0$	OR
$F_0 = 0$	$F = x \cdot F_1$	AND
$F_0 = 1$	$F = F_1 + \sim x$	ORNOT
$F_1 = 0$	$F = \sim x \cdot F_0$	ANDNOT
$F_1 = F_0$	$F = F_1$	NoDependence
$F_1 = \sim F_0$	$F = x \cdot F_1 + \sim x \cdot F_0$	XORNOT
ELSE	$F = x \cdot F_1 + \sim x \cdot F_0$	IF

selecting the operator required for each term of said decomposed expression based on the condition found to be true; and  
laying out said integrated circuit to provide the operator required for each term of said decomposed expression.

4,792,910

## ELECTRONIC METHOD AND STORAGE SYSTEM FOR STORING SETTING VALUES FOR SETTING DEVICES IN PRINTING MACHINES

Peter Lange, Mauer, Fed. Rep. of Germany, assignor to Heidelberger Druckmaschinen AG, Heidelberg, Fed. Rep. of Germany

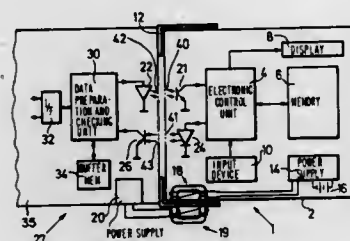
Filed Apr. 26, 1985, Ser. No. 727,530

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1984, 3415500; Mar. 16, 1985, 3509633

Int. Cl.<sup>4</sup> G06K 3/00

U.S. Cl. 364—519

19 Claims



1. Method of storing setting value data for adjustment devices of a printing machine having a machine operator including general data used by a printing machine for controlling printing machine processes and commands, using a portable memory unit having electronically operating storage elements, a keyboard for entry of commands and data, and including at least one communication device in contactless connection with the printing machine for contactless communication with the portable memory unit and for processing information stored therein, comprising the steps of: inserting the portable memory unit into the communication device; checking automatically the portable memory unit for presence of current supply; transmitting contactlessly the setting value data, manually entering commands and data via said keyboard, checking the data for errors, correcting, by the machine operator, the data for errors, if errors are found; re-storing the corrected data in the portable memory unit; and removing the portable memory unit from the communication device for safekeeping and later use.

4,792,911

## DIAGNOSTIC APPARATUS FOR AN ELECTRIC GENERATOR SEAL OIL SYSTEM

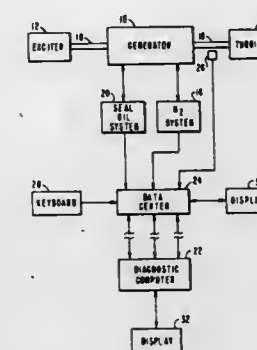
Avelino J. Gonzalez, Kurt H. Steinebrunn, Michael J. Rasinski, all of Winter Springs, and Owen R. Snuttjer, Oviedo, all of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 17, 1986, Ser. No. 821,369

Int. Cl.<sup>4</sup> G06F 15/46

U.S. Cl. 364—551.02

25 Claims



1. Diagnostic apparatus for a gas-cooled electric generator seal oil system having a plurality of components and wherein the generator includes a shaft which is sealed against escape of gas used for the gas-cooling, by means of spaced-apart gland seals and wherein sealing oil is supplied to the gland seals, comprising:

- A plurality of sensors connected to various ones of said components of said seal oil system and operable to provide respective output signals, each indicative of the on-line operating condition of an associated component;
- Diagnostic computer means responsive to said output signals and operable to provide an output indication indicative of an abnormal condition relative to a particular component based upon the output signal of the sensor directly associated with said particular component as well as at least one output signal of a sensor not directly associated with said particular component.

4,792,912

## SYSTEM FOR ESTIMATING THERMAL STRESS OF PRESSURE PARTS

Atsushi Kuramoto, Kure, Yukio Fukayama, Hiroshima, and Shigeo Kawanishi, Kure, all of Japan, assignors to Babcock-Hitachi Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 24, 1985, Ser. No. 726,645

Claims priority, application Japan, Apr. 24, 1984, 59-81158

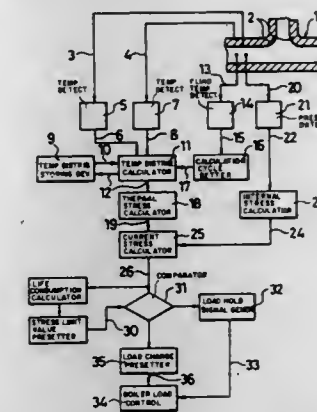
Int. Cl.<sup>4</sup> F01J 5/00

U.S. Cl. 364—557

10 Claims

1. A system for measuring thermal stress of a pressure-tight tube having a metal portion and a fluid therein, comprising:  
means for measuring temperature of at least the outer surface of said tube;  
temperature distribution calculating means for calculating distribution of temperature at positions equidistantly arranged in a direction of the thickness of said tube on the basis of measured values including at least a measured value from said temperature measuring means of the outer surface temperature of a metal portion of said tube;  
thermal stress calculating means for calculating a thermal stress value of the metal portion of said tube on the basis of said calculated distribution of temperature;  
internal stress calculating means for calculating an internal pressure stress value in said tube obtained on the basis of a measured fluid pressure value provided by a pressure

detector for measuring the pressure of the fluid in said tube; and



current stress calculating means for adding said internal pressure stress calculated value and said thermal stress calculated value together to obtain a current stress calculated value.

4,792,913

## SIMULATOR FOR SYSTEMS HAVING ANALOG AND DIGITAL PORTIONS

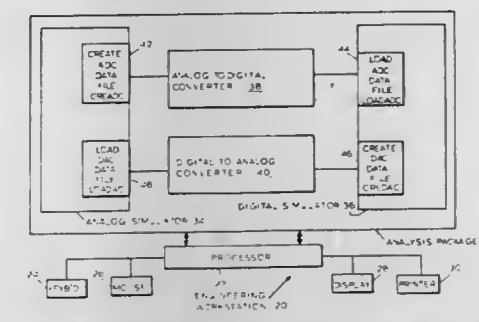
Dennis J. Buckland, Bethpage, and Robert B. DeRobertis, Maspeth, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Nov. 3, 1986, Ser. No. 926,642

Int. Cl.<sup>4</sup> G06J 1/00

U.S. Cl. 364—602

28 Claims



1. In an apparatus for simulating both analog and digital circuits, said apparatus having digital computer input means for inputting data concerning a circuit having at least one analog portion and at least one digital portion, said input means controlling said apparatus, analog analysis means for providing analog data of the analog portion of the circuit, digital analysis means for providing digital analysis data of the digital portion of the circuit, and output means for outputting at least one of said analog and digital analysis data, the improvement comprising:

- a first data extraction means for extracting selected analog analysis data from said analog analysis means;
- a first conversion means connected to said first data extraction means for converting the selected analog analysis data into digital values;
- a first data insertion means connected to said first conversion means for inserting said digital values into said digital analysis means;
- a second data extraction means for extracting selected digital analysis data from said digital analysis means;
- a second conversion means connected to said second data

extraction means for converting said selected digital analysis data to analog data; and  
 a second data insertion means connected to said second conversion means for inserting the selected analog data into said analog analysis means.

4,792,914

# HIGH FREQUENCY DIGITAL SYNTHESIZER WITH APERIODIC CORRECTION OPTIMIZING THE SPECTRAL PURITY

Lac Dartois, Colombes; André Roulet, Domont, and Raymond Riboni, Montesson, all of France, assignors to Thomson-CSF, Paris, France

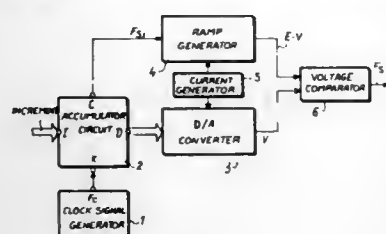
Filed Dec. 22, 1986, Ser. No. 943,993

Claims priority, application France, Dec. 23, 1985, 85 19067

Int. Cl.<sup>4</sup> H03K 3/78

U.S. Cl. 364—607

7 Claims



1. A high frequency digital synthesizer with periodic corrections optimizing the spectral purity with high time precision, comprising:

- a generator of reference clock signals of frequency  $F_C$ ;
  - a computing device which, from a frequency increment of the signal to be synthesized, delivers on the one hand uncorrected pulses of frequency  $F_S$  shifted in time with respect to the signal to be synthesized of frequency  $F_S$  by an amount  $\Delta t$  at most equal to  $1/F_C$  and, on the other hand, a time error signal corresponding to the shift  $\Delta t$ , and
  - a correction circuit coupled to said computing device for delaying the signal  $F_S$  by a maximum time when the timing error signal is zero and by an amount equal to the maximum time reduced by the shift  $\Delta t$  indicated by the timing error signal,
- said computing device comprising at least an accumulator register, incremented at a constant steps at the reference frequency  $F_C$  of the clock signal generator having an overflow output for delivering uncorrected pulses of frequency  $F_S$  whenever the maximum capacity of the accumulator register is reached and having an output D for delivering the contents of said accumulator register to said correction circuit and initializing said correction circuit, after each overflow of the maximum capacity of the accumulator register, by the content of said accumulator register which represent at this time said time error signal.

4,792,915

# NON LINEAR ADAPTIVE FILTERS

Peter F. Adams, Ipswich, England; Mark J. Smith, Edinburgh, Scotland, and Robert B. P. Carpenter, Ipswich, England, assignors to British Telecommunications public limited company, Great Britain

Filed May 9, 1986, Ser. No. 861,412

Claims priority, application United Kingdom, May 10, 1985, 85 11835

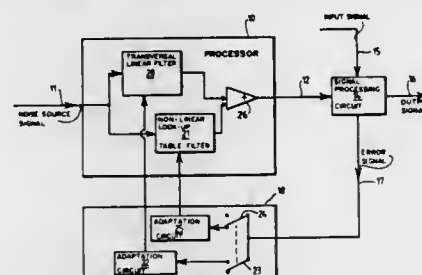
Int. Cl.<sup>4</sup> G06F 15/31

U.S. Cl. 364—724.19

9 Claims

1. A non linear adaptive filter comprising:  
 means for a receiving samples of a noise source signal,  
 processing means for processing a predetermined number of

said samples with values stored in said processing means to produce a cancellation signal,  
 means for combining the cancellation signal with an input signal to produce an error signal, and  
 adaptation means arranged to receive said error signal and adapt said stored values so that said error signal is substantially reduced over an initial training period wherein the adaptation means includes



a first adaptation means for adapting the processing means to cancel noise according to a linear algorithm  
 a second adaptation means for adapting the processing means to cancel noise according to a non linear algorithm, and  
 switching means arranged to select said first adaptation means for a first part of said initial training period, said switching means selecting said second adaptation means after said first part of said initial training period.

4,792,916

# DIGITAL SIGNAL PROCESSING DEVICE WORKING WITH CONTINUOUS BIT STREAMS

Otto Benestad, Jar, Norway, assignor to Geophysical Company of Norway AS, Sandvika, Norway

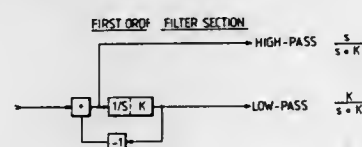
Filed Jun. 26, 1986, Ser. No. 878,860

Claims priority, application Norway, Jun. 27, 1985, 852597

Int. Cl.<sup>4</sup> G06F 15/31

U.S. Cl. 364—724.17

9 Claims



1. A device for digitally filtering continuous bit streams that are linear digital representations of analog signals, said device comprising a plurality of individual filter sections connected in cascade, each said individual filter section having a bit stream input fed from a respective previous filter section and a bit stream output feeding a respective next filter section, said respective bit stream inputs and outputs being at the same data rate, each said filter section including:

- at least one integrating and multiplying unit for outputting a bit stream equal to an integral of an input bit stream input thereto multiplied by a selectable constant;
- at least one inverting unit for outputting a bit stream equal to an input bit stream input thereto multiplied by  $-1$ ; and
- at least one adding unit for outputting a bit stream equal to the sum of two respective input bit streams input to respective inputs thereof;

output signals from said integrating and multiplying, inverting and adding units all being bit streams with the same bit rate as said input bit streams input thereto, said integrating and multiplying, inverting and adding units being connected together as a first-order filter section wherein an input bit stream is applied to a first input of said adding unit, an output bit stream from said adding units is applied

to an input of said integrating and multiplying unit, and an output bit stream of said integrating and multiplying unit is fed via said inverting unit to a second input of said adding unit.

4,792,917

# CONTROL APPARATUS FOR SIMULTANEOUS DATA TRANSFER

Hisashi Takamatsu; Hisaharu Takeuchi, and Yoshiro Shiroyanagi, all of Odawara, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

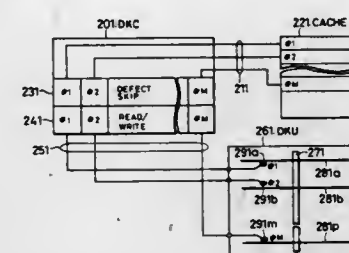
Filed Dec. 29, 1986, Ser. No. 947,081

Claims priority, application Japan, Dec. 28, 1985, 60-293559

Int. Cl.<sup>4</sup> G06F 12/08

U.S. Cl. 364—900

20 Claims



1. An apparatus for controlling data transfer between a rotary storage device, having a plurality of heads for different tracks therein, and another storage device, comprising:  
 a plurality of transfer circuit means each being coupled so as to operate concurrently with and independently of the other of said transfer circuit means for transferring data therethrough and irrespective of data format of the data to be transferred from the respective corresponding tracks; and  
 means for simultaneously connecting said plurality of transfer circuit means between said another storage device and said plurality of heads corresponding in number to said plurality of transfer circuit means.

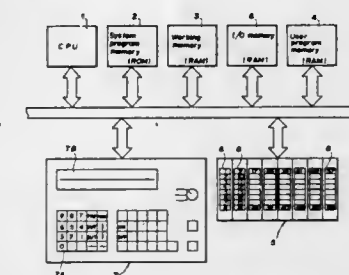
4,792,918

# PROGRAMMABLE CONTROLLER MONITORING SYSTEM FOR SIMULTANEOUS MULTIPLE LINE DISPLAY OF ORIGINAL AND UPDATED DATA PROGRAM EXECUTION

Kiyoto Hirase, Nagaokakyo, and Tetsuo Dol, Kyoto, both of Japan, assignors to Omron Tateisi Electronics Co., Japan  
 Continuation of Ser. No. 912,649, Sep. 29, 1986, abandoned, which is a continuation of Ser. No. 497,195, May 23, 1983, abandoned. This application Jan. 25, 1988, Ser. No. 147,653  
 Claims priority, application Japan, May 26, 1982, 57-89427  
 Int. Cl.<sup>4</sup> G06F 15/46, 3/14; G05B 19/10

U.S. Cl. 364—900

2 Claims



1. A scanning-type programmable controller, comprising:  
 user program creation means for creating a user program

which comprises a means for inputting, a means for reading and a means for storing steps of the user program;  
 I/O equipment means for storing input data and output data;  
 I/O memory buffer means for temporarily storing the input data and output data stored in the I/O equipment means;  
 means for updating the input data stored in the I/O memory buffer means from the input data stored in the I/O equipment means;  
 means connected to the user program creation means for sequentially performing each step of the user program on the basis of the updated input data stored in the I/O memory buffer means;  
 means for updating the output data stored in the I/O equipment means for the output data stored in the I/O memory buffer means, after each step of said user program has been performed; and

a monitor display system which comprises: (a) a multiple-data, multiple-line monitor instruction key; (b) means for determining when the multiple-data, multiple line monitor instruction key is in the monitor mode; and (c) means for inputting a multiple number of I/O numbers, timer numbers or counter numbers to be monitored while said monitor instruction key is not in the monitor mode; (d) means for storing the numbers thus input; and (e) display means connected to the numbers stored means and the means for updating the input data and the means for updating the output data for simultaneously displaying the numbers stored in said means for storing in combination with the updated input data, updated output data, timer data, or counter data corresponding to the numbers stored in said means for storing when the monitor instruction key in the monitor mode, said display means simultaneously displaying said stored numbers in a selected combination of numbers at a multiple number of lines.

4,792,919

# WORD PROCESSOR

Kouji Fukunaga, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan  
 Continuation of Ser. No. 625,824, Jun. 28, 1984, abandoned. This application Nov. 23, 1987, Ser. No. 124,368  
 Claims priority, application Japan, Jul. 1, 1983, 58-118115; Jul. 1, 1983, 58-118116

Int. Cl.<sup>4</sup> G06B 9/00

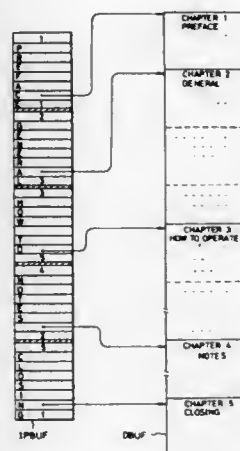
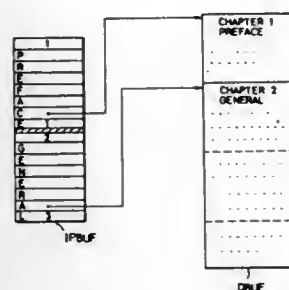
U.S. Cl. 364—900

15 Claims

1. A method of processing text comprising the steps of:  
 inputting a plurality of characters into a word processor;  
 compiling a text including chapters or paragraphs from the inputted characters and designating boundaries between the chapters or paragraphs of the compiled text;  
 storing the compiled text in a memory; and  
 reading the compiled text from the memory and compiling a table of contents from the read, compiled text, wherein the table of contents comprises a plurality of titles each corresponding to one of the chapters or paragraphs of the text



stored in the memory, wherein said step of compiling the table of contents comprises the step of compiling each title



of the table of contents from the contents of its corresponding chapter or paragraph.

4,792,920

# INTERFACE PROVIDING IMPEDANCE MATCHING BY SELECTIVE CONNECTION OF A RESISTOR ARRAY TO A POWER SUPPLY

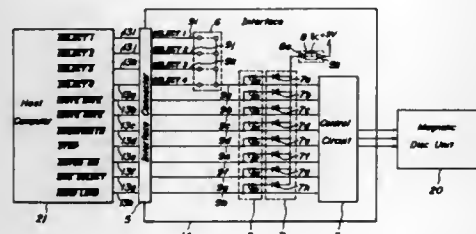
Tetsu Ogawa, Hanazono, Japan, assignor to Canon Denshi Kabushiki Kaisha, Chichibu, Japan

Continuation of Ser. No. 617,823, Jun. 5, 1984, Pat. No. 4,694,421. This application Apr. 15, 1987, Ser. No. 38,708

Claims priority, application Japan, Jun. 29, 1983, 58-101250 Int. Cl.<sup>4</sup> G06F 13/00

U.S. Cl. 364-900

3 Claims



1. An interface system for connecting a control circuit to a host computer wherein the control circuit has a plurality of input terminals and the host computer has a plurality of output terminals, said interface system comprising:

a plurality of signal lines, each of said signal lines connecting

one of the input terminals of the control circuit to a corresponding one of the output terminals of computer;

a connector having a first terminal and a second terminal, said first terminal being connected to a power source, said connector including a short circuiting means for selectively connecting said first and second terminals together electrically; and

a plurality of connection control means for impedance matching of the output of the host computer when said short circuiting means connects said first and second terminals, each of said plurality of connection control means having a first end and a second end, each said first end being connected to a respective one of said plurality of signal lines, each said second end being in electrical connection with said second terminal of said connector for connection to said power source to provide impedance matching for the output of the host computer when said short circuiting means connects said first and second terminals with said power source, said impedance matching not occurring when said short circuiting means does not connect said first and second terminals, each said connection control means including a means for preventing signal interconnection between ones of said plurality of signal lines.

4,792,921

## NETWORK EVENT IDENTIFIERS

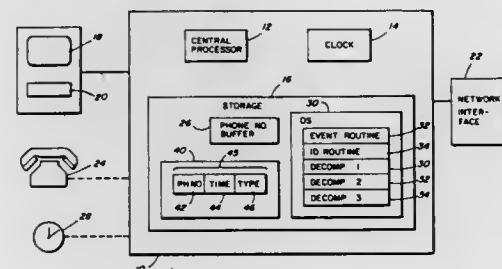
Daniel W. Corwin, Andover, Mass., assignor to Wang Laboratories, Inc., Lowell, Mass.

Filed Mar. 18, 1986, Ser. No. 841,070

Int. Cl.<sup>4</sup> G06F 5/00, 7/08, 7/10, 7/28

U.S. Cl. 364-900

3 Claims



1. In a data processing node, at which successive qualifying events can occur at time intervals no smaller than  $x$ , an improvement comprising:

identifier means for generating a unique identifier signal for a qualifying event having a characteristic, comprising storage means,

node number means for providing signals representing a predetermined number, and storing said signals in said storage means

time signal means for providing time signals indicative of distinctly denominated times, any two successive denominated times being separated by a time interval smaller than  $x$ ,

event signal means responsive to occurrence of one of said qualifying events and to a characteristic of said one event for providing an event signal,

generating means connected to said storage means, said time signal means, and said event signal means and responsive to a said event signal, to said stored node number signals and to said time signals indicative of the one of said denominated times minimally distant from the time of provision of said event signal, for generating an identifier signal associated with said event and indicative of said event characteristic, and for storing said identifier signal in said storage,

identifier signal presenting means comprising input/output means and network interface means,

analysis means responsive to a previously generated event identifier signal presented at said identifier presenting means, comprising

first decomposing means for generating node number signals representing the node number stored, at the time of occurrence of the event identified by said presented identifier signal, at the node at which said presented event identifier signal was generated,

second decomposing means for generating time signals indicative of the denominated time minimally distant from the time of occurrence of the event identified by said presented event identifier signal, and

third decomposing means for generating event characteristic signals indicative of a characteristic of the event identified by said presented event identifier signal.

4,792,922

## DYNAMIC SEMICONDUCTOR MEMORY WITH SMALLER MEMORY CELLS

Toshio Mimoto, Nara, and Yoshiji Ota, Terai, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

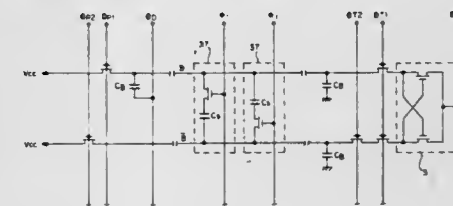
Division of Ser. No. 727,360, Apr. 25, 1985, abandoned. This application Jul. 24, 1987, Ser. No. 77,991

Claims priority, application Japan, May 12, 1984, 59-95425

Int. Cl.<sup>4</sup> G11C 11/24

U.S. Cl. 365-149

3 Claims



1. A method of operating a dynamic semiconductor memory, said memory comprising

a first bit line and second bit line for input and output of information, said first and second bit lines being complementary to each other, and

a plurality of memory cells, each including a selecting means for specifying said memory cell, and a storage capacitor means for storing information, said storage capacitor means having a first terminal connected to said first bit line through said selecting means and a second terminal connected to said second bit line, said first terminal and said selecting means defining a node therebetween,

said method comprising the steps of

precharging both said first and second bit lines to the level of a source voltage during a precharge period,

selecting one of said memory cells by causing said selecting means to electrically connect said first terminal to said first bit line,

writing a first logic in said selected memory cell by applying said source voltage to said first bit line and ground potential to said second bit line after said precharge period and electrically disconnecting said storage capacitor means from said first bit line, thereby causing the potential of said node to rise to nearly twice said source voltage, or writing a second logic in said selected memory cell by applying ground potential to said first bit line and said source voltage to said second bit line after said precharge period and electrically disconnecting said storage capacitor means from said first bit line, thereby causing the potential of said node to remain at ground potential.

4,792,923

## BIPOLAR SEMICONDUCTOR MEMORY DEVICE WITH DOUBLE WORD LINES STRUCTURE

Yasunobu Nakase, and Kenji Anami, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

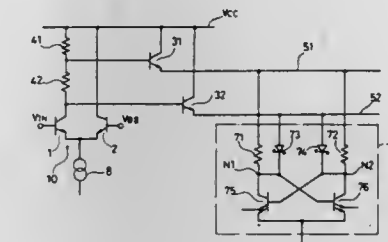
Filed Aug. 29, 1986, Ser. No. 901,745

Claims priority, application Japan, Aug. 30, 1985, 60-192522; Feb. 7, 1986, 61-26261; May 31, 1986, 61-126492

Int. Cl.<sup>4</sup> G11C 7/00, 11/40

U.S. Cl. 365-154

14 Claims



1. A semiconductor memory device having a plurality of word line pairs and a plurality of drain lines, a plurality of bit line pairs, and a plurality of memory cells connected to both said word line pairs and said bit line pairs at cross points thereof, comprising:

a first word line and a second word line being provided to form said word line pairs;

each said memory cell including:

a first transistor and a second transistor whose commonly connected emitters are connected to a said drain line

a first resistor and a second resistor connected between the collectors of said first and second transistors and said first word line,

the bases of said first and second transistors being connected to the collectors of said second and first transistors respectively, and

a first diode being connected between the collector of said first transistor and said second word line and a second diode is connected between the collector of said second transistor and said second word line;

a current switch provided in each row and utilizing;

an input transistor for receiving an address input signal at its base input and a reference transistor for receiving a predetermined voltage at its base input, the emitters of said input transistor and said reference transistor being commonly connected with each other;

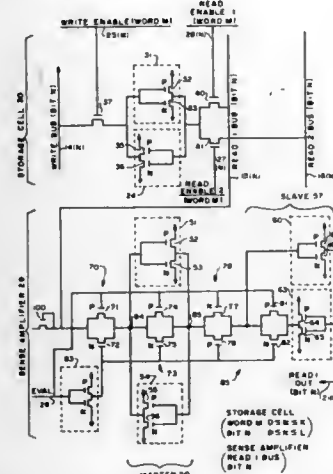
a third resistor and a fourth resistor serially connected between the collector of said input transistor and a power supply voltage;

a first word line driving transistor for driving said first word line, the base of said first word line driving transistor being connected between said third resistor and said fourth resistor, the emitter of said first word line driving transistor being connected to said first word line;

a second word line driving transistor for driving said second word line, the base of said second word line driving transistor is connected to the collector of said input transistor and said fourth resistor, the emitter of said second word line driving transistor being connected to said second word line; and

the collectors of said first and said second word line driving transistor being connected to said power supply voltage.

**4,792,924**  
**SINGLE RAIL CMOS REGISTER ARRAY AND SENSE AMPLIFIER CIRCUIT THEREFOR**  
 Jorge Rabinstein, Brighton, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.  
 Filed Jan. 16, 1985, Ser. No. 692,815  
 Int. Cl.<sup>4</sup> G11C 11/40  
 U.S. Cl. 365—154 7 Claims

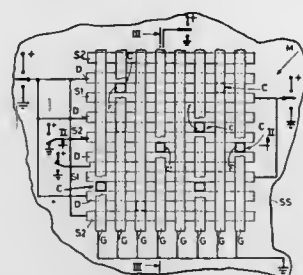


1. A storage cell for use in a register array comprising:
  - A. flip-flop means having a forward cell inverter and a reverse cell inverter each having an input terminal and an output terminal, the output terminal of each said cell inverter being connected to the input terminal of the other cell inverter;
  - B. write input means for connection to a write data bus and to receive a write enabling signal and connected to the input terminal of said forward cell inverter for selectively coupling an input data signal from the write data bus to the input terminal of said forward cell inverter in response to the write enabling signal; and
  - C. a first read output means connected to the output terminal of said flip-flop means and for connection to a first read data bus and to receive a first read enabling signal for selectively coupling the output of said forward cell inverter from the output terminal of said forward cell inverter to the first read data bus in response to the first read enabling signal and a second read output means for connection to a second read data bus and to receive a second read enabling signal and connected to the output terminal of said forward cell inverter for selectively coupling the output of said forward cell inverter from the output terminal of said forward cell inverter to the second read data bus in response to the second read enabling signal.

**4,792,925**  
**EPROM MEMORY MATRIX WITH SYMMETRICAL ELEMENTARY MOS CELLS AND WRITING METHOD THEREFOR**  
 Giuseppe Corda, Sarono, and Andrea Ravaglia, Monza, both of Italy, assignors to SGS Microelettronica S.p.A., Catania, Italy  
 Filed Oct. 3, 1985, Ser. No. 783,650  
 Claims priority, application Italy, Nov. 7, 1984, 23479 A/84  
 Int. Cl.<sup>4</sup> G11C 11/40  
 U.S. Cl. 365—185 4 Claims

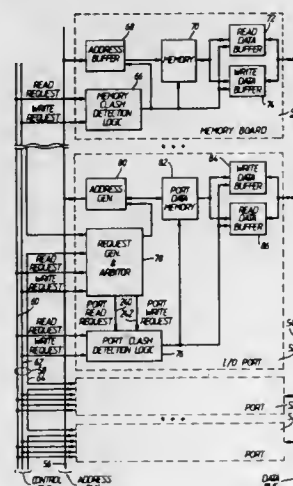
1. An EPROM memory matrix with symmetrical elementary MOS cells comprising:
  - a silicon substrate;
  - two pluralities of parallel source lines, one source line alternating with parallel drain lines formed on said substrate,

the source lines of each plurality being electrically connected together;  
 floating gate areas spanning said source and drain lines; and



parallel control gate lines developed perpendicularly to said source and drain lines and superimposed on and self-aligned with said floating gate areas.

**4,792,926**  
**HIGH SPEED MEMORY SYSTEM FOR USE WITH A CONTROL BUS BEARING CONTIGUOUS SEGMENTALLY INTERMIXED DATA READ AND DATA WRITE REQUEST SIGNALS**  
 Barry R. Roberts, Lindenhurst, Ill., assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Dec. 9, 1985, Ser. No. 806,427  
 Int. Cl.<sup>4</sup> G11C 7/00, 8/00  
 U.S. Cl. 365—189 9 Claims

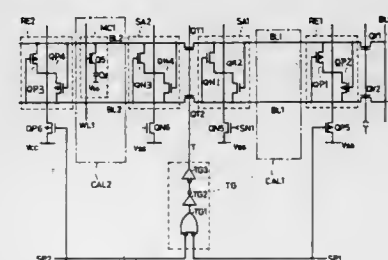


1. A high speed memory system for use with a control bus bearing sequentially intermixed data read and data write request signals and a data bus, said system comprising:
  - (a) storage means for holding data;
  - (b) first means, coupled to said storage means and said data bus, for reading data from said storage means onto said data bus in three sequential cycles comprising a request cycle during which a data read request signal appears on said control bus, a data read access cycle during which data is transferred by said first means from said storage means to said first means, and a data read transfer cycle during which said first means transfers said data from said first means to said data bus;
  - (c) second means, coupled to said storage means and said data bus, for writing data from said data bus into said storage means in three sequential cycles comprising a request cycle during which a data write request signal

appears on said control bus, a data read access cycle during which data is transferred by said second means from said data bus to said second means, and a data write transfer cycle during which said second means transfers said data from said second means to said storage means;

- (d) memory control means, coupled to said control bus and to said first and second means, for controlling operation of said first means in response to a data read request signal on said control bus and for controlling operation of said second means in response to a data write request on said control bus to permit contiguous sequential receipt and subsequent execution of said sequentially intermixed data read and write request signals on said control bus by arbitrating operation of said data read access cycles, data write access cycles, data read transfer cycles and data write transfer cycles to prevent potential clashes, in the form of attempts by said first and second means to simultaneously utilize said data bus or to simultaneously utilize said memory means, by selective delay of said data read access, data write access, data read transfer, or data write transfer cycles.

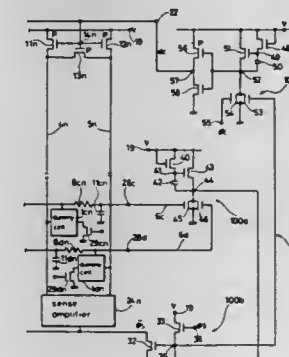
**4,792,927**  
**SEMICONDUCTOR MEMORY DEVICE WITH BIT LINE SENSE AMPLIFIERS**  
 Hiroshi Miyamoto, and Michihiro Yamada, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Feb. 26, 1987, Ser. No. 20,192  
 Claims priority, application Japan, Feb. 26, 1986, 61-41281  
 Int. Cl.<sup>4</sup> G11C 7/00  
 U.S. Cl. 365—189 8 Claims



1. A semiconductor memory comprising:
  - a plurality of word lines;
  - a plurality of pairs of bit lines with a folded bit line structure, each one of said pair of bit lines divided into a plurality of blocks, and each bit line of a pair of bit lines forming divided bit lines;
  - a plurality of memory cells each connected to a corresponding word line of said plurality of word lines and a corresponding divided bit line of said plurality of pairs of bit lines;
  - a plurality of sense amplifiers provided for each of the pairs of bit lines divided into said plurality of blocks for detecting and amplifying a difference between signal levels on the corresponding pair of divided bit lines after a particular word line is selected from said plurality of word lines;
  - a plurality of restore circuit provided for each of the pairs of bit lines divided into said plurality of blocks for detecting and further amplifying said difference between signal levels amplified by said sense amplifiers on a corresponding pair of divided bit lines;
  - first switching means provided for each of said divided bit lines for electrically connecting adjacent divided bit lines to each other;
  - a control circuit for generating activating signals for sequentially activating said plurality of restore circuits in a predetermined order beginning at a restore circuit provided in a block including said selected word line; and
  - switch control means responsive to said activating signals

for controlling an operation of said first switching means, said switch control means responsive to one of said activating signals to render said first switching means conductive.

**4,792,928**  
**SEMICONDUCTOR MEMORY CIRCUIT WITH CONTROL OF BIT LINE VOLTAGE BALANCING**  
 Youichi Tobita, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
 Filed Feb. 25, 1987, Ser. No. 18,467  
 Claims priority, application Japan, Feb. 25, 1986, 61-39390  
 Int. Cl.<sup>4</sup> G11C 7/00, 7/02  
 U.S. Cl. 365—210 2 Claims



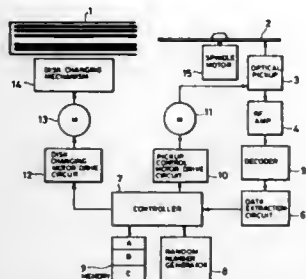
1. A semiconductor memory circuit comprising:
  - a plurality of bit lines extending in a first direction;
  - a plurality of word lines extending in a second direction perpendicular to said first direction,
  - said plurality of bit lines being arranged in pairs with each pair of bit lines forming a memory column of a first bit line and a second bit line, said plurality of bit line pairs forming a plurality of memory columns;
  - a plurality of memory cells connected to either a first bit line or a second bit line of said memory columns,
  - each of said plurality of word lines being connected to a first bit line memory cell or a second bit line memory cell in each of said plurality of memory columns;
  - a plurality of dummy cells each connected to a first or second bit line of said memory columns;
  - a first dummy word line connected to each first bit line dummy cell;
  - a second dummy word line connected to each second bit line dummy cell;
  - sense amplifier means, connected between each first bit line and second bit line, for sensing a voltage difference therebetween;
  - FET means, connected between each first bit line and second bit line, for balancing voltages appearing thereon;
  - selection means for selecting either said first or said second dummy word line for control of a specified dummy cell in each memory column; and
  - balancing control means, operatively interconnected with said dummy word lines and said FET means, for detecting the termination of dummy word line selection by said selection means and activating said FET means in response thereto.





memory for recording identities of already-played tunes on each of said disks, and a third memory for recording an incremental count of the number of the already-played tunes on said disks;

- (b) randomly selecting an as-yet-unplayed disk in accordance with a random number and on the basis of the contents of said first memory;
- (c) determining whether said randomly selected disk is present;
- (d) when said disk is not present, recording information on the result of said determination in said first memory, and when it is determined that said disk is present, reading information indicative of the number of all the tunes on said disk from said disk said third memory;



- (e) subtracting the number of tunes on said disk already-played read from said third memory from that of all the tunes on said disk when the result of said subtraction is one, recording the forthcoming completion of the playing of said disk in a corresponding already-played disk recording region in said first memory, and when the result of said subtraction is two or more, randomly selecting an as-yet-unplayed tune on said disk in accordance with a random number and on the basis of the contents of said second memory, and recording the forthcoming completion of the playing of said randomly selected tune in said second memory; and
- (f) when the playing of said randomly selected tune is completed, repeating steps (b) to (f) until the contents of said first memory indicate that all tunes on all said disks have been played.

4,792,935

#### OBJECTIVE LENS DRIVING DEVICE WITH MULTIPOLE MAGNET

Kenjiro Kime, Nagaokakyo; Shigekazu Sakabe, Amagasaki; Akira Hashimoto, Nagaokakyo, and Toshiya Matozaki, Gunma, all of Japan, assignors to Mitsubishi Denki K.K., Tokyo, Japan

Filed Dec. 22, 1986, Ser. No. 945,089

Claims priority, application Japan, Dec. 27, 1985, 60-296376; Dec. 27, 1985, 60-296377; Dec. 27, 1985, 60-296378; Dec. 27, 1985, 60-296382; Dec. 27, 1985, 60-296383; Mar. 20, 1986, 61-062655

Int. Cl.<sup>4</sup> G11B 7/00

U.S. Cl. 369-45

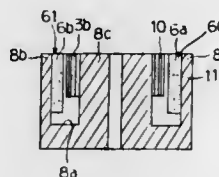
15 Claims

1. An objective lens driving device with a multipole magnet, which comprises:

- a yoke having a disk-shaped base section, an inner central yoke section with a central hole therein, and an outer cylindrical yoke section;
- a supporting shaft set upright in said central hole of said inner central yoke section;
- a lens holder with a central aperture fitted over said supporting shaft for rotary movement about and vertical movement along said supporting shaft and having a cylindrical coil mount extending downwardly therefrom;
- a ring-shaped focusing coil mounted around said cylindrical

coil mount for moving said lens holder along said supporting shaft for effecting focusing;

at least one rectangular tracking coil attached to a side of said focusing coil such that a pair of vertical coil sides of said tracking coil are parallel to said supporting shaft; and curved multipole magnet means disposed between said inner



and outer yoke sections and having at least three magnet sections, with opposite end magnet sections having a polarity opposite to that of a central magnet section so that said vertical coil sides interlink with magnetic fluxes having substantially opposite directions to each other, whereby forces act upon said vertical coil sides in substantially same direction.

4,792,936

#### PROCESS FOR DEFINING AND MODIFYING A PARTITION OF THE STORAGE SPACE OF A NON-ERASABLE CARRIER

Michel Picard, 16 Cours du Buisson, 77186 Noisiel, France

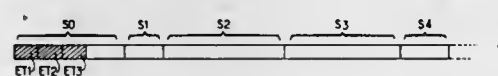
Filed Jul. 27, 1987, Ser. No. 77,741

Claims priority, application France, Jul. 31, 1986, 86 11128

Int. Cl.<sup>4</sup> G11B 7/00, 20/12

U.S. Cl. 369-59

7 Claims



1. A process for recording on a non-erasable information carrier permitting an updating of the segmentation of the storage space of said carrier, in which a segmentation is defined by a header containing at least one header identifier and a list of segments, said segments forming a partition of said storage space, wherein for defining a new segmentation, a new header is written at the end of the most recent header, the successive headers being sequentially written into the same segment and wherein, for determining the current partition, there is a passage through the successive headers of the segment from the initial header to the most recent header.

4,792,937

#### PROCESS FOR THE MANAGEMENT OF FILES ON A NON-ERASABLE INFORMATION CARRIER

Michel Picard, 16 Cours du Buisson, 77420 Noisiel, France

Filed Sep. 21, 1987, Ser. No. 99,312

Claims priority, application France, Sep. 19, 1986, 86 13144

Int. Cl.<sup>4</sup> G11B 7/13

U.S. Cl. 369-59

4 Claims

1. A process for the management of files on a non-erasable information carrier, said process comprising storing objects of the header, file and directory types, said files and directories containing data, whose access is defined by a descriptor-type object associated with each of said files and directories, said files and directories being stored in accordance with a tree-like architecture, whereof the files form the terminal nodes or knots, said tree incorporating a root directory, wherein the storage space of the non-erasable carrier is subdivided into several segments forming a partition of said storage space, said partition also having:

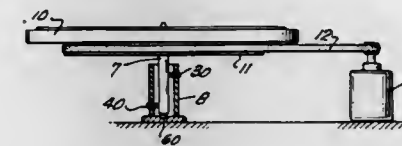
a first segment for storing successive versions of a header, said versions being sequentially written into said first segment, each header version having at least one identification field for the carrier, a listing field for containing the list of segments forming the partition of the storage space and a data field for containing a first physical address, a second physical address, and a third physical address,

a second segment for storing successive versions of a conversion table for converting a logic address of a descriptor into a physical address of a descriptor, said versions of said table being sequentially written into said second segment, each version of said table having a main table establishing a correspondence between a logic address and a physical address, for the physical addresses of the zones of the storage space containing an information at the time of the creation of said main table or for subsequently created objects and corresponding to a new logic address, and a supplementary table establishing a correspondence between a logic address and a physical address, for updating of logic addresses contained in the main table, the addresses of said main and supplementary tables of the most recent version of the conversion table being written during the storage of a new header version respectively into

slidably the cylindrical surface of said shaft and comprising:

a first and a second pair of small, angularly-spaced, fixed bearing pads,

said pads being linearly spaced along said shaft to provide bearing engagement therewith at four spaced points, and further comprising:



two pairs of adjusting screws extending through the wall of said housing, one of said pads being fastened to the inner end of each said screw, the end of each said pad being shaped as a generally convex figure of revolution.

4,792,939

#### DUPLEX RADIO COMMUNICATION TRANSCEIVER

Mitsutaka Hikita, Hachioji; Atsushi Sumioka, Kokubunji; Yoshikatsu Ishida, Ibaragi; Kunihiko Hamada, Koganei; Yutaka Chiba, and Yoshio Abe, both of Katsuma, all of Japan, assignors to Hitachi Denso Kabushiki Kaisha and Hitachi Ltd., both Tokyo, Japan

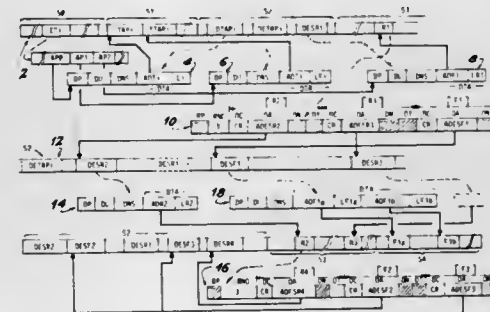
Filed Jan. 23, 1987, Ser. No. 6,171

Claims priority, application Japan, Jan. 24, 1986, 61-12122; Jan. 30, 1986, 61-16711

Int. Cl.<sup>4</sup> H04B 1/56

U.S. Cl. 370-24

12 Claims



the first physical address and into the second physical address of the data field of said header,

- a third segment for storing descriptors of files or directories, each descriptor having at least one preamble and a listing field, the preamble having at least one identification field for identifying the type (field or directory) described and a chaining field for connecting two successive versions of the same descriptor, and the listing field containing the list of physical addresses and the length of the zones of the storage space containing the file or directory, the physical address of the root directory being contained in the third physical address of the data field of the present header version,
- a fourth segment for storing directories, each directory having at least one preamble and an operations list, the preamble having at least one directory identifier and a chaining field to permit the addition of information to said directory and the operations list having the list of logic addresses of the file and directory descriptors contained in said directory and operations codes for indicating the state (existing or eliminated) of each of the said files and directories of said directory,
- a fifth segment for storing the content of the files.

4,792,938

#### LOW-NOISE BEARING FOR PHONOGRAPH TURNTABLES AND THE LIKE

William H. Firebaugh, 3108 McKinley Way, Costa Mesa, Calif. 92626

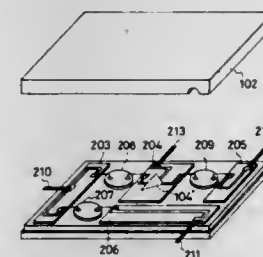
Filed Aug. 3, 1987, Ser. No. 81,020

Int. Cl.<sup>4</sup> G11B 3/60; F16C 17/10, 35/08

U.S. Cl. 369-269

4 Claims

1. A phonograph turntable having a central shaft, a housing surrounding said shaft, and low-noise bearing means fixed in said housing and engaging



1. A duplex radio communication transceiver comprising:
- (a) a module including the following parts mounted on a single metallic substrate:
- a branching circuit having an antenna terminal to be coupled to an antenna, a transmission signal input terminal and a reception signal output terminal;
  - a transmitting acoustic surface wave filter coupled to said transmission signal input terminal;
  - a first acoustic surface wave filter coupled to said reception signal output terminal;
  - a receiving amplifier for amplifying the output of said first acoustic surface wave filter; and
  - a second acoustic surface wave filter for inputting the output of said receiving amplifier;
- (b) a mixer for mixing the output of said second acoustic surface wave filter and the output of a local oscillator;
- (c) an intermediate amplifier for amplifying the output of said mixer; and
- (d) a transmission signal power amplifying part for amplifying power of a signal to be transmitted to apply it to said transmitting acoustic surface wave filter.



4,792,940

# **AUTOMATIC RETRAIN METHOD FOR A FULL DUPLEX MODEM HAVING AN ECHO CANCELLER AND AN EQUALIZER**

Masayoshi Hiraguchi, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

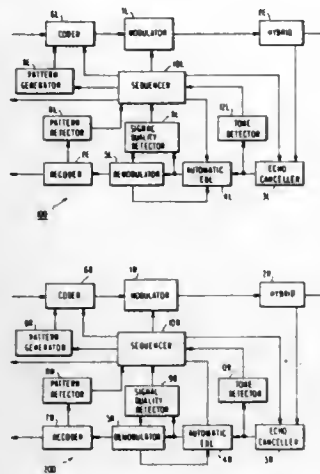
Filed Dec. 15, 1986, Ser. No. 941,868

Claims priority, application Japan, Dec. 13, 1985, 60-280367

Int. Cl.<sup>4</sup> H04L 5/14

U.S. Cl. 370—32.1

5 Claims



1. A retrain method for first and second modems operating in a full duplex data transmission mode via a two wire circuit, each of the first and second modems including modulating means for modulating input data to produce a modulated signal, and echo canceller for cancelling an echo produced in response to the modulated signal, an equalizer for equalizing waveform distortion produced on a received modulated signal transmitted through a transmission line, and demodulating means for demodulating the received modulated, equalized signal into the input data, said retrain method comprising the steps of:

- detecting deterioration of the received modulated signal from said second modem,
- suspending data transmission from said first modem in response to the detection of deterioration and transmitting, at least once, a first training signal having a predetermined pattern and time period,
- suspending data transmission from said second modem in response to said first training signal and transmitting, once, a second training signal having a predetermined pattern and time period, and
- automatically training only said equalizers of said first and second modems in response to the second and first training signals, respectively.

4,792,941

# **DATA SUBSYSTEM TRAFFIC CONTROL APPARATUS AND METHOD**

John A. Yanosy, Jr.; Paul Odlyzko, both of Stratford; Erramilli Ashok, Shelton, and Haisou Hsiang, Trumbull, all of Conn., assignors to ITT Corporation, New York, N.Y.

Filed Feb. 25, 1983, Ser. No. 705,465

Int. Cl.<sup>4</sup> H04Q 11/04

U.S. Cl. 370—58

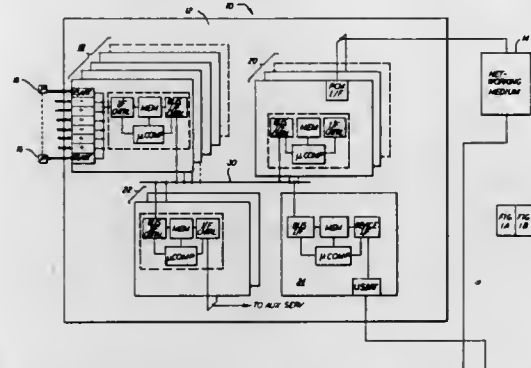
11 Claims

1. Apparatus for data traffic control throughout a multisubsystem communications network of the class having a plurality of substantially identical subsystems interconnected to a network medium, with each subsystem associated with a given number of peripherals wherein said plurality of subsystems are controlled by a system control computer having associated therewith a data bank for storing therein operative communi-

cations protocols for said communications network comprising:

a given number of network interface devices associated with each subsystem of said network, each of said network interface devices being substantially identical in configuration in each of said subsystems and each operative to transmit and receive data from said network medium and each operative to communicate with others of said network interface devices within a given subsystem via a subsystem bus to which bus each network interface device in said given subsystem is connected, each network interface device including:

means for monitoring the data flow through each network interface device in a given subsystem to provide an indica-



tion of data flow through each of said network interface device;

means for storing for each of said network interface devices a series of preselected data flow rate threshold levels for comparing a selected level with said indication of data flow and for providing a control output signal when said threshold level is exceeded;

means responsive to said control signal to transmit new data directed at a network interface device providing said control output signal to another network interface device within said subsystem as connected to said data bus, whereby the data load in each subsystem will be distributed relatively equally among said given number of network interface devices in said subsystem.

4,792,942

# **METHOD AND APPARATUS FOR MULTI-DESTINATION COMMUNICATION PROCESSING IN PACKET STORAGE/EXCHANGE NODE**

Tatsuo Osato, Tokyo, Japan, assignor to Hitachi, Limited, Tokyo, Japan

Filed Jan. 6, 1987, Ser. No. 668

Claims priority, application Japan, Jan. 7, 1986, 61-1086

Int. Cl.<sup>4</sup> H04Q 11/04

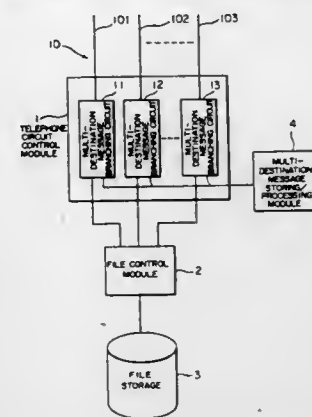
U.S. Cl. 370—60

7 Claims

1. An apparatus for multi-destination communication processing in a packet storage/exchange node comprising:

- a line control module for controlling transmission and reception of a message containing either a single destination message or a multi-destination message to and from a telephone line;
- a file storage for storing said message in accordance with delivery destination addresses;
- a file control module for controlling writing said message received from said line control module into said file storage and reading said message from said file storage to supply said message to said line control module; and
- a multi-destination message storing/processing module including a multi-destination message temporary storage having at least one multi-destination message temporary

storage area for temporarily storing said multi-destination message and at least one single destination message stor-



age area for storing individual single destination messages expanded from said multi-destination message.

4,792,943

# **DIGITAL FILTER BANK**

Heinz Gökler, Backnang, Fed. Rep. of Germany, assignor to ANT Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany

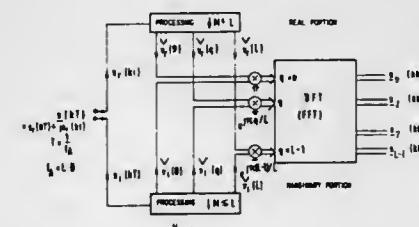
Filed Mar. 24, 1987, Ser. No. 29,768

Claims priority, application Fed. Rep. of Germany, Mar. 26, 1986, 3610195

Int. Cl.<sup>4</sup> H04J 1/02

U.S. Cl. 370—70

11 Claims



1. In a frequency multiplex circuit including a digital filter bank for effecting conversion between a frequency multiplexed signal and a plurality of weighted filter signals, and discrete Fourier transformation means connected to said filter bank for effecting a discrete Fourier transformation between the weighted filter signals and L individual complex signals appearing on separate lines, wherein:

- the frequency multiplexed signal contains component signals each associated with a respective individual complex signal and having a bandwidth B;
- the weighted filter signals have the form

$$s(k, q) = \sum_{p=-\infty}^{+\infty} s(k-p) \cdot h(p)$$

where

$i = p \cdot L + q$   
 $q = 0, 1, 2, \dots, L-1$ , and  
 $i, p, q = (0, 1, 2, 3, \dots)$

the frequency multiplexed signal is  $s(k)$  and has a sampling rate of  $f_s$ ;

$h(i)$  is a coefficient representing a pulse response of a finite length for  $i = 0, 1, 2, \dots, N-1$ ;

the discrete Fourier transformation has the form

$$s(k, M) = \sum_{q=0}^{L-1} s(k, q) \cdot e^{j2\pi q/L} = DFT\{s(k, q)\},$$

where  $s(k, M)$  represents the individual complex signals and  $DFT\{\}$  is the discrete Fourier transformation,  $M$  is a sampling rate reduction factor,  $M \leq L$ , and the discrete Fourier transformation involves sampling with respect to every  $M$ th value of the weighted filter signals; each component signal of the frequency multiplexed signal is associated with a respective channel having a channel number,  $l$ , and a center channel frequency  $f_l = l \cdot B$  and  $l = 1, 2, \dots, L-1$ , the improvement wherein:

the frequency multiplexed signal is a complex signal,  $s(k, T) = s_r(k, T) + js_i(k, T)$  with a real portion  $Re = s_r(k, T)$  and an imaginary portion  $Im = s_i(k, T)$ , and  $k$  is a time factor =  $\dots, -1, 0, +1, \dots$ ; and

said filter bank comprises:

two chains of  $N-1$  delay members each having a delay of  $T$  and each processing a respective portion of the complex signal, where  $N$  is the number of frequency multiplexed signal values associated with each set of weighted filter signal values and  $T = 1/f_s$ ; sampling means for sampling the signals associated with each delay member at a rate corresponding to the sampling rate of the frequency multiplexed signal reduced by  $M$ ; first processing means for effecting conversion between each sample signal associated with a given delay member and an associated weighted sample signal; and second processing means for effecting conversion between selected weighted filter signals and selected weighted sample signals.

4,792,944

# **TIME-DIVISION MULTIPLEXING COMMUNICATION SYSTEM FOR PERFORMING A PLURALITY OF COMMUNICATIONS HAVING DIFFERENT DATA SPEEDS**

Yasuhiko Takahashi, and Kunio Hiyama, both of Fujisawa, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

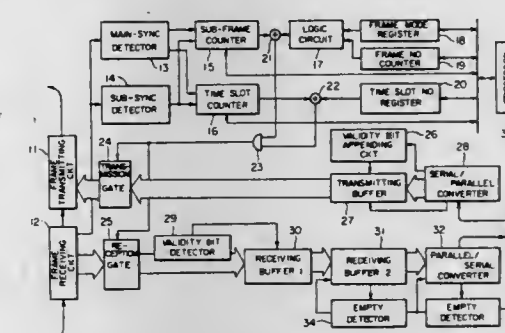
Filed Dec. 15, 1986, Ser. No. 941,839

Claims priority, application Japan, Dec. 20, 1985, 60-288191

Int. Cl.<sup>4</sup> H04J 3/02

U.S. Cl. 370—84

2 Claims



1. A communication system in which a plurality of terminal devices connected respectively through node devices to a loop transmission line perform data transmission/reception in a time-division multiplexing manner by using a communication frame constituted by a plurality of sub-frames circulating on said transmission line, each of said sub-frames being constituted by a plurality of time slots, each of said node devices comprising:

first means for storing a first parameter for specifying at least one of said plurality of sub-frames allotted to the respective node device;

second means for storing a second parameter for specifying

at least one of said plurality of time slots of said at least one of said plurality of sub-frames allotted to said respective node device;

third means for receiving said communication frame from said loop transmission line;

fourth means for identifying said at least one of said time slots specified by said second parameter in said at least one of said sub-frames specified by said first parameter in said communication frame received by said third means;

fifth means for inserting data received from a corresponding terminal device and an indicator into said time slot identified by said fourth means in said communication frame and for sending said communication frame onto said loop transmission line, said indicator indicating validity of said data inserted in said time slot identified by said fourth means; and

sixth means for extracting data from said time slot identified by said fourth means from said communication frame received by said third means and for transferring the extracted data to said corresponding terminal device when said indicator inserted in said time slot identified by said fourth means indicates said data in said time slot identified by fourth means to be valid.

4,792,945

## LOCAL AREA NETWORK SYSTEM

Jon W. Mark, Waterloo, Canada, assignor to University of Waterloo, Waterloo, Canada

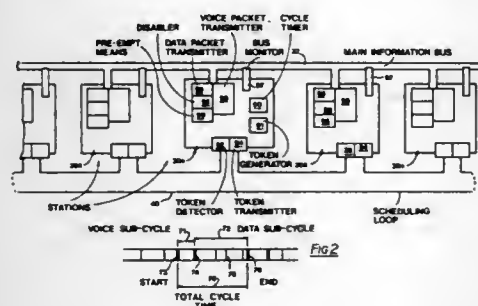
Filed Dec. 1, 1986, Ser. No. 936,434

Claims priority, application United Kingdom, Nov. 29, 1985, 8529369; Canada, Jun. 4, 1986, 510820

Int. Cl.<sup>4</sup> H04S 3/00

U.S. Cl. 370—85

10 Claims



1. Local Area Network (LAN) system, which comprises:

a main information channel;

many stations, where each station is able to put digitised information onto the main channel in the form of discrete packets;

where the packets from some of the stations sometimes comprise packets of Voice information, and the packets from certain of the stations sometimes comprise packets of Data information;

a scheduling channel in the form of a loop, connected in series from station to station;

where each station includes a means, which is responsive to the presence of a token signal on the loop at that station, for enabling the station to put a respective one of the packets onto the main channel;

where each station includes means for distinguishing between a Voice token-signal and a Data token-signal;

where one of the stations, designated the leader station, includes means for issuing the said Voice and Data token signals onto the scheduling loop;

where the leader station is provided with a timing means;

where each station includes a token-passing means which is effective to pass the token signal from station to station around the scheduling loop;

where each station includes a means for ensuring that each

station can only put such a Voice packet onto the main channel when that station has the Voice token, and can only put such a Data packet onto the main channel when that station has the Data token;

where the system is characterised by being so adapted and arranged;

that the leader issues the tokens in a regular periodic cycle, the total cycle comprising a Voice sub-cycle and a Data sub-cycle;

that, in the Voice sub-cycle, the leader issues one of the Voice token-signals onto the loop,

where the Voice sub-cycle ends when the said Voice token arrives back at the leader, having been round the loop;

that, in the Data sub-cycle, the leader issues one of the said Data token-signals onto the loop, and when the Data-token arrives back at the leader, the leader issues a further Data-token onto the loop;

that the leader starts the Data sub-cycle at the said end of the Voice sub-cycle;

that the leader ends the Data sub-cycle upon the expiry of a predetermined period of time, set by the timing means, after the start of the Voice sub-cycle;

that the station which has the Data token at the moment the Data sub-cycle ended is termed the pre-empted station;

and that at the start of the next Data sub-cycle, none of the stations are able to transmit packets onto the main channel until the Data token arrives at the pre-empted station, upon which the pre-empted station is able to put its Data packet onto the main channel.

4,792,946

## WIRELESS LOCAL AREA NETWORK FOR USE IN NEIGHBORHOODS

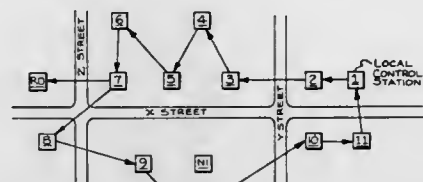
Scott T. Mayo, Raleigh, N.C., assignor to Spectrum Electronics, Inc., Raleigh, N.C.

Filed Apr. 7, 1987, Ser. No. 35,447

Int. Cl.<sup>4</sup> H04J 3/02

U.S. Cl. 370—86

23 Claims



1. A local area network for digital information transmission to and from each of a plurality of building units in an area, wherein all network interconnections between any of said plurality of units and any other of said plurality of units are wireless and employ no cables, said network comprising a plurality of transceiver stations, one each being located at each of said plurality of units, each said transceiver station including:

radio transmitter means adapted to transmit information in digital form, and further adapted to selectively address said transmitted information to at least either of two proximately located other transceiver stations of said plurality, said transmitter means being operable in a frequency range and at a sufficiently low maximum power level as to be normally and lawfully utilizable without an FCC license;

radio receiver means adapted to receive transmissions of information in digital form, and further adapted to specifically recognize such transmissions selectively addressed to said receiver means from at least either two proximately located other transceiver stations of said plurality;

interface means interconnecting said transceiver means with at least one electrical system associated with said unit of

said plurality where said transceiver station is located and adapted to accept data from said system and deliver commands to said system;

first means interposed between said interface means and said radio transmitter means and adapted to modulatingly convey said data from said interface means to said radio transmitter means; and

second means interposed between said first interface means and said radio receiver means and adapted to demodulatingly convey said commands from said radio receiver means to said interface means;

programmable control means adapted to cause said transmitter means to recognizably and selectively retransmit data and commands received by said receiver means in a predetermined manner;

whereby said plurality of transceiver stations may be serially linked in a loop; and

further whereby commands for any of said systems and data from any of said systems may be passed from station to station about the loop in either of two directions.

4,792,947

## METHOD OF MULTI-ADDRESS COMMUNICATION

Yoshihiro Takiyasu, Higashimurayama, and Kenichi Wada, Sagami-hara, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

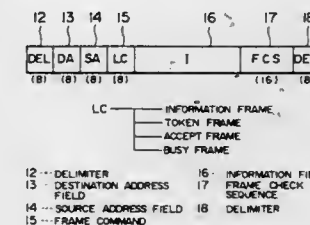
Filed Apr. 13, 1987, Ser. No. 37,848

Claims priority, application Japan, Apr. 11, 1986, 61-82231

Int. Cl.<sup>4</sup> H04J 3/00

U.S. Cl. 370—86

5 Claims



1. A method of multi-address communication in a network formed by connecting, in a ring, a plurality of nodes each coupled with a data processor, through a transmission line having a single transmission direction, wherein an information frame transmitted to said transmission line from one of said nodes is relayed successively by other nodes to return to the originating node, said method comprising the steps of:

transmitting from a first node of said plurality of nodes a multicast information frame to be delivered to other nodes of said plurality of nodes and subsequently, transmitting a multicast response frame for confirmation of delivery of said multicast information frame to said transmission line, said multicast response frame containing a source address and a destination address;

relaying from a node, which is in a busy state when said multicast information frame is received by said node, said multicast information frame and said multicast response frame transmitted thereto to a succeeding node unchanged;

checking a relationship between said source address or said destination address in said multicast response frame and an address stored in a node successful in receiving said multicast information frame, and changing said source address or said destination address in said multicast response frame when a predetermined relationship is ascertained in said checking step, or relaying said multicast response frame to a succeeding node without changing said source address or said destination address; and

determining whether said multicast information frame is to be retransmitted by said first node by checking said source

address or said destination address in said multicast response frame returned thereto.

4,792,948

## DISTRIBUTED SWITCHING ARCHITECTURE

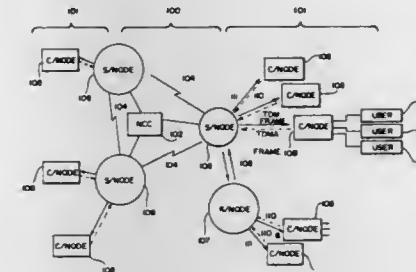
Joaquin J. Hagen, Olney; Robert A. Swithers, Gaithersburg; William A. Whelpley, Randolph, and Fred S. Lee, Rockville, all of Md., assignors to Data General Corporation, Westboro, Mass.

Filed Aug. 8, 1985, Ser. No. 763,701

Int. Cl.<sup>4</sup> H04J 3/16

U.S. Cl. 370—95

23 Claims



1. A distributed switching architecture for a communication network comprising:

a plurality of groups of user ports for message transmissions;

a plurality of user node means for receiving message transmissions from user ports, composing data frames from said message transmissions, transmitting the data frames in TDMA bursts over an associated communication channel, receiving continuous TDM signals including data intended for individual user ports, and distributing the data to the individual user ports, said user node means being connected to all of the user ports in a group;

a plurality of distributed switch means, each connected to at least one user node means by respective associated communication channels and at least one other distributed switch means by communication links, for receiving data frames in TDMA bursts from its associated user node means and receiving data frames from associated distributed switch means, temporarily storing the data frames in a storage device located within said distributed switch means, and transmitting TDM data frames to associated user node means in accordance with a time plan and transmitting data frames to associated distributed switch means; and

a means for network control connected to all distributed switch means for generation and distribution of said time plan.

4,792,949

## SERVICE CHANNEL CIRCUIT FOR MULTIPLEXED TELECOMMUNICATIONS TRANSMISSION SYSTEMS

Harbhajan S. Virdee, Phoenix, and Hamid R. Rezale, Glendale, both of Ariz., assignors to Siemens Transmission Systems, Inc., Phoenix, Ariz.

Filed Mar. 26, 1987, Ser. No. 30,754

Int. Cl.<sup>4</sup> H04J 3/04

U.S. Cl. 370—112

7 Claims

1. A service channel addition circuit for a fiber optic telecommunications transmission system comprising:

means for combining a plurality of parallel control inputs into serial control words;

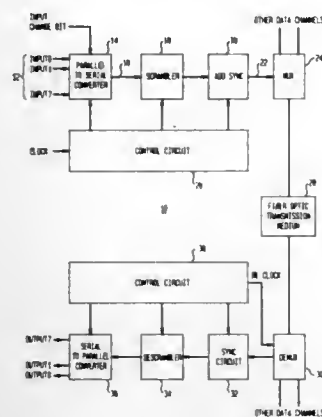
means for scrambling said serial control words;

means for generating a gapped clock and clocking said control words with said gapped clock;

means for inserting synchronization bits at a periodic rate into the scrambled control words in the gaps of said



gapped clock; said synchronization bits being start and stop bits;



means for multiplexing said synchronized control words into a desired channel in a telecommunications data stream for transmission over a transmission line.

4,792,950

## MULTIPLEX WIRING SYSTEM

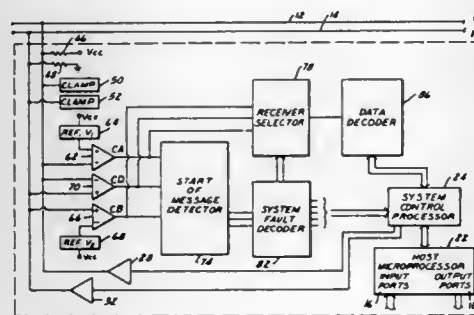
Jack R. Volk, Ann Arbor, and Alan J. Duszewicz, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Jun. 17, 1987, Ser. No. 63,333

Int. Cl.<sup>4</sup> G06F 11/20

U.S. Cl. 371—8

11 Claims



1. A method for communicating data between communications modules, comprising the steps of: transmitting data from a first one of said modules; transmitting complementary data from said first module, said transmitted complementary data being the complement of said transmitted data; receiving the transmitted data in a second one of said modules, said transmitted data being received in a first channel of said second module; receiving the transmitted complementary data in said second module, said transmitted complementary data being received in a second channel of said second module; combining the transmitted data and the transmitted complementary data in said second module, the transmitted data and the transmitted complementary data being combined in a third channel of said second module; detecting a predetermined data sequence in said first channel and said second channel and said third channel; providing an indication of a communication fault based upon said detecting step; and selecting data from either said first channel or said second channel or said third channel based upon said fault indication.

4,792,951  
APPARATUS AND METHOD OF STIMULATING AN EQUIPMENT

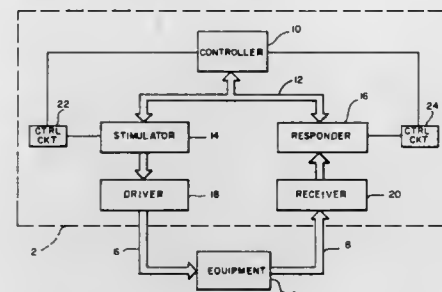
Robert E. Nielsen, Farmingville, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Sep. 11, 1986, Ser. No. 906,057

Int. Cl.<sup>4</sup> G06F 11/00

U.S. Cl. 371—27

16 Claims



1. In an apparatus for testing an equipment connected thereto, the apparatus including a controller means and a plurality of driver, receiver and stimulator means, the driver means transmitting stimuli generated from the stimulator means to the equipment and the receiver means relating the signals generated by the equipment in response to the stimuli to the controller means, each stimulator means comprising: input means connected to the controller means for receiving data and instructions therefrom; each data having multiple bits of information, the multiple bits being received in parallel by the input means; storage means connected to the input means and communicating with the controller means for storing in parallel the data from the controller means, the storage means operating at a first speed; register means having a plurality of output ports connected to the storage means and communicating with the controller means for receiving in parallel from the storage means sets of multiple bits, the register means capable of operating in the serial mode by shifting the bits serially at a second speed, the second speed being faster than the first speed, the register means further capable of operating at a parallel mode by transmitting the received multiple bits in parallel through the output ports; wherein, upon receiving a command from the controller means to operate in the serial mode, the register means shifts the bits serially and outputs the serially shifted bits through one of the output ports to the equipment, thereby stimulating the equipment at a rate equal to the second speed.

4,792,952

## SIGNAL RECEIVER

Clive R. Weston, Hayes, England, assignor to EMI Limited, Hayes, England

Filed May 20, 1986, Ser. No. 864,866

Claims priority, application United Kingdom, May 24, 1985, 8513218

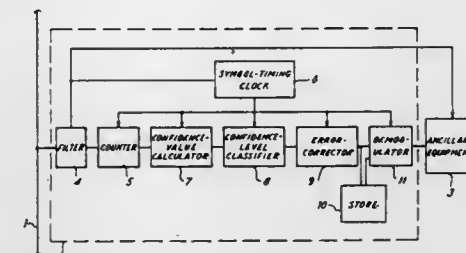
Int. Cl.<sup>4</sup> G06F 11/10

U.S. Cl. 371—30

12 Claims

1. Equipment for the processing of FSK modulated signals at a carrier frequency and formed of a plurality of symbols, the equipment comprising: means to determine digitally a confidence characteristic for the modulation state of a symbol

within a FSK modulated signal at a carrier frequency; means to error-correct the signal in accordance with the output of the



confidence-determining means; and means to demodulate a received signal as output from the error-correcting means.

4,792,953

## DIGITAL SIGNAL ERROR CONCEALMENT

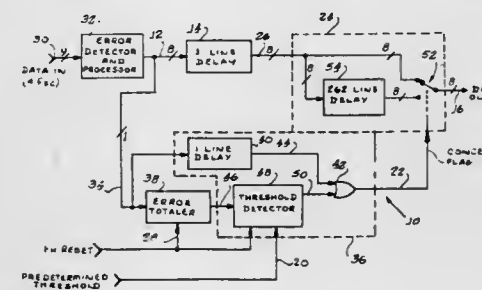
Leonard A. Pasdera, San Carlos, and Maurice G. Lemoine, Redwood City, both of Calif., assignors to Ampex Corporation, Redwood City, Calif.

Continuation-in-part of Ser. No. 845,648, Mar. 28, 1986, abandoned. This application Mar. 27, 1987, Ser. No. 31,503

Int. Cl.<sup>4</sup> G06F 11/10

U.S. Cl. 371—31

20 Claims



1. A method for concealing errors in data words recovered following the transmission of digital data having internal correlation wherein recovered correlated words are substituted for recovered words suspected of being in error, said method comprising providing error flag signals identifying corresponding respective recovered words suspected of being in error after any error correction has been effected, counting said error flag signals over a predetermined totalizing interval and generating a concealment interval signal over a concealment interval when the count exceeds a predetermined count, and substituting recovered correlated words for recovered words corresponding to respective error flags and for all other recovered words corresponding to a respective said concealment interval.

4,792,954

## CONCURRENT DETECTION OF ERRORS IN ARITHMETIC DATA COMPRESSION CODING

Ronald B. Arps, San Jose, Calif., and Ehud D. Karnin, Kiriat-Motzkin, Israel, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 31, 1986, Ser. No. 925,433

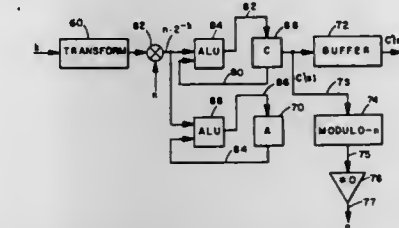
Int. Cl.<sup>4</sup> G06F 11/00

U.S. Cl. 371—48

14 Claims

1. A method for detecting single-bit errors during the recursive machine encoding of a binary symbol string  $s = b(1), b(2), \dots, b(i), \dots, b(n)$  to produce a compressed binary number  $c(s)$

as a representation of  $s$ ,  $c(s)$  being a number in the semi-open interval  $[0,1]$ , the interval being successively subdivided during successive encoding cycles, each subinterval being defined by its lower bound  $c(s)$  and a variable  $a(s)$  such that  $[c(s), c(s) + a(s)]$ ; the values of  $c(s)$  and  $a(s)$  being computed as arithmetically recursive functions of  $c(s)$  and  $a(s)$ , comprising the steps of:



scaling the arithmetically recursive functions by  $n$ ,  $n$  being an odd number not equal to  $+1$  or  $-1$ ; transforming  $s$  into a compressed error encoded binary representation  $C'(s)$  in the semi-open interval  $[0,n]$  according to said  $n$ -scaled arithmetically recursive functions; and testing  $C'(s)$  by a modulo- $n$  function for a non-zero residue.

4,792,955

## APPARATUS FOR ON-LINE CHECKING AND RECONFIGURATION OF INTEGRATED CIRCUIT CHIPS

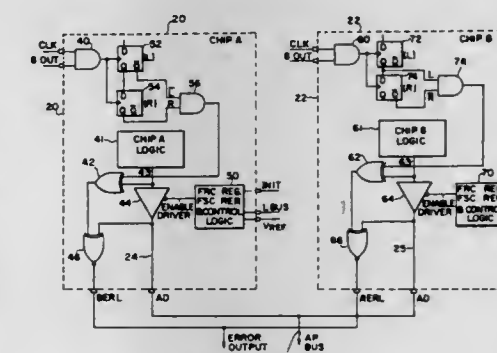
David B. Johnson, Portland; Stanley Kenoyer, Forest Grove; Mark S. Myers, Portland, all of Oreg., and Sven Nilsson, Deisenhofen, Fed. Rep. of Germany, assignors to Intel Corporation, Santa Clara, Calif.

Filed Aug. 21, 1986, Ser. No. 898,522

Int. Cl.<sup>4</sup> G06F 11/20

U.S. Cl. 371—68

1 Claim



1. In an error-checking system in which two substantially identical modules (20, 22) connected to a common bus (23) are checked by comparing the outputs (43, 63) of chip logic (41, 61) on each module with each other, and wherein at any particular time one module is designated a master and the other module is designated a checker, and wherein said outputs (43, 63) are checked by means of a comparator (46 or 66) on said one module designated as a checker, the improvement in at least one of said modules (20) comprising:

control logic (50) including first means (FRC reg. bit 0: MASTER) for designating said module as either a master or a checker and second means (FRC reg. bit 1: TOGGLE MASTER/CHECKER) for indicating, when in a first state, that a module designated as a master continuously drives said bus, and when in a second state that a module designated as a master and a module designated as a checker alternately drive said bus;

third means (FSC reg. bit 2: PASSIVE and driver-44) for preventing said chip logic (41) of said module (20) from driving the output (24) thereof;

fourth means (FSC reg. bit 4: MY PERMANENT ERROR) for indicating that said module has detected a permanent error;

said control logic (50) further including fifth means (FIG. 3) for distinguishing a warm initialization from a cold initialization and sixth means (FSC register bit 0: FRC SPLITTING DISABLE);

said control logic (50) further including seventh means (FSC reg. bit 1: SEPARATED M/C) responsive to said fourth means (FSC reg. bit 4: MY PERMANENT ERROR), said fifth means (FIG. 3), and said sixth means (FSC register bit 0: FRC SPLITTING DISABLE) for setting said seventh means (FSC reg. bit 1: SEPARATED M/C) to thereby indicate that said module (20) is logically separate from said other module (22), and for activating said third means (FSC reg. bit 2: PASSIVE and driver-44), to thereby prevent said chip logic (41) of said module (20) from driving said output (24).

4,792,956

## LASER DIODE INTENSITY AND WAVELENGTH CONTROL

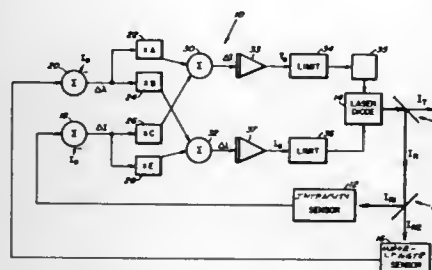
George W. Kamin, Albuquerque, N. Mex., assignor to Litton Systems, Inc., Beverly Hills, Calif.

Filed May 13, 1986, Ser. No. 862,759

Int. Cl.<sup>4</sup> H01S 3/13

U.S. Cl. 372-29

8 Claims



7. A system for simultaneously controlling the intensity and wavelength of an optical signal output from a laser diode, comprising:

means for sensing the intensity of the optical signal;

means for sensing the wavelength of the optical signal;

means for comparing the selected value of the intensity to the sensed intensity to produce an intensity error signal determining time variations of the laser diode injection current from a value of the injection current that corresponds to a selected intensity and a selected wavelength of the optical signal output from the laser diode;

means for comparing the selected value of the wavelength to the sensed wavelength to produce a wavelength error signal;

means for determining time variations of the laser diode operating temperature from a value of the operating temperature that corresponds to a selected intensity and a selected wavelength of the optical signal output from the laser diode;

means for decoupling variations in the injection current as a function of time from variations in operating temperature as a function of time;

means for producing a temperature variation signal that is a function of the wavelength and intensity error signals;

means for producing an injection current variation signal that is a function of the wavelength and intensity error signals;

means for adjusting the temperature of the laser diode as a function of the temperature variation signal;

means for adjusting the injection current of the laser diode as a function of the injection current variation signal; and

means for adjusting the injection current and operating temperature independently of one another to maintain the intensity and wavelength of the signal output from the laser diode within predetermined limits of selected values thereof.

4,792,957

## LASER TEMPERATURE CONTROLLER

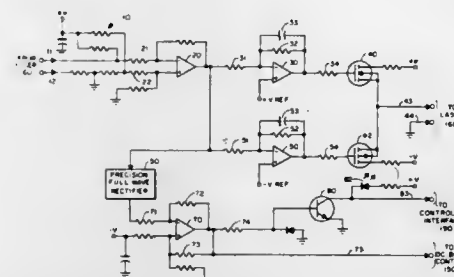
Miklos J. Kollanyi, Albuquerque, N. Mex., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Dec. 22, 1986, Ser. No. 944,044

Int. Cl.<sup>4</sup> H01S 3/04

U.S. Cl. 372-34

2 Claims



1. An arrangement for controlling the temperature of a light emitting device, said light emitting device including a temperature sensing element for sensing the temperature of said light emitting device and a thermoelectric unit which provides a source of cooling to said light emitting device when a current of a first direction is input to said thermoelectric unit and, a source of heat when a current of a second and opposite direction is input to said thermoelectric unit, said arrangement comprising:

bridge circuit means connected to said temperature sensing element, said bridge circuit means arranged to generate a first error signal representing a need for cooling said light emitting device when the temperature of said light emitting device rises above a set threshold, and a second error signal representing a need for heating said light emitting device when the temperature of said light emitting device falls below a set threshold;

conversion means including an input and an output, said conversion means input connected to said bridge circuit means, and said conversion means arranged to convert said first and said second error signals into a voltage signal;

first amplifier means connected to said conversion means output, and said first amplifier means further connected to a positive reference voltage source, and second amplifier means connected to said conversion means output, and said second amplifier means further connected to a negative reference voltage source, said first amplifier arranged to produce an output signal responsive to said conversion means voltage signal exceeding said first amplifier reference voltage, and said second amplifier means arranged to produce an output signal responsive to said conversion means voltage signal exceeding said second amplifier reference voltage; and,

first switch means connected to the output of said first amplifier means and to a source of electrical current of a first direction, and second switch means connected to the output of said second amplifier means and to a source of electrical current of a second direction, and in response to said first amplifier means output signal said first switch means is arranged to provide said electrical current of said first direction to said thermoelectric unit, whereby, said thermoelectric unit provides a source of cooling for said light emitting device, and alternately in response to said

second amplifier means output signal said second switch means is arranged to provide said electrical current of said second direction to said thermoelectric unit, whereby, said thermoelectric unit provides a source of heating for said light emitting device.

4,792,958

## SEMICONDUCTOR LASER WITH MESA STRIPE WAVEGUIDE STRUCTURE

Yasuo Ohba, Yokohama; Masayuki Ishikawa, Tokyo; Motoyuki Yamamoto, Kawasaki; Yukio Watanabe, Yokohama, and Hideto Sugawara, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

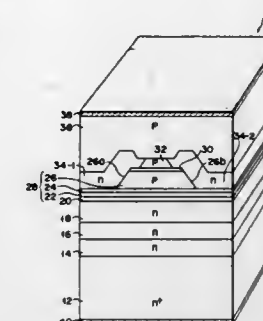
Filed Feb. 26, 1987, Ser. No. 19,332

Claims priority, application Japan, Feb. 28, 1986, 61-42933; Feb. 28, 1986, 61-42934

Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-45

14 Claims



1. In a semiconductor laser for emitting a continuous laser light having a wavelength within the visible wavelength range, comprising:

a semiconductor substrate of a first conductivity type of a III-V compound semiconductor material;

a first semiconductor cladding layer of the first conductivity type provided above said substrate;

an active layer of semiconductor material formed on said cladding layer;

a plurality of semiconductor cladding layers of a second conductivity type formed on said active layer, thereby forming a double hetero-structure;

a first semiconductive contact layer of the second conductivity type which is mesa-shaped and has slanted sides; and

conductive layer means for serving as terminal electrodes of said laser, the improvement wherein said cladding layers include;

a second semiconductor cladding layer formed directly on said active layer, and

a third semiconductor cladding layer formed on said second cladding layer, being mesa-shaped, and having slanted sides defining a waveguide channel, said first to third cladding layers being made of a specific III-V compound semiconductor material comprising at least indium, aluminum and phosphorus; the improvement comprising:

a second semiconductive contact layer provided between said third cladding layer and said first contact layer, having a band gap width which is smaller than that of said third cladding layer and yet greater than that of said first contact layer, for reducing the rate of band gap variation therebetween, and

a semiconductive, current-blocking layer covering the slanted sides of said third cladding layer and also the slanted sides of said first contact layer, said current-blocking layer being made of III-V compound semiconductor material.

4,792,959

## LASER DIODE

Gustav Mueller, Engelbert Hartl, and Martin Honsberg, all of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

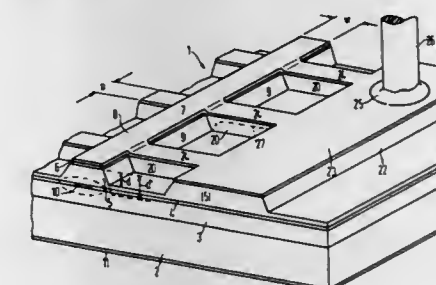
Filed Jan. 30, 1987, Ser. No. 8,752

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1986, 3604192

Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-46

17 Claims



1. An improved laser diode formed of a semiconductor-layer double hetero-layer structure on a substrate having an electrode, the double hetero-layer structure including a strip-shaped ridge less than 10  $\mu\text{m}$  wide and a contact coating wherein a third layer of the double hetero-layer structure is adjacent a second laser-active layer and between said laser-active layer and the contact coating, the third layer having a reduced thickness laterally of the ridge for wave guidance, the improvement comprising:

said contact coating being restricted to essentially an upper side of said strip-shaped ridge;

at least one lateral ridge extending laterally of said strip-shaped ridge;

a contacting surface being connected to said strip-shaped ridge by said at least one lateral ridge;

said third layer of said double hetero-layer structure being reduced to a thickness of between 0.4  $\mu\text{m}$  and 0  $\mu\text{m}$  laterally of said strip-shaped ridge and outside said at least one lateral ridge;

said second laser-active layer being present in a non-reduced thickness laterally of said strip-shaped ridge and outside of said at least one lateral ridge; and

an electrical connection between said contact coating of said strip-shaped ridge and said contacting surface formed on the upper side of said at least one lateral ridge.

4,792,960

## SEMICONDUCTOR LASER

Saburo Yamamoto, Nara; Hiroshi Hayashi, Kyoto; Taiji Morimoto, and Seiki Yano, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Apr. 23, 1985, Ser. No. 726,356

Claims priority, application Japan, Apr. 24, 1984, 59-83250; Apr. 24, 1984, 59-83251

Int. Cl.<sup>4</sup> H01S 3/19

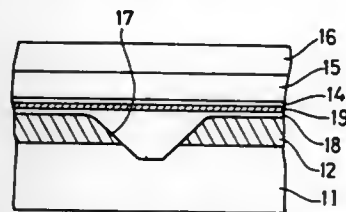
U.S. Cl. 372-46

7 Claims

1. In a semiconductor laser for laser oscillation at a short wavelength of visible light and of the type including a substrate having a striped channel in one surface thereof, an active layer for laser oscillation disposed on said one surface of said substrate above said striped channel, and a cladding layer containing Mg which is in contact with said active layer and disposed between said active layer and said one surface of said substrate; the improvement wherein a filler layer containing Mg is disposed between said one surface of said substrate



having said striped channel and one surface of said cladding layer, contacts said one surface of said cladding layer, and fills



said channel in said substrate, with the Mg content of said filler layer being less than that of said cladding layer.

4,792,961

## LASER DEVICES

Andrew J. Kearley, Oxford, England, assignor to Oxford Lasers Limited, Oxford, England

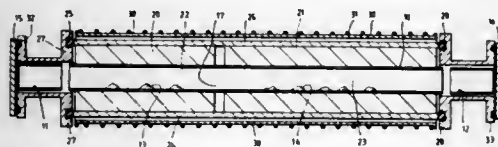
Filed Jul. 16, 1985, Ser. No. 755,421

Claims priority, application United Kingdom, Jul. 17, 1985, 8418169

Int. Cl.<sup>4</sup> H01S 3/14

U.S. Cl. 372-68

10 Claims



1. In a laser device for producing a lasing output from at least first and second materials each capable of lasing under different thermal conditions, said laser device having a resonant cavity and a pair of electrodes, the combination comprising

an evacuated discharge chamber interposed between said pair of electrodes, said chamber being divided into at least first and second regions having a common optical axis, said first material being located within said first region, said second material being located within said second region, and said first and second regions being separated by a cool zone comprising means for confining each of said materials within its respective region; and means for producing thermal conditions in said first and second regions which permit lasing of each of the materials located therein, the laser output of each of said first and second materials combining to form the laser output of said laser device.

4,792,962

## A RING-SHAPED RESONATOR TYPE SEMICONDUCTOR LASER DEVICE

Nobuyuki Miyachi, Tean; Hiroshi Hayashi, Kyoto; Osamu Yamamoto, and Saburo Yamamoto, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 23, 1986, Ser. No. 910,529

Claims priority, application Japan, Sep. 28, 1985, 60-215781

Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 372-94

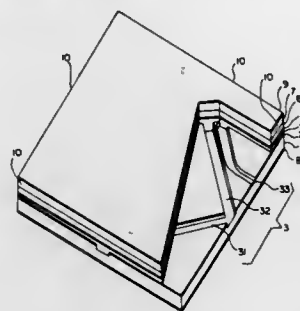
6 Claims

1. In a semiconductor laser device comprising a ring-shaped resonator,

said ring-shaped resonator is constituted by a square-shaped optical waveguide composed of four straight optical waveguide sides in which facing sides are positioned in a parallel manner and a reflecting mirror is formed at each of the four corners of said square-shaped optical waveguide in a manner to divide the intersection angle of two

each of said four sides at each of said four corners into two equal parts, and

a means for releasing laser light from said ring-shaped resonator is disposed near a part of at least one of said four



sides of said square-shaped optical waveguides, at least one portion of said means being optically coupled with at least one of said four sides of said square-shaped optical waveguides.

4,792,963

## SATELLITE CLOCK SYSTEM

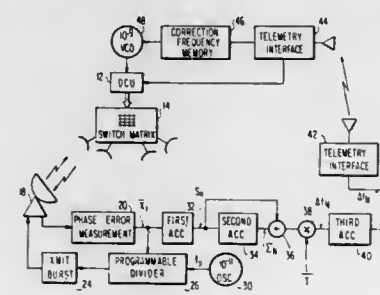
S. Joseph Campanella, and Thomas Inakal, both of Gaithersburg, Md., assignors to Communications Satellite Corporation, Washington, D.C.

Filed Jun. 14, 1982, Ser. No. 388,005

Int. Cl.<sup>4</sup> H03K 1/17; H04L 7/00

U.S. Cl. 375-109

14 Claims



1. A satellite clock system, comprising: means for transmitting metering bursts to a satellite; means responsive to re-transmitted bursts received from said satellite for determining an amount of error in an onboard clock of said satellite which occurs over a first interval of time which is a sidereal day multiple; and means for transmitting to said satellite a value for correcting said error in said onboard clock.

4,792,964

## ADAPTIVE JITTER CANCELLER HAVING SINUSOIDAL ACCENTUATOR AND JITTER PREDICTION FILTER

Atsushi Yoshida, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jan. 27, 1988, Ser. No. 148,984

Claims priority, application Japan, Jan. 28, 1987, 62-16119

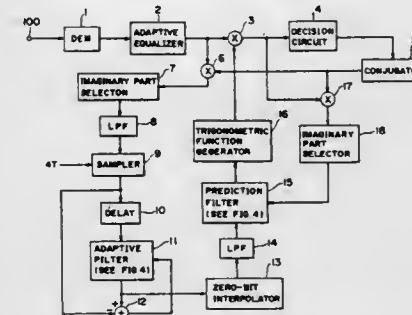
Int. Cl.<sup>4</sup> H04L 7/00

U.S. Cl. 375-118

4 Claims

1. An adaptive jitter canceller comprising: means for detecting a signal representative of the carrier phase of a received digitally modulated signal; first low-pass filter means for band-limiting said carrier phase signal to frequencies below  $1/(2NT)$ , where N is an

integer equal to or greater than two and T is a unit delay time; sampling means for sampling an output signal from said first low-pass filter means at intervals NT; digital sinusoidal accentuator means for accentuating an output signal from said sampling means at intervals NT; interpolator means for interpolating an output signal from said sinusoidal accentuator means and generating a series of samples spaced at intervals  $1/T$ ;



second low-pass filter means for band-limiting an output signal from said interpolator means to frequencies below  $1/(2NT)$ ; prediction filter means for receiving an output signal from said second low-pass filter means; and means for cancelling phase jitter contained in said received signal with an output signal from said prediction filter means.

4,792,965

## OSCILLATOR SYSTEM FOR DETECTING A SELECTED ONE OF A PLURALITY OF TUNED CIRCUITS

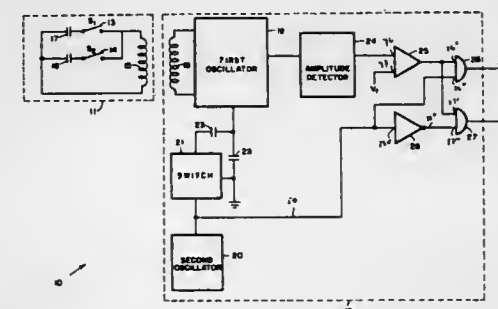
Harvey L. Morgan, 5580 Sarasota, Arlington, Tex. 76017

Filed Jan. 29, 1987, Ser. No. 8,486

Int. Cl.<sup>4</sup> H04B 5/00, 13/02; G08C 19/12

U.S. Cl. 375-6

9 Claims



1. A system for transmission of data across a gap without a physical connection across that gap comprising: passive circuit means including at least first and second series circuits each having inductive means, capacitive means connectable in series with said inductive means, and means for selectively completing each series circuit, and wherein said first series circuit is tuned to a first frequency of oscillation and said second series circuit is tuned to a second frequency of oscillation; active circuit means including a first oscillator means inductively coupled to said passive circuit means whereby completing a series circuit in said passive circuit means causes a change in the amplitude of the oscillation voltage of said first oscillator; said first oscillator means being operable at least at a first and second frequency of oscillation tuned to said first and second frequencies of oscillation of said passive circuit

means, and wherein said active circuit means includes means to selectively switch said first oscillator means between said first and second frequencies of oscillation; and, means for detecting a change in amplitude of said first oscillator means whereby information regarding whether a series circuit in said passive circuit means is completed may be transmitted from said passive circuit to said active circuit across a gap without a physical connection therebetween.

4,792,966

## ARRANGEMENT FOR SYNCHRONIZING A BYTE CLOCK DERIVED FROM A DATA BIT STREAM WITH A BYTE-ORIENTED PROCESSING CLOCK OF A TERMINAL EQUIPMENT

Adolf Ballweg, Germering, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

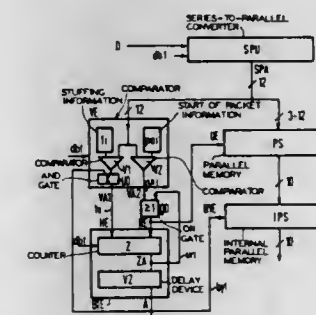
Filed Sep. 8, 1987, Ser. No. 93,596

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632842

Int. Cl.<sup>4</sup> H04L 7/00; H04J 3/06

U.S. Cl. 375-112

3 Claims



1. An arrangement for deriving a byte clock from a serial, packet transmission-oriented data bit stream of a ring-shaped network suitable for light waveguide data transmission and for synchronization of a derived byte clock with an internal processing clock of a terminal equipment connected to the ring-shaped network, in which at least one filler information comprising the same binary information at all bit positions is inserted into the data stream between the data packets provided with a respective start data packet information and the conversion of the serial data stream into a byte sequence adapted to the internal processing rate occurs, said arrangement comprising:

a clocked series-to-parallel converter for receiving the serial bit stream and converting the same into parallel information, said series-to-parallel converter comprising a plurality of parallel outputs; a parallel memory connected to said outputs of said series-to-parallel converter; a comparator connected to said outputs of said series-to-parallel converter and including first and second outputs, said comparator including means for stuffing filler information and start packet information for comparison with information at the output of said series-to-parallel converter; said comparator including a first comparator element for comparing said filler information with the output of said series-to-parallel converter and providing an output signal upon identification of a bit information different from the filler information; said comparator further comprising a second comparator element for comparing the output of the series-to-parallel converter with the start of packet information and opera-

able upon the recognition of the start of packet information to form a transfer or reset information;

an AND gate connected to the output of said first comparator element and clocked by a byte clock to provide a holding information at a first of said outputs of said comparator, said signal from said second comparator element being provided to a second output of said comparator;

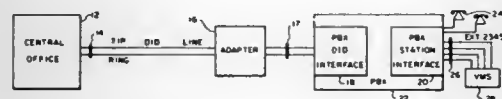
an OR gate connected to said second output of said comparator and clocked by a reset information;

a byte generating means clocked by the data bit clock and connected to said first output of said comparator and to said OR gate, said byte clock generating means including a counter connected to said first output of said comparator and to said OR gate and including a reset output connected to said OR gate, and a delay device connected to said counter, said delay device including an output providing said byte clock;

said parallel memory including a transfer input connected to and operable in response to the output of said OR gate; and

an internal parallel memory connected to said parallel memory and including a processing clock input connected to said delay device to receive said byte clock and operable in response to a byte clock to receive information stored in said parallel memory.

**4,792,967**  
**PBX DID AND E AND M TIE TRUNK INTEGRATION**  
**ADAPTER AND METHOD**  
**David J. Ladd, Los Gatos, and Stevan C. Smith, San Ramon,**  
**both of Calif., assignors to Opcom, San Jose, Calif.**  
**Filed Feb. 20, 1986, Ser. No. 831,177**  
**Int. Cl. H04M 3/50, 3/54, 7/14**  
**U.S. Cl. 379—67** **10 Claims**

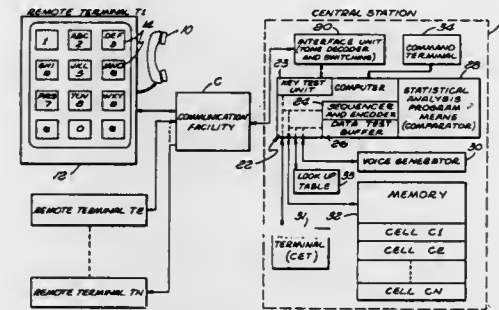


4. In a telephone system, including a central office, a private branch exchange (PBX), a signaling and voice connection between said central office and said PBX, a plurality of telephone extensions, and a voice message system, adapter apparatus comprising:

means interfacing between said connection and said PBX for detecting and saving a desired extension number of one of said telephone extensions sent by said central office from a calling party on said trunk line into said PBX, and means for permitting said calling party to be automatically connected to an assigned mailbox in said voice message system corresponding to said desired extension number when the desired telephone extension is busy or does not answer.

**4,792,968**  
**STATISTICAL ANALYSIS SYSTEM FOR USE WITH**  
**PUBLIC COMMUNICATION FACILITY**  
**Ronald A. Katz, Los Angeles, Calif., assignor to FDR Interactive Technologies, New York, N.Y.**  
**Continuation-in-part of Ser. No. 753,299, Jul. 10, 1985,**  
**abandoned. This application Feb. 24, 1987, Ser. No. 18,244**  
**Int. Cl.<sup>4</sup> H04M 11/06**

**U.S. Cl. 379—92** **12 Claims**

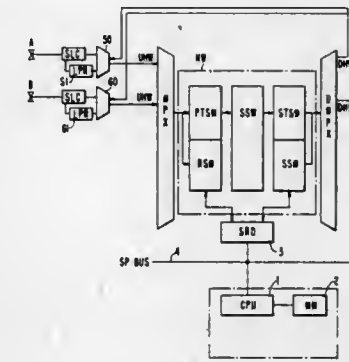


1. A statistical analysis process for data from remote sources and for use with a communication facility including remote terminal apparatus for individual callers, wherein said remote terminal apparatus may comprise a conventional telephone instrument including voice communication means and digital input means in the form of an array of alphabetic numeric buttons for providing data, said process including the steps of: interfacing said communication facility to provide voice signals and receive digital identification and answer signals representative respectively of identification data and answer data developed by said terminal apparatus under control of a caller; generating voice signals and supplying said voice signals to actuate said terminal apparatus, as to provide vocal operating instructions to a caller; providing sequence signals representative of sequence data indicating the time sequence of a call with reference to each of the calls from other callers; initiating files and storing, (1) answer data for specific callers as indicated by said digital answer signals, (2) sequence data as indicated by said sequence signals and (3) identification data as indicated by identification signals identifying callers; providing external data signals representative of external data distinct from answer data provided from said callers; and comparing said answer data from said callers and analyzing said answer data with said external data in combination to isolate a select subset of said callers.

4,792,969  
LINE CONDITION DATA COLLECTING SYSTEM FOR A  
TELEPHONE EXCHANGE

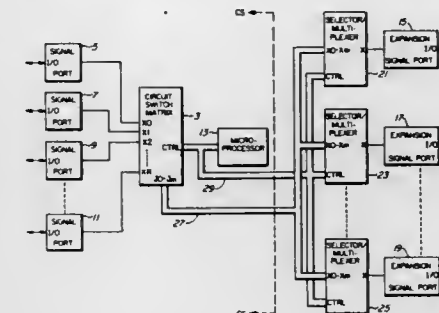
**Yuji Shibata, and Atsushi Fujihira, both of Kawasaki, Japan, assignors to Fujitsu Limited, Kawasaki, Japan**  
Filed Nov. 10, 1987, Ser. No. 118,946  
Claims priority, application Japan, Nov. 13, 1986, 61-270589;  
Nov. 13, 1986, 61-270590  
Int. Cl.<sup>4</sup> H04M 3/00  
U.S. Cl. 379—242 10 Claims  
1. A line condition data collection system for a telephone exchange, comprising:  
signal receiving memory means for holding line condition data of a plurality of lines; and  
processing means for periodically collecting the line condition data and for controlling the telephone exchange, comprising:  
central control means for executing commands control-

ling execution of said processing means, the commands including a readout command; and  
image memory means for sequentially reading the line condition data from said signal receiving memory means independently of the commands executed by said central control means, for storing validity flags, corresponding to the line condition data, indicating whether



the line condition data stored in said image memory means is valid and, in response to execution of the readout command by said central control means, for supplying specific line condition data stored in said image memory means to said central control means if a corresponding validity flag indicates that the specific line condition data is valid.

4,792,970  
EXPANSION PORT FOR USE IN A COMMUNICATION  
SYSTEM  
Gerald Molnar, Ottawa, Canada, assignor to Trillium Telephone  
Systems Inc., Canada  
Filed Mar. 17, 1986, Ser. No. 840,394  
Claims priority, application Canada, Nov. 20, 1985, 495812  
Int. Cl.<sup>4</sup> H04M 1/60; H04Q 3/54  
U.S. Cl. 379—284 13 Claims

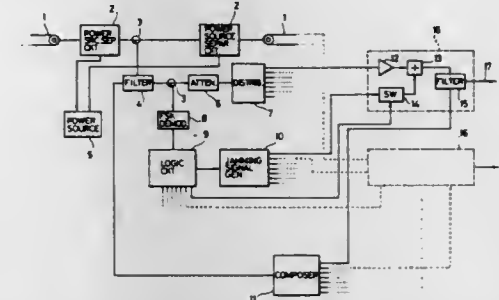


1. In a communication system comprised of a central controller for generating control signals, a common multiple line signal bus, and one or more switching circuits connected to said central controller and said signal bus for receiving said control signals and in response connecting a plurality of local signal ports to said signal bus for establishing bidirectional communication between said ports via said signal bus; an expansion port circuit comprised of a selector/multiplexer connected to respective lines of said signal bus, to said central controller and to a remote signal port, for receiving predetermined ones of said control signals and in response connecting said remote signal port to a predetermined one of said respective lines, whereby a communication path is established between said remote signal port and a predetermined one of said

ls plurality of local signal ports connected to said predetermined one of said respective lines.

**4,792,971**  
**SELECTIVE VIEWING CONTROL SYSTEM FOR CATV**  
**Hiroki Uemura, Tokyo, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**  
**Continuation of Ser. No. 736,058, May 20, 1985, abandoned.**  
**This application No. 13, 1987, Ser. No. 122,644**  
**Claims priority, application Japan, May 18, 1984, 59-101609**  
**Int. Cl.<sup>4</sup> H04N 7/167, 7/10**

**U.S. Cl. 380—7** **7 Claims**



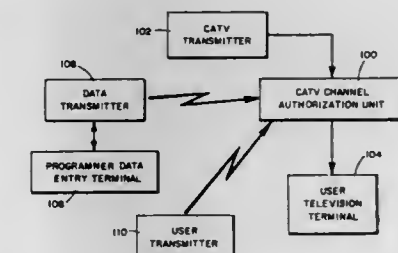
1. A CATV system having a central control center and a plurality of terminal units located at tap-off points for individual subscribers and coupled to said central control center via a signal distribution network, each of said terminal units comprising a selective viewing control system comprising:

controlled oscillator means operating in response to digital values transmitted from said central control center over said signal distribution network indicating channels to be jammed for producing a jamming signal containing only a repeating sequence of signal bursts at frequencies determined by said digital values and falling within respective channels to be jammed; and

means for adding said jamming signal to a television signal received from said central control center via said signal distribution network, a resulting sum signal being provided as an input signal to a respective subscriber's television set.

4,792,972  
**REMOTE PROGRAMMING OF CATV CHANNEL  
 AUTHORIZATION UNIT**  
 Alex M. Cook, Jr., Lilburn, Ga., assignor to Scientific-Atlanta,  
 Inc., Atlanta, Ga.

U.S. Cl. 380—20 13 Claims



1. Programming apparatus for remotely programming a cable television channel authorization unit of a cable television terminal with channel authorization data, the channel authori-



zation unit of the cable television terminal operable for selecting one channel from a predetermined configuration of authorized scrambled or unscrambled channels of a plurality of cable television channels transmitted to the terminal over a cable transmission system and responsive to user control via a space data communications link to the terminal, the programming apparatus comprising:

data entry means for producing the predetermined configuration representing said channels authorization data, the data entry means being responsive to programmer control;

transmission means responsive to said data entry means for transmitting the channel authorization configuration data via the space data communication link to the terminal and first data processing means having associated first memory means responsive to said data entry means for producing the channel configuration authorization data, said data processing means encoding the produced channel configuration data for transmission by the transmission means to a receiver means of the terminal; and

the receiver means of the terminal for receiving the channel configuration authorization data; said receiver comprising:

second data processing means having associated second memory means, the data processing means responsive to the channel configuration authorization data received at said receiver means for updating the channel authorization data recorded in said second memory means, the cable television channel authorization unit responsive to the data processing means providing a user with access to those channels prescribed by the recorded channel authorization data.

## 4,792,973

## SELECTIVE ENABLEMENT OF DESCRAMBLERS

Klein S. Gibbons; Jerrold A. Heller; Michael V. Harding, all of San Diego, and Robert D. Blakeney, II, Del Mar, all of Calif., assignors to M/A-COM Government Systems Inc. and Cable/Home Communication Corporation, both of San Diego, Calif.

Division of Ser. No. 618,917, Jun. 8, 1984, Pat. No. 4,712,238.

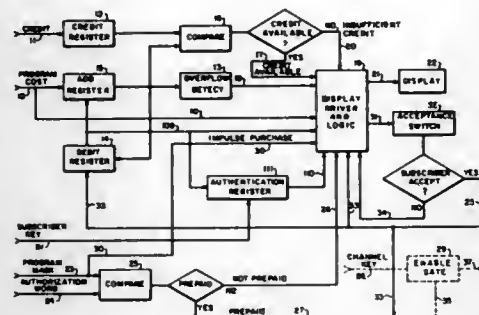
This application Dec. 4, 1987, Ser. No. 128,889

The portion of the term of this patent subsequent to Dec. 8, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> H04N 7/167, 7/00; H04L 9/00

U.S. Cl. 380—24

21 Claims



1. In a subscriber communication network, a system for enabling descrambling in a subscriber terminal of a received scrambled signal on an impulse-purchase basis, comprising: means in a central station for providing a credit signal indicating endlessly accumulated credit attributed to the subscriber terminal; means for sending said credit signal to the subscriber terminal; means in the subscriber terminal for processing a received cost signal indicating the charge for descrambling said given scrambled signal together with said credit signal to

determine whether the subscriber terminal has sufficient available credit to pay for descrambling of said scrambled signal, and for providing a credit-available signal when it is determined that there is sufficient credit available; means in the subscriber terminal responsive to the credit-available signal for indicating that the subscriber has the option of causing the scrambled signal to be descrambled on an impulse-purchase basis; means in the subscriber terminal that are enabled in response to the credit-available signal for accepting said option, and for providing an accepted signal upon said acceptance; and means in the subscriber terminal responsive to the accepted signal for enabling the scrambled signal to be descrambled.

## 4,792,974

## AUTOMATED STEREO SYNTHESIZER FOR AUDIOVISUAL PROGRAMS

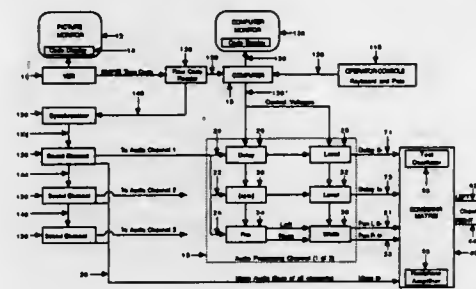
Frederic I. Chace, 1746 N. Courtney, Los Angeles, Calif. 90046

Filed Aug. 26, 1987, Ser. No. 89,507

Int. Cl.<sup>4</sup> H04S 1/00

U.S. Cl. 381—1

41 Claims



1. Automated stereo synthesizer apparatus for use with monaural audiovisual programs, comprising: audio playback means for producing monaural audio signals from an audio portion of a monaural audiovisual program; audio processing means for converting said monaural audio signals into stereo audio signals in response to control signals; video code means for generating video code signals correlated with a video portion of said audiovisual program; and control means responsive to said video code signals for generating said control signals which regulate the audio processing unit, whereby said stereo audio signals produced by said audio processing means are synchronized with said video portion of said audiovisual program.

## 4,792,975

## DIGITAL SPEECH SIGNAL PROCESSING FOR PITCH CHANGE WITH JUMP CONTROL IN ACCORDANCE WITH PITCH PERIOD

Kent W. MacKay, San Bruno, Calif., assignor to The Variable Speech Control ("VSC"), Santa Clara, Calif.

Continuation of Ser. No. 500,633, Jun. 3, 1983, abandoned. This application Mar. 10, 1987, Ser. No. 23,905

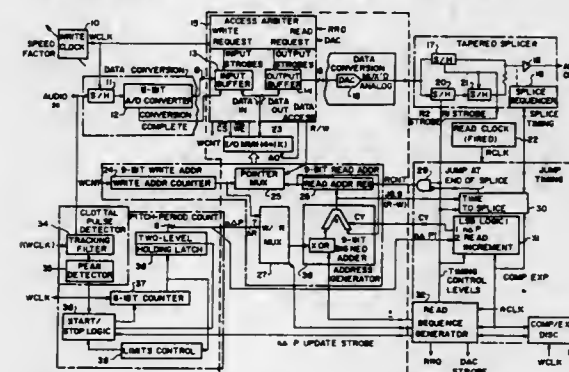
Int. Cl.<sup>4</sup> G10L 1/00

U.S. Cl. 381—34

8 Claims

1. Apparatus for pitch conversion of an audio signal comprising: means for deriving sequential samples of said audio signal and converting said samples into digital signals; a memory for storing said digital signals; means for sequentially writing said digital signals into said memory at a first fixed writing rate; means for reading out, in the same sequential order, said

digital signals stored in said memory at a second rate different from said first rate, said second rate being selected to produce a desired pitch conversion; and means for modifying the reading at said second rate such that the average reading rate approximates said first fixed writing rate comprising: means for monitoring the address differential in said memory at which said writing and reading is taking place,



means for determining the pitch period P of said audio signal, and means for jumping the reading address as said differential becomes larger than a predetermined function of pitch period, said jump being in a direction to reduce said differential.

## 4,792,976

## PATTERN RECOGNIZING DEVICE WITH PATTERN MATCHING IN SLANT PARALLELOGRAMMIC BLOCKS OF WIDTHS DEPENDENT ON CLASSIFIED REFERENCE PATTERN LENGTHS

Masao Watari, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

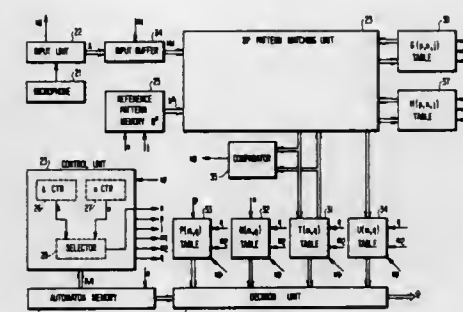
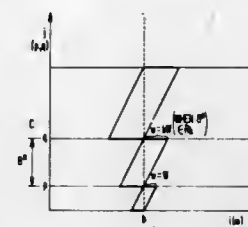
Filed Dec. 17, 1985, Ser. No. 809,968

Claims priority, application Japan, Dec. 19, 1984, 59-267830

Int. Cl.<sup>4</sup> G01L 1/00

U.S. Cl. 381—43

4 Claims



1. In a device for recognizing an input pattern which represents input words continuously spoken according to a finite state grammar and has an input pattern length consisting of a

plurality of frames consecutively arranged along a first time axis, said device comprising:

memory means for memorizing first through N-th reference patterns representative of first through N-th reference words, respectively, an n-th one of said reference patterns having an n-th reference pattern length measured in terms of said frames, where N represents a predetermined natural number and n represents a number between one and N; concatenating means for concatenating said reference patterns into a plurality of concatenations, each concatenation consisting of selected reference patterns which are selected from said first through said N-th reference patterns according to said finite state grammar and are arranged along a second time axis that is orthogonal to said first time axis;

matching means for pattern matching said input pattern with said concatenations in slant parallelogrammic blocks to provide dissimilarity measures between said input pattern and the respective concatenations, each block having a predetermined slope relative to said first time axis and a width and a height which are parallel to said first and said second time axes and equal to a selected number of the frames and to the reference pattern length of each selected reference pattern of each concatenation; and deciding means for deciding a minimum of said dissimilarity measures to recognize said input pattern as one of said concatenations that is pattern matched to said input pattern to provide said minimum of the dissimilarity measures;

the improvement wherein;

said memory means is for memorizing said first through said N-th reference patterns with said first through said N-th reference patterns classified into first through K-th classes according to the first through the N-th reference pattern lengths where K represents a preselected natural number, a k-th class comprising at least one of said first through said N-th reference patterns where k represents a variable natural number variable for said first through said K-th classes;

said matching means being for pattern matching said input pattern with said concatenations to provide said dissimilarity measures at each block in consideration of said width and said predetermined slope and the variable natural number of one of said classes that comprises said each selected reference pattern.

## 4,792,977

## HEARING AID CIRCUIT

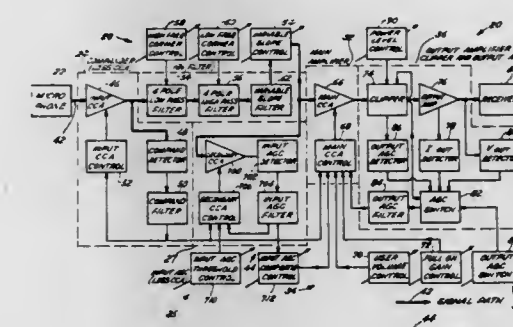
James R. Anderson, Chicago, and Richard Brander, Cicero, both of Ill., assignors to Beltone Electronics Corporation, Chicago, Ill.

Filed Mar. 12, 1986, Ser. No. 838,924

Int. Cl.<sup>4</sup> H04R 25/00, 3/04; H03G 3/20, 11/04

U.S. Cl. 381—68.4

13 Claims



1. A hearing aid comprising, in combination:

a microphone for receiving an input signal and providing a microphone signal;  
 a filter for receiving and shaping said microphone signal and providing a filtered signal, said filter including a four pole adjustable corner lowpass filter in cascade with an adjustable slope filter;  
 an amplifier for receiving said filtered signal and responsively providing an amplified signal; and  
 a receiver for receiving said amplified signal and responsively providing a sound signal.

4,792,978

## PLANAR LOUDSPEAKER SYSTEM

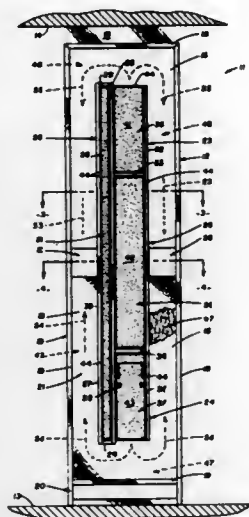
Stanley L. Marquis, 2001 Carbondale Rd., Plymouth, Calif. 95669

Filed Aug. 28, 1987, Ser. No. 90,738

Int. Cl.<sup>4</sup> H04R 7/18

U.S. Cl. 381-203

14 Claims



1. A planar loudspeaker system comprising:

- an elongated, substantially planar enclosure, having a front wall and a parallel rear wall, said front and rear walls being spanned by peripheral walls;
- an elongated, planar tweeter diaphragm;
- upper and lower planar woofer diaphragms;
- diaphragm housing means within a median longitudinal portion of said enclosure defining an elongated aperture in said front wall, said diaphragm housing means including:
  - a tweeter housing along one long side of said aperture, said tweeter housing having closed side walls extending forwardly from said rear wall, and having a tweeter opening adjacent said front wall; and
  - upper and lower woofer housings along the other long side of said aperture, said upper and lower woofer housings having side walls extending forwardly from said rear wall, and having a respective upper woofer opening and a lower woofer opening adjacent said front wall;
- upper and lower woofer labyrinths, defined by the volume exterior to said diaphragm housing means and interior to said planar enclosure;
- upper and lower woofer vents within said respective side walls of said upper and lower woofer housings, said woofer vents being in communication with a respective portion of said upper and lower woofer labyrinths;
- a pair of woofer labyrinth ports in the median portion of said front wall, on opposing sides of said elongated aperture, said labyrinth ports being in communication with the atmosphere;
- means for mounting said tweeter diaphragm, and said upper and lower woofer diaphragms, within a respective

said tweeter opening, upper woofer opening, and lower woofer opening;  
 i. cooperating coil and magnet means, interposed between said diaphragm housing means and said tweeter and woofer diaphragms, for driving said diaphragms in fore and aft piston movement in response to an electrical signal impressed upon said coil means.

4,792,979

## METHOD OF AND APPARATUS FOR CORRECTING GRADATION OF IMAGE REPRESENTED BY IMAGE DATA

Akihiro Nomura, Osaka, and Yasuo Karasu, Kyoto, both of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Kyoto, Japan

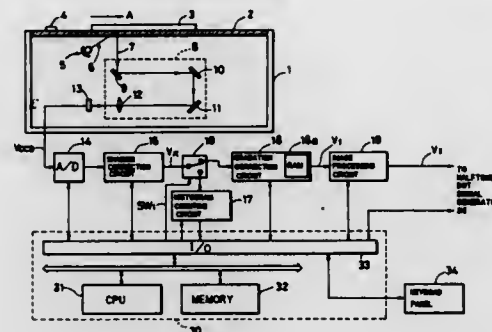
Filed Aug. 6, 1987, Ser. No. 82,334

Claims priority, application Japan, Aug. 8, 1986, 61-187379

Int. Cl.<sup>4</sup> G06K 9/36

U.S. Cl. 382-54

10 Claims



1. A method for correcting the gradation of an image comprising the steps of:

- preparing a standard gradation correction curve expressing an arbitrarily defined gradation correction rule;
- receiving image data obtained by reading an image of an original with a photoelectric scanning mechanism;
- statistically obtaining a density distribution curve of said image on the basis of said image data;
- obtaining a first gradation correction curve on the basis of a said standard gradation correction curve;
- obtaining a second gradation correction curve on the basis of said density distribution curve of said image;
- obtaining a third gradation correction curve by composing said first and second gradation correction curves at an arbitrary ratio; and
- correcting said gradation of said image through said third gradation correction curve to obtain a gradation corrected image.

4,792,980

## IMAGE TRANSMISSION SYSTEM

Katsuchi Shimizu, Kunitachi, Japan, assignor to Canon Kabushiki Kaisha, Japan

Continuation of Ser. No. 849,824, Apr. 9, 1986, abandoned, which is a division of Ser. No. 391,867, Jan. 24, 1982, abandoned. This application Jan. 9, 1987, Ser. No. 5,393

Claims priority, application Japan, Jul. 1, 1981, 56-103785; Jul. 1, 1981, 56-103786; Jul. 1, 1981, 56-103787; Jul. 1, 1981, 56-103788; Jul. 1, 1981, 56-103789; Jul. 1, 1981, 56-103790; Jul. 1, 1981, 56-103791

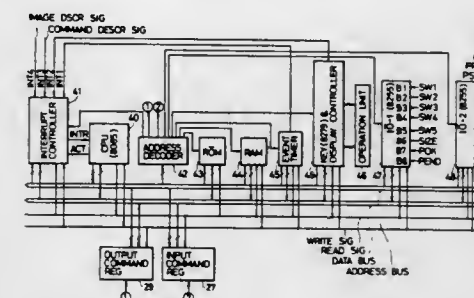
Int. Cl.<sup>4</sup> G06K 9/00

U.S. Cl. 382-56

18 Claims

1. An image processing system comprising:  
 a plurality of reading means, each operable for reading an original image and for generating an image signal representative of said original image;

a plurality of image processing means each operable for processing an image signal; and  
 transmitting means for transmitting the image signal obtained from one original image reading by any one of said reading means to said plurality of image processing means; said system being constructed to perform an image processing operation in which any selected one of said reading



means is used for original reading, said plurality of image processing means being capable of performing image signal processing respective different numbers of times, and said selected one of said reading means performing original image reading a number of times corresponding to the maximum of the number of times of image signal processing to be performed by individual ones of said plurality of image processing means.

4,792,981

## MANIPULATION OF RUN-LENGTH ENCODED IMAGES

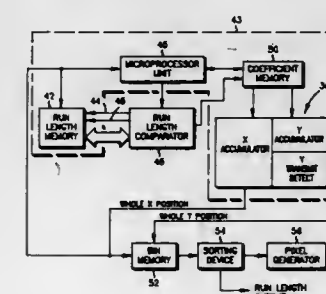
Benjamin M. Cahill, III, Madison, and Jeffrey R. Hedden, Randolph, both of N.J., assignors to AM International, Inc., Chicago, Ill.

Filed Sep. 21, 1987, Ser. No. 99,137

Int. Cl.<sup>4</sup> G06K 9/30, 9/48

U.S. Cl. 382-56

14 Claims



1. A method of characterizing run-length encoded data for a transformed form of an outline of an image constructed from a plurality of scan lines of pixels on a pixel grid, comprising the steps of:

- characterizing color changes for each of said scan lines of said image using visible and invisible unit vectors, an invisible unit vector disposed between the pixels of like color and a visible unit vector disposed between the pixels of unlike color, said visible unit vectors constituting said outline;
- determining scan line crossover information for each of said characterized scan lines after transformation of said image outline;
- storing said crossover information in memory bins; and
- sorting said crossover information and calculating said run-length encoded data using said crossover information stored in said memory bins.

4,792,982

## INTEGRATED RETINA HAVING A PROCESSORS ARRAY

Francis Devos, Les Ulis; Patrick Garda, Thiais, and Bertrand Zavidovique, Paris, all of France, assignors to Centre National de la Recherche Scientifique, Paris, France

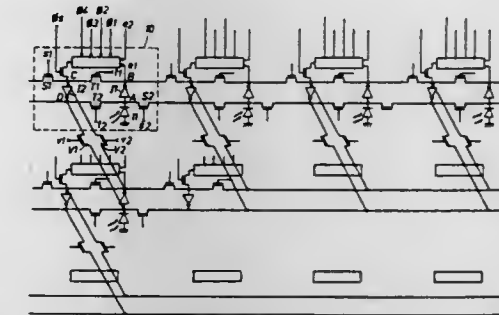
Filed Jun. 17, 1986, Ser. No. 875,078

Claims priority, application France, Jun. 18, 1985, 85 09256

Int. Cl.<sup>4</sup> G06K 9/20, 9/28

U.S. Cl. 382-68

6 Claims



1. An integrated retina including an array of cells formed on a substrate, wherein each cell comprises:

- a photosensitive element for supplying an analog signal representative of the value of one element of an image formed on the retina;
  - converting means connected to the photosensitive element for converting said analog signal into binary information;
  - storage means connected to said converting means for storing said binary information; and
  - an elementary processor formed on said substrate and connected to said storage means of the cell;
- the storage means being arranged as a bidimensional array of shift registers to allow the transfer of the binary information from one cell to any neighboring cell;
- the shift registers and elementary processors being connected in parallel to control inputs thereto so as to control
- the acquisition of an image by simultaneous storing of the binary information representing the values of the elements of said image;
  - the simultaneous transfer of binary information from each cell to any neighboring cell;
  - the realization of simultaneous and parallel processings by said processors on the stored binary information; and
  - the write-in of results of (iii) in the storage means.

4,792,983

## BAG OR LIKE PACKING HAVING AND INVIOLEABLE CLOSURE

André Allegre, Assignors: Decomatic S.A., Dardilly, France

Filed Jul. 22, 1987, Ser. No. 76,438

Claims priority, application France, Jul. 22, 1986, 86 10612

Int. Cl.<sup>4</sup> B65D 33/25

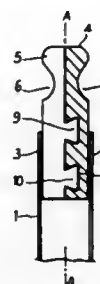
U.S. Cl. 383-13

8 Claims

1. A bag or like packing of flexible material, in particular a plastics material, said bag comprising an opening having inner edge portions and a closure means for the bag for preventing opening of the bag by manual force, said closure means comprising, respectively fixed to the two inner edge portions of the opening of the bag and substantially throughout the length of said opening, two bars of plastics material having complemen-



tary sections capable of mutual interpenetration responsive to the application of force so as to produce an assembly wherein



the bars act one against the other to prevent separation thereof by the application of manual force.

4,792,984

# **RADIO CHANNEL CONTROL METHOD FOR MOBILE COMMUNICATION SYSTEM**

Yoshitake Matsuo, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

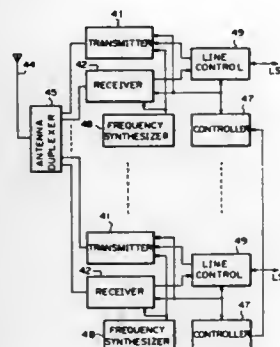
Continuation of Ser. No. 824,332, Jan. 30, 1986, abandoned. This application Apr. 12, 1988, Ser. No. 183,341

Claims priority, application Japan, Jan. 31, 1985, 60-17369

Int. Cl.<sup>4</sup> H04Q 7/00

U.S. Cl. 455—32

3 Claims



1. A radio channel control method for a mobile communication system in which a plurality of base stations share a plurality of channels and each selects any of the channels for setting up a call with any of a plurality of mobile stations independently of the other base stations, said radio channel control method comprising the steps of:

- at a time of channel selection, scanning at a base station all the channels to measure the reception field strength of each of the channels and, thereby, to check whether or not an electromagnetic wave is being emitted;
- selecting at said base station one channel out of the channels which show no reception sensitivity while excluding the channels which show reception sensitivity;
- transmitting from said base station to at least one of said mobile stations a pilot signal on the selected channel;
- awaiting reception at said at least one mobile station of said pilot signal and, in response to reception of said pilot signal, transmitting from said mobile station on the selected channel a signal for call origination;
- awaiting reception at said base station of a call origination signal over said selected channel; and
- repeating the performance of steps (a), (b), (c), (d) and (e) if, during the predetermined period of time, a correct call

origination signal over said selected channel is not received at said base station.

4,792,985

# **TRANSMITTERS AND SYSTEMS FOR TONE-IN-BAND TRANSMISSION**

Joseph P. McGeehan, Cornham, and Andrew Bateman, Bath, both of United Kingdom, assignors to National Research Development Corporation, London, England

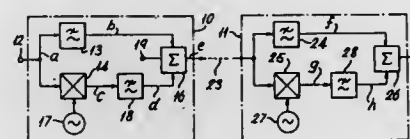
Filed Nov. 15, 1985, Ser. No. 798,801

Claims priority, application United Kingdom, Nov. 30, 1984, 8430319

Int. Cl.<sup>4</sup> H04B 1/76

U.S. Cl. 455—48

8 Claims



1. A method of providing a "notch" for a transparent tone-in-band signal, comprising the steps of: selecting a first frequency portion of a band of interest in the frequency spectrum;

operating on said band to provide a second frequency portion separated from said first portion by a notch in the frequency spectrum by frequency translation and selection of signals in said band by generating signals which are representative of at least one sideband, the frequency translation employing only one frequency translation step and providing a required frequency notch between the first and second portions, with the second portion then being one of the following:

- a lower part of the lower sideband of the translated portion,
- an upper part of the lower sideband of the translated portion, and
- a lower part of the upper sideband of the translated portion; and combining the first and second portions.

4,792,986

# **PORTABLE RADIO SYSTEM WITH EXTERNALLY PROGRAMMABLE UNIVERSAL DEVICE CONNECTOR**

Terry N. Garner, Lynchburg, and Ralph R. Sherman, Jr., Forest, both of Va., assignors to General Electric Company, Lynchburg, Va.

Filed Dec. 11, 1985, Ser. No. 807,645

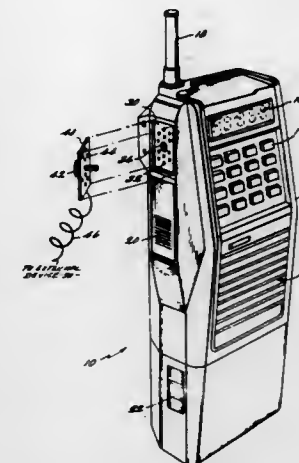
Int. Cl.<sup>4</sup> H04B 1/38

U.S. Cl. 455—89

21 Claims

8. A portable radio system comprising: a portable radio communications device having RF and audio circuits; said portable radio communications device including an externally accessible multi-point electrical connector; said portable radio communications device including an internal battery source of electrical energy and said multi-point electrical connector having at least one first connector point electrically connected to said battery through an active switch controlled to normally reside in an open condition thus presenting an externally accessible power source via said first connector point only when said active switch is controlled to a closed condition; and means for monitoring an electrical impedance externally

connected to at least one second connector point of said connector and for controlling said active switch to its



closed condition in response to detection of a predetermined impedance connected thereto.

4,792,987

# **ANTENNA COUPLING AMPLIFIER AND CONVERTER SYSTEM**

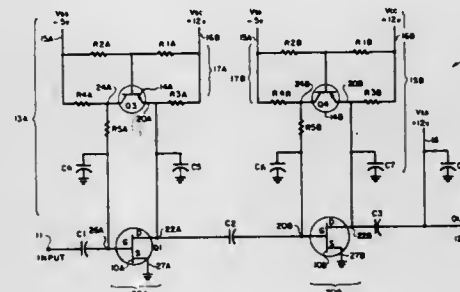
A. Ray Tumeo, San Diego, Calif., assignor to Starke Electronics, Inc., San Diego, Calif.

Filed Jan. 9, 1985, Ser. No. 689,935

Int. Cl.<sup>4</sup> H04B 11/18, 1/26; H03F 1/36, 3/04

U.S. Cl. 455—131

4 Claims



1. An amplifier and down converter system for coupling an antenna output to a receiver, comprising:

- a low-noise receiving amplifier circuit for amplifying the antenna signal above background noise, comprising at least one microwave frequency amplifier having an input for receiving the microwave signal and an output for providing an amplified microwave output signal, and an automatic feedback means connected across the input and output of the amplifier to reverse bias the amplifier into an optimum operating range, said feedback means comprising a low frequency response transistor having an emitter, a collector and a base, the transistor emitter being connected to the amplifier output and the transistor collector being connected to the amplifier input, and power supply means for providing a bias voltage to the transistor base; and

a separate down converter circuit connected to the output of the amplifier circuit, the down converter circuit comprising means for splitting the input signal into two parts 90 degrees out of phase with one another, tunable local oscillator means for providing an adjustable microwave frequency signal, means for splitting the adjustable microwave frequency into two parts 90 degrees out of phase with one another, means for combining each part of the input signal with a respective part of the adjusted microwave frequency signal, means for recombining each part of the mixed signal so as to reject image signals, and means for connecting the resultant signal to a receiver.

4,792,988

# **RADIO RECEIVING CIRCUIT WITH A SEARCH TUNING MECHANISM**

Tamaki Ohashi, Tokyo, and Toshiyuki Matsuda, Kawasaki, both of Japan, assignors to Nihon Technical Kabushiki Kaisha, Tokyo, Japan

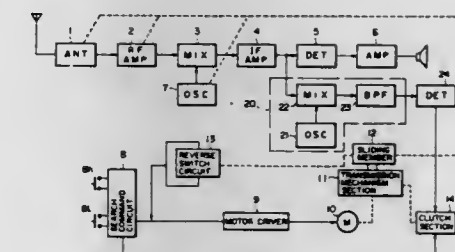
Filed Mar. 27, 1987, Ser. No. 31,949

Claims priority, application Japan, Mar. 28, 1986, 61-68480

Int. Cl.<sup>4</sup> H04B 11/32, 11/16

U.S. Cl. 455—162

14 Claims



1. A radio receiving circuit with a search tuning mechanism, said radio receiving circuit including an intermediate frequency amplifier circuit, said search tuning mechanism having an inertia which determines an inertia travelling time during which the tuning mechanism travels after suspension of a drive force applied thereto, and including a control circuit which receives a part of an output signal from said intermediate frequency amplifier circuit, said control circuit comprising:

- an oscillator circuit for producing an oscillating output oscillating at a center frequency in a pass band of said intermediate frequency amplifier circuit;
- a mixing circuit for mixing and detecting the oscillating output of said oscillating circuit and the output signal of said intermediate frequency amplifier circuit; and
- a setting circuit which receives an output signal of said mixing circuit and which presets a predetermined amount of variation of frequency or predetermined shift width of frequency relative to the center frequency within the pass band of said intermediate frequency amplifier circuit so that said setting circuit produces an output signal effective to intermittently suspend the application of the drive force according to the output signal of said mixing circuit, said amount of variation of frequency or said shift width of frequency preset by said setting circuit corresponding to the inertia travelling time of said search tuning mechanism.

4,792,989

# **TUNER CIRCUITS AND VOLTAGE GENERATORS THEREFOR**

Nicholas P. Cowley, Wiltshire, England, assignor to Plessey Overseas Limited, Ilford, England

Filed Feb. 24, 1987, Ser. No. 18,216

Claims priority, application United Kingdom, Feb. 25, 1986, 8604652

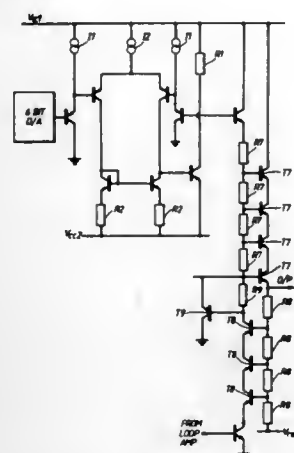
Int. Cl.<sup>4</sup> H04B 1/26

U.S. Cl. 455—195

6 Claims

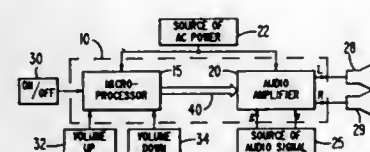
1. A tuner circuit comprising: a mixer having a reference input, a signal input and a signal output; a local oscillator connected to the reference input of said mixer;

- a varactor diode in the local oscillator, for controlling the frequency thereof; and,
- a synthesiser, including high frequency low voltage process components, responsive to said local oscillator, and, arranged to supply a control voltage to said varactor diode; and
- a voltage generator, integrated as part of said synthesiser in a common semiconductor chip, which voltage generator includes: a first series of resistive elements;
- a first series of transistors, the control electrodes of which transistors are connected to corresponding ones of said resistive elements;



- a second series of transistors connected in series with said first series of resistive elements; and,
- a second series of resistive elements connected in series with said first series of transistors, respective resistive elements thereof being connected to respective control electrodes of said second series of transistors, the last resistive element thereof being connected to receive a reference voltage; whereby, said control voltage is made available at, or near the connection between said first series of transistors and said second series of resistive elements.

**4,792,990**  
**AUDIO AMPLIFIER WITH PROGRAMMED VOLUME CONTROL**  
 Billy W. Beyers, Jr., Greenfield, Ind., assignor to RCA Licensing Corporation, Princeton, N.J.  
 Filed Feb. 27, 1987, Ser. No. 19,856  
 Int. Cl.<sup>4</sup> H03G 3/00  
 U.S. Cl. 455-234 1 Claim

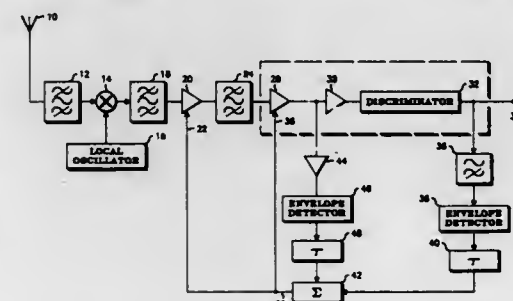


1. An audio signal processing system comprising: memory means for storing a signal representative of a gain for determining the volume of reproduced sound information;
- an audio amplifier having a signal input for receiving an audio signal containing sound information to be reproduced, a signal output for providing an amplified audio signal to sound reproducing means, and a controllable signal gain for determining the volume of reproduced sound information, in response to a first stored gain corresponding to a first signal level of said amplified audio

signal immediately prior to said amplifier being deactivated and a subsequent second gain corresponding to a second signal level of said amplified audio signal immediately prior to said amplifier being reactivated; and control means for providing a control signal to said audio amplifier for automatically controlling said signal gain and thereby said volume so that, when said amplifier is reactivated, wherein to prevent said system from developing an excessive volume level

said control signal automatically causes said second gain to be substantially equal to said first gain if said first gain is less than a predetermined preset gain value; and said control signal automatically causes said second gain to be substantially equal to said predetermined preset gain value, if said first gain is greater than said predetermined preset gain value.

**4,792,991**  
**FM RECEIVER HAVING IMPROVED AUDIO QUALITY IN RESPONSE TO RAYLEIGH FADED RECEIVED SIGNALS**  
 Orville M. Eness, Park Ridge, Ill., assignor to Motorola, Inc., Schaumburg, Ill.  
 Continuation of Ser. No. 847,964, Apr. 3, 1986, abandoned. This application Nov. 18, 1987, Ser. No. 124,409  
 Int. Cl.<sup>4</sup> H04B 1/16, 1/10  
 U.S. Cl. 455-210 21 Claims



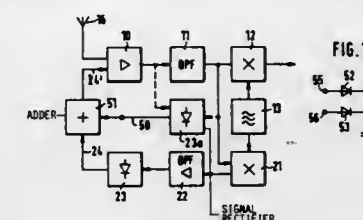
1. In an FM receiver having an improved audio output response to Rayleigh faded received signals including means for amplifying a received FM signal, means for limiting said amplified FM signal, and discriminator means for converting the limited FM signal into an audio signal, the improvement comprising:
- means for generating a control signal corresponding to the average magnitude of the received signal; and
- AGC means for controlling the magnitude of amplification provided by said amplifying means so that a predetermined level of limiting by said limiting means is maintained in response to said control signal, said predetermined level of limiting being within the range of 5-20 dB of limiting.

**4,792,992**  
**RADIO RECEIVER**  
 Heinz Rinderle, Heilbronn, Fed. Rep. of Germany, assignor to Telfunken Electronic GmbH, Heilbronn, Fed. Rep. of Germany  
 Continuation of Ser. No. 807,343, Dec. 9, 1985, abandoned. This application Mar. 15, 1988, Ser. No. 170,630  
 Claims priority, application Fed. Rep. of Germany, Dec. 24, 1984, 3447284  
 Int. Cl.<sup>4</sup> H04B 1/16  
 U.S. Cl. 455-239 33 Claims

1. A radio receiver for receiving an input signal in a first frequency range, which input signal contains a desired signal and undesired disturbance signals, said receiver comprising:

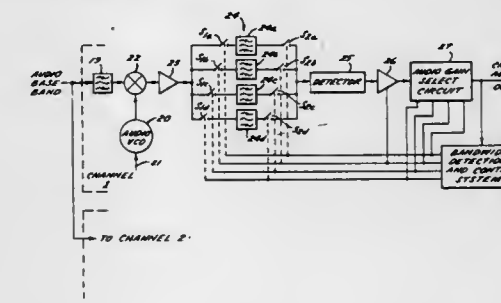
a receiving section including an input stage for receiving the input signal and a first mixer connected to said input stage for converting the input signal into an output signal in a second frequency range which is different than the first frequency range; and

apparatus including: signal distortion means connected for generating a signal which is a distorted version of the input signal having a degree of distortion greater than that



of the output signal; signal deriving means connected to said signal distortion means for deriving a control signal from the distorted signal; and signal conducting means connected for supplying the control signal to said input stage of said receiving section for varying the amplitude of the input signal in a manner to at least reduce the interference of the disturbance signals contained in the input signal.

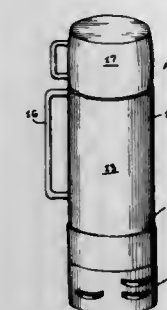
**4,792,993**  
**TVRD RECEIVER SYSTEM WITH AUTOMATIC BANDWIDTH ADJUSTMENT**  
 John Y. Ma, Milpitas, Calif., assignor to Capetronic (BSR) Ltd., Kowloon, Hong Kong  
 Filed Oct. 30, 1985, Ser. No. 792,783  
 Int. Cl.<sup>4</sup> H03J 1/16  
 U.S. Cl. 455-266 16 Claims



1. In a TVRO receiver for receiving signals broadcast over a plurality of channels with varying bandwidths and having a tuner producing output signals corresponding to selected ones of said received signals and having bandwidths which vary from channel to channel, the improvement comprising bandpass filtering means receiving said output signals and having a controllably adjustable pass band,
- bandwidth detecting means for receiving the output signals passing through said filtering means, said detecting means being responsive to a current output signal corresponding to the channel being received for producing a control signal indicative of the extent of deviation of the bandwidth of the current output signal beyond the current pass band of said filtering means, said control signal being substantially independent of the signal level of broadcast signals received by said tuner, and
- control means responsive to said control signal for adjusting the pass band of said filtering means to accommodate the bandwidth of the current output signal corresponding to the channel being received, if the bandwidth deviation of

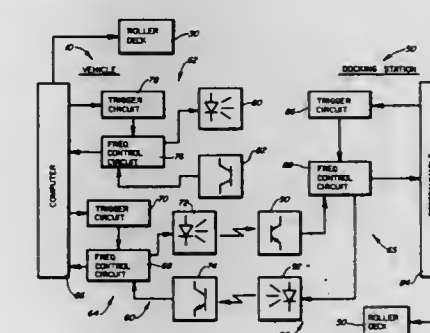
said current output signal exceeds a predetermined threshold value.

**4,792,994**  
**RADIO EQUIPPED THERMOS**  
 Richard A. Aylward, 10 Green Acres Dr., Mansfield, Mass. 02048  
 Filed Nov. 6, 1987, Ser. No. 117,723  
 Int. Cl.<sup>4</sup> H04B 1/06; H05K 11/00; A47B 5/00; A45C 11/20  
 U.S. Cl. 455-344 3 Claims



1. A combined apparatus comprising:
- a standard thermos member including a generally cylindrical thermos body having a base element wherein the base element comprises a flanged portion formed on the lower end of the thermos body; and,
- a radio member including a generally cylindrical housing element wherein the top portion of the radio housing element is releasably secured to the base element of the said thermos body; and, the radio member is provided with releasable securing means which cooperate with the base element of said thermos member; wherein the said thermos body is fabricated from magnetically attractive material, and the releasable securing means comprise a magnetic disk attached to the top portion of the radio housing element.

**4,792,995**  
**BIDIRECTIONAL ROLLER DECK CONTROL FOR A SELF GUIDED VEHICLE**  
 Joseph J. Harding, Mentor, Ohio, assignor to Caterpillar Industrial Inc., Mentor, Ohio  
 Filed Aug. 19, 1987, Ser. No. 87,048  
 Int. Cl.<sup>4</sup> H04B 9/00  
 U.S. Cl. 455-606 10 Claims



1. An apparatus for controlling the operation of a powered conveyor of a self guided vehicle in coordination with a powered conveyor of a docking station, the vehicle and docking



station conveyors each driven by an electric motor, the apparatus comprising:

first and second radiant energy emitting means for producing pulsed radiant energy in response to receiving respective pulse control signals, the first and second radiant energy emitting means being mounted on opposing sides of the vehicle and directed generally outward from the vehicle;

third radiant energy emitting means for producing pulsed radiant energy in response to receiving a pulse control signal, the third radiant energy emitting means being mounted on the docking station and generally directed outward from the docking station;

first and second radiant energy detecting means for producing electrical signals responsive to receiving radiant energy from the third radiant energy emitting means, the first and second radiant energy detecting means being mounted on opposing sides of the vehicle and directed generally outward from the vehicle;

third radiant energy detecting means for producing electrical signals responsive to receiving radiant energy from one of the first and second radiant energy emitting means, the third radiant energy detecting means being mounted on the docking station and directed generally outward from the docking station;

vehicle control means for delivering pulse control signals to the first and second radiant energy emitting means, monitoring the first and second radiant energy detecting means for a preselected period of time, and controlling the direction of energization of the vehicle electric motor responsive to receiving an electrical signal from one of the first and second radiant energy detecting means;

docking station control means for delivering pulse control signals to the third radiant energy emitting means, monitoring the third radiant energy detecting means, and controlling the energization of the docking station electric motor responsive to receiving an electrical signal from the third radiant energy detecting means; and

load transfer means for loading onto the vehicle conveyor from the docking station conveyor at either side of the vehicle, and unloading from the vehicle conveyor onto the docking station conveyor at either side of the vehicle.

4,792,996

# INFORMATION MEDIUM FOR COMMUNICATING DATA AND/OR A SELECTABLE CONTROL TRANSFER PROGRAM BETWEEN THE MEDIUM END AND EXTERNAL DEVICE

Masumi Oyama, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

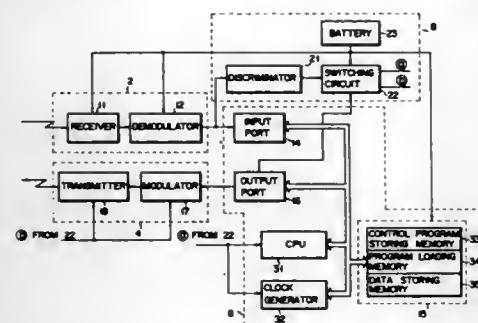
Filed Sep. 19, 1986, Ser. No. 909,326

Claims priority, application Japan, Sep. 27, 1985, 60-213712

Int. Cl.<sup>4</sup> H04B 9/00

U.S. Cl. 455-617

18 Claims



1. An information system which can correctly communicate with an external device having instruction information, said system comprising:

receiving means for receiving the instruction information from the external device;

transmitting means for transmitting transmission data input thereto, to the external device;

memory means for storing data, a transfer program, and a control program;

transfer control means for storing, as data, into said memory means the content in a data field of the instruction information received by said receiving means in a write mode in accordance with the stored transfer program, and for storing, as the transfer program, into said memory means the content in the data field in a program change mode in accordance with the stored control program; and

discriminating means coupled to said transfer control means and said transmitting means for discriminating an enabling code in an enabling code field of the instruction information received by said receiving means, and for selectively activating said transfer control means and said transmitting means in accordance with a result discriminated by said discriminating means.

4,792,997

# RECEIVER FOR OPTICAL DIGITAL SIGNALS WITH DARK CURRENT COMPENSATION

Hans N. Toussaint, and Jan Goerne, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

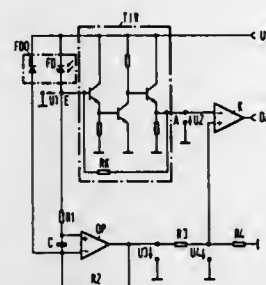
Filed Jun. 17, 1987, Ser. No. 62,518

Claims priority, application Fed. Rep. of Germany, Jun. 23, 1986, 3620931

Int. Cl.<sup>4</sup> H04B 9/00

U.S. Cl. 455-619

4 Claims



1. A receiver for optical digital signals, comprising:  
a transimpedance amplifier having an input connecting to an operating voltage via an active photodiode;  
an output of the transimpedance amplifier connecting to a first input of a comparator;  
an operational amplifier having a first input connected to said transimpedance amplifier input and a second input connected via an un-illuminated photodiode to said operating voltage;  
an output of the operational amplifier connecting through a voltage divider to a second input of said comparator; and  
said comparator connecting to an output whereby fluctuations in dark current occurring in the active photodiode are compensated.

4,792,998

# RECEIVER FOR OPTICAL DIGITAL SIGNALS HAVING DIFFERENT AMPLITUDES

Hans-Norbert Toussaint, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

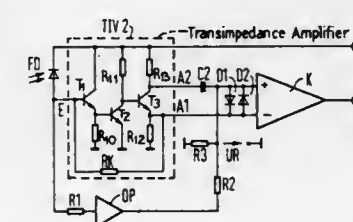
Filed May 12, 1987, Ser. No. 48,778

Claims priority, application Fed. Rep. of Germany, May 23, 1986, 3617331

Int. Cl.<sup>4</sup> H04B 9/00

U.S. Cl. 455-619

6 Claims



1. A receiver for optical digital signals having different amplitudes comprising, a transimpedance amplifier (TIV2) having an input, a first output and a second output, a signal at said first output being inverse to a signal at said input and said second output, a photodiode (FD) connected to the input (E) of said amplifier (TIV2), a comparator having an inverting and a non-inverting input, with the inverting input connected to the first output (A1) of said amplifier (TIV2), a capacitor (C2) connected between the second output (A2) of said amplifier (TIV2) and the non-inverting input of said comparator, a pair of diodes (D1, D2) connected in parallel and oppositely poled between said two inputs of said comparator (K) and a resistor (R2) connected to said non-inverting input of said comparator, said capacitor (C2) and said resistor (R2) forming a differentiating circuit; wherein a transistor (T3) forms the output stage of the transimpedance amplifier (TIV2) and said first output (A1) of said amplifier (TIV2) is taken from the emitter of said transistor (T3) and said second output (A2) of said amplifier (TIV2) is taken at the collector of said transistor.

4,792,999

# WAVELENGTH AGILE OPTICAL RECEIVER

George R. Stilwell, Jr., Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 20, 1987, Ser. No. 4,448

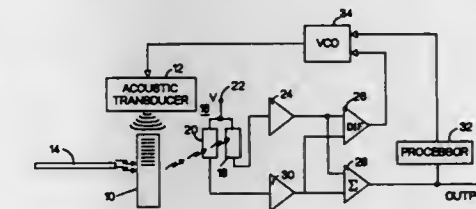
Int. Cl.<sup>4</sup> H04B 9/00

U.S. Cl. 455-619

8 Claims

1. A wavelength agile optical receiver for receiving a signal superimposed upon a carrier having a wavelength selectable from a set of wavelengths, said receiver including:  
a tunable grating in the path of an incoming signal, said grating have refractive characteristics dependent upon the value of an external drive signal;  
a split optical detector for receiving an optical signal re-

fracted from said grating, said detector having first and second output terminals for providing output signals;  
means for generating a drive signal having characteristics dependent upon a selected wavelength for tuning said grating to refract optical energy received at that wavelength onto said optical detector; and



means responsive to output signals from said split optical detector for adjusting the drive signal to fine tune the grating to follow slight changes in the wavelength of the received signal due to temperature changes or component aging.

4,793,000

# LIGHT SIGNAL RECEIVER

Harnuo Imano, Yokohama; Izumi Ichikawa; Satoshi Ogiwara, both of Atsugi, and Genmei Miura, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

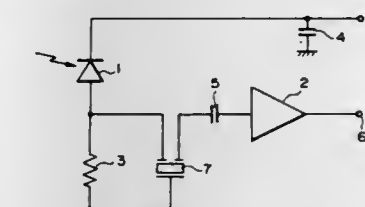
Filed Oct. 17, 1986, Ser. No. 920,130

Claims priority, application Japan, Oct. 22, 1985, 60-234555; Oct. 22, 1985, 60-234556

Int. Cl.<sup>4</sup> H04B 9/00

U.S. Cl. 455-619

7 Claims



1. A light signal receiver for detecting information carried on a modulated light signal, said receiver comprising:  
light-sensitive receiving means for receiving the modulated light signal;  
converting means for converting the light signal received by said receiving means to an electrical signal; and  
resonance means connected to said receiving means and said converting means, for providing a resonant frequency in said receiver, said resonance means having a mechanical vibration element whose resonant frequency is tuned to a modulation frequency of the received signal, thereby to improve detection of the information carried on the modulated light signal.

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## DESIGNS

DECEMBER 20, 1988

298,980

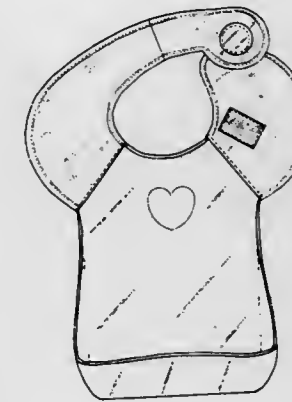
BIB

Karen D. Marconi, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Nov. 7, 1986, Ser. No. 929,226

Term of patent 14 years

U.S. Cl. D2—227



298,982

ELEMENT OF A SHOE UPPER

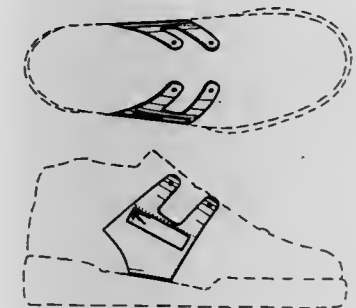
Edward Lussier, Hingham, Mass., assignor to Reebok International Ltd., Canton, Mass.

Division of Ser. No. 750,597, Jul. 1, 1985, Pat. No. Des. 297,281.

This application Sep. 4, 1987, Ser. No. 93,508

Term of patent 14 years

U.S. Cl. D2—314



298,981

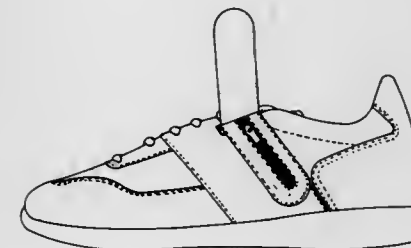
POCKETED ATHLETIC SHOE

Robert J. Gamm, St. Louis, Mo., assignor to Kangaroos U.S.A., Inc., St. Louis, Mo.

Filed Apr. 18, 1986, Ser. No. 855,781

Term of patent 14 years

U.S. Cl. D2—265



298,983

PORTION OF A SHOE SOLE

James K. Tong, Beaverton, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.

Filed Feb. 5, 1988, Ser. No. 152,585

Term of patent 14 years

U.S. Cl. D2—317

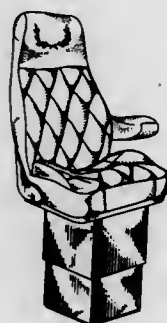




**298,984**  
**SHOE SOLE**  
 Lawrence Selbiger, Portland, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.  
 Filed Feb. 17, 1988, Ser. No. 156,650  
 Term of patent 14 years  
 U.S. Cl. D2—320



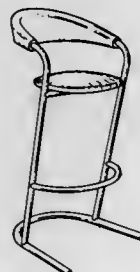
**298,986**  
**ADJUSTABLE VEHICLE SEAT**  
 John W. Carter, Moline, Ill., assignor to The Wise Co., Inc., Memphis, Tenn.  
 Filed Jul. 24, 1986, Ser. No. 889,504  
 Term of patent 14 years  
 U.S. Cl. D6—356



**298,985**  
**SEAT**  
 Otto Geffert, Ottmarsheim, and Roland Sternmann, Niefern, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany  
 Filed Aug. 21, 1985, Ser. No. 767,895  
 Claims priority, application Fed. Rep. of Germany, Feb. 21, 1985, MU 65  
 Term of patent 14 years  
 U.S. Cl. D6—356



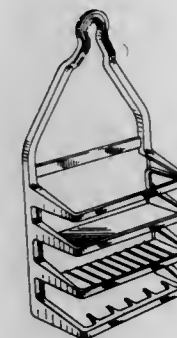
**298,987**  
**BAR STOOL**  
 H. Robert Tiffany, Philadelphia, Pa., assignor to Tiffany and Tiffany, Designers, Inc., Philadelphia, Pa.  
 Filed May 5, 1986, Ser. No. 859,761  
 Term of patent 14 years  
 U.S. Cl. D6—360



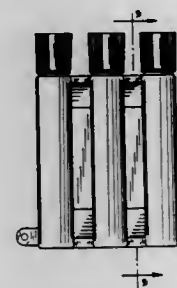
**298,988**  
**RECLINABLE CHAIR**  
 James R. Smith, Kirkland, and Walter E. Peeler, Seattle, both of Wash., assignors to Walter Dorwin Teague Associates, Inc., New York, N.Y.  
 Filed Jun. 20, 1986, Ser. No. 877,097  
 Term of patent 14 years  
 U.S. Cl. D6—366



**298,990**  
**SHOWER CADDY**  
 John P. Chap, Lemont, Ill., assignor to Selfix, Inc., Chicago, Ill.  
 Filed Sep. 23, 1985, Ser. No. 778,924  
 The portion of the term of this patent subsequent to Oct. 13, 2001, has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D6—525



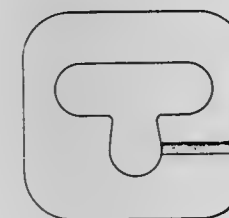
**298,991**  
**HANGING MULTIPRODUCT DISPENSER**  
 Jay Stanley, 6 Noble Ave., Barrington, R.I. 02806  
 Filed Jul. 11, 1986, Ser. No. 884,802  
 Term of patent 14 years  
 U.S. Cl. D6—542



**298,989**  
**CHAIR**  
 George C. Mulhauser, Paramus, N.J., assignor to Design Institute America, Inc., Montpelier, Ohio  
 Filed Apr. 7, 1986, Ser. No. 850,420  
 Term of patent 14 years  
 U.S. Cl. D6—372



**298,992**  
**FACE PILLOW**  
 Gene Voss, 213 Alcade Moreno, San Antonio, Tex. 78232  
 Filed Jul. 2, 1986, Ser. No. 881,207  
 Term of patent 14 years  
 U.S. Cl. D6—601



298,993

STEMMED WINE GLASS OR SIMILAR ARTICLE  
 Jean-Jacques Durand, LaBute 62510, Arques, France  
 Filed Dec. 3, 1985, Ser. No. 804,060  
 Term of patent 14 years  
 U.S. Cl. D7-12



298,995

STEMMED WINE GLASS OR SIMILAR ARTICLE  
 Jean-Jacques Durand, LaBute, 62510, Arques, France  
 Filed Jan. 24, 1986, Ser. No. 822,137  
 The portion of the term of this patent subsequent to Nov. 8, 2002,  
 has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D7-13



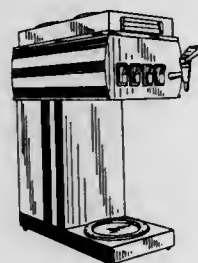
298,994

STEMMED WINE GLASS OR SIMILAR ARTICLE  
 Jean-Jacques Durand, LaBute 62510, Arques, France  
 Filed Dec. 3, 1985, Ser. No. 804,076  
 Term of patent 14 years  
 U.S. Cl. D7-12



298,996

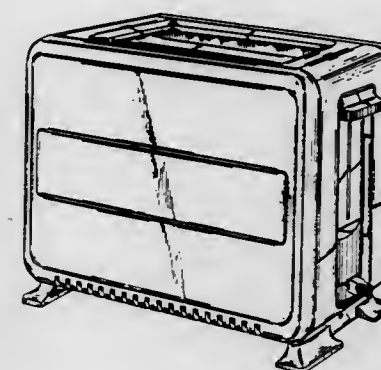
BEVERAGE MAKING AND DISPENSING MACHINE  
 Raymond E. Van Camp, Rochester, and Charles A. Nidiffer,  
 Decatur, both of Ill., assignors to Bunn-O-Matic Corporation,  
 Springfield, Ill.  
 Filed Aug. 26, 1985, Ser. No. 769,134  
 Term of patent 14 years  
 U.S. Cl. D7-309



296,997

TOASTER

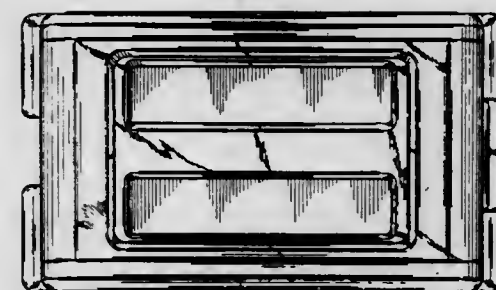
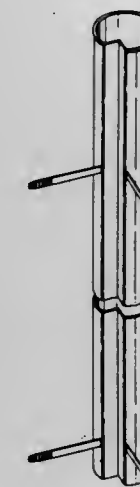
John Mezey, Edison, N.J., assignor to Robeson Industries  
 Corp., Mineola, N.Y.  
 Filed Dec. 2, 1985, Ser. No. 803,598  
 Term of patent 14 years  
 U.S. Cl. D7-330



298,998

TREE TRUNK GUARD

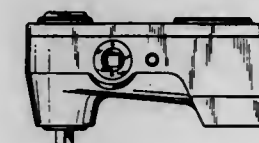
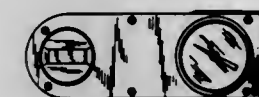
Graham F. Hurlstone, 29 Manston Road, Wey Lea Farm, Bur-  
 pham, Guildford GU4 7YE, United Kingdom  
 Filed Mar. 31, 1986, Ser. No. 847,583  
 Claims priority, application United Kingdom, Oct. 4, 1985,  
 8524506  
 Term of patent 14 years  
 U.S. Cl. D8-1



298,999

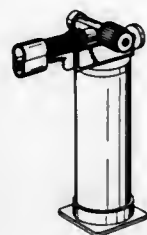
TORQUE WRENCH

David Kaiser, North Haven, Conn., assignor to Raymond Engi-  
 neering Inc., Middletown, Conn.  
 Filed Jul. 3, 1985, Ser. No. 752,254  
 Term of patent 14 years  
 U.S. Cl. D8-24





299,000  
HAND-HELD PIEZO ELECTRIC TORCH  
Sadao Yoshinaga, Ichikawa, Japan, assignor to Yoshinaga  
Prince Company Limited, Tokyo, Japan  
Filed Jul. 18, 1985, Ser. No. 756,764  
Term of patent 14 years  
U.S. Cl. D8—30



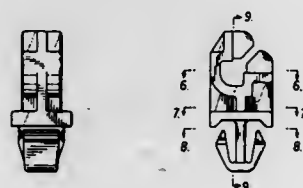
299,003  
PICTURE HANGER  
Herbert J. Fadeley, Jr., 37 Brunswick Rd., Troy, N.Y. 12180  
Filed Dec. 4, 1985, Ser. No. 804,500  
Term of patent 14 years  
U.S. Cl. D8—367



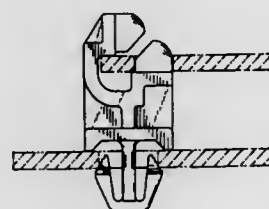
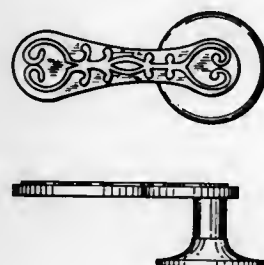
299,001  
CORKSCREW  
David J. Barnett, Hemel Hempstead, United Kingdom, assignor  
to Hesso Anstalt Limited, Gagoz, Liechtenstein  
Filed Aug. 13, 1985, Ser. No. 765,408  
Claims priority, application United Kingdom, Feb. 19, 1985,  
1025108  
Term of patent 14 years  
U.S. Cl. D8—42



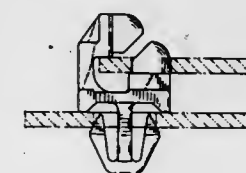
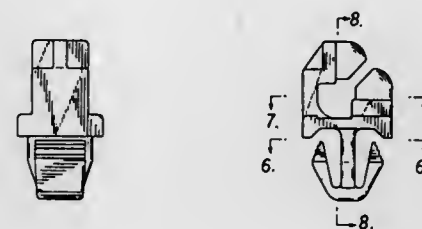
299,004  
RETAINER FOR RETAINING BOARDS  
Nobuaki Fujimoto, Okazaki, Japan, assignor to Kitagawa Indus-  
tries Co., Ltd., Nagoya, Japan  
Filed Sep. 5, 1986, Ser. No. 904,239  
Claims priority, application Japan, Mar. 13, 1986, 61-9033  
Term of patent 14 years  
U.S. Cl. D8—382



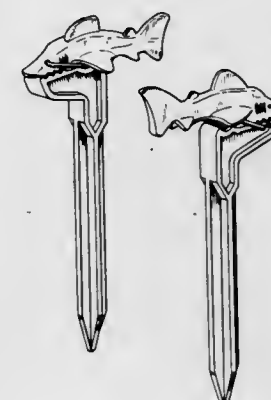
299,002  
DOOR LEVER  
Gary W. Emerson, Houston, Tex., assignor to Axco Products,  
Inc., Houston, Tex.  
Filed Nov. 25, 1985, Ser. No. 806,210  
Term of patent 14 years  
U.S. Cl. D8—308



299,005  
RETAINER FOR RETAINING BOARDS  
Nobuaki Fujimoto, Okazaki, Japan, assignor to Kitagawa Indus-  
tries Co., Ltd., Nagoya, Japan  
Filed Sep. 5, 1986, Ser. No. 904,240  
Claims priority, application Japan, Mar. 13, 1986, 61-9034  
Term of patent 14 years  
U.S. Cl. D8—382



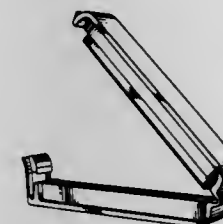
299,006  
CLIP  
David Mednick, Philadelphia, Pa., assignor to Shark Products,  
Inc., Upland, Pa.  
Filed Nov. 10, 1986, Ser. No. 932,892  
Term of patent 14 years  
U.S. Cl. D8—388



299,007  
SNOWMAN DECORATING KIT  
Josephine Laughner, Frankfort, Ind., assignor to Patricia Shaw  
and Cleveland Shaw, both of Frankfort, Ind., a part interest  
Filed Dec. 20, 1985, Ser. No. 811,779  
Term of patent 14 years  
U.S. Cl. D9—341



299,008  
BAG CLIP  
Jan I. Näslund, Vassvågen 21, S-141 39 Huddinge, Sweden  
Filed Apr. 15, 1986, Ser. No. 852,894  
Term of patent 14 years  
U.S. Cl. D9—443



299,009  
CONTAINER LID  
Richard Schneider, 16629 Newbrook Cir., Cerritos, Calif. 90701  
Filed Sep. 9, 1985, Ser. No. 773,629  
Term of patent 14 years  
U.S. Cl. D9—454

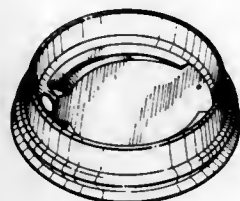


299,010  
CUP LID

Dean H. Wall, 7374 S. 2200 West, West Jordan, Utah 84084  
Filed Oct. 10, 1985, Ser. No. 785,975

Term of patent 14 years

U.S. Cl. D9—454



299,012  
METEROLOGICAL STATION

Harry R. Sampey, Vanderbilt, Pa., assignor to Arax International Corporation, Vanderbilt, Pa.

Filed Dec. 18, 1985, Ser. No. 810,294

Term of patent 14 years

U.S. Cl. D10—53



299,013  
METEROLOGICAL SUB-STATION

Harry R. Sampey, Vanderbilt, Pa., assignor to Arax International Corporation, Vanderbilt, Pa.

Filed Dec. 18, 1985, Ser. No. 810,292

Term of patent 14 years

U.S. Cl. D10—53



299,011  
TABLE CLOCK

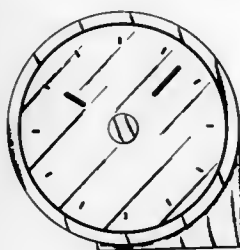
Bernd Brüssing, Ulm/Donau, Fed. Rep. of Germany, assignor to Hans Friedrich HEFENDEHL, Kierspe, Fed. Rep. of Germany

Filed Mar. 13, 1986, Ser. No. 844,289

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1985, MR-1085

Term of patent 14 years

U.S. Cl. D10—23



299,014  
PORTABLE MULTIMETER

Michael D. Nelson, 1062 California La. S.W., Seattle, Wash. 98116, and Allan H. Stephan, 2556 24th Ave. East, Seattle, Wash. 98112

Filed Apr. 7, 1986, Ser. No. 850,388

Term of patent 14 years

U.S. Cl. D10—78



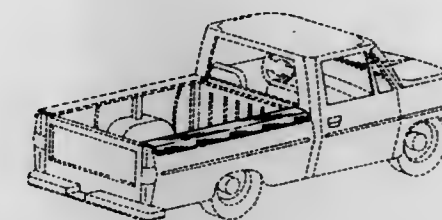
299,017  
PICKUP TRUCK SIDEBOARD GUARD AND TIE DOWN UNIT

Donald G. Renn, deceased, late of Lewiston, Id., by Lou J. Renn, personal representative, 2615 Country Club Dr., Lewiston, Id. 83501

Filed Feb. 10, 1986, Ser. No. 827,910

Term of patent 14 years

U.S. Cl. D12—155



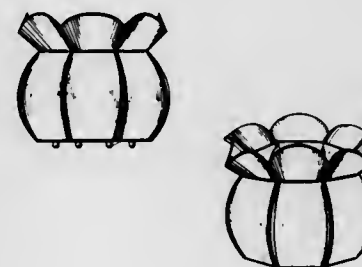
299,015  
CONTAINER FOR FLOWERS, TOILETRIES, JEWELRY OR THE LIKE

Janice Seymour, 4449 Lynview Dr., Louisville, Ky. 40216

Filed Oct. 20, 1986, Ser. No. 921,375

Term of patent 14 years

U.S. Cl. D11—143



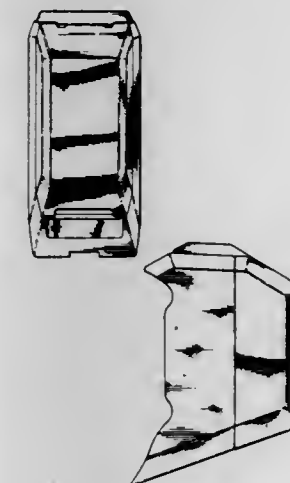
299,018  
BUMPER GUARD

Firle J. Wilkins, Laverne, Calif., assignor to Per-Lux, Inc., Covina, Calif.

Filed Aug. 16, 1985, Ser. No. 766,383

Term of patent 14 years

U.S. Cl. D12—167



299,016  
MOTORCYCLE

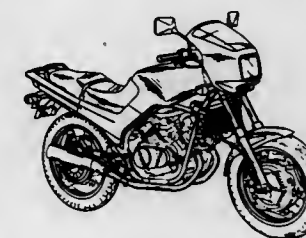
Makoto Kitagawa, Tokyo, and Nobuyuki Kyogoku, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 31, 1983, Ser. No. 462,223

Claims priority, application Japan, Jul. 30, 1982, 57-34988

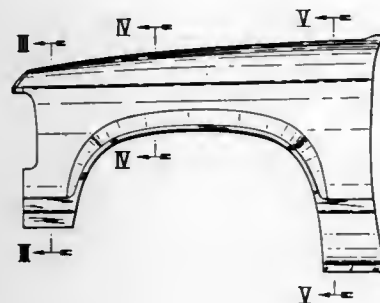
Term of patent 14 years

U.S. Cl. D12—110

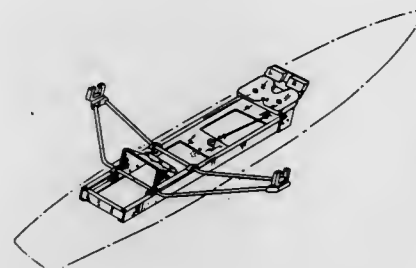




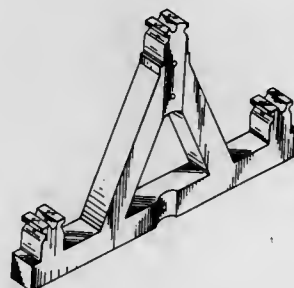
299,019  
**TRUCK FENDER**  
 David C. McKinnon, Ann Arbor, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.  
 Filed Apr. 4, 1986, Ser. No. 850,362  
 Term of patent 14 years  
 U.S. Cl. D12—184



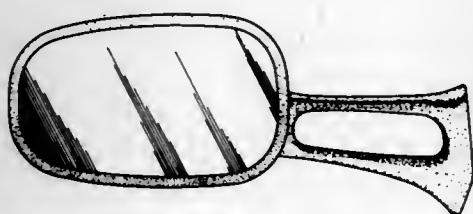
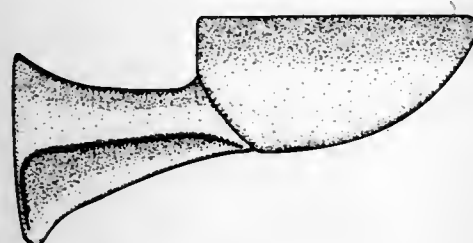
299,021  
**SELF-CONTAINED ROWING UNIT**  
 Edward S. Hand, 26 Weston Rd., Wellesley, Mass. 02181  
 Filed Aug. 29, 1984, Ser. No. 645,615  
 Term of patent 14 years  
 U.S. Cl. D12—317



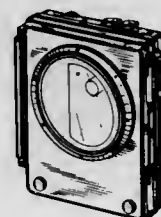
299,022  
**TELEPHONE POLE INSULATOR**  
 Halm C. King, Jr., and Nancy King, both of Star Rte. 2, Box 43J, Hwy. 90W, Del Rio, Tex. 78840  
 Filed Apr. 11, 1986, Ser. No. 851,438  
 Term of patent 14 years  
 U.S. Cl. D13—17



299,020  
**VEHICLE REAR VIEW MIRROR**  
 Hisato Saito, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Jul. 21, 1986, Ser. No. 887,326  
 Claims priority, application Japan, Jan. 20, 1986, 61-1586  
 Term of patent 14 years  
 U.S. Cl. D12—187



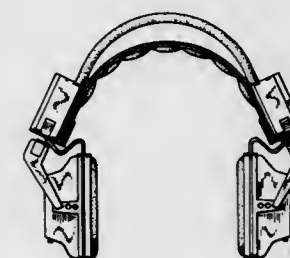
299,023  
**TAPE PLAYER**  
 Ichiro Hino, Rivervale, N.J., assignor to Sony Corporation, Tokyo, Japan  
 Filed Jul. 24, 1985, Ser. No. 758,368  
 Claims priority, application Japan, Feb. 7, 1985, 60-4527  
 Term of patent 14 years  
 U.S. Cl. D14—6



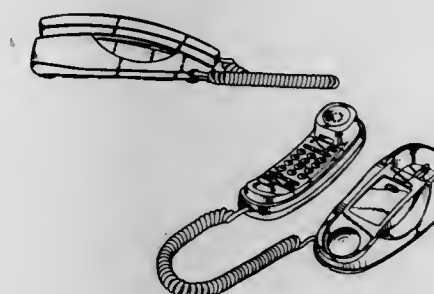
299,024  
**REMOTE MICROPHONE OR SIMILAR ARTICLE**  
 Scott H. Richards, Sunrise, Fla., and Khoo B. Lay, Singapore, Singapore, assignors to Motorola, Inc., Schaumburg, Ill.  
 Filed Dec. 30, 1986, Ser. No. 947,924  
 Term of patent 14 years  
 U.S. Cl. D14—12



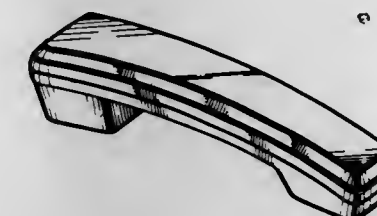
299,025  
**HEADPHONE**  
 Joseph C. Besasie, Shorewood, Wis., assignor to Silver Creek Nurseries, Inc., Manitowoc, Wis.  
 Filed Mar. 24, 1986, Ser. No. 845,758  
 Term of patent 14 years  
 U.S. Cl. D14—36



299,026  
**TELEPHONE**  
 Masaaki Iino, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
 Filed Feb. 16, 1988, Ser. No. 156,080  
 Claims priority, application Japan, Aug. 17, 1987, 62-33270  
 Term of patent 14 years  
 U.S. Cl. D14—53



299,027  
**TELEPHONE HANDSET**  
 Alan P. Boykiw, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada  
 Filed May 11, 1987, Ser. No. 48,447  
 Term of patent 14 years  
 U.S. Cl. D14—63



299,028

**WRIST COMPUTER FOR DIVERS**

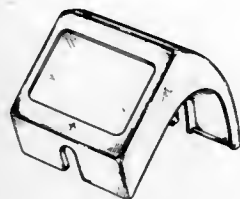
Jurgen Hermann, Mauren, Liechtenstein, assignor to Divetronic AG, Mauren, Liechtenstein

Filed Feb. 10, 1986, Ser. No. 827,532

Claims priority, application World Int. Prop. O., Aug. 21, 1985, 005722

Term of patent 14 years

U.S. Cl. D14—100



299,031

**ELECTRONIC COMPUTER**

Yoshihiko Sugano, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 27, 1986, Ser. No. 879,796

Claims priority, application Japan, Dec. 27, 1985, 60-53777

Term of patent 14 years

U.S. Cl. D14—106



299,029

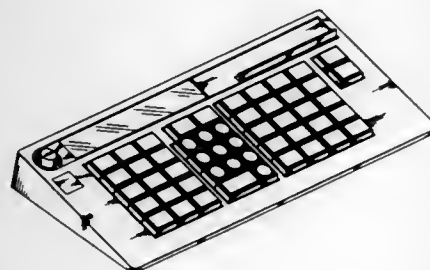
**KEYBOARD**

Roger C. Williams, Raleigh, N.C., assignor to International Business Machines Corp., Armonk, N.Y.

Filed Sep. 18, 1985, Ser. No. 779,714

Term of patent 14 years

U.S. Cl. D14—100



299,032

**FERTILIZER APPLICATOR BLADE SHANK INSERT**

Delmar D. Edmisson, Guymon, Okla., assignor to Adams Hard-Facing Company, Inc., Guymon, Okla.

Filed Jun. 16, 1986, Ser. No. 875,384

Term of patent 14 years

U.S. Cl. D15—29



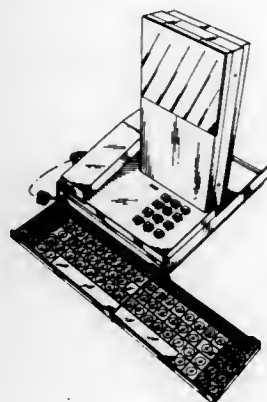
299,030

**VOICE AND DATA COMMUNICATION TERMINAL**  
Walter A. Menn, Stamford, Conn., assignor to Alcatel USA, Corp., New York, N.Y.

Filed Aug. 9, 1985, Ser. No. 764,272

Term of patent 14 years

U.S. Cl. D14—101



299,033

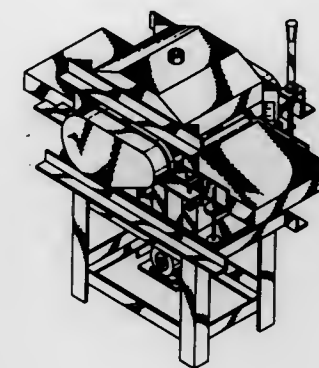
**TWO DRUM SANDER**

James F. Steele, 1593 Rice Rd., Centerville, Ind. 47330

Filed Apr. 28, 1986, Ser. No. 857,819

Term of patent 14 years

U.S. Cl. D15—124



299,035

**SHREDDER**

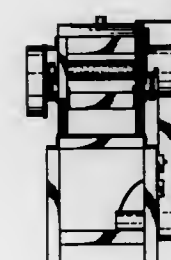
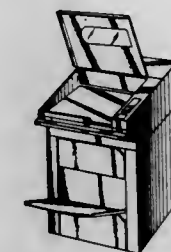
Hiroshi Nishibori; Ritsuko Makihara; Yoichi Tatsuta; Mikio Kosako, and Harumi Fukuda, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan

Filed Oct. 29, 1986, Ser. No. 924,506

Claims priority, application Japan, Apr. 30, 1986, 61-16799

Term of patent 14 years

U.S. Cl. D18—34



299,034

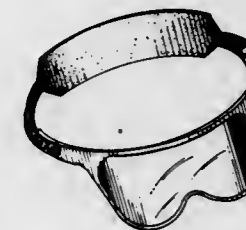
**SUNGLASSES**

Dana E. Seaboyer, 246 E. Main St., Georgetown, Mass. 01833

Filed Nov. 17, 1986, Ser. No. 931,568

Term of patent 14 years

U.S. Cl. D16—107



299,036

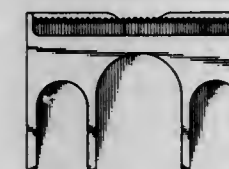
**TAPE CUTTER**

Rod W. Harris, 1011 Arlington Blvd., Suite 907, Arlington, Va.

Filed Aug. 14, 1986, Ser. No. 896,185

Term of patent 14 years

U.S. Cl. D19—69





299,037

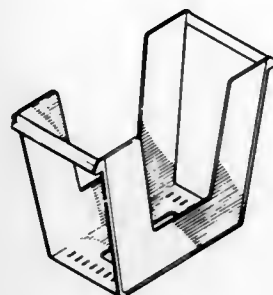
## HANGING FILE HOLDER

Gerald J. Klodt, Madison, Wis., assignor to W. T. Rogers Company, Madison, Wis.

Filed Oct. 1, 1985, Ser. No. 782,357

Term of patent 14 years

U.S. Cl. D19-90



299,038

## TAG

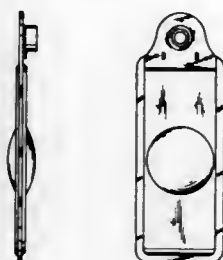
Petrus A. B. van Amelsfort, Ashhurst, New Zealand, assignor to Allflex International Limited, Palmerston North, New Zealand

Filed Feb. 28, 1986, Ser. No. 838,022

Claims priority, application New Zealand, Jun. 7, 1985, 19846

Term of patent 14 years

U.S. Cl. D20-27



299,039

## PUZZLE

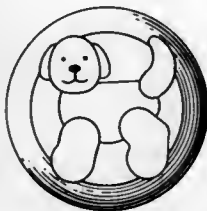
Patrick Ryland, London, England, assignor to Simon Gompes, Amsterdam, Netherlands

Filed Feb. 5, 1986, Ser. No. 826,298

Claims priority, application Benelux, Oct. 28, 1985, 60499-01

Term of patent 14 years

U.S. Cl. D21-104



299,040

## STUFFED DOLL

Sheila K. Burnham, 102 Big Bow, Smithville, Tex. 78957

Filed Feb. 25, 1986, Ser. No. 836,449

Term of patent 14 years

U.S. Cl. D21-171



299,041

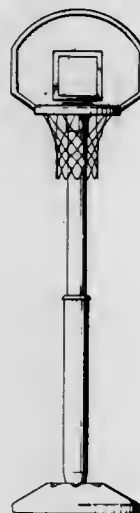
## TOY BASKETBALL GOAL

Ernest L. Thornell, Booneville, Ark., assignor to Spang &amp; Company, Butler, Pa.

Filed Jan. 2, 1986, Ser. No. 815,738

Term of patent 14 years

U.S. Cl. D21-201



299,042

## TENNIS RACQUET FRAME

Warren M. Bosworth, Jr., Glastonbury, Conn., assignor to FTM Corporation, Los Angeles, Calif.

Filed Jan. 3, 1986, Ser. No. 815,985

Term of patent 14 years

U.S. Cl. D21-212



299,043

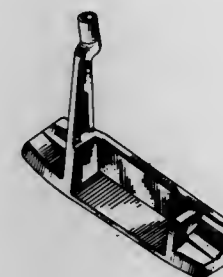
## GOLF CLUB HEAD

Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204

Filed Apr. 4, 1986, Ser. No. 847,886

Term of patent 14 years

U.S. Cl. D21-219



299,046

## FISH LURE

Roy D. Cunningham, 816 N. McCrary, Columbus, Miss. 39704

Filed Dec. 10, 1986, Ser. No. 940,259

Term of patent 14 years

U.S. Cl. D22-128



299,043

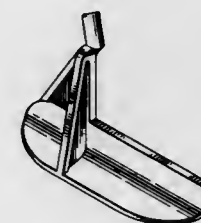
## GOLF CLUB HEAD

Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204

Filed Apr. 4, 1986, Ser. No. 847,891

Term of patent 14 years

U.S. Cl. D21-217



299,044

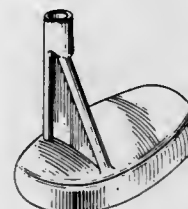
## GOLF CLUB HEAD

Anthony J. Antonious, 205 E. Joppa Rd., Towson, Md. 21204

Filed Apr. 4, 1986, Ser. No. 847,889

Term of patent 14 years

U.S. Cl. D21-217



299,047

## FISH LURE

Roy D. Cunningham, 816 N. McCrary, Columbus, Miss. 39704

Filed Jul. 7, 1987, Ser. No. 70,864

Term of patent 14 years

U.S. Cl. D22-128



299,048

## FISHING LURE

Patrick D. Bankston, Buford, Ga., assignor to Lightning Bug Products, Inc., Sugar Hill, Ga.

Filed Dec. 23, 1985, Ser. No. 812,526

Term of patent 14 years

U.S. Cl. D22—129



299,051

## VALVE HANDLE

Alvar Torstensson, Borås, Sweden, assignor to Tour & Andersson AB, Sweden

Filed Mar. 14, 1986, Ser. No. 844,759

Claims priority, application Sweden, Sep. 18, 1985, 8502202

Term of patent 14 years

U.S. Cl. D23—252



299,049

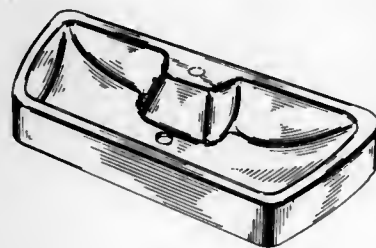
## TOILET TANK LID LAVATORY

Mary J. Reid, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.

Filed Apr. 15, 1986, Ser. No. 852,510

Term of patent 14 years

U.S. Cl. D23—294



299,052

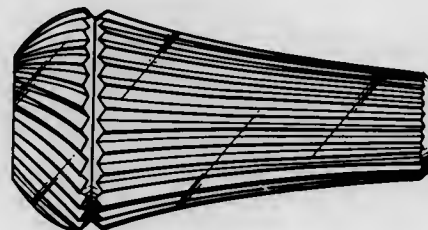
## LEVER HANDLE FOR FAUCETS OR THE LIKE

Holly K. Yost, North Hollywood, Calif., assignor to Price Pfister, Inc., Pacoima, Calif.

Filed May 7, 1986, Ser. No. 860,766

Term of patent 14 years

U.S. Cl. D23—252



299,050

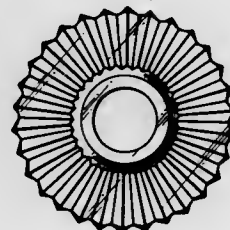
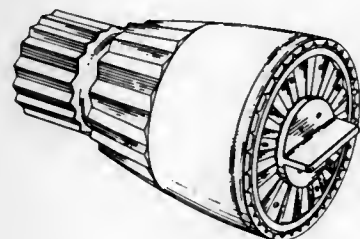
## SHOWERHEAD

Teodoro J. Gonzalez, Canyon, Calif., assignor to Price Pfister, Inc., Pacoima, Calif.

Filed May 21, 1986, Ser. No. 864,076

Term of patent 14 years

U.S. Cl. D23—229



299,053

## SPRAY GUN OR SIMILAR ARTICLE

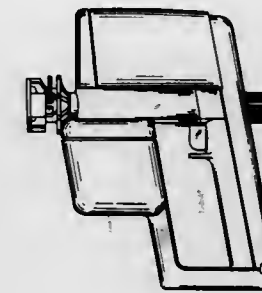
David C. Miller, 2 Craigmoor Rd. North, Ridgefield, Conn. 06877

Division of Ser. No. 703,724, Feb. 21, 1985. This application

Dec. 14, 1987, Ser. No. 132,851

Term of patent 14 years

U.S. Cl. D23—255



299,055

## TONGUE CLEANER OR THE LIKE

Avvari R. Swamy, P.O. Box 24, Wharton Medical Center, Wharton, W. Va. 25208

Filed Dec. 29, 1986, Ser. No. 947,492

Term of patent 14 years

U.S. Cl. D24—10



299,056

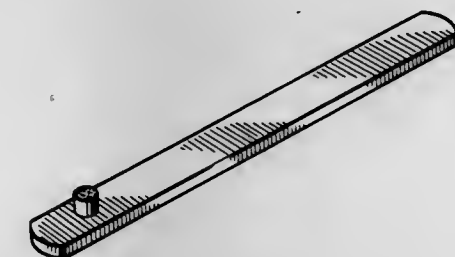
## DENTAL DIAGNOSTIC TOOL FOR FRACTURED TEETH

Roger J. Spott, 10012 Hall Rd., Potomac, Md. 20854

Filed Dec. 8, 1986, Ser. No. 939,011

Term of patent 14 years

U.S. Cl. D24—10



299,054

## DEODORIZER

Michel Brun, Unieux, France, assignor to Societe d'Etudes et de Recherches Appliquees S.E.R.A., S.a.r.l., Unieux, France

Filed May 30, 1986, Ser. No. 869,052

Term of patent 14 years

U.S. Cl. D23—368



299,057

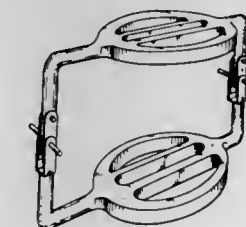
## DENTAL ARTICULATOR

Jack J. Tucker, 10306 Kings Grant, San Antonio, Tex. 78230

Filed Dec. 29, 1986, Ser. No. 1,570

Term of patent 14 years

U.S. Cl. D24—10





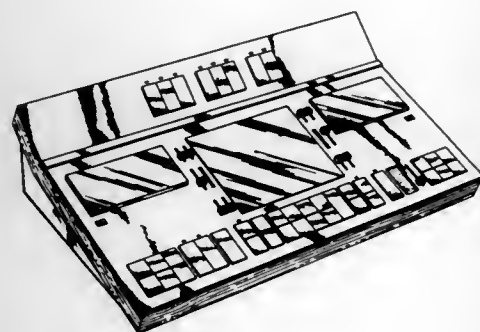
299,058

**MASTER HEARING AID TEST CONSOLE**

Barry Voroba, Minnetonka, and James P. Wilkinson, Richfield, Minn., assignors to Voroba Technologies Associates, Minnetonka, Minn.

Filed May 27, 1986, Ser. No. 867,737  
Term of patent 14 years

U.S. Cl. D24—17



299,060

**BLOOD PRESSURE METER**

Ronald D. Muller, Old Saybrook, Conn., assignor to North American Philips Corp., New York, N.Y.

Filed Feb. 25, 1986, Ser. No. 836,196  
Term of patent 14 years

U.S. Cl. D24—21



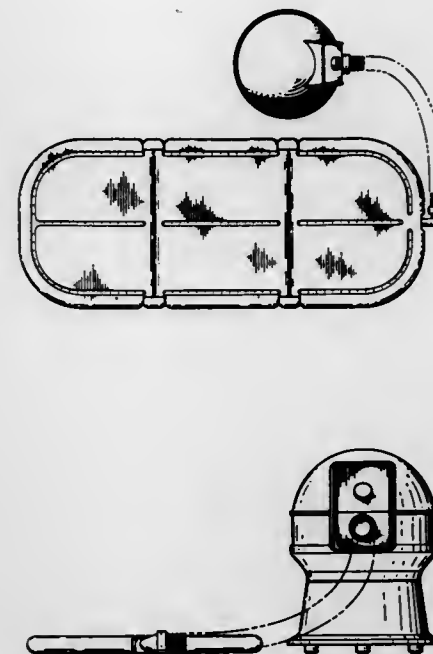
299,062

**HYDRO-MASSAGE APPLIANCE**

H. Gerald Young, South Plainfield; George J. Schimpf, Somerset, both of N.J., and Morris M. Levine, Scarsdale, N.Y., assignors to The Regina Company, Rahway, N.J.

Filed Jun. 9, 1986, Ser. No. 872,748  
Term of patent 14 years

U.S. Cl. D24—38



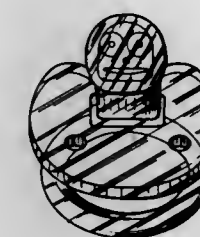
299,064

**INFANT PACIFIER WITH FUNNY FACE**

Dieter R. Berndt, 3407 Sandpiper Way, Allenwood, N.J. 08720  
Filed Nov. 10, 1986, Ser. No. 929,670

Term of patent 14 years

U.S. Cl. D24—46



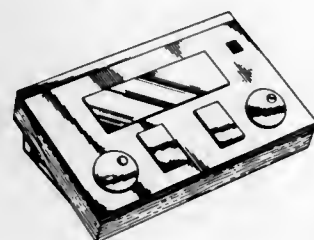
299,059

**MASTER HEARING AID PATIENT CONSOLE**

Barry Voroba, Minnetonka, and James P. Wilkinson, Richfield, Minn., assignors to Voroba Technologies Associates, Minnetonka, Minn.

Filed May 27, 1986, Ser. No. 867,740  
Term of patent 14 years

U.S. Cl. D24—17



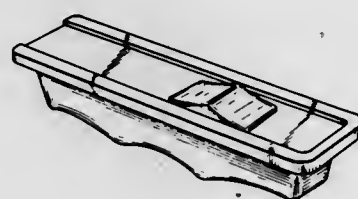
299,061

**DENTAL COMPOSITE TRAY**

Robert D. Holewinski, Lakehurst, N.J., assignor to Johnson & Johnson Consumer Products, Inc., New Brunswick, N.J.

Filed May 15, 1986, Ser. No. 863,552  
Term of patent 14 years

U.S. Cl. D24—31



299,065

**PIPETTOR**

George P. Kalmakis, Reading; R. Laurence Keene, Brookline, both of Mass.; Gary E. Nelson, Nashua, N.H., and Victor A. Torti, Groton, Mass., assignors to Matrix Technologies Corporation, Lowell, Mass.

Filed Mar. 5, 1986, Ser. No. 841,726  
Term of patent 14 years

U.S. Cl. D24—55



299,063

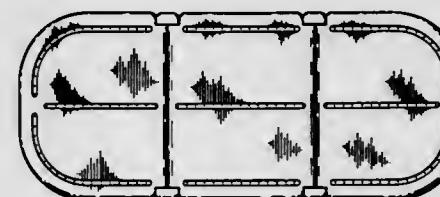
**HYDRO MASSAGE APPLIANCE MAT**

H. Gerald Young, South Plainfield; George J. Schimpf, Somerset, both of N.J., and Morris M. Levine, Scarsdale, N.Y., assignors to The Regina Company, Inc., Rahway, N.J.

Division of Ser. No. 872,748, Jun. 9, 1986. This application Jun. 15, 1987, Ser. No. 62,000

Term of patent 14 years

U.S. Cl. D24—38

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299,066  
INHALATOR

Robert E. Newell, Pinner, and Paul K. Rand, Hitchin, both of England, assignors to Glaxo Group Limited, London, England  
Filed Mar. 13, 1986, Ser. No. 844,284  
Claims priority, application United Kingdom, Sep. 16, 1985, 1029228

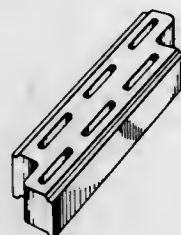
Term of patent 14 years  
U.S. Cl. D24—62



299,068  
INTERLOCKING BUILDING BLOCK

Welford L. McSorley, 1005-233 Booth Dr., Winnipeg, Manitoba, Canada R3Q 3M4, and Wilford J. McSorley, deceased, late of Winnipeg, Canada, by Welford L. McSorley  
Filed Feb. 14, 1986, Ser. No. 834,034  
Term of patent 14 years

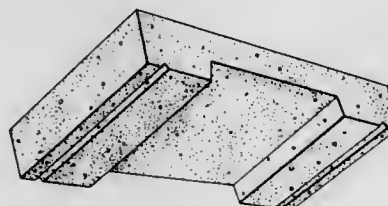
U.S. Cl. D25—117



299,069  
REVERSIBLE MODULAR COPING BLOCK

Angelo Risi, and Antonio Risi, both of Richmond Hill, Canada, assignors to Rothbury Investments Limited, Gormley, Canada  
Filed Jan. 13, 1986, Ser. No. 818,286  
Term of patent 14 years

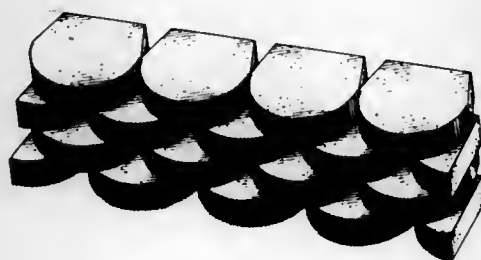
U.S. Cl. D25—157



299,067  
MODULAR BLOCK WALL

Paul J. Forsberg, Richfield, Minn., assignor to Keystone Retaining Wall Systems, Inc., Edina, Minn.  
Continuation-in-part of Ser. No. 907,077, Sep. 15, 1986, and Ser. No. 13,383, Feb. 11, 1987. This application Apr. 2, 1987, Ser. No. 33,178

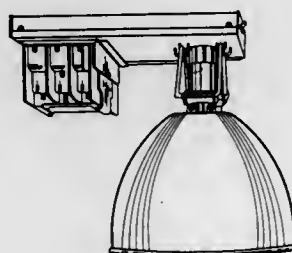
Term of patent 14 years  
U.S. Cl. D25—58



299,070  
LOW PROFILE LIGHTING FIXTURE

Terry M. Tharp; David W. Roberts; John C. McCartney, and John W. Harvey, all of Newark, Ohio, assignors to Manville Corporation, Denver, Colo.  
Filed Feb. 19, 1986, Ser. No. 834,463  
Term of patent 14 years

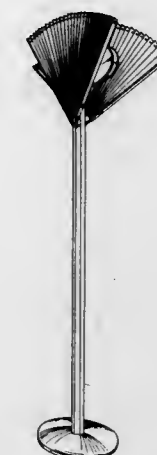
U.S. Cl. D26—88



299,071  
FLOOR LAMP

Tobia Scarpa, Trevignano, Italy, assignor to Flos S.p.A., Brescia, Italy  
Filed Mar. 17, 1986, Ser. No. 845,008  
Claims priority, application Italy, Sep. 19, 1985, 7105/86[U]

U.S. Cl. D26—93



299,073  
FEEDER FOR CATS

Roger C. Bacon, P.O. Box 1098, Bellevue, Wash. 98009  
Filed Jan. 15, 1986, Ser. No. 819,211  
Term of patent 14 years

U.S. Cl. D30—121



299,074  
COMBINED BLOWER AND VACUUM

Lloyd H. Tuggle, and Jeffery S. Franke, both of Shreveport, La., assignors to Emerson Electric Co., Shreveport, La.  
Filed Jul. 22, 1985, Ser. No. 757,688  
Term of patent 14 years

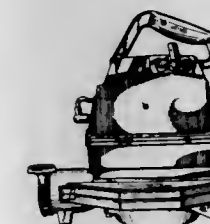
U.S. Cl. D32—15



299,072  
AQUARIUM OR THE LIKE

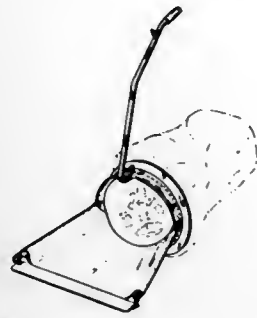
Joseph T. Daniels, 905 1/2 Jones St., Clearwater, Fla. 33515  
Filed Oct. 20, 1986, Ser. No. 921,018  
Term of patent 14 years

U.S. Cl. D30—101

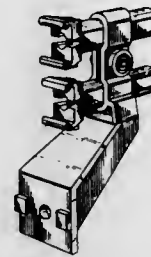




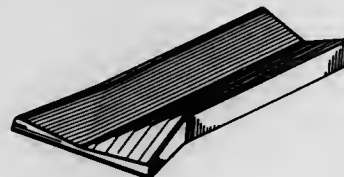
299,075  
**PORTABLE HAND HELD BAGGER**  
 Menay Scott, 382 Valleycent Ave., Scotch Plains, N.J. 07076  
 Filed Jan. 15, 1987, Ser. No. 3,703  
 Term of patent 14 years  
 U.S. Cl. D34-1



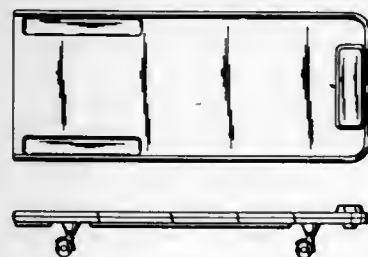
299,077  
**RAIL HOLDER FOR CONVEYORS**  
 Goran Abbestam, Goteborg, and Lelf Lachonius, Surte, both of Sweden, assignors to Aktiebolaget SKF, Sweden  
 Filed Nov. 12, 1986, Ser. No. 929,664  
 Term of patent 14 years  
 U.S. Cl. D34-29



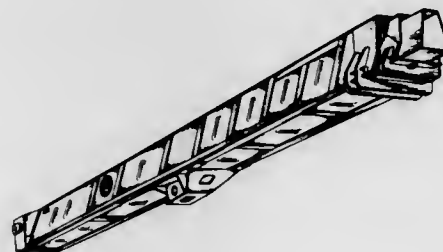
299,078  
**BOAT RAMP**  
 Kenneth G. Jacobsen, 3621 Lake St., Burlington, Wis. 53105  
 Filed Dec. 23, 1985, Ser. No. 812,530  
 Term of patent 14 years  
 U.S. Cl. D34-32



299,076  
**CREEPER**  
 Kirt E. Whiteside, Ostrander, Ohio, assignor to Whiteside Mfg. Co., Delaware, Ohio  
 Filed Sep. 22, 1986, Ser. No. 910,751  
 Term of patent 14 years  
 U.S. Cl. D34-23



299,079  
**EMBOSSED TELESCOPIC CRANE BOOM**  
 Vincent Bernabe, Jr., Newville, Pa., assignor to Kidde, Inc., Saddle Brook, N.J.  
 Filed Feb. 7, 1986, Ser. No. 827,099  
 Term of patent 14 years  
 U.S. Cl. D34-36



## LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF DECEMBER, 1988

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- A. H. Emery Company, The: See—  
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- A. O. Smith Corporation: See—  
 Nickel, Herbert W., 4,792,320, Cl. 464-181,000.
- Aalborg Værft A/S: See—  
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- Abe, Masaru; Ogura, Masami; and Sato, Tsuyoshi, to Honda Giken Kogyo Kabushiki Kaisha. Mechanism for steering front and rear wheels of four-wheel vehicle. 4,792,007, Cl. 180-140,000.
- Abe, Shuji; Tanaka, Toshihiro; Hayashi, Nobuhiro; Zaizen, Katsunori; and Ueno, Seiichi, to Matsushita Electric Industrial Co., Ltd. Control circuit for an air cleaner. 4,792,345, Cl. 55-210,000.
- Abe, Takao: See—  
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- Abe, Yasushi: See—  
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- Abe, Yoshio: See—  
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- Abic Ltd.: See—  
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- Abrams, Kenneth J., to Amoco Corporation. Method for continuous production of aromatic carboxylic acid. 4,792,621, Cl. 562-414,000.
- Ackerman, Archie W.; and Spector, George. Runners baton bat. 4,792,883, Cl. 362-102,000.
- Ackermann, Manfred, to Union Special Corporation. Needle guard for sewing machine. 4,791,875, Cl. 112-227,000.
- Acraloc Corporation: See—  
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- Acushnet Company: See—  
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- Adachi, Kaoru: See—  
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- Adams, Mark: See—  
 Ausman, Robert K.; Adams, Mark; Caballero, Gerardo; Hamid, Rahim; Hoffman, Norman E.; Quebbeman, Edward J.; Schulte, William J.; Thomson, Robert; Whipple, Julie; and Weitman, Steven D., 4,792,449, Cl. 424-440,000.
- Adams, Peter F.; Smith, Mark J.; and Carpenter, Robert B. P., to British Telecommunications public limited company. Non linear adaptive filters. 4,792,915, Cl. 364-724,190.
- Adams, Wilbur R., to Simulators Limited, Inc. Child resistant buckle for seat belt restraints. 4,791,711, Cl. 24-633,000.
- ADC Telecommunications, Inc.: See—  
 Nelson, Calvin G.; and Anton, Mark, 4,792,203, Cl. 350-96,200.
- Aderans Co., Ltd.: See—  
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- ADIR et Compagnie: See—  
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- Adkins, Ricky L.: See—  
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- Adriaansen, David L.; and Evans, David L., to Kidde Holding, Inc. Drawer support system. 4,792,195, Cl. 312-245,000.
- Adrian, George J.: See—  
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- Agarwal, Suresh C.; Janacek, Edward D.; Keyes, Marion A.; Schoeffler, James D.; and Willey, Michael S., to Babcock & Wilcox Company, The. Exception processing of operator displays. 4,792,888, Cl. 364-188,000.
- Agee, Jerry W. Hunter's glove. 4,791,683, Cl. 2-161,00A.
- Agency of Industrial Science & Technology, The: See—  
 Nakao, Yukimichi; Kaeriyama, Kyoji; Suda, Yoshio; Imai, Tomoyuki; Oze, Osamu; and Horiishi, Nanao, 4,792,645, Cl. 174-126,400.
- Agnew, Edward G.: See—  
 Maclean, William M.; Agnew, Edward G.; and Madter, Richard C., 4,792,896, Cl. 364-200,000.
- Aigo, Seiichiro. Device for developing treatment of semiconductor materials. 4,791,880, Cl. 118-50,000.
- Aikman, Collin D.: See—  
 Fulks, Bernard D.; Sawin, Steven P.; Aikman, Collin D.; and Jenkins, John M., III, 4,792,592, Cl. 526-62,000.
- Ailey, Harrison A., Jr., to Acraloc Corporation. Fluid operated shears. 4,791,726, Cl. 30-228,000.
- Air Products and Chemicals, Inc.: See—  
 Wang, Shouou-I; Patel, Nitin M.; Sircar, Shivaji; and Allam, Rodney J., 4,792,441, Cl. 423-359,000.
- Airmaster Fan Company: See—  
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- Aisin Seiki Kabushiki Kaisha: See—  
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- Akana, Yoshinori: See—  
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- Akashi, Akira; Ishizaki, Akira; Suda, Yasuo; Ohnuki, Ichiro; Ohtaka, Keiji; and Koyama, Takeshi, to Canon Kabushiki Kaisha. Apparatus for detecting focusing state of objective lens. 4,792,668, Cl. 250-201,000.
- Akashi, Akira, to Canon Kabushiki Kaisha. Camera having automatic focusing device. 4,792,819, Cl. 354-400,000.
- Akashi, Akira, to Canon Kabushiki Kaisha. Auto-focus apparatus in a camera. 4,792,821, Cl. 354-402,000.
- Akashi, Akira: See—  
 Ohnuki, Ichiro; Suda, Yasuo; Ishizaki, Akira; Akashi, Akira; Ohtaka, Keiji; and Koyama, Takeshi, 4,792,669, Cl. 250-201,000.
- Akebono Brake Industry Co., Ltd.: See—  
 Takahashi, Yoshio; and Yoshizawa, Hiroyuki, 4,792,193, Cl. 303-100,000.
- Akel, Fred A. Golf ball retriever. 4,792,271, Cl. 414-440,000.
- Akiyama, Kazuhiro; Koda, Takao; Syoji, Masao; Yodhida, Toshio; and Hirai, Masayoshi, to Fuji Photo Film Co., Ltd. Camera with changeable focal length. 4,792,822, Cl. 354-403,000.
- Akiyama, Noboru, to Fuji Xerox Co., Ltd. Off-line image fixing apparatus. 4,792,131, Cl. 271-7,000.
- Akiyama, Ryoichi, to Stanley Electric Co., Ltd. Liquid crystal television. 4,792,857, Cl. 358-236,000.
- A.G. (Patents) Limited: See—  
 Fricker, Richard, 4,792,402, Cl. 210-651,000.
- Alaze, Norbert; and Leiber, Heinz, to Robert Bosch GmbH. Wobble driven axial piston pump. 4,792,287, Cl. 417-269,000.
- Alberti, Gunter: See—  
 Illy, Alois; Alberti, Gunter; and Feilerlein, Karlheinz, 4,792,119, Cl. 251-333,000.
- Albertz, Theodor; Von Tolkecz, Theo; and Baumann, Hans R., to Krupp-Koppers GmbH. Method of determination and monitoring of fuel mass stream. 4,791,817, Cl. 73-861,040.
- Alcon Laboratories, Inc.: See—  
 Su, Kai C.; Stebbins, Leslie F.; and Bhatia, Rajkumar P., 4,792,414, Cl. 252-174,170.
- Alexander, Joseph H.; Radcliffe, Stanley L.; Robertson, Martin N.; Bator, Eugene A.; and Anderson, John E., to General Tire, Inc. Automatic sidewall servicer. 4,792,372, Cl. 156-394,100.
- Alexander, Robert D., to Pacific Roller Die Co., Inc. Roll forming process and apparatus for making ribs in strip material. 4,791,800, Cl. 72-180,000.
- Alfred Teves GmbH: See—  
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- Allam, Rodney J.: See—  
 Wang, Shouou-I; Patel, Nitin M.; Sircar, Shivaji; and Allam, Rodney J., 4,792,441, Cl. 423-359,000.
- Allegheny-Singer Research Institute: See—  
 Magovern, George J., 4,791,911, Cl. 600-36,000.
- Allegre, Andre. Bag or like packing having and inviolable closure. 4,792,983, Cl. 383-13,000.
- Allen, Glen D. Gun rack. 4,792,050, Cl. 211-64,000.
- Allenson, Stephan J.; Braden, Michael L.; and Banik, Jack A., to Nalco Chemical Company. Method for dewatering a slurry using a twin belt press with cationic amine salts. 4,792,406, Cl. 210-734,000.
- Allied Colloids Limited: See—  
 Hawe, Malcolm; and Farrar, David, 4,792,343, Cl. 44-51,000.
- Allied Corporation: See—  
 Menger, Eva L., 4,791,927, Cl. 128-303,100.
- Allied Engineering Company: See—  
 Anderson, Sture R., 4,792,158, Cl. 280-806,000.
- Allied-Signal Inc.: See—  
 Cipris, Divna; Palanisamy, Thirumalai G.; and Walsh, Arthur T., 4,792,791, Cl. 340-603,000.
- Emerson, Terence P., 4,792,278, Cl. 415-178,000.
- Kirby, Robert A.; and Davis, Clifton L., 4,791,812, Cl. 73-160,000.
- Liebermann, Howard H., 4,791,979, Cl. 164-463,000.

- Masilamani, Divakaran; Hammond, George S.; and Murthy, An-  
diappan K. S., 4,792,639, Cl. 568-697.000.  
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- Allred, David D.; Gonzalez-Hernandez, Jesus; and Van Nguyen, On, to  
Energy Conversion Devices, Inc. Multilayered article including  
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- Alpa Electric Co., Ltd.: See—  
Fuke, Takamichi; Ozawa, Kazuyoshi; Masuda, Atsushi; Shigenai,  
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- Aluminum Company of America: See—  
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- AM International, Inc.: See—  
Cahill, Benjamin M., III; and Hedden, Jeffrey R., 4,792,981, Cl.  
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- Amagaya, Hidefumi, to Plus Corporation. Sheathed scissors. 4,791,725,  
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- Amari, Mahmood. Liquid removal method system and apparatus for  
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- Amann, Markus-Christian; Stegmüller, Bernhard; and Kappeler,  
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- Amano, Satoru: See—  
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- AMCA International Corporation: See—  
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- Amdahl Corporation: See—  
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- American Home Products Corporation: See—  
Fobare, William F.; and Strike, Donald P., 4,792,614, Cl.  
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- American Maize-Products Company: See—  
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Frank J.; and Katz, Frances R., 4,792,458, Cl. 426-578.000.
- American Sterilizer Company: See—  
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- American Tobacco Company, The: See—  
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- Amikura, Seiki: See—  
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- Ammons, Joe L. Wind driven electrical generating system. 4,792,700,  
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- Amoco Corporation: See—  
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Cox, Jeffery A., 4,792,391, Cl. 208-108.000.
- Amor, Max: See—  
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- Anagnostopoulos, Hristo: See—  
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- Anami, Kenji: See—  
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- Anderson, Edward A., to E A Squared, Inc. Method and apparatus for  
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- Anderson, James R.; and Brander, Richard, to Belton Electronics  
Corporation. Hearing aid circuit. 4,792,977, Cl. 381-68.400.
- Anderson, John E.: See—  
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- Anderson, Thomas G.: See—  
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- Anderson, William N.; and Anderson, Thomas G., to Wand Tool  
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- Anderson, Sture R., to Allied Engineering Company. Emergency  
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- Andre, Axel G. Clutch arrangement. 4,792,029, Cl. 192-85.0AA.
- Andrews Paper & Chemical Co., Inc.: See—  
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- Annas, Dulin L., Sr.; and Teague, Richard M., to Anteg, Inc. Lifter.  
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- Antoine, Pery, to Deutsche Thomson-Brandt GmbH. Arrangement for  
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- Anton, Mark: See—  
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- Aoi, Hajime: See—  
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- Aoshima, Atsushi; Tonomura, Shoichiro; Fukui, Hiroyuki; and Imai,  
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ing polyether polyol and a product. 4,792,627, Cl. 564-487.000.
- Apoley Metals Limited: See—  
Goodfellow, Anthony G., 4,792,370, Cl. 156-111.000.
- Arai, Takayoshi: See—  
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- Arakawa, Eric: See—  
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- Ardent, John C. Adjustable support system for marine craft. 4,792,130,  
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- Ares, Inc.: See—  
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- Armstrong Rubber Co., The: See—  
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- Armstrong World Industries, Inc.: See—  
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- Ashland Oil, Inc.: See—  
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Fritz, Billy T.; Riggs, James R.; and Walters, Paul W., 4,792,437,  
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Hsiangsu, 4,792,941, Cl. 370-58.000.
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Nocck, Robert S.; Tilman, Paul A.; Rasko, George; and Ausnit,  
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- Autopart Sweden AB: See—  
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Lackner, Gerald; and Simburger, Karl, 4,791,808, Cl. 73-117.300.
- Axelbaum, Richard L. Optical device. 4,792,223, Cl. 351-158.000.
- Aylward, Richard A. Radio equipped thermos. 4,792,994, Cl.  
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Berchem, Rutger, 4,791,953, Cl. 137-375.000.
- Baba, Shiro, to Hitachi, Ltd. Data processor. 4,792,891, Cl. 364-200.000.
- Baba, Toshio; Mizutani, Takashi; and Ogawa, Masaki, to NEC Corpora-  
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- Babcock & Wilcox Company, The: See—  
Matoko, Theodore N.; Rand, Robert S.; Russell, Thomas D.;  
Scheib, Thomas J.; and Walker, Robert R., deceased, 4,791,889,  
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- Babcock & Wilcox Company, The: See—  
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Schoeffler, James D.; and Willey, Michael S., 4,792,888, Cl.  
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Michael J.; and Bacigalupe, Carlos, 4,792,303, Cl. 432-72.000.
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- Baker, Daniel C., to Shell Oil Company. Removal of hydrogen selenide  
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- Baker, Michael C.; and Hall, W. James, to Dynapert-HTC Corporation.  
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- Baker, Pamela K., to American Cyanamid Company. Method for  
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- Banik, Jack A.: See—  
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- Bansemir, Manfred, to VEB Elektromat Dresden. Apparatus for ultra-  
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- Barbee, James G., to Nippon Colin Co., Ltd. Deposit thickness mea-  
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- Barcia, Alfred; and Goebel, Klaus, to L. Schuler GmbH. Arrangement  
and the stepwise advance of band material with two oppositely  
driven feed rollers. 4,792,074, Cl. 226-149.000.
- Barnes Engineering Company: See—  
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- Barnes, Marvin C.: See—  
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John A.; Cannella, Vincent D.; Prache, Olivier; McCormick-
- Goodhart, Mark H.; and Barnes, Marvin C., 4,792,859, Cl.  
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- Barrall, Jeffery L.; and Garman, Robert C., to Armstrong World Indus-  
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- Barnotti, Edward J.; and Hance, Richard D., to Dynawave Corpora-  
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- Bartlett, Robert R.: See—  
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- BASF Aktiengesellschaft: See—  
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- Batchelor, Douglas R., to Libman Broom Company. Implement with  
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- Bateman, Andrew: See—  
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- Batina, William P.: See—  
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- Bator, Eugene A.: See—  
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Bator, Eugene A.; and Anderson, John E., 4,792,372, Cl.  
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- Bauer, Gunther H.; and Buck, David J., to Windor Manufacturing Ltd.  
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- Bauknecht, Otto; Lichte, Norbert; and Warken, Karl-Heinz, to I F M  
Electronic GmbH. Mounting structure for electric and electronic  
circuit elements. 4,792,879, Cl. 361-424.000.
- Baumann, Hans R.: See—  
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- Baumeister, Hans-Peter, to Eastman Kodak Company. Diak container  
supporting a detachable memory. 4,792,865, Cl. 358-342.000.
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Kupper, Alois; and Veluz, Serge, 4,791,943, Cl. 131-339.000.
- Bavaria Cargo Technologie GmbH: See—  
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- Baxter Travenol Laboratories, Inc.: See—  
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Rahim; Hoffman, Norman E.; Quebbeman, Edward J.; Schulte,  
William J.; Thomson, Robert; Whipple, Julie; and Weitman,  
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- Fry, Stephen M., 4,791,926, Cl. 128-303.100.
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Arne L., 4,792,373, Cl. 156-497.000.
- Kulle, Lee K., 4,792,163, Cl. 285-88.000.
- Maloney, Patrick M., 4,791,913, Cl. 128-6.000.
- Bayat, John J. Sprinkler control system. 4,791,948, Cl. 137-1.000.
- Bayer Aktiengesellschaft: See—  
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- Bayer Aktiengesellschaft: See—  
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- Kappe, Manfred; Mann, Max; Vehlewald, Peter; Meyer, Frank;  
Mehesch, Hans-Ernst; Cornely, Wolfgang; and Riecks, Birgit,  
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- Marhold, Albrecht; Klauke, Erich; and Kysela, Ernst, 4,792,635,  
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- Scholl, Thomas; Exner, Otto; Finkel, Peter; and Perrey, Hermann,  
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pounds using a modified Raney catalyst. 4,792,626, Cl. 564-422.000.
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Walter; and Werner, Margrit. Method and apparatus for aspirating  
secreted fluids from a wound. 4,792,328, Cl. 604-51.000.
- Beever, William H.: See—  
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- Behnke, Edward; and Dickey, Joseph E., to Reliance Electric Com-  
pany. Gearmotor, housing and associated method. 4,791,831, Cl.  
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- Behrens, William L., to Chrysler Motors Corporation. Gearshift knob  
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- Beichler, Robert W., Jr.: See—  
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Jr., 4,791,883, Cl. 119-1.000.
- Belcher, Mark D.; Berkhoe, James L.; and Hampel, Bruce A., to  
Donaldson Company, Inc. Air filtering method and apparatus.  
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- Belcher, Vernie L.: See—  
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- Belgia, Brian, to Ben Johnson & Company Limited. Dump gate control system. 4,792,392, Cl. 209-3.300.
- Belka, Allen B.: See—  
Wilson, Harold R.; and Belka, Allen B., 4,792,881, Cl. 361-428.000.
- Bell, John R., III; and Hodges, Robert E., Jr., to AMCA International Corporation. Subpurlin and attachment assembly. 4,791,770, Cl. 52-543.000.
- Belstone Electronics Corporation: See—  
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- Ben Johnson & Company Limited: See—  
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- Benestad, Otto, to Geophysical Company of Norway A.S. Digital signal processing device working with continuous bit streams. 4,792,916, Cl. 364-724.170.
- Benetton S.p.A.: See—  
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- Benisch, Johann: See—  
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- Benjamin, Gary H.; and Jones, Harry O., to Cooper Tire & Rubber Company. Valve for controlling two-way flow. 4,792,186, Cl. 297-284.000.
- Bent, Rodney B.; and Casper, Paul W., to Atlantic Scientific Corporation. Lightning position and tracking method. 4,792,806, Cl. 342-465.000.
- Berchem, Rutger, to B + S Metallpraxis Gesellschaft fur Metallformgebung m.b.H. Regulator and shut-off valve for corrosive media. 4,791,953, Cl. 137-375.000.
- Berendt, Hans-Ulrich; and Kuhn, Martin, to Ciba-Geigy Corporation. Process for printing or dyeing cellulose-containing textile material: novel quaternary ammonium salt from sulpho-succinic acid mixed di-ester for dye foam stability. 4,792,619, Cl. 560-151.000.
- Berg, John L. Wave actuated pump apparatus. 4,792,290, Cl. 417-332.000.
- Berg, Michael F.: See—  
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- Berger, Siegfried: See—  
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- Bergeron, Robert M. Variable pitch propeller. 4,792,279, Cl. 416-89.000.
- Berke, Joseph J.; and Muller, George H. Rotary scalpel method. 4,791,928, Cl. 128-305.000.
- Berkhoel, James L.: See—  
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- Berkowitz, Phillip T., to Olin Corporation. Stable, low viscosity polymer/polyisocyanate dispersion made using a macromolecular monomer and a functional monomer. 4,792,574, Cl. 521-137.000.
- Berliche, Enock: See—  
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- Berman, Arthur: See—  
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- Berman, Samuel M.: See—  
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- Berner, Bret: See—  
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- Bernitz, Franz; Statnic, Eugen; and Hansmann, Frank, to Patent-Treuhand-Gesellschaft. Regulated rectifier d.c. power supply. 4,792,887, Cl. 363-89.000.
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- Bertrand, Rene. Machine for cutting curbstones, sidewalks or the like. 4,792,190, Cl. 299-41.000.
- Besnier, Bertrand, to Salomon S. A. Safety binding apparatus for monoskia. 4,792,155, Cl. 280-607.000.
- Bethlehem Steel Corporation: See—  
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- Betta, Kenneth A.: See—  
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- Beyers, Billy W., Jr., to RCA Licensing Corporation. Audio amplifier with programmed volume control. 4,792,990, Cl. 455-234.000.
- Bhatia, Rajkumar P.: See—  
Su, Kai C.; Stebbins, Leslie F.; and Bhatia, Rajkumar P., 4,792,414, Cl. 252-174.170.
- Bickford, John H.; Meisterling, Jesse R.; and Smith, Milton O., to Raymond Engineering Inc. Apparatus and method for determining torque and presenting digital torque readout in a torque wrench system. 4,791,839, Cl. 81-479.000.
- Bickford, John H. F.; Meisterling, Jesse R.; Smith, Milton O.; and Kosciak, Geoffrey F., to Raymond Engineering Inc. Apparatus and method for determining torque, presenting digital torque readout and automatic cycling and termination of wrench operation in a torque wrench system. 4,791,838, Cl. 81-467.000.
- Bidlack, Jean M.: See—  
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- Bidwell, Howard. Water cooled scavenged crankcase type Otto internal combustion engine. 4,791,896, Cl. 123-193.0CH.
- Bien, Alfred A., to Chrysler Motors Corporation. Composite joint pad for synthetic resin panel. 4,792,475, Cl. 428-137.000.
- Bier, Kurt E. G. Paint. 4,792,357, Cl. 106-83.000.
- Bierbaum, Thomas: See—  
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- Bieron, Joseph F.; and Tang, David Y., to Occidental Chemical Corporation. Fluorinated carbocyclic compounds. 4,792,618, Cl. 560-127.000.
- Biggs, Alan: See—  
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- Bigley, James E.; and Estelle, Lee R., to Scott Fetzer Company, The. Fresnel lens illuminator for vacuum cleaner. 4,791,700, Cl. 15-324.000.
- Bilstein, Hans-Ulrich. Substrate for a cultivated plant. 4,791,755, Cl. 47-66.000.
- Binks Manufacturing Company: See—  
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- Biocompatibles Ltd.: See—  
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- Birkenstock, Udo: See—  
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- Bisseger, Marcel, to Saphirwerk Industrie Produkte. Apparatus for incremental length measurement having an inclined slot over the light source. 4,792,679, Cl. 250-237.000.
- Bisson, Michel: See—  
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- Bitthell, Tom C., to Gullick Dobson Limited. Mine roof supports. 4,792,261, Cl. 405-293.000.
- Bittar, Joseph; and Thangavelu, Kandasamy, to Otis Elevator Company. Continuous floor channeling with up hall call elevator dispatching. 4,792,019, Cl. 187-125.000.
- Bivona Surgical Instruments, Inc.: See—  
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- Blackburn, James W.; and Saylor, Gary S., to International Technology Corporation; and University of Tennessee Research Corporation. Method for the monitoring and control of microbial populations. 4,792,519, Cl. 435-6.000.
- Blackler, Francis G., to U.S. Philips Corporation. Graticule illuminator for an image intensifier. 4,792,673, Cl. 250-213.0VT.
- Blair, Brian E.; and Weiss, Mark H., to International Business Machines Corp. Method for resolving conflicts between interrupt sources sharing the same priority level. 4,792,890, Cl. 364-200.000.
- Blakeney, Robert D., II: See—  
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- Blandford, Brian, to Zumbach Electronic AG. Contact-free measuring apparatus having an F-theta-corrected, catadioptric objective and method for using the same. 4,792,695, Cl. 250-560.000.
- Blankenship, Gene E.: See—  
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- Blaszczak, Gotthardt; Eickholt, Hubert; Heinemann, Otto; Bredenholler, Norbert; Kimmeyer, Ludger; Tiggesbaumer, Peter; von Seebach, Michael; and Henne, Heinrich, to Krupp Polysius AG. Spiral air sifter having air regulation. 4,792,393, Cl. 209-135.000.
- Blaupunkt-Werke GmbH: See—  
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- Blum, Kenneth L., Jr. System for facilitating instruction of musicians. 4,791,848, Cl. 84-453.000.
- Blumenkranz, Robert M.; and Roberts, John O., Jr., to General Instrument Corporation. Apparatus for field testing the performance of a feedforward amplifier. 4,792,751, Cl. 324-57.00IN.
- Board of Regents, The University of Texas System: See—  
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- Bobbie's Automatic Hair Shampooer, Inc.: See—  
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- Bock, Jan: See—  
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- Bodine, Albert G. Acoustic detonation suppression in internal combustion engine. 4,791,899, Cl. 123-279.000.
- Boeing Company, The: See—  
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- King, Ethmer W.; Yotsuue, David S.; Kircher, Robert C., Jr.; and Radfar, Mohammed R., 4,792,906, Cl. 364-433.000.
- Tveitane, Nils, 4,792,192, Cl. 303-13.000.
- Boeshart, Patrick E. Wale clamp. 4,791,767, Cl. 52-426.000.
- Boffey, Stuart S.: See—  
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- Bohlmann, Dieter: See—  
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- Schutter, Hartmut; and Dietrich, Detlev, 4,792,389, Cl. 208-76.000.
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- Boyer, Kent R., to HR Texttron, Inc. Force motor, multiple, parallel element linear suspension. 4,792,708, Cl. 310-15.000.
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- Brelko (Proprietary) Limited: See—  
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- Bridgeport Metal Goods Manufacturing Co.: See—  
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- Bright, Randall P.: See—  
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- Brogli, Werner F. Disposable or reusable container for flowable material. 4,792,060, Cl. 222-107.000.
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 Clarion Co., Ltd.: See—  
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 Clark, Bryan K.: See—  
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 Clark, Harold E. Twisted boxboard furniture. 4,792,470, Cl. 428-12.000.  
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Claude, Tasset. Machine for automatically measuring portions of dough. 4,792,298, Cl. 425-239.000.  
 Claus, Richard O.: See—  
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 CMI International, Inc.: See—  
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 Colegrove, George T., to Merck & Co., Inc. Quaternary ammonium salts of anionic gums. 4,792,415, Cl. 252-308.000.  
 Coleman, Clint, to Northern Power Systems, Inc. Wind turbine pitch control hub. 4,792,281, Cl. 416-156.000.  
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 Columbia University in the City of New York. The Trustees of: See—  
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 Hatfield, Stephen C., 4,792,429, Cl. 376-446.000.  
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 Cooley, Stephen E.; and Jensen, Martin J., to Carnes Company, Inc. Humidifier controller having automatic over-current correcting means. 4,792,660, Cl. 219-295.000.  
 Cooper, Gary F.; Fried, John H.; and Waterbury, L. David, to Syntex (U.S.A.) Inc. 11-substituted-16-phenoxy and 16-substituted phenoxy-prostatrenic acid derivatives. 4,792,617, Cl. 560-53.000.  
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 Coran, Aubert Y., to Monsanto Company. Rubber blends. 4,792,583, Cl. 524-504.000.  
 Corby, Kenneth D.; and Faulstick, Luke T., to Eastman Kodak Corpo-ration. Mold for forming container adapter. 4,792,112, Cl. 249-155.000.  
 Corda, Giuseppe; and Ravaglia, Andrea, to SGS Microelettronica S.p.A. Eprom memory matrix with symmetrical elementary MOS cells and writing method therefor. 4,792,925, Cl. 365-185.000.  
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Noll, Burton A., 4,791,760, Cl. 51-267.000.  
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Coronato, Robert M., to P.T.L. Equipment Co., Inc. Vandal resistant display units. 4,791,746, Cl. 40-547.000.  
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Coserwath, Charles; Ju, Shiaw; and Verstrate, Gary W., to Exxon Research & Engineering Co. Narrow MWD alpha-olefin copolymers. 4,792,595, Cl. 526-348.000.  
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Dougherty, James; Locke, Harold O.; Vara, Fulvio J.; Login, Robert B.; and Smith, Terry E., to GAF Corporation. Insoluble vinyl lactam clarifiers. 4,792,400, Cl. 210-500.100.  
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E A Squared, Inc.: See—  
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E. R. Squibb & Sons, Inc.: See—  
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Eagleair, Inc.: See—  
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Winnington, Terence L.; and Eames, Ian W., 4,791,887, Cl. 122-11.000.  
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Mack, William J.; and Smyth, Robert R., 4,792,901, Cl. 364-424.100.  
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Eckert, Charles E., to Aluminum Company of America. Production of intermetallic particles. 4,792,431, Cl. 420-590.000.  
Eckes, Helmut: See—  
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Economy Label Sales Co., Inc.: See—  
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Eddy Pump Corporation: See—  
Weinrib, Harry P., 4,792,275, Cl. 415-53.00R.  
Edgar, James P.: See—  
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- Edmonson, Douglas A.: See—  
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- Edwards, Cree A.; and Johnson, Larsh M., to Domestic Automation Company, Inc. System for use with a utility meter for recording time of energy use. 4,792,677, Cl. 250-231.05E.
- Effland, Richard C.; Klein, Joseph T.; and Kapples, Kevin J., to Hoechst-Roussel Pharmaceuticals, Inc. N-(pyrrol-1-yl)pyridinamines having memory enhancing activity. 4,792,562, Cl. 514-343.000.
- Egasa, Roy B. Post removing device. 4,792,120, Cl. 254-30.000.
- Egri, John D., II. Metallic framing fire-stop. 4,791,766, Cl. 52-317.000.
- Eheim, Franz, deceased (by Eheim, Helga, legal representative), to Robert Bosch GmbH. RPM governor for fuel injection pumps. 4,791,901, Cl. 123-373.000.
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- Ehrlich, Paul H.: See—  
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- Eickholt, Hubert: See—  
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- Eidemore, Paul G., to Integrated Flow Systems, Inc. Fluid flow control valve. 4,792,113, Cl. 251-65.000.
- Eigenmann, Helmut. Method and apparatus for depositing prearranged retroreflecting elements onto a road surface. 4,792,259, Cl. 404-73.000.
- Eilentrapp, Heinz, to HEW-Kabel Heinz Eilentrapp KG. Wrapped, elongated stock. 4,791,966, Cl. 138-154.000.
- Eisai Co., Ltd.: See—  
Miyoshi, Isao, 4,792,524, Cl. 435-240.200.
- Eisenberg, Lawrence; and Eisenberg, Michael, to Sound Enhancement Systems, Inc. Electronic stethoscope system and method. 4,792,145, Cl. 128-715.000.
- Eisenberg, Michael: See—  
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- Eklund, Dah; and Westergard, Sivert, to Oy Wartsila Ab. Apparatus for coating running webs. 4,791,879, Cl. 118-50.000.
- Elben, Ulrich; Anagnostopoulos, Hristo; and Bartlett, Robert R., to Hoechst Aktiengesellschaft. Pyridine compounds, pharmaceutical compositions, their use in allergy therapy. 4,792,534, Cl. 514-255.000.
- Elberson, Michael D.; and Plummer, Raymond G., to DeVilbiss Company, The. Paint color change system. 4,792,092, Cl. 239-3.000.
- Eldridge, Jerome M.; Lee, Francis C.; Moore, James O.; and Olive, Graham, to International Business Machine Corporation. Thermal drop-on-demand ink jet print head. 4,792,818, Cl. 346-140.00R.
- Electric Power Research Institute, Inc.: See—  
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- Electricite de France - Service National: See—  
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- Electro-Mechanical Products: See—  
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- Elias, Peter M.: See—  
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- Ellison, John E., to Parker-Hannifin Corporation. Semi-pilot operated four-way valve. 4,791,960, Cl. 137-596.170.
- Elloy, Martin A.; and Johnson, Robert, to Chas F Thackray Limited. Surgical instruments. 4,791,919, Cl. 128-92.0VW.
- Ellrich, Klaus; and Herzog, Christian, to ESPE Fabrik Pharmazeutischer Präparate GmbH. Bisacrylphosphine oxides, the preparation and use thereof. 4,792,632, Cl. 568-15.000.
- Elcint Ltd.: See—  
Keren, Hanan; and Linnenberg, Itzhak, 4,792,759, Cl. 324-322.000.
- ELTECH Systems Corporation: See—  
Miller, Thomas M., 4,791,769, Cl. 52-511.000.
- EM Microelectronic Marin SA: See—  
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- Emerson, Terence F., to Allied-Signal, Inc. Turbocooler with multi-stage turbine wheel. 4,792,278, Cl. 415-178.000.
- Emhart Industries, Inc.: See—  
Ettinger, Donald H., 4,792,655, Cl. 219-98.000.
- Wright, Douglas W., 4,791,845, Cl. 83-150.000.
- EMI Limited: See—  
Weston, Clive R., 4,792,952, Cl. 371-30.000.
- En-tout-cas plc: See—  
Hawkins, Paul; and Dachtler, John D., 4,792,133, Cl. 272-3.000.
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- Endou, Yasuaki; Takahashi, Hideo; and Kon, Tetsuaki, to Kureha Kagaku Kogyo Kabushiki Kaisha. Pyroelectric infrared temperature compensated detector. 4,792,682, Cl. 250-338.300.
- Endura Tape, Inc.: See—  
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- Energy Conversion Devices, Inc.: See—  
Allred, David D.; Gonzalez-Hernandez, Jesus; and Van Nguyen, On, 4,792,501, Cl. 428-699.000.
- Enes, Orville M., to Motorola, Inc. FM receiver having improved audio quality in response to Rayleigh faded received signals. 4,792,991, Cl. 455-210.000.
- Engel, Georg; and Kosak, Dietmar, to SMS Schloemann-Siemag Aktiengesellschaft. Structural-shape steel rolling mill and method of operating same. 4,791,799, Cl. 72-225.000.
- Engelke, Claude W.: See—  
Ferns, James A.; and Engelke, Claude W., 4,792,107, Cl. 244-115.000.
- Eagle, Thomas H., to General Signal Corporation. Container securing device. 4,792,269, Cl. 410-53.000.
- Engnell, David: See—  
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- Enichem Anic SpA: See—  
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- Enichem Sintesi S.p.A.: See—  
Mizia, Franco; Rivetti, Franco; Romano, Ugo; Rivola, Luigi; and Ciaraldi, Giuseppe, 4,792,417, Cl. 252-392.000.
- Enoguchi, Yuji; Yamamoto, Masashi; and Natsumura, Toshiya, to Minolta Camera Kabushiki Kaisha. Loosely mounted outer sleeve member with biasing means. 4,791,882, Cl. 118-653.000.
- Enomoto, Eyo, to Ibsiden Kabushiki Kaisha. Ceramic wiring board and its production. 4,792,646, Cl. 174-68.500.
- Environment and Safety, Inc.: See—  
Nee, Victor W., 4,791,814, Cl. 73-49.200.
- Eppley, William J., to Honeywell Inc. Multi-functional hermetic seal for non-aqueous electrochemical cells. 4,792,503, Cl. 429-181.000.
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- Ericason, Inc.: See—  
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- ESCO Corporation: See—  
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- ESPE Fabrik Pharmazeutischer Präparate GmbH: See—  
Ellrich, Klaus; and Herzog, Christian, 4,792,632, Cl. 568-15.000.
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Herold, Wolf-Dietrich; and Lucka, Karlfried, 4,792,692, Cl. 250-504.00H.
- Eselte Moto International GmbH: See—  
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- Estelle, Lee R.: See—  
Bigley, James E.; and Estelle, Lee R., 4,791,700, Cl. 15-324.000.
- Ettinger, Donald H., to Emhart Industries, Inc. Stud welding system feeding device. 4,792,655, Cl. 219-98.000.
- Evans, David L.: See—  
Adriaansen, David L.; and Evans, David L., 4,792,195, Cl. 312-245.000.
- Exner, Otto: See—  
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- Expertek, Inc.: See—  
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- Exxon Research & Engineering Co.: See—  
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- Ho, Teh C.; Young, Archie R.; Jacobson, Allan J.; and Chianelli, Russell R., 4,792,541, Cl. 502-167.000.
- Schulz, Donald N.; Berluche, Enoch; Maurer, John J.; and Bock, Jan, 4,792,593, Cl. 526-240.000.
- Facet Enterprises, Incorporated: See—  
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- Fagan, Joseph H.: See—  
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- Fagerburg, David R.: See—  
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- Faltin, Hans G., to Custom-Bilt Machinery, Inc. Apparatus for stapling and creasing paper articles in transit. 4,792,077, Cl. 227-81.000.
- Fanuc Ltd.: See—  
Yamazaki, Etsuo; and Matsuura, Hitoshi, 4,792,738, Cl. 318-630.000.
- Farmer, Frederick M. Air valve push button adapter. 4,791,857, Cl. 92-98.00R.
- Farmer, Frederick M. Automobile wheel protector. 4,792,191, Cl. 301-37.00R.
- Farmer, James: See—  
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- Faron, Eugene J.: See—  
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- Farrar, David: See—  
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- Faulstick, Luke T.: See—  
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- Fauver, Jerry S.: See—  
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- Fauza, Dario. Tracheostomy cannula. 4,791,920, Cl. 128-207.150.
- FDR Interactive Technologies: See—  
Katz, Ronald A., 4,792,968, Cl. 379-92.000.
- Fedaravichius, Algimantas J.; Sudintas, Antanas L.; Kondratiev, Vladimir S.; and Ragulskis, Kazimeras M., to Kaunasakii Politechnicheskii Institut. Apparatus for orienting magnetic cores during fabrication of memory matrices. 4,791,720, Cl. 29-737.000.

- Federighi, George J. Pressure metering cork extractor. 4,791,834, Cl. 81-3.200.
- Feierlein, Karlheinz: See—  
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- Feigenblatt, Ronald I.: See—  
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- Feld, Sam H. Self-aligning, self-locking and self-leveling trailer hitch assembly. 4,792,151, Cl. 280-406.00A.
- Ferenc, Robert A., to Whelen Technologies, Inc. Wide angle warning light. 4,792,717, Cl. 313-113.000.
- Ferguson, James L.: See—  
Liptoh, Lenny; Berman, Arthur; Meyer, Lawrence D.; and Ferguson, James L., 4,792,850, Cl. 358-92.000.
- Ferland, Michael R.: See—  
Bowhens, William J.; and Ferland, Michael R., 4,792,932, Cl. 368-113.000.
- Ferns, James A.; and Engelke, Claude W., to Boeing Company, The. Airship telescopic boom. 4,792,107, Cl. 244-115.000.
- Ferrari, John B. Decorative display arch. 4,791,740, Cl. 40-124.000.
- Ferrari, William J. Apparatus for rebuilding vehicle axles. 4,792,080, Cl. 228-49.300.
- Fildan, Gerhard. Strap fastener. 4,791,709, Cl. 24-171.000.
- Filomeno, Vito G., to Warner-Lambert Company. Skin bleaching preparations. 4,792,443, Cl. 424-62.000.
- Fine, Gerald J., to Corning Glass Works. UV-transmitting glasses. 4,792,535, Cl. 501-66.000.
- Finkel, Peter: See—  
Scholl, Thomas; Exner, Otto; Finkel, Peter; and Perrey, Hermann, 4,792,609, Cl. 346-165.000.
- Finney, Roy F., to Medical Engineering Corporation. Penile prosthesis. 4,791,917, Cl. 128-79.000.
- Firebaugh, William H. Low-noise bearing for phonograph turntables and the like. 4,792,938, Cl. 369-269.000.
- Firestone Tire & Rubber Company, The: See—  
Brantley, Herbert L., Jr., 4,792,908, Cl. 364-473.000.
- Firmani, Alexander D. Light-exposure control unit. 4,792,829, Cl. 355-38.000.
- Fischer, James L.: See—  
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- Fischer, Werner: See—  
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- Fishbine, Glenn M.; Laveen, Eric W.; Kaufman, James M.; Klein, Theodore D.; and Warner, William T., to C.F.A. Technologies, Inc. Optical fingerprinting system. 4,792,226, Cl. 356-71.000.
- Fishler, Mark K., to Vesuvius Crucible Company. Gas permeable stopper rod. 4,791,978, Cl. 164-437.000.
- Flaig, Heinz, to Mannesmann AG. Chain guide. 4,792,323, Cl. 474-144.000.
- Flebbe, Werner: See—  
Duchow, Alfred; Haack, Dietmar; Frerichs, Udo; Flebbe, Werner; and Rach, Heinz-Dieter, 4,791,972, Cl. 152-398.000.
- Flegal, Christopher M.; and Porter, John R., to Varian Associates, Inc. Cryosorption surface for a cryopump. 4,791,791, Cl. 62-55.500.
- Flores Bermudez, Simon C., to Lagoven, S.A. System to proportion assisting fluids in a well. 4,791,985, Cl. 166-68.000.
- Flores Rivera, Mario. Highly stable free iodine iodophor compositions, process for preparing same and process for using same. 4,792,445, Cl. 424-78.000.
- Florida Probe Corporation: See—  
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- FMC Corporation: See—  
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- Fobare, William F.; and Strike, Donald P., to American Home Products Corporation. Substituted furans as inhibitors of 3-hydroxy-3-methylglutaryl-coa reductase. 4,792,614, Cl. 549-292.000.
- Forn, Roderick F. Electro-mechanical locomotive bell ringing apparatus for quick and easy replacement of existing pneumatic bell ringing systems. 4,792,795, Cl. 340-395.000.
- Forberg, Halvor. Method for drying or cooling particulate materials, and an arrangement in a mixing machine. 4,791,735, Cl. 34-181.000.
- Ford, David L., to Cameron Iron Works USA, Inc. Tool for cold forging tubular members. 4,791,796, Cl. 72-62.000.
- Ford, Dixon A.: See—  
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- Ford Motor Company: See—  
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- Noggle, Francis E., 4,791,765, Cl. 52-309.200.
- Siegl, Walter O.; and Chattha, Mohinder S., 4,792,355, Cl. 106-14.150.
- Van Kirk, Larry J.; and Waterloo, Ronald L., 4,791,964, Cl. 138-115.000.
- Volk, Jack R.; and Duszkievicz, Alan J., 4,792,950, Cl. 371-8.000.
- Ford New Holland, Inc.: See—  
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- Fortuno, Joseph; Gaffney, James R.; and Grey, Thaddeus J., to General Motors Corporation. Vacuum regulator valve unit. 4,792,114, Cl. 251-129.160.
- Fory, Werner: See—  
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- Fout, Randy A.: See—  
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- Fox, John R.: See—  
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- Framatome: See—  
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- Frances, Michel: See—  
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- Francis, Leslie H., to U.S. Philips Corporation. Cathode ray tube having a flat faceplate attached by a compliant pressure bonded seal. 4,792,722, Cl. 313-477.00R.
- Franklyn, Gilbert W. Adjustable bait-receiving fishing lure. 4,791,751, Cl. 43-44.600.
- Frank L. Wells Company: See—  
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- Franke, Hermann: See—  
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- Franklin, Carl M.: See—  
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- Franklin George Co., Inc.: See—  
Mizer, Frank A.; and Coghill, George J., 4,792,057, Cl. 221-187.000.
- Franklin, Smead P., Jr.; and Johnson, Edgar R. Vent cleaning system. 4,792,363, Cl. 134-8.000.
- Franklyn, Terry L.: See—  
Woepper, Thomas E.; and Franklyn, Terry L., 4,791,975, Cl. 164-29.000.
- Fraud, Michel; and Donnard, Rene, to Thomson-Brandt Arements; and Lohr, S.A. Mobile mortar firing unit. 4,791,852, Cl. 89-40.020.
- Freisinger, Henry: See—  
Stritzl, Karl; and Freisinger, Henry, 4,792,157, Cl. 280-618.000.
- Frerichs, Udo: See—  
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- Freuchlin, Harry G.: See—  
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- Freund, Paul X.; Rodgers, Sheridan J.; and Kairys, Christopher J. Laminate material for use in protective clothing. 4,792,480, Cl. 428-286.000.
- Fricker, Richard, to A.G. (Patents) Limited. Concentration of alcoholic beverages. 4,792,402, Cl. 210-651.000.
- Fried, David L. Laser speckle imaging. 4,792,231, Cl. 356-354.000.
- Fried, John H.: See—  
Cooper, Gary F.; Fried, John H.; and Waterbury, L. David, 4,792,617, Cl. 560-53.000.
- Fried, Raymond L.; and Hoover, David M., to Hewlett-Packard Company. Fast frequency settling signal generator utilizing a frequency locked-loop. 4,792,768, Cl. 331-11.000.
- Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., to American Maize-Products Company. Food stuffs containing starch of a dull sugary-2 genotype. 4,792,458, Cl. 426-578.000.
- Fritz, Billy T.: See—  
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- Frohn, Werner; Bohlmann, Dieter; Franke, Hermann; Zimmermann, Werner; Limmer, Heinz; Hopfer, Eberhard; Lindner, Horst; Matthey, Reinhard; Muller, Henner; Poppen, Hans; Schutter, Hartmut; and Dietrich, Detlev, to VEB Petrochemisches Kombinat Schwedt; Toyo Engineering Corporation; and Mitsui Coke Co., Ltd. Process to produce light products and fuel oils for conventional use from heavy metal- and sulfur-rich crude oil residues. 4,792,389, Cl. 208-76.000.
- Frohnert, Heinz; Ullrich, Hansjuergen; and Meier, Helmut, to Veba-Oel Entwicklungs-Gesellschaft mbH. Device for mixing disperse streams before they enter a catalyst bed. 4,792,229, Cl. 366-336.000.
- Fry, Stephen M., to Baxter Travenol Laboratories, Inc. Method of controlling laser energy removal of plaque to prevent vessel wall damage. 4,791,926, Cl. 128-303.100.
- Fry, Timothy J., to General Motors Corporation. Wiper arm for curved windshield. 4,791,697, Cl. 15-250.200.
- Fuhrman, Richard C. Animal capturing apparatus. 4,791,753, Cl. 43-63.000.
- Fuji Heavy Industries, Ltd.: See—  
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- Fuji Jukogyo Kabushiki Kaisha: See—  
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- Fuji Kiko Company, Limited: See—  
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- Fuji Photo Film Co., Ltd.: See—  
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- Hirobe, Hitoashi; and Adachi, Kaoru, 4,792,866, Cl. 360-10.100.  
Kato, Eiichi; Itakura, Ryosuke; Sera, Hidefumi; and Ishii, Kazuo, 4,792,511, Cl. 430-87.000.  
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Nakamura, Taku; and Sato, Kozo, 4,792,514, Cl. 430-138.000.  
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Sano, Shojiro; and Saeki, Keiso, 4,792,543, Cl. 503-209.000.  
Shina, Michihiro; Goto, Shigenori; Iwamoto, Junichi; and Hamada, Hisashi, 4,792,762, Cl. 324-426.000.  
Shimazaki, Osamu; Urabe, Hitoashi; and Shigaki, Takao, 4,792,847, Cl. 358-80.000.  
Takahama, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, 4,792,542, Cl. 503-208.000.  
Urabe, Hitoashi, 4,792,863, Cl. 358-335.000.  
Fuji Photo Optical Co., Ltd.: See—  
Suzuki, Takashi, 4,792,826, Cl. 355-8.000.  
Fuji Xerox Co., Ltd.: See—  
Akiyama, Noboru, 4,792,131, Cl. 271-7.000.  
Fujieda, Mamoru; and Oyama, Yoshihige, to Hitachi, Ltd. Fuel supply system for internal-combustion engine, 4,791,903, Cl. 123-472.000.  
Fujihira, Atsushi: See—  
Shibata, Yuji; and Fujihira, Atsushi, 4,792,969, Cl. 379-242.000.  
Fuji, Yoshikazu: See—  
Murakami, Yoshiteru; Takahashi, Akira; Fujii, Yoshikazu; Katsuyama, Hiroyuki; and Ohta, Kenji, 4,792,474, Cl. 428-64.000.  
Fujiki, Yasuo: See—  
Hori, Toshio; and Fujiki, Yasuo, 4,792,310, Cl. 439-620.000.  
Fujimoto, Noboru; and Okuyama, Tohiaki, to Hitachi, Ltd. Control apparatus for an inverter with self-adjustment function of control constants, 4,792,742, Cl. 318-805.000.  
Fujimura, Masaki: See—  
Nagasaki, Yoichi; Nagamoto, Itsumi; Tadokoro, Toyohiko; and Fujimura, Masaki, 4,792,139, Cl. 273-167.00H.  
Fujimura, Setsuo: See—  
Sagawa, Masato; Fujimura, Setsuo; and Matsuura, Yutaka, 4,792,368, Cl. 148-302.000.  
Fujino, Akihiko; Nakai, Masaki; and Ootsuka, Hiroshi, to Minolta Camera Kabushiki Kaisha. Camera and camera system, 4,792,823, Cl. 354-446.000.  
Fujioaka, Masanobu; Ikeda, Yoshikazu; and Furuya, Nobuo, to Kobusai Denzsin Denwa Co., Ltd. Local communication system among ISDN terminal equipments, 4,792,800, Cl. 340-825.050.  
Fujioaka, Yasushi: See—  
Shirai, Shigeru; Saitoh, Keishi; Arai, Takayoshi; Kato, Minoru; and Fujioaka, Yasushi, 4,792,509, Cl. 430-64.000.  
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Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Yoneda, Yoshihiro; Noda, Tetsuo; Fujita, Naoyuki; and Asakura, Osamu, 4,792,489, Cl. 428-400.000.  
Fujita, Takayuki, to Canon Kabushiki Kaisha. Electronic apparatus for proper handling of interchangeable memory, 4,792,869, Cl. 360-69.000.  
Fujitsu Limited: See—  
Fukushima, Toshitaka, 4,792,833, Cl. 357-86.000.  
Shibata, Yuji; and Fujihira, Atsushi, 4,792,969, Cl. 379-242.000.  
Fujiwara, Michinobu: See—  
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Yoneda, Yoshihiro; Noda, Tetsuo; Fujita, Naoyuki; and Asakura, Osamu, 4,792,489, Cl. 428-400.000.  
Fukazawa, Junichi; Yasuda, Yutaka; Sato, Yuji; and Shida, Jun, to Kao Corporation. Cosmetic comprising fluoroalkyl (meth)acrylate copolymers, 4,792,444, Cl. 424-63.000.  
Fukaya, Hiroyasu: See—  
Ikeda, Motozo; Fukaya, Hiroyasu; and Sakai, Tomihisa, 4,792,907, Cl. 364-449.000.  
Fukaya, Masaki; Komatsu, Tohiyuki; Shoji, Tatsumi; Kamio, Masaru; and Sekimura, Nobuyuki, to Canon Kabushiki Kaisha. Method of manufacturing photosensors, 4,792,670, Cl. 250-211.00R.  
Fukayama, Yukio: See—  
Kuramoto, Atsushi; Fukayama, Yukio; and Kawano, Shigeyoshi, 4,792,912, Cl. 364-557.000.  
Fuke, Takamichi; Ozawa, Kazuyoshi; Masuda, Atsushi; Shigenai, Osamu; and Gunji, Kunihiko, to Alps Electric Co., Ltd. Bearing device, 4,792,245, Cl. 384-610.000.  
Fukuda Denzhi Co., Ltd.: See—  
Asai, Toshio; Nakaya, Yasuhiro; and Onodera, Yasuaki, 4,791,933, Cl. 128-640.000.  
Fukudome, Toshiyuki: See—  
Matsumoto, Tsuyoshi; Fukudome, Toshiyuki; and Tsuchida, Masaki, 4,792,638, Cl. 568-682.000.  
Fukue, Naofumi: See—  
Furuta, Kouchi; Fukue, Naofumi; Muguruma, Taku; and Iwaki, Masato, 4,791,905, Cl. 123-497.000.  
Fukuhara, Setsuo: See—  
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Yoneda, Yoshihiro; Noda, Tetsuo; Fujita, Naoyuki; and Asakura, Osamu, 4,792,489, Cl. 428-400.000.  
Tetsuo; Fujita, Naoyuki; and Asakura, Osamu, 4,792,489, Cl. 428-400.000.  
Fukui, Hiroyuki: See—  
Aoshima, Atsushi; Tonomura, Shoichiro; Fukui, Hiroyuki; and Imai, Hisaya, 4,792,627, Cl. 564-487.000.  
Fukumura, Kagenori: See—  
Morisawa, Kunio; Yasue, Hideki; Fukumura, Kagenori; Yoshizawa, Kenichi; and Nakamura, Yasunari, 4,792,012, Cl. 180-247.000.  
Fukunaga, Kouji, to Canon Kabushiki Kaisha. Word processor, 4,792,919, Cl. 364-900.000.  
Fukushima, Hirotsugu; and Hamada, Toru, to Kabushiki Kaisha Daikin Seisakusho. Flywheel with dynamic damper, 4,791,829, Cl. 74-574.000.  
Fukushima, Hitoashi: See—  
Taniguchi, Makoto; Hayaashi, Seiichi; Takei, Katsumori; and Fukushima, Hitoashi, 4,792,495, Cl. 428-484.000.  
Fukushima, Masakazu: See—  
Oki, Kentaro; Maruyama, Masanori; Fukushima, Masakazu; and Kato, Shinichi, 4,792,721, Cl. 313-432.000.  
Fukushima, Toshitaka, to Fujitsu Limited. Junction-shorting type semiconductor read-only memory having increased speed and increased integration density, 4,792,833, Cl. 357-86.000.  
Fukuzawa, Genichiro; and Ideawa, Isao, to Nissin Kogyo Kabushiki Kaisha. Self-compensating device for a drum brake, 4,792,021, Cl. 188-79.620.  
Fukuzawa, Keiji; Ito, Fumihiko; and Tsurumaru, Shinobu, to Sony Corporation. Microwave antenna, 4,792,810, Cl. 343-778.000.  
Fukuzawa, Soichi; and Shikamori, Tamotsu, to Hitachi, Ltd. Washing machine and method of washing clothes, 4,791,691, Cl. 8-159.000.  
Fulk, Clyde W., Jr.: See—  
Truex, Todd A.; and Fulk, Clyde W., Jr., 4,792,401, Cl. 210-644.000.  
Fulka, Bernard D.; Sawin, Steven P.; Aikman, Collin D.; and Jenkins, John M., III, to Union Carbide Corporation. Process for reducing sheeting during polymerization of alpha-olefins, 4,792,592, Cl. 526-62.000.  
Fuller Company: See—  
Paul, Kermit D., 4,792,235, Cl. 366-107.000.  
Funabashi, Motohisa: See—  
Sekozawa, Teruji; Shioya, Makoto; Tokuda, Hiroatsu; Funabashi, Motohisa; and Onari, Mikihiko, 4,792,905, Cl. 364-431.050.  
Shioya, Makoto; Funabashi, Motohisa; and Nishiyama, Takushi, 4,792,694, Cl. 250-558.000.  
Funamoto, Susumu: See—  
Suzuki, Hiroyuki; Shiroishi, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazutsu; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yanushi; Ohta, Sakae; and Aoi, Hajime, 4,792,497, Cl. 428-336.000.  
Furukawa, Shigeo, to Komori Printing Machinery Co., Ltd. Phase adjusting apparatus for sheet-fed printing press, 4,791,869, Cl. 101-232.000.  
Furuta, Kouchi; Fukue, Naofumi; Muguruma, Taku; and Iwaki, Masato, to Nippondenso Co., Ltd.; and Mazda Motor Corporation. Control apparatus for a vehicle engine electric fuel pump, 4,791,905, Cl. 123-497.000.  
Furuya, Nobuo: See—  
Fujioaka, Masanobu; Ikeda, Yoshikazu; and Furuya, Nobuo, 4,792,800, Cl. 340-825.050.  
Fuse, Akihiro: See—  
Kumano, Masafumi; Shindoh, Yasuyuki; Sano, Yutaka; Haga, Koichi; and Fuse, Akihiro, 4,792,510, Cl. 430-65.000.  
Futaba Kinzoku Kogyo Kabushiki Kaisha: See—  
Nishimura, Tamotsu, 4,792,165, Cl. 292-19.000.  
Futamura, Shoji, to Institute of Technology Precision Electrical Discharge Works. Electrical discharge machining apparatus including a shield for preventing deformation by temperature, 4,792,653, Cl. 219-69.00R.  
Gaenzle, Reinhard, to Tampo-Tool, Inc. Ink pump system, 4,792,292, Cl. 417-440.000.  
GAF Corporation: See—  
Dougherty, James; Locke, Harold G.; Vara, Fulvio J.; Login, Robert B.; and Smith, Terry E., 4,792,400, Cl. 210-500.100.  
Tracy, David J.; and Rizzo, Thomas, 4,792,604, Cl. 540-485.000.  
Gaffney, James R.: See—  
Fornuto, Joseph; Gaffney, James R.; and Grey, Thaddeus J., 4,792,114, Cl. 251-129.160.  
Gailey, Edward D.: See—  
Jindra, Paul R.; and Gailey, Edward D., 4,792,115, Cl. 251-149.600.  
Galdes, Emmanuel. Trailer hitch, 4,792,153, Cl. 280-478.00B.  
Gammill, Roy M. Fishing lure with internal rattle, 4,791,730, Cl. 43-42.310.  
Gandhi, Harihar F., to North American Philips Corporation. Fluorescent lamp unit with integral ballast housing, 4,792,726, Cl. 315-52.000.  
Gangal, Subhash V.; and Malhotra, Satish C., to Du Pont de Nemours, E. I., and Company. Tetrafluoroethylene copolymers, 4,792,594, Cl. 526-253.000.  
Garcia De Couto, Manuel. Mechanism for filling and discharging a toilet tank, 4,791,689, Cl. 4-366.000.  
Garda, Patrick: See—  
Devos, Francis; Garda, Patrick; and Zavidovique, Bertrand, 4,792,982, Cl. 382-68.000.  
Gardam, Allan, to Pilkington F.E. Limited. Weapon aiming system for use in a tank, 4,791,853, Cl. 89-41.190.

- Garg, Kailash C.: See—  
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Gargouil, Yves-Michel: See—  
Regnier, Gilbert; Gargouil, Yves-Michel; and Vilaine, Jean-Paul, 4,792,559, Cl. 514-311.000.  
Garman, Robert C.: See—  
Barrall, Jeffery L.; and Garman, Robert C., 4,792,359, Cl. 106-85.000.  
Garner, Terry N.; and Sherman, Ralph R., Jr., to General Electric Company. Portable radio system with externally programmable universal device connector, 4,792,986, Cl. 455-89.000.  
Garvey, Charles C., Jr.; and Winegeart, Mitchell E. Snow ski transporting device, 4,792,159, Cl. 280-814.000.  
Gassen, James, to Textron Inc. Blower-vacuum apparatus, 4,792,286, Cl. 417-234.000.  
Gates, Donald C., to Expertek, Inc. Fuel tank leak detection apparatus, 4,791,805, Cl. 73-40.700.  
Gator Corporation: See—  
Schaefer, Quinton A., 4,791,941, Cl. 128-861.000.  
Gaudiana, Russell A.; Rogers, Howard G.; and Sinta, Roger F., to Polaroid Corporation. Melt-processable polyesteramides having para-linked, substituted-phenylene radicals, 4,792,597, Cl. 528-183.000.  
GE Solid State Patents, Inc.: See—  
Zazzu, Victor, 4,792,837, Cl. 357-35.000.  
GEC Avionics Limited: See—  
Redfern, Martin W., 4,792,733, Cl. 315-386.000.  
Gehrhardt, Jost-Wilfried: See—  
Lorenz, Kurt; Dunga, Horst; Mrongowius, Klaus; and Gehrhardt, Jost-Wilfried, 4,792,382, Cl. 201-3.000.  
Geibel, Jon F.: See—  
O'Connor, James E.; Geibel, Jon F.; and Beever, William H., 4,792,481, Cl. 428-288.000.  
General Electric Company: See—  
Garner, Terry N.; and Sherman, Ralph R., Jr., 4,792,986, Cl. 455-89.000.  
Han, Choong Y., 4,792,586, Cl. 525-88.000.  
Kumar, Ajith K., 4,792,788, Cl. 341-15.000.  
Lee, Gim F., Jr., 4,792,492, Cl. 428-411.100.  
Neitzel, Robert E., 4,791,783, Cl. 60-262.000.  
Parekh, Sharad V.; Shapiro, Seymour W.; and Profera, Charles E., Jr., 4,792,770, Cl. 333-113.000.  
Smith, William R.; Sheets, Marvin W.; and Greenlee, Paul W., 4,792,462, Cl. 427-49.000.  
Stokes, Vijay K., 4,792,712, Cl. 310-156.000.  
General Electric Company, p.l.c.: See—  
Hilsom, Cyril, 4,792,213, Cl. 350-351.000.  
General Hospital Corporation, The: See—  
Donahoe, Patricia K.; Budzik, Gerald P.; and Mudgett-Hunter, Meredith, 4,792,601, Cl. 530-387.000.  
General Instrument Corporation: See—  
Blumenkranz, Robert M.; and Roberts, John O., Jr., 4,792,751, Cl. 324-57.00N.  
General Motors Corporation: See—  
Fornuto, Joseph; Gaffney, James R.; and Grey, Thaddeus J., 4,792,114, Cl. 251-129.160.  
Fry, Timothy J., 4,791,697, Cl. 15-250.200.  
Jacobson, Lawrence J.; and Kleintert, Fred F., 4,792,180, Cl. 296-210.000.  
Lee, Robert W., 4,792,367, Cl. 148-104.000.  
McVey, Harry D., 4,791,702, Cl. 16-114.00B.  
Schlieter, Donald C., 4,792,714, Cl. 310-234.000.  
Thornton, Dennis F., 4,792,877, Cl. 361-24.000.  
Wells, Joel R.; and Fees, James M., 4,791,712, Cl. 29-156.50R.  
General Signal Corporation: See—  
Engle, Thomas H., 4,792,269, Cl. 410-53.000.  
General Tire, Inc.: See—  
Alexander, Joseph H.; Radcliffe, Stanley L.; Robertson, Martin N.; Bator, Eugene A.; and Anderson, John E., 4,792,372, Cl. 156-394.100.  
Gentzler, David L.: See—  
Humble, David R.; Gentzler, David L.; and Tilidetzke, Steven J., 4,792,018, Cl. 186-61.000.  
Geophysical Company of Norway AS: See—  
Benestad, Otto, 4,792,916, Cl. 364-724.170.  
Georg Fischer AG: See—  
Rianda, Kent A., 4,792,374, Cl. 156-503.000.  
Gerber, Curtis E., to Tampo G Manufacturing Co. Windshield assembly for golf carts, 4,792,175, Cl. 296-79.000.  
Gibbs, Charles H.: See—  
Hirschfeld, John W.; Gibbs, Charles H.; and Lee, James G., 4,791,940, Cl. 128-776.000.  
Gibson, John E., to Kalmson Pty, Limited. Cycle surfboard carrier, 4,792,072, Cl. 224-32.00A.  
Gilbert, Roland A.; and Sedivec, Darrel F., to Sanders Associates, Inc. Microstrip tee-fed slot antenna, 4,792,809, Cl. 343-770.000.  
Gilhouse, Klein S.; Heller, Jerrold A.; Harding, Michael V.; and Blakeney, Robert D., II, to M/A-COM Government Systems Inc.; and Cable/Home Communication Corporation. Selective enablement of descramblers, 4,792,973, Cl. 380-24.000.  
Gill, Michael J., to Brookes & Gatehouse. Direction sensing device, 4,791,730, Cl. 33-361.000.  
Gipson, Lamar H.; Batina, William P.; and Vernon, Paul H. Air tank handle assembly, 4,792,170, Cl. 294-31.200.

- Glaumer, Bertram: See—  
Goller, Ernst; Ploppa, Jurgen; and Glaumer, Bertram, 4,791,793, Cl. 66-69.000.  
Glaverbel: See—  
Robyn, Pierre; Mottet, Leon-Philippe; and Deschepper, Pierre, 4,792,468, Cl. 427-422.000.  
Glenn, William F., to New York Institute of Technology. Apparatus for temporally processing a video signal, 4,792,854, Cl. 358-160.000.  
Glock, Eugene: See—  
Rickett, Frederic L.; Pedersen, Feder M.; and Glock, Eugene, 4,791,942, Cl. 131-291.000.  
Gockler, Heinz, to ANT Nachrichtentechnik GmbH. Digital filter bank, 4,792,943, Cl. 370-70.000.  
Goda, Hiroshi; Kawamura, Masao; Kato, Kunioki; and Sato, Makoto, to Seitetsu Kagaku Co., Ltd. Thiophene derivatives and methods for producing the same, 4,792,612, Cl. 549-71.000.  
Godyak, Valery A., to GTE Products Corporation. System and method for operating a discharge lamp to obtain positive volt-ampere characteristic, 4,792,727, Cl. 315-176.000.  
Goebel, Klaus: See—  
Baris, Alfred; and Goebel, Klaus, 4,792,074, Cl. 226-149.000.  
Goerne, Jan: See—  
Toussaint, Hans N.; and Goerne, Jan, 4,792,997, Cl. 455-619.000.  
Goff, Kenneth W.; and Chizever, Gary E., to Performance Controls, Inc. Circuit for controlling the motion of a moving object, 4,792,737, Cl. 318-615.000.  
Goff, LeRoy L., to Warning Lites of Illinois, Inc. Collapsible warning barricade apparatus, 4,792,258, Cl. 404-6.000.  
Goller, Ernst; Ploppa, Jurgen; and Glaumer, Bertram, to H. Stoll GmbH & Co. Device for the offset control of the needle beds of a flat-bed knitting machine, 4,791,793, Cl. 66-69.000.  
Goncalves, Antonin, to L'Oreal. Package for two pressurized receptacles, 4,792,062, Cl. 222-135.000.  
Gonseth, Dennis: See—  
Kramer, Bruce M.; Dombrowski, David M.; Gonseth, Dennis; Yang, Minyang; and Kohler, Stephen P., 4,792,353, Cl. 75-235.000.  
Gonzalez, Avelino J.; Steinebronn, Kurt H.; Rasinaki, Michael J.; and Sauttjer, Owen R., to Westinghouse Electric Corp. Diagnostic apparatus for an electric generator seal oil system, 4,792,911, Cl. 364-551.020.  
Gonzalez-Hernandez, Jesus: See—  
Allred, David D.; Gonzalez-Hernandez, Jesus; and Van Nguyen, On, 4,792,501, Cl. 428-699.000.  
Goodfellow, Anthony G., to Apaley Metals Limited. Tire building method employing detachable transfer box, 4,792,370, Cl. 156-111.000.  
Goodyear Tire & Rubber Company, The: See—  
Cohn, Gerald, 4,792,573, Cl. 521-604.000.  
Colvin, Howard A.; and Bull, Charles L., Jr., 4,792,589, Cl. 525-343.000.  
Davison, Jack A., 4,791,973, Cl. 152-526.000.  
Goosen, Bernard T.: See—  
Goosen, Carl C.; and Goosen, Bernard T., 4,792,335, Cl. 604-323.000.  
Goosen, Carl C.; and Goosen, Bernard T. Pressure controlled valve apparatus, 4,792,335, Cl. 604-323.000.  
Goppelt, Dieter; and Schmidt, Dieter, to INA Walzlagler Schaeffler K.G. Chain tightener, 4,792,322, Cl. 474-136.000.  
Gordon, Eugene I.: See—  
Chang, Ifay F.; Feigenblatt, Ronald I.; Howard, Webster E.; and Gordon, Eugene I., 4,792,728, Cl. 315-169.300.  
Goschke, Bernd; and Nasaler, Peter, to Siemens Aktiengesellschaft. Method and apparatus for making comparative acoustic measurements, 4,791,819, Cl. 73-865.800.  
Goto, Koichi: See—  
Tsusue, Yoichi; and Goto, Koichi, 4,792,862, Cl. 358-330.000.  
Goto, Shigenori: See—  
Shina, Michihiro; Goto, Shigenori; Iwamoto, Junichi; and Hamada, Hisashi, 4,792,762, Cl. 324-426.000.  
Gotow, Shizuo; and Kagimasa, Toyohiko, to Hitachi, Ltd. Address translation unit for translation of virtual address to real address using translation tables of multi-level hierarchical structure, 4,792,897, Cl. 364-200.000.  
Gottneid, David J.: See—  
Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., 4,792,458, Cl. 426-578.000.  
Goudie, John W., to John Goudie Associates, Inc. Lockable display frame, 4,791,761, Cl. 52-109.000.  
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Kvinge, Daniel J.; and Powers, Frederick A., 4,792,291, Cl. 417-404.000.  
GRAPHIA-Holding AG: See—  
Grunder, Roland, 4,792,076, Cl. 226-175.000.  
Grare, Didier; and Salkin, Herve, to Vallourec. Device for determining when a threaded tube joint with screw limiting stop is properly made up, 4,791,816, Cl. 73-761.000.  
Greastore, Anthony T.; Robbins, Joseph; Toon, Ernest A.; and Thompson, David A., to USM Corporation. Precision control of the thickness of heat-softenable material, 4,792,426, Cl. 264-284.000.  
Grebe, James R.: See—  
Miles, Gerald; Labus, Rainer H.; and Grebe, James R., 4,791,890, Cl. 123-41.140.  
Greendale Bicycle Company: See—  
Groendal, Mark L.; and Shook, Robert E., 4,792,150, Cl. 280-275.000.



- Greenebaum, James E., II, to Pittway Corporation. Mounting cup. 4,792,067, Cl. 222-402.100.
- Greenlee, Donald R.; and Pitts, Michael W., to Dresser Industries, Inc. Hydraulically operated and released isolation packer. 4,791,992, Cl. 166-387.000.
- Greenlee, Paul W.: See—  
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- Gregory, John R.: See—  
Parks, Gerald R.; Dawson, Chris R.; and Dondero, John, 4,792,221, Cl. 351-120.000.
- Gregory, T. Jack. Hose nozzle with high pressure pump. 4,792,096, Cl. 239-113.000.
- Grey, Thaddeus J.: See—  
Fornuto, Joseph; Gaffney, James R.; and Grey, Thaddeus J., 4,792,114, Cl. 251-129.160.
- Grieshaber, Hermann; Schueler, Peter; and Wietelmann, Jürgen, to Robert Bosch GmbH. Method for assuring emergency driving functions for a vehicle having a diesel engine. 4,791,904, Cl. 123-479.000.
- Grigsby, John M., to North American Container Corporation. Shipping container for outboard motor. 4,792,041, Cl. 206-319.000.
- Grilli, David A.: See—  
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- Grimm, Peter: See—  
Metzger, Andre; Grimm, Peter; Nohl, Andre J.; and Nau, Vance J., 4,792,434, Cl. 422-100.000.
- Groendal, Mark L.; and Shook, Robert E., to Greendale Bicycle Company. Bicycle frame. 4,792,150, Cl. 280-275.000.
- Gromoll, Bernd; and Gulden, Peter, to Siemens Aktiengesellschaft. Encapsulated compressor. 4,792,288, Cl. 417-278.000.
- Gronert, Heinz; Benisch, Johann; Pichler, Johann; and Gropp, Reinhard, to Witzemann GmbH Metallschlauch-fabrik Pforzheim. Flexible tube with mutually parallel, ring-shaped flutes and axial support. 4,791,963, Cl. 138-110.000.
- Gropp, Reinhard: See—  
Gronert, Heinz; Benisch, Johann; Pichler, Johann; and Gropp, Reinhard, 4,791,963, Cl. 138-110.000.
- Grosfillex S.A.R.L.: See—  
Guichon, Jean-Paul, 4,792,181, Cl. 297-28.000.
- Gross, John G.: See—  
Harder, David R.; and Gross, John G., 4,792,564, Cl. 514-355.000.
- Grove, Michael M., to Sundstrand Data Control, Inc. Aircraft terrain closure warning system with descent rate based envelope modification. 4,792,799, Cl. 340-970.000.
- Grove, Thomas S. Adjustable support for ladders, scaffolds and the like. 4,792,017, Cl. 182-204.000.
- Gruber, Robert J.; and Nelson, Robert A., to Xerox Corporation. Positively charged toner compositions. 4,792,513, Cl. 430-110.000.
- Grunman Aerospace Corporation: See—  
Buckland, Dennis J.; and DeRobertis, Robert B., 4,792,913, Cl. 364-602.000.
- Nielsen, Robert E., 4,792,951, Cl. 371-27.000.
- Schmitz, Charles E., 4,792,672, Cl. 250-211.00R.
- Grunder, Roland, to GRAPHIA-Holding AG. Web transporting apparatus. 4,792,076, Cl. 226-175.000.
- Gryson, Dirk: See—  
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- GTE Communication Systems Corporation: See—  
Kollanyi, Miklos J., 4,792,957, Cl. 372-34.000.
- GTE Products Corporation: See—  
Godyak, Valery A., 4,792,727, Cl. 315-176.000.
- Johnson, Walter A.; Kopatz, Nelson E.; and Ritsko, Joseph E., 4,792,351, Cl. 75-0.50A.
- Ornstein, Jacob L., 4,792,719, Cl. 313-405.000.
- GTE Valeron Corporation: See—  
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- Guevremont, Pierre. Bike brake light. 4,792,882, Cl. 362-72.000.
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- Gulden, Peter: See—  
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- Gullick Dobson Limited: See—  
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- Gullion, Steven D.: See—  
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- Gundelfinger, Richard, to Rheodyne Incorporated. Multi-size injector port system. 4,792,396, Cl. 210-198.200.
- Gunji, Kunihiko: See—  
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- Gutzler, Marc H.: See—  
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- H. Stoll GmbH & Co.: See—  
Goller, Ernst; Plopp, Jürgen; and Glaumer, Bertram, 4,791,793, Cl. 66-69.000.
- Haack, Dietmar: See—  
Duchow, Alfred; Haack, Dietmar; Frerichs, Udo; Flebbe, Werner; and Rach, Heinz-Dieter, 4,791,972, Cl. 152-398.000.
- Haas, Günther, to Max-Planck-Gesellschaft Zur Förderung Der Wissenschaften e.V. Hot cathode ionization pressure gauge. 4,792,763, Cl. 324-462.000.
- Haberle, Friedrich: See—  
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- Hadden, William A.: See—  
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- Haddow, Andrew J., to Tioxide Group PLC. Improved impact plate grinding mill having reduced milling gas consumption. 4,792,098, Cl. 241-5.000.
- Haffner, James L., to Cincinnati Milacron Inc. Position error sensing and feedback apparatus and method. 4,792,228, Cl. 356-138.000.
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- Haga, Toru: See—  
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- Haghi-Tehrani, Yahya; and Hoppe, Joachim. Data carrier having an integrated circuit and method for producing same. 4,792,843, Cl. 357-72.000.
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Simpson, Geoffrey M., 4,791,870, Cl. 102-342.000.
- Hall, Roger M. Two-stroke engine. 4,791,892, Cl. 123-47.00R.
- Hall, W. James: See—  
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- Halliburton Company: See—  
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- Laurel, David F., 4,791,952, Cl. 137-272.000.
- Trevillion, William L., 4,791,988, Cl. 166-285.000.
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- Hamada, Hisashi: See—  
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- Hamada, Minoru: See—  
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- Hamada, Toru: See—  
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- Hamann, Scott R.: See—  
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- Hamid, Rahim: See—  
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- Hammond, George S.: See—  
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- Hammond, Robert W. Apparatus and method for providing improved resistive ratio stability of a resistive divider network. 4,792,782, Cl. 338-309.000.
- Hampel, Bruce A.: See—  
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- Han, Caoong Y., to General Electric Company. Impact strength of polyphenylene ether-linear polyester articles. 4,792,586, Cl. 525-88.000.
- Hance, Richard D.: See—  
Barsotti, Edward J.; and Hance, Richard D., 4,791,915, Cl. 128-24.00A.
- Hand, Evan L., Sr., to Bethlehem Steel Corporation. Consumable lance. 4,792,125, Cl. 266-266.000.
- Haneda, Satoshi; Itoh, Takashi; Nakamura, Ken; and Makoto, Tomono, to Konishiroku Photo Industry, Co., Ltd. Method of developing electrostatic images using two component developer and AC charging. 4,792,512, Cl. 430-102.000.
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- Hangen, Joaquin J.; Swithers, Robert A.; Whelpley, William A.; and Lee, Fred S., to Data General Corporation. Distributed switching architecture. 4,792,948, Cl. 370-95.000.
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- Hansmann, Frank: See—  
Bernitz, Franz; Statnic, Eugen; and Hansmann, Frank, 4,792,887, Cl. 363-89.000.
- Hanson, Charles M., to Varo, Inc. Infrared detector arrays. 4,792,681, Cl. 250-338.200.
- Hara, Mituo. Agitating blade structure of soil stabilizing apparatus. 4,792,237, Cl. 366-296.000.

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- Harada, Takamasa; Taguchi, Masaaki; Shimoda, Sadashi; and Ito, Kouichi, to Seiko Instruments & Electronics Ltd. Ferroelectric liquid crystal electro-optical device having high water repellent alignment layer. 4,792,211, Cl. 350-341.000.
- Harder, David R.; and Gross, John G., to Medical College of Wisconsin, Inc. The Method of treatment and prevention of cerebral vasospasms. 4,792,564, Cl. 514-355.000.
- Harding, Joseph J., to Caterpillar Industrial Inc. Bidirectional roller deck control for a self guided vehicle. 4,792,995, Cl. 455-606.000.
- Harding, Michael V.: See—  
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- Harmon, Al L. Pedal-powered golf cart. 4,792,149, Cl. 280-231.000.
- Harris Corp.: See—  
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- Harrison, George E.: See—  
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- Harl, Engelbert: See—  
Mueller, Gustav; Harl, Engelbert; and Honsberg, Martin, 4,792,959, Cl. 372-46.000.
- Harvard Corporation: See—  
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- Hasegawa, Sinichi: See—  
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- Hasegawa, Yoshihiko, to TLV Co., Ltd. Self-regulated pressure control valve. 4,791,954, Cl. 137-487.500.
- Hashi, Kazunori: See—  
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- Hashimoto, Akira: See—  
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- Hatada, Toshio; Oouchi, Tomihisa; Kunugi, Yoshifumi; Sugimoto, Shigeo; and Kaneko, Junichi, to Hitachi, Ltd. Heat transfer fin. 4,791,984, Cl. 165-151.000.
- Hatanaka, Kaoru: See—  
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- Hatch, Edward A.; and Skalka, Clemens J., to Combustion Engineering, Inc. Pulverizer auxiliary lubrication system. 4,792,099, Cl. 241-30.000.
- Hatebur Umformmaschinen AG: See—  
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- Hatfield, Richard, Jr.; Steele, Howard R.; and Shah, Nirad N., to Dow Chemical Company. The Process for polymeric MDA, recycle of finished polymeric MDA. 4,792,624, Cl. 564-333.000.
- Hatfield, Stephen C., to Combustion Engineering, Inc. Spring retention cap. 4,792,429, Cl. 376-446.000.
- Hattori, Makoto: See—  
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- Hattori, Masato, to Toyoda Gosei Co., Ltd. Hose intermediate retainer. 4,792,109, Cl. 248-56.000.
- Hattori, Shin; Takai, Makoto; Wakabayashi, Toshio; Suwabe, Yasuji; and Miyaoka, Syozo, to Terumo Kabushiki Kaisha. Diene derivatives and vasodilators containing the same. 4,792,553, Cl. 514-255.000.
- Hattori, Yasuo: See—  
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- Hawe, Malcolm; and Farrar, David, to Allied Colloids Limited. Dispensing agents. 4,792,343, Cl. 44-51.000.
- Hawkins, Paul; and Dachtler, John D., to En-tout-cas plc. Substitute ground surface material. 4,792,133, Cl. 272-3.000.
- Haworth, Inc.: See—  
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- Hayashibara, Ken: See—  
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- Hayashi, Hiroshi: See—  
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- Hayashi, Nobuhiko: See—  
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- Hayashi, Seiichi: See—  
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- Hayashi, Tuntomu; Kawaguchi, Takeshi; and Tauchida, Tetsuo, to Honda Giken Kogyo Kabushiki Kaisha. Antilock brake device for vehicles. 4,792,194, Cl. 303-116.000.
- Hayashi, Yasuhide; Matsue, Kouki; and Takita, Yoshisuke, to Kabushiki Kaisha Meidensha. Gate turn-off thyristor. 4,792,838, Cl. 357-38.000.
- Hayashi, Yoshitake: See—  
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- Hayashibara, Ken: See—  
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- Headrick, Edward E. Flying disc entrapment assembly. 4,792,143, Cl. 273-400.000.
- Hedden, Jeffrey R.: See—  
Cahill, Benjamin M., III; and Hedden, Jeffrey R., 4,792,981, Cl. 382-56.000.
- Heermann, Charles: See—  
Hrovat, Davorin; Heermann, Charles; and Tobler, William E., 4,792,902, Cl. 364-424.100.
- Heidel, Klaus, to Huels Akitengesellschaft. Process for producing low-viscosity starch dispersions. 4,792,362, Cl. 127-71.000.
- Heidelberg, Gotz. Transporting device of the conveyor belt type. 4,792,036, Cl. 198-619.000.
- Heidelberg Druckmaschinen AG: See—  
Lange, Peter, 4,792,910, Cl. 364-519.000.
- Heikkila, Kurt E.: See—  
Nash, James E.; and Heikkila, Kurt E., 4,792,413, Cl. 252-111.000.
- Heilwell, Israel J., to Mobil Oil Corporation. High temperature stable aqueous brine fluids viscosified by polyvinylpyrrolidone. 4,792,412, Cl. 252-8.514.
- Heim, Edgar; Sande, Kurt; and Staaland, Torbjørn, to Skarpenord Control Systems A/S. Single acting hydraulic actuator with variable return force. 4,791,856, Cl. 92-84.000.
- Heinemann, Otto: See—  
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- Heinis, Robert; Skene, James C.; and Smith, Ronald, to Red Devil, Inc. Multi-canister tinter with lost-motion coupling. 4,792,236, Cl. 366-245.000.
- Heitmann, Jürgen, to Robert Bosch GmbH. Differential pulse code modulation system with neutralization of direct current information. 4,792,794, Cl. 341-143.000.
- Held, Uwe: See—  
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- Helix Enterprises, Inc.: See—  
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- Heller, Jerrold A.: See—  
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- Hemmie, Dale L., to Conifer Corporation. Interdigital filter apparatus and method for construction. 4,791,717, Cl. 29-600.000.
- Hempkins, W. Brent; Kingsborough, Roger H.; Lohce, Wesley E.; and Nini, Conroy J., to Chevron Research Company. Method of avoiding stuck drilling equipment. 4,791,998, Cl. 175-61.000.
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- Piorr, Robert; and Meffert, Alfred, 4,792,419, Cl. 260-513.00R.
- Henne, Heinrich: See—  
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- Hensman, John R.; Roberts, Andrew J.; and Harrison, George E., to Davy McKee (London) Limited. Process of recovering aldehydes. 4,792,636, Cl. 568-492.000.
- Henson, John B.: See—  
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- Herberg, Helmut: See—  
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- Hercon Laboratories Corporation: See—  
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- Herndon, Robert M.: See—  
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- Herold, Wolf-Dietrich; and Lucks, Karlfried, to Espe Stiftung & Co. Produktions-Und Vertriebs KG. Dental irradiation apparatus. 4,792,692, Cl. 250-504.00H.
- Herr, Thomas E.; and McCormick, Susan H. Glove for attachment to self-service fuel pump. 4,791,682, Cl. 2-160.000.
- Herrington, Fox J.; and Holland, Richard A., to Mobil Oil Corporation. Bullet punch. 4,791,843, Cl. 83-100.000.
- Herrington, Fox J.: See—  
Broderick, Kevin; Catchman, Vernon C.; Herrington, Fox J.; Johnston, Shirley K.; Olson, Robert H.; and Stell, Donald, 4,792,241, Cl. 383-75.000.
- Hershman, Arnold: See—  
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- Hertz, Christian: See—  
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- Heslip, John A.: See—  
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Hetherington, Robert D.: See—  
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Hettinger, William F., Jr.; Murray, Steven W.; Adkins, Ricky L.; Fritz, Billy T.; Riggs, James R.; and Walters, Paul W., to Ashland Oil, Inc. Apparatus for the separation of solid particulates from a gaseous effluent. 4,792,437, Cl. 422-147.000.

Hetzner, Norbert, to Emsite Meto International GmbH. Price board. 4,791,739, Cl. 40-5.000.

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Hewlett-Packard Company: See—  
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Heymeijer, Herman R., to North American Philips Corporation. Powder densification using ice. 4,792,342, Cl. 23-313.00R.

Hickman, Fred E., III: See—  
Marchetti, Joseph R., deceased; Hickman, Fred E., III; and Thomas, Wilbur R., 4,792,479, Cl. 428-236.000.

Hicks, Dwan. Stair tread support. 4,791,764, Cl. 52-187.000.

High Yield Technology: See—  
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Hildebrand, Robert C., to Harris Corp. Ellipsoid distribution of antenna array elements for obtaining hemispheric coverage. 4,792,808, Cl. 343-833.000.

Hilsum, Cyril, to General Electric Company, p.l.c., The. Thermal imaging device. 4,792,213, Cl. 350-351.000.

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Soehnlein, Dieter; Neuhoerl, Josef; and Hoffman, Armin, 4,792,065, Cl. 222-387.000.

Hintz, John C. Semi-trailer truck. 4,792,148, Cl. 280-81.00A.

Hiraguchi, Masayoshi, to NEC Corporation. Automatic retrain method for a full duplex modem having an echo canceller and an equalizer. 4,792,940, Cl. 370-32.100.

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Hirata, Kazumasa: See—  
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Hiro, Masaaki: See—  
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Hirobe, Hitoshi; and Adachi, Kaoru, to Fuji Photo Film Co., Ltd. Still picture recording apparatus. 4,792,866, Cl. 360-10.100.

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Hiashiyama, Sadao: See—  
Suzuki, Hiroyuki; Shiroishi, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazuetsu; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yasushi; Ohta, Sakae; and Aoi, Hajime, 4,792,497, Cl. 428-336.000.

Hitachi Chemical Co.: See—  
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Toriumi, Minoru; Shiraiishi, Hiroshi; Irie, Ryotaro; and Koibuchi, Shigeru, 4,792,516, Cl. 430-196.000.

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Fukuzawa, Soichi; and Shikamori, Tamotu, 4,791,691, Cl. 8-159.000.

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Honma, Yoshio; Tsunekawa, Sukeyoshi; Yokoyama, Natsuki; and Morisaki, Hiroshi, 4,792,842, Cl. 357-71.000.

Inoue, Hiroaki; Tsuji, Shinji; Matsumura, Hiroyoshi; and Arimoto, Akira, 4,792,197, Cl. 350-3.700.

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Ohtani, Hideya; Momoi, Toshimitsu; Ooi, Eiji; Sakuraba, Shubei; Morita, Masayuki; and Wakashima, Yoshiaki, 4,792,532, Cl. 437-206.000.

Oku, Kentaro; Maruyama, Masanori; Fukushima, Masakazu; and Kato, Shinichi, 4,792,721, Cl. 313-432.000.

Osato, Tatsuo, 4,792,942, Cl. 370-60.000.

Sekozawa, Teruji; Shioya, Makoto; Tokuda, Hiroatsu; Funabashi, Motohisa; and Onari, Mikihiko, 4,792,905, Cl. 364-431.050.

Shioya, Makoto; Funabashi, Motohisa; and Nishiya, Takushi, 4,792,694, Cl. 250-558.000.

Suzuki, Hiroyuki; Shiroishi, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazuetsu; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yasushi; Ohta, Sakae; and Aoi, Hajime, 4,792,497, Cl. 428-336.000.

Takahashi, Yasuhiro; and Hiyama, Kunio, 4,792,944, Cl. 370-84.000.

Takamatsu, Hisashi; Takeuchi, Hisaharu; and Shiroyanagi, Yoshiro, 4,792,917, Cl. 364-900.000.

Takiyasu, Yoshihiro; and Wada, Kenichi, 4,792,947, Cl. 370-86.000.

Hitachi Maxell, Ltd.: See—  
Miyake, Akira; and Kishimoto, Mikio, 4,792,483, Cl. 428-323.000.

Hiyama, Kunio: See—  
Takahashi, Yasuhiro; and Hiyama, Kunio, 4,792,944, Cl. 370-84.000.

Hlava, Lorenz G., to Zebco Corporation. Magnetic bail. 4,792,106, Cl. 242-84.20G.

Hlavacek, Robert A.; Dumican, Barry L.; and McCusker, Edward J., to American Cyanamid Company. Flat braided ligament or tendon implant device having textured yarns. 4,792,336, Cl. 623-13.000.

Ho, I-Chung. Book/painting/treasure/equipment saver. 4,791,994, Cl. 169-48.000.

Ho, Teh C.; Young, Archie R.; Jacobson, Allan J.; and Chianelli, Russell R., to Exxon Research and Engineering Company. Hydro-treating catalysts comprising supported, mixed metal sulfide of iron promoted Mo and W and their uses. 4,792,541, Cl. 502-167.000.

Hochlan, Eugene, Jr. Manual tiller, mulcher, weeder tool. 4,791,995, Cl. 172-21.000.

Hodge, Steven E.: See—  
McArthur, James; and Hodge, Steven E., 4,792,255, Cl. 403-325.000.

Hodges, Robert E., Jr.: See—  
Bell, John R., III; and Hodges, Robert E., Jr., 4,791,770, Cl. 52-543.000.

Hoechst AG: See—  
Rudolph, Albert; and Eckes, Helmut, 4,792,356, Cl. 106-30.000.

Hoechst Aktiengesellschaft: See—  
Elben, Ulrich; Anagnostopoulos, Hristo; and Bartlett, Robert R., 4,792,554, Cl. 514-255.000.

Lachhein, Stephen; Mildnerberger, Hilmar; and Ressel, Hans-Joachim, 4,792,610, Cl. 548-329.000.

Raab, Klaus, 4,792,613, Cl. 549-229.000.

Hoechst-Roussel Pharmaceuticals, Inc.: See—  
Efland, Richard C.; Klein, Joseph T.; and Kapples, Kevin J., 4,792,562, Cl. 514-343.000.

Hoefer, Rainer; Meffert, Alfred; Pierr, Robert; Wegemund, Bernd; and Held, Uwe, to Henkel Kommanditgesellschaft auf Aktien. Polyethylene glycol ether foam inhibitors, emulsifiers, and stabilizers for polymers. 4,792,582, Cl. 524-378.000.

Hoffman, Armin: See—  
Soehnlein, Dieter; Neuhoerl, Josef; and Hoffman, Armin, 4,792,065, Cl. 222-387.000.

Hoffman, Joel A. Leaf-bagger. 4,791,779, Cl. 56-202.000.

Hoffman-La Roche Inc.: See—  
Kompis, Ivan; Rey-Bellet, Gerald; and Zanetti, Guido, 4,792,557, Cl. 514-275.000.

Hoffman, Norman E.: See—  
Ausman, Robert K.; Adams, Mark; Caballero, Gerardo; Hamid, Rahim; Hoffman, Norman E.; Quebbeman, Edward J.; Schulte, William J.; Thomson, Robert; Whipple, Julie; and Weisman, Steven D., 4,792,449, Cl. 424-440.000.

Hoffmann, Erich, to Robert Krups Stiftung & Co. KG. Electric toaster. 4,791,862, Cl. 99-385.000.

Hoffmann-La Roche Inc.: See—  
Winternitz, Paul; and Zurluh, Rene, 4,792,616, Cl. 560-21.000.

Hoffmann, Ulrich: See—  
Wiening, Wolfgang; Hoffmann, Ulrich; and Rake, Heinrich, 4,791,706, Cl. 19-105.000.

Hofmann, Ruediger, to Siemens Aktiengesellschaft. Broadband signal space coupling device. 4,792,801, Cl. 340-825.790.

Hojo, Takeshi; Nakaishi, Takafumi; and Morohoshi, Mikio, to Kabushiki Kaisha Tokyo Keiki. Gyro apparatus. 4,791,727, Cl. 33-325.000.

Hojo, Takeshi; and Nakaishi, Takafumi, to Kabushiki Kaisha Tokyo Keiki. Gyro apparatus with a vibration portion. 4,792,676, Cl. 250-231.00Y.

Hokuriku Pharmaceutical Co., Ltd.: See—  
Itoh, Yasuo; Kato, Hideo; Koshinaka, Eiichi; Ogawa, Nobuo; and Mitani, Kazuya, 4,792,547, Cl. 514-211.000.

Holladay, John T., to Packaging Corporation of America. Shipping unit for non-riding lawn mower or the like. 4,792,043, Cl. 206-349.000.

Holland, Richard A.: See—  
Herrington, Fox J.; and Holland, Richard A., 4,791,843, Cl. 83-100.000.

Holley, David M., to Power Components, Inc. No grow gas spring. 4,792,128, Cl. 267-118.000.

Holm, Ejler L.: See—  
Nielsen, Carsten; Holm, Ejler L.; Sandeman, Jens P.; and Madsen, Hanne F., 4,792,440, Cl. 423-244.000.

Holzheimer, George. Automotive parts cleaning device with asbestos residue compartment. 4,791,947, Cl. 134-123.000.

Honda Giken Kogyo Kabushiki Kaisha: See—  
Abe, Masaru; Ogura, Masami; and Sato, Tsuyoshi, 4,792,007, Cl. 180-140.000.

Hayashi, Tautomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,792,194, Cl. 303-116.000.

Ishikawa, Yoshikazu; and Yamaguchi, Kouji, 4,791,902, Cl. 123-399.000.

Miyamaru Yukio; Hatanaka, Kaoru; Kawada, Shigeo; and Shibata, Yasuo, 4,792,785, Cl. 340-73.000.

Okumura, Shinichi; and Suganuma, Yasushi, 4,792,020, Cl. 188-18.00A.

Yoshioka, Teruo; Nakano, Shoji; and Sato, Yutaka, 4,791,714, Cl. 29-156.40R.

Honeywell Inc.: See—  
Eppley, William J., 4,792,503, Cl. 429-181.000.

Honma, Yoshio; Tsunekawa, Sukeyoshi; Yokoyama, Natsuki; and Morisaki, Hiroshi, to Hitachi, Ltd. Semiconductor device with wiring layer using bias sputtering. 4,792,842, Cl. 357-71.000.

Honmura, Osamu: See—  
Yamamoto, Nobuyuki; Nishikawa, Isamu; and Honmura, Osamu, 4,792,544, Cl. 503-216.000.

Honnef, Peter: See—  
Chapman, Allen F.; and Honnef, Peter, 4,792,285, Cl. 417-206.000.

Honsberg, Martin: See—  
Mueller, Gustav; Hartl, Engelbert; and Honsberg, Martin, 4,792,939, Cl. 372-46.000.

Hoogovens Groep B.V.: See—  
Zonneveld, Petrus C. H., 4,792,124, Cl. 266-226.000.

Hoover, David M.: See—  
Fried, Raymond L.; and Hoover, David M., 4,792,768, Cl. 331-11.000.

Hopfer, Eberhard: See—  
Frohn, Werner; Bohlmann, Dieter; Franke, Hermann; Zimmermann, Werner; Limmer, Heinz; Hopfer, Eberhard; Lindner, Horst; Matthey, Reinhard; Muller, Henner; Poppen, Hans; Schutter, Hartmut; and Dietrich, Detlev, 4,792,389, Cl. 208-76.000.

Hoppe, Joachim: See—  
Haghiri-Tehrani, Yahya; and Hoppe, Joachim, 4,792,843, Cl. 357-72.000.

Hor, Ah-Mee: See—  
Kazmaier, Peter M.; Burt, Richard A.; Hor, Ah-Mee; and Hsiao, Cheng-Kuo, 4,792,508, Cl. 430-59.000.

Hori, Toshio; and Fujiki, Yasuo, to Murata Manufacturing Co., Ltd. Connector having filtering function. 4,792,310, Cl. 439-620.000.

Hori, Yoshimichi: See—  
Igaki, Masanori; Yoneyama, Sigeo; Hori, Yoshimichi; and Satoh, Takayuki, 4,792,318, Cl. 445-66.000.

Horiba, Ltd.: See—  
Okada, Masaru; and Tomita, Katsuhiko, 4,792,463, Cl. 427-126.300.

Horie, Fujio; and Matsubara, Kenji, to Brother Kogyo Kabushiki Kaisha. Feed control device for an electronically controlled zigzag sewing machine. 4,791,877, Cl. 112-456.000.

Horiishi, Nanao: See—  
Nakao, Yukimichi; Kaeriyama, Kyoji; Suda, Yoshio; Imai, Tomoyuki; Oze, Osamu; and Horiishi, Nanao, 4,792,645, Cl. 174-126.400.

Horikawa, Jiro: See—  
Saegusa, Takeo; Horikawa, Jiro; Niwano, Masahiro; and Kanazawa, Takenobu, 4,792,603, Cl. 540-451.000.

Horikoshi, Kuniaki, to Inpal Co., Ltd.; and Toyo Element Industry Co., Ltd. Rotary type ozonizer. 4,792,438, Cl. 422-186.130.

Horst, Gary E.: See—  
Smith, Robert C.; and Horst, Gary E., 4,792,709, Cl. 310-49.00R.

Horst, Ralph L., to Aluminum Company of America. Aluminum anode alloy. 4,792,430, Cl. 420-548.000.

Hosaka, Shuntaro: See—  
Uchida, Takafumi; and Hosaka, Shuntaro, 4,792,527, Cl. 436-507.000.

Hosaka, Tomiharu: See—  
Kishimoto, Yoshio; and Hosaka, Tomiharu, 4,792,663, Cl. 219-549.000.

Hoshizaki Electric Co., Ltd.: See—  
Narusu, Nobutaka; and Ogata, Shozo, 4,791,792, Cl. 62-135.000.

Hosotani, Takashi, to Nissan Motor Co., Ltd. Full hydraulic power steering system. 4,792,008, Cl. 180-142.000.

Houser, Robert J.: See—  
Krawiec, Donald F.; Kraf, Robert J.; and Houser, Robert J., 4,792,276, Cl. 415-118.000.

Howard, John R.; and Timmins, Peter, to E. R. Squibb & Sons, Inc. Controlled release formulation. 4,792,452, Cl. 424-475.000.

Howard, P. Guy: See—  
Cherry, Craig D.; and Howard, P. Guy, 4,792,666, Cl. 235-466.000.

Howard, Webster E.: See—  
Chang, Ifay F.; Feigenblatt, Ronald I.; Howard, Webster E.; and Gordon, Eugene L., 4,792,728, Cl. 315-169.300.

Hoya Corporation: See—  
Kobayashi, Norio; and Amano, Satoru, 4,792,930, Cl. 367-140.000.

HR Texton, Inc.: See—  
Boyer, Kent R., 4,792,708, Cl. 310-15.000.

Hrovat, Davorin; Heermann, Charles; and Tobler, William E., to Ford Motor Company. Engine ignition timing for a clutch engagement control system. 4,792,902, Cl. 364-424.100.

Hsei, Paul K.; Meguro, Jun-ichi; Stark, William A.; and Solberg, Arne L., to Baxter Travenol Laboratories, Inc. Heat sealing apparatus. 4,792,373, Cl. 156-497.000.

Hsiao, Cheng-Kuo: See—  
Kazmaier, Peter M.; Burt, Richard A.; Hor, Ah-Mee; and Hsiao, Cheng-Kuo, 4,792,508, Cl. 430-59.000.

Hsiung, Hsiao: See—  
Yanoy, John A., Jr.; Odlyzko, Paul; Aahok, Erramilli; and Hsiung, Hsiao, 4,792,941, Cl. 370-58.000.

Huang, Fu-chih, to Rorer Pharmaceutical Corporation. Quinoline hydroxamates and their use as modulators of arachidonic acid metabolic pathways. 4,792,560, Cl. 514-311.000.

Huang, Shu-Jen W., to Nalco Chemical Company. Paint deaerification. 4,792,364, Cl. 134-38.000.

Huber, George H., Jr. Sandblasting nozzle and control valve assembly. 4,792,116, Cl. 251-229.000.

Huber, Lothar; and Langenecker, Hermann, to Luk Lamellen und Kupplungsbau GmbH. Hub for clutch discs of friction clutches in motor vehicles. 4,792,030, Cl. 192-106.200.

Huber, Thomas, to Bavaria Cargo Technologie GmbH. Drive roller unit. 4,792,037, Cl. 198-788.000.

Hudson, John C.; Thantrey, Shok; and Jackson, Ian M., to Porous Element Heating Limited. Removal of particulate material from a gas. 4,791,785, Cl. 60-303.000.

Hue, Jean, to Salomon, S.A. Safety binding for cross-country skiing. 4,792,156, Cl. 280-615.000.

Huels Aktiengesellschaft: See—  
Heidel, Klaus, 4,792,362, Cl. 127-71.000.

Huey Bao Co., Ltd.: See—  
Pan, Shih C.; and Tseng, Ching P., 4,791,733, Cl. 33-403.000.

Hughes Aircraft Company: See—  
Chang, David B.; Berg, Michael F.; Drummond, James E.; and Mickelson, Lee, 4,792,683, Cl. 250-341.000.

Miglia, Egidio, 4,792,803, Cl. 342-372.000.

Pond, Ramona G.; Vitriol, William A.; and Brown, Raymond L., 4,792,779, Cl. 338-195.000.

Rosen, Harold A., 4,792,813, Cl. 343-781.00P.

Trujillo, Manuel A., 4,792,654, Cl. 219-69.00V.

Wickholm, David R.; and Strittmatter, Donald J., 4,792,214, Cl. 350-410.000.

Hughes, Gustav O.; and Criss, George H., to Dresser Industries, Inc. Resin-bonded taphole mix. 4,792,578, Cl. 523-140.000.

Humble, David R.; Gentzler, David L.; and Tildetzke, Steven J., to CheckRobot Inc. System for security processing of retail articles. 4,792,018, Cl. 186-61.000.

Hunt, David A.: See—  
Kwiatkowski, Patricia L.; and Hunt, David A., 4,792,224, Cl. 351-163.000.

Hunter, Scott R.: See—  
Christophorou, Loucas G.; McCorkle, Dennis L.; and Hunter, Scott R., 4,792,724, Cl. 313-637.000.

Huschelrath, Gerhard; and Rehfs, Ekkehard, to Nukem GmbH. Process and apparatus for the non-destructive examination of ferromagnetic bodies having sections of surface adjoining each other along edges and/or at corners. 4,792,755, Cl. 324-225.000.

Hutter, Heinrich, to U.S. Philips Corporation. Cassette loading apparatus with differential gear providing three functions. 4,792,871, Cl. 360-85.000.

Hwang, Bing-Yih. Structure for pipe fittings. 4,792,160, Cl. 285-39.000.

Hwang, Min-Su. Noise and burglar preventive door and window apparatus. 4,791,762, Cl. 52-171.000.

I F M Electronic GmbH: See—  
Bauknecht, Otto; Lichte, Norbert; and Warken, Karl-Heinz, 4,792,879, Cl. 361-424.000.

Ibiden Kabushiki Kaisha: See—  
Enomoto, Eyo, 4,792,646, Cl. 174-68.500.

Ichikawa, Izumi: See—  
Imano, Haruo; Ichikawa, Izumi; Ogiwara, Satoshi; and Miura, Genmei, 4,793,000, Cl. 455-619.000.

Ideawa, Isao: See—  
Fukuzawa, Genichiro; and Ideawa, Isao, 4,792,021, Cl. 188-79.620.

Ikaki, Masanori; Yoneyama, Sigeo; Hori, Yoshimichi; and Satoh, Takayuki, to Kabushiki Kaisha Toshiba. Device for warm press forming a plate-like member into a shadow mask for a color cathode ray tube. 4,792,318, Cl. 445-66.000.



Igarashi, Akira: See—  
Takashima, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, 4,792,542, Cl. 503-208.000.  
Igarashi, Masami; Kato, Yoshinori; and Kamijo, Yoshimi, to Alps Electric Co., Ltd. Dispersive type electroluminescent panel and method of fabricating same. 4,792,723, Cl. 313-503.000.  
Igarashi, Minoru: See—  
Takashima, Akira; Shimamura, Yoshiyuki; Kobayashi, Hide; Okonogi, Shigeo; Kawashima, Takuji; and Igarashi, Minoru, 4,792,349, Cl. 514-400.000.  
Igen, Inc.: See—  
Kim, Peter S.; and Kallenbach, Neville R., 4,792,446, Cl. 424-85.800.  
Ikebe, Takaki: See—  
Togo, Shizuo; Sugihara, Yasuo; and Ikebe, Takaki, 4,792,403, Cl. 210-692.000.  
Ikeda Bussan Co.: See—  
Oshikawa, Yoshitoshi, 4,792,185, Cl. 297-284.000.  
Ikeda, Motozou; Fukaya, Hiroyasu; and Sakai, Tomihisa, to Nippon-denso Co., Ltd. Vehicle navigation system. 4,792,907, Cl. 364-449.000.  
Ikeda, Yoshikazu: See—  
Fujioka, Masanobu; Ikeda, Yoshikazu; and Furuya, Nobuo, 4,792,800, Cl. 340-825.050.  
Ikonen, Veijo, to Orion-yhtymä Oy. Method for performing a liquid analysis and an analytical element for use in the method. 4,792,432, Cl. 422-72.000.  
Illy, Alois; Alberti, Gunter; and Feiertag, Karlheinz, to Klein, Schanzlin & Becker Aktiengesellschaft. Valve. 4,792,119, Cl. 251-333.000.  
Imai, Hisaya: See—  
Aoshima, Atsushi; Tonomura, Shoichiro; Fukui, Hiroyuki; and Imai, Hisaya, 4,792,627, Cl. 564-487.000.  
Imai, Tomoyuki: See—  
Nakao, Yukimichi; Kaeriyama, Kyoji; Suda, Yoshio; Imai, Tomoyuki; Oze, Osamu; and Horiishi, Nanao, 4,792,645, Cl. 174-126.400.  
Imaizumi, Junichi: See—  
Numata, Shun-ichi; Fujisaki, Koji; Kinjo, Noriyuki; Imaizumi, Junichi; and Mikami, Yoshikatsu, 4,792,476, Cl. 428-209.000.  
Imano, Haruo; Ichikawa, Izumi; Ogiwara, Satoshi; and Miura, Genmei, to Canon Kabushiki Kaisha. Light signal receiver. 4,793,000, Cl. 455-619.000.  
Imaoka, Eiichi: See—  
Ishizaka, Yasuo; Watanabe, Noboru; Kimura, Kazuo; and Imaoka, Eiichi, 4,792,486, Cl. 428-336.000.  
Imaseki, Chiharu, to Minolta Camera Kabushiki Kaisha. Film roll mounting assembly. 4,792,105, Cl. 242-68.400.  
Immunomedics, Inc.: See—  
Shochat, Dan, 4,792,521, Cl. 435-7.000.  
Imperial Chemical Industries PLC: See—  
Sherman, Rudolf W.; and Stainer, Philip J., 4,792,409, Cl. 252-8.600.  
Takao, Shoji; Yamaoka, Hideo; Suetsugu, Katsuyoshi; Toyama, Yasunori; and Sasaki, Kazuki, 4,792,575, Cl. 521-157.000.  
Taylor, Michael D.; Stacey, Martyn H.; Kenworthy, Jeffrey S.; and Boffey, Stuart S., 4,792,478, Cl. 428-221.000.  
Whittle, Alan J., 4,792,563, Cl. 514-345.000.  
INA Walzinger Schaeffler KG: See—  
Goppelt, Dieter; and Schmidt, Dieter, 4,792,322, Cl. 474-136.000.  
Inaba, Tsutomu: See—  
Kobayashi, Norihide; Kimura, Tadashi; Inaba, Tsutomu; and Sugihara, Masahiro, 4,792,296, Cl. 418-55.000.  
Inamori, Akio: See—  
Kitao, Yuichi; and Inamori, Akio, 4,792,010, Cl. 180-233.000.  
Independent Technologies, Inc.: See—  
Ingalsbe, Daryl E.; Ingalsbe, David L.; and Bourn, Arlen G., 4,792,016, Cl. 182-107.000.  
Industrial Machine Manufacturing, Inc.: See—  
Moore, Leo M., 4,792,063, Cl. 222-146.500.  
Ingalsbe, Daryl E.; Ingalsbe, David L.; and Bourn, Arlen G., to Independent Technologies, Inc. Ladder securing device. 4,792,016, Cl. 182-107.000.  
Ingalsbe, David L.: See—  
Ingalsbe, Daryl E.; Ingalsbe, David L.; and Bourn, Arlen G., 4,792,016, Cl. 182-107.000.  
Inoue, Hiroaki; Tsuji, Shinji; Matsumura, Hiroyoshi; and Arimoto, Akira, to Hitachi, Ltd. Fabrication method and equipment for diffraction gratings. 4,792,197, Cl. 350-3.700.  
Inoue, Koichi: See—  
Yamashita, Yuko; Masumoto, Yuji; Kimura, Takao; Nishida, Katsutoshi; Inoue, Koichi; Rokkaku, Kazuo; and Takebayashi, Hiroaki, 4,792,244, Cl. 384-492.000.  
Inpal Co., Ltd.: See—  
Horikoshi, Kuniaki, 4,792,438, Cl. 422-186.130.  
Institut Français Du Pétrole: See—  
Ecomard, André, 4,791,906, Cl. 123-564.000.  
Institut National de la Santé et de la Recherche Médicale: See—  
Philippon, Jean; and Liantard, Jean-Pierre, 4,792,331, Cl. 604-187.000.  
Institute of Technology Precision Electrical Discharge Works: See—  
Futamura, Shoji, 4,792,653, Cl. 219-69.000.  
Integrated Flow Systems, Inc.: See—  
Eldmore, Paul G., 4,792,113, Cl. 251-65.000.  
Intel Corporation: See—  
Johnson, David B.; Kenoyer, Stanley; Myers, Mark S.; and Nilsson, Sven, 4,792,955, Cl. 371-68.000.

Inter Innovation LeFebure Manufacturing Corporation: See—  
Podoll, Michael J., 4,792,263, Cl. 406-189.000.  
Interatom GmbH: See—  
Tittizer, Gabriel; and Junghans, Ewald, 4,791,895, Cl. 123-90.120.  
International Business Machine Corporation: See—  
Eldridge, Jerome M.; Lee, Francis C.; Moore, James O.; and Olive, Graham, 4,792,818, Cl. 346-140.000.  
International Business Machines Corporation: See—  
Arpa, Ronald B.; and Karmin, Ehud D., 4,792,934, Cl. 371-48.000.  
Blair, Brian E.; and Weiss, Mark H., 4,792,890, Cl. 364-200.000.  
Chang, Ifay F.; Feigenblatt, Ronald I.; Howard, Webster E.; and Gordon, Eugene I., 4,792,728, Cl. 315-169.300.  
Lobb, Kenneth G.; Schmerbeck, Timothy J.; Schuelke, Brian A.; and Sutton, Manning O., 4,792,704, Cl. 307-264.000.  
Praeur, Heinz; Johnson, Alfred H.; Schulz, Dietmar; and Pohl, Peter, 4,792,204, Cl. 350-96.200.  
Stilwell, George R., Jr., 4,792,999, Cl. 455-619.000.  
Tallman, Peter H., 4,792,895, Cl. 364-200.000.  
International Fuel Cells Corporation: See—  
Trocciola, John C.; and VanDine, Leslie L., 4,792,502, Cl. 429-19.000.  
International Rectifier Corporation: See—  
Nilarp, Andrea, 4,792,530, Cl. 437-6.000.  
International Technology Corporation: See—  
Blackburn, James W.; and Sayler, Gary S., 4,792,519, Cl. 435-6.000.  
Interroll Fordertechnik GmbH & Co. KG: See—  
Specht, Dieter, 4,792,273, Cl. 414-786.000.  
Inukai, Thomas: See—  
Campanella, S. Joseph; and Inukai, Thomas, 4,792,963, Cl. 375-109.000.  
Irie, Ryotaro: See—  
Toriumi, Minoru; Shiraishi, Hiroshi; Irie, Ryotaro; and Koibuchi, Shigeru, 4,792,516, Cl. 430-196.000.  
Iritani, Hirofumi, to Kubota Ltd. Four wheel drive vehicle. 4,792,009, Cl. 180-233.000.  
Irvine, Philip A., to Commonwealth Scientific and Industrial Research Organisation. Flow cell for particle scanner. 4,792,233, Cl. 356-440.000.  
Ishida, Masaharu; and Yamamoto, Isamu, to Yazaki Corporation. Solar heat collector. 4,791,910, Cl. 126-450.000.  
Ishida, Tokuji: See—  
Norita, Toshio; Taniguchi, Nobuyuki; Ishida, Tokuji; Karasaki, Toohiko; and Hamada, Masataka, 4,792,820, Cl. 354-402.000.  
Ishida, Yoshikazu: See—  
Hikita, Mitsutaka; Sumioka, Atsushi; Ishida, Yoshikazu; Hamada, Kunihiko; Chiba, Yutaka; and Abe, Yoshio, 4,792,233, Cl. 370-24.000.  
Ishihara, Toshiyuki; Kamiya, Takeshi; Nakayama, Yutaka; and Yamada, Tetsuhiro, to NGK Spark Plug Co., Ltd. Air-fuel ratio detecting device. 4,792,387, Cl. 204-425.000.  
Ishii, Kazuo: See—  
Kato, Eiichi; Itakura, Ryosuke; Sera, Hidefumi; and Ishii, Kazuo, 4,792,511, Cl. 430-87.000.  
Ishii, Tutomu: See—  
Shimotori, Hitoshi; Ishii, Tutomu; Yamazaki, Hideo; Kuwatsuka, Tohichi; Yanase, Yuji; and Tanaka, Yoshinori, 4,792,565, Cl. 514-406.000.  
Ishikawa Gasket Co., Ltd.: See—  
Udagawa, Tsunekazu, 4,791,897, Cl. 123-193.0CH.  
Ishikawa, Hideo: See—  
Suga, Michiharu; Ishikawa, Hideo; Akana, Yoshinori; Yoshitake, Junichi; and Kondoh, Masayuki, 4,792,588, Cl. 525-240.000.  
Ishikawa, Masayuki: See—  
Ohba, Yasuo; Ishikawa, Masayuki; Yamamoto, Motoyuki; Watanabe, Yukio; and Sugawara, Hideto, 4,792,958, Cl. 372-45.000.  
Ishikawa, Shubei: See—  
Matsui, Yosuke; Ishikawa, Shubei; and Iwadachi, Takaharu, 4,792,365, Cl. 148-12.70C.  
Ishikawa, Yoshikazu; and Yamaguchi, Kouji, to Honda Giken Kogyo Kabushiki Kaisha. Throttle valve control system for an internal combustion engine. 4,791,902, Cl. 123-399.000.  
Ishikawajima-Harima Jukogyo Kabushiki Kaisha: See—  
Yamashita, Yuko; Masumoto, Yuji; Kimura, Takao; Nishida, Katsutoshi; Inoue, Koichi; Rokkaku, Kazuo; and Takebayashi, Hiroaki, 4,792,244, Cl. 384-492.000.  
Ishizaka, Yasuo; Watanabe, Noboru; Kimura, Kazuo; and Imaoka, Eiichi, to Victor Company of Japan, Ltd. Perpendicular magnetic recording medium. 4,792,486, Cl. 428-336.000.  
Ishizaki, Akira: See—  
Akaishi, Akira; Ishizaki, Akira; Suda, Yasuo; Ohnuki, Ichiro; Ohnuki, Ichiro; and Koyama, Takeshi, 4,792,668, Cl. 250-201.000.  
Ohnuki, Ichiro; Suda, Yasuo; Ishizaki, Akira; Akaishi, Akira; Ohnuki, Ichiro; and Koyama, Takeshi, 4,792,669, Cl. 250-201.000.  
Itakura, Ryosuke: See—  
Kato, Eiichi; Itakura, Ryosuke; Sera, Hidefumi; and Ishii, Kazuo, 4,792,511, Cl. 430-87.000.  
Itaya, Keiji, to Kabushiki Kaisha Toshiba. Developing apparatus. 4,792,225, Cl. 355-3.0DD.  
Itaya, Sam S.; and Burglin, Robert E., to Waxing Corporation of America, Inc. Cleaning and waxing tool for automobiles, vans, etc. 4,791,694, Cl. 15-97.000.  
Ito, Fumihiko: See—  
Fukuzawa, Keiji; Ito, Fumihiko; and Tsurumaru, Shinobu, 4,792,810, Cl. 343-778.000.

Ito, Koukichi: See—  
Harada, Takamasa; Taguchi, Masaaki; Shimoda, Sadashi; and Ito, Koukichi, 4,792,211, Cl. 350-341.000.  
Ito, Makoto: See—  
Kitagawa, Nobutaka; and Ito, Makoto, 4,792,749, Cl. 323-314.000.  
Ito, Toshikazu, to Hitachi, Ltd. Air conditioning apparatus for automotive vehicles. 4,791,981, Cl. 165-22.000.  
Itoh, Takashi: See—  
Haneda, Satoshi; Itoh, Takashi; Nakamura, Ken; and Makoto, Tomono, 4,792,512, Cl. 430-102.000.  
Itoh, Yasuo; Kato, Hideo; Koshinaka, Eiichi; Ogawa, Nobuo; and Mitani, Kazuya, to Hokuriku Pharmaceutical Co., Ltd. Pyrazine-2-carboxamide derivatives useful in treating allergic disease. 4,792,547, Cl. 514-211.000.  
Itoh, Yoshikazu: See—  
Watanabe, Fumio; and Itoh, Yoshikazu, 4,792,864, Cl. 358-335.000.  
Itoki Co., Ltd.: See—  
Yoshida, Kakuo, 4,792,270, Cl. 414-273.000.  
ITT Corporation: See—  
Wilde, Paul M., 4,791,818, Cl. 73-861.240.  
Yanovsky, John A., Jr.; Odlyzko, Paul; Ashok, Erramilli; and Hsiung, Hsiangou, 4,792,941, Cl. 370-58.000.  
ITT Defense Communications, A Division of ITT Corporation: See—  
Baker, Anthony P., 4,792,212, Cl. 350-347.00V.  
Iwadachi, Takaharu: See—  
Matsui, Yosuke; Ishikawa, Shubei; and Iwadachi, Takaharu, 4,792,365, Cl. 148-12.70C.  
Iwai, Kiyoshi, to Nippon Board Computer Co., Ltd. Local area network protocol analyzer. 4,792,753, Cl. 324-73.00R.  
Iwai, Masahiro, to Sharp Kabushiki Kaisha. Module mounting system. 4,792,650, Cl. 200-50.00A.  
Iwaki, Masato: See—  
Furuta, Kouichi; Fukue, Naofumi; Muguruma, Taku; and Iwaki, Masato, 4,791,905, Cl. 123-497.000.  
Iwakura, Ken: See—  
Takashima, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, 4,792,542, Cl. 503-208.000.  
Iwamoto, Junichi: See—  
Shina, Michihiko; Goto, Shigenori; Iwamoto, Junichi; and Hamada, Hisashi, 4,792,762, Cl. 324-426.000.  
Iwanaga, Takashi: See—  
Yamaguchi, Tetsuo; and Iwanaga, Takeshi, 4,792,140, Cl. 273-173.000.  
Iwasaki, Katsuhiko: See—  
Ozeki, Akichika; Yamada, Kenzo; and Iwasaki, Katsuhiko, 4,792,352, Cl. 75-59.220.  
Iwasaki, Takashi, to Yasui Seiki Co., Ltd. Gravure coating device. 4,791,881, Cl. 118-244.000.  
Iwasaki, Yasuo: See—  
Yoneyama, Yoshihisa; and Iwasaki, Yasuo, 4,792,238, Cl. 366-307.000.  
Iwase, Yukio, to Prince Sewing Machine Co., Ltd. Mattress with support. 4,791,687, Cl. 5-447.000.  
Iwata, Yasuo; Tokunaga, Osamu; Kuga, Hisasi; and Kohata, Toshihide, to Tokyo Automatic Machinery Works, Ltd.; and Japan Tobacco Inc. Apparatus and method for supplying articles to a conveyor. 4,792,033, Cl. 198-357.000.  
Izumi Motors Limited: See—  
Kawamura, Hideo, 4,792,300, Cl. 431-247.000.  
Jackman, Raymond W.; and Monk, Anthony C., to W. J. Morray Engineering Limited. Method and apparatus for filling a bag with individual packs of articles or produce. 4,791,776, Cl. 53-570.000.  
Jackson, Ian M.: See—  
Hudson, John C.; Thantrey, Shok; and Jackson, Ian M., 4,791,785, Cl. 60-303.000.  
Jackson, James D. J.: See—  
McWilliams, Joseph A.; Morgan, Derek E.; and Jackson, James D. J., 4,792,466, Cl. 427-177.000.  
Jacob, Herve; and Bussacri, Jean, to Thomson-CGR. Reception antenna for optical image formation device using nuclear magnetic resonance. 4,792,760, Cl. 324-322.000.  
Jacob, Jeffrey M. Ski carrier. 4,792,073, Cl. 224-202.000.  
Jacobsen, Lawrence J.; and Kleintert, Fred F., to General Motors Corporation. Vehicle body roof construction and molding. 4,792,180, Cl. 296-210.000.  
Jacobson, Allan J.: See—  
Ho, Teh C.; Young, Archie R.; Jacobson, Allan J.; and Chianelli, Russell R., 4,792,541, Cl. 502-167.000.  
Jacobson, Jeff A. Disposable combination razor and shaving cream dispenser with movable cap. 4,791,723, Cl. 30-41.000.  
Jacobson, Ralph S. Binder ring having slip-on folio stops. 4,792,253, Cl. 402-20.000.  
Jahme, Hans J., to Neue Rotoprint GmbH. Sheet feeder and inverter apparatus for sheet-processing machines, preferably for two offset printing machines disposed in tandem. 4,792,132, Cl. 271-186.000.  
James A. Titmas Associates Incorporated: See—  
Titmas, James A., 4,792,408, Cl. 210-747.000.  
James Hardie Irrigation, Inc.: See—  
Wynn, Gerald E., 4,791,965, Cl. 138-146.000.  
James River Corporation of Virginia: See—  
Schubring, Herbert H.; Spalding, Donald R.; and Pollart, Kenneth A., 4,792,487, Cl. 428-342.000.  
Janacek, Edward D.: See—  
Agarwal, Suresh C.; Janacek, Edward D.; Keyes, Marion A.; Schoeffler, James D.; and Wiley, Michael S., 4,792,888, Cl. 364-188.000.

Janoick, Denis W.; and Schneider, John I., to Carrier Vibrating Equipment, Inc. System and process for sorting and conveying articles. 4,792,049, Cl. 209-556.000.  
Janowicz, Miroslaw. Shiftable outside rearview mirror for use on vehicles. 4,792,220, Cl. 350-637.000.  
Japan Storage Battery Co., Ltd.: See—  
Sakai, Yasuharu; Segawa, Shinichi; and Yasui, Tadashi, 4,791,833, Cl. 74-769.000.  
Japan Synthetic Rubber Co., Ltd.: See—  
Yamamoto, Kazuhiko; Nobuhara, Kenji; Mizuno, Hodaka; and Yanagawa, Atsuko, 4,792,585, Cl. 525-67.000.  
Japan Tobacco Inc.: See—  
Iwata, Yasuo; Tokunaga, Osamu; Kuga, Hisasi; and Kohata, Toshihide, 4,792,033, Cl. 198-357.000.  
Jarrett, Peter K.; Casey, Donald J.; and Lehmann, Leonard T., to American Cyanamid Company. Bioabsorbable coating for a surgical article. 4,791,929, Cl. 128-335.500.  
Jayne, Michael E., to R P & M Engines, Inc. V-engine with yoke. 4,791,898, Cl. 123-197.0AC.  
Jean Walterscheid GmbH: See—  
Konrad, Mathias, 4,791,716, Cl. 29-520.000.  
Jean Walterscheid GmbH: See—  
Nienhaus, Clemens; Buthe, Theo; and Mikeska, Felix, 4,792,006, Cl. 180-53.300.  
Jenkins, John M., III: See—  
Fulks, Bernard D.; Sawin, Steven P.; Aikman, Collin D.; and Jenkins, John M., III, 4,792,592, Cl. 526-62.000.  
Jennings, Robert W.: See—  
Malizio, Andrew B.; and Jennings, Robert W., 4,791,976, Cl. 164-58.100.  
Jensen, Martin J.: See—  
Cooley, Stephen E.; and Jensen, Martin J., 4,792,660, Cl. 219-295.000.  
Jimbo, Yoshiji; and Amikura, Seiki, to Hitachi, Ltd. Control apparatus for electric vehicles. 4,792,736, Cl. 318-338.000.  
Jindra, Paul R.; and Galle, Edward D., to Tuthill Corporation. Coupling with fusible actuator member. 4,792,115, Cl. 251-149.600.  
Jobe, John D.; and Lepley, Allen E., to Shell Oil Company. Method and apparatus for detection of undesirable surface deformities. 4,792,232, Cl. 356-394.000.  
Johann, Aglas: See—  
Moser, Peter; Weber, Alfred; Johann, Aglas; Popérahatsky, Johann; and Stastny, Georg, 4,792,123, Cl. 266-142.000.  
John Goudie Associates, Inc.: See—  
Goudie, John W., 4,791,761, Cl. 52-109.000.  
Johnson, Alfred H.: See—  
Praeur, Heinz; Johnson, Alfred H.; Schulz, Dietmar; and Pohl, Peter, 4,792,204, Cl. 350-96.200.  
Johnson, Allen B.: See—  
Reinagel, Frederick G.; and Johnson, Allen B., 4,792,904, Cl. 364-429.000.  
Johnson, David B.; Kenoyer, Stanley; Myers, Mark S.; and Nilsson, Sven, to Intel Corporation. Apparatus for on-line checking and reconfiguration of integrated circuit chips. 4,792,955, Cl. 371-68.000.  
Johnson, Edgar R.: See—  
Franklin, Smead F., Jr.; and Johnson, Edgar R., 4,792,363, Cl. 134-8.000.  
Johnson & Johnson Consumer Products, Inc.: See—  
Chen, Albert C.; Siegfried, David L.; and Mueller, Donald S., 4,792,577, Cl. 523-118.000.  
Johnson, Larsh M.: See—  
Edwards, Cree A.; and Johnson, Larsh M., 4,792,677, Cl. 250-231.0SE.  
Johnson, Raymond L. Electrical connector. 4,792,308, Cl. 439-35.000.  
Johnson, Robert: See—  
Elloy, Martin A.; and Johnson, Robert, 4,791,919, Cl. 128-92.0VW.  
Johnson, Walter A.; Kopatz, Nelson E.; and Ritako, Joseph E., to OTE Products Corporation. Hydrometallurgical process for producing irregular morphology powders. 4,792,351, Cl. 75-0.50A.  
Johnston, Shirley K.: See—  
Broderick, Kevin; Catchman, Vernon C.; Herrington, Fox J.; Johnston, Shirley K.; Olson, Robert H.; and Stiel, Donald, 4,792,241, Cl. 383-75.000.  
Jones, Harry O.: See—  
Benjamin, Gary H.; and Jones, Harry O., 4,792,186, Cl. 297-284.000.  
Jordan, A. Janet: See—  
Jordan, Robert L., 4,792,282, Cl. 416-176.000.  
Jordan, Robert L., to Jordan, A. Janet, a part interest. Liquid pump. 4,792,282, Cl. 416-176.000.  
Josephson, Elliot; and Parker, Frederick S., to Astec Components, Ltd. Non-dissipative series voltage switching regulator having improved switching speed. 4,792,746, Cl. 323-290.000.  
Joyce, Benjamin N., Sr. Variable volume rotary vane pump-motor units. 4,792,295, Cl. 418-31.000.  
Ju, Shiao: See—  
Cozewith, Charles; Ju, Shiao; and Verstrate, Gary W., 4,792,595, Cl. 526-348.000.  
Judge, John L., to Magni Systems, Inc. Color video signal phase detector. 4,792,845, Cl. 358-10.000.  
Junghans, Ewald: See—  
Tittizer, Gabriel; and Junghans, Ewald, 4,791,895, Cl. 123-90.120.  
Junko Co., Ltd.: See—  
Suzuki, Hirotsuke; and Kobayashi, Satoru, 4,791,930, Cl. 128-399.000.  
Yasumoto, Hiromi, 4,792,312, Cl. 439-640.000.



Kabeys, Motoo: See—  
Shindou, Yoshio; Kabeys, Motoo; and Saito, Katsumi, 4,792,499, Cl. 428-659.000.  
Kabushiki Kaisha Daikin Seisakusho: See—  
Fukushima, Hirotaka; and Hamada, Toru, 4,791,829, Cl. 74-574.000.  
Kabushiki Kaisha Kito: See—  
Watanabe, Hiatsugu, 4,792,734, Cl. 318-269.000.  
Kabushiki Kaisha Komatsu Seisakusho: See—  
Okuda, Junji; Hashi, Kazunori; Nakamura, Kentaro; and Kubo, Kazuo, 4,792,052, Cl. 212-162.000.  
Kabushiki Kaisha KOSMEK: See—  
Yonezawa, Keitaro, 4,791,844, Cl. 83-133.000.  
Kabushiki Kaisha Meidensha: See—  
Hayashi, Yasuhiko; Matsue, Kouki; and Takita, Yoshisuke, 4,792,838, Cl. 357-38.000.  
Kabushiki Kaisha Sankyo Seiki Seisakusho: See—  
Takahashi, Kouji, 4,791,718, Cl. 29-603.000.  
Kabushiki Kaisha Tokyo Keiki: See—  
Hojo, Takeshi; and Nakaishi, Takafumi, 4,792,676, Cl. 250-231.000.  
Kabushiki Kaisha Toshiba: See—  
Igaki, Masanori; Yoneyama, Sigeo; Hori, Yoshimichi; and Satoh, Takayuki, 4,792,318, Cl. 445-66.000.  
Itaya, Keiji, 4,792,225, Cl. 355-3.000.  
Kitagawa, Nobutaka; and Ito, Makoto, 4,792,749, Cl. 323-314.000.  
Komori, Yuji, 4,792,867, Cl. 360-13.000.  
Nakamura, Ritsuka; and Kuroiwa, Akihiko, 4,792,739, Cl. 318-661.000.  
Ogura, Masahiko, 4,792,827, Cl. 355-14.000.  
Obba, Yasuo; Ishikawa, Masayuki; Yamamoto, Motoyuki; Watanabe, Yukio; and Sugawara, Hideto, 4,792,958, Cl. 372-45.000.  
Oyama, Masumi, 4,792,996, Cl. 455-617.000.  
Ozaki, Hisami, 4,792,868, Cl. 360-46.000.  
Roberts, Barry R., 4,792,926, Cl. 365-189.000.  
Takenaka, Shigeo; Kamohara, Eiji; and Nishimura, Takashi, 4,792,720, Cl. 313-409.000.  
Tsuiji, Hitoshi; Kato, Tiharu; and Takaoki, Kiyoshi, 4,792,534, Cl. 437-229.000.  
Uchida, Yukimasa, 4,792,834, Cl. 357-23.000.  
Yamashita, Yuko; Masumoto, Yuji; Kimura, Takao; Nishida, Katsutoshi; Inoue, Koichi; Rokkaku, Kazuo; and Takebayashi, Hiroaki, 4,792,244, Cl. 384-492.000.  
Kabushiki Kaisha Toyota Chuo Kenkyusho: See—  
Tachi, Kazuyuki; Okuda, Chikaki; Yamada, Katsunori; Oyama, Yoichi; and Suzuki, Shoichi, 4,792,094, Cl. 239-106.000.  
Kabushiki Kaisha Tokyo Keiki: See—  
Hojo, Takeshi; Nakaishi, Takafumi; and Morohoshi, Mikio, 4,791,727, Cl. 33-325.000.  
Kaeriyama, Kyoji: See—  
Nakao, Yukimichi; Kaeriyama, Kyoji; Suda, Yoshio; Imai, Tomoyuki; Oze, Osamu; and Horiishi, Nanao, 4,792,645, Cl. 174-126.000.  
Kageyu, Akira: See—  
Nakagawa, Naoshi; Takigawa, Tetsuo; Kageyu, Akira; Shimamura, Michiya; Okada, Masafumi; and Mizuno, Masao, 4,792,615, Cl. 558-144.000.  
Kagimasa, Toyohiko: See—  
Gotou, Shizuo; and Kagimasa, Toyohiko, 4,792,897, Cl. 364-200.000.  
Kagiura, Kazuo: See—  
Takeda, Kenichi; and Kagiura, Kazuo, 4,792,831, Cl. 355-3.000.  
Kairys, Christopher J.: See—  
Freund, Paul X.; Rodgers, Sheridan J.; and Kairys, Christopher J., 4,792,480, Cl. 428-286.000.  
Kaiser Aluminum & Chemical Corporation: See—  
Sobolev, Igor, 4,792,643, Cl. 570-168.000.  
Kakihana, Sanehiko, to Menlo Industries, Inc. Self-aligned gate process, 4,792,531, Cl. 437-41.000.  
Kakimoto, Seiji: See—  
Masaki, Yuichi; Kakimoto, Seiji; Terada, Katsunori; and Sekimura, Nobuyuki, 4,792,671, Cl. 250-211.000.  
Kakimoto, Takehiko: See—  
Tajima, Akira; Kawabata, Takeo; Kakimoto, Takehiko; and Hirata, Kazumasa, 4,792,630, Cl. 564-474.000.  
Kakuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Yoneda, Yoshihiro; Noda, Tetsuo; Fujita, Naoyuki; and Asakura, Osamu, to Aderans Co., Ltd. Synthetic fibers having uneven surfaces and a method of producing same, 4,792,489, Cl. 428-400.000.  
Kali & Salz Aktiengesellschaft: See—  
Loblich, Karl-Richard; Bruns, Gunter; and Peuschel, Gerd, 4,792,350, Cl. 71-11.000.  
Kallenbach, Neville R.: See—  
Kim, Peter S.; and Kallenbach, Neville R., 4,792,446, Cl. 424-85.800.  
Kalmson Pty, Limited: See—  
Gibson, John E., 4,792,072, Cl. 224-32.00A.  
Kalthoff, Charles W. Smoker oven, 4,791,909, Cl. 126-21.00A.  
Kamata, Shigeo: See—  
Nishizawa, Yoshito; and Kamata, Shigeo, 4,792,044, Cl. 206-394.000.  
Kamegaya, Shigeru: See—  
Muranaka, Shigeo; Kamegaya, Shigeru; and Matayoshi, Yutaka, 4,791,893, Cl. 123-90.400.

Kamijo, Yoshimi: See—  
Igarashi, Masami; Kato, Yoshinori; and Kamijo, Yoshimi, 4,792,723, Cl. 313-503.000.  
Kamin, George W., to Litton Systems, Inc. Laser diode intensity and wavelength control, 4,792,956, Cl. 372-29.000.  
Kamio, Masaru: See—  
Fukaya, Masaki; Komatsu, Toshiyuki; Shoji, Tatsumi; Kamio, Masaru; and Sekimura, Nobuyuki, 4,792,670, Cl. 250-211.000.  
Kamiya, Takashi: See—  
Ishihara, Toshiyuki; Kamiya, Takashi; Nakayama, Yutaka; and Yamada, Tetsuayo, 4,792,387, Cl. 204-425.000.  
Kamiyama, Norio: See—  
Nishimura, Shigeharu; and Kamiyama, Norio, 4,792,028, Cl. 192-41.00A.  
Kamohara, Eiji: See—  
Takenaka, Shigeo; Kamohara, Eiji; and Nishimura, Takashi, 4,792,720, Cl. 313-409.000.  
Kanazawa, Takenobu: See—  
Sagusa, Takeo; Horikawa, Jiro; Niwano, Masahiro; and Kanazawa, Takenobu, 4,792,603, Cl. 540-451.000.  
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: See—  
Yasui, Hideo; Miki, Yasuhiro; and Okada, Wataru, 4,792,490, Cl. 428-407.000.  
Kaneko, Junichi: See—  
Hatada, Toshio; Oouchi, Tomihisa; Kunugi, Yoshifumi; Sugimoto, Shigeo; and Kaneko, Junichi, 4,791,984, Cl. 165-151.000.  
Kanno, Hiroshi; Endo, Toshio; Miyakawa, Keiichi; and Takano, Masao, to Ricoh Co., Ltd. Speed control method for printing press and printing press practicing the method, 4,791,866, Cl. 101-118.000.  
Kano, Toshio; Okada, Tsuneyoshi; and Hijikata, Kenji, to Polyplastics Co., Ltd. Resin composition which exhibits anisotropism when melted, 4,792,587, Cl. 525-131.000.  
Kao Corporation: See—  
Fukusawa, Junichi; Yasuda, Yutaka; Sato, Yuji; and Shida, Jun, 4,792,444, Cl. 424-63.000.  
Yamanaka, Shoji; Hattori, Makoto; and Suzuki, Yuji, 4,792,539, Cl. 501-144.000.  
Yokota, Yukinaga; Sawamoto, Yuzi; Taniguchi, Hideki; and Okabe, Kazuhiko, 4,792,622, Cl. 564-398.000.  
Kaplan, Murray A.; Vyas, Dolatrai M.; Palepu, Nagaswara R.; and Chen, Chih-Ming J., to Bristol-Myers Company. In-vial deposition of 7-(dimethylaminomethylene)amino-9 $\alpha$ -methoxymitosane, 4,792,566, Cl. 514-410.000.  
Kaplan, Neil B. Automobile security system, 4,792,784, Cl. 340-63.000.  
Kappeler, Franz: See—  
Amann, Markus-Christian; Stegmüller, Bernhard; and Kappeler, Franz, 4,792,200, Cl. 350-96.120.  
Kapples, Kevin J.: See—  
Effland, Richard C.; Klein, Joseph T.; and Kapples, Kevin J., 4,792,562, Cl. 514-343.000.  
Kappe, Manfred; Mann, Max; Vehlwald, Peter; Meyer, Frank; Mebesch, Hans-Ernst; Cornely, Wolfgang; and Rieck, Birgit, to Bayer Aktiengesellschaft. Process for strengthening geological formations, 4,792,262, Cl. 405-264.000.  
Kar, Gitimoy: See—  
Deneke, Charles W.; Kar, Gitimoy; and Mensah, Thomas O., 4,792,347, Cl. 65-3.110.  
Karasaki, Toshihiko: See—  
Norita, Toshio; Taniguchi, Nobuyuki; Ishida, Tokujii; Karasaki, Toshihiko; and Hamada, Masataka, 4,792,820, Cl. 354-402.000.  
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, to Medicorp Research Laboratories Corporation. Collimator for tomography, 4,792,686, Cl. 250-363.00S.  
Kardosh, Robert, to Thornhill Glass & Mirror Inc. Patio door block, 4,792,168, Cl. 292-288.000.  
Karford, Fred. Extension unit for sun visor, 4,792,176, Cl. 296-97.800.  
Karnin, Ehud D.: See—  
Arpe, Ronald B.; and Karnin, Ehud D., 4,792,954, Cl. 371-48.000.  
Karouji, Masao: See—  
Shiraki, Toshinori; Hattori, Yasuo; and Karouji, Masao, 4,792,584, Cl. 524-77.000.  
Karrasch, Wallace R.; McElroy, Kennedy K.; and McNeill, Steven R. Drive shaft assembly for outboard motor, 4,792,315, Cl. 440-83.000.  
Kasamura, Toshirou: See—  
Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshirou; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiro; Tanabe, Ken; and Tanaka, Hidetoshi, 4,792,828, Cl. 355-14.00R.  
Kasper & Richter Feinmechanischer Apparatebau: See—  
Ruhlemann, Gerhard, 4,792,665, Cl. 235-105.000.  
Katanuma, Yasushi, to Alps Electric Co., Ltd. Disk tracking device, 4,792,707, Cl. 310-12.000.  
Katayama, Hiroyuki: See—  
Murakami, Yoshiteru; Takahashi, Akira; Fujii, Yoshiyazu; Katayama, Hiroyuki; and Ohta, Kenji, 4,792,474, Cl. 428-64.000.  
Katayama, Keiichi: See—  
Yamamoto, Michinori; Tashiro, Shozo; Sakane, Satoshi; Morita, Toshiro; Shiota, Hiroshi; Rokkaku, Tadashi; and Katayama, Keiichi, 4,791,830, Cl. 74-603.000.  
Kato, Eiichi; Itakura, Ryoosuke; Sera, Hidefumi; and Ishii, Kazuo, to Fuji Photo Film Co., Ltd. Electrophotographic zinc oxide-resin binder lithographic printing plate precursor, 4,792,511, Cl. 430-87.000.

Kato, Hideo: See—  
Itoh, Yasuo; Kato, Hideo; Koishinaka, Eiichi; Ogawa, Nobuo; and Mitani, Kazuya, 4,792,547, Cl. 514-211.000.  
Kato, Kunioki: See—  
Goda, Hiroshi; Kawamura, Masao; Kato, Kunioki; and Sato, Makoto, 4,792,612, Cl. 549-71.000.  
Kato, Masanori: See—  
Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, 4,792,369, Cl. 148-404.000.  
Kato, Minoru: See—  
Shirai, Shigeru; Saitoh, Keishi; Arai, Takayoshi; Kato, Minoru; and Fujioka, Yasushi, 4,792,509, Cl. 430-64.000.  
Kato, Shigeki: See—  
Sakaida, Atsuo; Suzuki, Yoshihumi; and Kato, Shigeki, 4,792,247, Cl. 400-124.000.  
Kato, Shinichi: See—  
Oku, Kentaro; Maruyama, Masanori; Fukushima, Masakazu; and Kato, Shinichi, 4,792,721, Cl. 313-432.000.  
Kato, Tiharu: See—  
Tsuiji, Hitoshi; Kato, Tiharu; and Takaoki, Kiyoshi, 4,792,534, Cl. 437-229.000.  
Kato, Yoshinori: See—  
Igarashi, Masami; Kato, Yoshinori; and Kamijo, Yoshimi, 4,792,723, Cl. 313-503.000.  
Katsura, Masaki; and Shiratori, Masayuki, to Tokyo Shibaura Denki Kabushiki Kaisha. O<sub>2</sub> gas detecting device and circuit for driving the same, 4,792,433, Cl. 423-98.000.  
Katz, Edward; and Edmonson, Douglas A., to Anheuser-Busch Companies, Inc. Accelerated proofing of refrigerated doughs, 4,792,456, Cl. 426-551.000.  
Katz, Frances R.: See—  
Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., 4,792,458, Cl. 426-578.000.  
Katz, Ronald A., to FDR Interactive Technologies. Statistical analysis system for use with public communication facility, 4,792,968, Cl. 379-92.000.  
Kaufman, James M.: See—  
Fishbine, Glenn M.; Laveen, Eric W.; Kaufman, James M.; Klein, Theodore D.; and Warner, William T., 4,792,226, Cl. 356-71.000.  
Kaunasakii Politekhnikeskii Institut: See—  
Fedarovichius, Algimantas J.; Sudintas, Antanas L.; Kondratiev, Vladimir S.; and Ragulakis, Kazimeras M., 4,791,720, Cl. 29-737.000.  
Kawabata, Takeo: See—  
Tajima, Akira; Kawabata, Takeo; Kakimoto, Takehiko; and Hirata, Kazumasa, 4,792,630, Cl. 564-474.000.  
Kawada, Shigeo: See—  
Miyamaru, Yukio; Hatanaka, Kaoru; Kawada, Shigeo; and Shibata, Yasuo, 4,792,785, Cl. 340-73.000.  
Kawaguchi, Takeshi: See—  
Hayashi, Tsutomu; Kawaguchi, Takeshi; and Tsuchida, Tetsuo, 4,792,194, Cl. 303-116.000.  
Kawamura, Hideo, to Izuzu Motors Limited. Atomizing burner, 4,792,300, Cl. 431-247.000.  
Kawamura, Masao: See—  
Goda, Hiroshi; Kawamura, Masao; Kato, Kunioki; and Sato, Makoto, 4,792,612, Cl. 549-71.000.  
Kawano, Shigeyoshi: See—  
Kuramoto, Atsushi; Fukayama, Yukio; and Kawano, Shigeyoshi, 4,792,912, Cl. 364-557.000.  
Kawasaki, Akiyoshi: See—  
Miyake, Hajimu; Okegawa, Tadao; and Kawasaki, Akiyoshi, 4,792,550, Cl. 514-419.000.  
Kawasaki, Keiu: See—  
Matsuo, Takayoshi; and Kawasaki, Keiu, 4,792,741, Cl. 318-800.000.  
Kawasaki Kisen Kaisha: See—  
Hamada, Hiroshi; Watanabe, Takamitsu; and Suzuki, Mitiharu, 4,792,239, Cl. 383-22.000.  
Kawase, Shigeru; Kinjo, Hisao; Mizuno, Yoshio; and Shudo, Katsuyuki, to Victor Company of Japan, Ltd. Video signal recording apparatus with track centering using crosstalk detection and third odd multiple field recording, 4,792,861, Cl. 358-313.000.  
Kawashima, Hatsu, to Fuji Kiko Company, Limited. Swivel seat for vehicle, 4,792,188, Cl. 297-349.000.  
Kawashima, Masatoshi: See—  
Yoshizawa, Ryo; Kawashima, Masatoshi; and Yano, Hitoshi, 4,792,607, Cl. 544-310.000.  
Kawashima, Takuji: See—  
Takahashi, Akira; Shimamura, Yoshiyuki; Kobayashi, Hide; Okonogi, Shigeo; Kawashima, Takuji; and Igarashi, Minoru, 4,792,549, Cl. 514-400.000.  
Kawasumi, Yoshio: See—  
Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, 4,792,369, Cl. 148-404.000.  
Kaye, Gordon E., to Duracell Inc. Extruded container with dissimilar metal welding insert, 4,792,081, Cl. 228-115.000.  
Kaye, Paul S., to Lewisan Products, Inc. Crank handle apparatus, 4,791,828, Cl. 74-545.000.  
Kazmaier, Peter M.; Burt, Richard A.; Hor, Ab-Mee; and Hsiao, Cheng-Kuo, to Xerox Corporation. Electrophotographic photoconductive imaging members with cis, trans perylene isomers, 4,792,508, Cl. 430-59.000.  
Kearney & Trecker Corporation: See—  
Warner, Robert J., 4,792,267, Cl. 409-235.000.

Kearley, Andrew J., to Oxford Lasers Limited. Laser devices, 4,792,961, Cl. 372-68.000.  
Kelley, Rory R. Motorized string tuning apparatus, 4,791,849, Cl. 84-458.000.  
Kelman, Charles D. Lens forceps and method of use thereof, 4,791,924, Cl. 128-303.00R.  
Kender, John R.; and Smith, Earl M., to Columbia University in the City of New York. Trustees of. Method and an apparatus for determining surface shape utilizing object self-shadowing, 4,792,696, Cl. 250-360.000.  
Kennedy, Curtis V.: See—  
Hagar, Donald K.; Kennedy, Curtis V.; and Townsend, Garnold, 4,791,980, Cl. 165-9.000.  
Kennedy, John A., Jr., to Dr. Ing. Rudolf Hell GmbH. Device for transporting photosensitive material past an imaging line in text and graphics image setting apparatus, 4,792,816, Cl. 346-108.000.  
Kennedy, Robert M., III: See—  
Rose, Alan D.; and Kennedy, Robert M., III, 4,792,378, Cl. 156-643.000.  
Kenoyer, Stanley: See—  
Johnson, David B.; Kenoyer, Stanley; Myers, Mark S.; and Nilsson, Sven, 4,792,955, Cl. 371-68.000.  
Kenworthy, Jeffrey S.: See—  
Taylor, Michael D.; Stacey, Martyn H.; Kenworthy, Jeffrey S.; and Boffey, Stuart S., 4,792,478, Cl. 428-221.000.  
Kephart, Evelyn K. Artist's brush, 4,791,695, Cl. 15-160.000.  
Keran, Hanan; and Linnenberg, Itzhak, to Elacint Ltd. Multi-frequency surface probe, 4,792,759, Cl. 324-322.000.  
Kerner, James M.; Palmer, Carl; and Betts, Kenneth A., to United States Thermoelectric Corporation. Sealed hot, cold and room temperature pure water dispenser, 4,792,059, Cl. 222-67.000.  
Kerst, Gerrit; and Kerst, Hendrik, to Breilco (Proprietary) Limited. Coupling, 4,792,154, Cl. 280-489.000.  
Kerst, Hendrik: See—  
Kerst, Gerrit; and Kerst, Hendrik, 4,792,154, Cl. 280-489.000.  
Kesterson, Abbe L.: See—  
Lawrence, Lowell J.; Hamann, Scott R.; Kesterson, Abbe L.; and Ruzo, Luis O., 4,791,820, Cl. 73-863.210.  
Keyes, Marion A.: See—  
Agarwal, Suresh C.; Janacek, Edward D.; Keyes, Marion A.; Schoeffler, James D.; and Willey, Michael S., 4,792,888, Cl. 364-188.000.  
Kilde Holding, Inc.: See—  
Adriaansen, David L.; and Evans, David L., 4,792,195, Cl. 312-245.000.  
Kidder, Samuel W., to Strawdcoe, Inc. Unit dose drug package and administering device, 4,792,333, Cl. 604-83.000.  
Kieras, Ronald E.: See—  
Kremer, Leon V.; Kieras, Ronald E.; and Knickerbocker, Michael G., 4,792,252, Cl. 401-206.000.  
Kiffe, Horst G. Apparatus for the measurement of the energy expenditure at an operating member, 4,791,813, Cl. 73-379.000.  
Kim, In-Suk. Apparatus for adjusting torque and speed of a dentist handpiece D.C. motor, 4,792,735, Cl. 318-317.000.  
Kim, Myung K., to Su-Heng Capsule Co., Ltd. Medicinal capsule, 4,792,451, Cl. 424-453.000.  
Kim, Peter S.; and Kallenbach, Neville R., to Igen, Inc. Production of antibody catalysts, 4,792,446, Cl. 424-85.800.  
Kimberly-Clark Corporation: See—  
Tewa, Richard R., 4,792,326, Cl. 604-11.000.  
Kime, Kenjiro; Sakabe, Shigetazu; Hashimoto, Akira; and Matozaki, Toshiya, to Mitsubishi Denki K.K. Objective lens driving device with multiple magnet, 4,792,935, Cl. 369-45.000.  
Kimmeyer, Ludger: See—  
Blaszczk, Gotthard; Eickholt, Hubert; Heinemann, Otto; Bredenholler, Norbert; Kimmeyer, Ludger; Tiggesbaumer, Peter; von Seebeck, Michael; and Henne, Heinrich, 4,792,393, Cl. 209-135.000.  
Kimura, Akiyoshi: See—  
Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshirou; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiro; Tanabe, Ken; and Tanaka, Hidetoshi, 4,792,828, Cl. 355-14.00R.  
Kimura, Kazuo: See—  
Ishizaka, Yasuo; Watanabe, Noboru; Kimura, Kazuo; and Imaoka, Eiichi, 4,792,486, Cl. 428-336.000.  
Kimura, Suzushi: See—  
Yamaguchi, Hiroshi; Kimura, Suzushi; and Hayashi, Yoshitake, 4,791,815, Cl. 73-505.000.  
Kimura, Tadashi: See—  
Kobayashi, Norihide; Kimura, Tadashi; Inaba, Tsutomu; and Sugihara, Masahiro, 4,792,296, Cl. 418-55.000.  
Kimura, Takao: See—  
Yamashita, Yuko; Masumoto, Yuji; Kimura, Takao; Nishida, Katsutoshi; Inoue, Koichi; Rokkaku, Kazuo; and Takebayashi, Hiroaki, 4,792,244, Cl. 384-492.000.  
Kimura, Tomohiro: See—  
Yoshihara, Toshiyuki; Hiro, Masaki; and Kimura, Tomohiro, 4,792,507, Cl. 430-58.000.  
Kimura, Toshiro; Okuno, Güichi; Moritsu, Yukikazu; and Yamada, Koji, to Okuno Chemical Industry Co., Ltd. Inorganic coating compositions, 4,792,358, Cl. 106-84.000.  
Kinetics Technology International: See—  
Tsai, Frank W., 4,792,436, Cl. 422-111.000.  
King, Alan M. Coffee brewer, 4,791,859, Cl. 99-289.00R.



- King, Ethmer W.; Yotsuue, David S.; Kircher, Robert C., Jr.; and Radfar, Mohammed R., to Boeing Company, The. Navigational apparatus and methods for displaying aircraft position with respect to a selected vertical flight path profile. 4,792,906, Cl. 364-433.000.
- King, James C.; and Cooper, Michael A. Releaseable bolt devices for securing doors. 4,792,167, Cl. 292-179.000.
- King, Thomas C.; and Arnsen, Byron T. Geophysical prospecting with collimated magnetotelluric fields. 4,792,761, Cl. 324-350.000.
- Kingsborough, Roger H.: See—  
Hempkins, W. Brent; Kingsborough, Roger H.; Lohec, Wesley E.; and Nini, Conroy J., 4,791,998, Cl. 175-61.000.
- Kinjo, Hisao: See—  
Kawase, Shigeru; Kinjo, Hisao; Mizuno, Yoshio; and Shudo, Katsuyuki, 4,792,861, Cl. 358-313.000.
- Kinjo, Noriyuki: See—  
Numata, Shun-ichi; Fujisaki, Koji; Kinjo, Noriyuki; Imaizumi, Junichi; and Mikami, Yoshikatsu, 4,792,476, Cl. 428-209.000.
- Kirby, Robert A.; and Davis, Clifton L., to Allied-Signal Inc. Yarn inspection system. 4,791,812, Cl. 73-160.000.
- Kircher, Robert C., Jr.: See—  
King, Ethmer W.; Yotsuue, David S.; Kircher, Robert C., Jr.; and Radfar, Mohammed R., 4,792,906, Cl. 364-433.000.
- Kirkpatrick, Alan D., to Robud Company. Oscillating free wheeling resilient cover for rotary die-cutting anvil. 4,791,846, Cl. 83-659.000.
- Kishimoto, Mikio: See—  
Miyake, Akira; and Kishimoto, Mikio, 4,792,483, Cl. 428-323.000.
- Kishimoto, Yoshio; and Hosaka, Tomiharu, to Matsushita Electric Industrial Co., Ltd. Flexible thermosensitive wire having a barrier layer for dry-cleaning solvent and a moisture-permeable layer. 4,792,663, Cl. 219-549.000.
- Kiso, Masayuki: See—  
Saito, Masahiro; Takami, Hideyuki; Sato, Makoto; and Kiso, Masayuki, 4,792,469, Cl. 427-443.100.
- Kitagaki, Hiroshi; Takagawa, Seichi; and Shinagawa, Katuma, to Daikin Industries, Ltd. Sheet electrical heating element. 4,792,662, Cl. 219-545.000.
- Kitagawa, Nobutaka; and Ito, Makoto, to Kabushiki Kaisha Toshiba. Power source voltage detector device incorporated in LSI circuit. 4,792,749, Cl. 323-314.000.
- Kitamura, Shigehiro: See—  
Koshizuka, Kunihiko; Kitamura, Shigehiro; and Abe, Takao, 4,792,496, Cl. 428-522.000.
- Kitao, Yuichi; and Inamori, Akio, to 501 Kubota, Ltd. Four wheel drive vehicle. 4,792,010, Cl. 180-233.000.
- Kitazaki, Yasuaki: See—  
Suzuki, Hiroyuki; Shiroishi, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazuetsu; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yasuaki; Ohta, Sakae; and Aoi, Hajime, 4,792,497, Cl. 428-336.000.
- Kitz Corporation: See—  
Kubota, Kazuhisa, 4,792,117, Cl. 251-315.000.
- Klauke, Erich: See—  
Marhold, Albrecht; Klauke, Erich; and Kysela, Ernst, 4,792,635, Cl. 568-332.000.
- Klein, Gerald W.; McConkey, Robert C.; Molare, Michel F.; and Noonan, John M., to Eastman Kodak Company. Luminate for the formation of beam leads for IC chip bonding. 4,792,517, Cl. 430-275.000.
- Klein, Joseph T.: See—  
Efland, Richard C.; Klein, Joseph T.; and Kapples, Kevin J., 4,792,562, Cl. 514-343.000.
- Klein, Schanzlin & Becker Aktiengesellschaft: See—  
Illy, Alois; Alberti, Gunter; and Feilerlein, Karlheinz, 4,792,119, Cl. 251-333.000.
- Klein, Theodore D.: See—  
Fabbine, Glenn M.; Laveen, Eric W.; Kaufman, James M.; Klein, Theodore D.; and Warner, William T., 4,792,226, Cl. 356-71.000.
- Klein, Vernon W., to Marion Laboratories, Inc. Manual vacuum filtration device. 4,792,398, Cl. 210-406.000.
- Kleinert, Fred F.: See—  
Jacobsen, Lawrence J.; and Kleinert, Fred F., 4,792,180, Cl. 296-210.000.
- Kleinke, Bernard L. Wearing apparel device and method of using same. 4,791,743, Cl. 40-322.000.
- Kliklok Corporation: See—  
Warner, William L.; and Hadden, William A., 4,792,031, Cl. 193-200R.
- Knappe, Alan G., to U.S. Philips Corporation. Cathode ray display tubes. 4,792,718, Cl. 313-399.000.
- Knickerbocker, Michael O.: See—  
Kremer, Leon V.; Kieras, Ronald E.; and Knickerbocker, Michael G., 4,792,252, Cl. 401-206.000.
- Knieriem, Jeffrey L.: See—  
Morris, Arthur J.; and Knieriem, Jeffrey L., 4,791,991, Cl. 166-319.000.
- Knox, Walter R.: See—  
Paulik, Frank E.; Hershman, Arnold; Knox, Walter R.; and Roth, James F., 4,792,620, Cl. 560-232.000.
- Kobayashi, Hide: See—  
Takahashi, Akira; Shimamura, Yoshiyuki; Kobayashi, Hide; Okonogi, Shigeo; Kawashima, Takuji; and Igarashi, Minoru, 4,792,066, Cl. 222-387.000.
- Kobayashi, Naohiko, to Pan American Trading Co., Ltd. Chemical liquid injector. 4,792,066, Cl. 222-387.000.
- Kobayashi, Norihide; Kimura, Tadashi; Inaba, Tsutomu; and Sagihara, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. Scroll compressor with pressure-equalizing passage and gas vent conduit in main shaft. 4,792,296, Cl. 418-55.000.
- Kobayashi, Norio; and Amano, Satoru, to Hoya Corporation. Acoustooptic device capable of internally cooling an acoustooptic element. 4,792,930, Cl. 367-140.000.
- Kobayashi, Satoru: See—  
Suzuki, Hirotsuke; and Kobayashi, Satoru, 4,791,930, Cl. 128-399.000.
- Kobayashi, Tetsuo; Tsukada, Yukihisa; Narihige, Shinji; and Hara, Shinichi, to Hitachi, Ltd. Method of manufacturing a thin-film magnetic head. 4,791,719, Cl. 29-603.000.
- Kobusai Denahin Denwa Co., Ltd.: See—  
Fujioka, Masanobu; Ikeda, Yoshikazu; and Furuya, Nobuo, 4,792,800, Cl. 340-825.050.
- Koch Membrane Systems, Inc.: See—  
Truex, Todd A.; and Fulk, Clyde W., Jr., 4,792,401, Cl. 210-644.000.
- Kochloeff, Karl: See—  
Schneider, Michael; Wernicke, Hans J.; Kochloeff, Karl; and Maletz, Gerd, 4,792,439, Cl. 423-239.000.
- Koda, Takao: See—  
Akiyama, Kazuhiro; Koda, Takao; Syoji, Masao; Yodhida, Toshio; and Hirai, Masayoshi, 4,792,822, Cl. 354-403.000.
- Koehn, Stephen C.; and Plautz, Ricky A., to Minnesota Mining and Manufacturing Company. Transparent box for protecting against damage from electrostatic discharge and sheet material to be cut into a box blank for forming same. 4,792,042, Cl. 206-328.000.
- Kohata, Toshihide: See—  
Iwata, Yasuo; Tokunaga, Osamu; Kuga, Hisasi; and Kohata, Toshihide, 4,792,033, Cl. 198-357.000.
- Kohler, Stephen F.: See—  
Kramer, Bruce M.; Dombrowski, David M.; Gonseth, Dennis; Yang, Mingyang; and Kohler, Stephen F., 4,792,353, Cl. 75-235.000.
- Koibuchi, Shigeru: See—  
Toriumi, Minoru; Shiraishi, Hiroshi; Irie, Ryotaro; and Koibuchi, Shigeru, 4,792,516, Cl. 430-196.000.
- Koike, Michiro: See—  
Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshiro; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiro; Tanabe, Ken; and Tanaka, Hidetoshi, 4,792,828, Cl. 355-1400R.
- Kojima, Kiyooki, to Clarion Co., Ltd. Electroluminescence element. 4,792,500, Cl. 428-690.000.
- Kojima, Shyuichi: See—  
Suzuki, Hiroyuki; Shiroishi, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazuetsu; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yasuaki; Ohta, Sakae; and Aoi, Hajime, 4,792,497, Cl. 428-336.000.
- Koks, Paul G., to Rolltop, Inc. Truck tonneau cover assembly. 4,792,178, Cl. 296-98.000.
- Kollanyi, Miklos J., to GTE Communication Systems Corporation. Laser temperature controller. 4,792,957, Cl. 372-34.000.
- Komata, Kazuharu, to Daiyo Seiki Kabushiki Kaisha. Grinding wheel position detecting means for surface grinding machine. 4,791,759, Cl. 51-165.870.
- Komatsu, Toshiyuki: See—  
Fukaya, Masaki; Komatsu, Toshiyuki; Shoji, Tatsumi; Kamio, Masaru; and Sekimura, Nobuyuki, 4,792,670, Cl. 250-211.00R.
- Kominami, Naoya; Yokoyama, Ikuo; and Shimanuki, Yuzi, to Asahi Yukiwai Kogyo Co., Ltd. Constant flow valve. 4,791,956, Cl. 137-503.000.
- Komori Printing Machinery Co., Ltd.: See—  
Furukawa, Shigeo, 4,791,869, Cl. 101-232.000.
- Komori, Yuji, to Kabushiki Kaisha Toshiba. Synchronizing circuit for dubbing apparatus. 4,792,867, Cl. 360-13.000.
- Kompis, Ivan; Rey-Bellet, Gerald; and Zanetti, Guido, to Hoffman-La Roche Inc. 2,4-diamino-5[4-amino (or dimethylamino)-3,5-dimethoxybenzyl]pyrimidine and antibacterial composition thereof. 4,792,557, Cl. 514-275.000.
- Kon, Tetsuaki: See—  
Endou, Yasuaki; Takahashi, Hisao; and Kon, Tetsuaki, 4,792,682, Cl. 250-338.300.
- Kondo, Hiroshi: See—  
Obe, Junzo; and Kondo, Hiroshi, 4,792,807, Cl. 343-712.000.
- Kondo, Masamichi: See—  
Nishida, Katsuhiko; Shindo, Manasani; Suzuki, Masaharu; and Kondo, Masamichi, 4,792,931, Cl. 367-149.000.
- Kondo, Takenori, to Torio Electronics Co., Ltd. Card with built-in record/playback capability. 4,791,741, Cl. 40-124.100.
- Kondo, Takeo; Kushida, Yuichiro; and Abe, Yasushi, to Denki Kagaku Kogyo Kabushiki Kaisha. Rubber composition. 4,792,581, Cl. 524-523.000.
- Kondoh, Masayuki: See—  
Suga, Michiharu; Ishikawa, Hideo; Akana, Yoshinori; Yoshitake, Junichi; and Kondoh, Masayuki, 4,792,588, Cl. 525-240.000.
- Kondratiev, Vladimir S.: See—  
Fedaravichius, Algimantas J.; Sudintas, Antanas L.; Kondratiev, Vladimir S.; and Ragulskis, Kazimeras M., 4,791,720, Cl. 29-737.000.
- Konishi, Masataka: See—  
Saitoh, Kyoichiro; Tsunakawa, Mitsuki; Konishi, Masataka; and Miyaki, Takeo, 4,792,545, Cl. 514-35.000.

- Konishiroku Photo Industry, Co., Ltd.: See—  
Haneda, Satoshi; Itoh, Takashi; Nakamura, Ken; and Makoto, Tomono, 4,792,512, Cl. 430-102.000.
- Koshizuka, Kunihiko; Kitamura, Shigehiro; and Abe, Takao, 4,792,496, Cl. 428-522.000.
- Konno, Takeshi, to Fuji Photo Film Co., Ltd. Electrostatic recording sheet. 4,792,485, Cl. 428-327.000.
- Konrad, Mathias, to Jean Walterscheid GmbH. Method and apparatus for securing a connector to a pipe. 4,791,716, Cl. 29-520.000.
- Kopatz, Nelson E.: See—  
Johnson, Walter A.; Kopatz, Nelson E.; and Ritako, Joseph E., 4,792,351, Cl. 75-0.50A.
- Kortgen, Bernd, to Stabilus GmbH. Friction damper. 4,792,127, Cl. 267-64.150.
- Kosak, Dietmar: See—  
Engel, Georg; and Kosak, Dietmar, 4,791,799, Cl. 72-225.000.
- Kosciak, Geoffrey F.: See—  
Bickford, John H. F.; Meisterling, Jesse R.; Smith, Milton O.; and Kosciak, Geoffrey F., 4,791,858, Cl. 81-467.000.
- Koshinaka, Eiichi: See—  
Itoh, Yasuo; Kato, Hideo; Koshinaka, Eiichi; Ogawa, Nobuo; and Mitani, Kazuya, 4,792,547, Cl. 514-211.000.
- Koshizuka, Kunihiko; Kitamura, Shigehiro; and Abe, Takao, to Konishiroku Photo Industry Co., Ltd. Thermal transfer recording medium. 4,792,496, Cl. 428-522.000.
- Koutzaroff, Constantin. Panel system for a clean room. 4,791,763, Cl. 52-180.000.
- Koyabu, Seiji: See—  
Tsuji, Kazuhiro; and Koyabu, Seiji, 4,792,743, Cl. 320-15.000.
- Koyama, Shigeru, to Mitsubishi Denki Kabushiki Kaisha. Earthed circuit for an electric railway car. 4,792,703, Cl. 307-14.000.
- Koyama, Takeshi: See—  
Akashi, Akira; Ishizaki, Akira; Suda, Yasuo; Ohnuki, Ichiro; Oh-taka, Keiji; and Koyama, Takeshi, 4,792,668, Cl. 250-201.000.
- Ohnuki, Ichiro; Suda, Yasuo; Ishizaki, Akira; Akashi, Akira; Oh-taka, Keiji; and Koyama, Takeshi, 4,792,669, Cl. 250-201.000.
- Koyo Seiko Co., Ltd.: See—  
Takeuchi, Masamichi; and Nakajima, Junichi, 4,792,243, Cl. 384-486.000.
- Koyo Seiko Kabushiki Kaisha: See—  
Yamashita, Yuko; Masumoto, Yuji; Kimura, Takao; Nishida, Katsutoshi; Inoue, Koichi; Rokkaku, Kazuo; and Takebayashi, Hiroaki, 4,792,244, Cl. 384-492.000.
- Kozikowski, Stan D.; Menkart, J.; and Wolfram, L. J., to Clairol Incorporated. Hair photobleaching. 4,792,341, Cl. 8-103.000.
- Kozuka, Nobuhiko, to Mita Industrial Co., Ltd. Electrostatic copying apparatus having reduced size and complexity. 4,792,824, Cl. 355-3.08E.
- Kraf, Robert J.: See—  
Krawiec, Donald F.; Kraf, Robert J.; and Houser, Robert J., 4,792,276, Cl. 415-118.000.
- Kraft, Inc.: See—  
Brna, Miro A.; Walker, Robert G.; and Kukla, Charles, 4,792,457, Cl. 426-574.000.
- Kragelin, Birger; Stohr, Wilfried; and Opitz, Elisabeth, to Dr. Johannes Heider GmbH. Device and method for determining workpiece contours. 4,792,889, Cl. 364-191.000.
- Krall, Hermann-Dieter: See—  
Lantzech, Reinhard; and Krall, Hermann-Dieter, 4,792,606, Cl. 544-296.000.
- Kramer, Arthur W.; and Mickus, Vytautas J., to Westinghouse Electric Corp. Reversible fuel assembly grid tab repair tool. 4,791,801, Cl. 72-387.000.
- Kramer, Bruce M.; Dombrowski, David M.; Gonseth, Dennis; Yang, Mingyang; and Kohler, Stephen F., to Massachusetts Institute of Technology. Aluminum oxide-metal compositions. 4,792,353, Cl. 75-235.000.
- Kramer, Victor: See—  
Haney, Glen K.; and Kramer, Victor, 4,792,399, Cl. 210-484.000.
- Krasnov, Igor, to Vetco Gray Inc. Pipe handling apparatus and method. 4,791,997, Cl. 175-57.000.
- Krause, Manfred. Process and apparatus for producing vodka. 4,792,459, Cl. 426-592.000.
- Krawiec, Donald F.; Kraf, Robert J.; and Houser, Robert J., to United States of America, Energy. Turbomachinery debris remover. 4,792,276, Cl. 415-118.000.
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 Maibauer, Frederick P. Ventilated protective garment. 4,791,685, Cl. 2-227.000.  
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Kremer, Carl P., Jr.; Kremer, Ann S.; and Tom, Henry, 4,792,097, Cl. 239-338.000.

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Kubia, Heribert; and Winter, Josef, 4,791,891, Cl. 123-41.840.

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Cooper, Leonard M., 4,792,038, Cl. 206-180.000.

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Kress, Dieter; and Haberer, Friedrich, 4,792,264, Cl. 408-199.000.

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Marchetti, Laura J., administratrix: See—  
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Klein, Vernon W., 4,792,398, Cl. 210-406.000.

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Skjæle, Bjarne E., 4,791,999, Cl. 175-85.000.

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Ouyang, Kenneth W.; and Marmet, Melvin, 4,792,705, Cl. 307-296.000.

Marquis, Stanley L. Planar loudspeaker system, 4,792,978, Cl. 381-203.000.

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Artz, Ray E.; Martin, Richard J.; and Splett, Vincent E., 4,792,894, Cl. 364-200.000.

Martinez, George, Jr. Method and apparatus for heating a large building, 4,792,091, Cl. 237-19.000.

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Oku, Kentaro; Maruyama, Masanori; Fukushima, Masakazu; and Kato, Shinichi, 4,792,721, Cl. 313-432.000.

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Labenz, Norbert; and Neef, Heinz, 4,792,222, Cl. 351-136.000.

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Maryanoff, Bruce E.; and Nortey, Samuel O., to McNeilab, Inc. Anticonvulsant phenethyl sulfamates, 4,792,569, Cl. 514-517.000.

Masaki, Kazumi, to Hayashibara, Ken. Switch for iontophoresing cation and anion, 4,792,702, Cl. 307-112.000.

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Masaki, Naoki, to Pioneer Electronic Corporation. Disk playing method for multi-disk player, 4,792,934, Cl. 369-34.000.

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Kramer, Bruce M.; Dombrowski, David M.; Gonseth, Dennis; Yang, Minyang; and Kohler, Stephen P., 4,792,353, Cl. 75-235.000.

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Pierce, Richard A.; Masterson, Tipton T.; and Grilli, David A., 4,792,360, Cl. 106-90.000.

Masuda, Atsushi: See—  
Fuji, Takamichi; Ozawa, Kazuyoshi; Masuda, Atsushi; Shigenai, Osamu; and Gunji, Kunihiko, 4,792,245, Cl. 384-610.000.

Masuhara, Toshiaki: See—  
Nagasawa, Kouichi; Sakai, Yoshio; Minato, Osamu; Masuhara, Toshiaki; and Meguro, Satoshi, 4,792,841, Cl. 357-59.000.

Masumoto, Yuji: See—  
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Matayoshi, Yutaka: See—  
Muranaka, Shigeo; Kamegaya, Shigeru; and Matayoshi, Yutaka, 4,791,893, Cl. 123-90.400.

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Kime, Kenjiro; Sakabe, Shigekazu; Hashimoto, Akira; and Matozaki, Toshiya, 4,792,935, Cl. 369-45.000.

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Matsubara, Kenji: See—  
Horie, Fujio; and Matsubara, Kenji, 4,791,877, Cl. 112-456.000.

Matsuda, Shuichi: See—  
Watakabe, Yaichiro; and Matsuda, Shuichi, 4,792,461, Cl. 427-38.000.

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Ohashi, Tamaki; and Matsuda, Toshiyuki, 4,792,988, Cl. 455-162.000.

Matsui, Akio, to Pubot Giken Co., Ltd. Cylinder locking device, 4,791,855, Cl. 92-24.000.

Matsui, Yosuke; Ishikawa, Shubei; and Iwadachi, Takaharu, to NGK Insulators, Ltd. Production of beryllium-copper alloys and alloys produced thereby, 4,792,365, Cl. 148-12.700.

Matsumoto, Fumio, to Fuji Photo Film Co., Ltd. Method for detecting defocused photographic images and photographic printing device, 4,792,830, Cl. 355-55.000.

Matsumoto, Tsuyoshi; Fukudome, Toshiyuki; and Tsuchida, Masaaki, to Nisso Maruzen Chemical Co., Ltd. Isolation process of 2-chloroethyl vinyl ether, 4,792,638, Cl. 568-682.000.

Matsumura, Hiroyoshi: See—  
Inoue, Hiroaki; Tsuji, Shinji; Matsumura, Hiroyoshi; and Arimoto, Akira, 4,792,197, Cl. 350-3.700.

Matsumuro, Yoshiaki, to Yazaki Corporation. Alarm driving signal generator, 4,792,789, Cl. 340-384.000.

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Matsu, Yoshitake, to NEC Corporation. Radio channel control method for mobile communication system, 4,792,984, Cl. 455-32.000.

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Hayashi, Yasuhide; Matsue, Kouki; and Takita, Yoshisuke, 4,792,838, Cl. 357-38.000.

Matsushita Electric Industrial Co., Ltd.: See—  
Abe, Shuji; Tanaka, Toshihiro; Hayashi, Nobuhiko; Zaizen, Katsumori; and Ueno, Seichi, 4,792,345, Cl. 55-210.000.

Kishimoto, Yoshio; and Hosaka, Tomiharu, 4,792,663, Cl. 219-549.000.

Nakajima, Yasuo; Yamamoto, Yoshiharu; and Nagaoka, Yoshitomi, 4,792,218, Cl. 350-432.000.

Yamaguchi, Hiroshi; Kimura, Suzuaki; and Hayashi, Yoshitake, 4,791,815, Cl. 73-505.000.

Matsushita Seiko Co., Ltd.: See—  
Wada, Tsuyoshi, 4,792,649, Cl. 200-5.000.

Matsuura, Hitoshi: See—  
Yamazaki, Etsuo; and Matsuura, Hitoshi, 4,792,738, Cl. 318-630.000.

Matsuura, Yutaka: See—  
Sagawa, Masato; Fujimura, Setsuo; and Matsuura, Yutaka, 4,792,368, Cl. 148-302.000.

Matthey, Reinhard: See—  
Frohn, Werner; Bohlmann, Dieter; Franke, Hermann; Zimmermann, Werner; Limmer, Heinz; Hopfner, Eberhard; Lindner, Horst; Matthey, Reinhard; Muller, Henner; Poppen, Hans;

Schutter, Hartmut; and Dietrich, Detlev, 4,792,389, Cl. 208-76.000.

Maurer, John J.: See—  
Schulz, Donald N.; Berluiche, Enock; Maurer, John J.; and Bock, Jan, 4,792,593, Cl. 526-240.000.

Maurice, Francois. Active matrix display screen with transistor sources connected to adjacent addressing lines and processes for making this screen, 4,792,210, Cl. 350-334.000.

Max-Planck-Gesellschaft Zur Foerderung Der Wissenschaften e.V.: See—  
Haas, Gunther, 4,792,763, Cl. 324-462.000.

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Schlechtriemen, Gerhard-Ludwig; Weppner, Werner; and Schubert, Helmut, 4,792,752, Cl. 324-71.100.

May, Stephen C. Endotracheal device, 4,791,914, Cl. 128-10.000.

Mayo, Scott T., to Spectrum Electronics, Inc. Wireless local area network for use in neighborhoods, 4,792,946, Cl. 370-86.000.

Mazda Motor Corporation: See—  
Furuta, Kouichi; Fukue, Naofumi; Muguruma, Taku; and Iwaki, Masato, 4,791,905, Cl. 123-497.000.

McArthur, James; and Hodge, Steven E., to Med-Ex Diagnostics of Canada Inc. Coupling assembly, 4,792,255, Cl. 403-325.000.

McCaffrey, Charles N. Biscuit cutter and cooperative mold, 4,792,299, Cl. 425-289.000.

McCalley, Karl W.; Wilson, Steven D.; and Fischer, James L., to Telaction Corporation. Digital interactive communication system, 4,792,849, Cl. 358-86.000.

McCann, Michael P.; and Chen, Chung H., to University of Tennessee Research Corporation. Ultraviolet laser beam monitor using radiation responsive crystals, 4,792,690, Cl. 250-474.100.

McCarthy, Donald F.; Whitney, Bradley E.; Orban, Patricia G.; Fout, Randy A.; and Magor, Leslie A. Method and apparatus for temporarily storing multiple data records, 4,792,898, Cl. 364-200.000.

McCaw, Thomas M. Caged helical gear differential, 4,791,832, Cl. 74-715.000.

McConkey, Robert C.: See—  
Klein, Gerald W.; McConkey, Robert C.; Moltaire, Michel F.; and Noonan, John M., 4,792,517, Cl. 430-275.000.

McCorkle, Dennis L.: See—  
Christophorou, Loucas G.; McCorkle, Dennis L.; and Hunter, Scott R., 4,792,724, Cl. 313-637.000.

McCormick, Daniel F., to Brunswick Corporation. Marine drive with floating spider differential assembly, 4,792,314, Cl. 440-81.000.

McCormick-Goodhart, Mark H.: See—  
Wicker, Guy; Swartz, Louis D.; O'Donnell, Daniel H.; Heslip, John A.; Cannella, Vincent D.; Prache, Olivier; McCormick-Goodhart, Mark H.; and Barnes, Marvin C., 4,792,859, Cl. 358-294.000.

McCormick, Susan H.: See—  
Herr, Thomas E.; and McCormick, Susan H., 4,791,682, Cl. 2-160.000.

McCrink, James: See—  
Tanguay, William P.; and McCrink, James, 4,792,797, Cl. 340-628.000.

McCusker, Edward J.: See—  
Hlavacek, Robert A.; Dumican, Barry L.; and McCusker, Edward J., 4,792,336, Cl. 623-13.000.

McElroy, Kennedy K.: See—  
Karrasch, Wallace R.; McElroy, Kennedy K.; and McNeill, Steven R., 4,792,315, Cl. 440-83.000.

McEwen, David J.: See—  
Lang, Joseph H.; McEwen, David J.; and Meyer, John J., 4,792,680, Cl. 250-325.000.

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Willis, William I., 4,792,383, Cl. 204-55.300.

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McGinn, Terrance E., to Psi. Vehicle and track system, 4,791,872, Cl. 104-166.000.

McGregor, William H.; and Chang, Joseph Y., to American Home Products Corporation. Phospholipase A<sub>2</sub> inhibitors, 4,792,555, Cl. 514-255.000.

McGuire, Michael E.: See—  
Cornelson, Kenneth E.; and McGuire, Michael E., 4,792,422, Cl. 264-1.500.

McKechie, Ian C. Monitoring and indicating apparatus for use in the game of roulette, 4,792,137, Cl. 273-138.00A.

McKnight, William H.: See—  
Speiser, Jeffrey M.; Whitehouse, Harper J.; and McKnight, William H., 4,792,787, Cl. 341-156.000.

McLeod, Whitney G. Adjustable folding safety chair, 4,792,182, Cl. 297-55.000.

McMichael, James W., to Dow Chemical Company, The. Method and apparatus for installing a large, planar, delicate membrane in an electrolysis cell, 4,792,386, Cl. 204-279.000.

McNeilab, Inc.: See—  
Maryanoff, Bruce E.; and Nortey, Samuel O., 4,792,569, Cl. 514-517.000.

McNeill, Steven R.: See—  
Karrasch, Wallace R.; McElroy, Kennedy K.; and McNeill, Steven R., 4,792,315, Cl. 440-83.000.

McVey, Harry D., to General Motors Corporation. Carrying handle, 4,791,702, Cl. 16-114.00B.

McWilliams, Joseph A.; Morgan, Derek E.; and Jackson, James D. J., to Micropore International Limited. Method of making panels of microporous thermal insulation, 4,792,466, Cl. 427-177.000.

Mead Corporation, The: See—  
Calvert, Rodney K., 4,791,774, Cl. 53-48.000.

Miller, Byron R., 4,792,051, Cl. 211-184.000.

Meadows, Alan, to Coal Industry (Patents) Limited. Telemetry system for borehole drilling, 4,792,802, Cl. 340-856.000.

Mecaroute S.A.: See—  
Lamy, Jean-Pierre, 4,792,171, Cl. 294-68.300.

Med-Ex Diagnostics of Canada Inc.: See—  
McArthur, James; and Hodge, Steven E., 4,792,255, Cl. 403-325.000.

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Stambrook, Peter J.; and Tischfield, Jay A., 4,792,520, Cl. 435-6.000.

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Harder, David R.; and Gross, John G., 4,792,564, Cl. 514-355.000.

Medical Engineering Corporation: See—  
Finney, Roy P., 4,791,917, Cl. 128-79.000.

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Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, 4,792,686, Cl. 250-363.00S.

Medtronic, Inc.: See—  
Baudino, Michael D.; de Franco, Michael D.; Lassar, Joseph F.; Brumwell, Dennis A.; Bornzin, Gene A.; and Schweitzer, Jeffrey A., 4,791,935, Cl. 128-637.000.

Medvick, Richard J., to Swagelok Quick Connect Co. Protective device for quick connect coupling, 4,792,162, Cl. 285-45.000.

Meffert, Alfred: See—  
Hoefler, Rainer; Meffert, Alfred; Piort, Robert; Wegemund, Bernd; and Held, Uwe, 4,792,582, Cl. 524-378.000.

Piort, Robert; and Meffert, Alfred, 4,792,419, Cl. 260-513.00R.

Meguro, Jun-ichi: See—  
Haei, Paul K.; Meguro, Jun-ichi; Stark, William A.; and Solberg, Arne L., 4,792,373, Cl. 156-497.000.

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Mehesch, Hans-Ernst: See—  
Kappa, Manfred; Mann, Max; Vehlewald, Peter; Meyer, Frank; Meheach, Hans-Ernst; Cornely, Wolfgang; and Riecks, Birgit, 4,792,262, Cl. 405-264.000.

Mehta, Vijay C., to Lithium Corporation of America. Hydrocarbyloxy magnesium halides, 4,792,640, Cl. 568-851.000.

Meier, Helmut: See—  
Frohnert, Heinz; Ullrich, Hansjergen; and Meier, Helmut, 4,792,229, Cl. 366-336.000.

Meiko Pet Corporation: See—  
Wang, Chiao-Ming, 4,792,293, Cl. 417-571.000.

Meisenburg, Gary L., to Brunswick Corporation. Marine drive lower gearcase with non-cavitating drain plug location, 4,792,313, Cl. 440-76.000.

Meisterling, Jesse R.: See—  
Bickford, John H.; Meisterling, Jesse R.; and Smith, Milton O., 4,791,839, Cl. 81-479.000.

Bickford, John H. F.; Meisterling, Jesse R.; Smith, Milton O.; and Kosciak, Geoffrey F., 4,791,838, Cl. 81-467.000.

Melas, Andreas A.; and Braunagel, Norbert, to Morton Thiokol, Inc. Method for vapor phase deposition of gallium nitride film, 4,792,467, Cl. 427-248.100.

Meltach, Hans J., to RXS Schrupftechnik-Garnituren GmbH. Wrap-around cable sleeve liner and method of making, 4,792,472, Cl. 428-35.900.

Menger, Eva L., to Allied Corporation. Dual-wavelength laser scalpels background of the invention, 4,791,927, Cl. 128-303.100.

Menkart, J.: See—  
Kozikowski, Stan D.; Menkart, J.; and Wolfram, L. J., 4,792,341, Cl. 8-103.000.

Menlo Industries, Inc.: See—  
Kakihana, Sanchiko, 4,792,531, Cl. 437-41.000.

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Deneka, Charles W.; Kar, Gitimoy; and Mensah, Thomas O., 4,792,347, Cl. 65-3.110.

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Colegrove, George T., 4,792,415, Cl. 252-308.000.

Mercurio, Leonard, to Set-O-Matic, Inc. Installation tool for coin box drop, 4,792,248, Cl. 409-178.000.

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Cuman, Sylvain; and Moreau, Philippe J., 4,792,885, Cl. 363-16.000.

Merrell Dow Pharmaceuticals Inc.: See—  
Sunkara, Sai P.; Rhinehart, Barry L.; and Liu, Paul S., 4,792,558, Cl. 514-299.000.

Mersman, Wesley D.: See—  
Suman, Michael J.; and Mersman, Wesley D., 4,792,884, Cl. 362-135.000.

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Mueller, Herbert; and Meisch, Walter, 4,792,631, Cl. 564-489.000.

Messina, Giuseppe; Moretti, Mario D.; Sanna, Salvatore R.; Soma, Giovanni; and Cabras, Pier G., to Enichem Anic SpA. Process for the preparation of vinyl ethers, 4,792,637, Cl. 568-626.000.

Metal Casting Technology, Inc.: See—  
Chandley, George D., 4,791,977, Cl. 164-63.000.

Metalquimia, S.A.: See—  
Coromina, Narciso L., 4,791,705, Cl. 17-25.000.



- Metzger, Andre; Grimm, Peter; Nohl, Andre J.; and Nau, Vance J. Sample preparation chamber with mixer/grinder and sample aliquot isolation. 4,792,434, Cl. 422-100.000.
- Metzger, Heinz-Juergen: See—  
Lewia, Charles H.; Edgar, James F.; and Metzger, Heinz-Juergen, 4,792,786, Cl. 341-133.000.
- Meyer, Frank: See—  
Kappa, Manfred; Mann, Max; Vehlwald, Peter; Meyer, Frank; Mehsch, Hans-Ernst; Cornely, Wolfgang; and Riecks, Birgit, 4,792,262, Cl. 405-264.000.
- Meyer, Friedrich: See—  
Langhaus, Lutz; Meyer, Friedrich; and Drake, Johannes, 4,792,658, Cl. 219-121.630.
- Meyer, John J.: See—  
Lang, Joseph H.; McEwen, David J.; and Meyer, John J., 4,792,680, Cl. 230-325.000.
- Meyer, Lawrence D.: See—  
Lipton, Lenny; Berman, Arthur; Meyer, Lawrence D.; and Ferguson, James L., 4,792,850, Cl. 358-92.000.
- Meyerhofer, Leopold, to MAN Nutzfahrzeuge GmbH. Radiator assembly. 4,791,982, Cl. 165-38.000.
- MHB Joint Venture: See—  
Schwab, Gerhart; and Lee, Mei-Tsu, 4,792,504, Cl. 429-192.000.
- Michigan State University: See—  
Assmann, Jes, 4,792,772, Cl. 333-230.000.
- Mickelson, Lee: See—  
Chang, David B.; Berg, Michael F.; Drummond, James E.; and Mickelson, Lee, 4,792,683, Cl. 250-341.000.
- Mickus, Vytautas J.: See—  
Kramer, Arthur W.; and Mickus, Vytautas J., 4,791,801, Cl. 72-387.000.
- Microport International Limited: See—  
McWilliams, Joseph A.; Morgan, Derek E.; and Jackson, James D. J., 4,792,466, Cl. 427-177.000.
- Miglia, Egidio, to Hughes Aircraft Company. Multifunction active array. 4,792,805, Cl. 342-372.000.
- Mihara, Shin-ichi, to Olympus Optical Co., Ltd. Large aperture long focus macro lens system. 4,792,219, Cl. 350-463.000.
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Numata, Shun-ichi; Fujisaki, Koji; Kinjo, Noriyuki; Imaizumi, Junichi; and Mikami, Yoshikatsu, 4,792,476, Cl. 428-209.000.
- Mikecka, Felix: See—  
Nienhaus, Clemens; Buthe, Theo; and Mikecka, Felix, 4,792,006, Cl. 180-53.300.
- Miki, Yasuhiro: See—  
Yasui, Hideo; Miki, Yasuhiro; and Okada, Wataru, 4,792,490, Cl. 428-407.000.
- Mildenberger, Hilmar: See—  
Lachheia, Stephen; Mildenberger, Hilmar; and Ressel, Hans-Joachim, 4,792,610, Cl. 548-329.000.
- Miles, Gerald; Labus, Rainer H.; and Grebe, James R., to Wynn Oil Company. Engine cooling system power flush with flush liquid filtering and recirculation. 4,791,890, Cl. 123-41.140.
- Milewits, Marvin: See—  
Lam, Clive C.; Milewits, Marvin; and Bradfield, James E., 4,792,756, Cl. 324-232.000.
- Miller, Byron R., to Mead Corporation. The Reversible shelf divider. 4,792,051, Cl. 211-184.000.
- Miller, Grady A., Jr., to LTV Aerospace and Defense Co. Method of designing and manufacturing circuits using universal circuit board. 4,791,722, Cl. 29-850.000.
- Miller, Ira, to Motorola, Inc. Microprocessor support integrated circuit. 4,792,899, Cl. 364-200.000.
- Miller, Thomas M., to ELTECH Systems Corporation. Movable heat chamber insulating structure. 4,791,769, Cl. 52-511.000.
- Millipore Corporation: See—  
Lemoine, Jean, 4,792,454, Cl. 426-8.000.
- Mimasu Oil Chemical Co., Ltd.: See—  
Shimizu, Kazuo, 4,792,416, Cl. 252-369.000.
- Mimoto, Toshio; and Ota, Yoshiji, to Sharp Kabushiki Kaisha. Dynamic semiconductor memory with smaller memory cells. 4,792,922, Cl. 365-149.000.
- Minardi, John E.; von Ohain, Hans P.; and Lawson, Maurice O., to University of Dayton. Internal bypass gas turbine engines with blade cooling. 4,791,784, Cl. 60-262.000.
- Minato, Osamu: See—  
Nagawara, Kouichi; Sakai, Yoshio; Minato, Osamu; Masuhara, Toshiaki; and Meguro, Satoshi, 4,792,841, Cl. 357-59.000.
- Minigrip, Inc.: See—  
Aunitt, Steven, 4,792,240, Cl. 383-63.000.
- Nocek, Robert S.; Tilman, Paul A.; Rasko, George; and Aunitt, Steven, 4,791,710, Cl. 24-587.000.
- Minnesota Mining and Manufacturing Company: See—  
Devoc, Robert J.; and Mitra, Smarajit, 4,792,506, Cl. 430-281.000.
- Koehn, Stephen C.; and Plautz, Ricky A., 4,792,042, Cl. 206-328.000.
- Morloti, Romano; and Krawietz, Florian, 4,792,691, Cl. 250-484.100.
- Wyberg, Gregory R., 4,792,048, Cl. 206-631.300.
- Minolta Camera Kabushiki Kaisha: See—  
Enoguchi, Yuji; Yamamoto, Masashi; and Natsuhara, Toshiya, 4,791,882, Cl. 118-653.000.
- Fujino, Akihiko; Nakai, Masaki; and Ootsuka, Hiroshi, 4,792,823, Cl. 354-446.000.
- Imasaki, Chiharu, 4,792,105, Cl. 242-68.400.
- Kudo, Yoshinobu, 4,792,216, Cl. 350-432.000.
- Norita, Toshio; Taniguchi, Nobuyuki; Ishida, Tokuji; Karaaki, Toshihiko; and Hamada, Masataka, 4,792,820, Cl. 354-402.000.
- Oka, Tateki; Toyoshi, Naoki; and Yokoyama, Tomoaki, 4,792,775, Cl. 355-77.000.
- Minovitch, Michael A. Electromagnetic launching system for long-range guided munitions. 4,791,850, Cl. 89-8.000.
- Mintchev, Mintcho S.; Savov, Svetoslav A.; and Kretev, Emil I., to V M E I "Lenin". Circuit for interrupting arc discharge in a gas-discharge vessel. 4,792,730, Cl. 315-209.05C.
- Mita Industrial Co., Ltd.: See—  
Kozuka, Nobuhiko, 4,792,824, Cl. 355-3.0BE.
- Mitani, Kazuya: See—  
Itoh, Yasuo; Kato, Hideo; Koshinaka, Eiichi; Ogawa, Nobuo; and Mitani, Kazuya, 4,792,547, Cl. 514-211.000.
- Mitra, Smarajit: See—  
Devoc, Robert J.; and Mitra, Smarajit, 4,792,506, Cl. 430-281.000.
- Mitsubishi Denki K.K.: See—  
Kime, Kenjiro; Sakabe, Shigekazu; Hashimoto, Akira; and Matozaki, Toshiya, 4,792,935, Cl. 369-45.000.
- Mitsubishi Denki Kabushiki Kaisha: See—  
Ebisui, Takashi, 4,792,814, Cl. 343-786.000.
- Kobayashi, Norihide; Kimura, Tadashi; Inaba, Tsutomu; and Sugihara, Masahiro, 4,792,296, Cl. 418-55.000.
- Koyama, Shigeru, 4,792,703, Cl. 307-14.000.
- Matsuo, Takayoshi; and Kawasaki, Kei, 4,792,741, Cl. 318-800.000.
- Miyamoto, Hiroshi; and Yamada, Michihiro, 4,792,927, Cl. 365-189.000.
- Nakanishi, Yasuyuki; and Ushiba, Toshiyuki, 4,792,872, Cl. 360-96.500.
- Nakase, Yasunobu; and Anami, Kenji, 4,792,923, Cl. 365-154.000.
- Ohdate, Mitsuo, 4,792,844, Cl. 357-79.000.
- Tobita, Youichi, 4,792,928, Cl. 365-210.000.
- Watake, Yaichiro; and Matsuda, Shuichi, 4,792,461, Cl. 427-38.000.
- Mitsubishi Gas Chemical Company, Inc.: See—  
Togo, Shizuo; Sugihara, Yasuo; and Ikebe, Takaki, 4,792,403, Cl. 210-692.000.
- Mitsubishi Jukogyo Kabushiki Kaisha: See—  
Suemitsu, Sadayoshi, 4,792,164, Cl. 285-134.000.
- Yamamoto, Michinori; Tashiro, Shozo; Sakane, Satoshi; Morita, Toshiro; Shiota, Hiroshi; Rokkaku, Tadashi; and Katayama, Keiichi, 4,791,830, Cl. 74-603.000.
- Mitsubishi Petrochemical Company Limited: See—  
Ochiuni, Masahide, 4,792,477, Cl. 428-216.000.
- Mitsui, Akio: See—  
Kuwashima, Shigeru; Mitsui, Akio; and Sano, Masaru, 4,792,518, Cl. 430-505.000.
- Mitsui Coke Co., Ltd.: See—  
Frohn, Werner; Bohlmann, Dieter; Franke, Hermann; Zimmermann, Werner; Limmer, Heinz; Hopfner, Eberhard; Lindner, Horst; Matthey, Reinhard; Müller, Henner; Poppen, Hans; Schutter, Hartmut; and Dietrich, Detlev, 4,792,389, Cl. 208-76.000.
- Mitsui Petrochemical Industries, Ltd.: See—  
Suga, Michiharu; Ishikawa, Hideo; Akana, Yoshinori; Yoshitake, Junichi; and Kondoh, Masayuki, 4,792,588, Cl. 525-240.000.
- Mitsui Toatsu Chemicals, Inc.: See—  
Shimotori, Hitoshi; Ishii, Tutomu; Yamazaki, Hideo; Kuwatsuka, Toshiaki; Yanase, Yuji; and Tanaka, Yoshinori, 4,792,565, Cl. 514-406.000.
- Mitterer, Dennis M. Ring removal tool. 4,791,925, Cl. 128-303.00R.
- Mityok, Lajos: See—  
Nagy, Gabor; Szonyi, Zoltan; Mityok, Lajos; Pragay, Istvan; and Zambó, Jozsef, 4,792,126, Cl. 266-270.000.
- Miura, Genmei: See—  
Imano, Haruo; Ichikawa, Izumi; Ogiwara, Satoshi; and Miura, Genmei, 4,793,000, Cl. 455-619.000.
- Miyachi Electronic Company: See—  
Namiki, Mitsuo; and Nishizawa, Keiji, 4,792,656, Cl. 219-110.000.
- Miyakawa, Keiichi: See—  
Kanno, Hiroshi; Endo, Toshio; Miyakawa, Keiichi; and Takano, Masao, 4,791,866, Cl. 101-118.000.
- Miyake, Akira; and Kishimoto, Mikio, to Hitachi Maxell, Ltd. Magnetic recording medium. 4,792,483, Cl. 428-323.000.
- Miyake, Hajimu; Okegawa, Tadao; and Kawasaki, Akiyoshi, to Ono Pharmaceutical Co., Ltd. 13-aza-14-oxo-TXA<sub>2</sub> analogues. 4,792,550, Cl. 514-419.000.
- Miyaki, Takeo: See—  
Saitoh, Kyochiro; Tsunakawa, Mitsuaki; Konishi, Masataka; and Miyaki, Takeo, 4,792,545, Cl. 514-35.000.
- Miyamaru Yuki; Hatanaka, Kaoru; Kawada, Shigeo; and Shibata, Yasuo, to Honda Giken Kogyo Kabushiki Kaisha. Turn signal canceling apparatus for use in vehicles. 4,792,785, Cl. 340-73.000.
- Miyamoto, Hiroshi; and Yamada, Michihiro, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device with bit line sense amplifiers. 4,792,927, Cl. 365-189.000.
- Miyaoka, Syozo: See—  
Hattori, Shin; Takai, Makoto; Wakabayashi, Toshio; Suwabe, Yasui; and Miyaoka, Syozo, 4,792,553, Cl. 514-255.000.
- Miyauchi, Eisaku: See—  
Takahashi, Tetsuo; Miyasuchi, Eisaku; Yoshida, Masayuki; Kumagai, Shunichi; and Sasaki, Akio, 4,792,781, Cl. 338-307.000.
- Miyauchi, Nobuyuki; Hayashi, Hiroshi; Yamamoto, Osamu; and Yamamoto, Saburo, to Sharp Kabushiki Kaisha. A ring-shaped resonator type semiconductor laser device. 4,792,962, Cl. 372-94.000.

- Miyoshi, Isao, to Eisai Co., Ltd. Adult T cell leukemia associated cell strain. 4,792,524, Cl. 435-240.200.
- Miyota, Akihiro; and Shinoda, Hidetaka, to Tokyo Seat Corporation Limited. Method of and apparatus for forming trim cover. 4,792,371, Cl. 156-131.000.
- Mizer, Frank A.; and Coghill, George J., to Franklin George Co., Inc., The. Method and apparatus for dispensing flat discs. 4,792,057, Cl. 221-187.000.
- Mizia, Franco; Rivetti, Franco; Romano, Ugo; Rivola, Luigi; and Ciaraldi, Giuseppe, to Enichem Sintesi S.p.A. Stainless steels stress corrosion inhibitors. 4,792,417, Cl. 252-392.000.
- Mizuno, Hodaka: See—  
Yamamoto, Kazuhiko; Nobuhara, Kenji; Mizuno, Hodaka; and Yanagawa, Atsuko, 4,792,585, Cl. 525-67.000.
- Mizuno, Masao: See—  
Nakagawa, Naoshi; Takigawa, Tetsuo; Kageyu, Akira; Shimamura, Michiya; Okada, Masafumi; and Mizuno, Masao, 4,792,615, Cl. 558-144.000.
- Mizuno, Yoshio: See—  
Kawase, Shigeru; Kinjo, Hisao; Mizuno, Yoshio; and Shudo, Katsuyuki, 4,792,861, Cl. 358-313.000.
- Mizutani, Takashi: See—  
Baba, Toshiro; Mizutani, Takashi; and Ogawa, Masaki, 4,792,832, Cl. 357-16.000.
- Moby Corporation: See—  
Nodelman, Neil H., 4,792,576, Cl. 521-174.000.
- Mobil Oil Corporation: See—  
Broderick, Kevin; Catchman, Vernon C.; Herrington, Fox J.; Johnston, Shirley K.; Olson, Robert H.; and Stell, Donald, 4,792,241, Cl. 383-75.000.
- Heilwell, Israel J., 4,792,412, Cl. 252-8.514.
- Herrington, Fox J.; and Holland, Richard A., 4,791,843, Cl. 83-100.000.
- Mobley, Richard M. Freeman ion source. 4,792,687, Cl. 250-423.00R.
- Mochizuki, Takashi, to NEC Corporation. Method and apparatus for coding motion image signal. 4,792,851, Cl. 358-136.000.
- Moen, Alfred M., to Stanadyne, Inc. Fluid valve with protected valve closing seal. 4,791,962, Cl. 137-625.170.
- Moisdon, Roger F. G. Reception system for satellite signals. 4,792,815, Cl. 343-915.000.
- Molair, Michel F.: See—  
Klein, Gerald W.; McConkey, Robert C.; Molair, Michel F.; and Noonan, John M., 4,792,517, Cl. 430-275.000.
- Molnar, Gerald, to Trillium Telephone Systems Inc. Expansion port for use in a communication system. 4,792,970, Cl. 379-284.000.
- Momoi, Toshimitsu: See—  
Ohtani, Hideya; Momoi, Toshimitsu; Ooi, Eiji; Sakuraba, Shuhei; Morita, Masayuki; and Wakashima, Yoshiaki, 4,792,532, Cl. 437-206.000.
- Monk, Anthony C.: See—  
Jackman, Raymond W.; and Monk, Anthony C., 4,791,776, Cl. 53-570.000.
- Monsanto Company: See—  
Coran, Aubert Y., 4,792,583, Cl. 524-504.000.
- Montanari, Paolo; and Sala, Oneglio, to Riva Calzoni S.P.A. Gripping and lifting clamp for pipes and cylindrical objects of large dimensions. 4,792,172, Cl. 294-102.200.
- Moore, James O.: See—  
Eldridge, Jerome M.; Lee, Francis C.; Moore, James O.; and Olive, Graham, 4,792,818, Cl. 346-140.00R.
- Moore, Leo M., to Industrial Machine Manufacturing, Inc. Follower plate assembly. 4,792,063, Cl. 222-146.500.
- Moreau, Philippe J.: See—  
Cuman, Sylvain; and Moreau, Philippe J., 4,792,885, Cl. 363-16.000.
- Morelli, Aldo. Excavator. 4,791,737, Cl. 37-103.000.
- Moretti, Mario D.: See—  
Messina, Giuseppe; Moretti, Mario D.; Sanna, Salvatore R.; Soma, Giovanni; and Cabras, Pier G., 4,792,637, Cl. 568-626.000.
- Morgan, Derek E.: See—  
McWilliams, Joseph A.; Morgan, Derek E.; and Jackson, James D. J., 4,792,466, Cl. 427-177.000.
- Morgan, Harvey L. Oscillator system for detecting a selected one of a plurality of tuned circuits. 4,792,965, Cl. 375-6.000.
- Morgan, Peter E. D.: See—  
Dunn, Bruce S.; and Morgan, Peter E. D., 4,792,377, Cl. 156-624.000.
- Mori, Taro: See—  
Suga, Nagaichi; Mori, Taro; and Sasho, Yoshio, 4,792,093, Cl. 239-14.200.
- Morimoto, Hideyuki; and Tanaka, Ryuichi, to Fuji Heavy Industries, Ltd.; and Nippon Air Brake Co., Ltd. Brake control method and apparatus for a vehicle. 4,792,023, Cl. 188-353.000.
- Morimoto, Taiji: See—  
Yamamoto, Saburo; Hayashi, Hiroshi; Morimoto, Taiji; and Yano, Seiki, 4,792,960, Cl. 372-46.000.
- Morinaga Milk Industry Co., Ltd.: See—  
Takahashi, Akira; Shimamura, Yoshiyuki; Kobayashi, Hide; Okonogi, Shigeo; Kawashima, Takuji; and Igarashi, Minoru, 4,792,549, Cl. 514-400.000.
- Moriaki, Hiroshi: See—  
Honma, Yoshio; Tsunakawa, Sukeyoshi; Yokoyama, Natsuki; and Moriaki, Hiroshi, 4,792,842, Cl. 357-71.000.
- Moriawara, Kunio; Yasue, Hideki; Fukumura, Kagenori; Yoshizawa, Kenichi; and Nakamura, Yasunari, to Toyota Jidosha Kabushiki Kaisha. Anti torque shock control device and method engaging torque transmitting clutch between vehicle wheels when transmission is shifted from non drive range to drive range. 4,792,012, Cl. 180-247.000.
- Morita, Kouichi: See—  
Nagano, Eiki; Haga, Toru; Sato, Ryo; and Morita, Kouichi, 4,792,605, Cl. 544-105.000.
- Morita, Masayuki: See—  
Ohtani, Hideya; Momoi, Toshimitsu; Ooi, Eiji; Sakuraba, Shuhei; Morita, Masayuki; and Wakashima, Yoshiaki, 4,792,532, Cl. 437-206.000.
- Morita, Toshiro: See—  
Yamamoto, Michinori; Tashiro, Shozo; Sakane, Satoshi; Morita, Toshiro; Shiota, Hiroshi; Rokkaku, Tadashi; and Katayama, Keiichi, 4,791,830, Cl. 74-603.000.
- Moritani, Tobei, to Kuraray Co., Ltd. Composition, process for producing the same and multi-layer structure. 4,792,484, Cl. 428-323.000.
- Moritsu, Yukikazu: See—  
Kimura, Toshiro; Okuno, Giichi; Moritsu, Yukikazu; and Yamada, Koji, 4,792,358, Cl. 106-84.000.
- Moriyama, Toshio. Power operated toothbrush. 4,791,945, Cl. 132-84.00R.
- Morloti, Romano; and Krawietz, Florian, to Minnesota Mining and Manufacturing Company. Method for recording and reproducing a radiation image, radiation image storage panel, photostimulable phosphors and method for obtaining said stimulative phosphors. 4,792,691, Cl. 250-484.100.
- Moroboshi, Mikio: See—  
Hojo, Takeshi; Nakaishi, Takafumi; and Moroboshi, Mikio, 4,791,727, Cl. 33-325.000.
- Morris, Arthur J.; and Knieriem, Jeffrey L., to Camco, Incorporated. Subsurface well safety valve with hydraulic strainer. 4,791,991, Cl. 166-319.000.
- Morrison, Orville C.: See—  
Kutta, Helmut W.; and Morrison, Orville C., 4,791,804, Cl. 73-23.000.
- Morton, Kenneth P.; D'Arcy, Daniel J.; and Riehm, Merry S., to Quaker Oats Company. The Changing caddy including a removable changing pad for an infant. 4,792,024, Cl. 190-1.000.
- Morton Thiokol, Inc.: See—  
Melas, Andreas A.; and Braunagel, Norbert, 4,792,467, Cl. 427-248.100.
- Moser, Peter; Weber, Alfred; Johann, Aglas; Popperhatsky, Johann; and Stastny, Georg, to Voest-Alpine Aktiengesellschaft. Metallurgical plant. 4,792,123, Cl. 266-142.000.
- Motorola Inc.: See—  
Drye, James E.; and Post, Steven L., 4,792,533, Cl. 437-213.000.
- Enes, Orville M., 4,792,991, Cl. 455-210.000.
- Miller, Ira, 4,792,899, Cl. 364-200.000.
- Mottet, Leon-Philippe: See—  
Roby, Pierre; Mottet, Leon-Philippe; and Deschepper, Pierre, 4,792,468, Cl. 427-422.000.
- Mowli, John C. Two-stage screw auger pumping apparatus. 4,792,294, Cl. 418-9.000.
- Mowli, Jack U. Dual-mode transportation system. 4,791,871, Cl. 104-94.000.
- Moyes, Hilary, to Westinghouse Electric Corp. Electrodes made from mixed silver-silver oxides. 4,792,505, Cl. 429-219.000.
- Moyle, William R.: See—  
Canfield, Robert E.; Ehrlich, Paul H.; and Moyle, William R., 4,792,528, Cl. 436-515.000.
- Mrongowius, Klaus: See—  
Lorenz, Kurt; Dunga, Horst; Mrongowius, Klaus; and Gehrhardt, Jost-Wilfried, 4,792,382, Cl. 201-3.000.
- Mudgett-Hunter, Meredith: See—  
Donahoe, Patricia K.; Budzik, Gerald P.; and Mudgett-Hunter, Meredith, 4,792,601, Cl. 530-387.000.
- Mueller, Donald S.: See—  
Chen, Albert C.; Siegfried, David L.; and Mueller, Donald S., 4,792,577, Cl. 523-118.000.
- Mueller, Gustav; Hartl, Engelbert; and Honsberg, Martin, to Siemens Aktiengesellschaft. Laser diode. 4,792,959, Cl. 372-46.000.
- Mueller, Herbert; and Mesch, Walter, to BASF Aktiengesellschaft. Preparation of di-tert-butylethylenediamine. 4,792,631, Cl. 564-489.000.
- Muguruma, Taku: See—  
Furuta, Kouichi; Fukue, Naofumi; Muguruma, Taku; and Iwaki, Masato, 4,791,905, Cl. 123-497.000.
- Muller, George H.: See—  
Berke, Joseph J.; and Muller, George H., 4,791,928, Cl. 128-305.000.
- Muller, Henner: See—  
Frohn, Werner; Bohlmann, Dieter; Franke, Hermann; Zimmermann, Werner; Limmer, Heinz; Hopfner, Eberhard; Lindner, Horst; Matthey, Reinhard; Müller, Henner; Poppen, Hans; Schutter, Hartmut; and Dietrich, Detlev, 4,792,389, Cl. 208-76.000.
- Muller, Mathias: See—  
Schmidtchen, Gerhard; and Muller, Mathias, 4,792,661, Cl. 219-301.000.
- Muller, Maurice E., to Protek AG. Acetabulum part for a total hip prosthesis. 4,792,337, Cl. 623-22.000.
- Muller, Peter; Mustacchi, Henry; and Schmitz, George, to Andrews Paper & Chemical Co., Inc. Erasable diazotype material. 4,792,515, Cl. 430-160.000.
- Murakami, Yoshiteru; Takahashi, Akira; Fujii, Yoshikazu; Katayama, Hiroyuki; and Ohta, Kenji, to Sharp Kabushiki Kaisha. Optical memory element. 4,792,474, Cl. 428-64.000.



Muranaka, Shigeo; Kamegaya, Shigeru; and Matayoshi, Yutaka, to Nissan Motor Co., Ltd. Valve train arrangement for multi-valve engine. 4,791,893, Cl. 123-90.400.

Murata Manufacturing Co., Ltd.: See—  
Hori, Toshio; and Fujiki, Yasuo, 4,792,310, Cl. 439-620.000.

Tamura, Hiroshi; and Sagala, Djuniadi A., 4,792,537, Cl. 501-118.000.

Murata, Yukihiko, to Nissan Motor Company, Ltd. Wiper with wiper arm sweeping angle changer. 4,791,698, Cl. 15-250.130.

Murray, Alexander P.: See—  
Sayder, Thomas S.; and Murray, Alexander P., 4,792,385, Cl. 204-140.000.

Murray, Steven W.: See—  
Hettinger, William P., Jr.; Murray, Steven W.; Adkins, Ricky L.; Fritz, Billy T.; Riggs, James R.; and Walters, Paul W., 4,792,437, Cl. 422-147.000.

Murthy, Andriappan K. S.: See—  
Masilemani, Divakaran; Hammond, George S.; and Murthy, Andriappan K. S., 4,792,639, Cl. 568-697.000.

Murthy, D. V. K.; Venuti, Michael C.; and Young, John M., to Syntex (U.S.A.) Inc. Naphthalene anti-peptic agents. 4,792,556, Cl. 514-256.000.

Mustacchi, Henry: See—  
Muller, Peter; Mustacchi, Henry; and Schmitz, George, 4,792,515, Cl. 430-160.000.

Muther, Thomas: See—  
Schuss, Werner; Bierbaum, Thomas; and Muther, Thomas, 4,792,304, Cl. 433-126.000.

Myers, David J.: See—  
Sacarian, Stephen P.; Blankenship, Gene E.; Shah, Rajiv R.; Tran, Tom; Myers, David J.; Lin, Johnson J.; and Thompson, Steve, 4,792,835, Cl. 357-23.600.

Myers, Mark S.: See—  
Johnson, David B.; Kenoyer, Stanley; Myers, Mark S.; and Nilsson, Sven, 4,792,955, Cl. 371-68.000.

Nachtgeboren, Adrianus, to Ford New Holland, Inc. Bale discharge mechanism for plunger type agricultural balers. 4,791,865, Cl. 100-218.000.

Nadd, Bruno, to Thomson-CSF. Resistor integrated on a semiconductor substrate. 4,792,840, Cl. 357-51.000.

Nagamoto, Itsushi: See—  
Nagasaki, Yoichi; Nagamoto, Itsushi; Tadokoro, Toyohiko; and Fujimura, Masaki, 4,792,139, Cl. 273-167.00H.

Nagano, Eiki; Haga, Toru; Sato, Ryo; and Morita, Kouichi, to Sumitomo Chemical Company, Ltd. 1,4-benzoxazin-3-one-6-(amino or nitro) intermediates. 4,792,605, Cl. 544-105.000.

Naganuma, Kazumori; and Noda, Juichi, to Nippon Telegraph and Telephone Corporation. Method and apparatus for measuring ultrasonic optical pulses. 4,792,230, Cl. 356-345.000.

Nagaoka, Yoshitomi: See—  
Nakajima, Yasuo; Yamamoto, Yoshiharu; and Nagaoka, Yoshitomi, 4,792,218, Cl. 350-432.000.

Nagasaki, Yoichi; Nagamoto, Itsushi; Tadokoro, Toyohiko; and Fujimura, Masaki, to Yamaha Corporation. Golf club head. 4,792,139, Cl. 273-167.00H.

Nagasawa, Kouichi; Sakai, Yoshio; Minato, Osamu; Masuhara, Toshiaki; and Meguro, Satoshi, to Hitachi, Ltd. Semiconductor devices and a process for producing the same. 4,792,841, Cl. 357-59.000.

Nagy, Gabor; Szonyi, Zoltan; Mityok, Lajos; Pragy, Istvan; and Zambó, Jozsef, to Vasipari Kutató és Fejlesztő Vállalat. Blow lance for treating molten metal in metallurgical vessels. 4,792,126, Cl. 266-270.000.

Nakagawa, Kazuyuki: See—  
Oshiro, Yasuo; Ueda, Hiroaki; and Nakagawa, Kazuyuki, 4,792,628, Cl. 564-428.000.

Nakagawa, Naoshi; Takigawa, Tetsuo; Kageyu, Akira; Shimamura, Michiya; Okada, Masafumi; and Mizuno, Masao. Method of producing  $\alpha$ -dihydropolyprenyl monophosphates. 4,792,615, Cl. 558-144.000.

Nakagawa, Takayuki; and Omoda, Koichiro, to Hitachi, Ltd. Selectively recursive pipelined parallel vector logical operation system. 4,792,893, Cl. 364-200.000.

Nakai, Masaki: See—  
Fujino, Akihiko; Nakai, Masaki; and Ootsuka, Hiroshi, 4,792,823, Cl. 354-446.000.

Nakaishi, Takafumi: See—  
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Hojo, Takeshi; and Nakaishi, Takafumi, 4,792,676, Cl. 250-231.0GY.

Nakajima Dokusabo Company Limited: See—  
Nakajima, Masahiko, 4,792,435, Cl. 422-110.000.

Nakajima, Junichi: See—  
Takeruchi, Masamichi; and Nakajima, Junichi, 4,792,243, Cl. 384-486.000.

Nakajima, Masahiko, to Nakajima Dokusabo Company Limited. Oxygen generating system. 4,792,435, Cl. 422-110.000.

Nakajima, Yasuo; Yamamoto, Yoshiharu; and Nagaoka, Yoshitomi, to Matsushita Electric Industrial Co., Ltd. Projection lens for high definition TV. 4,792,218, Cl. 350-432.000.

Nakamura, Ken: See—  
Haneda, Satoshi; Itoh, Takashi; Nakamura, Ken; and Makoto, Tomono, 4,792,512, Cl. 430-102.000.

Nakamura, Kentaro: See—  
Okuda, Junji; Hashi, Kazunori; Nakamura, Kentaro; and Kubo, Kazuo, 4,792,052, Cl. 212-162.000.

Nakamura, Ritsuka; and Kuroiwa, Akihiko, to Kabushiki Kaisha Toshioka. High-accuracy position detection apparatus. 4,792,739, Cl. 318-661.000.

Nakamura, Taku; and Sato, Kozo, to Fuji Photo Film Co., Ltd. Light-sensitive material. 4,792,514, Cl. 430-138.000.

Nakamura, Yasunari: See—  
Morisawa, Kunio; Yasue, Hideki; Fukumura, Kagenori; Yoshizawa, Kenichi; and Nakamura, Yasunari, 4,792,012, Cl. 180-247.000.

Nakanishi, Yasuyuki; and Ushiba, Toshiyuki, to Mitsubishi Denki Kabushiki Kaisha. Holder structure in a cassette player. 4,792,872, Cl. 360-96.500.

Nakano, Shoji: See—  
Yoshioka, Teruo; Nakano, Shoji; and Sato, Yutaka, 4,791,714, Cl. 29-156.40R.

Nakao, Yukimichi; Kaeriyama, Kyoji; Suda, Yoshio; Imai, Tomoyuki; Oze, Osamu; and Horiishi, Nanao, to Agency of Industrial Science & Technology, The; and Toda Kogyo Corp. Process for producing electroconductive fibrous shaped articles. 4,792,645, Cl. 174-126.400.

Nakase, Yasunobu; and Anami, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Bipolar semiconductor memory device with double word lines structure. 4,792,923, Cl. 365-154.000.

Nakaya, Yasuhiro: See—  
Asai, Toshio; Nakaya, Yasuhiro; and Onodera, Yasuaki, 4,791,933, Cl. 128-640.000.

Nakayama, Yutaka: See—  
Ishihara, Toshiyuki; Kamiya, Takeshi; Nakayama, Yutaka; and Yamada, Tetsuhiro, 4,792,387, Cl. 204-425.000.

Nalco Chemical Company: See—  
Allenson, Stephen J.; Braden, Michael L.; and Banik, Jack A., 4,792,406, Cl. 210-734.000.

Huang, Shu-Jen W., 4,792,364, Cl. 134-38.000.

Namiki, Mitsuo; and Nishizawa, Keiji, to Miyachi Electronic Company. Inverter type DC resistance welding machine. 4,792,656, Cl. 219-110.000.

Nanik Division Wausau Metals Corporation: See—  
Reeves, John F., 4,792,427, Cl. 264-285.000.

Nantini, Hans; and Ohlsson, Ingemar, to Tetra Pak International AB. Pouring edge on packing containers. 4,792,069, Cl. 222-527.000.

Narang, Saran A.; and Wu, Ray J., to Cornell Research Foundation, Inc. Adaptors, and synthesis and cloning of proinsulin genes. 4,792,602, Cl. 536-27.000.

Narciso, Ralf A.: See—  
Zucker, Joseph; Levinson, Frank H.; and Narciso, Ralf A., 4,792,202, Cl. 350-96.160.

Narishige, Shinji: See—  
Kobayashi, Tetsuo; Tsukada, Yukihisa; Narishige, Shinji; and Hara, Shimichi, 4,791,719, Cl. 29-603.000.

Narusawa, Sadayuki, to Nippon Gakki Seizo Kabushiki Kaisha. Vertical synchronizing signal detection circuit. 4,792,852, Cl. 358-153.000.

Naruse, Nobutaka; and Ogata, Shozo, to Hoshizaki Electric Co., Ltd. Ice making machine. 4,791,792, Cl. 62-135.000.

Nash, James E.; and Heikkila, Kurt E., to Capsule Environmental Engineering, Inc. Novel cleaning composition for removal of PCBs. 4,792,413, Cl. 252-111.000.

Nassler, Peter: See—  
Goschke, Bernd; and Nassler, Peter, 4,791,819, Cl. 73-865.800.

National Research Development Corporation: See—  
McGeenan, Joseph P.; and Bateman, Andrew, 4,792,985, Cl. 455-48.000.

Williamson, Stephen, 4,792,710, Cl. 310-90.500.

Natsuhara, Toshiya: See—  
Enoguchi, Yuji; Yamamoto, Masashi; and Natsuhara, Toshiya, 4,791,882, Cl. 118-653.000.

Nau, Vance J.: See—  
Metzger, Andre; Grimm, Peter; Nohl, Andre J.; and Nau, Vance J., 4,792,434, Cl. 422-100.000.

Navarra De Componentes Electronicos, S.A. (NACESA): See—  
Arriazu, Jose C. L., 4,792,778, Cl. 338-174.000.

NEC Corporation: See—  
Baba, Toshio; Mizutani, Takashi; and Ogawa, Masaki, 4,792,832, Cl. 357-16.000.

Hiraguchi, Masayoshi, 4,792,940, Cl. 370-32.100.

Matsuo, Yoshitake, 4,792,984, Cl. 455-32.000.

Mochizuki, Takashi, 4,792,851, Cl. 358-136.000.

Watarai, Masao, 4,792,976, Cl. 381-43.000.

Yoshida, Atsushi, 4,792,964, Cl. 375-118.000.

Nee, Victor W., to Environment and Safety, Inc. System and method for detecting liquid leakage in storage tanks. 4,791,814, Cl. 73-49.200.

Neef, Heinz: See—  
Labenz, Norbert; and Neef, Heinz, 4,792,222, Cl. 351-136.000.

Neitzel, Robert E., to General Electric Company. Convertible aircraft engine. 4,791,783, Cl. 60-262.000.

Nelson, Calvin G.; and Anton, Mark, to ADC Telecommunications, Inc. Optical fiber distribution apparatus. 4,792,203, Cl. 350-96.200.

Nelson, Peter H.; Unger, Stefan H.; and Thieme, Thomas R., to Syntex (U.S.A.) Inc. 9-anthryloxyaminoalkanes and related compounds as anti-inflammatory and analgesic agents. 4,792,551, Cl. 514-651.000.

Nelson, Peter H.; Dunn, James P.; Unger, Stefan H.; and Thieme, Thomas R., to Syntex (U.S.A.) Inc. 3- and 4-biphenyloxyaminoalkanes and related compounds as anti-inflammatory and analgesic agents. 4,792,570, Cl. 514-651.000.

Nelson, Robert A.: See—  
Gruber, Robert J.; and Nelson, Robert A., 4,792,513, Cl. 430-110.000.

Nettleton, Donald E., Jr.; Bray, Stanley W.; Bush, James A.; and Bradner, William T., to Bristol-Myers Company. Rigolettone antitumor complex. 4,792,522, Cl. 435-67.000.

Neue Rotoprint GmbH: See—  
Jahme, Hans J., 4,792,132, Cl. 271-186.000.

Neuhoefer, Josef: See—  
Soehnlein, Dieter; Neuhoefer, Josef; and Hoffman, Armin, 4,792,065, Cl. 222-387.000.

New York Institute of Technology: See—  
Glenn, William F., 4,792,854, Cl. 358-160.000.

NGK Insulators, Ltd.: See—  
Matsui, Yosuke; Ishikawa, Shuhei; and Iwadachi, Takaharu, 4,792,365, Cl. 148-12.70C.

Watanabe, Akihiro; Nozaki, Hiroshi; and Okamoto, Mitsuharu, 4,792,647, Cl. 174-182.000.

NGK Spark Plug Co., Ltd.: See—  
Ishihara, Toshiyuki; Kamiya, Takeshi; Nakayama, Yutaka; and Yamada, Tetsuhiro, 4,792,387, Cl. 204-425.000.

Nickel, Herbert W., to A. O. Smith Corporation. Composite tubular structure. 4,792,320, Cl. 464-181.000.

Nicol, Edward A.; and Adrian, George J., to Unisys Corporation. Self-aligning liquid-cooling assembly. 4,791,983, Cl. 165-80.400.

Nicolau, Neculai A., to Delphin Corporation. Hydraulic assisted machine. 4,791,824, Cl. 74-55.000.

Niddam, Roger: See—  
Karcher, Gilles; Amor, Max; Niddam, Roger; and Villemot, Jean-Pierre, 4,792,686, Cl. 250-363.00S.

Nielsen, Carsten; Holm, Ejler L.; Sandeman, Jens P.; and Madsen, Hanne F., to Aalborg Værft A/S. Process for desulphurization of flue gas. 4,792,444, Cl. 423-244.000.

Nielsen, Robert E., to Grumman Aerospace Corporation. Apparatus and method of stimulating an equipment. 4,792,951, Cl. 371-27.000.

Nienhaus, Clemens; Buthe, Theo; and Mikeka, Felix, to Jean Walter-scheid GmbH. Drive shaft coupling. 4,792,006, Cl. 180-53.300.

Nierstachker, Willi, to Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt e.V. Reciprocating pump for cryogenic fluids. 4,792,289, Cl. 417-259.000.

Nihon Technical Kabushiki Kaisha: See—  
Ohashi, Tamaki; and Matsuda, Toshiyuki, 4,792,988, Cl. 455-162.000.

Nikon Corporation: See—  
Yamaguchi, Atsushi; and Hasegawa, Sinichi, 4,792,693, Cl. 250-548.000.

Nilarp, Andres, to International Rectifier Corporation. Process for balancing forward and reverse characteristic of thyristors. 4,792,530, Cl. 437-6.000.

Nilsson, Sven: See—  
Johnson, David B.; Kenoyer, Stanley; Myers, Mark S.; and Nilsson, Sven, 4,792,955, Cl. 371-68.000.

Nini, Conroy J.: See—  
Hempkins, W. Brent; Kingsborough, Roger H.; Lohec, Wesley E.; and Nini, Conroy J., 4,791,998, Cl. 175-61.000.

Nippon Air Brake Co., Ltd.: See—  
Morimoto, Hideyuki; and Tanaka, Ryuichi, 4,792,023, Cl. 188-353.000.

Nippon Board Computer Co., Ltd.: See—  
Iwai, Kiyoshi, 4,792,753, Cl. 324-73.00R.

Nippon Collin Co., Ltd.: See—  
Barbee, James G., 4,791,811, Cl. 73-119.00R.

Nippon Gakki Seizo Kabushiki Kaisha: See—  
Narusawa, Sadayuki, 4,792,852, Cl. 358-153.000.

Nishimoto, Tetsuo, 4,791,847, Cl. 84-1.210.

Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha: See—  
Yamamoto, Nobuyuki; Nishikawa, Isamu; and Honmura, Osamu, 4,792,544, Cl. 503-216.000.

Nippon Gosei Kagaku Kogyo Kabushiki Kaisha: See—  
Taisha, Akira; Kawabata, Takeo; Kakimoto, Takehiko; and Hirata, Kazumasa, 4,792,630, Cl. 564-474.000.

Nippon Kokan Kabushiki Kaisha: See—  
Ozeki, Akichika; Yamada, Kenzo; and Iwasaki, Katsuhiro, 4,792,352, Cl. 75-59.220.

Nippon Mining Co., Ltd.: See—  
Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kenji, 4,792,369, Cl. 148-404.000.

Nippon Steel Corporation: See—  
Shindou, Yoshio; Kabeya, Motoo; and Saito, Katsushi, 4,792,499, Cl. 428-659.000.

Nippon Telegraph and Telephone Corporation: See—  
Naganuma, Kazunori; and Noda, Juichi, 4,792,230, Cl. 356-345.000.

Nippondenso Co., Ltd.: See—  
Furuta, Kouichi; Fukue, Naofumi; Muguruma, Taku; and Iwaki, Masato, 4,791,905, Cl. 123-497.000.

Ikedo, Motozo; Fukaya, Hiroyasu; and Sakai, Tomihisa, 4,792,907, Cl. 364-449.000.

Nishida, Katsuhiko; Shindo, Mansanari; Suzuki, Masaharu; and Kondo, Masamichi, to Schlumberger Technology Corporation. Optical seismic detector. 4,792,931, Cl. 367-149.000.

Nishida, Katsutoshi: See—  
Yamashita, Yoko; Masumoto, Yuji; Kimura, Takao; Nishida, Katsutoshi; Inoue, Koichi; Rokkaku, Kazuo; and Takebayashi, Hiroaki, 4,792,244, Cl. 384-492.000.

Nishikawa, Isamu: See—  
Yamamoto, Nobuyuki; Nishikawa, Isamu; and Honmura, Osamu, 4,792,544, Cl. 503-216.000.

Nishimoto, Tetsuo, to Nippon Gakki Seizo Kabushiki Kaisha. Parameter setting system for electronic musical instrument. 4,791,847, Cl. 84-1.210.

Nishimura, Shigeharu; and Kamiyama, Norio, to NSK-Warner K.K. End-bearing equipped one-way clutch. 4,792,028, Cl. 192-41.00A.

Nishimura, Takashi: See—  
Takenaka, Shigeo; Kamohara, Eiji; and Nishimura, Takashi, 4,792,720, Cl. 313-409.000.

Nishimura, Tamotsu, to Futaba Kinzoku Kogyo Kabushiki Kaisha. Push latch device. 4,792,165, Cl. 292-19.000.

Nishiya, Takashi: See—  
Shioya, Makoto; Funabashi, Motohisa; and Nishiya, Takashi, 4,792,694, Cl. 250-558.000.

Nishizawa, Keiji: See—  
Namiki, Mitsuo; and Nishizawa, Keiji, 4,792,656, Cl. 219-110.000.

Nishizawa, Yoshio; and Kamata, Shigeo, to Fuji Photo Film Co., Ltd. Magnetic tape pancake package. 4,792,044, Cl. 206-394.000.

Nisida, Hirotaka, to Taisei Kako Co., Ltd. Collapsible tube with membrane cap. 4,792,061, Cl. 222-107.000.

Nissan Motor Co., Ltd.: See—  
Hosotani, Takashi, 4,792,008, Cl. 180-142.000.

Muranaka, Shigeo; Kamegaya, Shigeru; and Matayoshi, Yutaka, 4,791,893, Cl. 123-90.400.

Murata, Yukihiko, 4,791,698, Cl. 15-250.130.

Nissen, Knud E.: See—  
Haugaard, Kristian; and Nissen, Knud E., 4,791,771, Cl. 52-656.000.

Nissin Kogyo Kabushiki Kaisha: See—  
Fukuzawa, Genichiro; and Ideasa, Isao, 4,792,021, Cl. 188-79.620.

Nisso Maruzen Chemical Co., Ltd.: See—  
Matsumoto, Tsuyoshi; Fukudome, Toshiyuki; and Tsuchida, Masaki, 4,792,638, Cl. 568-682.000.

Nitzberg, Leonard R.; and Carmack, Paul D., to Helix Enterprises, Inc. Fluid joint swivel coupling. 4,791,961, Cl. 137-614.040.

Nivarox-FAR S.A.: See—  
Mailard, Germain, 4,791,939, Cl. 128-786.000.

Niwano, Masahiro: See—  
Saegusa, Takeo; Horikawa, Jiro; Niwano, Masahiro; and Kanazawa, Takenobu, 4,792,603, Cl. 540-451.000.

Nixdorf Computer AG: See—  
Langhans, Lutz; Meyer, Friedrich; and Drake, Johannes, 4,792,658, Cl. 219-121.630.

NL Industries, Inc.: See—  
Paske, William C.; Rodney, Paul F.; and Roeder, Ray A., 4,791,797, Cl. 73-152.000.

Nobuhara, Kenji: See—  
Yamamoto, Kazuhiko; Nobuhara, Kenji; Mizuno, Hodaka; and Yanagawa, Atsuko, 4,792,585, Cl. 525-67.000.

Nocek, Robert S.; Tilman, Paul A.; Rasko, George; and Ausnit, Steven, to Minigrip, Inc. Self-aligning closable extruded profile plastic fastener and method. 4,791,710, Cl. 24-587.000.

Noda, Juichi: See—  
Naganuma, Kazunori; and Noda, Juichi, 4,792,230, Cl. 356-345.000.

Noda, Tetsuo: See—  
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Yoneda, Yoshihiro; Noda, Tetsuo; Fujita, Naoyuki; and Asakura, Osamu, 4,792,489, Cl. 428-400.000.

Nodelman, Neil H., to Mobay Corporation. Production of polyurethane moldings by the reaction injection molding process. 4,792,576, Cl. 521-174.000.

Noggle, Francis E., to Ford Motor Company. Synthetic material structural body panel. 4,791,765, Cl. 52-309.200.

Nohl, Andre J.: See—  
Metzger, Andre; Grimm, Peter; Nohl, Andre J.; and Nau, Vance J., 4,792,434, Cl. 422-100.000.

Noll, Burton A., to Corning Glass Works. Grinding wheel coolant distributor. 4,791,760, Cl. 51-267.000.

Nomura, Akihiro; and Kurusu, Yasuo, to Dainippon Screen Mfg. Co., Ltd. Method of and apparatus for correcting gradation of image represented by image data. 4,792,979, Cl. 382-54.000.

Nonnenmacher, Gerhard, to Robert Bosch GmbH. Piston machine. 4,791,858, Cl. 92-12.100.

Noonan, John M.: See—  
Klein, Gerald W.; McConkey, Robert C.; Molare, Michel F.; and Noonan, John M., 4,792,517, Cl. 430-275.000.

Norita, Toshio; Taniguchi, Nobuyuki; Ishida, Tokuji; Karasaki, Toshihiko; and Hamada, Masataka, to Minolta Camera Kabushiki Kaisha. Camera with automatic focus and exposure control means. 4,792,820, Cl. 354-402.000.

Nortey, Samuel O.: See—  
Maryanoff, Bruce E.; and Nortey, Samuel O., 4,792,569, Cl. 514-517.000.

North American Container Corporation: See—  
Grigby, John M., 4,792,041, Cl. 206-319.000.

North American Philips Corporation: See—  
Gandhi, Harish F., 4,792,726, Cl. 315-52.000.

Heytmeijer, Herman R., 4,792,342, Cl. 23-313.00R.

Northern Power Systems, Inc.: See—  
Coleman, Clint, 4,792,281, Cl. 416-156.000.

Northwestern University: See—  
Raviv, Gil; Marhic, Michel E.; and Epstein, Max, 4,792,196, Cl. 350-3.600.

Nozaki, Hiroshi: See—  
Watanabe, Akihiro; Nozaki, Hiroshi; and Okamoto, Mitsuharu, 4,792,647, Cl. 174-182.000.



NSK-Warner K.K.: See—  
Nishimura, Shigeharu; and Kamiyama, Norio, 4,792,028, Cl. 192-41.00A.

Nukem GmbH: See—  
Huschelrath, Gerhard; and Rehfs, Ekkehard, 4,792,755, Cl. 324-225.000.

Numata, Shun-ichi; Fujisaki, Koji; Kinjo, Noriyuki; Imaizumi, Junichi; and Mikami, Yoshikatsu, to Hitachi, Ltd.; and Hitachi Chemical Co. Low thermal expansion resin material and composite shaped article. 4,792,476, Cl. 428-209.000.

Nussrallah, Steve; and Farmer, James, to Scientific-Atlanta, Inc. Cable television impulse pay per view system. 4,792,848, Cl. 358-86.000.

Oak Industries Inc.: See—  
Denley, Ronald S., 4,792,376, Cl. 156-540.000.

Oakley, Gordon S.: See—  
Craig, Preston S.; and Oakley, Gordon S., 4,792,423, Cl. 264-3.100.

Occidental Chemical Corporation: See—  
Bieron, Joseph F.; and Tang, David Y., 4,792,618, Cl. 560-127.000.

Ochumi, Masahide, to Mitsubishi Petrochemical Company Limited. Laminate of modified polycarbonate resin and modified polyolefin resin. 4,792,477, Cl. 428-216.000.

Ocha, Heinrich: See—  
Diffipp, Kurt; and Ocha, Heinrich, 4,791,868, Cl. 101-230.000.

O'Connor, James E.; Geibel, Jon P.; and Beever, William H., to Phillips Petroleum Company. Reinforced plastic. 4,792,481, Cl. 428-288.000.

Odlyzko, Paul: See—  
Yanoy, John A., Jr.; Odlyzko, Paul; Ashok, Erramilli; and Hsiung, Hsiangsu, 4,792,941, Cl. 370-58.000.

O'Donnell, Daniel H.: See—  
Wicker, Guy; Swartz, Louis D.; O'Donnell, Daniel H.; Heslip, John A.; Cannella, Vincent D.; Prache, Olivier; McCormick-Goodhart, Mark H.; and Barnes, Marvin C., 4,792,859, Cl. 358-294.000.

O'Donnell, Elizabeth D. Collimated knitting pattern instruction panel. 4,792,305, Cl. 434-95.000.

Oechale, S. John. Apparatus for determining the relative hardness and abrasion resistance of industrial film coatings and linings. 4,791,807, Cl. 73-78.000.

Officine Meccaniche G. Cerutti S.p.A.: See—  
Deregibus, Antonio, 4,791,867, Cl. 101-212.000.

Ogasawara, Fumihiko, to Ricoh Company, Ltd. Telematic reception terminal. 4,792,648, Cl. 178-4.000.

Ogata, Shozo: See—  
Naruse, Nobutaka; and Ogata, Shozo, 4,791,792, Cl. 62-135.000.

Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, to Nippon Mining Co., Ltd. Copper wires used for transmitting sounds or images. 4,792,369, Cl. 148-404.000.

Ogawa, Masaki: See—  
Baba, Toshio; Mizutani, Takashi; and Ogawa, Masaki, 4,792,832, Cl. 357-16.000.

Ogawa, Masao: See—  
Sasaki, Toshio; and Ogawa, Masao, 4,791,876, Cl. 112-241.000.

Ogawa, Nobuo: See—  
Itoh, Yasuo; Kato, Hideo; Koshinaka, Eiichi; Ogawa, Nobuo; and Mitani, Kazuya, 4,792,547, Cl. 514-211.000.

Ogawa, Tetsu, to Canon Denchi Kabushiki Kaisha. Interface providing impedance matching by selective connection of a resistor array to a power supply. 4,792,920, Cl. 364-900.000.

Ogiwara, Satoshi: See—  
Imano, Haruo; Ichikawa, Izumi; Ogiwara, Satoshi; and Miura, Genmei, 4,793,000, Cl. 455-619.000.

Ogura, Masahiko, to Kabushiki Kaisha Toshiba. Display device. 4,792,827, Cl. 355-14.00C.

Ogura, Masami: See—  
Abe, Masaru; Ogura, Masami; and Sato, Tsuyoshi, 4,792,007, Cl. 180-140.000.

Ohashi, Masashi: See—  
Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshiro; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiru; Tanabe, Ken; and Tanaka, Hidetoshi, 4,792,828, Cl. 355-14.00R.

Ohashi, Tamaki; and Matsuda, Toshiyuki, to Nihon Technical Kabushiki Kaisha. Radio receiving circuit with a search tuning mechanism. 4,792,988, Cl. 455-162.000.

Ohba, Yasuo; Ishikawa, Masayuki; Yamamoto, Motoyuki; Watanabe, Yukio; and Sugawara, Hideto, to Kabushiki Kaisha Toshiba. Semiconductor laser with mesa stripe waveguide structure. 4,792,958, Cl. 372-45.000.

Ohdaira, Hideichi, to Alps Electric Co., Ltd. Gimbal spring for floating type magnetic head. 4,792,875, Cl. 360-104.000.

Ohdate, Mitsuo, to Mitsubishi Denki Kabushiki Kaisha. Pressure contact semiconductor device. 4,792,844, Cl. 357-79.000.

Obe, Junzo; and Kondo, Hiroshi, to Toyota Jidohsha Kabushiki Kaisha. Automobile antenna system. 4,792,807, Cl. 343-712.000.

Ohkumo, Hiroya, to Fuji Jukogyo Kabushiki Kaisha. Control system for a clutch for a vehicle. 4,792,027, Cl. 192-0.032.

Ohlsson, Ingemar: See—  
Nantun, Hans; and Ohlsson, Ingemar, 4,792,069, Cl. 222-527.000.

Ohno, Tomoyuki: See—  
Suzuki, Hiroyuki; Shiroishi, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazuetsu; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yasuhide; Ohta, Sakae; and Aoi, Hajime, 4,792,497, Cl. 428-336.000.

Ohnuki, Ichiro; Suda, Yasuo; Ishizaki, Akira; Akashi, Akira; Ohtaka, Keiji; and Koyama, Takeshi, to Canon Kabushiki Kaisha. Focus

detecting device having two selectively movable lenses. 4,792,669, Cl. 250-201.000.

Ohnuki, Ichiro: See—  
Akashi, Akira; Ishizaki, Akira; Suda, Yasuo; Ohnuki, Ichiro; Ohtaka, Keiji; and Koyama, Takeshi, 4,792,668, Cl. 250-201.000.

Ohta, Kenji: See—  
Murakami, Yoshiteru; Takahashi, Akira; Fujii, Yoshikazu; Katayama, Hiroyuki; and Ohta, Kenji, 4,792,474, Cl. 428-64.000.

Ohta, Sakae: See—  
Suzuki, Hiroyuki; Shiroishi, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazuetsu; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yasuhide; Ohta, Sakae; and Aoi, Hajime, 4,792,497, Cl. 428-336.000.

Ohtaka, Keiji: See—  
Akashi, Akira; Ishizaki, Akira; Suda, Yasuo; Ohnuki, Ichiro; Ohtaka, Keiji; and Koyama, Takeshi, 4,792,668, Cl. 250-201.000.

Ohnuki, Ichiro; Suda, Yasuo; Ishizaki, Akira; Akashi, Akira; Ohtaka, Keiji; and Koyama, Takeshi, 4,792,669, Cl. 250-201.000.

Ohtani, Hideya; Momoi, Toshimitsu; Ooi, Eiji; Sakuraba, Shuhei; Morita, Masayuki; and Wakashima, Yoshiaki, to Hitachi, Ltd. Semiconductor device and process for producing the same, and tape carrier used in said process. 4,792,532, Cl. 437-206.000.

Oil Patch Group, Inc.: See—  
Perkin, Gregg S.; and Papke, Duane D., 4,792,000, Cl. 175-228.000.

Oka, Tateki; Toyoshi, Naoki; and Yokoyama, Tomoeiki, to Minolta Camera Kabushiki Kaisha. Method for the formation of outline images corresponding to the peripheral outlines of document's images. 4,792,775, Cl. 355-77.000.

Okabe, Kazuhiko: See—  
Yokota, Yuhiko; Sawamoto, Yuzi; Taniguchi, Hideki; and Okabe, Kazuhiko, 4,792,622, Cl. 564-398.000.

Okada, Masafumi: See—  
Nakagawa, Naoshi; Takigawa, Tetsuo; Kagey, Akira; Shimamura, Michiya; Okada, Masafumi; and Mizuno, Masao, 4,792,615, Cl. 558-144.000.

Okada, Masaru; and Tomita, Katsuhiko, to Okada, Masaru; and Horiba, Ltd. Method of producing ferroelectric thin film. 4,792,463, Cl. 427-126.300.

Okada, Tsuneyoshi: See—  
Kano, Toshio; Okada, Tsuneyoshi; and Hijikata, Kenji, 4,792,587, Cl. 525-131.000.

Okada, Wataru: See—  
Yasui, Hideo; Miki, Yasuhiro; and Okada, Wataru, 4,792,490, Cl. 428-407.000.

Okamoto, Mitsuharu: See—  
Watanabe, Akihiro; Nozaki, Hiroshi; and Okamoto, Mitsuharu, 4,792,647, Cl. 174-182.000.

Okayasu, Kenji. Heat-driven pump. 4,792,283, Cl. 417-52.000.

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Miyake, Hajimu; Okegawa, Tadao; and Kawasaki, Akiyoshi, 4,792,550, Cl. 514-419.000.

Okonogi, Shigeo: See—  
Takahashi, Akira; Shimamura, Yoshiyuki; Kobayashi, Hide; Okonogi, Shigeo; Kawashima, Takuji; and Igarashi, Minoru, 4,792,549, Cl. 514-400.000.

Oku, Kentaro; Maruyama, Masanori; Fukushima, Masakazu; and Kato, Shinichi, to Hitachi, Ltd. Cathode-ray tube with electrostatic deflection. 4,792,721, Cl. 313-432.000.

Okuda, Chikaaki: See—  
Tachi, Kazuyuki; Okuda, Chikaaki; Yamada, Katsunori; Oyama, Yoichi; and Suzuki, Shoichi, 4,792,094, Cl. 239-106.000.

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Okuno Chemical Industry Co., Ltd.: See—  
Kimura, Toshiro; Okuno, Giichi; Moritsu, Yukikazu; and Yamada, Koji, 4,792,358, Cl. 106-84.000.

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Fujimoto, Noboru; and Okuyama, Toshiaki, 4,792,742, Cl. 318-803.000.

Old, Charles F.; and Scruby, Christopher B., to United Kingdom Atomic Energy Authority. Flow monitoring. 4,791,810, Cl. 73-119.00A.

Olin Corporation: See—  
Berkowitz, Phillip T., 4,792,574, Cl. 521-137.000.

Olive, Graham: See—  
Eldridge, Jerome M.; Lee, Francis C.; Moore, James O.; and Olive, Graham, 4,792,818, Cl. 346-140.00R.

Olon, Thomas E.; and Zelina, Francis J., to American Sterilizer Company. Failure compensation circuit with thermal compensation. 4,792,701, Cl. 307-11.000.

O'Loughlin, James P., to United States of America, Air Force. Radio frequency plasma generator. 4,792,732, Cl. 315-334.000.

Olsen, Eric G.; and Campbell, Thomas G., to United Technologies Corporation. Helicopter rotor flexbeam. 4,792,280, Cl. 416-134.00A.

Olson, Anthony M.; and Rajaram, Babu, to Zenith Electronics Corporation. Data processing system with extended memory access. 4,792,929, Cl. 365-233.000.

Olson, Douglas M. Paper towel dispenser. 4,792,102, Cl. 242-55.540.

Olson, Peter K., to E. H. Wachs Company. Pipe machining apparatus. 4,791,842, Cl. 82-4.00C.

Olson, Robert H.: See—  
Broderick, Kevin; Catchman, Vernon C.; Herrington, Fox J.; Johnston, Shirley K.; Olson, Robert H.; and Stiel, Donald, 4,792,241, Cl. 383-75.000.

Olympus Optical Co., Ltd.: See—  
Mihara, Shin-ichi, 4,792,219, Cl. 350-463.000.

Teshiro, Yoshio, 4,791,912, Cl. 128-4.000.

Yoshizawa, Akihiko, 4,792,227, Cl. 356-128.000.

Olzog, Detlef, to A. H. Emery Company, The. Scale and flexure assembly. 4,792,005, Cl. 177-229.000.

Omoda, Koichiro: See—  
Nakagawa, Takayuki; and Omoda, Koichiro, 4,792,893, Cl. 364-200.000.

Omron Tateisi Electronics Co.: See—  
Hirase, Kiyoto; and Doi, Tetsuo, 4,792,918, Cl. 364-900.000.

Onan Corporation: See—  
Bush, Timothy J., 4,792,713, Cl. 310-217.000.

Onari, Mikihiko: See—  
Sekoza, Teruji; Shioya, Makoto; Tokuda, Hiroatsu; Funabashi, Motohisa; and Onari, Mikihiko, 4,792,905, Cl. 364-431.050.

Ono Pharmaceutical Co., Ltd.: See—  
Miyake, Hajimu; Okegawa, Tadao; and Kawasaki, Akiyoshi, 4,792,550, Cl. 514-419.000.

Onodera, Yasuaki: See—  
Asai, Toshio; Nakaya, Yasuhiro; and Onodera, Yasuaki, 4,791,933, Cl. 128-640.000.

Ooi, Eiji: See—  
Ohtani, Hideya; Momoi, Toshimitsu; Ooi, Eiji; Sakuraba, Shuhei; Morita, Masayuki; and Wakashima, Yoshiaki, 4,792,532, Cl. 437-206.000.

Ootsuka, Hiroshi: See—  
Fujino, Akihiko; Nakai, Masaaki; and Ootsuka, Hiroshi, 4,792,823, Cl. 354-446.000.

Oouchi, Tomihisa: See—  
Hatada, Toshio; Oouchi, Tomihisa; Kunugi, Yoshifumi; Sugimoto, Shigeo; and Kaneko, Junichi, 4,791,984, Cl. 165-151.000.

Opcom: See—  
Ladd, David J.; and Smith, Stevan C., 4,792,967, Cl. 379-67.000.

Opitz, Elisabeth: See—  
Kragelin, Birger; Stohr, Wilfried; and Opitz, Elisabeth, 4,792,889, Cl. 364-191.000.

Orban, Patricia G.: See—  
McCarthy, Donald F.; Whitney, Bradley E.; Orban, Patricia G.; Fout, Randy A.; and Magor, Leslie A., 4,792,898, Cl. 364-200.000.

Orion-yhtymä Oy: See—  
Ikonen, Veijo, 4,792,432, Cl. 422-72.000.

Orlando, Paul F. Roller gate opener. 4,791,757, Cl. 49-360.000.

Ornstein, Jacob L., to GTE Products Corporation. Edge-bonded bi-metal compensator for shadow mask. 4,792,719, Cl. 313-405.000.

Orozio de Nora Technologies, Inc.: See—  
de Nora, Oronzio, 4,792,388, Cl. 204-98.000.

Otsu, Tetsuo, to Hitachi, Limited. Method and apparatus for multi-destination communication processing in packet storage/exchange node. 4,792,942, Cl. 370-60.000.

Oshikawa, Yoshitoshi, to Ikeda Bussan Co. Seat device. 4,792,185, Cl. 297-284.000.

Oshiro, Yasuo; Ueda, Hiraki; and Nakagawa, Kazuyuki, to Otsuka Pharmaceutical Co., Ltd. Indane derivatives and salts thereof. 4,792,628, Cl. 564-428.000.

O'Sullivan, Timothy J.: See—  
Burgess, Edward J.; and O'Sullivan, Timothy J., 4,791,795, Cl. 70-202.000.

Oswald, Norman D.; Franklin, Carl M.; Gutzler, Marc H.; and Mankey, Harry S., to Standard Manufacturing Company, Inc. Container handling apparatus. 4,792,272, Cl. 414-458.000.

Ota, Yoshiji: See—  
Mimoto, Toshio; and Ota, Yoshiji, 4,792,922, Cl. 365-149.000.

Otis Elevator Company: See—  
Bittar, Joseph; and Thangavelu, Kandasamy, 4,792,019, Cl. 187-125.000.

Otsuka Pharmaceutical Co., Ltd.: See—  
Oshiro, Yasuo; Ueda, Hiraki; and Nakagawa, Kazuyuki, 4,792,628, Cl. 564-428.000.

Ottlinger, Ralph; and Strecker, Willi, to Wacker-Chemie GmbH. Continuous process for preparing organopolysiloxanes containing triorganosiloxy terminal units. 4,792,596, Cl. 528-14.000.

Ouellette, Gregory P.; Larter, Stephen R.; and Fox, John R., to Union Oil Company of California. Method for collecting and analyzing hydrocarbons. 4,792,526, Cl. 436-29.000.

Oughstun, Kurt E.: See—  
Smith, David C.; and Oughstun, Kurt E., 4,792,765, Cl. 330-4.300.

Ouyang, Kenneth W.; and Marmet, Melvin, to Western Digital Corporation. Fast switching charge pump. 4,792,705, Cl. 307-296.00R.

Ovens, Kevin M.; and Strong, Bobby D., to Texas Instruments Incorporated. ECL gates using diode-clamped loads and Schottky clamped reference bias. 4,792,706, Cl. 307-455.000.

Ovonic Imaging Systems, Inc.: See—  
Wicker, Guy; Swartz, Louis D.; O'Donnell, Daniel H.; Heslip, John A.; Cannella, Vincent D.; Prache, Olivier; McCormick-Goodhart, Mark H.; and Barnes, Marvin C., 4,792,859, Cl. 358-294.000.

Oxford Lasers Limited: See—  
Kearley, Andrew J., 4,792,961, Cl. 372-68.000.

Oy Wartila Ab: See—  
Eklund, Dan; and Westergard, Sivert, 4,791,879, Cl. 118-50.000.

Tank, Wolfgang, 4,791,949, Cl. 137-1.000.

Oyama, Masumi, to Kabushiki Kaisha Toshiba. Information medium for communicating data and/or a selectable control transfer program between the medium end and external device. 4,792,996, Cl. 455-617.000.

Oyama, Yoichi: See—  
Tachi, Kazuyuki; Okuda, Chikaaki; Yamada, Katsunori; Oyama, Yoichi; and Suzuki, Shoichi, 4,792,094, Cl. 239-106.000.

Oyama, Yoshihige: See—  
Fujieda, Mamoru; and Oyama, Yoshihige, 4,791,903, Cl. 123-472.000.

Ozaki, Hisami, to Kabushiki Kaisha Toshiba. Recording/reproducing device with means for switching inductance of such device for use in a floppy disk apparatus. 4,792,868, Cl. 360-46.000.

Ozawa, Kazuyoshi: See—  
Fuks, Takamichi; Ozawa, Kazuyoshi; Masuda, Atsushi; Shigenai, Osamu; and Gunji, Kunihiko, 4,792,245, Cl. 384-610.000.

Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshiro; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiro; Tanabe, Ken; and Tanaka, Hidetoshi, to Canon Kabushiki Kaisha. Image forming apparatus for forming a plurality of image from different originals on one transfer sheet. 4,792,828, Cl. 355-14.00R.

Oze, Osamu: See—  
Nakao, Yukimichi; Kaeriyama, Kyoji; Suda, Yoshio; Imai, Tomoyuki; Oze, Osamu; and Horiuchi, Nanao, 4,792,645, Cl. 174-126.400.

Ozeki, Akichika; Yamada, Kenzo; and Iwasaki, Katsuhiko, to Nippon Kokan Kabushiki Kaisha. Method for manufacturing steel through smelting reduction. 4,792,352, Cl. 75-59.220.

P.T.L. Equipment Co., Inc.: See—  
Coronato, Robert M., 4,791,746, Cl. 40-347.000.

PA Incorporated: See—  
Lam, Clive C.; Milewitz, Marvin; and Bradfield, James E., 4,792,756, Cl. 324-232.000.

Paceetter Infusion, Ltd.: See—  
Slate, John B., 4,791,931, Cl. 128-419.0PG.

Pacific Roller Die Co., Inc.: See—  
Alexander, Robert D., 4,791,800, Cl. 72-180.000.

Packaging Corporation of America: See—  
Holladay, John T., 4,792,043, Cl. 206-349.000.

Paez, Juan B., to Camp International, Inc. Suspended knee brace having limited range of motion hinge. 4,791,916, Cl. 128-80.00C.

Pagany, Hubertus: See—  
Wieschhoff, Reinhard; Rinne, Andreas; and Pagany, Hubertus, 4,792,766, Cl. 330-298.000.

Pajula, Juhani, to Valmet Oy. Closed and compact press section of a paper machine with double S shaped path or mirror image thereof. 4,792,381, Cl. 162-360.100.

Palanisamy, Thirumalai G.: See—  
Cipria, Divya; Palanisamy, Thirumalai G.; and Walsh, Arthur T., 4,792,791, Cl. 340-603.000.

Palepu, Nagaswara R.: See—  
Kaplan, Murray A.; Vyas, Dolatrai M.; Palepu, Nagaswara R.; and Chen, Chih-Ming J., 4,792,566, Cl. 514-410.000.

Palmer, Carl: See—  
Kerner, James M.; Palmer, Carl; and Betts, Kenneth A., 4,792,059, Cl. 222-67.000.

Pan American Trading Co., Ltd.: See—  
Kobayashi, Naohiko, 4,792,066, Cl. 222-387.000.

Pan, Daiming. Method and furnace apparatus for continuously heating steel blanks. 4,792,301, Cl. 432-52.000.

Pan, Shih C.; and Tseng, Ching P., to Huey Bao Co., Ltd. Student's multi-function protractor. 4,791,733, Cl. 33-403.000.

Papke, Duane D.: See—  
Perkin, Gregg S.; and Papke, Duane D., 4,792,000, Cl. 175-228.000.

ParaMagnetic Logging, Inc.: See—  
Vail, William B., III; and Schwinberg, Paul B., 4,792,757, Cl. 324-303.000.

Parekh, Sharad V.; Shapiro, Seymour W.; and Profera, Charles E., Jr., to General Electric Company. Waveguide directional coupler with multiple coupled outputs. 4,792,770, Cl. 333-113.000.

Parker, Frederick D.: See—  
De Rosier, William M.; and Parker, Frederick D., 4,791,840, Cl. 82-1.00C.

Parker, Frederick S.: See—  
Josephson, Elliot; and Parker, Frederick S., 4,792,746, Cl. 323-290.000.

Parker-Hannifin Corporation: See—  
Ellison, John E., 4,791,960, Cl. 137-596.170.

Parker, Robert J. Business card dispenser. 4,792,058, Cl. 221-232.000.

Parks, Gerald R.; Dawson, Chris R.; and Dondero, John, to Gregory, John R. Vertical plane adjusting mechanism for eyeglasses. 4,792,221, Cl. 351-120.000.

Pasdera, Leonard A.; and Lemoine, Maurice G., to Ampex Corporation. Digital signal error concealment. 4,792,953, Cl. 371-31.000.

Paske, William C.; Rodney, Paul F.; and Roeder, Ray A., to NL Industries, Inc. Density neutron self-consistent caliper. 4,791,797, Cl. 73-152.000.

Pastor, Walter. Safety assembly for a hand gun. 4,791,747, Cl. 42-66.000.

Pastre, Jean L.: See—  
Le Parquier, Guy; and Pastre, Jean L., 4,792,697, Cl. 250-561.000.



Patel, Mansukh M.: See—  
Reed, Michael A.; Patel, Mansukh M.; and Kures, Vasek J., 4,792,453, Cl. 426-5.000.

Patel, Nitin M.: See—  
Wang, Shoon-I; Patel, Nitin M.; Sircar, Shivaji; and Allam, Rodney J., 4,792,441, Cl. 423-359.000.

Patent-Trenhand-Gesellschaft: See—  
Bernitz, Franz; Statnic, Eugen; and Hansmann, Frank, 4,792,887, Cl. 363-89.000.

Paul, Ana: See—  
Paul, Marius A.; and Paul, Ana, 4,791,787, Cl. 60-605.100.

Paul, Kermit D., to Fuller Company. Gaseous fluid supply system for a vessel, 4,792,235, Cl. 366-107.000.

Paul, Marius A.; and Paul, Ana. Regenerative thermal engine, 4,791,787, Cl. 60-605.100.

Paul, Pradip K.: See—  
D'Haem, Marcel P.; and Paul, Pradip K., 4,791,836, Cl. 81-57.390.

Paulik, Frank E.; Herahman, Arnold; Knox, Walter R.; and Roth, James F., to BP Chemicals Limited. Carbonylation catalysts, 4,792,620, Cl. 560-232.000.

Pavlica, Stanley R.; and Whittemore, Dwight S., to Dresser Industries, Inc. Spall resistant chrome-alumina refractory brick, 4,792,538, Cl. 501-127.000.

Pearlman, Gordon W.; and Carlson, Steven B., to Lightolier Incorporated. Multi-room controlled for individual light controls, 4,792,731, Cl. 315-316.000.

Pearson, Timothy B., to Signode Corporation. Head for sealless strapping machine, 4,791,968, Cl. 140-93.200.

Peck, Walter R.; and Duncan, James W., to Universal Propulsion Company, Inc. Microprocessor controlled post ejection sequencer, 4,792,903, Cl. 364-425.000.

Pecoraro, George A.; and Shelestak, Larry J., to PPG Industries, Inc. Transparent infrared absorbing glass and method of making, 4,792,536, Cl. 501-70.000.

Pedersen, Harry E., to Danfoss A/S. Pressure limiting valve, 4,791,950, Cl. 137-115.000.

Pedersen, Peder M.: See—  
Rickett, Frederic L.; Pedersen, Peder M.; and Glock, Eugene, 4,791,942, Cl. 131-291.000.

Peca, James M.: See—  
Wells, Joel R.; and Peca, James M., 4,791,712, Cl. 29-156.50R.

Pekarsky, Alina V., to Powerplex Technologies, Inc. Method of forming glass bonded joint of beta-alumina, 4,792,348, Cl. 65-36.000.

Pellis, Mario A., to Pro Line Company. Bowstring release mechanism, 4,791,908, Cl. 124-35.00A.

Penlon Limited: See—  
Lindsay-Scott, David; Sykes, Malcolm K.; Sugg, Basil R.; and Tyrrell, Paul J., 4,791,922, Cl. 128-205.280.

Penner, Thomas L.: See—  
Ulmas, Abraham; Williams, David J.; Penner, Thomas L.; Robello, Douglas R.; Schildkraut, Jay S.; Scozzafava, Michael; and Willand, Craig S., 4,792,208, Cl. 350-96.340.

Penny, Bruce J., to Tektronix, Inc. Component television timing corrector, 4,792,846, Cl. 358-17.000.

Penny, Glenn S., to Stim Lab, Inc. Cell assembly for determining conductivity and permeability, 4,791,822, Cl. 73-865.600.

Pepe, David, to Davis Electric Wallingford Corporation. Apparatus and method for continuous spooling, 4,792,100, Cl. 242-25.00A.

Performance Controls, Inc.: See—  
Goff, Kenneth W.; and Chizever, Gary E., 4,792,737, Cl. 318-615.000.

Perkin-Elmer Corporation, The: See—  
Young, Lydia J., 4,792,688, Cl. 250-441.100.

Perkin, Gregg S.; and Papke, Duane D., to Oil Patch Group, Inc. Method and apparatus for well drilling, 4,792,000, Cl. 175-228.000.

Perrey, Hermann: See—  
Scholl, Thomas; Exner, Otto; Finkel, Peter; and Perrey, Hermann, 4,792,609, Cl. 546-165.000.

Peters, Robert M., to Lyall Electric, Inc. Fluorescent lamp brightness control, 4,792,729, Cl. 315-200.00R.

Peterson, John L., to United States of America, Health and Human Services. Method for obtaining a ratio measurement for correcting common path variations in intensity in fiber optic sensors, 4,792,689, Cl. 250-458.100.

Petry, William E. Open lower sash ventilation safety lock, 4,792,169, Cl. 292-305.000.

Peuschel, Gerd: See—  
Loblich, Karl-Richard; Bruns, Gunter; and Peuschel, Gerd, 4,792,350, Cl. 71-11.000.

Pfizer Inc.: See—  
Ranade, Gautam R., 4,792,448, Cl. 424-438.000.

Pharmacology & Toxicology Research Laboratory: See—  
Lawrence, Lowell J.; Hamann, Scott R.; Kesterson, Abbe L.; and Ruzo, Luis O., 4,791,820, Cl. 73-863.210.

Philippot, Jean; and Liautard, Jean-Pierre, to Centre National de la Recherche Scientifique; and Institut National de la Sante et de la Recherche Medicale. Device for obtaining and administering unilamellar liposomes, 4,792,331, Cl. 604-187.000.

Phillips, David X. Roof rake, 4,791,780, Cl. 56-400.040.

Phillips, Kevin. Ski boot orthotic, 4,791,736, Cl. 36-117.000.

Phillips Petroleum Company: See—  
O'Connor, James E.; Geibel, Jou F.; and Beever, William H., 4,792,481, Cl. 428-288.000.

Phillips, Richard B.: See—  
Burkart, Susan E.; Rodriguez, Cesar; Roush, David M.; and Phillips, Richard B., 4,792,567, Cl. 514-422.000.

Phoa, Tek T.; and Lunenschloss, Joachim. Method and apparatus for false twisting yarn in opened spinners, 4,791,781, Cl. 57-417.000.

Picanol N.V.: See—  
Van Bogaert, Philippe; Ampe, Frank; and Verhulst, Jozef, 4,792,101, Cl. 242-54.00R.

Vandeweghe, Michel; and Gryson, Dirk, 4,791,967, Cl. 139-353.000.

Picard, Michel. Process for defining and modifying a partition of the storage space of a non-erasable carrier, 4,792,936, Cl. 369-59.000.

Picard, Michel. Process for the management of files on a non-erasable information carrier, 4,792,937, Cl. 369-59.000.

Pichler, Johann: See—  
Gronert, Heinz; Benisch, Johann; Pichler, Johann; and Gropp, Reinhard, 4,791,963, Cl. 138-110.000.

Picker International, Inc.: See—  
Brunnett, Carl J., 4,791,934, Cl. 128-653.000.

Sattin, William, 4,792,758, Cl. 324-309.000.

Sones, Richard A.; and Lauro, Karen L., 4,792,900, Cl. 364-413.230.

Pierce, Richard A.; Masterson, Tipton T.; and Grilli, David A., to Dow Chemical Company, The. Workable cement composition of low water content containing a hydroxyalkyl (meth)acrylate polymer, 4,792,360, Cl. 106-90.000.

Pierachbacher, Michael: See—  
Ruolahti, Erkki; and Pierachbacher, Michael, 4,792,525, Cl. 435-240.243.

Pilkington P.E. Limited: See—  
Gardam, Allan, 4,791,853, Cl. 89-41.190.

Pinson, Denis, to Bull S.A. Method and apparatus for track accessing using a predicted state vector, 4,792,870, Cl. 360-78.140.

Pioneer Electronic Corporation: See—  
Hirano, Shizuo, 4,792,674, Cl. 250-216.000.

Manaki, Naoki, 4,792,934, Cl. 369-34.000.

Suzuki, Tsutomu, 4,792,933, Cl. 369-32.000.

Uemura, Hiroki, 4,792,971, Cl. 380-7.000.

Yoshioka, Takayuki, 4,792,217, Cl. 350-432.000.

Piort, Robert; and Meffert, Alfred, to Henkel Kommanditgesellschaft auf Aktien. Ether sulfonates, 4,792,419, Cl. 260-513.00R.

Piort, Robert: See—  
Hoefler, Rainer; Meffert, Alfred; Piort, Robert; Wegemund, Bernd; and Held, Uwe, 4,792,582, Cl. 524-378.000.

Pissiotas, Georg: See—  
Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, 4,792,608, Cl. 544-319.000.

Pitts, Michael W.: See—  
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Pittway Corporation: See—  
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Kremer, Leon V.; Kieras, Ronald E.; and Knickerbocker, Michael G., 4,792,252, Cl. 401-206.000.

Pizza Enterprises, Inc.: See—  
Weinkle, Steven G.; and Weinkle, Louis A., 4,791,861, Cl. 99-357.000.

PKL Verpackungssysteme GmbH: See—  
Trygg, Lars, 4,792,068, Cl. 222-512.000.

Pla, Joel: See—  
Canat, Jean-Noel; and Pla, Joel, 4,792,428, Cl. 376-440.000.

Platten, Conrad M., to Wrightson NMA Limited. Electric fence clip, 4,792,254, Cl. 403-48.000.

Plautz, Ricky A.: See—  
Koehn, Stephen C.; and Plautz, Ricky A., 4,792,042, Cl. 206-328.000.

Plessey Overseas Limited: See—  
Cowley, Nicholas P., 4,792,989, Cl. 455-195.000.

Ploppa, Jurgen: See—  
Goller, Ernst; Ploppa, Jurgen; and Glaumer, Bertram, 4,791,793, Cl. 66-69.000.

Pluff, Gary E.: See—  
Waring, John S., III; and Pluff, Gary E., 4,792,085, Cl. 229-114.000.

Plummer, Raymond G.: See—  
Elbertson, Michael D.; and Plummer, Raymond G., 4,792,092, Cl. 239-3.000.

Plus Corporation: See—  
Amagaya, Hidefumi, 4,791,725, Cl. 30-154.000.

Podoll, Michael J., to Inter Innovation LeFebvre Manufacturing Corporation. Carrier for large capacity single overhead pneumatic tube system, 4,792,263, Cl. 406-189.000.

Pohl, Peter: See—  
Praeur, Heinz; Johnson, Alfred H.; Schulz, Dietmar; and Pohl, Peter, 4,792,204, Cl. 350-96.200.

Pohn, Mac R. Black light display system, 4,791,745, Cl. 40-546.000.

Pola Kasei Kogyo Kabushiki Kaisha: See—  
Yoneyama, Yoshihisa; and Iwasaki, Yasuo, 4,792,238, Cl. 366-307.000.

Polaroid Corporation: See—  
Gaudiana, Russell A.; Rogers, Howard G.; and Sinta, Roger F., 4,792,597, Cl. 528-183.000.

Pollart, Kenneth A.: See—  
Schubring, Herbert H.; Spalding, Donald R.; and Pollart, Kenneth A., 4,792,487, Cl. 428-342.000.

Polyplastics Co., Ltd.: See—  
Kanoe, Toshio; Okada, Tsuneyoshi; and Hijikata, Kenji, 4,792,587, Cl. 525-131.000.

Pond, Ramona G.; Vitriol, William A.; and Brown, Raymond L., to Hughes Aircraft Company. Trimming passive components buried in multilayer structures, 4,792,779, Cl. 338-195.000.

Poperahatzky, Johann: See—  
Moser, Peter; Weber, Alfred; Johann, Aglas; Poperahatzky, Johann; and Stastny, Georg, 4,792,123, Cl. 266-142.000.

Popovich, Frank J.: See—  
Bruno, Jack A., Jr.; and Popovich, Frank J., 4,791,732, Cl. 33-578.000.

Poppen, Hans: See—  
Frohn, Werner; Bohlmann, Dieter; Franke, Hermann; Zimmermann, Werner; Limmer, Heinz; Hopfner, Eberhard; Lindner, Horst; Matthey, Reinhard; Muller, Henner; Poppen, Hans; Schutter, Hartmut; and Dietrich, Detlev, 4,792,389, Cl. 208-76.000.

Porous Element Heating Limited: See—  
Hudson, John C.; Thantrey, Shok; and Jackson, Ian M., 4,791,785, Cl. 60-303.000.

Port-A-Pour, Inc.: See—  
Doherty, Jerome J., 4,792,234, Cl. 366-14.000.

Porter, John R.: See—  
Flegel, Christopher M.; and Porter, John R., 4,791,791, Cl. 62-55.500.

Post, Steven L.: See—  
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Potucek, Frank R. Concrete reinforcing bar support, 4,791,772, Cl. 52-738.000.

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Power Components, Inc.: See—  
Holley, David M., 4,792,128, Cl. 267-118.000.

Powerplex Technologies, Inc.: See—  
Pekarsky, Alina V., 4,792,348, Cl. 65-36.000.

Powers Chemco, Inc.: See—  
Landman, Robert M., 4,792,858, Cl. 358-293.000.

Powers, Frederick A.: See—  
Kvinge, Daniel J.; and Powers, Frederick A., 4,792,291, Cl. 417-404.000.

PPG Industries, Inc.: See—  
Kwiatkowski, Patricia L.; and Hunt, David A., 4,792,224, Cl. 351-163.000.

Pecoraro, George A.; and Shelestak, Larry J., 4,792,536, Cl. 501-70.000.

Prache, Olivier: See—  
Wicker, Guy; Swartz, Louis D.; O'Donnell, Daniel H.; Heslip, John A.; Cannella, Vincent D.; Prache, Olivier; McCormick-Goodhart, Mark H.; and Barnes, Marvin C., 4,792,859, Cl. 358-294.000.

Praeur, Heinz; Johnson, Alfred H.; Schulz, Dietmar; and Pohl, Peter, to Siemens Aktiengesellschaft; and International Business Machines Corporation. Process and apparatus for elimination of tolerance dependent variations of a selectable spacing between components in optical communication equipment, 4,792,204, Cl. 350-96.200.

Pragay, Istvan: See—  
Nagy, Gabor; Szonyi, Zoltan; Mityok, Lajos; Pragay, Istvan; and Zambó, Jozsef, 4,792,126, Cl. 266-270.000.

Prince Corporation: See—  
Lindberg, Kenneth M.; Dykstra, Ronald A.; and Larsen, Danny B., 4,792,184, Cl. 297-194.000.

Suman, Michael J.; and Mersman, Wesley D., 4,792,884, Cl. 362-135.000.

Prince Sewing Machine Co., Ltd.: See—  
Iwase, Yukio, 4,791,687, Cl. 5-447.000.

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Pellia, Mario A., 4,791,908, Cl. 124-35.00A.

Prof.Dr.h.c. Hans List: See—  
Lackner, Gerald; and Simburger, Karl, 4,791,808, Cl. 73-117.300.

Profera, Charles E., Jr.: See—  
Parekh, Sharad V.; Shapiro, Seymour W.; and Profera, Charles E., Jr., 4,792,770, Cl. 333-113.000.

Protek AG: See—  
Muller, Maurice E., 4,792,337, Cl. 623-22.000.

Prussas, Herbert: See—  
Buselmeier, Bernhard; and Prussas, Herbert, 4,792,878, Cl. 361-383.000.

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PSI: See—  
McGinn, Terrance E., 4,791,872, Cl. 104-166.000.

Pubot Giken Co., Ltd.: See—  
Matsui, Akio, 4,791,855, Cl. 92-24.000.

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Friedman, Robert B.; Gottneid, David J.; Faron, Eugene J.; Pustek, Frank J.; and Katz, Frances R., 4,792,458, Cl. 426-578.000.

Py, Daniel. Ocular treatment apparatus, 4,792,334, Cl. 604-301.000.

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Morton, Kenneth F.; D'Arcy, Daniel J.; and Riehm, Merry S., 4,792,024, Cl. 190-1.000.

Quantum Design, Inc.: See—  
Simmonds, Michael B.; and Sager, Ronald E., 4,791,788, Cl. 62-49.000.

Quebbeman, Edward J.: See—  
Ausman, Robert K.; Adams, Mark; Caballero, Gerardo; Hamid, Rahim; Hoffman, Norman E.; Quebbeman, Edward J.; Schulte, William J.; Thomson, Robert; Whipple, Julie; and Weitman, Steven D., 4,792,449, Cl. 424-440.000.

Quinlan, Kenneth P., to United States of America, Air Force. Ion-sensitive photodetector, 4,792,836, Cl. 357-30.000.

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Bradshaw, Leroy; Henson, John B.; and Waterhouse, Paul I., 4,792,796, Cl. 340-539.000.

R P & M Engines, Inc.: See—  
Jayne, Michael E., 4,791,898, Cl. 123-197.0AC.

Raab, Klaus, to Hoechst Aktiengesellschaft. Polyfluorinated cyclic carbonates, 4,792,613, Cl. 549-229.000.

Rach, Heinz-Dieter: See—  
Duchow, Alfred; Haack, Dietmar; Frerichs, Udo; Flebbe, Werner; and Rach, Heinz-Dieter, 4,791,972, Cl. 152-398.000.

Radcliffe, Stanley L.: See—  
Alexander, Joseph H.; Radcliffe, Stanley L.; Robertson, Martin N.; Bator, Eugene A.; and Anderson, John E., 4,792,372, Cl. 156-394.100.

Radfar, Mohammed R.: See—  
King, Ethmer W.; Yotsuue, David S.; Kircher, Robert C., Jr.; and Radfar, Mohammed R., 4,792,906, Cl. 364-433.000.

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Yin, Huan B.; and Valade, Norbert, 4,792,205, Cl. 350-96.200.

Ragulska, Kazimeras M.: See—  
Fedaravichius, Algimantas J.; Sudintas, Antanas L.; Kondratiev, Vladimir S.; and Ragulska, Kazimeras M., 4,791,720, Cl. 29-737.000.

Rajaram, Babu: See—  
Olson, Anthony M.; and Rajaram, Babu, 4,792,929, Cl. 365-233.000.

Rake, Heinrich: See—  
Wiening, Wolfgang; Hoffmann, Ulrich; and Rake, Heinrich, 4,791,706, Cl. 19-105.000.

Ranade, Gautam R., to Pfizer Inc. Generic zero order controlled drug delivery system, 4,792,448, Cl. 424-438.000.

Rand, Robert S.: See—  
Matako, Theodore N.; Rand, Robert S.; Russell, Thomas D.; Scheib, Thomas J.; and Walker, Robert R., deceased, 4,791,889, Cl. 122-479.00R.

Raque Food Systems, Inc.: See—  
Raque, Glen; and Robinson, Edward A., 4,791,775, Cl. 53-510.000.

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Rasinski, Michael J.: See—  
Gonzalez, Avelino J.; Steinebronn, Kurt H.; Rasinski, Michael J.; and Snuttjer, Owen R., 4,792,911, Cl. 364-551.020.

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Nocek, Robert S.; Tilman, Paul A.; Rasko, George; and Ausnit, Steven, 4,791,710, Cl. 24-587.000.

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Ratcliff, Perry A. Method and composition for prevention and treatment of oral disease, 4,792,442, Cl. 424-53.000.

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Raychem Corp.: See—  
Zucker, Joseph; Levinson, Frank H.; and Narciso, Ralh A., 4,792,202, Cl. 350-96.160.

Raymond Engineering Inc.: See—  
Bickford, John H.; Meisterling, Jesse R.; and Smith, Milton O., 4,791,839, Cl. 81-479.000.

Bickford, John H. F.; Meisterling, Jesse R.; Smith, Milton O.; and Kosciak, Geoffrey F., 4,791,838, Cl. 81-467.000.

RCA Licensing Corporation: See—  
Beyers, Billy W., Jr., 4,792,990, Cl. 455-234.000.

Shiratsuchi, Shinichi, 4,792,856, Cl. 358-180.000.

Rebetez, Alain G.: See—  
Pruvot, Francois C.; Coste, Laurent R.; and Rebetez, Alain G., 4,791,841, Cl. 82-30.000.

Red Devil, Inc.: See—  
Heinis, Robert; Skene, James C.; and Smith, Ronald, 4,792,236, Cl. 366-245.000.

Redfern, Martin W., to GEC Avionics Limited. Cathode ray tube display arrangements, 4,792,733, Cl. 315-386.000.

Reeb, Max E. Identification device in the form of a tag-like strip affixable to an article and method for its manufacture, 4,792,790, Cl. 340-572.000.

Reed, Michael A.; Patel, Mansukh M.; and Kures, Vasek J., to Wm. Wrigley Jr. Company. Hard coated sugarless chewing gum, 4,792,453, Cl. 426-5.000.

Reeves, John F., to Nanik Division Wausau Metals Corporation. Method for making light-transmitting slats for blind, 4,792,427, Cl. 264-285.000.

Regie Nationale Des Usines Renault: See—  
Pournain, Michel, 4,792,754, Cl. 324-166.000.



Regnier, Gilbert; Gargouil, Yves-Michel; and Vilaine, Jean-Paul, to ADIR et Compagnie. 1,2,3,4-tetrahydroquinoline substituted 5-aminopentacyclic compounds and their use as calcium modulators. 4,792,559, Cl. 514-311.000.

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Huschelrath, Gerhard; and Rehfs, Ekkehard, 4,792,755, Cl. 324-225.000.

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Reinking, Klaus: See—  
Zecher, Wilfried; and Reinking, Klaus, 4,792,590, Cl. 525-424.000.

Reip, Raymond O., to Dresser Industries, Inc. Modulating pressure operated pilot relief valve. 4,791,955, Cl. 137-488.000.

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Behnke, Edward; and Dickey, Joseph E., 4,791,831, Cl. 74-606.00R.

Remplir Enterprises Limited: See—  
Carolus, Declan T., 4,792,152, Cl. 280-47.260.

Reingel, Alfred; and Schmidhuber, Andrea, to Wacker-Chemie GmbH. Process for reducing the halogen content of halogen-containing polycarbonylides and polyallenes. 4,792,591, Cl. 525-477.000.

Rennerfelt, Gustav, to Centri Gummifabrik AB. Artificial hand. 4,792,338, Cl. 623-64.000.

Ressel, Hans-Joachim: See—  
Lachlein, Stephen; Milkenberger, Hilmar; and Ressel, Hans-Joachim, 4,792,610, Cl. 548-329.000.

Retrofit Specialties, Inc.: See—  
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Rey-Bellet, Gerald: See—  
Kompis, Ivan; Rey-Bellet, Gerald; and Zanetti, Guido, 4,792,557, Cl. 514-275.000.

Rezaie, Hamid R.: See—  
Virdee, Harbajan S.; and Rezaie, Hamid R., 4,792,949, Cl. 370-112.000.

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Gundelfinger, Richard, 4,792,396, Cl. 210-198.200.

Rhinehart, Barry L.: See—  
Sunkara, Sai P.; Rhinehart, Barry L.; and Liu, Paul S., 4,792,558, Cl. 514-299.000.

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Hiraiwa, Kazuyoshi; Shimizu, Yoshiaki; and Hayasaki, Koichi, 4,791,951, Cl. 137-56.000.

Rianda, Kent A., to Georg Fischer AG. Apparatus for fusion joining plastic pipe. 4,792,374, Cl. 156-503.000.

Riboni, Raymond: See—  
Dartois, Luc; Roulet, Andre; and Riboni, Raymond, 4,792,914, Cl. 364-607.000.

Rickett, Frederic L.; Pedersen, Peder M.; and Glock, Eugene, to American Tobacco Company, The. Process and apparatus for the expansion of tobacco. 4,791,942, Cl. 131-291.000.

Ricoh Co., Ltd.: See—  
Kanno, Hiroshi; Endo, Toshio; Miyakawa, Keiichi; and Takano, Masao, 4,791,866, Cl. 101-118.000.

Kumano, Masafumi; Shindoh, Yasuyuki; Sano, Yutaka; Haga, Koichi; and Fuse, Akihiro, 4,792,510, Cl. 430-65.000.

Ogasawara, Fumihiko, 4,792,648, Cl. 178-4.000.

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Ricoh Research Institute of General Electronics: See—  
Kumano, Masafumi; Shindoh, Yasuyuki; Sano, Yutaka; Haga, Koichi; and Fuse, Akihiro, 4,792,510, Cl. 430-65.000.

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Kappa, Manfred; Mann, Max; Vehlwald, Peter; Meyer, Frank; Mebach, Hans-Ernst; Cornely, Wolfgang; and Rieck, Birgit, 4,792,262, Cl. 405-264.000.

Riedel, Hans-Dieter: See—  
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Riehm, Merry S.: See—  
Morton, Kenneth P.; D'Arcy, Daniel J.; and Riehm, Merry S., 4,792,024, Cl. 190-1.000.

Riggs, James R.: See—  
Hettinger, William P., Jr.; Murray, Steven W.; Adkins, Ricky L.; Fritz, Billy T.; Riggs, James R.; and Walters, Paul W., 4,792,437, Cl. 422-147.000.

Rinderle, Heinz, to Telfunken Electronic GmbH. Radio receiver. 4,792,992, Cl. 455-239.000.

Rinehart, Wayne R. Microwave earth station with embedded receiver/transmitter and reflector. 4,792,812, Cl. 343-781.00R.

Rinne, Andreas: See—  
Wieschhoff, Reinhard; Rinne, Andreas; and Pagany, Hubertus, 4,792,766, Cl. 330-298.000.

Rinninger, Hans, to Hans Rinninger u. Sohn GmbH u. Co. Set of paving stones, particularly set of concrete paving stones. 4,792,257, Cl. 404-41.000.

Ritako, Joseph E.: See—  
Johnson, Walter A.; Kopatz, Nelson E.; and Ritako, Joseph E., 4,792,351, Cl. 75-0.30A.

RIV-SKF Officine di Villar Perosa S.p.A.: See—  
Colanzi, Franco; and Vignotto, Angelo, 4,792,242, Cl. 384-482.000.

Riva Calzoni S.p.A.: See—  
Montanari, Paolo; and Sala, Oneglio, 4,792,172, Cl. 294-102.200.

Rivetti, Franco: See—  
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Rivola, Luigi: See—  
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Rizkalla, Nabil, to Eastman Kodak Company. Purification of carboxylic acid anhydrides. 4,792,420, Cl. 260-546.000.

Rizzo, Thomas: See—  
Tracy, David J.; and Rizzo, Thomas, 4,792,604, Cl. 540-485.000.

Robb, Neil E., to Airmaster Fan Company. Fan blade fabrication system. 4,791,713, Cl. 29-156.80B.

Robbins, Joseph: See—  
Grestorez, Anthony T.; Robbins, Joseph; Toon, Ernest A.; and Thompson, David A., 4,792,426, Cl. 264-284.000.

Robello, Douglas R.: See—  
Ulman, Abraham; Williams, David J.; Penner, Thomas L.; Robello, Douglas R.; Schildkraut, Jay S.; Scozzafava, Michael; and Wiland, Craig S., 4,792,208, Cl. 350-96.340.

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Buck, Rainer; Fischer, Werner; Kull, Hermann; Sieber, Albrecht; and Wessel, Wolf, 4,791,900, Cl. 123-359.000.

Eheim, Franz, deceased, 4,791,901, Cl. 123-373.000.

Grieshaber, Hermann; Schueler, Peter; and Wietelmann, Jurgen, 4,791,904, Cl. 123-479.000.

Heitmann, Jurgen, 4,792,794, Cl. 341-143.000.

Nonnenmacher, Gerhard, 4,791,858, Cl. 92-12.100.

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Hoffmann, Erich, 4,791,862, Cl. 99-385.000.

Roberts, Andrew J.: See—  
Hensman, John R.; Roberts, Andrew J.; and Harrison, George E., 4,792,636, Cl. 568-492.000.

Roberts, Barry R., to Kabushiki Kaisha Toshiba. High speed memory system for use with a control bus bearing contiguous segmentally intermixed data read and data write request signals. 4,792,926, Cl. 365-189.000.

Roberts, John O., Jr.: See—  
Blumenkranz, Robert M.; and Roberts, John O., Jr., 4,792,751, Cl. 324-57.00N.

Robertson, Martin N.: See—  
Alexander, Joseph H.; Radcliffe, Stanley L.; Robertson, Martin N.; Bator, Eugene A.; and Anderson, John E., 4,792,372, Cl. 156-394.100.

Robinson, Edward A.: See—  
Raque, Glen; and Robinson, Edward A., 4,791,775, Cl. 53-510.000.

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Kirkpatrick, Alan D., 4,791,846, Cl. 83-659.000.

Robyn, Pierre; Mottet, Leon-Philippe; and Deschepper, Pierre, to Glaverbel. Method of forming refractory masses from compositions of matter of specified granulometry. 4,792,468, Cl. 427-422.000.

Rodgers, Sheridan J.: See—  
Freund, Paul X.; Rodgers, Sheridan J.; and Kairys, Christopher J., 4,792,480, Cl. 428-286.000.

Rodney, Paul F.: See—  
Paske, William C.; Rodney, Paul F.; and Roeder, Ray A., 4,791,797, Cl. 73-152.000.

Rodriguez, Cesar: See—  
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Roeder, Ray A.: See—  
Paske, William C.; Rodney, Paul F.; and Roeder, Ray A., 4,791,797, Cl. 73-152.000.

Rogers, Howard G.: See—  
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Rokkaku, Kazuo: See—  
Yamashita, Yuko; Masumoto, Yuji; Kimura, Takao; Nishida, Katsutoshi; Inoue, Koichi; Rokkaku, Kazuo; and Takebayashi, Hiroaki, 4,792,244, Cl. 384-492.000.

Rokkaku, Tadashi: See—  
Yamamoto, Michinori; Tashiro, Shozo; Sakane, Satoshi; Morita, Toshiro; Shiota, Hiroshi; Rokkaku, Tadashi; and Katayama, Keiichi, 4,791,830, Cl. 74-603.000.

Rolls-Royce plc: See—  
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Rolltop, Inc.: See—  
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Rose, Alan D.; and Kennedy, Robert M., III, to Texas Instruments Incorporated. Gas dispersion disk for use in plasma enhanced chemical vapor deposition reactor. 4,792,378, Cl. 156-643.000.

Rosen, Harold A., to Hughes Aircraft Company. Antenna system for hybrid communications satellite. 4,792,813, Cl. 343-781.00P.

Rosa, Albert, to Western/Scott Fetzer Company. Stem regulator. 4,791,957, Cl. 137-505.120.

Roth, James F.: See—  
Paulik, Frank E.; Hershman, Arnold; Knox, Walter R.; and Roth, James F., 4,792,620, Cl. 560-232.000.

Rottler, Donald B.; and Engnell, David, to Rottler Manufacturing Company. Engine boring and surfacing machine. 4,792,265, Cl. 408-237.000.

Rottler Manufacturing Company: See—  
Rottler, Donald B.; and Engnell, David, 4,792,265, Cl. 408-237.000.

Roulet, Andre: See—  
Dartois, Luc; Roulet, Andre; and Riboni, Raymond, 4,792,914, Cl. 364-607.000.

Roush, David M.: See—  
Burkart, Susan E.; Rodriguez, Cesar; Roush, David M.; and Phillips, Richard B., 4,792,567, Cl. 514-422.000.

Rowan, Joseph C.: See—  
Walter, Jeffrey A.; Garg, Kailash C.; and Rowan, Joseph C., 4,792,774, Cl. 333-251.000.

Royal Appliance Manufacturing Co.: See—  
Sovia, John F.; Smith, Robert M.; and Bramhall, George H., 4,791,699, Cl. 15-344.000.

Rubechini, Roberto, to Dei-Dispositivi Elettronici Industriali Di Rubechini Roberto. Apparatus for detecting a body in motion on the ground of a protected area. 4,792,804, Cl. 342-27.000.

Rubin, David; and Rubin, Elyahu J., to Century Laboratories, Inc. Method of extraction and purification of polyunsaturated fatty acids from natural sources. 4,792,418, Cl. 260-412.000.

Rubin, Elyahu J.: See—  
Rubin, David; and Rubin, Elyahu J., 4,792,418, Cl. 260-412.000.

Rubinstein, Jorge, to Digital Equipment Corporation. Single rail CMOS register array and sense amplifier circuit therefor. 4,792,924, Cl. 365-154.000.

Rudick, Richard A.; Herndon, Robert M.; and Bidlack, Jean M., to University of Rochester. Immunoassay of free kappa light chains for the detection of multiple sclerosis. 4,792,529, Cl. 436-542.000.

Rudolph, Albert; and Eckes, Helmut, to Hoechst AG. Water-dilutable printing ink binder system and use thereof as printing ink. 4,792,356, Cl. 106-30.000.

Rudz Enterprises, Inc.: See—  
Rudzinski, Stanley P., 4,792,394, Cl. 210-159.000.

Rudzinski, Stanley P., to Rudz Enterprises, Inc. Bar screening apparatus. 4,792,394, Cl. 210-159.000.

Ruf, Erich, to Th. Goldschmidt AG. Use of modified polyethylene for finishing glass surfaces. 4,792,494, Cl. 428-426.000.

Ruhle, Gerhard, to Kasper & Richter Feinmechanischer Apparatebau. Step counter. 4,792,665, Cl. 235-105.000.

Rule, Mark; Fagerburg, David R.; and Watkins, Joseph J., to Eastman Kodak Company. Process for the preparation of copoly(arylene sulfide) with aromatic nitro compound catalyst. 4,792,600, Cl. 528-389.000.

Rule, Mark, to Eastman Kodak Company. Process for the preparation of aryl sulfides. 4,792,634, Cl. 568-58.000.

Rule, Mark; Lane, Donald W.; Larkins, Thomas H.; and Tustin, Gerald C., to Eastman Kodak Company. Process for preparing iodinated aromatic compounds. 4,792,641, Cl. 570-202.000.

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Ruolahti, Erkki; and Pierschbacher, Michael, to La Jolla Cancer Research Foundation. Tetrapeptide. 4,792,525, Cl. 435-240.243.

Russell, Raymond L., to Container Corporation of America. Removable cover for bulk container. 4,792,087, Cl. 229-125.150.

Russell, Thomas D.: See—  
Matko, Theodore N.; Rand, Robert S.; Russell, Thomas D.; Scheib, Thomas J.; and Walker, Robert R., deceased, 4,791,889, Cl. 122-479.00R.

Ruzo, Luis O.: See—  
Lawrence, Lowell J.; Hamann, Scott R.; Kesterson, Abbe L.; and Ruzo, Luis O., 4,791,820, Cl. 73-863.210.

RXS Schrupftechnik-Garnituren GmbH: See—  
Melsch, Hans J., 4,792,472, Cl. 428-35.900.

Ryder, Kenneth F., to Bridgeport Metal Goods Manufacturing Co. Smooth drive lipstick container. 4,792,251, Cl. 401-74.000.

Sacane, Elise J. Leg nets. 4,791,777, Cl. 54-81.000.

Sacarsen, Stephen P.; Blankenship, Gene E.; Shah, Rajiv R.; Tran, Toan; Myers, David J.; Lin, Johnson J.; and Thompson, Steve, to Texas Instruments Incorporated. MOS programmable memories using a metal fuse link and process for making the same. 4,792,835, Cl. 357-23.600.

Saegusa, Takeo; Horikawa, Jiro; Niwano, Masahiro; and Kanazawa, Takenobu, to Sumitomo Chemical Co., Ltd. Method of producing a polyether prepolymer. 4,792,603, Cl. 540-451.000.

Saeki, Keiso: See—  
Sano, Shojiro; and Saeki, Keiso, 4,792,543, Cl. 503-209.000.

Sagala, Djuniadi A.: See—  
Tamura, Hiroshi; and Sagala, Djuniadi A., 4,792,537, Cl. 501-118.000.

Sagawa, Masato; Fujimura, Setsuo; and Matsuura, Yutaka, to Sumitomo Special Metals Co., Ltd. Magnetic materials and permanent magnets. 4,792,368, Cl. 148-302.000.

Sager, Ronald E.: See—  
Simmonds, Michael B.; and Sager, Ronald E., 4,791,788, Cl. 62-49.000.

Sahm, Hans W., to EM Microelectronic Marin SA. Device comprising an electronic circuit for processing an analog signal. 4,792,886, Cl. 363-60.000.

Saigh, P. A.: See—  
Krishnakumar, C. K.; and Saigh, P. A., 4,791,688, Cl. 4-319.000.

Saito, Katsumi: See—  
Shindou, Yoshio; Kabeya, Motoo; and Saito, Katsumi, 4,792,499, Cl. 428-659.000.

Saito, Masahiro; Takami, Hideyuki; Sato, Makoto; and Kiso, Masayuki, to C. Uyemura & Co., Ltd. Electroless gold plating solution. 4,792,469, Cl. 427-443.100.

Saito, Takeshi; and Takagaki, Hiromitsu, to Ricoh Company, Ltd. Rotary developing device for image-forming apparatus. 4,792,825, Cl. 355-300.000.

Saitoh, Keishi: See—  
Shirai, Shigeru; Saitoh, Keishi; Arai, Takayoshi; Kato, Minoru; and Fujioka, Yasuaki, 4,792,509, Cl. 430-64.000.

Saitoh, Kyoichiro; Tsunakawa, Mitsuaki; Konishi, Masataka; and Miyaki, Takeo, to Bristol-Myers Company. Boholmycin antibiotic. 4,792,545, Cl. 514-35.000.

Sakabe, Shigekazu: See—  
Kime, Kenjiro; Sakabe, Shigekazu; Hashimoto, Akira; and Matozaki, Tohiya, 4,792,935, Cl. 369-45.000.

Sakai, Tomihisa: See—  
Ikeda, Motozo; Fukaya, Hiroyasu; and Sakai, Tomihisa, 4,792,907, Cl. 364-449.000.

Sakai, Yasuharu; Segawa, Shinichi; and Yasui, Tadashi, to Japan Storage Battery Co., Ltd. Reduction gear mechanism for motor-driven drill incorporating speed changing mechanism. 4,791,833, Cl. 74-769.000.

Sakai, Yoshio: See—  
Nagasaki, Kouichi; Sakai, Yoshio; Minato, Osamu; Masuhara, Toshiaki; and Meguro, Satoshi, 4,792,841, Cl. 357-59.000.

Sakaida, Atsuo; Suzuki, Yoshihumi; and Kato, Shigeki, to Brother Kogyo Kabushiki Kaisha. Armature supporting structure of a print head. 4,792,247, Cl. 400-124.000.

Sakane, Satoshi: See—  
Yamamoto, Michinori; Tashiro, Shozo; Sakane, Satoshi; Morita, Toshiro; Shiota, Hiroshi; Rokkaku, Tadashi; and Katayama, Keiichi, 4,791,830, Cl. 74-603.000.

Sako-Valmet Oy: See—  
Leskinen, Martti, 4,791,748, Cl. 42-75.020.

Sakuraba, Shuhei: See—  
Ohtani, Hideya; Momoi, Toshimitsu; Ooi, Eiji; Sakuraba, Shuhei; Morita, Masayuki; and Wakashima, Yoshiaki, 4,792,532, Cl. 437-206.000.

Sala, Oneglio: See—  
Montanari, Paolo; and Sala, Oneglio, 4,792,172, Cl. 294-102.200.

Salkin, Herve: See—  
Grare, Didier; and Salkin, Herve, 4,791,816, Cl. 73-761.000.

Salomon S. A.: See—  
Benier, Bertrand, 4,792,155, Cl. 280-607.000.

Salomon, S.A.: See—  
Hue, Jean, 4,792,156, Cl. 280-615.000.

Sande, Kurt: See—  
Heim, Edgar; Sande, Kurt; and Staaland, Torbjørn, 4,791,856, Cl. 92-84.000.

Sandeman, Jens P.: See—  
Nielsen, Carsten; Holm, Ejler L.; Sandeman, Jens P.; and Madsen, Hanne F., 4,792,440, Cl. 423-244.000.

Sanders Associates, Inc.: See—  
Gilbert, Roland A.; and Sedivec, Darrel F., 4,792,809, Cl. 343-770.000.

Sandlofer, Michael I. Whale harness. 4,791,885, Cl. 119-96.000.

Sandoz Ltd.: See—  
Ziegast, Gerd, 4,792,598, Cl. 528-206.000.

Sanna, Salvatore R.: See—  
Messina, Giuseppe; Moretti, Mario D.; Sanna, Salvatore R.; Soma, Giovanni; and Cabras, Pier G., 4,792,637, Cl. 568-626.000.

Sano, Masaru: See—  
Kuwashima, Shigeru; Mitsui, Akio; and Sano, Masaru, 4,792,518, Cl. 430-505.000.

Sano, Shojiro; and Saeki, Keiso, to Fuji Photo Film Co., Ltd. Pressure-sensitive recording sheet. 4,792,543, Cl. 503-209.000.

Sano, Yutaka: See—  
Kumano, Masafumi; Shindoh, Yasuyuki; Sano, Yutaka; Haga, Koichi; and Fuse, Akihiro, 4,792,510, Cl. 430-65.000.

Sanyo Electric Co., Ltd.: See—  
Tsujino, Kazuhiro; and Koyabu, Seiji, 4,792,743, Cl. 320-15.000.

Saphirwerk Industrie Produkte: See—  
Bissegger, Marcel, 4,792,679, Cl. 250-237.00G.

Sarcia, Domenico S. Method and apparatus for snubbing the movement of a free, gas-driven displacer in a cooling engine. 4,792,346, Cl. 62-6.000.

Sasaki, Akio: See—  
Takahashi, Tetsuo; Miyauchi, Eisaku; Yoshida, Masayuki; Kumagai, Shunichi; and Sasaki, Akio, 4,792,781, Cl. 338-307.000.

Sasaki, Kazuki: See—  
Takao, Shoji; Yamashita, Hideo; Suetsugu, Katsuyoshi; Toyama, Yasunori; and Sasaki, Kazuki, 4,792,575, Cl. 521-157.000.

Sasa'i, Nobukazu: See—  
Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshiro; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiro; Tanabe, Ken; and Tanaka, Hidetoshi, 4,792,828, Cl. 355-14.00R.

Sasaki, Toshiro; and Ogawa, Masao, to Brother Kogyo Kabushiki Kaisha. Automatic needle thread supply control system. 4,791,876, Cl. 112-241.000.

Sasho, Yoshio: See—  
Suga, Nagaichi; Mori, Taro; and Sasho, Yoshio, 4,792,093, Cl. 239-14.200.



Sasson, Yoel: See—  
Wiener, Harold; Vandel, Shmuel; and Sasson, Yoel, 4,792,623, Cl. 564-416.000.

Sato, Kozo: See—  
Nakamura, Taku; and Sato, Kozo, 4,792,514, Cl. 430-138.000.

Sato, Makoto: See—  
Goda, Hiroshi; Kawamura, Masao; Kato, Kunioki; and Sato, Makoto, 4,792,612, Cl. 549-71.000.

Saito, Masahiro; Takami, Hideyuki; Sato, Makoto; and Kiso, Masayuki, 4,792,469, Cl. 427-443.100.

Sato, Ryo: See—  
Nagano, Eiki; Haga, Toru; Sato, Ryo; and Morita, Kouichi, 4,792,605, Cl. 544-105.000.

Sato, Shigetada, to Asahi Kogaku Kogyo Kabushiki Kaisha. Zoom lens, 4,792,215, Cl. 350-426.000.

Sato, Tsuyoshi: See—  
Abe, Masaru; Ogura, Masami; and Sato, Tsuyoshi, 4,792,007, Cl. 180-140.000.

Sato, Yuji: See—  
Fukusawa, Junichi; Yasuda, Yutaka; Sato, Yuji; and Shida, Jun, 4,792,444, Cl. 424-63.000.

Sato, Yutaka: See—  
Yoshioka, Teruo; Nakano, Shoji; and Sato, Yutaka, 4,791,714, Cl. 29-156.40R.

Satoh, Seinosuke; and Hamada, Minoru, to Asahi Kasei Kogyo Kabushiki Kaisha. Stabilized oxymethylene copolymer composition, 4,792,579, Cl. 524-145.000.

Satoh, Shingo: See—  
Shiraiishi, Daiichi; and Satoh, Shingo, 4,792,166, Cl. 292-36.000.

Satoh, Takayuki: See—  
Igaki, Masanori; Yoneyama, Sigeo; Hori, Yoshimichi; and Satoh, Takayuki, 4,792,318, Cl. 445-66.000.

Satomura, Masato: See—  
Takashima, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, 4,792,542, Cl. 503-208.000.

Sattin, William, to Picker International, Inc. Steady-state echo magnetic resonance imaging, 4,792,758, Cl. 324-309.000.

Saverbier, Charles E. Tunnel-wave generator, 4,792,260, Cl. 405-79.000.

Savoca, Robert C., to Barnes Engineering Company. Dual field horizon scanner, 4,792,684, Cl. 250-347.000.

Savov, Svetoslav A.: See—  
Mintchev, Mintcho S.; Savov, Svetoslav A.; and Kretev, Emil I., 4,792,730, Cl. 315-209.05C.

Sawamoto, Yuzi: See—  
Yokota, Yukinaga; Sawamoto, Yuzi; Taniguchi, Hideki; and Okabe, Kazuhiko, 4,792,622, Cl. 564-398.000.

Sawin, Steven P.: See—  
Fulka, Bernard D.; Sawin, Steven P.; Aikman, Collin D.; and Jenkins, John M., III, 4,792,592, Cl. 526-62.000.

Saylor, Gary S.: See—  
Blackburn, James W.; and Saylor, Gary S., 4,792,519, Cl. 435-6.000.

Scarpa, Afra B.; and Scarpa, Tobia, to Benetton S.p.A. Garment display device, 4,792,071, Cl. 223-68.000.

Scarpa, Tobia: See—  
Scarpa, Afra B.; and Scarpa, Tobia, 4,792,071, Cl. 223-68.000.

Schaefer, Quinton A., to Gator Corporation. Athletic mouth guard, 4,791,941, Cl. 128-861.000.

Scheib, Thomas J.: See—  
Matako, Theodore N.; Rand, Robert S.; Russell, Thomas D.; Scheib, Thomas J.; and Walker, Robert R., deceased, 4,791,889, Cl. 122-479.00R.

Schildkraut, Jay S.: See—  
Ulman, Abraham; Williams, David J.; Penner, Thomas L.; Robello, Douglas R.; Schildkraut, Jay S.; Scozzafava, Michael; and Wiland, Craig S., 4,792,208, Cl. 350-96.340.

Schiltz, John R.; and Elias, Peter M., to American Cyanamid Company. Proteolipid compounds, 4,792,571, Cl. 514-773.000.

Schirmer, Henry G., to W. R. Grace & Co. High oxygen barrier coextruded film, 4,792,488, Cl. 428-349.000.

Schlechtliem, Gerhard-Ludwig; Weppner, Werner; and Schubert, Helmut, to Dräger AG; and Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V. Sensor for measuring partial pressures of gases, 4,792,752, Cl. 324-71.100.

Schlieter, Donald C., to General Motors Corporation. Commutator with non-uniform bars and equally spaced books, 4,792,714, Cl. 310-234.000.

Schliof, Michael, to Standard Elektrik Lorenz A.G. Picture-reproducing device, 4,792,498, Cl. 428-595.000.

Schlumberger Technology Corporation: See—  
Nishida, Katsuhiko; Shindo, Mansanari; Suzuki, Masaharu; and Kondo, Masamichi, 4,792,931, Cl. 367-149.000.

Schmerbeck, Timothy J.: See—  
Lobb, Kenneth G.; Schmerbeck, Timothy J.; Schuelke, Brian A.; and Sutton, Manning O., 4,792,704, Cl. 307-264.000.

Schmidhuber, Andrea: See—  
Rengstl, Alfred; and Schmidhuber, Andrea, 4,792,591, Cl. 525-477.000.

Schmidt, Dieter: See—  
Goppelt, Dieter; and Schmidt, Dieter, 4,792,322, Cl. 474-136.000.

Schmidt, Karl H., to Voest-Alpine Friedmann Gesellschaft M.B.H. Circuit arrangement to detect signals indicating a change in current through a needle lift sensor of an injection nozzle in combustion engines, which is connected to a constant direct voltage supply, 4,791,809, Cl. 73-119.00A.

Schmidtchen, Gerhard; and Muller, Mathias, to Durr Dental GmbH & Co KG. Electric heating apparatus for regulating the temperature of a plurality of liquids, 4,792,661, Cl. 219-301.000.

Schmidtke, Joachim G. Method and apparatus for manufacturing cardboard pallets, 4,792,325, Cl. 493-334.000.

Schmitz, Charles E., to Grumman Aerospace Corporation. Detector buffer board, 4,792,672, Cl. 250-211.00R.

Schmitz, George: See—  
Muller, Peter; Mustacchi, Henry; and Schmitz, George, 4,792,515, Cl. 430-160.000.

Schmoll, Wolfgang, to Theodor Grox & Sohne & Ernst Beckert Nadel-fabrik Commandit-Gesellschaft. Latch needle for stitch forming textile machines, 4,791,794, Cl. 66-121.000.

Schneider, John I.: See—  
Janoick, Denis W.; and Schneider, John I., 4,792,049, Cl. 209-556.000.

Schneider, Michael; Wernicke, Hans J.; Kochloeff, Karl; and Maletz, Gerd, to Sud-Chemie Aktiengesellschaft. Process for decreasing the content of nitrogen oxides in flue gases, 4,792,439, Cl. 423-239.000.

Schoeffler, James D.: See—  
Agarwal, Suresh C.; Janeczek, Edward D.; Keyes, Marion A.; Schoeffler, James D.; and Willey, Michael S., 4,792,888, Cl. 364-188.000.

Schoenenberger, Raymond: See—  
Broquet, Joseph; and Schoenenberger, Raymond, 4,791,803, Cl. 72-481.000.

Scholl, Thomas; Exner, Otto; Pinkel, Peter; and Perrey, Hermann, to Bayer Aktiengesellschaft. Indoline and 1,2,3,4-tetrahydroquinoline N(dicarboxalkoxyvinyl) substituted derivatives, 4,792,609, Cl. 546-165.000.

Schoonderbeek, Hubertus J., to Stork Brabant B.V. Device for splicing two webs of material each originating from a roll, 4,792,103, Cl. 242-58.100.

Schreuder, Johan C., to Duphar International Research B.V. Multi-compartment syringe, 4,792,329, Cl. 604-90.000.

Schroeder, James E., to Texas Instruments Incorporated. Low voltage dropout regulator, 4,792,747, Cl. 323-303.000.

Schubert, Helmut: See—  
Schlechtliem, Gerhard-Ludwig; Weppner, Werner; and Schubert, Helmut, 4,792,752, Cl. 324-71.100.

Schubring, Herbert H.; Spalding, Donald R.; and Pollart, Kenneth A., to James River Corporation of Virginia. Ink jet recording medium comprising (a) water expandable colloidal clay (b) silica and (c) water insoluble synthetic binder, 4,792,487, Cl. 428-342.000.

Schueler, Peter: See—  
Grieshaber, Hermann; Schueler, Peter; and Wietelmann, Jürgen, 4,791,904, Cl. 123-479.000.

Schuelke, Brian A.: See—  
Lobb, Kenneth G.; Schmerbeck, Timothy J.; Schuelke, Brian A.; and Sutton, Manning O., 4,792,704, Cl. 307-264.000.

Schulte, William J.: See—  
Ausman, Robert K.; Adams, Mark; Caballero, Gerardo; Hamid, Rahim; Hoffman, Norman E.; Quebbeman, Edward J.; Schulte, William J.; Thomson, Robert; Whipple, Julie; and Weitman, Steven D., 4,792,449, Cl. 424-440.000.

Schulz, Dietmar: See—  
Praeur, Heinz; Johnson, Alfred H.; Schulz, Dietmar; and Pohl, Peter, 4,792,204, Cl. 350-96.200.

Schulz, Donald N.; Berluche, Enock; Maurer, John J.; and Bock, Jan, to Exxon Research and Engineering Company. Novel acrylamide acrylate copolymers, 4,792,593, Cl. 526-240.000.

Schupack, Jay M.; and Biggs, Alan, to Comprehensive Health Education Foundation. Shipping container for educational materials and the like, 4,792,055, Cl. 220-94.00A.

Schurter, Rolf: See—  
Bohner, Beat; Fory, Werner; Schurter, Rolf; and Pissiotas, Georg, 4,792,608, Cl. 544-319.000.

Schuss, Werner; Bierbaum, Thomas; and Muther, Thomas, to Siemens Aktiengesellschaft. Catch mechanism for a dental handpiece, 4,792,304, Cl. 433-126.000.

Schutter, Hartmut: See—  
Frohn, Werner; Bohlmann, Dieter; Franke, Hermann; Zimmermann, Werner; Limmer, Heinz; Hopfer, Eberhard; Lindner, Horst; Matthey, Reinhard; Muller, Henner; Poppen, Hans; Schutter, Hartmut; and Dietrich, Detlev, 4,792,389, Cl. 208-76.000.

Schwab, Gerhart; and Lee, Mei-Tsu, to MHB Joint Venture. Liquid containing polymer networks as solid electrolytes, 4,792,504, Cl. 429-192.000.

Schwab, Walter, to Chibret Pharmazeutische GmbH. Closure counter, 4,792,664, Cl. 235-103.000.

Schwartz, Arnold. Ear held earmuff, 4,791,684, Cl. 2-209.000.

Schwarz, William M., Jr., to Xerox Corporation. Release agent management system for a heated fuser roll, 4,791,959, Cl. 137-561.00A.

Schweitzer, Jeffrey A.: See—  
Baudino, Michael D.; de Franco, Michael D.; Lessar, Joseph F.; Brumwell, Dennis A.; Borazin, Gene A.; and Schweitzer, Jeffrey A., 4,791,935, Cl. 128-637.000.

Schwinberg, Paul B.: See—  
Vail, William B., III; and Schwinberg, Paul B., 4,792,757, Cl. 324-303.000.

Schwind, James J.; and Tipton, Craig D., to Lubrizol Corporation. The Lubricant composition suitable for manual transmission fluids, 4,792,410, Cl. 252-38.000.

Scientific Atlanta, Inc.: See—  
Cook, Alex M., Jr., 4,792,972, Cl. 380-20.000.

Nussallah, Steve; and Farmer, James, 4,792,848, Cl. 358-86.000.

Scott Fetzer Company, The: See—  
Bigley, James E.; and Estelle, Lee R., 4,791,700, Cl. 15-324.000.

Scozzafava, Michael: See—  
Ulman, Abraham; Williams, David J.; Penner, Thomas L.; Robello, Douglas R.; Schildkraut, Jay S.; Scozzafava, Michael; and Wiland, Craig S., 4,792,208, Cl. 350-96.340.

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Seatt Corporation: See—  
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Sedivec, Darrel F.: See—  
Gilbert, Roland A.; and Sedivec, Darrel F., 4,792,809, Cl. 343-770.000.

Seed, Bernard E., to Rolls-Royce plc. Fluid outlet duct, 4,791,782, Cl. 60-226.100.

Segawa, Shinichi: See—  
Sakai, Yasuharu; Segawa, Shinichi; and Yasui, Tadashi, 4,791,833, Cl. 74-769.000.

Seguy, Michel; and Bisson, Michel, to Electricite de France - Service National. Electric induction cooking appliance with reduced harmonic emission, 4,792,652, Cl. 219-10.493.

Seiko Epson Corporation: See—  
Taniguchi, Makoto; Hayashi, Seiichi; Takei, Katsumori; and Fukushima, Hitoshi, 4,792,495, Cl. 428-484.000.

Seiko Instruments & Electronics Ltd.: See—  
Harada, Takamasa; Taguchi, Masaaki; Shimoda, Sadashi; and Ito, Koukichi, 4,792,211, Cl. 350-341.000.

Seitetsu Kagaku Co., Ltd.: See—  
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Sekimura, Nobuyuki: See—  
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Masaki, Yuichi; Kakimoto, Seiji; Terada, Katsunori; and Sekimura, Nobuyuki, 4,792,671, Cl. 250-211.00R.

Sekizawa, Kazuhiko: See—  
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Sekozawa, Teruji; Shioya, Makoto; Tokuda, Hirotsu; Funabashi, Motobias; and Onari, Mikihiko, to Hitachi, Ltd. Method of fuel injection control in engine, 4,792,905, Cl. 364-431.050.

Sera, Hidesumi: See—  
Kato, Eiichi; Itakura, Ryosuke; Sera, Hidesumi; and Ishii, Kazuo, 4,792,511, Cl. 430-87.000.

Serlet, Bertrand P., to Xerox Corporation. Boolean logic layout generator, 4,792,909, Cl. 364-491.060.

Set-O-Matic, Inc.: See—  
Mercurio, Leonard, 4,792,248, Cl. 409-178.000.

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Corda, Giuseppe; and Ravaglia, Andrea, 4,792,925, Cl. 365-185.000.

Shackelford, Michael D.: See—  
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Shah, Nirad N.: See—  
Hatfield, Richard, Jr.; Steele, Howard R.; and Shah, Nirad N., 4,792,624, Cl. 564-333.000.

Shah, Rajiv R.: See—  
Scaresen, Stephen P.; Blankenship, Gene E.; Shah, Rajiv R.; Tran, Toan; Myers, David J.; Lin, Johnson J.; and Thompson, Steve, 4,792,835, Cl. 357-23.600.

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Shapiro, Seymour W.: See—  
Parekh, Sharad V.; Shapiro, Seymour W.; and Profera, Charles E., Jr., 4,792,770, Cl. 335-113.000.

Shapiro, Sol, to Systron Electronic Systems Inc. Mechanical timing device electronic upgrading mechanism, 4,792,032, Cl. 194-243.000.

Sharp Kabushiki Kaisha: See—  
Mimoto, Toshio; and Ota, Yoshiji, 4,792,922, Cl. 365-149.000.

Miyachi, Nobuyuki; Hayashi, Hiroshi; Yamamoto, Osamu; and Yamamoto, Saburo, 4,792,962, Cl. 372-94.000.

Murakami, Yoshiteru; Takahashi, Akira; Fujii, Yoshikazu; Katayama, Hiroyuki; and Ohta, Kenji, 4,792,474, Cl. 428-64.000.

Yamamoto, Saburo; Hayashi, Hiroshi; Morimoto, Taiji; and Yano, Seiki, 4,792,960, Cl. 372-46.000.

Sharp Kabushiki Kaishi: See—  
Iwai, Masahiro, 4,792,650, Cl. 200-50.00A.

Shaw, Herbert J.; Youngquist, Robert C.; and Brooks, Janet L., to Leland Stanford Junior University. The Board of Trustees of the. Single mode fiber optic single sideband modulator and method of frequency shifting using same, 4,792,207, Cl. 350-96.290.

Sheets, Marvin W.: See—  
Smith, William R.; Sheets, Marvin W.; and Greenlee, Paul W., 4,792,462, Cl. 427-49.000.

Sheffield, Richard. Weight scale for a hydraulic loader and related method, 4,792,004, Cl. 177-141.000.

Shelestak, Larry J.: See—  
Pecoraro, George A.; and Shelestak, Larry J., 4,792,536, Cl. 501-70.000.

Shell Oil Company: See—  
Baker, Daniel C., 4,792,405, Cl. 210-721.000.

Chao, Kuo-Hua, 4,792,629, Cl. 564-463.000.

Jobe, John D.; and Lepley, Allen E., 4,792,232, Cl. 356-394.000.

Zijaling, Djurre H., 4,792,001, Cl. 175-329.000.

Sherman, Ralph R., Jr.: See—  
Garner, Terry N.; and Sherman, Ralph R., Jr., 4,792,986, Cl. 455-89.000.

Sherman, Rudolf W.; and Stainer, Philip J., to Imperial Chemical Industries PLC. Fabric softeners, 4,792,409, Cl. 252-8.600.

Sherwin-Williams Company, The: See—  
Doshi, Jyotindra K., 4,792,580, Cl. 524-261.000.

Sherwood, Gregory J., to Spectra-Physics, Inc. Method and apparatus for rotating one or more mirrors in a beam scanning system, 4,792,198, Cl. 350-6.700.

Sherwood, Russell W.: See—  
Madnick, Peter A.; and Sherwood, Russell W., 4,792,803, Cl. 340-905.000.

Shibata, Yasuo: See—  
Miyamaru Yukio; Hatanaka, Kaoru; Kawada, Shigeo; and Shibata, Yasuo, 4,792,785, Cl. 340-73.000.

Shibata, Yuji; and Fujihira, Atsushi, to Fujitsu Limited. Line condition data collecting system for a telephone exchange, 4,792,969, Cl. 379-242.000.

Shida, Jun: See—  
Fukusawa, Junichi; Yasuda, Yutaka; Sato, Yuji; and Shida, Jun, 4,792,444, Cl. 424-63.000.

Shigaki, Takao: See—  
Shimazaki, Osamu; Urabe, Hitoshi; and Shigaki, Takao, 4,792,847, Cl. 358-80.000.

Shigenai, Osamu: See—  
Fuke, Takamichi; Ozawa, Kazuyoshi; Masuda, Atsushi; Shigenai, Osamu; and Gunji, Kunihiko, 4,792,245, Cl. 384-610.000.

Shiina, Michihiro; Goto, Shigenori; Iwamoto, Junichi; and Hamada, Hisashi, to Fuji Photo Film Co., Ltd. Battery check system, 4,792,762, Cl. 324-426.000.

Shikamori, Tamotu: See—  
Fukuzawa, Soichi; and Shikamori, Tamotu, 4,791,691, Cl. 8-159.000.

Shimamura, Michiya: See—  
Nakagawa, Naoshi; Takigawa, Tetsuo; Kageyu, Akira; Shimamura, Michiya; Okada, Masafumi; and Mizuno, Masao, 4,792,615, Cl. 558-144.000.

Shimamura, Yoshiyuki: See—  
Takahashi, Akira; Shimamura, Yoshiyuki; Kobayashi, Hide; Okonogi, Shigeo; Kawashima, Takuji; and Igarashi, Minoru, 4,792,549, Cl. 514-400.000.

Shimanuki, Yuzi: See—  
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Shimazaki, Osamu; Urabe, Hitoshi; and Shigaki, Takao, to Fuji Photo Film Co., Ltd. Method for automatically setting signal processing conditions in image input/output system, 4,792,847, Cl. 358-80.000.

Shimizu, Katsuchi, to Canon Kabushiki Kaisha. Image transmission system, 4,792,980, Cl. 382-56.000.

Shimizu, Kazuo, to Mimasu Oil Chemical Co., Ltd. Substance and process for converting waste cooking oil into liquid soap, 4,792,416, Cl. 252-369.000.

Shimizu, Yoshiaki: See—  
Hiraiwa, Kazuyoshi; Shimizu, Yoshiaki; and Hayasaki, Koichi, 4,791,951, Cl. 137-56.000.

Shimoda, Sadashi: See—  
Harada, Takamasa; Taguchi, Masaaki; Shimoda, Sadashi; and Ito, Koukichi, 4,792,211, Cl. 350-341.000.

Shimotori, Hitoshi; Ishii, Tutomu; Yamazaki, Hideo; Kuwatsuka, Toshiaki; Yanase, Yuji; and Tanaka, Yoshinori, to Mitsui Toatsu Chemicals, Inc. Pyrazolecarbonylamine derivatives and agricultural and horticultural fungicides containing said compounds, 4,792,565, Cl. 514-406.000.

Shin-Seng, Lin. Tail pipe for drafting engine exhaust gas, 4,792,014, Cl. 181-280.000.

Shinagawa, Katuma: See—  
Kitagaki, Hiroshi; Takagawa, Seiichi; and Shinagawa, Katuma, 4,792,662, Cl. 219-545.000.

Shindo, Mansanari: See—  
Nishida, Katsuhiko; Shindo, Mansanari; Suzuki, Masaharu; and Kondo, Masamichi, 4,792,931, Cl. 367-149.000.

Shindoh, Yasuyuki: See—  
Kumano, Masafumi; Shindoh, Yasuyuki; Sano, Yutaka; Haga, Koichi; and Fuse, Akihiro, 4,792,510, Cl. 430-65.000.

Shindou, Yoshio; Kabeya, Motoo; and Saito, Katsushi, to Nippon Steel Corporation. Zn-Al hot-dip galvanized steel sheet having improved resistance against secular peeling and method for producing the same, 4,792,499, Cl. 428-659.000.

Shinn, Betty J., to Armstrong Rubber Co., The. Pneumatic tractor tire, 4,791,971, Cl. 152-209.00B.

Shinoda, Hidetaka: See—  
Miyota, Akihiro; and Shinoda, Hidetaka, 4,792,371, Cl. 156-131.000.

Shioda, Yoshihiko. Snack tray for automobile, 4,792,174, Cl. 296-37.120.

Shiomi, Kengo, to Tokyo Juki Industrial Co., Ltd. Chain stitch machine, 4,791,874, Cl. 112-162.000.

Shiota, Hiroshi: See—  
Yamamoto, Michinori; Tashiro, Shozo; Sakane, Satochi; Morita, Toshiro; Shiota, Hiroshi; Rokkaku, Tadashi; and Katayama, Keiichi, 4,791,830, Cl. 74-603.000.

Shioya, Makoto; Funabashi, Motobias; and Nishiya, Takushi, to Hitachi, Ltd. Method and apparatus for obtaining three dimensional distance information stereo vision, 4,792,694, Cl. 250-558.000.



Shioya, Makoto: See—  
Sekoawa, Teruji; Shioya, Makoto; Tokuda, Hiroatsu; Funabashi, Motohisa; and Onari, Mikihiko, 4,792,905, Cl. 364-431.050.  
Shirai, Shigeru; Saitoh, Keishi; Arai, Takayoshi; Kato, Minoru; and Fujioka, Yasushi, to Canon Kabushiki Kaisha. Light receiving member for use in electrophotography. 4,792,509, Cl. 430-64.000.  
Shiraishi, Daiichi; and Satoh, Shingo, to Toyota Jidosha Kabushiki Kaisha. Device for locking detachable roof in motor vehicle. 4,792,166, Cl. 292-36.000.  
Shiraishi, Hiroshi: See—  
Toriumi, Minoru; Shiraishi, Hiroshi; Irie, Ryotaro; and Koibuchi, Shigeru, 4,792,516, Cl. 430-196.000.  
Shirakashi, Yutaka: See—  
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Yoneda, Yoshihiro; Noda, Tetsuo; Fujita, Naoyuki; and Asakura, Osamu, 4,792,489, Cl. 428-400.000.  
Shiraki, Toshinori; Hattori, Yasuo; and Karouji, Masao, to Asahi Kasei Kogyo Kabushiki Kaisha. Adhesive compositions. 4,792,584, Cl. 524-77.000.  
Shiratori, Masayuki: See—  
Katsura, Masaki; and Shiratori, Masayuki, 4,792,433, Cl. 422-98.000.  
Shiratori, Tatsuya: See—  
Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshiro; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiro; Tanabe, Ken; and Tanaka, Hidetoshi, 4,792,828, Cl. 355-14.00R.  
Shiratsuchi, Shinichi, to RCA Licensing Corporation. Sampled data memory system as for a television picture magnification system. 4,792,856, Cl. 358-180.000.  
Shiroishi, Yoshihiro: See—  
Suzuki, Hiroyuki; Shiroishi, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazetsu; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yasushi; Ohta, Sakae; and Aoi, Hajime, 4,792,497, Cl. 428-336.000.  
Shiroyanagi, Yoshiro: See—  
Takamatsu, Hiemshi; Takeuchi, Hisaharu; and Shiroyanagi, Yoshiro, 4,792,917, Cl. 364-900.000.  
Shochat, Dan, to Immunomedica, Inc. Non-enzymatic immunohistochemical staining system and reagents. 4,792,521, Cl. 435-7.000.  
Shockley, Richard D.: See—  
Magee, Arthur W.; Shockley, Richard D.; and Crawford, Michael E., 4,792,379, Cl. 156-909.000.  
Shoji, Tatsumi: See—  
Fukaya, Masaki; Komatsu, Toshiyuki; Shoji, Tatsumi; Kamio, Masaru; and Sekimura, Nobuyuki, 4,792,670, Cl. 250-211.00R.  
Sholder, Jason A.: See—  
Snell, Jeffery D.; Mann, Brian M.; and Sholder, Jason A., 4,791,936, Cl. 128-697.000.  
Shook, Robert E.: See—  
Groendal, Mark L.; and Shook, Robert E., 4,792,150, Cl. 280-275.000.  
Shovar, John S. Seat assembly. 4,792,189, Cl. 297-452.000.  
Shudo, Katsuyuki: See—  
Kawase, Shigeru; Kinjo, Hisao; Mizuno, Yoshio; and Shudo, Katsuyuki, 4,792,861, Cl. 358-313.000.  
SICPA Holding, S.A.: See—  
Chen, Daniel Y.-J., 4,792,667, Cl. 235-488.000.  
Sieber, Albrecht: See—  
Buck, Rainer; Fischer, Werner; Kull, Hermann; Sieber, Albrecht; and Wessel, Wolf, 4,791,900, Cl. 123-359.000.  
Siegfried, David L.: See—  
Chen, Albert C.; Siegfried, David L.; and Mueller, Donald S., 4,792,577, Cl. 523-118.000.  
Siegl, Walter O.; and Chattha, Mohinder S., to Ford Motor Company. Corrosion inhibiting aqueous, acidic compositions comprising metal-chelating omicron-hydroxybenzylamine compound. 4,792,355, Cl. 106-14.150.  
Siemens Aktiengesellschaft: See—  
Amann, Markus-Christian; Stegmüller, Bernhard; and Kappeler, Franz, 4,792,200, Cl. 350-96.120.  
Ballweg, Adolf, 4,792,966, Cl. 375-112.000.  
Buselmeyer, Bernhard; and Prussas, Herbert, 4,792,878, Cl. 361-383.000.  
Goschke, Bernd; and Nassler, Peter, 4,791,819, Cl. 73-865.800.  
Gromoll, Bernd; and Gulden, Peter, 4,792,288, Cl. 417-278.000.  
Hofmann, Ruediger, 4,792,801, Cl. 340-825.790.  
Luebenberger, Klaus, 4,792,776, Cl. 335-80.000.  
Mueller, Gustav; Hartl, Engelbert; and Honsberg, Martin, 4,792,959, Cl. 372-46.000.  
Pracur, Heinz; Johnson, Alfred H.; Schulz, Dietmar; and Pohl, Peter, 4,792,204, Cl. 350-96.200.  
Schuaz, Werner; Bierbaum, Thomas; and Muther, Thomas, 4,792,304, Cl. 433-126.000.  
Strack, Helmut; and Herberg, Helmut, 4,792,839, Cl. 357-38.000.  
Toussaint, Hans N.; and Goerne, Jan, 4,792,997, Cl. 455-619.000.  
Toussaint, Hans-Norbert, 4,792,998, Cl. 455-619.000.  
Walker, Heinz; and Riedel, Hans-Dieter, 4,792,764, Cl. 328-5.000.  
Siemens-Pacesetter, Inc.: See—  
Snell, Jeffery D.; Mann, Brian M.; and Sholder, Jason A., 4,791,936, Cl. 128-697.000.  
Siemens Transmission Systems, Inc.: See—  
Virdee, Harubajan S.; and Rezaie, Hamid R., 4,792,949, Cl. 370-112.000.

Signode Corporation: See—  
Pearson, Timothy B., 4,791,968, Cl. 140-93.200.  
Silbermann, Joseph; and Burchill, Michael T., to M&T Chemicals Inc. Process for making surface modified U.V. stabilized PVC articles. 4,792,465, Cl. 427-160.000.  
Simburger, Karl: See—  
Lackner, Gerald; and Simburger, Karl, 4,791,808, Cl. 73-117.300.  
Simmonds, Michael B.; and Sager, Ronald E., to Quantum Design, Inc. Method for obtaining improved temperature regulation when using liquid helium cooling. 4,791,788, Cl. 62-49.000.  
Simonovitch, Haim, to Abic Ltd. Water-soluble adduct of norfloxacin. 4,792,552, Cl. 514-254.000.  
Simpson, Geoffrey M., to Haley & Weller Limited. Pyrotechnic assembly. 4,791,870, Cl. 102-342.000.  
Simpson, Harold, to Aahland Products Company. Latch for pivotal sash window. 4,791,756, Cl. 49-175.000.  
Simulators Limited, Inc.: See—  
Adams, Wilbur R., 4,791,711, Cl. 24-633.000.  
Sinta, Roger F.: See—  
Gaudiana, Russell A.; Rogers, Howard G.; and Sinta, Roger F., 4,792,597, Cl. 528-183.000.  
Sio S.p.A.-Societa' per L'industria Dell'Ossigeno e di Altri Gas: See—  
Stori, Oreste, 4,792,421, Cl. 261-122.000.  
Sipmas, John L., to Center Manufacturing Inc. Method for making a magnetic shield. 4,792,317, Cl. 445-23.000.  
Sircar, Shivaji: See—  
Wang, Shou-ji; Patel, Nitin M.; Sircar, Shivaji; and Allam, Rodney J., 4,792,441, Cl. 423-359.000.  
Siu, David, to Com Dev Ltd. Quadruple mode filter. 4,792,771, Cl. 333-208.000.  
Skalka, Clemens J.: See—  
Hatch, Edward A.; and Skalka, Clemens J., 4,792,099, Cl. 241-30.000.  
Skalki, John S., to Thomas A. Schutz & Co. Adjustable price display. 4,791,744, Cl. 40-451.000.  
Skarpenord Control Systems A/S: See—  
Heim, Edgar; Sande, Kurt; and Staalnd, Torbjrn, 4,791,856, Cl. 92-84.000.  
Skedelecki, David; and Arakawa, Eric. Surfboard protective tip. 4,792,316, Cl. 441-74.000.  
Skeie, Bjarne E., to Maritime Hydraulics A.S. Well drilling apparatus. 4,791,999, Cl. 175-85.000.  
Skene, James C.: See—  
Heinis, Robert; Skene, James C.; and Smith, Ronald, 4,792,236, Cl. 366-245.000.  
Skuratovsky, Eugene, to Babcock & Wilcox Company, The. Method and apparatus for aligning fiber optic cables. 4,792,206, Cl. 350-96.210.  
Slate, John B., to Pacesetter Infusion, Ltd. Demand pacemaker using an artificial baroreceptor reflex. 4,791,931, Cl. 128-419.0PG.  
Smith, Berry E., Jr. Electric generator for inducing current in the field coil. 4,792,711, Cl. 310-114.000.  
Smith, David C.; and Oughtstun, Kurt E., to United Technologies Corporation. Laser resonator with high aspect ratio gain region and azimuthally symmetric Fresnel number. 4,792,765, Cl. 330-4.300.  
Smith, Earl D., to Dallas Smith Engineering Corp. Apparatus for supporting vehicles and the like. 4,792,268, Cl. 410-9.000.  
Smith, Earl M.: See—  
Kender, John R.; and Smith, Earl M., 4,792,696, Cl. 250-560.000.  
Smith, Mark J.: See—  
Adams, Peter F.; Smith, Mark J.; and Carpenter, Robert B. P., 4,792,915, Cl. 364-724.190.  
Smith, Milton O.: See—  
Bickford, John H.; Meisterling, Jesse R.; and Smith, Milton O., 4,791,839, Cl. 81-479.000.  
Bickford, John H. F.; Meisterling, Jesse R.; Smith, Milton O.; and Kosciak, Geoffrey F., 4,791,838, Cl. 81-467.000.  
Smith, Otto J. M. Three-phase induction motor with single phase power supply. 4,792,740, Cl. 318-768.000.  
Smith, Robert C.; and Horst, Gary E., to Superior Electric Company, The. Winding for operation of a three-phase stepping motor from a two-phase drive. 4,792,709, Cl. 310-49.00R.  
Smith, Robert M.: See—  
Sovia, John F.; Smith, Robert M.; and Bramhall, George H., 4,791,699, Cl. 15-344.000.  
Smith, Ronald: See—  
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Smith, Stevan C.: See—  
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Smith, Terry E.: See—  
Dougherty, James; Locke, Harold O.; Vara, Fulvio J.; Login, Robert B.; and Smith, Terry E., 4,792,400, Cl. 210-500.100.  
Smith, William R.; Sheets, Marvin W.; and Greenlee, Paul W., to General Electric Company. Method of applying insulating material to windings in electrical machinery. 4,792,462, Cl. 427-49.000.  
Smolens, H. Dana, to Asten Group, Inc. Abrasion and hydrolysis resistant joining means for fabric seams. 4,791,708, Cl. 24-33.00C.  
Smrt, Thomas J. Fence bracket. 4,792,122, Cl. 256-68.000.  
SMS Schloemann-Siemag Aktiengesellschaft: See—  
Engel, Georg; and Kosak, Dietmar, 4,791,799, Cl. 72-225.000.  
Smyth, Robert R.: See—  
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Snell, Jeffery D.; Mann, Brian M.; and Sholder, Jason A., to Siemens-Pacesetter, Inc. Apparatus for interpreting and displaying cardiac

events of a heart connected to a cardiac pacing means. 4,791,936, Cl. 128-697.000.  
Snuttjer, Owen R.: See—  
Gonzalez, Avelino J.; Steinebronn, Kurt H.; Rasinski, Michael J.; and Snuttjer, Owen R., 4,792,911, Cl. 364-551.020.  
Snyder, Thomas S.; and Murray, Alexander P., to Westinghouse Electric Corp. Electrolytic decontamination apparatus and encapsulation process. 4,792,385, Cl. 204-140.000.  
Sobolev, Igor, to Kaiser Aluminum & Chemical Corporation. Catalyst and process for 1,1,1,2-tetrafluoroethane by vapor phase reaction. 4,792,643, Cl. 570-168.000.  
Soehnlein, Dieter; Neuboerl, Josef; and Hoffman, Armin, to Hilti Aktiengesellschaft. Composite ejecting piston with chamber. 4,792,065, Cl. 222-387.000.  
Solberg, Arne L.: See—  
Haei, Paul K.; Meguro, Jun-ichi; Stark, William A.; and Solberg, Arne L., 4,792,373, Cl. 156-497.000.  
Soma, Giovanni: See—  
Messina, Giuseppe; Moretti, Mario D.; Sanna, Salvatore R.; Soma, Giovanni; and Cabras, Pier G., 4,792,637, Cl. 568-626.000.  
Sones, Richard A.; and Lauro, Karen L., to Picker International, Inc. Adaptive filter for dual energy radiographic imaging. 4,792,900, Cl. 364-413.230.  
Sony Corporation: See—  
Fukuzawa, Keiji; Ito, Fumihiko; and Tsurumaru, Shinobu, 4,792,810, Cl. 343-778.000.  
Tsuase, Yoichi; and Goto, Koichi, 4,792,862, Cl. 358-330.000.  
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Southridge Corporation: See—  
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Sovia, John F.; Smith, Robert M.; and Bramhall, George H., to Royal Appliance Manufacturing Co. Hand vacuum cleaner. 4,791,699, Cl. 15-344.000.  
Spalding, Donald R.: See—  
Schubring, Herbert H.; Spalding, Donald R.; and Pollart, Kenneth A., 4,792,487, Cl. 428-342.000.  
Specht, Dieter, to Interroll Fordertechnik GmbH & Co. KG. Method and apparatus for documentless order picking of goods. 4,792,273, Cl. 414-786.000.  
Spector, George: See—  
Ackerman, Archie W.; and Spector, George, 4,792,883, Cl. 362-102.000.  
Spectra-Physics, Inc.: See—  
Cherry, Craig D.; and Howard, P. Guy, 4,792,666, Cl. 235-466.000.  
Sherwood, Gregory J., 4,792,198, Cl. 350-6.700.  
Spectrum Electronics, Inc.: See—  
Mayo, Scott T., 4,792,946, Cl. 370-86.000.  
Speiser, Jeffrey M.; Whitehouse, Harper J.; and McKnight, William H., to United States of America, Navy. Wide dynamic range analog-to-digital converter using linear prediction. 4,792,787, Cl. 341-156.000.  
Spencer, R. Wilson. Sample injection means. 4,791,821, Cl. 73-864.740.  
Spies, Alfons, to Dr. Johannes Heidenhain GmbH. Photoelectric angle measuring device. 4,792,678, Cl. 250-231.0SE.  
Spirax Sarco Limited: See—  
Dewhurst, Keith, 4,792,090, Cl. 236-56.000.  
Splett, Vincent E.: See—  
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Staalnd, Torbjrn: See—  
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Stabilus GmbH: See—  
Kortgen, Bernd, 4,792,127, Cl. 267-64.150.  
Stacey, Martyn H.: See—  
Taylor, Michael D.; Stacey, Martyn H.; Kenworthy, Jeffrey S.; and Boffey, Stuart S., 4,792,478, Cl. 428-221.000.  
Staggs, Darrell W.; Stine, Laurence O.; and Chen, Te-Yu M., to UOP Inc. Combination process for the conversion of a distillate hydrocarbon to produce middle distillate product. 4,792,390, Cl. 208-50.000.  
Stainer, Philip J.: See—  
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Stambrook, Peter J.; and Tlachfield, Jay A., to University of Cincinnati; and Medical College of Georgia Research Institute. Methods and kits for identifying mutagenic agents and molecular mutations in DNA in mammalian cells. 4,792,520, Cl. 435-6.000.  
Stamicarbon B.V.: See—  
Bongers, Jozef J. M.; and Van Geenen, Albert A., 4,792,540, Cl. 502-167.000.  
Stanadyne, Inc.: See—  
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Standard Elektrik Lorenz A.G.: See—  
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Oswald, Norman D.; Franklin, Carl M.; Gutzler, Marc H.; and Mankey, Harry S., 4,792,272, Cl. 414-458.000.  
Stanley Electric Co., Ltd.: See—  
Akiyama, Ryoichi, 4,792,857, Cl. 358-236.000.  
Stark, John H.: See—  
Straub, Paul W.; Stark, John H.; and Vermot, Michel, 4,792,284, Cl. 417-77.000.  
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Stastny, Georg: See—  
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Su, Kai C.; Stebbins, Leslie F.; and Bhatia, Rajkumar P., 4,792,414, Cl. 252-174.170.  
Steele, Howard R.: See—  
Hatfield, Richard, Jr.; Steele, Howard R.; and Shah, Nirad N., 4,792,624, Cl. 564-333.000.  
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Stell, Donald: See—  
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Stelter, Norbert; and Wuest, Rainer, to Dr. h.c.f. Ing. Porsche AG. Arrangement for the control of the force-transmission of a four-wheel drive vehicle. 4,792,011, Cl. 180-233.000.  
SteroGraphics Corporation: See—  
Lipton, Lenny; Berman, Arthur; Meyer, Lawrence D.; and Ferguson, James L., 4,792,850, Cl. 358-92.000.  
Stevance, Jean: See—  
Mamodaly, Narquise; and Stevance, Jean, 4,792,769, Cl. 331-96.000.  
Stevens, Michael C. Tonneau cover attaching system. 4,792,179, Cl. 296-100.000.  
Stewart, G. Wayne; Davis, Bill E.; Thomas, William M.; Dobie, Michael J.; and Bacigalupe, Carlos, to Stewart Systems, Inc. Air circulation and exhaust control system for commercial ovens. 4,792,303, Cl. 432-72.000.  
Stewart, Kenneth W., Sr., to United Technologies Electro Systems, Inc. Electrical contact and terminal assembly. 4,792,307, Cl. 439-26.000.  
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Stewart, G. Wayne; Davis, Bill E.; Thomas, William M.; Dobie, Michael J.; and Bacigalupe, Carlos, 4,792,303, Cl. 432-72.000.  
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Stim Lab, Inc.: See—  
Penny, Glenn S., 4,791,822, Cl. 73-865.600.  
Stine, Laurence O.: See—  
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Stitt, Robert M., II: See—  
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Stokes, Vijay K., to General Electric Company. Rotor having magnets with enclosing shells. 4,792,712, Cl. 310-156.000.  
Stoner, Eugene M., to Ares, Inc. Gun for firing telescoped ammunition. 4,791,851, Cl. 89-156.000.  
Stori, Oreste, to Sio S.p.A.-Societa' per L'industria Dell'Ossigeno e di Altri Gas. Oxygen moistening apparatus provided with a flow rate adjusting and metering device. 4,792,421, Cl. 261-122.000.  
Stork Brabant B.V.: See—  
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Stover, Gary L., to Economy Label Sales Co., Inc. Tractor feed plant labels. 4,791,742, Cl. 40-299.000.  
Strack, Helmut; and Herberg, Helmut, to Siemens Aktiengesellschaft. Semiconductor power circuit breaker structure obviating secondary breakdown. 4,792,839, Cl. 357-38.000.  
Straub, Paul W.; Stark, John H.; and Vermot, Michel. Device for creating and exploiting a pressure difference and the technical application thereof. 4,792,284, Cl. 417-77.000.  
Strawdase, Inc.: See—  
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Streckel, Willi: See—  
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Strittmatter, Donald J.: See—  
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Stumpe, Louis A.: See—  
Trimm, Joe R.; and Stumpe, Louis A., 4,792,349, Cl. 71-31.000.



Struyvenberg, Paulinus F., to De Rotterdamse Droogdok Maatschappij. Free-piston motor with hydraulic or pneumatic energy transmission. 4,791,786, Cl. 60-595.000.

Su-Hung Capsule Co., Ltd.: See—  
Kim, Myung K., 4,792,451, Cl. 424-453.000.

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Nakao, Yukimichi; Kaeriyama, Kyoji; Suda, Yoshio; Imai, Tomoyuki; Oze, Osamu; and Horiishi, Nanao, 4,792,645, Cl. 174-126.400.

Sudintas, Antanas L.: See—  
Fedaravichius, Algimantas J.; Sudintas, Antanas L.; Kondratiev, Vladimir S.; and Ragulakis, Kazimeras M., 4,791,720, Cl. 29-737.000.

Suemitsu, Sadao: See—  
Mitsubishi Jukogyo Kabushiki Kaisha. Rotary joint for stationary siphon. 4,792,164, Cl. 283-134.000.

Suetsugu, Katsuyoshi: See—  
Takao, Shoji; Yamashita, Hideo; Suetsugu, Katsuyoshi; Toyama, Yasunori; and Sasaki, Kazuki, 4,792,573, Cl. 521-157.000.

Suga, Michiharu; Ishikawa, Hideo; Akana, Yoshinori; Yoshitake, Junichi; and Kondoh, Masayuki, to Mitsui Petrochemical Industries, Ltd. Polyethylene composition. 4,792,588, Cl. 523-240.000.

Suga, Nagachi; Mori, Taro; and Sasho, Yoshio, to Suga Test Instruments Co., Ltd. Artificial snow wetting apparatus. 4,792,093, Cl. 239-14.200.

Suga Test Instruments Co., Ltd.: See—  
Suga, Nagachi; Mori, Taro; and Sasho, Yoshio, 4,792,093, Cl. 239-14.200.

Suganuma, Yasushi: See—  
Okumura, Shinichiro; and Suganuma, Yasushi, 4,792,020, Cl. 188-18.00A.

Sugawara, Hideo: See—  
Obba, Yasuo; Ishikawa, Masayuki; Yamamoto, Motoyuki; Watanabe, Yukio; and Sugawara, Hideo, 4,792,958, Cl. 372-45.000.

Sugg, Basil R.: See—  
Lindsay-Scott, David; Sykes, Malcolm K.; Sugg, Basil R.; and Tyrrell, Paul J., 4,791,922, Cl. 128-205.280.

Sugihara, Masahiro: See—  
Kobayashi, Norihide; Kimura, Tadaaki; Inaba, Tsutomu; and Sugihara, Masahiro, 4,792,296, Cl. 418-55.000.

Sugihara, Yasuo: See—  
Togo, Shinzo; Sugihara, Yasuo; and Ikebe, Takaki, 4,792,403, Cl. 210-692.000.

Sugimoto, Shigeo: See—  
Hatada, Tochio; Ouchi, Tomihisa; Kunugi, Yoshifumi; Sugimoto, Shigeo; and Kaneko, Junichi, 4,791,984, Cl. 165-151.000.

Suman, Michael J.; and Meraman, Wesley D., to Prince Corporation. Illuminated vanity mirror visor. 4,792,884, Cl. 362-135.000.

Sumioka, Atsushi: See—  
Hikita, Mitsutaka; Sumioka, Atsushi; Ishida, Yoshikazu; Hamada, Kunihiko; Chiba, Yutaka; and Abe, Yoshio, 4,792,939, Cl. 370-24.000.

Sumitomo Chemical Company, Ltd.: See—  
Nagano, Eiki; Haga, Toru; Sato, Ryo; and Morita, Kouichi, 4,792,605, Cl. 544-105.000.

Saegusa, Takeo; Horikawa, Jiro; Niwano, Masahiro; and Kanazawa, Takenobu, 4,792,603, Cl. 540-451.000.

Sumitomo Heavy Industries, Ltd.: See—  
Manabe, Tsuguchi; and Takase, Kohei, 4,791,798, Cl. 72-202.000.

Sumitomo Rubber Industries, Ltd.: See—  
Yamaguchi, Tetsuo; and Iwanaga, Takeshi, 4,792,140, Cl. 273-173.000.

Sumitomo Special Metals Co., Ltd.: See—  
Sagawa, Masato; Fujimura, Setsuo; and Matsuura, Yutaka, 4,792,368, Cl. 148-302.000.

Sun, Kwok K., to Dow Chemical Company, The. Novel meta-phenylene-diamine. 4,792,623, Cl. 564-315.000.

Sundstrand Corporation: See—  
Lundquist, Mark S., 4,792,321, Cl. 464-35.000.

Sundstrand Data Control, Inc.: See—  
Grove, Michael M., 4,792,799, Cl. 340-970.000.

Sunkara, Sai P.; Rhinehart, Barry L.; and Liu, Paul S., to Merrell Dow Pharmaceuticals Inc. Castanospermine for inhibiting tumor metastasis. 4,792,558, Cl. 514-299.000.

Superior Electric Company, The: See—  
Smith, Robert C.; and Horst, Gary E., 4,792,709, Cl. 310-49.00R.

Sutherland, James F.: See—  
Cather, Robert L.; and Sutherland, James F., 4,792,880, Cl. 361-426.000.

Sutton, Manning O.: See—  
Lobb, Kenneth G.; Schmerbeck, Timothy J.; Schuelke, Brian A.; and Sutton, Manning O., 4,792,704, Cl. 307-264.000.

Suwabe, Yasui: See—  
Hattori, Shin; Takai, Makoto; Wakabayashi, Toshio; Suwabe, Yasui; and Miyasaka, Syozo, 4,792,553, Cl. 514-255.000.

Suzuki, Akihiro: See—  
Suzuki, Makoto; and Suzuki, Akihiro, 4,792,201, Cl. 350-96.140.

Suzuki, Hirotsuke; and Kobayashi, Satoru, to Junkosha Co., Ltd. Cooler for human tissue for use during hyperthermia treatment against cancer. 4,791,930, Cl. 128-399.000.

Suzuki, Hiroyuki; Shirosaki, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazumasa; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yasushi; Ohta, Sakae; and Aoi, Hajime, to Hitachi, Ltd. Magnetic recording media for longitudinal recording. 4,792,497, Cl. 428-336.000.

Suzuki, Makoto; and Suzuki, Akihiro, to Brother Kogyo Kabushiki Kaisha. Optical deflector device. 4,792,201, Cl. 350-96.140.

Suzuki, Masaharu: See—  
Nahida, Katsuhiko; Shindo, Mansanari; Suzuki, Masaharu; and Kondo, Masamichi, 4,792,931, Cl. 367-149.000.

Suzuki, Mitiharu: See—  
Hamada, Hiroshi; Watanabe, Takamitsu; and Suzuki, Mitiharu, 4,792,239, Cl. 383-22.000.

Suzuki, Shoichi: See—  
Tachi, Kazuyuki; Okuda, Chikaaki; Yamada, Katsunori; Oyama, Yoichi; and Suzuki, Shoichi, 4,792,094, Cl. 239-106.000.

Suzuki, Takaaki, to Fuji Photo Optical Co., Ltd. Optical device for copying machine with inversion of principal point of optical system. 4,792,826, Cl. 355-8.000.

Suzuki, Tsutomu, to Pioneer Electronic Corporation. Optical recording/reproducing apparatus having disk lifetime estimating device. 4,792,933, Cl. 369-32.000.

Suzuki, Yoshihumi: See—  
Sakaida, Atsuo; Suzuki, Yoshihumi; and Kato, Shigeki, 4,792,247, Cl. 400-124.000.

Suzuki, Yuji: See—  
Yamanaka, Shoji; Hattori, Makoto; and Suzuki, Yuji, 4,792,539, Cl. 501-144.000.

Svagerko, Daniel E. Building blocks. 4,792,319, Cl. 446-104.000.

Svensson, E. Gunnar, to Autopart Sweden AB. Sun visor for a vehicle side window. 4,792,177, Cl. 296-152.000.

Swagelok Quick Connect Co.: See—  
Medvick, Richard J., 4,792,162, Cl. 285-45.000.

Swartz, Barry. Lipotomy cannula. 4,792,327, Cl. 604-22.000.

Swartz, Louis D.: See—  
Wicker, Guy; Swartz, Louis D.; O'Donnell, Daniel H.; Healip, John A.; Cannella, Vincent D.; Prache, Olivier; McCormick-Goodhart, Mark H.; and Barnes, Marvin C., 4,792,859, Cl. 358-294.000.

Swedo, Raymond J.; and Zupancic, Joseph J., to Allied-Signal Inc. Desalination of saline water. 4,792,404, Cl. 210-654.000.

Swithers, Robert A.: See—  
Hangen, Joaquin J.; Swithers, Robert A.; Whelpley, William A.; and Lee, Fred S., 4,792,948, Cl. 370-95.000.

Sykes, Malcolm K.: See—  
Lindsay-Scott, David; Sykes, Malcolm K.; Sugg, Basil R.; and Tyrrell, Paul J., 4,791,922, Cl. 128-205.280.

Syotec (U.S.A.) Inc.: See—  
Cooper, Gary F.; Fried, John H.; and Waterbury, L. David, 4,792,617, Cl. 560-53.000.

Murthy, D. V. K.; Venuti, Michael C.; and Young, John M., 4,792,556, Cl. 514-256.000.

Nelson, Peter H.; Unger, Stefan H.; and Thieme, Thomas R., 4,792,551, Cl. 514-651.000.

Nelson, Peter H.; Dunn, James P.; Unger, Stefan H.; and Thieme, Thomas R., 4,792,570, Cl. 514-651.000.

Walker, Keith A. M.; Bruno, John J.; and Martinez, Gregory R., 4,792,561, Cl. 514-312.000.

Syoji, Masao: See—  
Akiyama, Kazuhiro; Koda, Takao; Syoji, Masao; Yoshida, Toshio; and Hirai, Masayoshi, 4,792,822, Cl. 354-403.000.

Syrop, Alan N.: See—  
Wood, John D.; Ware, Jason R.; and Syrop, Alan N., 4,792,047, Cl. 264-138.000.

Syston Electronic Systems Inc.: See—  
Shapiro, Sol, 4,792,032, Cl. 194-243.000.

Szonyi, Zoltan: See—  
Nagy, Gabor; Szonyi, Zoltan; Mityok, Lajos; Pragay, Istvan; and Zambo, Jozsef, 4,792,126, Cl. 266-270.000.

T & N Materials Research Limited: See—  
Atkinson, Alan; Dearden, Kathryn; and Lancaster, Janet, 4,792,491, Cl. 428-408.000.

Tachi, Kazuyuki; Okuda, Chikaaki; Yamada, Katsunori; Oyama, Yoichi; and Suzuki, Shoichi, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Rotating spraying type coating apparatus. 4,792,094, Cl. 239-106.000.

Tachi-S Co.: See—  
Taguchi, Katsumi, 4,792,111, Cl. 249-83.000.

Tadokoro, Toyohiko: See—  
Nagasaki, Yoichi; Nagamoto, Itsushi; Tadokoro, Toyohiko; and Fujimura, Masaki, 4,792,139, Cl. 273-167.00H.

Taguchi, Katsumi, to Tachi-S Co. Forming die for forming a vehicle seat foam cushion member with a pile-type fastener. 4,792,111, Cl. 249-83.000.

Taguchi, Masaaki: See—  
Harada, Takamasa; Taguchi, Masaaki; Shimoda, Sadaaki; and Ito, Koukichi, 4,792,211, Cl. 350-341.000.

Taguchi, Michio: See—  
Hirano, Takashi; and Taguchi, Michio, 4,792,003, Cl. 177-25.140.

Taisei Kako Co., Ltd.: See—  
Nisida, Hirotsuka, 4,792,061, Cl. 222-107.000.

Taiha, Akira; Kawabata, Takeo; Kakimoto, Takehiko; and Hirata, Kazumasa, to Nippon Gosei Kagaku Kogyo Kabushiki Kaisha. Process for preparing aminoacetaldehyde dialkyl acetals. 4,792,630, Cl. 564-474.000.

Takagaki, Hiromitsu: See—  
Saito, Takehi; and Takagaki, Hiromitsu, 4,792,825, Cl. 355-300.000.

Takagawa, Seiichi: See—  
Kitagaki, Hiroshi; Takagawa, Seiichi; and Shinagawa, Katuma, 4,792,662, Cl. 219-545.000.

Takahashi, Akira; Shimamura, Yoshiyuki; Kobayashi, Hide; Okonogi, Shigeo; Kawashima, Takuji; and Igarashi, Minoru, to Morinaga Milk Industry Co., Ltd. Composition of amino acids. 4,792,549, Cl. 514-400.000.

Takahashi, Akira: See—  
Murakami, Yoshiteru; Takahashi, Akira; Fujii, Yoshikazu; Katayama, Hiroyuki; and Ohta, Kenji, 4,792,474, Cl. 428-64.000.

Takahashi, Hisao: See—  
Endou, Yasuaki; Takahashi, Hisao; and Kon, Tetsuaki, 4,792,682, Cl. 250-338.300.

Takahashi, Kiaburo, to Alps Electric Co., Ltd. Sliding operation type electric part. 4,792,780, Cl. 338-202.000.

Takahashi, Kiyohachi. Device for controlling concentration and temperature of flux. 4,792,078, Cl. 228-8.000.

Takahashi, Kouji, to Kabushiki Kaisha Sankyo Seiki Seisakusho. Method for assembling a magnetic head. 4,791,718, Cl. 29-603.000.

Takahashi, Shigeo, to Aisin Seiki Kabushiki Kaisha. Cam device for pressure regulating valve. 4,791,827, Cl. 74-567.000.

Takahashi, Tetsuo; Miyasuchi, Eisaku; Yoshida, Masayuki; Kumagai, Shunichi; and Sasaki, Akio, to TDK Corporation. Chip-type resistor. 4,792,781, Cl. 338-307.000.

Takahashi, Yasuhiro; and Hiya, Kunio, to Hitachi, Ltd. Time-division multiplexing communication system for performing a plurality of communications having different data speeds. 4,792,944, Cl. 370-84.000.

Takahashi, Yoshio; and Yoshizawa, Hiroyuki, to Akebono Brake Industry Co., Ltd. Anti-skid control system for motor vehicles. 4,792,193, Cl. 303-100.000.

Takai, Makoto: See—  
Hattori, Shin; Takai, Makoto; Wakabayashi, Toshio; Suwabe, Yasui; and Miyasaka, Syozo, 4,792,553, Cl. 514-255.000.

Takamatsu, Hisashi; Takeuchi, Hisaharu; and Shiroyanagi, Yoshiro, to Hitachi, Ltd. Control apparatus for simultaneous data transfer. 4,792,917, Cl. 364-900.000.

Takami, Hideyuki: See—  
Saito, Masahiro; Takami, Hideyuki; Sato, Makoto; and Kiso, Masayuki, 4,792,469, Cl. 427-443.100.

Takano, Masao: See—  
Kanno, Hiroshi; Endo, Toshio; Miyakawa, Keiichi; and Takano, Masao, 4,791,866, Cl. 101-118.000.

Takao, Shoji; Yamashita, Hideo; Suetsugu, Katsuyoshi; Toyama, Yasunori; and Sasaki, Kazuki, to Imperial Chemical Industries PLC. Method for manufacturing polyurethane foam. 4,792,575, Cl. 521-157.000.

Takaoki, Kiyoshi: See—  
Tsuiji, Hitoshi; Kato, Tiharu; and Takaoki, Kiyoshi, 4,792,534, Cl. 437-229.000.

Takase, Kohei: See—  
Manabe, Tsuguchi; and Takase, Kohei, 4,791,798, Cl. 72-202.000.

Takashima, Masanobu; Satomura, Masato; Iwakura, Ken; and Igarashi, Akira, to Fuji Photo Film Co., Ltd. Recording material. 4,792,542, Cl. 503-208.000.

Takayama, Makoto: See—  
Yamaguchi, Youichi; and Takayama, Makoto, 4,792,853, Cl. 358-153.000.

Takebayashi, Hiroaki: See—  
Yamashita, Yuko; Masumoto, Yuji; Kimura, Takao; Nishida, Katsutoshi; Inoue, Koichi; Rokkaku, Kazuo; and Takebayashi, Hiroaki, 4,792,244, Cl. 384-492.000.

Takeda, Kenichi; and Kagiura, Kazuo, to Canon Kabushiki Kaisha. Dry-type developing apparatus with elastic sheet. 4,792,831, Cl. 355-3.0DD.

Takei, Katsumori: See—  
Taniguchi, Makoto; Hayashi, Seiichi; Takei, Katsumori; and Fukushima, Hitoshi, 4,792,495, Cl. 428-484.000.

Takenaka, Shigeo; Kamohara, Eiichi; and Nishimura, Takashi, to Kabushiki Kaisha Toshiba. Color cathode ray tube. 4,792,720, Cl. 313-409.000.

Takeuchi, Hisaharu: See—  
Takamatsu, Hisashi; Takeuchi, Hisaharu; and Shiroyanagi, Yoshiro, 4,792,917, Cl. 364-900.000.

Takeuchi, Masamichi; and Nakajima, Junichi, to Koyo Seiko Co., Ltd. Bearing. 4,792,243, Cl. 384-486.000.

Takigawa, Tetsuo: See—  
Nakagawa, Naohi; Takigawa, Tetsuo; Kageyu, Akira; Shimamura, Michiya; Okada, Masafumi; and Mizuno, Masao, 4,792,615, Cl. 558-144.000.

Takita, Yoshisuke: See—  
Hayashi, Yasuhide; Matsue, Kouki; and Takita, Yoshisuke, 4,792,838, Cl. 357-38.000.

Takiyasu, Yoshihiro; and Wada, Kenichi, to Hitachi, Ltd. Method of multi-address communication. 4,792,947, Cl. 370-86.000.

Tallafus, Ottmar. Method for preserving fruits and vegetables. 4,792,455, Cl. 426-316.000.

Tallman, Peter H., to International Business Machines Corp. Instruction processing in higher level virtual machines by a real machine. 4,792,895, Cl. 364-200.000.

Tampa G Manufacturing Co.: See—  
Gerber, Curtis E., 4,792,175, Cl. 296-79.000.

Tampo-Tool, Inc.: See—  
Gaszle, Reinhard, 4,792,292, Cl. 417-440.000.

Tamura, Hiroshi; and Sagala, Djuniadi A., to Murata Manufacturing Co., Ltd. Dielectric ceramic composition for high frequencies. 4,792,537, Cl. 501-118.000.

Tamura, Masayuki: See—  
Matsuo, Masashi; and Tamura, Masayuki, 4,792,354, Cl. 106-2.000.

Tanabe, Ken: See—  
Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshiro; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiro; Tanabe, Ken; and Tanaka, Hidetoshi, 4,792,828, Cl. 355-14.00R.

Tanaka, Hidetoshi: See—  
Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshiro; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiro; Tanabe, Ken; and Tanaka, Hidetoshi, 4,792,828, Cl. 355-14.00R.

Tanaka, Kanji: See—  
Ogata, Takashi; Kato, Masanori; Kawasumi, Yoshio; Tominaga, Chikara; and Tanaka, Kanji, 4,792,369, Cl. 148-404.000.

Tanaka, Ryuichi: See—  
Morimoto, Hideyuki; and Tanaka, Ryuichi, 4,792,023, Cl. 188-353.000.

Tanaka, Toshihiro: See—  
Abe, Shuji; Tanaka, Toshihiro; Hayashi, Nobuhiro; Zaizen, Katsunori; and Ueno, Seiichi, 4,792,345, Cl. 55-210.000.

Tanaka, Yoshinori: See—  
Shimotori, Hitoshi; Ishii, Tutomu; Yamazaki, Hideo; Kuwatsuka, Toshiaki; Yanase, Yuji; and Tanaka, Yoshinori, 4,792,565, Cl. 514-406.000.

Tandy Corporation: See—  
Cook, Randall W.; and Clark, Bryan K., 4,792,876, Cl. 360-128.000.

Tang, David Y.: See—  
Bieron, Joseph F.; and Tang, David Y., 4,792,618, Cl. 560-127.000.

Tanguay, William P.; and McCrink, James, to Seatt Corporation. Smoke detector having variable level sensitivity. 4,792,797, Cl. 340-628.000.

Taniguchi, Harusige; and Taniguchi, Kyoko. Device for automatic rinsing of private parts after defecation and/or urination of physically disabled persons. 4,791,686, Cl. 4-448.000.

Taniguchi, Hideki: See—  
Yokota, Yukinaga; Sawamoto, Yuzi; Taniguchi, Hideki; and Okabe, Kazuhiko, 4,792,622, Cl. 564-398.000.

Taniguchi, Kyoko: See—  
Taniguchi, Harusige; and Taniguchi, Kyoko, 4,791,686, Cl. 4-448.000.

Taniguchi, Makoto; Hayashi, Seiichi; Takei, Katsumori; and Fukushima, Hitoshi, to Seiko Epson Corporation. Fusible ink sheet. 4,792,495, Cl. 428-484.000.

Taniguchi, Nobuyuki: See—  
Norita, Toshio; Taniguchi, Nobuyuki; Ishida, Tokuji; Karasaki, Toshihiko; and Hamada, Masataka, 4,792,820, Cl. 354-402.000.

Tank, Wolfgang, to Oy Wartsila Ab. Method of discharging sewage by vacuum and control apparatus for carrying the method into effect. 4,791,949, Cl. 137-1.000.

Tashiro, Shozo: See—  
Yamamoto, Michinori; Tashiro, Shozo; Sakane, Satoshi; Morita, Toshiro; Shiota, Hiroshi; Rokkaku, Tadashi; and Katayama, Keiichi, 4,791,830, Cl. 74-603.000.

Tashiro, Yoshio, to Olympus Optical Co., Ltd. Endoscope. 4,791,912, Cl. 128-4.000.

Tate, John E., to Southridge Corporation. Apparatus for forming yarn transfer tails. 4,792,104, Cl. 242-18.0PW.

Taylor, Lawrence H. Panel construction. 4,791,773, Cl. 52-790.000.

Taylor, Michael D.; Stacey, Martyn H.; Kenworthy, Jeffrey S.; and Boffey, Stuart S., to Imperial Chemical Industries PLC. Inorganic oxide fibres and their production. 4,792,478, Cl. 428-221.000.

Taylor, Paul A. Container formed from flat sheet of foam plastic. 4,792,046, Cl. 206-523.000.

TBL Development Corporation: See—  
Towns, Edward J.; Brown, Edward M.; and Lester, William M., 4,792,053, Cl. 215-250.000.

TDK Corporation: See—  
Takahashi, Tetsuo; Miyauchi, Eisaku; Yoshida, Masayuki; Kumagai, Shunichi; and Sasaki, Akio, 4,792,781, Cl. 338-307.000.

Teague, Richard M.: See—  
Annas, Dulin L., Sr.; and Teague, Richard M., 4,792,121, Cl. 254-95.000.

Tecumseh Products Company: See—  
von Kaler, Roland L., 4,791,825, Cl. 74-371.000.

Tektronix, Inc.: See—  
Penny, Bruce J., 4,792,846, Cl. 358-17.000.

Telcelon Corporation: See—  
McCalley, Karl W.; Wilson, Steven D.; and Fischer, James L., 4,792,849, Cl. 358-86.000.

Telecommunications Radioelectriques et Telephoniques T.R.T.: See—  
Mary, Luc; and Barazesh, Bahman, 4,792,892, Cl. 364-200.000.



- Teledyne Industries, Inc.: See—  
Yan, Raymond C., 4,792,750, Cl. 323-315.000.
- Telfunkon Electronic GmbH: See—  
Rinderle, Heinz, 4,792,992, Cl. 455-239.000.
- Tennessee Valley Authority: See—  
Trimm, Joe R.; and Stumpe, Louis A., 4,792,349, Cl. 71-31.000.
- Tepic, Slobodan, to Laboratorium fur Experimentelle Chirurgie, Forschungsinstitut. Self-locking stemmed component for a joint endo-prosthesis. 4,792,339, Cl. 623-23.000.
- Terada, Katsunori: See—  
Masaki, Yuichi; Kakimoto, Seiji; Terada, Katsunori; and Sekimura, Nobuyuki, 4,792,671, Cl. 250-211.00R.
- Teradyne, Inc.: See—  
Bowlers, William J.; and Ferland, Michael R., 4,792,932, Cl. 368-113.000.
- Terumo Kabushiki Kaisha: See—  
Hattori, Shin; Takai, Makoto; Wakabayashi, Toshio; Suwabe, Yasu; and Miyaoka, Syozo, 4,792,553, Cl. 514-255.000.
- Tetra Pak International AB: See—  
Nantini, Hans; and Ohlsson, Ingemar, 4,792,069, Cl. 222-527.000.
- Tews, Richard R., to Kimberly-Clark Corporation. Rapidly disintegrating paper tubes. 4,792,326, Cl. 604-11.000.
- Texas Instruments Incorporated: See—  
Ovens, Kevin M.; and Strong, Bobby D., 4,792,706, Cl. 307-455.000.
- Rohe, Alan D.; and Kennedy, Robert M., III, 4,792,378, Cl. 156-643.000.
- Sacarian, Stephen P.; Blankenship, Gene E.; Shah, Rajiv R.; Tran, Toan; Myers, David J.; Lin, Johnson J.; and Thompson, Steve, 4,792,835, Cl. 357-23.600.
- Schroeder, James E., 4,792,747, Cl. 323-303.000.
- Texstyrene Plastics, Inc.: See—  
White, Thomas B.; and Uebelhart, James J., 4,792,572, Cl. 521-57.000.
- Textron Inc.: See—  
Gassen, James, 4,792,286, Cl. 417-234.000.
- Th. Goldschmidt AG: See—  
Ruf, Erich, 4,792,494, Cl. 428-426.000.
- Thangavelu, Kandasamy: See—  
Bittar, Joseph; and Thangavelu, Kandasamy, 4,792,019, Cl. 187-125.000.
- Thantrey, Shok: See—  
Hudson, John C.; Thantrey, Shok; and Jackson, Ian M., 4,791,785, Cl. 60-303.000.
- Theodor Groz & Sohne & Ernst Beckert Nadelfabrik Commandit-Gesellschaft: See—  
Schmoll, Wolfgang, 4,791,794, Cl. 66-121.000.
- Thermo-O-Type Corporation: See—  
Van Pelt, Christopher K., 4,792,246, Cl. 400-120.000.
- Thiel, Rudolf, to Alfred Teves GmbH. Brake disc arrangement for an internally straddling disc brake, in particular for automotive vehicles. 4,792,022, Cl. 188-218.00X.
- Thieme, Thomas R.: See—  
Nelson, Peter H.; Unger, Stefan H.; and Thieme, Thomas R., 4,792,551, Cl. 514-651.000.
- Nelson, Peter H.; Dunn, James P.; Unger, Stefan H.; and Thieme, Thomas R., 4,792,570, Cl. 514-651.000.
- Thomas A. Schutz & Co.: See—  
Skalaki, John S., 4,791,744, Cl. 40-451.000.
- Thomas, David M.; Burt, Rodney T.; and Stitt, Robert M., II, to Burr-Brown Corporation. Two-terminal temperature-compensated current source circuit. 4,792,748, Cl. 323-312.000.
- Thomas, Paul H. Garage door opener heater. 4,792,659, Cl. 219-201.000.
- Thomas, Robert E. Caddy luggage. 4,792,025, Cl. 190-18.00A.
- Thomas, Wilbur R.: See—  
Marchetti, Joseph R.; deceased; Hickman, Fred E., III; and Thomas, Wilbur R., 4,792,479, Cl. 428-236.000.
- Thomas, William M.: See—  
Stewart, G. Wayne; Davis, Bill E.; Thomas, William M.; Dobie, Michael J.; and Bacigalupo, Carlos, 4,792,303, Cl. 432-72.000.
- Thompson, David A.: See—  
Grestorex, Anthony T.; Robbins, Joseph; Toon, Ernest A.; and Thompson, David A., 4,792,426, Cl. 264-284.000.
- Thompson, Steve: See—  
Sacarian, Stephen P.; Blankenship, Gene E.; Shah, Rajiv R.; Tran, Toan; Myers, David J.; Lin, Johnson J.; and Thompson, Steve, 4,792,835, Cl. 357-23.600.
- Thomson-Brandt Arements: See—  
Fraud, Michel; and Donnard, Rene, 4,791,852, Cl. 89-40.020.
- Thomson-CGR: See—  
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- Thomson-CSF: See—  
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- Dartois, Luc; Roulet, Andre; and Riboni, Raymond, 4,792,914, Cl. 364-607.000.
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- William J.; Thomson, Robert; Whipple, Julie; and Weitman, Steven D., 4,792,449, Cl. 424-440.000.
- Thornhill Glass & Mirror Inc.: See—  
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- Thornton, Dennis P., to General Motors Corporation. Electric motor armature current control circuit. 4,792,877, Cl. 361-24.000.
- Tiernan, Martin J., to Drum Parts, Inc. Drum and closure apparatus. 4,792,056, Cl. 220-320.000.
- Tiggesbaumker, Peter: See—  
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- Tilidetzke, Steven J.: See—  
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- Tilman, Paul A.: See—  
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- Timmins, Peter: See—  
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- Toxide Group PLC: See—  
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- Tipton, Craig D.: See—  
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- Tischfield, Jay A.: See—  
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- Tittzer, Gabriel; and Junghans, Ewald, to Iteratom GmbH. Electro-magnetic-hydraulic valve drive for internal combustion engines. 4,791,895, Cl. 123-90.120.
- TLV Co., Ltd.: See—  
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- TMC Corporation: See—  
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- Tobita, Youichi, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory circuit with control of bit line voltage balancing. 4,792,928, Cl. 365-210.000.
- Tobler, William E.: See—  
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- Toda Kogy Corp.: See—  
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- Togo, Shizuo; Sugihara, Yasuo; and Ikebe, Takaki, to Mitsubishi Gas Chemical Company, Inc. Method of removing organic impurities from aqueous solution of hydrogen peroxide. 4,792,403, Cl. 210-692.000.
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- Tokyo Automatic Machinery Works, Ltd.: See—  
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- Tokyo Seat Corporation Limited: See—  
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- Tonomura, Shoichiro: See—  
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- Toray Industries, Inc.: See—  
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- Torio Electronics Co., Ltd.: See—  
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- Tosoh Corporation: See—  
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- Toussaint, Hans N.; and Goerne, Jan, to Siemens Aktiengesellschaft. Receiver for optical digital signals with dark current compensation. 4,792,997, Cl. 455-619.000.
- Toussaint, Hans-Norbert, to Siemens Aktiengesellschaft. Receiver for optical digital signals having different amplitudes. 4,792,998, Cl. 455-619.000.
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- Towns, Edward J.; Brown, Edward M.; and Lester, William M., to TBL Development Corporation. Tamper-indicating capped container with angularly movable line. 4,792,053, Cl. 215-250.000.
- Townsend, Garnold: See—  
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- Toyo Engineering Corporation: See—  
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- Trimm, Joe R.; and Stumpe, Louis A., to Tennessee Valley Authority. Fertilizer values from galvanizer waste. 4,792,349, Cl. 71-31.000.
- Trocciola, John C.; and VanDine, Leslie L., to International Fuel Cells Corporation. Apparatus for producing nitrogen. 4,792,502, Cl. 429-19.000.
- Truex, Todd A.; and Fulk, Clyde W., Jr., to Koch Membrane Systems, Inc. Spiral wound membrane module and method of manufacture and use. 4,792,401, Cl. 210-644.000.
- Trujillo, Manuel A., to Hughes Aircraft Company. Method and apparatus for manufacturing slow-wave structures for traveling-wave tubes. 4,792,654, Cl. 219-69.00V.
- Trutzschler GmbH & Co. KG: See—  
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- Tsuchida, Masaaki: See—  
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- Tumeo, A. Ray, to Starke Electronics, Inc. Antenna coupling amplifier and converter system. 4,792,987, Cl. 455-131.000.
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- Uchida, Yukimasa, to Kabushiki Kaisha Toshiba. Semiconductor memory device with buried layer under groove capacitor. 4,792,834, Cl. 357-23.600.
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- Uemura, Hiroki, to Pioneer Electronic Corporation. Selective viewing control system for CATV. 4,792,971, Cl. 380-7.000.
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- Usui, Masayoshi, to Usui Kokusai Sangyo Kaisha, Ltd. Structure for connecting ends of exhaust pipes. 4,792,161, Cl. 285-45.000.
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- Vahatalo, Harri, to Valmet Paper Machinery Inc. System for controlling the nip pressure profile in a roll press. 4,791,863, Cl. 100-35.000.
- Vail, William B., III, and Schwinberg, Paul B., to ParaMagnetic Logging, Inc. Oil well logging tools measuring paramagnetic logging effect for use in open boreholes and cased well bores. 4,792,757, Cl. 324-303.000.
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- Van Sickle, Richard G.; and Bour, George, to GTE Valeron Corporation. Dimensioning head for plug gage. 4,791,728, Cl. 33-178.00R.
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- Vehlewald, Peter: See—  
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- Veluz, Serge: See—  
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- Venuti, Michael C.: See—  
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- Verheijen, B.V.: See—  
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- Verhulst, Jozef: See—  
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- Vermot, Michel: See—  
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- Versa Corporation: See—  
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- Verstrate, Gary W.: See—  
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- Vesuvius Crucible Company: See—  
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- Vetco Gray Inc.: See—  
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- Video Research Limited: See—  
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- Vignotto, Angelo: See—  
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- Vilaine, Jean-Paul: See—  
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- Villemot, Jean-Pierre: See—  
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- Vitale, Ralph F., to Endura Tape, Inc. Self adhesive wallboard tape. 4,792,473, Cl. 428-40.000.
- Vitetta, Ellen S.: See—  
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- Vitriol, William A.: See—  
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- Voeit-Alpine Aktiengesellschaft: See—  
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- Voeit-Alpine Friedmann Gesellschaft M.B.H.: See—  
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- Volk, Jack R.; and Duszkievich, Alan J., to Ford Motor Company. Multiplex wiring system. 4,792,950, Cl. 371-8.000.
- Von Hasselbach, Christoph. Femoral-neck implant. 4,791,918, Cl. 128-924.00K.
- von Kaler, Roland L., to Tecumseh Products Company. Transaxle. 4,791,825, Cl. 74-371.000.
- von Ohain, Hans P.: See—  
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- von Seebach, Michael: See—  
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- Vyas, Dolatrai M.: See—  
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- W. L. Gore & Associates, Inc.: See—  
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- W. R. Grace & Co.: See—  
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- Wacker-Chemie GmbH: See—  
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- Rengstl, Alfred; and Schmidhuber, Andrea, 4,792,591, Cl. 525-477.000.
- Wada, Kenichi: See—  
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- Wada, Tsuyoshi, to Matsushita Seiko Co., Ltd. Multiple push-button switch arrangement. 4,792,649, Cl. 200-5.00E.
- Wade, James H. Leak detection system. 4,791,806, Cl. 73-40.700.
- Wagner, Rodney D.: See—  
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- Wagstaff, Henry C., III. Combination motorcycle cover and rain gear with storage pouch. 4,792,040, Cl. 206-223.000.
- Wakabayashi, Toshio: See—  
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- Waldau, Eckart: See—  
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- Walker, Dorothy H., executrix: See—  
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- Walker, Heinz; and Riedel, Hans-Dieter, to Siemens Aktiengesellschaft. Noncontact electronic switching arrangement. 4,792,764, Cl. 328-5.000.
- Walker, Keith A. M.; Bruno, John J.; and Martinez, Gregory R., to Syntex (U.S.A.) Inc. Carbostyryl derivatives as combined thromboxane synthetase and cyclic-AMP phosphodiesterase inhibitors. 4,792,561, Cl. 514-312.000.
- Walker, Robert G.: See—  
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- Walker, Robert R., deceased: See—  
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- Walser, Donald C.; and Clarke, Michael R. Veneer lathes having veneer thickness sensor and thickness control. 4,791,970, Cl. 144-213.000.
- Walsh, Arthur T.: See—  
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- Walsh, Peter, to Duro-Test Corporation. Energy-efficient electric discharge lamp with reflective coating. 4,792,716, Cl. 313-113.000.
- Walsh, Reed H., to Lubrizol Corporation, The. Dioxolanes and thio analogs, derivatives thereof and lubricants and fuels containing same. 4,792,411, Cl. 252-45.000.
- Walter, Jeffrey A.; Garg, Kailash C.; and Rowan, Joseph C., to W. L. Gore & Associates, Inc. Dielectric waveguide having higher order mode suppression filters. 4,792,774, Cl. 333-251.000.
- Walters, Paul W.: See—  
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- Wand Tool Company: See—  
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- Wang, Chiao-Ming, to Meiko Pet Corporation. Air pump assembly for a fish bowl. 4,792,293, Cl. 417-571.000.
- Wang, Ko Pen. Transendoscopic needle. 4,791,937, Cl. 128-752.000.
- Wang Laboratories, Inc.: See—  
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- Wang, Shou-I; Patel, Nitin M.; Sircar, Shivaji; and Allam, Rodney J., to Air Products and Chemicals, Inc. Ammonia synthesis. 4,792,441, Cl. 423-359.000.
- Ward, William. Proportionate rocker balance. 4,792,002, Cl. 177-200.000.
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- Warhurst, Peter: See—  
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- Waring, John S., III; and Pluff, Gary E. Buckle-proof clamshell container. 4,792,085, Cl. 229-114.000.
- Warken, Karl-Heinz: See—  
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- Filomeno, Vito G., 4,792,443, Cl. 424-62.000.
- Warner, Robert J., to Kearney & Trecker Corporation. Carriage for a machine tool. 4,792,267, Cl. 409-235.000.
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- Warner, William T.: See—  
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- Warning Lites of Illinois, Inc.: See—  
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- Watakabe, Yaichiro; and Matsuda, Shuichi, to Mitsubishi Denki Kabushiki Kaisha. Method of forming a photomask material. 4,792,461, Cl. 427-38.000.
- Watanabe, Akihiro; Nozaki, Hiroshi; and Okamoto, Mitsuharu, to NGK Insulators, Ltd. Suspension insulator. 4,792,647, Cl. 174-182.000.
- Watanabe, Fumio; and Itoh, Yoshikazu, to Video Research Limited. Apparatus for detecting recorded data in a video tape recorder for audience rating purposes. 4,792,864, Cl. 358-335.000.
- Watanabe, Hiatsugu, to Kabushiki Kaisha Kito. Stepless speed change electric chain block. 4,792,734, Cl. 318-269.000.
- Watanabe, Noboru: See—  
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- Watanabe, Takamitsu: See—  
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- Watanabe, Yukio: See—  
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- Waterhouse, Paul I.: See—  
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- Waterloo, Ronald L.: See—  
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- Watkins, Joseph J.: See—  
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- Waxing Corporation of America, Inc.: See—  
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- Weidman, Craig C., to Weatherchem Corporation. Tamper-evident closure for dispensers. 4,792,054, Cl. 222-23.000.
- Weinkle, Louis A.: See—  
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- Weinkle, Steven G.; and Weinkle, Louis A., to Pizza Enterprises, Inc. Pizza dispenser and bake unit. 4,791,861, Cl. 99-357.000.
- Weinrib, Harry P., to Eddy Pump Corporation. Pump construction. 4,792,275, Cl. 415-53.00R.
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- Weitman, Steven D.: See—  
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- Wells, Joel R.; and Pees, James M., to General Motors Corporation. Modular piston with high strength tensile joint and method of manufacture. 4,791,712, Cl. 29-156.50R.
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- Western/Scott Fetzer Company: See—  
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- Westinghouse Electric Corp.: See—  
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- Gonzalez, Avelino J.; Steinebronn, Kurt H.; Rasinski, Michael J.; and Snuttjer, Owen R., 4,792,911, Cl. 364-551.020.
- Kramer, Arthur W.; and Mickus, Vytautas J., 4,791,801, Cl. 72-387.000.
- Marchetti, Joseph R., deceased; Hickman, Fred E., III; and Thomas, Wilbur R., 4,792,479, Cl. 428-236.000.
- Moyes, Hilary, 4,792,505, Cl. 429-219.000.
- Snyder, Thomas S.; and Murray, Alexander P., 4,792,385, Cl. 204-140.000.
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- Wheeler, Thomas R.: See—  
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- Whelpley, William A.: See—  
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- Whipple, Julie: See—  
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- Whitaker, Ronald O. Friction drive belt composed of two cables and a plurality of spacers. 4,792,324, Cl. 474-237.000.
- White, Ambrose. Reciprocating piston engine. 4,791,894, Cl. 123-90.160.
- White, Thomas B.; and Uebelhart, James J., to Textstyrene Plastics, Inc. Novel particulate expandable styrene polymers having short minimum molding times and method for preparing same. 4,792,572, Cl. 521-57.000.
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- Whiting, James C., to Facet Enterprises, Incorporated. Pressure differential bypass sensor switch with magnetic thermal lockout. 4,792,651, Cl. 200-82.00E.
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- Whittemore, Dwight S.: See—  
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- Whittle, Alan J., to Imperial Chemical Industries PLC. Insecticidal ethers. 4,792,563, Cl. 514-345.000.
- Wicker, Guy; Swartz, Louis D.; O'Donnell, Daniel H.; Heap, John A.; Cannella, Vincent D.; Prache, Olivier; McCormick-Goodhart, Mark H.; and Barnes, Marvin C., to Ovonic Imaging Systems, Inc. Digitizing wand adapted for manual and automatic operation. 4,792,859, Cl. 358-294.000.
- Wickholm, David R.; and Strittmatter, Donald J., to Hughes Aircraft Company. Optical magnifying system: 10 x loupe. 4,792,214, Cl. 350-410.000.
- Wiener, Harold; Vandel, Shmuel; and Sasson, Yoel, to Yissum Research Development Company. Process for the reduction of organic compounds using alkali formate salts. 4,792,625, Cl. 564-416.000.
- Wiening, Wolfgang; Hoffmann, Ulrich; and Rake, Heinrich, to Trutzschler GmbH & Co. KG. Method and apparatus for evening the silver produced by a card. 4,791,706, Cl. 19-105.000.
- Wieschhoff, Reinhard; Rinne, Andreas; and Pagany, Hubertus, to Blaupunkt-Werke GmbH. Method of controlling temperature in push-pull audio output circuits and temperature control circuit. 4,792,766, Cl. 330-298.000.
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- Williams, David J.: See—  
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- Williams, Peter C.: See—  
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- Williams, Robert A. Voltage detector apparatus. 4,791,823, Cl. 74-10.800.
- Williamson, Gaylord L. Enclosed animal litter box. 4,792,082, Cl. 229-103.000.
- Williamson, Stephen, to National Research Development Corporation. Construction of electrical machines. 4,792,710, Cl. 310-90.500.
- Willis, Lawrence E. Rotary finishing tool. 4,792,266, Cl. 409-182.000.
- Willis, William I., to McGean-Rohco, Inc. Polymer compositions and alkaline zinc electroplating baths and processes. 4,792,383, Cl. 204-55.300.
- Wilowaki, Robert F. Remote control system for pull-cords. 4,792,798, Cl. 340-696.000.
- Wilson, Harold R.; and Belka, Allen B., to Haworth, Inc. Work surface with power and communication module. 4,792,881, Cl. 361-428.000.
- Wilson, James F., to Duke University. Fluid actuated limb. 4,792,173, Cl. 294-119.300.
- Wilson, Jerome L. Injection molding apparatus. 4,792,297, Cl. 425-192.00R.
- Wilson, John J. Automatic self-cooling device for beverage containers. 4,791,789, Cl. 62-293.000.
- Wilson, Ronald E., to Deutz-Allis Corporation. Corn head gear box. 4,791,778, Cl. 56-106.000.
- Wilson, Steven D.: See—  
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- Windor Manufacturing Ltd.: See—  
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- Winegeart, Mitchell E.: See—  
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- Winnington, Terence L.; and Eames, Ian W., to Caradon Mira Limited. Boiler with rotatable heat exchanger. 4,791,887, Cl. 122-11.000.
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- Winternitz, Paul; and Zurluh, Rene, to Hoffmann-La Roche Inc. Diaryl ethers. 4,792,616, Cl. 560-21.000.
- Wise, Lawrence D.: See—  
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- Wise, Sean: See—  
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- Wissing, Robin F. Mechanics creeper. 4,792,147, Cl. 280-32.600.
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- Witzenmann GmbH Metallschlauch-fabrik Pforzheim: See—  
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- Wojtkowiak, Leonard S., to Retrofit Specialties, Inc. Gap setting tool for oil burner igniter electrodes. 4,791,734, Cl. 33-652.000.
- Wojtkowski, Paul W., to Du Pont de Nemours, E. I., and Company. Preparation of ortho-(alkyl- or arylthio)phenols. 4,792,633, Cl. 568-46.000.
- Wolfram, L. J.: See—  
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- Wong, Hing C.; and Chang, Shing, to Cetus Corporation. 3'Expression enhancing fragments and method. 4,792,523, Cl. 435-68.000.
- Wood, John D.; Ware, Jason R.; and Syrop, Alan N., to Devro, Inc. Process of forming an end closure. 4,792,047, Cl. 264-138.000.
- Wright, Douglas W., to Emhart Industries, Inc. Straight line shear. 4,791,845, Cl. 83-150.000.
- Wrightson NMA Limited: See—  
Platten, Conrad M., 4,792,254, Cl. 403-48.000.
- Wu, Jeng-Shyong. Electrical plug and socket having replaceable over-current protection device with safety latch means. 4,792,311, Cl. 439-622.000.
- Wu, Ray J.: See—  
Narang, Saran A.; and Wu, Ray J., 4,792,602, Cl. 536-27.000.
- Wuepper, Thomas E.; and Franklyn, Terry L., to CMI International, Inc. Process of flaskless sand casting. 4,791,975, Cl. 164-29.000.
- Wuest, Rainer: See—  
Stelter, Norbert; and Wuest, Rainer, 4,792,011, Cl. 180-233.000.
- Wyberg, Gregory R., to Minnesota Mining and Manufacturing Company. Gable-top container. 4,792,048, Cl. 206-631.300.
- Wynn, Gerald E., to James Hardie Irrigation, Inc. Co-extruded tube. 4,791,965, Cl. 138-146.000.
- Wynn Oil Company: See—  
Miles, Gerald; Labus, Rainer H.; and Grebe, James R., 4,791,890, Cl. 123-41.140.
- Xerox Corporation: See—  
Gruber, Robert J.; and Nelson, Robert A., 4,792,513, Cl. 430-110.000.
- Kazmaier, Peter M.; Burt, Richard A.; Hor, Ah-Mee; and Hsiao, Cheng-Kuo, 4,792,508, Cl. 430-59.000.
- Lang, Joseph H.; McEwen, David J.; and Meyer, John J., 4,792,680, Cl. 250-325.000.
- Schwarz, William M., Jr., 4,791,959, Cl. 137-561.00A.
- Serlet, Bertrand P., 4,792,909, Cl. 364-491.000.
- Yamada, Katsunori: See—  
Tachi, Kazuyuki; Okuda, Chikashi; Yamada, Katsunori; Oyama, Yoichi; and Suzuki, Shoichi, 4,792,094, Cl. 239-106.000.
- Yamada, Kenzo: See—  
Ozeki, Akichika; Yamada, Kenzo; and Iwasaki, Katsuhiro, 4,792,352, Cl. 75-59.220.
- Yamada, Koji: See—  
Kimura, Tohiro; Okuno, Giichi; Moritsu, Yukikazu; and Yamada, Koji, 4,792,358, Cl. 106-84.000.
- Yamada, Michihiro: See—  
Miyamoto, Hiroshi; and Yamada, Michihiro, 4,792,927, Cl. 365-189.000.
- Yamada, Tetsusyo: See—  
Ishihara, Tohiyuki; Kamiya, Takeshi; Nakayama, Yutaka; and Yamada, Tetsusyo, 4,792,387, Cl. 204-425.000.
- Yamagishi, Youichi; and Takayama, Makoto, to Canon Kabushiki Kaisha. Video signal processing devices. 4,792,853, Cl. 358-153.000.
- Yamaguchi, Atsushi; and Hasegawa, Shinichi, to Nikon Corporation. Step-and-repeat exposure method. 4,792,693, Cl. 250-548.000.
- Yamaguchi, Hiroshi; Kimura, Suzushi; and Hayashi, Yoshitake, to Matsushita Electric Industrial Co., Ltd. Cyclically driven gyro and adjusting system therefor. 4,791,815, Cl. 73-505.000.
- Yamaguchi, Kouji: See—  
Ishikawa, Yoshikazu; and Yamaguchi, Kouji, 4,791,902, Cl. 123-399.000.
- Yamaguchi, Tetsuo; and Iwanaga, Takeshi, to Sumitomo Rubber Industries, Ltd. Iron type golf club head. 4,792,140, Cl. 273-173.000.
- Yamaha Corporation: See—  
Nagasaki, Yoichi; Nagamoto, Itsushi; Tadokoro, Toyohiko; and Fujimura, Masaki, 4,792,139, Cl. 273-167.00H.
- Yamakawa, Masami. Photoelectric sensor. 4,792,685, Cl. 250-353.000.
- Yamamoto, Isamu: See—  
Ishida, Masaharu; and Yamamoto, Isamu, 4,791,910, Cl. 126-450.000.
- Yamamoto, Kazuhiko; Nobuhara, Kenji; Mizuno, Hodaka; and Yanagawa, Atsuko, to Japan Synthetic Rubber Co., Ltd. Thermoplastic resin composition. 4,792,585, Cl. 525-67.000.
- Yamamoto, Masashi: See—  
Enoguchi, Yuji; Yamamoto, Masashi; and Natsuhara, Toshiya, 4,791,882, Cl. 118-653.000.
- Yamamoto, Michinori; Tashiro, Shozo; Sakane, Satoshi; Morita, Toshiro; Shiota, Hiroshi; Rokkaku, Tadaaki; and Katayama, Keiichi, to Mitsubishi Jukogyo Kabushiki Kaisha. Balancer of reciprocating machine. 4,791,830, Cl. 74-603.000.
- Yamamoto, Motoyuki: See—  
Ohba, Yasuo; Ishikawa, Masayuki; Yamamoto, Motoyuki; Watanabe, Yukio; and Sugawara, Hideto, 4,792,958, Cl. 372-45.000.
- Yamamoto, Nobuyuki; Nishikawa, Isamu; and Honmura, Osamu, to Nippon Gohsei Kagaku Kogyo Kabushiki Kaisha. Heat sensitive recording material. 4,792,544, Cl. 503-216.000.
- Yamamoto, Osamu: See—  
Miyachi, Nobuyuki; Hayashi, Hiroshi; Yamamoto, Osamu; and Yamamoto, Saburo, 4,792,962, Cl. 372-94.000.
- Yamamoto, Saburo; Hayashi, Hiroshi; Morimoto, Taiji; and Yano, Seiki, to Sharp Kabushiki Kaisha. Semiconductor laser. 4,792,960, Cl. 372-46.000.
- Yamamoto, Saburo: See—  
Miyachi, Nobuyuki; Hayashi, Hiroshi; Yamamoto, Osamu; and Yamamoto, Saburo, 4,792,962, Cl. 372-94.000.
- Yamamoto, Yasuyoshi: See—  
Ozawa, Takashi; Yamamoto, Yasuyoshi; Ohashi, Masashi; Kimura, Akiyoshi; Sasaki, Nobukazu; Kasamura, Toshiro; Kubota, Atsushi; Shiratori, Tatsuya; Kusumoto, Toshihiko; Koike, Michiro; Tanabe, Ken; and Tanaka, Hidetoshi, 4,792,828, Cl. 355-14.00R.
- Yamamoto, Yoshiharu: See—  
Nakajima, Yasuo; Yamamoto, Yoshiharu; and Nagaoka, Yoshitomi, 4,792,218, Cl. 350-432.000.
- Yamanaka, Shoji; Hattori, Makoto; and Suzuki, Yuji, to Kao Corporation. Process for producing clay derivatives having a porous structure and novel clay derivatives obtained by the process. 4,792,539, Cl. 501-144.000.
- Yamashita, Hideo: See—  
Takao, Shoji; Yamashita, Hideo; Suetsugu, Katsuyoshi; Toyama, Yasunori; and Sasaki, Kazuki, 4,792,575, Cl. 521-157.000.
- Yamashita, Yoko; Masumoto, Yuji; Kimura, Takao; Nishida, Katsutoshi; Inoue, Koichi; Rokkaku, Kazuo; and Takebayashi, Hiroaki, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha; Kabushiki Kaisha Toshiba; and Koyo Seiko Kabushiki Kaisha. Ceramic bearing construction. 4,792,244, Cl. 384-492.000.
- Yamato Scale Company, Limited: See—  
Hirano, Takashi; and Taguchi, Michio, 4,792,003, Cl. 177-25.140.
- Yamazaki, Etsuo; and Matsuura, Hitoshi, to Fanuc Ltd. Machine position sensing device. 4,792,738, Cl. 318-630.000.
- Yamazaki, Hideo: See—  
Shimotori, Hitoshi; Ishii, Tutomu; Yamazaki, Hideo; Kuwatsuka, Toshiaki; Yanase, Yuji; and Tanaka, Yoshinori, 4,792,565, Cl. 514-406.000.
- Yan, Raymond C., to Teledyne Industries, Inc. Resistorless, precision current source. 4,792,750, Cl. 323-315.000.
- Yanagawa, Atsuko: See—  
Yamamoto, Kazuhiko; Nobuhara, Kenji; Mizuno, Hodaka; and Yanagawa, Atsuko, 4,792,585, Cl. 525-67.000.
- Yanase, Yuji: See—  
Shimotori, Hitoshi; Ishii, Tutomu; Yamazaki, Hideo; Kuwatsuka, Toshiaki; Yanase, Yuji; and Tanaka, Yoshinori, 4,792,565, Cl. 514-406.000.
- Yang, Minyang: See—  
Kramer, Bruce M.; Dombrowaki, David M.; Gonseth, Dennis; Yang, Minyang; and Kohler, Stephen P., 4,792,353, Cl. 75-235.000.
- Yano, Hitoshi: See—  
Yoshizawa, Ryo; Kawashima, Masatoshi; and Yano, Hitoshi, 4,792,607, Cl. 544-310.000.
- Yano, Seiki: See—  
Yamamoto, Saburo; Hayashi, Hiroshi; Morimoto, Taiji; and Yano, Seiki, 4,792,960, Cl. 372-46.000.
- Yano, John A., Jr.; Odlyzko, Paul; Ashok, Erramilli; and Hsiung, Hsiaoou, to ITT Corporation. Data subsystem traffic control apparatus and method. 4,792,941, Cl. 370-58.000.
- Yassur, Zion. Drinking tubes and covers for beverage containers and beverage containers incorporating the same. 4,792,083, Cl. 229-103.100.
- Yasuda, Yutaka: See—  
Fukasawa, Junichi; Yasuda, Yutaka; Sato, Yuji; and Shida, Jun, 4,792,444, Cl. 424-63.000.
- Yasue, Hideki: See—  
Morisawa, Kunio; Yasue, Hideki; Fukumura, Kagenori; Yoshizawa, Kenichi; and Nakamura, Yasunari, 4,792,012, Cl. 180-247.000.
- Yasui, Hideo; Miki, Yasuhiro; and Okada, Wataru, to Kanagafuchi Kagaku Kogyo Kabushiki Kaisha. Compacted agglomerates of polymer latex particles. 4,792,490, Cl. 428-407.000.
- Yasui Seiki Co., Ltd.: See—  
Iwasaki, Takashi, 4,791,881, Cl. 118-244.000.
- Yasui, Tadashi: See—  
Sakai, Yasuharu; Segawa, Shinichi; and Yasui, Tadashi, 4,791,833, Cl. 74-769.000.
- Yasumoto, Hiromi, to Junkosha Co., Ltd. Adaptor for effecting a tight bend in a coaxial cable. 4,792,312, Cl. 439-640.000.

- Yazaki Corporation: See—  
Ishida, Masaharu; and Yamamoto, Isamu, 4,791,910, Cl. 126-450.000.  
Matsumuro, Yoshiaki, 4,792,789, Cl. 340-384.00E.  
Tongu, Shinji, 4,791,790, Cl. 62-476.000.
- Yin, Huan B.; and Valade, Norbert, to Radiall Industrie. Ferrule of a connector for single-mode optical fibers with polarization maintenance and the process for its adjustment. 4,792,205, Cl. 350-96.200.
- Yissum Research Development Company: See—  
Wiener, Harold; Vandel, Shmuel; and Sasson, Yoel, 4,792,625, Cl. 564-416.000.
- Yodhida, Toshio: See—  
Akiyama, Kazuhiro; Koda, Takao; Syoji, Masao; Yodhida, Toshio; and Hirai, Masayoshi, 4,792,822, Cl. 354-403.000.
- Yokota, Yukinaga; Sawamoto, Yuzi; Taniguchi, Hideki; and Okabe, Kazuhiko, to Kao Corporation. Process for preparation of secondary amine. 4,792,622, Cl. 564-398.000.
- Yokoyama, Ikuo: See—  
Kominami, Naoya; Yokoyama, Ikuo; and Shimanuki, Yuzi, 4,791,956, Cl. 137-503.000.
- Yokoyama, Natsuki: See—  
Honma, Yoshio; Tsunekawa, Sukeyoshi; Yokoyama, Natsuki; and Morisaki, Hiroshi, 4,792,842, Cl. 357-71.000.
- Yokoyama, Tomoaki: See—  
Oka, Tateki; Toyoshi, Naoki; and Yokoyama, Tomoaki, 4,792,775, Cl. 355-77.000.
- Yoneda, Yoshihiro: See—  
Kakiuchi, Hiroshi; Fukuhara, Setsuo; Fujiwara, Michinobu; Maeda, Hiroshi; Shirakashi, Yutaka; Yoneda, Yoshihiro; Noda, Tetsuo; Fujita, Naoyuki; and Asakura, Osamu, 4,792,489, Cl. 428-400.000.
- Yoneyama, Sigeo: See—  
Igaki, Masanori; Yoneyama, Sigeo; Hori, Yoshimichi; and Satoh, Takayuki, 4,792,318, Cl. 445-66.000.
- Yoneyama, Yoshihisa; and Iwasaki, Yasuo, to Pola Kasei Kogyo Kabushiki Kaisha. Continuous dispersion apparatus having multi-step dispersion chambers. 4,792,238, Cl. 366-307.000.
- Yonezawa, Keitaro, to Kabushiki Kaisha KOSMEK. Knockout device for punching a work plate in a press-machine. 4,791,844, Cl. 83-133.000.
- Yoshida, Atsushi, to NEC Corporation. Adaptive jitter canceller having sinusoidal accentuator and jitter prediction filter. 4,792,964, Cl. 375-118.000.
- Yoshida, Kakuo, to Itoki Co., Ltd. Automatic rental safe-depositing box system. 4,792,270, Cl. 414-273.000.
- Yoshida, Kazuetsu: See—  
Suzuki, Hiroyuki; Shiroishi, Yoshihiro; Hishiyama, Sadao; Ohno, Tomoyuki; Yoshida, Kazuetsu; Kojima, Shyuichi; Funamoto, Susumu; Kitazaki, Yasushi; Ohta, Sakae; and Aoi, Hajime, 4,792,497, Cl. 428-336.000.
- Yoshida, Masaji, to Victor Company of Japan, Ltd. Noise reducing circuit for video signal. 4,792,855, Cl. 358-167.000.
- Yoshida, Masayuki: See—  
Takahashi, Tetsuo; Miyauchi, Eisaku; Yoshida, Masayuki; Kumagai, Shunichi; and Sasaki, Akio, 4,792,781, Cl. 338-307.000.
- Yoshihara, Tohiyuki; Hiro, Masaaki; and Kimura, Tomohiro, to Canou Kabushiki Kaisha. Electrophotographic member with surface layer having fluorine resin powder and fluorine graft polymer. 4,792,507, Cl. 430-58.000.
- Yoshioka, Takayuki, to Pioneer Electronic Corporation. Projection lens system. 4,792,217, Cl. 350-432.000.
- Yoshioka, Teruo; Nakano, Shoji; and Sato, Yutaka, to Honda Giken Kogyo Kabushiki Kaisha. Process for assembling a fly wheel and an ignition coil to an engine using an assembling jig. 4,791,714, Cl. 29-156.40R.
- Yoshitake, Junichi: See—  
Suga, Michiharu; Ishikawa, Hideo; Akana, Yoshinori; Yoshitake, Junichi; and Kondoh, Masayuki, 4,792,588, Cl. 525-240.000.
- Yoshizawa, Akihiko, to Olympus Optical Co., Ltd. Apparatus for measuring the refractive index of a substrate for an optical recording medium and method of measuring the same. 4,792,227, Cl. 356-128.000.
- Yoshizawa, Hiroyuki: See—  
Takahashi, Yoshio; and Yoshizawa, Hiroyuki, 4,792,193, Cl. 303-100.000.
- Yoshizawa, Kenichi: See—  
Morisawa, Kunio; Yasue, Hideki; Fukumura, Kagenori; Yoshizawa, Kenichi; and Nakamura, Yasunari, 4,792,012, Cl. 180-247.000.
- Yoshizawa, Ryo; Kawashima, Masatoshi; and Yano, Hitooshi, to Chisso Corporation. 5-fluoro-3,4-dihydro-2,4-dioxo-N-(3-indolyl)-1(2H)-pyrimidinecarboxamides. 4,792,607, Cl. 544-310.000.
- Yotsuue, David S.: See—  
King, Ethmer W.; Yotsuue, David S.; Kircher, Robert C., Jr.; and Radfar, Mohammed R., 4,792,906, Cl. 364-433.000.
- Young, Archie R.: See—  
Ho, Teh C.; Young, Archie R.; Jacobson, Allan J.; and Chianelli, Russell R., 4,792,341, Cl. 502-167.000.
- Young, John M.: See—  
Murthy, D. V. K.; Venuti, Michael C.; and Young, John M., 4,792,556, Cl. 514-256.000.
- Young, Lionel A.: See—  
Lebeck, Alan O.; and Young, Lionel A., 4,792,146, Cl. 277-26.000.
- Young, Lydia J., to Perkin-Elmer Corporation. The Differentially pumped seal apparatus. 4,792,688, Cl. 250-441.100.
- Youngquist, Robert C.: See—  
Shaw, Herbert J.; Youngquist, Robert C.; and Brooks, Janet L., 4,792,207, Cl. 350-96.290.
- Yusko, Edward M., Jr.; and Williams, Peter C., to Whitey Co. Low dead space ring. 4,792,118, Cl. 251-315.000.
- Zaizen, Katsunory: See—  
Abe, Shuji; Tanaka, Toshihiro; Hayashi, Nobuhiro; Zaizen, Katsunory; and Ueno, Seichi, 4,792,345, Cl. 55-210.000.
- Zambo, Jozsef: See—  
Nagy, Gabor; Szonyi, Zoltan; Mityok, Lajos; Pragay, Istvan; and Zambo, Jozsef, 4,792,126, Cl. 266-270.000.
- Zanetti, Guido: See—  
Kompis, Ivan; Rey-Bellet, Gerald; and Zanetti, Guido, 4,792,557, Cl. 514-275.000.
- Zavidovique, Bertrand: See—  
Devos, Francis; Garda, Patrick; and Zavidovique, Bertrand, 4,792,982, Cl. 382-68.000.
- Zazzu, Victor, to GE Solid State Patents, Inc. Orthogonal bipolar transistor. 4,792,837, Cl. 357-35.000.
- Zebco Corporation: See—  
Hlava, Lorens G., 4,792,106, Cl. 242-84.20G.
- Zeicher, Wilfried; and Reinking, Klaus, to Bayer Aktiengesellschaft. Aliphatic-aromatic polyamidimides containing polyamides. 4,792,590, Cl. 525-424.000.
- Zeff, Jack D.; and Leitis, Erika, to Ultrox International. Oxidation of organic compounds in water. 4,792,407, Cl. 210-748.000.
- Zelina, Francis J.: See—  
Olson, Thomas E.; and Zelina, Francis J., 4,792,701, Cl. 307-11.000.
- Zenith Electronics Corporation: See—  
Olson, Anthony M.; and Rajaram, Babu, 4,792,929, Cl. 365-233.000.
- Ziegast, Gerd, to Sandoz Ltd. Poly-dicarboxylic acid anhydrides and polymeric anhydrides therefrom. 4,792,598, Cl. 528-206.000.
- Zijaling, Djurre H., to Shell Oil Company. Rotary drill bit. 4,792,001, Cl. 175-329.000.
- Zimmermann, Werner: See—  
Frohn, Werner; Bohlmann, Dieter; Franke, Hermann; Zimmermann, Werner; Limmer, Heinz; Hopfner, Eberhard; Lindner, Horst; Matthey, Reinhard; Muller, Henner; Poppen, Hans; Schutter, Hartmut; and Dietrich, Detlev, 4,792,389, Cl. 208-76.000.
- Zonneveld, Petrus C. H., to Hoogovens Groep B.V. Sub-lance installation for carrying out measurements and/or taking samples in a metallurgical furnace. 4,792,124, Cl. 266-226.000.
- Zucker, Joseph; Levinson, Frank H.; and Narciso, Ralh A., to Raychem Corp. Bus optical fiber including low mode volume light source optimally aligned. 4,792,202, Cl. 350-96.160.
- Zumbach Electronic AG: See—  
Blandford, Brian, 4,792,695, Cl. 250-560.000.
- Zupancic, Joseph J.: See—  
Swedo, Raymond J.; and Zupancic, Joseph J., 4,792,404, Cl. 210-654.000.
- Zurfluh, Rene: See—  
Winternitz, Paul; and Zurfluh, Rene, 4,792,616, Cl. 560-21.000.
- 501 Kubota, Ltd.: See—  
Kitao, Yuichi; and Inamori, Akio, 4,792,010, Cl. 180-233.000.
- 516277 Ontario Limited: See—  
Maclean, William M.; Agnew, Edward G.; and Madter, Richard C., 4,792,896, Cl. 364-200.000.

## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF DECEMBER, 1988

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- Cummins Engine Company, Inc.: See—  
Kline, Herbert E., Re. 32,802, Cl. 123-65.0VD.
- Deere & Company: See—  
Hille, Hans-Jorg; and Halabiya, Sabah, Re. 32,803, Cl. 192-12.00C.
- Engelmore, Anthony R.; and Nold, William H. Rotatable electrical connector for coiled telephone cord. Re. 32,805, Cl. 439-26.000.
- Halabiya, Sabah: See—  
Hille, Hans-Jorg; and Halabiya, Sabah, Re. 32,803, Cl. 192-12.00C.
- Hille, Hans-Jorg; and Halabiya, Sabah, to Deere & Company. Hydraulic circuit for activating a clutch and a throttle valve used in the circuit. Re. 32,803, Cl. 192-12.00C.
- Kline, Herbert E., to Cummins Engine Company, Inc. Two-cycle engine with improved scavenging. Re. 32,802, Cl. 123-65.0VD.
- Lamb Technicon Corp.: See—  
Mason, Arthur C., Re. 32,804, Cl. 198-774.000.
- Mason, Arthur C., to Lamb Technicon Corp. Workpiece transfer. Re. 32,804, Cl. 198-774.000.
- Nold, William H.: See—  
Engelmore, Anthony R.; and Nold, William H., Re. 32,805, Cl. 439-26.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

- Campore Inc.: See—  
Fitzpatrick, John R., B1 3,820,292, Cl. 52-81.000.
- Combustion Engineering, Inc.: See—  
Musto, Richard L.; and Dunn, Mark R., B1 4,640,464, Cl. 241-34.000.
- Dunn, Mark R.: See—  
Musto, Richard L.; and Dunn, Mark R., B1 4,640,464, Cl. 241-34.000.
- Fitzpatrick, John R., to Campore Inc. Building structure. B1 3,820,292, 12-20-88, Cl. 52-81.000.
- Lear Siegler, Inc.: See—  
Prittie, Robert N., B1 4,166,968, Cl. 310-239.000.
- Musto, Richard L.; and Dunn, Mark R., to Combustion Engineering, Inc. Roller mill control system. B1 4,640,464, 12-20-88, Cl. 241-34.000.
- Prittie, Robert N., to Lear Siegler, Inc. Electrically isolated brush holder. B1 4,166,968, 12-20-88, Cl. 310-239.000.

## LIST OF DESIGN PATENTEEES

- Abbestam, Goran; and Lachonius, Leif, to Aktiebolaget SKF. Rail bolder for conveyors. 299,077, 12-20-88, Cl. D34-29.000.
- Adams Hard-Facing Company, Inc.: See—  
Edmison, Delmar D., 299,032, Cl. D15-29.000.
- Aktiebolaget SKF: See—  
Abbestam, Goran; and Lachonius, Leif, 299,077, Cl. D34-29.000.
- Alcatel USA, Corp.: See—  
Menn, Walter A., 299,030, Cl. D14-101.000.
- Allflex International Limited: See—  
van Amelsfort, Petrus A. B., 299,038, Cl. D20-27.000.
- Antoniou, Anthony J. Golf club head. 299,043, 12-20-88, Cl. D21-217.000.
- Antoniou, Anthony J. Golf club head. 299,044, 12-20-88, Cl. D21-217.000.
- Antoniou, Anthony J. Golf club head. 299,045, 12-20-88, Cl. D21-219.000.
- Arax International Corporation: See—  
Sampey, Harry R., 299,012, Cl. D10-53.000.
- Sampey, Harry R., 299,013, Cl. D10-53.000.
- AVIA Group International, Inc.: See—  
Selbiger, Lawrence, 298,984, Cl. D2-320.000.
- Tong, James K., 298,983, Cl. D2-317.000.
- Axco Products, Inc.: See—  
Emerson, Gary W., 299,002, Cl. D8-308.000.
- Bacon, Roger C. Feeder for cats. 299,073, 12-20-88, Cl. D30-121.000.
- Bankston, Patrick D., to Lightning Bug Products, Inc. Fishing lure. 299,048, 12-20-88, Cl. D22-129.000.
- Barnett, David J., to Ilesso Anstalt Limited. Corkscrew. 299,001, 12-20-88, Cl. D8-42.000.
- Bernabe, Vincent, Jr., to Kidde, Inc. Embossed telescopic crane boom. 299,079, 12-20-88, Cl. D34-36.000.
- Berndt, Dieter R. Infant pacifier with funny face. 299,064, 12-20-88, Cl. D24-46.000.
- Bessie, Joseph C., to Silver Creek Nurseries, Inc. Headphone. 299,025, 12-20-88, Cl. D14-36.000.
- Bosworth, Warren M., Jr., to FTM Corporation. Tennis racquet frame. 299,042, 12-20-88, Cl. D21-212.000.
- Boykiw, Alan P., to Northern Telecom Limited. Telephone handset. 299,027, 12-20-88, Cl. D14-63.000.
- Brun, Michel, to Societe d'Etudes et de Recherches Appliquees S.E.R.A., Sarl. Deodorizer. 299,054, 12-20-88, Cl. D23-368.000.
- Brussing, Bernd, to Hans Friedrich HEFENDEHL. Table clock. 299,011, 12-20-88, Cl. D10-23.000.
- Bunn-O-Matic Corporation: See—  
Van Camp, Raymond E.; and Nidiffer, Charles A., 298,996, Cl. D7-309.000.
- Burnham, Sheila K. Stuffed doll. 299,040, 12-20-88, Cl. D21-171.000.
- Carter, John W., to Wise Co., Inc., The. Adjustable vehicle seat. 298,986, 12-20-88, Cl. D6-356.000.
- Chap, John P., to Selfix, Inc. Shower caddy. 298,990, 12-20-88, Cl. D6-525.000.
- Chrysler Motors Corporation: See—  
McKinnon, David C., 299,019, Cl. D12-184.000.
- Cunningham, Roy D. Fish lure. 299,046, 12-20-88, Cl. D22-128.000.
- Cunningham, Roy D. Fish lure. 299,047, 12-20-88, Cl. D22-128.000.
- Daniels, Joseph T. Aquarium or the like. 299,072, 12-20-88, Cl. D30-101.000.
- Design Institute America, Inc.: See—  
Mulhauser, George C., 298,989, Cl. D6-372.000.
- Divetronic AG: See—  
Hermann, Jurgen, 299,028, Cl. D14-100.000.
- Dr. Ing. h.c.F. Porsche Aktiengesellschaft: See—  
Geffert, Otto; and Stermann, Roland, 298,985, Cl. D6-356.000.
- Durand, Jean-Jacques. Stemmed wine glass or similar article. 298,993, 12-20-88, Cl. D7-12.000.
- Durand, Jean-Jacques. Stemmed wine glass or similar article. 298,994, 12-20-88, Cl. D7-12.000.
- Durand, Jean-Jacques. Stemmed wine glass or similar article. 298,995, 12-20-88, Cl. D7-13.000.
- Edmison, Delmar D., to Adams Hard-Facing Company, Inc. Fertilizer applicator blade shank insert. 299,032, 12-20-88, Cl. D15-29.000.
- Emerson Electric Co.: See—  
Tuggle, Lloyd H.; and Franke, Jeffery S., 299,074, Cl. D32-15.000.



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ISSUED DECEMBER 20, 1988

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	CLASS 7		42.29	4,791,749	447	4,791,802	CLASS 73	230	4,791,868	207.15	4,791,924	360.1	4,792,381
138		4,791,690	44.6	4,791,751	481	4,791,803		232	4,791,869	303 R	4,791,925		
	CLASS 8		54.1	4,791,752						303.1	4,791,926		CLASS 162
103		4,792,341	63	4,791,753	23	4,791,804	CLASS 102	342	4,791,870		4,791,927	7.1	4,791,974
159		4,791,691			40.7	4,791,805				305	4,791,928	29	4,791,975
	CLASS 12		51	4,792,343	49.2	4,791,814	CLASS 104			335.5	4,791,929	58.1	4,791,976
142 P		4,791,692			78	4,791,807		94	4,791,871	399	4,791,930	63	4,791,977
	CLASS 15		29	4,791,754	117.3	4,791,808	CLASS 106	166	4,791,872	419 PG	4,791,931	437	4,791,978
			66	4,791,755	119 A	4,791,809					4,791,932	463	4,791,979
3.17		4,791,693			119 R	4,791,810		2	4,792,354		4,791,933		CLASS 165
97 R		4,791,694			152	4,791,811		14.15	4,792,355		4,791,934	9	4,791,980
160		4,791,695			160	4,791,812		30	4,792,356		4,791,936	22	4,791,981
250.13		4,791,698			379	4,791,813		83	4,792,357		4,791,937	38	4,791,982
250.2		4,791,697			505	4,791,758		84	4,792,358		4,791,938	80.4	4,791,983
250.23		4,791,696						90	4,792,359		4,791,939	151	4,791,984
324		4,791,700			761	4,791,816	CLASS 51	97	4,792,361		4,791,940		CLASS 166
344		4,791,699			861.04	4,791,817					4,791,941	68	4,791,985
	CLASS 16				861.24	4,791,818	CLASS 108				4,791,942	85	4,791,986
94 D		4,791,703			863.21	4,791,820		10	4,791,873		4,791,943		4,791,987
111 R		4,791,701			865.6	4,791,822					4,791,944	285	4,791,988
114 B		4,791,702			865.8	4,791,819	CLASS 74				4,791,945	293	4,791,989
	CLASS 17							162	4,791,874		4,791,946	311	4,791,990
11		4,791,704			10.8	4,791,823		227	4,791,875		4,791,947	319	4,791,991
25		4,791,705			55	4,791,824		241	4,791,876		4,791,948	387	4,791,992
	CLASS 19				371	4,791,825		456	4,791,877		4,791,949		CLASS 169
105		4,791,706			473 R	4,791,826	CLASS 116				4,791,950	16	4,791,993
	CLASS 23				567	4,791,827		173	4,791,878		4,792,363	48	4,791,994
313 R		4,792,342			574	4,791,829	CLASS 118				4,792,364		CLASS 172
	CLASS 24				603	4,791,830		50	4,791,879		4,791,946	21	4,791,995
33 C		4,791,708			606 R	4,791,831		244	4,791,880		4,791,947	47	4,791,996
171		4,791,709			715	4,791,832		653	4,791,882		4,791,882		CLASS 174
587		4,791,710			769	4,791,833	CLASS 119				4,791,948	68.5	4,792,646
633		4,791,711						1	4,791,883		4,791,949	126.4	4,792,647
	CLASS 29							48	4,791,884		4,791,950	182	4,792,648
156.4 R		4,791,714			48	4,791,774	CLASS 75	59.22	4,792,351		4,791,951		CLASS 175
156.5 R		4,791,712			510	4,791,775		235	4,792,352		4,791,952	57	4,791,997
156.8 B		4,791,713			570	4,791,776			4,792,353		4,791,953	61	4,791,998
464		4,791,715			81	4,791,777	CLASS 54				4,791,954	85	4,791,999
520		4,791,716						3.2	4,791,834		4,791,955	228	4,792,000
600		4,791,717					CLASS 55	53.12	4,791,835		4,791,956	329	4,792,001
603		4,791,718			96	4,792,344		57.39	4,791,836		4,791,957		CLASS 177
		4,791,719			210	4,792,345		63.1	4,791,837		4,791,958	25.14	4,792,003
737		4,791,720					CLASS 56	467	4,791,838		4,791,959	141	4,792,004
829		4,791,721			106	4,791,778		479	4,791,839		4,791,960	200	4,792,005
850		4,791,722			202	4,791,779	CLASS 82				4,791,961	229	4,792,006
	CLASS 30				400.04	4,791,780		1 C	4,791,840		4,791,962		CLASS 178
41		4,791,723						4 C	4,791,842		4,791,963	4	4,792,648
89		4,791,724			417	4,791,781	CLASS 57				4,791,964		CLASS 180
154		4,791,725									4,791,965	53.3	4,792,006
228		4,791,726					CLASS 60				4,791,966	140	4,792,007
	CLASS 33				226.1	4,791,782		100	4,791,843		4,791,897	142	4,792,008
178 R		4,791,728			262	4,791,783		133	4,791,844		4,791,898	233	4,792,009
325		4,791,727			303	4,791,784		150	4,791,845		4,791,899		4,792,010
356		4,791,729			395	4,791,785		659	4,791,846		4,791,900		4,792,011
361		4,791,730			605.1	4,791,786	CLASS 84				4,791,901		4,792,012
403		4,791,733						1.21	4,791,847		4,791,902		CLASS 181
528		4,791,731						453	4,791,848		4,791,903	247	4,792,013
578		4,791,732					CLASS 62	458	4,791,849		4,791,904		4,792,014
652		4,791,734			6	4,792,346					4,791,905	242	4,792,015
	CLASS 34				49	4,791,788		8	4,791,850		4,791,906	280	4,792,016
181		4,791,735			55.5	4,791,791	CLASS 89				4,791,907		CLASS 182
	CLASS 36				135	4,791,792		40.02	4,791,852		4,791,908	18	4,792,015
117		4,791,736			293	4,791,789		41.19	4,791,853		4,791,909	104	4,792,016
	CLASS 37				476	4,791,790	CLASS 92	156	4,791,851		4,791,910	204	4,792,017
103		4,791,737						5 R	4,791,854		4,791,911		CLASS 186
116		4,791,738						12.1	4,791,855		4,791,912	61	4,792,018
								24	4,791,856		4,791,913		CLASS 187
								84	4,791,857		4,791,914	125	4,792,019
								98 R	4,791,857		4,791,915		

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## CLASSIFICATION OF PATENTS

CLASS 188		545	4,792,662	4,792,671	CLASS 277		52	4,792,726	770	4,792,809
18 A	4,792,020	549	4,792,663	4,792,672	CLASS 280		169.3	4,792,728	778	4,792,810
79.62	4,792,021	CLASS 228		213 VT	26	4,792,146	176	4,792,727	781 CA	4,792,811
218 XL	4,792,022	94 A	4,792,055	216			200 R	4,792,729	781 P	4,792,813
353	4,792,023	320	4,792,056	227			209 SC	4,792,730	781 R	4,792,812
CLASS 190		CLASS 221		231 GY	32.6	4,792,147	316	4,792,731	786	4,792,814
1	4,792,024	187	4,792,057	231 SE	47.26	4,792,152	334	4,792,732	853	4,792,808
18 A	4,792,025	232	4,792,058	237 G	81 A	4,792,148	386	4,792,733	915	4,792,815
101	4,792,026	CLASS 222		325	231	4,792,149	CLASS 318		CLASS 346	
CLASS 192		23	4,792,054	328.2	275	4,792,150	269	4,792,734	108	4,792,816
0.032	4,792,027	67	4,792,059	338.3	406 A	4,792,151	317	4,792,735	140 R	4,792,817
12 C	Re.32,803	107	4,792,060	341	478 B	4,792,153	338	4,792,736		4,792,818
41 A	4,792,028	347	4,792,061	409	4,792,154		615	4,792,737	CLASS 350	
85 AA	4,792,029	353	4,792,062	615	4,792,155		630	4,792,738		
106.2	4,792,030	363 S	4,792,063	618	4,792,157		661	4,792,739	3.6	4,792,196
CLASS 193		423 R	4,792,064	804	4,792,158		768	4,792,740	3.7	4,792,197
2 R	4,792,031	441.1	4,792,065	816	4,792,159		800	4,792,741	6.7	4,792,198
CLASS 194		458.1	4,792,066	CLASS 285		CLASS 318		96.12	4,792,200	
243	4,792,032	474.1	4,792,067	39	4,792,160	CLASS 320		96.14	4,792,201	
CLASS 196		484.1	4,792,068	45	4,792,161	15	4,792,743	96.16	4,792,202	
357	4,792,033	504 H	4,792,069	548	4,792,162	CLASS 323		96.20		
372	4,792,034	558	4,792,070	560	4,792,164	217	4,792,744	96.21	4,792,203	
463.6	4,792,035	561	4,792,071	577	CLASS 280		269	4,792,745	96.29	4,792,205
619	4,792,036	CLASS 223		CLASS 292		290	4,792,746	96.34	4,792,207	
774	Re.32,804	32 A	4,792,072	55	CLASS 280		303	4,792,747	117	4,792,208
788	4,792,037	202	4,792,073	577	CLASS 292		312	4,792,748	134	4,792,209
CLASS 200		CLASS 226		CLASS 251		19	4,792,749	334	4,792,210	
5 E	4,792,649	149	4,792,074	65	4,792,165	36	4,792,750	341	4,792,211	
50 A	4,792,650	172	4,792,075	129.16	4,792,166	178	4,792,751	347 V	4,792,212	
82 E	4,792,651	175	4,792,076	149.6	4,792,167	305	4,792,752	351	4,792,213	
CLASS 201		CLASS 227		229	4,792,168	CLASS 294		410	4,792,214	
3	4,792,382	19	4,791,707	315	4,792,169	31.2	4,792,170	426	4,792,215	
CLASS 204		81	4,792,077	333	4,792,171	68.3	4,792,171	432	4,792,216	
55.3	4,792,383	CLASS 228		CLASS 252		102.2	4,792,172	463	4,792,218	
98	4,792,384	1.1	4,792,079	8.514	4,792,412	119.3	4,792,173	637	4,792,220	
129	4,792,385	8.6	4,792,078	38	4,792,413	CLASS 296		CLASS 351		
140	4,792,386	45	4,792,080	45	4,792,414	37.12	4,792,174	120	4,792,221	
279	4,792,387	111	4,792,081	111	4,792,415	79	4,792,175	136	4,792,222	
CLASS 206		174.17	4,792,082	308	4,792,416	98	4,792,176	156	4,792,223	
180	4,792,038	369	4,792,083	392	4,792,417	98	4,792,177	163	4,792,224	
223	4,792,040	392	4,792,084	CLASS 254		102	4,792,178	CLASS 354		
304	4,792,039	30	4,792,085	30	4,792,120	28	4,792,179	400	4,792,819	
319	4,792,041	95	4,792,086	95	4,792,121	55	4,792,180	402	4,792,820	
328	4,792,042	CLASS 232		CLASS 256		163	4,792,181	403	4,792,821	
349	4,792,043	68	4,792,122	68	4,792,122	194	4,792,182	446	4,792,822	
394	4,792,044	CLASS 235		CLASS 260		284	4,792,183	CLASS 355		
419	4,792,045	103	4,792,664	412	4,792,418	300	4,792,184	3 BE	4,792,824	
523	4,792,046	105	4,792,665	513 R	4,792,419	349	4,792,185	3 DD	4,792,825	
631.3	4,792,048	488	4,792,667	546	4,792,420	452	4,792,186		4,792,826	
CLASS 208		CLASS 236		CLASS 261		CLASS 299		8	4,792,827	
50	4,792,390	11	4,792,089	122	4,792,421	41	4,792,187	14 C	4,792,828	
76	4,792,389	56	4,792,090	CLASS 264		CLASS 301		14 R	4,792,829	
108	4,792,391	CLASS 237		1.5	4,792,422	37 R	4,792,191	55	4,792,830	
CLASS 209		CLASS 239		3.1	4,792,423	CLASS 303		77	4,792,831	
135	4,792,393	19	4,792,091	102	4,792,424	13	4,792,192	300	4,792,832	
556	4,792,049	CLASS 240		138	4,792,425	100	4,792,193	371	4,792,833	
CLASS 210		CLASS 242		102	4,792,426	116	4,792,194	71	4,792,834	
159	4,792,394	3	4,792,092	252	4,792,427	CLASS 307		128	4,792,835	
198.2	4,792,395	14.2	4,792,093	284	4,792,428	11	4,792,203	138	4,792,836	
314	4,792,396	106	4,792,094	285	4,792,429	14	4,792,204	128	4,792,837	
406	4,792,397	113	4,792,095	CLASS 266		11	4,792,205	128	4,792,838	
484	4,792,398	204	4,792,096	142	4,792,123	112	4,792,206	138	4,792,839	
500.1	4,792,400	338	4,792,097	226	4,792,124	264	4,792,207	345	4,792,840	
644	4,792,401	CLASS 241		266	4,792,125	295 R	4,792,208	345	4,792,841	
651	4,792,402	5	4,792,098	270	4,792,126	CLASS 310		394	4,792,842	
654	4,792,403	30	4,792,099	CLASS 267		12	4,792,209	440	4,792,843	
692	4,792,404	34	B1 4,640,464	64.15	4,792,127	15	4,792,210	CLASS 357		
721	4,792,405	CLASS 242		118	4,792,128	49 R	4,792,211	16	4,792,832	
734	4,792,406	18 PW	4,792,104	CLASS 269		90.5	4,792,212	23.6	4,792,834	
747	4,792,407	25 A	4,792,100	46	4,792,129	114	4,792,213	30	4,792,835	
748	4,792,407	34 R	4,792,101	296	4,792,130	136	4,792,214	35	4,792,836	
CLASS 211		55.34	4,792,102	CLASS 271		217	4,792,215	38	4,792,837	
64	4,792,050	58.1	4,792,103	7	4,792,131	234	4,792,216	38	4,792,838	
184	4,792,051	68.4	4,792,105	186	4,792,132	239	4,792,217	38	4,792,839	
CLASS 212		84.2 G	4,792,106	CLASS 272		316	4,792,218	51	4,792,840	
162	4,792,052	CLASS 244		CLASS 273		245	4,792,219	71	4,792,841	
CLASS 213		115	4,792,107	3	4,792,133	CLASS 312		72	4,792,842	
250	4,792,053	159	4,792,108	69	4,792,134	113	4,792,220	79	4,792,843	
CLASS 219		56	4,792,109	134	4,792,135	399	4,792,221	86	4,792,844	
10.493	4,792,652	651	4,792,110	CLASS 274		405	4,792,222	10	4,792,845	
69 R	4,792,653	CLASS 249		51	4,792,136	409	4,792,223	17	4,792,846	
69 V	4,792,654	138 A	4,792,137	138 A	4,792,137	432	4,792,224	80	4,792,847	
98	4,792,655	157 R	4,792,138	167 H	4,792,138	437	4,792,225	86	4,792,848	
110	4,792,656	173	4,792,139	235 R	4,792,141	503	4,792,226	92	4,792,849	
121.39	4,792,657	235 R	4,792,142	400	4,792,143	39	4,792,227	136	4,792,850	
121.63	4,792,658	411	4,792,144	405	4,792,144	39	4,792,228	153	4,792,851	
201	4,792,659	51	4,792,145	432	4,792,145	CLASS 313			4,792,852	
295	4,792,660	138 A	4,792,146	437	4,792,146	CLASS 314			4,792,853	
301	4,792,661	167 H	4,792,147	442	4,792,147	15	4,792,716		4,792,854	
CLASS 220		173	4,792,148	447	4,792,148	89	4,792,717		4,792,855	
		235 R	4,792,149	452	4,792,149	133	4,792,718		4,792,856	
		411	4,792,150	457	4,792,150	143	4,792,719		4,792,857	
		400	4,792,151	462	4,792,151	156	4,792,720		4,792,858	
		432	4,792,152	467	4,792,152	27	4,792,721		4,792,859	
		447	4,792,153	472	4,792,153	372	4,792,722		4,792,860	
		462	4,792,154	477	4,792,154	465	4,792,723		4,792,861	
		477	4,792,155	482	4,792,155		4,792,724		4,792,862	
		482	4,792,156	487	4,792,156		4,792,725		4,792,863	
		487	4,792,157	492	4,792,157		4,792,726		4,792,864	
		492	4,792,158	497	4,792,158		4,792,727		4,792,865	
		497	4,792,159	502	4,792,159		4,792,728		4,792,866	
		502	4,792,160	507	4,792,160		4,792,729		4,792,867	
		507	4,792,161	512	4,792,161		4,792,730		4,792,868	
		512	4,792,162	517	4,792,162		4,792,731		4,792,869	
		517	4,792,163	522	4,792,163		4,792,732		4,792,870	
		522	4,792,164	527	4,792,164		4,792,733		4,792,871	
		527	4,792,165	532	4,792,165		4,792,734		4,792,872	
		532	4,792,166	537	4,792,166		4,792,735		4,792,873	
		537	4,792,167	542	4,792,167		4,792,736		4,792,874	
		542	4,792,168	547	4,792,168		4,792,737		4,792,875	
		547	4,792,169	552	4,792,169		4,792,738		4,792,876	
		552	4,792,170	557	4,792,170		4,792,739		4,792,877	
		557	4,792,171	562	4,792,171		4,792,740		4,792,878	
		562	4,792,172	567	4,792,172		4,792,741		4,792,879	
		567	4,792,173	572	4,792,173		4,792,742		4,792,880	
		572	4,792,174	577	4,792,174		4,792,743		4,792,881	
		577	4,792,175	582	4					

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300	4,792,860	32.1	4,792,940	237	4,792,265	35.9	4,792,472	CLASS 445	240	4,792,588
313	4,792,861	58	4,792,941	CLASS 409	40	40	4,792,473	23	4,792,589	
330	4,792,862	60	4,792,942	178	4,792,248	137	4,792,474	66	4,792,590	
335	4,792,863	182	4,792,943	235	4,792,266	209	4,792,475	CLASS 446	CLASS 526	
342	4,792,864	216	4,792,944	CLASS 410	221	216	4,792,476	104	4,792,592	
CLASS 360		221	4,792,945	9	4,792,268	236	4,792,477	CLASS 447	CLASS 527	
10.1	4,792,866	221	4,792,946	53	4,792,269	286	4,792,478	32	4,792,593	
13	4,792,867	221	4,792,947	CLASS 414	311.5	288	4,792,479	32	4,792,594	
46	4,792,868	273	4,792,948	440	4,792,270	311.5	4,792,480	32	4,792,595	
69	4,792,869	440	4,792,949	458	4,792,271	323	4,792,481	131	4,792,596	
78.14	4,792,870	458	4,792,950	537	4,792,272	327	4,792,482	162	4,792,597	
85	4,792,871	786	4,792,951	CLASS 415	342	336	4,792,483	195	4,792,598	
96.5	4,792,872	342	4,792,952	33 R	4,792,275	342	4,792,484	210	4,792,599	
99.06	4,792,873	400	4,792,953	118	4,792,276	400	4,792,485	234	4,792,600	
102	4,792,874	160	4,792,954	178	4,792,277	407	4,792,486	239	4,792,601	
104	4,792,875	178	4,792,955	160	4,792,278	408	4,792,487	266	4,792,602	
128	4,792,876	178	4,792,956	178	4,792,279	411.1	4,792,488	344	4,792,603	
CLASS 361		178	4,792,957	178	4,792,280	424.8	4,792,489	606	4,792,604	
24	4,792,877	178	4,792,958	178	4,792,281	424.8	4,792,490	617	4,792,605	
383	4,792,878	178	4,792,959	178	4,792,282	424.8	4,792,491	619	4,792,606	
424	4,792,879	178	4,792,960	178	4,792,283	424.8	4,792,492	619	4,792,607	
426	4,792,880	178	4,792,961	178	4,792,284	424.8	4,792,493	619	4,792,608	
428	4,792,881	178	4,792,962	178	4,792,285	424.8	4,792,494	619	4,792,609	
CLASS 362		178	4,792,963	178	4,792,286	424.8	4,792,495	619	4,792,610	
72	4,792,882	178	4,792,964	178	4,792,287	424.8	4,792,496	619	4,792,611	
102	4,792,883	178	4,792,965	178	4,792,288	424.8	4,792,497	619	4,792,612	
135	4,792,884	178	4,792,966	178	4,792,289	424.8	4,792,498	619	4,792,613	
CLASS 363		178	4,792,967	178	4,792,290	424.8	4,792,499	619	4,792,614	
16	4,792,885	178	4,792,968	178	4,792,291	424.8	4,792,500	619	4,792,615	
60	4,792,886	178	4,792,969	178	4,792,292	424.8	4,792,501	619	4,792,616	
89	4,792,887	178	4,792,970	178	4,792,293	424.8	4,792,502	619	4,792,617	
CLASS 364		178	4,792,971	178	4,792,294	424.8	4,792,503	619	4,792,618	
188	4,792,888	178	4,792,972	178	4,792,295	424.8	4,792,504	619	4,792,619	
191	4,792,889	178	4,792,973	178	4,792,296	424.8	4,792,505	619	4,792,620	
200	4,792,890	178	4,792,974	178	4,792,297	424.8	4,792,506	619	4,792,621	
CLASS 365		178	4,792,975	178	4,792,298	424.8	4,792,507	619	4,792,622	
413.23	4,792,891	178	4,792,976	178	4,792,299	424.8	4,792,508	619	4,792,623	
424.1	4,792,892	178	4,792,977	178	4,792,300	424.8	4,792,509	619	4,792,624	
425	4,792,893	178	4,792,978	178	4,792,301	424.8	4,792,510	619	4,792,625	
429	4,792,894	178	4,792,979	178	4,792,302	424.8	4,792,511	619	4,792,626	
431.05	4,792,895	178	4,792,980	178	4,792,303	424.8	4,792,512	619	4,792,627	
433	4,792,896	178	4,792,981	178	4,792,304	424.8	4,792,513	619	4,792,628	
449	4,792,897	178	4,792,982	178	4,792,305	424.8	4,792,514	619	4,792,629	
473	4,792,898	178	4,792,983	178	4,792,306	424.8	4,792,515	619	4,792,630	
491	4,792,899	178	4,792,984	178	4,792,307	424.8	4,792,516	619	4,792,631	
519	4,792,900	178	4,792,985	178	4,792,308	424.8	4,792,517	619	4,792,632	
551.02	4,792,901	178	4,792,986	178	4,792,309	424.8	4,792,518	619	4,792,633	
557	4,792,902	178	4,792,987	178	4,792,310	424.8	4,792,519	619	4,792,634	
602	4,792,903	178	4,792,988	178	4,792,311	424.8	4,792,520	619	4,792,635	
607	4,792,904	178	4,792,989	178	4,792,312	424.8	4,792,521	619	4,792,636	
724.17	4,792,905	178	4,792,990	178	4,792,313	424.8	4,792,522	619	4,792,637	
724.19	4,792,906	178	4,792,991	178	4,792,314	424.8	4,792,523	619	4,792,638	
900	4,792,907	178	4,792,992	178	4,792,315	424.8	4,792,524	619	4,792,639	
CLASS 366		178	4,792,993	178	4,792,316	424.8	4,792,525	619	4,792,640	
149	4,792,908	178	4,792,994	178	4,792,317	424.8	4,792,526	619	4,792,641	
154	4,792,909	178	4,792,995	178	4,792,318	424.8	4,792,527	619	4,792,642	
185	4,792,910	178	4,792,996	178	4,792,319	424.8	4,792,528	619	4,792,643	
189	4,792,911	178	4,792,997	178	4,792,320	424.8	4,792,529	619	4,792,644	
210	4,792,912	178	4,792,998	178	4,792,321	424.8	4,792,530	619	4,792,645	
233	4,792,913	178	4,792,999	178	4,792,322	424.8	4,792,531	619	4,792,646	
CLASS 367		178	4,793,000	178	4,792,323	424.8	4,792,532	619	4,792,647	
140	4,792,914	178	4,793,001	178	4,792,324	424.8	4,792,533	619	4,792,648	
149	4,792,915	178	4,793,002	178	4,792,325	424.8	4,792,534	619	4,792,649	
CLASS 368		178	4,793,003	178	4,792,326	424.8	4,792,535	619	4,792,650	
113	4,792,916	178	4,793,004	178	4,792,327	424.8	4,792,536	619	4,792,651	
32	4,792,917	178	4,793,005	178	4,792,328	424.8	4,792,537	619	4,792,652	
34	4,792,918	178	4,793,006	178	4,792,329	424.8	4,792,538	619	4,792,653	
36	4,792,919	178	4,793,007	178	4,792,330	424.8	4,792,539	619	4,792,654	
38	4,792,920	178	4,793,008	178	4,792,331	424.8	4,792,540	619	4,792,655	
40	4,792,921	178	4,793,009	178	4,792,332	424.8	4,792,541	619	4,792,656	
42	4,792,922	178	4,793,010	178	4,792,333	424.8	4,792,542	619	4,792,657	
44	4,792,923	178	4,793,011	178	4,792,334	424.8	4,792,543	619	4,792,658	
46	4,792,924	178	4,793,012	178	4,792,335	424.8	4,792,544	619	4,792,659	
48	4,792,925	178	4,793,013	178	4,792,336	424.8	4,792,545	619	4,792,660	
50	4,792,926	178	4,793,014	178	4,792,337	424.8	4,792,546	619	4,792,661	
52	4,792,927	178	4,793,015	178	4,792,338	424.8	4,792,547	619	4,792,662	
54	4,792,928	178	4,793,016	178	4,792,339	424.8	4,792,548	619	4,792,663	
56	4,792,929	178	4,793,017	178	4,792,340	424.8	4,792,549	619	4,792,664	
58	4,792,930	178	4,793,018	178	4,792,341	424.8	4,792,550	619	4,792,665	
60	4,792,931	178	4,793,019	178	4,792,342	424.8	4,792,551	619	4,792,666	
62	4,792,932	178	4,793,020	178	4,792,343	424.8	4,792,552	619	4,792,667	
64	4,792,933	178	4,793,021	178	4,792,344	424.8	4,792,553	619	4,792,668	
66	4,792,934	178	4,793,022	178	4,792,345	424.8	4,792,554	619	4,792,669	
68	4,792,935	178	4,793,023	178	4,792,346	424.8	4,792,555	619	4,792,670	
70	4,792,936	178	4,793,024	178	4,792,347	424.8	4,792,556	619	4,792,671	
72	4,792,937	178	4,793,025	178	4,792,348	424.8	4,792,557	619	4,792,672	
74	4,792,938	178	4,793,026	178	4,792,349	424.8	4,792,558	619	4,792,673	
76	4,792,939	178	4,793,027	178	4,792,350	424.8	4,792,559	619	4,792,674	
78	4,792,940	178	4,793,028	178	4,792,351	424.8	4,792,560	619	4,792,675	
80	4,792,941	178	4,793,029	178	4,792,352	424.8	4,792,561	619	4,792,676	
82	4,792,942	178	4,793,030	178	4,792,353	424.8	4,792,562	619	4,792,677	
84	4,792,943	178	4,793,031	178	4,792,354	424.8	4,792,563	619	4,792,678	
86	4,792,944	178	4,793,032	178	4,792,355	424.8	4,792,564	619	4,792,679	
88	4,792,945	178	4,793,033	178	4,792,356	424.8	4,792,565	619	4,792,680	
90	4,792,946	178	4,793,034	178	4,792,357	424.8	4,792,566	619	4,792,681	
92	4,792,947	178	4,793,035	178	4,792,358	424.8	4,792,567	619	4,792,682	
94	4,792,948	178	4,793,036	178	4,792,359	424.8	4,792,568	619	4,792,683	
96	4,792,949	178	4,793,037	178	4,792,360	424.8	4,792,569	619	4,792,684	
98	4,792,950	178	4,793,038	178	4,792,361	424.8	4,792,570	619	4,792,685	
100	4,792,951	178	4,793,039	178	4,792,362	424.8	4,792,571	619	4,792,686	
102	4,792,952	178	4,793,040	178	4,792,363	424.8	4,792,572	619	4,792,687	
104	4,792,953	178	4,793,041	178	4,792,364	424.8	4,792,573	619	4,792,688	
106	4,792,954	178	4,793,042	178	4,792,365	424.8	4,792,574	619	4,792,689	
108	4,792,955	178	4,793,043	178	4,792,366	424.8	4,792,575	619	4,792,690	
110	4,792,956	178	4,793,044	178	4,792,367	424.8	4,792,576	619	4,792,691	
112	4,792,957	178	4,793,045	178	4,792,368	424.8	4,792,577	619	4,792,692	
114	4,792,958	178	4,793,046	178	4,792,369	424.8	4,792,578	619	4,792,693	
116	4,792,959	178	4,793,047	178	4,792,370	424.8	4,792,579	619	4,792,69	

## CLASSIFICATION OF DESIGNS

D2—	227	298,980	D8—	330	298,997	D11—	78	299,014	D15—	106	299,031	D23—	129	299,048		46	299,064
	265	298,981		1	298,998	D12—	143	299,015		29	299,032		229	299,050		55	299,065
	314	298,982		24	298,999		110	299,016		124	299,033		252	299,051		62	299,066
	317	298,983		30	299,000		155	299,017	D16—	107	299,034			299,052	D25—	58	299,067
D6—	320	298,984		42	299,001		167	299,018	D18—	34	299,035		255	299,053		117	299,068
	356	298,985		308	299,002		184	299,019	D19—	69	299,036		294	299,049		157	299,069
		298,986		367	299,003		187	299,020		90	299,037		368	299,054	D26—	88	299,070
	360	298,987		382	299,004	D13—	317	299,021	D20—	27	299,038		10	299,055		93	299,071
	366	298,988			299,005	D14—	17	299,022	D21—	104	299,039			299,056	D30—	101	299,072
	372	298,989	D9—	388	299,006		6	299,023		171	299,040			299,057		121	299,073
	525	298,990		541	299,007		12	299,024		201	299,041		17		D32—	15	299,074
	542	298,991		443	299,008		36	299,025		212	299,042			299,058	D34—	1	299,075
D7—	601	298,992		454	299,009		53	299,026		217	299,043		21	299,059		29	299,076
	12	298,993	D10—	23	299,010		63	299,027			299,044		31	299,061		32	299,077
		298,994			299,011		100	299,028	D22—	219	299,045		38	299,062			299,078
	13	298,995		53	299,012			299,029		128	299,046			299,063		36	299,079
	309	298,996			299,013		101	299,030			299,047						

## CLASSIFICATION OF PLANTS

P.—	7	6,469	43	6,472		6,475		6,478		74	6,481		80	6,483
	20	6,470	54	6,473		6,476		6,479	69		6,482		86	6,484
	41	6,471	68	6,474		6,477		6,480						

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## PATENTS

01 :	4,791,976	4,792,096	4,792,746	4,792,429	4,792,848	4,792,729
	4,792,349	4,792,113	4,792,750	4,792,448	4,792,772	4,792,776
	4,792,423	4,792,130	4,792,751	4,792,473	4,792,792	4,792,990
	4,792,471	4,792,143	4,792,779	4,792,502	4,792,796	4,791,717
04 :	4,792,095	4,792,153	4,792,783	4,792,574	4,791,688	4,791,767
	4,792,137	4,792,179	4,792,787	4,792,611	4,791,721	4,791,995
	4,792,214	4,792,182	4,792,793	4,792,623	4,791,744	4,792,087
	4,792,268	4,792,199	4,792,803	4,792,684	4,791,745	4,792,129
	4,792,442	4,792,202	4,792,805	4,792,709	4,791,756	4,792,169
	4,792,533	4,792,207	4,792,812	4,792,717	4,791,842	4,792,189
	4,792,748	4,792,221	4,792,813	4,792,765	4,791,875	4,792,263
	4,792,899	4,792,223	4,792,817	4,792,798	4,791,915	4,792,274
	4,792,949	4,792,231	4,792,818	4,792,841	4,791,955	4,791,682
05 :	4,791,683	4,792,249	4,792,850	4,792,850	4,791,968	4,791,938
	4,792,050	4,792,260	4,792,876	4,792,876	4,792,067	4,791,990
	4,792,308	4,792,278	4,792,909	4,792,774	4,792,088	4,792,045
06 :	4,791,694	4,792,282	4,792,938	4,792,829	4,792,122	4,792,107
	4,791,715	4,792,290	4,792,953	4,792,353	4,792,163	4,792,422
	4,791,723	4,792,305	4,792,954	4,792,353	4,792,183	4,791,775
	4,791,724	4,792,309	4,792,967	4,792,353	4,792,196	4,791,820
	4,791,743	4,792,319	4,792,968	4,792,353	4,792,252	4,792,049
	4,791,757	4,792,373	4,792,973	4,792,353	4,792,256	4,792,437
	4,791,766	4,792,374	4,792,974	4,792,353	4,792,258	4,791,693
	4,791,768	4,792,377	4,792,975	4,792,353	4,792,275	4,791,750
	4,791,777	4,792,396	4,792,978	4,792,353	4,792,292	4,791,894
	4,791,787	4,792,397	4,792,987	4,792,353	4,792,294	4,792,038
	4,791,788	4,792,407	4,792,993	4,792,353	4,792,321	4,792,091
	4,791,789	4,792,415	4,791,837	4,791,932	4,792,364	4,792,159
	4,791,791	4,792,418	4,792,102	4,791,940	4,792,376	4,792,306
	4,791,800	4,792,436	4,792,234	4,791,962	4,792,390	4,791,761
	4,791,806	4,792,464	4,792,898	4,792,013	4,792,391	4,791,848
	4,791,818	4,792,493	4,791,707	4,792,015	4,792,394	4,791,883
	4,791,834	4,792,523	4,791,710	4,792,018	4,792,404	4,791,937
	4,791,850	4,792,525	4,791,835	4,792,170	4,792,449	4,792,198
	4,791,878	4,792,526	4,791,838	4,792,175	4,792,453	4,792,333
	4,791,890	4,792,530	4,791,839	4,792,191	4,792,457	4,792,361
	4,791,899	4,792,531	4,791,840	4,792,246	4,792,458	4,792,948
	4,791,913	4,792,551	4,791,845	4,792,271	4,792,580	4,792,963
	4,791,921	4,792,556	4,791,929	4,792,335	4,792,621	4,791,737
	4,791,926	4,792,561	4,791,971	4,792,711	4,792,797	4,791,783
	4,791,931	4,792,570	4,792,005	4,792,806	4,792,849	4,791,873
	4,791,936	4,792,617	4,792,019	4,792,808	4,792,926	4,791,896
	4,791,944	4,792,643	4,792,039	4,792,815	4,792,977	4,791,898
	4,791,946	4,792,654	4,792,097	4,792,854	4,792,991	4,792,141
	4,791,965	4,792,672	4,792,099	4,792,911	4,640,464	4,792,195
	4,791,983	4,792,677	4,792,100	4,792,100	4,791,774	4,792,203
	4,791,994	4,792,683	4,792,251	4,791,824	4,791,711	4,792,250
	4,791,998	4,792,688	4,792,277	4,792,031	4,791,814	4,792,302
	4,792,002	4,792,705	4,792,280	4,792,041	4,791,832	4,792,346
	4,792,025	4,792,708	4,792,285	4,792,138	4,791,923	4,792,401
	4,792,046	4,792,725	4,792,336	4,792,147	4,792,089	4,792,446
	4,792,059	4,792,740	4,792,341	4,792,399	4,792,324	4,792,467
	4,792,064	4,792,745	4,792,384	4,792,414	4,792,586	4,792,601



## GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

4,792,687		4,792,456		4,792,144		4,792,054		4,792,359		4,792,327
4,792,726		4,792,620		4,792,145		4,792,056		4,792,385		4,792,360
4,792,727	31 :	4,792,016		4,792,208		4,792,057		4,792,430		4,792,363
4,792,784	32 :	4,791,948		4,792,212		4,792,092		4,792,431		4,792,378
4,792,836	33 :	4,791,977		4,792,240		4,792,115		4,792,441		4,792,379
4,792,921		4,792,279		4,792,241		4,792,118		4,792,479		4,792,386
4,792,924		4,792,597		4,792,248		4,792,142		4,792,480		4,792,405
4,792,932		4,792,809		4,792,269		4,792,162		4,792,503		4,792,406
4,792,994		4,792,860		4,792,297		4,792,186		4,792,505		4,792,447
26 :	Re.32,804	4,791,734	34 :	4,792,347		4,792,206		4,792,536		4,792,460
4,791,685		4,791,740		4,792,492		4,792,224		4,792,538		4,792,572
4,791,699		4,791,773		4,792,513		4,792,228		4,792,555		4,792,592
4,791,713		4,791,846		4,792,515		4,792,372		4,792,569		4,792,624
4,791,728		4,791,927		4,792,517		4,792,383		4,792,576		4,792,629
4,791,765		4,791,969		4,792,522		4,792,408		4,792,578		4,792,675
4,791,805		4,791,979		4,792,528		4,792,410		4,792,614		4,792,681
4,791,825		4,792,053		4,792,529		4,792,411		4,792,657		4,792,700
4,791,826		4,792,236		4,792,535		4,792,425		4,792,701		4,792,706
4,791,916		4,792,334		4,792,566		4,792,504		4,792,737		4,792,747
4,791,928		4,792,342		4,792,568		4,792,520		4,792,788		4,792,756
4,791,964		4,792,400		4,792,618		4,792,558		4,792,880		4,792,761
4,791,975		4,792,412		4,792,680		4,792,573	44 :	4,792,073		4,792,770
4,792,110		4,792,420		4,792,712		4,792,583	45 :	4,791,812		4,792,835
4,792,128		4,792,443		4,792,714		4,792,589		4,791,831		4,792,883
4,792,149		4,792,450		4,792,728		4,792,659		4,792,488		4,792,965
4,792,150		4,792,465		4,792,792		4,792,758	46 :	4,792,082	49 :	4,792,330
4,792,178		4,792,521		4,792,816		4,792,877	47 :	4,791,726	50 :	4,792,281
4,792,180		4,792,541		4,792,858		4,792,888		4,791,770		4,792,487
4,792,184		4,792,546		4,792,865		4,792,900		4,791,779	51 :	4,791,871
4,792,317		4,792,560		4,792,874		4,792,908		4,791,888		4,791,942
4,792,325		4,792,562		4,792,895		4,792,995		4,791,909		4,792,063
4,792,355		4,792,567		4,792,904		4,166,968		4,791,961		4,792,085
4,792,367		4,792,571		4,792,913	40 :	4,791,822		4,792,043		4,792,295
4,792,475		4,792,577		4,792,951		4,791,907		4,792,462		4,792,667
4,792,501		4,792,593	37 :	4,791,914		4,791,952		4,792,519		4,792,689
4,792,548		4,792,595		4,792,104		4,791,989		4,792,600		4,792,715
4,792,655		4,792,604		4,792,121		4,792,004		4,792,634		4,792,986
4,792,772		4,792,639		4,792,173		4,792,106		4,792,641	53 :	4,791,751
4,792,859		4,792,696		4,792,174		4,792,481		4,792,642		4,792,055
4,792,881		4,792,716		4,792,286	41 :	4,791,738		4,792,690		4,792,084
4,792,884		4,792,791		4,792,395		4,792,666		4,792,724		4,792,120
4,792,901		4,792,837		4,792,470		4,792,731	48 :	4,791,681		4,792,151
4,792,902		4,792,981		4,792,640		4,792,845		4,791,722		4,792,192
4,792,929	35 :	4,792,146		4,792,651		4,792,846		4,791,749		4,792,265
4,792,950		4,792,732		4,792,719		4,792,955		4,791,753		4,792,340
27 :	4,791,752	4,792,956		4,792,890	42 :	Re.32,805		4,791,780		4,792,757
4,791,754		4,792,957		4,792,903		4,791,695		4,791,796		4,792,768
4,791,935	36 :	Re.32,802		4,792,946		4,791,708		4,791,797		4,792,782
4,792,048		4,791,684		4,792,999		4,791,736		4,791,804		4,792,799
4,792,209		4,791,746	39 :	4,791,697		4,791,801		4,791,811		4,792,906
4,792,226		4,791,760		4,791,700		4,791,807		4,791,821	54 :	4,792,058
4,792,291		4,791,836		4,791,712		4,791,872		4,791,823		4,792,594
4,792,344		4,791,843		4,791,732		4,791,911		4,791,849	55 :	4,791,828
4,792,413		4,791,885		4,791,764		4,791,925		4,791,886		4,792,148
4,792,506		4,791,924		4,791,769		4,791,980		4,791,987		4,792,267
4,792,704		4,791,947		4,791,784		4,791,993		4,791,988		4,792,313
4,792,713		4,791,959		4,791,889		4,792,017		4,791,991		4,792,314
4,792,894		4,792,024		4,791,934		4,792,026		4,791,992		4,792,315
28 :	4,792,299	4,792,040		4,791,941		4,792,077		4,791,997		4,792,320
4,792,307		4,792,081		4,791,957		4,792,080		4,792,000		4,792,326
29 :	4,791,729	4,792,108		4,791,958		4,792,125		4,792,042		4,792,427
4,791,778		4,792,112		4,791,960		4,792,235		4,792,232		4,792,564
4,792,266		4,792,114		4,792,034		4,792,276		4,792,272		4,792,660
4,792,398		4,792,136		4,792,051		4,792,351		4,792,303		4,792,699

## DESIGN PATENTS

05 :	299,041	13 :	299,048		299,056	34 :	298,989	39 :	299,070		299,002
06 :	299,009	16 :	299,017	25 :	298,982		298,997		299,076		299,022
	299,018	17 :	298,986		299,021		299,023	40 :	299,032		299,040
	299,050		298,990		299,034		299,061	41 :	298,983		299,057
	299,052		298,996		299,065		299,062		298,984	49 :	299,010
09 :	299,073	18 :	299,007	26 :	299,019		299,063	42 :	298,987	51 :	299,036
	298,999		299,033	27 :	299,058		299,064		299,006	53 :	298,988
	299,030	21 :	299,015		299,059		299,075		299,012		299,014
	299,042	22 :	299,074		299,067	36 :	298,980		299,013	55 :	299,025
	299,053	24 :	299,043	28 :	299,046		299,003		299,079		299,037
	299,060		299,044		299,047	37 :	299,029	44 :	298,991		299,049
12 :	299,024		299,045	29 :	298,981		299,055	48 :	298,992		299,078
	299,072										

## PLANT PATENTS

06 :	6,469										
	6,471	6,472	6,473	24 :	6,484	41 :	6,475			6,476	

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C. William Verity, *Secretary*

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Donald J. Quigg, *Commissioner*

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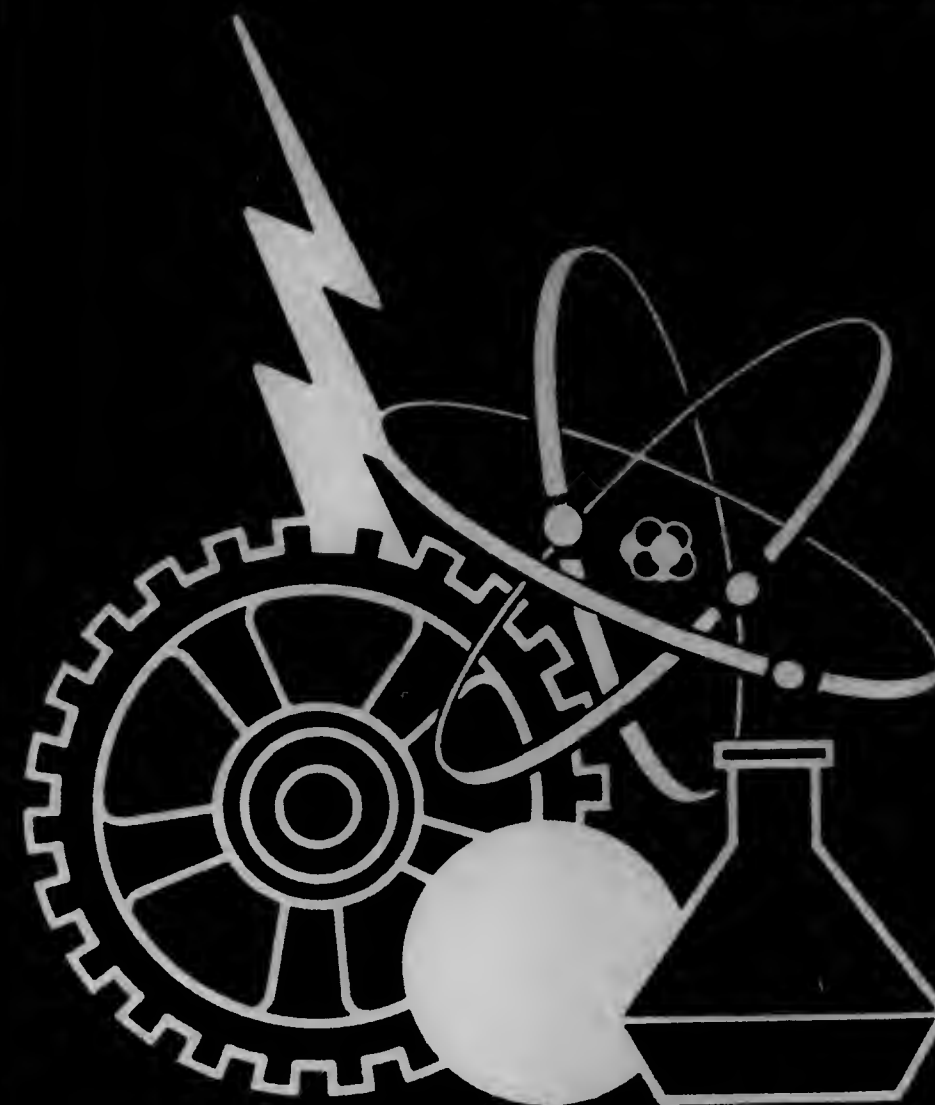
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Vol. 1097 Number 4

# OFFICIAL GAZETTE

of the  
UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS  
December 27, 1988



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OFFICIAL GAZETTE of the  
UNITED STATES PATENT AND TRADEMARK OFFICE  
December 27, 1988                      Volume 1097                      Number 4

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The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

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## PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1076 O.G. 3 on Mar. 3, 1987.

For use of the European Patent Office as a Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as a Preliminary Examining Authority for PCT applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar with regard to the German Mark as of Oct. 1, 1988, and was announced in the *Official Gazette* at 1094 O.G. 2 on Sept. 6, 1988.

Domestic PCT fees for Chapter II, effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

International PCT fees were changed on July 1, 1987 due to a difference in the exchange rate of the U.S. dollar with regard to the Swiss Franc and were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987.

International PCT Chapter II fees which were effective July 1, 1987, were announced in the *Official Gazette* at 1079 O.G. 50 on June 23, 1987. The elimination of multiple handling fees and the supplement to the handling fee under PCT Rule 57 was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Japanese declaration under PCT Article 64(2)(a), concerning the requirement for a Japanese translation of the international application within 20 months from the priority date when Japan is elected under PCT Chapter II, as from Dec. 8, 1987, was announced at 1085 O.G. 34 on Dec. 22, 1987.

The withdrawal of the Danish declaration under PCT Article 64 (1)(a), that Denmark shall not be bound by PCT Chapter II, as from Nov. 1, 1988, was announced at 1095 O.G. 2 on Oct. 4, 1988.

The withdrawal of the Norwegian declaration under PCT Article 64(1)(a), that Norway shall not be bound by PCT Chapter II, as from Jan. 1, 1989, was announced at 1096 O.G. 34 on Nov. 22, 1988.

National stage fees effective July 1, 1987, for entering the U.S. Patent and Trademark Office as a designated or elected Office were changed effective July 1, 1987, and were announced in the *Official Gazette* at 1079 O.G. 32 on June 16, 1987.

The current schedule of PCT fees is as follows:

Transmittal fee: . . . . .	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority (ISA)	
—No corresponding prior U.S. national application filed: . . . . .	520.00
—Corresponding prior U.S. national application filed: . . . . .	350.00
—Supplemental search fee, per additional invention . . . . .	140.00
European Patent Office as Searching Authority . . . . .	1160.00

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Preliminary examination fee	
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as Searching Authority . . . . .	370.00
—Additional examination fee, per additional invention . . . . .	125.00
—Searching Authority not the USPTO . . . . .	570.00
—Additional examination fee, per additional invention . . . . .	190.00

International fees	
Basic fee: . . . . .	485.00
Basic Supplemental fee (for each page over 30): . . . . .	10.00
Designation fee per country or region for the first 10 national or regional offices: . . . . .	120.00
Designation fee for 11th and subsequent designations: . . . . .	No Charge
Handling fee: . . . . .	150.00

## U.S. National Stage fees

	Small Entity	Non-small Entity
U.S. Patent and Trademark Office as Preliminary Examining Authority (IPEA)	150.00	300.00
USPTO was ISA but not IPEA . . . . .	170.00	340.00
USPTO was neither ISA nor IPEA . . . . .	225.00	450.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) . . . . .	25.00	50.00
—For each independent claim in excess of 3 . . . . .	17.00	34.00
—For each claim in excess of 20 . . . . .	6.00	12.00
—For each application containing a multiple dependent claim . . . . .	55.00	110.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39.1 . . . . .	55.00	110.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39.1 . . . . .	26.00	26.00

Oct. 26, 1988. DONALD J. QUIGG,  
Assistant Secretary and  
Commissioner of Patents  
and Trademarks.

## Status of Appeal Cases

The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Assignment to Panel For A Decision Without a Hearing as of Nov. 30, 1988

Chemical Discipline	February 16, 1988
Mechanical Discipline	March 2, 1987
Electrical Discipline	April 2, 1987

DECEMBER 27, 1988

U.S. PATENT AND TRADEMARK OFFICE

1097 OG 61

## The Date of Examiner's Answer of Oldest Ex Parte Appeals Awaiting Hearing as of Nov. 30, 1988

Chemical	August 1, 1986
Electrical	August 1, 1986
Mechanical	August 12, 1986

## Board of Patent Appeals and Interferences Decisions Rendered in Ex Parte Appeals During the month of Nov. 1988

Affirmed . . . . .	221
Affirmed-in-Part . . . . .	40
Reversed . . . . .	155
Total Decided . . . . .	416

## Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on December 24, 1985 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,559,646 through 4,561,120  
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

## 37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . \$ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)) . . . . . \$ 225.00  
By other than a small entity . . . . . \$ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . \$ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity (§1.9(f)) . . . . . \$ 55.00  
By other than a small entity . . . . . \$ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . \$ 500.00"

## Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

## PATENTS WHICH EXPIRED OCTOBER 9, 1988, DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,475,252	06/491,500	10/9/84
4,475,258	06/360,672	10/9/84
4,475,262	06/367,548	10/9/84
4,475,263	06/508,005	10/9/84
4,475,264	06/497,343	10/9/84
4,475,270	06/391,377	10/9/84
4,475,272	06/464,334	10/9/84
4,475,276	06/544,441	10/9/84
4,475,292	06/330,697	10/9/84
4,475,301	06/397,433	10/9/84
4,475,303	06/446,301	10/9/84
4,475,306	06/443,465	10/9/84
4,475,307	06/412,819	10/9/84
4,475,315	06/465,766	10/9/84
4,475,331	06/387,360	10/9/84
4,475,332	06/350,989	10/9/84
4,475,336	06/294,111	10/9/84
4,475,343	06/263,464	10/9/84
4,475,362	06/440,029	10/9/84
4,475,363	06/501,363	10/9/84
4,475,364	06/293,167	10/9/84
4,475,370	06/495,144	10/9/84
4,475,373	06/359,417	10/9/84
4,475,375	06/460,124	10/9/84
4,475,387	06/477,878	10/9/84
4,475,397	06/399,845	10/9/84
4,475,399	06/407,137	10/9/84
4,475,401	06/380,471	10/9/84
4,475,409	06/423,615	10/9/84
4,475,412	06/501,870	10/9/84
4,475,414	06/413,040	10/9/84
4,475,422	06/469,978	10/9/84
4,475,423	06/377,432	10/9/84
4,475,424	06/330,400	10/9/84
4,475,430	06/505,313	10/9/84
4,475,434	06/419,983	10/9/84
4,475,435	06/469,731	10/9/84
4,475,437	06/520,117	10/9/84
4,475,444	06/487,542	10/9/84
4,475,446	06/577,725	10/9/84



Patent Number	Serial Number	Issue Date	4,475,855	06/392,544	10/9/84
4,475,449	06/489,713	10/9/84	4,475,861	06/441,609	10/9/84
4,475,452	06/495,257	10/9/84	4,475,879	06/453,615	10/9/84
4,475,455	06/435,896	10/9/84	4,475,889	06/442,626	10/9/84
4,475,461	06/274,605	10/9/84	4,475,892	06/434,067	10/9/84
4,475,462	06/350,197	10/9/84	4,475,905	06/429,968	10/9/84
4,475,463	06/431,218	10/9/84	4,475,938	06/449,009	10/9/84
4,475,470	06/456,629	10/9/84	4,475,941	06/370,968	10/9/84
4,475,475	06/474,220	10/9/84	4,475,942	06/412,196	10/9/84
4,475,492	06/420,843	10/9/84	4,475,943	06/528,700	10/9/84
4,475,495	06/424,489	10/9/84	4,475,944	06/473,322	10/9/84
4,475,500	06/566,145	10/9/84	4,475,952	06/527,720	10/9/84
4,475,513	06/417,737	10/9/84	4,475,958	06/440,173	10/9/84
4,475,519	06/303,333	10/9/84	4,475,985	06/435,551	10/9/84
4,475,528	06/541,531	10/9/84	4,475,987	06/454,329	10/9/84
4,475,529	06/485,334	10/9/84	4,475,989	06/481,561	10/9/84
4,475,530	06/408,614	10/9/84	4,475,991	06/479,022	10/9/84
4,475,533	06/485,333	10/9/84	4,475,997	06/556,510	10/9/84
4,475,538	06/556,568	10/9/84	4,476,004	06/545,751	10/9/84
4,475,542	06/469,694	10/9/84	4,476,009	06/478,196	10/9/84
4,475,547	06/448,513	10/9/84	4,476,014	06/323,171	10/9/84
4,475,550	06/363,556	10/9/84	4,476,019	06/475,815	10/9/84
4,475,570	06/312,139	10/9/84	4,476,027	06/406,297	10/9/84
4,475,572	06/319,486	10/9/84	4,476,029	06/382,164	10/9/84
4,475,576	06/414,710	10/9/84	4,476,030	06/448,305	10/9/84
4,475,577	06/567,134	10/9/84	4,476,034	06/390,338	10/9/84
4,475,602	06/436,574	10/9/84	4,476,066	06/405,715	10/9/84
4,475,606	06/406,722	10/9/84	4,476,076	06/291,404	10/9/84
4,475,610	06/478,402	10/9/84	4,476,085	06/352,745	10/9/84
4,475,613	06/429,107	10/9/84	4,476,096	06/407,120	10/9/84
4,475,615	06/408,394	10/9/84	4,476,099	06/219,715	10/9/84
4,475,626	06/410,135	10/9/84	4,476,109	06/423,418	10/9/84
4,475,627	06/290,146	10/9/84	4,476,112	06/551,026	10/9/84
4,475,630	06/388,058	10/9/84	4,476,130	06/416,243	10/9/84
4,475,634	06/469,647	10/9/84	4,476,135	06/348,872	10/9/84
4,475,635	06/310,063	10/9/84	4,476,141	06/545,914	10/9/84
4,475,641	06/313,381	10/9/84	4,476,158	06/440,225	10/9/84
4,475,642	06/363,563	10/9/84	4,476,161	06/518,590	10/9/84
4,475,647	06/397,495	10/9/84	4,476,167	06/395,348	10/9/84
4,475,650	06/511,833	10/9/84	4,476,169	06/390,932	10/9/84
4,475,656	06/240,900	10/9/84	4,476,187	06/492,580	10/9/84
4,475,657	06/378,770	10/9/84	4,476,205	06/483,764	10/9/84
4,475,661	06/446,684	10/9/84	4,476,206	06/460,818	10/9/84
4,475,662	06/443,313	10/9/84	4,476,215	06/554,886	10/9/84
4,475,668	06/378,330	10/9/84	4,476,221	06/512,748	10/9/84
4,475,683	06/429,101	10/9/84	4,476,230	06/233,985	10/9/84
4,475,698	06/354,611	10/9/84	4,476,250	06/522,740	10/9/84
4,475,707	06/263,602	10/9/84	4,476,288	06/443,525	10/9/84
4,475,708	06/377,056	10/9/84	4,476,301	06/390,878	10/9/84
4,475,709	06/398,897	10/9/84	4,476,306	06/401,294	10/9/84
4,475,713	06/360,323	10/9/84	4,476,348	06/309,031	10/9/84
4,475,715	06/424,104	10/9/84	4,476,368	06/320,208	10/9/84
4,475,724	06/380,189	10/9/84	4,476,370	06/348,312	10/9/84
4,475,728	06/394,427	10/9/84	4,476,380	06/337,540	10/9/84
4,475,734	06/539,343	10/9/84	4,476,382	06/471,692	10/9/84
4,475,735	06/460,883	10/9/84	4,476,385	06/413,767	10/9/84
4,475,741	06/269,715	10/9/84	4,476,392	06/334,489	10/9/84
4,475,746	06/426,168	10/9/84	4,476,396	06/424,013	10/9/84
4,475,756	06/383,298	10/9/84	4,476,397	06/405,463	10/9/84
4,475,759	06/402,967	10/9/84	4,476,403	06/405,013	10/9/84
4,475,764	06/469,087	10/9/84	4,476,406	06/478,952	10/9/84
4,475,772	06/275,536	10/9/84	4,476,409	06/437,355	10/9/84
4,475,773	06/473,372	10/9/84	4,476,410	06/522,447	10/9/84
4,475,774	06/346,887	10/9/84	4,476,413	06/243,404	10/9/84
4,475,789	06/319,197	10/9/84	4,476,414	06/445,444	10/9/84
4,475,791	06/444,219	10/9/84	4,476,416	06/490,314	10/9/84
4,475,794	06/345,437	10/9/84	4,476,429	06/412,070	10/9/84
4,475,796	06/355,144	10/9/84	4,476,435	06/360,735	10/9/84
4,475,799	06/530,342	10/9/84	4,476,438	06/315,845	10/9/84
4,475,813	06/413,220	10/9/84	4,476,439	06/266,785	10/9/84
4,475,817	06/541,756	10/9/84	4,476,441	06/330,202	10/9/84
4,475,823	06/366,856	10/9/84	4,476,447	06/415,092	10/9/84
4,475,834	06/364,880	10/9/84	4,476,449	06/481,791	10/9/84
4,475,836	06/561,789	10/9/84	4,476,461	06/289,133	10/9/84
4,475,839	06/482,800	10/9/84	4,476,463	06/295,495	10/9/84
4,475,840	06/519,054	10/9/84	4,476,469	06/403,510	10/9/84
4,475,843	06/529,084	10/9/84	4,476,504	06/259,853	10/9/84
4,475,849	06/429,256	10/9/84	4,476,506	06/336,472	10/9/84
4,475,853	06/454,785	10/9/84	4,476,519	06/406,913	10/9/84
			4,476,521	06/500,164	10/9/84

# Notification of Acceptance of Delayed Payment of Maintenance Fee (35 U.S.C. 41(c); 37 CFR 1.378)

The patent(s) listed below is considered as not having expired but is subject to the conditions set forth in 35 U.S.C. 41(c)(2), in view of the Petition to Accept Late Payment of the maintenance fees which has been GRANTED BY THE COMMISSIONER OF PATENTS AND TRADEMARKS, as provided for under 35 U.S.C. 41(c)(1) and 37 CFR 1.378.

Patent No.	Serial No.	Patent Date	Application Filing Date	Delayed Payment Acceptance Date
4,437,599	06/351,328	3/20/84	2/22/82	11/21/88

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

4,490,148, Re. S.N. 267,224, Filed Nov. 2, 1988, Cl. 604/385, PROTECTOR AGAINST INCONTINENCE OR DIAPER, Bo Beckstrom, Owner of Record: Landstingens Inkopsentral LIG., Solna, Sweden, Attorney or Agent: Robert J. Patch, Ex. Gp.: 336

4,610,931, Re. S.N. 243,089, Filed Sept. 9, 1988, Cl. 428/547, PREFERENTIALLY BINDER ENRICHED CEMENTED CARBIDE BODIES AND METHOD OF MANUFACTURE, Bela J. Nemeth, et al., Owner of Record: Kennametal Ind., Latrobe, Pa., Attorney or Agent: Stephen T. Belsham, Ex. Gp.: 223

4,621,816, Re. S.N. 268,931, Filed Nov. 29, 1988, Cl. 273/168, SIDE STROKING GOLF PUTTER, John Leek, Owner of Record: Inventor, Attorney or Agent: Murray Schaffer, Ex. Gp.: 334

4,669,078, Re. S.N. 242,443, Filed Sept. 8, 1988, Cl. 369/291, DISC CASE, Mikio Ogusu, Owner of Record: Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan, Attorney or Agent: G. Lloyd Knight, Ex. Gp.: 246

4,701,510, Re. S.N. 263,603, Filed Oct. 27, 1988, Cl. 526/283, POLYCYCLOLEFINS RESISTANT TO SOLVENTS, Robert J. Minchak, et al., Owner of Record: B. F. Goodrich, Akron, Ohio, Attorney or Agent: Richard T. Traverso, Ex. Gp.: 155

4,768,436, Re. S.N. 264,164, Filed Oct. 28, 1988, Cl. 101/143, CONVERSION OF LETTERPRESS TO OFFSET PRINTING, Carl J. Hermach, et al., Owner of Record: Inventor, Attorney or Agent: Robert V. Jambor, Ex. Gp.: 337

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

4,209,506, Reexam. No. 90/001,639, Requested: Nov. 18, 1988, Cl. 424/68, ALUMINUM TRIS-(N-oxproline-2-thiolate); COSMETIC OR PHARMACEUTICAL COMPOSITIONS CONTAINING THE SAME AND THE USE OF SAID COMPOSITIONS, Claude Bouillon, et al., Owner of Record: L'Oreal-Societe Anonyme Dite, Paris, France, Attorney or Agent: Cushman, Darby, et al., Ex. Gp.: 120, Requester: Owner

4,368,716, Reexam. No. 90/001,643, Requested: Nov. 22, 1988, Cl. 123/557, FUEL PROCESSOR APPARATUS FOR DIESEL ENGINE POWERED VEHICLES, Leland L. Davis, Owner of Record: Davco Inc., Ann Arbor, Mich., Attorney or Agent: Harness, Dickey, et al., Ex. Gp.: 340, Requester: Lerner, David, et al., Westfield, N.J.

4,393,075, Reexam. No. 90/001,640, Requested: Nov. 18, 1988, Cl. 514/519, QUINONE COMPOUNDS AND THEIR USE IN SUPPRESSING THE PRODUCTION OF SRS-A IN MAMMALS, Shinji Terao, et al., Owner of Record: Takeda Chemical Industries, Ltd., Osaka, Japan, Attorney or Agent: Wenderoth, Lind, et al., Ex. Gp.: 120, Requester: Owner

4,421,090, Reexam. No. 90/001,642, Requested: Nov. 22, 1988, Cl. 123/557, FUEL PROCESSOR APPARATUS FOR DIESEL ENGINE POWERED VEHICLES, Leland L. Davis, Owner of Record: Davco Inc., Ann Arbor, Mich., Attorney or Agent: Harness, Dickey, et al., Ex. Gp.: 340, Requester: Lerner, David, et al., Westfield, N.J.

4,718,099, Reexam. No. 90/001,641, Requested: Nov. 21, 1988, Cl. 381/68.4, AUTOMATIC GAIN CONTROL FOR HEARING AID, David A. Hotvet, Owner of Record: Telex Communications Inc., Minneapolis, Minn., Attorney or Agent: W. A. Strum & Assocs., Ex. Gp.: 260, Requester: Owner

## Guidelines for Extension of Patent Term for New Animal Drugs or Veterinary Biological Products Under 35 U.S.C. 156 as Amended

This notice establishes initial guidelines for patent owners seeking extensions of patent terms for new animal drugs or veterinary biological products pursuant to 35 U.S.C. §156 as amended. See Pub. L. No. 100-670 enacted Nov. 16, 1988. These guidelines are effective until further notice. This notice does not affect the procedures in place for extensions of patent terms for human drug products, food additives, color additives, or medical devices as described in 52 Federal Register 9386 (Mar. 24, 1987) and 1079 Official Gazette 52 (June 23, 1987); this notice relates solely to procedures for extensions of patent terms for new animal drugs and veterinary biological products. In time, the pertinent regulations (37 C.F.R. Part 1, Subpart F) will be changed to encompass all items for which patent term extension is authorized.

A patent owner or its agent should use the guidelines in the various sections below in determining whether a patent is subject to, and meets the conditions for, extension of its term for a new animal drug or a veterinary biological product. If so, the patent owner or its agent should also use the guidelines below in preparing and filing an application for extension of the patent term. If any application for extension of the term of a patent for a new animal drug or a veterinary biological product is filed in accordance with 35 U.S.C. §156 as amended before the date on which this notice is published in the Official Gazette and the application is not in compliance

with the requirements of this notice, applicant will be notified of the deficiencies in the application and will be given a period of time within which to correct those deficiencies.

#### Guidelines

##### §A. Patents subject to extension of the patent term

- (a) Any patent that claims a product as defined in paragraph (b) of this section, or a method of using such a product, or a method of manufacturing such a product, is now subject to being extended under 35 U.S.C. §156 as amended.
- (b) The term "product" referred to in paragraph (a) of this section means a new animal drug or veterinary biological product (as those terms are used in the Federal Food, Drug and Cosmetic Act and the Virus-Serum-Toxin Act) that is not primarily manufactured using recombinant DNA, recombinant RNA, hybridoma technology, or other processes involving site specific genetic manipulation techniques, including any salt or ester of the active ingredient, as a single entity or in combination with another active ingredient.

##### §B. Conditions for extension of a term of a patent

The term of a patent may be extended if:

- (a) the patent claims a product or a method of using or manufacturing a product as defined in §A of this notice;
- (b) the term of the patent has never been previously extended;
- (c) an application for extension is submitted pursuant to §D of this notice;
- (d) the product has been subject to a regulatory review period as defined in 35 U.S.C. §1.56(g) and by the Secretary of Health and Human Services or the Secretary of Agriculture, as appropriate, before its commercial marketing or use;
- (e) the product has received permission for commercial marketing or use and the application is submitted within the sixty day period beginning on the date the product first received permission for commercial marketing or use under the provision of law under which the applicable regulatory review period occurred;
- (f) the term of the patent has not expired before the submission of the application pursuant to §D of this notice; and
- (g) no other patent has been extended for the same regulatory review period for the product.

##### §C. Applicant for extension of patent term

Any application for extension of a patent term must be submitted by the owner of record of the patent or its agent as defined in 37 C.F.R. §1.740(b)(1) and must comply with the requirements of §D of this notice.

##### §D. Application for extension of the term of a patent

- (a) An application for extension of the term of a patent must be made in writing to the Commissioner of Patents and Trademarks. The filing date of an application for an extension of the term of a patent is the date on which the complete application for extension and a duplicate of the papers, certified as such, are received in the Patent and Trademark Office or filed pursuant to the provisions of 37 C.F.R. §§1.8 or 1.10.
- (b) A complete application for the extension of the term of a patent comprises:

- (1) a complete identification of the product as by appropriate chemical and generic name, physical structure or characteristics;

- (2) a complete identification of the Federal statute including the applicable provision of law under which the regulatory review occurred;
- (3) an identification of the date on which the product received permission for commercial marketing or use under the provision of law under which the applicable regulatory review period occurred;
- (4) an identification of each active ingredient in the product and as to each active ingredient, a statement that it has not been previously approved for commercial marketing or use under the Federal Food, Drug and Cosmetic Act, the Public Health Services Act, or a statement of when the active ingredient was approved for commercial marketing or use (either alone or in combination with other active ingredients), the use for which it was approved, and the provision of law under which it was approved;
- (5) a statement that the application is being submitted within the sixty day period permitted for submission pursuant to 37 C.F.R. §1.720(f) and an identification of the last day on which the application may be submitted;
- (6) a complete identification of the patent for which an extension is being sought by the name of the inventor(s), the patent number, the date of issue, and the date of expiration;
- (7) a copy of the patent for which an extension is being sought, including the entire specification (including claims) and drawings;
- (8) a copy of any disclaimer, certificate of correction, receipt of maintenance fee payment, or reexamination certificate issued in the patent;
- (9) a statement beginning on a new page that the patent claims the product or a method of using or manufacturing the product, and a showing that lists each applicable patent claim and demonstrates the manner in which each applicable patent claim reads on the product or a method of using or manufacturing the product;
- (10) a statement beginning on a new page of the relevant dates and information pursuant to 35 U.S.C. §156(g) to enable the Secretary of Health and Human Services or the Secretary of Agriculture, as appropriate, to determine the applicable regulatory review period as follows:

- (i) for a patent claiming an animal drug product, (a) the date a major health or environmental effects test on the drug was initiated and any available substantiation of that date or the date of an exemption under subsection (j) of section 512 of the Federal Food, Drug, and Cosmetic Act became effective for such animal drug product, (b) the date on which a new drug application was initially submitted, (c) the number of the application, and (d) the date on which the application was approved; and
- (ii) for a patent claiming a veterinary biological product, (a) the date the authority to prepare an experimental biological product under the Virus-Serum-Toxin Act became effective, (b) the date an application for a license was submitted under the Virus-Serum-Toxin Act, and (c) the date the license issued;

- (11) a brief description beginning on a new page of the significant activities undertaken by the marketing applicant during the applicable regulatory review period with respect to the product and the significant dates applicable to such activities;
- (12) a statement beginning on a new page that in the opinion of the applicant the patent is eligible for the extension and a statement as to the length of the extension claimed, including how the length of the extension was determined;
- (13) a statement that applicant acknowledges a duty to disclose to the Commissioner of Patents and

Trademarks and the Secretary of Health and Human Services or the Secretary of Agriculture, as appropriate, any information that is material to the determination of entitlement to the extension sought;

- (14) the prescribed fee for receiving and acting upon the application for extension (see §F of this notice) and an oath or declaration as set forth in paragraph (c) of this section; and
- (15) the name, address, and telephone number of the person to whom inquiries and correspondence relating to the application for patent term extension are to be directed.

- (c) Any application for extension of the term of a patent submitted pursuant to paragraphs (a) and (b) of this section must include an oath or declaration signed by the owner of record of the patent or its agent that specifically identifies the application papers and the patent for which an extension is sought and avers that the person signing the oath or declaration:

- (1) is the owner, an official of a corporate owner authorized to obligate the corporation, or a patent attorney or agent authorized to practice before the Patent and Trademark Office and who has general authority from the owner to act on behalf of the owner in patent matters;
- (2) has reviewed and understands the contents of the application being submitted pursuant to this section;
- (3) believes the patent is subject to extension pursuant to §A of this notice;
- (4) believes an extension of the length claimed is justified under 35 U.S.C. §156 as amended; and
- (5) believes the patent for which the extension is being sought meets the conditions for extension of the term of a patent as set forth in §B of this notice.

- (d) If any application for extension of term of the patent submitted pursuant to this section is held to be incomplete, applicant may seek to have that holding reviewed by filing a petition pursuant to 37 C.F.R. §1.182 within such time as may be set, or if no time is set, within one month of the date on which the application was held incomplete. Compliance with the provisions of these guidelines that are not required by statute may be waived in appropriate circumstances. 37 C.F.R. §1.183.

##### §E. Interim extension of the term of a patent

An applicant who has filed an application for extension pursuant to §D of this notice may request one or

more interim extensions for periods of up to one year pending a final determination on the application. Any such request should be filed at least three months prior to the expiration date of the patent. The Commissioner may issue interim extensions for periods up to one year until a final determination is made without a request by the applicant. In no event will the interim extensions granted under this section be longer than the maximum period of extension to which the applicant would be eligible.

##### §F. Fee for receiving and acting on an application for extension of the term of a patent

Pursuant to 35 U.S.C. §156(h), the Commissioner has determined that a fee as set forth in 37 C.F.R. §1.20(n) (presently \$550.00) is appropriate to cover the costs to the Patent and Trademark Office of receiving and acting upon the applications for extension of the term of a patent filed pursuant to 35 U.S.C. §156 as amended. The fee should accompany the application when filed. If a fee in a different amount is adopted in Title 37 of the Code of Federal Regulations, applicant will be refunded any excess of the fee or will be required to submit any deficiency in the fee.

##### §G. Address for application for extension of the term of a patent and communications relating thereto

All applications for extension of the term of a patent and any communications relating thereto intended for the Patent and Trademark Office should be addressed to Box Patent Ext., Commissioner of Patents and Trademarks, Washington, D.C. 20231.

##### §H. For further information, contact:

Charles E. Van Horn by telephone at (703) 557-4035 or by mail marked to his attention and addressed to Box 8, Commissioner of Patents and Trademarks, Washington, D.C. 20231.

##### Summary

The initial guidelines set forth above are considered to be appropriate and authorized by 35 U.S.C. §156 as amended. They will provide appropriate guidance to patent owners and their agents pending appropriate changes that will be made in Title 37 of the Code of Federal Regulations.

DONALD J. QUIGG,  
Assistant Secretary and  
Commissioner of Patents  
and Trademarks.

Nov. 29, 1988



## Status of PTO Services

The following is an update of the status of PTO services for November 1988:

Service Item	FY 1988 Goal (Calendar Days <sup>1)</sup> )	Monthly Average (Calendar Days <sup>1)</sup> )
Filing Receipts:		
Patents	22	26
Trademarks	30	17
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	17 Hours
Window Coupons	5	2
Mail Coupons	12	6
Letter Orders	16	13
Certified Copies:		
Trademark Registrations	21	30
Applications-As-Filed	17	12*
File-Wrapper/Contents	N/A	13
Walk-up Certification	1	1
Trademark Search Library:		
Filing Pending Marks	21	11
Filing Reg. Certificates	Issue Date	Issue Date
Filing Temp. Drawings	6	7
Assignments:		
Recording Patent Assignments	20	144**
Receipt Date of Patent Documents Returned		July 5, 1988
Recording Trademark Assignments	20	61**
Receipt Date of Trademark Documents Returned		Aug. 31, 1988
Avg. Days from Issue Fee Payment to Issue Date	90-100	91
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	On schedule
Patent Copies Available	95% on Issue Date	99% on Issue Date
Trademark Copies Available	95% on Issue Date	99% on Issue Date

<sup>1)</sup> Unless otherwise noted.

\* The 5% of orders for which fiche are not on site are not included in calculations.

\*\* See Narrative.

## SERVICE STATISTICS

- **Assignment Processing** — Top priority is being given to getting assignment processing back on track.

We conducted an in-depth study of assignment processing in Aug. It was discovered that reports had been misleading and that, in fact, a large backlog existed. In the Official Gazette reports of Oct. 25, 1988, and Nov. 29, 1988, the definitions for the information being reported were clarified to be more meaningful and accurate. The backlog is now being reflected in the number of days to record assignments and return original documents.

We have recruited a team of professionals to assist us with the backlog of patent assignments to be quality reviewed. We have also recruited a team of clerical personnel to assist us with processing patent assignment documents and this should ensure expeditious return of documents when recorded.

We plan to be back on goal in the processing of both patent and trademark assignments by Jan. 31, 1989.

Trademark assignment recording shows marked improvement — from 98 days to 61 days in the past month.

Patent assignment documents have a backlog dating from July 1988. Patent assignment documents submitted after an application has been filed go directly to the assignments area for recording, usually within 3-5 days of receipt in the PTO Mail Room. However, assignment documents filed with new applications are not forwarded for recording until a filing receipt has been issued. Therefore, receipts in the assignment area each day have a variety of Mail Room receipt days. Some can be months old if they were involved in patent applications which were incomplete. It was determined not to be cost effective to sort the backlog into receipt date order for processing. Beginning with patent assignments received Nov. 1, 1988, however, separate batches are being maintained for documents received directly from the mail room and for those which had been associated in new application processing. When the backlog is worked off, we will begin reporting the days to process each of the two types of receipts.

Dec. 1, 1988

THERESA A. BRELSFORD,  
Assistant Commissioner  
for Administration.

## PATENT NOTICES

## Certificates of Correction for the Week of Dec. 27, 1988

4,177,080	4,724,507	4,742,676	4,755,755
4,496,502	4,724,795	4,742,877	4,755,973
4,578,335	4,725,207	4,744,160	4,756,290
4,618,940	4,727,086	4,745,587	4,756,846
4,632,481	4,727,122	4,746,084	4,757,134
4,634,807	4,727,202	4,746,933	4,757,418
4,636,564	4,728,193	4,747,120	4,757,516
4,639,884	4,729,049	4,747,213	4,757,799
4,655,527	4,729,480	4,747,484	4,757,900
4,657,267	4,730,661	4,747,671	4,758,098
4,659,875	4,730,850	4,747,738	4,758,116
4,660,911	4,730,880	4,747,793	4,758,147
4,666,584	4,731,682	4,748,121	4,758,179
4,684,271	4,731,792	4,748,163	4,758,471
4,684,587	4,731,907	4,748,216	4,759,955
4,684,588	4,733,294	4,748,971	4,760,504
4,689,338	4,733,561	4,749,093	4,760,998
4,690,824	4,733,732	4,749,497	4,762,088
4,693,981	4,734,417	4,749,974	4,762,403
4,700,268	4,735,406	4,750,062	4,762,462
4,703,477	4,735,727	4,750,239	4,762,658
4,709,934	4,735,875	4,750,594	4,762,802
4,714,164	4,735,950	4,750,852	4,763,026
4,714,777	4,737,175	4,751,251	4,763,518
4,718,534	4,738,074	4,751,258	4,764,778
4,718,687	4,738,904	4,751,420	4,765,982
4,721,116	4,738,909	4,751,537	4,766,170
4,721,951	4,738,974	4,752,498	4,766,386
4,722,637	4,739,722	4,753,416	4,767,711
4,722,667	4,739,948	4,754,093	4,767,902
4,722,730	4,740,702	4,754,766	
4,722,987	4,740,963	4,754,775	

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Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
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PATENT APPLICATION	
TRADEMARK APPLICATION	
	New trademark application and associated papers and fees.

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Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-6546
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Pennsylvania	Philadelphia, The Free Library of	(215) 686-5331
	Pittsburgh, Carnegie Library of	(412) 622-3138
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	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
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Wisconsin	Madison: Kurt F. Wendt Library, University of Wisconsin—Madison	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247



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## PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF November 19, 1988

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
<b>CHEMICAL EXAMINING GROUPS</b>	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	2-10-87
ORGANIC CHEMISTRY GROUP 120—S. N. ZAHARNA, Director	9-3-85
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	4-15-87
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	5-4-87
BIOTECHNOLOGY, GROUP 180—S. N. ZAHARNA, Acting Director	1-17-86
<b>ELECTRICAL EXAMINING GROUPS</b>	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	1-20-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	7-31-86
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	2-15-85
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	6-8-87
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director	2-27-87
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	1-28-87
DESIGN, GROUP 290—K. L. CAGE, Director	1-3-86
<b>MECHANICAL EXAMINING GROUPS</b>	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	11-10-87
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—VACANT, Director	6-19-87
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—VACANT, Director	1-20-87
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	4-16-87
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	1-4-88

Expiration of patents: The patents within the range of numbers indicated below expire during November 1988, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,616,463 to 3,624,838, inclusive  
Plant Patents ..... None

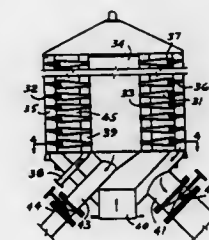
1097 OG 70

## REEXAMINATIONS

DECEMBER 27, 1988

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 3,415,374 (970th)  
METHOD AND APPARATUS FOR VORTICAL SEPARATION OF SOLIDS  
Nils A. L. Wikdahl, 42 Bravallavägen, Djursholm, Sweden  
Reexamination Request No. 90/000,865, Sep. 17, 1985.  
Reexamination Certificate for Patent No. 3,415,374, issued Dec. 10, 1968, Ser. No. 398,496, Sep. 23, 1964.  
Claims priority, application Sweden, Mar. 5, 1964, 2713/64; Jul. 20, 1964, 8800/64  
Int. Cl.<sup>4</sup> B04C 9/00  
U.S. Cl. 209—211



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-14 is confirmed.

1. A method of separating a suspension into a light fraction and a heavy fraction in a hydrocyclone separator assemblage including a plurality of hydrocyclone separators disposed in several superimposed layers and with their geometric axes in an at least substantially horizontal orientation, each of said separators including an elongate chamber of circular cross-section having at one end a first outlet for the discharge of light fraction into a first receptacle common to all separators and at the other end a second outlet for the discharge of heavy fraction into a second receptacle also common to all separators, said assemblage further including conduits for discharging the light fraction and the heavy fraction from the first and the second receptacle respectively, and a common suspension supply container for feeding suspension in tangential direction into said chamber of the separators, said method comprising the steps of discharging under pressure the heavy fraction into said second receptacle when the separator assemblage is in operation, and controlling the discharge of the light fraction and the heavy fraction from said first and second receptacles respectively so as to maintain the operational levels of the light fraction and the heavy fraction respectively in said receptacles at least at substantially the same height and above said heavy fraction outlets of the hydrocyclone separators in the uppermost one of said layers.

B1 3,956,240 (971st)  
NOVEL POLYKETONES  
Klaus J. Dahl, Palo Alto, and Viktors Jansons, Los Gatos, both of Calif., assignors to Raychem Corporation, Menlo Park, Calif.  
Reexamination Request No. 90/001,411, Jan. 11, 1988.  
Reexamination Certificate for Patent No. 3,956,240, issued May 11, 1976, Ser. No. 502,643, Sep. 3, 1974.  
Continuation-in-part of Ser. No. 378,616, Jul. 12, 1973, abandoned.  
Int. Cl.<sup>4</sup> C08G 8/02  
U.S. Cl. 528—125

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

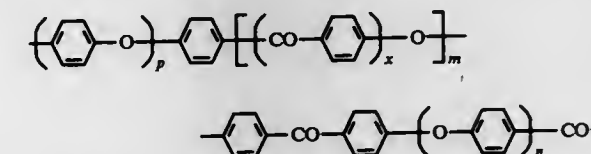
The patentability of claims 1-12 is confirmed.

Claim 13 is determined to be patentable as amended.

Claim 14, dependent on an amended claim, is determined to be patentable.

New claims 15 and 16 are added and determined to be patentable.

1. A substantially linear crystalline polymer predominately comprised of a single repeat unit of structure



wherein each of x, m and n are 0 or 1, p is an integer from 1 to 4, n is 0 when x is 1, and wherein m is 1 and x is 0 when p is greater than 1, the inherent viscosity of said polymer being at least about 0.4 and essentially unaffected by compression molding at 410° C. for 5 minutes at 10,000 p.s.i., said inherent viscosity being determined at 25° C. with 0.1 gram of polymer in a 100 milliliter solution of concentrated H<sub>2</sub>SO<sub>4</sub>.

B1 4,081,151 (972nd)  
STACKABLE WINDING CORES FOR MAGNETIC TAPES  
Günter Ender, Munich; Helmut Schultze, Gauting; Hartmut Thiele, Munich; Leo Gruber, Pentenried; Helmut Kober, Hohenschoftlarn; Werner Böttcher, Munich, and Tibor Maschiner, Oberschleissheim, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Fed. Rep. of Germany  
Reexamination Request No. 90/001,482, Mar. 29, 1988.  
Reexamination Certificate for Patent No. 4,081,151, issued Mar. 28, 1978, Ser. No. 620,645, Oct. 8, 1975.  
Claims priority, application Fed. Rep. of Germany, Oct. 14, 1974, 2448853  
Int. Cl.<sup>4</sup> B65H 75/18  
U.S. Cl. 242—68.5

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-7 is confirmed.

1. A stackable winding core for a magnetic tape, the core having an annular body defining an axial, cylindrical bore and a peripheral winding surface situated centrally with respect to the medial plane of the core, the annular body having horizontal surfaces between the cylindrical bore and the winding surface, the annular body being provided with deformations



which project from a medial plane of the core alternately upwardly and downwardly by about the width of the annular body and protrude beyond the horizontal surface of the annular body by about half the width of the annular body and the deformations on both sides of the winding core being interlockable with each other when the cores are stacked so that the peripheral winding surfaces of adjacent cores are situated closely adjacent one another.

**B1 4,125,698 (973rd)  
POLYMERIZATION OF ETHYLENICALLY  
UNSATURATED HYDROCARBONS**

Karl Ziegler; Heinz Breil; Heinz Martin, and Erhard Holzkamp, all of Mulheim an der Ruhr, Fed. Rep. of Germany, assignors to Studiengesellschaft Kohle M.B.H., Mulehim, an der Ruhr, Fed. Rep. of Germany

Reexamination Request No. 90/001,355, Oct. 16, 1987.  
Reexamination Certificate for Patent No. 4,125,698, issued Nov. 14, 1978, Ser. No. 770,484, Oct. 29, 1958.

Continuation of Ser. No. 482,412, Jan. 17, 1955, abandoned, and Ser. No. 527,413, Aug. 9, 1955, abandoned, and Ser. No. 514,068, Jun. 8, 1955.

Claims priority, application Fed. Rep. of Germany, Nov. 17, 1953, Z 3799; Dec. 15, 1953, Z 3862; Dec. 23, 1953, Z 3882; Jan. 19, 1954, Z 3941; Aug. 3, 1954, Z 4348; Aug. 16, 1954, Z 4375; Dec. 11, 1954, Z 4603; Dec. 13, 1954, Z 4604

Int. Cl.<sup>4</sup> C08F 4/64, 4/66, 10/00

U.S. Cl. 526—159

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-15 is confirmed.

1. Method for the production of high molecular polymers which comprises contacting an alpha-olefin with a catalyst formed by a mixture of a first and second component, said first component essentially consisting of an aluminum compound of the general formula  $RR'AIX$ , in which R and R' are each a member selected from the group consisting of hydrogen, alkyl radicals and aryl radicals, and X is a member selected from the group consisting of hydrogen, halogen atoms, alkoxy radicals, and aryloxy radicals, said second component essentially consisting of a non-ionized heavy metal compound selected from the group consisting of salts and freshly precipitated oxides and hydroxides of metals of Groups IV-B, V-B and VI-B of the Periodic System including thorium and uranium, metals of Group VIII of the Periodic System and manganese, and recovering the high molecular polymer formed.

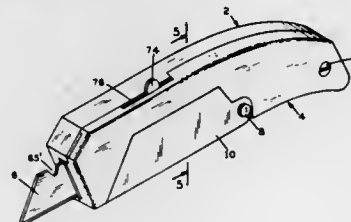
**B1 4,517,741 (974th)  
KNIFE WITH PLURAL REPLACEABLE BLADE  
STORAGE AND MEANS FOR SINGLE BLADE  
EXTENSION**

James M. Castelluzzo, 188 Avenue of the Americas, New York, N.Y. 10013

Reexamination Request No. 90/001,374, Nov. 12, 1987.  
Reexamination Certificate for Patent No. 4,517,741, issued May 21, 1985, Ser. No. 379,900, May 19, 1982.

Int. Cl.<sup>4</sup> B26B 21/04, 1/08

U.S. Cl. 30—162



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-4 is confirmed.

1. A utility knife having a handle, a recess in the handle for receiving a stack of knife blades, a knife blade guide in said handle parallel to said recess for receiving a knife blade from said recess, said guide having an opening in one wall thereof for guiding a received knife blade from said recess to a knife end of said handle, magnetic means for attracting at least an innermost blade of said stack of knife blades into alignment with said knife blade guide and for holding said innermost blade in such alignment, and follower means slidable in said handle parallel to said blade guide, means for sliding said follower means in said blade guide, said follower means including means for engaging and sliding said innermost blade of said stack of knife blades in said handle along said knife blade guide and for projecting the end of said innermost blade at the knife end of said handle and means for locking the blade in a projected position in said handle.

**B1 4,587,568 (975th)  
ELECTRONIC PRINT BOARD**

Shoichi Takayama; Yukio Suga; Joji Tadokoro, and Yukinori Takeda, all of Tokyo, Japan, assignors to OKI Electric Industry Co., Ltd., Tokyo, Japan

Reexamination Request No. 90/001,223, Apr. 20, 1987.  
Reexamination Certificate for Patent No. 4,587,568, issued May 6, 1986, Ser. No. 588,548, Mar. 12, 1984.

Claims priority, application Japan, Mar. 18, 1983, 58-44283; Mar. 18, 1983, 58-44284

Int. Cl.<sup>4</sup> H04N 1/10, 1/00

U.S. Cl. 358—293

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 12 is cancelled.

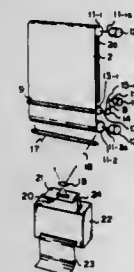
Claims 1 and 10 are determined to be patentable as amended.

Claims 2-9, 11, 13 and 14, dependent on an amended claim, are determined to be patentable.

1. An electronic print board comprising;  
(a) a housing,

- (b) a writing means mounted on said housing for receiving any pattern erasably written thereon with a pen means, said writing means being of a continuous length and having a plurality of writable screens,
- (c) an elongated lamp for illuminating an elongated portion on said writing means,
- (d) an image sensor mounted in said housing to provide an electrical signal relating to the pattern on a scanning line which is illuminated by said lamp,
- (e) a means for relatively moving said image sensor with respect to said writing means for full scanning of the pattern on said writing means,
- (f) a printer for printing the pattern on said writing means with smaller size than said pattern according to said elec-

trical signal from said image sensor, wherein said writing means is a flexible sheet which is movable by rotating a



roller sandwiching said writing means, and said image sensor is fixed.



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## REISSUES

DECEMBER 27, 1988

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,806

## SINK MOUNTED BATHING DEVICE

Richard C. Garolnick, Arlington Heights, Ill.

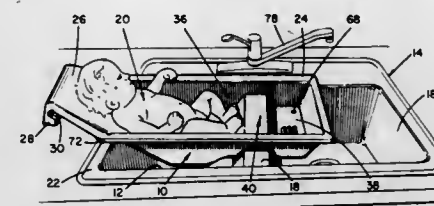
Original No. 4,216,552, dated Aug. 12, 1980, Ser. No. 3,342, Jan. 25, 1979. Continuation of Ser. No. 370,690, Apr. 22, 1982.

Application for reissue Jul. 14, 1986, Ser. No. 885,521

Int. Cl.<sup>4</sup> A47K 3/024

U.S. Cl. 4—572

9 Claims



9. An infant bathing device generally configured for use in a double basin kitchen sink having a raised partition between the basins, comprising:

ridge means defining a top opening;

a first trough portion for receiving the infant therein, said first trough portion including an uppermost part including an upwardly extending back and head supporting surface extending above the general plane of said top opening;

a second trough portion;

a divider portion located between the first and second trough portions and having an upper substantially horizontal surface and an outwardly directed surface substantially parallel to the general plane of said top opening for being received on the upper edge of the sink partition, said divider portion further including first and second spaced apart side walls angularly intersecting said outwardly directed surface each for extending into a respective sink basin at each side of the partition to prevent translation of the bathing device in a direction transversely of the partition;

the inner wall surface of the divider portion first side wall being integrally joined with the first trough portion and serving as a footrest for the infant; and

portions of the ridge means extending generally parallel to the divider portion horizontal surface and lying below the uppermost part of the first trough portion to define a lip for being restingly received on the sink immediately adjacent a sink basin.

Re. 32,807

## FAMILY TOILET SEAT

Harold D. Adams, Greenville, Miss., assignor to Adams Safety Seats, Inc., Greenville, Miss.

Original No. 4,461,046, dated Jul. 24, 1984, Ser. No. 436,275, Jan. 3, 1983. Application for reissue Feb. 9, 1987, Ser. No. 12,311

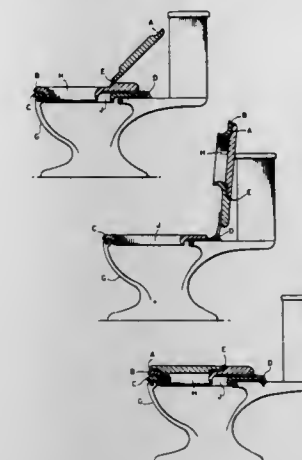
Int. Cl.<sup>4</sup> A47K 13/00

U.S. Cl. 4—235

7 Claims

1. A multiple toilet seat assembly for use with a conventional toilet bowl unit having an opening comprising a cover, an adult seat having a central opening therein and a downwardly extending contoured lip portion closely surrounding the bowl opening, a child seat [intermediate the cover and] mounted on top of said adult seat, said cover being mounted on top of the child seat, said child seat having therein a central opening of a diameter substantially less than the diameter of the central opening of said adult seat, said child seat having a downwardly extending contoured lip portion of a length at least equal to the extension of the lip portion of the adult seat and of a size to [snuggly]

snuggly fit within the contoured lip portion of the adult seat to thereby prevent lateral side-to-side movement therebetween



and to prevent the transfer of liquid from the child seat to the adult seat.

Re. 32,808

## PLANT PROPAGATING CONTAINER AND METHOD

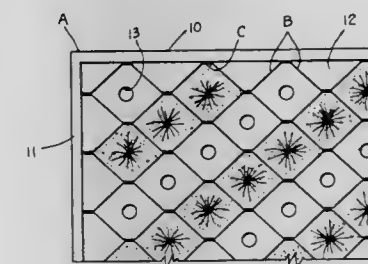
Aart V. Wingerden, Hwy. 191, Rte. 1, Box 74A, Horse Shoe, N.C. 28742

Original No. 4,453,344, dated Jun. 12, 1984, Ser. No. 520,758, Aug. 8, 1983. Continuation of Ser. No. 279,626, Jul. 1, 1981, abandoned. Application for reissue Jun. 9, 1986, Ser. No. 872,140

Int. Cl.<sup>4</sup> A01G 9/02

U.S. Cl. 47—85

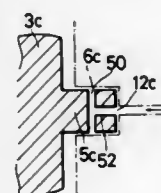
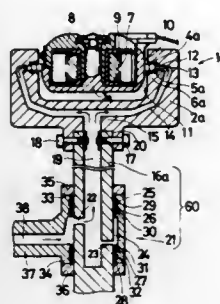
14 Claims



14. An apparatus for growing plants comprising: a plurality of interconnected hollow compartments: said compartments being open on both ends; a predetermined number of said compartments containing a growing medium; said compartments containing growing medium also containing said plants; a predetermined number of said compartments being open providing ventilation to said plants, whereby said interconnections are so constructed and the arrangement of said compartments containing growing medium and open compartments is such that air can move vertically substantially surrounding each of said plants.

Re. 32,809  
FULLY ROTATING HOOK FOR A LOCK STITCH  
SEWING MACHINE

Tokuo Hirose, Osaka, Japan, assignor to Hirose Manufacturing Company Limited, Osaka, Japan  
Original No. 4,577,572, dated Mar. 25, 1986, Ser. No. 591,194, Mar. 16, 1984. Application for reissue May 26, 1987, Ser. No. 54,395  
Claims priority, application Japan, Sep. 6, 1983, 58-164876  
Int. Cl.<sup>4</sup> D05B 57/08, 57/26, 71/02  
U.S. Cl. 112—231 2 Claims



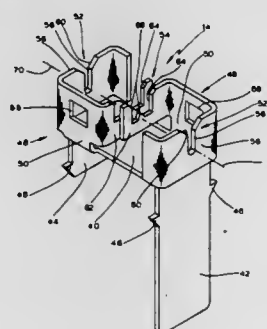
1. In a [vertically oriented] fully rotating hook assembly for a lock stitch sewing machine and being of the type including an inner bobbin case for supporting a thread bobbin, said bobbin case having formed on an outer peripheral surface thereof a track projection extending circumferentially of said bobbin case over a portion of the circumference thereof, an outer loop taker mounted about said bobbin case [..] said loop taker having formed in an inner peripheral surface thereof a track groove extending circumferentially of said loop taker over a portion of the circumference thereof, means for rotating said loop taker about [a vertical] an axis such that relative rotation occurs between said loop taker and said bobbin case, with such rotation being guided by said projection fitting within said groove, and means for reducing friction during such rotation between adjacent surfaces of said projection and groove, the improvement wherein said friction reducing means comprises:

means for injecting compressed air into a clearance between said adjacent surfaces and thereby for forming an air [films] film between [upper, lower and radially outermost] said adjacent surfaces of said projection and [adjacent complementary said surfaces of] said groove;  
said injecting means comprising at least one air passage formed in said loop taker, a plurality of air holes opening into said groove and connected to said air passage, and means for supplying compressed air to said air passage and thereby injecting the compressed air through said air holes into said clearance;  
said supplying means comprising said rotating means being in the form of a hollow rotatable shaft fixed to [the bottom of] said loop taker, said shaft having therethrough a passage connected to said air passage in said loop taker, said shaft having therethrough a hole connected to said passage in said shaft, and means for introducing com-

pressed air through said hole into said passage in said shaft; and  
said introducing means comprising a pipe fixed in position surrounding a portion of said shaft having therein said hole, said shaft being rotatable within said pipe, means defining a sealed clearance between said shaft and said pipe, said sealed clearance being connected to said hole, and an air feed pipe connected to said pipe for supplying compressed air therethrough and into said sealed clearance.

Re. 32,810  
ELECTRICAL CONTACT FOR TERMINATING  
INSULATED CONDUCTORS

Weldon L. Brubaker, Lisle, and Arnold A. Case, St. Charles, both of Ill., assignors to Molex Incorporated, Lisle, Ill.  
Original No. 4,538,872, dated Sep. 3, 1985, Ser. No. 549,109, Nov. 7, 1983. Application for reissue May 26, 1987, Ser. No. 53,657  
Claims priority, application United Kingdom, Nov. 22, 1982, 8233243  
Int. Cl.<sup>4</sup> H01R 4/24  
U.S. Cl. 439—397 4 Claims



1. An integral stamped electrical contact member for establishing an electrical connection between a conductor of an insulated wire and an external circuit, the contact member including first and second spaced-apart electrical connection means, each having a wall portion with opposed insulation displacing edges forming a conductor-receiving, insulation-displacing slot,  
the improvement wherein said contact member comprises: deflectable insulation piercing means colinearly aligned with said slots and disposed therebetween whereby said piercing means engages a pierceable conductor and is deflected by an impierceable conductor.

Re. 32,811  
EASILY DISPERSIBLE DIETARY FIBER PRODUCT AND  
METHOD FOR PRODUCING THE SAME

Richard E. Rudin, Kenosha, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.  
Original No. 4,551,331, dated Nov. 5, 1985, Ser. No. 500,603, Jun. 2, 1983. Application for reissue Jun. 3, 1986, Ser. No. 870,245  
Int. Cl.<sup>4</sup> A61K 35/78  
U.S. Cl. 424—195.1 36 Claims

1. A coated dietary fiber which is readily dispersible in liquids without agglomeration [comprising] consisting essentially of from about 80 to 99.95% by weight of at least one dietary fiber having laxative properties and subject to agglomeration upon mixing with liquids, and from about 0.05 to 20% by weight of a food grade emulsifier wherein the emulsifier substantially coats the powder to prevent agglomeration when added to liquids. 20

The questions raised in reexamination request No. 90/001,032, filed May 22, 1986, have been considered and the results thereof are reflected in this reissue patent which constitutes the reexamination certificate required by 35 U.S.C. 307 as provided in 37 CFR 1.570(e).

Re. 32,812  
FOUNDRY MOULDS AND CORES

Peter H. R. B. Lemon, Sheffield; Jeffrey D. Railton; Derek W. Baker, both of Southampton, and Vincent J. Coppock, Malpas, all of England, assignors to Borden (UK) Limited, Southampton, England  
Original No. 4,474,904, dated Oct. 2, 1984, Ser. No. 434,462, Oct. 14, 1982. Application for reissue May 6, 1986, Ser. No. 860,204  
Int. Cl.<sup>4</sup> C08K 3/36  
U.S. Cl. 523—145 22 Claims

1. A foundry moulding composition comprising  
(a) a granular refractory material,  
(b) from 0.25 to 2.5% based on the weight of the refractory material of an aqueous solution of a potassium alkali phenol-formaldehyde resin, said aqueous solution having a solids content of from 50 to 75% and said resin having a weight average molecular weight ( $M_w$ ) of from 700 to 2000, a formaldehyde:phenol molar ratio of from 1.2:1 to 2.6:1 and a potassium hydroxide:phenol molar ratio of from 0.5:1 to 1.2:1;  
(c) from 0.05 to 3% based on the weight of said aqueous solution, of at least one silane, and  
(d) from 20 to 110% based on the weight of said aqueous

solution of at least one ester active to catalyze curing of said resin.

Re. 32,813  
METHOD FOR THE SUSPENSION POLYMERIZATION  
OF VINYL CHLORIDE MONOMER

Kenichi Itoh, Clute, Tex.; Genji Noguchi, Yamaguchi, and Masanobu Nakahara, Ibaraki, both of Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan  
Original No. 4,694,055, dated Sep. 15, 1987, Ser. No. 748,432, Jun. 25, 1985. Application for reissue Dec. 7, 1987, Ser. No. 129,665  
Claims priority, application Japan, Jun. 29, 1984, 59-134176; Sep. 28, 1984, 59-203712  
Int. Cl.<sup>4</sup> C08L 33/02  
U.S. Cl. 526—201 4 Claims

1. In a method for the suspension polymerization of vinyl chloride monomer or a monomer mixture mainly composed of vinyl chloride in an aqueous polymerization medium containing a non-ionic surface active agent and in the presence of a monomer-soluble polymerization initiator, an improvement which comprises admixing the aqueous polymerization medium with a water-soluble cross-linked copolymer having carboxyl groups at a moment when the percentage of the monomer conversion is in the range from 1 to 20%, wherein the water-soluble cross-linked copolymer having carboxyl groups is a copolymer of 100 parts by weight of acrylic acid and from 0.05 to 10 parts by weight of diethyleneglycol bisallyl or bismethallyl ether.



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## PLANT PATENTS

GRANTED DECEMBER 27, 1988

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

6,485

**ANIGOZANTHOS PLANT NAMED BUSH MAGIC**  
Mervyn L. Turner, Moubulk, Australia, assignor to Biotech  
Plants Pty. Ltd., Somersby, Australia  
Filed Apr. 3, 1987, Ser. No. 33,812  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68 1 Claim  
1. A new and distinct cultivar of Anigozanthos plant named Bush Magic, as described and illustrated, and parts thereof.

6,486

**ANIGOZANTHOS PLANT NAMED BUSH EMERALD**  
Mervyn L. Turner, Moubulk, Australia, assignor to Biotech  
Plants Pty. Ltd., Somersby, Australia  
Filed Apr. 3, 1987, Ser. No. 33,813  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68 1 Claim  
1. A new and distinct cultivar of Anigozanthos plant named Bush Emerald, as described and illustrated, and parts thereof.

6,487

**ANIGOZANTHOS PLANT NAMED BUSH GLOW**  
Mervyn L. Turner, Moubulk, Australia, assignor to Biotech  
Plants Pty. Ltd., Somersby, Australia  
Filed Apr. 3, 1987, Ser. No. 33,814  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68 1 Claim  
1. A new and distinct cultivar of Anigozanthos plant named Bush Glow, as described and illustrated, and parts thereof.

6,488

**NECTARINE TREE, P-R RED**  
Pat Ricchiuti, 2917 E. Shepherd Ave., Clovis, Calif. 93612  
Filed Apr. 6, 1987, Ser. No. 34,916  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—41 1 Claim  
1. A new and distinct variety of nectarine tree substantially as illustrated and described which is characterized as to novelty by bearing a clingstone fruit having a yellow colored flesh, a skin color which is 80% to 90% red and by its general resemblance to the September Grand Nectarine Tree, U.S. Plant Pat. No. 1,755, from which it was derived as a chance sport, but from which it is distinguished therefrom by its bearing fruit which matures for harvesting approximately September 3 through September 19, later than the September Grand Nectarine Tree and by having excellent shipping and storage characteristics.

6,489

**PHILODENDRON PLANT**  
Howard N. Miller, Gainesville, Fla., assignor to Cora McColley,  
Orlando, Fla.  
Filed Apr. 6, 1987, Ser. No. 34,625  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—88 1 Claim  
1. A new and distinct variety of Philodendron plant, substantially as herein shown and described, characterized particularly as to novelty by its thick, ovate, waxy emerald green leaves, its self-heading growth habit and profuse branching from the crown, its excellent in-house growth, having the ability to withstand moderately low light, low maintenance and long periods without water, greater resistance to bacterial leaf rot than Philodendron varieties now available, and upright symmetrical growth, attaining an average height of 18" to 20" and width of 36" to 40" in approximately a year from tissue culture.

6,490

**CHRYSANTHEMUM PLANT NAMED CAPPA**  
Pieter L. van Loon, Sprang-Capelle, Netherlands, assignor to  
Hoek Breeding B.V., 's-Gravenzande, Netherlands  
Filed Apr. 16, 1987, Ser. No. 39,063  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—74 1 Claim  
1. A new and distinct Chrysanthemum plant named Cappa, as illustrated and described, and parts thereof.

6,491

**POINSETTIA PLANT NAMED H-365**  
Alexander Hrebeniuk, Rd. #1, Box 118, Sugar Run, Pa. 18846  
Filed Apr. 24, 1987, Ser. No. 42,032  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—86 1 Claim  
1. A new and distinct cultivar of Poinsettia plant named H-365, as described and illustrated, and particularly characterized by its bright red bracts; upright and compact growth habit, with excellent branching and breaking; 8½ week flowering response; excellent growth and flowering under cool conditions; excellent keeping qualities, and by its cyathias which remain up to five weeks after blooming.

6,492

**ROSE PLANT**  
Von C. Weddle, 2801 Charlestown Rd., New Albany, Ind. 47150  
Filed Mar. 16, 1987, Ser. No. 26,528  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—11 1 Claim  
1. A new and distinct variety of rose plant of the hybrid tea rose class, substantially as shown and described, characterized particularly by large light red, deep pink colored flowers of good exhibition form attractively displayed against shiny dark green foliage and which are long lasting on the plant and as cut flowers.

6,493

**"JOE MELLO" RED RASPBERRY**  
Stephen Wilhelm, Watsonville, Calif., assignor to Sweetbriar  
Co., Watsonville, Calif.  
Filed Feb. 19, 1987, Ser. No. 16,231  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—46 1 Claim  
1. The new and distinct cultivar of red raspberry herein described and identified by the characteristics enumerated above.

6,494

**STREPTOCARPUS PLANT NAMED ULYSSES**  
Lyndon W. Drewlow, Ashtabula, Ohio, assignor to Mikkelsen's,  
Inc., Ashtabula, Ohio  
Filed Apr. 22, 1987, Ser. No. 42,102  
Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68 1 Claim  
1. A new and distinct Streptocarpus plant named Ulysses, as illustrated and described, and particularly characterized by its distinct deep violet blue flower color, highly floriferous and continuous flowering habits, ease of propagation and early flowering, and its ability to flower both under low light and high temperature conditions.

6,495

**STREPTOCARPUS PLANT NAMED ELECTRA**

Lyndon W. Drewlow, Ashtabula, Ohio, assignor to Mikkelsen, Inc., Ashtabula, Ohio

Filed Apr. 22, 1987, Ser. No. 42,103

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—68

1 Claim

1. A new and distinct cultivar of Streptocarpus plant named Electra, as illustrated and described, and particularly characterized by its bright red-purple flower color, rosette form with short pliable leaves, compact growth habit, ease of propagation and early flowering, highly floriferous and continuous flowering habits, and its ability to flower both under low light and high temperature conditions.

6,498

**CHRYSANTHEMUM PLANT NAMED AKIRA**

Cornelis P. Vandenberg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed May 15, 1987, Ser. No. 49,831

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—74

1 Claim

1. A new and distinct Chrysanthemum plant named Akira, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; spoon daisy capitulum type; red-purple ray floret color; diameter across face of capitulum of up to 15 cm at maturity when grown as a pinched disbudded pot mum; uniform eight week photoperiodic flowering response to short days; medium plant height when grown as a pinched pot mum; recommended both as disbudded and spray pot mum; and spreading and prolific branching pattern.

6,496

**POINSETTIA PLANT NAMED HL1—HOT PINK**

Alexander Hrebeniuk, R.D. #1, Box 118, Sugar Run, Pa. 18846

Filed May 1, 1987, Ser. No. 44,461

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—86

1 Claim

1. A new and distinct cultivar of Poinsettia named HL1—Hot Pink, as illustrated and described.

6,499

**CHRYSANTHEMUM PLANT NAMED DART**

William E. Duffett, and Cornelis P. Vandenberg, both of Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed May 15, 1987, Ser. No. 49,832

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—74

1 Claim

1. A new and distinct plant of Chrysanthemum named Dart, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; spooned daisy capitulum type; red-purple ray floret color; diameter across face of capitulum of up to 12 cm at maturity; uniform nine week photoperiodic flowering response to short days; medium plant height when grown single stem; 15 to 25 cm peduncles on open, normally terminal sprays; and 13 degrees Celsius minimum temperature tolerance for initiation and development of flowering buds.

6,497

**CHRYSANTHEMUM PLANT NAMED BRIOSO**

Cornelis P. Vandenberg, Salinas, Calif., assignor to Yoder Brothers, Inc., Barberton, Ohio

Filed May 14, 1987, Ser. No. 49,779

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—74

1 Claim

1. A new and distinct plant of Chrysanthemum named Brioso, as described and illustrated, and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form; daisy capitulum type; purple ray floret color; diameter across face of capitulum of up to 125 mm at maturity; uniform nine week photoperiodic flowering response to short days; tall plant height when grown single stem; 10 to 25 cm peduncles on open, normally terminal sprays; and 13 degrees Celsius minimum temperature tolerance for initiation and development of flowering buds.

6,500

**CARNATION NAMED KLEFFTOP**

Siegfried Klemm, Hanfacker 8, D 7000 Stuttgart 50, Fed. Rep. of Germany

Filed Dec. 5, 1986, Ser. No. 938,558

Int. Cl.<sup>4</sup> A01H 5/00

U.S. Cl. Plt.—70

1 Claim

1. A new and distinct carnation cultivar, substantially as herein shown and described, characterized by its high productivity of venetian pink flowers having cardinal red stripes extending lengthwise on petals from the tips of petal ruffles, said flowers are borne singly on rigid, erect pedicels carried in spray formation on a sturdy and upright peduncle.

**PATENTS**

GRANTED DEC. 27, 1988

**ERRATA**

For	See
CLASS	PATENT NO.
012-142 .....	4,793,079
404-069 .....	4,793,162
366-336 .....	4,793,247
600-014 .....	4,793,325
177-025 .....	4,793,420
220-465 .....	4,793,519
294-065 .....	4,793,657
273-128 .....	4,793,769
065-002 .....	4,793,840
428-550 .....	4,793,968
526-064 .....	4,794,004
427-431 .....	4,794,044
430-041 .....	4,794,087
558-257 .....	4,794,205
437-247 .....	4,794,217
313-587 .....	4,794,308
343-715 .....	4,794,319
341-166 .....	4,794,369
341-120 .....	4,794,374
351-163 .....	4,794,435
372-038 .....	4,794,603



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## PATENTS

GRANTED DECEMBER 27, 1988

### GENERAL AND MECHANICAL

4,793,001

#### FULL FACIAL SHIELD ASSEMBLY

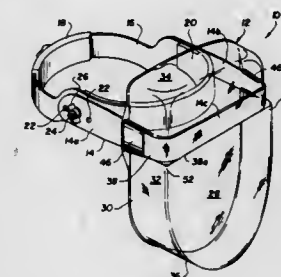
Vito A. Accardi, Dix Hills, N.Y., assignor to Accardi Enterprises, Inc., Dix Hills, N.Y.

Filed Mar. 29, 1988, Ser. No. 174,592

Int. Cl.<sup>4</sup> A42B 5/00

U.S. Cl. 2—9

20 Claims



1. A dental and medical facial shield assembly comprising:
  - a transparent face shield having a front portion adapted to cover the front of a wearer's face and a peripheral border around the front portion and adapted to extend toward the periphery of a wearer's face, said front portion and peripheral border defining an interior space, said face shield including a pair of spaced apart groove structure in said peripheral border, each groove structure having a concave surface on one side thereof and a convex surface on an opposite side thereof;
  - a support band for engagement in at least one of said groove structures for engaging the concave surface of said at least one of said groove structure to support said face shield; and
  - a clip engaged over said at least one groove structure and engaged against said convex surface of said at least one groove structure for holding said face shield to said support band.

4,793,002

#### PROTECTIVE EYEWEAR

James A. Simon, Hometown, Ind., assignor to Eye Pro, Inc., Indianapolis, Ind.

Division of Ser. No. 813,070, Dec. 24, 1985, Pat. No. 4,701,962.

This application May 7, 1987, Ser. No. 46,777

The portion of the term of this patent subsequent to Oct. 27,

2004, has been disclaimed.

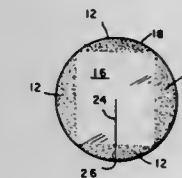
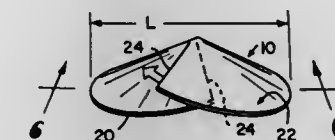
Int. Cl.<sup>4</sup> A61F 9/04

U.S. Cl. 2—12

12 Claims

1. An eye protector to reduce exposure of an eye to ultraviolet radiation and potential eye irritants, said protector comprising a film segment of generally ovoid to circular shape in plan view, said film segment comprising an ultraviolet light absorbing polymer film selected so that the eye protector is transparent to at least a portion of incident visible radiation, said film segment having
  - an eye proximal first side, an eye distal second side, and a peripheral edge,
  - a scission line extending radially inwardly from a point on the edge toward the center of the segment, and
  - a contact adhesive applied to a locus on the first side of the film segment, said locus of applied adhesive being coincident with at least a portion of the radially inwardly extending scission line to permit reconfiguration of the film segment to a conical configuration and said locus of applied adhesive being coincident with the peripheral edge of the film segment leaving a central portion of the first

side free of adhesive to permit opening and blinking of the eye while the peripheral edge is in adhesive contact with



the fleshy structures immediately adjacent the eye in the eye cavity.

4,793,003

#### LIGHT OCCLUSIVE EYE PATCH

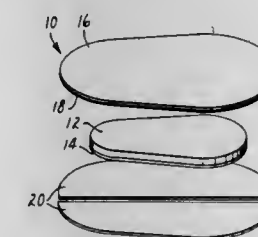
John E. Riedel, White Bear Lake, Minn., and Jay V. Ihlenfeld, Neuss, Fed. Rep. of Germany, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jun. 26, 1986, Ser. No. 878,995

Int. Cl.<sup>4</sup> A61F 9/04

U.S. Cl. 2—15

10 Claims



1. A self adherent eyepatch comprising:
  - an absorbent pad shaped to fit over the eye having a nonadherent lower surface for contacting the eye and an opposing upper surface;
  - a thin microporous polymeric film adhered to said upper surface of said absorbent pad and at least coextensive therewith, said film being capable of blocking at least 95 percent of the light of a preselected wavelength impinging thereon;

pressure sensitive adhesive means extending around the periphery of said absorbent pad for adhering the eyepatch to the eye socket; and  
 a removable protective liner covering said nonadherent lower surface of said absorbent pad and the exposed portion of said pressure sensitive adhesive;  
 said eyepatch having a moisture vapor permeability of at least 600 grams per square meter per 24 hours throughout and a conformability value of less than 800 grams.

4,793,004

## DISPOSABLE BIB CONSTRUCTION

Daniel C. Long, and Dale G. Welch, both of Newton, N.C., assignors to Unico Products, Inc., Newton, N.C.

Filed Feb. 5, 1988, Ser. No. 152,939

Int. Cl.<sup>4</sup> A41B 13/10

U.S. Cl. 2—49 R



1. A disposable bib comprising:  
 a unitary sheet of drapable material having opposite top and bottom edges defining a length direction therebetween, and opposite side edges defining a width direction therebetween,  
 a pair of slots extending generally along respective ones of said side edges of said sheet, with each of said slots including a first segment which extends along a substantial portion of the length of and generally parallel to the adjacent side edge of said sheet to a point adjacent said bottom edge of said sheet, and a second segment extending from said point to an adjacent edge of said sheet, and with each of said slots including at least one interruption which defines a bridging interconnection and which is at a location closer to said bottom edge than said top edge, and whereby said pair of slots define a pair of ties along respective opposite side edges of said sheet and such that said ties can be rendered free for use by rupturing said bridging interconnections.

4,793,005

## SPORTS GLOVE

John M. Hetzel, Jr., Dayton, Ohio, assignor to Powr-Lok, Inc., Dayton

Filed Jul. 28, 1987, Ser. No. 78,620

Int. Cl.<sup>4</sup> A41D 19/00

U.S. Cl. 2—161 A

9 Claims



1. A sports glove comprising:  
 a glove body shaped to slip over a human hand and includ-

ing a wrist opening and a palm side made of a flexible material and including a palm portion;  
 a flexible strap attached at one end thereof to said palm portion and having a free end; and  
 means for releasably attaching said free end to said glove body at a location on said palm side such that said one lies between said wrist opening and said attaching means on said palm side, whereby said strap can be looped outwardly away from said palm portion and said wrist opening, around an implement to be grasped, and secured to said attaching means such that tensile force exerted by said bar on a hand of a user is borne partially by said strap and glove body.

4,793,006

## VISOR CAP WITH MOVABLE PROTECTIVE VISOR

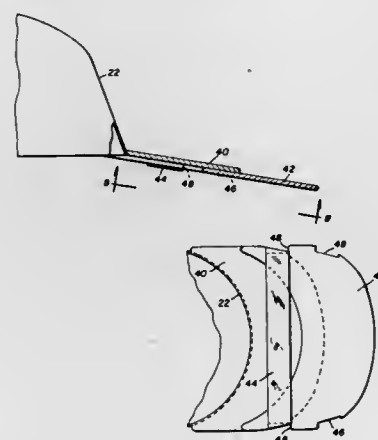
William O. Dawson, 267 Longpointe Ct., Vero Beach, Fla. 32966

Filed Feb. 16, 1988, Ser. No. 155,991

Int. Cl.<sup>4</sup> A42B 1/06

U.S. Cl. 2—191

2 Claims



1. A cap to be worn on the head of a person, comprising:  
 a generally hemispherical shell, having a lower edge, which fits over the upper portion of the head of a person;  
 a permanent visor attached to that portion of the shell lower edge which contacts the forehead and extending outwardly therefrom;  
 the permanent visor having an elastic band lateral to and extending across at least one side of the permanent visor;  
 an extendible visor having essentially the same shape as the permanent visor and movable from a stored position where it mates with the permanent visor to a forward extended position at which it effectively increases the length of the permanent visor;  
 the extendible visor being located between the permanent visor and the elastic band;  
 fastener means which releasably secures the extendible visor in stored mating position against one side of the permanent visor and which releasably secures the extendible visor in forward extended position against one side of the permanent visor;  
 the fastener means including two parallel pair of lateral notches;  
 a first pair of the laterally opposing notches being located along the edges of the extendible visor, with said notches engageable with the elastic band when the extendible visor is in storage position mating with the permanent visor;  
 a second pair of the laterally opposing notches being located along the edges of the extendible visor, with said notches engageable with the elastic band when the extendible visor is in forward extended position; and

the first pair of notches being located on the extendible visor forward of the second pair of notches.

4,793,007

## SAFETY HELMET AND ADJUSTABLE LIGHT

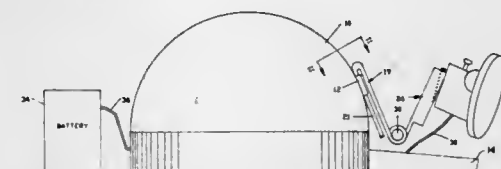
Elben R. Barnett, P.O. Box 54, Charleston, W. Va. 25301

Filed Jun. 15, 1987, Ser. No. 61,977

Int. Cl.<sup>4</sup> A42B 1/24, 3/00

U.S. Cl. 2—422

1 Claim



1. In combination with a safety helmet and a light attachable to the front of said helmet, said light being powered by a battery pack attached to a wearer, said helmet including a rim, said helmet having light supporting means including a band attached to said helmet above said rim and spaced from said helmet to provide a slot, said light having securing means suitable to attach said light to said helmet; the improvement comprising an adjustable connector for attaching said light to said helmet, said connector having a first member engaging said light support means of said helmet, said connector having a second member engaging said securing means of said light, said first member having a flange portion extending into said slot, said first member having a bent connecting portion and a base portion spaced from and generally parallel to said flange portion, said light securing means having a depending tongue, said second member having a slot to receive said tongue, and said connector having adjustment means pivotably connecting said first member and said second member to adjust the position of said light to selectively change the area illuminated whereby said light is movable from a normal upper position to a downwardly directed position suitable for illuminating a work area close to the wearer and close to the ground.

4,793,008

## METHOD OF TRANSFERRING A PATIENT AND MATS THEREFOR

Paul J. Johansson, 1416 Grant Rd., Northbrook, Ill. 60062

Continuation-in-part of Ser. No. 830,261, Feb. 18, 1986, Pat. No.

4,716,607, and Ser. No. 869,367, Jun. 2, 1986, Pat. No.

4,700,416. This application Dec. 11, 1986, Ser. No. 940,727

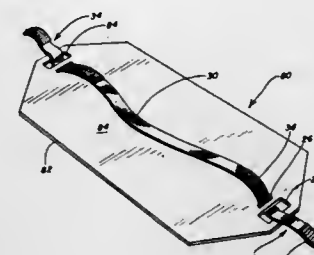
The portion of the term of this patent subsequent to Oct. 20,

2004, has been disclaimed.

Int. Cl.<sup>4</sup> A61G 7/08

U.S. Cl. 5—81 R

14 Claims



1. A simplified patient transfer mat comprising:  
 an elongated body portion having a substantially elongated rectangular shape adapted to be placed transversely under

a selected portion of the torso of a patient to facilitate moving at least said torso portion of the patient;  
 said body portion being formed from a flexible but substantially rigid lightweight material which will at least partially conform with the contour of a portion of the patient's body and provide a sufficient sliding surface for moving said patient, said body portion being integrally formed of a single planar piece of said material, said body portion having a length substantially less than the length of a patient, but greater than the width of a patient and a width substantially less than said length, said width being at least a third of said length; and  
 openings in each of said body portion adapted to be grasped by an attendant to move said patient and each end having a width lesser than the body portion width with substantially straight edges extending from and joining said end to the body portion to assist in inserting said body portion beneath the torso portion of the patient by sliding under said torso portion.

4,793,009

## PIECE OF RECLINING FURNITURE

Hugo Degen, Seltisberg, Switzerland, assignor to Marpal AG, Switzerland

Filed Jan. 9, 1987, Ser. No. 1,644

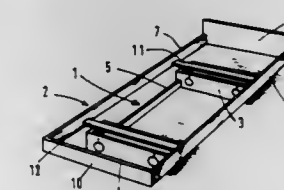
Claims priority, application Switzerland, Jan. 13, 1986, 99/86;

Jan. 13, 1986, 100/86

Int. Cl.<sup>4</sup> A47D 9/02

U.S. Cl. 5—103

12 Claims



1. A piece of reclining furniture having a longitudinal direction and a fixed stand on which a pendulum frame is suspended in freely oscillating manner via at least three pendulums and is provided with a device for limiting amplitude;  
 the stand having at least two bases which are arranged at a mutual distance, the bases being adapted for accommodating tension members which support the pendulum frame, the bases being made in a box shape and being connected into a rigid stand unit by means of connection elements, with the pendulum frame being supported on supporting members which, in the area of the two bases, are suspended in oscillating manner on the tension members;  
 the device for limiting the amplitude having a plate which is displaceable on the supporting member of the pendulum frame, the plate having a bore which encloses the tension member, an idle roller being arranged on the supporting member, over which roller a flexible belt runs, the belt being fastened on both sides of the roller to a part of the fixed stand.

4,793,010

## BABY ROCKER APPARATUS

Joseph Gross, Moshav Mazor, David Lowenstein, Nethanya; Menachem Tilman, Hoffit, and Etan Rosenberg, Rimona, all of Israel, assignors to General Ideas & Products Ltd., Tel Aviv, Israel

Filed Oct. 28, 1987, Ser. No. 113,304

Int. Cl.<sup>4</sup> A47D 9/02

U.S. Cl. 5—109

20 Claims

1. Apparatus for rocking a baby holding device having a plurality of legs for supporting the device on the floor, com-

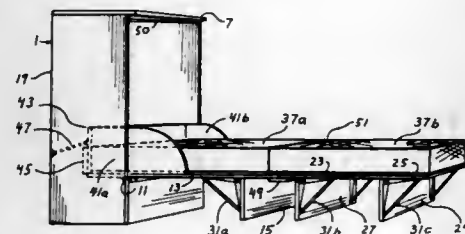


prising: roller means for each of said legs for supporting the respective leg so as to be rollable over the floor; one of said roller means comprising a base separate from, and detached from, the roller means of all the remaining legs and adapted to



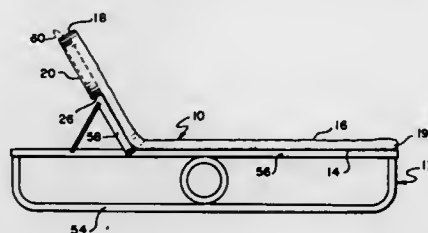
be non-rotatable supported on the floor to underlie one of said legs; a holder rollably supported on the base and adapted to receive its respective leg of the baby holding device; and a motor for rocking said holder and the leg received in its socket with respect to said base.

4,793,011  
FOLDING BED AND CABINET  
Melvin E. Eve, 1711 Anchovy Ave., San Pedro, Calif. 90732  
Filed Jun. 4, 1987, Ser. No. 58,242  
Int. Cl.<sup>4</sup> A47C 19/06  
U.S. Cl. 5—136 7 Claims



1. A combination cabinet and folding bed wherein  
(a) the cabinet comprises two sides, a top, a back, and a segmented front having a lower section and an upper section, the lower section being secured to the two sides, the interior surface of said top having a recessed stiffening member transversing the extent thereof and forming an abutment stop, and rotating means connecting the upper section to the lower section so that the upper section can rotate from an upright position outwardly from the cabinet to a horizontal position, and  
(b) the folding bed consists of an inner pallet, a middle pallet and an outer pallet, the inner pallet also being the upper section of the segmented front, the three pallets being solid and hinged together so that they are adapted to form a continuous horizontal surface, each pallet having at least one supporting leg extending the width of each of said pallets and being collapsibly attached to a surface which is the under surface in the horizontal position and said legs being approximately equal in height to the height of the lower section of the segmented front said inner pallet having a lateral edge member adjacent said middle pallet adapted to abut said stiffening member when said folding bed is in the upright position.

4,793,012  
BEACH MAT ADAPTED FOR USE ON A LOUNGE CHAIR  
Victor J. LaPorte, 1807 Bittersweet Ln., Mt. Prospect, Ill. 60056  
Filed Jun. 26, 1986, Ser. No. 879,003  
Int. Cl.<sup>4</sup> A47G 9/06; A45C 9/00; A47C 31/10  
U.S. Cl. 5—420 4 Claims



1. A beach mat for use on a lounge chair or a supporting surface comprising a rectangular pad of flexible, foldable, low resilience, water absorbent materials having a major central axis of elongation extending between opposite ends thereof and a minor central axis of elongation extending between opposite edges of the pad, said pad having a face side adapted to form a surface for supporting a person and an opposite rear side adapted to be in contact with the surface of a lounge chair or supporting surface, a flap of material extending across the rear side of the pad at one-end thereof and extending from said one-end toward the opposite end of the pad to an edge disposed at a distance from the one-end of the pad between 1/5th and 1/6th of the length of the major axis of elongation of the pad, said flap being attached to the pad at the one-end and the adjacent portions of the edges of the pad and forming a pocket closed at the one-end and edge portions of the mat and open at the edge of the flap, the pocket formed by the flap having a width measured parallel to the minor axis of the pad at the edge of the flap approximately equal to the length of the minor axis of the pad, the flap being adapted to receive the upper portion of the back of a lounge chair and accommodate said portion of the back to anchor the mat on the lounge chair, said mat being adapted to fold toward the back side thereof between four and five times to form a flat roll adjacent to the edge of the flap, said mat being adapted to fold an additional time toward the back side along an axis parallel to and adjacent to the edge of the flap, the flat roll being insertable in the flap for storage on said additional fold wherein the pad, with the flat roll disposed in the pocket, is adapted to fold along the major axis of elongation of the pad through an angle of approximately 180 degrees, the pad being adapted to fold along the major axis in a direction toward the front side of the pad, whereby the edge of the pocket is exposed to receive objects, and fastener means mounted on the pad adapted to retain the pad in folded position.

4,793,013  
WATER MATTRESS BAG, AND A METHOD FOR PRODUCING THE SAME  
Winfried P. Barulla, Bregnevelen 22, N-1825 Tomter, Norway  
Filed Apr. 1, 1987, Ser. No. 32,583  
Claims priority, application Norway, Apr. 4, 1986, 861319; Sep. 29, 1986, 863868  
Int. Cl.<sup>4</sup> A47C 27/08  
U.S. Cl. 5—451 11 Claims

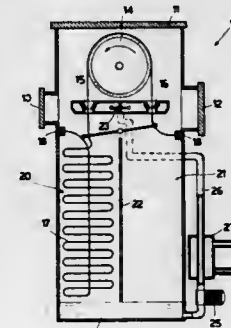
1. A water mattress bag of a resilient material and provided with a valve (2) for filling/draining water, for use with a main mattress member (3) of a resilient, flexible foamed plastic or some other similar material having a recess in its surface (4) extending over a substantial portion of the length (L) and width (B) of said surface, the bottom side (1a) of said water mattress bag (1) being shaped with a bulge (1a') for coopera-

tion with said recess (4), and the top side (1d) of said water mattress bag (1) having a length (L) and width (B), said water mattress bag (a) consisting of a blank (A) of a watertight resilient foil/sheet material with tensile strength with two pairs of opposed lateral edges (1b,1b') and (1c,1c'), one pair of lateral edges (1b,1b') having curved or tongue shaped projections (1b',1b''), with said lateral edges with curved projections joined together along a



longitudinal seam (5) and forming a sleeve (A') the openings of which are limited by a second pair of lateral edges (1c,1c') and closed by transverse welded seams in superimposed sleeve walls flattened against one another with said longitudinal seam (5) crossing the central portions of said transverse welded seam (6,6), said transverse welded seams (6) being provided at a distance from the ends of sleeve (A') having lateral edges (1c,1c').

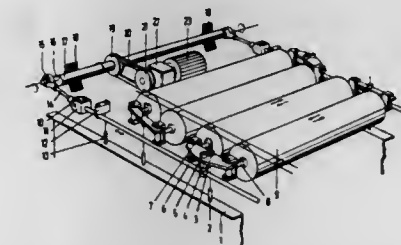
4,793,014  
PROCESS AND MACHINE FOR THE TREATMENT, IN PARTICULAR FOR BATCHWISE DYEING, OF LAP-FOLDED FABRICS  
Chiappini Luigi, Urgnano, Italy, assignor to M C S Officina Meccanica S.p.A., Bergamo, Italy  
Filed Sep. 11, 1987, Ser. No. 95,227  
Claims priority, application Italy, May 7, 1987, 20424 A/87  
Int. Cl.<sup>4</sup> D06B 5/22 25 Claims  
U.S. Cl. 8—152



20. The method of dyeing a length of fabric comprising the steps of:  
depositing said length of fabric in a stationary container;  
providing driven transport means having a stationary tangential substantially vertical fabric delivery on respective sides thereof in combination with a stationary nozzle substantially vertically below each respective delivery;  
lifting the fabric substantially vertically in running length from one stationary part of the container by said transport means;  
continuing to move the fabric in running length substantially vertically downwardly from a stationary tangential delivery in a substantially tensionless state while applying a dyeing liquid from a stationary nozzle to said fabric and depositing same in another part of the container;  
then reversing the direction of movement of the fabric again

lifting the fabric upwardly in running length from said another part of the container; and  
then again applying a dyeing liquid to said fabric while continuing to move said fabric in running length, prior to depositing same vertically in said one part of the container;  
whereby a dyeing liquid may be applied evenly and without immersion during application thereof.  
23. Apparatus for dyeing a length of fabric comprising:  
a liquid container;  
a partition dividing said container into at least a pair of stationary vertical compartments;  
a power operated transport means having a stationary axis and a stationary tangential substantially vertical fabric delivery on respective sides thereof alternately moving said fabric from one of said compartments into the other of said compartments;  
a nozzle carried substantially vertically below each of said deliveries fixed with respect to said compartments each receiving said fabric and delivering same into one or the other of said compartments;  
pump means collecting liquid from respective compartments so that substantially no liquid remains therein to impede the fall of the fabric and returning collected liquid to at least one of said nozzles;  
whereby said fabric may be dyed while being conveyed rapidly from one compartment to the other without substantial tension.

4,793,015  
APPARATUS FOR CLEANING EGGS AND LIKE ARTICLES  
Jelle van der Schoot, and Gerrit J. H. Nijkamp, both of Aalten, Netherlands, assignors to Staalkat B.V., Netherlands  
Filed Sep. 8, 1987, Ser. No. 94,303  
Int. Cl.<sup>4</sup> A01K 43/00 10 Claims  
U.S. Cl. 15—3.13



1. An apparatus for cleaning eggs having a housing, a roller conveyor disposed adjacent said housing such that at least an upper portion of said conveyor is disposed within said housing, a plurality of rotatable elongated brushes disposed within said housing and adjacent said upper portion of the conveyor, at least one crank-shaft operably connected to said brushes for reciprocating the brushes along the axes thereof, and a wash fluid supply means disposed above the said brushes for supplying wash liquid to said brushes, the improvement comprising at least one yoke having spaced apart connecting means for connecting each of a pair of adjacent brushes to said yoke at the axes of the brushes, a bearing disposed on said yoke between said spaced apart connecting means, a journal with a portion being received by said bearing so that said yoke is rotatable about said journal and another portion being fixedly attached to a support frame member, a pin fixed by a first end thereof to said yoke and being disposed between the spaced apart connecting means, a driving rod disposed adjacent said yoke and being fixed at a first portion to a second end of said pin and operably connected at a second portion to a drivable crank-shaft disposed such that reciprocable motion to said driving

rod is provided, whereby said driving rod is reciprocable along its axis, said pin is reciprocable along the axis of the driving rod, the yoke is reciprocable about said journal and said pair of adjacent brushes are oppositely reciprocable along the axes thereof.

4,793,016

## CONDUIT CLEANING APPARATUS

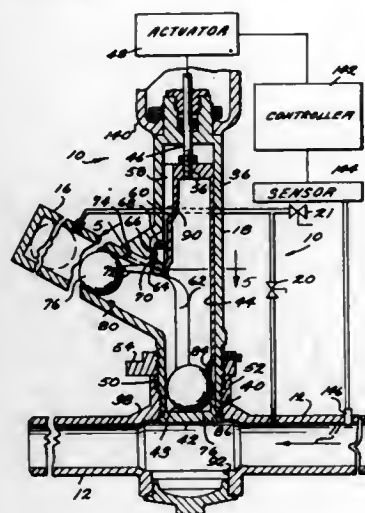
David E. Valentine, 2320 Valley High Dr., Independence, Kans. 67301, and Michael J. Orgeron, 2261 Killington Dr., Harvey, La. 70058

Continuation-in-part of Ser. No. 839,261, Mar. 13, 1986, abandoned. This application Oct. 30, 1986, Ser. No. 925,053

Int. Cl.<sup>4</sup> B08B 9/04

U.S. Cl. 15—104,062

19 Claims



1. Apparatus for cleaning a length of a conduit while the conduit carries fluid under pressure along the flow path defined by the length of the conduit, the apparatus comprising injector means mountable at a selected location along the length of the conduit, said injector means including a casing and an injector member in said casing and having a carrier portion for carrying a cleaning element, said carrier portion including a floor on which the cleaning element will rest, said injector means having a side which will be exposed to the flow of fluid in the conduit, said floor having wall means extending a selected distance from said floor of said carrier portion to prevent premature discharge of a cleaning element therefrom when said side of said injector means is exposed to fluid flow in the conduit, said injector member being movable relative to said casing between a retracted position where said carrier portion is out of the flow path of the conduit and an injected position where said carrier portion including said wall means is moved through the flow path of the conduit so that said cleaning element will be exposed to the fluid flowing through the conduit after said wall means enters said flow path so as to be movable off said carrier portion and into said conduit.

4,793,017

## VIBRATING DRAIN-CLEANING IMPLEMENT

Paul S. Kaye, Racine, Wis., assignor to Lewisan Products, Inc., Racine, Wis.

Filed Dec. 7, 1987, Ser. No. 129,456

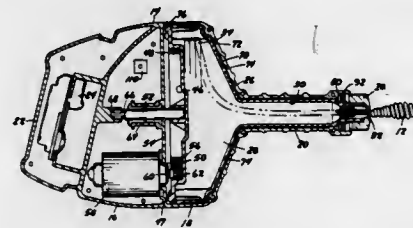
Int. Cl.<sup>4</sup> B08B 9/02

U.S. Cl. 15—104,33

21 Claims

1. In a drain-cleaning implement of the type with a non-rotatable frame, a snake rotatable with the snake container about the snake axis and extendable for drain insertion, a gripper adjustably secured to the snake and rotatable therewith, and means

to rotate the snake, the improvement comprising means to impart vibratory motion to the snake at a frequency greater than the rate of rotation, said vibratory means including first and second vibratory members secured with respect to the frame and the snake, respectively, each vibratory member



having a plurality of projecting means with spaces therebetween said projecting means adapted to be in repeated interrupted contact with each other to repeatedly change the relative positions of the first and second vibratory members as the snake rotates, hereby the snake will more readily pass traps and other obstacles in the drain.

4,793,018

## TENNIS SHOE CLEANING DEVICE

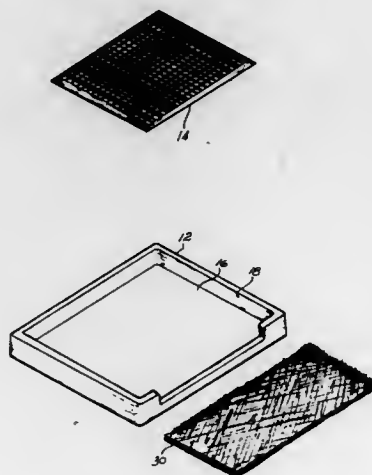
James D. Ehrich, Suite 12, 12875 S. Cleveland Ave., Fort Myers, Fla. 33907

Filed Nov. 6, 1986, Ser. No. 927,903

Int. Cl.<sup>4</sup> A47L 23/22; B08B 3/02

U.S. Cl. 15—104,92

1 Claim



1. A device for cleaning loose particles from sole crevices of a shoe, said device comprising a receptacle at least partially filled with a quantity of fluid, a flexible mat formed of pliable shape-returning material positioned within said receptacle, said mat including storage means for holding a portion of said fluid, said mat constituting means for expelling said fluid from said storage means under pressure into said shoe sole crevices to clean the loose particles from therein when the mat is stepped on and flexed by a wearer of said shoe, said storage means including a top wall and a plurality of pliable intersticed depending ribs extending from said top wall to adjacent said receptacle to form individual peripherally enclosed independent compartments, said storage means top wall having a plurality of holes therethrough extending into said compartments to accommodate expulsion of fluid from said compartments when said mat is so stepped upon.

4,793,019

## SPONGE MOP ATTACHMENT

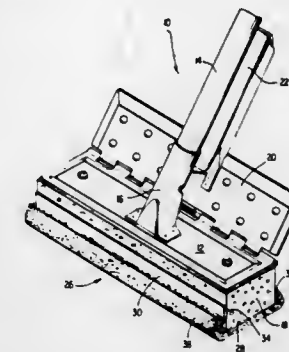
Joseph F. Stima, Edison; Ligia A. Rivera, Brunswick, both of N.J., and John C. Crawford, Lake Mahopac, N.Y., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Sep. 2, 1987, Ser. No. 92,018

Int. Cl.<sup>4</sup> A47L 13/19, 13/257

U.S. Cl. 15—104,94

10 Claims



1. An attachment for a sponge mop including a mop head and a sponge, the attachment comprising:

- (a) a clip attachment having inner and outer surfaces, said attachment adopted to be releasably secured to the mop head, said attachment including an elongated, semi-rigid clip which is generally U-shaped in transverse cross section, to thereby define a central bight portion integrally secured to two legs, said bight portion having an exterior surface, said legs each having a free edge and an inner surface adapted to clampingly and frictionally engage opposite, parallel surfaces of the sponge, the inner surface of at least one of said legs being provided adjacent its free edge with serrations, the exterior surface of the bight portion of the clip being adapted to be covered with a floor contacting material to thereby define a pad; and
- (b) a pad having a generally planar outer or front surface for contacting hard surfaces.

4,793,020

## NOISE INSULATOR FOR WINDSHIELD WIPER BLADE ASSEMBLY

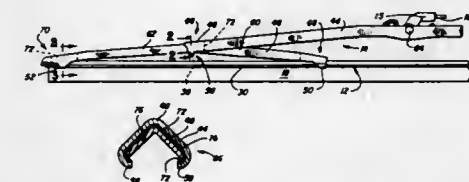
Donald W. Stratton, St. John; Michael A. Bianco, Valparaiso, and Gary W. Roadarmel, Michigan City, all of Ind., assignors to The Anderson Company of Indiana, Michigan, Ind.

Filed May 18, 1987, Ser. No. 50,324

Int. Cl.<sup>4</sup> B60S 1/02

U.S. Cl. 15—250,42

11 Claims



1. An improved windshield wiper blade assembly of the type having a wiper element and a superstructure carrying the wiper element, there being at least first and second pivotally interconnected elements on said windshield wiper blade assembly, the improvement characterized by:

means comprising a tape interposed between said first and second pivotally interconnected elements to prevent rattling therebetween.

4,793,021

## MOLDED CASTER PINTLE WITH HIGH STRENGTH CORE

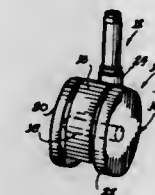
Richard Deasy, Torrance, and Henry J. Folsom, Redondo Beach, both of Calif., assignors to Illinois Tool Works, Inc., Chicago, Ill.

Filed Oct. 17, 1984, Ser. No. 661,847

Int. Cl.<sup>4</sup> B60B 33/00; E05D 5/10

U.S. Cl. 16—37

8 Claims



1. A caster pintle comprising an elongated high tensile strength resilient metal core, and a molded tough resilient organic plastic body molded around and substantially encapsulating said core, said body having a first end portion with means formed thereon for pivotally engaging a caster wheel means and a second opposite end portion with means for engaging a complementary mounting opening.

4,793,022

## TREAD PROTECTOR FOR DUAL WHEEL CASTER

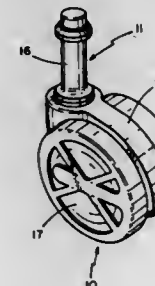
Lidio P. Raffaelli, Stratford, Conn., assignor to Stewart-Warner Corporation, Chicago, Ill.

Continuation of Ser. No. 836,117, Mar. 4, 1986, abandoned. This application Dec. 22, 1987, Ser. No. 136,496

Int. Cl.<sup>4</sup> A47B 91/06

U.S. Cl. 16—45

9 Claims



1. A wheel protector for a dual wheel caster of the type having a central horn member with an axle that rotatably supports two wheels each having an annular peripheral tread with an inner edge and outer face but without any annular groove, comprising:

- a one-piece flexible plastic molding including an unslotted smooth annular outer tread portion specifically designed for sliding over, attaching to and covering the wheel tread thereby protecting the wheel tread from contact with the ground without radially clamping the outer tread portion against the wheel, said outer tread portion having an inside surface and an outside surface;
- a face portion specifically designed to cover and protect the face of the wheel;
- a hand tab portion connected to the face portion; said face portion and outer tread portion being positioned



radially outwardly of the hand tab portion and being sufficiently weak so that when the hand tab portion is manually pulled, the face portion and the outer tread portion positioned radially outwardly of the tab portion will break, permitting the protector to be easily removed from the wheel; and  
flexible elastically deformable substantially flat radial projection means permanently extending inwardly from the axially inner side of the outer tread portion substantially parallel to the face portion to engage the inner edge of the wheel tread, said radial projection means extending radially inwardly from the inner surface of the outer tread portion a sufficient distance to lock the protector on the wheel until the outer tread portion is broken during protector removal and said projection means providing only axial locking of the protector on the wheel and sized to exert no radial clamping on the wheel.

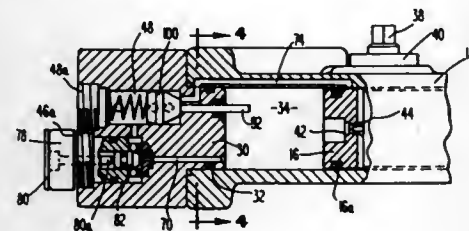
4,793,023

## DOOR CLOSER AND HOLDER

Jeffery M. Simpson, Monroe, and Clay E. Tully, Charlotte, both of N.C., assignors to Yale Security Inc., Monroe, N.C.  
Filed Jan. 15, 1987, Ser. No. 61,785  
Int. Cl.<sup>4</sup> E05F 3/22

U.S. Cl. 16-58

7 Claims



## 1. A door closer and holder comprising:

- a assembly including an oil-filled closed cylinder shell having therewithin a reciprocable journal in sealing engagement with the wall thereof;
- a control manifold at one end of the shell, the manifold being formed with a plunger chamber, the chamber being generally cylindrical;
- a plunger in the plunger chamber and having a shaft extending through a sealed bore in the manifold and into the interior of the shell to be engaged and depressed by the journal near the end of its travel toward the manifold end;
- biasing means urging the plunger toward the shell, in the manifold and shell,
  - inlet passage means interconnecting the manifold end of the shell and the plunger chamber at an opening in the chamber on the opposite side of the plunger from the shell;
  - drain passage means interconnecting the end of the plunger chamber more adjacent the shell and an opening in the shell on the opposite side of the journal from the manifold;
  - latch passage means interconnecting longitudinally spaced first and second openings in the wall of the plunger chamber, the first opening being more remote from the shell than the second opening, both openings being outward of the plunger when the plunger is in a first position close to the shell, and on opposite sides of the plunger when the plunger is moved by the journal to a second position away from the shell;
  - sweep passage means interconnecting the second opening and a third opening in plunger chamber at a point on the opposite side of the plunger from the other two openings when the plunger is in the first position;
  - spring means urging the journal toward the assembly;
  - check valve means in a return passageway in the assembly, the passageway communicating between oil on oppo-

site sides of the journal, the check valve means adapted to open during movement of the journal away from the manifold end and close during movement of the journal toward the manifold end, and  
h. rack and pinion and operator arm means associated with the journal to convert the motion of the journal into motion-controlling means for the door.

4,793,024

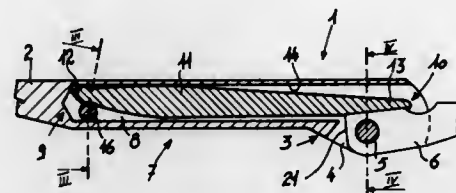
## ADJUSTABLE SPRING-LOADED HINGE DEVICE, PARTICULARLY FOR SPECTACLE FRAMES

Innocenzo Pivetta, San Vito Di Valdobbiadene, Italy, assignor to Celes Optical S.p.A., Pederobba, Italy  
Filed Mar. 2, 1987, Ser. No. 21,049  
Claims priority, application Italy, Mar. 3, 1986, 30647B/86[U]

Int. Cl.<sup>4</sup> G02C 5/22

U.S. Cl. 16-228

7 Claims



1. An adjustable spring-loaded hinge device, particularly for spectacle frames, comprising  
at least one element adapted to be rigidly associated with a spectacle frame front portion,  
a rod pivotally connected to said element and having a head, a cylindrical longitudinal recess defined in said head of said rod and having at least one blind end and at least one opening,  
elastic biasing means comprising a spring, said spring having a substantially circular cross-section and truncated-cone shaped ends, said spring being accommodated in said recess and having an intermediate portion, said ends including at least one end and at least one other end, said one end being adapted for cooperation with said element for determining conditions of stable balance and additional opening with elastic return, said other end facing said blind end of said recess, said spring defining a position in said recess,  
a pivot point defined by said intermediate portion and being adapted for pivoting on said recess,  
an inner lateral surface defined on said recess,  
seats defined on said inner lateral surface,  
at least one thread formed on said spring substantially at said pivot point and being adapted for cooperation with said seats,  
adjustment means adapted for permitting gradual rotation of said one end of said spring for adjusting said position of said spring in said recess.

4,793,025

## APPARATUS AND METHODS FOR REMOVAL OF TISSUE FROM BONE

Richard A. Melville, and Douglas W. Melville, both of 8c Tagal Road, Auckland, New Zealand  
Filed Jul. 7, 1987, Ser. No. 70,402  
Claims priority, application New Zealand, Jul. 7, 1986, 216766

Int. Cl.<sup>4</sup> A22C 17/04

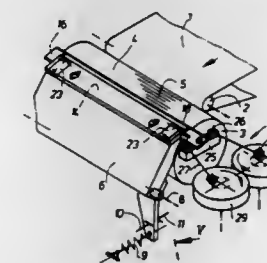
U.S. Cl. 17-46

6 Claims

3. A method for automated removal of tissue from a distal end of the rib bones of a rack of lamb, the method comprising the steps of moving the rack of lamb generally horizontally

through a cutting zone incorporating a first and a second predetermined position by a continuously operating generally horizontally oriented transport means comprising a pair of generally parallel spaced continuous drive chains having teeth for engaging the rack of lamb, the teeth of the drive chains being directed toward each other, the piece of meat being securely received between the drive chains and engaged by the teeth, generally linearly through the first and the second predetermined positions with the distal end of the ribs extending below the transport means, and during which first cutting at least a portion of the tissue extending below the transport means by a fluid jet cutting means comprising a pair of cutting nozzles disposed on opposing sides of the rack of lamb for

pad, said resilient displacement being also effective for resilient displacement of said knife blade;  
guide means for retaining said knife blade in said guide slot;



said guide means further including means for permitting said blade to reciprocate in said guide slot; and means for transversely reciprocating said knife blade in said knife slot.

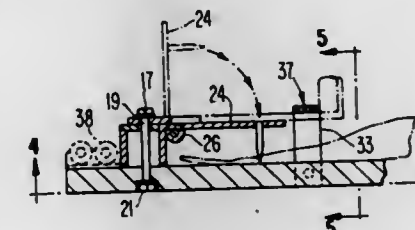
4,793,027

## FISH FILLETING KIT

Alfred Blight, 240 Bluefield Rd., Lexington, S.C. 29072  
Filed Jan. 12, 1988, Ser. No. 142,955  
Int. Cl.<sup>4</sup> A22C 25/06

U.S. Cl. 17-70

3 Claims



directing a pair of generally co-linear and oppositely directed jets of fluid of a generally circular cross-section at the distal end of the ribs extending below the transport means, the plane of the jets being generally horizontal and generally perpendicular to the path defined by the motion of the rack engaged within the transport means, and second stripping at least a portion of the previously cut tissue extending below the transport means from the rib by fluid jet stripping means comprising a first and a second nozzle for forming generally fan shaped jets of liquid to impact on opposite sides of approximately the same portion of each rib at angles of about 38 degrees and about 48 degrees respectively, with respect to the path defined by the motion of the rack engaged within the transportation means.

4,793,026

## APPARATUS FOR REMOVING A SURFACE LAYER FROM ANIMAL MUSCULAR TISSUE, PARTICULARLY A LAYER INCLUDING THE SKIN FROM FISH FILLETS

Horst Braeger, Rainer Brockach, both of Lübeck, and Peter Groth, Ratzeburg, all of Fed. Rep. of Germany, assignors to Nordischer Maschinenbau Rud. Baader GmbH + CO KG, Lübeck, Fed. Rep. of Germany  
Filed Feb. 18, 1987, Ser. No. 15,975  
Claims priority, application Fed. Rep. of Germany, Feb. 20, 1986, 3605414

Int. Cl.<sup>4</sup> A22C 25/17

U.S. Cl. 17-62

16 Claims

## 1. A skinning apparatus comprising:

- a rotatable skinning roller;
- means in a surface of said skinning roller for gripping a muscular tissue;
- a pressure pad;
- said pressure pad including a presser surface having a shape generally conforming to said skinning roller;
- a guide slot in said pressure pad;
- a knife blade in said guide slot;
- said knife blade including at least one cutting edge thereon;
- said guide slot being positioned in said pressure pad to dispose said at least one cutting edge projecting therefrom and facing said muscular tissue;
- means for permitting resilient displacement of said pressure

## 1. Apparatus for filleting fish comprising:

- a supporting board, for underlaying the fish to be filleted, which supporting board is large enough to support the largest fish to be filleted, and
- a mounting block, attached to said supporting board near one end of the upper surface of said supporting board, which mounting block is at least as thick as the thickest fish to be filleted, and
- a clamping means, attached to said upper surface of said mounting block, to hold said fish in place while it is being filleted, which clamping means is
- a gate arm, attached at one end by a hinge to the upper center of said mounting block, which gate arm extends over the tail of the fish to be filleted and is free to rotate about a horizontal axis perpendicular to the long axis of said support board, the length of said gate arm being at least as long as the tail of the longest fish to be filleted, and
- a plurality of pins attached to the underside of the free end of said gate arm so that, when said gate arm is extended fully over the fish to be filleted, said pins depend downwardly to just touch the upper surface of said supporting board, impaling and thereby securing said fish by its tail, and
- a locking means, attached to said mounting block and said supporting board, to hold said clamping means in an extended and closed position temporarily during the filleting process.

4,793,028

**FIBER-REMOVING ROLL FOR A BALE OPENER**

Johann Walk, Eichstaett, and Kurt Kriechbaum, Ingolstadt, both of Fed. Rep. of Germany, assignors to Schabert & Salzer, Ingolstadt, Fed. Rep. of Germany

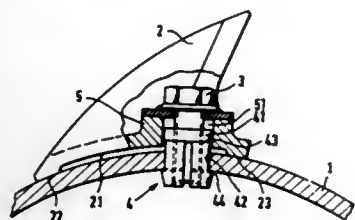
Filed Nov. 2, 1987, Ser. No. 120,113

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1986, 3637579

Int. Cl.<sup>4</sup> D01G 7/04, 7/06

U.S. Cl. 19—80 R

10 Claims



1. A fiber-removing roll for a bale opener, comprising:
  - (a) a hollow cylinder having a mantle with a plurality of perforations in said mantle;
  - (b) anchoring pegs, disposed in a plurality of said perforations;
  - (c) a plurality of fiber-removing teeth, each of which has a base with an arcuate contact surface adapted to conform to the outer circumferential contour of said hollow cylinder mantle; and
  - (d) means to anchor each of said teeth in place on circumferential contour and to said anchoring peg, whereby said teeth are releasably, but securely held on the circumferential contour of said hollow cylinder.

4,793,029

**TILTABLE BUTTON HAVING ANTI-ROTATION MEANS**

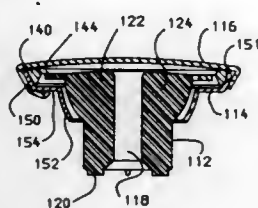
James E. Burke, Huntington, Conn., assignor to Scovill Fasteners Inc., New York, N.Y.

Filed Feb. 19, 1988, Ser. No. 157,534

Int. Cl.<sup>4</sup> A44B 1/12

U.S. Cl. 24—113 MP

8 Claims



1. A button comprising a rigid molded shank defined by a cylindrical lower portion having formed on its bottom at least one downward fabric-engaging projection offset from the center of the shank and a bulbous upper portion having a uniformly curving outward and upward side wall and a generally flat top; a collar loosely surrounding the upper end of the shank and having a contour on its inner surface generally proximate and complementing the bulbous upper portion of the shank; and a shell covering the top of the shank and crimped over the outer perimeter of the collar, and stabilizing means for limiting the rotary movement of the shell and collar with respect to the shank and whereby the shell and collar can tilt relative to the top of the shank but are held up in their center by the top of the rigid shank, and whereby the shell and collar are restrained from rotating relative to the shank.

4,793,030

**SINGLE-OR MULTILAYER STRAP OF FLEXIBLE MATERIAL**

Hermann Hirsch, Klagenfurt, Austria, assignor to Hermann Hirsch Leder- und Kunststoffwarenfabrik, Klagenfurt, Austria

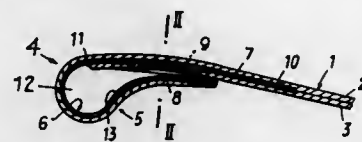
Filed May 31, 1983, Ser. No. 499,512

Claims priority, application Austria, Jun. 9, 1982, 2252/82

Int. Cl.<sup>4</sup> A44C 5/18

U.S. Cl. 24—265 WS

3 Claims



1. A watch strap comprising at least one layer of flexible material in the form of an elongated strip having an end portion adapted to be secured about a bar of a wristwatch, and a reversely bent member of spring metal, said spring metal member having a bend adapted to encircle a said watch bar and two legs which are outwardly convex when the strap is in a position secured to a watch bar, that leg which is the outer of said legs when the watch strap is worn being secured to the inner side of said flexible material and being convex in two orthogonal directions in said secured position and having a spring snap action, when the legs are pulled apart from each other, whereby said outwardly convex curvature in two orthogonal directions reverses to an outwardly concave curvature in two orthogonal directions to increase the distance between said legs to permit insertion of removal of a said watch bar.

4,793,031

**STRAP FASTENER**

Kazumi Kasai, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

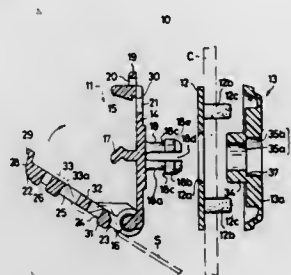
Filed Sep. 21, 1987, Ser. No. 98,943

Claims priority, application Japan, Sep. 19, 1986, 61-143679(U); Dec. 5, 1986, 61-187821(U)

Int. Cl.<sup>4</sup> A44B 11/25

U.S. Cl. 24—324

5 Claims



1. A strap fastener for connecting a strap to the fabric of a bag, comprising:
  - a socket member adapted to be mounted on the fabric of the bag and having a stepped bore; and
  - a fastener body having means for retaining the strap, and a plug projecting from the back of said fastener body, said plug including an enlarged head snappingly fittable in said stepped bore in said socket member to couple said fastener body with said socket member, said fastener body in coupled condition being rotatable about the axis of said plug with respect to said socket member;
  - said fastener body including a projection disposed on the back thereof, said socket member having an elongate groove receptive of said projecting and extending arcu-

ately about the axis of said stepped bore to a limited angular extent.

4,793,032

**SIDE RELEASE BUCKLE**

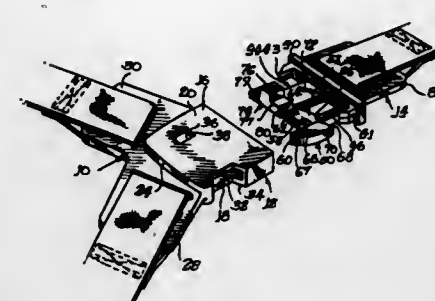
William G. Crowle, Deerfield, Ill., assignor to Illinois Tool Works, Inc., Chicago, Ill.

Filed Nov. 28, 1986, Ser. No. 935,833

Int. Cl.<sup>4</sup> A41F 1/00

U.S. Cl. 24—615

2 Claims



1. A buckle comprising a separable cooperating receptacle and clasp, said receptacle including a hollow body having an open end for receiving said clasp, and including first and second locking slots extending respectively through a sidewall and adjacent top or bottom wall of said hollow body, said clasp including a base member and first and second arm members extending from said base member in a lateral spaced-apart relation to each other, said first arm member including a first body portion supporting a first wing member and a first locking tab, said second arm member including a second body portion supporting a second wing member and a second locking tab extending in a ninety degree orientation relative to said first locking tab, said first wing member having a first ramp section slating toward said second wing member, said second wing member having a second ramping section slanting towards said first wing member at an angle complementary to the slanting angle of said first ramp section; the cooperating relation between said receptacle and said clasp being such that said first and second locking tabs seat in said first and second locking slots of said hollow body whenever said clasp is fully inserted into said receptacle to provide a latching relationship therebetween and said clasp is unlatched by depressing said first locking tab inwardly of said first aperture a sufficient distance to pass beyond said sidewall and simultaneously causing said first wing member to depress said second wing member through the interaction of said first and second ramp sections to cause said second locking tab to withdraw away from said second locking slot.

4,793,033

**METHOD AND APPARATUS FOR CUTTING CARPET DESIGNS**

Bruce H. Schneider, and Jerry S. Schneider, both of 518 N. 10th St., Council Bluffs, Iowa 51501

Continuation-in-part of Ser. No. 565,294, Dec. 27, 1983, abandoned. This application Oct. 1, 1984, Ser. No. 656,477

Int. Cl.<sup>4</sup> D06C 23/02; B26D 1/00, 3/00, 5/02

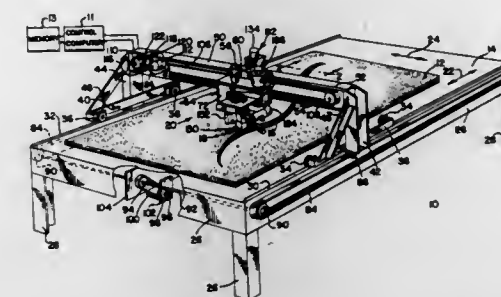
U.S. Cl. 26—16

10 Claims

7. Apparatus for cutting the pile of a carpet to provide a sculptured pattern in the carpet, comprising:
  - support means having a generally horizontal surface for supporting the carpet for cutting the pile thereof;
  - carriage means mounted for movement relative to said support means;
  - cutting means carried by said carriage means for cutting the pile of the carpet to form the sculptured pattern therein;
  - drive means for moving the carriage means, the operation of the drive means moving the cutting means relative to the

carpet for cutting the pile to form said sculptured pattern in the carpet;

control means for controlling at least the movement of said carriage means, said control means including processing means having an associated memory means, said memory means adapted to store data and instructions for controlling the apparatus for cutting a predetermined sculptured pattern in the carpet, including data identifying the eleva-



tion of each of a predetermined number of locations across said support means, said control means driving said carriage means to control the movement of said cutting means along a predetermined path relative to the carpet for cutting a predetermined sculptured pattern in the carpet and said control means being operable to vertically adjust the carriage means so that said cutting means cuts the pile of the carpet at a constant depth notwithstanding any undulation of the surface of the support means.

4,793,034

**METHOD OF MANUFACTURING KNIT BODY GARMENTS**

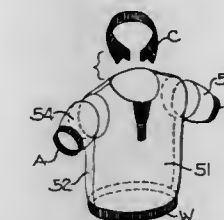
Dennis E. Poloff, Fayetteville; Robert M. Simpkins, Weaver, and Garlen R. Farley, Fayetteville, all of N.C., assignors to Stevcoknit Fabrics Co., Greenville, S.C.

Filed Aug. 21, 1987, Ser. No. 88,075

Int. Cl.<sup>4</sup> D04B 1/24

U.S. Cl. 28—153

14 Claims



1. A method of manufacturing knit body garments, such as sport shirts and the like, having a main body portion and knit trim, such as collars, cuffs, welts and the like, and being characterized by having the body portion and trim of the same color, said method comprising the steps of:
  - circularly knitting yarn and forming a first tubular fabric of the proper diameter to form at least one body blank, circularly knitting the same type of yarn and forming second tubular fabric therefrom,
  - simultaneously dyeing both said first and second tubular fabrics together to obtain the same color in both fabrics, unraveling the yarn from the dyed second tubular fabric, knitting the trim of the unraveled and dyed yarn from the second tubular fabric,
  - cutting and sewing the first dyed tubular fabric and forming a body blank therefrom, and
  - attaching the knit trim to the body blank.



**4,793,035**  
**DYNAMIC CONTROL OF TEXTILE WARP SIZE ADD-ON**  
**ON A RUNNING SLASHER**

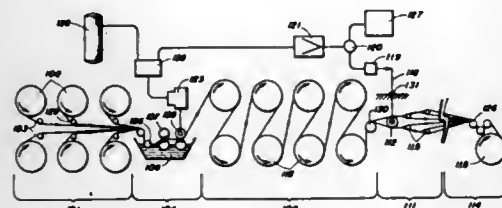
Donald L. Nehrenberg, Charlotte, N.C., and Robert L. Washburn, Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 28, 1987, Ser. No. 103,104

Int. Cl.<sup>4</sup> D02H 5/02

U.S. Cl. 28—183

15 Claims



1. In a process for applying warp size to warp threads in a slasher, comprising:

- (i) passing a sheet of parallel warp threads through a warp size solution;
- (ii) squeezing excess size solution from the threads by passing the threads between an adjustable pair of nip rolls, wherein one nip roll of said pair exerts a pressure on the threads and on the other nip roll;
- (iii) drying the threads so that substantially all of the solvent of the size solution is evaporated from the threads, resulting in a sheet of sized threads in which adjacent threads tend to adhere to one another due to the dried size;
- (iv) separating adjacent threads by running alternate threads on alternate sides of a transversely mounted separator bar, whereby a force is applied by the threads to the separator bar, which force is related to the amount of added size on the threads; and
- (v) thereafter recombining the separated threads into a single sheet;

the improvement which comprises:

- (a) measuring the force applied by the threads to the separator bar;
- (b) comparing said force with a preset value, which preset value corresponds to a predetermined amount of size to be added to the threads; and
- (c) adjusting the pressure exerted by the nip roll by reducing the pressure when the measured force is less than the preset value and increasing the pressure when the measured force is greater than the preset value, such that the difference between the measured force and the preset value is made substantially zero, whereby the amount of warp size added to the threads is maintained at the predetermined amount.

10. In an apparatus for applying warp size to a moving sheet of warp threads, comprising:

- (i) a means for supplying the sheet of warp threads;
- (ii) a means for applying a warp size, solution to said sheet of warp threads;
- (iii) a pair of adjustable nip rolls through which the sheet of warp threads is made to pass, wherein one nip roll of said pair exerts a pressure on the sheet of warp threads and on the other nip roll, whereby excess size solution is squeezed from the threads;
- (iv) a drier through which the sheets pass after passing between the nip rolls;
- (v) a transversely mounted separator bar located after the drier, around which alternate threads of the sheet pass on alternate sides and to which the threads apply a force, which force is related to the amount of added size on the threads; and
- (vi) a means for recombining the separated threads into a single sheet;

the improvement which comprises:

- (a) a means for measuring the force applied by the threads to

the separator bar and for producing an output signal determined by said force; and

- (b) a controller adapted to compare the output signal from the force measuring means with a preset value, which preset value corresponds to a predetermined amount of size to be added to the threads, and further adapted to produce a control signal determined by the comparison of the output signal from the force measuring device with the preset value.

**4,793,036**  
**APPARATUS FOR REMOVING WASTE ROVINGS FROM**  
**ROVING BOBBINS**

Hiroshi Nakayama, Kanazawa, Japan, assignor to Murao Boki Kabushiki Kaisha, Kanazawa, Japan

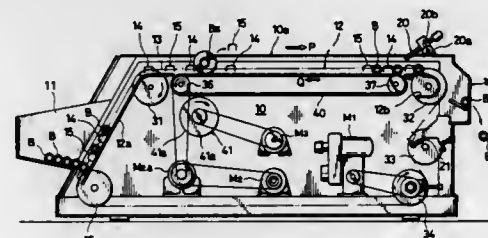
Filed Sep. 23, 1987, Ser. No. 100,265

Claims priority, application Japan, Sep. 30, 1986, 61-232158

Int. Cl.<sup>4</sup> B65H 73/00

U.S. Cl. 28—294

6 Claims



1. An apparatus for removing waste rovings from bobbins, said apparatus comprising:

- (a) a body structure having an opening in its top portion;
- (b) a pair of endless roller chains arranged under the opening in said body structure;
- (c) first means for driving said pair of endless roller chains;
- (d) a plurality of first and second carrier plates transversely supported on said roller chains so as to accommodate bobbins between adjacent first and second carrier plates;
- (e) second means for detachably securing at least one of said adjacent first and second carrier plates to said roller chains;
- (f) a flocked endless belt running under said roller chains, said flocked endless belt being spaced from said roller chains at such an interval as to allow the flocks on said flocked endless belt to contact the surface of bobbins, thereby removing rovings from the bobbins;
- (g) third means for driving said flocked endless belt so that it moves in the opposite direction to the bobbins when it is in contact with the bobbins;
- (h) a toothed wheel provided under said flocked endless belt at such an interval as to allow the teeth thereof to reach the surface of said flocked endless belt, thereby removing rovings from said flocked endless belt;
- (i) fourth means for rotating said toothed wheel so that its teeth move in the same direction as said flocked endless belt when they are in contact with said flocked endless belt; and
- (j) an air nozzle provided adjacent to said endless flocked belt, said air nozzle being adapted to eject compressed air against bobbins accommodated between adjacent first and second carrier plates.

**4,793,037**  
**METHOD OF MAKING A BULLET**

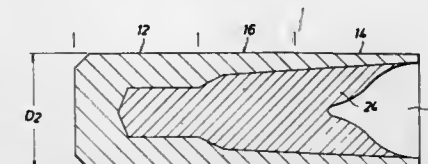
Herman L. Carter, P.O. Box 262348, Houston, Tex. 77207

Filed Feb. 6, 1987, Ser. No. 11,582

Int. Cl.<sup>4</sup> B21K 21/06

U.S. Cl. 29—1.23

2 Claims



1. A method of making a bullet having an outer jacket of copper base material and an inner core of lead, said jacket including a base portion, an ogive-shaped cylindrical portion, the walls of which decrease in thickness away from the base portion, and a transition portion between the base portion and the cylindrical portion, said base portion having a solid section and a cylindrical section with walls substantially thicker than those of the ogive-shaped cylindrical portion, said method comprising the steps of machining the outer jacket from a rod of copper base material with the base portion and the transition portion having an initial outside diameter greater than the desired caliber and the walls of the cylindrical portion being tapered inwardly, placing a predetermined amount of lead in the jacket, heating the jacket to melt the lead to cause the lead to bond to the inside surface of the jacket and to anneal the jacket to increase its ductility and reduce its hardness, drawing the outside diameter of the jacket to a diameter slightly less than the desired caliber to increase the tensile strength and hardness of the base portion of the jacket and to increase the tensile strength and hardness of the transition portion to a lesser extent, and forming the cylindrical portion into the desired ogive design while increasing the diameter of the base portion and the transition portion to the desired caliber to provide a bullet having a work hardened base portion that will remain intact after impact, a cylindrical portion that is slightly work hardened by the forming operation and a transition portion that is work hardened more than the cylindrical portion but less than the base portion so that the cylindrical portion and at least part of the transition portion will split longitudinal into several sections that curl outwardly while remaining attached to and carried by the base to reduce the weight loss of the bullet to a minimum as it penetrates a target.

**4,793,038**  
**APPARATUS FOR MAKING HARNESES OF RIBBON**  
**CABLE**

Jean B. Guerout, Confians Saint Honorine; Andre Canu, Beauchamp; Jack Urbin, Triel, and Alain Lavedan, Mezy sur Seine, all of France, assignors to AMP Incorporated, Harrisburg, Pa.

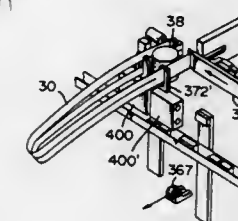
Filed Apr. 14, 1987, Ser. No. 38,266

Claims priority, application France, Apr. 14, 1986, 86 05283

Int. Cl.<sup>4</sup> H01R 43/00

U.S. Cl. 29—33 M

17 Claims



1. A method of making electrical harnesses in which a conductor is terminated at opposite ends by respective connectors

(13) comprising the steps of indexing pairs of connectors (13) along a feed path (12) past a terminating station (41) with rows of contacts in a conductor-receiving face of the connectors (13) extending along the feed path (12), feeding the conductor longitudinally to the terminating station (41) in a direction extending transversely of the connector feed path (12), turning the leading end of the conductor to form a loop of desired length extending transversely of the feed path (12), and inserting the leading and trailing ends of the loop in respective connectors (13) on the feed path (12), characterized by the step of feeding flat cable (30) towards the feed path (12) with its plane and the axis of said loop extending perpendicularly to the contact rows, and rotating the conductor-receiving face of the connectors (13) and the leading and trailing ends of the loop through 90° about their longitudinal axis to bring the plane of the cable ends parallel to the contact rows with individual conductors aligned with respective contacts.

**4,793,039**  
**ELECTRONICALLY CONTROLLABLE ROTARY**  
**TRANSFER MACHINE**

Elis Mantovani, Cadempino, Switzerland, assignor to Tecnodelta S.A., Manno, Switzerland

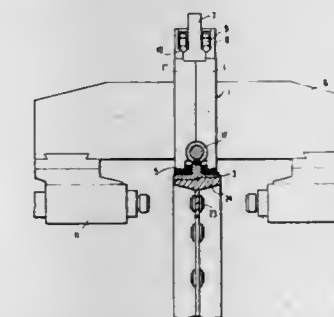
Filed Aug. 27, 1987, Ser. No. 89,986

Claims priority, application Switzerland, Jan. 27, 1987, 02868/87

Int. Cl.<sup>4</sup> B23P 23/00

U.S. Cl. 29—38 B

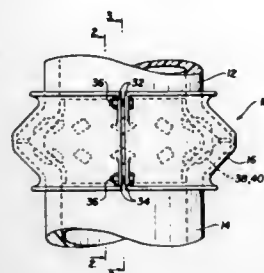
14 Claims



1. An automatic transfer machine for performing simultaneous working operations on different portions of workpieces of variable size and with respect to a plurality of axes to increase the productivity and precision of the working process, comprising

- (a) a working machine integrated with a computer program for automatically performing a plurality of simultaneous working operations on different axes;
- (b) a collet-holding table including collets which hold the workpieces, said collets being located coaxially by intermediate elements between two annular half-plates fastened together to form the base support of said working machine and externally holding the working tools thereof;
- (c) said two half-plates having an internal mirror-like configuration for containing guide elements and control elements for rotation and positioning of said collet-holding table, said intermediate elements comprising a ring affording substitution of different collet-holding tables;
- (d) said collet-holding table including intermittence control elements rotating in two directions, said table being capable of continuous rotation by a dedicated motor; and
- (e) means for advancing the working tools of said working machine, said advancing means including cams which reach the working position by kinematic mechanisms and levers operated in synchronism with the control elements of the collet-holding table.

4,793,040  
**METHOD OF CONNECTING TWO SHAFTS WITH A COUPLING**  
 William E. Rumberger, Newtown Square, Pa., assignor to The Boeing Company, Seattle, Wash.  
 Division of Ser. No. 429,408, Sep. 30, 1982. This application Apr. 24, 1984, Ser. No. 603,389  
 Int. Cl.<sup>4</sup> B23P 19/00  
 U.S. Cl. 29—525.1 3 Claims

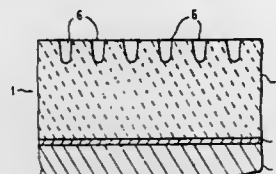


1. A method of connecting two shafts for rotation, with a two-piece coupling, one of the pieces being adjustable and one of the shafts having a drive torque applied thereto, each shaft defining a longitudinal axis, comprising the steps of:  
 constructing each shaft with a hollow outwardly flared end portion, which includes an inner and an outer surface, at least one of said surfaces including alignment and torque transmitting means;  
 constructing at least one piece of the two-piece coupling with a surface including alignment and torque transmitting means compatible with the alignment and torque transmitting means of the shaft surfaces;  
 engaging the outer surface of each outwardly flared end portion with compatible surfaces of one piece of the two-piece coupling;  
 engaging the inner surface of each outwardly flared end portion with compatible surfaces of the other piece of the two-piece coupling;  
 adjusting the adjustable piece of the two-piece coupling to generate thereby a pressure at the engaged surfaces and produce engagement of the compatible alignment and torque transmitting means substantially preventing relative movement between the engaged surfaces thereby aligning the longitudinal axes of the two shafts and permitting torque transmission and thereby rotation about the aligned longitudinal axes; and  
 transmitting the drive torque applied to one of the shafts substantially through said other piece of the two-piece coupling to the other of the shafts.

4,793,041  
**TRANSFER ROLL WITH CERAMIC-FLUOROCARBON COATING CONTAINING CYLINDRICAL INK HOLES WITH ROUND, BEVELED ENTRANCES**  
 Jerome D. Jenkins, 4749 N. 118th St., Wauwatosa, Wis. 53225, and Neal G. Schultz, Milwaukee, Wis., assignors to Jerome D. Jenkins, Wis.  
 Continuation of Ser. No. 729,628, May 2, 1985, abandoned, which is a division of Ser. No. 581,121, Feb. 17, 1984, Pat. No. 4,566,438, which is a continuation-in-part of Ser. No. 192,080, Sep. 29, 1980, abandoned, which is a continuation-in-part of Ser. No. 035,514, May 3, 1979, abandoned. This application Dec. 11, 1987, Ser. No. 132,716  
 Int. Cl.<sup>4</sup> B21B 27/00

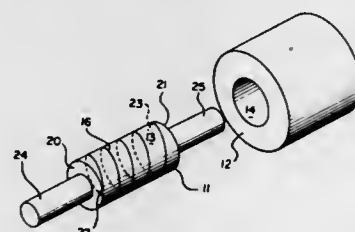
U.S. Cl. 29—121.1 15 Claims  
 1. A transfer roll for transferring ink or like mediums from ink holes formed therein to a print roll or material comprising:  
 (a) a metal substrate; and  
 (b) an outer coating of a ceramic-fluorocarbon mixture covering said substrate, said ceramic-fluorocarbon mixture

coating containing a fluorocarbon homogeneously dispersed throughout the entire thickness of the outer coating, thereby lowering the dyne level to greatly enhance



ink transfer from the transfer roll to the print roll by providing a precise distribution of ink to the print roll and improving the durability, and corrosion resistance of the transfer roll.

4,793,042  
**ROLLING MILL ROLL ASSEMBLY**  
 Holton C. Easter, Michigan City, Ind., assignor to Inland Steel Company, Chicago, Ill.  
 Filed Sep. 19, 1983, Ser. No. 533,240  
 Int. Cl.<sup>4</sup> B21K 1/02; B21B 27/00  
 U.S. Cl. 29—148.4 D 31 Claims



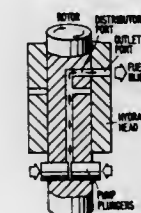
1. A rolling mill roll assembly for rolling metals, said assembly comprising:  
 a cylindrical, metal mandrel having an exterior surface;  
 a cylindrical, metal sleeve disposed around said mandrel;  
 metal wire disposed around said exterior surface of said mandrel and sandwiched between the latter and said interior surface of said sleeve;  
 said metal wire comprising means for centering said sleeve about said mandrel;  
 a space between the exterior surface of the mandrel and the interior surface of the sleeve;  
 the dimension of said space, in a radial direction, corresponding to the thickness of said wire;  
 said sleeve being shrink fitted on said wire;  
 and glue means in said space for adhering together said sleeve, said mandrel and said wire;  
 said wire comprising dam means for the glue means in said space.

4,793,043  
**FUEL PUMP DISTRIBUTION ASSEMBLY SALVAGE METHOD**  
 Will W. Mathews, and Richard B. Jones, both of Germantown, Tenn., assignors to Cummins Engine Company, Inc., Columbus, Ind.  
 Filed Jul. 7, 1987, Ser. No. 70,386  
 Int. Cl.<sup>4</sup> B23P 15/00

U.S. Cl. 29—156.4 WL 2 Claims  
 1. Method of salvaging worn hydraulic head and rotor assemblies of distributor type fuel injection pumps having a

hydraulic head with an axial bore and radial fuel inlet and outlet ports, and a rotor received for rotation within the bore of the hydraulic head, said rotor having a first body portion of an outer diameter that is precision matched to an interior diameter of said bore and having radial bores forming distributor and inlet ports which are directly communicable with the inlet and outlet ports of the hydraulic head and which are connected via an axial passage with a metering pump arrangement receiving area located at a second portion of said rotor that is situated outside of the bore of the hydraulic head at one end of the rotor, and a supply pump arrangement mounting area being located at a third position of said rotor at an opposite end of the rotor from the metering pump arrangement mounting area; comprising the steps of:

(A) disassembling said rotor and hydraulic head from each other and from said metering and supply pump arrangements;  
 (B) inspecting said rotor and hydraulic head for signs of damage such as scoring, fuel pitting, rusting, and chipping;

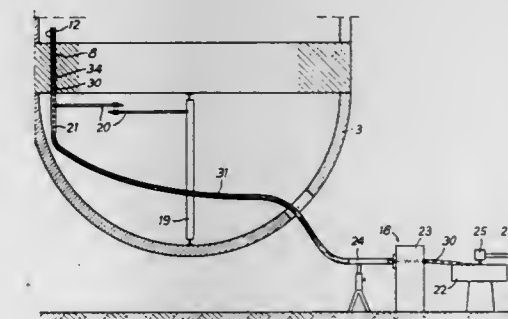
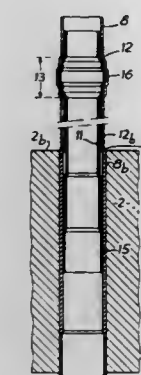


(C) categorizing hydraulic head surface areas as being either undamaged, minimally damaged, or heavily damaged;  
 (D) categorizing rotor surface areas as being either undamaged, minimally damaged, or heavily damaged;  
 (E) machining the hydraulic head bore and rotor surface areas in accordance with the respective damage categorization and in a manner providing a predetermined finish and dimensions within prescribed manufacturing tolerances;  
 (F) cleaning the hydraulic head and rotor;  
 (G) masking selected areas of the rotor;  
 (H) chrome plating unmasked areas of the rotor;  
 (I) finish machining the rotor to provide precision matching of the outer diameter of the body portion to the interior diameter of the machined bore of the hydraulic head within prescribed precision matching tolerances, to ensure that all openings in the surface of the body portion are clear, sharp and well defined, and to remove any excess chrome from end faces of the rotor; and  
 (J) reassembling said rotor within said hydraulic head.

4,793,044  
**PROCESS FOR REMOTELY LINING A STEAM GENERATOR TUBE OF A PRESSURIZED WATER NUCLEAR REACTOR**  
 Jean P. Cartry, and Bruno Fraissenet, both of Lyons, France, assignors to Framatome, Courbevoie, France  
 Filed Apr. 30, 1987, Ser. No. 44,254  
 Claims priority, application France, Apr. 30, 1986, 8606342  
 Int. Cl.<sup>4</sup> F28F 11/00

U.S. Cl. 29—157.4 2 Claims  
 1. In a process for remotely lining a tube (8) of a steam generator of a pressurized water nuclear reactor, the tube (8) having two ends crimped into a tube plate (2) below which the steam generator forms a water box (3) accessible from outside via a manhole (9), said process comprising insertion of a liner (12) into said tube (8) through one of its ends, diametral expansion of said liner (12) in at least two regions situated in the vicinity of its ends, one of said regions being within a thickness of said tube plate and the other beyond said tube plate, (2) and crimping by means of a roller-expander of said liner in each of said regions, the improvement comprising the steps of  
 (a) automatically by remote control from an operating sta-

tion (18) located outside said water box, inserting a liner (12) into said water box (3), through said manhole (9), as far as a location located under said tube plate (2) vertically in line with said manhole (9);  
 (b) moving said liner (12) inside said water box (3) as far as a position located under said tube plate (2) vertically in line with one of said ends of said tube to be lined; and



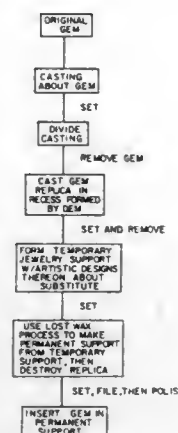
(c) performing each of the operations of insertion of said liner (12) into said tube (8), of diametral expansion and of roller-expanding, in the region situated outside said tube plate (2), successively by inserting and receiving a respective tool into said water box (3) and using said tool by controlling driving means located at said operating station (18) and connected to said tool through a flexible member passing through said manhole inside a flexible guiding tube.

4,793,045  
**ARTICLE FORMING METHOD**  
 Steven M. Singer, 1292 SW. Evergreen La., Palm City, Fla. 34990  
 Continuation-in-part of Ser. No. 714,114, Mar. 20, 1985, Pat. No. 4,630,346. This application Nov. 21, 1986, Ser. No. 933,390  
 The portion of the term of this patent subsequent to Dec. 23, 2003, has been disclaimed.  
 Int. Cl.<sup>4</sup> B23P 5/00

U.S. Cl. 29—160.6 8 Claims  
 1. A method of making jewelry to enhance the retention of a gem in a retaining bezel area of the jewelry comprising the steps of:  
 casting a replica of the gem using a soluble casting material that is substantially resistant to heat;  
 crafting a temperature sensitive substance about and against the replica to form a temporary bezel which encloses sides of the gem, so that the replica cannot be removed therefrom without destroying either the replica or the temporary bezel;  
 allowing the crafted temporary bezel to set;



forming the retaining bezel from the temporary bezel in a lost wax process having molten metal, using a soluble casting material as a support block for the temporary



bezel, wherein the molten metal sets to form the retaining bezel; and dissolving the replica and casting material leaving the retaining bezel.

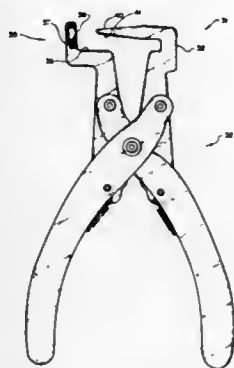
#### 4,793,046 METHOD AND APPARATUS FOR PRECISION INSTALLATION OF PIANO HAMMERS ON PIANO ACTIONS

Wendell D. Hart, 417 Main, P.O. Box 1567, Grand Junction, Colo. 81501

Filed Apr. 21, 1986, Ser. No. 854,304  
Int. Cl.<sup>4</sup> B23P 19/04

U.S. Cl. 29—253

3 Claims



1. A knuckle removal tool for removing knuckles from piano hammers comprising  
a shank holder having a shelf thereon, and a back extending from the shelf and said back having an opening there-through;  
a bifurcated lift blade having blade sections conveying from an outer end thereof and with inner edges increasing in thickness from the outer end;  
means aligning the outer end of the blade with the opening in the back of the shank holder; and  
means for reciprocating the bifurcated blade closely over the shelf and in a path into and out of the opening.

#### 4,793,047 METHOD OF ADJUSTING THE DISTRIBUTION OF LOCOMOTIVE AXLE LOADS

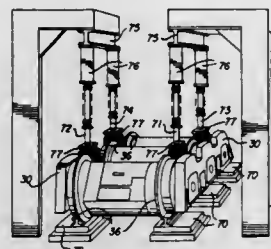
Daniel L. Curtis; William G. Skrzypczyk, and Thumpakerry J. Thomas, all of Erie, Pa., assignors to General Electric Company, Erie, Pa.

Continuation of Ser. No. 943,230, Dec. 18, 1986, abandoned.  
This application Feb. 10, 1988, Ser. No. 154,545

Int. Cl.<sup>4</sup> B23Q 17/00

U.S. Cl. 29—407

10 Claims



1. A method of adjusting the weight distribution of a locomotive having a body supported on a pair of asymmetrical 3-axle truck assemblies each of which includes a frame, at least six separate axle springs and a floating bolster, to obtain a predetermined distribution of the loads on the respective axles of the locomotive after it has been built, comprising the steps of:

- loading the locomotive body with fuel, water, and other supplies that the locomotive normally uses in operation;
- placing the body, together with the pair of truck bolsters but without the other parts of the truck assemblies on a balancing fixture comprising eight separate weighing stands arranged in two groups of four each, the four stands of each group being respectively aligned with the regular bolster mount load points of the bolster supported thereon, whereby each stand measures the weight at a different load point of the bolster;
- measuring the actual weight that the truckless locomotive impresses on each of the eight weighing stands;
- comparing the eight actual weights, respectively, with desired weights at the eight separate load points of the two bolsters to determine the errors, if any, that need correction;
- using the errors between actual and desired weights to select from a predetermined influence matrix the locations and sizes of shims required to correct the errors;
- raising the locomotive body and bolsters, adding the selected shims at the designated load points of the bolsters, and lowering the body and bolsters onto the balancing fixture;
- repeating steps c and d above;
- repeating steps e, f and g above, unless the weight error at each load point is within predetermined limits;
- securing all of the added shims to the associated bolster;
- removing the locomotive body and bolsters from the balancing fixture;
- installing, at the spring seats of the respective axle springs of each of the locomotive truck assemblies, whatever shims are needed to obtain a desired weight distribution among the three axles of each truck assembly when the locomotive body is placed on both truck assemblies;
- checking the distribution, among the three axles of each truck assembly, of the truck assembly weight plus the locomotive body weight that will be impressed on the truck assembly by applying predetermined downward forces to the respective load points of the four bolster mounts thereof, with the force on the two forward load points being applied in a different plane than the force on the two rear load points to give the frame of the truck

assembly a predetermined slope with respect to a horizontal plane; and  
e. placing the locomotive body on the pair of truck assemblies.

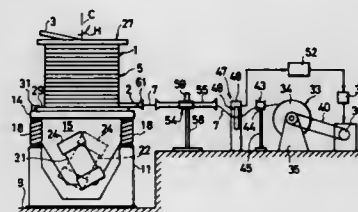
#### 4,793,048 METHOD FOR PASSING OPTICAL FIBERS THROUGH TUBULAR PRODUCTS BY VIBRATING THE TUBULAR PRODUCTS

Kunio Kashiwaya, Tokyo; Hiroyo Haga, Sagami-hara; Nobuo Saei, Tokyo; Yonichi Yabuki, Tokyo; Kuniyuki Ozoe, Tokyo; Shinichi Fukushima, Narashino, and Kazufumi Tabata, Narashino, all of Japan, assignors to Nippon Steel Corporation and Nippon Steel Welding Products & Engineering Co., Ltd., both of Tokyo, Japan

Filed Feb. 5, 1987, Ser. No. 11,917  
Int. Cl.<sup>4</sup> B23P 19/04

U.S. Cl. 29—433

8 Claims



1. A method of passing an optical fiber through a tube which comprises the steps of:  
forming a coil of the tube;  
causing the coil of the tube to vibrate in such a manner that a given point thereof reciprocates along a helical path;  
feeding the optical fiber into one end of the coil of tube that is being thus vibrated, whereupon the optical fiber fed into the tube moves forward under the influence of the intermittent conveying force exerted by the inner wall of the tube in the direction of the circumference of the coil of tube, said feeding step including positively feeding the optical fiber into the coil of tube at substantially the same speed as the speed of forward movement of the optical fiber through the coil of tube.

#### 4,793,049 METHOD OF MANUFACTURING AND EMBODIMENT OF MEASURE

Walter Miller, Traunstein, Fed. Rep. of Germany, assignor to Dr. Johannes Heldenhain GmbH

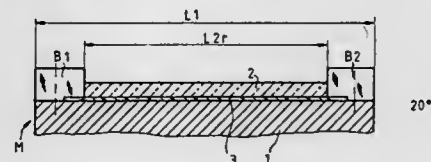
Filed Nov. 5, 1987, Ser. No. 117,663

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1986, 3637628

Int. Cl.<sup>4</sup> B23P 11/02

U.S. Cl. 29—446

3 Claims



1. A method of manufacturing an embodiment of measure, including a bending resistant graduation carrier member having end faces, and a base member and fastening element for fastening the graduation carrier member on the base member, the material of the graduation carrier member having a lower temperature expansion coefficient than the material of the base member, comprising placing the graduation carrier member on the base member in a floating manner, heating the graduation

carrier member and the base member to a predetermined temperature, fixing at least the end faces of the graduation carrier member by means of the fastening elements to the base member, such that the graduation carrier member is in a compressed state when cooled to normal temperature.

#### 4,793,050 REMOTE CONTROL ASSEMBLY WITH IMPROVED ISOLATOR

Don L. Niakanen, Livonia, Mich., assignor to Teleflex Incorporated, Limerick, Pa.

Division of Ser. No. 885,534, Jul. 14, 1986, Pat. No. 4,726,251.  
This application Oct. 19, 1987, Ser. No. 109,734

Int. Cl.<sup>4</sup> B21D 39/00

U.S. Cl. 29—455.1

5 Claims



1. A method of making a motion transmitting remote control assembly of the type including a support means for supporting a flexible motion transmitting core element supported for axial movement in a guide means, said method including the steps of:

- forming inside abutments extending radially from the exterior of the guide means,
- forming outside abutments extending radially on the support means, and
- forming resilient vibration dampening means in axial mechanical interlocking engagement with the abutments and free of radial compressive forces between the support means and the guide means by being in discontinuous radial contact with the support means.

#### 4,793,051 METHOD FOR CONSTRUCTION OF CRIMP SEAL PLEATED FILTER ASSEMBLY

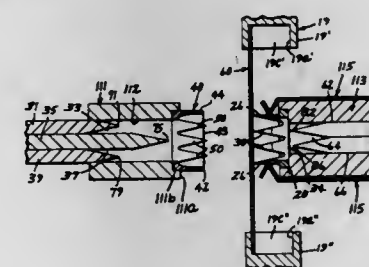
Patrick Golden; Daniel T. Risch, both of Minneapolis, Minn., and Steve W. Sabelko, Prescott, Wis., assignors to Donaldson Company, Inc., Minneapolis, Minn.

Division of Ser. No. 862,772, May 13, 1986, Pat. No. 4,736,518.  
This application Jul. 20, 1987, Ser. No. 55,937

Int. Cl.<sup>4</sup> B23P 19/02

U.S. Cl. 29—525

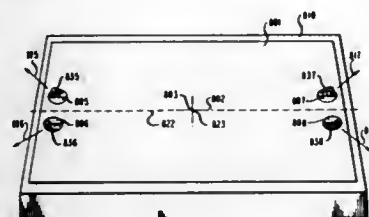
6 Claims



1. A method for making a filter assembly including a crimp sealed and encapsulated filter element, comprising the steps of:  
positioning a first half and a second half of a filter assembly housing in oppositely disposed and cooperatively aligned first and second supporting means, respectively;  
positioning a filter media between the first and second halves of said filter assembly housing, one half of said filter assembly housing including a front wall and back wall

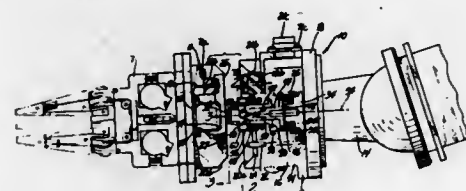
which overlap a pair of side wall blades on the second half of the housing when said housing is assembled;  
 forming a center pleat in said media by folding said media between a slidable center pleating blade having a pleat forming blade edge which moves toward said media from one of said supporting means and an oppositely disposed and cooperatively aligned pair of center blades having pleat forming edges extending from said other supporting means toward said media;  
 forming additional pleats on each side of said center pleat by folding said media between oppositely disposed and cooperatively aligned pairs of pleating blades, said additional pleats being formed by said pair of center blades and a first pair of slidable outer pleating blades having one blade adjacent each side of said center pleating blade;  
 forming a pair of end pleats between a final pair of blades extending from one of said supporting means and said pair of side wall blades on one of said housing halves;  
 moving said first and second filter assembly housing halves into near engagement with each other with said media pleats in substantially final alignment with said first and second housing halves; and  
 pushing said first and second filter assembly housing halves together, thereby crimp sealing and encapsulating said pleated media in said filter assembly housing.

**4,793,052**  
**METHOD FOR POSITIONING A PANEL**  
 Hans H. Ammann, Chester, and Richard F. Kovacs, Hanover Township, Morris County, both of N.J., assignors to American Telephone and Telegraph Company, AT&T Laboratories, Murray Hill, N.J.  
 Filed Nov. 13, 1987, Ser. No. 119,941  
 Int. Cl.<sup>4</sup> B23Q 7/00  
 U.S. Cl. 29—559 19 Claims



1. A method for positioning a panel on a work surface, with a fixed point and a selected axis of the panel passing through the fixed point being in register with an origin point and a reference axis passing through the origin point of the work surface, comprising the steps of:  
 preparing a panel to be positioned with tooling features within the periphery of the panel that permit engagement by localized area contact in at least four designated locations,  
 engaging the tooling features at the four designated locations with localized area contact engagement elements by moving the localized area contact engagement elements synchronously and equidistantly such that the motions of the four localized area contact engagement elements are symmetrical with respect to the origin point and the reference axis passing through the origin point.

**4,793,053**  
**QUICK DISCONNECT DEVICE**  
 Dante C. Zaccaro, Warren, and Frederick A. McCarty, Royal Oak, both of Mich., assignors to General Motors Corporation, Detroit, Mich.  
 Filed Apr. 16, 1987, Ser. No. 39,091  
 Int. Cl.<sup>4</sup> B23Q 3/155; B25B 15/04  
 U.S. Cl. 29—568 15 Claims

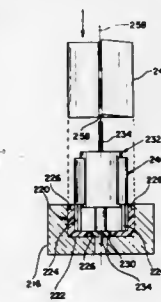


1. A quick disconnect coupling for connecting a tool to machine, said coupling in combination comprising:  
 a tool adapter for holding said tool having a generally axial central cavity, and at least one generally axially orientated tubular member bordering said central cavity and projecting towards said machine and said tool adapter having a frusto conical surface surrounding and radially spaced from said generally axially orientated member; and  
 a tool changer adapted for sequentially mating and coupling with said tool adapter and connected with said machine, said tool changer including:  
 a shell with a generally axial interior chamber and with a frusto conical surface along a common axial center line with said tool adapter frusto conical surface for mating therewith;  
 a first passage fluidly connecting the outside of said shell and said interior chamber, and said interior chamber having at least one generally radial aperture intersecting said chamber axially separated from said first passage and towards said tool adapter;  
 a piston slidably mounted in said interior chamber and responsive to a fluid fed into said interior chamber from said first passage said piston having a rod portion with a cam portion adjacent said radial aperture;  
 a locking member movably mounted within said radial aperture for interacting with said cam portion of said rod and said axially orientated member to radially push said cam member outward to couple said tool changer with said tool adapter; and  
 closure means biased to a first position whereby said radial aperture is surrounded and closed when said tool changer and said tool adapter are not mated and whereby said closure means is moved to a second position by said axially orientated member to open said radial aperture when said tool changer and said tool adapter are mated, the opening of said aperture allowing said piston to move to a position to cause said locking member to be captured between said cam portion of said rod and said axially orientated member to couple said tool changer with said tool adapter.

**4,793,054**  
**ALIGNMENT SYSTEM FOR PERMANENT MAGNET MOTORS**  
 Salvatore R. Abbratozzato, Timonium; Richard T. Walter, Baldwin, and Dale K. Wheeler, Fallston, all of Md., assignors to Black & Decker Inc., Newark, Del.  
 Division of Ser. No. 796,928, Nov. 12, 1985, Pat. No. 4,682,066.  
 This application Jun. 12, 1987, Ser. No. 61,858  
 Int. Cl.<sup>4</sup> H02K 15/14  
 U.S. Cl. 29—596 5 Claims

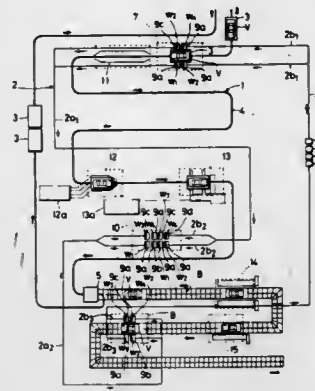
1. A process for assembling a permanent magnet motor, comprising the steps of:  
 (a) forming a rectangle of stamped sheet ferromagnetic

material into a cylinder such that two parallel edges of said rectangle define a longitudinal split in said cylinder;  
 (b) placing one end of said cylinder against a first end cap defining a bore;  
 (c) placing a second end cap defining a bore against the other end of said cylinder;



(d) closing the distance between said end caps until said cylinder longitudinal edges are in axial alignment, thereby coaxially aligning said end cap bores; and  
 (e) connecting said cylinder to said end caps to maintain said coaxial alignment.

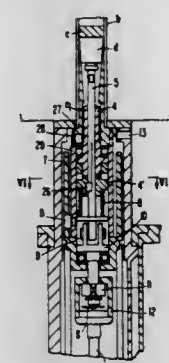
**4,793,055**  
**ASSEMBLY LINE ARRANGEMENT FOR PRODUCING VEHICLES**  
 Katsuhiko Shintani, Hiroshima, Japan, assignor to Mazda Motor Corporation, Japan  
 Filed Oct. 28, 1986, Ser. No. 924,218  
 Claims priority, application Japan, Oct. 29, 1985, 60-242010  
 Int. Cl.<sup>4</sup> B23P 21/00  
 U.S. Cl. 29—786 1 Claim



1. An assembly line arrangement for producing a vehicle comprising:  
 body assembly line means including a door removing station for detaching at least one door from a vehicle body fed thereto with the door, a door mounting station located at the lower course of the body assembly line means compared with said door removing station for attaching the door fed thereto to the vehicle body from which the door is detached at said door removing station, and a body conveying device for transporting the vehicle body through said door removing station and said door mounting station successively, and  
 door assembly line means including a door equipping station so located with respect to said door mounting station that the distance between the door equipping station and the door mounting station is short relative to the distance between the door equipping station and the door removing station for equipping the door detached from the vehicle body at said door removing station and fed thereto

with door parts, and a door conveying device for transporting doors detached from the vehicle body at said door removing station to and through said door equipping station and for transporting doors equipped with the door parts at said door equipping station to said door mounting station, wherein at least a pair of right and left doors are detached from right and left sides of the vehicle body, respectively, at said door removing station, wherein said door conveying device includes a double-track portion comprising a pair of door conveying branches which extend in parallel at said door removing station, said door equipping station and said door mounting station, a first single-track portion extending between said door removing and said door equipping station and a second single-track portion extending between said door equipping station and said door mounting station, wherein left and right doors are gathered together on the first single-track portion after passing through said door removing station and then separated and respectively directed onto left door and right door branches of the double-track portion at said door equipping station, and wherein left and right doors are gathered together on said second single-track portion after passing through said door equipping station and the separated and respectively directed onto left door and right door branches of the double-track portion at said door mounting station.

**4,793,056**  
**PLUG REMOVAL APPARATUS**  
 Hideyuki Kurokawa, Shiochi Hamada, and Makoto Ohta, all of Kobe, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Apr. 20, 1987, Ser. No. 40,472  
 Claims priority, application Japan, Apr. 25, 1986, 61-94932; Apr. 25, 1986, 61-61638[U]  
 Int. Cl.<sup>4</sup> B23P 15/26  
 U.S. Cl. 29—726 5 Claims

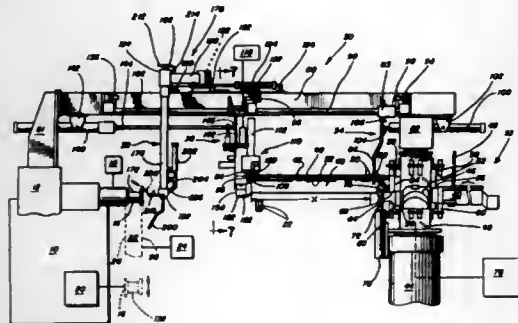


1. An apparatus for removing a mechanical plug including a cone member disposed within a threaded cylindrical member from a heat exchange tube extending in a plate in which a plurality of such heat exchange tubes extend, said apparatus comprising:  
 a plug removing mechanism for removing the plug, said mechanism including a mandrel insertable into the cylindrical member of the plug, said mandrel having a threaded portion for threadedly engaging the threaded cylindrical member,  
 a push rod extending coaxially through said mandrel for pushing the cone member of the plug within the cylindrical member,  
 an actuating means operatively connected to said mandrel and/or such push rod for moving said mandrel and/or said push rod toward or away from the plug, and  
 drive means operatively connected to said mandrel for selec-



tively rotating said mandrel into threaded engagement with the plug.  
said drive means including a drive motor, a gear train operatively connected to said motor so as to be driven thereby, a rotor shaft extending through said actuating means and connected to said gear train, and a torque limiting clutch operatively connected between said motor and said mandrel for limiting torque imparted to said mandrel through said drive means to a preset screwing torque.

**4,793,057**  
**APPARATUS FOR MOUNTING POWER TRANSMISSION BELTS ON AND REMOVING SAME FROM PULLEYS**  
Yoshihiko Kamiyama, Kobe; Miso Fukuda, Miki, and Akihiro Nagata, Komaki, all of Japan, assignors to Mitsubishi Belting, Limited, Nacata, Japan  
Filed Mar. 19, 1987, Ser. No. 27,856  
Claims priority, application Japan, Jan. 16, 1987, 62-8701  
Int. Cl.<sup>4</sup> B21D 53/10  
U.S. Cl. 79-822 16 Claims

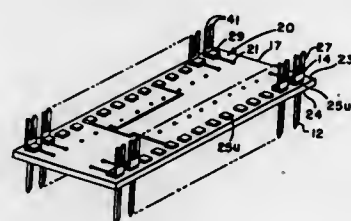


1. A power transmission belt transfer mechanism comprising:  
push-out means for delivering power transmission belts seriatim to a pick-up position;  
grasping means for grasping a portion of a belt at said pick-up position;  
shuttle means for transferring the grasped belt to a release position;  
release means for causing release of the grasped belt from the grasping means to a work station; and  
removal means for removing the belt from the work station for permitting similar transfer of subsequent belts seriatim by said transfer mechanism.

**4,793,058**  
**METHOD OF MAKING AN ELECTRICAL CONNECTOR**  
John T. Venaleck, Madison, Ohio, assignor to Aries Electronics, Inc., Frenchtown, N.J.  
Division of Ser. No. 719,638, Apr. 4, 1985, Pat. No. 4,588,239, which is a continuation of Ser. No. 471,280, Mar. 2, 1983, abandoned. This application May 2, 1986, Ser. No. 859,127  
The portion of the term of this patent subsequent to May 13, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> H01R 9/09  
U.S. Cl. 29-845 13 Claims

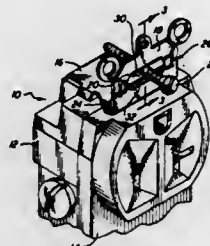
1. A method of electrically coupling terminals of one electrical device with circuitry configured electrically to couple with the terminals of another electrical device, comprising electrically connecting the terminals of such one device respectively to plural first electrical contacts mounted with respect to one surface of a support, electrically connecting the terminals of such another device respectively to plural second electrical contacts mounted with respect to another surface of such support,

electrically isolating a plurality of such first contacts from a plurality of such second contacts, and electrically coupling plural contacts on one surface of such



support with respective plural contacts on the other surface of such support thereby to alter the apparent terminal configuration of at least one of such devices for electrical coupling with the other of such devices.

**4,793,059**  
**AUTOMATIC GROUNDING CLIP**  
Bernard Moreau, Aix sur Vienne, and Roger Parlatore, Solignac, both of France, assignors to Pass & Seymour, Inc., Syracuse, N.Y.  
Division of Ser. No. 017,607, Feb. 24, 1987, Pat. No. 4,745,523.  
This application Mar. 4, 1988, Ser. No. 164,189  
Int. Cl.<sup>4</sup> H01R 3/06  
U.S. Cl. 29-854 7 Claims

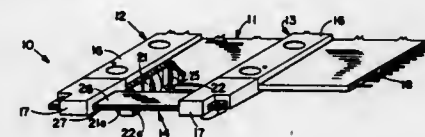


1. A method of forming a single strand of spring wire to provide an automatic grounding clip and for assembling said clip with an electrical wiring device to assure a low resistance electrical connection between said wiring device and a metal flush box wherein it is mounted by a screw extending through an elongated slot having a width greater than the diameter of said screw in a metal yoke of said wiring device to connect the latter with said flush box, said method comprising:

- initially bending said wire to an essentially U-shaped configuration to provide two spaced, substantially parallel legs of equal length with adjacent terminal ends and joined by an intermediate portion;
- forming first and second openings in said yoke respectively outwardly adjacent opposite ends of said slot;
- further bending said U-shaped wire about first and second axes, parallel to one another and perpendicular to said legs, spaced by approximately the center-to-center distance between said openings, to form first and second end portions extending in the same direction from said legs and including said terminal ends and said intermediate portion, respectively;
- passing said first and second end portions through said first and second openings, respectively, from a first to a second side of said yoke; and
- finally bending said first and second end portions over on said second side of said yoke to engage said clip in firm electrical contact with said yoke with said legs extending from side to side across said slot in closely superposed

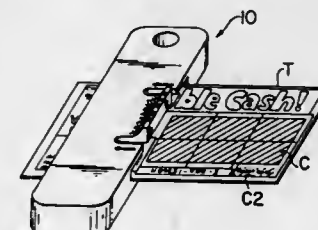
relation therewith, whereby said screw in extending through said slot extends between and in contact with said legs.

**4,793,060**  
**MANUFACTURE OF LOW PROFILE CLIP CONNECTOR**  
David A. Pretchel, Moreland Hills, Ohio, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Division of Ser. No. 681,362, Dec. 13, 1984, Pat. No. 4,679,870.  
This application Jul. 13, 1987, Ser. No. 72,557  
Int. Cl.<sup>4</sup> H01R 43/24  
U.S. Cl. 29-858 14 Claims



1. A method of manufacturing an electrical connector including an electrical cable including plural electrical conductors, and at least one connector body molded to the cable, the connector body including therein plural electrical contacts having exposed contacting portions for engaging respective leads of an electrical device and a mounting portion about which the connector body is molded and which is electrically connected to a respective conductor of the cable from which the cable insulation has been removed; the method comprising the steps of: placing in a mold cavity a cable/contact sub-assembly including an electrical cable including plural electrical conductors having insulation removed from portions thereof that are mechanically and electrically connected at junctions to respective contacts at one side of the cable, also placing in the mold a premolded cap of non-conductive material for juxtaposition with the side of the cable opposite the contacts in coextensive relationship with the insulation removed portion of the conductors, then closing the mold with the cap positioned between the cable and a surface of the mold, and then flowing molten plastic material into the mold to fill the mold cavity such that forced flow of the plastic material urges the part of the cable in the mold against the cap for proper positioning of the cable within the plastic material forming the connector body along with the cap.

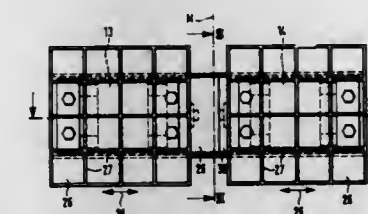
**4,793,061**  
**TICKET SCRAPER**  
Joseph A. Rizzo, Jr., 739 East St., Southington, Conn. 06489  
Filed Sep. 29, 1987, Ser. No. 102,098  
Int. Cl.<sup>4</sup> B26B 3/00  
U.S. Cl. 30-169 7 Claims



2. A ticket scraper for removing coating material from a surface of a ticket and comprising a unitary structure made from resilient material and including a scraper body and a scraper element resiliently hinged at its rear end in cantilever position on said scraper body and cooperating with said scraper body to define a ticket receiving slot extending from front to rear through said ticket scraper, said slot having a top wall, a bottom wall and a pair of laterally opposed side

walls, a laterally extending scraper member integrally connected to and depending from said scraper element within said slot in rearwardly spaced relation to the front end of said scraper element, a laterally extending ticket supporting rib projecting upwardly from said bottom wall in opposing relation to said scraping member, said scraper element being movable toward said bottom wall and to a ticket scraping position in response to squeezing pressure applied to said scraper element and said scraper body, said scraping member cooperating with said ticket supporting rib in said scraping position to engage opposite sides of a ticket disposed within said slot between said scraping member and said ticket supporting rib to scrape coating material from the ticket when the ticket is pulled through said slot while squeezing pressure is applied to said scraper element and said scraper body to maintain said scraping member in scraping engagement with the coating material on the surface of the ticket.

**4,793,062**  
**DEVICE FOR REMOVING PLASTER FROM WALLS**  
Wolfgang Schoeck, Bismarckstrasse 11, D-7417 Pfullingen, Fed. Rep. of Germany  
Filed Oct. 21, 1986, Ser. No. 921,774  
Claims priority, application Fed. Rep. of Germany, Oct. 21, 1985, 3537372  
Int. Cl.<sup>4</sup> B26B 3/00  
U.S. Cl. 30-172 11 Claims

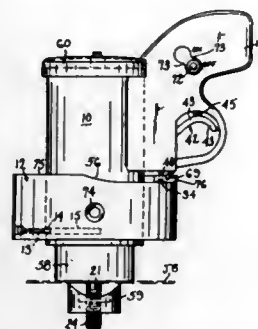


1. A device for removing plaster from a wall, comprising a housing including a carrying plate; a single handgrip secured to said carrying plate; two tool supports positioned in said housing and oscillatorily movable in a straight-line motion in counter directions relative to each other, said tool supports each carrying a cutting tool; at least two cylinder-piston units positioned in said housing, each cylinder-piston unit being coupled with a respective tool support and acting as a drive organ therefor, said housing having a central plane extending normal to the direction of movement of said tool supports, said tool supports being positioned symmetrically relative to said central plane; said handgrip being centrally positioned on an outer side of said carrying plate.

**4,793,063**  
**PUNCH GUN**  
Lucien C. Ducret, 9 Tod's Driftway, Old Greenwich, Conn. 06870  
Filed Mar. 31, 1987, Ser. No. 32,770  
Int. Cl.<sup>4</sup> B26F 1/02  
U.S. Cl. 30-360 16 Claims

1. An explosive actuated tool comprising:  
a body provided with a main bore,  
a firing mechanism associated with the body, and workpiece engaging elements;  
the main bore being cylindrical and having a closed end and a vented end and a cartridge chamber communicating with the main bore,  
the firing mechanism including:  
a trigger mechanism mounted on the tool body,  
cartridge firing means between the cartridge chamber and the trigger mechanism,  
and a locking member mounted on the tool body for

rotation about the longitudinal axis of the main bore between a first radial position on said tool body which opens the cartridge chamber for loading and a second radial position on said tool body which closes the cartridge chamber for firing, and the workpiece engaging elements including:



a piston movably mounted in the main bore,  
a piston rod extending from the piston through the closed end wall of the main bore, and  
a punch and die both operatively associated with the piston rod.

4,793,064

## CHAIN SAW SAFETY BRAKING DEVICE

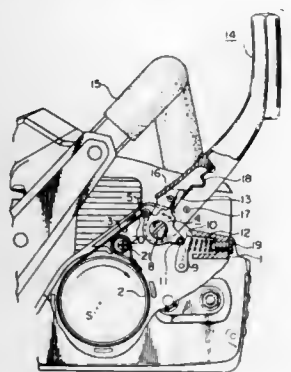
Akira Nagashima, Kawasaki, Japan, assignor to Kioritz Corporation, Tokyo, Japan

Filed Apr. 27, 1987, Ser. No. 42,887

Claims priority, application Japan, May 2, 1986, 61-67227[U]  
Int. Cl. B60T 13/04

U.S. Cl. 30-382

2 Claims



1. A chain saw braking device comprising:

- a brake handle having a lower end pivotally supported by a shaft on a chain saw body in front of a forward operation handle;
- a pivot member supported pivotally by said shaft and concentrically with respect to the supported portion of said brake handle, said pivot member having a brake operation leg portion for connecting one end of a brake band wound onto the outer periphery of a clutch drum of centrifugal clutch for driving a saw chain, a locking leg portion formed at an opposite side of said pivot member with respect to said brake operation leg portion, and an arm portion formed between said brake operation leg portion and said locking leg portion extending in the direction toward said brake handle; and
- a locking lever for preventing said locking leg portion from pivoting in a clockwise direction, wherein said arm por-

tion is pivoted between a pair of pins on said brake handle, said locking leg portion of said pivot member is engaged with and released from said locking lever in accordance with the pivoting of said brake handle, and said brake handle comprises a spring adapted to urge said arm portion in a counterclockwise direction such that said arm portion abuts against one of said pair of pins during a non-braked condition.

4,793,065

## CIRCULAR SAW WITH ANNULAR SAW BLADE

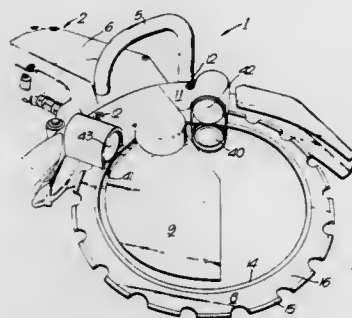
Mats Johansson, Forshaga, Sweden, assignor to Electrolux Motor Aktiebolag, Huskvarna, Sweden

Filed Oct. 8, 1987, Ser. No. 105,589

Claims priority, application Sweden, Oct. 22, 1986, 8604487  
Int. Cl. B27B 5/14

U.S. Cl. 30-389

4 Claims



1. Circular saw with an annular blade (8), known as an annular saw, with a power unit (2) comprising a motor housing with motor, elements to hold the saw blade in place in the power unit and a transmission system to transmit the motor drive moment to the saw blade, with the saw blade having a plane of symmetry (19) substantially perpendicular to the imaginary centre axis, an inner rim section (14) with first drive surfaces (22), an outer rim section (15) with a cutting system and between them a web portion (16) exhibiting a smooth underside (17) and a smooth topside (18), and these sides (17, 18) are parallel to the said plane of symmetry (19), at least one annular groove (24) is provided in at least one of the aforementioned sides, and with the said holding elements including at least two lower support rollers (40, 41), each one with a surface of rotation (46, 47) bearing upon the smooth underside and at least two upper support rollers (42, 43) each with a surface of rotation (61, 62) bearing upon the smooth topside (18) of the web portion of the saw blade, and also on at least two of the said lower and upper support rollers at least one flange (44) which is limited in the axial direction of the roller by an annular outer flange edge and an annular inner flange edge (45), said flange having a flange thickness (b) which is less than the width (B) of the groove in the web portion of the saw blade and a flange height (h) which is less than the depth (D) of the groove in which the flange is fitted, said transmission system comprising a drive pulley (30) fitted substantially on the inside of the inner rim of the saw blade with an axis of rotation (31) located between the inner rim of the saw blade and the said centre axis, parallel to the centre axis, and transmission means to transmit the motor torque to the drive pulley, which drive pulley comprises second drive surfaces (38) linking with the said first drive surfaces (22) on the inner rim section of the saw blade so as to transmit, on rotation of the drive pulley, the torque of the drive pulley to the saw blade through a friction coupling between the said first and second drive surfaces (22, 38) so that this rotates around its imaginary centre axis, characterised by force-exerting members (53, 56, 57) provided to work on the support rollers (40, 41), which have at least one flange (44) in engagement with a groove in the web portion of the saw blade, said force-exerting members working essentially in the axial

direction of the support rollers, essentially parallel to the plane of symmetry of the saw blade, towards the centre of the saw blade, so that the said first and second drive surfaces are pressed toward each other and so that the said inner edge of the flange on the said flange on the support rollers is pressed against said inner edge of said groove in the web portion of the saw blade.

4,793,066

## PIPE JOINT INTERSECTION CONTOUR SCRIBER

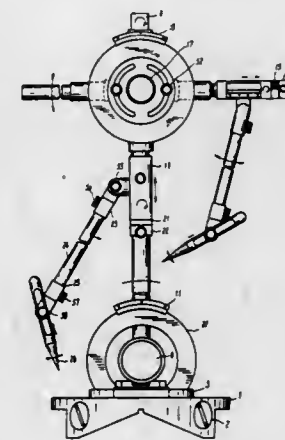
Wang X. Cheng, c/o Servicing Team of Petroleum Piping Company, Qin Huang Dao, Hebei Province, China

Filed Jun. 19, 1987, Ser. No. 64,015

Claims priority, application China, Jun. 20, 1986, 86204124  
Int. Cl. B23K 37/00

U.S. Cl. 33-21.3

11 Claims



1. A pipe joint intersection contour scriber comprising: a magnetic base, a rotat unit, a hinge unit, a locking unit, a longitudinal rod, a longitudinal rod disc, a transverse rod, a transverse rod disc, guide sleeves units and scribing units, wherein

- said magnetic base has (1) a lower surface with a longitudinal V-shaped groove for resting the contour scriber on a cylindrical piece of work, and (2) a central axis extending vertically of said lower surface and perpendicularly intersecting the longitudinal axis of said V-shaped groove;
- said rotat unit has a 360°-graduated disc which is mounted on said magnetic base and rotatable around said central axis of said magnetic base in a plane parallel to the lower surface of the magnetic base;
- said hinge unit permits the lower end of said longitudinal rod to be hinged to said 360°-graduated disc by way of a turntable hinge shaft which has an axis perpendicularly intersecting said central axis of said magnetic base at a point about which said longitudinal rod is permitted to rotate in a plane perpendicular to said lower surface of said magnetic base;
- said locking unit acts on said hinge shaft so as to lock said longitudinal rod at a predetermined angular position with respect to the lower surface of the magnetic base;
- said longitudinal rod disc is slidably mounted on the other end of said longitudinal rod with a central axis perpendicular thereto;
- said transverse rod is removably mounted on said transverse rod disc, which, in turn, is rotatably mounted on said longitudinal rod disc, said transverse rod disc having a central axis aligned with said central axis of said longitudinal rod disc so that said transverse rod is permitted to rotate around as well as to slide axially along said longitudinal rod;
- said guide sleeve units are respectively mounted on said longitudinal and transverse rods, so as to slide along as

well as rotate around longitudinal and transverse rods, respectively; and  
said scribing units include two scribing arms respectively fixed in two scribing arm connecting bushings which in turn are hinged to said guide sleeve units for changing the intersecting angle between said scribing arm and longitudinal or transverse rod.

4,793,067

## POSITION MEASURING INSTRUMENT WITH PLURALITY OF REFERENCE

Wolfgang Reimar, Traunreut, and Johann Oberhans, Post Emertsham, both of Fed. Rep. of Germany, assignors to Dr. Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany

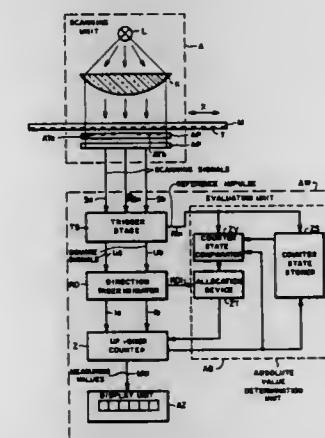
Filed May 21, 1987, Ser. No. 53,145

Claims priority, application Fed. Rep. of Germany, May 22, 1986, 3617254

Int. Cl. G01D 5/34

U.S. Cl. 33-125 A

10 Claims



1. In a measuring instrument for measuring the relative position of two relatively movable objects, the instrument comprising a measuring scale and a scanning unit, the measuring scale defining a graduation and a plurality of reference marks absolutely allocated to the graduation, the graduation defining a measuring direction, the scanning unit operative to scan the graduation and the reference marks to produce at least one scanning signal and at least one reference signal, respectively, the improvement comprising:

means for defining each reference mark along the graduation wherein each two adjacent reference marks defines a respective spacing such that a unique absolute value for each reference mark is determinable from at least two of the spacings.

4,793,068

## SPACER FOR USE IN SETTING TILE

Homayun Golkar, 2125 Sherington Pl., #C 106, Newport Beach, Calif. 92663

Filed Dec. 14, 1987, Ser. No. 132,766

Int. Cl. G01B 5/14

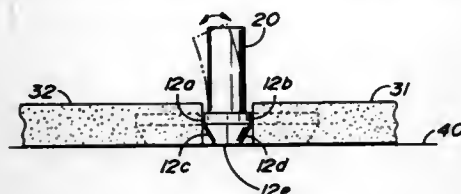
U.S. Cl. 33-526

16 Claims

1. A unitary spacer member for aligning and spacing tiles relative to each other when the tiles are placed on an adhesive on a supporting surface, said spacer member comprising: at least three generally identical arms of generally the same width and depth intersecting at a junction area, two of said arms being in general alignment and at least one of said arms being at a right angle relative to the two aligned arms, each of said arms having a generally identical cross-section with the sides thereof having a first side portion



including opposing generally parallel side edges narrow in dimension relative to the depth, and second side portions converging to a narrow bottom, said first side portions defining the spacing between adjacent tiles while providing narrow edge contact with the tiles with said narrow bottom of the spacer placed in bottom surface contact with the adhesive on the supporting surface and said first side portions in abutting relation with adjacent tiles; and



an integrally formed gripping means projecting from the upper surface of the spacer centrally relative to the junction of said arms, said gripping means being adapted to be gripped by the fingers for placing in and removing said member from between the tiles following the alignment of the latter on the supporting surface, and during removal of said member, said projecting gripping means provides a lever which, in conjunction with said narrow bottom, enables rocking movement of said member to facilitate detachment from within the space between the tiles.

4,793,069

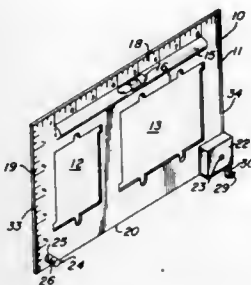
#### DEVICE FOR INSTALLING ELECTRIC OUTLET BOXES

Kenneth H. McDowell, 127 Krista Ct., Chalfont, Pa. 18914  
Filed Jun. 15, 1987, Ser. No. 61,816

Int. Cl.<sup>4</sup> G01B 5/14, 3/02

U.S. Cl. 33—528

8 Claims



1. A device for preparing a wall or similar support to receive an electrical outlet box which comprises:

- (1) a flat elongate sheet having one or more cutouts for outlining the contours of said box;
- (2) a rule extending along at least one edge of said device;
- (3) a level within an elongate protuberance which extends horizontally and outwardly from the face of said device;
- (4) an extensible tape measure secured to the face of said device; and
- (5) a peg affixed to said face and having a threaded orifice for receiving a threaded screw to which a line may be attached for measuring distances to floor level.

4,793,070

#### PERFORATION GAUGE FOR POSTAGE STAMPS

Horst Hohner, Rosenbergstr. 52, D7022 Leinfelden-Echterdingen 1, Fed. Rep. of Germany

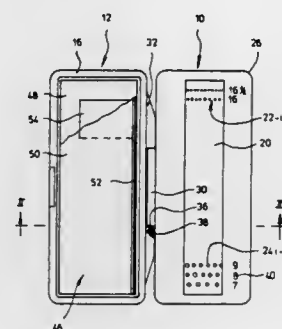
Filed Jul. 2, 1987, Ser. No. 69,488

Claims priority, application Fed. Rep. of Germany, Apr. 18, 1987, 8705720

Int. Cl.<sup>4</sup> G01B 5/00

U.S. Cl. 33—541

14 Claims



1. Perforation gauge for postage stamps comprising a measuring plate (10) which supports an elongated, rectangular panel (20) filled with a plurality of parallel rows (22i) of elongated perforation fingers (24i-k), the spacing of the perforation fingers within one row being constant and the transverse dimension of the perforation fingers being coordinated with this spacing, while the spacing of the perforation fingers varies from row to row, characterized by a lid member (12) which in its inoperative position covers the side of the measuring plate (10) supporting the perforation fingers (24i-k) and exposes the latter in its working position, and in its closed position the lid member (12) together with the measuring plate (10) defines a body with smooth outer surfaces.

4,793,071

#### ARRANGEMENT FOR MEASURING THE RELATIVE DISTANCE OF CLOSELY ADJACENT OBJECTS

Dieter Steinselzer, Siegen, and Ivar-Rudolf Schwertner, Wenden, both of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 6, 1987, Ser. No. 118,482

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1986, 36388334

Int. Cl.<sup>4</sup> G01B 5/14

U.S. Cl. 33—657

9 Claims



1. An arrangement for measuring the relative distance of closely adjacent objects including a distance measuring sensor having a chamber filled with liquid, said chamber being bounded by a diaphragm-like wall, a transparent ascending conduit connected to said chamber for receiving liquid there-

from, wherein the distance measuring sensor comprises a rigid base layer, an intermediate layer of solid synthetic material abutting said rigid base layer, said intermediate layer having recesses which form said chamber and said ascending conduit, and an elastic covering layer abutting said intermediate layer, said covering layer having a transparent section over at least part of said ascending conduit whereby someone looking through said transparent section can see the height of liquid, if any, in said ascending conduit, said three layers closing said chamber and said ascending conduit to the surrounding atmosphere except for the end of said ascending conduit remote from said chamber.

and inlet and outlet openings for photosensitive material between said portions; and first and second suction nozzles respectively located in said first and second portions, each of said nozzles having a suction opening facing away from the respective portion of said enclosure.

4,793,074

#### DRYER ASSEMBLY FOR PHOTOGRAPHIC PAPER

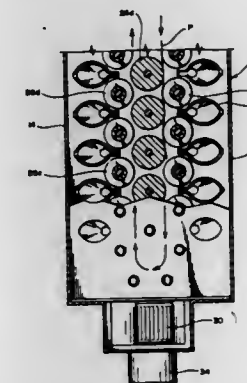
Thomas C. Jessop, Webster, and Ralph L. Piccinino, Jr., Rush, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 7, 1988, Ser. No. 141,644

Int. Cl.<sup>4</sup> F26B 13/00

U.S. Cl. 34—160

4 Claims



4,793,072

#### DEHYDRATION METHOD AND DEHYDRATION SYSTEM

Shiro Igarashi, Fuchu; Mamoru Matsubara, Tokyo, and Shiro Tanaka, Atsugi, all of Japan, assignors to Kewpie Kabushiki Kaisha; Showa Denko Kabushiki Kaisha and San-Ei Shokuhin Hanbai Kabushiki Kaisha, all of Tokyo, Japan

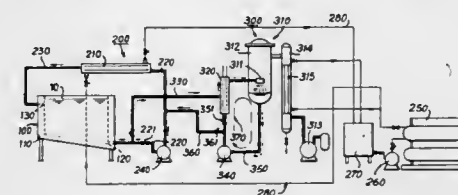
Filed Jul. 9, 1987, Ser. No. 71,622

Claims priority, application Japan, Jul. 22, 1986, 61-170944

Int. Cl.<sup>4</sup> F26B 3/00

U.S. Cl. 34—9

24 Claims



1. A dehydration method for removing water from materials, comprising dipping a material to be treated wrapped in a semipermeable sheet into a dehydrating solution to absorb part of the water contained in said material, cooling and concentrating said dehydrating solution to adjust temperature and concentration of said dehydrating solution, and sterilizing said dehydrating solution as needed for reuse in dehydration.

4,793,073

#### DEVICE FOR REMOVING MOISTURE FROM WET PROCESSED PHOTSENSITIVE MATERIAL

Jürgen Leuchter, Tutzing, Fed. Rep. of Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

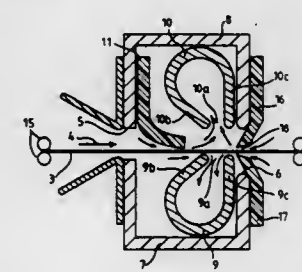
Filed Aug. 14, 1987, Ser. No. 85,984

Claims priority, application Fed. Rep. of Germany, Sep. 2, 1986, 3629794

Int. Cl.<sup>4</sup> F26B 13/00

U.S. Cl. 34—156

21 Claims



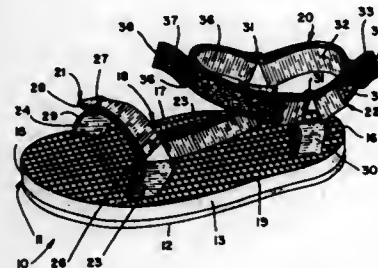
1. An apparatus for the continuous wet processing of photosensitive material, comprising a device for the removal of moisture from photosensitive material issuing from a processing bath and travelling along a predetermined direction, said device including an enclosure having first and second portions,

1. Apparatus for transporting and drying photographic paper in a drying tank, the apparatus comprising:

- a. roller means for transporting the paper inside the tank, the roller means including (i) first and second upper rollers which are supported on upper shaft means in a manner that the upper rollers are spaced apart so that the upper shaft means is exposed therebetween, and further that each of the upper rollers has a paper engaging surface which is located radially outward from the upper shaft means, and (ii) first and second lower rollers which are supported on lower shaft means in a manner that the lower rollers are spaced apart so that the lower shaft means is exposed therebetween, and further so that each of the lower rollers has a paper engaging surface which is located radially outward from the lower shaft means, with the paper engaging surfaces of the lower rollers being separated from the paper engaging surfaces of the upper rollers by a vertical gap;
- b. air distribution means for directing air against the surface of the paper and for providing a return path for the air after the air has been deflected from the paper, the air distribution means including
  - (1) pump means for propelling the air, and
  - (2) duct means, in communication with the pump means, for directing the air from the pump means to locations inside the tank, the duct means including an air tube having a discharge chute which is positioned in the vertical gap between the upper and lower rollers for directing air from the air tube against the paper; and
- c. the duct means in combination with the roller means providing (i) an upper return outlet, which is formed by a upper surface of the discharge chute and a lower surface of the exposed portion of the upper shaft means, providing an upper path for the air which has been deflected from the paper for return to the pump means, and (ii) a lower return outlet, which is formed by a lower surface of the discharge chute and an upper surface of the exposed portion of the lower shaft means, providing a lower path for the air which has been deflected from the paper for return to the pump means.

**4,793,075**  
**SPORT SANDAL FOR ACTIVE WEAR**  
 Mark Thatcher, Box 968, Flagstaff, Ariz. 86002  
 Filed Sep. 15, 1987, Ser. No. 96,914  
 Int. Cl.<sup>4</sup> A43B 3/12  
 U.S. Cl. 36—11.5

3 Claims



1. In a sport sandal having an elongated sole configured to the profile of a human foot and having a toe end and a heel end along with an insole and an outsole, a special tether strap system for retaining said sole on a human foot comprising:  
 a toe strap unit extending transversely across said toe end of said insole, and toe strap unit having an extending toe post attached to one side of said insole at its outer edge which terminates in an attached first pivot means located above said insole and a toe strap anchored in said insole on the opposite side of said insole at said toe end and which is threadable through said first pivot means, said toe strap unit having means operable to adjust its length;  
 a heel strap unit having spaced apart, extending heel posts connected to said insole at its edges adjacent to said heel end of said sole, each of said posts terminating in a separate second pivot means above said insole and a heel strap having one end attached to one of said second pivot means and loopable through the other of said second pivot means with means operable to adjust its length, said heel strap unit also having an instep strap attached to said one of said second pivot means and loopable through the other second pivot means with means to adjust its length whereby said heel strap and said instep strap are operable to encircle a user's ankle when said sandal is in use; and  
 a tether strap having one end connected to said first pivot means on said toe post and disposed parallel and above the outside edge of said sandal, said tether strap having its other end connected to said instep strap adjacent to the latter's attachment to said second pivot means and operable to cause the tension in said toe strap unit and said heel strap unit to dependently change as tension on said straps changes in said toe strap unit and said heel strap unit when the sandal is in use.

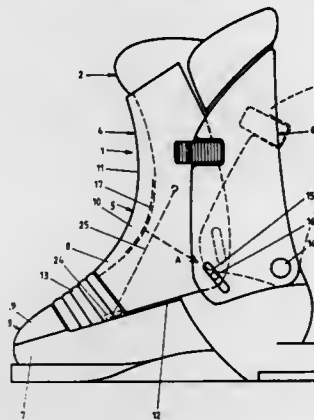
**4,793,076**  
**SKIING BOOT AND PROCESS FOR ITS MANUFACTURE**  
 Kurt Hilgarth, Graz, Austria, assignor to Skischuhfabrik Dynafit Gesellschaft m.b.H., Graz, Austria  
 Filed Jan. 9, 1987, Ser. No. 59,948  
 Claims priority, application Austria, Jul. 24, 1986, A2007/86  
 Int. Cl.<sup>4</sup> H43B 5/04

U.S. Cl. 36—117

8 Claims

1. Skiing boot comprising a shell and a shaft which is composed of a cover adapted for entering the boot from behind, the cover being attached on opposite sides to a heel region of the shell by pivot means having an axis transverse to a longitudinal axis of the boot, and a collar forming a front portion of the shaft, the collar extending into an upper region of the shell and forming an integral structural unit with a portion of the shell upper region adjacent the collar, said unit being mounted for sliding movement on the shell in a lengthwise direction of travel in relation to a tip upper portion of the shell, wherein a connection between the structural unit and the tip upper por-

tion of the shell comprises a resilient member in fixed connection on one side with the structural unit and on the other side



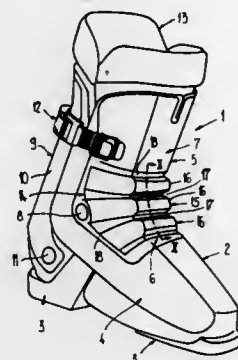
with the tip upper portion of the shell, the resilient member being located forwardly of an instep region of the boot.

**4,793,077**  
**ARTICLE OF ATHLETIC FOOTWEAR, ESPECIALLY A SKI BOOT**  
 Klaus Walkhoff, Kreuzlingen, Switzerland, and Erik O. Giese, Snowmass Village, Colo., assignors to Raichle Sportschuh AG, Kreuzlingen, Switzerland  
 Filed Dec. 17, 1986, Ser. No. 942,898  
 Claims priority, application Switzerland, Dec. 23, 1985, 05512/85

U.S. Cl. 36—117

Int. Cl.<sup>4</sup> A43B 5/04

24 Claims



1. An article of athletic footwear, especially a ski boot, comprising:  
 a shoe upper portion;  
 said shoe upper portion containing at least one wall section subjected to bending load and a wall region surrounding said at least one wall section;  
 said at least one wall section possessing a lower flexural rigidity than said surrounding wall region;  
 said at least one wall section being made of a different type of material than said surrounding wall region; and  
 said at least one wall section being substantially undetachably attached to said surrounding wall region.

**4,793,078**  
**INSOLES FOR FOOTWEAR**  
 Anthony C. Andrews, 299 Muswell Hill Broadway, London, N.10., England  
 Filed Apr. 23, 1987, Ser. No. 41,718  
 Claims priority, application United Kingdom, Apr. 24, 1986, 8609998  
 Int. Cl.<sup>4</sup> A43B 13/38  
 U.S. Cl. 36—43

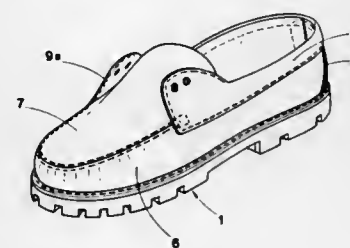
11 Claims



1. An insole for footwear, comprising:  
 a layer of resilient plastic material including integral therewith a portion shaped and positioned to provide support for at least one of the metatarsal and valgus regions of a foot;  
 a covering secured to said upper surface of said layer; said layer having a plurality of depressions therein and said insole including a plurality of inserts corresponding in number to said plurality of depressions, said depressions and said inserts being sized and shaped such that a corresponding insert may be releasably fitted in a corresponding depression, said depressions being configured and positioned such that upon selective removal of a respective insert or inserts a respective depression or depressions is exposed corresponding to a sensitive spot or spots on a user's foot.

**4,793,079**  
**PROCESS FOR THE MANUFACTURING OF FOOTWEAR AND FOOTWEAR OBTAINED THROUGH THIS PROCESS**  
 Fernando Vico, Monte San Giusto, Italy, assignor to Max del F. 111 Vico & C. S.p.A., Italy  
 Filed May 6, 1987, Ser. No. 47,426  
 Claims priority, application Italy, Oct. 17, 1986, 3546 A/86; Jan. 16, 1987, 3319 A/87  
 Int. Cl.<sup>4</sup> A43B 03/14, 13/12  
 U.S. Cl. 12—142 MC

6 Claims



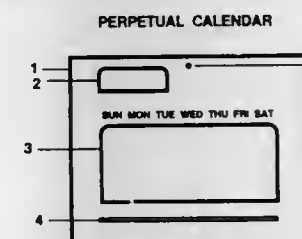
3. A process for manufacturing of footwear, said process including the following steps:  
 forming a first sole element having two faces, an upper face

and a lower face, said lower face of said first element having a recess;  
 forming a second sole element having two faces, an upper face and a lower face, said upper face of said second element being formed to correspond to said recess such that it fits within and mates with said recess of said first element;  
 forming a toe cap and at least two strips;  
 forming a one-piece vamp having a rear area, an upper part, and a central portion;  
 superimposing said central portion of said vamp, while lying flat, on said upper face of said first sole element and sewing it thereto;  
 applying a layer of glue on said upper face of said second sole element and a layer of glue on said lower face of said first element;  
 heating said first and second sole elements for a predetermined period of time at a predetermined temperature;  
 inserting said second sole element into said recess of said first sole element so that said first element and said second element are glued together;  
 folding up said upper part of said vamp and sewing said rear area to close the rear area as well as sewing said strips to said vamp; and  
 sewing said toe cap to said upper part of said vamp so as to close the upper part of said vamp.

**4,793,080**  
**PERPETUAL CALENDAR**  
 Frank Tangorra, Nassau Bay Branch, 18214 Upper Bay Rd., Nassau Bay, Tex. 77058  
 Filed Nov. 3, 1986, Ser. No. 926,321  
 Int. Cl.<sup>4</sup> G09D 3/02

U.S. Cl. 40—122

8 Claims



1. An improved perpetual calendar of the type having:  
 (a) cards with months;  
 (b) cards with numbers of days;  
 (c) a frame, wherein the improvement comprises of frontal separate cavities arranged and of size and shape to hold respective sets of cards snugly therein and configured with a horizontal slit to enable the concealment of a specific number or numbers on cards with number of days.

**4,793,081**  
**ANIMATED SIGN**  
 Ralph N. Andrae, 15 Morgan St., Crystal Lake, Ill. 60014, and Richard R. Seiberlich, 442 N. Elia St. Apt. 2 South, Barrington, Ill. 60010  
 Filed May 18, 1987, Ser. No. 50,871  
 Int. Cl.<sup>4</sup> G09F 19/08

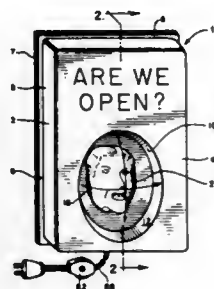
U.S. Cl. 40—414

19 Claims

1. A motile sign comprising:  
 a support structure,  
 a movable message indicator operable in two modes for transmitting different messages, manually shiftable drive means for the indicator,  
 said drive means mounting said indicator,  
 said drive means comprising a crank-driven pitman position-



able in a first position for oscillating said indicator in a first direction to operate in a first mode, and



said drive means positionable in a second position for operating said indicator in another direction in a second mode.

4,793,082

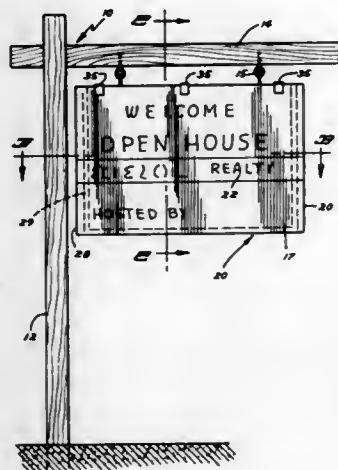
## REMOVABLE DISPLAY STRUCTURE

Mary E. Petrick, 4505 Grace St., White Bear Lake, Minn. 55110, and Timothy Morrissey, 894 Shirley La., Shoreview, Minn. 55126

Filed Aug. 17, 1987, Ser. No. 98,898  
Int. Cl.<sup>4</sup> G09F 7/22

U.S. Cl. 40-617

1 Claim



1. A portable display device having indicia thereon to be used with a fixed in position real estate sign which includes a rigid hanging plate sign member being hung, at its upper edge portion, comprising:

- a pair of opposed side panels of somewhat larger size than that of said rigid plate member to be disposed at each side of said rigid plate member,
- said panels having one end portion unitary and having an opposite end portion carrying a releasable closure,
- said side panels having upper edge portions and secured to an upper edge portion of one of said panels are flexible releasable strap-like securing means disposed over said upper edge of said rigid plate member and releasably secured to the upper edge portion of the other of said panels,
- whereby said panels envelop said rigid plate and overlay it with the indicia carried by said panels.

4,793,083

## SIGN HOLDER

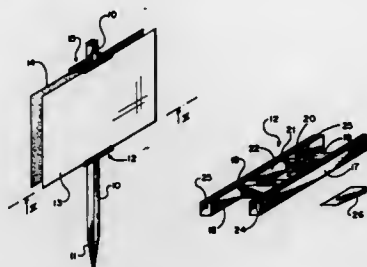
Angus E. McDonald, 147 Hyland Drive, Sudbury, Ontario, Canada P3E 1R7

Filed Oct. 27, 1986, Ser. No. 923,267

Int. Cl.<sup>4</sup> G09F 15/00

U.S. Cl. 40-607

4 Claims



1. A display panel mounting system comprising:

- (a) a normally generally upright post provided with support means for holding the post in a generally vertical position;
- (b) a first holder including a sleeve portion of a cross-section complementary with that of a post to allow a sliding displacement of the holder along the post, and frictional securement means operatively associated with the sleeve portion to firmly press a section thereof against the surface of the post to frictionally clamp the respective sleeve portion to the post, said sleeve being generally integral with a pair of transverse members parallel with each other and being disposed one to each side of the post, each transverse member defining a transverse slot which, when the sleeve is secured to the post, is open in a generally vertically upward direction;
- (c) a second holder of a structure and size generally identical with that of said first holder, said second holder being so arranged, when secured to the post, that the transverse slots thereof are parallel with the transverse slots of the first holder and are open in a generally vertically downward direction, toward the respective upwardly open slot of the first holder, whereby two display panels, one to each side of the post, can be held in the respective slots of the first and second holders,
- (d) the frictional securement means of each holder including a camming member disposed near that portion of the respective sleeve which extends between the respective pair of transverse members, whereby the camming member is accessible through a space between two panels held by the holders.

4,793,084

## CYLINDER FIREARM, AND AN ASSOCIATED IMPROVED CYLINDER

Jean Beltzer, Lutterbach, France, assignor to Matra Manurhin Defense, Vélizy-Villacoublay, France

Filed Jul. 2, 1987, Ser. No. 69,268

Claims priority, application France, Jul. 4, 1986, 86 09749

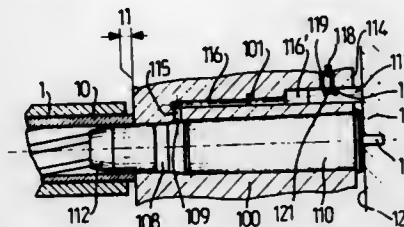
Int. Cl.<sup>4</sup> F41C 1/00; F41D 11/32

U.S. Cl. 42-59

18 Claims

1. A cylinder firearm including a frame, a barrel, and a cylinder having a plurality of cartridge-receiving chambers, said cylinder being rotatably mounted on a rod coaxial therewith inside a cylinder-receiving housing associated with said frame, and being free to rotate relative to said barrel by virtue of an operating clearance between said cylinder and said barrel, the firearm including the improvement whereby said cylinder includes a channel associated with each chamber and opening out at one end into said chamber ahead of the casing of a cartridge placed therein, with the other end of said channel receiving a sliding closure member, said sliding closure

member being disposed to press against said frame when said firearm is fired under the effect of the pressure of the combus-



tion gases and, by reaction thereto, causing said cylinder to move forwardly until said operating clearance is eliminated.

4,793,085

## ELECTRONIC FIRING SYSTEM FOR TARGET PISTOL

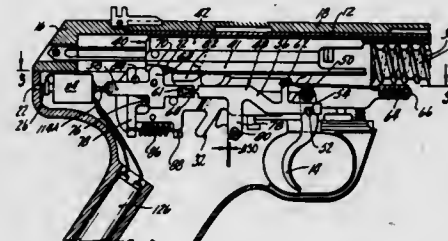
Stephen J. Surawski, Woodbury; Larry W. Cowles, South Windsor, and John J. Muller, West Hartford, all of Conn., assignors to Colt Industries Inc., New York, N.Y.

Filed Jan. 28, 1987, Ser. No. 7,881

Int. Cl.<sup>4</sup> F41C 19/12, 27/12

U.S. Cl. 42-84

19 Claims



1. In an electronically operated firearm of the type having a trigger, a solenoid responsive to movements of the trigger and a sear operatively associated with the solenoid and responsive to actuation thereof, the improvement comprising: a trigger bar for displacing the sear having a front section connected to the trigger and a rear section connected to the solenoid, the sections of the trigger bar being interconnected such that each section is axially movable relative to the other section.

4,793,086

## FISHING ROD HOLDER

Thomas Cup, 3301-E E. Lake Rd., Livonia, N.Y. 14487

Filed Oct. 1, 1987, Ser. No. 103,341

Int. Cl.<sup>4</sup> A01K 97/10

U.S. Cl. 43-21.2

17 Claims



1. A fishing rod holder, comprising:

a base member for supporting said fishing rod holder on a support surface;  
means for holding a plurality of fishing rods, said holding means being supported on said base member and extending upwardly therefrom; and  
means for securing said holding means in adjustable predetermined positions, said securing means operatively cooperating with said holding means so as to simultaneously secure said fishing rods in respective individually-adjusted predetermined positions in a locked state of said securing means, and to permit individual adjustment of each of said fishing rods in a released state of said securing means; said holding means comprises a plurality of sleeve members each adapted to receive a fishing rod therein, and a plurality of support members for respectively supporting said sleeve members;  
said support members being arranged in stacked relation on said base member so as to be individually rotatable relative thereto; and  
said securing means is adapted to lock said support members against rotation in said locked state.

4,793,087

## FISHING ROD HANDLE ADAPTED FOR BAIT CASTING

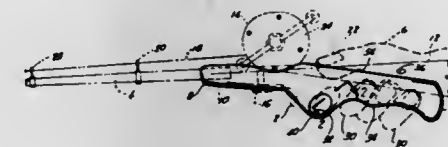
Gary L. McGee, Rte. 1, Box 669, Lucedale, Miss. 39503

Filed Apr. 30, 1987, Ser. No. 44,141

Int. Cl.<sup>4</sup> A01K 87/00

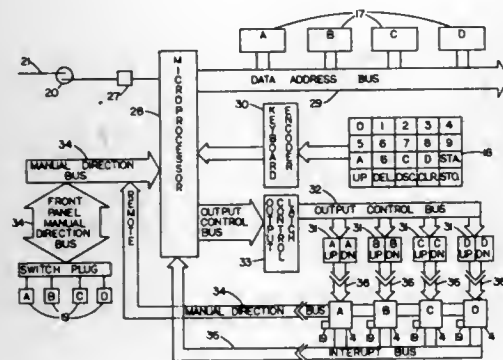
U.S. Cl. 43-23

1 Claim



1. A handle, adapted to the manipulation of a fishing rod comprising:  
a. a nose piece adapted to rigidly, removably affix to an end of a fishing rod, defining a front end of said handle;  
b. said fishing rod and said nose piece defining a first line of position of said handle;  
c. means adjacent a midsection of said handle, adapted to receiving in operating engagement thereto reel means for the dispensing and retrieval of a fishing line, said midsection being affixed intermediate said nose piece and a hand grip means;  
d. said hand grip means affixed to said midsection of said handle, defining an end of said handle away from said nose piece, said hand grip means further comprising:  
i. an extended, angled section, substantially rectangular in cross-section, adapted to being grasped by the three smaller fingers of the hand in conjunction with the palm thereof;  
ii. said extended, angled section extending at an angle substantially equal to fifteen degrees from said first line of position; and  
iii. finger tactile feedback means attached to said hand grip means intermediate said extended, angled section and said midsection, said feedback means further comprising an aperture having:  
a. a symmetrical beveled rear section adapted to support the second joint segment of the index finger at between forty five and a sixty degree angle to said first line of position;  
b. an enclosing circumferential section in touching contact with at least the back of the index finger.

**4,793,088**  
**MULTIPLE REMOTE CONTROLLED DOWN RIGGER**  
**AND PLANING BOARD SYSTEM**  
 Joseph J. Fortuna, 1506 Bonnie Dr., Bethlehem, Pa. 18018  
 Filed May 15, 1987, Ser. No. 90,015  
 Int. Cl.<sup>4</sup> A01K 89/00  
 U.S. Cl. 43—27.4 4 Claims



1. A multiple remote controlled down rigger and planing board system automatically and simultaneously controlling a plurality of down rigger and planing board fishing systems, each fishing system including a reversible motor means for changing the position of a down rigger and/or planing board, from a single central control box located at any desired location on a boat based upon input commands, the remote controlled system comprising:

a central controller means, disposed in said central control box for independently generating control signals for controlling said plurality of down rigger and planing board fishing systems;

a plurality of remote controlled means disposed near and for actuating said reversible motor means and hence the respective down rigger and planing board, a respective one of said plurality of remote controlled means actuating a corresponding reversible motor means based upon a corresponding control signal from the central controller means, each said remote control means including sensing means for sensing a condition of said reversible motor indicative of a position of said down rigger and planing board and for generating a corresponding position-indicating signal;

said central controller means including:

input means for accepting said input commands and generating signal to the remote controlled units for oscillating the down rigger and planing systems between predetermined depths and/or distances, and also generating a signal for simultaneously raising and retracting all the down rigger and planing board systems;

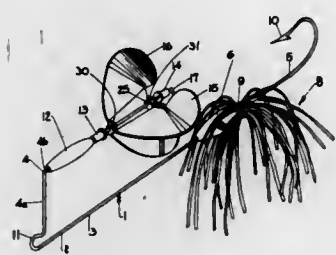
means for displaying respective line depths for said plurality of down rigger and planing board fishing systems based upon the respective position signals from said plurality of said remote controlled means;

said remote controlled means including:

remote input means for accepting input commands at said reversible motor means and for local generation of an override control signal that supersedes said corresponding control signal; and,

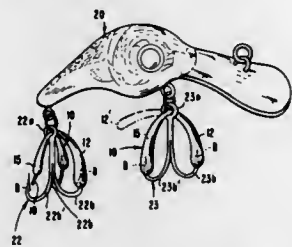
local means for displaying line depth for said respective down rigger and planing board systems based upon said corresponding position signal.

**4,793,089**  
**SURFACE TYPE FISHING LURE**  
 Carl E. Long, 3063 Hyannis Dr., Cincinnati, Ohio 45239; William Hines, 2712 E. Towers Dr., Apt. 211, Cincinnati, Ohio 45238, and Jack L. Gerros, 3760 Nightingale Dr., Cincinnati, Ohio 45227  
 Filed May 4, 1987, Ser. No. 45,528  
 Int. Cl.<sup>4</sup> A01K 85/00  
 U.S. Cl. 43—42.13 15 Claims



2. A surface type fishing lure comprising an elongated body, said body having a forward end configured for attachment to a fishing line and a rearward end, a fish hook affixed to said body rearward end, said body having a shaft-like portion, a pair of spinners rotatively mounted on said shaft-like portion in nested condition, each of said spinners comprising a central body portion and a pair of blades extending therefrom, said body portion and said blades of each spinner comprise a one-piece integral structure, said body portion being substantially planar, said body portion having a forward edge and a rearward edge, a forward tab and a rearward tab extending downwardly from each of said forward and rearward body portion edges respectively, said forward and rearward tabs having coaxial holes therein receiving said shaft-like portion of said lure body therethrough, said blades each extending upwardly and outwardly from said body portion along a fold line therebetween, said blades forming acute exterior angles C and D with the plane of said body portion, said fold lines defining the sides of said body portion, said sides and front and rear edges defining a right trapezoid, said fold lines diverging from said forward edge toward said rearward edge at an acute angle B therebetween, said nested blades on said shaft-like portion of said lure body having their forward tabs adjacent each other and their rearward tabs adjacent each other, said blades of said spinners being so configured and so angularly related to their respective body portions that said spinners rotate in the same direction at different speeds at different times, whereby they strike each other producing a fish attracting sound.

**4,793,090**  
**WEEDLESS HOOK ATTACHMENT**  
 Dennis K. Cooper, 4010 S. Lyons Ave., Indianapolis, Ind. 46241  
 Filed Apr. 8, 1988, Ser. No. 179,573  
 Int. Cl.<sup>4</sup> A01K 85/00  
 U.S. Cl. 43—42.43 10 Claims



1. A weedless hook attachment for use with a fishing hook having an eye and several barbs, comprising:

a body having a central hub with several legs emanating radially therefrom;  
 each of said several legs including a free end adapted to conceal a corresponding one of said several barbs of the fishing hook;  
 wherein, one of said several legs is a starter leg having a starter nub projecting from the free end of said starter leg, said starter nub having a diameter less than the diameter of said starter leg and being adapted to be severed from said starter leg; and  
 further wherein at least said starter leg and said starter nub are adapted to be threaded through the eye of the fishing hook.

**4,793,091**  
**TRAP FOR SHARKS**  
 Alexander Cerny, P.O. Box 417, Sechart, British Columbia, Canada V0N 3A0  
 Filed Apr. 27, 1987, Ser. No. 42,986  
 Int. Cl.<sup>4</sup> A01K 91/00  
 U.S. Cl. 43—42.74 5 Claims



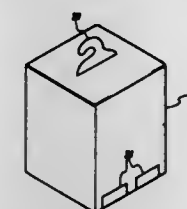
1. A shark trap comprising:

a float;  
 a first line extending from the float;  
 a first hook on the distal end of the first line;  
 a longitudinal tubular housing on the first line, below the float, having open ends and extending essentially perpendicularly to the first line;  
 a second line slidably received within the housing, the ends of the second line extending out the open ends of the housing;  
 second and third hooks, one on each end of the second line; whereby a shark taking bait on said first, second or third hooks will be susceptible to attack by other sharks.

**4,793,092**  
**FLY TRAP**  
 Naftali Avittan, 431 Malden, Richardson, Tex. 75080  
 Filed Sep. 21, 1987, Ser. No. 98,685  
 Int. Cl.<sup>4</sup> A01M 1/10  
 U.S. Cl. 43—122 1 Claim

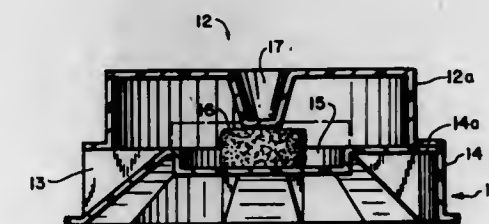
1. A fly trap comprising:  
 an extended closed container having a portal in its lower extremity;  
 a funnel located in said container which tapers from the lower extremity of the container to its upper extremity, there being a space between the top of said funnel and the upper extremity of said container,

a surface on which said funnel rests to elevate it above the top of the portal in said container;  
 a first pair of flaps connected to the opposite edges of said surface to provide the elevation for said funnel, and



a second pair of flaps connected to the opposite edges of said surface which are not connected to said first pair of flaps for pressing against the side walls of said container when said funnel is inserted therein.

**4,793,093**  
**FEEDING STATION FOR VERMIN**  
 James L. Gentile, Orange, Conn., assignor to Chesebrough-Pond's Inc., Greenwich, Conn.  
 Filed Jun. 10, 1987, Ser. No. 60,192  
 Int. Cl.<sup>4</sup> A01M 1/20  
 U.S. Cl. 43—131 5 Claims



1. A feeding station for vermin which allows for the ingress of the vermin, to feed on a poisoned bait held at a central portion therein, and for their subsequent egress from the feeding station, which comprises:

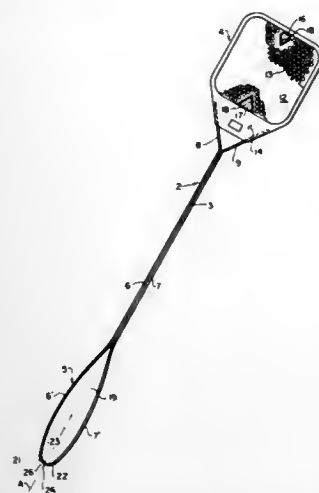
(a) a base member having at least one inclined ramp leading from more peripheral sections of the base member inwardly to a more raised position adjacent a single central wall adapted to hold a poisoned bait for the vermin;  
 (b) peripheral wall means bounding and closing off a substantial portion of the interior sections of the feeding station from the exterior and having at least one opening therein in communication with the inclined ramp which leads inwardly to the central well of the base member;  
 (c) a cover joined to the top of the base member to cover the central well holding the poisoned bait and a substantial portion of the ramp and wall means, the cover having an inwardly protruding member in contact with top surface of the poisoned bait to aid in holding the bait in the central well; and  
 (d) support means to inhibit crushing of the cover located adjacent the periphery of the base member.

**4,793,094**  
**INSECT SWATTER INCORPORATING MEANS FOR PICKING UP DEAD INSECT**  
 Ted T. Weaver, 301 Tolos PL-Space #19, Fallon, Nev. 89406  
 Filed Jan. 5, 1987, Ser. No. 634  
 Int. Cl.<sup>4</sup> A01M 3/02  
 U.S. Cl. 43—137 11 Claims

1. A swatter for swatting insects such as flies and spiders, comprising:



- (a) an elongated handle having a gripping portion adapted to be gripped in the hand of a user to effect a swatting movement of the swatter to swat an insect;
- (b) a swatting head attached to said handle at the end thereof remote from said gripping portion whereby to impact with an insect as a result of a swatting movement, said swatting head being a substantially flat, thin quadrilateral body; and



- (c) means formed on said swatting head for picking up said insect after it has been swatted, comprising at least one aperture in said swatting head sufficiently large to admit the passage of the swatted insect from one side of the head to the other, whereby when said aperture is positioned about the insect and the swatting head is moved relative to the insect in a plane common to both the insect and the swatting head, the swatted insect will be lifted and deposited on the swatting head for appropriate disposal therefrom.

4,793,095

## AQUEOUS ROOTING GEL

Michael W. Stow, Ipswich, Great Britain, assignor to Fisons plc, Ipswich, United Kingdom  
PCT No. PCT/GB86/00102, § 371 Date Nov. 4, 1986, § 102(e)  
Date Nov. 4, 1986, PCT Pub. No. WO86/05065, PCT Pub. Date Sep. 12, 1986  
PCT Filed Feb. 26, 1986, Ser. No. 2,716  
Claims priority, application United Kingdom, Mar. 9, 1985, 85/06153

Int. Cl.<sup>4</sup> A01G 9/10; C05G 3/00

U.S. Cl. 47—59

9 Claims

1. An aqueous rooting gel which comprises a thixotropic gel of hectorite in water containing at least 60 and not more than 200 ppm calcium ions, wherein said hectorite comprises from 58 to 63 parts by weight  $\text{SiO}_2$ , 25 to 30 parts by weight  $\text{MgO}$ , 2.2 to 2.8 parts by weight  $\text{Na}_2\text{O}$ , 0.65 to 0.90 parts by weight  $\text{Li}_2\text{O}$  and from 0.15 to 0.40 parts by weight sulphate and said gel comprises from 1 to 10% weight/volume of said hectorite.

4,793,096

## PLANT GROWING AND HANDLING SYSTEM

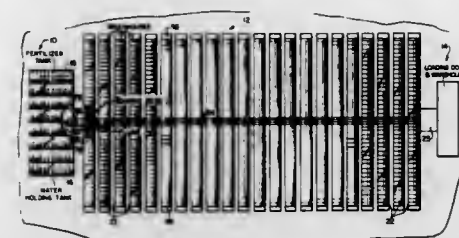
George K. Todd, Sr., Ruskin, Fla., assignor to Speedling Incorporated, Sun City, Fla.  
Filed Feb. 20, 1986, Ser. No. 831,914  
Int. Cl.<sup>4</sup> A01G 31/02

U.S. Cl. 47—59

19 Claims

1. A plant flat handling system comprising:
- (a) an elongated horizontally extending main channel for receiving a quantity of liquid;
- (b) liquid control means for selectively withdrawing liquid

- from said main channel for substantially filling said main channel with liquid;
- (c) a plurality of elongated branch channels each having a length axis branching outwardly from said main channel for receiving liquid from, said main channel so as to be filled with liquid, or for discharging liquid into, said main channel so as to achieve a substantially drained condition;
- (d) selectively operable valve means provided between each of said branch channels and said main channel for permitting or preventing liquid flow between said main channel and each of said branch channels;



- (e) vertically fixedly positioned plant flat support means extending lengthwise of said branch channels;
- (f) a plurality of floatable plant flats extending in said branch channels and arranged in at least two rows respectively extending transversely to and parallel to the length axis of each branch channel; and
- (g) wherein said floatable plant flats are supported above the bottoms of their respective branch channel by said plant flat support means when the respective branch channel is drained of liquid but float above said plant flat support means in spaced relation thereto when the respective branch channel is substantially filled with liquid.

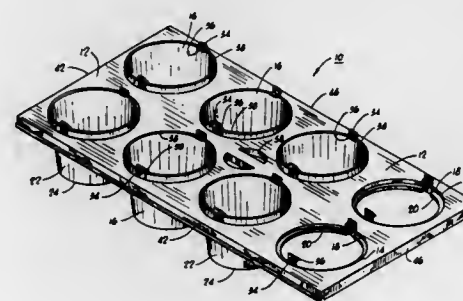
4,793,097

## PLANT CONTAINER HANDLING AND PROTECTION SYSTEM

Carl E. Whitcomb, Stillwater, Okla., assignor to Lacebark Publications, Stillwater, Okla.  
Filed Sep. 26, 1986, Ser. No. 911,712  
Int. Cl.<sup>4</sup> A01G 9/02

U.S. Cl. 47—86

24 Claims



1. A frame for releasably holding a plurality of plant containers that are free for engagement with the earth's surface, comprising:
- a plurality of plant containers having flat bottoms and to be retained in engagement with the earth's surface to allow continual heat transfer;
- frame means of generally planar form having a plurality of spaced holes therein for receiving said plurality of plant containers passed downwardly therethrough;
- interfering means formed around each of said spaced holes to engage the upper portion of a respective plant container

thereby to support the container while preventing complete downward passage through the respective hole; and plural locking means affixed to said frame means adjacent each of said plurality of spaced holes to secure releasably the respective plant containers therein against upward movement relative to said frame means once the respective plant containers have been passed downwardly through the spaced holes into engagement with said interfering means.

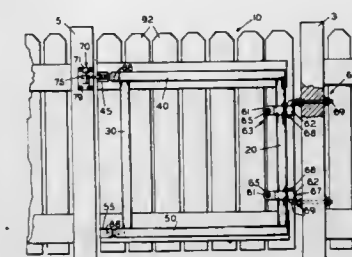
4,793,098

## REVERSIBLE, WIDTH ADJUSTABLE, GATE

Destre L. Wilkerson, 10601 W. State, Boise, Id. 83703  
Filed Jun. 24, 1987, Ser. No. 66,087  
Int. Cl.<sup>4</sup> E06B 7/00

U.S. Cl. 49—55

4 Claims



1. A reversible, width adjustable, gate comprising:
- a vertically oriented hinge tube;
- an end tube, parallel with and laterally spaced from said hinge tube;
- a pair of vertically spaced, horizontally oriented framing tubes secured to said hinge tube and said end tube in parallel relationship, each of said framing tubes provided with an extension portion protruding beyond said end tube, and each of said extension portions provided with one or more scores for segmental removal of said extension portions; and
- hinge means operable to support said gate in a conventional or reversed, up-side-down, position.

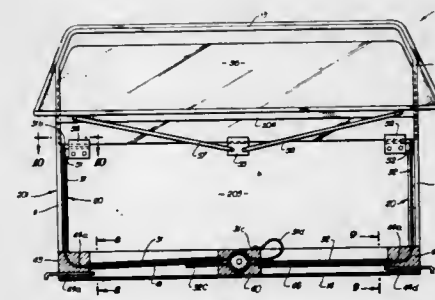
4,793,099

## TAPE DRIVEN POWER WINDOW MODULE

Donald E. Friese, Northridge, and Gerald P. Wirkkala, Downey, both of Calif., assignors to NORAN, Los Angeles, Calif.  
Filed Sep. 23, 1987, Ser. No. 100,126  
Int. Cl.<sup>4</sup> E06B 1/00

U.S. Cl. 49—380

8 Claims



1. A window comprising:
- a window frame having a left vertical leg and a right vertical leg disposed at respective left and right exterior sides of the frame, the vertical legs each having a vertical conduit formed at an interior portion thereof and a vertical slit

communicating between the vertical conduit and the interior of the window frame;

a window pane, slidably disposed within the frame, the window pane having left and right edges respectively projecting into the vertical slits of the left and right vertical legs;

left and right sliding members, made of an elongated flexible material having a predetermined compression strength, respectively disposed in the vertical conduits of the left and right vertical legs, the sliding members being coupled to the window pane for sliding the window pane vertically within the frame; and

a drive means, coupled to the left and right sliding members, for moving the sliding members in unison through their respective vertical conduits to thereby move the window pane.

4,793,100

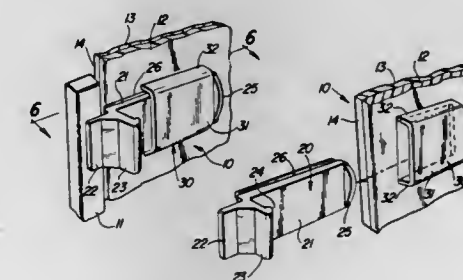
## SLIDE LATCH FOR CABANA DOORS

George W. Harding, Clearwater, Fla., and George Hiskes, Munster, Ind., assignors to Poly-John Enterprises Corp., Whiting, Ind.

Filed Mar. 2, 1987, Ser. No. 20,571  
Int. Cl.<sup>4</sup> E05C 1/10

U.S. Cl. 49—394

10 Claims



1. A cabana or outhouse structure, comprising:
- a panel being hinged and having a leading edge, said panel being formed of a plastic sheet like material;
- a jamb-like member being aligned with the leading edge of the panel;
- a slide latch mechanism including an elongated, generally flat, wide slider;
- said slider including a body portion, said slider arranged upon a surface of the panel for sliding in its lengthwise direction into latching engagement with an adjacent portion of the jamb-like member;
- said body portion of said slider having a first end, a second end, two surfaces opposite one another and two elongated side edges opposite one another running the length of said body portion between said first end and said second end; at least one integral, rigid rib formed upon the surface of the body portion of the slider that faces said panel surface at each of the elongated side edges of the body portion of the slider;
- said ribs being of substantially uniform, narrow cross-section along their lengths and each having a free edge surface which overlies and slidably engages their adjacent panel surface portions, with the body portion of the slider being otherwise out of engagement with said panel surface;
- a flattened, open-ended loop being struck-out of said panel, and with the body portion of the slider extending through the loop, for holding the body portion of the slider upon the panel and guiding its sliding movement;
- whereby the ribs form sled-like runners on the body portion of the slider for reducing the friction between the body portion of the slider and the panel surface and simultaneously rigidifying and reinforcing the body portion of the slider against bending, twisting and warping;

a tongue integral with said body portion extending from said first end of said body portion substantially parallel to the surface of the body portion that faces said panel surface, said tongue engagable with the jamb-like member;

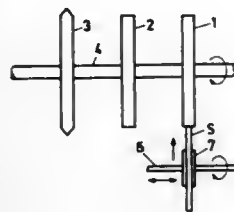
a raised stop integral with said body portion extending from said second end of said body portion substantially normal to the surface of said body portion opposite said surface that faces said panel, said raised stop having an end with the end of said stop being engagable with said loop to limit the sliding movement of the slider towards the jamb-like member;

a grip flange integral with said body portion extending from said first end of said body portion substantially normal to the surface of said body portion that faces said panel, said grip flange located between said tongue and said body portion such that said loop is located between said grip flange and said raised stop so that said grip flange abuts said jamb-like member when said slider is moved towards said jamb-like member and said grip flange limits the movement of the slider when said slider is moved away from said jamb-like member; and

an indicia applied upon the surface of said body portion that faces said panel surface between said ribs so that preselected portions of the indicia are visible through a window-like opening formed in said panel overlying said slider, with the position of the preselected portion of the indicia depending upon whether the slider is arranged in a latching position or an unlatching position.

**4,793,101**  
**METHOD OF MAKING AN ENCIRCLING GROOVE ON THE EDGE OF A SEMICONDUCTOR SLICE OF A POWER SEMICONDUCTOR COMPONENT**  
 Jiri Dlouhy, Milgenwil; Otto Kuhn, Lupfig, and Andreas Rüegg, Gebenstorf, all of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland  
 Filed Oct. 15, 1987, Ser. No. 108,710  
 Claims priority, application Switzerland, Oct. 22, 1986, 4212/86

Int. Cl. B24B 1/00  
 U.S. Cl. 51—283 E 4 Claims



1. A method of making an encircling groove on an edge of a semiconductor slice of a power semiconductor component, comprising the steps of:

rough grinding surplus semiconductor material from the edge of the semiconductor slice with a rough grinding wheel having diamond grains with an average diameter of 25  $\mu\text{m}$  in a metal bond, with a concentration of 4.4 carats/cm<sup>2</sup>;

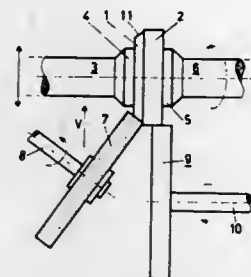
finish grinding the rough ground edge of the semiconductor slice with a precision grinding wheel having diamond grains with an average diameter of 20  $\mu\text{m}$  in a synthetic bond, with a concentration of 4.4 carats/cm<sup>2</sup>;

grinding an encircling groove in the finish ground edge of the semiconductor slice with a form grinding wheel correspondingly contoured on an edge thereof, said form grinding wheel having diamond grains with an average diameter of 16  $\mu\text{m}$  in a metal bond, with a concentration of 4.4 carats/cm<sup>2</sup>; and

cooling the ground edge with water having a rust preventive in all of said grinding steps, wherein all of said grinding steps are carried out at a cutting speed of 35 m/sec. with the semiconductor slice rotating at about 80 revolutions/min. and in a direction opposite to that of each respective said grinding wheel.

**4,793,102**  
**METHOD OF PRODUCING A BEVELED PERIPHERAL PROFILE ON A SEMICONDUCTOR DISC**  
 Jiri Dlouhy, Milgenwil, Switzerland, assignor to BBC Brown Boveri AG, Baden, Switzerland  
 Filed Oct. 5, 1987, Ser. No. 104,224  
 Claims priority, application Switzerland, Oct. 13, 1986, 4070/86

Int. Cl. B24B 1/00, 9/06  
 U.S. Cl. 51—283 E 8 Claims



1. Method, especially for medium and high voltage diodes, of producing a beveled peripheral profile on a semiconductor disk having a disk plane, comprising the steps of:

bonding said semiconductor disk onto a molybdenum disk, thereby creating a two-disk assembly;

clamping said two-disk assembly in a clamping device rotatable about an axis of rotation perpendicular to said disk plane, and being movable perpendicularly to said axis of rotation;

centering said two-disk assembly by letting a periphery of said molybdenum disk roll against a rotatable guide disk having a guide disk axis, said guide disk axis having a fixed position; and

grinding said peripheral profile by means of a rotating grinding disk having a grinding disk axis, said grinding disk axis being arranged at an angle to said axis of rotation corresponding to the beveled peripheral profile.

**4,793,103**  
**CONTINUOUS DEFLASHING APPARATUS FOR MOLDED ARTICLES**  
 Jürgen Baumgart, Huntington Beach, Calif., assignor to ACD, Inc., Santa Ana, Calif.  
 Filed Aug. 19, 1986, Ser. No. 897,850  
 Int. Cl. B24C 03/14, 9/00

U.S. Cl. 51—418 12 Claims

1. A deflashing apparatus for removing residual flash from molded article which comprises:

(a) a housing defining a plurality of serially oriented, individual work stations including a prechill station, a chill station and a deflashing station arranged in that order;

(b) means for providing an atmosphere of air within the work stations;

(c) vapor compression refrigeration means connected to the prechill station for maintaining a temperature at the prechill station which is between the ambient temperature outside of the housing and the temperature required to embrittle the residual flash, the vapor compression refrigeration means including a heat exchanger disposed within the housing adjacent the prechill station, means for

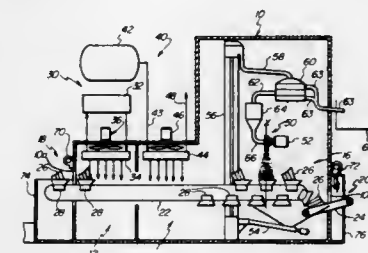
continuously circulating refrigerant through the heat exchanger in a vapor compression cycle so that the refrigerant within the heat exchanger has a temperature below ambient and means for circulating air through the heat exchanger and over the articles located at the prechill station;

(d) cryogenic refrigeration means connected to the chill station, the cryogenic refrigeration means including a closed coil disposed within the housing, and means for introducing liquid cryogen at a temperature below that required to embrittle the flash into the coil, means for

(c) a third body joined to a free end of said transverse arm;

(d) said bodies each having a thickness substantially greater than the thickness of said frame and presenting flat upper and lower surfaces that are parallel to each other and that lie in the same planes as corresponding surfaces of the other bodies of said guide;

(e) said third body being spaced transversely on said guide from said first and second bodies a distance only slightly less than the width of one of said recessed face surfaces.



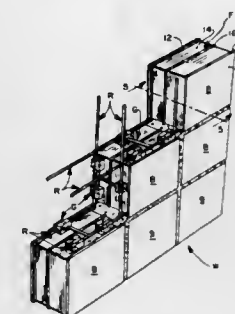
circulating air over said coil and against the molded articles located at the chill stations to embrittle the residual flash on the articles, and means for exhausting the vaporized cryogen from the coil outside of the housing for venting or further use;

(e) means for directing a deflashing media at high velocity at articles located at the deflashing station to remove the residual flash therefrom; and

(f) conveyor means for transporting the articles to be deflashed through each of the prechill, chill and deflash stations.

**4,793,104**  
**GUIDE FOR LAYING GLASS BLOCKS**  
 Jeffrey A. Hultberg, Elk Grove Village, and Richard A. Riedel, Park Ridge, both of Ill., assignors to Delberg, Inc., Park Ridge, Ill.  
 Filed Jun. 15, 1988, Ser. No. 206,815  
 Int. Cl. E04C 5/16

U.S. Cl. 52—121.3 20 Claims



1. A one-piece guide adapted to be inserted into an adhesive compound, such as mortar, between recessed surfaces of predetermined width presented by opposing faces of adjacent units, such as glass blocks, to space and align said units with respect to each other in the formation of a masonry structure, said guide comprising:

(a) a generally T-shaped frame including a longitudinal arm and a transverse arm joined at one end to a medial portion of said longitudinal arm;

(b) a pair of longitudinally spaced first and second bodies joined to opposite ends of said longitudinal arm;

1. Apparatus for adapting the earthquake response of a building superstructure, wherein the building superstructure includes an array of columns and walls supporting the building above the foundation, said apparatus provided between the base of each column and the foundation, comprising:

a top plate, a middle plate and a bottom plate in a vertically stacked, three-level arrangement, wherein said top plate is fixedly mounted with respect to the base end of a column, and said bottom plate is fixedly mounted to an upper surface that is connected to the foundation which is centered directly below said top plate at a normal position, with said middle plate sandwiched between said top plate and said bottom plate, contacting surfaces of said plates being provided with a low-friction lubricant, said top middle and bottom plates further comprising:

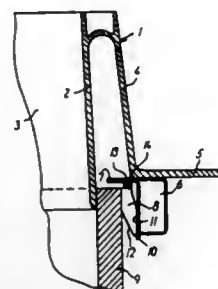
means for guiding horizontal movement of said plates relative to one another, said guiding means constraining said top plate to horizontal linear movement in a first direction with respect to said middle plate and said guiding means further constraining said middle plate to horizontal linear movement with respect to said bottom plate in a second direction that is perpendicular to said first direction, said guiding means comprising:

a first set of clamps fixedly mounted to the upper surface of said bottom plate, for permitting relative sliding movement of said top plate with respect to said middle plate restricted to said first direction; and

a second set of clamps fixedly mounted to a surface below said bottom plate for permitting relative sliding movement of said middle plate with respect to said bottom plate restricted to said second direction.



4,793,106  
**WINDOW COMPRISING A FRAME WITH A GROOVE FOR AN INTERNAL PANEL MEMBER**  
 Gorm L. Jonsson, Hangesund, Norway, assignor to V. Kann Rasmussen Industri A/S, Soborg, Denmark  
 Filed Oct. 24, 1986, Ser. No. 923,098  
 Claims priority, application Denmark, Oct. 30, 1985, 4983/85  
 Int. Cl.<sup>4</sup> E06B 1/04  
 U.S. Cl. 52—204 9 Claims



1. A window comprising
  - a main frame comprising lateral and transversal members, a main opening and an edge portion facing in a direction transverse to a plane containing the main frame;
  - a groove extending into the edge portion in a direction transverse to the plane containing the main frame, said groove being defined by a first lateral wall adjacent to the main opening of said main frame and by a second lateral wall opposite to said first lateral wall;
  - an internal panel member abutting against said first lateral wall and having a thickness in a direction perpendicular to said first lateral wall, said groove having a width substantially larger than the thickness of the internal panel member, so that a slit is left between the panel member and a surface of said second lateral wall;
  - spring clamps in said slit for pressing the panel member against said first lateral wall of said groove, each spring clamp including a body secured to the panel member and a spring tongue extending in a direction allowing the panel member to be inserted into the groove but opposing the separation of the panel member from the groove, the spring tongue having a free end biting into the second lateral wall of the groove when the panel member is subjected to a pulling-out force.

4,793,107  
**WINDOW CONSTRUCTION AND COMPONENTS**  
 Stephen R. Pacca, 150 Overlook Ave., Apt. 15F, Hackensack, N.J. 07601

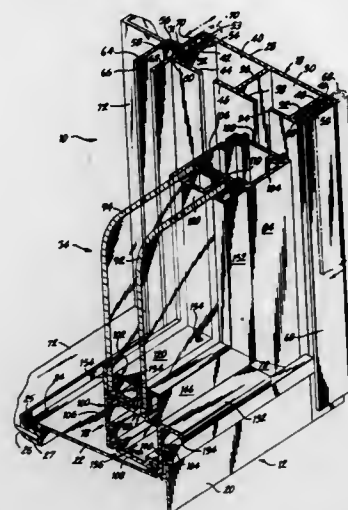
Filed Apr. 20, 1987, Ser. No. 40,283  
 Int. Cl.<sup>4</sup> E06B 1/04

U.S. Cl. 52—204

4 Claims

1. A window construction comprising a frame including a sill member, a head member, a left side member and a right side member, said frame having a first side destined to face indoors and a second side opposite said first side, each of said members having a straight casing slot portion extending longitudinally of its said member and having an opening facing away from said first side, said casing slot portion of said sill member communicating with said casing slot portions of said left side member and said right side member at the lower ends thereof, and said casing slot portion of said head member communicating with said casing slot portions of said left side member and said right side member at the upper ends thereof, said casing slot portions together providing, extending completely around said second side of said frame, a casing slot for sealingly receiving a casing therein, each said member including a pair of flange portions having free edges and confronting surfaces which provide said casing slot portion of said member, said members being fabricated of extrusions of plastic material and as ex-

truded said casing slot portions being narrowest at said free edges thereof and said flange portions being resiliently flexible



away from each other by insertion of the casing therebetween to engage said casing and establish a seal therewith.

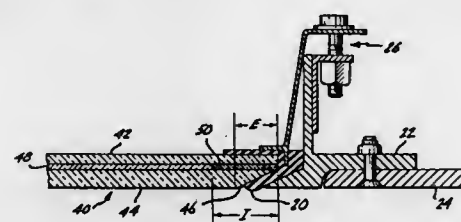
4,793,108  
**ENCLOSED INTERLAYER PLASTIC LAMINATED WINDOW**

Peter H. Bain, Renton, Wash., and Brian L. Yaney, Silver Springs, Md., assignors to The Boeing Company, Seattle, Wash.

Continuation of Ser. No. 471,362, Mar. 1, 1983, abandoned. This application Apr. 21, 1986, Ser. No. 837,628  
 Int. Cl.<sup>4</sup> E06B 3/00

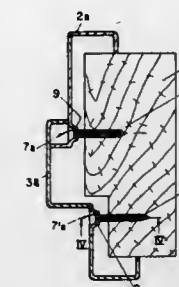
U.S. Cl. 52—208

1 Claim



1. In combination in an aircraft passenger window station:
  - a multilayer plastic window pane having an inner surface in the passenger cabin of the aircraft and an outer surface in the exterior of the aircraft;
  - a chamfered frame assembly for supporting said multilayer plastic window pane;
  - said multilayer plastic window pane having a first layer forming said inner surface, a second layer forming said outer surface, and a third layer intermediate said first layer and said second layer;
  - said second layer having a chamfered peripheral edge portion;
  - an cast acrylic edge insert member disposed between said chamfered peripheral edge portion and said first layer;
  - said second layer having a thickness greater than the thickness of said first layer;
  - said edge insert member having a thickness equal to the thickness of said third layer; and,
  - wherein the thickness of said third layer is between about 0.03 inches and 0.06 inches.

4,793,109  
**METHOD AND APPARATUS FOR FACING WOODEN DOOR FRAMES**  
 Eizen Noach, 34 Ben-Gurion St., Rishon-le-Zion, Israel  
 Continuation-in-part of Ser. No. 637,008, Aug. 2, 1984, abandoned. This application Apr. 25, 1986, Ser. No. 856,536  
 Claims priority, application Israel, Aug. 16, 1983, 69506  
 Int. Cl.<sup>4</sup> E06B 1/20  
 U.S. Cl. 52—211 8 Claims



6. In combination with a wooden door jamb defining a doorway, a facing for use in mounting a door in said doorway, said facing comprising at least one elongated profiled steel member having a flat portion thereof located within the plane of said doorway, and disposed in a plane running generally parallel to, spaced from and adjacent said jamb, said flat portion having at least one thread-receiving aperture opening toward the adjacent surface of said jamb, a screw threadedly received in said aperture and threadedly engaged in said jamb, said screw disposed on an axis normal to the plane of said flat portion, and being threadedly engaged with both said profiled member and said jamb as it is turned and engaging only the boundary of said aperture and said jamb,
- said aperture having a diameter equal to the root diameter of said screw, whereby as said screw is turned threadedly in said aperture its point will first engage with the surface of said jamb and then enter the body of said jamb from whence on the screw, solely, will maintain the same spacing and a constant planar relationship between said member and said jamb until rotation of said screw is stopped by the bottoming of the screw head against the inner surface of said aperture whereupon said facing, plumb and level and spaced from said jamb is fixed permanently in place generally parallel to and spaced from said jamb solely by the engagement of said screw head with the boundary of said aperture and the threaded engagement of said screw with the body of said jamb.

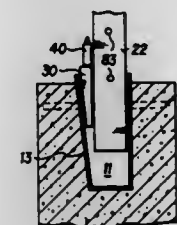
4,793,110  
**FOUNDATION AND BUILDING STRUCTURE SUPPORT SYSTEM APPARATUS AND METHOD**  
 Joe W. Tucker, 1915 Tipperary, Leander, Tex. 78641  
 Filed Mar. 30, 1987, Ser. No. 31,741  
 Int. Cl.<sup>4</sup> E04F 11/18

U.S. Cl. 52—297

21 Claims

4. A foundation apparatus which joins to a concrete foundation member at its lower portion and supports and secures a segment of a structure at its upper end, said apparatus comprising:
  - (A) a thin, deformable, metal socket means embedded in and reinforced by said concrete member, said socket having vertical side and rear walls and an upwardly divergent front wall;
  - (B) a column, fabricated from rectangular tubing, installed vertically in said socket means, its lower portion positioned adjacent said rear and side walls of said socket means;

- (C) a wedge driven between the front surface of said column and said divergent front wall of said socket means;
- (D) a locking mechanism, operably attached between said column and said wedge in a manner to cause said wedge to move downward in tandem with said column;
- (E) support and securement means at said column's upper end, which support and securement means supports a segment of a structure and secures said segment against upward, downward and lateral movement with respect to said column;
- (F) said side walls of the socket spaced to provide a clearance between each said side wall and the adjacent surface of said column;
- (G) said rear wall of said socket means, which bears against



- the rear surface of said column, characterized as concave in a side-to-side direction so that said column, when installed in said socket, is secured by surface contact between said column's front surface and a surface of said wedge, and by vertical line contact between each of said column's rear corners and said concave surface of said rear socket wall; and
- (H) said surface contact and said line contact creating horizontally triangulated securement of said column along a portion of its length, preventing movement of its free end in any lateral direction so that said column is prevented from upward and from downward movement, its vertical location maintained by friction resulting from the horizontal pressure created by said wedge and bearing upon vertically regular and continuous surfaces of said column.

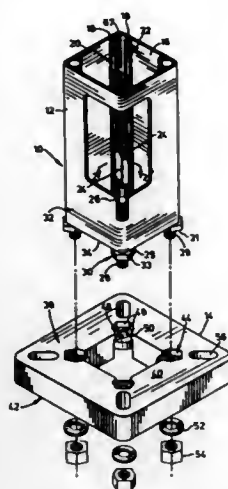
4,793,111  
**THREADED MOUNTING FOR EXTRUDED POLE**  
 Peter Shewchuk, 940 Meyerside Drive, Mississauga, Canada L5T 1R9  
 Filed Apr. 11, 1988, Ser. No. 180,091  
 Claims priority, application Canada, Apr. 15, 1987, 534856  
 Int. Cl.<sup>4</sup> E02D 27/42

U.S. Cl. 52—298

15 Claims

1. An assembly comprising:
  - a tubular member and a plate member releasably locked to said tubular member.
  - the tubular member having a plurality of spaced-apart longitudinal partial first bores integral therewith;
  - the plate members having a plurality of second bores therein, each second bore being aligned with a partial first bore of said tubular member, to form an aligned bore passage;
  - a spindle housed in each aligned bore passage and extending into the partial first bore and second bore thereof;
  - means connected to the tubular member to close said partial

first bores to mount each said spindle to said tubular member; and



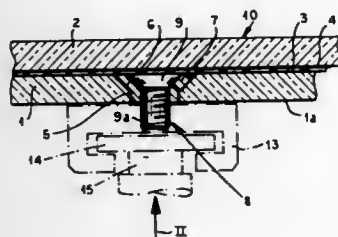
locking means engaging each said spindle and said plate member such that said plate member is releasably locked to said tubular member.

#### 4,793,112 FACADE PLATE COMPOSED OF A COMPOSITE GLASS STRUCTURE

Hans J. Säfte, Bochum, Fed. Rep. of Germany, assignor to Flachglas Aktiengesellschaft, Furth, Fed. Rep. of Germany  
Filed Mar. 25, 1988, Ser. No. 173,731  
Int. Cl.<sup>4</sup> E04B 1/60

U.S. Cl. 52—309.14

11 Claims



1. A facade plate, comprising:

- an outer visible glass pane;
- a layer of synthetic resin bonded to an inner surface face of said outer glass pane;
- an inner wall-side glass pane coextensive with said outer glass pane and bonded to said layer so that said glass panes and said layer form a composite laminated panel, said inner glass pane being formed with at least two spaced apart circular undercut bores directly therein;
- respective sleeves received in said bores; and
- respective metallic fastening elements traversing said sleeves and anchored with said sleeves in said inner glass pane while projecting from said inner glass pane to enable mounting of said composite laminated panel along an inner surface of said inner glass pane.

#### 4,793,113 WALL SYSTEM AND METAL STUD THEREFOR

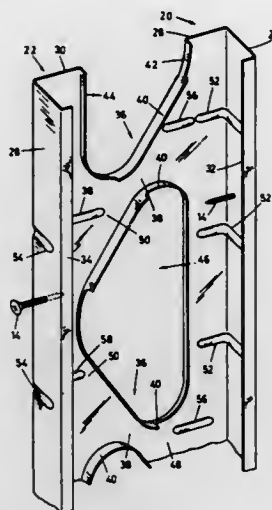
Ernest R. Bodnar, 53 Pheasant Lane, Ialington, Ontario, Canada M9A 1T5

Continuation of Ser. No. 908,958, Sep. 18, 1986, abandoned. This application Jun. 12, 1987, Ser. No. 61,038

Int. Cl.<sup>4</sup> E04B 2/42

U.S. Cl. 52—481

1 Claim



1. A wall comprising:

- a plurality of integral one-piece structural metal wall stud members, formed of light-gauge sheet strip arranged in parallel spaced apart relation and each in turn, comprising; two parallel spaced apart L-shaped angle portions each of said angle portion formed integrally from said metal strip and defining a panel supporting flange, to which wall panels may be attached by self-tapping screw fastening means, and each said angle portion further defining a bracing strip member, formed integrally with said panel supporting flange, and joined at right angles thereto;
- a plurality of strap members formed integrally with said angle portions from said metal strip, and each strap member defining an axis extending diagonally between said bracing strip members, said strap members defining generally triangular shaped openings with rounded corners therebetween, said generally triangular shaped openings being arranged with their apexes directed alternately in opposite directions, said bracing strip members, and said web members and said triangular root portions all lying in a common plane, normal to the planes of said wall supporting flanges;

- first edge flanges on each side edge of each said strap member having a predetermined depth, defining a channel-shape in cross-section along each said strap member; further edge flanges extending completely around said openings having a predetermined depth less than said predetermined depth of said first flanges, and joining said first edge flanges at said rounded corners;
- generally triangular widened roots on each end of said strap members where the same join said bracing strip members;
- a plurality of first transverse linear inwardly indented ribs of a first predetermined length formed transversely in said panel supporting flanges and in said bracing strip members at spaced intervals and directed normal to and extending from said right angle junctions between said bracing strip members and said panel supporting flanges;
- a plurality of second transverse linear inwardly indented ribs formed transversely in said panel supporting flanges and in said bracing strip members at spaced intervals between said first transverse linear ribs and extending across said panel supporting flanges and said bracing strip members

and directed normal to said right angle junctions between said bracing strip members and said panel supporting flanges and said second transverse linear ribs having a length greater than said first linear ribs and extending into said triangular enlarged roots along an axis lying at an acute angle to said axis of said strap member extending from said root portion, whereby to resist flexing of said panel supporting flanges; and wherein all of said panel supporting flanges lie in a common plane; wall panelling overlying said panel supporting flange on at least one side of said stud members; and, screw fastening means extending through said wall panelling at spaced locations and passing through and secured in said panel supporting flanges.

#### 4,793,114 WINDOW SILL CONSTRUCTION

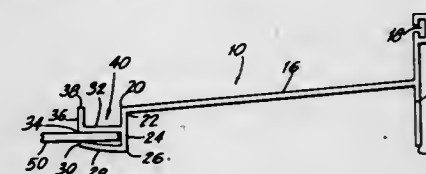
Stephen R. Pacca, 150 Overlook Ave., Apt. 15F, Hackensack, N.J. 07601

Filed Apr. 21, 1987, Ser. No. 40,819

Int. Cl.<sup>4</sup> E06B 3/30

U.S. Cl. 52—738

2 Claims



1. A sill member for a replacement window, said sill member fabricated by cutting an extrusion of plastic material to desired length, said sill member comprising a first wall portion having a first planar inner face, a second wall portion having a second planar inner face confronting and parallel to said first inner face, said face and second inner faces placeable on an indoor side and an outdoor side respectively of a window opening, and a main floor portion integrally joining said wall portions and having upper and lower parallel planar faces intersecting said first inner face at locations such that said first wall portion extends above and below said floor portion, said upper face of said floor portion intersecting said first inner face at an obtuse angle and said lower face of said floor portion intersecting said first inner face at an acute angle supplementary to said obtuse angle, said additional floor portion and said ceiling portion are formed so that said casing slot is widest at the juncture of said additional floor portion and said ceiling portion with said second wall portion and said additional floor portion and said ceiling portion being capable of relative resilient flexure away from each other to increase effective width of said casing slot.

#### 4,793,115 METHOD OF CLADDING METAL EXTRUSIONS AND PRODUCT OBTAINED THEREFROM

William J. Horgan, Jr., Pittsburgh, Pa., assignor to Blumcraft of Pittsburgh, Philadelphia, Pa.

Filed Nov. 12, 1987, Ser. No. 119,546

Int. Cl.<sup>4</sup> E04C 3/30; B23P 17/00, 11/02

U.S. Cl. 52—728

18 Claims

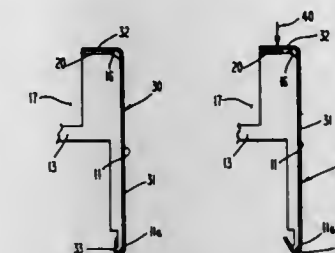
1. A method of cladding a metal extrusion, which method comprises:
- (a) applying a strip of adhesive material to a top surface of a metal extrusion;
  - (b) placing a piece of cladding material against the metal extrusion and adjacent a side wall thereof, wherein a cover portion of said cladding material is disposed in overlying spaced relation to said strip of adhesive material;
  - (c) applying pressure to said cover portion of said cladding

material to force said cover portion into contact with said adhesive material; and

(d) bending a bottom portion of said cladding material around a lower edge of said metal extrusion to create constant spring-tension on said strip of adhesive material.

10. A cladded metal extrusion comprising:

- (a) a metal extrusion having a strip of adhesive material disposed thereon on a top surface thereof;



- (b) a piece of cladding material disposed against said metal extrusion and adjacent a side wall thereof, said cladding material having a cover portion disposed against said strip of adhesive material and a bottom portion in wrapped engagement with a lower edge of said side wall of said metal extrusion; and
- (c) wherein said cladding material comprises means for creating a constant spring-tension on said strip of adhesive material to fixedly secure said piece of cladding material to said metal extrusion.

#### 4,793,116 BONDING PLATE FOR USE IN RUBBER ROOF INSTALLATION

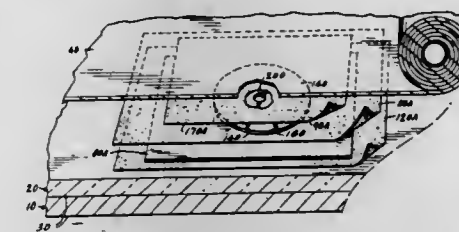
Robert E. Whitman, 1-2143 Sherwood Ln., Swanton, Ohio 43558

Filed Jan. 9, 1988, Ser. No. 204,265

Int. Cl.<sup>4</sup> E04D 5/14

U.S. Cl. 52—173 R

1 Claim



1. A multiple-layered bonding plate device for facilitating the process of affixing rubber roofing sheetings to the upper surface of a roof comprising said bonding plate comprising:
- (a) a base central binder plate member having an upper surface and a lower surface;
  - (b) first double-faced adhesive layered material affixed to the lower surface of said base central binding plate, said faced adhesive layered material having an upper surface and a lower surface;
  - (c) second double-faced adhesive layered material affixed to the upper surface of said base binder plate member, said double-faced adhesive layered material having an upper surface and a lower surface;
  - (d) metallic plate member having an upper surface and a lower surface with the lower surface of said metallic plate member being adhered to the upper surface of said second double-faced adhesive layered material;
  - (e) third double-faced adhesive layered material having an



- upper surface and a lower surface; said third double-faced adhesive layered material being affixed to the upper surface of said metallic plate member; and;
- (f) removable envelope covering the entire bonding plate member.

**4,793,117**  
**CONTINUOUS MOTION TRAY TYPE PACKAGING MACHINE**

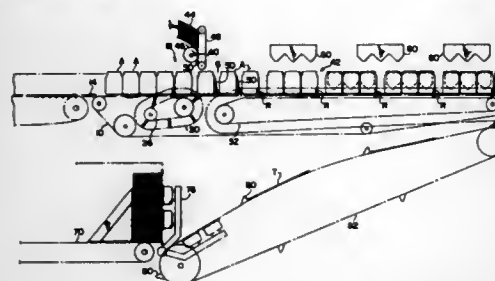
John L. Randat, North Madison, and Lloyd D. Johnson, Portland, both of Conn., assignors to Standard Knapp, Inc., Portland, Conn.

Filed May 6, 1987, Ser. No. 47,244

Int. Cl.<sup>4</sup> B65B 21/24

U.S. Cl. 53—48

18 Claims



1. A continuous motion tray forming and product loading machine comprising:

- (a) product conveyor means for providing a plurality of lanes of cylindrical articles and advancing the cylindrical articles in a downstream direction side-by-side in rows;
- (b) article engaging pin means for slowing each side-by-side row of articles to create a space between adjacent rows, said product conveyor means also moving the spaced rows of articles continuously through and beyond the downstream end of said article engaging pin means;
- (c) means for inserting cross partitions between said spaced article rows as these rows move through a first partition station located adjacent the downstream end of said first article slowing means;
- (d) lane dividing means for said advancing articles, said lane divider means being shaped for shifting one lane of articles away from an adjacent lane of articles to provide a space therebetween;
- (e) means for inserting partitions between said spaced article lanes, said partitions having downwardly open notches that nest with upwardly open notches in said cross partitions, and said product conveyor means moving the cylindrical articles and nested partitions downstream of said article engaging means;
- (f) overhead flight bar conveyor means for moving said article in groups into and through a load station;
- (g) magazine means for storing tray blanks on edge below the path of the articles on said product conveying means;
- (h) blank transport means for moving flat blanks toward said load station wherein said tray blank transport means includes two lug conveyor chains arranged side-by-side below said product conveyor means and including an active run that converges with the path of the articles at the load station, said blank transport means includes at least two sprockets for said side-by-side lug conveyor chains, said sprockets provided on a first axis oriented parallel and proximate the axis of said blank withdrawal arm, rotatable first cam means driven with one of said sprockets, cam follower means operable in response to rotation of said cam means and coupled to said magazine biasing means to move blanks toward the exit end of said magazine during each blank withdrawal, said magazine means having an exit end, means for biasing blanks toward said exit end of said magazine means, said blank withdrawal means comprising a pivotably mounted arm

having at least one vacuum cup provided thereon, and means for sequentially pivoting said arm from a pick-up position wherein said cup engages the endmost blank to a position wherein the blank is moved onto said blank transport lug conveyor chains for movement from a position below the path of the product to said load station;

- (i) blank withdrawal means for extracting the endmost blank from said magazine means and providing the blank in the path of said blank transport means;
- (j) pocket defining conveyor means for moving folded tray blanks and the article groups loaded thereon out of said load station;
- (k) said pocket defining conveyor means including a flight bar conveyor having leading and trailing flight bars associated with each pocket, each said leading flight bar having a front flap engageable plow portion for lifting the flat tray blank slightly at the upstream end of said pocket conveyor means so that the blank is engaged by the product and more specifically by the leading row of articles in the group arriving at the loading station, said overhead flight bar conveyor means acting on the trailing row of articles in the same article group to create a preliminary pocket for the article group and the front portion of the tray blank, and each said trailing flight bar having a rear flap folding portion for engaging the blank downstream of said overhead flight bar conveyor path and only after the tray blank has had its front flap folded between said leading flight bar and the article group.

**4,793,118**  
**APPARATUS FOR THE FURTHER PROCESSING OF A PACKAGING LINE**

Jacques Meier, Bäretswil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

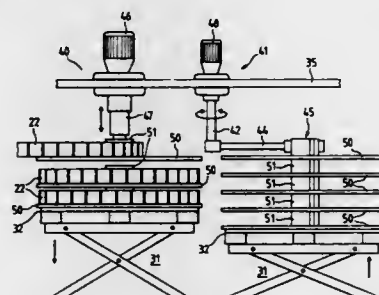
Filed May 11, 1987, Ser. No. 48,287

Claims priority, application Switzerland, Jul. 21, 1986, 02 911/86

Int. Cl.<sup>4</sup> B65B 63/04

U.S. Cl. 53—118

14 Claims



1. An apparatus in a packaging process for ordering and storing a coherent package line, before cutting said line into individual product portions, said apparatus comprising:

- a plurality of winding plates each having a central core around which said coherent packaging line is wound;
- a supply means for supplying empty winding plates to a predetermined loading position to receive said coherent packaging line;
- a winding plate drive means for driving each winding plate supplied to said predetermined loading position in order to wind said coherent packaging line on said plate; and
- a conveying means for conveying said coherent packaging line discharged from a previous processing station at full process speed to a winding plate positioned at said loading position.

**4,793,119**  
**BANDER MACHINE FOR DRUGS CONTAINING CAPSULES**

Paolo Maso, Via Sabotino, 16, I-40131 Bologna, Italy

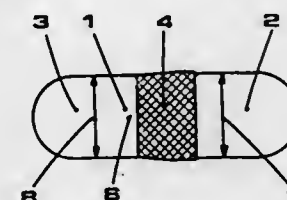
Filed Feb. 6, 1987, Ser. No. 12,061

Claims priority, application European Pat. Off., Oct. 20, 1986, 86830301.7

Int. Cl.<sup>4</sup> B65B 51/02

U.S. Cl. 53—139.3

25 Claims



1. A bander machine for capsules containing drugs, said capsules each having a cover portion and a bottom portion, said bottom portion being inserted partially within said cover portion in an overlapping manner such that an edge joint is present between a lower edge of said cover and a lateral surface of said bottom portion, said machine comprising:

- (a) a first conveyor belt means for conveying said capsules;
- (b) a second conveyor belt means for conveying said capsules;
- (c) a first feeding station for feeding said capsules onto said first conveyor belt means;
- (d) a drive means for moving said first conveyor belt means intermittently with a predetermined stopping time, running speed and duration of intermittent movement;
- (e) a second station for applying an annular layer of liquid gelatin around a circumference of said capsules adjacent said edge joint between said lower edge of said cover and said lateral surface of said bottom portion, whereby when said liquid gelatin dries, it forms an annular seal around said edge joint to prevent opening of said capsules;
- (f) a third station for transferring said capsules from said conveyor belt means to said second conveyor belt means;
- (g) a ventilation chamber through which said second conveyor belt means passes to dry said liquid gelatin on said capsules to close said annular seal; and
- (h) a fourth station for removing said capsules from said machine.

**4,793,120**  
**CLUTCH AND CAP DISC ASSEMBLY**

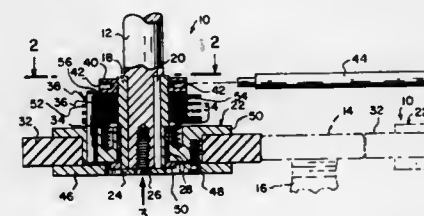
Kenneth J. Herzog, 200 Mill Rd., Riverhead, N.Y. 11901

Filed Dec. 24, 1987, Ser. No. 138,812

Int. Cl.<sup>4</sup> B67B 3/20; B65B 7/28; F16D 7/00

U.S. Cl. 53—331.5

3 Claims



1. A cap disc clutch mechanism driven by a spindle shaft on a capper machine so that a pair of spaced apart cap disc clutch mechanisms simultaneously spinning in opposite directions, will engage a cap for tightening the cap onto a container, said cap disc clutch mechanism comprises:

- (a) a clutch hub keyed onto the spindle shaft which prevents

movement circumferentially between said hub and the shaft;

- (b) a clutch spool attached to bottom of the spindle shaft while at the same time rotatable about said clutch hub;
- (c) a cap tightening disc disposed within said spool for engaging the cap;
- (d) a plurality of springs disposed about and into top of said spool;
- (e) a plurality of torque pins disposed about and into the top of said spool;
- (f) a friction plate assembly disposed over said clutch hub to sit upon said springs and in engagement with said torque pins;
- (g) an adjusting nut threadable onto top portion of said clutch hub and bearable onto top of said friction plate assembly so that said friction plate assembly can provide torque to said torque pins and into said spool, said adjusting nut having a plurality of side apertures therein; and
- (h) a clutch adjusting tool for engagement within one of the side apertures in said adjusting nut for turning said adjusting nut to change tension therebetween thus varying pressure from said clutch hub through said friction plate assembly and into said spool, whereby both of said cap disc clutches will sense the torque between the cap and neck of the neck of the container and will allow said cap tightening discs to stop once the desired torque is reached and at the same time, allow the spindle shaft to still spin.

**4,793,121**  
**DISPENSING SPOUT PRE-FORMING SYSTEM FOR POUCH**

Mark D. Jamison, 3333 Sharon Pl., Zion, Ill. 60099

Filed Jan. 2, 1987, Ser. No. 215

Int. Cl.<sup>4</sup> B65B 61/18, 61/00, 47/04, 47/08

U.S. Cl. 53—410

20 Claims



1. A spout pre-forming system for flexible web material being formed into a filled and peripherally sealed pouch having a discharge spout therefrom to improve the discharge spout functioning thereof, comprising:

- a die plate defining a substantially planar surface having a shallow groove of tortuous configuration therein over which said web material is to be received, and
- means for applying pressure to said web material when so overlaid, thereby to displace said web material into said groove by stretching the same and define therein the tortuous configuration of the spout to be formed in the finished pouch.

4,793,122

**TAMPER-INDICATING CLOSURE FOR A CONTAINER, CONTAINER AND METHOD FOR MAKING SAME**

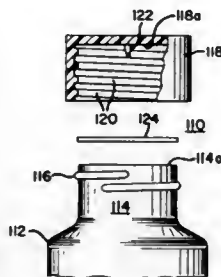
Edward J. Towns, Convent Station; Edward M. Brown, Livingston, both of N.J., and William M. Lester, Del Ray Beach, Fla., assignors to TBL Development Corporation, Livingston, N.J.

Continuation-in-part of Ser. No. 441,109, Nov. 12, 1982. This application Nov. 22, 1982, Ser. No. 443,608

Int. Cl.<sup>4</sup> B65B 61/00; B67B 3/20

U.S. Cl. 53—421

6 Claims



1. A method for providing tamper-indication for a container of type having a vessel for article containment and having an access opening, and a closure member for first sense movement relative to said vessel into securement therewith and in circumscribing relation to said access opening and for second opposite sense movement for release from such securement, said method comprising the steps of:

- disposing a retaining member interiorly of said closure member in dependent relation thereto and restraining said retaining member for travel with said closure member;
- applying an indicating element in retained relation to said retaining member for travel therewith;
- securing a closure element to said indicating element in contiguous unretained relation to said retaining member; and
- engaging said closure member with said vessel and securing said closure element to said vessel adjacent said access opening upon engagement of said closure element with said vessel in the course of said first sense movement of said closure member, said retaining member and said indicating element being so selected as to provide for tearing of said indicating element by said retaining member on said second sense movement of said closure member.

4,793,123

**ROLLED-UP PACKAGING SYSTEM AND METHOD**

Daniel A. Pharo, 1901 Avenue of the Stars, Suite 450, Los Angeles, Calif. 90067

Filed Nov. 16, 1987, Ser. No. 120,655

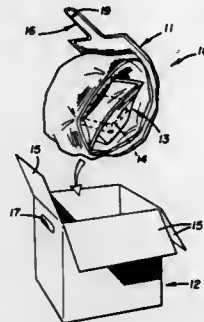
Int. Cl.<sup>4</sup> B65B 23/00, 55/20, 11/56

U.S. Cl. 53—449

26 Claims

1. A packaging system comprising a rolled-up bag generally assuming a spiralled configuration and defining a chamber therein adapted to be at least partially filled with a filler medium, said bag having first and second ends, pouch means secured adjacent to the first end of said bag to define an open pocket facing the second end of said bag for retaining an article therein, said pouch means disposed within the confines of overlying rolled-up portions of said bag and the spiralled configuration of said bag defining a plurality of overlying portions of said chamber entirely surrounding said pouch means and the article retained therein, and

filling means for at least substantially charging said chamber with said filler medium to at least substantially encapsulate



and support said pouch means and article within the rolled-up portions of said bag.

4,793,124

**BALE WRAPPING MACHINE**

David W. Anderson, Avonlea, Turriff, Aberdeenshire, Great Britain AB5 7RY

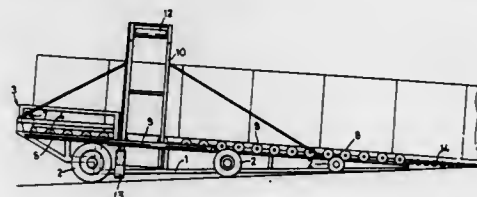
Filed Feb. 3, 1988, Ser. No. 151,911

Claims priority, application United Kingdom, Jun. 30, 1987, 8715345

Int. Cl.<sup>4</sup> B65B 13/12

U.S. Cl. 53—588

2 Claims



1. A bale wrapping machine comprising a wheeled base frame having a bale-receiving cradle followed by a bale-wrapping device and a roller bed sloping down to ground level, the bale-receiving cradle comprising a support along which a bale can be translated into the bale-wrapping device and a hydraulic ram device for translating the bale along the support, the bale-wrapping device being located at a gap between the support and the roller bed and comprising a hoop arrangement through which bales can be translated by the hydraulic ram device, the hoop arrangement including a fixed hoop, a rotary hoop rotatable coaxially with the fixed hoop, a reel for plastic strip carried by the rotary hoop and drive means for the rotary hoop.

4,793,125

**FRAME FOR WINDROW INVERTER**

Philip J. Ehrhart, Narvon, and Bryant F. Webb, Ephrata, both of Pa., assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Sep. 23, 1987, Ser. No. 99,823

Int. Cl.<sup>4</sup> A01D 57/12, 78/16

U.S. Cl. 56—16.1

7 Claims

1. In a windrow inverter having a mobile frame adapted for movement over the ground along a forward direction of travel; pick-up means supported from said frame for engagement of a windrow of crop material lying on the ground and elevating said windrow above the ground; and windrow inversion means supported on said frame for receiving an elevated windrow of crop material from said pick-up means, inverting said windrow and depositing said inverted windrow on the ground, an improved frame comprising:

a support portion having wheels mounted thereto for mo-

4,793,127

**SPINDLE MOISTENER PAD FOR A COTTON HARVESTER**

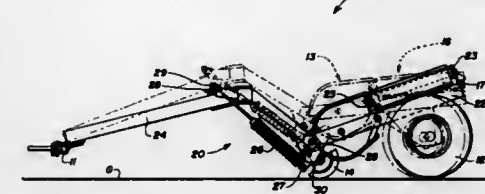
Donald H. Sheldon, Jr., Des Moines, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Mar. 29, 1988, Ser. No. 174,939

Int. Cl.<sup>4</sup> A01D 46/08

U.S. Cl. 56—41

6 Claims



terminating in a forward hitch member for connection to a prime mover; and

latching means interengaging said support portion and said hitch portion for selectively fixing the relative articulated positions between said support portion and said hitch portion.



1. In a moistener pad for wiping moving spindles of a cotton harvester picking unit, the moistener pad including a base, a plurality of fins extending vertically from the base generally in parallel spaced rows, the fins including leading edges facing generally the direction of approach of the moving spindles and vertically offset edges extending longitudinally from the leading edges, the improvement comprising:

the leading edges of the fins being tapered from the base to the vertically offset edges to thereby provide a tapered transition area between non-contacting and contacting positions of the spindle to reduce distortion and shearing of the fins as the spindle contacts the fins.

4,793,128

**HORIZONTAL FORCE BALANCED SHAKER AND METHOD**

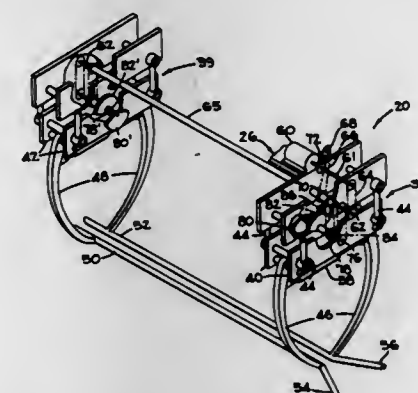
Sherman H. Creed, Fresno, Calif., assignor to FMC Corporation, Chicago, Ill.

Filed Dec. 11, 1986, Ser. No. 940,388

Int. Cl.<sup>4</sup> A01D 46/26

U.S. Cl. 56—330

23 Claims



4,793,126

**COMPACTOR AND DUMP CONTROLLING DEVICE FOR A COTTON HARVESTER**

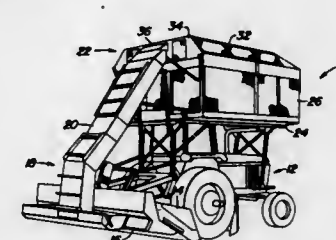
William R. Wood, Ames; Ronald L. Reichen, Alleman; Joe H. Hoekema, and Schlueter, Francis E., both of Des Moines, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed May 22, 1984, Ser. No. 612,764

Int. Cl.<sup>4</sup> A01D 46/08, 45/00, 90/00

U.S. Cl. 56—16.6

15 Claims



1. In a cotton harvester including a basket having fore-and-aft extending sidewalls and a lower horizontal surface, means for directing a stream of cotton in the fore-and-aft direction into the basket between the sidewalls, means for rocking the basket about a first axis to dump the cotton, fork structure including upright fore-and-aft spaced forks supported for rocking in the basket below the stream of incoming cotton about a pivotal axis generally parallel to the first axis, wherein the axes extend substantially in the fore-and-aft direction, means for rocking the fork structure about the pivotal axis to compress cotton against the sidewalls as the cotton enters the basket and to hold a partial load of cotton against one of the sidewalls of the basket as the basket is rocked about the first axis, wherein the fork structure comprises two fork assemblies supported end-to-end in the basket for independent rocking about the pivotal axis, and means for providing a substantially constant force of the forks against the cotton regardless of differential basket loading in the axial direction.

1. A horizontal force balanced shaker, comprising: means defining a support frame; means defining a shaker head; means for connecting said shaker head to said support frame for horizontal oscillatory movement; a first counterweight; a second counterweight; means for eccentrically mounting said first counterweight for rotation about an axis; means for eccentrically mounting said second counterweight for rotation about said axis; and drive means for rotating said first and second counter-



weights about said axis in opposite directions for alternately oscillating said shaker head horizontally.

4,793,129

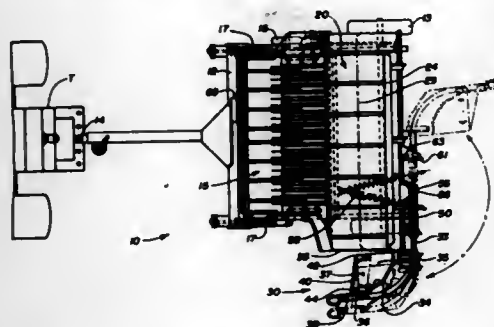
## INVERSION CHUTE FOR WINDROW TURNER

Philip J. Ehrhart, Narvon, Pa.; Gilbert A. Cartee, Holtville, Calif., and Ernest A. Schoeneberger, New Holland, Pa., assignors to Ford New Holland, Inc., New Holland, Pa.

Filed Sep. 23, 1987, Ser. No. 99,828  
Int. Cl.<sup>4</sup> A01D 78/00

U.S. Cl. 56—370

13 Claims



1. In a machine for inverting and displacing windrows of crop material, said machine having a frame; a pick-up mechanism mounted on said frame to elevate a windrow of crop material lying on the ground in a first orientation along a first path with a dry side above a damp side; a conveyor to receive said elevated windrow of crop material from said pick-up mechanism and convey said elevated windrow to a discharge end laterally of said first path to permit said windrow to be deposited on the ground in a second path transversely spaced from said first path; and drive means for operatively powering said pick-up mechanism and said conveyor, the improvement comprising:

an inversion chute supported by said frame adjacent said discharge end of said conveyor to receive said windrow of crop material from said conveyor, invert said windrow, and deposit said windrow on the ground in said second path in a second orientation with said damp side being above said dry side, said inversion chute being movably positionable relative to said discharge end of said conveyor to accommodate varying sizes of windrows of crop material.

4,793,130

## THIN-METAL-WIRE CONJUGATED YARN

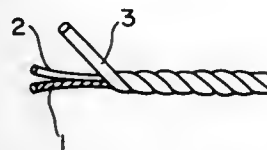
Takahiko Togashi, Tomotsugu Kanamura, Yoshiyuki Mori, Yoshinori Sato, Yasuji Inoue, and Teruhiro Tsuchida, all of Nagoya, Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Jun. 12, 1987, Ser. No. 60,888  
Claims priority, application Japan, Jun. 20, 1986, 61-94090(U); Jun. 20, 1986, 61-94091(U)

Int. Cl.<sup>4</sup> D02G 3/12, 3/38

U.S. Cl. 57—210

7 Claims



1. A thin-metal-wire conjugated yarn comprising a core portion composed of a thin metal wire having a diameter of 50  $\mu$  or less and a chemical or synthetic fiber or natural fiber yarn,

and another chemical or synthetic fiber or natural fiber yarn as a sheath wound round and covering said core, the covering percentage being 70% or more based on the surface area of the conjugated yarn.

4,793,131

## TIRE CORD MADE OF POLYVINYL ALCOHOL

Masaharu Mizuno, Ehime, and Mitao Katoh, Okazaki, both of Japan, assignors to Toray Industries Inc., Tokyo, Japan  
PCT No. PCT/JP86/00286,  $\S$  371 Date Feb. 11, 1987,  $\S$  102(e) Date Feb. 11, 1987, PCT Pub. No. WO86/07393, PCT Pub. Date Dec. 18, 1986

PCT Filed Jun. 10, 1986, Ser. No. 26,794

Claims priority, application Japan, Jun. 12, 1985, 60-125975  
Jun. 12, 1985, 60-125975

Int. Cl.<sup>4</sup> D02G 3/02, 3/48

U.S. Cl. 57—243

8 Claims

1. A tire cord comprising at least two multifilament yarns of a polyvinyl alcohol polymer, said multifilament yarns being twisted together to the coefficient of twist in the range of 500 to 2500, wherein each of said multifilament yarns consists of a plurality of single filaments of a polyvinyl alcohol polymer having a degree of polymerization of at least 2000, said yarn having a tensile strength of at least 15 g/d, and an initial modulus of at least 250 g/d, said yarn being further characterized by the fact that at least about 90% of the single filaments constituting the yarn can be separated from each other without being damaged;

said tire cord having a tensile strength of at least 8.5 g/d, a medium elongation in the range of 0.5 to 2.2%, and a thermal shrinkage in the range of 0.2 to 2.0%.

4,793,132

## APPARATUS FOR COOLING STEAM TURBINE FOR USE IN SINGLE-SHAFT COMBINED PLANT

Akira Okabe, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

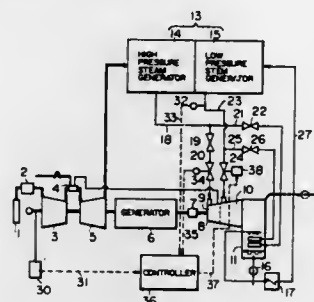
Filed Apr. 24, 1987, Ser. No. 42,252

Claims priority, application Japan, Apr. 25, 1986, 61-94846

Int. Cl.<sup>4</sup> F02C 6/18

U.S. Cl. 60—39.182

2 Claims



1. For use in a single-shaft combined plant including a gas turbine, a steam generator using exhaust gases of said gas turbine as a heat source and including a low pressure steam generator and a high pressure steam generator, and a steam turbine driven by the steam supplied from the steam generator, said steam turbine and said gas turbine being connected together by a single shaft, an apparatus for cooling said steam turbine comprises:

- (a) sensor means for sensing that the rotational speed of said single shaft reaches a predetermined value;
- (b) sensor means for sensing that the pressure level of low pressure steam acting to drive said steam turbine reaches a predetermined value; and
- (c) control means for outputting a signal to open and close a

low pressure steam control valve in response to the signals from said sensor means set forth in items (a) and (b).

4,793,133

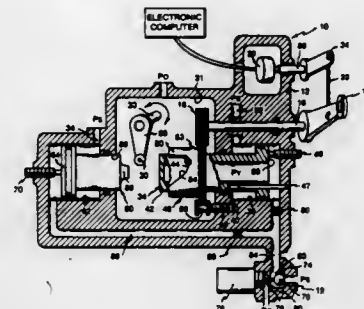
## MANUAL BACKUP FOR ELECTRONIC FUEL CONTROL

Albert H. White, Wethersfield, and Robert E. Peck, Prospect, both of Conn., assignors to Colt Industries Inc., New York, N.Y.

Filed Oct. 28, 1983, Ser. No. 546,567  
Int. Cl.<sup>4</sup> F02C 9/28

U.S. Cl. 60—39.281

7 Claims



1. In an engine fuel control for a gas turbine engine, which control is of the type having: a housing, a metering valve in the housing for controlling fuel flow to the engine, a motor operatively connected to the metering valve for positioning the metering valve, an electronic computer for sensing various engine parameters and controlling the motor and a lever member for generating a signal to the computer indicative of a demanded quantity, a manual backup system comprising: means responsive to movements of the lever member for setting a requested fuel flow to compressor discharge pressure ratio as a function of the position of the lever member; transducer means for sensing compressor discharge pressure; multiplier means for multiplying the set fuel flow to compressor discharge pressure ratio and the sensed compressor discharge pressure to obtain an output representative of requested fuel flow; and means responsive to the output of the multiplier means for positioning the metering valve.

4,793,134

## FLUID PROPULSION ENGINE WITH FLOW EXIT CONTROL DEVICE

John F. Coplin, and Rowan H. Colley, both of Derby, England, assignors to Rolls-Royce plc, London, England

Filed Oct. 30, 1987, Ser. No. 114,731

Claims priority, application United Kingdom, Dec. 17, 1986, 8630178

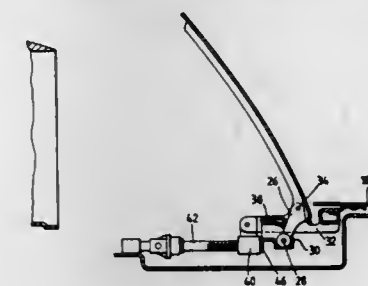
Int. Cl.<sup>4</sup> F02K 3/04

U.S. Cl. 60—226.1

8 Claims

1. A fluid propulsion engine including an exit flow control device comprising a plurality of driven flaps which in an inoperative mode form a peripheral portion of a propulsive fluid flow surface and are mounted for pivoting movement across a propulsive fluid flow path, wherein the pivot connection for each flap consists of a leg which projects radially inwardly with respect to the engine axis from the downstream end of the flap and terminates in a roller, an at least partially double walled guide track means which turns radially inwardly with respect to said axis, the roller being positioned so as to engage said track means, bracket means pivotally connected to an end of the leg remote from said roller and to a bracket moving device which on actuation moves the bracket and via the bracket connection to the leg, moves the flap axially of the engine, wherein when said movement is in a downstream

direction, said roller engages the inwardly turned wall portion of the track means and causes the flap coupled thereto to pivot to a position across the propulsive fluid flow path, the bracket moving means comprising a plurality of screwjacks spaced equi-angularly around and within a casing of the fluid propul-



sion engine and fixed thereto by ends thereof which are remote from the bracket means, the brackets being affixed to and between upstream and downstream stiff rings, wherein the downstream stiff ring is affixed to a wall which defines a portion of the fluid flow surface which is immediately downstream of said flaps and moves with said brackets.

4,793,135

## METHOD OF DETOXIFICATION OF EXHAUST GAS FROM AN INTERNAL COMBUSTION ENGINE USING A CATALYTIC SYSTEM, AND APPARATUS FOR PERFORMING THE METHOD

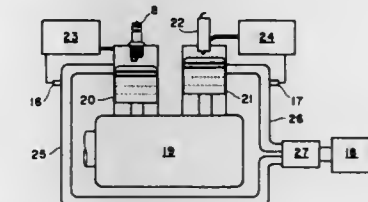
Matthias Obstfelder, Günther Obstfelder, both of Panoramstr. 28, 6940 Weinheim-Lützelbach, and Hatto Seitz, Altmannweg 1, D-6905 Schriesheim, all of Fed. Rep. of Germany  
Filed Sep. 23, 1986, Ser. No. 910,469

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1986, 3614251

Int. Cl.<sup>4</sup> F01N 3/20

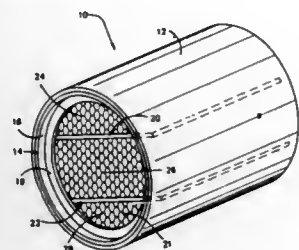
U.S. Cl. 60—274

6 Claims



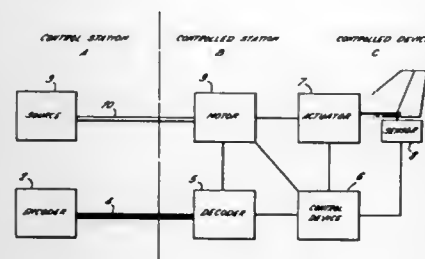
1. A method for detoxifying exhaust gas components of a diesel engine, the engine having at least two combustion chambers with separate, regulatable fuel preparation systems and separate exhaust gas lines, exhaust gas sensors in the exhaust gas lines, a catalytic converter and a carbon monoxide source, said method comprising the steps of: sensing the exhaust gas components in the individual exhaust gas lines; regulating the air/fuel mixture supplied by each fuel preparation system to its respective combustion chamber so that a predetermined proportion is reached of the exhaust gas components of the exhaust gas lines; delivering the exhaust gas components from the exhaust gas lines to the catalytic converter; and supplying carbon monoxide to the catalytic converter as needed for detoxification of the exhaust gas components.

4,793,136  
**REINFORCED METALLIC HONEYCOMB STRUCTURE**  
 William A. Whittenberger, Garrettsville, Ohio, assignor to W. R. Grace & Co., New York, N.Y.  
 Filed Aug. 26, 1987, Ser. No. 89,577  
 Int. Cl.<sup>4</sup> F01N 3/28  
 U.S. Cl. 60—299 9 Claims



1. A fluid conduit comprising (a) a housing, (b) at least a pair of corrugated thin metal elements disposed in said housing, and (c) at least one longitudinally extending metal strut dividing said housing into segments, said housing having at each end thereof retaining means for engaging the ends of said corrugated thin metal elements and said strut, and retaining said elements and strut against axial movement, each of said corrugated elements filling a segment of the cross-section of said housing and each of said elements comprising a plurality of accordion folded nonnesting corrugated thin metal portions and defining longitudinally extending fold lines adapted to conform to the internal geometric configuration of said housing in the segment of the housing filled thereby and to lie along the sides of said housing, said at least one metal strut lying between a pair of said corrugated metal portions and defining a segment of said housing cross-section filled by one of said corrugated thin metal elements, and opposing longitudinal marginal edges of said strut lying adjacent the sides of said housing, the assembly of accordion folded corrugated thin metal portions and said intermediate strut filling the entire cross-section of the housing to form a honeycomb fluid permeable structure.

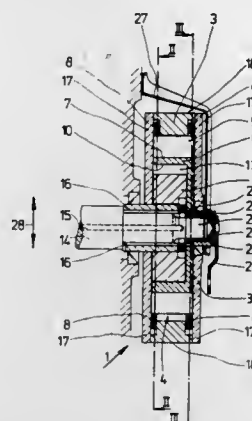
4,793,137  
**CONTROL SYSTEM**  
 Jeffrey R. Munk, London, England, assignor to Airship Industries (UK) Limited, London, England  
 Filed Dec. 12, 1986, Ser. No. 940,798  
 Claims priority, application United Kingdom, Sep. 26, 1986, 8623258  
 Int. Cl.<sup>4</sup> F16D 31/02  
 U.S. Cl. 60—390 4 Claims



1. A control system in which control signals are transmitted from a control station to effect control of a device at a controlled station, the system comprising at the control station;  
 a source of compressed fluid;  
 a source of optical control signals;  
 non-electrically conductive piping by which pressurized

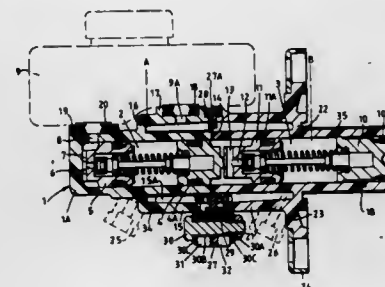
fluid from said source of compressed fluid is conveyed from the control station to the controlled station;  
 an optical fiber conductor over which said optical control signals are transmitted from the control station to the controlled station;  
 at the controlled station, a motor driven by the pressurized fluid received from the control station over said piping and operative to drive an associated generator providing electrical power at the controlled station;  
 a decoder energized by electrical power from said generator and operative to convert said optical control signals into electrical control signals; and  
 a control device energized by electrical power from said generator and responsive to said electrical control signals from said decoder to control an actuator which effects said control of said device at the controlled station.

4,793,138  
**HYDROSTATIC DRIVE WITH RADIALLY-NESTED RADIAL-ROLLER PUMP AND MOTOR HAVING COMMON DISPLACEMENT CONTROL RING**  
 Hans Baumgartner, Viersen, Fed. Rep. of Germany, assignor to Pierburg GmbH, Neuss, Fed. Rep. of Germany  
 Filed Sep. 8, 1987, Ser. No. 94,397  
 Claims priority, application Fed. Rep. of Germany, Sep. 8, 1986, 3630514  
 Int. Cl.<sup>4</sup> F16H 39/06  
 U.S. Cl. 60—491 5 Claims



1. An adjustable hydrostatic drive unit, particularly for the auxiliary units of motor vehicle internal combustion engines, comprising a pump and a motor arranged radially one inside the other in a common housing around a drive shaft and an eccentric control ring, having inner and outer curved ring surfaces, arranged between said pump and said motor, said pump and motor being connected together hydraulically and having delivery volumes adjustable in opposite senses, characterized in that the drive shaft passes through the side plates of the housing and has a projecting end that rotates in an inner bushing that receives said shaft end and has an eccentric, sickle-shaped shoulder that engages in a throughbore in a front face of said control ring, and said inner bushing is coaxially surrounded by an outer bushing having a nose that projects into a radial groove in said control ring, whereby relative rotation of said inner and outer bushings effects radial or rotary displacement of said control ring.

4,793,139  
**JOINT FOR TWO PIECE PLASTIC MASTER CYLINDER HOUSING**  
 Desmond H. J. Reynolds, West Midlands, Great Britain, assignor to Lucas Industries Public Limited Company, Birmingham, England  
 Filed Jul. 6, 1987, Ser. No. 70,213  
 Claims priority, application United Kingdom, Jul. 9, 1986, 8616676  
 Int. Cl.<sup>4</sup> F15B 7/00; F01B 11/02  
 U.S. Cl. 60—562 16 Claims

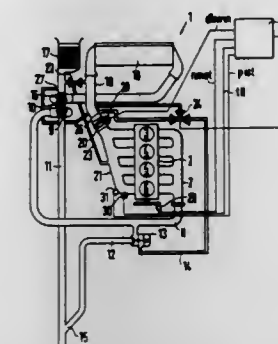


1. A tandem master cylinder comprising:  
 at least two separately molded cylinder portions of plastics material joined together in coaxial relationship with respect to each other;  
 a pressure chamber in each of said cylinder portions;  
 a respective pressure piston slidable in each pressure chamber;  
 a respective seal mounted on each piston for sealing between each piston and the respective pressure chamber;  
 a respective generally cylindrical body, molded integrally with each of said cylinder portions and surrounding at least a part of the length of the respective cylinder portion in spaced relationship therewith;  
 each cylindrical body being joined to the respective cylinder portion only at a joining location beyond the extent of travel of the respective seal on the respective piston within the respective cylinder portion; and  
 said cylindrical bodies being interconnected at a region remote from said joining locations for connecting said cylinder portions together.

4,793,140  
**INTERNAL COMBUSTION ENGINE WITH AT LEAST ONE TURBOCHARGER**  
 Hans-Joachim Esch, Heimsheim, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany  
 Filed Jul. 13, 1987, Ser. No. 72,784  
 Claims priority, application Fed. Rep. of Germany, Jan. 12, 1986, 3623541  
 Int. Cl.<sup>4</sup> F02B 37/12  
 U.S. Cl. 60—600 10 Claims

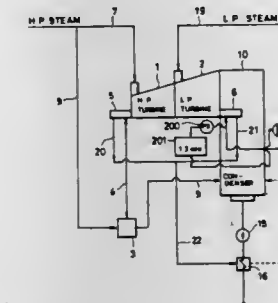
1. An internal combustion engine, comprising at least one turbocharger including a turbine and a compressor whose compressor is operatively connected by way of a charging pressure line with an intake manifold of the internal combustion engine and whose turbine is operatively connected into an exhaust gas line coming from an engine exhaust gas manifold, a by-pass line coming from the exhaust gas manifold and bypassing the turbine, a controllable blow-off valve means in said by-pass line, vent valve means for short-circuiting the compressor, engine throttle valve means for controlling the supply of fuel and air to the engine intake manifold, engine speed detecting means for detecting the engine speed, and blow-off valve control means for controlling the blow-off valve means such that the blow-off valve means is moved to a closed position for a limited time interval during transitional operation of

the engine with the engine throttle valve means closed and the speed of the engine above a predetermined value, whereby the



charging pressure of the turbocharger is maintained substantially unchanged during vehicle shifting operations.

4,793,141  
**GLAND SEALING STEAM SUPPLY SYSTEM FOR STEAM TURBINES**  
 Eiji Yanai, Iwaki; Tsuguo Hashimoto, Hitachi; Kiyoshi Takenchi, Ibaraki; Takashi Asao, and Yoshiaki Noguchi, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Nov. 13, 1987, Ser. No. 120,097  
 Claims priority, application Japan, Nov. 14, 1986, 61-269596  
 Int. Cl.<sup>4</sup> F01K 21/00  
 U.S. Cl. 60—657 7 Claims



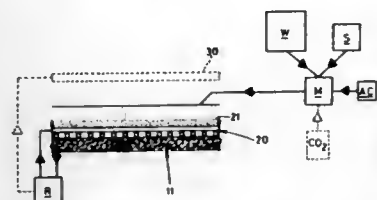
1. A gland sealing steam supply system for a steam turbine, comprising means for supplying steam to a low pressure gland portion of the steam turbine independently of steam supplied to a high pressure gland portion of the steam turbine, and reducing valve means for depressurizing the steam supplied to said low pressure gland portion.

4,793,142  
**METHOD FOR MAKING ARTIFICIAL SNOW**  
 Alfio Bucceri, Newmarket, Australia, assignor to Permasnow (Australasia) Limited, Queensland, Australia  
 PCT No. PCT/AU86/00158, § 371 Date Feb. 3, 1987, § 102(e) Date Feb. 3, 1987, PCT Pub. No. WO86/07373, PCT Pub. Date Dec. 18, 1986  
 PCT Filed Jun. 3, 1986, Ser. No. 22,639  
 Claims priority, application Australia, Jun. 4, 1985, PH0877  
 Int. Cl.<sup>4</sup> F25C 3/04  
 U.S. Cl. 62—74 15 Claims

1. A method for making artificial snow including the steps of:  
 mixing water with a surfactant;



agitating, aerating and/or bubbling gas through the mixture to form a foam or froth of water bubbles;



applying the foam or froth of bubbles as a substantially unfrozen layer to the area on which the artificial snow is to be created; and  
freezing the foam or froth of bubbles to form snow crystals.

#### 4,793,143 ENTHALPIC HEAT PUMP DESICCANT AIR CONDITIONING SYSTEM

Barry V. Rhodes, Rte. 1, Box 92, Johnston Rd., Chickamauga, Ga. 30707

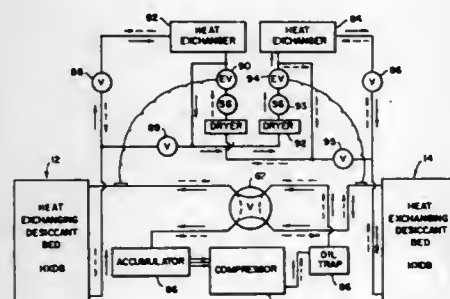
Division of Ser. No. 838,520, Mar. 10, 1986, Pat. No. 4,700,550.

This application Sep. 30, 1987, Ser. No. 103,030

Int. Cl.<sup>4</sup> F25D 17/06

U.S. Cl. 62—93

5 Claims



1. An improved method of desiccant bed air conditioning comprising:

circulating heat transfer liquid in liquid circulating channels in heat exchanging relationship with a desiccant bed having desiccant material surfaces defining air passageways through the desiccant bed;

storing relatively hot heat transfer liquid in a first storage tank;

storing relatively cold heat transfer liquid in a second storage tank;

alternately coupling the first storage tank for circulating relatively hot heat transfer liquid and the second storage tank for circulating relatively cold heat transfer liquid to the liquid circulating channels of the heat exchanging desiccant bed for alternately operating the desiccant bed respectively in a desorption mode and an adsorption mode;

and pumping heat from the second storage tank to the first storage tank.

#### 4,793,144 AIR CONDITIONING INSTALLATION WITH CENTRIFUGAL SPRAYERS

Daniel Bidon, Verdon, and Joelle Garet, Chateau-Thierry, both of France, assignors to Societe Airbi SA, Chateau-Thierry, France

PCT No. PCT/FR87/00048, § 371 Date Dec. 17, 1987, § 102(e)

Date Dec. 17, 1987, PCT Pub. No. WO87/05379, PCT Pub.

Date Sep. 11, 1987

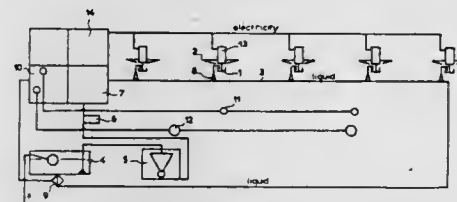
PCT Filed Feb. 26, 1987, Ser. No. 133,033

Claims priority, application France, Mar. 5, 1986, 86 03207

Int. Cl.<sup>4</sup> B01F 3/02; F28D 3/00

U.S. Cl. 62—171

10 Claims



1. An air conditioning installation with centrifugal sprayers, characterized by it mainly comprising of centrifugal sprayers (1) each provided with a deflector (2) the shape and slant angle of which are defined as a function of the area to be covered; wherein the sprayers are hydraulically connected to a loop circuit (3) including: a buffer reservoir (4) which is supplied with liquid, a centrifugal purifier (5), a self-cleaning filter (6), a pump (7), individual flow regulating devices (8) and a collective flow regulating electro-valve (9) controlled by a regulation device (10) which is servo-controlled by a temperature sensor (11) and by a hygrometry sensor (12); wherein the driving motors (13) for the centrifugal sprayers (1) are power supplied through an adjustable frequency inverter (14).

#### 4,793,145 DOOR SHUTTER FOR USE IN A REFRIGERATOR

Jae S. Hwang, 923-29, Shinjung 5-Dong, Kangsu-ku, and Kyung J. Kim, 124-20, Gahrheebong 1-Dong, Kooroh-ku, both of, Seoul, Rep. of Korea

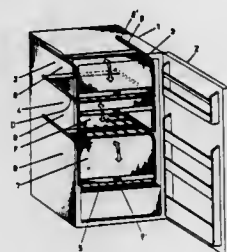
Filed Nov. 18, 1987, Ser. No. 122,182

Claims priority, application Rep. of Korea, Aug. 25, 1987, 87-14260

Int. Cl.<sup>4</sup> A47F 3/04

U.S. Cl. 62—252

8 Claims



1. A refrigerator having a door shutter device for use therein which comprises:

at least one refrigerator door operatively associated with said refrigerator for opening and closing said refrigerator, a plurality of food storage chambers disposed in said refrigerator, a plurality of shelves for partitioning said plurality of chambers,

a plurality of transparent door shutters for closing and open-

ing each of said chambers, respectively, each of said door shutters having a handle, and  
a plurality of pairs of L-shaped guide rails disposed above each of said food storage chambers for slidably engaging said door shutters, wherein each of said door shutters opens individually for obtaining access to each of said chambers and wherein the cold temperature in said refrigerator is maintained with high accuracy when said refrigerator door is opened frequently or for long periods of time.

#### 4,793,146 COLD STORAGE STRUCTURE

Kimitooshi Ryokai, Tokyo, Japan, assignor to Shimizu Construction Co., Ltd. and Fujikura Ltd., both of Tokyo, Japan

Filed Jul. 7, 1987, Ser. No. 70,371

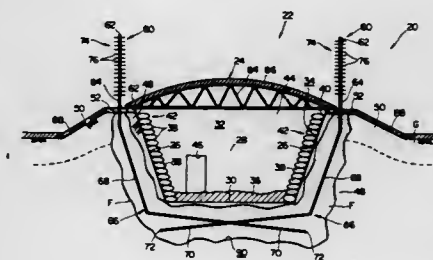
Claims priority, application Japan, Jul. 8, 1986, 61-160164;

Jul. 8, 1986, 61-104517; Dec. 17, 1986, 61-194238

Int. Cl.<sup>4</sup> F25D 23/12

U.S. Cl. 62—260

11 Claims



1. A cold storage structure comprising:  
storage means for storing articles, the storage means including a ceiling, a pair of side walls and a bottom wall, at least both the side walls and the bottom wall being formed in the ground;  
heat accumulating means arranged in the ground to surround at least both the side walls and the bottom wall, the accumulating means being adapted for cooling the storage means; and  
a plurality of heat pipes mounted on the ground to extend in the heat accumulating means to a position below the bottom wall and shaped to surround at least both side walls and the bottom wall for heat exchanging with the heat accumulating means to cool the storage means.

#### 4,793,147 DRAINAGE DEVICE FOR ROOM AIR CONDITIONER

Wooyeon Cho, Kyungkido, Rep. of Korea, assignor to Sam Sung Electronic Co., Ltd., Soowon, Rep. of Korea

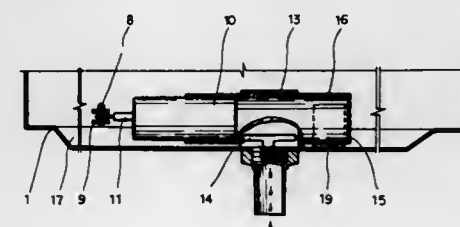
Filed Sep. 15, 1987, Ser. No. 96,580

Claims priority, application Rep. of Korea, Sep. 16, 1986, 86-14354[U]

Int. Cl.<sup>4</sup> F25D 21/00

U.S. Cl. 62—272

3 Claims



1. A drainage device for room air conditioners, comprising:

a base plate comprising a fluid drain pan with an inserting hole, and a side edge with a guide hole;  
a drainage lever comprising a first end, a second end, and a fulcrum hole at or near its middle, said first end inserted through said guide hole;  
a snap band spring means comprising three steps fixed to said base plate, for elastically clamping said drainage lever;  
a pivot for insertion into said fulcrum hole for allowing said drainage lever to rotate;  
a piston;  
a connecting rod for connecting said piston to said second end of said drainage lever at a lever joint comprising joint holes;  
a cylinder into which said piston is slidably inserted, comprising one or more cylinder drainage slots;  
a cylinder holder, formed integrally with said cylinder and comprising one or more holder drainage slots matched to said cylinder drainage slots at lower portions of each, for affixing said cylinder to said fluid drain pan through said inserting hole; and  
a bracket for holding said cylinder.

#### 4,793,148 AIR CONDITIONING APPARATUS

Yoshiaki Ikari, Ashikaga; Masanori Akutsu, Isesaki; Wazoh Yamada, Gunma, and Hideo Maeda, Ashikaga, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

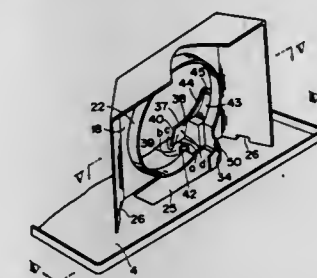
Filed Apr. 29, 1988, Ser. No. 183,813

Claims priority, application Japan, May 13, 1987, 62-116206

Int. Cl.<sup>4</sup> F25B 47/00

U.S. Cl. 62—280

4 Claims



1. An air conditioning apparatus comprising:  
a compartment having a bottom plate and a casing,  
a partition dividing said compartment into an air suction chamber and an air discharge chamber, said partition having a fan orifice formed therein,  
a fan adapted for cooperation with said fan orifice of said partition for moving air from said air suction chamber to said air discharge chamber,  
a water storage means disposed on said bottom plate for collecting water,  
a bore provided in said partition which is away from the lowermost portion of said fan orifice in the rotational direction of said fan, and extending from said fan orifice to said bottom plate,  
a guide means provided in said air discharge chamber so that said guide means is opposed to said bore and said fan,  
a baffle means provided in said air suction chamber so as to extend from a higher edge portion of said bore in the anti-rotational direction of said fan, said baffle means having a surface facing said guide means with said bore interposed therebetween,  
an air passage formed between a free end portion of said baffle means and a lower edge portion of said bore, and  
a curl means having an opening confronting said air suction chamber, said curl means being set in a portion of said air passage in which a part of an air stream discharged from said fan and then guided from said guide means to said baffle means and an air stream sucked into said air passage

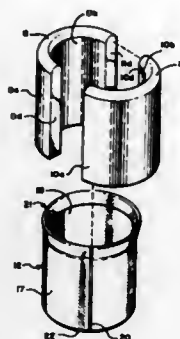
before the air stream has been sucked by said fan are swirled in combination to produce an air stream vortex.

**4,793,149**  
**COOLING AND INSULATING DEVICE FOR CONTAINERS SUCH AS BEVERAGE CANS AND THE LIKE**

Martin K. Riche, 1604 26th St., Ogden, Utah 84401  
Filed Jul. 27, 1987, Ser. No. 78,585  
Int. Cl. F25D 3/08

U.S. Cl. 62-293

15 Claims



1. A cooling and insulating device for containers such as beverage cans and the like, comprising a plurality of hollow, arcuate reservoir pieces, the number of pieces being such that when placed together in abutting, side-by-side relationship they form a ring with an opening therethrough forming open ends of the ring; coolant material within each of said reservoir pieces; and resilient means surrounding at least a portion of said reservoir pieces when placed together to form a ring for biasing said reservoir pieces inwardly thereby maintaining said reservoir pieces in ring formation and allowing said reservoir pieces to separate against the bias of the resilient means and snugly receive a container larger than the opening, said resilient means providing a surface for holding said device in the hand of a user and also extending across an open end of the ring to form a bottom therefor.

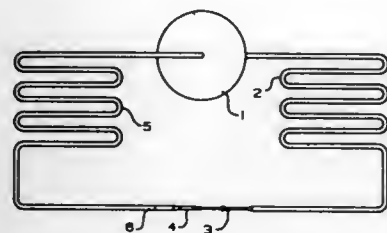
**4,793,150**  
**REFRIGERATION SYSTEM INCLUDING REFRIGERANT NOISE SUPPRESSION**

Mark D. Wattley, Louisville, Ky., and Douglas D. Daniel, Kankakee, Ill., assignors to General Electric Company, Louisville, Ky.

Filed May 13, 1988, Ser. No. 193,558  
Int. Cl. F25D 19/00

U.S. Cl. 62-296

4 Claims



1. In a refrigeration system including a condenser, an evaporator having a tubular inlet and a capillary tube flow restrictor for controlling the flow of refrigerant from said condenser to said evaporator and having a flow restriction sufficient to maintain the desired range of pressure differential between said condenser and said evaporator;

a jumper tube connecting the outlet end of said capillary

tube to said evaporator inlet, said jumper tube comprising at least five successive tubular sections including:

- a first section having an inside diameter slightly larger than the outside diameter of the capillary tube,
- a second section having a conical shape and in fluid flow communication with the first section and increasing in diameter in a direction away from the first section,
- a third section in fluid flow communication with the second section and having an inside diameter substantially larger than the outside diameter of the capillary tube,
- a fourth section having a conical shape and in fluid flow communication with the third section and increasing in diameter in a direction away from the third section,
- a fifth section in fluid flow communication with the fourth section and having a diameter larger than the third section, and

said capillary tube extending through the first and second sections of the jumper tube and into the third section a distance of between 12% and 88% of the length of the third section and secured to the first section of the jumper tube by suitable means.

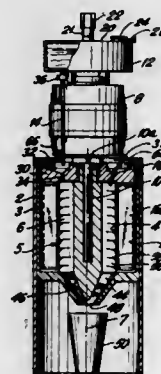
**4,793,151**  
**ICE-CREAM MAKING MACHINE**

Ruben Masel, 16 Hatzahar Street, Kiron; George Valdshtein, Holon; Philipp Leitner, Rehovot, and Gustavo Krosenberg, Even Yehuda, all of Israel, assignors to Ruben Masel, Kiron, Israel

Filed Apr. 1, 1987, Ser. No. 33,434  
Int. Cl. A23G 9/12

U.S. Cl. 62-306

12 Claims



1. A machine for making a frozen comestible such as ice cream, from a liquid, comprising:

- a housing;
- a freezing chamber in said housing having an inlet, an outlet, and a smooth inner surface of cylindrical configuration;
- liquid feeding means for feeding the liquid into the inlet of the freezing chamber;
- cooling means externally of said freezing chamber for cooling the freezing chamber below the freezing point of said liquid;
- a rotary assembly including a plurality of radially-extending blades rotatably mounted within said freezing chamber for atomizing, aerating and moving the frozen liquid through the freezing chamber to its outlet;

said plurality of blades being of a hard elastic, low-friction, plastic material and having a plurality of outer tips, the outer tips of the blades in an unstressed condition lying on an outer diameter larger than the inner diameter of said freezing chamber, whereby when the rotary assembly is inserted into the freezing chamber, the blades are deformed by their engagement with the inner cylindrical surface of the freezing chamber to a stressed condition wherein they forcibly engage the inner cylindrical surface

of the freezing chamber and are twisted towards said outlet of the freezing chamber, and wherein said feeding means comprises a supply container disposed vertically above said freezing chamber, a top cover closing said supply container, a feed line from the bottom of said container to the upper end of said freezing chamber for gravity feeding the liquid thereto, an on/off valve in said feed line, and a presetable control member in said top cover venting the upper end of the container to the atmosphere and effective to fix the feed rate of the liquid to said freezing chamber substantially independently of the viscosity of the liquid, and wherein said feeding means further comprises a distribution plate formed with a bottom wall and an overlying annular channel underlying said feed line for receiving the gravity-fed liquid, and an opening through the bottom wall leading to the inlet end of said freezing chamber.

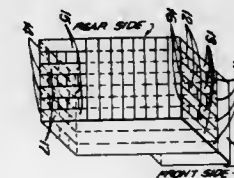
**4,793,152**  
**EVAPORATIVE COOLER WITH VENTILATIVE DEVICE**  
Mohammad T. Naderi, Eecampaan 23, The Hague, Netherlands

Filed Jun. 24, 1985, Ser. No. 717,433

Int. Cl. F28D 5/00

U.S. Cl. 62-311

3 Claims



1. A combination heat exchanger, reverse channels and cooler for cooling and dehumidifying outdoor air which comprises:

- (a) a heat exchanger comprising a plurality of generally vertically disposed channels, said channels consisting of suction channels for flow of fresh useful air, exhaust channels for flow of precooled indoor air an outlet opening in said suction channel and an outlet opening in said exhaust channel,
- (b) a reverse channel for passage of precooled indoor air, said reverse channel having a distal open end for introduction of precooled indoor air and a proximal end disposed over the top of said exhaust channels wherein the precooled indoor air is diverted from said reverse channel into said exhaust channels,
- (c) each of said exhaust channels having an open top end and a closed bottom end, and each of said suction channels having a closed top end and an open bottom end, with said fresh outdoor air being conducted through said suction channels for indirect heat exchange with said precooled indoor air passing through said exhaust channels, and
- (d) a cooler disposed below said reverse channel and fixed to said heat exchanger such that said fresh outdoor air after heat exchange with said precooled indoor air enters said cooler wherein said fresh outdoor air is evaporatively cooled before discharge outside of said cooler.

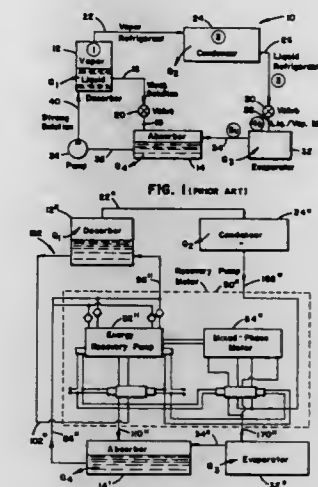
**4,793,153**  
**ENERGY RECOVERY APPARATUS**

Richard D. Hembree, and David E. E. Carmela, both of Minneapolis, Minn., assignors to Recovery Engineering, Inc., Minneapolis, Minn.

Filed Jun. 12, 1987, Ser. No. 62,232  
Int. Cl. F25B 15/00

U.S. Cl. 62-476

7 Claims



1. An absorption refrigeration and/or heating system, comprising:

- a desorber which absorbs heat and at a high relative pressure vaporizes a first volume of refrigerant from a second volume of strong solution leaving a third volume of weak solution;
- a condenser which releases heat and condenses the vapor refrigerant to liquid refrigerant at said high pressure;
- an evaporator which absorbs heat and evaporates said liquid refrigerant at a low relative pressure;
- an absorber which releases heat and absorbs said evaporated refrigerant into said weak solution at said low pressure to form said strong solution;
- means for fluidly communicating said strong solution from said absorber to said desorber, said weak solution from said desorber to said absorber, said high pressure vapor refrigerant from said desorber to said condenser, said liquid refrigerant from said condenser to said evaporator, and said low pressure evaporated refrigerant from said evaporator to said absorber, said communicating means including first means for recovering hydraulic and expansion energy from said high pressure, liquid refrigerant, said communicating means also including means for recovering energy from said high pressure weak solution to pump said low pressure, strong solution thereby reducing pressure in said weak solution and increasing pressure in said strong solution, said energy recovering means including first and second aligned cylinders with first and second pistons therein, respectively, said pistons being connected together with a rod, said cylinders having a first diameter and said rod having a second diameter, said cylinder first diameter squared to the specific volume of strong solution forming a first ratio, said cylinder first diameter squared to the specific volume of weak solution forming a second ratio, said rod second diameter squared to the specific volume of refrigerant forming a third ratio, said first ratio being equal to the sum of said second and third ratios.



4,793,154

## CENTRIFUGAL HEAT PUMP

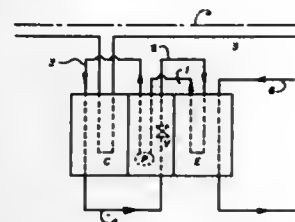
William T. Cross, Coddington, and Colin Ramshaw, Norley, both of England, assignors to Imperial Chemical Industries PLC, London, England

Continuation-in-part of Ser. No. 588,103, Mar. 9, 1984, abandoned. This application Jul. 1, 1985, Ser. No. 750,276 Claims priority, application United Kingdom, Mar. 22, 1983, 8308137

Int. Cl.<sup>4</sup> F25B 3/00

U.S. Cl. 62—499

7 Claims



1. A compression heat pump, comprising:

an evaporator;  
a compressor; and  
a condenser;

means operatively associating said evaporator, compressor and condenser to function as components of a compression heat pump;

at least one of said evaporator and condenser comprising at least one plate having two opposite faces separated by the thickness of such plate;

each said plate being mounted for rotation about an axis which extends at least generally parallel to the thickness direction of such plate;

means for charging a fluid at one temperature to one said face of each said plate and means for charging a fluid at another temperature to the respective opposite said face of such plate;

each said plate being constructed and arranged for accomplishing heat transfer from one said face to the respective opposite said face thereof;

said means for charging to the respective opposite said face of such plate, when forming part of said evaporator, being adapted to charge a liquid to be evaporated to such plate adjacent said axis of rotation thereof so that said liquid flows radially outwards across said opposite face as a continuous film of liquid; and

said one face of such plate, when forming part of said condenser, being adapted to have vapor condense to a liquid thereon and flow radially outward as a thin film thereacross.

4,793,155

## JEWELRY WITH INTERCHANGEABLE ORNAMENTATION

Donna M. Law, Box 4665, New River Stage, Phoenix, Ariz. 85029

Filed May 29, 1987, Ser. No. 55,593

Int. Cl.<sup>4</sup> A44C 25/00, 27/00

U.S. Cl. 63—2

3 Claims

1. A jewelry device for removably holding and displaying a selected ornamental flexible sheet member and for detachable securement to a selected substrate, said jewelry device comprising:

(a) a backing member including

(i) a front side,  
(ii) a rear side, and

(iii) a plurality of forwardly directed flexible fingers;

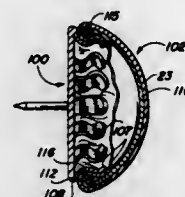
(b) a hollow removable member including

(i) a front surface for receiving said sheet member thereover, and

(ii) a rearwardly directed opening for receiving said fingers therein;

(c) engagement means for detachably securing said removable member to said backing member including

(i) an accurate contact surface circumscribing the opening of said removable member, and



(ii) each of said fingers including a smooth outer recessed contact surface and a radially inwardly sloping end portion for cammingly engaging and receiving said arcuate contact surface; and

(d) attachment means projecting from the rear side of said backing member for detachably securing said jewelry device to said substrate.

4,793,156

## GEM SETTING WITH CHANNEL-SHAPED SUPPORT

Ernest W. Pence, Ambler, Pa., assignor to Keystone Findings, Inc., Harleysville, Pa.

Filed Feb. 3, 1987, Ser. No. 10,408

Int. Cl.<sup>4</sup> A44C 17/02

U.S. Cl. 63—26

5 Claims



1. A setting for mounting an article such as a gemstone, comprising:

at least one support member formed of a length of sheet material folded longitudinally to define a channel, two opposite ends of the support member defining receptacles for receiving parts of said article, sides of the support member being compressed together to form a web portion of the support member at a space from the receptacles, the support member being folded along its length to define the receptacles and the support member being bent in a direction perpendicular to a direction of folding to face said receptacles toward one another, the channel being V-shaped in cross-section at the receptacles, and the sides of the channel being folded tightly into contact at said web portion, the support member being operable to confine the article between the opposite ends of the support member; and,

at least one prong member attached to the support member at said compressed web portion, the prong member having spaced distal ends for confining the article between the distal ends and the receptacle, the prong member being operable to confine the article transversely to said opposite ends of the support member.

4,793,157

## FLAT KNITTING MACHINE

Franz Schmid, Bodelshausen, Fed. Rep. of Germany, assignor to H. Stoll GmbH & Co., Reutlingen, Fed. Rep. of Germany

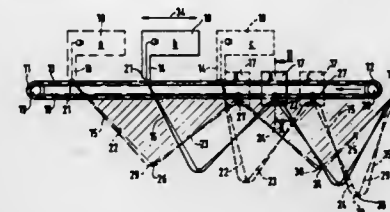
Filed Jan. 12, 1988, Ser. No. 143,046

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1987, 3702881

Int. Cl.<sup>4</sup> D04B 7/00

U.S. Cl. 66—75.2

5 Claims



1. Flat knitting machine with a drivable machine carriage to which electrical energy and/or control signals are conveyed via at least one trailing cable, with at least one trailing cable holder displaceable parallel to the carriage track simultaneously with the carriage and arranged between the cable end on the carriage and that on the machine frame, characterised by the arrangement, at least between the cable end (21) on the carriage (10) and the cable holder (17) in the plane of the trailing cable, of two linked guides (22, 23; 24, 25) for supporting the cable (15), the total length of which guides corresponds approximately to the length of the cable loop to be supported and with which guides the trailing cable (15) is coupled at at least one point.

4,793,158

## PROCESS AND MECHANISM FOR FEEDING WEFT THREADS FOR WARP KNITTING MACHINES WITH LONGITUDINAL CONVEYORS AND RAKES

Gunnar Liebrandt, Hof/Saale, Fed. Rep. of Germany, assignor to LIBA Maschinenfabrik GmbH, Fed. Rep. of Germany

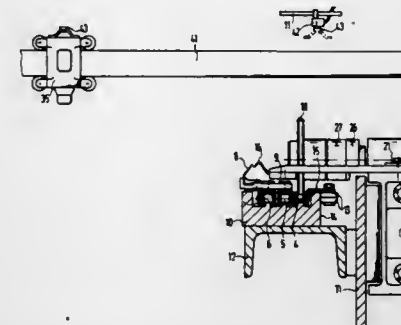
Filed Dec. 1, 1987, Ser. No. 127,132

Claims priority, application Fed. Rep. of Germany, Dec. 5, 1986, 3641640

Int. Cl.<sup>4</sup> D04B 23/06

U.S. Cl. 66—84 A

6 Claims



2. In an apparatus for feeding weft threads to a warp knitting machine including longitudinal conveyor means (1) traveling toward the knitting instrumentalities, transversely movable weft carriage means (35) with thread guide means, and rake means (2) arranged outside of said longitudinal conveyor means (1) said rake means (2) being movable between a starting position (A) in which the weft threads are placed into the longitudinal conveyor means (1) and said rake means (2) and a racking position (B) against the traveling direction of said longitudinal conveyor means (1), whereby the weft threads

are transferred onto said longitudinal conveyor means (1) upon reaching said racking position (B), and whereby said racking means (2) is returned to said starting position (A) in the traveling direction of said longitudinal conveyor means (1), said apparatus being characterized by coupling link means (26, 27 and 28) for temporarily drivingly connecting said rake means (2) with said longitudinal conveyor means (1) to move said rake means (2) from said racking position (B) to said starting position (A), and control means (38, 40) for disconnecting the driving connection of said rake means (2) with said longitudinal conveyor means (1) when said rake means (2) reaches said starting position (A).

4,793,159

## NEEDLE SELECTION DEVICE FOR CIRCULAR KNITTING MACHINES

Masatoshi Sawazaki, Kobe, Japan, assignor to Precision Fukuhara Works, Ltd., Japan

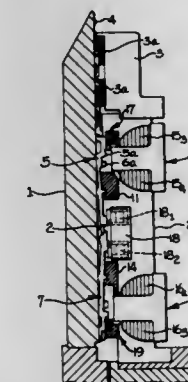
Filed Aug. 10, 1987, Ser. No. 83,206

Claims priority, application Japan, Feb. 27, 1987, 62-46286

Int. Cl.<sup>4</sup> D04B 15/78

U.S. Cl. 66—220

4 Claims



1. A needle selection device for circular knitting machines including a plurality of closely spaced knitting stations surrounding a needle cylinder having needle grooves spaced therearound, a needle supported for vertical sliding movement in each of the needle grooves, and upper and lower selector jacks positioned beneath each needle, said lower selector jack being directly engageable with said upper selector jack and said upper selector jack being directly engageable with said needle, said needle selection device being positioned in advance of each of said knitting stations and including two vertically arranged needle selection units, one of said needle selection units being operable to select needles to knit and welt positions, and the other of said needle selection units being operable to select needles to tuck and welt positions, and wherein said two needle selection units are arranged one above the other so that needle selection takes place along a single vertical line in advance of each knitting station.

4,793,160

## DEVICE FOR CONTROLLING THREAD GUIDES OF CIRCULAR KNITTING MACHINES

Pavel Uhlir, and Jaroslav Maxa, both of Trebic, Czechoslovakia, assignors to ELITEX koncern textilního strojírenství, Liberec, Czechoslovakia

Filed Sep. 7, 1982, Ser. No. 415,687

Claims priority, application Czechoslovakia, Sep. 7, 1981, 6584-81

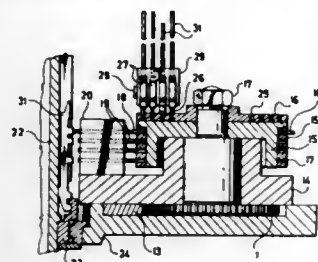
Int. Cl.<sup>4</sup> D04B 15/74, 15/58

U.S. Cl. 66—224

2 Claims

1. A device for controlling thread guide levers in a circular knitting machine having a needle cylinder having a plurality of

grooves with needle control jacks therewithin, comprising a control drum disposed with its axis parallel to the axis of the needle cylinder, first programming elements mounted upon the cylindrical surface of the control drum for controlling the needle control jacks of the knitting machine by moving them in a radial direction, second programming elements mounted upon an end surface of the control drum disposed in a plane transverse to the axis thereof, and means operated by the second programming elements for controlling the thread guide levers of the knitting machine;



wherein the second programming elements are in the form of programming pins mounted in openings on a disc mounted on said transverse end of the control drum and fixedly secured thereto, the first programming elements being in the form of radially disposed pins on the cylindrical surface of the body of the control drum; wherein the means for controlling the thread guide levers comprises first levers having run-on parts which cooperate with the programming pins mounted in the openings of the disc, and lifting rods bearing against the ends of said levers for controlling the thread guide levers.

4,793,161

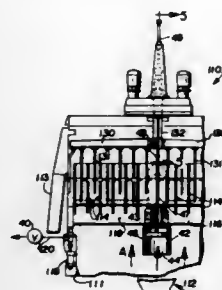
## EFFECTIVE DIFFUSER/THICKENER SCREEN BACKFLUSHING

Johan C. F. C. Richter, Oslo, Norway; Ole J. Richter, and Finn Jacobsen, both of Karlstad, Sweden, assignors to Kamy AB, Karlstad, Sweden

Filed Nov. 27, 1987, Ser. No. 125,710  
Int. Cl.<sup>4</sup> D21D 5/04

U.S. Cl. 68—181 R

12 Claims



1. A pulp treating apparatus comprising:  
a generally upright vessel defining an interior volume containing pulp to be treated;  
a pulp inlet to the vessel;  
a pulp outlet from the vessel, the pulp flowing generally vertically between the inlet and the outlet;  
a plurality of screens mounted within the vessel and connected to supporting liquid conduits;  
extraction means for withdrawing liquid from the pulp, through the screens, and through the conduits to a point outside the vessel; and  
screen backflushing means mounted within the vessel and including a chamber defining element having first and

second ends, the first end in open communication with liquid in the liquid conduits, and the second end in open communication with the pulp within the interior volume of the vessel; a liquid engaging element mounted within said chamber defining element for relative reciprocal movement between said liquid engaging element and said chamber defining element; and means for effecting relative movement between said chamber defining element and said liquid engaging element to cause said liquid engaging element to force liquid out of the chamber in one direction of relative movement between said elements, to effect backflushing, and take liquid into the chamber in another direction of relative movement therebetween.

4,793,162

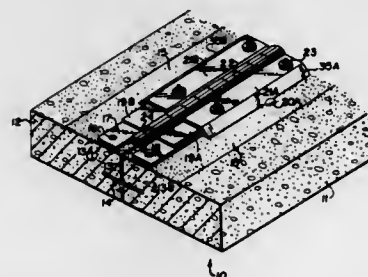
## METHOD FOR REPAIRING FAILED WATERSTOPS AND PRODUCTS RELATING TO SAME

Peter H. Emmons, Gaithersburg, Md., assignor to SPT, Inc., Baltimore, Md.

Filed Aug. 7, 1986, Ser. No. 894,104  
Int. Cl.<sup>4</sup> E02B 15/04

U.S. Cl. 404—69

30 Claims



1. A water-sealed joint defined between a pair of structural elements comprising:

a flexible diaphragm member having side edges disposed on respective surfaces of said pair of structural elements in covering relationship to said joint such that a center portion of said diaphragm member, between said side edges thereof, defines therebelow a region in communication with said joint;

anchor means for anchoring said side edges of said diaphragm member to said respective surfaces of said structural elements laterally of said joint;

an access opening defined by at least one of said structural elements, said opening intersecting said joint at a location below said region defined by said center portion of said diaphragm member and extending from said location to another location on said respective surface of said at least one structural element laterally of said anchor means;

a water sealant collectively filling said joint, said region defined below said center portion of said diaphragm member, and said access opening, whereby said joint is water sealed.

5. A method of water-sealing a selected portion of a joint defined between a pair of structural members comprising the steps of:

(a) laying a flexible diaphragm member on respective surfaces of said structural members so that said diaphragm covers said selected joint portion, and such that a center portion of said diaphragm member establishes therebelow a region in communication with said covered selected joint portion;

(b) anchoring at least side edges of said diaphragm member to said respective surfaces of said structural members;

(c) forming at least one access opening in one of said structural members which intersects said joint at a location below said region established by said center portion of

said diaphragm member and extends therefrom to a location on said respective surface of said one structural member laterally of said joint; and then

(d) injecting a foamable water sealant into said at least one access opening and allowing said sealant to foam sufficiently to fill said selected joint portion and said region established below said center portion of said diaphragm member, whereby said selected joint portion is water-sealed.

4,793,163

## HASP-TYPE LATCH AND METHOD OF MAKING AND USING SAME

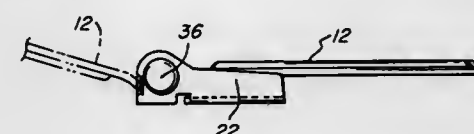
Walter J. MacFarlane, Kensington, and Louis G. Bobrowski, Berlin, both of Conn., assignors to The Stanley Works, New Britain, Conn.

Filed Feb. 19, 1987, Ser. No. 16,273

Int. Cl.<sup>4</sup> E05B 65/48

U.S. Cl. 70—2

21 Claims



1. A hasp-type latch comprising:

(a) a hasp-type member having:

(i) a pad with a base wall and a pair of upstanding walls extending along its side margins, said base wall being adapted to be mounted on a support surface;

(ii) an elongated leaf having one end portion disposed between said upstanding walls, said one end portion terminating in a generally cylindrical barrel portion, said leaf having an aperture therethrough adjacent its other end;

(iii) hinge pin means seated in said upstanding walls adjacent one end thereof and extending into said barrel portion to pivotally mount said leaf on said pad for movement from a locking position wherein its opposite end portion extends beyond the margins of said pad spaced from said hinge pin means and an open position in which said other end portion extends in the opposite direction, said pad having means in said upstanding walls adjacent said one end releasably engageable with said leaf only in its open position to hold it in said position; and

(b) a staple member having:

(i) a base with a top wall and a depending sidewall defining a cavity thereunder, said top wall having an opening therethrough; and

(ii) a post member with a pedestal portion extending through said opening into said cavity and a post portion extending above said top wall and through said aperture in said leaf in said closed position thereof, said pedestal portion having securing means thereon in said cavity extending beyond said opening to prevent its being pulled through said opening in said top wall.

4,793,164

## LOCKING ASSEMBLY FOR UTILITY METER BOXES

Clifford E. Sloop, Sr., P.O. Box 1574, Columbus, Ga. 31906

Continuation of Ser. No. 803,257, Dec. 2, 1985, abandoned. This application Mar. 23, 1987, Ser. No. 30,298

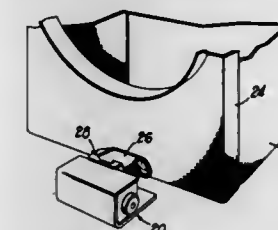
Int. Cl.<sup>4</sup> B65D 55/14

U.S. Cl. 70—164

6 Claims

1. In a utility meter box enclosure having a covering device for said enclosure and a securing means for maintaining said covering device in secured relationship with said enclosure, a locking assembly for said enclosure, wherein the improvement comprises a bracket member connected to said securing means

for said enclosure, a closure means for substantially encompassing said bracket member for preventing unauthorized access to said securing means, a lock retaining means disposed



4,793,165

## PROTECTIVE DEVICE FOR KEY-OPERATED DOOR LOCKS

Henri Rochman, Levontin St. 4, Natanya 42318, Israel

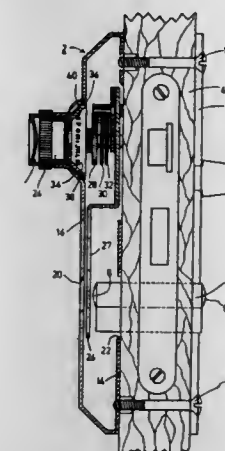
Filed Jun. 10, 1987, Ser. No. 60,180

Claims priority, application Israel, Jun. 19, 1986, 79153

Int. Cl.<sup>4</sup> E05B 17/14

U.S. Cl. 70—284

16 Claims

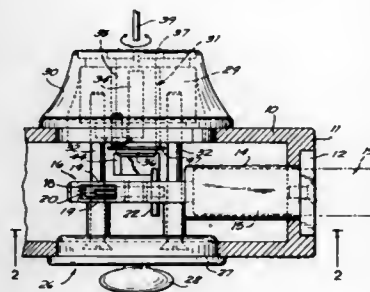


1. A protective device for key-operated door locks, comprising: a housing mountable to the door over the keyhole of a lock mounted within the door; a guard plate movable to a blocking position to block access to said keyhole, or to an unblocking position to permit access to said keyhole; a rotary knob rotatable to a plurality of positions and having markings thereon indicating its position; a transmission mechanism between said rotary knob and said guard plate for moving said guard plate from its blocking position to its unblocking position; said transmission mechanism including at least a first and a second code disc coupleable to said rotary knob such that rotating the rotary knob in one direction positions said first code disc according to the end position of the knob, and then rotating the knob in the opposite direction positions the second code disc according to the end position of the knob; said code discs having notches which are aligned with each other when the discs are in their predetermined code positions; and coupling means comprising an interposer member coupled to said guard plate and having a drive pin receivable in said notches when aligned to couple to interposer member to the rotary knob so as to pivot the interposer member by the further rotation of the knob; said interposer including a second pin received within an opening in the guard plate to move said plate to its unblocking



position when the interposer member is pivoted by said rotary knob.

4,793,166  
**MULTI-USE LOCK CYLINDER**  
 George R. Marks, 19, The Hemlocks, Roslyn Estates, N.Y. 11576  
 Filed Dec. 12, 1986, Ser. No. 940,924  
 Int. Cl.<sup>4</sup> E05B 17/04  
 U.S. Cl. 70—379 R 3 Claims



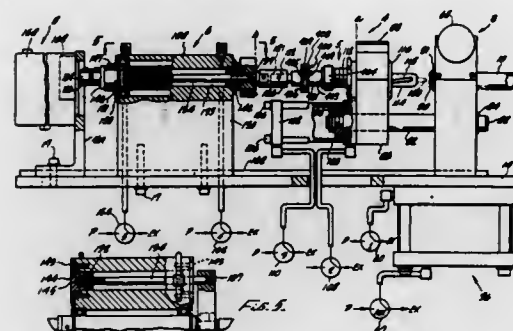
1. A deadbolt lock comprising:
  - a bolt slidable between extended and retracted positions,
  - a mechanism for operating the bolt including a stationary portion and a rotatable member carried by the stationary portion, the bolt being slidable in response to rotation of the rotatable member,
  - a pair of holes in the stationary portion,
  - a lock cylinder housing having a pair of holes,
  - a pair of mounting bolts passing through the holes in the stationary portion and into the holes in the lock cylinder housing,
  - a cylinder plug carried by and rotatable with respect to the housing, the axis of rotation of the cylinder plug being colinear with the axis of rotation of the rotatable member,
  - a tailpiece carried by the cylinder plug in non-rotatable relationship thereto,
  - a cam follower carried by the rotatable member at a point spaced from the axis of rotation of the latter, the cam follower being located in the path of movement of the tailpiece, and
  - the colinear axes of rotation of the cylinder plug and the rotatable member being located in the same plane which contains the mounting bolts.

4,793,167  
**ROLLER SWAGING MACHINE**  
 Mark J. Bailey, 26114 Belle Porta, #11, Harbor City, Calif. 90710, and Makram T. Mikhail, 10667 Freer St., Temple City, Calif. 91780  
 Filed Jun. 2, 1987, Ser. No. 57,325  
 Int. Cl.<sup>4</sup> B21D 39/10

U.S. Cl. 72—19 38 Claims

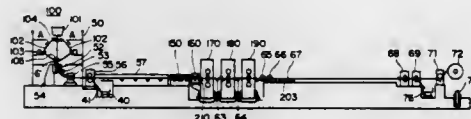
1. A roller swaging machine for installing a metallic sleeve on a metallic tube by expanding the tube into engagement with the sleeve, the machine comprising:
  - (a) an expander assembly having a tapered mandrel for engaging a plurality of tapered rollers for expanding the tube as the mandrel is rotated and advanced on its axis, the mandrel requiring a final maximum torque as the tube reaches complete expansion;
  - (b) a drive for rotating the mandrel in a swaging cycle, the drive being capable of rotating the mandrel at high speed and at low speeds; and
  - (c) control means for the drive for
    - (i) rotating the mandrel at the high speed during initial expansion of the tube when rotation of the mandrel requires less than a predetermined ramp threshold

- torque of less than 50 percent of the final maximum torque;
- (ii) following the initial expansion of the tube and when rotation of the mandrel requires less than a predetermined intermediate torque of less than the final maximum torque but at least 60 percent thereof, continuously reducing the speed of the mandrel to a low speed, the low speed being between about 10 and 30 percent of the high speed; and
- (iii) during final expansion of the tube when rotation of the mandrel requires more than the intermediate torque, rotating the mandrel at the low speed.



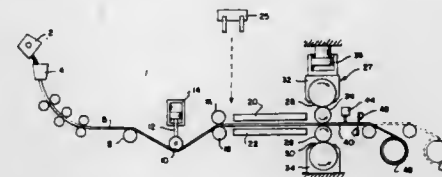
- ously reducing the speed of the mandrel to a low speed, the low speed being between about 10 and 30 percent of the high speed; and
- (iii) during final expansion of the tube when rotation of the mandrel requires more than the intermediate torque, rotating the mandrel at the low speed.

4,793,168  
**METHOD OF AND APPARATUS FOR EFFECTING A THICKNESS-REDUCTION ROLLING OF A HOT THIN PLATE MATERIAL**  
 Tomoaki Kimura, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan  
 Filed Apr. 9, 1987, Ser. No. 36,864  
 Claims priority, application Japan, Apr. 14, 1986, 61-84140  
 Int. Cl.<sup>4</sup> B21B 45/04  
 U.S. Cl. 72—40 15 Claims



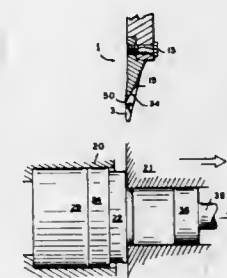
1. A method of effecting a thickness-reduction rolling of a hot thin plate material, comprising the steps of:
  - drawing a hot thin plate material manufactured by a continuous casting machine out of the continuous casting machine in hot state;
  - performing a widthwise rolling of said hot thin plate material in the direction of width thereof thereby applying a compressive strain to scale formed on the surface of said hot thin plate material, and further performing a bending work of said hot thin plate in the longitudinal direction thereof thereby applying a bending strain to said scale on the surface of said thin plate material and thereafter exfoliating said scale from said thin plate material; and
  - effecting by a rolling mill a thickness-reduction rolling of said hot thin plate material from which said scale has been exfoliated.

4,793,169  
**CONTINUOUS BACKPASS ROLLING MILL**  
 Vladimir B. Ginzburg, Pittsburgh, Pa., assignor to United Engineering, Inc., Pittsburgh, Pa.  
 Filed Jun. 27, 1986, Ser. No. 879,369  
 Int. Cl.<sup>4</sup> B21B 31/20  
 U.S. Cl. 72—240 9 Claims



1. A method for rolling in a rolling mill an elongated metal product to form strip comprising the steps of:
  - (a) subjecting a first segment of predetermined length of said metal product, said length being substantially less than the total length of said elongated slab, to a reduction pass in a first direction wherein said first segment is passed from the entry side to the delivery side of said mill, between a pair of work rolls, said reduction pass having a first phase in which a leading portion of said first segment is rolled to finish thickness and a second phase in which a trailing portion of said first segment is rolled to a thickness greater than finish thickness;
  - (b) disengaging said work rolls from said first segment and then reversing the direction of movement of said first segment to bring the leading edge of said trailing portion to the entry side of said mill while accommodating the additional length of said trailing portion produced by said reduction pass;
  - (c) repeating step (a) with respect to said trailing portion and a next contiguous predetermined length of said elongated metal product which together form a second segment;
  - (d) repeating step (b) with respect to said second segment; and
  - (e) repeating steps (a) and (b) in sequence with respect to consecutive segments of said elongated metal product formed in accordance with step (c).

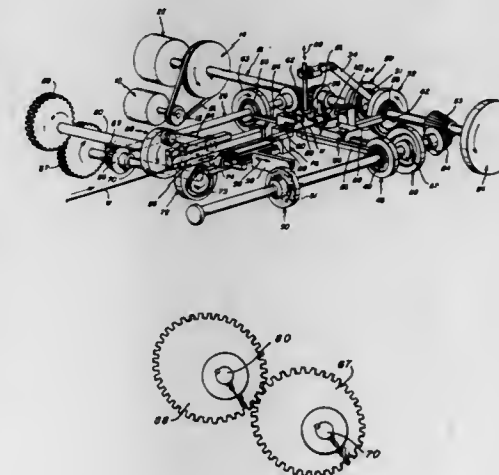
4,793,170  
**SHEAR BLADE FOR ALUMINUM EXTRUSION PROCESS**  
 Everett Daniels, Rte. 7, Box 380, Westwood Estates, Piedmont, S.C. 29673  
 Filed Jun. 19, 1987, Ser. No. 64,119  
 Int. Cl.<sup>4</sup> B21C 35/04  
 U.S. Cl. 72—255 21 Claims



1. An improved shear blade for a butt shearing apparatus associated with guide means and operative force means for removing an unextruded butt end of a billet of metal adjacent a die ring in an extrusion press, comprising:
  - a cutting section;
  - a cutting edge;

- a die ring side extending from said cutting edge;
- a butt side of the blade extending upward from said cutting edge;
- said cutting section including a first cutting section having a first included angle extending from said cutting edge for slicing said unextruded butt end of said billet from said billet adjacent said die ring; and
- said cutting section including a second wedge shaped section having a second included angle between said die side and said butt side which extends from said first cutting section and is less than said first included angle.

4,793,171  
**MULTI-SLIDE WIRE AND STRIP FORMING MACHINE**  
 Frank S. Russell, Northboro, Mass., assignor to Sleeper & Hartley Corp., Boston, Mass.  
 Continuation of Ser. No. 761,189, Jul. 31, 1985, abandoned. This application Mar. 3, 1988, Ser. No. 163,655  
 Int. Cl.<sup>4</sup> B21J 9/18  
 U.S. Cl. 72—449 19 Claims



1. A multi-slide wire and strip forming machine comprising:
  - a machine frame,
  - feed means supported from the frame and for selectively feeding wire to a work station of the machine,
  - camshaft means supported from the frame,
  - a drive source for driving said camshaft means,
  - wire forming means including multiple slide means operable at said work station in response to said camshaft means and over a predetermined forming period,
  - said wire feed means including a feed mechanism and control shaft means operable in response to said camshaft means and over a predetermined feeding period,
  - and non-circular gear means intercoupling the camshaft means and wire feeding means control shaft and configured to provide, during a full camshaft means rotation, said predetermined forming period greater than said predetermined feeding period,
  - said forming and feeding intervals associated with forming an item being completed in a single camshaft means rotation,
  - said wire forming means comprising follower means operable from said camshaft means for controlling each of said sliding means in a sequence to form an item, said predetermined forming period and said predetermined feeding period being respectively mutually exclusive.

4,793,172

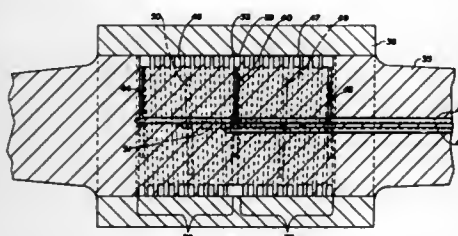
**THERMAL CROWN CONTROLLED ROLLS**

Werner W. Eibe, Pittsburgh, Pa., assignor to Italmimpianti of America Incorporated, Coraopolis, Pa.

Continuation-in-part of Ser. No. 832,379, Feb. 24, 1986, abandoned. This application Oct. 13, 1987, Ser. No. 108,110 Int. Cl.<sup>4</sup> B21B 27/06

U.S. Cl. 72-200

12 Claims



1. In an adjustable crown rolling mill roll for rolling metal comprising a substantially inflexible arbor, a shrunk fit metal sleeve thereon and means for introducing an externally generated heating or cooling heat transfer fluid medium between arbor and sleeve;

the improvement comprising a plurality of parallel circumferential grooves in the surface of said arbor connected together and spaced from each other along said arbor so as to divide said arbor surface encompassed therebetween into fins having ends contacting said sleeve and having an axial dimension sufficient to transmit rolling pressure from said arbor to said sleeve for pushing said roll sleeve outwardly when said fins are thermally expanded radially outwardly into contact with said sleeve upon heating by said fluid medium and a radially dimension substantially greater than the axial dimension sufficient to effectuate greater heat transfer between fins and said heat transfer fluid medium than between said sleeve and said heat transfer, fluid medium for permitting said roll sleeve to contract inwardly when said fins are thermally contracted radially inwardly upon cooling by said fluid medium.

4,793,173

**PROCESS FOR CALIBRATING A GAS METERING INSTRUMENT**

Benno Moreth, Labeck, and Kurt Lechnitz, Gross Grönan, both of Fed. Rep. of Germany, assignors to Drägerwerk Aktiengesellschaft, Fed. Rep. of Germany

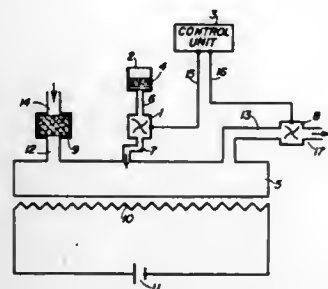
Continuation of Ser. No. 873,194, Jan. 11, 1986, Pat. No. 4,723,436. This application Oct. 13, 1987, Ser. No. 92,425 Claims priority, application Fed. Rep. of Germany, Jun. 15, 1985, 3521535

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> G01N 1/22

U.S. Cl. 73-1 G

2 Claims



1. A process to form a calibrating gas, comprising providing

the test chamber with a gas inlet duct for receiving a flushing gas into the chamber and a gas outlet duct for removing gas from the chamber, providing a feed pump in the gas outlet duct for moving gas out of the test chamber through the gas outlet duct which also draws flushing gas into the test chamber through the gas inlet duct, activating the feed pump at a selected known rate and for a selected predetermined time period to draw gas out of the test chamber through the gas outlet duct and draw flushing gas into the test chamber through the gas inlet duct to flush all but the flushing gas from the test chamber, deactivating the feed pump after the selected predetermined time period to stop the passage of flushing gas, and thereafter feeding into the test chamber a known metered amount of a liquid calibrating substance using a delivery metering pump, the calibrating substance being supplied from a reservoir containing the liquid calibrating substance by the metering pump, controlling the metering pump and the feed pump at known selected rates, the calibrating substance being fed into the test chamber producing a mixture with the flushing gas in the test chamber to form the calibrating gas.

4,793,174

**DIFFERENTIAL PRESSURE CAPILLARY VISCOMETER**

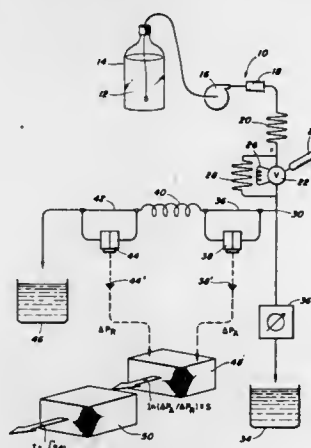
Wallace W. Yau, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Oct. 5, 1987, Ser. No. 104,108

Int. Cl.<sup>4</sup> G01N 11/04

U.S. Cl. 73-55

11 Claims



1. A method for measuring either the inherent viscosity  $\eta_{inh}$  or intrinsic viscosity,  $[\eta]$ , of a solute in solution with a solvent, comprising:

passing a stream of the solvent at a flow rate  $R$  through a first capillary tube and a second capillary tube which are separated from each other by an offset volume  $\Delta V$ , where  $0 < \Delta V \leq RT$ , where  $T$  is as defined below;

introducing into said stream of solvent, upstream of said first and second capillary tubes, a substantially localized volume of a solution comprising the solute and the solvent; measuring, as a function of time, pressure differences  $\Delta P_1(t)$  and  $\Delta P_2(t)$  across said first and second capillary tubes, respectively, said  $\Delta P_1(t)$  and  $\Delta P_2(t)$  being characterized by a rise time  $T$ ;

measuring, as a function of time, the concentration  $C(t)$  of the solute in the solvent;

obtaining a function  $S(t)$ , where

$$S(t) = \ln[\Delta P_1(t)/\Delta P_2(t)],$$

and where  $S(t)=0$  when solvent is flowing through both the first and second capillary tubes;

obtaining a function  $I(t)$ , where

$$I(t) = \int S(t) dt;$$

and relating  $C(t)$ ,  $I(t)$  and  $\Delta V$  to the inherent or intrinsic viscosity of the solute in solution with the solvent.

4,793,175

**HUMIDITY SENSOR, SENSOR MATERIAL, METHOD OF MANUFACTURE AND HUMIDITY SENSING SYSTEM, ESPECIALLY FOR AUTOMOTIVE USE**

Horst Fedter, Bühlertal; Werner Grünwald; Manfred Köder, both of Gerlingen; Peter Nolting, Bühlertal; Claudio De La Prieta, Stuttgart, and Kurt Schmid, Ditzingen-Schöckingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

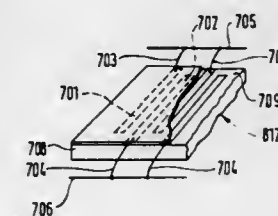
Filed Mar. 20, 1987, Ser. No. 28,715

Claims priority, application Fed. Rep. of Germany, Apr. 5, 1986, 3611468; Apr. 16, 1986, 3612726; Jul. 24, 1986, 3625071

Int. Cl.<sup>4</sup> G01N 19/10

U.S. Cl. 73-73

29 Claims



1. Method of making a relative humidity sensor to measure humidity by change of resistance between electrodes (701, 702) located on a substrate (708) in which a ceramic material is applied between the electrodes, comprising, in accordance with the invention, the steps of homogenizing a mixture of  $Cr_2O_3$ ,  $V_2O_5$  and  $Na_2WO_4$ ; presintering said homogenized mixture; adding a glass paste to the presintered mixture to form an application paste; applying said application paste on the substrate (708) between said electrodes (701, 702); and sintering the substrate, with the electrodes and the glass-presintered mixture thereon.

4,793,176

**HOT FILM TYPE AIR FLOW METER HAVING A TEMPERATURE SENSING EXOTHERMIC RESISTOR**

Kanemasa Sato, and Sadayasu Ueno, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

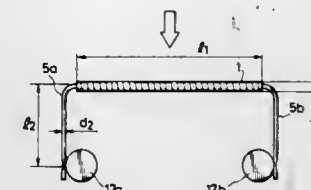
Filed Aug. 12, 1987, Ser. No. 84,217

Claims priority, application Japan, Aug. 22, 1986, 61-195410

Int. Cl.<sup>4</sup> G01F 1/68

U.S. Cl. 73-118.2

8 Claims



1. A hot film type air flow meter having a temperature sensing exothermic resistor in a fuel supply system which supplies fuel at a flow rate matching the flow rate of air sucked into an internal combustion engine, wherein said air flows in a single direction, said temperature sensing exothermic resistor comprising:

a bobbin-shaped temperature sensing exothermic resistor

main body having a length  $l_1$  and a diameter  $d_1$ , and leads extending from both end portions of said exothermic resistor main body, wherein said exothermic resistor main body includes a ceramic body with said leads bonded to both end portions thereof, a metallic film body formed on an outer circumferential surface of said ceramic body and a glass material overcoated on said ceramic body and said metallic film body, and

said exothermic resistor main body projects upstream into the flow of air such that a ratio of said length  $l_1$  of said exothermic resistor main body to said diameter  $d_1$  of said exothermic resistor main body is  $25 > l_1/d_1 > 14$ , and said leads are bent adjacent both end portions of said exothermic resistor main body.

4,793,177

**COMBINATION TIRE VALVE AND PRESSURE GAUGE**

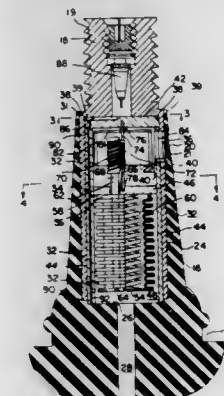
Min-Yu Wu, and Andrew H. Wu, both of 1219 Brandybuck Way, San Jose, Calif. 95121

Filed Nov. 19, 1987, Ser. No. 122,842

Int. Cl.<sup>4</sup> B60C 23/02; G01L 7/06

U.S. Cl. 73-146.8

2 Claims



1. A combination tire valve and pressure gauge formed for disposition within a tire valve stem, comprising:

a housing being fixedly engaged within said tire valve stem; a tire air pressure sensitive means being engaged within said housing and functioning to produce movement of a portion thereof upon exposure to changing tire air pressure; said tire air pressure sensitive means being in pneumatic communication with the air pressure within said tire; said tire air pressure sensitive means including a bellows being substantially cylindrical in shape and formed for collapsible movement along the central axis thereof, and wherein a calibrated spring is disposed within said bellows and operable to resist the movement of said bellows;

a driving rod being engaged to said bellows and slidably engaged within said housing, such that movement of said bellows results in axial movement of said driving rod along the linear axis thereof;

a rotational engagement means being mounted on a rotatable shaft which is journaled in said housing, said rotational engagement means being matingly engaged to said driving rod and operating to convert said axial movement of said driving rod into rotational movement of said shaft;

said driving rod having a first end and a second end, said first end of said driving rod being fixedly engaged to said bellows and said second end of said driving rod being disposed proximate said rotational engagement means, and wherein said rotational engagement means includes a first worm gear being engaged to said driving rod proximate said second end thereof and a second worm gear being disposed upon said shaft in meshing engagement with said first worm gear;

a pressure indicator means being engageably mounted on



said shaft and rotatable within said housing, said pressure indicator means having numerals disposed thereon for indicating the air pressure within said tire;  
a pressure indicator viewing means being formed through said tire stem and said housing proximate said pressure indicator means and operating to permit the visual inspection of said pressure indicator means whereby information related to the tire air pressure may be visually obtained.

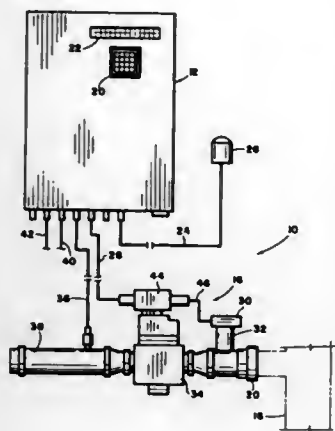
**4,793,178**  
**METHOD AND APPARATUS FOR GENERATING DATA AND ANALYZING THE SAME TO DETERMINE FLUID DEPTH IN A WELL**

Timothy K. Ahern, Tulsa, and Phillip J. Cebuhar, Lawton, both of Okla., assignors to Xelo, Inc., Tulsa, Okla.

Filed Apr. 13, 1987, Ser. No. 37,738  
Int. Cl.<sup>4</sup> G01F 23/00

U.S. Cl. 73—151

43 Claims



1. A method for generating data indicative of fluid depth in a well, said method comprising the steps of:  
initiating an acoustic pulse at the top of the well;  
continuously monitoring the pressure in the well adjacent the top thereof for reflected pulses indicative of acoustic pulse reflections produced by variations in the cross-sectional area of the well;  
periodically sampling the electrical signal;  
storing each sample in a memory device;  
processing the stored samples to generate a velocity estimate of the acoustic pulse; and  
using the velocity estimate to calculate the well depth from which a selected pulse was reflected.

**4,793,179**  
**APPARATUS AND METHOD FOR PRESSURE BURST TESTING OF A VESSEL**

Ernest M. Carlson, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Feb. 10, 1988, Ser. No. 154,418  
Int. Cl.<sup>4</sup> G01L 5/14

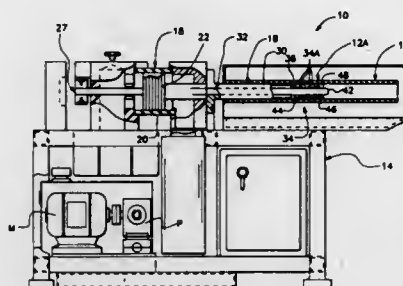
U.S. Cl. 73—167

31 Claims

1. In an apparatus for pressure burst testing of a hollow vessel, a test mandrel comprising:  
(a) a hollow sleeve having an outer end adapted to receive thereover a hollow vessel such that a portion of the vessel to be tested extends beyond said sleeve outer end;  
(b) an elongated drawbar disposed within said hollow sleeve and having an outer end extending beyond said outer end of said sleeve and being coextensible with the vessel portion to be tested when the vessel is received over said sleeve outer end, at least one of said drawbar and sleeve being disposed for movement relative to the other through

respective pressure-generating and pressure-releasing strokes; and

(c) at least one resiliently yieldably deformable annular member mounted on said drawbar and disposable within the vessel portion to be tested when the vessel is received over said sleeve outer end, said deformable member having opposite ends and being mounted between and in contact at its opposite ends with said outer end of said sleeve and said outer end of said drawbar;  
(d) said deformable member being adapted to expand radially so as to apply expansive mechanical pressure against the interior of the vessel portion to be tested upon relative movement of said sleeve and drawbar through said pres-



sure-generating stroke which causes relative movement of said sleeve outer end and said drawbar outer end toward one another and thereby application of compressive force against said opposite ends of said deformable member;  
(e) said deformable member being adapted to contract radially so as to release application of the mechanical pressure against the interior of the vessel portion to be tested upon relative movement of said sleeve and drawbar through said pressure-releasing stroke which causes relative movement of said sleeve outer end and said drawbar outer end away from one another and thereby release of application of compressive force against said opposite ends of said deformable member.

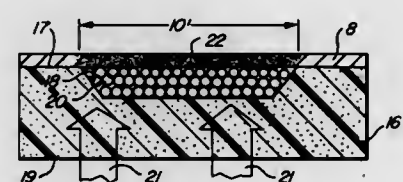
**4,793,180**  
**DELAYED ACTION IRREVERSIBLE HUMIDITY INDICATOR**

Roger K. Stewart, Tucson, Ariz., and James R. Blinn, Riverside, Calif., assignors to AGM Cargo-Ties, Inc., Tucson, Ariz. and Humidat Corporation, Colton, Calif.

Continuation of Ser. No. 311,391, Oct. 14, 1981, abandoned.  
This application Mar. 8, 1984, Ser. No. 587,369  
Int. Cl.<sup>4</sup> G01N 25/56

U.S. Cl. 73—335

12 Claims



1. An irreversible humidity indicator having a delayed response time for monitoring humidity levels within an enclosed space, comprising in combination:  
a. a porous plastic carrier having and lower opposing surfaces, said upper surface including a depressed region;  
b. isolating means for isolating said upper surface from direct exposure to moisture-laden air within the enclosed space while allowing said lower surface to be directly exposed to such moisture-laden air;  
c. a deliquescent agent coated with a water soluble dye

disposed within the depressed region of said upper surface;  
d. a layer of absorbent sheet material overlying said upper surface of said porous carrier and directly above said dye-coated deliquescent agent for absorbing said water soluble dye when the humidity level within said depressed region is sufficiently high to dissolve said dye-coated deliquescent agent; and  
e. said porous plastic carrier being of a sufficient density and thickness to delay the passage of moisture-laden air within the enclosed space to said depressed region for a time period greater than the time period normally required to dissolve said deliquescent agent upon direct exposure to such moisture-laden air.

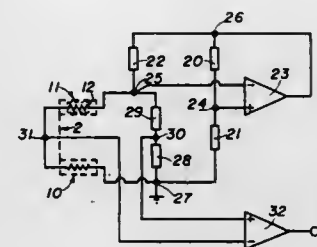
**4,793,181**  
**CONSTANT TEMPERATURE SORPTION HYGROMETER**

Robert S. Djourap, 20 Lovewell Rd., Wellesley, Mass. 02181

Filed Jun. 2, 1987, Ser. No. 57,050  
Int. Cl.<sup>4</sup> G01W 1/00

U.S. Cl. 73—336.5

22 Claims



1. Hygrometer comprising:  
a pair of temperature coefficient resistive sensing elements, one of the elements including a hygroscopic material and the other element being substantially non-hygroscopic;  
a transducer Wheatstone bridge including the pair of sensing elements as two of the transducer bridge arms;  
a heating Wheatstone bridge including the transducer bridge as one arm of the heating bridge;  
a feedback controlled electrical circuit adapted to maintain the resistance of the transducer bridge constant; and  
circuitry adapted to measure the transducer bridge imbalance, the imbalance being related to the amount of water adsorbed by the sensing element including the hygroscopic material.

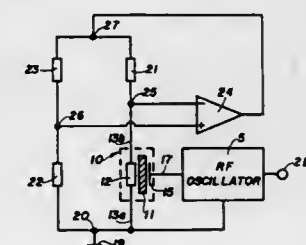
**4,793,182**  
**CONSTANT TEMPERATURE HYGROMETER**

Robert S. Djourap, 20 Lovewell Rd., Wellesley, Mass. 02181

Filed Jun. 2, 1987, Ser. No. 57,034  
Int. Cl.<sup>4</sup> G01W 1/00

U.S. Cl. 73—336.5

20 Claims



1. Hygrometer comprising:

a piezoelectric substrate including a sorptive material affixed thereto;  
a heater adapted to maintain the substrate at a constant temperature;  
electrodes disposed on opposing sides of the substrate; and  
an oscillator circuit connected to the electrodes adapted to oscillate the substrate and to generate a signal proportional to oscillation frequency, the oscillation frequency being related to the amount of sorbed water.

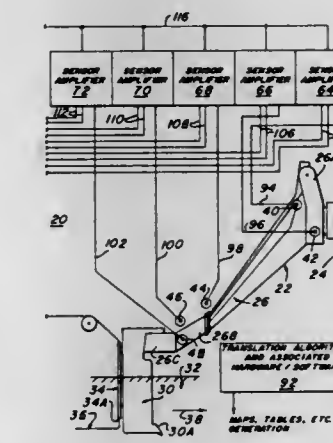
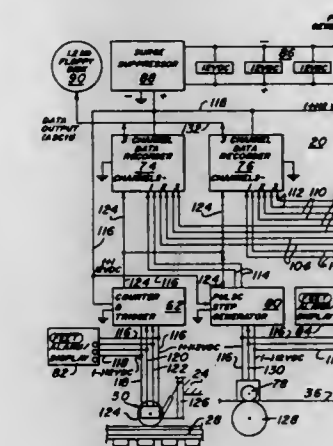
**4,793,183**  
**AUTOMATED POSITIONING/DRAWING SYSTEM AND METHOD OF USE**

Martin F. Helms, Philadelphia, and Joseph D. Pigott, Jr., Downingtown, both of Pa., assignors to Henkels & McCoy, Inc., Blue Bell, Pa.

Filed Aug. 6, 1987, Ser. No. 82,884  
Int. Cl.<sup>4</sup> G01D 9/00

U.S. Cl. 73—432.1

35 Claims



1. A position sensing system for use in conjunction with apparatus for burying an elongated flexible member in an underground path, said apparatus being arranged for cutting a kerf in the ground and for inserting said flexible member therealong as said apparatus traverses a first above ground path adjacent said underground path, said apparatus comprising ground engaging means to cut said kerf and to introduce said flexible member into said kerf, and support means to position said ground engaging means at desired positions as said apparatus is moved along said first path, the position of each portion of said flexible member along said underground path being definable by first, second, and third coordinates representative

of the distance along the first path, the lateral distance from said first path, and the depth below said first path, respectively, said support means comprising at least two sections which are movable relative to one another to establish the position of the flexible member in said under ground path, said positioning sensing system comprising first measuring means to provide first signals indicative of the distance traveled by said apparatus along said first path, sensor means coupled to said at least two sections of said support means to detect the position thereof, first means responsive to said sensor means for providing support position signals indicative of the position of at least one of said sections with respect to at least another of said sections at selected longitudinal points along said first path as said apparatus traverses said first path and second means responsive to said first means for providing second and third signals, representative of said second and third coordinates, respectively, at each of said selected points.

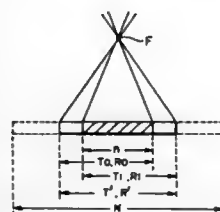
4,793,184

**ULTRASONIC IMAGING APPARATUS AND METHOD OF FORMING AN ULTRASONIC IMAGE OF AN OBJECT**  
Hiroshi Ikeda, Hachioji; Kageyoshi Katakura; Toshio Ogawa, both of Tokyo; Shin'ichiro Umehara, Hachioji, and Shinichi Kondo, Kodaira, all of Japan, assignors to Hitachi Ltd. and Hitachi Medical Corporation, both of Tokyo, Japan  
Filed Aug. 21, 1986, Ser. No. 898,518

Claims priority, application Japan, Oct. 9, 1985, 60-223610; Nov. 22, 1985, 60-261221

Int. Cl.<sup>4</sup> G01N 29/04  
U.S. Cl. 73—626

16 Claims



1. An ultrasonic imaging apparatus operative to converge an ultrasonic beam by controlling the phase of signals transmitted and received by an array of transducers so as to produce an ultrasonic image of an object, said apparatus comprising:  
means having a plurality of transmitting and receiving partial apertures, each implementing both transmission and reception operations;  
means for switching said partial apertures;  
means for storing received signals; and  
means for summing received signals with said stored received signals of partial apertures associated with different transmission operations with phase information thereof being retained, thereby to synthesize reception signal for a total aperture.

4,793,185

#### NONDESTRUCTIVE TESTING

Wolfgang Boettger, Duesseldorf; Willi Weingarten, Moers, and Heinz Schneider, Duesseldorf, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Filed Apr. 17, 1987, Ser. No. 39,672

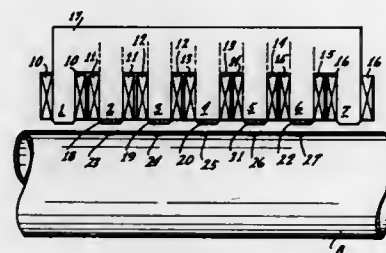
Claims priority, application Fed. Rep. of Germany, Apr. 24, 1986, 3614069

Int. Cl.<sup>4</sup> G01N 28/04  
U.S. Cl. 73—643

11 Claims

1. Electromagnetic transducer for nondestructive testing of structural, electrically conductive material comprising:  
a plurality of pole pieces arranged in a row, each of the pole pieces having a free end facing the piece to be tested;

a soft magnetic return path and flux member connected to the respective opposite ends of all of the pole pieces; and a plurality of transducer coil means arranged on these pole pieces and provided for dc energizing such that the mag-



netic polarity at the free ends of the pole pieces alternate along the row, further provided for generating magnetically ultrasonic signal producing pulses, and for responding to magnetic field variations on account of ultrasonic echos.

4,793,186

#### MONITORING OF EXCITER SHAFT TORSIONAL VIBRATIONS

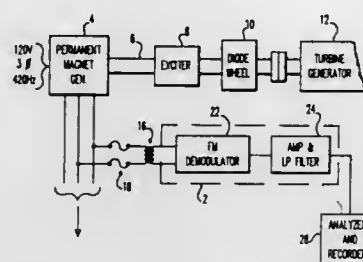
Joseph D. Hurley, Casselberry, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 21, 1987, Ser. No. 110,986

Int. Cl.<sup>4</sup> G01H 1/10

U.S. Cl. 73—650

10 Claims



1. Apparatus for detecting torsional vibrations of the shaft of an exciter of a turbine-generator, said apparatus comprising: a permanent magnet generator connected to be driven by the exciter shaft and having an electrical output for providing an output voltage having a frequency proportional to the rate of rotation of the exciter shaft; and signal processing means connected to said electrical output for deriving a signal representative of torsional vibrations experienced by the exciter shaft.

4,793,187

#### CIRCUIT ARRANGEMENT FOR THE COMPENSATION OF TEMPERATURE-DEPENDENT AND TEMPERATURE-INDEPENDENT DRIFT AND FOR THE COMPENSATION OF THE SENSITIVITY OF A CAPACITIVE SENSOR

Jürgen Kordtz, Wedel, Fed. Rep. of Germany, assignor to U.S. Philips Corp., New York, N.Y.

Filed Jun. 16, 1987, Ser. No. 62,919

Claims priority, application Fed. Rep. of Germany, Jun. 18, 1986, 3620399

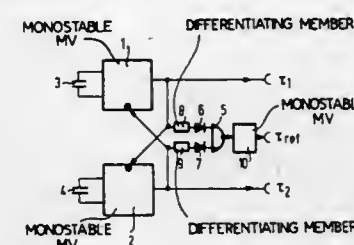
Int. Cl.<sup>4</sup> G01L 9/12, 19/04

U.S. Cl. 73—708

10 Claims

1. A circuit arrangement for the compensation of temperature-dependent and temperature-independent drift and for the compensation of the sensitivity of a capacitive sensor, comprising: two measuring capacitors, connected to at least one oscil-

lator which outputs pulses of a duration proportional to the capacitance of the capacitors, the pulses arising from the respective capacitances appearing in an alternating fashion, comprising a circuit for generating reference pulses from the pulses arising from the respective capacitances, the duration of the reference pulses being shorter than the duration of the pulses from the respective capacitances, a pulse duration demodulator associated with a respective capacitance and which forms, from the pulses applied, a d.c. signal which corresponds to the relevant reciprocal value of a capacitance in that during a first period  $t_{ref}$  which depends on the duration of a reference pulse a first reference signal is up-slope integrated and during a



second period, after expiration of the reference pulse, a second reference signal is down-slope integrated, and an output subtraction member which forms the difference between the two output signals of the pulse duration demodulators, characterized in that one output of the pulse duration demodulators is connected to a respective input of a summing/subtraction member whose output supplies a controller, supplying the first reference signal, with an input d.c. signal ( $U_r$ ), a d.c. signal ( $U_0$ ) of the controller output, which is connected to a further input of the summing/subtraction member and to a further input of the output subtraction member, being re-adjusted so that the controller input d.c. signal ( $U_r$ ) on the output of the summing/subtraction member is equal to a reference signal ( $U_{ref}$ ).

4,793,188

#### LUBRICATION SENSOR APPARATUS

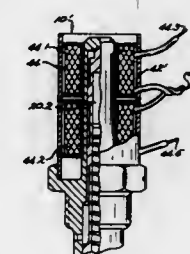
Werner Strasser, and Edward C. Lewis, both of Lexington, Ky., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 818,836, Jan. 14, 1986, abandoned. This application Dec. 22, 1986, Ser. No. 945,422

Int. Cl.<sup>4</sup> G01L 7/16, 9/00; H01H 35/38

U.S. Cl. 73—745

33 Claims



1. Apparatus for sensing a fluid pressure differential between first and second ports connected respectively to low and high pressure sources comprising a housing having a bore having a longitudinal axis, the bore extending between first and second ends, the second end being closed, a shuttle having a first portion having a selected axial length with a fluid sealing surface about its periphery slidably received in the bore between first and second extremities, a low pressure source, a first port connected to the low pressure source and with the first end of the bore, a second port connected to the high pressure source and with the bore at a location spaced axially from the first end, the axial length of the first portion being less

than the distance between the first extremity and the second port, the shuttle having a second portion having a selected axial length and having a force receiving surface in communication with the second port adapted to place a force on the shuttle tending to move the shuttle toward the first end of the bore, the force receiving surface positioned axially between the second port and the second extremity when the shuttle is at the first extremity, dampening means to increase the time in which the shuttle responds to a change in differential pressure, the dampening means including a passage means formed along the length of the second portion in communication with the second port and leading to the force receiving surface of the shuttle, the passage means configured such that the fluid received in the second end of the bore between the shuttle and the closed end when the fluid pressure differential is sufficiently high to cause the shuttle to move toward the first end of the bore having to be displaced through the passage in a direction opposite to the movement of the shuttle for the shuttle to thereafter move away from the first end of the bore when the fluid pressure differential decreases, means to bias the shuttle in a direction toward the high pressure, second end of the bore and means to calibrate the apparatus so that during normal operation the shuttle is located at the first end of the bore.

4,793,189

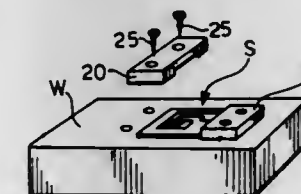
#### THICK-FILM STRAIN GAUGE FOR SENSING STRESSES & STRAINS IN MECHANICAL MEMBERS OR STRUCTURES

Giuseppe Dell'Orto, Milan, and Giuseppina Rossi, Pavia, both of Italy, assignors to Marelli Autronica S.p.A., Pavia, Italy  
Continuation of Ser. No. 908,467, Sep. 17, 1986, abandoned. This application Nov. 2, 1987, Ser. No. 115,557

Claims priority, application Italy, Sep. 17, 1985, 53804/85[U]  
Int. Cl.<sup>4</sup> G01B 7/20

U.S. Cl. 73—775

1 Claim



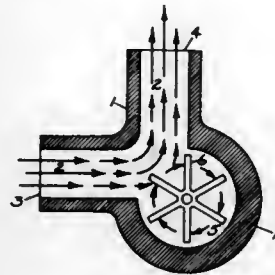
1. A strain gauge sensor for sensing stress and deformations in a mechanical member, said sensor comprising a support substrate in the form of a thin rectangular plate separate from said member but adapted to be secured to said member, said plate being made of an electrically insulating ceramic material, said plate having an upper surface and a lower surface, a plurality of thick-film resistors deposited on said upper surface and surface metal tracks on said upper surface connected to said thick-film resistors for connecting said resistors to circuits remote from said plate, said lower surface of said support substrate being adapted to be firmly attached onto said member of which stresses and deformations are to be locally sensed so that said stresses and deformation of said member cause, through the substrate, corresponding deformations of said thick-film resistors and

clamping means for clamping the sensor to said mechanical member, said clamping means comprising a pair of plates each having recess in one surface adapted to overlie and engage opposite ends of said substrate with each end of said substrate being located within a respective recess and means for securing said plates to said mechanical member.



4,793,190  
**DEVICE FOR MEASURING AND INDICATING FLOW AROUND A BEND**  
 Shih-Chih Chang, 2339 Darison Ave., Richland, Wash. 99352  
 Filed Jul. 23, 1987, Ser. No. 76,880  
 Int. Cl.<sup>4</sup> G01F 1/06, 1/20  
 U.S. Cl. 73—861.33

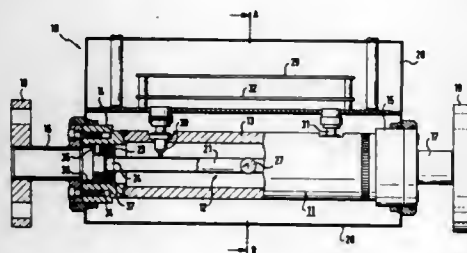
11 Claims



1. A device for indicating fluid flow by visual observation comprising a housing containing a curved flow path, a cavity positioned at the outer side of the curvature of said curved flow path and connecting to said fluid in said curved flow path, an inlet portion connected to one end of said curved flow path and an outlet port connected to the second end of said curved flow path; a rotor means with a plurality of substantially radial blades being rotatable about a fixed axis in said cavity, at least one view port; the flow field in said curved flow path inducing a secondary flow vortex in said cavity, said vortex flow driving said indicating rotor to rotate; said view port being positioned such that it provides a view of said rotor and, thereby, said fluid flow being detected visually by viewing said turning rotor through said view window.

4,793,191  
**MASS FLOW METER OPERATING BY THE CARIOLIS PRINCIPLE**  
 Peter Flecken, Weß-Haltingen, Fed. Rep. of Germany, and Niels Ahlgaard, Logstor, Denmark, assignors to Flowtec AG, Switzerland  
 Filed Sep. 22, 1987, Ser. No. 99,484  
 Claims priority, application Fed. Rep. of Germany, Sep. 26, 1986, 3632851  
 Int. Cl.<sup>4</sup> G01F 1/84  
 U.S. Cl. 73—861.38

9 Claims



1. Coriolis type mass flow meter comprising a support tube, a mechanical oscillation system disposed axially in the support tube and comprising at least one straight measuring tube, an oscillation exciter which sets the center of said at least one straight measuring tube in flexural oscillations, and oscillation sensors for sensing the mechanical oscillations at equal distances from the center on both sides of the oscillation exciter, and plural continuously arcuate diaphragm means each having an inner end connected to one end of the straight measuring

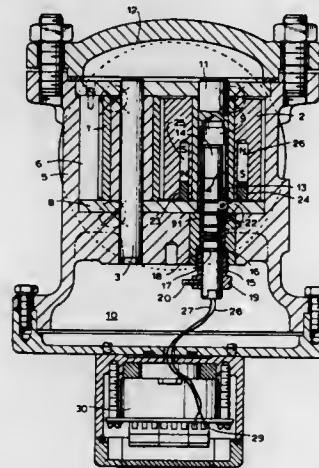
tube and an outer end clamped to the support tube for providing the sole support for the straight measuring tube.

4,793,192  
**ELECTROMAGNETIC PULSE RECEIVER FOR A FLOW METER**

Walter Jerger, Mannheim, and Jürgen Böhm, Mannheim-Wallstadt, both of Fed. Rep. of Germany, assignors to Bopp & Reuther, Mannheim, Fed. Rep. of Germany  
 Filed Oct. 30, 1986, Ser. No. 926,405  
 Claims priority, application Fed. Rep. of Germany, Oct. 30, 1985, 3538514

Int. Cl.<sup>4</sup> G01P 3/487; G01F 1/075  
 U.S. Cl. 73—861.78

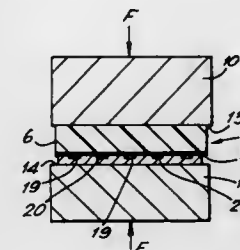
10 Claims



1. An electromagnetic pulse receiver for a flow meter, comprising a measuring wheel element to be driven in rotation by a flowing medium; a stationary axle which rotatably supports said measuring wheel element and is at least partially formed as a hollow axle with a cylindrical hollow space; a pulse wire sensor arranged in said cylindrical hollow space of said hollow axle and formed as a cylindrical probe, said probe having a probe head which carries a plurality of cylindrically arranged pulse wires, a receiver coil, and a cylindrical magnet yoke concentrically located inside said receiver coil, said probe also having an outwardly extending probe shaft with inwardly located electrical pulse conductors and an outwardly located holding element for holding said probe shaft; and magnet means including at least one pair of magnets located near said hollow axle in said measuring wheel element, said magnet pair extending in a direction parallel to said hollow axle and magnetized in said direction with opposite polarity so as to encircle said probe head during the rotation of said measuring wheel element, so that during the rotation of said measuring wheel element magnetic pulses are generated in said pulse wires of said probe head due to the application upon said pulse wires from said magnet pair of alternately differently directed and differently strong magnetic fields, which magnetic pulses are converted in said receiver coil into electric pulses whose number is indicative of a quantity of a medium flowing through the flowmeter.

4,793,193  
**DEVICE FOR SENSING LOADS**  
 Slim T. Borgudd, Flat 10, Wootton Hall, Wootton Wawen, Sweden (B95 6EE)  
 Continuation-in-part of Ser. No. 784,885, Sep. 26, 1985, abandoned. This application Dec. 2, 1986, Ser. No. 937,096  
 Claims priority, application PCT Int'l Appl., Jan. 31, 1985, PCT/SE85/00045  
 Int. Cl.<sup>4</sup> G01L 5/16; H01C 10/12  
 U.S. Cl. 73—862.04

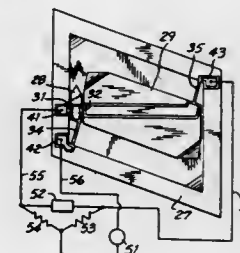
13 Claims



1. A device for sensing loads comprising a rigid first member, a rigid second member, said first and second members having opposed surfaces, and a plurality of sensors spaced apart in the same plane between said opposed surfaces, each said sensor comprising an electrically conductive film of material having a conductive surface, the film being in permanent conductive engagement with conductor means to provide an electrical path between the conductor means and said conductive film, the film being under an initial pre-load between the first and second members and the conductive engagement being arranged to vary with variations in axial and torsional loading between the sensor and one of said members.

4,793,194  
**PIEZORESISTIVE TRANSDUCER**  
 Leslie B. Wilner, Palo Alto, Calif., assignor to Endevco Corporation, San Juan Capistrano, Calif.  
 Division of Ser. No. 716,070, Mar. 26, 1985, Pat. No. 4,737,473.  
 This application Oct. 29, 1987, Ser. No. 114,333  
 The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> G01L 1/22  
 U.S. Cl. 73—862.67

5 Claims

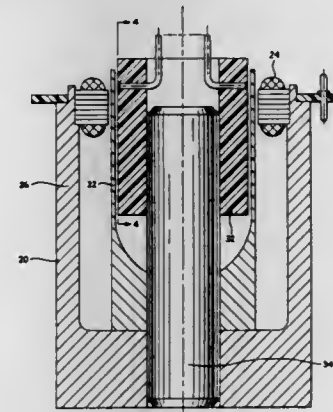


1. An operable strain sensitive element for use in a system for converting mechanical movement of relatively movable portions of the element into electrical signals, comprising: a substantially planar substrate comprising an N-type silicon crystal material, said substrate including groove means extending into said substrate defining an integral hinge portion between at least two relatively movable parts; at least one unitary strain gage extending across said groove means without any separate support so that said strain gage and said hinge portion are spaced apart, said strain gage being a unitary member derived from the same silicon crystal material of said substrate, said strain gage

comprising P-type silicon material, said strain gage being joined to two of said relatively movable parts of said substrate; at least one unitary conductor extending across said groove means without separate support so that said conductor and said hinge portion are spaced apart, said conductor being derived from the same silicon crystal material as said substrate, said conductor comprising P-type silicon material, said conductor being oriented substantially transversely with respect to said strain gage when viewed from a position directed perpendicularly from the plane of said substrate, said conductor being joined to two of said relatively movable parts of said substrate; and contact means electrically connected to said strain gage and said conductor for allowing electrical communication with test apparatus for measuring changes in electrical resistance in said strain gage when said strain gage is subject to stress resulting from relative movement of said movable parts of said substrate.

4,793,195  
**VIBRATING CYLINDER GYROSCOPE AND METHOD**  
 Menno G. Koning, Dover, Mass., assignor to Northrop Corporation, Hawthorne, Calif.  
 Filed Oct. 20, 1986, Ser. No. 920,743  
 Int. Cl.<sup>4</sup> G01C 19/28, 19/56  
 U.S. Cl. 74—5.6 D

8 Claims

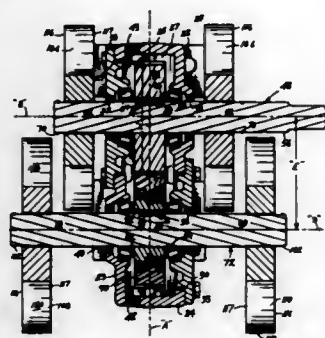


1. Vibrating cylinder gyro comprising: a cylinder; electromagnetic forcers arranged to apply forces on the cylinder to excite its lowest order radially oscillating mode and to steer the resulting nodal pattern; means for sensing the nodal pattern; and servo means for controlling the forcers to steer the nodal pattern to its original configuration in the presence of cylinder rotations, the steering commands being related to rotation rate.  
 2. In a method for measuring angular rotation of a rotating platform with a vibrating cylinder gyro including a cylindrical shell mounted to the platform for movement therewith, said shell having an open end extending away from the platform, said end being free to resonate, exciting the shell with an electrical transducer and drive current circuit means to produce low order radial oscillations with nodes of vibration which move in response to rotational movement of the platform and shell, sensing movement of the nodes of vibration with pickoff means, regulating the electrical transducer current with a servo loop means responsive to said pickoff means to move the nodes or vibration back to an original, unrotated position to thereby define a restore electrical current magnitude

and phase, the values of which indicate the amount of rotation of said platform and gyro.

**4,793,196**  
**GEAR COUPLED, COUNTER-ROTATING VIBRATORY DRIVE ASSEMBLY**  
Walter L. Davis, Milton-Freewater, Oreg., and Joseph C. Thomas, Aberdeen, S. Dak., assignors to Key Technology, Inc., Milton-Freewater, Oreg.  
Filed Mar. 24, 1987, Ser. No. 30,051  
Int. Cl.<sup>4</sup> B06B 1/16

U.S. Cl. 74—61



1. A gear coupled, counter-rotating vibratory drive assembly comprising:
  - a housing for operatively connecting to a device to be vibrated in a desired linear motion;
  - said housing having a prescribed length with an elongated central gear box compartment formed therein;
  - a drive shaft extending through the gear box compartment and rotatably supported by drive shaft support bearings for rotation about a drive shaft axis;
  - said drive shaft having a central gear section intermediate the drive shaft support bearings and end section extending outward from the central gear section and the drive shaft support bearings exterior of the gear box compartment;
  - a drive gear having a prescribed diameter mounted on the central gear section for rotation with the drive shaft within the gear box compartment;
  - a driven shaft extending through the gear box compartment and rotatably supported by driven shaft support bearing for rotation about a driven shaft axis that is parallel with the drive shaft axis;
  - said driven shaft having a central gear section intermediate the driven shaft support bearings and end sections extending outward from the central gear section and the driven shaft support bearings, exterior of the gear box compartment;
  - a driven gear mounted on the central gear section intermeshed with the drive gear for rotating the driven shaft at the same angular speed but in a direction counter to the drive shaft;
  - eccentric weights mounted on the end sections of both the drive shaft and the driven shaft for rotation therewith in counter-rotating directions about the shaft axes in phased angular relationship to generate vibrational linear motion;
  - each of the eccentric weights having a prescribed peripheral radius from the respective shaft axis that is less than the prescribed diameter of the drive gear but greater than one-half the prescribed diameter of the drive gear wherein the eccentric weights on the drive shaft are mounted axially offset with respect to the eccentric weights on the driven shaft so that the eccentric weights rotate in noninterfering paths; and
  - wherein one of gears has metal teeth and wherein the other gear has a metal hub with a plastic gear ring mounted on

the hub in which the plastic gear ring has plastic teeth engaging the metal teeth of the one gear.

**4,793,197**  
**TELESCOPING DEVICE**  
Peter Petrovsky, Konstanz, Fed. Rep. of Germany, assignor to Dornier GmbH, Friedrichshafen, Fed. Rep. of Germany  
Filed Aug. 24, 1987, Ser. No. 88,865  
Claims priority, application Fed. Rep. of Germany, Sep. 10, 1986, 3630746  
Int. Cl.<sup>4</sup> F16H 25/24; F16B 7/10

U.S. Cl. 74—89.15

5 Claims



1. In a telescopic arrangement wherein a plurality of telescoped tubes are provided for retraction and protraction; the tubes each include a nut element, said nut element being axially aligned, and means for causing one tube to engage respective outer one, the combination comprising:
  - a first main drive and working spindle onto which said nut elements are threaded to cause protraction and retraction of the respective tube, the nut elements disengaging, one by one, from the thread of the spindle as the respective next tube is caused to protract and its nut travels on the first spindle;
  - a second, nut retention spindle onto which nuts of those tubes are threaded which are not yet to be extended or which have been retracted;
  - means defining a threadfree space between the first and second spindle to be traversed by that one of the nuts next to be threaded onto the first spindle and prior to that one of the nuts that travels on the first spindle leaving that first spindle; and
  - means for driving the first and second spindles in unison so that a nut on the first spindle travels essentially for the length of the first spindle while the nut on the second spindle moves only for a short distance.

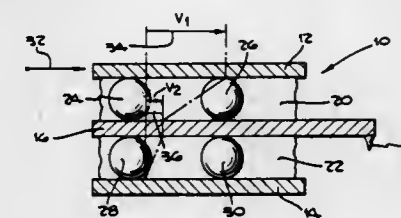
**4,793,198**  
**FLUID FLOW MOTION REDUCTION SYSTEM**  
Jon H. Myer, Woodland Hills, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.  
Filed May 29, 1987, Ser. No. 56,216  
Int. Cl.<sup>4</sup> F16H 21/44; G05G 9/00

U.S. Cl. 74—110

8 Claims

1. A fluid flow motion reduction apparatus, comprising:
  - at least three plates including a top movable plate, a bottom stationary plate, and an interleaved driven plate positioned between the top plate and the bottom plate;
  - a first fluid positioned between said top movable plate and said interleaved driven plate;
  - a second fluid positioned between said interleaved driven plate and said bottom plate, said second fluid being of a higher viscosity than said first fluid; and
  - means for separating said plates in a substantially frictionless manner;

whereby, when a lateral displacement is imparted on said top movable plate, the interleaved driven plate moves a

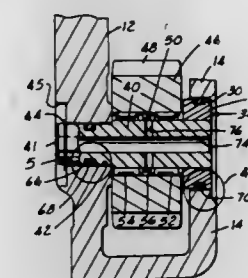


smaller lateral distance compared to the movement of said top plate.

**4,793,200**  
**REVERSE IDLER GEAR NOISE-REDUCTION ARRANGEMENT**  
Robert L. McDonald, Livonia, Mich., assignor to Chrysler Motors Corporation, Highland Park, Mich.  
Filed Nov. 19, 1987, Ser. No. 122,966  
Int. Cl.<sup>4</sup> F16H 3/08

U.S. Cl. 74—331

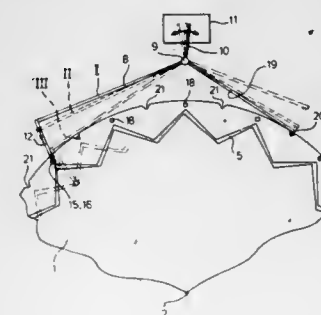
3 Claims



**4,793,199**  
**ELECTROMAGNETIC PRECISION ROTARY DRIVE**  
Dieter Sodelkat, Baierbrunn, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany  
Filed Dec. 15, 1986, Ser. No. 941,397  
Claims priority, application Fed. Rep. of Germany, Dec. 19, 1985, 3544930

Int. Cl.<sup>4</sup> F16H 27/02  
U.S. Cl. 74—141.5

6 Claims



1. An electromagnetic precision rotary drive, in particular a step drive, for a rotor, comprising:
  - armature means comprising a closed armature band disposed in an outer flat annular zone of the rotor, having a pattern periodical in a direction of rotation of the rotor which descends within each period from a radially outer edge of the annular zone toward a radially inner edge and thence ascends again towards an outer edge;
  - magnet support means for at least one permanent magnet which forms part of a C-shaped magnet circle surrounding the edge of the rotor having an air gap for receiving the armature band, which support means is arranged at one end of driving arm means which is pivotable about a shaft by drive lever means, said driving arms means also being connected to a stopping arm means, which stopping arm means pivots about the same shaft as said support means and has at a free end thereof a mechanical stopping means for engaging the rotor;
  - said rotor being provided with notches on its circumference which engage with the mechanical stopping means at the end of the stopping arm means; and
  - drive means for providing reciprocating movement to the magnet support means in a substantially radial direction with respect to the rotor with at least an amplitude corresponding to the width of the armature band.

1. In a vehicle manual transmission supported within a housing and shiftable into a plurality of forward drive modes and a reverse drive mode, said transmission housing having a transversely extending midship plate mounted therein, an output shaft journally supported in a midship plate first opening for rotation about its principal axis, a countershaft journally supported in a midship plate second opening for rotation about its principal axis, a reverse gear train arrangement including a reverse drive gear journally supported on said output shaft and adapted for rotation therewith about said output shaft principal axis, a countershaft reverse gear fixedly supported on said countershaft for rotation therewith about said countershaft principal axis, said midship plate including an idler shaft mounting flange portion positioned parallel to and axially spaced from said midship plate, a reverse idler gear shaft having its ends supported in first and second longitudinally aligned axially spaced bores in said midship plate and flange portion respectively, a reverse idler gear journally supported on said idler shaft intermediate said first and second aligned bores having its teeth in constant mesh with the teeth of both said output shaft reverse gear and said countershaft reverse gear, said idler shaft reverse gear adapted for rotation about the principal axis of said idler shaft, the improvement comprising:
  - said idler shaft having said first end resiliently supported in said first bore by a first elastomeric O-ring and said second end resiliently supported in said second bore by a second O-ring;
  - said first and second O-rings of a size relative to their associated bores such that with said transmission being shifted into any of said forward drive modes said reverse idler shaft principal axis is centered in said aligned bores so as to be located a first predetermined distance from each said output shaft and said countershaft principal axes, whereby the teeth of said reverse idler gear are resiliently biased into preloaded face contact with the teeth of both the output shaft reverse drive gear and the countershaft reverse gear during said forward drive modes wherein no drive torque is transmitted between said three meshed reverse gears, thereby obviating backlash gear rattle and idler shaft audible vibration noise transmission to the housing via said midship plate;
  - and whereby upon driving torque being transmitted between said three gears during said reverse driving mode the resulting gear separation forces being sufficient to compress said O-rings whereby the principal axis of said reverse idler gear shaft principal axis is positioned a predetermined distance off-center relative to said first and second bores and away from both principal axes of said output shaft and said countershaft such that said reverse idler gear teeth are positioned in a normal designed reverse



drive torque transmitting manner with said output shaft reverse drive gear teeth and said countershaft reverse gear teeth thereby obviating excessive wear of said reverse gear teeth during reverse drive torque transfer therebetween.

4,793,201

## POROUS STATIC PRESSURE GUIDE

Munenori Kanai; Sunao Ishihara, and Hiroo Kinoshita, all of Tokyo, Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

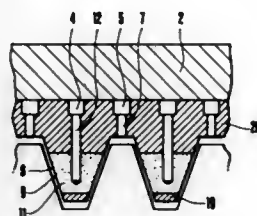
Filed Sep. 9, 1987, Ser. No. 95,038

Claims priority, application Japan, Jun. 29, 1987, 62-159737; Aug. 21, 1987, 62-206567

Int. Cl.<sup>4</sup> F16H 25/24; F16C 32/06

U.S. Cl. 74—424.8 R

32 Claims



1. A porous static pressure guide comprising a porous body of a ceramic material formed on a solid base member, wherein a guide hole is formed to extend through said solid base member and guided inside said porous body to supply a fluid to an interior of said porous body, thereby separating said porous body from an opposite object.

4,793,202

## VEHICULAR TRANSMISSION SHIFT MECHANISM

Kiyokazu Okubo, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

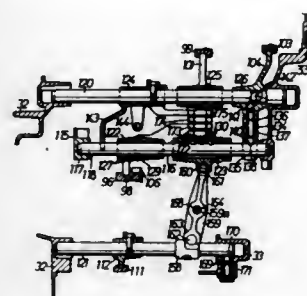
Filed Oct. 8, 1985, Ser. No. 785,468

Claims priority, application Japan, Oct. 9, 1984, 59-211903; Oct. 9, 1984, 59-211904; Oct. 9, 1984, 59-211908

Int. Cl.<sup>4</sup> G05G 5/10

U.S. Cl. 74—477

12 Claims



11. A vehicular transmission having a main speed change mechanism and a sub speed change mechanism both housed within a transmission case, said main speed change mechanism having gear trains in plural shifting stages provided between input and output shafts and capable of being established selectively and also having a plurality of synchronizing mechanisms operable by shift forks to establish said gear trains selectively, said sub speed change mechanism having a reduction gear train for obtaining a still lower speed than the lowest shifting stage in said main speed change mechanism and also having a sub speed gear shifting synchronizing mechanism operable by a sub speed gear shift fork to establish said reduction gear train, said

sub speed change mechanism being disposed in parallel with said main speed change mechanism, said sub speed gear shift fork having means connected to one end of a lever pivotably supported at an intermediate part thereof by a pivot pin, said pivot pin being mounted on the transmission case from the outside thereof.

4,793,203

## ROBOT ARM

Roland Staggl, Wetter; Manfred Stüber, Witten, and Hartwig Sprung, Wetter, all of Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Düsseldorf, Fed. Rep. of Germany

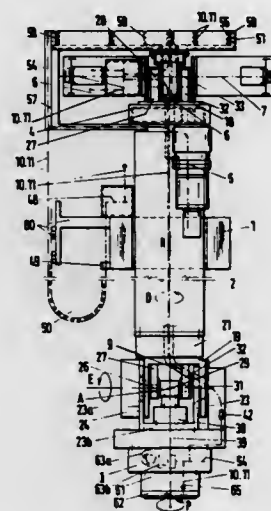
Filed Sep. 9, 1987, Ser. No. 94,825

Claims priority, application Fed. Rep. of Germany, Sep. 9, 1986, 3631024

Int. Cl.<sup>4</sup> B25J 17/02, 18/00

U.S. Cl. 74—479

28 Claims



1. A robot arm for positioning equipment including a tool, a work piece, a work piece gripper, a gripper change system or the like, said robot arm comprising:  
a column having a central axis and a first end, a second end and an intermediate region therebetween;  
means for supporting said column;  
a support element mounted for rotation within said column; said support element including a first end and a second end respectively corresponding to said first end and said second end of said column;  
means for selectively rotating said support element about said central axis relative to said column;  
said means for selectively rotating being located at said first end of said support element and at said first end of said column;  
pivot means having a first end and a second end;  
means for pivotally connecting said second end of said pivot means to said second end of said support element for relative rotation therebetween about a pivot axis which is perpendicular to said central axis;  
said pivot axis extending through said central axis at a common point;  
a connector for supporting the equipment;  
said connector being rotatably mounted at said first end of said pivot means for rotation about a connector axis;  
said connector axis being perpendicular to said pivot axis;  
said connector axis extending through said pivot axis at said common point;  
pivot drive means including: a pivot motor rigidly mounted to said first end of said support element, a first gear wheel supported by said second end of said support element at

said pivot axis for rotation of said pivot means about said pivot axis, and first tooth belt drive means extending between said pivot motor and said first gear wheel; and connector drive means including: a connector drive motor rigidly mounted to said first end of said support element, a second gear wheel supported by said pivot means at said pivot axis for rotation of said connector about said connector axis, and second tooth belt drive means extending between said connector drive motor and said second gear wheel.

4,793,204

## TILT AND TELESCOPE STEERING COLUMN HAVING A SINGLE CONTROL

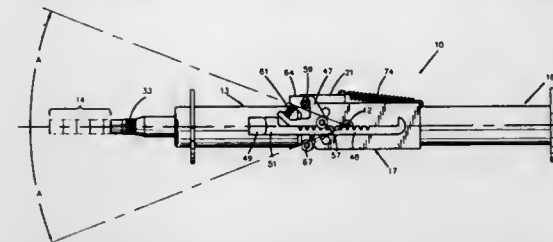
Duane T. Kbasiak, Bronson, Mich., assignor to Douglas Components Corporation, Bronson, Mich.

Filed Nov. 25, 1987, Ser. No. 125,565

Int. Cl.<sup>4</sup> B62D 1/18

U.S. Cl. 74—493

15 Claims



1. An elongated adjustable steering column comprising first and second housing assemblies pivoted together for tilt adjustment, a third housing assembly mounted on said second housing assembly for telescoping movement relative thereto, a telescope lock pawl and a tilt lock pawl both pivoted on said second housing member for oscillating movement between a locked position in which they lock the housings against adjustment and a release position respectively permitting telescoping adjustment and tilt adjustment, a control member movable in two directions from a neutral position, movement of said control member from said neutral position in one direction causing engagement and movement of the telescope lock pawl to its release position and in the other direction causing engagement and movement of said tilt lock pawl to its release position, and spring means normally maintaining said pawls in their locked positions.

4,793,205

## SELF-ADJUSTING MECHANICAL CABLE-CONTROL APPARATUS

Charles Guidicelli, Noyen, France, assignor to Acco Cable Controls Ltd., Worcestershire, England

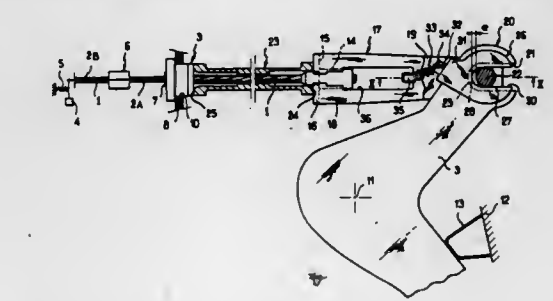
Filed Feb. 25, 1987, Ser. No. 18,537

Claims priority, application France, Feb. 26, 1986, 86 02650

Int. Cl.<sup>4</sup> F16C 1/10

U.S. Cl. 74—501.5 R

10 Claims



1. Self-adjusting mechanical cable-control apparatus includ-

ing a length of cable sliding inside a cable sheath and arranged to have a first end connected through connecting means to an actuating pedal and a second end arranged to be connected to a member to be actuated provided with a resiliently biased return means, the cable sheath having a first end anchored in a wall fixed relative to the cable adjacent the pedal, with the connecting means including a transverse member extending through a U-shaped aperture in the pedal, and positioned intermediate the connecting means and the wall, a spacer member so dimensioned that with the connecting means bearing against the spacer member, and the pedal bearing against a pedal stop, the transverse member is disengaged from a bearing surface of the U-shaped aperture of the pedal.

4,793,206

## AUTOMATIC TENSION REGULATING DEVICE FOR REMOTE CONTROL WIRE

Kazuhiro Suzuki, Nishinomiya, Japan, assignor to Nippon Cable System, Inc., Hyogo, Japan

Continuation of Ser. No. 918,193, Oct. 14, 1986, abandoned.

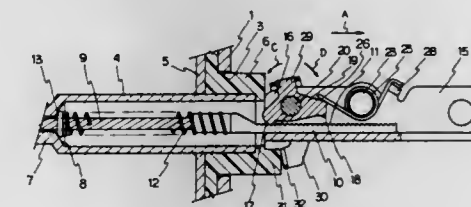
This application Feb. 29, 1988, Ser. No. 165,368

Claims priority, application Japan, Mar. 7, 1986, 61-51097

Int. Cl.<sup>4</sup> F16C 1/10

U.S. Cl. 74—501.5 R

5 Claims



1. An automatic tension regulating device for placement between a control wire and a wire-operating means for operating said control wire, said automatic tension regulating device comprising:

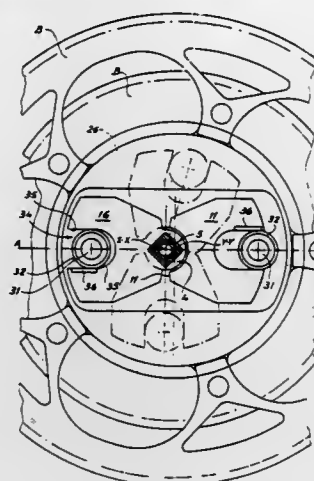
a first link means connected to an end of said control wire, said first link means extending in a wire-operating means direction, said first link means having an upper surface and a series of ratchet teeth on said upper surface;  
a second link means for providing linear movement of the first link means in the wire-operating means direction, a first end of said second link means being connected to said first link means, a second end of said second link means being connected to said wire-operating means;  
a locking means for sequentially releasably connecting—disconnecting—reconnecting said first and second link means with each other when said wire-operating means is moving adjacent a return point, said locking means comprising:  
a pin attached to said second link means,  
an escapement member rotatively supported by said pin, said escapement member extending along said upper surface of said first link means and being provided on said second link means, said escapement member having opposite ends and a claw at each end for alternately engaging with said ratchet teeth, said escapement member having an upward projecting pin,  
an engagement spring resiliently urging said escapement member to rotate in a first direction such that one of said two claws engages said ratchet teeth, and  
an arm member rotatably mounted on said pin and fixed to said upward projecting pin of said escapement member, wherein when said wire-operating means is operated, said second link means moves in the wire-operating means direction causing said arm member to rotate, said rotation of said arm member causes said escapement member to disengage from said ratchet teeth during the

course of rotation, such that linear movement of said first and second link means is possible relative to each other causing said control wire to move in either of a wire-shortening direction and a wire-lengthening direction, movement in said wire-shortening direction causing said first link to move in a direction opposite the wire-operating means direction and movement in said wire-lengthening direction causing said first link means to move in the wire-operating means direction; and an adjusting spring for resiliently urging said first link means in a wire-operating means direction at least during a period when said locking means releases connection between said first and second link means.

4,793,208  
CRANK-GEAR FOR BICYCLE OR SIMILAR LOCOMOTION VEHICLE  
Jean-Pierre Bregnard, La Chaux-de-Fonds, Switzerland; Michel Bezin, Nevers, and Yves Boisot, Varennes Vauzelles, both of France, assignors to Société Look, Nevers Cédex, France  
PCT No. PCT/FR86/00080, § 371 Date Jan. 7, 1987, § 102(e)  
Date Jan. 7, 1987, PCT Pub. No. WO86/05459, PCT Pub. Date Sep. 25, 1986

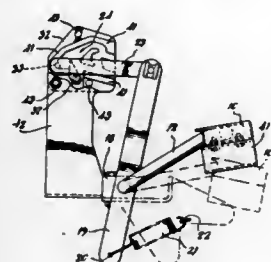
PCT Filed Mar. 12, 1986, Ser. No. 934,632  
Claims priority, application Switzerland, Mar. 13, 1985, 01121/85

Int. Cl.<sup>4</sup> G05G 1/14  
U.S. Cl. 74—594.2 12 Claims



4,793,207  
PEDAL ACTUATORS  
John L. Old, Kenilworth, England, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles  
Filed May 29, 1987, Ser. No. 55,268  
Int. Cl.<sup>4</sup> G05G 5/06

U.S. Cl. 74—532 4 Claims



1. A pedal actuator comprising a pedal movable by the application of foot pressure between raised and depressed positions, an operating means connected with the pedal and operable to actuate a device as the pedal is moved between its raised and depressed positions, bias means operative to bias the pedal towards its raised position, and a holding device for maintaining the pedal in its depressed position, the holding device comprising a cam follower connected with the operating means for co-movement therewith, cam means for co-operation with the follower and comprising a first cam path along which the follower is moved as the pedal is moved from its raised to its depressed position, a holding position in which the cam follower is held by the bias means to hold the pedal in its depressed position, a second cam path along which the follower moves under the action of the bias means as the pedal rises from its depressed position to its raised position, and a pivotable bridging member which is movable by the follower to bridge a gap in the first cam path when the pedal is depressed from its raised position and which is movable by the follower on its way back along the second cam path to allow the follower to return via the gap to its position corresponding to the raised position of the pedal.

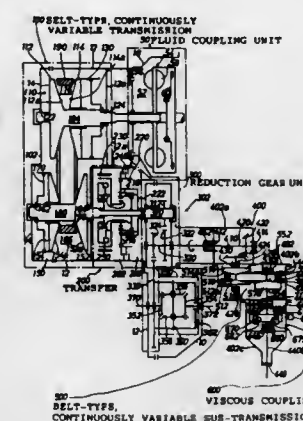
1. A crank-gear for a bicycle comprising two cranks for bearing pedals and which are rotatively mounted about a first axis in a crank-gear case fixed to the bicycle frame, at least one sprocket plate having teeth to actuate a chain and rotatively mounted in said gear case about a second axis parallel to the first axis, but offset relative to the latter by means of a decentering ring fixed on the crank-gear case and exhibiting an external cylindrical surface centered on the second axis, and transmission means comprising two guides, each of which is rigidly fixed to a corresponding one of said cranks and radially disposed relative to the first axis, and a roller for each crank arranged to be displaced relative to the corresponding guide while being supported thereon in a circumferential direction so as to transmit a pedalling force, said rollers corresponding to the cranks being fixed to said sprocket plate so as to describe in the course of crank rotation an oscillating orbital movement, said cranks being mounted to rotate in said crank-gear case relative to one another about said first axis and said guides being arranged in a common plane parallel to the plane of the sprocket plate.

12. A crank-gear for a bicycle comprising two cranks for bearing pedals and which are rotatively mounted about a first axis in a crank-gear case fixed to the bicycle frame, at least one sprocket plate having teeth to actuate a chain and rotatively mounted in said gear case about a second axis parallel to the first axis, but offset relative to the latter by means of a decentering ring fixed on the crank-gear case and exhibiting an external cylinder surface centered on the second axis, and transmission means comprising two guides, each of which is rigidly fixed to a corresponding one of said cranks and radially disposed relative to the first axis, and a roller for each crank arranged to be displaced relative to the corresponding guide while being supported thereon in a circumferential direction so as to transmit a pedalling force, said rollers corresponding to the cranks being respectively engaged in said guides and fixed to said sprocket plate so as to describe in the course of crank rotation an oscillating orbital movement, said cranks being mounted to

rotate in said crank-gear case relative to one another about said first axis and respectively fixed to two coaxial shafts mounted so as to rotate relative to one another, said guides being respectively fixed to one of the common extremities of said shafts and arranged in a common plane parallel to the plane of the sprocket plate, and said guides being formed by plates in the form of a fork respectively fixed to said shafts and radially extending in said common plane in diametrically opposed senses.

4,793,209  
FOUR-WHEEL-DRIVING SYSTEM HAVING A CONTINUOUSLY VARIABLE SUB-TRANSMISSION  
Kenio Morisawa, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan  
Filed Apr. 14, 1987, Ser. No. 38,326  
Claims priority, application Japan, Apr. 25, 1986, 61-97490  
Int. Cl.<sup>4</sup> F16H 37/10

U.S. Cl. 74—665 GE 9 Claims



1. A four-wheel-driving system having two driving axes which transmit driving torque provided from a continuously variable main transmission respectively to front and rear wheels, comprising:  
a continuously variable sub-transmission coupled to one of said two axes;  
a viscous coupling coupled to one of said two axes, said viscous coupling transmitting torque in accordance with a rotational speed difference between an input and an output of the viscous coupling; and  
control means for variably controlling the ratio of said driving torque distributed between said front and rear wheels by controlling a change gear ratio of said continuously variable sub-transmission and for increasing a continuously variable main transmission ratio while decreasing said continuously variable sub-transmission ratio.

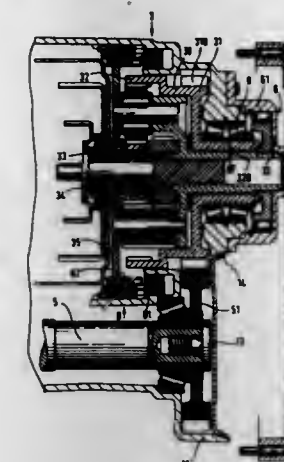
4,793,210  
COMPACT CONSTRUCTION FOR TRANSVERSELY MOUNTED TRANSMISSION  
Manfred Buckach, Friedrichshafen, Fed. Rep. of Germany, assignor to Zahnradfabrik Friedrichshafen, AG., Friedrichshafen, Fed. Rep. of Germany  
PCT No. PCT/EP86/00431, § 371 Date Apr. 2, 1987, § 102(e)  
Date Apr. 2, 1987, PCT Pub. No. WO87/00901, PCT Pub. Date Feb. 12, 1987

PCT Filed Jul. 23, 1986, Ser. No. 44,031  
Claims priority, application PCT Int'l Appl., Aug. 1985, PCT/EP85/00397

Int. Cl.<sup>4</sup> F16H 37/08  
U.S. Cl. 74—695 4 Claims

1. A variable speed gear transmission for a motor vehicle having a prime mover located transversely of the direction of travel, said transmission being in a housing (11) and coaxially

flanged for automatic speed change and having a hydrodynamic unit (2) including controls for said transmission comprising shift couplings (A, B, E) and shift brakes (C, C1, D) and free wheel units (F, G) including planetary gearing (3) comprising a ring gear (32), an output gear 31 and a planet carrier (35); including an output drive shaft (5) parallel to the axis of the planetary gearing, and on output drive gear (51) thereon meshing with said output gear (31);  
the improvement comprising a reduced size planetary coupling gearing (3); an output element (30) integrally comprising the ring gear (32) of said planetary gearing and



having teeth closely adjacent to the output gear (31) and to the teeth (310) thereof and having a hollow hub (30') extending forwardly in said housing (11); said housing at the front thereof having a bearing (6) and said hub being journaled therein;  
a shaft (320) rotative with said planet carrier and extending through the bearing (6) and the hub (30') of said output element (30) and connecting to one free wheel unit (G) at the front of the housing (11), whereby a compact arrangement of components is effected for a transversely located transmission.

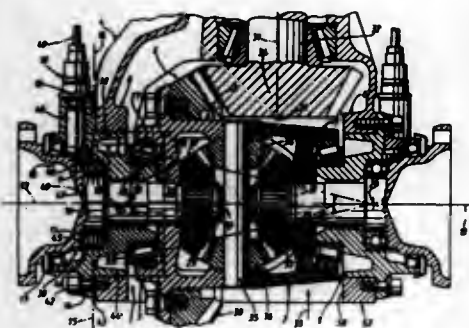
4,793,211  
VEHICLE DIFFERENTIAL AXLE BEARING ARRANGEMENT  
Johannes Schmidt, Esslingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany  
Filed Dec. 3, 1987, Ser. No. 128,181  
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1986, 3642875

Int. Cl.<sup>4</sup> F16H 1/40  
U.S. Cl. 74—713 13 Claims

1. Bearing arrangement of a differential casing of a differential transmission in an axle transmission light-metal casing of a motor vehicle, in which a bearing intermediate sleeve, also in light metal, is inserted so that it cannot move in a bearing eye formed integrally with the axle transmission casing, in which an axle journal of the differential casing is supported by a conical roller bearing, in turn supported on the bearing intermediate sleeve and in which a driven shaft has sliding bearing support by means of a shaft section in a corresponding shaft passage of the differential casing, wherein the inner race of the conical roller bearing is seated on the bearing intermediate sleeve and the driven shaft is additionally supported in the



bearing intermediate sleeve by a rolling contact bearing located offset relative to the conical roller bearing in the direc-



tion of the bearing axis pointing away from the differential casing.

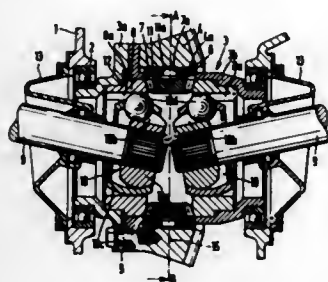
#### 4,793,212 DIFFERENTIAL GEAR ASSEMBLY FOR MOTOR VEHICLES

Hans-Heinrich Welschhof, Rodenbach, and Rudolf Beier, Offenbach am Main, both of Fed. Rep. of Germany, assignors to Lohr & Bromkamp GmbH, Offenbach am Main  
Continuation of Ser. No. 757,689, Jul. 22, 1985, Pat. No. 4,723,464. This application Aug. 14, 1987, Ser. No. 85,456  
Claims priority, application Fed. Rep. of Germany, Jul. 26, 1984, 3427577

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

U.S. Cl. 74—713 Int. Cl.<sup>4</sup> F16H 1/40

5 Claims



1. A differential gear assembly for motor vehicles having integral universal joints comprising:

- a rotatably supported differential housing;
- a driving gear attached to said differential housing;
- at least two rotatably supported differential bevel gears;
- a pair of output bevel gears which engage said differential bevel gears;
- a pair of constant velocity universal joints each including an inner joint member and an outer joint member, with each of said pair of output bevel gears being arranged to form, respectively, the outer joint member of one of said universal joints whereby one each of said outer members and said output bevel gears are formed as a single integral member;
- a pair of driven shafts each connected to one of said inner joint members so as to be rotated, respectively, through one of said universal joints; and
- mounting means rotatably mounting said differential bevel gears on said driving gear, said mounting means including recess means formed on a radially inner side of said driving gear and pin means on said differential bevel gears extending to within said recess means for rotatably mounting said differential bevel gears only on said driving gear

at a position generally axially aligned therewith so that said differential bevel gears are mounted for rotation only on radial outer sides thereof to said driving gear; said differential housing defining a space for operatively receiving said differential bevel gears and said universal joints therein, with said universal joints being immediately adjacent each other axially of said differential gear assembly and free of any structure between said adjacent universal joints, said differential bevel gears being on opposite radial sides of said adjacent universal joints.

#### 4,793,213 COMPACT TRANSMISSION APPARATUS FOR A VEHICLE

Sadanori Nishimura, Omiya, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

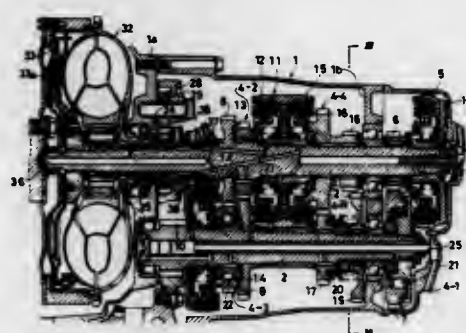
Filed May 13, 1982, Ser. No. 377,907

Claims priority, application Japan, May 14, 1981, 56-71380

Int. Cl.<sup>4</sup> F16H 47/06

U.S. Cl. 74—730

3 Claims



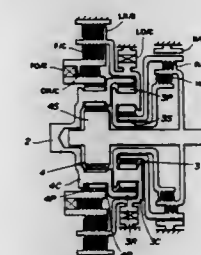
1. A transmission apparatus comprising:
  - a casing having a front end defined by a front wall, a rear end defined by a rear wall and a middle wall dividing an interior of the casing into a forward portion and a rearward portion;
  - an input shaft extending longitudinally through the casing from said front wall towards said rear wall;
  - an output shaft extending longitudinally from said front wall towards said rear wall in parallel with said input shaft, both said input shaft and said output shaft being rotatably supported on said front wall and said middle wall;
  - a first-speed driving train for a low speed provided on said input and output shafts in said rearward portion of said casing between said middle wall and said rear wall;
  - a second-speed driving train for a middle speed provided on said input and output shafts in said forward portion of said casing and including a second-speed clutch on said input shaft;
  - a third speed driving train for a high speed provided on said input and output shafts in said forward portion forwardly of and adjacent to said second-speed driving train;
  - a fourth-speed driving train for a highest speed provided on said input and output shafts in said forward portion rearwardly of and adjacent to said second-speed driving train, said fourth-speed driving train including a fourth-speed clutch on said input shaft, a fourth-speed driving gear on said input shaft coupled to said fourth-speed clutch, and a fourth-speed driven gear rotatably supported on said output shaft and meshed with said fourth-speed driving gear, said fourth-speed clutch being a rearward clutch mechanism of a double-type clutch and said second-speed clutch being a forward clutch mechanism of said double-type clutch;
  - a reverse driving train for a reverse speed provided on said input and output shafts in said forward portion between

said fourth-speed driving train and said middle wall, said reverse driving train including a reverse driving gear on said input shaft integrally connected to said fourth-speed driving gear on an output side of said fourth-speed clutch, an idler gear meshed with said reverse driving gear and a reverse driven gear rotatably supported on said output shaft adjacent said fourth-speed driven gear, said reverse driven gear being meshed with said idler gear; and selection means fixed to said output shaft between said fourth-speed driven gear and said reverse driven gear for selectively coupling one at a time of said fourth-speed driven gear and said reverse driven gear to said output shaft.

4,793,215  
TRANSMISSION  
Kazuhiko Sugano, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan  
Filed Jul. 14, 1986, Ser. No. 885,136  
Claims priority, application Japan, Aug. 6, 1985, 60-171866  
Int. Cl.<sup>4</sup> F16H 57/10

U.S. Cl. 74—758

4 Claims

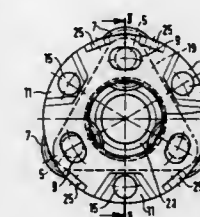


4,793,214  
PLANET WHEEL CARRIER  
Günter Nürberger, Schweinfurt, and Günter Look, Bergheimfeld, both of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany  
Filed Nov. 14, 1986, Ser. No. 931,547  
Claims priority, application Fed. Rep. of Germany, Nov. 14, 1985, 3540343

Int. Cl.<sup>4</sup> B62M 11/14

U.S. Cl. 74—750 R

8 Claims



1. Planetary wheel carrier for a planetary gear, comprising:
  - (a) two annular discs (1, 101) of substantially the same shape and stamped from sheet metal material and each having an axis and a first surface and a second surface extending transversely of the axis, said discs are arranged coaxially in mirror-image fashion with said first surfaces directed toward one another and with said second surfaces directed outwardly away from one another, each said annular disc has a plurality of axially projecting cylindrical bearing journals (5, 105) formed therefrom on the first surface thereof and angularly spaced apart in the circumferential direction and bridge dogs (11, 111) projecting in the axial direction from the first surface, stamped depressions (9, 109, 133) located in the second surface opposite to the bearing journals and the bridge dogs, and in the mirror-image arrangement of the annular discs (1, 101) the bearing journals (5, 105) are aligned in pairs and the bridge dogs (11, 111) are axially in contact with each other and determine the axial spacing between the annular discs (1, 101);
  - (b) a plurality of planetary gear wheels (7, 107) arranged axially between the annular discs (1, 101) with each said planetary gear wheel rotatably supported on one of the bearing journal pairs (5, 105);
  - (c) attachment means (15, 115) for fixedly connecting the annular discs (1, 101) through the bridging dogs (11, 111), and
  - (d) coupling elements (17, 117) formed on the annular discs (1, 101) serving for a torque-transmitting connection for the planetary wheel carrier.

1. A transmission comprising:
  - an input shaft;
  - an output shaft;
  - a first planetary gear set including a first sun gear selectively connectable by a first clutch to said input shaft, a first carrier selectively connectable by a second clutch to said input shaft, and a first ring gear connected to said output shaft, said first sun gear being selectively held stationary by a first brake, said first carrier being allowed to rotate in the same forward direction as said input shaft when said second clutch is engaged, but prevented from rotating in a reverse direction opposite to said forward direction by a first one-way clutch, said first carrier being selectively held stationary by a second brake;
  - a second planetary gear set including a second sun gear connected to said input shaft, a second carrier connected to said first ring gear and also to said output shaft, and a second ring gear;
  - means for drivingly connecting said first carrier to said second ring gear in such a manner as to allow overrunning of said second ring gear relative to said first carrier, said drivingly connecting means includes a third clutch and a second one-way clutch which is connected in series with said third clutch, said second one-way clutch being arranged to allow transmission of forward rotation from said first carrier to said second ring gear and to allow overrunning of said second ring gear relative to said first carrier when said third clutch is engaged.

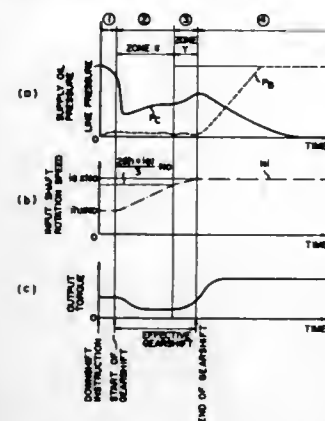
4,793,216  
CONTROL APPARATUS FOR AUTOMATIC TRANSMISSION GEAR SYSTEM FOR VEHICLE  
Takeo Hiramatsu, Yuichi Tanaka, and Hisaji Nakamura, all of Kyoto, Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed May 5, 1987, Ser. No. 46,987  
Claims priority, application Japan, May 8, 1986, 61-105137  
Int. Cl.<sup>4</sup> B60K 41/18

U.S. Cl. 74—866

5 Claims

1. A control apparatus for an automatic transmission gear system for vehicle, comprising:
  - an input shaft to which a driving force of an engine is transmitted;
  - selectively engageable first and second engaging elements;
  - a control device having;
  - engaging element switching means for engaging said first engaging element and for disengaging said second engaging element so as to achieve gearshift from a relatively high speed ratio to a relatively low speed ratio;
  - controlling means for controlling engaging forces of said first and second engaging elements during the gearshift;

instructing means for generating an instruction signal for starting the gearshift;  
input shaft rotation speed detecting means for detecting rotation speed of said input shaft; and  
changing rate detecting means for detecting changing rate of the rotation speed of said input shaft,  
wherein said control device, during the gearshift, when said engine is accelerating from the gearshift ratio of the relatively low speed ratio, moves said first engaging element to a position immediately before an engaging position or

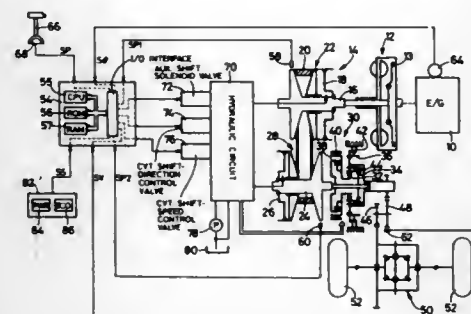


to an initial engaging position, controls the engaging force of said second engaging element such that the rotation speed of said input shaft changes with a first changing rate until said transmission gear system reaches a predetermined operation state and the rotation speed of said input shaft changes with a second changing rate smaller than said first changing rate after said transmission has reached said predetermined operation position, and increases the engaging force of said first engaging element when the rotation speed of said input shaft corresponds to the rotation speed of the relatively low speed ratio.

**4,793,217**  
**METHOD AND APPARATUS FOR CONTROLLING POWER TRANSMITTING SYSTEM FOR AUTOMOTIVE VEHICLE, INCLUDING CONTINUOUSLY VARIABLE TRANSMISSION AND AUXILIARY TRANSMISSION**  
Kunio Morinawa, Michitaka Kakama, and Nobuyuki Kato, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Sep. 15, 1986, Ser. No. 907,106  
Claims priority, application Japan, Sep. 17, 1985, 60-205067; Dec. 11, 1985, 60-278533; Dec. 11, 1985, 60-278534  
Int. Cl. B60K 41/12

U.S. Cl. 74-866



1. A method of controlling a power transmitting system for an automotive vehicle, including a continuously variable trans-

mission having an input shaft operatively connected to an engine of the vehicle, and further including an auxiliary transmission which is connected to the continuously variable transmission and which is automatically shifted from one of at least two forward drive positions thereof to the other depending upon operating conditions of the vehicle, comprising the steps of:

preparing a plurality of relationships of at least two variables which include a target speed of said input shaft of said continuously variable transmission, and a currently required output of the engine, said plurality of relationships corresponding to said at least two forward drive positions of said auxiliary transmission, and being determined so that when said auxiliary transmission is shifted down from one of said at least two forward drive positions to another of said at least two forward drive positions an actual speed of said engine does not exceed a predetermined maximum permissible speed after the auxiliary transmission is placed in said another of said at least two forward drive positions; detecting currently selected one of said at least two forward drive positions of said auxiliary transmission; selecting one of said plurality of relationships which corresponds to the detected currently selected forward drive position of said auxiliary transmission; determining the target speed of said input shaft of said continuously variable transmission, according to the selected one of said plurality of relationships; and controlling a speed ratio of said continuously variable transmission so that an actual speed of said input shaft coincides with the determined target speed.

**4,793,218**  
**METHOD OF FORMING KNIFE BLADES BY PHOTO-CHEMICAL ETCHING**  
George Jordan, 2620 Temple Heights Dr., Oceanside, Calif. 92056, and Dimitri G. Mondiadis, 28 Sylvan St., Melrose, Mass. 02176

Filed Oct. 9, 1987, Ser. No. 106,383

Int. Cl. B21D 35/00

U.S. Cl. 76-101 R

9 Claims



1. A method of forming knife blades from a flat section of pre-hardened metal such that each blade has a predetermined shape, comprising the steps of:  
photo-chemically etching a plurality of blanks from said flat section of pre-hardened metal so that each said blank has a respective predetermined shape; and  
sharpening at least one edge of each blank by grinding said at least one edge.

**4,793,219**  
**METHOD OF MANUFACTURING NON-SLIP THREAD ROLLING DIES**  
Edmund T. Wozniak, Cleveland, Ohio, assignor to Colt Industries Operating Corporation, W. Hartford, Conn.  
Division of Ser. No. 865,756, May 22, 1986, Pat. No. 4,716,751.  
This application Oct. 26, 1987, Ser. No. 112,524

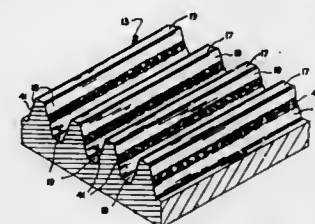
Int. Cl. B21K 5/20

U.S. Cl. 76-107 R

8 Claims

1. A method of producing thread rolling dies comprising forming metal bodies with working faces extending from a

start end to a finish end, producing thread forming grooves in said working faces extending between said start end and said finish end, providing said grooves with crests, flanks, and roots, and removing portions of metal from said flanks to



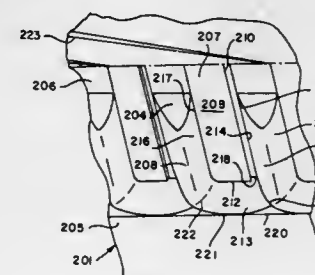
provide a roughened band of surface irregularities along each flank having a width at least along a portion of said band less than the width of its associated flank while leaving a surface of said flank adjacent to at least said portion of said band substantially smooth.

**4,793,220**  
**METHOD OF MAKING A DRILL-SHAPED CUTTING TOOL AND THREAD ROLLING DIES**  
Fukuzo Yamamoto, Yoshiaki Aoya, and Hisayoshi Yamamoto, all of Kawachinagano, Japan, assignors to Kabushiki Kaisha Yamamoto, Osaka, Japan  
PCT No. PCT/JP85/00610, § 371 Date Jun. 3, 1986, § 102(c)  
Date Jun. 3, 1986, PCT Pub. No. WO86/02867, PCT Pub. Date May 22, 1986

PCT Filed Nov. 2, 1985, Ser. No. 874,180  
Claims priority, application Japan, Nov. 5, 1984, 59-234000  
Int. Cl. B21K 5/20

U.S. Cl. 76-108 R

7 Claims



1. A method of making a drill-shaped cutting tool which comprises:  
making an electrode for electric discharge machining, said electrode having an end part which is to be treated;  
electrically discharging and rotating said electrode while moving said electrode parallel to a thread rolling die whereby uneven parts are formed on said end part by the thread rolling die; and  
rolling said end part by said thread rolling die to form a drill-shaped part of said drill-shaped cutting tool.

**4,793,221**  
**WIRE STRIPPER**  
Sergio Leandris, Fenouillet, and Jose Moly, Gratentour, both of France, assignors to Precision Mecanique Labinal, Bois D'Arcy, France  
Filed Mar. 30, 1987, Ser. No. 31,840

Int. Cl. H02G 1/12

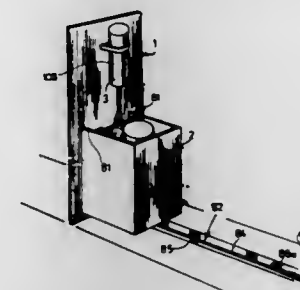
U.S. Cl. 81-9.51

20 Claims

1. An apparatus for stripping a wire conductor formed by a central conducting core housed in an insulating sleeve comprising:

(a) a clamping device including clamping jaws for holding

the wire conductor to be stripped under a constant pressure regardless of the cross-section of the wire conductor;  
(b) means for actuating the closure of said clamping jaws to hold said conductor operably connected to said clamping device;  
(c) cutting nippers mounted on a plate adapted to tilt about an axis substantially perpendicular to a longitudinal axis of said wire conductor to be stripped, said cutting nippers being also directly coupled to the clamping device in such a way that said blades approach one another to a distance corresponding to the distance between said clamping jaws



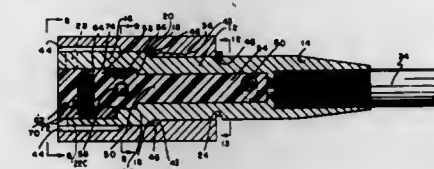
of said clamping device for effecting a cut in said sleeve without cutting into said core of said wire conductor spaced a predetermined distance from and operably coupled to said clamping device;  
(d) means for closing said blades when the clamping jaws are closed operably connected to the cutting nipper; and  
(e) means for displacing said clamping device and said cutting nippers with respect to each other in the direction of the longitudinal axis of said conductor so as to displace said sleeve starting at the cut so as to obtain a stripped part operably connected to said clamping device and said cutting nippers.

**4,793,222**  
**RATCHETING TOOL DRIVER AND METHOD OF ASSEMBLING A RATCHETING TOOL DRIVER**  
Anthony F. Bengeladyk, Wichita, Kans., assignor to Conchemco, Inc., Wichita, Kans.  
Continuation of Ser. No. 907,807, Sep. 16, 1986, Pat. No. 4,735,120, which is a continuation-in-part of Ser. No. 709,767, Mar. 8, 1985, abandoned. This application Jan. 28, 1988, Ser. No. 149,486

Int. Cl. B25B 13/46

U.S. Cl. 81-63.1

19 Claims



1. A method of assembling a ratcheting tool driver comprising the steps of:  
(a) forming a generally conduit head means with a head recess and a head opening and with an open first end and with an open second end that includes an external head flange, an internal head flange, a head slot which is open on its sides, a loading hole and a pair of detent holes;  
(b) sliding through said open second end a switch rod means having a first cylindrical rod hole, a second cylindrical rod hole, a channeled side with a rod recess therein, until said second cylindrical rod hole collimates with said loading hole;



- (c) slipping through said loading hole a rod retention spring bias means with a pair of ball means on opposed sides thereof until said rod retention spring bias means and the pair of opposed positioned ball means are seated into said second cylindrical rod hole;
- (d) sliding further said switch rod means until said pair of ball means are biased by said rod retention spring bias means against the internal wall of said open second end of said conduit head means;
- (e) seating a pawl spring bias means in a pawl recess of a pawl means and in the rod recess of said channeled side of said switch rod means;
- (f) pressing said pawl means toward the channeled side in order to compress said pawl spring bias means simultaneously while continuing to slide said switch rod means through said open second end until said second cylindrical rod hole collimates with said head opening, and said pair of ball means biased by said rod retention spring bias means circumferentially registers with said pair of detent holes until said pawl means slidably lodges within said head slot;
- (g) flushing circumferentially a washer means against said external head flange;
- (h) positioning rotatably a hollow cylindrical retainer means with a plurality of inwardly facing ratchet teeth and an internal retainer flange around the open second end of said generally conduit head means from the beginning of said open second end to the head recess and such that said washer means is rotatably sandwiched by said external head flange and said internal retainer flange;
- (i) providing friction to said washer means of step (h) in conjunction with maintaining said retainer means around said open second end by positioning a snap ring means in said head recess; and
- (j) seating a switch button means in said second cylindrical rod hole and extending through said head opening of said head means in order to rotate the switch rod means about its central axis within said head means in a predetermined direction.

4,793,223

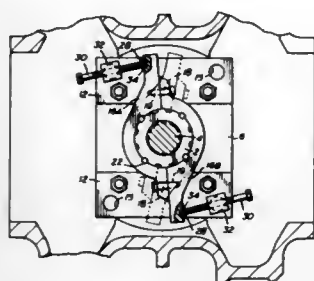
## NUT AND WRENCH SYSTEM

John M. Horne, Grove City, and Daniel L. Umbaugh, Slippery Rock, both of Pa., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Nov. 28, 1986, Ser. No. 935,874  
Int. Cl.<sup>4</sup> B25B 13/50, 13/58

U.S. Cl. 81-176.15

6 Claims



1. An apparatus for turning a nut having a circular exterior side surface with a plurality of slots formed thereon, said nut in the vicinity of a structure, said apparatus comprising:  
a wrench comprising  
two identical body portions, each body portion having a perforated portion through which a portion of a threaded fastener may pass, a center portion defining a semicircular band with at least one protrusion, which band and at least one protrusion mate with the exterior side surface of said nut and the plurality of slots formed thereon respectively, and an arm portion extending radially away from an engaged nut and containing a hemispheric depression on the

distal end thereof, said hemispheric depression having an axis parallel to a tangent of the exterior side surface of the nut, that tangent being the tangent passing through the first point of intersection between the exterior side surface of the nut and a line perpendicular to the axis and extending toward the exterior side surface of the nut from a point centrally located within the depression, and said arm portions further containing interiorly threaded voids on the proximal end thereof,

two threaded fasteners which act to connect said two identical body portions when joined so as to mate with the nut, the two threaded fasteners so acting by each passing through a perforated portion of one body portion and threadedly engaging an interiorly threaded void of the other body portion;

two reaction blocks, each having a threaded hole therethrough and each rotatably positioned on said structure so that hole axes can coincide with one and the other axes of the hemispheric depressions, and

two jackscrews extending through and engaged with the threads in the holes of one and the other of said reaction blocks, each jackscrew having a head end adapted to accept a driving tool and a leading driven end, which leading driven end mates with one or the other of said hemispheric depressions,

whereby driving of the heads of said jackscrews applies torque to said wrench and, concurrently, said nut.

4,793,224

## COMBINATION RETAINING RING FITTING TOOL

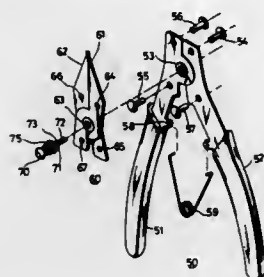
Hsin-Teh Huang, No. 12, Alley 3 South, Yung Hsin Lane, Wen Hwa Rd., Hsi Tun District, Taichang, Taiwan, Taiwan

Filed Jun. 3, 1987, Ser. No. 57,081

Int. Cl.<sup>4</sup> B25B 7/12; B23P 19/04

U.S. Cl. 81-302

4 Claims



1. An improved combination retaining ring fitting tool comprising a pair of handles joined together at a handle joint center and a pair of jaws joint together at a jaw joint center, the pair of handles and the pair of jaws being removably fastened together by an open-slotted pivot bolt and a latch, the latch being rotatably mounted within the open slot of the pivot bolt by a pin, such that the pivot bolt together with the latch passes through the handle joint center and the jaw joint center and after passing there-through the latch is rotated to prevent the pivot bolt from being removed therefrom,  
the pair of handles having a first pair of studs arranged above the handle joint center and a second pair of studs arranged below the handle joint center, one stud of each of the first and second pairs of studs being present on each handle, the pair of handles also having a pair of projections with a spring arranged therebetween for keeping the pair of handles open,  
the pair of jaws having a first pair of holes arranged above the jaw joint center and a second pair of holes arranged below the jaw joint center, one hole of each of the first and second pairs of holes being present on each jaw, the

pair of jaws also having ring engaging tips on an end thereof, and  
the first and second pair of studs and the first and second pair of holes being capable of two arrangements, the first arrangement being the first pair of studs passing through the first pair of holes so that closing action on the pair of handles causes the pair of jaws to open, and the second arrangement being the second pair of studs passing through the second pair of holes so that closing action on the pair of handles causes the pair of jaws to close.

4,793,225

## CLAMPING TOOL

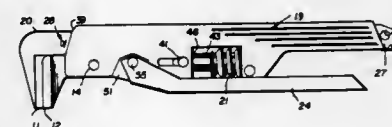
Ronald Berkich, R.D. #1, Leola, Pa. 17540

Filed Sep. 19, 1983, Ser. No. 533,639

Int. Cl.<sup>4</sup> B25B 7/04

U.S. Cl. 81-356

13 Claims



## 1. A hand tool comprising:

- a first jaw;  
a body;  
a second jaw affixedly attached to said body; and  
means for mounting said first jaw to said body for linear reciprocal movement with respect to said body, and operative cooperation with said second jaw;  
said mounting means including first means for adjusting the position of said first jaw with respect to said body; and second means, including components distinct from said first means, for adjusting the position of said first jaw with respect to said body; said first means comprising an elongated bar attached to said first jaw, and including a linear gear portion thereof, said bar being elongated in a dimension defining the linear path of reciprocation of said first jaw with respect to said body, and said bar being received by said body for linear reciprocation; a worm gear rotatable about a pin which passes completely through said worm, said pin operatively mounted by said body, and said pin extending parallel to the dimension of elongation of said bar and an enlarged end; said worm cooperatively engaging said linear gear of said bar; and said second means comprising: a member connected to said pin enlarged end and for reciprocating said pin; and means for mounting said pin for linear reciprocation with respect to said body in a linear path along the axis of said pin, linear reciprocation of said pin effecting linear reciprocation of said worm gear and thereby linear movement of said first jaw with respect to said body.

4,793,226

## MANUAL DEVICE FOR DRIVING SCREWS

Willy Kress, Breitenwasen 21, D-7457 Bisingen, Fed. Rep. of Germany

Filed Mar. 3, 1987, Ser. No. 21,154

Claims priority, application Fed. Rep. of Germany, Mar. 4, 1986, 3606927

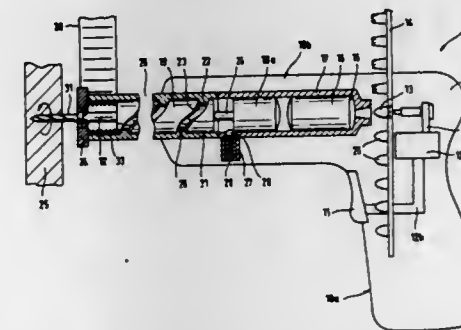
Int. Cl.<sup>4</sup> B25B 19/00

U.S. Cl. 81-463

8 Claims

1. A manual device for driving screws or similar fasteners in walls and the like including a housing having a piston grip to facilitate handling of the device, means for producing a rotational motion for driving the screw, said housing having support means adapted to support an explodable power source, and a trigger on said housing and being operable to explode the power source to initiate the screw driving procedure, wherein:  
(a) a first longitudinally movable ram in said housing;

- (b) a rotary ram in said housing mounted for axial and rotational movement when acted upon by said first ram;  
(c) a screw holder on said rotary ram for holding the screw to be driven;  
(d) a power source in energy exchanging relationship with said first ram for exerting an axial force on said first ram to drive said first ram toward said rotary ram when said power source is exploded by said trigger;  
(e) and an intermediate ram between said first and rotary



rams wherein to smooth and equalize the transmitted force, said first ram, as it is rebounding under the force of the explosion of said exploded power load, strikes said intermediate ram which, in turn, acts in an axial manner upon said rotary ram, and thread means between said housing and said rotary ram whereby said rotary ram is caused to move forward with coordinated, simultaneous axial and rotational motions and drives a screw which is at least indirectly arranged there against into an appropriate mating material.

4,793,227

## APPARATUS AND METHOD FOR TRIMMING SIGNATURES

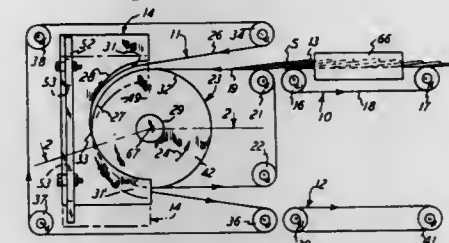
Walter J. Stobb, Pittstown, N.J., assignor to Stobb Inc., Clinton, N.J.

Filed Jun. 15, 1987, Ser. No. 61,726

Int. Cl.<sup>4</sup> B26D 1/02, 1/20

U.S. Cl. 83-21

13 Claims



1. A signature trimmer comprising two conveyor belts for transporting along a path a plurality of signatures disposed horizontally between said conveyors, said conveyor belts including an arcuate portion for transporting said signatures along said arcuate portion, a non-moving knife disposed and having an arcuate cutting edge adjacent to and facing said arcuate portion to form a crescent-shaped opening therewith, said arcuate cutting edge extending across said path to be in engagement with said signatures being transported along said arcuate portion, for trimming said signatures.

4,793,228

## SLICING MACHINE

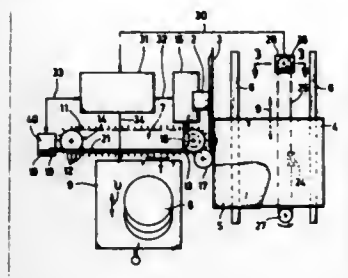
Herbert Etter, Rosenfeld; Klaus Hald, Balingen; Jürgen Schwellbach, Bisingen-Thauheim, and Rolf Veit, Balingen, all of Fed. Rep. of Germany, assignors to Bizerba-Werke Wilhelm Kraut GmbH & Co. KG, Fed. Rep. of Germany  
Filed Jun. 1, 1987, Ser. No. 57,568

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1986, 3618774

Int. Cl. B26D 7/32

U.S. Cl. 83—155.1

13 Claims



1. A slicing machine for slicing food such as meat, sausage or cheese, said machine comprising:

a machine frame;  
a blade mounted on said machine frame for slicing the food;  
first motor means for driving said blade;  
a slide slidably displaceable along a course on said machine frame for accommodating and feeding said food to said blade;

conveyor means, positioned to receive the slices cut by said blade, for carrying said slices to a knocking-off area;  
knocking-off means for transferring the slices from said conveyor means at said knocking-off to a deposit area;  
second motor means for driving said conveyor means;  
means for sensing the positions of said slide as said slide moves along said course; and  
control means, coupled to receive from the sensing means position data corresponding to the positions of said slide as said slide moves along said course and coupled to said second motor means, for controlling said second motor means to move said conveyor means in synchronism with said slide irrespective of a size of said food.

4,793,229

## MULTIFUNCTIONAL WEB ROTARY MODULE

E. Bruce Kleber, Wheaton, Ill., assignor to Western Printing Machinery Company, Schiller Park, Ill.

Filed Dec. 24, 1986, Ser. No. 946,381

Int. Cl. B23D 25/12

U.S. Cl. 83—344

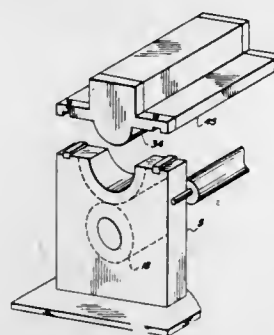
7 Claims

1. A multipurpose web rotary apparatus comprising, in combination,

a base frame structure having a permanently positioned die cylinder assembly rotatably mounted therein;

and a preassembled anvil cylinder assembly with an impression or anvil cylinder and gear assembly removably located above said die cylinder assembly and on top of the base frame structure, said anvil cylinder assembly having

means which engages corresponding means on said base frame structure for aligning said anvil cylinder with said



die cylinder that may be disengaged so that said anvil cylinder assembly may be easily removed and replaced.

4,793,230

## PRESSURE BEAM FOR SAWING MACHINES

Piergiorgio Benuzzi, Bologna, Italy, assignor to Giben Impianti S.p.A., Bologna, Italy

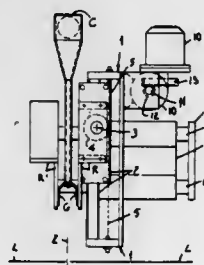
Filed Jun. 4, 1987, Ser. No. 58,013

Claims priority, application Italy, Jun. 11, 1986, 12490 A/86

Int. Cl. B26D 7/02

U.S. Cl. 83—466

6 Claims



1. A pressure beam adapted to be used in sawing machines for cutting panels or packs of panels (P), of the type comprising a panel support table (L) having a straight longitudinal slot defining a cutting line and a sawing tool (Z) movable along said cutting line, said pressure beam being arranged above said workpiece support table (L), extending along the entire length of the cutting line and consisting of first and second pressure elements (R, R') arranged at both sides of said cutting line, parallel thereto, means being provided for raising and lowering each pressure element (R, R') independently with respect to the other pressure element, and further comprising traverse means for laterally moving said pressure elements (R, R') to vary the distance of said pressure elements (R, R') with respect to said cutting line located between them in order to avoid interference between said pressure elements and leading and trailing edges of said packs of panels.

4,793,231

## COMPOSITE TOOL AND METHOD OF MAKING

Richard H. Brown, 4850 Meadowbrook Rd., Williamsville, N.Y. 14221

Filed Mar. 4, 1987, Ser. No. 21,403

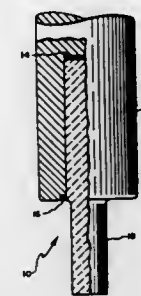
Int. Cl. B26F 1/14

U.S. Cl. 83—684

14 Claims

1. A composite tool subject to compression shock such as a punch or die, said tool comprising:  
a body having an insert receiving bore extending inwardly

from an outer surface of one end of the body and receiving means adjacent the bore and the outer surface of said one end of the body, the bore having parallel sidewalls and an inner end surface disposed inwardly of said outer surface, and the receiving means being a counterbore having sidewalls parallel to the sidewalls of the insert receiving bore; an insert formed of a single material which is harder and more abrasion resistant than the body, the insert having inner and outer ends and parallel sidewalls extending between the ends, the inner end of the insert being disposed within the bore adjacent the inner end surface of the bore, and a first portion of the sidewalls of the insert



extending away from the inner end engaging the sidewalls of the bore with an interference fit;  
bonding material disposed between the inner end of the insert and the inner end surface of the bore, said bonding material bonding the inner end of the insert to the inner end surface of the bore, said bonding material additionally being capable of dampening compression shock; and  
additional bonding material disposed within the receiving means, the additional bonding material bonding a second portion of the sidewalls of the insert of the body, said additional bonding material being capable of dampening radial shock.

4,793,232

## CUTTING APPARATUS FOR SEPARATING HARD AND SOFT MATERIALS

Daniel Villemain, Chennevières sur Marne, and Paul Romand, Valence, both of France, assignors to Etablissements Arrive S.A., Saint Fulgent and Union Financière pour le Développement de l'Economie, Paris, both of France

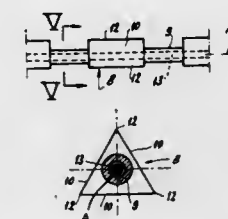
Filed May 20, 1986, Ser. No. 865,267

Claims priority, application France, May 20, 1985, 85 08276

Int. Cl. B27B 33/14

U.S. Cl. 83—788

11 Claims



1. An apparatus for cutting a soft material, such as meat, from a hard material, such as bone, the apparatus comprising:  
a chain formed of a succession of alternating cutting and coupling links extending along a longitudinal line, the cutting links being of generally polygonal cross-sectional shape and having corners forming longitudinally extending sharp cutting edges spaced a predetermined maximum transverse distance from the line, the coupling links being of a predetermined maximum radial dimension from the

line shorter than the distance such that the cutting edges project transversely beyond the coupling links, the cutting links being freely rotatable in the chain about the line relative to one another; and  
means for advancing the chain in a longitudinal direction parallel to the line, whereby surfaces of the cutting links between said corners lie substantially flat against said hard material during cutting.

4,793,233

## MECHANISM FOR CHANGING BRIDGE SUPPORT BETWEEN ALTERNATE MODES IN STRINGED MUSICAL INSTRUMENTS

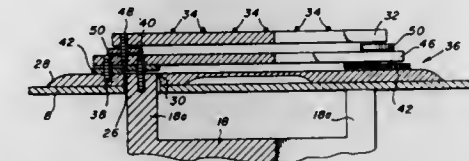
Kenneth G. Olthoff, 4136 Hidden Brook Dr., Glen Burnie, Md. 21061

Filed Nov. 6, 1987, Ser. No. 117,750

Int. Cl. G10D 3/00

U.S. Cl. 84—299

13 Claims



1. Apparatus for altering the bridge support for different modes of operation of a hollow body stringed musical instrument having a soundboard, comprising

(a) bridge saddle means for supporting the strings of the instrument and for coupling the acoustic energy generated thereby;

(b) a rigid member mounted within the body of the instrument; and

(c) means for selectively connecting said bridge saddle means with said rigid member and with the instrument soundboard to alter the acoustical sound produced by the instrument, whereby when said bridge saddle means is connected with the soundboard, acoustic energy from the instrument strings is coupled to the soundboard to produce a hollow body sound, and when said bridge saddle means is connected with said rigid member, acoustic energy from the instrument strings is coupled to and reflected by said rigid member to produce a solid body sound, and when said bridge saddle means is coupled with both the soundboard and said rigid member, acoustic energy from the instrument strings is coupled to the soundboard and said rigid member to produce a partial solid body sound.

4,793,234

## CAPO FOR STRINGED INSTRUMENT

Karl E. Gels, 1413 Butlercrest, Houston, Tex. 77060

Filed Mar. 11, 1988, Ser. No. 167,640

Int. Cl. G10D 3/04

U.S. Cl. 84—318

6 Claims

1. A capo for a stringed musical instrument having a neck with a front fingerboard surface and a curved rear surface and having a plurality of strings extending longitudinally of said neck over said fingerboard surface, said capo comprising:

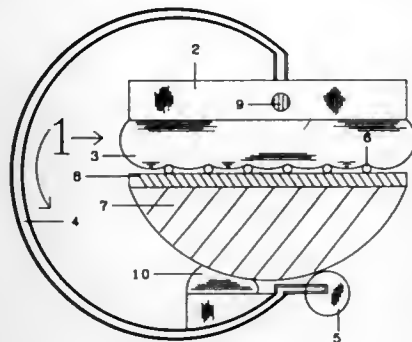
a rigid arm adapted to extend transversely across said neck over said strings;

a string contacting member fixed to said arm and adapted to contact and depress said strings; and

attaching means for attaching the capo to said neck, said attaching means comprising:



a generally C-shaped, spring-like member pivoted at one end to said arm and adapted to extend around said curved rear surface when attached to said neck in operative position,



said spring-like member expanding against its spring bias by the camming action of said curved rear surface of said neck for holding said capo on said neck.

4,793,235

## KEY MECHANISM FOR A CLARINET

Shigeru Yamaryo, Hamamatsu, Japan, assignor to Yamaha Corporation, Japan

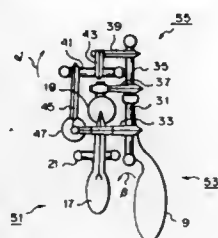
Filed Dec. 16, 1987, Ser. No. 133,564

Claims priority, application Japan, Jan. 6, 1987, 62-000898[U]

Int. Cl.<sup>4</sup> G10D 7/06

U.S. Cl. 84—382

4 Claims



1. An improved key mechanism for a clarinet comprising: a G# key unit having a G# key of a first cap for a G# sound hole, an A key unit having an A key of a second cap for an A sound hole and spaced from said G# unit, and a control unit mechanically combined with said G# and A key units in an arrangement such that release of said G# sound hole by said first cap is inhibited when said G# key is operated during operation on said A key.

4,793,236

## SELF-ALIGNING NECK JOINT

Michael D. McGuire, 9510 West Hierba, Agua Dulce, Calif. 91350, and Stephen J. Boulanger, La Habra, Calif., assignors to Albert J. Carness, Chatsworth and Michael D. McGuire, Northridge, both of, Calif., part interest to each

Filed Jun. 24, 1987, Ser. No. 65,897

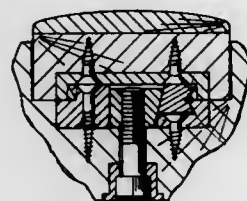
Int. Cl.<sup>4</sup> G10D 1/08

U.S. Cl. 84—293

4 Claims

1. A self-aligning neck joint for releasably securing the neck of an electric guitar to the guitar body and maintaining the neck in fixed and proper alignment with the body, said joint comprising: a first bracket adapted to be rigidly secured to the neck of the guitar, said first bracket defining a pair of rows of spaced tooth members, said rows being disposed along the opposite lateral sides of said first bracket and each of said tooth members defining an inwardly inclined mating surface; a second bracket adapted to be rigidly secured to the body of the

guitar such that upon said brackets being secured together the neck of the guitar is rigidly secured to and in proper alignment with the guitar body, said second bracket including a row of spaced rigid tooth members disposed along one side thereof, said tooth members defining inwardly inclined surfaces adapted to abut and mate with the inclined surfaces in one of said rows of tooth members on said first bracket, a horizontal support surface inclined locking surface disposed along the side of said second bracket opposite said second bracket tooth members and adjacent said horizontal support surface, a moveable elongated bar member defining a row of spaced rigid tooth members on one side thereof, said tooth members defining inwardly inclined surfaces adapted to abut and mate with the inclined surfaces on the tooth members in the other of said rows thereof on said first bracket, a first inclined surface dis-



posed below said tooth members thereon and adapted to mate with said locking surface and a second inclined surface disposed on the opposite side of said bar member from said first inclined surface; a wedge locking member defining an inclined surface adapted to abut and mate with said second inclined surface on said bar member; and means for drawing said wedge lock member against said second inclined surface on said bar member such that said first inclined surface on said bar member is urged outwardly and against said locking surface and said inclined surfaces on said tooth members on said bar member are urged against said inclined surfaces of said tooth members in said other of said rows of tooth members on said first bracket thereby securing said second bracket to said first bracket and said neck to said body portion of the guitar in fixed and proper alignment with said body portion.

4,793,237

## SERVO CONTROL SYSTEM, PARTICULARLY A POWER CONTROL SYSTEM FOR MOTOR VEHICLES

Eugen Dürr, Alchwald, and Günter Wörner, Kernen, both of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

Filed Jan. 25, 1987, Ser. No. 66,303

Claims priority, application Fed. Rep. of Germany, Jun. 25, 1986, 3621294

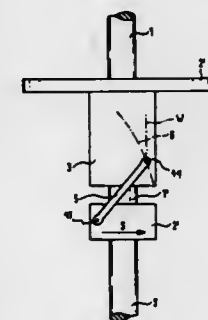
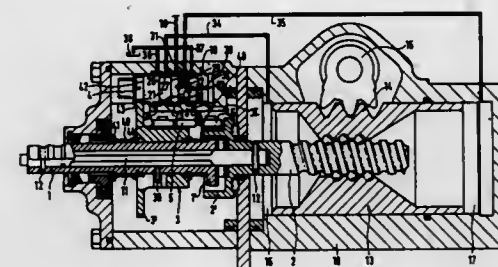
Int. Cl.<sup>4</sup> F15B 9/10

U.S. Cl. 91—380

11 Claims

1. A servo control system, having a first shaft part connected to an operating side, a second shaft part that is coaxial with said first shaft part and is connected to control gear, a spring unit for elastically coupling said first and second shaft parts, a control slide of a servo valve unit that is arranged in a stationary housing, a gear unit connected between said first and second shaft parts for adjusting said control slide by means of said gear unit, and as a function of an extent of a relative rotation of said first and second shaft parts with respect to one another, being deflected from a central position more or less, and as a function of the rotating direction, into one or the other direction, said control slide connecting a pressure source to a motor operator controlled by said servo valve unit and that with respect to drive is connected with said control gear, said motor operator being movable forwards and backwards in response to an adjusting force that depends on the extent of the deflection of said control slide, said gear unit having an element arranged on one said shaft part and being axially displaceable by said relative rotation of said shaft parts and is drivingly

coupled with said control slide, said element that is axially displaceable on one said shaft part being coupled with the other said shaft part by at least one connecting rod means, one end of said connecting rod means being coupled to said axially displaceable element, and another end of said connecting rod means, at a radial distance from a shaft axis, being coupled to the other said shaft part or an element connected to the other



said shaft part in a torsionally fixed manner, such that a projection of a connecting line between the couplings of said connecting rod means onto an axial plane of the shaft parts forms an angle with respect to the shaft axis, wherein said displaceable element is screwably displaceable on the one said shaft part, such that the axial stroke of the displaceable element is increased during said relative rotation between said shaft parts.

4,793,238

## CONTROL SIGNAL BLOCKING DIRECTION CONTROL VALVE IN LOAD-SENSING CIRCUIT

Tadeusz Budzich, Moreland Hills, Ohio, assignor to Caterpillar Inc., Peoria, Ill.

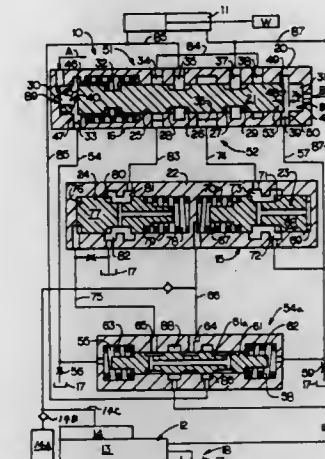
Filed Jul. 1, 1987, Ser. No. 68,494

Int. Cl.<sup>4</sup> F15B 13/02, 13/08

U.S. Cl. 91—421

10 Claims

1. A load responsive system including a fluid power actuator operable to control a positive or negative load W, a source of pressure fluid, fluid exhaust means, flow control means of said load responsive system, and first valve means for selectively interconnecting said actuator with said source of pressure fluid and said fluid exhaust means, positioning means of said first valve means responsive to first and second control signals, load pressure identifying means operable to identify the type of load pressure as positive or negative and to supply said identified load pressure to said flow control means, logic means responsive to said control signals in said load pressure identifying means, and synchronizing means between said first valve



to selectively control the connection of the first and second control signals with the logic means.

4,793,239

## AXIAL PISTON MOTOR OR PUMP WITH AN ARRANGEMENT TO THRUST THE ROTOR AGAINST A BEARING OF THE SHAFT

Karl Eickmann, 2420 Ishiki, Hayama-machi, Kanagawa-ken, Japan

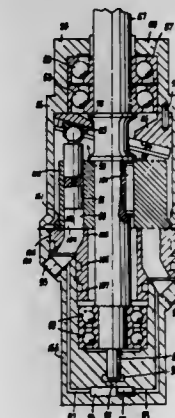
Continuation-in-part of Ser. No. 678,540, Dec. 5, 1984, Pat. No. 4,664,018, which is a continuation-in-part of Ser. No. 387,567, Jun. 11, 1982, abandoned, and a continuation-in-part of Ser. No. 521,874, Aug. 10, 1983, abandoned, and a continuation of Ser.

No. 954,553, Oct. 25, 1978, Pat. No. 4,358,078, and a continuation of Ser. No. 122,914, Feb. 19, 1980, abandoned, and a continuation of Ser. No. 224,769, Jan. 13, 1981, abandoned, and a continuation of Ser. No. 282,990, Jul. 14, 1981, Pat. No. 4,557,347. This application Apr. 24, 1987, Ser. No. 41,961

Int. Cl.<sup>4</sup> F01B 13/04

U.S. Cl. 91—485

8 Claims



1. A fluid handling device, like a pump or motor, comprising, in combination: a housing with a therein revolvable rotor which is provided with substantially axially extending cylinders to locate therein reciprocable pistons, a piston stroke guide face provided on a piston stroke guide body in a front portion of said housing for guiding on said piston stroke guide face piston shoes which are pivotably provided on the heads of said pistons, a rotary control face on a rear portion of said

rotor, a non-revolving control face on a control body to seal along said rotary control face, entrance ports and outlet ports communicated to respective individually with inflow and outflow control ports in said control body and in said non-revolving control face whereby one of said spaces is a high pressure space to form a thrust chamber to thrust the control body and thereby said non-revolving control face against said rotary control face to seal the flow of fluid into and out of said cylinders of said rotor, wherein an improvement is provided, and; wherein said improvement is a straight through longitudinal shaft, and a holding means in said front portion of said housing to provide an axial holding of said shaft in combination with a thrust arrangement on a rear end portion of said shaft to press said shaft against said holding means, in combination with the sealing of said control body in a portion of said housing exclusively by cylindrical faces.

4,793,240

# ADJUSTABLE DEVICE FOR AXIAL PISTON PUMP/MOTOR OF A TILTING AXIS TYPE

Yoshikazu Nagahara, Yokohama, and Michio Onzo, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

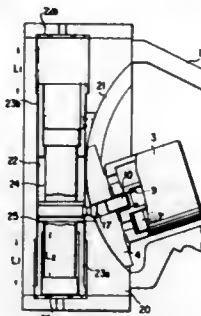
Filed Jan. 24, 1986, Ser. No. 877,942

Claims priority, application Japan, Jan. 26, 1985, 60-137870

Int. Cl.<sup>4</sup> F01B 3/00; F04B 1/30

U.S. Cl. 91-506

3 Claims



1. An adjusting device for an axial piston/motor of a tilting axis type in which a tilt angle of a valve plate is varied by rocking said valve plate along arcuate guide grooves formed in an end cover of said axial piston pump/motor, comprising: sleeve means and a piston slidably received in said sleeve means in a telescopic assembly within a cylinder formed in said end cover and extending in the rocking direction of said valve plate, said sleeve means being slidably movable internally of said cylinder with a portion of the length of said piston nested internally of said sleeve means when said sleeve means is moved to each end of said cylinder, and a trunnion pin mounted to said piston and engaged with said valve plate.

4,793,241

# PISTON POSITION DETECTOR FOR FLUID PRESSURE CYLINDER

Shigeru Mano, Kakamigahara, and Hiroshi Kagohashi, Kasugai, both of Japan, assignors to C K D Kabushiki Kaisha, Aichi, Japan

Filed Nov. 4, 1987, Ser. No. 117,464

Claims priority, application Japan, Nov. 13, 1986, 61-27038

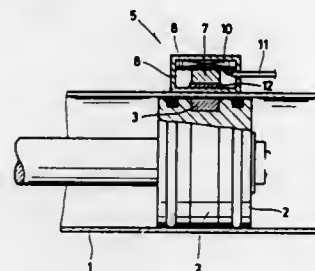
Int. Cl.<sup>4</sup> F01B 25/26, 31/12

U.S. Cl. 92-5 R

2 Claims

1. A piston position detector for a fluid pressure cylinder wherein a piston is fitted closely and slidably in a cylinder made of a non-magnetic material comprising:  
a permanent magnet mounted on the piston;  
a magnetic detection element mounted at a required position

on the outer circumference of the cylinder for responding to a magnetic field formed by the permanent magnet and for generating electric detection signals; and  
a magnetic induction piece in sheet form interposed between the magnetic detection element and the cylinder, said magnetic induction piece having a plane area substantially larger than that of the magnetic detection element and is made of an amorphous alloy with a small amount of residual magnetism,



whereby when the permanent magnet faces the front of the magnetic detection element, the magnetic induction piece is magnetically saturated by performing bypass induction of only a part of the magnetic flux of the permanent magnet to act on the magnetic detection element, and as the permanent magnet is substantially shifted from the front of the magnetic detection element, the ratio of the magnetic flux performed bypass induction through the magnetic induction piece to the magnetic flux of the permanent magnet to act on the magnetic detection element is increased.

4,793,242

# BRAKE BOOSTER WITH A SEAL AND GUIDE UNIT

Michio Kobayashi, Higashimatsuyama, Japan, assignor to Jidosha Kiki Co., Ltd., Tokyo, Japan

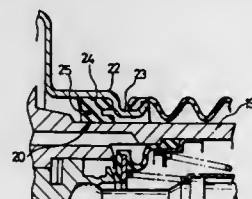
Filed Nov. 6, 1987, Ser. No. 118,191

Claims priority, application Japan, Nov. 10, 1986, 61-172174[U]

Int. Cl.<sup>4</sup> F16J 15/18; F15B 9/10

U.S. Cl. 92-168

5 Claims



1. A brake booster including a shell having its interior divided into a plurality of pressure chambers, a valve body internally housing a valve mechanism which controls a communication between the pressure chambers and between the pressure chambers and the atmosphere, and a seal unit disposed within the shell for maintaining the interior thereof hermetically sealed against the exterior thereof and for supporting the valve body for reciprocating motion, the seal unit comprising a seal member fitted between the internal surface of the shell and the external surface of the valve body, the seal member including a seal lip and a bearing portion, which are formed on the internal surface of an annular resilient member, and a retainer locked to the internal surface of the shell for holding the seal member, the retainer comprising an outer peripheral flange and an inner peripheral flange which in cross-section are bent substantially at a right angle with respect to one another,

the inner peripheral flange of the retainer being formed as a cylinder extending in the direction of reciprocating motion of the valve body, the cylinder being axially inserted into the seal member for supporting the latter for sliding contact with valve body, said cylinder being axially inserted in said seal member at or radially inboard of the radially central portion of said seal member, so that not more than half the radial thickness of said seal member is radially surrounded by said cylinder, said cylinder thus extending parallel to the external surface of said valve body, said cylinder along its length evenly radially bearing against the back surface of said bearing portion of the seal member to enable said bearing portion to perform a bearing function in axially slidably guiding contact with the valve body, the retainer including a locking portion around its outer peripheral flange, which locking portion is in resilient engagement with and locked in abutment against the internal surface of the shell so as to restrict axial movement of said retainers with respect to said shell.

4,793,243

# SUPPLEMENTARY WORT REMOVAL DEVICE IN LAUTER TUNS

Bernhard Leuz, Schwarzscher Str.51, and August Lema, Am Eselsberg 7a, both of D-8710 Kitzingen, Fed. Rep. of Germany

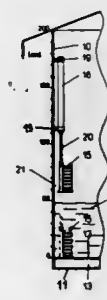
Filed Jul. 31, 1987, Ser. No. 79,896

Claims priority, application Fed. Rep. of Germany, Aug. 23, 1986, 3628726

Int. Cl.<sup>4</sup> C12C 7/10

U.S. Cl. 99-277.1

8 Claims



1. In a lauter tun having a tun wall and a perforated floor, a supplementary wort removal device comprising at least one hollow member with an inner screen wall and an outer screen wall, and an inside chamber formed between said screen walls, said at least one hollow member being arranged vertically movable over the perforated floor of the lauter tun, said tun wall and said outer screen wall forming an area therebetween, and means for removal of the wort from the hollow member, characterized in that the hollow member (15) has an open bottom (17) and is placed with this open bottom (17) on the perforated floor (12) of the lauter tun for the purpose of removal of the wort from said inside chamber (24), said hollow member being of substantially circular configuration and being arranged substantially concentrically in the lauter tun, said hollow member comprising a plurality of circumferential segments that are movable up and down independently of one another, and actuating means are mounted on said tun wall of the lauter tun for selectively moving said segments up and down.

# VENTILATION DEVICE FOR FOOD DISPENSING MACHINE

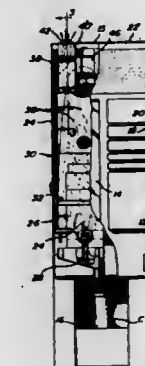
Alan M. King, Westmont, Canada, assignor to Vending International Ltd., St. Hubert, Canada

Filed Nov. 12, 1987, Ser. No. 119,728

Int. Cl.<sup>4</sup> A47J 31/00

U.S. Cl. 99-285

3 Claims



1. In a food dispensing machine which includes a housing wall adjacent the dispensing area, a ventilation unit comprising an elongated closed duct mounted on the housing wall and exhaust openings provided at spaced-apart locations on the duct, the duct comprising an exit opening and a negative pressure means for providing a suction in the duct to thereby draw vapors from the areas adjacent the openings in the duct and exhausting the vapors on board of the dispensing machine; wherein a window is provided in the housing wall and the elongated duct extends in part along an edge of the window, and exhaust openings are provided in the duct adjacent the window so as to draw vapors from the area of the window in order to reduce fogging thereon.

4,793,245

# VACUUM COFFEE MAKER

Shinichi Kimura, Yamatokoriyama, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

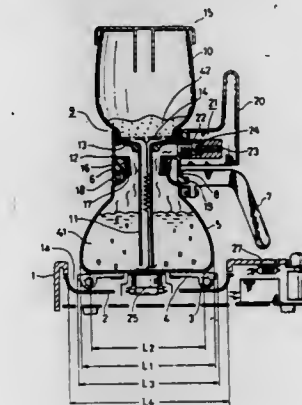
Filed Mar. 3, 1988, Ser. No. 163,628

Claims priority, application Japan, Mar. 3, 1987, 62-31633; Mar. 6, 1987, 62-33360; Mar. 11, 1987, 62-35473; Mar. 13, 1987, 62-37521; May 20, 1987, 62-76232

Int. Cl.<sup>4</sup> A47J 31/043

U.S. Cl. 99-292

5 Claims



1. A vacuum coffee maker comprising;

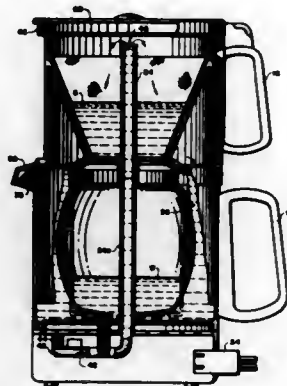


a first container having a handle on the outer periphery and an opening on the top thereof;  
 a second container in a funnel shape having a handle on the outer periphery thereof and engaging the opening of the first container in a sealed state by a gasket interposed therebetween, wherein the bottom is vertically provided with a pipe;  
 engagement retaining means, whereby the engagement of the first container with the second container is retained by the gasket being compressed and interposed therebetween;  
 heating means including a heater and a heating plate whose outer dimension is greater than that of the bottom of the first container, whereby a liquid inside the first container which is to be mounted on the heating plate is heated; and  
 a control valve which is provided inside the handle of the second container and opened or closed by a shape-memory alloy.

**4,793,246**  
**ELECTRICALLY OPERATED HOT BEVERAGE MAKER**  
 George Barradas, 15 Riverview Ct., Greenwich, Conn. 06830  
 Filed Aug. 7, 1987, Ser. No. 82,588  
 Int. Cl.<sup>4</sup> A47J 31/10

U.S. Cl. 99—307

11 Claims



1. A coffee maker provided with separable upper and lower compartments, said upper compartment including a coffee basket provided with holes therein, a filter in said basket for holding said coffee substance, said lower compartment having a flexible, expandable water container, means for heating said water, and means for conducting said heated water through said coffee to thereby drip through said holes in the coffee basket, and an annular dispensing container surrounding said expandable water container for receiving said brewed coffee that has accumulated therein after passing through said holes, said flexible container upon filling with water has the capability of expanding laterally into said annular dispensing container in order to accommodate more water than when said container is in its relaxed condition.

**4,793,247**  
**METHOD OF MIXING TWO OR MORE GAS FLOWS**  
 Kees Verweij, Beverwijk, Netherlands, assignor to Hoogovens Groep B.V., IJmuiden, Netherlands  
 Filed Sep. 1, 1987, Ser. No. 91,980  
 Claims priority, application Netherlands, Sep. 16, 1986, 8602338

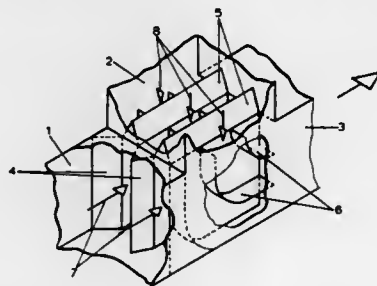
Int. Cl.<sup>4</sup> B01F 5/00, 13/00

U.S. Cl. 366—338

11 Claims

1. A method of mixing at least two gas flows comprising passing each gas flow through an array of at least three parallel adjacent guide conduits, causing the flows to emerge from said conduits into a mixing zone as an array of parallel adjacent streams flowing in the same direction, and mixing said gas

flows together in the mixing zone, with the gas flows entering said mixing zone being distributed alternately in said conduits so that each said stream has, as an adjacent gas stream, a

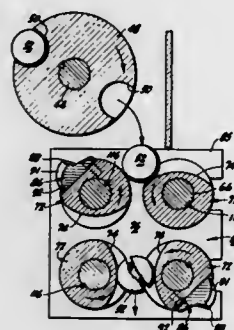


gas stream from a different gas flow and with the streams derived from the respective gas flows having different velocities at their emergence from the guide conduits into the mixing zone.

**4,793,248**  
**NUT SHELLING MACHINE**  
 Wilfred C. Frederiksen, 16881 Bolero La., Huntington Beach, Calif. 92649, and Sun Y. Kim, 2384 Lancaster Ct., Hayward, Calif. 94542  
 Filed Feb. 16, 1988, Ser. No. 156,327  
 Int. Cl.<sup>4</sup> A23N 5/00

U.S. Cl. 99—575

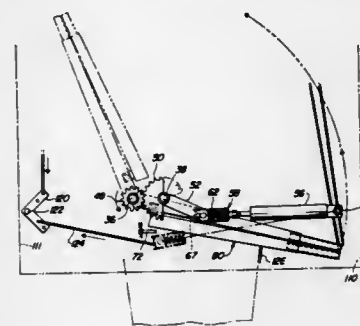
17 Claims



1. A nut shelling machine comprising:  
 a rotary drive mechanism;  
 a shelling mechanism having a frame and four shelling shafts connected to the rotary drive mechanism arranged in spaced upper and lower, side by side pairs, the shelling shafts and frame including at least one shelling station;  
 a nut feed mechanism having dispensing means arranged with the shelling mechanism for periodic delivery of individual nuts to the shelling station;  
 means on the upper and lower pairs of the shelling shafts for periodically enlarging and contracting the effective space between the shelling shafts of the upper pair and for periodically enlarging and contracting the effective space between the shelling shafts of the lower pair on coordinated rotation of the shelling shafts by the drive mechanism, said means being arranged such that an individual nut dispensed by the feed mechanism passes between the pair of upper shafts, is subsequently trapped between the pair of upper shafts and lower shafts and finally passes between the pair of lower shafts; and,  
 a periodic shell splitting means arranged with said shaft for splitting the shell of a nut when trapped between the upper shafts and lower shafts.

**4,793,249**  
**DOUBLE TWINE ARM FOR DISPENSING TWINE INTO A BALE CHAMBER**  
 Stanley P. Wellman, Ottumwa, Iowa, assignor to Deere & Company, Moline, Ill.  
 Filed Jun. 1, 1987, Ser. No. 56,083  
 Int. Cl.<sup>4</sup> B65B 13/18; A01D 39/00  
 U.S. Cl. 100—13

10 Claims



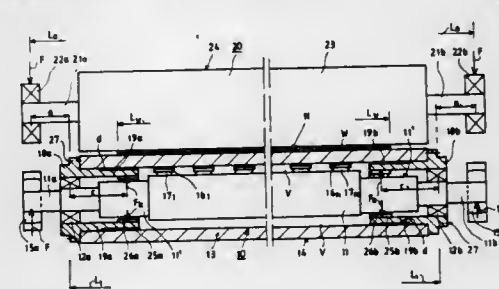
1. A baler including a baling chamber having transversely spaced first and second sides and a double twine arm assembly for dispensing twine for wrapping a large cylindrical bale located within the bale chamber, said twine arm assembly comprising: a first twine arm including a first twine dispensing end being pivotally mounted for oscillation about an axis to sweep a path between first and second locations respectively disposing the twine dispensing end thereof adjacent the first and second sides of the chamber; a second twine arm including a second twine dispensing end and being mounted for oscillating in a path at least adjacent to the path swept by the first twine arm; reversible drive means coupled to said first twine arm for oscillating the latter between said first and second locations; and connection means coupling the second arm to the first arm for concurrent movement therewith both towards and away from the second location and including adjustment means for selectively varying the distance between the twine dispensing ends of the first and second twine arms.

**4,793,250**  
**METHOD AND APPARATUS FOR CONTROLLING DEFLECTION OF AN ADJUSTABLE CROWN ROLL**  
 Juhani Niskanen, Jyväskylä, Finland, assignor to Valmet Oy, Finland

Filed Apr. 8, 1987, Ser. No. 36,100  
 Claims priority, application Finland, Apr. 9, 1986, 861511  
 Int. Cl.<sup>4</sup> B30B 3/04

U.S. Cl. 100—35

6 Claims



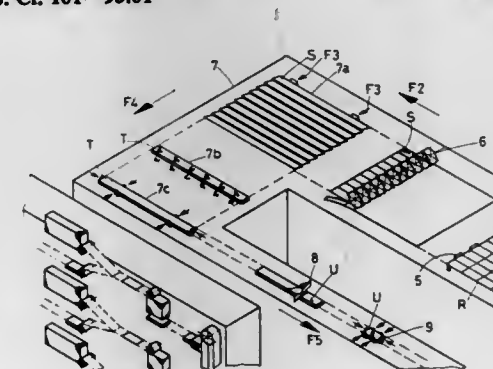
1. A method for obtaining uniform profiles of roll mantles of an adjustable-crown roll and a counter-roll at a nip formed therebetween, wherein the adjustable-crown roll includes a fixed central axle and a hollow roll mantle rotatably mounted on the axle by bearings spaced from each other by a first bearing distance, and wherein the counter-roll is mounted on axle journals fixed to the counter-roll mantle by bearings spaced

from each other by a second bearing distance which is larger than the first bearing distance, and wherein the nip formed between the adjustable-crown roll and the counter-roll is loaded by applying load forces to one or both of the adjustable-crown roll and the counter-roll, comprising the steps of:  
 providing devices inside the hollow mantle of the adjustable-crown roll and within the first bearing distance operable for producing a compensation force which in turn produces a compensation moment which loads a respective end region of the roll mantle of the adjustable-crown roll; loading each end region of the adjustable-crown roll by a compensation moment through operation of said devices, said compensation moment being produced by directing the compensation force in a direction substantially parallel to the axis of the adjustable-crown roll upon components within the roll mantle of the adjustable-crown roll and wherein the compensation force has a torque arm having a length equal to the distance between the line of action of the compensation force and the central axis of the adjustable-crown roll; and  
 adjusting the magnitude of said compensation moment by adjusting the magnitude of the compensation force whereby the profiles of the deflected roll mantles of the adjustable-crown roll and the counter-roll at the nip formed therebetween are adjustable to be substantially uniform.

**4,793,251**  
**PROCESS AND APPARATUS FOR THE PROCESSING OF SECURITY-PAPER PRINTS AND IDENTIFICATION OF MISPRINTS**

Runwalt Kuhfuss, Lausanne, Switzerland, assignor to De La Rue Giori S.A., Switzerland  
 Filed May 27, 1987, Ser. No. 54,523  
 Claims priority, application Switzerland, Jun. 6, 1986, 2304/86  
 Int. Cl.<sup>4</sup> B41J 45/00; G06F 15/20; B41F 13/56  
 U.S. Cl. 101—93.01

9 Claims



1. A process for the processing of print carriers in the form of security-paper sheets or security-paper webs, which are printed with security-paper prints and of which the security-paper prints are arranged in matrix form in transverse rows and longitudinal rows and the misprints are marked, into security-paper bundles composed of numbered individual security papers, in which process  
 the positions of all the misprints on each print carrier are sensed by a reader and stored,  
 the print carriers run successively through a numbering machine, the numbering units of which are controlled individually as a function of the stored misprint positions and carry out numbering of the security-paper prints in such a way that the particular security-paper prints arranged within a row receive a consecutive numerical sequence, but when a misprint occurs the incrementing of the respective numbering unit is interrupted and is contin-

used only when the following perfect security-paper print appears, the numbered print carriers are cut into individual security papers, the marked misprints are separated out, and all the remaining consecutively numbered individual security papers coming from the same particular row are combined into security-paper parcels with a complete numerical sequence,

wherein

after numbering, the print carriers are cut, perpendicularly to the rows containing respective consecutively numbered security-paper prints, into as many strips as the print carrier has security-paper prints transverse relative to the cutting direction,

a number  $n$  of particular cut strips is stacked, in the order in which they occur, into a strip stack, in which all the security-paper prints coming from one and the same row of consecutively numbered security-paper prints are arranged on top of one another in an ordered numerical sequence, if appropriate mixed with misprints, these strip stacks are cut into security-paper bundles of the correct size,

a group of  $p$  successive security-paper bundles is distributed to  $p$  buffer stores working in parallel and collected there,  $p$  being equal to the number of security-paper prints on a strip,

and subsequently the security papers from each buffer store are checked, in parallel, for any misprints, these misprints are separated out, and security-paper parcels, each with a complete numerical sequence, are formed from the remaining perfect security papers.

4,793,252

#### MATRIX LINE PRINTER

Josef Pichler, Ebreichsdorf, Austria, assignor to Mannesmann Tally GmbH, Vienna, Austria

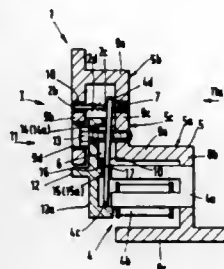
Filed Jul. 18, 1983, Ser. No. 514,965

Claims priority, application European Pat. Off., Jul. 3, 1983, 82105951.6

Int. Cl.<sup>4</sup> B41J 3/10

U.S. Cl. 101—93.05

8 Claims



1. In a matrix type line printer, the improvement comprising: a bar like carrier frame provided for oscillation along a printing platen of the printer and being comprised of a first section having a particular cross section and extending predominantly into a first direction and of a second section integral therewith, but offset therefrom and extending predominantly in a transverse direction, each section extending essentially over an entire line to be printed; a plurality of electromagnetic actuator means arranged in and along the first section in an arrangement parallel to the line to be printed and including a yoke in each instance, a coil, and a pivot armature, a free end of the pivot armature projecting into the second section being smaller in cross section than the first section; a relatively short, pin-like print needle in the second section being guided in a wall portion thereof and having its rear

end in abutment with said free projecting end of the pivot armature; and an adjusting screw for adjusting the relative disposition of the print needle and the armature.

4,793,253

#### MACHINE FOR PRINTING SELLER IDENTIFICATION ON LOTTERY TICKETS

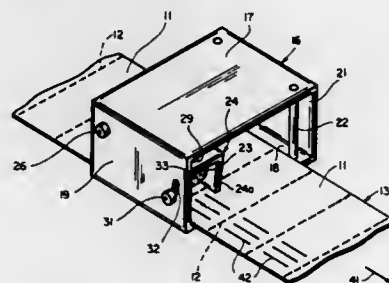
Leon M. Han, 671 Aldo Ave., #21, Santa Clara, Calif. 95054

Filed Nov. 14, 1986, Ser. No. 930,775

Int. Cl.<sup>4</sup> B41F 11/00

U.S. Cl. 101—329

7 Claims



6. In a machine for imprinting information on successive ones of a plurality of generally rectangular tickets separably joined together along opposing edges thereof to form a strip: a generally rectangular hand-held frame having a top wall, a bottom wall and a side wall, a pair of posts extending between the top and bottom walls of the frame and defining a path near the bottom wall along which the strip of tickets can be fed, a pivot arm pivotally mounted on the side wall and having a pair of generally parallel flanges in which obliquely extending slots are formed, resilient means for yieldably urging one end of the pivot arm toward the bottom wall, a printing wheel having peripheral means for printing the information rotatably mounted on the pivot arm toward the one end for rolling engagement with the strip of tickets, movement of the strip causing the wheel to rotate and imprint the information on each successive ticket moving past the wheel, and an inking roller rotatably mounted between the flanges of the pivot arm on an axle received in the obliquely extending slots, and screws threadably mounted in the flanges abutting against the axle to hold the inking roller in peripheral engagement with the printing wheel for applying ink to the printing wheel.

4,793,254

#### DOCUMENT AND CARD POSITIONING DEVICE WITH SPRING RELEASEABLE BASE

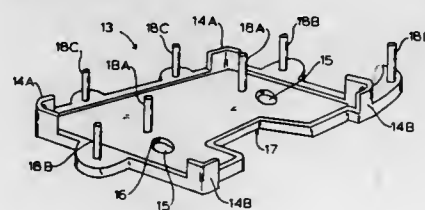
A. Glenn Wright, Rte. 4, Box 355, Pittsboro, N.C. 27312, and James L. Ross, 1803 Fountain Ridge Rd., Chapel Hill, N.C. 27514

Filed Feb. 12, 1988, Ser. No. 155,216

Int. Cl.<sup>4</sup> B41F 1/28, 3/04

U.S. Cl. 101—407 BP

11 Claims



1. A card and document positioning device for use with an identification card imprinter having a platen, comprising:

- (a) a guide base positioned beneath the platen, said platen having therethrough a plurality of guide corner holes and a plurality of peg holes;
- (b) a plurality of guide corners extending upward from the guide base for positioning an identification card;
- (c) a plurality of pegs extending upward from the guide base; and
- (d) a depressible spring means for vertically positioning the guide base beneath the platen so that the guide corners protrude upward through the guide corner holes and the pegs protrude upward through the peg holes in the platen.

4,793,255

#### ELECTROSTATIC PICK-UP ONTO AND RETENTION OF PERMANENT MASTER ON A FLEXIBLE WEB

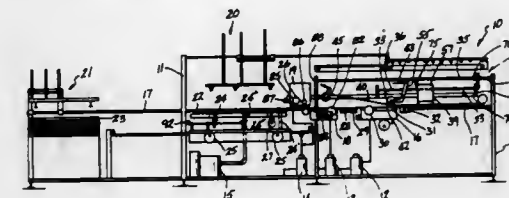
David P. Bujese, Butler, and Robert H. Detig, Berkeley Heights, both of N.J., assignors to Olin Hant Specialty Products, Inc., Palisades Park, N.J.

Filed Mar. 25, 1988, Ser. No. 173,571

Int. Cl.<sup>4</sup> B41F 1/30

U.S. Cl. 101—426

41 Claims



29. A method of electrostatically picking up and retaining an exposed master having a permanent latent image in a photopolymer layer on a carrier means comprising the steps of:

- (a) tensioning the carrier means between a tensioning means and a retention means;
- (b) applying a voltage to the carrier means to form a high voltage plane on the carrier means;
- (c) providing a break between the high voltage plane and a ground plane;
- (d) positioning the carrier means adjacent the exposed master;
- (e) contacting transfer means to one surface of the carrier means at discrete points of contact thereby moving the carrier means at the discrete points of contact into contact with the master on the opposing surface of the carrier means by the transfer means traversing the one surface of the carrier means to thereby effect the electrostatic picking up and retaining of the master to the carrier means at those discrete points of contact; and
- (f) contacting an electrically conductive strip along one edge of the master to electrically conductive means connected to the carrier means at the ground plane.

4,793,256

#### PIEZOELECTRIC FUSE FOR PROJECTILE WITH SAFE AND ARM MECHANISM

George Webb, Larwill, Ind., assignor to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Mar. 25, 1987, Ser. No. 30,142

Int. Cl.<sup>4</sup> F42C 11/02

U.S. Cl. 102—210

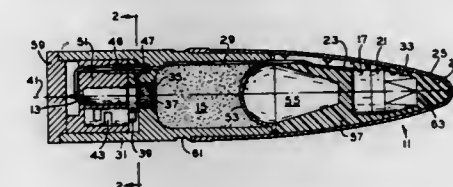
4 Claims

1. In a small active projectile of the type having an electrically triggerable detonator for firing a shaped charge, an impact actuator piezoelectric generator arrangement for triggering the detonator comprising:

- a piezoelectric element mounted within the projectile near the leading end thereof and having forward and rearward electrical contacts;
- an impact deformable electrically conductive shell spaced

from and at least partially surrounding the piezoelectric element;

a resilient material substantially filling the space between the piezoelectric element and the shell, the resilient material electrically isolating the piezoelectric element forward electrical contact from the electrically conductive shell; means electrically connecting the detonator to the shell and



to the rearward piezoelectric element contact so that upon projectile impact, the shell deforms compressing the piezoelectric element generating a voltage thereacross; the forward electrical contact including means for cutting the resilient material so that the shell makes electrical connection with the piezoelectric element forward contact upon sufficient shell deformation thereby actuating the detonator.

4,793,257

#### SAFETY AND ARMING MECHANISM

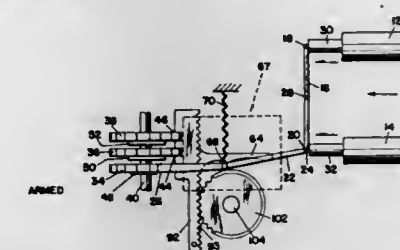
Christopher W. Bollean, Brigham City, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Apr. 16, 1987, Ser. No. 39,185

Int. Cl.<sup>4</sup> F42C 15/40

U.S. Cl. 102—221

19 Claims



11. Safety and arming mechanism responsive to electrical signals comprising, a first solenoid, a second solenoid, each of said first and second solenoids having an individually associated armature, an actuator arm having a first end and a second end, a rocker arm pivoted at an intermediate position thereof and having a first end and a second end, the armature of said first solenoid being connected to the first end of said rocker arm and the armature of said second solenoid being connected to the second end of said rocker arm and to said first end of said actuator arm, track means for guiding said actuator arm, a series of coaxial cogwheels each of which has a cutout therein, wherein said track means includes an individual straight track section in alignment with each of said cogwheels and a curved section between each of said straight sections, an elongated bar, said first solenoid and said second solenoid being disposed in operative relation with said rocker arm and said actuator arm such that said first solenoid and said second solenoid give a pull stroke and a push stroke, respectively, to the first end of said actuator arm when an electrical signal is applied thereto,

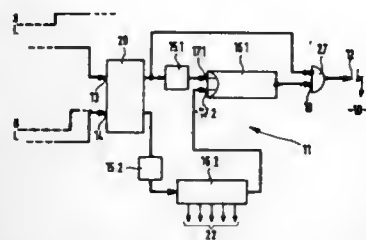


further including means for biasing said actuator arm to follow each curved section to the adjacent straight section each time said actuator arm is given a pull stroke, said actuator arm being disposed in operative relation with said track means and said cogwheels such that each pull stroke thereon moves the second end of said actuator arm sequentially from one cogwheel to the adjacent cogwheel in the series of cogwheels and each push stroke thereon rotates by a step the cogwheel with which the actuator arm is then in operative relation, said cogwheels being so arranged that each requires a different number of rotative steps to bring its cutout into alignment with the cutouts in the other cogwheels, whereby when each of the cogwheels has been rotated a predetermined number of steps prescribed by a secret code the cutouts in the series of cogwheels are aligned to permit passage therethrough of said elongated bar that can then allow arming.

**4,793,258**  
**TIME FUZE FOR UNPREDICTABLY-DETONATING**  
**SCATTER AMMUNITION**

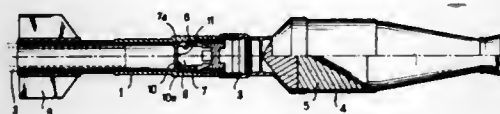
Rainer Stiebert, Röttenbach, and Erich Gerns, Nurnberg, both of Fed. Rep. of Germany, assignors to Diehl GmbH & Co., Nurnberg, Fed. Rep. of Germany  
Filed Nov. 20, 1987, Ser. No. 123,180  
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1986, 3642862

Int. Cl.<sup>4</sup> F42B 3/00  
U.S. Cl. 102—311 5 Claims



1. A time fuze for unpredictably triggered scatter ammunition, said time fuze being initiated by an electrical trigger signal, comprising a cyclical counter which is supplied with counting pulses of high pulse frequency dependent upon a time period extending from the deployment of the scatter ammunition; and upon reaching a final count condition determined by the appearance of a switching information momentarily reached in said cyclical counter, said cyclical counter is counted further at a low pulse frequency into a pre-given triggering count condition for the emitting of the trigger signal.

**4,793,259**  
**GRENADE LAUNCHER**  
Francis Ambrosi, Jean-Pascal Gardiola, both of Bourges, and Michel Schilling, Chateaufort/Cher, all of France, assignors to Luchaire S.A., Paris, France  
Filed Oct. 19, 1987, Ser. No. 109,402  
Claims priority, application France, Oct. 17, 1986, 86 14437  
Int. Cl.<sup>4</sup> F42B 11/42  
U.S. Cl. 102—485 9 Claims

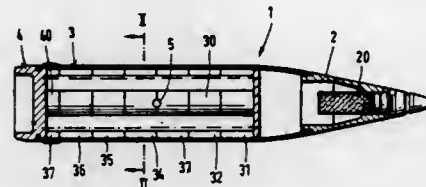


1. A rifle grenade comprising at one end, a launching tube designed to be fitted onto the barrel of a rifle and, at the other

end, a fuse and a head enclosing an explosive charge, said tube comprising, upstream of the fuse, a bullet-trap and a booster-charge of propellant powder protected from external influences by a transverse one-piece sealing wall, characterized in that the sealing wall is integral with an axially extending wall portion of the said tube and comprises an axial cavity defining a reduction in the thickness of the wall sufficient to ensure that the bullet shot by the rifle shall penetrate the wall while maintaining the integrity of the wall about the bullet.

**4,793,260**  
**SPIN-STABILIZED BOMBLET-CARRYING PROJECTILE**  
Helmut J. Kruse, Ratingen; Karin Fey, Düsseldorf; Klaus D. Karus, Jüchen, and Harmut Schilling, Kaarst, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Düsseldorf, Fed. Rep. of Germany  
Filed Aug. 31, 1987, Ser. No. 91,012  
Claims priority, application Fed. Rep. of Germany, Aug. 30, 1986, 3629663

Int. Cl.<sup>4</sup> F42B 13/50  
U.S. Cl. 102—489 3 Claims



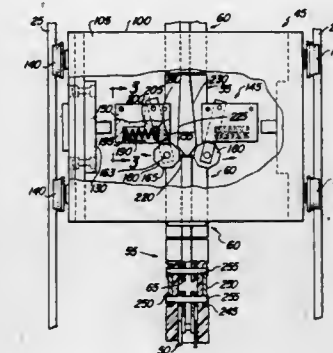
1. In a spin-stabilized projectile including a casing and a longitudinal axis, a plurality of bomblets accommodated in the casing parallel to said axis, filler pieces inserted between the casing and the bomblets, means for ejecting the bomblets by explosive force from the projectile at a predetermined point along a trajectory thereof; the improvement wherein said filler pieces are arranged in a series parallel to said axis; said series having a central part located centrally as viewed in a direction parallel to said axis, and two flanking parts on both sides of the central part; filler pieces forming said central part are of tungsten and filler pieces forming said flanking parts are of steel.

**4,793,261**  
**ACCUMULATING PALLET CHAIN-DOG CONVEYOR**  
**AND METHOD OF CONVEYING PALLETS**  
Kurt W. Schwemmler, Belleville, Mich., assignor to Durr Industries, Inc., Plymouth, Mich.  
Filed Feb. 11, 1987, Ser. No. 13,482  
Int. Cl.<sup>4</sup> B61B 10/00; B65G 17/00  
U.S. Cl. 104—172.3 11 Claims

1. An accumulating pallet chain-dog conveyor comprising: a carrier attachment defining a conveyor course; a pallet adapted to be propelled on said carrier attachment through said conveyor course; a pallet stop for halting the movement of said pallet through said conveyor course; an endless propelling means associated with said carrier attachment for propelling said pallet through a portion of conveyor course; a generally wedge-shaped dog connected to said endless propelling means; a spacer attached to said endless propelling means; two pivoting arms attached to the underside of said pallet; two horizontally opposed rollers for sequentially engaging said dog and said spacer during movement of said endless propelling means and defining a space between said rollers, said rollers each having at least one flat surface for said sequential engagement of said dog and said spacer and one of said rollers being attached to one of said pivoting

arms and the other of said rollers being attached to the other of said pivoting arms; first biasing means in operative relation to said one of said pivoting arms; second biasing means in operative relation to said other of said pivoting arms, said first and second biasing means for biasing said rollers toward one another such that said dog and said spacer are sequentially, substantially, continuously engaging by said flat surfaces of said rollers; whereby said rollers engage said dog during operation of said conveyor to propel said pallet through said conveyor course until the movement of said pallet is halted by said pallet stop at which time said biased rollers allow said dog to move through said space, said flats of said rollers being in sliding frictional contact with said dog, whereupon said spacer moves through said space in sliding, frictional contact with said flats of said rollers, imparting a stabilizing force on said pallet.

11. A method of conveyance employing the following: a conveyor having a carrier attachment defining a conveyor course; a pallet adapted to be propelled on said carrier attachment through said conveyor course; a pallet stop for halting the movement of said pallet through said conveyor course; and endless propelling means associated with said carrier attachment for propelling said pallet through a portion of said conveyor course;

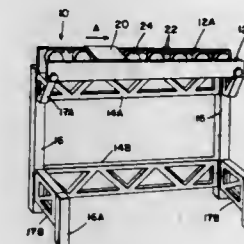


a generally wedge-shaped dog connected to said endless propelling means; a spacer attached to said endless propelling means; two pivoting arms attached to the underside of said pallet; two horizontally opposed rollers for sequentially engaging said dog and said spacer during movement of said endless propelling means and defining a space between said rollers, said rollers each having at least one flat surface for said sequential engagement of said dog and said spacer and one of said rollers being attached to one of said pivoting arms and the other of said rollers being attached to the other of said pivoting arms; first biasing means in operative relation to said one of said pivoting arms; and second biasing means in operative relation to said other of said pivoting arms, said first and second biasing means for biasing said rollers toward one another such that said dog and said spacer are sequentially, substantially, continuously engaging by said flat surfaces of said rollers; said method comprising the steps of: propelling said pallet at least partially through said conveyor course by engaging said dog with said rollers whereby said pallet is propelled along said carrier attachment; stopping the movement of said pallet through said conveyor course using said pallet stop, whereby said rollers slidingly frictionally engage said dog and subsequently said spacer

to stabilize said pallet to prevent rearward and lateral movement of said pallet on said carrier attachment.

**4,793,262**  
**TRANSPORT SYSTEM FOR COMPUTER INTEGRATED**  
**MANUFACTURING/STORAGE AND DRIVE**  
**COMPONENT THEREFOR**  
George W. Horn, Concord, Mass., assignor to Middlesex General Industries, Inc., Woburn, Mass.  
Filed Oct. 3, 1987, Ser. No. 915,147  
Int. Cl.<sup>4</sup> B61B 13/00

U.S. Cl. 104—168 11 Claims



1. Transport system for programmed transport for machining, assembly and the like of workpieces or the like comprising, in combination,

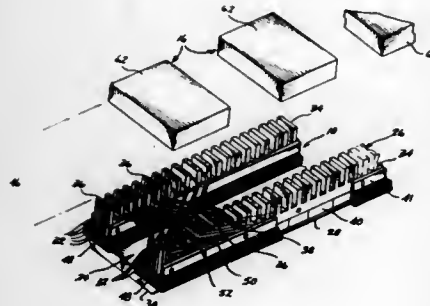
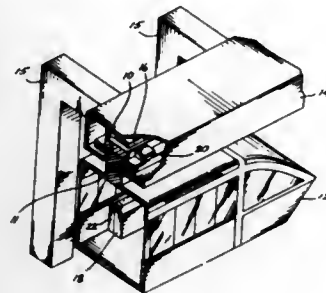
(a) means defining at least one transport path for movement of the parts and including means to selectively stop motion of the parts,  
(b) support means for supporting workpiece parts in said path and constructed and arranged for movement along said path,  
(c) drive means for moving said support means and continuously applying driving torque thereto whether said support means are moving or stopped by said means (a) and (b), the torque application being made during stops essentially without frictionally generating shedding of particles.

**4,793,263**  
**INTEGRATED LINEAR SYNCHRONOUS UNIPOLAR**  
**MOTOR WITH CONTROLLED PERMANENT MAGNET**  
**BIAS**  
John J. Basic, Renton, and Richard G. Gilliland, Redmond, both of Wash., assignors to The Boeing Company, Seattle, Wash.  
Filed Aug. 1, 1986, Ser. No. 891,697  
Int. Cl.<sup>4</sup> B61B 13/08

U.S. Cl. 104—282 20 Claims

1. A single, integrated device for the magnetic suspension, propulsion, braking, and lateral control of at least one vehicle in cooperation with a passive guideway, said guideway having a passive reaction rail formed of a magnetic material and extending the length of said guideway, said device comprising: a stator body affixed to said vehicle in confronting relationship with said reaction rail, said stator body being formed of magnetic material and including a plurality of teeth that are spaced apart from one another; at least one high-energy permanent magnet operable along a substantially linear demagnetization curve and mounted to said stator body with the poles of each said permanent magnet arranged to produce a first magnetic field having lines of magnetic flux completing a path through each said permanent magnet, an adjoining portion of said stator body and said reaction rail, said first magnetic field producing an attractive force between said stator body and said reaction rail that tends to suspend said vehicle from said guideway; means for maintaining a desired air gap between said guideway and said vehicle suspended from said guideway by said first magnetic field; and,

a polyphase propulsion coil wound through the spaces between said teeth of said stator body, said polyphase propulsion coil for producing a wave of magnetic flux that continuously travels the length of said stator body when a polyphase, AC voltage is supplied to said propulsion coil,



said wave of magnetic flux traveling at a speed directly proportional to the pole pitch and the frequency of said AC voltage and applying a force between said stator body and said reaction rail tending to cause said vehicle to be propelled along said guideway at said speed of said wave of magnetic flux.

4,793,264

#### LOW CORROSION IMPULSE INK JET INK CONTAINING ANTI-OXIDANT

An-Chung R. Lin, New Town, Conn., and Richard G. Whitfield, Kalamazoo, Mich., assignors to Dataproducts Corporation, Woodland Hills, Calif.

Continuation of Ser. No. 672,587, Nov. 16, 1984, abandoned, which is a continuation-in-part of Ser. No. 522,837, Aug. 12, 1983, Pat. No. 4,537,631, which is a continuation of Ser. No. 327,994, Dec. 7, 1981, Pat. No. 4,400,215. This application Apr. 13, 1987, Ser. No. 37,062

Int. Cl.<sup>4</sup> C09D 11/02

U.S. Cl. 106—22

2 Claims

1. An impulse ink jet system comprising:

- (a) an impulse ink jet comprising 10-97 weight percent of at least one C<sub>8</sub>-C<sub>26</sub> fatty acid, 3-20 weight percent dye and 10-90 weight percent solvent additive selected from the group consisting of aromatic alcohols, aromatic ethers, dimethyl sulfoxides, alkyl pyrrolidones, methoxy- and ethoxy- triglycols, polyethylene glycols, aliphatic ketones, and mixtures thereof; and
- (b) an ink delivery means for supplying ink to an impulse ink jet head, said means comprising metal surfaces in contact with said ink and subject to corrosion thereby;

said ink further comprising 0.1-5 weight percent anti-oxidant in amounts sufficient to reduce the rate of corrosion of said metal surfaces by said ink by at least 10% as compared to the rate of corrosion of said ink without said anti-oxidant.

4,793,265

#### FOLDING SECTIONAL TABLE

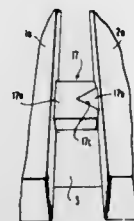
Gleam H. Morris, 1192 Cumberland Rd., Chattanooga, Tenn. 37419

Filed Jan. 26, 1988, Ser. No. 148,567

Int. Cl.<sup>4</sup> A47B 3/02

U.S. Cl. 106—118

6 Claims



1. A folding sectional table comprising, a pair of mating halves, a first pair of brace members disposed underneath one of said mating halves, the said one mating half being secured to said first pair of brace members, said first pair of brace members extending from substantially adjacent one end of said one mating half to the undersurface of the other mating half, a second pair of brace members disposed underneath the other of said mating halves, the other mating half being secured to said second pair of brace members, said second pair of brace members extending from substantially adjacent one end of said other mating half to the undersurface of the said one mating half, a first pair of laterally spaced leg members pivotally connected at one end thereof to the free ends of said first pair of brace members, a second pair of laterally spaced leg members pivotally connected at one end thereof to the free ends of said second pair of brace members, one leg of each pair crossing a leg in the other pair and being pivotally connected at said crossing; and spacer means provided at the medial portion of the table where the pair of mating halves meet, said spacer means being constructed and arranged to not only provide an aesthetically pleasing appearance to the table when in the erected position but also to align and prevent lateral movement in the mating halves when the table is in the erected position, said spacer means comprising at least one projection secured to the edge of one of the mating halves at the medial portion of the table, and at least one other projection secured to the edge of the other of the mating halves at the medial portion of the table, said one projection having a recess open on the top side and on the end facing said one other projection, thereby allowing the said other projection to enter and leave the two open sides of the recess simultaneously with the pair of mating halves disposed at an angle to each other to facilitate moving the table between the erected position and the folded position.

4,793,266

#### CAKE DECORATING STAND

Vito Napolitano, 5750 N. Octavia, Chicago, Ill. 60631, and John DiCataldo, 2914 N. Beulah St., River Grove, Ill. 60171

Filed Apr. 3, 1987, Ser. No. 33,727

Int. Cl.<sup>4</sup> A47B 11/00

U.S. Cl. 106—141

9 Claims

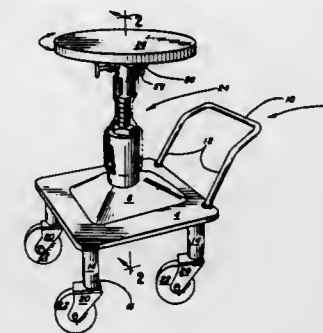
1. In a rotary table of the type having a planar support platform positioned to be centrally engaged on its underside by the rounded upper terminus of an upright support standard, the standard having a vertically disposed axis about which said support platform is adapted to rotate;

the improvement comprising, in combination:

an apertured plate means secured to the bottom side of the support platform;

a downwardly extending, centrally-located, sleeve-like member projecting from the underside of said support platform through said apertured plate means to extend below said plate means to provide a lower tubular section that is integral with an upper section that is shaped to

provide a downwardly facing hemispherical socket that is secured to the bottom side of the support platform; support means for said support platform spaced below said sleeve-like member and including an internally screw-threaded, lower support member, spaced below said centrally-located, sleeve-like member; an elongated pintle shaft, of a shape and length to extend from a supporting, bearing engagement with the innermost surface of the downwardly facing hemispherical socket and at least partially through said internally threaded support member that is spaced below the sleeve-



like member that is secured to the underside of the support platform;

the pintle shaft having an elongated threaded section for screw connection with said internally screw-threaded support member; and

a manually actuatable, handled, set screw, threadably mounted to extend through an upright wall of said lower tubular section of said sleeve-like member, for either selectively engaging the tubular section to the pintle shaft, so that they will rotate together, or for releasing the pintle shaft, so that the table and the socket may together rotate freely relative to the pintle shaft.

4,793,267

#### CANTILEVERED SHELF WITH INVISIBLE MOUNTING MEANS

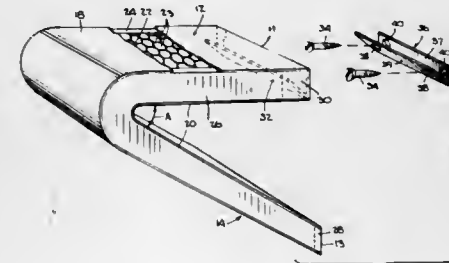
Benjamin Birillo, 1045 5th Ave., New York, N.Y. 10028

Continuation of Ser. No. 741,181, Jan. 6, 1985, abandoned, which is a continuation-in-part of Ser. No. 584,750, Feb. 29, 1984, abandoned. This application Dec. 16, 1986, Ser. No. 942,957

Int. Cl.<sup>4</sup> A47B 5/00

U.S. Cl. 106—152

7 Claims



1. A removably mountable shelf assembly comprising: a unitary rigid shelf structure in the form of a panel folded into an acute V-shape, the panel having a first end, a second end spaced from and parallel to said first end, two side edges extending between the first and second ends, a first surface forming an outer surface of the V-shape, and a second surface uniformly spaced from the first surface

and forming an inner surface of the V-shape, the first and second surfaces extending at uniform spacing to form respective outer and inner edges of the first and second ends, the V-shape having a smoothly rounded apex disposed intermediate and parallel to said first and second ends, a portion of the panel between the apex and the first end being a shelf part and a portion of the panel between the apex and the second end being a brace part, and

an angle bracket having a first leg adapted for attachment to an upright support surface and a second leg joined at an acute angle to the first leg, the first end of the shelf structure being provided with a slot having an opening adjacent to the second surface and extending at an acute angle into the panel toward the first surface, the slot being sized to slidably receive the second leg of the angle bracket, the lengths of the first and second legs of the angle bracket being less than the spacing between the first and second surfaces of the panel, such that the bracket does not extend beyond the first and second surfaces or beyond a plane containing the outer and inner edges of the first end of the panel when the second leg is fully inserted into the slot.

4,793,268

#### METHOD FOR CONTROLLING ADDITIVE FEED IN A BOILER SYSTEM

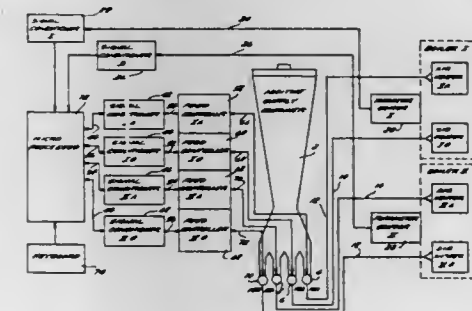
Ira Kukin, West Orange, and William C. Pepe, Stanhope, both of N.J., assignors to Apollo Technologies Int'l, Morris Plains, N.J.

Filed Nov. 27, 1987, Ser. No. 125,926

Int. Cl.<sup>4</sup> F23B 7/00

U.S. Cl. 110—343

23 Claims



1. A method of controlling the feed of an additive to a fuel-burning boiler system which comprises:

- (a) detecting a plurality of boiler operational parameter values and converting said values to corresponding boiler parameter signals;
- (b) converting each of said boiler parameter signals to a control signal in accordance with its own characteristic conversion program;
- (c) combining each of said control signals in accordance with a predetermined schedule;
- (d) detecting the existing additive feed and producing a corresponding computed additive feed signal, and
- (e) comparing said existing additive feed signal and said computed additive feed signal and modifying the additive feed to cause it to conform to said computed additive feed signal if necessary.



4,793,269

## KILN FOR WASTE DISPOSAL

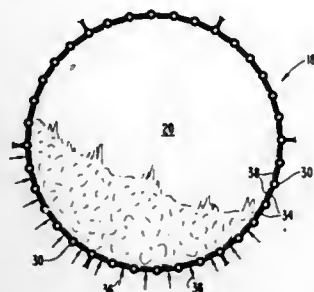
Egon A. Dezabay, Mt. Lebanon, and Graham A. Whitlow, Murrysville, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 29, 1988, Ser. No. 161,538

Int. Cl.<sup>4</sup> A47J 36/00, 36/24

U.S. Cl. 110—246

9 Claims



1. A rotary kiln device for burning waste solids including an elongated, generally cylindrical combustor structure defining an internal combustion chamber and means mounting said structure for rotation about its longitudinal axis, said structure comprising:

- a plurality of generally parallel water pipes spaced circumferentially about the periphery of said structure;
- means interconnecting said pipes and comprising a plurality of individual webs, each disposed to extend longitudinally of the structure between a respective adjacent pair of pipes for circumferentially interconnecting the latter, each web comprising structure defining at least one opening providing access to the chamber for combustion air;
- protective means including at least one protective sheet for each web;
- spacer means mounting each sheet on its respective web, internally of the chamber, and in slightly spaced and generally parallel relationship relative to the web, said web and said sheet defining a plenum therebetween; and
- means for diverting combustion air flowing through said opening and toward the chamber and causing such air to flow through the plenum across a surface of the sheet for cooling the latter prior to introduction of the combustion air into the chamber.

4,793,270

## INCINERATION OF WASTE MATERIALS

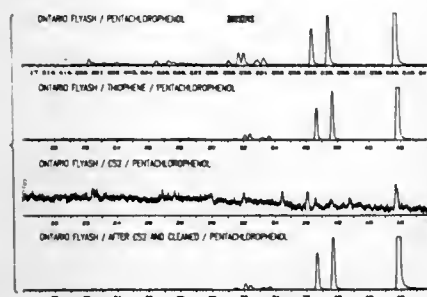
Francis W. Karasek; Leslie C. Dickson, both of Waterloo, Canada, and Otto Hutzinger, Bayreuth, Fed. Rep. of Germany, assignors to University of Waterloo, Waterloo, Canada

Filed Dec. 24, 1986, Ser. No. 946,035

Int. Cl.<sup>4</sup> F23B 7/00

U.S. Cl. 110—344

15 Claims



1. A method of disposal of solid refuse in the form of municipi-

pal waste containing materials which are combustible to form precursors for dioxin formation, which comprises incinerating said solid refuse in a self-sustaining incineration operation to form gaseous products of incineration containing fly ash and precursors for dioxin formation, passing said gaseous products of incineration to a precipitation step wherein said fly ash is precipitated from the gaseous products of incineration, contacting the surface of said fly ash during said passage of said gaseous products of incineration to said precipitation step with a small quantity of at least one catalytic-effect inhibiting substance capable of being adsorbed on and reacting with catalytically-active sites on the surface of the fly ash to form stable, inactive surface compounds, so as to inhibit catalytic effects of said fly ash towards the formation of dioxins from said precursors during said passage, and venting said gaseous products of incineration after said precipitation of fly ash therefrom.

4,793,271

## KNIFE HOLDER APPARATUS FOR CUT PILE TUFTING MACHINE

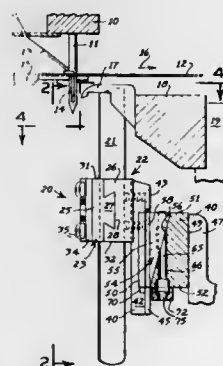
Ray O. V. Magourik, Dunlap, Tenn., assignor to Tuftco Corporation, Chattanooga, Tenn.

Filed Jan. 19, 1988, Ser. No. 145,108

Int. Cl.<sup>4</sup> D05C 15/24

U.S. Cl. 112—80.6

7 Claims



1. In a cut pile tufting machine having means for supporting a base fabric for longitudinal movement in a feeding direction through said machine, a plurality of transversely spaced reciprocal needles for introducing yarns through said base fabric to form loops, a looper hook for each needle on the opposite side of the base fabric from the needles and adapted to cooperate with a corresponding needle to seize and hold a yarn carried by the needle to form a loop, a cutting apparatus comprising:

- (a) a knife holder module comprising a knife block member having front and rear portions and top and bottom portions, and an elongated mast having upper and lower end portions and opposed side surfaces,
- (b) a plurality of elongated knife slots extending upright through said block
- (c) a plurality of elongated knives, each knife being received in a corresponding knife slot,
- (d) securing means in said block member for engaging and holding each knife in said corresponding knife slot to project above said knife block member,
- (e) said upper end portion of said mast being fixed to the rear portion of said knife block member so that said lower end portion of said mast depends below said knife block member,
- (f) a flange projecting transversely away from each of said opposed side surfaces of said mast,

- (g) an elongated knife bar mounted below said looper hooks for cooperative reciprocable movement with said looper hooks, said knife bar having a front face, a top face, and a bottom face,
- (h) an upright slot for each mast formed through the front face of said knife bar and extending through said top and bottom faces,
- (i) each slot having a pair of opposed parallel side walls spaced apart a distance substantially equal to the transverse dimension of said corresponding mast, and a back wall connecting said side walls and sloping from said top face toward said bottom face,
- (j) a pair of opposed parallel elongated recesses in said side walls opening through said bottom face for slidably receiving said corresponding flanges for positioning said knife holder module in an operative position relative to said knife bar, said recesses being spaced forward of said back wall,
- (k) a wedge member receivable in said slot between said back wall and said mast in said operative position, and
- (l) securing means for holding said wedge member in said slot in said operative position.

4,793,272

## FOLDING DEVICE FOR AN AUTOMATIC SEWING MACHINE

Hans Scholl, Oerlinghausen-Lipperreibe, and Wolfram Schulze, Bielefeld, both of Fed. Rep. of Germany, assignors to Kochs Adler Aktiengesellschaft, Fed. Rep. of Germany

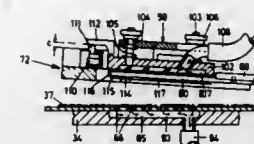
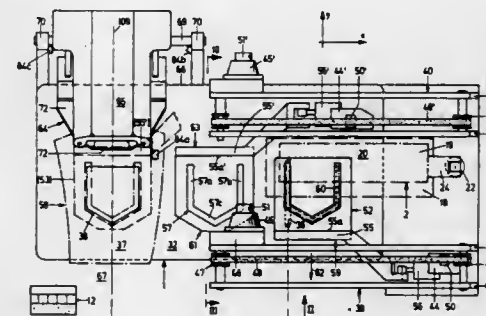
Filed Mar. 15, 1988, Ser. No. 169,275

Claims priority, application Fed. Rep. of Germany, Mar. 20, 1987, 37092103

Int. Cl.<sup>4</sup> D05B 21/00

U.S. Cl. 112—121.15

9 Claims



- 1. Folding device for an automatic sewing machine, comprising:
  - a carrier plate (32) for a first workpiece (37);
  - a sword (80) attached to a sword carrier (76) for receiving a second workpiece (38);
  - an outer frame (72) attached to an outer frame carrier (65)

and having creasing devices (83) for folding the second workpiece (38) around the sword (80);

a lower working position of the sword (80) on the carrier plate (32) and an upper working position of the sword (80) above the carrier plate (32);

means for moving the sword carrier (76) bearing the sword (80) between said lower working position and said upper working position;

a lower working position of the outer frame (72) on the carrier plate (32), a central working position of the outer frame (72) which is substantially identical with the upper working position of the sword (80) and above this central working position, and an upper work starting position of the outer frame (72);

means for moving the outer frame carrier (65) into the said lower, central and work starting positions of the outer frame (72); and

means for drawing out the sword (80) of one of its working positions into a retracted position out of the second workpiece (38); wherein

the outer frame (72) is provided with a vacuum holding device (99) for the sword (80).

4,793,273

## AUTOMATIC THREAD TENSION DEVICE FOR A SEWING MACHINE

Kazumasa Hara, Hino; Akiyoshi Sasano, Musashino, and Mikio Kofke, Oume, all of Japan, assignors to Janome Sewing Machine Co., Ltd., Tokyo, Japan

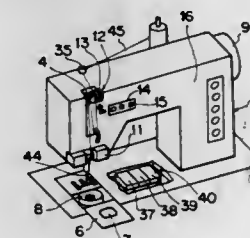
Continuation-in-part of Ser. No. 783,750, Oct. 3, 1985, abandoned. This application Mar. 17, 1987, Ser. No. 27,490

Claims priority, application Japan, Oct. 3, 1984, 59-206200

Int. Cl.<sup>4</sup> D05B 47/04

U.S. Cl. 112—254

9 Claims



1. An automatic thread tension adjusting device for a sewing machine including an upper thread supply, a needle (44) vertically reciprocable by rotation of an upper drive shaft (9) to penetrate into a fabric to be sewn to thereby form stitches in the fabric from an upper and lower thread, a thread take-up lever (4) receiving an upper thread from the upper thread supply, a loop taker, a bobbin (8) placed in the loop taker, the lower thread being wound up on the bobbin, the loop taker being rotatable in timed relation with the vertical reciprocating movement of the needle to interlock the upper thread with the lower thread, the upper thread being supplied from the upper thread supply to the needle through at least the thread take-up lever, and

user-operated means including a start switch (15) operated to produce a start signal for a sewing machine, the automatic thread tension adjusting device comprising: thread tensioning means (12,35) positioned between the upper thread supply and the thread take-up lever, said thread tensioning means being responsive to said start signal for giving a predetermined tension to the upper thread;

detecting means (11) positioned between the thread take-up lever and the needle for detecting a tension of the upper thread, said detecting means being activated in response to a tension applied to the upper thread at a predetermined

angular position of the upper drive shaft as the latter is rotated and producing a detected tension signal; measuring means (37) responsive to said detected tension signal for measuring therefrom the value of the tension applied to the upper thread and producing an output representing the measured value of the tension applied to the upper thread; calculating means (39,40) responsive to said output of said measuring means to produce an output calculated value; and display means (14,43) responsive to said output calculated value from said calculating means for indicating said calculated output value, whereby said thread tensioning is adjusted to give to said upper thread a tension corresponding to said calculated output value.

**4,793,274**  
**METHOD AND APPARATUS FOR CONDUCTING GEOPHYSICAL EXPLORATION FROM A MARINE VESSEL**

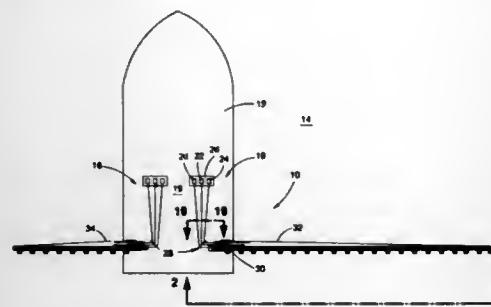
William R. Regone, La Place, La., assignor to Amoco Corporation, Chicago, Ill.

Filed Apr. 15, 1987, Ser. No. 38,397

Int. Cl.<sup>4</sup> B63B 21/16

U.S. Cl. 114-242

21 Claims



1. An apparatus with a ship for conducting geophysical exploration in a marine environment, comprising:
  - (a) a boom mounted with the ship and extending therefrom;
  - (b) a winch mounted with the ship and separate from the boom;
  - (c) a cable having a first end wound onto the winch;
  - (d) a geophysical exploration device attached to the other end of the cable;
  - (e) pulley means mounted on the boom at a selected distance from the ship for rotatably suspending the cable and attached geophysical exploration device therefrom;
  - (f) rotating means disposed between the boom and the ship for rotating the boom between an extended position in which the boom extends athwartships and a stowed position adjacent the ship; and
  - (g) guide means interposed between the winch and pulley means for aligning the cable with the winch and pulley means as the boom is rotated between the stowed and extending positions.

**4,793,275**  
**MARINE HAZARDOUS OFF-LOADING SYSTEM**

David Usher, 16400 N. Park Place #1202, Southfield, Mich. 48071

Continuation of Ser. No. 549,323, Nov. 7, 1983, abandoned, which is a continuation of Ser. No. 36,760, May 7, 1979, abandoned. This application Oct. 9, 1984, Ser. No. 658,639

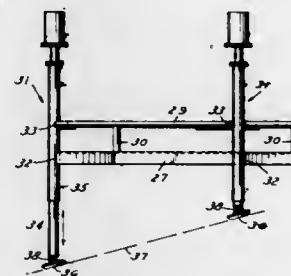
Int. Cl.<sup>4</sup> B63B 27/00

U.S. Cl. 114-270

11 Claims

1. A hazardous off-loading system for emergency use in unloading the cargo of disabled ships comprising a deck mountable leveling platform, a personnel control and survival

equipped module on said platform, substantial displacement means for post-placement leveling of the platform after it has been deposited and released with its full weight on a support surface, power generating and power actuated means for ef-



fecting said leveling of the platform, said respective means to accommodate initial deck inclination and/or re-leveling after deck shifting, and a secure base on said platform for said module, personnel and equipment to be employed in the unloading operations.

**4,793,276**  
**ANCHOR**

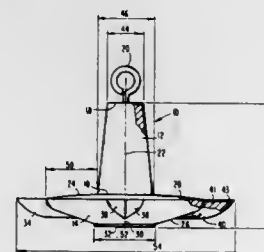
Edward Stafford, 322 Englewood Dr., Crawfordsville, Ind. 47933

Filed Oct. 22, 1986, Ser. No. 921,758

Int. Cl.<sup>4</sup> B63B 21/26

U.S. Cl. 114-300

16 Claims



1. An improved anchor for securing a floating object to the bottom of a body of water comprising:
  - a head portion having a convex top surface, a convex bottom surface interfacing at an acute angle with said convex top surface to define a substantially circular peripheral edge, a substantially planar seating surface attached to said convex bottom surface;
  - a shank portion extending at an obtuse angle from said convex top surface of said head portion;
  - a plurality of flukes extending radially from said peripheral edge;
  - a rope attachment means fixedly attached to said shank portion for attaching a rope or cable thereto;
 wherein said shank portion, head portion and flukes are manufactured of high density lead.

**4,793,277**  
**DETECTOR OF THE INFLATION PRESSURE OF MOTOR VEHICLE TIRES**

Lothar Haas, Stein; Gerhard Hettich, Dietershofen; Manfred Kamp; Hans-Dieter Schmid, both of Nuremberg; Hans Schrumpf, and Berthold Walter, both of Oberasbach, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE86/00444, § 371 Date Aug. 6, 1987, § 102(e) Date Aug. 6, 1987, PCT Pub. No. WO87/03546, PCT Pub. Date Jun. 18, 1987

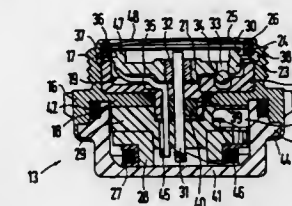
PCT Filed Nov. 5, 1986, Ser. No. 112,509

Claims priority, application Fed. Rep. of Germany, Dec. 12, 1985, 3543864

Int. Cl.<sup>4</sup> H01H 35/26; B60C 23/04

U.S. Cl. 116-34 R

7 Claims



1. In a tire pressure detector for motor vehicles, comprising a pressure switch which is to be fastened to a circumference of a wheel rim and is actuated by air pressure in the tire for monitoring the tire pressure and which comprises an electrically conductive switching diaphragm; a member forming a reference pressure chamber closed toward the tire by said electrically conductive switching diaphragm; a contact pin supported in said member and cooperating with the switching diaphragm; electric oscillating circuit, the contact pin and the switching diaphragm being connected with said electric oscillating circuit; and a detector housing in which the reference pressure chamber is thermally insulated from the wheel rim, the improvement comprising a supporting ring (22), a spacing ring (24) of insulating material, said detector housing being metallic, said member (23) having a radially projecting collar (36), the member forming reference pressure chamber (23) being axially clamped between the supporting ring (22) and the spacing ring (24) in the metallic detector housing (16) at the collar (36) thereof so that an annular gap (37) is formed between the collar (36) and an inner wall of the detector housing (16).

**4,793,278**  
**TRAVEL DISTANCE INDICATING METHOD**

Michael F. Gillick, 1838 Ellen Ave., San Jose, Calif. 95125

Filed Nov. 19, 1986, Ser. No. 933,040

Int. Cl.<sup>4</sup> G09F 9/00

U.S. Cl. 116-323

1 Claim



1. A method of tracking progress of travel during a journey comprising, positioning removable members on an elongated lengthwise ends and having a plurality of spaced apart graduations disposed to divide the length of said bar member into a plurality of equal sections, each section representing a portion of a journey, said first lengthwise end nearest a portion representing the start of said journey and said second lengthwise end nearest a portion representing a destination of said journey, said removable members each having a representation of an observation on said journey,

said positioning of each of said removable members being in accordance with a section of said elongated bar representing a portion of said journey in which a corresponding observation will occur, locating a marker member at the first lengthwise end of said bar member, said marker member slidably fit to said bar member, sliding said marker member to coincide with a removable member having a representation of travel observation when said observation occurs, and sliding said marker member to coincide with a graduation when a portion of the journey represented by the section preceding said graduation has been completed.

**4,793,279**  
**ICE-CREAM DISPENSER**

Laval Grenier, 1340 Vachon Blvd., South, Sainte-Marie de Beauce, Canada G6E 2S5

Filed May 20, 1987, Ser. No. 51,826

Int. Cl.<sup>4</sup> B05C 5/02

U.S. Cl. 118-16

1 Claim



1. In combination, an ice cream dispenser frame, an ice cream supply means, a sweet additive supply means, a first nozzle operatively connected to said ice cream supply means and anchored in vertical position to said frame and defining a bottom mouth, a second nozzle operatively connected to said sweet additive supply means and anchored in horizontal position to said frame and defining a mouth proximate said first nozzle mouth; each nozzle defining a sealable casing, a valve member movable into said sealable casing, biasing means to bias the valve member to close the corresponding nozzle mouth, and manual lever means to pull the valve member out of the nozzle mouth against the bias of said biasing means; wherein said nozzle mouth constitutes a frusto-conical section of said nozzle casing; each said valve member consisting of an elongated rigid rod member having a needle valve member at one end, said needle valve member defining a conical free end frictionally sealingly closing said nozzle mouth under the bias of said biasing means; whereby actuation of said manual lever means progressively continuously disengages said needle valve member from said mouth.



4,793,280

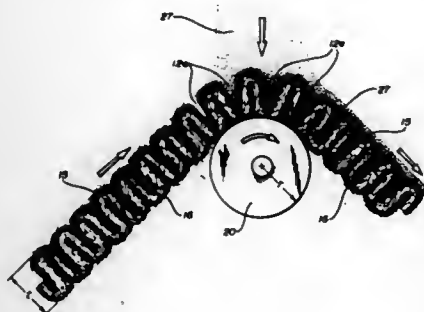
**METHOD AND APPARATUS FOR PROVIDING POWDER INTO FIBROUS WEB STRUCTURES**

Michael J. Menard, Doylestown, Pa.; Thomas J. Helmstetter, Sr., Piscataway, N.J., and David E. Johnson, Newton, Pa., assignors to Personal Products Company, Milltown, N.J.  
Division of Ser. No. 897,171, Aug. 15, 1986, Pat. No. 4,699,808.  
This application Jul. 13, 1987, Ser. No. 72,947

Int. Cl.<sup>4</sup> B05B 13/02

U.S. Cl. 118—44

3 Claims



1. An apparatus for providing a powder material into a corrugated fibrous web, the apparatus comprising:

- (a) web feeding means for continuously feeding a corrugated fibrous web over a roller to open spaces between the web corrugations, said feeding means including dual belts gripping the web;
- (b) means for continuously feeding a powder by gravity onto the web corrugations while the corrugations are opened, so as to substantially fill the spaces between the corrugations with the powder;
- (c) reciprocating pad means for compacting the powder into the web corrugations, whereby the corrugations are substantially completely filled with the powder; and
- (d) a vertically-movable roller under which the powder-filled web is passed for changing continuous forward motion of the web to an intermittent forward motion of the web.

4,793,281

**UNITIZED TONER ASSEMBLY FOR CONTINUOUS ELECTROSTATIC FILM MEDIUM**

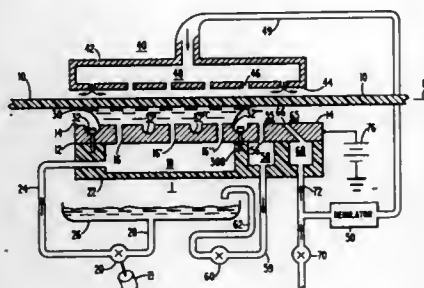
Lawrence W. Dobbin, Woodlynne, and Sia K. Luk, Collingswood, both of N.J., assignors to General Electric Company, Camden, N.J.

Filed Aug. 28, 1987, Ser. No. 90,630

Int. Cl.<sup>4</sup> G03G 15/06

U.S. Cl. 118—650

19 Claims



1. An applicator for applying toner to elongated sheet photoconductive medium including upper and lower sides pre-charged on said lower side with an electrostatic image, and

adapted to move in a travel direction along a travel path, said applicator comprising:

an electrically conductive, generally flat monolithic first surface disposed below and parallel to said travel path of said photoconductive medium, said first flat surface being interrupted, in a toner application region, by an alternating pattern of a plurality of parallel elongated first slots and elongated fluid channels, the direction of elongation of said first slots and channels being perpendicular to said medium travel direction;

a plenum of pressurized toner, said plenum of first pressurized toner communicating with said plurality of slots for, in operation, causing said toner to flow from said first slots and into the region between said first surface and said lower side of said photoconductive medium, and thence to said fluid channels;

a substantially flat second surface including gas orifices, said second surface being maintained parallel to and at a fixed distance from said first surface on the upper side of said travel path for supporting the medium with its lower surface at a predetermined spacing from said first surface in such a fashion as to urge said photoconductive medium into contact with said toner, whereby excess toner tending to flow from said lower side of said photoconductive medium to said upper side of said photoconductive medium at locations along the side of said travel path is urged back towards said lower side by said gas, but excess toner tends to adhere to said lower side of said photoconductive medium as said photoconductive medium travels past said toner application region, thereby tending to tone portions of said photoconductive medium other than those portions defining the electrostatic image;

a further slotted portion of said first surface, said further slotted portion being located relative to said toner application region such that a portion of said medium during its progress along said travel path reaches said further slotted portion after leaving said toner application region;

a vacuum source coupled to said further slotted portion of said first surface, for tending to remove said excess toner tending to adhere to said lower side of said photoconductive medium;

an air knife, said air knife including a third slotted portion of said first surface and a source of gas under pressure communicating with said third slotted portion of said first surface, for causing gas to issue from said third slotted portion of said first surface, said third slotted portion being configured to direct the issuing gas in an initial direction defining a direction component normal to said first surface and a direction component opposed to said travel direction, said air knife being located relative to said further slotted portion for tending to keep said excess toner in the region of said further slotted portion, thereby enhancing the effective removal of said excess toner; and electrical means coupled to said first surface for applying a potential to said first surface to impart a charge to said toner, thereby aiding in developing said image.

4,793,282

**DISTRIBUTOR BEAM FOR CHEMICAL VAPOR DEPOSITION ON GLASS**

William M. Greenberg, Oregon; Dennis G. Maas, and Randall L. Bauman, both of Perrysburg, all of Ohio, assignors to Libbey-Owens-Ford Co., Toledo, Ohio

Filed May 18, 1987, Ser. No. 50,466

Int. Cl.<sup>4</sup> B05C 11/00

U.S. Cl. 118—667

22 Claims

1. An apparatus for coating a surface of a sheet of glass by deposition of a coating material comprising:

a first plenum for receiving a first coating gas and having an outlet;

a second plenum for receiving a second coating gas and having an outlet;

a mixing chamber having an inlet connected to said first

4,793,284

**APPARATUS AND PROCESS FOR OBTAINING MARKETABLE SHELLFISH**

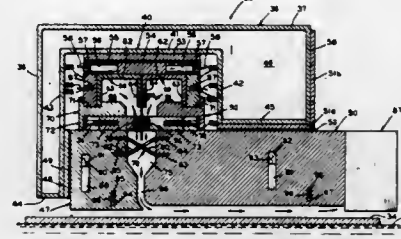
Roy E. Davis, 16 Laydon Way, Pequoton, Va. 23662

Filed May 22, 1987, Ser. No. 53,008

Int. Cl.<sup>4</sup> A01K 61/00, 80/00

U.S. Cl. 119—4

10 Claims



the first coating gas and the second coating gas to form a coating material, said finger baffle including at least two finger elements each extending across said mixing chamber and having one end located closer to said mixing chamber inlet than an opposite end.

4,793,283

**APPARATUS FOR CHEMICAL VAPOR DEPOSITION WITH CLEAN EFFLUENT AND IMPROVED PRODUCT YIELD**

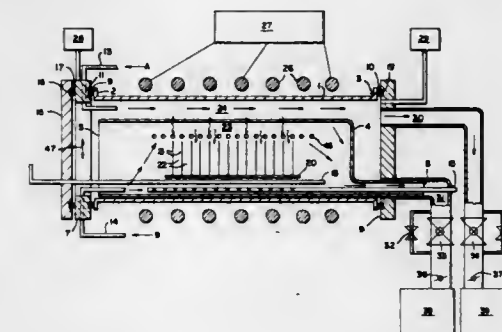
Robert F. Sarkozy, 85 Concord Rd., Westford, Mass. 01886

Filed Dec. 10, 1987, Ser. No. 131,475

Int. Cl.<sup>4</sup> C23C 16/52

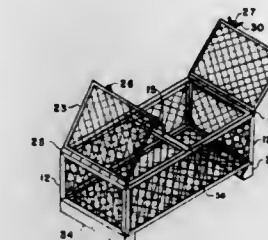
U.S. Cl. 118—725

6 Claims



1. A system for the chemical vapor deposition of a film onto surfaces of a plurality of substrates comprising:

- (a) a furnace tube;
- (b) a reactor tube arranged inside furnace tube to provide a plenum chamber between the outer surface of said reactor tube and the inner surface of said furnace tube, said reactor tube having a reduced cross-section exhaust end, an open end, and a plurality of axially spaced openings;
- (c) means for introducing a plurality of said substrates into said reactor tube through said open end;
- (d) means for introducing a stream of first reactant gas into said plenum chamber;
- (e) means for controlling gas pressures in said plenum chamber and in said reactor tube to cause a portion of said first reactant gas to flow from said plenum chamber through said axially spaced openings into said reactor tube;
- (f) first gas exhaust means for removing said first reactant gas from said plenum chamber;
- (g) means for separately introducing a stream of a second reactant gas into said reactor tube; and
- (h) second gas exhaust means for removing said second reactant gas from said reactor tube.



1. Apparatus for transporting harvested contaminated shellfish from contaminated waters to uncontaminated waters and for housing the contaminated shellfish for a predetermined time in the uncontaminated waters to permit the shellfish to purge themselves of contaminants and become marketable, comprising:

an enclosure for housing the shellfish, said enclosure including a non-corrosive angle bar open frame defining a bottom, at least four sides and a top portion,

each said bottom and sides having heavy gauge mesh material secured to segments of said angle bar open frame so as to define a perforate box-like structure having an open top,

a pair of closure doors for said open top and rotatably secured to the open top of said perforate box-like structure, each one of said pair of closure doors being formed of a flat bar peripheral frame and a heavy gauge mesh material spanning said peripheral frame and secured thereto, each one of said pair of closure doors having one peripheral side thereof hingedly connected to opposite sides of said enclosure at the top portion thereof and pivotally movable about the hinged connection from a closed position closing the open top of said enclosure to an open position wherein said enclosure may be selectively filled and emptied of the contents thereof,

a T-bar secured to said top portion and spanning the open width of said enclosure at substantially the midpoint thereof,

said pair of closure doors each having the peripheral side that is opposite to the hinged peripheral side being adapted to abut against the top of said T-bar when said pair of doors are in closed position, and means for selectively securing said closure doors against the top of said T-bar to thereby form a sealed closure for said open top.

4,793,285

**AUTOMATIC MILKING APPARATUS AND METHODS**

Barry R. Marshall, Ramsden, England, assignor to Ambic Equipment Limited, Oxfordshire, England

Filed Nov. 10, 1986, Ser. No. 928,547

Claims priority, application United Kingdom, Nov. 12, 1985, 8527864

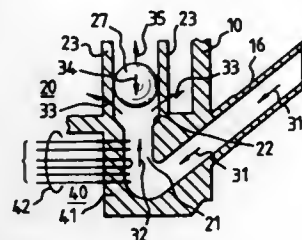
Int. Cl.<sup>4</sup> A01J 7/00

U.S. Cl. 119—14.02

7 Claims

4. Automatic milking apparatus which comprises a claw-piece and in which air-bleed on the upstream side of the claw-piece is excluded during milking, said apparatus further comprising a cluster of four short-milk tubes and associated teat cups for milking the four quarters of a cow, four monitoring passages within the said claw-piece, each separately carrying

the milk from one of the quarters of the cow, a one-way valve means associated with each of the four monitoring passages for preventing milk from one quarter of the cow from entering the monitoring passage of another quarter of the cow, a group of electrical sensing means, each associated with a respective one of the four monitoring passages, for continuously making



electrical measurements of a plurality of values relating to the milk passing through the respective monitoring passage and for producing electrical signals in accordance therewith, switching means for selecting sensing means of the four groups of sensing means for monitoring, a data processing means for converting said electrical signals into meaningful values and display means for visual display of such values.

4,793,286

## HOUSING UNIT FOR A DOMESTIC ANIMAL

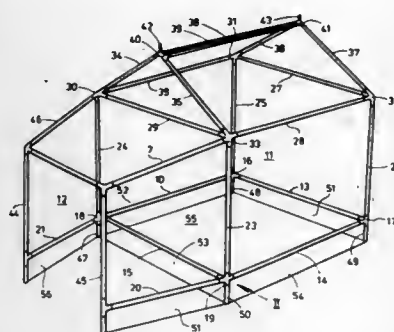
Ronald A. Buxton, 45 Trescobars Road, Falmouth, Cornwall, England

Filed Apr. 16, 1987, Ser. No. 38,963

Int. Cl.<sup>4</sup> A01K 1/03

U.S. Cl. 119-19

7 Claims



1. A housing unit for a domestic animal comprising a generally rectangular upwardly open box-like base structure having side walls,

upstanding further side members attachable to said side walls of said base structure in forwardly extending side-by-side relation to define an entrance corridor to said housing unit,

a frame composed of a plurality of individual frame elements having means for attachment to said base structure to be supported thereon,

a plurality of frame element interconnection means for interconnecting the ends of said frame elements other than those attached to said base structure whereby to form a frame overlying said base structure,

water proof ground sheet means shaped to fit over the underside of said box-like base structure and extend at least part-way up the walls on the outside thereof, fixing means for fixing an edge of said ground sheet means to the side walls of said base structure,

a flexible waterproof cover removably supportable on said

frame and defining therewith an interior housing chamber in which said base-structure forms a bed,

means defining an opening in said flexible waterproof cover through which access can be gained to said interior chamber defined by said flexible cover and said frame, said opening being a permanently open non-closable entrance for a domestic pet animal,

further frame elements attachable to said upstanding further side members to project upwardly therefrom,

further frame element attachment means interconnecting said further frame elements together and to said frame elements to form a composite frame including a first frame part defining said interior housing chamber and a second frame part defining an entrance chamber in communication with said interior housing chamber,

said flexible cover including a portion extending over said entrance chamber and defining therewith a permanently open entrance for an animal.

4,793,287

## FARROWING STATION WITH AN ELECTRONIC CONTROL

Helmut Hofmann, Postgasse 6, 8671 Köditz, Fed. Rep. of Germany

PCT No. PCT/DE85/00211, § 371 Date Apr. 14, 1986, § 102(e)

Date Apr. 14, 1986, PCT Pub. No. WO86/00192, PCT Pub.

Date Jan. 16, 1986

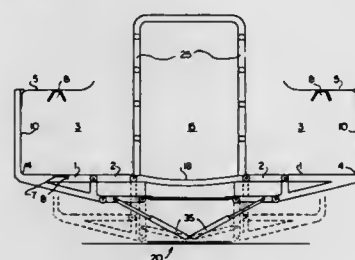
PCT Filed Jun. 25, 1985, Ser. No. 851,075

Claims priority, application Fed. Rep. of Germany, Jun. 27, 1984, 3423627

Int. Cl.<sup>4</sup> A01K 1/02

U.S. Cl. 119-20

37 Claims



1. A farrowing station assembly having a cage for a mother animal such as a sow including a first floor, comprising:

at least one lateral floor section for piglets on at least a portion of an outside perimeter of said first floor, said at least one lateral floor section and said first floor being movable to different levels with respect to one another in an upward and downward direction;

lifting and lowering means for moving at least one of said first floor and said at least one lateral floor section to said different levels, said lifting and lowering means being disposed under at least one of said first floor and said at least one lateral floor section on a side opposite the mother animal; and

protecting matting means impermeable to liquid disposed on at least a portion of said first floor and said at least one lateral floor section for protecting the animals from injury and protecting said lifting and lowering means from soiling or exposure to liquid.

4,793,288

## PRACTIJUMPS

Francis B. Hoadley, Rte. 3, Box 30, Monticello, Fla. 32344

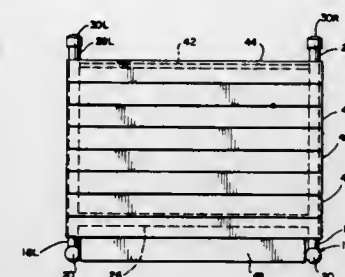
Continuation of Ser. No. 698,900, Feb. 6, 1985, abandoned. This

application Jun. 4, 1987, Ser. No. 57,635

Int. Cl.<sup>4</sup> A01K 15/02

U.S. Cl. 119-29

15 Claims



1. A dog jumping apparatus comprising two bases disposed at opposite sides of the apparatus; each base including a portion extending horizontally front to back;

two uprights extending vertically at said opposite sides, each upright having a plurality of mounts at different heights thereon;

a top board extending between said uprights and secured at two of said mounts, said top board having lower securing means at a bottom edge thereof; and

at least one lower board having upper securing means at a top edge, said top edge of said at least one lower board being secured to said bottom edge of said top board by said securing means of said top board mating to said securing means of said at least one lower board such that said at least one lower board is supported by said top board.

4,793,289

## HOLDER FOR SALT BLOCK

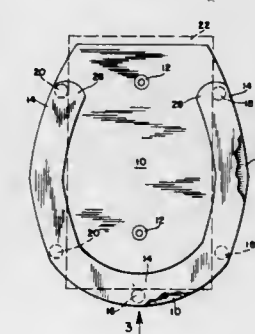
Patricia A. Peco, 70 Flanagan Hills Rd., Sterling, Mass. 01564

Filed Dec. 4, 1987, Ser. No. 128,642

Int. Cl.<sup>4</sup> A01K 5/015

U.S. Cl. 119-51 R

6 Claims



1. A salt block holder comprising a solid, continuous flat plate, a one piece U-shaped front holder, the front plate being open centrally for access to the interior of the holder, the plate, the holder element being otherwise generally of similar outline, said plate and said holder element being spaced and parallel, and having their outline in general conformation,

a post attached to and connecting the plate and the holder element at the closed end of the U shape, said post being centrally located and forming a bottom for the holder and content thereof,

a spaced pair of similar posts attached to and connecting the

plate and the holder element at both lateral edges thereof, the top of the holder being free, open, and unimpeded, and the sides of the holder being substantially open.

4,793,290

## PET FOOD PROTECTING DEVICE

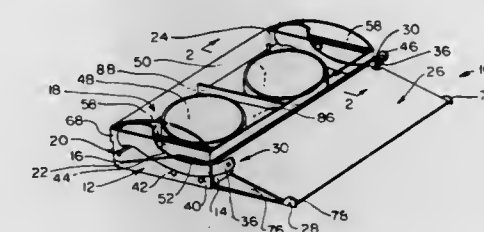
Timothy O'Donnell, 2501 Pepperwood, Long Beach, Calif. 90815

Filed Nov. 13, 1987, Ser. No. 119,963

Int. Cl.<sup>4</sup> A01K 5/01

U.S. Cl. 119-62

14 Claims



1. A pet feeding apparatus comprising a food tray having a front and rear, a tray cover hinged to said rear of said tray, a foot plate hinged at a horizontal axis forward of said front of said tray for rotation between an upwardly and rearwardly inclined released disposition and an actuated disposition depressed downwardly from said released disposition, a ram mechanism having a first end oriented to bear against the underside of said tray cover and a second end, connection means coupling said second end of said ram mechanism to said foot plate, and guide means on said food tray engaged with said ram mechanism to constrain said ram mechanism to move in a concave upwardly facing arcuately curved path, whereby depression of said foot plate to said actuated disposition carries said ram mechanism rearwardly and upwardly to lift said cover in rotation above said tray and release of said foot plate allows said cover to drop in counter-rotation onto said tray, thereby returning said foot plate to said released disposition.

4,793,291

## MINI DRINKER

Eldon Hostetler, Middlebury, Ind., assignor to Ziggity Systems, Inc., Middlebury, Ind.

Continuation-in-part of Ser. No. 821,072, Jan. 21, 1986, Pat. No.

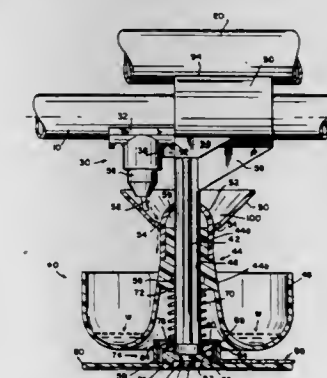
4,770,126. This application Aug. 10, 1987, Ser. No. 84,419

The portion of the term of this patent subsequent to Sep. 13, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> A01K 39/022, 7/02

U.S. Cl. 119-81

2 Claims



1. An attachment to a poultry or small animal watering



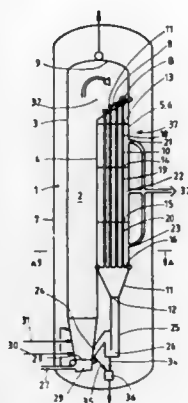
system for use with either a trigger drinker or a nipple drinker having a vertically movable actuating pin, comprising:

- a housing portion;
- engagement means, connected to said housing portion, for detachably securing said attachment to a supply line separately from said trigger drinker or nipple drinker;
- a water retaining portion connected to said housing portion;
- a flange portion connected to said housing portion;
- biasing means, connected to said housing portion, for causing vertical movement of said flange portion in response to a predetermined volume of fluid being present in said water retaining portion; and
- said vertical movement of said flange portion causing actuating engagement of said flange portion with said actuating pin which results in fluid flow from said trigger drinker of said nipple drinker over the exterior surface of said housing portion.

**4,793,292**  
**CIRCULATING FLUIDIZED BED REACTOR**  
Folke Engstrom, San Diego, Calif., and Juhani Isaksson, Karhula, Finland, assignors to A. Ahlstrom Corporation, Karhula, Finland

Filed Jul. 13, 1987, Ser. No. 72,597  
Int. Cl.<sup>4</sup> F22B 1/00  
U.S. Cl. 122-4 D

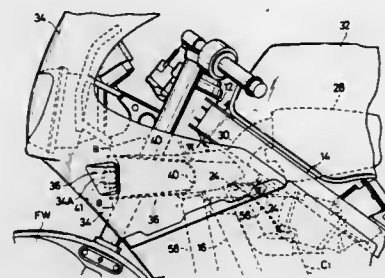
28 Claims



1. A circulating fluidized bed reactor, comprising: means defining an upright reactor chamber having at least one gas discharge opening adjacent its upper end and at least one inlet opening for solids separated from the gas adjacent its lower end;
- a housing;
- a plurality of generally vertically extending horizontally spaced filtration tubes in part formed of porous material and disposed in said housing;
- said filter housing and said reactor chamber being arranged in back-to-back relation one with the other, said housing having a gas inlet in communication with said gas discharge opening, a solids outlet in communication with said solids inlet opening and at least one clean gas outlet in communication with the space between said filtration tubes and said housing whereby gas flows through the porous material of said tubes into said space for communicating with said one clean gas outlet.

**4,793,293**  
**COOLING AIR INTAKE STRUCTURE FOR SMALL-SIZED VEHICLES**  
Hidemi Minami, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Mar. 4, 1987, Ser. No. 21,838  
Claims priority, application Japan, Mar. 7, 1986, 61-31989[U]; Apr. 25, 1986, 61-62886[U]  
Int. Cl.<sup>4</sup> F02P 1/02, 1/06  
U.S. Cl. 123-41.7

9 Claims



1. A cooling air intake structure for a small-sized vehicle in which a front portion of a vehicle body is covered by a vehicle body cover and a carburetor is disposed behind said vehicle body cover; comprising a cooling air intake port formed on the front surface of said vehicle body cover at a side portion thereof, and a separate cooling air duct adjoining to said cooling air intake port and extending backwards of the vehicle body for guiding running wind entering into the cooling air duct towards the carburetor.

**4,793,294**  
**APPARATUS FOR CONTROLLING A VARIABLE-EFFECTIVE-LENGTH AIR INTAKE SYSTEM**  
Hiroki Wada, Toyota, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

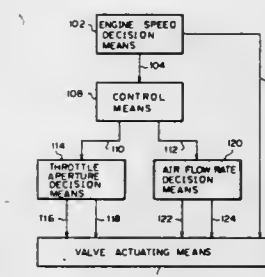
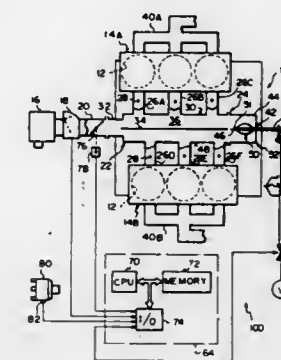
Filed Mar. 11, 1986, Ser. No. 838,360  
Claims priority, application Japan, Mar. 12, 1985, 60-47385  
Int. Cl.<sup>4</sup> F02B 75/18

- U.S. Cl. 123-52 MB
1. Apparatus for controlling a variable-effective-length air intake system of an internal combustion engine, said air intake system having a throttle valve for controlling a flow rate of air drawn into the engine and a flow control valve for varying an effective length of said intake system, said flow control valve being operable to reduce the effective length of the system when opened and to extend said length when closed, said apparatus comprising:

- (a) first means for detecting a rotational speed of the engine, said first means delivering a valve opening signal under a high speed rotational condition of the engine and delivering a control signal under a flow speed rotational condition of the engine;
- (b) load sensing means responsive to said control signal for providing a valve opening signal when the engine load is low, and for providing a valve closing signal when the engine load is high, said load sensing means including alternate means for sensing engine load during accelerating and non-accelerating engine conditions, said load sensing means including:
  - (i) second means for detecting the degree of opening of said throttle valve and delivering a valve closing signal when said throttle valve is open greater than a preset degree, and a valve opening signal when said throttle valve is open less than said preset degree;
  - (ii) third means for detecting the amount of intake air drawn into the engine per one revolution thereof and delivering a valve closing signal in response to said detected amount being greater than a preset amount and

- a valve opening signal in response to said detected amount being less than said preset amount, and
- (iii) control means responsive to said control signal for detecting the rate of acceleration of the engine and exclusively selectively operating said second and third means at times when said first means delivers said control signal, said control means operating said second

retainer comprising a rim held on the top land by tabs which engage the exterior of the body, the rim being engageable with



- means in response to an accelerating condition of the engine and operating said third means in response to a non-accelerating condition; and
- (c) actuating means operatively connected to said first means and to said control means for closing said flow control valve in response to a valve closing signal and opening said flow control valve in response to a valve opening signal.

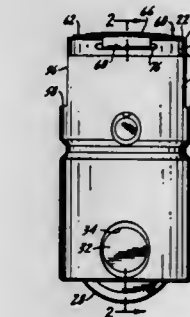
**4,793,295**  
**RETAINER FOR A HYDRAULIC LASH ADJUSTER**  
Todd R. Downing, Glen Ellyn, Ill., assignor to Stanadyne, Inc., Windsor, Conn.

Filed Nov. 8, 1984, Ser. No. 669,343  
Int. Cl.<sup>4</sup> F01L 1/24

U.S. Cl. 123-90.5

4 Claims

1. A hydraulic roller tappet, comprising a generally cylindrical, hollow body having an open end and a top land at the open end, a plunger positioned in the body, a roller mounted for rotation in the body opposite the open end, non-rotation means formed on the body for maintaining proper orientation of the roller including at least one flat formed on the exterior of the body, and a retainer for holding the plunger in the body, the



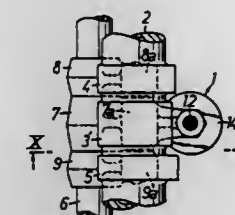
the plunger, said tabs being circumferentially spaced from said non-rotation flat.

**4,793,296**  
**VALVE OPERATING MECHANISM FOR INTERNAL COMBUSTION ENGINE**  
Kazuo Inoue, Kenichi Nagahiro, Yoshio Ajiki, and Masaaki Katoh, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 30, 1987, Ser. No. 9,239  
Int. Cl.<sup>4</sup> F01L 1/26

U.S. Cl. 123-90.16

6 Claims



1. A valve operating mechanism for operating a single valve of a particular cylinder of an internal combustion engine, comprising:
  - a camshaft rotatable in synchronism with rotation of the internal combustion engine;
  - a plurality of cams on said camshaft with each of said cams bearing a different cam profile;
  - a plurality of cam followers, each of which slidably engages one of said cams for selectively operating the valve according to the profile of the selected cam and one of which engages said valve; and
  - means for selectively interconnecting and disconnecting the respective cam followers to operate the valve differently in different speed ranges of the internal combustion engine.

**4,793,297**  
**VALVE OPERATING MECHANISM FOR INTERNAL COMBUSTION ENGINE**  
Noriaki Fujii, Takeshi Iwata, and Naoki Takahara, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 9, 1987, Ser. No. 71,653  
Claims priority, application Japan, Jul. 9, 1986, 61-162859  
Int. Cl.<sup>4</sup> F01L 1/44; F02F 1/24

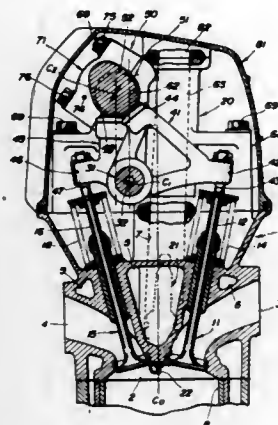
U.S. Cl. 123-90.23

6 Claims

1. A valve operating mechanism in an internal combustion engine including a cylinder bore, a cylinder head disposed

above the cylinder bore and having a combustion chamber, intake and exhaust valves movably supported in the cylinder head, and a spark plug supported in the cylinder head and having electrodes disposed centrally in the combustion chamber, said valve operating mechanism comprising:

- a single camshaft rotatably disposed above said cylinder head;
- a single rocker arm shaft rotatably disposed above said cylinder head;
- an intake-valve rocker arm swingably supported on said rocker arm shaft and operatively engaging said intake valve;



- an exhaust-valve rocker arm swingably supported on said rocker arm shaft and operatively engaging said exhaust valve;
- a camshaft holder disposed above said cylinder bore, said camshaft being rotatably supported by said camshaft holder;
- a rocker arm shaft holder disposed above said cylinder bore, said rocker arm shaft being rotatably supported by said rocker arm shaft holder; and
- a plug insertion tube having a plug insertion hole for insertion of the spark plug therethrough, said plug insertion tube being integrally formed with said camshaft holder and said rocker arm shaft holder in a holder block means.

4,793,298

## VENTILATOR FOR IGNITION DISTRIBUTOR

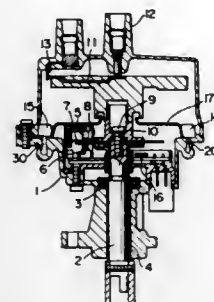
Isamu Arano, and Takashi Kokubun, both of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 9, 1987, Ser. No. 94,604

Claims priority, application Japan, Sep. 16, 1986, 61-215795  
Int. Cl.<sup>4</sup> F02P 7/02

U.S. Cl. 123—146.5 A

7 Claims



1. A ventilator for an ignition distributor in which a plurality of bent air holes are provided in a housing of the distributor

and ventilation of the distributor is performed by utilizing rotation of air in the distributor caused by rotation of a distribution rotor wherein the improvement comprises an angle of bend of each of said bent air holes being an obtuse angle and among said plurality of air holes, a cross-sectional area of each ventilation intake port is larger than that of each ventilation exhaust port.

4,793,299

## ENGINE CYLINDER BLOCK REINFORCING STRUCTURE

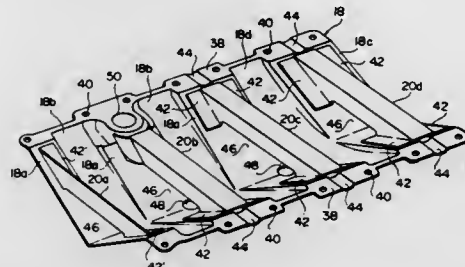
Fumio Iihimura, Hiroshi Kagaya, Kazuaki Nishimura, and Takafumi Teramoto, all of Hiroshima, Japan, assignors to Manda Motor Corporation, Hiroshima, Japan

Filed Jul. 7, 1987, Ser. No. 70,780

Claims priority, application Japan, Jul. 8, 1986, 61-104657[U]  
Int. Cl.<sup>4</sup> F16M 1/026

U.S. Cl. 123—195 R

15 Claims



1. An engine cylinder block structure comprising:

- a cylinder block integrally formed to include skirts projecting downwardly from both sides of a lower surface of the cylinder block;
- an oil pan attached to lower surfaces of both skirts of said cylinder block for receiving engine oil used inside said cylinder block, said oil pan having a deep first portion on a front side and a shallow second portion on a rear side, said first and second portions being connected to each other and said second portion having a rear end;
- flanges integrally formed on lower ends of said skirts for having said oil pan attached thereto; and
- reinforcing means for reinforcing the strength of both skirts; said reinforcing means including:
- a plate-shaped reinforcing member for reinforcing the strength of both skirts, said plate-shaped reinforcing member spanning and interconnecting sections of said skirts in a range extending between the first portion of said oil pan and the second portion of said oil pan excluding the rear end of the second portion of said oil pan; and
- stiffening means for providing parts of said flanges adjacent the second portion of said oil pan with a rigidity higher than that of parts of said flanges adjacent the first portion of said oil pan.

4,793,300

## ACCESSORY ATTACHMENT STRUCTURE FOR A V-SHAPED ENGINE

Yoshio Kadoshima, and Atsushi Niiimi, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kogyo, Tokyo, Japan

Filed Oct. 21, 1986, Ser. No. 922,029

Claims priority, application Japan, Oct. 21, 1985, 60-161128[U]; Oct. 21, 1985, 60-161127[U]  
Int. Cl.<sup>4</sup> F16M 1/026

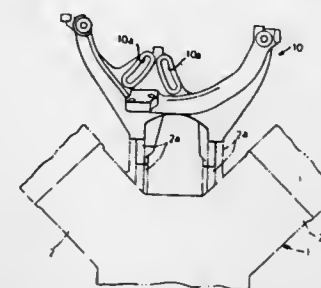
U.S. Cl. 123—195 A

12 Claims

1. An accessory attachment structure for a V-shaped engine having a pair of cylinder banks with a V-shaped space defined therebetween, a crank pulley disposed on one end of the engine

in the direction of a crankshaft, and transmission case on an opposite end of the engine, comprising:

- an intake manifold with a throttle body assembled thereon, said intake manifold being disposed in said V-shaped space



and positioned with said throttle body disposed over said transmission case, providing a space between said pair of cylinder banks close to said crank pulley; and

at least one accessory disposed in said last mentioned space and actuatable by said crank pulley.

4,793,301

## LUBRICATING SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

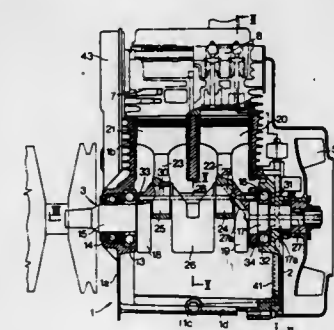
Tadashi Ishikawa, Urawa, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 21, 1987, Ser. No. 135,590

Claims priority, application Japan, Dec. 25, 1986, 61-201932[U]; Dec. 25, 1986, 61-201936[U]  
Int. Cl.<sup>4</sup> F01M 1/00

U.S. Cl. 123—196 R

4 Claims



1. A lubricating system for an internal combustion engine having at least one cylinder, crankcase, a crankshaft, a balancer shaft rotated by said crankshaft through gears, and an oil pump, comprising:

- a cover secured to said crankcase to form a part of the crankcase, said crankshaft being supported by a first bearing provided in said cover and by a second bearing provided in said crankcase;
- a first oil passage provided in said crankcase and cover and extending from an opening at a bottom of the crankcase to an inlet of said oil pump;
- a second oil passage provided in said cover and extending from an outlet of said oil pump to a first opening which opens to a journal of said crankshaft;
- a third oil passage provided in said crankshaft and extending from a second opening corresponding to said first opening to third openings which open to said first and second bearings and to connecting rods at crankpins of said crankshaft.

4,793,302

## ENGINE COOLING SYSTEM

Kenneth Osborne, Peterborough, and Howard J. Paul, Stamford, both of England, assignors to Perkins Engines Group Limited, London, England

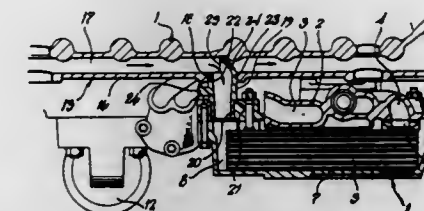
Filed Apr. 20, 1987, Ser. No. 40,511

Claims priority, application United Kingdom, Apr. 19, 1986, 8609626

Int. Cl.<sup>4</sup> F01M 1/00

U.S. Cl. 123—196 AB

13 Claims



1. A method of mounting an oil cooler on the side of an engine block comprising the steps of:

- (i) providing the cooler with a back-plate and a tubular rigid coolant flow coupling that projects rearwardly from the back-plate and terminates in an inlet opening that is directed laterally of the axis of the coupling;
- (ii) locating the back-plate on the side of the engine block with the coupling inserted as a push-fit in an aperture in the block with the inlet opening directed upstream of a flow of coolant in the block; and
- (iii) fastening the cooler to the side of the engine block with fasteners that engage the back-plate and block.

4,793,303

## ELBOW FOR CARBURETTOR

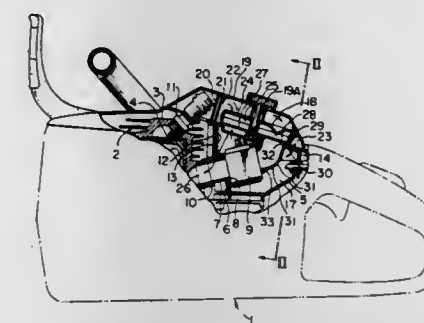
Akira Nagashima, Kawasaki, Japan, assignor to Kioritz Corporation, Tokyo, Japan

Filed Feb. 12, 1987, Ser. No. 13,920

Claims priority, application Japan, Feb. 25, 1986, 61-25187[U]  
Int. Cl.<sup>4</sup> F16L 11/12

U.S. Cl. 123—198 E

2 Claims



1. An elbow in combination with an air cleaner and a carburettor for defining an air passageway therebetween comprising a carburettor for feeding an air-fuel mixture to an internal combustion engine and having an air inlet port; an air clear for supplying clean air to said carburettor and having an air outlet port; an elbow connected at one end to said air outlet port of said air cleaner and at its other end to said air inlet port of said carburettor; said elbow formed of an elastomeric resilient material capable of undergoing elastic deformation and having an upper flange at said one end and a lower flange at said other end;



said upper flange having an annular lip portion formed integrally with said elbow at a top surface of said upper flange;  
said annular lip portion of said upper flange held in pressing engagement with a peripheral portion of said air output port to form an hermetical seal between said elbow and said air cleaner.

4,793,304

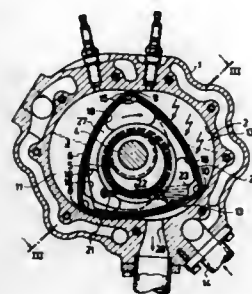
**ARRANGEMENT FOR COOLING THE PISTON OF A ROTARY PISTON INTERNAL COMBUSTION ENGINE**  
Dankwart Elermann, Weissenberg, Fed. Rep. of Germany, assignor to Wankel GmbH, Berlin, Fed. Rep. of Germany  
PCT No. PCT/DE85/00444, § 371 Date Sep. 8, 1987, § 102(e)  
Date Sep. 8, 1987, PCT Pub. No. WO87/03040, PCT Pub. Date May 21, 1987

PCT Filed Nov. 8, 1985, Ser. No. 92,350  
Claims priority, application Fed. Rep. of Germany, May 11, 1984, 3417488

Int. Cl.<sup>4</sup> F02B 53/10

U.S. Cl. 123—205

3 Claims



1. An arrangement for cooling the piston of a rotary piston internal combustion engine that includes a housing which has a central portion with a trochoidal liner surface in the form of a double arc of a circle, and also has two side portions; a shaft passes through said housing at right angles thereto, and has an eccentric on which rotates, within said housing, and at a speed ratio of 2:3 relative to the rotation of said shaft, a triangular piston that is cooled by a mixture of fuel and air that flows therethrough, said piston having corners that move along said liner surface and have inside walls, with said piston, during its movement with said housing, alternatively forming with said liner surface an intake compression chamber, an expansion chamber, and an exhaust chamber; said arrangement further comprises:

a fuel injector disposed in one of said side portions in such a way that the center line of the injection spray of said injector is directed toward that corner of said piston which leads the respective expansion chamber, as well as toward the axial center of said inside wall of this corner, when said piston passes a position which, within a rotation of said shaft, is 30° to 10° before said piston reaches its bottom deadcenter position.

4,793,305

**HIGH TURBULENCE COMBUSTION CHAMBER FOR TURBOCHARGED LEAN BURN GASEOUS FUELED ENGINE**

Robert S. Joyce, Droitwich Spa, United Kingdom, assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jul. 16, 1987, Ser. No. 74,522

Int. Cl.<sup>4</sup> F02B 23/08

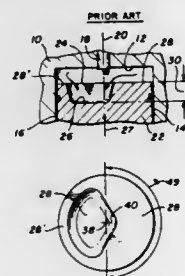
U.S. Cl. 123—279

18 Claims

1. In a gaseous fueled engine having at least a cylinder with an fuel/air intake and combustion product exhaust means, a cylinder head having a flat lower surface enclosing one end of

said cylinder, and a piston with a flat top piston head slidably received in said cylinder, the improvement comprising:

a. an ignition device extending from said flat lower surface of said cylinder head in the center of said cylinder, and



b. a baffleless combustion chamber eccentrically located in the head of said piston with respect to said piston axis such that ignition of said fuel/air mixture by said ignition device occurs within but on the outer periphery of said combustion chamber.

4,793,306

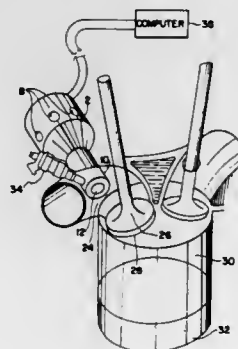
**AIR FLOW MANAGEMENT IN AN INTERNAL COMBUSTION ENGINE THROUGH THE USE OF ELECTRONICALLY CONTROLLED AIR JETS**  
Michael R. Swain, Miami, Fla., assignor to University of Miami, Coral Gables, Fla.

Filed Dec. 16, 1986, Ser. No. 942,458

Int. Cl.<sup>4</sup> F02M 23/04

U.S. Cl. 123—308

8 Claims



1. In an internal combustion engine having at least one combustion chamber having at least one intake valve, means for producing an air/fuel mixture in the valve pocket and means for directing the air/fuel mixture past the intake valve into the combustion chamber, the improvement comprising a device for generating a swirling flow of said air/fuel mixture in said combustion chamber to thereby obtain greater combustion stability, said device comprising:

(a) a nozzle positioned within the valve pocket and directed at an acute angle toward the intake valve comprising at least one opening for receiving air, connected to a first pathway, and at least one opening for expelling air, connected, to a second pathway joined to the first pathway and extending to the expulsion opening, said first and second pathways providing a continuous channel for the flow of air from the air receiving opening to the expulsion opening wherein the first and second pathways are joined at a junction, said junction comprising a pair of opposed arcuate walls extending from the end of the first pathway remote from the air receiving opening to the end of the second pathway remote from the expulsion opening,

through which the air travels from the expulsion opening past the intake valve into the combustion chamber; and  
(b) means for controlling the flow of air through the pathway and out the expulsion opening comprising:  
(i) a stopper having sides complementary in shape to the pair of opposed arcuate walls movable from an open position allowing air through the pathway to a closed position wherein the sides of the stopper are in a sealed relationship with the opposed arcuate sides of the junction thereby preventing the flow of air through the second pathway and out of the expulsion opening; and  
(ii) an electronic computer which determines the size and duration of the pathway opening.

4,793,307

**ROCKER ARM DECOUPLER FOR TWO-CYCLE ENGINE RETARDER**

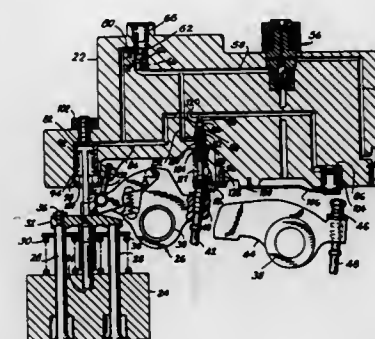
Raymond N. Quenneville, Suffield, and Vincent J. Pitzl, South Windsor, both of Conn., assignors to The Jacobs Manufacturing Company, Bloomfield, Conn.

Continuation-in-part of Ser. No. 60,505, Jan. 4, 1987, abandoned. This application Dec. 15, 1987, Ser. No. 133,488

Int. Cl.<sup>4</sup> F02D 9/06

U.S. Cl. 123—323

31 Claims



1. An engine retarding system of a gas compression release type comprising a multi-cylinder four-stroke cycle internal combustion engine having a crankshaft and a camshaft driven from said crankshaft, engine piston means associated with said crankshaft, exhaust valve means, intake valve means and fuel injector means associated with each cylinder of said engine, rocker arm means associated with each of said exhaust valve means, intake valve means and fuel injector means, pusher means driven from said camshaft and associated with said exhaust valve means, intake valve means and fuel injector means, hydraulic fluid supply means, hydraulically actuated first piston means associated with said exhaust valve means to open said exhaust valve means, second piston means actuated by said pusher means associated with said fuel injector means and hydraulically interconnected with said first piston means and said hydraulic fluid supply means to open said exhaust valve means during an upstroke of the engine piston associated with said exhaust valve means corresponding to its compression stroke during normal operation of the engine to produce a compression release event and to hold said exhaust valve means open during a substantial portion of the ensuing downstroke of said engine piston, said rocker arm means associated with said exhaust valves comprising a rocker member adapted to be oscillated by said exhaust valve pusher, a latch member adapted to drive said exhaust valve means, link means interconnecting said rocker member and said latch member, adjusting screw means adapted to limit the oscillation of said link means and means biasing said latch member away from said rocker member, said exhaust valve rocker arm means adapted to disable said exhaust valve means from moving at the point it would move in the cycle during powering operation of the engine, trigger valve means hydraulically interconnected

with said first and second piston means, said trigger valve means including trigger valve driving means driven by said exhaust valve pusher means and spring means biasing said trigger valve driving means toward said exhaust valve pusher means, said trigger valve means adapted to release the pressure on said first piston means at a pre-determined time so as to permit said exhaust valve means to partially close commencing prior to the bottom dead center position of said engine piston corresponding to its expansion stroke during powering operation, said latch member of said exhaust rocker arms means adapted to hold said exhaust valve in a partially closed position during at least the ensuing upstroke of said engine piston corresponding to its exhaust stroke during powering operation of the engine to produce a bleeder retarding event, said first piston means adapted to permit said exhaust valve to close fully during the ensuing downstroke of said engine piston corresponding to its intake stroke during powering operation of the engine whereby one compression release retarding event and one bleeder retarding event is produced in each said cylinder during each engine cycle comprising two revolutions of said crankshaft.

4,793,308

**EMERGENCY CONTROL DEVICE FOR A DIESEL INTERNAL COMBUSTION ENGINE WITH ELECTRONICALLY CONTROLLED FUEL PROPORTIONING**

Jürgen Brünninger, Stuttgart; Wolfgang Dühlmeyer, Schwiebendingen; Günter Kettenacker, Steinheim; Volker Schäfer; Albrecht Sieber, both of Ludwigsburg, and Jürgen Wietelmann, Hirschlanden, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany  
PCT No. PCT/DE86/00445, § 371 Date Oct. 6, 1987, § 102(e)  
Date Oct. 6, 1987, PCT Pub. No. WO87/04759, PCT Pub. Date Aug. 13, 1987

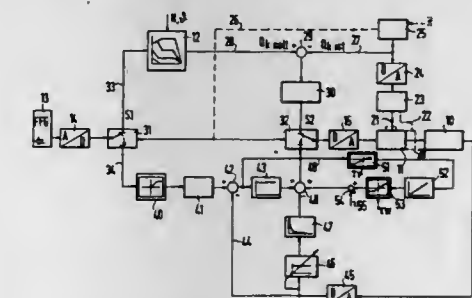
PCT Filed Nov. 5, 1986, Ser. No. 130,876

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1986, 3603571

Int. Cl.<sup>4</sup> F02M 39/00

U.S. Cl. 123—359

15 Claims



1. Emergency control device for a diesel internal combustion engine, comprising an electronically controlled fuel proportioning device, transmitters for speed, for drive pedal position and for a volume of fuel fed to the internal combustion engine, means for determining an actual value of fuel volume from transmitter signals, means for determining a desired value of fuel volume at least from signals of the drive pedal position transmitter and the speed transmitter, means for monitoring the means for determining the actual value of fuel volume, switching devices, which in case of error in the means for determining the actual value of fuel volume, eliminate the influence of fuel volume controlling means and the desired value of fuel volume on the fuel proportioning device and connect the fuel proportioning device with an emergency control signal formed from the signals of said speed transmitter and the drive pedal position transmitter, the improvement comprises that a first signal is formed from

the drive pedal position transmitter signal and the speed signal, a second signal is formed from a speed signal, which is at least weighted, and the emergency control signal is a function of a difference between the first and second signals.

4,793,309

# ENGINE GOVERNOR EDDY-CURRENT DAMPER MECHANISM AND METHOD

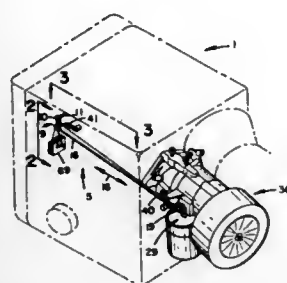
Paul F. Huffman, Ham Lake, Minn., and Ron L. Bardell, Mountain View, Calif., assignors to Onan Corporation, Minneapolis, Minn.

Filed Aug. 31, 1987, Ser. No. 91,269

Int. Cl.<sup>4</sup> F02D 9/10

U.S. Cl. 123—376

13 Claims



1. A method of damping a governor mechanism of an engine subject to load variations; said method including a step of positioning an eddy-current damper in operative association with the governor mechanism to inhibit searching and over-compensation;

- (a) said governor mechanism including a governor member and a link mechanism constructed and arranged to translate motion of the governor member to throttle plate adjustment; said engine having a side portion;
- (b) said method including a step of providing an eddy-current plate on a first of said governor member and said engine side portion; and
- (c) said method including a step of providing a magnet on a second of said engine side portion and said governor member, said magnet being oriented to generate an eddy-current in said eddy-current plate in response to movement of said governor member.

4,793,310

# ELECTRONIC IGNITION CONTROL APPARATUS INCLUDING KNOCKING CONTROL

Satoshi Komurasaki, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 3, 1987, Ser. No. 128,136

Int. Cl.<sup>4</sup> F02P 5/14

U.S. Cl. 123—425

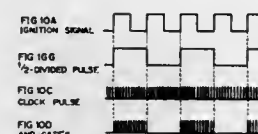
18 Claims

1. An electronic ignition control apparatus comprising:
- first detecting means for detecting mechanical vibrations of an internal-combustion engine to derive a vibration signal containing at least mechanical noise information and knocking phenomenon information of the internal-combustion engine;
  - gating means for gating the vibration signal supplied from the first detecting means;
  - second detecting means for detecting a noise level of said vibration signal derived from the first detecting means via the gating means to produce a reference voltage signal;
  - generating means for generating a reference revolution signal representative of drive conditions of the internal-combustion engine;
  - processing means for processing the vibration signal directly supplied from the first detecting means via the gating means based upon the reference voltage signal of the

second detecting means and the reference revolution signal of the generating means, so as to produce an ignition signal;

third detecting means for detecting the ignition signal from the processing means to produce a revolution-speed detecting signal corresponding to an engine speed of the internal-combustion engine; and

gate controlling means for producing a gate control signal



by receiving both the ignition signal and the revolution-speed detecting signal, whereby said gating means is controlled in response to the gate control signal in order to interrupt supply of the vibration signal to the processing means while a knocking phenomenon occurs, a time period of said vibration signal interruption being varied in response to the drive conditions of the internal-combustion engine so as to suppress the knocking phenomenon of the internal-combustion engine.

4,793,311

# FUEL INJECTION PUMP WITH MULTI-STATE LOAD/SPEED CONTROL SYSTEM

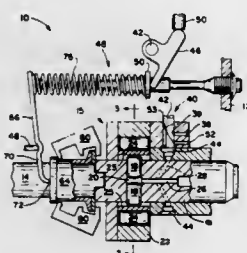
Daniel E. Salzgeber, Windsor; George Woliver, Wallingford, and Alan F. Lasher, Ellington, all of Conn., assignors to Stannadyne, Inc., Windsor, Conn.

Continuation of Ser. No. 825,632, Feb. 3, 1986, abandoned. This application Nov. 4, 1987, Ser. No. 120,197

Int. Cl.<sup>4</sup> F02M 39/00

U.S. Cl. 123—450

17 Claims



1. In an internal combustion engine fuel injection pump having a fuel charge pump with a fuel intake stroke for receiving an intake charge of fuel and a fuel pumping stroke for pumping the charge of fuel for fuel injection, an inlet metering valve for variably metering fuel to the charge pump during its intake stroke and a fuel supply pump for supplying fuel under pressure to the metering valve, the metering valve having a primary port for supplying fuel to the charge pump and a valve member adapted to be variably positioned for variably metering the supply of fuel through said primary port to the charge pump, the improvement wherein the metering valve has a boost port for supplying additional fuel to the charge pump, wherein the valve member meters the supply of fuel through

the boost port to the charge pump in accordance with the valve member position, and wherein the fuel injection pump further comprises control means for selectively activating the boost port for supplying additional fuel to the charge pump.

4,793,312

# FUEL SUPPLY CONTROL ARRANGEMENT FOR AN INTERNAL COMBUSTION ENGINE

Hajime Doiwa; Shunji Inoue, both of Hiroshima; Kazunori Matsumoto, and Michiya Masuhara, both of Higashihiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

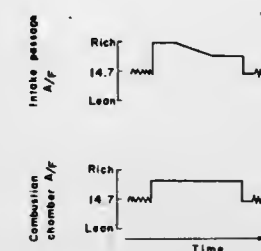
Filed Apr. 29, 1987, Ser. No. 43,765

Claims priority, application Japan, Apr. 30, 1986, 61-100652

Int. Cl.<sup>4</sup> F02D 41/04

U.S. Cl. 123—492

16 Claims



1. In an internal combustion engine provided with a fuel supply means for supplying fuel into an intake passage of said engine, a fuel supply control arrangement which comprises:
- a specific operating region detecting means for detecting a specific operating region in which an air/fuel ratio of an air/fuel mixture should be decreased as compared with that in another operating region,
  - a fuel amount correcting means for correcting an amount of fuel to be supplied by said fuel supply means, and
  - a correction factor setting means for setting a correction factor for the fuel,

said correction factor setting means being so arranged as to set the correction factor in such a manner that, at an initial stage when the transfer from the specific operating region to the other operating region, or from the other operating region to the specific operating region is detected by said specific operating region detecting means, the correction factor is set so as to correct the fuel amount fed into the intake passage more excessively than in a fuel amount which provides the air/fuel ratio in the operating region at said initial stage after the transfer, and thereafter, to cause the fuel amount to be restored to that which provides the air/fuel ratio at said operation regions whereby an air fuel ratio at said intake passage is different during said initial stage than during said operating region while said air/fuel ratio in a combustion chamber of said combustion engine is substantially uniform during said initial stage and throughout said operating region.

4,793,313

# FUEL INJECTION APPARATUS FOR INTERNAL COMBUSTION ENGINES

Henri Paganon, Venissieux; Werner Pape, Jonage, both of France; Néstor Rodríguez-Amaya, Stuttgart, and Alfred Schmitt, Ditzingen, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 10, 1987, Ser. No. 24,196

Claims priority, application Fed. Rep. of Germany, Apr. 10, 1986, 3612152; Sep. 30, 1986, 3633107

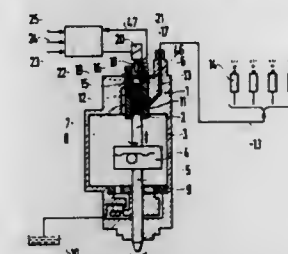
Int. Cl.<sup>4</sup> F02M 39/00

U.S. Cl. 123—506

24 Claims

1. A fuel injection apparatus for internal combustion engines comprising a fuel injection pump provided with a pump piston

operative within a pump cylinder and having a pump work chamber defined thereby, in particular a fuel injection pump of the distributor injection pump type, said pump further having a valve disposed in a connecting line between the pump work chamber and a low-pressure fuel supply chamber, the valve being electrically controllable between two switching positions occurring at selectable switching times, said switching allowing determination of a quantity of fuel to be injected per pump piston supply stroke, said pump further having a control unit for switching the valve in accordance with engine operating parameters and a switching position transducer connected thereto, said switching position transducer being arranged to detect an instantaneous switching position of said valve and to



deliver two electrical signals to the control unit, a first of said indicating a beginning of movement state of a valve member of the valve and comprising a beginning-of-movement signal, a second of said signals indicating an end of movement state of the valve member and comprising an end-of-movement signal, the control unit being adapted to detect a first time interval occurring between a first said end-of-movement signal and an ensuing said beginning-of-movement signal, said time interval comprising a control time of the valve effective for metering a quantity of fuel actually attaining injection, whereby correction of the valve switching and compensation for any undesired variations in switching time due to wear, drift or malfunction may be realized.

4,793,314

# FUEL INJECTION PUMP FOR AN INTERNAL COMBUSTION ENGINE

Toru Yoshinaga, Okazaki; Toshifiko Igashira, Toyokawa; Yasuyuki Sakakibara, Nishio; Seiko Abe, Okazaki, and Yukihiko Natsuyama, Anjo, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

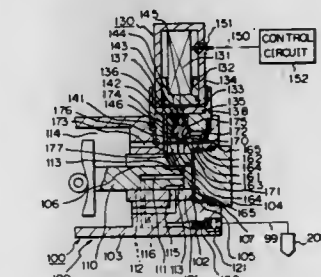
Filed Sep. 2, 1987, Ser. No. 92,204

Claims priority, application Japan, Sep. 4, 1986, 61-208784

Int. Cl.<sup>4</sup> F02M 39/00

U.S. Cl. 123—506

12 Claims



1. A fuel injection pump for an internal combustion engine comprising:
- a body having a cylinder bore, low pressure chamber, an overflow passage coupled to said cylinder bore and communicating with said low pressure chamber, and a feed



passage formed in said cylinder bore and open to said cylinder bore;

a plunger slidably housed in said cylinder bore to define a high pressure chamber therein, said plunger configured to draw low pressure fuel from said low pressure chamber into said high pressure chamber when it moves backward and to compress fuel in said high pressure chamber to discharge the fuel to outside of said pump when it moves forward;

valve means for opening and closing said overflow passage to said cylinder bore according to a fuel pressure acting thereon, said valve means opening to cause undischarged surplus fuel to spill from said high pressure chamber through said overflow passage;

a piezoelectric actuator attached to said body to define a control chamber therein, said control chamber communicating with said feed passage, a fuel pressure in said control chamber urging said valve means in a direction in which said valve means closes said overflow passage, said piezoelectric actuator expanding and contracting according to a voltage applied thereto to vary the fuel pressure in said control chamber and thereby open and close said valve means to control a fuel supply; and

means for opening and closing said feed passage, said opening and closing means opening said feed passage to feed the low pressure fuel in said low pressure chamber to said control chamber through said overflow passage, said high pressure chamber and said feed passage on an intake action of said plunger, and then closing said feed passage to hold the pressure in said control chamber at a desired value.

4,793,315

## FUEL PUMPING APPARATUS

Ronald Phillips, Northolt, England, assignor to Lucas Industries, Birmingham, England

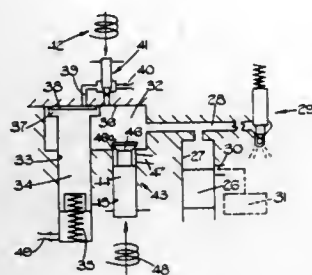
Filed Jul. 10, 1985, Ser. No. 753,431

Claims priority, application United Kingdom, Jul. 13, 1984, 8417864

Int. Cl.<sup>4</sup> F02M 39/00

U.S. Cl. 123—506

5 Claims



1. A fuel pumping apparatus for supplying fuel to an internal combustion engine comprising a reciprocable plunger pump operable in use to deliver fuel in timed relationship with the associated engine, a chamber communicating with a pumping chamber of the pump, a bore opening into said chamber and a piston member slidable in the bore, an outlet through which fuel displaced from the pumping chamber can flow to the associated engine, resilient biasing means biasing the piston towards an end wall of the chamber, a recess defined between said end wall and the end of said piston when the latter is in contact with the end wall, first electrically operable means operable to place said recess in communication with said chamber thereby to allow the pressure of fuel in said chamber to drive the piston out of said chamber, a valve member having a head for co-operation with a seating defined about a bore extending from the chamber for controlling the escape of fuel from said chamber, said head being located in the chamber so that it will be pressure actuated into contact with the seating

and being tapered to narrow towards the seating and being located so that pressure from said pumping chamber acts on said head to maintain said head in contact against the seating when the valve member is closed, and an electromagnetic device which when energized maintains the head of the valve member away from the seating for controlling the operation of said valve member, the arrangement being such that at the start of a delivery stroke of said pumping plunger, said piston will be in contact with said end wall and said valve member will be open, closure of said valve member will cause delivery of fuel through the outlet and later operation of said first electrically operated means will allow outward movement of the piston, the piston movement absorbing further fuel displaced by the plunger.

4,793,316

## FUEL INJECTION PUMP FOR INTERNAL COMBUSTION ENGINES

Guenter Seller, and Karlheinz Hoffmann, both of Stuttgart, Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

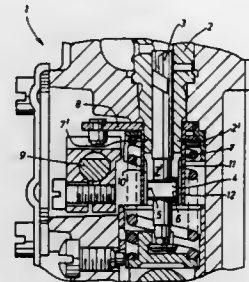
Filed Dec. 8, 1986, Ser. No. 938,884

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1985, 3544051

Int. Cl.<sup>4</sup> F02N 3//00

U.S. Cl. 123—509

14 Claims



1. A fuel injection pump arrangement comprising: movable piston means having a control collar means with control surface means adjustable control sleeve means engageable with the control surface means for controlling the rotative position of the piston means, and resilient clamping means for limiting play between the control collar means and the control sleeve means, wherein said resilient clamping means is a clamping member separated from the control sleeve means, and clamping member being disposed between the control sleeve means and control collar means.

4,793,317

## METHOD AND APPARATUS FOR LIQUEFYING PARAFFIN CRYSTALS INCLUDED IN FUEL

Edouard P. Grenet, Amieres, France, assignor to INOTEC, Societe A Responsabilite Limitee, Ville d'Avray, France

Filed Mar. 31, 1987, Ser. No. 32,767

Claims priority, application France, Apr. 7, 1986, 86 04917

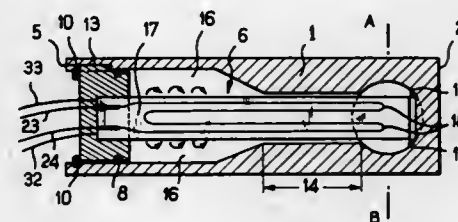
Int. Cl.<sup>4</sup> F02M 31/12

U.S. Cl. 123—557

21 Claims

1. A method of liquefying fuels containing paraffins when, under the effect of cold temperatures, said paraffins obstruct the filter element of the filter (and also of the pre-filter if one exists) located in the feed circuit of a compression ignition engine or of a heating installation, there being a pump situated downstream from the filter to draw-in fuel from a tank, the method including the step of placing a heat source in a heating chamber located upstream from and close to said filter element

with the fuel passing through said heating chamber, the method including the improvement whereby the heating chamber is chosen to be of small volume compared with the volume of the filter or the pre-filter and said heat source is regulated to a temperature of about 70° C., thereby initially injecting a small number of cubic centimeters of fuel contained in the heating chamber heated to about 70° C. into the filter element when the pump starts during the start-up operation of engine, and subsequently during normal operation of engine, injecting into the filter element very hot streamlines of fuel included within a flow having an average temperature which remains less than 40° C. even though some of said streamlines are at a temperature close to 70° C., said heat source having a



large contact area with the fuel, said area being electrically insulated for safety reasons and having a uniform temperature, and the flow of fuel through the heating chamber when the pump is in operation being directed around the heat source in such a manner as to ensure a long period of contact and a high degree of heat exchange between the heat source and the fuel, with turbulent flow being set up in the fuel, thereby setting up instantaneous temperature differences within the volume of its flow and as a function of time, thus providing intermittent streamlines or jets of fuel at the outlet from the heating chamber at temperature close to the surface temperature of the heat source wherein the flow of fuels is directed along a substantially U-shaped path around the heat source within the heating chamber.

4,793,318

## DIAGNOSTIC SYSTEM FOR EXHAUST GAS RECIRCULATION DEVICE

Shinji Tsurusaki, Toyokawa, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

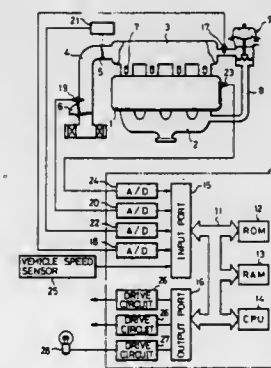
Filed Nov. 23, 1987, Ser. No. 124,046

Claims priority, application Japan, Nov. 26, 1986, 61-279617; Jul. 31, 1987, 62-190308

Int. Cl.<sup>4</sup> F02M 25/06

U.S. Cl. 123—571

20 Claims



1. A diagnostic system of an exhaust gas recirculation device having an exhaust gas recirculation control valve which is arranged in an exhaust gas recirculation passage interconnect-

ing an exhaust passage to an intake passage of an internal combustion engine, said diagnostic system comprising: first determining means of determining whether the engine is operating in a state at which the recirculation of exhaust gas is to be carried out; detecting means for detecting a temperature in the exhaust gas recirculation passage downstream of the exhaust gas recirculation control valve; count means having a count value which is variable between a predetermined first value and a predetermined second value in response to a result of a determination by said first determining means, said count value being changed from said first value toward said second value when the engine is operating in a state where the recirculation of exhaust is to be carried out; means for storing a first temperature detected by said detecting means when said count value is equal to said first value; and second determining means for obtaining a difference between said first temperature and second temperature detected by said detecting means when said count value becomes equal to said second value, to thereby determine that a malfunction has occurred in the exhaust gas recirculation device when said difference is lower than a predetermined value.

4,793,319

## ARCHERY BOW LIMB ADJUSTMENT BOLT

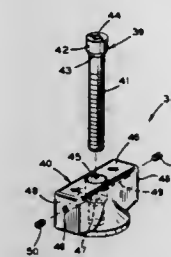
Norman Vaughan, 424 Monroe St., Delta, Ohio 43515, and James A. Nuhfer, 30 S. Dorcas, #16, Toledo, Ohio 43615

Filed Mar. 12, 1987, Ser. No. 25,221

Int. Cl.<sup>4</sup> F41B 5/00; F16B 23/00

U.S. Cl. 124—23 R

19 Claims



16. A compound archery bow comprising: a handle portion adapted to be attached to a pair of limbs; a pair of limbs adapted to be attached to said handle portion; and means including a pair of adjustment bolts for releasably attaching said limbs to said handle portion each of said bolts including a threaded shank connected at one end to a generally circular flange and a head of generally rectangular cross section, said head having spaced apart front and rear walls each having an outwardly tapering central portion attached to said flange, and a pair of end walls attached to opposite ends of said front and rear walls and spaced apart a distance greater than a diameter of said flange whereby said head can be grasped by a human hand for rotating said bolt with respect to a corresponding one of said limbs to adjust the draw force of the bow.

4,793,320

## CHARCOAL BURNER

Mark C. Bakic, P.O. Box 963, Eweas, Tex. 76039

Filed Feb. 24, 1987, Ser. No. 18,920

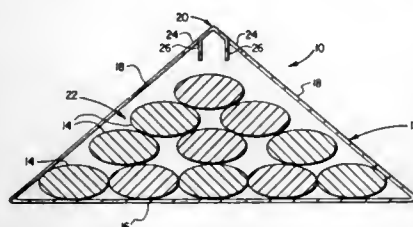
Int. Cl.<sup>4</sup> F24B 3/00

U.S. Cl. 126—25 B

21 Claims

1. A combustible fuel apparatus, comprising: side walls formed contiguous with and extending generally

upward from a base and converging to form a closed container, having stacked charcoal fuel particles therein arranged to conform to the interior dimensions of said container including said base, wherein said base may be placed directly on a substantially horizontal surface and said container may be ignited and substantially burned to ash, and said charcoal fuel particles may be ignited and sufficiently burned for cooking,



wherein said charcoal fuel particles are stacked on said base in a relatively stable position prior to the igniting of said container, and are maintained in a relatively stable position during and after the igniting and burning of said container, whereby a mound of ignited charcoal fuel particles remains on said substantially horizontal surface after the burning of said container, said mound having a configuration substantially similar to the shape of said container prior to the combustion thereof.

4,793,321

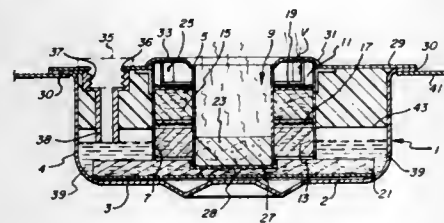
## SELF-PRIMING ALCOHOL STOVE

Charles R. Rafford, and Walter Hoehn, both of Clinton, Conn., assignors to International Marine Industries, Inc., Stamford, Conn.

Filed Apr. 28, 1987, Ser. No. 43,436  
Int. Cl.<sup>4</sup> F24C 5/04, 5/02

U.S. Cl. 126—43

20 Claims



1. An alcohol stove comprising:
  - a burner cup having a base and side walls for storage of liquid alcohol;
  - a main burner assembly attached to said burner cup at a location where said main burner assembly will consume alcohol evaporating from within said burner cup when said main burner assembly is ignited, a top plate having upper and lower surfaces, wherein said main burner assembly is defined on the upper surface of said top plate and said burner cup is attached to the lower surface of said top plate, wherein said main burner assembly comprises a perimetrical surface, defined by an inner edge and an outer edge, and openings between the inner and outer edges from which alcohol escapes;
  - an outer wall extending downwardly from the lower surface of said top plate in alignment with the outer edge; and
  - an inner wall extending downwardly from the lower surface of said top plate in alignment with the inner edge, at least one screen located in said outer chimney which extends outwardly from the inner wall; and
  - a metallic disc positioned within and near the base of said burner cup and in contact with the base or side walls of said burner cup which are also metallic for cooling said

liquid alcohol in said burner cup the base and sidewalls being metallic, thereby preventing excessive alcohol evaporation and consequent uncontrolled combustion of alcohol at said main burner assembly.

4,793,322

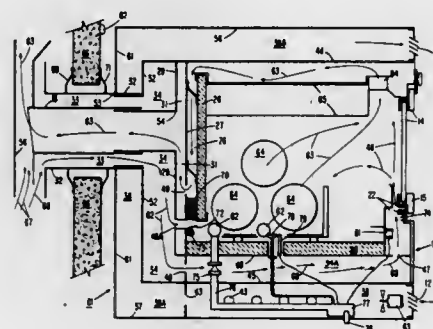
## DIRECT-VENTED GAS FIREPLACE

Ronald J. Shimek, 8996 W. 154 St., Prior Lake, Minn. 55372, and Daniel C. Shimek, 5260 W. 132d St., Apple Valley, Minn. 55124

Filed Nov. 6, 1986, Ser. No. 927,744  
Int. Cl.<sup>4</sup> F24C 1/14

U.S. Cl. 126—80

15 Claims



1. A zero clearance fireplace of the type adapted to be installed against an outside wall of an interior space to be heated, comprising:
  - a box shaped fireplace having six walls comprising four substantially vertical walls, a top wall, and a bottom wall, at least one of said four vertical walls having a glass access door and one of said remaining walls having a horizontal exhaust pipe connected thereto for insertion through said outside wall of the space to be heated,
  - a combustion chamber in said box shaped fireplace located within said six walls,
  - said bottom wall comprising an inner, and an outer bottom plenum below said combustion chamber,
  - the wall having said horizontal exhaust pipe connected thereto comprising an inner plenum, a middle plenum and an outer plenum,
  - said outer plenums being connected to form an air passage for interior space air being circulated around the outside of said fireplace combustion chamber and exhausted as heated air into said interior space to be heated,
  - said bottom inner plenum and said middle plenum being connected together and to a source of outside fresh air and connected to said combustion chamber to provide primary combustion air, and
  - said horizontal exhaust pipe being connected to said inner plenum of said wall having said horizontal exhaust pipe connected thereto, said inner plenum being connected to said combustion chamber for receiving and exhausting exhaust gases from said combustion chamber.

4,793,323

## SINGLE-USE SELF-HEATING CONTAINER FOR LIQUIDS AND/OR SOLIDS

Francesco Guida; Giacomino Randazzo, and Vittorio Guida, all of Naples, Italy, assignors to Blusei S.P.A., Naples, Italy

Filed Jul. 14, 1987, Ser. No. 73,242

Claims priority, application Italy, Jul. 16, 1986, 40427 A/86; Jul. 8, 1987, 48148 A/87

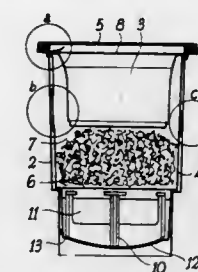
Int. Cl.<sup>4</sup> F24J 1/00, 3/00

U.S. Cl. 126—263

21 Claims

1. A single-use, self-heating container for liquids and/or solids, characterized in that it comprises an outer insulating

envelope; a plastic material vessel provided inside said outer envelope and fastened integrally to the same, said vessel being divided into two compartments, respectively an upper and a lower compartment separated by a membrane; a metallic container for containing solid and/or liquid substances, said container being fastened by keying or shrinking-on with thermal welding to the upper part of said plastic material vessel and being closed at the top by a thermally welded diaphragm that



can be peeled off; a covering member which seals and protect at the upper part said self-heating container; and a breaking member arranged inside the lower compartment of said plastic material vessel divided into two said compartments, said breaking member being able to break said membrane when acted upon by external starting means; a liquid reactant being contained within the lower compartment of said vessel whereas a solid reactant is contained within the upper compartment of the vessel itself, or viceversa.

4,793,324

## COOKING ASSEMBLY AND METHOD FOR COOKING

Dennis Caferro, E. 508 Augusta, Spokane, Wash. 99207  
Filed Oct. 16, 1987, Ser. No. 109,455

Int. Cl.<sup>4</sup> F24D 1/00

U.S. Cl. 126—369

14 Claims



1. A cooking vessel insert adapted for placement in the bottom of an upright covered cooking vessel that contains a layer of water of a prescribed depth for enabling food in a flexible container within the cooking vessel to be rapidly cooked or baked at a temperature substantially equal to the boiling point of the layer of water as the water is boiled in response to application of heat to the bottom of the cooking vessel, comprising:

an insert body complementary in shape to the bottom of the cooking vessel;  
the insert body having a honeycomb structure presenting a large number of open ended, vertical passageways extending from a bottom surface to a top surface of the insert

body for subdividing water within a cooking vessel into vertical columns in which adjacent passageways are formed and separated by thin walls;  
the thickness of the insert body between its top and bottom surfaces being greater than the depth of the layer of water within the cooking vessel to enable a flexible container of food to be supported on its top surface above the layer of water with the flexible container overlying and enclosing a substantial number of the passageways having columns of water therein to form a plurality of evaporative heat pipes within the insert body for transfer of large quantities of heat from the bottom of the cooking vessel through the enclosed columns of water within the enclosed passageways to and through the overlying flexible container to rapidly cook or bake food within the flexible container at substantially the boiling temperature of the water.

4,793,325

## METHOD AND DEVICE FOR TREATING LIVING TISSUES AND/OR CELLS BY MEANS OF PULSATING ELECTROMAGNETIC FIELDS

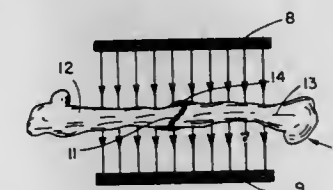
Ruggero Cadosi, and Donata Marazzi, both of 42015 Correggio, (Reggio Emilia-Italy) Via Geminiola, 1, Italy

Continuation of Ser. No. 928,935, Nov. 12, 1986, Pat. No. 4,683,873, which is a continuation of Ser. No. 616,318, Jan. 1, 1984, abandoned. This application Jul. 28, 1987, Ser. No. 78,360  
Claims priority, application Italy, Jan. 2, 1983, 67613 A/83  
The portion of the term of this patent subsequent to Aug. 4, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> A61N 1/40

U.S. Cl. 600—14

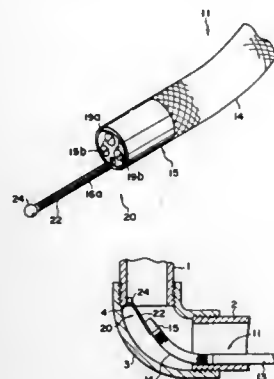
13 Claims



1. A method for treating living tissue by means of pulsating electromagnetic fields to stimulate the growth, healing or repair of said tissue, consisting essentially of electromagnetically inducing in the tissue alternating pulsating electrical signals having a wave form which comprises a positive portion composed, in chronological order, of a first, a second and a third segment, the first of which defines the peak value of said positive portion, and a negative portion composed respectively of a segment which defines the peak value and constitutes the prolongation of the third segment of said positive portion and a region of exponential extension tending to the reference value zero; the positive portion taken together with the zero signal base line having substantially the shape of a trapezium, the peak value of the positive portion being greater in absolute magnitude than the peak value of the negative portion, the duration of said positive portion being between 1 and 3 milliseconds and the frequency of repetition of said pulsating electrical signals being greater than 50 Hz, and with the absolute magnitude of the peak value of said negative portion being about half the peak value of said positive portion.



**4,793,326**  
**ENDOSCOPE HAVING INSERTION END GUIDE MEANS**  
 Yoshio Shihido, Sagamihara, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan  
 Filed Dec. 1, 1987, Ser. No. 127,070  
 Claims priority, application Japan, Dec. 8, 1986, 61-292779; Feb. 19, 1987, 62-34459; Feb. 19, 1987, 62-22065[U]  
 Int. Cl.<sup>4</sup> A61B 1/00  
 U.S. Cl. 128—4 23 Claims

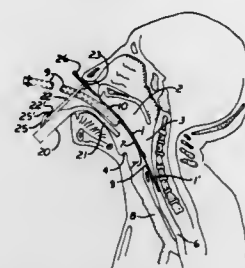


1. An endoscope comprising:  
 an elongated insertion section insertable into a channel;  
 an operation section connected to a base end of said insertion section, and adapted to control the insertion section from outside of said channel;  
 said operation section having an eyepiece section and said insertion section including a flexible section connected at its base end to said operation section and having a remote end, an angle section connected at its base end to the remote end of said flexible section, having a remote end and adapted to have its curvature controlled by the operation of said operation section, and a rigid section connected at its base end to the remote end of said angle section, having a remote end and having an observation window capable of observing an inner wall of said channel space; and  
 guide means mounted on said rigid section and capable of guiding said rigid section along an inner wall of said channel, and around a curve or bend thereof;  
 wherein said guide means includes an elongated arm member extending substantially in an axial direction of said rigid section, and having proper rigidity and elasticity, said arm member being fixed at its first end to said rigid section and having a distal-side remote end, and said guide means further includes a slide means fixed to the second end of said arm member and slidable along the inner surface of said channel space.

**4,793,327**  
**DEVICE FOR OPENING A PATIENT'S AIRWAY DURING AUTOMATIC INTUBATION OF THE TRACHEA**  
 Alfred R. Frankel, 403 Gulf Way-Apt. 701, Pass-A-Grille Beach, Fla. 33706  
 Continuation-in-part of Ser. No. 820,664, Jan. 21, 1986, Pat. No. 4,672,960, which is a continuation-in-part of Ser. No. 640,843, Aug. 15, 1984, abandoned. This application Mar. 19, 1987, Ser. No. 27,881  
 Int. Cl.<sup>4</sup> A61M 16/00  
 U.S. Cl. 128—12 7 Claims

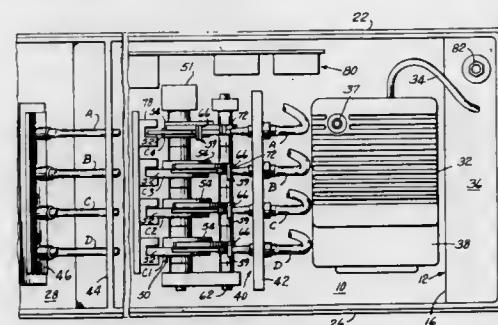
1. A combination of (A) a device for holding a patient's mouth open during automatic intubation of an endotracheal tube comprising (a) a first arm having a lower portion and an upper portion, said upper portion being bent from said lower portion at an angle of approximately 90°; (b) a second arm slidably attached to said lower portion of said first arm on the side of said first arm which is opposite to the bent upper portion thereof, and having a means for locking said second arm in an upward position when said second arm is slid upward from the lower portion of said first arm, said second arm having a lower portion and an upper portion and said upper portion of said second arm having an opening therein which permits the passage of an esophageal guide and also of an endotracheal tube through the upper portion of said second arm; and (c) a means for releasing said locking means to permit the sliding of said second arm from its upward position to a lower position; said device being capable of holding a patient's mouth open by resting the upper portion of said first arm on the patient's tongue and the patient's upper teeth or jaw on the upper portion of said second arm and (B) an esophageal guide and an endotracheal tube inserted in said opening, said endotracheal tube being at least partially and slidably attached to said guide.

tion thereof, and having a means for locking said second arm in an upward position when said second arm is slid upward from the lower portion of said first arm, said second arm having a lower portion and an upper portion and said upper portion of said second arm having an opening therein which permits the passage of an esophageal guide and also of an endotracheal tube through the upper portion of said second arm; and (c) a means for releasing said locking means to permit the sliding of said second arm from its upward position to a lower position; said device being capable of holding a patient's mouth open by resting the upper portion of said first arm on the patient's tongue and the patient's upper teeth or jaw on the upper portion of said second arm and (B) an esophageal guide and an endotracheal tube inserted in said opening, said endotracheal tube being at least partially and slidably attached to said guide.



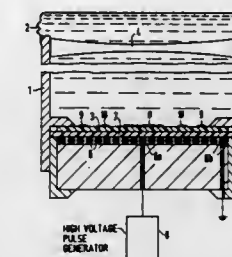
means for releasing said locking means to permit the sliding of said second arm from its upward position to a lower position; said device being capable of holding a patient's mouth open by resting the upper portion of said first arm on the patient's tongue and the patient's upper teeth or jaw on the upper portion of said second arm and (B) an esophageal guide and an endotracheal tube inserted in said opening, said endotracheal tube being at least partially and slidably attached to said guide.

**4,793,328**  
**METHOD OF PRODUCING PRESSURE FOR A MULTI-CHAMBERED SLEEVE**  
 Mark Kolstedt, Algonquin, and John F. Dye, Elgin, both of Ill., assignors to The Kendall Company, Boston, Mass.  
 Filed Feb. 19, 1988, Ser. No. 157,819  
 Int. Cl.<sup>4</sup> A61H 9/00  
 U.S. Cl. 128—24 R 12 Claims



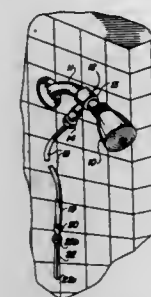
7. A method of pressurizing a multi-chambered pressurizable sleeve which is wrappable about a patient's limb, comprising the steps of:  
 pressurizing an accumulator housing with fluid under pressure by means within said housing;  
 sequentially discharging portions of that fluid under pressure through a conduit means to said chambers of said multi-chambered sleeve.

**4,793,329**  
**SHOCK WAVE SOURCE**  
 Matthias Mahler, Erlangen, and Manfred Rattner, Buckenhof, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Filed Sep. 21, 1987, Ser. No. 98,843  
 Claims priority, application Fed. Rep. of Germany, Oct. 6, 1986, 8627238[U]  
 Int. Cl.<sup>4</sup> A61B 17/22  
 U.S. Cl. 128—24 A 3 Claims



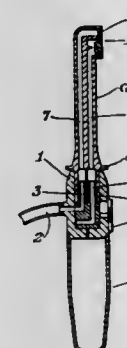
1. A shock wave source for treating calculi disposed in the body of a patient, said shock wave source comprising:  
 a shock wave tube having a volume filled with a shock wave-conducting medium closed at one end by a flexible cover adapted for application against said patient and closed at an opposite end by a membrane consisting of electrically insulating material;  
 an insulating layer disposed adjacent said membrane;  
 means for generating a high voltage pulse;  
 a flat coil disposed adjacent said insulating layer connected to said means for generating a high-voltage pulse such that upon supply of a high-voltage pulse to said coil said membrane is rapidly repelled therefrom thereby generating a shock wave in said shock-wave conducting medium;  
 means for focussing said shock wave at said calculi; and  
 a plurality of electrically conductive tracks disposed on said membrane, said tracks being spaced from each other on said membrane with said insulating material of said membrane therebetween to reduce arcing between said tracks and said coil.

**4,793,331**  
**SHOWER FLOSSING SYSTEM**  
 Clyde F. Stewart, 26300 Hickory Blvd. SW, Apt. 1105, Bonita Springs, Fla. 33923  
 Filed Feb. 5, 1988, Ser. No. 152,870  
 Int. Cl.<sup>4</sup> A61H 9/00 7 Claims



1. In a system for attaching an oral syringe to a shower head, means for diverting to the syringe a manually adjustable portion of the water flowing to the shower head comprising an adapter having one end which is connected to the water supply pipe and an opposite end which is connected to the shower head, the adapter having a passageway lying between its opposite ends and at right angle to the direction of flow of water to the shower head, a thumb-and-finger operated valve stem threadedly located partially within the passageway of the adapter, said valve stem having within its rear portion an axial passageway whose one end is connected to the passageway within the adapter and whose other end is connected to the oral syringe, and an O-ring valve of waterproof resilient material mounted in a groove on the valve stem for controlling the flow of water into the passageway within the adapter by rotating the valve stem to change the position of the O-ring valve.

**4,793,332**  
**HANDLE FOR A MOUTH WASH DEVICE**  
 Horst Klein, Kerkheim-Fischbach, Fed. Rep. of Germany, assignor to Blendax-Werke R. Schnieder, Fed. Rep. of Germany  
 Continuation of Ser. No. 320,557, Nov. 12, 1981, abandoned.  
 This application Feb. 26, 1988, Ser. No. 160,777  
 Claims priority, application Fed. Rep. of Germany, Nov. 22, 1980, 3044025  
 Int. Cl.<sup>4</sup> A61H 9/00 4 Claims



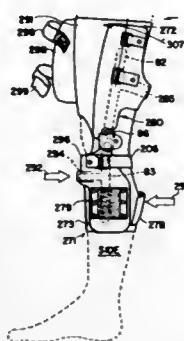
1. In a handle for a mouth wash device, provided with a liquid intake and a spray nozzle attachable to the handle by means of a nozzle tube, the improvement being said handle

**4,793,330**  
**ORTHOPEDIC CAST SYSTEM**  
 Travis W. Honeycutt, Irvine, Calif., and Barry D. Setzer, Hickory, N.C., assignors to Isopedix Corporation, Irvine, Calif.  
 Filed Jun. 18, 1985, Ser. No. 746,351  
 The portion of the term of this patent subsequent to Mar. 4, 2003, has been disclaimed.  
 Int. Cl.<sup>4</sup> A61F 5/04 100 Claims

1. A method for the application of an orthopedic cast or splint for the immobilization of an appendage comprising applying to a fabric to wet said fabric, a hardening quantity of a composition wherein the hardening component thereof comprises an  $\alpha$ -cyanoacrylate monomer and applying the fabric to the appendage which becomes immobilized upon the polymerization of the  $\alpha$ -cyanoacrylate monomer wherein the appendage has first been covered with a barrier fabric prior to the application of the  $\alpha$ -cyanoacrylate monomer containing fabric in at least those areas to be covered with the  $\alpha$ -cyanoacrylate monomer containing fabric.

being provided with a first set of two parallel canals for liquid, said first set of canals being arranged within a longitudinally adjustable insert for selective flow communication with said liquid intake, switch means for controlling said selective flow communication, a nozzle tube attached to said handle, a second set of two parallel canals in said nozzle tube communicating with said first set of canals to form a pair of elongated canals, one of said elongated canals leading to a bristleless single-jet spray nozzle, and the other of said elongated canals leading to a bristleless multi-jet spray nozzle wherein the multijets are generally arranged in a circle.

**4,793,333**  
**KNEE STABILIZER**  
Stuart H. Marquette, 2927 Via Pepita, Carlsbad, Calif. 92008  
Continuation-in-part of Ser. No. 732,345, May 8, 1985,  
abandoned, which is a continuation-in-part of Ser. No. 579,728,  
Feb. 13, 1984, Pat. No. 4,733,656. This application Apr. 30,  
1986, Ser. No. 857,918  
Int. Cl.<sup>4</sup> A61F 5/00  
U.S. Cl. 128—80 C 9 Claims



6. A knee stabilizer for stabilizing medial-lateral, rotatory, and posterior-anterior forces, including forces having an anterior tibial component, and thereby suppressing displacement of the tibia relative to the femur, comprising:

- (a) a closed rigid band system comprising (1) a femur band system including a pair of femur uprights extending one on the lateral side of the thigh and one on the medial side of the thigh above the knee, and a transverse band connected between said femur uprights at the posterior of the femur proximate the knee, said femur uprights defining a lever pivotally positioned on the leg at a fulcrum defined by said rear femur band and having an upper lever section extending above the fulcrum and a lower lever section extending below the fulcrum, the length of the upper lever section relative to the lower lever section providing a mechanical advantage  $\geq 1:1$  and (2) a tibia band system including a pair of tibia uprights extending one on the lateral side of the leg and one on the medial side of the leg below the knee pivotally connected respectively to said lateral and medial femur uprights adjacent the knee, and a transverse band connected between said tibia uprights at the anterior side of the leg proximate the knee;
- (b) an anterior tibial shell having elongated medial and lateral sections defining a rear opening therebetween and a relatively short upper anterior section proximate the knee spanning the distance between the medial and lateral sections, said anterior, medial and lateral sections being shaped to closely fit the leg of a selected wearer and being mounted, respectively, to said anterior band, said medial upright and said lateral upright of said tibia band system;
- (c) a posterior femoral shell having elongated medial and lateral sections defining an anterior opening therebetween and a relatively short lower posterior section proximate the knee spanning the distance between the medial and lateral sections; said posterior, medial and lateral sections

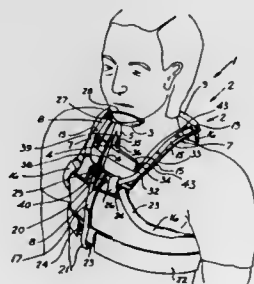
being mounted, respectively, to said posterior femur band, said medial upright and said lateral upright of said femur band system; and said posterior, medial and lateral sections being shaped to closely fit the thigh of a selected wearer, including said posterior section comprising, proximate the knee, two protruding regions and an intervening depressed region closely approximating the outline of the biceps femoris muscle and the semitendinosus muscle and the intervening soft tissue above the back of the knee;

(d) an anterior quadriceps pad shaped for fitting within said anterior opening of said posterior femoral shell; and

(e) strap means adapted for adjustably cinching the anterior quadriceps pad to the femoral shell to pivot the upper end of said lever anteriorly about said fulcrum, locking said femoral shell to the thigh, thereby (1) producing a rearward-directed force at the lower end of said lever for counteracting anterior tibial force components and (2) compressing the soft tissue against the femur;

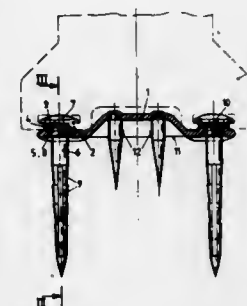
(f) whereby, during application of a force having an anterior tibial component to the leg of the wearer, the anterior tibial section of the tibial shell transmits the anterior tibial force component to the posterior femoral section of the femoral shell and through the compressed tissue to the femur for limiting displacement of the tibia relative to the femur.

**4,793,334**  
**CERVICAL BRACE**  
Charles G. McGuinness, 6 High St., Hicksville, Long Island, N.Y. 11801, and John J. McCourt, Silverstream, Monaghan, Ireland  
Filed Aug. 14, 1987, Ser. No. 85,587  
Claims priority, application Ireland, Jul. 22, 1986, 1938/86  
Int. Cl.<sup>4</sup> A61F 5/04  
U.S. Cl. 128—87 B 18 Claims



1. A cervical brace comprising:
- a torso engaging member having a back portion and a front portion, the front portion, in use, being adjacent to the front of the torso and the rear portion, in use, being adjacent to the back of the torso;
- a chin support member for engaging and supporting the chin of the wearer; and
- mounting means for mounting the chin support member to the torso engaging member, the mounting means comprising a strut and a brace member each supporting the chin support member, said strut having one end operatively coupled with the chin supporting member, and being pivotally connected at the other end to the front portion of the torso engaging member so that the chin support member is movable backwardly and forwardly relative to the torso engaging member for accommodating, in use, different positions of a wearer's chin, said brace member operatively coupled at one end to the chin support member, and engaging at the other end a front portion of the torso engaging member at a position spaced rearwardly from the pivotal mounting of the strut, adjusting means being provided on the brace member for adjusting the length thereof.

**4,793,335**  
**BONE IMPLANT FOR FIXING ARTIFICIAL TENDONS OR LIGAMENTS WITH APPLICATION AND EXTRACTION MEANS**  
Otto Frey, Winterthur, and Rudolf Koch, Berlingen, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur, Switzerland  
Filed Jan. 20, 1987, Ser. No. 5,469  
Claims priority, application Switzerland, Jan. 28, 1986, 320/86  
Int. Cl.<sup>4</sup> A61F 5/04; A61B 17/04, 17/08, 17/18  
U.S. Cl. 128—92 R 9 Claims



1. A bone implant for fixing artificial ligaments and tendons to a bone, said implant comprising:
- a permanently deformable metal plate defining a connecting bridge element and a pair of projections extending from opposite sides of said bridge element;
- a pair of spike-like anchor pins, each said pin extending from a respective projection; and
- means between each said projection and each said pin for detachably securing each said pin to a respective projection for selective removal therefrom to adapt to a bone thickness for fixation of an artificial ligament.

**4,793,336**  
**WOUND COVERINGS AND PROCESSES FOR THEIR PREPARATION**  
Paul Y. Wang, 47 Marblemount Crescent, Agincourt, Ontario, Canada M1T 2H5  
Division of Ser. No. 247,604, Mar. 25, 1981, Pat. No. 4,643,179.  
This application Dec. 5, 1986, Ser. No. 938,284  
Int. Cl.<sup>4</sup> A61L 15/00  
U.S. Cl. 128—156 10 Claims

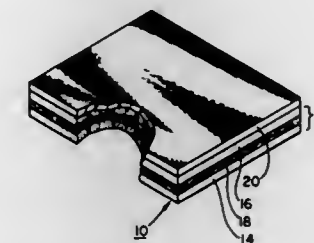
1. A method of preparing a wound covering material comprising reacting clinical grade dextran C with epichlorohydrin to form an insolubilized sheet thereof, and impregnating the sheet so formed with a humectant formulation comprising a mixture of glycerin or isopropanol/propylene glycol and castor oil.

**4,793,337**  
**ADHESIVE STRUCTURE AND PRODUCTS INCLUDING SAME**  
Frank Freeman, Lawrenceville, N.J.; Michael J. Amery, Upper Makefield Township, Bucks County, Pa., and Clyde L. Sharik, Trenton, N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.  
Filed Nov. 17, 1986, Ser. No. 931,501  
Int. Cl.<sup>4</sup> A61L 15/00  
U.S. Cl. 128—156 17 Claims

1. An adhesive structure, suitable for use as a wound dressing or for adhesion of an article to fluid emitting wounds and surrounding normal skin, including:
- a first contact region comprised of a fluid-interactive adhesive material which provides adhesion to said wound and surrounding normal skin;
- a second contact region comprised of the same or a different

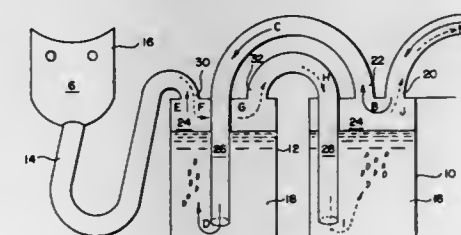
adhesive material, which provides adhesion between said first region, or another region integral with said first region, and said article; and,

an absorbent region comprised of an absorbent material from the group consisting of sodium calcium alginate wool or



fibers and calcium alginate wool or fibers interposed said first and second contact regions whereby enhanced adhesion between said first and second contact regions and between said second contact region and said article, under conditions of heavy fluid emission, is provided.

**4,793,338**  
**ANTI-SIPHONING LIQUID VALVE FILTER**  
Terence J. Andrews, 36 Simeon La., Sterling, Va. 22170  
Filed Jun. 16, 1987, Ser. No. 62,631  
Int. Cl.<sup>4</sup> A62B 23/00  
U.S. Cl. 128—200.11 11 Claims



1. A method for the filtering of a gas for a gas mask through a liquid comprising the steps of:
- (a) inhaling atmospheric gas at the gas mask by a user;
- (b) bypassing the gas over a liquid partially filling a first vessel upon inhaling;
- (c) filtering inhaled bypassed gas through liquid partially filling a second vessel, whereby the filtered gas enters the gas mask for inhalation by the user;
- (d) exhaling gas at the gas mask by the user;
- (e) bypassing the gas over the liquid partially filling the second vessel upon exhaling; and
- (f) directing exhaled bypassed gas through the liquid partially filling the first vessel, whereby the gas exits the first vessel to the atmosphere.



4,793,339

**ULTRASONIC ATOMIZER AND STORAGE BOTTLE AND NOZZLE THEREFOR**

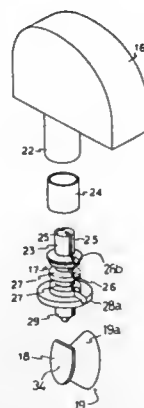
Kazuhiko Matsumoto; Kei Asai, and Hirohito Yamamoto, all of Nagaokakyo, Japan, assignors to Omron Tateisi Electronics Co., Shimokallaji, Nagaokakyo-City, Kyoto, Japan  
Continuation of Ser. No. 770,078, Aug. 28, 1985, abandoned.  
This application Feb. 4, 1988, Ser. No. 153,467

Claims priority, application Japan, Aug. 29, 1984, 59-181453; Sep. 7, 1984, 59-136282; Sep. 8, 1984, 59-136310; Sep. 10, 1984, 59-190153; Sep. 12, 1984, 59-192269

Int. Cl.<sup>4</sup> A61M 11/00

U.S. Cl. 128—200.16

17 Claims



1. An ultrasonic atomizer for atomizing a liquid comprising: an oscillating member; a means for vibrating said oscillating member at an ultrasonic frequency; a bottle, with an opening, for storing the liquid to be atomized, said bottle disposed above said oscillating member when said atomizer is oriented for use; and a nozzle means fitted within said bottle opening for directing fluid downwardly from said bottle toward said oscillating member for atomization, said nozzle means having a tip portion extending from said bottle toward said oscillating member with a very narrow gap therebetween, said nozzle means having a fine liquid conducting groove means for leading liquid from said bottle downwardly to said tip portion by capillary action and gravitational action, and said nozzle means further having an air conducting groove means for introducing air from the outside of said bottle to the inside of said bottle, wherein the liquid to be atomized travels from the bottle, through the nozzle means to the vicinity of the oscillating member for atomization.

4,793,340

**BREATHING SYSTEM FOR DIVERS**

Nils T. Ottestad, Tonsberg, Norway, assignor to Den Norske Stats Oljeselskap A.S., Stavanger, Norway

Filed Sep. 16, 1986, Ser. No. 908,105

Claims priority, application Norway, Sep. 18, 1985, 853654

Int. Cl.<sup>4</sup> B63C 11/02

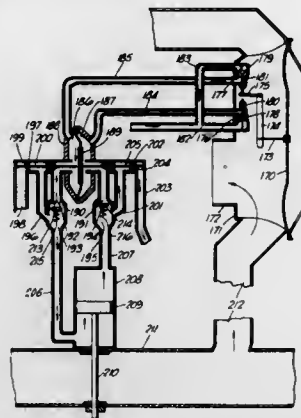
U.S. Cl. 128—200.24

10 Claims

1. A self-contained breathing apparatus for divers, comprising: a variable volume breathing bag (1; 211) for delivering inhalation gas to and receiving exhalation gas from the diver, said bag being connected to a valve housing (120; 171) for connection to a mouthpiece or a breathing mask for the diver; a pneumatic cylinder/piston unit (5; 208, 209) of which the piston (7; 209) is operatively coupled to said breathing bag (1; 211), to compress or expand the bag; a compressed gas source (45) connected to said breathing

bag (1; 211) for supplementing the breathing gas therein as required, and further connected to said cylinder/piston unit (5; 208, 209) at a first and a second side of the piston (7; 209);

- a sensing means (20; 170) arranged to respond to pressure variations in the breathing gas caused by the diver terminating inhalation or exhalation;
- a switching means (12; 173-205) arranged to be actuated by said sensing means (20; 170), so that it switches said compressed gas source (45) to either side of said piston (7; 209) in accordance with the breathing pattern of the diver, and



- a control means (16; 170-177) arranged to maintain the breathing gas pressure in said valve housing (120; 171) stable and approximately equal to the ambient pressure, said control means (16; 170-177) including a sensing diaphragm (121; 170) disposed in said valve housing (120; 171) and forming part of a sensitive low-pressure demand regulator controlled by the diver's breathing pattern and causing breathing gas to be carried to the diver from said breathing bag (1; 211) and from the diver to said breathing bag in accurate correspondence with the demand of the diver.

4,793,341

**UNDERWATER BREATHING APPARATUS HAVING A REPOSITORY**

Stanley D. Arasmith, P.O. Box 2458, Rome, Ga. 30164-2458

Filed May 20, 1987, Ser. No. 51,647

Int. Cl.<sup>4</sup> B63C 11/16

U.S. Cl. 128—201.11

11 Claims



1. An underwater breathing apparatus, comprising: an inlet tube having an upper end and a lower end; a mouthpiece connected to said inlet tube intermediate the ends thereof; inlet valve means positioned adjacent to said upper end of said inlet tube for admitting fluid into said inlet tube upon suction force being applied to said mouthpiece; and

outlet valve means positioned adjacent to the lower end of said inlet tube for allowing fluid to escape from said inlet tube upon compression force being applied to said mouthpiece; said inlet tube defining a fluid repository between said mouthpiece and said outlet valve.

4,793,342

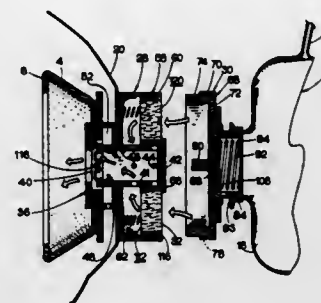
**EMERGENCY SMOKE HOOD AND BREATHING MASK**  
Terry M. Haber, El Toro, Calif., and Romeo Le Marie, Hong Kong, Hong Kong, assignors to Terry McGovern Gaber, El Toro, Calif.

Filed Mar. 3, 1987, Ser. No. 21,274

Int. Cl.<sup>4</sup> A62B 9/04

U.S. Cl. 128—202.27

21 Claims



1. An emergency escape mask apparatus adapted for use in conjunction with and independently of an emergency oxygen supply system comprising: a mask adapted to be placed over the mouth and nose of a user; first and second conduit means in fluid communication with each other, the first conduit means being in fluid communication with the mask and the second conduit means being adapted to be in fluid communication with the emergency oxygen supply system; means for detachably securing the first and second conduit means to each other; filter means disposed in the first conduit means adapted to remove undesirable substances from air passing there-through; means preventing oxygen from the emergency oxygen supply flowing through the first and second conduit means from flowing through the filter means; and means activated in response to a separation of the first and second conduit means directing ambient air flowing through the first conduit means to pass through the filter means before it reaches the mask to thereby remove from the ambient air the unwanted substances; whereby the user can inhale cleansed, non-toxic air after the mask has been disconnected from the emergency oxygen supply system.

4,793,343

**RESPIRATORY HEATED FACE MASK**

James M. Cummins, Jr., 3334 Parker; George Morrison, Jr., 20637 Donaldson, both of Dearborn, Mich. 48124, and Robert E. Pierfelice, 15218 Meyer, Allen Park, Mich. 48101

Filed Aug. 20, 1987, Ser. No. 87,398

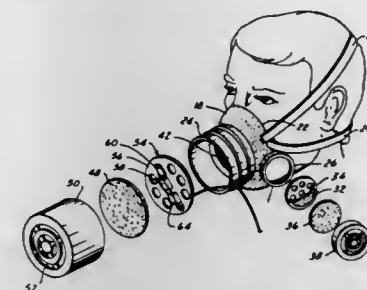
Int. Cl.<sup>4</sup> A62B 7/00

U.S. Cl. 128—204.17

16 Claims

1. A respiratory apparatus which comprises: a face housing constructed and arranged for overlying and encircling the nose and mouth of a person when received on their face, an intake housing having an air intake chamber and carried by said face housing, an inlet check valve carried by said face housing and constructed and arranged to permit air to pass from said chamber through said valve

and into said face housing when the wearer of the mask inhales and to prevent air from passing from said face housing into said chamber when the wearer exhales, an exhaust check valve carried by said face housing and constructed and arranged to permit air to pass from said face housing through said exhaust valve to the exterior of said face housing when the wearer of the mask exhales and to prevent air from passing through said exhaust valve and into said face housing when the wearer of the mask inhales, and a heater assembly having an electric heating element means, a radiator means disposed in said chamber and in heat transfer relationship with said heating element means and constructed and arranged to heat air in said chamber when an electric current is supplied to said heating element means, whereby cold air drawn into said



chamber is heated by said heater assembly to an elevated temperature to supply warm air to be inhaled by the wearer of the mask, a temperature sensor means for sensing the temperature of said radiator means with respect to an adjustable reference level and producing an associated electronic temperature sensor signal, an electronic control circuitry means constructed and arranged to receive said temperature sensor signal and having a current supply means connected to a portable power supply means for selectively and controllably supplying current to said electric heating element means in response to said temperature sensor signal, a means for sensing failure of said temperature sensor means and a means for inhibiting operation of said heating element means in the event of failure of said temperature sensor means.

4,793,344

**METHOD FOR PREPARING CORNEAL DONOR TISSUE FOR REFRACTIVE EYE SURGERY**

J. Stuart Cumming, Anaheim, and J. Roberts Fosberg, S. Laguna, both of Calif., assignors to Recore, Inc., Irvine, Calif.

Filed Nov. 2, 1987, Ser. No. 115,882

Int. Cl.<sup>4</sup> A61F 17/32

U.S. Cl. 128—305

10 Claims

1. A method for fabricating a corneal tissue for use in refractive eye surgery which comprises the following steps: (a) removing the corneal tissue from a donor; (b) placing the tissue in a fixative solution for a selected time interval to cross-link the collagen fibrils in the tissue and to prevent swelling of the tissue; and (c) lathing the tissue to provide a lenticule of a selected shape and thickness.

4,793,345

**HIGH VOLTAGE PROTECTION CIRCUIT FOR ULTRASONIC CATARACT REMOVER**

Donald E. Lehmer, 687 Woodmont Ave., Berkeley, Calif. 94708

Filed Jan. 24, 1987, Ser. No. 65,995

Int. Cl.<sup>4</sup> A61B 17/39

U.S. Cl. 128—303.13

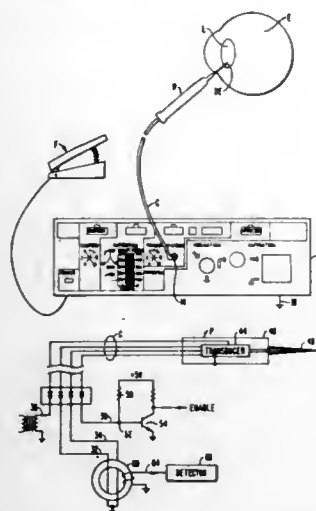
3 Claims

1. In the combination of an ultrasonic cataract remover

including a high voltage power source, a phacoemulsification probe for transducing power from said source to sonic energy for the phacoemulsification of the lens of the eye, a cable including a power path and a ground path for transmitting power to said probe from said power supply, and means for switching power to said cable having a first input to supply switched power to said phacoemulsification probe; the improvement in said cable and said means for switching power comprising:

said cable including first and second ground path conductors from said probe to said power supply;

said means for switching power including means for sending a small current to said probe on said power path for verifying the path to ground through at least one of said first and second ground path conductors;



means for sensing said small current at said probe having a first output operable to output a signal upon said small current at said probe;

said switching means further including a second input for disabling power to said phacoemulsification probe;

said first output from said means for sensing operatively connected to said second input to disable power to said phacoemulsification probe only upon the sensing of said switching means of a voltage at said probe;

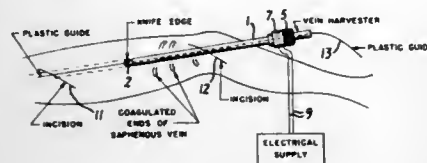
means for comparing current flow in said paired ground wires having an output when said flow in said ground wires is other than equal; and

said output from said means for comparing operatively connected to said second input of said switching means whereby said power to said phacoemulsification probe is disabled upon non-equal current flow in said ground conductors.

4,793,346  
PROCESS AND APPARATUS FOR HARVESTING VEIN  
Bruce Mindich, 100 St. & 5th Ave., New York, N.Y. 10029  
Filed Sep. 4, 1986, Ser. No. 904,047  
Int. Cl.<sup>4</sup> A61B 17/32

U.S. Cl. 128—305

## 19 Claims



1. Apparatus for harvesting a vein comprising: an elongate

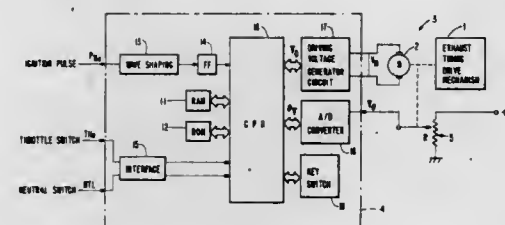
plastic tube having an inside diameter slightly larger than the outside diameter of a vein to be harvested, at least one knife blade mounted on the distal end of said tube in position to sever branches of the vein as said tube is slipped over the vein and is rotated as it is advanced, said tube having at its distal end a nose portion of reduced outside diameter extending radially inwardly of said knife blade and extending axially slightly beyond said knife blade, electrical conductors extending lengthwise of said tube and electrically connected to said knife blade to supply current to heat said knife blade and thereby cauterize the vein branches as they are severed, means at the proximal end of said tube for moving said tube axially over the vein and for rotating said tube as it is moved axially, and means for supplying electrical current to said conductors.

4,793,347  
EXHAUST TIMING CONTROL DEVICE FOR TWO  
CYCLE ENGINES

**Kazuman Taniguchi; Masayuki Toriyama; Takumi Tottori, and  
Kazumi Shibata, all of Saitama, Japan, assignors to Honda  
Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**  
Filed Jan. 29, 1987, Ser. No. 8,524  
Claims priority, application Japan, Jan. 29, 1986, 61-018381  
Int. Cl.<sup>4</sup> F02D 9/06

U.S. Cl. 123—323

## 6 Claims



1. An exhaust timing controller for controlling an exhaust timing member in a two cycle engine, comprising  
a control circuit responsive to more than one engine parameter for generating a working control signal, said engine parameters including engine speed;  
means for determining the rate of change in engine speed;  
means for producing a working control signal responsive to said rate of change in engine speed; and  
means for driving the exhaust timing member operatively connected to said control circuit to receive said working control signal.

**4,793,348**  
**BALLOON EXPANDABLE VENA CAVA FILTER TO**  
**PREVENT MIGRATION OF LOWER EXTREMITY**  
**VENOUS CLOTS INTO THE PULMONARY**  
**CIRCULATION**

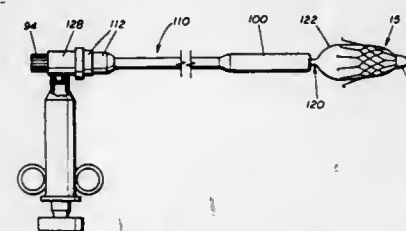
**Julio C. Palmaz, 12610 Stonehenge, San Antonio, Tex. 78230**  
**Filed Nov. 15, 1986, Ser. No. 941,401**  
**Int. Cl.<sup>4</sup> A61B 17/00**

U.S. Cl. 128—325

### 32 Claims

1. A vena cava filter for preventing migration of lower extremity venous clots into pulmonary circulation, comprising: a tubular body having a distal end, a proximal end and there-between means for rendering the tubular body radially expandable into a plastically deformed shape, said means comprising a wall surface partitioned by a pattern of slots into a latticework;

a head piece circumferentially affixed to the distal end of said tubular body; and

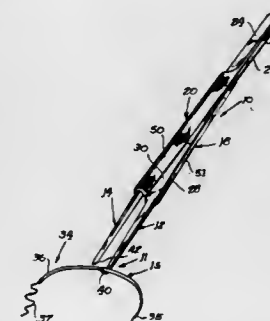


a plurality of tines affixed about the proximal end of said tubular body.

**4,793,349**  
**NEEDLE HOLDER FOR SURGERY**  
**Harry P. Weinarb, 2644 W. Estes Ave., Chicago, Ill. 60645**  
Continuation-in-part of Ser. No. 648,583, Sep. 10, 1984,  
abandoned. This application Mar. 13, 1986, Ser. No. 839,643  
Int. Cl. A61B 17/06, 17/28  
U.S. Cl. 128—340 9 Claims

U.S. Cl. 128-340

### 9 Claims



1. A hand-held surgical tool for turning and gripping microsurgical curved needles having ends, said tool comprising:  
an elongated body for grasping by the user and having a generally cylindrical central portion for spinning about a longitudinal axis through said body,  
spaced upper and lower tips on said body adapted to be moved toward each other to grip the needle,  
said tips terminating in sharp pointed ends, one of said ends on said first tip being a hooked end and having a first curved surface for hooking under a microsurgical needle and for holding the needle while it pivots its ends downwardly,  
said second end having a shorter length than said hooked end,  
said hooked end on said first tip extending beyond said second end and extending across the longitudinal axis and over said second end,  
a second curved surface on the end of the second tip facing the first curved surface to engage a side of the microsurgical needle when the tips are moved together,  
said second curved surface engaging and rolling the needle along the first curved surface to swing the ends upwardly as the tips are brought to the closed gripping position, said needle being held between said curved surfaces as the cylindrical central section is turned to spin the microsurgical needle ends in an arc.

**4,793,350**  
**LIQUID FILLED LOW PROFILE DILATATION**  
**CATHETER**

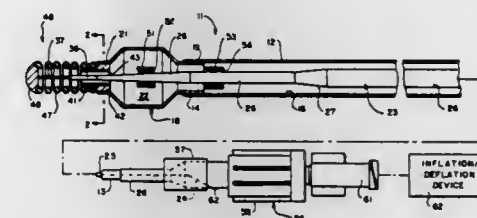
**CRAIG E. MAR, FREMONT, AND JEFFREY S. FRISBLE, SAN JOSE, BOTH OF CALIF., ASSIGNORS TO ADVANCED CARDIOVASCULAR SYSTEMS, INC., MOUNTAIN VIEW, CALIF.**

Filed Jan. 6, 1987, Ser. No. 648

Int. Cl.<sup>4</sup> A61M 29/02

U.S. Cl. 128-344

## 12 Claims



1. A low profile dilatation catheter comprising an elongate flexible tubular member having proximal and distal extremities and having a flow passage extending therethrough, an inflatable balloon having proximal and distal extremities with the proximal extremity of the balloon connected to the distal extremity of the elongate flexible tubular member so that the interior of the balloon is in fluid communication with the flow passage in the tubular member, a flexible tip secured to the distal extremity of the balloon, a core wire having a tapered distal extremity and extending through the balloon and into the flexible tip, means securing the distal extremity of the core wire to the flexible tip, means for rotating the proximal extremity of the core wire for causing rotation of the flexible tip, a passageway between the core wire and the inner diameter of the flexible tip for venting gas from the balloon to ambient without passage of inflation liquid therethrough, and an adapter carried by the proximal extremity of the elongate tubular member which is adapted to supply a liquid to the flow passage for inflating and deflating the inflatable balloon.

4,793,351  
MULTI-LUMEN BALLOON CATHETER  
Mark S. Landman, Sharon, and Steven R. LeMott, Stoughton,  
both of Mass., assignors to Mansfield Scientific, Inc., Mans-  
field, Mass.

Filed Jun. 15, 1987, Ser. No. 62,786

Int. Cl.<sup>4</sup> A61M 25/00

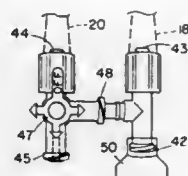
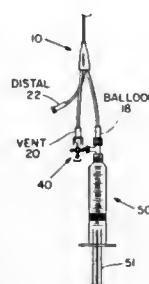
U.S. Cl. 128-344

### 18 Claims

1. A medical device comprising an elongated catheter having a distal portion and a proximal portion, an inflatable balloon associated with the distal portion of said catheter, said catheter defining at least a first lumen and a second lumen communicating with the volume of said balloon, and a valve member associated proximally with said first and second lumens, said valve member having a first position for connection of said first lumen to a source of liquid to be introduced into said balloon and for connection of said second lumen to atmosphere for venting gas displaced from said balloon by said liquid, and said valve member having a second position for connection of both said first and second lumens to inflation/deflation means to enable flow of liquid into and rapidly out of said balloon via both said lumens simultaneously, said valve member defining, with said first lumen and said second lumen of said catheter, a closed system wherein said valve member remaining connected to said first lumen and to said second lumen in said first position and in said second position, and said medical device further comprising means for venting of residual gas from within said medical device during use of



said device in an inflation/deflation procedure, said means for venting of residual gas comprising said valve member, said valve member adapted for selective adjustment, both prior to use of said device in the inflation/deflation medi-



cal procedure, and during the inflation/deflation procedure, for venting residual gas from within the device, between said first position for venting of gas from said device and said second position for inflation/deflation of said balloon via said first and second lumens.

4,793,352

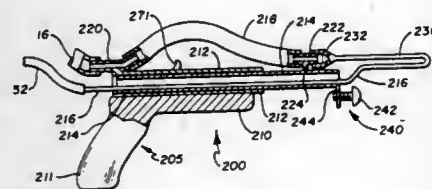
**LIMITED HEAT TRANSFER DEVICE AND METHOD**  
Elchenlaub, John E., 1300 France Ave. S., Golden Valley, Minn. 55427

Continuation of Ser. No. 827,780, Feb. 7, 1986, abandoned, which is a continuation of Ser. No. 537,499, Sep. 30, 1983, abandoned. This application May 11, 1987, Ser. No. 48,024 The portion of the term of this patent subsequent to Oct. 25, 2000, has been disclaimed.

Int. Cl. A61F 7/00

U.S. Cl. 128—399

26 Claims



1. A vapor-utilization device for heating human body tissue without danger thereto at or below a predetermined maximum temperature, comprising:

- vaporization means for heating a liquid within a chamber to produce vapors;
- vapor transfer means connected to said vaporization means in non-diluting vapor-conducting relation for directing said vapors in non-diluted condition to a heating terminal; and
- a heating terminal having throughout its extended use a normally non-pressurized interior in free fluid communication with the atmosphere and being connected to said vapor transfer means in non-diluted vapor-receiving relation

tion and including a heat conductive surface which allows the heat of condensation to transfer from said vapor across said surface, said heating terminal comprising a heating chamber with a vapor inlet and outlet and a flexible, heat transmitting glove in sealed relationship within said heating chamber such that an object may be inserted into said glove within said heating chamber.

4,793,353

**NON-INVASIVE MULTIPROGRAMMABLE TISSUE STIMULATOR AND METHOD**

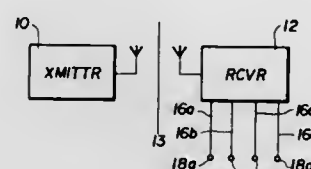
William N. Borkan, 3364 NE. 167th St., N. Miami Beach, Fla. 33160

Continuation of Ser. No. 631,299, Jul. 16, 1984, Pat. No. 4,612,934, which is a continuation-in-part of Ser. No. 278,991, Jun. 30, 1981, Pat. No. 4,459,989. This application May 7, 1986, Ser. No. 860,429

Int. Cl. A61N 1/36

U.S. Cl. 128—421

18 Claims



1. An electronic tissue stimulator system, comprising: at least three electrodes to be implanted adjacent tissue to be stimulated in a patient; means connected to said electrodes for programmably determining a positive, negative and high impedance state for each electrode; transmitting means for transmitting programming data to define for each of said electrodes said positive, negative or high impedance state; and receiving means to be surgically implanted within said patient for receiving said programming data, for generating stimulation pulses and for delivering said stimulation pulses to said electrodes having positive and negative states as defined by said programming data.

4,793,354

**TOUCH ENHANCEMENT**

H. Earl Wright, and Don A. Perry, both of Decatur, Ill., assignors to Inventive Products, Inc., Decatur, Ill.

Filed Oct. 20, 1987, Ser. No. 110,379

The portion of the term of this patent subsequent to Apr. 14, 2004, has been disclaimed.

Int. Cl. A61B 5/00

U.S. Cl. 128—630

5 Claims

1. A method of enhancing the sense of touch which comprises:

- providing two layers of a pliable, elastic material, each layer having a thickness of about 0.002 to 0.020 inches, a modulus of elasticity at 300 percent elongation of less than about 3,500 psi, a tensile strength of greater than about 3,000 psi, and an ultimate elongation of greater than about 300 percent so that the layers are resistant to tearing and puncturing and are able to conform to the contours of the object being touched and to readily transmit touch stimuli;
- placing the two layers between the fingertips and the object being touched in such a way that the two layers can move freely relative to each other;
- maintaining the coefficient of kinetic friction between the two layers at less than the coefficient between the fingertips and the top layer and less than the coefficient between the object being touched and the bottom layer so that the

top layer moves with the fingertips while the bottom layer remains stationary over the object being touched; and (d) moving the fingertips over the object being touched separated by the two layers of material.

4,793,355

**APPARATUS FOR PROCESS FOR MAKING BIOMAGNETIC MEASUREMENTS**

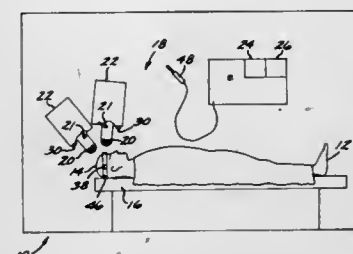
Duane B. Crum, San Diego; Ronald C. Wesley, Cardiff; Richard E. Greenblatt, San Diego; Roberta M. Toussaint, Olivenhain, and Eugene C. Hirschko, Leucadia, all of Calif., assignors to Biomagnetic Technologies, Inc., San Diego, Calif.

Filed Apr. 17, 1987, Ser. No. 39,515

Int. Cl. A61B 5/05

U.S. Cl. 128—653

24 Claims



1. Apparatus for making magnetic measurements of the human body, comprising: biomagnetometer means including a magnetic sensing coil for measuring magnetic fields arising from a selected portion of the body; and means for recording in real time the location of the selected portion of the body from which the magnetic fields emanate, said means for recording including electromagnetic means for sensing the location of the selected portion of the body using an electromagnetic signal, said electromagnetic means including a transmitter and a receiver of electromagnetic signals.

4,793,356

**SURFACE COIL SYSTEM FOR MAGNETIC RESONANCE IMAGING**

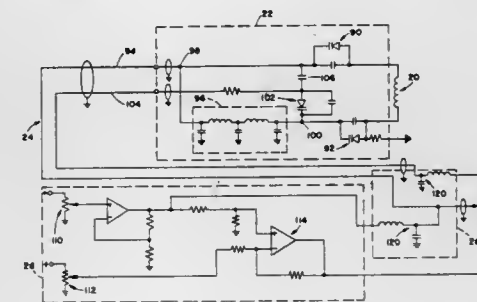
George J. Misis, Hiram; Gregory C. Hurst, Shaker Hts.; G. Neil Holland, Chagrin Falls; John L. Patrick, III, Solon, and Paul T. Orlando, Euclid, all of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio

Filed Aug. 14, 1985, Ser. No. 765,708

Int. Cl. A61B 5/05

U.S. Cl. 128—653

7 Claims



1. A magnetic resonance imaging apparatus comprising: a main magnetic field generating means for generating a main magnetic field longitudinally along an image region;

a gradient field means for producing magnetic field gradients across the main magnetic field in the image region; a magnetic resonance excitation means for exciting nuclei of an object in the image region to resonate, the resonating nuclei generating radio frequency resonance signals; a flexible coil disposed in conformity with a selected surface portion of the object for at least receiving the resonance signals; a first variable capacitance means mounted to the flexible coil for selectively adjusting a resonant frequency thereof under control of a received resonance frequency adjusting signal; a second variable capacitance means operatively connected with the coil for selectively adjusting an impedance match thereof under control of an impedance adjusting signal; a common electrical conductor connected to the coil and the first and second variable capacitance means for concurrently conveying the resonance signals from the coil and resonance frequency and impedance adjusting signals to the first and second variable capacitance means; a control means connected to the electrical conductor for applying the resonant frequency and impedance adjusting signals thereto; and, an image reconstruction means for reconstructing a representation of an image of resonating nuclei position and density, the image reconstruction means being operatively connected with the electrical conductor.

4,793,357

**CT BLOOD FLOW MAPPING WITH XENON GAS ENHANCEMENT**

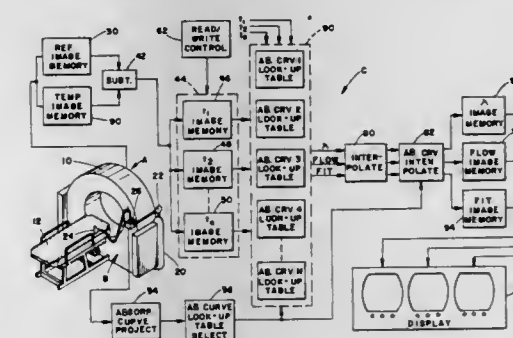
Walter W. Lindstrom, Shaker Hts., Ohio, assignor to Picker International, Inc., Highland Hts., Ohio

Filed Nov. 24, 1986, Ser. No. 933,781

Int. Cl. A61B 6/00

U.S. Cl. 128—654

20 Claims



1. An apparatus for determining partition coefficients and blood flow rates in a tissue region of interest of a subject, the apparatus comprising: an enhancement agent means for introducing an enhancement agent into a patient's blood; a means for providing an indication of a concentration of the enhancement agent within the blood over time; an absorption curve projecting means for projecting an absorption curve designation indicative of one of a plurality of preselected absorption curves representing enhancement agent absorption by the blood from the provided indications of the enhancement agent concentration in the blood over time; a look-up table means preprogrammed with blood flow and partition coefficient values which have a previously calculated relationship to preselected sampling intervals, image pixel values, and blood enhancement agent absorption curve designations, the look-up table means being addressable at least by the image pixel values and the absorption

curve designations to retrieve the corresponding precalculated blood flow and partition coefficient values; an imaging means for generating electronic image representations of at least the tissue region of interest, each image representation including a plurality of image pixel values, each pixel value being indicative of enhancement agent concentration in a corresponding subregion of the tissue region of interest; an image representation storing means for storing a plurality of image representations of the selected region of interest, the stored image representations being generated at selected sampling intervals; and a look-up table access means for selectively accessing the look-up table means with at least the projected absorption curve designation and the image pixel values to retrieve the corresponding preprogrammed partition coefficient and blood flow values.

#### 4,793,358 APPARATUS FOR MEASURING LOCAL CEREBRAL BLOOD FLOW

Tokumori Kimura, Utsunomiya, and Naotohshi Kobayashi, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

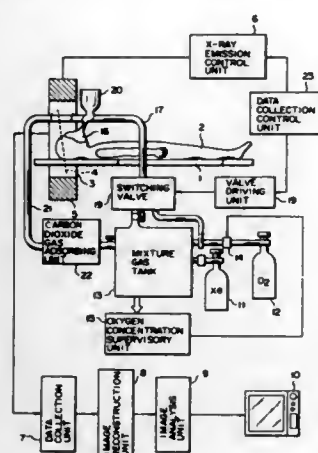
Filed Feb. 20, 1987, Ser. No. 17,047

Claims priority, application Japan, Feb. 25, 1986, 61-40044

Int. Cl.<sup>4</sup> A61B 6/00

U.S. Cl. 128—654

9 Claims



1. An apparatus for measuring local cerebral blood flow of a patient under examination, said apparatus comprising: gantry means for supporting the patient during examination, said gantry means including a photography area in which a portion of the patient to be examined is positioned and means for scanning said portion of the patient with X-rays along a slice of said portion of the patient to produce tomographic image data indicative of cerebral blood flow in the patient; inspiratory gas means for supplying a tracer gas to the patient during an inspiration cycle of the patient; expiratory gas receiving means for receiving expiratory gas from the patient during an expiration cycle of the patient, said expiration cycle including an end tidal air portion during which said expiratory gas includes end tidal air, said expiratory gas receiving means including means positioned in said photography area of said gantry means for selectively receiving said end tidal air; control means coupled to said gantry means and to said expiratory gas receiving means for causing said scanning means to scan said portion of the patient and said end tidal air receiving means during said end tidal air portion of said

expiration cycle to produce corresponding tomographic image data; and means for calculating the concentration of said tracer gas in the cerebral blood of the patient from said tomographic image data.

#### 4,793,359 CENTERING BALLOON STRUCTURE FOR TRANSLUMINAL ANGIOPLASTY CATHETER

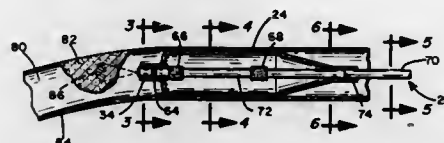
James S. Sharrow, Bloomington, Minn., assignor to GV Medical, Inc., Minneapolis, Minn.

Filed Apr. 24, 1987, Ser. No. 41,996

Int. Cl.<sup>4</sup> A61B 10/00

U.S. Cl. 128—658

10 Claims



1. A laser enhanced transluminal angioplasty catheter, including: a length of pliable catheter tubing having proximal and distal ends and being insertable by its distal end into an artery, and means forming a first lumen in said catheter tubing extending from its proximal end to the distal end; an optical fiber in said first lumen for transmitting laser energy from the proximal end of the catheter tubing to the distal end; a catheter balloon mounted to said catheter tubing in surrounding relation thereto at a distal region of the catheter tubing such that a distal tip of the catheter tubing extends slightly beyond said balloon; means forming a second lumen in said catheter tubing, extending from the proximal end of the catheter tubing to a point near said distal end and open to the interior of said balloon; said balloon, in response to a fluid supplied under pressure through said second lumen, dilating to a generally cylindrical configuration to engage a segment of said artery to substantially axially align said balloon and said arterial segment about a central axis; and wherein said balloon, when in said cylindrical configuration, includes a distal wall substantially perpendicular to said central axis and joined with respect to said distal tip in surrounding relation thereto, said distal wall tending to position said distal tip parallel to said balloon and spaced apart from said arterial segment.

#### 4,793,360 ELECTRONIC BLOOD PRESSURE MEASURING DEVICE

Yoshinori Miyawaki, 33-1-204, Sanbonbashi, Yawata, Yawata-shi, Kyoto-fu; Satoshi Ueno, 52-5, Tanigatsujicho, Arashiyama, Nishigyo-ku, Kyoto-fu; Satoshi Egawa, 2-3, Shakata-cho, Oomiya, Kita-ku, Kyoto-shi, Kyoto-fu, and Osamu Shirasaki, 118-2, Higashi-Sonoda-cho 6-chome, Amagasaki-shi, Hyogo-ken, all of Japan

Division of Ser. No. 839,580, Mar. 14, 1986, Pat. No. 4,703,760. This application Jul. 30, 1987, Ser. No. 80,463

Claims priority, application Japan, Mar. 15, 1985, 60-52902; Mar. 22, 1985, 60-59297

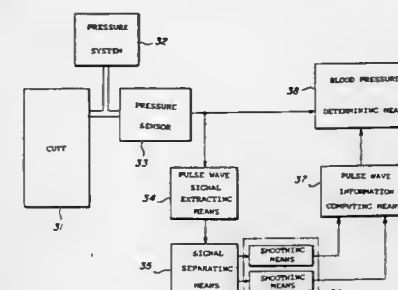
Int. Cl.<sup>4</sup> A61B 5/02

U.S. Cl. 128—681

1 Claim

1. An electronic blood pressure measuring device, comprising: (a) a cuff; (b) a pressure system connected with said cuff for pressurizing and evacuating said cuff; (c) a pressure sensor associated with said cuff for detecting

the cuff internal pressure within said cuff and producing a signal representative of said cuff internal pressure; (d) a pulse wave extraction means for extracting the pulse wave component overlaid in said cuff internal pressure signal and producing a pulse wave signal representative of said pulse wave component; (e) a signal separating means for separating the pulse wave signal into a first signal component which is greater than a reference value and a second signal component which is smaller than said reference value;



(f) a smoothing means for separately smoothing said separated first and second signal components; (g) a pulse wave information computing means for computing pulse wave information by combining said smoothed first and second signal components; and (h) a blood pressure determining means for determining blood pressure according to said pulse wave information and said signal representative of said cuff internal pressure obtained from said pressure sensor.

#### 4,793,361 DUAL CHANNEL P-WAVE DETECTION IN SURFACE ELECTROCARDIOGRAPHS

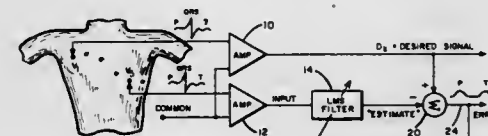
Robert A. DuFault, Roseville, Minn., assignor to Cardiac Pacemakers, Inc., St. Paul, Minn.

Filed Mar. 13, 1987, Ser. No. 25,731

Int. Cl.<sup>4</sup> A61B 5/04

U.S. Cl. 128—696

5 Claims



1. A system for detecting P-waves in ECG signals obtained from chest contacting surface electrodes, comprising: (a) first and second surface electrodes individually coupled to first and second differential amplifying means for obtaining time varying ECG signals from two separate locations on the chest wall of a patient, the output of first differential amplifying means comprising a "reference" waveform; (b) adaptive filter means having means for receiving an "input" signal and a "desired" signal and having "error" signal feedback means and "estimate" output means; (c) means coupling the output of said first differential amplifying means to said means for receiving a "desired" signal; (d) means coupling the output of said second differential amplifying means to said means for receiving an "input" signal; (e) summing means connected to receive said "desired" signal and coupled to said "estimate" output means of said adaptive filter means for producing an "error" signal proportional to the difference between said "desired"

signal and said "estimate" output means of said adaptive filter means; and (f) means coupling said "error" signal feedback means to said adaptive filter means for varying the characteristics of said adaptive filter means whereby the energy content of said "error" signal due to the QRS content of said ECG signals is minimized while the energy content due to the P-wave is enhanced.

#### 4,793,362 METHOD AND APPARATUS FOR MONITORING THE FLUID BALANCE OF THE BODY

Bo Tedner, Tjädervägen, Sweden, assignor to Karolinska Institutet, Stockholm, Sweden

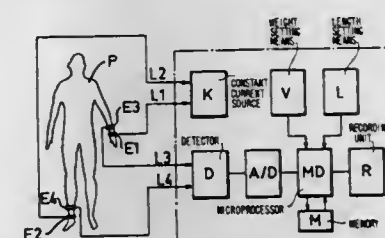
PCT No. PCT/SE83/00148, § 371 Date Dec. 21, 1983, § 102(e) Date Dec. 21, 1983, PCT Pub. No. WO83/03746, PCT Pub. Date Nov. 10, 1983

PCT Filed Apr. 20, 1983, Ser. No. 567,849

Claims priority, application Sweden, Apr. 22, 1982, 8202533 Int. Cl.<sup>4</sup> A61B 5/05

U.S. Cl. 128—734

7 Claims



1. A method for monitoring the fluid balance of a body comprising the steps of: (1) attaching a first pair of electrodes to the body at spaced locations to establish a path for current to pass therebetween; (2) attaching a second pair of electrodes to the body, each located at a short distance from one of the first pair of electrodes and located in the current path between said first pair of electrodes; (3) simultaneously passing first and second high-frequency alternating currents between said first pair of electrodes, one of said currents having a frequency on the order of 1.5 kHz and the other 150 kHz; (4) measuring the voltage drop between said second pair of electrodes for a first measurement; (5) separating the voltage drop into two components of different frequencies, each of which scalarly represents the impedance of the body at the respective frequency; (6) repeating steps 4 and 5 after a desired time period for a second measurement; and (7) calculating the ratio between the differences in impedance taken in the first measurement and the difference in impedances in the second measurement to thereby indicate a change in fluid balance of the body so that a tapping or refilling of fluid may be effected to restore fluid balance.

#### 4,793,363 BIOPSY NEEDLE

Ronald W. Ausherman, Alton, Ill., and Richard A. Burkholder, St. Charles, Mo., assignors to Sherwood Medical Company, St. Louis, Mo.

Filed Sep. 11, 1986, Ser. No. 906,358

Int. Cl.<sup>4</sup> A61B 10/00

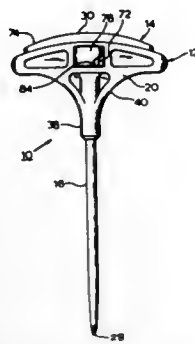
U.S. Cl. 128—754

24 Claims

1. A bone marrow biopsy device comprising a cannula member having upper proximal and lower distal ends and including a cannula open at the proximal and distal ends, and a handle connected to said cannula at the proximal end thereof, and a



stylet member having upper proximal and lower distal ends and including a stylet having a pointed distal end, and a handle connected to said stylet at the proximal end thereof, said stylet being slidable in said cannula and removable from said cannula



member, said stylet member handle including an upper wall having a length substantially greater than the width thereof, said upper wall having an upper surface generally arcuate in the lengthwise direction thereof and substantially flat in the widthwise direction thereof.

4,793,364

## CIGARETTE MANUFACTURE

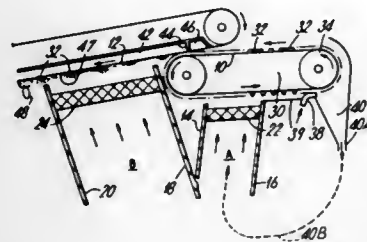
Francis A. M. Labbe, Neuilly-sur-Seine, France; John R. Nowers, London, England; Paul R. Wiese, London, England; Ivan Y. Hirsh, London, England, and Godfrey A. Wood, High Wycombe, England, assignors to Molins PLC, London, England

Filed Feb. 10, 1986, Ser. No. 827,604  
Claims priority, application United Kingdom, Feb. 9, 1985, 8503371; May 3, 1985, 8511406

Int. Cl.<sup>4</sup> A24C 5/14

U.S. Cl. 131—84.3

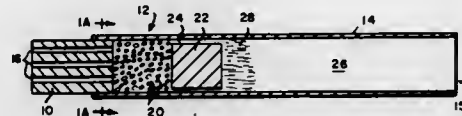
10 Claims



1. A cigarette making machine comprising means for feeding tobacco A onto a first conveyor carrying outward projections defining the ends of spaced portions of tobacco A, the first conveyor being air-pervious in areas lying between the projections and including means for applying suction to the air-pervious areas to retain the required portions of tobacco A on the first conveyor; a second conveyor arranged to receive the portions of tobacco A from the first conveyor and thereafter to receive a layer of tobacco B filling spaces between the portions of tobacco A and also extending over those portions; and a trimming device for removing excess tobacco B to form a cigarette filler stream ready for enclosing in a paper wrapper to form a continuous cigarette rod; the first conveyor being in the form of a band which, after receiving the tobacco A, passes around a pulley at which excess tobacco A which is not retained by suction is arranged to fly off under the influence of centrifugal force.

4,793,365  
SMOKING ARTICLE  
Andrew J. Sensabaugh, Jr., Winston-Salem; Henry T. Ridings, Lewisville, and John H. Reynolds, IV, Winston-Salem, all of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

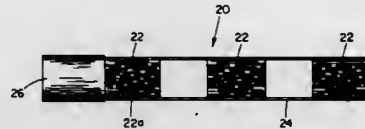
Filed Sep. 14, 1984, Ser. No. 650,604  
Int. Cl.<sup>4</sup> A24D 1/00, 1/02, 1/18; A24F 1/00  
U.S. Cl. 131—194 59 Claims



1. A cigarette-type smoking article comprising:  
(a) a carbonaceous fuel element;  
(b) a physically separate aerosol generating means including a volatile substance, the aerosol generating means being longitudinally adjacent to the fuel element; and  
(c) a mouthpiece;  
the fuel element and the aerosol generating means being arranged in a conductive heat exchange relationship by contact between the aerosol generating means and a part of the fuel element such that the aerosol generating means receives conductive heat transfer substantially throughout the time of burning of the fuel element.

4,793,366  
NICOTINE DISPENSING DEVICE AND METHODS OF MAKING THE SAME

Ira D. Hill, Clay Court, Locust, N.J. 07760  
Filed Nov. 12, 1985, Ser. No. 796,883  
Int. Cl.<sup>4</sup> A24D 1/00; A24F 1/00  
U.S. Cl. 131—273 28 Claims



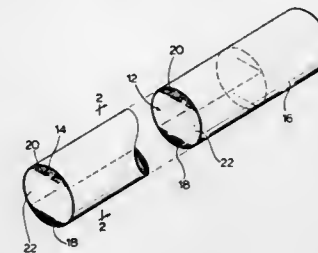
17. An nicotine dispensing device for non-pyrolytic use, said device being adapted to release nicotine bearing vapors into air drawn therethrough, said device comprising:  
(a) a housing comprising an elongated tube, said housing defining a passageway for air through said device; and  
(b) a polymer material disposed within said housing, said material having a plurality of micro-sized reservoirs containing a nicotine bearing fluid to be volatilized in response to suction supplied by the user.

4,793,367  
LINEAR LAYERED CIGARETTE  
Warren A. Brackmann, Mississauga, Canada, assignor to Rothmans of Pall Mall Canada Limited, North York, Canada  
Filed Nov. 26, 1986, Ser. No. 935,214  
Claims priority, application United Kingdom, Dec. 4, 1985, 8529851

Int. Cl.<sup>4</sup> A24D 1/00; A24F 1/00; A24C 5/14, 5/39  
U.S. Cl. 131—360 6 Claims

4. A novel cigarette having a filler rod within a paper tube, comprising a laminate of two outer layers of a first tobacco material and a relatively thick layer of a second tobacco material located therebetween, the tobacco material in each layer of said laminate comprising cut tobacco lamina material, with the cut lamina material in said relatively thick layer being of a

different blend from the cut lamina material in said outer layers, the tobacco blend in said outer layers having a greater ratio

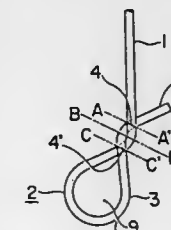


of flavour to tar ratio than the tobacco blend in said relatively thick layer.

4,793,368  
ARTIFICIAL HAIR FOR HAIR IMPLANTATION AND METHOD OF PREPARATION THEREOF

Shiro Yamada, No. 2-7-1-606, Mita, Minato-ku, Tokyo, Japan  
Filed Feb. 12, 1987, Ser. No. 13,917  
Claims priority, application Japan, May 22, 1986, 61-116283; May 22, 1986, 61-76349[U]

Int. Cl.<sup>4</sup> A61F 1/00  
U.S. Cl. 132—53 5 Claims



1. An artificial hair for hair implantation formed of a monofilament of a thermoplastic synthetic resin, and comprising a hair shaft portion and a hair root portion, said root portion including a loop part and a hooked part, the hooked part protruding from the end of the loop part at a predetermined angle to the shaft portion;  
two sections of said monofilament overlap each other between the loop part and hooked part in the form of an S; and  
both monofilament sections being fusion bonded at the points where the sections overlap.

4,793,369  
SPRAY GUN AND ASSOCIATE PARTS WASHER AND RECYCLER

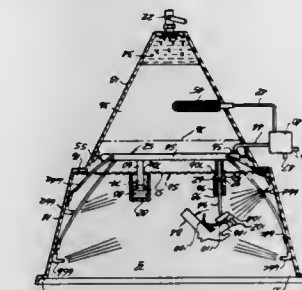
Richard A. Robb, West Bloomfield, Mich.; Michael J. Grubb, London, Canada; John J. Grubb, Calgary, Canada, and James T. Asanger, Carstairs, Canada, assignors to Herkules Equipment Corporation, Walled Lake, Mich. and ABT Equipment and Manufacturing Ltd., Calgary, Canada

Filed Sep. 5, 1986, Ser. No. 904,097  
Int. Cl.<sup>4</sup> B08B 3/02

U.S. Cl. 134—170 16 Claims

1. A paint removal system for cleaning paint from an object comprising:  
an enclosed housing divided into a work chamber and a fluid storage reservoir containing paint solvent;  
spray means including a first and a second outlet adapted to receive pressurized solvent;  
said first outlet including means for receiving and supporting

a conduit and for directing solvent to flow through said conduit;  
means defining a surface for supporting articles to be cleaned in a preferred orientation relative to said second outlet

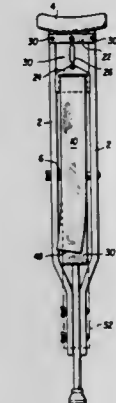


comprising a foraminous material including openings proximate said first and said second outlets;  
means for recirculating solvent from said reservoir to said spray means.

4,793,370  
CRUTCH CAST SUPPORT

Ignacio Perez, 2835 SW. 6th St., Miami, Fla. 33135, and Stephen M. Calderon, 7301 SW. 100 Ct., Miami, Fla. 33173  
Filed Jun. 3, 1987, Ser. No. 56,905

Int. Cl.<sup>4</sup> A61H 3/02  
U.S. Cl. 135—69 14 Claims



1. In combination:  
a crutch having a shoulder rest and hand hold;  
leg support means comprising a loop of flexible material extending to a position below said hand hold; and  
mounting means for attaching said loop of flexible material to said crutch at a location thereof that is closer to said shoulder support than to said hand hold and for loosely attaching said loop of flexible material from said mounting means.

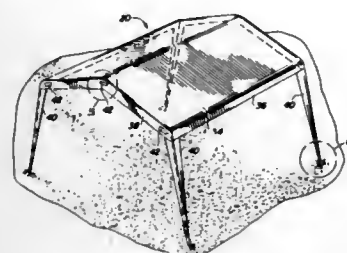
4,793,371  
PORTABLE SHELTER

J. Richard O'Ferrell, and Kevin Butts, both of Phoenix, Ariz., assignors to Ultra Shades, Inc., Phoenix, Ariz.  
Filed Nov. 27, 1987, Ser. No. 125,933

Int. Cl.<sup>4</sup> E04H 15/44, 15/64  
U.S. Cl. 135—106 26 Claims

1. A portable shelter including in combination:  
an open frame including a roof portion and having elongated legs extending from the roof portion to the ground, such that said frame is free-standing;

a fabric cover for placement over the roof portion of said frame;  
elongated narrow fabric leg panels attached to said fabric cover adjacent each of said elongated legs of said frame and extending from the roof portion at least to a point near the ground;



means for releasably attaching each of said fabric leg panels to the elongated leg to which each said leg panel is adjacent at a point near the ground to apply tension through said leg panels to hold said fabric cover tightly in place on the roof portion of said frame.

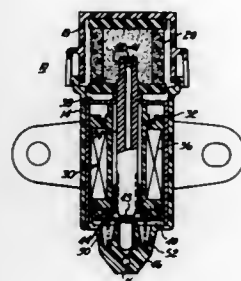
4,793,372  
**ELECTRONIC VACUUM REGULATOR (EVR) WITH BI-METALLIC ARMATURE DISK TEMPERATURE COMPENSATOR**

Michel D. Gauthier, and Albert J. Carmanico, both of Chatham, Canada, assignors to Bendix Electronics Limited, Chatham, Canada

Filed Oct. 29, 1987, Ser. No. 115,011  
Int. Cl.<sup>4</sup> F16K 31/06

U.S. Cl. 137—82

23 Claims



1. A solenoid valve comprising:  
a stator;

a coil responsive to current, magnetically connected to the stator for causing magnetic flux to flow therethrough; wherein the resistance of the coil varies with changes in temperature;

a valve seat positioned about one end of the stator defining a valve seating surface a predetermined distance from the one end and a flat armature movable relative to the valve seat and when seated thereon is spaced from the one end, the armature including first means for causing a portion of such armature to move closer to or farther from the stator to vary the distance between such portion and the one end as a function of temperature.

4,793,373  
**CURRENT-PRESSURE TRANSDUCER, PARTICULARLY FOR A VACUUM CONTROL IN AUTOMOTIVE VEHICLES**

Stephan Weitschork-Muhsold, Usingen, and Wolfgang Gocking, Neu-Anspach, both of Fed. Rep. of Germany, assignors to VDO Adolf Schindling AG, Frankfurt am Main, Fed. Rep. of Germany

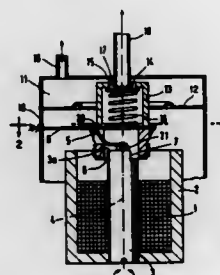
Filed Mar. 5, 1986, Ser. No. 836,289

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1985, 3508481

Int. Cl.<sup>4</sup> G05D 16/06

U.S. Cl. 137—116.5

7 Claims



1. A current-pressure transducer, in particular for vacuum control in automotive vehicles, having a chamber including a connection for supply vacuum and a connection for relief of control pressure within the chamber, having an air inlet for outside pressure and a flexible membrane serving as an internal chamber wall, there being a plunger-type armature of a plunger-type armature electromagnet for displacing the membrane, the transducer further comprising

a double valve which is controlled by the membrane and, depending on the position of the membrane, establishes a fluid-conducting connection to the supply vacuum or to the outside pressure until the control pressure in the chamber corresponds to the force exerted by the plunger-type armature on the membrane as by a proportional relationship between the control pressure and the force; and wherein

the transducer further comprises an approximately annular air gap between the plunger-type armature and a core of the electromagnet, the gap being developed eccentrically to a longitudinal axis of said electromagnet and being rotatably adjustable around the longitudinal axis; wherein the plunger-type armature is mounted swingable around a swing point spaced apart for a center line of said chamber.

4,793,374  
**CORROSION RESISTANT TIRE VALVE ASSEMBLY AND COMPONENTS THEREOF**

John R. Earley, Lynchburg, Va., assignor to Bridge Products, Inc., Northbrook, Ill.

Filed Apr. 15, 1987, Ser. No. 38,868  
Int. Cl.<sup>4</sup> F16K 15/20

U.S. Cl. 137—234.5

11 Claims

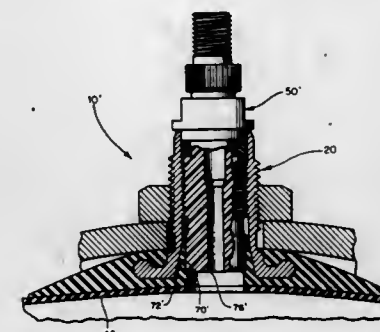
1. A tire valve assembly comprising:

a valve body which defines an outer passageway, a lower end, and an upper end;

a corrosion resistant base member secured to the lower end of the valve body so as to surround the lower end of the valve body and to extend into the outer passageway, said base member defining an annular outer sealing surface within the outer passageway;

a valve core assembly sized to fit within the outer passageway, said valve core assembly defining a lower end, an upper end, and an inner passageway, said valve core assembly adapted to receive valve means for releasably sealing the inner passageway;

a corrosion resistant seal member formed of a synthetic material and positioned at the lower end of the valve core assembly so as to surround the lower end of the valve core assembly and to extend into the inner passageway; and means for releasably securing the valve core assembly in place in the outer passageway;  
said seal member defining an annular inner sealing surface positioned to contact and seal against the outer sealing surface as the valve core assembly is installed in the valve body in order to protect both the valve body and the exterior of the valve core assembly from corrosion;



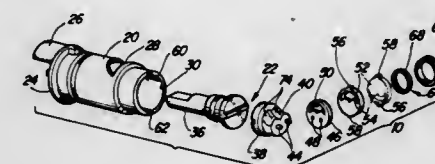
said annular inner sealing surface having a rest outer diameter which is larger than that of the outer sealing surface, and said outer sealing surface shaped to receive the seal member in an interference fit;  
said seal member defining an opening therethrough aligned with the inner passageway, and said opening having a diameter of about 1/16 inch such that the seal member facilitates the entrapment of air in the inner passageway between the valve means and the seal member.

4,793,375  
**FAUCET VALVE CARTRIDGE**  
Garry R. Marty, Noblesville, Ind., assignor to Masco Corporation of Indiana, Indianapolis, Ind.

Filed Jul. 16, 1987, Ser. No. 74,222  
Int. Cl.<sup>4</sup> F16K 5/12, 27/06

U.S. Cl. 137—270

12 Claims



1. A faucet valve cartridge adapted to be used in both the hot water supply and the cold water supply of a knob-operated and a lever-operated faucet, said faucet valve cartridge seated within a housing chamber of the faucet having an axial inlet passage and an outlet passage fluidly communicating with the faucet spout, said faucet valve cartridge comprising:

a valve body having an axial bore and a pair of side outlet ports communicating with said axial bore, said valve body fixedly seated within the housing chamber with one of said outlet ports in communication with the outlet passage of the housing chamber;

a valving member rotatably received within said axial bore of said valve body, said valving member cooperating with said valve body to form a fluid flow passageway open to the bottom of said valving member and capable of selective registry with at least one of said valve body outlet ports, said valving member including a valve stem extending through the upper end of said valve body and a flow

control member having a plurality of flow control channels formed the length of said fluid flow passageway to direct fluid flow towards said valve body outlet ports;  
a first fluid flow plate fixedly attached to said valving member within said axial bore of said valve body, such that said first flow plate rotates with said valving member, said first flow plate having a single inlet aperture in registry with said fluid flow passageway of said valving member to form an inlet port for said passageway of said valving member;

a second fluid flow plate fixedly mounted within said axial bore of said valve body to prevent rotation thereof, said second flow plate having a single inlet aperture adapted for selective registry with said inlet port of said fluid flow passageway upon rotation of said valving member and first fluid flow plate; and

retaining seal means for retaining the said first and second flow plates within said valve body and sealing said axial bore of said valve body against the inlet passage in the bottom of the housing chamber, said retaining seal means including an elastomeric tubular seal disposed within the end of said axial bore and adapted to elastically engage the bottom of said housing chamber and a retaining ring to secure said seal within said axial bore;

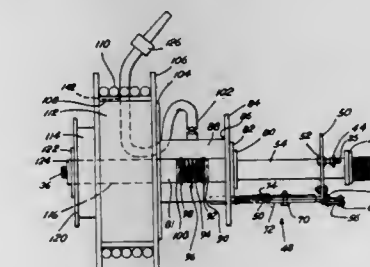
wherein upon rotation of said valving member and first flow plate said inlet aperture of said first plate is brought into selective registry with said aperture of said second flow plate to provide fluid flow through said fluid flow passageway, said passageway being in registry with at least one of said valve body outlet ports and the outlet passage, said fluid flow being selectively interrupted by bringing said inlet aperture of said first flow plate into and out of registry with said aperture of said second flow plate;

said inlet aperture of said second flow plate being offset from the center of said plate and the rotational axis of said valving member, said second flow plate capable of being reversibly mounted within said valve body to reorientate said inlet aperture of said second flow plate relative to said valve body, said second flow plate being mounted within said valve body in a first position with said inlet aperture offset to a first side relative to said valve body to provide fluid flow through said fluid passageway over a first set of rotational positions of said valving member and in a second position with said offset inlet aperture reversed 180° to a second side relative to said valve body to provide fluid flow through said passageway over a second set of rotational positions of said valving member.

4,793,376  
**PORTABLE, RECOILABLE HOSE SYSTEM**  
Larry L. Hare, Bellingham, Wash., assignor to Wayne L. Hare  
Filed Apr. 13, 1987, Ser. No. 37,879  
Int. Cl.<sup>4</sup> B65H 75/34

U.S. Cl. 137—355.23

2 Claims



1. In a recoilable hose winding device comprising two stationary members:

(1) a stationary support bracket having a pair of uprights; and

(2) a stationary shaft disposed between said uprights;



a reel member rotatably mounted on said shaft for paying out, retaining, or winding in a hose;

a band spring having two ends wherein one end is affixed to said reel and the second end is affixed to either of said stationary members, said band spring being placed in tension by rotation of said reel member during said paying out of said hose; and

a braking mechanism;

said improvement comprising adding a remote control brake mechanism wherein said brake mechanism comprises:

a stationary bracket plate;

a planar base plate pivotally affixed to said stationary bracket plate;

a ratchet-like tooth gear rotationally affixed to said reel and positioned adjacent to said planar base plate such that the plane of said ratchet-like tooth gear is perpendicular to the plane of said base plate, said ratchet-like tooth gear having at least one tooth;

a lock catch coplanar with said planar base plate and rigidly affixed thereto such that one end of said lock catch projects outwardly from said lock catch-base plate combination toward said ratchet-like tooth gear for a distance sufficient to perpendicularly engage said tooth gear via a tooth thereon;

a retention spring having a first end and a second end, said first end affixed to said lock catch at the end proximate to said tooth gear, said second end affixed to said bracket plate so as to maintain a tension in said spring whereby said tension acts to pivot said lock catch-base plate combination toward said ratchet-like gear so as to cause said lock catch to perpendicularly engage one said tooth of said ratchet-like tooth gear thereby preventing rotation of said tooth gear in a second direction of rotation ("prevented direction");

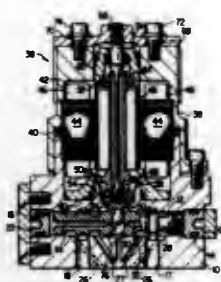
a cable wire affixed to said planar base plate at a point distal to said ratchet-like tooth gear, whereby when sufficient tension is drawn on said cable wire said lock catch-base plate combination pivots away from said ratchet-like tooth gear, causing said lock catch to disengage said tooth thereby permitting said ratchet-like tooth gear to freely rotate in said otherwise prevented direction.

4,793,377

## DIRECT DRIVE SERVO VALVE

Larry E. Haynes, Syracuse, and Larry L. Lucas, Midvale, both of Utah, assignors to E-Systems, Inc., Dallas, Tex.  
Continuation of Ser. No. 898,143, Aug. 18, 1986, abandoned.  
This application Aug. 24, 1987, Ser. No. 89,033  
Int. Cl.<sup>4</sup> F15B 13/044; F16K 31/04  
U.S. Cl. 137—625.65

5 Claims



4. A direct drive servo valve comprising:

a valve housing having a cylindrical bore;

a valve spool mounted for movement in the cylindrical bore of said valve housing for controlling fluid flow through said valve housing;

a cylindrical drive well extending through said valve spool and located therein with a longitudinal axis transverse to the longitudinal axis of the spool;

drive means secured to the valve housing and having a stator

and a rotor, said rotor being rotated in response to energy applied to the stator of the drive means;

a shaft attached to said rotor for rotation therewith;

torque adjustment means mounted to said shaft and having one of two ends fastened to one end of said shaft to control rotational movement;

null adjustment means mounted external of said drive means and engaging the second end of said torque adjustment means to adjust the null position of said shaft, said drive means, said shaft, and said torque adjustment means assembled to said valve housing; and

a spherical tip formed integral with such shaft at one end thereof to be located above the longitudinal axis of the spool and eccentric to the longitudinal axis of said shaft.

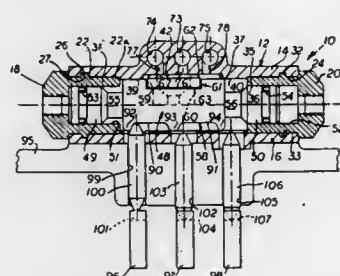
4,793,378

## INTERLOCK VALVE AND CONTROL

John M. Loeffler, Toledo, Ohio; Rick D. Watson, Lambertville, Mich., and George F. Schetter, Toledo, Ohio, assignors to Dana Corporation, Toledo, Ohio  
Continuation of Ser. No. 893,593, Aug. 6, 1986, abandoned. This application May 21, 1987, Ser. No. 54,077  
Int. Cl.<sup>4</sup> F15B 13/042

U.S. Cl. 137—560

4 Claims



1. In a transmission having a fluid pressure actuated means for shifting a range shift section of the transmission and having a plurality of movable shift rails, a valve for selectively connecting an input line communicating with a source of pressurized fluid to one of two output lines communicating with the shifting means for shifting the range shift section comprising:

a valve body secured to the transmission having an inlet port formed therein connected to the input line, a pair of outlet ports formed therein respectively connected to the output lines, and a chamber formed in said valve body;

a valve spool disposed in said valve body chamber, said valve spool being movable between a first position, wherein communication is provided between said inlet port and one of said outlet ports, and a second position, wherein communication is provided between said inlet port and the other of said outlet ports;

a plurality of recesses formed in said valve spool defining respective shoulders between adjacent pair of said recesses; and

individual rod means cooperating with each of the shift rails, each of said individual rod means adapted to extend through said valve body into one of said recesses only when its associated shift rail is not in a neutral position.

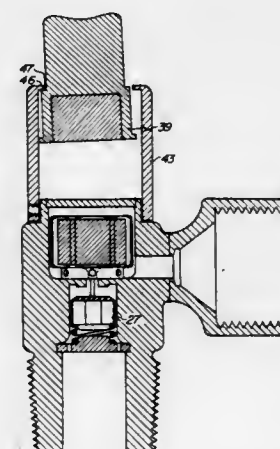
4,793,379

## SUPPLY CYLINDER SHUT-OFF AND FLOW CONTROL VALVE

Paul G. Eldsmore, 2 Blue Hill Ct., Scotts Valley, Calif. 95066  
Continuation of Ser. No. 830,286, Feb. 18, 1986, abandoned, which is a continuation-in-part of Ser. No. 826,022, Feb. 4, 1986, Pat. No. 4,694,860, which is a continuation-in-part of Ser. No. 675,825, Nov. 28, 1984, Pat. No. 4,624,443, which is a continuation-in-part of Ser. No. 398,845, Jul. 16, 1982, abandoned. This application Dec. 2, 1987, Ser. No. 127,634  
Int. Cl.<sup>4</sup> F16K 17/28

U.S. Cl. 137—614.19

6 Claims



1. An apparatus for controlling fluid flow comprising:

a housing having a chamber operatively communicating with an inlet and outlet;

a first valve seat in said chamber interposed between said inlet and outlet;

a first element received in said housing movable between open and closed position with said first valve seat;

means for biasing said first element to one of said open and closed positions;

control means freely received in said housing for movement toward and away from selective engagement with a surface adjacent said first valve seat, said control means having a magnet facilitating generally axial movement of said control means in said housing;

a first actuator disposed between said first element and control means, said first actuator imparting movement to said first element through a first range of movement of said first element when said first actuator abuttingly engages both said first element and said control means, and said first element being unaffected by said first actuator through a second range of movement of said first element;

a shield means extending outwardly from a first face of said control means toward said first valve seat for impeding development of Bernoulli forces between said control means and said surface adjacent said first valve seat, said shield means including plural, spaced apart openings extending generally laterally through said shield to permit fluid flow therethrough when said control means operatively engages said surface adjacent said first valve seat and reducing oscillatory motion of said control means; and

an actuating magnet externally mounted to said housing and magnetically interactive with said control means magnet, said actuating magnet being selectively positionable relative thereto whereby said control means is selectively axially shifted.

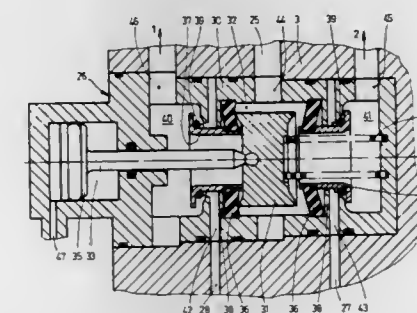
4,793,380

## SWITCH-OVER VALVE, PREFERABLY FOR AN AIR DRIER

Jiri E. J. Lhota, Helsingborg, Sweden, assignor to Garphyttan Haldex AB, Landskrona, Sweden  
Filed Dec. 22, 1987, Ser. No. 136,351  
Claims priority, application Sweden, Dec. 22, 1986, 8605524  
Int. Cl.<sup>4</sup> F16K 11/10

U.S. Cl. 137—627.5

14 Claims



1. A switch-over valve for connection to inlets to two compartments to selectively permit flow into one compartment while the other compartment is vented to permit flow therefrom, said valve comprising:

(a) valve housing means including an inner chamber and an outer chamber at opposite ends of the inner chamber, dividing wall means between the inner chamber and the respective outer chambers, the dividing wall means each including openings to permit flow between the inner chamber and a respective one of the outer chambers, first conduit means communicating with the inner chamber for admitting fluid into the inner chamber of the housing means, and second and third conduit means communicating with respective ones of the outer chambers to permit flow out of the housing means;

(b) a pair of annular valve seat means carried within the inner chamber and spaced from each other, the valve seat means each including a valve opening to permit communication between the inner chamber and the respective outer chambers;

(c) valve body means within the inner housing and movable between the respective valve seat means to selectively open one valve opening and close the other valve opening;

(d) sleeve means extending between the inner chamber and a respective outer chamber and slidably movable within each valve opening and positioned on opposite sides of the valve body means, the sleeve means including sealing means engageable with the respective dividing wall means;

(e) first biasing means within the valve housing means to bias the valve body means into sealing contact with one of the valve seat means;

(f) second biasing means carried by each of the sleeve means for urging the respective sleeve means into sealing engagement with the dividing wall means; and

(g) vent channel means communicating with a respective one of the outer chambers and closable by sealing engagement of the sleeve sealing means with the respective dividing wall means to permit vent flow from only one end chamber while the other end chamber is in communication with the first conduit means.

**4,793,381**  
**BLADDER SUPPORTING DEVICE IN AN**  
**ACCUMULATOR**  
 Nobuyuki Sagimura, 308, Mabase, Shimizu-shi, Shizuoka-ken,  
 Japan  
 Filed Nov. 16, 1987, Ser. No. 121,790  
 Claims priority, application Japan, Nov. 22, 1986, 61-  
 179892[U]  
 Int. Cl.<sup>4</sup> F16L 55/04  
 U.S. Cl. 138—30 4 Claims



1. In an accumulator having a vessel with a cylindrical inner wall, said inner wall including a step formed at an upper portion thereof, a bladder dividing the vessel into a first chamber and a second chamber, said bladder having a bladder flange, and a lid member capable of mated attachment to the vessel including a hook-shaped press edge at a lower portion of the lid member for capturing a bladder flange between said lid member and said step, a bladder support device comprising: an annular support ring having an inner surface of circular arc cross-section transverse the ring and substantially parallel upper and lower legs; said ring being formed of sheet metal in one piece folded upon itself to form said arc and said upper and lower legs, the lower ring leg engaging the step in the vessel; the bladder having a circumferential groove formed in an outer surface beneath an upper portion of the bladder flange; wherein a clearance between the inner surface of said arc of the support ring and the press edge is less than the thickness of the upper portion of the bladder flange, said groove receives said ring and the bladder being mounted within the vessel with said ring engaging said step.

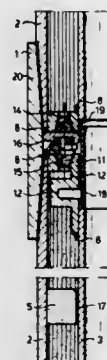
**4,793,382**  
**ASSEMBLY FOR REPAIRING A DAMAGED PIPE**  
 Laszlo Szalvay, San Carlos, Calif., assignor to Raychem Corporation, Menlo Park, Calif.  
 Continuation-in-part of Ser. No. 65,146, Jun. 24, 1987, abandoned, which is a continuation of Ser. No. 596,743, Apr. 4, 1984, abandoned. This application Dec. 16, 1987, Ser. No. 133,753  
 Int. Cl.<sup>4</sup> F16L 55/16  
 U.S. Cl. 138—98 7 Claims

1. An assembly for securing a repair sleeve within a damaged pipe, comprising:  
 (a) a tubular repair sleeve, and  
 (b) a shape memory alloy element positioned within the sleeve and having a mandrel on each end with at least a

portion of each mandrel extending beyond the sleeve at a respective end of the sleeve;



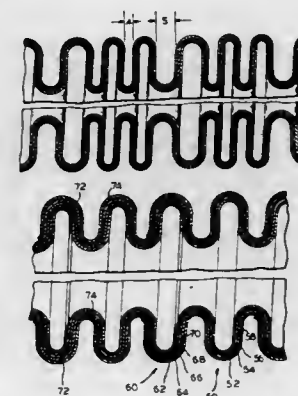
**4,793,383**  
**HEAT INSULATING TUBE**  
 Gyula Gyory, Szolnok, and Zoltán Flórián, Nagykanizsa, both of Hungary, assignors to Kőolajkutató Vállalat, Szolnok and Dunántúli Kőolajipari Gépgyár, Nagykanizsa, both of Hungary  
 Continuation of Ser. No. 833,879, May 5, 1986, abandoned. This application Oct. 14, 1987, Ser. No. 110,089  
 Int. Cl.<sup>4</sup> F16L 9/18, 39/00  
 U.S. Cl. 138—114 6 Claims



1. A heat insulating tube comprising:  
 (a) an outer casing having a first end;  
 (b) an inner casing concentric with and housed within said outer casing;  
 (c) a cross connecting bridge extending between said inner casing and said outer casing and joining at said first end said outer and said inner casings to each other;  
 (d) said cross connecting bridge having a circular outer groove extending towards said outer casing, and a circular inner groove extending toward said inner casing, said outer and inner groove being overlapped when viewed along the length of said tube;  
 (e) a plurality of heat resistant spacer rings thermally separating said inner casing from said outer casing, said spacer rings being located from said connecting bridge and from

one another by a distance which is the outer diameter of the inside casing multiplied by a number from 20-50; and  
 (f) the slenderness ratio of said tube is between about 30 and about 70.

**4,793,384**  
**SELF-DAMPING CONVOLUTED CONDUIT**  
 James M. Lalikos, Springfield, and Harold K. Waite, East Longmeadow, both of Mass., assignors to Titeflex Corporation, Springfield, Mass.  
 Continuation-in-part of Ser. No. 828,295, Feb. 11, 1986, abandoned. This application May 1, 1987, Ser. No. 47,508  
 Int. Cl.<sup>4</sup> F16L 09/14  
 U.S. Cl. 138—121 12 Claims

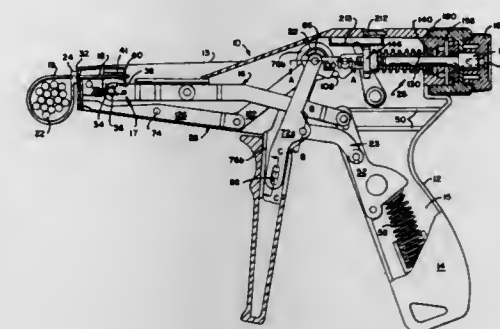


1. A metallic convoluted fluid conveying conduit for use in an exhaust system of an automotive vehicle, said vehicle causing certain vibrational characteristics which would tend to establish localized high energy loops and nodes in said conduit at various resonant frequencies resulting from an operation of said vehicle, said conduit comprising a plurality of coaxial layers forming a multi-layered convoluted wall of alternating peaks and valleys, the conduit having a mass and a spring rate which determines the nature of the conduit response to said vibrational characteristics, the layers being arranged to provide a conduit wall comprised of successive incremental lengths, each incremental length of said wall having a thickness which is variable relative to the thickness of neighboring incremental lengths in order to vary said mass and said spring rate to produce localized vibration response characteristics which do not coincide with said localized high energy loops and nodes, whereby successive incremental areas of said conduit have different resonant characteristics responsive to said certain vibrations, and said variations in thickness being distributed along the length of said conduit to inhibit localized resonance in said conduit at said resonant frequencies of said vehicle.

**4,793,385**  
**HANDHELD TENSIONING AND CUT-OFF TOOL**  
 Edward Dyer, Germantown, and William K. Lueschen, Grafton, both of Wis., assignors to Tyton Corporation, Milwaukee, Wis.  
 Continuation of Ser. No. 899,017, Aug. 22, 1986, abandoned. This application Mar. 18, 1988, Ser. No. 170,035  
 Int. Cl.<sup>4</sup> B21F 9/02  
 U.S. Cl. 140—123.6 59 Claims

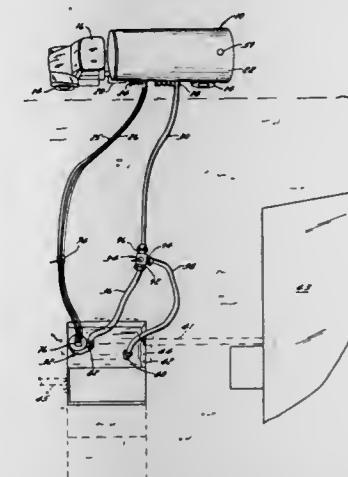
1. A tool for tensioning and severing an elongate cable tie having a tie head portion and tie tail portion comprising, means for gripping and tensioning the tail of the cable tie capable of reciprocating linear movement, means for severing the cable tie tail adjacent said cable tie head upon attainment of a preselected tension in said tie, actuating means including an actuating link for actuating

said tensioning means and being capable of pivotal and linear movement, said actuating means being operatively connected to said severing means and said tie tensioning means,



and restraining means for restraining said actuating means to pivotal movement until a preselected tension is achieved in said cable tie tail by said tensioning means, whereupon said actuating means moves linearly and said actuating link actuates said severing means and severs said tie tail adjacent said tie head.

**4,793,386**  
**APPARATUS AND METHOD USING PORTABLE PUMP**  
 Albert H. Sloan, Ft. Lauderdale, Fla., assignor to Sloan Pump Company, Inc., Ft. Lauderdale, Fla.  
 Filed Sep. 3, 1987, Ser. No. 92,561  
 Int. Cl.<sup>4</sup> B08B 9/08  
 U.S. Cl. 141—65 63 Claims



1. Apparatus for emptying a first tank (42) comprising: a holding tank (22) having a tank inlet port (55) and movable to a jobsite whereat a first tank (42) is located, said first tank (42) containing liquid and solids in said liquid and having an access opening (44) therein; a portable pump (32) operable to ingest liquid and solids in said liquid through a pump inlet port (80) and to expel the ingested liquid and solids in said liquid in a pressurized stream through a pump outlet port (82), said portable pump (32) being adapted to be located remote from said holding tank (22) and near said first tank (42) and having said pump inlet port (80) in communication with said liquid in said first tank (42);



a hose (30) for connecting said pump outlet port (82) to said tank inlet port (55);  
and power supply means for operating said portable pump (32) while it is disposed near said first tank (42) to effect pumping of the contents of said first tank (42) into said holding tank.

4,793,387

**OVERFILL SPILLAGE PROTECTION DEVICE**

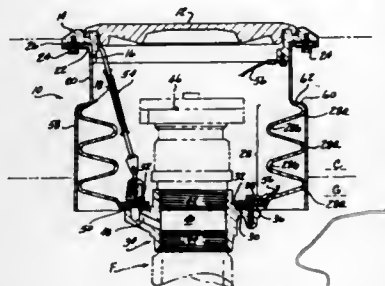
Leo J. LeBlanc, Bloomfield Hills, and Elmer P. Klop, Grand Haven, both of Mich., assignors to Enterprise Brass Works, Inc., Muskegon, Mich.

Filed Sep. 8, 1987, Ser. No. 93,917

Int. Cl.<sup>4</sup> B65B 3/06

U.S. Cl. 141—86

7 Claims



1. An overflow and spillage protection device for use in combination with an underground fuel storage tank having fill pipe means extending upwardly from said tank to an upper end located below ground level, said device comprising a hollow, tubular, bellows member symmetrical about a central vertical axis; said tubular bellows member being of a fuel impervious material of sufficient flexibility to accommodate axial extension and compression of said tubular bellows member, said member having an upper end, a lower end, an exterior surface and an internal chamber, means defining a relatively short, hollow, cylindrical section of said member extending downwardly from said upper end to a radially outwardly flared annular projection, said annular projection constituting the uppermost portion of a hollow bellows-shaped section of said tubular bellows member integral with and extending downwardly from said cylindrical section substantially to said lower end, a rigid annular rim member fixedly and sealingly secured to the upper end of said tubular bellows member in coaxial relationship to said central vertical axis, annular fill pipe coupling means fixedly and sealingly secured to said lower end in coaxial relationship to said central vertical axis, and a rigid, hollow, cylindrical skirt surrounding the exterior surface of said bellows-shaped section of said tubular member in axially overlapping relationship therewith, said rim member being adapted to be fixedly embedded in the ground at ground level and said coupling means being adapted to be fixedly and sealingly coupled to said upper end of said fill pipe means.

4,793,388

**APPARATUS FOR TREATING FLOWABLE MATERIALS**

Berhard Ladwein, Überherrn-Altforweiler, Fed. Rep. of Germany, assignor to Rosemarie Ladwein, Überherrn-Altforweiler, Fed. Rep. of Germany

Filed Mar. 10, 1987, Ser. No. 24,328

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1986, 3608103

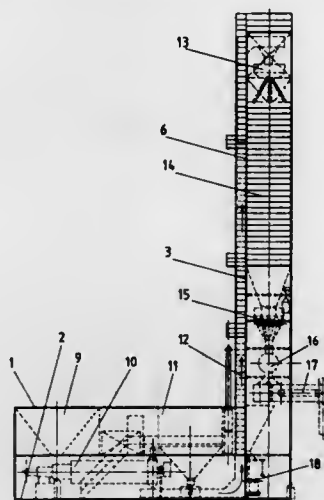
Int. Cl.<sup>4</sup> B65G 65/30

U.S. Cl. 141—98

20 Claims

1. Apparatus for treatment of flowable materials, particularly for drying, sifting, storing, metering, dispensing and packing of flowable solids materials, comprising a plurality of

neighboring modules in the form of containers of the type used for storage of cargo during shipment in railroad container cars,



in container ships and in cargo planes; and material treating units provided in and/or on at least some of said containers.

4,793,389

**TREE HARVESTER**

Roger Sigouin, 601 R 111 onest, Amos, Quebec, Canada J9J 2Y1, and Michel St Pierre, Amos, Canada, assignors to Roger Sigouin, Amos, Canada

Continuation-in-part of Ser. No. 894,611, Aug. 8, 1986, Pat. No. 4,727,916. This application Sep. 14, 1987, Ser. No. 96,151

Int. Cl.<sup>4</sup> A01G 23/08

U.S. Cl. 144—34 R

18 Claims



1. A tree harvester comprising:  
a head boom having a lower free end;  
a tree felling head comprising an elongated post having a longitudinal axis and a platform structure fixedly mounted at one end of said post and extending laterally therefrom; said platform structure defining a storage enclosure including a flat bottom wall having a straight front edge and a circumscribing wall upstanding from and around said bottom wall, said circumscribing wall extending at least up to the ends of said straight front edge;  
a rotary cylindrical cutting knife and means solidly mounting said knife on said platform structure immediately adjacent and parallel to said bottom wall front edge outside said storage enclosure, said cylindrical knife having a

top longitudinal edge essentially flush with the top face of said bottom wall;  
means pivotally mounting said post on said lower end of said head boom for holding said tree felling head with said rotary cutting knife in essentially horizontal position and applied against one side of a butt end of a tree to be felled;  
first gripping arm means comprising at least one first gripping arm storage enclosure and adjacent thereto; means mounting one end of said first arm on said tree felling head for pivotal movement of said first arm about an axis parallel to said post longitudinal axis, and first power means for pivoting said first gripping arm along an arc of circle of sufficient length to allow said first arm to close in around the other side of said butt end of the tree to be felled whereby to press said rotary cutting knife against the tree butt end to cut a kerf thereacross and thereafter to move said tree into said storage enclosure in vertical position against said circumscribing wall;

a tree support fixed to said post above at least part of said circumscribing wall for holding said cut tree in said vertical position; and

second gripping arm means for releasably holding said felled tree in said storage enclosure while a further tree is being felled, said second gripping arm means being operative independently of said first gripping arm means and comprising a compound linkage means, including a second gripping arm, and a power jack operating said compound linkage means;

wherein said compound linkage means is constructed to act as a knuckle joint and comprises:

a first long link and a first short link; first pivot means pivotally interconnecting said first link at adjoining ends thereof and pivotally mounting said links at said adjoining ends on said post for pivotal movement about an axis parallel to said post longitudinal axis;

a second long link and a second short link; second pivot means pivotally interconnecting one end of said second long link to the end of said first short link away from said first pivot means; third pivot means pivotally interconnecting the other end of said second long link to one end of said second short link, and fourth pivot means pivotally interconnecting the other end of said second short link to the other end of said first long link;

wherein said second long link is shorter than said first long link and is located inward with respect to said storage enclosure;

wherein said second tree gripping arm is an inward solid extension of said second short link past said third pivot means;

a coil spring having one end secured to said first short link at the end thereof having said second pivot means and the other end secured to said first long link at the end thereof having said fourth pivot means; and

wherein said power jack used for operating said compound linkage means has one end pivotally mounted on said post and the other end pivotally mounted on said first short link at the end thereof having said second pivot means.

4,793,390

**HEADRIG SLABBING HEAD**

Brian T. Stroud, Richmond, Canada, assignor to CAE Machinery, Vancouver, Canada

Filed Mar. 2, 1988, Ser. No. 162,913

Int. Cl.<sup>4</sup> B27C 9/00

U.S. Cl. 144—39

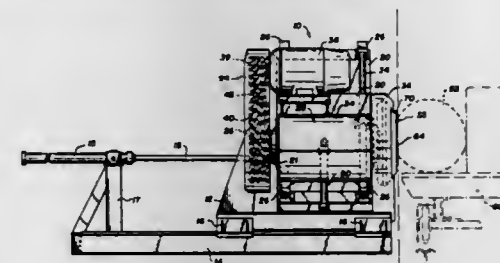
12 Claims

1. A headrig slabbing head for machining a face on a log comprising:

a movable base platform with means to vary the position of said base platform;

guide means extending from said movable base platform that support a carriage member adapted for movement along said guide means;

cutting means mounted to said carriage member for cutting a face on a log;  
driving means to drive said cutting means; and



means to vary the position of said carriage member on said guide means whereby said cutting means can be adjusted to machine a face on logs of different diameters.

4,793,391

**STRIPPER DEVICE FOR LOG SPLITTERS**

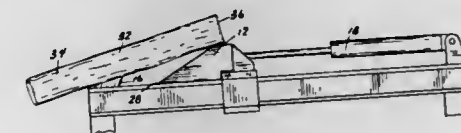
James J. Maier, 5513 Hilldale Dr., Racine, Wis. 53406

Filed May 5, 1988, Ser. No. 190,409

Int. Cl.<sup>4</sup> B27L 7/00; B26D 7/06

U.S. Cl. 144—193 A

17 Claims



1. A device for removal of a log from a log-splitter blade, the log extending from a stuck end lodged on the blade to a free end along the splitter, comprising:

an anvil member facing the blade;

means to drive the blade and anvil together;

a stripper member removably engaged with respect to the anvil member and having distal and proximal ends, the stripper member having a front surface beveled upwardly from lower edge at the distal end toward the proximal end,

whereby the power of the drive means can act on the free end of the log through the stripper member to remove it from the blade.

4,793,392

**BENDING DEVICE**

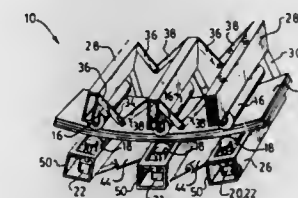
Stephen K. Gauld, Richmond Hill, Canada, assignor to Oakridge Railing and Stair Company Inc., Richmond Hill, Canada

Filed Feb. 3, 1988, Ser. No. 151,951

Int. Cl.<sup>4</sup> B27H 1/00

U.S. Cl. 144—256.1

12 Claims



1. A device for curving a sheet-like member comprising:  
(a) at least three spaced double roller clamp means, each clamp means having first and second parallel elongated

rollers and operating means to open and close the rollers together, the double roller clamp means being arranged in a row to receive and clamp a sheet-like member between the rollers thereof;

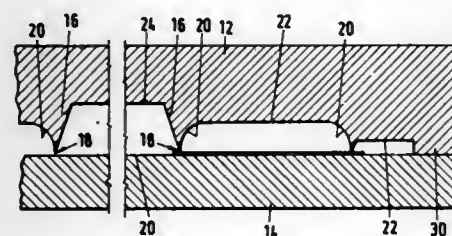
(b) a plurality of hinge means, one hinge means being located between and pivotally connected to each adjacent pair of double roller clamp means; and

(c) a plurality of actuating means, at least one actuating means being connected between each adjacent pair of double roller clamp means, the actuating means being operable to pivot the double roller clamp means about the hinge means to curve the row of double roller clamp means.

**4,793,393**  
**PROCESS FOR THE PRODUCTION OF A VENEER WORKPIECE WITH CUTOUT, AS WELL AS PRESSURE PUNCHING TOOL FOR PERFORMING THE SAME**  
 Peter Pelz, Dieselweg 10, 8192 Geretsried 2/Obb., Fed. Rep. of Germany

Filed Oct. 14, 1987, Ser. No. 108,017  
 Claims priority, application Fed. Rep. of Germany, Oct. 28, 1986, 3636587

Int. Cl.<sup>4</sup> B27G 11/00  
 U.S. Cl. 144—350 12 Claims



1. A process for producing a veneer workpiece including at least one base veneer layer, a cover veneer layer and a cutout passing through the base veneer layer and the cover veneer layer which comprises:

providing a stack of base veneer layer and cover veneer layer with an adhesive layer between said base veneer layer and said cover veneer layer, as a single step:

(a) applying sufficient pressure on said stack to adhere said base veneer layer and said cover veneer layer together;

(b) punching said cutout through said stack and

(c) lining the circumferential wall of said cutout with the cover veneer layer, said cover veneer layer being pressed through into said cutout up to the junction of said circumferential wall with the cutout edge which defines the opposite surface of the veneer workpiece.

6. A pressure punching tool for simultaneously uniting an adhesive coated base veneer to a face veneer to form a veneer workpiece and forming a smoothly contoured cutout in the resulting workpiece comprising:

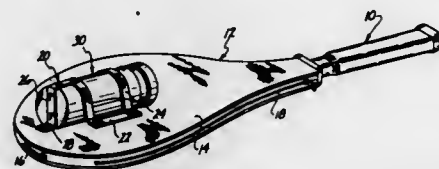
a punching tool body having at least one cutting edge with a displacement surface forming one face of said cutting edge and a shaping surface forming the other edge thereof; and

a substantially planar tool body cooperating with said punching tool body to sever a cutout from said veneers while said veneers are confined between said tool bodies.

**4,793,394**  
**BALL CAN CARRIER ATTACHMENT FOR TENNIS RACKET COVERS**

Jack M. Cohen, 20471 Nashville St., Chatsworth, Calif. 91311  
 Filed Feb. 1, 1988, Ser. No. 151,218

Int. Cl.<sup>4</sup> A63B 49/18, 61/00  
 U.S. Cl. 150—52 G 6 Claims



5. In a racket cover having two cover faces joined along common edges for receiving a stringed racket therebetween, the improvement comprising:

a web having a rectangular frame consisting of four segments of pliable ribbon joined at their ends, and a fifth segment of pliable ribbon exterior to said frame but connected transversely to one of said four segments and terminating in a free end;

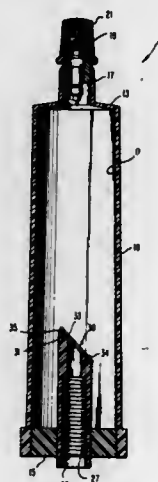
adhesive means provided on two of said four segments and said free end for attachment of the web to the cover surface; and

two of said four segments secured by said adhesive means to an outer surface of said racket cover in mutually parallel relationship spaced apart by substantially less than the length of each of the outer two of said four segments to form loops adapted to receive the circumference of a cylindrical ball container and hold the container to the racket cover;

said free end being adhesively secured to said surface for supporting one end of the ball container against axial displacement through said loops.

**4,793,395**  
**TIRE SHOCK ABSORBER**  
 Donald E. Mahan, 2434 Phillips Rd., Forked River, N.J. 08731  
 Filed Dec. 4, 1986, Ser. No. 937,693

Int. Cl.<sup>4</sup> B60B 9/02; B60C 23/00, 29/00  
 U.S. Cl. 152—8 4 Claims



1. A tire shock absorber for direct screw-on attachment to the existing valve stem of a pneumatic tire, said pneumatic tire providing a primary airspace, said tire shock absorber for improving the smoothness of ride and decreasing the road vibration generated by the pneumatic tire and comprising:

a chamber defining a secondary airspace, in fluid communication with and removably securable to a valve stem of a pneumatic tire, exterior to said pneumatic tire, said valve stem of said pneumatic tire having its valve means removed;

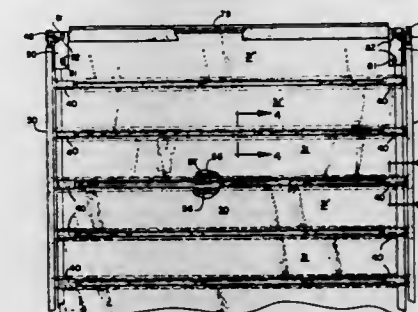
a first valve means secured to said chamber, said first valve means comprising a tire valve to permit air to be introduced into said chamber and subsequently into said pneumatic tire for pressurizing said pneumatic tire;

a second valve means positioned in said chamber, disposed between said first valve means and said valve stem, said second valve means comprising a reed valve having a reed positioned between a reed cage and a reed stop, said reed valve opening to permit the passage of air from said pneumatic tire into said chamber when said pneumatic tire is subjected to intermittent pressure, said reed valve substantially closing upon release of said intermittent pressure to said pneumatic tire permitting the slow backflow of air or gas into said pneumatic tire from said chamber.

**4,793,397**  
**DOOR AND HINGE CONSTRUCTION FOR OVERHEAD DOORS**

Paul L. Whiteman, East Earl, Pa., assignor to Morgan Corporation, Morgantown, Pa.  
 Continuation of Ser. No. 824,417, Jan. 31, 1986, abandoned. This application Mar. 17, 1987, Ser. No. 26,787

Int. Cl.<sup>4</sup> E05D 15/16  
 U.S. Cl. 160—201 5 Claims



1. A door hinge construction for a sliding overhead door, said door being intended to be carried in tracks at the sides thereof which comprises:

a plurality of stacked door panels in transverse meeting relationship and carried between said tracks;

said door panels having top and bottom edges, and side edges;

said door panel top edges having an upwardly extending rail including a first transverse groove therein;

said door panel bottom edges having a downwardly extending rail including a second transverse groove therein;

said upwardly extending and said downwardly extending rails of adjacent door panels being of complementary configuration;

seal means between adjacent panels engaged in said first and second transverse grooves, said seal means including first and second ribs carried in said first and second transverse grooves and a centerplate connecting said ribs, to provide thereby a hinge, and also retaining said panels in close relationship;

readily removable combination hinge and roller housing means between and in engagement with adjacent door panels, said hinge and roller housing means including first and second ribs carried in said first and second transverse grooves, said hinge and roller housing means being separated and independent from said seal means by being independently disengageable from said adjacent door panels by removing the first and second ribs of the hinge and roller housing means from the first and second transverse grooves;

said roller housing means including roller means for insertion in tracks at the sides of said door, said roller means being at said side edges of said door panels, wherein said readily removable combination hinge and roller housing means comprises:

a plate connecting said ribs of said roller housing means;

an offset sleeve extending rearwardly and outwardly from said door panels, said sleeve having a bore therein, said bore extending outwardly from said door panels;

a pin in said bore; and

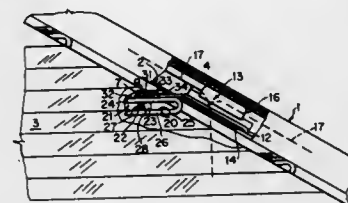
said roller means carried by and being rotatable about said pin, whereby said roller means are disposed rearwardly and outwardly from said door panels.

**4,793,396**  
**ADJUSTABLE FABRIC RETAINER FOR A WINDOW BLIND**

Richard N. Anderson; Donald E. Fraser, both of Owensboro, Ky., and Ren Judkins, Salt Lake City, Utah, assignors to Hunter Douglas, Inc., Saddle River, N.J.

Filed Sep. 17, 1986, Ser. No. 908,412  
 Int. Cl.<sup>4</sup> E06B 3/94 32 Claims

U.S. Cl. 160—84.1



30. A blind comprising a surface of blind material preferably of the pleated or cell type, said blind material having opposite ends and opposite sides extending between the ends with one of said ends extending at a predetermined angle to one side which angle is other than perpendicular so as to define a free edge for said one end and said supporting member extends along said one end and said free edge to support said blind therealong, and a series of retaining devices each comprising:

(a) a body;

(b) holding means for fixedly connecting said body to said supporting member at a selectable position along the length thereof;

(c) an elongated tongue connected at one end to said body and extending from said body;

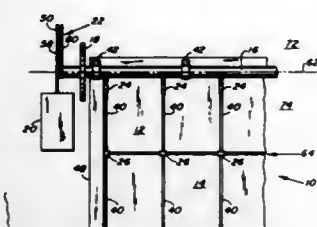
(d) an adjustable connection between and connecting said one end of the tongue and said body to permit angular adjustment of said tongue relative to said body to an angle compatible with said predetermined angle and the orientation of the blind material along said one edge; and

(e) attachment means on the second end of said tongue for attaching a portion of a free edge of said blind material.



**4,793,398**  
**HANGAR DOOR ASSEMBLY**  
 Robert A. Hoff, Rte. 7 Box 170, and John D. Hoff, Rte. 7 Box 171, both of Idaho Falls, Id. 83401  
 Filed Jan. 8, 1987, Ser. No. 1,823  
 Int. Cl.<sup>4</sup> E05D 15/26  
 U.S. Cl. 160—213

5 Claims



1. An improved airplane hangar, comprising:
  - a housing assembly describing a passageway; and
  - a door assembly for opening and closing the passageway, the door assembly including:
    - a door having an upper panel and a lower panel, the door fixed at the passageway along a torque line, the torque line delineating a top area above the torque line and a bottom area below the torque line, the door capable of moving between a closed position and a fully open position, the fully open position described by the upper panel and the lower panel disposed entirely in the top area exteriorly of the housing assembly while the upper panel and the lower panel are in substantially vertical orientations;
    - hinge means for articulating the upper panel and the lower panel relative to each other, the hinge means being fixed between the upper panel and the lower panel;
    - a torque tube extending along the torque line and directly and contiguously fixed to an upper transverse edge of the upper panel;
    - at least one sprocket element directly affixed to an end of the torque tube;
    - at least one rotating means for rotating the sprocket element and thereby the torque tube and the upper panel, such rotation causing the lower panel to move in a vertical direction while remaining in a vertical orientation;
    - an arm assembly having a first arm and a second arm positioned in an end to end relationship, the first arm being engaged to the end of the torque tube;
    - at least one counterbalance element engaged to the second arm; and
    - at least one stabilizing rod rotatably fixed between the door and the housing assembly which prevents swinging of the lower panel without lifting it.

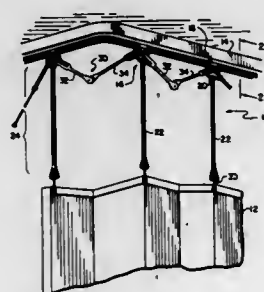
**4,793,399**  
**HANGER ASSEMBLY**  
 John W. Pryor, 420 N. Cedros Ave., Solana Beach, Calif. 92075  
 Continuation of Ser. No. 739,313, May 30, 1985, abandoned.  
 This application Feb. 12, 1987, Ser. No. 14,228  
 Int. Cl.<sup>4</sup> A47H 5/00

U.S. Cl. 160—345

10 Claims

1. A hanger assembly for suspending a curtain with its upper edge spaced a predetermined distance below a support, comprising:
  - a series of trolleys, each trolley comprising a trolley body having roller means for traveling engagement in opposite directions in a support, the trolley body having connecting means facing in the opposite directions of travel of the roller means located at a position close to the roller means and including a downwardly depending hanger member extending at least 18 inches from the roller means, the

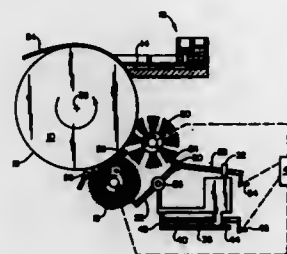
hanger member having suspending means at its lower end for suspending a curtain;  
 collapsible link means for connecting successive trolley bodies in the assembly and for transmitting pulling force from one trolley body to the next, each collapsible link means comprising first and second elongate arms having adjacent inner ends and outer free ends for releasable connection to successive trolley bodies in the assembly, a hinge connection between the adjacent inner ends of the arms, one connecting means of each trolley body being pivotally connected to the free end of the first arm of one link means and the opposite side connecting means of the trolley body being pivotally connected to the free end of the second arm of the next successive link means in the assembly;



each arm having a loop at its free end and said connecting means of said trolley body comprising chambers at opposite side edges of said trolley body, the loops of each link comprising means for pivotal engagement in the chambers at the adjacent side edges of successive trolley bodies;  
 each trolley body having a reduced width passageway at each side edge connecting that side edge of the trolley body to the chamber at that side; and  
 each loop comprising side arms and a thickened end portion connecting the arms, the side arms being thin enough to pass along the passageway and the end portion being thick enough to be locked in the chamber when the loop is rotated so that the end portion extends transversely through the chamber.

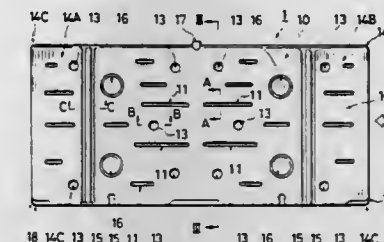
**4,793,400**  
**DOUBLE BRUSHING OF GROOVED CASTING WHEELS**  
 Richard A. Wood, Columbus, Ohio, assignor to Battelle Development Corporation, Columbus, Ohio  
 Filed Nov. 24, 1987, Ser. No. 124,746  
 Int. Cl.<sup>4</sup> B22D 11/06  
 U.S. Cl. 164—121

38 Claims



1. A process for conditioning a casting surface comprising, providing a cylindrical casting surface mounted to rotate about its axis, orienting said axis to the horizontal position, rotating said surface about said axis and positioning said surface adjacent a tundish to receive molten metal on said

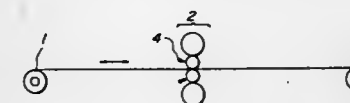
surface from said tundish, said tundish being located above a horizontal plane which includes said axis, providing grooves in said casting surface, said grooves extending generally in the direction of the rotation of said surface,  
 cleaning the casting surface by contacting said surface with two bristled brushes, said brushes being in tandem and mounted to rotate about their axes, the direction of rotation of both brushes being the same direction of rotation as said casting surface, thereby the contact areas between the brushes and the casting surface are moving in opposite directions,  
 changing the contact pressure between the brushes and the casting surface while the casting surface is rotating, adjusting the contact pressure between each brush and the casting surface to a degree that the bristles of each rotating brush in contact with the rotating casting surface are bent in the direction of rotation of said casting surface, the degree of contact and bend being such that the sides of the bristles on each brush are in contact with the casting surface in a plane passing through the axes of the casting surface and the brush.



sponding to the protrusions on the other face plate, said hollow vessel containing a heat storage composition.

**4,793,401**  
**METHOD OF PRODUCING THIN STEEL SHEETS HAVING AN IMPROVED PROCESSABILITY**  
 Saiji Matsuoka; Susumu Satoh; Takashi Obara; Kozo Tsunoyama, and Hideo Abe, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan  
 Filed Dec. 9, 1986, Ser. No. 939,543  
 Claims priority, application Japan, Dec. 12, 1985, 60-278019; Dec. 12, 1985, 60-278020; Dec. 12, 1985, 60-278021; Dec. 12, 1985, 60-278022  
 Int. Cl.<sup>4</sup> B21B 1/46, 13/22; B22D 11/12  
 U.S. Cl. 164—476

20 Claims



1. A method of producing thin steel sheets having an improved processability, comprising a combination of a continuous casting step, a rough rolling step and a lubrication rolling step at a temperature of from Ar<sub>3</sub> transformation point to 300° C. and a rolling speed of not less than 1,500 m/min.

**4,793,402**  
**HEAT STORAGE COMPOSITION, LATENT HEAT STORAGE CAPSULES CONTAINING SAID HEAT-STORE COMPOSITION AND TEMPERATURE CONTROL APPARATUS USING SAID CAPSULES**  
 Naomichi Yano, Takarazuka; Tadatsugu Ueno, Osaka, and Shigeru Tsuboi, Amagasaki, all of Japan, assignors to Kubota Tekko Kabushiki Kaisha, Osaka, Japan  
 Division of Ser. No. 850,100, Apr. 10, 1986, Pat. No. 4,715,978.  
 This application Sep. 16, 1987, Ser. No. 97,146  
 Int. Cl.<sup>4</sup> F28D 17/00

U.S. Cl. 165—10

6 Claims

1. A flat latent heat storage capsule which comprises a rectangular plate-like hollow vessel having a plurality of oblong recesses surrounded by slant faces as formed by bonding together by fusion the face plate bottoms at corresponding sites on both the face plates and a plurality of circular holes passing through the hollow vessel in the thickness direction thereof as formed by fusion bonding in the same manner as above to form circular recesses followed by punching at least at the fused bottom of said circular recesses and further having at least one groove-like recess continuously extending in the longitudinal direction in the neighborhood of each of the left and right edge portions of each face plate and a protrusion serving as a spacer

1. For use with an internal combustion engine cooling system, the combination comprising:
  - (a) first means for forcing the coolant liquid from the cooling system to the exterior of that system,
  - (b) second means in communication with said first means for receiving the coolant liquid at the exterior of the cooling system, for treatment thereof, and
  - (c) third means in communication with said second means for returning the treated coolant liquid to the cooling system,
  - (d) the cooling system including a heat radiator including a container having a coolant liquid fill opening, and said first means includes tube means to extract coolant liquid from lower extent of the radiator for passage from the radiator, and means associated with said tube means for maintaining the fill opening otherwise closed during said passage of coolant from the radiator.
17. A coolant system for use in the method of treating coolant liquid in an internal combustion engine cooling system, the method steps including:
  - (a) forcing the coolant liquid from the cooling system to the exterior of that system,
  - (b) treating the coolant liquid in a zone or zones outside the cooling system, said treating including removing contaminant from the coolant liquid, and
  - (c) returning the treated coolant liquid to the cooling system,
  - (d) and wherein the cooling system includes a heat radiator

including a container having a coolant liquid fill opening, the improvement comprising:

- first means for forcing the coolant liquid from the cooling system to the exterior of that system,
- second means in communication with said first means for receiving the coolant liquid at the exterior of the cooling system, for treatment thereof, and
- third means in communication with said second means for returning the treated coolant liquid to the cooling system,
- tube means to extract coolant liquid from lower extent of the radiator for passage from the radiator, and means associated with said tube means for maintaining the fill opening otherwise closed during said passage of coolant from the radiator.

4,793,404

# COMPOSITE PIPE, PROCESS FOR PRODUCING THE SAME, AND HEAT PIPE USING OF THE SAME

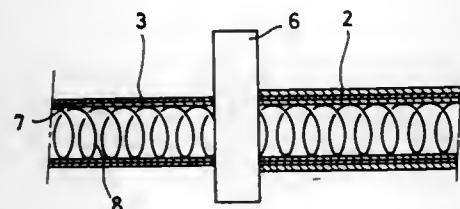
Ryosuke Hata, c/o Osaka Works of Sumitomo Electric Industries, Ltd., 1-3, Shimaya 1-chome, Konohana-ku, Osaka, Japan

Division of Ser. No. 811,164, Dec. 19, 1983, Pat. No. 4,733,699. This application Aug. 31, 1987, Ser. No. 91,853

Int. Cl. F28D 15/02

U.S. Cl. 165-104.26

1 Claim



1. A composite pipe comprising an aluminum pipe, a lead pipe in contact with the inner wall of said aluminum pipe, a wick material in contact with the inner wall of said lead pipe and a rigid spiral mounted in said lead pipe in engagement with said wick material for shape retention of said wick material.

4,793,405

# PROCESS AND APPARATUS FOR DISSIPATING THE HEAT LOSS OF AT LEAST ONE ASSEMBLY OF ELECTRICAL ELEMENTS

Hans Diggelmann, Neuenegg, and Bohdan Ulrich, Kehrsatz, both of Switzerland, assignors to Haeler AG., Bern, Switzerland

Filed Dec. 12, 1986, Ser. No. 941,150

Claims priority, application Switzerland, Dec. 13, 1985, 5329/85; Jun. 20, 1986, 2496/86

Int. Cl. F28D 15/02; H01L 23/46

U.S. Cl. 165-104.33

23 Claims

1. Apparatus for dissipating the heat loss of a plurality of assemblies of electrical elements (10) arranged in tiers in super-imposed relationship, comprising

a plate-like element (13) consisting of two sheets (134, 137), said two sheets (134, 137) joined together in superimposed pressure-sealed relationship forming therebetween a plurality of mutually spaced evaporator cavity means (15; 135) arranged one above the other substantially along the length of said plate-like element, and forming therebetween a first conduit (22) and a second conduit (23) extending substantially along the length of said plate-like element, all of said evaporator cavity means (15; 135) being connected in parallel communication to one another between said first and said second conduits (22, 23), thermally conductive means (12, 50, 51, 112), each of said evaporator cavity means (15; 135) being respectively

connected by said thermally conductive means with the assembly or assemblies of electrical elements arranged in a tier, a condenser (28) arranged at a higher level than the topmost evaporator cavity means (15; 135) of said plurality of evaporator cavity means, said condenser (28) having an inlet (31) connected to said first conduit (22) and an outlet (32) connected to said second conduit (23),



said condenser (28), said evaporator cavity means (15; 135) and said first and second conduits (22, 23) constituting a unit sealed in a pressure-proof fashion, an evaporable liquid filling said unit to such an extent that the topmost evaporator cavity means (15; 135) of said plurality of evaporator cavity means is filled entirely or at least partially with said evaporable liquid, and the condenser (28) is filled not at all or at most partially with said evaporable liquid.

4,793,406

# TUBE SPACING GRID

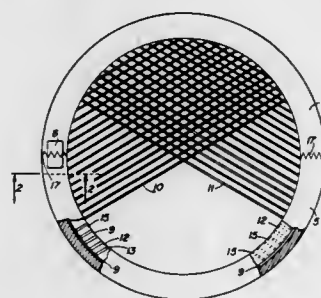
Reinhold Becker, Oberhausen, Fed. Rep. of Germany, assignor to MAN Gutehoffnungshütte GmbH, Fed. Rep. of Germany Filed Sep. 8, 1987, Ser. No. 93,823

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1986, 3630502

Int. Cl. F28F 9/00

U.S. Cl. 165-162

2 Claims



1. A tube spacing grid for guiding the pipes of a vapor generator, comprising: a grate formed of intersecting grate rods arranged in more than one plane, said grate rods each having grate rod ends, each end having a tongue and a groove portion; an outer ring with an inner wall having an encircling groove, said outer ring being of at least two interengaged parts; a single piece inner ring positioned within said groove having an interior planar face with a plurality of grid rod receiving slots, each slot adapted to receive one of said grate rods, each of said receiving slots of said inner ring having a tongue member forming a tongue and groove portion within said receiving slot, the tongue portion of each said grate rod end engaging a

groove portion within one of said receiving slots and said groove portion of each said grate rod end engaging a tongue portion in one of said receiving slots, said tongue portion of each said receiving slot being smaller than the associated said groove portion of each of said grate rod end, thereby allowing said grate rods to move relative to said inner ring under thermal stress.

4,793,407

# HEAT EXCHANGER FOR TWO FLUID MEDIA

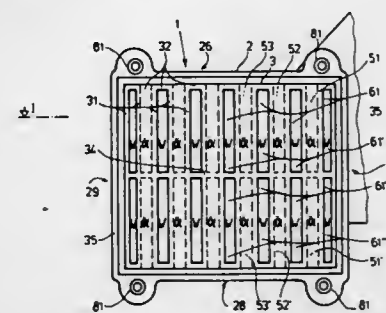
Dieter Baumann, Greven-Gimbte, Fed. Rep. of Germany, assignor to Ing. Walter Hengst GmbH & Co. KG, Münster, Fed. Rep. of Germany

Filed Apr. 23, 1987, Ser. No. 41,865

Int. Cl. F28D 7/02

U.S. Cl. 165-165

7 Claims



1. A heat exchanger for two fluid media, especially liquids, comprising:

- a cover;
- a housing closable with said cover and having inlets and outlets for two fluid media;
- two fluids media;
- a core in said housing for the separate carrying of the two media with heat exchange, at least the core being manufacturable as a pressure casting, said core being formed substantially of a train of walls running zig-zag and forming vertically long, narrow adjacent chambers;
- one medium and the other medium flowing alternately through said adjacent chambers, a common horizontal partition wall integral with said train of walls and dividing all of said chambers vertically into partial chambers disposed in two levels through which said media successively flow.

4,793,408

# DEVICE FOR SEPARATING AND EXTRACTING COMPONENTS HAVING DIFFERENT DENSITIES FROM AN EFFLUENT

Hubert Miffre, Tourves, France, assignor to Societe Nationale Elf Aquitaine, Courbevoie, France

Filed Aug. 28, 1987, Ser. No. 90,362

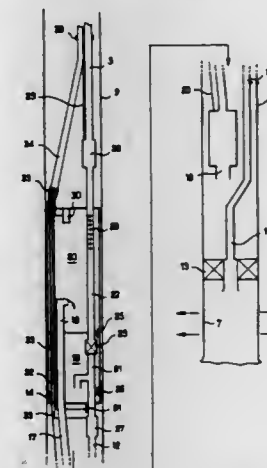
Claims priority, application France, Aug. 29, 1986, 86 12214; Aug. 29, 1986, 86 12215

Int. Cl. E21B 43/34, 43/40, 43/38; B01D 17/032

U.S. Cl. 166-53

15 Claims

1. A device for separating and extracting components having different densities from an effluent which is available in a production zone of an oil well, the wellbore being provided with a casing string which is perforated at the level of the production zone and with a tubing string, said device being of the type comprising means for separating said components under the action of gravity, extraction means for withdrawal of the heavier-density component, means for reinjecting the extracted component into a reinjection zone through perforations formed in the wellbore casing, means for displacing the lower-density component up to a wellhead, wherein the separating means are constituted by a closed-unit separator housed within the well and wherein said device includes a single pump



having the function of regulating the delivery of the lower-density component being mounted within an extraction pipe for withdrawal of said component and at least one regulator having the function of regulating the delivery of the other component being mounted within an extraction pipe for withdrawal of said other component.

4,793,409

# METHOD AND APPARATUS FOR FORMING AN INSULATED OIL WELL CASING

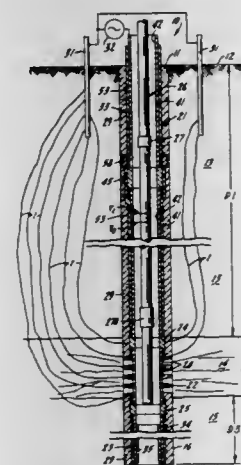
Jack E. Bridges, Park Ridge; Joseph O. Enk, Lake in the Hills, both of Ill.; Homer L. Spencer, and Vincent R. Young, both of Tulsa, Okla., assignors to ORS Development Corporation, Tulsa, Okla.

Filed Jun. 18, 1987, Ser. No. 64,063

Int. Cl. E21B 19/16, 36/00; F16L 9/14; H05B 3/02

U.S. Cl. 166-57

43 Claims



1. A method of forming a casing in an oil well comprising an externally insulated electrically conductive casing employed as a conductor carrying electrical current to a heater electrode positioned downhole in the well in alignment with an oil producing formation, comprising the following steps:



(A) pre-assembling a plurality of casing segments, each casing segment comprising an elongated metal pipe, each casing segment having an electrical insulator covering on substantially all of its external surface; the insulator covering having a figure of merit  $(\epsilon_r L)/\Delta$  of no more than  $4 \times 10^8$ , after extended immersion in water, wherein  $\epsilon_r$ =relative dielectric constant of the insulator covering at 60 Hz,

$\Delta$ =thickness of the insulator covering in feet, and  
 $L$ =length of insulated casing in feet;

(B) inserting one casing segment partially into the well;  
 (C) joining another casing segment end-to-end to the one casing segment;

(D) applying electrical insulator material to the joint between the casing segments to afford a continuous external insulator covering approximating the electrical insulation characteristics of the insulator covering on each segment; and

repeating steps B through D to complete an electrically conductive externally insulated casing down to approximately the depth of the oil producing formation.

21. A casing segment for use in an oil well comprising an electrically conductive casing employed as a conductor carrying electrical current to a heater electrode, the heater electrode to be positioned in the lower part of the well in alignment with an oil producing formation, the casing segment comprising:

an elongated metal pipe;

and an electrical insulator covering on substantially all of the external surface of the metal pipe;

the insulator covering having a figure of merit  $(\epsilon_r L)/\Delta$  of no more than  $4 \times 10^8$ , after extended immersion in water, wherein

$\epsilon_r$ =relative dielectric constant of the insulator covering at 60 Hz,

$\Delta$ =thickness of the insulator covering in feet, and  
 $L$ =length of insulated casing in feet.

33. In an electrically heated oil well comprising:

a well bore extending downwardly from the surface of the earth through one or more overburden formations and through an oil producing formation;

an electrically conductive externally insulated main casing extending from the surface of the earth down into the well bore to a depth adjacent the top of the oil producing formation;

an electrically conductive externally uninsulated primary heating electrode extending downwardly from the casing, through the oil producing formation;

at least one secondary heating electrode positioned within one of the overburden and oil producing formations;

and electrical power supply means connected to the primary electrode through the main casing and connected to the secondary electrode, for energizing the electrodes for conduction heating of a portion of the oil producing formation adjacent the well;

a casing which comprises a multiplicity of casing segments interconnected end-to-end, each such casing segment comprising:

an elongated metal pipe;

and an electrical insulator covering on substantially all of the external surface of the metal pipe;

in which

$$[G_c]^2 + [\omega C_c]^2 < \left[ \frac{1}{R_p} \right]^2$$

wherein:

$G_c$ =conductance of the insulator covering in mhos;

$C_c$ =capacitance of the insulator covering in farads;

$R_p$ =spreading resistance of the primary electrode in ohms; and

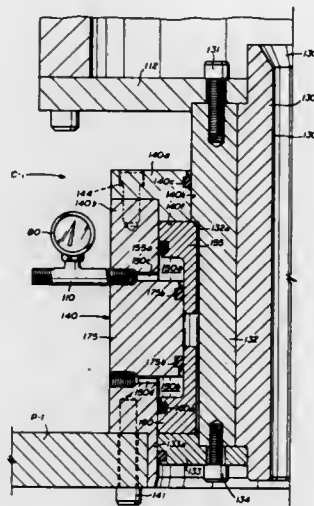
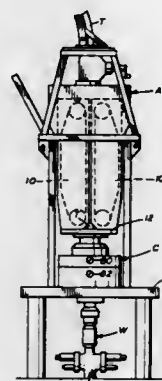
$\mu=2\pi f$ , where  $f$  is frequency.

#### 4,793,410 LOAD DETECTION AND INDICATOR APPARATUS FOR WELL TUBING OR THE LIKE

David L. Sipos, Duane M. Kaske, and Paul D. White, Jr., all of Houston, Tex., assignors to Bowen Tools, Inc., Houston, Tex.  
 Filed Jun. 13, 1988, Ser. No. 205,824  
 Int. Cl.<sup>4</sup> E21B 19/08

U.S. Cl. 166-77

12 Claims



1. Apparatus for detecting and indicating loads on an elongate object disposed for movement relative to the apparatus comprising:

a load cell housing having a longitudinally extending central portion;

a tubular guide positioned in said central portion of said housing for limited longitudinal movement relative to said housing;

a load cell chamber between said housing and said tubular guide;

a first piston extending into said chamber and adapted for longitudinal movement relative to said housing;

a second piston extending into said chamber and longitudinally spaced from said first piston and adapted for longitudinal movement relative to said housing;

said load cell chamber having a sealed first chamber section adjacent said first piston with fluid therein which is adapted to be compressed by longitudinal movement of said first piston relative to said housing;

said load cell chamber also having a sealed second chamber section adjacent said second piston with fluid therein which is adapted to be compressed by longitudinal movement of said second piston relative to said housing;

means for imparting longitudinal movements of said tubular guide to one of said pistons independently of the other of said pistons to develop a pressure on the fluid in one of said chamber sections which is indicative of the amount of longitudinal force on said tubular guide; and  
 indicator means associated with each of said chamber sections for indicating the amount of force on said tubular guide.

#### 4,793,411 RETRIEVABLE GRAVEL PACKER AND RETRIEVING TOOL

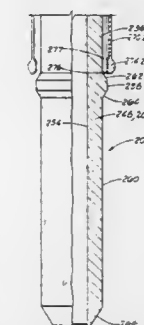
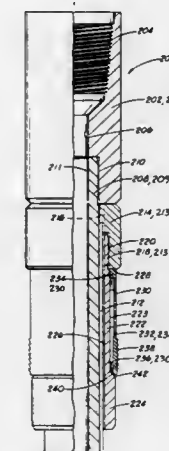
Gary D. Zunkel, Chickasha, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Jun. 29, 1988, Ser. No. 213,204

Int. Cl.<sup>4</sup> E21B 23/00, 23/06, 31/20

U.S. Cl. 166-98

20 Claims



1. A retrieving tool for retrieving a gravel packer set in a well bore, said gravel packer being of the type having an inner mandrel with a threaded portion thereon and a releasing mandrel, said retrieving tool comprising:

retrieving mandrel means for attaching to a tool string;

collet support means for supporting a collet means and

slidably disposed on said retrieving mandrel means;

upper collet means for engaging said threaded portion and

slidably disposed on said collet support means and adapted

for support thereby; and

lower collet means for engaging said releasing mandrel.

#### 4,793,412 CENTRALIZER FOR A POLISHED BAR AND/OR A SUBSTANCE PUMP PISTON STEM

Olegario Rivas, and Alejandro Newaki, both of Miranda, Venezuela, assignors to Intevep, S.A., Caracas, Venezuela  
 Filed Sep. 21, 1987, Ser. No. 98,553  
 Int. Cl.<sup>4</sup> E21B 17/10

U.S. Cl. 166-241

10 Claims



1. A device for centralizing structures within a production pipe for withdrawing oil from a subterranean formation which comprises an elongate, substantially cylindrical body member having a longitudinal axis of symmetry, at least one slot extending laterally through said member, and a rotatable member mounted within each said slot for rotation about an axis located within said cylindrical body and eccentrically located with respect to said longitudinal axis for contacting a wall of said pipe to centralize said structures within said pipe wherein each rotatable member is mounted for rotation about said axis which is substantially transverse to said longitudinal axis and each rotatable member lies in a plane substantially parallel to a plane containing said longitudinal axis.

#### 4,793,413 METHOD FOR DETERMINING FORMATION PARTING PRESSURE

Pramod K. Singh; Ram G. Agarwal, both of Tulsa, Okla., and Charles W. Miller, Levelland, Tex., assignors to Amoco Corporation, Chicago, Ill.

Filed Dec. 21, 1987, Ser. No. 135,873

Int. Cl.<sup>4</sup> E21B 43/26, 47/06

U.S. Cl. 166-250

17 Claims



1. A method for determining the parting pressure of a formation having a wellbore therethrough comprising the steps of: establishing a first rate at which fluid is injected into the wellbore;

injecting fluid into the wellbore at the first rate of injection for a first time period;  
 changing the rate of injection to a second rate which causes the formation pressure to rise above the formation parting pressure;  
 injecting fluid into the wellbore at the second rate of injection for a second time period;  
 measuring the pressure of the formation ring the periods of the first and second rates of injection;  
 normalizing the pressure data obtained during said first time period;  
 normalizing the pressure data obtained during said second time period; and  
 determining the formation parting pressure by locating the point at which the normalized data for said second time period deviate from the normalized data for said first time period.

4,793,414

## STEAM INJECTION PROFILING

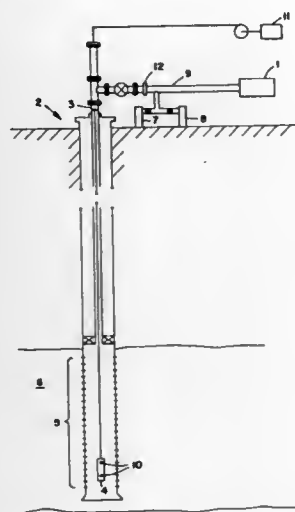
Tanh V. Nguyen, Fullerton, Calif., and C. Brent Davenport, Houston, Tex., assignors to Chevron Research Company, San Francisco, Calif.

Continuation-in-part of Ser. No. 935,662, Nov. 26, 1986, abandoned. This application Aug. 19, 1987, Ser. No. 88,465

Int. Cl.<sup>4</sup> E21B 43/24, 49/08

U.S. Cl. 166—252

4 Claims



3. A method of determining liquid and vapor phase steam profiles in a steam injection well comprising the steps of:

- inserting a well logging tool into a steam injection well;
- measuring a mass flow rate of steam entering the injection well;
- performing a spinner survey of a perforated zone of the steam injection well to determine a mass flow rate of steam at a first station;
- injecting a thermally stable vapor phase tracer into the steam injection well;
- determining a vapor transit time at a first station;
- repeating steps (c), (d), and (e) for a second station; and
- calculating an amount of vapor and an amount of liquid entering a formation at various locations in said perforated zone based on said mass flow rate at said first and said

second station of steam entering the well, said mass flow rate, and said vapor transit time at said first and said second station.

4,793,415

## METHOD OF RECOVERING OIL FROM HEAVY OIL RESERVOIRS

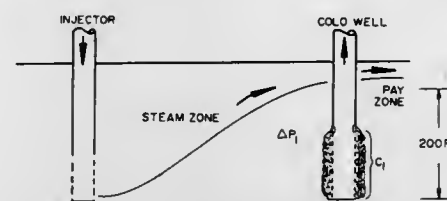
Billy G. Holmes, Lancaster, and Stevan L. Weber, Allen, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 29, 1986, Ser. No. 947,140

Int. Cl.<sup>4</sup> E21B 43/24

U.S. Cl. 166—263

21 Claims



1. A method of recovering oil from an underground oil formation penetrated by an injection well and at least one production well comprising steps (a) through (e), identified below, conducted sequentially in the order of steps (a) through (e):

- decreasing the permeability of the lower vertical portion of the production well by at least an order of magnitude of the initial permeability thereof;
- injecting steam into the injection well until thermal communication is established between the injection and the production wells;
- increasing the permeability of the lower vertical portion of the production well substantially to the level of the initial permeability thereof;
- continuing the steam injection; and
- recovering the oil from the production well.

4,793,416

ORGANIC CROSSLINKING OF POLYMERS FOR CO<sub>2</sub> FLOODING PROFILE CONTROL

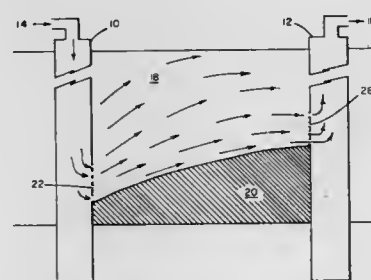
Thomas O. Mitchell, Pennington, N.J., assignor to Mobile Oil Corporation, New York, N.Y.

Filed Jun. 30, 1987, Ser. No. 68,006

Int. Cl.<sup>4</sup> E21B 33/138, 43/16, 43/20

U.S. Cl. 166—266

31 Claims



1. A method for recovering hydrocarbonaceous fluids from a formation having a substantially low pH, penetrated by at least one injection well and fluidly communicating with at least one production well which formation contains a low permeability and a high permeability zone comprising:

- mixing together above ground, water, a biopolymer selected from the group consisting of Xanthan polysac-

charides, Alcaligene polysaccharides, and mixtures thereof in an amount of about 0.2 to about 5.0 weight percent;

- maintaining said mixture at a pH of less than about 5.5;
- adding only sufficient aminoplast resin as a crosslinker to form a rehealable gel which forms in about 0.5 to about 6.0 hours at ambient temperature and which is of a size sufficient to selectively close pores in said high permeability zone;
- injecting via said injection well into said high permeability zone said gel in an amount sufficient to selectively close pores in said high permeability zone;
- injecting via said injection well into said low permeability zone a drive fluid in an amount sufficient to remove hydrocarbonaceous fluids from said low permeability zone which fluid is diverted from said high permeability zone containing said closed pores; and
- recovering hydrocarbonaceous fluids and the drive fluid from said low permeability zone via said production well.

4,793,417

## APPARATUS AND METHODS FOR CLEANING WELL PERFORATIONS

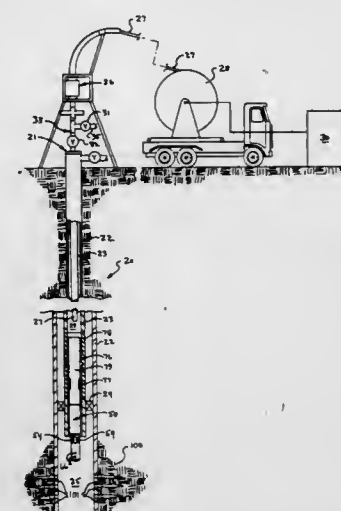
William D. Rumbaugh, Carrollton, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Aug. 19, 1987, Ser. No. 86,877

Int. Cl.<sup>4</sup> E21B 21/00

U.S. Cl. 166—312

23 Claims



1. Apparatus for cleaning downhole perforations which communicate fluids between a well bore and a geological formation adjacent thereto, comprising:

- means for releasably anchoring the apparatus at a downhole location within the well bore;
- means for establishing a fluid barrier between the exterior of the apparatus and the well bore;
- housing means with a longitudinal flow passageway extending therethrough;
- first port means extending radially through the housing means intermediate the ends thereof;
- the first port means providing fluid communication between the longitudinal flow passageway and the well bore below the fluid barrier;
- valve closure means slidably disposed within the longitudinal flow passageway having a first position which blocks fluid communication through the port means and a second position which allows fluid communication through the port means;
- means for shifting the valve closure means between its first and second position in response to the difference in

pressure between fluid within the longitudinal flow passageway and fluid exterior to the first port means;

- the valve closure means comprising a sleeve slidably disposed within the longitudinal flow passageway;
  - a longitudinal bore extending partially through the sleeve whereby one end of the sleeve is open to fluid communication with the longitudinal flow passageway and the other end of the sleeve is closed;
  - second port means extending radially through the sleeve intermediate the ends thereof; and
  - the second port means aligned with the first port means when the valve closure means is in its second position.
20. A method for cleaning perforations, which communicate fluids between a well bore and a geological formation adjacent thereto, by developing a surge of formation fluids through the perforations, comprising:
- releasably anchoring a well tool by wireline techniques within the well bore to establish a fluid barrier above the perforations;
  - decreasing fluid pressure to below a preselected value in a portion of the well bore above the well tool;
  - opening the well tool in response to the decrease in fluid pressure to suddenly establish fluid flow therethrough and surge fluid flow from the formation through the perforations; and
  - retrieving the well tool from the well bore by wireline techniques.

4,793,418

## HYDROCARBON FLUID SEPARATION AT AN OFFSHORE SITE AND METHOD

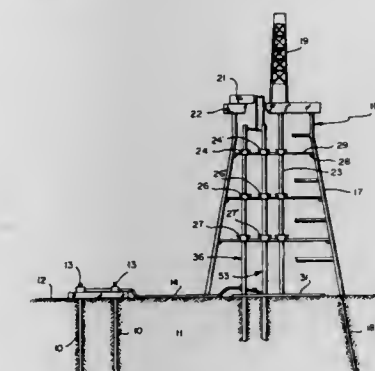
Steven A. Wheeler, West Byfleet, and Mark E. Taylor, Twickenham, both of England, assignors to Texaco Limited, White Plains, N.Y.

Filed Aug. 3, 1987, Ser. No. 81,052

Int. Cl.<sup>4</sup> E21B 43/36

U.S. Cl. 166—357

12 Claims



1. The combination with a marine structure fixed to the sea floor and having a deck with hydrocarbon processing equipment, at least one leg supporting said deck above water's surface, vertically spaced and aligned conductor guides positioned adjacent said at least one leg; a pipeline at the sea floor communicated at one end with at least one subsea well which is producing a composite hydrocarbon fluid stream comprised of liquid and vaporous hydrocarbon to conduct said composite hydrocarbon fluid stream from said at least one subsea well to said marine structure;



vertically aligned conductor guides in said marine structure and supported at the sea floor to form a liquid holding reservoir,  
first conductor means communicating said elongated fluid separator with said production riser to conduct hydrocarbon liquid to said liquid holding reservoir, and  
pumping means having a pump positioned in said liquid holding reservoir, and having a pump discharge communicated with said hydrocarbon processing equipment.

10. Method for expanding the capability of an offshore marine structure located in a body of water, to treat a multi-phase fluid comprised of vaporous and liquid phases, said marine structure including:

a deck holding multi-phase fluid processing equipment, at least one leg supportably positioning said deck above the water's surface, and  
conductor guides depending from said at least one leg and spaced apart in substantial vertical alignment between the deck and the floor of said body of water, which method includes:

providing a multi-phase fluid separator comprised of: an elongated multi-phase fluid separating column having an inlet for communication with a source of the multi-phase fluid, and having a vaporous phase discharge means for communication with said multi-phase fluid processing equipment, and an elongated production riser having an inlet for communication with said fluid separator, and having at least a discharge port communicated with said fluid processing equipment,  
registering said elongated fluid separating column in at least some of said vertically aligned conductor guides,  
registering said production riser in other vertically aligned conductor guides,  
communicating said separator column with said production riser to deliver liquid phase fluid thereto, and to said multi-phase processing equipment, to deliver vaporous phase fluid thereto.

4,793,419

**ADDING LIGNOSULFONATE TO CAUSTIC FLOODS TO SHIFT OPTIMAL SALINITY TO A HIGHER SALINITY**  
Gabriel Prukop, and Vernon H. Schievelbein, both of Houston, Tex., assignors to Texaco, Inc., White Plains, N.Y.

Filed Jan. 4, 1988, Ser. No. 140,368

Int. Cl. E21B 43/22

U.S. Cl. 166—270

8 Claims

1. A method for recovering hydrocarbons from an underground hydrocarbon reservoir penetrated by at least one injection well and at least one production well, which comprises: injecting into the reservoir through an injection well an aqueous caustic solution comprising greater than 0.1% and less than 1.0% lignosulfonate by weight to shift the optimal salinity for enhanced oil recovery of the caustic solution to a relatively higher salinity; and producing hydrocarbons and other fluids through a production well.

4,793,420

**CONTROLLED PRODUCT FEEDING DEVICE FOR COMBINATION WEIGHING MACHINE**  
Takashi Hirano, Kobe, Japan, assignor to Yamato Scale Company, Limited, Japan

Filed Jul. 14, 1987, Ser. No. 72,856

Claims priority, application Japan, Jul. 14, 1986, 61-166372  
Int. Cl. G01G 13/00, 19/52

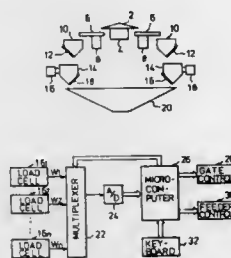
U.S. Cl. 177—25

42 Claims

1. In a combination weighing machine comprising a plurality of weighers for weighing product respectively to provide corresponding weight data, and means for selecting an optimum combination of said weight data which satisfies a predetermined condition and unloading those weighers correspond-

ing to said optimum combination for delivery; a product feeding device comprising:

a plurality of product feeders for feeding product respectively to said weighers, each feeder being adapted to feed product to one of the weighers; feed control means for individually controlling the amounts of product fed to each of said weighers by said feeders based upon feed control data respectively provided for each of said weigh-



ers, and means for providing said feed control means with said feed control data and for controlling those feeders corresponding to the unloaded weighers, the data corresponding to deviations of the weight of product in each of said weighers as compared to respective target weight data for each of said weighers thereby to control the amount of product delivered by each of said feeders to its corresponding unloaded weigher.

4,793,421

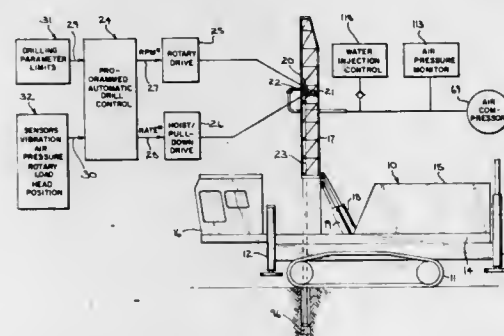
**PROGRAMMED AUTOMATIC DRILL CONTROL**  
Richard A. Jasinski, Oak Creek, Wis., assignor to Becor Western Inc., South Milwaukee, Wis.

Continuation of Ser. No. 849,538, Apr. 8, 1986, abandoned. This application Jul. 13, 1987, Ser. No. 73,910

Int. Cl. E21B 44/00

U.S. Cl. 175—27

10 Claims



1. A drill control system for continuously and efficiently operating drilling machinery having a first electric motor to rotate a drill pipe with attached drilling bit and a second electric motor to operate a hoist pulldown mechanism for applying axial forces on the drill pipe, the drill control system comprising:

means to set a revolutions per minute (RPM) command value, the RPM command value representing a desired commanded rotational speed for said drill pipe;  
first sensing means for sensing a first set of drilling parameter values, including drilling parameter values representing only the horizontal component of the vibration being produced by the drill pipe and the axial force being exerted on the drill pipe by the second electric motor;  
RPM correction means connected to receive the RPM command value and the first set of drilling parameter values, the RPM correction means including a plurality of pre-

terminated limit values, each predetermined limit value being associated with one drilling parameter value in the first set of drilling parameter values, the RPM correction means producing a corrected RPM command value in which the RPM correction means regulates the corrected RPM command value at the level of the RPM command value while all drilling parameter values in the first set of drilling parameter values are below the associated predetermined limits, and in which the RPM correction means regulates the corrected RPM command values at a level less than the RPM command value while any one of the drilling parameter values in the first set of drilling parameter values is equal to the associated predetermined limit so as to maintain all drilling parameter values in the first set of drilling parameter values at or below the associated predetermined limits;

first drive means connected to receive the corrected RPM command value for driving the first electric motor to achieve the rotational speed of the drill pipe corresponding to the corrected RPM command value;

means to set an axial penetration rate command value, the axial penetration rate command value representing a desired commanded axial velocity for the drill pipe in terms of axial length of drill pipe advancement per unit of time;  
second sensing means for sensing a second set of drilling parameter values, including a drilling parameter values representing only the vertical component of the vibration being produced by the drill pipe and the pressure of clearing air being injected into the drill pipe;

axial penetration rate correction means connected to receive the axial penetration rate command value and the second set of drilling parameter values, the axial penetration rate correction means including a plurality of predetermined limit values, each predetermined limit value being associated with one drilling parameter value in the second set of drilling parameter values, the axial penetration rate correction means producing a corrected axial penetration rate command value in which the axial penetration rate correction means regulates the corrected axial penetration rate command value at the level of the axial penetration rate command value while all drilling parameter values in the second set of drilling parameter values are below the associated predetermined limits, and in which the axial penetration rate correction means regulates the corrected axial penetration rate command value at a level less than the axial penetration rate command value while any one of the drilling parameter values in the second set of drilling parameter values is equal to the associated predetermined limit so as to maintain all drilling parameter values in the second set of drilling parameter values at or below the associated predetermined limit;

second drive means connected to receive the corrected axial penetration rate command value for driving the second electric motor to achieve the axial velocity of the drill pipe corresponding to the corrected axial penetration rate command value.

4,793,422

**ARTICULATED ELEVATOR LINKS FOR TOP DRIVE DRILL RIG**

Igor Krasnov, Houston, Tex., assignor to Hughes Tool Company - USA, Houston, Tex.

Filed Mar. 16, 1988, Ser. No. 168,833

Int. Cl. E21B 19/06

U.S. Cl. 175—57

4 Claims

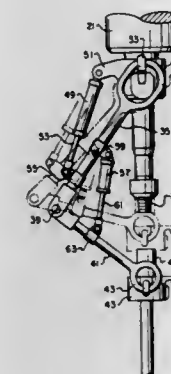
1. In a drill rig having a derrick, a drive head assembly suspended in the derrick having a drive stem for connection to and for rotating a string of drill pipe, an improved means for connecting a stand of the drill pipe to the drive stem, comprising in combination:

a pair of upper link sections, each pivotally suspended from the drive head assembly and having a lower end;  
a pair of lower link sections, each having an upper end

pivotally connected to one of the lower ends of the upper link sections and each having a lower end;  
a set of elevators mounted to lower ends of the lower link sections for clamping about the stand of drill pipe;  
upper lifting means connected between the upper link sections and the drive head assembly for pivoting the upper link sections relative to the drive head assembly; and  
lower lifting means connected between the upper and lower link sections for pivoting the lower link sections relative to the upper link sections for lifting the elevators upward relative to the drive head assembly to engage the stand of drill pipe with the drive stem.

4. In a drill rig having a derrick, a drive head assembly suspended in the derrick having a drive stem for connection to and for rotating a string of drill pipe, a method for connecting a stand of the drill pipe to the drive stem, comprising in combination the steps of:

pivotally suspending from the drive head assembly a pair of upper link sections;  
pivotally connecting a pair of lower link sections to the upper link sections;  
mounting a set of elevators to the lower link sections;



connecting between the drive head assembly and the upper link sections retractable upper lifting means for pivoting lower ends of the upper link sections relative to the drive head assembly;  
connecting between the upper and lower link sections retractable lower lifting means for pivoting lower ends of the lower link sections upward relative to the upper link sections;  
retracting the upper lifting means to extend the upper link sections downward and outward relative to the drive stem;  
clamping the elevators to an upper end of the stand of drill pipe; then  
retracting the lower lifting means to pivot the lower ends of the lower link sections upward while continuing to retract the upper lifting means to lift the elevators substantially straight upward relative to the drive head assembly to engage the stand of drill pipe with the drive stem; then  
rotating the drive stem to connect the stand of drill pipe to the drive stem; then  
at a selected time, releasing the elevators from the stand of drill pipe, and fully retracting the upper and lower lifting means to move the elevators to one side of the drill stem.





charge signal output in response to pressure applied thereto; and means for converting said charge signal to a weight value according to the relationship

$$\text{weight} = q/d_{33}$$



where  $q$  is said charge signal and  $d_{33}$  is the thickness sensitivity of said piezoelectric material, said means for converting charge to weight including means for converting said charge signal to a voltage signal, means for detecting the peak voltage of said voltage signal, and means for converting said peak voltage to a weight value.

4,793,430

#### HITCH AND DRIVE STRUCTURE FOR PTO-DRIVEN, SEMI-INTEGRAL IMPLEMENT

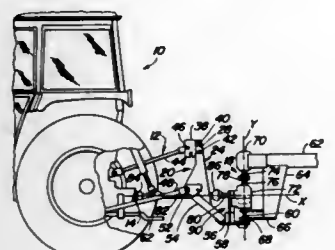
Roger D. Stephenson, Bloomfield; James C. Walters, and Craig A. Richardson, both of Ottumwa, all of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Nov. 20, 1987, Ser. No. 123,518

Int. Cl.<sup>4</sup> B60K 25/10; A01B 71/06

U.S. Cl. 180-14.4

5 Claims



1. In an agricultural implement requiring power to be delivered thereto by a towing tractor and including a draft tongue, a hitch adapter adapted for connection to a tractor three-point hitch and having a rearwardly projecting central portion coupled to a forwardly projecting member of the draft tongue by a spherical hitch ball connector, an implement drive including a transmission housing supported on the draft tongue for rota-

tion about an upright first axis passing through the hitch ball connector, an input shaft supported in said housing along a second axis extending perpendicular to and intersecting the upright first axis and being adapted for connection to a tractor PTO shaft and a steering structure operatively coupled between said housing and the hitch adapter for maintaining the input shaft in parallel relationship to the PTO shaft, the improvement comprising: said steering structure including a guide member fixed to the hitch adapter adjacent said rearwardly projecting central portion and having an abutment surface formed concentrically to a third axis located in a plane containing the first and second axes and passing through the ball connector; and a steering arm means fixed to said housing and including end portions engaging diametrically opposite locations on said abutment surface whereby rolling motion of the hitch adapter about said third axis relative to the draft tongue will not effect any steering motion of said housing about the upright axis.

4,793,431

#### APPARATUS FOR CONTROLLING STEERING FORCE PRODUCED BY POWER-STEERING SYSTEM

Kunihiko Eto, Toyota; Yutaka Mori, and Kazumasa Kodama, both of Okazaki, all of Japan, assignors to Toyota Koki Kabushiki Kaisha, Kariya, Japan

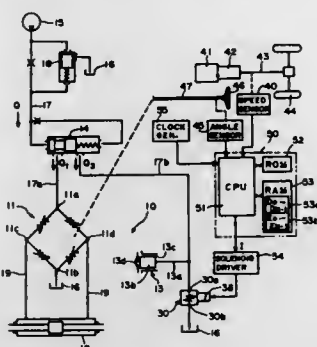
Filed Sep. 3, 1987, Ser. No. 92,584

Claims priority, application Japan, Sep. 12, 1986, 61-216795

Int. Cl.<sup>4</sup> B62D 5/06

U.S. Cl. 180-142

7 Claims



1. An apparatus for controlling the steering force produced by a power-steering system installed in an automobile and equipped with a solenoid valve which can vary the ratio of the assisting steering torque produced by the power-steering system to the torque applied to the steering wheel by the driver according to a control current applied to the solenoid valve, said apparatus comprising:

- a velocity sensor for detecting vehicle velocity information;
- an angle sensor for detecting the angle through which the steering wheel is rotated;
- a first arithmetic means which receives plural signals from the velocity sensor at predetermined times and calculates a driver's condition index indicating the condition of the driver from these signals;
- a second arithmetic means which receives plural signals indicative of the angle from the angle sensor at predetermined times and calculates a road condition index indicating the condition of the road from these signals;
- a storage means in which at least four control current characteristic curves are stored, the characteristic curves specifying various control current values according to various values of the velocity of the automobile for each of at least four conditions that consist of the combinations of first and second conditions of the driver and first and second conditions of the road;
- a control current value-taking means for taking one control

current value corresponding to the output signal from the velocity sensor from each of the at least four control current characteristic curves;

a third arithmetic means for calculating an output control current value from the at least four control current values taken by the control current value-taking means, from the driver's index calculated by the first arithmetic means, and from the road condition index calculated by the second arithmetic means; and

a valve-actuating means for applying to the solenoid valve an electric current corresponding to the output control current value calculated by the third arithmetic means.

4,793,432

#### MOTOR VEHICLE WITH FRONT WHEEL AND REAR WHEEL STEERING, IN PARTICULAR FOUR-WHEEL STEERING

Peter Tattermusch, Esslingen, Fed. Rep. of Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

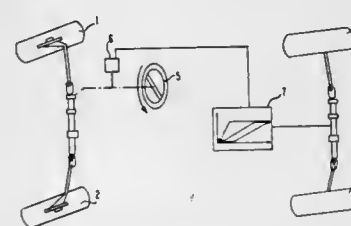
Filed Oct. 1, 1987, Ser. No. 103,298

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1986, 3633342

Int. Cl.<sup>4</sup> B62D 5/06

U.S. Cl. 180-142

10 Claims



1. A motor vehicle with front wheel steering and rear wheel steering, in particular four-wheel steering, in which front and rear wheels are steerable in the same sense but with less steering deflection at said rear wheels in comparison to said front wheels, a lock rate of said rear wheels increasing with increasing lock rate of said front wheels, comprising: control means for causing said rear wheel to follow said front wheel steering with a variable delay period which decreases with said increasing lock rate of said front wheels, and for causing said lock rate of said rear wheels to be influenced by transverse acceleration of said vehicle.

4,793,433

#### HYDRAULIC REACTION FORCE APPARATUS FOR POWER STEERING SYSTEM

Yasuyoshi Emori, and Hirotsugu Sonoda, both of Higashimatsuyama, Japan, assignors to Jidosha Kiki Co., Ltd., Tokyo, Japan

Filed Jul. 17, 1987, Ser. No. 74,798

Int. Cl.<sup>4</sup> B62D 5/083

U.S. Cl. 180-143

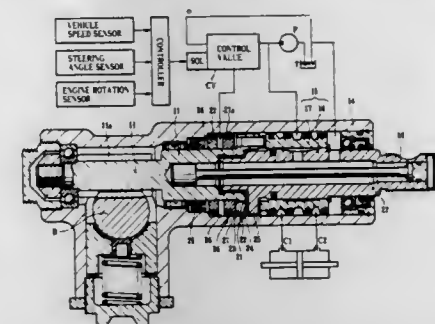
8 Claims

1. A hydraulic reaction force apparatus for a power steering system, comprising:

- an input shaft;
- an output shaft coaxial with said input shaft, said output shaft and said input shaft being rotatable relative to each other;
- a flange formed on one of said input and output shafts;
- said plurality of guide holes axially extending through a flange formed on one of said input and output shafts;
- a corresponding plurality of balls each axially slidable in a different one of said guide holes, respectively;
- a reaction force reception portion formed on the other one of said input and output shafts so as to oppose one major surface of said flange, said reaction force reception portion being adapted to receive said balls;
- a hydraulic reaction force chamber located adjacent the

other major surface of said flange which opposes said one major surface thereof; and

a reaction force piston slidably coaxial with said input and output shafts in said hydraulic reaction force chamber,



said reaction force piston being adapted to urge said balls against said reaction force reception portion to generate a restriction force corresponding to a reaction force hydraulic pressure between said input and output shafts.

4,793,434

#### ROAD FINISHING MACHINE

Hans-Dieter Bachle, Aerzen, Fed. Rep. of Germany, assignor to ABG-Werke GmbH, Hameln, Fed. Rep. of Germany

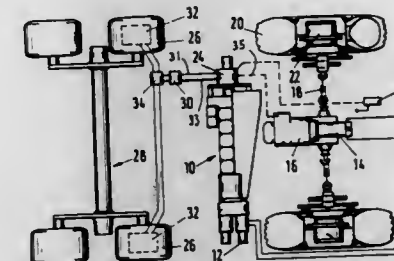
Filed Mar. 24, 1987, Ser. No. 30,152

Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611268

Int. Cl.<sup>4</sup> B60K 25/04

U.S. Cl. 180-243

3 Claims



1. A road finishing machine comprising:

- a set of rear wheels;
- at least one set of steerable front wheels;
- a first hydraulic motor means for driving said set of rear wheels;
- a second hydraulic motor means for driving said at least one set of steerable front wheels;
- an internal combustion engine;
- hydraulic first and second pump means driven by said engine for feeding pressurized hydraulic fluid to said first and second hydraulic motor means so as to drive said first wheels with substantially identical peripheral speed;
- a first hydraulic circuit connecting said first hydraulic motor means to said hydraulic pump means;
- a gearbox disposed between said first hydraulic motor means and said rear wheels;
- means for linking said gearbox with said second hydraulic pump means for varying the output volume of said second hydraulic pump means as a function of the speed of said rear wheels;
- a second hydraulic circuit, separate and distinct from said first hydraulic circuit, connecting said second hydraulic pump means to said second hydraulic motor means; and
- a short-circuit valve means interposed in said second hy-

draulic circuit for, when actuated, diverting the pressurized hydraulic fluid away from said second hydraulic motor means so as to reduce driving force on the driven front wheels to zero.

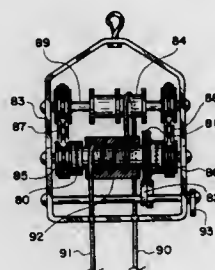
**4,793,436**  
**PUSH-PULL SKY-RIDE VERTICAL MOBILITY DEVICE**  
Hyok S. Lew; Hyon S. Lew, and Yon K. Lew, all of 7890 Oak St., Arvada, Colo. 80005

Continuation-in-part of Ser. No. 711,318, Mar. 13, 1985, Pat. No. 4,702,384, and a continuation-in-part of Ser. No. 797,411, Nov. 12, 1985, Pat. No. 4,679,656. This application Dec. 4, 1986, Ser. No. 938,389

The portion of the term of this patent subsequent to Jul. 14, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> A62B 1/08

U.S. Cl. 182—42

6 Claims



**4,793,435**  
**APPARATUS FOR GENERATING MULTIPLE SEISMIC SIGNALS IN A WELLBORE**

Lonnie J. Smith, Allen, and Charles C. Mosher, Plano, both of Tex., assigns to Atlantic Richfield Company, Los Angeles, Calif.

Filed Sep. 17, 1987, Ser. No. 97,783

Int. Cl.<sup>4</sup> G01V 1/40

U.S. Cl. 181—106

8 Claims



1. Apparatus for generating multiple seismic signals in a borehole comprising:

at least one elongated rod segment adapted to be inserted in said borehole and including means for coupling said rod segment to an elongated cable for lowering said rod segment into a predetermined selected position in said borehole;

a plurality of explosive charge means spaced apart on and secured to said rod segment, said explosive charge means each including a length of explosive cord wrapped around the exterior of said rod segment, each of said explosive cords being of a predetermined length and of a predetermined charge intensity to provide a suitable acoustic signal in said borehole without damaging said borehole or said apparatus;

detonator means connected to one end of each of said explosive cords and connected to electrical conductors extending within a passage formed in said rod segment; and means including switch means connected to said conductors for selectively firing each of said explosive cords separately at will to generate multiple acoustic signals detectable from the earth's surface in the vicinity of said borehole.

1. A vertical mobility apparatus comprising in combination:
  - (a) a first cylindrical member rotatably and nonshiftably secured to a frame including means for securing said frame to an elevated structure;
  - (b) a second cylindrical member rotatably and nonshiftably secured to said frame in a generally parallel arrangement with respect to said first cylindrical member;
  - (c) a third cylindrical member rotatably and shiftably secured to said frame intermediate said first and second cylindrical members in a generally parallel arrangement with respect to said first cylindrical member;
  - (d) a closed loop of cord member wound on said first cylindrical member over at least one and one half complete laps wherein one portion of said closed loop of cord member extending from one side of the cylindrical surface of said first cylindrical member loops over the combination of said third and first cylindrical members over at least one complete loop and the other portion of said closed loop of cord member extending from the other side of the cylindrical surface of said first cylindrical member loops over the combination of said second and third cylindrical members over at least one complete loop;
  - (e) at least one brake cord wound on said first cylindrical member over at least one half lap for exerting braking on the rotating motion of said first cylindrical member, wherein at least one extremity of said brake cord is secured to a member shifting with said third cylindrical member;
  - (f) cord guide means for guiding said closed loop of cord member wound on said first cylindrical member wherein said cord guide means enhances smooth looping movement of said closed loop of cord member over said cylindrical members;
  - (g) harness means secured to said first portion of the closed loop of cord member extending from the combination of said cylindrical members;
  - (h) stirrup slidably secured to said the other portion of the closed loop of cord member, wherein said stirrup includes locking means that grabs said the other portion of the closed loop of cord member when a pressure is exerted on said stirrup while said stirrup slides substantially freely on said the other portion of the closed loop of cord member when said stirrup does not support a pressure;
  - (i) handle slidably secured to said the other portion of the closed loop of cord member, wherein said handle includes locking means that grabs said the other portion of the closed loop of cord member when said handle is pulled down while said handle slides substantially freely on said

the other portion of the closed loop of cord member when said handle does not support a pull; whereby a person secured to said one portion of the closed loop of cord member by said harness means can suspend oneself in midair or lower oneself at a safe speed by exerting a small amount of tension on said the other portion of the closed loop of cord member, or elevate oneself by repeating movements including firstly, pulling up the stirrup by bending one's knees while pulling the handle with an easily affordable force and, then, standing up on the stirrup by straightening one's knees while pushing up the handle.

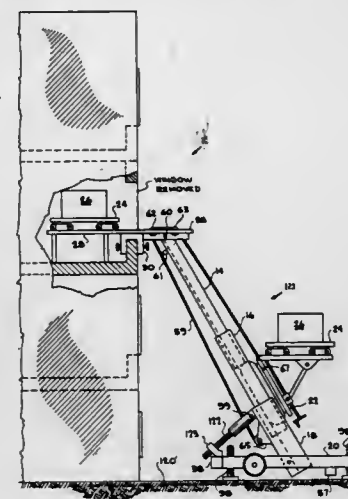
**4,793,437**  
**PORTABLE LIFT WITH TELESCOPIC BOOMS AND LOAD-CARRYING APPARATUS**  
Philip Hanthorn, Box 276, San Francisco, Calif. 94101

Filed Jul. 20, 1987, Ser. No. 75,410

Int. Cl.<sup>4</sup> E06C 5/04

U.S. Cl. 182—102

44 Claims



1. A portable conveyor comprising a pair of extensible and retractable telescopic booms positioned in side-by-side relationship, support means having lower ends of said booms mounted thereon, said booms being inclined to extend upwardly and forwardly from said support means, a plurality of longitudinally spaced rungs interconnected between said booms to define a series of supporting surfaces, and an independently mobile primary load carrier means mounted for movement on the supporting surfaces of said rungs, said primary load carrier means including a load-carrying primary platform and adjustment means for selectively moving said primary platform to a horizontally disposed position.

**4,793,438**  
**SCAFFOLD LATCH MEANS**  
Eugene D. Perry, P.O. Box 306, Mooresville, Ind. 46158  
Continuation-in-part of Ser. No. 907,798, Sep. 16, 1986, and a continuation-in-part of Ser. No. 934,825, Nov. 25, 1986, abandoned. This application Dec. 21, 1987, Ser. No. 135,648  
Int. Cl.<sup>4</sup> E04G 1/20

U.S. Cl. 182—112

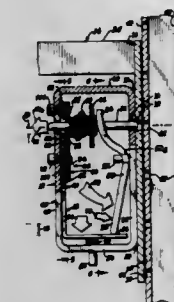
23 Claims

1. A latch means for a scaffold, the scaffold having a support leg having an abutment against which a latch pin of the latch means abuts for supporting a support platform of the scaffold, the latch pin being supported to be movable into and between (a) a support position in which it abuts the leg abutment for supporting the platform and (b) a withdrawn position in which the latch pin is removed from the leg

abutment to an abutment-release position for permitting a change of position of the platform with respect to the leg, there being a pin-spring which biases the latch pin to its platform-supporting position in which it abuts the leg abutment, there being a release lever means, having an actuator portion and an actuated portion, the actuator portion being manually movable to cause the actuated portion to operatively engage the latch pin and to cause its movement to its said withdrawn position of leg-abutment-release, against the bias of the pin-spring.

the improvement for such a latch means, comprising:

a movable control member having a pin-blocking means and an actuator means, support means which supports the control member in and between (a) a position in which its pin-blocking means is disposed in the path of the latch pin, thus blocking the latch pin from moving from its leg-abutting position of platform support to its withdrawn position, and (b) a



position in which the control member's pin-blocking means is withdrawn from said path, thus permitting the latch pin to move to its withdrawn position of leg-abutment release,

a control spring being provided, which biases the control member to a position in which its pin-blocking means is in pin-blocking position,

the actuator means of the control member being moved in response to pin-releasing movement of the release lever means, to achieve movement of the control member to move its pin-blocking means to a withdrawn position in which the pin is movable to its withdrawn position of abutment-release with respect to the scaffold leg, the arrangement providing that the only time the latch pin can move to its withdrawn position sufficiently to release its abutment with the scaffold leg abutment of platform support is while the release lever means is being actuated to cause pin-withdrawal thrust upon the latch pin by force applied to the actuator portion of the release lever means.

**4,793,439**  
**APPARATUS FOR CLIMBING TREES, POLES AND THE LIKE AND BEING REMOTELY CONTROLLED FROM GROUND ELEVATION**

Homer S. Crawford, 4418 Shingle Oak La., Houston, Tex. 77008  
Continuation-in-part of Ser. No. 078,903, Jul. 28, 1987, abandoned. This application Jan. 11, 1988, Ser. No. 142,181  
Int. Cl.<sup>4</sup> B66F 1/02, 19/00

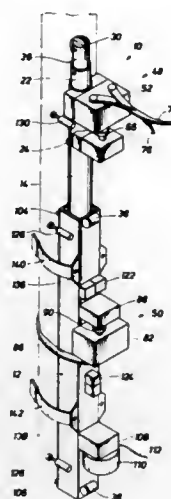
U.S. Cl. 182—136

19 Claims

1. Apparatus for climbing objects such as trees, poles and the like, comprising:
  - (a) a main frame;
  - (b) a hydraulically driven telescoping mast being connected in telescoping relation with said main frame;
  - (c) power energized telescoping means establishing driving relation between said main frame and hydraulically driven telescoping mast for selectively extending and retracting



- said hydraulically driven telescoping mast relative to said main frame;
- (d) first gripping means being supported by hydraulically driven telescoping mast and incorporating a first pair of pivotal gripping arms for establishing gripping relation with said object;
- (e) second gripping means being supported by said main frame and incorporating a second pair of pivotal gripping arms for establishing gripping relation with said object;
- (f) first and second arm drive means interconnected in driving relation respectively with said first and second gripping means;
- (g) power energized winch means being supported by at least one of said main frame and hydraulically driven telescoping mast and being operable for lifting or lowering objects relative to said apparatus;



- (h) power and control means being supported by said main frame and having power interconnection with said power energized telescoping means, said first and second gripping means, said first and second arm drive means and said winch means, said power and control means having remote push button station means being interconnected in controlling relation with said power and control means and being operable by personnel from locations remote to said power and control means for operation of said apparatus; and
- (i) safety interlock means being interconnected with said first and second gripping means and normally ensuring that at least one of said first and second gripping means is in gripping engagement with said object, said safety interlock means having manual lockout means accessible for manual operation when said main frame is at ground level relative to said object.

**4,793,440**  
**LIQUID LUBRICANT SUMP LEVEL MANAGEMENT SYSTEM**  
 Walter J. Iseman, Monroe Center, Ill., assignor to Sandstrand Corporation, Rockford, Ill.

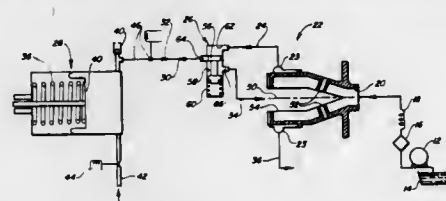
Filed Dec. 18, 1987, Ser. No. 134,707  
 Int. Cl.<sup>4</sup> F01M 11/08

U.S. Cl. 184—6.23

15 Claims

1. A liquid lubricant sump level management system, comprising:  
 a scavenging circuit communicating with the lubricant sump;  
 centrifugal deaerator means in the circuit;  
 liquid reservoir means in liquid communication with the deaerator means; and  
 sensing means operatively associated with the deaerator

means for sensing the liquid level condition therein, and providing for passage of liquid from the deaerator means to the reservoir means in response to a high liquid level



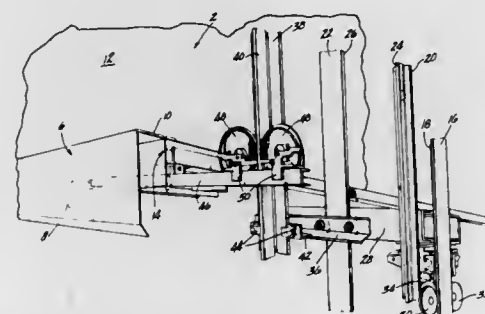
condition and for passage of liquid from the reservoir means to the deaerator means in response to a low liquid level condition.

**4,793,441**  
**ELEVATOR CAR SYSTEM WITH THREE GUIDE RAILS**  
 Janis Cilderman, West Simsbury, and Stuart B. Spence, Simsbury, both of Conn., assignors to Otis Elevator Company, Farmington, Conn.

Filed Oct. 20, 1987, Ser. No. 110,408  
 Int. Cl.<sup>4</sup> B66B 7/02

U.S. Cl. 187—95

4 Claims



1. A system for guiding movement of an elevator car in a hoistway, said system comprising:

- (a) an elevator car having opposed side walls; a pair of end walls joining said side walls at corners wherein at least one of said end walls includes a car door; and said car further having a floor;
- (b) a pair of guide rails mounted in said hoistway outside of said car, each of said guide rails being located midway between said car end walls outwardly adjacent to one of said car side walls, and each of said guide rails having a blade which is perpendicular to and extends toward a respective one of said car side walls;
- (c) sets of guide rolls mounted on said car, each one of said sets including individual rolls being disposed in rolling contact with a respective one of said guide rail blades whereby said guide rails and sets of guide rolls guide movement of said car through said hoistway;
- (d) a single stabilizer rail mounted in said hoistway outside of said car opposite one of said car corners, said stabilizer rail having a blade which is spaced from said car and parallel to said car side walls; and
- (e) a pair of stabilizer rolls mounted on said car, said stabilizer rolls engaging opposite parallel side surfaces of said stabilizer rail blade to damp oscillatory movement of said car in directions perpendicular to said side walls.

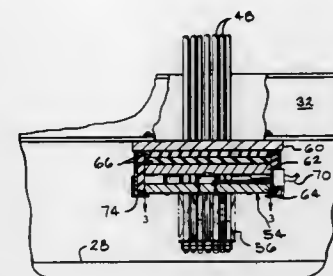
**4,793,442**  
**METHOD AND APPARATUS FOR PROVIDING PRE-TRAVEL BALANCING ENERGY TO AN ELEVATOR DRIVE**

Mark K. Heckler, Ebikon, Switzerland, and Larry V. Birney, Toledo, Ohio, assignors to Schindler Elevator Corporation, Toledo, Ohio

Filed Nov. 5, 1987, Ser. No. 117,621  
 Int. Cl.<sup>4</sup> B66B 1/44

U.S. Cl. 187—115

32 Claims



1. An elevator control system comprising, in combination, means for measuring the total weight of an elevator car, passengers and suspended cables, means for storing the empty weight of said elevator at the lower and upper operating limits of said car, means for determining an energy input to a drive motor to maintain said car stationary at a lower and an upper operating limit of said car, means for providing an interpolation representative of the portion of said total weight of said elevator car resulting from said suspended cables, means providing a data signal representative of the weight of passengers in said elevator car, and means for determining an energy input level to said drive motor which maintains said elevator car substantially stationary.

**4,793,443**  
**DYNAMIC ASSIGNMENT SWITCHING IN THE DISPATCHING OF ELEVATOR CARS**  
 Robert C. MacDonald, W. Caldwell, and Elsa Abrego, Nutley, both of N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 16, 1988, Ser. No. 168,817  
 Int. Cl.<sup>4</sup> B66B 1/18

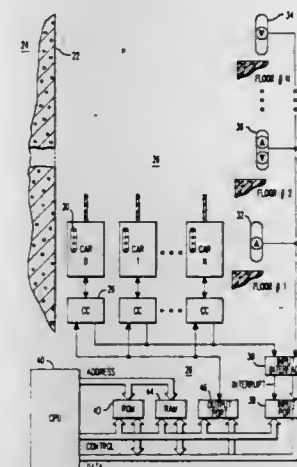
U.S. Cl. 187—127

6 Claims

1. A method for assigning hall calls registered from floors of a building to a plurality of elevator cars which provide elevator service for the floors of the building, comprising the steps of:

tabulating the number of hall calls and the cumulative waiting time,  
 calculating the average waiting time (AWT) by dividing the cumulative waiting time by the number of hall calls,  
 storing the calculated AWT,  
 providing a desired AWT,  
 selecting a travel path for each car relative to a floor having a registered hall call to be assigned,  
 preparing a trip list for each car using the travel path selected,  
 determining the time (ETA) for each car to service the associated trip list and arrive at the floor of a hall call under consideration,  
 assigning each new hall call to an elevator car based upon relative ETA times,  
 reassigning a previously assigned hall call to another elevator car when said other elevator car has an ETA which is

at least T seconds less than that of the previously assigned elevator car,  
 providing an initial value for T,  
 comparing the calculated AWT with the desired AWT,



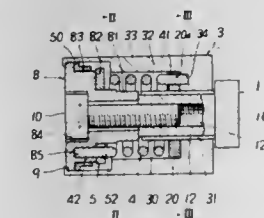
and changing T when the calculated AWT has a predetermined relationship with the desired AWT, and wherein the reassigning step uses the latest value of T.

**4,793,444**  
**CALIPER BRAKE FOR A BICYCLE**  
 Masashi Nagano, Izumi, Japan, assignor to Shimano Industrial Company Limited, Osaka, Japan  
 Filed Jul. 7, 1987, Ser. No. 70,529  
 Claims priority, application Japan, Jul. 12, 1986, 61-107029[U]

Int. Cl.<sup>4</sup> B62L 1/02

U.S. Cl. 188—24.12

22 Claims



1. A caliper brake for a bicycle, comprising:  
 (a) a fixing base,  
 (b) a brake arm including a brake shoe and a boss at which

- said brake arm is supported rotatably to said fixing base, said boss having a cavity,
- (c) a return spring housed in said cavity and having first and second spring legs, said first spring leg being retained to said brake arm,
- (d) a spring holder having a retaining bore retaining said second spring leg of said return spring and mounted rotatably with respect to said boss, said spring holder comprising means for applying a preload to said return spring responsive to rotation of said holder relative to said boss,
- (e) a rotation regulation means for regulating within a predetermined range the rotation of said spring holder relative to said boss and for holding said preload applied to said return spring by said spring holder, said rotation regulation means comprising a first regulating portion provided at said spring holder and a second regulating portion provided at said boss, said second regulating portion being engageable with said first regulating portion to limit rotation of said spring holder relative to said boss within said predetermined range, and
- (f) a fixing means which fixes said spring holder to said fixing base.

4,793,445

## CASTER BRAKE ASSEMBLY

Herbert E. Collignon, and Dennis W. Hollis, both of Evansville, Ind., assignors to Babcock Industries, Inc., Evansville, Ind.  
Filed Oct. 5, 1987, Ser. No. 104,816  
Int. Cl.<sup>4</sup> B60T 3/00

U.S. Cl. 188—29

15 Claims



1. A caster brake assembly for simultaneously braking ground engaging caster wheels separately mounted on a vehicle, comprising:

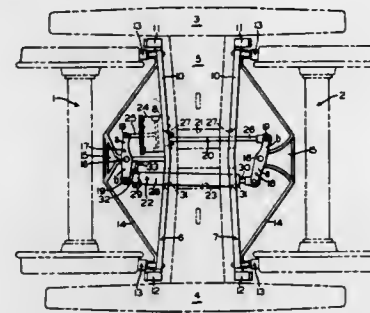
- a bracket rigidly mounted to the vehicle between the wheels and having a first downwardly extending plate;
- a longitudinal frame assembly extending between the wheels and being slidably mounted to the plate for planar motion parallel to the plate;
- brake shoes rigidly attached at ends of said frame assembly;
- guide means, connected to said frame assembly and said bracket, for guiding the movement of said frame assembly along only one linear direction relative to said bracket;
- a cam member pivotally mounted to one of said frame assembly and said bracket such that pivoting of said cam member against the other of said frame assembly and said bracket causes said frame assembly to move relative to said bracket and causes said brake shoes to simultaneously engage both wheels; and,
- spring means, mounted between said bracket and said frame assembly, for urging said frame assembly and said brake shoes away from the wheels;
- said frame assembly including a pair of opposing parallel walls defining a cavity for sliding receipt of the plate therebetween and wherein said cam member is pivotally mounted to said frame assembly within said cavity for cam engagement against said bracket.

4,793,446  
SINGLE-CYLINDER, TRUCK-MOUNTED BRAKE ASSEMBLY

James E. Hart, Trafford; William K. Mong, North Huntingdon; Allen W. Kyllonen, Plum, and Mark S. Kramplitz, Hunker, all of Pa., assignors to American Standard Inc., Wilmerding, Pa.  
Filed Dec. 10, 1986, Ser. No. 939,996  
The portion of the term of this patent subsequent to Sep. 23, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> B61H 13/00, 13/34

U.S. Cl. 188—52

27 Claims



1. For a railway vehicle truck having a longitudinal axis, a transverse axis perpendicular thereto, a pair of wheel/axle units parallel to said transverse axis, a bolster so disposed between said pair of wheel/axle units that its axis coincides with said transverse axis, said bolster having first and second openings spaced equidistantly on opposite sides of said longitudinal axis and passing through said bolster in a direction parallel thereto, a brake rigging comprising:

- (a) first and second brake beams interposed between said bolster and a respective one of said wheel/axle units so as to be in substantially parallel relationship with said bolster, said first and second brake beams having brake shoes carried thereon adjacent the wheel treads of said wheel/axle units for engagement therewith when said brake beams are spread apart;
- (b) first and second transfer levers pivotally-connected, respectively, at a point intermediate the ends thereof to said first and second brake beams, each said transfer lever forming first and second lever arms, the effective lengths of said first and second lever arms of at least one of said first and second transfer levers being dissimilar;
- (c) first force-transmitting means passing through said first opening of said bolster for connection with said first lever arms of said first and second transfer levers, said first force-transmitting means including force actuator means for effecting rotation of said first transfer lever; and
- (d) second force-transmitting means passing through said second opening of said bolster for connection with said second lever arms of said first and second transfer levers to effect rotation of said second transfer lever, whereby a force is exerted on said first and second brake beams, at said pivotal connection of said first and second transfer levers therewith, in opposite directions.

4,793,447

## ELECTRICALLY OPERATED DISC BRAKE

Alistair G. Taig, South Bend; Paul J. Grabill, Mishawaka, and Robert W. Jackson, South Bend, all of Ind., assignors to Allied-Signal Inc., Morristown, N.J.  
Filed Dec. 23, 1986, Ser. No. 946,400  
Int. Cl.<sup>4</sup> F16D 55/16

U.S. Cl. 188—72.1

23 Claims

1. A disc brake that may be operated by motor means, comprising a caliper having a bore with a piston slidably received therein, the caliper and piston actuatable to displace a pair of friction elements into engagement with a rotor, a planetary

gear assembly disposed within said bore and comprising a sun gear, planetary gears, and a pair of ring gears, and the motor means coupled with said sun gear which drives the planetary gears, one ring gear fixed to said caliper and the other ring gear rotatable by said planetary gears, the other ring gear engaging screw means which is connected with said piston, the other

eccentrically relative to one another, whereby the caliper support key retains the caliper in operational alignment with the support member and receives braking torque so that the resilient member permits movement between the key members.

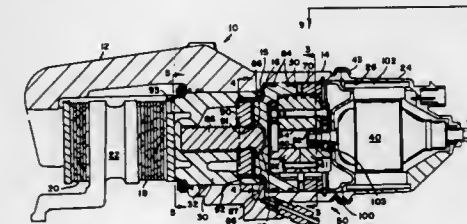
4,793,449

## RAILROAD TRUCK BRAKING SYSTEM

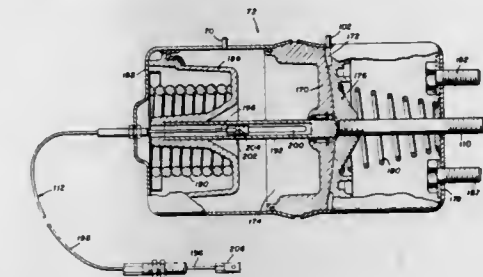
Sam D. Smith, Richton Park, Ill., assignor to Thrall Car Manufacturing Company, Chicago Heights, Ill.  
Filed Oct. 28, 1987, Ser. No. 114,637  
Int. Cl.<sup>4</sup> B60T 13/38

U.S. Cl. 188—107

10 Claims



ring gear coupled nonrotatably with screw means in order to effect rotation of the screw means while permitting axial misalignment therebetween, operation of said motor means causing rotation of said other ring gear and operative displacement of said piston into engagement with one of said friction elements so that the caliper, by reaction, displaces the other friction element into engagement with said rotor.



4,793,448

## CALIPER SUPPORT KEY

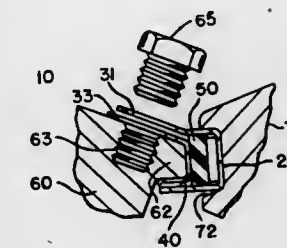
Daniel L. Bolenbaugh, South Bend, Ind., and Lawrence C. Dow, Berrien Springs, Mich., assignors to Allied-Signal Inc., Morristown, N.J.

Filed Mar. 29, 1988, Ser. No. 174,752

Int. Cl.<sup>4</sup> F16D 65/02

U.S. Cl. 188—73.43

3 Claims



1. A caliper support key in a disc brake having a caliper supported by a support member, the support member having one of a recess and a protrusion and the caliper having the other of the recess and protrusion, the caliper support key comprising an outer key member that is generally U-shaped and which includes radially outer and radially inner arms connected by a radially extending part, the radially outer arm having an end extending further than and outwardly at an angle away from the radially inner arm, and at least one aperture disposed within the end of the radially outer arm, an inner key member that is shaped complementary to said outer key member, the inner key member also having a radially outer arm with an end which extends further than and outwardly at an angle away from an associated radially inner arm which is connected by a radially extending part with the outer arm of the inner key member, the end of the inner key member having at least one opening therethrough which is in axial alignment with the one aperture, a resilient member disposed between the radially extending parts of the inner and outer key members, the caliper support key received between the protrusion and recess so that the outer key member engages the recess and the inner key member engages the protrusion, and a retaining member extending through said one aperture and one opening and received within a receptacle of one of the support member and caliper, the one aperture and one opening being aligned

1. A railroad truck having at least four wheels comprising: brake means for braking each wheel; a single enclosed air cylinder mounted on the truck; the air cylinder having first and second chambers; means to supply service air pressure to the first chamber; the first chamber containing means pneumatically operated by service air pressure to apply controlled service braking pressure, emergency braking pressure and, when the truck is stopped, parking braking pressure, to the brake means; the second chamber containing spring means which applies automatic parking pressure to the brake means when the truck is stopped, and applies emergency fail-safe pressure to the brake means when there is a pneumatic system failure to supply air to the first chamber; means to supply pressurized air to the second chamber to keep the spring means from applying pressure to the brake means so long as adequate air pressure is maintained in the second chamber; a handbrake assembly mounted on the truck in a position readily accessible for manual operation when the railroad truck is joined to a vehicle or separated therefrom; and the handbrake assembly including longitudinally manually reciprocal means operative to compress the spring means so that the brake means can be fully released and maintained released for an indefinite time so long as pneumatic braking pressure is not applied to the first chamber and upon manual reverse movement of the said longitudinally reciprocal means compression of the spring means is released so that the spring means can apply pressure to the brake means unless pneumatic pressure supplied to the first and second chambers prevents application of braking pressure by the spring means.

4,793,450

## LOCKABLE PISTON-CYLINDER ASSEMBLY

Franciscus G. Savenije, Schalkhaar, Netherlands, assignor to Auping B. V., Netherlands  
Continuation-in-part of Ser. No. 860,488, May 7, 1986, abandoned. This application Jul. 15, 1987, Ser. No. 73,832  
Claims priority, application Netherlands, May 9, 1985, 8501334

U.S. Cl. 188—300

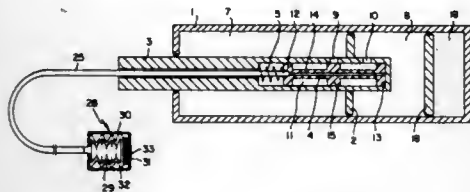
Int. Cl.<sup>4</sup> F16F 9/34

20 Claims

1. Lockable piston-cylinder assembly adapted to be mounted between two parts being movable relative to each other, comprising a cylinder being divided into two chambers by a recip-



rovable piston connected to a hollow piston rod having a cavity and a bore extending between said cavity and an end of said piston rod projecting from said cylinder, said two chambers being fillable with a substantially non-compressible fluid, said cavity having at least two openings disposed on either side of said piston for fluid communication between said chambers, at least one of said openings being closable by a valve member



arranged in said cavity of said piston rod and controlling fluid communication between said chambers, said valve member being on one end actuatable from said end of said piston rod projecting from said cylinder, said cavity including a space in which the other end of the valve member is movable, said space being in fluid communication with the exterior of the cylinder.

#### 4,793,451 ENERGY ABSORBER DEVICE WITH PLASTIC CASING AND SCREW-IN PLASTIC SEAL

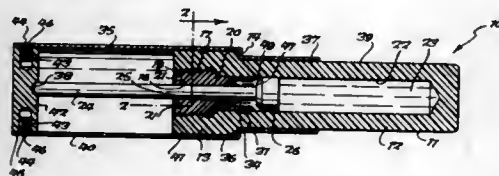
Paul H. Taylor, Grand Island, N.Y., assignor to Tayco Developments, Inc., North Tonawanda, N.Y.

Filed Sep. 17, 1982, Ser. No. 419,174

Int. Cl.<sup>4</sup> F16F 5/00, 9/10, 9/36, 9/38

U.S. Cl. 188—316

13 Claims



1. An energy absorber device comprising a plastic casing having a first casing section of a first diameter and a second casing section of a second diameter which is larger than said first diameter, first shoulder means at the junction of said first and second casing sections, a housing having a housing section for sliding engagement with said second casing section, second shoulder means in said housing for engagement with said first shoulder means, abutment means on said housing, a seal in said casing, fluid in said plastic casing, and piston means extending through said seal and having an end in engagement with said abutment means.

#### 4,793,452 PISTON-CYLINDER TYPE OIL DAMPER

Alan Kong, Yokohama, Japan, assignor to Nifco, Inc., Yokohama, Japan

Filed Jun. 23, 1987, Ser. No. 65,448

Claims priority, application Japan, Jun. 27, 1986, 61-149490

Int. Cl.<sup>4</sup> F16F 9/342

U.S. Cl. 188—317

20 Claims

1. A piston-cylinder type oil damper, comprising:  
a cylinder containing oil;  
a piston disposed within said cylinder for dividing the interior of said cylinder into a head chamber and a rod chamber, and provided with axial through-hole means for permitting said oil within said head chamber and said rod chamber to flow therethrough in opposite directions;  
a piston rod passing through said rod chamber so as to have an intermediate portion thereof connected to said piston

and a first proximal end thereof connected to a force generating means for moving said piston rod and said piston in opposite directions within said cylinder; and  
a valve plate axially movable upon a second distal end of said piston rod between a first position at which said valve plate is separated from said piston so as to entirely uncover said axial through-hole means in order to permit



free flow of said oil therethrough between said rod chamber and said head chamber, and a second position at which said valve plate is brought into contact with one side of said piston so as to partially shield said axial through-hole means in order to define only partially reduced flow therethrough between said rod chamber and said head chamber.

#### 4,793,453 ELECTROMAGNETICALLY CONTROLLED SPRING CLUTCH MECHANISM

Kozo Nishimura, Akashi, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Continuation-in-part of Ser. No. 847,079, Apr. 1, 1986, Pat. No. 4,704,554. This application Mar. 13, 1987, Ser. No. 25,763

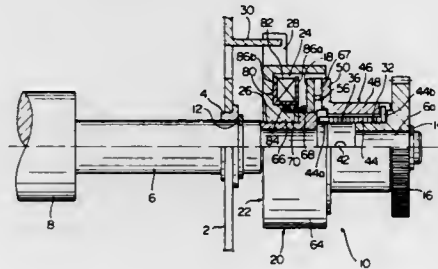
Claims priority, application Japan, Mar. 31, 1986, 61-71024

The portion of the term of this patent subsequent to Nov. 3, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> F16D 13/02, 13/08, 27/10

U.S. Cl. 192—26

5 Claims



1. An electromagnetically controlled spring clutch mechanism comprising an output rotating element mounted rotatably, an input rotating element mounted on the output rotating element for free rotation relative to the output rotating element, a first boss member adapted to rotate as a unit with the input rotating element, a second boss member provided adjacent to the first boss member and adapted to rotate as a unit with the output rotating element, a coil spring means fitted over and across the first and second boss members and drivingly connected said two boss members by its contraction, a rotation control member for hampering the contraction of the coil spring means, an armature mounted in proximity to the rotation control member for free rotation axially of the output rotating element, a biasing means for biasing the armature in a direction in which the armature approaches the rotation control member, and an electromagnetic means for magnetically attracting the armature away from the rotation control member against the biasing action of the biasing means; wherein when the electromagnetic means is deenergized, the armature is biased toward the rotation control member by the action of the biasing means and the rotation of the rotation control member is hampered whereby the contraction of the coil spring means is hampered, and when the electromagnetic

means is energized, the armature is magnetically attracted in a direction away from the rotation control member by the action of the electromagnetic means and the rotation control member is free to rotate whereby the coil spring means is contracted, said electromagnetic means including a cylindrical field and a coil assembly, said field including an outside wall and having one open end surface, a coil assembly comprising a bobbin and a coil wound on the bobbin, said coil assembly being mounted within the field, said coil having a connecting wire portion, a protective member fitted to the connected wire portion of the coil, a mounting opening formed in the field and extending to said open end surface of the field, said protective member being mounted in the mounting opening from said open end surface, said field having shoulder portions extending in the mounting direction of the protective member, said shoulder portions being formed at positions of the field which define the mounting opening, said protective member having a main body portion and engaging portions, said main body portion projecting outwardly through the mounting opening and outwardly of the outside wall of the field, said engaging portions being engaged with the shoulder portions, said bobbin having a sleeve portion and flange portions, said coil being wound on said sleeve portion, said flange portions being provided at both ends of the sleeve portion, one of said flange portions being positioned at said open end surface of the field and being provided with a position setting protrusion, said position setting protrusion being positioned in the shoulder portions in the field.

#### 4,793,454 CONTINUOUSLY VARIABLE TRANSMISSION CLUTCH CONTROL SYSTEM

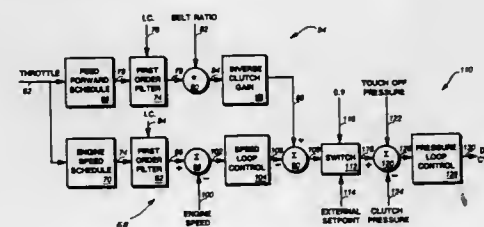
Werner P. Petzold, Harwood Heights; Alan L. Miller, Chicago, both of Ill., and William P. Umlauf, Schererville, Ind., assignors to Borg-Warner Automotive, Inc., Troy, Mich.

Filed Mar. 13, 1987, Ser. No. 25,391

Int. Cl.<sup>4</sup> B60K 41/02, 41/28

U.S. Cl. 192—0.032

7 Claims



1. A clutch control system for use in a continuously variable transmission system for regulating torque transfer upon driver demand from an engine to a drive line mounted in a vehicle and having a fluid-actuated clutch operable to transfer torque to the drive line and having an associated supply line to supply fluid to apply the clutch and discharge fluid to release the clutch controlled by a clutch control valve assembly in said supply line, which system comprises:

first control means responsive to a driver demand signal to provide a first control signal representative of a preselected engine torque;  
second control means responsive to said driver demand signal to provide a second control signal representative of a preselected engine speed;  
first filter means in said first control means to provide a modified first control signal;  
second filter means in said second control means to provide a modified second control signal; and  
third control means responsive to said first and second modified control signals to regulate said clutch control valve.

#### 4,793,455 ELECTROMAGNETIC COUPLING

Yasuo Tabuchi, Kariya; Masao Nakano, Okazaki; Kichiro Kato, Sasano, and Tomoyuki Kurata, Yokohama, all of Japan, assignors to Nippondenso Co., Ltd., Kariya; Toyota Jidosha Kabushiki Kaisha, Toyota and Bridgestone Corporation, Tokyo, all of Japan

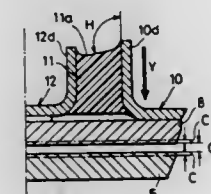
Filed Jul. 31, 1987, Ser. No. 80,007

Claims priority, application Japan, Aug. 1, 1986, 61-119053[U]

Int. Cl.<sup>4</sup> F16D 3/12, 27/10

U.S. Cl. 192—84 C

8 Claims



1. An electromagnetic coupling for selectively transmitting power from a drive source to a driven member, comprising:  
a rotor having excitation coils thereon and rotatable by the drive source;  
an armature movable toward and away from said rotor, said armature being magnetically attractable in a direction toward said rotor for rotation therewith in response to energization of said excitation coils;  
an outer holder plate mounted on said armature and having a first flange;  
an inner holder plate adapted to be connected to the driven member and disposed radially inwardly of said outer holder plate, said inner holder plate having a second flange positioned concentrically with and spaced from said first flange; and  
an elastomeric member disposed between and joined to said first and second flanges for transmitting the power from said outer holder plate through said elastomeric member to said inner holder plate upon energization of said excitation coils, said elastomeric member having a thickness in said direction which is progressively increased from said second flange toward said first flange, said elastomeric member having a surface remote from said armature, said surface and said first flange of the outer holder plate forming an obtuse angle before said armature is magnetically attracted to said rotor.

#### 4,793,456 VARIABLE RATIO CLUTCH LEVER

Martin E. Kummer, Auburn, and Richard A. Flotow, Butler, both of Ind., assignors to Dana Corporation, Toledo, Ohio

Filed Mar. 31, 1987, Ser. No. 32,725

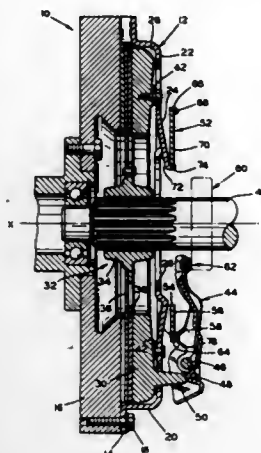
Int. Cl.<sup>4</sup> F16D 13/44

U.S. Cl. 192—99 A

10 Claims

6. A clutch comprising a cover, a plurality of radially extending levers movable relative to said cover, a throw-out bearing engagable with an inner end of each of said levers, a collector ring adjacent an intermediate portion of each of said levers, and nose means formed in said intermediate portion of

said levers and having a longitudinal axis angled from a central point in said intermediate portion toward said inner end of each



said lever and angled from said central point toward said collector ring.

4,793,457

# SNAP-ON DUST SHIELD FOR AUTOMOTIVE COMPRESSOR CLUTCH

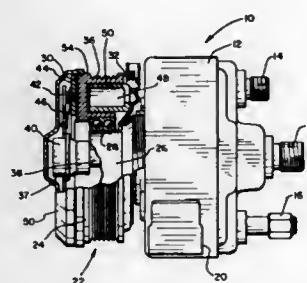
Herbert G. Siewert, Sylvania, Ohio, and Russell A. Cowen, Brooklyn, Mich., assignors to Tecumseh Products Company, Tecumseh, Mich.

Filed Apr. 10, 1987, Ser. No. 36,912

Int. Cl.<sup>4</sup> F16D 27/14

U.S. Cl. 192—112

15 Claims



1. In a compressor assembly including a pulley having a front surface, a dust shield attachable to the pulley for substantially covering the front surface, comprising:

a resilient hollow part having an open end to fit substantially over the front surface of the pulley, there being a protrusion on one of the pulley and the hollow part and a corresponding depression in the other of the pulley and the hollow part, the protrusion and corresponding depressing resiliently cooperatively mating to attach the shield to the pulley, said hollow part and said pulley being positively interlocked together against rotation relative to each other.

4,793,458

# SHIFT MOTOR ASSEMBLY FOR A TWO-SPEED AXLE

Noah A. Shealy, Fort Wayne, Ind., assignor to Dana Corporation, Toledo, Ohio

Filed Nov. 9, 1987, Ser. No. 118,664

Int. Cl.<sup>4</sup> F16H 25/24; G05G 3/00; F16D 71/04

U.S. Cl. 192—141

9 Claims

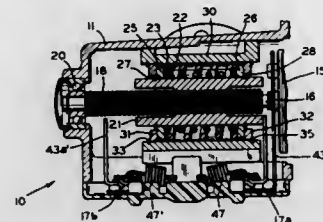
1. In a gear changing mechanism including drive nut means movable between first and second gear engaging positions and

electric motor means selectively electrically connected to a source of electrical energy for moving the drive nut means, a movement limiting mechanism for limiting the amount of movement of the drive nut means comprising:

stationary electrical contact means electrically connected to one of the source of electrical energy and the electric motor means;

movable electrical contact means;

means for normally maintaining said movable contact means in engagement with said stationary contact means, said means for normally maintaining including a spring which is deformable along an axis thereof, said spring being



formed from an electrically conductive material and being electrically connected between said movable electrical contact means and the other of the source of electrical energy and the electric motor means; and

means formed on said movable electrical contact means extending into the path of movement of the drive nut means at a predetermined limit position such that the drive nut means engages said means at said predetermined limit position and moves said movable electrical contact means out of engagement with said stationary electrical contact means, thereby electrically disconnecting the electric motor means from the source of electrical energy and preventing further movement of the drive nut means.

4,793,459

# END CAP ASSEMBLIES FOR CONVEYOR ROLLERS

John P. Forknall, Barton-Le-Clay, and Hubert W. T. Neal, Luton, both of England, assignors to SKF (U.K.) Limited, Luton, England

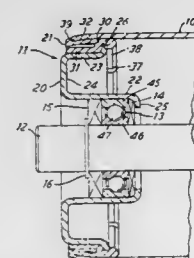
Continuation-in-part of Ser. No. 779,956, Sep. 25, 1986, abandoned. This application Apr. 10, 1987, Ser. No. 37,154

Claims priority, application United Kingdom, Oct. 11, 1984, 8425684

Int. Cl.<sup>4</sup> B65G 39/04

U.S. Cl. 193—37

11 Claims



1. An end cap assembly for a roller tube of a conveyor roller, comprising an annular housing having an axially inner end and an axially outer end, a collar mounted on and surrounding the housing, and a bearing mounted in the housing for rotatably supporting the end cap assembly and roller tube on a shaft, in which the annular housing and the collar are separate components, the annular housing is a substantially rigid structure having a radially inner wall and a radially outer wall, said radially inner wall defining a recess for reception of the bear-

ing, the collar is formed of a resilient plastics material and comprises an inner tubular wall and an outer tubular wall surrounding said inner tubular wall, the inner tubular wall of the collar lies along said outer wall of the housing and has a radially outer surface which is curved radially inwards in the direction towards the axially outer end of said inner tubular wall over at least part of the length of said inner tubular wall, the outer tubular wall of the collar is of a size to be a sliding fit within an end of the roller tube and is formed at the axially outer end thereof with an outwardly projecting radial flange adapted to abut the end of the roller tube, and the axially outer end portion of the outer tubular wall of the collar is spaced radially from said curved outer surface of the inner tubular wall of the collar and is movable radially inwards against its own resilient resistance to deformation into abutting contact with said curved outer surface of the inner tubular wall of the collar, so that the end cap assembly can be firmly secured in an end of the roller tube by positioning the assembly in the tube with the outwardly projecting radial flange on the collar abutting the end of the tube and swaging the end of the tube radially inwards so as to force the outer tubular wall of the collar against the inner tubular wall of the collar with at least part of the outer tubular wall of the collar lying along the curved outer surface of the inner tubular wall of the collar and deformed to the curvature thereof, wherein the radially outer wall of the housing is formed at its axially inner end thereof with an outwardly projecting radial flange, the collar has an annular portion integral with the axially inner ends of the tubular walls of the collar, said annular portion of the collar is formed with a groove which receives said flange on the housing, and the part of the collar between said groove and the axially inner end of the collar has axial grooves which divide said part of the collar to form an annular series of lugs which project axially, the lugs being deformable radially outwards to facilitate fitting of the collar on the radial flange on the housing.

4,793,460

# HANDLING DEVICE FOR DYNAMIC WAREHOUSING SYSTEMS

Vittorio Canico, Via Plave no. 23, Traversetolo (Parma), Italy 43029

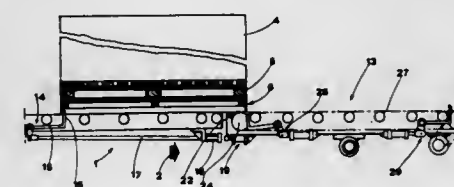
Filed Sep. 18, 1986, Ser. No. 908,577

Claims priority, application Italy, Sep. 25, 1985, 40097 A/85

Int. Cl.<sup>4</sup> B65G 37/00

U.S. Cl. 198—465.1

5 Claims



1. In a handling device for dynamic warehousing systems wherein items of merchandise are set down on bearer frames capable of travel along gravity conveying lines having rollers, the improvement comprising:

a device stationed at the end of each line, provided with a platform designed to accommodate one frame and serving to load or offload frames onto or from the line;

a plurality of frames, each comprising at least two parallel longitudinal members that sit directly on each gravity conveying line, said frames having rigidly attached stops; and

each line having detent mechanisms and each load/offload platform having devices with which said stops of said frames engage,

wherein said stops are embodied as sets of plates attached to front and rear ends of each frame, which project downward from cross members interconnecting said frame but do not

intersect the plane within which the crests of rollers incorporated in each line and the undersides of parallel longitudinal members located at the bottom of each frame are brought into contact, and wherein the stops of front and rear sets are offset longitudinally, each of the single plates extending at right angles to the axis of a relative longitudinal member, in such a way that there is no overlap of the several transverse areas occupied.

4,793,461

# CONTAINER FEED APPARATUS

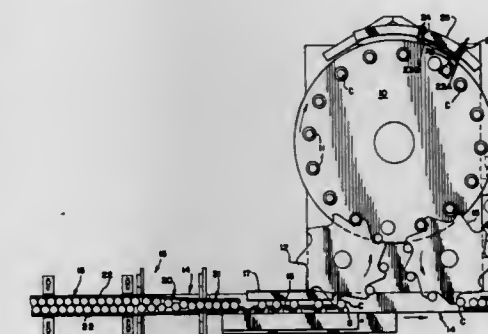
George E. Leonard, Bettendorf, Iowa, assignor to The Kartridge Pak Co., Davenport, Iowa

Filed Feb. 26, 1987, Ser. No. 19,220

Int. Cl.<sup>4</sup> B65G 43/00

U.S. Cl. 198—341

12 Claims



1. In apparatus for feeding cylindrical containers having the same diameters to a plurality of work stations spaced around the border of a turntable, said apparatus having container transfer means operatively positioned to transfer said containers sequentially from a container-receiving location adjacent to said work stations, worm feed means having a container infeed receiving end and a container discharge end operatively positioned to feed said containers sequentially to said container receiving location, and conveyor means operatively positioned to deliver said containers one-at-a-time to said container receiving end,

said conveyor means including a conveyor upper run operatively positioned to deliver upright cylindrical containers to said container receiving end, and container arranging and channeling means disposed above said upper run, said container arranging and channeling means having an elongated dual row container conveying section with fixed parallel sides communicating with a funneling section having a single file container discharge end juxtaposed to said container receiving end of said worm feed means,

said parallel sides being spaced apart a predetermined distance in relation to the diameter of said cylindrical containers which distance is less than two container diameters and greater than one container diameter whereby in passing therethrough on said upper run said containers arrange themselves into two parallel rows confined between said parallel sides with the containers in each row abutting each other at the front and rear and with each container in each of said rows engaging one of the two adjacent containers in the other row and being slightly spaced from the other of said adjacent containers, and

power means operatively connected in synchronized driving relationship with said turntable, said feed wheel and said worm feed means and operatively connected in driving relationship with said conveyor means whereby said containers tend to be delivered to said worm feed means at an appreciably faster rate than said worm feed means receives and delivers said containers to said worm feed

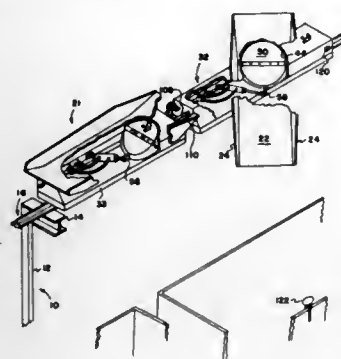


means receives and delivers said containers to said feed wheel whereby the containers in said elongated container receiving section with parallel sides exert a forward feed pressure on each container reaching said discharge end of said funneling section.

**4,793,462**  
**MATERIAL LOADING APPARATUS**  
Robert M. McFall, P.O. Box 1282, Clintwood, Va. 24228  
Filed May 11, 1987, Ser. No. 48,729  
Int. Cl.<sup>4</sup> B65G 37/00

U.S. Cl. 198—365

9 Claims



1. Apparatus for the overhead loading of one or more containers positioned on a path proximate said apparatus, said apparatus comprising support means proximate said path, transport means on said support means for carrying a plurality of gondolas mounted thereon for movement therealong, each said gondola being comprised of a body and a carriage wherein the body is formed with a substantially flat floor section extending over a major portion of the overall length of the body, and with downwardly tapered side walls adjacent one end with an upwardly slanted floor section adjacent its other end to allow the ends of in-line gondolas to vertically nest in overlapping manner and accommodate individual pivotal motion of adjacent gondola bodies, and wherein the carriage is provided with a substantially flat top extending over a substantial portion of the overall length of the carriage, the said flat floor section and flat top being adapted for slidable engagement to provide support for heavy loads, pivot means pivotally connecting said body onto said carriage, said gondolas and containers being proportioned such that each container can accommodate the simultaneous pivoting and dumping of at least two gondolas, and tipples means on said gondolas for dumping the same, wherein said flat top terminates adjacent one side portion of said carriage and joins into a downwardly slanting camming surface upon which the flat floor section of said body is adapted to slide, wherein when the tipples means pivots the flat floor section relative to the flat top the downwardly slanting camming surface permits the body to tilt to a dump position wherein the body is supported thereon.

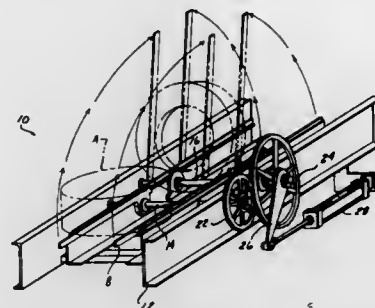
**4,793,463**  
**TURNOVER DEVICE**  
John P. Kane, Sterling Hts., Mich., assignor to Allied Automation Systems, Inc., Detroit, Mich.  
Filed Nov. 16, 1987, Ser. No. 120,936  
Int. Cl.<sup>4</sup> B65G 47/24

U.S. Cl. 198—403

11 Claims

1. A device for turning over an article as it advances through a production path comprising:  
first and second shaft means mounted in parallel relationship to each other;  
a first turning member rotationally mounted on the first shaft means for rotational movement;

a second turning member rotationally mounted on the second shaft means for rotational movement; and  
gear means including synchronously meshing first and second gears mounted respectively on said first and second shaft means for synchronizing the relative rotational movement of the first and second members with respect to each other such that the first rotational member will rotate in one rotational direction from a first, loading position,

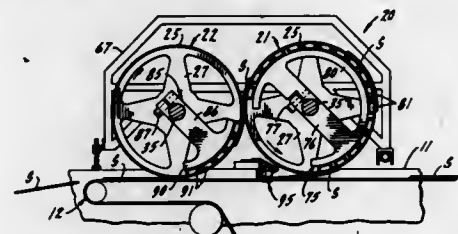


wherein it is oriented in a substantially horizontal plane, to a second, unloading position, wherein it has rotated more than 90° about the first axis, as the second member rotates in the opposite rotational direction from a first, unloaded position wherein it is oriented in a horizontal plane, to a second, loaded position, wherein it is oriented in a plane substantially parallel to the first member in the second position.

**4,793,464**  
**APPARATUS FOR INVERTING STRIPS OF SHEET MATERIAL**  
Chester M. Wieg, Lincolnwood, Ill., assignor to F. J. Littell Machine Company, Chicago, Ill.  
Filed Mar. 14, 1983, Ser. No. 474,832  
Int. Cl.<sup>4</sup> B65G 29/00

U.S. Cl. 198—404

6 Claims

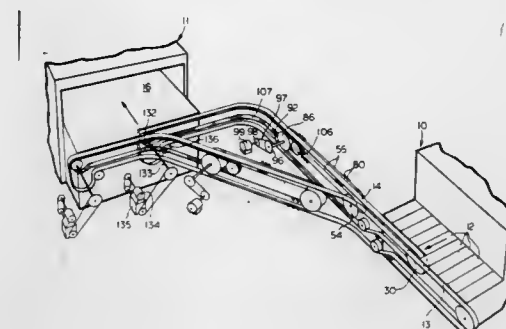


4. An apparatus for inverting strips of sheet metal comprising:  
(a) means for feeding said strips of metal;  
(b) a pair of rotating drums having closely adjacent portions;  
(c) means for establishing a magnetic field on the surfaces of said drums; and  
(d) said feeding means feeding said strips of sheet metal into engagement with the surface of one of said drums whereby said strips rotate with said one drum, are transferred directly to the other of said drums at said closely adjacent portions, and are delivered back to said feeding means in inverted fashion.

**4,793,465**  
**BOTTLE CONVEYING SYSTEM**  
Frank J. DiFrank, Toledo, Ohio, assignor to Owens-Illinois Glass Container Inc., Toledo, Ohio  
Filed Jul. 30, 1987, Ser. No. 79,561  
Int. Cl.<sup>4</sup> B65G 47/26

U.S. Cl. 198—432

8 Claims

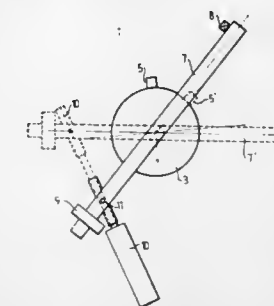


1. Apparatus for conveying bottles from a glass forming machine to a lehr comprising, an endless, flexible, link-belt conveyor, a first drive means for engaging the ends of horizontal pins in said conveyor to move the conveyor past the line of forming machines to receive and transport the bottles in single file at a first linear velocity while resting thereon, a second drive means for engaging the conveyor and driving the conveyor at a second linear velocity, said second drive means moving the conveyor around a curve and past the loading end of a lehr, second drive means being driven at a lesser speed than first whereby the pins which hold the links in the conveyor are moved into closer relationship after the bottles are positioned thereon to thereby move the bottles closer together as the second drive means moves the conveyor and bottles in front of the lehr, and means for guiding the link-belt conveyor in its return to the position in front of the line of forming machines.

**4,793,466**  
**DEVICE FOR DETECTING A SHEET OF GLASS**  
Jean-Marc Petitcollin, Thourrotte, and Francis Perin, Nevers, both of France, assignors to Saint-Gobain Recherche, Aubervilliers, France  
Filed Sep. 16, 1986, Ser. No. 907,789  
Claims priority, application France, Sep. 18, 1985, 85 13801  
Int. Cl.<sup>4</sup> B65G 43/08, 13/02

U.S. Cl. 198—502.3

5 Claims



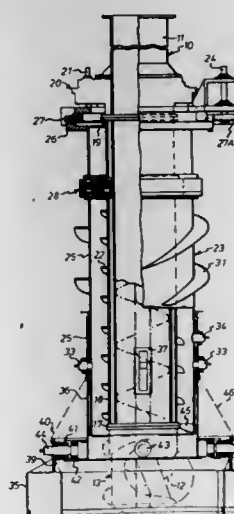
1. A device for detecting a sheet of glass being carried on a conveyor comprised of a plurality of rollers, said device comprising a detector finger mounted on one of said rollers termed the detector roller, the movement of which is independent of that of the remaining rollers, which said detector finger in its active position projects above the plane of the conveyor, means for retracting the detector finger consisting of a jack

articulated on a lever arm, which lever arm connects said detector finger to a proximity detector for registering the movement of the detector finger under the action of the sheet of glass which has been heated to its softening temperature.

**4,793,467**  
**APPARATUS FOR UNLOADING BULK MATERIAL**  
Robert Johansson, Viken, and Lennart Tingakog, Helsingborg, both of Sweden, assignors to Consilium Materials Handling Marine AB, Bjuv, Sweden  
PCT No. PCT/SE87/00049, § 371 Date Oct. 19, 1987, § 102(e) Date Oct. 19, 1987, PCT Pub. No. WO87/04996, PCT Pub. Date Aug. 27, 1987  
PCT Filed Feb. 4, 1987, Ser. No. 112,836  
Claims priority, application Sweden, Feb. 21, 1986, 8600805  
Int. Cl.<sup>4</sup> B65G 65/16

U.S. Cl. 198—518

6 Claims



1. An apparatus for unloading bulk material from ships in particular, said apparatus comprising a vertical conveyor and a horizontal conveyor connected thereto, said vertical conveyor being provided at its feeding end with a rotary feeding device for feeding the bulk material into the vertical conveyor, the apparatus also comprising a rotatable material supply device adapted to supply material to the feeder and operable by means of a driving motor at a speed adapted to the supply of material to said feeder, characterized in that the material supply device has a material draw-in device surrounding the feeder and having at least one helical wing which is adapted to convey bulk material in a substantially radial inward direction toward said feeder and which is connected with the motor of the material supply device by a driving pipe surrounding the supporting pipe of the feeder, and that said material draw-in device is connected to said driving pipe by means of a gimbal joint to be universally tiltable relative to said driving pipe, said feeder and said vertical conveyor.

4,793,468

**MULTIPHASE SLIDING FLOOR FOR CONTINUOUS MATERIAL MOVEMENT**

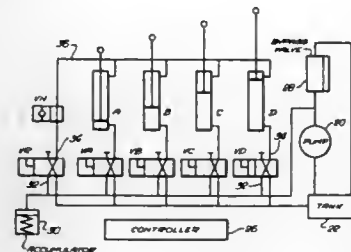
James M. Hamilton, El Cajon, and Phillip J. Sweet, Fresno, both of Calif., assignors to Western Waste Industries et al., Gardena and American Carrier Equipment Incorporated, Fresno, both of, Calif.

Filed Oct. 31, 1986, Ser. No. 926,366

Int. Cl.<sup>4</sup> B65G 25/04

U.S. Cl. 198—750

24 Claims



1. A system for moving a load supported by a floor, comprising:

a plurality of elongated floor slats movable in a direction parallel to the slats; and  
means for moving the slats in a reciprocating manner such that, at any instant during operation of the system, a majority of the slats are moving in a desired direction at a predetermined speed, and a minority of the slats are moving in the opposite direction at a higher speed, whereby, the load supported by the floor will tend to move in the direction of the majority of slower moving slats;

and wherein  
the slats are arranged in a plurality (N) of groups, which are interlaced such that no group contains adjacent slats;

the means for moving the slats includes a plurality (N) of individually controllable actuators for controlling the movement of each of the groups;

(N-1) of the groups of slats are moved in the desired direction at the same time, while the remaining one of the groups is moved in the reverse direction at (N-1) times the speed of the (N-1) majority of the groups; as each group moving in the desired direction reaches the end of its travel in that direction, it is selected as the group to be moved in the reverse direction;

each of the individually controllable actuators includes a hydraulic cylinder and an associated valve; and  
the means for moving the slats also includes means for controlling the valves in a sequence such that, at any time, fluid from (N-1) cylinders moving the (N-1) groups in the desired direction is communicated with the one remaining cylinder to move one group of slats in the reverse direction.

4,793,469

**REDUCED SIZE DRIVE/FRAME ASSEMBLY FOR A RECIPROCATING FLOOR CONVEYOR**

Raymond K. Foster, P.O. Box 1, Madras, Oreg. 97741  
Division of Ser. No. 477,767, Mar. 22, 1983, abandoned. This application Apr. 24, 1987, Ser. No. 42,328

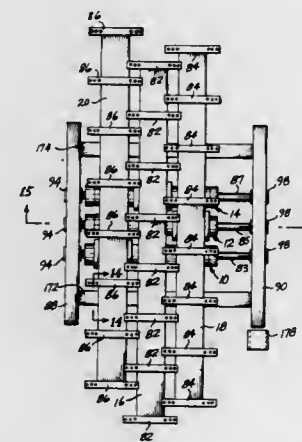
Int. Cl.<sup>4</sup> B65G 25/04

U.S. Cl. 198—750

33 Claims

1. For use in a reciprocating floor conveyor of a type comprising a plurality of floor slat members mounted adjacent to each other for longitudinal reciprocation, and divided into sets, a hydraulic assembly for moving all of the floor slat members together in one direction, for advancing a load, and for retracting them in the opposite direction, one set at a time, characterized by:

a pair of spaced apart end frame members which extend transversely of the conveyor;  
a plurality of transverse drive beams, one for each set of floor slat members, each transverse drive beam including means for connecting it to its set of floor slat members;  
a plurality of reversible linear hydraulic drive units, each drive unit comprising fixed piston rod means having two opposite end mounting portions, piston head means fixed in position on the piston rod means, and a cylinder body mounted to reciprocate back and forth along said piston rod means, said cylinder and said piston head means together defining variable volume fluid chambers;  
said drive units being positioned to place the cylinder bodies directly below the transverse drive beams;



means securing the opposite end mounting portions of the piston rod means to the end frame members;  
a pair of longitudinal beams positioned laterally outwardly adjacent the drive units, and structurally interconnecting the two end frame members; and  
means connecting each cylinder body to a related transverse drive beam comprising an upper clamp member attached to the transverse drive beam and having a lower portion shaped to engage the cylinder body, a lower clamp member having an upper portion shaped to engage the cylinder body, and removable connectors for detachably securing the two clamp members together; and  
wherein in use said transverse drive beams are moved by said drive units back and forth within a space between the two end frame members.

4,793,470

**CONVEYOR BELT CRADLE ASSEMBLY**

Sven E. Anderson, Sandy, Utah, assignor to Baker International Corporation, Orange, Calif.

Filed Jul. 14, 1986, Ser. No. 885,215

Int. Cl.<sup>4</sup> B65G 15/08

U.S. Cl. 198—823

6 Claims



1. An outboard subassembly of bar-like support members adapted to interact with a main support member to form a cradle for a conveyor belt, said outboard subassembly comprising:

4,793,472

**CONVEYOR, IN PARTICULAR FOR OBJECTS SUSPENDED FROM HANGERS**

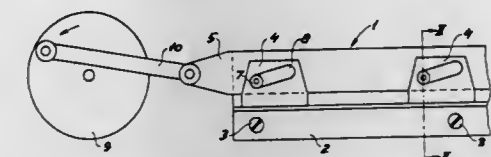
Jorgen Solund, Tappernøje, Denmark, assignor to ITS-Intern Transport System A/S, Tappernøje, Denmark  
PCT No. PCT/DK86/00117, § 371 Date May 27, 1987, § 102(e) Date May 27, 1987, PCT Pub. No. WO87/02339, PCT Pub. Date Apr. 23, 1987

PCT Filed Oct. 15, 1986, Ser. No. 64,942

Claims priority, application Denmark, Oct. 16, 1985, 4727/85 Int. Cl.<sup>4</sup> B65G 25/00

U.S. Cl. 198—774

8 Claims



1. A conveyor for conveying objects suspended from hangers, said conveyor comprising:

a cross-sectionally U-shaped stationary means having an upwardly facing opening;  
rod-shaped member reciprocally mounted within said stationary means;

an operating mechanism for reciprocating said rod-shaped member;

coupling means for lifting said rod-shaped member upwardly such that an upper edge thereof extends above the opening of said stationary means upon movement in a forward direction and for lowering said rod-shaped member such that the upper edge is lowered below the opening upon movement in a rearward direction, said coupling means comprising U-shaped slide members having an upwardly facing opening, said slide members being slidable in the longitudinal direction of said stationary means upon overcoming frictional forces, said slide members accommodating the movable rod-shaped member and having means which are inclined with respect to the direction of elongation of the rod-shaped member, said inclined means being shorter than the stroke of said rod-shaped member during its reciprocating movement; and  
projections secured to said rod-shaped member and adapted to cooperate with said inclined means, said slide members only being movable relative to said stationary means after said operating mechanism has moved said rod-shaped member and said projections the length of said inclined means.

4,793,471

**FURNACE GRATE STRUCTURE**

Martin Bartels, Stuttgart, Fed. Rep. of Germany, assignor to Deutsche Richard Kablitz Gesellschaft für Ökonomie der Dampferzeugungskosten und Feuerungskontrolle Richard Kablitz GmbH & Co. KG, Fed. Rep. of Germany

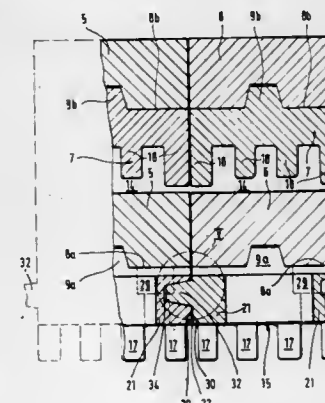
Filed Apr. 8, 1987, Ser. No. 36,109

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1986, 3612391

Int. Cl.<sup>4</sup> B65G 25/00

U.S. Cl. 198—774

12 Claims



1. A furnace grate structure for conveying combusting solid fuel in a direction of conveyance, said structure comprising:

a plurality of grate bars for supporting the solid fuel, said grate bars extending substantially parallel to each other and substantially in said direction of conveyance, each of said grate bars having two ends;

a plurality of grate beams supporting said ends of said grate bars, said grate beams extending substantially parallel to one another and substantially transversely to said direction of conveyance and supported on a substructure;

at least one of said grate beams comprising a plurality of grate beam sections, each beam section having two ends, each end having an end surface, said grate beam sections being arranged end to end on said substructure to form one of said grate beams having gaps between adjacent grate beam sections, said gaps being covered by covering means;

characterized in that at least one of said end surfaces of at least one of said grate beam sections has at least one recess to receive said covering means.

4,793,473

**CHAIN CONVEYOR ASSEMBLY**

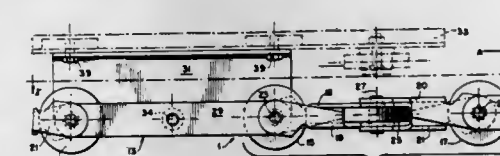
William H. Gilgore, York, Pa., and Gary A. Messerly, Richardson, Tex., assignors to Teledyne, Inc., Los Angeles, Calif.

Filed Sep. 15, 1987, Ser. No. 96,490

Int. Cl.<sup>4</sup> B65G 39/20

U.S. Cl. 198—845

15 Claims



1. A chain conveyor assembly comprising:

A. A conveyor chain formed of a series of wheel units, each wheel unit having first and second single wheels journaled to a first end of each link of a respective first and second



pair of pivot links for rotation about an axis extending normal to a direction of chain movement within a plane extending parallel to said direction of chain movement, and a third single wheel journaled to a second end of each link of both of said pairs of pivot links for rotation about an axis extending normal to both said plane and the direction of chain movement, each wheel unit of said series of wheel units being linked, in said direction of chain movement, to a preceding and a succeeding wheel unit by drive link means, said drive link means including a rigid upper drive link and a rigid lower drive link, both of which are pivotally connected at opposite ends thereof at the axis of rotation of a respective first single wheel and second single wheel of the preceding and succeeding wheel units, and said upper and lower drive links being rigidly interconnected to each other intermediate said opposite ends by a drive lug;

- B. guide track means for providing surfaces upon which said first, second and third wheels ride;  
C. drive means for driving said conveyor chain by engaging said drive lug; and  
D. self-supporting tray means for conveying of articles thereon, each said tray means being coupled to a said drive link means.

4,793,474

#### CONTROLLED DELIVERY AGRICULTURAL CAPSULE AND METHOD OF MAKING

Cyril F. Drake, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

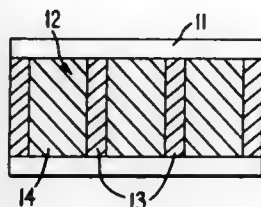
Filed Mar. 3, 1982, Ser. No. 354,442

Claims priority, application United Kingdom, Mar. 5, 1981, 8107005

Int. Cl.<sup>4</sup> A01M 25/00; B65B 9/10

U.S. Cl. 206—0.5

5 Claims



1. An agricultural capsule for the controlled release of an active material selected from the group consisting of an insecticide, a nematocide, a molluscicide, a fungicide, a fertilizer, a pest attractant and mixtures thereof, said capsule comprising a water insoluble plastic tube, a plurality of spaced water soluble glass cylindrical partition bodies positioned in said tube, said glass containing phosphorus pentoxide or boric oxide as its principal glass forming oxide, said glass partition bodies dividing the tube bore into a plurality of hermetically sealed compartments, each compartment containing said active material, at least one wall of each compartment being said glass partition, the outer wall of each compartment being said insoluble tubing, and wherein the dissolution rate of the glass bodies is such that, when the capsule is contacted with water or moisture, the glass bodies dissolve over a period of time to release the active material contained in the compartments.

5. A method of making a capsule for the controlled release of an active material selected from the group consisting of an insecticide, a nematocide, a molluscicide, a fungicide, a fertilizer, a pest attractant and mixtures thereof said method including extruding a water insoluble plastic tube, and simultaneously filling the tube bore with water soluble glass cylindrical partition bodies interposed with measured quantities of active material, said glass containing phosphorus pentoxide or boric oxide as its principal glass forming oxide, said glass partition bodies being of substantially the same diameter as the bore to provide

a tube having a plurality of hermetically sealed compartments each of which contains the active material, and cutting said filled tube into portions each of which contains a plurality of said compartments.

4,793,475

#### CLOSURE CAPS FOR TWO-COMPONENT PACKAGING SYSTEMS

Hanshelmut Itzel, Gan-Algeheim, Fed. Rep. of Germany, assignor to Celamereck GMBH & Co. KG, Ingelheim am Rhein, Fed. Rep. of Germany

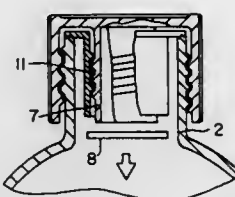
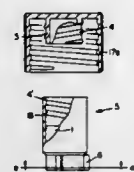
Continuation of Ser. No. 823,154, Jan. 27, 1986, abandoned. This application Jan. 6, 1987, Ser. No. 677

Claims priority, application Fed. Rep. of Germany, Jan. 26, 1985, 3502580

Int. Cl.<sup>4</sup> B65D 81/32

U.S. Cl. 206—221

9 Claims



1. A binary package comprising a container having a threaded bottle neck (2) and adapted to receive a diluent, an inner container (5) forming a reservoir adapted to receive a concentrate (1) which is to be admixed in situ with said diluent, and a threaded closure cap threadably engaging said bottle neck (2), said closure cap having a base, a bottle thread (17a) for engaging the bottle neck (2) and a collar (3) extending radially into the bottle neck (2) from the base of the closure cap, said collar having a collar thread (4) for receiving the inner container (5) and a lower end in the form of an abutment edge (7), the inner container (5) having a flat base (8) and having a weakened line (10), the bottle neck (2) and the inner container (5) both having inner and outer walls, the inner wall of the bottle neck (2) having at least one rotation block (6'), and the outer wall of the inner containers having at least one rotation block (6), said rotation blocks (6,6') cooperating between the outer wall of the inner container (5) and the inner wall of the bottle neck (2) to prevent free rotation of the inner container (5) in at least one direction of rotation, whereby when the binary package is closed the abutment edge (7) rests on the base of the inner container (5), and when the closure cap is rotated further in the direction of closure of the collar thread (4), the inner container is severed along the weakened line (10).

5. A binary package comprising a container having a threaded bottle neck (2) and adapted to receive a diluent, an inner container (5) forming a reservoir adapted to receive a concentrate (1) which is to be admixed in situ with said diluent, and a threaded closure cap threadably engaging said bottle

neck, said closure cap having a base, a bottle thread (17a) for engaging the bottle neck (2) and a collar (3) extending radially into the bottle neck (2) from the base of the closure cap, said collar having a collar thread (4) for receiving the inner container (5), the bottle neck (2) and the inner container (5) both having inner and outer walls, the inner wall of the bottle neck (2) having at least one rotation block (6') and the outer wall of the inner container (5) having at least one rotation block (6), said rotation blocks (6,6') cooperating the outer wall of the inner container (5) and the inner wall of the bottle neck (2) to prevent free rotation of the inner container (5) in at least one direction of rotation, where the collar thread (4) and the bottle thread (17a) have different directions of rotation.

4,793,476

#### DEVICE FOR DISPENSING A CONCENTRATE INTO A LIQUID WITHOUT EXPOSING THE CONCENTRATE TO THE ATMOSPHERE

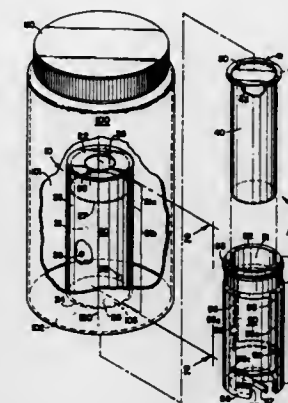
Earl H. Schrupp, 3740 Tonkawood Rd., Minnetonka, Minn. 55345, assignor to Earl H. Schrupp, Minnetonka, Minn.

Filed Mar. 30, 1988, Ser. No. 175,148

Int. Cl.<sup>4</sup> B65D 81/32

U.S. Cl. 206—222

9 Claims



1. A device for dispensing a substance into a liquid, which comprises:

- a jacket defining a right circular cylindrical cavity and having, a perforate top, an open bottom, a side wall, and an inner side wall surface;
- a cylindrical container for retaining the substance to be dispensed; the container sized to fit within the cavity defined by the jacket and having, an open top, a bottom, a longitudinal axis, a side wall, and an outer side wall surface;
- a means for opening the container when the top of the container is sealed; the opening means unsealing the container only when the container is substantially completely inserted into the cavity defined by the jacket and the container is rotated about its longitudinal axis relative to the jacket;
- a means for sealing a gap between the outer surface of the container wall and the inner surface of the jacket wall after the container is inserted an established distance into the cavity defined by the jacket; the sealing means sealing the gap prior to the opening means unsealing the container; and
- a graspable element coupled to the container which allows the container to be manipulated when the container is retained within the cavity defined by the jacket.

4,793,477

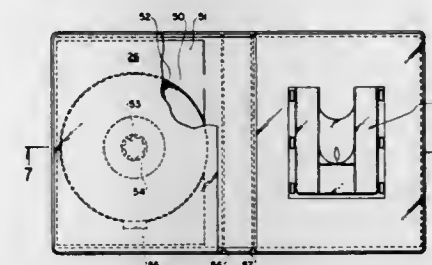
BOOK CARRIER FOR CASSETTE AND COMPACT DISC  
Larry F. Manning, 4706 Kester, Sherman Oaks, Calif. 91403,  
and Theodore Tobias, 455 Martin La., Beverly Hills, Calif. 90210

Filed Oct. 26, 1987, Ser. No. 112,692

Int. Cl.<sup>4</sup> B65D 85/57, 85/672

U.S. Cl. 206—232

1 Claim



1. A folder or carrier simulating a book cover for holding a tape cassette or cartridge comprising the combination of:  
an elongated rectangular backing sheet of transparent material having opposite end portions separated by an elongated flat central strip defined by parallel spaced apart score lines so that said backing sheet end portions fold over upon themselves about said respective score lines aligning the peripheral edges of said backing sheet end portions together to represent the cover of a book;  
a pair of front sheets carried against each of said backing sheet end portions secured to said peripheral edges thereof with unsecured edges opposing each other so as to constitute a pair of open pockets facing each other in opposing relationship;  
an elongated rectangular sheet of foldable material having indicia thereon visually displayed through said end portions and central strip of said backing sheet and further having opposite ends insertably disposed within said pair of pockets wherein said sheet of foldable material is conformal in shape and configuration with said backing sheet;  
an elongated pouch attached to one of said front sheets having an open end for slidably receiving said cassette or cartridge;  
said pouch having a rigid sidewall upstanding from said front sheet on which it is attached so that said pouch has a predetermined thickness;  
said central strip having a width substantially equal to said pouch sidewall thickness to separate said backing sheet end portions when folded over upon themselves so that said backing sheet end portion peripheral edges are aligned and conformal;  
said pouch having an open cavity for insertably receiving said cassette or cartridge;  
said pouch having a top sheet of material having its edge secured to the edge of said sidewall;  
said pouch top sheet configured to conform to the shape and configuration of said cassette or cartridge;  
a cantilevered protrusion carried on said top sheet projecting into said cavity for yieldable interference with said cassette or cartridge;  
each of said backing sheet end portions terminating their outer ends with squared corners;  
said squared corners of each end portion connected together by a straight edge;  
said end portion straight edges being arranged in parallel spaced apart relationship and in alignment when said end portions are folded over;  
a compact disc having recorded data on both sides thereof;  
a movable carrier releasably retaining said disc and slidably disposed within a selected one of said pockets adapted to pass through its elongated opening for access to said disc;

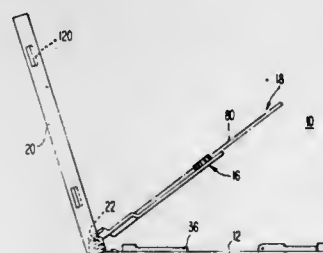
said carrier substantially occupying said selected pocket to totally protect said compact disc;  
said carrier having a recess for storage of said disc and being of greater depth than the thickness of said disc so that an upper surface of said disc is in spaced-apart relationship with respect to said front sheet of said pocket; and resilient retention means mounted on said carrier for yieldably holding said disc on said carrier.

**4,793,479**  
**HOLDER TRAY OF A COMPACT DISC**  
Chusaburo Otsuka, and Toshitsugu Yajima, both of Saitama, Japan, assignors to Shin-Estu Polymer Co., Ltd., Tokyo, Japan  
Filed Mar. 30, 1988, Ser. No. 175,243  
Claims priority, application Japan, Apr. 4, 1987, 62-50315  
Int. Cl.<sup>4</sup> B65D 85/57  
U.S. Cl. 206—310 2 Claims



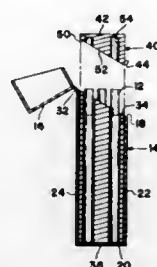
1. A holder tray of a compact disc which is a generally flat, integrally shaped body made of a rigid plastic resin provided with (a) a circular center opening, (b) a pushing part raised above the surface of the body of the tray to form a space for pushing stroke below the lower surface thereof and coaxially positioned with the circular center opening, (c) a plurality of radially arranged connecting pieces each in a cranked form composed of a lower flat part connected to the periphery of the center opening, upper flat part connected to the periphery of the pushing part and a riser part connecting the lower and upper flat parts, the riser parts of the plurality of the radially arranged connecting pieces collectively forming an approximately cylindrical surface, and (d) a plurality of radially arranged flap pieces each cantilevered at the periphery of the pushing part and positioned between two connecting pieces.

**4,793,480**  
**STORAGE CONTAINER FOR A RECORDING MEDIUM WITH A PIVOTALLY MOUNTED TONGUE**  
Anthony L. Gelardi; John Gelardi, both of Cape Porpoise; Richard Rolfe, Biddeford, all of Me.; Alan B. Lowry, Canton, Mass., and Craig Lovecky, Old Orchard Beach, Me., assignors to Shape Inc., Biddeford, Me.  
Filed Dec. 16, 1986, Ser. No. 942,266  
Int. Cl.<sup>4</sup> B65D 85/57  
U.S. Cl. 206—312 17 Claims



1. A storage container for receiving a compact disc, comprising:  
(a) a base;  
(b) a recording medium holder having means for holding the compact disc at a center hole of the compact disc and being pivotally attached at a first end thereof to a first end of the base such that a second, free end thereof is adapted for movement between a first position and a second position;  
wherein the means for holding includes a pivotally mounted tongue having a portion which partially receives the center hole in the compact disc,  
(c) a cover movable relative to the base and holder and being pivotally attached at a first end thereof to the first end of the base; and

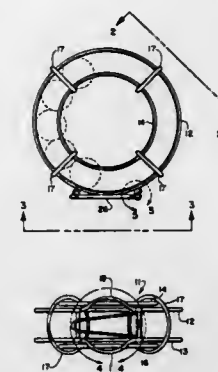
**4,793,478**  
**CIGARETTE PACKAGE AND THE LIKE**  
Thomas T. Tudor, Crestwood, Ky., assignor to Brown & Williamson Tobacco Corporation, Louisville, Ky.  
Filed Jan. 24, 1987, Ser. No. 65,546  
Int. Cl.<sup>4</sup> B65D 85/10  
U.S. Cl. 206—256 3 Claims



1. A cigarette package for containing a plurality of cigarettes comprising:  
a box having a closed bottom end, a front wall extending upwardly from the bottom end, a rear wall in spaced apart parallel relationship to the front wall and extending upwardly from the bottom end, the front wall of the box is at a lower elevation than the top edge of the back wall, two spaced apart, parallel side walls perpendicular to and interconnecting the front and rear walls, and an open top;  
a box cover hinged to the rear wall of the box for pivotal movement between a closed position covering the open top of the box and an open position away from the open top of the box; and  
a cigarette holding block section fitted within the box with the top end of the block section located at the open top end of the box being slanted downwardly from the rear wall of the box to the front wall of the box, the block section being formed with a plurality of generally cylindrical, spaced apart, parallel cigarette receiving bores with the longitudinal axes of the bores being generally parallel to the walls of the box, the bores extend entirely through the block section and are open to both the top end of the block section and the bottom end of the block section, having an open end open to the top end of the block section, the cylindrical bores are arrayed in parallel rows extending along the width of the block section, the bores of each row are staggered with respect to the bores of the adjacent rows, and the height of the block section measured from the bottom end to the top end being less than the length of a cigarette contained in the bores so that each of the cigarettes rest at its bottom end on the bottom end of the box and protrudes from the open ends of the bores above the top end of the block section.

(d) means for actuating movement of the holder relative to the base,  
whereby, when the cover is pivoted relative to the base, the actuating means causes the holder to move from the first position to the second position and to present the recording medium for use away from the base and the tongue pivots so that the portion thereof no longer partially receives the center hole of the compact disc.

**4,793,481**  
**BALL CARRIER**  
Redell Randle, 156 W. Chaslor Ave., Richmond, Calif. 94801  
Filed May 23, 1988, Ser. No. 197,425  
Int. Cl.<sup>4</sup> B65D 85/58  
U.S. Cl. 206—315.9 8 Claims

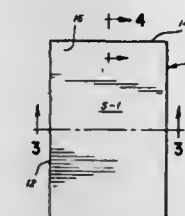


1. A carrier for holding a plurality of baseballs or the like comprising a continuous raceway of generally toroidal configuration having means to confine a plurality of balls for rolling motion over a predetermined endless path, means for permitting visual examination of the plurality of balls confined in said raceway, and gate means along a minor portion of said toroidal configuration of only said raceway for admitting balls thereto and for removing individually selected balls therefrom wherein a ball selected after visual examination may be individually located said gate means for removal without prior removal of other balls.  
7. A carrier for holding a plurality of baseballs or the like comprising a continuous raceway adapted to confine a plurality of balls for rolling motion over a predetermined endless path, and gate means along said raceway for selectively admitting balls thereto and removing balls therefrom, wherein said raceway is defined by a plurality of substantially endless spaced apart rods along which said balls can ride in engagement therewith, said rods comprising two pairs respectively defining the exterior periphery and inner periphery of said raceway, wherein said pair of rods defining the inner periphery of said raceway are spaced apart from one another transversely by a distance greater than the corresponding spacing between the pair of rod defining the exterior periphery.

**4,793,482**  
**ONE-PIECE SHIM PACK**  
Gary L. Workman, Lombard, Ill., assignor to Deslauriers, Incorporated, Bellwood, Ill.  
Filed Nov. 25, 1987, Ser. No. 125,147  
Int. Cl.<sup>4</sup> B65D 85/48  
U.S. Cl. 206—343 11 Claims

1. A shim pack having a plurality of multi-sided generally rectangular shims wherein less than all of the shims can be used to provide a desired usable height of the shim pack determined by the shims remaining in the pack, the improvement wherein the shim pack is of a one-piece construction having a plurality of stacked individual shims bonded together along substantially the entire length of two sides extending from a common

corner of the shims in order to securely hold the shims in associated relation while still enabling the peeling of one or



more shims from the pack to achieve the desired height for the shim pack.

**4,793,483**  
**TRAY FOR SURGICAL PATTIES**  
June S. Holmes, 4113 Devonshire Dr., Moss Point, Miss. 39501  
Filed Apr. 27, 1988, Ser. No. 186,629  
Int. Cl.<sup>4</sup> B65D 85/24  
U.S. Cl. 206—363 4 Claims



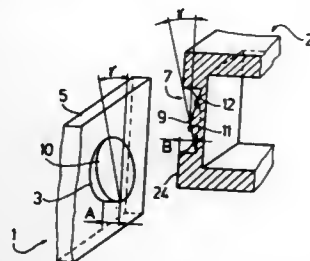
1. A tray for surgical patties comprising:  
a. an impervious, autoclavable planar sheet having a first upper section extending from an upper edge to a fold;  
b. said edge having a plurality of inward, V-shaped extensions;  
c. each said extension defining a notch having a wider throat and a narrower base;  
d. each said extension having substantially smooth edges;  
e. a second planar base section extending outward from the fold at an acute angle to the first section, having a length adapted to the length of a typical provided surgical patty;  
f. a retention lip arising at a substantial acute angle from the base section distal the first section; and  
g. non-penetrating means, at a first and a second upper corner of the first section for fastening the tray to a surgical drape proximate the operating area.

**4,793,484**  
**BOX-SHAPED CONTAINER FOR ARTICLES**  
Klaus Schoettle, Heidelberg, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany  
Filed Oct. 31, 1986, Ser. No. 925,213  
Claims priority, application Fed. Rep. of Germany, Nov. 6, 1985, 8531274[U]  
Int. Cl.<sup>4</sup> B65D 85/672  
U.S. Cl. 206—387 9 Claims

1. A box-shaped container for articles, in particular recording media, comprising a bottom part having a rear wall, a base wall and side walls, a lid part having at least one lid wall and lid side walls, at least slight initial tension being present between the lid side walls and the side walls of the bottom part, and joint means and rotation-restricting means provided on said side walls, wherein the joint means and rotation-restricting



means are in the form of a unit on each side of the container, wherein said unit consists of a joint projection having a free end and a recess therefor having a bottom and wherein said free end comprises an oblique surface which oblique surface forms an angle gamma of from 8° to 45° with the side wall surface from which the said joint projection extends and said



bottom in said recess is provided with two oppositely inclined bottom relief surfaces intersecting in a ridge and falling away on the two sides of said ridge, said two oppositely inclined relief surfaces forming approximately the same angle gamma of inclination of from 8° to 45° with the side wall surface in which the said recess is located.

4,793,485

# WRAPPER FOR RIBBON TYPE METAL COIL AND PROCEDURE FOR FORMING IT

Luigi Bertolotti, S. Giovanni Valdarno, Italy, assignor to Bertolotti S.p.A., Incisa Valdarno and Nuova Italsider S.p.A., Genoa, both of Italy

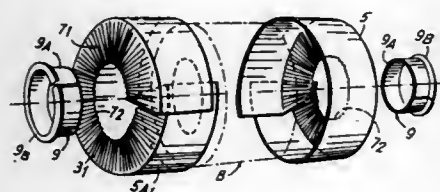
Continuation of Ser. No. 836,317, Mar. 5, 1986, abandoned. This application Nov. 23, 1987, Ser. No. 124,415

Claims priority, application Italy, Mar. 15, 1985, 9362 A/85; Dec. 20, 1985, 9549 A/85

Int. Cl.<sup>4</sup> B65D 85/66

U.S. Cl. 206—397

7 Claims



1. In combination, an individual ribbon coil of metal sheeting, a protective wrapper of metal sheeting to protect the coil from damage and from atmospheric corrosive agents comprising, two separate discoidal end caps for completely enclosing the coil circumferentially and axially and each having a cylindrical band defining a sleeve and an annular, radially inwardly projecting end flange and an opposite end of the band being open, the discoidal end caps being disposed on the coil on opposite ends thereof with the corresponding bands circumferentially of the coil extending toward each other, each band having a width greater than half the axial length of the coil so that the marginal edges at the open end of the bands overlap circumferentially and axially disposed on the coil, the end flange of each cap having a radial extent inwardly toward the center of the coil at least equal to the radial thickness of the coil, each end flange having flexible corrugations disposed radially from the center of the coil, the depth of which increases progressively toward the center of the coil, and the protective wrapper discoidal end caps being made of metal sheeting from rejected ribbon coil metal sheeting similar in dimension to the metal sheeting of the individual coil being

protected, whereby the coil is housed internally of the two sleeves each with one end open and an opposite end partially closed by a corresponding flange capping the opposite ends of the coil to effectively protect the turns of the coil.

4,793,486

# PROTECTIVE BAG FOR WATER-SENSITIVE MEDICAL OR ELECTRONIC APPARATUS

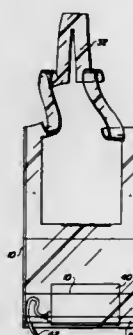
April A. Konopka, San Dimas, and John H. Livingston, Santa Monica, both of Calif., assignors to Facesetter Infusion, Ltd., Sylmar, Calif.

Filed Jun. 11, 1986, Ser. No. 873,237

Int. Cl.<sup>4</sup> A61B 19/02; B65D 85/38, 30/10; B31B 1/76

U.S. Cl. 206—438

19 Claims



1. A protective, water-resistant bag for temporarily storing a small medical or electronic apparatus which apparatus is sensitive to water damage, said apparatus being connected to a tube or cord leading from said apparatus to the user of said apparatus, said bag comprising:

- a pouch formed by a first segment of thin material having a flap attached to the bottom edge thereof and folded upward therefrom, said flap not extending to the top edge of said first segment of thin material, said apparatus being stored in said pouch prior to entry into a wet environment;
- a second segment of thin material sealingly attached at the top edge thereof to said top edge of said first segment of thin material, said second segment of thin material extending downwardly over at least a portion of said flap, the sides of said first and second segments of thin material being sealingly attached together, thereby sealing said pouch save for an opening between said second segment and said flap and shielding said apparatus from a wet environment, said tube or cord extending from said apparatus in said pouch over said flap and between said flap and said second segment of thin material, said tube or cord thereby extending out of said bag;
- adhesive sealing means for removably sealing said second segment of thin material to said flap around a portion of said tube or cord located between said flap and said second segment of thin material, thereby making said pouch water-resistant; and
- means for supporting said pouch and said first and second segments of thin material, said supporting means being attached to the top edges of said first and second segments of thin material.

19. A method of making a protective, water-resistant bag for temporarily storing a small medical or electronic apparatus which apparatus is sensitive to water damage, said apparatus being connected to a tube or cord leading from said apparatus to the user of said apparatus, said method comprising:

- providing a rectangular sheet of thin, flexible material having a top edge and a bottom edge, and two side edges;
- folding a flap of said sheet including said bottom edge up to form a first fold;

folding said sheet to bring said top edge down to a location near to the bottom of said flap to form a second fold; sealing together across the width of said sheet to form a first seam between a portion of said sheet located between the two folds and above said flap, and a portion of said sheet between said second fold and said top edge, thereby forming below said first seam a pouch between said first seam and said first fold, which pouch is covered by the portion of said sheet between said first seam and said top edge, said apparatus being stored in said pouch prior to entry into a wet environment;

sealing the sides of said sheet to enclose said pouch and shield said apparatus from a wet environment, said tube or cord extending from said apparatus in said pouch over said flap and between said flap and the portion of said sheet adjacent the said top edge, said tube or cord thereby extending out of said bag;

providing adhesive sealing means on said top edge to removably seal said top edge to said flap around a portion of said tube or cord located between said flap and said segment, thereby making said pouch water-resistant; and providing in the portion of said sheet above said first seam means for supporting said pouch around the neck of a user of said enclosure.

4,793,487

# DISPENSING OF BAGS INITIALLY JOINED HEAD-TO-HEAD

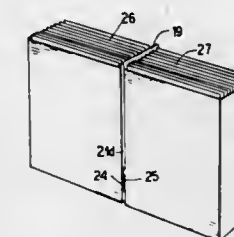
Per Bentsen, Suffern, N.Y.; Robert S. Nocek, Stamford, Conn., and Steven Ausmit, New York, N.Y., assignors to Minigrip, Inc., Orangeburg, N.Y.

Filed Oct. 3, 1986, Ser. No. 914,930

Int. Cl.<sup>4</sup> B65D 85/48, 3/26

U.S. Cl. 206—451

6 Claims



1. A container dispenser assembly comprising in combination:
  - an elongate rectangular container dispenser having continuous flat side walls and defining opposite end sections of the container;
  - first and second stacks of flat dispensable bags with one stack in one end section of the container and a second stack in the other end section of the container with the stacks located in parallel relationship and their top ends adjacent each other at the meeting of the sections of the container with the container holding the bags in their stacked relationship;
  - a fold line extending across one wall of the container in alignment with the top ends of the bags; and
  - means defining parallel tear lines with a tear strip therebetween and extending across the remaining container walls at the location of the top ends of the bags and joining the ends of the fold line so that the container walls may be separated by tearing said strip along the tear lines to expose the top ends of the bags to extend exposed a substantial distance above the tear lines when the container sections are folded toward one another at said fold line for facilitating individual removal of the bags from the container sections by grasping the upwardly extending exposed ends of the bags.

4,793,488

# PACKAGE FOR SEMICONDUCTOR WAFERS

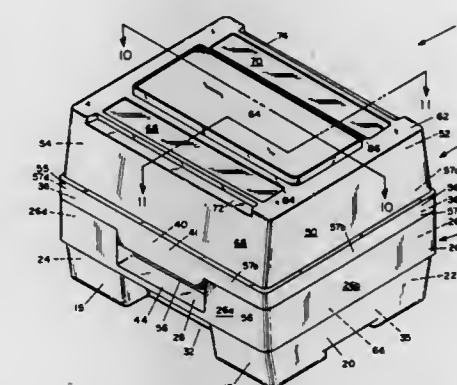
Roger Mortensen, Excelsior, Minn., assignor to Empak, Inc., Chanhassen, Minn.

Filed Jul. 7, 1987, Ser. No. 70,435

Int. Cl.<sup>4</sup> B65D 85/48

U.S. Cl. 206—454

1 Claim

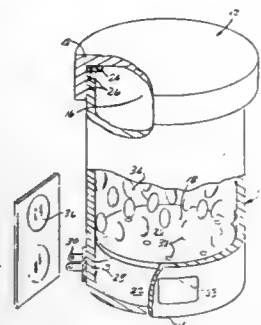


1. A sealable contamination proof container including package bottom and package top members for storing and transporting a plurality of semiconductor wafers or like articles in a semiconductor wafer carrier comprising:

- a. a package bottom including four sides, a substantially planar bottom, a continuous vertical member for tape sealing and surrounding above said four sides, a package bottom indented lip positioned on said continuous vertical member, opposing latches on said opposing longitudinal vertical members, opposing indented handle areas at a mid portion of said longitudinal vertical members for accepting fingers of an individual hand, opposing catch recesses on said opposing longitudinal vertical members and above said handle area and a raised surface in said planar bottom for package stacking; and,
- b. a package top including four sides, a substantially planar top, a continuous vertical package top lip for tape sealing and surrounding said four sides and for engaging about said package bottom lip in providing a flush perimeter about said top and bottom lips and said vertical members and said sides, opposing hook catches on said opposing longitudinal sides for engaging over said latches providing for said package top to move in a direction coinciding to the vertical plane of said wafers and with respect to said catches and said latches, a top surface with raised stacking surface, and two rows of spaced opposing wafer contactors on an underside of said planar top, each of said contactor including two flexible members and a thin member therebetween said flexible member with a "V" formed therebetween for engaging with a wafer, the vertex of said "V" located on center of said thin member, ramped legs adjacent to said vertex and upon biased surfaces of said flexible members whereby said package top and bottom halves provide that a semiconductor wafer carrier with a plurality of wafers mates between said package top and said package bottom with said wafers in said carrier and said package top rotates about said package bottom and about the plane of said semiconductor wafers during opening and closing.

**4,793,489**  
**TAMPER RESISTANT PACKAGE AND METHOD FOR**  
**DETECTING TAMPERING WITH A PACKAGED**  
**PRODUCT**

Howard A. Israel, 853 S. Bedford St., Los Angeles, Calif. 90035  
 Filed Feb. 5, 1987, Ser. No. 11,023  
 Int. Cl.<sup>4</sup> G01N 21/78; B65D 55/02  
 U.S. Cl. 206—459 8 Claims

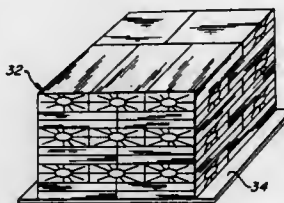


1. A tamper resistant package comprising:
  - a container having a product access opening, a first interior compartment for product storage exposed to the access opening, and a second interior compartment isolated from the access opening;
  - a lid adapted to close and seal the access opening;
  - an unenveloped incandescent filament in the second compartment for indicating the absence of an aerobic atmosphere therein;
  - means for permitting gas to flow from the first compartment to the second compartment without permitting removal of the filament from the second compartment; and
  - a window in the second compartment for transmitting the indication to the exterior of the container.
7. A method for detecting tampering with a packaged consumer product comprising the steps of:
  - (a) placing in a sealable package a product for human consumption;
  - (b) placing in the package an unenveloped incandescent filament;
  - (c) atmospherically evacuating and sealing the container after steps (a) and (b);
  - (d) storing the container after step (c) pending use of the product; and
  - (e) passing electric current through the filament after step (d) to determine whether the interior of the container has been violated during storage.

**4,793,490**  
**PACKAGE FOR COMPRESSIBLE BAGS AND PROCESS**  
 Daniel D. Evert, Bourbonnais, Ill., assignor to Gaines Pet Foods Corp., Chicago, Ill.  
 Continuation of Ser. No. 130,311, Mar. 14, 1980, abandoned.  
 This application Nov. 26, 1984, Ser. No. 674,490  
 Int. Cl.<sup>4</sup> B65D 85/62  
 U.S. Cl. 206—497 16 Claims

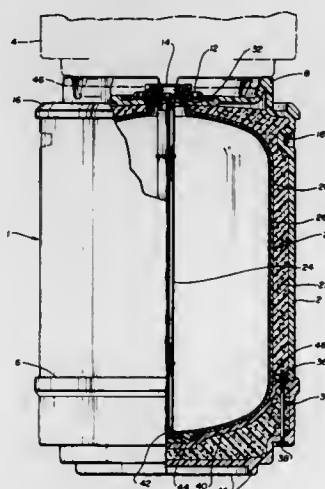
1. A stackable package for shipping and storing bags containing dense, compressible, and resilient material, comprising: an essentially rectangular compressed array of bags, the array having a top, a bottom and four sides forming four vertical corners, wherein the bags each contain dense, compressible, and resilient material which is compressed so that said material is capable of supporting similar packages; rigid vertical support means substantially equal in height to the height of the com-

pressed array, positioned at least at the vertical corners of the array; and a film of a synthetic polymeric material tightly-



stretched or heat shrunk over the top, the bottom, at least two complete sides and the four vertical corners.

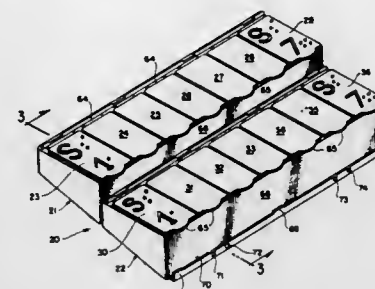
**4,793,491**  
**PRESSURIZABLE CHEMICAL SHIPPING VESSEL**  
 Raymond D. Wolf, Chaska, and Joshua P. Waldman, Edina, both of Minn., assignors to Fluoroware, Inc., Chaska, Minn.  
 Filed Nov. 24, 1986, Ser. No. 934,483  
 Int. Cl.<sup>4</sup> B65D 21/02, 8/02, 8/06, 90/08  
 U.S. Cl. 206—509 10 Claims



1. A pressurizable vessel for storing, transporting, and dispensing fluid chemicals having an inner container and an outer container, wherein the improvement comprises:
  - an inner container having a filler neck extending from the upper surface thereof through a correspondingly sized neck opening in the upper surface of the outer container; the outer container being fitted around the inner container in spaced relationship therefrom;
  - the outer container consisting of an upper member and a base member separably attached to each other by cooperating securing means;
  - the upper member contacting and supporting the inner container at the neck opening in the top surface of the upper member and at a concentric inward flange at the bottom of the side wall of the upper member;
  - the base member being of double wall construction with the inner surface of the base member being shaped to contact and support the inner container by generally conforming to the bottom outer surface of the inner container;
  - the space defined by the double wall construction of the base member of the outer container and the space defined between the inner container and the upper member of the outer container being filled with an inert energy absorbing material to provide mechanical support for said inner container and to block the transmission of shock thereto; and

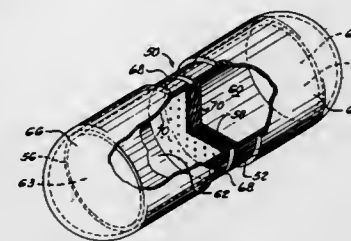
the base member and the upper member of the outer container and the inner container all being separable from each other upon detachment of the base member from the upper member.

**4,793,492**  
**HOME CARE PILLBOX**  
 Frank Halblch, 11983 Salem Dr., Granada Hills, Calif. 91344  
 Continuation of Ser. No. 930,445, Nov. 14, 1986, abandoned.  
 This application Apr. 18, 1988, Ser. No. 182,780  
 Int. Cl.<sup>4</sup> B65D 21/02  
 U.S. Cl. 206—538 8 Claims



1. A pillbox means including a box having the plurality of separate compartments for receiving pills and cover means therefor for individually closing respective pill compartments, said pillbox having a rear wall and a front wall taller than the rear wall, connecting means for connecting a plurality of said pillboxes together in front to back relationship wherein the cover means of the boxes so connected are disposed in non-coplanar relationship so as to present a stepped appearance affording access to each of the pillboxes from the front and means for opening the covers on their respective pill compartments.

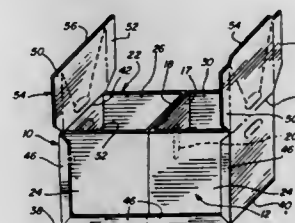
**4,793,493**  
**MULTIDOSE CAPSULES**  
 Walter J. Makiej, Jr., 93 River Rd., Lowell, Mass. 01852  
 Division of Ser. No. 906,823, Sep. 18, 1986, This application Aug. 5, 1987, Ser. No. 82,034  
 Int. Cl.<sup>4</sup> B65D 85/42  
 U.S. Cl. 206—538 11 Claims



1. An ingestible hard gelatin capsule for holding medication to be ingested which comprises:
  - a longitudinally extending tube having a first end and a second end;
  - at least one dividing wall intermediate said first and second ends and extending in a cross-sectional plane through said longitudinally extending tube which separates said longitudinally extending tube into a first and second chamber, said at least one dividing wall having frangible means for severing said at least one dividing wall along a plane perpendicular to said longitudinally extending tube; and
  - first and second removably supportable caps wherein each of said first and second removably supportable caps has a

first end which is open and a second end which is sealed such that said open end of said first removably supportable cap is slidable along and mountable upon said first end of said longitudinally extending tube and said open end of said second removably supportable cap is slidable along and mountable upon said second end of said longitudinally extending tube to an extent sufficient to support each of said first and second removably supportable caps on said longitudinally extending tube thereunder.

**4,793,494**  
**BREAK-APART CONTAINER**  
 Eugene W. Gordon, Jr., Marion, N.C., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.  
 Filed Jun. 8, 1987, Ser. No. 59,344  
 Int. Cl.<sup>4</sup> B65D 5/54, 5/48  
 U.S. Cl. 206—602 7 Claims



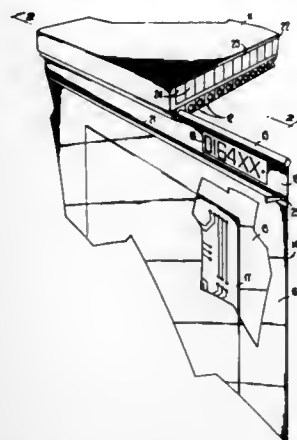
1. A break-apart container which comprises: abutting first and second compartments, said first and second compartments each being defined by an inner member having a central web portion and opposed flange portions carried on said web portion to exhibit an I-shaped cross-section, said central web portion defining a pair of facing walls folded together along a fold line during container formation, said facing walls respectively facing each compartment and abutting against the facing wall of the other compartment in face-to-face relation, said fold line being severed during container formation, and said facing walls being sealed together only with manually frangible seal means and integral with each other only through said seal means; said container also comprising an outer member that folds about said inner member to enclose spaces between said opposed flange portions, said outer member defining abutting ends adjacent one end of said facing walls, said abutting ends being essentially unsealed to each other, and said outer member also defining a transverse line of tearing weakness to permit severing said outer member in half, said transverse line of weakness being adjacent and along an end of said facing walls opposed to said one end, said outer member being sealed to said inner member, whereby said compartments may be separated by breaking said manually frangible seal means between the facing walls and said transverse line of tearing weakness without first opening the first and second compartments.

**4,793,495**  
**FILM STORAGE SYSTEM**  
 Axel Preu, Moderne Elemt GmbH, Postfach 23 03 42, D 7000 Stuttgart 23, Fed. Rep. of Germany  
 Filed Sep. 28, 1987, Ser. No. 101,758  
 Claims priority, application Fed. Rep. of Germany, Oct. 9, 1986, 3634442  
 Int. Cl.<sup>4</sup> A47F 5/00  
 U.S. Cl. 211—41 5 Claims

1. A film storage system comprising:
  - a. an elongated track with a groove therein;
  - b. a unitary storage envelope and hanging support means comprising:
    - i. a front side and back side interconnected to form a storage compartment with a top edge and an opening;



- ii. fastener means for closing the opening connected to said envelope;
- iii. an integral connecting piece along the top edge; and



- iv. an integral elongated rib along the connecting piece for insertion in the groove.

4,793,496

## WALL-MOUNTED SKI STORAGE UNIT

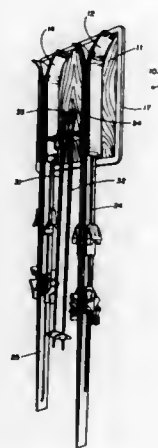
Brooks T. Wait, Littleton, Colo., assignor to Ski Tree Products, Inc., Missoula, Mont.

Filed Sep. 3, 1987, Ser. No. 92,506

Int. Cl.<sup>4</sup> A47F 7/00

U.S. Cl. 211-70.5

6 Claims



1. A wall-mounted ski storage unit comprising:

a vertical base means;  
wall mounting means attached to said vertical base means;  
pole holding means attached to said vertical base means; and  
at least two opposed ski-contoured holding means attached substantially normal to said vertical base means, each holding means having an upper arcuate portion and a lower substantially flat portion, wherein the upper arcuate portion provides a ski tip engaging surface, and the lower flat portion provides a ski top engaging surface, and wherein said upper arcuate portion and said lower flat portion of each contoured ski-holding means are joined to form a waist portion, and wherein said waist portion of each of said contoured ski-holding means is spaced at a closer distance from each other than said lower portions are spaced from each other.

4,793,497

## TILT-SHELF DISPLAY CART

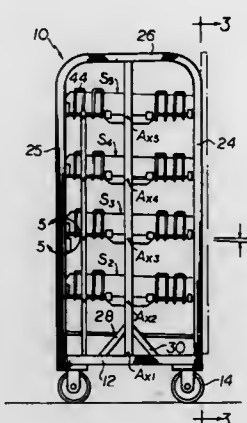
Don Hall, Chattanooga, and Charles F. A. Laitner, Jr., Signal Mountain, both of Tenn., assignors to Cumberland Corporation, Chattanooga, Tenn.

Filed Sep. 25, 1987, Ser. No. 100,852

Int. Cl.<sup>4</sup> A47F 5/13

U.S. Cl. 211-150

14 Claims



1. A tilt-shelf display cart, comprising:

a frame;  
at least two shelves mounted on said frame for rotation about respective axes between a first and at least one other position;

means for releasably positioning said shelves at a selected one of said first and other positions and having means for engaging said frame to maintain said shelves at the selected position; and

user operable means connected to said releasable positioning means and including a user operable handle having first and second handholds for operation by a user to cause said means for engaging said frame to effect disengagement therefrom in response to movement of said handle from one position to another.

4,793,498

## CAP FOR A CONTAINER CLOSURE

Alan A. Baxter, Colchester, United Kingdom, assignor to National Plastics Limited, United Kingdom

Filed Sep. 21, 1987, Ser. No. 99,252

Claims priority, application United Kingdom, Sep. 25, 1986, 8623064

Int. Cl.<sup>4</sup> B65D 41/34

U.S. Cl. 215-230

7 Claims

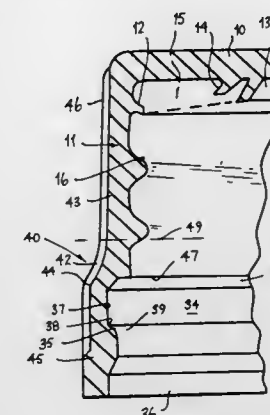
1. A cap for a container closure comprising a cap and an insert adapted to be received in the cap and retained therein by engagement of a projection on the insert in a recess in the cap, wherein

said cap has an annular wall portion having a recess in an inner surface thereof in a region near the open mouth of the cap to receive and interengage with the insert, said recess having an edge, nearer the mouth opening of the cap, which is inclined at an angle no greater than 70° and no less than 60° to the axis of the cap,

the cap is outwardly flared in this region so that no significant reduction in wall thickness of the cap occurs in this region, and

the outer surface of the cap flared region has a smooth curve which, in the direction towards the mouth opening of the

cap, comprises a concave portion and a convex portion, the concave portion of the curve swelling smoothly from



the upper wall of the cap and merging by the convex portion into the lower larger diameter wall of the cap.

4,793,499

## TAMPER EVIDENT CLOSURE DEVICE

Werner F. Dubach, Maur, Switzerland, and Kenneth M. Sinnott, St. Noets, United Kingdom, assignors to Alfatech AG, Switzerland

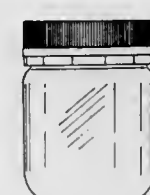
Filed Nov. 13, 1987, Ser. No. 120,633

Claims priority, application United Kingdom, Nov. 14, 1986, 8627251

Int. Cl.<sup>4</sup> B65D 41/04

U.S. Cl. 215-230

12 Claims



1. A plastic tamper evident container closure assembly comprising a container closure having a skirt, a tamper evident band having inwardly projecting means capable of holding said tamper evident band on said container while said closure is removed therefrom, said closure skirt being formed with an annular groove between radially spaced skirt portions of said closure, and said tamper evident band being dimensioned to be received tightly within said annular groove and comprising a plurality of segments which are separated from one another by slits extending at least partially through said tamper evident band in an axial direction thereof.

4,793,500

## TAMPER INDICATOR

Claude J. Harding, 3520 E. Cannon Dr., Phoenix, Ariz. 85028

Filed Nov. 10, 1987, Ser. No. 119,389

Int. Cl.<sup>4</sup> B65D 55/02

U.S. Cl. 215-230

19 Claims

1. A tamper indicator comprising:
- a. a first cylindrical element having a first interior chamber;
  - b. a second cylindrical element telescopically interconnected with said first cylindrical element, displaceable between first, second and third positions relative to said first cylindrical element and including a second interior chamber, wherein a displacement between the first and second positions moves said first and second cylindrical elements

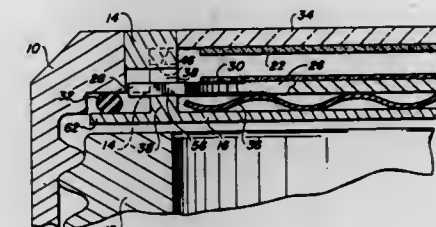
closer together and wherein a displacement between the second and third positions moves said first and second cylindrical elements further apart;

- c. indicator means including

- i. a first indicator element coupled to said first cylindrical element and positioned within said first interior chamber;

- ii. a second indicator element positioned within the second interior chamber and displaceable between a first position spaced apart from said first indicator element and a second position contacting said first indicator element, whereby said first indicator element changes visual state when it contacts said second indicator element;

- d. means for biasing said first indicator element toward said second indicator element; and



e. locking means for maintaining said first and second indicator elements in a locked, spaced apart configuration while said first and second cylindrical elements remain in the first position, for enabling relative movement to occur between said first and second indicator elements after said first and second cylindrical elements have been displaced from the first position into the second position, and for enabling said biasing means to displace said first and second indicator elements together to establish contact and to effect the change in visual state of said first indicator element upon displacement of said first and second cylindrical elements from the second position into the third position.

4,793,501

## WATER TIGHT HINGE CLOSURE

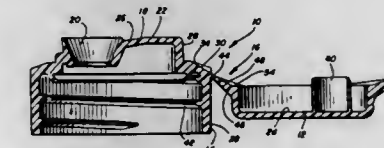
James M. Beck, Carol Stream, Ill., assignor to Creative Packaging Corp., Wheeling, Ill.

Filed Mar. 17, 1988, Ser. No. 159,328

Int. Cl.<sup>4</sup> B65D 51/18

U.S. Cl. 215-235

16 Claims



1. A watertight hinge closure, comprising:

- a cap body portion adapted to be secured to a container having a dispensing opening therein, said cap body portion including a top portion raised above a shoulder and including a periphery therearound, said shoulder including a planar ramp portion; and

- a lid including a bottom wall hinged to said cap body by a hinge integrally formed between said cap body and said lid, said hinge including a central planar portion complementary with said cap body ramp portion and designed to abut said ramp portion when said lid is closed to exclude

contamination and prevent seepage therearound, said cap body top planar portion having a minimal clearance between an upper surface thereof and said lid bottom wall when said lid is closed around said periphery of said cap body portion.

4,793,582

## HINGED DISPENSING CLOSURE

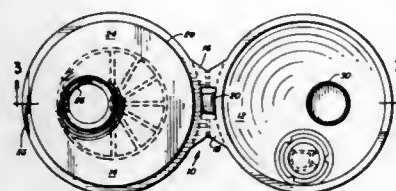
James M. Beck, Carol Stream, Ill., assignor to Creative Packaging Corp., Wheeling, Ill.

Filed Feb. 29, 1988, Ser. No. 162,066

Int. Cl. B65D 43/14

U.S. Cl. 215-235

16 Claims



1. A closure with a snap type hinge cap, comprising: a cap body portion adapted to be secured to a container; a lid hinged to said cap body by a pair of spaced apart hinges integrally formed between said cap body and said lid; and a substantially planar tapered hinge strap integrally formed between said cap body and said lid between said pair of hinges, said hinge strap having a width at one end adjacent one of said cap body and said lid greater than the width at a second end thereof.

4,793,503

## CONTAINER CLOSURE WITH RUPTURABLE TAMPER DISK

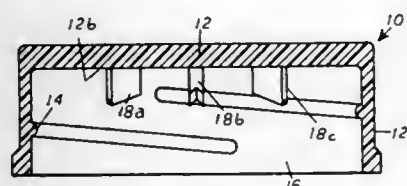
Edward J. Towns, Convent Station, and Edward M. Brown, Livingston, both of N.J., assignors to TBL Development Corporation, Livingston, N.J.

Filed Dec. 17, 1982, Ser. No. 450,531

Int. Cl. B65D 53/04

U.S. Cl. 215-250

25 Claims



1. A container closure having a closure member defining container closing expanse, means in said closure interiorly of said closure member for providing tamper indication and means dependent from said closure member and movable with said closure member for both retaining said tamper indication means with said closure and for selectively rupturing said tamper indication means, such movable means being inaccessible through said closing expanse of said closure member and said closure affording visibility exteriorly thereof of said tamper indication means, such tamper indication means including a compressible layer, said movable means having a first extent adjacent said closure member and a second extent distal from said closure member, said second closure member extent being enlarged with respect to said first closure member extent and being in retentive residence within said compressible layer.

14. A method of providing a tamper-indicating closure of type including a closure member for first sense movement relative to a container into securement therewith and in circumscribing relation to a container access opening and for

second sense movement for release from such securement, said method comprising the steps of:

- disposing a retaining member interiorly of said closure member and restraining said retaining member for travel with said closure member;
- forming a secured assembly of a tamper-indicating element and a compressible layer; and
- applying a backing member to said assembly and forcing said assembly into such closure member interior and onto said retaining member, said backing member being selected such that, in the resulting closure, the retaining member is deformed and thereby retentively captured by said compressible layer.

4,793,504

## CLOSURE WITH CONTAINMENT OF TELLTALE MEANS

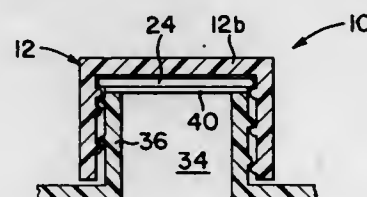
Edward J. Towns, Morristown, and Edward M. Brown, Livingston, both of N.J., assignors to TBL Development Corporation, Livingston, N.J.

Filed Sep. 12, 1983, Ser. No. 531,007

Int. Cl. B65D 53/04

U.S. Cl. 215-250

12 Claims



1. A container closure having a see-through closure member defining container closing expanse, a tamper-indicating element in said closure interiorly of said closure member, first means movable with said closure for both retaining said tamper-indicating element with said closure and for selectively tearing said tamper-indicating element and second means in said closure for engaging said tamper-indicating element selectively following such tearing thereof for retaining said tamper-indicating element with said closure, said tamper-indicating element comprising a rupturable and tearable layer, said first means being secured in said rupturable and tearable layer, a stiffening layer juxtaposed with said rupturable and tearable layer, and a telltale layer juxtaposed with said stiffening layer and exposed therethrough upon tearing of said rupturable and tearable layer by said first means, and a container sealing layer juxtaposed with said telltale layer, said second means being disposed in spaced confronting relation to said container sealing layer.

5. A tamper-indicating container comprising:

- a vessel for article containment and having an access opening;
- a see-through closure member for first sense movement relative to said vessel into securement therewith and in circumscribing relation to said access opening and for second opposite sense movement for release from such securement;
- first and second means disposed interiorly of said closure member for travel with said closure member; and
- indicating means in captive relation to said first means for movement therewith during said closure member first sense movement into securement with said vessel across said access opening,

said first means tearing said indicating means in the course of said closure member second sense movement to provide such tamper indication, said second means engaging said indicating means following such tearing thereof and releasing said indicating means from said securement thereof with said vessel, said tamper-indicating element comprising a rupturable and tearable layer, said first means being

secured in said rupturable and tearable layer, a stiffening layer juxtaposed with said rupturable and tearable layer, and a telltale layer juxtaposed with said stiffening layer and exposed therethrough upon tearing of said rupturable and tearable layer by said first means, and a container sealing layer juxtaposed with said telltale layer, said second means being disposed in spaced confronting relation to said container sealing layer.

9. A tamper-indicating container comprising:

- a vessel for article containment and having an access opening;
- a see-through closure for first sense movement relative to said vessel into securement therewith and in circumscribing relation to said access opening and for second opposite sense movement for release from such securement;
- a tamper-indicating element in said closure;
- first means movable with said closure for both retaining said tamper-indicating element with said closure and for selectively tearing said tamper-indicating element; and
- second means in said closure for engaging said tamper-indicating element selectively following such tearing thereof for retaining said tamper-indicating element with said closure, said tamper-indicating element comprising a rupturable and tearable layer, said first means being secured in said rupturable and tearable layer, a stiffening layer juxtaposed with said rupturable and tearable layer, and a telltale layer juxtaposed with said stiffening layer and exposed therethrough upon tearing of said rupturable and tearable layer by said first means, and a container sealing layer juxtaposed with said telltale layer, said second means being disposed in spaced confronting relation to said container sealing layer.

4,793,505

## TAMPER-INDICATING CONTAINER CLOSURE WITH RUPTURABLE DISK

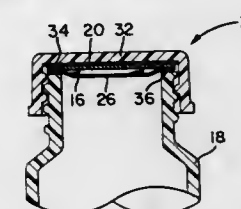
Edward J. Towns, Convent Station; Edward M. Brown, Livingston, both of N.J., and William M. Lester, Del Ray Beach, Fla., assignors to TBL Development Corporation, Livingston, N.J.

Continuation-in-part of Ser. No. 443,608, Nov. 22, 1982. This application Jan. 28, 1983, Ser. No. 462,085

Int. Cl. B65D 53/04

U.S. Cl. 215-250

6 Claims



1. A tamper-indicating closure for a container comprising: (a) a see-through closure member defining container closing expanse and including means for rotation of said closure member in container closing and opening senses; (b) means disposed interiorly of said closure member expanse for movement with said closure member; (c) a tamper-indicating element in said closure member in engagement with said means (b) to be activated thereby upon opening sense closure member rotation; and (d) means secured to said closure member for movement therewith and movable relative to said tamper-indicating element, such secured means being situated between said tamper-indicating element and said closure member closing expanse and adapted to engage said tamper-indicating element (1) to impart a given force to said tamper-indicating element at a location thereon distal from the location of engagement of said tamper-indicating element and said means (b), thereby to displace said tamper-indicating element jointly with displacement thereof by said means (b) in the course of said closure member container closing sense movement and (2) to rotate relative to said tamper-indicating element in the course of said closure member

opening sense movement, said secured means further defining a container access port sealing surface upon removal of said tamper-indicating element from said closure.

4,793,506

## CLOSURE CAP WITH A SEAL AND METHOD OF AND APPARATUS FOR FORMING SUCH CLOSURE AND SEAL

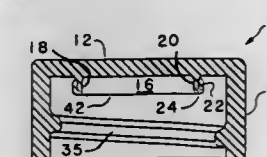
Mortimer S. Thompson, Maumee, Ohio, assignor to Tri-Tech Systems International Inc., Maumee, Ohio

Filed Jun. 10, 1987, Ser. No. 60,217

Int. Cl. B65D 53/00

U.S. Cl. 215-344

13 Claims



1. A method of forming a cap including a linerless seal comprising:

molding a cap from plastic having a top wall, and a depending wall within the cap comprising plastic and having an upper end extending from said top wall to a lower free end, and turning said lower free end away from said depending wall to pre-stretch the inner surface of the said lower free end at the turn to provide a preformed sealing surface at said turn which is softer than its contiguous unstretched portions and which upon subsequent sealing engagement said performed softened sealing surface at said turn is adapted to compress and seal.

4,793,507

## FOLDING PACKAGING CASE

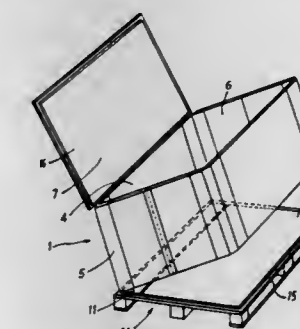
Alain Delplanque, 24, Av. Mont des Louviers, 59250 Halluin, France

Filed Apr. 13, 1987, Ser. No. 37,689

Int. Cl. B65D 5/36

U.S. Cl. 217-13

9 Claims



1. A collapsible rectangular packing case comprising: a pair of side panels, each of said side panels having two articulated sections interconnected by a flexible joint, said sections being capable of folding over one another within an interior of said rectangular packing case; a front panel connected to corresponding edges of said side panels by flexible joints; a rear panel connected to corresponding edges of said side panels opposite said front panel by flexible joints; a cover panel connected by a flexible joint to one of said front, rear or side panels along a free edge of said one panel, said cover having support means along its contour to support at least three of said front, rear and side panels prior to the collapse of said case;



a rigid intermediate panel connected by a flexible joint to an edge of said one panel opposite said free edge connected to said cover; and

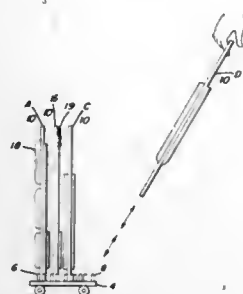
a bottom panel connected to said rigid intermediate panel by a flexible joint, said bottom panel having support means along its contour serving to support at least three of said front, rear and side panels prior to the collapse of said case, said rigid intermediate panel having a width between said flexible joints with said one panel and said bottom panel at least equal to the sum of a thickness of each of said two sections of said side panels, said rear panel and said front panel.

**4,793,508**  
**STRUCTURE FOR DETACHABLY RECEIVING AT LEAST ONE RETAINING BOARD IN VARIABLE CONFIGURATION**

Priscilla B. Thompson, P.O. Box 2160, Arlington, Va. 22202  
Continuation of Ser. No. 773,566, Sep. 9, 1985. This application  
Sep. 11, 1987, Ser. No. 96,789  
Int. Cl.<sup>4</sup> B65D 57/00

U.S. Cl. 220—22.1

13 Claims



1. A support structure comprising:
  - at least one retaining board;
  - a base including a planar array of spaced and upstanding pegs of flexible construction;
  - said at least one retaining board being removably mounted securely on said base and between at least two of said upstanding pegs;
  - each pair of adjacent upstanding pegs of flexible construction define a corresponding gap therebetween and are jointly operative to receive securely one said retaining board in a plurality of variable configurations;
  - at least one of said retaining boards supports an article holder on one surface thereof;
  - each said retaining board being selectively removable from each secured position on said base independently of any other retaining board.

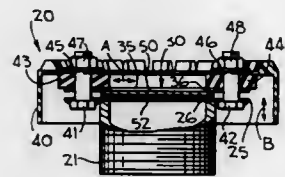
**4,793,509**  
**BULK MATERIAL CONTAINER HAVING A FILTER VENT**  
Clarence B. Coleman, San Leandro, Calif., assignor to Fabricated Metals, Inc., San Leandro, Calif.  
Filed Feb. 12, 1988, Ser. No. 155,494  
Int. Cl.<sup>4</sup> B65D 51/16

U.S. Cl. 220—207

18 Claims

1. A bulk material container comprising:
  - (a) a shell for storing fluid material, said shell being formed with an opening disposed in a path communicating with air under atmospheric pressure and along which fluid material stored in said shell travels; and
  - (b) a vent disposed along said path and comprising a filter for fluid material stored in said shell to breathe with air under atmospheric pressure and for separating in response to

fluid material disposed in said shell under fluid pressure in excess of a predetermined pressure, whereby fluid mate-

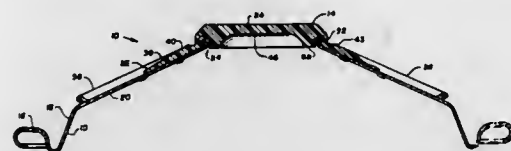


rial in said shell under excessive fluid pressure vents to atmosphere through said separated filter.

**4,793,510**  
**RESEALABLE CONTAINER CLOSURE**  
Horst F. W. Arfert; Daniel F. Cudzik, both of Chesterfield County, and Roger H. Donaldson, Lancaster County, Va., assignors to Reynolds Metals Company, Richmond, Va.  
Filed Jul. 13, 1987, Ser. No. 73,080  
Int. Cl.<sup>4</sup> B65D 41/16, 41/18

U.S. Cl. 220—306

62 Claims



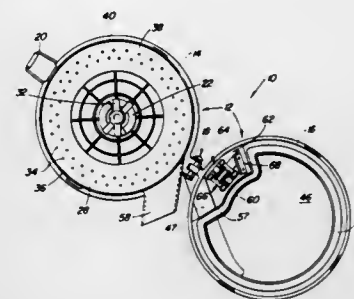
1. A closure device for a can comprising a metallic end wall having an opening therethrough and a flexible closure element, said opening being substantially surrounded by a beaded flange means that flares outwardly relative to said opening, said beaded flange means including an exterior surface portion, said end wall including a wall portion surrounding said flange means with said wall portion extending at a selected angle relative to said exterior surface portion of said flange means, said flexible closure element having a central panel, a lever portion and a connecting portion connecting said central panel with said lever portion, said lever portion being initially positioned in a first position, when said central panel is generally horizontally disposed, as a generally upwardly directed frustoconical skirt portion and having, as viewed in vertical cross-section, a nose at its connection with said connecting portion, said metallic end wall and said closure element being constructed and arranged such that, upon positioning said closure element over said opening of said metallic end wall and moving said lever portion to a second position including, when said central panel is generally horizontally disposed, moving said lever portion to a generally downwardly directed position, said nose portion will sealingly engage at least a continuous annular part of said exterior surface portion of said flange means, said central panel including a first surface and a second surface each disposed so that, when said closure element is fitted on said flange means of said opening of said end wall and said lever means is in said second position and said end wall is mounted on a can body, said first surface will face outwardly of said opening and said second surface will face inwardly, said second surface including removal retarding means for frictionally engaging at least a portion of said flange means at least as said closure element is being removed from said opening to thereby provide a resistance to removal of said closure device at least until said retarding means is free of said flange means, said wall portion of said metallic end wall having a substantially frustoconical annular section extending outwardly

from said flange means and said lever portion having a smooth surfaced section which intimately engages said substantially frustoconical annular section of said end wall when said lever portion is moved to said second position so as to substantially prevent ingress of dirt and the like between said lever portion in said second position and said annular section of said wall portion.

**4,793,511**  
**SEED METER HAVING SEED DISK APERTURE CLEANING WIPER AND BRUSH ARRANGEMENT**  
Robert H. Ankum, Davenport, Iowa, and Jay H. Olson, Rock Island, Ill., assignors to Deere & Company, Moline, Ill.  
Continuation of Ser. No. 593,476, Mar. 26, 1984, abandoned.  
This application Mar. 17, 1986, Ser. No. 840,536  
Int. Cl.<sup>4</sup> A01C 7/14

U.S. Cl. 221—211

13 Claims



1. In a seed meter in which a rotatable seed disk has at least one row of apertures extending through the seed disk from a side surface thereof, the row of apertures being arranged generally circumferentially about the seed disk and being operative to carry seeds from a seed mass to a seed discharge area, the improvement comprising a brush assembly disposed adjacent the side surface of the seed disk, the brush assembly including at least one rotatably mounted circular brush engaging the side surface of the seed disk at the row of apertures, the brush assembly including a circular band disposed adjacent and rotatable with the circular brush, the circular band having an outer diameter smaller than an outer diameter of the circular brush and engaging the side surface of the seed disk.

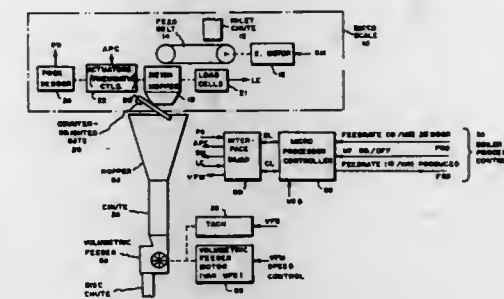
**4,793,512**  
**APPARATUS AND METHOD FOR FEEDING PARTICULATE MATERIAL SUCH AS COAL AND OTHER BULK MATERIALS**  
Kenneth J. Krauss, Fairview Park, Ohio, assignor to Stock Equipment Copy, Chagrin Falls, Ohio  
Filed Aug. 26, 1985, Ser. No. 769,055  
Int. Cl.<sup>4</sup> G01G 13/24

U.S. Cl. 222—1

16 Claims

1. Apparatus for feeding particulate materials, such as coal, at a feed rate in terms of weight per unit time of the materials, which comprises variable speed means for feeding said materials by volume, which volume varies in accordance with the speed of said volume feeding means, means for feeding weighed batches of said material to said volume feeding means, means responsive to the periods during which said batches are fed to said volume feeding means and the speed of said volume feeding means for providing an output representing the feed rate of said material from said volume feeding means in units of weight per units of time, said output providing means comprising means for computing a volumetric efficiency factor of said volume feeding means corresponding to the ratio of the weights of successive ones of the batches and the speed of the

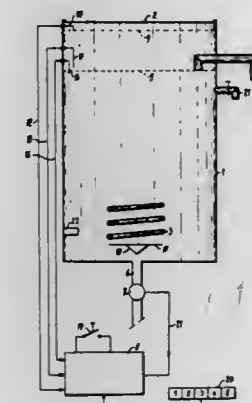
volume feeding means during the periods of the feeding of said batches, and means for computing said output in accordance



**4,793,513**  
**DEVICE FOR DELIVERING HOT WATER**  
Jan J. Verheijen, Heiloo, Netherlands, assignor to Verheijen B.V., Heiloo, Netherlands  
Filed Sep. 15, 1986, Ser. No. 907,353  
Int. Cl.<sup>4</sup> B67D 5/30

U.S. Cl. 222—14

5 Claims



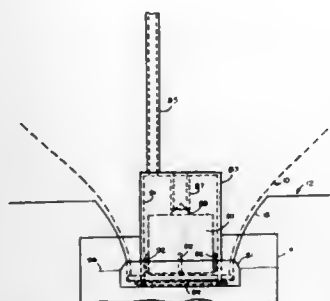
1. An apparatus for delivering hot water, comprising:
  - (a) a water tank;
  - (b) a thermostatically controlled heating unit installed at a relatively low level within said water tank;
  - (c) a syphonic tube for discharging hot water from the tank, said tube being installed in a sidewall of said tank, whereby an inside end of said tube is at a level above the heating unit;
  - (d) a cold water inlet pipe connected to the tank at a level underneath said heating unit;
  - (e) a shut-off valve, installed in the cold water inlet pipe and controlled by a control unit;
  - (f) two water level detecting probes, the first probe being positioned at a first level above the inside end of the syphonic tube and the second probe being positioned at a second level above the inside end of the syphonic tube but below the first level, wherein said first probe delivers a signal to the control unit which in response closes the shut-off valve as soon as the water reaches the first level, and said second probe delivers a signal to the control unit as soon as the water reaches the second level; and
  - (g) a start means to provide a start signal to the control unit which in response opens the shut-off valve, wherein said control unit comprises a counter, which is presettable to a predetermined end setting and advances by one step

from an initial setting every time a signal is received from said first probe and generates a signal to open the shut-off valve as the signal from the second probe is received unless said presettable end setting of the counter has been reached.

**4,793,514**  
**CAP FOR INVERTED WATER BOTTLE**  
Kerney T. Sheets, P.O. Box 771, Duplessis, La. 70728  
Filed May 14, 1987, Ser. No. 49,531  
Int. Cl.<sup>4</sup> B67D 5/08, 3/00

U.S. Cl. 222-67

9 Claims



1. A closure assembly for conveying air to the interior of an inverted water bottle and for conveying water from the interior of an inverted water bottle having a downwardly pointing spout comprising:

- a. closure means connectable to the spout of said water bottle, said closure means having an opening therein through which water may flow from said inverted water bottle;
- b. hollow cylinder means having an open first end and a partially closed second end, said first end being connected to said closure means, said second end being located in the interior of said water bottle and having an air inlet open to said hollow cylinder means for conveying air from the interior of said hollow cylinder means to the interior of said water bottle, said second end also having a water inlet open to said hollow cylinder means for conveying water from the interior of the inverted water bottle to the interior of said hollow cylinder means, said closure means having an opening therein in alignment with said first end of said hollow cylinder means; and
- c. float means slidably received in said hollow cylinder means for sealing said water inlet while said air inlet remains open to said hollow cylinder means.

**4,793,515**  
**SODA SYSTEM FOR SOFT DRINK DISPENSER**  
Joseph W. Shannon, and Thomas S. Green, both of Kent, Ohio, assignors to American Business Computers, Mogadore, Ohio  
Filed Jul. 8, 1987, Ser. No. 70,903  
Int. Cl.<sup>4</sup> B67D 5/08

U.S. Cl. 222-69

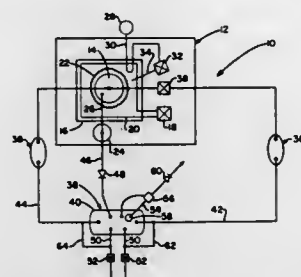
11 Claims

7. A system for generating and maintaining soda for dispensing in a soft drink system, comprising:

- a carbonator for generating soda;
- a pressurized source of carbon dioxide in communication with said carbonator;
- a pump connected to said carbonator and at least one dispensing station for circulating soda to and from said dispensing station;
- an auxiliary tank receiving said soda from said pump and in communication with said source of carbon dioxide, said auxiliary tank maintaining a reservoir of soda under a pressure head of carbon dioxide provided by said source of carbon dioxide and having an inlet passage receiving

soda from said pump and an outlet passage returning soda to said pump; and

a float switch maintained within said auxiliary tank and



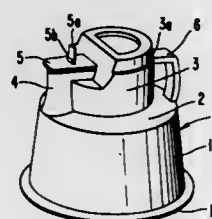
operatively connected to a first valve maintained within a vent within said auxiliary tank, said float switch selectively venting said pressure head to atmosphere through said first valve.

**4,793,516**  
**NESTABLE PACKAGING CONTAINER**  
Isao Niwa, Amagasaki, and Mikio Ishimoto, Takarazuka, both of Japan, assignors to Kishimoto Sangyo Co., Ltd., Osaka, Japan

Filed Nov. 28, 1986, Ser. No. 936,076  
Claims priority, application Japan, Nov. 27, 1985, 60-182447[U]; May 30, 1986, 61-83538[U]  
Int. Cl.<sup>4</sup> B65D 17/32, 43/16

U.S. Cl. 222-143

4 Claims



1. A packaging container for a liquid, comprising:
- a container proper having an open bottom and formed of a thermoplastic resin, said container proper having a tapered shape to permit stacking like containers proper one within the other through said open bottom, said container proper having a lower portion with a truncated conical shape decreasing in diameter toward its top, an upper portion having a horizontal top and a cylindrical shape smaller than the top of said lower portion, and a shoulder portion between the top of said lower portion and the bottom of said upper portion; a pouring portion between said shoulder portion and said upper portion and a handle connected between the shoulder portion and said upper portion, said pouring portion having a pouring opening and a lid over the top of said opening having a hinge portion integrally connected at one end with said upper portion and having a vertical flange on the under face of said lid and fitting into the pouring opening when the lid is in a position closing said pouring opening, said lid and said flange having a frangible connection with a peripheral edge of said pouring opening, and said lid having a projection on its outside face and said projection having an end in the same horizontal plane as the top of said upper portion, the end of the projection forming with the top of said upper portion means for stably supporting said packaging container when it is turned upside down, and said pouring portion having a projecting lip at a front edge of

said opening remote from said upper portion and over which the contents of the packaging container is to be poured; and

a bottom cap sealed over the open bottom of the container proper, whereby the packaging container can be closed after it has been filled from the bottom.

**4,793,517**  
**PORTABLE PERSONAL LIQUID STORAGE AND DISPENSER UNIT**

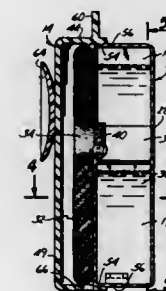
Harry E. Washut, 716 Val Vista, Sheridan, Wyo. 82801

Filed Apr. 8, 1987, Ser. No. 35,915

Int. Cl.<sup>4</sup> B65D 37/00; B67D 5/06

U.S. Cl. 222-129

8 Claims

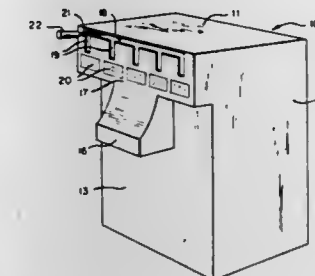


1. A unit for storage and dispensing fluids including:
- (a) an at least partially resilient container encompassing a plurality of separate, fluid tight, fluid containing compartments at least partially defined by deformable walls, each compartment being in intimate contact with at least one other compartment;
  - (b) a normally closed, openable port extending away from each such compartment;
  - (c) wherein the container includes a deformable wall which is manually deformable to tend to reduce the volume of each compartment to develop a pressure in each compartment such that fluid will be dispensed through any compartment port that is open while the other ports remain normally closed;
  - (d) wherein the container is rectilinear in shape and includes front and back walls, top and bottom walls, and first and second side walls; and
  - (e) wherein the compartments are each partially defined by the front and back container walls;
  - (f) the front wall of the container is a resilient flexible wall;
  - (g) there are at least three compartments within the container walls; and
  - (h) the normally closed, openable ports of two of the compartments open through the container bottom wall while the normally closed, openable port of the third compartment is open through the container back wall;
  - (i) the unit includes an open face case of rectilinear configuration to encompass at least a portion of the container by covering the back wall and snugly contacting at least portions of the container top, bottom and side walls; the open face case and the container including cooperating means for retaining the container in a first storage position wherein the openable ports at the container bottom wall are free from obstruction by the open face case and for retaining the container in a second storage position wherein the openable ports at the container bottom wall are covered by the open face case.

**4,793,518**  
**DISPENSER FOR BEVERAGES AND THE LIKE**  
John W. Burton, #4 Woodland Dr., Pittsburgh, Pa. 15228  
Filed Apr. 22, 1987, Ser. No. 41,214  
Int. Cl.<sup>4</sup> B65D 5/56

U.S. Cl. 222-129.3

20 Claims

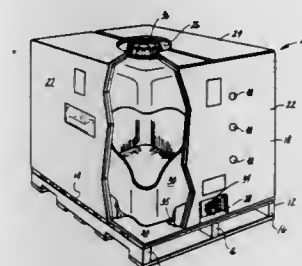


1. A dispenser comprised of
- a. a housing having a base and a front wherein an opening is provided in the front through which liquids can be dispensed and a first slot and at least one second slot extending at an angle from the first slot are provided in the front;
  - b. at least one container positioned within the housing on its base;
  - c. a plunger type pump attached to the container;
  - d. a tube extending from the pump to the opening at the front plate;
  - e. a nozzle attached to the housing in a manner to allow liquid to flow through the nozzle and out of the opening in the front plate;
  - f. a valve attached to the nozzle having an outwardly extending stem movement of which opens and closes the valve and having an inlet which may be connected to a liquid supply;
  - g. a bar pivotally attached to the housing, said bar extending substantially parallel to the first slot and attached to the valve stem so that movement of the bar will move the valve stem to open the valve; and
  - h. a lever attached to the housing in a manner so that it may extend and move through the first and second slots an sized and positioned so that it will engage and activate said plunger type pump and the bar when moved downwardly through said second slot.

**4,793,519**  
**COMPOSITE SHIPPING CONTAINER**  
John Voorkies, Jr., Strongsville, Ohio, assignor to Hoover Group, Inc., Alpharetta, Ga.  
Filed Mar. 23, 1987, Ser. No. 28,865  
Int. Cl.<sup>4</sup> B65D 35/14

U.S. Cl. 220-465

2 Claims



1. A composite disposable one-way container having vertical stacking capabilities comprising:
- a. a pallet member having a top surface and depending legs



- spaced apart to enable extension of fork lift tines therebetween,
- b. an outer container of rectangular shape having a rectangular bottom wall supported on the secured to said pallet top surface,
- said outer container having upright continuous side walls and a substantially flat top wall formed of corrugated paper material,
- said top wall having a central fill opening and one of said side walls having a discharge opening located adjacent said bottom wall, and
- c. a unitary blow molded plastic inner tank positioned upright inside said outer container and having side walls sufficiently thin to prevent said tank from being self-supporting, said tank having an inlet fitting extending into said container fill opening, and a discharge fitting extending into said container discharge opening,
- d. a support structure for said inner tank on said outer container bottom wall, said structure having a complimentary surface abutting said inner tank and said outer container side walls so as to nest said inner tank on said support structure and provide support for said discharge fitting, said container side walls being of multi-layered construction to maintain said tank in an upright position in said container when the tank is filled with a liquid to be transported, said container side walls being free of obstruction on the inner sides thereof so that said inner tank side walls are free to engage said inner sides of the container side walls directly when the tank is filled with a liquid to be transported, and said container top wall being of similar multi-layered construction to enable two such containers to be stacked two high.

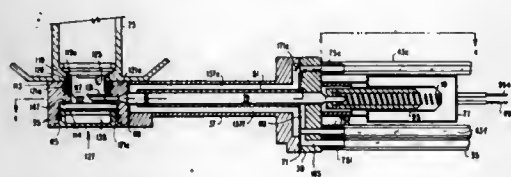
4,793,520

## FLAVOR DISPENSING DEVICE

Ernest C. Gerber, 10 Londonderry Ct., Danville, Ind. 46122  
Filed Jun. 3, 1987, Ser. No. 57,966  
Int. Cl.<sup>4</sup> B67D 5/56

U.S. Cl. 222-145

23 Claims



1. A device for combining one of a plurality of syrups with a frozen confection comprising:
- a rotor housing having a mixing chamber, a confection inlet to said mixing chamber, and a confection outlet from said mixing chamber, said rotor housing including not more than one syrup duct means for delivering syrup into said mixing chamber;
- a rotor positioned in said mixing chamber, said rotor having a central aperture therein;
- means for driving said rotor circumferentially around said central aperture;
- a plurality of syrup supply lines operably coupling said duct means to respective ones of the plurality of syrups; and
- means for pumping a syrup selected from the plurality of syrups through a corresponding one of said syrup supply lines and said syrup duct means and into said mixing chamber.

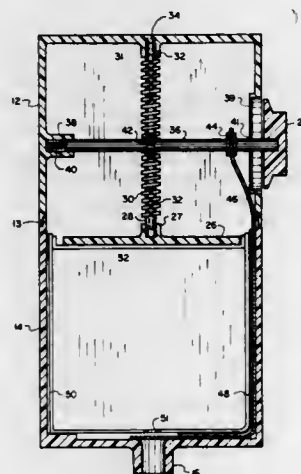
4,793,521

## DEVICE FOR DISPENSING FLUENT MATERIALS FROM CARTRIDGES

Andy Steiner, 2309 11th St., Two Rivers, Wis. 54241  
Filed Jan. 13, 1988, Ser. No. 143,372  
Int. Cl.<sup>4</sup> B05B 11/02

U.S. Cl. 222-156

10 Claims



1. A dispenser for soap, shampoo, tooth paste, and the like, comprising:
- housing means;
- dispensing opening means in said housing means;
- disposable refill cartridge means having a content to be dispensed removably received in said housing means, said cartridge means having an aperture in alignment with said dispensing opening means;
- door means for selectively opening and closing said opening means;
- plunger means in said housing means for dispensing the contents of said cartridge means;
- control knob means on said housing means;
- shaft means rigidly connected to said control knob means transversely extending within said housing means and mounted for rotary and axial movement;
- stem means attached to said plunger means;
- rack means on said stem means;
- a pinion means mounted for rotation with said shaft means whereby rotation of the said pinion means in engagement with said rack means will provide axial movement of said plunger means; and
- means connected to said control knob means for actuating said door means.

4,793,522

## POSITIVE DISCHARGE VALVE FOR VISCOUS PRODUCT DISPENSER

Douglas F. Corsette, Los Angeles, Calif., assignor to Calmar, Inc., Wáchung, N.J.

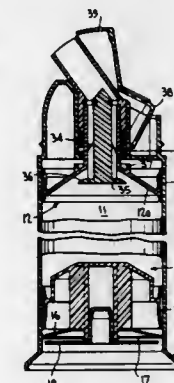
Filed Jun. 15, 1987, Ser. No. 61,777  
Int. Cl.<sup>4</sup> B65D 37/00; G01F 11/00

U.S. Cl. 222-257

3 Claims

1. A viscous product dispenser comprising, a longitudinally extending, cylindrical container having a pump chamber container for a supply of the viscous product to be dispensed, said container having at one end a follower piston slideable toward an opposite end of said container in response to negative pressure in the chamber after product is dispensed from said chamber, manually actuated means mounted at said other end of said container for dispensing the viscous product upon manual actuation, said dispensing means comprising a longitudinally reciprocable discharge spout having a sleeve, said container having an end wall at said opposite end thereof, said end wall

having a longitudinally extending cylinder surrounding said sleeve, a reciprocable pump piston having a piston head operating within said chamber and located inwardly of said end wall, said piston having a hollow stem located within said sleeve and being spaced from said cylinder, an inner end of said sleeve spaced from said end wall, a discharge valve having a valve flange normally seated against the inner surface of said piston head in a valve closed position, said valve having a longitudinally extending stem connected to said spout for reciprocating movement together therewith, said valve stem extending through said piston stem and defining an annular



passage therewith in communication with said spout, a return spring extending between said inner end of said sleeve and said end wall within the spacing between said piston stem and said cylinder for biasing said valve flange into said valve closed position, and stop means on said spout spaced from an outer end of said piston stem in said valve closed position, whereby upon depression of said spout said stop means bears against said outer end of said piston stem for initially shifting said discharge valve flange inwardly of said inner surface of said piston head into a valve open position, and for inwardly reciprocating said piston for pumping the viscous product through said annular passage and said spout.

4,793,523

## METERING MECHANISM

Alfred J. Bailey, Coventry, and David E. Stone, Leicester, both of United Kingdom, assignors to Massey-Ferguson Services N.V., London, England  
PCT No. PCT/GB85/00333, § 371 Date Apr. 21, 1986, § 102(e)  
Date Apr. 21, 1986, PCT Pub. No. WO86/01370, PCT Pub. Date Mar. 13, 1986

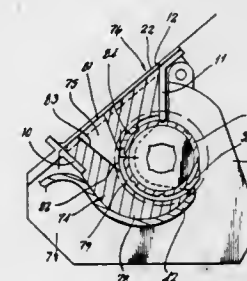
PCT Filed Jul. 26, 1985, Ser. No. 878,873

Claims priority, application United Kingdom, Aug. 22, 1984, 8421338

Int. Cl.<sup>4</sup> B65D 88/54

U.S. Cl. 222-288

17 Claims



1. A metering mechanism suitable for use in metering material such as seed and fertilizer in an agricultural drill comprising a housing with side walls defining a chamber and a material

inlet, a feed roll and a cut-off member mounted on a rotary drive shaft between side walls of the housing with the periphery of the feed roll exposed to said chamber within the housing so as to meter material from the chamber as it rotates, a shutter member adapted to shut off the supply of material to the feed roll, and a removable insert that is a close fit in said chamber and has a passage through it that communicates at one end with said inlet and at the other end with the periphery of the feed roll, the insert having a first portion that is a close fit with the periphery of the cut-off member and a second portion that is spaced away from the periphery of the feed roll and is formed with an opening from said other end of the passage.

4,793,524

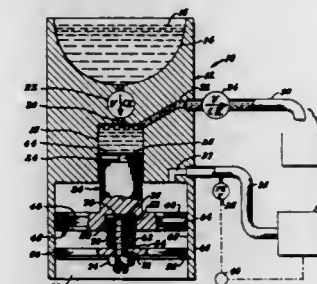
## INTEGRATED REAGENT CONTAINER AND METERED DISPENSER MEANS

Maurice Starr, Indianapolis, Ind., assignor to American Monitor Corporation, Indianapolis, Ind.

Filed Apr. 30, 1981, Ser. No. 259,004  
Int. Cl.<sup>4</sup> G01F 11/06, 11/30

U.S. Cl. 222-309

4 Claims



1. An integrated reagent-container and dispenser, comprising, in combination:
- a body member means,
- the body member means being provided with a reagent-container reservoir and a metering cavity, and a first passageway means having a first check valve means, between the said reservoir and the said cavity, of a type permitting reagent liquid flow between the said reservoir and the said cavity only in a direction from the reagent-containing reservoir to the metering cavity,
- a piston means operatively disposed in the metering cavity, actuation means for operatively reciprocating the piston means relative to the metering cavity,
- the body member means being provided with a dispensing outlet means exteriorly of the body member means and with second passageway means communicating the metering cavity with the dispensing outlet means, there being provided a second check valve means permitting flow of liquid through the second passageway means only in a direction from the metering cavity to the dispensing outlet means,
- the reciprocating of the piston means thus being operative, in its movement in one direction, to draw a batch of reagent liquid from the reagent-container reservoir through the first passageway means and into the metering cavity, and in its movement in the other direction being operative to dispense a corresponding batch of reagent liquid outwardly from the body member means through the second passageway means,
- the said reagent-container reservoir being non-communicating with any pressure used in achieving the reciprocating of the piston means; and the movement of the piston means in dispensing a batch of reagent liquid thus dispensing a metered amount, independent of pressure used in achieving piston-movement actuation, and avoiding any reagent entering the metering cavity during the dispensing

movement of the piston, and avoiding contamination of the reagent supply in the container reservoir by the pressure source;

in which the piston means is of stepped-piston type, one surface of which operatively faces the metering cavity and the other surface of which in movement of the piston means is in a region of the body member means which is out of communication with the metering cavity;

in a combination in which the said other surface of the piston means is provided with a source of compressed air for causing a movement of the piston means in one direction, there being spring means which cause the piston means to move in the other direction upon relief of the pressure of the compressed air.

4,793,525

# APPARATUS FOR THE DOSING OF A PULVERULENT SOLID MATERIAL

Klaus Kaufmann, Hünenberg, Switzerland, assignor to Contraves AG, Zürich, Switzerland

Continuation-in-part of Ser. No. 16,183, Feb. 17, 1987, abandoned. This application Mar. 14, 1988, Ser. No. 167,704  
Claims priority, application Switzerland, Feb. 21, 1986, 06696/86; Dec. 1, 1987, 04699/87

Int. Cl. G01F 11/20

U.S. Cl. 222-333

19 Claims



1. An apparatus for the dosing of a pulverulent solid material, comprising:

a container for receiving the solid material;  
a distributor element positioned within said container;  
drive means including a drive shaft with which there is operatively connected said distributor element for selective rotation in opposite directions of rotation;  
a rotary diaphragm arranged below said distributor element;  
a base plate operatively associated with and located below said rotary diaphragm;

said rotary diaphragm having at least one discharge opening for the through-passage of the solid material;  
said base plate being provided with at least one discharge opening for the through-passage of the solid material;  
said rotary diaphragm and said base plate being rotatable relative to each other through an angle less than a full revolution, such that said at least one discharge opening of said rotary diaphragm and said at least one discharge opening of said base plate can be closed by rotating said rotary diaphragm and said base plate relative to one another;

coupling means for providing a rotary connection between said distributor element and said rotary diaphragm; and  
said coupling means including elastic form-locking elements for momentarily disengaging, under increasing load, the

rotary connection between said distributor element and said rotary diaphragm.

4,793,526

# TOOTHPASTE PUMP

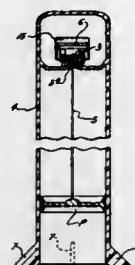
Ronald J. Webb, Baton Rouge, La., assignor to Charles C. Garvey, Jr., New Orleans, La., a part interest

Filed Jan. 1, 1987, Ser. No. 55,987

Int. Cl. B67D 5/42

U.S. Cl. 222-391

6 Claims



1. A paste dispenser comprising:

(a) an elongated tubular body having a continuous side wall defining a central bore for containing a paste product therein with a dispensing outlet positioned at one end portion of the tube;

(b) a follower plate movably disposed within the bore of the tubular body at one end portion thereof, defining an end portion for containing paste contained within the tube, the initial position of the plate being at an opposite end of the tube from the outlet when the tube is filled with paste;

(c) a transverse plate positioned at the end portion of the tubular body adjacent the outlet closing one end of the bore by communicating at its periphery with the side wall;

(d) a rotatable drum mounted on the tubular body upon the transverse plate;

(e) a pivotally moving support mounted at least in part inside the continuous wall at one end portion of the tubular body and connected to the drum for rotating said drum and providing a gripping surface which can be manually forced to move the pivot between first and second positions which rotates the drum;

(f) biasing means for urging the pivot to assume the first position;

(g) ratchet means on the pivotally moving support and drum for urging a rotation of the drum in one rotational direction; and

(h) an elongated length of cable attached at one end portion to the follower plate and at its other end portion to the drum so that rotation of the drum winds the cable thereupon, applying tension to the cable for urging the follower plate towards the transverse plate.

4,793,527

# AEROSOL DISPENSER

Alfonso Di Stefano, 1413 Wayburn Rd., Grosse Pointe Park, Mich. 48230, and Gerald A. Farber, 23227 Clairwood, St. Clair Shores, Mich. 48060

Filed Sep. 18, 1987, Ser. No. 98,395

Int. Cl. B65D 83/06

U.S. Cl. 222-402.24

9 Claims

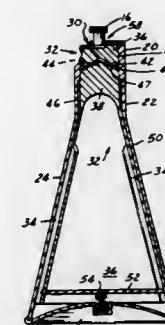
1. A dispenser comprising:

a housing adapted to hold an aerosol under pressure relative to a pressure outside of the housing, the housing having a housing opening that opens to the outside and an interior chamber surrounded by an interior wall;

a stopper assembly shaped to substantially conform to the shape of the housing and disposed within the housing so that at least a portion of the stopper assembly is exposed to

the outside through the housing opening, the stopper assembly having at least one opening through which the interior chamber is communicated to the outside and the stopper assembly being movable from a first position, in which the stopper assembly is substantially in contact with the interior wall so as to seal off the aerosol from the interior chamber to the outside of the housing, to a second position in which the stopper assembly is substantially out of contact with the interior wall thereby connecting the aerosol and the interior chamber to the outside of the housing through the stopper assembly opening;

said housing including a collar detail adjacent the opening that opens to the outside and the stopper assembly including a neck section generally disposed within the collar detail and sealing means to seal off the interior chamber from the outside of the housing when said stopper assembly is in said first position;



said sealing means being in intimate contact between the collar detail and the neck section of the stopper assembly when in said first position;

said housing including a housing interior chamber wall detail depending from the collar detail and the stopper assembly including a stopper assembly interior chamber wall section depending from the neck section, the stopper assembly interior chamber wall section having a rim with spring means disposed thereat, the spring means biasing the stopper assembly interior chamber wall section into confirmed contact with the housing interior chamber wall section; and

said housing having a bottom plate and said spring means including a cross-member diametrically attached to the rim of the stopper assembly interior chamber wall section and a compression spring attached at one end to said cross-member and at the other end to the bottom plate of said housing.

4,793,528

# LID WITH AN ADJUSTABLE POURING AND VENTING ARRANGEMENT, PARTICULARLY FOR PRIMARY COLOR OR PAINT CONTAINERS UTILIZED FOR CAR BODYWORK

Alain Krzywdziak, Saint-Denis-en-Val, France, assignor to Fonderie & Ateliers des Sablons, Orleans, France

Filed Jun. 3, 1987, Ser. No. 57,612

Claims priority, application France, Jul. 4, 1986, 86 09782

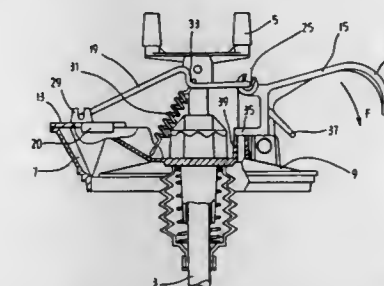
Int. Cl. B67D 3/00

U.S. Cl. 222-487

9 Claims

1. Lid with a pouring device for primary color or paint containers on stirring machines, comprising at least one latching member for fastening said lid on the opening of a container; a pouring spout having an opening portion with a planar upper surface; and operating lever having a lower end pivotally connected to an upper wall of the lid and being displaceable between a resting position and a depressed working position; a sliding element having a planar bottom surface slidable on said opening portion for selective sealing and opening

thereof, said sliding element being displaced responsive to depression of said operating lever to enable pouring of paint through said pouring spout opening; a stop member on the front side of the operating lever spaced at a distance from the pouring spout for maintaining said operating lever in the resting position and concurrently sealingly pressing against a venting orifice on the upper wall of said lid, an articulating member connecting the sliding element to said operating lever, said articulating member being hingedly connected with, respectively, the upper middle portion of the sliding element and with said operating lever at a distance from its pivot axis; spring means for biasing said sliding element to return and bear with pressure against the opening portion of the pouring spout and said operating lever so as to return the lever into the resting position in which the opening portion of the pouring spout is sealingly closed by the sliding element,



wherein said articulated member comprises a U-shaped rod having a straight middle portion and parallel arms extending from the ends of said portion and arranged on opposite sides of a stirring shaft and being curved inwardly towards each other at their free ends, said curved ends and the straight middle portion of the rod forming the hinging axes of the rod with respectively the sliding element and with the operating lever, said rod being connected to the sliding element through upstanding shoulders on the upper surface of the sliding element, and to the operating lever through bore holes formed in said lever, the plane of the sliding element and the respective hinging axes of the rod with the sliding element and the operating lever being in parallel with each other and perpendicular to the stirring shaft, the sliding element being guided over the opening portion of the pouring spout by side plates extending along side edges of the sliding element.

4,793,529

# EMPTYING DEVICE FOR A BULK SILO

Werner Krauss, and Karl-Heinz Matthies, both of Hamburg, Fed. Rep. of Germany, assignors to Claudius Peters AG, Fed. Rep. of Germany

Filed Jul. 22, 1987, Ser. No. 76,342

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1986, 3624885

Int. Cl. B65G 65/00

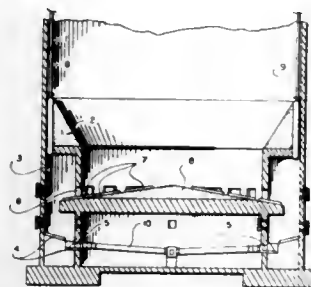
U.S. Cl. 222-637

5 Claims

1. A silo for bulk material comprising: a vertical silo housing (1) having an inclined bottom wall (8) terminating within a ventilate annular chamber (3); a circumferential inwardly sloped wall (2) from a vertical wall of said silo housing, spaced above said bottom wall (8) and over said annular chamber (3); a plurality of openings (6) between said sloped wall (2) and said bottom wall (8) leading into said annular chamber (3); said annular chamber (3) having a bottom wall lower than the bottom wall of the silo and downwardly inclined towards the vertical axis of the silo to a plurality of spaced apart discharge openings (5); a plurality of radially extending open air driven conveying chutes (7) distributed over the bottom wall (8) of the silo, through said openings (6) and terminating within said



annular chamber (3); and a plurality of circumferentially arranged air driven conveying chutes (4) on said bottom wall of



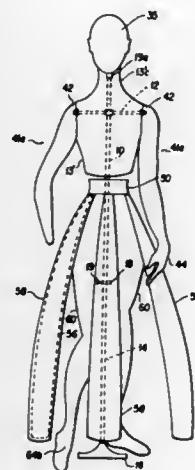
said annular chamber (3) directed towards said discharge openings (5).

**4,793,530**  
**MODULAR AND ADJUSTABLE MANNEQUIN**  
Kathryn G. Krotzeng, 5308 Dorchester Rd., Richmond, Va. 23225

Filed Apr. 29, 1987, Ser. No. 43,713  
Int. Cl. A41H 5/00

U.S. Cl. 223—68

14 Claims



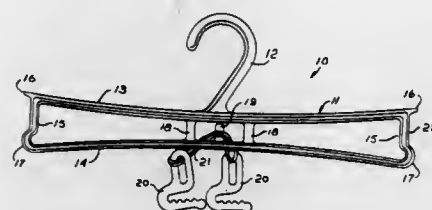
1. A modular and adjustable mannequin system comprising: a flexibly adjustable vertical support means for simulating the spinal column of the human anatomy, said vertical support means being adjustable to simulate various curvatures of said spinal column; flexibly adjustable and transversely extendable support means adapted to slide along said flexible vertical support means for simulating the shoulder structure of the human anatomy and being adjustable to simulate various curvatures of said shoulder structure, said flexibly adjustable and transversely extendable support means including means for fixing its location along said flexibly adjustable vertical support means; and, main support means adapted to have slidably mounted with respect thereto said flexible vertical support means, said main support means including means for fixing the position of said flexible vertical support means with respect to main support means.

**4,793,531**  
**WRAPAROUND SKIRT AND SLACK HANGER WITH TENSION ANCHOR**  
Russell O. Blanchard, Zeeland, and John H. Batts, Grand Rapids, both of Mich., assignors to Batts, Inc., Zeeland, Mich.

Filed Mar. 26, 1987, Ser. No. 28,150  
Int. Cl. A47G 25/62

U.S. Cl. 223—95

18 Claims

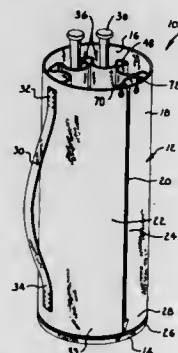


1. A garment hanger having a rigid body formed as a single straight elongated beam of fixed length, hook means for supporting said body, said body having a depending member at each end, said members each having an outwardly facing garment engaging end surface shaped to extend downwardly and outwardly to resist sliding movement relative thereto of a garment pulled firmly around both of said members to press the garment against said end surfaces; a pair of hooks each one adapted to engage an opposite end of a garment, the top of which garment extends along one face of the body and the ends thereof are wrapped around said members to seat against the opposite face of said body, tension means connecting said hooks and resiliently urging said hooks toward each other and the center of the body for applying equal tension to both ends of the garment and hold it against said end surfaces with said garment being substantially centered about the midpoint of the body between said end surfaces.

**4,793,532**  
**CARRIER FOR BALL GAME ITEMS**  
Dennis R. Cash, Box 231, Conway Springs, Kans. 67031  
Filed Aug. 10, 1987, Ser. No. 83,440  
Int. Cl. A45F 3/02

U.S. Cl. 224—202

16 Claims



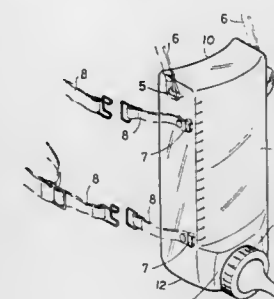
1. A carrier for ball game items, said carrier comprising: a sidewall having interior and exterior surfaces and longitudinally extending side edges; a plurality of elongated compartments coupled with said interior surface of said sidewall and extending between said side edges for holding a ball bat, said compartment having a closed end and an opposite open end; a bottom having top and bottom panels forming a compartment therebetween for holding balls; an opening in said top panel of said bottom to allow placement and removal of said balls in said compartment; first means for releasably coupling said bottom with said sidewall along a portion of a periphery of said bottom; and

second means for releasably joining together said sidewall side edges, wherein said bottom and sidewall may be coupled together to form an elongated container which is closed at the bottom and open at the top and wherein said bottom may be detached from said sidewall along a portion of the perimeter of the bottom to provide access to the ball-holding compartment.

**4,793,533**  
**INTIMACY-PROMOTING BABY FEED BOTTLE**  
Tai-Her Yang, 5-1 Taipin St., Si-Hu Town, Dzan-Hwa, Taiwan, Taiwan  
Continuation of Ser. No. 817,249, Jan. 8, 1986, abandoned. This application Sep. 3, 1987, Ser. No. 93,138  
Int. Cl. A45F 65/00

U.S. Cl. 224—148

7 Claims



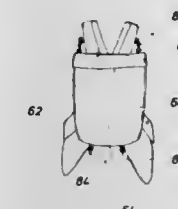
1. An infant feeding bottle comprised of: an elongated, arcuately-shaped body including a front wall having an arcuate plane, a concavely-formed rear wall, a bottom wall, and a pair of sidewalls; wherein the body is adapted to be held substantially vertically during feeding, and wherein the concavely-formed rear wall is adapted to fit the bottle on the mother or other person during feeding and to promote an intimacy with the baby, said front wall having a lower substantially arcuately-shaped feeding portion extending outwardly from the bottom of the arcuate plane of the front wall, said feeding portion having a feed aperture formed therein; a flexible feed nipple secured to the lower feeding portion over the feed aperture, providing for the controlled flow of feed formula therethrough, from the bottle, in response to the suckling of an infant; the bottom wall being inclined downwardly from the rear wall to the front wall to facilitate a smoother flow of fluid out of the nipple, and means for supporting the body on a mother or other person comprising a neck strap secured to respective first hooks on the side walls of the body, and further comprises at least one body strap secured to respective second hooks on the side walls.

**4,793,534**  
**MODULAR BACK PACK**  
Boyd B. Berry, 2006 Thompson Hwy., Richmond, Tex. 77469  
Filed Nov. 12, 1987, Ser. No. 119,681  
Int. Cl. A45F 3/04, 5/00; B65D 00/00; A41F 15/02  
U.S. Cl. 224—209

18 Claims

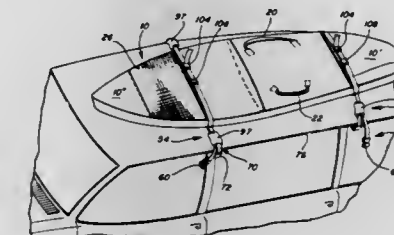
1. A modular back pack comprising: (a) a first shoulder loop component defining a first enclosure having a plurality of partitions for dividing the interior of said first enclosure to form a first set of compartments; (b) a second shoulder loop component defining a second enclosure having a plurality of partitions for dividing the interior of said second enclosure to form a second set of compartments; (c) a third component detachably connected to said first and

second shoulder loop components across the chest of a user, said third component comprising a front pack having front and rear panels connected along three sides thereof to form said front pack enclosure; and



**4,793,535**  
**COMBINED RACK AND CARRIER FOR SURFBOARD**  
Donald Johnson, 1000 Ocean Drive, #4, Oxnard, Calif. 93035  
Filed Jul. 13, 1987, Ser. No. 72,652  
Int. Cl. B60R 9/04; A45F 4/00  
U.S. Cl. 224—329

16 Claims



1. A sack carrier for surfboards, and the like, comprising: a main storage bag comprising an outer shell and defining a hollow, interior chamber in which may be stored a surfboard, or the like, said bag also having a front end and a rear end in which rear end a tail-end of a surfboard is positionable; a first strap means, and a second strap means for carrying the bag and for securing; each of said first and second strap means comprising a first elongated strap portion having a first end affixed to a first portion of said outer shell and a second end comprising one of a male-coupling means and a female coupling means, and a second elongated strap portion having a first end affixed to a second portion of said outer shell and a second end comprising the other of a male coupling coupling means and a female-coupling means; each of said second ends of each of said first and second strap portions comprising a hook means for attaching the respective said second end to a portion of a roof gutter of a vehicle, so that said bag means may be used as a vehicular roof-rack for transporting a surfboard, or the like therein; said hook means of each of said strap portions comprising a hook, and a secondary strap, said secondary strap having a first end affixed to the respective said second end, and said secondary strap having a second end to which is affixed said hook.

4,793,536

## TAPE CUTTER

Sakae Urushizaki, 7-1-1226, Minamihorie 4-chome, Nishi-ku, Osaka, Japan

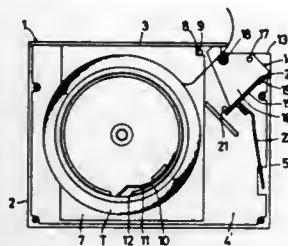
Filed Sep. 2, 1987, Ser. No. 92,218

Claims priority, application Japan, Oct. 2, 1986, 61-236705

Int. Cl.<sup>4</sup> B26F 3/02

U.S. Cl. 225-22

14 Claims



1. A tape cutter for holding a roll of tape and cutting the tape while it is pulled out, comprising:

a case;

a tape holder mounted in said case for supporting a roll of tape; a cutter support having an inner end and an outer end, pivotally mounted in said case for pivotal movement between an operative position for cutting the tape and an inoperative position, said cutter support being disposed adjacent a path of the tape pulled out of the roll of tape successively past said inner end and said outer end;

a tape guide roller rotatably mounted on and carried by said cutter support near said inner end;

a cutter fixedly mounted on said cutter support near said outer end for cutting the tape when the cutter support is in said operative position, such that drawing of the tape along said path downward toward said cutter engages the tape with said roller to pivot said cutter support into said operative position;

a stopper means for stopping said cutter support from turning in one direction with said cutter in said inoperative position;

and means for biasing said cutter support to such a direction as to put said cutter support into said inoperative position.

4,793,537

## ROLLED ADHESIVE TAPE HOLDER

Hidefumi Amagaya, Tokyo, Japan, assignor to Plus Corporation, Tokyo, Japan

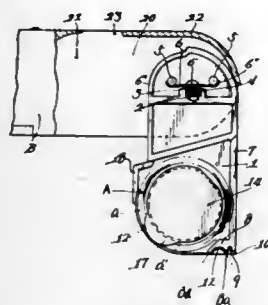
Filed Apr. 10, 1987, Ser. No. 37,184

Claims priority, application Japan, Oct. 22, 1986, 61-161946

Int. Cl.<sup>4</sup> B26F 3/02

U.S. Cl. 225-47

5 Claims



1. A rolled adhesive tape holder comprising: a primary body element having a projecting support rod for supporting a roll of adhesive tape thereon; a member extending from said primary body element in the same direction as said support rod

and having an end portion thereon; a groove adjacent the end portion of said member extending in the same direction as said member and defined by spaced walls having narrow edges; a cutting edge provided on one of said groove wall edges; and a recess on said member adjacent to said groove and spaced from said cutting edge opposite to the direction of travel of tape from a roll and of sufficient size to accommodate a fingertip therein, the edge of the walls defining said groove and recess being adapted to support the tape in substantially a point contact, whereby depression of the tape into said recess separates the tape end from said cutting edge, and causes the tape end to extend outwardly away from the holding and cutting portion of the member such that it may be grasped by the operator.

4,793,538

## ARRANGEMENT FOR THE MANUAL BREAKING OF AMPOULES

Anders Blomberg, Kungälv, Sweden, assignor to AB Västa-vensk Medicinteknik, Sweden

PCT No. PCT/SE86/00335, § 371 Date Sep. 17, 1987, § 102(e)

Date Sep. 17, 1987, PCT Pub. No. WO87/03195, PCT Pub.

Date Jun. 4, 1987

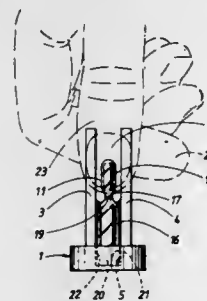
PCT Filed Jul. 14, 1986, Ser. No. 133,149

Claims priority, application Sweden, Nov. 25, 1985, 8505542

Int. Cl.<sup>4</sup> A61J 1/08

U.S. Cl. 225-93

4 Claims



1. An arrangement for the manual breaking of ampoules comprising a base part (1) so arranged as to maintain in position one end of an ampoule, and projecting upwards from the base part a side supporting part (2) so arranged as to provide a lateral support for the ampoule (16), characterized in that the supporting part exhibits two finger supporting surfaces (12, 13) for the fingers of a user, which finger supporting surfaces extend to either side of at least the other end (18) of the ampoule, so that this projects partly into a space (6) between the finger supporting surfaces, so that before the moment of breaking the other end of the ampoule projects slightly beyond a connecting line (25) between the aforementioned finger supporting surfaces, and at the moment of breaking is introduced into the aforementioned space by the fingers of the user being squeezed together with the side supporting part and the head of the ampoule in between.

4,793,539

## THROUGH-COUNTER DISPENSING SYSTEM FOR PLASTIC BAGS

Edwin W. Haenni, and Mickey M. Wilkes, both of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed Apr. 7, 1987, Ser. No. 35,552

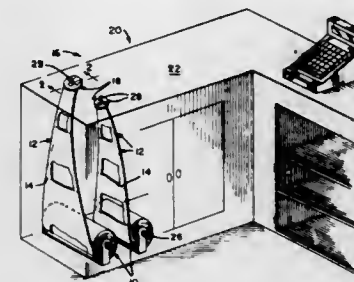
Int. Cl.<sup>4</sup> B26F 3/02

U.S. Cl. 225-106

18 Claims

1. In a system for individually severing and dispensing plastic bags from a package of bags sequentially joined along severance lines, a counter including a countertop having a product-receiving upper surface, bag storage means below said countertop for supporting a package of bags for the sequential

drawing of bags therefrom, a bore through said countertop, a bag dispensing nozzle including a plate portion mounted on said countertop in alignment with said bore, said nozzle further defining a bag-passing aperture in said plate portion and including opposed spaced edges defining an elongated dispensing slot with means resisting the free movement of bags therethrough, said means resisting the free movement of bags comprising alternating projections and recesses along said edges defining a zigzag configuration, said bag passing aperture further includ-



ing a bag supply introducing opening extending through said plate laterally to one side of said slot and communicating with said slot through an adjacent slot edge, said opening being of greater width than said slot and including a generally circular portion remote from said slot and a radial extension interconnecting said circular portion and said slot whereby the first bag from said bag supply is initially introduced through said bag supply opening and moved to said bag dispensing slot by withdrawal of the initial bag from the supply and subsequent bags are dispensed through said dispensing slot.

4,793,540

## PALLET SYSTEM

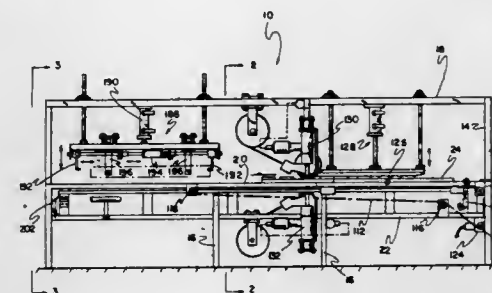
Steven J. Mangan, Xenia, and James L. May, Greenville, both of Ohio, assignors to Accurate Tool and Manufacturing, Inc., Dayton, Ohio

Filed Jan. 29, 1987, Ser. No. 8,710

Int. Cl.<sup>4</sup> B27F 7/02

U.S. Cl. 227-7

15 Claims



1. Apparatus for assembling a pallet consisting of a plurality of laterally spaced, longitudinally extending, wooden stringers, laterally extending, longitudinally spaced, top and bottom slats, overlying top and bottom surfaces respectively, of said stringers, and a plurality of nails interconnecting said stringers and slats comprising:

a main supporting frame,

a fixture having:

a first set of locators for receiving ends of said bottom slats and positioning them in desired, spaced relationship to each other,

a second set of locators for receiving said stringers and positioning them in desired spaced relationship to each other,

other and in substantially perpendicular, overlying relationship to said bottom slats, and

a third set of locators for receiving ends of said top slats and positioning them in desired spaced relationship to each other, in overlying relationship to said stringers and bottom slats, and substantially perpendicularly with respect to said stringers,

means for adjusting the positions of said locators with respect to each other, and

means for moving said third set of locators laterally outwardly to facilitate loading of said first and second sets of locators,

a nailing station mounted on said main frame medially thereof and having opposed pairs of upper and lower nailing guns equal in number to said stringers and spaced apart a distance equal to the spacing of said stringers as they are received in said second plurality of locators,

means for adjusting vertically said upper guns as a unit,

means for adjusting vertically said lower guns as a unit,

longitudinally extending rails mounted on said main frame and slidably supporting said fixture for longitudinal movement of said fixture between said opposed pairs of nailing guns,

said rails extending upstream and downstream of said nailing station a distance at least equal to the length of said fixture,

a chain drive mounted on said main frame for moving said fixture along said rails from a loading station upstream of said nailing station to a pickoff station downstream of said nailing station,

a hold-down clamp mounted on said main frame and slidably engaging in its operative position top surfaces of said top slats as said fixture moves toward said nailing station,

lowering and raising mechanism for raising and lowering said hold-down clamp from and to said operative position,

a plurality of wheels interconnected to said upper nailing guns for vertical movement therewith and engaging said top surfaces of said top slats for positioning said upper nailing guns in desired relationship to said top surfaces of said top slats,

actuating bosses positioned longitudinally along said fixture in a number corresponding to the number of top and bottom slats received in said fixture,

upper and lower proximity switches positioned along said main frame in the path of said actuating bosses for actuation of said switches by said bosses as said fixture moves along said rails,

control means for firing said nailing guns in response to actuation of said proximity switches by said actuating bosses,

opposed slat detecting switches positioned upstream of said nailing station for detecting the presence or absence of a slat as said fixture moves into said nailing station and deactivating said nailing guns in response to the absence of a slat,

a pickup carriage mounted for vertical movement downstream of said nailing station,

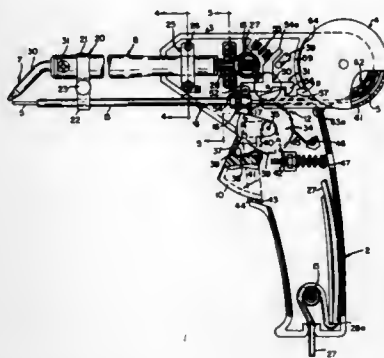
pickup arms mounted on said pickup carriage for longitudinal movement into and out of engagement with a completed pallet,

cam means carried by said carriage for vertical movement therewith and engageable with said means for moving said third set of locators laterally outwardly, and

limit switches for terminating movement of said fixture along said rails at positions upstream and downstream of said nailing station.



**4,793,541**  
**SOLDERING GUN HAVING FINGER ACTUATED FEED UNIT APPARATUS**  
 Konstantinos Dravaleks, Thiensville, Wis., assignor to International Development, Inc., Thiensville, Wis.  
 Filed Sep. 21, 1987, Ser. No. 99,246  
 Int. Cl.<sup>4</sup> B23K 3/02  
 U.S. Cl. 228—52 15 Claims



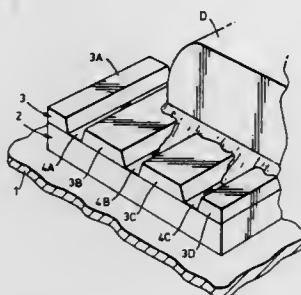
1. A soldering gun apparatus for feeding a solder wire to work, comprising:  
 a barrel member for passing solder wire therethrough and a depending handle portion for manipulation of the gun, a guide means for guiding of the wire from said barrel member, a feed wheel adapted to engage the wire and feed the wire through said barrel member and into said guide means, trigger means in said handle for rotating said feed wheel, a pressure wheel rotatably secured within said barrel in alignment with said feed wheel and including a pivoted support lever and a resilient means pivoting the lever and pressure wheel toward the feed wheel and establishing resilient engagement between the feed wheel and pressure wheel with the solder wire in the barrel between said feed wheel and said pressure wheel, release means coupled to said lever for positively moving said lever in order to space said pressure wheel from said feed wheel.

**4,793,542**  
**PROCESS FOR WELDING CAST IRON**  
 Wolfgang Farrenkopf, Friedberg/Staetzing; Heinrich Gruenauer, Augsburg; Manfred Menzinger, Kissing; Joachim von Hirsch, Schwerte, and Reinhard Opitz, Dortmund, all of Fed. Rep. of Germany, assignors to Walter Hundhausen GmbH & Co. KG, Schwerte and KUKA Schweissanlagen-+Roboter GmbH, Augsburg, both of, Fed. Rep. of Germany  
 Filed Dec. 28, 1987, Ser. No. 138,050  
 Claims priority, application Fed. Rep. of Germany, Dec. 27, 1986, 3644577  
 Int. Cl.<sup>4</sup> B23K 20/12 10 Claims

1. A process for friction-welding steel to nodular graphite-containing cast iron, comprising the steps of  
 (a) generating a relative movement between contacting surfaces of parts to be joined by rotation for a period of time,  
 (b) pressing said parts against each other along their contacting surfaces during rotation at a frictional pressure, and  
 (c) pressing said parts during a subsequent stationary period, at a forging pressure, to produce a friction-welded joint, wherein  
 (i) said cast iron is of grade 40.3 S and has a structural constitution comprising about 280-320 graphite nodules per mm<sup>2</sup>, about 280-300 ferrite grains per mm<sup>2</sup>, and a spherulite proportion of at least 95% of total graphite precipitation,  
 (ii) said period of time is such that carbon diffusion into

steel is minimized in region of the friction-welded joint, and  
 (iii) said forging pressure is elevated such that a quantitative ejection of a carburized melt results, but a weld laminate of graphite nodules in a lamella is avoided.

**4,793,543**  
**SOLDER JOINT**  
 Trevor C. Gainey, Ian Hall, and Alan R. Jones, all of Gt Yarmouth, Great Britain, assignors to STC PLC, London, England  
 Filed Aug. 28, 1987, Ser. No. 91,054  
 Claims priority, application United Kingdom, Aug. 28, 1986, 8620793  
 Int. Cl.<sup>4</sup> B23K 1/20, 31/02  
 U.S. Cl. 228—121 9 Claims



1. A method of mounting an electrical component on to a discrete area of an insulating substrate, comprising providing on said discrete area a first thick film conductive layer on the substrate and providing a second thick film conductive layer over the first layer, the second layer forming an evenly distributed series of troughs and lands, and securing the component on to the second layer by means of an adhesive such as solder.

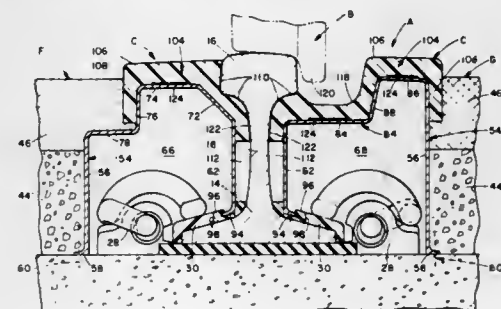
**4,793,544**  
**METHOD OF PRODUCING A MULTI-LAYER TUBE OF A MUFFLER**  
 Masuo Fukuda, Omiya, Japan, assignor to Sankai Giken Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Oct. 2, 1986, Ser. No. 914,499  
 Claims priority, application Japan, Oct. 2, 1985, 60-219714  
 Int. Cl.<sup>4</sup> F01N 7/18  
 U.S. Cl. 228—144 4 Claims



1. A method of producing a substantially cylindrical tube of a muffler for use with an internal combustion engine, comprising the steps of:  
 preparing first and second generally rectangular sheets each of which has a first and second end and each of which is dimensioned in a circumferential direction of said tube such that one end portion of each of said sheets which is

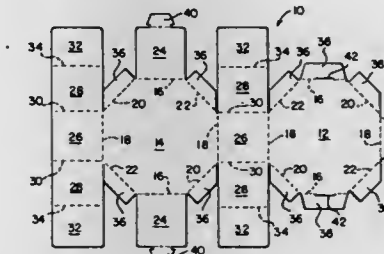
parallel to an axial direction of said tube overlaps a portion of said sheet which is wound in a tubular configuration; joining the other of said ends of said first sheet and that of said second sheet by crimping to form a joint portion; inserting said one end portion of said first sheet in a slot of a mandrel which extends parallel to an axial direction of said mandrel;  
 rotating said mandrel while pressing a roller toward said mandrel against said first and second sheets which are sequentially wrapped around on a periphery of said mandrel in a tubular configuration, whereby said first sheet is wound in a tubular configuration such that said first sheet overlaps with said one end portion of said first sheet, and said second sheet is wound in a tubular configuration on an outer periphery of said first sheet and the joint portion formed by the crimping such that said one end portion of said second sheet overlaps said second sheet at least at a portion of said second sheet non-adjacent to said one end and said other end thereof; and  
 welding said second sheet and said one end portion of said second sheet which overlaps each other;  
 whereby said substantially cylindrical tube is formed.

**4,793,545**  
**EMBEDDED TRACK ASSEMBLY**  
 Ronald P. Raymond, Cleveland, Ohio, assignor to Construction Polymers Company, Cleveland, Ohio  
 Filed Jul. 14, 1987, Ser. No. 72,967  
 Int. Cl.<sup>4</sup> E01B 1/00  
 U.S. Cl. 238—8 21 Claims



1. An insulated embedded track construction for a transit railway comprising:  
 first and second spaced, generally parallel rails extending for an indefinite length in a first longitudinal direction;  
 plural, spaced ties disposed generally perpendicular to the rails in supporting relation thereof;  
 plural rail clips secured to said ties and engaging said rails at spaced positions along said first direction for fastening said rails to said ties; and,  
 a first composite insert disposed in abutting engagement with said first rail, said first insert extending continuously along said indefinite length in said first longitudinal direction, said composite insert including a first, generally rigid channel having first and second legs extending outwardly from a connecting portion and defining a cavity for receiving said rail clips, and an elastomeric member cooperating therewith.

**4,793,546**  
**BOX**  
 Gary L. Nunn, Eaton, Ohio, assignor to Color-Box, Inc., Richmond, Ind.  
 Filed Oct. 30, 1987, Ser. No. 114,953  
 Int. Cl.<sup>4</sup> B65D 5/06, 5/36  
 U.S. Cl. 229—109 18 Claims

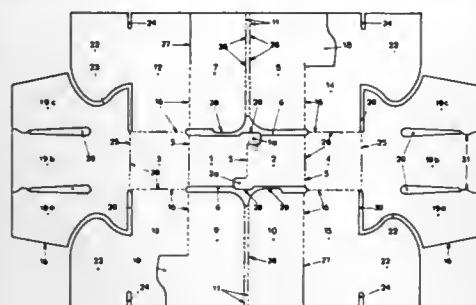


1. A box comprising:  
 polygonal top and bottom walls of substantially the same size and shape,  
 said top and bottom walls each having an even number of sides greater than four, including a first and second opposing pairs of sides,  
 a first pair of substantially rectangular wall panels each joined along first edges thereof to said first opposing sides of said bottom wall,  
 a second pair of wall panels of substantially the same size and shape as said first wall panels each joined along first edges thereof to said second opposing sides of said bottom wall, additional wall panels equal in number to at least the number of said sides minus four, interconnected to said bottom wall and of substantially the same size and shape as said first and second wall panels,  
 said top wall being joined along one of said second sides thereof to a second edge of one of said second wall panels opposite said first edge thereof,  
 a flap joined to said top wall along a second of said second sides thereof, and  
 locking tabs joined to said first wall panels along second edges thereof opposite said first edges thereof.

**4,793,547**  
**DIVIDING RACK FOR PACKING BOX**  
 Patrick Lapoule, Merignac, and Jean-Claude Roger, Ruelle, both of France, assignors to Societe Cooperative Ouvriere De Production Anonyme A Capital Et Personnel Variables, France  
 Filed Jan. 28, 1986, Ser. No. 823,412  
 Claims priority, application European Pat. Off., Jan. 28, 1985, 85450003.0; France, Jan. 19, 1985, 85 09427  
 Int. Cl.<sup>4</sup> B65D 5/48 8 Claims

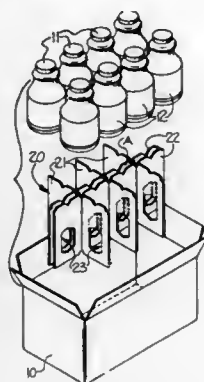
1. A dividing rack for parallelepipedal packing box, made from on cardboard flank that is cut out, grooved and formed in order to build a plurality of adjacent individual divisions which comprise rectangular panels, solid with each other, and divided by orthogonal and parallel cutting and grooving lines, which, when the rack is formed comprises:  
 a double vertical central partition aligned in a first plane,  
 two double lateral partitions aligned in said first plane on opposing sides of said double vertical central partition,  
 first single-panel partitions aligned in second planes orthogonal to said first plane between said double lateral partitions and said double vertical central partition,  
 second single panels extending in continuation of said first single panels,  
 third single panels aligned in a third plane parallel to said first plane and running between said first single panel partitions and said second single panels,

wherein said double vertical central partition includes outwardly protruding portions defined by cutups which divide panels of the double vertical central partition and the double lateral partitions,  
and wherein said third single panels and said second single panels include slot means for locking said third single panels at right angles to said second single panels;



wherein each protruding portion is defined by a flap made in one panel of the double vertical central portion which encroaches on the other panel; and  
wherein said cut-ups define an inwardly projecting portion in the vicinity of joints between panels of the double lateral partitions which is a transversal wedge for the rack at the base of the packing box.

**4,793,548**  
**ANTI-SCUFF CARTON DIVIDER**  
Glenn D. Ross, Smyrna, Ga., assignor to Sonoco Products Company, Hartsville, S.C.  
Filed Sep. 24, 1987, Ser. No. 100,750  
Int. Cl.<sup>4</sup> B65D 5/48  
U.S. Cl. 229—120.36

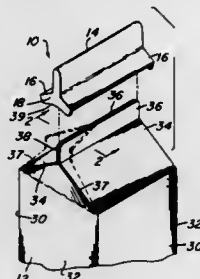


1. A carton divider for dividing the interior of a carton into cells for receiving containers, characterized by a construction which avoids scuffing of labels applied to the containers, comprising

at least one vertically oriented longitudinal partition;  
at least one separate vertically oriented transverse partition intersecting said longitudinal partition and cooperating therewith to define a plurality of cells for receiving containers, the cells having cell walls defined by the intersecting longitudinal and transverse partitions serving to separate adjacent containers from contact with one another; and  
an opening formed in at least one cell wall of each cell, each said opening having a V-shaped top, a V-shaped bottom and a pair of generally vertically extending, substantially parallel sides defined by the cell wall, and said opening being located medially of the cell wall and being so ar-

ranged in relation to a container received within the cell as to prevent contact of the cell wall with selected portions of the container where the label is applied to thereby prevent scuffing of the label.

**4,793,549**  
**MODIFIED REUSABLE CLOSURE DEVICE FOR CARTONS FOR GABLE TOPS**  
Hy Wald, 108 Flick Dr., Fort Washington, Pa. 19034  
Filed Feb. 23, 1988, Ser. No. 159,155  
The portion of the term of this patent subsequent to Mar. 3, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> B65D 45/04  
U.S. Cl. 229—125.39



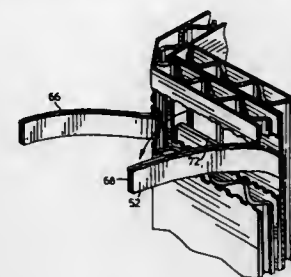
1. A closure device for a carton with a gable top, said device comprising: a cap including a pair of inner surfaces defining a longitudinal slot, said device further including shortened inclined walls extending from said cap and adapted to make a fit with said gable top, said device further including end walls extending downwardly from said cap, said carton comprising: a pair of strips, said strips having inner and outer surfaces, the inner surfaces of said strips being sealed together along their longitudinal length so that when one end of said strips is pried apart, a pouring spout is formed for dispensing the contents of said carton, and when said device is placed onto said carton, said outer surfaces of said strips of said carton are disposed within said slot in a confining relationship whereupon said inner surfaces forming said slots hold said strips closed together thereby protecting the contents of said carton from spillage or the ingress of contaminants therein, with said shortened inclined side walls conforming to said carton to guide said carton strips into said slot and wherein said end walls are in part defined by an inclined convex arcuate edge to facilitate gripping by one or more fingers of a user.

**4,793,550**  
**REINFORCED CARTON**  
Norman J. Gottlieb, Thornhill, Canada, assignor to Container Corporation of Canada, Richmond Hill, Canada  
Filed Nov. 2, 1987, Ser. No. 115,390  
Int. Cl.<sup>4</sup> B65D 5/02, 5/54  
U.S. Cl. 229—199

1. In a carton having a side wall which forms a perimeter wall of a load storage compartment and wherein the side wall has first and second side edges and first and second margin portions extending inwardly from said first and second side edges respectively, said first margin portion overlapping and being secured to said second margin portion to form a lap-joint to complete the perimeter wall, the improvement of;

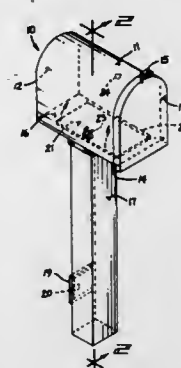
a binding strap secured to said perimeter wall so that is retained in close proximity to the perimeter wall, said strap having a sufficient length to extend about the perimeter wall and to provide first and second end portions at the first and second margin portions respectively and which terminate at the first and second edges respectively, said first margin portion being formed with weakened tear lines which extend inwardly from the first edge on either

side of the first end portion of the strap, said weakened tear lines terminating at or adjacent the second edge to form a removable tab which when removed forms a window in the first margin portion which provides access to



the second end portion to permit the second end portion to be connected to the first end portions such that the strap may form a reinforcing band which extends about the perimeter of the load storage compartment.

**4,793,551**  
**STORAGE MAIL BOX**  
Jack W. Baylor, 1094 Fairview Dr., Paradise, Calif. 95969  
Filed Mar. 10, 1988, Ser. No. 166,406  
Int. Cl.<sup>4</sup> B65D 91/00  
U.S. Cl. 232—17



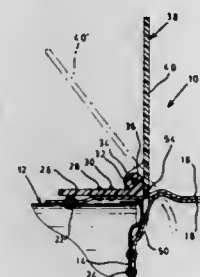
1. A storage mail box apparatus for receiving mail comprising a horizontally oriented housing including an elongate side wall means integrally secured to a floor means and a rear end wall for defining a chamber with a forward housing access door pivotally mounted to said side wall means;  
said floor means including a planar floor with a trap door pivotally mounted to said floor overlying a delivery chamber mounted to a hollow post;  
said hollow post formed with a post access door proximate a lower end thereof remote from said delivery chamber wherein said lower end is fixedly securable to a support.

**4,793,552**  
**MAILBOX SERVICE INDICATOR**  
Jewel W. Revels, Rte. 2, Box 448, Rockwood, Tenn. 37854  
Filed Feb. 18, 1988, Ser. No. 157,251  
Int. Cl.<sup>4</sup> B65D 91/00  
U.S. Cl. 232—35

1. A service signalling device for mailboxes of the type having cooperating friction latch members, at least one latch member being attached to a top of the mailbox body, said latch member having a substantially flat exposed surface, said mail-

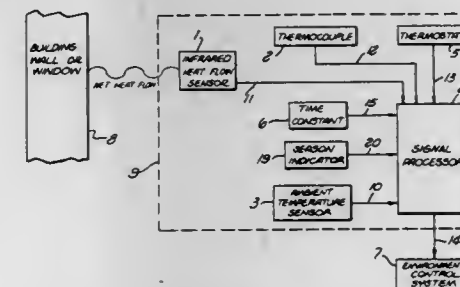
box provided with an access door, said service signalling device comprising:

a mounting plate member for placement juxtaposed said flat exposed surface of said latch member, said mounting plate having a first end directed toward said door, and a second end;  
a cylindrical body member joined to said first end of said mounting plate, said body member having an axis transverse said mounting plate and substantially parallel to a plane of said door, said body member provided with an axial bore;  
a pivot member extending through said bore;  
a signal flag member having a forward surface and a rearward surface, said signal flag defining a perimeter and



provided with a cutout portion in said perimeter to define a pair of leg members having terminal ends;  
a pair of journal members carried by said rearward surface of said signal flag member, said journal members positioned whereby said legs extend past opposite edges of said latch member, said journal members provided with aligned apertures to receive said pivot member whereby said signal flag member can be pivoted from a "tripped" position substantially parallel with said mounting plate to a "set" position substantially parallel to said door; and  
friction engagement means adapted to provide friction when said signal flag member is in said "set" position to inhibit pivoting motion of said signal flag member away from said "set" position unless said door is opened away from said mailbox body.

**4,793,553**  
**INFRARED THERMOSTAT CONTROL**  
Herbert L. Berman, 12680 Viscaino Rd., Los Altos, Calif. 94022  
Filed Nov. 9, 1981, Ser. No. 319,273  
Int. Cl.<sup>4</sup> G01K 17/00; G05D 23/00  
U.S. Cl. 236—91 R



1. A system for automatically controlling the temperature within an enclosed building having an environmental control system, which has at least a heater and/or air conditioning equipment, and at least one wall exposed to external thermal energy comprising:  
(A) means responsive to the flow of thermal energy through



the wall into the enclosed building for providing an electrical input signal;  
 (B) means responsive to the internal ambient air temperature of the building for providing an ambient temperature signal;  
 (C) means for processing the electrical input signal and the ambient temperature signal for providing a control signal;  
 (D) means to set the threshold level for the control signal;  
 (E) means for switching on and off the building environmental control system in response to the control signal.

4,793,554

## DEVICE FOR MAKING ARTIFICIAL SNOW

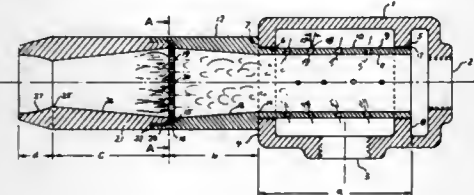
Edmund J. Kraus, and Robert A. Kraus, both of 1636-T E. Edinger, Santa Ana, Calif. 92705

Continuation-in-part of Ser. No. 74,040, Jul. 16, 1987, Pat. No. 4,759,503. This application May 5, 1988, Ser. No. 190,684

Int. Cl.<sup>4</sup> A01G 15/00

U.S. Cl. 239-2.2

6 Claims



1. An apparatus and method for making artificial snow, comprising:

- (a) a housing means having a laterally thereto disposed, first inlet port connectable to a source of compressed air, and having an axially disposed second inlet port connectable to a source of pressurized water;
- (b) a first tubular member having a first portion being provided with a cylindrical inner wall, a multitude of circumferential and longitudinally spaced holes, and an axial to said second inlet port connected entrance aperture; as well as being provided with second portion having a diverging inner wall, and an internally threaded exit aperture;
- (c) a second tubular member having a converging inner wall, an externally threaded axial disposed entrance aperture, and an axial disposed exit nozzle to atmosphere;
- (d) a flat disk having a multitude of longitudinally aligned atomizer orifices, being flow restrictive disposed between said exit aperture of said first tubular member, and said entrance aperture of said second tubular member;

said first tubular member being fixed within said housing means so as to form within an annular chamber surrounding said first portion of said first tubular member; and so as to form a fluid communicative passage from said first inlet port through said annular chamber, and via said multitude of holes into said first tubular member; as well as to form a second fluid communicative passage from said second inlet port through said first tubular member, and via said atomizer orifices and said second tubular member and exit nozzle into atmosphere; said method involves:

- (1) the induction of a steady stream of compressed air through said first inlet port, and the conduction of said compressed air via said annular chamber and said multitude of holes so as to form within said first tubular member a multitude of radially inward directed jets of compressed air;
- (2) the concurrent induction of a steady stream of water at a substantially lower pressure through said second inlet port so as to follow a path, longitudinal through said first tubular member, and via said atomizer orifices and through said second tubular member and said exit nozzle into atmosphere;
- (3) the mixing of said compressed air with said stream of water, within said first tubular member;
- (4) the forcing of said mixture of water and compressed air

through said atomizer orifices, thereby causing the partial expansion of said compressed air, and the consequential first atomization, i.e., the formation of a multitude of progressive in longitudinal direction expanding jets of tiny, uniformly sized water droplets being mixed with partially decompressed air;

- (5) the merging of said multitude of jets into a single stream of atomized water droplets mixed with still partially compressed air and the accelerating of said mixture to maximum velocity toward said exit nozzle within said second tubular member;
- (6) the concurrent utilization of the cooling effect generated by the partial expansion of said compressed air for pre-cooling, and thereby partially nucleating said water droplets before egress through said nozzle into atmosphere;
- (7) the final expansion of said still partially compressed air to atmospheric pressure, thereby causing the final atomization of any water not jet being atomized, and the projecting of a plume of finely atomized water droplet from said nozzle, through an trajectory within the colder atmospheric air, along which said droplets freeze into tiny crystalline particle of ice before falling to the ground.

4,793,555

## CONTAINER, METHOD AND COMPOSITION FOR CONTROLLING THE RELEASE OF A VOLATILE LIQUID FROM AN AQUEOUS MIXTURE

Chi-Long Lee; Gerald A. Gornowicz, both of Midland, Mich.; Frank P. Larkin, Roswell, Ga., and Ryuzo Mikami, Ichihara, Japan, assignors to Dow Corning Corporation, Midland, Mich.

Filed Apr. 22, 1988, Ser. No. 184,727

Int. Cl.<sup>4</sup> A61L 9/12

U.S. Cl. 239-6

8 Claims

6. In a method for achieving release of at least one volatile liquid ingredient of an aqueous mixture into a gaseous atmosphere at a controlled rate by separating said mixture from said atmosphere by means of a release controlling layer of a solid material that is inert with respect to said mixture, from 0.001 to 1 mm. thick and permeable to said ingredient, where the improvement is characterized by selecting the material of said release controlling layer from substantially linear dimethylsiloxane/oxyethylene/urethane block copolymers comprising from 20 to 40 weight percent of hard segments consisting essentially of polyurethane units derived from an organic diisocyanate and an alkylene diol, and from 60 to 80 weight percent of soft segments comprising from 15 to 65 percent by weight, based on the weight of said copolymer, of a hydrophobic portion consisting essentially of at least one sequence of from 15 to about 100 dimethylsiloxane units and from 10 to 65 percent by weight, based on the weight of said copolymer, of a hydrophilic portion consisting essentially of at least one sequence of from 5 to 70 oxyethylene units, where the molar ratio of hard to soft segments is from 2.5 to 7.

4,793,556

## METHOD OF AND APPARATUS FOR THE NEBULIZATION OF LIQUIDS AND LIQUID SUSPENSIONS

Barry L. Sharp, Skene, Scotland, assignor to National Research Development Corporation, London, England

Continuation of Ser. No. 812,645, Dec. 23, 1985, abandoned.

This application Sep. 8, 1987, Ser. No. 96,233

Claims priority, application United Kingdom, Dec. 21, 1984, 8432338

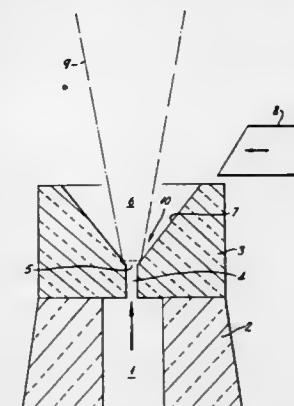
Int. Cl.<sup>4</sup> B05B 1/02, 7/08

U.S. Cl. 239-418

3 Claims

1. Apparatus for the nebulisation of fluid materials comprising an expansion nozzle connectable to a gas supply and having an orifice for the emergence of a divergent stream of gas from said gas supply into an exhaust region partially bounded by a guide wall convergent towards said orifice, fluid materials

transport means to convey said fluid materials from a source to said guide wall to introduce said fluid materials into said stream of gas wherein said guide wall is substantially conical and converges towards said orifice at an angle greater than the



Prandtl-Mayer angle for the gas from said gas supply to create a region of entrainment and backflow of said fluid materials along said guide wall towards said orifice and wherein said fluid transport means terminates adjacent said region of entrainment and backflow.

4,793,557

## FIREFIGHTING MONITOR APPARATUS

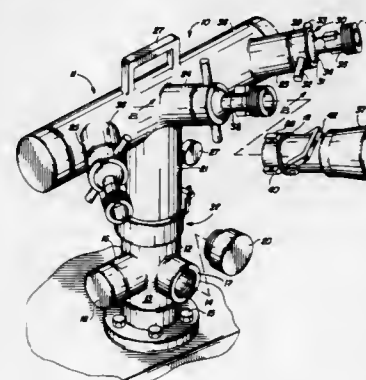
Antonio B. Marchese, 1020 NE. 8th Ave., Ocala, Fla. 32670, and Timothy P. Ernst, 2677 NW. 20 St., Ocala, Fla. 32675

Filed May 15, 1984, Ser. No. 610,375

Int. Cl.<sup>4</sup> A62C 31/24

U.S. Cl. 239-587

11 Claims



- 1. A fire fighting monitor comprising in combination: a casing having at least one fluid inlet thereinto and a plurality of outlet therefrom;
- rotary joint means formed on said casing for rotating said fluid outlets together; and
- a swiveling nozzle coupling coupled with dual swiveled ball joint couplings to each fluid outlet for directing fluid from each outlet separately for each nozzle, each nozzle being separately controlled for direction in spray pattern and each ball joint having a passageway therethrough having an annular radius surface thereon and attached to the outlet with an attaching collar having internal threads therein for locking said ball joint in position by rotating said collar whereby a fire fighting monitor allows separate fluid streams of controlled fluid dispersion patterns.

4,793,558

## DEVICE FOR DISSEMINATION OF A SPREADABLE MATERIAL

Jan Winkel, Sassenheim, and Gerrit J. Lamfers, Nieuw-Vennep, both of Netherlands, assignors to Multinor B.V., Nieuw-Vennep, Netherlands

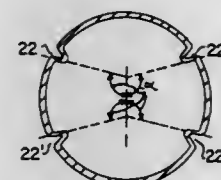
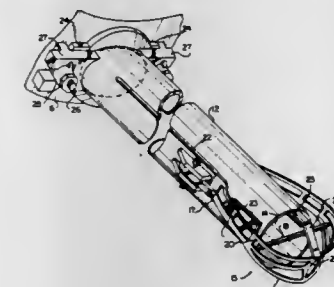
Filed Feb. 17, 1987, Ser. No. 15,682

Claims priority, application Netherlands, Feb. 10, 1986, 8600420

Int. Cl.<sup>4</sup> A01C 15/00

U.S. Cl. 239-659

14 Claims



- 1. A device for spreading particulate material such as fertilizer onto ground surface, which comprises the combination of a frame adapted to be attached to a powered vehicle and a hopper carried by the frame and having a bottom opening, a dosage mechanism disposed below the bottom opening of the hopper for receiving particulate material therefrom and including a horizontally projecting spreader pipe having a longitudinal axis, an infed end communicating with the hopper bottom opening, an inner surface for guiding the particulate material along the length of the spreader pipe and a free end portion defining a discharge end, means for rapidly oscillating the dosage mechanism about a generally vertical axis so that the spreader pipe whips back and forth to travel and guide particulate material from the infed end to the discharge end under action of centrifugal force and to broadcast particulate material through the discharge end thereof, and the inner surface of the spreader pipe including guide surface means on either side of a vertical plane containing the longitudinal axis of the spreader pipe and enclosing an angle with such plane for confining particulate material traveled by the spreader pipe due to the whipping motion thereof within a zone at the discharge end of the spreader pipe which is vertically narrower than such discharge end.

4,793,559

## LIQUID CHEMICAL APPLICATOR

Edward Marlek, 8 Northfield Dr., Ft. Salonga, N.Y. 11768

Filed Dec. 28, 1987, Ser. No. 137,970

Int. Cl.<sup>4</sup> B05B 1/20

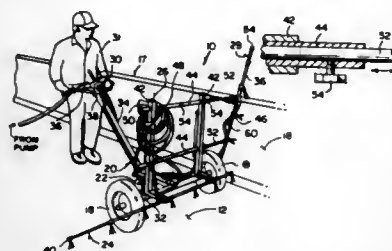
U.S. Cl. 239-722

5 Claims

- 1. An improved liquid chemical applicator for treatment of horizontal, vertical and angular surfaces which comprises: (a) a pair of front wheels;
- (b) a first frame assembly having an axle, an extension arm

and a control handle, the axle extending between said front wheels, the extension arm rearwardly projecting transversely from center of the axle and extending upwardly therefrom, with the control handle disposed at the distal end of the extension arm;

- (c) a rear wheel rotatably connected to the bottom of the extension arm rearwardly of said front wheels whereby said rear wheel is manually steered by an operator holding onto the control handle;
- (d) a first manifold assembly mounted in front of, and in parallel alignment with said axle, and having a plurality of spaced apart first spray nozzles thereon;
- (e) a second frame assembly having a pair of vertical posts and a pair of horizontal hollow pipes, the vertical posts being spaced apart and secured to the axle of said first frame assembly between said front wheels, with the hol-



low pipes spaced apart and horizontally secured through the vertical posts so that the hollow pipes are above, behind and in parallel alignment with said first manifold assembly;

- (f) a second manifold assembly adjustably mounted within the hollow pipes said second manifold assembly having a plurality of spaced apart second spray nozzles connected thereto; and
- (g) means for directing flow of pressurized liquid chemical by the operator to said first manifold assembly and said second manifold assembly so that the first and second spray nozzles will apply a plurality of overlapping sprays of the liquid chemical at a constant height, at a constant pressure and in a proper direction onto the horizontal vertical and angular surfaces to form a uniform coating thereon.

4,793,560

#### METHOD AND APPARATUS FOR ADJUSTING THE GAP WIDTH OF A CONE-TYPE CRUSHER

Hermann Schrödl, Gallsbach, Austria, assignor to Fried. Krupp Gesellschaft mit beschränkter Haftung, Essen, Fed. Rep. of Germany

PCT No. PCT/EP86/00519, § 371 Date May 11, 1987, § 102(e) Date May 11, 1987, PCT Pub. No. WO87/01305, PCT Pub. Date Mar. 12, 1987

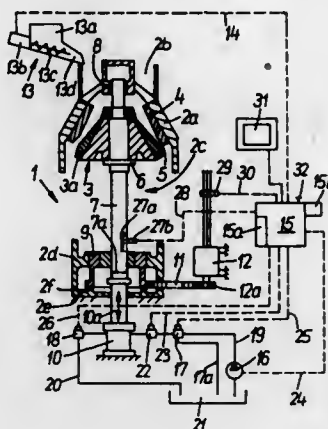
PCT Filed Sep. 9, 1986, Ser. No. 61,434  
Claims priority, application Austria, Sep. 10, 1985, 2634/85  
Int. Cl.<sup>4</sup> B02C 2/00

U.S. Cl. 241—30

10 Claims

1. A method for adjusting the gap width between a rotatable crusher cone and a crusher housing, comprising the steps of:
  - (a) determining a reference position of the crusher cone relative to the crusher housing;
  - (b) storing a first quantity representative of said reference position;
  - (c) moving said crusher cone to said reference position;
  - (d) moving said crusher cone from said reference position toward said crusher housing until a limit position is reached, stopping the movement of said crusher cone toward said crusher housing when the limit position is reached, and measuring the distance between said reference position and said limit position;

- (e) storing a second quantity representative of said distance;
- (f) repeating steps (c)-(e) a plurality of times while separately storing each of the second quantities;
- (g) obtaining a new reference position by analyzing each of said second quantities in conjunction with each other;



- (h) determining an operating position of said cone crusher based on said new reference position;
- (i) moving said crusher cone to said new operating position; and
- (j) performing steps (c)-(i) while continuously rotating said crusher cone.

4,793,561

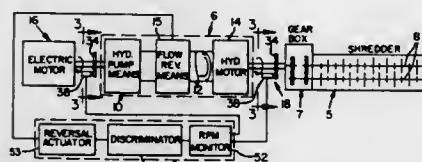
#### SPEED-RESPONSIVE REVERSING HYDRAULIC DRIVE FOR ROTARY SHREDDER

Dan S. Burda, Carrollton, Tex., assignor to MAC Corporation of America, Grand Prairie, Tex.

Filed May 24, 1982, Ser. No. 381,432  
Int. Cl.<sup>4</sup> B02C 25/00

U.S. Cl. 241—36

8 Claims



1. A drive arrangement for a rotary shear-type shredder including shredding means, said arrangement comprising:

- a hydraulic fluid-pumping means;
- a first rotational drive means operatively connected to said fluid-pumping means for unidirectionally driving the latter;
- a reversible hydraulic motor means;
- a second rotational drive means operatively-connected to said hydraulic motor means for bidirectionally driving said shredding means;
- a hydraulic fluid drive circuit means including the hydraulic fluid-pumping means and the reversible hydraulic motor means for transmitting power from the first drive means in a downstream direction to the second drive means and transmitting changes in a load in the shredder means upstream to the first drive means, the first drive means being responsive to an increase in load to operate at a reduced speed;
- a flow-reversing means for reversing a fluid flow in the hydraulic circuit to the hydraulic motor means to reverse said motor means and thus said shredding means; and
- an electrically operable reversing control means for actuat-

ing the flow-reversing means upon detecting an increase in load corresponding to a jamming condition during shredding operation, including:

- jam-sensing means connected to the first drive means upstream of the fluid circuit means and operable to sense the speed of said first drive means and responsive to a predetermined minimum speed thereof corresponding to a jamming condition in the shredding means to produce an electrical signal; and
- electrically reversible operable actuation means responsive to the reversal signal for actuating the flow-reversing means to reverse flow in the fluid circuit means for a predetermined time interval.

4,793,563

#### WIRE HOLDING DEVICE FOR COIL WINDING MACHINE HAVING WIRE CHIP REMOVING MECHANISM

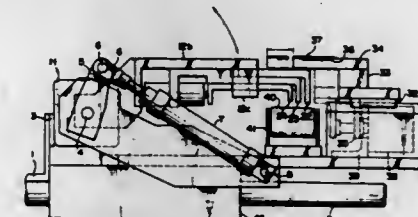
Yoji Suekane, Tokyo, Japan, assignor to Tanaka Seiki Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1987, Ser. No. 27,446

Claims priority, application Japan, Apr. 1, 1986, 61-48433[U]  
Int. Cl.<sup>4</sup> B21F 3/00

U.S. Cl. 242—1

4 Claims



1. A wire holding device for a coil winding machine having a wire chip removing mechanism, said device comprising:
  - a moving base;
  - a support arm mounted on said moving base;
  - an axle bar supported by said support arm;
  - a wire holder support rotatably mounted on said axle bar with said axle bar forming an axis of rotation;
  - a wire holder mounted on said wire holder support, said wire holder having a plurality of fingers driven by first actuators;
  - a rotary actuator mounted on said moving base for rotating said wire holder support about said axle bar from a first wire holding position to a second wire releasing position; and
  - a wire chip remover selectively positioned adjacent said wire holder when said wire holder is in said second wire releasing position for removing wire from said fingers; wherein said plurality of fingers slidably engage said wire chip remover during a return of said wire holder support from said second wire releasing position to said first wire holding position.

4,793,564

#### DEVICE FOR CONTROLLING UNWINDING IN A WEB-FEEDING DEVICE OF A PRINTING MACHINE

Dietrich Hank, Leipzig; Reinhard Naumann, Delitzsch, and Wolfgang Schneider, Leipzig, all of Fed. Rep. of Germany, assignors to Veb Kombinat Polygraph "Werner Lamberz" Leipzig, Fed. Rep. of Germany

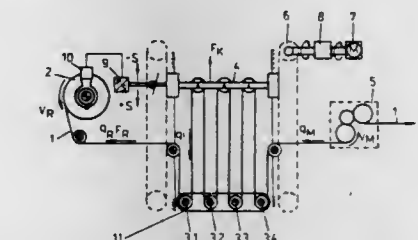
Filed Jan. 25, 1987, Ser. No. 67,227

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1986, 293880

Int. Cl.<sup>4</sup> B65H 59/00, 20/24

U.S. Cl. 242—75.44

2 Claims



1. In a device for controlling an unrolling of a continually unwound material web in material web unwinding devices of printing machines, comprising an unwinding roller with a roller brake; a web storage including a housing-fixed roller group with a plurality of rollers unloadable in a stand still

4,793,562

#### ELECTRIC MOTOR FOR DRIVING PROCESSING MACHINES, ESPECIALLY REFINERS, AND HAVING A ROTOR HOLDING DEVICE

Werner Hirmake, Kalchauerth, and Erich Losensky, Berlin, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

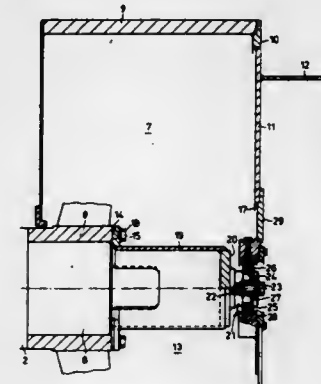
Filed Aug. 12, 1987, Ser. No. 84,921

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1986, 3628196

Int. Cl.<sup>4</sup> B02C 7/16

U.S. Cl. 241—101.2

7 Claims



1. An electric motor having a rotor shaft, a housing and slide bearings for supporting the rotor shaft, the motor adapted for driving a processing machine, wherein the rotor shaft has no shaft shoulders in the vicinity of the slide bearings, the electric motor having a first shaft end adapted to be coupled to the processing machine and a second shaft end facing away from the processing machine, and further wherein the second shaft end is provided with means for centering and fastening a rotor holding device comprising an antifriction bearing with axial load-carrying capacity, said bearing having an inner ring fixed relative to the second shaft end and an outer ring fixed relative to the housing, the housing comprising a housing part located in front of the second shaft end having an opening for access to the second shaft end, said opening being closable; and the length of the rotor holding device in a longitudinal direction of the rotor shaft selected so that the rotor shaft is displaced a given distance away from the processing machine in a direction toward the antifriction bearing when the rotor shaft is fastened to the rotor holding device.



position and loadable again, and a movable roller groups, wherein said movable roller group, upon emptying of said web storage is biased by a biasing force means against an advancing force exerted on said movable roller group by a web tension, and for loading said web storage, is displaced opposite to the direction of said housing-fixed roller group by an advancing force exerted on said movable roller group; and means for controlling the roller brake in dependence upon a deviation of said movable roller group, the improvement comprising drive means which couple two rollers (3.1, 3.4) of said housing-fixed roller groups of said web storage so that peripheral speeds of said coupled rollers (3.1, 3.4) are the same; and means to uncouple said drive means during the emptying of said web storage.

4,793,565

# YARN STORAGE AND SUPPLY APPARATUS, PARTICULARLY FOR TEXTILE MACHINES

Josef Fecker, Bisingen-Steinhofen, Fed. Rep. of Germany, assignor to Memminger GmbH, Freudenstadt, Fed. Rep. of Germany

PCT No. PCT/DE87/00003, § 371 Date Aug. 3, 1987, § 102(e) Date Aug. 3, 1987, PCT Pub. No. WO87/04417, PCT Pub. Date Jul. 30, 1987

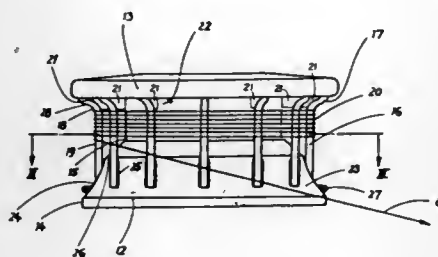
PCT Filed Jan. 10, 1987, Ser. No. 113,279

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1986, 3601586

Int. Cl.<sup>4</sup> B65H 51/22

U.S. Cl. 242—47.01

18 Claims



1. Yarn storage and supply apparatus, particularly for textile machines, comprising:

a storage drum having a drum shaft, a drum body, and a plurality of elongated yarn support elements distributed circumferentially around the drum shaft at a given radial distance therefrom and extending substantially in the direction of the drum shaft;

each of said yarn support elements being in the form of a narrow yoke secured at both ends to said drum body and having, on a yarn supply side of the drum body, a first portion tapering radially inward toward the drum shaft to form a run-on incline for oncoming yarn and, adjoining this first portion, a second portion that at least in some segments is substantially straight and that forms a yarn support region for a plurality of loops of one yarn winding, wherein the first and second portions of all the yokes are, respectively, each located on common imaginary rotational bodies that are coaxial with the drum shaft; yarn delivery means for feeding yarn to the yarn supply side of the drum body;

yarn run-off for removing yarn tangentially from a rim on a yarn run-off side of the drum body to a location positioned laterally of the drum shaft direction;

a drive means coupled to the storage drum for attaining a relative rotation between the storage drum and the yarn delivery means and yarn run-off means;

said drum body having said yarn supply side located toward one end of the drum shaft,

a yarn run-off side toward the other end of the drum shaft including said rim which is a radially protruding, circu-

lar, continuous yarn run-off rim extending further axially from the yarn supply side than does the substantially straight second portion of the yokes, and means on the yarn run-off side for preventing accumulation on the yarn run-off side of fiber parts shed by the yarn, including means for defining a circumferential surface which is engaged by the yarn and extends, in the drum shaft direction, toward the yarn supply side from the run-off rim, an is radially inwardly inclined toward the drum shaft, said surface being coaxial with and coupled to the drum shaft and continuous in the circumferential direction, at least in regions located between adjacent yokes, at least part of said surface being, in the drum shaft direction, between the yarn supply side and said location to which the yarn is removed, said yokes entering the surface to form a substantially smooth transition zone therebetween; whereby the circumferential surface on the yarn run-off side of the storage drum is axially stripped continuously by yarn running off the yarn run-off rim to clear the drum of fiber parts shed by the yarn.

4,793,566

# METHOD AND APPARATUS FOR FORMING MULTI-LAYER COILS FROM SUBSTANTIALLY FLAT, FLEXIBLE PRODUCTS, ESPECIALLY PRINTED PRODUCTS, ARRIVING IN IMBRICATED PRODUCT FORMATION

Werner Honegger, Tann-Rüti, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

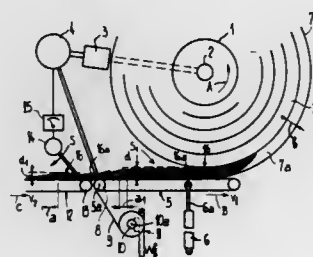
Continuation of Ser. No. 649,370, Sep. 11, 1984, abandoned. This application Oct. 23, 1986, Ser. No. 922,257

Claims priority, application Switzerland, Sep. 19, 1983, 5067/83

Int. Cl.<sup>4</sup> B65H 75/00

U.S. Cl. 242—59

9 Claims



1. A method for forming a multi-layer coil from printed products, each having a given product thickness and delivered in an imbricated product formation having a given imbrication pitch and a delivered formation thickness conjointly determined by said product thickness and said imbrication pitch, comprising the steps of:

regulating, before winding-up the products into a coil, said delivered formation thickness of said imbricated product formation to be wound-up so as to have a prescribed value which remains essentially constant throughout the formation of said coil, by increasing or decreasing the given imbrication pitch of said products within said imbricated product formation as a function of the given product thickness;

winding-up said products together with a winding strap upon a winding mandrel to form said coil so as to have a multiplicity of coil layers having a radial dimension corresponding to said prescribed value; and said winding strap lying on an outer face of a coil layer being formed.

4,793,567

# CLAMPING HEAD FOR CENTERING AND CLAMPING WINDING TUBES

Hans Weiss, Hans-Joachim Fissmann, and Hans-Albrecht Ruff, all of Heidenheim, Fed. Rep. of Germany, assignors to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany

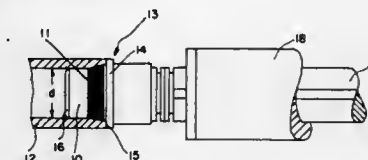
Filed Oct. 14, 1987, Ser. No. 108,228

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1986, 3636457

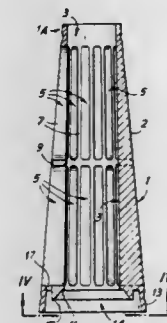
Int. Cl.<sup>4</sup> B65H 18/04, 16/06

U.S. Cl. 242—68.1

8 Claims



1. A clamping head for centering and clamping a winding tube onto or from which web type material such as a paper web and the like is being wound or unwound and wherein said winding tube comprises an internal axially extending cylindrical surface, comprising a clamping head body means, said body means comprising a non-expandable cylindrical body portion with an outer cylindrical surface for reception within and against said internal cylindrical surface and a radiating flange portion for being juxtaposed to an axial end face of said winding tube upon said reception of said cylindrical body portion, wherein the outer diameter of said cylindrical body portion corresponds to the inner diameter of said internal cylindrical surface, said body means further comprising a longitudinally extending non-expandable serration portion of conical-like configuration generally axially between said cylindrical body portion and said flange portion, wherein said serration portion comprises a plurality of longitudinally extending teeth angularly spaced about the axis of said cylindrical body portion and defining a like plurality of surface areas between said teeth, wherein said teeth start with and in said cylindrical surface of said cylindrical body portion beginning there with a zero cross-section and extend toward said flange portion with a continuously increasing geometrically similar cross-section, wherein said plurality of surface areas between said teeth comprise continuing extensions of said cylindrical surface of said cylindrical body portion, and wherein in the region of said flange portion said teeth abut against each other at their respective bases in circumferential direction about the axis of said cylindrical body portion.



in the body wall extending radially outwardly from the socket; the slots progressively increasing in width as they extend radially outwardly from the socket; a conical skirt defined by a longitudinal extension of the body wall at the largest diameter end; the conical skirt protruding axially beyond an axial end of the socket to form a longitudinally extending recess in the largest diameter end; an annular bottom for the recess extending around the axial

end of the socket and having the same diameter as the smallest diameter end; an annular projection protruding into the recess from the annular bottom at a location radially inwardly of and spaced apart from the skirt; an inner surface of the projection defining an inwardly inclined profile to provide a funnel-entry surface for guiding the bottom accurately into engagement with a smallest diameter end of another, similar, carrier centered on the same stem enabling stacking of similar carriers on the same stem intermated in precise coaxial alignment.

4,793,569

# APPARATUS FOR GUIDING A LEADER BLOCK AND A TAPE IN A TAPE CARTRIDGE FOR A MAGNETIC INSTRUMENT

Mitsuhiro Ohsaki, Kodaira, Japan, assignor to Nakamichi Corporation, Kodaira, Japan

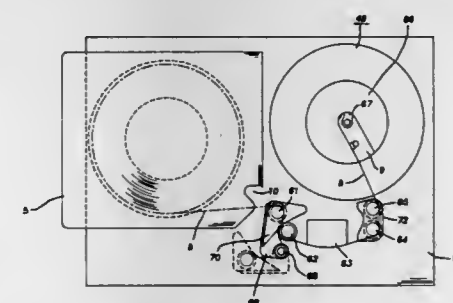
Filed Oct. 27, 1987, Ser. No. 113,876

Claims priority, application Japan, Nov. 10, 1986, 61-172256[U]

Int. Cl.<sup>4</sup> G11B 15/66

U.S. Cl. 242—195

3 Claims



1. An apparatus for guiding a leader block and a tape contained in a tape cartridge for a magnetic instrument having a single reel and connected to a leader end of a tape in the tape cartridge characterized by comprising; a leader block guide member to guide said leader block so that said leader block is contained in said tape cartridge;

4,793,568

# CONE FOR DYEING YARNS REELED ON SPOOLS WITH AXIAL SEAT TO GUIDE THE STEM AND RECESS FOR THE INTERPENETRATION OF SUPERIMPOSED CONES

Tiziano Romagnoli, Florence, Italy, assignor to Mariplast S.p.A., Italy

Filed Oct. 30, 1987, Ser. No. 116,006

Claims priority, application Italy, Nov. 11, 1986, 11915/86[U]

Int. Cl.<sup>4</sup> B65H 75/20

U.S. Cl. 242—118.1

4 Claims

1. A carrier for supporting reeled yarns on the stem of a dyeing machine comprising:

a tubular body including a body wall defining a truncated-cone external surface with axially spaced smallest and largest diameter ends and an internal, axially extending, through-socket for centering on the stem; the through-socket having opposite axial ends adjacent the smallest and largest diameter ends, respectively; a series of longitudinally extending dyestuff admitting slots

a tape guide member to guide said tape so that said tape is moved along a tape running path; and drive means to displace said leader block guide member and said tape guide member integrally with each other whereby said leader block guide member engages with said leader block while said tape guide member is disengaged from said tape.

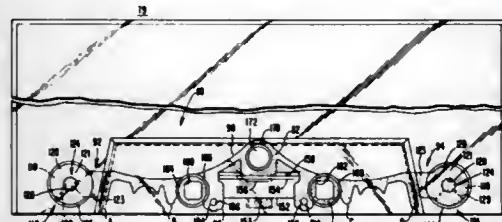
**4,793,570**  
**TAPE CASSETTE WITH SEPARATE TAPE GUIDE**  
**HAVING INTEGRATED ROLLERS AND METHODS FOR**  
**MANUFACTURING SAME**

Anthony L. Gelardi; John Gelardi, both of Cape Porpoise; Vincent F. Landry; Diane C. Purneau, both of Saco, all of Me., and Alan B. Lowry, Canton, Mass., assignors to Shape Inc., Biddeford, Me.

Filed Jan. 6, 1987, Ser. No. 883  
Int. Cl.<sup>4</sup> G11B 23/087

U.S. Cl. 242—199

11 Claims



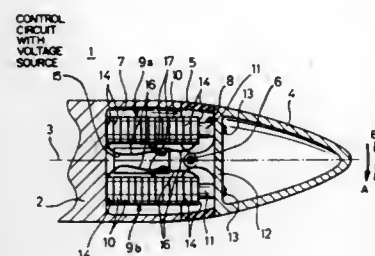
1. A tape guide subassembly for a tape cassette, comprising:  
(a) a relatively rigid, injection molded, plastic, one-piece bridge having left and right ends, each of which includes a bearing extension with a pair of opposed, parallel and substantially planar members extending from respective support members, each of which is parallel to a planar top and bottom of the bridge, and roller receiving means molded as an integral part of each planar member; and  
(b) a rotatable roller located in the roller receiving means of each bearing extension,  
wherein the roller receiving means includes  
a recessed, angled area extending to a hole formed centrally in each planar member, the two holes formed in the two planar members of each bearing extension being colinear and perpendicular to the parallel, planar members.

**4,793,571**  
**MISSILE WITH AERODYNAMIC CONTROL**  
Walter Kranz, Taufkirchen, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Filed Jul. 2, 1987, Ser. No. 69,434  
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1986; 3628152

Int. Cl.<sup>4</sup> F41G 7/00

U.S. Cl. 244—3.1



1. A missile, particularly a shell flying at supersonic velocity,

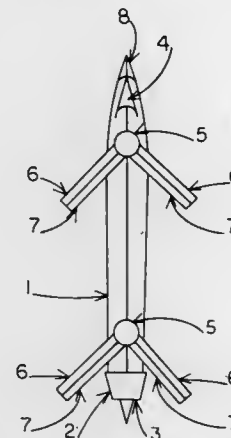
having a missile housing and an aerodynamic control system wherein a forward part of the missile can be tilted relative to the missile housing at least in one plane by means of a positioning device for fixing the part into desired positions relative to the missile housing, the positioning device comprising at least one piezoelectric positioning member and electric control means for controlling said positioning member.

**4,793,572**  
**VERTICAL LAUNCH AND HOVERING SPACE SHUTTLE**  
John Mecca, 110 Whittier Dr., San Remo, N.Y. 11754

Continuation of Ser. No. 826,810, Feb. 6, 1986, abandoned. This application Sep. 17, 1986, Ser. No. 909,846  
Int. Cl.<sup>4</sup> B64C 27/24

U.S. Cl. 244—7 R

4 Claims



1. Apparatus for use with a heavier than air machine lacking a fixed wing for providing vertical and horizontal takeoff and propulsion comprising, a fuselage, means for supporting a plurality of revolvable rotor blades including means to rotate said blades to obtain vertical takeoff and hovering without a fixed wing and means to pair and deploy said blades as a fixed wing suitable for horizontal takeoff and propulsion, each pair of said blades having one forwardly facing blade and one rearwardly facing blade, and means for changing the pitch of each of the forwardly and rearwardly facing blades independently of each other, said fuselage being provided with multiple spaced supporting means disposed along the length of said fuselage in lieu of a tail assembly.

**4,793,573**  
**FIGURE EIGHT WING DRIVE**  
James W. Kelfer, 1602 Bauerle, Austin, Tex. 78704

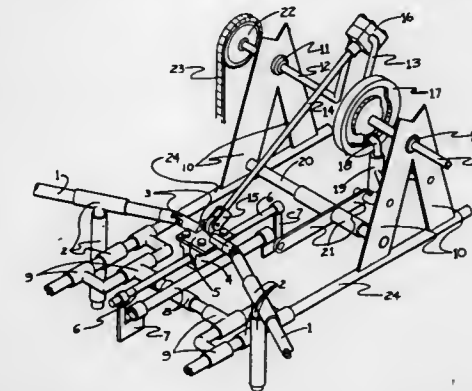
Filed Jun. 12, 1987, Ser. No. 61,415  
Int. Cl.<sup>4</sup> B64C 33/02

U.S. Cl. 244—11

1 Claim

1. A mechanical wing drive to propel a flying machine comprising: a center shaft extending from the base of each of a pair of wings and extending through one of a pair of oarlock devices, each said oarlock device attached to one of two parallel main frame members, the end of each said center shaft connected by a universal joint to a common plate mounted on top of a linear ball bearing, said linear ball bearing riding on a shaft held by a bracket on each end of said shaft, said shaft connected to a pivoting mount supported between said main frame members, also on said main frame members, beyond said oarlock devices, are two raised crankshaft bearing supports which hold a crankshaft, said crankshaft creating back and forth motion of said center shafts, said crankshaft extending across said main frame members, said linear ball bearing running parallel with and between said main frame members, a

connecting rod attached on one end to a throw on said crankshaft and on its other end to said common plate, also on said crankshaft is an intermittent motion cam track, synchronized with said throw, and connected by a cam follower to a cam follower rocker for creating up-down motion of said center



shafts, said cam follower rocker connected to said bracket on said shaft end closest to said crankshaft, also on said crankshaft is a drive chain sprocket connected by a drive chain to a drive motor, wherein said crankshaft and said intermittent motion cam track cooperate to create a "figure 8" motion of said center shaft extending from each wing.

**4,793,574**  
**BACKREST CUSHION FOR AN AIR PASSENGER SEAT**  
Jürgen W. Fenske, Memmingen; Ludwig Steyrer, Bad Wildungen, and Michael Eble, Ulm, all of Fed. Rep. of Germany, assignors to Metzeler Schaum GmbH, Memmingen, Fed. Rep. of Germany

Filed Jan. 14, 1987, Ser. No. 3,106  
Claims priority, application Fed. Rep. of Germany, Jan. 31, 1986, 3603017; Mar. 4, 1986, 3607041

Int. Cl.<sup>4</sup> B64D 11/06

U.S. Cl. 244—122 R

14 Claims



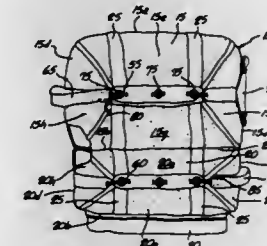
1. A backrest cushion of polyurethane foam having recesses (13) extending parallel to the direction of pressure caused by use, said recesses all ending at the same distance from the surface of the cushion, to impart flame resistance said polyurethane foam being impregnated with an impregnant by weight consisting of 30 to 60% of chloroprene latex binder, 40 to 70% aluminum hydroxide and 2 to 3% of antimony trioxide, the impregnated foam having a gross weight of 60 to 80 kg/m<sup>3</sup> and the impregnation amounting to 250 to 350% by weight of the untreated foam.

**4,793,575**  
**EMERGENCY PARACHUTE PACK**  
Manley C. Butler, 1539 N. China Lake Blvd., Ste. 630, Ridgecrest, Calif. 93555

Filed May 1, 1987, Ser. No. 45,044  
Int. Cl.<sup>4</sup> B64D 17/50

U.S. Cl. 244—148

12 Claims



8. An emergency parachute system comprising:  
a harness having a plurality of main lift webs, the main lift webs having receiving means to which a parachute pack may be attached in front of the chest of a person wearing the harness,  
a parachute pack having an upper compartment adapted to contain and deploy a parachute,  
a lower compartment adapted to contain and deploy an inflatable flotation device, the lower compartment being contiguous with the upper compartment,  
and attachment means whereby said pack may be connected to said receiving means.

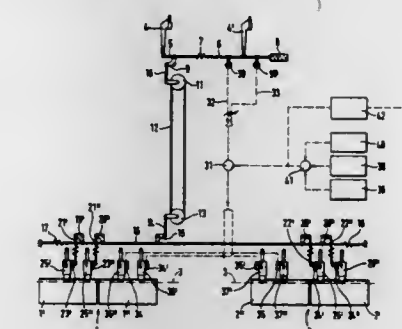
**4,793,576**  
**OPERATING THE CONTROL SURFACES IN AIRCRAFT**  
Karl Frerk, Delmenhorst, Fed. Rep. of Germany, assignor to VFW GmbH, Bremen, Fed. Rep. of Germany

Filed Dec. 21, 1982, Ser. No. 451,828  
Claims priority, application Fed. Rep. of Germany, Dec. 28, 1981, 3151623

Int. Cl.<sup>4</sup> B64C 13/04, 13/50

U.S. Cl. 244—228

8 Claims

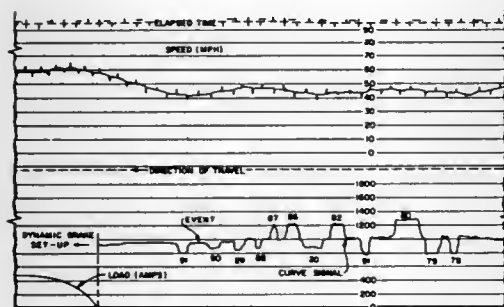
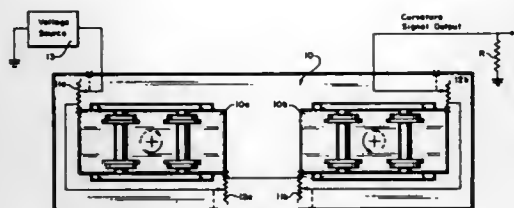


1. Apparatus for operating control surfaces in an aircraft, comprising:  
control surface means constructed to be established by bi-parted control surfaces in which each portion of a bi-parted control surface is to undergo normally the same deflection as the respective other one so that a bi-parted control surface as such may undergo a particular deflection reflected by similar deflections of its two parts;  
control means including at least one steering column, said control means upon deflection of the steering column providing a first output in the form of a mechanical dis-



placement and a second output in the form of an electrical signal;  
 mechanical signal transmission means coupling said mechanical displacement to the control surfaces, said surfaces in each instance being and including one part of the biparted control surfaces;  
 electrical signal transmission means coupling said electrical signal as a displacement actuation to the other parts; and wherein the mechanical signal transmission operates independent from the electrical transmission and vice versa, so that the one part of the biparted control surface is adjusted independently from the electrical transmission means and the other part being adjusted independently from the mechanical transmission means.

**4,793,577**  
**LOCOMOTIVE CURVE TRACKING SYSTEM**  
 Robert J. Anstall, 2236 Dianne Dr., Santa Clara, Calif. 95050, and Joseph M. Lambert, P.O. Box 862, Lincoln, Calif. 95648  
 Filed Dec. 11, 1986, Ser. No. 940,599  
 Int. Cl.<sup>4</sup> B61L 25/00  
 U.S. Cl. 246—107 9 Claims

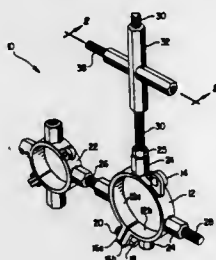


1. A method of recording and marking the location of a railroad vehicle event with respect to curvature on a track, comprising the steps of producing a signal proportional to the degree and direction of curvature of track being traversed by said vehicle, producing a signal upon the occurrence of said event, recording said curvature signal and said event signal, playing back said curvature signal and said event signal for display, whereby the location of said vehicle at any point is indicated with reference to at least one curve in a segment of a railroad track.

**4,793,578**  
**MULTIPLE CONDUIT SUPPORT SYSTEM**  
 Harold L. Howard, 4800 Northway Dr., #14C, Dallas, Tex. 75206

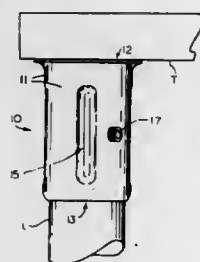
Filed Nov. 9, 1987, Ser. No. 117,963  
 Int. Cl.<sup>4</sup> E21F 17/02  
 U.S. Cl. 248—62 8 Claims  
 1. Apparatus for supporting multiple conduit lines from a structural member, comprising:  
 a support rod attachable to the structural member;  
 a plurality of support rings adaptable to surround the con-

duit lines, each of said rings having a circumference with a plurality of ring connectors extending therefrom, a first support ring having a first connector adaptable for connecting said first ring to said support rod, and said first support ring also having a second connector adaptable for connecting said first ring to a second support ring; and



a connecting rod adaptable for use with said ring connectors in rigidly connecting one ring to another, and said connecting rod connecting the second connector on the first support ring to a connector on the second ring.

**4,793,579**  
**TABLE LEG MOUNTING SOCKET**  
 Burl Finkelstein, Shenandoah, and Mel Lehto, Newnan, both of Ga., assignors to Kason Industries, Inc., Shenandoah, Ga.  
 Filed Feb. 16, 1988, Ser. No. 155,992  
 Int. Cl.<sup>4</sup> F16M 11/16  
 U.S. Cl. 248—188 10 Claims

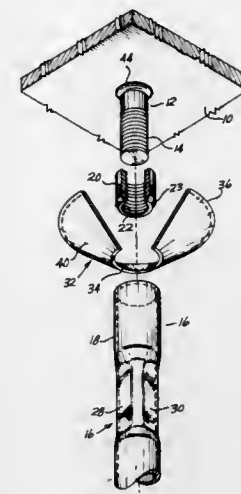


1. A socket for use in mounting a cylindrical leg to a table or the like, and with the socket being comprised of a tube having a generally cylindrical wall one end of which is inwardly flared to form a circular lip of a selected inside diameter substantially equal to the outside diameter of the leg, and wherein said generally cylindrical wall is formed with at least three inwardly projection ribs located substantially tangentially about a geometric cylindrical boundary of the same diameter as said selected inside diameter of said wall end lip.

**4,793,580**  
**WIREWAY SUSPENSION SYSTEM WITH BRACED SUPPORT LEG CONSTRUCTION**  
 Peter S. Richards, 100 Mt. St. Pl., NW., Issaquah, Wash. 98027  
 Continuation-in-part of Ser. No. 47,051, May 6, 1987, Pat. No. 4,735,390. This application Mar. 28, 1988, Ser. No. 173,990  
 Int. Cl.<sup>4</sup> F16M 11/16  
 U.S. Cl. 248—188 6 Claims

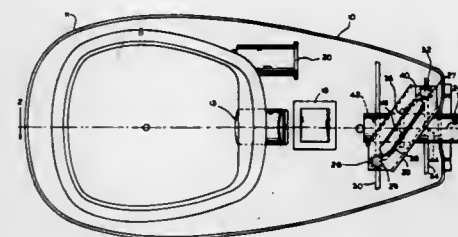
1. A wireway suspension system, comprising:  
 an overhead member;  
 a downwardly depending elongated support leg attachable at an upper end to the overhead member and having a substantially squared portion along the length of the support leg;  
 an elongated cross-beam member perpendicularly attachable to the support leg, said cross-beam having a first portion

which extends in a vertical plane adjacent and parallel to a side of the squared portion of the support leg and having first and second edges along the length of the cross-beam, a second portion extending outwardly from said first edge away from the support leg substantially perpendicular to the first portion, and a third portion extending outwardly from said second edge toward the support leg substantially perpendicular to the first portion;  
 said third portion being notched to receive and closely engage two opposed sides of the squared portion of the support leg; and



said beam attachable to the support leg by a U-bolt having two threaded end portions and a substantially squared bight portion such that the end portions extend through openings formed in the first portion of the cross-beam and the squared bight portion closely engages three adjacent sides of the squared portion of the support leg, and flanged nuts on the threaded ends of the U-bolt which bear against the first portion of the cross-beam such that the cross-beam is bound to the support leg.

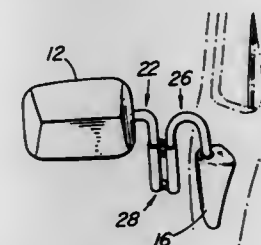
**4,793,581**  
**LUMINAIRE FITTER BOLT BRACKET**  
 Edward B. Bilson, Memphis, and Immanuel Mills, Bartlett, both of Tenn., assignors to FL Industries, Inc., Livingston, N.J.  
 Filed Dec. 31, 1984, Ser. No. 687,856  
 Int. Cl.<sup>4</sup> F21P 5/00  
 U.S. Cl. 248—230 7 Claims



1. A luminaire comprising an upper housing, a bezel housing hinged at one end to said upper housing, said bezel housing

including a refractor mounted therein, and a fitter bolt bracket having a generally elongated shape with two holes near either end thereof, said upper housing of said luminaire having two laterally and longitudinally offset openings near its hinge end, said openings in said upper housing matching said fitter bolt bracket holes; a luminaire support secured to said upper housing by said fitter bolt bracket; fastening means for connecting said bracket with said upper housing and passing through said openings and holes; said elongated bracket being sharply angled relative to said support;  
 said bracket having two raised straight ribs, each of said ribs including a cut out portion receiving said support;  
 said holes located along the longitudinal axis of said elongated bracket and substantially outside said ribs.

**4,793,582**  
**REAR VIEW MIRROR EXTENSION DEVICE**  
 Benjamin Bronstein, 1831 Ord. Rd., Hugh Russell, 3575 West-side Rd., and Donald G. Manke, 685 Harrington, all of Kamloops, B.C., Canada  
 Filed Jul. 12, 1982, Ser. No. 397,086  
 Claims priority, application Canada, Apr. 30, 1982, 402032  
 Int. Cl.<sup>4</sup> A47G 1/24  
 U.S. Cl. 248—486 3 Claims



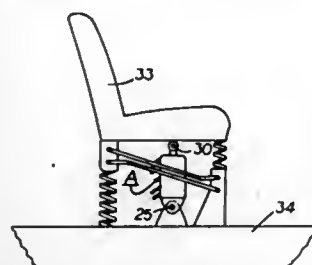
1. An extension device for a vehicular mirror assembly having a mirror, a tubular support arm connected thereto, and mounting means for rotatably receiving said arm and for mounting said assembly to a vehicle, comprising: a generally U-shaped tubular extension member, one leg thereof being rotatably receivable in said mounting means in place of said arm, and a clamp member defining a pair of parallel passages therein, said tubular arm, in use of said device, being rotatably receivable in one of said passages, and the other leg of said extension member being rotatably receivable in the other of said passages.

**4,793,583**  
**METHOD AND APPARATUS FOR HYDRAULICALLY ACTUATING A VEHICLE SEAT**  
 John W. Bergacker, 1009 NE. 104 St., Miami Shores, Fla. 33138; Thomas H. Milbauer, Rte. 2, and Donald G. Parks, P.O. Box 91, 320 Siegert St., both of Marion, Wis. 54950  
 Continuation of Ser. No. 929,098, Nov. 10, 1986, Pat. No. 4,729,538. This application Mar. 4, 1988, Ser. No. 164,446  
 The portion of the term of this patent subsequent to Mar. 8, 2005, has been disclaimed.  
 Int. Cl.<sup>4</sup> A47B 97/00  
 U.S. Cl. 248—550 10 Claims

1. Effective mechanisms, apparatus and fluid circuitry to actuate a vehicular seat in a general downward movement in response to a general upward movement of a terrain contacting

apparatus in relation to the vehicular main body mass having no outside power or energy source involved except that produced by movement of the vehicle terrain contacting apparatus, comprising

- a piston reciprocally arranged within a cylinder, the piston and cylinder comprising a flexible coupling between a vehicular seat and a suitable support structure to the vehicle, this piston and cylinder hereafter known as the seat actuator, the piston tending to be moveable within the cylinder and to respond relative to upward movement of the vehicular terrain contacting apparatus in relation to the vehicular main body mass,
- a fluid control device (response controller) to provide control and regulation of fluid to and from a hydraulic cylinder which is part of the seat actuator,
- another fluid cylinder having a piston slidable therein in response to relative motion between the vehicular main



body mass and the vehicular terrain contacting apparatus and flexibly attached to each, this cylinder and piston hereafter known as the response actuator, this response actuator pumps fluid to the seat actuator via the response controller to actuate the vehicle seat toward the vehicle main body mass,

- a fluid reservoir being in communication with all fluid cylinders directly or indirectly,
- a check valve restricting fluid flow from the bottom of the response actuator cylinder to the fluid reservoir, the top of the response controller cylinder, the bottom of the seat actuator cylinder and the top of the response actuator cylinder and allowing fluid flow from the fluid reservoir to the bottom of the fluid response actuator cylinder, and
- a restrictive orifice restricting fluid flow to the cylinder areas on either side of the piston of the response actuator.

4,793,584

**MODULAR PRESS FRAME AND STACKING PEDESTAL**  
Gordon Etchell, Downers Grove, Ill., assignor to Pathfinder Graphic Associates Inc., Justice, Ill.

Filed Jan. 10, 1987, Ser. No. 61,675

Int. Cl.<sup>4</sup> F16M 13/00

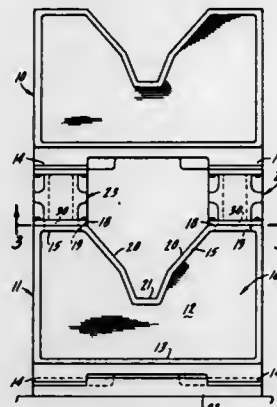
U.S. Cl. 248—639

7 Claims

1. A press unit formed of modular frames having a compartment for housing press working mechanisms including means for vertically stacking of said units comprising:

- (a) modular side frames connected in spaced apart relation;

- (b) each side frame having a rear wall, a bottom wall, and a top wall, said bottom and top walls formed by laterally extending flanges so as to define an open sided compartment for housing press working mechanisms;
- (c) said top wall and said bottom wall providing at their opposite ends pedestal stands;
- (d) said top wall having an access opening;
- (e) a stacking pedestal having a bottom wall and a side wall, said stacking pedestal positioned between said pedestal



stands provided by said top and bottom walls as said frames are vertically stacked; and

- (f) access means provided by said stacking pedestal in alignment with the access opening in said top wall permitting access to said compartment for housing press working mechanisms therethrough to the area between said side frames.

4,793,585

Patent Not Issued For This Number

4,793,586

QUOIN MOLDS

Cecil F. Bass, 30 Mine Rd., Quakertown, Pa. 18951

Filed Aug. 28, 1987, Ser. No. 90,447

Int. Cl.<sup>4</sup> E04F 21/04

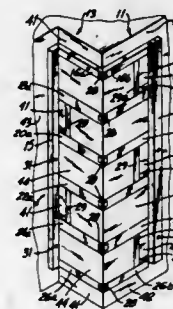
U.S. Cl. 249—15

15 Claims

1. A reusable mold for use in applying a cementitious material to corners of intersecting planar surfaces, said mold comprising:

- a generally rectangular framework with non-adhering surfaces, said framework including two opposed longitudinal members and at least two sets of cross member pairs joined to the longitudinal members, the cross members of each pair being of equal length and hingedly joined endwise to one another; and,
  - each pair of cross members being further hingedly joined to each of the longitudinal members,
- whereby said mold may be folded over said corner and positioned with one cross member of each said pair flush

on one of said intersecting surfaces and said longitudinal members may be selectively positioned flush on said surfaces.



faces and folded to accommodate other intersecting surfaces.

4,793,587

CORE FOR MOLDING HOLLOW CONCRETE BLOCKS

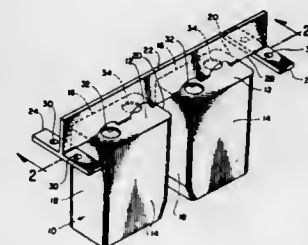
Leon Berger, 17459 Hesperia, Hesperia, Calif. 92345

Filed Sep. 3, 1987, Ser. No. 92,531

Int. Cl.<sup>4</sup> B28B 7/38

U.S. Cl. 249—63

5 Claims



1. A hollow core for a concrete block molding machine, said core formed entirely from a homogenous abrasive resistant steel and comprising a top wall and integrally formed side walls, said side walls having an upper portion and a lower portion, said upper portion of said side walls merging into said top wall, at least a part of the external surfaces of the upper portion of the side walls having a machine ground smooth planar mirror finish forming fine tooling grooves which are parallel to each other and transverse to the top wall of the core to lessen frictional resistance between a concrete mixture and the side walls of the core.

4,793,588

FLUSH VALVE WITH AN ELECTRONIC SENSOR AND SOLENOID VALVE

Martin J. Laverty, Jr., Earlysville, Va., assignor to Coyne &amp; Delany Co., Charlottesville, Va.

Filed Apr. 19, 1988, Ser. No. 183,042

Int. Cl.<sup>4</sup> F16K 31/02, 31/126

U.S. Cl. 251—30.03

20 Claims

- 1. A sensor operated flush valve comprising: a valve body having a water inlet and a water outlet; a valve body cover for said valve body, said valve body cover having a U-shaped cup-shaped portion therein, and first and second openings in the base of said cup-shaped portion, said first opening being aligned with said water outlet;
- cooperating means on said valve body and said valve body cover for holding said valve body cover to said valve body in a water-tight fitting relationship;
- a diaphragm valve assembly including a diaphragm member

and a main valve seat member having one end held in a fixed relationship between said valve body and said valve body cover for separating said inlet from said outlet, said diaphragm member having a central opening aligned with said first opening and said water outlet and defining another end, holding means coupled with said other end aligned with said other end controlling the movement thereof longitudinally of said water outlet, and by-pass means associated with said diaphragm member for permitting water under pressure supplied to said water inlet to pass from one side of said diaphragm to the other side thereof into said valve body cover;

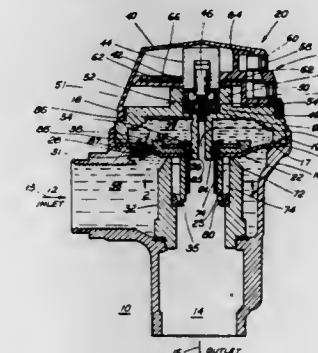
said valve body cover including a guide element extending through said diaphragm assembly for permitting said diaphragm to slidably and sealingly engage said guide element during movement of said diaphragm assembly, said guide element defining said first opening;

a housing connected with said cover for containing a flush valve operating mechanism;

said flush valve operating mechanism comprising:

a solenoid valve apparatus housed within said housing and including a solenoid valve body element received within said cup-shaped portion having first and second passageways, said first and second passageways being aligned with said first and second openings;

said solenoid valve apparatus including in said housing a solenoid means supported on said solenoid valve body



element and a reciprocable solenoid plunger movable within said solenoid means;

said solenoid plunger being associated with said solenoid valve body element and aligned therewith to overlie said first and second passageways and to close off said first passageway from said second passageway;

said second opening being displaced from said first opening and communicating with the interior of said cover away from said outlet and said other side of said diaphragm member;

said solenoid plunger cooperating with said solenoid valve body element and being movable relative thereto to close and to open said first and second passageways and to permit water to flow from said second to said first passageway upon activation of said solenoid means and to close off said first and second passageways from each other upon deactivation of said solenoid means for closing said diaphragm assembly, said plunger being raised upon activation of said solenoid means for opening said diaphragm assembly and upon deactivation thereof is moved by gravity into engagement with said solenoid valve body element to isolate said first and second passageways from each other; and

activation means including circuitry contained within said housing responsive to an external stimulation including at least one of an infra-red sensor mechanism and external non-user control to activate said solenoid valve means to move said solenoid plunger and cause the water to flow



from said second passageway into said first passageway and into said outlet and means for enclosing said circuitry to prevent moisture contamination thereof.

4,793,589

# PISTON VALVE WITH PROPORTIONAL SOLENOID CONTROLLED PILOT VALVE

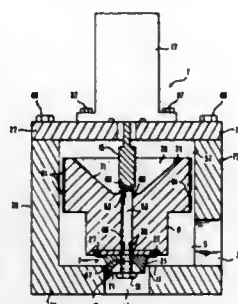
David S. Eldredge, Greensboro; Dolan F. Blalock, Kernersville, and John S. McSpadden, Greensboro, all of N.C., assignors to Gilbarco Inc., Greensboro, N.C.

Filed Jan. 18, 1987, Ser. No. 64,203

Int. Cl.<sup>4</sup> F16K 31/40, 1/52

U.S. Cl. 251—30.03

21 Claims



1. In a valve system, the combination comprising:
  - a cylindrical valve body including a side wall, an inlet port through a portion of said side wall, a bottom with a centrally located discharge port, and an interior chamber;
  - a valve cover secured to the top perimeter surface of said side wall of said valve body, a hole being centrally located through said valve cover;
  - a proportional solenoid rigidly attached to the top of said valve cover over said hole, responsive to the magnitude of a control signal for positioning a plunger through said hole at a desired location within said interior chamber;
  - a piston slidably positioned within said interior chamber, said piston including a conically shaped hollowed out top portion, a centrally located through hole providing a control orifice, a raised boss-like portion concentric with said orifice hole for providing an orifice seat, said conically shaped portion serving to direct air entrapped in liquid in a control cavity formed above the top of said piston into said control orifice, said piston having an upper section including its top portion of substantial outside diameter, and a lower section of relatively less outside diameter concentric with said upper section;
  - a throttle rigidly attached to and concentric with the bottom of said lower section of said piston, said throttle having a through hole for continuing said control orifice, the upper portion of said throttle being cylindrical and having an outside diameter approaching the inside diameter of said discharge port, the lower portion of said throttle including a plurality of scalloped regions;
  - said lower section of said piston having a recessed portion in the bottom thereof;
  - an O-ring located in the perimeter of said recessed portion of said lower section of said piston;
  - a tapered disk located in said recessed portion between said throttle and said piston for retaining said O-ring in said recessed portion;
  - said piston further including vertical slots in the upper section of said piston for permitting fluid to flow from a central chamber formed between the side walls of said lower section and inside wall of said valve body to said control cavity, and side grooves around the circumference of said upper section for creating turbulence in said fluid for providing a liquid seal;
  - said plunger having a sealing tip on its end, and being positionable for forcing said sealing tip against said orifice seat for causing the pressure in said control cavity to create a greater force against the top of said piston, than the force from the pressurized fluid in said central chamber, for moving the piston downward toward a valve seat formed about said discharge port below said O-ring, tending to controllably decrease the flow rate, whereas when said plunger is moved away from said orifice seat, fluid flows from said control cavity through said control orifice into said discharge port, causing an opposite pressure imbalance for moving the piston upward away from said valve seat, thereby further opening said valve.

tionable for forcing said sealing tip against said orifice seat for causing the pressure in said control cavity to create a greater force against the top of said piston, than the force from the pressurized fluid in said central chamber, for moving the piston downward toward a valve seat formed about said discharge port below said O-ring, tending to controllably decrease the flow rate, whereas when said plunger is moved away from said orifice seat, fluid flows from said control cavity through said control orifice into said discharge port, causing an opposite pressure imbalance for moving the piston upward away from said valve seat, thereby further opening said valve.

4,793,590

# PILOTED CHECK VALVE

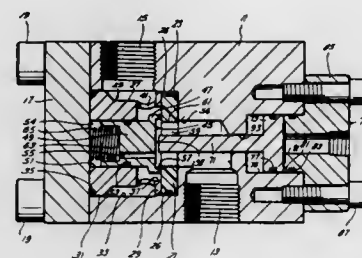
Richard R. Watson, Bellaire, Tex., assignor to Gilmore Valve Company, Bellaire, Tex.

Filed Apr. 14, 1983, Ser. No. 484,828

Int. Cl.<sup>4</sup> F16K 31/143

U.S. Cl. 251—63.5

10 Claims



1. A pilot locked poppet check valve comprising:
  - a valve body having a hollow interior and first and second flow ports extending from the hollow interior to the exterior of the body, forming with the hollow interior a flow passage through the body;
  - a valve seat around said flow passage having an opening therethrough communicating portions of said flow passage on opposite sides of said seat;
  - a valve closure in said flow passage moveable between a closed position in which the closure is in engagement with said seat at one end of said opening through the seat to fully block flow through the flow passage and an open position in which the closure is away from said seat leaving the flow passage open for the flow of fluid there-through from said first port through a first part of said flow passage to said seat and thence through said seat to said end of the opening therethrough into a second part of said flow passage and past said closure to said second port and vice versa, the cross sectional area of said closure perpendicular to the direction of movement of the closure toward the seat being larger than the cross-sectional area of the opening through the seat where the closure engages the seat;
  - resilient means biasing said closure to closed position;
  - valve closing means responsive to fluid pressure in said second part of the flow passage when the valve is closed for holding the valve closure in closed position, said valve closing means comprising surface on said closure exposed to fluid pressure in said second part of the flow passage, said valve closing means being effective when the closure is in closed position to assist said resilient means, the surface of said valve closure subject to fluid pressure in said second part of said flow passage when the valve is closed producing in response to the last said fluid pressure a resultant force in said direction tending to hold the valve closed;
  - a rod extending in said passage in said valve body with clearance between the outer periphery of the rod and the inner periphery of said passage leaving room for fluid flow

through said passage, said rod being separate from said closure and moveable between a position engaging said closure and a position out of engagement with said closure;

hydraulic means connected to said rod for moving the rod, when the hydraulic means is actuated, to a position in engagement with said closure holding the closure in open position and for allowing the rod, when the hydraulic means is unactuated, to move with the closure as the closure means moves to closed position under the force of said resilient means;

balancing means which when the valve closure is in closed position, shields a first portion of the surface of said closure, other than the portion of the surface of the closure engaging the seat, from the fluid pressure in said second part of the flow passage and exposing said first portion to fluid pressure in said first part of the flow passage, and valve opening means responsive to fluid pressure in said first part of the flow passage when the valve is closed for moving the valve closure to open position, said valve opening means comprising surface on said closure exposed to fluid pressure in said first part of the flow passage, said valve opening means being effective to move said closure to open position upon occurrence of fluid pressure in said first part of the flow passage sufficient to overcome said resilient means and the effect of fluid pressure on surface of said closure subject to fluid pressure in said second part of the passage, said valve opening means being effective when said hydraulic means is unactuated and said rod is out of engagement with said closure.

shear seal into engagement with said opposed planar surface;

means for supporting said slide for low-friction movement in the valve body, said means for supporting said slide including at least a pair of rollers supported by said valve body and engageable with said other planar side of the slide;

said rollers being rotatably supported by axles, said rollers being spaced apart and engaging opposite ends of said slide whereby the force of the rollers on said slide is substantially outside said passages included in said slide;

said valve body including a removable cover plate, said cover plate including a surface portion defining one wall of said elongate chamber, said surface portion including spaced apart cavities housing said rollers, said cavities including grooves supporting said axles; and

said shear seal including an outwardly extending flange around said planar face, said flange being adapted to engage said port and thereby limit telescoping movement of said shear seal into said port;

said outwardly extending flange including a sloped, frusto-conically shaped upper surface adapted to disperse hydraulic fluid away from said shear seal as said shear seal moves into registry with one of said passages in said slide.

4,793,592

# PLURAL JACK APPARATUS

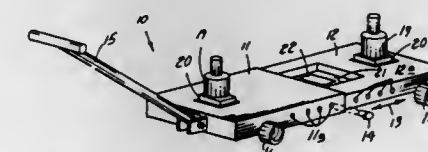
Charles L. Green, and Fran A. Green, both of 909 Pyegrave Pl., Austin, Tex. 78753

Filed Sep. 10, 1987, Ser. No. 94,836

Int. Cl.<sup>4</sup> B66F 5/04

U.S. Cl. 254—2 R

5 Claims



# HYDRAULIC SHEAR SEAL VALVE INCLUDING SLIDE BEARING

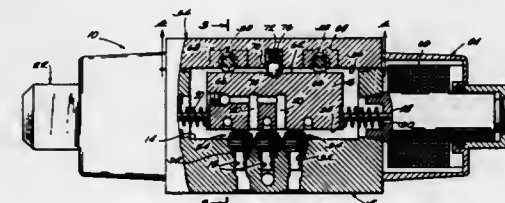
Arnold F. Decker, Aurora, and Roy Reynolds, Crystal Lake, both of Ill., assignors to Templeton, Kenly & Co., Broadview, Ill.

Filed Dec. 11, 1987, Ser. No. 131,757

Int. Cl.<sup>4</sup> F16K 11/065, 25/00, 31/02

U.S. Cl. 251—172

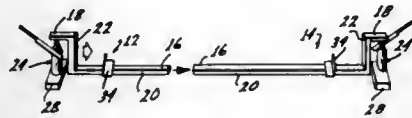
12 Claims



9. A control valve comprising:
  - a valve body having an elongate chamber and inlet and outlet fluid passages;
  - a slide shiftable longitudinally in said elongate chamber, said slide including passages therethrough arranged to provide communication with said inlet and outlet fluid passages when said passages in the slide are aligned with the inlet and outlet fluid passages in the valve body, said slide including opposite planar sides, one planar side being positioned in opposed relation to said inlet and outlet fluid passages and the other planar side including a planar surface, one of said valve body and said slide having a flat face through which said passages open and the other of said valve body and said slide including a valve port carrying at least one tubular metallic shear seal for limited telescoping movement, said tubular metallic shear seal including an annular flat end face slideably and sealingly engaging said flat face of said one of said valve body and said slide, and said shear seal including an opposite end exposed to fluid pressure forcing said planar face of said

1. A plural jack support apparatus for providing mobile, underlying support of mechanical objects comprising:
  - a forward and rear relatively movable support base securable in a locked relationship, and forward and rear jack support recesses positioned on said respective forward and rear support base, and first and second extensible and retractable jack support means positionable within said respective forward and rear jack support recesses, and a pair of wheels secured to said forward support base and a pair of wheels secured to said rearward support base, and a handle means secured in a forward portion of said forward support base wherein said plural jack apparatus is maneuverable by means of said handle and mobile by means of said attached wheels for selective positioning of said apparatus to an underlying position of a mechanical object for support thereof by use of said jack members, and wherein a recessed compartment is formed within said rearward support base, and a third jack support means is positionable in a first horizontal position in said compartment not extending above said rear support base's upper surface, and said third jack support means positionable in a second vertical working position for extending and retracting a piston associated with said third jack support means for support of various mechanical objects in cooperative relationship with said first and second jack support means.

4,793,593  
**JACK SYSTEM FOR LIFTING ROOF MOUNTED AIR CONDITIONERS**  
 Don Pittman, 801 S. Flower St., Burbank, Calif. 91502  
 Continuation of Ser. No. 863,097, May 14, 1986, abandoned.  
 This application Feb. 8, 1988, Ser. No. 150,514  
 Int. Cl.<sup>4</sup> B66F 7/12  
 U.S. Cl. 254—89 H 8 Claims



1. A method for facilitating re-roofing of an essentially flat roof of buildings having a structure such as an air conditioning unit or other equipment supported in spaced relation to surface of said roof to be repaired by support means resting on the roof, comprising the steps of:

providing at least two pairs of support elements, each of the support elements including a beam section adapted to extend transversely of the structure and to engage the underside thereof for support of the same in spaced relation to the surface of said roof and including a jack receiving end portion including a riser segment and an associated outer segment under which a jack may be placed such that the beam section is below the outer segment, inserting the support elements of each pair under the structure such that the riser section is spaced laterally of the structure,

assembling the two support elements of each said pair underneath the structure so as to make at least two substantially rigid load bearing beams extending in mutually spaced apart relationship under the structure and across the full width thereof,

said step of assembling including positioning each beam such that each jack receiving end portion is spaced laterally and outwardly from the structure,

interposing a jack and supporting a jack beneath each jack receiving end portion of each said beam,

applying lifting force by means of said jacks to the jack receiving end portions of said beam to raise said structure off said support means therefor,

removing said support means from beneath said structure to fully expose the roof portion beneath said structure and to provide an exposed peripheral portion and thereby permit access for repair of the roof surface under the raised structure and peripherally thereof, and

repairing the roof and thereafter positioning the support means under said structure and lowering said structure on to said support means.

6. An apparatus for lifting and supporting roof mounted equipment which is supported in spaced relation to said roof to provide a space therebetween and a peripheral clearance around such equipment while re-roofing work is done on the roof surface under and around the raised equipment comprising:

two load bearing beams each consisting of a first and a second beam section each having an inner end and an outer end, said inner ends being mutually telescopically engageable for assembling said sections into a substantially rigid beam of adjustable overall length and capable of supporting said equipment between said outer ends;

a jack supporting structure affixed to the outer end of each beam section;

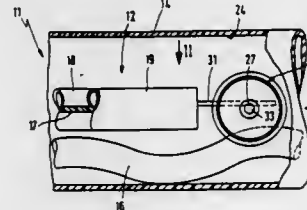
said jack supporting structure including a riser segment connected at a right angle to said opposite end and a relatively short outer end segment supported by said riser segment in spaced parallel relationship to the associated beam section,

a plurality of jacks adapted to be placed under the outer segment of said jack supporting structure, and stop elements on each of said beam sections arranged to abut against the sides of the roof mounted equipment supported on the assembled beams so as to maintain said riser sections and said jacks spaced laterally from the roof mounted equipment whereby repairs can be made to a roof area surrounding the roof mounted equipment and thus leave a border of repaired roofing after the unit is lowered in place.

4,793,594  
**APPARATUS FOR SUBSEQUENT INSERTION OF CABLES IN DUCTS PROVIDED FOR THIS PURPOSE**  
 Erich Kumpf, Esslingen, Fed. Rep. of Germany, assignor to Ursula Kumpf, Esslingen, Fed. Rep. of Germany  
 PCT No. PCT/DE85/00319, § 371 Date May 13, 1987, § 102(e)  
 Date May 13, 1987, PCT Pub. No. WO87/01878, PCT Pub. Date Mar. 26, 1987

PCT Filed Sep. 13, 1985, Ser. No. 55,626  
 Int. Cl.<sup>4</sup> B65H 59/00

U.S. Cl. 254—134.3 FT 7 Claims



1. An apparatus for the subsequent insertion of at least one cable in a duct having at least one cable therein, comprising: intermediate bottom means capable of being drawn into the duct, said intermediate bottom means having two side portions, a middle portion, and a front portion connected to each other with a height guide in the form of a hollow bead-like longitudinal rim situated along each of the two side portions, each rim being slit in the longitudinal direction; and a cable guide connected to the front portion of the intermediate bottom means.

4,793,595  
**METHOD AND APPARATUS FOR RELINING BLAST FURNACE**

James D. Head; Edward F. Burns; William A. Schleizer, all of Valparaiso; C. Douglas White, Chesterton, and Dennis L. Gentry, Cedar Lake, all of Ind., assignors to BMI, Inc., Pittsburgh, Pa.

Filed Oct. 29, 1986, Ser. No. 924,405  
 Int. Cl.<sup>4</sup> C21B 13/00

U.S. Cl. 266—44 6 Claims

1. Apparatus for relining the interior surface of a blast furnace wall comprising:

a mantle,

a plurality of circumferentially spaced windows extending through said blast furnace wall at an elevation above said mantle, each of said windows having a sill,

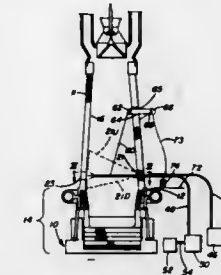
an elongated supply pipe extending through at least one of said windows, said supply pipe having an outlet end facing the interior surface of said blast furnace wall opposite said window and an inlet end extending outside of said blast furnace,

means pivotally supporting said pipe on said sill to permit said pipe outlet end to pivot horizontally and vertically,

means to supply material to be sprayed to said inlet end of said pipe,

means to apply air under pressure to said inlet end of said

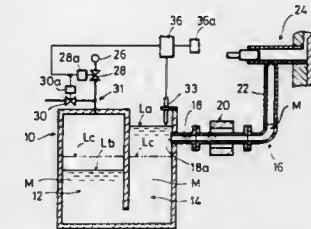
pipe to propel said material to be sprayed through said pipe and impinge on the interior surface of said blast furnace wall,  
 means to control the supply of said material to be sprayed,



means to control said flow of air under pressure, and means to pivot said pipe while said material and air under pressure is applied to said interior surface of said blast furnace wall.

4,793,596  
**APPARATUS FOR AND A METHOD OF RAPIDLY DISCHARGING A MOLTEN METAL FROM ITS SUPPLY SYSTEM OF A PRESSURIZED HOLDING FURNACE**  
 Shoko Kibota, and Sadayoshi Yamada, both of Zama, Japan, assignors to Toshiba Machine Co., Ltd., Tokyo, Japan  
 Filed Nov. 10, 1987, Ser. No. 119,154  
 Claims priority, application Japan, Nov. 10, 1986, 61-265567  
 Int. Cl.<sup>4</sup> C21B 13/00

U.S. Cl. 266—44 2 Claims



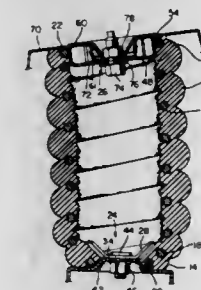
1. A method of rapidly discharging a molten metal from the supply system associated with a pressurized holding furnace which supplies molten metal to the feeding section of a die cast machine, said pressurized furnace including (1) a pressure chamber having an inlet valve and a discharge valve for a pressure gas and (2) an open feeding chamber communicating with said pressure chamber at a level below the level of the molten metal in the pressure chamber, said pressure chamber being pressurizable to maintain a constant molten metal level in said feeding chamber, said supply system including a delivery pump operatively connected between a suction pipe and a delivery pipe, said delivery pipe extending upward from the level of said suction pipe and said delivery pump and being connected adjacent its upper end to the feeding section of said die cast machine which is above the level of molten metal in said feeding chamber. said method comprising the steps of:

connecting the end of said suction pipe remote from said delivery pump to said feeding chamber at a level below the level at which said molten metal is maintained in said feeding chamber when said pressure chamber is pressurized, but above the level to which said molten metal falls in said feeding chamber when said pressure chamber is depressurized;

pressurizing said pressure chamber so that when said delivery pump is not operating, the molten metal level in said supply system is above the level of said delivery pump but

below the level of the feeding section of said die cast machine;  
 operating said delivery pump while said pressure chamber is pressurized to cause the molten metal level in said supply system to rise to the level of the feeding section of said die cast machine; and  
 opening said discharge valve to depressurize said pressure chamber so that the molten metal level in said feeding chamber falls below the level of said end of said suction pipe and the molten metal in said supply system flows back into said feeding chamber.

4,793,597  
**TAPERED END COMPOSITE SPRING**  
 Frank F. Smith, Seattle, Wash., assignor to The Paton Corporation, Seattle, Wash.  
 Filed Dec. 1, 1986, Ser. No. 936,433  
 Int. Cl.<sup>4</sup> B60G 11/52; F16F 1/12; F16M 13/00; F16D 1/00  
 U.S. Cl. 267—33 4 Claims



1. A composite spring mountable on a coil spring seat having a projection surrounded by a circular coil support surface using two internal support assemblies, each of which grips said spring internally, said spring comprising: a tubular elastomeric body having two ends reinforced to resist deformation by two gripping forces respectively exerted by said support assemblies, wherein one of said ends is generally cylindrical and has a diameter greater than the diameter of said coil support surface, and the other of said ends is tapered and terminates in a circular opening having a diameter corresponding to the diameter of said coil support surface such that said other end is supportable by said coil support with said projection inside said opening.

4,793,598  
**AIR SPRING HAVING INTERNAL SEALING BAND AND METHOD OF INSTALLING SAME**  
 Wayne H. Geno, Cicero, Ind., and David A. Weitzenhof, Akron, Ohio, assignors to The Firestone Tire & Rubber Company, Akron, Ohio  
 Continuation of Ser. No. 910,715, Sep. 24, 1986, abandoned. This application May 10, 1988, Ser. No. 192,233  
 Int. Cl.<sup>4</sup> F16F 9/04; D02J 3/14

U.S. Cl. 267—64.21 19 Claims

1. An improved air spring for vehicles including

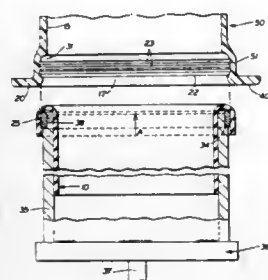
(a) cap means for mounting the air spring on a vehicle, said cap means having a cup-like configuration with a side wall terminating in an open end and having an inwardly extending annular lip, said annular lip having an inner diameter and an inner annular sealing surface recessed in an inner surface of the side wall adjacent to and outwardly of said annular lip;

(b) a piston member adapted to be mounted on the vehicle and located in a spaced relationship from the open end of the cap means;

(c) a fluid pressure chamber formed between the cap means and piston member by a flexible sleeve sealingly con-



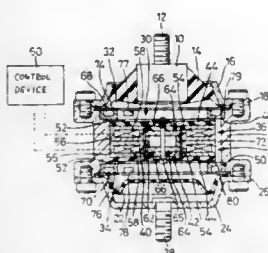
ected at opposite ends thereof to the cap means and piston member; and  
(d) a continuous annular sealing band located within the open end of the cap means, said band having an outer diameter greater than the inner diameter of the annular lip prior to being installed within the open end of the cap means so as to be retained therein by the annular lip, said



sealing band being concentric with the recessed inner annular sealing surface of said cap means with one end of the flexible sleeve being located between the sealing band and the recessed sealing surface and placed in a state of compression by the sealing band to form a generally air tight seal with said sealing band and annular sealing surface, with said sealing band being in a non-deformed state.

#### 4,793,599 ELECTRONICALLY CONTROLLED MOUNTING STRUCTURE FOR MOUNTING POWER UNIT ON VEHICLE

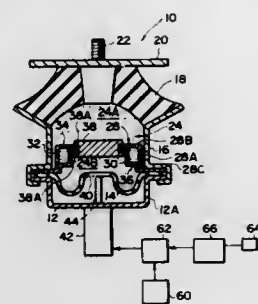
Yutaka Ishioka, Nagoya, Japan, assignor to Tokai Rubber Industries, Ltd., Aichi, Japan  
Filed Jun. 1, 1987, Ser. No. 56,376  
Claims priority, application Japan, Jun. 6, 1986, 61-132558  
Int. Cl.<sup>4</sup> F16M 1/00  
U.S. Cl. 267—140.1 16 Claims



1. A mounting structure disposed between a body and a power unit of a vehicle for mounting of the power unit on the body, so as to effect vibration damping and isolation under the control of a control device, comprising:  
an elastic body disposed between said body and said power unit of the vehicle;  
means for defining a pressure-receiving chamber, in cooperation with said elastic body, said pressure-receiving chamber being filled with an incompressible fluid through which the pressure-receiving chamber is subject to vibrations to be damped or isolated;  
means for defining an equilibrium chamber which is filled with said incompressible fluid, and which communicates with said pressure-receiving chamber through passage means, so as to permit a change in a volume of said pressure-receiving chamber;  
a movable member disposed between said pressure-receiving chamber and said equilibrium chamber, and functioning as parts of said means for defining said pressure-receiving

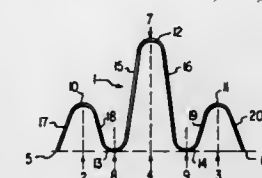
and equilibrium chambers, said movable member being movable over a predetermined maximum distance in opposite directions parallel to a direction in which the mounting structure receives said vibrations;  
elastic holder means comprising a pair of generally planar elastic members fixed to opposite ends of said movable member for flexibly supporting said movable member such that said movable member is movable in said opposite directions;  
guide means for guiding said movable member in said opposite direction in a sliding contact manner; and  
drive means connected to said control device, for reciprocating said movable member in said opposite directions along said guide means, over a controlled operating stroke and at a controlled frequency.

4,793,600  
VIBRATION ISOLATING APPARATUS  
Hiroshi Kojima, Yokohama, Japan, assignor to Bridgestone Corporation, Tokyo, Japan  
Filed Mar. 9, 1987, Ser. No. 23,796  
Claims priority, application Japan, Mar. 14, 1986, 61-56705  
Int. Cl.<sup>4</sup> F16F 13/00; B60K 5/12  
U.S. Cl. 267—140.1 20 Claims



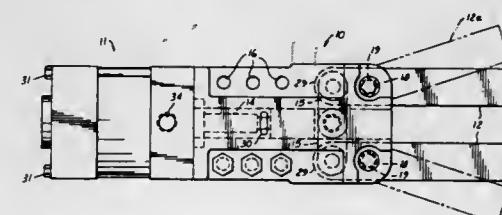
1. A vibration isolating apparatus disposed between a vibration generating portion and a vibration receiving portion, comprising:  
(a) a liquid chamber capable of being expanded and contracted, said chamber being filled with a liquid;  
(b) a partition provided at an intermediate portion of said liquid chamber dividing said liquid chamber into a plurality of small liquid chambers;  
(c) an orifice provided in said partition for communicating between said small liquid chambers;  
(d) vibrating means provided on said partition in such a manner that said means is movable slightly in directions in which said small liquid chambers are expanded and contracted;  
(e) a flexibly membrane defining a part of a wall portion of said liquid chamber and being elastically deformable; and  
(f) restraining means for preventing said vibrating means from vibrating to ensure the occurrence of resonance of the liquid within said orifice in order to absorb low-frequency vibration when a vibration of extremely low frequency occurs on said vibration isolating apparatus.

4,793,601  
KEY SPRING  
Peter Wild, Mettmensstetten; Johannes Rometsch, Rickenbach; Werner U. Frey, Thalwil, and Karl Iseli, Wädenswil, all of Switzerland, assignors to Alcatel N.V., Amsterdam, Netherlands  
Filed Sep. 7, 1983, Ser. No. 530,881  
Claims priority, application Switzerland, Sep. 9, 1982, 5361/82  
Int. Cl.<sup>4</sup> F16F 1/20  
U.S. Cl. 267—165 4 Claims



1. A one-piece spring comprising:  
a first loop at one end;  
a second loop at the other end, said second loop being of a substantially equal size to said first loop;  
a middle loop positioned between said first and second loops, said middle loop being of a greater size than either said first or said second loops, each of said loops lying within a plane;  
a first arcuate section connecting said first loop and said middle loop;  
a second arcuate section connecting said middle loop and said second loop said first and second arcuate sections being of a substantially equal shape;  
wherein said spring is in a non-pretensioned state, said first and second loops having legs enclosing angles of 25°-50°, said middle loop having legs enclosing an angle of 10°-20°, and said first and second arcuate sections each having legs enclosing an angle of 15°-30° thereby yielding a spring having an arced stress curve when said spring is displaced while in a pretensioned state, said stress curve yielding greatest resistance at substantially one-half displacement.

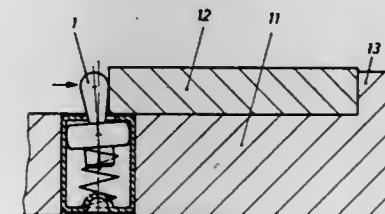
4,793,602  
LOCKING POWER CLAMP  
Alexander W. McPherson, Farmington Hills, Mich., assignor to De-Sta-Co Division, Dover Resources, Inc., Troy, Mich.  
Filed Oct. 26, 1987, Ser. No. 112,265  
Int. Cl.<sup>4</sup> B23Q 3/03; B25B 1/04  
U.S. Cl. 269—34 1 Claim



1. Power clamp comprising base means provided with reaction guide track means, track follower means, a pair of opposed clamp arm means each pivotally connect to said base means, actuating linkage means for each clamp arm means having spaced pivots respectively confined to said guide track means by said track follower means and having an actuating connection with said clamp arm means, coupling means adapted for connection with said clamp arm means, coupling means adapted for connection to a reciprocable power source for

actuating said track follower means along said track means and through said linkage means to provide equal and opposite pivotal movement of said arm means to respective clamp and release positions, and stop means limiting said movement to a locked clamping position of each of said respective link means, said track following means including anti-friction bearing means with rolling elements adapted to enable release actuating movement with less force than clamp locking movement, said bearing means comprising a spaced pair of needle bearing track follower means operating in parallel opposed straight reaction guide tracks, a second pivotal link connection in each of said clamp arms spaced from said base pivotal connection, a pair of links each with spaced pivots, one of which is connected to said track follower means and the other of which is connected to said second pivotal connection of one of said clamp arms, whereby said reciprocation of said track follower means will simultaneously actuate said links and respective clamp arms toward and away from the clamping position, a common pivot shaft extending through both of said needle bearing track follower means, both of said links and said actuating connection, a reciprocable air cylinder power source for actuating said respective clamp arms with a stroke adapted to open each clamp arm through approximately a 20° angle and to close said clamp arms to a clamping positions wherein the pivotal connections of said respective links are in substantial alignment in a substantially right angle relationship with the connecting line of the pivots of each of said respective clamp arms, said reciprocable air cylinder power source comprising an oval air cylinder having its major axis in alignment with the plane of action of said clamp arms in order to accommodate a relatively narrow width of opening for installation in comparison to a circular air cylinder of equal capacity, and means for mounting the bases of a plurality of said clamps in stacked lateral relation to the plane of actuation of the clamp arms.

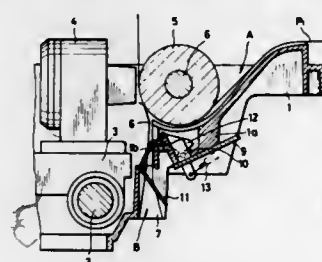
4,793,603  
LATERAL PRESSURE PAD FOR POSITIONING  
WORKPIECES  
Ralf Wüber, Märkerstrasse 19, D-6000 Frankfurt 56; Dieter Reis, Friedenstrasse 21, and Stanko Petroci, Lüneburger Strasse 3, both of D-6236 Eschborn, all of Fed. Rep. of Germany  
PCT No. PCT/DE85/00102, § 371 Date Dec. 5, 1985, § 102(e) Date Dec. 5, 1985, PCT Pub. No. WO85/04611, PCT Pub. Date Oct. 24, 1985  
PCT Filed Apr. 6, 1985, Ser. No. 817,750  
Claims priority, application Fed. Rep. of Germany, Apr. 9, 1984, 3413298  
Int. Cl.<sup>4</sup> R25B 1/00  
U.S. Cl. 269—254 R 19 Claims



1. A lateral pressure pad assembly for positioning a workpiece being located on a support, the support having one or more stationary stops, said lateral pressure pad assembly comprising:  
a housing including opposed side walls and opposed top and bottom walls, said top wall having an opening formed therein,  
retaining means including a retaining pin and a flange having a greater width than said retaining pin connected thereto, said flange having an outer edge surface,

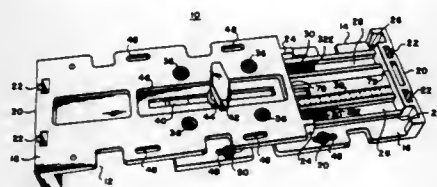
said flange positioned within said housing with said outer edge surface of said flange contiguous with said side walls of said housing, and with said retaining pin extending from said flange through said opening formed in said housing top wall and projecting outwardly thereof, means for allowing lateral movement of the retaining pin towards and away from the one or more stationary stops including said outer edge surface of said flange being at least partially curved to permit said flange to tilt with respect to a longitudinal axis extending through said opening such that said flange maintains its contiguous relationship with said housing side walls, and said opening in said housing top wall having a dimension greater than the dimension of a portion of said retaining pin passing therethrough to thereby permit said flange and retaining pin to tilt about said longitudinal axis, and spring means for urging said flange towards said top wall of said housing, such that the workpiece is gripped between said retaining pin and the one or more stationary stops.

paths; and means mechanically responsive to the insertion of paper in said other guide path for switching the detecting



means from the first to the second mode to thereby enable the detecting means to detect the presence of paper in said other guide path.

**4,793,604**  
**UNIVERSAL PRECISION POSITIONING JIG**  
Christopher L. Taylor, 3615 Courtale Dr., Farmers Branch, Tex. 75234  
Filed Nov. 9, 1987, Ser. No. 117,954  
Int. Cl.<sup>4</sup> B23Q 3/00  
U.S. Cl. 269—303 12 Claims

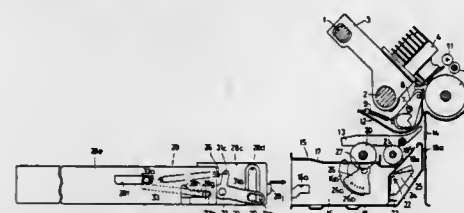


1. A jig for orienting and/or maintaining a work piece in a predetermined position relative to a cutting tool, said jig comprising:  
first and second relatively flat body members having first and second major surfaces for being positioned in facing relationship;  
first and second rack means coupled to the respective first and second major surfaces so that first and second rack means are substantially in registration when said first and second major surfaces are in facing relationship, each of said first and second rack means having a plurality of teeth spaced at predetermined intervals along a major axis of the corresponding rack means for being meshed together with corresponding teeth of complementary rack means to inhibit said body members from being moved relative to one another along the major axis of the jig; and  
means for securing said body members together along an axis which is substantially perpendicular with respect to the first and second major surfaces.

**4,793,605**  
**PAPER DETECTOR OF PRINTER**  
Akio Tajima, Tokyo, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan  
Filed Sep. 30, 1986, Ser. No. 913,698  
Claims priority, application Japan, Oct. 7, 1985, 60-222996  
Int. Cl.<sup>4</sup> B65H 5/26  
U.S. Cl. 271—9 6 Claims

2. A paper detector for use with an apparatus having two paper guide paths for guiding paper therealong, the paper detector comprising: detecting means normally operable in a first mode for detecting the presence of paper in one of the two guide paths and operable when switched to a second mode for detecting the presence of paper in the other of the two guide

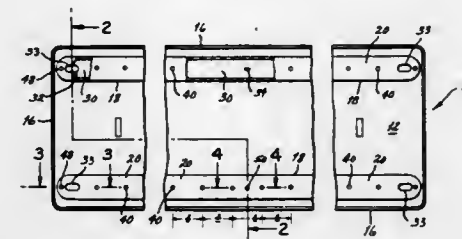
**4,793,606**  
**PAPER FEEDING DEVICE FOR A PRINTER**  
Tadashi Yasuoka, and Hidetoshi Kodama, both of Tokyo, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan  
Filed Mar. 2, 1988, Ser. No. 162,888  
Claims priority, application Japan, Mar. 3, 1987, 62-48285  
Int. Cl.<sup>4</sup> B65H 1/26  
U.S. Cl. 271—157 1 Claim



1. A paper feeding device for a printer comprising: a paper feeding tray in which cut sheets are stored, and a tray receiver which detachably receives said paper feeding tray, said paper feeding tray being constituted by a hopper plate which is rotatably supported at a bottom of said paper feeding tray for the purpose of stacking said cut sheets, a hopper shaft disposed on the lower surface of the front end of said hopper plate, a pair of movable levers which are connected to two ends of said hopper shaft, and which are movably supported by two sides of said paper feeding tray, guide grooves each of which is provided on the side surface of said paper feeding tray in the direction in which the tray is installed, a pair of movable members which are respectively movably supported by the corresponding two guide grooves, and in which securing portions each extending outwardly is provided, and a spring which is provided between said movable levers and said movable members, and which can apply upward urging force to said movable levers in such a manner that the same can rise said hopper plate through said hopper shaft, while said tray receiver being constituted by a pair of side plates which are disposed at an interval which allows said paper feeding tray to be inserted, securing grooves which are respectively provided on inner surfaces in the rear portions of said two side plates, and which are brought into engagement with said securing portions so that the same prevent said movable member from movement and increase a spring force by way of expanding said spring, and a lock-cam which is movably supported on the inner surface in the front portion of said two side plates, and in which a cam surface to which said hopper shaft is able to

be brought into engagement when said paper feeding tray is mounted.

**4,793,607**  
**REINFORCED PLASTIC SWING SEAT AND METHOD OF MOLDING**  
Steven M. Suellentrop, Imperial, Mo., assignor to Lemay Machine Company, St. Louis, Mo.  
Filed May 14, 1986, Ser. No. 862,964  
Int. Cl.<sup>4</sup> A63G 9/00  
U.S. Cl. 272—85 6 Claims

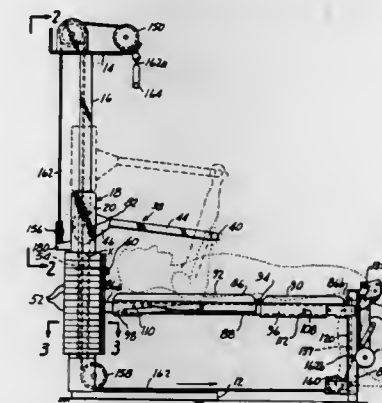


1. A plastic swing seat reinforced by internal metal straps comprising  
A. A pair of flexible metal straps positioned parallel to each other and spaced apart in the same plane, each having an attachment aperture adjacent to and spaced inwardly of each of its ends, and  
B. A panel-like flexible plastic seat body completely surrounding and encompassing the upper, lower and outer edge surfaces of said straps, the thickness of the body being less than half the width of the straps, there being apertures through the seat body coinciding with said attachment apertures of the straps, the seat body further having a plurality of pits extending perpendicularly inward into the upper and lower seat surfaces, spaced from each other along the length of said straps and extending inward toward said straps and terminating in pit bottoms comprising films of plastic material adjacent to the side surfaces of the straps, whereby the straps are substantially sealed from rusting.

**4,793,608**  
**EXERCISE APPARATUS**  
Parker E. Mahnke, Studio City, and Ron Sheltra, Alhambra, both of Calif., assignors to Marcy Fitness Products, Ontario, Calif.  
Continuation-in-part of Ser. No. 608,372, May 9, 1984, abandoned. This application Oct. 8, 1986, Ser. No. 916,639  
Int. Cl.<sup>4</sup> A63B 21/06  
U.S. Cl. 272—118 26 Claims

1. An exercising apparatus, comprising:  
(a) a main frame including a base and a single, generally vertically extending central guide column having guide means;  
(b) a carriage vertically movable upwardly and downwardly along said central guide column between a first position and a second higher position, said carriage having bearing means movable along said guide means;  
(c) two weight stacks carried by said base substantially below said carriage and disposed proximate either side of said central guide column, each said weight stack comprising a plurality of discrete weights, each said weight having an aperture therethrough comprising a first portion and a second portion, said first portion being adapted to receive a portion of said guide column;  
(d) two substantially vertically extending selector bars connected to said carriage and adapted to removably interconnect said carriage with one or more weights from

either or both weight stacks, for biasing said carriage downwardly, one of said selector bars being receivable within said second portion of said weight;  
(e) a handle bar extending outwardly from said carriage and including spaced apart body engaging means for engagement by a user, said handle bar including at least one pivot plate having a plurality of spaced apart apertures disposed along an arc, said handlebar and pivot plate being adapted



for pivotal movement about a transverse axis between a first position and a second position whereby the height of said body engaging means can be adjusted relative to said base of said frame; and  
(f) adjustment means carried by said carriage at a spaced apart location from said transverse axis for cooperation with said pivot plate of said handlebar to position said handlebar at a plurality of intermediate positions between said first and second positions.

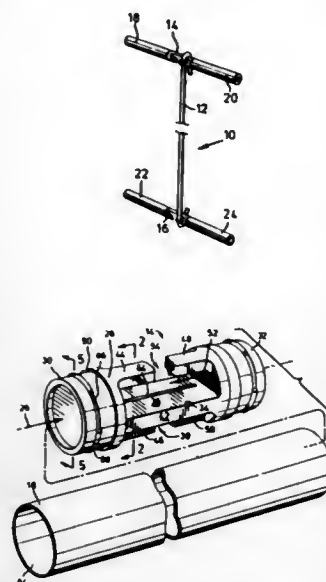
**4,793,609**  
**EXERCISE DEVICE**  
David Coutts, Toronto; Amey Buehler, Cobourg, and James Bristow, Willowdale, all of Canada, assignors to Healthletics Inc., Scarborough, Canada  
Filed Oct. 6, 1986, Ser. No. 915,562  
Int. Cl.<sup>4</sup> A63B 21/02  
U.S. Cl. 272—137 15 Claims

1. An exercise comprising:  
an elastomeric member;  
a pair of elongate handles, each handle having  
(a) a longitudinal axis;  
(b) an outer surface around the longitudinal axis dimensioned to be gripped in a person's hand;  
(c) a longitudinal slot formed internally of the outer surface;  
(d) an open-ended slot formed in the outer surface and accessing the longitudinal slot, the open-ended slot being dimensioned to permit insertion of the elastomeric member into the longitudinal slot;  
(e) a pair of opposing handle end portions;  
(f) an intermediate handle portion connecting the opposing handle end portions;  
(g) a pair of longitudinally-directed, axially-aligned fingers, one of the fingers being attached to one of the pair of opposing handle end portions, the other of the fingers being attached to the other of the pair of opposing handle end portions, the pair of fingers and the intermediate handle portion defining at least in part the longitudinal slot, the pair of fingers being spaced-apart to define the open-ended slot, the separation between each of the fingers and the intermediate handle portion being



such that the elastomeric member is gripped when inserted through the open-ended slot into the longitudinal

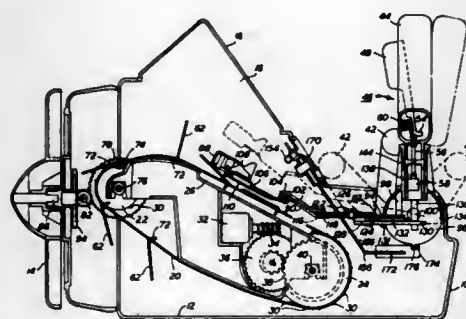
of the successively oncoming targets for knocking them down.



nal slot and located between either of the fingers and the intermediate handle portion.

**4,793,610**  
**TOY AIRPLANE AMUSEMENT GAME**  
David E. Moomaw, East Aurora, and Frederick B. Robjant, Orchard Park, both of N.Y., assignors to The Quaker Oats Company, Chicago, Ill.  
Filed Sep. 29, 1987, Ser. No. 101,986  
Int. Cl.<sup>4</sup> A63F 9/06  
U.S. Cl. 273-1 GC

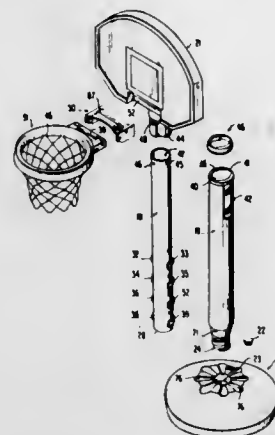
8 Claims



1. A toy amusement game for knocking down flip-up targets comprising:  
a housing, a pair of spaced rollers supported at each end of the housing, an endless web mounted on the rollers, drive means coupled to at least one of the rollers;  
means for transporting laterally and longitudinally spaced targets in one direction on said web wherein each target in a horizontal position has a depending substantially vertical foot-piece, and the housing has an inclined ramp engagable by the foot-piece as it is transported on the web, the ramp camming the foot-piece and flipping the target into its substantially vertical position;  
a miniature toy facing the targets; and  
control means coupled to the toy for moving the toy laterally of the web across the width thereof and into the paths

**4,793,611**  
**ADJUSTABLE HEIGHT TOY BASKETBALL GOAL**  
Ernest L. Thornell, Booneville, Ark., assignor to Spang & Company, Butler, Pa.  
Filed Sep. 10, 1986, Ser. No. 905,536  
Int. Cl.<sup>4</sup> A63B 63/08  
U.S. Cl. 273-1.5 R

5 Claims



1. Portable, lightweight-construction, toy basketball goal structure with yieldably interfitted plastic parts capable of relative movement to prevent damage thereto during execution of a slam dunk play, comprising:  
basketball backboard means presenting a generally planar backboard playing surface and a recessed contour presenting an opening facing in a direction normal to such planar backboard playing surface,  
hoop means associated with such backboard means, such hoop means having a generally toroidal configuration with a hoop, which is circular in plan view, and a unitary hoop flange extending radially outwardly at a single location about the circumference of such hoop,  
bracket means for:  
(a) yieldably positioning such hoop means in relation to such backboard means to dispose such circular hoop in horizontally-oriented play position,  
(b) releasing such hoop means to permit angular movement of such hoop means relative to such backboard means so as to rotate such hoop from its horizontally-oriented play position to an out-of-play position when a predetermined downwardly-directed force, such as that from execution of a slam dunk play, is exerted on such hoop, and  
(c) yieldably permitting oppositely directed angular relative movement of such hoop means to manually return such hoop means from such out-of-play position to such horizontally-oriented play position,  
such bracket means acting between such backboard means and such hoop means to enable such relative angular movement, and  
means for securing such bracket means within such recessed contour of the backboard means.  
3. A basketball goal for support on a support structure having a basketball backboard attached thereto, comprising:  
a hoop means having a generally toroidal configuration and including a hoop, said hoop being circular in plan view, and a unitary hoop flange extending radially outwardly at a single location about the circumference of said hoop;  
bracket means attached to said support means for supporting said hoop means adjacent to said backboard, said bracket yieldably positioning said hoop means in relation to said backboard to dispose said hoop in a horizontally-oriented

play position, said bracket being configured to release said hoop means to permit angular movement of said hoop means relative to said backboard so as to rotate said hoop from its play position to an out-of-play position when a predetermined downwardly directed force is exerted on said hoop, said bracket also yieldably permitting oppositely directed angular movement of said hoop means to manually return said hoop from said out-of-play position to said play position;

said bracket means and said hoop flange having matching configurations providing for nesting of said hoop flange within said bracket means when said hoop means is moved into position with said hoop in said play position during which said hoop flange is yieldably interlocked within said bracket means;

said bracket means and said hoop flange each including a generally horizontally-oriented wall in a plane substantially parallel to the plane of said hoop when in its play position and, a generally vertically extending side wall for each lateral side of said horizontally-oriented walls of said bracket means and said hoop flange;

such bracket means and hoop flange side walls each including means which interact to enable such hoop means to hold said hoop in said play position, to allow said hoop to be dislodged from said play position and to be returned to said yieldably interlocked nested position in which said hoop is in said play position;

said side walls including cooperating aperture means and protruding button means which interfit when said hoop is in said play position and which are yieldably released from said interfitted relationship to allow said hoop to be moved to said out-of-play position when said downwardly-directed force is applied to said hoop.

5. Apparatus for supporting a basketball net having upwardly extending loops on a circular basketball hoop, comprising:

a plurality of protuberances attached symmetrically to said hoop about the diametrical inner surface thereof;  
each such protuberance having a "T" shaped configuration in horizontal cross section with the stem of such "T" shaped configuration being attached to such inner surface and oriented in a radially inward direction for receiving an individual loop of said net thereon, the cross leg of such "T" shaped configuration providing means for retaining a leg of a loop on each peripheral side of such "T" shaped configuration stem.

**4,793,612**  
**APPARATUS FOR PRACTICING AND TEACHING BALL BATTING**

Robert G. Hammond, 25572 Orchard Rim La., El Toro, Calif. 92630

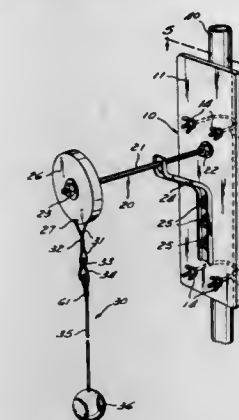
Filed Feb. 26, 1987, Ser. No. 19,208  
Int. Cl.<sup>4</sup> A63D 15/10

U.S. Cl. 273-26 E

4 Claims

1. An apparatus for practicing ball batting comprising:  
a backboard having a front and rear surface;  
an arm member mounted to said backboard and extending generally perpendicularly outward from said front surface;  
an impact member suspended from said arm member to rotate about the longitudinal axis of said arm member upon being struck by a bat;  
means positioned on the rear surface of said backboard and extending therethrough to said front surface of said backboard for mounting said backboard to a vertical support post; and  
a pair of elongate spacer bars mounted to the rear surface of said backboard extending in a plane generally parallel to the plane of said backboard, said pair of spacer bars being laterally spaced from one another to define a channel

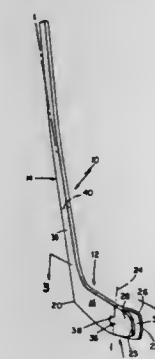
therebetween and a pair of parallel rear abutment surfaces, said channel being adapted to support said backboard



substantially parallel with the longitudinal axis of the support post.

**4,793,613**  
**HOCKEY STICK**  
Owen P. Hughes, 155 Messinger St., Canton, Mass. 02021  
Division of Ser. No. 34,032, Apr. 1, 1987. This application Jun. 1, 1988, Ser. No. 201,570  
Int. Cl.<sup>4</sup> A63B 59/00  
U.S. Cl. 273-67 A

3 Claims

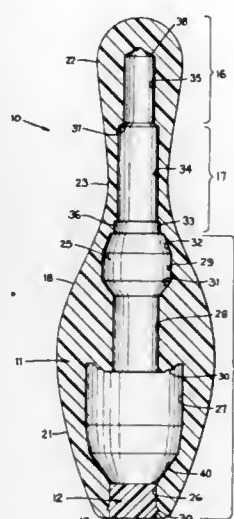


1. In a hockey stick having a handle, and an elongated blade extending from a heel portion at one end of said handle and terminating in a bifurcated toe portion at an end spaced from said heel portion, said blade defining a concavely curved fore-hand puck striking surface terminating in a fore toe segment and a backhand puck striking surface terminating in a back toe segment,

the improvement wherein  
said fore toe segment and said back toe segment are spaced apart, have an open space between them, define an acute angle between them, and are longer than they are thick so as to allow said toe segments to flex independently for improved puck control on the forehand and on the backhand, and  
said blade further comprises a playing surface engaging edge, said edge terminating upon said bifurcated toe segments, each of said toe segments also having a playing surface engaging edge, the playing surface engaging edge of said back toe segment, when said puck striking surfaces are disposed substantially normal to a playing surface and the playing surface engaging edge of said fore toe segment contacts the playing surface, extending upwardly, out of

engagement with said playing surface in a manner to allow the forehand puck striking surface to be inclined for a forehand "roofing" or "lift" shot.

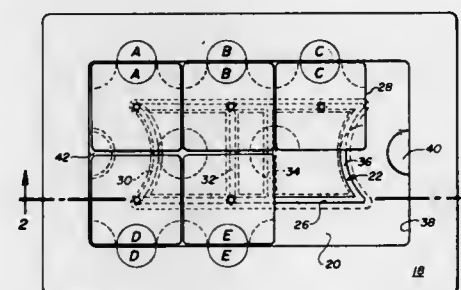
4,793,614  
**PLASTIC BOWLING PIN**  
 George R. Laure, Kalamazoo, Mich., assignor to The W-L Molding Company, Portage, Mich.  
 Filed Nov. 12, 1987, Ser. No. 119,804  
 Int. Cl.<sup>4</sup> A63R 9/00  
 U.S. Cl. 273—82 R 3 Claims



1. A bowling pin constructed of two parts, comprising:
  - a main body part which is of an integral one-piece structure formed by injection molding of a hard high-density plastic material, said main body part having a substantially flat base surface defined on a lower end thereof which is adapted to bear against an alley surface for maintaining the bowling pin in an upright condition, said main body part defining at an upper end thereof a rounded head which defines the upper extremity of the bowling pin, whereby said main body part extends throughout and defines the full vertical extent of the bowling pin;
  - said main body part including a base portion which projects upwardly from said base surface and is of a generally truncated bulbous configuration, said base portion being defined by a surrounding annular exterior surface which is of a generally convex configuration as it extends upwardly from the base surface, said base portion having a cross-section of maximum diameter located substantially midway between the upper and lower ends of the base portion;
  - said main body part including a neck portion which integrally joins to the upper end of said base portion and projects upwardly therefrom, said neck portion being of short upward extent and defining thereon a surrounding exterior annular surface which is of a generally concave configuration as it projects upwardly, the concave exterior surface of the neck portion merging smoothly with the convex exterior surface of the base portion;
  - said main body part including a head portion which is integrally joined to and projects upwardly from the upper end of said neck portion, said head portion being of short upward extent relative to said base portion and having a surrounding exterior annular surface which is generally convex as it projects upwardly and which at its lower end smoothly merges into the concave surface of said neck portion, the convex exterior surface of said head portion extending upwardly and wrapping around the upper end of the bowling pin to define a generally rounded convex

- end surface which closely resembles a semi-spherical shape;
- said main body part having a continuous blind bore arrangement which opens upwardly from said base surface and extends upwardly in concentric relationship to the upright longitudinal central axis of the bowling pin, said bore arrangement terminating at its upper end in an end wall which is spaced downwardly a small distance from the exterior convex end surface, said bore arrangement including:
- (a) a first substantially cylindrical bore which extends upwardly from said base surface through a small longitudinal extent, said first cylindrical bore being of substantially smaller diameter than said base surface;
  - (b) a second substantially cylindrical bore extending upwardly from said first bore and being in open communication therewith through an intermediate truncated conical bore, said second cylindrical bore being of substantially greater diameter than said first bore and projecting upwardly so as to terminate at a downwardly-facing annular shoulder which is disposed at an elevation which is in the vicinity of the maximum cross-sectional diameter of said base portion;
  - (c) a third substantially cylindrical bore communicating directly with and projecting upwardly from said second bore, said third bore being of substantially the same diameter as said first bore and projecting upwardly towards said end wall through a substantial vertical extent of said base portion;
  - (d) a fourth substantially cylindrical bore communicating with and projecting directly upwardly from said third bore, said fourth bore being disposed in the vicinity of the upper end of said base portion, said fourth bore having a diameter which is significantly greater than the diameter of said third bore but is significantly less than the diameter of said second bore;
  - (e) a fifth substantially cylindrical bore projecting upwardly from said fourth bore, said fifth bore being of smaller diameter than said fourth bore and projecting upwardly through said neck portion and partially through said head portion so as to terminate at said end wall; and
- a substantially cylindrical plug part fixedly seated within said first bore for closing off the lower end of said bore arrangement.

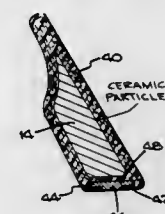
4,793,615  
**PUZZLE WITH MOVABLE PIECES**  
 John K. Martin, 1093 Elizabethtown Rd., Elizabethtown, Pa. 17022  
 Filed Sep. 25, 1987, Ser. No. 100,908  
 Int. Cl.<sup>4</sup> A63F 9/08  
 U.S. Cl. 273—153 S 9 Claims



1. A single plane puzzle with movable pieces comprising:
  - (a) a base;
  - (b) said base having a wall structure around the perimeter of the base to form a recessed area, said recessed area having a base area and side walls formed by the wall structure;

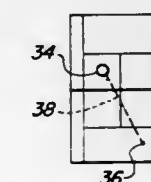
- (c) a pattern of connected grooves cut in the base area of the recessed area and the grooves being completely within the area surrounded by the side walls of the recessed areas;
- (d) a plurality of puzzle pieces;
- (e) said puzzle pieces being in a single plane in said recessed area and having means restraining the puzzle pieces for movement along the pattern of connected grooves and, at points, means as part of the puzzle forcing said puzzle pieces to rotate within the single plane; and
- (f) said puzzle pieces being provided with a design means providing the pieces with a desired pre-arranged relationship marked on their upper exposed surface whereby the puzzle pieces can be randomly moved to upset the pre-arranged relationship and then selectively moved to reform the desired pre-arranged relationship.

4,793,616  
**GOLF CLUB**  
 David Fernandez, 1457 Dara St., Camarillo, Calif. 93010  
 Continuation-in-part of Ser. No. 722,814, Apr. 12, 1985, abandoned, which is a continuation of Ser. No. 568,809, Jan. 6, 1984, abandoned. This application Jan. 21, 1987, Ser. No. 6,002  
 Int. Cl.<sup>4</sup> A63B 53/04  
 U.S. Cl. 273—167 H 8 Claims



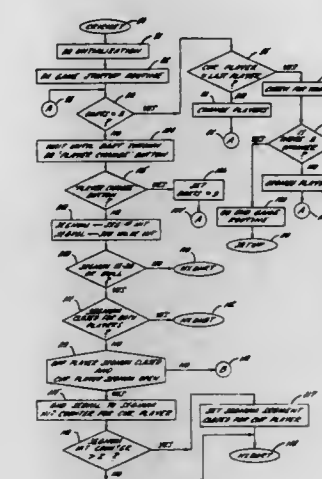
1. A golf club head comprising a rigid club head shell wherein said shell comprises resin impregnated fibers and ceramic particles dispersed in said resin.

4,793,617  
**TENNIS CARD GAME**  
 Henry R. Sanon, 150 NW. 106 St., Miami Shores, Fla. 33150  
 Filed Aug. 3, 1987, Ser. No. 80,939  
 Int. Cl.<sup>4</sup> A63F 1/00  
 U.S. Cl. 273—298 2 Claims



1. A plurality of decks of playing cards for playing a game simulating lawn tennis, comprising a serving deck including a plurality of cards bearing indicia indicative of different serving situations; a first playing deck including a plurality of playing cards bearing indicia in the form of a small-scale pictorial illustration of a typical tennis court as seen from above on which are superimposed the representation of a tennis player at one side of the net, a line extended from the player and crossing the net and terminating in a designation of the spot at which the struck ball landed; a second playing deck including a plurality of playing cards identical to those in the first playing deck; and each playing deck includes additional cards bearing indicia representing sure shots that are unreturnable.

4,793,618  
**SELF-SCORING ELECTRONIC TARGET GAME WITH VIDEO DISPLAY**  
 Michael L. Tillery, and Paul F. Beall, both of Rockford, Ill., assignors to Arachnid, Inc., Rockford, Ill.  
 Continuation-in-part of Ser. No. 926,916, Nov. 3, 1986, abandoned. This application Aug. 24, 1987, Ser. No. 88,723  
 Int. Cl.<sup>4</sup> F41J 3/00, 3/02  
 U.S. Cl. 273—376 15 Claims



1. An electronic dart game apparatus to be played by one or more players having successive turns which comprises an entire game, said apparatus comprising in combination:
  - an electronic dart board forming a target for a dart, said dart board comprising a plurality of radially extending ribs and concentric circular ribs dividing the dart board into a plurality of scoring segments each containing a large number of closely spaced holes corresponding substantially to the cross-sectional dimensional of the tip of said dart, one or more of said scoring segments comprising a scoring element, and a switch matrix means for electrically indicating one of the plurality of scoring segments hit by a thrown dart;
  - a first electronic memory storage area containing algorithms for scoring one or more different dart games wherein the value of points earned in a particular turn of said one or more different dart games is dependent upon the scoring segments hit during previous player turns;
  - a second electronic memory storage area for retaining information regarding which of one or more of said scoring elements were hit by a thrown dart during at least one previous turn of the same player;
  - selection means for selecting said algorithms for a particular one of said one or more different dart games;
  - an electronic data process means responsive to said electronic dart board, said first and second memory storage areas and said selection means for (1) detecting and distinguishing said electrical indication of a target scoring segment hit by said thrown dart, (2) calculating from said algorithms selected by said selection means appropriate dart game conditions for each of said players, including the score and (3) providing said conditions and an indication of said information for display; and
  - a means for displaying said conditions and an indication of said information.



4,793,619

**FLIP OUT GAME AND GAME PIECE**

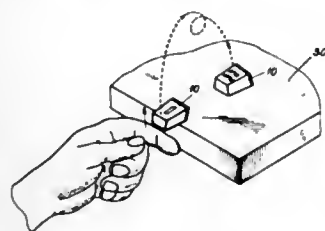
Hans Unander-Scharin, Forest Road Wolfeboro, N.H., assignor to Anjar Company, New York, N.Y.

Continuation-in-part of Ser. No. 744,109, Jun. 12, 1985, abandoned. This application Apr. 8, 1986, Ser. No. 849,462

Int. Cl.<sup>4</sup> A63F 9/04

U.S. Cl. 273-428

11 Claims



1. A game comprising:
- providing a game piece having sides of different surface area and indicia including indicia, including numbers, thereon and a space within said game piece, wherein said space contains a movable weight;
  - providing a generally flat playing surface having at least one open edge;
  - placing the game piece on the playing surface with a first side of said game piece abutting the surface with a portion of said game piece overhanging the surface at the edge;
  - flipping said game piece at least 180° so that said piece lands on the flat surface with one side in a face-abutting relationship; and
  - adding the numbers on the upper side until a predetermined total is reached.

4,793,620

**SEALING ARRANGEMENT FOR THE CLOSURE OF A GAP**

Radi Karch, Ludwigshafen-Ruchheim, Fed. Rep. of Germany, assignor to Deere &amp; Company, Moline, Ill.

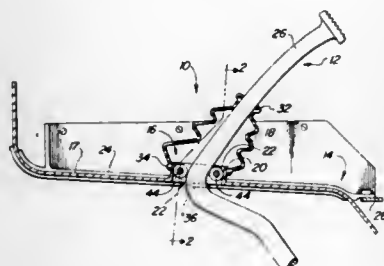
Filed Dec. 7, 1987, Ser. No. 129,808

Claims priority, application Fed. Rep. of Germany, Dec. 13, 1986, 3642680

Int. Cl.<sup>4</sup> F16J 15/52, 3/04

U.S. Cl. 277-12

6 Claims



1. An arrangement for sealing between an arm which extends through an opening in a housing and which is movable with respect to the housing, comprising:
- a slide member which receives and engages the arm and which is coupled for sliding movement only with respect to the housing; and
  - a flexible sleeve with a first end sealingly engaging the arm and with a second end sealingly engaging the member.

4,793,621

**SLIDING SLEEVE SEAL ASSEMBLY INCORPORATING REPLACEABLE ELASTOMERIC ELEMENT**

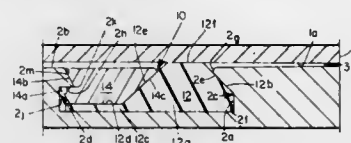
John C. Heinze, Houston, Tex., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Dec. 7, 1987, Ser. No. 129,604

Int. Cl.<sup>4</sup> F16J 15/12, 15/24

U.S. Cl. 277-30

8 Claims



1. A replaceable seal assembly for effecting a seal between a telescopically related outer body having an internal cylindrical surface and an inner body having an external cylindrical surface; one of said cylindrical surfaces having an annular groove formed therein; said annular groove having axially spaced end walls and each end wall having an annular recess formed therein, thereby defining annular retaining lips respectively overlying a portion of the ends of said annular groove; an annular seal assembly mounted in said annular groove comprising annular elastomeric means having a radially enlarged body portion compressible between the bottom surface of said annular groove and the other cylindrical surface; said annular elastomeric means having end portions to respectively project into said annular recesses, one of said end portions being of reduced thickness to lie in radially spaced, underlying relation to one of said retaining lips; and a retainer C-ring having an axial end surface positioned beneath said one of said retaining lips and secured thereby in radial compressing relation to said reduced thickness end portion of said annular elastomeric means.

4,793,622

**COMPACT FOLDABLE GOLF CART**

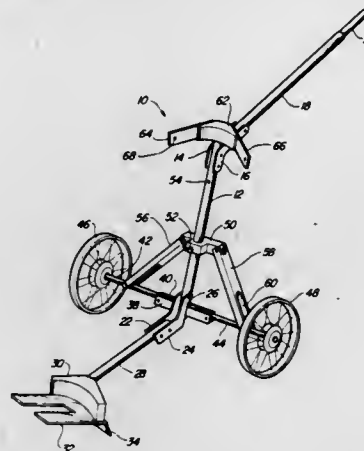
Thomas Sydlow, 20951 Littlestone Rd., Harper Woods, Mich. 48225

Filed Mar. 7, 1988, Ser. No. 165,004

Int. Cl.<sup>4</sup> B62B 1/04

U.S. Cl. 280-40

9 Claims



1. A compact foldable cart for golf bags and the like comprising:
- an elongate rigid main support member;
  - a load support member connected to the main support member adjacent the bottom end to lie against one side of the main support member when folded but to extend at a substantial angle therefrom when in an operative position;
  - a handle member pivotally connected to the main support

4,793,624

**SMALL, LIGHTWEIGHT, STRONG, MULTIPLE USE CART HAVING A REMOVABLE VERTICAL SUPPORT FOR MOVING HEAVY ITEMS IN OR OUT OF DWELLINGS VIA A PERSON SIZE DOORWAY**

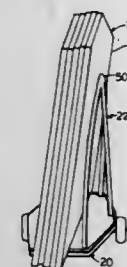
Ted C. Mace, 15129 S.E. 139th Pl., Renton, Wash. 98056

Filed Sep. 24, 1987, Ser. No. 100,593

Int. Cl.<sup>4</sup> B62B 3/02

U.S. Cl. 280-47.16

8 Claims



- member adjacent the top end to lie against the side of the main support member opposite one side when folded but to extend at a substantial angle therefrom when in the operative position;
- a pair of half axles pivotally connected at the inboard ends thereof to said main support member adjacent the bottom end of said main support member to form a full axle when extended substantially at right angle to the main support member but pivotal to lie against the main support member when folded; said half axles being adapted to removably receive wheels at the outboard ends thereof;
  - an anchor member slidably mounted on the main support member between the ends thereof and manually slidable between two stable anchor points which are spaced along the main support member; and
  - a pair of axle support struts pivotally connected between the anchor members and midpoints of respective half axles whereby sliding the anchor member between said anchor points folds and extends to half axles relative to the main support member; said struts being slotted to nestingly receive the portions of the half axles which extend outwardly from the strut pivots when folded whereby the overall length of the half axles and support struts, when folded, is less than the length of the main support member.

4,793,623

**LOAD GRIPPING HAND CART**

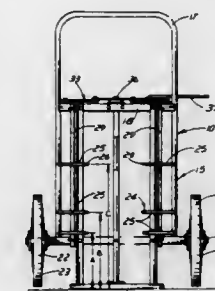
Charles Talbot, Rte. 1, Box 1456, Prosser, Wash. 99350

Filed Nov. 4, 1986, Ser. No. 927,333

Int. Cl.<sup>4</sup> B62B 1/14

U.S. Cl. 280-47.24

21 Claims



1. A load gripping hand cart, comprising:
- an elongated cart frame extending longitudinally from a foot end to a handle end, with a forwardly facing load abutment surface between said ends;
  - a ground engaging wheel rotatably mounted to the frame for rotation about a wheel axis adjacent the foot end thereof;
  - load grab means on the frame including a pair of pivoted load gripping arms for movement thereon forward of the load abutment surface between an open position for loosely receiving and releasing the load and a closed position for gripping and supporting the load;
  - manual actuator means on the frame separate and independent from the handle end and spaced toward the foot end of the frame from the handle end, operatively connected to the load grab means for manual operation to move the load grab means between the open and closed positions, and for selectively releasably locking the load grab means in the closed position;
  - wherein the actuator means is comprised of toggle means on the frame having a manually operable lever and toggle linkage connected to the arms for operation in response to manual manipulation of said lever to pivot the arms apart relative to one another to said open position and to pivot the arms toward one another to said closed position, and wherein the toggle linkage moves to an over-center, locked position as the arms are moved to said closed position.

4,793,625

**PORTABLE BOAT TRAILER**

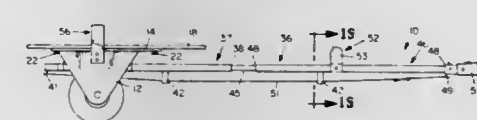
Donald E. Gerber, Rte. 2, Box 21A, Sequi, Wash. 98381

Filed Nov. 23, 1987, Ser. No. 124,252

Int. Cl.<sup>4</sup> B60P 3/10

U.S. Cl. 280-414.1

12 Claims



6. An improved boat trailer adapted to be assembled and disassembled for storage in combination with conventional wheels and a trailer hitch, wherein the improvement comprises:
- a trailer adapted to be assembled and disassembled for storage, comprising a pair of metal U-shaped housings rotatably mounted on wheels having outwardly facing and non-facing webs, the facing webs facing each other in spaced alignment being intimately secured to an upper base supporting panel and having opposite ends extending beyond front and rear side edges of said webs and including a slot therein adjacent to the front edge, the supporting panel further having a hole therethrough adjacent to each end;
  - a square socket member mounted between said side edges;
  - a rear square spacing tube for setting apart the housings with opposite ends loosely inserted in the sockets;
  - a connecting device mounted and straddling the middle of the rear square spacing tube further having a top and

spaced sides jointed to a pair of outwardly reaching flanges and including a pin extending downwardly there-through,

a front, square spacing tube for setting apart said housings including opposite ends formed in lug-like inserts for a loose connection with the slots in said facing webs,

an elongated telescopic tongue consisting of a square first length having a pair of holes therein adapted to mesh with the pins in the connecting device, a hook secured to the outer end, and an inner end slidably enclosing an end of a square second length together with a square third length having a hook and a trailer hitch mounted adjacent to the outer end and likewise having an inner end slidably enclosing the other end of the second length,

a pair of transversely adjustable cables loosely stretched between said housings underneath of said first square length having opposite ends fastened to said facing webs adjacent to the horizontal supporting panel on opposite sides of the rear square spacing tube,

means in cooperation with the transversely adjustable cables adapted to be tightened so as to bind said front and rear square tubes and said first length securely together with said housings for a compact wheeled structure,

an elongated, longitudinally adjustable cable attached loosely to the hooks on the opposite ends of the tongue,

means associated with the longitudinal adjustable cable adapted to be tightened and apply an axial force on said tongue and provide sufficient stiffness therein for towing said trailer,

a cradle mounted on the third length having V-shaped side flanges adapted to contact and support the bow portion of a small boat,

a pair of arcuate side members fastened on said housings non-facing webs, said webs being on the opposite side of said facing webs for supporting the stern portion of the boat, and

means whereby said trailer may be dismantled by the separation of said transverse and longitudinal cables and said housings so that said rear and front spacing tubes fall to the ground, and said wheeled housings, said spacing tubes, and said cables being placed in two ordinary canvas bags.

4,793,626

## TRAILER HITCH

John A. Gefroh, Rte. 2, Box 63, Rolla, N. Dak. 58367

Filed Apr. 17, 1987, Ser. No. 39,217

Int. Cl.<sup>4</sup> B60D 1/00

U.S. Cl. 280—478 R

17 Claims



1. A trailer hitch comprising a channel-shaped member having an opening therein, a tongue member having an opening therein registrable with the opening in said channel-shaped member when said tongue member is received in said channel-shaped member, elongated resilient means attached at one end to said channel-shaped member and having its other end biased toward said channel-shaped member, pin means carried on said resilient means for movement relative to the opening in said channel-shaped member into an obstructive engagement with the opening in said tongue member, and trigger means including a first means for normally engaging said resilient means to overcome the bias of said resilient means in one position and for moving said pin means into a non-obstructive relation with the opening in said tongue member and including a second means connected to said first means and engageable by said tongue member for moving said first means into a second position to allow the other end of said resilient means to move

toward said channel-shaped member and to cause said obstructive engagement of said pin means with said opening in said tongue member.

4,793,627

## SKI HANDLES CONVERTIBLE TO STANDARD SKI POLES

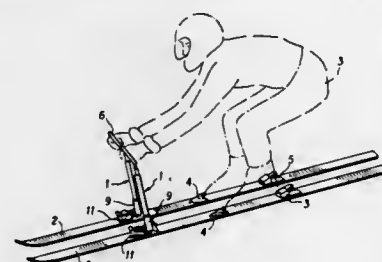
F. Javier Monreal, 4242 Barker Hill Rd., Jamesville, N.Y. 13078

Continuation-in-part of Ser. No. 70,227, Jul. 6, 1987, Pat. No. 4,744,584. This application Mar. 21, 1988, Ser. No. 171,013

Int. Cl.<sup>4</sup> A63C 5/06

U.S. Cl. 280—606

1 Claim



1. A sporting, paired, ski steering device for use with a pair of skis having standard toe and heel downhill ski bindings mounted thereon, said device being capable of providing a snow skier, while the skier's feet are locked on said downhill ski binding, with hand steering controls of the skis, each member of the pair of said steering device being identical to one another and being releasably attached to each ski, each member of the pair comprising:

an upright handlebar made of at least two sections of snugly fitting telescoping light weight metal tubes, said handlebar height being telescopically adjustable from 18" when retracted to 60" when fully extended, a plurality of round perforations located along the axial length of each lower tube section, a spring biased push button located at the lower end of each tube section, a curved handle portion formed at the upper end of the top tube section, and a non-slip rubberized sleeve surrounding said handle portion;

a basket for removable attachment to the bottom end of the lowest tube section of said upright handlebar, said basket comprising a short metal tube extending vertically from one side of a substantially horizontal plate, said short tube being capable of receiving the bottom end of said lowest tube section, said short tube having a perforation for receiving said spring biased push button of said lowest tube section, said plate being substantially pear shaped and having an aperture axially aligned with said short metal tube, and a plurality of perforations extending vertically through said plate; and

a cross-country ski binding secured to the ski at approximately mid-distance between the front tip of the ski and the toe piece of said downhill ski binding, said cross-country ski binding having a plurality of vertically extending pins to be received within said perforations of said plate and a spring bar for securing said plate to said cross-country ski binding, wherein said handlebar may be used as a ski pole by inserting the bottom end of said lowest tube section into said aperture of said plate and then into said short metal tube and wherein said handlebar may be secured to said ski by inserting the bottom end of said lowest tube section directly into said short metal tube and then securing said plate to said cross-country ski binding.

4,793,628

## TRANSPORTABLE AND COLLAPSABLE BAG CARRYING CART

Thomas S. Haley, Sr., 14 Hemlock Ct., Cromwell, Conn. 06416

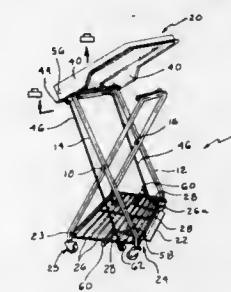
Continuation-in-part of Ser. No. 933,817, Nov. 24, 1986,

abandoned. This application Dec. 4, 1987, Ser. No. 128,607

Int. Cl.<sup>4</sup> B62B 3/02

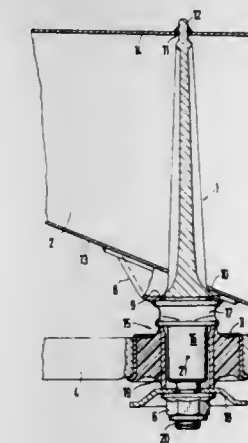
U.S. Cl. 280—641

33 Claims



30. A foldable bag holding cart comprising: first and second frame means, said first frame means pivotally connected to said second frame means, each of said first and second frame means having an inverted U-shape, said U-shape including two substantially vertical legs having a cross-piece member therebetween; base means attached between said legs of each of said first and second frame means; cover assembly means, said cover assembly means being pivotable on said frame means wherein said cover assembly means comprises; a lid pivotably attached to one of said first or second frame means; foot pedal means pivotably attached to said base means; rod extensions connected between said foot pedal means and said lid whereby said rod extensions urge said lid to pivot into an open position when said foot pedal means is pivoted downwardly, each of said rod extensions including elongated loops connected to said foot pedal means.

and lower walls of said carrier which are separated a distance from one another;



4,793,630

## MULTI-PIVOT VEHICLE SUSPENSION

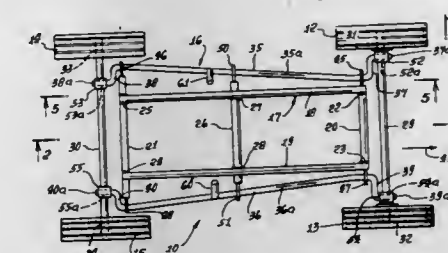
Johannes Schult, 1433 Camilo Trillado, Carpinteria, Calif. 93013

Filed Apr. 6, 1987, Ser. No. 34,611

Int. Cl.<sup>4</sup> B60F 11/18

U.S. Cl. 280—721

12 Claims



1. In a vehicle suspension, the combination comprising: (a) a main frame extending forwardly and rearwardly, (b) front and rear pairs of wheels, and axles for the wheels of said pairs, (c) two forwardly and rearwardly elongated members pivotally carried by the frame at forward and rearward locations on the frame for pivoting of the members about length axes defined by the members, each member having front and rear turned end portions and being continuous therebetween, (d) four supports on the axles near the wheels, the supports terminally supporting said turned end portions, respectively for pivoting about axes that extend forwardly and rearwardly, during pivoting of said members, (e) and means interconnecting said two elongated members to transmit torque therebetween, said last named means comprising and actuator operable to effect controlled relatively opposite pivoting of said members about their length axes, to cause said frame forward and rearward locations to move vertically oppositely.

4,793,629

## GUIDING LINK BEARING SYSTEM FOR A WHEEL SUSPENSION OF A MOTOR VEHICLE

Gerhard König, Löchgau, and Jan Tschunko, Stuttgart, both of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Fed. Rep. of Germany

Filed Sep. 23, 1987, Ser. No. 100,347

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1986, 3637920

Int. Cl.<sup>4</sup> B62D 7/02

U.S. Cl. 280—688

13 Claims

1. A guiding link bearing arrangement for a wheel suspension of a motor vehicle, in which an elastic link bearing is supported at a carrier of the body structure of said vehicle, comprising:

supporting arm means having a free lower end, said supporting arm means fixedly and rigidly being fastened at upper

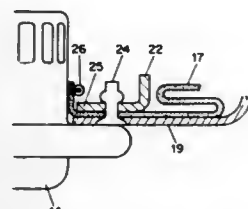


4,793,631

**MOUNTING FOR INFLATABLE SAFETY BAG**  
 Juichiro Takada, 3-12-1 Shinmachi Setagayaku, Tokyo, Japan  
 Filed Nov. 12, 1986, Ser. No. 930,319  
 Int. Cl.<sup>4</sup> B60R 21/08

U.S. Cl. 280—743

5 Claims



1. A mounting for an inflatable safety bag having an opening in communication with the discharge of a gas generator to inflate the bag in an emergency condition, comprising a pair of retainers clamping between them a peripheral region of the bag surrounding the opening and a chain-stitched stitch in the bag around the opening and adjacent an inner face of at least one of the retainers, so that upon inflation of the bag the forces which tend to pull the clamped peripheral region of the bag from the retainers will be resisted by the engagement of said chain-stitched stitch with said inner face.

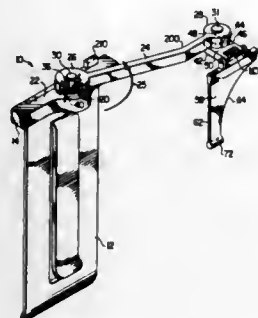
4,793,632

**AUTOMATIC BOOKMARK AND PAGE HOLDING DEVICE**

Henry R. Hoffman, Jr., 4201 Spring Valley Rd., Ste. 333, Dallas, Tex. 75244

Filed Nov. 24, 1986, Ser. No. 934,024  
 Int. Cl.<sup>4</sup> B42D 9/00, 9/06; E05D 15/00  
 U.S. Cl. 281—42

10 Claims



1. A bookmark and page holding device comprising:  
 a means for attachment to a book;  
 a swing arm having a first end pivotally connected to said means for attachment, said first end being pivotable about a first axis, said swing arm also having a second end distal to said first end;  
 means for spring-loading said swing arm relative to said means for attachment;  
 a yoke having a first end pivotally connected to said second end of said swing arm, said yoke being pivotable about a second axis, said second axis lying parallel to and co-planar with said first axis, said yoke also having a second end distal to said first end of said yoke, and said yoke being limited in its pivotable movement relative to said second end of said swing arm by a rotation limiting means; and  
 a page holder plate pivotally connected to said second end of said yoke, said page holder plate being pivotable about a third axis being perpendicular to said second axis and lying in a plane parallel to said plane defined by the page

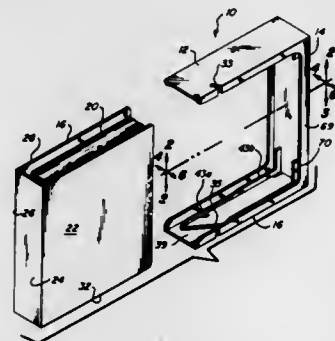
tops of said book, wherein said rotation limiting means comprises a pin extending from a surface of said yoke adjacent said swing arm and a groove formed in a side of said second end of said swing arm adjacent said yoke for receiving said pin, whereby said page holder's rotational movement in the plane of said swing arm is limited by the length of said groove in which said pin travels.

4,793,633

**DEVICE FOR SUPPORTING BOUND MATERIAL**  
 Robert D. Rose, Jr., 2635 S. Santa Fe Dr., Denver, Colo. 80223  
 Continuation-in-part of Ser. No. 883,616, Jul. 9, 1986, which is a continuation-in-part of Ser. No. 734,959, May 16, 1985, abandoned. This application Jul. 31, 1987, Ser. No. 80,675  
 The portion of the term of this patent subsequent to Aug. 18, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> B42D 3/02; G09F 5/04; B65D 73/00; A47B 41/06  
 U.S. Cl. 281—45

7 Claims



1. A support device for bound materials including a front and back cover interconnected by a spine, said device comprising in combination:

a generally C-shaped frame, including an upper member, a spine member and a lower member, each of said members having tracks formed therein for receiving free edges of said front and back covers and for holding said front and back covers in a pre-established, fixed position wherein said bound materials are completely enclosed and said covers are positioned by said tracks essentially parallel to each other, said tracks of said upper and lower members defined by an outside wall and an inside wall, at least one of said inside walls including an integral guide wall, said guide wall extending angularly from one of said inside and outside walls to the other, defining with one of said walls a separation point which is insertable between said front and back covers of said bound materials.

4,793,634

**ORIGINAL PERPETUAL DIARY CALENDAR**  
 Paul Alloggiamento, 86-11 34th Ave., Apt. 6K, Jackson Heights, N.Y. 11372

Filed Dec. 22, 1986, Ser. No. 944,956  
 Int. Cl.<sup>4</sup> B42D 5/04

U.S. Cl. 283—2

11 Claims

1. A calendar diary chart comprising:  
 (a) a flat sheet of rigid cardboard;  
 (b) a plurality of vertical lines and horizontal lines disposed onto said cardboard sheet forming a grid pattern divided into quarterly segments for one complete year, each of said quarterly segments of said grid pattern including a first column, a second column, a third column, a fourth column indicating a first set of check boxes, a fifth column indicating a first set of note boxes, a sixth column indicating a second set of check boxes, a seventh column indicating AM boxes, an eighth column indicating a second set of

4,793,636

**APPARATUS FOR JOINING HOSES WITH CONNECTING PIECES**

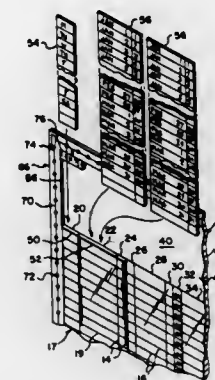
Hermann W. Keck, Blumenstrasse 13, CH 4106 Therwil/BL/Schweiz, Switzerland

Filed Dec. 15, 1986, Ser. No. 941,427  
 Claims priority, application Switzerland, Dec. 16, 1985, 05334/85

Int. Cl.<sup>4</sup> F16L 21/04

U.S. Cl. 285—12

7 Claims



1. An apparatus for selectively joining a hose to rigid connecting pieces having an end portion with any of threaded, ribbed or smooth type outer surfaces, said apparatus being composed of:

(A) a first part having a cylindrical boring with a first gasket ring seated therein, one end of said first part being internally threaded and an opposite end having external slots, each of which has an entry portion that connects with a locking portion that slopes circumferentially toward said one end;  
 (B) a second part having a boring with a second gasket ring seated therein, radially inwardly directed bosses being provided at one end of the second part which are lockingly engageable in said external slots of the first part for fixing said second end of the first part against said second gasket ring, and a hose coupling portion for mounting a hose at a second end;  
 (C) a third part having a cylindrical shape and an internal boring, one end of said third part having an external threading that is matched to the internal threading of said first part;  
 (D) a fourth part comprising an annular compressible seal means; wherein said first and second parts are operable by themselves as a means for joining of a hose mounted to said hose-coupling portion of the second part to an end portion of a connecting piece having a threaded outer surface matched to the internal threading of the first part by a threading-in of the connecting piece into engagement with the first gasket ring; and wherein said third and fourth parts are operable in conjunction with said first and second parts as a means for joining of a hose mounted to said hose-coupling portion to an end portion of a connecting piece having a type of outer surface other than a threaded one, said fourth part being pressed against the outer surface of the connecting piece by being compressed between said first and third parts.

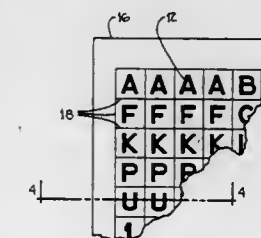
4,793,635

**RADIOPAQUE GRAPHICS**

Douglas I. Lovison, 3468 Sitio Baya, Carlsbad, Calif. 92009  
 Continuation of Ser. No. 893,059, Aug. 4, 1986, abandoned.

Filed Nov. 10, 1987, Ser. No. 119,022  
 Int. Cl.<sup>4</sup> B42D 15/00, 5/00; B42F 21/06  
 U.S. Cl. 283—74

7 Claims



1. A transferable identifier for placement on a plate during a radiology procedure which comprises:  
 a plastic carrier having a recess thermoformed into an alphanumeric shape;  
 a radiopaque material deposited within said recess;  
 a sheet attached to said carrier to hold said radiopaque material in said recess; and  
 an adhesive deposited on said sheet to hold said identifier in place on said plate.

4,793,637

**TUBE CONNECTOR WITH INDICATOR AND RELEASE**  
 Robert A. Laipply, and John C. Field, both of Jackson, Mich., assignors to Aeroquip Corporation, Jackson, Mich.

Filed Sep. 14, 1987, Ser. No. 95,681

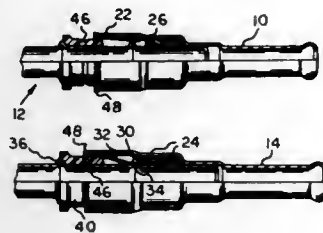
Int. Cl.<sup>4</sup> F16L 37/26

U.S. Cl. 285—39

13 Claims

1. A push-to-connect connector comprising, in combination, a female part having a passage defined therein, a male part axially receivable within said passage, retainer means mounted upon one of said parts engagable with the other part to maintain said parts in a fully connected condition upon said male part being fully axially inserted into said female part, and

indicia means separate from said retainer means mounted upon said male part engagable with said female part during axial



movement of said male part within said passage indicating the extent of axial insertion of said male part into said passage.

**4,793,638**  
**PLASTIC PIPE TO METAL PIPE FITTING**  
Lyman C. Baldwin, Jr., 2130 San Fernando, Los Angeles, Calif. 90065

Filed Jun. 10, 1988, Ser. No. 205,205  
Int. Cl.<sup>4</sup> F16L 55/00  
U.S. Cl. 285—174



1. A transition fitting for interconnecting a plastic pipe with a larger diameter metal pipe, comprising:  
a first retainer ring for receipt onto an end portion of the plastic pipe;  
a compressible bushing for clamping receipt on the plastic pipe end portion in contact with said first retainer ring;  
a second retainer ring for receipt on the plastic pipe contacting the compressible bushing;  
a pliant cylindrical seal for receipt on the plastic pipe in contact with the second retainer ring;  
a washer on the plastic pipe contacting the cylindrical seal; and  
an insert tube for receipt within said plastic pipe end portion having an enlarged end contacting the washer;  
in assembly said plastic pipe end portion being received within the metal pipe and a portion of the metal pipe being deformed to clampingly engage and distend the pliant cylindrical seal.

**4,793,639**  
**TUBE COUPLING MECHANISM**  
Alfred H. Glover, Decatur; Joseph T. Betterton, Arab; Daniel F. Lawless, Hazel Green, and Anthony M. Michalovic, Decatur, all of Ala., assignors to Chrysler Motors Corporation, Highland Park, Mich.

Filed Apr. 29, 1988, Ser. No. 188,015  
Int. Cl.<sup>4</sup> F16L 37/00, 47/00  
U.S. Cl. 285—319

9 Claims



1. A coupling device for tubing used in a pressurized fluid circuit to permit simple assembly and disassembly between the coupling device and a tube end, the tube end having a radially outwardly projecting collar, the coupling device, comprising: the coupling device including an elongated body portion molded of elastomeric material and with passage means extending axially therethrough for the flow of fluid; the passage means including a first bore dimensioned only slightly larger than the tube to permit insertion thereof into the body, a second bore dimensioned slightly larger than the collar to permit insertion thereof into the body and a radially extending shoulder therebetween to limit axial insertion of the collar into the body; an annulus spaced axially away from the remainder of the coupling body and the second bore therein and with its interior opening being coaxial with and of substantially the same dimension as the second bore; support means extending between the annulus and the remainder of the coupling body, the support means being integral with the annulus and the remainder of the body and having an inwardly facing surface which guides the tube end into the body and specifically into the second bore; an elongated actuator lever integrally attached near its midportion to the annulus and at a position equidistant from the attachment of the annulus to the support means, the lever having a radially inwardly positioned end portion and a radially outwardly positioned end portion, the inwardly positioned end engaging the tube collar during and after assembly and the outwardly positioned portion adapted for manually applied forces to disassemble the tube from the coupling device, whereby the inwardly positioned end of the lever is moved radially outward from an assembled position blocking axial movement of the collar and tube end to a disassembly position unblocking axial movement of the collar as the tube end is withdrawn from the coupling body, the movement of the lever permitted by the gentle bending of the annulus from an unstressed plane to a stressed non-planar configuration.

**4,793,640**  
**CAM-ACTUATED ELECTRIC DOOR LOCK**  
Kenneth W. Stewart, Sr., Columbus, Miss., assignor to United Technologies Electro Systems, Inc., Columbus, Miss.

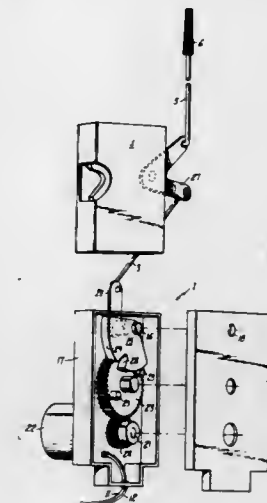
Filed Oct. 30, 1986, Ser. No. 925,054  
Int. Cl.<sup>4</sup> F05C 3/06  
U.S. Cl. 292—201

10 Claims

1. A door lock system for a motor vehicle which comprises: a latching and locking means having a lever which may be displaced between locked and unlocked positions to either a latch the door lock or place the door lock in a condition where the door may be opened;  
a cam means connected to displace said lever, said cam means being mounted for rotational displacement and

defining only one fixed receiving slot formed within said cam means;  
a gear means mounted for rotational displacement and offset from the cam means to overlap therewith, said gear means including at least one projecting pin means extending axially outward from a radially extending surface of the gear means and sized to engage the cam means within the receiving slot such that rotational displacement of the gear

said device comprising first and second locking members and a bottom portion,  
one of said locking members defining a catch means having a first and a second opening,  
said first opening being aligned with said apertures and said second opening being normal to said apertures when said device is placed in said apertures,  
the other of said locking members defining a latch means dimensioned to fit substantially within and be in locking engagement with said catch means when placed within said catch means when said catch means is positioned within said apertures of objects whose closure is to be confirmed,  
one of said locking members also comprising a flange extending transversely to cover one end of said apertures, and  
said bottom portion comprising a flange extending transversely to cover the other end of said apertures and a neck for attachment to said other locking member.

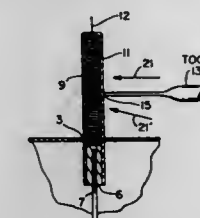


**4,793,642**  
**VEHICLE DOOR LOCK HANDLE FOR DETERING THEFT OF A VEHICLE**

John Lafstidia, 47 Everett St., Everett, Mass. 02149  
Filed Mar. 27, 1987, Ser. No. 31,026  
Int. Cl.<sup>4</sup> E05B 1/00; E05C 13/02

U.S. Cl. 292—336.3

6 Claims

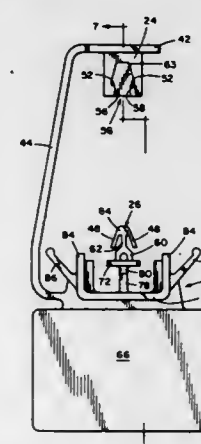


means effects rotational displacement of the cam means and continued rotational displacement of the gear means disengages the projecting pin means from the slot; and  
means for driving the gear means to effect rotational displacement thereof whereby when the projecting pin means is not in the slot, the cam means may be displaced as a result of displacement of the latching and locking means lever without causing rotational displacement of the gear means or the means for driving the gear means.

**4,793,641**  
**TAMPER REVEALING SEAL**  
Robert L. Sokol, Orland Park, Ill., assignor to Panduit Corp., Tinley Park, Ill.

Filed Jun. 9, 1987, Ser. No. 59,724  
Int. Cl.<sup>4</sup> B65D 55/06  
U.S. Cl. 292—322

23 Claims



14. A seal for placement in apertures of objects whose closure is to be confirmed,

1. A door lock handle highly flexible in all directions transverse to its longitudinal axis for locking and unlocking a vehicle door lock, comprising an elongated handle having sufficient stiffness along said longitudinal axis to enable transmission of manually applied forces to said handle substantially parallel to said longitudinal axis to lock and unlock said door lock, and having high lateral compliance in directions transverse to said longitudinal axis to yield when a relatively low lateral force is applied to said handle to prevent a tool from engaging said handle and unlocking said vehicle door lock, said handle including a cylindrical coil spring positioned along at least a portion of said longitudinal axis, and a flexible jacket positioned about said coiled spring for preventing said tool from being inserted through said coil spring while enabling bending of said handle in said transverse directions.

**4,793,643**  
**DOOR CLOSING AND LOCKING MECHANISM**  
Munir J. Ahad, Valencia, and Sven A. Pettersson, Santa Monica, both of Calif., assignors to Adams Rite Products, Inc., Glendale, Calif.

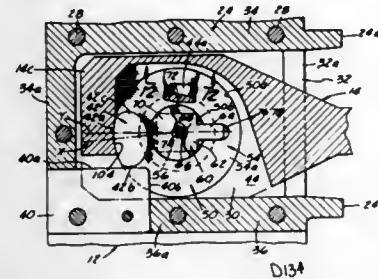
Filed Mar. 16, 1987, Ser. No. 25,973  
Int. Cl.<sup>4</sup> E05C 3/04  
U.S. Cl. 292—241

11 Claims

6. A mechanism for closing and locking a door including: a bolt member projecting from the closing edge of the door, door closing and latching means for edgewise reception of the bolt member, including a rotatable element engagable with the bolt member and being operable to move the bolt member substantially rectilinearly along a closing path from a partially open position to a fully closed position, said door closing and locking means including cam means which is moved to an over center position as the bolt

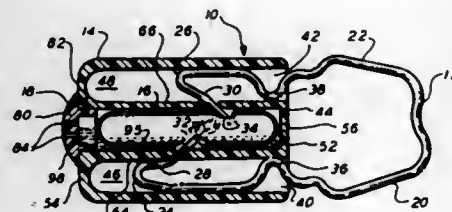


member is moved to the locked position which acts against movement of the door in a reverse door opening direction, said cam means being adjacent the perimeter of the rotatable element and having an outer edge which has a curved shape corresponding to an arcuate segment of a circle whose center coincides with the point of rotation of the rotatable element, and



said bolt member has a cam surface with a curved shape essentially complementary to the shape of said outer edge and its center coinciding with the point of rotation of the rotatable element upon movement of the cam means to the over center position, and said outer edge and said cam surface being in an abutting relationship upon movement of the cam means to said over center position.

**4,793,644**  
**SECURITY SEAL WITH DYE**  
Allan W. Swift, Deenville, N.J., assignor to E. J. Brooks Company, Newark, N.J.  
Filed Mar. 14, 1988, Ser. No. 167,705  
Int. Cl.<sup>4</sup> B65D 33/34  
U.S. Cl. 292—320 13 Claims

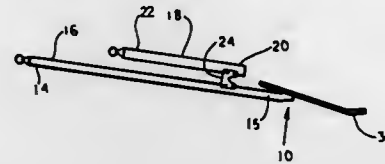


1. A security seal comprising:  
a seal body having adjacent first and second chambers therein;  
a liquid contained in said first chamber; and  
a shackle having at least one leg including means for locking said leg in said second chamber and for rupturing said first chamber to permit said liquid to seep from said first chamber when a force is exerted to unlock said leg.

**4,793,645**  
**TWO HANDLED SHOVE WITH ELASTOMERIC HINGE**  
Mark Decker, 7660 S. Creek Rd., Girard, Pa. 16417  
Filed Feb. 8, 1988, Ser. No. 152,975  
Int. Cl.<sup>4</sup> A01B 1/22; B25G 3/38  
U.S. Cl. 294—58 7 Claims

1. A shovel comprising a main handle having a first end and a second end,  
a shovel blade attached to said second end of said main handle,  
an auxiliary handle having a first end and a second end, a flexible elastomeric member,

said flexible elastomeric member having a first side and a second side,  
said main handle being fixed to a first edge of said flexible elastomeric member along the length of said main handle, a second edge of said flexible elastomeric member being



fixed to said auxiliary handle at said second end of said auxiliary handle,  
said flexible elastomeric member comprising a body of flexible material providing a hinge swingably connecting said handles together whereby said main handle can swing relative to said auxiliary handle.

**4,793,646**  
**ADJUSTABLE INTERLOCKING TELESCOPIC HANDLE AND ARM ASSEMBLY**  
Fernand L. Michaud, Jr., Milford, Conn., assignor to Northeast Marine, Inc., North Branford, Conn.  
Filed Aug. 17, 1987, Ser. No. 86,156  
Int. Cl.<sup>4</sup> B63B 21/04  
U.S. Cl. 294—19.1 10 Claims

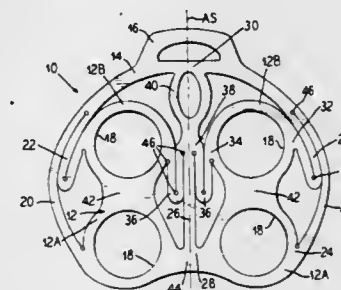


1. An easily adjustable, securely interlocked handle and arm assembly comprising:  
A. a first elongated tube member incorporating  
a. a plurality of locking zones formed along the length of said tube, with each of said zones  
1. establishing an alternate position for adjusting the operative length of the handle and arm assembly, and  
2. comprising a pair of post-receiving holes formed in the wall of the tube member in juxtaposed, spaced, facing, diametrically opposed relationship to each other, and  
b. a reduced diameter zone formed at one end of said first elongated tube member; and  
B. a second elongated tube member telescopically engaged with said first tube member for sliding interengagement therewith, with one end thereof maintained within said first tube member and the opposed end thereof maintained outside the first tube member, and incorporating  
a. at least two locking zones formed at opposed ends of said tube member, each of said locking zones comprising a pair of post-receiving holes formed in the wall of the tube member in juxtaposed, spaced, facing diametrically opposed relationship to each other,  
b. a reduced diameter zone formed at the end of said tube member maintained outside of the first tube member, and  
c. an enlarged diameter zone formed at the end of said tube member maintained within the first tube member, said enlarged diameter being greater than the reduced diameter of the first tube member, thereby preventing removal of said second tube member from said first tube member; and  
C. at least one spring loaded, dual-post locking member  
a. mounted within said second elongated tube in cooperating interengagement with one of said pairs of post-receiving holes, and  
b. maintained with said post members thereof biased into locked interengagement with said post receiving holes,

ready for locked interengagement with any pair of post receiving holes formed in said first elongated tube member,

whereby said second elongated tube member can be quickly and easily moved into interlocked engagement with said first elongated tube member in any one of a plurality of locking zones formed along the length thereof, thereby providing a handle and arm assembly which can be quickly and easily adjusted to have its operative length changed to any particular desired configuration, while also preventing accidental removal of said second elongated tube member from said first elongated tube member.

**4,793,647**  
**CUP CADDY**  
Claire C. Marvin, 104 N. Greenwood, Park Ridge, Ill. 60068  
Filed Nov. 2, 1987, Ser. No. 115,523  
Int. Cl.<sup>4</sup> B65D 71/00  
U.S. Cl. 294—87.2 18 Claims

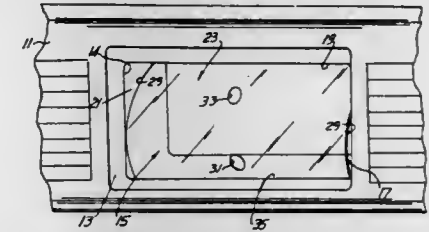


1. A cup carrier for carrying up to a predetermined number of cups, comprising:  
a predetermined number of flexible cup engaging portions each for completely encircling a cup in an engaging relationship;  
each of said engaging portions having a pair of flexible support webs extending generally from opposite sides of said cup engaging portions for supporting each of said cup engaging portions substantially independently of others of said cup engaging portions; and  
a flexible bail connected to each of said support webs and spanning said predetermined number of cup engaging portions, said cup engaging portions and said bail and said support webs being sufficiently flexible to support each of said cup engaging portions in a substantially level condition when suspended from said flexible bail regardless of the presence of cups in others of said cup engaging portions, ones of said cup engaging portions which are free of a cup being capable of movement out of a plane defined by ones of said cup engaging portions in an engaging relationship with a cup.

**4,793,648**  
**REMOVABLE CLOSURE FOR DASH BOARD UTILITY SHELF**  
Louis Zerilli, 25120 Culver, St. Clair Shores, Mich. 48081  
Filed Mar. 2, 1988, Ser. No. 163,005  
Int. Cl.<sup>4</sup> B60R 7/06  
U.S. Cl. 296—37.12 6 Claims

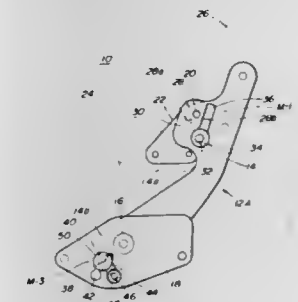
1. In combination with a vehicle dash board having a recessed utility shelf opening through the dash board, and a removable closure including a normally flat sheet of flexible plastic material of rectangular shape, along its bottom edge anchored and retained within and upon the shelf along its

length against the interior of the dash board, with the body of the sheet curved rearwardly under tension and with its top



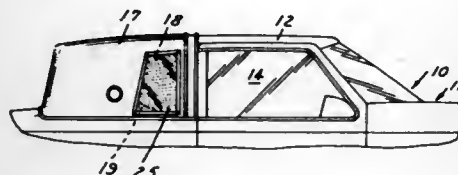
edge frictionally and retainingly engaging the top of the shelf rearwardly of its opening.

**4,793,649**  
**FOLDING SEAT**  
Eiichi Yamano, and Takashi Yamashita, both of Kanagawa, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan  
Filed May 29, 1987, Ser. No. 55,367  
Claims priority, application Japan, Jun. 18, 1986, 61-92590[U]  
Int. Cl.<sup>4</sup> B60N 1/02  
U.S. Cl. 296—65.1 10 Claims



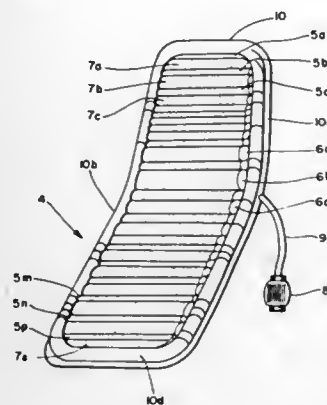
1. A folding seat for use on a floor, comprising:  
first and second spaced side arms each having a lower end pivotally connected to said floor, each arm being pivotal between an upright position and a folded position with respect to said floor;  
a seatback secured to said first and second spaced side arms to move therewith;  
a seat cushion connected to said first and second spaced side arms in such a manner as to be pivotal between a horizontal in-use position and an upright folded position with respect to said seatback;  
a first latching mechanism for latching said seat cushion to said first side arm when the same assumes one of said horizontal in-use position and said upright folded position;  
a second latching mechanism for latching said second side arm to the floor when said second side arm assumes said upright position;  
a third latching mechanism for latching said first side arm to the floor when said first side arm assumes said upright position; and  
an unlatching mechanism for making said second latching mechanism inoperative when said seat cushion assumes said upright folded position.

4,793,650  
**CUSTOMIZED AUTOMOBILE ROOF AND WINDOW CONSTRUCTION**  
 Joseph T. Raj, Riverview, Mich., assignor to Evans Automotive, Division of Evans Industries, Inc., Wayne, Mich.  
 Filed Sep. 28, 1987, Ser. No. 101,585  
 Int. Cl.<sup>4</sup> B60D 25/06; B60N 1/00; B21K 21/16  
 U.S. Cl. 296—210 4 Claims



3. A customized roof construction for changing the appearance of an automobile which has an original window opening wherein a portion of the body of the automobile covers a desired window position in the customized roof comprising portions of the window being masked while leaving a portion of the window and a portion of the body associated with the original window unmasked, a deeply tinted transparent panel applied over the unmasked portion of the window and said portion of the body where it is desired to provide the effect of a window, said tinted panel having low light transmission characteristics, and a roof cap with a window opening corresponding substantially to the unmasked portion of the tinted panel and said portion of such as to provide a window having a substantially different configuration from the original window of the automobile with a portion of the window overlying said portion of the body of the automobile.

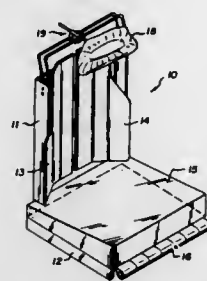
4,793,651  
**HEAT-RETAINING AIR-FILLED SEAT COVER FOR LUMBAR SUPPORT**  
 Akio Inagaki, Okazaki; Chiaki Yamada, Nishio; Tamio Ohi, Okazaki; Marehito Kato, Toyota, and Minoru Hirata, Chiryu, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan  
 Filed Dec. 21, 1981, Ser. No. 333,054  
 Claims priority, application Japan, Dec. 22, 1980, 55-184365[U]  
 Int. Cl.<sup>4</sup> A47C 27/08  
 U.S. Cl. 297—180 3 Claims



1. A seat cover for attachment to a seat in an automotive vehicle, which seat cover comprises:  
 a pliable synthetic resin sheet member which is impermeable

to air for being attached to the entire front surface of the seat;  
 a plurality of air-tight first inflatable columnar portions formed in said sheet member transversely thereof and spaced apart longitudinally thereof;  
 a plurality of air-tight second inflatable columnar portions, larger in diameter than said first inflatable columnar portions, formed in said sheet member transversely thereof and so spaced longitudinally thereof as to be positioned at the lumbar region of an individual seated in said automobile seat when the seat cover is attached to said seat;  
 a third air-tight inflatable portion formed in said sheet member and interconnecting said first and second inflatable columnar portions so that said first, second and third inflatable portions form a unitary body capable of being inflated with air;  
 inflation means communicating with said third inflatable portion for inflating said third inflatable portion as well as said first and second inflatable columnar portions; and  
 a plurality of heat-retaining portions each formed in said sheet member transversely thereof between adjacent ones of said first and second inflatable columnar portions, each heat-retaining portion containing a heat-retaining agent capable of absorbing solar heat and retaining the accumulated solar thermal energy for several hours, said heat-retaining agent being selected from the group consisting of polyethylene glycol and soda of acetic acid, whereby the first, second and third inflatable portions may be inflated to fit the contour of the individual and the seat will keep warm for several hours, even after a drop in the ambient temperature.

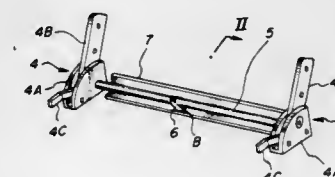
4,793,652  
**ORTHOPAEDIC SEATING DEVICE**  
 Richard E. Hannah, Ganges, and Christine C. Stow, Victoria, both of Canada, assignors to Arbutus Society for Children, British Columbia, Canada  
 Filed Aug. 11, 1987, Ser. No. 84,442  
 Int. Cl.<sup>4</sup> A47C 7/02  
 U.S. Cl. 297—230 13 Claims



1. A modular orthopaedic insert for wheelchairs, comprising, in combination:  
 a backrest;  
 a seat base;  
 hinge means for removably mounting said backrest to said seat base;  
 adjustable thoracic support means, detachably mounted to said backrest;  
 securing means for mounting said thoracic support means to said backrest and adapted to permit said support means to be moved vertically and horizontally relative to a vertical plane defined by said backrest;  
 a cushion for mounting on said seat base; and  
 an adjustable headrest attached to said backrest comprising a pair of spaced rods positioned adjacent and parallel each other, each of said rods being formed with first and second depending straight sections joined by a third straight

section perpendicular to said first and second sections and extending therebetween;  
 first connecting means mounted to said backrest for slidably receiving said first and second depending straight sections of said pair of spaced rods;  
 a headrest connected to a headrest support rod; and  
 second connecting means for slidably receiving said headrest support rod, said second connecting means being slidably mounted between said third straight sections of said pair of spaced rods.

4,793,653  
**RECLINING DEVICE FOR AUTOMOTIVE SEAT**  
 Yuzo Kanazawa, Gifu Prefecture, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase, Japan  
 Filed Nov. 20, 1987, Ser. No. 123,521  
 Claims priority, application Japan, Dec. 29, 1986, 61-199242[U]  
 Int. Cl.<sup>4</sup> B60N 1/02  
 U.S. Cl. 297—355 2 Claims



1. In an automotive seat having a seat cushion and a seat-back,  
 a reclining device comprising:  
 first and second substantially identical units which are respectively arranged at lateral sides of the seat, each unit including a base portion secured to said seat cushion, essential parts of a reclining mechanism mounted to said base portion, an operation handle extending from the essential parts, and an arm extending from the essential parts and secured to the seatback, so that upon manipulation of the operation handle, the angular position of the seatback relative to said seat cushion can be adjusted;  
 an elongate rod having longitudinal both ends respectively connected to the operation handles of the first and second units thereby to achieve a synchronous pivotal movement of the operation handles about the axis of the elongate rod;  
 a channel-like frame which constitutes a rear part of the seat cushion, said channel-like frame extending along said elongate rod; and  
 a rubber band surrounding a generally middle portion of the elongate rod and attached to the channel-like frame, so that the middle portion of the rod is biased toward the channel-like frame and vibration of said elongate rod is substantially prevented.

4,793,654  
**CHAIR WITH HEIGHT-ADJUSTABLE SEAT**  
 Hirotsuke Takafuji, 5-19, Obatsu Higashi 3-chome, Higashi-osaka-shi, Osaka-fu, Japan  
 Filed Feb. 9, 1987, Ser. No. 12,865  
 Int. Cl.<sup>4</sup> A67C 5/10  
 U.S. Cl. 297—338 1 Claim

1. A chair with a height-adjustable seat, comprising:  
 a main frame having substantially inverse-U shaped outside and inside frames, each of said outside and inside frames formed by a pipe, said inside frame being arranged and fixed to said outside frame so as to form parallel gaps at left and right sides of the inverse-U shaped frames, a predetermined portion of said parallel gaps serving as left

and right guide portions arranged in a pair extending in an up-and-down direction parallel with each other; and a seat adapted to be movably connected to said guide portions, said seat having a width broader than a distance between said guide portions, said seat having left and right vertical plate supporting portions, each vertical plate supporting portion being inserted into one of said gaps, and being provided with a pair of bar-like rear stoppers perpendicularly and symmetrically aligned with respect to each of said supporting portions, respectively, and a pair of bar-like front stoppers perpendicularly and symmetrically aligned with respect to each of said vertical

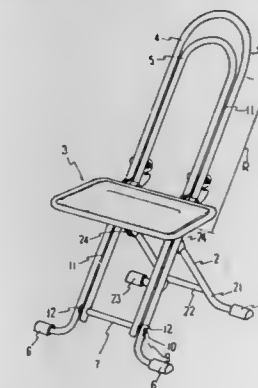
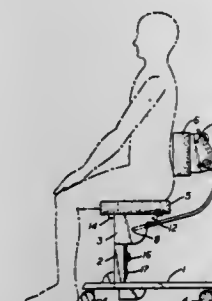


plate supporting portions, respectively, said rear stoppers and said front stoppers being situated between said pair of pipes, so that said rear stoppers abut against said pipes from a rear side thereof and said front stoppers abut against said pipes from a front side thereof in order to hold said seat in a substantially horizontal orientation;  
 a foldable rear leg having upper ends pivotally jointed to said main frame, a bar-like engaging member bridged between said outside and inside frames; and  
 a slot for receiving said engaging member provided in said vertical plate supporting portions so as to receive said engaging member to lock said seat in an orientation turned toward said main frame.

4,793,655  
**MULTI-POSITION CONVERTIBLE THERAPEUTIC CHAIR**  
 Andrew M. Kvalheim, and Fleming M. Pedersen, both of Petaluma, Calif., assignors to Kval Marketing Inc., Petaluma, Calif.  
 Filed Mar. 20, 1987, Ser. No. 28,580  
 Int. Cl.<sup>4</sup> A47C 7/50  
 U.S. Cl. 297—423 9 Claims



1. A convertible chair having a supporting structure comprising:  
 a first cushion pivotally mounted on said structure in an initially horizontal position;



said first cushion being mounted on a first pivot means on said structure and disposed to support the posterior of a person;

a second cushion positioned on a rotating arm mounted on a second pivot means in a first initially vertical position on said structure;

said second cushion being disposed to initially support the back of a person while in a seated position on said first cushion;

means for rotating said arm and said second cushion downwards in a vertical plane through a predetermined arc about said second pivot;

interlocking means engaging said first cushion with said rotating arm;

said interlocking means being disposed to position said arm and said second cushion to a second position in spaced relation below and facing said first cushion at a predetermined angle thereto while simultaneously tilting said first cushion forward towards said second cushion about said first pivot means;

thereby causing said second cushion to act as a support for the knee of a person while seated on said first cushion;

said interlocking means being further disposed to hold said second cushion alternately in said first position and in said second position.

4,793,656

## IN-SITU COAL DRYING

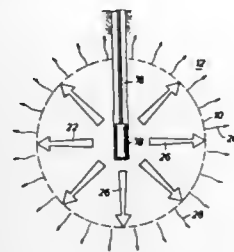
Mark A. Siddoway, and Timothy S. Westby, both of Houston, Tex., assignors to Shell Mining Company, Houston, Tex.

Filed Feb. 12, 1987, Ser. No. 14,421

Int. Cl. F21B 43/24; E21C 37/16

U.S. Cl. 299—14

21 Claims



1. A method for mining coal upgraded within a coal seam comprising:

creating a cavity within the coal seam;

placing a source of energy within the cavity, effective to substantially irreversibly collapse pores within a treatment zone in the coal seam;

activating the energy source;

driving pore moisture from the coal;

substantially irreversibly collapsing pores in the coal within the treatment zone of the coal seam, thereby reducing the ability of the coal to resorb pore moisture; and

removing the upgraded coal from the seam.

4,793,657

## SUCTION DEVICE FOR TAKING-UP AND DEPOSITING OF WORK PIECES

Lorenz Mense, Hamburg, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschränkter Haftung, Munich, Fed. Rep. of Germany

Filed Sep. 1, 1987, Ser. No. 92,042

Claims priority, application Fed. Rep. of Germany, Sep. 3, 1986, 3629968

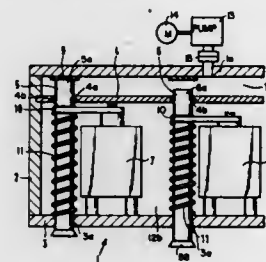
Int. Cl. B25J 15/06; B66C 1/02

U.S. Cl. 294—65

10 Claims

1. A suction device for taking-up and depositing work pieces comprising a plurality of suction tubes, housing means for

holding said suction tubes in a predetermined pattern for movement between an operative suction applying position and



an inoperative rest position, and drive means in said housing means for individually connecting one end of each of said suction tubes to a source of vacuum or reduced pressure.

4,793,658

## VEHICLE WHEEL COVER

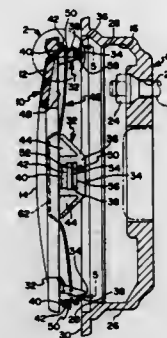
Trevor J. Brown, Rochester, Mich., assignor to General Motor Corporation, Detroit, Mich.

Filed Mar. 31, 1987, Ser. No. 91,098

Int. Cl. B60B 7/00

U.S. Cl. 301—37 PB

8 Claims



1. In combination with a vehicle wheel having axially extending generally annular flange means defining an opening and generally radially inwardly extending abutment means having axially inner and outer sides, a vehicle wheel cover comprising, in combination,

a cover body having axially extending radially facing cover flange means locatable in juxtaposed relationship to the wheel flange means and to the abutment means, the cover flange means including diametrically opposite openings and resilient positioning means axially outwardly of each opening,

a linear leaf spring traversing the axially inner side of the cover body and including shoulder means adjacent each end thereof and stop means adjacent each shoulder means, each shoulder means of the leaf spring being received in a respective opening of the cover flange means and projecting radially outwardly of the cover flange means through such opening, the spring stop means engaging cooperating stop means on the cover flange means adjacent each opening to set the extent of projection of the spring shoulder means radially outwardly of the cover flange means, the leaf spring between its stop means having a linear extent greater than the diametrical distance between the cover stop means whereby the leaf spring bows and goes over-center into engagement against the axially inner side of the cover body to provide a spring force resisting radially

inward movement of the shoulder means within their respective openings,

movement of the cover flange means within the wheel flange means engaging the spring shoulder means with the axially outer sides of the wheel abutment means and forcing the shoulder means inwardly of the openings against the spring force until the shoulder means move axially inwardly of the wheel abutment means and axially engage the axially inner sides thereof to retain the cover against axially outward movement, the resilient positioning means engaging the wheel flange means axially outwardly of the abutment means to resiliently hold the shoulder means in axial engagement with the axially inner sides of the abutment means.

4,793,659

## SPOKED WHEEL OF SYNTHETIC MATERIAL AND METHOD OF MAKING THEREFOR

Werner Oleff, Rüschstr. 13, D-4972 Löhne 3, and Fritz G. Pape, Porta Westfalica, both of Fed. Rep. of Germany, assignors to Werner Oleff, Löhne and ASV Stübbe GmbH & Co. KG, Vlotho, both of, Fed. Rep. of Germany

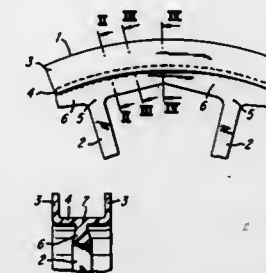
Continuation-in-part of Ser. No. 589,458, Mar. 14, 1984, Pat. No. 4,639,046. This application Dec. 3, 1986, Ser. No. 937,345

The portion of the term of this patent subsequent to Jan. 27, 2004, has been disclaimed.

Int. Cl. B60B 1/00

U.S. Cl. 301—63 PW

4 Claims



1. A wheel of synthetic material having an injection-molded center part including a hub as well as having spokes and a rim integral therewith;

said rim including main rim walls having a predetermined rim cross section with a rheological cross-sectional area thereof and being unitary with said spokes at spoke connection locations on said rim, said hub also being unitary with said spokes and being the injection-molded center part of the wheel, the improvement therewith which comprises:

said rim being provided with a plurality of circumferentially extending additional rim wall elements of synthetic material between all of said spokes;

each of said additional rim wall elements leading from said spoke connection location of a given spoke to the middle of a rim portion located between two adjacent spokes and each of said wall elements being provided, in comparison with said main rim walls with respect to the rheological cross-sectional area thereof, with an advance-flow cross-sectional area;

the synthetic material in each of said additional rim wall elements at the middle of said rim portion, where two of said wall elements join one another, and the synthetic material in said main rim walls of said rim portion between said two adjacent spoke connection locations being free from cold flow seams, in which each of said additional rim wall elements is an approximately rib-shaped widened portion of said main rim walls which projects from a surface of said rim and extends in the circumferential direction of said rim beyond said spoke connection locations on said rim.

4,793,660

## HYDRAULIC BRAKE SYSTEM FOR AUTOMOTIVE VEHICLES

Horst P. Becker, Frankfurt am Main, and Olaf Mogwitz, Glashütten, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

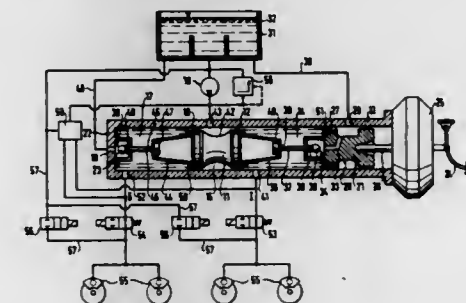
Filed Jan. 19, 1987, Ser. No. 64,137

Claims priority, application Fed. Rep. of Germany, Jul. 14, 1986, 3623736

Int. Cl. B60T 15/12, 8/44, 13/12, 13/58

U.S. Cl. 303—54

3 Claims



1. A hydraulic brake system for automotive vehicles, said system including a brake slip control device and comprising a master brake cylinder connected to an unpressurized reservoir, said master cylinder including a pedal-operated first master cylinder piston which includes a supply valve means which is responsive to the position of said first master cylinder piston to open in the rest position of the first master cylinder piston and is otherwise closed by an actuating force being applied to a brake pedal coupled thereto, said supply valve means connecting a working chamber in the master cylinder with a supply bore leading to an unpressurized reservoir, a brake line connected to the working chamber of the master brake cylinder and leading to pressure control valves of a brake slip control device, said valves being connectable to at least one wheel brake, the working chamber of the master brake cylinder being connected to a pressure medium source which source is actuated in response to and upon the starting of the brake slip control device, means being provided to control the outlet pressure of the pressure medium source so that the outlet pressure of the pressure medium source is greater than the maximum braking pressure achievable by applying the master brake cylinder so that, upon the starting of the brake slip control device, the first master cylinder piston is displaced into its rest position in response to a pressure differential thereacross and the supply valve means is opened until the pressure in the working chamber has dropped to a value corresponding to the actuating force at the brake pedal whereupon said supply valve means closes, the working chamber's front side being away from the first master cylinder piston and being sealed by a second master cylinder piston sealedly arranged in the master cylinder, the second master cylinder piston being sealed relative to the master cylinder by a non-return valve gasket, an annular chamber formed between the master cylinder and the second master cylinder piston, said annular chamber being located on the non-return valve gasket's side away from the working chamber, the annular chamber being connected to the pressure medium source, the non-return valve gasket opening when the pressure in the annular chamber is higher than that in the working chamber create said pressure differential and thereby to displace said first master cylinder piston to open said supply valve until the pressure in the working chamber equals the pressure which corresponds to the pedal pressure.

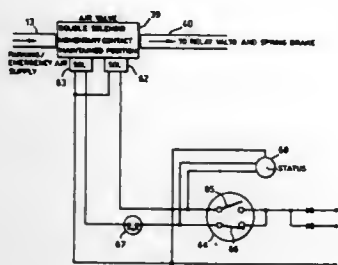
4,793,661

**TRACTOR-TRAILER FLUID PRESSURE BRAKE MONITORING SYSTEM**

Donald G. Munro, Mississauga, Canada, assignor to Alert-O-Brake Systems Inc., Mississauga, Canada  
Continuation-in-part of Ser. No. 898,016, Aug. 19, 1986, Pat. No. 4,712,422. This application Sep. 28, 1987, Ser. No. 101,755  
Int. Cl. B60T 17/16

U.S. Cl. 303-89

7 Claims



1. In a vehicle having fluid-operated spring brakes and supply means for supplying operating fluid to the brakes whereby to release the brakes from a locked condition, security means to prevent unauthorized release of the brakes comprising a bistable solenoid valve for controlling the supply of fluid to the brakes, energizing circuit means for operating the valve, and limited access switching means interconnected with said energizing circuit means and operable to set the solenoid valve selectively in an open or a closed condition.

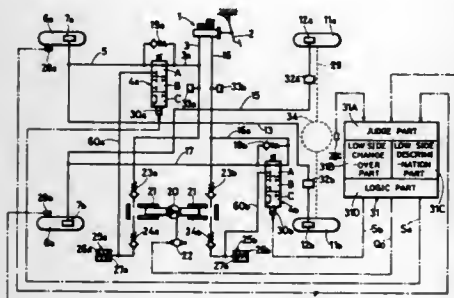
4,793,662

**ANTI-SKID CONTROL APPARATUS FOR A VEHICLE BRAKING SYSTEM**

Tetsuro Arikawa, Kanagawa, Japan, assignor to Nippon A B S, Ltd., Tokyo, Japan  
Filed Feb. 17, 1988, Ser. No. 157,323  
Claims priority, application Japan, Feb. 18, 1987, 62-036654  
Int. Cl. B60T 8/82, 8/62, 8/64, 17/18

U.S. Cl. 303-96

16 Claims



1. An anti-skid control apparatus for a vehicle braking system comprising:

- (A) a pair front wheels, and a pair of rear wheels;
- (B) a first fluid pressure control valve device for controlling the brake fluid pressure of the wheel cylinder of one of said front wheels, arranged between a first fluid pressure generating chamber of a tandem master cylinder and said wheel cylinder of the one front wheel;
- (C) a second fluid pressure control valve device for controlling the brake fluid pressure of the wheel cylinder of another of said front wheels, arranged between a second fluid pressure generating chamber of said tandem master cylinder and said wheel cylinder of the other front wheel;
- (D) a first path which transmits the brake fluid pressure controlled by said first fluid pressure control valve device,

to the wheel cylinder of the one of said rear wheels connected diagonally to said one front wheel;

(E) a second path which transmits the brake fluid pressure controlled by said second fluid pressure control valve device, to the wheel cylinder of the other of said rear wheels connected diagonally to said other front wheel;

(F) first and second wheel speed sensors associated with said front wheels, respectively;

(G) a third wheel speed sensor associated in common with said rear wheels, and

(H) a control unit receiving outputs of said first, second and third wheel speed sensors for measuring or judging the skid conditions of said front and rear wheels and for generating instructions for controlling said first and second fluid pressure control valve devices; wherein said control unit discriminates the frictionally lower one (designated as "low side") of the sides of the road on which said wheels are running, from the measuring or judging results of the skid conditions of said rear and front wheels, or of said front wheels on the basis of the outputs of said first, second and third wheel speed sensors, or of said first and second wheel speed sensors, said low side being able to change over in accordance with said measuring or judging results at any time, combines logically the measuring or judging results of the skid conditions of said rear wheels with the measuring or judging result of the skid condition of the one front wheel running on the low side for generating the instruction for controlling said first or second fluid pressure control valve device, and generates the instruction for controlling said second or first fluid pressure control valve device, on the basis of the measuring or judging result of the skid condition of the other front wheel running on the high side (frictionally higher side) independently of those of said rear wheels.

4,793,663

**VALVE ARRANGEMENT FOR BRAKE SYSTEMS OF AUTOMOTIVE VEHICLES COMPRISING AN ELECTRONIC ANTILOCKING AND TRACTION SLIP CONTROL**

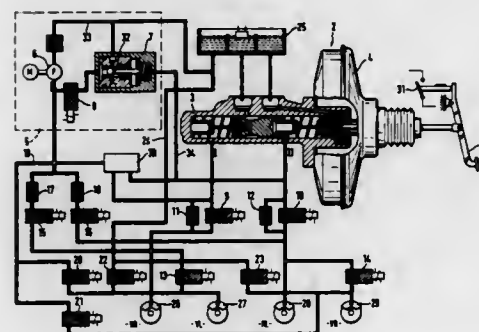
Norbert Ocvirk, Offenbach; Lutz Weise, Mainz; Horst-Peter Becker, Frankfurt Am Main, and Otto Determann, Darmstadt, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt Am Main, Fed. Rep. of Germany  
Filed Jul. 15, 1987, Ser. No. 73,487

Claims priority, application Fed. Rep. of Germany, Jul. 22, 1986, 3624722

Int. Cl. B60T 8/48

U.S. Cl. 303-110

9 Claims



1. A valve arrangement for automotive brake systems having electronic antilocking and traction slip control, said arrangement comprising a brake pressure generator (2) that includes a brake pedal (1), a tandem master cylinder (3), and a vacuum brake force booster (4), said brake pressure generator (2) being connected to two hydraulic brake circuits (I, II) each

of which is connectible to one front wheel and one rear wheel, an auxiliary brake pressure generator associated with each of the brake circuits, said auxiliary brake pressure generator including an auxiliary pressure supply system (5) comprising a hydraulic pump (6), an auxiliary pressure control valve (7), and a 2-way/2-position valve (8), said valve arrangement further comprising a first multi-way valve (9, 10) in each brake circuit, said first multi-way valve (9, 10) being open in the resting position, and being provided in the pressure fluid conduit from said brake pressure generator and in the pressure fluid path from said auxiliary pressure supply system to the wheel brakes, the driven wheel of the vehicle being connected through a second multi-way valve (15, 16) open in the resting position, to said first multi-way valves (9, 10) for connection to the brake pressure generator (2) and the auxiliary pressure supply system (5), a third multi-way valve (22, 23) associated with each driven wheel of the vehicle blocked in the resting position and in communication with a pressure compensating tank, and at least one additional valve between said auxiliary pressure supply system and the driven wheels of the vehicle, said additional valve being operative to feed auxiliary pressure in the traction slip control phase to the driven wheels of the vehicle.

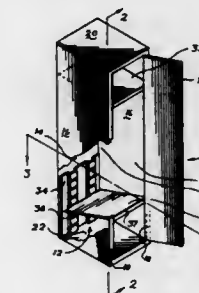
4,793,664

**CABINET STRUCTURE AND SHELVING APPARATUS THEREFOR**

Charles Jackson, Rte. #3, Box 428-B, Newton, N.C. 28658  
Filed Oct. 26, 1983, Ser. No. 545,452  
Int. Cl. A47B 57/00

U.S. Cl. 312-306

23 Claims



11. A cabinet structure comprising vertical rear wall means, a front access opening, vertical front frame members laterally adjacent said opening, plural vertically spaced receiving openings formed in said rear wall means and facing said front frame members, and at least one shelf member having projecting means at one side thereof for selective receipt in said receiving openings and dimensioned from said one side to the opposite side of said shelf member to be sufficiently greater than the dimension between said rear wall means and said front frame members so that said shelf member will extend at an upward incline from said rear wall means into braced edgewise resting engagement of said opposite side of said shelf member with the inward surfaces of said front frame members to present a generally flat, upwardly facing shelf surface without other means for supporting said shelf member, thereby for enhanced organization of the storage capabilities of said cabinet structure.

4,793,665

**STORING AND DISPENSING SYSTEM**

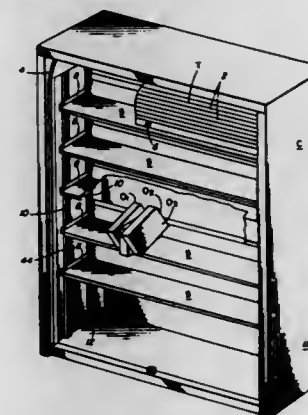
Ronald R. King, Sutton, Mass., assignor to Wright Line Inc., Worcester, Mass.  
Filed Apr. 2, 1987, Ser. No. 34,012  
Int. Cl. A47B 81/06

U.S. Cl. 312-17

5 Claims

1. A stationary storing and dispensing system for substantially square or rectangular objects comprising: at least two shelves,

each of the shelves having an article engaging bottom, the bottom having front and rear continuous parallel edges extending widthwise of the shelf, a ramp inclined upwardly at an angle from the rear edge of the bottom and extending widthwise of the shelf, a finger guide extending widthwise of the shelf below the bottom, the guide being inclined downwardly and rearwardly from the front edge at an acute angle with the bottom of the shelf, a continuous, uninterrupted article engaging and restraining member projecting downwardly below the bottom of each shelf, and extending widthwise of the shelf between the finger guide and the ramp,



the shelves being assembled horizontally, one above the other, such that the single finger guide on the upper of two assembled shelves may be engaged at any point widthwise of the shelf by at least one finger to guide it while removing or inserting an object on a shelf immediately below the first shelf, and such that the article engaging and restraining member on the upper of the two assembled shelves may be engaged by an object on the shelf immediately below the upper shelf when the object is tilted in the process of removing the object, the engaging and restraining member limiting the amount of tilt.

4,793,666

**MOTION DISPLAY FOR ARTICLES INSIDE A SHOWCASE**

Arthur Torrence, Newtown, Conn., assignor to Timex Corporation, Middlebury, Conn.

Filed Dec. 24, 1987, Ser. No. 137,708

Int. Cl. A47F 3/08

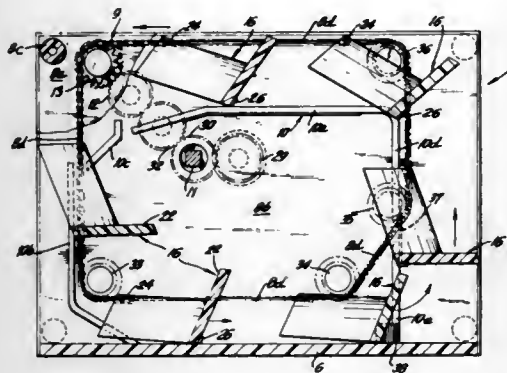
U.S. Cl. 312-134

10 Claims

1. A motion display for articles inside a showcase comprising: a frame having opposed longitudinally spaced wall members, a plurality of longitudinal shelves each shelf having a plurality of receptacles for articles to be displayed, conveyor means for causing said shelves to move transversely between said walls in a continuous loop defining a first substantially vertical part at the front of said display and a second substantially horizontal part along the top of said display, a motor driving said conveyor means, opposed pivot means on opposite ends of said shelves, said shelves being spaced around said continuous loop and supported by said pivot means, and guide rail means cooperating with said shelves to cause them



to periodically pivot around said pivot means into a first orientation over said first part of said continuous loop and



into a second orientation over said second part of said continuous loop.

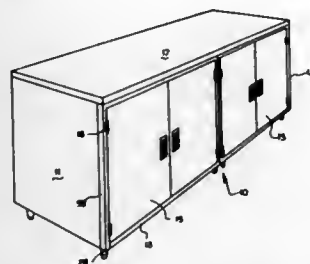
4,793,667

**KNOCKDOWN STEEL COUNTER**

John W. Gilliom, Conway, Ark., assignor to White Consolidated Industries, Inc., Cleveland, Ohio  
Continuation of Ser. No. 36,440, Apr. 9, 1987, abandoned. This application Feb. 19, 1988, Ser. No. 159,478  
Int. Cl.<sup>4</sup> A47B 48/00

U.S. Cl. 312-263

7 Claims



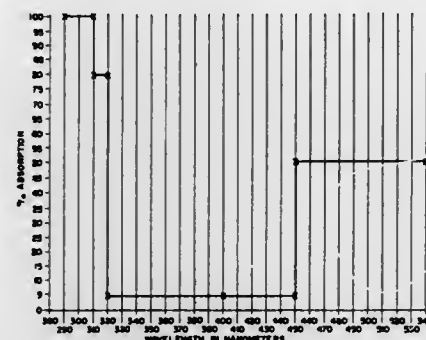
1. A knockdown metal cabinet comprising a flat rectangular base, said base having a center section and an integral flange extending downwardly along each edge of said center section, a bracket secured to each corner of said base at the front and rear flanges and extending upwards therefrom, each of said brackets being fastened to the base flange by a fastener and having a lip extending beneath the base flange, a pair of rectangular side panels extending upwards from and secured to opposite sides of said base, each of said side panels having a closed channel portion extending along each vertical edge and which telescopically receives and encloses the adjacent bracket, each side panel having a portion extending downwardly to cover said base flange and the enclosed brackets, fastener means extending through the inner side of each channel portion and the enclosed bracket to secure the side panel to said base, a pair of parallel horizontal cross-bars extending between opposing upper corners of said side panels, each cross-bar at each end being secured to the side panels at two vertically spaced points along the inner side of the closed channel portion, whereby said base, said side panels, and said cross-bars define a rigid rectangular boxlike structure, each of said side panels having an inwardly extending flange along the upper edge, a top extending over the upper surface of said cabinet, and means securing said top to said flanges on said side panels.

4,793,668  
**SUNBATHING FILTER WITH INCOMPLETE UV-B ABSORPTION**

Eric Longstaff, 5 Cantey Pl., Atlanta, Ga. 30327  
Filed Nov. 13, 1986, Ser. No. 930,602  
Int. Cl.<sup>4</sup> G02B 5/22, 7/00

U.S. Cl. 350-1.1

11 Claims



1. Apparatus for use in sunbathing, comprising: a substrate screen material which is substantially transparent to the safe UV-A wavelengths of solar radiation in the range 320-400 nm and light in the range 400-450 nm; which said substrate containing at least one first agent which absorbs at least 80% of the UV-B radiation in the range 310-320 nm but substantially all UV-B in the range 290-310 nm; said substrate containing at least one second agent which prevents transmittal of a biologically significant proportion, being 50% or more, of the visible and IR radiation of wavelengths in the range 450-700 nm and 700-15,000 nm respectively through said substrate, said agents being substantially uniformly dispersed throughout said substrate; and at least one third agent which is a heat absorbing material, wherein the relatively small portion of UV-B not absorbed by the apparatus stimulates the production of new melanin in a sunbather, which will be later available for tanning by UV-A radiation.

4,793,669

**MULTILAYER OPTICAL FILTER FOR PRODUCING COLORED REFLECTED LIGHT AND NEUTRAL TRANSMISSION**

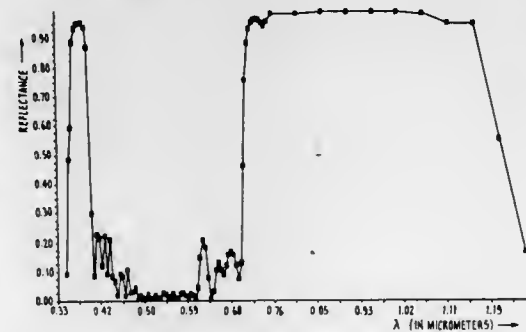
Bruce E. Perilloux, Grass Valley, Calif., assignor to Coherent, Inc., Auburn, Calif.

Filed Sep. 11, 1987, Ser. No. 96,135

Int. Cl.<sup>4</sup> G02B 5/22, 5/28

U.S. Cl. 350-1.6

23 Claims



1. An optical filter, including: a substrate having a surface, and a coating supported by the surface of the substrate, said coating including a set of

alternating layers formed of material having high refractive index and substantially quarter-wave optical thickness, and material having low refractive index and substantially quarter-wave optical thickness, where the thickness of each layer is selected so that the filter has a reflectance spectrum exhibiting a ripple over a first segment of the visible spectrum but exhibiting no significant ripple over a second segment of the visible spectrum, so that the reflected light having wavelength within the first segment is sufficient to give the filter a desired aesthetic color, and where the thickness of each layer is selected so that the filter reflects substantially all electromagnetic radiation having wavelengths in the near-infrared range.

4,793,670

**DYNAMIC HOLOGRAM RECORDING**

William A. Crossland, Harlow; Peter W. Ross, Stansted, and Neil Collings, Harlow, all of England, assignors to STC PLC, London, England

Filed Jul. 7, 1986, Ser. No. 882,545

Claims priority, application United Kingdom, Jul. 18, 1985, 8518155

The portion of the term of this patent subsequent to Mar. 31, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> G02F 1/13; G02H 1/04

U.S. Cl. 350-3.64

2 Claims



1. A method of providing optical four-wave mixing, wherein a liquid crystal layer incorporating a guest pleochroic dye is thermally stabilised to a predetermined temperature, wherein two waves for which the dye is selectively absorbing are interfered in the layer to produce a thermal hologram and concomitant phase hologram, and wherein a third wave of the same wavelength as that of said two interfering waves to which the dye is substantially transparent is employed to illuminate the layer so as to interact with the phase hologram to produce a holographically diffracted fourth wave, characterised in that illumination with the third wave commences after commencement of illumination with the first and second waves while that illumination with the first and second waves continues, and in that it terminates not before termination of illumination with the first and second waves.

4,793,671

**OPTICAL EFFECTS DEVICE**

John B. Palochak, and John C. Palochak, both of 227 Chico Ave., Santa Cruz, Calif. 95060

Filed Sep. 23, 1987, Ser. No. 100,348

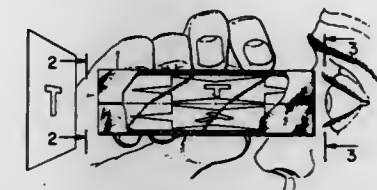
Int. Cl.<sup>4</sup> G02B 23/00

U.S. Cl. 350-4.1

7 Claims

1. An optical effects device adaptable as a container, said device comprising a hollow structure elongate about an axis, said hollow structure having a viewing port at a first end thereof and an opaque end wall at a second end thereof, said end wall extending generally transverse to said axis, said end wall having an apertured portion of predetermined design through which light can be transmitted, said hollow structure having an empty interior bounded by a plurality of substantially planar interior walls that are reflective of light, said viewing port being defined by end portions of said reflective

interior walls at said first end of said hollow structure, said reflective interior walls extending from said first to said second end of said hollow structure so that light passing through said apertured portion of said end wall is reflected from said interior walls to form corresponding images of said apertured



portion of said end wall, said images of said apertured portion of said end wall being seen in a generally arrangement around said apertured portion of said end wall when a viewer looks into the interior of said hollow structure through said viewing port at said first end of said hollow structure.

4,793,672

**CONSTANT DEVIATION SCANNING APPARATUS**

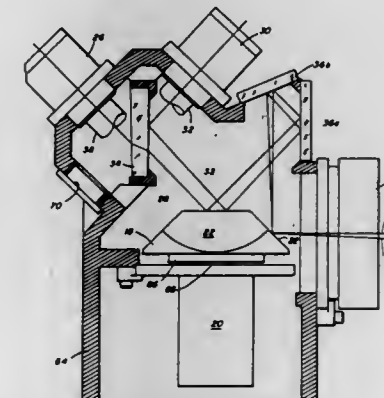
John F. McGrath, Jr., Arlington, Mass., assignor to Compa-graphic Corporation, Wilmington, Mass.

Filed Apr. 8, 1987, Ser. No. 35,974

Int. Cl.<sup>4</sup> G02B 26/10

U.S. Cl. 350-6.7

21 Claims



1. A beam scanning apparatus comprising: (a) a rotatable reflective means having an axis of rotation; (b) at least one planar reflective scanning facet located on said rotatable reflective means with the plane thereof intersecting the axis of rotation at an acute angle; (c) a planar reflective wobble compensating facet located on said rotatable reflective means with the plane thereof being normal to the axis of rotation; (d) constant deviation reflective means including two reflective surfaces positioned so that a light beam reflected by the wobble compensating facet is reflected by one of said reflective surfaces to the other of said reflective surfaces and then to said at least one planar reflective scanning facet; and (e) means for rotating said rotatable reflective means.

4,793,673

**TRANSMISSION DEVICE FOR CONTROL PANELS IN COMMUNICATIONS TERMINAL EQUIPMENT**

Erich Kock, Fuerstenfeldbruck, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

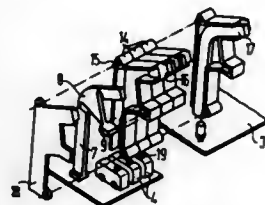
Filed May 27, 1986, Ser. No. 866,918

Claims priority, application Fed. Rep. of Germany, Jun. 13, 1985, 3521277

Int. Cl.<sup>4</sup> G02B 6/00

U.S. Cl. 350—96.10

12 Claims



12. A transmission device for control panels in communications terminal equipment wherein function elements operated from the control panels are rigidly secured on printed circuit boards at a distance from the control panels, the improvement comprising:

- stationary guide elements positioned between said control panels and function elements;
- said stationary guide elements being formed in blocks of sub-elements, wherein the individual sub-elements are formed as half shells and contain latch guides which enable the individual sub-elements to be stacked on top of one another, so that a bottom of a half shell of one sub-element terminates the sub-element arranged next to it;
- mechanical thrust elements carried in the said stationary guide elements to extend between said control panels and said function elements;
- biasing means operative on said thrust elements to continuously urge said thrust elements away from said function elements;
- light conductors carried in said stationary guide elements to extend between said control panels and said function elements;
- whereby manual force applied to individual thrust elements at said control panels is transmitted to selected function elements allocated to said individual thrust elements.

4,793,674

**FIBER OPTIC COUPLER USING FRIT**

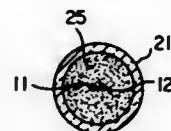
Beth A. Buzzio, Rutherford; Eugenia M. Viera, West New York; Christine M. Flaherty, Upper Montclair; Arlene C. Ives, Mountainside; Herbert T. Califano, Bloomington, and Joseph P. Pierry, Park Ridge, all of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jan. 16, 1987, Ser. No. 4,354

Int. Cl.<sup>4</sup> G02B 6/26, 6/42

U.S. Cl. 350—96.11

7 Claims



1. Fiber optic coupler characterized by:

- (a) at least two optical fibers juxtaposed at portions of the fibers corresponding to a desired optical coupling, the fibers each having a core and a buffer coating;

- (b) the buffer coating being removed from the optical fibers at the set portions corresponding to the optical coupling;
- (c) a glass tube section surrounding the fibers at the said portion corresponding to the optical coupling; and
- (d) fused glass frit surrounding the optical fibers at said portions corresponding to the optical coupling and interposed between the glass tube and the optical fibers.

4,793,675

**ELEMENT HAVING LIGHT WAVEGUIDES AND METHOD OF MAKING SAME**

Yuichi Handa, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 674,919, Nov. 26, 1984, abandoned.

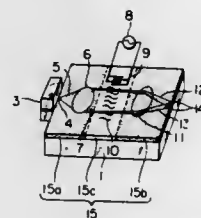
This application Mar. 18, 1988, Ser. No. 170,622

Claims priority, application Japan, Dec. 2, 1983, 58-226981

Int. Cl.<sup>4</sup> G02B 6/10

U.S. Cl. 350—96.13

12 Claims



1. An element having light waveguides, comprising:
  - a planar substrate comprising one of lithium niobate crystal and lithium tantalate crystal and having a first surface and an end surface;
  - a first light waveguide formed by diffusing a metal in a part of the first surface of said substrate spaced from said end surface;
  - a second light waveguide formed by externally diffusing the lithium oxide in said substrate in the remain in area of the first surface of said substrate;
  - means for introducing light, through said end surface, into said second light waveguide as a diverging light;
  - means for varying the refractive index of said first light waveguide by extraneous action and modulating or deflecting said light propagated through said first light waveguide;
  - a butt coupling, through which waveguide light is introduced from said end surface of said second light waveguide; and
  - a semiconductor laser in intimate contact with said end surface of said second light waveguide,
- wherein said second light waveguide is formed so that the distribution of the intensity of the light propagated through said second light waveguide in the direction of depth of said second waveguide is substantially coincident with the distribution of intensity of light output by said semiconductor laser.

4,793,676

**OPTICAL FIBER ACOUSTO-OPTIC AMPLITUDE MODULATOR**

William P. Risk, Redwood City, Calif., assignor to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Continuation of Ser. No. 768,405, Aug. 21, 1985, abandoned, which is a continuation-in-part of Ser. No. 670,763, Nov. 13, 1984, abandoned. This application Dec. 23, 1987, Ser. No. 142,348

Int. Cl.<sup>4</sup> G02B 6/26; G02F 1/00

U.S. Cl. 350—96.13

32 Claims

1. A device for coupling light between the propagation modes of an optical fiber, comprising:

4,793,678

**FIBER OPTIC POLARIZATION CONTROLLER**

Takao Matsumoto, and Haruo Kano, both of Kanagawa, Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

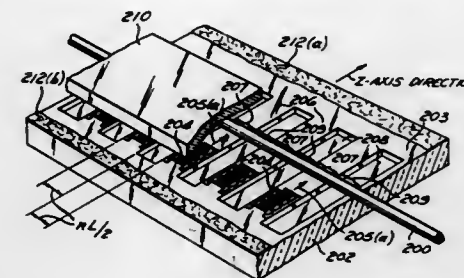
Filed May 20, 1986, Ser. No. 864,923

Claims priority, application Japan, May 20, 1985, 60-107748; Jul. 12, 1985, 60-152407; Dec. 23, 1985, 60-289874

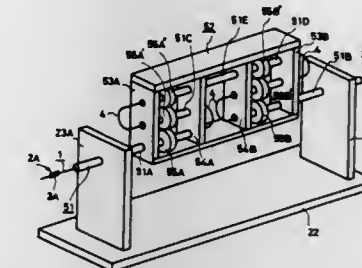
Int. Cl.<sup>4</sup> G02B 6/26, 6/02, 5/30

U.S. Cl. 350—96.15

13 Claims



a transducer for generating said surface acoustic waves in said substrate, said transducer oriented to produce wave fronts parallel to the longitudinal axis of said fiber, said transducer producing a phase relationship among said plural acoustic waves which causes additive coupling of light from one of said modes to the other of said modes.



1. A fiber optic polarization controller comprising an optical fiber having a curved portion, for generating birefringence within the fiber means for fixing said optical fiber at two positions on both sides of said curved portion, means for loosely holding said curved portion on a plane to allow for rotation of said optical fiber without accumulating twists on said optical fiber, and rotating means to rotate said holding means and therefore said curved portion of said optical fiber around an axis extending between said two positions so that said polarization is controlled.

4,793,677

**ELECTRO-OPTIC DEVICES WITH WAVEGUIDE AND HAVING SMALL SPATIAL SPREAD OF APPLIED ELECTRIC FIELD**

Michael J. Adams; Michael J. Robertson; Paul M. Rodgers, and Simon Ritchie, all of Ipswich, England, assignors to British Telecommunications Public Limited Company, Great Britain

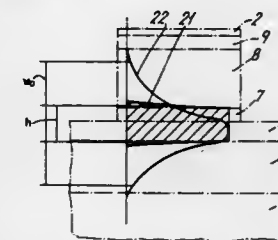
Filed Oct. 14, 1986, Ser. No. 918,108

Claims priority, application United Kingdom, Oct. 17, 1985, 8525593

Int. Cl.<sup>4</sup> G02B 1/015

U.S. Cl. 350—96.14

19 Claims



8. An electro-optic device having an optical waveguide for transmitting an optical beam in a predetermined direction of propagation, the device comprising:

- a plurality of layers extending in the direction of propagation and means for applying an electrical field perpendicular to the layers and transverse to the direction of propagation, said beam having a beam spot size transverse to the direction of propagation and perpendicular to the layers of  $W_0$  and said plurality of layers comprising boundary layers on each side of a region that contains the peak optical beam amplitude that have substantially higher electrical doping layers than said region containing the peak optical amplitude, and
- the spacing between the boundary layers being substantially less than the beam spot size  $W_0$ .

4,793,679

**OPTICAL COUPLING SYSTEM**

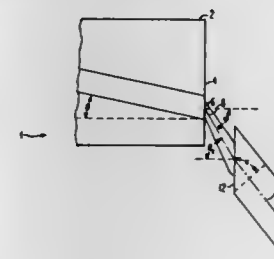
Minoru Toda, Lawrenceville, and Gerard A. Alphonse, Princeton, both of N.J., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 20, 1987, Ser. No. 40,976

Int. Cl.<sup>4</sup> G02B 6/26

U.S. Cl. 350—96.15

11 Claims



1. An optical system comprising:

- a radiation emitting device having a first optical axis and an emitting end face wherein the emitted radiation has an output optical axis of symmetry, said optical axis of symmetry being inclined relative to the direction perpendicular to said emitting end face and relative to said first axis; and
- a radiation receiver having a receiving axis and a receiving end face wherein said receiving end face is inclined at a wedge angle relative to a plane perpendicular to said receiving axis to maximize the amount of radiation received by the receiver, said receiving end face being



positioned adjacent said emitting end face so that said emitted radiation is incident upon said receiving end face, said receiver axis being inclined relative to said first axis.

4,793,680

# INDUCED GRATING DEVICES AND METHOD OF MAKING SAME

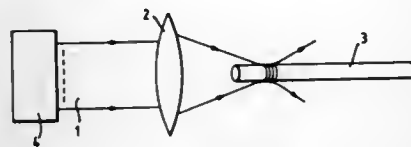
Kevin C. Byron, Bishop's Stortford, Great Britain, assignor to STC PLC, London, England

Filed May 21, 1987, Ser. No. 52,284

Int. Cl.<sup>4</sup> G02B 6/34, 5/18

U.S. Cl. 350—96.19

9 Claims



1. A method of writing a permanent optical grating at an outer surface of an optical fibre, which method includes focusing a light beam from a laser on to the outer surface of the fibre so that a region of that surface is illuminated, the light beam having a power such as to generate a succession of ripples at said region, which succession of ripples comprises the permanent optical grating, interference between the light beam as incident on the surface and the light beam as scattered by the surface causing intensity fringes which correspondingly locally heat and melt the surface and result, after cooling, in the ripples, the spacing of said ripples being determined by the wavelength of the incident light from the laser.

5. Apparatus for writing a permanent optical grating at an outer surface of a cylindrical optical fibre, which apparatus includes a laser which when in use generates a high-power pulsed beam of light at a writing wavelength, means to support an optical fibre at the outer surface of which the grating is to be produced after cladding of the fibre has been etched away at a region at which the grating is required, and a lens system which when the apparatus is in use focuses the laser beam on to the cylindrical region at which the grating is to be written, the arrangement of the apparatus being such that in use the laser beam produces a region of closely adjacent ripples which define the grating due to interference between the laser beam as incident on the outer surface and the laser beam as scattered by the outer surface, which interference causes intensity fringes that locally heat and melt the outer surface and result, after cooling, in the ripples, the dimensions of said ripples being defined by the wavelength of the incident laser beam.

4,793,681

# SPLICE CRADLE

Robert W. Barlow, Canton; Timmy D. Troutman, Jersey Shore, and David A. Cooper, Logantown, Pa., assignors to GTE Products Corporation, Stamford, Conn.

Filed Apr. 18, 1988, Ser. No. 182,659

Int. Cl.<sup>4</sup> G02B 6/36

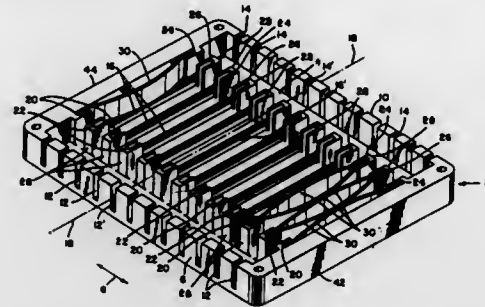
U.S. Cl. 350—96.20

9 Claims

1. A splice cradle comprising:

- a housing having a base; said base having a first peripheral edge extending in a longitudinal direction and an opposite second peripheral edge spaced from said first peripheral edge and extending in said longitudinal direction,
- a plurality of entrance slots extending along said first peripheral edge,
- a plurality of exit slots extending along said second edge,
- a plurality of grooves in said base and extending in a direction transverse to said longitudinal direction, each of said entrance slots of said plurality of entrance slots being in alignment with a corresponding one of said exit slots of said plurality of exit slots, and each groove of said plural-

ity of grooves being in alignment with a corresponding one of said entrance slots of said plurality of entrance slots and said exit slots of said plurality of exit slots, and retaining means associated with said base for retaining a plurality of splice retention members in place relative to



said plurality of grooves, said retaining means including a first and second spring slot located at one end of each groove on opposite sides thereof and a third and fourth spring slot located at an opposite end of each groove on opposite sides thereof.

4,793,682

# FIBER OPTIC SPLICE AND FIBER HOLDER AND HOUSING THEREFOR

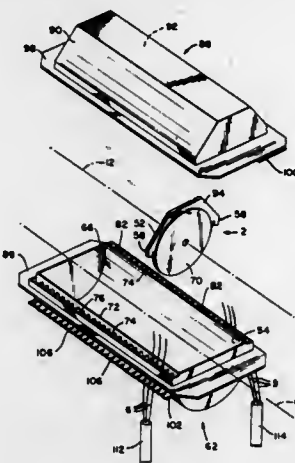
David A. Cooper, Logantown, Pa., assignor to GTE Products Corporation, Stamford, Conn.

Filed Jan. 11, 1988, Ser. No. 141,818

Int. Cl.<sup>4</sup> G02B 6/36

U.S. Cl. 350—96.20

17 Claims



13. Apparatus including a plurality of housed splice and fiber holders each of which can be used in holding a splice used to connect a first fiber and a second fiber and for storing an excessive length of said first fiber and said second fiber, each splice and fiber holder of said plurality of splice and fiber holders including a main body portion having an axis of rotation, a first arm extending from one position of a peripheral surface of said main body portion and a second arm extending from an opposite position of said peripheral surface, said apparatus comprising:

- a first housing portion including at least one wall forming a first cavity, extending in a longitudinal direction, for containing a first portion of each splice and fiber holder of said plurality of splice and fiber holders such that said longitudinal direction and each respective axis of rotation

extend in the same direction, said first housing portion including a first edge on one side of said cavity and a second edge on an opposite side of said cavity, said first edge and said second edge being parallel to said longitudinal direction, said first edge comprising a plurality of first mounting slots each of which is of a size and configuration coincident with a respective first arm for receiving a respective first base having a respective first aperture therethrough, and said second edge comprising a plurality of second mounting slots each of which is of a size and configuration coincident with a respective second arm for receiving a respective second base having a respective second aperture therethrough,

a plurality of said splice and fiber holders each of which includes one of said main body portions, each of said main body portions comprising:

- a center section having a first surface, an opposing second surface, a peripheral surface extending between said first surface and said second surface and an axis of rotation extending in a direction from said first surface towards said second surface;
- a first hub adjacent said first surface and extending away from said first surface along said axis of rotation;
- a second hub adjacent said second surface and extending away from said second surface along said axis of rotation;

a first side plate attached to said first hub for rotation relative to said first surface and said first hub about said axis of rotation;

a second side plate attached to said second hub for rotation relative to said second surface and said second hub about said axis of rotation;

means positioned at said peripheral surface of said center section for holding said splice, when in use, such that said first fiber and said second fiber will extend from said holding means;

means at a peripheral edge of said first side plate for engaging, when in use, said first fiber extending from said holding means such that as said first side plate is rotated about said axis of rotation said first fiber is wrapped about said first hub;

means at a peripheral edge of said second side plate for engaging, when in use, said second fiber extending from said holding means such that as said second side plate is rotated about said axis of rotation said second fiber is wrapped about said second hub;

means positioned at said first surface adjacent said holding means for directing, when in use, said first fiber from said holding means towards said engaging means of said first side plate;

means positioned at said second surface adjacent said holding means for directing, when in use, said second fiber from said holding means towards said engaging means of said second side plate; and,

means positioned at said first surface adjacent said holding means for orienting, when in use, said first fiber which has been wrapped about said first hub away from said first hub;

means positioned at said second surface adjacent said holding means for orienting, when in use, said second fiber which has been wrapped about said second hub away from said second hub; and,

means positioned at said peripheral surface of each main body portion for coupling each splice and fiber holder to said first housing portion, each of said coupling means including a first arm extending from one position of said peripheral surface of a respective main body portion and extending into a respective first mounting slot of said plurality of first mounting slots, and a second arm extending from an opposite position of said peripheral surface of said respective main body portion and extending into a

respective second mounting slot of said plurality of second mounting slots.

4,793,683

# OPTICAL FIBER CONNECTOR

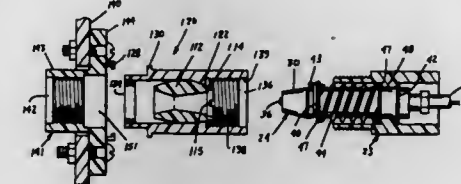
Thomas C. Cannon, Jr., Dunwoody; Bruce V. Darden, Lawrenceville, and Norman R. Lampert, Norcross, all of Ga., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 8, 1986, Ser. No. 861,198

Int. Cl.<sup>4</sup> G02B 6/38

U.S. Cl. 350—96.21

22 Claims



22. An optical fiber connection, which includes: a coupling which includes a housing having opposed cavities each of which has an internally threaded portion which is recessed within said each cavity;

first and second plug assemblies each being mounted in one of said cavities of said housing and including:

- a plug having a passageway extending therethrough;
- a cap in which said plug is mounted and which includes a threaded portion engaged with a threaded portion of said housing, said cap capable of being turned rotatably with respect to said plug; and

an optical fiber which is disposed in the passageway of each of said plugs with an end of each fiber terminating in an end face of the plug in which it is mounted, with at least one of said plug assemblies including key means projecting toward a free end of the at least one plug assembly; and

sleeve means disposed in said housing and having opposed cavities in each of which is disposed one of said plugs, said sleeve means including walls which define the cavities thereof and which include surfaces conformable to and mating with outer surfaces of said plugs, with at least one of the walls which define one of the cavities of said sleeve means being provided with a notch in which is disposed the key means of said at least one plug assembly which prevented unintended rotation of the plug relative to the sleeve when the cap was turned into threaded engagement with said housing of said coupling.

4,793,684

# ARRANGEMENT FOR FORMING A STRAIN-RELIEF CONNECTION BETWEEN AN OPTICAL FIBRE CABLE AND A COUPLING DEVICE

Theodor Oppenländer, Cologne, Fed. Rep. of Germany, assignor to U.S. Philips Corp., New York, N.Y.

Filed Aug. 20, 1987, Ser. No. 87,589

Claims priority, application Fed. Rep. of Germany, Aug. 22, 1986, 3628570

Int. Cl.<sup>4</sup> G02B 6/36

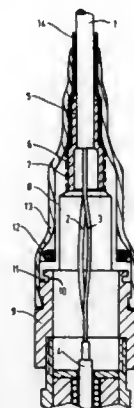
U.S. Cl. 350—96.23

8 Claims

1. An arrangement for the stress-relieved connection between an optical fiber cable and the housing of a coupling device, said arrangement comprising:

- a covering sleeve having a first part and a second part, said first part being constructed and arranged to engage said optical fiber cable;
- a spacer sleeve having a first part for engagement with said housing, a second part for engagement with said covering sleeve and a center portion spaced apart from said optical

fiber cable, said spacer sleeve being formed from two half shells joined along a plane parallel to their longitudinal axis; and



interengaging grooves and elevations disposed on said second part of said covering sleeve and said second part of said spacer sleeve to dispose said covering sleeve in engagement with at least one of said two half shells of said spacer sleeve.

#### 4,793,685 OPTICAL CABLE WITH NONMETALLIC REINFORCING ELEMENTS

John E. Taylor, Maidenhead; Christopher J. White, Billericay, and Jonathan E. Nevett, London, all of England, assignors to BICC plc, London, England

Filed Jan. 2, 1987, Ser. No. 125

Claims priority, application United Kingdom, Jan. 7, 1986, 8600294

Int. Cl.<sup>4</sup> G02B 5/14, 5/16

U.S. Cl. 350—96.23

13 Claims



1. An elongate flexible core for use in an optical cable, which core has in its outer circumferential surface a plurality of circumferentially spaced, longitudinally extending separate grooves, wherein the core comprises extruded plastics material and a multiplicity of longitudinally stressed elongate flexible non-metallic reinforcing elements each substantially encapsulated in said extruded plastics material, the multiplicity of non-metallic reinforcing elements being substantially evenly distributed throughout the cross-sectional area of the core.

#### 4,793,686 OPTICAL FIBER COMPOSITE OVERHEAD TRANSMISSION LINE AND METHOD FOR PRODUCING SAME

Yasumori Saito, Kanagawa, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Continuation of Ser. No. 394,959, Jul. 2, 1982, abandoned. This application May 17, 1984, Ser. No. 610,938

Claims priority, application Japan, Jul. 7, 1981, 56-106560

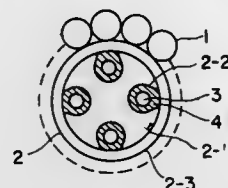
Int. Cl.<sup>4</sup> G02B 6/44

U.S. Cl. 350—96.23

3 Claims

1. An optical fiber composite overhead transmission line comprising: at least one stranded substantially cylindrical wire layer which includes a plurality of tension-resisting outer metal

electrical conductor wires; a central cylindrical housing member extending along the axis of said layer and including a substantially cylindrical inner spacer formed with spiral grooves in its outer peripheral surface, and a cylindrical metal cover disposed over said spacer and having an inner wall in



close contact with said spacer, wherein said spacer is made of insulation material; and optical fibers housed in said spiral grooves and positioned at the radially outer portion of said spacer when said transmission line is not elongated by tension, thereby protecting said fibers from lightning and from tensile forces applied to the transmission line.

#### 4,793,687 COLLIMATED OPTICAL VISUAL SIMULATION SYSTEM

Martin H. Shenker, Pomona, and Joseph A. LaRossa, Yorktown Heights, both of N.Y., assignors to Farrand Optical Co., Inc., Valhalla, N.Y.

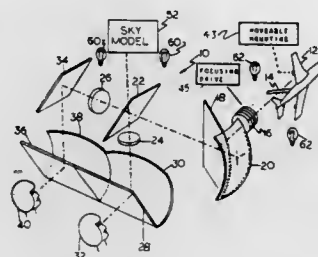
Filed May 11, 1984, Ser. No. 609,467

The portion of the term of this patent subsequent to Nov. 24, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> G02B 27/14

U.S. Cl. 350—174

24 Claims



1. An optical display system, comprising:

- a model of an object whose visual appearance is to be simulated;
- illuminating means for illuminating said model and causing it to emit rays of light;
- collimating optics for receiving said rays emanating from said model;
- means for moving said model to a desired position where its apparent scale as perceived by an observer looking through said collimating optics has a desired value;
- means for adjusting the collimating optics to place the focal point of the collimating optics at a desired point with respect to the model; and
- optical coupling means for conveying an image of said model to an observer, said optical coupling means having an optical axis which includes at least one fold, wherein said optical coupling means comprises a telescope having two optical trains with substantially the same magnification but having different path lengths for bringing an image of the model to two different observers in two different positions.

#### 4,793,688 PHOTO ELECTRO DEVICE, METHOD FOR MANUFACTURE OF SAME, AND LENS SUPPORT FRAME FOR USE IN SUCH PHOTO ELECTRO DEVICE

Kunio Aiki; Atsushi Sasayama; Tugio Nemoto, all of Komoro; Tsunetoshi Kawabata, Tamamura, and Haruo Kugimiya, Komoro, all of Japan, assignors to Hitachi Ltd. and Hitachi

Tobu Semiconductor, Ltd., both of Tokyo, Japan

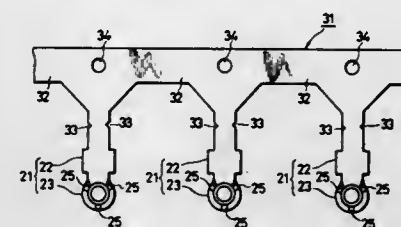
Filed May 26, 1987, Ser. No. 53,481

Claims priority, application Japan, May 26, 1986, 61-119239

Int. Cl.<sup>4</sup> G02B 7/02

U.S. Cl. 350—252

8 Claims



1. A photo electric device having a light emitting element and a lens for condensing the light emitted from said element, wherein said lens is retained by a lens support holder which includes a lens support frame comprising a frame member, at least one arm extending from said frame member, a ring to receive said lens, said ring being disposed at the fore end of said arm to hold said lens, and bendable claws extending from one peripheral edge of said ring.

#### 4,793,689 LENS BARREL WITH VIBRATION WAVE MOTOR

Masso Aoyagi, Yokohama; Shigeru Kamata, Tokyo, and Ryuji Suzuki, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

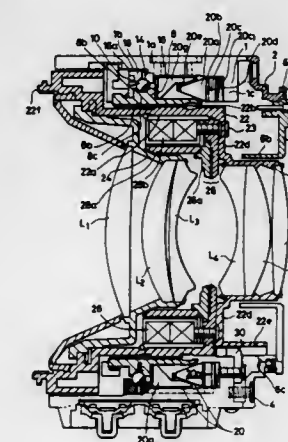
Filed Dec. 23, 1986, Ser. No. 945,479

Claims priority, application Japan, Dec. 26, 1985, 60-200433[U]; Dec. 27, 1985, 60-204708[U]

Int. Cl.<sup>4</sup> G02B 7/02, 15/00; H01L 41/04; G03B 9/02

U.S. Cl. 350—285

15 Claims



1. A lens barrel comprising: a hollow fixed cylinder; a hollow rotary ring disposed within the hollow of said fixed cylinder; bearing means disposed radially between said fixed cylinder and said rotary ring, said rotary ring being rotatable around the optical axis of the lens barrel; and a moving member disposed within the hollow of said rotary

ring, said moving member being movable in response to rotation of said rotary ring; and a vibration wave motor comprising a rotary member and disposed radially between said fixed cylinder and said rotary ring, said rotary member of said motor being substantially secured to said rotary ring, and said rotary ring being rotated by said motor.

#### 4,793,690 REARVIEW MIRROR CONTROL CIRCUIT

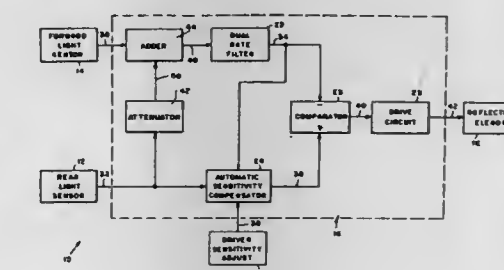
Edward A. Gahan, Holland, Mich.; Keith W. Molyneux, Ballymore Eustace, Ireland, and Kenneth Schofield, Holland, Mich., assignors to Donnelly Corporation, Holland, Mich.

Continuation-in-part of Ser. No. 888,130, Jul. 18, 1986, abandoned, which is a continuation-in-part of Ser. No. 888,129, Jul. 18, 1986, abandoned. This application Apr. 27, 1987, Ser. No. 43,210

Int. Cl.<sup>4</sup> G02B 17/00

U.S. Cl. 350—279

52 Claims



1. An automatic rearview mirror system for a vehicle comprising: a reflective element actuatable between at least two different reflective conditions; a forward light sensor to detect light forward of the mirror; a rear light sensor to detect light rearward of the mirror; a control circuit means coupled to said reflective element, said forward light sensor, and said rear light sensor for causing said reflective element to assume a reflective state dependent upon the output of said forward and rear light sensors, said control circuit means including a time-filter means for time filtering an ambient light signal which is at least partially dependent on the output of said forward sensor, said time-filter means providing faster time filtering of the signal during periods of increasing ambient light than during periods of decreasing ambient light, whereby said time-filter means and therefore said control circuit means approximates the adaptation of the human eye to changing ambient light levels.

#### 4,793,691 LIQUID CRYSTAL COLOR DISPLAY DEVICE

Takamichi Enomoto, Tokyo; Wasaburo Ohta; Kiyohiro Uehara, both of Kanagawa; Sumio Kamoi, Chiba, and Fuyuhiko Matsumoto, Saitama, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 23, 1985, Ser. No. 812,860

Claims priority, application Japan, Dec. 25, 1984, 59-272011; Jan. 8, 1985, 60-000345; Mar. 22, 1985, 60-056174; May 7, 1985, 60-095544; May 7, 1985, 60-095545; May 10, 1985, 60-098046; May 10, 1985, 60-098047; Oct. 25, 1985, 60-238713

Int. Cl.<sup>4</sup> G02F 1/13

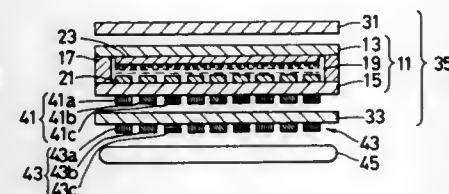
U.S. Cl. 350—339 F

17 Claims

1. A liquid crystal color display device for displaying image information comprising: a liquid crystal unit including a liquid crystal cell for controlling the transmission and shutoff light according to said image information, said liquid crystal cell including a transparent pixel electrode having pixel electrode ele-

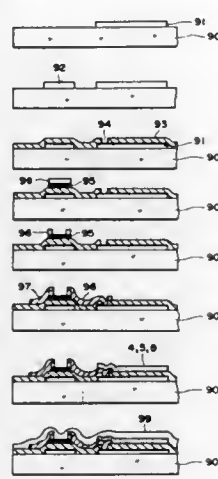


ments, a plurality of plates, and a liquid crystal material sealed between said plates;  
 a light source having an emission spectrum separated into colors with red, green and blue peaks, each peak having a wavelength region at the half amplitude, said wavelength regions being non-overlapping;  
 a color filter for passing therethrough light emitted by said light source in order to purify the color tone of said light, said color filter having pixel filters aligned with said pixel



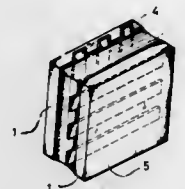
electrode elements said pixel filters having a transmission spectrum with red, green and blue peaks, each peak having a wavelength region at the half amplitude level which includes the wavelength region of the corresponding emission spectrum;  
 at least one of said plates of said liquid crystal cell comprising a thin plastic film; and  
 said color filter being disposed on the surface of said plastic film which is not in contact with said liquid crystal material.

**4,793,692**  
**COLOR FILTER**  
 Masaru Kamio, Atsugi; Taiko Motoi, and Hideaki Takao, both of Sagamihara, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
 Filed Dec. 13, 1985, Ser. No. 808,507  
 Claims priority, application Japan, Dec. 14, 1984, 59-262675; Dec. 26, 1984, 59-276940; Dec. 28, 1984, 59-276989  
 Int. Cl.<sup>4</sup> G02B 5/20  
 U.S. Cl. 350—311 25 Claims



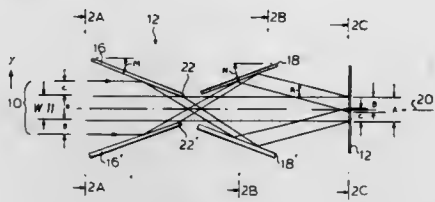
1. A color filter comprising a vapor deposited green colorant layer, said green colorant layer comprising 1 part by volume of an octa-4,5-phenylphthalocyanine colorant and from 1-5 parts by weight of a yellow colorant selected from the group consisting of isindolinone and anthraquinone colorants.

**4,793,693**  
**FERRO-ELECTRIC LIQUID CRYSTAL ELECTRO-OPTICAL DEVICE HAVING A DRIVE VOLTAGE WITH DC AND CHOPPING COMPONENTS**  
 Sadaaki Shimoda; Takamasa Harada; Masaaki Taguchi, and Kokichi Ito, all of Tokyo, Japan, assignors to Seiko Instruments, Inc., Tokyo, Japan  
 Filed Mar. 2, 1987, Ser. No. 20,694  
 Int. Cl.<sup>4</sup> G02F 1/13  
 U.S. Cl. 350—350 S 16 Claims



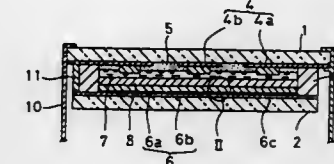
1. A ferro-electric liquid crystal electro-optical device switchable between bi-stable states of ferro-electric liquid crystal molecules, comprising: means for effecting a change from one of the stable states to the other including means for applying a selected signal having a first portion and a second portion, wherein one of the first and second portions comprises a DC pulse of one polarity effective to change the molecules from one stable state to the other, and the other of the first and second portions comprises a chopping pulse of the opposite polarity ineffective to change the stable state of the molecules.

**4,793,694**  
**METHOD AND APPARATUS FOR LASER BEAM HOMOGENIZATION**  
 Kuo-Ching Liu, Setauket, N.Y., assignor to Quantronix Corporation, Smithtown, N.Y.  
 Filed Apr. 23, 1986, Ser. No. 856,631  
 Int. Cl.<sup>4</sup> G02B 27/16  
 U.S. Cl. 350—379 9 Claims



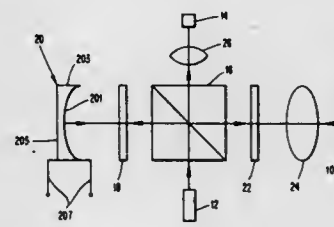
1. A method of concentrating a beam of coherent light having a cross-sectional intensity profile on a preselected plane comprising:  
 separating said beam into a central portion defined between first and second portion edges disposed transversely with respect to the beam, a first lobe having a first lobe edge initially adjacent to said first portion edge, and a second lobe having a second lobe edge initially adjacent to said second portion edge by intercepting said first and second lobes with a first pair of mirrors and directing the corresponding lobe across a longitudinal axis of the beam; and combining said central portion and first and second lobe into a concentrated beam with said first lobe edge superimposed on said second portion edge and said second lobe edge superimposed on said first second portion edge by way of a second pair of mirrors directing the first and second lobes toward the preselected plane.

**4,793,695**  
**ELECTROCHROMIC DISPLAY DEVICE**  
 Shuichi Wada; Tsunemi Ohiwa; Hirokazu Kidou; Akira Kawakami, and Toshikatsu Manabe, all of Osaka, Japan, assignors to Hitachi Maxell, Ltd., Osaka, Japan  
 Filed Jul. 8, 1987, Ser. No. 71,174  
 Claims priority, application Japan, Jul. 8, 1986, 61-160410  
 Int. Cl.<sup>4</sup> G02F 1/01  
 U.S. Cl. 350—357 13 Claims



1. An electrochromic display device which comprises:  
 a display electrode comprising a transparent first substrate which has an inner surface, a transparent electrode formed on said inner surface of said transparent first substrate, and an electrochromic material layer for display made of tungsten oxide and formed on said transparent electrode;  
 a counter electrode comprising a second substrate which has an inner surface that faces said inner surface of said transparent first substrate, a conductive layer formed on said inner surface of said second substrate, and an activated carbon fiber cloth bonded to said conductive layer with a conductive adhesive; and  
 a spacer means provided between said display electrode and said counter electrode so as to define an electrolyte chamber, which is filled with an electrolyte comprising LiClO<sub>4</sub> dissolved in propylene carbonate and containing water and an acid.

**4,793,696**  
**METHOD AND APPARATUS FOR RAPID FOCUS CONTROL IN AN OPTICAL DATA STORAGE DEVICE**  
 Suk Y. Suh, Bridgewater, N.J., assignor to Hoechst Celanese Corporation, Somerville, N.J.  
 Filed Nov. 13, 1987, Ser. No. 119,886  
 Int. Cl.<sup>4</sup> G02B 5/10; G11B 5/09  
 U.S. Cl. 350—379 10 Claims



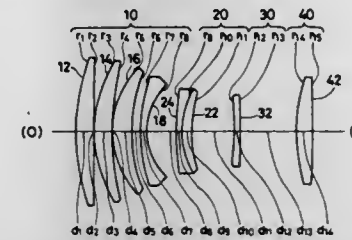
1. In an optical data storage device having an optical storage medium and an optical system for focussing light to a focal point on the storage medium, a method of focus control comprising the steps of:  
 providing in the optical system a membrane reflector having an electrically controllable surface contour; and  
 controlling the surface contour to move the focal point.

**4,793,697**  
**PLZT SHUTTER WITH MINIMIZED SPACE CHARGE DEGRADATION**  
 Adam Y. Wu; Krupanidhi B. Salaru, both of Albuquerque, N. Mex., and Rickey G. Pastor, Chicago, Ill., assignors to Motorola, Inc., Schaumburg, Ill.  
 Filed Aug. 4, 1986, Ser. No. 892,550  
 Int. Cl.<sup>4</sup> G02F 1/03 20 Claims



1. A light modulator comprising:  
 (a) first and second spaced-apart polarizers;  
 (b) transparent ferroelectric PLZT disposed between said first and second polarizers;  
 (c) means for inducing an electric field in said plate, said inducing means including electrodes; and  
 (d) means for minimizing space-charge on the surface of said plate, said minimizing means comprising at least a first film of substantially transparent material disposed on said plate and having a resistivity less than 0.1 times the resistivity of the plate.

**4,793,698**  
**TELEPHOTO LENS SYSTEM**  
 Hiroyuki Hirano, Tokyo, Japan, assignor to Asahi Kogaku Kabushiki Kaisha, Tokyo, Japan  
 Filed Apr. 2, 1987, Ser. No. 33,421  
 Claims priority, application Japan, Apr. 2, 1986, 61-75771  
 Int. Cl.<sup>4</sup> G02B 13/02, 9/64 9 Claims



1. A telephoto lens system, comprising, in order from an object side, a first lens unit having a positive power, a second lens unit having a negative power, a third lens unit having a positive power, and a fourth lens unit having a positive power, and which achieves focusing by displacing the second and third lens units, said telephoto lens system satisfying the following conditions (1) to (5):  
 (1)  $-2.5 < f/f_{2,3} < -0.9$   
 (2)  $-0.25 < f_2/f_3 < 0.90$   
 (3)  $0.40 < X_3/X_2 < 1.00$   
 (4)  $0.05 < d_{2,3}/f < 0.15$   
 (5)  $0.10 < d_{3,4}/f < 0.18$   
 wherein:  
 f: an overall focal length of said first through fourth lens units with an infinitely distant object being brought to focus;  
 f<sub>2,3</sub>: a composite focal length of the second and third lens units with said infinitely distant object being brought to focus;

$f_i$ : a focal length of an  $i$ -th one of said lens units;  
 $X_i$ : an amount of displacement of said  $i$ -th one of said lens units; and  
 $d_{ij}$ : an axial distance between an  $i$ -th one and a  $j$ -th one of said lens units.

4,793,699

**PROJECTION APPARATUS PROVIDED WITH AN ELECTRO-MECHANICAL TRANSDUCER ELEMENT**  
 Mitsuhito Tokuhara, Chigasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

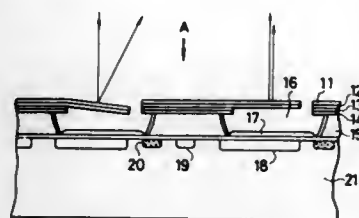
Continuation of Ser. No. 853,164, Apr. 17, 1986, abandoned.  
 This application Apr. 4, 1988, Ser. No. 180,618

Claims priority, application Japan, Apr. 19, 1985, 60-85183;  
 Apr. 19, 1985, 60-85187

Int. Cl.<sup>4</sup> G02B 26/08

U.S. Cl. 350-487

17 Claims



1. A projection apparatus comprising:

a light source;

an element having at least two deflection means rows each comprising a plurality of deflection means for deflecting light from said light source in at least two directions and arranged in a predetermined direction;

drive means for providing a signal for driving said deflection means, said deflection means deflecting said light in response to said signal; and

a light-receiving member for receiving light from said deflection means, said light-receiving member being movable relative to said element in a subsidiary scan direction which traverses a main scan direction in which light dots are formed on said light-receiving member by said deflection means arranged in said predetermined direction, whereby the light from said deflection means is subsidiary-scanned on said light-receiving member;

wherein the spacing between the deflection means of one row in said predetermined direction is shorter than the length of said deflection means of the other row in said predetermined direction and said one row is deviated from said the other row by about a half of the length of a deflection means arrangement pitch in said predetermined direction so that the light dots adjacent to each other in said main scan direction overlap each other on the light-receiving member.

4,793,700

**GAZE-FIXING DEVICE FOR SURGICAL MICROSCOPE**  
 Kazutoshi Takagi, and Nobuaki Kitajima, both of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 23, 1987, Ser. No. 28,895

Claims priority, application Japan, Mar. 26, 1986, 61-68099  
 Int. Cl.<sup>4</sup> A61B 3/10; G02B 21/06

U.S. Cl. 350-507

5 Claims

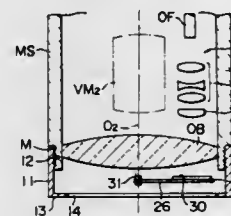
1. A gaze-fixing device for a surgical microscope, comprising:

a gaze-fixing target;

light quantity reducing means for reducing the quantity of illumination light applied from an illumination light source for illuminating an eye to be operated on; and

a base plate having said gaze-fixing target and said light

quantity reducing means arranged thereon such that they can be simultaneously inserted in and removed from an



observation optical axis of the microscope and illumination optical path, respectively, by movement of said base plate.

4,793,701

**AUXILIARY REAR VIEW MIRROR**

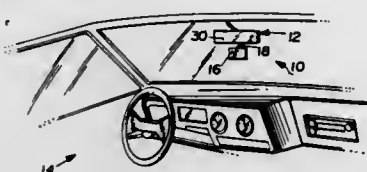
Don E. Browne, Rte. 3, Box 235A, Clinton, Mo. 64735

Filed Jul. 21, 1987, Ser. No. 75,944

Int. Cl.<sup>4</sup> G02B 7/18

U.S. Cl. 350-632

6 Claims



1. For use with a rear view mirror of a vehicle, an auxiliary mirror assembly comprising:

an auxiliary mirror;

a coupling device for fixed connection with said rear view mirror; and

an elongated, rod-like member interconnecting said coupling device and said auxiliary mirror for supporting the latter, said member being bendable by hand for movement of said auxiliary mirror relative to said coupling device about any one of a number of vertical and horizontal axes in order to shift said auxiliary mirror toward a selected, inclined position relative to said rear view mirror, said member being self-sustaining subsequent to bending in any one of a number of configurations to substantially retain said auxiliary mirror in said selected position, said member being axially bendable by hand from a configuration having a straight longitudinal axis to configurations having a curved longitudinal axis.

4,793,702

**EYEGLASS STEM HOLDER**

William C. Ahrens, and Sandra L. Ahrens, both of P.O. Box 70, Palo Cedro, Calif. 96073-0070

Continuation-in-part of Ser. No. 791,076, Oct. 24, 1985, abandoned. This application Aug. 19, 1986, Ser. No. 897,910

Int. Cl.<sup>4</sup> G02C 3/02

U.S. Cl. 351-157

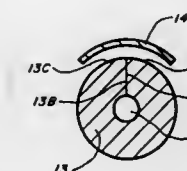
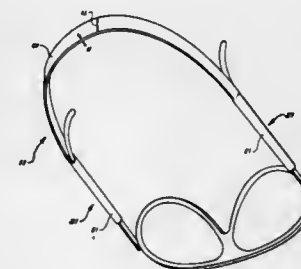
6 Claims

1. An eyeglass retainer comprising:

an elongated band formed from at least lengthwise stretchable material of sufficient length to extend about the back of the wearer's head, said band having opposite ends from which said band is configured to form tubular shaped members for a predetermined length; and

a retention sheet formed from a material with dissimilar elasticity than said material from which said band is formed which is adhered to and along said predetermined length of said band formed as said tubular shaped members, said retention sheet is adhered to, thus constituting

the junction of said tubular shaped members thereby holding said predetermined length of said band in said tubular shape; and  
 whereby the material from which said band is made is suffi-



ciently dissimilar in elasticity than the material from which said retention sheet is made to provide a cooperative interaction between these materials so that said tubular shaped members will grip an eyeglass frame passed therethrough.

4,793,703

**LAMINATED GLASS LENSES**

Edward R. Fretz, Jr., Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed Aug. 3, 1987, Ser. No. 80,902

Int. Cl.<sup>4</sup> G02C 7/10, 7/02

U.S. Cl. 351-163

27 Claims



1. A three-component laminated lens structure exhibiting optical quality transmission which does not delaminate after repeated thermal cyclings over the temperature range of  $-40^{\circ}$  to  $+80^{\circ}$  C. and does not delaminate or demonstrate significant haze after exposure to high humidities for extended periods of time, said lens consisting of:

(a) a thin inorganic glass layer having a linear coefficient of thermal expansion within the range of about  $60-120 \times 10^{-7}/^{\circ}\text{C.}$ ;

(b) an organic plastic layer having a linear coefficient of thermal expansion within the range of about  $200-700 \times 10^{-7}/^{\circ}\text{C.}$ ; and

(c) an organic adhesive that exhibits flexibility, and can be cured at temperatures in the vicinity of room temperature which bonds said glass layer and said plastic layer into an essentially stress-free assemblage;

wherein the power of said lens results from a curvature in the rear surface of said plastic layer.

4,793,704

**PHOTOMETRIC CIRCUIT**

Bo Hagner, Orrvigen 11, Tilly, Sweden (18251)

PCT No. PCT/SE86/00325, § 371 Date Jan. 28, 1987, § 102(e)

Date Jan. 28, 1987, PCT Pub. No. WO87/00271, PCT Pub.

Date Jan. 15, 1987

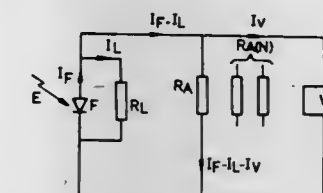
PCT Filed Jul. 4, 1986, Ser. No. 34,153

Claims priority, application Sweden, Jul. 5, 1985, 8503358

Int. Cl.<sup>4</sup> G01J 1/44

U.S. Cl. 356-226

1 Claim



1. An electronic circuit for an instrument for indicating the intensity of light radiation, comprising:

a photo-diode means for generating a photo-electric current in response to light radiation incident thereon;

a measurement resistance means connected in parallel with the photo-diode means, said photo-electric current generating a voltage across said measurement resistance means, the amplitude of said voltage corresponding to the intensity of the incident light radiation; and

a low leakage current voltmeter means connected in parallel with the photo-diode means and the measurement resistance means for measuring the voltage across the measurement resistance means which voltage across the measurement resistance means is equal to or less than a voltage amplitude at which a varying forward internal resistance of the photo-diode means has a substantially higher value than that of the measurement resistance means, thus making the leakage current of said photo-diode means substantially less than the current through said measurement resistance means;

such that the voltage amplitude across the measurement resistance means measured by the voltmeter means corresponds linearly to the photo-electric current generated by the photo-diode means.

4,793,705

**SINGLE MOLECULE TRACKING**

E. Brooks Shera, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Oct. 7, 1987, Ser. No. 105,376

Int. Cl.<sup>4</sup> G01N 21/64

U.S. Cl. 356-318

12 Claims

1. A molecule detection system, comprising:

a flow cell for passing a train of molecules in laminar flow; laser means for exciting said molecule to emit photons at a selected wavelength;

position sensitive sensor means effective to detect said photon emissions within said flow cell and assign spatial and temporal coordinates for said detected photons;

computer means for predicting spatial and temporal coordinates for a molecule in said laminar flow as a function of a first detected photon; and

comparison means for comparing said detected spatial and





dust layer on top of a rock dust substratum comprising the steps of:

directing a light source onto a coal and rock dust deposit; detecting the amount of light reflected from the dust deposit; generating a signal proportional to the amount of light reflected from the dust deposit; determining a normalized output for the signal generated; calibrating the normalized output to correspond to range of values from a point at which a minimum amount of light is reflected from the dust deposit to a point at which a maximum amount of light is reflected from the dust deposit; and calculating the surface density of the coal dust  $S_c$  from the equation:

$$S_c = 1 / -a_c \ln(V)$$

wherein  $V$  is the normalized output, and  $a_c$  is a constant which is a function of the coal dust particle diameter  $D_c$  and of the coal dust particle density  $\rho_c$  and which follows the relationship:

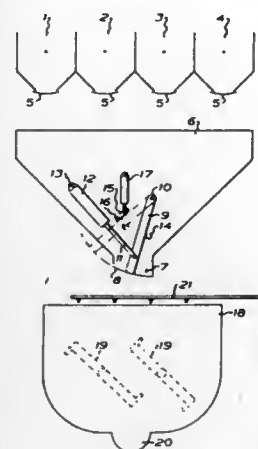
$$a_c = \frac{k}{\rho_c D_c}$$

wherein  $k$  is a constant.

**4,793,711**  
**METHOD AND APPARATUS FOR THE BATCHWISE PRODUCTION OF PAVING MIXES CONTAINING MINERAL AGGREGATE AND BITUMINOUS BINDER**  
Karl G. Ohlson, Postlada 9073, S-281 00 Hässelholm, Sweden  
Continuation of Ser. No. 591,660, Mar. 20, 1984, abandoned, which is a continuation of Ser. No. 285,228, Jul. 20, 1981, Pat. No. 4,468,125. This application Apr. 22, 1986, Ser. No. 856,438  
Claims priority, application Sweden, Aug. 1, 1980, 8005503  
Int. Cl.<sup>4</sup> B01F 15/04

U.S. Cl. 366—18

11 Claims



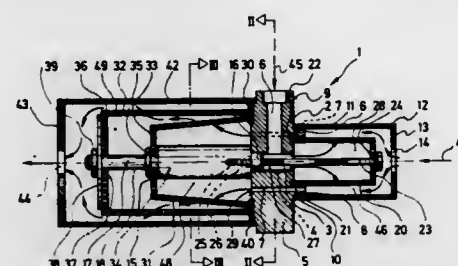
9. An apparatus for the batchwise production of an asphalt paving mix from a batch of mineral aggregate of different sizes of particles and a batch of bituminous binder, comprising a container having a discharge opening therein, a continuously operating asphalt mixer, first means for introducing a coarse-grained portion of a mineral aggregate batch in measured quantity into said container, discharge door means normally discharging said coarse-grained portion through said discharge opening into said asphalt mixer, said discharge door means including a door panel pivotally suspended beneath and normally closing said discharge opening,

means for discharging said bituminous binder into said asphalt mixer, second means for introducing a fine-grained portion of said aggregate batch into said container after said coarse-grained portion has been discharged into said asphalt mixer, adjustable stop means cooperating with said discharge door means to permit only a predetermined partial opening of said discharge opening so as to discharge said fine-grained portion through said partially opened opening at a predetermined discharge rate into said asphalt mixer, said adjustable stop means including an arm for stopping movement of said door in intermediate positions between the closed position and the fully opened position of said door panel, whereby said fine-grained aggregates are admixed with the coarse-grained aggregates and binder composition in said asphalt mixer without any build-up of thick layers of fine-grained aggregates on top of said composition.

**4,793,712**  
**GAS MIXER**  
Michael Kostecki, Wiesbaden-Delkenheim, Fed. Rep. of Germany, assignor to Perkin-Elmer-Metco GmbH, Hattersheim, Fed. Rep. of Germany  
Filed Mar. 20, 1986, Ser. No. 842,084  
Claims priority, application Fed. Rep. of Germany, Apr. 1, 1985, 3511927  
Int. Cl.<sup>4</sup> B01F 3/02, 5/06

U.S. Cl. 366—349

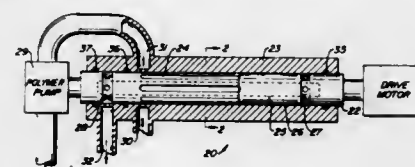
10 Claims



1. A gas mixer for mixing at least two gas flows, comprising a first filter body (20) surrounding an interior space (28) and communicating with a supply means (6, 27) for a first gas flow and adapted to have said first gas flow directed therethrough from a first surface of said first filter body (20) to a second surface of said first filter body (20) and to have a second gas flow directed along said second surface to form a gas mixture with said first gas flow exiting from said second surface, a second filter body (31) adapted to have said gas mixture directed therethrough, a third filter body (32) surrounding said second filter body (31) to define a space (49) between itself and said second filter body (31), a first housing (12) forming a space (46) between itself and the outer surface of said first filter body (20), means (14) for supplying said second gas flow to said space (46), a gas conduit (7) communicating with said space (46) and opening into an interior space (48) defined by said second filter body (31), and a second housing (42) communicating with a gas discharge conduit (44) and surrounding said second filter body (31) and enclosing said third filter body (32) so as to form a space therebetween, wherein said filter bodies (20, 31, 32) consist of porous sintered metal or porous sintered alloy such that the average pore size of said filter bodies (20, 31, 32) decreases from said first towards said third filter bodies.

**4,793,713**  
**ROTARY MIXER**  
L. Tony King, Long Beach, Calif., assignor to Komax Systems, Inc., Long Beach, Calif.  
Filed Apr. 6, 1987, Ser. No. 34,672  
Int. Cl.<sup>4</sup> B01F 7/12, 13/00, 15/02  
U.S. Cl. 366—150

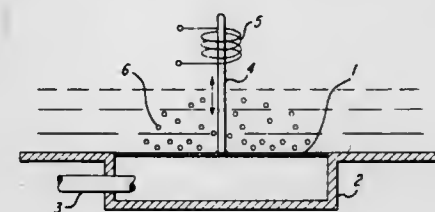
4 Claims



1. A mixing device for the mixing of two or more liquids comprising a drive motor connected to a hollow shaft such that activation of said drive motor causes said shaft to rotate, a shell body for rotatably housing said hollow shaft, said shell body having inlets for the liquids to be mixed proximate one end thereof, slotted grooves configured within the hollow shaft for receiving the liquids to be mixed from the inlets located within said shell body, a narrow annular gap region formed between the outer surface of the hollow shaft and the inner surface of the shell body in an area of the hollow shaft not occupied by said slotted grooves, a first set of holes configured in said hollow shaft for the introduction of said liquids into the interior of said hollow shaft and a second set of holes configured in the hollow shaft located downstream from said first set of holes for dispensing said liquids from the interior of the hollow shaft and through the shell body.

**4,793,714**  
**APPARATUS FOR MIXING FLUIDS**  
Bruno Gruber, Ehbauer-Ring, Fed. Rep. of Germany, assignor to Achmed N. Sadik, Ottawa, Canada, a part interest  
Filed Feb. 18, 1987, Ser. No. 16,149  
Int. Cl.<sup>4</sup> B01F 15/02, 13/02  
U.S. Cl. 366—150

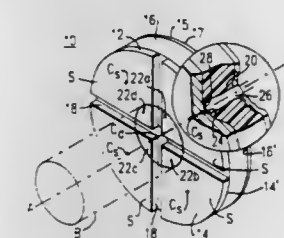
9 Claims



1. Apparatus for mixing two fluids, comprising: a fluid distribution outlet, having a plurality of fluid exits disposed in a plane, closing an otherwise airtight chamber; vibration generating means connected to a membrane forming a wall of said airtight chamber by means of non-resilient vibration transfer means; and means for introducing a first fluid into said airtight chamber; whereby vibrations in said membrane compress said first fluid through said fluid distribution outlet and mixingly distribute it into a second fluid on the other side of the fluid distribution outlet.

**4,793,715**  
**DETECTOR FOR ALIGNING HIGH POWER LASERS**  
William H. Kasner, Penn Hills; Vincent A. Toth, Harrison City, and John M. Zomp, North Huntingdon, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Aug. 28, 1987, Ser. No. 90,639  
Int. Cl.<sup>4</sup> G01J 1/20  
U.S. Cl. 374—6

33 Claims



1. A detector responsive to laser energy impinging thereon for sensing the position of a laser beam to be aligned, the laser beam having an axis and being of a given cross-sectional area smaller than the detector, the laser beam being directed toward said detector which is centered relative to a desired path for the laser beam comprising:

a substrate;  
a plurality of thermally conductive sectors carried by the substrate, each of said sectors being thermally isolated from each other and symmetrically located relative to a center of the detector for intercepting a portion of the beam cross-section and for absorbing a portion of the laser energy impinging thereon in proportion to the portion of the beam cross-section intersected by each sector, each sector converting a portion of said absorbed laser energy to heat; and  
a corresponding thermal sensitive means for each sector in thermal contact therewith for sensing the heat of the absorbed laser energy impinging on each corresponding sector, each of said thermal sensitive means being thermally isolated from the other sectors and responsive to the heat absorbed by its corresponding sector for producing a response corresponding to the amount of the laser energy impinging on its said corresponding sector in proportion to the beam cross-section intersected by said sector, relative differences in the response of each thermal sensitive means providing an indication of the relative misalignment of the laser beam axis with respect to the desired path.

**4,793,716**  
**THERMAL SHOCK TEST APPARATUS AND THE METHOD OF TESTING**  
George C. Wei, Weston, and John Walsh, Milford, both of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.  
Filed Nov. 18, 1987, Ser. No. 122,166  
Int. Cl.<sup>4</sup> G01N 3/60, 25/72

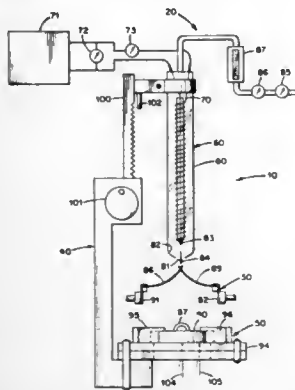
U.S. Cl. 374—45

7 Claims

1. A thermal shock apparatus comprising a hot gas stream impinging means for providing an impingement of a hot gas stream upon a predetermined hot gas stream impingement area of a sample, said sample having an upper surface containing a center portion, said predetermined hot gas stream impingement area being located on said center portion of said upper surface of said sample; a hot gas stream impinging control means being adapted to deflect said hot gas stream away from said sample when said hot gas stream impinging control means is positioned between said hot gas stream impinging means and said sample, and being adapted to provide an opening from positioning said hot gas stream impinging means close to



said sample to provide impingement of said hot gas stream upon said predetermined hot gas stream impingement area of said sample;



a positioning means being connected to said hot gas stream impinging means and being adapted to position said hot gas stream impinging means; and  
a sample holding means being connected to said positioning means to hold said sample in a predetermined position.

cover including a shallowly curved, exteriorly convex spherical dome extending in a first position of stability away from said base and said wick, said cover having a radius selected to permit a snap movement from said first position of stability to a second position of stability and opposite curvature upon the application of force to said cover while in said first position, said snap movement of said cover from said first to said second position carrying and forcing said wick into pressure contact with said pad so that said liquid will be absorbed by said wick from said pad, said liquid thereby coloring said wick and providing a visual indication through said transparent cover that sufficient force has been applied to said cover to cause said snap movement.

4,793,718

Patent Not Issued For This Number

4,793,719

## PRECISION ROLLER BEARING ROCK BITS

David P. Crockett, Mission Viejo; Gerard P. Erpenbeck, Costa Mesa, and Michael E. Hooper, Mission Viejo, all of Calif., assignors to Smith International, Inc., Newport Beach, Calif.

Filed Nov. 18, 1987, Ser. No. 122,156

Int. Cl.<sup>4</sup> E21B 10/22; F16C 19/26, 33/58

U.S. Cl. 384—92

10 Claims

4,793,717  
DEVICE FOR VISUALLY INDICATING A PRESSURE OR TEMPERATURE CONDITION

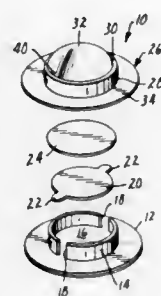
Wendell J. Manake, Birchwood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 6, 1982, Ser. No. 375,376

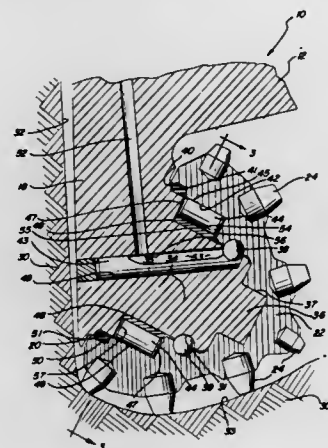
Int. Cl.<sup>4</sup> G01K 11/08

U.S. Cl. 374—160

4 Claims



1. An irreversible, snap-action indicating device comprising:  
a flat base;  
an upstanding arcuate wall projecting from said base to define a shoulder spaced from said base;  
a liquid saturable pad within said wall and adjacent said base;  
a liquid contained within said pad and including a coloring dye;  
a wick having a circular edge supported by said shoulder, said wick spanning said shoulder in spaced relationship to said base and said pad; and  
a transparent cover overlying said wick and clampingly maintaining said wick edge against said shoulder, said



1. A sealed bearing rotary cone rock bit comprising:  
a rock bit body having a first pin end and a second cutter end, said body forming at least one leg extending from said body toward said second cutter end, said leg forming a journal adapted to support a rotary cutter cone rotatively secured thereon, said cone forming a cylindrical cavity to accept said journal;  
a precision roller bearing assembly comprising metal bearing elements that include inner and outer races that confine a

multiplicity of cylindrical bearings therebetween bearing surfaces of said bearing elements have a surface finish between 20 and 32 Ra microinch, said bearing elements further are formed of steel that has a surface hardness range between 58 and 65 Rockwell C hardness, the bearing assembly is installed into said cylindrical cavity formed by said cone, a clearance between an outside surface formed by said inner race, an outer surface formed by said multiplicity of cylindrical roller bearings and an inside surface formed by said outer race is between plus 0.004 inch to minus 0.002 inch, a clearance between an outer surface formed by said journal bearing and an inside surface formed by said inner race is between 0.005 inch to 0.007 inch; and

a lubricant to lubricate said precision roller bearing assembly, said lubricant having a lube viscosity of greater than 100 centipoise at 212° F.

4,793,720

## RAILWAY CAR RESILIENT SIDE BEARING

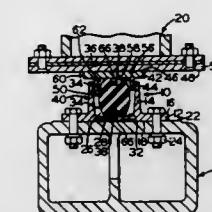
Walter H. Merker, Jr., Downers Grove, Ill., assignor to American Standard Inc., Chicago, Ill.

Filed Jan. 21, 1988, Ser. No. 146,663

Int. Cl.<sup>4</sup> F16C 17/04

U.S. Cl. 384—423

30 Claims



1. A railway car resilient side bearing assembly which serves a dual purpose of first, providing a supplemental support between a car body portion and a truck portion of such railway car, and second, as a means of transmitting such car body portion rocking forces into a spring system that is mounted on such truck portion, said railway car resilient side bearing assembly comprising:

- a housing member which includes a base portion and an upstanding body portion secured to an upper surface of said base portion, said base portion having a bottom surface, disposed axially-opposite said upper surface, engageable with such truck portion, said upstanding body portion extends upwardly from said upper surface of said base portion a predetermined distance and forms a cavity in said housing member, said cavity having a predetermined cross-sectional shape;
- a resilient spring block having at least a first substantial portion thereof disposed within said cavity of said housing member in a position such that a lower surface of said resilient spring block abuttingly engages a predetermined portion of said upper surface of said base portion of said housing member, said resilient spring block having a predetermined length and a predetermined cross-sectional shape, said resilient spring block including a convexly-tapered portion adjacent each of an upper surface and said lower surface, said convexly-tapered portion having a predetermined taper, said resilient spring block providing a predetermined amount of preload to said resilient side bearing assembly at an installed height on such truck portion of such railway car;
- an at least one aperture formed in each end of said resilient spring block substantially in axial alignment with a longitudinal centerline of said resilient spring block, said at least one aperture in said each end of said resilient spring block having a predetermined length and a predetermined cross-sectional shape;
- a friction head member which includes a plate portion

and a downwardly extending rim portion secured to said plate portion, said plate portion having an upper friction surface which frictionally engages a wear plate that is secured to an underside of such body portion of such railway car and a lower surface disposed axially opposite said upper friction surface, said upper friction surface of said plate portion having a predetermined shape which ensures that a substantial portion of said upper friction surface remains in frictional engagement with such wear plate during cycling of such truck portion of such railway car, at least a predetermined portion of said lower surface of said plate portion abuttingly engages said upper surface of said resilient spring block, said downwardly extending rim portion extends downwardly from said lower surface of said plate portion a predetermined distance and forms a cavity in said friction head member which surrounds a second portion of said resilient spring block adjacent said upper surface, said cavity in said friction head member having a predetermined cross-sectional shape, said downwardly extending rim portion is positioned for reciprocal movement within said cavity in said housing member;

- an at least one peg means, secured substantially perpendicular to and substantially at a geometric center of each of said upper surface of said base portion of said housing member and said lower surface of said plate portion of said friction head member, which engage a respective one of said at least one aperture in said each end of said resilient spring block for maintaining said resilient side bearing assembly together during shipment and installation on such truck portion of such railway car, each of said at least one peg means having a predetermined length and a predetermined cross-sectional shape; and
- an indicator means having a first portion positioned on said friction head member and a second portion positioned on said housing member for indicating a nominal working height of said resilient side bearing assembly after such installation on such truck portion of such railway car.

4,793,721

## DEVICE FOR SWITCHING APPARATUS HAVING A SHAFT

Günter Prietzel, and Ralf Seebold, both of Berlin, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, München, Fed. Rep. of Germany

Continuation of Ser. No. 922,360, Oct. 23, 1986, abandoned.

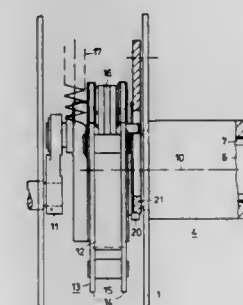
This application Feb. 25, 1988, Ser. No. 160,398

Claims priority, application Fed. Rep. of Germany, Nov. 11, 1985, 3540328

Int. Cl.<sup>4</sup> F16C 19/24

U.S. Cl. 384—584

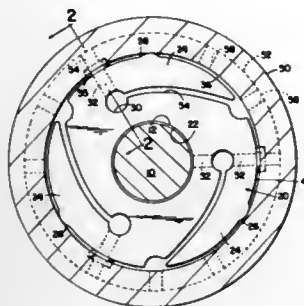
1 Claim



1. An actuating device for circuit breaking elements of a circuit breaker, comprising a housing comprised of sheet metal and an actuating mechanism, said actuating mechanism comprising an actuating shaft, a tube which coaxially surrounds the actuating shaft for retaining the shaft between two parallel walls of the housing, the tube being mounted at ends thereof in

respective holes in each of the walls of the housing, further having cuts which match cuts in the housing walls, thereby allowing the tube to be supported in the housing against axial movement, the actuating mechanism further comprising bearings disposed within the tube for allowing the shaft to rotate in the tube, said bearing comprising roller cage bearings.

**4,793,722**  
**FLEXIBLE DAMPED BEARING ASSEMBLY**  
Richard C. Jensen, Greensburg, Pa., assignor to Elliott Turbomachinery Co., Inc., Jeannette, Pa.  
Filed Aug. 14, 1984, Ser. No. 640,893  
Int. Cl.<sup>4</sup> F16C 27/06  
U.S. Cl. 384—99 15 Claims

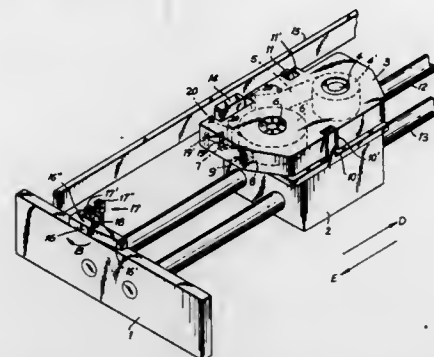


1. A flexible damped bearing assembly for securing a rotating shaft maintained within a bearing which comprises:  
an annular damper means formed from a resilient material having an axial bore sized to receive the bearing and shaft, said damper means including at least one damper arm defined between a surface of the damper means and a transversely extending damper slot;  
a retainer for securing the damper means;  
means for supplying a damping fluid to the damper means; and  
pivot means for localizing forces applied through the damper means to the retainer, said pivot means being located relative to the damper arm to cause complex damper arm displacement for effecting damping upon displacement of the damper means.

**4,793,723**  
**MECHANISM FOR DETECTING END OF INK RIBBON IN A RIBBON CASSETTE**  
Tadashi Furukawa, Suwa, Japan, assignor to Seiko Epson Corporation, Tokyo, Japan  
Filed May 2, 1986, Ser. No. 858,625  
Claims priority, application Japan, May 15, 1985, 60-71891[U]  
Int. Cl.<sup>4</sup> B41J 35/36  
U.S. Cl. 400—249 4 Claims

1. A mechanism for detecting the end of an ink ribbon supplied from an enclosed cassette to a print mechanism, the cassette and the print mechanism being supported for travel on a frame of a printer and the ink ribbon being fed from a supply spool in the cassette and returned to a take-up spool therein, the take-up spool having an axis of rotation, the cassette having a wall adjacent to at least the take-up spool, the mechanism further comprising:  
an opening in the wall of the cassette adjacent to the take-up spool;  
a detector member in the cassette, the detector member including a movable surface contacting the outside layer of the ink ribbon on the take-up spool, the detector member being supported in the cassette for radial motion relative to the take-up spool and axial motion along an axis substantially parallel to the axis of rotation of the take-up spool, the detector member moving to project along said

axis substantially parallel to the axis of rotation of the take-up spool through the opening in the cassette wall when the ink ribbon on the take-up spool has reached a predetermined level thereon; and  
resilient means for maintaining the detector member in



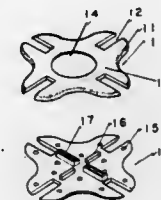
contact with the ink ribbon on the take-up spool as the level changes, the resilient means urging the detector against the cassette wall and also urging the detector member to project through the opening in the cassette wall when the ink ribbon on the take-up spool has reached the predetermined level thereon.

**4,793,724**  
**PRINTING SUPPORT AND METHOD FOR PLACING LABELS ON A TRANSPARENT RECORD MEDIUM**  
George C. Battles, 7611 South Allison Circle, Unit C, Littleton, Colo. 80235  
Filed Aug. 18, 1986, Ser. No. 897,256  
Int. Cl.<sup>4</sup> B41J 1/24  
U.S. Cl. 400—174 6 Claims



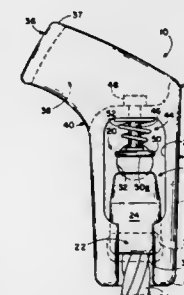
1. A method of placing print characters on a first transparent print medium to be attached to an undersurface of a second transparent print medium for viewing through an upper surface of said second medium, comprising the steps of:  
successively printing selected print characters onto a first surface of said first transparent print medium in an orientation inverted relative to a correct orientation by a rotation of each character 180 degrees about its horizontal center line;  
inverting said first transparent print medium by rotating said first print medium 180 degrees about its horizontal centerline so that the printed characters are readable in a correct orientation when viewed through said first print medium from a second surface opposite said first surface; and  
attaching said first print medium to an undersurface of said second transparent print medium causing said print characters to appear in a readable orientation when viewed through an upper surface of said second print medium opposite said undersurface.

**4,793,725**  
**PHOTO CLAMP JOINT**  
Huo-Ching Cheng, 49, Lane 410, Chen Shing Rd., Taichung, Taiwan  
Filed Apr. 22, 1987, Ser. No. 41,117  
Int. Cl.<sup>4</sup> F16D 1/00  
U.S. Cl. 403—174 5 Claims



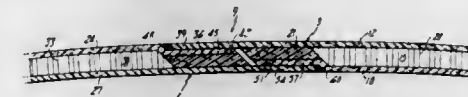
1. A type of photo clamp joint consisting of two identical pieces, featuring elongated openings on the four edges of each arm of a cross-shape piece, and a central recess at the middle of the upper surface, and several semi-spherical protrusions in a crosswise pattern on the lower surface, and a crossed pattern of elongated protrusion edges and elongated housing grooves to join a first piece with opposing elongated housing protrusion edges and the elongated grooves of a second piece.

**4,793,726**  
**CONNECTOR (SLIDER)**  
Alexander F. Sword, 59201 Sword Pl., Vernonia, Oreg. 97064  
Filed Jun. 4, 1987, Ser. No. 58,233  
Int. Cl.<sup>4</sup> B25G 3/00  
U.S. Cl. 403—316 19 Claims



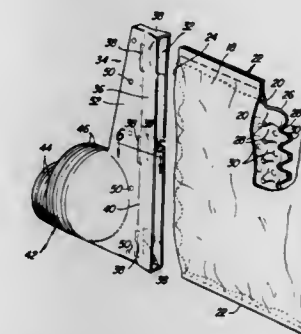
1. A line connector for use in connecting a choker cable, having a nubbin at an end thereof, to a line, which has abutment means thereon, the connector comprising:  
an elongate body having a sidewall thereabout, a base at one end thereof and a nubbin-receiving chamber therein, said chamber having an upper, nubbin-insertion region sized freely to receive a nubbin therein, and a lower, nubbin-seating region, said chamber further including a first opening in said sidewall adjacent said upper region sized to allow passage of a nubbin therethrough and a second opening in said sidewall, located below and connected to said first opening, which extends into said base, sized to allow passage only of a cable therethrough;  
a spring-biased nubbin retainer located at the upper end of said nubbin-insertion region, said retainer including a shaft extending through and axially movable in the upper end of said nubbin-insertion region, and a plate mounted on the end of said shaft in said nubbin-insertion region, said shaft and plate being constructed and arranged such that the plate, when fully extended into said insertion region, is spaced apart from a nubbin seated in said seating region; and  
attachment means for attaching the connector to the line.

**4,793,727**  
**TWO-STEP COMPOSITE JOINT**  
David N. Schmaling, Oxford, Conn., assignor to United Technologies Corporation, Hartford, Conn.  
Filed May 21, 1987, Ser. No. 52,304  
Int. Cl.<sup>4</sup> F16D 1/00 2 Claims



1. A two-step joint comprising:  
(a) a first article comprising a filler layer disposed between first and second composite layers;  
(b) a second article comprising a filler layer disposed between first and second composite layers;  
(c) an end section of said first article's first layer disposed external to, overlapping and bonded to an end section of said second article's first layer to form a first overlap wherein said second article's first layer extends inwardly prior to said first overlap;  
(d) an end section of said first article's second layer disposed internal to, overlapping and bonded to an end section of said second article's second layer to form a second overlap; and  
(e) said first overlap displaced across the thickness and along the length of the joint from said second overlap; whereby loads are transferred across the joint from first layer to first layer and from second layer to second layer.

**4,793,728**  
**SUBSURFACE WATER DRAINAGE SYSTEM**  
Donn W. Ellis, Brighton, Mich., assignor to Construction Supply, Inc., Highland, Mich.  
Filed May 13, 1987, Ser. No. 49,856  
Int. Cl.<sup>4</sup> E01C 11/22  
U.S. Cl. 404—2 23 Claims



1. A drainage system directing water to a drainpipe, a catch basin or an outlet pipe, comprising:  
at least one fabric inlet tube having a discharge end;  
a self-sustaining, rectangular water-porous inlet support disposed in said at least one fabric inlet tube, an end of said support extending generally up to said discharge end of said inlet tube; said support being composed of a substantially rigid plastic sheet including a regularly spaced array of alternating elevations and depressions, so as to define spaces between alternating elevations and spaces between alternating depressions; said fabric tube extending over said spaces so as to be generally flat in shape, but being deformable to fit into at least some of said spaces; and  
an outlet fluidly connecting said discharge end of at least one inlet tube and said drainpipe, catch basin or outlet pipe;



wherein said outlet includes at least one generally flat open end including a rectangular opening dimensioned to compressively receive and retain said discharge end of said inlet tube and said end of said support therein, one of said outlet and said support being stiff but slightly resilient; wherein said open end of said outlet includes an outwardly flared portion facilitating insertion of said fabric tube discharge end and said support end into said outlet open end; and wherein said outlet includes a plurality of inwardly depending projections, located interiorly of said rectangular opening, said projections being dimensioned so as to deform said fabric tube upon insertion so as to fit said fabric tube into said at least some of said spaces of said support and trap said fabric tube between said support and said outlet.

4,793,729

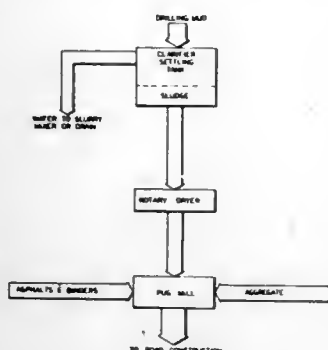
# PROCESS OF MAKING MATERIAL FOR AND CONSTRUCTING A ROAD

Joseph F. Bosich, 9405 Brakeman Rd., Chardon, Ohio 44024  
Continuation-in-part of Ser. No. 776,211, Sep. 16, 1985, Pat. No. 4,668,121, and a continuation-in-part of Ser. No. 908,617, Sep. 17, 1986, abandoned. This application Jan. 7, 1988, Ser. No. 142,508

Int. Cl.<sup>4</sup> E01C 7/00; C08L 95/00

U.S. Cl. 404—72

12 Claims



1. A process of making materials for and constructing a road over frozen ground, said process comprising separating water from waste material sludge to form a partially dried sludge, mixing the partially dried sludge with caustic soda, forming a solid body of material by heating the mixture of sludge and caustic soda, grinding the body of material to form particles of a first size, the particles to a second size which is at least 2 to 10 times as great as the first size, mixing the particles of a size with asphalt to form a product, and depositing the over frozen ground to at least partially form a road.

7. A process of making lightweight material from waste material sludge said process comprising separating water from the waste material sludge to form a partially dried sludge, mixing the partially dried sludge with caustic soda, forming a solid body of material by heating the mixture of sludge and caustic soda, grinding the solid body of material to form particles of a first size, and expanding the particles to a second size which is at least 2 to 10 times as great as the first size.

4,793,730

# ASPHALT SURFACE RENEWAL METHOD AND APPARATUS

Adam F. Butch, P.O. Box 916, Casselberry, Fla. 32707  
Filed Aug. 13, 1984, Ser. No. 639,745

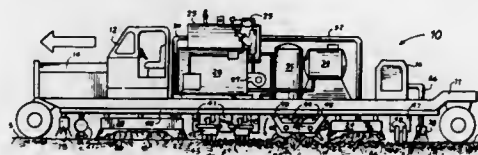
Int. Cl.<sup>4</sup> E01C 7/06, 23/12, 23/14

U.S. Cl. 404—77

12 Claims

1. A method of renewing an asphalt pavement having a thin

degraded surface portion over an underlying thick undegraded portion comprising the steps of:  
heating the surface of the asphalt pavement to a temperature in the range of 300°–500° F.;  
breaking the thin degraded surface portion of the heated asphalt;  
breaking the underlying undegraded portion to a depth of about two inches;



mixing the broken degraded surface portions with the broken undegraded portions from below such degraded surface portion in situ;  
reheating the mixed broken portions of degraded and undegraded asphalt material to fuse the mixture into a homogeneous mass;  
leveling the mixed and reheated mass by screeding; and  
compacting the smoothed, mixed, and reheated material.

4,793,731

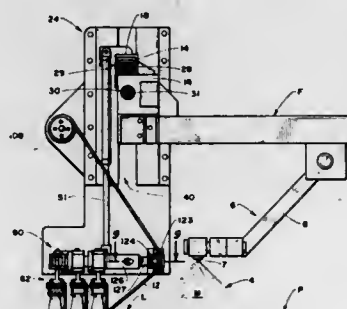
# ROAD COATING SYSTEM

Edward C. Gness, 160 Patterson Rd., Santa Maria, Calif. 93455  
Continuation-in-part of Ser. No. 874,033, Jun. 13, 1986, Pat. No. 4,684,289. This application Aug. 3, 1987, Ser. No. 80,783

Int. Cl.<sup>4</sup> E01C 23/03

U.S. Cl. 404—83

27 Claims



6. In a pavement coating apparatus with a truck having a truck frame and a means for applying pavement coating material onto a pavement while simultaneously applying a sheet of paving fabric onto said material with a fabric application means, said fabric application means comprising:  
a support beam connected to said truck frame;  
an end plate attached to each opposing end of said support beam including a plate drive means for raising and lowering said end plate;  
an expandable fabric press means connected to said end plates; and  
fabric roll engagement means connected to each end plate for holding a roll of paving fabric and guiding a continuous sheet of said fabric from said roll onto said pavement coating material.

4,793,732

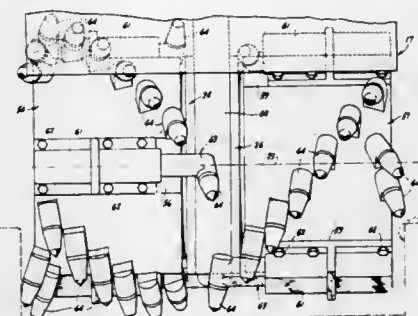
# PAVEMENT SLOT CUTTER

Robert L. Jordon, P.O. Box 273, Elk Grove, Calif. 95624  
Filed Jan. 21, 1988, Ser. No. 146,656

Int. Cl.<sup>4</sup> E01C 23/12

U.S. Cl. 404—90

8 Claims



1. A pavement slot cutter comprising a support, a boom on said support and extending therefrom in a predetermined direction, a drum having an end, means for mounting said drum on said boom for rotation relative thereto about a horizontal axis extending normal to said predetermined direction, a mobile tooth, means for mounting said mobile tooth on said drum for rotation with said drum and for reciprocating said mobile tooth in a path between a projected position beyond said end of said drum and a retracted position proximate said end of said drum.

4,793,733

# SCARIFIER

Tatsuhiko Chiba, Kawaguchi, and Ken-ichi Igarashi, Kohnosu, both of Japan, assignors to Taisei Road Construction Co., Ltd., Tokyo, Japan

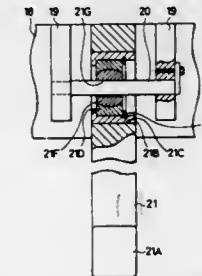
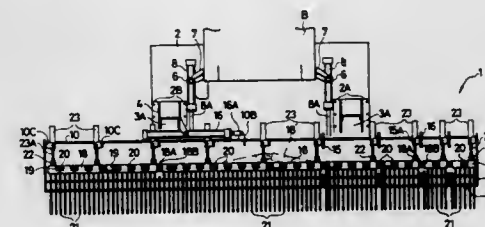
Filed Jul. 7, 1987, Ser. No. 70,722

Claims priority, application Japan, Dec. 3, 1986, 61-186417[U]

Int. Cl.<sup>4</sup> E01C 23/12

U.S. Cl. 404—90

2 Claims



1. A scarifier suspended beneath a body of an automotive vehicle such that it is vertically movable by means of suspending cylinders, comprising a suspending frame provided on a main frame vertically movable by means of said suspending cylinders, said suspending frame having a longitudinal axis

extending in the widthwise direction of said vehicle body and being horizontally movable by means of adjusting cylinders so that it may freely slide in the widthwise direction of said vehicle body, a plurality of supporting bars horizontally disposed within said suspending frame so that they extend in the longitudinal direction of said suspending frame and so that may two adjacent bars may be connected in series to each other by means of a connecting pin, said supporting bars being each connected to an inclining cylinder vertically provided on said suspending frame so that each bar may be inclined in a vertical plane of the longitudinal axis thereof, and a multiplicity of claws mounted, at prescribed intervals, on said supporting bars by way of pivot pins mounted parallel to said supporting bars in such a manner, that said claws extend downward from said pivot pins and that said claws are pivotal about an axis normal to a longitudinal axis of said pivot pins.

4,793,734

# APPARATUS FOR REMOVING STRUCTURAL CONCRETE

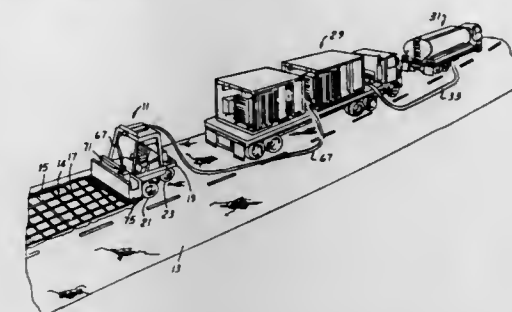
Forrest A. Shook, Fenton, and Gerard J. DeSantis, Battle Creek, both of Mich., assignors to NLB, Wixom, Mich.

Filed Oct. 22, 1987, Ser. No. 111,500

Int. Cl.<sup>4</sup> E01C 23/12; B05B 3/02

U.S. Cl. 404—90

27 Claims



1. An apparatus for removing structural concrete comprising:  
an elongated hood having an inner zone and an outer zone; said inner zone being generally nonaccessible; and said outer zone being accessible for maintenance purposes; said hood having an elongated slot extending along the length thereof and located between said inner and outer zones;  
a feed carriage guidably mounted within and upon said hood in the inner zone thereof for longitudinal reciprocal movement along the length of said hood;  
a seal support housing overlying said carriage and located substantially in the outer zone of said hood;  
said support housing including portions extending through said slot into said inner zone for connection to said carriage;  
pivot means interposed between said housing portions and said carriage;  
a rotating shaft and seal assembly mounted upon said support housing and including a body having a water inlet adapted to be connected to a source of water under pressure; and  
an elongated tubular shaft and nozzle assembly having a generally vertical operating position, axially connected to said rotating seal and shaft assembly and extending from said support housing in said outer zone through said slot into said inner zone and through said carriage into the bottom of said hood for directing water under pressure against the structural concrete;  
said support housing being adapted to pivot about said pivot means to swing and thereby move said tubular shaft and

nozzle assembly from the vertical operating position to a generally horizontal inspection and service position for maintenance purposes.

4,793,735

**VIBRATORY ROLLER STEERING SYSTEM**

Julius Pankert, Munich, Fed. Rep. of Germany, assignor to Wacker Werke GmbH & Co. KG, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 798,130, Nov. 14, 1985, abandoned.

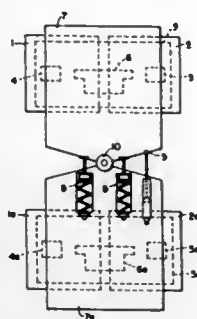
This application Nov. 3, 1987, Ser. No. 117,931

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1984, 3441625

Int. Cl.<sup>4</sup> E02D 3/032

U.S. Cl. 404—126

3 Claims



1. A vibratory roller having sides and having four drums that can be vibrated; the drums are driven individually, and are rotatably mounted, in pairs, on a front or rear support means respectively, with the front support means being attached to a front frame, and the rear support means being attached to a rear frame; said vibratory roller further comprises in combination therewith:

a single hydraulic system to carry out two types of steering in one hydraulic system including a circuit,

a hinged or swivel coupling that interconnects said front and rear frames by a pivot joint as well as to permit a diversified dual steering condition therewith including combination of both articulated steering capability via principle and structure of articulated steering and as well as panzer steering capability via principle and structure of panzer steering, said single hydraulic system being switchable between articulated steering capability as well as panzer steering capability during operation of the vibratory roller as said hydraulic system operates the roller drums in a selected direction without interrupting travel by two control levers;

said system including steering hydraulic cylinder means connected to said front and rear frames respectively for pivoting the latter relative to one another about said coupling in a bending control steering function for curve travel;

a multi-way valve means operatively connected in circuit with said steering hydraulic cylinder means;

tension accumulator means connected to said front and rear frames primarily for an alignment function thereof relative to each other; other than when said steering hydraulic cylinder means is actuated, said front and rear frames are held by said accumulator means in a relative angular position in which upon switching from articulated steering capability to panzer steering when said steering hydraulic cylinder means employed for articulated steering capability has been turned-off so that said pairs of drums are centered without any force and holding effect by said hydraulic cylinder means concurrently with said multi-way valve means being aligned positively as to each other to assume a straight-ahead travel position determined by

said tension accumulator means that only align the drums for the alignment function attributable thereto; and drive means for said drums; each pair of drums having a drum on each side of said roller when viewed in the direction of straight-ahead travel, with the drive means of those drums of both pairs of drums disposed on a given side of said roller being controllable in common and independently of those drums disposed on the other side of said roller for steering movement in the bending control steering function only via desired and wanted actuation of said multi-way valve means during operation of the vibratory roller with which normal travel with limited changes in direction as well as slight corrections of direction is carried out pursuant to the principle of articulated steering that enables immediate changes in direction without interrupting travel and without damaging already compacted ground on one hand and on the other hand permits a rotation on the spot pursuant to the principle of panzer steering with the aid of the tension accumulator means, which for this purpose, other than when the steering cylinder means is actuated, effectively makes the two pivotally interconnected front and rear frames an essentially rigid unit that is essentially aligned for straight-ahead travel.

4,793,736

**METHOD AND APPARATUS FOR CONTINUOUSLY BORING AND LINING TUNNELS AND OTHER LIKE STRUCTURES**

Louis J. Thompson, 1216 Haines, College Station, Tex. 77840;

Peter M. McIntyre, 713 E. 30th St., Bryan, Tex. 77801, and

James K. Carta, P.O. Box 5561, Arlington, Tex. 76011

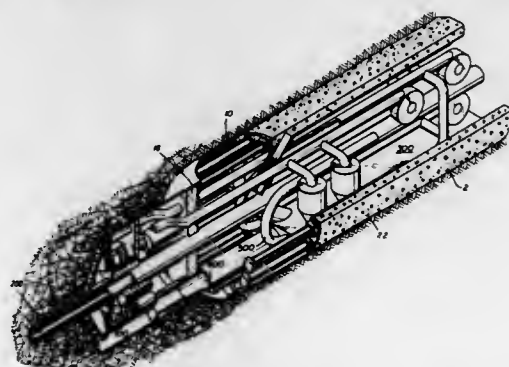
Continuation of Ser. No. 766,919, Aug. 19, 1985. This

application Nov. 12, 1987, Ser. No. 122,534

Int. Cl.<sup>4</sup> E21D 11/10, 9/06

U.S. Cl. 405—146

6 Claims



1. An apparatus for continuously and simultaneously boring and lining a tunnel comprising:

(a) a main structure comprising a housing, and a bulkhead disposed within the housing;

(b) a means for excavating the tunnel partially disposed within the housing and supported by the bulkhead

(c) a means for lining the tunnel with a hardenable liner material where continuous passageways are formed in the liner to said in removing excavation debris and retrieving the hardenable liner material without having to stop the apparatus to add pipe or other apparatus required to carry liner material or remove excavation debris;

(d) a means for retrieving the hardenable liner materials from a remote location to the means for lining the tunnel;

(e) a means for removing excavation debris through at least one continuous passageway; and

(f) a means for controlling the means for: (i) excavating; (ii) lining; (iii) retrieving liner materials; and (iv) removing excavation debris.

4,793,737

**FLEXIBLE RISER SYSTEM**

Keith Shotbolt, Gerrards Cross, England, assignor to Bechtel Limited, London, England

Filed Jun. 3, 1987, Ser. No. 57,554

Claims priority, application United Kingdom, Jun. 5, 1986,

8613690; Nov. 17, 1986, 8627392; Nov. 20, 1986, 8627696; Jan.

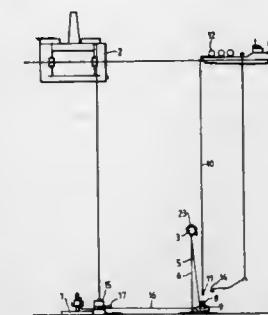
6, 1987, 8700099; Jan. 6, 1987, 8700100; Feb. 10, 1987, 8703026;

Feb. 25, 1987, 8704466; Apr. 16, 1987, 8709301

Int. Cl.<sup>4</sup> E21B 43/013; F16L 1/04

U.S. Cl. 405—169

23 Claims



1. A method of installing a flexible riser system in water to bring flexible risers from seabed equipment to a production vessel at the sea surface, including

(a) providing a support to one lateral side of a line running vertically from the production vessel and at a level intermediate the seabed and the sea surface,

(b) lowering at least one flexible pipe from the sea surface in a region laterally further from said line than said support to at least contact the seabed,

(c) bringing said pipe to the support at a lateral side portion thereof remote from the said line,

(d) attaching said pipe and said support together whereby to sustain on said support at least the weight of the pipe below said support, and thereafter

(e) laying an upper portion of the pipe over the support towards said line to form a catenary upper leg of a riser.

4,793,738

**SINGLE LEG TENSION LEG PLATFORM**

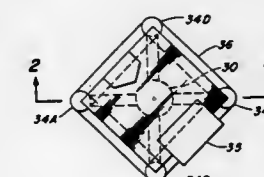
Charles N. White, and Filmy R. Botros, both of Houston, Tex., assignors to Conoco Inc., Ponca City, Okla.

Filed Apr. 16, 1987, Ser. No. 40,461

Int. Cl.<sup>4</sup> E02D 21/00; B63B 35/00

U.S. Cl. 405—224

17 Claims



1. A single leg tension leg platform for use in a body of water having a bottom and a surface comprising:

a deck;

a central buoyant column;

at least three peripheral buoyant columns symmetrically located about said central buoyant column;

connection means for connecting said peripheral buoyant columns and said central buoyant column;

supporting means for supporting said deck from said central buoyant column and said peripheral buoyant column;

one and only one vertical tension leg having a top and a bottom with the top connected to said central buoyant column and a bottom connectable to an anchor on said bottom; whereby said central column and said peripheral columns have sufficient positive buoyancy to support said deck above said water surface and to maintain said tension leg in tension.

4,793,739

**OFFSHORE STRUCTURE**

Alf E. Hasle, Stependen, and Per C. Sandness, Oslo, both of Norway, assignors to Aker Engineering A/S, Oslo, Norway

Filed Jun. 19, 1987, Ser. No. 64,338

Claims priority, application Norway, Jul. 4, 1986, 862713

Int. Cl.<sup>4</sup> E02B 17/02

U.S. Cl. 405—227

7 Claims



1. A compliant offshore concrete structure extending from the sea floor to above the water surface, characterized in that the concrete structure (10) comprises a single rotation symmetrical shell provided with a watertight, pressure resistant bottom structure (13) having integrated, temporarily sealed pipe sleeves (18) and being vertically supported by a compliant pile system comprising pile sleeves (3) rigidly connected to the concrete structure (10) at a lower end portion (2), and piles (4) mounted within the pile sleeves (3) and attached to the pile sleeves (3) at an upper end portion (17), wherein the compliant pile system is adapted to yield to the swaying movements of the concrete structure without losing strength, and said concrete structure having a natural oscillation period greater than the natural oscillation period of the water with which it is in contact.

4,793,740

**DRILLING SYSTEM**

Verne L. Schellhorn, Gualala, Calif., assignor to Foundation Constructors, Antioch, Calif.

Filed Nov. 28, 1986, Ser. No. 935,772

Int. Cl.<sup>4</sup> E02D 7/00; F21B 10/44

U.S. Cl. 405—232

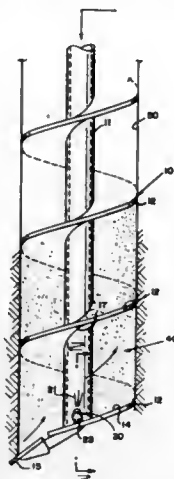
4 Claims

4. A method for driving piling comprising the following steps:

(a) boring a hole to a selected depth with an auger, while simultaneously directing a high pressure, low volume fluid jet near the cutting tip of said auger upwardly into the slip stream of spoil, without enlarging the diameter of said bore, thereby fluidizing said spoil as said auger advances downwardly in said hole,



- (b) withdrawing said auger by rotating it and leaving at least a portion of the fluidized spoil in said hole,  
 (c) placing a pile in said hole and driving said pile to a point below said selected depth of said hole having fluidized spoil whereby said fluidized spoil is displaced by said pile



- and is forced into any spaces between said pile and the walls of said hole, and  
 (d) allowing said fluid in said fluidized spoil to flow away from said hole, whereby said spoil increased its frictional engagement with the surface of said pile as time passes and said spoil equalizes.

4,793,741

# **METHOD FOR IMPROVING THE MECHANICAL PROPERTIES OF SOIL, A POLYMERIC SOLUTION THEREFORE, AND A PROCESS FOR PREPARING POLYMERIC SOLUTIONS**

Shawqi Lahalib, Rique; Ma'mun Abul-Halabi, Salmia; Nouria Al-Awadhi, Al-Dahia, and Khamis Shuhair, Al-Shaab, all of Kuwait, assignors to Kuwait Institute for Scientific Research, Kuwait

Filed Dec. 5, 1986, Ser. No. 938,421

Int. Cl.<sup>4</sup> C09K 17/00

U.S. Cl. 405-263

26 Claims

1. A process for preparing a polymeric solution for use as a soil stabilizer comprising the steps of:

- (a) mixing an aqueous formaldehyde solution having a concentration ranging between about 30-50% at a temperature of between about 40° to 60° C. and a pH of about 10 to 12 with a urea-melamine resin so that the molar ratio of formaldehyde to urea-melamine is in the range of 2.5 to 4.5:1 until the urea-melamine resin dissolves;  
 (b) adding a sulfonating agent in an amount to provide a molar ratio of sulfite group to the urea-melamine in the range of 0.8 to 1.2:1 and heating the resulting solution to a temperature of about 70° to 90° C. for a period of 20 to 100 minutes;  
 (c) cooling the solution to about 40°-60° C. and adjusting the pH of the solution to about 2.5 to 4.0 and polymerizing the reactants in the solution for a period of 30 to 150 minutes;  
 (d) adjusting the pH of the solution to about 7-9, heating the solution to a temperature of between 70°-90° C. and adding polyvinyl alcohol having an average molecular weight in the range of 40,000 to 120,000 to the solution until the weight ratio of the polyvinyl alcohol to sulfite groups is between 0.001 to 0.03, and maintaining the reaction solution at the 70° to 90° C. temperature for between 30 and 150 minutes.

16. A method for improving the mechanical properties of soil and its resistance to erosion comprising the steps of:

- (a) providing a water soluble polymeric composition con-

taining a sulfonated urea-melamine formaldehyde resin having a relative average molecular weight of between about 700,000 and 1,000,000, a polyvinyl alcohol having an average molecular weight within the range of 40,000 to 120,000 wherein the weight ratio of the urea-melamine resin to the polyvinyl alcohol ranges from 100:1 to 200:1, and water with the concentration of solids within the solution within the range of 5% to 50%; and,  
 (b) spraying the water soluble solutions on to the surface of the soil which is to be stabilized.

4,793,742

# **TRUCK MOUNTED FERTILIZER APPLICATOR USING FLUID CONVEYING**

Glen L. Strand, Murdock, Minn., assignor to TCI, Inc., Benson, Minn.

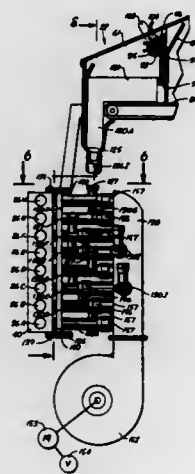
Continuation of Ser. No. 840,585, Mar. 17, 1986, abandoned.

This application Oct. 5, 1987, Ser. No. 104,784

Int. Cl.<sup>4</sup> B65G 53/48

U.S. Cl. 406-79

12 Claims



1. An air distribution apparatus for particulate materials discharged from a mobile boom assembly comprising a plurality of boom tubes vertically spaced apart and having axes defining a substantially common vertical plane and the boom tubes receiving particulate material from an air distribution apparatus adapted to minimize space occupied in horizontal direction, comprising:

- a frame for supporting the boom assembly and the air distribution apparatus;
- metering means for separating the particulate material into individual metered portions;
- a plenum chamber mounted on said frame and having a longitudinal axis elongated in substantially vertical direction and being below the metering means;
- a source of fluid under pressure to supply fluid to the plenum chamber;
- a plurality of outlet openings from said plenum chamber, the outlet openings being spaced in vertical direction along the longitudinal axis to form vertically spaced outlet openings, and the outlet openings being of a first diameter;
- a separate mixing chamber tube connected to each outlet opening, the mixing chamber tubes each having a transition section open to the respective outlet opening and tapering to a small diameter in direction away from the outlet opening;
- a separate nozzle positioned to open to each mixing chamber tube and adapted to carry particulate material under gravity into the mixing chamber tube, the nozzle being substantially at right angles to the respective mixing chamber tube and having a wall portion, positioned in the mixing

chamber tube to form a reduced pressure at an outlet of the nozzle as fluid flows through the mixing chamber tube;  
 means to mount the metering means vertically above the plenum chamber and the mixing chamber tubes;  
 separate conduit means for receiving each of the metered portions connected to each of the nozzles respectively, the conduit means carrying the metered portions under gravity to the respective nozzle; and  
 means to couple the mixing chamber tubes to corresponding ones of the vertically spaced tubes of the boom assembly.

4,793,743

# **AIR SEEDER PURGING SYSTEM**

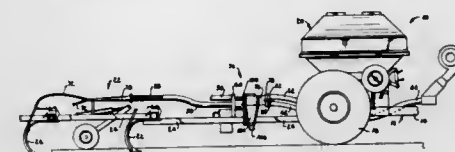
Lawrence S. Grodecki; Murray K. Just; James W. Henry; Glenn M. Hantke, and Jack A. Lesanko, all of Yorkton, Canada, assignors to Morris Rod-Weeder Company Ltd., Yorkton, Canada

Filed Apr. 29, 1987, Ser. No. 44,049

Int. Cl.<sup>4</sup> B65G 53/46, 53/52, 53/60

U.S. Cl. 406-123

14 Claims



1. In a farm implement for having apparatus for containing a supply of particles to be dispensed, metering means for delivering a plurality of metered particle streams from said apparatus, a plurality of transfer conduits for receiving said plurality of particle streams, an air blower in upstream communication with said transfer conduits for providing a particle entraining stream of air for entraining said particle streams and conveying said particles downstream through said transfer conduits, a plurality of delivery conduits in downstream communication with said transfer conduits for delivering said air-entrained particle streams to the ground, the improvement comprising:

- an air-particle separator;
- means for selectively, temporarily disconnecting said transfer conduits from said delivery conduits;
- means for temporarily connecting said transfer conduits to said separator; and
- a drainage control assembly for selectively bypassing said metering means and permitting gravitational flow of particles from said apparatus to said transfer conduits.

4,793,744

# **GRANULAR MATERIAL CONVEYOR**

Roger A. Montag, Rodman, Iowa, assignor to Newmatics, Inc., Algona, Iowa

Filed Nov. 4, 1986, Ser. No. 926,549

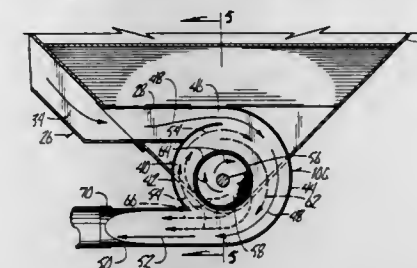
Int. Cl.<sup>4</sup> B65G 53/14

U.S. Cl. 406-153

8 Claims

1. A flowable material conveyor comprising, an air carrier medium source providing a carrier medium moving at a conveying speed,  
 a flowable material source providing flowable material,  
 a mixing unit connected to said carrier medium source and said flowable material source for mixing the flowable material into said carrier medium and accelerating it to the conveying speed of the carrier medium,  
 said mixing unit having a chamber with a substantially 360° curved inner wall surface with a radial center and with an inlet connected to said carrier medium source positioned to move said carrier medium in a stream along said 360° curved inner wall surface and develop a centrifugal force, said chamber having an outlet positioned to provide a discharge for said carrier medium moving along said inner wall surface,  
 a flowable material inlet in said chamber at the substantial

radial center of said 360° curved inner wall surface whereby a vacuum is generated at said radial center by the centrifugal force of said carrier medium moving along said curved inner wall surface which in turn draws said flowable material into the stream of moving carrier medium,  
 said 360° inner wall surface includes an outside circular wall extending to said outlet and an inside substantially circular



4,793,745

# **DOUBLE DIAMETER BORING TOOL**

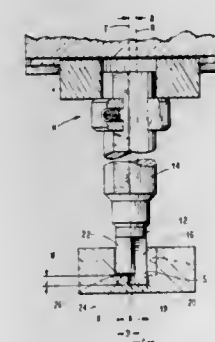
Fred N. Ashbaugh, Belton, and Kenneth R. Murry, Odessa, both of Mo., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 10, 1986, Ser. No. 827,704

Int. Cl.<sup>4</sup> B23B 51/00

U.S. Cl. 408-1 R

5 Claims



1. A method of boring two concentric holes of different depths, utilizing an elongated boring tool having a tool axis of rotation, a longitudinally disposed tool centerline axis, and first and second transverse cutting edges at one end thereof extending across said boring tool, said second cutting edge being longitudinally rearwardly recessed with respect to said first cutting edge, comprising the steps of:

- inserting said boring tool into an adjustable boring head;
- adjusting a distance B between said tool centerline axis and said tool axis of rotation such that said tool axis of rotation intersects a first boring area of said first cutting edge; and
- boring said concentric holes having respectively larger and smaller diameters.

4,793,746

## BORING DEVICE

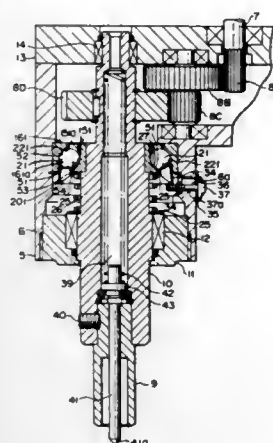
Yasumasa Ooki, Osamu Asano, and Toshio Mikiya, all of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Tokyo, Japan Division of Ser. No. 82,351, Aug. 6, 1987. This application Apr. 26, 1988, Ser. No. 186,228

Claims priority, application Japan, Sep. 9, 1986, 61-210603; Sep. 9, 1986, 61-210604

Int. Cl.<sup>4</sup> B23B 47/34

U.S. Cl. 408—17

3 Claims



## 1. A boring device comprising:

- a casing;
- a tool spindle supported in said casing and movable in axial direction thereof, one direction being a feed direction and the other direction being a return direction;
- means for biasing said tool spindle in said return direction;
- a first thrust ring fixed to said tool spindle and coaxially disposed with respect to said spindle thereto, said first thrust ring having a substantially hollow cylindrical shape and a track surface having an arcuate cross section facing outwardly thereof and in said return direction;
- a second thrust ring concentrically surrounding said first thrust ring and fixed to said casing, said second thrust ring having a substantially hollow cylindrical shape and a track surface facing said track surface of said first thrust ring, said track surface of said second thrust ring having an arcuate cross section facing inwardly thereof and in said feed direction;
- a rolling element retaining ring rotatably disposed between said first and second thrust rings and having at least three rolling element receiving bores facing said track surfaces of said first and second thrust rings, said rolling element receiving bores being spaced apart from each other in a circumferential direction of said rolling element retaining ring and being radially extended in said rolling element retaining ring;
- rolling elements respectively received in said rolling element receiving bores such that said rolling elements are in rolling contact with said track surfaces of said first and second thrust rings;
- receptacles formed in the track surface of one of said first and second thrust rings so as to be arranged in the same circumferential spaced relation as said rolling element receiving bores such that said receptacles simultaneously receive said rolling elements; and
- coupling means for causing said rolling element retaining ring to operatively engage and disengage with respect to the other one of said first and second thrust rings, said coupling means comprising (i) notches formed in said rolling element retaining ring, and (ii) engaging means engageable with said notches fixed to said casing in a required position along said tool spindle.

4,793,747

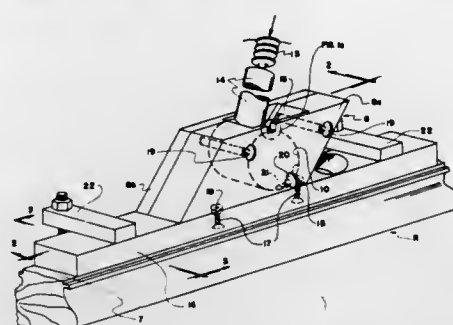
## STAIR RAIL SPINDLE JIG

George J. Reitz, 121 Village Dr., Feasterville, Pa. 19047 Filed Apr. 18, 1988, Ser. No. 182,381

Int. Cl.<sup>4</sup> B23B 47/28

U.S. Cl. 408—115 R

12 Claims



1. A stair rail spindle jig for use in drilling spindle apertures in stair rails, said jig comprising a mounting block having a planar surface adapted to extend along and parallel to the underside surface of a stair rail, the mounting block having a cylindrical cavity spaced from said surface of the block and having its axis extended in a plane parallel to the plane of said surface but transversely of the length of said surface, a tubular guide for a drill for drilling spindle-receiving apertures in a stair rail, a cylindrical support for said tubular guide, said cylindrical support being proportioned to fit coaxially within said cylindrical cavity of the mounting block and having an aperture extended transversely and diametrically through the cylindrical support for receiving the end of the tubular guide presented toward said planar surface of the mounting block, the cylindrical cavity in the mounting block having open regions toward opposite sides of the block for accommodating angular adjustment movements of the tubular drill guide with respect to the block, and releasable fastening means for securing the cylindrical support in said cylindrical cavity in different relative positions and thereby provide for alternatively fastening the tubular guide in different angular positions with respect to said surface of the mounting block.

4,793,748

## BORING TOOL FOR MACHINE TOOL

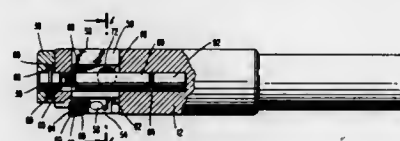
Roger J. Santi, Fond du Lac, Wis., assignor to AMCA International Corporation, Hanover, N.H.

Filed May 11, 1987, Ser. No. 48,569

Int. Cl.<sup>4</sup> B23B 117/18

U.S. Cl. 408—161

11 Claims



1. A boring tool for use in connection with a machine tool comprising:
- a tool body having a longitudinal opening, a longitudinal axis, and a slot positioned generally perpendicular to the longitudinal axis and having a predetermined cross-sectional shape;
  - a tool bar slidably situated in the slot, having a pair of ends, a cross-sectional shape which generally conforms to the predetermined cross-sectional shape, and an opening therethrough intermediate the ends, and carrying a cutting tool at one end thereof;
  - a member shaped to conform to the opening through the

- tool bar, having a splined surface, being retained in the opening such that the splined surface is exposed;
- a longitudinally adjustable wedge, self-reacting against the member, disposed in the longitudinal opening of the tool body, and having a splined surface engaging the splined surface of the member; and
- means for longitudinally adjusting the wedge relative to the tool body such that the longitudinal position of the wedge relative to the tool body determines the position of the tool bar in the transverse opening through the engaged splined surfaces of the wedge and the member, thereby positioning the cutting tool.

4,793,749

## PROCESS FOR EDGING METAL STRIP MATERIAL AND A LINEAR GUIDE THEREFOR

Rolf Julius, Wülfrath, Fed. Rep. of Germany, assignor to Julius Maschinenbau GmbH, Wülfrath, Fed. Rep. of Germany

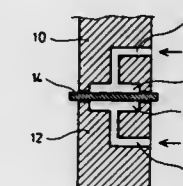
Filed Feb. 27, 1987, Ser. No. 20,112

Claims priority, application European Pat. Off., Feb. 28, 1986, 86102595.5

Int. Cl.<sup>4</sup> B23C 3/12

U.S. Cl. 409—132

20 Claims



1. A process for edging metal strip, especially nonferrous metal strip, by means of an edging machine, comprising the steps of:
- (a) longitudinally moving in a longitudinal direction and guiding metal strip between an upper and a lower linear guide, having a middle part, with tools for machining strip edges disposed in tandem in the direction of movement of the strip, laterally of the guides; and
  - (b) forcing a liquid under pressure between the metal strip and each linear guide from the middle part of the guide, at individual points spaced apart in the direction of movement.

4,793,750

## PRECISION ADJUSTMENT FOR A MACHINE TOOL, ESPECIALLY A BORING MACHINE OR THE LIKE

Otto Eckle, Loeckgau, Fed. Rep. of Germany, assignor to Komet Stahlhalter-und Werkzeugfabrik Robert Breunig GmbH, Besigheim, Fed. Rep. of Germany

Filed Sep. 17, 1987, Ser. No. 98,063

Claims priority, application Fed. Rep. of Germany, Oct. 16, 1986, 3635228

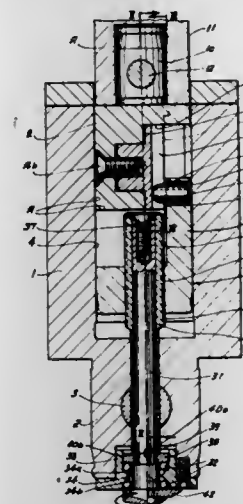
Int. Cl.<sup>4</sup> B23Q 3/12; B23B 39/00

U.S. Cl. 409—231

17 Claims

1. A precision adjustment head for a machine tool, especially a boring machine or the like, comprising a substantially cylindrical housing which can be connected to a spindle of a machine tool, a slide member radially displaceable in a radially extending guide of the housing on which a tool carrier can be fixed a positioning member axially displaceable in the housing and a positioning element fixed to the slide and having a groove running obliquely to the housing axis, said groove having a groove bottom forming base and sidewalls which divergently taper away therefrom, said groove receiving therein a projecting insert provided on the positioning member

- and tapering at its free end in correspondence with the taper of the sidewalls of the groove, and wherein means are provided



- for adjusting and fixing said insert relative to the positioning member perpendicular to the groove bottom.

4,793,751

## OPTI-MECHANICAL TORQUE INDICATING CONNECTING MEMBER

Hirotsato Takeuchi, Osahiko Miyazaki, Yasuo Kazama, and Naoya Kurihara, all of Tokyo, Japan, assignors to Nitto Kohki Co., Ltd., Japan

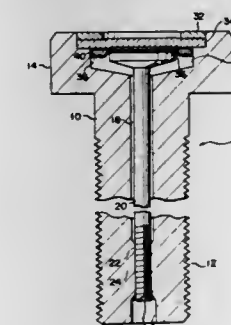
Filed Jul. 30, 1987, Ser. No. 79,431

Claims priority, application Japan, Sep. 29, 1986, 61-149091[U]

Int. Cl.<sup>4</sup> F16B 31/02

U.S. Cl. 411—13

6 Claims

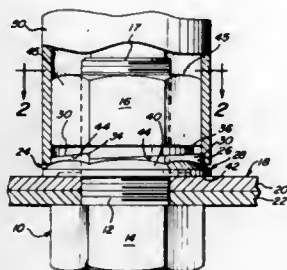


1. A connecting member for integrally connecting a plurality of independent members comprising:
- a rod-shaped body having a longitudinally extending containing hole having an inner surface which is opened at one end face thereof, and connecting means provided on an outer peripheral surface thereof so as to integrally connect said plurality of independent members;
  - a rod disposed in the containing hole of the body and fixed at one end thereof to the body so that an opposite end of the rod located nearer to the opened end of the containing hole is relatively moveable with respect to the inner surface of the containing hole of the body when a longitudinal strain is exerted upon the body;
  - a light transmissive window member fixed to and covering the open end of the containing hole of the body; and



fluid holding means provided within the containing hole of the body immediately behind a rear surface of said light transmissive window member for holding a substantially opaque fluid, said fluid holding means for causing a color change to be visibly perceptible through the light transmissive window member in response to a change in the amount of fluid held by said fluid holding means between the end of the open side of the rod and the rear surface of the light transmissive window member when a predetermined longitudinal strain is exerted upon the body due to said opposite end of the rod located nearer said open end of said containing hole being moved relative to the inner surface of the containing hole of the body, wherein the inner end of the rod is threadably engaged with the inner end of the containing hole of the body; and wherein the inner end of the rod is exposed at the other end of the body.

**4,793,752**  
**DRIVE-HEAD LOCK WASHER**  
Bengt O. Frieberg, Laguna Niguel, Calif., assignor to Permatite AB, Sweden  
Filed May 11, 1987, Ser. No. 48,235  
Int. Cl.<sup>4</sup> F16B 39/24  
U.S. Cl. 411-161

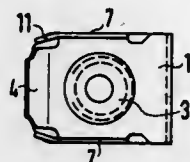


1. A wedge-action lock washer in combination with a threaded fastener, comprising:

- a fastener means having a threaded stud member, a fastener head formed at one end thereof, and a nut adapted to be threaded to said stud member, said fastener-head and said nut being formed having a plurality of wrench-engageable vertical side surfaces, wherein one surface of said nut includes a plurality of contiguous cam members;
- a one-piece wedge-action lock washer having a first body portion and an integrally formed second body portion, each of said body portions having a center bore disposed therethrough; said first body portion being formed to define a drive head having a plurality of contiguous cam members adapted to engage said cam members of said nut in a locking arrangement under force, and a plurality of wrench-engageable vertical side surfaces being formed to match and be aligned with said vertical side surfaces of said nut thereof; and said second body portion being defined by an enlarged radially extending flange member, said flange member having a substantially flat frictional engaging surface adapted to engage the surface of a work-piece to which is secured said threaded fastener.

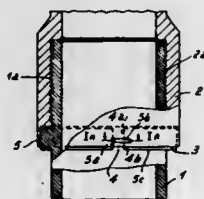
**4,793,753**  
**C-SHAPED SHEET-METAL NUT**  
Klaus Muller, Weil-Haltingen; Lothar Escher, Bad Bellingen; Gerhard Mack, Rheinfelden-Adelhausen, and Ernst Kramer, Iazlingen, all of Fed. Rep. of Germany, assignors to A. Raymond, Lorrach, Fed. Rep. of Germany  
Filed Dec. 3, 1986, Ser. No. 937,390  
Claims priority, application Fed. Rep. of Germany, Dec. 4, 1985, 3542841

Int. Cl.<sup>4</sup> F16B 39/28  
U.S. Cl. 411-175



1. A C-shaped sheet-metal nut comprising a thread leg having an embossed thread portion therein for receipt of a threaded member and a clip leg integrally connected at one end to one end of the thread leg to form the C-shaped nut, said clip leg having two lateral side edges and a through hole in line with the thread portion in the thread leg, said thread leg having two lateral side edges and a free end, an insertion plate that inclines forwardly and upwardly from said free end of the thread leg and having an upper edge and a pair of guide webs on the two lateral side edges of the thread leg that extend upwardly at right angles to the leg, said guide webs having upper edges that extend above the upper edge of the insertion plate and are parallel with the clip leg, forward edges that converge toward each other in the area near the insertion plate and outer side surfaces in line with the lateral side edges of the clip leg.

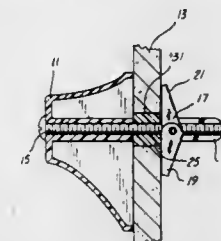
**4,793,754**  
**PROCESS FOR LOCKING TWO SCREWED ELEMENTS AND ELEMENTS FOR CARRYING OUT THIS PROCESS**  
Philippe Nobileau, Saint-Germain-E-Laye, France, assignor to Vetco Gray Inc., Houston, Tex.  
Filed Jul. 6, 1983, Ser. No. 511,205  
Claims priority, application France, Jul. 7, 1982, 82 11939  
Int. Cl.<sup>4</sup> F16B 39/32  
U.S. Cl. 411-186



1. A threaded connection integrally provided with an anti-unthreading lock, said threaded connection comprising:  
a first externally threaded connector;  
a second internally threaded connector;  
these two threaded connectors being constructed to be threadedly connected together until tight, and at such time to have means defining a surface portion of one of said connectors facially juxtaposed with means defining an angularly elongated slot formed in a marginal portion of the other of said connectors, near but spaced from an edge surface of the latter, said slot being bounded by a perimetrical surface.

means defining a recess in said surface portion means, said recess opening toward said other connector between said slot and said edge surface and having a first at least generally radially extending, angularly facing stop shoulder oriented to cooperate with a lock tang having a second oppositely angularly facing stop shoulder when such a lock tang is field-formed on said other connector and deformed into interfering relation with said recess;  
said marginal portion of said other connector, between said slot and said edge surface being constructed and arranged to be field-sheared crosswise to form a locking tang bounded by said perimetrical surface of said slot, by said edge surface and by a sheared end surface providing said second angularly facing stop shoulder and to have such locking tang then deformed into said recess and said first and second stop shoulders thereby into locking engagement.

**4,793,755**  
**DEVICE FOR USE WITH A TOGGLE BOLT**  
Russell L. Brown, 1620 Kingsbury La., Oklahoma City, Okla. 73116  
Continuation of Ser. No. 178,830, Aug. 18, 1980, Pat. No. 4,392,763. This application Mar. 18, 1983, Ser. No. 476,785  
The portion of the term of this patent subsequent to Jul. 12, 2000, has been disclaimed.  
Int. Cl.<sup>4</sup> F16B 21/00  
U.S. Cl. 411-342

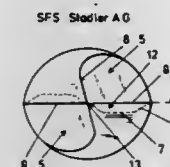


1. A securing device for fastening to a securing member of predetermined thickness through a hole of predetermined size in said securing member, comprising:

- a threaded bolt of predetermined diameter;
- a toggle threadable to said bolt having a pair of spring opened wings for expanding and bridging said hole and thereby anchoring said bolt to said securing member as said toggle is threadedly tightened by said bolt against said securing member;
- a spool for extending about said bolt in said hole in said securing member having a supportive axial length approximately equal to said predetermined thickness of said securing member for supporting said securing member to prevent said toggle from crushing said securing member, said spool having an axial opening through which said bolt can closely extend and a radial periphery for closely fitting within said hole in said securing member such that said bolt is radially fixed in said hole when said spool extends about said bolt in said hole;
- a cantilever guide leg for orienting and guiding said toggle with respect to said securing member as said toggle is threadably tightened against said securing member, said guide leg freely extending axially from the radial periphery of said spool such that said bolt extends parallel to said guide leg and such that said toggle is fixedly oriented between said guide leg and said bolt when said spool is positioned in said hole in said securing member and said bolt extends through said opening in said spool and said toggle is threadedly tightened against said securing member by said bolt;
- means for fixedly orienting said spool in said hole of said securing member such that said toggle is oriented with

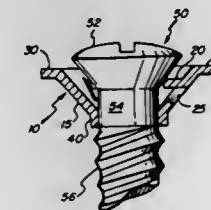
respect to said securing member as said toggle is threadedly tightened against said securing member when said spool is fixedly oriented in said hole; and  
means for changing the supportive axial length of said spool such that the length of said spool can be adjusted to fit securing members of differing thicknesses.

**4,793,756**  
**TAPPING SCREW**  
Albert Baumgartner, Kriessern, Switzerland, assignor to SFS Stadler AG, Heerbrugg, Switzerland  
Filed Oct. 14, 1986, Ser. No. 918,776  
Claims priority, application Austria, Oct. 24, 1985, 3082/85  
Int. Cl.<sup>4</sup> F16B 25/02  
U.S. Cl. 411-387



1. A tapping screw comprising a head, a self-tapping thread portion connected to the head and a drilling point connected to the thread portion, the drilling point defining a pair of approximately axially extending flutes located diametrically opposite each other relative to the screw axis and forming clearing surfaces and cutting surfaces, wherein the cutting surfaces end in cutting edges tapered toward the point of the screw and in lateral outer cutting knives parallel to the axis of the screw, and wherein, with respect to a plane extending through a cutting edge and a corresponding cutting knife, each flute defines an essentially concavely rearwardly arched indentation, wherein the improvement comprises that, immediately adjacent the cutting edges and cutting knives, the cutting surfaces have a convexly arched cross-sectional shape.

**4,793,757**  
**FINISHING WASHER**  
Francis C. Peterson, Woodbury, Conn., assignor to Buell Industries, Inc., Waterbury, Conn.  
Filed May 15, 1987, Ser. No. 49,944  
Int. Cl.<sup>4</sup> F16B 43/00  
U.S. Cl. 411-533



1. A screw assembly comprising a threaded screw and a finishing washer disposed between the uppermost threads of said screw and a frustoconical head of said screw, said finishing washer comprising a frustoconical perforated disk having a continuous horizontally oriented upper edge and a plurality of tabs extending inwardly only from said disk, said tabs defining openings in the side of said disk, wherein said tabs are shaped

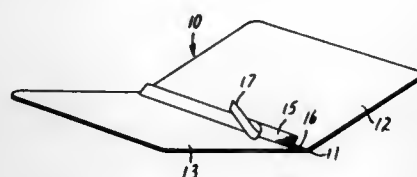
such that the internal sides of said frustoconical perforated disk are not contacted by the head of said screw.

**4,793,758**  
**COVER FOR BINDING SHEETS**  
Gary R. Hanson, Minneapolis; Ray A. Hunder, Birchwood, and George R. Rabuse, Sunfish Lake, all of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.

Filed May 19, 1986, Ser. No. 864,530  
The portion of the term of this patent subsequent to Jan. 16, 2004, has been disclaimed.  
Int. Cl. B42L 11/00

U.S. Cl. 412-4

11 Claims



1. A backing for binding loose sheets of known length, width and thickness disposed in a stack and having inside edges that are in parallel generally uniformly spaced relationship to expose from overlying sheets in the stack narrow side surface portions of the sheets adjacent said inside edges, said backing comprising a folded flexible cover sheet of cover stock having a fold line dividing said cover sheet into a front portion and a back portion, said back portion having a length not less than the corresponding size of the sheets to be bound and width not less than the width of the sheets to be bound plus an additional marginal space, and a longitudinal pressure-sensitive adhesive tape strip having opposite continuous longitudinal edges attached along less than one-half its width to said front portion of the cover sheet adjacent the said fold line, the unattached portion of said adhesive tape strip overlaying said front portion and being in contact with a release material from which release material the unattached portion of said adhesive tape strip may be removed and adhered over the narrow side surface portions the backing.

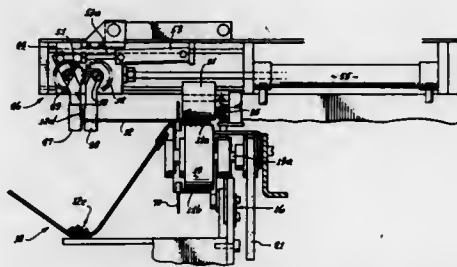
11. A method of binding loose pages of paper of known length, width and thickness, said method comprising the steps of:

- selecting a cover having a size to cover the pages to be bound and having a strip of pressure sensitive adhesive tape adhered along one edge adjacent to the central fold line thereof,
- removing a release liner from the pressure-sensitive tape, joggling the pages to be bound against a flat surface along the front left longitudinal edge,
- clamping the pages together along the opposite longitudinal edge,
- rolling the pages forward upon themselves, causing the unclamped longitudinal edges of the pages to become shingled,
- sliding the rolled pages along the inside of the cover up to the central fold line and beneath the free longitudinal edge of the tape, and
- pressing the tape into contact with the shingled edges of the pages.

**4,793,759**  
**WIRE STRAND STACKING METHOD**  
Jack L. Hoffa, Brea, Calif., assignor to Eshbanks Engineering Co., Moorpark, Calif.  
Division of Ser. No. 22,982, Mar. 6, 1987. This application Dec. 14, 1987, Ser. No. 132,430  
Int. Cl. B65H 39/06

U.S. Cl. 414-786

4 Claims

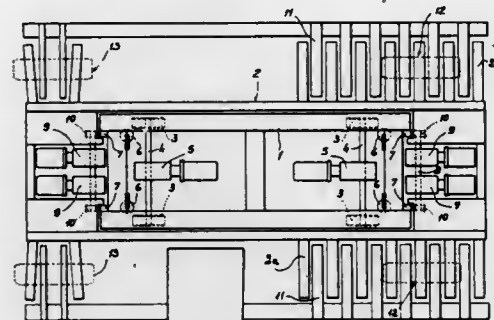


1. In the method of stacking a flexible strand, and employing conveyor means, and gripper means, the step that include:
  - (a) feeding the strand endwise onto an elongated endwise traveling stretch to be carried endwise on said stretch,
  - (b) causing the gripper means to grip a trailing portion of the strand as forward extent of the strand is carried endwise on the stretch, and
  - (c) effecting displacement of said gripper means to a position locating the gripped portion of the strand sufficiently out of alignment with the stretch that the strand is progressively pulled sidewardly off the stretch in response to endwise travel of the stretch relative to the strand,
  - (d) holding the strand to the traveling stretch to be endwise positioned for said gripping,
  - (e) and including providing barrier fingers traveling with said stretch for blocking sideward displacement off said stretch of strand length on the stretch.

**4,793,760**  
**AUTOMOBILE PARKING APPARATUS**  
Giovanni Valli, Via Lavizzari, 15, 22070, Rodero (Como), Italy  
Filed Feb. 9, 1987, Ser. No. 12,349  
Claims priority, application Italy, Feb. 13, 1986, 19390 A/86  
Int. Cl. E04H 6/06

U.S. Cl. 414-254

4 Claims



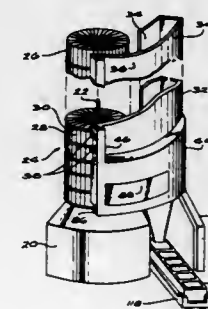
1. An automobile parking apparatus comprising:
  - a carriage for transporting automobiles between a deposition and retrieval station and a plurality of storage stations, said carriage being constituted by an inner frame and an outer frame,
  - a plurality of wheels on said inner frame carrying said carriage on rails,
  - a plurality of motors on said inner frame or driving said

wheels, said outer frame being shaped so that it does not overlie said inner frame, vertical displacement means for displacing said outer frame vertically with respect to said inner frame, automobile support means on said outer frame having comb-like teeth projecting from said outer frame for supporting the wheels of an automobile, said deposition and retrieval station and said storage station having automobile support means comprising a plurality of comb-like teeth between which said comb-like teeth of said outer frame automobile support means can pass as said outer frame is raised or lowered, whereby to enable said carriage to deposit an automobile on a fixed rack or to retrieve it therefrom by vertical lowering or raising displacement of said outer frame, said inner frame being provided with first wheels having a horizontal axis and second wheels having a vertical axis engaging with guide rails, wherein said first and second wheels of said inner frame are arranged in the region defined by said outer frame, said apparatus further including automobile centering means operating to align the longitudinal axis of an automobile with that of said carriage, said automobile centering means having a base frame supporting a front centering carriage and a rear centering carriage independently engageable by the front and rear wheels of an automobile on said centering means, each said centering carriage being independently laterally displaceable with respect to said base frame.

**4,793,761**  
**RAPID AUTOMATIC SLIDE RETRIEVAL DEVICE**  
Helman I. Stern, 1120 Monterey Ave., Berkeley, Calif. 94707  
Filed Mar. 9, 1987, Ser. No. 23,141  
Int. Cl. B65G 1/10

U.S. Cl. 414-331

9 Claims



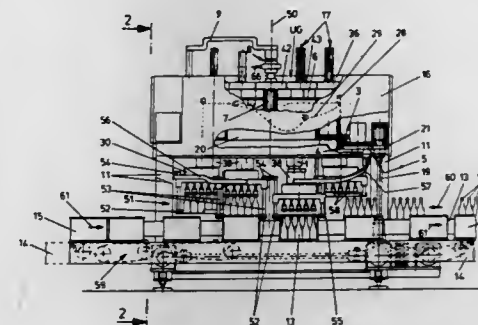
1. An apparatus for storage and radial discharge of selected like items, including,
  - A rotary storage device for storing a plurality of the selected like items at individual radial positions and with rotation of the storage device about a central axis providing for positioning of individual ones of the stored items for propelling outwardly individual ones of the stored items by centrifugal force as the storage device rotates about the central axis,
  - a plurality of retainer means individually coupled to individual ones of the plurality of stored items and with each retainer means each including a first position to retain a stored item and a second position to release a stored item, a retrieval mechanism to trigger individual ones of the retainer means to release individual ones of the stored items, a catcher to interrupt the propelled items along a substantially horizontal path and to direct the caught items along a substantially vertical path into a collector device, and
  - a controller responsive to the location of individual ones of the stored items for controlling the retrieval mechanism to

trigger the proper retainer means to allow the desired item to be released and propelled.

**4,793,762**  
**PACKING AND UNPACKING MACHINE**  
Karl Münch, Heppenheim, and Hans W. Holzer, Worms, both of Fed. Rep. of Germany, assignors to SEITZ ENZINGER NOLL Maschinenbau Aktiengesellschaft, Mannheim, Fed. Rep. of Germany  
Filed Jun. 19, 1987, Ser. No. 64,992  
Claims priority, application Fed. Rep. of Germany, Jun. 20, 1986, 3620717  
Int. Cl. B65G 65/00

U.S. Cl. 414-416

19 Claims



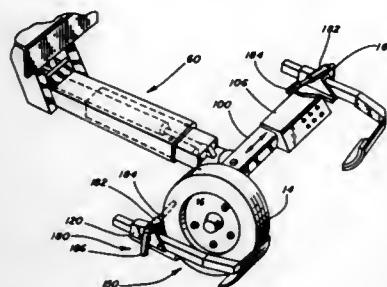
1. A machine for the packing or unpacking of articles into or out of containers, with said machine including a conversion mechanism, for said articles, that is associated with conveyer tracks for said articles and containers, with said conveyer tracks extending parallel to one another and leading to and away from the side of said machine; said conversion mechanism is provided with one or more transfer units that can be moved in a circular path, about a vertical central axis, into and out of the regions above said two conveyer tracks; each transfer unit includes a pick-up and carrier head on a support element that can be raised and lowered in a controlled manner within the appropriate region of said conveyer tracks; each pick-up and carrier head being movable about a vertical axis and being provided with means for receiving, transporting in a suspended manner, and depositing a group of articles associated with an accommodating space within a given container; each pick-up and carrier head is also provided with means for aligning a respective container; said machine further comprises:

a movement mechanism for producing a relative movement between said pick-up and carrier heads and their support elements having a rotational movement, with said relative movement being superimposed over the rotational movement of said support elements; said movement mechanism is embodied in such a way that during a respective rotation of said support elements in a circular path about said vertical central axis, said pick-up and carrier heads are moved in a common elliptical or elliptical-like overall path of revolution that has a major axis and a center point coinciding with and disposed on said vertical central axis; each pick-up and carrier head is moved about the vertical axis of movement thereof respectively such that a constant parallel position is maintained relative to said conveyer tracks, with the major axis of said overall path of revolution being disposed between said conveyer tracks and parallel thereto.



**4,793,763**  
**TOWING APPARATUS WITH FRONT STOP**  
 Leslie Buhk, Ontario, Canada, assignor to Vulcan Equipment Company Limited, Ontario, Canada  
 Continuation-in-part of Ser. No. 872,137, Jun. 6, 1986, which is a division of Ser. No. 752,980, Jul. 8, 1985, Pat. No. 4,637,623.  
 This application Jun. 17, 1987, Ser. No. 63,015  
 The portion of the term of this patent subsequent to Jan. 20, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> B60F 3/12  
 U.S. Cl. 414—563

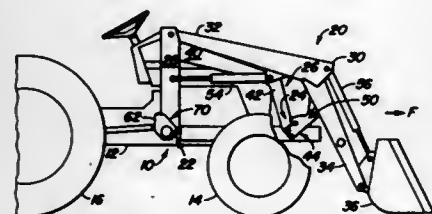
7 Claims



1. An apparatus for use in lifting and towing a vehicle, comprising:  
 a support beam positionable below said vehicle and having end portions positionable adjacent an opposed pair of wheels on said vehicle;  
 two wheel support members, each having an elongated arm and a wheel retainer;  
 two collars, each connected to one of the end portions of said support beam and each adapted to mount one of said wheel supports to said support beam in a vehicle lifting position; and  
 two rigid stop members each being selectively movable into an operative position above one of said end portions of said beam for preventing said pair of wheels from rolling over said support beam.

**4,793,764**  
**LOADER MOUNTING SYSTEM**  
 Nicholas Hamm, Vineland, Canada, assignor to Deere & Company, Moline, Ill.  
 Filed Jul. 15, 1987, Ser. No. 73,601  
 Int. Cl.<sup>4</sup> B66F 9/00  
 U.S. Cl. 414—686

18 Claims

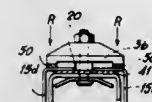
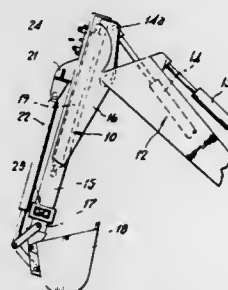


18. In a front end loader adapted for mounting on a framed vehicle such as a tractor, the loader including a mast having a rear upright mast post and a mast arm extending forwardly from the post, mounting and stand structure comprising:  
 a parking stand;  
 means pivotally connecting the stand to the forward end of the mast arm for rocking with respect to the mast arm

between a downwardly extending ground support position and an upwardly extending mounted position;  
 a rear support connected to the vehicle frame;  
 means for attaching the mast post to the rear support;  
 a front support connected to the vehicle frame;  
 means for rocking the mast between a parked position wherein the mast arm is supported on the ground from the parking stand when the stand is in the parking position, and an upward mounted position; and  
 means connected to the parking stand for securing the mast arm to the front support as the parking stand is rotated with respect to the mast arm from the ground support position to the upwardly extending mounted position.

**4,793,765**  
**MATERIAL HANDLING APPARATUS**  
 David S. Paul, Daley, and Richard S. Saunders, Sale, both of United Kingdom, assignors to Massey-Ferguson Services N.V., Netherlands Antilles  
 Filed Aug. 31, 1987, Ser. No. 91,180  
 Claims priority, application United Kingdom, Jul. 24, 1987, 8717654  
 Int. Cl.<sup>4</sup> B66C 23/00; B66F 9/00  
 U.S. Cl. 414—718

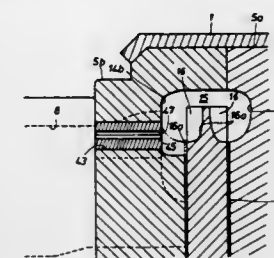
9 Claims



1. An extendable material handling arm for use in an industrial machine, the arm comprising an outer member having a slot extended along the length thereof, an inner member provided with material handling means adjacent one end, the inner member being encircled by the outer member for sliding therein, a first actuating means acting between the inner and outer members to vary the effective length of the arm and hold the arm at a selected length, a second actuating means acting between the inner member and the material handling means to move the material handling means relative to the inner member, a first support structure carried by the inner member adjacent the end thereof remote from the material handling means, the first support structure including a support means having a support surface for sliding contact with longitudinally extending portions of the outer member adjacent the slot, and securing means extending through said slot for securing the support means to the inner member for sliding movement therewith so that said remote end of the inner member is supported within said outer member by holding said portions of the outer member adjacent the slot between said support means support surface and a support surface on the inner member and clearance is left between the inner and outer members along side portions opposite and remote from the slot.

**4,793,766**  
**REGENERATIVE FUEL PUMP HAVING MEANS FOR REMOVING FUEL VAPOR**  
 Hirotaka Kumata, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Japan  
 Filed Mar. 3, 1988, Ser. No. 163,626  
 Claims priority, application Japan, Mar. 12, 1987, 62-57614  
 Int. Cl.<sup>4</sup> F04D 9/00  
 U.S. Cl. 415—53 T

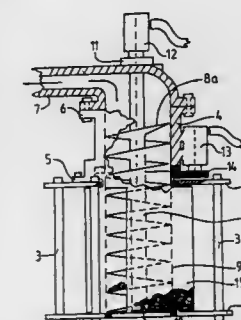
8 Claims



1. A regenerative fuel pump, comprising:  
 a pump rotor having a plurality of vanes along its periphery;  
 a pump housing accommodating the pump rotor in a rotatable manner;  
 a fluid inlet port provided in the pump housing along a longitudinal direction;  
 an arcuate fuel passage extending in the pump housing from the inlet port along the periphery of the pump rotor;  
 a fluid outlet port communicating with a terminal end of the arcuate fuel passage; and  
 a slot extending from the inlet port a certain distance into the arcuate fuel passage along an inner circumferential region thereof;  
 the slot extending longitudinally from the arcuate fuel passage to pump exterior through a substantially narrow path and circumferentially through a tortuous path.

**4,793,767**  
**DEVICE FOR PUMPING HIGHLY-VISCOUS MATERIAL, IN PARTICULAR THICK OIL**  
 Lars Lundin, Porvoo, Finland, assignor to Oy Lars Lundin Patent AB, Finland  
 PCT No. PCT/Fin86/00144, § 371 Date Oct. 8, 1987, § 102(e) Date Oct. 8, 1987, PCT Pub. No. WO87/03652, PCT Pub. Date Jun. 18, 1987  
 PCT Filed Dec. 10, 1986, Ser. No. 133,111  
 Claims priority, application Finland, Dec. 13, 1985, 854951  
 Int. Cl.<sup>4</sup> F04D 3/02  
 U.S. Cl. 415—62

7 Claims

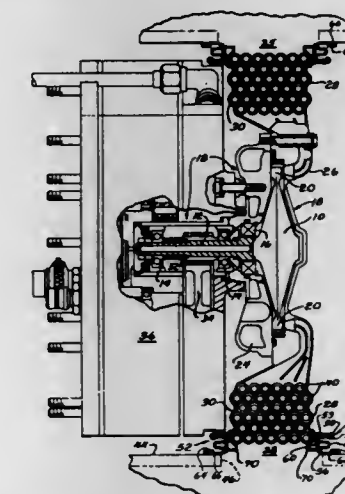


1. A device for pumping highly-viscous material, said device being adapted to at least partial immersion in said material and comprising a rotary helical screw, and a shell surrounding said screw and being partially open to permit entry of said material, said shell being adapted to rotate in an opposite direction with

respect to said screw, and provided with means for promoting feed of said material towards said screw wherein said feed promoting means comprises at least one vane attached to said shell and extending outwardly in a curved or inclined fashion so as to feed said material towards said shell as said shell rotates, and that in said shell at the foot of each feeding vane, on the collection side thereof, is an aperture for delivery of said material to said screw within said shell.

**4,793,768**  
**SEAL AND TURBINE MOUNT**  
 Jeffery Fairchild, Rockford; Anthony R. Smith, Roscoe, and Steven Heitz, Rockford, all of Ill., assignors to Sundstrand Corporation, Rockford, Ill.  
 Filed Dec. 27, 1985, Ser. No. 813,998  
 The portion of the term of this patent subsequent to Sep. 29, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> F01D 5/10  
 U.S. Cl. 415—119

18 Claims



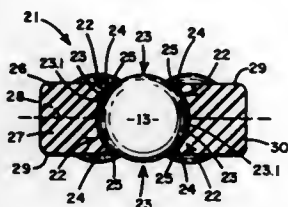
1. A power plant comprising a turbine wheel rotatable about an axis;  
 a transmission engaged with said turbine wheel;  
 a turbine housing containing and journailling said turbine wheel and having a radially directed peripheral outlet including two axially spaced side walls;  
 a tubular housing containing said turbine wheel, said transmission, and said turbine housing and including a radially inwardly opening port aligned with said outlet; and  
 elastomeric means of low stiffness mounted on said spaced side walls for (a) sealing said outlet to said port, and (b) serving as an engine mount for mounting said turbine housing, and thus said turbine wheel, to said tubular housing.

**4,793,769**  
**HOCKEY PUCK**  
 Michael Dolan, 203 - 14th Ave., NE., Minneapolis, Minn. 55413  
 Filed Mar. 3, 1988, Ser. No. 163,602  
 Int. Cl.<sup>4</sup> A63B 71/00  
 U.S. Cl. 273—128 R

7 Claims

1. A hockey puck, for use on a playing surface, comprising:  
 (a) a disk having a set of receptacles formed therein and, a pair of outer faces through which the receptacles open; and  
 (b) a set of bearings, each bearing freely rotatably mounted

in a receptacle, each bearing partially extending by a substantially equal distance from each said outer face, said



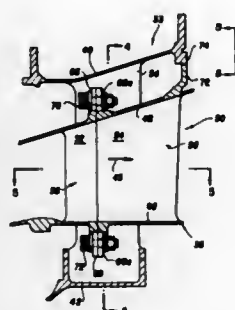
bearings supporting either outer face of said disk relative to said playing surface.

**4,793,770**  
**GAS TURBINE ENGINE FRAME ASSEMBLY**  
Roger W. Schonewald, Ipswich, and Albert A. Legault, Hamilton, both of Mass., assignors to General Electric Company, Lynn, Mass.

Filed Aug. 6, 1987, Ser. No. 82,409

Int. Cl.<sup>4</sup> F01D 9/04

U.S. Cl. 415—190



9. A fairing assembly for mounting onto a gas turbine frame to isolate the frame from hot flowpath gases, said fairing assembly comprising mating forward and aft annular sections, each section comprising an outer wall, an inner wall, a gas flowpath being defined between said inner and outer walls, a plurality of circumferentially-spaced hollow fairing struts radially extending between said inner and outer walls, and coupling means for matingly securing said annular sections together about the frame.

**4,793,771**  
**IMPELLER FOR SPHERICAL PUMPS**  
Karsten A. Laing, 1253 La Jolla Rancho Rd., La Jolla, Calif. 92037

Filed Nov. 9, 1987, Ser. No. 118,780

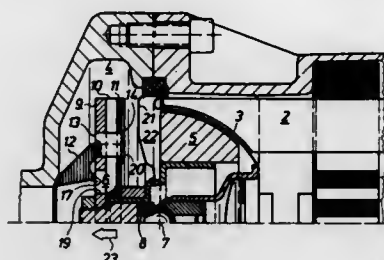
Int. Cl.<sup>4</sup> B63H 1/26

U.S. Cl. 415—206

2 Claims

1. Impeller with vanes and a shroud with a spherical eye portion for single stage centrifugal pumps which forms a rotatably mounted unit with a spherical armature of an electric motor, said unit being pivotably supported by a bearing consisting of a ball and a bearing cap permitting swivel movement, the weight of said impeller compensating the weight of said armature, characterized in that the impeller consists of an impeller wheel (11) with vanes (10), a disc (9) stamped out of sheet metal, said disc being centered on the armature (3) by a central hole and acting as a shroud forming radially extending channels (18) together with the impeller wheel (11) and the vanes (10), the weight of said disc (9) compensating the weight of the rotor (5), said disc (9) having a first circle of holes (19) as ports for the liquid conveyed through the channels (18), a

second outer circle of holes (24), and an inlet member (12) forming the spherical eye of the impeller, said inlet member (12) forming a unit with a number of protrusions (13) equally



distributed over its circumference, penetrating said holes (24) and congruently arranged holes (16) in the impeller wheel (11), said protrusions (13) having noses (14) which are driven into recesses (15) of the impeller (11) by snap action.

**4,793,772**  
**METHOD AND APPARATUS FOR COOLING A HIGH PRESSURE COMPRESSOR OF A GAS TURBINE ENGINE**  
Gerhard Zaehring, Woerthsee; Josef Wohlmut, Puchheim Bf., and Hans-Juergen Schmahl, Woerthsee, all of Fed. Rep. of Germany, assignors to MTU Motoren-Und Turbinen-Union Muenchen GmbH, Munich, Fed. Rep. of Germany

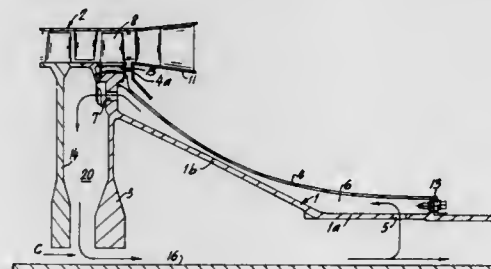
Filed Nov. 16, 1987, Ser. No. 120,991

Claims priority, application Fed. Rep. of Germany, Nov. 14, 1986, 3638961

Int. Cl.<sup>4</sup> F01D 5/08

U.S. Cl. 416—95

9 Claims



1. A gas turbine jet engine comprising a high pressure compressor including a rotor and a plurality of rotor discs secured for rotation with the rotor, each disc having an outer periphery and a plurality of rotor blades secured thereto, said blades having respective feet secured in said disc at said periphery thereof, said rotor comprising a hollow shaft including a conical section downstream of the last rotor disc of the high pressure compressor and means for cooling the high pressure compressor by supplying cooling air from a low pressure compressor, characterized as follows:

- a conical heat shield surrounding said conical section of the rotor to define a hollow, annular space therebetween, said heat shield having an upstream end connected to the last rotor disc of the compressor radially outwards of the conical section,
- said hollow shaft being provided with circumferentially distributed holes through which cooling air coming from the low pressure compressor can flow into said hollow annular space;
- said last rotor disc of the high pressure compressor being provided with holes proximate the outer periphery of the disc through which cooling air in said hollow space can flow;
- said annular heat shield covering the entire region at

which the feet of the blades are secured in the last rotor disc said heat shield including a portion which extends radially outwards of the feet of the blades.

**4,793,773**  
**MARINE PROPELLING APPARATUS**  
Sosuke Kinouchi, Kakogawa, and Hideto Yoshitake, Akashi, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

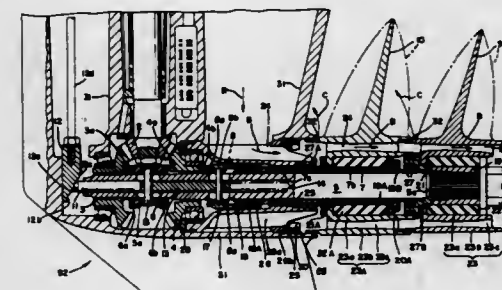
Filed Oct. 19, 1987, Ser. No. 110,203

Claims priority, application Japan, Oct. 20, 1986, 61-250026

Int. Cl.<sup>4</sup> B63H 5/10

U.S. Cl. 416—129

4 Claims



1. A marine propelling apparatus comprising:  
a housing having a front end and a rear end,  
a single vertical shaft rotatably journaled in said housing and adapted to be driven to rotate in one direction,  
a driving bevel gear secured to the lower end of said vertical shaft,  
a pair of first and second oppositely driven bevel gears journaled in said housing on a horizontal axis, said first gear being located forwardly from said second gear,  
said driven bevel gears being in driving mesh with said driving gear to rotate in opposite directions, and having axially inner teeth on their adjacent sides,  
said second driven bevel gear being located rearwardly from said first driven bevel gear and having axially outer teeth at its rear end,  
an outer hollow horizontal shaft journaled in said housing on said axis,  
an inner horizontal shaft journaled coaxially inside said outer shaft and extending rotatably through said driven bevel gears,  
a first propeller for rotation in opposite directions to exert forward and rearward drive thrusts, said first propeller being carried by said inner shaft adjacent said rear end,  
a second propeller for rotation in one direction to exert a forward drive thrust, said second propeller being carried by said outer shaft forwardly adjacent said first propeller,  
a first annular clutch supported around said inner horizontal shaft between said driven bevel gears in axially slidable and rotationally driving engagement with said inner shaft, said first annular clutch having teeth at both ends for alternative meshing with said inner teeth of one of said driven gears,  
a second annular clutch supported around said outer horizontal shaft rearwardly adjacent said second driven bevel gear in axially slidable and rotationally driving engagement with said outer shaft,  
said second annular clutch having teeth at its front end for meshing with said outer teeth of said second driven bevel gear, and  
slide means connected to said clutches to slide them together between first and second axially different positions,  
said first position being a forward drive position wherein said first annular clutch meshes with said first driven bevel gear while said second annular clutch meshes with said second driven bevel gear, whereby said first and second

propellers are driven through separate driven bevel gears and both propellers exert forward drive thrust and said second position being a rearward drive position wherein said first annular clutch meshes with said second bevel gear while said second annular clutch disengages from said second bevel gear, whereby only said first propeller is driven and exerts rearward drive thrust.

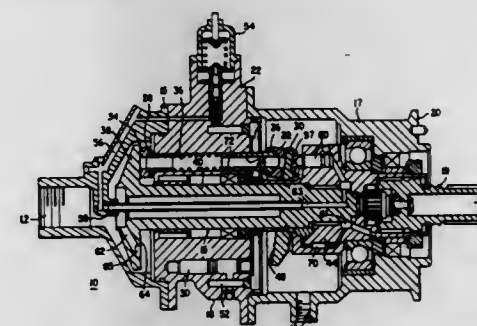
**4,793,774**  
**VARIABLE DISPLACEMENT HIGH PRESSURE PUMP**  
Howard J. Bradt, Whitesboro, and Steven B. Croke, Utica, both of N.Y., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Sep. 28, 1987, Ser. No. 101,892

Int. Cl.<sup>4</sup> F04B 23/10, 23/14, 1/28

U.S. Cl. 417—203

22 Claims



1. A variable displacement multiple piston pump having an inlet and an outlet disposed on a housing which includes a cylinder block with a plurality of cylinders each having a pumping piston which is caused to reciprocate by a swash plate disposed in a cavity and tiltable in response to outlet pressure to vary the stroke of the pumping piston to maintain the output pressure relatively constant, the improvement comprises:  
a longitudinally extending drive shaft extending through an opening in the swash plate and the cylinder block;  
swash plate connecting means for connecting the swash plate to one end of the drive shaft and transferring axially generated pumping forces to the drive shaft;  
a thrust plate attached to the other end of said drive shaft; transfer means disposed between said thrust plate and said cylinder block for transferring forces to the thrust plate and the attached drive shaft which are opposite the forces transferred to the drive shaft from the swash plate; and, mechanical seal means for preventing inlet fluid from filling the cavity in which the tiltable swash plate is disposed.

**4,793,775**  
**HERMETIC MOTOR-COMPRESSOR UNIT FOR REFRIGERATION CIRCUITS**  
Federigo Peruzzi, Turin, Italy, assignor to ASPERA S.R.L., Turin, Italy

Continuation of Ser. No. 893,554, filed as PCT EP85/00545 on Oct. 17, 1985, published as WO86/02703 on May 9, 1986, abandoned.

This application Feb. 16, 1988, Ser. No. 158,119  
Claims priority, application Italy, Oct. 13, 1984, 68088 A/84  
Int. Cl.<sup>4</sup> F04B 21/00, 17/00

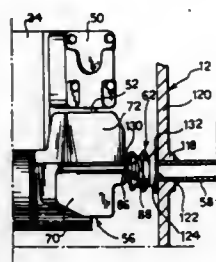
U.S. Cl. 417—312

1 Claim

1. Hermetic motor-compressor unit for refrigeration circuits and the like, of the type in which a sealed casing (10) is formed by upper and lower half-shells joined in a horizontal plane and encloses a volumetric motor-compressor (18) for the refrigerant fluid in which the motor-compressor rests on the bottom of the lower half-shell by means of suspension springs, and in which a pair of pipes terminate at the outside of the casing, one of which is a fluid intake pipe (58) opening into the casing (10) through a wall (120) of the lower half-shell and communicating



with an intake opening (94) of the motor-compressor, characterized in that the outlet of the intake pipe (58) into the lower half-shell is an orifice (124) in the wall (120) of the lower half-shell, and the intake opening (94) of the motor-compressor (1) is provided with a connector duct (56) which has an inlet aperture (86) facing the outlet orifice (124) of the intake pipe (58) and which carries a suction cup (62) having a peripheral



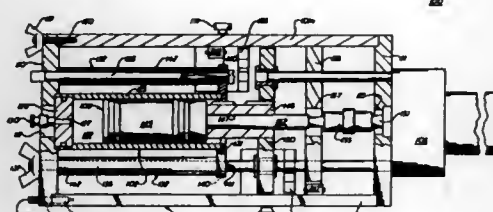
bellows-like skirt that is resiliently deformable in an axial sense, the bottom (128) of which communicates with the interior of the intake duct (56) and the edge (132) of which is pressed into resilient engagement with the inner surface of the wall (120) of the lower half-shell around the outlet orifice (124) whereby the bellows-like suction cup may be resiliently deformed in an axial sense under impact of inducted liquid to allow the liquid to drain into the lower half-shell.

4,793,776

**PUMP FOR OSCILLATING A FLUID IN VIVO**  
Johnson L. Thistle, SW. Rochester; Patrick E. Caskey, Rochester, and Wayne H. Fjerstad, Mantorville, all of Minn., assignors to Research Corporation, New York, N.Y.  
Division of Ser. No. 773,404, Sep. 6, 1985, Pat. No. 4,723,941.  
This application Dec. 8, 1987, Ser. No. 130,134

Int. Cl.<sup>4</sup> F04B 39/14  
U.S. Cl. 417—360

12 Claims



1. A pump for directing a fluid into and out from a body area, the pump comprising:
  - a support frame including
    - (i) a side section forming a front opening,
    - (ii) a front plate extending across the front opening and forming a pump inlet, and
    - (iii) means releasably connecting the front plate to the side section;
  - a cylinder for holding the fluid, located within the support frame and forming a fluid chamber in communication with the pump inlet;
  - a piston extending into the fluid chamber and supported for forward and rearward reciprocating movement therein, to inject fluid outward from the fluid chamber and into the body area and to aspirate fluid from the body area and inward into the fluid chamber;
  - power means supported by the frame and connected to the piston to reciprocate the piston in the fluid chamber;
  - means releasably connecting the cylinder to the support frame including

- (i) support means longitudinally extending rearward from the front plate, and
- (ii) a retaining plate supported by the support means, transversely extending across the cylinder, rearward thereof, and capturing the cylinder between the front plate and the retaining plate.

4,793,777

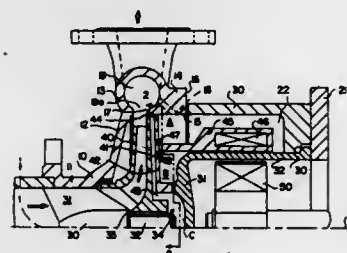
**CENTRIFUGAL PUMP WITH AUXILIARY IMPELLER OPERATIVELY ASSOCIATED WITH A PRIMARY IMPELLER TO BALANCE THE FORCES ON THE OPPOSITE SIDES THEREOF**

Ernst Hasenstein, Birkenweg 343, CH-4803 Vordenwald, Switzerland

Filed Mar. 18, 1987, Ser. No. 27,493  
Claims priority, application Switzerland, Mar. 21, 1986, 1160/86

Int. Cl.<sup>4</sup> F04B 17/00; F04D 29/66  
U.S. Cl. 417—365

6 Claims



1. A centrifugal pump which comprises
  - a pump casing which includes a first annular portion that defines a generally cylindrical intake duct and an axis through said pump casing; a second annular portion which extends outwardly from said first annular portion; a third annular portion which is located at an outer end of said second annular portion; and a fourth annular portion which extends from said third annular portion in parallel with said first annular portion, said fourth annular portion providing an annular inner surface and an annular end surface remote from said third annular portion, said fourth annular portion forming with said third annular portion an annular pressure chamber having an annular inlet mouth, said fourth annular portion also providing a plurality of circumferentially spaced control slots which communicate with said annular inlet mouth and a plurality of circumferentially spaced bores which extend from said annular pressure chamber to outlet openings in said inner surface of said fourth annular portion,
  - a motor casing which defines an annular end surface at one end thereof which is in abutment with said annular end surface of said fourth annular portion of said pump casing and an end wall at its opposite end, said motor casing and said pump casing together forming a housing,
  - a generally cap-shaped isolation shell having a head portion and a side portion mounted in said motor casing, said side portion being in contact with the end wall of said motor

casing and said head portion facing said intake duct of said pump casing,  
an inner magnet rotor rotatably mounted within said isolation shell,  
a bearing means located along said axis within said pump casing, said bearing means defining two end stops,  
a primary impeller rotatably mounted on said bearing means and axially movable therealong between said two end stops, said primary impeller, when rotated, causing fluid passing into said pump casing through said intake duct to be pressurized and delivered to said annular pressure chamber via said annular inlet mouth, and  
an auxiliary impeller rotatably mounted within said pump casing between said primary impeller and the head portion of said isolation shell and operatively connected with said primary impeller such that rotation of said auxiliary impeller will cause rotation of said primary impeller, said auxiliary impeller including an annular flange which extends outwardly of said side portion of said isolation shell and includes an outer magnet rotor, said auxiliary impeller being axially movable with said primary impeller, said auxiliary impeller and said primary impeller providing at least one radial relief channel therebetween which extends from an annular hub chamber between said primary impeller and the head portion of said isolation shell to a peripheral mouth located near said annular inner surface of said fourth annular portion and between said annular inlet mouth and said outlet openings of said bores; the flow of pressurized fluid from said annular pressure chamber through said bores and the flow of fluid from said hub chamber through said at least one radial relief channel to said annular pressure chamber via said control slots when said primary and auxiliary impellers are rotated creating a balancing of forces on opposite sides of the primary impeller such that it will remain positioned between said end stops of said bearing means.

curvature mantle runway and side parts with the housing as well as having an eccentric shaft passing therethrough and a triangular piston operable in a planetary movement upon an eccentric means of the eccentric shaft such that sealing parts of the triangular piston rotate in continuous sliding engagement along a mantle runway, the improvement therewith comprising that the eccentric shaft and the eccentric means thereof are constructed entirely hollow as subjected to a hydraulic pressure via deformation for higher material strength as well as torsional stiffness and rigidity so that walls of inner space of said eccentric shaft follow outer contour of said shaft and eccentric means thereof in a space relation to each other as constructed entirely hollow which simultaneously provides approximately one-eighth of the weight compared with a solid shaft of equal proportions and measurement; and

bearings cooled directly as located radially adjacent to said eccentric means of said shaft constructed entirely hollow and subjected to effects of fluid cooling medium that flows through the hollow shaft as well as eccentric means thereof, a tube being pressed into an open end of the eccentric shaft and being coaxial therewith such that said tube lengthens and extends said eccentric shaft beyond a shaft bearing therewith, said tube being arranged to receive circulating pumps as well as output gears for additional auxiliary devices employable therewith.

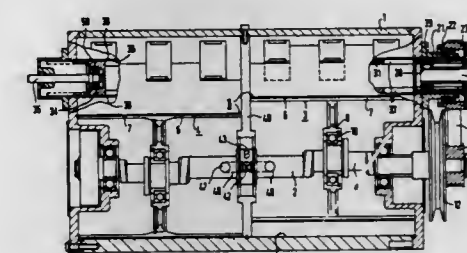
4,793,779

**ROTATING PISTON COMPRESSOR HAVING AN AXIALLY ADJUSTABLE ROTARY SLEEVE VALVE**  
Hans-Peter Schabert, Erlangen; Max Heller, Uttenreuth, and Klaus Zach, Erlangen, all of Fed. Rep. of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Filed Apr. 3, 1987, Ser. No. 35,501  
Claims priority, application Fed. Rep. of Germany, Apr. 4, 1986, 3611326

Int. Cl.<sup>4</sup> F04C 18/356, 29/08, 23/00  
U.S. Cl. 418—60

14 Claims



1. Rotating piston compressor, comprising a cylinder having inlet and outlet openings formed therein, a piston rotating in a given direction in said cylinder, a shaft supporting said piston and rotating in said given direction, a casing connected to said cylinder and having slits formed therein, a control device for controlling flow through said inlet opening in the form of a rotary slide disposed outside said cylinder in said casing, connecting means for connecting said shaft to a curved tooth coupling, said curved tooth coupling driving said rotary slide for connecting said rotary slide to said shaft for a rotational movement, and a pushrod coaxial to said coupling for adjusting the relative position of said rotary slide and said casing.

4,793,778

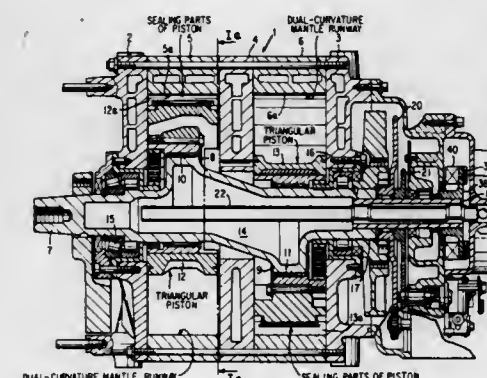
**ECCENTRIC SHAFT OF A ROTARY PISTON INTERNAL COMBUSTION ENGINE**

Dankwart Eiermann, Weissensberg, Fed. Rep. of Germany, assignor to Wankel GmbH, Berlin, Fed. Rep. of Germany  
Filed Jun. 19, 1986, Ser. No. 876,197

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1985, 3545820

Int. Cl.<sup>4</sup> F01C 1/22, 21/06; F16C 3/16; B23P 17/00  
U.S. Cl. 418—60

5 Claims

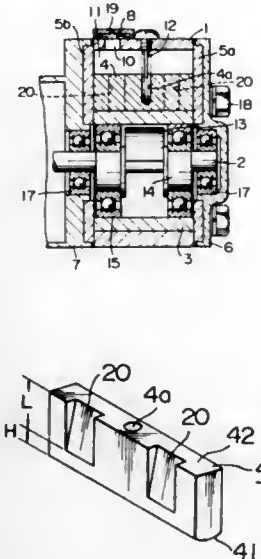


1. For a rotary piston internal combustion engine of trochoidal type of construction with a housing consisting of a dual-

4,793,780

**ROLLING PISTON TYPE ROTARY MACHINE WITH DISCHARGE PASSAGE IN VANE**  
 Nobuaki Ishihara, Kariya; Toshihiro Takei, Okazaki; Yoshiyuki Hattori, Toyonaka, and Koji Okazaki, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan  
 Division of Ser. No. 798,021, Nov. 14, 1985, Pat. No. 4,669,963.  
 This application Mar. 30, 1987, Ser. No. 32,026  
 Claims priority, application Japan, Nov. 15, 1984, 59-242069; Oct. 24, 1985, 60-237989; Oct. 24, 1985, 60-237990  
 Int. Cl.<sup>4</sup> F01C 1/356, 21/00  
 U.S. Cl. 418-65

5 Claims

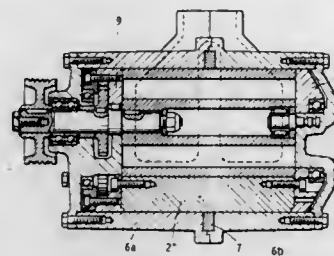


1. A rolling piston type rotary machine comprising:  
 a cylinder having a cylindrical inner peripheral surface,  
 a rotor disposed in said cylinder in eccentric relationship to the axis of said cylinder and mounted for revolution in rolling contact with said cylindrical inner peripheral surface of said cylinder,  
 said cylinder being formed therein with a vane chamber having an inner part open substantially radially in said cylindrical inner peripheral surface of said cylinder,  
 said cylinder and said rotor cooperating to define therebetween a generally crescent-shaped space movable about the axis of said cylinder by the revolution of said rotor,  
 a radially inwardly biased vane slidably mounted in said vane chamber and having an inner end in sliding contact with the outer peripheral surface of said rotor so that said vane is reciprocally moved as said rotor is revolved,  
 said vane dividing said crescent-shaped space into a suction chamber and a discharge chamber,  
 said vane chamber having an outer part into and out of which said vane is reciprocally moved,  
 said cylinder being further formed therein with a suction port adapted to be open to said suction chamber and a discharge port communicated with said outer part of said vane chamber,  
 said inner part of said vane chamber and said vane being so shaped as to define therebetween a substantially radial communication passage through which said discharge chamber is adapted to be communicated with said outer part of said vane chamber,  
 said communication passage being so arranged that the communication between said discharge chamber and said outer part of said vane chamber is interrupted at least

when the point of contact between said rotor and said inner peripheral surface of said cylinder reaches said vane, said vane being provided with at least one groove formed in a side of said vane,  
 said groove cooperating with a mating wall of said inner part of said vane chamber to provide said communication passage,  
 said groove being shaped such that the cross-section of said communication passage is gradually increased at a substantially constant rate as said vane is moved out of said outer part of said vane chamber.

4,793,781  
**EXTERNAL AND INTERNAL ROTOR MACHINE HAVING INTERNAL AXES AND CIRCUMFERENTIAL REINFORCEMENT WEB**  
 Felix Wankel, Fraunhoferstrasse 10 D-8990, Lindau, Fed. Rep. of Germany  
 Filed Jun. 10, 1987, Ser. No. 60,656  
 Claims priority, application Switzerland, Jun. 13, 1986, 02405/86  
 Int. Cl.<sup>4</sup> F01C 1/10, 21/08  
 U.S. Cl. 418-168

11 Claims



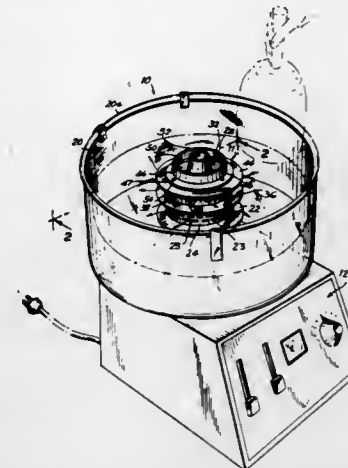
1. An internal axis single-rotation machine comprising:  
 an external rotor with an outer circumference and having end parts at each end thereof which axially close the external rotor, the external rotor having openings therein extending to the circumference;  
 an internal rotor located in the openings of the external rotor, the external rotor and internal rotor being adapted to reciprocally engage each other as each rotates to produce variable working spaces which extend to the circumference of the external rotor;  
 a casing about the internal and external rotors, said casing having inlet and outlet openings communicating with said working spaces through said openings in the circumference of the rotor; and  
 at least one circumferentially directed ring-like web about the external rotor to provide reinforcement therefor, the web being located between the end parts of the external rotor and projecting radially over the external rotor outer circumference.

4,793,782  
**COTTON CANDY MACHINE**  
 John T. Sullivan, Washington, D.C., assignor to Sells-Floto Inc., Washington, D.C.  
 Filed Dec. 17, 1986, Ser. No. 942,739  
 Int. Cl.<sup>4</sup> B29C 67/02  
 U.S. Cl. 425-7

10 Claims

1. A floss head assembly for use in a cotton candy machine comprising a first rotatably supported cotton candy chamber means for heating and dispensing melted sugar, said first chamber means including first port means for introducing sugar into said first chamber means, the first port means including a frusto-conical wall concentrically disposed about the axis of rotation of the support, second rotatably supported cotton candy chamber means separated from said first cotton candy

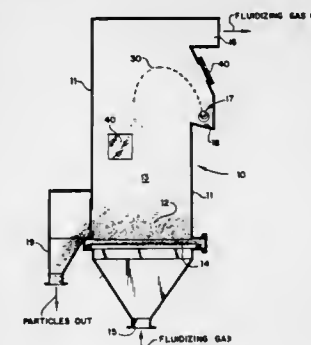
chamber means, said second chamber means including a second port means for introducing sugar into said second chamber means, said second port means having a conical wall concentrically disposed about the axis of rotation of the support and about said frusto-conical wall to define therebetween an opening to said second chamber means, said frusto-conical wall extending beyond the conical wall, a first annular stripe en-



hancer positioned intermediate said first and second chamber means and said first and second chamber means constructed and arranged to independently produce melted sugar which recrystallizes into confectionary fluff at the same time exteriorly of the respective chamber means so that said recrystallized confectionary fluff produced is striped when a first color sugar and a second color sugar are respectively introduced into said first and second chamber means.

4,793,783  
**APPARATUS FOR PRODUCING PRILLS**  
 A. Michael Huey, Lake Jackson, Tex.; Arthur R. Shirley, Jr., and Phillip A. Forsythe, both of Florence, Ala., assignors to The Dow Chemical Company, Midland, Mich.  
 Filed Jan. 20, 1987, Ser. No. 5,507  
 Int. Cl.<sup>4</sup> B22D 11/01  
 U.S. Cl. 425-10

8 Claims

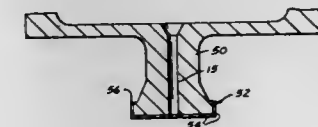


1. A prilling apparatus comprising:  
 (a) a housing with a top, bottom and side walls and defining interiorly thereof a chamber,  
 (b) a bed support member disposed within the housing and dividing the chamber into a fluidizing zone thereabove and fluidizing gas plenum therebeneath,  
 (c) the chamber including a spraying zone above the fluidizing zone,

(d) a fluidized bed of prills superadjacent to the bed support member,  
 (e) a means for supplying a cooling fluidizing gas into the fluidizing gas plenum to pass through the bed support member into the fluidizing zone to fluidize the bed of prills,  
 (f) a spray header assembly disposed in the chamber for spraying a stream of molten material into the chamber in the spraying zone above the fluidizing zone at an angle such that the individual streams first travel in a generally upwardly direction and then in a generally downwardly direction in the chamber and the streams are not contacting each other or the internal surfaces of the chamber, the spray header assembly disposed near at least one side wall of the chamber such that the spray is diverted into the cooling fluidizing gas passing from the fluidizing zone through the spraying zone and such that the spray droplets formed fall toward the fluidized bed of the chamber for a sufficient time to form prills upon contact with the fluidized bed, the spray header assembly including an elongated tubular header member with a flat surface along the longitudinal length of the tubular header member and a plurality of orifices disposed on the flat surface of the tubular header member along the longitudinal length of the tubular header member,  
 (g) a means for removing the fluidizing gas passing through the spraying zone, and  
 (h) a means for removing the prills from the fluidized bed.

4,793,784  
**APPARATUS FOR MAKING FOAMED ARTICLES**  
 Ernest L. Belleville, Barrington, N.H., and Patricia A. Betzig, Gainesville, Fla., assignors to Davidson Textron Inc., Dover, N.H.  
 Filed Oct. 14, 1987, Ser. No. 108,422  
 Int. Cl.<sup>4</sup> B29C 33/12  
 U.S. Cl. 425-111

7 Claims



1. An apparatus useful for molding a composite article having an outer layer and an insert with foam therebetween, comprising:  
 (a) a first mold member having a first surface defining a mold cavity for receiving the layer thereon,  
 (b) a second mold member having a second surface thereon generally contiguous with the first surface when the second mold member is in an open position for receiving and carrying thereon a portion of said layer extending from the first surface,  
 (c) a third mold member for positioning an insert in the cavity when the second mold member is in the open position with the insert spaced from the layer in the mold cavity,  
 (d) said second mold member being movable to a closed position between the first mold member and third mold member after the third mold member positions the insert in the mold cavity so as to move said portion of the layer thereon toward the insert positioned in the mold cavity and fold said portion of the layer onto the insert as a result



of said movement of said second mold member to said closed position, and  
(e) means for moving said second mold member between the open position and closed position.

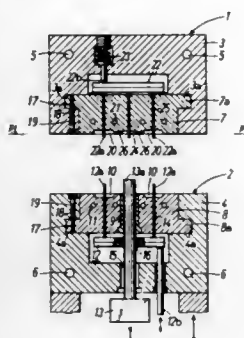
**4,793,785**  
**APPARATUS OF MULTIPLUNGER TYPE FOR**  
**ENCLOSING SEMICONDUCTOR ELEMENTS WITH**  
**RESIN**

Michio Osada, No. 6-197, 3-chome, Myojyo-cho, Uji-shi, Kyoto, Japan

Filed Apr. 6, 1987, Ser. No. 34,946  
Claims priority, application Japan, Apr. 11, 1986, 61-55057[U]; May 17, 1986, 61-113353  
Int. Cl.<sup>4</sup> B29C 45/02

U.S. Cl. 425—116

5 Claims



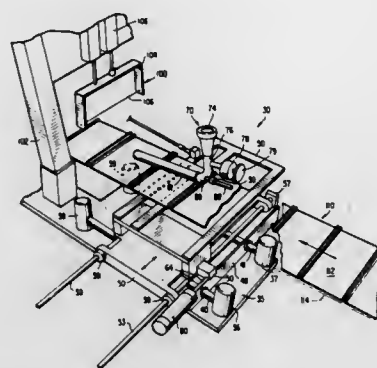
1. An apparatus of the multiplunger type for enclosing semiconductor elements with resin, suitable for producing wide variety of semiconductor devices in small quantities by exchanging components of the apparatus suitable for producing semiconductor devices of one kind for similar components suitable for producing of semiconductor devices of a different kind, said apparatus comprising a stationary die base, a movable die base opposed to the stationary die base, a stationary cavity block and a movable cavity block provided on the stationary die base and the movable die base, respectively, and opposed to each other, a plurality of pots formed in the lower one of the two cavity blocks, a plunger holder having plungers individually inserted in the pots, a plurality of cavities formed in each of the opposed surfaces of the two cavity blocks at the plane of parting line therebetween, culls formed in the other cavity block at the plane of the parting line and opposed to the pots, gates formed in the other cavity block and providing communication between each of the culls specified cavities in the other cavity block, two ejector plates having ejector pins for ejecting molded resin bodies from the cavities in the two cavity blocks and the culls, and heating means for the cavity blocks, said lower die base being provided with the plunger holder, and the apparatus further comprising means for removably mounting components comprising the stationary cavity block and the corresponding ejector plate with the ejector pins thereof as assembled with the stationary die base, so as to permit removal thereof from the stationary die base such that one or more of the stationary cavity block and the ejector plate with the said ejector pins thereof, can be exchanged relative to the stationary die base for a corresponding component or components suitable for producing a semiconductor device of a different kind, and means for removably mounting components comprising the movable cavity block, the plunger holder with the plungers thereof and the corresponding ejector plate with the ejector pins thereof, as assembled with the movable die base, so as to permit removal thereof from the movable die base such that one or more of the movable cavity block, the plunger holder with the plungers thereof, and the corresponding ejector plate with the ejector pins thereof, as assembled with the movable die base, can be exchanged relative to the

movable die base for a corresponding component or components suitable for producing a said semiconductor of a different kind.

**4,793,786**  
**EXTRUSION OF ARCULATE PRODUCTS**  
Eugene Greenhouse, Latham, N.Y., and Richard E. Durst, Austin, Tex., assignors to Perfect Products, Inc., Rancho Cucamonga, Calif.

Filed Nov. 7, 1986, Ser. No. 928,152  
Int. Cl.<sup>4</sup> A21C 11/16; B29C 47/34  
U.S. Cl. 425—131.1

16 Claims



1. Apparatus for extruding arcuate products comprising: conveyor means movable only continuously in a forward direction; extrusion means positioned a distance above said conveyor means for extruding a semi-solid extrudate stream in said forward direction and depositing said extrudate stream upon said conveyor means; cutoff means for severing said extrudate stream into individual products deposited upon said conveyor means; and drive means suitable for displacing said extrusion means for each of said products from a starting position transversely of said forward direction as said extrudate stream is extruded and deposited upon said conveyor means and for displacing said extrusion means transversely of said forward direction back to said starting position, said drive means being such as to time said transverse displacement back to said starting position that each of said products is deposited with its end on said conveyor means at a position corresponding to said starting position but displaced therefrom along the conveyor.

**4,793,787**  
**APPARATUS FOR THE PRODUCTION OF MAT WEBS**  
**FROM A MIXTURE OF GRANULES**

Konrad Schermatzki, Remseck, Fed. Rep. of Germany, assignor to Santrade Ltd., Lucerne, Switzerland

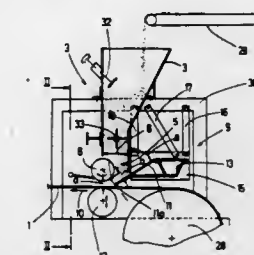
Filed Jan. 21, 1988, Ser. No. 146,602  
Claims priority, application Fed. Rep. of Germany, Jan. 30, 1987, 3702753

Int. Cl.<sup>4</sup> B28B 17/00  
U.S. Cl. 425—140

23 Claims

1. Apparatus for the production of mat-like webs from a layer of granules which is to be subjected to pressure and temperature while carried on a conveyor, said apparatus comprising: a conveyor belt for receiving a layer of granules and conveying such layer in a direction of conveyance, and feeder means for depositing the layer of granules on said belt, comprising: a granule hopper having a downwardly facing outlet, a draw-in roll mounted for rotation about an axis oriented

transversely relative to said direction of conveyance, said draw-in roll having a roughened peripheral surface and oriented beneath a portion of said outlet, said draw-in roll spaced above said belt to form therewith a first gap, a guide plate inclined relative to vertical and disposed beneath the remainder of said outlet and arranged opposite said draw-in roll such that granules from said hopper flow through a space formed between said draw-in roll and said guide plate, said draw-in roll



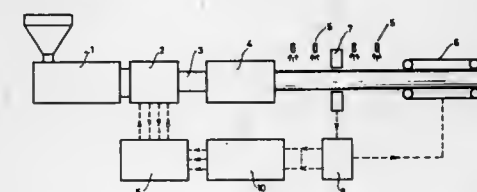
rotating in a direction to promote such flow, said guide plate including a lower free edge disposed below said draw-in roll and spaced therefrom to form a second gap, said second gap disposed upstream from said first gap with reference to the direction of granule flow and being larger than said first gap to supply excess granules to said first gap, and oscillating means for oscillating said guide plate transversely relative to said direction of conveyance to facilitate a back-flow of excess granules away from said second gap.

**4,793,788**  
**APPARATUS OF EXTRUDING A PLASTIC PIPE UNDER**  
**CONTROL OF THE WALL THICKNESS OF THE**  
**EXTRUDED PLASTIC PIPE**

Kees Börger, and Hans Overbeek, both of Hardenberg, Netherlands, assignors to Wavin b v, Zwolle, Netherlands  
Division of Ser. No. 885,073, Jul. 14, 1986, Pat. No. 4,749,531, which is a continuation of Ser. No. 686,535, Dec. 26, 1984, abandoned. This application Mar. 2, 1988, Ser. No. 162,977  
Claims priority, application Netherlands, Dec. 27, 1983, 8304451

Int. Cl.<sup>4</sup> B29C 47/86, 47/92  
U.S. Cl. 425—141

2 Claims



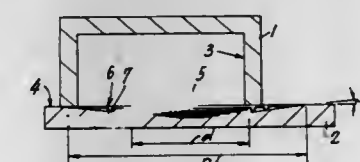
1. A pipe wall thickness controlling unit for use in an apparatus for extruding a solid rigid plastic pipe of a thermoplastic polymer and controlling the wall thickness of the extruded pipe, said apparatus comprising a comparator for comparing a wall thickness measuring value with another wall thickness value provided with a connection to a pipe wall thickness measuring device; a temperature control unit connected with said comparator and being provided with a connection to heating elements disposed about the circumference of the extrusion die moulding end part of an extrusion die of an extruder; said controlling unit comprising: a signal processing unit for processing wall thickness measuring data, a comparator element for comparing two values of wall

thickness measurement value averaging operations, one measurement averaging value obtained by averaging data of several wall thickness measurements in one measuring sector, and the other measurement averaging value by averaging data of wall thickness measurements in all measuring sectors; a temperature control unit connected with the comparator element and being provided with a connection to heating elements disposed in temperature-controlled sectors about the moulding end of an extrusion die of an extruder, said temperature control unit being of the type of controlling the temperature of said heating elements in the absence of cooling means in a temperature-controlled sector located in the axial extension of the one measuring sector aforementioned as a function of the difference observed so as to remove the difference measured, such that said heating elements only effect the temperature of a superficial layer of the plastic pipe body thus reducing or increasing the friction between the outside of the plastic pipe body and the opposite inner surface of the moulding end part, a too small wall thickness being increased by increasing the temperature and a too high wall thickness being decreased by decreasing the temperature in said temperature controlled sectors.

**4,793,789**  
**DOUGH-ROUNDING APPARATUS**  
Gerhard Müller, Asperg, Fed. Rep. of Germany, assignor to Werner & Pfleiderer GmbH, Stuttgart, Fed. Rep. of Germany  
Filed Nov. 17, 1987, Ser. No. 121,479  
Claims priority, application Fed. Rep. of Germany, Nov. 24, 1986, 3640051

Int. Cl.<sup>4</sup> A21C 7/00, 7/04  
U.S. Cl. 425—332

16 Claims



1. In a dough-rounding apparatus having first and second groups of elements which undergo revolving movements with respect to one another, the elements of one group having chambers for receiving pieces of dough, the elements of the other group being formed in a working surface by circular recesses which are opposite the chambers, the improvement comprising a limited region immediately adjacent to and surrounding each circular recess, said limited region having a broken, irregular formation in said working surface to provide a roughening thereof.

**4,793,790**  
**APPARATUS FOR SUPPORTING TUBULAR FILMS OF**  
**THERMOPLASTIC MATERIAL**

Klaus Reinhold, Krönerstrasse 3, D-4540 Lengerich i.W., Fed. Rep. of Germany

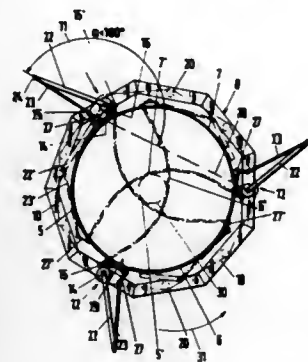
Filed Sep. 24, 1987, Ser. No. 100,797  
Claims priority, application Fed. Rep. of Germany, Oct. 1, 1986, 8626188

Int. Cl.<sup>4</sup> B29C 47/20  
U.S. Cl. 425—325

10 Claims

9. An apparatus for the external support of a tubular film of thermoplastic material issuing from an extruder, comprising a plurality of curved film supporting segments, said curved supporting segments being arranged in relation to each other so as to surround a tubular film issuing from said extruder, each supporting segment having a first end and a second end, a supporting frame for supporting said plurality of supporting

segments, a plurality of bar units on said supporting frame, each bar unit comprising a turning bar pivotally journaled in the supporting frame and a holding bar aligned parallel to and pivotally connected to said turning bar, and a connecting piece interconnected with said turning bar, the holding bar of one bar unit being directly connected to the first end of a supporting segment and the second end of the respective supporting

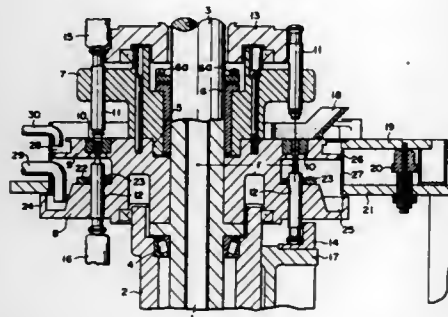


segment being connected to the connecting piece of a bar unit adjacent said one bar unit, each bar unit further comprising a boom connected to and extending outwardly from the turning bar of the bar unit and a link arm interconnecting the boom and the connecting piece of an adjacent bar unit, whereby adjustment of the bar units simultaneously and equally adjust the plurality of supporting segments to accommodate different tubular film diameters.

#### 4,793,791 ROTARY POWDER COMPRESSION MOLDING APPARATUS

Hiroshi Kokuryo, Osaka, Japan, assignor to Hata Iron Works, Ltd., Japan

Filed Apr. 6, 1987, Ser. No. 35,398  
Claims priority, application Japan, Apr. 8, 1986, 61-80455  
Int. Cl.<sup>4</sup> B29C 43/08  
U.S. Cl. 425-345



1. In a rotary powder compression molding apparatus, including a rotary disk rotated within a horizontal plane, said rotary disk being provided with a mortar mounting portion, an upper pestle guide portion arranged above said mortar mounting portion, and a lower pestle guide portion arranged below said mortar mounting portion, said mortar mounting portion being provided with a plurality of mortars arranged on an identical circumference of said mortar mounting portion, said upper pestle guide portion being adapted to guide a plurality of upper pestles, and said lower pestle guide portion being adapted to guide a plurality of lower pestles, wherein, the improvement comprises:

an annular vertical wall formed on a periphery of said lower pestle guide portion and extending upwardly therefrom,

said annular vertical wall being disposed outside said circumference;  
a first grooved powder trap portion formed inside said vertical wall and having a bottom; and  
a suction nozzle having a distal end opening adjacent said grooved powder trap portion bottom for drawing powder and air from said powder trap portion.

#### 4,793,792 REPRODUCTION MOLD FOR FORMING SUBSTRATE FOR RECORDING MEDIUM WITH INFORMATION SIGNAL RECORDED THEREON

Shoji Akino, Yokosuka, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 20, 1986, Ser. No. 932,519  
Claims priority, application Japan, Nov. 25, 1985, 60-262568  
Int. Cl.<sup>4</sup> B29C 59/00  
U.S. Cl. 425-385

1 Claim



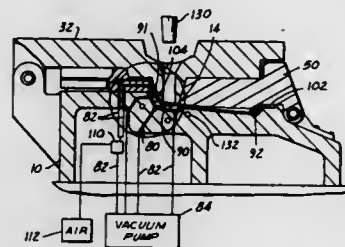
1. A precision recording mold having a surface bearing precise patterns for forming a substrate of a recording medium capable of recording information signals; said mold being principally composed of a material selected from the group consisting of nickel or a mixture of nickel and cobalt, wherein said surface having implanted therein titanium ions and ions selected from the group consisting of phosphorus ions, boron ions, carbon ions, nitrogen ions, oxygen ions and mixtures thereof.

#### 4,793,793 APPARATUS HAVING FLUID PRESSURE PLASTIC SKIN FOLDING MEANS FOR MAKING FOAMED ARTICLES

Harold W. Swenson, Dover, N.H., and Patricia A. Betzig, Gainesville, Fla., assignors to Davidson Textron Inc., Dover, N.H.

Filed Mar. 28, 1988, Ser. No. 174,212  
Int. Cl.<sup>4</sup> B29C 53/40, 65/70  
U.S. Cl. 425-503

13 Claims



1. An apparatus for molding a composite article having an outer layer and an insert with foam molded therebetween comprising:

- (a) a first mold means having a first surface defining a mold cavity for receiving and holding the layer,
- (b) second mold means having a second surface generally contiguous with the first surface for receiving thereon a portion of said layer extending from the first surface,
- (c) third mold means for positioning an insert in the mold cavity, with the insert spaced from the layer in the mold

cavity to define a molding space for molding said foam therein and with a surface on the insert adjacent said portion of the layer on the second surface, and  
(d) said second surface including means for directing fluid pressure against the portion of said layer thereon to fold said portion of the layer over the adjacent surface of the insert while said layer is held on said first surface.

#### 4,793,794 APPARATUS FOR THE MANUFACTURE OF PLASTIC PARTS BY INJECTION MOLDING OR REACTION INJECTION MOLDING

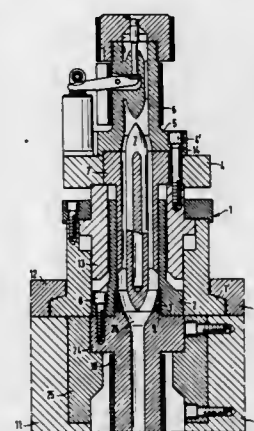
Hans-Heinrich Kaaden, Friedrich-Herschel-Strasse 5, 8000 Munich 80, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 865,197, Apr. 1, 1986, Pat. No. 4,753,592. This application Sep. 19, 1986, Ser. No. 909,841  
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1985, 3534252

Int. Cl.<sup>4</sup> B29C 45/30, 45/74

U.S. Cl. 425-549

16 Claims



1. A nozzle system for an apparatus used in the manufacture of plastic parts from thermoplastic, thermoset and/or elastomer material by injection molding or reaction injection molding, said apparatus having a multi-station locking unit of horizontal or vertical configuration adapted to hold a number of molds, an injection unit associated with said nozzle system for the simultaneous injection of the molds, a two-part movable center mold clamping plate sectioned crosswise relative to the locking direction, the two parts of said mold clamping plate being kept together by a high-speed clamping device and having a melt conduction system disposed between the two parts, the melt conduction system having one or a number of separate melt conduction rails, each being rigidly clamped at its face side between the sectioned mold clamping plate lengthwise relative to the direction of flow of the melt, and a median centering collar and a widened melt inlet with rounded side walls adapted to receive the nozzle system arranged on a flange of the melt conduction rail, said nozzle system comprising:

a cut-off nozzle system capable of being displaced within itself in the direction of injection, said cut-off system being rigidly mounted on the face side of the melt conduction rail, and a melt compensation system disposed within the melt conduction rail and associated with said cut-off nozzle system, wherein said melt compensation system is arranged in the end of the melt conduction rail opposing the melt inlet, said melt conduction rail ending outside a last pair of melt distributors viewed in the direction of flow of the melt, said melt compensation system further comprising a melt chamber with an associated hydraulic cylinder with a piston, a piston rod and a guide sleeve.

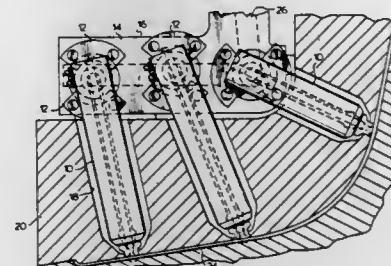
#### 4,793,795 INJECTION MOLDING SYSTEM HAVING CLAMPED ROTATABLE NOZZLES AND METHOD

Harald H. Schmidt; Jobst U. Gellert, both of Georgetown, and Rory McDowall, Acton, all of Canada, assignors to Mold-Masters Limited, Georgetown, Canada

Filed Dec. 7, 1987, Ser. No. 130,205  
Claims priority, application Canada, Oct. 16, 1987, 549516  
Int. Cl.<sup>4</sup> B29C 45/22

U.S. Cl. 425-549

4 Claims



1. In a multi-gate injection molding system having a plurality of heated nozzles extending from a common elongated manifold with a side surface, the manifold having a longitudinal melt bore extending from an outlet to a plurality of outlet bores, each outlet bore leading to an outlet on the side surface of the manifold, each nozzle having a forward end and a rear end, each nozzle being located with the forward end seated in a well in a core and having a melt channel extending to a central gate leading to a common cavity, the improvement wherein:

- (a) each nozzle has a side portion with a central face which projects sideways adjacent the rear end,
- (b) the melt channel of each nozzle has a lateral portion and a generally longitudinal portion, the lateral portion around a smoothly curved bend to the longitudinal portion, the longitudinal portion leading to the gate adjacent the forward end, and
- (c) clamping means to rotatably mount each nozzle to the manifold with the central face of the side portion of the nozzle abutting against the side surface of the manifold with the melt channel inlet in alignment with a respective one of the outlets from the manifold, the clamping means being operative to releasably secure the nozzle to the manifold in any desired angular position.

#### 4,793,796 APPARATUS FOR THE MANUFACTURE OF PLASTIC PARTS BY INJECTION MOLDING OR REACTION INJECTION MOLDING

Hans-Heinrich Kaaden, Friedrich-Herschel-Strasse 5, 8000 Munich 80, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 865,197, Apr. 1, 1986, Pat. No. 4,753,592. This application Sep. 19, 1986, Ser. No. 909,843  
Claims priority, application Fed. Rep. of Germany, Sep. 26, 1985, 3534255

Int. Cl.<sup>4</sup> B29C 45/70

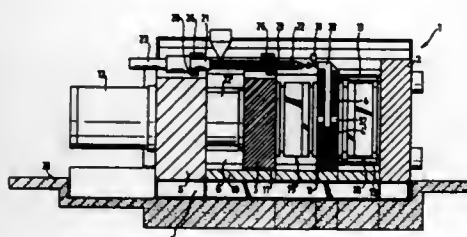
U.S. Cl. 425-572

4 Claims

1. In an apparatus for the manufacture of plastic parts from thermoplastic, thermoset and/or elastomer material, said apparatus having a multi-station locking unit adapted to hold a number of molds, an associated injection unit for the simultaneous injection of the molds, two outer mold clamping plates, one plate of which is disposed on guide elements and movable thereon in the locking direction, a center mold-holding assembly movably arranged in guide elements between the two mold clamping plates, the center mold-holding assembly being provided with a heatable melt conduction system with sprue nozzles and having a section of a mold attached to each of its two sides, the center mold-holding assembly having a mold



clamping plate having the melt conduction system arranged therein and separate driving cylinders being fastened on the mold clamping plate, the improvement comprising:



the mold clamping plate being sectioned crosswise to said locking direction into three parts with said melt conduction system being arranged in two parts between said three parts of said mold clamping plate.

4,793,797

#### METHOD OF CATALYTIC COMBUSTION USING HEAT-RESISTANT CATALYST

Akira Kato; Hisao Yamashita; Hiroshi Kawagoshi, all of Hitachi; Noriko Watanabe, Mito, and Shinpei Matsuda, Tokai, all of Japan, assignors to Hitachi, Ltd. and Babcock-Hitachi Kabushiki Kaisha, both of Tokyo, Japan

Filed Sep. 10, 1987, Ser. No. 95,617

Claims priority, application Japan, Sep. 10, 1986, 61-211659; Mar. 6, 1987, 62-50067

Int. Cl.<sup>4</sup> F23D 3/40

U.S. Cl. 431-7

9 Claims

1. A method of catalytic combustion which comprises contacting a hydrocarbon gas fuel at a temperature of 800° to 1500° C. in the presence of oxygen with a heat-resistant catalyst comprised of at least one heat-resistant inorganic carrier selected from the group consisting of oxides, carbides and nitrides of elements belonging to Groups IIa, IIIa and IV of the Periodic Table, particles of at least one catalytically active component selected from the group consisting of platinum, palladium, rhodium and ruthenium dispersed and carried on said carrier, and particles of an oxide of at least one base metal selected from the group consisting of magnesium, manganese, nickel, cobalt, strontium, niobium, zinc, tin, chromium, and zirconium dispersed on said particles of catalytically active component, wherein the atomic ratio of said base metal to said catalytically active component is 0.1 to 10.

4,793,798

#### BURNER APPARATUS

Darrel B. Sabia, 2800 N. First St., Martin, Ohio 43445

Continuation-in-part of Ser. No. 894,795, Aug. 8, 1986, abandoned. This application Jan. 27, 1987, Ser. No. 7,005

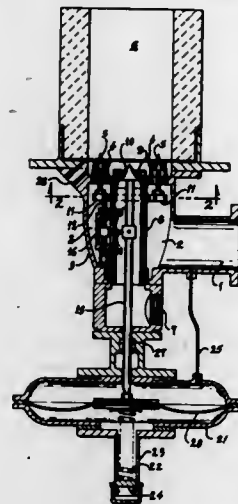
Int. Cl.<sup>4</sup> F23N 1/02

U.S. Cl. 431-90

14 Claims

1. An improved burner apparatus comprising, in combination, a combustion air conduit, a fuel gas conduit, a first nozzle valve means in communication with said air conduit, a second nozzle valve means in communication with said fuel gas conduit, drive means, operatively connected to both said first nozzle valve means and said second nozzle valve means, for positioning said first and second nozzle valve means in direct proportion to one another, control means operatively connected to said drive means for moving said drive means, and sensing means for communicating the pressure of the combustion

air present in said combustion air conduit to said control means, whereby the drive means moves said first nozzle valve



means and said second nozzle valve means jointly upon movement of said drive means.

4,793,799

#### PHOTOVOLTAIC CONTROL SYSTEM

Mark K. Goldstein, La Jolla, and Earl M. Dolnick, Encinitas, both of Calif., assignors to Quantum Group, Inc., San Diego, Calif.

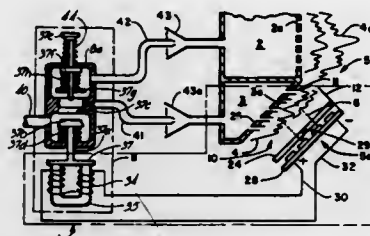
Continuation of Ser. No. 659,074, Oct. 5, 1984, abandoned, which is a continuation-in-part of Ser. No. 517,699, Jul. 25, 1983, abandoned. This application May 11, 1987, Ser. No. 48,961

Claims priority, application PCT Int'l Appl., Jul. 3, 1984, PCT/US84/01038

Int. Cl.<sup>4</sup> F23N 5/08

U.S. Cl. 431-79

25 Claims



1. Self-contained apparatus for controlling burning of a fuel in a burner comprising:

- a burner;
- controller means for controlling burning of fuel in the burner;
- an emissive surface heated by burning of fuel in the burner; and
- photovoltaic means connected to the controller means for receiving electromagnetic radiation from the emissive surface and for generating sufficient electric current and voltage from such radiation for operating the controller means with no other source of electric power.

4,793,800

#### GAS WATER HEATER/BOILER

William L. Vallett, Old Hickory, and Mohsen Sarfehjo, Nashville, both of Tenn., assignors to Lochivar Water Heater Corporation, Nashville, Tenn.

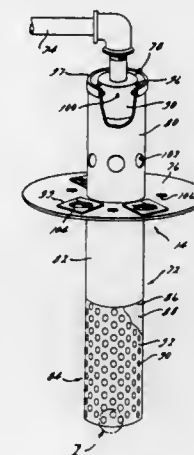
Continuation of Ser. No. 824,168, Jan. 10, 1986, Pat. No. 4,723,513. This application Aug. 7, 1987, Ser. No. 83,515

The portion of the term of this patent subsequent to Feb. 9, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> F23D 14/12

U.S. Cl. 431-328

15 Claims



1. A gas-fired burner tube for a water heater/boiler apparatus comprising an inner tube having a plurality of first perforations and an outer tube superimposed over said inner tube, said outer tube having a plurality of second perforations which are substantially larger than said first perforations, with more than one of said first perforations at least partially underlying each second perforation, said superimposed inner and outer tubes arranged to increase the thickness of said burner tube and to cover a portion of said first perforations.

4,793,801

#### METHOD FOR RETAINING THE CONFIGURATION OF AN APERTURE FORMED THROUGH A COIL

Thomas J. Roman, Prophetstown, Ill., and Michael A. Ringle, Bettendorf, Iowa, assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Aug. 24, 1987, Ser. No. 88,296

Int. Cl.<sup>4</sup> F27D 5/00; C21D 9/00

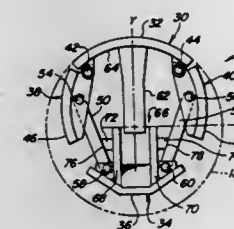
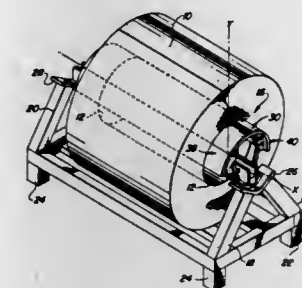
U.S. Cl. 432-5

5 Claims

1. A method of retaining the configuration of an aperture formed through a coil when said coil is supported on a saddle having a pair of spaced apart upstanding legs by using an apparatus having a first member and a second member, said second member having a length sufficient to extend beyond opposite sides of said coil when said aperture lies in a horizontal plane, a pair of arms pivotally attached to said first member and means for joining said pair of arms to said second member, said means enabling said arms to move between a first position in which said arms are spaced apart from the perimeter of said aperture when said second member is not in contact with said saddle and a second position in which said arms cooperate with said first member to support said coil when said second member is in contact with said saddle, said method comprising the steps of:

- (a) positioning a lifting mechanism into said apparatus and moving said apparatus into alignment with an aperture formed in a coil;
- (b) inserting said apparatus into said aperture with said arms being in their first position;
- (c) positioning said coil on said saddle with said second

member spanning said pair of upstanding legs and lowering said coil to cause said second member to contact said



pair of legs and move said arms to said second position; and  
(d) removing said lifting mechanism from said aperture.

4,793,802

#### CIRCULATING GAS OVEN FOR HEATING FIBER REINFORCED THERMOPLASTIC RESIN SHEETS

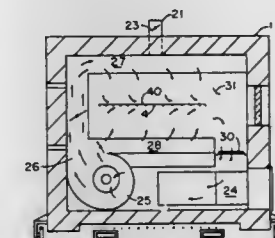
Timothy E. Chlva, Utica, Mich., assignor to Azdel, Inc., Shelby, N.C.

Continuation of Ser. No. 937,798, Dec. 4, 1986, abandoned. This application Nov. 20, 1987, Ser. No. 123,413

Int. Cl.<sup>4</sup> F27B 9/28; F23G 3/00

U.S. Cl. 432-59

2 Claims

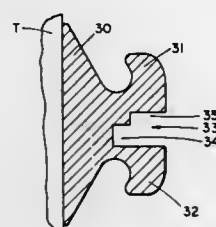


1. A circulating gas oven suitable for heating sheets of fiber reinforced thermoplastic resin with hot gases to temperatures sufficient to render the resin in the sheets flowable but below the decomposition temperature of the resin comprising:

- a gas plenum having an outlet and an inlet,
- a heater means to heat all gases passed into said gas plenum through said inlet,
- a chamber connected to the plenum to which all gases from the gas plenum are passed, said chamber having a first opening at one end thereof through which an endless belt passes and a second opening opposite said first opening through which the endless belt passes out of the oven,
- an endless belt, means to pass said endless belt through said first and second openings continuously and constructed so that sheets of fiber glass reinforced thermoplastic material

contained thereon will have their surfaces above and below the belt exposed to circulating hot gases, means in said chamber dividing gases fed from the plenum to the chamber into a lower and an upper stream, the lower stream passing upwardly against the undersurface of said endless belt and the upper stream passes downwardly onto the surface of the endless belt to thereby contact the thermoplastic resin sheet on said endless belt with hot gases on both their upper and lower surfaces, means to remove all gases from the chamber through a common passage in which is located a filter interposed between exiting gases from the chamber and the heating means, means to pass all gases passing through the filter to the heating means and from the heating means to the gas plenum.

side walls and opening away from and in a direction substantially perpendicular to said outer tooth surface, at least one of



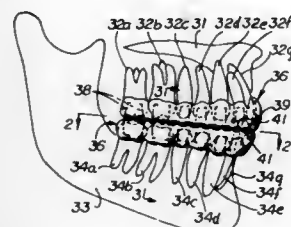
said side walls being of stepped configuration so that said channel defines at least two adjacent slots of different widths.

#### 4,793,803 REMOVABLE TOOTH POSITIONING APPLIANCE AND METHOD

Martin G. Martz, 215 S. Monarch St., Aspen, Colo. 81611  
Filed Oct. 8, 1987, Ser. No. 105,914  
Int. Cl.<sup>4</sup> A61C 7/00

U.S. Cl. 433—6

44 Claims



1. An appliance for orthodonture characterized in that at least most of said appliance may be installed and removed by the patient as required, said appliance comprising

- a tooth clasp portion having individual clasps shaped to grip individual teeth while in malocclusion positions and being relatively rigid,
- a resilient intermediate portion overlying and fixed to said tooth clasp portion,
- a backbone portion of construction more rigid than said intermediate portion fixed to said intermediate portion and shaped to stress said intermediate portion so as to bias said clasp portion from an initial malocclusion position toward a desired ideal position,
- said tooth clasp portion, said intermediate portion and said backbone portion being contained within a single appliance shaped to fit upon at least a portion of one jaw of a patient.

4,793,804  
ORTHODONTIC BRACKET  
George F. Schudy, 909 Dairy Ashford, Suite 201, Houston, Tex. 77079  
Filed Sep. 14, 1987, Ser. No. 95,859  
Int. Cl.<sup>4</sup> A61C 7/00

U.S. Cl. 433—8

10 Claims

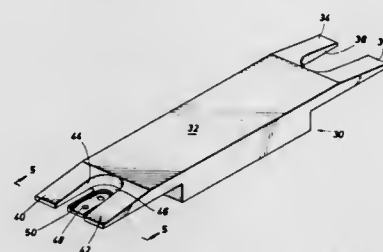
1. An orthodontic bracket of the edgewise type for cooperation with at least one rectangular cross-sectioned arch wire comprising: a base portion adapted for attachment to the outer surface of a tooth; first and second wing portions projecting outwardly from said base portion; and a channel formed between said wing portions for receiving said arch wire, said channel having a bottom adjacent said base portion, having

#### 4,793,805 APPARATUS AND METHOD FOR FORMING SHADE SAMPLES

Evard M. Pitre, 2611 Tangley, Houston, Tex. 77005  
Continuation-in-part of Ser. No. 766,895, Aug. 16, 1985, abandoned. This application Aug. 26, 1986, Ser. No. 900,373  
Int. Cl.<sup>4</sup> A61C 19/10

U.S. Cl. 433—26

6 Claims



1. A method of forming a shade tab comprising the following steps:

- a. providing a former body including a recess between two opposed arms thereof, and having a shelf facing into said recess wherein said shelf has at least one hole;
- b. mounting a base on said shelf within the lateral confines of said recess, and anchoring said base to said shelf by at least one post positioned within a respective hole in said shelf;
- c. positioning opaque ceramic material on said base generally within the confines of said recess;
- d. positioning finish ceramic material on said opaque ceramic material;
- e. removing said base, with said opaque and finish ceramic material, from said recess; and
- f. firing said tab.

4,793,806  
DENTAL DOWEL PIN  
Paul Elledge, 1718 Salem, Deer Park, Tex. 77536  
Filed Apr. 29, 1987, Ser. No. 43,744  
Int. Cl.<sup>4</sup> A61C 19/00

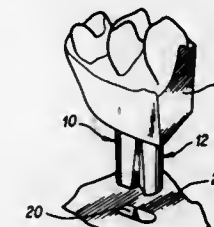
U.S. Cl. 433—74

10 Claims

1. A dental dowel pin comprising:  
a shank defining a generally rectangular solid member having substantially parallel side walls joined to shorter end walls to form a shank periphery of substantially oval cross-section;  
a plurality of inverse angular channels in said shank periphery;

one said channel in each said side wall adjacent respective opposite ones of said end walls; and,

ery and interruption of electrical power to the heat sink thereby to maintain the temperature of the heat sink within a predetermined temperature range.



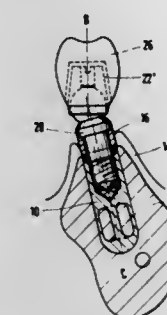
said channels being on opposite sides of a transverse center line bisecting said side walls.

4,793,808  
ENOSSAL IMPLANT  
Axel Kirsch, P.O. Box 11 68, 7024 Filderstadt 4, Fed. Rep. of Germany  
Filed May 22, 1986, Ser. No. 865,680  
Claims priority, application Fed. Rep. of Germany, Sep. 3, 1985, 3531389

U.S. Cl. 433—173

Int. Cl.<sup>4</sup> A61C 8/00

8 Claims



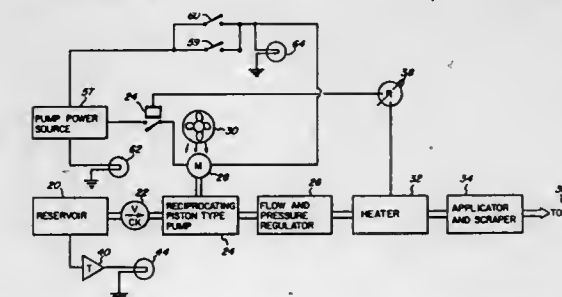
4,793,807  
METHOD FOR SUPPLYING A HEATED LIQUID  
Aaron Friedman, Wethersfield, and H. Gordon Minns, Suffield, both of Conn., assignors to National Patent Dental Products, Inc., New Brunswick, N.J.

Continuation of Ser. No. 827,793, Feb. 6, 1986, Pat. No. 4,699,589. This application Jun. 17, 1987, Ser. No. 63,646  
The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> A61G 17/02

U.S. Cl. 433—80

5 Claims



1. A method for heating a solution for the treatment of dental caries of plaque to a temperature which is at or near the normal temperature of the human body, said method comprising

withdrawing said solution from a stock thereof which is at ambient temperature and passing it as a pulsating pressurized flow thereof in a closed delivery course through a heat sink receiving and storing heat from an electrically powered heating source which is remote from said closed delivery course, said heat sink having a heat capacity such that the heat sink temperature remains relatively constant both when the heat source has electrical power delivered thereto and when delivery of electrical power is interrupted so that heat stored in the heat sink transfers to the solution to raise its temperature from that at inlet to the heat sink to that higher temperature at or near normal body temperature upon its outlet from the heat sink, and sensing the temperature of the heat sink at the location at which the solution outlets therefrom to control the deliv-

1. An enossal implant for removably fastening a removable tooth replacement comprising a base body, and an implant post for connection to said base body and for providing a connection for said tooth replacement, wherein the improvement comprises:

said base body:

- (a) being substantially rigid and elongated;
- (b) having a closed bottom and an open top;
- (c) defining a recess therein;
- (d) defining shoulder means at said top and adjacent said open top for receiving mating shoulder means; and
- (e) having internal thread means in said recess adjacent said bottom;

there being further provided:

spacer means:

- (a) which are substantially cylindrical, hollow and have first and second spaced ends;
- (1) said first end constructed for engagement by an implant post; and
- (2) said second end defining shoulder means for mating engagement with said shoulder means on said base body; and

(b) being removably mounted on said base body; said implant post being an elongated member constructed to fit within and extend from said base body and spacer means, said implant post defining a tooth replacement fastening head and cushion means for cushioning forces applied thereto, said post:

- (a) having an elongated body threaded at one end for engagement with said base body threads;
- (b) defining a fastening head at the other end of the post body;
- (c) defining spacer means engaging shoulder means for engaging the first end of said spacer means and urging said spacer means into engagement with said base body and for capturing said spacer means between the base body and the implant shoulder means; and
- (d) having cushioning means between said fastening head and threads for cushioning forces applied to said post.



4,793,809

## FIBER FILLED DENTAL PORCELAIN

Mark A. Sigler, Kansas City, Kans.; Timothy J. Sigler, St. Joseph, and Delbert E. Day, Rolla, both of Mo., assignors to Myron International, Inc., Kansas City, Kans.

Filed May 21, 1987, Ser. No. 52,843

Int. Cl. A61C 5/08

U.S. Cl. 433-218

8 Claims

1. A dental restoration comprising a porcelain body selected from the group consisting of inlays, onlays, crowns and pontics having at least a core portion thereof formed of fused dental porcelain having a total fiber content of from about 1 to 4% by weight based upon the weight of the core portion and dispersed in the core portion, at least 25% by weight of said total fiber content being zirconium oxide ceramic fibers having a zirconium oxide content of at least about 50% by weight, said dental restoration further including an outer portion disposed about said core portion and being formed of non-fiber filled dental porcelain, the dental porcelain making up said core and outer portions including a major amount of SiO<sub>2</sub>, and respective smaller quantities of Al<sub>2</sub>O<sub>3</sub> and K<sub>2</sub>O.

4,793,810

## INTERACTIVE INSTRUCTIONAL APPARATUS AND METHOD

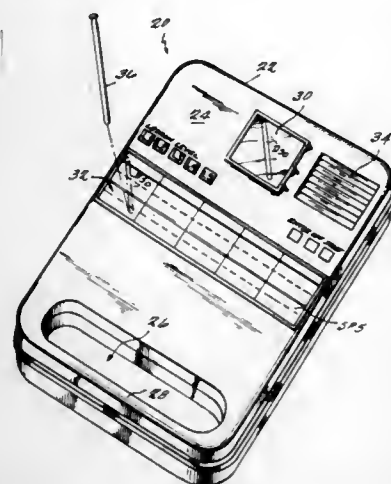
Engene T. Beasley, Jr., Huntsville, Ala., assignor to Data Entry Systems, Inc., Huntsville, Ala.

Filed Nov. 19, 1986, Ser. No. 932,259

Int. Cl. G09B 11/04

U.S. Cl. 434-165

34 Claims



1. An apparatus for providing instruction in stroke forming skills, comprising:

display means for displaying an exemplary stroke to a user; input means having a stroke-drawing surface for providing a digital data output representative of a stroke drawn by a user upon said stroke-drawing surface in response to said displayed exemplary stroke;

mode selecting means for selecting one of a plurality of instruction modes including at least one instruction mode in which a succession of exemplary strokes defining a character are presented on a stroke-by-stroke basis to said user on said display means for emulation by said user on said stroke-drawing surface;

memory means for storing digital representations of at least one exemplary stroke for display on said display means and for storing digital data provided by said input means representative of each stroke drawn on said stroke-drawing surface in response to each displayed exemplary stroke; and

stored-program controlled processor means for controlling said memory means and said display means in accordance with a mode selected by said mode selecting means to

display each said exemplary stroke and for comparing digital data representative of each displayed exemplary stroke and each corresponding stroke drawn on said stroke-drawing surface and quantifying the deviation between the digital data representative of each exemplary stroke and the corresponding drawn stroke and for providing an indication to the user of the deviation.

4,793,811

## ARRANGEMENT FOR SHOT SIMULATION

Kurt Eichweber, Hamburg, Fed. Rep. of Germany, assignor to Precitronic Gesellschaft fuer Fein-Mechanik und Electronic mbH, Hamburg, Fed. Rep. of Germany

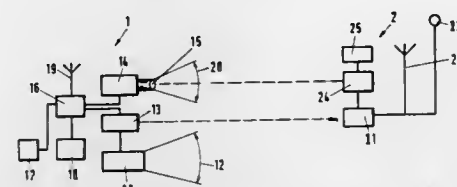
Filed Jun. 12, 1987, Ser. No. 62,009

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1986, 3643107

Int. Cl. G09B 9/00

U.S. Cl. 434-22

18 Claims



1. An apparatus for the in-field simulation of actual combat, comprising:

a full-sized target, capable of unrestricted, random movement on a combat field, including means for emitting invisible light comprising radiation of a non-visible wavelength, and hit detecting means for detecting a light beam directed at the target;

a shot simulator spaced from and independent of the target, including means for firing a first beam of light at the target and receiving means for detecting the invisible light emitted by the target;

whereby the detection of the invisible light by the receiving means provides an indication when the target comes in the field of view of the shot simulator, and the detection of light by the hit detecting means provides an indication when the target was hit by the first light beam; and means for measuring the period of time between the detection of the invisible light by the receiving means and the firing of said first beam of light by said shot simulator, to thereby determine the reaction time between the time the target comes in the field of view of the shot simulator and the time the first beam is fired at the target.

4,793,812

## HAND HELD OPTICAL SCANNER FOR OMNI-FONT CHARACTER RECOGNITION

Michael Sussman, Winchester, and Yair Kipman, Concord, both of Mass., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 5, 1987, Ser. No. 104,741

Int. Cl. G09B 21/00

U.S. Cl. 434-116

10 Claims

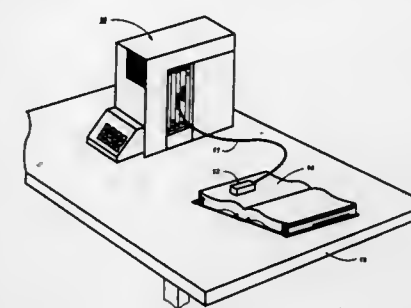
1. A hand held optical scanner to provide font independent character recognition for use in connection with a reading machine for the visually impaired or print handicapped people, comprising:

an elongated, dust-tight carriage having an internal cavity, a broad roller rotatably mounted along its length and at an outer edge thereof, a split roller rotatably mounted along an opposite outer edge, and a light passing window, said rollers having axes which are parallel with each other, so that, when the scanner is placed on a page of printed text to be scanned, the carriage rollers rest on the page and insure that the printed text is maintained within the focal

plane of the scanner and so that, when the carriage is manually moved, the rollers guide the carriage in a substantially straight line;

a rotary encoder being mounted within the carriage cavity and coupled to the split roller for providing speed and scanning direction information signals;

a CCD array having a plurality of linear sensing elements and being positioned within the carriage cavity for employment as the image sensor, the CCD array being adapted to sum the output signals from each predetermined number of adjacent sensing elements to synthesize video or digitized data signals having a resolution of 400 or more pixels per inch with increased light gathering ability, and the CCD sensing elements being scanned in a direction parallel to the roller axes and normal to the direction of movement of the carriage;



a Selfoc® lens being adjustably aligned adjacent the CCD array for providing light reflected through the carriage window from the page to be scanned to the CCD array; a LED array being adjustably positioned within the carriage cavity for providing light to illuminate the portion of the page to be scanned through the carriage window; and circuit means for energizing the LED array in response to the information signals from the rotary encoder in order to compensate for the CCD array's variation in light sensitivity caused by non-uniform movement of the carriage as it is manually guided across the page to be scanned, and for processing the digitized data signals from the CCD in accordance with the rotary encoder information signals and producing output digitized data signals for transmittal to the reading machine for converting the data signals into synthesized human voice.

4,793,813

## COMPUTER-BASED EDUCATION SYSTEM

David L. Blitzer; John E. Stifle; Michael W. Walker, all of Urbana; Clarence E. Kelley, Champaign; Donald D. Paakey, Champaign, and Donald A. Lee, Champaign, all of Ill., assignors to The Board of Trustees of the University of Illinois, Urbana, Ill.

Filed Oct. 15, 1985, Ser. No. 787,542

Int. Cl. G09B 7/00

U.S. Cl. 434-335

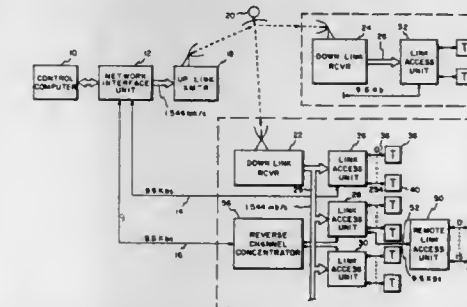
15 Claims

1. A rapidly responsive, real-time interactive, computer-based education system comprising:

central computer means for storing and executing interactive educational software and providing a forward channel data flow, said forward channel data flow including digital code sequences indicative of data to be displayed by a receiving display terminal, the forward channel data flow rate of said digital code sequences per receiving display terminal averaging hundreds of bits per second;

a plurality of remotely located, keyboard actuated display terminals, each said display terminal receiving certain code sequences from such forward channel data flow, displaying data represented thereby and providing as an output, real-time user responses to said displayed forward

channel data in the form of keystroke data, the flow rate of said keystroke data averaging tens of bits per second; high speed communications means dedicated to unidirectionally transmitting said forward channel data flow to said display terminals, said communications means including uplink-satellite transmitting means and at least one downlink satellite receive-only means; and



land-based communication means including a reverse channel for transmitting said keystroke data from each said display terminal to said central computer means whereby said computer means responds to said key stroke data in its execution of said interactive educational software.

4,793,814

## ELECTRICAL CIRCUIT BOARD INTERCONNECT

Mark S. Zifcak, Putnam, and Bruce G. Kosa, Woodstock, both of Conn., assignors to Rogers Corporation, Rogers, Conn.

Filed Jul. 21, 1986, Ser. No. 887,260

Int. Cl. H01R 9/09

U.S. Cl. 439-66

20 Claims



1. An area array connector device for providing electrical interconnection between a plurality of first contact pads arranged on a surface of a first circuit board and a plurality of corresponding second contact pads on an opposed surface of a second opposed circuit board,

said area array connector device comprising an electrically nonconductive support member adapted to be disposed between the circuit boards and comprising resilient elastomeric foam material defining a distribution of voids, said support member having support surfaces to be respectively opposed to the surfaces of the first and second circuit boards and being adapted to be compressed by urging of the circuit boards together, and

a plurality of bodily-rotatable, electrically conductive interconnect elements, each comprising a body extending generally in the direction of the thickness of the resilient elastomeric foam support member and tab portions projecting angularly from the respective ends of said body, said element defining a pair of pad engagement surfaces disposed to engage the respective corresponding contact pads, a line projected through said engagement surfaces being disposed at an initial, acute angle to the direction of thickness of said support member, and said tab portions defining engagement surfaces disposed at least closely in opposition to said support surfaces of said support member to engage upon said support surfaces during bodily rotation of said interconnect element to locally compress the elastomeric foam of said support member,

whereby, when said area array connector device is disposed between the circuit boards in a clamped-together relation

ship with said interconnect elements in registry with their respective corresponding contact pads and with said interconnect elements rotated bodily as a result of said clamping so that said line projected through said pad engagement surfaces of each element lies at an acute angle resiliently supported by said elastomeric foam to bear with force upon the contact pads, and said voids of said elastomeric foam of said support member serve locally to accommodate bodily rotation of said interconnect elements in a manner avoiding disturbance of adjacent elements whereby displacement of the elastomeric foam material of said support member about each said interconnect element is limited generally to the local region of said element.

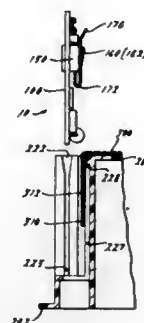
4,793,815

## ELECTRICAL CONNECTOR

Lev Lilov, Royal Oak, and Joseph C. Guck, Garden City, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.  
Filed May 18, 1987, Ser. No. 50,813  
Int. Cl.<sup>4</sup> H01R 9/09

U.S. Cl. 439—77

7 Claims



1. An electrical connector for providing a removable connection between exposed conductor runs on a flexible printed circuit film layer and corresponding conductors on a rigid printed circuit board, comprising:

- an insulated block member;
- a plurality of spring contacts extending from a first surface of said insulated block member;
- a printed circuit board for supporting said insulated block member and said spring contacts extending therefrom in an exposed condition;
- rigid means for supporting said flexible printed circuit film layer and backing said exposed conductor runs;
- holding means extending from said rigid means for retaining said printed circuit board in a position for compressing said spring contacts against said exposed conductor runs of said flexible printed circuit film layer backed by said rigid means.

4,793,816

## TERMINAL PROTECTOR FOR CIRCUIT BOARD CONNECTOR

Robert B. Pittman, Hackensack, N.J., and Michael Offerman, Merrick, N.Y., assignors to Industrial Electronic Hardware, New York, N.Y.

Filed Jul. 20, 1987, Ser. No. 75,592

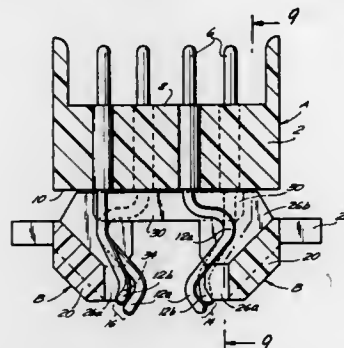
Int. Cl.<sup>4</sup> H01R 23/70

U.S. Cl. 439—79

26 Claims

1. In combination with a connector comprising a body along which a series of conductive terminals are located in exposed fashion, said series of terminals collectively extending over a substantial length of said body and in a given configuration with spaces therebetween, a terminal protector removably associable with said connector and without which said connector can function in normal fashion comprising a body separate from said connector having a length and configuration corresponding to that of said series of terminals, and a series of first

parts extending from said body and so arranged as to fit into spaces between exposed portions of adjacent terminals, thereby to define pockets into which said exposed portions of said terminals are received so as to minimize the possibility of distortion of said terminals from outside influences, and second



parts located below and in line with some of said first parts and extending from said body in the same direction as said first parts extend and to points beyond the ends of said first parts, thereby to be interposed between adjacent ones of said terminals.

4,793,817

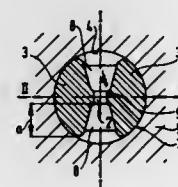
## CONTACT PIN

Heinz G. Hiesbock, Modling, Austria, assignor to Karl Neumayer, Erzeugung und Vertrieb von Kabeln, Drahten isolierten Leitungen und Elektromaterial Gesellschaft mit beschränkter Haftung, Günselsdorf, Austria

Continuation-in-part of Ser. No. 783,232, Oct. 2, 1985, abandoned. This application Dec. 8, 1986, Ser. No. 938,960  
Claims priority, application Austria, Feb. 27, 1985, 587/85;  
Fed. Rep. of Germany, Jul. 11, 1986, 3623453  
Int. Cl.<sup>4</sup> H01R 13/428

U.S. Cl. 439—82

16 Claims



11. A contact pin for fastening in a perforation, particularly for pressing into a plated-through hole in a printed circuit board, said contact pin comprising:

- a fastening section including a cross-section having two axes of symmetry and including two mutually mobile lateral parts mutually distanced by two mutually diametrically opposite grooves extending in the longitudinal direction of the pin, and said lateral parts include a peripheral curvature corresponding to the curvature of the cross-section of the perforation, particularly to the curvature of the printed circuit board hole provided to receive the pin, and the surfaces of said lateral parts adapted to be in contact with the inside of the printed circuit board hole together exhibit a circumferential distance equal to between 70% and 90% of the circumferential distance of the inside of the printed circuit board hole and said two lateral parts are mutually separated by a slit-shaped perforation oriented in the longitudinal direction of the contact pin.

4,793,818

## SAFETY GUARD FOR ELECTRICAL OUTLET

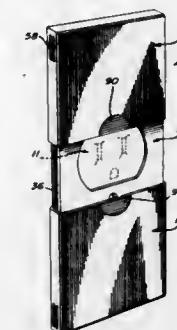
Michel Poirier, 2, 7th Avenue, Forestville, Quebec, Canada  
Filed Oct. 21, 1987, Ser. No. 110,867

Claims priority, application Canada, Sep. 16, 1987, 547004

Int. Cl.<sup>4</sup> H01R 13/44

U.S. Cl. 439—140

10 Claims



1. A safety guard for an electrical outlet having one or more sockets, comprising:

- a cover adapted to be mounted over said electrical outlet and having one or more opening means allowing an electrical plug to be connectingly received in said sockets;
- closure means movably mounted to said cover to expose or to cover said opening means;
- cooperating means on said cover and said closure means allowing, on the one part, said closure means to move relative to said cover and, on the other part to prevent said closure means to move when said closure means cover said opening means; said cooperating means being so constructed as to require two movements to displace said closure means from a socket-covering position to a socket-exposing position; and
- resilient means connected between said cover and said closure means to bias said closure means to said socket-covering position as said closure means are moved to expose said opening means.

4,793,819

## OVER-THE-ROAD VEHICLE ELECTRICAL CONNECTOR WITH DRAIN PASSAGE

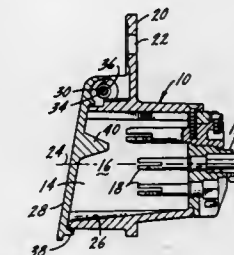
Arthur A. Berg, Northbrook, Ill., assignor to Sloan Valve Company, Franklin Park, Ill.

Filed Feb. 20, 1987, Ser. No. 17,135

Int. Cl.<sup>4</sup> H01R 13/44

U.S. Cl. 439—142

4 Claims



1. An electrical connector receptacle for use in over-the-road vehicles including a receptacle body, a mounting flange extending outwardly from said body and adapted to be mounted in a generally vertical disposition on a vehicle, said body having a closed end and a chamber, with said chamber having an axis generally perpendicular to the plane of said mounting flange, a plurality of contact pins mounted on said

body closed end and extending into said chamber, said chamber having an open end and a cover pivotally mounted on said body to close said chamber open end,

and a defined inclined drain passage formed in the bottom of said chamber and extending axially a substantial portion of said chamber, said drain passage extending below the bottom of said chamber and slanting downwardly from adjacent said body closed end to an opening at said body open end.

4,793,820

## ELECTRICAL WIRING HARNESS TERMINATION SYSTEM

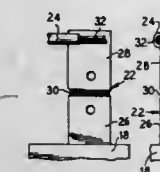
James I. Czech, Lincoln Township, Berrien County, and Shannon L. Madison, St. Joseph, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Dec. 21, 1987, Ser. No. 135,649

Int. Cl.<sup>4</sup> H01R 29/00

U.S. Cl. 439—177

17 Claims



1. An electrical wiring harness termination system for use with a replaceable original electrical component comprising: an electrical terminal extending from said original component having a proximal section secured to said component and a distal section extending away from said component, said terminal having a length sufficient to permit a severing of said terminal into separate proximal and distal sections;

a wire lead connected to said terminal at said distal section;

a replacement component having a terminal; and

a connector means for securing a severed distal section to said terminal of said replacement component.

4,793,821

## VIBRATION RESISTANT ELECTRICAL COUPLING

Clifford C. Fowler, Chatsworth, and Edward P. Goett, Geyersville, both of Calif., assignors to Engineered Transitions Company, Inc., Geyersville, Calif.

Continuation-in-part of Ser. No. 819,604, Jan. 17, 1986,

abandoned. This application Feb. 24, 1986, Ser. No. 832,403

Int. Cl.<sup>4</sup> H01R 13/623

U.S. Cl. 439—321

6 Claims

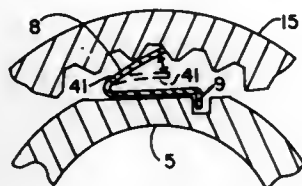
1. A coupling member, comprising:

a cylindrical body shell having a first and a second end, said shell configured for abutment against a connector end where the connector contains at least one axially engageable electrical contact means,

a hollow cylindrical collar rotatably positioned around said shell adjacent to and partially overlapping one of said ends, said collar being adapted to secure said shell to a connector, spring detent means seated on said shell and positioned between said shell and said collar, said detent spring means includes a main body portion and a radially



deflectable arm having a protrusion adjacent one end thereof and an alignment tab,  
a detent spring engaging surface integral with the interior surface of said collar and for bias engagement by said arm, said detent spring means engaging surface having a plurality of closely spaced teeth,



said shell having a transverse groove in its exterior surface, said groove containing a radial alignment hole, and said detent spring means seated in said transverse groove where said alignment tab is located in said alignment hole and said deflectable arm is in bias engagement with said teeth.

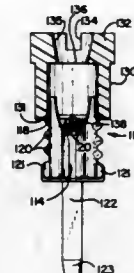
4,793,822

## SCREW SLOT CONNECTOR

Brian E. Cozzens, Mechanicsburg, Pa.; William R. Evans, Mooresville, N.C., and Wayne E. Kleiner, Mohrsville, Pa., assignors to AMP Incorporated, Harrisburg, Pa.  
Continuation-in-part of Ser. No. 114,183, Oct. 28, 1987, abandoned. This application Mar. 7, 1988, Ser. No. 164,943  
Int. Cl.<sup>4</sup> H01R 4/24

U.S. Cl. 439—397

7 Claims



1. In a system for providing electrical interconnection of wires of different sizes to electronic devices, the combination comprising:

- a plurality of electrical terminals of conductive material, each terminal having a threaded surface and a tubular portion including a wire receiving slot extending along said tubular portion, said slot having a tapering surface to engage a corresponding wire inserted therein and to displace insulation of said wire and to deform said wire,
- a relatively narrow portion of each said slot engaging a relatively smaller wire, and a relatively broad portion of each said slot engaging a relatively larger wire,
- each of a plurality of screw means having threading adapted to engage the threaded surface of a corresponding terminal,
- each corresponding screw means being adapted for manual rotation, with corresponding threading engaging a corresponding threaded surface and effecting a vertical and downward displacement of the corresponding screw means,
- said screw means having corresponding wire engaging surfaces for engaging corresponding wires and for pushing said wires along corresponding said slots,
- the wire engaging surfaces being located at different lengths along corresponding said screw means for providing dif-

ferent displacements of corresponding wires along corresponding slots.

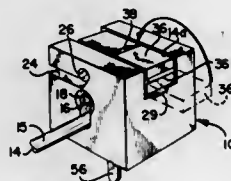
4,793,823

## CAM LEVER CONNECTOR

Brian E. Cozzens, Mechanicsburg, Pa.; William R. Evans, Mooresville, N.C., and Wayne E. Kleiner, Mohrsville, Pa., assignors to AMP Incorporated, Harrisburg, Pa.  
Filed Oct. 28, 1987, Ser. No. 113,946  
Int. Cl.<sup>4</sup> H01R 4/24

U.S. Cl. 439—409

5 Claims



1. An electrical terminating device adapted to provide an electrical interconnection between a conductor wire and an electrical or electronic circuit comprising in combination; a plastic insulating housing apertured to receive a conductor wire inserted therein, said housing further including an internal recess,
- a plastic and insulating cam lever means fitted within said recess including an engagement with said housing providing for rotary movement of said cam lever means between a first position and a second position, said cam lever means including surfaces disposed to contact said wire as said wire is inserted within said housing, and to drive said wire in movement upon rotation of said cam lever means from said first position to said second position,
- an electrical terminal contained within said housing extending within said recess including a slot therein dimensioned to receive said wire and upon said movement, deforming inelastically said wire and stripping insulation therefrom and effecting an electrical interconnecting with surfaces of said wire upon rotation of said cam lever means, and said cam lever means includes a portion foldable into a position to provide an enhanced mechanical advantage to the rotation thereof, said portion being connected to said cam lever means via an integral hinge.

4,793,824

## WEDGE SLOT CONNECTOR

Brian E. Cozzens, Mechanicsburg, Pa.; William R. Evans, Mooresville, N.C., and Wayne E. Kleiner, Mohrsville, Pa., assignors to AMP Incorporated, Harrisburg, Pa.  
Filed Sep. 24, 1987, Ser. No. 100,378  
Int. Cl.<sup>4</sup> H01R 4/24

U.S. Cl. 439—395

5 Claims

1. An electrical interconnection device comprising; an insulating housing having a first part including a plurality of recesses, and a plurality of second parts shaped to be slidably pressed into and axially along corresponding said recesses,
- apertures in said first and second parts,
- means on the surfaces of said first and second parts to latch said first and second parts together in corresponding first positions to receive conductor wires inserted through said apertures, and to latch said first and second parts together in corresponding second positions with said second parts pressed into said first part through said recesses,
- said second parts including corresponding slits therein oriented obliquely of corresponding recesses to force corresponding conductor wires to travel obliquely of corresponding recesses,

electrical terminals mounted in said first part and extending along corresponding recesses, said terminals including corresponding wire receiving slots oriented obliquely of

4,793,825

## ACTIVE SILICON IMPLANT DEVICES

John D. Benjamin, Malvern; Adrian L. Mearns, Cheltenham, and John C. White, Lincoln, all of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom and Northern Ireland, London, England

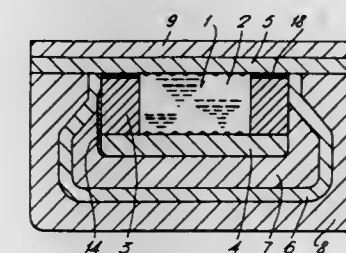
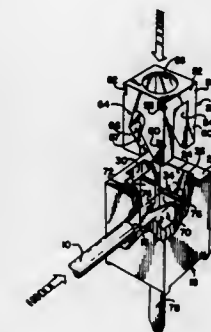
Filed Sep. 11, 1985, Ser. No. 774,691

Claims priority, application United Kingdom, Sep. 11, 1984, 8422876

Int. Cl.<sup>4</sup> A61M 1/00

U.S. Cl. 604—891.1

28 Claims



17. A pharmaceutical preparation comprising a plurality of semiconductor devices in a pharmaceutically acceptable carrier or diluent, each device having a maximum dimension less than 500  $\mu\text{m}$  and encapsulating a pharmaceutical compound or composition and adapted to pass along blood vessels in large numbers, said devices each including signal processing means for providing an output in response to an input signal, each said device having a frangible part which is capable of rupturing to release said pharmaceutical compound or composition from each said device on receipt of said output from each said signal processing means.

corresponding recesses and extending across corresponding slits, whereby to wedge corresponding wires in said slots and in said slits to trap said wires.

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## CHEMICAL

4,793,826

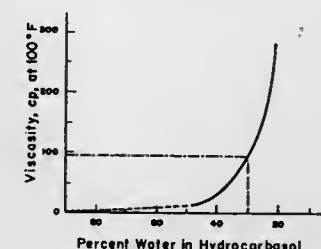
**BIOEMULSIFIER-STABILIZED HYDROCARBOSOLS**  
Michael E. Hayes, Fernandina Beach; Kevin R. Hrebencar, Jacksonville; Patricia L. Murphy, Amelia Island; Laurence E. Futch, Jr., Fernandina Beach; James F. Deal, III, Amelia Island, and Paul L. Bolden, Jr., Fernandina Beach, all of Fla., assignors to Petroleum Fermentations N.V., Curacao, Netherlands Antilles

Division of Ser. No. 653,808, Sep. 24, 1984, Pat. No. 4,684,372, which is a continuation-in-part of Ser. No. 547,892, Nov. 2, 1983, Pat. No. 4,618,348. This application Sep. 27, 1985, Ser. No. 780,783

Int. Cl.<sup>4</sup> C10L 1/18

U.S. Cl. 44-51

39 Claims



1. A pre-atomized fuel comprising a bioemulsifier-stabilized hydrocarbon-in-water emulsion formed by emulsifying a hydrocarbon with API gravity of about 20° API or less, viscosity of about 100 centipoise or greater at 150° F., paraffin content of about 50% by weight or less, and aromatic content of about 15% by weight or greater into an aqueous phase using a surfactant package, comprising about 15% by weight  $\alpha$ -emulsan, about 42.5% by weight ethoxylated monononylphenol with about 40 ethoxy groups, and about 42.5% by weight of an ammonium salt of poly(3)ethoxy C<sub>12</sub>-C<sub>14</sub> linear primary alcohol sulfate, in a proportion from about 1:100 to about 1:20,000 by weight based on hydrocarbon, said hydrocarbon-in-water emulsion having a hydrocarbon:water ratio from about 60:40 to about 90:10 by volume.

4,793,827

**HYDROCARBON CRACKING CATALYST**

Charles F. Lochow, Russell, and Daniel B. Kovacs, Ashland, both of Ky., assignors to Ashland Oil, Inc., Ashland, Ky.  
Division of Ser. No. 794,350, Nov. 1, 1985, Pat. No. 4,664,780.  
This application Dec. 4, 1986, Ser. No. 938,365

Int. Cl.<sup>4</sup> B01J 29/08

U.S. Cl. 44-65

4 Claims

1. A catalyst composition for cracking hydrocarbons to maximize gasoline comprising: rare earth exchanged "Y" crystalline faujasite dispersed in a clay containing matrix material; and which has been subsequently further ion exchanged to contain 0.20 to 3.0 wt% yttrium, calculated as the oxide, whereby the yttrium is chemically combined in said catalyst composition.

4,793,828

**ABRASIVE PRODUCTS**

Richard P. Burnand, Johannesburg, South Africa, assignor to Tenon Limited, Tortola, British Virgin Islands.  
Continuation of Ser. No. 712,421, Mar. 25, 1985, abandoned.  
This application Dec. 4, 1986, Ser. No. 269,383  
Claims priority, application South Africa, Mar. 30, 1984, 84/2407

The portion of the term of this patent subsequent to Aug. 13, 2002, has been disclaimed.

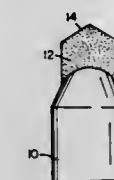
Int. Cl.<sup>4</sup> B24D 3/00

U.S. Cl. 51-293

34 Claims

1. An abrasive tool having a working portion which includes an abrasive insert held therein, said abrasive insert consisting

essentially of a mass of diamond particles present in an amount of 80 to 90 percent by volume of the insert and a second phase present in an amount of 10 to 20 percent by volume of the insert, the mass of diamond particles containing substantial diamond-to-diamond bonding to form a coherent skeletal mass and the second phase consisting essentially of silicon or silicon



carbide or a combination thereof, said abrasive insert being capable of withstanding a temperature of 1200° C. under a vacuum of 10<sup>-4</sup> Torr or better or in an inert or reducing atmosphere without significant graphitization of the diamond occurring, and said insert having been exposed to a high temperature during manufacture of the tool, or being adapted for exposure to a high temperature during use of the tool.

4,793,829

**PERMEATION PROCESS FOR SEPARATING AMMONIA FROM A GAS MIXTURE**

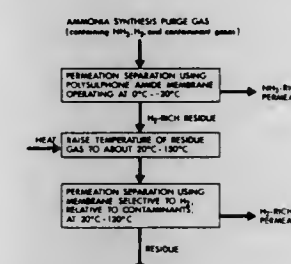
Chuen Y. Pan, and Earl M. Hadfield, both of Edmonton, Canada, assignors to International Permeation, Inc., Calgary, Canada

Filed Mar. 10, 1988, Ser. No. 166,375

Int. Cl.<sup>4</sup> B01D 53/22

U.S. Cl. 55-16

6 Claims



1. A process for separating ammonia from an ammonia-containing gas mixture stream, which comprises: providing a permeator containing a polysulphone amide separation membrane exhibiting selectivity to ammonia permeation; introducing the gas stream into the permeator at a temperature below about 0° C.; and contacting the gas stream with the polysulphone amide separation membrane to separately produce an ammonia-rich permeate stream and an ammonia-lean residue stream.





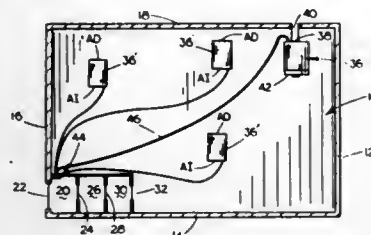
member will hover above the top surface of the water and the openings will be elevated above the top surface of the water and the diffuse stream of air will be humidified by the water.

#### 4,793,836 REMOTE CONTROL FOR AN AIR FILTRATION SYSTEM

Steven C. Griffin, 2929 Avenue D, Council Bluffs, Iowa 51501  
Continuation-in-part of Ser. No. 072,044, Jul. 10, 1987, Pat. No. 4,750,922. This application Apr. 4, 1988, Ser. No. 177,422  
The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.  
Int. Cl. B01D 46/02

U.S. Cl. 55-210

1 Claim



1. A system for removing dangerous solid materials from an enclosed contaminated area within a building, said system comprising:

- a wall means defining said enclosed contaminated area;
- said enclosed contaminated area having at least one air inlet associated therewith to permit air to enter said enclosed contaminated area;
- said wall means having at least one air outlet formed therein to permit air to exit said enclosed contaminated area;
- a first air filtration unit located within said enclosed contaminated area;
- said first air filtration unit having an air inlet in communication with said enclosed contaminated area;
- said first air filtration unit having an air outlet in operative communication with the air outlet in said wall means;
- said first air filtration unit including means for creating a reduced air pressure within said enclosed contaminated area for moving air through said filtration unit so that air will be drawn into said air inlet of said enclosed, contaminated area, through said filtration unit, and thence through the air outlet in said wall means;
- means for sealing said air inlet in the event that the reduced air pressure is lost in said enclosed contaminated area;
- at least a second air filtration unit located within said enclosed contaminated area and having an air inlet and an air outlet in communication with said enclosed contaminated area,
- and remote control and monitoring means for controlling the operation of at least one of said first and second filtration units and for monitoring the operation of at least one of said first or second filtration units;
- said remote control and monitoring means being located outside of said enclosed contamination area whereby the said filtration unit may be operated and monitored without entering said enclosed contaminated area.

4,793,837  
GASEOUS FILTER CONSTRUCTION  
Jeffrey S. Pontius, Amanda, Ohio, assignor to Columbus Industries, Inc., Ashville, Ohio  
Filed Jan. 15, 1988, Ser. No. 144,130  
Int. Cl. B01D 50/00

U.S. Cl. 55-316

5 Claims

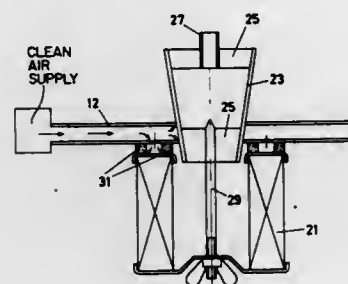
1. A filter for pet applications comprising, in combination, a base filter pad formed of a plurality of unwoven synthetic fibers randomly oriented to provide a tortuous path for the flow

of air through said pad and impregnated with a mixture of particles of zeolite and activated carbon distributed uniformly through said pad in an amount effective to remove a substantial amount of undesirable gaseous components contained in the air flowing through said impregnated pad, wherein approximately 97% of said zeolite particles are within a size range between 100 mesh and 325 mesh and said activated carbon particles have a size of approximately 325 mesh.

4,793,838  
AIR CLEANERS  
John Thorne, Kingswood House, Woodhouse Eaves, Loughborough, Leicestershire, United Kingdom  
Filed Mar. 11, 1987, Ser. No. 24,744  
Claims priority, application United Kingdom, Mar. 14, 1986, 8606395  
Int. Cl. B01D 46/00

U.S. Cl. 55-378

3 Claims

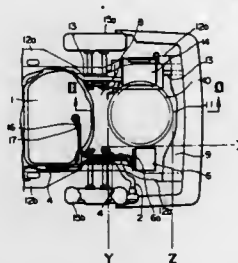


1. An air cleaner comprising means defining a dirty air space, a clean air space, and a partition carrying at least one filter element separating said dirty air space and said clean air space, mounting and sealing means for each filter element sealing said element to said partition, said partition being provided with means for supplying clean air to the mounting and sealing means of each said filter element at the clean air space side of said mounting and sealing means at a pressure greater than that of dirty air to be filtered, whereby to create a positive pressure at the clean air space side of each said mounting and sealing means so as to prevent the escape of dirty air.

4,793,839  
ARRANGEMENT OF CANISTER-USED EMISSION CONTROL SYSTEM IN MOTOR VEHICLE  
Tsutomu Hayashida, Sagamihara; Yutaka Shibamoto, Atsugi; Tomiharu Yamada, and Tetsuro Kondo, both of Ischahara, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan  
Filed Dec. 2, 1987, Ser. No. 127,427  
Claims priority, application Japan, Dec. 5, 1986, 61-290270  
Int. Cl. B01D 50/00

U.S. Cl. 55-385.3

8 Claims



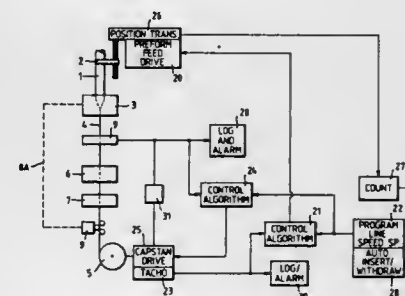
1. In a motor vehicle having a floor panel, a fuel tank mounted beneath the floor panel, two side members welded to

lateral sides of said floor panel and extending along the same and a circular spare tire container defined by said floor panel, an emission control system comprising:  
an activated charcoal canister arranged beneath said floor panel;  
a bracket secured to said floor panel;  
means for detachably connecting said canister to said bracket; and  
a fuel vapor conveying tube extending from said fuel tank to said canister,  
wherein said canister is positioned within a given zone which is defined between selected one of said side members and said spare tire container.

4,793,840  
OPTICAL FIBRE MANUFACTURE  
Ian D. Harding, Saffron Walden, Great Britain, assignor to STC PLC, London, England  
Filed Aug. 14, 1986, Ser. No. 896,518  
Claims priority, application United Kingdom, Aug. 21, 1985, 8520945  
Int. Cl. C03B 37/023

U.S. Cl. 65-2

3 Claims



1. A method of manufacturing optical fibre comprising feeding an optical fibre preform into a furnace at a first predetermined rate while operating the furnace at a predetermined temperature, pulling a fibre from the preform around a capstan at a second predetermined rate, said first and second predetermined rates being calculated to produce a fibre of a predetermined nominal diameter, sensing the diameter of the drawn optical fibre and providing a signal representative of a deviation of the measured diameter from the nominal diameter, and modifying the speed of the capstan in response to the deviation signal from the diameter monitor, whereby to tend to maintain the optical fibre as close as possible to the nominal preset diameter, and wherein a signal is derived representative of the rotational speed of the capstan, and this signal is compared with a signal representative of the predetermined second rate to derive a preform feed control signal for adjusting said first rate.

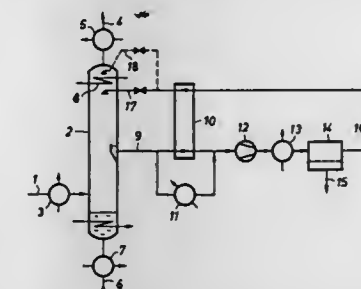
4,793,841  
PROCESS AND APPARATUS FOR FRACTIONATION OF A GASEOUS MIXTURE EMPLOYING SIDE STREAM WITHDRAWAL, SEPARATION AND RECYCLE  
Peter S. Burr, Munich, Fed. Rep. of Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany  
Continuation of Ser. No. 6,866,293, May 23, 1986, abandoned, which is a continuation of Ser. No. 6,610,725, May 16, 1984, Pat. No. 4,599,096. This application Jul. 6, 1987, Ser. No. 70,677  
Claims priority, application Fed. Rep. of Germany, May 20, 1983, 3318529  
The portion of the term of this patent subsequent to Jul. 8, 2003, has been disclaimed.  
Int. Cl. F25J 3/02

U.S. Cl. 62-27

18 Claims

1. A process for fractionating a gaseous mixture by distillation in a fractionating column wherein, during distillation, at

least one of the components of the gaseous mixture is present in the fractionating column in a sufficient concentration to freeze out in a non-hydrated form as a solid under distillation conditions in the column in the absence of a preventive step and another one of the components is present in the fractionating column in liquid phase, said another one of the components having the highest dissolving capacity of the freezable component, said process comprising withdrawing a sidestream fluid



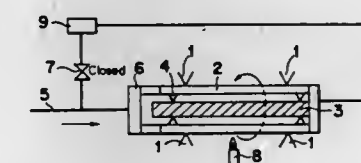
form the column during the fractionation at a point in the column where: (a) the freezable component is at a concentration lower than the maximum concentration and (b) where the high dissolving component is at substantially the maximum concentration, and separating said fluid so as to remove preferentially the at least one of the components and recycling resulted depleted stream to said fractionating column, said depleted stream having a higher dissolving capacity for the at least one of the components than the stream withdrawn.

4,793,842  
METHOD FOR PRODUCING GLASS PREFORM FOR OPTICAL FIBER

Hiroshi Yokota; Hiroo Kanamori; Gotaro Tanaka; Hiroshi Suganuma, and Toshio Danzuka, all of Yokohama, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan  
Continuation of Ser. No. 847,319, Apr. 2, 1986, abandoned. This application Dec. 21, 1987, Ser. No. 139,141  
Claims priority, application Japan, Apr. 3, 1985, 60-69203  
Int. Cl. C03B 37/014, 37/027

U.S. Cl. 65-3.11

5 Claims



1. A rod-in-tube method for producing a glass preform for use in the fabrication of an optical fiber, which comprises steps of:

- inserting a glass rod constituting a core material in a glass tube constituting a cladding material,
- preheating the rod-tube composite wherein said preheating comprises heating the rod-tube composite using at least two passes along the length of said composite by an outer heating means, the preheating of said two passes being at a temperature at which the rod-tube composite is not collapsed nor fused together in combination with the introduction of, in the gap between the rod and the tube, a gaseous mixture containing a silicon halogenide, a fluorine-containing compound, and oxygen (O<sub>2</sub>) gas, in which gaseous mixture a ratio of silicon and fluorine (Si/F) is larger than 1/300 and smaller than 1/5, said preheating step being effective to remove moisture, dust, hydroxyl groups and other impurities from the surfaces of the rod



and the tube, while inhibiting the formation of etched rough surfaces, further heating the composite to progressively longitudinally collapse the tube onto the rod at a temperature not lower than 1,900° C. and fusing the thus-collapsed composite to provide a diminishing gap between the tube and rod while flushing the diminishing gap with a gaseous mixture comprising a halogen-containing compound and oxygen (O<sub>2</sub>) gas and continuing said heating and fusing until the composite has been fused into a core-clad preform rod.

#### 4,793,843 METHOD OF MANUFACTURING AN OPTICAL FIBER PREFORM

René A. M. Puijms; Pieter van der Ree; Gerrit J. Koel, and Jan G. J. Feelen, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.  
Continuation of Ser. No. 758,586, Jul. 25, 1985, abandoned, which is a continuation of Ser. No. 580,976, Feb. 16, 1984, abandoned. This application Mar. 20, 1987, Ser. No. 29,351  
Claims priority, application Netherlands, Feb. 22, 1983, 8300650

Int. Cl.<sup>4</sup> C03C 25/02, 17/00

U.S. Cl. 65—3.12

11 Claims

1. A method of manufacturing a solid optical fiber preform in which disturbance of the refractive index profile is substantially avoided, said method consisting essentially of the steps of:

providing a hollow optical fiber preform having a longitudinal direction, said hollow preform having an inside wall bounding a central duct, the central duct extending in the longitudinal direction, the inside wall portion of the hollow preform comprising quartz glass doped with a dopant, said dopant being more volatile than quartz glass; heating the hollow preform to a temperature at which the duct closes spontaneously to form a solid preform; and passing a gaseous etchant through the central duct while the duct is closing, said gaseous etchant consisting of oxygen and 5-30 volume percent C<sub>2</sub>F<sub>6</sub>.

#### 4,793,844 METHOD FOR PREPARING GLASSY BORATE DISKS FOR INSTRUMENTAL ANALYSIS AND IN PARTICULAR FOR X-RAY FLUORESCENCE ANALYSIS

Georgi A. Panayotov, Sofia, Bulgaria, assignor to Geologicheski Institut, Sofia, Bulgaria  
Filed Aug. 11, 1987, Ser. No. 84,267  
Claims priority, application Bulgaria, Aug. 15, 1986, 76186  
Int. Cl.<sup>4</sup> C03B 19/09

U.S. Cl. 65—63

4 Claims

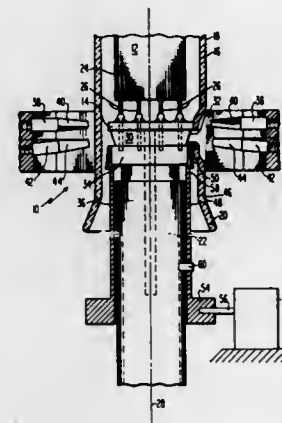
1. A method for preparing glassy borate disks for x-ray fluorescence analysis comprising the steps of mixing a fixed quantity of oxide material with borate flux, homogenizing the mixture, tableting the mixture, and melting the tablet in a graphite ring placed on a graphite support, at a temperature from 900 to 1200 degrees C.; and a following cooling of the melted tablet, wherein, the oxide material, prior to mixing, is preheated at a temperature higher than 800 degrees C., and wherein the graphite ring in which the melting of the tablet is performed has a height, expressed in "mm" approximately equal to the integral numeric value of the ratio of the mass of mixture of investigated material and borate flux, expressed in "g" to the inner diameter of the graphite ring, expressed in "cm", the height of the ring not exceeding 3 mm.

#### 4,793,845 METHOD FOR REMOVING A CULLET OF A CATHODE-RAY TUBE

Emil V. Fitzke, Lawrenceville; Michael A. Colacello, and Jack F. Otto, both of Trenton, all of N.J., assignors to RCA Licensing Corporation, Princeton, N.J.  
Division of Ser. No. 880,047, Jun. 30, 1986, Pat. No. 4,723,979.  
This application Oct. 28, 1987, Ser. No. 113,690  
Int. Cl.<sup>4</sup> C03B 9/46

U.S. Cl. 65—105

6 Claims



1. In a method for sealing a mount having a glass stem in a neck of a cathode-ray tube including supporting said mount on a mount socket within said neck and applying heat to the outside of said neck proximate said stem so that said neck softens, thins and then seals to said stem, whereby excess neck material that is lower than said stem, known as cullet, is cut off and falls away from said neck, the improvement comprising the steps of:

positioning a sleeve around said mount socket within the space defined by said neck adjacent said cullet with a clearance between said sleeve and said socket, prior to said heat-applying step, and vibrating said sleeve during said heat-applying step.

#### 4,793,846 GOB DISTRIBUTOR

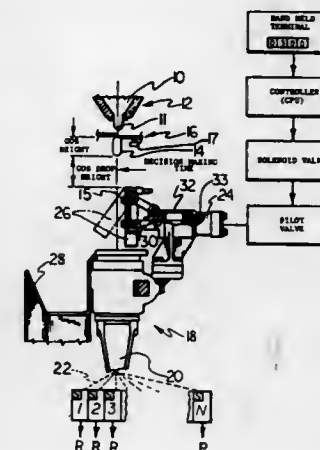
George T. Peterson, Bristol, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.  
Filed Mar. 2, 1987, Ser. No. 20,272  
Int. Cl.<sup>4</sup> C03B 7/16

U.S. Cl. 65—164

4 Claims

1. A glassware forming machine comprising means for feeding a runner of molten glass, means for shearing a gob of glass from said runner, the gob falling by gravity along a drop path, a plurality of glassware forming sections, a gob distributor including at least one gob scoop for receiving a gob as it falls along the drop path, means for positioning said gob scoop at a plurality of positions in accordance with a predetermined feed program to sequentially deliver received gobs to said plurality of sections, gob deflector means, means for advancing said deflector means from a retracted deliver position to an advanced reject position for deflecting a gob falling along the drop path toward said gob distributor away from said gob distributor, means for timing the drop of said gob from said shear location along the drop path, means for setting said timing means to have a duration selected to locate the gob along the drop path a predetermined height above said deflector means,

means for determining, when said timer times out, whether a section in accordance with the feed program has requested a gob and whether that section has been enabled, and



means for operating said advancing means in the event said determining means does not so determine, said predetermined height of the gob above said deflector means being selected to permit the advancement of said deflector means to said reject position before the gob reaches said deflector means.

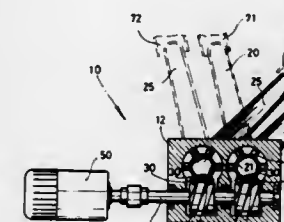
#### 4,793,847 APPARATUS FOR DISTRIBUTING GOBS IN BOTTLE MAKING MACHINE

Fumio Kawachi; Masataka Nakasima, and Kazuo Komatsu, all of Ogaki, Japan, assignors to Nihon Taisanba Kogyo Kabushiki Kaisha, Gifu, Japan

Filed Oct. 28, 1987, Ser. No. 113,699  
Claims priority, application Japan, Dec. 27, 1986, 61-315746  
Int. Cl.<sup>4</sup> C03B 7/14

U.S. Cl. 65—225

2 Claims



1. An apparatus for distributing gobs which are fed from a feeder to plural desired immovable chutes of a bottle making machine, said apparatus comprising:

a body, plural rotatably scoops, each scoop having vertical shaft portion having a center axis, an archwise distributing portion at a lower end of said vertical shaft portion, and a funnel mounted on an upper end of said vertical shaft portion, each vertical shaft portion being rotatably supported in said body for rotation about said center axis to selectively connect the feeder to the chutes, plural shafts radially extending from each vertical shaft portion of each rotatable scoop, said shafts being spaced from each other in a circumferential direction of said vertical shaft portion and extending perpendicular to said center axis in a horizontal plane,

plural rollers each rotatably supported on and by one of said plural shafts, a cam shaft rotatably supported in said body lying in said horizontal plane, a servo motor directly connected to said cam shaft for rotating said cam shaft, and plural cylindrical cams, one for each rotatable scoop, secured to said cam shaft, each cam having a spiral cam surface rollingly engaged by said rollers of the respective rotatable scoop.

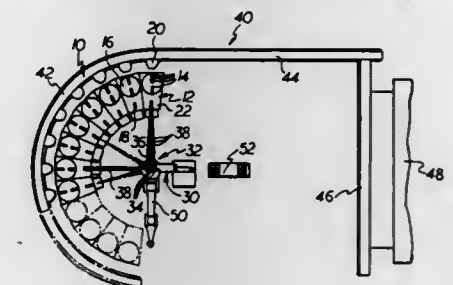
#### 4,793,848 GLASSWARE FORMING MACHINE AND APPARATUS INCORPORATING SUCH A MACHINE

Hermann H. Nebelung, Wismar/Lube, Fed. Rep. of Germany, assignor to Emhart Industries, Inc., Farmington, Conn.  
Filed Sep. 4, 1987, Ser. No. 94,343  
Claims priority, application United Kingdom, Sep. 16, 1986, 8622290

Int. Cl.<sup>4</sup> C03B 7/14

U.S. Cl. 65—225

5 Claims



1. Apparatus for use in the manufacture of glassware articles formed from gobs of molten glass sheared from a runner or runners of molten glass falling from a corresponding number of orifices of a feeder comprising

a plurality of machine sections each including means for forming gobs into glassware, means for supporting said plurality of machine sections along an arc of a circle, gob distributor means for distributing gobs sheared from the runners sequentially to said plurality of machine sections, the center of said circle corresponding to the median position of the runners of molten glass, and conveyor means including a portion adjacent to said plurality of machine sections for carrying completed articles of glassware away from said plurality of machine sections, said adjacent portion being concentric to said circle.

5. Apparatus for use in the manufacture of glassware articles formed from gobs of molten glass sheared from a runner or runners of molten glass falling from a corresponding number of orifices of a feeder comprising

a plurality of machine sections each including mould means for forming gobs into glassware, means for supporting said plurality of machine sections along an arc of a circle, gob distributor means for distributing gobs sheared from the runners sequentially to said plurality of machine sections, the center of said circle corresponding to the median position of the runners of molten glass, a plurality of replacement mould means, means for supporting replacement mould means proximate each of said machine section mould means, manipulator means for removing the mould means of any of said machine sections and replacing said removed mould means with the replacement mould means proximate thereto, and means for mounting said manipulator means for arcuate movement about said center point of said circle.

**4,793,849**  
**HEAT SHIELD FOR REFRACTORY TUBE IN MOLTEN GLASS FEEDER**

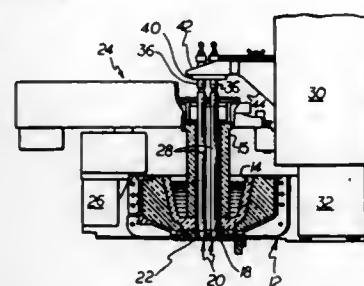
Kenneth L. Bratton, Windsor, Conn., assignor to Emhart Industries, Inc., Farmington, Conn.

Filed Feb. 3, 1988, Ser. No. 151,732

Int. Cl.<sup>4</sup> C03B 7/08

U.S. Cl. 65—328

2 Claims



1. A molten glass feeder comprising:
  - a feeder bowl having a hole at the bottom thereof,
  - a refractory tube defining with said feeder bowl a reservoir for molten glass, said refractory tube being selectively sized to surround said opening and being selectively spaced from said feeder bowl to permit molten glass to flow from said reservoir to said hole,
  - an orifice plate closing said feeder bowl hole, said plate having a plurality of openings so that molten glass will be discharged therefrom in discrete streams,
  - a corresponding plurality of needles cooperating with said openings to control the streams of molten glass, the lower portion of said needles being surrounded by said refractory tube,
  - heat shield means surrounding the upper portion of said needles including a pair of opposed metallic semi-cylindrical portions each having
    - an inwardly extending lip extending substantially around the bottom of said semi-cylindrical portion,
    - a semi-circular metallic plate supported by said lip,
    - a refractory element having a semi-circular horizontal base and an upwardly projecting wall at the diameter of said semi-circular base,
    - said upwardly projecting wall being contoured to receive said needles, and
    - said refractory element defining with said semi-cylindrical portion, a semi-cylindrical volume and
    - insulating means contained within said volume.

**4,793,850**  
**EVAPORATION INHIBITOR COMPOSITIONS**  
Josef Koester, Duesseldorf; Karl Schmid, Mettmann; Konrad Albrecht, Kelkheim; Paul Bittner, Krefeld, and Fritz Keim, Hofheim, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf and Hoechst Aktiengesellschaft, Frankfurt am Main, both of, Fed. Rep. of Germany

Filed Nov. 14, 1985, Ser. No. 798,210

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1985, 3507380

Int. Cl.<sup>4</sup> A01N 25/02

U.S. Cl. 71—79

19 Claims

1. An evaporation inhibitor composition consisting of:
  - A. from about 15 to about 50% by weight of a wax mixture containing at least about 5% by weight, based on the wax mixture, of a wax component having an acid number of from about 10 to about 95 mg KOH/g wax; said wax mixture being selected from one of the following:
    - (a) from about 60 to about 95% by weight of paraffin wax and/or microcrystalline paraffin wax having a setting point of from about 40 to about 70°C, and from about 5 to about 40% by weight of oxidized polyethylene wax having a dropping point of from about 95 to about 140°C

- and an acid number of from about 10 to about 95 mg KOH/g wax;
- (b) from about 60 to about 95% by weight of paraffin wax and/or microcrystalline paraffin wax having a setting point of from about 40 to about 70°C, and from about 5 to about 40% by weight of wax containing ester bonds and having a dropping point of from about 75 to about 100°C and an acid number of from about 10 to about 95 mg KOH/g wax; and
- (c) from about 20 to about 50% by weight of paraffin wax having a setting point of from about 30 to about 50°C, and from about 50 to about 80% by weight of oxidized paraffin wax having a setting point of from about 60 to about 90°C and an acid number of from about 10 to about 95 mg KOH/g wax;
- B. from about 4 to about 20% by weight of at least one nonionic and/or anionic emulsifier; and
- C. from about 19.5 to about 81% by weight of water and/or at least one organic solvent selected from the group consisting of hydrocarbons, esters, and ketones having a boiling point of from about 70 to about 280°C.

**4,793,851**  
**COMPOUNDS WITH ANTIDOTAL ACTIVITY FOR THE DEFENSE OF CULTIVATIONS OF AGRARIAN INTEREST FROM THE ACTION OF NON-SELECTIVE WEED KILLERS**

Ottorino Palla, Crema; Giovanni Camaggi, Lodi; Franco Gozzo, S. Donato Milanese, and Ernesto Signorini, Malnate, all of Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 632,066, Jul. 18, 1984, abandoned. This application Jan. 21, 1987, Ser. No. 6,271

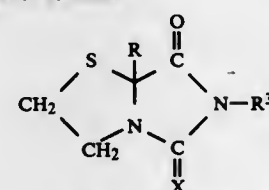
Claims priority, application Italy, Jul. 29, 1983, 22343 A/83

Int. Cl.<sup>4</sup> C07D 513/04; A01N 43/78

U.S. Cl. 71—90

6 Claims

1. Compounds of formula



wherein X is oxygen, R<sub>3</sub> is methyl or ethyl and R is phenyl or C<sub>1</sub>-C<sub>4</sub> alkyl.

**4,793,852**  
**PROCESS FOR THE RECOVERY OF NON-FERROUS METAL SULFIDES**

Guy H. Harris, Concord, Calif.; Patrice K. Ackerman, Kent, Wash., and Frank F. Aplan, State College, Pa., assignors to The Dow Chemical Company, Midland, Mich.

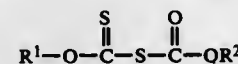
Filed Oct. 28, 1985, Ser. No. 791,803

Int. Cl.<sup>4</sup> C22B 1/00

U.S. Cl. 75—2

9 Claims

1. A method of recovering non-ferrous metal sulfides from a metal ore which comprises subjecting the metal ore, in the form of an aqueous pulp, to a froth flotation process in the presence of a floating amount of between about 0.001 and 1.0 kg per metric ton of ore of a flotation collector wherein the collector comprises a compound which corresponds to the formula



wherein

- R<sup>1</sup> is alkyl, aryl, or aralkyl group wherein the aryl or aralkyl is unsubstituted or substituted with a halo or alkyl moiety, and;
- R<sup>2</sup> is alkyl, aryl, or aralkyl group wherein the aryl or aralkyl is unsubstituted or substituted with a halo or alkyl moiety; with the proviso that at least one of R<sup>1</sup> and R<sup>2</sup> must be aryl or aralkyl unsubstituted or substituted; under conditions such that the metal sulfide values are recovered in the froth.

**4,793,853**  
**APPARATUS AND METHOD FOR FORMING METAL POWDERS**

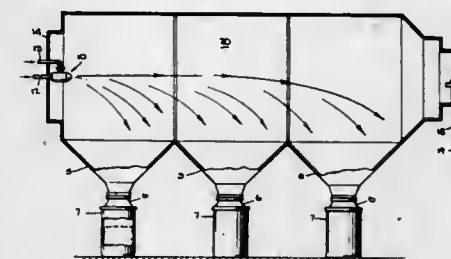
Sadashiv S. Kale, 980 Sunset Rd., Piscataway, N.J. 08854

Filed Feb. 9, 1988, Ser. No. 154,152

Int. Cl.<sup>4</sup> B22F 9/08

U.S. Cl. 75—0.5 C

24 Claims



17. A method for forming metal powders comprising the steps of:
  - introducing a non-reactive gas under pressure into a sealed chamber;
  - maintaining the gas pressure within said chamber in the range of 1.5 to 6.5 atmospheres;
  - atomizing a molten metal and expelling said atomized metal within said chamber in a substantially horizontal direction, wherein said atomized metal falls in an arcuate path within said chamber and solidifies to form metal particles; and
  - accumulating said metal particles.

**4,793,854**  
**HIGHLY PURE TITANIUM AND PROCESS FOR PRODUCING THE SAME**

Kazumi Shimotori, Kawasaki; Yoshiharu Ochi, Ichihara; Hideo Ishihara; Takenori Umeki, both of Yokohama, and Takashi Ishigami, Chigasaki, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 20, 1987, Ser. No. 51,772

Claims priority, application Japan, May 30, 1986, 61-123463

Int. Cl.<sup>4</sup> C22B 34/12, 9/22

U.S. Cl. 75—10.10

9 Claims

1. A process for producing a highly pure titanium containing not more than 200 ppm of oxygen; not more than 30 ppm each of elements consisting of iron, nickel and chromium, and not more than 0.1 ppm each of elements consisting of sodium and potassium, which comprises melting a crude titanium obtained by molten salt electrolysis, in a high vacuum of  $5 \times 10^{-5}$  mbar or less.

**4,793,855**  
**PROCESS FOR THE GASIFICATION OF SEWAGE SLUDGE**

Rolf Hank, Friedrichstr. 45, D-4000 Düsseldorf 1, Fed. Rep. of Germany

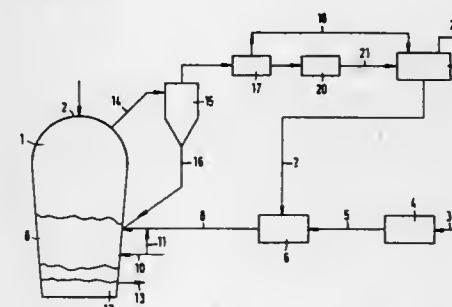
Filed Jan. 30, 1987, Ser. No. 9,184

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1986, 3603054

Int. Cl.<sup>4</sup> C21B 13/00

U.S. Cl. 75—26

9 Claims



1. Process for the gasification of sewage sludge or other carbon-containing waste materials in a gasifier having bottom,

a middle and upper areas, comprising steps of: feeding sewage sludge or other carbon-containing waste materials, a solid fuel and oxygen-containing gas into a gasifier, producing gasification gas in the gasifier and forming a slag bath adjacent to the bottom of said gasifier, forming a fluidized bed above the slag bath, said fluidized bed being formed from the sewage sludge or other carbon-containing waste materials, the solid fuel, the oxygen-containing gas and the gasification gas.

**4,793,856**  
**PROCESS FOR THE DIRECT REDUCTION OF IRON ORES**

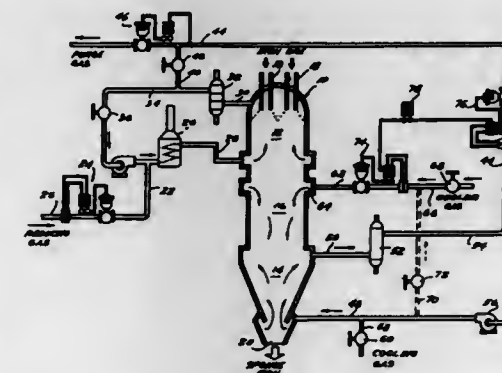
J. Federico Price-Falcon, and Hector Lopez-Ramos, both of Nuevo Leon, Mexico, assignors to Hylsa, S.A. de C.V., Guernero y Munich, Mexico

Filed Sep. 8, 1987, Ser. No. 94,335

Int. Cl.<sup>4</sup> C21B 13/02

U.S. Cl. 75—35

11 Claims



1. The method of reducing particulate ironore to sponge iron in a vertical shaft, moving bed reactor having a reducing zone in the upper portion thereof, a cooling zone in the lower portion thereof and an intermediate zone between said reducing and cooling zones, and wherein the ore is reduced by a stream of hot reducing gas that is caused to flow upwardly through a downwardly moving ore bed in said reduction zone and reduced ore is cooled by a first cooling gas stream that flows upwardly therethrough in said cooling zone, is removed from said reactor near the top of said cooling zone, then cooled and returned to the bottom of said cooling zone to form a cooling loop, and a make-up gas stream is supplied to said cooling gas loop, the improvement which comprises introducing a second cooling gas stream into said intermediate zone, causing said second cooling gas stream to flow downwardly and generally selectively along the wall of said intermediate zone where the wall is in contact with the reduced ore to cool said wall and the particulate reduced ore adjacent thereto, mixing said second cooling gas stream with said first cooling gas stream near the top of said cooling zone, and removing the resulting mixture from said reactor.

**4,793,857**  
**PROCESS FOR COOLING AND CLEANING PRODUCER GAS AND TOP GAS**

Bogdan Vuleti, Düsseldorf, Fed. Rep. of Germany, assignor to Korf Engineering GmbH, Düsseldorf, Fed. Rep. of Germany and Voest-Alpine Aktiengesellschaft, Linz, Austria

Filed Jul. 2, 1986, Ser. No. 881,071

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1985, 3524011

Int. Cl.<sup>4</sup> C21B 13/00

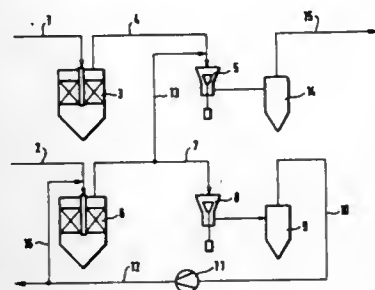
U.S. Cl. 75—34

3 Claims

1. A process for producing a cooling gas for an apparatus comprising a melt-down gasifier and an iron reduction unit, and for producing a surplus gas for use outside the gasifier



and reduction unit, comprising: producing the cooling gas exclusively from a producer gas from the melt-down gasifier and producing the surplus gas in part from a top gas of the iron reduction unit and in part from the producer gas; passing a substantially constant gas quantity of the producer gas through a gasifier supply conduit having a cooling and cleaning apparatus and back into the melt-down gasifier and reduction unit as



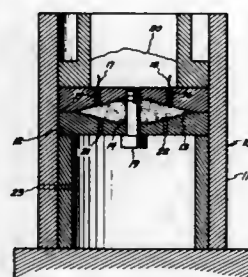
the cooling gas, passing the top gas through a surplus gas supply line having a cooling and cleaning apparatus to the outside use; and passing the producer gas exceeding said substantially constant gas quantity directly into the surplus gas supply line through the cooling and cleaning apparatus therein and to the outside use, by-passing the melt-down gasifier and reduction unit.

4,793,858

#### 4,793,859 INFILTRATION OF MO-CONTAINING MATERIAL WITH SILICON

Charles R. Morelock, Saratoga Springs, N.Y., assignor to General Electric Company, Schenectady, N.Y.  
Continuation of Ser. No. 887,599, Jul. 21, 1986, abandoned, which is a division of Ser. No. 760,844, Jul. 31, 1985, Pat. No. 4,626,516. This application Jul. 13, 1987, Ser. No. 73,918  
The portion of the term of this patent subsequent to Dec. 2, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> C22C 29/00, 29/02, 29/16, 29/18  
U.S. Cl. 75—245 13 Claims



1. An integral polycrystalline composite having a contact angle of less than 90 degrees and a phase composition consist-

ing essentially of a silicide of molybdenum in an amount of at least about 5% by volume of the composite, elemental silicon in an amount of at least about 1% by volume of the composite, and a member selected from the group consisting of a silicide of titanium, a silicide of chromium, a silicide of tungsten, a silicide of silver, a silicide of aluminum, elemental molybdenum, a mixture of said silicide of titanium and elemental titanium, a mixture of said silicide of chromium and elemental chromium, a mixture of said silicide of tungsten and elemental tungsten, a mixture of said silicide of silver and elemental silver, a mixture of said silicide of aluminum and elemental aluminum and a mixture thereof, said member of said group being present in an amount of at least about 80% by volume of the composite, said silicide of molybdenum being formed in situ, said composite being bonded by at least said silicide of molybdenum, said composite having a porosity ranging up to about 10% by volume of said composite, said porosity having no significant deleterious effect on said composite.

4,793,860

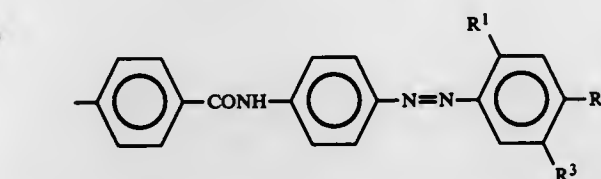
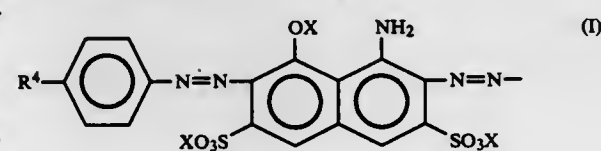
#### AQUEOUS INK COMPOSITION

Kakuji Murakami; Masaru Shimada, both of Shizuoka; Tamotsu Aruga, Numazu; Hiroyuki Uemura, Numazu, and Kiyofumi Nagai, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 2, 1987, Ser. No. 33,350  
Claims priority, application Japan, Apr. 2, 1986, 61-074284  
Int. Cl.<sup>4</sup> C09D 11/02, 11/16

U.S. Cl. 106—22 5 Claims

1. An aqueous ink composition comprising:  
(a) a dye having formula (I) in an amount of 0.5 to 6.0 wt.%, in which 20% or more of the total of the cations of —SO<sub>3</sub>X and —OX groups directly connected to the aromatic rings thereof is replaced by Li<sup>+</sup> ion or a quaternary ammonium ion,



wherein X represents a cation; R<sup>1</sup> represents hydrogen, a hydroxyl group, an alkyl group having 1 to 4 carbon atoms, or an amino group; R<sup>2</sup> represents



(in which R<sup>5</sup> and R<sup>6</sup> each represent hydrogen, an alkyl group having 1 to 4 carbon atoms, a hydroxyethyl group, or a cyano-

ethyl group); R<sup>3</sup> represents hydrogen, —SO<sub>3</sub>X; and R<sup>4</sup> represents —C<sub>2</sub>H<sub>4</sub>OX,

(b) a polyhydric alcohol in an amount of at least 10 wt.%; and  
(c) water.

4,793,861

#### GLASS REINFORCED COMPOSITIONS

Jean-Michel Sohm, Nancy, France, assignor to Vetrotex Saint-Gobain, Chambéry, France

Filed Jul. 7, 1987, Ser. No. 70,481  
Claims priority, application France, Jul. 10, 1986, 86 10117  
Int. Cl.<sup>4</sup> C04B 14/44

U.S. Cl. 106—99 28 Claims

7. A reinforced composition comprising  
100 parts by weight of a cementitious composition;  
from about 1–12 parts by weight of an alkali-resistant glass;  
and  
from about 10–40 parts by weight of a metakaolin additive to prevent a chemical attack upon said alkali-resistant glass by an alkaline interstitial solution formed within said cementitious composition.

4,793,862

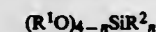
#### SILICA-BASED ANTIMONY CONTAINING FILM-FORMING COMPOSITION

Tsutomu Ishikawa, Kanagawa; Munee Nakayama, Tokyo; Akira Hashimoto, and Toshihiro Nishimura, both of Kanagawa, all of Japan, assignors to Tokyo Ohka Kogyo Co., Ltd., Kanagawa, Japan

Filed Sep. 3, 1987, Ser. No. 92,510  
Claims priority, application Japan, Sep. 8, 1986, 61-209568  
Int. Cl.<sup>4</sup> C09K 3/00

U.S. Cl. 106—287.13 32 Claims

1. A silica-based film-forming composition for diffusion of antimony which comprises:  
an organic solvent;  
a partial hydrolysis product of an alkoxy silane compound dissolved in the organic solvent wherein said alkoxy silane compound is represented by the general formula



in which R<sup>1</sup> and R<sup>2</sup> are, each independently from the other, an alkyl, alkoxy, alkenyl, aryl, glycidyl, alkoxy alkyl, acryloxy alkyl, or methacryloxy alkyl group and n is 0, 1, 2 or 3; and

an antimony compound represented by the general formula Sb(OR)<sub>m</sub> in which R is an alkyl group or an aryl group and m is a positive integer of 3 or 5 dissolved in the organic solvent.

4,793,863

HIGH STRENGTH PIGMENTS FOR PRINTING INKS  
Kalpathy R. Anantharaman; Susan T. Soward, both of Cincinnati, Ohio, and Wilmet M. Smoot, Crittenden, Ky., assignors to Sun Chemical Corporation, Fort Lee, N.J.

Filed Oct. 23, 1987, Ser. No. 112,824  
Int. Cl.<sup>4</sup> C09C 3/00; C09D 11/08  
U.S. Cl. 106—500 20 Claims

1. A method for making a resonated pigmentary composition comprising the steps of:  
contacting an organic pigment with a dispersion enhancer selected from the group consisting of resins, rosins and mixtures of the foregoing, said dispersion enhancer being present in an amount between about 90% and about 100% by weight of said organic pigment;  
contacting said dispersion enhancer with an amount of an aluminum salt effective to form aluminum resinate or rosinate by combining with at least about 50% of said dispersion enhancer, said aluminum salt being present in a concentration below stoichiometric amount.

4,793,864

#### SUBSTRATE HAVING AN ADHERENT PHOTO-PRODUCT COATING ON ITS SURFACE AND A METHOD OF COATING SAID SUBSTRATE

Phillip J. Neumiller, and Robert M. Etter, both of Racine, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.  
Continuation-in-part of Ser. No. 3,350, Jan. 14, 1987. This application May 12, 1987, Ser. No. 49,062

Int. Cl.<sup>4</sup> B06B 3/00; C06F 2/48; C06G 2/16

U.S. Cl. 134—1 52 Claims

1. A natural or synthetic gemstone substrate or mineral substrate having on its surface an adherent photo-product coating, which coating is formed by exposing to light in the presence of an oxygen source, a reactant mixture having a pH from about 7 to 10.5 comprising:

(a) 2,2',4,4'-tetrahydroxybenzophenone;  
(b) ammonium hydroxide; and  
(c) optionally a trace amount of at least one reactive metal selected from the group consisting of zinc, copper, nickel, silver, iron, manganese, lead, cobalt, zirconium, mercury, palladium, cadmium, ruthenium, rhodium, and mixtures thereof; in a solvent.

6. A natural or synthetic gemstone substrate having on its surface an adherent photo-product coating, which coating is formed by exposing to light in the presence of an oxygen source, a reactant mixture having a pH from about 7 to 10.5 comprising:

(a) 2,2',4,4'-tetrahydroxybenzophenone;  
(b) at least one metal salt wherein the metal is selected from the group consisting of zinc, copper, nickel, silver, iron, manganese, lead, cobalt, zirconium, mercury, palladium, cadmium, ruthenium, rhodium, and mixtures thereof; and  
(c) at least one amine; in a solvent.

38. A method of cleaning a natural or synthetic mineral substrate comprising the steps of:

(A) forming an adherent photo-product coating on the surface of said substrate by:  
(1) preparing a reactant mixture of claim 1;  
(2) contacting said substrate with said reactant mixture; and  
(3) exposing said reactant mixture in contact with said substrate to light in the presence of an oxygen source; and  
(B) removing said photo-product coating from the surface of said substrate.

**4,793,865**  
**METHOD AND COMPOSITION FOR THE REMOVAL OF AMMONIUM SALT AND METAL COMPOUND DEPOSITS**

Charles M. Staley, Houston; Verle E. Cornish, Missouri City, and Howard J. Platte, Houston, all of Tex., assignors to Aqua Process, Inc., Houston, Tex.

Filed Aug. 19, 1987, Ser. No. 87,497

Int. Cl.<sup>4</sup> B08B 9/00, 3/00, 9/08; C23C 1/26  
 U.S. Cl. 134—2

**25 Claims**  
 25. A method of treating a refinery or a petrochemical processing unit which processes a hydrocarbon stream, comprising the steps of:

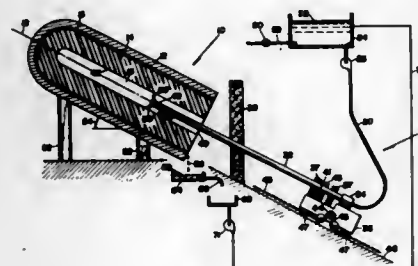
- injecting an amine into the stream, the amine containing an oxygen atom;
- flowing an oxygenated hydrocarbon compound into the stream, the oxygenated hydrocarbon compound containing at least two oxygen atoms, one of which is in a keto group;
- interacting the amine with an ammonium salt deposit present in the unit to form an amine salt in liquid form;
- reacting the oxygenated hydrocarbon compound with a metal compound deposit present in the unit to form a chelate; and
- flowing the amine salt and the chelate out of the unit.

**4,793,866**  
**METHOD AND APPARATUS FOR REMOVING SOLID PROPELLANT FROM ROCKET MOTOR CASES**

Melson J. McIntosh, North Ogden, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Dec. 13, 1985, Ser. No. 808,791

Int. Cl.<sup>4</sup> B08B 3/02, 9/08  
 U.S. Cl. 134—24



1. A process for removing solid propellant from a rocket motor case composed of a composite of resin and fiber material comprises the steps of:

- a. heating water to a temperature which is at least about 150° F.;
- b. pressurizing the water to a pressure within the range of about 600 to 1200 psi;
- c. focusing the water into a jet;
- d. directing the water jet onto the surface of the propellant from a stand-off distance of up to about 20 inches and at an angle relative to the propellant surface which is within the range of about 15 to 45 degrees; and
- e. re-directing the water jet over the propellant surface to effect cuts in the propellant whereby pieces of propellant which are cut therefrom may be removed.

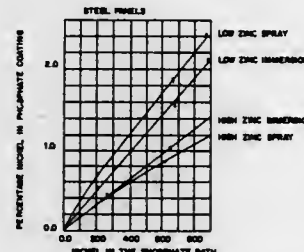
**4,793,867**  
**PHOSPHATE COATING COMPOSITION AND METHOD OF APPLYING A ZINC-NICKEL PHOSPHATE COATING**

Harry R. Charles, Sterling Heights; Thomas W. Cape, W. Bloomfield, and Donald L. Miles, Farmington Hills, all of Mich., assignors to Chemfil Corporation, Troy, Mich.

Filed Sep. 26, 1986, Ser. No. 912,754

Int. Cl.<sup>4</sup> C23C 22/12  
 U.S. Cl. 148—6.15 Z

**6 Claims**



1. A method of phosphate conversion coating metallic substrates selected from the group consisting of steel, zinc-coated steel, and aluminum comprising the steps of:

- cleaning the surface of the substrates with an alkali cleaner;
- conditioning the surface of the substrates with a titanium containing aqueous solution;
- coating the surface of the substrates with a solution consisting essentially of an aqueous solution of the constituents A, B, and C combined in the ratio of 8 to 20 parts by weight A: 2 parts by weight B: 2-4 parts by weight C, and B is provided at a concentration of between about 300 ppm and 750 ppm,

wherein

- A is selected from the group consisting of potassium, sodium and ammonium ions present as a phosphate salt;
  - B is zinc ions; and,
  - C is selected from the group consisting of nickel, or nickel and manganese wherein the concentration of C does not exceed 1500 ppm;
- applying said coating composition to the surface of the substrates at a temperature of between about 100° and 140° F. for between 30 and 300 seconds; and
- rinsing said substrates.

**4,793,868**  
**THERMOMECHANICAL METHOD OF FORMING FATIGUE CRACK RESISTANT NICKEL BASE SUPERALLOYS AND PRODUCT FORMED**

Keh-Mian Chang, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 15, 1986, Ser. No. 907,275

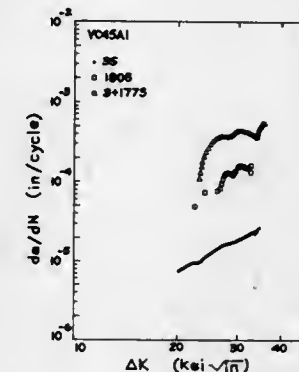
Int. Cl.<sup>4</sup> C22F 1/10

**7 Claims**

1. A method of reducing the fatigue crack propagation rate of a nickel base superalloy which comprises selecting a nickel base superalloy having a gamma strengthening precipitate at a volume concentration of less than 35%,

heating the alloy to recrystallize the grains thereof and to

render them of a minimum average diameter of about 35 microns, and



deforming the grains of the alloy by working the alloy mechanically to change its shape by at least 15%.

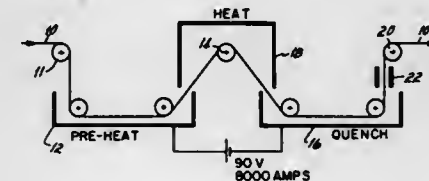
**4,793,869**  
**CONTINUOUS TREATMENT OF COLD-ROLLED CARBON MANGANESE STEEL**

George Krauss, Evergreen, Colo., and Phillip M. Roberts, Naperville, Ill., assignors to Signode Corporation, Glenview, Ill.

Filed Apr. 10, 1987, Ser. No. 37,185

Int. Cl.<sup>4</sup> C21D 8/00  
 U.S. Cl. 148—12.1

**8 Claims**



1. A method of treating steel in a continuous process wherein the steel is cold reduced and has a composition of from about 0.04% to 0.15% by weight carbon and 0.25% to 0.70% by weight manganese, without the addition of microalloying agents for the purpose of achieving enhanced mechanical properties, comprising the steps of:

- (1) preheating the steel to a temperature in the range of 700° to 1000° F.;
  - (2) heating the steel to a temperature in the range of 1625° to 1725° F.; and
  - (3) quenching the steel at a temperature in the range of 650° to 750° F.;
- the treated steel having a minimum of 40,000 psi yield strength; 50,000 psi tensile strength; and 22% elongation.

**4,793,870**  
**CONTINUOUS TREATMENT OF COLD-ROLLED CARBON HIGH MANGANESE STEEL**

George Krauss, Evergreen, Colo., and Phillip M. Roberts, Naperville, Ill., assignors to Signode Corporation, Glenview, Ill.

Filed Apr. 10, 1987, Ser. No. 37,186

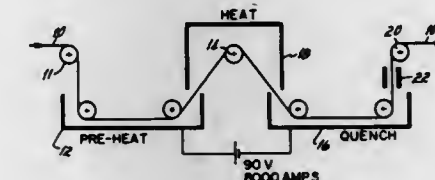
Int. Cl.<sup>4</sup> C21D 8/04

**7 Claims**

1. A method of treating steel in a continuous process wherein the steel is cold reduced and has a composition of from about 0.11% to 0.18% by weight carbon and 1.20% to 1.40% by weight manganese, without the addition of microal-

loying agents for the purpose of achieving enhanced mechanical properties, comprising the steps of:

- (1) preheating the steel to a temperature in the range of 700° to 1000° F.;
- (2) heating the steel to a temperature in the range of 1500° to 1575° F.; and



(3) quenching the steel at a temperature in the range of 800° to 950° F.;

the treated steel having a minimum of 70,000 psi yield strength; 85,000 psi tensile strength; and 14% elongation.

**4,793,871**  
**METHOD OF IMPROVING SURFACE WEAR QUALITIES OF METAL COMPONENTS**

Cyril Dawes, West Midlands, and Donald F. Tranter, Worcestershire, both of England, assignors to Lucas Industries Public Limited Company, Birmingham, England

Filed Apr. 10, 1987, Ser. No. 37,192

Int. Cl.<sup>4</sup> C21D 1/74  
 U.S. Cl. 148—16.5

**13 Claims**

1. A method of subjecting a steel component made of a non-alloy or fine grained steel to a hardening treatment to increase the surface wear resistance thereof, comprising the steps of:

- (a) disposing the component in a sealable vessel;
- (b) deliberately excluding from the atmosphere in the vessel all elements in gaseous form which will cause the formation of a porous epsilon iron nitride layer thereon;
- (c) heating the component in the vessel to a treatment temperature; and then
- (d) exposing the component, heated to the treatment temperature at atmospheric pressure, to a gaseous nitriding or nitrocarburizing atmosphere for a period until there is formed thereon an epsilon iron nitride layer which is wear resistant, has a hardness of about 800 to 1000 HV, is non porous, and extends 18 micron deep.

**4,793,872**  
**III-V COMPOUND HETEROEPIAXIAL 3-D SEMICONDUCTOR STRUCTURES UTILIZING SUPERLATTICES**

Paul L. Meunier, and Manijeh Razeghi, both of Orsay, France, assignors to Thomson-CSF, Paris, France

Filed Mar. 4, 1987, Ser. No. 21,684

Int. Cl.<sup>4</sup> H01L 27/14, 29/161  
 U.S. Cl. 148—33.4

**17 Claims**

1. A device formed of semiconductor material deposited by epitaxial growth on a substrate having a predetermined and different lattice parameter, comprising on said substrate an alternate succession of layers of a first semiconductor material ranging in number (i) from 1 to n and layers of a second type ranging in number (i) from 1 to n as well as at least a first functional component for performing a predetermined function formed on said succession of layers, the layers of the first semiconductor material having a lattice parameter which is substantially matched with a multiple or a sub-multiple of the substrate lattice parameter, the layers of the second semicon-





4,793,879

# METHOD FOR PERFORMING A REPAIR ON AN OBSTRUCTED SECTION OF A COMPOSITE STRUCTURE

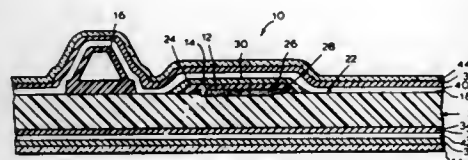
Charles C. Mimbs, Gordon, Ga., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Dec. 10, 1987, Ser. No. 131,199

Int. Cl.<sup>4</sup> B32B 35/00

U.S. Cl. 156—98

11 Claims



1. A method for performing a repair to a damaged area of a composite structure wherein an obstruction is in close proximity to the repair site, comprising the steps of:

- laying up a first patch on the repair site on a first side of the composite structure;
- applying heat to the repair site via a second side of the composite structure which is opposite to the first side of the composite structure so that heat is conducted through the composite structure from the second side of the composite structure to the repair site on the first side of the composite structure;
- applying pressure to the repair site via the first side and the second side of the composite structure; and
- curing the first patch.

4,793,880

# STERILE WELDING OF PLASTIC TUBES

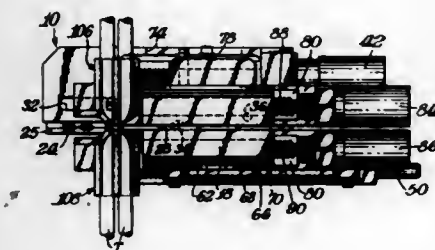
John B. Shapotska, and Dudley W. C. Spencer, both of Wilmington, Del., assignors to Denco, Inc., Wilmington, Del.

Filed May 18, 1987, Ser. No. 51,390

Int. Cl.<sup>4</sup> A61M 5/00; B29C 65/20

U.S. Cl. 156—158

31 Claims



1. A linear welder for butt welding tubes comprising a stationary base, a carriage slidably mounted on said base, a pair of side by side arms secured to said carriage, a pair of spaced tube holders, each of said tube holders being mounted on a respective arm and having a plurality of tube receiving grooves, said grooves of one holder being selectively in line with said grooves of the other holder whereby a pair of tubes may be placed in said holders across said arms, clamping means on said arms for clamping the tubes in said holders, cutting means, drive means for moving said arms toward said cutting means to dispose said cutting means in the spacing between said holders to cut the tubes into tube sections, said drive means being capable of moving one of said arms forwardly of the other of said arms to realign the tube sections and being capable of moving the realigned tube sections out of contact with said cutting means, means for heating the realigned tube sections, one of said arms being pivotally mounted on said carriage for pressing the realigned heated tube sections into contact with each other for the butt welding, one of said arms being a pivot

arm pivotally secured at one end to said carriage, the other of said arms being a shift arm which is mounted for relative sliding movement on said carriage, stop means in the path of motion of said shift arm, and locking means selectively securing said shift arm to said carriage in one of two positions.

4,793,881

# METHOD FOR MAKING FABRIC COVERED ARTICLES, ESPECIALLY BELT BUCKLES

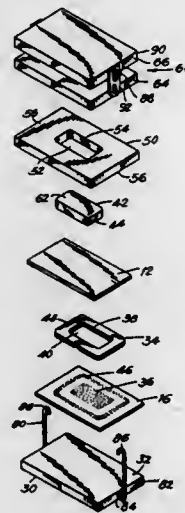
Richard Fink, 2110 Oliver Way, Merrick, N.Y. 11516

Filed Oct. 23, 1987, Ser. No. 113,224

Int. Cl.<sup>4</sup> B29C 53/06, 59/02, 65/48, 65/54

U.S. Cl. 156—212

10 Claims



1. A method of manufacturing a fabric-covered article comprising the steps of:

- locating an article insert on a backing sheet;
- applying a first bead of glue to said backing sheet adjacent to a first edge of said article insert;
- placing a piece of covering fabric over said article insert, said first edge and said backing sheet;
- adhering said covering fabric to said backing sheet, at said first bead of glue, by pressing a mold insert, shaped to said first edge of said article insert against said covering fabric;
- applying a second bead of glue to said backing sheet adjacent to a second edge of said article insert; and,
- adhering said covering fabric to said backing sheet, at said second bead of glue, by pressing a mold, having a central opening corresponding in shape to said article insert, over said covering fabric.

4,793,882

# PROCESS FOR PRODUCING THREE-DIMENSIONAL STIFFENING ELEMENT OF A MELTABLE PLASTIC POWDER OR A POWDER MIXTURE CONTAINING MELTABLE PLASTIC POWDER AND APPLICATION THEREOF TO A SUBSTRATE, PARTICULARLY SHOE PARTS

Harald Brehmer, Neuhofen, and Emil Wilding, Birkenheide, both of Fed. Rep. of Germany, assignors to Giulini Chemie GmbH, Ludwigshafen am Rhein, Fed. Rep. of Germany

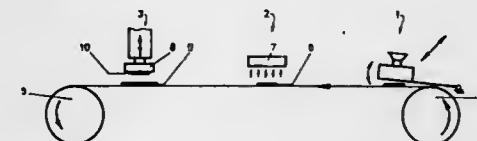
Filed Nov. 7, 1986, Ser. No. 928,008

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1985, 3539573

Int. Cl.<sup>4</sup> A43B 23/17

U.S. Cl. 156—235

12 Claims



1. A process for producing a three-dimensional stiffening element from at least one meltable plastic powder comprising: applying the powder with the aid of a template to an auxiliary carrier; compressing and sintering the powder on the auxiliary carrier with a hot molding plug to obtain a blank; lifting the molding plug with the blank held thereon due to greater adhesion of the blank to the molding plug than to the auxiliary carrier, thereby removing the blank from the auxiliary carrier, and further melting the sintered plastic particles of the blank which are in contact with the molding plug; disposing a substrate below the blank held on the molding plug; and transferring the further melted blank onto the substrate disposed therebelow by lowering the further melted blank, held on the molding plug, into contact with the substrate and removing the molding plug, leaving the further melted blank adhered on the substrate due to greater adhesion of the further melted blank to the substrate than to the molding plug, the transferred further melted blank forming a three-dimensional stiffening element.

4,793,883

# METHOD OF BONDING A SEMICONDUCTOR CHIP TO A SUBSTRATE

Gregory M. Sheyon, and Joseph A. Aurichio, both of Anderson, S.C., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Jul. 14, 1986, Ser. No. 885,127

Int. Cl.<sup>4</sup> B32B 31/26

U.S. Cl. 156—235

2 Claims

1. A method of bonding a semiconductor chip to a substrate which comprises:

- bonding a tacky, curable and partially cured, non-viscous chip bonding adhesive, which is releasably supported on a support film, to the surface of the chip intended to be bonded to the substrate;
- further partially heat curing the adhesive to convert it to a non-tacky state;
- mounting the chip on the substrate at elevated temperature to change the adhesive to a more tacky state; and
- curing of the adhesive, wherein the chip is in the configuration of a semiconductor wafer, the wafer is mounted on the adhesive on the support film, the wafer is scribed and then cracked into individual chips, the resulting chips with adhesive adhesives are removed from the support film, and the adhesive is converted to a non-tacky state.

4,793,884

# DECORATIVE PLATE PRODUCING METHOD

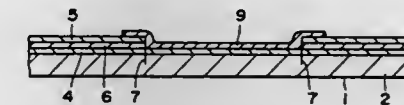
Yataro Horikiri, Tokyo, Japan, assignor to Wakaba Co., Ltd., Tokyo, Japan

Filed Oct. 22, 1987, Ser. No. 111,177

Int. Cl.<sup>4</sup> B32B 31/18

U.S. Cl. 156—247

4 Claims



1. Method of producing a decorative plate comprising the steps of:

- applying a bonding agent to an upper surface of a substrate to form a bonding agent layer,
- bonding release paper to the resultant bonding agent layer on said upper surface of said substrate, a lower surface of said release paper being coated with a silicone resin,
- cutting said release paper, said silicone resin, said bonding agent layer therethrough and said upper surface of said substrate to a small depth to thereby pattern said release paper and said substrate with a predetermined figure,
- removing a patterned portion of said release paper to form a recessed portion with said bonding agent layer exposed,
- said patterned portion being enclosed with a cut made by the cutting,
- applying decorative paper to said bonding agent layer in said recessed portion,
- cutting said decorative paper along said cut to thereby remove a peripheral portion thereof, and
- forcing fluff formed at the cut edge of a bonded portion of said decorative paper into said cut formed in said substrate.

4,793,885

# METHOD OF LAMINATING AND STRETCHING FILM MATERIAL AND APPARATUS FOR SAID METHOD

Ole-Bendt Rasmussen, 7, Topstykke, 3460 Binkeroed, Denmark

Continuation of Ser. No. 455,045, Jan. 3, 1983, abandoned, which is a continuation of Ser. No. 000,600, Jan. 2, 1979, abandoned, which is a continuation of Ser. No. 803,895, Jan. 6, 1977, abandoned, which is a division of Ser. No. 592,273, Jul. 1, 1975, Pat. No. 4,039,364. This application Jul. 9, 1984, Ser. No. 627,501

Claims priority, application United Kingdom, Dec. 11, 1974, 53644; Feb. 12, 1975, 5972

The portion of the term of this patent subsequent to Dec. 16, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> B29C 65/72

U.S. Cl. 156—200

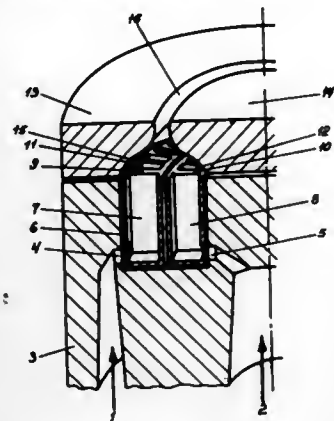
11 Claims

1. A method of simultaneously laterally stretching and laminating together at least two separate films formed from at least one thermoplastic, orientable polymer which comprises the steps of positively advancing said separate films under tension in generally spread out condition with the adjacent surfaces of each adjacent pair of said films in direct face-to-face contact to form a sandwich of separate films; and while maintaining said films in said tensioned sandwich condition and at a temperature substantially below their melting point, applying mechanical pressure to the opposite sides of the advancing film sandwich alternately in directions perpendicular to the opposite sandwich faces along a multiplicity of generally uniformly closely spaced loci extending parallel to the direction of advance to positively deflect said sandwich into a temporary generally uniform laterally zig-zag or pleated configuration to said sandwich, the magnitude of said mechanical pressure and the deflection produced thereby being sufficient to mechanically work the mutually contacting surfaces of adjacent pairs of



films in said sandwich along said loci and thereby impart a permanent lateral stretch while coincidentally effecting cold-weld bonding together of the mutually contacting film surfaces.

11. Apparatus for simultaneously laterally stretching and laminating together films of thermoplastic orientable polymer which comprises means for positively advancing under tension at least two separate films of said polymer in generally flat spread out condition with the adjacent surfaces of each adjacent pair of said films in direct face-to-face contact to form a sandwich of at least one pair of said separate films, and means



for applying mechanical pressure to opposite sides of said advancing sandwich in alternating directions perpendicularly out of the faces thereof along generally uniformly closely spaced loci extending parallel to the direction of advancing to positively deflect the advancing sandwich and impart a temporary generally uniform zig-zag or pleated configuration thereto, the magnitude of such deflection being sufficient to mechanically work the mutually contacting surfaces of each adjacent pair of films along said loci and thereby impart a permanent lateral stretch while coincidentally effecting cold-weld bonding together of the mutually contacting film surfaces.

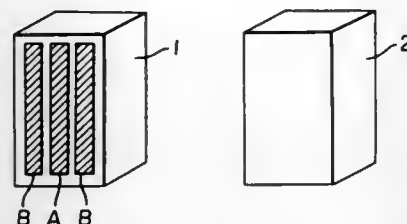
#### 4,793,886 BONDING METHOD AND ADHESIVE USEFUL FOR THE METHOD

Nasumi Okamura, Kuki; Hiroshi Aoki, Saitama; Junzo Makino, Omiya; Hajime Yagi, Tokyo; Yasuo Arai, Saitama, and Takashi Yamazaki, Chiba, all of Japan, assignors to Cemedine Co., Ltd., Tokyo, Japan

Filed Jul. 2, 1987, Ser. No. 69,187  
Claims priority, application Japan, Jul. 2, 1986, 61-154154; Nov. 6, 1986, 61-262700; Nov. 17, 1986, 61-271719  
Int. Cl.<sup>4</sup> C09J 5/02

U.S. Cl. 156—307.3

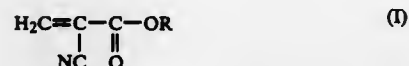
19 Claims



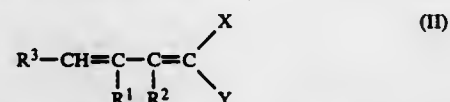
1. A method for bonding two objects by means of the following two adhesives:

(A) a moisture-inducible room temperature anion polymerization curing adhesive consisting essentially of at least one anion polymerizable compound selected from the group

consisting of an  $\alpha$ -cyanoacrylate compound of the formula:



wherein R is an alkyl group having from 1 to 16 carbon atoms, an alkoxyalkyl group having from 2 to 16 carbon atoms, a haloalkyl group having from 1 to 16 carbon atoms, a cyanoalkyl group having from 2 to 16 carbon atoms, an aralkyl group having from 6 to 12 carbon atoms, an acyloxyalkyl group having from 2 to 16 carbon atoms, a cycloalkyl group having from 3 to 16 carbon atoms, an alkenyl group having from 2 to 16 carbon atoms or an aryl group having from 6 to 12 carbon atoms, and a 1,1-disubstituted diene compound of the formula:



wherein each of R<sup>1</sup> and R<sup>2</sup> which may be the same or different, is a hydrogen atom, an alkyl group having from 1 to 5 carbon atoms, an aryl group, an aralkyl group having from 6 to 12 carbon atoms or a halogen atom, R<sup>3</sup> is a hydrogen atom or a methyl group, each of X and Y which may be the same or different is a cyano group, a carboxylic acid ester group having from 2 to 12 carbon atoms, an ethylsulfone group, a phenylsulfone group, a formyl group, an acetyl group, a benzoyl group, an aride group, a diethyl sulfonyl group, or a phenyl group; and (B) a room temperature self-curing adhesive containing from 0.05 to 50% by weight of an anion polymerization accelerator, said self-curing adhesive being selected from the group consisting of (1) a room temperature moisture-curing adhesive, (2) a room temperature curing two-part type epoxy resin adhesive, and (3) a room temperature curing synthetic resin aqueous emulsion adhesive, which comprises applying said two adhesives (A) and (B) at the bonding interface of the objects so that they do not contact each other and pressing the objects to each other to bring the two adhesives in contact with each other.

4,793,887  
UNDERWATER BONDING OF SURFACE-CONFORMING MATERIAL  
Steve W. Card, Minden, and Joseph R. West, Bossier City, both of La., assignors to Morton Thiokol, Inc., Chicago, Ill.  
Continuation-in-part of Ser. No. 884,443, Jul. 11, 1986. This application Jun. 1, 1987, Ser. No. 57,567

The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> C09J 3/14, 5/02

U.S. Cl. 156—307.3

9 Claims

1. A method of adhering a surface-conforming material to a target surface which is submerged underwater, the method comprising

applying to a surface of said conforming material or to said target surface a cyanoacrylate formulation consisting essentially of cyanoacrylate monomers with or without dissolved thickening agents, said cyanoacrylate formulation having a viscosity between about 75 cps and about 10,000 cps, and

pressing said conforming material against said target surface to establish contact of said conforming material surface with said target surface and for a period of time sufficient to effect a cure of said cyanoacrylate adhesive formulation to form a bond adequate to support said conforming material from said target surface.

4,793,888  
SYSTEM FOR UNDERWATER AND COLD TEMPERATURE BONDING  
Steve W. Card, Minden, and Joseph R. West, Bossier City, both of La., assignors to Morton Thiokol, Inc., Chicago, Ill.  
Filed Jul. 11, 1986, Ser. No. 884,443  
Int. Cl.<sup>4</sup> C09J 5/02

U.S. Cl. 156—307.3

9 Claims

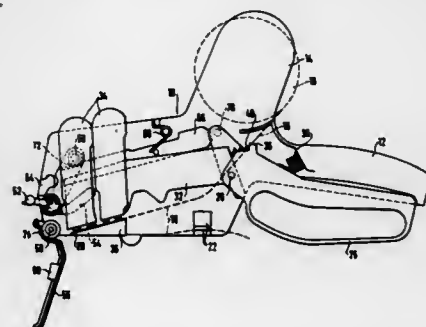
1. A method of adhering an object to a target surface which is submerged under water, the method comprising securing a sheet of compliant backing material to a surface of said object, leaving one surface of said backing material sheet exposed, applying to said exposed surface a cyanoacrylate formulation consisting essentially of a cyanoacrylate monomer with or without a dissolved thickening agent, said cyanoacrylate formulation having a viscosity between about 75 cps and about 10,000 cps, and pressing said object against said target surface to establish contact of said cyanoacrylate formulation-covered surface with said target surface and for a period of time sufficient to effect a cure of said cyanoacrylate formulation to form a bond between said backing sheet and said target surface of strength adequate to support said object from said target surface.

4,793,889  
HAND LABELING DEVICE  
Werner Becker, Hirschhorn, Fed. Rep. of Germany, assignor to Easelte Meto International Produktions GmbH, Fed. Rep. of Germany  
Filed Feb. 29, 1988, Ser. No. 162,255  
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1987, 3706439

Int. Cl.<sup>4</sup> B65C 11/02; B41F 1/46

U.S. Cl. 156—384

3 Claims



1. Hand labeling device for imprinting, dispensing and applying self-adhering labels to articles in the course of an operating cycle, comprising a printing mechanism accommodated in a device housing and having print types for generating an imprint on a self-adhering label disposed in a printing position, a transport means which brings the self-adhering labels consecutively into the printing position and into the position for application to the articles, and an inking means for inking the print types of the printing mechanism before each printing operation and including an inking roll which inking roll is adapted to be rolled on the print types of the printing mechanism and which inking roll is rotatably mounted in an inking roll holder which inking roll holder during the rolling of the inking roll on the print types is guided in a guideway in the housing by means of guide pins extending parallel to the inking roll, characterized in that the guideway (54) comprises an exit opening (64) for the guide pins (52, 53) on the inking roll holder (48) and that the device housing (10) is provided with a flap (56) which flap is pivotal between a closed and an open position and on which flap at least one extension (60) is disposed

which extension in the closed position of the flap (56) closes the exit opening (64) of the guideway (54).

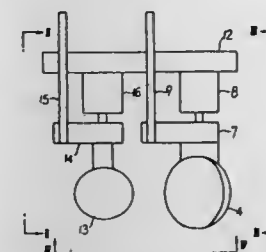
4,793,890  
AUTOMATIC JOINING APPARATUS FOR A CARCASS PLY

Hidemasa Sato, Nagasaki, Japan, assignor to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 19, 1987, Ser. No. 122,847  
Claims priority, application Japan, Mar. 20, 1987, 62-40089[U]

Int. Cl.<sup>4</sup> B29D 30/06, 23/00; B29C 69/00; B31F 5/00  
U.S. Cl. 156—405.1

3 Claims



1. An automatic joining apparatus for a carcass ply said automatic forming apparatus provided with a pair of magnet-containing drive rollers movable in an axial direction of a former drum while being held in contact with a proximity of an attachment start edge of the carcass ply and in contact with a proximity of an attachment finish edge thereof to join said attachment start edge and said attachment finish edge together when the carcass ply cut into a length somewhat shorter than a circumferential length of the former drum has been wound around an outer circumferential surface of the former drum, and a pair of gathering rollers movable in the axial direction of the former drum disposed behind said respective magnet-containing drive rollers while being held in contact with the proximity of said attachment start edge and the proximity of the attachment finish edge to join said attachment start edge and said attachment finish edge together.

4,793,891  
APPLICATION OF LABELS TO ARTICLES  
Michael Freeman, and Brian Nicholson, both of Essex, United Kingdom, assignors to John Waddington, PLC., England  
Filed Mar. 18, 1987, Ser. No. 27,374  
Claims priority, application United Kingdom, Mar. 18, 1986, 8606629

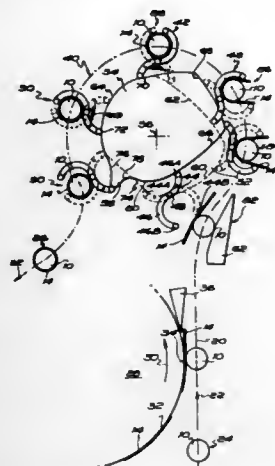
Int. Cl.<sup>4</sup> B65C 9/02, 9/32

U.S. Cl. 156—476

8 Claims

1. A machine for applying labels to bottles comprising:  
(a) means for moving the bottles in sequence through the machine;  
(b) means for applying labels whilst flat individually and tangentially to the bottles;  
(c) a plurality of arm assemblies mounted for continuous movement in an endless path and each defining a pocket to receive a bottle and adapted to wrap a tangentially applied label around a bottle;  
(d) said means for moving the bottles in sequence being arranged to feed the bottles individually into the pockets of said arm assemblies in a direction tangentially to said endless path whilst the said assemblies move in the endless path so that the bottles are progressively fed into the pockets and such progressive feeding causes partial wrapping of the labels round the bottles; and

(c) cam means co-operating with said arm assemblies to operate same by virtue of the movement of the assemblies



around said endless path to complete the wrapping of the labels round the bottles.

4,793,892

#### APPARATUS FOR PRODUCING REINFORCED CEMENTITIOUS PANEL WEBS

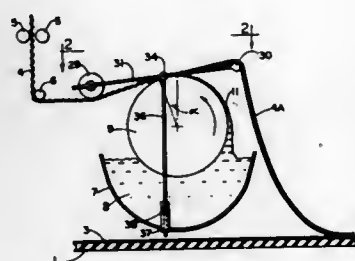
Robert G. Miller, and Richard J. Walter, both of Bakersfield, Calif., assignors to Glascrete, Inc., Bakersfield, Calif.

Filed Sep. 24, 1987, Ser. No. 104,283

Int. Cl. B32B 31/00

U.S. Cl. 156-549

3 Claims



1. Apparatus for the application of cementitious composition to a web of pervious reinforcing fabric in the continuous production of fabric reinforced cementitious panel webs comprising:

- a conveyor belt on which said panel webs are deposited,
- a reservoir containing a cementitious composition,
- a reversely turning pumping roller partially immersed in said cementitious composition,
- a variable speed means for driving said pumping roller,
- means for feeding a web of pervious reinforcing fabric into contact with the upper surface of said pumping roller,
- an adjustable-position first guide means located between said means for feeding said web and said pumping roller, said first guide means contacting the upper face of said web, and
- an adjustable-position second guide means placed to receive said web as it leaves the surface of said pumping roller, said second guide means contacting the lower face of said web and serving to guide said web forward in a non-tensioned condition,
- said first guide means and said second guide means being mounted at opposite ends of a frame, said frame being pivotally mounted on vertically adjustable members,
- said first guide means and said second guide means serving

to regulate the arc of contact of said web with the surface of said pumping roller.

4,793,893

#### METHODS FOR THE PREPARATION OF THIN LARGE-AREA SINGLE CRYSTALS OF DIACETYLENES AND POLYDIACETYLENES

Mrinal K. Thakur, Waltham; Sakant K. Tripathy, Arlington, and Daniel J. Sandman, Acton, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Division of Ser. No. 705,587, Feb. 26, 1985, Pat. No. 4,684,434.

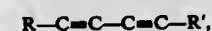
This application May 7, 1987, Ser. No. 46,499

Int. Cl. C30G 1/12, 29/54, 29/58

U.S. Cl. 156-622

8 Claims

1. A method for preparing thin large-area single crystals of a diacetylene monomer comprising:  
forming a liquid layer consisting of a pure solvent in which is dissolved a pure diacetylene monomer represented by the formula



wherein R and R' are side groups selected such that the diacetylene monomer is polymerizable by a 1,4-addition solid state reaction, upon exposure to actinic radiation between two opposed surfaces;

applying pressure of at least 0.5 psi to the liquid layer disposed between the two opposed surfaces; and  
crystallizing the liquid layer disposed between the two opposed surfaces, by evaporating the solvent from the liquid layer at a constant temperature, while the liquid layer is kept under constant pressure, to form a thin large-area single crystal of diacetylene monomer.

4,793,894

#### PROCESS FOR CRYSTAL GROWTH FROM SOLUTION

John C. Jacco, Woodstock, N.Y., and Gabriel M. Lotacomo, Franklin Lakes, N.J., assignors to North American Phillips Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 24,239, May 10, 1987, Pat. No. 4,761,202, which is a continuation-in-part of Ser. No. 869,170, May 30, 1986, abandoned. This application Oct. 19, 1987, Ser. No. 110,298

Int. Cl. C30B 7/08, 7/10

U.S. Cl. 156-623 R

9 Claims

1. In a method of producing large substantially flaw-free single crystals of a composition of the formula  $LiNdP_4O_{12}$ , the steps comprising:

- (a) preparing a mixture of  $LiNdP_4O_{12}$  and a flux comprising the oxides  $Li_2O$  and  $P_2O_5$  in the ratio by weight of  $Li_2O$  to  $P_2O_5$  in the range of 0.7:1 to 2:1 or of their precursors and producing a melt thereof by heating said mixture, to a temperature of 750° C.-1000° C. the ratio by weight of  $LiNdP_4O_{12}$  to flux at the seeding temperature being about equal to the saturation value of said  $LiNdP_4O_{12}$  in said flux;
- (b) suspending a seed crystal of said  $LiNdP_4O_{12}$  in said melt;
- (c) slowly decreasing the temperature of said melt while maintaining essentially spatially isothermal conditions throughout said melt, the maximum temperature difference being not greater than about 4° C., to thereby cause said  $LiNdP_4O_{12}$  to crystallize from said melt on said seed crystal; and
- (d) continuing decreasing the temperature of said melt until crystallization of said  $LiNdP_4O_{12}$  on said seed crystal is completed.

4,793,895

#### IN SITU CONDUCTIVITY MONITORING TECHNIQUE FOR CHEMICAL/MECHANICAL PLANARIZATION ENDPOINT DETECTION

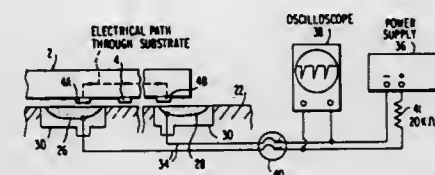
Carter W. Kaanta, Colchester, and Michael A. Leach, Bristol, both of Vt., assignors to IBM Corporation, Armonk, N.Y.

Filed Jan. 25, 1988, Ser. No. 147,422

Int. Cl. H01L 21/306; B44C 1/22

U.S. Cl. 156-627

18 Claims



18. A method for monitoring the conductivity of a work piece during the course of a lapping process carried out in a lapping machine having a polishing pad that contacts the work piece, the polishing pad having an active electrode and at least one passive electrode contacting the work piece, comprising the step of:

monitoring the current flow between said active and at least one passive electrode of the polishing pad during the polishing process.

4,793,896

#### METHOD FOR FORMING LOCAL INTERCONNECTS USING CHLORINE BEARING AGENTS

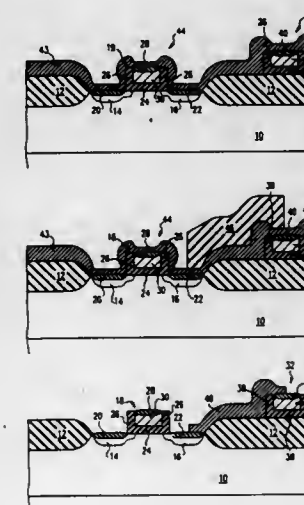
Monte A. Douglas, Coppell, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 22, 1988, Ser. No. 159,852

Int. Cl. B44C 122; C03C 15/00, 25/06; C23F 1/02

U.S. Cl. 156-643

26 Claims



1. A method for dry etching a conductive titanium chemical compound formed over a dielectric and a silicide on a semiconductor surface, comprising the steps of:  
disposing the semiconductor surface within a plasma etcher;  
flowing a chlorine bearing agent into said plasma etcher and over the semiconductor surface;  
igniting said chlorine bearing agent to form plasma; and  
etching the titanium chemical compound with said plasma without undesirably etching the dielectric from the semiconductor surface.

4,793,897

#### SELECTIVE THIN FILM ETCH PROCESS

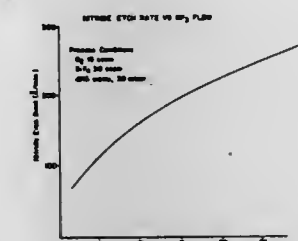
John S. Dunfield, San Jose, and Bradley J. Taylor, Saratoga, both of Calif., assignors to Applied Materials, Inc., Santa Clara, Calif.

Filed Mar. 20, 1987, Ser. No. 28,242

Int. Cl. B44C 1/22; C03C 15/00, 25/06

U.S. Cl. 156-643

30 Claims



1. A process for etching a film with high selectivity relative to an underlying oxide layer or a masking oxide layer, comprising exposing the film to a plasma formed from a mixture of silicon-containing and fluorine-containing etchant-forming gas and oxygen-containing gas, for etching the film and simultaneously depositing silicon oxide compounds on the underlayer or mask at a selected rate to offset inherent etching of the underlayer or mask by said etchant component of said plasma.

4,793,898

#### PROCESS FOR BLEACHING ORGANIC PEROXYACID COOKED MATERIAL WITH AN ALKALINE SOLUTION OF HYDROGEN PEROXIDE

Lauri A. Laamanen, Helsinki; Jorma J. Sundquist; Ilkka Y. P. Wartiovaara, both of Espoo; Seppo V. Kaaliomäki, and Kristina J. Poppina, both of Helsinki, all of Finland, assignors to Oy Keskuslaboratorio - Centrallaboratorium Ab, Espoo, Finland

PCT No. PCT/FI86/00028, § 371 Date Nov. 17, 1986, § 102(e) Date Nov. 17, 1986, PCT Pub. No. WO86/05529, PCT Pub. Date Sep. 25, 1986

PCT Filed Mar. 24, 1986, Ser. No. 936,344

Claims priority, application Finland, Mar. 22, 1985, 850738; Feb. 11, 1986, 860609

Int. Cl. D21C 3/04, 9/16

U.S. Cl. 162-76

21 Claims

1. A sulfur free and chlorine free process for preparing bleached Chemically defibered pulp from lignocellulosic raw material, wherein said material is first treated with a cooking liquor containing an oxidizing component to form a pulp, whereinafter the pulp is bleached, which comprises:

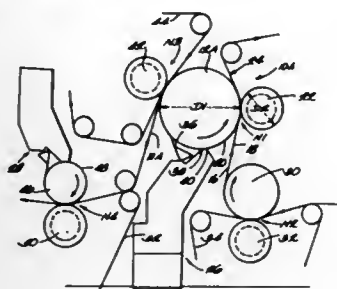
- (A) chemically defibering the lignocellulosic raw material by means of a cooking liquor comprising an active organic acid selected from the group consisting of peroxyformic acid and peroxyacetic acid to form a chemically defibered pulp having a Kappa number of 62.2 or less, and
- (B) bleaching the chemically defibered pulp with an alkaline solution comprising hydrogen peroxide in an amount which when calculated as a percent of the dry weight of the material coming to the treatment, corresponds to from 0.20 to 0.80 times the kappa number of the chemically defibered pulp obtained from stage A of the process, at a pH of at least 10 in the initial stages of the bleaching, to form a bleached chemically defibered pulp having a brightness of at least 84.3%.



4,793,899  
COATING PRESS APPARATUS USING SHORT DWELL COATERS  
Borgeir Skarsten, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.

Filed Jul. 23, 1987, Ser. No. 76,828  
Int. Cl.<sup>4</sup> D21D 3/00  
U.S. Cl. 162—381

5 Claims



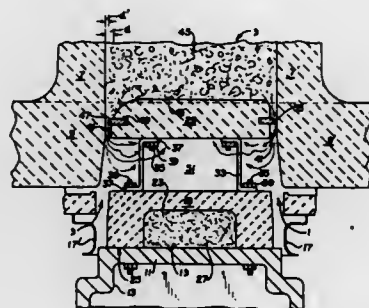
1. A coating press apparatus for coating a first and second side of a pressed web formed in a forming section of a paper-making machine, said apparatus comprising:

- a first press roll defining a smooth imperforate first surface, said surface cooperating with the first side of the web;
- a first backing roll cooperating with said first press roll for defining therebetween a first nip for the passage there-through of the web;
- a first felt for supporting the web during passage through said first nip;
- a first short-dwell coater for applying a coating substance directly to said surface of said first press roll upstream relative to said first nip such that a smooth and even first layer of said coating substance is applied to said first side of the web during passage through said first nip;
- said first short-dwell coater including: a doctor disposed upstream relative to said first nip for cleaning said imperforate first surface prior to the coating of said first surface with said first layer;
- an applicator disposed between said doctor and said first nip for applying said first layer to said first imperforate surface;
- a metering blade disposed between said applicator and said first nip for smoothing said first layer before said first layer is brought into physical contact with the first side of the web;
- a second short-dwell coater disposed downstream relative to said first nip for applying a smooth and even second layer of coating substance to said second side of the web such that the first and second sides of the resultant pressed web exhibit a higher coating content than the coating content between the first and the second sides thereby enhancing the printability of the resultant web;
- said coating press further including:
- a second press roll disposed upstream relative to said first nip, said first felt extending around said second press roll;
- a second backing roll cooperating with said second press roll such that said second press roll and second backing roll define therebetween a second nip for the passage therebetween of said first felt and the web; and
- a second felt extending through said second nip such that the web is disposed between said first and second felt during passage through said second nip; a third backing roll disposed downstream relative to said first nip, said third backing roll cooperating with said first press roll such that a third nip is defined between said third nip backing roll and said first press roll so that the web is pressed during passage through said third nip with the second side of the web facing towards said third backing roll;
- a third felt extending through said third nip such that said third felt is disposed in physical contact with the second

side of the web for further pressing said first layer against the first side of the web; and said second short dwell coater being disposed downstream relative to said third nip.

4,793,900  
UNIVERSAL COKE OVEN DOOR LINER  
Paul V. Suey, 1043 Black Forest Dr., Pittsburgh, Pa. 15235  
Continuation-in-part of Ser. No. 932,884, Nov. 20, 1986, Pat. No. 4,744,867. This application Dec. 17, 1987, Ser. No. 134,352  
Int. Cl.<sup>4</sup> C10B 25/16  
U.S. Cl. 202—248

11 Claims



1. A coke oven door adapted to substantially seal a coking chamber of a coke oven battery, the coking chamber having a doorjamb at the end of each of the walls forming the same, wherein said coke oven door has:

- a metallic door panel having an inner surface;
- a cold side refractory layer, secured to the inner surface of said metallic door panel, formed from a plurality of abutting, vertically aligned refractory sections, each of said refractory sections having a surface that contacts the door panel with a cavity therein, said cavity containing an insulating material;
- a hot side refractory layer, formed from a plurality of abutting, vertically aligned refractory sections, spaced from and secured to said cold side refractory layer, each of said hot side refractory sections having side walls spaced from and confronting the doorjamb of a coking chamber;
- a vertically extending groove in the side walls of each of said hot side refractory sections; and
- a frangible ceramic wiper strip secured in said grooves and extending outwardly therefrom and having an exposed portion, the exposed portion of said wiper strip adapted to substantially close the spacing between said side walls and the doorjamb of a coking chamber.

4,793,901  
SEPARATION OF 2-PENTANONE FROM FORMIC ACID BY EXTRACTIVE DISTILLATION  
Lloyd Berg, and Rudolph J. Szabados, both of Bozeman, Mont., assignors to Hoechst Celanese Chemical Co., Pampa, Tex.

Filed Apr. 11, 1988, Ser. No. 180,129  
Int. Cl.<sup>4</sup> B01D 3/40; C07C 45/83, 53/02  
U.S. Cl. 203—51

2 Claims

1. A method for recovering 2-pentanone from mixtures of 2-pentanone and formic acid which comprises distilling a mixture of 2-pentanone and formic acid in a rectification column in the presence of about one part of an extractive agent per part of 2-pentanone-formic acid mixture, recovering 2-pentanone as overhead product and obtaining the formic acid and the extractive agent from the stillpot, wherein said extractive agent comprises dimethylsulfoxide.

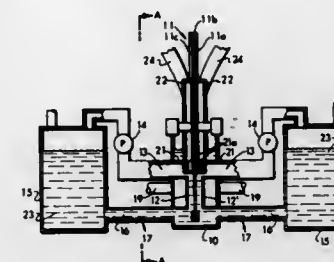
4,793,902  
METHOD FOR ELECTROLYZING ZINC AND APPARATUS THEREFOR  
Nagakazu Furuya, No. 4-3-31, Ohte 2-chome, and Satoshi Motoo, No. 5-24, Takeda 3-chome, both of Kofu-shi Yamana-shi, Japan, assignors to Nagakazu Furuya; Satoshi Motoo and Tanaka Kikinzoku Kogyo, all of Japan

Filed Mar. 4, 1988, Ser. No. 164,070  
Claims priority, application Japan, Mar. 4, 1987, 62-49802; Mar. 12, 1987, 62-57377

Int. Cl.<sup>4</sup> C25D 1/04, 17/00

U.S. Cl. 204—13

6 Claims



1. A method for electrolyzing zinc which comprises vertically disposing a rotatable disk made of an electrically conductive metal functioning as a cathode at least of which an outer periphery has an insulation covering; immersing the lower portion of the disk into an electrolyte; disposing a circular arc shaped gas permeable electrode functioning as an anode to be closely opposed to the lower portion of the exposed portion of the both sides of the rotatable disk in the electrolyte; operating the electrolysis with the supply of hydrogen; and peeling off the zinc foil deposited onto the exposed portion of the both sides of the rotatable disk with rotation of the disk.

4,793,903  
METHOD OF CLEANING ALUMINUM SURFACES  
Howard W. Holmquist, Kirkland, and Larry E. Tarr, Seattle, both of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 24, 1986, Ser. No. 923,086  
Int. Cl.<sup>4</sup> C25D 5/44

U.S. Cl. 204—33

14 Claims



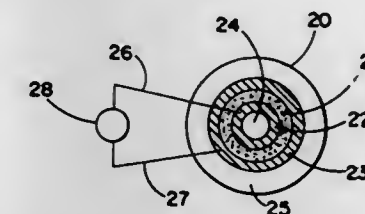
1. A method of cleaning surfaces of an aluminum article, comprising subjecting the article to electrolytic action by making it anodic in an aqueous solution comprising phosphoric acid to etch said surfaces at a rate of from about 0.0002 to about 0.0005 inch/surface/hour, to form an oxide on said surfaces and dissolve the oxide as it forms to deoxidize said surfaces and displace contaminants from said surfaces, and to minimize the thickness of residual oxide on said surfaces to a thickness of from 0 Angstroms to a maximum of about 3000 Angstroms.

4,793,904  
PROCESS FOR THE ELECTROCATALYTIC CONVERSION OF LIGHT HYDROCARBONS TO SYNTHESIS GAS  
Terry J. Mazanec, Solon; Thomas L. Cable, Newbury, and John G. Frye, Jr., Solon, all of Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Filed Oct. 5, 1987, Ser. No. 105,120  
Int. Cl.<sup>4</sup> C25B 3/00

U.S. Cl. 204—59 R

23 Claims



1. An electrocatalytic process for converting methane, natural gas or other light hydrocarbons to synthesis gas which comprises

- (A) providing an electrochemical cell comprising a solid electrolyte having a first surface coated with conductive metal, metal oxide or mixtures thereof capable of facilitating the reduction of oxygen to oxygen ions, and a second surface coated with conductive metal, metal oxide or mixtures thereof, provided that both coatings are stable at the operating temperatures;
- (B) heating the electrochemical cell to a temperature of at least 1000° C.;
- (C) passing an oxygen-containing gas in contact with the first conductive coating;
- (D) passing methane, natural gas or other light hydrocarbons in contact with the second conductive coating; and
- (E) recovering synthesis gas.

4,793,905  
METHOD FOR PARTIALLY AND SELECTIVELY OXIDIZING ALCOHOLS TO ESTERS OR CARBOXYLIC ACIDS

Stanley H. Langer; Michael J. Foral, and John C. Card, all of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.

Continuation of Ser. No. 70,426, Jul. 7, 1987. This application Dec. 29, 1987, Ser. No. 138,961  
Int. Cl.<sup>4</sup> C25C 1/00

U.S. Cl. 204—59 R

7 Claims

1. A method for partially and selectively oxidizing an alcohol to an ester or carboxylic acid with suppression of CO<sub>2</sub> and aldehyde-formation, in an electrochemical cell comprising a cathode, an anode, an electrolyte in contact with the cathode, and the same or a different electrolyte in contact with the anode, comprising the steps of:

bringing a alcohol into contact with a surface of said anode, said surface of the anode comprising a transition metal of Group VIII or Group I-B of the Periodic Table, 10-95 atomic % of which, at said surface, is bound to a reduced form of a sulfur-containing species which is chemisorbable on or by said transition metal and which has the structural formula



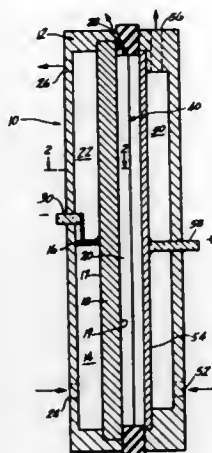
p where x and y are numbers from 1 to 6 and z is a number from 0 to 2, provided that y is >4x when z=2 and is <3x when z is 0, so that the average oxidation state of the S atoms in said sulfur-containing species is greater than +1 but less than +6 prior to reduction, and is <+1 after

reduction, said reduced form being resistant to removal by leaching or washing with oxygen-containing neutral or acidic media and being resistant to removal by electrochemical means at an  $E_{cell}$  voltage in the range of 0 to 0.9 volt;  
operating said cell electrogeneratively at an  $E_{cell}$  voltage of about 0.1 to about 0.5 volt; and  
recovering the resulting ester or carboxylic acid and electrical energy from said cell.

**4,793,906**  
**ELECTROCHEMICAL PROCESS FOR PRODUCING HYDROSULFITE SOLUTIONS**  
Roger E. Balick, II, Chattanooga; David W. Cawfield, and Jimmy M. French, both of Cleveland, all of Tenn., assignors to Olin Corporation, Cheshire, Conn.  
Filed Aug. 4, 1986, Ser. No. 892,518  
Int. Cl.<sup>4</sup> C25B 1/14

U.S. Cl. 204-92

10 Claims



1. A process for the electrochemical production of an alkali metal hydrosulfite by the reduction of an alkali metal bisulfite component of a circulated aqueous catholyte solution in an electrolytic membrane cell having a cathode compartment, a porous cathode in the cathode compartment, an anode compartment and a cation exchange membrane separating the cathode compartment from the anode compartment, which process comprises passing at least 30 percent by volume of said aqueous catholyte twice through the porous cathode, the first pass being in one direction through a first section of the porous cathode and the second pass in a generally opposite direction through a second section of the porous cathode.

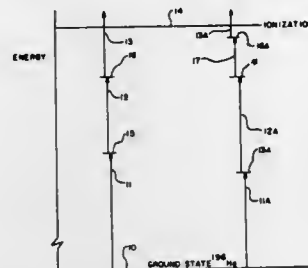
**4,793,907**  
**METHOD FOR ISOTOPE ENRICHMENT OF MERCURY-196 BY SELECTIVE PHOTOIONIZATION**  
Jeffrey A. Palmer, San Ramon, and John K. Crane, Pleasanton, both of Calif., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.  
Filed Aug. 20, 1986, Ser. No. 898,084  
Int. Cl.<sup>4</sup> B01D 4/34

U.S. Cl. 204-157.22

18 Claims

1. A method for selectively photoionizing  $^{196}\text{Hg}$  atoms in a vapor comprising the naturally-occurring distribution of mercury isotopes, comprising the steps of  
subjecting said vapor to radiation emitted by a first radiation source at a first determined wavelength of 2537 Å;  
subjecting said vapor to radiation emitted by a second radiation source at a second wavelength of 2655 Å; and

subjecting said vapor to radiation emitted by a third radiation source at a third wavelength of less than about 1.40

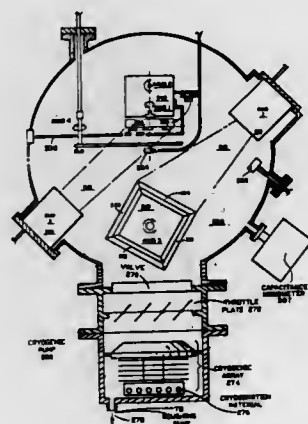


microns whereby the additive effect of said sources upon said vapor selectively ionizes  $^{196}\text{Hg}$  atoms.

**4,793,908**  
**MULTIPLE ION SOURCE METHOD AND APPARATUS FOR FABRICATING MULTILAYER OPTICAL FILMS**  
Gene Scott, El Toro; Charles W. Kohlenberger, Fullerton, and David M. Warren, Chino Hills, all of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.  
Filed Dec. 29, 1986, Ser. No. 947,141  
Int. Cl.<sup>4</sup> C23C 14/46

U.S. Cl. 204-192.26

21 Claims



1. A method of fabricating multiple layer, solid, thin films on a substrate having a surface to be coated, said substrate being held in a substrate holder, said substrate holder exposing said substrate surface to be coated, the method providing control over the thickness, stoichiometry, and morphology of each separate layer formed by a method comprising steps:

- forming a first ion beam from an inert gas;
- bombarding a target surface with said first ion beam in a vacuum chamber to generate a vapor cloud composed of target material atoms by the process of sputtering;
- forming a second ion beam from a mixture of inert and reactive gases to provide chemically reactive gas ions, said second ion beam being directed at said substrate surface to be coated;
- rotating said substrate holder on a first rotational axis at a predetermined rotational rate;
- rotating said substrate holder on a second rotational axis to a first predetermined angle to position the surface of said substrates to form a predetermined oblique angle with said second ion beam;
- bombarding said substrate surface with said second ion

beam and controlling the ion density and ion energy of said second ion beam for cleaning and for smoothing the surface of said substrates;

- rotating said substrate holder on said second rotational axis to a second predetermined angle; rotating and oscillating said substrate holder on said first rotational axis;
- bombarding said substrate surface simultaneously with said second ion beam and controlling the ion density and ion energy of said second ion beam, the control of the ion density and ion energy of said second ion beam being independent of the control of the ion density and energy of said first ion beam, to promote a chemical reaction between the target material atoms and said chemically reactive gas ions as said target material atoms and said chemically reactive gas ions impinge upon said surface to be coated, a chemical compound building up in thickness as a homogeneous thin solid film layer;
- positioning an alternative target material in the place occupied by the previous one;
- bombarding said alternative target material with said first ion beam in said vacuum chamber to generate a vapor cloud composed of alternative target material atoms by the process of sputtering; and
- repeating the above method steps H. through J. to produce each successive thin solid film layer of different material formed upon each previous layer.

20. An apparatus for fabricating multilayer optical films on a substrate having a surface to be coated comprising:

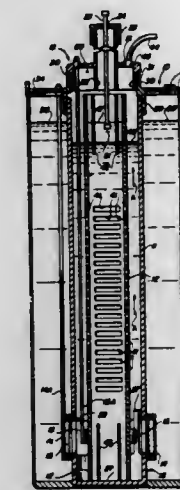
- a vacuum chamber having a rescalable means for entry, inspection and loading;
- means for evacuating said vacuum chamber when said means for entry is sealed;
- a turret for holding at least one target, a turret rotating means for supporting and rotating said turret to a predetermined rotational position within said chamber on a turret rotational axis, said turret rotating means being further characterized to oscillate said turret back and forth, over a small angular excursion about said turret rotational axis;
- a substrate holder within said vacuum chamber for holding at least one substrate;
- means for rotating said substrate holder on a first and second rotational axis;
- means within said vacuum chamber subsequent to sealing and evacuation, for forming, directing and controlling a first ion beam to bombard a target surface on said target to produce a vapor cloud composed of said target material by the process of sputtering; said vapor cloud being directed toward said substrate while said substrate holder is being rotated;
- means within said vacuum chamber for forming a second ion beam from a mixture of inert and reactive gases;
- means for rotating said substrate holder on said first rotational axis at a predetermined rotational rate;
- means for rotating said substrate holder on said second rotational axis to a first predetermined angle with said substrate holder rotating on said first rotational axis said first predetermined angle being selected to position the surface of said substrates to form a predetermined oblique angle with said second ion beam for cleaning and for smoothing the surface of said substrates;
- means for rotating said substrate holder on said second rotational axis to a second predetermined angle, means for rotating and oscillating said substrate holder on said first rotational axis with said second ion beam being directed to bombard said substrate surface simultaneously with said target vapor to produce a chemical reaction between said target vapor and said reactive gases ions to form a chemical compound on the surface of said substrate, the ion density and energy of said first ion beam being controlled independently of the current density and energy of said second ion beam.

**4,793,909**  
**ELECTROLYTIC CHLORINE GENERATOR WITH SALT SPACER**

Robert E. Maddock, 2252 Grant Ave., Phoenix, Ariz. 85009  
Filed Mar. 14, 1988, Ser. No. 167,649  
Int. Cl.<sup>4</sup> C25B 9/00, 13/02

U.S. Cl. 204-266

2 Claims



- Apparatus for electrolytically generating chlorine gas from a salt solution, comprising  
(a) hollow housing means for holding a volume of water and including  
(i) an outer wall having an upper portion and a lower portion,  
(ii) a base connected to said lower portion, and  
(iii) cover means mounted on said upper portion of said housing means;
- an elongate hollow salt cell spaced apart from said outer wall and having a window formed therein;
- a first aqueous solution of sodium ions intermediate said salt cell and said outer wall;
- a second aqueous salt solution inside said hollow salt cell and having an upper surface;
- an elongate hollow salt spacer having a bottom portion and carried in said housing means inside and spaced apart from said salt cell, and including a plurality of spaced apart perforations formed therein, said second solution being both intermediate said spacer and salt cell and being inside said spacer;
- a volume of salt particles inside said salt spacer and having an upper surface;
- anode means mounted in said housing means adjacent said window and intermediate said salt cell and said salt spacer, said salt spacer extending upwardly from said anode means to a point above said upper surface of said second solution and said upper surface of said salt, said perforations in said spacer being intermediate said anode and said upper surface of said salt;
- cathode means mounted in said housing means adjacent and spaced apart from said anode and intermediate said anode and said housing; and,
- membrane means intermediate said anode and cathode means and covering said window to generally separate said second solution in said salt cell from said first solution, said membrane permitting sodium ions to migrate outwardly from said second solution through said membrane means into said first solution intermediate said salt cell outer wall;

salt ions from within said salt spacer moving outwardly through said perforations and downwardly intermediate said salt spacer and salt cell through said second solution to contact said anode means to produce chlorine gas rising



upwardly intermediate said salt cell and spacer through said second aqueous solution and travelling near said perforations and through said salt ions moving outwardly from said perforations to said upper surface of said second aqueous solution, and

said perforations permitting chlorine gas collecting inside said salt spacer when said upper surface of said salt is solid to outwardly escape through at least one of said perforations into said second aqueous solution intermediate said spacer and salt cell and rise to said upper surface of said second aqueous solution; and,

- (j) a panel attached to said bottom portion of said salt spacer to support said volume of salt particles in said salt spacer and to permit said salt spacer to be removed from said apparatus with said salt particles retained in said spacer.

**4,793,910**  
**MULTIELECTRODE PHOTOELECTROCHEMICAL CELL FOR UNASSISTED PHOTOCATALYSIS AND PHOTOSYNTHESIS**

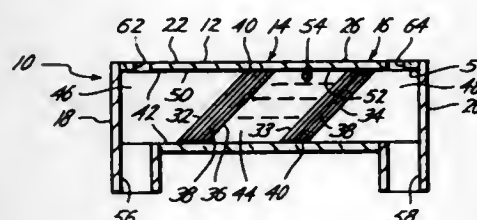
Eugene Smotkin; Allen J. Bard, and Marye A. Fox, all of Austin, Tex., assignors to Gas Research Institute, Chicago, Ill.

Filed May 18, 1987, Ser. No. 51,469

Int. Cl.<sup>4</sup> C25B 1/04, 9/04; H01M 6/30

U.S. Cl. 204—268

23 Claims



1. A multielectrode photoelectrochemical unit for unassisted photoelectrical-induction of a chemical reaction comprising:
- a housing having at least one light-passing side, a first end, a second end and a housing wall defining an internal section;
  - a first photoactive bipolar electrode panel in the internal section, said first photoactive bipolar electrode panel having a semiconductor side, an ohmic contact layer and an underside and being attached to the housing wall near the first end of said internal section with the semiconductor side oriented toward the first end and partially forming a first terminal compartment; and
  - a second photoactive bipolar electrode panel in the internal section, said second photoactive bipolar electrode panel having a semiconductor side, an ohmic contact layer and a catalytic side and being attached to the housing wall near the second end of the internal section with the catalytic side oriented toward the second end and partially forming a second terminal compartment, an internal compartment in said internal section being partially formed by the underside of the first photoactive bipolar electrode panel and the semiconductor side of the second photoactive bipolar electrode panel, said first and second photoactive bipolar electrode panels being attached to said housing walls to prevent liquid flow between the internal compartment and the terminal compartments and being positioned so that light from an external source entering the internal section is substantially incident upon the semiconductor sides.

**4,793,911**  
**APPARATUS FOR THE PRODUCTION OF COATINGS WITH A UNIFORM THICKNESS PROFILE BY CATHODE SPUTTERING**

Guenther Kemmerer, Alzenau, and Hans Wolf, Erlensee, both of Fed. Rep. of Germany, assignors to Leybold-Heraeus GmbH, Cologne, Fed. Rep. of Germany

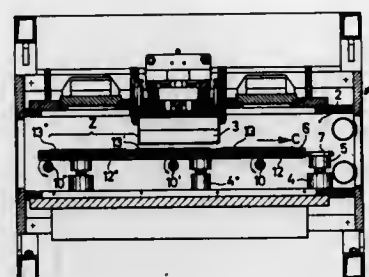
Filed Nov. 12, 1987, Ser. No. 119,628

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1987, 3725571

Int. Cl.<sup>4</sup> C23C 14/50

U.S. Cl. 204—298

5 Claims



1. Apparatus for the production of coatings with a uniform thickness profile on substrates by cathode sputtering, consisting of a coating chamber, a sputtering cathode stationarily held therein, and a substrate carriage guided through the coating chamber transversely of the sputtering cathode, characterized in that the substrate carriage is adapted to have one or more substrate disks rotatably mounted thereon on the side of the substrate carriage facing the cathode, whose axes of rotation are each disposed transversely of the plane of movement of the substrate carriage, while on the side of the substrate carriage facing away from the cathode, motor-driven shafts equipped with magnets are journaled in the coating chamber, and their longitudinal axes are disposed in a plane parallel to a plane of movement of the substrate carriage.

**4,793,912**  
**PROCESS FOR PRODUCING A PITCH HAVING A LOW SOFTENING POINT**

Kazuhito Tate; Hajime Yoshida, and Teruhiko Sasaki, all of Kanagawa, Japan, assignors to Mitsubishi Oil Co., Ltd., Tokyo, Japan

Filed Jan. 2, 1987, Ser. No. 56,634

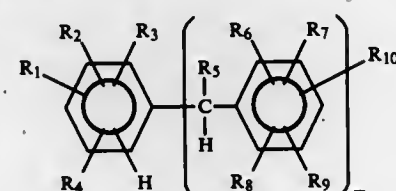
Claims priority, application Japan, Jan. 2, 1986, 61-125657

Int. Cl.<sup>4</sup> C10C 3/06; D01F 9/20

U.S. Cl. 208—44

6 Claims

1. A process for producing an optically anisotropic pitch, wherein said pitch is produced from a compound represented by formula (1) and one of heavy oils selected from the group consisting of a residual oil from fluid catalytic cracking, a naphtha, tar pitch or a coal tar pitch:



wherein m is an integer of 2 or more; R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub> and R<sub>10</sub> each represents a hydrogen atom, a methyl group or an ethyl group; and R<sub>5</sub> represents a hydrogen atom or a methyl group; and said process is carried out by: (1) subjecting said compound alone to a thermal reforming reaction at

380°–440° C. for 0.2 to 20 hours under atmospheric pressure, or at 400°–470° C. for 0.5 to 10 hours under pressure, and separately subjecting one of said heavy oils alone to a thermal reforming reaction at 380°–440° C. for 0.5 to 20 hours under atmospheric pressure, or at 400°–470° C. for 0.5 to 10 hours under pressure in a first step, and (2) mixing the obtained thermally reformed compound and one of said heavy oils in a range of 5:95 to 95:5 by weight, and subjecting the mixture to thermal modification in order to produce a pitch having an optical anisotropy of 95% or more, a softening point of 220°–270° C., and a quinoline-insoluble content of not more than 15 wt% in a second step.

**4,793,913**  
**METHOD FOR LIQUID FEED DISPERSION IN FLUID CATALYTIC CRACKING SYSTEMS**

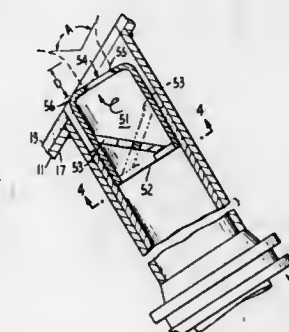
Donald O. Chessmore, Walnut Creek, and Frederick A. Petersen, Novato, both of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 640,110, Aug. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 464,121, Feb. 4, 1983, abandoned. This application Dec. 24, 1985, Ser. No. 813,152

Int. Cl.<sup>4</sup> C10G 11/00, 35/00

U.S. Cl. 208—113

5 Claims



1. A process for dispersing a liquid hydrocarbon feed into a fluid catalytic hydrocarbon cracking system wherein heated catalyst is circulated through a riser reactor tube for contact with said liquid hydrocarbon feed, with or without water or steam, to improve atomization and/or vaporization by reducing the hydrocarbon partial pressure of said liquid hydrocarbon feed, which comprises:

introducing said liquid hydrocarbon feed as an unconfined single fluid stream into said riser reactor tube without concurrent flow of auxiliary fluid to confine or disperse said single fluid stream during contact of a stream of said heated catalyst flowing therethrough by first imparting centrifugal rotation to said single fluid stream to form a free vortex about its axis of flow, said centrifugal rotation being imparted solely by flow of said fluid stream through a cylindrical chamber having vane means positioned in line with and as a cylindrical extension of a conduit supplying said feed to said riser reactor tube, and then passing said single fluid stream, during the free vortex rotation, through a square-edged orifice recessed sufficiently within an opening in a side wall of said reactor tube to retain said square-edged orifice out of said stream of said heated catalyst, said square-edged orifice having a diameter less than the diameter of said chamber and having a throat substantially shorter than said orifice diameter, and controlling the hydraulic pressure of said fluid stream flowing through the supply conduit sufficient to retain a cylindrical form of a vena contracta created by the free vortex from said orifice across said opening in said reactor tube before dispersion of said fluid stream by the hydraulic energy of the fluid stream into a uniform mist of liquid drops over a substantially uniform conical volume for

contact with said stream of said heated catalyst flowing through said riser reactor tube.

**4,793,914**  
**PASSIVATION OF METAL CONTAMINATED CRACKING CATALYSTS**

Brent J. Bertus, Bartlesville, Okla., and Darrell W. Walker, Media, Pa., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 895,086, Aug. 11, 1986, Pat. No. 4,727,053.

This application Nov. 13, 1987, Ser. No. 120,576

Int. Cl.<sup>4</sup> C10G 11/00

U.S. Cl. 208—113

16 Claims

1. A process for cracking a hydrocarbon feedstock which comprises contacting said hydrocarbon feedstock with a cracking catalyst under cracking conditions wherein said cracking catalyst is modified with a passivating agent which comprises an antimony component and a lithium component, wherein said lithium component is present in an amount in the range from about 0.03 to about 0.5 weight percent, said weight percent being based on the weight of the cracking catalyst prior to the addition of said passivating agent.

**4,793,915**  
**SHORT CONTACT TIME FLUID CATALYTIC CRACKING PROCESS**

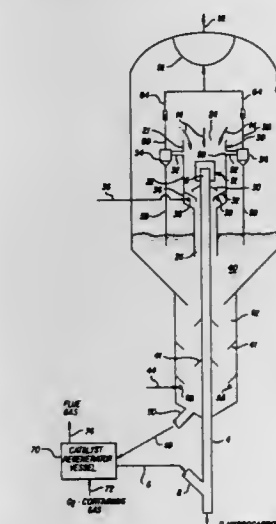
James H. Haddad, Princeton Junction, and Hartley Owen, Belle Mead, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 15, 1987, Ser. No. 3,677

Int. Cl.<sup>4</sup> C10G 11/18

U.S. Cl. 208—161

8 Claims



1. A fluid catalytic cracking process comprising the steps of:
- (a) passing hydrocarbon feed and catalyst into an upstream end of an elongated tubular riser, comprising sidewalls, at fluid catalytic cracking conditions to produce a gasiform mixture of catalyst and cracked hydrocarbon;
  - (b) upwardly discharging said mixture from a downstream end of said riser into a deflector baffle, said downstream end terminating within said deflector baffle, said deflector baffle comprising first cylindrical sidewalls attached to a top wall, said top wall being located above said riser downstream end, a circumference of a bottom of said first cylindrical sidewalls having slots cut therein, said riser sidewalls and said baffle sidewalls defining a first annular opening therebetween, said deflector baffle being located within a stripping vessel comprising second cylindrical sidewalls and a top wall, said stripping vessel located

- within a disengaging vessel, an atmosphere of said disengaging vessel being separate from an atmosphere of said stripping vessel, said deflector baffle being spaced from said riser downstream end and said stripping vessel;
- (c) downwardly deflecting said discharged mixture by contact with said deflector baffle top wall without passing said discharged mixture into said disengaging vessel atmosphere, downwardly passing a major portion of said deflected mixture through said first annular opening towards a first catalyst stripping zone located within said stripping vessel, and passing a minor portion of said deflected mixture through said slots, said deflector baffle being located a distance above said stripping zone;
- (d) injecting stripping gas from outside said disengaging vessel directly into said first stripping zone;
- (e) stripping said downwardly deflected catalyst in said first stripping zone by contact with a stream consisting essentially of said stripping gas on trays located within said first stripping zone to produce a stripped vapor stream, comprising vapor and entrained catalyst, and a stripped catalyst stream;
- (f) passing said stripped vapor stream through a conduit attached to an opening in an upper portion of said stripping vessel sidewalls, to a cyclone located outside said stripping vessel, wherein said catalyst in said first stripping zone passes from said riser to said baffle and to said first stripping zone without contacting said opening in said upper portion of said stripping vessel sidewalls and, wherein a portion of said cracked hydrocarbon immediately separates from said downwardly deflected mixture when it passes out of said deflector baffle and passes into said atmosphere of said stripping vessel and then into said cyclone;
- (g) separating a portion of catalyst from said stripped vapor stream in said cyclone to form a separated catalyst stream and a vapor product stream;
- (h) passing said vapor product stream from said cyclone through a cyclone overhead conduit directly into a closed conduit;
- (i) passing a disengaging vessel vapor stream from said disengaging vessel atmosphere through an annulus defined between said cyclone overhead conduit and said closed conduit;
- (j) combining said disengaging vessel vapor stream and stripped vapor stream in said closed conduit to form a combined vapor stream;
- (k) passing said combined vapor stream through said closed conduit directly to outside said disengaging vessel atmosphere; and
- (l) passing said stripped catalyst stream from said stripping vessel to a second stripping zone located within said disengaging vessel and below said first stripping zone.

4,793,916

## COAL LIQUEFACTION PROCESS

Clyde L. Aldridge, and Roby Bearden, Jr., both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 773,596, Sep. 9, 1985, abandoned, which is a continuation-in-part of Ser. No. 682,379, Dec. 17, 1984, abandoned. This application Apr. 3, 1987, Ser. No. 33,682

Int. Cl. C10G 1/08

U.S. Cl. 208—421

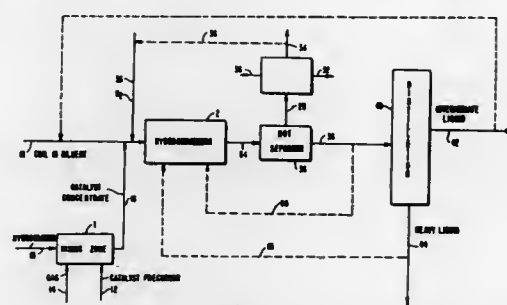
10 Claims

1. A process for hydroconverting coal to liquid products, in a slurry comprising coal and a diluent, which process comprises the steps of:

- (a) forming a mixture of a hydrocarbonaceous oil and a hydrocarbon-dispersible chromium compound in an amount ranging from about 0.1 to about 2 weight percent, calculated as elemental metal, based on said hydrocarbonaceous oil;
- (b) heating the mixture resulting from step (a) in the presence of a hydrogen sulfide-containing gas in the absence of

coal, at conditions including a temperature ranging from about 500° to 779° F., to convert said chromium compound to a chromium-containing solid catalyst in said hydrocarbonaceous oil;

- (c) adding at least a portion of said hydrocarbonaceous oil comprising said catalyst resulting from step (b) to said diluent;



- (d) adding coal to said diluent before step (c), after step (c), or simultaneously with step (c);
- (e) subjecting the mixture resulting from step (d), said mixture comprising said solid chromium-containing catalyst and said coal to a temperature ranging from about 800° to about 900° F., and a hydrogen partial pressure from about 400 to about 5,000 psig and
- (f) recovering a liquid hydrocarbonaceous product.

4,793,917

## CENTRIFUGAL CLASSIFIER FOR SUPERFINE POWDERS

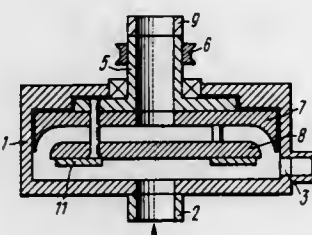
Anatoly F. Eremin; Evgeny L. Goldberg; Vladimir Y. Gololobov; Valentin I. Petrozhitsky, and Vladimir V. Boldyrev, all of Novosibirsk, U.S.S.R., assignors to Institut Khimii Tverdogo Tela i Pererabotki Mineralnogo Syrya Sibirskogo Otdelenia Akademii Nauk USSR, Novosibirsk, U.S.S.R.

Filed Apr. 3, 1987, Ser. No. 34,440

Int. Cl. B07B 7/00

U.S. Cl. 209—143

5 Claims



1. A centrifugal classifier for superfine powders comprising:

- (1) a housing with a means for feeding a mixture of powder and gas to be treated;
- (2) a rotatable shaft in said housing;
- (3) a means for rotating said shaft;
- (4) a pair of coaxial discs rigidly fixed to said shaft with a fixed space therebetween, defined by a surface of each disc, to which the gas/powder mixture entering into the space therebetween, peripheral portions of the surfaces of said discs, which face each other to define the fixed space therebetween, are rounded off and spaced equidistantly apart; and
- (5) means for separately discharging larger particles and fines obtained by separation of said material.

4,793,918

## GRAVITY SEPARATOR

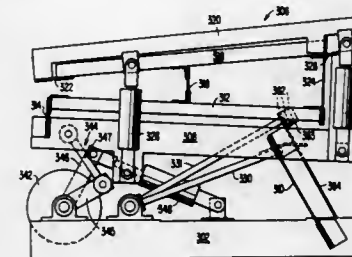
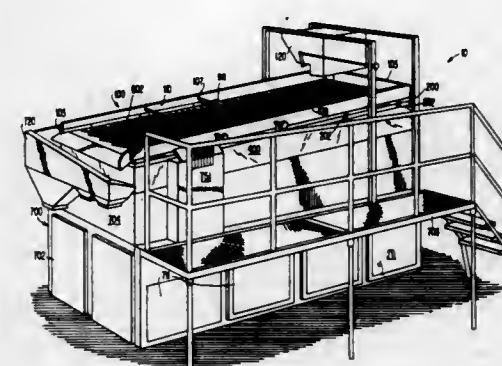
James A. Thomas, Rocky Ford, Colo., assignor to Oliver Manufacturing Co., Inc., Rocky Ford, Colo.

Filed Jul. 8, 1986, Ser. No. 883,503

Int. Cl. B03B 4/00

U.S. Cl. 209—467

24 Claims



1. In a gravity separator for separating heavier particulate material from lighter particulate material on a vibrating separator deck, the separator deck being supported on a support framework for vibratory motion with respect to said framework with an inlet end of the deck elevated with respect to an outlet end of the deck to define an end raise and with a first side of the deck elevated with respect to a second side of the deck to define a side tilt, suspension and adjustment mechanisms comprising:

a suspension assembly comprising a discharge end support unit for supporting the discharge end of the separator deck and end raise adjusting means for supporting an input end of the separator deck and adjusting the end raise of the separator deck;

said end raise adjusting means including a bottom member, a top member spaced above said bottom member for supporting the inlet end of the separator, at least one hydraulic jack connected between said top and bottom member, a thrust member for transmitting vibratory thrust from said bottom member to said top member, said thrust member being hingedly connected at one end to said top member and at the other end to said bottom member, an equalizer member for keeping the tilt angle between said top and bottom members equal during adjusting motion of said at least one hydraulic jack, one end of said equalizer member being hingedly connected to said bottom member, the other end of said equalizer member being hingedly connected to said top member, and a portion of said equalizer member between its opposite ends being hingedly connected to a portion of said thrust member; and

side tilt adjustment means for adjusting the side tilt of the separator deck including a rotatable member extending between opposite ends of the separator deck, a torque arm extending from each end of said rotatable member, one of

said torque arms being coupled to said discharge end support unit and the other of said torque arms being coupled to said bottom member of said end raise adjusting means, and means for rotating said rotatable member to adjust the position of said torque arms and the side tilt of the separator deck.

4,793,919

## WET OXIDATION SYSTEM

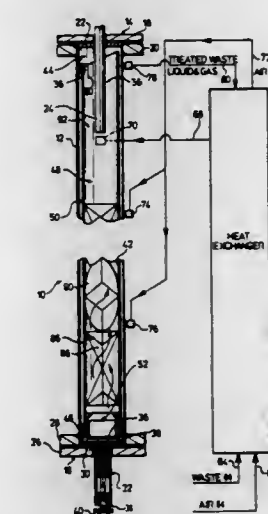
Robert P. McCorquodale, West Hill, Canada, assignor to Kenox Corporation, Oakville, Canada

Division of Ser. No. 595,821, Apr. 2, 1984, Pat. No. 4,604,212. This application Jan. 17, 1986, Ser. No. 820,892

Int. Cl. C02F 11/08

U.S. Cl. 210—177

18 Claims



1. An apparatus in which oxidation of an aqueous suspension of organic matter at elevated temperature and pressure is carried out by exposing organic matter to an oxygen-containing gas in a reactor for a period sufficient to reduce chemical oxygen demand of the organic matter to a predetermined desired level, said apparatus comprising a reaction zone consisting of a static mixer vane arrangement and means for pumping and thereby circulating such aqueous suspension of organic matter through said static mixer vane arrangement, means for introducing an oxygen-containing gas into said reactor and means for introducing an aqueous suspension of organic matter into an area of said reactor separate from where said oxygen-containing gas is introduced, said static mixer comprising a plurality of vanes arranged within said reaction zone to split, rearrange and combine the aqueous suspension of organic matter and oxygen-containing gas bubbles as said aqueous suspension is pumped and thereby circulated about said vane arrangement and means for withdrawing treated organic matter in aqueous suspension and gases from said reactor.

8. An apparatus in which oxidation of an aqueous suspension of organic matter at elevated temperature and pressure is carried out by exposing organic matter to an oxygen-containing gas in a reactor by means for pumping and thereby circulating for a period sufficient to reduce chemical oxygen demand of the organic matter to a predetermined desired level, said apparatus comprising a reactor for vertical orientation and having an inner cylindrical open-ended tube defining a cylindrical reactor core and outer concentric cylindrical tube spaced from said inner tube to define an outer annular reactor chamber surrounding said reactor core, said inner tube being shorter than said outer tube to define upper and lower regions of fluid communication between said reactor core and outer annular chamber, said outer tube having closed ends to define a sealed



reactor where said outer tube is fabricated of materials and reinforced to withstand pressures and temperatures in its operating range, means for introducing an aqueous suspension of organic matter into the upper region of said outer annular reactor chamber and first means for introducing an oxygen-containing gas spaced from said introduction means for the aqueous suspension, a circulation pump located in said lower region for circulating the aqueous suspension of organic matter and gases upwardly of said reactor core and downwardly of said outer annular reactor chamber, a static mixer vane arrangement provided in said inner tube and extending from the lower region of said inner tube and along a majority of said inner tube, said static mixer comprising a plurality of vanes arranged within the cylindrical reactor core to split, rearrange and combine the aqueous suspension of organic matter and oxygen-containing gas bubbles as said aqueous suspension is pumped and thereby circulated upwardly over said vane arrangement and means provided for withdrawing treated organic matter in aqueous suspension and gases from said upper region.

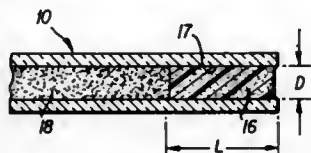
4,793,920

**CHROMATOGRAPHY COLUMNS WITH CAST POROUS PLUGS AND METHODS OF FABRICATING SAME**  
Herman Cortes; Curtis D. Pfeiffer; Bruce E. Richter, and Timothy S. Stevens, all of Midland, Mich., assignors to Lee Scientific, Inc., Salt Lake City, Utah  
Continuation of Ser. No. 807,729, Dec. 11, 1985, abandoned.  
This application Oct. 20, 1987, Ser. No. 111,147

Int. Cl.<sup>4</sup> B01D 15/08

U.S. Cl. 210—198.2

42 Claims



1. In a process for fabricating a chromatographic column wherein the column includes a capillary tube of a selected material, the tube having an open end and an inner wall having a silica component, the process comprising the steps of:
  - (a) providing a chemically fusible material which is microporous upon casting and which adheres to the specific material of the tube upon fusing, which chemically fusible material comprises a composition having a silicate component;
  - (b) depositing a quantity of the chemically fusible material in the tube; and
  - (c) casting a plug in situ by fusing the material within the tube and chemically adhering the material to the inner wall of the tube to form a solid microporous mass having a length along the tube within the range of between less than 4 centimeters and more than 10 microns.

4,793,921

#### SEPARATION MATERIALS FOR THIN LAYER CHROMATOGRAPHY

Hetaz E. Haack, Frankfurt am Main, and Willi Jost, Langen, both of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft Mit Beschränkter Haftung, Darmstadt, Fed. Rep. of Germany  
Division of Ser. No. 014,162, Feb. 11, 1987, Pat. No. 4,741,830, which is a continuation of Ser. No. 759,551, Jul. 26, 1985, abandoned. This application Dec. 9, 1987, Ser. No. 130,572  
Claims priority, application Fed. Rep. of Germany, Jul. 28, 1984, 3427923

Int. Cl.<sup>4</sup> B01D 15/08

U.S. Cl. 210—198.3

13 Claims

1. A separation material of high uniformity and sized and dimensioned for thin layer chromatography comprising a

impregnating with a catalyst effective for catalyzing a later silanizing reaction between said silica gel surface and said silanizing agent, and solvent washing resultant doped silica gel surface of excess catalyst prior to a later silanizing reaction. carrier material having a superimposed coating of an adsorbent layer of silica gel, said silica gel on surfaces not attached to said carrier material, being partially modified by a hydrophobic silanizing agent having insufficient polar groups to impart water wettability to said silanizing agent, said silanizing agent uniformly covering said silica gel to the extent of 0. to 0.8  $\mu\text{mol}/\text{m}^2$ , resulting in a reverse phase separation material having sufficient hydrophilic character so as to be eluted by an aqueous solution, wherein said separation material is prepared by a process comprising, prior to a silanization step, controlled homogenous doping of said nonattached silica gel surface by

4,793,922

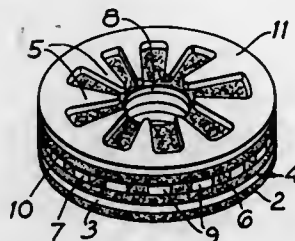
#### FILTER ELEMENT USING NON-WOVEN MAT AND MULTI FINGER SEPARATORS

Eric E. Morton, Wolverhampton, England, assignor to Marston Palmer Limited, Wolverhampton, England  
Filed May 11, 1987, Ser. No. 48,649  
Claims priority, application United Kingdom, May 15, 1986, 8611911

Int. Cl.<sup>4</sup> B01D 29/46

U.S. Cl. 210—317

11 Claims



1. A filter assembly, comprising:
  - a plurality of annular filter elements having axially opposite faces, an inner perimeter and an outer perimeter;
  - a set of first annular filter supports each having axially opposite faces, an inner perimeter and an outer perimeter, and including a perimetrical continuous outer wall and a plurality of medially inwardly-directed fingers having free inner ends, said inwardly-directed fingers being disposed on and forming corresponding parts of said perimetrical continuous outer wall, said inwardly-directed fingers defining said inner perimeter;
  - a set of second annular filter supports each having axially opposite faces, an inner perimeter and an outer perimeter, and including a perimetrical continuous inner wall and a plurality of laterally outwardly-directed fingers having free outer ends, said outwardly-directed fingers being disposed on and forming corresponding parts of said perimetrical continuous inner wall, said outwardly-directed fingers defining said outer perimeter;
  - said filter elements, first filter supports and second filter supports being arranged face to face in series, in alternation, to provide a stacked set of components; and
  - means holding said components in tight touching contact, axially neighboring component to axially neighboring component, in said stacked set;
  - said annular filter elements, first filter supports and second filter supports of said stacked set defining among them a flow path for fluid to be filtered, which flow path extends from laterally outwardly of said stacked set, medially inward between said fingers of said second filter supports, axially through said annular filter elements and medially inwardly between said fingers of said first filter supports, to a longitudinal bore defined axially centrally of said stacked set.

4,793,923

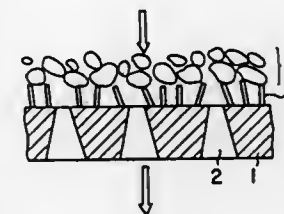
#### GRADIENT DENSITY FILTER MEDIUM

Teruichi Kadoya, Hamakita; Tatsuo Ohta, Hamamatsu; Takashi Nagashima, Tokigawa; Daisuke Horiuchi, Tokyo; Masayuki Okazaki, Niiha, and Naoki Ebisu, Kamifukuro, all of Japan, assignors to Toyo Roki Seiso K.K., Shizuoka and Honda Giken Kogyo K.K., Tokyo, both of Japan  
Continuation of Ser. No. 866,223, May 22, 1986, abandoned.  
This application Jan. 15, 1988, Ser. No. 145,696

Int. Cl.<sup>4</sup> B01D 39/14

U.S. Cl. 210—491

9 Claims



1. A filter medium for filtration of a fluid to flow there-through from one side of the filter medium to an opposite side thereof, said filter medium comprising a filter substrate having a density gradient wherein the density is high on the one side and a low density on the opposite side of the substrate, the filter substrate having pores increasing in cross section from said one side toward the opposite side thereof, and a fluffy layer formed on said one side having a high density, said fluffy layer comprising upstanding end portion of fibers extending from said filter substrate.

4,793,924

#### CYCLONE SEPARATOR

Derek A. Colman, Fleet, and Martin T. Thew, South Hampton, both of United Kingdom, assignors to B.W.N. Vortoil Rights Co. Pty. Ltd., Dandenong, Australia  
PCT No. PCT/AU86/00173, § 371 Date Feb. 27, 1987, § 102(e)  
Date Feb. 27, 1987, PCT Pub. No. WO86/07548, PCT Pub. Date Dec. 31, 1986

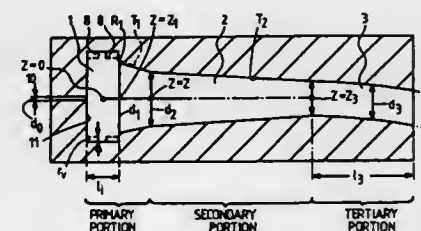
PCT Filed Jun. 17, 1986, Ser. No. 44,362

Claims priority, application United Kingdom, Jun. 17, 1985, 8515264

Int. Cl.<sup>4</sup> B01D 29/00, 37/00

U.S. Cl. 210—512.1

17 Claims



1. A cyclone separator comprising at least a primary portion having generally the form of a volume of revolution and having a first end and a second end, the diameter at said second end being less than at said first end, a plurality of n axially staggered inlets, each inlet giving into an inwardly spiralling feed channel, where  $n > 1$ , each said inlet having at least a tangential component at or adjacent said first end for introduced feed to be separated into the cyclone separator and the separator further including at least two outlets, in which cyclone separator the following relationship applies:

where  $d_1$  is the diameter of the said primary portion where flow enters (but neglecting any feed channel),  $d_{ix}$  is twice

the radius at which flow enters the cyclone through the  $x^{\text{th}}$  inlet (i.e. twice the minimum distance of the tangential component of the inlet centre line from the axes) and

$$d_1 = \frac{1}{A_1} \sum_{x=1}^{x=n} d_{ix} A_{ix}$$

where  $A_{ix}$  is the total cross sectional area of the  $x^{\text{th}}$  inlet at entry to the cyclone separator in a plane parallel to the axis of the cyclone separator and perpendicular to the component of the inlet centre line not parallel to the cyclone axis, and where

$$A_1 = \sum_{x=1}^{x=n} A_{ix}$$

and where  $d_2$  is the diameter of the primary portion at said second end and is measured at a point  $z_2$  where the condition first applies that

$$\tan^{-1} \left( \frac{d_2 - d}{2(z - z_2)} \right) < 2^\circ$$

for all  $z > z_2$  where  $z$  is the distance along the cyclone separator axis downstream of the plane containing the inlet and  $d$  is the diameter of the cyclone at  $z$ , and further  $z=0$  being the axial position of the weighted areas of the inlets such that the injection of angular momentum into the cyclone separator is equally distributed axially about said axial position where  $z=0$  and being defined by

$$\frac{1}{A_1 d_1} \sum_{x=1}^{x=n} z_x A_{ix} d_{ix} = 0$$

where  $z_x$  is the axial position of the  $x^{\text{th}}$  inlet, and further

$$\frac{\pi d_2 d_1}{4 A_1}$$

is from 3 to 12.

4,793,925

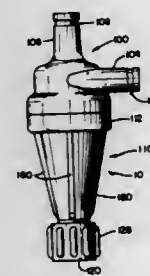
#### HYDROCYCLONE CONSTRUCTION

John F. Duvall, Buffalo, N.Y.; Mike Wilfley, Castlerock, and Carl R. MacLachlan, Federal Heights, both of Colo., assignors to A. R. Wilfley & Sons, Inc., Denver, Colo.  
Continuation-in-part of Ser. No. 651,781, Sep. 18, 1984, abandoned. This application Jan. 23, 1986, Ser. No. 877,250

Int. Cl.<sup>4</sup> B01D 17/038

U.S. Cl. 210—512.1

14 Claims



1. A hydrocyclone device comprising: an upper hollow rigid body provided with a tangential inlet, an inner wall surface, an axially directed outlet and a lower connecting end having a first annular sealing surface thereon; a lower hollow conical

body having an upper connecting end provided with a second annular sealing surface thereon, said conical body converging downwardly and terminating in a lower outlet, means designed for preventing leakage of fluid between connecting ends of a pair of bodies to be interconnected together including a resilient replaceable inner liner inserted only into said lower conical body, said liner including an inner wall surface forming an uninterrupted continuation of the inner wall surface of said upper body when said device is assembled and having a circumferential flange at its upper end disposed on said second annular sealing surface; and attaching means for attaching said first and second annular sealing surfaces of said upper and lower connecting ends defined by an externally treaded projection on one of said bodies and internally threaded recess on the other of said bodies complementary to said projection for threadedly interconnecting said upper body and said conical body together, said circumferential flange held between said first and second annular sealing surfaces, said attaching means having no extra fastening elements other than said externally threaded projection on said one of said bodies and internally threaded recess on said other of said bodies for interconnection of the entire device.

4,793,926

## LAMELLAR DECANTER

Patrick Vion, Houdoules, France, assignor to Societe Degremont, S.A., Rueil-Malmaison, France

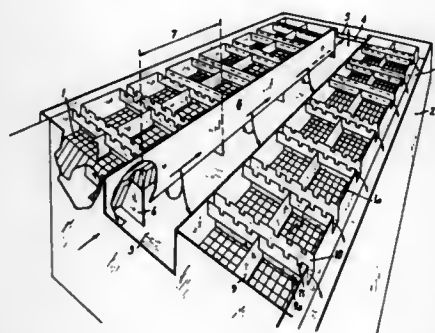
Filed Apr. 17, 1987, Ser. No. 39,177

Claims priority, application France, May 7, 1986, 86 06638

Int. Cl.<sup>4</sup> B01D 21/00

U.S. Cl. 210—521

15 Claims



1. An ascending flux lamellar decantation apparatus for treating a liquid, comprising:

- (a) a plurality of lamellar modules which comprise a plurality of ducts disposed within an enclosure, said lamellar modules being arranged in parallel relationship to one another;
- (b) at least one channel for introducing a liquid to be treated into the apparatus adjacent a first end of said channel, said channel running parallel to said lamellar modules;
- (c) a repartition device for maintaining hydraulic flux of a liquid to be treated positioned above at least one of said lamellar modules, said repartition device being divided into a plurality of hydraulically independent sections of substantially equal size such that the treated liquid flow in each said section is identical, said repartition device being provided with treated liquid recovery means for collecting the treated liquid.

4,793,927

## METHOD OF TREATING SEWAGE

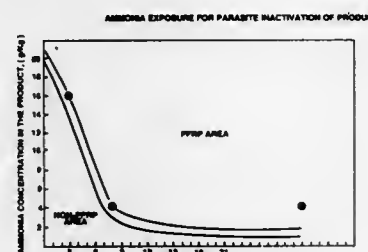
Peter P. Meehan; Robert S. Reimers, both of Metairie; Thomas G. Akers, and Maurice D. Little, both of New Orleans, all of La., assignors to Tulane Medical Center of Tulane Univ., New Orleans and Chemfix Technologies, Inc., Metairie, both of, La., a part interest to each

Filed Jan. 27, 1987, Ser. No. 6,767

Int. Cl.<sup>4</sup> C02F 1/68

U.S. Cl. 210—751

21 Claims



1. A method of treating sewage, comprising the steps of: mixing sewage with an ammonia source capable of evolving ammonia for treating the sewage; and combining the ammonia source and sewage with a silicate and a setting agent in sufficient proportions to form a substantially impermeable mass, the ammonia evolved from the ammonia source being retained within the mass in order to prevent its dissipation into the atmosphere, wherein the ammonia may then be used to destroy parasites in the sewage contained within the mass.

4,793,928

## POLYMER FILTERING APPARATUS

Tsugio Tsukamoto, and Tsuneo Inoue, both of Soka, Japan, assignors to SMC Corporation, Tokyo, Japan  
PCT No. PCT/JP86/00205, § 371 Date Feb. 25, 1987, § 102(e)  
Date Feb. 25, 1987, PCT Pub. No. WO86/06317, PCT Pub. Date Nov. 6, 1986

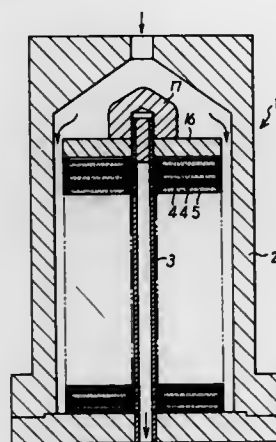
PCT Filed Apr. 25, 1986, Ser. No. 15,856

Claims priority, application Japan, Apr. 27, 1985, 60-62647

Int. Cl.<sup>4</sup> B01D 25/02, 29/34

U.S. Cl. 210—344

21 Claims



1. A polymer filtering apparatus comprising:
  - (a) a polymer duct in a form of a hollow conduit having a threaded end and a plurality of openings in a sidewall thereof forming passages leading from the exterior to the interior of said hollow conduit;
  - (b) a plurality of filtration stacks slidably mounted on said

hollow conduit, each one of said plurality of filtration stacks comprising:

- (i) a pair of non-self-supporting spaced filter members, said pair of spaced filter members defining a polymer passage therebetween, said polymer passage having an inner side adjacent said hollow conduit and an outer side;
- (ii) a liquid-permeable support member having an inner side adjacent said hollow conduit and an outer side, said liquid-permeable support member being in planar supporting contact with one of said pair of spaced filter members in each pair of spaced filter members on the side opposite to said polymer passage and in planar supporting contact with one of said pair of spaced filter members in the adjacent one of said plurality of filtration stacks on the side opposite to said polymer passage in said adjacent one of said plurality of filtration stacks;
- (iii) a plurality of polymer inlets in fluid communication with the outer side of said polymer passage;
- (iv) the inner side of said polymer passage being closed to fluid flow;
- (v) a plurality of polymer outlets in fluid communication with the inner side of said liquid-permeable support member and with said passages in said hollow conduit; and
- (vi) the outer side of said liquid permeable support member being closed to fluid flow;
- (c) a holder plate slidably mounted on said hollow conduit in abutting contact with the end one of said plurality of filtration stacks; and
- (d) a nut threaded on said threaded end of said hollow conduit so as to press said holder plate against said end one of said plurality of filtration stacks.

4,793,929

## METHOD FOR THE PURIFICATION OF SEWAGE WATERS

Reinhold W. Kickuth, Gilsbergstrasse 9, D-3436 Hess.-Lichtenau, and Norbert Koenemann, Mühlenstrasse 4, D-3527 Calden-Obermeiser, both of Fed. Rep. of Germany

Filed May 26, 1987, Ser. No. 53,966

Claims priority, application Fed. Rep. of Germany, May 28, 1986, 3618029

Int. Cl.<sup>4</sup> C02F 3/30, 3/32

U.S. Cl. 210—602

32 Claims



1. A method of purifying sewage waters which contain ammonia, compounds containing ammonia or both, comprising:
  - in a first purification stage, passing said sewage waters through at least one sewage water pond, aerating said sewage waters as said sewage waters pass through said sewage water pond and adjusting the pH of said sewage waters to a value in the slightly alkaline regimen to stimulate the growth of ubiquitous nitric bacteria, whereby at least a major portion of said ammonia, compounds containing ammonia or both is oxidized to nitrate and pretreated sewage waters containing nitrate and residual ammonia, residual ammonia containing compounds or both are formed;
  - passing said pretreated sewage waters containing nitrate and residual ammonia, residual ammonia containing compounds or both from said sewage water pond of said first purification stage into contact with a reaction medium of

a subsequent, second purification stage, said reaction medium having areas rich in atmospheric oxygen and areas poor in atmospheric oxygen; and in said subsequent, second purification stage, flowing said pretreated sewage waters containing nitrate and residual ammonia, residual ammonia containing compounds or both through said reaction medium having areas rich in atmospheric oxygen and areas poor in atmospheric oxygen and thereby converting at least a predominant portion of said residual ammonia, residual ammonia containing compounds or both and at least a predominant portion of said nitrate to nitrogen.

4,793,930

## PROCESS FOR WASTE WATER PURIFICATION EMPLOYING THE ACTIVATED SLUDGE PROCESS

Carl J. Soeder, Dortmund; Heinrich Kessen, Jülich; Erich Zander, Elsdorf, and Franz Hofmeister, Rheine, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany

Filed Mar. 6, 1986, Ser. No. 837,082

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1985, 3508126

Int. Cl.<sup>4</sup> C02F 3/12

U.S. Cl. 210—614

18 Claims

1. A process for waste water purification in a system utilizing an activated sludge process to reduce sludge bulking, said process having an aeration tank, having a volume, from which treated waste water is continuously discharged, said process comprising the steps of:

- identifying an oxygen related constituent of interest in the waste water in the aeration tank, which constituent has a concentration which is known to change in a characteristic manner during a cycle of the intermittently fed activated sludge process;
- said oxygen related constituent being dissolved oxygen in the waste water in the aeration tank;
- establishing a control value of said concentration of said dissolved oxygen in the waste water being treated in the aeration tank, said value being indicative for a requested purification stage of the treated waste water;
- measuring said concentration of said dissolved oxygen in the waste water in the aeration tank;
- comparing the measure concentration of said dissolved oxygen in the waste water in the aeration tank against the established control value; and
- intermittently introducing, in a cycle of from about one half hour to two hours, batches of waste water, having a volume, to be treated into the aeration tank only when said measured concentration of said dissolved oxygen in the waste water in the aeration tank equals said established control values wherein the intermittent introduction of batches of waste water to be treated occurs for a period of each cycle, of about one half hour to about two hours, of waste water purification as a function of the measured concentration and said determinable period of each cycle for introducing a batch of waste water is substantially shorter than its corresponding cycle of from about one half hours to two hours;
- the volume of the batches of waste water being introduced into the aeration tank in each said cycle being in a range of from about 5% to about 30% of the volume of the aeration tank, whereby sludge bulking is reduced.



**4,793,931**  
**PROCESS FOR TREATMENT OF ORGANIC**  
**CONTAMINANTS IN SOLID OR LIQUID PHASE**  
**WASTES**

R.D. Samuel Stevens, Thorahill, and Pauline M. Brown, Toronto, both of Canada, assignors to Solarchem Research, A Division of Brolor Investments Limited, Willowdale, Canada  
 Filed Sep. 10, 1987, Ser. No. 94,941  
 Int. Cl.<sup>4</sup> B01D 11/00; C02F 1/32  
 U.S. Cl. 210—636

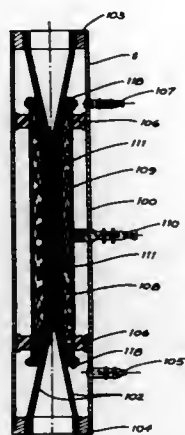
20 Claims



1. A process of treating a solid or liquid phase waste containing an organic contaminant which can be photodegraded, comprising:  
 contacting the solid or liquid phase waste with a perfluorinated solvent to extract the contaminant into the perfluorinated solvent; and  
 irradiating the perfluorinated hydrocarbon solvent containing the contaminant with U.V. light at any wavelength between about 180 and 400 nm to photodegrade the contaminant.

**4,793,932**  
**VARIABLE VOLUME FILTER OR CONCENTRATOR**  
 Douglas L. Ford, Eastwood, and Clinton V. Kopp, Castle Hill, both of Australia, assignors to Memtec Limited, New South Wales, Australia  
 PCT No. PCT/AU86/00085, § 371 Date Dec. 5, 1986, § 102(e) Date Dec. 5, 1986, PCT Pub. No. WO86/05997, PCT Pub. Date Oct. 23, 1986  
 PCT Filed Apr. 4, 1986, Ser. No. 10,089  
 Claims priority, application Australia, Apr. 10, 1985, 0081; Nov. 11, 1985, 3356

Int. Cl.<sup>4</sup> B01D 13/01  
 U.S. Cl. 210—636



1. Apparatus for treating a liquid suspension and concentrat-

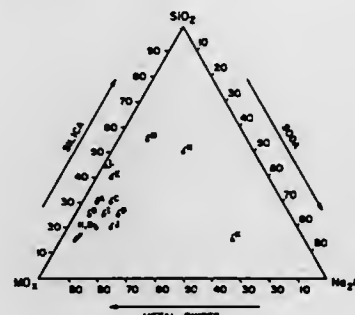
ing the solids of said liquid suspension, comprising: a shell, a plurality of elastic, hollow, microporous fibers within the shell, means communicated with said shell for supplying pressurized feed suspension to the shell, means communicated with said shell for withdrawing clarified liquid from the shell, means communicated with said shell for applying a pressurized reverse flow of gas to discharge solids retained on or in the fibers or otherwise within the shell, means communicated with said shell for discharging said solids, a variable volume elongated diaphragm positioned within the shell and enclosing the plurality of fibers, and means for varying the volume of said diaphragm.

7. A method of concentrating the solids of a liquid suspension, comprising the steps of:

- applying the liquid suspension to the outer surface of elastic, microporous, hollow fibers enclosed by a deformable, variable volume diaphragm within a shell to concentrate said solids by
  - passing some of the liquid suspension through the walls of the fibers to be drawn off as clarified liquid from the fiber lumens,
  - retaining at least some of the solids on or in the fibers or otherwise within the shell with the non-retained solids being removed from the shell with the remainder of liquid,
  - discharging the retained solids from the shell by:
    - applying to the fiber lumens a gas at a pressure sufficient to stretch all of the pores, followed by:
    - maintaining the flow of the gas at said pressure through the lumens for a time sufficient to drive the liquid from the pores having a bubble point below the pressure of the gas so as to wash out any solids retained in those pores and to substantially dislodge solids retained on the outer surface of the fibers so that the washed and dislodged solids are removed from the shell to an external collection point, and then,
    - reducing the pressure of the gas so that the pores will substantially return to their original size whereupon the gas is removed so that a portion of the liquid suspension passes through the walls of the fiber to be drawn off as clarifying liquid from the fiber lumens; and
  - varying the volume of the diaphragm so as to provide a reduced but variable volume during the application of the liquid suspension and a larger volume whilst the pressurized gas is applied.

**4,793,933**  
**WASTE TREATMENT METHOD FOR METAL**  
**HYDROXIDE ELECTROPLATING SLUDGES**  
 William Rostoker, Chicago, and John Dvoracek, Oak Lawn, both of Ill., assignors to Rostoker, Inc., Burnham, Ill.  
 Filed Nov. 16, 1987, Ser. No. 120,928  
 Int. Cl.<sup>4</sup> C02F 1/70

U.S. Cl. 210—710



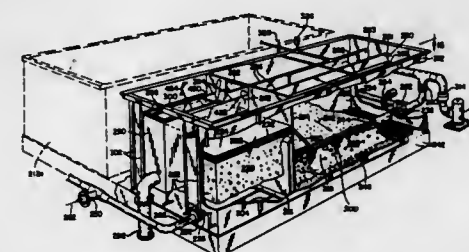
1. A waste treatment method for metal hydroxide sludges

generated from electroplating waste water treatment, said method comprising the steps of:  
 dewatering said sludge;  
 heating said metal hydroxide sludge, in an oxidizing environment, to a temperature sufficient to cause substantially all said metal hydroxides in said sludge to convert to metal oxides, thereby forming a metal oxide sludge;  
 mixing said metal hydroxide sludge, or said metal oxide sludge formed therefrom, with predetermined quantities of silica and soda;  
 heating said mixture of metal oxide sludge, silica and soda, to a temperature sufficient to cause fusion thereof to form a slag-like composition; and  
 cooling said fused slag-like composition to ambient temperature to form a solidified mass that is predominantly crystalline in structure and has a substantial quantity of said metal oxides in solid solution, either in a precipitate phase or in a silicate matrix.

**4,793,934**  
**METHOD FOR ENHANCING THE SEPARATION**  
**CAPACITY OF A MULTI-BED FILTRATION SYSTEM**  
 Robert E. Thompson, Houston, Tex., and Kurt M. Geiser, Minneapolis, Minn., assignors to Signal Environmental Systems, Inc., Hampton, N.H.  
 Filed Apr. 22, 1987, Ser. No. 41,307  
 Int. Cl.<sup>4</sup> C02F 1/52

U.S. Cl. 210—715

3 Claims



1. A method for enhancing the separation capacity of a multi-bed water filtration system comprising:  
 providing a filter apparatus having an upstream filter bed that is buoyant during filtration, a downstream filter bed of nonbuoyant media, and backwashing means for moving water upwardly through said downstream filter bed at selected time intervals;  
 treating raw water with at least one chemical coagulant;  
 passing said treated water upwardly through said upstream filter bed to partially filter said water;  
 passing said partially filtered water downwardly through said downstream filter bed to provide additional filtration of said water, said filtration causing coagulated materials from said water to be collected within said downstream filter bed;  
 periodically interrupting the flow of said partially filtered water through said downstream filter bed;  
 causing said backwashing means to move water upwardly through said downstream filter bed during said interruption of said flow of partially filtered water, said upwardly moving water comprising water previously filtered through said upstream and downstream filter beds, said upward movement of said water causing release of said coagulated materials collected therein, said released materials rising to a zone above the surface of said downstream filter bed to form a floc deck of coagulated materials thereabove; and  
 resuming the flow of said partially filtered water from said upstream filter bed downwardly through said downstream filter bed, said water first passing through said zone of coagulated materials.

**4,793,935**  
**METHOD OF REMOVING CYANURIC ACID FROM**  
**BATHER WATER**  
 Neil W. Stillman, Mesa, Ariz., assignor to Applied Biochemists, Inc., Mequon, Wis.  
 Filed May 15, 1987, Ser. No. 49,996  
 Int. Cl.<sup>4</sup> C02F 1/54

U.S. Cl. 210—729

1. A method of sanitizing a body of bath water, comprising the steps of intermittently adding to the body a cyanuric acid derivative containing a stabilized halogen, said halogen being released in said body to sanitize the same and produce a progressively increased concentration of residual cyanuric acid in said body, admixing an effective amount of melamine with said body of water to reduce said concentration of residual cyanuric acid to an acceptable limit of less than a maximum level of about 150 ppm by reacting said melamine with said residual cyanuric acid and forming an insoluble precipitate, removing the precipitate from said body, and adding additional quantities of said cyanuric acid derivative to said body, after the removal of said precipitate, to sanitize said body.

**4,793,936**  
**METHOD OF RECOVERING ALKALI METAL**  
**FLUORIDES FROM ORGANIC SLURRY**  
 Philip A. Lefrancols, Cranford, and Donald Pickens, Mendham, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.  
 Filed Aug. 1, 1983, Ser. No. 518,882  
 Int. Cl.<sup>4</sup> C02F 1/52

U.S. Cl. 210—729

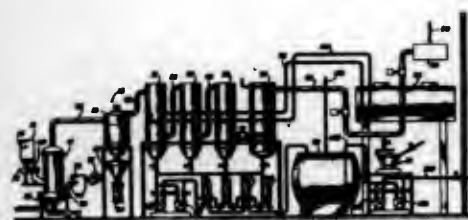
1. A method for recovering organic ether solvent and alkali metal fluoride from a slurry which comprises the steps:  
 (a) adding water to a slurry consisting of an organic ether liquid phase and a finely-divided solid phase comprising an alkali metal fluoride, said water being added in an amount sufficiently large to reduce adherence of organic ether to the solid phase and sufficiently small not to create a discernable separate aqueous liquid phase;  
 (b) maintaining the slurry with added water at a treatment temperature of at least about 50° C. for a treatment period of at least one minute, and  
 (c) separating the slurry with added water after treatment into a crude fluoride solid and an ether liquid.

**4,793,937**  
**METHOD AND APPARATUS FOR SEPARATING**  
**CONTAMINANTS FROM FLUIDIZABLE SOLIDS**  
 William C. Meenan, Waukegan, and George D. Sullivan, Wilmette, both of Ill., assignors to American Colloid Company, Arlington Heights, Ill.  
 Continuation-in-part of Ser. No. 648,274, Sep. 5, 1984, Pat. No. 4,699,721, which is a continuation-in-part of Ser. No. 528,910, Sep. 2, 1983, Pat. No. 4,685,220. This application Apr. 10, 1987, Ser. No. 37,026  
 The portion of the term of this patent subsequent to Oct. 13, 2004, has been disclaimed.  
 Int. Cl.<sup>4</sup> F23G 7/00

U.S. Cl. 210—771

1. A method for treating a fluidizable solid material contaminated with a polychlorinated biphenyl comprising:  
 fluidizing and heating said material in a drying vessel at a temperature sufficient to enable recovery of substantially all of the polychlorinated biphenyls in a gaseous stream out of said drying vessel, leaving 5 parts per million or less of the polychlorinated biphenyls in the material, thereby

separating the polychlorinated biphenyls from the material; and



removing said gaseous stream containing said separated polychlorinated biphenyls from said drying vessel for further treatment.

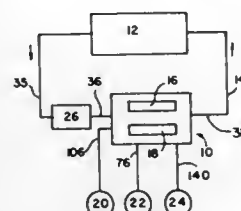
# **4,793,938** **METHOD AND APPARATUS FOR DECONTAMINATING DRY CLEANING FLUID AND FILTERS**

James E. Dayton, P.O. Box 1563, Colton, Calif. 92324  
Filed Nov. 18, 1986, Ser. No. 932,202

Int. Cl.<sup>4</sup> D06F 43/08

U.S. Cl. 210—774

19 Claims



1. In a method of filtering and recirculating dry cleaning fluid which employs a plurality of coaxially aligned annular dry cleaning filter means arranged longitudinally along a horizontal axis within a hollow filter housing thereby defining an elongated hollow central core and coupled in a recirculation loop with a machine for dry cleaning clothing and in which dry cleaning fluid is passed through said filter means in a single radial direction, the improvement comprising:

decoupling said filter means and filter housing from said recirculation loop to isolate them from said machine for dry cleaning clothing,

forcing a portion of said dry cleaning fluid through said filter means in a radial direction opposite to said single direction and out of said filter housing in unvaporized form to flush contaminants from said dry cleaning filter means by applying heat radially inwardly to the contents of said filter housing from the periphery thereof and by also applying heat radially outwardly to the contents of said filter housing from within said hollow central core to vaporize a portion of said dry cleaning fluid within said filter housing, thereby building pressure within said filter housing to aid in forcing an unvaporized portion of dry cleaning fluid out of said filter housing,

distilling separate portions of said dry cleaning fluid within said filter housing and externally thereof to vaporize and separate it from unvaporized contaminants, condensing said vaporized dry cleaning fluid to liquid form, separating water from said condensed liquified dry cleaning fluid,

passing said liquified, dry cleaning fluid to said machine for dry cleaning clothing for reuse,

recoupling said filter means and said filter housing in said recirculation loop, and

passing dry cleaning fluid from said machine for dry clean-

ing clothing through a lint trap prior to returning said dry cleaning fluid to said dry cleaning fluid filter means.

# **4,793,939** **LUBRICATING OIL COMPOSITION COMPRISING A POLYALKYLENE OXIDE ADDITIVE**

Shigeo Mori, Kyoto; Chuzo Isoda, and Satoshi Teshima, both of Uji, all of Japan, assignors to Dai-Ichi Kogyo Seiyaku Co., Ltd., Kyoto, Japan

Filed May 18, 1987, Ser. No. 50,365

Claims priority, application Japan, May 20, 1986, 61-117086

Int. Cl.<sup>4</sup> C10M 129/16, 129/18

U.S. Cl. 252—52 A

8 Claims

1. A lubricating oil composition consisting essentially of a paraffinic or naphthenic mineral oil or a mixture of both types of mineral oils, and 5 to 60% by weight of the composition of a polyalkylene oxide compound of the formula:



wherein

R is the residue of a compound having 1-8 active hydrogen atoms with removal of the active hydrogen atoms,

n is 3-4,

m is 6-40,

x and y are an integer, and

Z is 1-8;

said polyalkylene oxide compound having a molecular weight of 500 to 100,000 and a C<sub>6</sub>-C<sub>40</sub> alkylene oxide content of 15 to 60% by weight of the entire molecule.

# **4,793,940** **ABSORBENT COMPOSITION FOR REFRIGERATION AND HEATING SYSTEMS**

Irena Borde, and Michael Jelinek, both of Beer Sheva, Israel, assignors to Ben Gurion Univ. of the Negev Research and Development Authority, Beer Sheva, Israel

Continuation-in-part of Ser. No. 23,901, Mar. 10, 1987, abandoned, which is a continuation of Ser. No. 802,192, Nov. 25, 1985, abandoned. This application Feb. 11, 1988, Ser. No. 159,491

Claims priority, application Israel, Nov. 28, 1984, 73656

Int. Cl.<sup>4</sup> C09K 5/04

U.S. Cl. 252—69

2 Claims

1. A working fluid for an absorption refrigeration system comprising a mixture of about 30-70 w/w% dimethyl formamide and about 70-30 w/w% N-methyl-2-pyrrolidone as the absorbent therein, and difluoromonochloromethane as refrigerant.

# **4,793,941** **CLEANING PRODUCT**

Paul J. Serbiak, Green Bay, Wis.; Edwin G. Greenman, Woodstock, Ga., and Gary L. Shanklin, Appleton, Wis., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed Oct. 17, 1986, Ser. No. 920,494

Int. Cl.<sup>4</sup> C11D 17/00

U.S. Cl. 252—91

7 Claims

1. A cleaning product comprising a melt-down web saturated with at least 150 grams per square meter of condensed liquid laundry detergent having a gel-like consistency.

# **4,793,942** **DETERGENT SYSTEMS WITH A DISPERSED AQUEOUS-ORGANIC SOFTENING AGENT FOR HARDNESS REMOVAL**

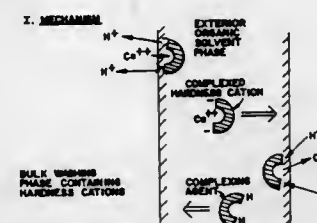
Keith D. Lokken, Burnsville, and Keith E. Olson, Apple Valley, both of Minn., assignors to Ecolab Inc., St. Paul, Minn.

Filed Jan. 8, 1987, Ser. No. 1,397

Int. Cl.<sup>4</sup> C11D 3/39, 7/24, 17/00

U.S. Cl. 252—99

52 Claims



14. A warewashing detergent system, capable of removing soil from flatware or dishware and removing divalent or trivalent ions from service water, comprising:

(a) about 0.1 to 95 wt-% of a source of an inorganic alkaline detergent;

(b) about 2 to 60 wt-% of a softening agent dispersed in the detergent system, which softening agent comprises:

(1) about 25 to 95 vol.-% of an exterior organic phase comprising a major proportion of an organic medium and about 0.5 to 45 wt-% of an organic soluble hardness ion complexing agent;

(2) about 5 to 75 vol.-% of an inner acidic aqueous phase dispersed within the exterior organic solvent phase which comprises water and about 0.5 to 99 wt-% of an acid; and

(3) about 0.1 to 50 wt-%, based on the organic phase, of a surfactant to stabilize the dispersed inner aqueous phase within the exterior organic phase; and

(c) about 0.1 to 25 wt-% of a source of active halogen.

# **4,793,943** **LIQUID DETERGENT COMPOSITIONS**

William P. Haslop, Cleator Moor; John M. Allonby; Brian J. Akred, both of Whitehaven, and Edward T. Messenger, Workington, all of England, assignors to Albright & Wilson Limited, West Midlands, England

Division of Ser. No. 684,802, Dec. 24, 1984, Pat. No. 4,618,446, which is a continuation-in-part of Ser. No. 576,632, Feb. 3, 1984, abandoned. This application Jul. 30, 1986, Ser. No. 890,530

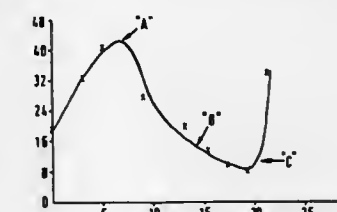
Claims priority, application United Kingdom, Dec. 22, 1983, 8334250; Jan. 20, 1984, 8415783; Aug. 8, 1984, 8421783

The portion of the term of this patent subsequent to Oct. 21, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> C11D 3/14, 3/065, 3/08, 1/18

U.S. Cl. 252—135

30 Claims



1. A Stable, Pourable, fluid, detergent composition comprising water, surfactant and a water soluble, surfactant-desolubilizing salt having a weight ratio of surfactant to water such that, when said salt is progressively dissolved in an aqueous micellar solution of said surfactant having said weight ratio,

the electrical conductivity of said solution passes through a trough containing a First Conductivity Minimum at which the mixture is Stable and turbid, and said salt being dissolved in the composition in an amount corresponding to said trough, said amount being between the minimum and maximum such amounts at which the composition is Stable and Pourable at a temperature below 5° C. and at 40° C.

# **4,793,944** **CRYSTALLINE LANTHANUM-OXY-HALIDE PHOSPHOR ACTIVATED WITH RARE EARTHS**

Gerhard Herzog; Detlef Starck; Walter Tews, all of Greifswald; Franz Braunholz, Bad Liebenstein, all of German Democratic Rep.; Alexander M. Gurvic, Moscow; Svetlana I. Golovkova, Chirki, both of U.S.S.R., and Karl Dietzel, Bad Liebenstein, German Democratic Rep., assignors to VEB Mikroelektronik, Leuchtstoffwerk Bad Liebenstein, Bad Liebenstein, German Democratic Rep.

Filed Sep. 30, 1987, Ser. No. 103,234

Claims priority, application German Democratic Rep., Sep. 30, 1986, WP C 09 K/294 821

Int. Cl.<sup>4</sup> C09K 11/86

U.S. Cl. 252—301.4 H

2 Claims

1. A crystalline lanthanum-oxy-halide phosphor, activated with Tm<sup>3+</sup> and Gd<sup>3+</sup> for the conversion of X-radiation to photographically effectual ultraviolet and blue luminescence, the phosphor consisting essentially of



where X is Cl and/or Br, and y is from 0.0001 to 0.1, and z is from 0.001 to 0.3, and exhibiting a smaller phosphorescence than said phosphor absent Gd<sup>3+</sup>.

# **4,793,945** **USE OF INOSITOL TRIPHOSPHATE AS A STABILIZER AND COMPOSITIONS FORMED THEREFROM**

Matti Siren, Via Poporino 9, CH-6926 Montagnola/Lugano, Switzerland

Continuation-in-part of Ser. No. 788,830, Oct. 18, 1985, Pat. No. 4,735,902. This application Feb. 17, 1987, Ser. No. 15,698

Claims priority, application Sweden, Oct. 23, 1984, 8405295; Jan. 26, 1985, 8503164; Jan. 26, 1985, 8503165

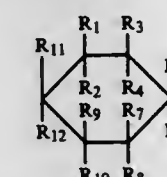
The portion of the term of this patent subsequent to Apr. 5, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> C09K 15/32; C12N 9/96; A23L 00/00; A61K 31/66

U.S. Cl. 252—400.2

21 Claims

1. A stabilized composition comprising an organic substrate subject to degradation by oxidation and/or free radical reaction and between about 0.01% to about 2% by weight, based on the total weight of the composition, of at least one isomer of inositol triphosphate, a salt thereof or an acid thereof, said isomer having the structural formula



where

(a) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>5</sub>, R<sub>7</sub>, R<sub>10</sub> and R<sub>11</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>4</sub>, R<sub>6</sub>, R<sub>8</sub>, R<sub>9</sub> and R<sub>12</sub> are hydrogen;

(b) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>9</sub> and R<sub>12</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>8</sub>, R<sub>10</sub> and R<sub>11</sub> are hydrogen;

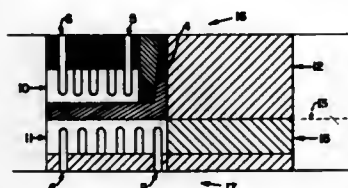
(c) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>5</sub>, R<sub>8</sub>, R<sub>10</sub> and R<sub>12</sub> are hydroxyl and the





plastic parts wherein the parts are formed by intimate contact under high pressure within the mold cavity comprising:

- (a) at least one optically-lapped surface composed of an electroplated nickel, said lapped surface facing into said mold cavity so as to permit incoming molten thermoplastic to wet said surface during filling of the cavity so as to form the part during pressurization of the molten thermoplastic in the mold cavity, and thus to replicate the lapped surface in the resulting thermoplastic optical parts; and
  - (b) a suitably dimensioned, load-bearing substrate component of the mold cavity member, wherein the substrate component is of a beryllium-copper alloy composition, and the resulting mold cavity member is of a seamless, monolithic construction, consisting of a beryllium-copper substrate integrally joined with a nickel plated face.
8. A method of forming a special mold cavity surface for use in high-pressure injection and compression molds for optical



thermoplastic parts wherein the optical surfaces of said thermoplastic parts are formed by intimate contact under high pressure with certain elements of the mold cavity, comprising the steps of:

- (a) depositing a nickel surface through electroplating or electrodeless deposition onto a suitably dimensioned, load-bearing substrate component of the mold element, the substrate being of a beryllium-copper alloy, and
- (b) lapping optically said deposited nickel surface composed of an electroplated or electrodeless nickel, the lapped surface facing into the mold cavity so as to permit the incoming molten thermoplastic to wet the surface during filling so as to form the part during pressurization of the molten thermoplastic in the mold cavity, and thus to replicate the lapped surface in the resulting thermoplastic optical part, and the resulting mold element being of a seamless, monolithic construction, including a beryllium-copper substrate integrally joined with a nickel plated face.

**4,793,954**  
**SHEAR PROCESSING THERMOPLASTICS IN THE PRESENCE OF ULTRASONIC VIBRATION**  
Bling-Lin Lee, Broadview Heights, and Cameron Cranston, Wadsworth, both of Ohio, assignors to The B. F. Goodrich Company, Akron, Ohio  
Filed Aug. 17, 1987, Ser. No. 86,119  
Int. Cl. B29C 47/12

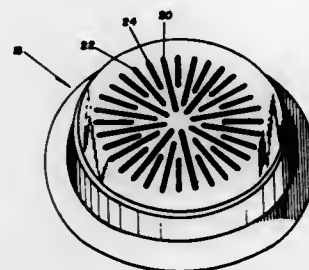
U.S. Cl. 264—23 4 Claims

1. A process for improving the processability of a shear thinning thermoplastic melt, comprising the steps of: melting the shear thinning thermoplastic in a shear processing apparatus containing a die, said shear thinning thermoplastic being a styrenic type polymer or a polyolefin, said polyolefin made from monomers having from 2 to 6 carbon atoms, said apparatus being an injection molding apparatus or extrusion apparatus; applying ultrasonic vibration to said die at a frequency of 10,000 to 40,000 hertz at a substantially longitudinal flow angle of about 15 degrees or less to said shear processing apparatus whereby the shear processability of said thermoplastic is improved; and injection molding or extruding said thermoplastic at a reduced viscosity and temperature.

**4,793,955**  
**METHOD AND APPARATUS FOR CASTING SOLID PROPELLANT ROCKET MOTORS**  
Larry W. Poulter, Ogden; John L. Brown, Brigham City, and Ernest D. Brown, Ogden, all of Utah, assignors to Morton Thiokol, Inc., Chicago, Ill.  
Filed May 24, 1983, Ser. No. 497,538  
Int. Cl. C06B 21/00

U.S. Cl. 264—3.3

18 Claims

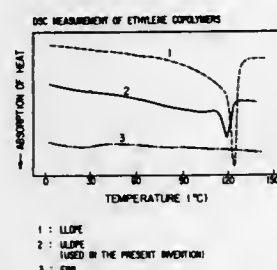


1. The method of providing a uniform flow distribution during casting of a solid propellant in an evacuated chamber comprising the step of introducing into the evacuated chamber uncured propellant in the form of symmetrical, radially oriented, ribbons.

**4,793,956**  
**PROCESS FOR PREPARING POROUS FILM OR SHEET**  
Motomi Nogiwa, Zushi; Shunichi Yoshida, Yokohama; Shigeki Komori, Sagami; Toshitane Yoshikawa, Kawasaki, and Toshio Kotsuka, Yokohama, all of Japan, assignors to Nippon Petrochemicals Company, Limited, Tokyo, Japan  
Filed Dec. 24, 1986, Ser. No. 946,074  
Claims priority, application Japan, Dec. 26, 1985, 60-291996  
Int. Cl. B29C 67/20, 55/02

U.S. Cl. 264—41

5 Claims



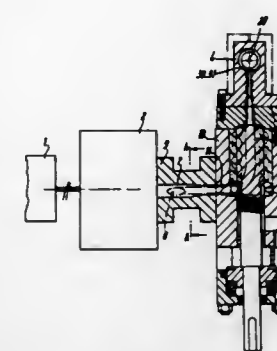
1. A process for preparing a porous film or sheet, which process comprises melt-forming a composition into a film or sheet and then stretching the thus-formed film or sheet at a temperature in the range of 30° to 110° C., said composition containing:
  - (a) 30-90% by weight of a linear low-density polyethylene having a density not smaller than 0.910 g/cm<sup>3</sup> and smaller than 0.940 g/cm<sup>3</sup>;
  - (b) 10-70% by weight of an ethylene/α-olefin copolymer having a density not smaller than 0.860 g/cm<sup>3</sup> and smaller than 0.910 g/cm<sup>3</sup>, a boiling n-hexane insolubles content not less than 10% by weight and a maximum peak temperature not lower than 100° C. as measured according to a differential scanning calorimetry; and
  - (c) 20-500 parts by weight of a filler based on 100 parts by weight of said resin components.

**4,793,957**  
**APPARATUS FOR AND METHOD OF TREATING A VISCOUS MATERIAL**  
John G. A. Lovegrove, Oldham, England, assignor to Francis Shaw & Co. (Manchester) Ltd., Manchester, England  
Filed Feb. 25, 1987, Ser. No. 18,533  
Claims priority, application United Kingdom, Feb. 25, 1986, 8604673

U.S. Cl. 264—171

Int. Cl. B29C 47/04, 47/64

22 Claims



1. Apparatus for treating a viscous material comprising a positive displacement material feed means, means for dividing material passing from the feed means into at least two component streams, a cavity transfer mixer for mixing a material modifying agent into at least one of the streams and means for recombining the streams.

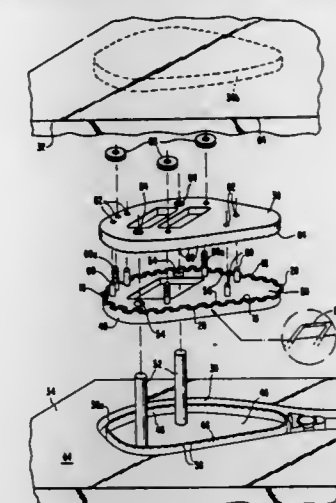
14. A method of modifying a viscous material including the steps of feeding the material to a positive displacement feed means, splitting the material flow into at least two streams, mixing a modifying agent into one at least of the streams by means of a cavity transfer mixer and subsequently recombining the streams to produce a composite material comprising adjacent modified and unmodified regions.

**4,793,958**  
**METHOD OF MOLDING A RACQUET WITH STRING SECURING LOOPS**  
Jonathan C. Mott, Olde Forge Cottage, The Common, Womersley - Nr. Guildford, GU50PJ, England  
Continuation of Ser. No. 662,100, Oct. 18, 1984, abandoned.  
This application Dec. 15, 1986, Ser. No. 942,038  
Claims priority, application United Kingdom, Oct. 18, 1983, 8327851

U.S. Cl. 264—274 5 Claims

1. A method of making a racquet, the method comprising the steps of: forming a plurality of string-securing members in the form of a sinuous shape with oppositely facing U-shaped loops defined by limbs connected by bent over inner and outer ends with form string-securing loops and string-securing loop anchorages, respectively; providing a mould shaped to define the frame of the racquet with said mould forming a mould cavity including a radially inner wall with cut-outs for receiving limbs of the U-shaped loops; providing first and second separable and cooperating locating members separate from said mould, with said locating member each having a peripheral wall shaped and dimensioned to fit closely adjacent to the radially inner wall of said mould; securing the plurality of string-securing members in said locating members by sandwiching the inner ends and adjacent portions of the limbs between said first and second locating members and by having the remaining por-

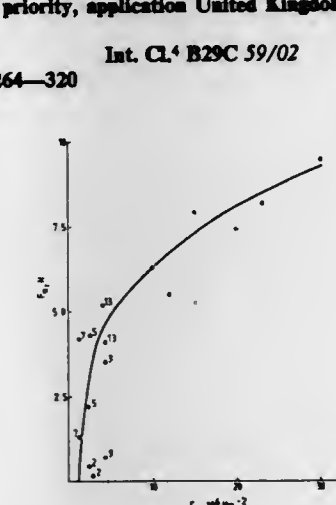
tions of the limbs and the outer ends extend past said peripheral walls of said locating members; supporting the remaining portions of the limbs and the outer ends of the loops of the string-securing members in said mould cavity by placing said peripheral wall of said locating members adjacent said radially inner wall of said mould so that said locating members are disposed outside of said mould cavity and the remaining portions of the limbs together with the outer ends of the U-shaped loops



extend through said cut-outs in said radially inner wall of said mould to be located within said mould cavity; and injecting a plastics material into said mould cavity to mould the frame around the remaining portions of the limbs and the outer ends of the loops located within said mould cavity, whereby after moulding the inner ends of the loops project radially inwardly of the moulded frame to receive and position at least one string of the stringing of the racquet.

**4,793,959**  
**PROCESS FOR STAMPING A DETERGENT BAR**  
Michael J. Adams, and Brian Edmondson, both of Cheshire, England, assignors to Lever Brothers Company, New York, N.Y.  
Filed Jan. 25, 1988, Ser. No. 147,397  
Claims priority, application United Kingdom, Jan. 26, 1987, 8701635

U.S. Cl. 264—320 10 Claims



1. In a process of stamping a detergent bar by moving at least



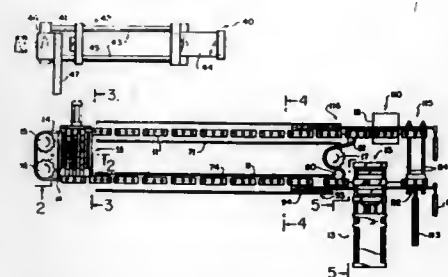
one die member relatively towards the bar so as to contact the bar, the improvement wherein said at least one die member has a total modulus of elasticity within the range  $10^5$  to  $5 \times 10^7$   $\text{Nm}^{-2}$ , whereby die-blocking is reduced and a good quality gloss and sheen is imparted to the surface of said bar.

#### 4,793,960 PROCESS FOR PREPARING HOLLOW PLASTIC ARTICLES

Robert D. Schad, Toronto; Herbert Rees, Orangeville; Gary Hughes, Nobleton, and John R. Marchle, Aurora, all of Canada, assignors to Husky Injection Molding Systems Ltd., Bolton, Canada  
Division of Ser. No. 733,969, May 14, 1985, Pat. No. 4,690,633, which is a continuation-in-part of Ser. No. 648,793, Sep. 7, 1984, Pat. No. 4,522,581. This application Mar. 30, 1987, Ser. No. 31,540

Int. Cl.<sup>4</sup> B29C 49/02  
U.S. Cl. 264—535

6 Claims



1. A process for preparing hollow plastic articles which comprises: injection molding a first number of plastic parisons in an injection molding operation in an injection molding cycle; transferring said first number of plastic parisons to a multiplicity of pallets at a receiving station wherein each pallet holds a second number of plastic parisons less than said first number, with the output of the injection molding operation coordinated with the receiving station; conveying said pallets with parisons thereon in a single row from said receiving station to a finishing station for forming said parisons into said hollow plastic articles; returning said pallets from said finishing station to said receiving station in a single row one at a time in a continuous operation including continuously transferring said pallets to said receiving station one at a time until the number of pallets at the receiving station is suitable for receiving said first number of plastic parisons; providing a temperature conditioning means between said receiving station and finishing station and conditioning the temperature of the parisons to render same suitable for forming into said hollow plastic articles at said finishing station; and transporting said pallets with parisons thereon through said temperature conditioning means in a single row to first equalize the temperature of said parisons and second obtain the desired temperature profile for forming into said hollow plastic article.

4,793,961  
METHOD AND SOURCE FOR PRODUCING A HIGH CONCENTRATION OF POSITIVELY CHARGED MOLECULAR HYDROGEN OR DEUTERIUM IONS  
Kenneth W. Ehlers, Alamo, and Ka-Ngo Leung, Hercules, both of Calif., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.  
Filed Jul. 26, 1983, Ser. No. 517,476

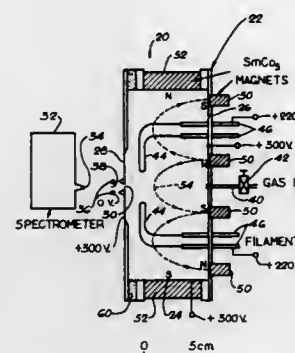
Int. Cl.<sup>4</sup> G21B 1/00; H05H 1/00  
U.S. Cl. 376—127

12 Claims

1. A positive ion source for producing a beam of high concentration positively charged molecular ions when supplied with hydrogen or deuterium, said ion source comprising:

a plasma chamber constructed so as to minimize the path

length of positive ions in the chamber before such ions are extracted therefrom, electron emitting means positioned in said chamber, means for metering hydrogen or deuterium into said chamber, a plasma grid forming a wall of said plasma chamber and spaced from said electron emitting means and having an extraction opening therein through which a beam of high concentration positive ions is extracted, said extraction opening having a small cross-section reactive to an adjacent cross-section of said chamber, extractor electrode means located outside said chamber adjacent to an in alignment with said extraction opening of



said plasma grid for extracting a beam of positive ions from said chamber through said extraction opening, said electron emitting means being located closely adjacent with respect to said plasma grid and closely adjacent to said extraction opening in said plasma grid so that the path length of positive ions from the neighborhood of said electron emitting means to said extraction opening is short in relation to the mean free path of the hydrogen or deuterium molecules in said chamber to achieve a high concentration of hydrogen or deuterium ions and to minimize the production of other ions species by collisions of the positive hydrogen or deuterium ions with hydrogen or deuterium molecules.

4,793,962  
PROCESS FOR PLACING A BUNDLE OF RODS OF A NUCLEAR FUEL ASSEMBLY INTO A CASE AND INSTALLATION FOR PERFORMING THIS PROCESS  
Jean Tittschvill, Issy Les Moulineaux, France, assignor to Cogema Compagnie Generale Des Matieres Nucleaires, France

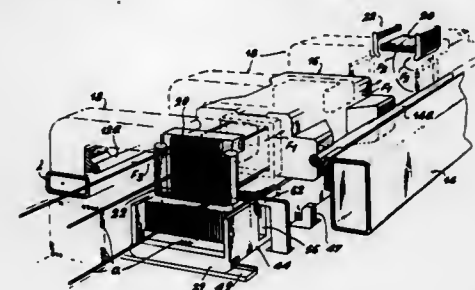
Filed Mar. 24, 1987, Ser. No. 29,726  
Claims priority, application France, Apr. 1, 1986, 86 04584  
Int. Cl.<sup>4</sup> G21C 19/33

U.S. Cl. 376—261

14 Claims

1. A process for placing in a case a bundle of rods arranged in n parallel rows of at least r rods, in accordance with a square pitch lattice in a nuclear fuel assembly, wherein it comprises placing the bundle of rods horizontally in accordance with said lattice in a waiting position above a cassette having p recesses separated by partitions, p being an integer at least equal to n, so that each row of rods is located above a recess in the cassette, lowering the rods into the cassette recesses, placing the cassette in the horizontal extension of a case, by interposing between cassette and case a transformation member, whose width decreases progressively from cassette to case by a value

equal to the cumulative thickness of the cassette partitions and transferring the rods from the cassette into the case through



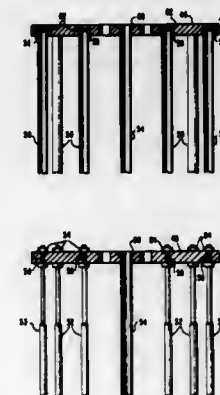
the transformation member by simultaneously pushing all the rods.

4,793,963  
FUEL ROD CLUSTER INTERCHANGE SYSTEM AND METHOD FOR NUCLEAR FUEL ASSEMBLIES  
Edmund E. Demario, Penn Hills Township; Denis L. Burman; Carl A. Olson, both of Monroeville, and Jeffrey R. Secker, Monroeville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation of Ser. No. 716,282, Mar. 26, 1985, abandoned.  
This application Dec. 5, 1987, Ser. No. 129,326  
Int. Cl.<sup>4</sup> G21C 19/20

U.S. Cl. 376—267

6 Claims



1. In a nuclear reactor core having a multiplicity of fuel assemblies, a method of fuel interchange between said fuel assemblies, comprising the steps of:

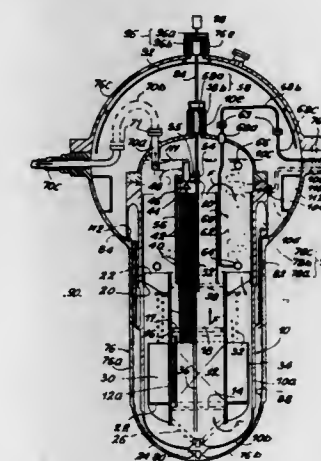
- inserting a cluster assembly of a first plurality thereof, with each cluster assembly of said first plurality containing an array of fuel rods having burnt fuel disposed therein, into a fuel assembly of a first plurality thereof, with each fuel assembly of said first plurality containing an array of fuel rods having fresh fuel disposed therein; and
- inserting a cluster assembly of a second plurality thereof, with each cluster assembly of said second plurality containing an array of fuel rods having fresh fuel disposed therein, into a fuel assembly of a second plurality thereof, with each fuel assembly of said second plurality containing an array of fuel rods having burnt fuel disposed therein;
- certain groups of said fuel rods in each fuel assembly being spaced apart laterally from one another by a greater distance than the rest of said fuel rods so as to define a plurality of empty elongated channels in an array being interspaced within said array of fuel rods, each elongated channel being in the form of an open space extending

laterally between and longitudinally along said fuel rods of said certain groups thereof;  
(d) said fuel rods of each cluster assembly in each of said first and second pluralities thereof being larger in size than said fuel rods of each fuel assembly in each of said first and second pluralities thereof, said larger size cluster assembly fuel rods being inserted in said elongated channels defined in said respective fuel assemblies.

4,793,964  
SMALL NATURAL CIRCULATION PRESSURIZED WATER NUCLEAR REACTOR  
Maurice Fajean, Pertuis, France, assignor to Commissariat a l'Energie Atomique, Paris, France  
Filed May 19, 1987, Ser. No. 51,836  
Claims priority, application France, May 22, 1986, 86 07300  
Int. Cl.<sup>4</sup> G21C 15/26

U.S. Cl. 376—294

12 Claims



1. A pressurized nuclear reactor with circulation by natural convection, comprising: a main vessel adapted to be filled with water and to be surmounted by a pressurized steam layer, said vessel containing in a lower part thereof a reactor core and in an upper part thereof a steam generator, a first ferrule surrounding the reactor core and a second ferrule located within the steam generator, said ferrules adapted to channel water between the core and the steam generator, a confinement enclosure externally duplicating the main vessel and defining with the latter an intermediate space, the main vessel being thermally uninsulated, the intermediate space having an upper zone adapted to be filled with pressurized neutral gas, an intermediate zone adapted to be filled with water and communicating with the upper zone and defined between the enclosure and a fluid-tight ferrule sealingly connecting the confinement enclosure to the vessel, above the reactor core, and a lower zone adapted to be filled with water and defined between the fluid-tight ferrule, the vessel and the enclosure, the confinement enclosure being adapted to be immersed in an external cooling liquid and internally equipped with thermal insulation in the lower zone of the intermediate space, except in a lower part of the confinement enclosure located at a level below the reactor core.

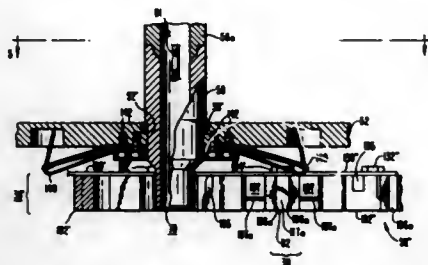
4,793,965  
SIMPLIFIED, FLEXIBLE TOP END SUPPORT FOR  
CANTILEVER-MOUNTED ROD GUIDES OF A  
PRESSURIZED WATER REACTOR

Denis J. Altman, Penn Township, Westmoreland County, and Douglas E. Ekerdt, Plum Borough, Allegheny County, both of Pa., assigns to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 3, 1986, Ser. No. 926,295  
Int. Cl. G21C 1/01

U.S. Cl. 376-353

25 Claims



1. A support for the top ends of a plurality of elongated rod guides of at least first and second types, generally vertically disposed within a pressurized water reactor vessel in corresponding, at least first and second interleaved matrices, said vessel having lower and upper support structures and said rod guides having lower ends fixedly supported on the lower support structure and upper ends disposed adjacent to and spaced vertically below the upper support structure, said support comprising:

plural top support plates of at least first and second types, disposed on and connected to the respective top ends of said corresponding, at least first and second types of rod guides;

said top support plates of said at least first and second types having respectively mating, exterior peripheral surfaces for assembly of each said top support plate of one said type in mating relationship with respective, contiguous and surrounding top support plates of another said type; said respective, mating exterior peripheral surfaces further comprising a vertically extending, recessed channel in one said peripheral surface and a mating transverse extension in said mating peripheral surface, received in said vertically extending recessed channel in telescoping relationship in the assembly of each said contiguously surrounding top support plate with said top support plate of said one type, each top support plate of one of said first and second types being independently, vertically and telescopically movable, into and out of assembly with the respective, contiguously surrounding top support plates of the other said type;

means for resiliently interconnecting each top support plate of one type with each of said respective, contiguous and surrounding top support plates of the other said type; and said type being

each top support plate of a selected adapted for connection to the upper support structure of a pressure vessel in which said elongated rod guides and respectively associated top support plates are disposed.

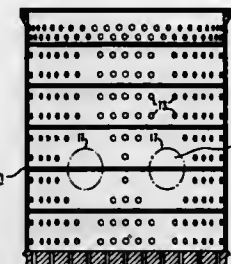
4,793,966  
NUCLEAR REACTOR  
Luciano Veronesi, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.  
Continuation of Ser. No. 490,097, Apr. 29, 1983. This application Mar. 29, 1988, Ser. No. 178,801  
Int. Cl. G21C 15/00

U.S. Cl. 376-377

12 Claims

1. The method of operating a nuclear reactor having a vessel, a nuclear core within said vessel, at least an inlet nozzle and

an outlet nozzle, and control-rod assemblies within a plenum within said vessel; the said method including: conducting a coolant in sequence generally vertically through said core and generally vertically and generally transversely through said control-rod assemblies in said plenum, said coolant flowing at a high velocity through said core, reducing the velocity of said coolant as it flows through said plenum by the step of expand-



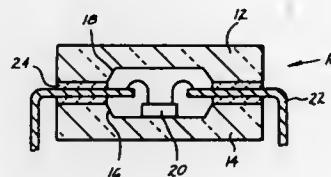
ing the volume through which said coolant flows through said plenum over substantially the whole volume of said plenum, said volume-expanding step including the step of compensating for the pressure variation of said coolant along said plenum between the generally lower regions of said plenum and the generally upper regions of said plenum, and thereafter conducting said coolant through said outlet nozzle.

4,793,967  
CERMET SUBSTRATE WITH SPINEL ADHESION  
COMPONENT

Michael J. Pryor, Woodbridge; Eugene Shapiro, Hamden, and Deepak Mahulikar, Meriden, all of Conn., assigns to Olin Corporation, New Haven, Conn.  
Division of Ser. No. 838,967, Mar. 12, 1986, Pat. No. 4,743,299.  
This application Dec. 31, 1987, Ser. No. 140,184  
Int. Cl. B22F 1/00

U.S. Cl. 419-19

11 Claims



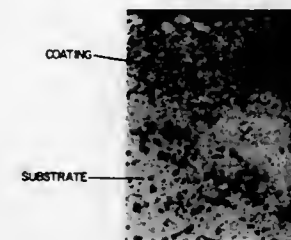
1. The process of forming a composite material adapted for use in a semiconductor substrate, comprising the steps of: providing a mixture comprising: from about 40 to about 60 volume % of particles consisting essentially of aluminum or aluminum alloy, from an effective amount up to about 10 volume % of binder in the form of particles for enhancing bonding between said aluminum or aluminum alloy particles and ceramic particles, said binder being selected from the group consisting of Mg, Li, Cr, Ca, Be, MgO and mixtures thereof, and the balance essentially ceramic particles; compacting said mixture; and heat treating said compacted mixture to form a matrix comprising aluminum alloyed with said binder and ceramic particles distributed within said matrix.

4,793,968  
SURFACE MODIFIED POWDER METAL PARTS AND  
METHODS FOR MAKING SAME

Mark F. Mosser, Sellersville, and Bruce G. McMordie, Philadelphia, both of Pa., assigns to Sermatech International, Inc., Limerick, Pa.  
Continuation of Ser. No. 454,473, Dec. 29, 1982, abandoned.  
This application Jan. 27, 1984, Ser. No. 624,924  
Int. Cl. B22F 7/06

U.S. Cl. 428-550

25 Claims



IRON DISC COATED AND SINTERED

11. A coherent porous sintered coated powder metallurgical part of improved corrosion resistance, said part having interconnected pores and essentially consisting of metal particles sintered to each other and a coherent metal coating having interconnected pores, said coating being derived from sintering under a vacuum or reducing atmosphere an acid solution consisting essentially of sinterable metal particles and their alloys and an inorganic aqueous solution of phosphate ions and ions selected from the group consisting of chromate and molybdate ions, and said porous coating essentially consisting of cured solution components and sintered metal particles, sintered to the metal particles of the metal part and to each other.

4,793,969  
PROCESS FOR PRODUCING TUNGSTEN HEAVY  
ALLOY SHEET USING HIGH TEMPERATURE  
PROCESSING TECHNIQUES

Walter A. Johnson, Towanda; Preston B. Kemp, Jr., Athens, and Nelson E. Kopatz, Sayre, all of Pa., assigns to GTE Products Corporation, Stamford, Conn.  
Filed Jan. 14, 1988, Ser. No. 143,869  
Int. Cl. B22F 1/00

U.S. Cl. 419-31

8 Claims

1. A process for producing a sheet of tungsten heavy alloy, said process comprising:

- (a) forming metal particles of said alloy wherein each metal particle is a uniform admixture of said alloy components;
- (b) entraining said particles in a carrier gas to form entrained particles;
- (c) passing said entrained particles and said carrier gas into a high temperature zone at a temperature above the melting point of the matrix phase of said particles and maintaining said particles in said zone for a sufficient time to melt at least said matrix phase of said particles and form spherical particles;
- (d) rapidly and directly resolidifying the resulting high temperature treated material, while said material is in flight;
- (e) forming a slurry of said high temperature treated material and a liquid medium;
- (f) removing said liquid medium from said high temperature treated material forming a planar cake of said high temperature treated material;
- (g) drying said cake; and
- (h) sintering said cake to a density equal to or greater than about 90% of the theoretical density of said alloy to form said sheet.

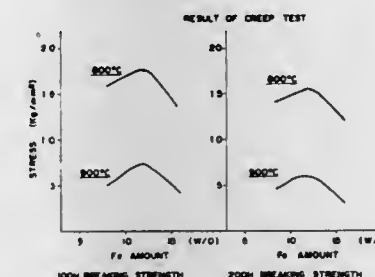
4,793,970  
HEAT-RESISTANT, CORROSION-RESISTANT NICKEL  
BASE ALLOYS

Itaru Niiimi, 4-1205 Aza Obasama, Oaza Takahari Idaka-cho, Ohigusa-ku, Nagoya-shi, Aichi-ken; Kametaro Hashimoto, 29-5-cho, Takami-cho, Toyota-shi, Aichi-ken; Masamitsu Noguchi, 10, Toyota-cho, Toyota-shi, Aichi-ken; Tadaoki Arakawa, 8, Toyota-cho, Toyota-shi, Aichi-ken; Taiso Suzuki, 5-33, Ote-machi, Sendai-shi, Miyagi-ken, and Kunio Imada, 17, Kadota, Odaka-cho, Midori-ku, Nagoya-shi, Aichi-ken, all of Japan

Continuation of Ser. No. 859,598, Dec. 12, 1977, abandoned, which is a continuation of Ser. No. 698,789, Jun. 22, 1976, abandoned, which is a continuation of Ser. No. 547,409, Feb. 6, 1975, abandoned. This application May 17, 1979, Ser. No. 40,089  
Claims priority, application Japan, Feb. 9, 1974, 49-16711  
Int. Cl. C22C 19/05

U.S. Cl. 420-447

1 Claim



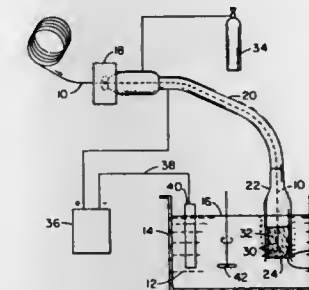
1. Heat-resistance, high temperature lead oxide corrosion-resistant Ni-base alloy consisting essentially of:  
C 0.02-0.04%, Cr 20.05-20.8%, CO 1.9-2.9%, Fe 11-12%, Ti 2.9-3.5%, Al 1.2-1.4%, Nb+Ta 0.3-0.4% (but the amount of Ta is 1/5 of Nb) where the total amount of Ti+Al+Nb+Ta is 4-5%, and the balance substantially all Ni and impurities.

4,793,971  
GRAIN REFINING

Charles E. Eckert, Plum Boro, and Elwin L. Rooy, Franklin Park Boro, both of Pa., assigns to Aluminum Company of America, Pittsburgh, Pa.  
Continuation-in-part of Ser. No. 812,982, Dec. 24, 1985, Pat. No. 4,689,199, which is a continuation of Ser. No. 654,736, Sep. 27, 1984, abandoned. This application Aug. 25, 1987, Ser. No. 89,217  
The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.  
Int. Cl. C22C 1/00

U.S. Cl. 420-590

16 Claims



1. A process for adding grain refiner to molten media, comprising the steps of:  
(a) providing a chamber having an open discharge position within said media;  
(b) introducing into said chamber a gas comprising an ioniz-



able gas under sufficient pressure to maintain an interior molten media surface substantially at said chamber's discharge region;

- (c) providing a plasma within said chamber, said plasma substantially extending at least from said interior molten media surface to a site within said chamber and spaced from said interior media surface;
- (d) supplying to said site within said chamber feed comprising one or more of the group consisting of:
  - (i) a grain refining material,
  - (ii) two or more materials capable of reacting to form a grain refiner,
  - (iii) a material capable of reacting in said media to produce grain refiner in said media.
 and converting said material into superheated array substantially within said plasma and carried toward said interior molten media surface; and
- (e) conducting gas from said chamber into said media to said entry of said material into said molten media.

4,793,972

**CORROSION INHIBITION OF POLYMETHYLPENTENE**  
Kenneth W. Willcox, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 29, 1988, Ser. No. 161,938

Int. Cl.<sup>4</sup> C08K 5/52, 5/34; C09K 15/22; C08F 110/14

U.S. Cl. 422—7

12 Claims

1. A polymer composition having reduced corrosion tendencies comprising:

- (a) a polymer selected from homopolymers and copolymers of 4-methyl-1-pentene;
- (b) tris-(3,5-ditert-butyl-4-hydroxybenzyl)isocyanurate;
- (c) bis-(2,4-ditert-butylpentacrythritol diphosphite and
- (d) poly[[6-[1,1,3,3-tetramethylbutylamino]-5-triazine-2,4-diy]][(2,2,6,6-tetramethyl-4-piperidyl)imino]hexamethylene[2,2,6,6-tetramethyl-4-piperidyl)imino]].

4,793,973

**CONTAINER FOR ADDING ANTIBODIES OR ANTIGENS TO A BIOLOGICAL LIQUID**

Anthony Ringrose, Chene-Bougeries, Switzerland, assignor to Serono Diagnostic Partners, Braintree, Mass.

Continuation of Ser. No. 882,344, Jul. 7, 1986, abandoned. This application Nov. 12, 1987, Ser. No. 120,742

Claims priority, application Switzerland, Jul. 8, 1985, 2956/85

Int. Cl.<sup>4</sup> G01N 21/07, 33/48

U.S. Cl. 422—102

5 Claims



1. A container especially adapted for use in a process for determining the quantity of antibodies or antigens in a biological liquid which process forms specific antibody-antigen complexes, one of said antigens or antibodies being initially associated with suspended magnetic particles, said complexes being separated from the remainder of a liquid sample by gathering

them against a side wall of the container by magnetic attraction of said particles, said container comprising:

- a tubular body having an open upper end and a lower end closed by a bottom wall;
- said tubular body having a side wall having a collecting surface portion situated at a lower part of said side wall, said collecting surface portion being located above said bottom wall and being directly laterally accessible from the space surrounding said tubular body whereby a magnet may be placed adjacent said collecting surface;
- said bottom wall having a cross section which includes a curved portion defining an arc of a circle and a retaining surface portion located between said curved portion of said bottom wall and said collecting surface portion of said wall, said retaining surface portion being substantially planar and forming an angle with said collecting surface portion of substantially 105° to 120°.

4,793,974

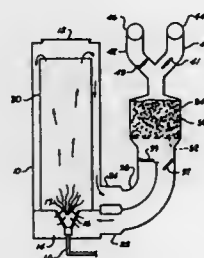
**FUME INCINERATOR WITH REGENERATIVE HEAT RECOVERY**

William H. Hebrank, 14 Hermitage Rd., Greenville, S.C. 29615  
Filed Mar. 9, 1987, Ser. No. 23,771

Int. Cl.<sup>4</sup> F23B 5/04; F23G 7/06

U.S. Cl. 422—175

13 Claims



1. A continuous flow thermal regeneration incinerator comprising:

- (a) a combustion chamber having an opening in an entrance end of said chamber and having an exit end;
- (b) a plenum chamber disposed adjacent said entrance end of said combustion chamber in fluid communication with said combustion chamber;
- (c) a combustion burner disposed within said plenum chamber so that the flame from said burner extends generally adjacent said entrance end opening of said combustion chamber and waste fumes flow from said plenum through said entrance end for combustion by the flame;
- (d) at least three separate regeneration heat exchanger beds, disposed adjacent to said plenum chamber and said combustion chamber;
- (e) inlet manifold means connecting each of said regenerative heat exchanger beds to said plenum chamber;
- (f) a supply duct for supplying waste fumes to said regenerative heat exchanger beds, selectively;
- (g) an inlet duct connecting each of said regenerative heat exchanger beds to said supply duct;
- (h) an exhaust manifold communicating with said combustion chamber for carrying away purified gases having a negative pressure therein for selectively exhausting the purified gases through said regenerative heat exchanger beds;
- (i) an exhaust duct connecting each of said regenerative heat exchanger beds to said exhaust manifold;
- (j) an exhaust line connecting each of said regenerative heat exchanger beds to an ambient atmosphere;
- (k) valve means for selectively connecting said regenerative heat exchanger beds to said supply duct and to said inlet manifold for supplying waste fumes to said burner;
- (l) valve means for selectively connecting said regenerative

heat exchanger beds to said exhaust manifold and to said exhaust line for sending purified gases to the ambient atmosphere; and

- (m) control means for cycling said valve means for alternately connecting said heat regenerative exchanger beds to said supply duct and to said exhaust manifold in a manner that flow direction in said regeneration heat exchanger beds reverses but flow direction in said combustion chamber continuously flows in one direction from said plenum chamber, through said entrance end, and out of said exit end of said combustion chamber.

4,793,975

**PLASMA REACTOR WITH REMOVABLE INSERT**  
David J. Drage, Sebastopol, Calif., assignor to Tegal Corporation, Petaluma, Calif.

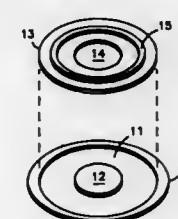
Continuation of Ser. No. 736,032, May 20, 1985. This

application Apr. 24, 1987, Ser. No. 45,260

Int. Cl.<sup>4</sup> B01J 19/08; C23C 15/00; C23F 1/02

U.S. Cl. 422—186.05

7 Claims



1. In a plasma reactor chamber enclosed by sidewall means, a upper surface, and a lower surface adapted to receive a removable electrode, and wherein said lower surface is electrically separated from said sidewall means by an insulator which extends into said chamber, the improvement comprising: said electrode having an annular groove therein; and a ring which fits within said groove and extends under said insulator for controlling the electrical characteristics of said chamber.

4,793,976

**SULFUR RECOVERY SYSTEM**

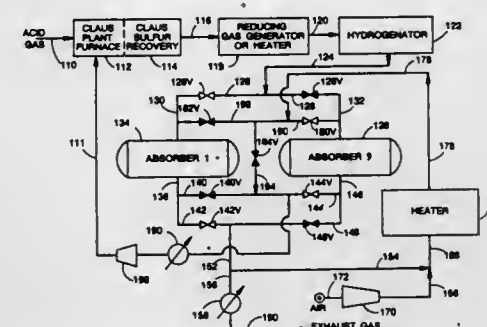
Min-Hsiun Lee, Tulsa, Okla., assignor to Amoco Corporation, Chicago, Ill.

Continuation of Ser. No. 944,706, Dec. 19, 1986, abandoned, which is a continuation of Ser. No. 727,493, Apr. 26, 1985, abandoned, which is a continuation of Ser. No. 544,335, Oct. 21, 1983, Pat. No. 4,533,529. This application Sep. 18, 1987, Ser. No. 98,776

Int. Cl.<sup>4</sup> B01J 8/04

U.S. Cl. 422—190

9 Claims



1. In an Apparatus for the recovery of sulfur comprising Claus conversion means for converting hydrogen sulfide to sulfur and for producing an effluent stream comprising

hydrogen sulfide, sulfur dioxide, and means for providing in the effluent stream reducing species in at least the stoichiometric amount required for converting 111 sulfur species in the effluent stream to hydrogen sulfide,

hydrogenation means in flow communication with the Claus conversion means for receiving the effluent stream therefrom and for converting substantially all sulfur compounds therein and for producing a hydrogenated effluent stream containing substantially all sulfur compounds as hydrogen sulfide, the hydrogenation means containing a bed of effective hydrogenation catalyst having at least one metal selected from the group consisting of Groups VB, VIB, and VIII, and the Rare Earth Series of the Periodic Table of the Elements, and mixtures of any two or more thereof, in contact with which the effluent stream is passed for conversion of substantially all sulfur compounds to hydrogen sulfide,

absorber means in flow communication with the hydrogenation means for receiving the thus hydrogenated effluent stream therefrom and for removing hydrogen sulfide therefrom in the presence of a zinc oxide sorbent and for producing an absorber effluent stream reduced in content of hydrogen sulfide, the absorber means comprising at least a first reactor and a second reactor, each of the first reactor and the second reactor containing the zinc oxide sorbent, and the apparatus further comprising regeneration means for producing a heated regeneration stream effective for regeneration of the zinc oxide sorbent and for introducing oxygen-containing gas into a reactor during regeneration,

switching means for placing the first reactor on sorption and the second reactor on regeneration and for placing the second reactor on sorption and the first reactor on regeneration, absorber effluent gas being produced from the reactor on sorption and regeneration effluent gas being produced from the reactor on regeneration, the improvement comprising:

means for connecting the reactor on sorption in flow communication with the reactor on regeneration and for providing absorber effluent gas to the reactor on regeneration.

4,793,977

**COLORIMETRIC DETECTOR FOR MONITORING OIL DEGRADATION**

R. Scott Morris, Fairhaven, Mass., assignor to Cape Cod Research, Inc., Buzzards Bay, Mass.

Filed Apr. 9, 1987, Ser. No. 36,354

Int. Cl.<sup>4</sup> G01N 21/80

U.S. Cl. 422—55

6 Claims

1. A colorimetric detector for determining the corrosive nature of an oil, over a wide temperature range and in operating internal combustion engines comprising:

- a. a polymeric matrix comprised of ion-rich domains, chemically bound water and a plurality of hydrophobic domains
- b. ionic indicator dyes covalently bonded to the ion-rich domains in said matrix and which dyes have a net charge opposite to that of said matrix
- c. a basic compound bound to said matrix.

4,793,978

# METHOD AND APPARATUS FOR PRODUCING URANYL PEROXIDE (UO<sub>4</sub>·2H<sub>2</sub>O) FROM URANIUM AND URANIUM ALLOY PIECES

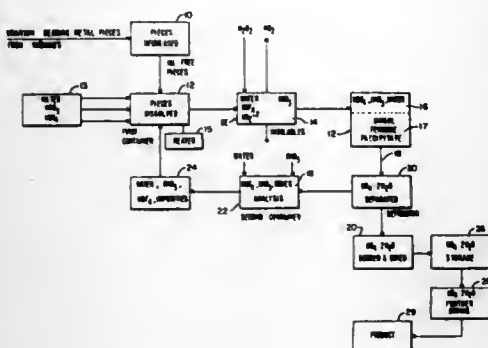
Engene N. Pollock, Brookline, Mass., assignor to Nuclear Metals, Inc., Concord, Mass.

Continuation-in-part of Ser. No. 737,523, May 24, 1985, Pat. No. 4,701,310. This application Jan. 20, 1987, Ser. No. 5,083. The portion of the term of this patent subsequent to Oct. 20, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> C01G 43/01

U.S. Cl. 423-16

18 Claims



1. A method of producing uranyl peroxide (UO<sub>4</sub>·2H<sub>2</sub>O) from uranium-bearing metal pieces comprising:

- dissolving the uranium-bearing metal pieces in a first aqueous solution containing nitric acid and at least 0.5% but not greater than 5.0% fluoboric acid to provide a second aqueous solution which includes uranyl ions (UO<sub>2</sub><sup>2+</sup>) and nitric and fluoboric acids;
- adding hydrogen peroxide to said second aqueous solution to precipitate uranyl peroxide out of said second solution and provide a third aqueous solution containing nitric and fluoboric acids; and
- separating said uranyl peroxide from said third aqueous solution.

4,793,979

# PROCESS FOR CHEMICAL SEPARATION OF PHOSPHORUS ORE

La Wenxing, Xian, China, assignor to Shaanxi Chemical and Fertilizer Industry Company, Xian, China and Kemira Company of Finland, Helsinki, Finland

Filed Mar. 20, 1986, Ser. No. 841,853

Claims priority, application China, Apr. 1, 1985, 85100187

Int. Cl.<sup>4</sup> C01F 1/00, 5/00; C01B 25/16

U.S. Cl. 423-167

30 Claims

1. A process for chemically refining phosphorus ore which comprises the following steps:

- (a) reacting an aqueous mixture of ammonium chloride and ammonium nitrate in a weight ratio of 0.5-10:1 having a concentration of 5-25% by weight with phosphorus ore powder of -20 mesh to -200 mesh in an ore pulp reaction with 1:2-10 weight ratio of phosphorus ore powder to the aqueous mixture of ammonium chloride and nitrate at a temperature of at least 60° C. for at least 10 minutes to produce solid phosphate concentrate, liquid solution of metal salts and ammonia and carbon dioxide containing gas products;
- (b) introducing continuously the gases obtained from step (a) into a calcium ion-containing filtrate obtained directly or indirectly from the ore pulp reaction, said introduction being effected at a temperature of at least 40° C. to bring about carbonization to precipitate the calcium content of the filtrate as calcium carbonate.

4,793,980

# HOLLOW POROUS MICROSPHERES AS SUBSTRATES AND CONTAINERS FOR CATALYST

Leonard B. Torobin, Materials Technology Corporation, 120 Interstate N., Parkway E., Suite 158, Atlanta, Ga. 30339

Continuation of Ser. No. 886,742, Jul. 18, 1986, abandoned, which is a division of Ser. No. 711,951, Mar. 14, 1986, Pat. No. 4,637,990, which is a continuation-in-part of Ser. No. 639,126, Aug. 9, 1984, Pat. No. 4,671,909, and a continuation-in-part of Ser. No. 657,090, Oct. 3, 1984, said Ser. No. 639,126, is a continuation-in-part of Ser. No. 428,923, Sep. 30, 1982, Pat. No. 4,548,196, which is a continuation of Ser. No. 103,113, Dec. 13, 1979, abandoned, which is a division of Ser. No. 59,296, Jul. 20, 1979, abandoned, which is a continuation-in-part of Ser. No. 937,123, Aug. 28, 1978, abandoned, and Ser. No. 944,643, Sep. 21, 1978, abandoned. This application Jul. 30, 1987, Ser. No. 83,008

The portion of the term of this patent subsequent to May 10, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> B01D 53/36, 53/34; C10G 11/02; B01J 20/22

U.S. Cl. 423-213.5

57 Claims



1. A process for carrying out a catalytic reaction which comprises contacting hollow porous microsphere catalyst with a reaction medium under conditions such that at least one constituent in the reaction medium is brought into contact with the catalyst for a period of time sufficient for said constituent to undergo a chemical change, said microsphere catalyst comprising hollow porous microspheres having a substantially uniform diameter of 200 to 10,000 microns and a substantially uniform wall thickness of 1.0 to 1000 microns, the walls of said microspheres comprise sintered together particles which define interconnecting voids within the walls and a single central cavity in the interior of the microspheres and inner and outer microsphere wall surfaces, said interconnecting voids are continuous and extend from the outer wall surface to the inner wall surface, said walls have substantially uniform void content and said interconnecting voids are substantially uniformly distributed in the walls of the hollow microspheres, said walls include entrance means through which a reactant can be introduced into the interconnecting voids and into the single central cavity of the microspheres, said microspheres have catalyst on the particles forming the walls or have catalyst contained within the single central cavity or have catalyst on the particles forming the walls and have catalyst contained within the single central cavity, and the walls of said microspheres are free of latent solid or liquid blowing gas materials and are substantially free of relatively thinned wall portions or sections and bubbles.

4,793,981

# INTEGRATED INJECTION AND BAG FILTER HOUSE SYSTEM FOR SO<sub>2</sub>-NO<sub>x</sub>-PARTICULATE CONTROL WITH REAGENT/CATALYST REGENERATION

John B. Doyle, Massillon; Ed A. Pirsh, Akron, and William Downs, Alliance, all of Ohio, assignors to The Babcock & Wilcox Company, New Orleans, La.

Filed Nov. 19, 1986, Ser. No. 932,754

Int. Cl.<sup>4</sup> B01J 8/00; C01B 21/00, 17/00

U.S. Cl. 423-239

6 Claims

1. A method of controlling emission of pollutants from a coal-fired boiler system, the system being of the type including

a boiler, an economizer, a fabric filter baghouse and an air heater in a serial fluid communication path, by removing, SO<sub>2</sub>, NO<sub>x</sub> and particulates from a combustion flue gas stream passing through the path comprising the steps of:

- (a) adding a reagent, said reagent further being a catalyst selected from the group consisting of alumina, alkalinized alumina, sodium aluminate, dawsonite, analcite, magnesio-riebeckite, feldspar, alunite, anatase, azurite, bauxite, bunsenite, gothite, hematite, iron spinel, ilmenite, malachite, manganite, manganosite, mellite, siderite, spinel, and metal oxides of titanium, vanadium, manganese, cobalt, iron, nickel, copper and zinc in powdered form and ammonia into the combustion flue gas stream upstream of the fabric filter baghouse intermediate the boiler and the economizer in a temperature zone having a temperature below the melting point of the reagent;
- (b) reacting some of the reagent and ammonia with the SO<sub>2</sub> and NO<sub>x</sub> to form reaction products while passing the flue gas stream to the baghouse;
- (c) separating the particulates, the reaction products and reagent from the flue gas within the temperature range by filtration in the baghouse to form a filter cake;
- (d) passing the flue gas stream through the filter cake to react additional reagent and ammonia with the SO<sub>2</sub> and NO<sub>x</sub> to form additional reaction products and cleansed gas; and
- (e) venting the cleansed gas out of the baghouse through the air heater.

4,793,982

# USE OF NITRITES TO ENHANCE SO<sub>2</sub> REMOVAL IN FLUE GAS DESULFURIZATION WET SCRUBBERS

Mel-Jan L. Lin, and Edward W. Ellis, Jr., both of Naperville, Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Feb. 29, 1988, Ser. No. 161,580

Int. Cl.<sup>4</sup> C01B 17/00

U.S. Cl. 423-242

2 Claims

1. A method of improving the SO<sub>2</sub> scrubbing efficiency of flue gas desulfurization scrubbers which comprises conducting the scrubbing operation in such scrubbers in the presence of at least 10 ppm of a water-soluble nitrite salt.

4,793,983

# METHOD OF REPROCESSING BORON CARBIDE IRRADIATED WITH NEUTRONS FROM TRIM OR SHUT-DOWN ELEMENTS FROM NUCLEAR REACTORS

Herbert Wiczorek, Weingarten, Fed. Rep. of Germany, assignor to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

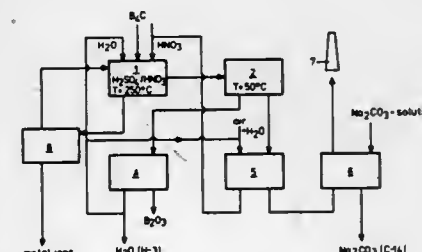
Filed Nov. 4, 1987, Ser. No. 116,861

Claims priority, application Fed. Rep. of Germany, Dec. 16, 1986, 3642841

Int. Cl.<sup>4</sup> E01B 31/36

U.S. Cl. 423-291

6 Claims



1. A method of reprocessing neutron-irradiated contaminated boron carbide, containing corrosion products, irradiation products and other contaminants comprising the steps of:

- (a) dissolving the contaminated boron carbide in a hot acid mixture comprising sulfuric and nitric acids at a tempera-

ture sufficiently high, to convert boron carbide to boric acid, and to form a first exhaust gas comprising nitric oxide and carbon dioxide;

- (b) introducing at least one of water and tritiated, boric acid-containing water in liquid form under the surface of the hot acid mixture of said dissolving step, to produce steam;
- (c) steam distilling the boric acid developed in said dissolving step with the aid of the steam generated in said introducing step, to separate the boric acid from nonvolatile radioactive and nonradioactive corrosion and irradiation products;
- (d) condensing the boric acid-containing steam from said steam distilling step to provide boric acid and a condensate comprising at least one of water and 3H-containing water;
- (e) evaporating the condensate from said condensing step to dry and calcine the boric acid to form boron oxide and at least one of water vapor and 3H-containing water vapor;
- (f) recycling, in liquid form, the water vapor or 3H-containing vapor formed in said evaporating step, after condensation, into one of the water in said introducing step and the hot acid mixture in said dissolving step;
- (g) forming nitric acid by recycling at least part of the first exhaust gas developed in said dissolving step by adding air and water, and producing a second exhaust gas comprising carbon dioxide; and
- (h) converting the boron oxide obtained in said evaporating step to boron carbide.

4,793,984

# MOLECULAR SIEVE COMPOSITIONS

Brent M. Lok, New City; Bonita K. Marcus, Rye; Lawrence D. Vail, New Rochelle; Edith M. Flanigan, White Plains; Robert L. Patton, Katonah, and Stephen T. Wilson, Shrub Oak, all of N.Y., assignors to Union Carbide Corporation, Danbury, Conn.

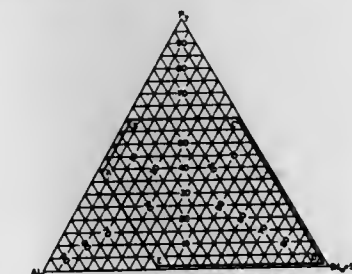
Filed Apr. 13, 1984, Ser. No. 600,312

The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> C01B 25/26; B01J 27/182

U.S. Cl. 423-306

21 Claims



1. Crystalline molecular sieves having three-dimensional microporous framework structures of ELO<sub>2</sub>, AlO<sub>2</sub>, PO<sub>2</sub>, SiO<sub>2</sub> oxide units and having an empirical chemical composition on an anhydrous basis expressed by the formula:



wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of (EL)<sub>y</sub>Al<sub>x</sub>P<sub>z</sub>Si<sub>z</sub>O<sub>2</sub> and has a value of zero to about 0.3; "EL" represents at least one element capable of forming a three dimensional oxide framework, "EL" is characterized as an element having a mean "T-O" distance in tetrahedral oxide structures between about 1.51 Angstroms and about 2.06 Angstroms, "EL" has a cation electronegativity between about 125 kcal/g-atom to



about 310 kcal/g-atom and "EL" is capable of forming stable M-O-P, M-O-Al or M-O-M bonds in crystalline three dimensional oxide structures having an "M-O" bond dissociation energy greater than about 59 kcal/mole at 298° C.; and "w", "x", "y" and "z" represent the mole fractions of "EL", aluminum, phosphorus, and silicon, respectively, present as framework oxides, said mole fractions being within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1, wherein element "EL" and each of aluminum, phosphorus and silicon are present such that "w", "x", "y" and "z" are at least 0.01 and each element "EL" is present as a tetrahedral oxide unit  $\text{ELO}_2$  in an amount of at least 0.01, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables A and B:

TABLE A (ELAPSO-5)		
2θ	d(Å)	Relative Intensity
7.2-7.7	12.28-11.48	m-vs
19.4-19.9	4.58-4.46	w-m
20.85-21.3	4.26-4.17	w-vs
22.1-22.6	4.02-3.93	m-vs
25.6-26.1	3.480-3.414	vw-m

TABLE B (ELAPSO-11)		
2θ	d(Å)	Relative Intensity
7.8-8.2	11.19-10.85	m-s
9.0-9.8	9.83-9.03	vw-vs
12.8-13.6	6.92-6.51	vw-m
19.9-20.5	4.46-4.33	m-s
20.8-21.8	4.27-4.08	m-vs
22.0-22.6	4.04-3.93	m-vs
22.6-23.1	3.93-3.85	vw-vs
23.1-23.5	3.85-3.79	w-vs

2. Process for preparing the crystalline molecular sieves having three-dimensional microporous framework structures of  $\text{ELO}_2$ ,  $\text{AlO}_2$ ,  $\text{PO}_2$ ,  $\text{SiO}_2$  oxide units and having an empirical chemical composition on an anhydrous basis expressed by the formula:



wherein "R" represents at least one organic templating agent present in the intracrystalline pore system; "m" represents the molar amount of "R" present per mole of  $(\text{EL}_w\text{Al}_x\text{P}_y\text{Si}_z)_2\text{O}_2$  and has a value of zero to about 0.3; "EL" represents at least one element capable of forming a three dimensional oxide framework, "EL" is characterized as an element having a mean "T-O" distance in tetrahedral oxide structures between about 1.51 Angstroms and about 2.06 Angstroms, "EL" has a cation electronegativity between about 125 kcal/g-atom to about 310 kcal/g-atom and "EL" is capable of forming stable M-O-P, M-O-Al or M-O-M bonds in crystalline three dimensional oxide structures having an "M-O" bond dissociation energy greater than about 59 kcal/mole at 298° C.; and "w", "x", "y" and "z" represent the mole fractions of "EL", aluminum, phosphorus, and silicon, respectively, present as framework oxides, said mole fractions being within the pentagonal compositional area defined by points A, B, C, D and E of FIG. 1, wherein element "EL" and each of aluminum, phosphorus and silicon are present such that "w", "x", "y" and "z" are at least 0.01 and each element "EL" is present as a tetrahedral oxide unit  $\text{ELO}_2$  in an amount of at least 0.01, said crystalline molecular sieves having a characteristic X-ray powder diffraction pattern which contains at least the d-spacings set forth in one of the following Tables A and B:

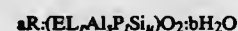
TABLE A

(ELAPSO-5)		
2θ	d(Å)	Relative Intensity
7.2-7.7	12.28-11.48	m-vs
19.4-19.9	4.58-4.46	w-m
20.85-21.3	4.26-4.17	w-vs
22.1-22.6	4.02-3.93	m-vs
25.6-26.1	3.480-3.414	vw-m

TABLE B

(ELAPSO-11)		
2θ	d(Å)	Relative Intensity
7.8-8.2	11.19-10.85	m-s
9.0-9.8	9.83-9.03	vw-vs
12.8-13.6	6.92-6.51	vw-m
19.9-20.5	4.46-4.33	m-s
20.8-21.8	4.27-4.08	m-vs
22.0-22.6	4.04-3.93	m-vs
22.6-23.1	3.93-3.85	vw-vs
23.1-23.5	3.85-3.79	w-vs

which process comprises providing a reaction mixture composition at an effective temperature and for an effective time sufficient to produce said molecular sieves, said reaction mixture composition being expressed in terms of molar oxide ratios as follows:



wherein "R" is an organic templating agent; "a" is the amount of "R" and is an effective amount greater than zero to about 6; "b" has a value of from zero to about 500; "EL" represents at least one element capable of forming a three-dimensional oxide, "EL" is characterized as an element having a mean "T-O" distance in tetrahedral oxide structures between about 1.51 Angstroms and about 2.06 Angstroms, "EL" has a cation electronegativity between about 125 kcal/g-atom to about 310 kcal/g-atom and "EL" is capable of forming stable M-O-P, M-O-Al or M-O-M bonds in crystalline three dimensional oxide structures having an "M-O" bond dissociation energy greater than about 59 kcal/mole at 298° C.; and "r", "s", "t" and "u" represent mole fractions, respectively, of "EL", aluminum, phosphorus and silicon in the  $(\text{EL}_w\text{Al}_x\text{P}_y\text{Si}_z)_2\text{O}_2$  constituent, and each has a value of at least 0.01.

4,793,985

## METHOD OF PRODUCING ULTRAFINE GROUND CALCIUM CARBONATE

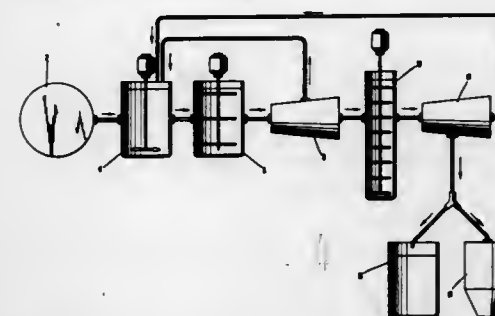
Charles R. Price, Frank R. Trowbridge, and Albert C. Kunkle, all of Macon, Ga., assignors to J. M. Haber Corporation, Locust, N.J.

Continuation of Ser. No. 410,794, Aug. 23, 1962, abandoned, which is a continuation of Ser. No. 229,475, Jan. 29, 1961, abandoned, which is a continuation-in-part of Ser. No. 61,148, Jul. 27, 1979, abandoned. This application Jan. 12, 1984, Ser. No. 570,105

Int. Cl. A C01F 5/24, 11/18; C04B 14/28; C09C 1/02  
U.S. Cl. 423-430

1. A process for the production of ultrafine ground calcium carbonate having a brightness of 95-97% at 457 nm and wherein up to 90% of the particles are less than about 2 microns in size, said calcium carbonate being suitable as a white filler or coating for paper, the process comprising the steps of: (a) providing a dry crushed calcium carbonate to be slurried; (b) slurrying said calcium carbonate with water at a constant rate in a slurry tank to produce about a 15-60 weight percent solids slurry; (c) dispersing said slurry by adding a polyacrylate dispersant thereto in an amount of about 0.2 to 0.4 weight percent, said dispersant being susceptible to being destroyed by ozone;

- (d) bead grinding said dispersed slurry in an attrition mill containing about 40 to 60 percent by volume of beads for a sufficient time for the output product slurry of said attrition mill to comprise particles of calcium carbonate having a size wherein about 50 to 70 percent by weight are less than 2 microns;
- (e) removing said output product from the attrition mill to a classifying centrifuge, adding a flocculent to the output product, and classifying the output product of said attrition mill at an elevated temperature into a product stream having 70 to 90 percent by weight of its particles of a size less than 2 microns, and an underflow stream of predominately larger particles;



- (f) contacting said output product with about 1.5 to 7 pounds of ozone per ton of dry calcium carbonate contained in said output product for about 10 minutes to 1.5 hours to brighten said calcium carbonate and under conditions sufficient to destroy any dispersant, flocculent, organic matter or microorganisms contained in the mixture and return the product to a non-dispersed state; and
- (g) dewatering the product resulting from treatment with the ozone to produce a calcium carbonate mixture having a solids content of about 65 to 769 percent by weight and a brightness of 95-97% at 457 nm, and process liquids.

4,793,986

## MACROMOLECULAR PLATINUM ANTITUMOR COMPOUNDS

Anthony J. Serino, West Chester; Geoffrey W. Henson; David A. Schwartz, both of Exton, and Donald H. Picker, Merian, all of Pa., assignors to Johnson Matthey, Inc., Malvern, Pa.  
Filed Feb. 25, 1987, Ser. No. 18,715

U.S. Cl. 424-1.1  
Int. Cl. C07F 15/00

11 Claims  
1. A composition comprising a pharmaceutically acceptable polysaccharide carrier which has been chemically activated by oxidation and then linked to platinum in either a +2 or +4 oxidation state through a bidentate oxygen containing ligand including an amine group which is coupled to the oxidized group of the activated polysaccharide.

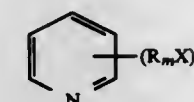
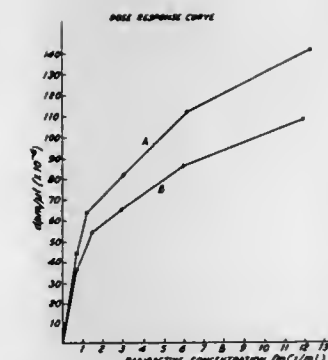
4,793,987

## STABILIZED RADIOLABELLED COMPOUNDS

Alan Henderson, Waddenswil, Switzerland, and Kenneth S. Bowler, Buckinghamshire, Great Britain, assignors to Amer-sham International plc, Bucks, England

Filed Apr. 25, 1986, Ser. No. 856,019  
Claims priority, application United Kingdom, Apr. 26, 1985, 8510726

Int. Cl. A A61K 49/02; G01N 33/48, 33/50; C09K 15/30  
U.S. Cl. 424-1.1  
1. A composition comprising at least one radioactivity labelled organic compound selected from the group consisting of amino acid or nucleotide and a stabiliser therefor which stabiliser has the general formula



where  
R is C1 to C4 alkylene which may be OH substituted  
m is 0 or 1  
X is carboxyl or sulphonyl or a salt thereof,  
n is 1, 2 or 3.

4,793,988

## GERMICIDE AND DYE COMPOSITION

Irene Casey, Dept. 1013, P.O. Box 90020, Houston, Tex. 77290, and Daniel Tusté, Fremont, Calif., assignors to Irene Casey and Larry J. Casey, both of Houston, Tex.

Continuation-in-part of Ser. No. 738,082, May 24, 1985, abandoned. This application Dec. 1, 1986, Ser. No. 936,171  
The portion of the term of this patent subsequent to Jul. 7, 2004, has been disclaimed.

Int. Cl. A A61F 13/00; A61L 15/03; A61K 9/70  
U.S. Cl. 424-7.1

5 Claims  
1. A biocide composition for disinfecting a surface for personal use consisting essentially of:  
a germicide;  
a small amount of surfactant;  
a pH sensitive dye which changes color upon exposure to air;  
an alkali means for adjusting the pH of the composition to produce a color in the liquid with the dye so that upon neutralization the dye loses color;  
said biocide being a visually colored germicide composition with the disappearing pH sensitive dye effectively indicating the delivery of the germicide and giving a visual check as to the area disinfected when the visually colored compound is applied; and  
said biocide composition is packaged sealed airtight.

4,793,989

**METHOD AND COMPOSITION FOR PREVENTION AND TREATMENT OF ORAL DISEASE**

Perry A. Ratcliff, 7125 E. Lincoln Dr., Scottsdale, Ariz. 85253  
Continuation of Ser. No. 17,241, Dec. 29, 1986, Pat. No. 4,696,811, which is a continuation of Ser. No. 846,342, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 636,027, Jul. 30, 1984, abandoned, and a continuation of Ser. No. 947,079, Dec. 29, 1986, Pat. No. 4,689,213, which is a continuation of Ser. No. 846,342, Mar. 31, 1986, abandoned, which is a continuation of Ser. No. 636,027, Jul. 30, 1984, abandoned. This application Jul. 22, 1987, Ser. No. 76,542

The portion of the term of this patent subsequent to Aug. 25, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> A61K 33/20, 7/20

U.S. Cl. 424—53

6 Claims

1. A method for cleaning a dental prosthetic device, said method comprising the step of irrigating the dental prosthetic device with a solution containing stabilized chlorine dioxide in a concentration in the range of 0.002% to 0.27%.

4,793,990

**USE OF COFFEE BEAN OIL AS A SUN FILTER**

Jean F. Grollier, and Sophie Plessis, both of Paris, France, assignors to L'Oreal, Paris, France  
Continuation of Ser. No. 249,823, Apr. 1, 1981, abandoned. This application Jan. 17, 1983, Ser. No. 458,638

Claims priority, application Luxembourg, Apr. 2, 1980, 82 323  
Int. Cl.<sup>4</sup> A61K 7/021, 7/06, 7/42, 7/44

U.S. Cl. 424—59

11 Claims

1. A sun filter composition, adapted for application to the human skin, which comprises a coffee extract consisting of a coffee bean oil which does not contain water soluble extracts, said composition being in the form of (1) an oil-in-water or water-in-oil emulsion containing said coffee bean oil, (2) a gel containing said coffee bean oil, or (3) an oil which is a mixture of said coffee bean oil and a vegetable oil other than coffee bean oil, wherein said coffee bean oil has a high absorption capacity to filter light selectively in the range of 280 to 320 nm and a low absorption capacity to filter light in the range above 320 nm.

4,793,991

**HYPOALLERGENIC COSMETICS, LIP BALMS AND LIP STICKS**

Karen M. Slimak, 9207 Shotgun Ct., Springfield, Va. 22153  
Filed Jan. 31, 1986, Ser. No. 825,657

Int. Cl.<sup>4</sup> A61K 7/027, 35/64

U.S. Cl. 424—64

18 Claims

1. A composition of matter including single plant source beeswax and oil in a cosmetic preparation.

15. A method of treating human lips comprising applying a composition including a single plant source beeswax to the lips.

4,793,992

**HAIR TREATMENT COMPOSITION**

Roger A. Mathews, Newbury Park; Edward R. Moore, Canoga Park, and David W. Cannell, Los Angeles, all of Calif., assignors to Redken Laboratories, Inc., Canoga Park, Calif.  
Filed Mar. 25, 1987, Ser. No. 30,742

Int. Cl.<sup>4</sup> A61K 7/075

U.S. Cl. 424—70

19 Claims

1. A keratinous tissue treatment composition comprising: amino acid derived zwitterion having a molecular weight less than 200 in the range of from 0.5 to 10% by weight; and hydrolyzed protein having an average molecular weight in the range of from 500 to 2,000 in a proportion approximately equimolar with the zwitterion; and having a pH in the range of from 3 to 10.

4,793,993

**CROSSLINKING OF HAIR THIOLS**

Patricia Siuta-Mangano, Valley Cottage, N.Y., and Herbert Edelstein, Stratford, Conn., assignors to Chesebrough-Pond's Inc., Greenwich, Conn.

Continuation-in-part of Ser. No. 69,929, Jul. 6, 1987. This application Aug. 24, 1987, Ser. No. 88,356  
Int. Cl.<sup>4</sup> A61K 7/00, 7/06

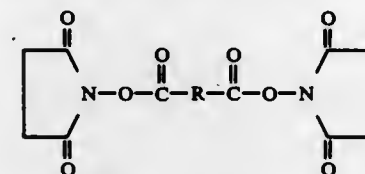
U.S. Cl. 424—70

24 Claims

1. A process for treating keratinous material in which the disulfide linkages have been disrupted to form free sulfhydryl groups which comprises: contacting the keratinous material with a crosslinking reagent selected from the group consisting of (1) diimides of the formula:



and (2) disuccinimidyl compounds of the formula:



and mixtures thereof, wherein R represents a connecting moiety and R<sub>1</sub> represents an alkyl of 1 to 10 carbons, at a temperature and pH to form crosslinkages and insufficient to substantially denature the protein of the keratinous material.

4,793,994

**COMPOSITIONS USED IN PERMANENT STRUCTURE ALTERING OF HAIR**

Michael W. Heliott, Westfield; Carmen D. Bires, Long Valley, and Robert B. Logia, Oakland, all of N.J., assignors to GAF Corporation, Wayne, N.J.

Continuation-in-part of Ser. No. 879,776, Jun. 27, 1986, abandoned. This application Feb. 12, 1987, Ser. No. 13,617

Int. Cl.<sup>4</sup> A61K 7/09

U.S. Cl. 424—71

24 Claims

1. A composition comprising a permanent structure altering lotion for hair containing a reducing agent suitable for relaxation of the hair fiber structure and a sufficient hair fiber protective and conditioning amount of an N-alkyl lactam having a 5 to 7 membered heterocyclic ring and from 8 to 22 carbon atoms in said alkyl group.

4,793,995

**MODIFIED (1-56) BETA INTERFERONS**

Leslie D. Bell, Thame; John C. Smith, and Paul G. Boseley, both of High Wycombe, all of United Kingdom, assignors to G. D. Searle & Co., Chicago, Ill.

Filed Jun. 22, 1984, Ser. No. 623,815

Claims priority, application United Kingdom, Jul. 1, 1983, 8317880

Int. Cl.<sup>4</sup> A61K 45/02; C07K 13/00, 15/26; C12P 21/00

U.S. Cl. 424—85.6

17 Claims

1. A modified beta interferon comprising a beta interferon wherein amino acids 2 to 7 of said beta interferon are replaced by amino acids 1 to 5 of alpha 2 interferon and amino acids 9 to 56 of said beta interferon are replaced with amino acids 7 to 54 of alpha 1 interferon.

8. A pharmaceutical composition for treating viral infections in an animal comprising an effective therapeutic amount of the modified beta interferon of claim 1 admixed with a pharmaceutically acceptable carrier.

4,793,996

**METHOD OF MAKING SOYBEAN EXTRACT INHIBITOR**

Ann R. Kennedy, 145 Fuller St., West Newton, Mass. 02165; Walter Troll, Brooklyn, N.Y., and Jonathan Yavelow, Lawrenceville, N.J., assignors to Ann R. Kennedy, Wynnewood, Pa.

Continuation of Ser. No. 671,229, Nov. 14, 1984, abandoned. This application Sep. 25, 1986, Ser. No. 912,190

Int. Cl.<sup>4</sup> A61K 35/00

U.S. Cl. 424—195.1

16 Claims

1. A process for preparing a Bowman-Birk inhibitor from soybeans which comprises the steps of:

- (a) treating soybeans with at least an equal weight of acetone by mixing said soybeans in a dry, finely-divided form with said acetone for a sufficient time and at a sufficient temperature to provide said inhibitor with the capability of inhibiting malignant transformation of cells;
- (b) extracting the treated soybeans with ethyl alcohol or aqueous ethyl alcohol for a sufficient time and at a sufficient temperature to form a solution containing said inhibitor;
- (c) separating residual solids from said solution; and
- (d) precipitating the inhibitor from said solution by mixing the solution with acetone, whereby an inhibitor is obtained which is capable of inhibiting malignant transformation of C3H mouse embryo cells.

4,793,998

**STABILIZED DRUG COMPOSITIONS**

Kuchi S. Murthy, Morris Plains; Michael R. Harris, Hackettstown; Gerard C. Hokanson, Long Valley; Robert G. Reich, Jr., Haledon; Frank Waldman, Wayne, and Mahdi B. Pawzi, Flanders, all of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 20, 1986, Ser. No. 921,931  
Int. Cl.<sup>4</sup> A61K 9/68, 31/27, 31/40, 31/195

U.S. Cl. 424—440

21 Claims

1. A pharmaceutical composition which contains:

- (a) a drug component which comprises from about 1 to about 70% by weight of an ACE inhibitor which is susceptible to cyclization and/or hydrolysis,
- (b) about 1 to about 90% by weight of an ascorbic acid-containing stabilizer to inhibit cyclization and/or hydrolysis with ascorbic acid being at least 10% by weight of the pharmaceutical composition; and optionally,
- (c) one or more components which do not significantly interfere in the function of component (b).

4,793,999

**METHOD OF MANUFACTURING AN ANTIHYPERTENSIVE, DIURETIC AND ANTIHYPOKALEMIC PHARMACEUTICAL COMPOSITION WITH POLYETHYLENE GLYCOL**  
Prabhakar R. Sheth, 224 Highland Ave., Pearl River, N.Y. 10965

Filed Mar. 27, 1987, Ser. No. 30,559

Int. Cl.<sup>4</sup> A61K 31/74

U.S. Cl. 424—451

12 Claims

1. A method of manufacturing an antihypertensive, diuretic and antihypokalemic pharmaceutical composition comprising the steps of forming a mixture of a PEG, of molecular weight of about 3350 to 20000, a triamterene active pteridine, a hydrochlorothiazide active benzothiadiazide, and an inert filler in which the weight ratio of the pteridine to the benzothiadiazide provides an effective bioavailability of the pteridine to control the hypokalemic condition induced by the dosage amount of the benzothiadiazide and mixing while heating to the melting point of the PEG whereby the mixture instantaneously fuses to form granules, then cooled.

4,793,997

**CONTROLLED DELIVERY DEVICE**

Cyril F. Drake, Harlow, and Alfred J. Arch, Ongar, both of England, assignors to Standard Telephone Cables Public Ltd. Co., London, England

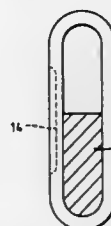
Continuation of Ser. No. 845,580, Mar. 28, 1986, abandoned. This application Jun. 29, 1987, Ser. No. 68,787

Claims priority, application United Kingdom, Mar. 28, 1985, 8508173

Int. Cl.<sup>4</sup> A61K 9/00; A01N 11/04

U.S. Cl. 424—426

7 Claims



1. A device for the timed release of an active material into an aqueous medium, the device comprising a sealed container having a wall consisting of a water soluble glass and in which container the active material is encapsulated, wherein a minor proportion of container wall consists of a region of reduced resistance to solution attack whereby, when the device is contacted by the aqueous medium, that region is dissolved over a predetermined time period to provide an opening in the container wall so as to release the active material whilst the remainder of the glass container wall is only partially dissolved so as to prevent collapse of the container.

4,794,000

**COACERVATE-BASED ORAL DELIVERY SYSTEM FOR MEDICALLY USEFUL COMPOSITIONS**

Bernard Ecanow, Wilmette, Ill., assignor to Synthetic Blood Corporation, Deerfield, Ill.

Filed Jan. 8, 1987, Ser. No. 1,814

Int. Cl.<sup>4</sup> A61K 37/00

U.S. Cl. 424—457

29 Claims

1. A method of preparing a composition for oral delivery of a pharmaceutical component; said method based upon a non-toxic liquid aqueous two phase coacervate system;

- (a) one of said phases being an aqueous colloid rich phase, semi-polar to non-polar in character;
- (b) the other of said phases being an aqueous colloid poor phase, semi-polar to polar in character;
- (c) said colloid rich phase being insoluble and in equilibrium with said colloid poor phase;
- (d) said two phase system prepared from water and one or more surfactants selected from the group consisting of anionic, cationic, amphoteric, and non-ionic surfactants, polysaccharides, synthetic polymers, polysorbates and their derivatives and mixtures thereof;
- (e) said two phase system further prepared to contain a pharmaceutical component in the colloid poor phase of the coacervate system.



4,794,001

## FORMULATIONS PROVIDING THREE DISTINCT RELEASES

Atul M. Mehta, Ramsey, N.J.; Lisbeth A. Bachand; Thomas W. Leonard, both of Plattsburgh, N.Y., and Ronald N. Warner, Grand Isle, Vt., assignors to American Home Products Corporation, New York, N.Y.

Division of Ser. No. 836,033, Mar. 4, 1986, Pat. No. 4,728,512, which is a continuation-in-part of Ser. No. 731,175, May 6, 1985, abandoned. This application Sep. 24, 1987, Ser. No. 100,646

Int. Cl.<sup>4</sup> A61K 9/52, 9/54, 9/58

U.S. Cl. 424—458

8 Claims

1. A therapeutic composition for oral administration consisting essentially of a pharmaceutical gelatin capsule containing film coated spheroids, which spheroids prior to coating comprise 10% to 60% by weight of a vinpocetine in admixture with non-water swellable microcrystalline cellulose, and said film coating comprising (i) an undercoat selected from the group consisting of hydroxypropyl methylcellulose and hydroxypropyl methylcellulose containing as a disintegrant carboxymethylcellulose sodium or sodium starch glycolate and (ii) an overcoat consisting of a copolymer based on polymethacrylic acid esters containing metallic stearates.

4,794,002

## MODIFIED POLYMERIC SURFACES AND PROCESS FOR PREPARING SAME

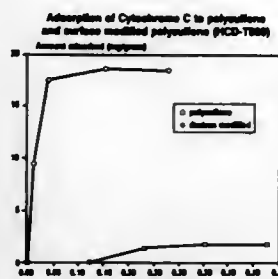
Jay M. Henis, St. Louis; Mary K. Tripodi, and Donald I. Stimpson, both of Creve Coeur, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 794,100, Nov. 1, 1985, abandoned. This application Sep. 5, 1986, Ser. No. 902,377

Int. Cl.<sup>4</sup> A61K 9/16; B05D 3/02

U.S. Cl. 424—488

36 Claims



1. A process for surface modifying a predetermined polymeric support material which comprises irreversibly adsorbing a modifying polymer onto substantially the entire surface of said support material accessible to said modifying polymer, said modifying polymer having a molecular weight of at least 10,000 and containing an effective number of binding groups which partition onto or into the support material and adhere the modifying polymer to the support material, and subsequently removing excess non-adsorbed modifying polymer by washing the modified polymeric support material.

4,794,003  
POLYVINYLACETATE BUBBLE GUM BASE COMPOSITION

Sabraman R. Cherukuri, Towaco, N.J., and Gul Mansukhani, Staten Island, N.Y., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 846,690, Apr. 1, 1986, Pat. No. 4,721,620. This application Nov. 20, 1987, Ser. No. 123,449. The portion of the term of this patent subsequent to Jan. 26, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> A23G 3/30

U.S. Cl. 426—6

36 Claims

1. A bubble gum base composition, which comprises in weight percent:

- (a) about 0.5% to about 30% non-SBR elastomer selected from the group consisting of synthetic gums, synthetic elastomers, natural gums, natural elastomers and mixtures thereof;
- (b) not more than about 2% of a SBR elastomer;
- (c) an effective amount of a two polyvinyl acetate polymeric materials selected from:
  - (1) not more than 14% of a polyvinyl acetate having a low molecular weight of about 12,000 to about 16,000; and
  - (2) not more than 35% of a polyvinyl acetate having a medium molecular weight of about 35,000 to 55,000; wherein the polyvinyl acetate polymeric materials are present in a mole ratio of 1:2 to 1:45 based on the low molecular weight polyvinyl acetate;
- (d) about 5% to about 12% acetylated monoglyceride having a saponification value above about 400; and
- (e) optionally, an effective amount of a material selected from the group consisting of elastomer solvents, emulsifiers, plasticizers, waxes, fillers and mixtures thereof.

4,794,004

## PREPARATION OF COPOLYMERS OF ETHYLENE WITH VINYL ESTERS IN A TUBULAR REACTOR AT ABOVE 500 BAR

Klaus Pflieger; Klaus Boettcher, both of Wesseling; Oskar Buechner, Dudenhofen; Friedrich Kanne, and Siegfried Karsawe, both of Wesseling, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 22, 1987, Ser. No. 41,231

Claims priority, application Fed. Rep. of Germany, May 9, 1986, 3615563

The portion of the term of this patent subsequent to Nov. 29, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> C08F 220/40, 2/38, 2/00

U.S. Cl. 526—64

5 Claims

1. A process for preparing a copolymer of ethylene with a vinyl ester by copolymerizing 100 parts by weight of ethylene with from 0.1 to 30.0 parts by weight of vinyl ester in a continuously operated tubular polymerization reactor at pressures of from 500 to 5,000 bar and at temperatures of from 50° to 450° C. in the presence of a polymerization initiator which decomposes into free radicals, which process further comprises: feeding a mixture of ethylene, vinyl ester and initiator into the tubular polymerization reactor in the form of a main stream at the inlet point of the reactor; passing said mixture along said reactor where the ethylene and vinyl ester polymerize to form a copolymer; feeding into the reactor an additional amount of said mixture in one or more secondary streams(I) at a point or points where a maximum temperature is reached in the reactor due to the heat of polymerization, and feeding a further amount of said mixture into the reactor in one or more secondary streams(II) at a point or points which, relative to the direction of flow of the ethylene, are positioned upstream of the feed points of secondary streams(I) and upstream of the points at which a maximum temperature is reached in the reactor.

4,794,005

## PACKAGE ASSEMBLY INCLUDING A MULTI-SURFACE, MICROWAVE INTERACTIVE TRAY

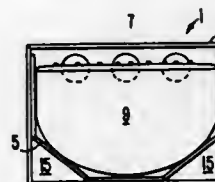
Anthony J. Swiontek, Neenah, Wis., assignor to James River Corporation, Norwalk, Conn.

Filed Feb. 14, 1986, Ser. No. 829,227

Int. Cl.<sup>4</sup> B65D 81/34

U.S. Cl. 426—107

21 Claims



1. Package assembly for the storing and microwave heating of a food item comprising:

- (a) an outer package body defining an internal food receiving space;
- (b) a food item within said food receiving space; and
- (c) an inner tray member disposed in the food receiving space of the outer package body and having a layer of a microwave interactive material, that is capable of converting microwave energy to heat, disposed on a side thereof; and wherein said inner tray member is sized and shaped relative to the food item so as to cradle the food item with multiple surfaces of the food item in sufficient proximity with respect to the microwave interactive layer for producing browning or crisping of said multiple surfaces during heating of the food item within the package assembly in a microwave oven; and wherein said outer package is closed in a first condition thereof for shipping and storing and has opening means for venting the food receiving space to the exterior of the outer package body in a second condition thereof for microwave heating of a food item disposed therein, and said inner tray member has a generally U-like cross-sectional shape having a bottom wall and upwardly directed sidewalls and is disposed within the outer package body in a manner defining vent channels, at least a portion of each of opposite outer sides of the upwardly directed sidewalls of the inner tray member in cooperation with the outer package body, that extend substantially the entire length of the food receiving space and wherein the walls of the inner tray member are provided with vent means for venting gases and vapor released by the food within said inner tray member, past said sidewalls, into said vent channels defined at the opposite outer sides of the inner tray member.

4,794,006

## STRENGTHENED EDIBLE COLLAGEN CASING AND METHOD OF PREPARING SAME

Kenneth A. Boni, Columbia, S.C., assignor to Teepak, Inc., Oak Brook, Ill.

Filed Apr. 29, 1987, Ser. No. 44,080

Int. Cl.<sup>4</sup> A22C 13/00

U.S. Cl. 426—140

14 Claims

1. A food casing, having improved mechanical properties at low temperatures, comprising collagen and a low temperature, food casing mechanical property improving amount of a lower alkyl diol.

4,794,007

## PROCESS FOR PRODUCING GROUND FISH

Hirotsada Ozaki, Tokyo, Japan, assignor to Taiyo Fishery Co., Ltd., Tokyo, Japan

Filed Dec. 8, 1986, Ser. No. 939,368

Claims priority, application Japan, Dec. 16, 1985, 60-282487

Int. Cl.<sup>4</sup> A23L 1/325

U.S. Cl. 426—271

9 Claims

1. A process for producing a ground meat, which comprises grinding raw fish bodies or raw fish meat to a myofibril level in a liquid containing 0.3 to 3000 µg/ml of protease inhibitor and 1 to 1,000 µm of chelating agent and having an adjusted ionic strength; filtering the ground mixture thus obtained to remove fine bones, skin and pieces of the internals and binding tissues therefrom; and centrifuging the obtained liquid phase at a centrifugal force of 2,000 g or above to obtain the ground meat containing 80 to 90% of moisture.

4,794,008

## METHOD OF PREPARING A PACKAGED FROZEN CONFECTION

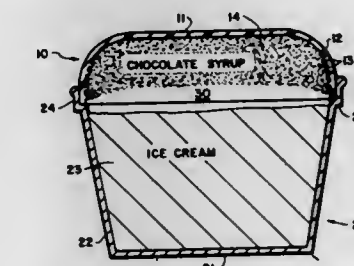
Walter L. Schmidt, Hopewell Junction, N.Y.; Clement R. Wyss, Hilldale, N.J.; Edward L. Scarsella, Bedford Hills, N.Y.; John F. Halligan, Riverside, Conn., and Joan M. Adams, Brick, N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed Feb. 27, 1987, Ser. No. 20,052

Int. Cl.<sup>4</sup> B65D 85/78, 81/32

U.S. Cl. 426—234

4 Claims



1. A process for making an ice cream sundae type product comprising:

- (a) providing a first package portion having an open end and a generally U-shaped cross section, said first package portion being transparent to microwaves;
- (b) filling said first package portion, with a melted syrup and freezing to enable adherence thereto;
- (c) providing a second package portion having an open end and a generally U-shaped cross section, said second package portion being reflective to microwaves;
- (d) partially filling said second package portion with either an ice cream, frozen edible emulsion or frozen pudding;
- (e) removably securing the open ends of said U-shaped portions together to form a one-compartment package wherein the first and second frozen food components are spaced apart from each other, said space being open, the open space measuring from about one-half inch to about three-quarter inch; and
- (f) subjecting the one compartment package to microwave heating in a microwave oven for a period of time sufficient to cause the majority of the frozen syrup to liquify and reach a temperature within the range of from about 185° F. to about 225° F. while the ice cream, frozen edible emulsion or frozen pudding remains substantially frozen.

4,794,009

# METHOD FOR FORMING FILLED DOUGH PRODUCTS

Ilya Drelata, 253 W. 57 St. #1257, New York, N.Y. 10019

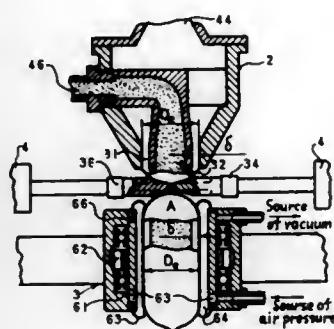
Division of Ser. No. 798,222, Nov. 14, 1985, Pat. No. 4,685,874.

This application Apr. 14, 1987, Ser. No. 38,003

Int. Cl.<sup>4</sup> A21C 3/04

U.S. Cl. 426-283

2 Claims



1. In the method of forming filled dough product comprising steps of providing outwardly directable tubular dough source in relation to axis of extrusion, providing outwardly directable filling source inside of said dough source, providing means for pinching and separating of ends of the extruding items down stream of said sources, providing means for receiving just extruded item downstream of said pinching means, simultaneously extruding predetermined quantity of dough tube from said dough source and internal filling from said filling source to said receiving means through said pinching means, interrupting the extrusion of filling from said filling source and continuing the extrusion of the additional part of dough tube from said dough source, interrupting the extrusion of dough tube from said source; the improvement includes the following steps: after said additional part of dough tube for one item has been extruded, twisting it through turning a just extruded dough tube with internal filling around axis of extrusion for some angle, relatively an upstream part of the extruding material, by internal filling around of extrusion for some angle by receiving means; forming, closing and separating of two adjacent ends of two adjacent items in the place of the twisted part of said dough tube by said pinching means.

4,794,010

# PROCESS FOR THE PREPARATION OF SOLUBLE COFFEE

Gary V. Jones, Bremen, Fed. Rep. of Germany; Stuart A. Stein, Hoboken, N.J., and David Kaganoff, New York, N.Y., assignors to General Foods Corporation, White Plains, N.Y.

Filed Feb. 2, 1988, Ser. No. 151,354

Int. Cl.<sup>4</sup> A23F 5/24, 5/50

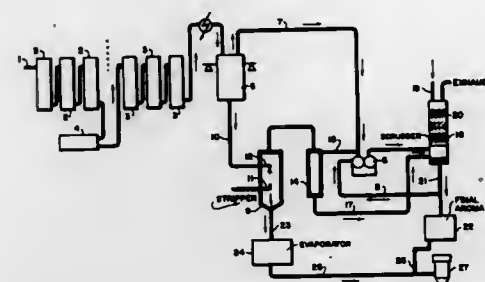
U.S. Cl. 426-387

2 Claims

1. A process for preparing aromatized dried coffee extract comprising:

- (a) drawing off extract from fresh roasted and ground coffee to obtain coffee extract having a minimum gas chromatograph count of 2500 ug/g soluble coffee solids;
- (b) collecting light aromas from said extract in a vacuum pump using a cold water seal to condense and collect aromas in the water seal;
- (c) stripping the extract of step (a) with steam and collecting up to 20% condensable aroma by using a cold condenser and also collecting the non-condensibles of the stripping operation in the vacuum pump of step (b);
- (d) evaporating at subatmospheric conditions the stripped extract of step (c) to a solids content of at least 40% solids;
- (e) introducing the seal water aroma of step (b) and the condensed aroma of step (c) to an absorber having 4 to 48 plates and contacting the aromas with cold water under

10° C. at a liquid to gas ratio of 0.1 to 1 to 30 to 1, the gas comprising the seal water aroma of step (b);  
(f) combining the absorbate aroma of step (e) with the concentrated extract of step (d) and



(g) spray drying the concentrate of (f), to a dry aromatized soluble coffee.

4,794,011

# PROCESS FOR THE TREATMENT OF VEGETABLE RAW MATERIALS

Heinz O. Schumacher, Höperfeld 26, D-2050 Hamburg 80, Fed. Rep. of Germany

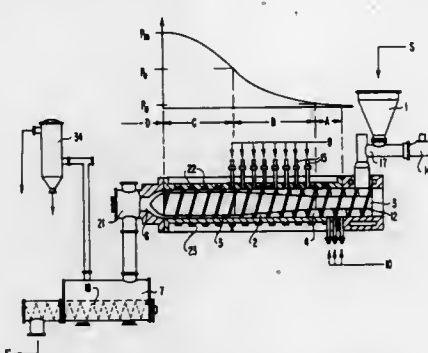
Filed Aug. 7, 1986, Ser. No. 894,057

Claims priority, application Fed. Rep. of Germany, Aug. 14, 1985, 3529229; Dec. 14, 1985, 3544298

Int. Cl.<sup>4</sup> A23L 1/18, 1/211; A23P 1/12

U.S. Cl. 426-448

17 Claims



1. A process for the treatment of vegetable raw material which is subjected to one of: (1) an extraction step, (2) a compressing step, and (3) an extraction step and a compressing step, and which vegetable raw material is also subjected to a thermal conditioning step in which the material is heated to a temperature above 100 degrees Celsius at a pressure above atmospheric pressure in an oxygen-free atmosphere, comprising:

carrying out the thermal conditioning step at a pressure of 2.0 to 25 bar for a time period of between 0.1 and 5 seconds, and  
after said time period, suddenly releasing the pressure, moving the heated material into an oxygen-free zone, and cooling the heated material to temperature below 100 degrees Celsius in said oxygen-free zone.

4,794,012

# METHOD OF MANUFACTURING DRIED RICE WITH PREGELATINIZED STARCH CONTENT

Morio Taniuchi, Nabari; Ryusuke Nakanaga, Takatsuki, and Noriko Yano, Kawachinagano, all of Japan, assignors to House Food Industrial Company Limited, Higashiosaka, Japan

Filed Feb. 3, 1987, Ser. No. 10,435

Claims priority, application Japan, Feb. 6, 1986, 61-24862

Int. Cl.<sup>4</sup> A23L 1/10

U.S. Cl. 426-462

18 Claims

1. A method for manufacturing dried rice having a pregelatinized starch content, comprising:

- (a) soaking polished rice for a period of time of 1 to 16 hours in water having a temperature below 30° C.;
- (b) soaking the polished rice resulting from said step (a) for a period of time of 30 to 90 minutes in water having a temperature between 50° and 70° C.;
- (c) steam cooking the polished rice resulting from said step (b) at a temperature of from 95° to 100° C. for a period of time of 5 to 30 minutes; and
- (d) drying the polished rice resulting from said step (c).

4,794,014

# FOOD COMPOSITIONS CONTAINING INOSITOL TRIPHOSPHATE AND METHOD FOR MAKING SAME

Matti Siren, Via Poporiso 9, CH-6926 Montagnola/Lugano, Switzerland

Continuation-in-part of Ser. No. 788,823, Oct. 18, 1985, Pat. No. 4,734,283. This application Feb. 17, 1987, Ser. No. 15,676

Claims priority, application Sweden, Oct. 23, 1984, 8405295

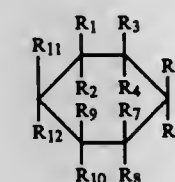
The portion of the term of this patent subsequent to Mar. 29, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> A23C 9/14; A61K 31/66, 9/00

U.S. Cl. 426-547

21 Claims

1. A composition comprising a food and at least 5 mg. of inositol triphosphate per 100 g. of a composition of said food and inositol triphosphate, said inositol triphosphate provided by at least one compound, salt thereof or acid thereof having the structural formula



where

- (a) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>5</sub>, R<sub>7</sub>, R<sub>10</sub> and R<sub>11</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>4</sub>, R<sub>6</sub>, R<sub>8</sub>, R<sub>9</sub> and R<sub>12</sub> are hydrogen;
- (b) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>9</sub> and R<sub>12</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>8</sub>, R<sub>10</sub> and R<sub>11</sub> are hydrogen;
- (c) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>5</sub>, R<sub>8</sub>, R<sub>10</sub> and R<sub>12</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>4</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>9</sub> and R<sub>11</sub> are hydrogen;
- (d) three of R<sub>1</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>8</sub>, R<sub>9</sub> and R<sub>12</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>3</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>10</sub> and R<sub>11</sub> are hydrogen;
- (e) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>6</sub>, R<sub>8</sub>, R<sub>9</sub> and R<sub>12</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>7</sub>, R<sub>10</sub> and R<sub>11</sub> are hydrogen;
- (f) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>10</sub> and R<sub>12</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>8</sub>, R<sub>9</sub> and R<sub>11</sub> are hydrogen;
- (g) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>5</sub>, R<sub>8</sub>, R<sub>10</sub> and R<sub>12</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>4</sub>, R<sub>6</sub>, R<sub>7</sub>, R<sub>9</sub> and R<sub>11</sub> are hydrogen; or
- (h) three of R<sub>1</sub>, R<sub>3</sub>, R<sub>5</sub>, R<sub>7</sub>, R<sub>9</sub> and R<sub>11</sub> are hydroxyl and the remaining three are phosphate and R<sub>2</sub>, R<sub>4</sub>, R<sub>6</sub>, R<sub>8</sub>, R<sub>10</sub> and R<sub>12</sub> are hydrogen.

4,794,015

# PROCESS FOR EMULSIFYING FAT OR OIL INTO AQUEOUS PHASE COMPRISING SOY SAUCE AS THE MAIN COMPONENT

Satoshi Fujita, and Hiroshi Edo, both of Tokyo, Japan, assignors to Asahi Denka Kogyo Kabushiki Kaisha, Osaka, Japan

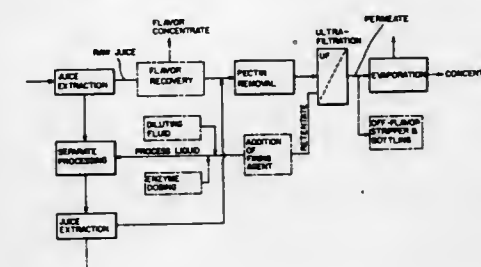
Filed Jan. 10, 1987, Ser. No. 60,223

Int. Cl.<sup>4</sup> A23L 1/238, 1/39

U.S. Cl. 426-589

8 Claims

1. A process for emulsifying a fat or an oil into an aqueous phase comprising at least 50% soy sauce and therefor a high salt content, which comprises  
adding 0.5 to 5% by weight, based on said fat or oil, of glycerol phospholipid(s) containing at least 40% by weight of mono acyl glycerol phospholipid(s) as at least one emulsifier component in the emulsification of said fat or oil, into said aqueous phase, said aqueous phase comprising at least 50% by weight soy sauce; thereafter  
adding said fat or oil to said aqueous phase and emulsifying the mixture.



1. A process for forming a juice product of a selected quality by the extraction of liquid from residues of dregs, macromolecules and colloidal dissolved particles separated from a filtered residual substance, including residues resulting from the extraction of juices from agricultural products comprising fruit, grain, berries and vegetables, the steps of subjecting an agricultural product to a first extraction to obtain a raw juice and an at least partially pressed out pomace, subjecting the juice to a fining or clarification operation to form a clear juice and a retentate consisting of a residue of dregs, macromolecules and colloidal dissolved particles, mixing the retentate with the at least partially pressed out pomace in a further processing step subsequent to and separate from the first extraction step to form a processed pomace so that the first extraction of juice from the agricultural product remains undisturbed, and subjecting the processed pomace to a second juice extraction separate from the first extraction to obtain additional raw juice.



4,794,016

## REDUCTION OF INSTANT RICE POUR-OFF

Manoj K. O. Shah, Dover, Del.; Arthur H. Cahoe, Jr., Ridgely, Md.; Joseph D. Burke, Philippsburg, and Gary F. Greenwald, Hamilton Square, both of N.J., assignors to General Foods Corporation, White Plains, N.Y.

Filed May 12, 1987, Ser. No. 48,787

Int. Cl. A23L 1/182

U.S. Cl. 426-618

4 Claims

1. A method for reducing pour-off in instant rice products comprising: coating instant rice prior to drying with instant rice fines, said rice fines having granulation ranging from -20 m to +80 m and in amounts up to 5% by weight, said amounts being sufficient to lower the pour-off of the finished instant rice product by up to 100%, subsequently drying the coated instant rice to a moisture content ranging from 5.0% to 15%.

3. An instant rice product comprising an instant rice coated with instant rice fines, said fines having granulation ranging from -20 m to +80 m and being present in amounts up to 5% by weight, said amounts being sufficient to lower the pour-off of the finished instant product by up to 100%.

4,794,017

## SOYBEAN PROCESSED FOOD

Mizuo Yajima, Tokyo, Japan, assignor to Asama Chemical Co., Ltd., Tokyo, Japan

Filed Oct. 22, 1986, Ser. No. 921,457

Claims priority, application Japan, Sep. 19, 1986, 61-219146

Int. Cl. A23L 1/20, 1/00; A23J 1/00

U.S. Cl. 426-634

7 Claims

1. A processed food comprising soybean or a processed soybean and 0.1 to 5 parts by weight of a fish oil containing a highly unsaturated fatty acid, per part by weight of said soybean or processed soybean.

4,794,018

## PARTIAL IMMERSION FLOW COATING METHOD AND APPARATUS

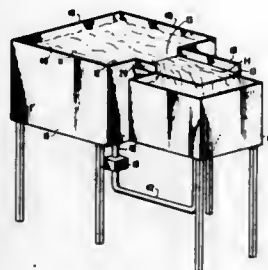
Frederick M. Scheetz, 2013 East Carter, Kokomo, Ind. 46901

Filed Aug. 7, 1987, Ser. No. 82,741

Int. Cl. B05D 5/12

U.S. Cl. 427-96

11 Claims



9. A method for coating a lower portion of a workpiece with a coating material comprising:

providing a flow of coating material to a flow surface capable of supporting the workpiece and having at least one drain edge;

adjusting the volume of flow of coating material so that the depth of the flow matches the height of coating material desired on the workpiece;

placing the workpiece on the flow surface so that the portion to be coated is immersed in coating material;

removing the workpiece from the flow surface.

4,794,019

## REFRACTORY METAL DEPOSITION PROCESS

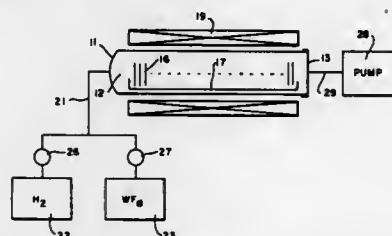
Nicholas E. Miller, Cupertino, Calif., assignor to Applied Materials, Inc., Santa Clara, Calif.

Continuation of Ser. No. 915,905, Oct. 6, 1986, abandoned, which is a continuation of Ser. No. 774,190, Sep. 9, 1985, abandoned, which is a continuation of Ser. No. 183,974, Sep. 4, 1980, abandoned. This application Oct. 22, 1987, Ser. No. 115,579

Int. Cl. B05D 5/12

U.S. Cl. 427-124

8 Claims



1. In a process for selectively forming a refractory metal coating on a pattern metal in the presence of another material as an oxide, nitride or oxynitride on a semiconductor substrate, exposing both the pattern metal and the other material to a gas containing a fluoride of the refractory metal and a reducing agent at a temperature on the order of 220°-400° C. and a pressure on the order of 0.1-1.0 torr to deposit an adherent coating of the refractory metal on the pattern metal but not on the other material.

4,794,020

## PROCESS FOR MANUFACTURING INLAID TYPES OF SHEET MATERIALS

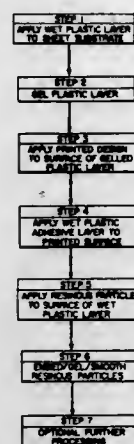
Edward F. Luzzi, Bethlehem, Pa., and Andrew J. Manning, Randolph, N.J., assignors to Tarkett Inc., Parsippany, N.J.

Filed Oct. 7, 1985, Ser. No. 784,742

Int. Cl. B05D 1/36, 3/02, 3/12; D06N 7/04

U.S. Cl. 427-195

17 Claims



1. In a method for making decorative inlaid types of sheet materials, which comprises forming a plastic layer of wet ungelled PVC plastisol or organosol on a sheet of flexible substrate and depositing resinous particles on said plastic layer, the improvement which comprises then passing the sheet between a heated, cylindrical surface and a means for gradually and uniformly increasing the contact pressure between the cylindrical surface and the coated surface of the sheet facing the cylindrical surface, at a temperature sufficient to gell the plastisol, so that, upon completion of the operation, an inlaid

sheet material is produced which has the particles embedded in a gelled top layer having a smooth and firm outer surface.

mixing the wood waste while it is being transported through the treatment area.

4,794,021

## METHOD OF PROVIDING A PLANARIZED POLYMER COATING ON A SUBSTRATE WAFER

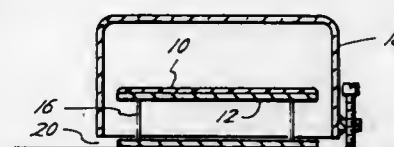
Curtis N. Potter, Austin, Tex., assignor to Microelectronics and Computer Technology Corporation, Austin, Tex.

Filed Nov. 13, 1986, Ser. No. 930,166

Int. Cl. B05D 3/12

U.S. Cl. 427-240

8 Claims



1. The method of providing a planarized coating on a substrate wafer comprising, applying a polymer of a thickness of greater than 5 microns containing a solvent to the wafer by spin coating, before the polymer dries, placing the coated wafer in an oven having heating means out of direct contact with the wafer, and supporting the coated wafer in the oven from a plurality of pins for allowing the wafer to be evenly heated, heating the wafer while controlling the solvent loss by retaining solvent vapor and maintaining the pressure of the solvent vapor and providing a slow solvent loss for planarizing the top surface of the polymer, and placing the wafer in a bake oven for completing the bake cycle.

4,794,022

## STABLE BEDDING METHOD AND APPARATUS

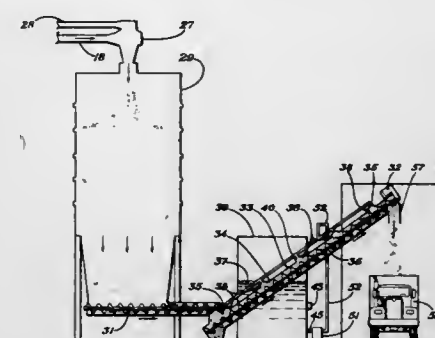
Roland R. Johnson, and Richard R. Napier, both of Fort Worth, Tex., assignors to Frank Paxton Lumber Company, Fort Worth, Tex.

Filed Jan. 10, 1987, Ser. No. 59,353

Int. Cl. B05D 7/00; B05B 17/00; A01K 45/00; C09K 3/22

U.S. Cl. 427-212

8 Claims



1. A method of producing an improved stable bedding, the method comprising the steps of:

providing a wood waste mixture of wood chips, wood shavings, and sawdust;

providing a food grade oil selected from the group consisting of cotton seed oil, soybean oil, peanut oil, corn oil, sunflower oil, or palm oil;

providing an enclosed treatment area;

transporting the wood waste through the treatment area; spraying food grade oil into the wood waste while it is being transported through the treatment area; and

4,794,023

## PROCESS FOR PRODUCING A CALCIUM PHOSPHATE COMPOUND COATED COMPOSITE MATERIAL

Takayuki Shimamura, Tokyo; Masashi Hosonuma, and Yukie Matsumoto, both of Kanagawa, all of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan

Filed Jul. 17, 1987, Ser. No. 74,837

Claims priority, application Japan, Jul. 18, 1986, 61-169547

Int. Cl. B05D 3/02, 3/12

U.S. Cl. 427-350

6 Claims

1. A process for producing a calcium phosphate compound coated composite material, comprising coating the surface of said metal substrate with an aqueous solution of nitric acid having hydroxyapatite dissolved therein to form a coating layer of a calcium phosphate compound on the surface of a metal substrate, and then firing said coated substrate at a temperature of 300° C. or more.

5. A process according to claim 1, wherein the substrate is fired in an inert atmosphere or in vacuum.

4,794,024

## STABILIZER AND RIGIDIFIED POP-UP STRUCTURES RESEMBLING SOLID POLYHEDRONS

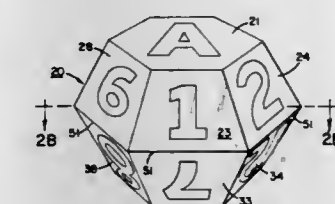
Christopher S. Crowell, Old Lyme, Conn., and Ib Penick, Palatine, Ill., assignors to Structural Graphics, Inc., Essex, Conn.

Filed Aug. 21, 1987, Ser. No. 88,041

Int. Cl. B65D 5/36

U.S. Cl. 428-12

15 Claims



1. A collapsible, flattenable pop-up structure formed of stiff foldable sheet material, having a collapsed mode in which it is flattened into a thin substantially co-planar structure for storage, and self-erectable into an erect mode configuration resembling a polygonal solid with pairs of upper and lower trapezoidal face panels, having short parallel edges foldably joined to the sides of similar polygonal top and bottom face panels, and extending therefrom diagonally outward to meet in an equatorial plane with their longer parallel edges foldably joined together to define an equatorial plane polygon similar to but larger than the top and bottom polygonal face panels, characterized by

notched actuating flanges formed by glue tabs foldably joined to the long parallel edges of two opposed mating pairs of upper and lower trapezoidal face panels and having notch hook means formed therein presented protruding inward facing each other on opposed sides of the equatorial plane inside the flattenable pop-up structure.

elastic band means connecting the opposed notch hook means resiliently urging the opposed actuating flanges toward each other, and

guide flange means positioned at the apices of the equatorial plane polygon to guide the foldably joined longer parallel sides of at least two adjacent pairs of upper and lower trapezoidal face panels into sliding apex juxtaposition with each other while blocking their respective inward movement past each other beyond the aligned apex juxtaposition of said erect configuration, while providing free

sliding disengagement for flattening collapse of the structure, whereby the self-erecting force supplied by the stretched elastic band means is counteracted by the guide flange means when the two adjacent pairs of trapezoidal face panels arrive at juxtaposition at an apex of the equatorial plane polygon in the erect configuration of the structure, and flattening forces applied to move the two similar top and bottom face panels toward each other disengage the guide flange means while stretching the elastic band means, causing the structure to move from its erect mode configuration to its collapsed mode.

4,794,025

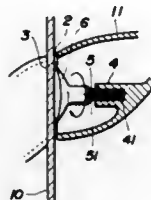
## ORNAMENT FOR WINDOW DISPLAY

Kichinosuke Yamazaki, Tokyo, Japan, assignor to Kabushiki Kaisha Bando, Tokyo, Japan  
Filed Dec. 8, 1987, Ser. No. 130,319  
Claims priority, application Japan, Jul. 14, 1987, 62-107906[U]

Int. Cl.<sup>4</sup> A63H 3/16

U.S. Cl. 428—31

2 Claims



1. An ornamental article for window display and for attachment to a transparent plate member comprising: first and second hollow ornamental article sections which constitute said ornamental article when abutting them together at end surfaces thereof along which said ornamental article is divided into said first and second hollow ornamental article sections; each of said first and second ornamental article sections comprising: a boss formed within said hollow ornamental article section, said boss being formed therein with a first threaded portion along its longitudinal axis extending substantially perpendicular to said end surface; and attachment means comprising a suction device and a shaft formed integrally therewith, said shaft being formed outside thereof with a second threaded portion which meshes with said first threaded portion to minutely adjust the degree of threading of said shaft into or out of said boss to position said suction device substantially at said end surface and hence at said transparent plate member; whereby when both said first and second hollow ornamental article sections are attached to said transparent plate member by means of said attachment means, said ornamental article can be visually recognized as if it penetrated through said transparent plate member without said attachment means being visually recognized.

4,794,026

## REFLECTOR CONSTRUCTION

Harold D. Boaltinghouse, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.  
Filed May 24, 1985, Ser. No. 737,846  
Int. Cl.<sup>4</sup> B27N 5/02

U.S. Cl. 428—35.9

7 Claims

1. An article of manufacture exhibiting increased reflectance upon exposure to increased temperatures comprising: (a) a substrate formed from poly(arylene sulfide) resin, (b) a thermally cured coating of a relatively low viscosity

silicone resin in direct contact with and adherence to at least one surface of said substrate, and (c) a reflective layer in direct contact with and adherent to said silicone coating.

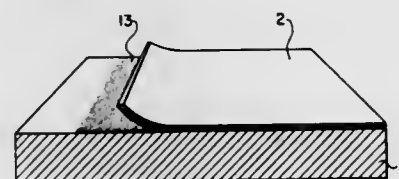
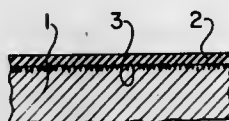
4,794,027

## PROCESS FOR COATING A BASE MATERIAL WITH AN ELASTOMER AND PRODUCT PRODUCED BY SUCH PROCESS

Reinhard F. Hering, Via Albaredo 34, CH-6645 Brione S.M., Switzerland  
Filed Mar. 27, 1985, Ser. No. 716,646  
Claims priority, application Fed. Rep. of Germany, Mar. 28, 1984, 3411451; Jul. 26, 1984, 3427487  
Int. Cl.<sup>4</sup> F16L 11/04

U.S. Cl. 428—68

30 Claims



1. A process for coating a preformed, porous base material comprising a mineral fibrous or particulate material or an organic fibrous or particulate material or mixtures thereof, which process comprises: applying, at atmospheric pressure, a coating of a vulcanizable elastomeric material in unvulcanized form to a porous surface of said preformed porous base material; and permanently adhering said elastomeric material to said preformed porous base material by a hot press, hot vulcanization step; whereby said elastomeric material is substantially simultaneously both adhered securely to one outer surface of said base material and is penetrated into and impregnated below and into the same surface of same base material to be within the porous structure of said base material, and is vulcanized therein in situ by the joint action of a high pressure of about 50 to about 500 Newton/cm<sup>2</sup> and at a temperature of about 120° C. to about 300° C.

20. A preformed base material comprising a mineral fibrous or particulate material or an organic fibrous or particulate material, or mixtures thereof, having permanently adhered to an outer surface thereof, a vulcanized elastomeric material which is substantially simultaneously both adhered securely to one outer surface of said base material and is penetrated into and impregnated below and into the same surface of said base material to be within the porous structure of said base material, and is vulcanized therein in situ by the joint action of a high pressure of about 50 to about 500 Newton/cm<sup>2</sup> and at a temperature of about 120° C. to about 300° C.; wherein two mutually opposed outer surfaces have said vulcanized elastomeric material permanently adhered thereto.

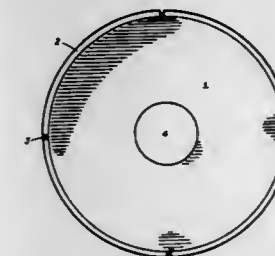
4,794,028  
METHOD FOR CONTINUOUSLY PRODUCING A MULTI-HOOK FASTENER MEMBER AND PRODUCT OF THE METHOD

James R. Fischer, Sheboygan, Wis., assignor to Velcro Industries B.V., Amsterdam, Netherlands  
Continuation of Ser. No. 600,990, Apr. 16, 1984, abandoned.  
This application May 15, 1986, Ser. No. 865,575  
Int. Cl.<sup>4</sup> B29C 43/46, 43/22; A44B 18/00  
U.S. Cl. 428—100 27 Claims



1. A method suitable for continuously producing an elongated strip-like fastener member, comprising the steps of: forming a strip-like extrusion of plastic material; providing a first, cooled forming roller having a plurality of hook-forming cavities defined about the periphery thereof, each of said hook-forming cavities including a throat portion adjacent the periphery of said forming roller, and an inner end portion communicating with said throat portion, said inner end portion of each said hook-forming cavity extending in a direction generally toward the periphery of said forming roller; providing a second pressure roller in position for coaction with said first forming roller; concurrently rotating said first and second rollers in opposite directions about respective parallel axes; directing said extrusion in between said first and second rollers at an interface thereof so that said plastic material fills said hook-forming cavities to form a base portion of said strip-like fastener member and a great multiplicity of hook-like projections extending integrally from one surface of said base portion; cooling said fastener member to a desired temperature by carrying it on the periphery of said rotating, cooled forming roller; and removing said strip-like fastener member from said first forming roller at a position spaced from the interface of said first and second rollers without opening said hook-forming cavities after sufficiently cooling the hook-like projections so that said hook-like projections are withdrawn from said hook-forming cavities without unacceptable deformation of the hook-like projections, each said hook-like projection having a free end portion extending generally toward the base portion of said fastener member.

a casing formed at the perimeter of said towel; a cord threaded through said casing; and



a section of relatively non-stretchable fabric of a shape geometrically similar to that of said towel attached with its edges equidistant from the edges of said towel.

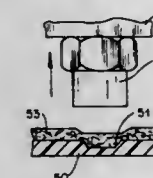
4,794,030

## LOW DENSITY MATERIAL BONDED TO A PLASTIC SUBSTRATE

Wayne M. Cella, 242 Purdue Ct., Paramus, N.J. 07652  
Filed Sep. 17, 1987, Ser. No. 97,655  
Int. Cl.<sup>4</sup> B32B 3/00, 3/26, 7/04

U.S. Cl. 428—156

7 Claims



1. A composite laminated structure comprising, a. a sized and shaped thermoplastic plastic substrate having at least one depression with a flattened bead of plastic therearound; b. a sized and shaped laminate of low density material having fibers fused within the flattened bead of plastic.

4,794,031

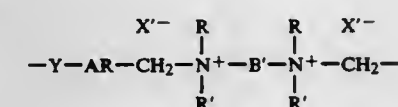
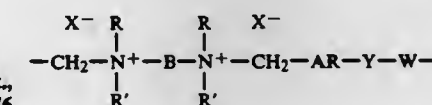
## SHEET MATERIALS COATED WITH ADHESIVE COMPOSITIONS CONTAINING IONENE ELASTOMERS

Charles M. Leir, and John E. Stark, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Division of Ser. No. 918,579, Nov. 24, 1986, Pat. No. 4,734,458, which is a division of Ser. No. 801,281, Nov. 25, 1985, Pat. No. 4,677,182. This application Sep. 3, 1987, Ser. No. 92,658  
Int. Cl.<sup>4</sup> B32B 7/02, 15/08

U.S. Cl. 428—195

3 Claims

1. A sheet material at least partially coated with a pressure sensitive adhesive comprising an ionene elastomer having repeating units represented by the formula I as follows:



4,794,029

## TOWEL THAT CONVERTS INTO A BAG

Lynne H. Tennant; Ashley A. Herring, both of 244 Thirteenth St., NE, #101, Atlanta, Ga. 30309, and Garrett L. Simmons, 876 Broadway, Fourth Floor, New York, N.Y. 10003  
Filed Feb. 24, 1987, Ser. No. 18,358  
Int. Cl.<sup>4</sup> A45C 9/00; A47G 9/00

U.S. Cl. 428—101

10 Claims

1. A towel-bag construction comprising: a non-rectangular towel;



wherein:

R is a lower alkyl group of 1 to 4 carbon atoms;  
R' is a lower alkyl group of 1 to 4 carbon atoms wherein R' may be the same as or different from R, and R' and R may be joined together with or without an additional hetero atom to form a heterocyclic ring;  
X is a halogen selected from the group consisting of Cl, Br, and I;  
X' is a halogen selected from the group consisting of Cl, Br, and I and can be the same as or different from X;  
B is a divalent polymeric moiety having a molecular weight of about 1,000 to about 50,000;  
B' is a divalent polymer moiety having a molecular weight of about 1,000 to about 50,000 and may be the same as or different from B but, if B and B' are different, at least one of B or B' has a  $T_g$  of less than 20° C.;  
AR is a phenylene or substituted phenylene radical;  
Y is a divalent electron-donating substituent; and  
W is a divalent radical selected from the group consisting of (1) a C<sub>2-12</sub> alkylene selected from the group consisting of saturated C<sub>2-12</sub> alkylene, C<sub>2-12</sub> alkylene with one double bond, C<sub>2-12</sub> alkylene with more than one double bond, and C<sub>2-12</sub> alkylene with a triple bond, (2)  $-(CH_2CH_2O)-$ ,  $-CH_2CH_2-$  when Y is oxygen or sulfur, and (3) carbonyl, terephthaloyl, or adipoyl when Y is nitrogen.

4,794,032

## FLOOR STRUCTURE

Hideichi Fujii, Kobe, and Kiyomori Nakano, Akashi, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Feb. 13, 1987, Ser. No. 14,321

Claims priority, application Japan, Feb. 13, 1986, 61-29977  
Int. Cl.<sup>4</sup> B32B 3/00; B61D 17/00; C09K 2/10

U.S. Cl. 428-209 13 Claims



1. A floor structure, comprising:  
a self-supporting structural member, for providing structural strength to said floor structure, fabricated from a flame-retardant material and having an upper and lower surface;  
an upper layer, secured to said upper surface of said self-supporting structural member, selected from materials comprising either a hydroxide, a hydrated salt, or an aquo-complex salt, which are thermally decomposable so as to release water under heated conditions;  
a layer of heat insulating material secured to said lower surface of said self-supporting structural member; and  
a lower layer secured to an undersurface of said heat insulating layer and formed of flame-retardant material.

4,794,033

## OPTICAL JOINT COMPRISING ANTIREFLECTION FILMS

Yoshihara Ooi, Shizuoka, Japan, assignor to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan

Filed Sep. 17, 1986, Ser. No. 909,029

Claims priority, application Japan, Oct. 2, 1985, 219616

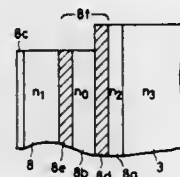
Int. Cl.<sup>4</sup> B32B 7/02; G02B 1/10

U.S. Cl. 428-212 7 Claims

1. An optical joint for joining a first light-transmissive material having a refractive index  $n_1$ , to a second light-transmissive material having a refractive index  $n_3$ , comprising:  
a transparent adhesive layer, having a refractive index  $n_0$ ,

adapted to be disposed between the first and second materials;

a first antireflection film, having a refractive index between  $n_1$  and  $n_0$ , disposed between said adhesive layer and the first material; and



a second antireflection film, having a refractive index between  $n_3$  and  $n_0$ , disposed between the adhesive layer and the second material, such that Fresnel reflection occurring at the interfaces between the adhesive layer and the first and second light-transmissive materials are substantially suppressed.

4,794,034

## WATER ABSORBING ARTICLE

Kazunori Nishizawa, Funabashi; Osamu Ito, and Iwao Miyashita, both of Utsunomiya, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed May 3, 1982, Ser. No. 374,111

Claims priority, application Japan, May 18, 1981, 56-74716

Int. Cl.<sup>4</sup> A41B 13/02; A61F 13/16

U.S. Cl. 428-218 18 Claims



1. In a water-absorbing article including a water-permeable surface sheet, a water-impermeable backing sheet, and a water-absorbing layer disposed between said surface sheet and said backing sheet in face-to-face contact with both of said sheets, the improvement which comprises: said surface sheet comprises a surface layer and an elastic compressible layer, both of said layers consisting essentially of a non-woven fabric, said layers being joined together in face-to-face contact with each other by heat-fusible binder fibers, wherein the basis weight of said surface layer is in the range of 5 to 15 g/m<sup>2</sup>, and the basis weight of said elastic compressible layer is in the range of 20 to 45 g/m<sup>2</sup>, said elastic compressible layer being in face-to-face contact with said water-absorbing layer of said water-absorbing article, and when said surface sheet is in a wet state, the values of  $\rho_{FO}$  and K in the compression characteristic formula:

$$\rho_F = \rho_{FO} [1 + \{(a-1)P/K\rho_{FO}\}]^{\frac{1}{a-1}}$$

wherein P is the pressure exerted on said surface sheet in g/cm<sup>2</sup>,  $\rho_F$  is the apparent specific weight of said surface sheet in g/cm<sup>3</sup> not including the weight of water when said surface sheet is in a wet state,  $\rho_{FO}$  is the  $\rho_F$  value when the pressure exerted on said surface sheet is 0 g/cm<sup>2</sup>, and a and K are each a constant, are in the ranges of  $\rho_{FO} \leq 1.2 \times 10^{-2}$  g/cm<sup>3</sup> and  $K \geq 1.2 \times 10^6$ , under conditions wherein the relation  $E = K\rho_F^a$  is substantially established, wherein E is the Young's modulus for said surface sheet in g/cm<sup>2</sup>.

4,794,035

## MAGNETIC RECORDING MEDIUM

Heigo Ishihara, Tokyo; Takamori Kudo; Tomoyuki Ohno, both of Kokubunji, and Motoo Akagi, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

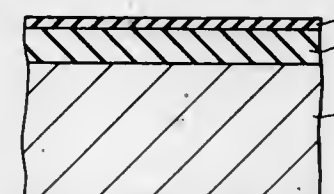
Filed Sep. 4, 1987, Ser. No. 93,205

Claims priority, application Japan, Sep. 10, 1986, 61-211559

Int. Cl.<sup>4</sup> G11B 5/72, 5/71

U.S. Cl. 428-219

9 Claims



1. In a magnetic recording medium in which a magnetic coating film having magnetic particles in a binder is provided on a substrate, the improvement wherein said magnetic coating film has a surface that is treated with both a fluorinated surface treatment agent having functional groups at terminals that bond to the magnetic particles and a fluorinated surface treatment agent having functional groups at terminals that bond to the binder, wherein the amount of the surface-treated layer is from 2 to 40 mg/m<sup>2</sup>, said surface-treated layer being comprised of said surface treatment agent that bonds to the magnetic particles and said surface treatment agent that bonds to said binder.

4,794,036

## STAINPROOF WOVEN FABRIC FOR PAPER MAKING AND METHOD FOR MAKING THE SAME

Takuo Tate, Hachioji, Japan, assignor to Nippon Filcon Co., Ltd., Tokyo, Japan

Filed Oct. 26, 1987, Ser. No. 112,996

Claims priority, application Japan, Mar. 18, 1987, 62-61382

Int. Cl.<sup>4</sup> B32B 7/00

U.S. Cl. 428-263

10 Claims

1. A stainproof woven fabric for paper making, characterized in that an original woven fabric for the stainproof woven fabric is made of synthetic resin monofilaments as warp and synthetic resin monofilaments as weft, and a cation-exchangeable synthetic resin film having metallic ions adsorbed therein is formed on the surfaces of the component monofilaments of the original woven fabric to obtain the stainproof woven fabric.

4,794,037

## FLAME-PROOF FIBER PRODUCT

Yoshinori Hosoda, Otsu; Shunroku Tohyama, Shiga, and Heiroku Suganuma, Otsu, all of Japan, assignors to Toray Industries Incorporated, Japan

Continuation of Ser. No. 712,262, Mar. 15, 1985, abandoned.

This application Feb. 2, 1987, Ser. No. 14,119

Claims priority, application Japan, Mar. 16, 1984, 59-49278

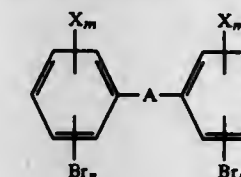
Int. Cl.<sup>4</sup> B32B 9/00; D02G 3/00

U.S. Cl. 428-264

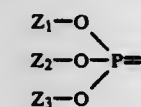
14 Claims

1. A flame-proof fiber product comprising a blend consisting essentially of a cellulose fiber and a polyester fiber selected from the group consisting of polyethylene terephthalate, polybutylene terephthalate and mixtures thereof, said polyester fiber containing at least 5% by weight of an antimony oxide and characterized by a carbonization burning mechanism, said surface of said flame-proof fiber product provided with at least one agent selected from the group consisting of a halogen-based flame-proofing agent selected from the group consisting of cycloalkanes containing 7 to 12 carbon atoms and 3 to 6 halogen atoms bonded to carbon; phenylglycidyl derivatives

containing 1 to 6 halogen atoms bonded to the benzene ring; compounds having the structural formula



wherein X is  $-R$ ,  $-OR$ ,  $-OH$  or  $-O(CHR'CHR''O)_zH$ ; where R is C<sub>1-3</sub> alkyl or halogenated alkyl; R' and R'' are hydrogen or methyl with the proviso that R' and R'' are not both methyl; z is an integer of 1 to 4; A is  $-O-$ ,  $-NH-$ ,  $-CH_2-$ ,  $-C(CH_3)_2-$  or  $-SO_2-$ , alternatively, A is not present; m is 0 or an integer of 1 to 4; and n is an integer of 1 to 5; a compound having the structural formula



where Z<sub>1</sub>, Z<sub>2</sub> and Z<sub>3</sub> are each a halogenated aliphatic or aromatic radical; and a phosphorus-based flame-proofing agent selected from the group consisting of vinyl group-containing flame-proofing phosphorus compounds and epoxy group-containing phosphorus compounds and mixtures thereof.

4,794,038

## POLYESTER FIBERFILL

Ilan Marcus, Versoix, Switzerland, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 734,423, May 15, 1985, Pat. No. 4,618,531. This application Oct. 21, 1986, Ser. No. 921,644

Int. Cl.<sup>4</sup> D04H 1/58

U.S. Cl. 428-288

26 Claims



1. Fiberballs of average dimension about 2 to about 15 mm consisting essentially of randomly-arranged, entangled, spirally-crippled polyester fiberfill having a cut length of about 10 to about 100 mm, intimately blended with binder fibers in amount about 5 to about 50% by weight of the blend.

4,794,039

**MULTI-USABLE PRESSURE-SENSITIVE TRANSFER  
RECORDING MEDIUM**

Masami Shino, Toyonaka, Japan, assignor to Fuji Kagakuhi  
Kogyo Co., Ltd., Osaka, Japan

PCT No. PCT/JP86/00634, § 371 Date Aug. 14, 1987, § 102(e)  
Date Aug. 14, 1987, PCT Pub. No. WO87/03945, PCT Pub.  
Date Jul. 2, 1987

PCT Filed Dec. 15, 1986, Ser. No. 92,920

Claims priority, application Japan, Dec. 17, 1985, 60-285179  
Int. Cl. B41M 5/025

**U.S. Cl. 428—321.3** **5 Claims**

**1.** In a multi-usable pressure-sensitive transfer recording medium wherein a finely porous layer comprising minute porous particles and a binder material for bonding the porous particles to each other is provided on a surface of a foundation, and a liquid ink paste substantially incompatible with the binder material is contained in said finely porous layer, the improvement in which said binder is a copolymer containing 4 to 7 parts by weight of vinyl chloride per 5 parts by weight of vinyl acetate, said foundation is a plastic film, and said foundation and said finely porous layer are bonded to each other with an adhesive layer comprising a hydroxyl group-containing copolymer comprising vinyl chloride and vinyl acetate, said copolymer being cross-linked with an isocyanate compound in an amount of 1 to 6 parts by weight of the isocyanate compound per 20 parts by weight of said hydroxyl-group containing copolymer.

4,794,040

**MAGNETIC RECORDING MEDIUM HAVING A BACK COAT LAYER CONTAINING CARBON BLACK HAVING DEFINED RANGES OF PH AND COLORING POWER**

**Kuniko Ojima; Yukio Matsumoto, both of Mitto; Hiroshi Togashi, Yamagata, and Hiroshi Ogino, Mitto, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan**

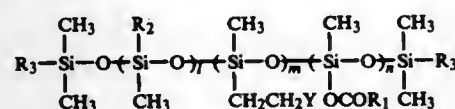
**Filed May 28, 1966, Ser. No. 867,685**

**Claims priority, application Japan, May 29, 1965, 60-114187; May 29, 1965, 60-114188**

U.S. Cl. 428—323 Int. Cl.<sup>4</sup> G11B 5/72 7 Claims

1. In a magnetic recording medium which comprises a non-magnetic support, a magnetic recording layer formed on one side of said support, and a back coat layer formed on the other side of said support, the improvement characterized in that said back coat layer is made of a composition which comprises a dispersion, in 100 parts by weight of a resin binder, of from 25 to 400 parts by weight carbon black having a pH of from 2.0 to 8.5, a coloring power not less than 90 when determined by the method prescribed in ASTM D-3051-76, and an average size of from 0.01 to 0.05 micrometers.

4. A magnetic recording medium according to claim 1, further comprising 0.5 to 4.5 parts by weight, per 100 parts by weight of the resin binder, of an aliphatic acid-modified, fluorinated organosilicone of the general formula



in which  $R_1$  represents a saturated or unsaturated hydrocarbon group having from 7 to 21 carbon atoms,  $R_2$  represents a methyl or phenyl group, each  $R_3$  represents  $-\text{OCOR}$  wherein  $R_1$  has the same meaning as defined above,  $Y$  represents  $\text{CF}_3$  or  $-(\text{CF}_2)_k-\text{W}$  in which  $W$  represents hydrogen or fluorine,  $k$  is an integer of from 1 to 8, and  $l, m$  and  $n$  are, respectively, an integer within ranges that  $0 \leq l < 200$ ,  $1 \leq m < 100$ ,  $1 \leq n < 100$  and  $l + m + n \leq 300$ .

4,794,041

**ACTIVATION OF POLYETHYLENE TEREPHTHALATE  
MATERIALS FOR IMPROVED BONDING TO  
ADHESIVES**

Guntilla E. Gillberg-LaForce, Summit, N.J., assignor to Hoechst  
Celanese Corp., Somerville, N.J.

Filed Sep. 21, 1963, Ser. No. 534,229

Int. Cl.<sup>4</sup> B32B 27/02, 27/16, 27/36; D02G 3/48

U.S. Cl. 428—394

22 Claims

U.S. Cl. 428-394

1. A process for the treatment of a polyethylene terephthalate material to improve the adhesion thereof in subsequent rubber-reinforcing applications comprising the steps of:

- (1) activating the surface of the polyethylene terephthalate material with an electron beam from a suitable source to promote free radical formation on said material;
- (2) permitting said free radicals to form hydrophilic carboxyl and hydroxyl functional groups under ambient conditions; and
- (3) applying an adhesive composition which is reactive to carboxyl or hydroxyl functional groups to said material, said adhesive composition being selected from the group consisting of:
  - (i) multifunctional isocyanate compounds,
  - (ii) epoxy compounds,
  - (iii) mixtures of (i) and (ii), and
  - (iv) mixtures of (i), (ii) or (iii) with a phenolic-aldehyde latex adhesive whereby the material is suitable for reinforcing rubber.

4,794,042

**MAGNETIC RECORDING MEDIUM**

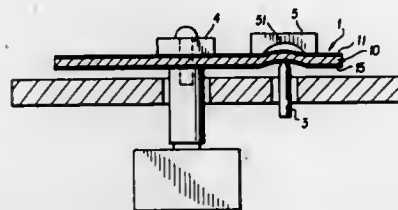
Yuichi Kubota; Keiji Koga; Kazunori Tamaraki; Tsutomu Aoyama, all of Nagano, and Akio Watanabe, Miyagi, all of Japan, assignors to TDK Corporation, Tokyo, Japan

Filed Oct. 9, 1986, Ser. No. 917,224

Claims priority, application Japan, Oct. 9, 1985, 60-225673; Oct. 11, 1985, 60-226087; Oct. 12, 1985, 60-227267

The portion of the term of this patent subsequent to Dec. 30, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> G11B 5/70



1. A magnetic recording medium comprising a substrate and a magnetic layer formed thereon and containing a particulate magnetic material and a radiation curable binder, characterized in that

the particulate magnetic material comprises (a) magnetic particles having iron carbide of the formula:  $Fe_nC$  where  $n$  is a number of at least 2 at least on the surface thereof and (b) oxide particles, and the particulate magnetic material contains 5 to 90% by weight of iron carbide.

4,794,043

**CARBON PRODUCT COMPRISING CARBONACEOUS MATERIALS JOINED TOGETHER, SAID CARBON PRODUCT FOR ELECTRODE SUBSTRATE OF FUEL CELLS AND PROCESS FOR PRODUCTION THEREOF**

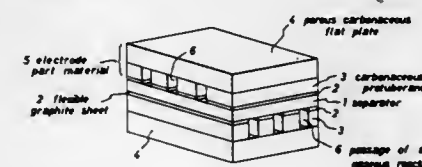
Hisatsugu Kaji, Iwaki, and Kuniyuki Saitoh, Abiko, both of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 22, 1986, Ser. No. 854,607

Claims priority, application Japan, Apr. 30, 1985, 60-93494; Apr. 30, 1985, 60-93495

Int. Cl.<sup>4</sup> B32B 9/00, 3/10, 3/20; H01M 4/96

U.S. Cl. 422-408 17 Claims



1. A carbon product comprising carbonaceous materials and flexible graphite sheets interposed between said carbonaceous materials, wherein (1) said carbonaceous materials and said flexible graphite sheet are joined together, (2) the thus joined materials have been integrated by calcination as a unitary carbon body in an inert atmosphere, (3) the joining surface of at least one of said carbonaceous materials comprises both joining parts and non-joining parts which have an optional shape and are uniformly arranged on the joining surface, (4) the ratio of the total area of said non-joining parts in said joining surface of said carbonaceous material to the total area of said joining surface is from 0.20 to 0.80, and (5) the value of the difference of the rate (%) of linear expansion and contraction at calcination between two said carbonaceous materials to be subjected to mutual joining via said flexible graphite sheet is not more than 3%.

4,794,044

**METHOD FOR SURFACE TREATMENT**

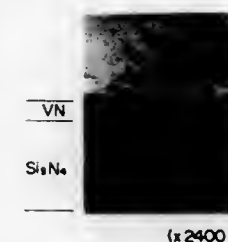
Tohru Arai, and Hatsuhiro Oikawa, both of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kogyosha, Japan

Filed Dec. 8, 1967, Ser. No. 130,902

Claims priority, application Japan, Dec. 10, 1966, 61-294282

Int. Cl.<sup>7</sup> C04B 41/81

U.S. Cl. 427—431 21 Claims



1. A method for surface treatment which comprises the steps of:

preparing a molten salt bath by heating and melting a bath agent comprising boron oxide and/or borate and at least one member selected from the group consisting of a metallic element and a substance containing at least one metallic element, the metallic element being a Group IVA element, a Group Va element, a Group VIA element, calcium, manganese, boron, aluminum, silicon, magnesium, or a rare earth element, and

immersing an article made of silicon nitride, silicon carbide or sialon in said molten salt bath,

thereby forming a surface layer of a carbide or nitride of said

metallic element or of boron nitride on the surface of said article.

4,794,045

**LANGMUIR-BLODGETT FILMS USABLE IN  
NONLINEAR OPTICS**

Philippe Robin, Le Picault Robinson; Evelynne Chastaign, Massy;  
Jean P. Pocholle, Arpajon, and Jean Raffy, Croune, all of  
France, assignors to Thomson-CSF, Paris, France

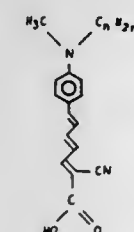
Filed Jan. 7, 1968, Ser. No. 141,503

Claims priority, application France, Jan. 9, 1967, 87 00164

Int. Cl.<sup>4</sup> B05D 1/20

U.S. Cl. 422—411.1

6 Claims



1. A Langmuir-Blodgett film comprising at least one layer of amphiphilic molecules deposited on a substrate, wherein these molecules comprise, first molecules being active in nonlinear optics and second molecules capable of remaining inert or being active in nonlinear optics, said first and second molecules being mixed in specified proportions to obtain a film capable of giving out, perpendicular to the substrate, an optic wave which is a second harmonic with respect to an exciting wave.

4,794,046

**IMPLANT MATERIAL WITH CONTINUOUS AND TWO-DIMENSIONAL PORES AND PROCESS FOR PRODUCING THE SAME**

Hiroshi Nagai, Chofu, Japan, assignor to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 16, 1987, Ser. No. 62,660

Claims priority, application Japan, Jun. 16, 1986, 61-139846

Int. Cl.<sup>4</sup> C04B 38/00, 38/06; B32B 3/26

U.S. Cl. 428—312.2 8 Claims

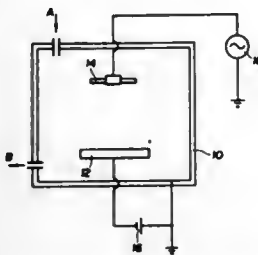
1. A ceramic material of hydroxyapatite having continuous and two-dimensional pores therein, wherein said ceramic material has continuous passages in the two-dimensional directions.

4,794,047  
METHOD OF MANUFACTURING MAGNETIC  
RECORDING MEDIUM  
Susumu Funamoto, Odawara, Japan, assignor to Hitachi, Ltd.,  
Tokyo, Japan  
Filed Jul. 20, 1987, Ser. No. 75,524  
Claims priority, application Japan, Jul. 21, 1986, 61-169911  
Int. Cl.<sup>4</sup> G11B 5/64, 5/72

U.S. Cl. 428-408 11 Claims  
1. A method of manufacturing a magnetic recording medium, comprising a step of forming on a substrate a ferromagnetic metal layer containing Co metal or Co-alloy by sputtering or evaporation, said step comprising:  
a first process in which said ferromagnetic metal layer is formed on said substrate to a predetermined thickness without applying a bias voltage to said substrate, and  
a second process contiguous to said first process and in



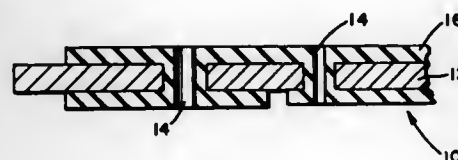
which another ferromagnetic metal layer is formed by applying a bias voltage to said substrate.



3. A magnetic recording medium manufactured by the method according to claim 1.

**4,794,048**  
**CERAMIC COATED METAL SUBSTRATES FOR ELECTRONIC APPLICATIONS**  
M. Reza Oboodi, Livingston, and Daniel C. Blazek, Annandale, both of N.J., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed May 4, 1987, Ser. No. 45,930  
Int. Cl.<sup>4</sup> B32B 15/00, 9/00; C03C 10/14, 3/23  
U.S. Cl. 428—432 48 Claims

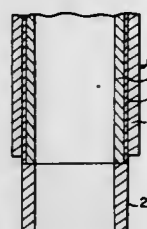


1. A glass/ceramic coated substrate having a metal core and having on at least a portion of the surface of (on an oxide basis)  
(a) from about 8 to about 26% by weight of magnesium oxide (MgO); based on the total weight of the coating;  
(b) from about 10 to about 49% by weight of aluminum oxide (Al<sub>2</sub>O<sub>3</sub>); based on the total weight of the coating;  
(c) from about 42 to about 68% by weight of silicon oxide (SiO<sub>2</sub>); based on the total weight of the coating and  
(d) from about 3 to about 15% by weight, based on the total weight of MgO, Al<sub>2</sub>O<sub>3</sub> and SiO<sub>2</sub> in the coating of one or more alkali metal or alkaline earth metal oxides, and a boron oxide.

**4,794,049**  
**ELECTRODE SUPPORTING CONDUIT TUBE FOR ELECTRICAL HEATING OR UNDERGROUND HYDROCARBON RESOURCES**  
Ichiro Takahashi, Suita; Goro Okamoto, Itami, and Kazuo Okahashi, Toyonaka, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 837,662, Mar. 7, 1986, abandoned, which is a continuation of Ser. No. 580,428, Feb. 15, 1984, abandoned. This application Jan. 14, 1987, Ser. No. 6,346  
Claims priority, application Japan, Feb. 16, 1983, 58-25595; Jan. 17, 1983, 58-109650  
Int. Cl.<sup>4</sup> B32B 15/08; F16L 9/14  
U.S. Cl. 428—460 3 Claims

1. An electrode supporting conduit tube for electrical heating above 300° of underground hydrocarbon resources, which comprises: in order a metal conduit tube formed with an advance on the outer peripheral surface by the melt-plating method and where the outer surface is made from the group of metal or metal alloys containing nickel, nickel/aluminum alloy, nickel/chromium alloy, silica/aluminum alloy or silicon;

and an insulative covering adhered on and around the outer peripheral surface of said metal conduit tube, said insulative covering being a laminated body of polyether/ether/ketone resin film having a thickness in a range from 0.01 mm to 0.20 mm, and glass fiber having 90% or greater silica content, which is obtained by confining both polyether/ether/ketone



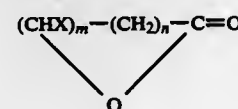
film resin and glass fiber wound on and around said metal conduit tube within a metal mold and subjecting said laminated materials to shaping under heat and pressure at a heating temperature of from 350° C. to 450° C. and a pressure of from 10 to 200 kg/cm<sup>2</sup> while confining said laminations within said mold.

**4,794,050**  
**RESISTANCE WELDING OF GALVANIZED STEEL**  
Donald H. Campbell, Niagara-on-the-Lake, Canada, and Gerald L. Everts, Tonawanda, N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.  
Filed Jan. 8, 1987, Ser. No. 59,298  
Int. Cl.<sup>4</sup> B22F 7/04 11 Claims

1. An article having improved resistance welding characteristics, said article consisting essentially of:  
(a) a steel substrate,  
(b) a zinc metal or zinc alloy base layer applied directly to the steel substrate by contacting the substrate with molten zinc or a zinc alloy, or by electrodepositing the zinc or zinc alloy onto the substrate, and  
(c) a coating applied to said base layer, said coating comprising a binder and a pigment, said pigment consisting essentially of a least one metal phosphide selected from the group consisting of phosphides of iron, nickel, cobalt, tin, copper, titanium, manganese, molybdenum, tungsten, vanadium, tantalum and mixtures thereof.

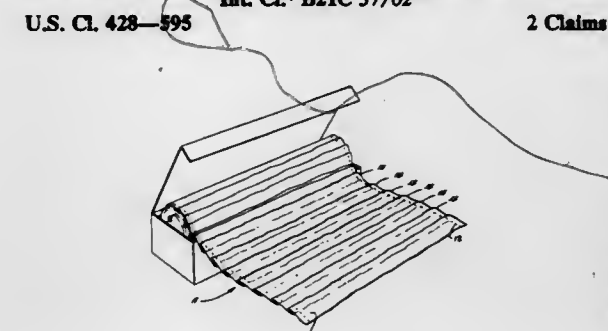
**4,794,051**  
**LOW SHRINKAGE PHENOLIC MOLDING COMPOSITIONS**  
Manoj K. Gupta, Williamsville, N.Y., assignor to Occidental Chemical Corporation, Niagara Falls, N.Y.  
Filed May 11, 1987, Ser. No. 48,209  
Int. Cl.<sup>4</sup> C08K 7/16, 3/34; C08L 61/10 14 Claims

1. A molding composition comprising:  
(a) a resole phenolic resin,  
(b) a curing agent selected from the group consisting of alkaline earth metal oxides, alkaline earth metal hydroxides and silanes,  
(c) a filler in an amount of about 5 to about 75 percent by weight of said molding composition, and  
(d) a lactone of the formula



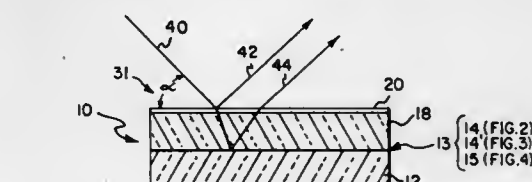
wherein x is halogen, m is 0 or 1, n is 2 to 4 and m+n is 2 to 5.

**4,794,052**  
**DISPOSABLE BROILER PAN AND MATERIAL FOR FORMING SAME**  
Marlene C. Morrison, 463 Holly Rd., Blue Bell, Pa. 19422  
Continuation-in-part of Ser. No. 688,792, Jan. 4, 1985, abandoned. This application Feb. 23, 1988, Ser. No. 159,205  
Int. Cl.<sup>4</sup> B21C 37/02 2 Claims



1. A flexible foil product formable into a disposable broiler pan having a series of spaced, parallel, food-supporting ridges extending upwardly from a floor surface of the pan comprising:  
a flexible sheet of uniformly thin metal foil, the sheet having top and bottom faces, and first and second side edges extending parallel to each other;  
spaced parallel pleats formed in the sheet and extending from one of said side edges to the other, each pleat being folded over throughout substantially its entire length so that its thickness is approximately three times the foil thickness and so that the sheet is freely manually bendable along lines parallel to and spaced from said first and second edges from a condition in which the entire sheet is substantially flat to a condition in which the portions of the sheet adjacent to the first and second side edges are bent upwardly to form side walls, and the portion of the pleats extending between side walls being manually unfoldable from the folded-over condition to form said food-supporting ridges.

**4,794,053**  
**OPTICAL ELEMENTS HAVING BURIED LAYERS**  
Randal W. Tustison, Lexington, Mass., assignor to Raytheon Company, Lexington, Mass.  
Filed Jul. 1, 1985, Ser. No. 750,943  
Int. Cl.<sup>4</sup> B37B 15/04 19 Claims



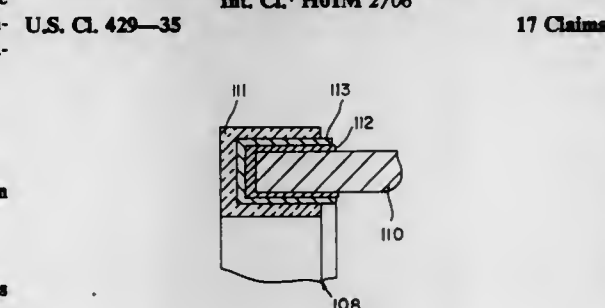
1. An article comprising:  
a base comprising an optically transmissive material;  
an intermediate region disposed over at least a portion of the base comprising a layer of a refractory type of material;  
an overcoat having a physical thickness greater than about 25 microns disposed over the intermediate layer comprising a dense optically transmissive material having an

actual density substantially equal to 100% of the theoretical density of said material.

**4,794,054**  
**PLATINUM ALLOY ELECTROCATALYST AND ACID-ELECTROLYTE FUEL CELL ELECTRODE USING THE SAME**  
Takaaki Ito, Ichikawa; Shigemitsu Matsuzawa, Edogawa, and Katsuaki Kato, Ichikawa, all of Japan, assignors to Nippon Engelhard Ltd., Tokyo, Japan  
Continuation of Ser. No. 855,736, Apr. 25, 1986, abandoned. This application Jan. 24, 1987, Ser. No. 67,423  
Int. Cl.<sup>4</sup> H01M 4/92 20 Claims

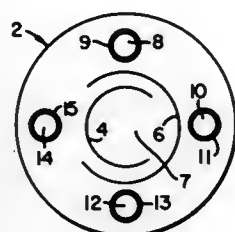
1. In a fuel cell which includes an anode, a cathode and an electrolyte between the anode and the cathode, the improvement wherein said cathode comprises a conductive carrier and an electrocatalyst supported in dispersed form on said conductive carrier, said electrocatalyst being composed of a platinum-iron-cobalt alloy that contains 40 to 80 atomic percent platinum, 10 to 40 atomic percent iron and 10 to 40 atomic percent cobalt, said platinum-iron-cobalt alloy having a face centered cubic lattice structure of lattice constant d in the range of 3.76 Å to 3.86 Å.

**4,794,055**  
**GAS MANIFOLD FOR A FUEL CELL**  
Mitsuo Matsumura, and Hiroaki Urushibeta, both of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan  
Filed Apr. 1, 1987, Ser. No. 32,540  
Claims priority, application Japan, Apr. 2, 1986, 61-78853  
Int. Cl.<sup>4</sup> H01M 2/08 17 Claims



1. A fuel cell system comprising a gas manifold provided on the side of a fuel cell stack, said gas manifold comprising:  
a casing;  
a corrosion protection layer provided at contact areas between said casing and the side of said fuel cell stack and portions adjacent thereto for protecting said casing from corrosion;  
an insulating layer composed of an inorganic insulating material having stability towards electrolytes provided over the outer surface of said corrosion protection layer; and  
a thermal stress relief layer provided between said insulating layer and said corrosion protection layer for relieving the thermal stress arising between said casing and said insulating layer under high temperature conditions.

**4,794,056**  
**COILED ELECTRODE ASSEMBLY CELL**  
 CONSTRUCTION WITH TELESCOPIC TERMINAL TAB  
 Christopher S. Pedicini, Brunswick, Ohio, assignor to Eveready Battery Company, St. Louis, Mo.  
 Filed Sep. 11, 1987, Ser. No. 97,551  
 Int. Cl.<sup>4</sup> H01M 4/00, 4/02  
 U.S. Cl. 429-94 23 Claims

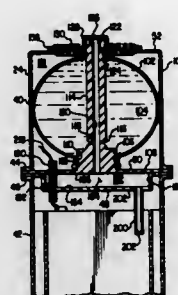


1. A galvanic cell comprising a coiled electrode assembly contained in a housing; said coiled electrode assembly comprising a first electrode strip superimposed on and overlapping a second electrode strip and a separator disposed between said first electrode strip and said second electrode strip; said first electrode strip, said second electrode strip and said separator are wound into a coiled electrode assembly such that said first electrode strip is electronically insulated from said second electrode strip by said separator and the edge of at least one electrode strip protrudes from the coiled electrode assembly at one end and electronically contacts a conductive terminal at a first portion of the housing, and the second electrode strip electronically contacts a conductive terminal at a second portion of the housing which is insulated relative to said first portion; the improvement wherein a conductive tab has at least one slit disposed substantially about the central area of the tab to enable the central area to flex above or below the plane of the tab to accommodate bulging of the cell, without effectively distorting the peripheral area of the tab, said tab being in electronic contact with the protruding edge of the electrode strip, and a conductive portion of the housing is electronically connected to said tab thereby adapting said conductive portion as the conductive terminal for said electrode strip having its edge protruding from the coiled electrode assembly.

**4,794,057**  
**SEPARATOR FOR ELECTROCHEMICAL CELLS**  
 Rowland A. Griffin, Bedford, Mass., assignor to Duracell Inc., Bethel, Conn.  
 Filed Jul. 17, 1987, Ser. No. 74,590  
 Int. Cl.<sup>4</sup> H01M 4/00, 2/16  
 U.S. Cl. 429-94 5 Claims

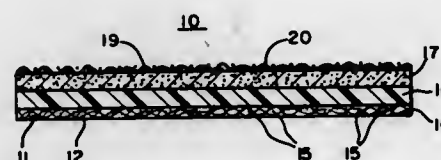
1. An electrochemical cell comprising a sealed casing; an anode, a cathode, a separator positioned between said anode and said cathode, and a non-aqueous electrolyte sealed in said casing; a pair of electrical terminals on said casing; means for electrically isolating the electrical terminals from each other; and means for electrically connecting the anode to one terminal and the cathode to the other terminal; wherein the anode is comprised of lithium foil, the cathode is comprised of manganese dioxide, and said separator consists essentially of a microporous polypropylene film having a thickness of about 1.5 mils and internal voids of about 60% by volume; wherein said anode, cathode, and separator are spirally wound together in a jelly roll configuration.

**4,794,058**  
**RESERVE BATTERY**  
 George H. Thiess, Dallas, Tex., assignor to Power Cell, Inc., Dallas, Tex.  
 Filed Jul. 10, 1987, Ser. No. 72,112  
 Int. Cl.<sup>4</sup> H01M 6/32  
 U.S. Cl. 429-116 9 Claims



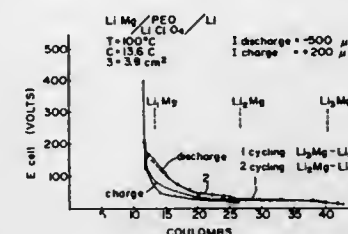
1. A reserve battery, comprising:  
 a battery cell compartment defined by housing walls surrounding a plurality of battery cells;  
 an electrolyte reservoir containing pressurized electrolyte fluid;  
 an elongate member formed of rigid material having interior walls defining a closed orifice between the battery cell compartment and the electrolyte fluid reservoir; and  
 the elongate member including a groove adjacent the orifice to define a frangible portion such that upon angular displacement of the elongate member the elongate member is severed at the frangible portion to open the orifice and allow pressurized electrolyte fluid to be conveyed through the orifice to the battery cell compartment.

**4,794,059**  
**LIGHTWEIGHT SOLID STATE RECHARGEABLE BATTERIES**  
 Henry F. Hope, and Stephen F. Hope, both c/o Hope Industries, Inc., 5701 Moreland Rd., Willow Grove, Pa. 19090  
 Filed Feb. 29, 1988, Ser. No. 161,724  
 Int. Cl.<sup>4</sup> H01M 6/18  
 U.S. Cl. 429-192 10 Claims



1. In a solid state rechargeable battery of the alkaline or alkaline earth metal type which includes an anode, a polymer dielectric layer, a cathode and having current collection and carrying base means which comprises  
 a web of strands of carbon fibres or carbon graphite fibers and  
 a coating of metal on said web.

**4,794,060**  
**DENSE ANODES OF LITHIUM ALLOYS FOR ALL SOLID BATTERIES**  
 André Belanger, and Michel Robitaille, both of Sainte-Julie, Canada, assignors to Hydro-Quebec and Societe Nationale Elf Aquitaine, both of Quebec, Canada  
 Division of Ser. No. 714,394, Mar. 21, 1985, Pat. No. 4,652,506.  
 This application Dec. 4, 1986, Ser. No. 937,883  
 Claims priority, application Canada, Nov. 4, 1984, 451783  
 Int. Cl.<sup>4</sup> H01M 4/02  
 U.S. Cl. 429-209 15 Claims



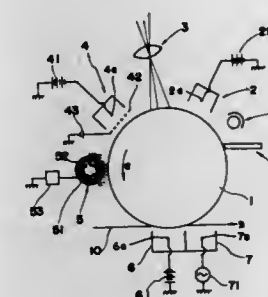
1. Dense anode for use in an all solid battery and obtained after charging a battery incorporating said anode comprising a compact metallic foil alloyed with an alkali metal, having a rechargeability on at least 20 cycles and whose thickness varies between 5 μ and 100 μ.

**4,794,061**  
**DEVICE FOR ALIGNING A PHOTOMASK ONTO A PRINTED WIRING BOARD**  
 John V. Cronin, Newport Beach, Calif., assignor to M&T Chemicals Inc., Woodbridge, N.J.  
 Continuation of Ser. No. 791,256, Oct. 25, 1985, Pat. No. 4,696,284. This application Apr. 22, 1987, Ser. No. 41,271  
 Int. Cl.<sup>4</sup> G03F 9/00; G03C 5/00; G03B 27/04, 27/30  
 U.S. Cl. 430-5 5 Claims



1. A process for applying a flexible phototool to a light sensitive receiving element comprising the following steps:  
 positioning the phototool in alignment with and off contact from the light sensitive receiving element;  
 applying the flexible phototool to the light sensitive receiving element by means of a roller;  
 maintaining the flexible phototool under tension while it is being applied to the light sensitive receiving element by slidably securing said flexible phototool by suction by means of vacuum restraining means separate from said roller, said vacuum restraining means positioned adjacent said roller and between said roller and a free end of said phototool when the roller applies the flexible phototool to the light sensitive receiving element.

**4,794,062**  
**METHOD FOR THE FORMATION OF OUTLINE IMAGES CORRESPONDING TO THE PERIPHERAL OUTLINES OF DOCUMENT'S IMAGES**  
 Tateki Oka, Toyokawa; Naoki Toyoshi, Toyokashi, and Tomoaki Yokoyama, Toyokawa, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan  
 Filed Feb. 19, 1987, Ser. No. 16,716  
 Claims priority, application Japan, Feb. 21, 1986, 61-37830; May 2, 1986, 61-102587; Sep. 19, 1986, 61-223247  
 Int. Cl.<sup>4</sup> G03G 13/02, 21/00  
 U.S. Cl. 430-31 8 Claims



1. A method for forming by photocopying an outline of an image, said method comprising:  
 a first step of charging an electrostatic latent image bearing member to a predetermined surface potential and charge polarity;  
 a second step of irradiating the charged electrostatic latent image bearing member to thereby form a positive electrostatic image thereon having an image portion with a surface potential corresponding to said predetermined surface potential and a non-image portion having a substantially lower surface potential;  
 a third step of recharging the thus irradiated electrostatic latent image bearing member with a scorotron charger for lowering the potential of the image portion other than an outline portion around the edge of the image portion for giving the outline portion a potential higher than the potential of the remainder of the image portion; and  
 a fourth step of developing the electrostatic latent image formed in said third step with a normal development by using a toner charged to a polarity opposite to the first step of charging and a voltage higher than the potential of the remainder of the image portion.

**4,794,063**  
**PHOTORECEPTOR FOR ELECTROPHOTOGRAPHY, METHOD FOR THE PRODUCTION THEREOF AND METHOD OF THE IMAGE FORMATION THEREBY**  
 Satoshi Haneda, Hachioji, Japan, assignor to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan  
 Filed Oct. 20, 1986, Ser. No. 921,600  
 Claims priority, application Japan, Oct. 23, 1985, 60-238489; Nov. 8, 1985, 60-251483; Nov. 8, 1985, 60-251484  
 Int. Cl.<sup>4</sup> G03G 5/12; G03F 9/00  
 U.S. Cl. 430-42 28 Claims

1. A photoreceptor for electrophotography comprising an electrically insulating layer operable to be subjected to a uniform electric charge and an imagewise exposure thereon, said electrically insulating layer comprising a complex color separation filter layer having plural kinds of color separation filters being juxtaposed in a predetermined arrangement, each of said color separation filters being formed by ink containing a setting transparent resin having a resistivity being not less than 10<sup>8</sup> ohm-cm and



coloring agents being in the amount of 2 to 30% by weight; a photoconductive layer having two opposed sides, said electrically insulating layer being superposed on one side thereof so that said photoconductive layer is imagewise exposed through said insulating layer when said insulating layer is imagewise exposed, and an electrically conductive layer being superposed on the other side of said photoconductive layer.

#### 4,794,064 AMORPHOUS SILICON ELECTROPHOTOGRAPHIC RECEPTOR HAVING CONTROLLED CARBON AND BORON CONTENTS

Toshinori Yamazaki, Tatsuo Nakanishi, and Hiroyuki Nomori, all of Hachioji, Japan, assigns to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan  
Continuation of Ser. No. 799,029, Nov. 18, 1985, abandoned, which is a continuation-in-part of Ser. No. 611,157, May 17, 1984, abandoned. This application Feb. 5, 1987, Ser. No. 11,375  
Claims priority, application Japan, May 18, 1983, 58-86893; May 18, 1983, 58-86894

Int. Cl. G03G 5/085  
U.S. Cl. 430—58 16 Claims  
1. An electrophotographic photoreceptor comprising  
a photosensitive layer comprising at least one compound selected from the group consisting of hydrogenated amorphous silicon and fluorinated amorphous silicon,  
a surface modifying layer formed on the upper surface of said photosensitive layer and comprising at least one compound selected from the group consisting of hydrogenated amorphous silicon carbide, fluorinated amorphous silicon carbide, hydrogenated and fluorinated amorphous silicon carbide, hydrogenated amorphous silicon nitride, fluorinated amorphous silicon nitride, and hydrogenated and fluorinated amorphous silicon nitride,  
a charge transport layer formed on the lower surface of said photosensitive layer comprising at least one compound selected from the group consisting of hydrogenated amorphous silicon carbide, fluorinated amorphous silicon carbide, and hydrogenated and fluorinated amorphous silicon carbide, the carbon content of said charge transport layer is within the range of 5 to 30 atomic % and said charge transport layer is doped with boron and is formed in a glow discharge decomposition process whereby boron atoms are doped at a flow rate ratio of  $[B_2H_6]/[SiH_4] = 1-100$  ppm, and the charge blocking layer is formed into a p-type in glow discharge decomposition process at a flow rate ratio of  $[B_2H_6]/[SiH_4] = 200-2000$  ppm,  
a charge blocking layer formed on the lower surface of said charge transport layer comprising at least one compound selected from the group consisting of hydrogenated amorphous silicon carbide, fluorinated amorphous silicon carbide, and hydrogenated and fluorinated amorphous silicon carbide, doped with a larger amount of at least one element from group III of the periodic table than the amount of boron atoms in said charge transport layer, and a substrate.

#### 4,794,065 TONER PARTICLES FOR ELECTROPHOTOGRAPHIC COPYING AND PROCESSES FOR THEIR PREPARATION

Bertil Hedvall, Sundsvall; Gunnar Mattson, Njurunda; Sten Porrvik, and Göran Sundström, both of Sundsvall, all of Sweden, assigns to Casco Nobel AB, Stockholm, Sweden  
PCT No. PCT/SE86/00421, § 371 Date Apr. 20, 1987, § 102(e)  
Date Apr. 20, 1987, PCT Pub. No. WO87/01828, PCT Pub. Date Mar. 26, 1987  
PCT Filed Sep. 19, 1986, Ser. No. 46,041  
Claims priority, application Sweden, Sep. 20, 1985, 8504372; Nov. 13, 1985, 8505355  
Int. Cl. G03G 9/00, 13/06

U.S. Cl. 430—111 22 Claims  
1. A toner particle having multiple protuberances on its exterior surface and which is suitable for electrophotographic copying or electrostatic printing which comprises  
(a) an internally pigmented thermoplastic spherical base particle  
(1) that has been prepared by suspension polymerization, and  
(2) that has a mean diameter within the range of 2 to 25  $\mu$ m (b) adhering to the surface of the base particle are finely-grained latex polymerizable particles  
(1) that have been prepared by emulsion or micro-suspension polymerization,  
(2) that have a mean diameter which is between 0.05 and 33 percent of the mean diameter of said base particle,  
(3) that cover 10 to 91 percent of the exterior surface of said base particles, and  
(4) that form the protuberances on the exterior of said base particle.

#### 4,794,066 PROCESS FOR PREPARATION OF LIQUID ELECTROSTATIC DEVELOPER

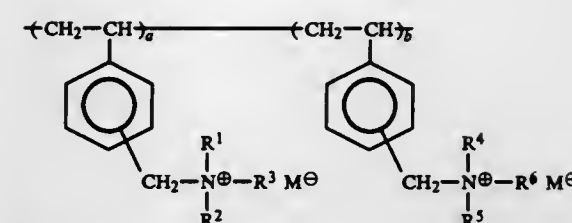
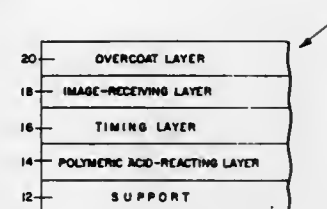
Arthur J. Taggi, Hockessin, and Tarence J. Trout, Wilmington, both of Del., assigns to E. I. Du Pont de Nemours and Company, Wilmington, Del.  
Filed Nov. 4, 1987, Ser. No. 116,657  
Int. Cl. G03G 9/12

U.S. Cl. 430—137 31 Claims  
1. A process for preparing an improved liquid electrostatic developer containing electrostatic toner particles comprising:  
(a) mixing intimately a water-wet presscake pigment with at least one water insoluble vehicle in the absence of a solvent for the water insoluble vehicle until water separates from the mixture leaving the pigment dispersed in the water insoluble vehicle;  
(b) removing substantially all the water;  
(c) dispersing at an elevated temperature in a vessel under high shear the pigment dispersion, a thermoplastic resin, a nonpolar liquid having a Kauri-butanol value of less than 30, the temperature being maintained to plasticize and liquify the resin and below that at which the nonpolar liquid degrades and any component decomposes;  
(d) cooling the dispersion to form resin toner particles having pigment dispersed therein.

#### 4,794,067 COPOLYMERIC MORDANTS AND PHOTOGRAPHIC PRODUCTS AND PROCESSES CONTAINING SAME

J. Michael Grashoff, Hudson, and Myron S. Simon, West Newton, both of Mass., assigns to Polaroid Corporation, Patent Dept., Cambridge, Mass.  
Filed Nov. 23, 1987, Ser. No. 123,884  
Int. Cl. G03C 5/54

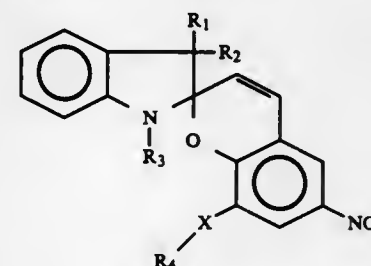
U.S. Cl. 430—213 24 Claims  
1. An image-receiving element which comprises a support carrying an image-receiving layer comprising a copolymeric mordant having recurring units according to the formula



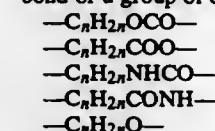
wherein each of  $R^1$ ,  $R^2$  and  $R^3$  is independently alkyl of from 1 to 4 carbon atoms; each of  $R^4$ ,  $R^5$  and  $R^6$  is independently alkyl of from 1 to 18 carbon atoms and the total number of carbon atoms in  $R^4$ ,  $R^5$  and  $R^6$  is from 13 to 20; each  $M^-$  is an anion; and each of a and b is the molar proportion of each of the respective repeating units.

4,794,068  
OPTICAL RECORDING MEDIUM  
Jinsai Miyazaki, Hirakata; Eiji Ando, Katano; Kimiaki Yoshino, Yawata, and Kazuhisa Morimoto, Settsu, all of Japan, assigns to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
Continuation of Ser. No. 790,969, Oct. 24, 1985, abandoned.  
This application Aug. 31, 1987, Ser. No. 94,032  
Claims priority, application Japan, Oct. 25, 1984, 59-224413; Oct. 25, 1984, 59-224415  
Int. Cl. G03C 1/733

U.S. Cl. 430—345 2 Claims  
1. An optical recording medium capable of information writing and readout by means of a laser beam comprising a recording layer formed thereon, said recording layer containing a J-aggregate, or a preaggregate thereof, of a spiropyran photochromic dye of the formula

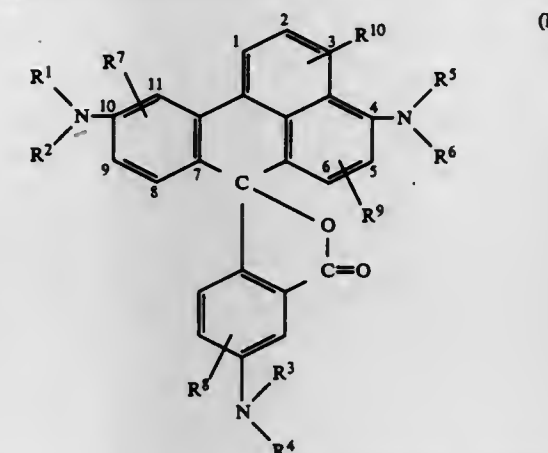


wherein each of  $R_1$  and  $R_2$  is alkyl having at least one carbon atom,  $R_3$  is alkyl having at least 10 carbon atoms, X is a single bond or a group of one of the following formulas



wherein  $n \geq 0$  and  $R_4$  is an alkyl group having at least one carbon atom.

4,794,069  
SPIROBENZANTHRACENE PHTHALIDE  
COMPOUNDS, PROCESSES FOR PREPARING SAME  
AND COLOR FORMING RECORDING MATERIALS  
CONTAINING SAID COMPOUNDS  
Yutaka Ohnishi, Urawa; Shinji Yoshinaka, Iwatsuki; Toshiyuki Tanaka, Inagi; Minoru Koguchi, Ageo; Takeo Obitsu, Omiya, all of Japan, assigns to Shin Nisso Kako Co., Ltd., Japan  
Filed Jul. 14, 1987, Ser. No. 72,911  
Claims priority, application Japan, Jul. 15, 1986, 61-164591  
Int. Cl. G03C 1/733, 5/16; C07D 307/94  
U.S. Cl. 430—338 19 Claims  
1. A spirobenzanthracene phthalide compound of the formula (I)



wherein  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $R^5$ , and  $R^6$  independently represent  $C_1-C_8$  alkyl, or  $C_1-C_8$  alkyl substituted by  $C_1-C_3$  alkoxy;  $C_5$  of  $C_6$  cycloalkyl; unsubstituted aralkyl or aryl, or aralkyl or aryl substituted by  $C_1-C_3$  alkoxy or  $C_1-C_3$  alkoxy, and  $R^1$  and  $R^2$ ,  $R^3$ , and  $R^4$ , and  $R^5$  and  $R^6$  taken together with the nitrogen atom to which they are attached, form a pyrrolidino, piperidino or morpholino ring, and  $R^7$ ,  $R^8$ ,  $R^9$  and  $R^{10}$  independently represent hydrogen,  $C_1-C_3$  alkyl,  $C_1-C_3$  alkoxy or trifluoromethyl.

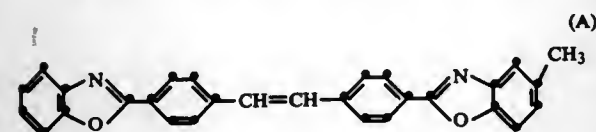
4,794,070  
AUTOMATICALLY PROCESSIBLE PHOTOGRAPHIC  
ELEMENT COMPRISING A NON-SILVER HALIDE  
LAYER CONTAINING BROMIDE  
James B. Phillip, Jr.; Peter D. Sills, and James E. Lindquist, all of St. Paul, Minn., assigns to Minnesota Mining and Manufacturing Company, St. Paul, Minn.  
Filed Jun. 9, 1987, Ser. No. 59,931  
Int. Cl. G03C 1/46, 1/06

U.S. Cl. 430—502 16 Claims  
1. A photographic element comprising a base layer and at least one silver halide photographic emulsion on one side of said base, said element characterized by having at least one layer thereon which is free of silver halide and contains at least 0.1 g/m<sup>3</sup> of bromide ion as an aqueous alkaline soluble bromide salt wherein said salt is selected from the group consisting of KBr, NaBr, MgBr<sub>2</sub>, CaBr<sub>2</sub>, and NH<sub>4</sub>Br.

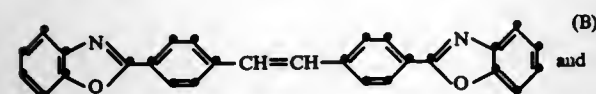
4,794,071  
OPTICALLY BRIGHTENED PHOTOGRAPHIC SILVER  
HALIDE ELEMENT WITH A POLYOLEFIN PAPER  
COATED SUPPORT  
Donna L. Tomko, Penfield, and Kenneth Harbison, Rochester, both of N.Y., assigns to Eastman Kodak Company, Rochester, N.Y.  
Filed Mar. 23, 1987, Ser. No. 29,020  
Int. Cl. G03C 1/86

U.S. Cl. 430—538 7 Claims  
1. A photographic element comprising a support and at least one silver halide emulsion layer, said support comprising a paper base material having thereon at least one polyolefin

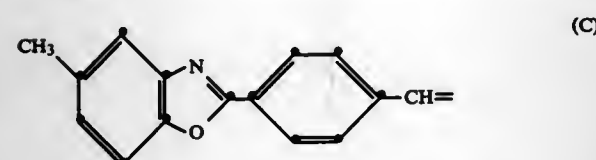
coating containing at least one white pigment present in an amount of 3-35% by weight based on the total weight of said polyolefin coating, said polyolefin coating comprising a mixture of optical brighteners, said mixture consisting of 15-90% by weight based on the total weight of said mixture of



5-70% by weight based on the total weight of said mixture of



5-70% by weight based on the total weight of said mixture of



said mixture being present in an amount of 0.001 to 0.25 percent by weight based on the total weight of said polyolefin coating, and wherein said silver halide emulsion layer is on the same side of said paper base material as said polyolefin coating containing said mixture of optical brighteners.

4,794,072

## PHOSPHATE ESTER STABILIZERS

John D. Goddard, Harrow, United Kingdom, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 24, 1988, Ser. No. 159,794

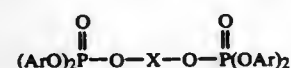
Claims priority, application United Kingdom, Mar. 18, 1987, 8706358

Int. Cl. G03C 1/34

U.S. Cl. 430-546

9 Claims

1. A photographic element comprising a support having thereon at least one silver halide emulsion layer having associated therewith a yellow or cyan dye-forming coupler and a dye stabilizer comprising a phosphate ester compound having the formula:



wherein

each Ar independently represents a substituted or unsubstituted aryl group, and X is a linking group.

7. The element of claim 1 wherein the phosphate ester com-

pound is a liquid which is present as or as part of a coupler solvent.

4,794,073

## DETECTION OF NUCLEIC ACID HYBRIDS BY PROLONGED CHEMILUMINESCENCE

Nanibhushan Dattagupta, New Haven, Conn., and Anton H. Clemens, Elkhart, Ind., assignors to Molecular Diagnostics, Inc., West Haven, Conn.

Filed Jul. 10, 1985, Ser. No. 753,734

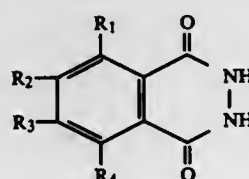
Int. Cl. C12Q 1/68; C07H 21/00

U.S. Cl. 435-6

5 Claims

1. A method for determining a particular single stranded polynucleotide sequence in a test medium, comprising the steps of:

- immobilizing on a solid support single stranded nucleic acids in the test medium;
- contacting the immobilized nucleic acids with a polynucleotide probe having a base sequence substantially complementary to the sequence to be determined and said contacting being under conditions favorable to hybridization between the probe and the sequence to be determined, wherein the probe is labeled with a chemiluminescence enhancer;
- separating the immobilized hybrids from the unhybridized probe;
- initiating a chemiluminescent reaction by contacting the separated, labeled, immobilized hybrids with an oxidant, a 2,3-dihydro-1,4-phthalazinedione chemiluminescence precursor, and a peroxidase enzyme;
- detecting the resulting light emission; and
- relating the amount of emitted light to the amount of the single stranded polynucleotide sequence, the chemiluminescence enhancer being selected from the group consisting of luciferin and dehydroluciferin and wherein the chemiluminescent precursor is a 2,3-dihydro-1,4-phthalazinedione of the formula



wherein R<sub>1</sub> is amino, and R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> are all H and wherein R<sub>1</sub> is amino and each of R<sub>2</sub>, R<sub>3</sub> and R<sub>4</sub> is unsubstituted C<sub>1</sub>-C<sub>6</sub>-alkyl or alkenyl or C<sub>1</sub>-C<sub>6</sub>-alkyl or alkenyl substituted by a substituent selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy, carboxy, nitro, cyano and thiol; hydroxyl; C<sub>1</sub>-C<sub>6</sub>-alkoxy; carboxyl or amino or R<sub>2</sub> is an amino or substituted amino and each of R<sub>1</sub>, R<sub>3</sub> and R<sub>4</sub> is H, unsubstituted C<sub>1</sub>-C<sub>6</sub>-alkyl or alkenyl or C<sub>1</sub>-C<sub>6</sub>-alkyl or alkenyl substituted by a substituent selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy, carboxy, nitro, cyano and thiol; hydroxyl; C<sub>1</sub>-C<sub>6</sub>-alkoxy or carboxyl, amino, or R<sub>1</sub> and R<sub>2</sub> together with the ring carbon atoms they are bonded to form a fused benz ring which is substituted with an amino group or a substituted amino group, said substituted amino group being substituted by a substituent selected from the group consisting of carboxy, C<sub>1</sub>-C<sub>10</sub> alkyl and C<sub>2</sub>-C<sub>10</sub> alkenyl, and each of R<sub>3</sub> and R<sub>4</sub> is H, unsubstituted C<sub>1</sub>-C<sub>6</sub>-alkyl or alkenyl or C<sub>1</sub>-C<sub>6</sub>-alkyl or alkenyl substituted by a substituent selected from the group consisting of chlorine, fluorine, bromine, iodine, hydroxy, carboxy, nitro, cyano and thiol; hydroxyl; C<sub>1</sub>-C<sub>6</sub>-alkoxy; carboxyl or amino, said hydroxyl being unsubstituted or substituted by a substituent selected

from the group consisting of C<sub>1</sub>-C<sub>10</sub> alkyl and C<sub>2</sub>-C<sub>10</sub> alkenyl.

4,794,074

## METHOD AND KIT FOR DETECTING HUMAN EXPOSURE TO GENOTOXIC AGENTS

Curtis C. Harris, Bethesda, Md., assignor to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.

Filed Sep. 23, 1985, Ser. No. 778,669

Int. Cl. C12Q 1/68; G01N 33/536, 33/557

U.S. Cl. 435-6

1 Claim

1. A method of detecting current or past human exposure to carcinogen comprising:

- obtaining a sample of human serum;
- detecting the presence of antibodies specific to a DNA-carcinogen adduct of 7β-8α-dihydroxy-(9α,10α-epoxy-7,8,9,10-tetrahydrobenzo-(a)-pyrene-deoxyribonucleic acid in said sample; and
- correlating the presence of said antibody to current or past exposure to said carcinogen.

4,794,075

## METHOD FOR LOCATING AND PURIFYING DNA CONTAINING SINGLE BASE MISMATCHES

John P. Ford, Tappan; David F. Novack, White Plains, and Nancy J. Canna, Hopewell Junction, all of N.Y., assignors to Lifecodes Corporation, Valhalla, N.Y.

Filed Aug. 29, 1985, Ser. No. 770,841

Int. Cl. C12Q 1/68; G01N 33/48

U.S. Cl. 435-6

38 Claims

1. A method for detecting guanine and thymine bases which are unpaired according to the Watson-Crick base pairing scheme in a double stranded polynucleotide molecule, each unpaired guanine or thymine base being immediately preceded by at least one base which is paired, and immediately followed by at least one base which is paired, said preceding and following paired bases being on the same polynucleotide sequence as the unpaired guanine or thymine base comprising:

- reacting the double stranded polynucleotide molecule with a reagent capable of altering the electrophoretic mobility of a double stranded polynucleotide molecule by derivatizing unpaired guanine and thymine bases in the double stranded polynucleotide molecule, wherein the double stranded polynucleotide molecule is not a covalently closed circular DNA;
  - observing the electrophoretic mobility of the double stranded polynucleotide molecule which has been reacted with the reagent; and
  - determining the presence or absence of an alteration in the electrophoretic mobility;
- whereby the presence or absence of unpaired guanine and thymine bases in the double stranded polynucleotide molecule is detected.

4,794,076

## SIMULTANEOUS EXTRACTION OF A LIGAND FROM A SAMPLE AND CAPTURE BY ANTI-LIGANDS THEREFOR IN LIGAND/ANTI-LIGAND ASSAYS

Henry W. Founds, Jr., Scarborough, and Roger N. Plasio, Yarmouth, both of Me., assignors to VXR, Inc., Portland, Me.

Filed Sep. 23, 1985, Ser. No. 779,212

Int. Cl. G01N 33/535, 33/545, 33/569

U.S. Cl. 435-7

28 Claims

1. A method for performing the assay of a ligand extracted from a sample of cells or cell fragments, the method comprising: (1) simultaneously carrying out the extraction of the ligand from the sample and reaction of the ligand with at least two anti-ligands therefor to form a detectable reaction product; and (2) detecting the reaction product.

15. The method of claim 1 wherein the ligand is Group A

Streptococcal antigen and the extraction reagent comprises nitrous acid or Streptomyces albus enzyme.

4,794,077

## DETECTION OF HUMAN CANCER CELLS WITH ANTIBODIES TO HUMAN CANCER NUCLEOLAR ANTIGEN P145

Harris Busch; James W. Freeman, and Rose K. Busch, all of Houston, Tex., assignors to Biosciences Corporation of Texas, Houston, Tex.

Filed Dec. 13, 1985, Ser. No. 808,913

Int. Cl. G01N 33/53; C12N 5/00; C07K 3/20

U.S. Cl. 435-7

16 Claims

1. A human cancer cell associated nucleolar antigen purified to homogeneity characterized by: solubility in 0.01M Tris HCl/0.2% deoxycholate pH 8.0; a molecular weight of about 145,000±5,000 daltons as measured by Western transfer analysis on polyacrylamide gel; localization in nucleoli of human cancer cells and absence from nucleoli of normal cells; and sedimentation with ribonucleoprotein particles within the nucleolus.

4,794,078

## ALPHA AMYLASE ASSAY

Henry E. Blair, Barnstable, Mass., assignor to Genzyme Corporation, Boston, Mass.

Division of Ser. No. 634,873, Jul. 26, 1984, Pat. No. 4,649,108.

This application Oct. 20, 1986, Ser. No. 921,601

The portion of the term of this patent subsequent to Mar. 10, 2004, has been disclaimed.

Int. Cl. C12Q 1/34, 1/40

U.S. Cl. 435-18

3 Claims

1. A reagent kit for an α-amylase assay comprising, in one or more containers, an oligosaccharide substrate for α-amylase, said substrate being characterized in that it contains at least 3 glucose units, its reducing-end glucose unit is bonded, via a bond cleavable by α- or β-glucosidase, to a label which exhibits an optically measurable change upon cleavage of said bond, and its non-reducing end glucose unit is bonded to a chemical blocking substituent which inhibits cleavage by exo-enzymes of the bond between said non-reducing end glucose unit and the adjacent glucose unit, a first serum-free exo-enzyme capable of cleaving the bond between said reducing-end glucose unit and said label, and a second exo-enzyme capable of cleaving a bond in said substrate between two said glucose units.

4,794,079

## DETERMINATION OF HYDROGEN PEROXIDE USING FLUOROGENIC DIHYDROQUINOLONE AND DIHYDROCUMARIN INDICATORS

Robert T. Buckler, Edwardsburg, Mich., and Robert P. Hatch, Elkhart, Ind., assignors to Miles Inc., Elkhart, Ind.

Division of Ser. No. 594,242, Mar. 27, 1984, Pat. No. 4,558,130.

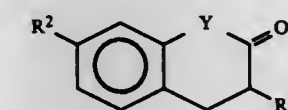
This application Sep. 30, 1985, Ser. No. 781,747

Int. Cl. C12Q 1/28

U.S. Cl. 435-28

20 Claims

1. A method for determining hydrogen peroxide comprising the steps of (a) contacting a test sample in the presence of a peroxidatively active substance with a compound of the formula:



wherein R<sup>1</sup> is hydrogen, alkyl, alkenyl, aryl, or an electron



withdrawing group; R<sup>2</sup> is hydroxyl or —NR<sup>3</sup>R<sup>4</sup> where R<sup>3</sup> and R<sup>4</sup>, which can be the same or different, are hydrogen, alkyl, alkenyl, or aryl; and Y is —O or —N—R<sup>5</sup> where R<sup>5</sup> is hydrogen or lower alkyl; and (b) measuring the fluorescence of a product resulting from oxidation of said compound by hydrogen peroxide.

#### 4,794,080 MICROBIAL CO-CULTURE PRODUCTION OF PROPIONIC ACID

Thomas D. Mays, Burtonsville, and Pamela N. Fornali, Annapolis, both of Md., assignors to IGENE Biotechnology, Inc., Columbia, Md.

Filed Apr. 16, 1984, Ser. No. 600,824  
Int. Cl.<sup>4</sup> C12P 39/00, 7/54, 7/52; C12N 1/20

U.S. Cl. 435—42

14 Claims

1. A simultaneously sequential anaerobic fermentation process for the in vitro production of propionic acid and acetic acid, which comprises:

- selecting a stable, obligatory two-component co-culture which maintains a relatively constant ratio of species populations over multiple passages, the co-culture consisting essentially of:
  - a first microorganism component which homofermentatively converts a hexose to a first metabolic product consisting essentially of lactic acid; and
  - a second microorganism component from the genus *Veillonella* which is metabolically incapable of assimilating said hexose and which converts the lactic acid metabolic product of the first microorganism to a second metabolic product consisting essentially of propionic acid and acetic acid;
- inoculating said co-culture into an assimilable nutrient growth feedstock containing a metabolizable source of said hexose;
- anaerobically fermenting said feedstock with said co-culture, at a fermentation rate of at least five millimoles per liter per hour, for a period of time and under conditions sufficient to convert a major portion of the lactic acid into a fermentation product consisting essentially of propionic acid, acetic acid, salts and mixtures thereof;
- maintaining the pH of the fermentation mixture such that the *Veillonella* continues to ferment the lactic acid being produced by the first microorganism for a period of time sufficient to accumulate said fermentation product; and
- recovering the accumulated fermentation product.

4,794,081  
PROCESS FOR THE PREPARATION OF RIBOFLAVIN  
Kimitoshi Kawai, Akinobu Matsuyama, both of Himeji, and Shoji Takao, Sapporo, all of Japan, assignors to Daiichi Chemical Industries, Ltd., Sakai, Japan

Filed Aug. 21, 1984, Ser. No. 643,226  
Claims priority, application Japan, Sep. 9, 1983, 58-165245; May 17, 1984, 59-99096; May 17, 1984, 59-99097

Int. Cl.<sup>4</sup> C12P 25/00; C12N 1/16

U.S. Cl. 435—46

11 Claims

1. A process for preparing riboflavin, which comprises: cultivating under aerobic conditions a riboflavin-producing culture medium containing (1) a microorganism having a riboflavin-producing ability and which is selected from the group consisting of *Saccharomyces cerevisiae* FERM BP-565, *Saccharomyces cerevisiae* FERM BP-566 and *Saccharomyces cerevisiae* FERM BP-567, (2) a carbon source and (3) a nitrogen source and (4) a purine compound when said microorganism is *Saccharomyces cerevisiae* FERM BP-565 or *Saccharomyces cerevisiae* FERM BP-566, to produce riboflavin in the culture medium; extracting riboflavin from the culture medium with hot water; and then crystallizing riboflavin from said hot water.

#### 4,794,082 BIOTINYLATED AGENTS

Gerald F. Sigler, San Diego, Calif., assignor to Hoechst Celanese Corporation, Somerville, N.J.

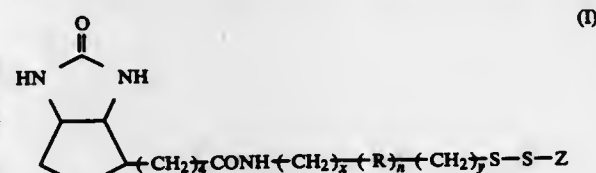
Division of Ser. No. 15,324, Feb. 17, 1987. This application Sep. 3, 1987, Ser. No. 92,739

Int. Cl.<sup>4</sup> C07K 15/00, 17/02, 17/06

U.S. Cl. 435—177

9 Claims

1. A method for preparing a biotin derivative of a thiol containing protein, said method comprising contacting said thiol containing protein in an aqueous buffered solution maintaining a pH in the range of 6 to 9 with a compound of the formula:



where x and y are integers of 1 to 5, n is 0 or 1, R is —CONH— or —CH(CO<sub>2</sub>H)NHCO— and Z is a pyridyl group optionally substituted with one or more substituents of such type and in such position as to preserve the tautomerism of the thiol-thione generated upon cleavage of the —S—S— group, in a water-miscible organic solvent, and isolating said biotin derivative.

7. A method according to claim 1 wherein the thiol containing protein is a hormone, enzyme, or antibody.

#### 4,794,083 PROCESS FOR IMMOBILIZATION OF GLUCOAMYLASE

László Boross, Iván Darózi, Ágoston Hóschke, Jeno Kürtösy, Elemér László, László Ludwig, Gabriella Klamár, and Béla Szajáni, all of Budapest, Hungary, assignors to Resana Finomvegyszergyar and Szaszpari Kutatóintézet, Budapest, Hungary

Continuation of Ser. No. 541,432, Oct. 13, 1983, abandoned.

This application Jul. 29, 1986, Ser. No. 889,609

Claims priority, application Hungary, Aug. 24, 1982, 2717/82

Int. Cl.<sup>4</sup> C12N 11/08, 11/06, 9/34

U.S. Cl. 435—180

11 Claims

1. A process for the preparation of an immobilized glucoamylase enzyme composition comprising: treating a glucoamylase enzyme with a carbodiimide compound which is water-soluble or soluble in an organic solvent at a temperature below 0° C.; mixing the treated glucoamylase and a polymer which is suspended and swollen in a buffer solution having a pH of from 4.5 to 9, said polymer being formed by polymerizing a monomer selected from the group consisting of N-aminoethyl-acrylamide, N-aminoethyl-methacrylamide, acrylamide, methacrylamide and mixtures thereof in the presence of a cross-linking agent selected from the group consisting of N,N'-methylene-bis-acrylic amide, ethylene diacrylate and N,N'-diallyl-tartaric amide, which polymers contain at least 1.0 m. equiv./g of —NH<sub>2</sub> functional groups; stirring the mixture at 0° to 4° C. for a period of 24 to 72 hours to produce an immobilized glucoamylase enzyme composition; filtering the immobilized glucoamylase enzyme composition produced; and thereafter washing the product composition several times with a buffer solution having a pH of 4.5 to 9 and then washing the product composition with water.

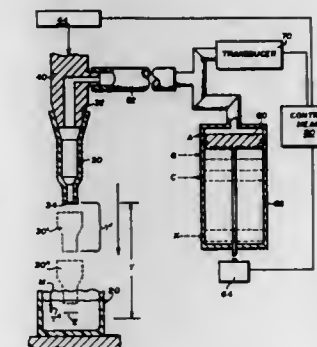
3. A process for the preparation of an immobilized glucoamylase enzyme composition comprising: treating a polymer which is suspended and swollen in a buffer solution having a pH of from 4.5 to 9, said polymer

being formed by polymerizing a monomer selected from the group consisting of acrylic acid, methacrylic acid, acrylamide, methacrylamide and mixtures thereof in the presence of a cross-linking agent selected from the group consisting of N,N'-methylene-bis-acrylic amide, ethylene diacrylate and N,N'-diallyl-tartaric amide, which polymers contain at least 1.0 m. equiv./g of —COOH functional groups, with a carbodiimide compound which is water-soluble or soluble in an organic solvent at a temperature below 0° C. to form an activated carrier; mixing a glucoamylase solution having a pH of 4.5 to 9 with the activated carrier; stirring the mixture at 0° to 4° C. for a period of 24 to 72 hours to produce an immobilized glucoamylase enzyme composition; filtering the immobilized glucoamylase enzyme composition produced; and thereafter washing the product composition several times with a buffer solution having a pH of 4.5 to 9 and then washing the product composition with water.

4,794,085  
APPARATUS AND METHOD FOR DETECTING LIQUID  
PENETRATION BY A CONTAINER USED FOR  
ASPIRATING AND DISPENSING THE LIQUID  
Thomas C. Jenson, Webster; Raymond L. Nelson, and Rodney J. Whitcomb, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Continuation of Ser. No. 632,516, Jul. 19, 1984, abandoned. This application Jul. 29, 1987, Ser. No. 80,146  
Int. Cl.<sup>4</sup> G01N 35/00

U.S. Cl. 436—84

18 Claims



- In apparatus for aspirating and dispensing liquid and including a probe for removably mounting a container having an aspirating and dispensing aperture; pressurizing means fluidly connected to said probe for generating an operative pressure differential relative to atmospheric pressure, effective to aspirate or dispense liquid into or from a mounted container; and moving means for advancing said probe and such mounted container toward, and away from a nominal level location; an improved aspiration control system comprising:
  - means for controlling the advance of said probe in increments;
  - means for actuating said pressurizing means only when said probe is not advancing, to generate a pressure differential in such container, relative to atmospheric pressure, that is sufficient to indicate whether such container aperture is closed by the liquid;
  - means for detecting and signalling the pressure produced within such container by said pressure differential; and
  - means for comparing the signalled pressure against a reference value determinative of the presence of liquid in such container aperture, said control system further being free of any valve means interposed between said pressurizing means and said detecting means.

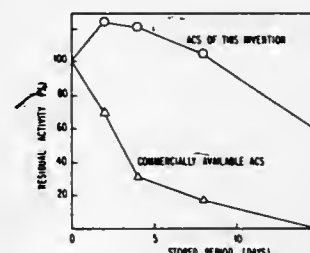
4,794,084  
ACYL-COA SYNTHETASE  
Mitsuo Watanabe, Hiroshi Sato, Tomoko Kamet, and Masao Kageyama, all of Kyoto, Japan, assignors to Unitika Ltd., Hyogo, Japan

Filed Feb. 5, 1987, Ser. No. 11,478  
Claims priority, application Japan, Feb. 5, 1986, 61-23084; Feb. 5, 1986, 61-23085

Int. Cl.<sup>4</sup> C12N 9/00, 1/20

U.S. Cl. 435—183

9 Claims



- An acyl-CoA synthetase having the following characteristics:
  - Reaction: Capable of acting on saturated or unsaturated lower to higher fatty acids to produce a CoA derivative thereof (Acyl-CoA), adenosine monophosphate, and pyrophosphoric acid, in the presence of adenosine triphosphate and coenzyme A;
  - Stability: Having a residual activity of not less than about 50% after being incubated in a buffer (pH about 7.5) for about 15 minutes at a temperature of about 55° C.; and
  - Optimum reaction temperature: Having an optimum reaction temperature between 50° and 60° C.

4,794,086  
METHOD FOR MEASUREMENT OF IMPURITIES IN  
LIQUIDS

Gerhard Kasper, Downers Grove, and Horag Y. Wen, Brookfield, both of Ill., assignors to Liquid Air Corporation, Walnut Creek, Calif.

Filed Nov. 25, 1985, Ser. No. 801,305

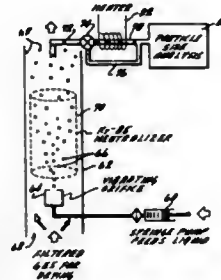
Int. Cl.<sup>4</sup> G01N 1/28, 15/02

U.S. Cl. 436—36

11 Claims

1. A method for the rapid measurement of the concentration by volume of sub-ppm levels of dissolved impurities in a liquid comprising: providing a liquid containing dissolved impurities; dispersing said liquid in a gas stream to generate uniform droplets of precisely known diameter D; evaporating said droplets while they are carried in said gas

stream so that each droplet leaves a residue particle having a diameter  $d$ ;  
measuring the diameter  $d$  of the residue particles; and



calculating the concentration by volume,  $C_v$ , of the dissolved impurities in the liquid according to the equation:

$$C_v = (d/D)^3$$

4,794,087

## CIRCUIT WRITING PROCESS

Bernard Despax, Toulouse, France, and Eric Kay, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 786,413, Oct. 10, 1985, abandoned.

This application Dec. 9, 1986, Ser. No. 940,879

Int. Cl.<sup>4</sup> G03G 13/00, 5/00

U.S. Cl. 430-41

2 Claims

1. A dry process for circuit writing on a substrate consisting of the steps:

- (1) covering the substrate with a medium of about 1,500 Angstroms thickness comprising electrically isolated conducting clusters of gold from about 25 to about 150 Angstroms in size in a dielectric matrix material which is a highly cross-linked polytetrafluoroethylene, and
- (2) irradiating selected portions of said medium with a laser whereby migration of the conduction clusters and aggregation of said clusters into conducting areas takes place in the areas divided by the laser radiation.

4,794,088

## METHOD AND APPARATUS FOR SEPARATING AND ANALYZING USING LIQUID CHROMATOGRAPHY

Yoshiyuki Miyaki, and Toshiya Kataoka, both of Shin-nanyo, Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shin-nanyo, Japan

Filed Sep. 18, 1986, Ser. No. 908,793

Claims priority, application Japan, Sep. 25, 1985, 60-210074

Int. Cl.<sup>4</sup> G01N 30/02, 30/84

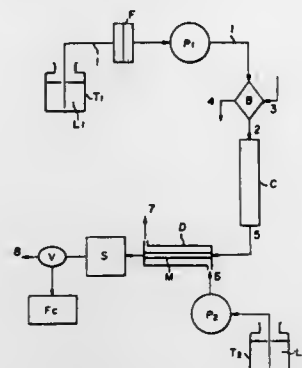
U.S. Cl. 436-161

20 Claims

1. A method for analyzing a sample containing low and intermediate molecular weight components and separating the components by liquid column chromatography, which consists essentially of:

- (a) introducing a sample which contains low and intermediate molecular weight components and as eluting solution into a packed chromatography column to effect separation of the components in the sample;
- (b) passing an eluate from the column through a flow passage containing an amphoteric ion exchange membrane, so as to subject said eluate to dialysis with a dialyzate solution to substantially remove electrolytes from the eluate; and
- (c) recovering the separated components and detecting said separated components either before or after said dialysis, wherein said amphoteric ion exchange membrane contains either cation and anion exchange, regions only or cation and anion exchange regions and regions having no ion exchange groups, said regions being positioned such that

centers of adjacent regions are not more than about 1 mm apart, and wherein cation and anion exchange capacities of the amphoteric ion exchange membrane are, respectively, from about 0.1 to 2 meq/g of dry resin, and further wherein said amphoteric ion exchange membrane has a potential difference of from -8 to +8 mV as measured



between both sides of the membrane when one side of the membrane is in contact with 0.02 mol/liter of an aqueous potassium chloride solution and the other side is in contact with 0.01 mol/liter of an aqueous potassium chloride solution, and a membrane resistance of at most 50 ohm-cm<sup>2</sup> as measured in 0.5 mol/liter of an aqueous potassium chloride solution.

4,794,089

## METHOD FOR ELECTRONIC DETECTION OF A BINDING REACTION

Susan J. Mroczkowski, Franklin; Kenneth A. Siegemund, Brookfield, and Donald E. Yorke, Greenfield, all of Wis., assignors to Midwest Research Microscopy, Inc., Milwaukee, Wis.

Filed Mar. 25, 1986, Ser. No. 843,982

Int. Cl.<sup>4</sup> G01N 33/53

U.S. Cl. 436-501

19 Claims

1. A method of detecting, in a sample, a first one of a pair of first and second substances, which substances specifically bind together to form a complex, said method comprising: mixing said sample with electrically conductive particles under conditions effective to cause binding of said first substance, if present in said sample, to the surface of said particles;

contacting said electrically conductive particles with a layer of said second substance which substantially spans a bottom wall of a channel between a pair of side-by-side, spaced-apart electrical conductors superposed on a substantially non-electrically conductive base, each of said conductors being connected to means defining an electrical circuit which includes said conductors and said channel therein, the binding reaction between said first and second substances causing said particles to be bound to said bottom wall to form electrically conductive aggregates; removing unbound particles; and measuring a change in the electrical current flow through said circuit caused by formation of said aggregates in said channel, in the widthwise direction thereof, said width being the distance between said conductors, said electrical change indicating the presence of said first substance in said sample.

13. A diagnostic element, comprising a substantially non-electrically conductive base; a plurality of pairs of conductors, said pairs disposed on said base in spaced-apart positions, said conductors of said pairs being superposed side-by-side on said base and spaced-apart to define a channel therebetween, each of

said channels having a width in the range of about 0.1 to 100 microns, said width being the distance between said conductors of each of said pairs; a plurality of layers of different substances, each of which undergoes a specific binding reaction with another substance, each one of said layers being bound to said base in a different one of said channels and substantially spanning the width of each channel;

a plurality of electrically conductive terminals disposed on said base; and

electrical connection means for conducting an electrical current from each one of said pairs of said conductors to a corresponding pair of said terminals, one of each pair of terminals being electrically connected to one conductor of the associated pair of conductors, and the other of each pair of terminals being electrically connected to the other conductor of said pair of conductors.

4,794,090

## IMMOBILIZATION SUPPORT FOR BIOLOGICALS

Marc E. Parham, Bedford, and Julie L. Radolph, Carlisle, both of Mass., assignors to W. R. Grace & Co.-Conn., New York, N.Y.

Filed Sep. 26, 1986, Ser. No. 911,944

Int. Cl.<sup>4</sup> G01N 33/545, 33/549

U.S. Cl. 436-531

20 Claims

1. An assay support matrix for an immobilized biologicals assay comprising a support matrix which consists of a microporous membrane or particulate media having a protein non-adsorptive polyurethane polymeric coating thereon, with a bioaffinity agent immobilized on said polymeric coating by passive adsorption.

4,794,091

## METHOD OF MAKING HIGH-PERFORMANCE DRAM ARRAYS INCLUDING TRENCH CAPACITORS

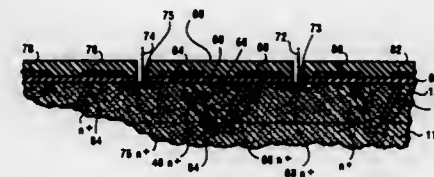
William T. Lynch, Summit, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

Division of Ser. No. 758,885, Jul. 25, 1985, abandoned. This application Nov. 17, 1987, Ser. No. 121,556

Int. Cl.<sup>4</sup> H01L 21/302

U.S. Cl. 437-48

1 Claim



1. A method of fabricating a memory array, comprising the steps of

forming plural parallel spaced-apart elongated trenches having flat continuous facing walls in a semiconductor body which is of one conductivity type, forming a dielectric layer only at the bottom of each trench, filling the entire extent of each trench with a material that constitutes a source of dopant of the opposite conductivity type, removing said material from spaced-apart between-cell regions of each trench, driving dopant from said remaining material into underlying memory-cell regions of each trench, said doped regions including portions that extend to the surface of said body, removing said remaining material from said trenches, forming a dielectric layer on the walls of each trench, filling each trench with a conductive material, and forming a switching device in and overlying said body

adapted to be connected to the doped surface portion of each memory-cell region.

4,794,092

## SINGLE WAFER MOATED PROCESS

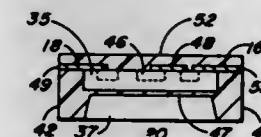
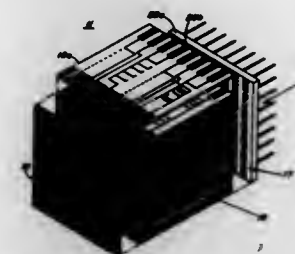
Allen L. Solomon, Fullerton, Calif., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Nov. 18, 1987, Ser. No. 122,178

Int. Cl.<sup>4</sup> H01L 21/76

U.S. Cl. 437-51

18 Claims



1. A method of forming an integrated circuit chip from a wafer wherein the doped portions of the wafer are electrically isolated from edge portions thereof, comprising: forming a plurality of grooves in a wafer; selectively doping a first surface of the wafer; depositing insulating material within the grooves; forming conductive lead upon the first surface of said wafer, said conductive lead extending to and across at least a portion of said grooves; thinning the wafer such that said grooves extend the entire thickness of the wafer; trimming longitudinal edge portions of the wafer so that the length of the wafer is bounded by portions of said grooves and the insulating material therein; and depositing conductive material along the longitudinal edge portions of the wafer, said conductive material being in electrical communication with at least one of the conductive leads formed on the surface of the wafer, said conductive material being isolated by said insulating material from the wafer, except through said at least one of the conductive leads.

4,794,093

## SELECTIVE BACKSIDE PLATING OF GAAS MONOLITHIC MICROWAVE INTEGRATED CIRCUITS

Elsa K. Tong, Wayland, and Thomas E. Kazior, Sudbury, both of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed May 1, 1987, Ser. No. 44,685

Int. Cl.<sup>4</sup> H01L 19/00

U.S. Cl. 437-203

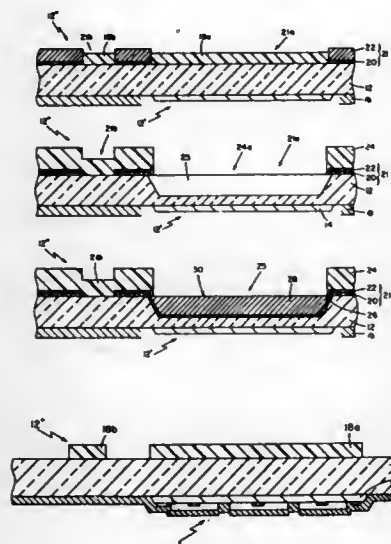
23 Claims

1. A method comprising the steps of: providing a first continuous conductive layer over selected portions of a surface of a substrate; masking said first continuous conductive layer and a first portion of exposed portion of said substrate surface; forming a first recess in said substrate having a first depth from said unmasked second portions of said exposed portions of said substrate;



disposing a solid deposit of a conductive material in said first recess;  
masking said first continuous conductive layer and said conductive material disposed in said first recess, leaving said first portion of said substrate exposed;  
forming a second recess in said substrate having a second depth from said unmasked first portion of said substrate; and  
disposing a solid deposit of a conductive material in at least a portion of said second recess.

2. The method as recited in claim 1 wherein said first disposing step comprises the steps of:  
providing a second continuous conductive layer on exposed portions of said substrate formed in said first recess, with



said second continuous conductive layer being disposed in electrical contact with said first continuous conductive layer; and  
plating a conductive material over said second continuous conductive layer, to provide the solid deposit to substantially fill said first recess;  
and wherein said second disposing step comprises the steps of:  
providing a third continuous conductive layer on exposed portions of said substrate formed by said second recess, with said third continuous conductive layer being disposed in electrical continuity with said first continuous conductive layer; and  
plating a conductive layer over said third continuous conductive layer to fill said second recess.

4,794,094

**PROCESS FOR PRODUCING AND PRODUCT OF A MACHINABLE CRYSTALLIZED GLASS HAVING NEEDLE-LIKE CRYSTALS PRECIPITATED THEREIN**  
Akio Makishima, and Mitsunori Asami, both of Sakuma, Japan, assignors to National Institute for Research in Inorganic Materials, Ibaraki, Japan

Filed Feb. 13, 1987, Ser. No. 14,844

Claims priority, application Japan, Aug. 11, 1986, 61-188300  
Int. Cl. C03C 10/04

U.S. Cl. 501-5

4 Claims

1. A process for producing a machinable crystallized glass having needle-like crystals precipitated therein, which comprises melting a mixture comprising from 40 to 60 mol % of SiO<sub>2</sub>, from 6 to 16 mol % of Al<sub>2</sub>O<sub>3</sub>, from 6 to 16 mol % of Y<sub>2</sub>O<sub>3</sub> and from 15 to 30 mol % of CaO, and allowing the melt

to cool to have fine needle-like crystals of Ca<sub>4</sub>Y<sub>6</sub>O(SiO<sub>4</sub>)<sub>6</sub> precipitated.

3. A machinable glass having fine needle-like crystals of Ca<sub>4</sub>Y<sub>6</sub>O(SiO<sub>4</sub>)<sub>6</sub> precipitated therein, obtained by melting a mixture comprising from 40 to 60 mol % of SiO<sub>2</sub>, from 6 to 16 mol % of Al<sub>2</sub>O<sub>3</sub>, from 6 to 16 mol % of Y<sub>2</sub>O<sub>3</sub> and from 15 to 30 mol % of CaO, and allowing the melt to cool to have fine needle-like crystals of Ca<sub>4</sub>Y<sub>6</sub>O(SiO<sub>4</sub>)<sub>6</sub> precipitated.

4,794,095

**CATALYTIC CRACKING CATALYST**

Darrell W. Walker, Media, Pa., and Fu M. Lee, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jul. 2, 1987, Ser. No. 69,553  
Int. Cl. B01J 29/06, 29/08

U.S. Cl. 502-64

19 Claims

1. A composition of matter, effective as a cracking catalyst composition, comprising

- zeolite,
- silica matrix material, in which said zeolite is embedded, containing less than about 0.5 weight-% alumina, and
- at least one vanadium oxide at a total level of at least about 0.2 weight-% V, based on the entire composition of matter.

4,794,096

**HAFNIUM METALLOCENE CATALYST FOR THE POLYMERIZATION OF OLEFINS**

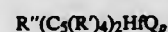
John A. Ewen, Houston, Tex., assignor to Fina Technology, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 34,341, Apr. 3, 1987, abandoned. This application Sep. 11, 1987, Ser. No. 96,075  
Int. Cl. C08F 4/64

U.S. Cl. 502-117

8 Claims

1. A catalyst for the polymerization and copolymerization of olefins comprising an alumoxane and chiral, stereorigid hafnium metallocene catalyst described by the formula



wherein (C<sub>5</sub>(R')<sub>4</sub>) is a cyclopentadienyl or substituted cyclopentadienyl ring; each R' is the same or different and is a hydrogen or a hydrocarbyl radical having from 1-20 carbon atoms; R'' is a structural bridge between the two (C<sub>5</sub>(R')<sub>4</sub>) rings imparting stereorigidity to said catalyst and R'' is selected from the group consisting of an alkylene radical having 1-4 carbon atoms, a silicon hydrocarbyl radical, a germanium hydrocarbyl radical, a phosphorus hydrocarbyl radical, a nitrogen hydrocarbyl radical, a boron hydrocarbyl radical, and an aluminum hydrocarbyl radical; each Q is a hydrocarbyl radical having 1-20 carbon atoms or is a halogen; and 0 ≤ p ≤ 3.

4,794,097

**CATALYTIC COMPOSITE PRODUCT FOR THE OXIDATION OF MERCAPTANS AND ITS USE FOR THE SWEETENING OF PETROLEUM FRACTIONS**

Claude Marty, and Rene Blondeau, both of Le Havre, France, assignors to Compagnie De Raffinage et de Distribution Total France, Levallois-Perret, France

Filed Jul. 13, 1987, Ser. No. 72,552  
Int. Cl. B01J 31/22

U.S. Cl. 502-163

20 Claims

1. A composite catalytic product for use in a fixed-bed process for the sweetening of mercaptans contained in petroleum fractions comprising:

- a catalyst based on a metal chelate for oxidation of the mercaptans, and
- a solid adsorbent support impregnated with the catalyst, such that the composite catalytic product contains:

from 0.05 to 10 weight percent of a metal chelate per gram of composite;  
from 5 to 35 weight percent of pyrolyzed carbon, and from 60 to 90 weight percent of a mineral matrix.

9. The composite catalytic product of claim 1 wherein the metal chelate is one selected from porphyrins, metalloporphyrins, corrins, metal phthalocyanines, the cobalt, copper, iron and vanadium salts of all of the above, and sulfur dyes.

4,794,098

**PROCESS FOR THE STABILIZATION OF ACTIVATED CATALYST MASSES**

Joachim Pohl, Duesseldorf; Franz-Josef Carduck, Haan, and Gerd Goebel, Erkrath, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jun. 15, 1987, Ser. No. 62,275

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1986, 3620275

Int. Cl. B01J 31/26, 33/00

U.S. Cl. 502-172

29 Claims

1. A process for the stabilization of a particulate hydrogenation catalyst mass after the activation thereof in a reducing activating gas stream, comprising the steps of

- contacting the particulate, activated catalyst mass in an inert gas atmosphere with an at least stabilizing quantity of at least one liquid straight chain or branched chain alkanol containing from 6 to 12 carbon atoms for a time sufficient to impregnate the catalyst mass with the alcohol to stabilize it against oxidation upon contact with air;
- removing excess alkanol from the catalyst mass; and
- introducing the resulting catalyst mass into a catalysis reactor.

4,794,099

**SIO<sub>2</sub>-PROMOTED COBALT CATALYST ON A SUPPORT OF TiO<sub>2</sub> FOR CONVERTING SYNTHESIS GAS TO HEAVY HYDROCARBONS**

Enrique Iglesias, Clinton; Stuart Soled, Pittstown, and Rocco A. Plato, Basking Ridge, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Filed Jan. 28, 1987, Ser. No. 7,494  
Int. Cl. B01J 21/06, 21/08, 23/84

U.S. Cl. 502-241

8 Claims

1. A hydrocarbon synthesis catalyst comprising cobalt in a catalytically active amount composited with an inorganic refractory support comprised of a major portion of titania to which a lesser portion up to about 15 wt. % of silica in the form of silica or a silica precursor has been added.

4,794,100

**PREPARATIVE PROCESS FOR SUPPORTS**

E. William Broder, Jr., Oak Forest, Ill., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Division of Ser. No. 600,926, Apr. 16, 1984, Pat. No. 4,544,787.  
This application May 28, 1985, Ser. No. 737,750

Int. Cl. B01J 21/14

U.S. Cl. 502-251

21 Claims

10. A contact agent useful in a method for hydrocarbon conversion which comprises contacting said hydrocarbon with said agent, said agent produced by the steps comprising:

- combining hydroxylated magnesia and a component of silicon which forms silica and which is readily suspendible in a continuous medium;
- contacting said combined components with a component of at least one metal, the oxide of which is reduced and produces higher hydrocarbon products and water when contacted with said hydrocarbons at selected temperatures within the range of about 500° to about 1000° C.; and
- calcining said contacted components to form said contact agent.

11. The agent of claim 10 wherein said reducible metal oxide

is selected from a group consisting of manganese, tin, indium, germanium, antimony, lead, bismuth, and mixtures thereof.

13. The agent of claim 10 wherein said agent comprises additionally an amount of at least one alkali metal.

4,794,101

**HEAT-SENSITIVE RECORDING MATERIAL**

Nobuo Kanda, Hirakata; Kimie Tambo, Shimizu; Fumio Seyama, Osaka, and Mitsuru Kondo, Hyogo, all of Japan, assignors to Kanzaki Paper Manufacturing Co., Ltd., Tokyo, Japan

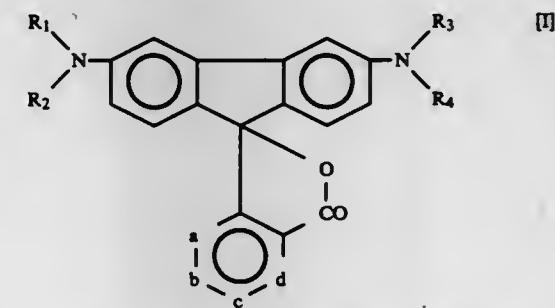
Filed Jun. 8, 1987, Ser. No. 59,746

Claims priority, application Japan, Jun. 17, 1986, 61-142277  
Int. Cl. B41M 5/18

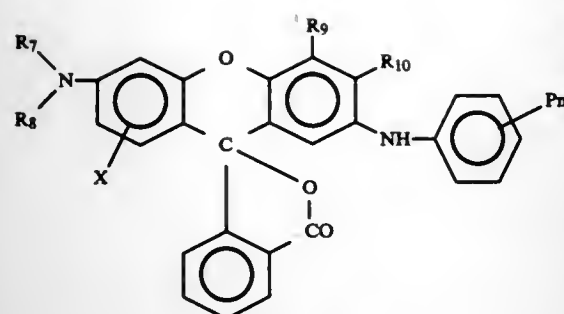
U.S. Cl. 503-208

10 Claims

1. In a heat-sensitive recording material incorporating a substrate, a colorless or pale-colored basic dye and a color acceptor which is reactive with the dye to form a color when contacted therewith, the recording material characterized in that (a) as the basic dye are used 100 parts by weight of a phthalide derivative of the formula (I) and 20 to 100 parts by weight of a black color-forming fluoran derivative of the formula (II), (b) as the color acceptor is used a polyvalent metal salt of an aromatic carboxylic acid and (c) a heat-fusible recording sensitizer having a melting point of 70° to 140° C. is further used, and whereby the resulting record images are at least 0.75 in PCS value at 800 nm



wherein R<sub>1</sub> to R<sub>4</sub> are each hydrogen atom; C<sub>1-8</sub> alkyl; C<sub>5-8</sub> cycloalkyl; C<sub>3-9</sub> unsaturated alkyl; tetrahydrofurfuryl; tetrahydropyran-2-methyl; C<sub>7-10</sub> aralkyl unsubstituted or substituted with halogen atom, C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy; phenyl unsubstituted or substituted with halogen atom, C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy; C<sub>2-8</sub> alkyl having phenoxy unsubstituted or substituted with halogen atom, C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy; or halogenated C<sub>1-8</sub> alkyl; R<sub>1</sub> and R<sub>2</sub>, and/or R<sub>3</sub> and R<sub>4</sub> may form a heteroring selected from the group consisting of pyrrolidine, piperidine, hexamethylencimine, morpholine, julolidine and tetrahydroquinoline together therewith or with an adjacent benzene ring, a, b, c and d represent carbon atoms and one or two of them may be nitrogen atom, the carbon atom may have a substituent selected from the group consisting of hydrogen atom; halogen atom; C<sub>1-4</sub> alkyl; C<sub>1-4</sub> alkoxy; -N(R<sub>5</sub>)(R<sub>6</sub>), R<sub>5</sub> and R<sub>6</sub> are same as R<sub>1</sub> to R<sub>4</sub>; and nitro, one of a-b, b-c and c-d bond may form another benzene ring together with the substituent,



wherein R<sub>7</sub> and R<sub>8</sub> are each C<sub>1-8</sub> alkyl unsubstituted or substituted with halogen atom or C<sub>1-4</sub> alkoxy; unsaturated C<sub>3-9</sub> alkyl; C<sub>5-12</sub> alicyclic group; phenyl unsubstituted or substituted with halogen atom, C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy; benzyl unsubstituted or substituted with halogen atom, C<sub>1-4</sub> alkyl or C<sub>1-4</sub> alkoxy; or tetrahydrofurfuryl, R<sub>7</sub> and R<sub>8</sub> may form a ring selected from the group consisting of pyrrolidine, piperidine, hexamethyleneimine and morpholine together therewith, R<sub>9</sub> and R<sub>10</sub> are each hydrogen atom; halogen atom; C<sub>1-4</sub> alkyl; or C<sub>1-4</sub> alkoxy, P is hydrogen atom; halogen atom; C<sub>1-4</sub> alkyl; alkyl; C<sub>5-6</sub> alicyclic group; halogenated C<sub>1-4</sub> alkyl; phenyl; benzyl; C<sub>1-4</sub> alkoxy; (C<sub>1-4</sub> alkoxy)carbonyl; or di(C<sub>1-4</sub> alkyl)amino, X is hydrogen atom; halogen atom; or C<sub>1-4</sub> alkyl, n is an integer of 1 to 4.

## 4,794,102

**THERMALLY-RESPONSIVE RECORD MATERIAL**  
Thomas C. Petersen, and Dean G. Dalebroux, both of Appleton, Wis., assignors to Appleton Papers Inc., Appleton, Wis.  
Filed Sep. 3, 1987, Ser. No. 92,490  
Int. Cl.<sup>4</sup> B41M 5/18

U.S. Cl. 503—209 13 Claims

1. A thermally-responsive record material resistant to image smearing comprising a support member bearing a thermally-sensitive color-forming composition, said thermally-sensitive color-forming composition comprising:

- a chromogenic material, and in contiguous relationship, an acidic developer material whereby the melting or sublimation of either material produces a change in color by reaction between the two,
- a water insoluble polymeric compound selected from the group consisting of poly  $\alpha$ -methylstyrene and copolymer of  $\alpha$ -methylstyrene/vinyltoluene, and in combination therewith,
- a thermal modifier selected from the group consisting of acetacet-o-toluidine, diphenoxymethane, phenyl-1-hydroxy-2-naphthoate, diheptadecyl ketone, and octadecanamide, and a binder therefor.

## 4,794,103

**PHARMACEUTICAL COMPOSITIONS CONTAINING PEPTIDES OF THE CHOLECYSTOKININ-CERULEIN GROUP FOR THE THERAPY OF SHOCK CONDITIONS AND OF RESPIRATORY AND CARDIOCIRCULATORY INSUFFICIENCIES**

Alfo Bertolini, 8, Vittorio Veneto Street, Scandiano (Reggio Emilia), Italy

Filed Jan. 2, 1987, Ser. No. 184

Claims priority, application Italy, Jan. 10, 1986, 19055 A/86  
Int. Cl.<sup>4</sup> A61K 37/02

U.S. Cl. 514—12

4 Claims

1. A method of therapeutically treating a subject suffering from shock, and respiratory and circulatory insufficiencies which comprises administering to said subject a therapeutically effective amount of a pharmaceutical composition comprising as the principal active ingredient a polypeptide selected from (a) cholecystokinin, (b) any fragment of cholecystokinin

(III)

provided it comprises the sequence 26-33 (CCK-8), (c) gastrin, (d) any fragment of gastrin provide it comprises the tetrapeptidic sequence L-tryptophyl-L-methionyl-L-aspartyl-L-phenylalaninamide, (e) and cerulein, together with a pharmaceutically acceptable carrier.

## 4,794,104

**PHARMACEUTICAL COMPOSITIONS CONTAINING ACTH FRAGMENTS FOR THE THERAPY OF SHOCK CONDITIONS AND OF RESPIRATORY AND CARDIOCIRCULATORY INSUFFICIENCIES**

Alfo Bertolini, 8, Vittorio Veneto Street, Scandiano, Italy

Filed Jan. 2, 1987, Ser. No. 183

Claims priority, application Italy, Jan. 15, 1986, 19086 A/86  
Int. Cl.<sup>4</sup> A61K 37/40

U.S. Cl. 514—13

4 Claims

1. A method of therapeutically treating a subject suffering from shock or respiratory or circulatory insufficiencies which comprises administering to said subject a composition comprising as the principal active ingredient a polypeptide selected from the group consisting of

- (a) a fragment of ACTH (1-39) having the formula ACTH (X-Y) wherein X is an integer from 1-5 and Y is an integer from 10-39, provided that when X is 1, Y is different from 24;
- (b) the N-acetyl and N,O-diacetyl derivatives of said ACTH fragment (X-Y); and
- (c) 4-norleucine, 7-D-phenylalanine- $\alpha$ -MSH; in admixture with a pharmaceutically acceptable excipient.

## 4,794,105

**METHOD FOR TREATMENT OF SWINE DYSENTERY**  
Toru Hasegawa; Setsuo Harada, and Toshiyuki Yamazaki, all of Kawanishi, Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jun. 24, 1986, Ser. No. 878,363

Claims priority, application Japan, Jun. 27, 1985, 60-142329  
Int. Cl.<sup>4</sup> A61K 31/70

U.S. Cl. 514—25

4 Claims

1. A method for treatment of swine dysentery, which comprises administering to swine, as an active ingredient, an anti-dysenteric effective amount of hygromycin, epihygromycin or a mixture thereof.

## 4,794,106

## CREAM

Yasuji Takashima; Shigeo Tanaka; Kenji Tsunoda; Ichirou Kawamata, all of Suita, and Hiroshi Murayama, Tokyo, all of Japan, assignors to Taiho Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 574,020, Jan. 26, 1984, abandoned. This application Aug. 28, 1986, Ser. No. 902,002

Claims priority, application Japan, Jan. 31, 1983, 58-14302  
Int. Cl.<sup>4</sup> A61K 31/56, 31/58; C07J 5/00

U.S. Cl. 514—179

9 Claims

1. An oil-in-water type cream for topical application consisting essentially of:

- (a) 0.01 to 0.5% by weight of hydrocortisone butyrate propionate,
- (b) 5 to 50% by weight of a higher paraffinic hydrocarbon component selected from the group consisting of light liquid paraffin, liquid paraffin, white petrolatum, yellow petrolatum, paraffin, ceresin and a mixture thereof,
- (c) 3 to 15% by weight of a surface-active agent component having a total HLB of 9 to 12 consisting of a member selected from the group consisting of a sorbitan fatty acid ester, a glycerin fatty acid ester, a propylene glycol fatty acid ester, and a mixture thereof, said surface-active agent component being the only surface-active agent component in the cream,
- (d) 30 to 65% by weight of purified water,

- (e) 5 to 15% by weight of a monohydric higher alcohol component selected from the group consisting of cetyl alcohol, stearyl alcohol, cetostearyl alcohol, myristyl alcohol and a mixture thereof,
- (f) 5 to 15% by weight of a member selected from the group consisting of a glycol having 2 to 6 carbon atoms and glycerol, and
- (g) a pharmaceutically acceptable acid selected from the group consisting of citric acid, lactic acid, phosphoric acid, tartaric acid, malic acid and malic acid in an amount required to adjust the pH of the cream to a value in the range of 3.5 to 6.5 when it is diluted with distilled water to 20 times its volume.

## 4,794,107

## OINTMENT

Yasuji Takashima; Shigeo Tanaka, both of Ageo; Ichirou Kawamata, Kitamoto, and Hiroshi Murayama, Houya, all of Japan, assignors to Taiho Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 574,021, Jan. 26, 1984, abandoned. This application Sep. 12, 1986, Ser. No. 906,653

Claims priority, application Japan, Jan. 27, 1983, 57-11638

Int. Cl.<sup>4</sup> A61K 31/56, 9/10; C07J 7/00, 5/00

U.S. Cl. 514—179

7 Claims

1. A oily ointment consisting essentially of:

- (a) 0.01 to 0.5% by weight of hydrocortisone butyrate propionate,
- (b) 2 to 10% by weight of a mixture of propylene glycol and purified water in a weight ratio of from 1:1 to 10:1,
- (c) 0.1 to 6% by weight of a surface-active agent component having a total HLB of 3.0 to 7.0 consisting of a member selected from the group consisting of a sorbitan fatty acid ester, a glycerin fatty acid ester, a propylene glycol fatty acid ester, and a mixture thereof, said surface-active agent component being the only surface-active agent component in the ointment, and
- (d) 75 to 97% by weight of a higher paraffinic hydrocarbon component selected from the group consisting of light liquid paraffin, liquid paraffin, white petrolatum, yellow petrolatum, paraffin, ceresin and a mixture thereof.

## 4,794,108

**1-CARBOXYMETHOXY ACETIDINONES AND THEIR PRODUCTION**

Shoji Kishimoto, Takarazaka; Michiyuki Sendai, and Michihiko Ochiai, both of Suita, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Sep. 14, 1984, Ser. No. 651,033

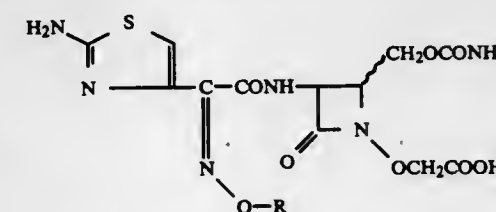
Claims priority, application PCT Int'l Appl., Apr. 24, 1984, 84/00215; Apr. 24, 1984, 84/00215

Int. Cl.<sup>4</sup> A61K 31/425; C07D 205/08, 417/12, 303/48

U.S. Cl. 514—210

8 Claims

1. A 2-acetidinone compound represented by the formula



wherein R is an alkyl or carboxyalkyl group, or a pharmaceutically acceptable salt or ester thereof.

8. An antibacterial composition which comprises an antibacterially effective amount of a compound or pharmaceutically acceptable salt or ester thereof as defined in claim 1 in admixture with a pharmaceutically acceptable carrier therefor.

**6-HYDROXY-LOWER ALKYL-PENEM COMPOUNDS, PHARMACEUTICAL PREPARATIONS THAT CONTAIN THESE COMPOUNDS, AND THE USE OF THE LATTER**  
Erfinders M. Lang, Rixheim, France, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 601,763, Apr. 18, 1984, abandoned, which is a continuation-in-part of Ser. No. 549,141, Nov. 7, 1983, abandoned. This application Jan. 14, 1987, Ser. No. 3,118

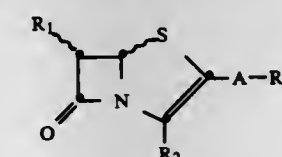
Claims priority, application Switzerland, Nov. 16, 1982, 6670/82; May 6, 1983, 2490/83

Int. Cl.<sup>4</sup> C07D 499/00; A61K 31/415

U.S. Cl. 514—192

31 Claims

1. A penem compound of the formula



having the (5R,6S) configuration in which

- R<sub>1</sub> represents methyl or ethyl, each substituted by hydroxy;
- R<sub>2</sub> represents carboxy or esterified carboxy that can be cleaved under physiological conditions;
- R<sub>3</sub> represents a tetrazolyl radical that is bonded via a tertiary ring nitrogen atom; and
- A represents straight-chained lower alkyl substituted by lower alkyl,

or a pharmaceutically acceptable salt thereof.

## 4,794,110

**5-ARYL-11-SUBSTITUTED-5H,11H-PYRROLO[2,1-C][1,4]BENZOXAZEPIN-2-ONE AS ANALGESIC AND HYPOTENSIVE AGENTS**

Richard C. Effland, and Kevin J. Kapples, both of Bridgewater, N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

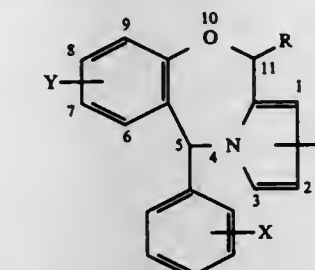
Filed Jul. 20, 1987, Ser. No. 75,463

Int. Cl.<sup>4</sup> C07D 413/04; A61K 31/40

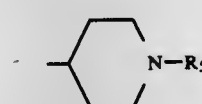
U.S. Cl. 514—211

18 Claims

1. A compound having the formula

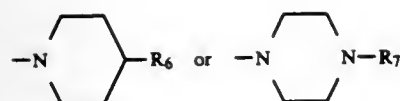


where X and Y are each independently hydrogen, loweralkyl, halogen or trifluoromethyl; Z is hydrogen or 2- or 3-Cl, Br, I, CHO or CH=CR<sub>2</sub> where R<sub>1</sub> and R<sub>2</sub> are each independently hydrogen or loweralkyl; R is hydrogen, —(CH<sub>2</sub>)<sub>n</sub>NR<sub>3</sub>R<sub>4</sub> or

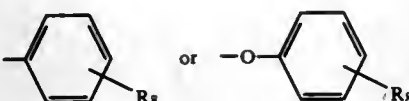


where n is 1, 2 or 3, R<sub>3</sub> is loweralkyl, and R<sub>4</sub> is hydrogen or loweralkyl, or alternatively the group —NR<sub>3</sub>R<sub>4</sub> as a whole is

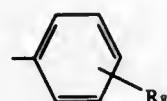




where  $R_6$  is loweralkyl,



and  $R_7$  is loweralkyl or



$R_8$  being hydrogen, loweralkyl, halogen, trifluoromethyl or methoxy; and  $R_5$  is hydrogen, loweralkyl or aryloweralkyl, or a pharmaceutically acceptable acid addition salt thereof.

18. A method of alleviating pain in a patient in need of relief from pain which comprises administration of an effective amount of a compound as defined in claim 1.

#### 4,794,111 DIHYDROPYRIDINE PREPARATIONS CONTAINING $\beta$ -BLOCKERS

Ulrich Posanski, Roesrath; Rainer Groos, Wuppertal; Stanislaw Kanda, Wuppertal; Gerhard Schlüter, Wuppertal, and Matthias Schramm, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 730,974, May 6, 1985, abandoned, and a continuation-in-part of Ser. No. 757,051, Jul. 19, 1985, abandoned. This application Sep. 19, 1986, Ser. No. 909,137

Claims priority, application Fed. Rep. of Germany, May 23, 1984, 3419131; Jul. 25, 1984, 3427402

Int. Cl.<sup>4</sup> A61K 31/18, 31/44, 31/165, 31/535  
U.S. Cl. 514—236.2 7 Claims

1. A composition comprising by weight a synergistically effective mixture of

(A) 0.1 to 10 parts of a dihydropyridine selected from the group consisting of nisoldipine, nimodipine and nitrendipine

(B) about 10 to 200 parts of a  $\beta$ -blocker selected from the group consisting of atenolol, sotalol, timolol and nadolol which is without local anesthetic action.

#### 4,794,112 ACETAMINOPHEN/HYDROXYZINE ANALGESIC COMBINATIONS

Stephen A. Cooper, 85 Westview Rd., Short Hills, N.J. 07078  
Continuation of Ser. No. 753,014, Jul. 8, 1985, abandoned, which is a continuation of Ser. No. 586,567, Mar. 6, 1984, abandoned, which is a continuation-in-part of Ser. No. 448,290, Dec. 9, 1982.

This application Feb. 14, 1986, Ser. No. 829,571

Int. Cl.<sup>4</sup> A61K 31/16, 31/495  
U.S. Cl. 514—255 20 Claims

1. A pharmaceutical composition for oral or rectal administration to a human subject, said composition comprising a pharmaceutically acceptable carrier and a pain relieving effective amount of the combination of (a) at least 200 mg. to 1300 mg. of acetaminophen and (b) at least 25 mg. to 120 mg. of hydroxyzine or an acid salt form thereof in an amount sufficient to potentiate the analgesic action of acetaminophen.

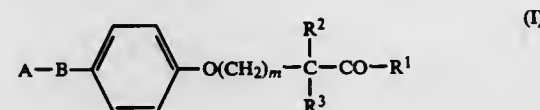
#### 4,794,113 IMIDAZOLYL PHENOXY COMPOUNDS AND METHOD OF USE

Tadao Kojima, Saitama; Shunji Kageyama; Minoru Okada, both of Tokyo; Isao Ohata, and Noboru Sato, both of Saitama, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 623,174, Jun. 21, 1984, abandoned. This application Jan. 2, 1987, Ser. No. 203  
Claims priority, application Japan, Jun. 24, 1983, 58-113988; Oct. 27, 1983, 58-201639; Dec. 26, 1983, 58-248928

Int. Cl.<sup>4</sup> C07D 233/60, 233/61; A61K 31/415  
U.S. Cl. 514—399 8 Claims

1. A phenoxy compound having the formula (I):



wherein

A is a 1-imidazolyl group;

B is a single bond or a group having the formula:



wherein n is an integer of 1 to 6 and k is 0 or an integer 1 to 5; m is 0 or an integer 1 to 6;  $R^1$  is a hydroxyl group or a lower alkoxy group; and  $R^2$  and  $R^3$ , which may be the same or different, each is a hydrogen atom or a  $C_{1-3}$  alkyl group; or a pharmaceutically acceptable salt thereof.

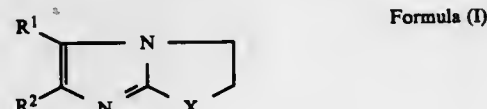
#### 4,794,114 INHIBITION OF INTERLEUKIN-1 PRODUCTION BY MONOCYTES AND/OR MACROPHAGES

Paul E. Bender, Cherry Hill, N.J.; Don E. Griswold, North Wales, Pa.; Nabli Hanna, Berwyn, Pa., and John C. Lee, Radnor, Pa., assignors to SmithKline Beckman Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 897,909, Aug. 19, 1986, abandoned. This application Jun. 17, 1987, Ser. No. 63,550

Int. Cl.<sup>4</sup> A61K 31/44 20 Claims

1. A method of inhibiting the production of interleukin-1 by monocytes and/or macrophages in a human in need thereof which comprises administering to such human an effective, interleukin-1 production inhibiting amount of a compound of the formula



wherein:

One of  $R^1$  and  $R^2$  must be 4-pyridyl and the other is selected from monohalo-substituted phenyl wherein said substituent is selected from halo or  $C_{1-4}$  alkoxy;

X is  $CH_2$ ,  $CH_2CH_2$  or  $S(O)_n$ ; and

n is 0, 1 or 2;

or a pharmaceutically acceptable salt thereof.

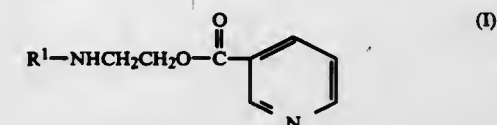
#### 4,794,115 METHOD OF TREATING HYPERLIPEMIA

Keiko Takahashi, Tsuchiura, and Toshio Wakabayashi, Tama, both of Japan, assignors to Terumo Corporation, Tokyo, Japan

Filed Oct. 31, 1986, Ser. No. 925,239

Claims priority, application Japan, Nov. 1, 1985, 60-245794  
Int. Cl.<sup>4</sup> A61K 31/44 9 Claims

1. A method for treating hyperlipemia in mammals in need of such treatment which comprises administering to said mammal an effective amount of an ethanolamine derivative represented by the formula



wherein  $R^1$  represents an acyl group derived from  $\alpha$ - or  $\gamma$ -linolenic acid or eicosapentaenoic acid.

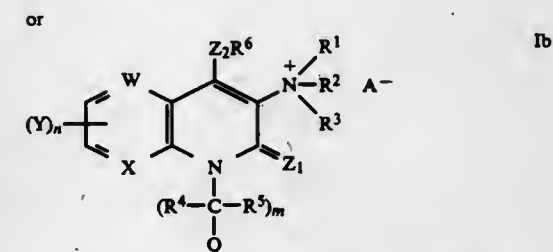
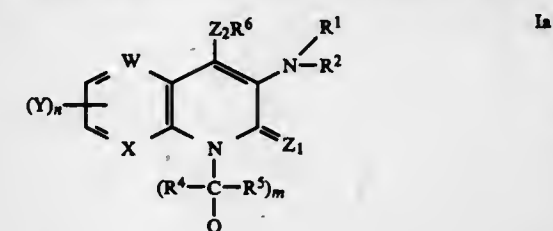
#### 4,794,116 ANTI-ALLERGIC ESTERS, ACETAL ETHERS, THIOETHERS AND NITROGEN SUBSTITUTED DERIVATIVES OF BICYCLIC COMPOUNDS

David J. Blythin, North Caldwell, and Ho-Jane Shue, Pine Brook, both of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 760,196, Jul. 29, 1985, Pat. No. 4,684,727. This application Jul. 22, 1987, Ser. No. 76,450  
Claims priority, application PCT Int'l Appl., Jul. 25, 1986, PCT/US86/01518

Int. Cl.<sup>4</sup> A61K 31/435; C07D 47/04  
U.S. Cl. 514—300 27 Claims

1. A compound having the structural formula Ia or Ib



a pharmaceutically acceptable salt or a solvate thereof, wherein:

W and X may be the same or different and each independently represents  $-CH=$  or  $-N=$ ;

$Z_1$  and  $Z_2$  are the same or different and each independently represents O or S;

$R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$  and  $R^5$  are the same or different and each independently represents H, alkyl having from 1 to 12 carbon atoms, alkenyl having from 3 to 8 carbon atoms, alkynyl having from 3 to 8 carbon atoms, alkoxyalkyl having from 1 to 6 carbon atoms in the alkoxy portion and from 2 to 6 atoms in the alkyl portion thereof, hydroxyalkyl having from 2 to 8 carbon atoms, cycloalkyl having

from 3 to 8 carbon atoms, acyloxyalkyl having from 1 to 6 carbon atoms in the acyloxy portion and from 2 to 8 carbon atoms in the alkyl portion thereof, and  $-R^7-CO_2R^0$  wherein  $R^7$  represents an alkylene group having from 1 to 6 carbon atoms and  $R^0$  represents hydrogen or an alkyl group having from 1 to 6 carbon atoms, with the proviso that the OH of the hydroxyalkyl group and the acyloxy of the acyloxyalkyl group are not joined to the same carbon atom as another heteroatom and that, when at least one of  $R^1$ ,  $R^2$  and  $R^3$  is alkenyl or alkynyl, there is at least one carbon-carbon single bond between the nitrogen atom and the carbon-carbon double or triple bond;

in addition, one of  $R^1$  or  $R^2$  can be aryl having from 6 to 15 carbon atoms which can be substituted with one to three substituents Y as defined below;

in further addition, any two of  $R^1$ ,  $R^2$  and  $R^3$  can be joined together to represent a moiety when taken together with the N to which they are attached represents a ring which contains from 2 to 8 carbon atoms, said ring optionally containing in addition a  $-O-$ ,  $-S-$  and/or  $-NR^4-$  wherein  $R^4$  is as defined above, and optionally containing a carbon-carbon double bond, and said ring optionally being substituted with one to three additional substituents  $R^8$  which substituents may be the same or different and are each independently selected from OH with the proviso that OH is not on a carbon already joined to a heteroatom,  $-O-$  acyl having from 1 to 6 carbon atoms, hydroxyalkyl having from 1 to 8 carbon atoms, alkoxyalkyl having from 1 to 6 carbon atoms in each alkyl portion thereof, alkyl having from 1 to 6 carbon atoms, alkenyl having from 3 to 8 carbon atoms, alkynyl having from 3 to 8 carbon atoms,  $-COOR^9$  wherein  $R^9$  represents H, alkyl having 1 to 6 carbon atoms or aryl having from 6 to 15 carbon atoms, or any two  $R^8$  substituent groups may represent a hydrocarbon ring having from 4 to 8 total carbon atoms;

in still further addition, all three of  $R^1$ ,  $R^2$  and  $R^3$  can be joined together to represent when taken together with the N to which they are attached a polycyclic hydrocarbon ring, which polycyclic ring can optionally be substituted by one to three substituent groups  $R^8$  as defined above;  $R^6$  represents  $-CO-R^{10}$ ,  $-CS-OR^{17}$ ,  $-CS-NR^{15}R^{16}$ ,  $-C(R^{11})_2-OR^{12}$ ,  $-C(R^{11})_2-SR^{12}$  or  $-C(R^{11})_2-NR^{12}R^{13}$ ;

$R^{10}$  represents aryl having from 6 to 15 carbon atoms,  $-R^{14}$ , aromatic heterocyclic having from 2 to 14 carbon atoms and at least one O, S and/or N in the ring structure,  $-OR^{14}$  or  $-NR^{15}R^{16}$ ;

each  $R^{11}$  represents H, alkyl having from 1 to 6 carbon atoms,  $-CCl_3$ ,  $-COOR^9$  or aryl having from 6 to 15 carbon atoms;

$R^{12}$  represents  $-R^{14}$ ,  $-CO-R^{13}$  or  $-CS-R^{17}$ ;

$R^{13}$  represents H, alkyl having 1 to 6 carbon atoms or aryl having from 6 to 15 carbon atoms;

$R^{14}$  represents alkyl having from 1 to 12 carbon atoms;  $R^{15}$  and  $R^{16}$  each independently represents H, alkyl having 1 to 6 carbon atoms or aryl having from 6 to 15 carbon atoms, or  $R^{15}$  and  $R^{16}$  taken together represent a divalent polymethylene group of from 4 to 6 carbon atoms, said polymethylene group being optionally substituted with a carboxy group or alkyl ester thereof;

$R^{17}$  represents  $-R^{14}$  or aryl having from 6 to 15 carbon atoms;

m is an integer of from 0 to 3;

n is an integer of from 0 to 2;

Q represents aryl having from 6 to 15 carbon atoms or an aromatic heterocyclic group having from 2 to 14 carbon atoms and at least one O, S and/or N in the ring structure, which aromatic heterocyclic group can optionally be substituted with from 1 to 3 substituents Y as defined below;

each Y substituent is independently hydroxy, alkyl having from 1 to 6 carbon atoms, halogen,  $NO_2$ , alkoxy having from 1 to 6 carbon atoms, trifluoromethyl, cyano, cycloal-

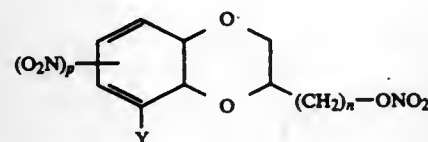
kyl having from 3 to 7 carbon atoms, alkenyloxy having from 3 to 6 carbon atoms, alkynyloxy having from 3 to 6 carbon atoms, hydroxyalkyl having from 1 to 6 carbon atoms,  $-S(O)_n-R^{18}$  wherein  $R^{18}$  represents alkyl having from 1 to 6 carbon atoms and  $n$  is as defined above,  $-SO_2NH_2$ ,  $-CO-R^{19}$  wherein  $R^{19}$  represents OH,  $-NH-R^{18}$  or  $-O-R^{18}$ , where  $R^{18}$  is as defined above,  $-O-B-COR^{19}$  wherein  $B$  represents an alkylene group having from 1 to 4 carbon atoms and  $R^{19}$  is as defined above,  $-NH_2$ ,  $-NHCHO$ ,  $-NH-CO-R^{19}$  wherein  $R^{19}$  is as defined above, with the proviso that it is not hydroxy,  $-NH-COCF_3$ ,  $-NH-SO_2R^{18}$  wherein  $R^{18}$  is as defined above, or  $-NHSO_2CF_3$ , and  $A$  is a pharmaceutically acceptable counterion.

**4,794,117**  
PROCESS FOR SOLUBILIZING ACTIVE INGREDIENTS  
AND THE THUS-OBTAINED PHARMACEUTICAL  
COMPOSITIONS

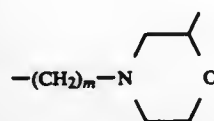
Jérôme Corbière, 17 rue Cortambert, 75016 Paris, France  
Continuation of Ser. No. 801,148, Nov. 12, 1985, abandoned.  
This application Sep. 30, 1987, Ser. No. 103,451  
Claims priority, application France, Mar. 3, 1984, 84 1279  
Int. Cl.<sup>4</sup> A61K 31/40

U.S. Cl. 514-420 6 Claims  
1. A process for solubilizing indomethacin in water consisting essentially of dissolving an anti-inflammatory amount of indomethacin in a solubilizing amount of at least one polyethylene-glycol having a molecular weight of 300 to 700 and dissolving the resulting solution in a solubilizing amount of an aqueous medium buffered in a pH range of 4.5 to 8.

**4,794,118**  
1,4-BENZODIOXANE DERIVATIVES  
Toshinobu Kuniti; Norio Minami; Fumihiko Ozaki; Nobuyuki Mori; Mikio Takeda, and Hiroshi Katoh, all of Ibaraki, Japan, assigns to Eisai Co., Ltd., Tokyo, Japan  
Filed Jul. 18, 1986, Ser. No. 887,720  
Claims priority, application Japan, Jul. 23, 1985, 60-161096  
Int. Cl.<sup>4</sup> A61K 31/335; C07D 319/20, 405/12, 413/12  
U.S. Cl. 514-452 10 Claims  
1. A 1,4-benzodioxane derivative represented by the following formula:



wherein  $p$  stands for an integer of 0-2,  $Y$  represents a hydrogen atom; or a group represented by the formula  $-OR$  in which  $R$  denotes a hydrogen atom, a lower alkyl, lower alkoxy, carbonyl, an alkanoyl, nicotinoyl, or a group represented by the formula



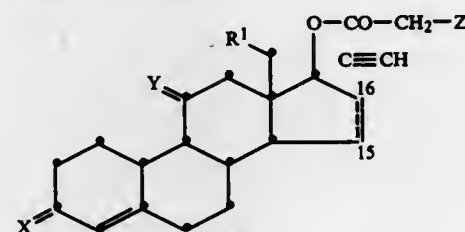
in which  $m$  is 1 or 2;  $n$  is an integer of 1-3, exclusive of the case wherein  $p=0$  and  $Y=H$ , or a pharmacologically acceptable salt thereof.

**4,794,119**  
AQUEOUS CRYSTALLINE SUSPENSION OF STEROID  
GLYCOESTERS

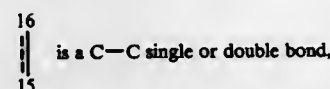
Paul-Eberhard Schulze; Bernard Acksteiner, and Bernd Dusterberg, all of Berlin, Fed. Rep. of Germany, assigns to Schering Aktiengesellschaft, Berlin and Bergkamen, Fed. Rep. of Germany

Filed Mar. 27, 1986, Ser. No. 844,642  
Claims priority, application Fed. Rep. of Germany, Mar. 27, 1985, 3511588  
Int. Cl.<sup>4</sup> A61K 31/56; C07J 1/00

U.S. Cl. 514-170 12 Claims  
1. An aqueous crystalline suspension comprising an effective amount of a 17-tertiary glycoester of the formula



wherein  
 $X$  is two hydrogen atoms or an oxygen atom,  
 $Y$  is two hydrogen atoms or a methylene group,  
 $R^1$  is hydrogen or methyl,  
 $Z$  is hydroxy or  $-O-CO-R^2$ ,  
 $R^2$  is methyl or phenyl, and



in the following fractions:  
0-30% by weight of a particle size of 5-10  $\mu m$ ,  
40-90% by weight of a particle size of 10-26  $\mu m$ , and  
20-60% by weight of a particle size of 26-40  $\mu m$ .

**4,794,120**  
ANTIPARASITIC NITROFURAN DERIVATIVES  
Philippe Manoury, Verrieres le Buisson; Jean Bluet, Breuille, and Michel Aletra, Paris, all of France, assigns to Synthelabo, Paris, France

Filed Jul. 7, 1987, Ser. No. 70,541  
Claims priority, application France, Jul. 8, 1986, 86 09886  
Int. Cl.<sup>4</sup> A61K 31/435, 31/345; C07D 471/04, 307/75  
U.S. Cl. 514-249 2 Claims  
1. A nitrofuran derivative of the formula (I)



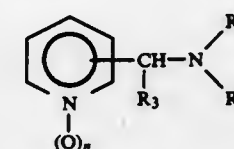
in which  $n$  is 0 or 1 and  $R$  is an imidazo[1,2-a]pyrid-2-yl, imidazo[2,1-b]thiazol-6-yl, imidazo[1,2-a]pyrazin-2-yl, 5,6,7,8-tetrahydroimidazo[1,2-a]pyrazin-2-yl, 7-acetyl-5,6,7,8-tetrahydroimidazo[1,2-a]pyrazin-2-yl, imidazo-[1,5-a]pyrid-1-yl, imidazo[1,5-a]pyrid-3-yl, pyrazolo-[1,5-a]pyrid-3-yl, 1-indoliziny, 3-indoliziny, 5,6,7,8-tetrahydro-1-indoliziny, 5,6,7,8-tetrahydro-2-indoliziny, 6H-thieno[2,3-b]pyrrol-5-yl, 4H-thieno[3,2-b]pyrrol-5-yl, 4-oxo-4H-pyrido[1,2-a]pyrimidin-3-yl, benzimidazol-2-yl or imidazo[1,2-a]pyrid-3-yl radical.

**4,794,121**  
ALKYLCARBOXAMIDES OF PYRIDYLALKYLAMINES,  
AND THEIR USE IN HUMAN AND VETERINARY  
MEDICINE

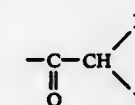
Claude Larnelle, Villeneuve Loubet; Marcel Lepant, Nice, and Bernard Raynier, Cagnes, all of France, assigns to Panmedica, Carros, France

Filed Sep. 18, 1986, Ser. No. 908,680  
Claims priority, application Morocco, Oct. 11, 1985, 20776  
Int. Cl.<sup>4</sup> C07D 213/56; A61K 31/44

U.S. Cl. 514-357 16 Claims  
1. A compound of formula I or one of its pharmaceutically acceptable salts:



in which:  
 $n=0$  or 1,  
 $R_1$  represents a hydrogen atom,  
 $R_2$  represents an alkyl group of  $C_1$  to  $C_3$  or a hydrogen atom,  
 $R_3$  represents an alkyl group of  $C_1$  to  $C_3$  or a hydrogen atom,  
 $R_2$  represents:



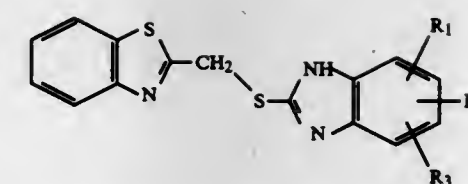
in which:  
(1)  $X$  and  $Y$  are different and individually represent  $-(CH_2)_m-CH_3$ ,  $m$  being a number between 0 and 14; or  
(2)  $X$  and  $Y$  together form an unsubstituted saturated cyclic hydrocarbon of from 3 to 12 carbon atoms or a cyclic saturated hydrocarbon of from 3 to 12 carbon atoms substituted by a methyl group.

**4,794,122**  
NOVEL  
BENZIMIDAZOLYL-THIOMETHYL-BENZO-  
THIAZOLES

Stephen Clements-Jewery, Ashton Keynes Near Swindon; Peter D. Keanewell, Swindon, and Robert Westwood, Kingston Bagpuzle, all of Great Britain, assigns to Roussel Uclaf, Paris, France

Filed Jan. 3, 1987, Ser. No. 57,758  
Claims priority, application United Kingdom, Jun. 4, 1986, 8613592

Int. Cl.<sup>4</sup> A61K 31/425; C07D 417/12  
U.S. Cl. 514-367 18 Claims  
1. A compound selected from the group consisting of a compound of the formula



wherein  $R_1$ ,  $R_2$  and  $R_3$  are individually selected from the group consisting of hydrogen, halogen and alkyl and alkoxy of 1 to 6 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

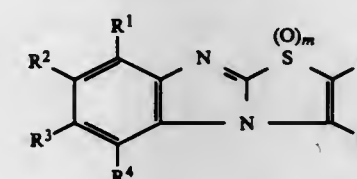
(I) 13. A method of treating allergic and inflammatory conditions in warm-blooded animals comprising administering to warm-blooded animals an anti-allergically and anti-inflammatorily effective amount of at least one compound of claim 1.

**4,794,123**  
THIAZOLO- AND THIAZINO- BENZIMIDAZOLES AND  
THEIR USE AS ANTI-ULCER AGENTS

Roger Crossley, Reading, and Peter J. Meade, Maidenhead, both of England, assigns to John Wyeth & Brother Limited, Maidenhead, England

Division of Ser. No. 866,180, May 22, 1986, Pat. No. 4,725,605, which is a continuation-in-part of Ser. No. 619,869, Jun. 12, 1984, abandoned. This application Oct. 13, 1987, Ser. No. 108,252

Claims priority, application United Kingdom, Dec. 13, 1983, 8333231  
Int. Cl.<sup>4</sup> A61K 31/38; C07D 417/04, 401/14, 215/38  
U.S. Cl. 514-232.5 4 Claims  
1. A compound of formula



or a pharmaceutically acceptable salt thereof wherein  $R$  represents a phenyl, naphthyl, pyridyl, thienyl, furyl, thiazolyl, quinolyl, isoquinolyl or indolyl group, each optionally substituted by one or more substituents the same or different selected from lower alkylthio, lower alkyl, lower alkoxy, halogen, alkanoyloxy of 2 to 7 carbon atoms, lower alkoxy carbonyl, halolower alkyl, hydroxy, cyano, amino, mono- or diloweralkyl amino, lower alkanoylamino, carboxy, carboxyloweralkyl, hydroxylower alkyl, carbamoyl, carbamoyloxy, lower alkyl-carbonyl, benzoyl, naphthoyl, (loweralkoxy)lower alkoxy, 1-piperidinyl, 4-morpholinyl, 4-loweralkylpiperazinyl, 1-pyrrolidinyl, OR<sup>8</sup>, SR<sup>8</sup>, phenyl and phenyl substituted by one or more substituents as hereinbefore defined excepting phenyl;

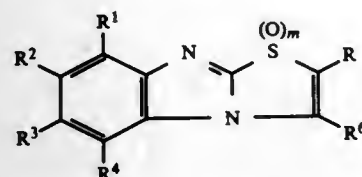
(where  $R^8$  is  $C_2-C_6$  alkenyl,  $C_3-C_{10}$  cycloalkyl, phenyl, naphthyl, phenylalkyl, naphthylalkyl or phenyl or naphthyl or phenylalkyl or naphthylalkyl each carrying from 1 to 3 substituents on the aryl selected from lower alkyl, halogen, nitro, haloloweralkyl, hydroxy and lower alkoxy), any adjacent pair of  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  together with the carbon atoms to which they are attached complete a five or six membered saturated or unsaturated carbocyclic ring, said ring being optionally substituted by a substituent as defined above in connection with the group  $R$ , wherein each member of the remaining non-adjacent pair of  $R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  is hydrogen or a substituent as mentioned above in connection with  $R$ ;

$R^6$  independently represents hydrogen or lower alkyl; and  $m$



is 0 or 1, with the proviso that when R<sup>1</sup> and R<sup>2</sup> together with the carbon atoms to which they are attached represent a 6-membered unsaturated carbocyclic ring and R is phenyl, 2-thienyl, p-methoxyphenyl or p-bromophenyl then m is 1.

3. A method of treating ulcers or hypersecretion in a mammal which method comprises administering to said mammal in need of such treatment an antilucer/antihypersecretion effective amount of a compound of formula



or a pharmaceutically acceptable salt thereof, wherein

R represents a phenyl, naphthyl, pyridyl, thienyl, furyl, thiazolyl, quinolyl, isoquinolyl or indolyl group, each optionally substituted by one or more substituents the same or different selected from lower alkylthio, lower alkyl, lower alkoxy, halogen, alkanoyloxy of 2 to 7 carbon atoms, lower alkoxy carbonyl, halolower alkyl, hydroxy, cyano, amino, mono- or dioweralkyl amino, lower alkanoylamino, carboxy, carboxylower alkyl, hydroxylower alkyl, carbamoyl, carbamoyloxy, lower alkyl-carbonyl, benzoyl, naphthoyl, (loweralkoxy)lower alkoxy, 1-piperidiny, 4-morpholinyl, 4-lower alkylpiperazinyl, 1-pyrrolidinyl, OR<sup>5</sup>, SR<sup>5</sup>, phenyl, and phenyl substituted by one or more substituents as hereinbefore defined excepting phenyl;  
(where R<sup>5</sup> is C<sub>2</sub>-C<sub>6</sub> alkenyl, C<sub>3</sub>-C<sub>10</sub> cycloalkyl, phenyl, naphthyl, phenylalkyl, naphthylalkyl or phenyl or naphthyl or phenylalkyl or naphthylalkyl each carrying from 1 to 3 substituents on the aryl selected from lower alkyl, halogen, nitro, haloloweralkyl, hydroxy and lower alkoxy), any adjacent pair of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> together with the carbon atoms to which they are attached complete a five or six membered saturated or unsaturated carbocyclic ring, said ring being optionally substituted by a substituent as defined above in connection with the group R, wherein each member of the remaining non-adjacent pair of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> is hydrogen or a substituent as mentioned above in connection with R;  
R<sup>6</sup> independently represents hydrogen or lower alkyl; and m is 0 or 1.

#### 4,794,124 THERAPEUTIC COMPOSITION FOR DIABETIC COMPLICATIONS

Yujiro Yamamoto, Suifu; Hiroshi Kuriyama, Toyonaka, and Mitsuyoshi Azuma, Amagasaki, all of Japan, assignors to Senja Pharmaceutical Co., Ltd., Osaka, Japan  
Filed Nov. 12, 1986, Ser. No. 929,305  
Claims priority, application Japan, Nov. 27, 1985, 60-268065  
Int. Cl.<sup>4</sup> A61K 37/44

U.S. Cl. 514-562

1 Claim

1. A method of inhibiting the formation of cataracts in a diabetic animal which comprises orally administering to the animal 10-5000 mg per day of cysteine or a pharmacologically acceptable salt thereof.

#### 4,794,125 COMPOUNDS HAVING AN IMMUNIZING ACTIVITY

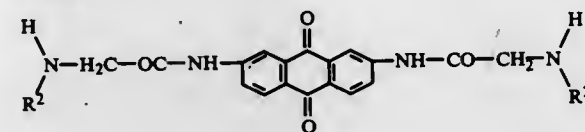
Rudolf Biber, Vienna, Austria, assignor to CL Pharma AG, Linz, Austria  
Continuation of Ser. No. 862,355, filed as PCT AT85/00019 on Jul. 31, 1985, published as WO86/00892 on Feb. 13, 1986, abandoned.

This application Apr. 21, 1988, Ser. No. 186,688  
Claims priority, application Austria, Aug. 1, 1984, 2468/84  
Int. Cl.<sup>4</sup> A61K 31/12

U.S. Cl. 514-616

3 Claims

1. A method for the treatment of a mammal to achieve immunizing activity, which comprises administering to such mammal an immunosuppressive amount of a compound of the formula



wherein R<sup>2</sup> is methyl or ethyl, or an acid addition salt thereof.

#### 4,794,126 REDUCTION OF DISCOLORATION IN FLAME RETARDED POLYURETHANE FOAMS

Gerald Fesman, Teaneck, N.J.; Barry Jacobs, Bethel, Conn., and Barbara Williams, New York, N.Y., assignors to Akzo America Inc., New York, N.Y.

Filed May 2, 1988, Ser. No. 188,968  
Int. Cl.<sup>4</sup> C08G 18/14

U.S. Cl. 521-117

12 Claims

1. An anti-scorch composition designed to be used to reduce scorch in polyurethane foams containing a halogenated phosphorus-based flame retardant, which comprises:  
(a) a diaryl arylendiamine compound;  
(b) the reaction product of a diarylamine and a lower alkyl ketone; and  
(c) a hindered phenol.

#### 4,794,127 OXYNITRATE ADDITIVE FOR POLYURETHANE FOAMS

Thomas M. Knobel, and Mary A. Walker, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Mar. 11, 1988, Ser. No. 166,856  
Int. Cl.<sup>4</sup> C08J 9/00

U.S. Cl. 521-123

34 Claims

1. In a process for producing polyurethane foam by allowing a reaction mixture comprising at least one polyisocyanate component and at least one polyfunctional active hydrogen component to react, the improvement which comprises employing an oxynitrate compound selected from the group consisting of oxynitrate salts of metals of Group IV B of the Mendeleef periodic table in an amount effective to provide open cells in a resulting foam.

#### 4,794,128 POROUS FILM

Heihachiro Kawaguchi, Wakayama; Hidenori Shirai, Utsunomiya, and Akio Kimura, Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan  
Filed May 27, 1987, Ser. No. 54,856  
Claims priority, application Japan, May 28, 1986, 61-122999  
Int. Cl.<sup>4</sup> C08L 67/00, 77/00

U.S. Cl. 521-138

9 Claims

1. A porous film which comprises a polyolefin resin, a filler and a polyester obtained from a polybasic acid, a polyhydric alcohol and a monobasic acid having 14 to 22 carbon atoms and/or a monohydric alcohol having 12 to 22 carbon atoms or a polyester obtained from a polybasic acid and a monohydric

alcohol, the film being obtained by melting and moulding and then stretching.

#### 4,794,129 REACTION INJECTION MOLDING COMPOSITIONS

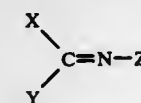
Herbert R. Gillis, Jr., Sterrebeek, and Malcolm P. Hanna, Louvain, both of Belgium, assignors to ICI Americas Inc., Wilmington, Del. and Imperial Chemical Industries PLC, London, England  
Continuation-in-part of Ser. No. 105,641, Oct. 6, 1987, abandoned. This application Feb. 26, 1988, Ser. No. 160,647  
Claims priority, application United Kingdom, Mar. 11, 1987, 8705801

Int. Cl.<sup>4</sup> C08G 18/14

U.S. Cl. 521-121

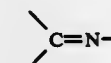
91 Claims

1. A reaction system for use in making a polymer by a reaction injection molding process, said system comprising the following reaction components:  
(A) an organic aromatic polyisocyanate; and  
(B) an isocyanate-reactive composition comprising at least one imino-functional compound which has at least one imino group that is directly reactive towards isocyanates and which conforms to the following structure



wherein

X, Y, and Z are chemical moieties which collectively form the rest of said compound and are each independently selected from the group consisting of H and organic radicals which are attached to the imino unit



of said compound through N, C, O, S, Si or P; the central carbon atom of said imino unit is bonded to three atoms; and  
said system is used to make a polymer by impingement mixing a stream comprising said reaction component (A) and a stream comprising said reaction component (B).

#### 4,794,130 METHOD FOR GRAFT POLYMERIZATION OF ACETYLENE COMPOUND ON A SHAPED POLYMER ARTICLE

Kiyoshi Hayakawa, Gifu; Hiromi Yamakita, Asahi; Masato Tazawa, and Hiroshi Taoda, both of Nagoya, all of Japan, assignors to Agency of Industrial Science and Technology and Ministry of International Trade and Industry, both of Tokyo, Japan

Filed Mar. 30, 1987, Ser. No. 31,368  
Claims priority, application Japan, May 16, 1986, 61-113047  
Int. Cl.<sup>4</sup> C08F 2/50, 255/02

U.S. Cl. 522-33

4 Claims

1. A method for graft polymerizing phenylacetylene onto a shaped polyethylene article, which consists essentially of: mutually contacting said shaped polyethylene article and at least one of bromine or iodine in molecular form; irradiating said shaped polyethylene article in mutual contact with said halogen, thereby forming a halogenated shaped polyethylene article; and irradiating said shaped, halogenated polyethylene article with light in the presence of a polymerizable monomer in the vapor phase consisting essentially of phenylacetylene

thereby graft polymerizing said phenylacetylene onto said shaped, halogenated polyethylene article.

#### 4,794,131 PHOTO-PRODUCT ENERGY BARRIER COMPOSITION

Robert M. Etter, and Phillip J. Neumiller, both of Racine County, Wis., assignors to S. C. Johnson & Son, Inc., Racine, Wis.

Filed Jan. 14, 1987, Ser. No. 3,350  
Int. Cl.<sup>4</sup> C08F 12/48

U.S. Cl. 522-173

67 Claims

3. A process for making a photo-product comprising:  
(1) contacting:  
(a) 2,2',4,4'-tetrahydroxybenzophenone;  
(b) ammonium hydroxide; and  
(c) optionally a trace amount of at least one metal selected from the group consisting of zinc, copper, nickel, silver, iron, manganese, lead, cobalt, zirconium, mercury, palladium, cadmium, ruthenium, rhodium, and mixtures thereof; in a solvent to form a reactant mixture having a pH from about 7 to 10.5; and  
(2) exposing the reactant mixture to light in the presence of an oxygen source.  
15. A process for making a photo-product comprising:  
(1) contacting:  
(a) 2,2',4,4'-tetrahydroxybenzophenone;  
(b) at least one metal salt wherein the metal is selected from the group consisting of zinc, copper, nickel, silver, iron, manganese, lead, cobalt, zirconium, mercury, palladium, cadmium, ruthenium, rhodium, and mixtures thereof; and  
(c) at least one amine;  
in a solvent to form a reactant mixture having a pH from about 7 to 10.5; and  
(2) exposing the reactant mixture to light in the presence of an oxygen source.

#### 4,794,132 LOW SMOKE POLYPROPYLENE INSULATION COMPOSITIONS

Lie K. Djiauw, Houston, Tex., and Ronald D. Icenogle, Spokane, Wash., assignors to Shell Oil Company, Houston, Tex.  
Filed Dec. 29, 1986, Ser. No. 947,054  
The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> C08K 9/04, 9/06, 3/22

U.S. Cl. 523-200

18 Claims

1. A flame retardant insulation composition comprising:  
(a) 5-40 percent by weight of a hydrogenated monoalkylarene (A)-conjugated diene (B) block copolymer containing at least one A block and at least one B block wherein at least 1 percent by weight of said block copolymer has been functionalized with a monomer that does not polymerize easily;  
(b) 1-20 percent by weight of a plasticizer;  
(c) 1-40 percent by weight of polypropylene;  
(d) 10-85 percent by weight of a hydrated magnesium hydroxide which has been surface treated with a coupling agent.

#### 4,794,133 ACRYLATED POLYURETHANES BASED ON POLYOXYTETRAMETHYLENE GLYCOLS EXTENDED WITH ETHYLENICALLY UNSATURATED DICARBOXYLIC ACIDS

Elias P. Moschovis, Des Plaines; Joseph J. Stanton, Buffalo Grove, and Clive J. Coady, Hanover Park, all of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Filed Jan. 4, 1988, Ser. No. 140,675  
Int. Cl.<sup>4</sup> C08G 18/42

U.S. Cl. 524-99

15 Claims

1. An ultraviolet-curable coating composition adapted for

the buffer coating of optical glass fiber, consisting essentially of an acrylate-capped polyurethane, which may contain urea groups, in admixture with at least about 25% of the weight of the acrylate-capped polyurethane of liquid monoethylenically unsaturated monomer having a low glass transition temperature below about 0° C. and at least about 3% of N-vinyl pyrrolidone based on the weight of said low glass transition temperature monomer, said acrylate-capped polyurethane being based on a generally linear polyurethane which is the reaction product of organic diisocyanate with a stoichiometric deficiency of a modified diol, said modified diol being the diester reaction product of polyoxytetramethylene glycol having a molecular weight of from about 200 to about 2000 with a stoichiometric deficiency of an ethylenically unsaturated dicarboxylic acid or ester-forming substitution product thereof to provide a higher molecular weight polyoxytetramethylene glycol which includes ester groups and copolymerizable ethylenic unsaturation.

4,794,134

## OZONE RESISTANT ELASTOMERIC ARTICLES

Edward L. Wheeler, Watertown, and Robert J. Franko, Beacon Falls, both of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Continuation-in-part of Ser. No. 90,298, Aug. 28, 1987. This application Mar. 4, 1988, Ser. No. 163,924

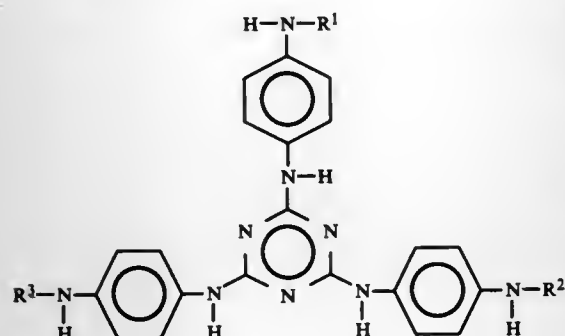
Int. Cl. C08K 5/34, 5/17

U.S. Cl. 524—100

8 Claims

1. A non-staining, ozone resistant rubber article having an elastomer body comprising:

- (a) at least one ozone degradation-prone highly unsaturated polymer; and  
(b) a compound of structure (I), added in an amount effective to protect said unsaturated polymer against ozone attack,



in which R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are radicals independently selected from a C<sub>3</sub>-C<sub>18</sub> branched or linear alkyl, or a C<sub>3</sub>-C<sub>12</sub> cycloalkyl or a C<sub>3</sub>-C<sub>12</sub> cycloalkyl substituted with one or more C<sub>1</sub>-C<sub>12</sub> alkyl groups.

4,794,135

## ARYLENEDIAMINE SUBSTITUTED TRIAZINES

Edward L. Wheeler, Watertown; Franklin H. Barrows, Nantucket; Robert J. Franko, Beacon Falls, and Wadim Batorewicz, New Haven, all of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Filed Aug. 28, 1987, Ser. No. 90,298

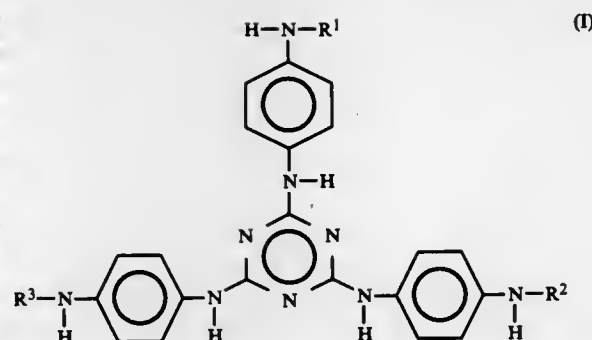
Int. Cl. C08K 5/34, 5/17

U.S. Cl. 524—100

18 Claims

1. A degradation-resistant composition comprising:

- (a) an unsaturated polymer; and  
(b) a compound of structure (I), added in an effective amount to said unsaturated polymer,



in which R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are radicals independently selected from a C<sub>3</sub>-C<sub>18</sub> branched or linear alkyl, or a C<sub>3</sub>-C<sub>12</sub> cycloalkyl or a C<sub>3</sub>-C<sub>12</sub> cycloalkyl substituted with one or more C<sub>1</sub>-C<sub>12</sub> alkyl groups.

4,794,136

## PRIMER FOR PVDC TOPCOATS ON OPP FILM

Robert E. Toussaint, Fairport, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 5, 1987, Ser. No. 342

Int. Cl. C08L 61/00

U.S. Cl. 524—512

6 Claims

1. A primer suitable for use in heat sealable films consisting essentially of a water-based acrylic/melamine system consisting of the reaction product of an acrylic emulsion interpolymers, a water-soluble partially alkylated melamine formaldehyde resin curing agent, and a suitable acid catalyst.

4,794,137

## (I) THERMOPLASTIC POLYMER MIXTURE COMPRISING POLYFUNCTIONAL DIENE COMPOUNDS

Roelof van der Meer, AZ Bergen op Zoom, and Jan Busink, CT Bergen op Zoom, both of Netherlands, assignors to General Electric Company, Selkirk, N.Y.

Filed Jul. 24, 1986, Ser. No. 889,983

Claims priority, application Netherlands, Jul. 24, 1985, 850217

Int. Cl. C08K 5/52

U.S. Cl. 524—142

4 Claims

1. A thermoplastic polymer mixture consisting essentially of:  
A. 80 to 99.4% by weight of at least one polyphenylene ether compound;  
B. 0.5 to 19.5% by weight of a softener compound effective for plasticizing said polyphenylene ether; and  
C. 0.01 to 4.0% by weight of divinyl benzene,  
wherein the weight percentages of constituents A, B, and C are based on the weights of A, B, and C taken together.

4,794,138

## PENTAERYTHRITOL CO-ESTERS WHERE UP TO 75 PERCENT OF THE ACID COMPONENT IS ALKYLTHIOALKANOIC

Nell Dunski, Creve Coeur, and Ali A. Bazzi, Chesterfield, both of Mo., assignors to Mallinckrodt, Inc., St. Louis, Mo.

Division of Ser. No. 871,007, Jun. 5, 1986, Pat. No. 4,734,519.

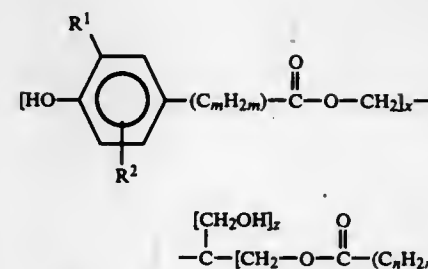
This application Aug. 28, 1987, Ser. No. 90,819

Int. Cl. C07C 149/20

U.S. Cl. 524—289

13 Claims

1. An extruded composition of matter comprising (a) an organic material normally subject to oxidative deterioration; and (b) a stabilizing amount of a compound having the formula:



wherein

R<sup>1</sup> is methyl, ethyl, an alpha-branched acyclic alkyl group having from 3 to 10 carbon atoms, or a cycloalkyl group having from 5 to 12 carbon atoms;

R<sup>2</sup> is hydrogen, methyl, ethyl, an alpha-branched acyclic alkyl group having from 3 to 10 carbon atoms, or a cycloalkyl group having from 5 to 12 carbon atoms and R<sup>2</sup> is meta or para to R<sup>1</sup>;

m is an integer from 1 to about 6;

n is an integer from 1 to about 10;

k is an integer from 1 to about 30;

x is 1, 2 or 3;

y is 1, 2 or 3; and

z is zero, 1 or 2;

subject to the provisos that

- (a) the sum of x, y and z is 4;  
(b) when z is zero, y is 1, 2 or 3 and x is 4-y;  
(c) when z is 2, each of x and y is 1;  
(d) when x is 2 or 3, each R<sup>1</sup> is selected independently of each other R<sup>2</sup> and each m is selected independently of each other m; and  
(e) when y is 2 or 3, each n is selected independently of each other n and each k is selected independently of each other k.

4,794,139

## THIXOTROPIC THICKENING AGENT FOR AQUEOUS SYSTEMS

Jennifer T. Braden, Stow; Gary L. Burroway, Doylestown; Herbert L. Ballard, Norton, and Donald A. Tedeschi, Uniontown, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Sep. 22, 1986, Ser. No. 910,054

Int. Cl. C08L 37/00

U.S. Cl. 524—117

19 Claims

1. A copolymer which can be utilized as a thixotropic thickening agent for use in aqueous coating systems which consists of repeat units which are derived from methacrylic acid monomer, ethylacrylate monomer, and a water soluble crosslinking agent selected from the group consisting of alkylene bisacrylamides and ethylene glycol dimethacrylate; wherein from 25 to 55 weight percent of the repeat units in said copolymer are derived from ethylacrylate, wherein from 45 to 75 weight percent of the repeat units in said copolymer are derived from methacrylic acid wherein from 0.05 to 0.75 weight percent of the repeat units in said copolymer are derived from said water soluble crosslinking agent, and wherein the Brookfield RVT viscosity of a 2 weight percent solution of said copolymer at a pH within the range of 7 to 8 in water as measured at 50 rpm using a number 3 spindle is within the range of 50 to 2000 mPa.s.

3. An aqueous coating composition which is comprised of (a) a water reducible resin which is comprised of, based on 100 weight percent of monomeric units within the water reducible resin: (1) from about 50 to about 90 percent of at least one monomer selected from the group consisting of styrene, alpha-methyl styrene and vinyl toluene, (2) from about 10 to about 40 of at least one alkyl acrylate monomer wherein the alkyl moiety contains from 3 to 5 carbon atoms, and (3) from about 1 to about 10 percent of at least one unsaturated carbonyl com-

pound selected from the group consisting of acrylic acid, methacrylic acid, fumaric acid, itaconic acid, maleic acid and maleic anhydride; (b) a thixotropic thickening agent which is comprised of repeat units which are derived from methacrylic acid monomer, ethylacrylate monomer, and a water soluble crosslinking agent, wherein from 25 to 55 weight percent of the repeat units in said copolymer are derived from ethylacrylate monomer, wherein from 45 to 75 weight percent of the repeat units in said copolymer are derived from methacrylic acid monomer, and wherein from 0.05 to 0.75 weight percent of the repeat units in said copolymer are derived from said water soluble crosslinking agent; (c) a pigment; (d) a plasticizer; and (e) water.

4,794,140

## PRODUCTION PROCESS FOR MANUFACTURING LOW MOLECULAR WEIGHT WATER SOLUBLE ACRYLIC POLYMERS AS DRILLING FLUID ADDITIVES

William Alexander, Naperville, Ill., assignor to American Colloid Company, Arlington Heights, Ill.

Division of Ser. No. 816,290, Jan. 6, 1986, Pat. No. 4,709,767.

This application Nov. 30, 1987, Ser. No. 126,403

Int. Cl. C08J 3/06

U.S. Cl. 524—827

15 Claims

1. A process for preparing a solid, essentially uncrosslinked water-soluble resin comprising mixing with water a monomer solution of an acrylic monomer and 0-30 mole percent acrylamide, said acrylic monomer neutralized 0-100 mole percent; and limiting the degree of polymerization of the monomer to a weight average molecular weight of about 1,000 to about 50,000 to form a mixed monomer solution, wherein the monomers of the mixed monomer solution consist essentially of the acrylic monomer and optionally acrylamide, and water is present in the mixed monomer solution in an amount of 1 to 40% by weight of the mixed monomer solution, and initiating polymerization of the acrylic monomer such that during polymerization, the exothermic heat of reaction is substantially the only heat energy used to accomplish polymerization, and to drive off sufficient water to obtain a solid, water-soluble resin having a water content of 13 percent by weight or less.

4,794,141

## THERMOPLASTIC MOULDING COMPOSITIONS BASED ON POLYSILOXANE/POLYCARBONATE BLOCK COPOLYMERS

Winfried Paul, Krefeld; Ulrich Grigo, Kempen; Peter R. Müller, Leverkusen, and Werner Nouverté, Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Bayerwerk, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 828,471, Feb. 12, 1986, abandoned. This application Dec. 10, 1986, Ser. No. 940,874

Claims priority, application Fed. Rep. of Germany, Feb. 26, 1985, 3506680

Int. Cl. C08L 53/00

U.S. Cl. 525—92

8 Claims

1. A thermoplastic moulding composition containing  
(A) 47 to 99 parts by weight of a polydiorganosiloxane/poly-carbonate block copolymer having a weight average molecular weight of 10,000 to 30,000 determined in a known manner by ultracentrifugation or measurement of scattered light and with a content of poly(diorganosiloxane) structural units of between 10% by weight and 0.5% by weight, in each case based on the total weight of the blocked copolymer, the blocked copolymer having been prepared starting from polydiorganosiloxane(s) which contain alpha,omega-bis-hydroxyaryloxy end groups and having a degree of polymerization P<sub>n</sub> of between 5 and 100, chain stopper also being used,  
(B) 1 to 3 parts by weight of an elastomeric polymer having a glass transition temperature of less than -20° C. selected from optionally selectively hydrogenated blocked copolymers of a vinyl aromatic monomer X and a conjugated



diene Y of the X-Y type or X(Y-X)<sub>r</sub> type wherein r is a whole number of 1 to 5, or Y(X)<sub>s</sub> type wherein s is a whole number of 3 to 5, and

(C) 0 to 50 parts by weight of a thermoplastic polyalkylene terephthalate, the total of parts by weight of components A)+(B)+(C) in each case being 100 parts by weight, in which component (A) is prepared by the phase boundary process using a monoalkylphenol or dialkylphenol with a total of 8 to 20 carbon atoms in the alkyl substituents or a halogenocarbonic acid ester of such phenols, as the chain stopper.

4,794,142

# USE OF SPECIAL ETHYLENE-VINYL ACETATE-COPOLYMERS FOR THE MODIFICATION OF PVC

Heinrich Albert; Herbert Bartl, both of Odenbach; Otto Billinger, Linz, and Fritz Mietzsch, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 10, 1987, Ser. No. 83,230

Claims priority, application Fed. Rep. of Germany, Aug. 12, 1986, 3628315

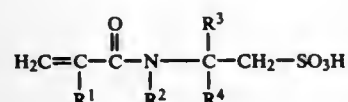
Int. Cl.<sup>4</sup> C08L 23/08, 27/06, 33/02

U.S. Cl. 525-196

3 Claims

1. Modified polyvinyl chloride comprising 90 to 98% by weight of polyvinyl chloride and 10 to 2% by weight of a modifying copolymer which is 20 to 79.9% by weight of vinyl acetate, 79.9-20% by weight of ethylene and 0.1-20% by weight of at least one of unsaturated carboxylic acid, unsaturated sulphonic acid or unsaturated phosphonic acid, produced by emulsion polymerization in water,

wherein said carboxylic acid comprises semi-esters of maleic acid, itaconic acid, acrylic acid or methacrylic acid, said sulphonic acid comprises vinyl sulfonic acid, allylsulfonic acid, methallylsulfonic acid or an acid of the formula



wherein

R<sup>1</sup> is H or methyl;

R<sup>2</sup> is H or methyl or ethyl; and

R<sup>3</sup> and R<sup>4</sup> independent of each other are alkyl having 1 to 8 carbon atoms said phosphonic acid comprises vinyl, allyl phosphonic acid or their derivatives, the acid groups in the copolymer being at least partially in the form of the corresponding alkali metal or ammonium salt.

4,794,143

# POLYMER COMPOSITION CONTAINING CPE AND STYRENE POLYMER

Kam W. Ho, Sarnia, Canada, assignor to Polysar Limited, Sarnia, Canada

Filed Mar. 24, 1988, Ser. No. 172,384

Int. Cl.<sup>4</sup> C08L 23/26, 23/28; C08K 3/16, 3/10

U.S. Cl. 525-196

8 Claims

1. A process to prepare an impact resistant polymer composition consisting of thoroughly admixing in a polymer mixer a composition comprising:

(i) 25 to 90 parts by weight styrenic polymer, and correspondingly

(ii) 7 to 10 parts by weight chlorinated polyethylene, with

(iii) 0.1 to 4.0 parts by weight, per 100 parts combined weight of said styrenic polymer and said chlorinated

polyethylene, of a Lewis acid selected from AlCl<sub>3</sub>, FeCl<sub>3</sub> and SbCl<sub>3</sub>.

4,794,144

# ACRYLIC STAR POLYMERS CONTAINING MULTI-FUNCTIONAL MONOMERS IN THE CORE, MADE BY GROUP TRANSFER POLYMERIZATION

Harry J. Spinelli, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 771,685, Sep. 3, 1985, which is a continuation-in-part of Ser. No. 627,919, Jul. 5, 1984, abandoned. This application Sep. 30, 1986, Ser. No. 914,714 The portion of the term of this patent subsequent to Apr. 21, 2004, has been disclaimed.

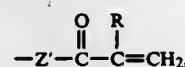
Int. Cl.<sup>4</sup> C08F 269/00

U.S. Cl. 525-284

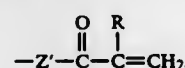
9 Claims

1. An acrylic core comprising

a. a crosslinked core comprising a polymer derived from a mixture comprising one or more monomers having at least two groups



polymerizable by a group transfer polymerization process, b. attached to the core, at least 5 arms comprising polymer chains derived from one or more monomers polymerizable by a group transfer process, each such monomer having one group



in each of which R is the same or different and is H, CH<sub>3</sub>, CH<sub>3</sub>CH<sub>2</sub>, CN or CO R' and Z' is O or NR', wherein R' is C<sub>1-4</sub> alkyl, and,

said polymer being made by a process comprising group transfer polymerization utilizing a polymerization initiator selected from the group consisting of tetracoordinate organosilicon, organotin and organogermanium initiators having at least one initiating site, and a catalyst suitable for group transfer polymerization, in which star polymer one or more functional groups are attached to the arms, the core, or the arms and the core.

4,794,145

# PROCESS FOR METALLATING NONCONJUGATED DIENE-CONTAINING ETHYLENE POLYMERS AND GRAFT POLYMERS PREPARED THEREFROM

Gary K. Lund, Ogden, Utah; Raymond L. Laakso, Jr., St. Francisville, La.; Calvin P. Esneault, and Brian W. Walther, both of Baton Rouge, La., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 899,183, Aug. 18, 1986, Pat. No. 4,761,456, which is a continuation-in-part of Ser. No. 745,763, Jun. 16, 1985, abandoned. This application Oct. 16, 1987, Ser. No. 109,332

Int. Cl.<sup>4</sup> C08F 255/06, 255/00

U.S. Cl. 525-250

15 Claims

1. A process for preparing a thermoplastic graft polymer having an ethylene polymer backbone and a plurality of side chains which comprises:

(a) providing a metallated ethylene polymer;

(b) contacting the metallated ethylene polymer with a modifying compound selected from the group consisting of alpha-methylstyrene, alpha-ethylstyrene, alpha-propylstyrene and alpha-isopropylstyrene under conditions sufficient to form a modified polymer wherein at least one moiety of the modifying compound is attached to the ethylene polymer backbone; and

(c) contacting the modified polymer with at least one anionically polymerizable monomer selected from the group consisting of vinyl aromatic compounds, vinyl unsaturated amides, acrylonitrile, methacrylonitrile, organic isocyanates, organic diisocyanates, lower alkyl acrylates, lower alkyl methacrylates, lower olefins, vinyl esters of carboxylic acids, vinyl lower alkyl ethers, vinyl pyridines and vinyl pyrrolidones under reactive conditions sufficient to form the graft polymer.

4,794,146

# OIL ADDITIVES CONTAINING A THIOCARBAMYL MOIETY

Stanley J. Brois, Westfield, and Antonio Gutierrez, Mercerville, both of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 908,786, Sep. 18, 1986, Pat. No. 4,717,754, which is a continuation of Ser. No. 776,019, Sep. 13, 1985, abandoned, which is a continuation of Ser. No. 320,574, Nov. 21, 1981, abandoned, which is a continuation of Ser. No. 109,778, Jan. 7, 1980, abandoned. This application Aug. 20, 1987, Ser. No. 89,449

The portion of the term of this patent subsequent to Jan. 5, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> C08F 8/34

U.S. Cl. 525-331.8

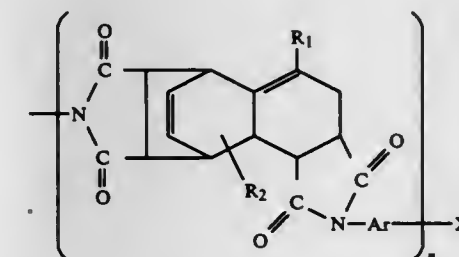
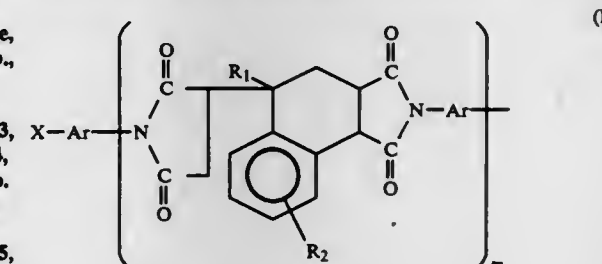
23 Claims

1. A polyalkenyl isothiocyanate having the isothiocyanate group attached to a carbon which is one carbon removed from an ethylenically unsaturated carbon, said polyalkenyl isothiocyanate being obtained by the method of:

(a) adding a solution of a thiocyanogen halide in acetic acid, tetrahydrofuran or alcohol solvent to a polyalkene to form an adduct wherein the polyalkene is selected from the group consisting of polypropylene, polyisobutylene, ethylene copolymers, ethylene terpolymers, polybutadiene-isoprene interpolymer, butylene-isoprene interpolymer, and mixtures thereof;

(b) removing a hydrogen halide from said adduct to produce a polyalkenyl thiocyanate having the thiocyanate group attached to a carbon which is one carbon removed from an ethylenically unsaturated carbon; and

(c) thermally rearranging said polyalkenyl thiocyanate to said polyalkenyl isothiocyanate.



wherein X represents —NH<sub>2</sub> group and/or —OH group, Ar represents an aromatic residue, R<sub>1</sub> represents a hydrogen atom or an alkyl group having from 1 to 10 carbon atoms, R<sub>2</sub> represents a hydrogen atom, an alkyl or alkoxy group having from 1 to 20 carbon atoms or a hydroxyl group, and each of m and n represents a number of from 0 to 30, provided that m and n cannot be 0 at the same time, and a fiber (C) as a reinforcing material.

4,794,149

# COATING COMPOSITION CONTAINING A HYDROXY FUNCTIONAL EPOXY ESTER RESIN

Andrew H. Dervan, Grosse Pointe Farms; Dennis J. Grebur, and Panagiotis I. Kordomenos, both of Mt. Clemens, all of Mich., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 809,642, Dec. 16, 1985, Pat. No. 4,754,002. This application Sep. 3, 1987, Ser. No. 93,172

Int. Cl.<sup>4</sup> C08L 63/02, 67/04

U.S. Cl. 525-450

19 Claims

1. An organic solvent based, thermosetting coating composition comprising:

(A) hydroxy functional epoxy ester resin having a number average molecular weight (M<sub>n</sub>) between about 1,000 and about 4,000 and being the reaction product of (1) a chain extended product of diepoxide with aliphatic diol and (2) acid comprising primary hydroxy functional acid and a fatty acid and reacted in a 1:1 equivalent ratio with the chain extended product;

(B) linear polycaprolactone diol having a molecular weight between about 1500 and about 5000, wherein said (A) and (B) are included in said composition in a weight ratio between about 4:1 and 1:4; and

(C) blocked polyisocyanate crosslinking agent comprising at

4,794,147

# NOVEL NON-IONIC POLYURETHANE RESINS HAVING POLYETHER BACKBONES IN WATER-DILUTABLE BASECOATS

Thomas G. Savino, Northville; Thomas C. Balch, West Bloomfield; Alan L. Steinmetz, Milford; Sergio E. Balatin, West Bloomfield, and Nicholas Calozzo, St. Clair Shores, all of Mich., assignors to BASF Corporation, Inmont Division, Clifton, N.J.

Filed Jul. 24, 1987, Ser. No. 77,353

Int. Cl.<sup>4</sup> C08G 18/40

U.S. Cl. 525-440

26 Claims

1. A laterally stabilized polyurethane resin comprising the reaction product of:

(a) at least one organic compound having two or more reactive hydrogen functionalities;

(b) a nonionic stabilizer prepared by the reaction of:

(i) a polyether having a single active hydrogen functionality with a first polyisocyanate compound to produce a partially capped isocyanate intermediate; and

(ii) a compound having at least one active amine hydrogen and at least two active hydroxyl groups; and

(c) at least one second isocyanate-containing compound.

least two isocyanate groups which have been blocked by reaction with an active hydrogen bearing blocking agent, which crosslinking agent de-blocks at the cure temperature of said composition, said crosslinking agent being included in said composition in an amount equal to between about 10 and about 50 percent of the combined weight of said (A) and (B) in said composition.

4,794,150

## SYNTHESIS OF PEPTIDE ANALOGS

Samuel Steel, 4401 W St., NW., Washington, D.C. 20007

Filed Mar. 11, 1987, Ser. No. 24,602

Int. Cl.<sup>4</sup> A61K 37/02; C07C 103/52; C08F 283/00

U.S. Cl. 525—54.11 21 Claims

1. A polymeric resin for use in a solid phase peptide synthesis of peptide analogs, said resin being insoluble and capable of permitting an attachment to it of a first amino acid in said solid phase peptide synthesis, wherein the improvement comprises said resin being in a shape of a water or a disc and reactor cell means for use in combination with said resin, said reactor cell means being capable of at least partially containing said resin during said solid phase peptide synthesis.

4,794,151

**PREPARATION OF FINELY DIVIDED HOMOPOLYMERS AND COPOLYMERS OF ETHENE USING A LIQUID ALKANE AS REACTION MEDIUM**  
Radolf Mueller-Mall, Neubofen; Guido Funk; Robert Bachl, both of Worms; Peter Hennenberger, Freinsheim, and Erich Kolk, Bad Duerkheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 8, 1987, Ser. No. 35,919

Claims priority, application Fed. Rep. of Germany, Apr. 12, 1986, 3612376

Int. Cl.<sup>4</sup> C08F 2/14, 10/02, 10/08

U.S. Cl. 526—64 1 Claim

1. A process for the continuous preparation of a finely divided homopolymer of ethene or copolymer of ethene with a minor amount of C<sub>3</sub>–C<sub>8</sub> α-monoolefin, with an average particle diameter (by DIN 53,477) of from 0.3 to 1.5 mm and a bulk density (by DIN 53,468) of from 0.400 to 0.600 g/cm<sup>3</sup> by catalytic polymerization at from 60° to 100° C. and under a total pressure of from 30 to 50 bar in a circular tube reactor using a C<sub>4</sub>–C<sub>8</sub> alkane which is present in liquid form as reaction medium in which the ethene or ethene/comonomer mixture to be polymerized is present in dissolved form and the polymer formed is present in suspended form, and running the reaction mixture as a cycle stream to which the feed materials are added by bleeding in and from which the polymer formed is withdrawn by bleeding out reaction mixture, which comprises

- maintaining the mean concentration C<sub>m</sub> of polymer in the cycle stream at a value within the range from 0.40 to 0.70 g of polymer per g of reaction mixture and
- effecting the bleeding out of reaction mixture at a point of the cycle stream where the concentration of polymer has a value within the range from 0.50 × C<sub>m</sub> to 0.70 × C<sub>m</sub>.

4,794,152

**BEAD-LIKE POLYMER AND PRODUCTION THEREOF**  
Toshiyuki Kobashi; Hideo Naka, and Shoyo Takagi, all of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Continuation of Ser. No. 612,788, May 22, 1984, abandoned.

This application Feb. 4, 1986, Ser. No. 827,213

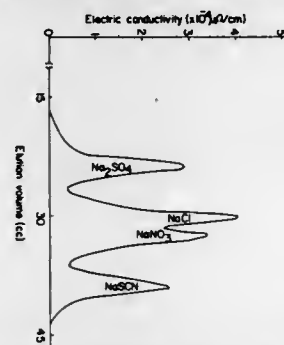
Claims priority, application Japan, Jun. 10, 1983, 58-104735; Jun. 15, 1983, 58-108422

Int. Cl.<sup>4</sup> C06F 24/00

U.S. Cl. 526—273 5 Claims

1. A bead-like polymer produced by polymerizing glycidyl acrylate or glycidyl methacrylate alone or a monomer mixture composed of more than 60 weight % of glycidyl acrylate or

methacrylate and at least one other ethylenically unsaturated monomer which forms the remainder, which polymer has hydroxyl groups resulting from the ring-opening of the epoxy groups of said glycidyl acrylate or methacrylate, said polymer having a gel water content value of not less than 50% and said polymer having a particle diameter greater than 10 μ, which process comprises aqueous suspension polymerization of glycidyl acrylate or glycidyl methacrylate alone or a monomer mixture composed of more than 60 weight % of said glycidyl



acrylate or glycidyl methacrylate and at least one other monomer which forms the remainder, in the presence of a water-soluble polymer as a dispersant in an amount sufficient to produce said bead-like polymer which contains essentially monomer units consisting of an ethylenically unsaturated carboxylic acid or a salt thereof and monomer units consisting of an ethylenically unsaturated sulfonic acid or a salt thereof, and an oil-soluble radical polymerization initiator, at a pH of from 2 to 9 and at a stirring speed of from 50 to 500 r.p.m., followed by heat treatment at a temperature above 70° C. at a pH below 3.

4,794,153

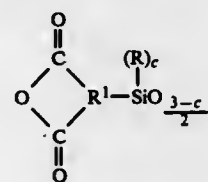
**POLYANHYDRIDE-SILOXANES AND POLYIMIDE-SILOXANES OBTAINED THEREFROM**  
Jonathan D. Rich, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 861,162, May 9, 1986, abandoned, which is a continuation-in-part of Ser. No. 678,725, Dec. 5, 1984, abandoned. This application Nov. 16, 1987, Ser. No. 122,484

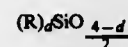
Int. Cl.<sup>4</sup> C08G 77/04

U.S. Cl. 528—26 10 Claims

1. Polyanhydride siloxane having from about 5 to about 2000 chemically combined units comprising a mixture of silylanhydride units of the formula



and organosiloxane units of the formula



where R is selected from the class consisting of C<sub>(1-14)</sub> monovalent hydrocarbon radicals and monovalent C<sub>(1-14)</sub> hydrocarbon radicals substituted with radicals neutral during intercondensation, R<sup>1</sup> is a C<sub>(6-14)</sub> trivalent aromatic organic radical, c is a whole number equal to 0 to 2 inclusive and d is an interger equal to 1 to 3 inclusive.

4,794,154

## TWO-COMPONENT URETHANE CONTAINING BLOCKED ISOCYANATE

James W. Benefiel, Northville, Mich., assignor to BASF Corporation, Clifton, N.J.

Filed May 6, 1988, Ser. No. 190,788

Int. Cl.<sup>4</sup> C08G 18/80

U.S. Cl. 528—45 8 Claims

1. A two component polyurethane coating kit, comprising a first component housed in a first container, said first component comprising at least one polyisocyanate having isocyanate groups blocked with an isocyanate blocking agent; and a second component housed in a second container, said second component comprising at least one isocyanate-reactive compound; which polyisocyanate and isocyanate-reactive compounds when contacted with each other react to form a polyurethane.

4,794,155

## PROCESS FOR FORMING ARYLETHER POLYMERS

Edmond P. Woo; Hendrik E. Tuinstra, and Michael J. Mullins, all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Aug. 26, 1987, Ser. No. 89,467

Int. Cl.<sup>4</sup> C08G 8/02, 14/00

U.S. Cl. 528—125 24 Claims

1. The process for preparing an aromatic ether polymer or oligomer comprising contacting (1) a first monomer which contains one or more activated aryl-aryl ether moieties having (a) an aryl moiety bonded directly to (b) an activating group which has an electron withdrawing moiety with sufficient strength to activate the aryl-aryl ether group so that exchange of aryloxy moieties occurs under reaction conditions and (c) an aryloxy moiety in ortho or para position to said activating group, with (2) a second monomer which contains: (a) one or more aryloxy moieties linked by the oxygen directly to; (b) a leaving group that can easily be removed from the oxygen in the presence of a catalyst in a concentration effective to promote exchange of the aryloxy moiety ortho or para to the activating group in the first monomer for the aryloxy moiety of the second monomer.

4,794,156

## TWO STAGE CATALYTIC PRODUCTION OF HIGH MOLECULAR WEIGHT POLYHALOBISPHENOL POLYCARBONATES

Thoi H. Ho; Frederick B. Kassell; Che I. Kao, all of Lake Jackson, and Jose L. Aguilar, Richwood, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

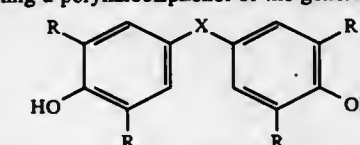
Filed Aug. 4, 1987, Ser. No. 81,418

Int. Cl.<sup>4</sup> C08G 63/62

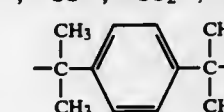
U.S. Cl. 528—199 19 Claims

1. A process for the production of high molecular weight polyhalobisphenol polycarbonates having an inherent viscosity range greater than 0.4 when measured in methylene chloride at 25° C. with a concentration of 5 gms per liter which consists essentially of the steps of

(A) mixing a polyhalobisphenol of the general formula



in which R is chlorine, bromine, or mixtures thereof, and X is a single bond or X is C<sub>1</sub>–C<sub>6</sub> alkylene, cycloalkylene, —O—, —S—, —SO—, —SO<sub>2</sub>—, —CO— or



with a halogenated solvent, and sufficient aqueous alkali metal hydroxide to obtain a mixture having said bisphenol in the alkali metal form,

(B) adding phosgene to said mixture and additional aqueous hydroxide whereby the pH of said mixture is maintained in the range from about 8 to about 13 and whereby mixtures of bischloroformate and monochloroformate of the bisphenols are formed,

(C) adding a catalytic amount of an activated pyridine selected from the group consisting of 4-aminopyridines and 2-substituted pyridines and additional aqueous hydroxide whereby said pH is maintained and a high molecular weight polycarbonate is produced, and

(D) recovering said high molecular weight polycarbonate.

4,794,157

## POLYETHERIMIDE COPOLYMERS, AND METHOD FOR MAKING

Donald R. Berdahl, Scotia, and Susan A. Nye, Albany, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

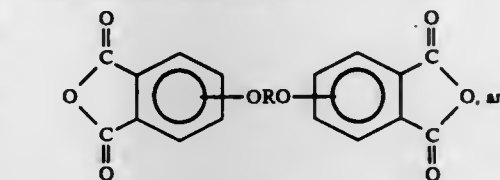
Filed Mar. 25, 1987, Ser. No. 29,914

Int. Cl.<sup>4</sup> C08G 63/06

U.S. Cl. 528—208 14 Claims

1. Injection moldable polyetherimide copolymers comprising the intercondensation product of reaction of substantially equimolar amounts of

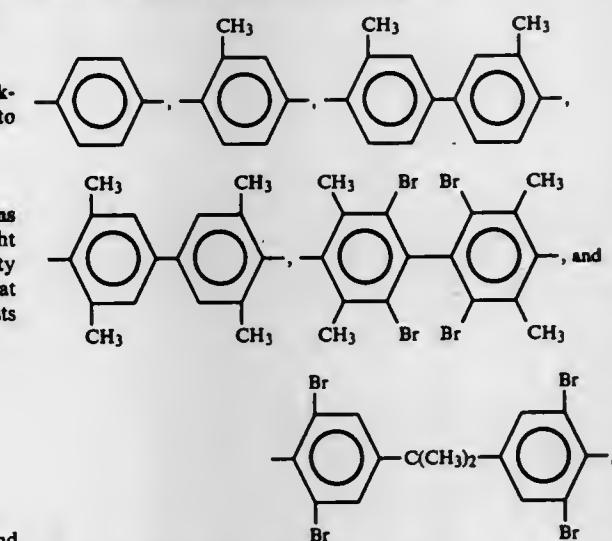
(A) aromatic bisanhydride comprising from about 10 to about 50 mole percent of oxydiphthalic anhydride and from about 90 to 50 mole percent of aromatic bis(ethranhydride) of the formula



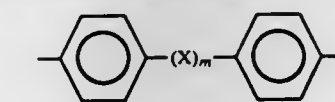
(B) aryldiamine of the formula,



where R is a member selected from the class consisting of divalent organic radicals of the formulas,



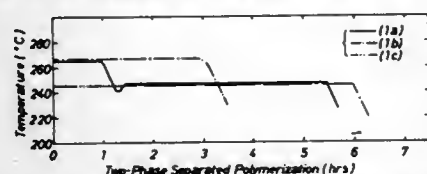
and (a) divalent organic radical of the formula,







- amount of an aprotic organic polar solvent used is from 0.2 to 5 kg per one mole of the alkali metal sulfide charged and from 0.5 to 5 mol of water is present together per kg of the organic polar solvent, until the conversion of the dihalo aromatic compound charged reaches from 50 to 98 mol % and the melt viscosity of the resultant prepolymer reaches 5 to 300 poise (as measured at 310° C. under a shear rate of 200 sec<sup>-1</sup>), and
- (2) a two-phase separated polymerization step of adding water to the resultant reaction mixture such that from 5.5



- to 15 mol of water is present per kg of the organic polar solvent in the reaction system without separating the resultant prepolymer from the reaction system,
- (i) heating and maintaining the reaction system for at least 10 minutes at a temperature (T<sub>1</sub>) within a range of from 257° to 290° C. while stirring,
- (ii) lowering the temperature of the reaction system and maintaining the reaction system for at least 2.0 hours at a temperature (T<sub>2</sub>) within a range of from 220° to 250° C. while stirring.

**4,794,165**  
**CARBON MONOXIDE/OLEFIN POLYMERIZATION WITH BIDENTATE LIGAND CONTAINING**  
 Johannes A. Van Doorn; Johannes J. M. Sael, and Eit Drent, all of Cn Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Dec. 21, 1987, Ser. No. 135,426  
 Claims priority, application Netherlands, Feb. 23, 1987, 8700443

Int. Cl.<sup>4</sup> C08G 67/02 7 Claims  
 1. In the process of producing a linear alternating polymer of carbon monoxide and at least one ethylenically unsaturated hydrocarbon in the presence of a catalyst composition formed from a palladium compound, the anion of a non-hydrohalogenic acid having a pK<sub>a</sub> below about 4 and a bidentate ligand incorporating two atoms of Group VA elements, the improvement which comprises employing a ligand wherein one of said Group VA atoms is phosphorus and the other Group VA atom is arsenic.

**4,794,166**  
**PROCESS FOR THE PREPARATION OF A HYDROGEL WHICH IS LARGELY FREE FROM MONOMERS**  
 Friedrich Engelhardt, Frankfurt; Manfred Schrod, Weiterstadt; Manfred Ziegelmayer, Bischofsheim; Josef Hilbig, Taunusstein, and Reinhard Dinges, Bad Soden, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Jul. 27, 1987, Ser. No. 77,803  
 Claims priority, application Fed. Rep. of Germany, Aug. 30, 1986, 3629611; Oct. 17, 1986, 3635367

Int. Cl.<sup>4</sup> C08F 6/00 14 Claims  
 1. A process for preparation of a hydrogel based on polyacrylic acid for use as superabsorbent substantially free from monomers and oligomers which comprises contacting a previously prepared hydrogel based on polyacrylic acid with a single-phase mixture of water and a solvent selected from group consisting of lower alcohol, lower ketone and dimethylformamide and then separating the hydrogel from the mixture of water and solvent.

**4,794,167**  
**PROCESS FOR THE PREPARATION OF POLYMER POWDERS BY SPRAY DRYING**  
 Christian Lindner, Cologne; Edwin Roth, Bergisch-Gladbach; Otto Koch; Hans-Eberhard Braese, both of Cologne, and Pol Bamels, Overath, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany  
 Filed Nov. 27, 1987, Ser. No. 126,306

Claims priority, application Fed. Rep. of Germany, Dec. 10, 1986, 3642106  
 Int. Cl.<sup>4</sup> C08J 3/12, 3/16 1 Claim  
 1. A process for the preparation of polymer powders from polymer dispersions, wherein a polymer dispersion is continuously fed into an atomization apparatus and a liquid agent is introduced simultaneously but separately, the dispersion and the liquid agent are completely mixed within at the most one second, and immediately thereafter the mixture is dried with evaporation of the volatile constituents to form a powder composed of particles having an average diameter of from 0.05 to 1 mm.

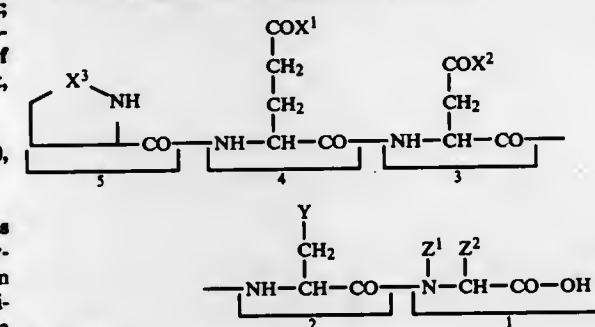
**4,794,168**  
**LEUKEMIA-ASSOCIATED VIRUS IMMUNOGEN, VACCINE AND ASSAY**  
 John H. Elder, Cardiff, and Richard A. Houghton, Solana Beach, both of Calif., assignors to Scripps Clinic and Research Foundation, La Jolla, Calif.  
 Continuation-in-part of Ser. No. 603,348, Apr. 24, 1984, Pat. No. 4,663,436. This application Dec. 10, 1985, Ser. No. 813,279  
 The portion of the term of this patent subsequent to May 5, 2004, has been disclaimed.

Int. Cl.<sup>4</sup> C07K 7/06, 7/08, 7/10 24 Claims  
 1. A synthetic polypeptide containing about 8 to about 40 amino acid residues in a sequence corresponding to a peptide sequence of an antigenic determinant domain of an envelope protein that is homologous to the small envelope protein p15E of FeLV-B from about position 70 to about position 95 taken from the amino-terminus of p15E.

**4,794,169**  
**PENTAPEPTIDES WITH CELL GROWTH REGULATORY EFFECTS AND A PROCESS FOR THE PREPARATION THEREOF**  
 Kjell Elgjo, and Karl-Ludvig Reichelt, both of Oslo, Norway, assignors to Bio-Tech A/S, Oslo, Norway  
 PCT No. PCT/NO86/00041, § 371 Date Feb. 18, 1987, § 102(e) Date Feb. 18, 1987, PCT Pub. No. WO87/00180, PCT Pub. Date Jan. 15, 1987

PCT Filed Jun. 18, 1986, Ser. No. 30,959  
 Claims priority, application Norway, Jun. 26, 1985, 852564; Feb. 28, 1986, 860752

Int. Cl.<sup>4</sup> C07K 7/06 4 Claims  
 1. A pentapeptide, represented by the formula



in which  
 X<sup>1</sup> and X<sup>2</sup> are the same or different and are OH or NH<sub>2</sub>,  
 Y is H or OH,  
 X<sup>3</sup> is CO or CH<sub>2</sub>.

one of the groups Z<sup>1</sup> and Z<sup>2</sup> is H and the other is H or CH<sub>3</sub>, all the amino acid units being in L-configuration, with the exception that the C-terminal amino acid unit is in D-configuration when Z<sup>2</sup> is methyl, and the C-terminal carboxyl group may be in reduced form —CH<sub>2</sub>—OH or be in amide form —CO—NH<sub>2</sub>, and cation complexes and salts thereof.

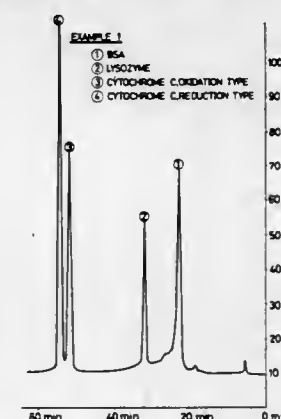
**4,794,170**  
**METHOD FOR THE PREPARATION OF CONJUGATES OF ADENINE-9-BETA-ARABINOFURANOSIDE 5' MONOPHOSPHATE WITH LACTOSAMINATED HUMAN ALBUMIN, THE OBTAINED CONJUGATES AND THERAPEUTICALLY ACTIVE COMPOSITIONS CONTAINING THEM**

Luigi Fiume; Corrado Busi; Alessandro Mattioli, all of Bologna, and Massimo Baldacci, Pisa, all of Italy, assignors to Laboratori Baldacci SpA, Italy  
 Filed Dec. 11, 1985, Ser. No. 807,657  
 Claims priority, application Italy, Dec. 11, 1984, 23998  
 Int. Cl.<sup>4</sup> C07D 15/06

U.S. Cl. 530—363 12 Claims  
 1. In a process for the preparation of a conjugate of adenine-9-beta-D-arabinofuranoside 5' monophosphate (ara-AMP) with lactosaminated human albumin (L-HSA) wherein ara-AMP activated with a carbodiimide and lactosaminated human albumin are reacted with each other, the improvement comprising carrying out the conjugation at a pH higher than 6.5 so as to produce a conjugate product which remains soluble after lyophilization.

**4,794,171**  
**CALCIUM-PHOSPHATE TYPE HYDROXYAPATITE AND PROCESS FOR PRODUCING SAME**  
 Nobuaki Tagaya, Kawagoe; Hideyuki Kuwahara, Oi; Takao Hashimoto, Oi; Noriko Komatsu, Oi; Keiko Fukamachi, Mitaka, and Tsugio Maeshima, Saitama, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan  
 Filed Sep. 22, 1986, Ser. No. 909,981  
 Claims priority, application Japan, Sep. 23, 1985, 60-209561  
 Int. Cl.<sup>4</sup> C01B 25/32

U.S. Cl. 530—417 10 Claims



1. A calcium-phosphate type hydroxyapatite characterized by a hexagonal unit lattice having unit lattice constants of 9.58±0.08 Å for the a axis and 7.00±0.05 Å for the c axis.

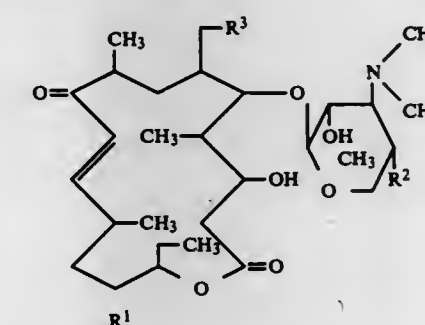
**4,794,172**  
**CERIC OXIDANT**  
 Robert P. Kreh, Jessup, Md., assignor to W. R. Grace & Co., Conn., New York, N.Y.  
 Filed Oct. 10, 1986, Ser. No. 917,462  
 Int. Cl.<sup>4</sup> C07F 5/00; C25B 3/02

U.S. Cl. 534—15 9 Claims  
 1. A Solid product having of having a formula selected from Ce(CH<sub>3</sub>SO<sub>3</sub>)<sub>2</sub>.xH<sub>2</sub>O and Ce(CH<sub>3</sub>SO<sub>3</sub>)<sub>2</sub>(OH)<sub>2</sub>.xH<sub>2</sub>O wherein x is an integer equal to or greater than 1.

**4,794,173**  
**MYCAMINOSYL TYLONOLIDE DERIVATIVES**  
 Hamao Umezawa; Sumio Umezawa, both of Tokyo; Tsutomu Tsuchiya, Kanagawa; Tomio Takemichi, Tokyo; Akihiro Tanaka, Tokyo, and Shuichi Sakamoto, Tokyo, all of Japan, assignors to Yamanouchi Pharmaceutical Co., Ltd., Tokyo, Japan

Filed May 9, 1986, Ser. No. 861,537  
 Claims priority, application Japan, May 13, 1985, 60-102402  
 Int. Cl.<sup>4</sup> C07H 17/08

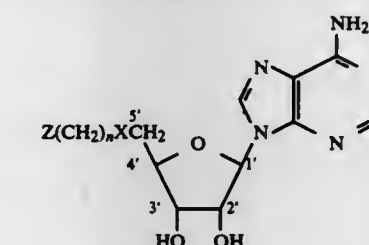
U.S. Cl. 536—7.1 6 Claims  
 1. Mycaminosyl tylonolide derivatives represented by the following general formula



wherein R<sup>1</sup> is a lower alkanoyloxy group, benzoyloxy group, azido group, or amino group which may be substituted with a lower alkyl or a lower alkanoyl radical; R<sup>2</sup> is a hydrogen atom or hydroxyl group; R<sup>3</sup> is a hydrogen atom or formyl group; and means a double bond or a radical represented by ; and salts thereof.

**4,794,174**  
**5'-DEOXY-5'-SUBSTITUTED ADENOSINES**  
 John A. Secrist, III, Birmingham, Ala., assignor to Southern Research Institute, Birmingham, Ala.  
 Filed Feb. 10, 1987, Ser. No. 13,061  
 Int. Cl.<sup>4</sup> C07H 19/16; C12P 19/28

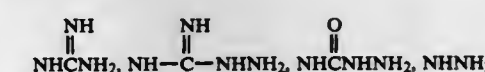
U.S. Cl. 536—26 11 Claims  
 1. A compound having the formula



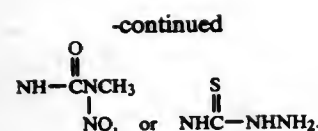
wherein X is a member selected from the group consisting of NH, NCH<sub>3</sub>, S,



n is an integer from 2-4; and Z is a member selected from the group consisting of:







4,794,175

## GLUCOAMYLASE CDNA

Jack Numborg, Oakland; Jeffrey E. Flatgaard, Berkeley, and Michael A. Innis, Oakland, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation of Ser. No. 564,078, Dec. 20, 1983, abandoned, which is a continuation-in-part of Ser. No. 461,920, Jan. 28, 1983, abandoned. This application Apr. 27, 1987, Ser. No. 47,552 Int. Cl.<sup>4</sup> C07H 21/04; C12P 21/02, 19/34; C12N 15/00, 9/34, 1/20, 1/14

U.S. Cl. 536-27

13 Claims

1. A DNA sequence coding for fungal glucoamylase protein, wherein said DNA sequence is free of introns, is capable of hybridizing to *Aspergillus awamori* or *Aspergillus niger* mRNA, and is capable, when correctly combined with a cleaved expression vector, of expressing a non-native protein which has glucoamylase enzyme activity and can degrade starch in an aqueous slurry of starch or starch hydrolysate to glucose molecules upon transformation of a host by an expression vector, correctly combined with said sequence.

4,794,176

## SYNTHESIS OF TUMOR ANTIGENIC DETERMINANT

Raymond U. Lemieux; Robert M. Ratcliffe, both of Edmonton, Canada, and Donald A. Baker, Castro Valley, Calif., assignors to Chembiomed, Edmonton, Canada

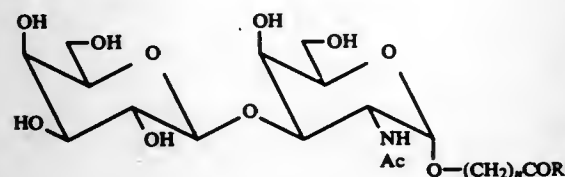
Continuation of Ser. No. 277,680, Jan. 26, 1981, abandoned. This application Oct. 15, 1986, Ser. No. 918,935

Int. Cl.<sup>4</sup> C07H 11/02, 13/06

U.S. Cl. 536-53

4 Claims

1. The human T-antigenic determinant hapten having the structure



where  $n=3-19$ , and R is an alkoxy, aryloxy, NHNH<sub>2</sub>, OH or N<sub>3</sub> group.

4,794,177

## METHOD FOR THE PRODUCTION OF BEAD DEXTRAN MATERIALS FOR GEL CHROMATOGRAPHY

Jan Puskas; Jiri Lenfeld; Zdenek Plichta; Milan Benes, all of Prague; Frantisek Svec, Hrobec, and Jiri Cousek, Prague, all of Czechoslovakia, assignors to Ceskoslovenska akademie ved, Czechoslovakia

Filed Dec. 16, 1985, Ser. No. 809,929  
Claims priority, application Czechoslovakia, Dec. 29, 1984, 10609-84

Int. Cl.<sup>4</sup> C08B 37/02; B01D 15/08; C02F 1/28

U.S. Cl. 536-112

10 Claims

1. In a method for performing gel chromatography, the improvement comprising employing as the chromatographic medium, bead dextran material made by a process consisting essentially of reducing dextran in an alkaline medium containing sodium borohydride, suspending an aqueous solution of the dextran in an immiscible liquid and subsequently cross-linking

the dextran in suspension to a desired degree, with a cross-linking agent.

4,794,178

PROCESS FOR THE PRODUCTION OF <sup>18</sup>F-LABELED ORGANIC COMPOUNDS BY NUCLEOPHILIC SUBSTITUTION

Heinrich H. Coenen, Grevenbroich; Kurt Hamacher, Aachen/Kornellienminster; Manfred Schüller, Jülich; Gerhard Stöcklin, Titz-Kahrath; Bernd Klatte, and Arndt Knöchel, both of Hamburg, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany

Filed Jul. 5, 1985, Ser. No. 752,413

Claims priority, application Fed. Rep. of Germany, Jul. 4, 1984, 3424525

Int. Cl.<sup>4</sup> C07H 1/00; C07B 39/00

U.S. Cl. 536-122

4 Claims

1. A process for labeling organic compounds with fluorine 18, said process comprising the steps of:

(a) providing an organic compound having a formula:



wherein R is an arbitrarily substituted hydrocarbon structure, said hydrocarbon structure being selected from a member of the group consisting of aliphatic, alicyclic, heterocyclic aliphatic, carbocyclic and heterocyclic aromatic structures substituted wherever but excluding H-acid compounds, wherein X is a nucleophilic leaving group; and

(b) contacting said organic compound with fluoride ions in a solvent, wherein said fluoride ions are essentially carrier free <sup>18</sup>F ions; said solvent being a moderately polar, aprotic solvent which further contains homogeneously dissolved therein the complex of a basic non-nucleophile alkali salt and macrocyclic polyether.

4,794,179

## 2-(1-OXO-3-THIOLANYL)-2-PENEM ANTIBIOTICS

Robert A. Volkmann, Ledyard, and David L. Lindner, Niantic, both of Conn., assignors to Pfizer Inc., New York, N.Y.

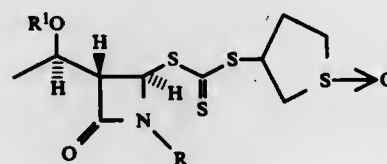
Division of Ser. No. 877,831, Jan. 24, 1986, Pat. No. 4,739,047, which is a continuation-in-part of Ser. No. 788,273, Oct. 17, 1985, abandoned. This application Dec. 3, 1987, Ser. No. 128,375

Int. Cl.<sup>4</sup> C02D 409/12

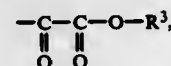
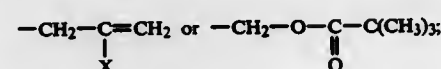
U.S. Cl. 540-354

7 Claims

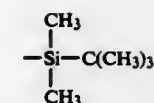
1. A compound of the formula



wherein R is hydrogen or

R<sup>3</sup> is

X is hydrogen or chloro; and

R<sup>1</sup> is

4,794,180

PROCESS FOR PRODUCING FINE-GRAINED  $\beta$ -HMX

Klaus Heinemeyer, Leverkusen; Klaus Redeker, Nuremberg, and Ulrich Sassmannshausen, Brühl, all of Fed. Rep. of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Fed. Rep. of Germany

Filed May 26, 1987, Ser. No. 53,480

Claims priority, application Fed. Rep. of Germany, May 23, 1986, 3617403

Int. Cl.<sup>4</sup> C07D 257/02

U.S. Cl. 540-475

8 Claims

1. A process for producing fine grained  $\beta$ -HMX by recrystallization of a solution containing  $\beta$ -HMX in a nonsolvent for  $\beta$ -HMX, characterized in that the recrystallization is conducted in a temperature range of between 5° and 50° C. by admixing a solution of  $\beta$ -HMX in a  $\gamma$ -lactone with toluene and subsequently the resulting crystals of  $\beta$ -HMX are recovered from the toluene; said crystals having a grain size between 2  $\mu$ m and 50  $\mu$ m.

4,794,181

## 1-ARYLOXY-2,3,4,5-TETRAHYDRO-3-BENZAZEPINES

Richard C. Effland; Joseph T. Klein, both of Bridgewater, and Larry Davis, Sergeantsville, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals, Inc., Somerville, N.J.

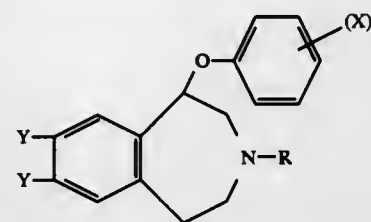
Continuation of Ser. No. 541,767, Oct. 13, 1983, abandoned, which is a continuation-in-part of Ser. No. 387,916, Jun. 14, 1982. This application Jan. 16, 1986, Ser. No. 819,439

Int. Cl.<sup>4</sup> C07D 223/16

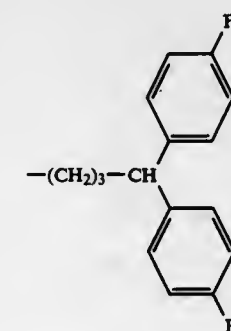
U.S. Cl. 540-594

22 Claims

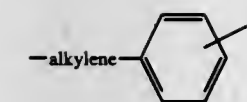
1. A compound having the formula



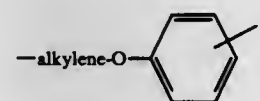
wherein Y is the same or different and is hydrogen and lower alkoxy; X is hydrogen, halogen, lower alkyl, lower alkoxy, CF<sub>3</sub>, NO<sub>2</sub> and NH<sub>2</sub>; R is hydrogen, lower alkyl, cycloalkyl lower alkyl,



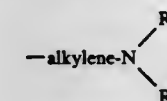
Ar lower alkyl of the formula



where Z is hydrogen, lower alkyl, lower alkoxy, CF<sub>3</sub>, NO<sub>2</sub> and NH<sub>2</sub>; Aryloxy lower alkyl of the formula



where Z is as defined; and an alkylene amine of the formula



where R<sub>1</sub> and R<sub>2</sub> are the same or different and are hydrogen and lower alkyl; n is an integer of 1 or 2; and the acceptable acid addition salts thereof.

4,794,182

## 2-ALKYL-4-AMINO-5-AMINOMETHYLPYRIMIDINES

Kunio Takanoashi, Kawanishi; Toru Yamano, Itami, and Mitsutaka Tanaka, Sanda, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Jul. 14, 1987, Ser. No. 73,697

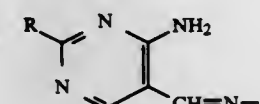
Claims priority, application Japan, Jul. 14, 1986, 61-166501

Int. Cl.<sup>4</sup> C07D 239/42

U.S. Cl. 544-326

6 Claims

1. A compound of the formula



wherein

R is lower alkyl, and

Y is hydroxyl, amino, C<sub>1-4</sub> lower alkyl carbonylamino, C<sub>1-3</sub> lower alkyl amino or phenylamino, or a salt thereof.

4,794,183

## CERTAIN TETRAHYDRO-FURAN OR PYRAN PHOSPHATE-ETHYLENE OR PROPYLENE AMMONIUM DERIVATIVES

Norio Nakamura; Hideki Miyazaki; Fusaaki Shimizu, and Kazuhiko Sasagawa, all of Hiromachi, Japan, assignors to Sankyo Company Limited, Tokyo, Japan

Filed Jan. 14, 1986, Ser. No. 818,876

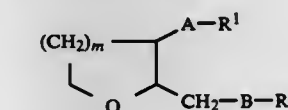
Claims priority, application Japan, Jan. 16, 1985, 60-4054

Int. Cl.<sup>4</sup> C07F 9/58, 9/141

U.S. Cl. 546-22

14 Claims

1. A compound of formula (I):

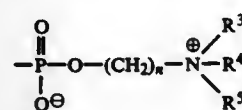


in which

m is an integer of from 1 to 2;

A and B are independently selected from the group consist-

ing of oxygen atoms and sulfur atoms; and one of R<sup>1</sup> and R<sup>2</sup> represents a C<sub>10</sub>-C<sub>22</sub> alkyl group and the other represents a group of formula (II):



in which:

n represents an integer of from 2 to 3;  
R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> are independently selected from the group consisting of hydrogen atoms and C<sub>1</sub>-C<sub>6</sub> alkyl groups, or R<sup>3</sup>, R<sup>4</sup> and R<sup>5</sup> together with the nitrogen atom to which they are attached, represent 1-pyridinium, 1-quinolinium, or 2-isoquinolinium; or a pharmaceutically acceptable salt thereof.

**4,794,184**  
**NOVEL**  
**BENZOPYRANO[6,7,8-L<sub>1</sub>J]QUINOLIZINE-11-ONE**  
**LASING DYES**

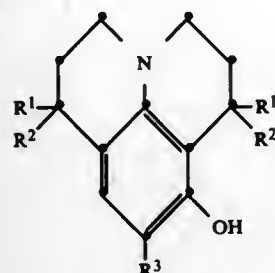
John L. Fox, Baltimore, Md., and Chin H. Chen, Webster, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Division of Ser. No. 814,460, Dec. 30, 1985, Pat. No. 4,736,032.  
This application Aug. 31, 1987, Ser. No. 91,564  
Int. Cl.<sup>4</sup> C07D 221/06

U.S. Cl. 546-95

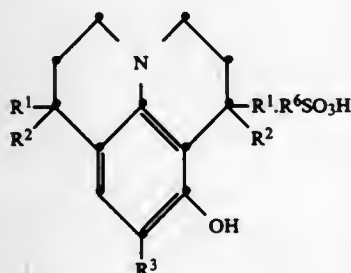
3 Claims

1. A compound selected from the group consisting of 1,1,7,7-alkyl-substituted 8-hydroxyjulolidines or the alkyl sulfonic acid salts thereof; wherein the alkyl group on the julolidine has from 1-6 carbon atoms.

2. The compound of claim 1 selected from those having the structures



and



wherein

R<sup>1</sup>, R<sup>2</sup> and R<sup>6</sup> are lower alkyl of about 1 to 6 carbon atoms;  
and  
R<sup>3</sup> represents -H or -CHO.

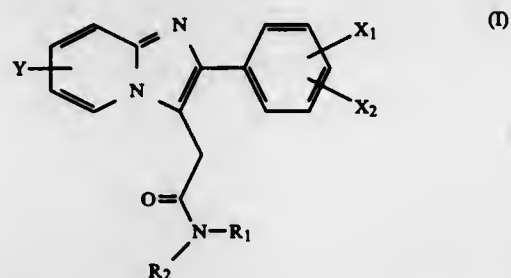
**4,794,185**  
**PROCESS FOR THE PREPARATION OF**  
**IMIDAZOPYRIDINES**

Guy Rossey, and David Long, both of Montigny Le Bretonneux, Belgium, assignors to Synthelabo, France  
Filed Jan. 26, 1987, Ser. No. 66,530  
Claims priority, application France, Jan. 27, 1986, 86 09330  
Int. Cl.<sup>4</sup> C07D 471/04

U.S. Cl. 546-121

2 Claims

1. A process for the preparation of an imidazopyridine which is a compound of formula (I)

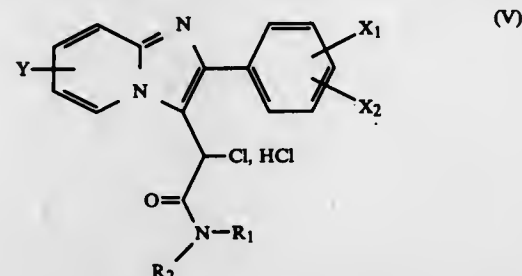


in which:

Y denotes hydrogen, a halogen or a C<sub>1-4</sub> alkyl group;  
X<sub>1</sub> and X<sub>2</sub> denote, independently of each other, hydrogen, a halogen or a C<sub>1-4</sub> alkoxy, C<sub>1-6</sub> alkyl, CF<sub>3</sub>, CH<sub>3</sub>S, CH<sub>3</sub>SO<sub>2</sub> or NO<sub>2</sub> group; and

R<sub>1</sub> and R<sub>2</sub> denote, independently of each other, hydrogen or a C<sub>1-5</sub> alkyl group, with the proviso that R<sub>1</sub> and R<sub>2</sub> do not both denote hydrogen, or a salt thereof;

which process comprises reacting a compound of formula (V)



wherein Y, X<sub>1</sub>, X<sub>2</sub>, R<sub>1</sub> and R<sub>2</sub> are as defined above, with a reducing agent and if desired converting the resulting compound of formula (I) into a salt.

**4,794,186**  
**THIAZOLYLACETIC ACID DERIVATIVE AND**  
**PROCESSES FOR PREPARING THE SAME**

Toyonari Otae, Nara; Yoshikisa Yamada, Kyoto, and Hiroshi Sugano, Nara, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Osaka, Japan

Filed Dec. 13, 1984, Ser. No. 681,252

Claims priority, application Japan, Dec. 21, 1983, 58-242777  
The portion of the term of this patent subsequent to Jul. 2, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> C07D 417/12

U.S. Cl. 546-209

8 Claims

1. A compound of the formula:

**4,794,188**  
**CERTAIN UNSYMMETRICAL QUINOLINYL ETHERS**  
**HAVING ANTI-INFLAMMATORY AND**  
**ANTI-ALLERGIC ACTIVITY**

John H. Musser, Malvern, Pa., and Utpal R. Chakraborty, Orangeburg, N.Y., assignors to USV Pharmaceutical Corporation, Tuckahoe, N.Y.

Continuation-in-part of Ser. No. 666,430, Oct. 30, 1984, abandoned, which is a continuation-in-part of Ser. No. 530,811, Sep. 9, 1983, Pat. No. 4,567,184, which is a continuation-in-part of Ser. No. 445,876, Dec. 1, 1982, abandoned. This application Dec. 19, 1985, Ser. No. 810,868

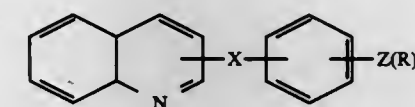
The portion of the term of this patent subsequent to Jan. 28, 2003, has been disclaimed.

Int. Cl.<sup>4</sup> C07D 215/22, 217/24

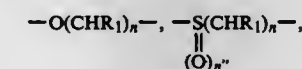
U.S. Cl. 546-152

36 Claims

1. A compound of the formula:



where the quinolyl or phenyl ring contains one to three substituents selected from the group hydrogen, lower alkyl of up to 6 carbon atoms, phenyl halo, hydroxy, trifluoromethyl, carboxy, formyl, nitrilo, amino, carboxamide, phenoxy nitro, sulfonyl, sulfonamide, thio or wherein



Z is an alkylene chain containing up to 10 carbon atoms in the principle chain and a total of up to 12 carbon atoms and from 0 to 2 double bonds;

each R is a substituent, attached to one of the carbon atoms of Z selected from the group consisting of =O, OR<sub>3</sub>, SR<sub>3</sub>, R<sub>1</sub> is H or CH<sub>3</sub>;

R<sub>2</sub> is H, C<sub>1</sub> to C<sub>6</sub> alkyl, phenyl or benzyl;

n=0 or 1;

n'=1 or 2;

n''=0, 1 or 2.

**4,794,187**  
**<sup>35</sup>S-LABELLED 1,4-DIHYDROPYRIDINES**

Hartmut Glossmann, Henckelheim, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Jan. 5, 1987, Ser. No. 505

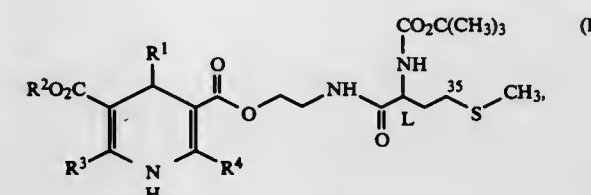
Claims priority, application Fed. Rep. of Germany, Jan. 11, 1986, 3600593

Int. Cl.<sup>4</sup> C07D 211/90, 413/04, 401/12

U.S. Cl. 546-321

4 Claims

1. A radioactively labelled dihydropyridine compound of the formula



in which

R<sup>1</sup> represents a phenyl radical which is unsubstituted or substituted once or twice by an identical or different substituent selected from the group consisting of halogen, nitro, trifluoromethyl and difluoromethoxy, or R<sup>1</sup> represents benzoxadiazolyl;

R<sup>2</sup> represents a straight-chain or branched alkyl which has up to 8 carbon atoms and which is unsubstituted or substituted by cyano, phenyl, halogen, N-benzyl-N-methylamino, N-phenylpiperazino or by alkoxy having up to 4 carbon atoms, and

R<sup>3</sup> and R<sup>4</sup> are identical or different and each represents a cyano or represents a straight-chain or branched alkyl which has up to 6 carbon atoms, is not interrupted or is interrupted in the chain by one oxygen atom and is unsubstituted or substituted by hydroxyl or amino.

**4,794,189**  
**SYNTHESIS OF N-SUCCINIMIDYL HALOACETYL**  
**AMINO BENZOATES**

Andrea Leone-Bay, Ridgefield, Conn., and Peter E. Timony, Valley Cottage, N.Y., assignors to Akzo America Inc., New York, N.Y.

Filed Dec. 7, 1987, Ser. No. 129,493

Int. Cl.<sup>4</sup> C07D 207/46

U.S. Cl. 548-542

4 Claims

1. A process for preparing N-succinimidyl haloacetyl amino-benzoate compounds which comprises:

- reacting an aminobenzoic acid with haloacetylhalide to form a haloacetylaminobenzoic acid;
- optionally converting the haloacetylaminobenzoic acid to the differing and desired haloacetylaminobenzoic acid;
- reacting the haloacetylaminobenzoic acid with oxalyl halide to form the corresponding benzoyl compound; and
- coupling the benzoyl compound from (c) with an N-hydroxysuccinimide to form the N-succinimidyl haloacetyl aminobenzoate.



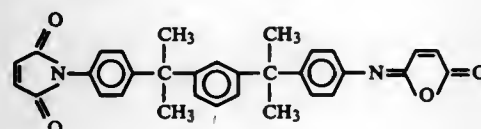
4,794,190  
AROMATIC MALEIMIDE-ISOMALEIMIDE  
COMPOUND

Linda A. Domeler, and Elke M. Clark, both of Flemington, N.J.,  
assignors to Amoco Corporation, Chicago, Ill.  
Filed Jan. 28, 1987, Ser. No. 8,602  
Int. Cl.<sup>4</sup> C07D 207/244

U.S. Cl. 548—548

2 Claims

1. The maleimide-isomaleimide compound of the following structural formula:



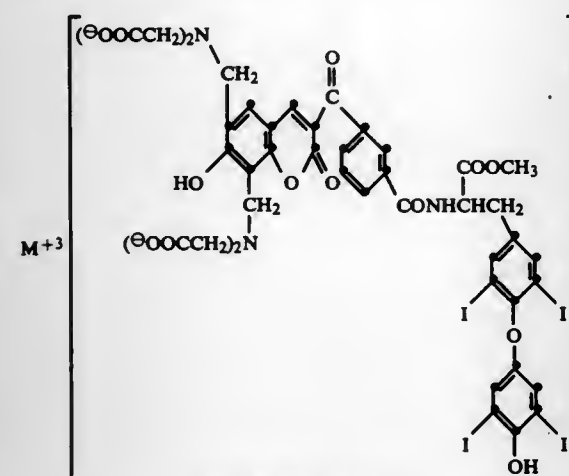
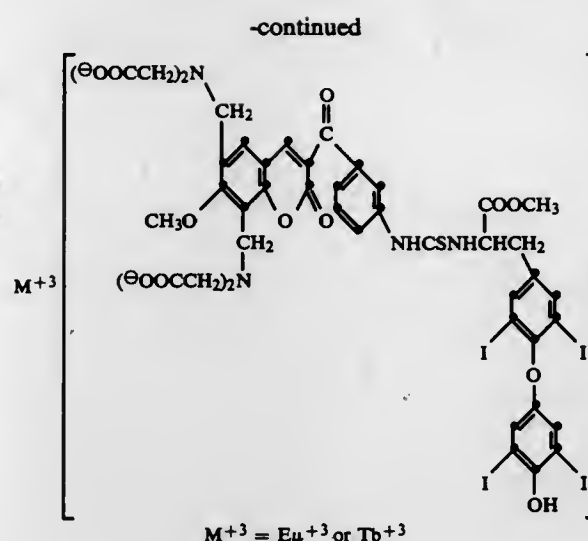
4,794,191  
FLUORESCENT CHELATES

Jerald C. Hinshaw, Ogden, Utah; John L. Toner, Webster, and  
George A. Reynolds, Rochester, both of N.Y., assignors to  
Eastman Kodak Company, Rochester, N.Y.  
Division of Ser. No. 7,024, Jan. 27, 1987, which is a division of  
Ser. No. 825,693, Feb. 3, 1986, Pat. No. 4,637,988, which is a  
continuation of Ser. No. 279,398, Jul. 1, 1981, abandoned. This  
application Feb. 3, 1988, Ser. No. 151,847  
Int. Cl.<sup>4</sup> C07D 311/18

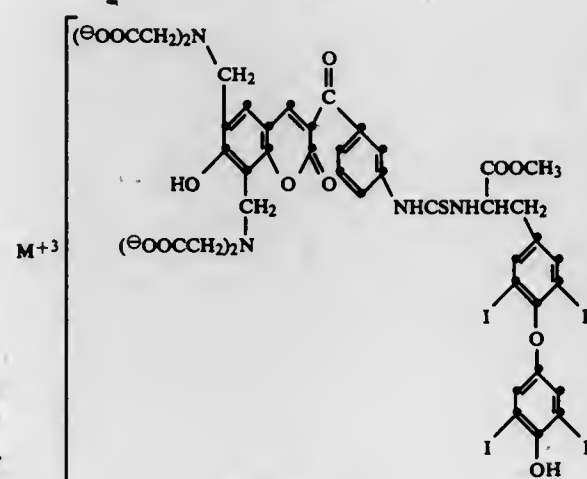
U.S. Cl. 549—211

1 Claim

1. A labeled immunoreagent having the structure selected  
from the group consisting of:

M<sup>3+</sup> = Eu<sup>3+</sup> or Tb<sup>3+</sup>M<sup>3+</sup> = Eu<sup>3+</sup> or Tb<sup>3+</sup>

and

M<sup>3+</sup> = Eu<sup>3+</sup> or Tb<sup>3+</sup>

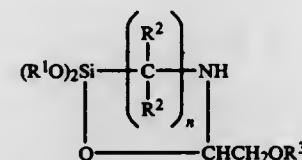
4,794,192  
CYCLIC AMINOALKYLSILANES AND THEIR USE AS  
ADHESION PROMOTERS IN ROOM TEMPERATURE  
VULCANIZABLE POLYDIORGANOSILOXANE  
COMPOSITIONS

Judith Stein, Schenectady, N.Y., assignor to General Electric  
Company, Schenectady, N.Y.  
Filed Jul. 6, 1987, Ser. No. 70,009  
Int. Cl.<sup>4</sup> C07F 7/10

U.S. Cl. 556—408

4 Claims

1. A composition comprising cyclic aminoalkylsilanes hav-  
ing the formula



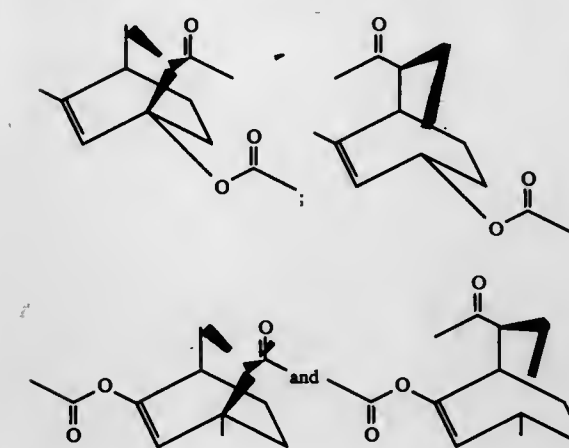
wherein R<sup>1</sup> is C<sub>1-8</sub> alkyl, each R<sup>2</sup> is independently hydrogen or  
C<sub>1-4</sub> primary or secondary alkyl, R<sup>3</sup> is methyl or ethyl and n is  
2 or 3.

4,794,193  
PROCESS FOR PREPARING  
4,4A,5,6-TETRAHYDRO-7-METHYL-2-(3H)-NAPH-  
THALENONE, INTERMEDIATES USED IN SAID  
PROCESS AND NOVEL CRYSTALLINE FORM OF SAME  
Alan O. Pittet, Atlantic Highlands; Ranya Muralidhara, Fair  
Haven, and Myrna L. Hagedorn, Edison, all of N.J., assignors to  
International Flavors & Fragrances Inc., New York, N.Y.  
Continuation-in-part of Ser. No. 354,111, Mar. 2, 1982,  
abandoned. This application Apr. 15, 1982, Ser. No. 368,640  
Int. Cl.<sup>4</sup> C07C 69/145

U.S. Cl. 560—256

1 Claim

1. A mixture of compounds having the structures:

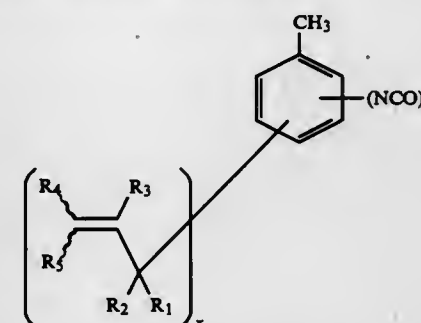


4,794,194  
ALKENYLATED TOLUENEDIISOCYANATES FOR USE  
IN PREPARING POLYURETHANE UREA SYSTEMS  
William F. Burgoyne, Jr., Allentown, and Dale D. Dixon, Kutz-  
town, both of Pa., assignors to Air Products and Chemicals,  
Inc., Allentown, Pa.  
Filed Jul. 21, 1986, Ser. No. 888,540  
Int. Cl.<sup>4</sup> C07C 69/00; C08G 18/00

U.S. Cl. 560—360

30 Claims

1. A toluenediisocyanate composition having one alkenyl  
substituent represented by the formula:



wherein R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are hydrogen, C<sub>1-3</sub> aliphatic,  
phenyl, halogen or alkoxy radicals, or R<sub>2</sub> and R<sub>4</sub> or R<sub>5</sub> are  
bridged via an alkylene radical —(CH<sub>2</sub>)<sub>y</sub>— wherein y = 2 to 5,  
and x is one provided that in said formula at least one of R<sub>1</sub>, R<sub>2</sub>,  
R<sub>3</sub>, R<sub>4</sub> or R<sub>5</sub> is C<sub>1</sub> or greater and the isocyanate groups in said  
toluenediisocyanate composition are in the 2 and 4-positions or  
in the 2 and 6 positions.

4,794,195  
PROCESS FOR PRODUCING  
2,6-NAPHTHALENEDICARBOXYLIC ACID BY  
OXIDIZING 2,6-DIISOPROPYLNAPHTHALENE  
Shoichi Hayashi; Toshikazu Matsuda; Atsushi Sasakawa, and  
Yutaka Kono, all of Iwaki, Japan, assignors to Kureha  
Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Mar. 16, 1987, Ser. No. 26,322  
Claims priority, application Japan, Mar. 14, 1986, 61-56352;  
Mar. 14, 1986, 61-56353; Mar. 14, 1986, 61-56355; Mar. 14,  
1986, 61-56357

Int. Cl.<sup>4</sup> C07C 51/265

U.S. Cl. 562—414

16 Claims

1. A process for producing 2,6-naphthalenedicarboxylic acid  
by oxidation of 2,6-diisopropyl naphthalene, comprising the  
steps of:

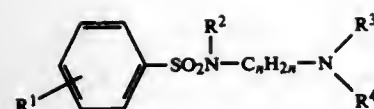
- dissolving 2,6-diisopropyl naphthalene or an oxidized  
intermediate thereof and a catalyst comprising a water-  
soluble salt of cobalt, a water-soluble salt of manganese or  
a mixture thereof, a water-soluble salt of cerium and a  
bromine compound in a lower aliphatic monocarboxylic  
acid as the solvent, wherein the concentration of 2,6-diiso-  
propyl naphthalene in the solvent is less than 20% by  
weight and the molar ratio of 2,6-diisopropyl naphthalene  
to the metals of the catalyst is less than 2.5, the atomic  
ratio of cobalt, manganese or a mixture thereof to cerium  
is from 0.0001 to 0.1 and the total amount of heavy metals  
in said catalyst is from 0.01 to 0.15 g-atom per 100 g of said  
lower aliphatic monocarboxylic acid;
- continuously supplying the solution prepared in step (a)  
to an oxidation reactor and oxidizing 2,6-diisopropyl naph-  
thalene or the oxidized intermediate thereof with molecu-  
lar oxygen at a reaction temperature of 140° to 210° C.  
under a partial pressure of oxygen of 0.2 to 8 kg/cm<sup>2</sup>  
(absolute pressure);
- continuously withdrawing the reaction mixture obtained  
in step (b) from the oxidation reactor, depositing crystals  
of the crude 2,6-naphthalenedicarboxylic acid from the  
reaction mixture and separating the crystals;
- bringing the crystals into contact with an aqueous solu-  
tion of mineral acid by adding an aqueous solution of  
sulfuric acid or hydrochloric acid of a concentration from  
1 to 10% by weight to the crude 2,6-naphthalenedicar-  
boxylic acid under stirring while adjusting the pH of the  
aqueous solution from 1 to 3, thereby dissolving and re-  
moving the metals of the catalyst from the crystals;
- purifying the crude 2,6-naphthalenedicarboxylic acid  
crystals and, optionally,
- converting to dialkali salt to the free acid of 2,6-naph-  
thalenedicarboxylic acid;
- adding an aqueous solution of an alkali carbonate or an  
alkali bicarbonate of a concentration of 1 to 34% by  
weight to the filtrate of step (d) to adjust pH of the filtrate  
of step (d) from 7 to 10, thereby precipitating heavy metals  
of the catalyst as carbonates or bicarbonates, separating the  
carbonates or bicarbonates and supplying them to the  
first step, and
- supplying the filtrate of step (c) to step (a).

4,794,196  
N-AMINOALKYLPERFLUOROALKANOYLAMINOBEN-  
ZENE-SULFONAMIDE ANTI-ARRHYTHMIC AGENTS  
George C. Buzby, Jr., Blue Bell, and Thomas J. Colatsky, Paoli,  
both of Pa., assignors to American Home Products Corpora-  
tion, New York, N.Y.  
Filed Feb. 10, 1987, Ser. No. 12,969  
Int. Cl.<sup>4</sup> C07C 143/80; A61L 31/18

U.S. Cl. 564—86

6 Claims

1. A compound of the formula:



in which

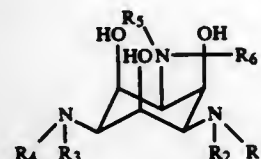
- $R^1$  is perfluoroalkylamino of 2 to 4 carbon atoms, in 3- or 4-position of the benzene ring;  
 $R^2$  is hydrogen or alkyl of 1 to 4 carbon atoms;  
 $R^3$  is hydrogen or straight or branched chain alkyl of 1 to 4 carbon atoms;  
 $R^4$  is straight or branched chain alkyl of 1 to 4 carbon atoms; and  
 $n$  is one of the integers 2, 3 or 4;  
 or a pharmaceutically acceptable salt thereof.

**4,794,197**  
**ALL-CIS-1,3,5-TRIAMINO-2,4,6-CYCLOHEXANETRIOL**  
**DERIVATIVES, THEIR USE, PROCESSES FOR THEIR**  
**PREPARATION AND PHARMACEUTICAL**  
**PREPARATIONS CONTAINING THEM**

Walter Schneider, Isidor Erni, and Hans K. Hegetschweiler, c/o Laboratorium für anorganische Chemie, Eidgenössische Technische Hochschule Zürich, ETH-Zentrum, Universitätsstrasse 6, CH-8092 Zürich, Switzerland  
 Filed Jan. 31, 1986, Ser. No. 824,950  
 Claims priority, application Fed. Rep. of Germany, Feb. 2, 1985, 3503614

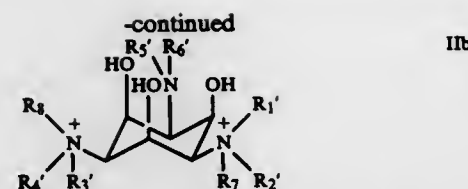
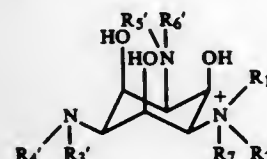
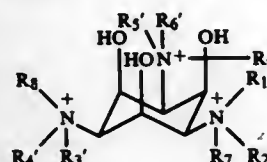
Int. Cl.<sup>4</sup> C07C 87/36, 103/19  
 U.S. Cl. 564—152

**18 Claims**  
 1. An all-cis-1,3,5-triamino-2,4,6-trihydroxycyclohexane compound corresponding to the formula I:



wherein  $R_1, R_2, R_3, R_4, R_5$  and  $R_6$  are the same or different and each represent hydrogen, alkyl groups or —CO-alkyl groups wherein the alkyl or —CO-alkyl group contains 1 to 18 carbon atoms and the alkyl and —CO-alkyl groups may independently contain at least one functional group capable of coordinating with metal cations, and at least one of the group  $R_1$  to  $R_6$  is a substituted or unsubstituted alkyl or —CO-alkyl group, or

a salt thereof with a pharmaceutically acceptable inorganic or organic acid, or a quaternary ammonium salt thereof corresponding to the formula II, Ila or I Ib:



with a pharmaceutically acceptable anion, wherein  $R_1$  to  $R_6$  and  $R_7, R_8$  and  $R_9$  independently denote substituted or unsubstituted alkyl groups or —CO-alkyl groups as defined above, with the proviso that when  $R_2, R_4$  and  $R_6$  are all hydrogen, at least one of  $R_1, R_3$  and  $R_5$  must be other than —CO—CH<sub>3</sub>.

**4,794,198**  
**CATALYTIC PROCESS FOR THE MANUFACTURE OF**  
**OXIMES**

Paolo Roffia, Saronno; Mario Padova, Milan; Giuseppe Leonardi, Bollate; Maria A. Mantegazza, Cambiago; Giordano De Alberti, Besenato, and Giorgio R. Tassari, Milan, all of Italy, assignors to Montedipe S.p.A., Milan, Italy  
 Filed Jan. 8, 1987, Ser. No. 59,536  
 Claims priority, application Italy, Nov. 14, 1986, 22346 A/86; Mar. 6, 1987, 19607 A/87

Int. Cl.<sup>4</sup> C07C 131/04

**31 Claims**

1. A continuous catalytic process for the manufacture of cyclohexanone-oxime by ammoxidation in the liquid phase of cyclohexanone with NH<sub>3</sub> and H<sub>2</sub>O<sub>2</sub>, wherein:

the catalyst is a titanium-silicalite (with a Si:Ti atomic ratio at least equal to 30), subjected, before use, to an activation with H<sub>2</sub>O<sub>2</sub> and optionally also with H<sub>2</sub>S<sub>4</sub>;  
 the ammoxidation is carried out at 60°–120° C., in the presence of t-butanol (and/or cyclohexanol) according to a ketone:H<sub>2</sub>O<sub>2</sub> molar ratio from 0.5 to 1.3, according to NH<sub>3</sub>:ketone molar ratios equal to or greater than 1.5 and according to t-butanol (and/or cyclohexanol): ketone molar ratios from 0.1 to 100 (but preferably from 0.5 to 10);

the ketone is fed into the ammoxidation zone in admixture with t-butanol (and/or cyclohexanol), the amount of ketone being from 2 to 200 kg/h per kg of pure titanium silicalite.

**4,794,199**  
**PROCESS FOR SYNTHESIS OF PRIMARY AMINES**  
**FROM OLEFINS, SYNGAS AND AMMONIA**

Jiang-Jen Lin, Round Rock, and John F. Knifton, Austin, both of Tex., assignors to Texaco Inc., White Plains, N.Y.  
 Continuation of Ser. No. 628,104, Jul. 5, 1984, abandoned. This application Oct. 1, 1987, Ser. No. 105,462  
 Int. Cl.<sup>4</sup> C07C 85/08, 85/18

**2 Claims**

1. A process for synthesis of C<sub>14</sub> primary amines comprising reacting 1-hexene, carbon monoxide, hydrogen and anhydrous ammonia in the presence of a catalyst comprising dicobalt octacarbonyl and a triphenylphosphine ligand in p-dioxane solvent at a temperature of 50° C. to 300° C. and a pressure of 500 psig to 2000 psig.

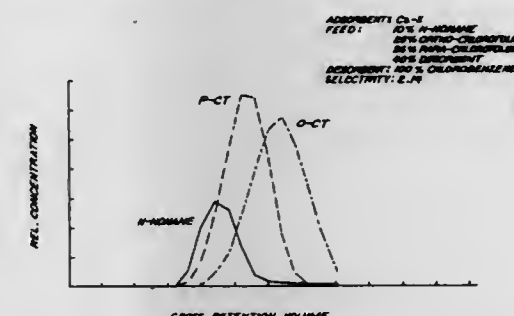
**4,794,200**  
**PROCESS FOR THE PREPARATION OF**  
**TRIFLUOROMETHYL IODIDE**  
 Marc Tordoux, Sceaux, and Claude Wakselman, Paris, both of France, assignors to Rhone-Poulenc Chimie, France  
 Filed Oct. 9, 1987, Ser. No. 106,347  
 Claims priority, application France, Oct. 10, 1986, 86 14283  
 Int. Cl.<sup>4</sup> C07C 17/20, 19/07

U.S. Cl. 570—170

**18 Claims**

1. A process for the preparation of trifluoromethyl iodide which comprises the steps of, in a first stage, introducing into a polar aprotic solvent either a metal selected from the group consisting of zinc, cadmium, aluminum and manganese, together with sulfur dioxide, or an alkali metal dithionite; thereafter adding thereto trifluoromethyl bromide at a pressure greater than one bar for a time sufficient to react; and, in a second stage, adding iodine dissolved in a carboxylic or sulfonic acid to the reaction product of the first stage and reacting for a time sufficient to obtain said trifluoromethyl iodide.

said adsorbent, at desorption conditions, with a desorbent composition consisting essentially of chlorobenzene and/or bromobenzene and a saturated aliphatic hydrocarbon having



**4,794,201**  
**PROCESS FOR PREPARATION OF**  
**p-HALOGENO-MONOALKYLBENZENES**

Yasushi Higuchi, and Suzuki, both of Shizuoka, Japan, assignors to Ihara Chemical Industry Co., Ltd., Tokyo, Japan  
 Continuation of Ser. No. 758,250, Jan. 24, 1985, abandoned, which is a continuation-in-part of Ser. No. 715,777, Mar. 26, 1985, abandoned, which is a continuation of Ser. No. 564,527, Dec. 22, 1983, abandoned. This application Feb. 5, 1987, Ser. No. 11,246  
 Int. Cl.<sup>4</sup> C07C 17/12

U.S. Cl. 570—208

**21 Claims**

1. A process for preparing a p-monohalogenomonoalkylbenzene, the alkyl group of which has 1 to 4 carbon atoms, comprising:

(i) combining a mono-(C<sub>1-4</sub>)-alkylbenzene with a halogenating agent which is one member selected from the group consisting of chlorine, bromine and sulfonyl halides, in the liquid phase in the presence of a catalyst, said catalyst being a L-type zeolite represented by the following formula:



wherein M represents at least one exchangeable metal cation selected from the group consisting of the ions of potassium, sodium and metals of IA, IIA, IIIA, IVA and VA groups in the Periodic Table of the Elements, n represents the valence of M, x is a number between 0.9 and 1.3, y is a number between 4.0 and 8.0, and z is a number of from 0 to about 9; and

(ii) obtaining said p-halogenomonoalkylbenzene.

**4,794,202**  
**PROCESS FOR SEPARATING HALOGEN SUBSTITUTED**  
**TOLUENE ISOMERS**

Hermann A. Zinnen, Evanston, and Thad S. Franczyk, Skokie, both of Ill., assignors to UOP Inc., Des Plaines, Ill.  
 Filed Apr. 15, 1985, Ser. No. 723,582  
 Int. Cl.<sup>4</sup> C07C 17/38

U.S. Cl. 570—211

**11 Claims**

1. A process for separating the para and ortho isomers of halogen substituted toluenes selected from the group consisting of chlorotoluene and bromotoluene from a feed mixture comprising said isomers which process comprises contacting said feed mixture at adsorption conditions, with an adsorbent comprising an X type zeolite having cations selected from the group consisting of calcium, barium, potassium and combinations thereof at cation exchange sites, selectively adsorbing one isomer to the substantial exclusion of the other isomer on said adsorbent, removing the nonadsorbed portion of the feed mixture from contact with the adsorbent, and thereafter recovering the adsorbed isomer from the adsorbent by contacting

less than 9 carbon atoms, said saturated aliphatic hydrocarbon being present in said desorbent composition in an amount ranging from 60 to 90 percent by volume.

**4,794,203**  
**HYDROHALOGENATION OF MYRCENE IN THE**  
**PRESENCE OF ORGANIC AMINES**

Lois T. McElligott, Abington, Pa., assignor to Union Carbide Corporation, Wayne, N.J.  
 Continuation-in-part of Ser. No. 515,563, Jul. 20, 1983. This application Jan. 27, 1985, Ser. No. 749,881  
 Int. Cl.<sup>4</sup> C07C 17/08

U.S. Cl. 570—231

**10 Claims**

1. A novel method for the hydrohalogenation of a myrcene comprising hydrohalogenating myrcene under anhydrous, liquid phase conditions in the presence of a copper-containing hydrohalogenation catalyst, and further comprising carrying out the hydrohalogenation at a temperature of from —10° C. to 25° C. in the presence of an organic amine wherein the amine is selected from the group consisting of aliphatic secondary and tertiary amines containing at least 2 hydrocarbyl groups of six or more carbon atoms each.

**4,794,204**  
**PROCESS FOR THE REMOVAL OF DIMETHYL ETHER**  
**IN METHYL CHLORIDE**

Hendrik W. Post, Hofheim am Taunus; Helmut von Plessen, Königstein/Taunus, and Wilhelm Lendle, Bad Soden am Taunus, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany  
 Filed Jan. 11, 1987, Ser. No. 61,793  
 Claims priority, application Fed. Rep. of Germany, Jun. 14, 1986, 3620069

Int. Cl.<sup>4</sup> C07C 17/38, 19/02

U.S. Cl. 570—262

**2 Claims**

1. A process for the removal of dimethyl ether in methyl chloride by catalytic cleavage by means of hydrogen chloride, wherein 0.3 to 3.0 percent dimethyl ether is present as an impurity in crude methyl chloride produced by the catalytic esterification of methanol, the crude methyl chloride is cooled, so that hydrogen chloride at least in part and water separate out, the methyl chloride in admixture with gaseous hydrogen chloride is passed over a methanol esterification contact catalyst at an elevated temperature the molar ratio of hydrogen chloride/dimethyl ether being at least 2:1, wherein aluminum oxide is employed as the esterification catalyst, wherein the gas passed over the methanol esterification contact catalyst is cooled again in order to deposit water and hydrogen chloride



and wherein the gas freed from water and hydrogen chloride is then washed with sulfuric acid having concentration of

**4,794,205**  
**METHOD FOR PRODUCING ALKENYLTHIOPHENOLS AND THEIR ESTERS**

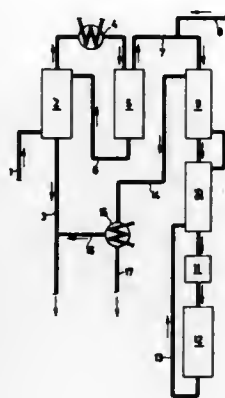
Mohammad Aslam, and Kenneth G. Davenport, both of Corpus Christi, Tex., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed Dec. 10, 1986, Ser. No. 940,675

Int. Cl.<sup>4</sup> C07C 153/11, 148/00

U.S. Cl. 558—257

15 Claims



1. A method for producing alkenylthiophenols and their esters comprising reacting a hydroxy aromatic ketone with an N,N-di(organo)thiocarbamoyl halide to form an O-(acylaryl) N,N-di(organo)thiocarbamate, pyrolytically rearranging the latter compound to form an S-(acylaryl) N,N-di(organo)thiocarbamate, and either (I) reducing the S-(acylaryl) N,N-di(organo)thiocarbamate to form an S-(1-hydroxyalkylaryl) N,N-di(organo)thiocarbamate which is then either a) hydrolyzed to form a (1-hydroxyalkyl) thiophenol, or b) dehydrated to form an S-(alkenylaryl) N,N-di(organo)thiocarbamate which is then hydrolyzed to form an alkenylthiophenol; or alternatively, (II) hydrolyzing said S-(acylaryl) N,N-di(organo)thiocarbamate to form an acylthiophenol, acylating the thiol group of the latter compound to form an acylthiophenol thioester, and reducing and hydrolyzing said acylthiophenol ester to form a (1-hydroxyalkyl) thiophenol; and then either dehydrating said (1-hydroxyalkyl) thiophenol made by any of the foregoing methods to form an alkenylthiophenol or acylating the thiol group of said (1-hydroxyalkyl) thiophenol and dehydrating the resulting thioester to form an groups being at the ring-bonded carbon atoms, the organo groups in said thiocarbamates being such that the amino nitrogen is attached to two different carbon atoms each of which is saturated with hydrogen atoms, other carbon atoms, or a combination of those, or is an aromatic ring carbon atom.

approx. 80 to 96% by weight of H<sub>2</sub>SO<sub>4</sub>, in order to remove the last traces of dimethyl ether.

**ELECTRICAL**

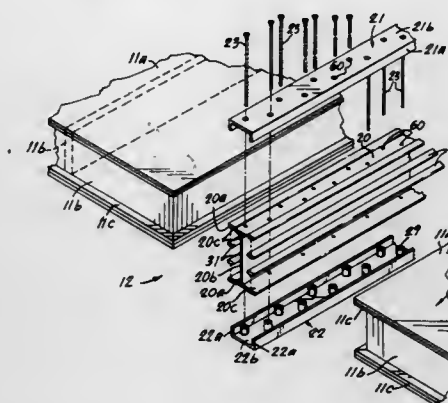
**4,794,206**  
**RF SHIELDED AND ACOUSTIC ROOM**  
Jonathan Weinstein, Wantagh, N.Y., assignor to Industrial Acoustics Company, Inc., Bronx, N.Y.

Filed Nov. 20, 1986, Ser. No. 932,622

Int. Cl.<sup>4</sup> H05K 9/00

U.S. Cl. 174—35 MS

20 Claims



1. A joint assembly for fastening a pair of panels for shielding electromagnetic waves comprising:
  - (a) a generally "H" shaped joiner member formed from an electromagnetic wave shielding material, said joiner member having a pair of spaced apart flange members and a support member joining said flange members;
  - (b) deformable electromagnetic shielding material disposable between said joiner flange members and said panels; and
  - (c) means for fastening the panels together and compressing said joiner flange members, panel members and the electromagnetic shielding material disposed there between so as to form a continuous electromagnetic wave shield, wherein said fastening means comprises a pair of generally "U" shaped channel members, each having a pair of leg portions joined by a base portion.

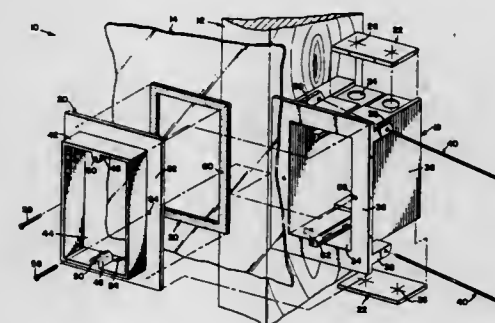
**4,794,207**  
**ELECTRICAL OUTLET UNIT FOR A BUILDING**  
Kenneth L. Norberg, and Harold B. Henley, both of Watertown, S. Dak., assignors to Eascept, Inc., Watertown, S. Dak.

Filed Mar. 21, 1986, Ser. No. 842,465

Int. Cl.<sup>4</sup> H02G 3/08

U.S. Cl. 174—48

6 Claims



1. An electrical outlet unit for receiving an electrical device, said electrical outlet unit for attachment to a stud or other structural member of a frame for a building, said building also having an air and vapor barrier and wall panel attached to said stud or other structural member, said air and vapor barrier being between said stud or other structural member and said wall panel, said wall panel and said air and vapor barrier having aligned access openings, said electrical outlet unit comprising:
  - a wiring box having a back wall and an interconnecting first side wall extending forwardly from said back wall defining a forward opening for receiving said electrical device, said forward opening being aligned with said access openings in air and vapor barrier and said wall panel, said wiring box including a first flange secured peripherally about said forward opening of said wiring box, said wiring box also including a wire access opening;
  - means for fastening said wiring box to said structural member;
  - a projecting retainer collar for mounting to said first flange of said wiring box, said retainer collar having an interconnecting second side wall defining a channel with a rearward opening of approximately the same size as said forward opening of said wiring box, said retainer collar including a second flange secured peripherally about said rearward opening of said channel of said second side wall; means for fastening said second flange of said retainer collar to said first flange of said wiring box to clamp said air and vapor barrier therebetween; and
  - one of said wiring box and said retainer collar including means for holding said electrical device to said one of said wiring box and said retainer collar; wherein said first and second flanges of said wiring box and said projecting retainer collar are assembled and attached together with said fastening means to clamp said air and vapor barrier therebetween to minimize passage of air and vapor from one side of said air and vapor barrier through or around said electrical outlet unit to the opposite side of said air and vapor barrier.

ing aligned access openings, said electrical outlet unit comprising:

- a wiring box having a back wall and an interconnecting first side wall extending forwardly from said back wall defining a forward opening for receiving said electrical device, said forward opening being aligned with said access openings in air and vapor barrier and said wall panel, said wiring box including a first flange secured peripherally about said forward opening of said wiring box, said wiring box also including a wire access opening;
- means for fastening said wiring box to said structural member;
- a projecting retainer collar for mounting to said first flange of said wiring box, said retainer collar having an interconnecting second side wall defining a channel with a rearward opening of approximately the same size as said forward opening of said wiring box, said retainer collar including a second flange secured peripherally about said rearward opening of said channel of said second side wall; means for fastening said second flange of said retainer collar to said first flange of said wiring box to clamp said air and vapor barrier therebetween; and
- one of said wiring box and said retainer collar including means for holding said electrical device to said one of said wiring box and said retainer collar; wherein said first and second flanges of said wiring box and said projecting retainer collar are assembled and attached together with said fastening means to clamp said air and vapor barrier therebetween to minimize passage of air and vapor from one side of said air and vapor barrier through or around said electrical outlet unit to the opposite side of said air and vapor barrier.

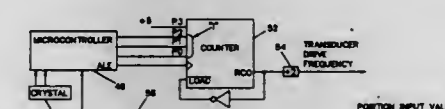
**4,794,208**  
**FREQUENCY SHIFTING DIGITIZER FOR REDUCING AC FIELDS INTERFERENCE**  
James S. Watson, Phoenix, Ariz., assignor to Calcomp Inc., Anaheim, Calif.

Filed Feb. 8, 1988, Ser. No. 152,993

Int. Cl.<sup>4</sup> G08C 21/00

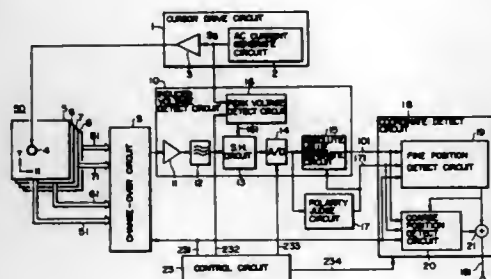
U.S. Cl. 178—19

15 Claims



1. In a digitizer wherein the position of a movable instrument on a digitizing surface is determined from voltages induced between one or more conductors disposed across the digitizing surface and an electrical element carried by a movable instrument at a transduction frequency established by a frequency source, the improvement for reducing interference caused by adjacent AC fields comprising:
  - (a) counter means for receiving input pulses at a first input, for outputting output pulses employed to generate the transduction frequency source in the digitizer, and for receiving an initial count value at a second input, said counter means including logic for repeatedly counting from said initial count value at said second input to a terminal value, for outputting a said output pulse upon reaching said terminal value, and for resetting to said initial count value after outputting each said output pulse;
  - (b) a source of a higher frequency than the transduction frequency connected to said first input of said counter means; and,
  - (c) means for selectively setting said initial count value at said second input.

4,794,209  
**POSITION COORDINATE DETERMINING APPARATUS**  
 Akihiro Asada, Chigasaki, and Hideaki Idei, Oyama, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed May 28, 1987, Ser. No. 55,134  
 Claims priority, application Japan, May 28, 1986, 61-121051; Nov. 28, 1986, 61-281711  
 Int. Cl.<sup>4</sup> G06C 21/00  
 U.S. Cl. 178—19 20 Claims



19. A coordinate read device for use with a position coordinate determining apparatus detecting coordinate positions of points on a plane comprising:

- (a) first grid structures including a first insulator substrate and a first position measuring conductor formed on, or in said first insulator substrate, said first position measuring conductor having a plurality of fine position sense lines each said fine position sense line being disposed with a distance Z therebetween and including a plurality of groups of parallel conductors each having a width I, each said group of parallel conductors being disposed electrically separated from each other with a distance P therebetween, said groups of parallel conductors adjacent to each other passing electric currents in directions opposing to each other; and
- (b) second grid structures including a second insulator substrate and a second position measuring conductor formed on, or in said second insulator substrate, said second position measuring conductor having a plurality of coarse position sense lines each said coarse position sense line being disposed with a distance  $Z_G$  ( $Z < Z_G < P$ ) therebetween.

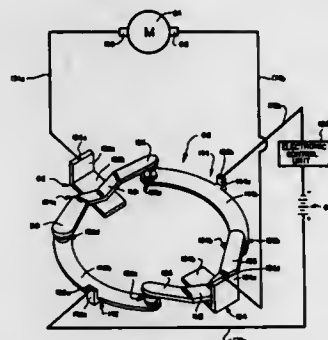
4,794,210  
**REVERSING SWITCH ASSEMBLY FOR AN ELECTRIC ASSIST STEERING SYSTEM**  
 Frederick A. Hammerle, Topsfield, Mass.; Richard Wicel, Kingston, N.H., and James A. Mallett, East Milton, Mass., assignors to TRW Inc., Lyndhurst, Ohio  
 Filed Jul. 30, 1987, Ser. No. 79,882  
 Int. Cl.<sup>4</sup> H01H 9/00; B62D 5/04  
 U.S. Cl. 200—1 V 24 Claims

1. A reversing switch for establishing electrical connections in response to torque applied across first and second coaxial shaft sections connected by a torsion bar, said applied torque causing said torsion bar to twist about its axis, said reversing switch comprising:

- first base portion fixed to said first shaft section and second base portion fixed to said second shaft section, twisting of said torsion bar in response to said applied torque causing relative rotation to occur between said first and second base portions about the torsion bar axis in a direction dependent upon the direction of applied torque;
- actuatable contact means carried by said first base portion and responsive to a pivotable actuator for, when in a first condition, closing a first set of electrical contacts thereby making a first electrical connection and, when in a second condition, closing a second set of electrical contacts thereby making a second electrical connection and, when

in a third condition, retaining said first and second sets of electrical contacts open; and

pivotable actuator means having a first distal end portion received in a recess portion of said second base portion and a second distal end portion operatively contacting said actuatable contact means, said pivotable actuator means mounted radially outward of said torsion bar axis and pivotably mounted to said first base portion, relative rotation between said first and second base portions in first and second relative directions causing said pivotable actuator means to pivot in first and second directions, respec-



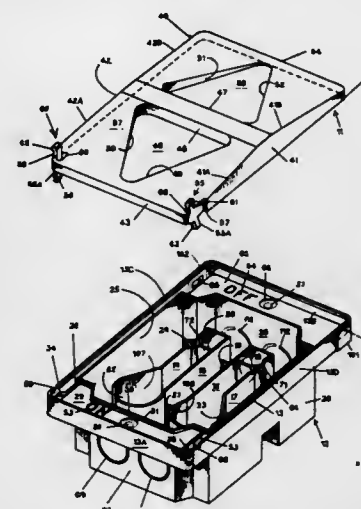
tively, about a second axis transverse to the torsion bar axis, said pivotable actuator means controlling the condition of said actuatable contact means so as to be in said first condition when said pivotable actuator means pivots in its first pivotal direction upon application of torque across said first and second coaxial shaft sections in a first direction, and in said second condition when said pivotable actuator means pivots in its second pivotal direction upon application of torque across said first and second coaxial shaft sections in a second direction, and in said third condition when no torque is applied across said first and second coaxial shaft sections.

4,794,211  
**FUSED DISCONNECT SWITCH WITH NON-METALLIC ENCLOSURE**  
 David A. Hibbert, South Windsor, and Larry J. Newmark, Avon, both of Conn., assignors to General Electric Company, New York, N.Y.  
 Division of Ser. No. 26,496, Mar. 16, 1987, Pat. No. 4,755,909.  
 This application Feb. 22, 1988, Ser. No. 158,959  
 Int. Cl.<sup>4</sup> H01H 15/00  
 U.S. Cl. 200—16 F 14 Claims

1. A fused electric switch comprising:
- a molded plastic case including a front and a rear wall joined by a pair of opposing sidewalls and a bottom;
- a peripheral rim extending around said front and rear walls and said side walls and defining a first platform between said peripheral rim and said front wall and a second platform between said peripheral rim and said rear wall;
- a first pair and a second pair of guide slots formed within said first platform;
- a pair of elongated guide recesses formed on an interior surface of said peripheral rim;
- a pair of line terminal assemblies attached to said case proximate one end having a pair of line stab contacts;
- a pair of load terminal assemblies attached to said case at an opposite end having a pair of load stab contacts;
- a molded plastic cover-operator having a pair of pins extending from opposite sides thereof at one end, said pins being captured within corresponding ones of said elongated guide recesses for pivotally retaining said cover-operator to said case;
- a pair of blade conductors extending from an interior surface

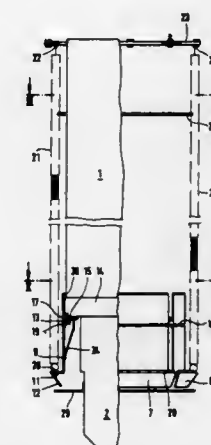
of said cover-operator and arranged for movement between said line and load stab contacts in response to lateral "ON"-"OFF" movement of said cover-operator between said first and second platforms; and

tom portion, and magnets temporarily retaining said screen parts in their operative position, and said screen parts in their tilted position contacting at least one of the springs and resultingly forming electrical contacts.



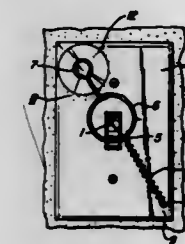
a pair of flexible tabs attached to said cover-operator at an opposite end and extending within said first and second guide slots for retaining said cover-operator to said case during said "ON"-"OFF" movement of said cover operator.

4,794,212  
**PROTECTIVE DEVICE FOR A FEED UNIT**  
 Gerhard Band, Oberndorf, and Bernd Muller, Herrenzimmern, both of Fed. Rep. of Germany, assignors to Manzer-Werke Oberndorf GmbH, Oberndorf, Fed. Rep. of Germany  
 Filed Dec. 24, 1987, Ser. No. 137,749  
 Claims priority, application Fed. Rep. of Germany, Jan. 16, 1987, 3701125  
 Int. Cl.<sup>4</sup> H01H 3/16 8 Claims



1. A protective device with a feed unit, said feed unit using a spindle sleeve of a measuring machine, said feed unit being encompassed by a jacket constituted of a multiplicity of springs which touch the feed unit during a collision and thereby form electrical contacts of a switch, and the bottom portion of the feed unit being encompassed by a protective shield; the improvement comprising: said protective shield is constituted of individual screen parts which are tiltable from an inoperative position, said screen parts collectively encompassing the bot-

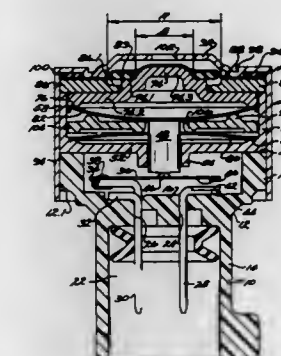
4,794,213  
**DELAYED ACTION SWITCH ACTUATOR**  
 D. Gregory Wood, 40 Baytree Way, San Mateo, Calif. 94402  
 Filed Mar. 25, 1988, Ser. No. 173,218  
 Int. Cl.<sup>4</sup> H01H 3/70, 43/00  
 U.S. Cl. 200—33 R 8 Claims



1. A delayed action switch actuator, for use with a switch having a toggle movable between first and second orientations and a face plate having an opening through which the toggle passes, comprising:

- a spring attached to the face plate at a first position;
- a toggle-engaging member attached to the spring to create a spring assembly, the spring assembly sized to be flexed when the toggle-engaging member is in a toggle-engaging position; and
- suction cup means for temporarily maintaining the spring assembly in tension, the suction cup means including:
- a suction cup attached to the spring assembly and affixable to a second position on the face plate; and
- means for creating an imperfect seal between the suction cup and the face plate such that the suction cup releases after a period of time whereupon the spring forces the toggle-engaging member towards the toggle to trip the toggle from its first orientation to its second orientation.

4,794,214  
**FLUID PRESSURE RESPONSIVE ELECTRICAL SWITCH**  
 Carlton E. Sanford, E. Providence, R.I., assignor to Texas Instruments Incorporated, Dallas, Tex.  
 Filed Oct. 28, 1987, Ser. No. 114,184  
 Int. Cl.<sup>4</sup> H01H 35/34 7 Claims



1. A fluid pressure switch device comprising a housing, an electric switch mounted in the housing, the switch having



contacts movable relative to one another into and out of positions of engagement,

first and second discs movable between convex and concave configuration and movably controlling the position of the contacts,

the first disc having a centrally located aperture mounted in the housing, said first disc movable from one configuration to another at a first pressure level, the second disc mounted in the housing aligned with and beneath the first disc and moves from one configuration to another at a second higher pressure level,

a motion transfer member slidably extending from the contacts through the aperture in the first disc and contacting the second disc,

a pressure converter slidably mounted in the housing having an annular disc receiving seat, the second disc received at the seat,

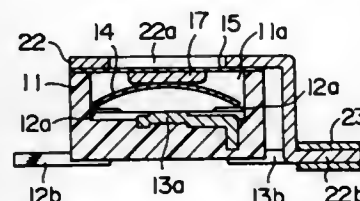
a flexible membrane in engagement with an opposite side of the pressure converter,

an orifice formed in the housing so that the membrane can be placed in communication with a pressure source,

the pressure converter having first and second portions movable relative to one another in engagement with the flexible membrane and stop means limiting movement of one portion while permitting movement of the other portion, both first and second portions being movable in response to selected pressure levels to effect movement of the first disc from one configuration to another and until the stop means limits movement of the one portion and at increased pressure levels the other portion being movable to effect movement of the second disc from one configuration to another.

**4,794,215**  
**PUSH SWITCH SEALED AGAINST CONTAMINANTS**  
Masaki Sawada, Osaka; Futoshi Matsui, Hirakata, and Katsuyoshi Onda, Katano, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan  
PCT No. PCT/JP85/00533, § 371 Date Aug. 8, 1986, § 102(e) Date Aug. 8, 1986, PCT Pub. No. WO86/02196, PCT Pub. Date Apr. 10, 1986

PCT Filed Sep. 26, 1985, Ser. No. 878,974  
Claims priority, application Japan, Sep. 29, 1984, 59-202988; Sep. 29, 1984, 59-202989; Nov. 22, 1984, 59-247149  
Int. Cl.<sup>4</sup> H01L 13/02  
U.S. Cl. 200—199 B



1. A push switch comprising a mount base made of a heat resisting and insulating material and having a recess in a top surface thereof, which defines a recess opening, said recess having a plurality of contact terminals disposed therein, external terminals connected to said contact terminals and having planar surface portions which are adapted to be in surface contact with a planar electrode pattern on a circuit board, a curved push spring having an inverting function and disposed in said recess, and an operating portion through which said push spring is operated, said operating portion being formed by a flexible heat resistant film which is hermetically attached to said mount base to cover the entirety of said recess opening; and a cover made of a material substantially resistant to solder

deposition, said cover covering the entire area of said heat resistant film except the central portion of said film.

**4,794,216**  
**CONTACT SPRING FOR A BISTABLE RELAY FOR THE SWITCHING OF HIGH CURRENT**

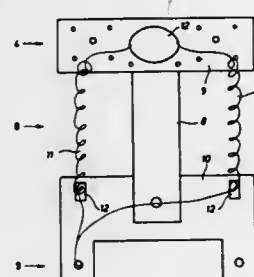
Gunter Seeger, Heidelberger Landstr. 341, Darmstadt-Eberstadt, Fed. Rep. of Germany 6100

Filed May 6, 1986, Ser. No. 860,134

Int. Cl.<sup>4</sup> H01L 41/08

U.S. Cl. 200—275

10 Claims



1. In a contact spring for a bistable relay for the switching of high amperage electrical currents, which consists of a metal plate with one clamped end and one contact end, between which a bending zone is formed by a first elongated metal strip connected to and extending between said clamped end and said contact end, said contact end including a second elongated metal strip transversely connected to said first elongated metal strip at said contact end of said first elongated metal strip, the improvement comprising:

at least one stranded wire (11) in said bending zone substantially parallel to and laterally spaced from said first metal strip (5) and electrically connected to said clamped end (2) and to said second metal strip (6) at said contact end (3).

**4,794,217**  
**INDUCTION SYSTEM FOR RAPID HEAT TREATMENT OF SEMICONDUCTOR WAFERS**

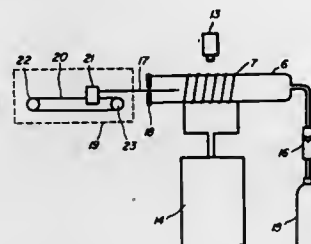
Pei Xin Quan; Dong Yan Hou; Bi-Xian Chen; Teng Ge Ma; Hui Wang Lin, and Zai Jian Li, all of Beijing, China, assignors to Qing Hua University, China

Continuation-in-part of Ser. No. 815,867, Jan. 3, 1986, abandoned. This application Apr. 15, 1987, Ser. No. 38,516  
Claims priority, application China, Apr. 1, 1985, 85100131; Mar. 5, 1987, 87202679

Int. Cl.<sup>4</sup> H05B 6/10

U.S. Cl. 437—247

12 Claims



1. An apparatus for rapid heat treatment of semiconductor wafers in which ions have been implanted to anneal ion implantation damage and to activate ion-implanted dopants in the wafers, said apparatus comprising:

a housing;  
means inside the housing holding a semiconductor wafer in which ions have been implanted;

a graphite heater in said housing spaced apart from the wafer for rapidly heating the wafer by radiation;  
means inside the housing holding the heater;  
a gas medium in the housing for accelerating absorption of heat originating from the graphite heater by the wafer during a time period when heat originating from the heater is absorbed by the wafer primarily through band-to-band electron transition, and for reducing the differences in temperature between different portions of the wafer when it is heated; and  
means for rapidly delivering the wafer holding means and the wafer to and withdrawing them from a location which is inside the housing and spaced apart from the heater so that the wafer is heated by heat from the heater and for rapidly withdrawing the wafer after heating, wherein said wafer holding means, heater holding means, said housing and the portion of the delivering and withdrawing means inside the housing during the heating process are made of quartz to reduce metal ion contamination.

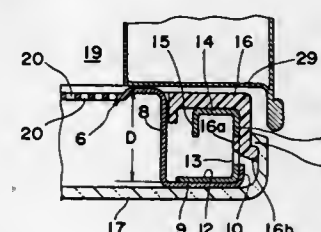
**4,794,218**  
**DOOR ASSEMBLY FOR MICROWAVE HEATING APPARATUS**

Okihiko Nakano, Nara, and Yoshio Ishimura, Kashihara, both of Japan, assignors to Matsushita Electric Industrial Co. Ltd., Osaka, Japan  
Continuation of Ser. No. 799,737, Nov. 19, 1985, Pat. No. 4,742,201. This application Jan. 12, 1988, Ser. No. 143,026  
Claims priority, application Japan, Nov. 20, 1984, 59-244966; Nov. 20, 1984, 59-244967; Jan. 14, 1985, 60-4278

Int. Cl.<sup>4</sup> H05B 6/76

U.S. Cl. 219—10.55 D

1 Claim



1. A heating apparatus employing high frequency electromagnetic wave energy, said apparatus comprising:

a heating chamber in which the high frequency electromagnetic wave energy is employed for heating, said heating chamber having an access opening and a front panel extending around said access opening;

a door hinged to said heating chamber for opening and closing over said access opening, said door having a peripheral portion surrounding said access opening when said door is closed,

said peripheral portion defining a groove open towards the front panel of said heating chamber, the peripheral portion of the door comprising an outer peripheral wall defining a side of the groove, the outer peripheral wall having a plurality of projections extending toward the front panel and a plurality of openings therein, and said peripheral portion also comprising a first covering member comprised of synthetic resin extending over said projections for covering said groove, said first covering member having a plurality of engagement portions extending in said openings in said outer peripheral wall and also having an extending part,

said door also comprising a second covering member defining the front face of the door, said second covering member having an extension part engaging the extending part of said first covering member for securing said first covering member to the door.

**4,794,219**  
**MICROWAVE OVENS AND METHODS OF COOKING FOOD**

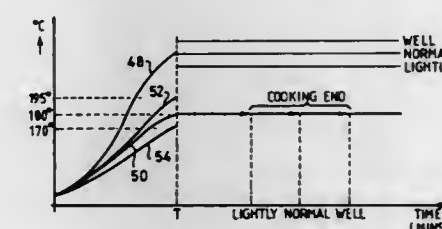
Kenneth I. Eke, South Croydon, England, assignor to Microwave Ovens Limited, Shirley, England  
Continuation of Ser. No. 027,247, Mar. 18, 1987, abandoned.

This application Jul. 5, 1988, Ser. No. 214,828  
Claims priority, application United Kingdom, Mar. 26, 1986, 8607486; Apr. 1, 1986, 8607901; Oct. 17, 1986, 8624938

Int. Cl.<sup>4</sup> H05B 6/68

U.S. Cl. 219—10.55 M

7 Claims



1. A microwave oven, comprising: a cavity for receiving a food item to be cooked; a magnetron for delivering microwave power to the cavity; a forced hot air system including a fan and an electrical resistance heating element which are disposed in a compartment separated from the cavity by a dividing panel, said panel having a first aperture as a hot air outlet aperture for said cavity and a second aperture serving as a hot air inlet aperture for said cavity, whereby said fan draws air into said compartment from said cavity through said outlet aperture, directs the air over said heating element and then returns the air to said cavity through said inlet aperture; a first thermistor located adjacent to said fan for monitoring the variation of air temperature over time and determining the time at which the air temperature reached a predetermined value and, when the air temperature reached the predetermined value, means for:

(1) determining the remaining cooking time, beyond the time when the air temperature reached the predetermined value to the end of the cooking by reference to a first stored pre-set characteristic that in combination with the time when the air temperature reached the predetermined value permits a determining of total cooking time, and  
(2) determining a maximum air temperature for air entering the oven through said hot air inlet aperture from the time when the temperature reached the predetermined value to the end of cooking, the determination being made by reference to a second stored pre-set characteristic using the time when the temperature reached the predetermined value to determine the maximum hot air temperature, said maximum hot air temperature being thermostatically measured and controlled by a second thermistor adjacent said inlet aperture to said cavity, immediately downstream of said heating element.

**4,794,220**  
**ROTARY BARREL TYPE INDUCTION VAPOR-PHASE GROWING APPARATUS**

Isao Sekiya, Numazu, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 19, 1987, Ser. No. 27,727  
Claims priority, application Japan, Mar. 20, 1986, 61-62590

Int. Cl.<sup>4</sup> H05B 6/40; C23C 16/00

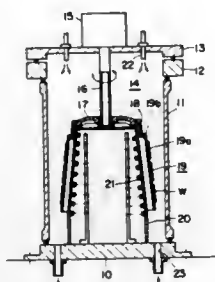
U.S. Cl. 219—10.491

15 Claims

1. A rotary barrel type induction vapor-phase growing apparatus comprising:

a reaction cylinder;  
a seal plate for sealing an upper end of said reaction cylinder;  
a radio-frequency heating coil having an upper end, the heating coil being provided in said reaction cylinder;  
a susceptor having an upper end, the susceptor being pro-

vided in said reaction cylinder to surround said radio-frequency heating coil, so that a number of semiconductor wafers are supported and heated on a surface of said susceptor;  
a rotating means provided on said seal plate; and  
a suspension means for suspending and rotating said susceptor within said reaction cylinder at a position where



the upper end of the susceptor is held lower than the upper end of said radio-frequency heating coil, which comprises a hanger having an upper and a lower end, the upper end coupled with said rotating means, and an upper cover member supported by the lower end of said hanger and having a peripheral portion extending downwardly, the upper end of said susceptor being secured to the peripheral portion of said upper cover member.

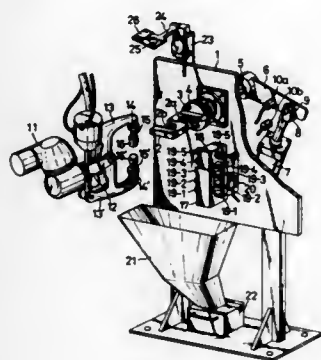
#### 4,794,221 APPARATUS AND METHOD FOR EXCHANGING ELECTRODE CHIPS USED FOR RESISTANCE WELDING

Fumio Takabe; Masashi Kitadate; Makoto Sumiyoshi; Kiyohiko Igarashi; Kazuo Suzuki, and Takashi Akita, all of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan

Filed Sep. 14, 1987, Ser. No. 95,647  
Claims priority, application Japan, Nov. 26, 1986, 61-181449(U); Nov. 26, 1986, 61-181450(U)

Int. Cl.<sup>4</sup> B23K 11/30  
U.S. Cl. 219—86.8

11 Claims

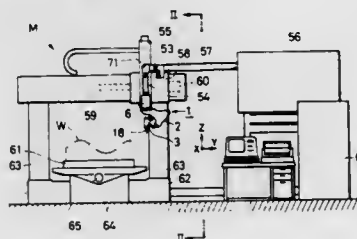


1. An apparatus for exchanging electrode chips used for resistance welding, said apparatus comprising:  
a shaft rotatably mounted to a base;  
driving means connected to one end of the shaft for rotating the shaft about its axis;  
a chip-withdrawing tool mounted axially at the other end of the shaft and having a surface portion disposed in a plane parallel to the radius of the shaft with at least one open recess formed in said surface portion of the tool, said chip

withdrawing tool having a knife edge portion in said at least one recess;  
a locating guide member mounted on the base; and  
an electrode chip supply holder slidably mounted on the locating guide member for positioning the electrode chips relative the chip withdrawing tool.

4,794,222  
LASER BEAM MACHINING APPARATUS  
Manabe Funayama, No. 3322-17, Kamijima, Tonami-shi, Toyama, and Yoshinobu Sawada, No. 1472, Sanohomachi, Takaoka-shi, Toyama, both of Japan  
Filed Jun. 30, 1987, Ser. No. 68,008  
Claims priority, application Japan, Jun. 30, 1986, 61-154472; Aug. 18, 1986, 61-192256; Oct. 28, 1986, 61-257933  
Int. Cl.<sup>4</sup> B23K 26/02  
U.S. Cl. 219—121.78

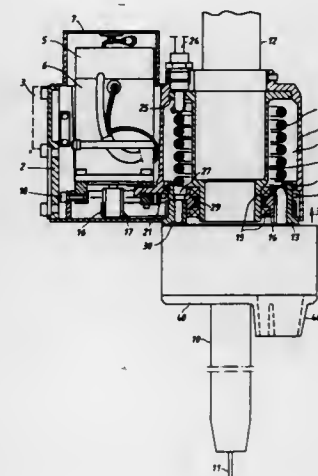
19 Claims



1. A laser beam machining apparatus comprising:  
a head supporting member;  
a first rotating bracket member for guiding a laser beam, said first rotating member being supported on said head supporting member and rotatable about a first axis with respect to said head supporting member;  
a second rotating bracket member for guiding said laser beam from said first rotating bracket member, said second rotating bracket member being supported on said first rotating bracket member and rotatable with respect to said first rotating bracket member about a second axis, said second axis crossing said first axis at a fixed point with a predetermined angle;  
laser beam concentrating means for concentrating the laser beam entering from said second bracket member and projecting the beam to the fixed point where the first axis crosses the second axis;  
retainer means for retaining said laser beam concentrating means, said retainer means being movable with respect to said second rotating bracket member in an optical axis direction of the laser beam passed through said laser beam concentrating means, to thereby perform focusing adjustment of the beam on a workpiece to be machined;  
a nozzle member for projecting out the laser beam concentrated by said concentrating means and detecting a distance between said nozzle and said workpiece to be machined, said nozzle member being retained in said retainer means, said nozzle member comprising:  
a first electrode layer for detecting electrostatic capacitance between a tip end of said first electrode layer and the workpiece, said first electrode layer extending along an inner side portion of the nozzle member to a tip end portion thereof;  
a second electrode layer for electrically shielding a side portion of said first electrode layer from the workpiece, said second electrode layer being provided on an outer lateral side portion, except the tip end portion of said first electrode layer; and  
an insulating layer provided between said first and second electrode layers for electrically insulating said first and second electrode layers from each other.

4,794,223  
SEAM TRACKING DEVICE FOR AN INDUSTRIAL  
ROBOT  
Lars Barkman; Torbjörn Forn; Hakan Färdig, and Tommy Svemason, all of Västerås, Sweden, assignors to ASEA Aktiebolag, Västerås, Sweden  
Filed Aug. 21, 1987, Ser. No. 87,819  
Claims priority, application Sweden, Sep. 1, 1986, 8603655  
Int. Cl.<sup>4</sup> B23K 9/12  
U.S. Cl. 219—124.34

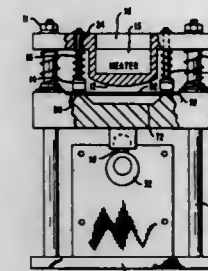
10 Claims



1. A seam tracking device which can be mounted on a tool attachment of an industrial robot hand for welding a workpiece, said device comprising:  
a housing which has an open first side intended to face the workpiece and second side opposite said first side,  
a hose means connected to said housing for supplying compressed cooling air thereto,  
a sensor means which has a first face and an opposite second face and is rotatably mounted over said first side of said housing such that said second face thereof faces said housing, said sensor means including a hole which extends from said second face to said first face, a light-emitting means for projecting a spot of light on a workpiece, a light-sensing means for sensing reflected light from a workpiece, and channels for accepting compressed cooling air from said housing and causing it to flow therethrough,  
a motor for rotating said sensor means,  
a heat shield mounted on said first face of said sensor means, said heat shield including a hole which is aligned with the hole in said sensor means, a window means which covers said light-emitting means and said light-sensing means of said sensor means, and air channels therein which enable compressed cooling air from said sensor means to pass therethrough and then flow in front of said window means, and  
a welding torch which extends through each of said housing, said hole in said sensor means, and said hole in said heat shield, said welding torch including an electrode which extends towards said workpiece.

4,794,224  
DRY FILM DEVELOPER FOR AN APERTURE CARD  
PRINTER  
Semyon Spektor, San Francisco; Michael Veprinsky, and Michael H. Ranger, both of San Jose, all of Calif., assignors to NCR Corporation, Dayton, Ohio  
Filed Apr. 9, 1987, Ser. No. 36,517  
Int. Cl.<sup>4</sup> H05B 3/20  
U.S. Cl. 219—216

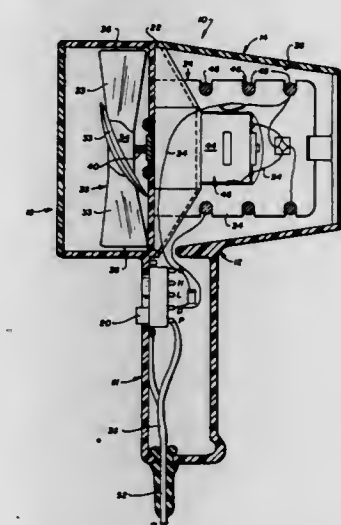
11 Claims



7. An improved dry film developer for use with a machine of the type that records images on a frame of dry film mounted to an aperture card, comprising:  
a base member;  
at least one pair of rods extending from said base member;  
a heater block for generating a temperature sufficient to develop a dry film, said heater block having a projecting arcuate surface which stretches and heats the film and is mounted to said at least one pair of rods;  
a bearing block having a recessed area corresponding to the size of a frame of dry film movably mounted to said at least one pair of rods;  
holding means for holding a frame of dry film between said heater block and said bearing block as said blocks are urged into a development position.

4,794,225  
TUBE AXIAL HANDHELD BLOW DRYER FOR HAIR  
Hector L. Maese, 1025 S. Solano, Las Cruces, N. Mex. 88001  
Filed Oct. 9, 1987, Ser. No. 106,399  
Int. Cl.<sup>4</sup> F24H 7/00; H05B 1/00, 3/02  
U.S. Cl. 219—370

7 Claims



1. A tube axial handheld blow dryer for hair, comprising:  
a housing including a tubular barrel having an inlet and an



outlet, and a handle for permitting handholding of the housing, this handle being secured to the barrel intermediate said inlet and said outlet;

- a fan-motor-heating coil assembly of coaxially disposed members, including a tube axial fan having at least five blades radiating from a hub to which said blades are attached; an axially rearwardly projecting output shaft from said motor; said hub of said axial fan being mounted on said shaft to be rotated by said motor; said motor having a generally cylindrical casing which is substantially equal in diameter to said hub; and said heating coil being disposed downstream of said fan but upstream of said outlet of said housing barrel;
- mechanical spider means mounting said fan-motor-heating coil assembly coaxially in said housing barrel so as to provide a substantially unobstructed passageway axially of said housing barrel from said inlet to said outlet thereof; said inlet being about 1.5 times the diameter of said outlet, and said inlet having a diameter of at least 3.75 inches; said blades of said fan having tip portions located radially no more than about 0.125 inch from an inner peripheral wall of said tubular barrel;
- said tube axial fan having a hub diameter of at least about 1.0 inch; and
- said motor being a D.C. motor having a normal operating speed of approximately 6000 RPM.

4,794,226

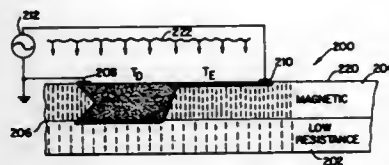
## SELF-REGULATING POROUS HEATER DEVICE

Rodney L. Derbyshire, Menlo Park, Calif., assignor to Metcal, Inc., Menlo Park, Calif.

Continuation of Ser. No. 498,328, May 26, 1983, abandoned.

This application Oct. 8, 1986, Ser. No. 917,266

Int. Cl.<sup>4</sup> F24H 1/00; H05B 6/10; B01D 35/18; B01J 19/08  
U.S. Cl. 219—374 10 Claims



1. In a device for uniformly heating a body of fluid to a specified temperature:

- a heating element of such extended length that one portion thereof may be cooled more than another portion, said heating element being composed of at least partly of a ferromagnetic material having a Curie temperature at about said specified temperature,
- said heating element having holes therethrough, distributed along the length of said element, that are transverse to the direction of elongation of said element,
- means for directing said fluid through said holes, and
- means for heating said element to said specified temperature by passing an alternating current therethrough having a frequency so high that when said fluid flow lowers the temperature of one portion of the length of said element more than the fluid flow lowers the temperature of another portion of the length of said element that the skin depth of the current flow in said one portion decreases to thus increase the effective resistance of said one portion, as compared to the skin depth of the current flow in and the effective resistance of said another portion, and thus increases the heat supplied to said one portion as compared to the heat supplied to said another portion, so that the portions of the element that are subject to the greatest cooling load are provided with the greatest heating; to thereby uniformly heat said fluid to said specified temperature; said holes being of such size, distribution and density that such uniform heating of fluid is achieved.

4,794,227

## ELECTRICAL RESISTANCE HEATER ELEMENT FOR ROOM AIR HEATER

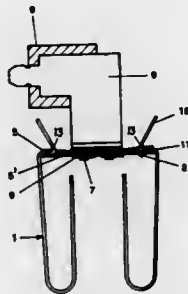
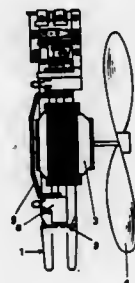
Giansante Antoniazzi, Conegliano, and Claudio Fattorel, Vittorio Veneto Treviso, both of Italy, assignors to R.I.C.A. Resistenze Industriali Corazzate E, Treviso, Italy

Filed Jan. 13, 1988, Ser. No. 143,347

Claims priority, application Italy, Jan. 27, 1987, 61905/87[U]

Int. Cl.<sup>4</sup> H05B 3/02; H01C 1/01, 3/10

U.S. Cl. 219—375 6 Claims



1. An electrical resistance heater element for room air heaters, comprising a heating conductor (1) mounted on an electrically insulating support (2) which is itself mounted on a support flange (9) to which can be fitted an electric motor (3) provided with a fan (4) which passes a stream of air across the heating conductor (1), wherein the insulating support (2) is of cylindrical form with its axis adapted to be positioned parallel to the direction of the stream of the air to be heated and consists of at least one pair of nested cylindrical mica bands (5,5') kept superposed by fillets (6), each rigid with a pair of circumferentially spaced brackets (8) connected to said support flange (9), and wherein the heating conductor (1) comprises at least one wire of resistive material bent in zig-zag manner to form a plurality of radial loops, each having portions extending inwardly and outwardly of said cylindrical bands, with the central portion of each loop bent over and retained between the two mica bands (5,5') and the inner portion of each loop emerging radially from the inner band through apertures (13) provided therein.

4,794,228

## SELF-REGULATING HEATER ASSEMBLY

Fred P. Braun, Jr., Lake Quivira, Kans., assignor to Heaton, Inc., Leavenworth, Kans.

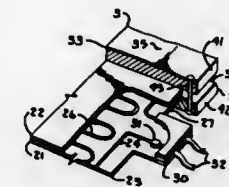
Filed Aug. 25, 1986, Ser. No. 900,282

Int. Cl.<sup>4</sup> F27D 11/02

U.S. Cl. 219—415 2 Claims

1. A steam table assembly comprising:
  - (a) a vessel having sides, ends, a bottom and an open top through which fluid to be heated is passed;
  - (b) a heater assembly mounted on said vessel for heating fluid contained in said vessel, including:

- (1) upper and lower conductor plates;
- (2) resistance wire sandwiched between said conductor plates, said resistance wire having a resistance which is non-uniformly dependent on the temperature of the wire to increase rapidly as the temperature of the wire increases from ambient to operating temperature and then to increase only slowly as the temperature of the wire increases above operating temperature;
- (3) means for attaching said upper and lower conductor plates together with said resistance wire sandwiched therebetween;
- (4) source means for energizing said resistance wire; and
- (5) cutoff means connected between said source means and said resistance wire and mounted on said lower conductor plate, including:
  - (i) temperature sensing means for sensing the temperature of said lower conductor plate;



- (ii) interrupt means connected to said temperature sensing means for automatically interrupting the flow of energy from said source means to said resistance wire when the temperature of said lower conductor plate increases to a predetermined level; and
- (iii) reset means for re-establishing the connection between said source means and said resistance wire, said reset means having operating means which must be manually operated to re-establish said connection between said source means and said resistance wire, said reset means being resettable only when said lower conductor plate temperature is below said predetermined level at which said energy flow is interrupted; and
- (c) said fluid in said vessel maintaining said lower conductor plate at an operating temperature below said predetermined level at which said energy flow is interrupted.

4,794,229

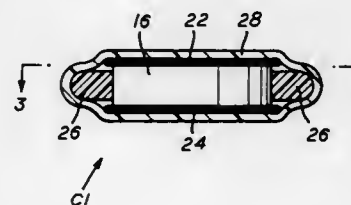
## FLEXIBLE, ELONGATED THERMISTOR HEATING CABLE

David C. Goes, San Marcos, and Chandrakant M. Yagnik, Austin, both of Tex., assignors to Thermo Manufacturing Company, San Marcos, Tex.

Filed Apr. 24, 1987, Ser. No. 42,177

Int. Cl.<sup>4</sup> H05B 3/10

U.S. Cl. 219—548 13 Claims



1. An electrical heating cable to provide heat to pipes, tanks and the like, comprising
  - first and second conductor means extending parallel and

spaced from each other along the length of the cable for conveying electrical current and for conducting heat; heating means comprising a plurality of chips of variable resistance heating material electrically connected between said first and second conductor means at longitudinally spaced locations for producing heat when current flows therethrough, said variable resistance chips substantially increasing in resistance when a temperature limit is reached to reduce the current flowing through said heating means and control the heat output of the cable; means for preventing contact between said first and second conductor means along the length of the cable; and wherein each of said conductor means comprises a substantially flat, elongated, multi-stranded electrical conductor having a thermal conductivity so as to conduct substantial amounts of heat relative to said means for preventing contact.

4,794,230

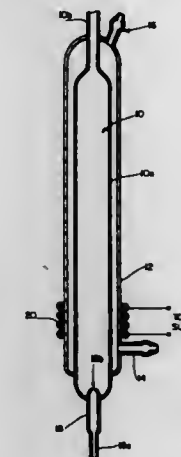
## LOW-PRESSURE WATER-COOLED INDUCTIVELY COUPLED PLASMA TORCH

Carl J. Seliskar, Cincinnati, and David K. Warner, Centerville, both of Ohio, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 16, 1984, Ser. No. 580,983

Int. Cl.<sup>4</sup> B23K 9/00

U.S. Cl. 219—121.52 6 Claims



1. An inductively coupled low-pressure plasma torch consisting of:

- an transparent inner tube comprising an elongate main portion in which the plasma flame is confined extending from an input end to an output end, the output end including a portion having a neck of narrower diameter than the diameter of said main portion;
- short capillary tube means penetrating the input end of said inner tube for injecting plasma gas and samples into said inner tube through an inlet orifice, said inlet orifice being adjacent the input end of said inner tube;
- an transparent outer tube surrounding said inner tube and containing water therein for cooling the inner tube, said outer tube including a water inlet port to which water is supplied and a water outlet port spaced from said water inlet port from which water is removed after flowing through said outer tube; and
- r.f. induction coil means surrounding said outer tube for exciting a plasma in the gas passing into said inner tube.

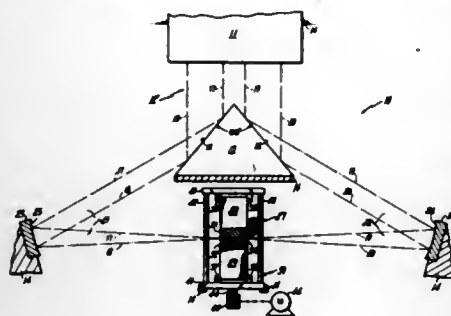
# 4,794,231 METHOD OF AND ARRANGEMENT FOR LASER WELDING

Conrad M. Bannas, Bolton, and Brian M. Doyle, East Hartford, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 24, 1987, Ser. No. 137,682  
Int. Cl. B23K 26/00

U.S. Cl. 219—121.63

15 Claims



1. A method of laser welding, comprising the steps of: positioning a plurality of workpieces to be joined next to one another so as to form an assembly having at least one interface between the workpieces; simultaneously directing two laser beams from opposite sides of the assembly against effective welding regions of the workpieces each of which is situated at the interface on a different one of the sides of the assembly and is substantially aligned with the respective other of said effective welding regions across the assembly as considered from one of the sides of the assembly to the other, each of said laser beams carrying an amount of energy sufficient to form a molten weld pool penetrating into the assembly at the interface to an extent insufficient for either one of the molten weld pools to penetrate to the respective other side of the assembly by itself but sufficient for the two molten weld pools to merge with one another within the assembly; and effecting relative movement between the assembly and the two laser beams along the interface while maintaining the substantial alignment of the effective welding regions.

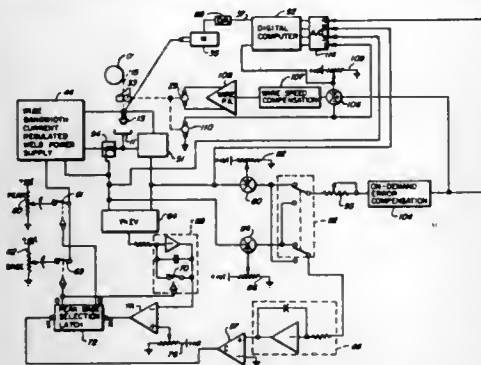
# 4,794,232 CONTROL FOR GAS METAL ARC WELDING SYSTEM

Andrew G. Kimbrough, and Timothy A. Ferris, both of Simi Valley, Calif., assignors to Kinetic Energy Corporation, Rancho Cordova, Calif.

Filed Sep. 17, 1986, Ser. No. 908,279  
Int. Cl. B23K 9/09

U.S. Cl. 219—130.51

18 Claims



1. In an arc welding system having a torch head spaced from

a work to be welded, said arc welding system for delivering power from a contact tip of a feed wire electrode carried by said torch head to said work wherein the power is cyclicly delivered at a high level during a high level portion of the cycle and at a low level during a low level portion of the cycle, the improvement comprising:  
means for delivering power at the high level until a desired pulse energy has been delivered; and  
means for delivering power at the low level until a recovery condition has been satisfied.

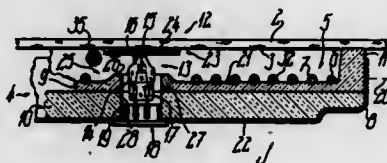
# 4,794,233 RADIANT HEATER

Gerhard Goeßler, Oberderdingen, and Eugen Wilde, Kaitlingen, both of Fed. Rep. of Germany, assignors to E.G.O. Elektro-Geräte Blanc u. Fischer, Fed. Rep. of Germany  
Filed Sep. 18, 1987, Ser. No. 98,495  
Claims priority, application Fed. Rep. of Germany, Oct. 17, 1986, 3635345

Int. Cl. H05B 3/74

U.S. Cl. 219—464

45 Claims



1. A radiant heater adapted for use inside of an electric cooker having a top plate, said heater comprising:  
a support having an insulator member, the insulator member having a front side facing the top plate, said insulator member being made from an insulating material;  
at least one elongated heating resistor located substantially in a plane substantially parallel to the top plate, said heating resistor being located on the front side of said insulator member; and,  
an electric light source electrically connected as an indicating device separate from the heating resistor, said light source being located in the vicinity of the insulator member, wherein the electric light source is arranged to extend substantially into the vicinity of the front side of the insulator member and of the plane of the heating resistor.

# 4,794,234 ELECTRONIC APPARATUS

Kiyoshi Kinugawa, and Selo Kainoh, both of Nara, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan  
Filed Aug. 26, 1987, Ser. No. 89,398

Claims priority, application Japan, Aug. 26, 1986, 61-130436[U]

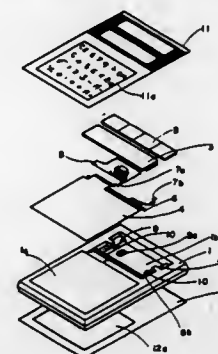
Int. Cl. G06C 5/02

U.S. Cl. 235—1 D

3 Claims

1. An electronic apparatus comprising:  
a transparent cabinet member for housing components of said electronic apparatus;  
a lens member integrally formed in a portion of said cabinet member;  
transparent key input means for inputting information into said electronic apparatus, said transparent key input means overlaying said lens member;  
a transparent face member overlaying said transparent cabinet member on a first major surface thereof, said transparent face member including a plurality of key input indicia corresponding to a plurality transparent electrodes on said transparent key input means; and  
a transparent base member overlaying said transparent cabinet member on a second major surface thereof;

wherein said electronic apparatus has a transparent viewing area coextensive throughout the superimposed layers so



that images below said electronic apparatus are magnified when viewed from the side of the first major surface.

# 4,794,235 NON-LINEAR PREDICTION FOR GUN FIRE CONTROL SYSTEMS

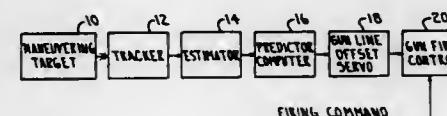
Harold H. Burke, and Toney R. Perkins, both of Bel Air, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 19, 1986, Ser. No. 864,400

Int. Cl. G06G 7/80

U.S. Cl. 235—412

1 Claim



1. A weapon fire control system comprising:  
tracking means for generating a target tracking data signal at an output thereof;  
estimating means connected to the output of the tracking means for filtering the tracking data signal and estimating its present velocity and acceleration effects;  
predicting means having an input connected to the output of the estimating means for computing offset equations relating target present and future position;  
the present position of the target being related to the future position of the target in accordance with the following offset equations, where the offsets are with respect to the target's present velocity and acceleration;  
 $T_f = T_p + \Delta x$  parallel to velocity  
 $T_f = T_p + \Delta y$  parallel to acceleration  
where  
 $T_f T_p$  = target position-future and present  
 $A_N/V$  = target acceleration normal to target velocity  
 $V$  = target velocity

$$\Delta x = \left[ 1 - \frac{\omega \Delta t^2}{6} \right] \cdot V \Delta t^2$$

$$\Delta y = \left[ 1 - \frac{\omega \Delta t^2}{12} \right] \cdot \frac{1}{2} A_N \Delta t^2$$

$\Delta t$  = projectile time-of-flight  
 $A_N/V = \omega$   
 $\omega$  = cyclic frequency of maneuvering target; and  
means for calculating a gun line offset from a line-of-sight of

$$\lambda = \tan^{-1} \frac{(\Delta x^2 + \Delta y^2)^{1/2} \sin(\psi + \phi)}{R_p - (\Delta x^2 + \Delta y^2)^{1/2} \cos(\psi + \phi)}$$

where

$$\psi = \tan^{-1} \frac{\Delta y}{\Delta x}$$

$$\phi = \tan^{-1} \frac{R_p \sigma}{R_p}$$

where

$R_p$  = target present range  
 $R_p$  = target present range rate  
 $\sigma$  = target present line-of-sight rate; and gun line offset servo means responsive to the calculated gun line offsets for positioning a weapon in preparation for firing the weapon.

# 4,794,236 IC CARD SYSTEM

Shigeyuki Kawana, Tokyo, and Yoshimi Shigenaga, Higashiyama, both of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

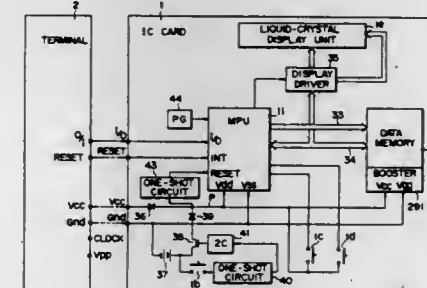
Filed Oct. 23, 1986, Ser. No. 923,329

Claims priority, application Japan, Oct. 29, 1985, 60-242237; Oct. 29, 1985, 60-242238

Int. Cl. G06K 7/06

U.S. Cl. 235—441

6 Claims



1. An IC card system comprising:  
IC card means including:  
memory means for storing at least transaction data and secret data for identification;  
power source means for supplying power to an internal circuit of said IC card means, and  
power source control means for controlling an ON/OFF state of said power source means; and  
terminal means, in which said IC card means is inserted, for performing data communication with said IC card means, said terminal means including at least detection means for detecting the ON/OFF state of said power source means of said IC card means when said IC card means is inserted in said terminal means.

# 4,794,237 MULTIDIRECTIONAL HOLOGRAPHIC SCANNER

Ronald A. Ferrante, Seneca, Ohio, assignor to NCR Corporation, Dayton, Ohio

Filed Nov. 10, 1986, Ser. No. 929,050

Int. Cl. G06K 7/10

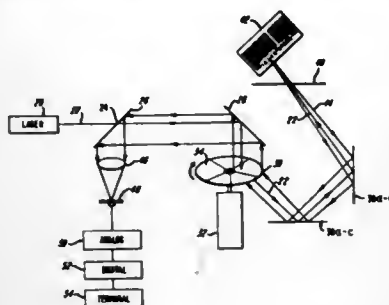
U.S. Cl. 235—457

10 Claims

7. An apparatus for scanning a coded label comprising:



- a laser for projecting narrow beams of light along a first path;  
 a first optical reflecting member positioned in said first path, said reflecting member having an aperture therein through which the beam of light travels along said first path;  
 a second optical reflecting member positioned in said first path for reflecting the beams of light along a second path;  
 a substrate of material mounted for rotation on its center in said second path;  
 means for rotating said substrate;  
 a plurality of two sided hologram members formed as facets around the substrate comprising the total surface area of the substrate to intercept said beams of light, each of said hologram members having one side constructed to focus said beams of light at a different focal point adjacent a scanning area which overlaps the focal point of each of the other hologram members for scanning a bar coded label on an article which passes through said scanning



- area, said hologram members having the other side constructed to receive light beams reflected from the coded label for collimating the reflected light beams at said first and second optical members which reflect the collimated light beam to a receiving area;  
 a plurality of sets of mirrors positioned between the hologram members and the scanning area for reflecting the light beams received from the hologram members towards said scanning area as a series of intercepting diagonal and substantially horizontal lines relative to the path of the article passing through the scanning area during one revolution of the substrate and for directing the light beams reflected from the coded label to the hologram members;  
 a lens member positioned at the receiving area for focusing the received collimated light beams at a collection point; and  
 photodetector means positioned at said collecting point for detecting changes in the intensity of the light beams reflected from the coded label on the article passing through the scanning area.

**4,794,238**  
**METHOD AND APPARATUS FOR READING AND MARKING A SMALL BAR CODE ON A SURFACE OF AN ITEM**

Gordon P. Hampton, Cupertino, Calif., assignor to Ultracision, Inc., Santa Clara, Calif.

Filed Oct. 9, 1987, Ser. No. 107,565

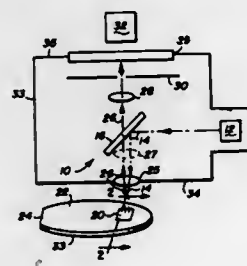
Int. Cl.<sup>4</sup> G06K 7/10

U.S. Cl. 235-462

16 Claims

1. An apparatus for reading a small bar code region marked on a surface of an item comprising:  
 a collimated light source which emits an incident beam of light;  
 a means for directing part of the incident beam, including a beam splitter so that the incident beam strikes a bar code region on a surface of an item at approximately a ninety degree angle from a plane containing the bar code region;  
 a first lens system positioned between the means for direct-

ing and said surface, for focusing the incident beam on the bar code region and for magnifying and focusing a reflected beam of light on a second lens system positioned coaxially with the first lens system, on an opposite side of the beam splitter from the first lens system, the second lens



system functioning to further focus and magnify the reflected beam;  
 an image screen for displaying the reflected beam after it passes through the second lens system; and  
 a detector for reading the reflected beam displayed on the image screen.

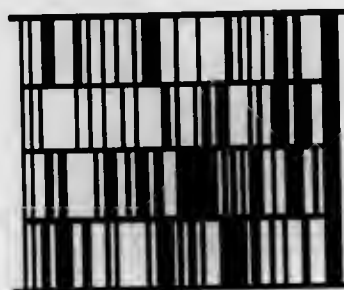
**4,794,239**  
**MULTITRACK BAR CODE AND ASSOCIATED DECODING METHOD**  
 David C. Allais, Edmonds, Wash., assignor to Intermec Corporation, Lynnwood, Wash.

Filed Oct. 13, 1987, Ser. No. 108,844

Int. Cl.<sup>4</sup> G06K 7/10

U.S. Cl. 235-462

23 Claims

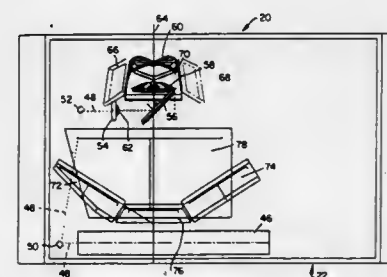


1. A bar code structure comprising a plurality of ordered rows of bar coded information, the bar coded information in each of the plurality of rows consisting of an array of code words, each code word representing at least one information-bearing character and being selectable in even or odd parity form, each of the characters having a distinct attributable numerical value, at least one of the plurality of characters in each row bearing information regarding the remainder of the characters in that row, the array of code words in each row having a parity pattern indicative of the order of that row, a predetermined one of the ordered rows comprising at least one character containing information regarding the number of ordered rows and regarding the information-bearing characters in the ordered rows.

**4,794,240**  
**BAR CODE SCANNER CONSTRUCTION**  
 Theodore H. Schorr, and James J. Jensen, both of Eugene, Oreg., assignors to Spectra-Physics, Inc., San Jose, Calif.  
 Filed Sep. 12, 1986, Ser. No. 907,339  
 Int. Cl.<sup>4</sup> G06K 7/14

U.S. Cl. 235-467

23 Claims



1. A bar code scanner housing construction in a scanner of the type which produces multiple intersecting laser scan lines from a series of apparent sources, and which includes a rotating mirror and a series of internal beam routing mirrors which are fixed and non-adjustable, comprising:

only two castings to which all the beam routing mirrors are secured, the two castings being a platform or bottom casting and a main or upper casting securable together by removable fasteners;  
 each casting having three-point spherical ball locating means for locating the plane of each beam routing mirror on the casting, with the back side of the beam routing mirror being bonded to the spherical ball locating means;  
 the two castings each including three contact points located for contact with complementary contact points similarly located on the other casting, for precisely locating the two castings together with respect to tilt orientation;  
 and including position locating means for precisely locating the two castings together with respect to relative slidable positioning of the two castings in a plane containing the three contact points.

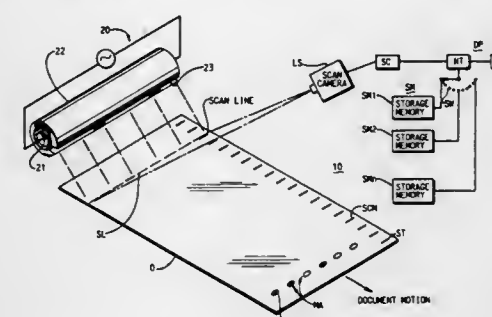
**4,794,241**  
**SCANNABLE DOCUMENT VELOCITY DETECTOR**  
 George E. Carmer, and John V. McMillin, both of Iowa City, Iowa, assignors to National Computer Systems, Eden Prairie, Minn.

Filed Jan. 21, 1988, Ser. No. 146,534

Int. Cl.<sup>4</sup> G06F 7/016

U.S. Cl. 235-474

11 Claims



1. A device for checking the velocity of a scannable document, said document having a timing mark track and response mark areas in specified relation to said timing mark track, while said document is being transported past means for scanning

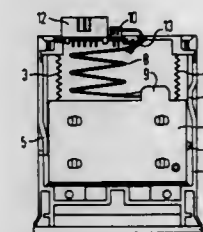
response mark areas in a sequence of consecutive scanning operations occurring at a specified frequency, comprising:  
 processing means for receiving signals from said means for scanning and for processing said signals to recognize a first timing mark on said document and subsequent timing marks;  
 first counter means operatively connected to said processing means for counting the first and all subsequent timing marks;  
 second counter means operatively connected to said scanning means for counting the number of consecutive scanning operations occurring after the first timing mark is recognized;  
 first comparator means for receiving the count in said first counter means, comparing said count to a preselected value and producing a first comparator output signal when said count equals said preselected value;  
 second comparator means for receiving the count in said second counter means, comparing said count to preselected high and low values and for producing a second comparator output signal when said count falls between said preselected high and low values; and  
 velocity status detector means for receiving the first and second comparator output signals and for producing a velocity status acceptable signal only when said velocity status detector simultaneously receives said first and second comparator output signals.

**4,794,242**  
**CHIP CARD READER**  
 Erwin Grassl, and Hermann Hansbauer, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
 Continuation-in-part of Ser. No. 788,271, Oct. 17, 1985, Pat. No. 4,717,817. This application Nov. 25, 1987, Ser. No. 125,634  
 Claims priority, application Fed. Rep. of Germany, Nov. 28, 1986, 8631861[U]

Int. Cl.<sup>4</sup> G06K 13/00

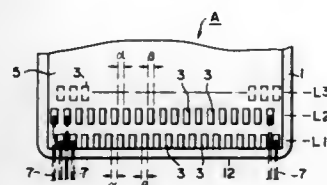
U.S. Cl. 235-482

1 Claim



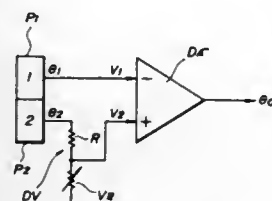
1. A chip card reader, comprising:  
 a movable carriage shaped to receive a chip card and including means for establishing electrical contact with a chip mounted on said card;  
 a fixed frame supporting the carriage for sliding movement within the frame; and  
 a multi-lead ribbon conductor which is formed into a fanfold configuration and has one end fixed to the carriage and another end fixed to the frame.

**4,794,243**  
**INTEGRATED CIRCUIT CARD WITH INCREASED NUMBER OF CONNECTING TERMINALS**  
 Yoshitaka Hamada, Kawasaki, Japan, assignor to Mips Co., Ltd., Tokyo, Japan  
 Continuation of Ser. No. 804,488, Dec. 4, 1985, abandoned. This application Jan. 19, 1988, Ser. No. 147,570  
 Claims priority, application Japan, Mar. 16, 1985, 60-37898[U]  
 Int. Cl.<sup>4</sup> G06K 19/06  
 U.S. Cl. 235-492 4 Claims



1. An integrated circuit card for use in an electronic arrangement when inserted into a receiving slot of the arrangement, comprising:  
 a card body having a flat and rectangular shape;  
 a printed circuit board mounted on said card body; and  
 an integrated circuit chip carried on said circuit board, said chip being adhered to said circuit board and encapsulated by a molding adhesive;  
 said circuit board having a plurality of rows of connecting terminals which are arranged parallel to an edge of the rectangular shape of said card body for establishing electrical connections with mating connecting terminals of a receiving slot of the electronic arrangement, into which slot said card body is inserted;  
 said plurality of rows of connecting terminals being arranged in a staggered form between the adjacent rows with the connecting terminals of each of said rows intervening with respect to the direction parallel to the edge of the rectangular shape of said card body and between the respective connecting terminals of adjacent rows;  
 said printed circuit board having connecting wires printed thereon for electrically connecting circuitry of said chip with said plurality of rows of connecting terminals.

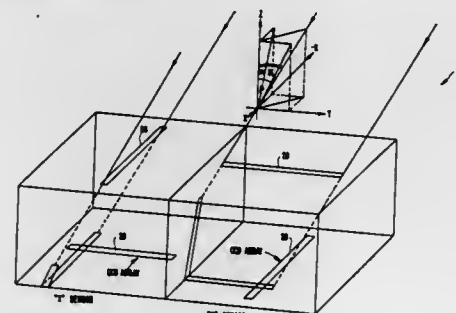
**4,794,244**  
**METHOD AND APPARATUS FOR DETECTING FOCUSING POSITION DEVIATION OF READ/WRITE APPARATUS IN AN OPTICAL RECORDING MEDIUM**  
 Fumio Kimura, Tokyo, Japan, assignor to CSK Corporation, Tokyo, Japan  
 Filed Feb. 9, 1987, Ser. No. 21,665  
 Claims priority, application Japan, Feb. 13, 1986, 61-029466  
 Int. Cl.<sup>4</sup> G01J 1/20  
 U.S. Cl. 250-201 R 9 Claims



1. In a method for detecting a focussing position when reading and writing operations with respect to an optical recording medium are carried out with a light source providing a light output which varies in intensity when a writing operation takes

place, wherein a difference between photoelectric outputs from two photodetectors is amplified by a differential amplifier to detect a deviation of a focal point of a read-write head in the reading/writing operation for an optical recording medium, the improvement comprising:  
 prior to the amplification of the difference between the photoelectric outputs from the photodetectors, changing the output voltage from one of the photodetectors input to the differential amplifier by a ratio set so that the output from the differential amplifier will be zero when focalized.

**4,794,245**  
**POSITION SENSOR**  
 Siegfried Auer, Landover, Md., assignor to Applied Research Corporation, Landover, Md.  
 Filed Mar. 3, 1987, Ser. No. 21,214  
 Int. Cl.<sup>4</sup> G01J 1/20  
 U.S. Cl. 250-203 R 11 Claims

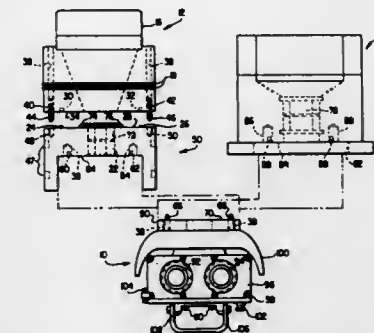


1. A radiant energy angle sensor comprising an evacuated radiant energy chamber within a housing, a pair of linear array of detectors in said chamber and mounted at one end of the housing with said arrays positioned normal to each other to provide X and Y channels, a pair of slits at the opposite end of the housing, each of said slits positioned perpendicular to an associated one of the linear arrays, and electrical circuit means connected to the detectors and having separate X and Y axis outputs, said X and Y axis outputs being representative of the angle at which radiation strikes the sensor as measured by the passing of radiation through the slits and determination of the position at which the line of radiation passing through one of the slits crosses the associated array, there being a lens-free radiation path from outside said housing to said arrays.

**4,794,246**  
**UNIVERSAL PASSIVE NIGHT VISION SYSTEM**  
 William A. Kastendieck, Wylie, Tex., assignor to Varo, Inc., Garland, Tex.  
 Filed Jul. 10, 1987, Ser. No. 72,109  
 Int. Cl.<sup>4</sup> H01J 31/50  
 U.S. Cl. 250-213 VT 21 Claims

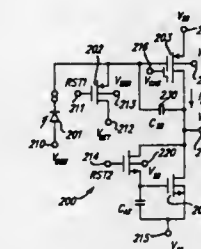
1. Primary optical binocular viewing apparatus for use with other optical equipment, comprising:  
 a housing having internal passages defining an optical path, said passages extending to a single opening in a surface of said housing, and said passages extending to a pair of openings in said housing;  
 optical equipment, including a single image intensifier tube, fixed in one said passage to process and carry a single optical image input to the housing via said single opening, an image splitter for splitting the image output from said image intensifier tube, and optical directing means for carrying the split images for output to respective said pair of openings in said housing;  
 an external interface surface on said housing formed around

said single opening, said interface surface being adapted for mounting to other equipment; and



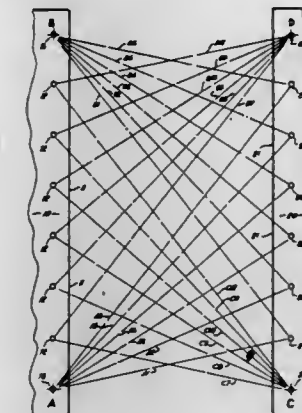
means for fixing said image intensifier with respect to said single opening at said interface surface.

**4,794,247**  
**READ-OUT AMPLIFIER FOR PHOTOVOLTAIC DETECTOR**  
 John A. Stineman, Jr., Goleta, Calif., assignor to Santa Barbara Research Center, Goleta, Calif.  
 Filed Sep. 18, 1987, Ser. No. 98,155  
 Int. Cl.<sup>4</sup> H01J 40/14  
 U.S. Cl. 250-214 A 10 Claims



1. A read-out amplifier for a photovoltaic detector comprising:  
 first switching means coupling, in a low impedance state, a source of bias potential to an output terminal of the photovoltaic detector;  
 integrator means having an input coupled to the detector output and an output coupled to an output of the read-out amplifier, the integrator means operative to integrate output current being generated by the photovoltaic detector while the first switching means is in a high impedance state; and  
 active load means coupled to the integrator means output, operative to provide a self-calibrated current sink for current output by the integrator means enabling the integrator means to maintain a substantially constant bias potential at the detector while the first switching means is in the high impedance state.

**4,794,248**  
**DETECTION DEVICE HAVING ENERGY TRANSMITTERS LOCATED AT VERTICALLY SPACED APART POINTS ALONG MOVABLE DOORS**  
 John E. Gray, Milperra, Australia, assignor to Otis Elevator Company, Farmington, Conn.  
 Continuation of Ser. No. 755,966, Jul. 16, 1985, abandoned. This application Jan. 29, 1988, Ser. No. 148,203  
 Int. Cl.<sup>4</sup> G01V 9/04; H01J 40/14  
 U.S. Cl. 250-221 2 Claims



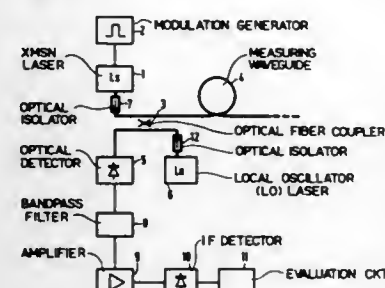
1. A method for detecting the presence of an object in the path of a closing sliding door, characterized by:  
 sequentially activating energy transmitters as the door closes, to transmit energy between vertically spaced apart points along one of the two vertical edges of the area closed by the door to a detector on the second of said edges, an imaginary line between the detector and each transmitter decreasing as the door closes and being at an angle greater than 0 but less than 90 degrees to the direction in which the door slides;  
 sensing the transmitted energy with the detector for producing an output signal in response to the energy;  
 sensing the output from the detector when the energy is transmitted from each energy transmitter and providing a door stop signal when there is no output from the detector when each energy transmitter is activated.

**4,794,249**  
**OPTICAL TIME DOMAIN REFLECTOMETER WITH HETERODYNE RECEPTION**  
 Friedrich-Karl Beckmann, Pinnberg; Wolfgang Hoppe, Norderstedt; Reinhard Knöchel, Elmshorn, and Jürgen Kordts, Wedel, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.  
 Filed Mar. 17, 1987, Ser. No. 26,797  
 Claims priority, application Fed. Rep. of Germany, Mar. 20, 1986, 3609371  
 Int. Cl.<sup>4</sup> H01J 5/16  
 U.S. Cl. 250-227 18 Claims

1. An optical time domain reflectometer arrangement having heterodyne reception for determining attenuation of an optical measuring waveguide comprising  
 first laser means for transmitting laser light pulses, said laser light pulses passing in consecutive time intervals,  $t_1$  to  $t_2$ , with a light frequency varying between two cutoff frequencies,  $f_{L1}$  and  $f_{L2}$ ;  
 second laser means for transmitting continuous light at a frequency  $f_{LO}$ , said frequency  $f_{LO}$  being outside a range between said cutoff frequencies,  $f_{L1}$  and  $f_{L2}$ , and said frequency  $f_{LO}$  differing from a frequency value  $f_{LM}$  between said cutoff frequencies,  $f_{L1}$  and  $f_{L2}$ , by an amount equal to a frequency  $f_{ZF}$ ;  
 control means for monotonically varying control current for

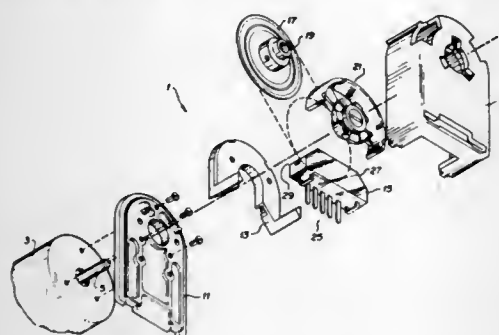


said first laser means, said control current being monotonically varied for each back-scattered light pulse between said time intervals  $t_1$  and  $t_2$ ,  
optical waveguide means for receiving at least portions of said laser light pulses,



at least one detector means receiving at least said continuous light for providing electrical signals, and  
circuit means for filtering and evaluating intermediate ones of said electrical signals.

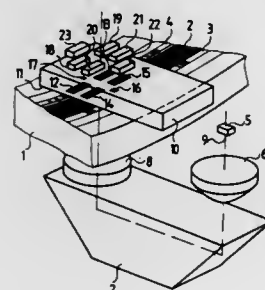
**4,794,250**  
**SELF-GAPPING OPTICAL ENCODER**  
Chris K. Togami, San Jose, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.  
Filed Feb. 27, 1987, Ser. No. 20,006  
Int. Cl.<sup>4</sup> G01D 5/34  
U.S. Cl. 250—231 SE 13 Claims



1. An optical encoder for attachment to a motor and for detecting angular position of a shaft of the motor, comprising:  
a housing, capable of attachment to the motor at an attachment end and of receiving the shaft along a central axis, having a reference surface orthogonal to the axis and axially distant from the attachment end;  
a cover, rotatably mounted within the housing between the reference surface and the attachment end, for axial movement between a retracted position near the reference surface and a set position farther from the reference surface, a portion of the cover being accessible from outside the housing for initiation of rotation;  
an emitter separated from a detector by a distance, the emitter and detector being fixedly aligned together along a path crossing the distance and parallel to the axis, the emitter and detector being mounted within the housing at a predetermined location relative to the reference surface;  
a code wheel, axially alignable within the housing and having a central hub for receiving the shaft along the axis, positioned to cross the path between the emitter and the detector;  
fixing means, attached to the hub, for attaching the code wheel to the shaft such that light projected from the

emitter to the detector is modulated by the code wheel as the shaft rotates; and  
a retainer, attached to the housing distant from the reference surface and near the attachment end, for receiving the shaft and for completing enclosure of the cover, emitter, detector and code wheel within the housing such that the optical encoder is self-contained.

**4,794,251**  
**APPARATUS FOR MEASURING LENGTHS OR ANGLES**  
Thomas Scholian, Rombach, Switzerland, assignor to Kern & Company Ltd., Aarau, Switzerland  
Filed Nov. 17, 1987, Ser. No. 121,796  
Claims priority, application Switzerland, Nov. 19, 1986, 04624/86  
Int. Cl.<sup>4</sup> G01D 5/34; H01J 3/14  
U.S. Cl. 250—231 SE 8 Claims

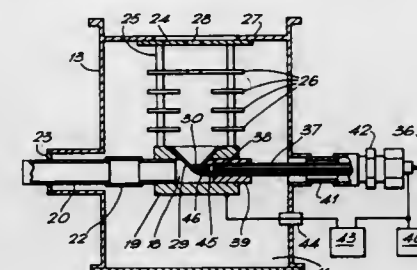


1. Apparatus for measuring lengths or angles comprising:  
a carrier including a first incremental graduation having equal intervals, a second graduation parallel to said first incremental graduation and having marks with equal intervals, and a third graduation parallel to said first incremental graduation and having marks with equal intervals;  
a sensor device movable with respect to said carrier for a distance to be measured to sense said graduations and generate pulses corresponding thereto;  
a counter for counting incremental pulses generated by said sensor device corresponding to the marks of said first incremental graduation passing by said sensor device; and  
an evaluating circuit including control means for causing said counter to count the number of incremental pulses between the passage at said sensor device of any mark of said second graduation and at least one succeeding mark of said third graduation, means for determining the distance from a zero position of said mark of the second graduation on the basis of said number of pulses, and means for determining the distance between a position on said carrier and said zero position on the basis of the determined distance of said mark of the second graduation from the zero position and the sum of pulses counted by said counter.

**4,794,252**  
**DISCHARGE IONIZATION MASS SPECTROMETER**  
Robert H. Bateman, Knutsford, and David S. Jones, Sale, both of England, assignors to VG Instruments Group Limited, Crawley, England  
Filed Jul. 10, 1987, Ser. No. 72,019  
Claims priority, application United Kingdom, Jul. 11, 1986, 8616940  
Int. Cl.<sup>4</sup> H01J 49/00  
U.S. Cl. 250—288 16 Claims

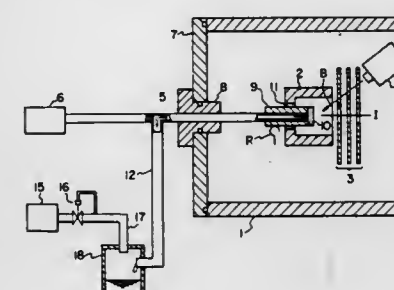
1. In a mass spectrometer adapted for the analysis of a sample dissolved in a fluid comprising:  
(a) spraying means for spraying said fluid into a spraying chamber in the form of a jet of fluid at least partly in the gas or vapour phase;

(b) means for maintaining the pressure in said spraying chamber substantially below atmospheric pressure;  
(c) means for creating and maintaining in said spraying chamber and between at least two electrode means a glow discharge having a cathode dark space in which discharge ions characteristic of said sample are formed; and



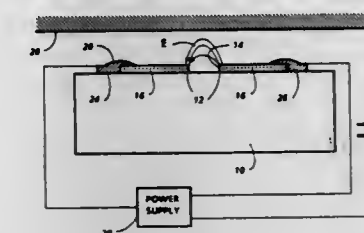
(d) means for extracting from said discharge and subsequently mass analyzing at least some of said ions;  
the improvement in which said discharge is disposed adjacent said spraying means and one of said electrode means comprises said spraying means.

**4,794,253**  
**ION SOURCE FOR MASS SPECTROMETER**  
Tatsuji Kobayashi, Tokyo, Japan, assignor to JEOL Ltd., Tokyo, Japan  
Filed Jun. 15, 1987, Ser. No. 61,464  
Int. Cl.<sup>4</sup> B01D 44/00  
U.S. Cl. 250—288 20 Claims



1. An ion source for use in a mass spectrometer, said ion source comprising:  
an ionization chamber;  
a pump for continuously pumping liquid sample;  
an inlet tube whose front end is located inside the ionization chamber to introduce the liquid sample delivered from the pump into the ionization chamber;  
a means for ionizing a sample introduced into the ionization chamber;  
an exhaust pipe connected with the inlet tube to direct superfluous liquid so said liquid does not enter the ionization chamber;  
a quick responding means for applying a substantially constant pressure on the superfluous sample in the exhaust pipe by employing a gaseous material which is maintained at a substantially constant pressure; and  
means for changing the substantially constant pressure for varying the flow rate of the liquid sample introduced into the ionization chamber.

**4,794,254**  
**DISTRIBUTED RESISTANCE CORONA CHARGING DEVICE**  
Frank C. Genovese, and Robert W. Anderson, both of Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.  
Filed May 28, 1987, Ser. No. 55,663  
Int. Cl.<sup>4</sup> H01T 19/04  
U.S. Cl. 250—324 20 Claims



1. A distributed resistance corona generating device for the production of ions, comprising:  
a high voltage power supply;  
an insulating substrate;  
a highly resistive material layer uniformly deposited on said substrate, said resistive material layer separated into at least first and second resistive material regions by a plasma gap through said resistive material layer to said substrate;  
a relatively highly conductive electrode associated with each said resistive material region for connection of said resistive material regions to said power supply to produce ions at said plasma gap;  
said electrodes and said resistive material regions arranged to provide a uniform resistance through said resistive material layers between said electrodes and each point along said plasma gap.

**4,794,255**  
**ABSORPTION ANALYZER**  
Kimio Miyatake, Takao Imaki, and Kenji Takeda, all of Kyoto, Japan, assignors to Horiba, Ltd., Kyoto, Japan  
Filed Nov. 26, 1986, Ser. No. 935,301  
Claims priority, application Japan, Nov. 27, 1985, 60-267640  
Int. Cl.<sup>4</sup> G01J 3/00  
U.S. Cl. 250—343 7 Claims



1. An absorption type gas analyzer for measuring the concentration of a component in a sample gas, said analyzer comprising:  
at least one gas cell comprising a sample gas cell for containing the sample gas having the component;  
at least one light source comprising a light source for radiating light along an optical path that passes through said sample gas cell, a portion of the light being absorbed in said sample gas cell in an amount corresponding to the concentration of the component in the sample gas and a remaining portion of the light passing from said sample gas cell;  
a gas filter disposed in said optical path, said gas filter comprising a housing containing an ingredient gas having an absorption spectrum band an absorption spectrum band corresponds substantially to that of the component; and  
a detector disposed in said optical path for receiving the

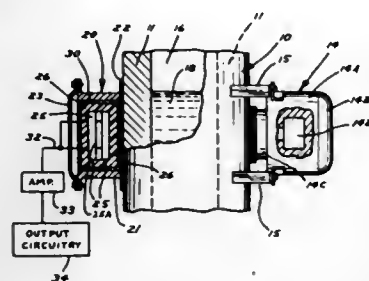
light after passing through said sample gas cell and said gas filter, and for detecting the amount of the light that has been absorbed.

4,794,256

**FAST NEUTRON PROCESS MEASUREMENT SYSTEM**  
John M. DiMartino, Chicago, and John G. Crump, Sr., Palestine, both of Ill., assignors to Kay-Ray, Inc., Arlington Heights, Ill.  
Filed Jan. 31, 1986, Ser. No. 824,418  
Int. Cl.<sup>4</sup> G01N 23/09

U.S. Cl. 250—357.1

12 Claims



1. A fast neutron detection system for monitoring conditions in a chamber of a thick walled vessel having vessel walls of fast neutron absorption characteristics equal to or greater than a steel wall approximately two and one-half inches thick, comprising:

- a fast neutron source directing fast neutrons in a first direction from the exterior of the vessel through one thick wall portion and across the chamber;
- a detector system mounted across the chamber being monitored for determining the transmission of fast neutrons from the source across the chamber, said detector system being disposed on the exterior of a second thick wall portion of the vessel to provide an output representative of high energy neutron transmission from the fast neutron source across the chamber through two wall thicknesses; and
- means for sensing the output from the detector system.

4,794,257

**QUANTUM-COUNTING RADIOGRAPHY**  
Saeiki Baba, Suita; Osamu Yamamoto, Moriguchi; Tadaoki Yamashita, Hirakata, and Hiroshi Totsui, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan  
Filed May 16, 1984, Ser. No. 610,805  
Int. Cl.<sup>4</sup> G01T 1/24

U.S. Cl. 250—370.01

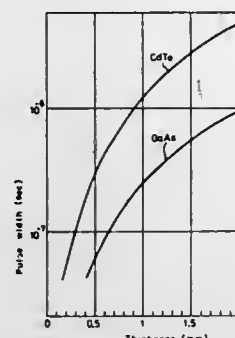
11 Claims

1. A radiation quantum-counting method of radiography comprising the steps of:

- (a) emitting quanta of radiation from a radiation source toward an objective body;
- (b) detecting individual radiation quantum passing through said objective body, and providing a pulse signal for each such detected quantum, said detecting step including the step of receiving said radiation quanta on a plurality of semiconductor, radiation sensitive elements, each element having first and second electrodes disposed on opposite faces of a semiconductor material which is substantially 0.1–0.5 mm thick, said semiconductor material having an effective atomic number greater than 30 and an energy band gap greater than 1.3 eV, each said element providing said pulse signal when it detects one of said radiation quantum, said elements providing a plurality of pulse signals;
- (c) amplifying said pulse signals with a plurality of pulse amplifiers to provide amplified pulse signals, each ampli-

fier coupled to a respective one of said radiation sensitive elements;

- (d) counting the amplified pulse signals provided by said pulse amplifiers to provide pulse number data;
- (e) producing radiographic image signals from said pulse number data;
- (f) storing said pulse number data in memory means;



- (g) moving said objective body relative to said radiation source and said radiation sensitive elements; and
- (h) repeating steps (a)–(f) after step (g) is performed for providing plural sets of said radiographic image signals comprising two-dimensional signals having quantum number data of image gradation therein.

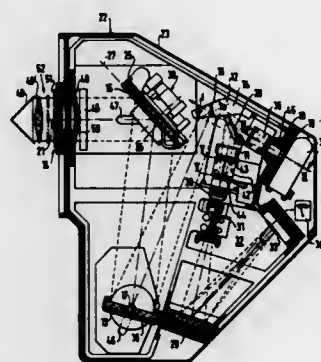
4,794,258

**SPECTROANALYTICAL GAS MEASURING APPARATUS**  
Günter Fetzner, Gundelfingen; Jürgen Kaufmann, Denzlingen; Hans-Jürgen Schneider, Emmendingen, and Frank Strohmach, Denzlingen, all of Fed. Rep. of Germany, assignors to Erwin Sick GmbH Optik-Elektronik, Waldkirch, Fed. Rep. of Germany  
Filed Jun. 24, 1987, Ser. No. 65,996  
Claims priority, application Fed. Rep. of Germany, Jul. 21, 1986, 3624567

Int. Cl.<sup>4</sup> G01N 21/35

U.S. Cl. 250—373

33 Claims



1. A spectroanalytical measuring apparatus for analyzing gases present over a variable length measurement path including a first path and defined by a beam passage opening and a second path end defined by a retroreflector, comprising:

- an apparatus housing including a front and a back, and defining a beam passage opening situated in said housing back, said front defining a generally front orientation for said measuring apparatus and said back defining a generally rear orientation;
- a source of electromagnetic radiation for transmitting a

4,794,259

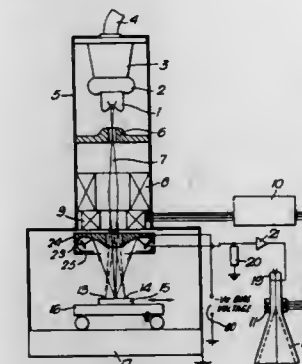
**CHARGED PARTICLE COLLECTION**

Allan Sanderson, and Colin N. Ribton, both of Cambridge, England, assignors to The Welding Institute, Cambridge, England  
Filed Mar. 19, 1987, Ser. No. 27,829  
Claims priority, application United Kingdom, Mar. 24, 1986, 8607222

Int. Cl.<sup>4</sup> H01J 37/244

U.S. Cl. 250—397

15 Claims



1. A charged particle collector assembly comprising a reflection member onto which charged particles impinge in use, said reflection member substantially absorbing particles of one polarity and substantially reflecting articles of the other polarity; and a sensor positioned to receive said reflected particles only after said particles have impinged on and been reflected from said reflection member and to generate a corresponding output signal.

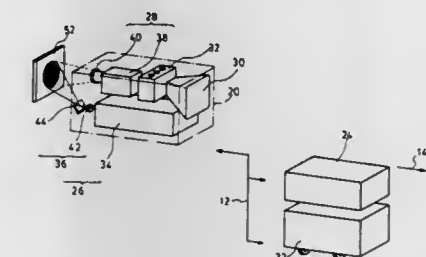
4,794,260

**METHOD FOR DETECTING FINGERPRINTS USING A LASER AND AN APPARATUS THEREFOR**

Yuichiro Asano; Yoshihisa Kono; Takayuki Yanagimoto; Akio Torao, all of Chiba; Susumu Moriya, and Atsushi Momose, both of Nishinomiya, all of Japan, assignors to Kawasaki Steel Corporation, Tokyo, Japan  
Division of Ser. No. 810,988, Dec. 19, 1985, Pat. No. 4,708,882.  
This application Feb. 10, 1987, Ser. No. 933,032  
Claims priority, application Japan, Dec. 9, 1985, 60-276601  
Int. Cl.<sup>4</sup> F21V 9/16; G01J 1/58

U.S. Cl. 250—458.1

6 Claims



1. An apparatus for the detection of a latent fingerprint on a sample by projecting a laser beam on to the surface area of the sample including the fingerprint and receiving the fluorescent image from the surface area including the fingerprint to detect the fingerprint which comprises:

- (a) a projector unit of the laser beam;
- (b) a detector head integrally composed of an image receiving unit and an image monitoring unit;
- (c) a power source unit for laser;

- source radiation beam whose spectrum includes the spectral regions required for the gases to be analyzed;
- a condenser lens situated so said source radiation beam is transmitted therethrough;
- a deflecting mirror including a deflecting mirror tilt axis, displaceable in the direction of said source radiation beam between a first position and a second position and tiltable about said deflecting mirror tilt axis;
- a beam divider situated between said condenser lens and said deflecting mirror;
- a replaceable objective reflector having a chosen focal length, an angle of reflection and an objective reflector tilt axis, a shorter focal length being selected when said deflecting mirror is in said first position and a longer focal length being selected when said deflecting mirror is in said second position, said objective reflector being tiltable about said objective reflector tilt axis parallel to said deflecting mirror tilt axis;
- a followup mirror including a surface;
- a retroreflector, spaced apart from said housing at the second end of the beam path;
- a polychromator including an entry gap, for splitting the spectrum of radiation falling upon said polychromator into component spectra;
- a photoreceiver apparatus for receiving said component spectra from said polychromator and for producing therefrom electrical signals associated with specific spectral wavelengths;
- said source radiation beam from said source being transmitted through said condenser lens to said beam divider;
- said beam divider passing at least part of said source radiation to said deflecting mirror;
- said deflecting mirror being tilted about said deflecting mirror tilt axis to deflect source radiation to said objective reflector and said deflecting mirror when in said first position deflecting said source radiation in front of said followup mirror to said objective reflector and said deflecting mirror when in said second position deflecting said source radiation behind said followup mirror to said objective reflector;
- said objective reflector being displaceable in the direction of said source radiation from said deflecting mirror and reflecting said source radiation from said deflecting mirror to said followup mirror which deflects said source radiation through said beam passage opening and said measurement path onto said retroreflector, forming thereon an image of said condenser lens; and
- said retroreflector further reflecting said radiation from said followup mirror back past said measurement path to said followup mirror;
- said followup mirror reflecting said reflected radiation back to said objective reflector;
- said objective reflector reflecting said reflected radiation back to said deflecting mirror;
- said deflecting mirror tilt axis being perpendicular to a plane defined by said source radiation and said reflected radiation at said deflecting mirror, said reflected radiation being reflected from said deflecting mirror back to said beam divider which reflects at least part of said reflected radiation to said polychromator,
- such that a range of measurement path lengths are accommodated by changing the position of said deflecting mirror and by replacing said objective reflector, the signals form said photoreceiver apparatus determining from the spectra from said polychromator the presence and/or quantity of gases in the measurement path.



- (d) an image memory processing unit for performing addition or reduction memory processing of the images in the image receiving unit; and  
(e) a control circuit unit for synchronously controlling the power source unit for laser and the image memory processing unit.

**4,794,261**  
**RADIATION PROTECTION CIRCUIT FOR PROTECTION AGAINST GAMMA RAY AND NEUTRON RADIATION**

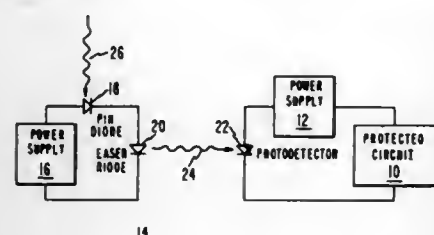
Arye Rosen, Cherry Hill Township, Camden County, N.J., assignor to General Electric Company, Schenectady, N.Y.

Filed Apr. 24, 1987, Ser. No. 41,941

Int. Cl.<sup>4</sup> G02B 27/00

U.S. Cl. 250-551

9 Claims



1. A protection circuit for protecting a protected circuit adapted to be coupled to a first power supply against gamma ray and neutron radiation, said protection circuit comprising:  
a photodiode adapted to be coupled to said protected circuit and said first power supply;  
a laser optically coupled to said photodiode;  
a PIN diode coupled to said laser; and  
a second power supply coupled to said PIN diode and to said laser.

**4,794,262**  
**METHOD AND APPARATUS FOR MEASURING PROFILE OF THREE-DIMENSIONAL OBJECT**

Yukio Sato, Wakamizu-Jutaku #1-45, 2-2-8, Wakamizu, Chikusa-ku, Nagoya-shi, and Kazuo Araki, Chayagasaki-koen Heights #B-211, 1-23-1, Ageta-cho, Chikusa-ku, Nagoya-shi, both of Aichi, Japan, assignors to Yukio Sato; Kazuo Araki, both of Aichi and Cadix Inc., Tokyo, all of Japan

Filed Nov. 25, 1986, Ser. No. 934,834

Claims priority, application Japan, Dec. 3, 1985, 60-272254; Dec. 3, 1985, 60-272253; Nov. 13, 1986, 61-271251

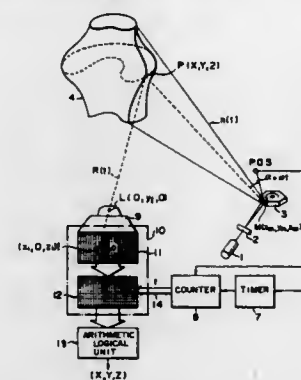
Int. Cl.<sup>4</sup> G01B 11/24

U.S. Cl. 250-560

13 Claims

6. An apparatus for measuring the profile of three-dimensional object comprising:  
a means for scanning a surface of an object to be measured with a measuring slit-ray;  
a non-scanning type two-dimensional image sensor which is composed of a plurality of mutually independent arrayed photosensors and which form an imaging plane onto which an optical image on the surface of said object is formed by reflected rays from said slit-ray scanning of said object;  
means for measuring each time interval between a first time when said slit-ray passes a predetermined point and a second time when reflected rays from said slit-ray scanning said object are received by any of each of said plurality of mutually independent arrayed photosensors;  
storing means for storing each of said time intervals measured in predetermined ones of a plurality of separate memory means with a one to one correspondence between the position of each of said plurality of photosen-

sors and each of said predetermined ones of said plurality of separate memory means; and



a means for determining the profile of the object from the time intervals stored in each of said predetermined ones of a plurality of separate memory means.

**4,794,263**  
**APPARATUS FOR MEASURING CRYSTAL DIAMETER**

Nobuo Katsuka, Takasaki; Yoshihiro Hirano; Atsushi Ozaki, both of Annaka, and Masahiko Baba, Takeha, all of Japan, assignors to Shinetsu Handotai Kabushiki Kaisha, Tokyo, Japan

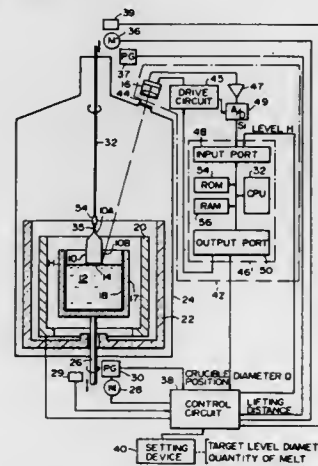
Filed Oct. 19, 1987, Ser. No. 109,722

Claims priority, application Japan, Oct. 29, 1986, 61-257674

Int. Cl.<sup>4</sup> C30B 15/26; G01B 11/08

U.S. Cl. 250-560

12 Claims



1. An apparatus for measuring the diameter of a crystal comprising:  
an optical sensor whose sensing line crosses at one point a luminous ring formed at the interface between a crystalline rod and a melt;  
peak luminance position discriminating means for determining a picture element position P corresponding to a maximum luminance, by making said optical sensor scan;  
mean peak luminance position calculating means for calculating a mean value  $\bar{P}$  of said picture element position P over at least one revolution of said crystalline rod;  
level detecting means for detecting the level H of said melt; and  
crystal diameter calculating means for calculating from said mean value  $\bar{P}$  and said level H the diameter D of said crystalline rod at the portion thereof interfacing with said

melt, said crystal diameter calculating means outputting a signal corresponding to said diameter D.

**4,794,264**  
**SURFACE DEFECT DETECTION AND CONFIRMATION SYSTEM AND METHOD**

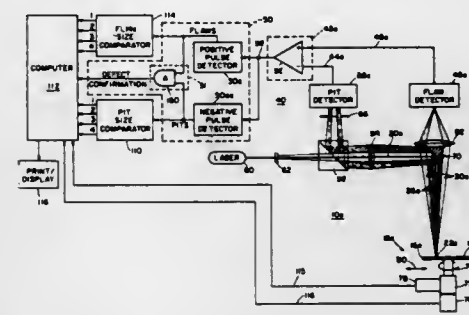
George S. Quackenbos, Newburyport, Mass.; Jay L. Ormsby, Salem, N.H.; Eric T. Chase, Andover, Mass.; Sergey V. Bronde, Acton, Mass., and Koichi Nishine, Westford, Mass., assignors to QC Optics, Inc., Burlington, Mass.

Filed May 8, 1987, Ser. No. 47,888

Int. Cl.<sup>4</sup> C018 21/88

U.S. Cl. 250-563

17 Claims



1. A surface defect detection and confirmation system comprising:  
means for directing a beam of radiation to a surface;  
means for separately sensing radiation scattered from the surface in the near-specular region indicative of a pit and in the far-specular region indicative of a flaw and producing signals representative thereof;  
means, responsive to said means for sensing, for normalizing the near-specular pit signal with respect to the far-specular flaw signal;  
means, responsive to said means for normalizing, for discriminating the near-specular components of said normalized signal; and  
means, responsive to said means for discriminating, for indicating that the flaw is a defect and not contamination upon coincidence of a pit signal and a flaw signal.

**4,794,265**  
**SURFACE PIT DETECTION SYSTEM AND METHOD**

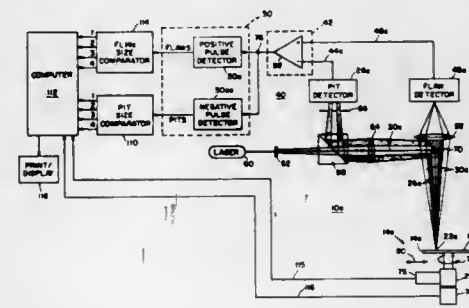
George S. Quackenbos, Newburyport, Mass.; Jay L. Ormsby, Salem, N.H.; Eric T. Chase, Andover, Mass.; Sergey V. Bronde, Acton, Mass., and Koichi Nishine, Westford, Mass., assignors to QC Optics, Inc., Burlington, Mass.

Filed May 8, 1987, Ser. No. 47,889

Int. Cl.<sup>4</sup> G01B 21/88

U.S. Cl. 250-572

21 Claims



1. A detection system for uniquely defining pits on a smooth surface comprising:

means for directing a beam of radiation to a surface;  
means for separately sensing radiation scattered from the surface in the near-specular region and in the far-specular region and producing signals representative thereof;  
means, responsive to said means for sensing, for normalizing the near-specular signal with respect to the far-specular signal to provide a normalized near-specular signal; and  
means for discriminating the near-specular components of said normalized signal representative of surface pits.

**4,794,266**  
**METHOD AND APPARATUS FOR LIGHT TRANSMISSION MEASUREMENT BY SENDING LIGHT, MEASURING RECEIVED LIGHT AND COMPUTING TRANSMITTANCE**

Heikki Saari, Espoo, Finland, assignor to Vaisala Oy, Helsinki, Finland

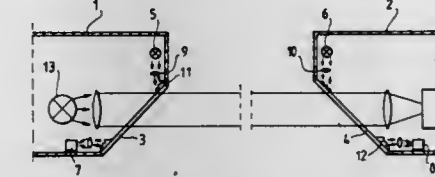
Filed Feb. 4, 1987, Ser. No. 10,766

Claims priority, application Finland, Feb. 4, 1986, 860499

Int. Cl.<sup>4</sup> G01N 15/06, 15/07

U.S. Cl. 250-573

8 Claims



1. A method for measurement of light transmission comprising the steps of:  
sending light from a transmitter through a first protective glass;  
receiving the light through a second protective glass at least at one receiver, said receiver being located at a distance from said transmitter;  
measuring an intensity value of the light received by said at least one receiver;  
calculating a preliminary transmission value by using the intensity value;  
transmitting light through both the first and second protective glasses to obtain a total internal reflection inside the first and second protective glasses;  
measuring the intensities of both of the lights totally reflected inside the first and second protective glasses by detectors; and  
calculating and correcting attenuations of the totally reflected lights caused by the first and second protective glasses and their contamination by using the intensities of both of the lights in order to calculate a final transmission value.

**4,794,267**  
**ANTI-LOCK BRAKING SYSTEM CHECK VALVE WITH BUILD ORIFICE**

William L. Stevens, Dowagiac, Mich., assignor to Allied-Signal Inc., Morristown, N.J.

Filed May 18, 1987, Ser. No. 50,350

Int. Cl.<sup>4</sup> B60T 15/46, 8/42

U.S. Cl. 303-115

1 Claim

1. In an anti-lock braking system having an orifice valve through which fluid from a master cylinder and a pump is communicated to a modulator valve to selectively supply pressurized fluid to a wheel brake cylinder, the improvement in the orifice valve comprising:  
a housing having a bore therein with a first inlet port connected to said master cylinder, a second inlet port connected to said pump, an outlet port connected to said

modulator valve, and a passage connecting said second inlet port with said outlet port;

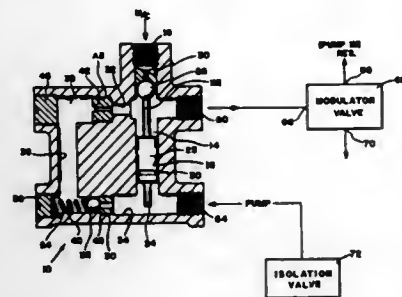
a piston located in said bore for separating said first inlet port from said second inlet port, said piston having a first and second pins extending therefrom to limit the movement in said bore;

a first spherical member located in said passage;

a resilient member for urging said first spherical member toward a first seat to prevent the flow of fluid from the outlet port toward said second inlet port;

a fixed area opening member located in said passage for controlling the rate at which fluid from said pump may be communicated to said outlet port; and

a second spherical member located in said bore adjacent a second seat surrounding said first inlet port, said master cylinder communicating fluid having a first pressure to said first inlet port, said first pressure acting on and moving said second spherical member away from said second



seat to allow said fluid from the master cylinder having a first fluid pressure to freely flow to said modulator valve through said outlet port, said first fluid pressure being communicated through said fixed area opening member in said passage to assist said resilient member in holding said first spherical member against said first seat and thereby isolating said fluid from said master cylinder from said pump, said pump responding to an operational input to supply fluid with a second fluid pressure to said second inlet port, said second fluid pressure acting on said piston by moving said second spherical member into engagement with said second seat to interrupt communication through said first inlet port while acting on said first spherical member to overcome said first resilient member and allow said second fluid pressure to be communicated to said passage, said fixed area opening member controlling the rate at which said fluid having the second fluid pressure is presented to said modulator valve.

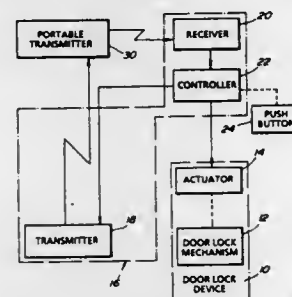
**4,794,268**  
**AUTOMOTIVE KEYLESS ENTRY SYSTEM**  
**INCORPORATING PORTABLE RADIO**  
**SELF-IDENTIFYING CODE SIGNAL TRANSMITTER**  
 Kinichiro Nakano, and Mikio Takeuchi, both of Kanagawa, Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Jun. 19, 1987, Ser. No. 64,006  
 Claims priority, application Japan, Jun. 20, 1986, 61-144212  
 Int. Cl.<sup>4</sup> B62D 45/00; G06F 7/04; G08C 19/00; B60R 25/04  
 U.S. Cl. 307-10 AT 8 Claims

1. A keyless entry system for an automotive vehicle comprising:  
 a vehicle device including an actuator operating said vehicle device between a predetermined first position and a predetermined second position;  
 a manually operable switch for triggering keyless entry operation;  
 first means mounted on a vehicle body and responsive to manual operation of said manually operable switch, for transmitting a first radio signal containing a selected trigger code, said first means being set with a plurality of

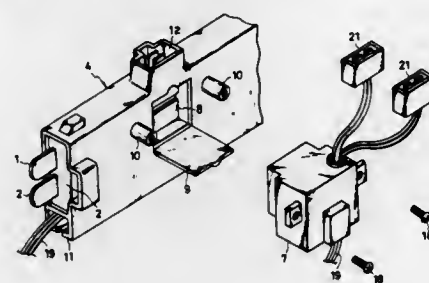
mutually distinct trigger codes and transmitting one of said trigger codes at a time and in a given order as said selected trigger code;

second means, which is separated from the vehicle body and is portable, for receiving said selected trigger code in said first radio signal to compare with a first preset code, and, upon coincidence of said selected trigger code with said first preset code, generating a second radio signal containing a preset transmitter identifying code; and



third means, mounted on a vehicle body and adapted to receive said second radio signal, for comparing said transmitter identifying code with a second preset code for producing a control signal to operate said actuator in said vehicle device to a desired one of said first and second predetermined positions when said transmitter identifying code matches said second preset code, said third means setting one of said triggering codes in said first means to be the first code to be transmitted in response to the next occurrence of manual operation of said manually operable switch.

**4,794,269**  
**LOAD CONTROLLER FOR AUTOMOBILE**  
 Toshihiko Kawata, Furukawa, and Ken Mizuta, Miyagi, both of Japan, assignors to Alps Electric Co., Ltd., Japan  
 Filed Sep. 24, 1987, Ser. No. 101,007  
 Claims priority, application Japan, Jan. 8, 1987, 62-1182[U]  
 Int. Cl.<sup>4</sup> B62G 45/00 2 Claims  
 U.S. Cl. 307-10 R



1. A load controller for providing power to a load from a common power line connected to a battery power source in an automobile, comprising:  
 said common power line being formed by a pair of conductor strips made of electrically and thermally conductive material which are arranged in parallel in an insulator body, wherein said insulator body is provided with pre-formed openings at selected positions thereof, and wherein each of said openings exposes respective contact surfaces of said pair of conductor strips in said insulator body;  
 a control unit adapted to be connected to said power line

through any one of said openings at the corresponding selected position thereof, said control unit including:

(a) a housing having one end adapted to be inserted in said opening in said insulator body of said common power line,

(b) mounting means on said housing for mounting said control unit in position at said opening of said common power line,

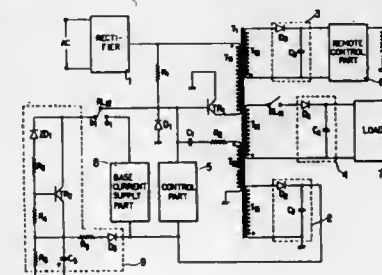
(c) a switch in said housing having a pair of contacts exposed through said one end of said housing for electrically and thermally conductive contact with the respective exposed surfaces of said pair of conductor strips and a pair of terminals which are selectively connected ON/OFF with said contacts in accordance with a control signal provided to said switch,

(d) a connector electrically connecting the terminals of said switch to a load associated with said control unit, and

(e) signal line means connected to said switch for providing a control signal thereto from a controller in the automobile in order to switch said control unit in ON/OFF connection with said common power line,

wherein said exposed contacts of said switch and said exposed surfaces of said conductor strips of said common power line provide a heat dissipation structure for dissipating heat through said conductor strips which is generated in said switch by current flowing through the switch to a load connected thereto via said connector of said control unit.

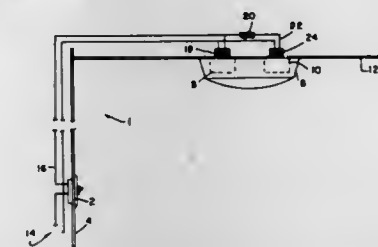
**4,794,270**  
**STABILIZING CIRCUIT FOR SWITCHING MODE**  
**POWER SUPPLY CIRCUIT**  
 Chan W. Park, Kyungsangbook-do, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea  
 Filed Jun. 19, 1987, Ser. No. 64,000  
 Claims priority, application Rep. of Korea, Jun. 20, 1986, 4967/1986  
 Int. Cl.<sup>4</sup> H02M 7/24, 3/335 2 Claims  
 U.S. Cl. 307-17



1. A switching mode power supply means having voltage stabilizing means for supplying a constant voltage to a load of an electronic apparatus, comprising:  
 blocking oscillator means for inducing voltage to a plurality of secondary transformer windings in response to a rectified input voltage;  
 first rectifier means for rectifying a voltage induced in a first winding of said plurality of secondary transformer windings and applying the rectified voltage of said first rectifier means to a remote control means;  
 switching relay means for developing a first signal when the rectified voltage of said first rectifier means is induced and a second signal when the rectifier voltage of said second rectifier means is not induced;  
 second rectifier means for rectifying a voltage induced in a second winding of said plurality of secondary transformer windings and applying the rectified voltage of said second rectifier means to the load in response to said first signal of said switching relay means;  
 third rectifier means for rectifying a voltage induced in a

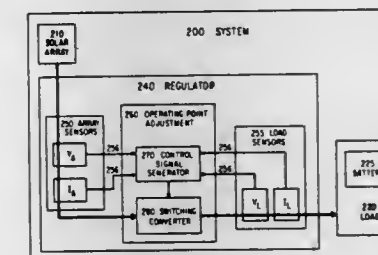
third winding of said plurality of secondary transformer windings;  
 base current supply means for applying the rectified voltage of said third rectifier means to said blocking oscillator means only in response to said first signal of said switching relay means; and  
 base current absorption means for reducing and applying the rectified voltage of said third rectifier means to said blocking oscillator means only in response to said second signal of said switching relay means;  
 whereby a constant voltage is supplied to the load regardless of voltage induced by said blocking oscillator means.

**4,794,271**  
**POWER CONTROL METHOD AND APPARATUS**  
 Rhett McNair, 4081-G E. LaPalma, Anaheim, Calif. 92807  
 Filed Sep. 10, 1985, Ser. No. 774,552  
 Int. Cl.<sup>4</sup> H02J 1/00; H05B 37/00 27 Claims  
 U.S. Cl. 307-38



1. The apparatus for alternately switching on and off electrical devices and groups of electrical devices comprising, first and second electrical circuits, an alternate action switch connected to the circuits and electrical means connected to the switch for alternating condition of the switch to alternately complete and interrupt the second circuit, wherein the alternate action switch comprises a push ON, push OFF mechanical switch and actuator means connected to the switch for actuating the switch on operations of the first circuit.

**4,794,272**  
**POWER REGULATOR UTILIZING ONLY BATTERY**  
**CURRENT MONITORING**  
 Lee T. W. Bavaro, Manhattan Beach, and James W. Bates, Palos Verdes Estates, both of Calif., assignors to The Aerospace Corporation, El Segundo, Calif.  
 Filed Jan. 20, 1987, Ser. No. 5,058  
 Int. Cl.<sup>4</sup> H02J 7/00 6 Claims  
 U.S. Cl. 307-66



1. A combination comprising:  
 A. A primary power source containing a maximum power point;  
 B. A load;  
 C. A secondary power source directly coupled to the load along a single path;  
 D. A sensor means located at the secondary power source



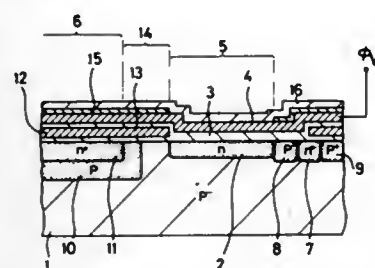


4,794,279

# A SOLID STATE IMAGING DEVICE WHICH APPLIES TWO SEPARATE STORAGE VOLTAGES FOR THE SIGNAL CHARGES SO AS TO REDUCE THE SMEAR LEVEL AND THE DARK CURRENT

Michio Yamamura, Tokyo; Hiroshi Terakawa, Kanagawa; Tetsuro Kumezawa, Kanagawa, and Takashi Fukusyo, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan  
Filed May 18, 1987, Ser. No. 50,400

Claims priority, application Japan, May 19, 1986, 61-114375  
Int. Cl.<sup>4</sup> H03K 3/42; H01L 29/78, 27/14; H04N 3/14  
U.S. Cl. 307-311 3 Claims



1. A solid state imager device which operates with various timings including horizontal blanking periods, comprising:

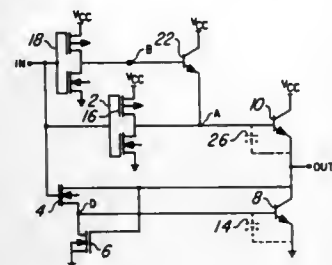
- a substrate of a first conductivity type;
- a charge storage area of a second conductivity type formed on a surface of said substrate of the first conductivity type;
- a forward electrode formed on said charge storage area of the second conductivity type which extends through an insulating layer; and
- a means for alternatively supplying said forward electrode with a first voltage for accumulating minority carriers in said charge storage area on a boundary between said charge storage area of the second conductivity type and said insulating layer and a second voltage for extending the depletion layer formed beneath said charge storage area of the second conductivity type and wherein said first and second voltages are applied during signal charge accumulation.

4,794,280

# DARLINGTON BICMOS DRIVER CIRCUIT

Hiep Van Tran, Carrollton, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Feb. 16, 1988, Ser. No. 158,004  
Int. Cl.<sup>4</sup> H03K 19/02, 3/26, 17/60, 17/687  
U.S. Cl. 307-446 17 Claims



1. An improved driver circuit of the type including a first inverter connected to a first bipolar pull-up transistor including a parasitic capacitance between the base and emitter of the latter, wherein the improvement comprises:

- connecting a second bipolar pull-up transistor to said first bipolar pull-up transistor; and
- providing a resistance path within said first inverter capable

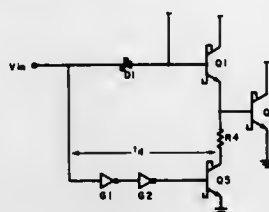
of permitting said parasitic capacitor to boot said base of said first bipolar pull-up transistor above a first predetermined voltage so as to raise the emitter voltage of said first bipolar pull-up transistor above a second predetermined voltage.

4,794,281

# SPEED-UP CIRCUIT FOR TRANSISTOR LOGIC OUTPUT DEVICE

Keith K. Onodera, and Alex B. Djenguerian, both of San Jose, Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jan. 24, 1986, Ser. No. 822,083  
Int. Cl.<sup>4</sup> H03K 19/088, 17/16, 3/33, 5/13  
U.S. Cl. 307-456 12 Claims



1. A logic circuit operable from first and second supply terminals connectable to a source of operating power and having an input terminal for receiving a multistate input signal and an output terminal to which a capacitive load is connected for receiving an output signal, said circuit comprising:

- phase splitter means connected to said input terminal and responsive to said input signal for providing a signal current when said input signal changes from a first to a second respective state and for removing said signal current when said input signal changes from said second to said first state;

a sink transistor having a collector connected to said output terminal, an emitter connected to said second supply terminal, and a base connected to receive said signal current for turning said sink transistor on to conduct current from said output terminal through said collector and emitter to said second supply terminal when said signal current is provided and for turning said sink transistor off when said signal current is removed;

switchable current path means responsive to said input signal for, when said input signal changes from said first to said second state, being switched to a first condition connecting a path across said sink transistor base and emitter terminals and for, when said input signal changes from said second to said first state, being switched to a second condition removing said current path; and

delay means connected between said input terminal and said current path means for maintaining said current path means in said first or said second condition for a predetermined amount of time after said input signal changes states.

4,794,282

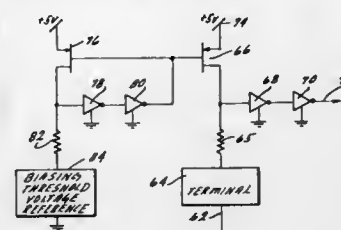
# TTL TO CMOS VOLTAGE LEVEL TRANSLATOR

Joseph H. Colles, Oceanside, Calif., assignor to Brooktree Corporation, San Diego, Calif.

Continuation of Ser. No. 714,503, Mar. 21, 1985, abandoned.  
This application Oct. 7, 1987, Ser. No. 106,179  
Int. Cl.<sup>4</sup> H03K 19/092, 17/687; H03L 5/00  
U.S. Cl. 307-475 25 Claims

1. In combination for converting an output voltage from a TTL logic device to an input voltage for C-MOS circuitry, first means for providing the output voltage from the TTL logic device,

a first C-MOS transistor having first, second and third electrodes, means for applying an energizing voltage to the first electrode of the first C-MOS transistor to provide for the flow of current through the first C-MOS transistor, a first biasing impedance connected between the second electrode of the first C-MOS transistor and the first means, a second C-MOS transistor having first, second and third electrodes respectively corresponding to the first, second and third electrodes of the first C-MOS transistor, means for applying the energizing voltage to the first electrode of the second C-MOS transistor to provide for the flow of current through the second C-MOS transistor,



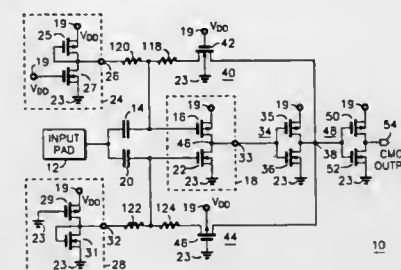
a second biasing impedance connected to the second electrode of the second C-MOS transistor, means for biasing the second electrode of the second C-MOS transistor through the second biasing impedance to a voltage related to the input voltage to the C-MOS circuitry, means for providing a negative feedback between the second and third electrodes of the second C-MOS transistor, and means for introducing the voltage on the third electrode of the second C-MOS transistor to the third electrode of the first C-MOS transistor.

4,794,283

# EDGE SENSITIVE LEVEL TRANSLATING AND REREFERENCING CMOS CIRCUITRY

Steven P. Allen, Mesa, and Robert C. Ledasz, Chandler, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 26, 1987, Ser. No. 54,469  
Int. Cl.<sup>4</sup> H03K 19/094  
U.S. Cl. 307-475 11 Claims



1. A logical level translating circuit including in combination:

- capacitive input means coupled for receiving an input logic signal having a direct current level, said capacitive means differentiating said input logic signal to provide positive and negative transitions;

input amplifier means having an input terminal and an output terminal, said input terminal being coupled to said capacitive input means, said input amplifier means further including a first normally non-conductive device of a first conductivity type having a threshold voltage of a first polarity, said first device being coupled between said input and output terminals of said input amplifier means, said first device being rendered temporarily conductive in

response to one of said positive and negative transitions traversing said threshold voltage thereof to provide a first control signal at said output terminal of said input amplifier means;

first threshold voltage generating circuitry coupled to said first device for providing a bias voltage thereto having a magnitude substantially equal to the magnitude of said threshold voltage of said first device; and

feedback circuit means coupled between said output terminal and said input terminal of said input amplifier means, said feedback circuit means providing a first feedback signal for holding said first device in said conductive state in response to said first control signal, said first device thereby providing a first predetermined potential to said output terminal of said input amplifier means in response to said one of said positive and negative transitions.

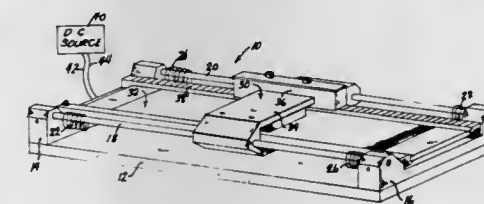
4,794,284

# LINEAR D.C. MOTOR WITH NON-FERROUS STATOR CORE

Georges Bnon, 166-41 Powells Cove Blvd., Flushing, N.Y. 11357

Filed Mar. 26, 1987, Ser. No. 31,243  
Int. Cl.<sup>4</sup> H02K 14/02 16 Claims

U.S. Cl. 310-12 16 Claims



1. A linear D.C. motor comprising flat parallel tiers of flat windings arranged along and parallel to a linear path, commutator mean extending along said path and coupled to said windings, conductor means to supply current through said commutator means and through said windings, at least one pair of magnets arranged in serial magnetic relation on opposite sides of said parallel tiers, support means of high magnetic permeability material supporting said magnets to form a substantially closed magnetic circuit having a gap in which said tiers of windings are accommodated, brush means on said support means for coupling said conductor means and commutator means, said support means being displaceable along said linear path for selectively passing current through said windings to establish electro-magnetic fields in sequence along said linear path, and for displacing said magnets along said linear path in correspondence with said fields, and a rigid matrix in which said tiers of windings are embedded whereby the windings are fixed relative to each other, the windings being of generally flat shape and overlapping each other in the respective tiers, said matrix including an epoxy resin and a fiberglass reinforcement in said resin.

4,794,285

# VEHICLE AC GENERATOR WITH VOLTAGE REGULATOR

Takayasu Nimura, Nagoya, and Tsutomu Shiga, Aichi, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan  
Continuation of Ser. No. 665,496, Oct. 29, 1984, abandoned, which is a continuation of Ser. No. 213,491, Dec. 5, 1980, abandoned. This application Jun. 2, 1987, Ser. No. 57,733  
Claims priority, application Japan, Dec. 14, 1979, 54-162439  
Int. Cl.<sup>4</sup> H02K 9/06 9 Claims

U.S. Cl. 310-68 D 9 Claims

1. An alternating current generator for use in a vehicle comprising:

- a housing including a circumferential portion extending between spaced apart axial side portions, each of said axial



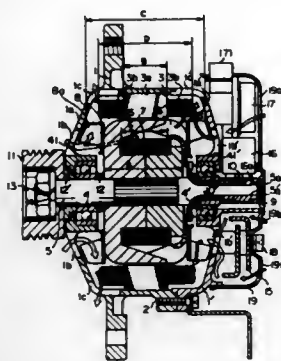
side portions having a central portion and means defining a plurality of intake ports adjacent said central portion for permitting air passage therethrough, each of said axial side portions extending obliquely between said central and circumferential portions in such a manner that the axial length of said housing decreases from said central portions towards said circumferential portion, said circumferential portion further including means defining first and second air exhaust ports spaced from each other;

a stator assembly, including a stator core fixed to an inner surface of said circumferential portion at a location between said first and second air exhaust ports, said stator core having an axial width (B) which is smaller than that of said rotor core (A) and a stator winding wound around said stator core;

a rotor assembly, including a rotor shaft, a rotor coil, and a rotor core fixed to the rotor shaft for rotation therewith and comprising interleaved pole members which define a plurality of angularly separated fingers having axially extending spaces therebetween;

bearing means in the central portion of each of said axial side portions for rotatably supporting said rotor shaft;

a first fan provided on one side of said pole members of said rotor, said first fan having a plurality of blades, the outside of said blades being positioned close to one of said axial side portions and extending substantially parallel to the



inclination of the obliquely extending portion of said one axial side portion, whereby during rotation of the rotor core said first fan draws air through said intake ports in said one axial side portion and directs the air radially of the housing past said stator winding along an inner surface of said one axial side portion and through said first air exhaust ports in said circumferential portion and axially of said housing through said spaces between said fingers, and between said rotor and stator core; and

a second fan provided at the other end of said rotor core for rotation therewith and having a plurality of blades, the outside of said blades being close to the other of the said axial side portions and extending substantially parallel to the inclination of the obliquely extending portion of said other axial side portion, whereby during rotation of the rotor core, said second fan draws air through said intake ports in the other of said axial side portions and directs the air radially of the housing past said stator winding along an inner surface of the other of the said axial side portions and through said second air exhaust ports in said circumferential portion;

wherein said stator winding has an axial width (D) which is less than the axial distance (C) defined by the outer sides of said first and second fans so that the air flow established by each of said first and second fans is directed toward said stator winding along the respective interior surfaces of said axial side portions.

4,794,286

## VARIABLE RELUCTANCE STEPPER MOTOR

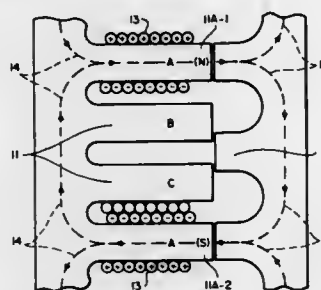
Jon C. Taenzer, Palo Alto, Calif., assignor to Adept Technology, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 847,730, Apr. 3, 1986, abandoned. This application Oct. 23, 1987, Ser. No. 113,332

Int. Cl.<sup>4</sup> H02K 41/00

U.S. Cl. 310-12

14 Claims



1. A variable reluctance motor comprising a stator and a movable member  
said stator including a plurality of equally spaced teeth each tooth forming a stator pole to provide a plurality of single tooth stator poles  
windings on each of said stator poles for magnetizing the stator poles so that every other stator pole of the same phase is of opposite polarity  
said movable member including a plurality of equally spaced movable member teeth each tooth forming a member pole to provide a plurality of single tooth member poles, member poles positioned to cooperate with the stator poles, said movable member poles being spaced so that the spacing between alternate movable member poles is equal to the spacing between stator poles of the same phase and opposite polarity whereby the member poles can align with the stator poles of opposite polarity to provide a low reluctance flux path through the movable member from one stator pole to the adjacent stator pole of opposite polarity.

4,794,287

## LINEAR MOTOR

Takao Hyuga, Soraku, and Kazuhiko Ueda, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

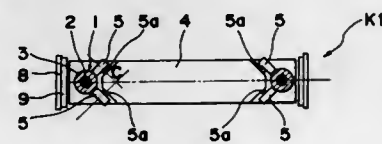
Filed Nov. 13, 1986, Ser. No. 929,816

Claims priority, application Japan, Nov. 13, 1985, 60-255790; Apr. 30, 1986, 61-102993

Int. Cl.<sup>4</sup> H02K 41/00

U.S. Cl. 310-13

10 Claims



1. A linear motor for a magneto-optical disk drive comprising:  
a movable member;  
guide means for guiding said movable member;  
a driving yoke provided at a central portion of said guide means, wherein said guide means includes an outer peripheral guide portion surrounding said driving yoke;  
an actuating member provided at said movable member; and  
a coil wound around said actuating member such that said actuating member is axially movably fitted around said guide;

whereby a height of a line of action of a driving force produced by electromagnetic action between said coil and said driving yoke is set to coincide with a height of a centerline of said guide.

4,794,288

## SERIES RESONANT CAPACITOR MOTOR

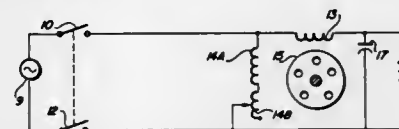
Alexander J. Lewis, 9844 N. 11th Ave., Phoenix, Ariz. 85021

Filed Jan. 15, 1988, Ser. No. 144,544

Int. Cl.<sup>4</sup> H02K 11/00; H02P 1/44

U.S. Cl. 310-68 R

26 Claims



1. An alternating current motor for operation from a source of single phase alternating current power and having first and second windings electrically angularly displaced from one another substantially 90° on a stator core and inductively coupled to a rotor, said motor including in combination:

a source of alternating current power;  
first capacitor means;  
means connecting said first winding and said first capacitor means in series circuit with said source of alternating current power throughout the operation of said motor;  
means connecting said second winding in parallel with said series circuit of said first winding and said first capacitor means;  
said first capacitor means and said first winding forming a series resonant circuit at the frequency of alternating current power from said source of alternating current power, with the wire size of first winding selected to be sufficient to carry start, full load, and no load current throughout the time of operation of said motor; and  
said capacitor having a sufficiently large capacitance such that during normal load operating conditions of said motor substantially low current flows through said second winding.

4,794,289

## BEARING STRUCTURES

Anthony B. Barnaby, Leicestershire, United Kingdom, assignor to Rank Taylor Hobson Limited, England

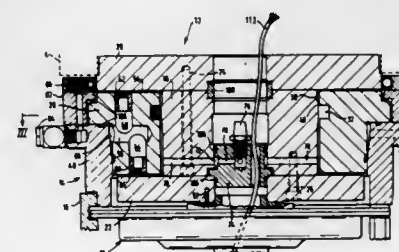
Filed Jul. 29, 1986, Ser. No. 891,397

Claims priority, application United Kingdom, Aug. 2, 1985, 8519460

Int. Cl.<sup>4</sup> H02K 5/16

U.S. Cl. 310-90

15 Claims



1. A bearing structure comprising:  
a stationary member;  
a rotatable member mounted for rotation about a vertical axis relative to said stationary member;  
first air bearing means acting between said rotatable member and said stationary member and constraining said rotat-

able member against downward axial movement relative to said stationary member;  
second air bearing means acting between said rotatable member and said stationary member and constraining said rotatable member against upward axial movement relative to said stationary member;  
conduit means for supplying air to said first and second air bearing means for operation thereof; and  
dry low-friction bearing means acting between said rotatable member and said stationary member and constraining said rotatable member against radial movement relative to said stationary member.

4,794,290

## STRUCTURE OF ACTIVE TYPE MAGNETIC BEARING

Nagahiko Nagasaka, Iruma, Japan, assignor to Kabushiki Kaisha Yaskawa Denki Seisakusho, Fukuoka, Japan

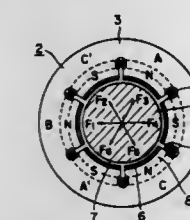
Continuation-in-part of Ser. No. 810,065, Dec. 17, 1985, abandoned. This application Jul. 23, 1987, Ser. No. 76,991

Claims priority, application Japan, Jan. 28, 1985, 60-12577

Int. Cl.<sup>4</sup> F16C 39/06

U.S. Cl. 310-90.5

1 Claim



1. An active type magnetic bearing comprising a controllably and radially supported rotatable shaft made of a magnetic material, the bearing being configured in a plurality of electromagnetic poles secured in an annular stator core including a plurality of slots made of laminated magnetic material surrounding said rotatable shaft and multi-phase exciting windings secured in said stator core, including:

thin sheet-like permanent magnets secured to internal surfaces of said electromagnetic poles opposing said rotatable shaft, and magnetized in radial direction such that the magnets secured to two adjacent electromagnetic poles are polarized oppositely; and  
each phase of said exciting windings are connected in series and wound such that, when the phase windings are energized selectively by a DC current, a pair of said electromagnetic poles located at 180 degrees spaced apart positions are polarized into the same polarity, and cooperate with a bias magnetic field produced by a corresponding one of said permanent magnets so as to attract said shaft to set back said shaft in normal position.

4,794,291

## PERMANENT MAGNET FIELD DC MACHINE

Toshimi Abukawa, Hitachioota; Kazuo Takara; Noriyoshi Takahashi, both of Hitachi, and Toshio Tomite, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 16, 1987, Ser. No. 26,259

Claims priority, application Japan, Mar. 17, 1986, 61-56824

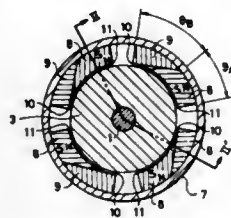
Int. Cl.<sup>4</sup> H02K 21/26

U.S. Cl. 310-154

10 Claims

1. A permanent magnet field DC machine having a rotor and a stator, said rotor comprising an armature core, an armature winding and a commutator, and said stator comprising a yoke and field poles having a center of magnetism including permanent magnets disposed on the inner periphery of said yoke, characterized in further comprising magnetic pole pieces made of a material whose permeability is greater than that of said permanent magnets the magnetic pole pieces being connected

to said yoke, being interposed between said yoke and a portion of each of said permanent magnets and being disposed on a magnetizing side of a magnetomotive force of the armature reaction thereof relative to the center of the magnetism of each



field pole, and said permanent magnets being connected to said magnetic pole pieces and said yoke facing to said rotor and disposed on both the magnetizing side and a demagnetizing side thereof.

#### 4,794,292 STEPPING MOTOR WITH DIVIDED STATOR POLE PIECES

Akira Torisawa, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

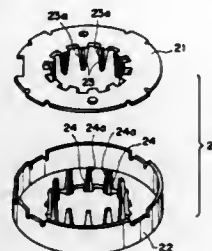
Filed Jul. 15, 1987, Ser. No. 73,970

Claims priority, application Japan, Jul. 21, 1986, 61-171307; Mar. 27, 1987, 62-74771

Int. Cl.<sup>4</sup> H02K 19/02, 21/14

U.S. Cl. 310-257

6 Claims



1. A stepping motor comprising: a permanent magnet rotor provided with magnetic poles on the periphery thereof; first and second stator sets, each having magnetic pole plates provided with tooth-shaped pole pieces extended in the axial direction and arranged at substantially uniform intervals around said rotor; and a coil for magnetizing said tooth-shaped pole pieces; wherein said tooth-shaped pole pieces are divided by a high reluctance area so that the magnetic reluctance of each pole piece changes substantially symmetrically with respect to the central axis thereof.

#### 4,794,293 DIRECT CURRENT ELECTRIC MOTOR

Kiyomori Fujimaki, 195-4 Ooyaguchi, Matsudo-shi, Chiba-ken; Toshio Kobayashi, 6-1-13 Kitakarasuyama, Setagaya-ku, Tokyo, and Heihachi Kato, 232 Terao, Kawagoe-shi, Saitama-ken, all of Japan

Filed Apr. 17, 1986, Ser. No. 853,226

Claims priority, application Japan, Aug. 20, 1985, 60-183236

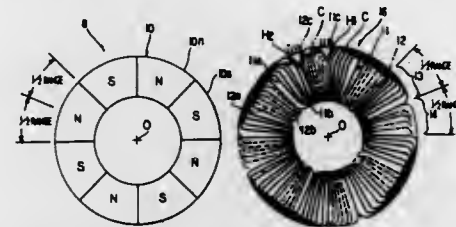
Int. Cl.<sup>4</sup> H02K 1/22

U.S. Cl. 310-268

12 Claims

1. A direct current electric motor comprising a permanent magnet having a plurality of N-magnetic poles and a plurality of S-magnetic poles arranged thereon, said N and S-magnetic poles being alternately arranged adjacent to each other, each defining a magnetic range of its own; phase coil means including a first phase coil and a second phase coil, each being composed of a plurality of conductors, said conductors each hav-

ing a plurality of electromagnetic force producing linear segments, each such linear segment being spaced from an adjacent linear segment and oriented generally transverse to the direction of relative movement between said conductors and said permanent magnet, said adjacent linear segments of said conductors of said first phase coil and of said second phase coil, respectively, being arranged in groups of linear conductor segments, said first and second phase coils being displaced by a half range in each magnetic pole of said permanent magnet with each group of linear conductor segments of said first phase coil and each group of linear conductor segments of said



second phase coil alternately disposed adjacent to each other, one being disposed in one half of said magnetic range and the other being disposed in the other half thereof; and magnetism detector means including a first magnetism detector and a second magnetism detector, said first magnetism detector being connected to an end of said first phase coil and said second magnetism detector being connected to an end of said second phase coil, and wherein said first and second magnetism detectors and said first and second phase coils form an armature to be positioned opposite to said permanent magnet with a predetermined amount of air gap provided therebetween.

#### 4,794,294 VIBRATION WAVE MOTOR

Masao Shimizu, Kawasaki; Nobuyuki Suzuki, Yokohama, and Mitsuhiro Katsuragawa, Niiza, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

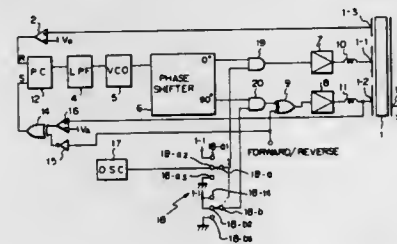
Filed Jun. 8, 1987, Ser. No. 59,782

Claims priority, application Japan, Jun. 12, 1986, 61-137602; Jun. 18, 1986, 61-143924; Jun. 23, 1986, 61-147794

Int. Cl.<sup>4</sup> G05B 19/18

U.S. Cl. 310-316

11 Claims



1. A vibration wave motor for generating a travelling vibration wave in a first member by applying periodic signals of different phases to electro-mechanical energy conversion elements arranged at different positions on said first member and causing relative movement between said first member and a second member in contact with said first member, said electro-mechanical energy conversion elements being arranged at a first position and a second position on said first member, wherein said motor comprises:

- a signal generating circuit for generating a periodic signal applied to an electro-mechanical energy conversion element provided at the first position on said first member;
- a phase shift circuit for shifting the phase of the periodic

signal generated by said signal generating circuit and for applying the phase shifted periodic signal to an electro-mechanical energy conversion element provided at the second position on said first member;

- a speed designation circuit for generating a designated speed signal;
- a monitor circuit for detecting the rotation speed of the motor and generating a detected speed signal;
- a comparing circuit for comparing said designated speed signal and said detected speed signal and for outputting a first output when said designated speed signal corresponds to a higher speed than the speed corresponding to said detected speed signal and for outputting a second output when both of said signals correspond to substantially the same speed; and
- a setting circuit for setting the amount by which said phase shift circuit shifts the phase of the periodic signals generated by said signal generating circuit, said setting circuit gradually changing the amount by which said phase shift circuit shifts the phase from an initial amount in response to said first output of said comparing circuit during the outputting of said first output by said comparing circuit and stopping the changing of the phase shifting in response to the outputting of said second output by said comparing circuit.

#### 4,794,295

##### ACOUSTIC TRANSDUCER

Richard J. Penneck, "Treeve", Westway, Lechlade, Gloucestershire; Peter N. Barnett, 50 Tismeads Crescent, Swindon, Wiltshire; David R. Fox, 48 Berton Close, Broad Blunsdon, Swindon, Wiltshire; Michael C. Booth, 135 Marlborough Road, Swindon, Wiltshire, and Edward B. Atkinson, Hyams Lane, Holbrook, Ipswich, Suffolk, all of England

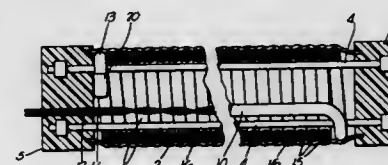
Filed Dec. 5, 1986, Ser. No. 938,293

Claims priority, application United Kingdom, Dec. 5, 1985, 8529976

Int. Cl.<sup>4</sup> H01L 41/08

U.S. Cl. 310-330

25 Claims



1. A pressure sensing transducer which comprises a central region around which is formed a helix of piezoelectric coaxial cable that will generate electrical signals in response to external pressure variations, and a barrier that suppresses transmission of external pressure variation to the central region, the barrier being formed at least partly by the helix of coaxial cable, and the central region having a sufficiently low radial stiffness to allow radial contraction of the helix in response to external pressure variations such that the electrical signals generated by the coaxial cable have a d<sub>31</sub> polarity.

#### 4,794,296

##### CHARGE TRANSFER SIGNAL PROCESSOR

Cardinal Warde, Newton Centre, and Robert F. Dillon, Stoneham, both of Mass., assignors to Optron System, Inc., Waltham, Mass.

Filed Mar. 18, 1986, Ser. No. 840,684

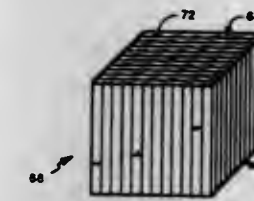
Int. Cl.<sup>4</sup> G02F 1/03, 1/05; G02B 5/30; H04N 9/31

U.S. Cl. 313-105 R

62 Claims

1. A charge transfer signal processor, comprising: vacuum housing means defining longitudinally spaced and confronting two-dimensional input and output external

ports for providing an evacuated region between the external input and output ports; input electromagnetic signal means coupled to said vacuum housing means for writing an input electromagnetic signal defining a two-dimensional (the 2-D) spatially-varying input intensity distribution into the evacuated region as a selectable two-dimensional spatially-varying electronic charge intensity distribution; imaging means for transporting said selectable two-dimensional spatially-varying electronic charge intensity distribution of said input electromagnetic signal proximate to said output port; and two-dimensional electronic charge collecting and electrically conductive feedthrough means vacuum-mounted at said external output port to said vacuum housing means and cooperative with said imaging means for receiving said two-dimensional electronic charge intensity distribution proximate said output port and electrically transferring it externally of said vacuum housing means; said two-dimensional electronic charge collecting said electrically conducting feedthrough means including a preselected high resolution 2-D array of electrically isolated longitudinally extending conductors having ends termi-



nating in first and second surfaces, with the ends terminating in said first surface being located inside said evacuated region confronting said input port, and with the ends terminating in said second surface being located outside said evacuated region and facing externally of said vacuum housing means; said preselected resolution of said high resolution 2-D array being selected to substantially preserve the fidelity of the input 2-D electromagnetic signal; said 2-D electronic charge intensity distribution being locally received by said ends of said two dimensional electronic charge collecting and electrically conductive feedthrough means terminating in said first surface of said high-resolution 2-D array of electrically isolated and longitudinally extending conductors and individually electrically transferred thereby to associated ones of the ends thereof terminating in said second surface of said high-resolution 2-D array of electrically isolated longitudinally extending conductors of said feedthrough means so as to provide at said second ends and externally of the housing an electrical 2-D output signal having a spatially varying output intensity distribution corresponding to that of the input electromagnetic signal.

#### 4,794,297

##### SHIELDED DISCHARGE-TYPE AUTOMOTIVE HEAD LAMP

Manfred Gangel, Fürstfeldbruck; Jürgen vom Scheidt, Taufkirchen, and Ewald Wurster, Grünwald, all of Fed. Rep. of Germany, assignors to Patent-Treuhand-Gesellschaft für elektrische Glühlampen mbH, Munich, Fed. Rep. of Germany

Filed Dec. 30, 1986, Ser. No. 947,616

Claims priority, application Fed. Rep. of Germany, Jan. 20, 1986, 8601283[U]

Int. Cl.<sup>4</sup> H01J 5/16

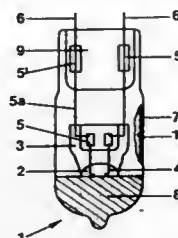
U.S. Cl. 313-117

11 Claims

1. Shielded discharge-type vehicular head lamp (1,11) having



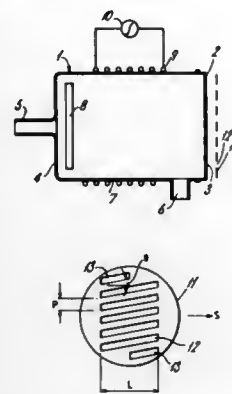
a discharge vessel or discharge bulb (2,12); electrode leads (5a, 15a) extending from said discharge vessel or discharge bulb;  
a base (9,19) extending from said base; and means for partially shielding visible light radiation emitted from the discharge vessel or discharge bulb and for asymmetrically directing light in accordance with the desired light distribution pattern, comprising, in accordance with the invention, an outer bulb (7,17) of transparent material surrounding said



discharge vessel or discharge bulb (2,12) and retaining said discharge vessel or discharge bulb therein; wherein the base (9,19) and the outer bulb form a unitary element, the discharge vessel (2, 12) is sealed within the outer bulb (7,17) and spaced from the inner wall of the outer bulb, and the space between the discharge vessel and the outer bulb is evacuated; and wherein the partial shielding and asymmetrically light-directing means comprises a visible-light radiation-absorbing coating (8,18) directly applied to the outer bulb and extending further along a first side of said outer bulb than along a second, opposing, side of said outer bulb.

**4,794,298**  
**ION SOURCE**  
Gary Proudfoot, Wantage, England, assignor to United Kingdom Atomic Energy Authority, London, England  
Filed Sep. 8, 1986, Ser. No. 904,269  
Claims priority, application United Kingdom, Sep. 17, 1985, 8522976

Int. Cl.<sup>4</sup> H01J 39/34  
U.S. Cl. 313—363.1

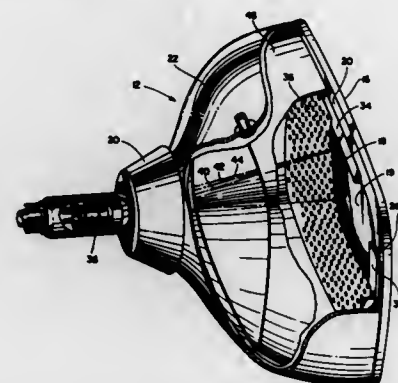


1. An ion beam source comprising a chamber, means for introducing into the chamber a gaseous medium ions of which are to be provided by the source, means for establishing a plasma within the chamber, and means for extracting ions from the plasma and providing an array of parallel planar ion beams the centres of which are colinear and the planes of which are at an oblique angle to the line joining their centres such that a geometric projection of the ion beams in a direction orthogonal to that of the line joining the centres of the ion beams and

orthogonal to the direction of beam propagation is continuous at least.

**4,794,299**  
**FLAT TENSION MASK COLOR CRT FRONT ASSEMBLY WITH IMPROVED MASK FOR DEGROUPING ERROR COMPENSATION**  
Wayne R. Chiodi, Northbrook, and Charles J. Prazak, III, Elmhurst, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.  
Filed Mar. 25, 1986, Ser. No. 843,890  
Int. Cl.<sup>4</sup> H01J 29/07, 29/32

U.S. Cl. 313—402 16 Claims



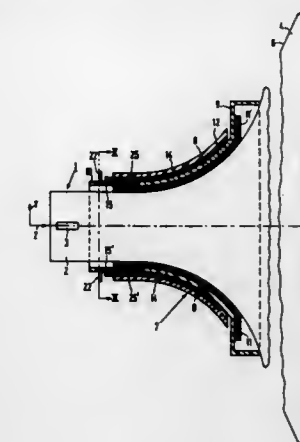
1. For use in a color cathode ray tube having a substantially flat faceplate, a planar shadow mask with a pattern of circular apertures characterized by having a substantially constant vertical pitch throughout the mask, but with a horizontal pitch increasing outwardly from the center of the mask.

**4,794,300**  
**COLOUR PICTURE TUBE INCLUDING A DEFLECTION UNIT HAVING PICTURE BALANCE CORRECTION MEANS**  
Wilhelmus A. J. Beelaard; Albertus A. S. Sluyterman, and Johannes A. P. De Volder, all of Eindhoven, Netherlands, assignors to U.S. Philips Corp., New York, N.Y.  
Filed Mar. 2, 1987, Ser. No. 20,925

Claims priority, application Netherlands, Mar. 28, 1986, 8600810; Apr. 21, 1986, 8601003  
Int. Cl.<sup>4</sup> H01J 29/72; H01F 1/00

U.S. Cl. 313—440 4 Claims  
1. An improved deflection unit for a color television picture tube whose neck accommodates an electron gun system for emitting to a display screen three electron beams, a central beam which coincides at least substantially with the axis of the picture tube and first and second outer beams located on either side thereof; such deflection unit being secured coaxially around the picture tube and comprising a system of line deflection coils which when energized deflects the electron beam in a first direction and a system of field deflection coils which when energized deflects the electron beam in a direction at right angles to the first direction; said system of field deflection coils comprising two field deflection coils located diametrically with respect to each other, each field deflection coil comprising a plurality of conductors extending in the longitudinal direction of the deflection unit; such improvement being characterized in that at the beam entrance side of the deflection field generated by the field deflection coils and situated in such field there is provided a first pair of substantially rectangular plate-shaped elements of a soft-magnetic material which extend parallel to the tube axis and are at a distance from each other in the circumferential direction relative to the neck of the tube; each of such first pair of elements being movable in such

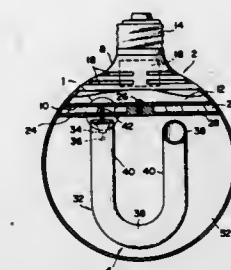
circumferential direction from a neutral position in which the distances between the center of each such element and each of said first and second outer beams are equal, to a position in which the distance between the center of each such element and said first outer beam exceeds the distance to said second



outer beam; said first pair of elements being situated closer to the neck of the tube than the field deflection coils; whereby said first pair of elements can be moved to positions in which they provide convergence correction of the deflection field generated by the field deflection coils.

**4,794,301**  
**FLUORESCENT LAMP HAVING A CONVOLUTED DISCHARGE PASSAGE AND FLUORESCENT LAMP APPARATUS INCORPORATING THE SAME**  
Katsuhide Misono, Yokohama; Yuji Kawaguchi; Kazuhisa Origuchi, both of Yokosuka; Shinichi Tsunekawa, Fujisawa, and Taketo Kamei, Yokosuka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Aug. 18, 1987, Ser. No. 86,519  
Claims priority, application Japan, Aug. 19, 1986, 61-193501; Oct. 30, 1986, 61-259082

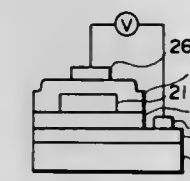
Int. Cl.<sup>4</sup> H01J 61/30, 61/24  
U.S. Cl. 313—490 17 Claims



1. A fluorescent lamp apparatus comprising:  
a fluorescent lamp including a tubular envelope having two end portions, a pair of electrodes and a quantity of amalgam being disposed at one end portion and forming a discharge passage between said electrodes, the amalgam being located in a tube communicating with said envelope, a lighting means electrically connected to said electrodes for lighting said fluorescent lamp;  
a base member supporting said fluorescent lamp including:  
a housing wherein said lighting means is disposed;  
a partition wall partitioning said housing to form a chamber within said housing wherein said lighting means is installed; and  
a cover member spaced from said partition wall by a predetermined distance and defining an air chamber

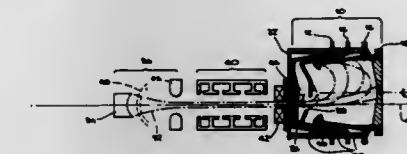
between itself and said partition wall, said air chamber being located between said lighting means and said fluorescent lamp and communicating with the atmosphere so that air streams are suppressed, the tube containing the amalgam being disposed in said air chamber.

**4,794,302**  
**THIN FILM EL DEVICE AND METHOD OF MANUFACTURING THE SAME**  
Takashi Nire, Hiratsuka, and Takehito Watanabe, Isehara, both of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan  
Filed Dec. 30, 1986, Ser. No. 947,782  
Claims priority, application Japan, Jan. 8, 1986, 61-1883; Jan. 24, 1986, 61-13472  
Int. Cl.<sup>4</sup> H05B 33/14, 33/22  
U.S. Cl. 313—509 11 Claims



1. A thin film EL device having increased brightness comprising a transparent electrode, a first insulating layer, a luminescent layer, a second insulating layer and a back electrode, said luminescent layer being constituted by column polycrystals.

**4,794,303**  
**AXISYMMETRIC ELECTRON COLLECTOR WITH OFF-AXIS BEAM INJECTION**  
Johanna R. Hechtel, Redwood City, and Ronald W. Herriott, San Bruno, both of Calif., assignors to Litton Systems, Inc., Woodland Hills, Calif.  
Filed Jan. 22, 1987, Ser. No. 6,010  
Int. Cl.<sup>4</sup> H01J 23/02  
U.S. Cl. 315—5.38 17 Claims



7. A charged-particle collector for collecting charged particles comprising:  
an enclosed region having a longitudinal axis passing through the center of said enclosed region into which the charged particles are directed; and  
a plurality of electrodes for collecting the charged particles, each of said electrodes being arranged about said longitudinal axis and having a surface area which is substantially symmetrical about said longitudinal axis, at least one of said electrodes also containing an aperture through which the charged particles are directed, said aperture being offset from said longitudinal axis.

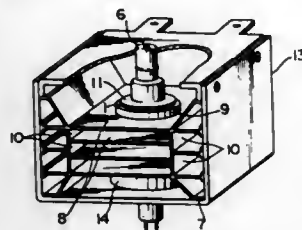
4,794,304

**MAGNETRON WITH COOLING FIN STRUCTURE**  
Takeshi Ito, Osaka, Japan, assignor to Matsushita Electronics Corporation, Kadoma, Japan

Filed Dec. 24, 1986, Ser. No. 945,881  
Claims priority, application Japan, Dec. 27, 1985, 60-296807;  
Jan. 8, 1986, 61-1741

Int. Cl.<sup>4</sup> H01J 25/50, 23/033  
U.S. Cl. 315—39.51

9 Claims



1. A magnetron apparatus comprising a magnetron with an anode cylinder having an outer peripheral surface, a frame-like yoke having side walls, and a radiator attached to the outer peripheral surface of said anode cylinder and adapted to allow cooling air to pass therethrough, wherein said radiator includes a plurality of horizontal plates arranged in stages, each of said horizontal plates having a cylindrical portion for receiving therein said anode cylinder and outer side ends held in contact with the said side walls of said frame-like yoke, and a pair of vertical walls which connect between said each adjacent horizontal plates intermediate between said cylindrical portion and said outer side ends, said vertical walls serving to maintain, between said each adjacent horizontal plates, a gap which is greater than the axial length of said cylindrical portion of said each adjacent horizontal plates.

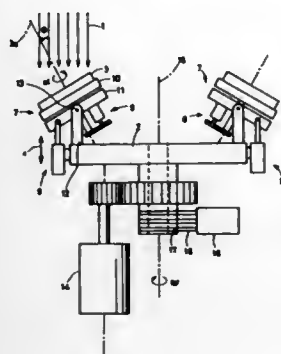
4,794,305

**SUBSTRATE SUPPORT STRUCTURE FOR ION IMPLANTATION DEVICE**  
Takayuki Matsukawa, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 27, 1987, Ser. No. 54,765  
Claims priority, application Japan, May 29, 1986, 61-126763

Int. Cl.<sup>4</sup> H01L 21/265  
U.S. Cl. 315—111.81

10 Claims



1. A substrate support structure for an ion implantation device for supporting a substrate to be implanted with ions, comprising

a plurality of rotatable substrate holders, each for supporting a sample substrate so that the sample substrates can each be rotated around an axis perpendicular to its main surface and so that the angle of inclination of said main surface with respect to ion beams can be changed;

rotary drive means responsive to a first control signal for rotatively driving said sample substrate;  
inclination angle adjusting means responsive to a second control signal for changing the angle of inclination of said sample substrates with respect to the ion beam; and  
a rotary disk rotatably installed and supporting said plurality of substrate holders on a common circumference centered at the axis of rotation of the rotary disk.

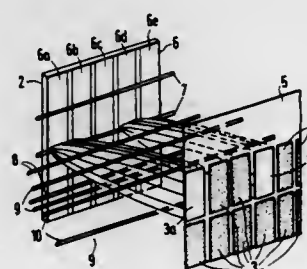
4,794,306

**FLAT PICTURE-REPRODUCING DEVICE**  
Kurt-Manfred Tischer, Wendlingen; Harald Rose, Darmstadt; Rainer Spehr, Ober-Ramstadt, and Gerald Schonecker, Rueselsheim, all of Fed. Rep. of Germany, assignors to Standard Elektrik Lorenz AG, Stuttgart, Fed. Rep. of Germany

Filed Nov. 20, 1986, Ser. No. 933,405  
Claims priority, application Fed. Rep. of Germany, Nov. 21, 1985, 3541164

Int. Cl.<sup>4</sup> G09G 3/10  
U.S. Cl. 315—169.3

10 Claims



1. In a flat, vacuum-enclosed picture-reproducing display device having a phosphor-coated glass faceplate and a shallow tray-shaped rear housing containing an area cathode consisting of a first two-dimensional array of heating wires for emitting a beam of electrons, a counterelectrode behind said first array, and a control arrangement between said cathode and said faceplate:

a second two-dimensional array of conductive focusing electrode elements each above and to one side of at least one associated said heating wire,  
means for applying to at least those of said focusing electrode elements associated with a selected said heating wire a negative potential with respect thereto for repelling the laterally extending portion of said beam of electrons emanating from the selected heating wire, thereby focusing said beam of electrons;

a third two-dimensional array of conductive attracting electrode elements each above an associated one of said focusing electrode elements and laterally displaced with respect thereto towards an associated one of said heating wires,  
means for applying to at least those of said focusing electrode elements associated with a selected said heating wire a first positive potential with respect thereto for attracting said beam of electrons emanating from the selected heating wire, thereby accelerating said beam of electrons;

a perforated anode, and  
means for applying to said anode a second positive potential below than said first positive potential thereby decelerating said beam of electrons before it reaches said anode,  
a fourth two-dimensional array of shaping electrode elements each above an associated one of said attracting electrode elements and laterally located between an associated one of said heating wires and an associated one of said focusing electrode elements for shaping said beam of electrons,

means for applying to at least those of said shaping electrode elements associated with a selected said heating wire a second negative potential with respect thereto for repelling any laterally extending portion of said beam of elec-

trons in the vicinity of said associated shaping electrode elements thereby shaping said beam of electrons;  
means for applying to said anode a second positive potential below than said first positive potential thereby decelerating said beam of electrons before it reaches said anode,  
said second two-dimensional array, said third two-dimensional array, said fourth two-dimensional array and said perforated anode being arranged successively between said first two-dimensional array and said control arrangement, whereby said beam of electrons is accelerated, formed, focused, shaped and decelerated before it reaches said control arrangement.

4,794,307

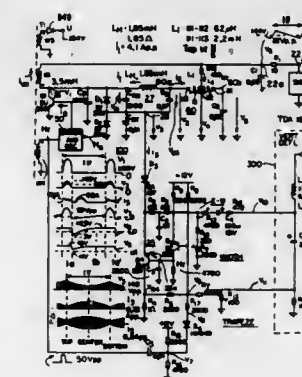
**RASTER DISTORTION CORRECTION FOR A DEFLECTION CIRCUIT**

Peter E. Haferl, Feldblumenstrasse 20, CH-8134, Adliswil, Switzerland

Filed Sep. 29, 1987, Ser. No. 102,584  
Claims priority, application United Kingdom, Nov. 4, 1986, 8626316; Nov. 4, 1986, 8626317

Int. Cl.<sup>4</sup> H01J 29/56  
U.S. Cl. 315—371

26 Claims



1. A deflection apparatus with raster distortion correction, comprising:

an input signal at a frequency that is related to a first deflection frequency;  
a deflection winding;  
switching means coupled to said deflection winding that operates, in accordance with said input signal, at said first deflection frequency for generating scanning current in said deflection winding during a trace interval of a given deflection cycle;

a deflection retrace capacitance coupled to said deflection winding to form a deflection retrace resonant circuit that produces a first retrace pulse voltage at a retrace frequency during a retrace interval of said given deflection cycle;

a source of supply voltage;

a supply inductance coupled between said source of said supply voltage and said switching means for generating a second retrace pulse voltage in said supply inductance, said supply inductance being coupled to said retrace resonant circuit during said retrace interval for supplying a supply current from said source of supply voltage that replenishes energy losses in said retrace resonant circuit;

a load circuit energized by said second retrace pulse voltage in said supply inductance;

a source of a modulation signal; and  
controllable semiconductor means responsive to said modulation signal for generating a modulation current that is coupled to said retrace resonant circuit to modulate said scanning current for providing raster distortion correction, said semiconductor means forming an output impedance that during said retrace interval is large for substan-

tially isolating said supply inductance from said retrace resonant circuit during said retrace interval.

4,794,308

**MULTIPLE GASEOUS DISCHARGE DISPLAY/MEMORY PANEL HAVING IMPROVED OPERATING LIFE**

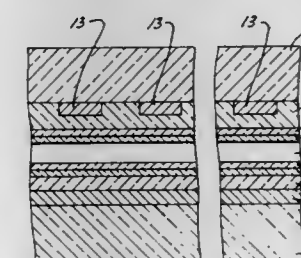
Roger E. Ernsthansen, Lackey, Ohio, assignor to Owens-Illinois Television Products Inc., Toledo, Ohio

Continuation of Ser. No. 385,973, Aug. 6, 1973, abandoned, which is a continuation of Ser. No. 61,842, Aug. 6, 1970, abandoned. This application May 29, 1987, Ser. No. 56,292. The portion of the term of this patent subsequent to Mar. 15, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> H01J 17/49

U.S. Cl. 313—587

12 Claims



1. An article of manufacture for a gaseous discharge display/memory device consisting of a dielectric body having at least one electrode on one side thereof and on the opposite side thereof a coating consisting of at least one oxide of Al, Ti, Zr, Hf, or Si in an amount sufficient to provide gaseous discharge operating voltages in the device which do not substantially change over a given period of operating time.

4,794,309

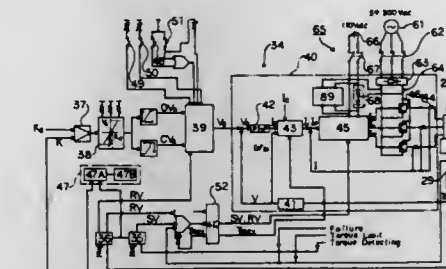
**ELECTRIC ACTUATOR FOR A CONTROL VALVE**

Takeshi Saito, Mishima; Takeshi Suguro, Shizuoka; Toshio Edo, Numazu, and Yutaka Utsunomiya, Hiratsuka, all of Japan, assignors to Bailey Japan Co., Ltd., Shizuoka and Nippon Gear Co., Ltd., Kanagawa, both of Japan

Filed Nov. 20, 1987, Ser. No. 123,151  
Claims priority, application Japan, Aug. 26, 1987, 62-210206; Nov. 5, 1987, 62-280185

Int. Cl.<sup>4</sup> F16K 31/04  
U.S. Cl. 318—9

5 Claims



1. An electric actuator means for controlling a control valve of the type including a casing having a valve chamber, an inlet passage and an outlet passage; a valve seat located in said valve chamber; a movable valve rod which is supported in said casing; a valve plug connected to said valve rod; and an induction motor having an output shaft drivingly coupled to said valve rod for driving said valve plug into and out of contact



with said valve seat, thereby changing the degree of opening of the control valve;

said electric actuator means comprising a control means which includes:

means for determining an opening deviation of an actual opening degree of the control valve from a demand opening degree of the control valve;

means for generating a valve opening or closing speed command in accordance with said opening deviation;

means for determining a speed deviation of the actual valve opening or closing speed from the speed corresponding to said speed command;

means for generating a torque command in accordance with said speed deviation;

means for computing by means of a vector computing method a primary current which is to be supplied to said induction motor to cause said induction motor to output a required torque; and

means for supplying said computed primary current to said induction motor to drive said induction motor.

4,794,311

## NUMERICAL CONTROL SYSTEM

Nobuyuki Kiya, Hachioji, and Motoaki Yoshino, Suginami, both of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

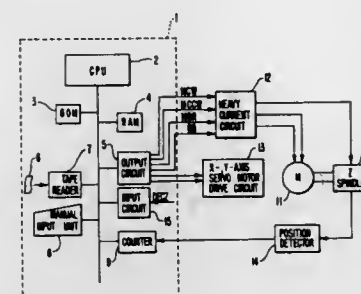
Filed Dec. 1, 1986, Ser. No. 936,941

Continuation of Ser. No. 705,340, filed as PCT JP84/00282 on Jun. 1, 1984, published as WO84/04978 on Dec. 20, 1984, abandoned.

Claims priority, application Japan, Jun. 6, 1983, 58-99412.  
Int. Cl.<sup>4</sup> G05B 19/18

U.S. Cl. 318—569

2 Claims



4,794,310

## PHASE ANGLE CONTROL CIRCUIT FOR MOTORS

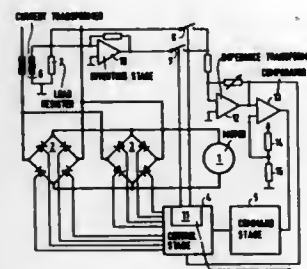
Josef Lukas, and Grammenos Nicoltsios, both of Vienna, Austria, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 852,332, Apr. 15, 1986, abandoned. This application Apr. 20, 1987, Ser. No. 40,427

Int. Cl.<sup>4</sup> H02P 7/14

U.S. Cl. 318—342

3 Claims



1. A phase angle control circuit for an electric motor having control means for driving a plurality of thyristors of rectifier bridges, and further having current transformer means for the determination of an actual value of electrical current supplied to the motor by the bridges, said current transformer means being coupled to an a-c supply, said current transformer means being utilized for determining a current zero-axis crossing before motor current reversal, and further for detecting a current rest time duration between pulses near the zero crossing, said circuit further comprising comparator means for detecting the current zero-axis crossing connected to a secondary of the current transformer means via switch means controlled by the control means for the motor current at the points of phase angles during half waves of one polarity of the a-c current directly such that the signal from the secondary is not inverted, and during the half waves of the opposite polarity of the a-c current via inversion means, so that the motor current is always represented by only one polarity which allows an unambiguous zero current determination by the comparator means.

1. A numerical control system for a machine tool having a movable element, for controlling drive motors in accordance with a numerical control program including desired stopping position data and a series of blocks each containing a position instruction, comprising:

general-purpose motor means for driving the movable element of the machine tool in response to first control signals, said general-purpose motor means being used as at least one of the drive motors for indexing the movable element along a first axis which does not require high precision indexing;

servo motor means for driving the movable element in response to second control signals, said servo motor means being used as at least one of the drive motors for indexing the movable element along a second axis which requires high precision indexing;

position detecting means for detecting movement of the movable element along the first axis and for providing movement data, indicative of a current position of the movable element, responsive to the detected movement;

means for correcting the position instruction contained in each block in accordance with an error between the position instruction in a preceding block and the movement data and for providing position data for each of the blocks responsive to the error;

error means for receiving and storing as stored data, the desired stopping position data, for repetitively updating the stored data in dependence upon the movement data during execution of numerical control associated with the first axis and for providing a combination signal responsive to the updating;

means, responsive to the combination signal, for providing the first control signals for the general-purpose motor; and braking means for braking the general-purpose motor means when the current position approaches a position defined by the desired stopping position data and so that said movable element is stopped at the position defined by the desired stopping position data.

4,794,312

## METHOD AND APPARATUS FOR CONTROLLING A SERVO MOTOR

Minoru Kano, Ibaraki; Kenzo Takeichi, Tochigi; Minoru Makita, Tochigi; Ryolchi Hisatomi, Tochigi, and Akinobu Takemoto, Oyama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

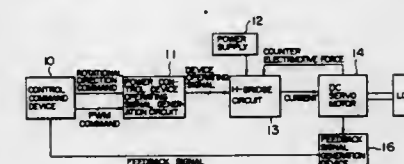
Filed Sep. 28, 1987, Ser. No. 101,443

Claims priority, application Japan, Sep. 29, 1986, 61-228178; Nov. 28, 1986, 61-281703

Int. Cl.<sup>4</sup> G05B 11/28

U.S. Cl. 318—599

10 Claims



1. A servo motor control apparatus comprising:  
a driver stage which includes power control devices for driving a servo motor; power control device operating signal generation means which generates a pulse-width modulation (PWM) signal having a PWM frame interval time of  $T_p$  for controlling said power control devices; and control command means which operates at a time interval of  $T_s$  where ( $T_s > T_p$ ) for providing a control command to said power control device operating signal generation means causing said power control device operating signal generation means to generate said pulse-width modulation signal, said control command being proportionally related to said pulse-width modulation signal, wherein said control command means comprises means for transforming a desired pulse-width modulation command value calculated in each time interval  $T_s$  into a pulse-width modulation command set having a plurality of pulse-width modulation command values, and means for outputting a control command including said transformed pulse-width modulation command set sequentially to said power control device operating signal generation means at a constant time interval of  $T$  where ( $T_s > T > T_p$ ), and where  $T_s = m \cdot T$  ( $m$  is an integer number).

4,794,313

## THREE ELEMENT DIGITAL CONTROL SYSTEM

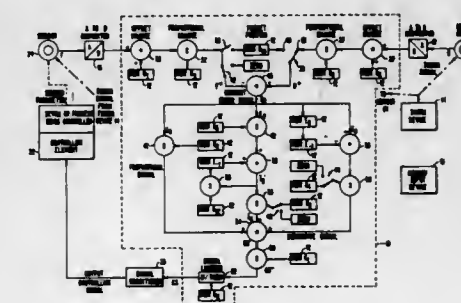
Douglas J. Ohmen, 1220 Greenbrook Dr., Danville, Calif. 94526

Filed Jul. 21, 1987, Ser. No. 76,072

Int. Cl.<sup>4</sup> G05B 11/42

U.S. Cl. 318—610

26 Claims



1. An improved three element digital control system for controlling a parameter in a machine or process by driving a controlling element, wherein the control system is of the type which senses the parameter to be controlled and provides a sensed parameter signal representative thereof, forms an error signal which is the difference between the sensed parameter

signal and an order signal, and forms a driving signal for driving the controlling element which driving signal includes a component which is proportional to said error signal, a component which is proportional to a time integral of said error signal, and a component which is proportional to a time derivative of said error signal, the improvement comprising:  
means for preprocessing the sensed parameter signal or the order signal that form the error signal prior to forming the driving signal.

4,794,314

## ENVIRONMENTAL POSITION ACTUATOR APPARATUS HAVING LOAD RESPONSIVE LIMIT CONTROL APPARATUS

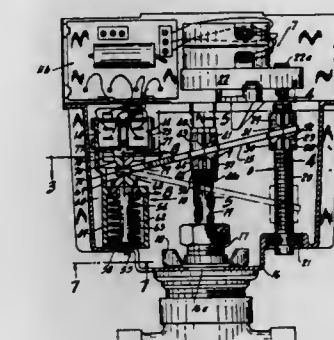
George J. Janu, Brookfield; Raymond D. Feller, Franklin, and Richard N. Laakaniemi, Hales Corners, all of Wis., assignors to Johnson Service Company, Milwaukee, Wis.

Filed Aug. 28, 1987, Ser. No. 90,796

Int. Cl.<sup>4</sup> G05B 19/40

U.S. Cl. 318—685

36 Claims



1. A limit switch apparatus for monitoring bi-directional movement of a positioned device between first and second limits and having an electrically operated motor means operable to establish forced movement of the positioned device in excess of the force on the device in moving between said first and second limits whereby the force increases at said first and second limits, comprising a spring means having retainer means movably mounted for stressing said spring means, a switch operator coupled to said retainer means, switch means mounted in the path of said operator, a pivot unit secured to said switch operator and extending axially outwardly of said operator, a pivoted lever coupled to said pivot unit and operable to pivot in opposite directions relative to said switch operator, said pivoted lever being operable to move said pivot support unit relative to said spring means in response to movement at both said limits and thereby actuate said switch means in response to said forced movement at said limits.

4,794,315

## RECHARGEABLE BATTERY-POWERED DEVICE

John T. Pederson, Kankakee, and Jeffrey D. Wallace, Carol Stream, both of Ill., assignors to Pittway Corporation, Northbrook, Ill.

Filed Jan. 11, 1988, Ser. No. 141,990

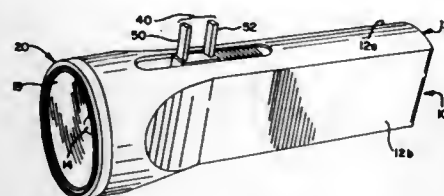
Int. Cl.<sup>4</sup> H02J 7/00; H01M 10/46

U.S. Cl. 320—2

20 Claims

1. A rechargeable device comprising:  
a battery-operated load;  
a rechargeable battery means adapted to provide power to said load;  
connector means selectively positionable in a first recharging position for effecting connection of said battery means to a source of recharging energy and in a second standby

position for providing a connection circuit between said battery means and said load;  
said connector means including first and second conductive connector members for effecting a connection between said battery means and said energy source when said connector means is in said recharging position;



one of said connector members being operable to provide a connection between said battery means and said load when said connector means is in said standby position; and switch means operable to complete a circuit between said battery means and said load for energizing said load when said connector means is in said standby position.

4,794,316

## INDUCTION MACHINE SYSTEM

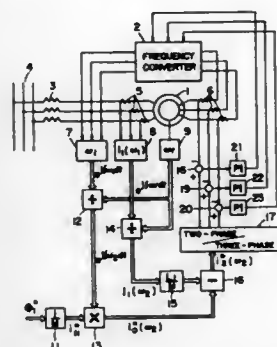
Hiroshi Uchino, and Takeo Shimamura, both of Hachioji, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 8, 1987, Ser. No. 71,139

Claims priority, application Japan, Jul. 11, 1986, 61-163458  
Int. Cl.<sup>4</sup> H02P 9/00

U.S. Cl. 322-47

6 Claims



1. An induction machine system comprising:  
a wound-rotor induction machine connected at its primary side to a power system;  
a frequency converter for controlling a secondary current of said wound-rotor induction machine;  
setting means for setting an excitation current reference vector with respect to said wound-rotor induction machine;  
means for detecting a primary current vector of said wound-rotor induction machine;  
coordinate transformation means for applying coordinate transformation to said excitation current reference vector and said primary current vector so that they exist in the same coordinate system;  
means for preparing a secondary current reference vector on the basis of said primary current vector and said excitation current reference vector which have been subjected to the coordinate transformation by said coordinate transformation means;  
means for detecting a secondary current vector of said wound-rotor induction machine; and  
current control means for controlling said frequency con-

verter so that said secondary current vector as in correspondence with said secondary current reference vector.

4,794,317

## ECL-TO-CMOS LEVEL CONVERSION FOR USE IN ECL-BICMOS CIRCUIT

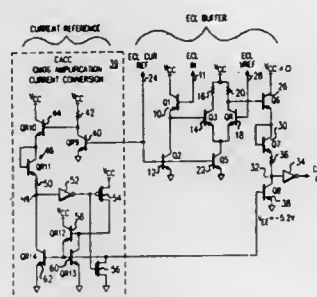
Hiep van Tran, Carrollton, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Dec. 18, 1987, Ser. No. 134,652

Int. Cl.<sup>4</sup> G05F 3/20

U.S. Cl. 323-316

20 Claims



1. A voltage level shifter for converting an input signal having first high and low logic levels to an output signal having second high and low logic levels comprising:  
an input node for receiving the input signal;  
an impedance device having first and second terminals, said first terminal operably connected to said input node for providing a voltage drop having a magnitude dependent upon the current through said impedance device;  
a latching device having an input connected to said second terminal of said impedance device and operable to provide said output signal in response to the relative magnitudes of the voltage at the input of said latching device and a predetermined trip voltage of the latching device; and  
a current source for controlling the current through said impedance device such that the voltage at said input of said latching device is equal to said trip voltage when the voltage at said first node is at a predetermined voltage.

4,794,318

## CURRENT TRANSDUCER ARRANGEMENT FOR OUTDOOR HIGH-VOLTAGE INSTALLATIONS

Martin Maschek, Wilrenlos, and Georg Mastner, Niederrohrdorf, both of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland

Filed Sep. 25, 1987, Ser. No. 101,019

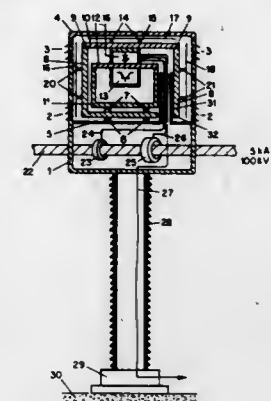
Claims priority, application Switzerland, Sep. 29, 1986, 3896/86  
Int. Cl.<sup>4</sup> G01R 15/07

U.S. Cl. 323-358

7 Claims

1. A current transducer arrangement for outdoor high-voltage installations, comprising:  
(a) a primary conductor and a current transducer for detecting an alternating current flowing through the primary conductor;  
(b) at least one electronic signal processing device for the measurement signal of the current transducer;  
(c) a transducer head casing in which the current transducer and the electronic signal processing device are accommodated; and wherein  
(d) said electronic signal processing device is arranged above the current transducer and is attached to one of a cover and a coverplate of a first shield casing;  
(e) the first shield casing is enclosed by a second shield casing of a material having good electric conductivity;  
(f) the second shield casing includes one of a cover which can be removed towards the top and a coverplate;

(g) an annular power supply transformer for supplying the electronic signal processing device with power is arranged inside the transducer head casing at the primary conductor; and



(h) power supply lines coming from the power supply transformer and a measurement signal line coming from the current transducer are carried through the space between the first and second shield casing to the power section of the electronic signal processing device and are detachably connected to this power section.

4,794,319

## GLASS MOUNTED ANTENNA

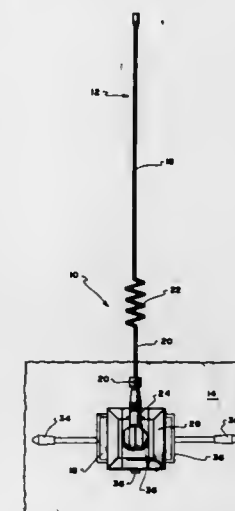
Tetsuo Shimazaki, Tokyo, Japan, assignor to Alliance Research Corporation, Chatsworth, Calif.

Filed Jul. 3, 1986, Ser. No. 881,602

Int. Cl.<sup>4</sup> H01Q 1/32

U.S. Cl. 343-715

19 Claims



1. An antenna system for use with a transceiver including:  
a primary radiating element of at least one-half wavelength of the frequency of interest;  
first and second quarter wave elements adjacent the base of said primary radiating element and orthogonally aligned therewith to create a ground plane therefor, said quarter wave elements electrically connected to a source of common potential;  
coupling means adapted to connect said radiating element and said quarter wave elements to the transceiver through a coaxial cable; and  
tuning means including reactive elements between said radiating element and the transceiver circuit for matching the

impedance between said radiating element and the coaxial cable.

4,794,320

## MULTI-FREQUENCY CAPACITANCE SENSOR

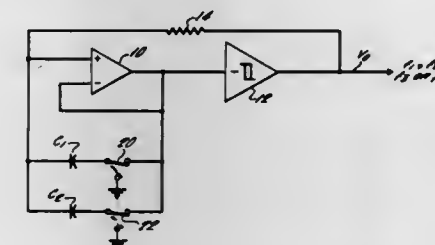
Chih C. Chang, Huntingdon Valley, Pa., assignor to Moore Products Co., Spring House, Pa.

Filed Aug. 10, 1987, Ser. No. 83,781

Int. Cl.<sup>4</sup> G01R 27/26

U.S. Cl. 324-60 CD

4 Claims



1. A system for producing a signal value representative of the ratio between the capacitance  $C_1$  of a first capacitor and the capacitance  $C_2$  of a second capacitor, comprising:  
oscillator means having a frequency-determining circuit and oscillating at a frequency which varies in a predetermined manner with the total value of capacitance actively connected in said circuit;  
said frequency-determining circuit inherently including a continuously-present capacity  $C_p$  determining the frequency of oscillations of said oscillator means in the absence of said capacitors  $C_1$  and  $C_2$ ;  
said first and second capacitors having four possible combinations in which they could be connected to said frequency-determining circuit, namely:  
(1) only said first capacitor actively connected in said circuit;  
(2) only said second capacitor actively connected in said circuit;  
(3) neither of said first and second capacitors actively connected in said circuit;  
(4) both said first and second capacitors actively connected in said circuit;  
switching means connecting said first and second capacitors with said frequency-determining circuit in said combination (1) at a first time to produce oscillations at a first frequency  $f_1$ , connecting said first and second capacitors with said circuit at another time in said combination (2) to produce oscillations at a second frequency  $f_2$ , and connecting said first and second capacitors with said frequency-determining circuit at still another time in one of said combinations (3) and (4) to produce oscillations at one of two corresponding different frequencies  $f_3$  and  $f_4$ ; and  
means responsive to said oscillations at frequencies  $f_1$ ,  $f_2$  and one of said frequencies  $f_3$  and  $f_4$  to produce signal values representative of the values of said ratio between  $C_1$  and  $C_2$ , substantially undistorted by the effects of said capacitance  $C_p$ .

4,794,321

## VARIABLE CAPACITY PROXIMITY SENSOR

Martin Dotzko, Binghamton, N.Y., assignor to Dotzko Enterprises, Inc., Binghamton, N.Y.

Filed Nov. 27, 1987, Ser. No. 126,013

Int. Cl.<sup>4</sup> G01R 27/26

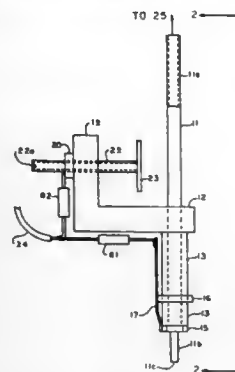
U.S. Cl. 324-61 P

20 Claims

1. A capacitive sensor comprising, in combination:  
(a) an electrically conductive rod having front and rear ends;

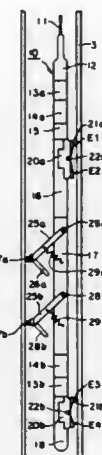


- (b) a first electrically conductive ring having an outside diameter and substantially encircling said rod at a first distance rearwardly from the front end thereof; and  
(c) a second electrically conductive ring electrically connected to said first ring, said second ring having an outside



diameter greater than said first ring outside diameter and substantially encircling said rod at a second distance rearwardly from the front end thereof, said second distance exceeding said first distance said conductive rings being carried on and electrically insulated from said rod.

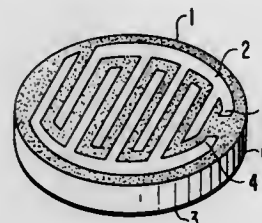
**4,794,322**  
**METHOD, SYSTEM, AND TOOL FOR INVESTIGATING BOREHOLE CASINGS**  
Dylan Davies, Tokyo, Japan, assignor to Schlumberger Technology Corp., New York, N.Y.  
Filed Oct. 30, 1986, Ser. No. 925,035  
Claims priority, application Japan, Nov. 1, 1985, 60-244217  
Int. Cl.<sup>4</sup> G01R 27/02  
U.S. Cl. 324—65 CR 27 Claims



1. A system which investigates a casing fitted into a borehole traversing an earth formation, comprising:  
(a) a downhole tool capable of investigating said casing along the length of said casing;  
(b) a measurement control unit located in proximity to the surface of said earth formation; and  
(c) a cable having one end connected to said downhole tool and the other end connected to said measurement control unit, said cable including at least a plurality of first connection lines, said downhole tool comprising,  
(1) at least a first pair of longitudinally spaced electrodes,

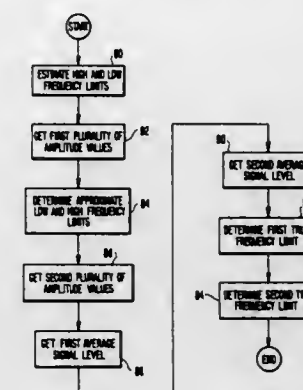
- (2) means for causing said pair of electrodes to be contacted with the inner peripheral surface of said casing,  
(3) at least a pair of second connection lines, each of said second connection lines having one end connected to a corresponding one of said electrodes, and  
(4) relay means interposed between said first connection lines of said cable and the second connection lines of said downhole tool, said relay means being arranged to be positioned in first and second positions, wherein when said relay means is in said first position, said first connection lines of the cable are short-circuited by said relay means, and when said relay means is in said second position, said first connection lines are connected to their corresponding second connection lines thereby establishing an electrical connection between said measurement control unit and said electrodes, and  
wherein said measurement control unit includes at least means for measuring at least one predetermined electrical property with said electrodes of said downhole tool in contact with said casing, at least once with said relay means in said first position and at least once with said relay means in said second position, and means for subtracting a value obtained with said relay means in said first position from a value obtained with said relay means in said second position to provide a true value of said predetermined electrical property.

**4,794,323**  
**MULTIFUNCTIONAL CERAMIC SENSOR**  
Zhi-Gang Zhou, Zhong-Tai Zhang, and Gang Zhao, all of Beijing, China, assignors to Tsinghua University, Beijing, China  
Filed Apr. 1, 1986, Ser. No. 846,630  
Claims priority, application China, Apr. 1, 1985, 85-100146  
Int. Cl.<sup>4</sup> G01N 27/12  
U.S. Cl. 324—71.5 12 Claims



1. A multifunctional ceramic sensor capable of detecting temperature, humidity and gases, said sensor comprising:  
a sensing element formed of a p-type metal-oxide porous ceramic semiconductor consisting of  $\text{Ba}(\text{Ti}_{1-x}\text{Sn}_x)\text{O}_3$  where  $0.05 < x < 0.50$ ;  
said sensing element capable of detecting temperature in accordance with the variations in the dielectric constant of the sensing element with temperature for temperatures from  $-40^\circ$  to  $150^\circ$  C., and capable of detecting humidity in accordance with the variations in the electrical resistance of the sensing element with humidity from 1 to 100% RH for temperatures less than  $150^\circ$  C.;  
said sensing element capable of detecting gases in accordance with the variations in the electrical resistance of the sensing element in the presence of gases for temperatures from  $200^\circ$  C. to  $550^\circ$  C.

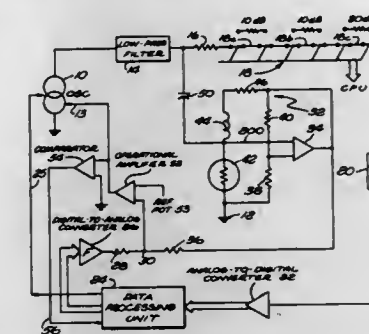
**4,794,324**  
**METHOD AND APPARATUS FOR CHARACTERIZING A BROAD SPECTRUM SIGNAL**  
Joseph F. Tracey, Owings Mills; David G. Welfenbach, Reisterstown, and Mitchell D. Turner, Baltimore, all of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.  
Filed Sep. 2, 1986, Ser. No. 902,809  
Int. Cl.<sup>4</sup> G01R 23/16  
U.S. Cl. 324—77 A 12 Claims



1. A method for analyzing the bandwidth of a broad spectrum signal, comprising the steps of:  
estimating the high frequency limit and low frequency limit of said signal;  
obtaining a first plurality of amplitude values of said signal at frequencies extending from below said estimated low frequency limit to above said estimated high frequency limit;  
determining approximate low and high frequency limits of said signal from said first plurality of amplitude values;  
obtaining a second plurality of amplitude values of said signal at frequencies extending from said approximate low frequency limit to said approximate high frequency limit;  
averaging the amplitudes of a first subset of said second plurality of amplitude values to obtain a first average signal level, and averaging the amplitudes of a second subset of said second plurality of amplitude values to obtain a second average signal level;  
determining a first true frequency limit of said signal equal to the frequency of one of said second plurality of amplitude values the amplitude of which bears a predetermined relation with said first average signal level; and  
determining a second true frequency limit of said signal equal to the frequency of one of said second plurality of amplitude values the amplitude of which bears a predetermined relationship with said second average signal level.

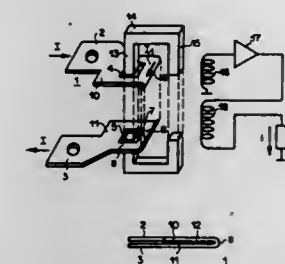
**4,794,325**  
**CALIBRATED POWER DETECTOR**  
Ralph H. Britton, Palo Alto, and Bret A. Herscher, Mountain View, both of Calif., assignors to Wavetek Corporation, San Diego, Calif.  
Filed May 29, 1985, Ser. No. 738,964  
Int. Cl.<sup>4</sup> G01R 17/06, 11/32; G01C 17/38  
U.S. Cl. 324—99 D 23 Claims  
20. A system for calibrating a voltage from a detector comprising:  
means for converting the voltage into digital signals representative of voltage,  
data processing means for processing the digital signals to provide an output dependent upon such processing,  
means for converting the output from the data processing means into an analog voltage,  
means including a bridge circuit for providing a reference voltage,  
means for combining the analog voltage from the converting

means and the reference voltage to produce a control voltage,  
means for providing a reference potential,  
means responsive to the control voltage and the reference potential to produce an error signal, and



means for introducing the error signal to the data processing means to obtain an adjustment of the data processing means in a direction for eliminating the error signal.

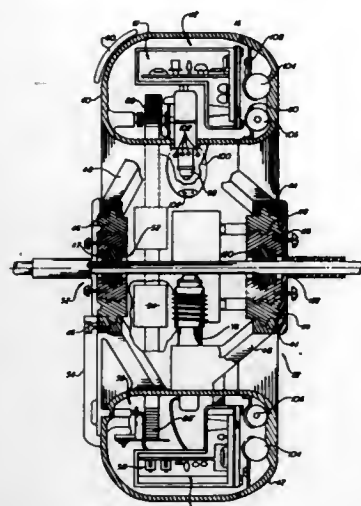
**4,794,326**  
**TRANSDUCER FOR CURRENT MEASUREMENTS**  
Richard Friedl, Brunswick, Fed. Rep. of Germany, assignor to LGZ Landis and Gyr ZUG AG, both of Zug, Switzerland  
Filed Feb. 23, 1984, Ser. No. 582,968  
Claims priority, application Switzerland, Mar. 2, 1983, 1137/83  
The portion of the term of this patent subsequent to Apr. 1, 2003, has been disclaimed.  
Int. Cl.<sup>4</sup> G01R 1/20, 15/02; H01C 7/00  
U.S. Cl. 324—117 R 19 Claims



1. A transducer for measuring a current, comprising,  
a magnetic core,  
a U-shaped electrical conductor comprising two legs connected along one end, said U-shaped electrical conductor having a longitudinal axis generally perpendicular to said one end and located in a central portion of said U-shaped electrical conductor, said two legs being in a generally confronting relationship to each other and in close thermal contact with one another, but spaced apart from each other by a thin insulation layer, each of said legs having an opening defined therein for receiving said magnetic core, said magnetic core being positioned to engage each opening in each leg; and  
each of said legs including a connecting terminal, said connecting terminals operable for providing a plurality of currents in said legs when energized by being connected to an electrical source,  
said currents including two main currents along each of said two legs generally parallel to said longitudinal axis, said main currents in each of said legs being on opposite sides of said longitudinal axis, the direction of flow of said main

currents in one leg being opposite to the direction of flow of said main currents in the other leg, said U-shaped electrical conductor including physical differences with respect to said longitudinal axis so as to produce a cross-current flowing between said main currents when said U-shaped electrical conductor is energized, said cross-current being located near said one end, whereby, an electrical source can be connected to said connecting terminals to produce currents in said legs thereby generating a magnetic flux from said cross-current which is coupled to said magnetic core.

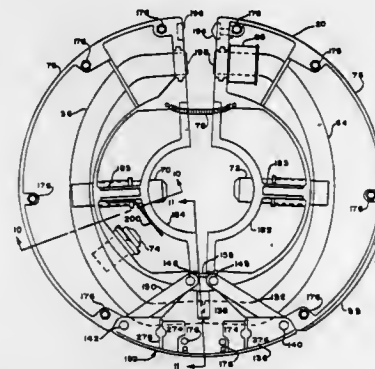
**4,794,327**  
ELECTRICAL PARAMETER SENSING MODULE FOR MOUNTING ON AND REMOVAL FROM AN ENERGIZED HIGH VOLTAGE POWER CONDUCTOR  
Roosevelt A. Fernandez, 104 Ruby Rd., Liverpool, N.Y. 13068  
Division of Ser. No. 859,496, May 5, 1986, Pat. No. 4,709,339, which is a continuation-in-part of Ser. No. 484,687, Apr. 13, 1983, Pat. No. 4,689,752, and a continuation-in-part of Ser. No. 795,226, Nov. 5, 1985, abandoned. This application May 11, 1987, Ser. No. 48,646  
Int. Cl.<sup>4</sup> G01R 19/00; G08B 21/00  
U.S. Cl. 324—126 34 Claims



1. A sensor module for measuring a plurality of parameters associated with operation of an electric power conductor, said module comprising:

- housing means having a metallic outer skin, and containing at least one electrical element responsive to the electromagnetic field associated with said conductor mounted within said housing means, said metallic skin being divided by an insulating member along at least one, complete, peripheral path to prevent an electrical short circuit loop extending entirely around said element, thereby allowing said electromagnetic field to be coupled to said element;
- means for mounting said housing upon an energized power conductor;
- means carried by said housing for sensing the value of current flow through said conductor;
- means including said metallic skin of said housing for sensing the value of the voltage on said conductor;
- means carried by said housing for determining the phase relationship between said sensed values of current and voltage; and
- means for communicating data representing the respective values of current, voltage and phase angle to a location remote from said sensor module.

**4,794,328**  
TOOL FOR MOUNTING A SENSOR MODULE ON A LIVE POWER TRANSMISSION LINE  
Roosevelt A. Fernandez, Liverpool, N.Y.; William R. Smith-Vaniz, Darien, Conn.; John E. Burbank, III, Ridgefield, Conn., and Richard L. Sieros, Fairfield, Conn., assignors to Niagara Mohawk Power Corporation, Syracuse, N.Y.  
Division of Ser. No. 484,681, Apr. 13, 1983, This application Apr. 7, 1986, Ser. No. 848,979  
Int. Cl.<sup>4</sup> G01R 1/02  
U.S. Cl. 324—127 4 Claims

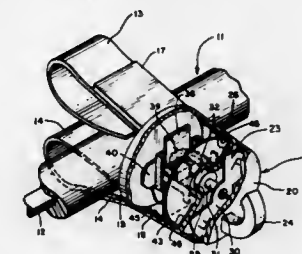


3. Apparatus for removably attaching a sensor module to a power conductor comprising:  
a module housing including an axial splined opening;  
a tool including a splined shaft for complementary engagement with said axial splined opening in said module housing; and  
said tool including a threaded member axially aligned with said shaft for complementary engagement with a threaded opening in said module housing; whereby  
said shaft, in complementary engagement with said splined opening in said module housing, is rotated in one direction to open said module to receive said conductor and said shaft is rotated in a second direction to close said module around said conductor; and whereby  
said threaded member engages said threaded opening in said module housing to attach said tool to said module when said shaft is rotated in one direction to open said module, and said threaded member is disengaged from said threaded opening to remove said tool from said module when said shaft is rotated in a second direction to close said module.

**4,794,329**  
CABLE MOUNTED CAPACITIVELY-COUPLED CIRCUIT CONDITION INDICATING DEVICE  
Edmund O. Schweitzer, Jr., 2433 Center St., Northbrook, Ill. 60060  
Filed Mar. 28, 1986, Ser. No. 845,592  
Int. Cl.<sup>4</sup> G01R 1/20, 31/02; G08B 21/00  
U.S. Cl. 324—127 5 Claims

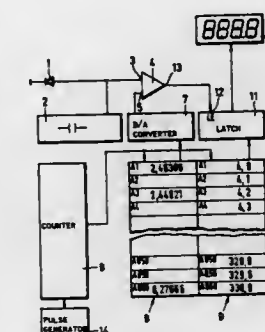
1. A circuit condition monitoring device adapted for mounting on a monitored conductor to monitor a circuit condition associated with the conductor, comprising:  
an elongated cylindrical hollow housing formed of non-electrically-conductive material;  
high impedance circuit means within said housing operable from an applied alternating current for providing an output indicative of the circuit condition;  
mounting means at one end of said housing for securing said housing in close proximity to said conductor;  
first electrostatic coupling means comprising a first electrode entirely within said housing means at said one end thereof for providing a first interior pick-up point electrically isolated from the exterior of said housing between said circuitry and the electric field surrounding said conductor;  
second electrostatic coupling means comprising a second electrode generally annular in form and entirely within

cally isolated from the exterior of said housing between said circuitry and the electric field surrounding said conductor;  
second electrostatic coupling means comprising a second electrode generally annular in form and entirely within



and concentric with said housing at the other end thereof for providing a second internal electrostatic pick-up point electrically isolated from the exterior of said housing between said circuitry and said electric field; and means for connecting said first and second electrodes to said circuit means to provide operating current thereto.

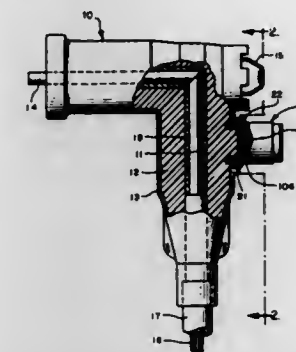
**4,794,330**  
METHOD AND CIRCUIT FOR MEASURING AND DISPLAYING PHYSICAL VALUES  
Hans-Hermann Klein, Rürath, and Zoltan Szöcs, Bonn, both of Fed. Rep. of Germany, assignors to Leybold-Heraeus GmbH, Köln, Fed. Rep. of Germany  
Filed Feb. 3, 1987, Ser. No. 10,423  
Claims priority, application European Pat. Off., Feb. 3, 1986, 86101335  
Int. Cl.<sup>4</sup> G01R 17/04  
U.S. Cl. 324—132 7 Claims



5. In a method for measuring and displaying a parameter, which method includes sensing the parameter by means of a sensor which supplies an output voltage representative of the value of the parameter, comparing the output voltage with a comparison voltage associated with the sensor response characteristic by supplying the output voltage from the sensor to a first input of a comparator and supplying the comparison voltage to a second input of the comparator, and producing a display on the basis of the result of the comparing step; the improvement wherein:  
said method further includes providing a first memory in which representations of successive comparison voltage values extending over the output voltage range of the sensor are stored in respective addressable locations, and a second memory in which representations of successive parameter values, each associated with a respective comparison voltage value, are stored in respective addressable locations;  
said step of supplying a comparison voltage includes varying

the comparison voltage by addressing the first memory to read-out the successive comparison voltage values stored in respective locations of the first memory, and applying a voltage corresponding to the respective readout comparison voltage values to the second input of the comparator; and  
said step of producing a display includes addressing the second memory to read-out and provide a succession of said parameter values in synchronism with the occurrence of the associated comparison voltage values, and displaying the parameter value which is associated with the comparison voltage value that is substantially equal to the output voltage value of the sensor.

**4,794,331**  
CIRCUIT CONDITION MONITORING SYSTEM HAVING INTEGRAL TEST POINT  
Edmund O. Schweitzer, Jr., 2433 Center St., Northbrook, Ill. 60062  
Filed Oct. 30, 1987, Ser. No. 115,166  
Int. Cl.<sup>4</sup> G01R 19/14 17 Claims



8. A circuit condition monitoring system for an electrical power distribution system providing an electrical monitoring connection between the terminals of electrical components within the distribution system, comprising:

- a connector body formed of electrically non-conductive material;
- first and second terminal means for electrically and mechanically engaging the component terminals;
- electrical conductor means extending within said body between said first and second terminal means for providing an electrical current path therebetween, said conductor means being substantially surrounded by said body;
- a sheath layer formed of an electrically-conductive material overlying the surface of said body;
- a circuit condition monitoring module including a monitoring circuit operable from a capacitive coupling to said conductor;
- means defining a channel in said sheath layer, said channel extending through said sheath layer and into said body portion and forming a closed loop dimensioned to receive said module, and whereby an interior test point portion of said sheath layer is electrically isolated from said sheath layer and capacitively coupled to said conductor means; and
- said module including an internal capacitive coupling element at one end for establishing a capacitive coupling to said test point portion and electrical coupling to said monitored conductor.



4,794,332

## FAULT INDICATOR HAVING IMPROVED TRIP INHIBIT CIRCUIT

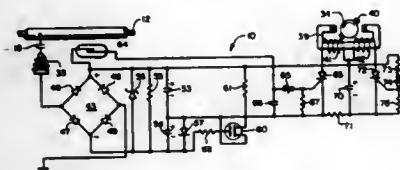
Edmund O. Schweitzer, Jr., 2433 Center St., Northbrook, Ill. 60062

Filed Mar. 28, 1986, Ser. No. 845,591

Int. Cl. G01R 19/14

U.S. Cl. 324—133

20 Claims



1. A fault indicator for indicating the occurrence of a fault current in an electrical conductor of an alternating current distribution power system, wherein the conductor is subject to inrush current levels in excess of fault current levels upon power up of the conductor, comprising:

- status indicating means having reset-indicating and fault-indicating states;
- a trip capacitor;
- trip circuit means operable from said trip capacitor for conditioning said status indicating means to said fault-indicating state in response to the occurrence of a fault current in the conductor;
- a trip inhibit capacitor;
- charge circuit means powered by alternating current in the monitored conductor for developing a charge current for charging said trip capacitor to a predetermined charge level;
- delay circuit means operable upon interruption of said charge current for establishing current flow between said trip capacitor and said trip inhibit capacitor, the terminal voltage across said trip inhibit capacitor progressively increasing with said current flow; and
- trip inhibit circuit means responsive to the voltage across said trip capacitor increasing beyond a predetermined threshold level for discharging said trip capacitor to render said trip circuit means inoperative and the fault indicator non-responsive to inrush current in the conductor.

4,794,333

## CONTINUOUS SWITCHED-CAPACITOR DUAL SLOPE WATTHOUR METER CIRCUIT WITH CHARGE INJECTION OFFSET COMPENSATION

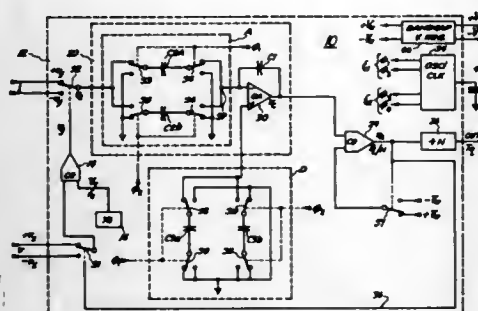
Miran Milkovic, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Feb. 4, 1987, Ser. No. 10,613

Int. Cl. G01R 21/33

U.S. Cl. 324—142

17 Claims



1. An electronic circuit for measuring energy consumption in an electrical system comprising:

- multiplying means responsive to a voltage and a current in

said electrical system for providing a first signal representative of instantaneous power in the electrical system; a switched-capacitor integrator for integrating the first signal to provide a second signal representative of average energy; said integrator comprising an amplifier, a feedback capacitor connected between an output and an input of the amplifier, and a switched input capacitor network coupled between said multiplying means and said amplifier input, said switched input capacitor network comprising an input capacitor, analog switching means for switching the input capacitor between a first position at which the input capacitor is connected between the multiplying means and the amplifier input, and a second position at which the input capacitor is disconnected from said amplifier, said network further comprising means for compensating for a transient offset error voltage at said amplifier input due to charge injection by said analog switching means;

means for converting the second signal into a train of pulses, each pulse of which represents a predetermined amount of energy consumed in said electrical system; and a second input capacitor and second analog switching means for switching said second input capacitor between a first position at which said second input capacitor is connected between the multiplying means and the amplifier input, and a second position at which said second input capacitor is disconnected from said amplifier, and means for operating each of said analog switching means such that when the first-mentioned input capacitor is in the first position, the second input capacitor is in the second position, and vice-versa.

4,794,334

## PARAMAGNETIC GAS MEASURING APPARATUS

Riad M. A. Kocache, and Danny F. Holman, both of Crowborough, England, assignors to Servomex, Ltd., Crowborough, England

PCT No. PCT/GB86/00244, § 371 Date Dec. 11, 1986, § 102(e) Date Dec. 11, 1986, PCT Pub. No. WO86/06837, PCT Pub. Date Nov. 20, 1986

PCT Filed May 7, 1986, Ser. No. 2,601

Claims priority, application United Kingdom, May 8, 1985, 8511618

Int. Cl. G01N 27/74; G01R 33/12

U.S. Cl. 324—204

16 Claims



1. Gas testing apparatus comprising a main body provided with a chamber, a hole extending from a first surface of the main body into the chamber, a test body located for movement in the chamber, means for permitting test gas to flow through said chamber, and means for applying a magnetic field to said test body in said chamber, characterized in that a front plate is provided arranged to be mechanically fixed to said first surface

4,794,336

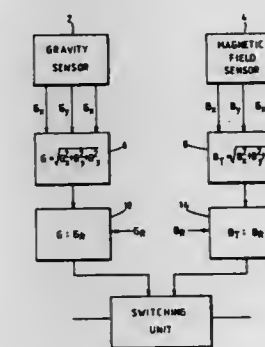
## APPARATUS FOR SURVEYING A BOREHOLE COMPRISING A MAGNETIC MEASUREMENT PROBE TO BE MOVED WITHIN A DRILL PIPE TO A MEASUREMENT POSITION WITHIN A NON-MAGNETIC COLLAR

Peter J. C. Marlow, and Kenneth S. Evans, both of Cheltenham, England, assignors to NL Sperry-Sun, Inc., Stafford, Tex.

Filed Aug. 19, 1987, Ser. No. 87,094

Claims priority, application United Kingdom, Sep. 4, 1986, 8621385

Int. Cl. G01N 27/72; G01V 3/26, 7/00; E21B 47/09 U.S. Cl. 324—221 8 Claims



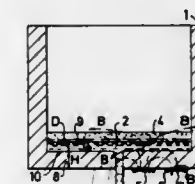
## 4,794,335 METHOD AND APPARATUS FOR MEASURING THE THICKNESS OF A METAL MELT ADJACENT THE BOTTOM OF A CONTAINER

Sten V. Linder, Trosa, Sweden, assignor to Stadsverk Energi- och Värme, Nyköping, Sweden

Filed Nov. 23, 1983, Ser. No. 554,701

Claims priority, application Sweden, Dec. 6, 1982, 8206963

Int. Cl. G01N 27/74; G01R 33/12; G01F 23/00 U.S. Cl. 324—204 6 Claims



3. An apparatus for measuring the thickness of a layer of molten metal located between a bottom portion of a container and a slag layer, the container arranged for tapping the molten metal from the container, comprising a transmitter coil arranged for being supplied by generator means for generating an alternating magnetic field having field components incident to the surface of the molten metal arranged substantially horizontal to the ground surface, a receiver coil arranged so as to detect alternating magnetic field changes caused by the slag layer moving toward the bottom portion of the container and to generate a measurement value signal corresponding thereto, and means connected to the receiver coil for evaluating the measurement value signal, wherein said generator means are arranged for energizing the transmitter coil with a predetermined frequency to provide a penetration depth into the molten metal, said penetration depth being greater than a desired thickness of a residue layer of the molten metal in the container; said transmitter and receiver coils being positioned such that when the thickness of the remaining layer of molten metal, while passing the penetration depth, approaches the desired thickness, the receiver coil detects less alternating magnetic field components reflected at the molten metal surface, as a result of the field components increasing passing through the remaining layer of molten metal, to provide an indication of the thickness of the layer of molten metal remaining in the container wherein the transmitter and receiver coils are positioned below the lower surface of the remaining layer of molten metal.

4,794,337

## METHOD AND APPARATUS FOR MAGNETIC RESONANCE ANALYSIS OF NUCLEAR DISTRIBUTION

Donald B. Twieg, Norato, Calif., assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 11, 1987, Ser. No. 13,319

Claims priority, application Fed. Rep. of Germany, Feb. 12, 1986, 3604280

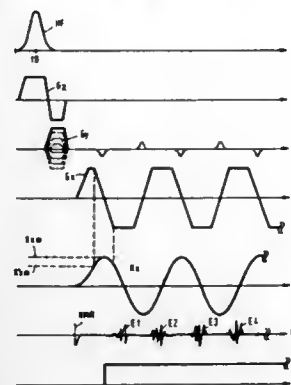
Int. Cl. G01R 33/20

U.S. Cl. 324—309

9 Claims

7. In an arrangement for carrying out a method for the determination of the spatial and of the spectral distribution of the nuclear magnetization in a region under investigation, said arrangement having a magnet for the generation of a homogeneous steady magnetic field, a high-frequency coil for the generation of high-frequency excitation pulses, gradient coils for the generation of magnetic gradient fields with gradients extending in differing directions, a control arrangement for the control of the temporal progression of the fields generated by

the gradient coils, an analog to digital converter arrangement for the generation of digital samples from echo signals, a memory for receiving the samples and a computer for carrying out a Fourier transformation with the samples, the improvement comprising the control arrangement (15) controlling at least one of the gradient coils (7) to generate a periodic magnetic field (Gx) with a temporal progression of non-quadrangular form, controlling the analog to digital converter arrangement



(65, 66) to generate digital samples during the periods of time with a non-constant gradient from the echo signals (E1, E3 . . .), store the digital samples in the memory and further comprising means (19) for converting the sequence of the digital samples into a sequence of values (F(kx, . . .)) which is equidistant in the spatial frequency range, which values are fed to the computer for the Fourier transformation from the spatial frequency range into the spatial range.

4,794,338

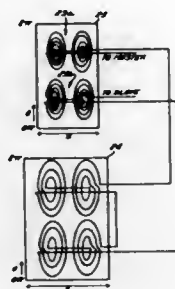
**BALANCED SELF-SHIELDED GRADIENT COILS**  
Peter B. Roemer, Schenectady, N.Y., and Kenneth M. Bradshaw, Idaho Falls, Id., assignors to General Electric Company, Milwaukee, Wis.

Filed Nov. 25, 1987, Ser. No. 125,659

Int. Cl.<sup>4</sup> G01R 33/20

U.S. Cl. 324—39

8 Claims



1. A coil set for producing a magnetic field in a magnetic resonance apparatus, comprising:  
an inner coil;  
an outer coil coaxially disposed from said inner coil, said inner and outer coils adapted to provide a predetermined magnetic field within said inner coil and a substantially zero magnetic field outside said outer coil; and  
interconnect means for electrically interconnecting said inner and outer coils such that energizing current for said coil set flows in series through a portion of one of said inner and outer coils, through at least a portion of the other of said inner and outer coils, and then through a further portion of said one coil, so that the localized po-

tential impedance of said coil set are symmetrically balanced.

4,794,339

**METHOD AND APPARATUS FOR ELECTRICALLY TESTING TELECOMMUNICATIONS CABLES**

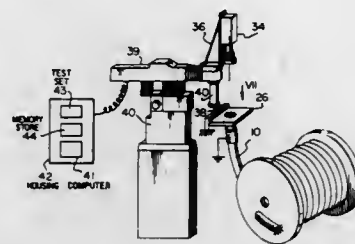
Victor L. LeNir, Montreal West; Jean-Marc Roberge, Kirkland, and Paul Valois, Oka, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Nov. 1, 1985, Ser. No. 793,944

Int. Cl.<sup>4</sup> G01R 19/00, 31/02

U.S. Cl. 324—540

4 Claims



1. A method of electrically testing conductors of a telecommunications cable having a cable core comprising a plurality of individually insulated electrical conductors in which the method comprises:

providing the core with one end which is stripped of surrounding cable material;  
separating the conductor ends from one another at said one end of the core;  
causing a flowing hardenable dielectric material to fill spaces between the separated conductors;  
hardening the material to form a solid mass in which the conductor end portions are embedded in fixed relative positions and are electrically isolated from one another, the solid mass reflecting light at a different intensity from that of the conductor ends;  
removing some of the hardened material and part of each conductor end portion to provide a planar end face of the solid mass with the electrically isolated conductor ends terminating at and exposed at said end face;  
directing light at the end face and monitoring light reflected from the end face;  
converting the monitored light into signals in which light signals from the conductor ends differ from those for the solid mass and storing the signals in a memory; and  
subsequently contacting the exposed ends of conductors to be tested with a single electrically conductive probe while moving the probe, dependent upon the stored signals, from conductor to conductor so as to contact sequentially each conductor to be tested, passing an electrical current through the probe and into any conductor which it contacts, and measuring the value of a desired electrical property as the current passes along said conductor.

4,794,340

**SYNCHROTRON-TYPE ACCELERATOR WITH ROD-SHAPED DAMPING ANTENNA**

Munehiro Ogasawara, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 1, 1987, Ser. No. 127,089

Claims priority, application Japan, Dec. 2, 1986, 61-287129

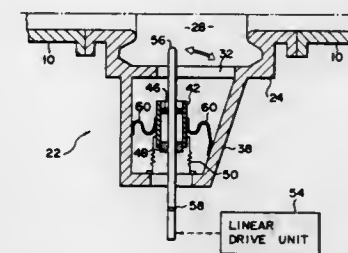
Int. Cl.<sup>4</sup> H05H 13/04

U.S. Cl. 328—235

5 Claims

1. A synchrotron-type accelerator comprising:  
orbital means comprising a beam duct defining an orbit of charged particles, that constitutes a closed loop;  
an accelerating section inserted in said beam duct and defin-

ing an accelerating cavity therein, said accelerating cavity having a predetermined path area in a plane perpendicular to the orbit of the charged particles;  
applying means for applying an RF electric field in said accelerating cavity, the RF electric field accelerating the charged particles passing said accelerating cavity so that a fundamental mode is excited in said accelerating cavity;  
a rod-shaped damping antenna, pivotally supported on a pivotal support point located outside of the accelerating cavity, one end of said damping antenna extending from the pivotal support point toward the accelerating cavity,



and another end thereof extending in a direction away from the accelerating cavity, said one end of the damping antenna being advanced into or retreated from the accelerating cavity through an opening formed in the outer wall of the accelerating cavity when the damping antenna is pivoted on the pivotal support point; and  
adjusting means for adjusting an angle over which the damping antenna is pivoted, to thereby adjust to what degree said one end of the damping antenna should be inserted into the accelerating cavity, said adjusting means including driving means, connected to said another end of damping antenna, for driving the damping antenna.

4,794,341

**DIGITAL FILTERS AND DEMODULATORS**

Stephen K. Barton, Waterbeach Cambridge, and Peter M. Terrell, Cambridgeshire, both of England, assignors to Signal Processors Limited, Cambridge, England

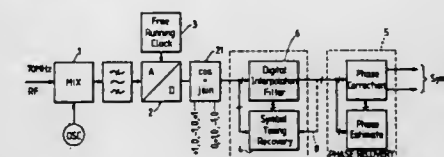
Filed Nov. 4, 1986, Ser. No. 926,529

Claims priority, application United Kingdom, Nov. 5, 1985, 8527248

Int. Cl.<sup>4</sup> H03D 3/18

U.S. Cl. 329—50

22 Claims



1. A demodulator for demodulating a phase and/or amplitude modulated signal in which symbols are represented by predetermined phases and/or amplitudes of the signal, the demodulator comprising:

means, including an analogue-to-digital converter, for sampling the modulated signal with arbitrary phase relative to the symbols and digitizing the samples to produce a digital representation of the modulated signal;  
a digital symbol timing recovery circuit responsive to said digital representation of the modulated signal for producing a signal indicative of symbol timing;  
a digital symbol timing correction circuit responsive to the symbol timing recovery circuit for correcting the symbol timing of the digital representation, the symbol timing recovery circuit being responsive to the signal at the input of the symbol timing correction circuit to derive, and feed

forward to the symbol timing correction circuit, the signal indicative of symbol timing, and digital demodulation means, responsive to the symbol time corrected digital representation of the signal to recover the phase of the carrier and demodulate the signal.

4,794,342

**INTERMEDIATE FREQUENCY AMPLIFICATION CIRCUIT CAPABLE OF DETECTING A FIELD STRENGTH WITH LOW ELECTRIC POWER**

Katsuji Kimura, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

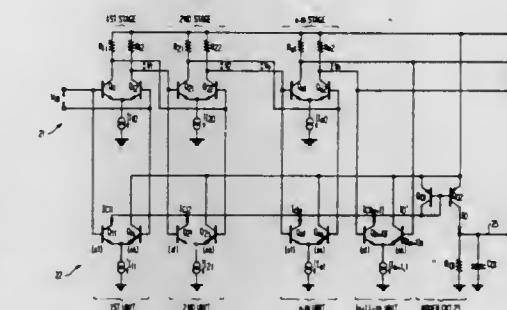
Filed Jun. 3, 1987, Ser. No. 57,145

Claims priority, application Japan, Jun. 4, 1986, 61-130802; Jun. 12, 1986, 61-137415; Jun. 16, 1986, 61-140511

Int. Cl.<sup>4</sup> H03F 3/45

U.S. Cl. 330—2

4 Claims



1. In an intermediate frequency amplification circuit operable in response to a circuit input signal to produce a circuit output signal subjected to amplification, said intermediate frequency amplification circuit comprising first through n-th differential amplifiers which have first through n-th amplifier input terminal pairs and first through n-th amplifier output terminal pairs, respectively, and which are connected in cascade from said first to said n-th differential amplifiers for successively connecting the amplifier output terminal pair of each differential amplifier to the amplifier input terminal pair of the next following differential amplifier, said circuit input signal being supplied across said first amplifier input terminal pair while said circuit output signal is produced through said n-th amplifier output terminal pair, said intermediate frequency amplification circuit further comprising a measuring circuit responsive to said circuit input signal for measuring a field strength to produce a field strength signal representative of said field strength, the improvement wherein:

said circuit measuring circuit comprises:  
first through (n+1)-th differential units which have first through (n+1)-th unit input terminal pairs, respectively, said first through n-th input terminal pairs being connected to said first through n-th amplifier input terminal pairs, respectively, while said (n+1)-th unit input terminal pair is connected to said n-th amplifier output terminal pair, and first through (n+1)-th unit output terminal pairs are supplied with first through (n+1)-th unit output signals, respectively; and  
an adder circuit connected to said first through (n+1)-th unit output terminal pairs for adding said first through (n+1)-th unit output signals to one another to produce said field strength signal;  
each of said first through (n+1)-th differential units comprising:  
a primary differential circuit of first and second primary transistors which have first and second base regions, first and second emitter regions, and first and second collector regions, respectively, said first and said second base regions of the first through n-th differential units being



connected to said first through n-th amplifier input terminal pairs, respectively, while the first and second base regions of the (n+1)-th differential unit are connected to said n-th amplifier output pair, while said first and said second emitter regions have an area ratio of 1:k where k is greater than unity, and are coupled in common to each other, said first and said second collector regions being connected to said unit output terminal pair, respectively.

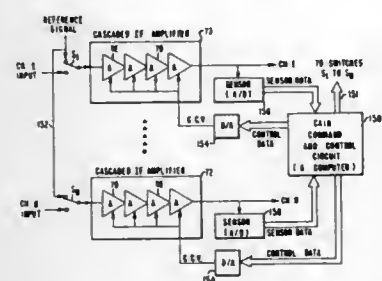
#### 4,794,343 METHOD AND APPARATUS FOR CALIBRATING AND EQUALIZING A MULTI-CHANNEL AUTOMATIC GAIN CONTROL AMPLIFIER

Steve S. Yang, Chatsworth, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 809,641, Dec. 16, 1985, abandoned. This application Oct. 31, 1986, Ser. No. 926,317  
Int. Cl.<sup>4</sup> H03F 3/68; H03G 3/00

U.S. Cl. 330—2

5 Claims



1. An improved method for automatically calibrating the gain of each channel of a multi-channel amplifier wherein each channel is gain controlled by a gain control signal applied and controlled by a computer and the gain in decibels of each channel is defined by the function

$$G = C + D \log (-V)$$

where

G is the gain of a channel being calibrated,  
V is the magnitude of the gain control signal,  
C and D are constants corresponding to a particular channel being calibrated,

said improved method comprising the implementation by computer of the steps of:

- initializing the input voltage signal to said channel;
- setting the magnitude of said gain control signal applied to an amplifier of said channel to a preselected first value;
- measuring the output signal of said channel;
- calculating a first of said constants of said channel based on said input voltage signal magnitude and the magnitude of said measured output signal;
- setting the magnitude of said gain control signal applied to said amplifier of said channel to a preselected second value;
- measuring the output signal of said channel;
- calculating a second of said constants of said channel based on said input voltage signal magnitude and the magnitude of said measured output signal; and
- adjusting the magnitude of said gain control signal applied to said amplifier of said channel such that the channel's gain, as defined by the above function, is adjusted to a desired value.

#### 4,794,344 INJECTED PHASE CONJUGATE LASER AMPLIFIER

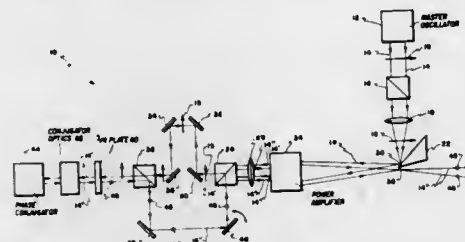
Michael M. Johnson, Westlake Village, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 1, 1986, Ser. No. 936,580

Int. Cl.<sup>4</sup> H01S 3/23, 3/30

U.S. Cl. 330—4.3

16 Claims



1. An apparatus for amplifying a laser beam, comprising: means for producing an input laser beam at an input power level;
- means for focussing said input beam at an input focal point;
- reflecting means for directing said input laser beam into a power amplifier, said power amplifier for amplifying said input laser beam to a moderate power level between said input power level and an output power level;
- phase conjugating means for redirecting the moderate power laser beam back through said power amplifier thereby amplifying said moderate power laser beam to said output power level; and
- beam separation means for separating the input laser beam from the higher power output laser beam, the output laser beam being focused at an output focal point displaced from the input focal point, the output focal point being in a vacuum; whereby, the output laser beam is produced with essentially no degradation of its spatial coherence.

#### 4,794,345 PHASED ARRAY COMBINATION OF LASER BEAMS

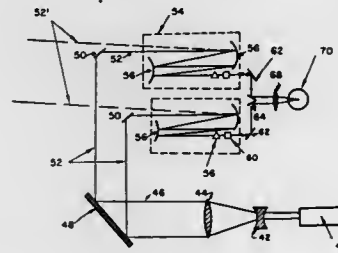
Gary J. Linford, Torrance; Robert Aprahamian, Hermosa Beach; Leonard J. Marabella, Torrance; Jesper Munch, Playa Del Rey; Richard H. Moyer, Rolling Hills Estates, and Gabriel G. Lombardi, Redondo Beach, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Feb. 26, 1986, Ser. No. 832,950

Int. Cl.<sup>4</sup> H01S 3/23, 3/30, 3/098

U.S. Cl. 330—4.3

16 Claims



1. Apparatus for producing a phased array of multiple laser beams, the apparatus comprising: a master laser oscillator for producing a reference laser beam that is coherent and diffraction-limited;
- optical means for dividing the reference beam into a plurality of probe beams;
- an equal plurality of laser amplifiers positioned to receive the respective probe beams, each including a laser gain region

and optical means to provide multiple passes through the gain region, to produce near saturation flux in the probe beams;

a single phase conjugation cell;

means for focusing the plurality of probe beams into partially overlapping focal volumes within the phase conjugation cell, whereby each probe beam is reflected from the phase conjugation cell along a path substantially identical with that of the corresponding probe beam;

discrimination means associated with each of the probe beams, for discriminating between a probe beam and the corresponding reflected beam, whereby the reflected beams emerging from the laser amplifiers are phase coherent with each other and are free of aberrations resulting from passage through the laser amplifiers and through the means for focusing the probe beams into the phase conjugation cell; and

means for coupling the reflected beams emerging from the laser amplifiers out of the apparatus, to produce a set of output beams that are laterally displaced from each other as they leave the apparatus and are dynamically locked together in phase.

#### 4,794,346 BROADBAND SEMICONDUCTOR OPTICAL AMPLIFIER STRUCTURE

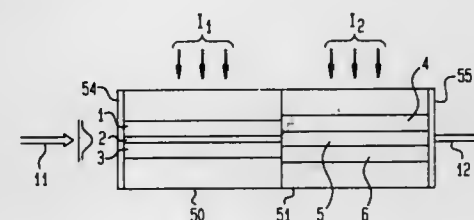
Stewart E. Miller, Middletown Township, Monmouth County, N.J., assignor to Bell Communications Research, Inc., Livingston, N.J.

Continuation-in-part of Ser. No. 937,040, Dec. 2, 1986, abandoned, which is a division of Ser. No. 673,584, Nov. 21, 1984, Pat. No. 4,680,769. This application Jan. 26, 1988, Ser. No. 148,756

Int. Cl.<sup>4</sup> H01S 3/19

U.S. Cl. 330—4.3

31 Claims



1. An amplifier for amplifying a broadband input optical signal comprising:

first and second active semiconductor regions having first and second ends, wherein the first and second active semiconductor regions are disposed against one another at the second ends thereof, the input optical signal being input at the first end of said first active semiconductor region and the amplified optical signal being output at the first end of the second active semiconductor region, and first and second means for injection pumping the first and second active semiconductor regions to produce gain over a wavelength in each, the wavelength at which the gain of the first active semiconductor region is a maximum being different than the wavelength at which the gain of the second active semiconductor region is a maximum, the wavelength regions overlapping to produce a combined gain distribution over a broader wavelength region than the wavelength regions of either the first or second active semiconductor regions alone.

#### 4,794,347 AMPLIFIER CIRCUIT HAVING CROSSOVER SWITCHING FEATURES

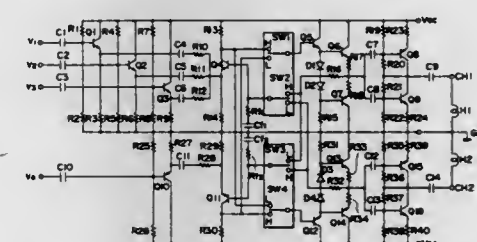
Tomotaka Muramoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed May 19, 1987, Ser. No. 51,323  
Claims priority, application Japan, May 21, 1986, 61-114912; May 21, 1986, 61-114916; May 21, 1986, 61-114917; May 21, 1986, 61-114932

Int. Cl.<sup>4</sup> H03F 1/14

U.S. Cl. 330—51

14 Claims



1. An amplifier comprising: (a) first amplifier means for amplifying a first input signal;
- (b) second amplifier means for amplifying a second input signal;
- (c) third amplifier means for amplifying a signal input therein and supplying said amplified input signal to a first load;
- (d) fourth amplifier means for amplifying a signal input therein and supplying said amplified input signal to a second load;
- (e) first switch means for supplying an output of said first amplifier means selectively to said third amplifier means and said fourth amplifier means; and
- (f) second switch means for supplying an output of said second amplifier means selectively to one of said third amplifier means and said fourth amplifier means, said second switch means operating with said first switch means.

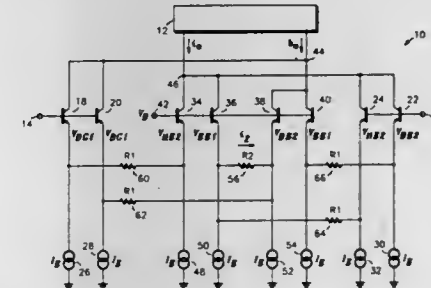
#### 4,794,348 LINEAR WIDEBAND DIFFERENTIAL AMPLIFIER AND METHOD FOR LINEARIZING THE SAME

Michael McGinn, Scottsdale, Ariz., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 15, 1988, Ser. No. 181,886  
Int. Cl.<sup>4</sup> H03F 1/32, 3/45

U.S. Cl. 330—252

6 Claims



1. An amplifier, comprising: a first differential amplifier section including first and second differentially connected transistor pairs, the bases of the first pair of transistors being coupled to a first input of the amplifier, the bases of the second pair of transistors being coupled to a terminal to which a reference potential is supplied, the collectors of the first pair of transistors and a

first one of the second pair of transistors being coupled to a first output of the amplifier and the collector of the second one of the second pair of transistors being coupled to a second output of the amplifier;

a second differential amplifier section including first and second differentially connected transistor pairs, the bases of the first pair of transistors being coupled to a second input of the amplifier, the bases of the second pair of transistors being coupled to said terminal, the collectors of the first pair of transistors and a first one of said second pair of transistors being coupled to said second output of the amplifier and the collector of the second one of said second pair of transistors being coupled to said first output of the amplifier; and

circuit means coupled between the emitters of said first transistors of said second pair of transistors respectively of said first and second differential amplifier sections for providing a signal which cancels the non-linear effects of the base-emitter junctions of said transistors of the amplifier.

#### 4,794,349 FULLY DIFFERENTIAL, CMOS OPERATIONAL POWER AMPLIFIER

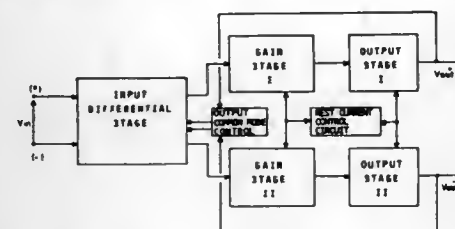
Daniel Senderowicz, Berkeley, Calif., and Germano Nicollini, Piacenza, Italy, assignors to SGS Microelettronica S.p.A., Catania, Italy

Filed Aug. 7, 1987, Ser. No. 82,608

Claims priority, application Italy, Aug. 8, 1986, 83636 A/86  
Int. Cl.<sup>4</sup> H03F 3/45

U.S. Cl. 330—253

2 Claims



1. A fully differential, CMOS, operational power amplifier, operable to produce signals at two differential output terminals in accordance with a signal applied to two differential input terminals, comprising:

- an input differential stage, having a first input node constituting one input terminal of the amplifier and a second input node constituting the other input terminal of the amplifier, operable to produce differential output signals at two pairs of differential output terminals thereof in accordance with said signal applied to said input terminals of the amplifier;
- a first and second gain stage, each having two differential input terminals respectively coupled to one of said pairs of differential output terminals of said input differential stage to produce differential output signals at a pair of respective differential output terminals;
- a first and a second complementary, common source configured output stage, each having two differential input terminals respectively coupled to one of said pairs of differential output terminals of one of said two gain stages to produce an output signal at one of said differential output terminals of the amplifier in accordance with said differential output signals of said respective one of the two gain stages;

means for controlling the DC biasing current flowing through said output stages under rest condition;

said input differential stage having duplicated differentially coupled input transistor pairs, each producing one of said output signals at the respective pair of said differential output terminals, both differentially coupled input transistor pairs sharing a common constant current source which imposes a biasing current on both differentially coupled

input transistor pairs through an intervening third differentially coupled transistor pair having a first and a second input terminal;

a switched capacitor output common mode control circuit comprising a capacitive voltage divider connected across said differential output terminals of the amplifier and having a central node directly connected to the first input terminal of said intervening third differentially coupled transistor pair of the input differential stage and through switched capacitor means to a reference voltage source, the second input terminal of said intervening third differentially coupled transistor pair being substantially connectable through switched capacitor means to the same reference voltage source;

said switched capacitor control circuit providing an output common mode feedback signal which is applied to the input stage by means of said third differentially coupled transistor pair for counterbalancing any output common mode voltage.

#### 4,794,350 CIRCUIT ARRANGEMENT FOR CONVERTING A RESISTANCE VARIATION INTO A FREQUENCY VARIATION

Dietrich Meyer-Ebrecht, Hamburg, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

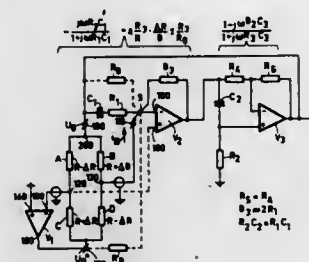
Filed Dec. 29, 1980, Ser. No. 220,931

Claims priority, application Fed. Rep. of Germany, Jan. 5, 1980, 3000291

Int. Cl.<sup>4</sup> G01R 27/02; H03B 5/20

U.S. Cl. 331—65

16 Claims



8. A variable frequency oscillator circuit for converting a resistance variation into a frequency variation comprising, a frequency control device having an input terminal and an output terminal and a variable resistance element, the gain factor F of said frequency control device being determined by the resistance of said variable resistance element, first and second phase shift networks connected in cascade in a positive feedback loop, said first phase shift network including a high pass filter and a summing amplifier connected in cascade and said second phase shift network including an all-pass filter, and means coupling said input and output terminals of the frequency control device to the first phase shift network with said input terminal of the frequency control device coupled to an input of the high pass filter.

#### 4,794,351 OPTICAL MIXER FOR UPCONVERTING OR DOWNCONVERTING AN OPTICAL SIGNAL

Thomas E. Darcie, Hazlet, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

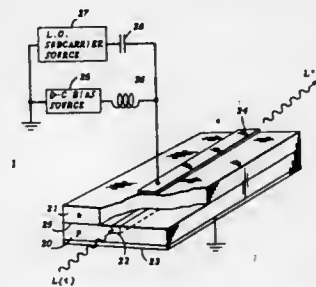
Filed Sep. 29, 1986, Ser. No. 912,802

Int. Cl.<sup>4</sup> H01S 3/10; G02F 1/36; H04B 9/00  
U.S. Cl. 332—7.51

8 Claims

1. An optical mixer comprising:  
an optical modulator including an active channel region for

receiving and propagating therealong a subcarrier modulated optical signal; and  
means for concurrently impressing a predetermined D-C



bias signal and a predetermined local oscillator signal across the optical modulator for intensity modulating the received subcarrier optical signal to produce an upconverted or downconverted optical output signal.

#### 4,794,352 HIGH POWER JUNCTION CIRCULATOR FOR HIGH FREQUENCIES

Günter Mörz, Ludwigsburg, and Wolfgang Weiser, Asbach, both of Fed. Rep. of Germany, assignors to ANT Nachrichtentechnik GmbH, Backnang, Fed. Rep. of Germany

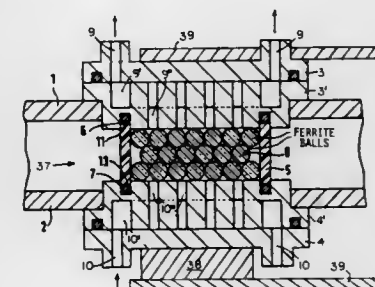
Filed Oct. 2, 1987, Ser. No. 103,728

Claims priority, application Fed. Rep. of Germany, Oct. 4, 1986, 3633910

Int. Cl.<sup>4</sup> H01P 1/387, 1/39

U.S. Cl. 333—1.1

11 Claims



1. A junction circulator having a plurality of ports for connection to microwave transmission lines, comprising:  
junction means, defining a microwave junction zone, for communicating microwaves between the ports and the microwave junction zone;  
means for generating a static magnetic field which penetrates the microwave junction zone; and  
a ferrite structure disposed in the microwave junction zone, the ferrite structure including a plurality of ferrite lumps which are stacked so that the ferrite lumps are in contact with one another, with a plurality of fluid passages extending through the stack of ferrite lumps.

#### 4,794,353 DISSIPATIVE LOW-PASS FILTER

Frédéric Broyde, St. Martin d'Heres, France, assignor to Merlin Gerin, Grenoble Cedex, France

Filed Dec. 28, 1987, Ser. No. 137,947

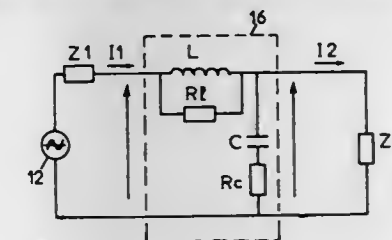
Claims priority, application France, Jan. 28, 1987, 87 01178  
Int. Cl.<sup>4</sup> H03H 7/06, 7/075

U.S. Cl. 333—167

3 Claims

1. A dissipative low-pass filter comprising a first input, a second input, a first output and a second output, the second

output being connected to said second input, said filter comprising a first branch located between said first input and said first output and formed by an inductance coil in parallel with a first resistor, and a second branch, located between said first output and said second output and formed by a capacitor in



series with a second resistor, wherein the values of the inductance coil (L), of the capacitor (C) and of the resistors (R1) and (R2) respectively in parallel with the inductance coil and in series with the capacitor being chosen whereby the minimum attenuation M of the filter, given by the relation

$$M = -10 \log_{10} \left[ 1 - \frac{2R1}{Rc} \left( \sqrt{1 + \frac{Rc}{R1}} - 1 \right) \right],$$

is fixed at a predetermined value, and whereby, for an angular frequency  $\omega_0$  above which the filter must present said minimum attenuation, we have

$$Rc >> \frac{1}{\omega_0 C} \text{ and } R1 << \omega_0 L$$

the values of L and C also defining the characteristics of the filter inside the pass band.

#### 4,794,354 APPARATUS AND METHOD FOR MODIFYING MICROWAVE

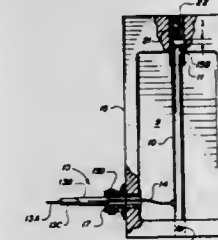
Bruce E. Dinamore, Glendale; Gary O. Larson, Phoenix, and William H. Brettner, Glendale, all of Ariz., assignors to Honeywell Incorporated, Minneapolis, Mich.

Filed Sep. 25, 1987, Ser. No. 100,958

Int. Cl.<sup>4</sup> H01P 1/205, 7/06

U.S. Cl. 333—207

13 Claims

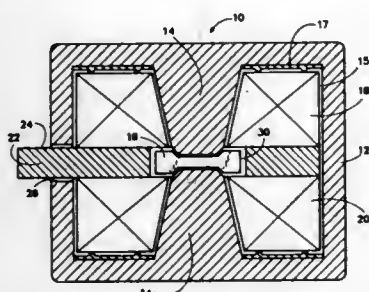


1. A resonant cavity for use at microwave frequencies, said resonant cavity comprising:  
a housing having a cavity fabricated therein;  
a conductor element having a first end attached to said housing, wherein a length of said conductor element determines a resonant frequency of said cavity;  
tuning apparatus engaging threads fabricated within a second end of said conductor element, said tuning apparatus including:



a locking insert positioned in said threads of said second end of said conductor element; and  
 a threaded rod inserted in said locking insert, said threaded rod capable of extending beyond said conductor element second end, wherein rotation of said threaded rod controls an extension of said threaded rod beyond said conductor element second end, said extension modifying said resonant frequency; and  
 activation means for applying an external signal to said conductor element.

**4,794,355**  
**HEAT SINK FOR MAGNETICALLY TUNED FILTER**  
 David L. Harris, Hillsboro, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.  
 Filed Aug. 31, 1987, Ser. No. 91,147  
 Int. Cl.<sup>4</sup> H01P 7/00, 1/217  
 U.S. Cl. 333—219 **8 Claims**

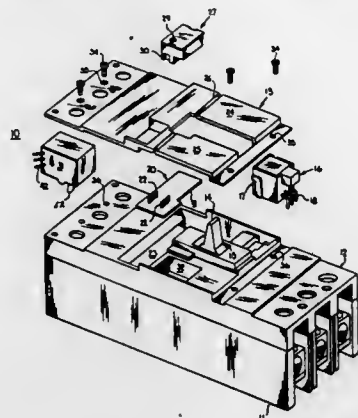


1. A heat sink for a magnetically tuned filter of the type having a magnetic housing with pole pieces extending from opposite sides toward a central location within the magnetic housing and with respective magnetic coils wound around the pole pieces, and having located between the ends of the pole pieces a filter housing containing resonant crystal spheres, comprising means surrounding the filter housing and in thermal contact with the magnetic coils for conducting heat, generated by the magnetic coils when the resonant crystal spheres are tuned to very high frequencies, to a point external of the magnetic housing so that heating of the pole pieces is minimized and thermal equilibrium is maintained within the magnetic housing.

**4,794,356**  
**MOLDED CASE CIRCUIT BREAKER AUXILIARY SWITCH UNIT**  
 Yuet-Ying Yu, Danbury; Robert A. Morris, Burlington; Paul T. Rajotte, Plainville, and Lee A. Wambolt, Colchester, all of Conn., assignors to General Electric Company, New York, N.Y.  
 Filed Dec. 16, 1987, Ser. No. 133,868  
 Int. Cl.<sup>4</sup> H02B 1/08  
 U.S. Cl. 335—13 **9 Claims**

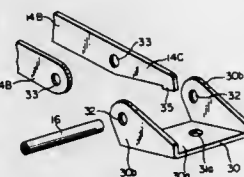
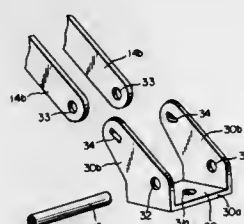
1. Molded case circuit breaker and accessory comprising:  
 a molded plastic circuit breaker cover and case, said cover defining an enclosure space;  
 a pair of separable contacts within said case having closed and open conditions;  
 a circuit breaker operating mechanism within said case and associated with said contacts and opening said contacts upon the occurrence of a current through said contacts in excess of a predetermined current;  
 electromagnetic actuator means within said circuit breaker cover enclosure space associated with said circuit breaker operating mechanism and articulating said operating mechanism to open said contacts upon the occurrence of said excess current; and  
 an accessory unit substantially within said circuit breaker cover enclosure space proximate said operating mechanism,

an operating lever on said accessory unit interacting with means on said operating mechanism and having



means providing remote indication of said closed and open conditions of said contacts.

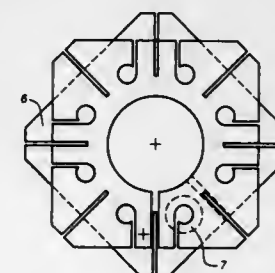
**4,794,357**  
**MULTI-POLE CIRCUIT INTERRUPTER**  
 Haruhisa Toda; Shiroo Murata, and Hiroaki Fujihisa, all of Fukuyama, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan  
 Filed Jul. 30, 1987, Ser. No. 79,460  
 Claims priority, application Japan, Aug. 4, 1986, 61-120175[U]; Aug. 4, 1986, 61-120176[U]  
 Int. Cl.<sup>4</sup> H01H 75/00  
 U.S. Cl. 335—46 **2 Claims**



1. A multi-pole circuit interrupter having a first pole unit provided with an operating mechanism and a second pole unit provided with no operating mechanism, said circuit interrupter interrupting current flowing therethrough by separating a movable contact from a stationary contact as a result of an electromagnetic repulsive force generated upon occurrence of a large overcurrent irrespective of an automatic trip operation of the operating mechanism, each of said first and second pole units comprising:  
 a base;  
 a substantially U-shaped support bracket secured to said base and having a leg portion;  
 a movable contact and a stationary contact;  
 a contact arm assembly for supporting the movable contact

of the respective pole unit including a first contact arm and a second contact arm pivotally supported by a common pivot pin;  
 said first contact arm of said contact arm assembly in said first pole unit having an elongated guide hole extending in a direction of movement of the movable contact of said contact arm assembly and being directly connected to the operating mechanism of said first pole unit;  
 said first contact arm of said contact arm assembly in said second pole unit being connected to the operating mechanism of said first pole unit through a cross bar;  
 said second contact arm of said contact arm assembly in both said first and second pole units extending longitudinally and having an elongated hole extending substantially in the longitudinal direction of said second contact arm;  
 a spring-biased sliding pin extending through the elongated hole of said second contact arm and the elongated guide hole of said first arm of said contact arm assembly; and  
 stopping means including a projection formed on an inner surface of said leg portion of said support bracket for engaging said second contact arm to prevent said second contact arm from moving beyond a predetermined position.

**4,794,358**  
**MAGNETIC FIELD COIL WITH DISC-SHAPED CONDUCTOR**  
 Dietrich Steingrover, 5060 Berg-Gladbach 1, and Erich Steingrover, Flensburger Str. 33, 5300 Bonn 1, both of Fed. Rep. of Germany  
 Filed Aug. 22, 1986, Ser. No. 899,402  
 Claims priority, application Fed. Rep. of Germany, Mar. 29, 1986, 3610690  
 Int. Cl.<sup>4</sup> H01F 5/00  
 U.S. Cl. 335—299 **20 Claims**

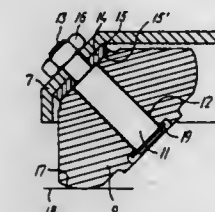


1. A magnetic field coil consisting of electrically conductive rectangular plates which have a radial slit and are spirally connected to one another in series, said plates including:  
 an inner annular region for conducting current;  
 an outer region for dissipating heat; and said plates are offset to each other around the central axis through their inner annular regions.

**4,794,359**  
**VARIABLE TRANSFORMER**  
 Ove Hansen, Bogense, Denmark, assignor to Transpower A/S, Bogense, Denmark  
 Filed Jan. 15, 1988, Ser. No. 144,146  
 Claims priority, application Denmark, Jan. 19, 1987, 268/87  
 Int. Cl.<sup>4</sup> H01F 15/06, 29/06  
 U.S. Cl. 336—61 **4 Claims**

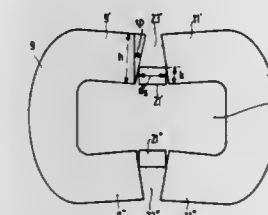
1. A variable transformer comprising an annular core with a winding, the individual turns of which formed from insulated wire in a circular area close to the circumference of the end faces of the core are adjacently arranged and in a section of the circular area are laid open at at least one end face to form a circular contact path in such a manner that a current brush which in the form of an electrically conducting contact roller

which for the purpose of being mainly punctiformly connected with the contact path is formed so as to curve at the connecting point both in the radial and the tangential direction of the contact path is mounted on a rotor capable of rotating about the axis of the core may be connected with an arbitrary turn, characterized in that the contact roller of the current brush (9) is rotatably journaled on a shaft pin (11) which from the rotor



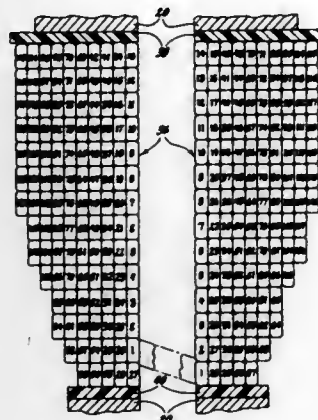
(7) located above the contact path (18) is directed obliquely downwardly towards the end surface of the core and inwardly towards the axis thereof, and that the shaft pin (11) where it is secured to the rotor (7) is provided with a contact plate (14) surrounding the pin and being in heat-conducting contact with the rotor (7) and having a plane, circular surface (15) adjacent a corresponding plane, circular surface (15') on the contact roller about a bore (12) thereof.

**4,794,360**  
**INDUCTIVE DEVICE HAVING A CORE OF AN AMORPHOUS MATERIAL**  
 Adrianus J. van Mensvoort, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.  
 Filed Sep. 3, 1987, Ser. No. 92,836  
 Claims priority, application Netherlands, Sep. 12, 1986, 8602302  
 Int. Cl.<sup>4</sup> H01F 17/06, 17/26, 41/02  
 U.S. Cl. 336—178 **4 Claims**



1. An inductive device comprising a ferromagnetic core having two approximately U-shaped core halves fastened together with their limbs facing each other so that they enclose a core window and each of which is constructed substantially from a packet of mutually parallel strips of an amorphous ferromagnetic material by cutting it from a packet of strips formed by bending and stacking or by winding a longer strip of such material, characterized in that the core comprises means for decreasing the temperature-dependency of its effective magnetic permeability, said means comprising a filling member made of a solid, non-ferromagnetic material placed between free ends of each pair of facing limbs and in a space between the ends extends from the core window in the outward direction over at most half of the width of the limbs.

**4,794,361**  
**COIL WINDING METHOD FOR MAXIMUM UTILIZATION OF WINDING ENVELOPE**  
 Carl E. Young, LaGrange, Ill., assignor to General Motors Corporation, Detroit, Mich.  
 Filed Mar. 10, 1988, Ser. No. 166,477  
 Int. Cl.<sup>4</sup> H01F 27/28, 41/06  
 U.S. Cl. 336—189

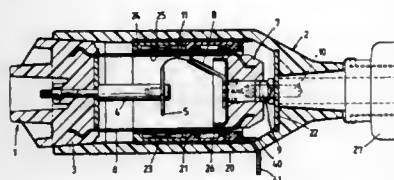


1. A method of winding a coil on a coil form, where the coil is defined by substantially concentric layers of coil turns, each such layer being defined by a plurality of coil turns placed in successive slots along the axis of the coil form, said method comprising the steps of:

- winding a plurality of coil turns using a first winding technique in which approximately one-half of the starting slot of the first layer defined by such turns is initially left vacant, and thereafter filled by a coil turn from a subsequently wound layer defined by such turns, thereby to define a first group of coil layers in which coil turn crossings that cause a bulge in the coil profile occur on a first end of the coil; and
- winding a plurality of coil turns using a second winding technique in which an entire coil turn is placed in the starting slot of the first layer defined by such turns, thereby to define a first group of coil layers in which coil turn crossings that cause a bulge in the coil profile occur on a second end of the coil opposite said first end.

**4,794,362**  
**ALTERNATING CURRENT POWER CIRCUIT AND FUSE THEREFOR**  
 Martin C. Oakes, and David W. Klaus, both of Leeds, England, assignors to Y.S. Securities Limited, West Yorkshire, England  
 Filed Jan. 11, 1988, Ser. No. 142,465  
 Claims priority, application United Kingdom, Jan. 10, 1987, 8700530

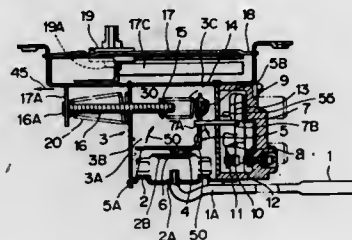
Int. Cl.<sup>4</sup> A01H 85/04  
 U.S. Cl. 337—158 10 Claims



1. A fuse for an alternating current power circuit, the fuse comprising an input terminal, a first contact electrically connected to the input terminal, an output terminal, a second contact electrically connected to the output terminal, a fusible element electrically connecting the first and second contacts

and completing a normal electrical path between the input and output terminals, and an arcing contact positioned in relation to the first contact so as to form a potential arc path between the first contact and the arcing contact, along which path an arc will become established after the fusible element breaks in response to fault current, characterized in that the arcing contact is electrically connected to a third terminal and is electrically isolated from the output terminal.

**4,794,363**  
**THERMOSTAT TYPE OPERATING TEMPERATURE SETTING APPARATUS UTILIZING CONICAL COMPRESSION SPRING**  
 Shigeru Hirata; Hideyuki Yajima, and Koichi Takahashi, all of Tokorozawa, Japan, assignors to Kabushiki Kaisha Saginomiya Selsakusho, Tokyo, Japan  
 Filed Oct. 6, 1987, Ser. No. 105,032  
 Claims priority, application Japan, Oct. 13, 1986, 61-241472  
 Int. Cl.<sup>4</sup> H01H 37/36, 37/12  
 U.S. Cl. 337—314 10 Claims

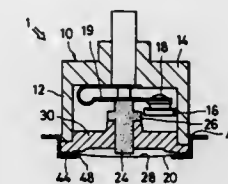
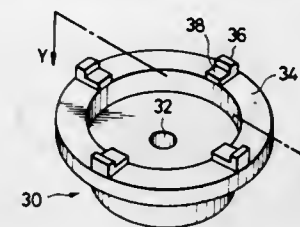


1. An operating temperature setting apparatus comprising: a frame; means for converting temperature changes into pressure variations; switching means for selectively changing bistable switching positions in response to the pressure variations of the converting means; means for adjusting the operating temperature of the converting means; first spring means including a tension spring coupled between the operating temperature adjusting means and the switching means, for biasing the adjusting means in a first direction; sliding means capable of sliding along a sliding path; cam lever means pivotably journaled to a fulcrum member fixed on the frame and connected to the adjusting means, for being slidably in touch with the sliding means; and, second spring means including a conical compression spring mounted on the adjusting means, for biasing the adjusting means in a second direction opposite to the direction of the first spring means such that the sliding means is slidable on the sliding path with substantially the same sliding force over the sliding path.

**4,794,364**  
**THERMOSTAT**  
 Yasuhiro Uehara, Kanagawa, Japan, assignor to Fuji Xerox Co., Ltd., Tokyo, Japan  
 Filed May 26, 1987, Ser. No. 53,863  
 Claims priority, application Japan, May 24, 1986, 61-118431  
 Int. Cl.<sup>4</sup> H01H 37/52  
 U.S. Cl. 337—354 5 Claims

1. A thermostat comprising: a generally circular supporting frame, said frame including a main member and a cap having a plurality of claws mounted thereon; a plurality of projections mounted on the main member, said projections being formed at positions corresponding to said claws; disc means mounted on said plurality of projections and

secured thereto by said plurality of claws so that said disc means is not in direct contact with said main member, said disc means being movable between two stable positions in response to changes in the temperature of said disc means;



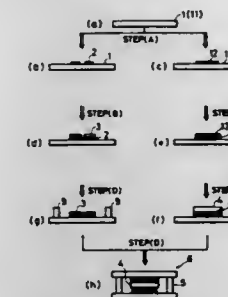
a pin slidably mounted in said frame for movement in response to movement of the disc means between the two stable positions; and electrical contact means which includes at least one movable contact responsive to slidable movement of the pin for opening and closing the contact means.

**4,794,365**  
**PRESSURE SENSOR**  
 John H. Dunbar, Swindon, England, assignor to Raychem Limited, Swindon, United Kingdom  
 Filed Oct. 2, 1986, Ser. No. 914,701  
 Claims priority, application United Kingdom, Oct. 2, 1985, 8524237  
 Int. Cl.<sup>4</sup> H01C 10/10  
 U.S. Cl. 338—99 15 Claims



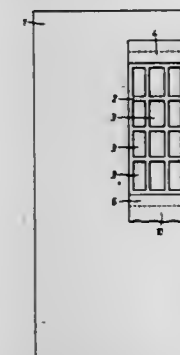
1. A pressure sensor comprising a coaxial cable having an inner electrical conductor substantially uniformly surrounded by a partially resistive layer comprising either particles in the substantial absence of a continuous solid binder, or fibres, which layer is at least partly surrounded by an outer electrical conductor, the fibres or particles comprising partially resistive material and being arranged to provide an electrical circuit between the inner and outer conductors such that when pressure is applied to the sensor and compresses the partially resistive layer between the inner and outer conductors, a resulting change in the electrical resistance of the said circuit through the partially resistive layer is detectable via said conductors.

**4,794,366**  
**KEY-TOUCH SENSOR AND METHOD OF MANUFACTURE**  
 Ryuji Sakamoto, Ohta, Japan, assignor to Toshiba Silicone Co., Ltd., Japan  
 Filed Nov. 10, 1986, Ser. No. 929,557  
 Claims priority, application Japan, Nov. 15, 1985, 60-254899; Nov. 15, 1985, 60-254900  
 Int. Cl.<sup>4</sup> H01C 10/10, 10/12  
 U.S. Cl. 338—114 13 Claims



1. A key-touch sensor comprising: an electric circuit formed on a first electrically insulating substrate and covered with a carbon electrode, an electric circuit formed on a second electrically insulating substrate, covered with a carbon electrode, said electric circuit of the second substrate opposed to said electric circuit of the first substrate across a gap; and a silicone rubber pressure-sensitive electroconductive layer deposited at least on one of said first or second substrates and disposed to fill said gap.

**4,794,367**  
**CIRCUIT ARRANGEMENT**  
 James Ashe; Nicholas Chandler, and Andrew J. Crofts, all of Essex, England, assignors to Marconi Electronic Devices Limited, Stanmore, United Kingdom  
 Filed Dec. 18, 1986, Ser. No. 943,028  
 Claims priority, application United Kingdom, Dec. 19, 1985, 8531324  
 Int. Cl.<sup>4</sup> H01C 1/012  
 U.S. Cl. 338—308 12 Claims



1. A circuit arrangement including an electrically insulating substrate having a top surface supporting a layer of an electrically resistive material in which said layer is provided with a plurality of closed apertures distributed over its surface, each closed aperture being a recess extending through the thickness of said electrically resistive material and being wholly bounded by the resistive material and extending to said top surface, said resistive material defining a first plurality of electrically parallel paths extending between two terminations and a second



plurality of electrically parallel paths which form a plurality of cross linkages between the first plurality of paths, such that said plurality of closed apertures are disposed upon said substrate as a two-dimensional array.

4,794,368

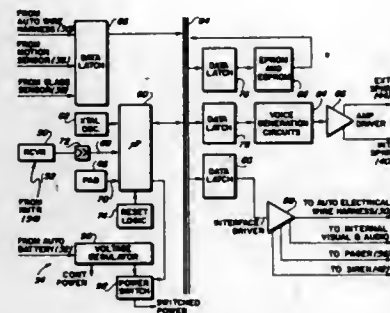
**PROGRAMMABLE AUTOMOBILE ALARM SYSTEM HAVING VOCAL ALARM AND REPORTING FEATURES**  
Edward Grossheim, Los Angeles, and Michael Nykerk, Encino, both of Calif., assignors to Electronic Security Products of California, Los Angeles, Calif.

Filed Jan. 21, 1987, Ser. No. 5,873

Int. Cl.<sup>4</sup> B60R 25/00

U.S. Cl. 340—63

22 Claims



21. A vocal alarm system for use with a vehicle having doors and windows comprising:

- sensor means for sensing a violation event made against said vehicle and for generating a latched violation signal in response to the occurrence of said violation event;
- arming means for enabling said sensor means;
- vocal alarm means for generating a vocal alarm message in response to said latched violation signal, said vocal alarm message being intended to frighten away the source of said violation event, and to attract attention to the vehicle; and
- report generating means responsive to said latched violation signal for storing a signal identifying said violation event, and for generating a vocal report, in response to a disabling of said arming means, indicating the violation event that occurred.

4,794,369

**MULTI-FUNCTION ELECTRICITY METERING TRANSDUCER**

James E. Haferd, Columbus, Ohio, assignor to Scientific Columbus, Inc., Columbus, Ohio

Continuation of Ser. No. 352,106, Feb. 25, 1982, abandoned.

This application Oct. 12, 1984, Ser. No. 660,390

Int. Cl.<sup>4</sup> H03M 1/00

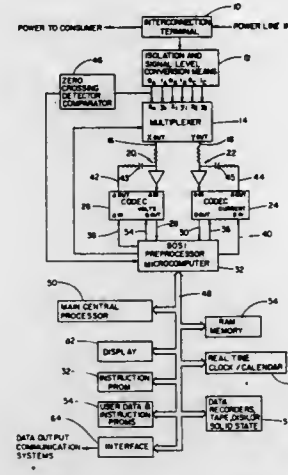
U.S. Cl. 341—166

4 Claims

1. An improved method for sampling the current and voltage signals of an electricity distribution system, converting said samples to digital form to provide a plurality of samples and machine computing selected electricity metering quantities from said samples, wherein the improvement comprises, generating a signal for controlling the sample rate by:

- (a) periodically detecting the period of said system signals as a numeric value represented by electronic signals;
- (b) dividing said numeric value of said system signal period by at least ten to obtain a first time interval; and
- (c) adding a second time interval to said first time interval to obtain a resulting numeric value, represented by electronic signals, for the period of said control signal, said

second time interval being small relative to said first time interval; and



- (d) generating a control signal for controlling the sample rate, said control signal generating a sampling period equal to said resulting numeric value.

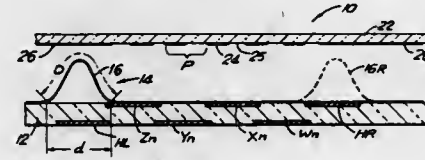
4,794,370

**PERISTALTIC ELECTROSTATIC BINARY DEVICE**  
George R. Simpson, Westport, Conn., and Herbert W. Sullivan, New York, N.Y., assignors to Bos-Knox Ltd., Tulsa, Okla.  
Continuation-in-part of Ser. No. 642,752, Aug. 21, 1984, Ser. No. 642,997, Aug. 21, 1984, Ser. No. 642,996, Aug. 21, 1984, Ser. No. 683,619, Dec. 19, 1984, Ser. No. 819,917, Jan. 16, 1986, and Ser. No. 819,918, Jan. 16, 1986. This application Apr. 23, 1986, Ser. No. 854,821

Int. Cl.<sup>4</sup> H04Q 1/00

U.S. Cl. 340—825.00

16 Claims



- 15. A reciprocable electrostatically actuated binary device comprising: a stator member, a movable member linearly reciprocable by electrostatic force, and a plurality of electrode regions arranged in a linear series, the movable member always overlying the stator member, the electrode regions providing the electrostatic force for moving the linearly moveable member.

4,794,371

**REMOTE CONTROL APPARATUS**  
Hitoshi Yamamoto, Kawasaki, Japan, assignor to Fuji Electric Company Ltd., Kanagawa, Japan

Continuation of Ser. No. 563,914, Dec. 21, 1983, abandoned.

This application Jan. 6, 1987, Ser. No. 4,281

Claims priority, application Japan, Dec. 21, 1982, 57-225468

Int. Cl.<sup>4</sup> H04Q 1/00

U.S. Cl. 340—825.64

4 Claims

- 1. A remote control apparatus comprising: pulse generating means for generating periodic bursts of pulses, each of a first predetermined duration, with said bursts being separated by silent intervals of a second predetermined duration;

4,794,372

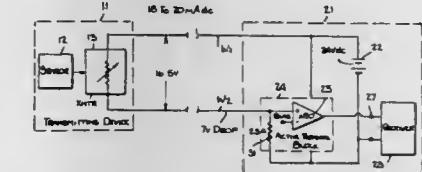
**TWO-WIRE DC SIGNAL TELEMETERING SYSTEM**  
Masahiro Kazahaya, Southampton, Pa., assignor to Fischer & Porter Co., Warminster, Pa.

Filed Aug. 24, 1987, Ser. No. 88,561

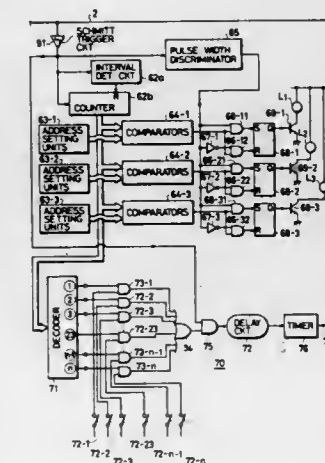
Int. Cl.<sup>4</sup> G08B 21/00

U.S. Cl. 340—870.16

5 Claims



a plurality of load stations, each of said load stations comprising at least one load, each said burst of pulses containing a number of pulses at least equal to a total number of loads among all said load stations; and  
a single signal line interconnecting said pulse generator and all said load stations;  
each of said load stations further comprising switching means for shortening said first predetermined duration of selected ones of said pulses to a third predetermined duration, means for selectively activating each load of said load station said burst, wherein each said load is activated when the corresponding pulse of said load is activated when the corresponding pulse of said burst has said third predetermined duration and deactivated when said corresponding pulse has said first predetermined duration;  
wherein said selective activating means comprises: counter means for counting the pulses of each said burst; a pulse width discriminator having an input coupled to said single signal line and producing an output in a first state in the presence of a pulse having said first predetermined duration and a second state in the presence of a pulse having said third predetermined duration; a comparator for each said load, said comparator having a first input port cou-



pled to a count output of said counter; an address setting unit for each said load, said address setting unit being set to an address for its respective load corresponding to a sequential number of a corresponding pulse of each said burst, an output of said address setting unit being applied to a second input port of the respective comparator; and gating means operating in response to said output of said pulse width discriminator and an output of said comparator for controlling the activation of the respective load;  
said gating means comprising: an RS flip-flop, a first AND gate having a first input coupled to said output of said comparator and a second input coupled to said output of said pulse width discriminator and output of said first AND gate being coupled to an S input of said flip-flop; a second AND gate having a first input coupled to said output of said comparator and an output coupled to an R input of said flip-flop; an inverter coupled between said output of said pulse width discriminator and a second input of said second AND gate; and a driver transistor having a collector-emitter circuit and base, said base being coupled to an output of said flip-flop, the respective load being coupled to said collector emitter circuit of said transistor.

1. A telemetering system for conveying over a two-wire line both a direct-current signal representing a process variable and operating power, said system comprising:

- (A) a transmitting device provided with a transmitter connected to said line, which transmitter in response to an input voltage representing a metered variable generates a corresponding direct-current signal in a direct-current signal range whose lowest value is a current  $I_0$  and whose highest value is a current  $I_{100}$ , in which current  $I_0$  at a 0% signal generated by the transmitter has a ratio to current  $I_{100}$  at a 100% signal generated by the transmitter that substantially exceeds 1/5;
- (B) a receiving station provided with a DC voltage source connected to said line through a terminal resistor whereby developed across the resistor is an output voltage corresponding to said direct-current signal, said source supplying operating power to said transmitting device through said line; and
- (C) means at said receiving station to convert said output voltage to a corrected output voltage in a range whose lowest value is a voltage  $V_0$  and whose highest value is a voltage  $V_{100}$  in which voltage  $V_0$  at said 0% signal has a ratio to voltage  $V_{100}$  at said 100% signal that equals 1/5.

4,794,373

**LIGHTING STRIP APPARATUS FOR VISUALLY GUIDING THE OCCUPANTS OF A STRUCTURE**  
John M. Harrison, Chattanooga, Tenn., assignor to Collins & Aikman Corporation, New York, N.Y.

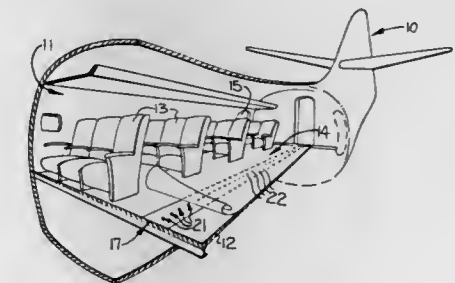
Filed Aug. 27, 1986, Ser. No. 900,826

The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.

Int. Cl.<sup>4</sup> G08B 25/00

U.S. Cl. 340—286 R

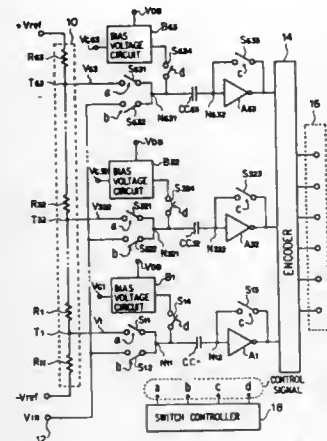
20 Claims



1. An apparatus for visually guiding the occupants of a structure in a path of travel along a floor within the structure, comprising a carpet having a fibrous face and overlying the floor, a lighting strip extending underneath said carpet and comprising an elongate ribbon of flexible plastic sheet material, a group of laterally spaced-apart electrical conductors encased

in and extending longitudinally of said ribbon of sheet material, a series of relatively small light-transmissive plastic housings connected to and arranged longitudinally in spaced relationship along a common outer surface of said ribbon of plastic sheet material, and a relatively small and singular light-emitting means within each of said housings and being electrically connected to predetermined ones of said group of electrical conductors, said carpet having relatively small holes extending therethrough and spaced inwardly from the sides of the carpet and arranged in a series corresponding to said series of light-transmissive housings, and said housings being positioned in the holes of said carpet and being completely surrounded by said fibrous face so that when the light-emitting means positioned within the housings are energized a visually discernible pathway is defined along the fibrous face of the carpet, and when the light-emitting means are not energized no pathway of lights is discernible and the light-emitting means are substantially hidden from view.

**4,794,374**  
**FLASH A/D CONVERTER**  
Yukio Koike, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan  
Filed May 4, 1987, Ser. No. 45,996  
Claims priority, application Japan, May 2, 1986, 61-102401  
Int. Cl. H03M 1/36  
U.S. Cl. 341-120



1. An A/D converter comprising:
  - a resistor ladder composed of a plurality of resistors series-connected between a first reference potential and a second reference potential different from the first reference potential so that a connection tap between each pair of adjacent resistors provides a different divided reference potential;
  - at least one first switch means connected at its one end to one connection tap of the resistor ladder and at its other end to a common connection node;
  - at least one second switch means connected at its one end to an input for an analog voltage signal and at its other end to the common connection node;
  - at least one coupling capacitor connected at its one end to the common connection node;
  - at least one amplifier having an input connected to the other end of the coupling capacitor and an output adapted to generate an output signal representative of whether the voltage of the input signal is higher or lower than a voltage appearing at the above mentioned one connection tap of the resistor ladder;
  - at least one third switch means connected between the input and the output of the amplifier;
  - a bias voltage means for generating a fixed bias voltage independent of the voltage of the analog voltage signal

and having an internal impedance smaller than that of the resistor ladder;

at least one fourth switch means connected between the bias voltage means and the common connection node so that the fixed bias voltage of the bias voltage means can be selectively applied to the common connection node without intermediary of the first and second switch means;

an encoder means connected to the output of the amplifier so as to generate a digital signal corresponding to the input analog signal; and

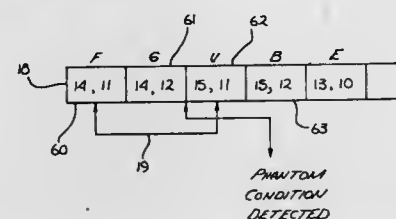
a switch controller for controlling the on-off of the first, second, third and fourth switch means in such a manner that

in a pre-calibration period the first and second switch means are opened and the third and fourth switch means are closed so that the common connection node is forcedly charged or discharged toward the fixed bias voltage of the bias voltage means at a first voltage changing rate per unit time;

in a calibration period succeeding to the pre-calibration period the second and fourth switch means are opened and the first and third switch means are closed so that the common connection node is forcedly charged or discharged to the divided reference potential at a second voltage changing rate per unit time smaller than the first voltage changing rate; and

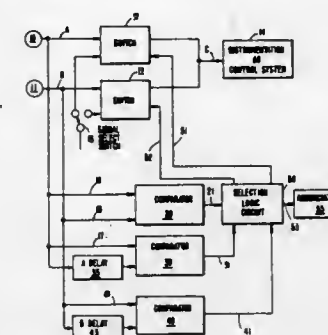
in a comparison period succeeding to the calibration period the first, third and fourth switch means are opened and only the second switch means is closed so that the analog signal voltage is supplied to the common connection node.

**4,794,375**  
**KEYBOARD CROSSPOINT ENCODER HAVING PSEUDO-N-KEY ROLLOVER**  
Lyle E. Morris, San Ramon, and Choo-Kee Bo, Cupertino, both of Calif., assignors to Apple Computer, Inc., Cupertino, Calif.  
Filed Apr. 13, 1987, Ser. No. 37,866  
Int. Cl. H04L 3/00  
U.S. Cl. 340-365 E



1. In a crosspoint encoder device, an improved method for the detection and solution of phantom key problems comprising the steps of:
    - (a) scanning rows and columns of an encoder matrix to determine a status of each switch in said matrix;
    - (b) creating a keystroke event buffer to store successive changes in said crosspoint switch status by storing said changes sequentially in order of occurrence;
    - (c) analyzing accumulated data in said event buffer for an existence of a phantom condition;
    - (d) halting the reporting of data to an object device when said phantom condition is detected;
    - (e) continuing to record incoming data and retaining such data in said event buffer until said phantom condition no longer exists;
    - (f) reporting a corrected data stream in an order recorded to said object device when said phantom condition ceases to exist;
- whereby actual switch changes are presented correctly in the order of their occurrence.

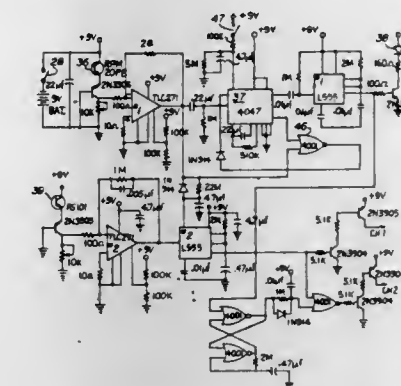
**4,794,376**  
**AUTOMATIC SIGNAL EVALUATION AND TRANSFER**  
Alva B. Lloyd, Jr., and Kenneth Schroeder, both of Lynchburg, Va., assignors to The Babcock & Wilcox Company, New Orleans, La.  
Filed Jan. 28, 1988, Ser. No. 149,347  
Int. Cl. G08B 29/00  
U.S. Cl. 340-508



1. In a process measurement system of the type having a process data source and first and second signal generator means each operatively connected to the data source for generating first and second redundant signals, respectively, of the same process data, a first input channel connected to the first signal generator means, a second input channel connected to the second signal generator means, one output channel, and switch means operatively connected between the two input channels and one output channel for selectively connecting one of the input channels to the output channel, an improved system for detecting signal faults among the redundant signals comprising:
  - (a) a first comparator, means for transmitting the first and second redundant signals to the first comparator from the data source, the first comparator including means for comparing the first and second redundant signals for detecting whether the redundant signals fall within a predetermined first acceptance band and generating a first fault signal when at least one of the redundant signals falls outside of the first acceptance band, and selection logic means connected to said first comparator for generating an indicating signal responsive to the first fault signal;
  - (b) a second comparator connected directly to the first redundant signal transmitting means, a first delay means operatively interconnected between the first redundant signal transmitting means and the second comparator for generating a delayed first redundant signal, the second comparator including means for comparing the first redundant signal and the delayed first redundant signal for detecting whether the first redundant signal and delayed first redundant signal fall within a second predetermined acceptance band and generating a second fault signal when at least one of the first redundant signal and delayed first redundant signal falls outside of the second acceptance band, the selection logic means being operatively connected to the second comparator and including means for generating a first signal switching signal responsive to said second fault signal; and
  - (c) a third comparator connected directly to the second redundant signal transmitting means, a second delay means operatively interconnected between the second redundant signal transmitting means and the third comparator for generating a delayed second redundant signal, the third comparator including means for comparing the second redundant signal and the delayed second redundant signal for detecting whether the second redundant signal and the delayed second redundant signal fall within a predetermined third acceptance band and generating a third fault signal when at least one of the second redundant

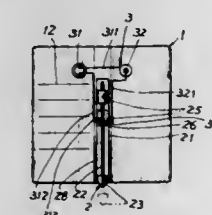
signal and the delayed second redundant signal falls outside of the third acceptance band, the selection logic means being operatively connected to the third comparator and including means for generating a second signal switching signal responsive to the third fault signal.

**4,794,377**  
**MAIL SIGNAL SYSTEM**  
Alexander Benages, 1585 Lakeview Dr., Hillsborough, Calif. 94010  
Filed May 14, 1986, Ser. No. 863,057  
Int. Cl. G08B 21/00  
U.S. Cl. 340-569



1. A remote incoming signal system comprising a mailbox having a top, bottom and an open end, a door for closing off said open end, a reflective optical sensor positioned below said top having a photodiode transmitter directed at said bottom and a photodiode receiver to receive the reflected signal of said photodiode transmitter whereby presence of mail in said box effects the transmission between the photodiode transmitter and photodiode receiver and triggers an r.f. transmitter, an r.f. receiver remote from said r.f. transmitter tuned to said r.f. transmitter, a "mail in" signal energized by said r.f. receiver, discriminating means in said mailbox including a photodiode discriminator energized by light received upon opening said door, and a timer connected to said photodiode discriminator emitting a pulse to said photodiode transmitter a fixed time after said door is opened and then closed to trigger said r.f. transmitter.

**4,794,378**  
**GRAVITATIONALLY-ACTUATING MISSING REMINDER FOR POCKET ARTICLE**  
Sheng-Chuan Chen, and Wen-Tsung Lin, both of P.O. Box 30-443, Taipei, Taiwan  
Filed Dec. 23, 1987, Ser. No. 137,328  
Int. Cl. G08B 13/14  
U.S. Cl. 340-571



1. A missing reminder for pocket article comprising: a wallet normally stored in a user's pocket having two leaves



foldable upon each other and having bags therein for storing credit cards or valuable documents;  
 a gravitational actuator including an outer tube clamped on a central folding portion intermediate between the two leaves of said wallet, an inner tube having a lower plug formed on a lower end of said inner tube movably sliding within the outer tube, a weight disk mounted on an upper portion of said inner tube, a contactor receiver made of insulating material retained on a central portion inside said outer tube having a central through hole formed therein slidably engageable with said inner tube, a top cap formed on a top end of said outer tube and a sliding pipe jacketing on said outer tube and slidably moving said lower plug of said inner tube within said pipe, said pipes having a lower opening edge coinciding with a bottom edge of said wallet; and

an alarming means having a buzzer and a battery stored in said outer tube, said buzzer having one electric terminal electrically connecting a right wire having a right contact formed on said contactor receiver and having the other electric terminal of said buzzer electrically connecting said battery and a left wire having a left contact formed on said receiver opposite to said right contact;  
 said weight disk, normally suspending above said receiver when said lower plug being raised upwardly as retained by a user's pocket, having an electrically conductive plate formed on a bottom surface of said weight disk and gravitationally descending to seat on said contactor receiver to close two said contacts of said buzzer for sounding said buzzer when upwardly removing said wallet from a user's pocket.

4,794,379

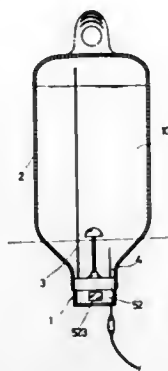
#### AUTOMATIC ALARM DEVICE FOR DRIPPING INJECTION FLUID BOTTLE

Kuo-Hsien Wang, Keelung, Taiwan, assignor to Tech Zeal Industrial Company Ltd., Taiwan

Filed Feb. 3, 1987, Ser. No. 10,405  
 Int. Cl.<sup>4</sup> G08B 21/00

U.S. Cl. 340—624

6 Claims



1. An alarm for an intravenous liquid injection bottle: said alarm having a casing and means for sealing said casing in a bottle;  
 means for permitting fluid from the bottle to flow through said casing;  
 a buoyant member supported on said casing in the bottle projecting above said casing and disposed in the path of fluid flow;  
 an end member in said casing and attached to said buoyant member to move with said buoyant member; said buoyant member moving in one direction with respect to said casing in response to the fluid level in said casing and moving said end member correspondingly;  
 a compression spring between said end member and said casing for moving said end member and said buoyant

member counter to the buoyant motion thereof which responds to fluid level;  
 a switch in said casing positioned for being engaged by said end member when said end member is moved by said compression spring which occurs when the fluid in said casing approaches exhaustion and declines below the level of said buoyant member; upon being engaged, said switch being movable to a switch closed position;  
 a power source and an alarm in said casing in circuit with said switch for being connected together for activating said alarm when said switch is in said closed position.

4,794,380

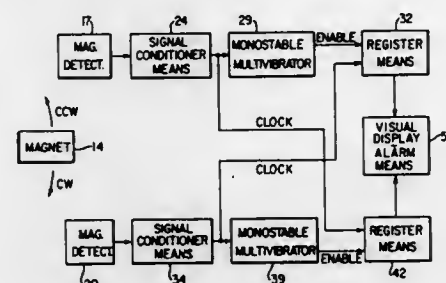
#### MEANS AND METHOD FOR DETERMINING THE ROTATION DIRECTION OF AN OIL WELL PUMPING UNIT CRANK ARM

Jack A. Dennison, Waller, and Richard S. Simpson, Houston, both of Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Jul. 21, 1987, Ser. No. 78,301  
 Int. Cl.<sup>4</sup> G08B 21/00

U.S. Cl. 340—672

4 Claims



1. Apparatus which detects the rotation of an oil well pumping unit crank arm comprising:  
 sensing means including:  
 a magnet, and  
 two magnetic sensing means, each magnetic sensing means being means for sensing relative movement between the magnet and the magnetic sensing means and providing a signal corresponding thereto; and  
 alarm means connected to both magnetic sensing means for providing an alarm in accordance with the signal from both magnetic means when the rotation of the crank arm is in one direction and for not providing an alarm when the rotation of the crank arm is in an opposite direction; the alarm means includes:  
 a pair of signal conditioning means, each signal conditioning means being connected to a corresponding magnetic sensing means for providing a conditioned signal in accordance with the signal from the magnetic sensing means,  
 a pair of monostable multivibrators, each monostable multivibrator being connected to a corresponding signal conditioning means and providing pulse output in accordance with the conditioned signal from the signal conditioning means,  
 a pair of register means, each register means being connected to a corresponding monostable multivibrator and to the signal condition means not connected to the corresponding monostable multivibrator for entering the conditioned signal from the signal condition means when the rotation of the crank arm is in one direction and for providing a signal of one level in accordance with an entered signal and of another level if the conditioned signal is not entered, and  
 alarm device means connected to both register means for providing an alarm when the rotation is in the one direction and for not providing an alarm when the rotation is in

the other direction in accordance with the signals from both register means.

4,794,381

#### ELECTRONIC APPARATUS

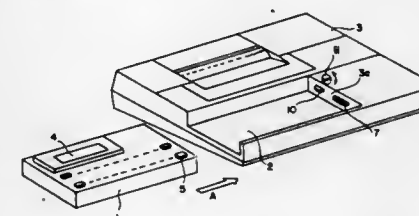
Masahiro Iwai, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Sep. 2, 1986, Ser. No. 904,711

Claims priority, application Japan, Sep. 9, 1985, 60-139069[U]  
 Int. Cl.<sup>4</sup> G05G 1/00

U.S. Cl. 340—700

3 Claims



1. An electronic apparatus comprising a computer main body including a display portion and keyboard portion, an external output unit comprising a printer integrally coupled with said computer main body such that an electrical connection is made between said main body and external output unit by said coupling, a control knob for controlling a function on said computer main body disposed on a side of said computer main body where said computer main body is joined to said printer output unit, an adjustment knob provided on an outside surface of said printer output unit so that it is accessible when said main body and output unit are coupled to each other, operable for causing said control knob to operate in conjunction therewith, and transmission means for transmitting an operating force applied to said adjustment knob to said control knob of said main body when coupled with said output unit, whereby control of said computer main body is accomplished by manipulation of the adjustment knob of said printer output unit when said computer main body and printer output unit are coupled.

4,794,382

#### IMAGE RETOUCHING

Ching T. Lai, and David J. MacKenzie, both of Herts., England, assignors to Croesfield Electronics Limited, London, England

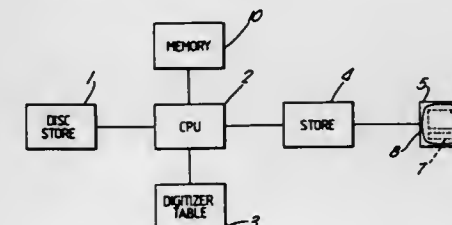
Filed Aug. 23, 1985, Ser. No. 768,607

Claims priority, application United Kingdom, Sep. 3, 1984, 8422209

Int. Cl.<sup>4</sup> G09G 1/16

U.S. Cl. 340—703

12 Claims



1. A method of selecting a tint for modifying colour printing data representing part or all of an image displayed on a monitor screen, the method comprising displaying on said monitor screen part or all of an image to be modified, and during said displaying step displaying on said monitor screen, in a region different from that of said image to be modified, a first range of colours, adjacent colours within said first range differing from each other by more than a predetermined amount, selecting

one of said displayed colours; displaying on said monitor screen, in a region different from that of said image to be modified, a second range of colours wherein said selected colour is in a middle portion of said second range, adjacent colours of said second range differing from each other by less than said predetermined amount; and selecting one of said second range of colours to constitute said selected tint.

4,794,383

#### VARIABLE COLOR DIGITAL MULTIMETER

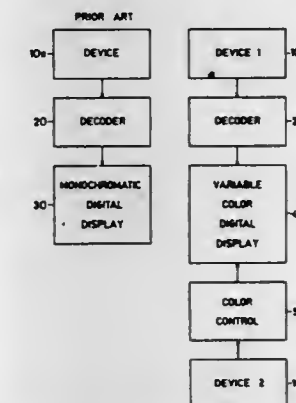
Karel Havel, P.O. Box 66, Station M, Toronto, Ontario, Canada M6S 4T2

Filed Jan. 15, 1986, Ser. No. 819,111

Int. Cl.<sup>4</sup> G01R 13/02; G09G 3/16

U.S. Cl. 340—704

10 Claims



1. The method of simultaneously indicating RMS values and crest factor values of a measured waveform, on a single variable color digital display means, by causing said RMS values to be indicated on said variable color digital display means in a digital format, and by controlling the color of said variable color digital display means in accordance with said crest factor values.

4,794,384

#### OPTICAL TRANSLATOR DEVICE

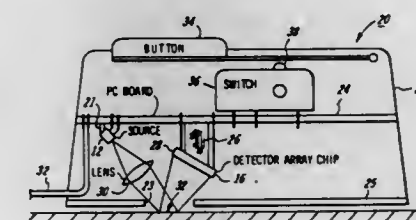
Stephen B. Jackson, La Honda, Calif., assignor to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 655,138, Sep. 27, 1984, abandoned. This application Apr. 9, 1987, Ser. No. 37,094

Int. Cl.<sup>4</sup> G09G 3/02

U.S. Cl. 340—710

15 Claims



1. In an optical translator device that does not require a specific repetitive reflective pattern for operation and capable of providing information indicative of the amount and direction of relative movement between said device and an unpatterned surface having natural surface irregularities positioned relative thereto and comprising a light source having a sufficient degree of coherent radiation to provide a speckle pattern relative to said surface, said source directed toward an area of said surface wherein a portion of the light is reflected from said

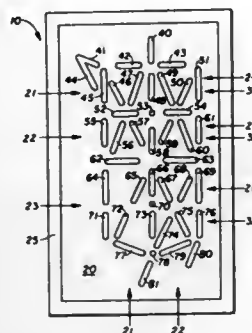
1. Display system having attribute commands for modifying appearances of displayed data by attributes comprising:
  - a. stacking means comprising a plurality of stack memories for storing a plurality of attribute strings, each attribute string including one byte which includes at least one command signal and at least one attribute mask;
  - b. means for evaluating each attribute string responsive to a load signal and means for controlling the stack of said attribute strings in said stacking means; and,
  - c. command means connected to said level setting means for reading said command signal of each attribute string and means responsive to said command signal for moving each of said attribute strings through levels in said stacking means and means for setting levels of priority of said attribute strings in said stacking means whereby each of



said command signal precede each of said levels of said attribute strings.

**4,794,390**  
**ALPHANUMERIC DISPLAY MEANS**  
 Jeffrey H. Lippman, 263 Camino Norte, Chico, Calif. 95926  
 Filed Mar. 10, 1986, Ser. No. 842,420  
 Int. Cl.<sup>4</sup> G09G 3/04  
 U.S. Cl. 340—756

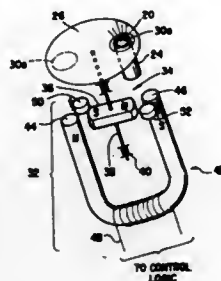
11 Claims



1. An alphanumeric display system for displaying the Russian and English languages comprising in combination; an array of 42 electrically energizable elements, which elements are arranged in a generally vertically oriented rectangular array with appendages thereto, said array consisting of six generally rectangular zones arranged in two equal vertical columns of said zones, said array's six zones each having spaced horizontal and spaced vertical boundary elements, and said array's six zones each having at least one linear, angularly disposed element within each zone, said array being energizable in selected combinations to form all of the numerals, letters and other symbols of said languages.

**4,794,391**  
**DISPLAY MATRIX INCORPORATING LIGHT-CONDUCTING FIBERS AND LIGHT-OCCLUDING SHUTTERS**  
 Richard Costa, Paris; Michel Batt, Tours, and Roland Gassmann, Saone, all of France, assignors to Securite et Signalisation, Tours Cedex, France  
 Continuation-in-part of Ser. No. 547,380, Oct. 31, 1983. This application Oct. 24, 1986, Ser. No. 922,959  
 Int. Cl.<sup>4</sup> G08B 5/00  
 U.S. Cl. 340—815.31

8 Claims



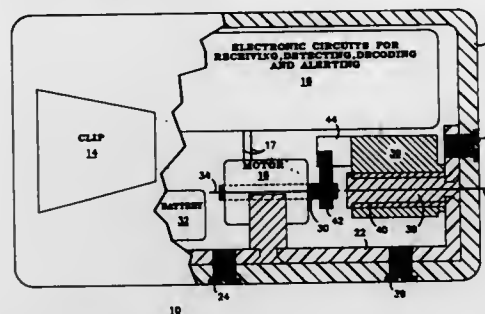
1. In a display matrix wherein a display is selectively formed by elements of the matrix, each matrix element being formed by the downstream ends of a plurality of optical fibers whose upstream ends are adapted to receive light from a light source, electromechanical occulting means interposed in the path of light between said downstream end of said optical fibers and

the front of said matrix and capable of modifying the properties of the light emitted to the front of the matrix in which said optical fibers are associated individually or in very small assemblies with said electromechanical occulting means, and means controlling said occulting means to selectively control the occulting of said associated optical fibers to form the desired display on the front of the matrix, the improvement comprising:

- said occulting means comprising a disc disposed in front of said downstream ends of said fibers and rotatable about an axis perpendicular to the surface of said disc, said disc incorporating multiple light modifying sectors capable of being interposed in said path of light as a function of rotation controlled by said control means, said disc being rotated by a rotary motor means having two positions of equilibrium;
- said motor means having a rotor rotating freely on a rotor axis and comprised of a small permanent magnet with two poles oriented radially with respect to said rotor axis, and a stator made of a material with good magnetic remanence and high magnetic permeability forming a circuit magnetizable by an electrical pulse and presenting two poles diametrically opposite with respect to said rotor axis; and means adapted to initiate rotation of said rotor at the moment of an electrical pulse energizing said stator, by misaligning said rotor poles relative to said stator poles when said rotor has stopped rotating and said stator is no longer energized by an electrical pulse, said means to misalign comprising said stator having a smooth, continuous inner peripheral surface disposed eccentrically with respect to said rotor and having portions diverging away from said rotor axis, the portions of said stator surface located closest to said rotor axis being locations of minimum magnetic reluctance causing said rotor to stop in a misaligned orientation relative to the stator residual magnetic lines of flux when said stator is no longer being energized by an electrical pulse.

**4,794,392**  
**VIBRATOR ALERT DEVICE FOR A COMMUNICATION RECEIVER**  
 George J. Selanko, Lighthouse Point, Fla., assignor to Motorola, Inc., Schaumburg, Ill.  
 Filed Feb. 20, 1987, Ser. No. 17,283  
 Int. Cl.<sup>4</sup> G08B 5/22; F16H 33/10  
 U.S. Cl. 340—825.460

21 Claims

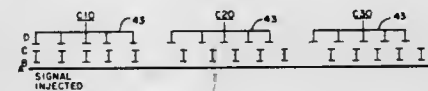


1. An alert device for vibrating a portable communication receiver being enclosed in a housing, the communication receiver having a decoding means for generating an alert signal in response to detecting received information, said alerting device comprising:
  - a rotational motive means for rotating a shaft about a first axis of rotation, the motive means being responsive to the alerting signal for converting electrical energy to mechanical energy to drive the shaft;

an eccentric weight capable of being rotated about a second axis of rotation to generate tactile vibration in the housing; support means coupled to the housing for fixing said eccentric weight onto the housing during rotation of said eccentric weight and transmitting vibrating motion generated by the eccentric weight to the housing; and linking means coupling the shaft to said eccentric weight for transmitting rotational movement from the shaft to the eccentric weight while preventing translational movement from being transmitted between the eccentric weight and shaft, the linking means further providing for the transmission of rotational movement when the first axis of rotation is offset from the second axis of rotation.

**4,794,393**  
**DEVICE FOR MEASURING PARAMETERS ON ELECTROCARDIOGRAM STRIP RECORDINGS**  
 Mir A. Imran, 2707 Louis St., Palo Alto, Calif. 94303  
 Continuation of Ser. No. 899,541, Aug. 22, 1986, abandoned.  
 This application Apr. 5, 1988, Ser. No. 180,593  
 Int. Cl.<sup>4</sup> G08C 19/10  
 U.S. Cl. 340—870.37

12 Claims

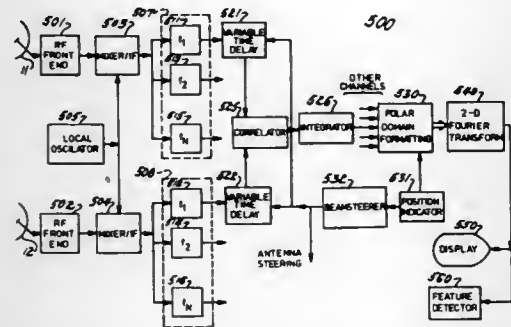


- (a) at least one emergency-sound-emitting device, which at least one emergency-sound-emitting device is alternately turned on and off as the output from said astable multivibrator switches between said first and second logic levels; and
- (b) at least one lamp, which at least one lamp alternately flashes on and off in unison with said emergency-sound-emitting device being turned on and off as the output from said astable multivibrator switches between said first and second logic levels.

**4,794,395**  
**PASSIVE INTERFEROMETRIC IMAGING RECEIVER SYSTEM**  
 Ivan Chadrich, Plymouth; Walter G. Carrara, Ann Arbor; Ivan J. LaHale, Dexter, and Anthony M. Tai, Plymouth, all of Mich., assignors to Environmental Research Institute of Mich., Ann Arbor, Mich.

Filed Apr. 17, 1987, Ser. No. 40,442  
 Int. Cl.<sup>4</sup> G01S 5/02, 13/00  
 U.S. Cl. 342-424

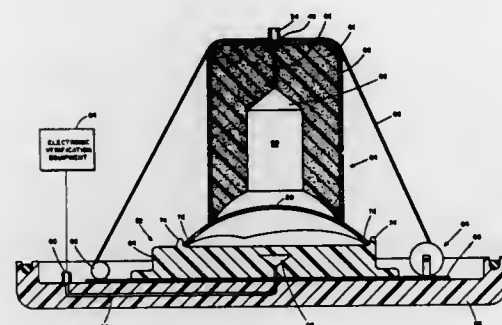
30 Claims



1. A passive interferometric imaging receiver comprising:
- a pair of sensors disposed on a moving platform along a baseline substantially parallel to the motion of the moving platform, separated by a distance  $d$ , each for receiving electromagnetic radiation from an area of interest and generating a received signal proportional to the amplitude and phase of said received electromagnetic radiation;
  - a pair of filtering means, each filtering means receiving said received signal from a corresponding one of said sensors, each filtering means for generating a plurality of filtered signals corresponding to the portion of said received signal of said corresponding sensor within a set of predetermined narrow bandwidths;
  - a plurality of correlation means, each correlation means receiving one of said filtered signals from each of said filtering means for a selected one of said narrow bandwidths, each correlation means for generating a correlation signal representing the correlation of said received signals from said pair of sensors over an interval of time  $T$  within said selected narrow bandwidth;
  - a position indicating means for detecting and indicating the position of the moving platform relative to the area of interest; and
  - a Fourier imaging means connected to said plurality of correlation means and said position indicating means for generating a Fourier transform of said correlation signals over the intervals of time  $T$  at positions indicated by said position indicating means thereby forming an image of the area of interest.

**4,794,396**  
**ANTENNA COUPLER VERIFICATION DEVICE AND METHOD**  
 Robert G. Pothier, Amherst, N.H., assignor to Sanders Associates, Inc., Nashua, N.H.

Filed Apr. 5, 1985, Ser. No. 720,445  
 Int. Cl.<sup>4</sup> H01Q 1/52  
 U.S. Cl. 343-703 55 Claims

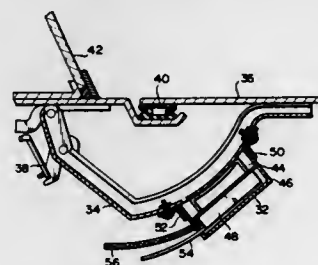


47. Apparatus for axial alignment of any of a plurality of antenna couplers, comprising:
- a first member;
  - a first antenna connected to said first member and having a first axis;
  - a first plurality of members connected to and extending from said first member and arranged in a first arrangement about said first axis to contact respective portions of a first antenna coupler of a first configuration; and
  - a second plurality of members connected to and extending from said first member and arranged in a second arrangement, smaller than said first arrangement, about said first axis to contact respective portions of a second antenna coupler of a second configuration.

**4,794,397**  
**AUTOMOBILE ANTENNA**  
 Junzo Ohe, and Hiroshi Kondo, both of Aichi, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan  
 Filed Oct. 11, 1985, Ser. No. 786,865  
 Claims priority, application Japan, Oct. 13, 1984, 59-214972  
 Int. Cl.<sup>4</sup> H01Q 1/32

U.S. Cl. 343-712

3 Claims



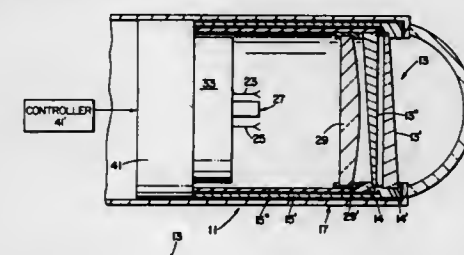
1. An automobile antenna system comprising:
- a casing having an opening at one side and a portion of said casing being electrostatically shielded;
  - high-frequency pickup means housed in said casing with a part thereof arranged at a position facing the opening of said casing, for detecting high-frequency surface currents induced on the automobile body by broadcast waves and outputting a signal in response to the detection of the high-frequency surface currents; and
  - mounting means for mounting said casing to a trunk hinge of the automobile body where the high-frequency surface

currents concentratedly flow such that said high-frequency pickup means faces the trunk hinge through the opening in said casing.

**4,794,398**  
**MULTIMODE, MULTISPECTRAL SCANNING AND DETECTION**  
 Peter E. Raber, Milford, and Lester H. Kosowsky, Stamford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Oct. 1, 1986, Ser. No. 913,890  
 Int. Cl.<sup>4</sup> H01Q 19/06, 15/08  
 U.S. Cl. 343-754

5 Claims

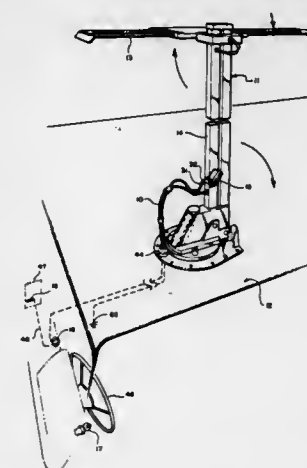


1. A multi frequency electromagnetic detection system comprising: electromagnetic transceiver means responsive to electromagnetic radiation in a radar frequency range about a frequency  $f_1$  and an optical frequency range about a frequency  $f_2$ ; and scanning means including cooperative first and second rotatable scanning prisms, characterized in that each of said scanning prisms comprises at least first and second subprisms each constructed of a material, having frequency-dependent indices of refraction  $n_a(f)$  and  $n_b(f)$ , respectively and having prism angles  $\alpha_a$  and  $\alpha_b$ , respectively, with the indices of refraction related by the condition that  $n_a(f_1) = n_b(f_1)$  and the condition that  $n_a(f_2) < n_b(f_2) < n_a(f_1)$ , and the prism angles having values such that the deviation of electromagnetic radiation passing through said scanning means is the same for frequencies substantially equal to  $f_1$  or  $f_2$ .

**4,794,399**  
**RETRACTION ALARM FOR EXTERIOR TELEVISION ANTENNA OR RV ANTENNA**  
 Ed Sensibaugh, P.O. Box 1084, Dayton, Nev. 89403  
 Filed Aug. 4, 1986, Ser. No. 892,372  
 Int. Cl.<sup>4</sup> H01Q 3/00

U.S. Cl. 343-760

4 Claims



1. A retraction alarm device for use with an exterior horizontally and vertically movable roof-mounted television antenna which is mounted in projecting orientation with respect

to a recreational vehicle such as a motor home; said alarm comprising:

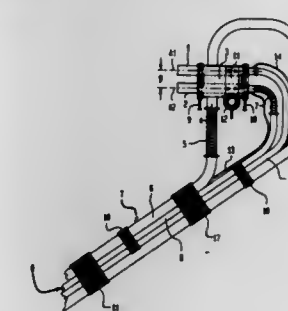
- a mercury leveling switch means of a tubular construction including position indicating means capable of signalling the occurrence of a condition for the exterior antenna wherein the antenna has been at least partially extended toward the projecting position, thereby increasing the vulnerability of the antenna to possible impact with foreign objects, as contrasted with an opposing condition wherein the antenna has been retracted to a safe position proximate to the vehicle, thereby being partially shielded from impact with foreign objects;
- attachment means connected to the switch means and being operable to position the switch means with respect to the antenna to enable detection of the stated condition;
- alarm means electrically coupled to the switch means and being operable to position the switch means with respect to the antenna to generate an alarm for giving notice to a driver of the vehicle; and
- power source attachment means for attachment between the switch means and a voltage source.

**4,794,400**  
**ANGULAR-DIVERSITY RADIATING SYSTEM FOR TROPOSPHERIC-SCATTER RADIO LINKS**  
 Carlo Campora, Genoa, and Elio Deponti, Vaprio D'Adda, both of Italy, assignors to GTE Telecomunicazioni, S.p.A., Milan, Italy

Filed Sep. 21, 1987, Ser. No. 99,365  
 Claims priority, application Italy, Sep. 22, 1986, 21777 A/86  
 Int. Cl.<sup>4</sup> H01Q 3/12

U.S. Cl. 343-761

8 Claims



1. An angular-diversity radiating system comprising:
- an antenna reflector;
  - a first and a second antenna horn having a longitudinal symmetry, attached to said reflector such that their longitudinal symmetry axes are parallel to each other and to the optical axis of said antenna reflector and such that the centers of their radiating apertures are near the focus of said antenna reflector;
  - a first, a second, a third and a fourth rectangular cross-section wave guides; and
  - means for adjusting the distance between said first and said second antenna horn allowing the optimization of the diversity angle of the radiating system;
  - wherein said first and second antenna horns consist of a first part having a constant cross-section connected to a second part having a continuously varying cross-section;
  - wherein said second parts of said antenna horns terminate with a rectangular aperture perpendicular to said longitudinal symmetry axis;
  - wherein said second and fourth wave guides are respectively connected to said rectangular apertures of said antenna horns;
  - wherein said first and third wave guides are respectively connected to said first parts of said first and second an-



tenna horns in such a way the longer dimension of said rectangular section of said wave guides is parallel to the respective longitudinal symmetry axes of said antenna horns; and wherein said first and third wave guides are perpendicular to said second and fourth wave guides.

4,794,401

**ROTATION MECHANISM FOR A WAVEGUIDE FEEDER**  
Shigami Murashima, Tokyo, Japan, assignor to NEC Corporation, Japan

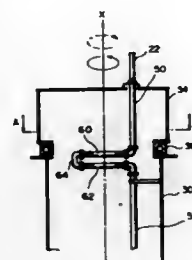
Filed Nov. 20, 1986, Ser. No. 933,023

Claims priority, application Japan, Nov. 30, 1985, 183635/85[U]

Int. Cl.<sup>4</sup> H01Q 3/12

U.S. Cl. 343—761

4 Claims



1. A rotation mechanism for a waveguide feeder installed in a satellite tracking antenna system which includes an antenna and an antenna rotating section which includes a rotary yoke for rotating said antenna about a predetermined axis and a stationary yoke, said rotation mechanism comprising:

- a first waveguide feeder fixed to said rotary yoke in parallel to said axis of rotation;
- a second waveguide feeder fixed to said stationary yoke in parallel to said axis of rotation;
- a first flexible waveguide connected to that end of said first waveguide feeder which adjoins said second waveguide feeder, said first flexible waveguide extending perpendicular to said first waveguide feeder;
- a second flexible waveguide connected to that end of said second waveguide feeder which adjoins said first waveguide feeder, said second flexible waveguide extending perpendicular to said second waveguide feeder; and
- a coupling waveguide coupling the other end of said first flexible waveguide and the other end of said second flexible waveguide to each other.

4,794,402

**ANTENNA FOR ANIMAL TRAINING RECEIVER UNIT MOUNTED BENEATH COLLAR**

Gerald J. Gonda, and Gregory J. Parkas, both of Tucson, Ariz., assignors to Tri-Tronics, Inc., Tucson, Ariz.

Filed Nov. 26, 1986, Ser. No. 935,515

Int. Cl.<sup>4</sup> H01Q 1/36; H05C 1/04

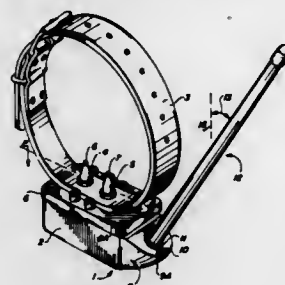
U.S. Cl. 343—895

10 Claims

1. An electronic training apparatus comprising in combination:

- (a) a collar adapted to be placed around an animal's neck;
- (b) a receiver unit attached to a lower portion of the collar;
- (c) a pair of electrodes attached to an inner surface of the lower portion of the collar and operatively coupled to the receiver unit and conducting electrical stimulus from the receiver unit to the neck of the animal;
- (d) means designed for providing a solution to problems of extending signal reception range of the receiver unit, and antenna damage and distraction of the animal caused by antenna contact with external objects as the animal moves through brush, under fences, etc., comprising:
  - i. a helically wound antenna having a conductive base, an

elongated lower section including a helical, elastic first conductor having a first number of turns, a lower end of the first conductor being rigidly attached to and electrically connected to the conductive base, and an elongated upper section including a helical second conductor having a second number of turns, a lower end of the second conductor being electrically connected to an upper end of the first conductor,



- ii. a rigid antenna support base attached to one side of the receiver unit and extending outwardly therefrom, the antenna support base having an upper surface and antenna connecting means for rigidly, and electrically connecting the conductive base to the antenna support base, the helically wound antenna extending along side of the animal's neck in close predetermined spaced relationship thereto; and
- (e) means for coupling the antenna connecting means to an input of the receiver unit.

4,794,403

**WRITING SYSTEM**

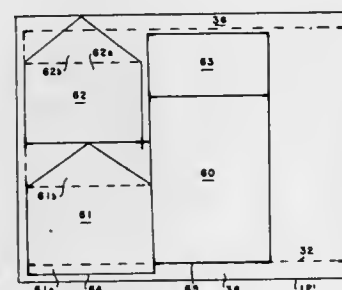
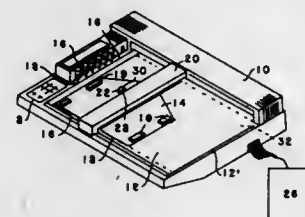
Jonathan D. Sieber, and Joseph S. Sieber, both of 31 Granville Rd., Cambridge, Mass. 02138

Filed Apr. 7, 1987, Ser. No. 35,448

Int. Cl.<sup>4</sup> G01D 9/00, 15/24; G06F 15/626

U.S. Cl. 346—33 R

16 Claims



- 1. In a writing system including a writing bed, a pen or other writing means attached to the bed for movement relative thereto for writing on an item supported on said bed, and a

computer or other processor for controlling movement of the pen or other writing means relative to the bed, that improvement comprising:

- first means responsive to data representative of the height and width of said item for determining a preferred location of said item on said bed, and
- second means for causing said pen or other writing means to draw on said bed a plurality of positioning marks which indicate the proper location of a plurality of edge portions of said item when said item is in said preferred location.

4,794,404

**THERMAL TRANSFER PRINTER**

Mikio Shiraishi, Yokohama; Toshiko Gotoh, Tokyo; Koutarou Tanno, Kamakura, and Kentaro Hamma, Yokohama, all of Japan, assignors to Hitachi Ltd. and Hitachi Video Engineering, Incorporated, both of Tokyo, Japan

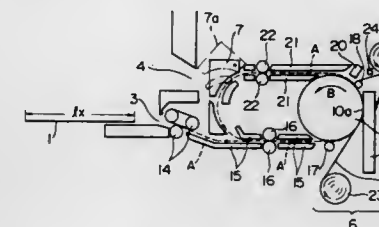
Filed Dec. 3, 1986, Ser. No. 937,570

Claims priority, application Japan, Dec. 5, 1985, 60-272666

Int. Cl.<sup>4</sup> G01D 15/10; B41J 3/20; B65H 39/10; G03G 15/00

U.S. Cl. 346—76 PH

11 Claims



1. A thermal transfer printing apparatus comprising printing means and ink donor sheet feeding means for feeding an ink donor sheet coated with inks of a plurality of color tones to said printing means, to print an image on a recording sheet by transfer printing, wherein said printing means comprises:

- a heat generating member for generating heat when an electric current is passed thereto; and
- a platen roller against which the recording sheet is urged by said heat generating member through said ink donor sheet fed by said ink donor sheet feeding means, said thermal transfer printing apparatus comprising:

recording sheet conveyor means for conveying the recording sheet to said printing means, said recording sheet conveyor means including:

- (a) sheet feeding passageway forming means for forming a sheet feeding passageway into which the recording sheet is fed;
- (b) sheet conveying passageway forming means comprising (1) recording sheet guide means for regulating the direction in which the recording sheet is conveyed, and (2) recording sheet conveying means for conveying the recording sheet, said recording sheet guide means and said recording sheet conveying means cooperating with each other to constitute a recording sheet conveying passageway in loop form which remains closed while one sheet is being printed for conveying the recording sheet therealong, said printing means being provided in a part of said recording sheet conveying passageway;
- (c) sheet ejection passageway forming means for forming a sheet ejection passageway through which the recording sheet is ejected out of the apparatus;
- (d) sheet ejection means disposed in a part of said recording sheet conveying passageway, said recording paper being led from said conveying passageway to said sheet ejection passageway upon completion of printing a number of times corresponding to the number of colors of ink on the ink sheet, and
- (e) recording sheet tip detecting means disposed in a part of said conveying passageway in said loop form and adapted to detect a tip of said recording sheet, wherein said recording sheet is conveyed through said convey-

ing passageway in said loop form said number of times corresponding to said number of colors of ink of said ink sheet, and said printing means supplies to said heat generating member a recording signal corresponding to each of said colors upon receipt of a signal from said recording sheet tip detecting means.

4,794,405

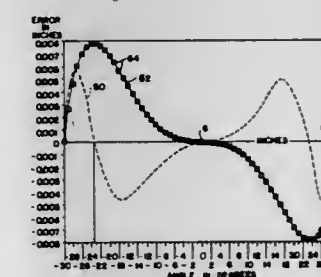
**CIRCUIT FOR MODULATING A SCANNING BEAM IN A TEXT AND GRAPHICS IMAGE SETTING APPARATUS**  
John A. Kennedy, Jr., Ridge, N.Y., assignor to Dr.-Ing. Rudolf Hell GmbH, Kiel, Fed. Rep. of Germany

Filed Sep. 22, 1986, Ser. No. 909,873

Int. Cl.<sup>4</sup> G01D 9/42

U.S. Cl. 366—108

11 Claims



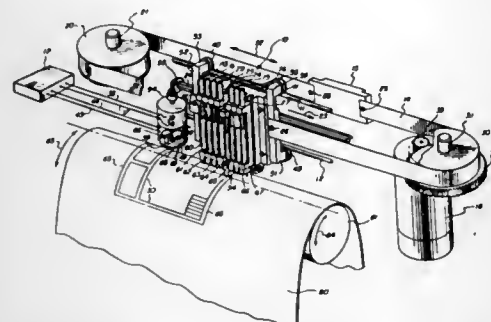
1. An image setting apparatus for producing a two-dimensional image on photosensitive material, said apparatus comprising, in combination:

- (a) means for transporting said photosensitive material past an imaging line to provide a first dimension of said two-dimensional image on said photosensitive material, said imaging line extending in a direction perpendicular to the direction of transport of said photosensitive material;
- (b) a controllable source of electromagnetic radiation ("EMR") for producing a modulated EMR beam;
- (c) means for converting said EMR beam into a scanning beam;
- (d) scan lens means located in the path of said scanning beam such that a focused beam spot moves repeatedly in a linear direction across said photosensitive material on said imaging line to provide the other dimension of said two-dimensional image on said photosensitive material; and
- (e) means for controlling said EMR source to switch said EMR beam on and off in accordance with the two-dimensional image to be produced;

the improvement wherein said source controlling means comprises means for producing a stable video clock signal and means for selectively removing pulses from said video clock signal to produce an average clock rate that makes a linear approximation of the curve of accumulated error between the actual position of said beam spot and its desired position, assuming constant speed, along said imaging line, thereby to substantially compensate for

variations in the scanning speed of said beam spot along said imaging line.

**4,794,406**  
**PEN LIFTING AND LOWERING POSITIONER FOR GRAPHIC RECORDER**  
 Robert H. Niemeyer III, Martinez, Calif., assignor to AM International Corporation, Chicago, Ill.  
 Filed Jul. 20, 1987, Ser. No. 75,430  
 Int. Cl.<sup>4</sup> G01D 15/16; G06F 15/626  
 U.S. Cl. 346-139 R



1. In a graphic recorder having a recording pen and motor drive means for moving said recording pen to and from contact with recording media and servo control means producing a following error signal operative upon the motor drive means to control pen carriage motion, automatic pen positioning means for establishing a pen to media contact reference point comprising:

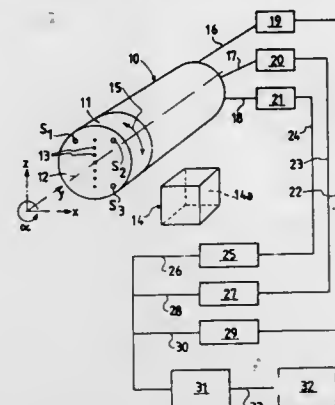
means initiating pen motion toward the media causing said recording pen to contact the media and be obstructed from further movement thereby;  
 sensing means coupled to said servo control means detecting the response of said following error signal of said servo control means to the pen motion obstruction created; and  
 reference means coupled to said sensing means establishing a pen to media contact reference point when said obstruction is sensed.

**4,794,407**  
**RECORDING DEVICE HAVING ROTATABLE MATRIX UNIT AND SENSOR MEANS FOR DETECTING RELATIVE MOVEMENT DIRECTION, RELATIVE SPEED AND ROTATION ANGLE OF MATRIX COLUMN**  
 Jiri Vozasek, Kungälv, Sweden, assignor to Markpoint System AB, Gothenburg, Sweden  
 Filed Nov. 12, 1987, Ser. No. 119,509  
 Claims priority, application Sweden, Nov. 12, 1986, 8604836  
 Int. Cl.<sup>4</sup> G01D 15/16

U.S. Cl. 346-139 R

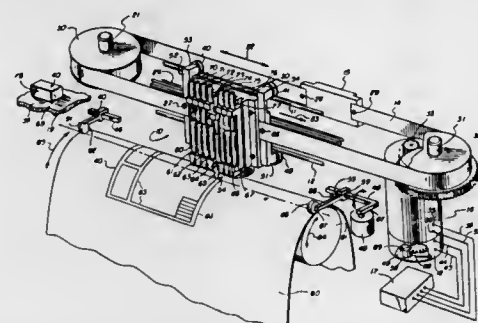
1. In a device for recording information in the form of characters or symbols onto an information carrier (14), the device including a recording device of the matrix type, means for providing a relative movement between the recording device and the information carrier, means for supporting the recording device rotatably around an axis (12) generally perpendicular to the direction of relative movement between the recording device and the information carrier, and means for activating the matrix for information recording in the movement direction dependent on the angle between a matrix column of the recording device and the movement direction, the improvement comprising a sensor arrangement rotatable with the recording device around said axis and having means for detect-

ing the parameters of relative movement direction, relative speed and said angle, and a signal processing unit for control-



ling the character recording in a predetermined manner dependent on said detected parameters.

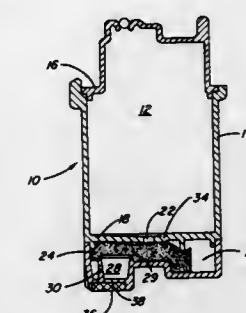
**4,794,408**  
**FOLLOWING ERROR LIMIT SYSTEM FOR GRAPHIC RECORDER**  
 Robert H. Niemeyer, III, Martinez, Calif., assignor to AM International Corporation, Chicago, Ill.  
 Filed Jul. 20, 1987, Ser. No. 75,531  
 Int. Cl.<sup>4</sup> G01D 15/16; G06F 15/626  
 U.S. Cl. 346-139 R



1. In a graphic recorder having motor drive means for moving a pen carriage back and forth along a carriage path characterized by a system degree of flexibility and servo control means characterized by a following error signal and operative upon the motor drive means to control pen carriage motion, limit means for establishing a carriage travel reference point comprising:

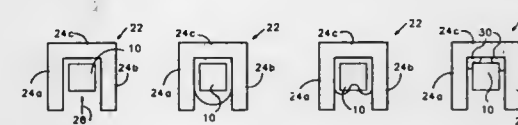
means obstructing carriage motion at a predetermined point;  
 sensing means coupled to said servo control means detecting the response of the following error of said servo control means to the carriage obstruction and establishing a predetermined maximum following error related to said system degree of flexibility;  
 reference means coupled to said sensing means establishing a carriage travel reference point when said following error exceeds said predetermined maximum following error.

**4,794,409**  
**INK JET PEN HAVING IMPROVED INK STORAGE AND DISTRIBUTION CAPABILITIES**  
 Bruce Cowger, and Robert Beeson, both of Corvallis, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.  
 Filed Dec. 3, 1987, Ser. No. 129,030  
 Int. Cl.<sup>4</sup> G01D 15/16  
 U.S. Cl. 346-140 R



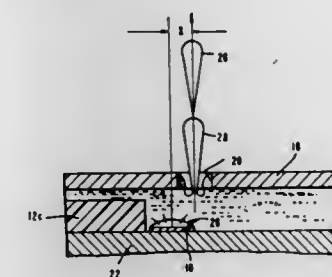
1. An ink jet pen comprising:  
 a. a pen body housing having a primary ink reservoir section, a secondary ink reservoir section and printhead support section, with said sections being adjacent to one another, and a passageway interconnecting all of said sections for passing ink from said primary ink reservoir section to both said secondary ink reservoir section and said printhead support section,  
 b. a porous member mounted between said passageway and both said printhead support section and said secondary ink reservoir section for passing ink thereto during an ink jet printing operation and for passing ink back and forth between said primary and secondary reservoirs and through said porous member during changes in temperature and pressure within said pen, and  
 c. a printhead member mounted on said printhead support section for receiving ink from said porous member during ink jet printing.

**4,794,410**  
**BARRIER STRUCTURE FOR THERMAL INK-JET PRINTHEADS**  
 Howard H. Taub, San Jose, Calif., and Gordon D. Denler, Monmouth, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.  
 Filed Jun. 2, 1987, Ser. No. 57,573  
 Int. Cl.<sup>4</sup> G01D 15/18  
 U.S. Cl. 346-140 R



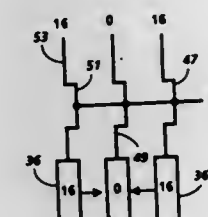
1. A thermal ink-jet printhead including at least one resistor for firing droplets of ink normal to the plane of said resistor toward a medium, characterized by a three-sided barrier structure having three walls and encompassing said resistor to provide an open side for replenishing of ink from a reservoir, each said wall of said barrier structure spaced from said barrier, said spacing being less than about 25  $\mu$ m from an edge of said resistor.

**4,794,411**  
**THERMAL INK-JET HEAD STRUCTURE WITH ORIFICE OFFSET FROM RESISTOR**  
 Howard H. Taub, San Jose, Calif., and Gordon D. Denler, Monmouth, Oreg., assignors to Hewlett-Packard Company, Palo Alto, Calif.  
 Filed Oct. 19, 1987, Ser. No. 109,685  
 Int. Cl.<sup>4</sup> G01D 15/18  
 U.S. Cl. 346-140 R



1. A thermal ink-jet printhead for ink-jet printing onto a print medium including a controlled resistor (10) supported on a substrate (22) in cooperative association with an orifice (20) in an orifice plate (18) maintained substantially parallel above said resistor, said resistor provided on three sides with a barrier structure (12a-c) and open on a fourth side to a reservoir of ink (14), wherein the center-line of said orifice is off-set from the center-line of said resistor along said fourth side by an amount ranging from about 1 to 25  $\mu$ m to maintain droplets (26, 28) of ink ejected therefrom by a trajectory less than about 0.5° from the normal to said orifice plate.

**4,794,412**  
**VERTICAL LINE WIDTH CONTROL IONOGRAPHIC SYSTEM**  
 Brendan C. Casey, Webster, and William L. Gary, Lyons, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.  
 Filed May 16, 1988, Ser. No. 194,238  
 Int. Cl.<sup>4</sup> G01D 15/00  
 U.S. Cl. 346-154



1. An ion projection device for providing latent images on an image bearing member including:  
 an ion generator,  
 an inlet channel and an outlet channel connected to the ion generator,  
 a source of transport fluid in communication with the inlet channel for delivering transport fluid to move ions through the outlet channel, the outlet channel being located near the image bearing member,  
 modulation means located adjacent the outlet channel for controlling the passage of ions therethrough to the image bearing member, the modulation means comprising a plurality of spaced, individually controllable modulation electrodes for neutralizing selected ions in the outlet chan-



nel and allowing selected ions to pass to the image bearing member representing a desired charge pattern, and a switch electrically connected to each of the modulation electrodes, each driver responding to a data voltage and a strobe voltage to selectively control the modulation electrode wherein the improvement comprises that the data voltage conveyed to each of the switches is less than the strobe voltage conveyed and each of the switches.

4,794,413

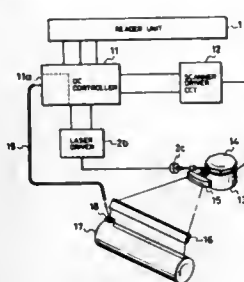
## IMAGE RECORDING APPARATUS

Koji Yamazaki, Ebina; Shigenori Ueda, Yokosuka; Toshiyuki Ehara, Yokohama, and Yutaka Udagawa, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Aug. 17, 1987, Ser. No. 85,862  
Claims priority, application Japan, Aug. 20, 1986, 61-192751; Nov. 19, 1986, 61-275565

Int. Cl. G01D 15/00

U.S. Cl. 346-160

11 Claims



1. An image recording apparatus comprising: recording means for recording an image on a recording medium; output means for outputting data representing the characteristics of the recording medium at each position thereon; and control means for controlling an operating condition of said recording means at each position on the recording medium in accordance with the data output from said output means at each position on the recording medium.

4,794,414

## UNIVERSAL CAMERA ACTUATOR BRACKET

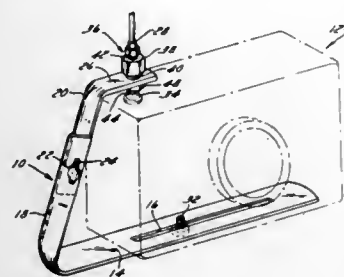
Daniel P. Kozian, 819 Monroe Ave., South Milwaukee, Wis. 53172, and Kenneth P. Pagel, 4964 S. Bartel, Greenfield, Wis. 53220

Filed Nov. 4, 1987, Ser. No. 116,644

Int. Cl. G03B 17/38

U.S. Cl. 354-269

5 Claims



1. A camera actuator bracket for a camera having a shutter button on the top, said bracket comprising an elongated base, means for adjustably mounting said base on the bottom of a camera,

an upright post at one end of said base, a locking post, means for adjustably mounting said locking post on said upright post to accommodate different height cameras, a cable release actuator, and means on said locking post for supporting said cable release actuator over the shutter button for the camera whereby said base can be adjusted to align the actuator with the shutter button on the camera.

4,794,415

## DEVELOPING TRAY

Rex S. Larsen, Rødovre, Denmark, assignor to Eskofot A/S, Ballerup, Denmark

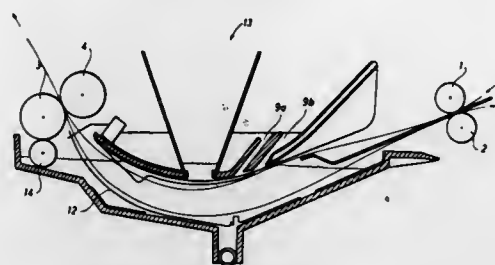
Filed Apr. 20, 1987, Ser. No. 39,733

Claims priority, application Denmark, Apr. 28, 1986, 1940/86

Int. Cl. G03B 3/08

U.S. Cl. 354-302

1 Claim



1. A developing tray for feeding a sheet of positive material and a sheet of negative material through a bath of developer, comprising: an upwardly open tray body for containing a bath of developer; a lid superimposed on said tray body for reducing evaporation of developer from said bath; longitudinal rib means integrally provided on said tray body and lid within said tray for preventing internal sticking of said sheets of positive and negative material to walls of said tray; first edge means of said tray body and lid defining between them an input opening into said tray; second edge means of said tray body and lid defining between them an output opening from said tray; said input opening and said output opening being longitudinally spaced from one another along means defining a first feeding path for sheets in said tray; a first set of feed rollers including at least two opposed feed rollers separated by divider means, said first set of feed rollers being juxtaposed with said input opening and said at least two opposed feed rollers thereof being power operable for simultaneously feeding into said tray and along said first feeding path a sheet of positive material and a sheet of negative material separated from one another by said divider means; a second set of feed rollers including at least two opposed feed rollers, said second set of feed rollers being juxtaposed with said output opening and said at least two opposed feed rollers of said second set thereof being power operable for simultaneously feeding along said first feeding path and out of said tray said sheet of positive material and said sheet of negative material while squeezing said sheet of positive material and said sheet of negative material together after said sheets have emerged from the bath contained in said tray body; said first set of feed rollers and said second set of feed rollers being longitudinally spaced from one another along said first feeding path by a first distance; said lid further including transverse slot means defining two

longitudinally adjacent manual feed openings there-through separated by projection means; said manual feed openings and said output opening being longitudinally spaced from one another along means defining a second feeding path which merges with said first feeding path between said manual feeding openings and said second set of feed rollers; said manual feed openings and said second set of feed rollers being longitudinally spaced along said second path by a second distance, which is shorter than said first distance, whereby a sheet of positive material and a sheet of negative material which are too short to reach from said first set of feed rollers to said second set of feed rollers along said first feeding path but are long enough to reach from said manual feed openings to said second set of feed rollers along said second path can be simultaneously manually fed into said tray respectively separated by said projection means, along said second feeding path, and out of said tray through said output opening while being squeezed together by said two power operable opposed feed rollers of said second set after emerging from the bath contained in said tray body.

4,794,416

## FOCUS DETECTION APPARATUS

Hiroma Mukai, Kawachinagano; Tokuji Ishida, Daito, and Hisashi Tokumaru, Osaka, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

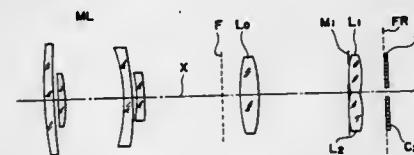
Filed Aug. 13, 1986, Ser. No. 896,391

Claims priority, application Japan, Aug. 14, 1985, 60-179839; Sep. 27, 1985, 60-215688

Int. Cl. G03B 3/00

U.S. Cl. 354-402

7 Claims



1. A focus detection apparatus for a camera comprising: a condenser lens means being arranged close to or behind a predetermined focal plane of an objective lens of the camera; and an image separation means for separating an image of an object formed on the predetermined focal plane by use of light having been passed through said objective lens into two images, including: a pair of separation lenses arranged, behind said condenser lens means, symmetrically with respect to the optical axis of said objective lens; and a mask means for projecting exit pupils of said image separation means within a range which covers both of an exit pupil of a cata-dioptric lens system as the objective lens and an exit pupil of a dioptric lens system as the objective lens, having a pair of apertures whose outer shapes are determined in accordance with the shape of the exit pupil of the dioptric lens system and whose inner shapes are determined in accordance with the shape of the exit pupil of the cata-dioptric lens system, wherein the correlation between the two images formed separately is measured in order to detect the focus condition of the objective lens.

4,794,417

## PHOTOGRAPHING APPARATUS

Takeaki Sekiguchi, Yokohama; Tsuneaki Kadosawa, Kanagawa, and Takashi Kamai, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

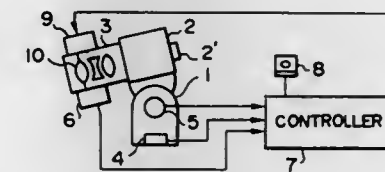
Filed Oct. 2, 1986, Ser. No. 914,292

Claims priority, application Japan, Oct. 4, 1985, 60-221555; Sep. 16, 1986, 61-217816

Int. Cl. G03B 3/00

U.S. Cl. 354-400

11 Claims



1. A photographing apparatus comprising: (a) a photographing optical system having displaceable optical means; (b) angle detection means for detecting a tilt angle of said photographing optical system; (c) position detection means for detecting a position of said optical means; (d) storage means for storing detection signals from said angle detection means and said position detection means when said photographing optical system is adjusted to a plurality of different points within a predetermined photographing range; (e) first control means for outputting displacement data for displacing said optical means in accordance with an angle signal from said angle detection means and the storage signal in said storage means when the angle falls within a predetermined range; (f) second control means for outputting data for setting said optical means in a predetermined state based on the angle signal when the angle falls outside the predetermined range; and (g) drive means for driving said optical means in accordance with the outputs from said first and second control means.
7. A photographing apparatus comprising: (a) a photographing lens system having a displaceable focusing lens; (b) detection means for detecting an inclination of the focusing lens when said photographing lens system is directed toward an object present on a plane; (c) an arithmetic circuit, connected to said detection means, for calculating lens position data so that said photographing lens system can be approximately focused on the object on the plane, wherein the lens position  $dD$  of said displaceable focusing lens is expressed by an equation:

$$dD = dA \cdot \left\{ \left| \frac{YB - YA}{YC - YA} \frac{ZB - ZA}{ZC - ZA} \right| \cos \phi \sin \theta + \left| \frac{ZB - ZA}{ZC - ZA} \frac{XB - XA}{XC - XA} \right| \cos \phi \cos \theta + \left| \frac{XB - XA}{XC - XA} \frac{YB - YA}{YC - YA} \right| \sin \phi \right\} / \left( \left| \frac{YB - YA}{YC - YA} \frac{ZB - ZA}{ZC - ZA} \right| \cos \phi \sin \theta + \left| \frac{ZB - ZA}{ZC - ZA} \frac{XB - XA}{XC - XA} \right| \cos \phi \cos \theta + \left| \frac{XB - XA}{XC - XA} \frac{YB - YA}{YC - YA} \right| \sin \phi \right)$$

-continued-

$$\begin{vmatrix} ZB - ZA & XB - XA \\ ZC - ZA & XC - XA \end{vmatrix} \cos \phi A \cos \phi A +$$

$$\begin{vmatrix} XB - XA & YB - YA \\ XC - XA & YC - YA \end{vmatrix} \sin \phi A$$

where (XA, YA, ZA), (XB, YB, ZB), and (XC, YC, ZC) are coordinate values of three points A, B, and C on the plane respectively, dA is the displacement of said displaceable focusing lens when focus adjusting is made for said A point, and  $\phi A$  and  $\theta A$  are a plan angle and a tilt angle for point A, respectively, and  $\phi$  and  $\theta$  are a plan angle and a tilt angle, respectively, when said photographing lens is directed to any point D on the plane; and (d) drive means for driving said focusing lens in accordance with the position data.

4,794,418

#### PROGRAMMED SHUTTER AND APPARATUS FOR PREVENTING FOREIGN MATTER ON LENS FROM BEING PHOTOGRAPHED IN A LENS SHUTTER TYPE OF CAMERA

Takeo Kabayashi; Shigeru Kondoh; Etsuroh Nishio, and Shinsuke Kohmoto, all of Tokyo, Japan, assignors to Asahi Kogyo Kogyo Kabushiki Kaisha, Tokyo, Japan

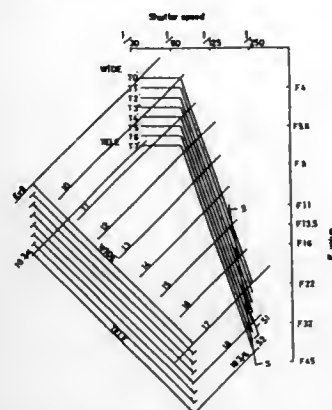
Filed Dec. 8, 1987, Ser. No. 130,561

Claims priority, application Japan, Dec. 12, 1986, 61-296175; Dec. 12, 1986, 61-191524[U]

Int. Cl.<sup>4</sup> G03B 7/089, 11/00

U.S. Cl. 354-435

35 Claims



1. A programmed shutter used in a lens shutter type of camera having a lens system with at least two different focal lengths, said camera having a variable mechanical diaphragm aperture having F numbers, respectively, corresponding to a small diaphragm aperture on the long focal length side of said lens system and to a large diaphragm aperture on the short focal length side of said lens system, in accordance with changing focal lengths of said lens system, said shutter constructed such that said diaphragm has an F number Fa on the short focal length side of said lens system, Fa being greater than an F number Fb, said F number Fb being obtained when the focal length of said lens system is changed while maintaining the minimum diaphragm aperture on the long focal length side of said lens system, said diaphragm minimum value Fa on the short focal length side of said lens system representing a greater diaphragm aperture than Fb, wherein said shutter comprises means for controlling exposure in said camera by controlling a combination of said F numbers and shutter speeds corresponding to said F numbers.

#### 4,794,419 INTEGRAL DOCUMENT PROCESSING APPARATUS EQUIPPED WITH AN IMAGE FORMING SYSTEM AND A FACSIMILE TRANSMISSION SYSTEM

Kenji Shibasaki, Aichi; Yoshikazu Kawai, Toyokawa, and Kanji Wada, Aichi, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

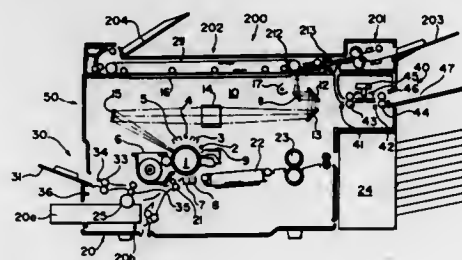
Filed Dec. 22, 1987, Ser. No. 136,278

Claims priority, application Japan, Dec. 24, 1986, 61-312746

Int. Cl.<sup>4</sup> G03G 15/00

U.S. Cl. 355-3 R

7 Claims



1. An integral document processing apparatus comprising an image forming system and a facsimile transmission system, further comprising:

- a document storing means for storing a plurality of documents;
- a first document read unit;
- a second document read unit;
- a document feed means capable of feeding the documents stored in the document storing means one at a time;
- a first document conveying means for conveying the document fed by the document feed means to the first document read unit;
- a second document conveying means for conveying the document fed by the document feed means to the second document read unit;
- a document passage changeover means for selectively guiding the document to the first document conveying means or to the second document conveying means;
- an image forming means capable of reading the document delivered to the first document read unit and forming the image of the document on a copying sheet; and
- a facsimile transmission means capable of reading the document delivered to the second document read unit and providing an electric signal representing the image of the document.

4,794,420

#### DEVICE FOR DRIVING ROTARY BODY

Michihito Ohashi, Yokohama; Shizaji Nagatsuna, Tokyo, and Kizai Saito, Kawasaki, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed Nov. 27, 1987, Ser. No. 126,115

Claims priority, application Japan, Nov. 27, 1986, 61-182285[U]

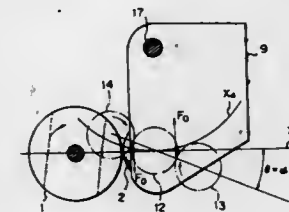
Int. Cl.<sup>4</sup> G03G 15/00

U.S. Cl. 355-3 R

6 Claims

- 1. A device for driving a rotary body, comprising
- a first rotary body fixed in place;
- a second rotary body supported to be movable in a predetermined direction into and out of contact with said first rotary body;
- a driven gear mounted on at least one end of a shaft portion of said second rotary body; and
- a drive gear meshing with said driven gear for driving said driven gear and, thereby, said second rotary body in a rotary motion;
- said drive gear being located at a position in which an angle  $\theta$  between said direction of movement and a line extend-

ing through axes of said driven and drive gears is defined upstream of said direction of movement with respect to an



intended direction of rotation of said second rotary body and substantially equal to a pressure angle  $\alpha$  between said drive and driven gears.

4,794,421

#### APPARATUS AND METHOD FOR ELECTROPHOTOGRAPHICALLY PRODUCING COPIES FROM ORIGINALS HAVING CONTINUOUS-TONE AND OTHER CONTENT

Michael D. Stoudt, Webster; Michael Mosehaner, Rochester; Eric K. Zeise, Pittsford; Jerome G. Spitzner, deceased, late of Rochester (by Nona V. Spitzner, administratrix); David Q. McDowell, Penfield, and George N. Talliba, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

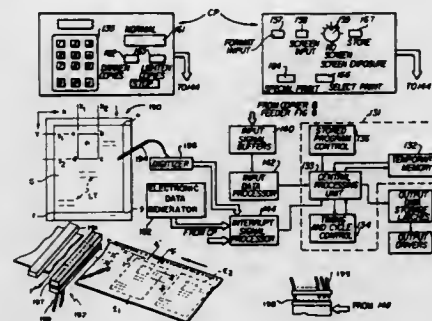
Continuation-in-part of Ser. No. 746,218, Jun. 18, 1985, abandoned, which is a continuation of Ser. No. 617,047, Jun. 4, 1984, Pat. No. 4,537,490, which is a division of Ser. No. 493,868, May 12, 1983, Pat. No. 4,472,047. This application Dec. 16, 1985, Ser. No. 809,550

The portion of the term of this patent subsequent to Sep. 18, 2001, has been disclaimed.

Int. Cl.<sup>4</sup> G03G 15/01, 15/04

U.S. Cl. 355-3 R

56 Claims



23. Apparatus for electrophotographically producing a reproduction having a composite image of screened image areas of pictorial information and unscreened areas of line-type information, the apparatus comprising:

- (a) means for uniformly electrostatically charging each of two photoconductor image sectors;
- (b) means for forming on one image sector an electrostatically screened image of pictorial information by exposing the one image sector to light from a reflection exposure of an original having the pictorial information as an unscreened continuous tone image and forming on the second image sector an electrostatic unscreened image of line-type information by reflection exposure of an original having line-type information;
- (c) means for erasing background areas of the said one image sector which border the pictorial information exposure reducing the charge in the background areas to a level below which will permit development;

(d) means for developing the images on the two-image sectors with toner; and  
(e) means for transferring the developed toner images from respective image sectors in register onto a copy sheet.

39. A method for electrophotographically reproducing an original so that the reproduction is provided with spot coloring comprising:

- (a) placing the original on an exposure platen of an electrophotographic reproduction apparatus with an image surface thereof facing away from the platen;
- (b) placing a handheldable wand on or near points of the document while supported on said exposure platen in (a) to generate signals and using said signals to identify the location of said points relative to a reference associated with said apparatus;
- (c) exposing the document while on the exposure platen, with said image surface now facing toward said platen and said original registered to said reference, to more than one image sector on a primary charged photoconductor of the apparatus to form electrostatic images;
- (d) selectively erasing charge from at least one image sector in response to the signals generated in step (b);
- (e) developing the electrostatic images on the image sectors with toner of different colors; and
- (f) transferring the developed images in register onto a copy sheet.

4,794,422

#### ELECTROPHOTOGRAPHIC REPRODUCTION MACHINE WITH DOCUMENT EXPOSURE SYSTEM DIRECTLY COUPLED TO AC LINE INPUT

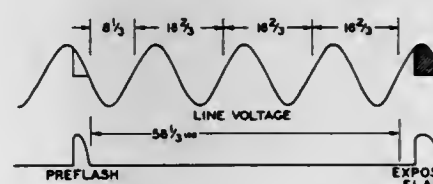
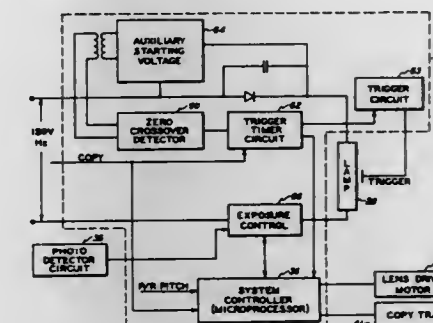
Richard F. Lehman, Webster; David K. Shogren, Ontario; Thomas J. Hammond, and Lawrence J. Mason, both of Penfield, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 872,328, Jun. 9, 1986, abandoned. This application Nov. 27, 1987, Ser. No. 123,795

Int. Cl.<sup>4</sup> G03G 15/04

U.S. Cl. 355-14 E

2 Claims



1. An electrophotographic document reproduction machine comprising, in combination, means for charging the surface of a photoreceptor medium, a full-frame flash-exposure system for illuminating the document and for projecting an image onto

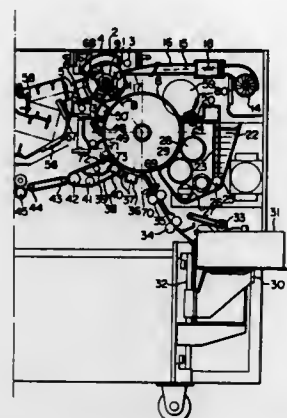
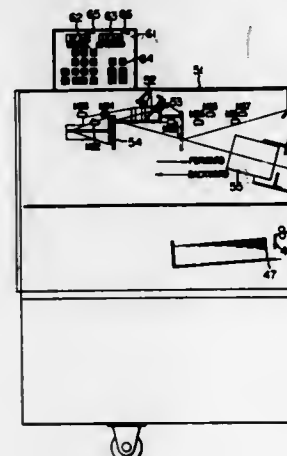
BEST COPY AVAILABLE



said charged surface to form a latent image of the document thereon said exposure system including a flash lamp which is energized to provide a pre-exposure (preflash) radiation output and at least one radiation output during an exposure cycle, said exposure system further including a photodetector for sensing the preflash radiation and the exposure radiation said exposure system further including feedback control means connected between the photodetector and the lamp, said feedback control means adapted to calculate and trigger the exposure lamp into operation based on the preflash input signal from the photodetector and to adjust the lamp output to provide the output radiation level for a required document exposure;

means for developing said latent image and for transferring said developed image to an output sheet and means for fusing said transferred image onto said output sheet; said machine further including control means connected between an AC line input and at least said exposure system, said control means adapted to cause said exposure system to produce a flash exposure pulse during at least one half cycle of said AC input, said control means including a zero crossover detector circuit adapted to sense the next zero point crossover of said line input and to generate a delayed clock signal indicative of this crossover event, said control means further including a trigger timer circuit, which receives the clock signal from said zero crossover detector circuit, and generates a lamp trigger signal.

second process means to start the secondary image formation without starting the primary image formation in



accordance with said second input means when the interruption by said interrupting means occurs.

4,794,424

## COPYING APPARATUS

Masahiro Higaki, Keiji Nakatani, and Hirokazu Yamada, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

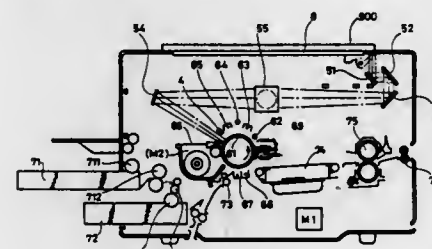
Filed Jan. 6, 1988, Ser. No. 141,195

Claims priority, application Japan, Jan. 8, 1987, 62-2057

Int. Cl.<sup>4</sup> G03G 15/00

U.S. Cl. 355-14 R

3 Claims



1. A copying apparatus comprising:  
input means for inputting data for specifying a desired area of a document,

4,794,423  
PRINTING OR COPYING APPARATUS

Katsueichi Shimizu, Hoya; Toshio Honma, Tokyo, and Hisashi Sakamaki, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 518,093, Jul. 28, 1984, abandoned, which is a division of Ser. No. 75,968, Sep. 17, 1979, Pat. No. 4,470,692, which is a continuation of Ser. No. 744,427, Nov. 23, 1976, abandoned. This application Apr. 28, 1986, Ser. No. 856,712

Claims priority, application Japan, Nov. 28, 1975, 50-143178; Nov. 28, 1975, 50-143179; Nov. 28, 1975, 50-143180; Dec. 2, 1975, 50-144158

Int. Cl.<sup>4</sup> G03G 21/00, 15/00

U.S. Cl. 355-14 R

4 Claims

1. An image formation apparatus, comprising:  
a first process means for forming a primary image on a recording medium;  
a second process means for forming a secondary image repeatedly in correspondence with the primary image;  
first input means for setting a desired number of secondary images to be provided;  
second input means for starting the operation of the apparatus;  
means for interrupting the operation of the apparatus before the completion of the set number of the secondary images in response to improper states; and  
means for controlling the first process means and the second process means to execute the primary image formation and the secondary image formation successively in accordance with said second input means, and controlling the

storing means for storing input data,  
copy means for copying an image of an arbitrary area of the document on copy paper,  
control means for controlling said copy means based on data stored in said storing means,  
mode designation means for designating a mode for operating said control means, data of the designated mode being stored in said storing means,  
clear signal generating means for generating a auto-clear signal for initializing said copy means, and  
cancel means responsive to said clear signal for cancelling the mode designated by said mode designation means, whereby only said designated mode is canceled when said clear signal is generated, and said data for specifying the desired area and said data of the designated mode are maintained in said storing means.

4,794,425

## OVERHEAD PROJECTOR WITH A COPYING DEVICE

Jun Sakai, Nagoya; Kenji Sakakibara, and Masanari Kobayashi, both of Ichinomiya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

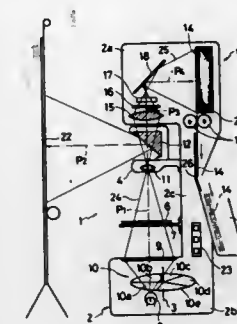
Filed May 18, 1987, Ser. No. 50,456

Claims priority, application Japan, May 19, 1986, 61-113875

Int. Cl.<sup>4</sup> E03B 27/52

U.S. Cl. 355-27

12 Claims



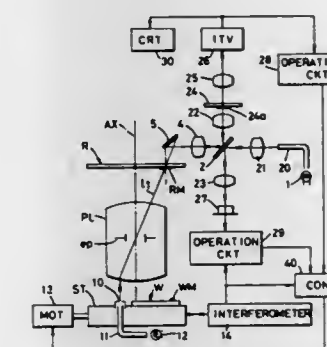
1. An overhead projector, comprising:

a projector section including support means supporting an original, a light source, and projection optical system means for applying a light from the light source to the original and projecting a light of an original image onto a screen;

a copying section including a record medium capable of recording the original image thereon by exposure to the light of the image, exposure optical system means connected to the projection optical system means of the projector section, said exposure optical system means receiving the light of the image from the projection optical system means and transmitting the light of the image to the record medium thereby recording the image on the record medium, and developing means for applying a pressure to the record medium, with the image recorded thereby visualizing the recorded image on the record medium; and

said record medium being formed of a light-and pressure-sensitive sheet means including substrate means, a sheet element of pressure-rupturable microcapsules which contain achromatic dyes and are liable to change their hardness when exposed to the light of the image, and a sheet element of developer material reacting to the achromatic dyes of the microcapsules to develop color when the microcapsules are ruptured by the pressure of said developing means.

4,794,426  
ALIGNMENT APPARATUS  
Kenji Nishi, Kawasaki, Japan, assignor to Nikon Corporation, Tokyo, Japan  
Filed Nov. 20, 1987, Ser. No. 123,335  
Claims priority, application Japan, Nov. 26, 1986, 61-280973  
Int. Cl.<sup>4</sup> G03B 27/42, 27/70  
U.S. Cl. 355-43  
12 Claims



1. An apparatus for optically aligning a first mark of a substrate and a second mark of a mask formed by a member transmitting radiation therethrough and a member intercepting the radiation, including:

- stage means for supporting said substrate thereon;
- moving means for two-dimensionally moving said stage means;
- a projection optical system for projecting the pattern of said mask onto said substrate supported on said stage means;
- mark detecting means for optically detecting said first and second marks, said mark detecting means having first application means for applying radiation to said first mark of said substrate through said mask, second application means for applying radiation to said second mark of said mask through said projection optical system, an objective optical system for forming the images of said first and second marks on a predetermined surface, and an optical member comprised of a member transmitting the radiation therethrough and a member reflecting the radiation and disposed so as to be substantially coincident with said predetermined surface, said mark detecting means producing a first radiation detection signal conforming to the radiation from said first mark passed through said optical member and producing a second radiation detection signal conforming to the radiation from said second mark reflected by said optical member; and
- control means for detecting the deviation between the image of said first mark and said optical member on the basis of said first radiation detection signal to produce a first deviation detection signal, detecting the deviation between the image of said second mark and said optical member on the basis of said second radiation detection signal to produce a second deviation detection signal, and controlling said moving means on the basis of said first and second detection signals.

4,794,427

## IMAGE SCANNING APPARATUS

Masahiro Shirai, Tokyo, and Motomu Fukasawa, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

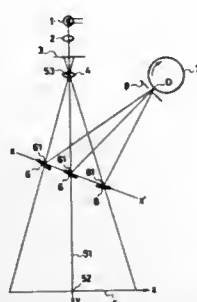
Filed May 8, 1987, Ser. No. 47,138

Claims priority, application Japan, May 15, 1986, 61-109604; Jan. 19, 1986, 61-143556; Nov. 4, 1986, 61-262116

Int. Cl.<sup>4</sup> G03B 27/70

U.S. Cl. 355—49

11 Claims



1. An image scanning apparatus comprising: a focusing lens; a mirror for guiding light beams passing through said focusing lens onto a predetermined exposure position of a moving photosensitive body; moving means for causing said mirror to move along a line intersecting a perpendicular bisector of a line segment connecting an imaginary focal plane of said focusing lens and the exposure position; rotating means for changing an angle of said mirror upon movement of said mirror; and said moving means having a rotatable support member supporting said mirror and drive means for moving said support member along a guide surface parallel to said line.

4,794,428

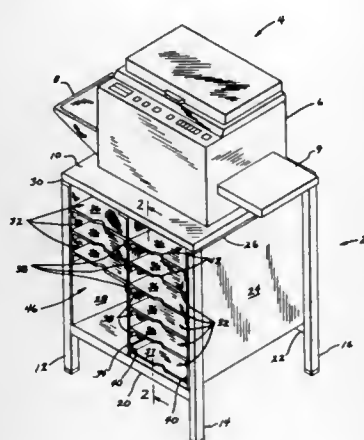
## COPIER STAND WITH SORTING BINS

Jon E. DeGlopper, 18630 Crest Ct., Brookfield, Wis. 53005  
Division of Ser. No. 89,666, Aug. 26, 1987. This application Feb. 22, 1988, Ser. No. 158,565

Int. Cl.<sup>4</sup> G03B 27/58, 27/62

U.S. Cl. 355—72

7 Claims



1. In combination, a copy machine having a top which moves back and forth along a first lateral direction when said copy machine is copying a document, and a manual sorting stand for said copy machine, said manual sorting stand com-

prising an upper support surface for receiving said copy machine; a support structure disposed below and connected to said upper support surface for supporting and spacing said copy machine above a floor or like surface, said support structure including one or more brace members extending substantially parallel to said first lateral direction of movement of said movable top of said copy machine for bracing said upper support surface against movement and vibration induced by said movable top of said copy machine during operation; and manual sorting means comprising a plurality of individual sorting bins connected to said sorting stand, each said sorting bin having an open area for receiving copies therein for manually individually sorting copies of a document, produced by said copy machine.

4,794,429

## AUTOMATIC DUAL MODE SHEET AND WEB DOCUMENT TRANSPORT FOR COPIERS

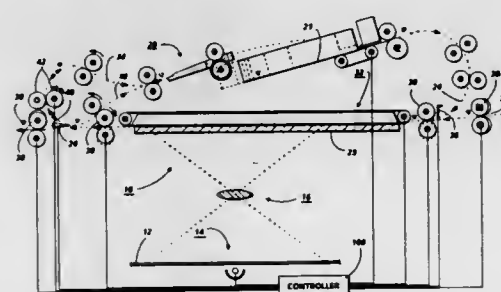
Thomas Acquaviva, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 23, 1987, Ser. No. 29,027

Int. Cl.<sup>4</sup> G03B 27/62; G03G 21/00

U.S. Cl. 355—76

2 Claims



1. In an automatic document handling system for a copier, with means for feeding and registering document sheets to the imaging station platen of the copier, including a platen transport system for transporting the documents over the platen and providing an imaging background surface, wherein said platen transport system includes a document belt system and a vacuum system for retaining documents against the document belt system, the improvement comprising: common input means for inputting either conventional document sheet documents or continuous computer form web documents to said automatic document handling system; common document path means for feeding either conventional document sheets or continuous computer form web documents from said input means over said imaging station platen of the copier through said platen transport system; said document belt system comprising relatively low friction belt material; said vacuum system comprising vacuum means for automatically maintaining a first vacuum level in said vacuum system high enough to retain said conventional document sheets against the document belt system with sufficient force to resist slippage of said conventional document sheets relative to said document belt system so that said document belt platen transport system functions as the primary platen transport system for said conventional document sheets; vacuum reduction means for automatically reducing the vacuum level in said vacuum system to a second vacuum level substantially lower than said first vacuum level for said continuous computer form web documents, which second vacuum level provides for slippage of said continuous computer form web documents relative to said document belt system; and separate computer form web deskewing and driving

4,794,431

## PACKAGE FOR PHOTOACTIVATED SEMICONDUCTOR DEVICE

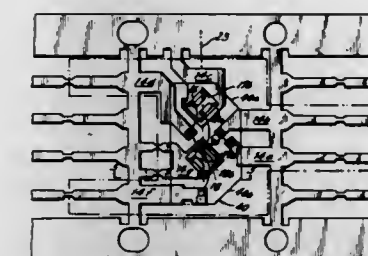
Khee Park, Los Angeles, Calif., assignor to International Rectifier Corporation, Los Angeles, Calif.

Filed Apr. 21, 1986, Ser. No. 854,425

Int. Cl.<sup>4</sup> H01L 31/12, 31/16, 29/60

U.S. Cl. 357—19

10 Claims



means for feeding said continuous computer form web documents over said platen in cooperation with said platen transport system; to provide a dual mode document handling system in which said platen transport system provides for low frictional relative movement and an imaging background surface for said continuous computer form web documents, but is not the primary platen transport system for said continuous computer form web documents; further including means for automatically sensing the acquisition of continuous computer form web documents by said document handling system, and wherein said vacuum reduction means for automatically reducing the vacuum level in said vacuum system is actuated automatically in response to said sensing; wherein said document handling system includes additional roller drive means in said common document path means for engaging said conventional document sheets adjacent said platen transport system, which additional roller drive means are automatically disengaged in response to said sensing of the acquisition of continuous computer form web documents by said document handling system.

4,794,430

## SOLID STATE RETICLE PROJECTOR FOR A WEAPON SIGHT

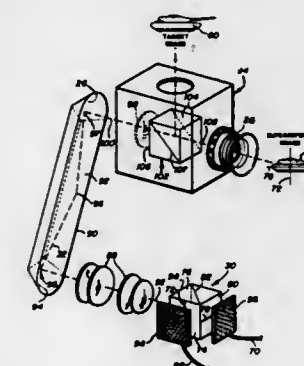
Thomas F. Whittaker, Bedford; Wayne E. Isbell, Dallas, and Peter Sorensen, III, Garland, all of Tex., assignors to Varo, Inc., Garland, Tex.

Filed Apr. 29, 1987, Ser. No. 44,007

Int. Cl.<sup>4</sup> G02B 27/34, 27/36

U.S. Cl. 356—252

14 Claims



1. A reticle generator, comprising: a first array including a plurality of elongate, closely spaced light emitting diode filaments formed on a first substrate; a second array including a plurality of elongate closely spaced light emitting diode filaments formed on a second substrate; said first and second arrays each being individually encapsulated and having a transparent window through which light from the respective arrays is emitted; optical superimposing means comprising a prism structure with a first face oriented orthogonal to a second face thereof, a partially reflecting surface oriented at an angle with respect to said first and second faces, and a third face disposed in a plane parallel to one said first or second faces; and means for fixing the windowed part of said first array with respect to said first face of said prism, and for fixing the windowed part of said second array with respect to said second face of said prism to provide a reticle image having superimposed filament images of said first and second arrays exiting said third prism face.

4,794,432

## MOSFET STRUCTURE WITH SUBSTRATE COUPLED SOURCE

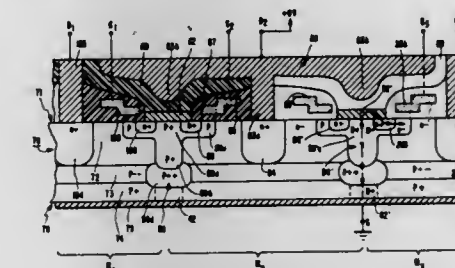
Hamza Yilmaz, Raleigh; King Owyang, Carrboro, and Robert G. Hodgins, Raleigh, all of N.C., assignors to General Electric Company, Somerville, N.J.

Filed Jan. 27, 1987, Ser. No. 7,034

Int. Cl.<sup>4</sup> H01L 29/78, 27/02

U.S. Cl. 357—23.4

9 Claims

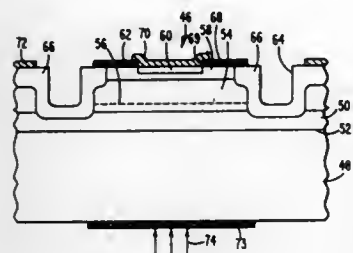
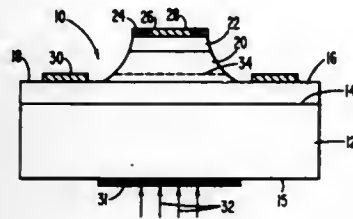


1. A lateral MOSFET cell structure comprising: a substrate having a top surface and a bottom surface; a first layer of first conductivity type across the bottom surface and a relatively lightly doped epitaxial layer of





including at least a portion at its surface which is of high conductivity,

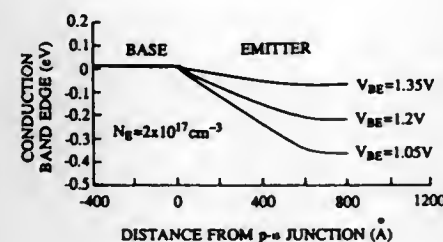
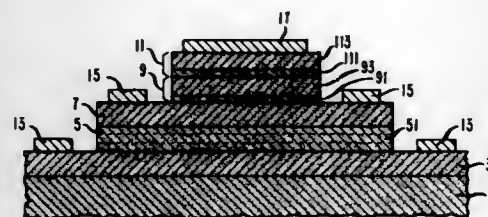


a first contact to said highly conductive portion of said third layer, and  
a second contact to said first layer.

**4,794,440**  
**HETEROJUNCTION BIPOLAR TRANSISTOR**  
Federico Capasso, Westfield; Arthur C. Gossard, Warren; John R. Hayes, Plainfield; Roger J. Malik, Summit, and Pierre M. Petroff, Westfield, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.  
Continuation of Ser. No. 27,045, Mar. 20, 1987, abandoned, which is a continuation of Ser. No. 497,849, May 25, 1983, abandoned. This application Dec. 30, 1987, Ser. No. 142,316  
Int. Cl.<sup>4</sup> H01L 29/72

U.S. Cl. 357—34

6 Claims



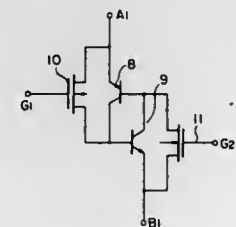
1. A bipolar transistor comprising a first region having a first conductivity type and a first bandgap; a second region having

a second conductivity type and a second bandgap; said first bandgap being greater than said second bandgap; a third region having said first conductivity type, said first, second, and third regions being emitter, base, and collector regions, respectively; and electrical contacts to said first, second, and third regions.

**CHARACTERIZED IN THAT** the emitter depletion region corresponding to a base-emitter bias voltage in a desired range comprises a fourth region in which composition is graded complementary to the electrostatic potential corresponding to said voltage, whereby the sum of the functions representing said electrostatic potential and the grading potential is essentially constant in said fourth region.

**4,794,441**  
**SEMICONDUCTOR SWITCH CIRCUIT**  
Yoshitaka Sugawara, Hitachi; Junjiro Kitano, Fujisawa; Tadatsugu Kimura, Ebina; Yasunobu Inabe, Atsugi, and Masa-aki Tanabe, Kodaira, all of Japan, assignors to Hitachi Ltd. and Nippon Telegraph & Telephone, both of Tokyo, Japan  
Filed Jun. 24, 1985, Ser. No. 748,199  
Claims priority, application Japan, Jun. 22, 1984, 59-127491; Sep. 3, 1984, 59-182665  
Int. Cl.<sup>4</sup> H01L 29/74, 29/747, 27/02, 29/78  
U.S. Cl. 357—38

12 Claims



1. A semiconductor switch circuit of field-drive type comprising:  
a bipolar transistor having at least one forward blocking junction and at least one reverse blocking junction; and  
a p-channel insulated gate field effect transistor (IGFET) and an n-channel IGFET connected across said bipolar transistor so as to short-circuit at least one of said forward blocking junctions.

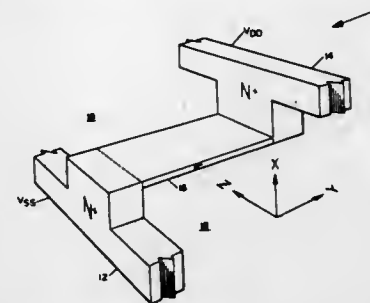
**4,794,442**  
**THREE-DIMENSIONAL INTEGRATED CIRCUIT**  
Raymond M. Warner, Jr., Edina; Ronald D. Schrimpf, St. Paul, both of Minn., and Alfons Tuszynski, San Diego, Calif., assignors to Regents of the University of Minnesota, Minneapolis, Minn.  
Filed Nov. 19, 1985, Ser. No. 799,652  
Int. Cl.<sup>4</sup> H01L 27/02, 29/80, 29/88  
U.S. Cl. 357—41

24 Claims

1. All-semiconductor three-dimensional integrated circuit comprising:  
a. semiconductor monolith means with no metals or insulators inside;  
b. three-dimensional doping pattern within said monolith means forming at least one buried device, and being junction-isolated;  
c. semiconductor interconnecting signal-path means and power-bus means that are junction-isolated; and,

d. a three-dimensional JFET with gate and channel regions of opposite conductivity types including at least one chan-

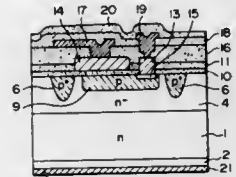
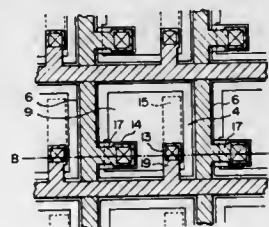
nel substantially surrounding at least one gate, thereby forming an internal gate.



nel substantially surrounding at least one gate, thereby forming an internal gate.

**4,794,443**  
**SEMICONDUCTOR DEVICE AND PROCESS FOR PRODUCING SAME**  
Nobuyoshi Tanaka, Tokyo, and Shigeyuki Matsumoto, Atsugi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 736,383, May 21, 1985, abandoned. This application Nov. 16, 1987, Ser. No. 120,786  
Claims priority, application Japan, May 28, 1984, 59-106663; May 28, 1984, 59-106664; May 28, 1984, 59-106665; May 28, 1984, 59-106666  
Int. Cl.<sup>4</sup> H01L 27/02  
U.S. Cl. 357—43

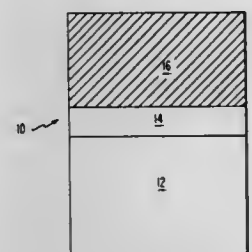
6 Claims



1. A semiconductor device comprising:  
a plurality of semiconductor elements arranged in an array, each comprising at least a semiconductor region of one conductivity type;  
a plurality of element isolation regions, each comprising a semiconductor of said one conductivity type and being disposed between each adjacent pair among said plurality of semiconductor elements to electrically isolate the plurality of semiconductor elements independently from each other;  
a potential supply for providing a predetermined potential electrically connected to said element isolation regions; and  
switching means having a first state, in which said semiconductor region of each semiconductor element and a respective one of said element isolation regions are electrically conductive with each other to reset said semiconductor region to the predetermined potential, and a second state, in which said semiconductor regions are not

**4,794,444**  
**OHMIC CONTACT AND METHOD FOR MAKING SAME**  
Shing-Gong Liu, Princeton, and John P. Paczkowski, Kingston, both of N.J., assignors to General Electric Company, Schenectady, N.Y.  
Filed Apr. 10, 1986, Ser. No. 850,163  
Int. Cl.<sup>4</sup> H01L 29/161, 29/167, 23/48  
U.S. Cl. 357—65

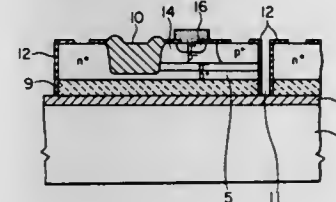
14 Claims



1. An ohmic contact to a semiconductor body comprising:  
a semiconductor first layer having a thickness of less than about 10 nm and a doping level of at least about  $10^{18}$  cm<sup>-3</sup> and overlying said body and lattice mismatched with respect to the body; and  
a conductive second layer overlying said first layer and non-alloyed with said first layer.

**4,794,445**  
**SEMICONDUCTOR DEVICE**  
Hideo Homma, Hitachi; Yutaka Misawa, Katsuta, and Naohiro Momma, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jul. 29, 1987, Ser. No. 78,999  
Claims priority, application Japan, Jul. 31, 1986, 61-178890  
Int. Cl.<sup>4</sup> H01L 23/08, 23/54  
U.S. Cl. 357—71

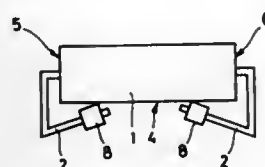
24 Claims



1. A semiconductor device comprising a semiconductor substrate, an insulating layer formed on a main surface of said semiconductor substrate and a plurality of monocrystalline/metal-silicide islands formed on said insulating layer, said islands being isolated from one another with an insulating region between each pair of said islands, each island including a metal-silicide layer disposed over a portion of said insulating layer, and a monocrystalline layer formed on said metal-silicide layer and a semiconductor element formed into said monocrystalline layer.



4,794,446  
ELECTRODE DEVICE AND A METHOD FOR MAKING  
THE SAME  
Hisanori Hamano, Hyogo, Japan, assignor to Mitsubishi Denki  
Kabushiki Kaisha, Tokyo, Japan  
Filed Oct. 24, 1986, Ser. No. 923,081  
Claims priority, application Japan, Oct. 25, 1985, 60-240095  
Int. Cl. <sup>4</sup> H01L 23/28, 23/48  
U.S. Cl. 357—74 13 Claims



1. An electronic device, comprising:  
a package for protecting an electronic circuit of said electronic device, said electronic circuit to be connected to external circuitry, said package comprising:  
a plurality of electrically conductive connecting leads taken out from at least one side of said package, for electrical connection to said electronic circuit, wherein  
each of said electrically conductive connecting leads is bent approximately at a right angle at a portion adjacent to the side of said package and further bent at an acute angle below said package toward the lower surface of said package, and  
the tip of each of said electrically conductive connecting leads is maintained spaced apart from said package.

4,794,447

**METHOD AND APPARATUS FOR TRANSMITTING AND RECEIVING A HIGH DEFINITION NTSC COMPATIBLE TELEVISION SIGNAL OVER A SINGLE DBS CHANNEL IN TIME DIVISION MULTIPLEX FORM**

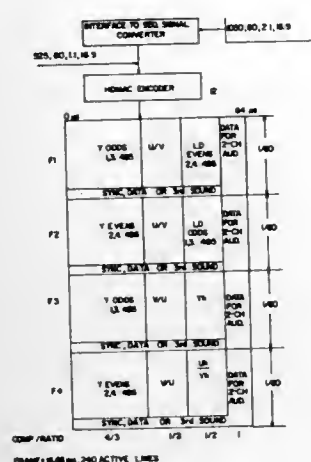
**Mikhail Tsienberg, Riverdale, N.Y., assignor to North American Philips Corporation, New York, N.Y.**

Filed Nov. 17, 1966, Ser. No. 931,756

Int. Cl.<sup>4</sup> H04N 11/18, 7/12

U.S. Cl. 358—14

11 Claims



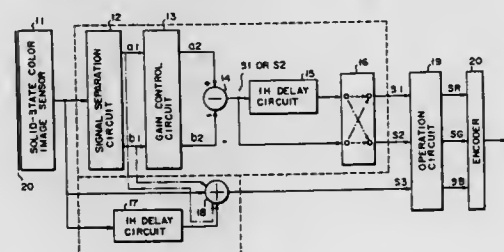
10. Apparatus for encoding a high definition television signal having a predetermined number of lines per frame, each line having a predetermined line period, a predetermined number of frames per second, a predetermined scanning pattern, a first predetermined bandwidth, a luminance signal, a first chrominance signal, and a second chrominance signal, for transmiss-

sion over a single channel having an assigned channel bandwidth less than said first predetermined bandwidth, comprising means for combining at least selected ones of said luminance signals with at least one vertically adjacent luminance signal, thereby creating line difference signals; and selection means for selecting luminance, and first and second chrominance signals associated with odd numbered lines and line difference signals associated with even numbered lines during alternate ones of said frames, the so-selected signals constituting first selected signals, and for selecting luminance and first and second chrominance signals associated with even numbered lines and line difference signals associated with odd numbered lines during the remaining ones of said frames, thereby creating second selected signals:

means for generating first time multiplexed line signals having said first selected signals in predetermined time intervals thereof during said alternate ones of said frames, and for generating second time-multiplexed line signals having said second selected signals in predetermined time intervals thereof during said remaining ones of said frames; further comprising low pass filter means for filtering said luminance signal and applying a low frequency luminance signal to said combining means; high pass filter means for filtering said luminance signal and generating a high frequency luminance signal, first heterodyning means for heterodyning said high frequency luminance signal thereby generating difference luminance signals in a predetermined low frequency range and sum luminance signals outside of said assigned channel bandwidth; wherein said selection means further comprises means for substituting said difference luminance signals for said line difference signals in selected ones of said frames; and

further comprising second high pass filter means and second low pass filter means for, respectively, filtering said first and second chrominance signal and generating, respectively, first and second high frequency and first and second low frequency chrominance signals, second heterodyning means for heterodyning said high frequency first and high frequency second chrominance signals to generate heterodyned first and heterodyned second chrominance signals and applying said heterodyned first and heterodyned second chrominance signals to said selection means; and wherein said selection means substitutes said heterodyned first and heterodyned second chrominance signals for said line difference signals in every fourth one of said frames.

4,794,448  
SOLID-STATE COLOR IMAGING APPARATUS FOR  
PREVENTING COLOR ALIAS  
Yoshinori Takizawa, Tokyo, Japan, assignor to Kabushiki Kai-  
sha Toshiba, Kawasaki, Japan  
Filed Mar. 14, 1985, Ser. No. 711,761  
Claims priority, application Japan, Mar. 16, 1984, 59-50622  
Int. Cl.<sup>7</sup> H04N 9/077, 9/73  
U.S. Cl. 358—44 8 Claims



1. A color solid-state imaging apparatus comprising:

color solid-state image sensor means, including a color filter, for producing a color image output signal which includes alternate first and second color scanning line signals, said first color scanning line signal comprising alternate first and second color pixel signals, and said second color scanning line signal comprising alternate third and fourth color pixel signals; and

color signal processing means for producing first and second difference signals from said color image output signal, said color signal processing means including:

- (c) color pixel signal separating means, coupled to said color solid-state image sensor means, for separating the two types of color pixel signals in each of said first and second color scanning line signals from one another to produce first and second color signals which correspond to said first and second color pixel signals, respectively, when said color solid-state image sensor means is producing said first color scanning line signal, and to produce first and second color signals which correspond to said third and fourth color pixel signals, respectively, when said color solid-state image sensor means is producing said second color scanning line signal;

- (b) gain control means, coupled to said color pixel signal separating means, for respectively adjusting the levels of said first and second color signals by predetermined amounts, said predetermined amounts being such as to produce a zero difference between said level-adjusted first and second color signals when said color solid-state image sensor means picks up a subject of a predetermined color; and

- (c) subtracting means, coupled to said gain control means, for producing a difference signal representing the difference between said level-adjusted first and second color signals, said difference signal being produced as said first difference signal when said color solid-state image sensor means is producing said first color scanning line signal, and being produced as said second difference signal when said color solid-state image sensor means is producing said second color scanning line signal.

8. A color solid-state imaging apparatus comprising:  
color solid-state image sensor means, including a color filter,  
for simultaneously producing first, second, third and  
fourth color signals; and  
color signal processing means for producing first and second  
difference signals from said color signals, said color signal  
processing means including:

- (a) gain control means, coupled to receive said second and third color signals, for respectively adjusting the levels of said second and third color signals by predetermined amounts, said predetermined amounts being such as to produce a zero difference between said first color signal and said level-adjusted second color signal and between said fourth color signal and said level-adjusted third color signal when a subject of a predetermined color is picked up by said color solid-state image sensor means;

- (b) a first subtractor having a first input section for receiving said first color signal and a second input section for receiving said level-adjusted second color signal; and
- (c) a second subtractor having a first input section for receiving said fourth color signal and a second input section for receiving said level-adjusted third color signal;
- wherein outputs of said first and second subtractors are produced as said first and second difference signals, respectively;

said apparatus further comprising adding means for producing a fundamental signal by adding together said first, second, third and fourth color signals simultaneously produced by said color solid-state image sensor means.

4,794,449

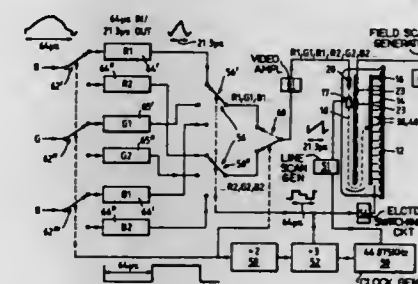
**ELECTRON MULTIPLIER FLAT CRT DISPLAY  
APPARATUS PROVIDING SUCCESSIVE COLOR  
SCANNING LINES FOR EACH SCANNING LINE OF A  
RECEIVED COLOR VIDEO SIGNAL**

**Kenneth G. Freeman, Reigate, England, assignor to U.S. Philips  
Corporation, New York, N.Y.**

**Filed Oct. 1, 1966, Ser. No. 914,047**

**Claims priority, application United Kingdom, Oct. 4, 1965,  
8524547**

U.S. Cl. 358—71      Int. Cl.<sup>4</sup> H04N 9/26, 9/22      10 Claims



1. Color display apparatus for received video signals representing three primary colors of successive picture elements on each of successive scanning lines of an image occurring at a scanning line frequency  $H$ , such apparatus including an electron multiplier color display tube which comprises: a display screen having thereon successive triads of phosphor stripes respectively electroluminescent in the respective primary colors; an electron gun producing a single electron beam which causes said stripes to luminesce when incident thereon; line-scanning means for deflecting said beam across the successive triads of color stripes; and a succession of color selection electrodes for selectively diverting said beam to respective color stripes in each of such triads; such apparatus being characterized in that it further includes a color selection circuit comprising:

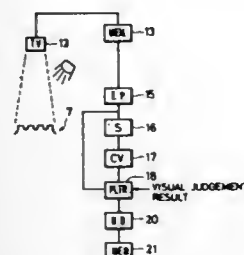
- clock pulse generating means for controlling said line scanning means to deflect the electron beam at a line scanning frequency of substantially 3 H; first switching means for applying voltages to said color selection electrodes which are cyclically changed so as to cause said electrodes to divert said beam to successive color stripes in each of said triads at a frequency of substantially 3 H; and second switching means for receiving the three primary color video signals for each image scanning line and sequentially applying them to said electron gun during each such scanning line; whereby three primary color scanning lines are successively produced on said display screen corresponding to each of the image scanning lines of the received video signals.

4,794,450  
METHOD AND APPARATUS FOR JUDGING  
AGGLUTINATION PATTERN  
Tomo Saito; Yasuake Sakurabayashi; Toshitatsu Inouchi, and  
Norihiko Suzuki, all of Tokyo, Japan, assignors to Fujirebio  
Kabushiki Kaisha, Tokyo, Japan  
Filed Aug. 28, 1967, Ser. No. 90,477  
Claims priority, application Japan, Aug. 29, 1966, 61-201779;  
Apr. 14, 1967, 62-89785

Int. Cl.<sup>4</sup> H04N 7/18; G06K 9/00  
U.S. Cl. 358-93 5 Claims

1. A method of judging an agglutination pattern comprising the steps of:  
setting a reference value, and  
judging the testing agglutination pattern.

- said reference value setting step including the steps of:
- (a) storing video images of a plurality of agglutination images;
  - (b) differentiating the video images to produce differential images;
  - (c) producing an area of the profile of the differential images;
  - (d) producing a variation coefficient of each picture element of a differential image having a luminance level not zero from a standard deviation of the picture elements;
  - (e) plotting the relationship between the variation coefficients and the area of the profile;
  - (f) inputting a visual judgement of a plurality of agglutina-

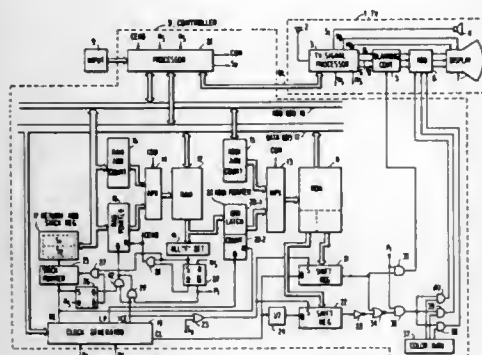


- tion images to plot the images on a plot of said relationship,
- (g) determining a linear line on the relationship plot so that an overlapping portion of positive and negative agglutination regions of the plot of the visual judgement on the plot of said relationship is obtained, and
- (h) storing the result obtained from step (g) of determining the linear line, and
- said agglutination judging step including the steps of:
- (i) executing the above steps (a) to (e) for independently prepared agglutination images, and
- (j) comparing the result obtained in step (i) with the linear line stored in step (h).

4,794,451  
SIGNAL GENERATOR GENERATING CHARACTER  
DATA HAVING CONTOUR  
Hiroyuki Suzuki, and Kazuhide Kawata, both of Tokyo, Japan,  
assignors to NEC Corporation, Tokyo, Japan  
Filed Jun. 3, 1987, Ser. No. 57,146  
Claims priority, application Japan, Jun. 3, 1986, 61-129582  
Int. Cl.<sup>4</sup> H04N 7/00

U.S. Cl. 358-96

### 7 Claims



1. A character generator comprising a memory storing data for a character to be displayed, said data including first data representing a contour of said character and second data representing said character, means for reading out said data from said memory, a first shift register temporarily storing the outputted first data, a second shift register temporarily storing the outputted second data, means for supplying a first shift clock

signal to said first shift register, said first shift clock signal having a first frequency, means for supplying a second shift clock signal to said second shift register, said second shift clock signal having a second frequency, that is different from said first frequency, means responsive to the output of said first shift register for producing a contour signal of said character, and means responsive to outputs of said first and second shift registers for producing a character signal.

4,794,452

**THROUGH FLAME OPTICAL VIEWING**

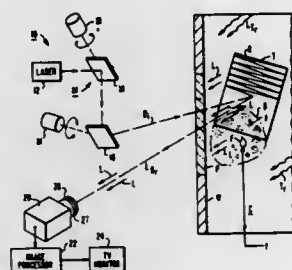
Jeffrey D. Taft, Murrysville Boro, and James F. Ellison, Pittsburgh, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 891,037, Jul. 31, 1986, abandoned. This application Jan. 30, 1987, Ser. No. 9,846

Int. Cl. 1 H04N 7/18

U.S. CL 358-100

### 15 Claims



1. A viewing system external to a combustion chamber for viewing internal surfaces therein in which intense ambient light is produced in said combustion chamber comprising: a coherent light source external to the combustion chamber operable to generate visible illuminating light of a given intensity and at a wavelength distinguishable from the ambient light substantially within a preselected visible wavelength band between about 422 and 780 nm, which coherent light source is operable when directed to illuminate a target within the combustion chamber with said visible illuminating light; and means external to the combustion chamber for viewing the illuminated portion of the target including means for filtering said ambient light produced in the combustion chamber including ambient light reflected from the target to pass the wavelength of the illuminating light through the viewing means and rejecting the ambient light produced within the combustion chamber.

4,794,453  
METHOD AND APPARATUS FOR STROBOSCOPIC  
VIDEO INSPECTION OF AN ASYNCHRONOUS EVENT  
Herman C. Gnechtel, Arlington Heights, and Stephen P. Kos-  
men, Hoffman Estates, both of Ill., assignors to Web Printing  
Controls Co., Barrington, Ill.  
Filed Sep. 9, 1986, Ser. No. 905,707  
Int. Cl.<sup>4</sup> H04N 7/18

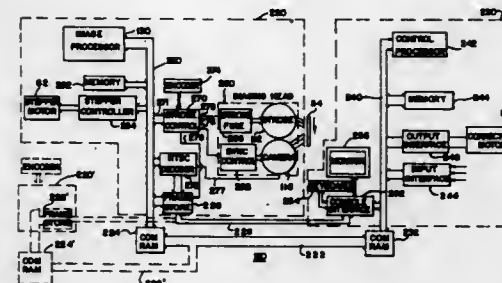
U.S. CL. 358-101

## 21 Claims

14. A method for synchronizing image acquisition by a video camera to high intensity short duration illumination of a substantially predictable asynchronous event in real time wherein the video camera includes an image sensor, the method comprising the steps of;

- generating periodic refresh pulses to periodically trigger an image acquisition scan of the image sensor;
- disabling the refresh pulses and generating a preflush pulse a first predetermined time period prior to the substantially predictable event for triggering an image acquisition scan of the image sensor a first predetermined time period prior to the substantially predictable event thereby preconditioning the image sensor;

tioning the image sensor and disabling image acquisition scan until occurrence of the substantially predictable event; and



generating an image acquisition pulse for triggering an image acquisition scan of the image sensor a second predetermined time period subsequent to the first predetermined time period to generate image information responsive to the substantially predictable event.

4,794,454

**MOVEMENT DETECTION CIRCUIT OF A VIDEO  
SIGNAL USED IN A TELEVISION RECEIVER**

**Masato Sugiyama; Kenji Katsumata; Shigeru Hirahata; Isao Nakagawa, all of Yokohama; Susuo Suzuki, Kamakura; Masahiko Achiha, Iruma, and Kazuo Ishikura, Hachioji, all of Japan, assignors to Hitachi, Ltd., Tokyo and Hitachi Video Engineering, Inc., Kanagawa, both of Japan**

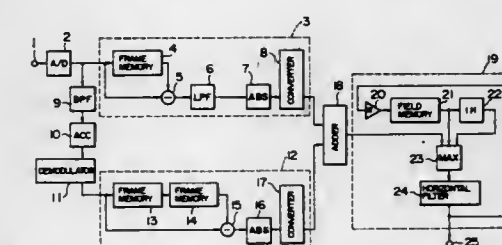
**Filed Oct. 6, 1967, Ser. No. 105,013**

**Claims priority, application Japan, Oct. 6, 1966, 61-236135**  
**Int. Cl.<sup>4</sup> H04N 7/18, 5/21**

**U.S. Cl. 358—105** **20 Claims**

U.S. Cl. 358-105

## 20 Claims



1. A movement detection circuit used in a television receiver for detecting movement information of a video signal, comprising:

- (a) an input terminal for receiving a composite video signal;  
(b) an analog-digital converter connected to said input terminal for receiving the composite video signal from said input terminal and converting the input composite video signal to an m-bit digital signal;  
(c) first movement information detection means connected to said analog-digital converter for receiving the digital composite video signal from said analog-digital converter to generate a first movement information signal;  
said first movement information detection means including a first frame memory for delaying the digital composite video signal by one frame period, and a first subtractor connected to said first frame memory for subtracting the digital composite video signal from the delayed composite video signal delayed by said first frame memory to generate the first movement information signal;  
(d) chrominance signal demodulation means connected to said analog-digital converter for receiving the digital composite video signal from said analog-digital converter to reproduce a chrominance signal therefrom;  
(e) second movement information detection means con-

4,794,455

**METHOD AND APPARATUS EMPLOYING ADAPTIVE  
FILTERING FOR EFFICIENTLY COMMUNICATING  
IMAGE SEQUENCES**

S. Staffan Ericsson, Manchester, Mass., assignor to PicTel  
Corporation, Peabody, Mass.

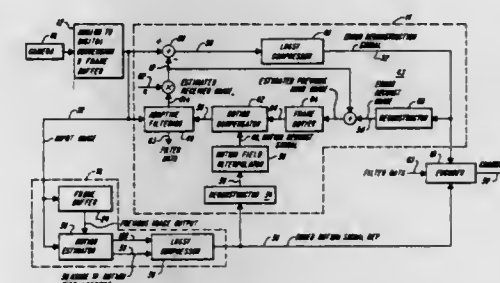
Continuation of Ser. No. 001,145, Jan. 7, 1967. This application  
Mar. 21, 1968, Ser. No. 175,661  
Int. Cl.<sup>4</sup> H04N 7/12

U.S. Cl. 358—135

13 Claims

U.S. Cl. 358-135

### 13 Claims



1. A method for encoding and transmitting a sequence of image frames comprising the steps of  
estimating, for successive image of the sequence, and for each of a plurality of multi-pixel blocks of the image, a measure of motion displacement of each block between successive images,  
generating, using said measures of motion displacement, a motion compensated image,  
selecting, for each block of an image frame representation, one block chosen from between corresponding blocks of, respectively, said motion compensated image and a low-pass filter representation of said motion compensated image, and  
transmitting filter selection data over a communications channel to enable a receiver to determine for a block of the image being transmitted whether to employ low-pass filtering in said block of the image in generating a prediction image from a motion compensated receiver image, said filter selection data being dependent upon the selecting step at the transmitter.

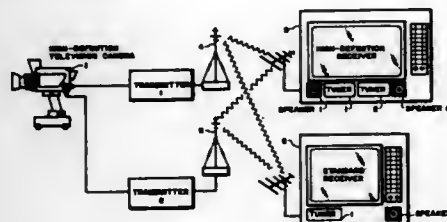


# 4,794,456 HIGH-DEFINITION TELEVISION TRANSMISSION SYSTEM

Mikhail Talaberg, Riverdale, N.Y., assignor to North American Philips Corporation, New York, N.Y.  
Continuation of Ser. No. 856,622, Apr. 25, 1986, Pat. No. 4,694,338. This application Jun. 8, 1987, Ser. No. 59,664. The portion of the term of this patent subsequent to Sep. 15, 2004, has been disclaimed.  
Int. Cl.<sup>4</sup> H04N 7/01, 7/04

U.S. Cl. 358—141

7 Claims



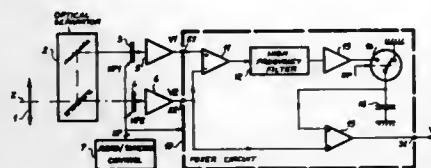
2. A method of transmitting a high-definition television (HDTV) signal comprising the steps of:  
forming said HDTV signal with sequentially scanned scan lines representing picture information, a frame of said HDTV signal being formed at twice the rate of a frame of a standard television (TV) signal;  
converting said HDTV signal into a first transmission signal and a second transmission signal, at least said first transmission signal being compatible with a standard TV receiver, wherein during a first frame of the HDTV signal said first transmission signal comprises information representing odd ones of said scan lines and said second transmission signal comprises information representing the remaining portion of the picture information of said first frame, and during a second frame of the HDTV signal said first and second transmission signals comprise even ones of said scan lines and the remaining portion of the picture information of said second frame, respectively; and  
transmitting said first and second transmission signals.

# 4,794,457 VIDEO SIGNAL MIXER CIRCUIT FOR HIGH-RESOLUTION IMAGING WITH SOLID-STATE MATRIX SENSOR CAMERAS

Claude Gillet, Montreuil; Gérard Voisin, Trappes, and Jean-François Bruyeres-Iaza, Orgeval, all of France, assignors to Thomson-CSF, Paris, France  
Filed Oct. 27, 1987, Ser. No. 113,157  
Claims priority, application France, Oct. 31, 1986, 86 15237  
Int. Cl.<sup>4</sup> H04N 5/208

U.S. Cl. 358—162

7 Claims



1. A video mixer circuit receiving a first video signal and a second video signal, the latter signal corresponding to the first signal displaced by half a dot in the line-scanning direction, the said mixer circuit comprising: an adder circuit; a first channel comprising the following series-connected elements: a subtractor circuit which receives the first video signal and the second video signal, a high-frequency filter circuit to eliminate the low-frequency spectrum ranging between 0 and a predetermined frequency and a change-over/sampler circuit to connect, by its output, the first channel to a first input of the

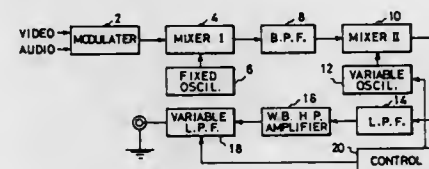
said adder circuit, the second channel transmitting at least one of the video signals to a second input of the said adder circuit, so that the signal delivered at the output of the adder circuit spectrally comprises a high-frequency part corresponding to one of the video signals during the first half of each dot cycle and to the other video signal during the second half of each dot cycle and a low-frequency part corresponding to at least one of the said video signals.

# 4,794,458 MODULATION DEVICE

Akihiko Nagatomi, Kobe, Japan, assignor to DX Antenna Company, Ltd., Hamazaki, Japan  
Filed Aug. 14, 1987, Ser. No. 85,189  
Claims priority, application Japan, Aug. 25, 1986, 61-199341  
Int. Cl.<sup>4</sup> H04N 5/38, 5/40

U.S. Cl. 358—186

2 Claims



1. A modulation device comprising modulator means for modulating a carrier wave with input video and audio signals to provide a modulated signal, variable oscillator means for providing an oscillation signal having variable frequency, mixer means for mixing said modulated signal with said oscillation signal to provide mixed signals, wide band amplifier means for amplifying said mixed signals to provide amplified mixed signals, variable low-pass filter means having a variable cutoff frequency for filtering said amplified mixed signals to provide an output signal having a predetermined frequency, and control means for providing a frequency control signal for controlling the frequency of said oscillation signal and a cutoff frequency control signal for controlling said cutoff frequency, characterized in that said frequency control signal is selected to specify said predetermined frequency as the output frequency of said mixer means which is the frequency difference between said modulated signal and said oscillation signal and said cutoff frequency control signal is selected to provide said variable low-pass filter means with a cutoff frequency for causing said filter to shut off any frequency higher than said predetermined frequency.

# 4,794,459 COLUMNAR FOCUSING INDICATOR FOR A MANUALLY FOCUSED VIDEO CAMERA

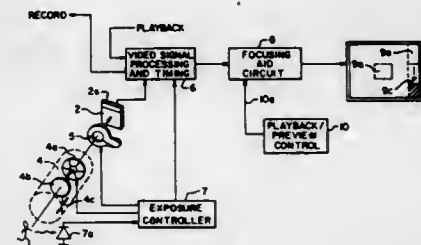
Gregory O. Moberg, Rochester; Wilfred D. Rhodes, W. Webster, and Keith R. Surdyke, Bergen all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.  
Filed Dec. 28, 1987, Ser. No. 138,890  
Int. Cl.<sup>4</sup> H04N 5/232, 5/30

U.S. Cl. 358—227

13 Claims

1. In video apparatus of the type that isolates the high frequency content of a video signal and uses the high frequency content to modify a video display generated within an electronic viewfinder in order to indicate a properly focused video image, the improvement wherein said video apparatus comprises:  
means for generating a control signal that varies according to the high frequency content of the video signal as the video image is brought into focus;  
means for accumulating the control signal; and  
means responsive to the amplitude of the accumulated con-

trol signal for changing the d.c. level of the video signal generating the display in the viewfinder whereby the



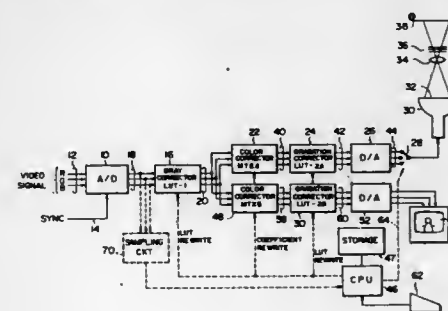
transition in brightness level in the viewfinder corresponds to the high frequency content of the video signal.

# 4,794,460 APPARATUS FOR RECORDING IMAGE EXACTLY CORRESPONDING TO ONE DISPLAYED ON VIDEO MONITOR

Kazuo Shiota, Kaisei, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan  
Filed May 27, 1987, Ser. No. 54,875  
Claims priority, application Japan, May 28, 1986, 61-121171  
Int. Cl.<sup>4</sup> H04N 5/84, 9/79

U.S. Cl. 358—244

4 Claims



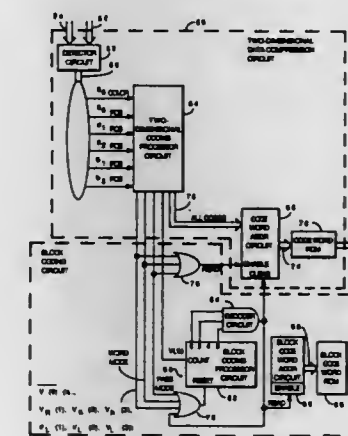
1. An image recording apparatus comprising:  
image processing means for processing an input video signal from a video signal source;  
recording means for recording the processed video signal on a photo sensitive material;  
display means for displaying an image represented by the processed video signal;  
storage means for storing a first image processing parameter determined according to a sensitivity characteristic of the photosensitive material and a second image processing parameter determined according to a display characteristic of said display means;  
input means for receiving instructions; and  
control means responsive to instructions received by said input means for controlling said image processing means, said recording means, said display means, and said storage means;  
said control means setting values of the second image processing parameter in said image processing means to cause said display means to display an image, and setting values of the first image processing parameter having a predetermined relationship to said set second image processing parameter in said image processing means, to cause said recording means to effect a printing operation on the photosensitive material to print an image with a picture quality equal to the image displayed on said display means.

# 4,794,461 METHOD AND APPARATUS FOR BLOCK CODING VERTICAL MODE CODES FOR ENHANCED COMPRESSION OF IMAGE DATA

Lawrence G. Roberts, Woodside; Alex E. Henderson, El Granada, and Fredrick L. Drain, San Francisco, all of Calif., assignors to Netexpress Systems, Inc., San Mateo, Calif.  
Filed Sep. 10, 1986, Ser. No. 905,829  
Int. Cl.<sup>4</sup> H04N 1/417, 1/411, 1/413

U.S. Cl. 358—261.3

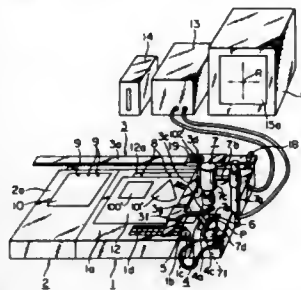
18 Claims



1. A method for processing image data for data compression, said image data representing a two-dimensional image, said image data defining successive input scan lines, said method comprising the steps of:  
establishing one of said scan lines as a current scan line;  
establishing another of said scan lines as a reference scan line;  
using said current scan line and said reference scan line in connection with a two-dimensional image coding process to produce vertical mode codes;  
detecting a predetermined run of a given vertical mode code within coded image data produced during said image coding process; and  
substituting a preselected block code for said predetermined run of said given vertical mode code.  
10. An apparatus for processing image data for data compression, said image data representing a two-dimensional image, said image data defining successive input scan lines, said apparatus comprising:  
means for establishing one of said scan lines as a current scan line;  
means for establishing another of said scan lines as a reference scan line;  
means for using said current scan line and said reference scan line in connection with a two-dimensional image coding process to produce vertical mode codes; and  
block coding means for substituting a preselected block code for a predetermined run of a given vertical mode code within coded image data produced during said image coding process.

**4,794,462**  
**METHOD AND SYSTEM FOR PATCHING AN ORIGINAL**  
**AT A DESIRED ANGULAR ORIENTATION ON A**  
**SCANNER INPUT DRUM OR AN ORIGINAL PATCHING**  
**SHEET AND EXTRACTING ORIGINAL TRIMMING**  
**DATA**

Hideaki Kitamura, Osaka, and Mitsuhiro Yamada, Kyoto, both of Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan  
 Filed Jan. 27, 1986, Ser. No. 822,889  
 Claims priority, application Japan, Apr. 11, 1985, 60-75411  
 Int. Cl.<sup>4</sup> H04N 1/06, 1/00, 1/04  
 U.S. Cl. 358—289 3 Claims



1. A method for patching an original and extracting original trimming data in a scanner, said method comprising the steps of:

- mounting a layout sheet on a digitizer;
  - utilizing said digitizer to determine location data of a trimming frame and a corresponding rectangular trimming region on the layout sheet, the rectangular trimming region circumscribing the trimming frame and corresponding to an area of an original to be trimmed;
  - storing the determined location data of the trimming frame and the rectangular trimming region and displaying the trimming frame on a monitor;
  - reproducing an image of an original positioned at a pick-up location on the monitor;
  - adjusting the angular orientation and position of the original at the pick-up location and adjusting the reproduction magnification at which the original is reproduced on the monitor so as to display a desired portion of the original on the monitor whereby the desired portion of said original may be fitted within said trimming frame;
  - calculating location data of a rectangular region on the original corresponding to the area of the original to be trimmed from the location data of the rectangular trimming region on the layout sheet corresponding to the area of the original to be trimmed and the adjusted reproduction magnification;
  - moving the original from the pick-up location to an input drum of a scanner or an original patching sheet to be mounted on an input drum of a scanner while maintaining the angular orientation of the original unchanged;
  - patching the original on the input drum of the scanner or on an original patching sheet; and
  - calculating location data of a rectangular region on the input drum corresponding to the area of the original to be trimmed from displacement data representing the distance the original was moved from the pick-up location and the location data of the rectangular region on the original corresponding to the area of the original to be trimmed.
2. A system for patching an original and extracting original trimming data in a scanner, said system comprising:
- a digitizer for determining location data of a trimming frame and a corresponding rectangular trimming region on a layout sheet, the rectangular trimming region circumscribing the trimming frame and corresponding to an area of an original to be trimmed;
  - a memory device for storing the location data;

an original-holding plate for holding an original at an adjustable angular orientation;

an original-shifting device for holding the original-holding plate at an adjustable position;

a pick-up device for developing an electronic representation of the original with an adjustable magnification when the original is positioned at a pick-up location; and

a monitor coupled to said pick-up device and said memory device for displaying the trimming frame as a function of the stored location data and for displaying an image of a desired portion of the original relative to be displayed trimming frame as a function of the electronic representation;

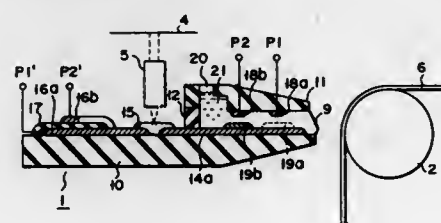
said original-holding plate and said original-shifting device enabling the original to be positioned at a desired angular orientation and position at the pick-up location so that the image of the desired portion of the original is fitted within the displayed trimming frame on the monitor when the pick-up device develops the electronic representation of the original with a desired magnification, and said original-shifting device enabling the original to be moved from the pick-up location to an input drum of a scanner or an original patching sheet to be mounted on an input drum of a scanner while maintaining the desired angular orientation of the original unchanged;

said system further comprising means for detecting the distance the original-shifting device is moved from the pick-up location.

**4,794,463**  
**INK JET SYSTEM**

Sakae Tamura, Chiba; Tsutomu Uehara, Yokosuka; Tetsuo Okuyama, and Mutsuki Yamazaki, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 10, 1987, Ser. No. 118,883  
 Claims priority, application Japan, Nov. 10, 1986, 61-265455;  
 Jun. 30, 1987, 62-163078; Jun. 30, 1987, 62-163079  
 Int. Cl.<sup>4</sup> G01D 15/16  
 U.S. Cl. 358—296 38 Claims



1. An ink jet system comprising:
- an insulating substrate board having one end;
  - a plurality of main electrode formed on said insulating substrate board such that they extend toward said end;
  - means, disposed on said substrate board, for defining an ink reservoir accommodating ink and a slit-like ink jet port communicating with said ink reservoir and extending along said end of said insulating substrate board;
  - a control electrode facing said main electrodes in said ink reservoir and extending along said end of said insulating substrate board;
  - auxiliary electrodes arranged corresponding to said main electrodes and extending on said substrate board outside said ink reservoir;
  - photoconductive members provided on said substrate board and connecting said main electrodes to said auxiliary electrodes outside said ink reservoir and providing resistance capable of being changed when said members are exposed to light;

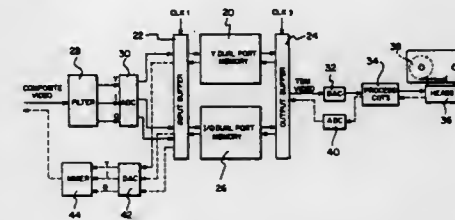
back electrode means facing said ink jet port via a gap, ink being jetted from said ink jet port through said gap; and means for supplying voltage signals to said control electrode, auxiliary electrode and back electrode means, a voltage signal having a periodically varying level being supplied to one of said control electrode and auxiliary electrode, the potential on main electrodes being varied according to voltage signals supplied to said control electrode and auxiliary electrode, ink on said main electrodes being jetted toward said back electrode when a predetermined value is reached by the potential difference between the potential on said back electrode means and potential on said main electrodes.

**4,794,464**

**VIDEO TIME DIVISION MULTIPLEXER WITH PLURAL DUAL PORT MEMORIES**

Steven J. Sasson, Springwater, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 2, 1986, Ser. No. 902,821  
 Int. Cl.<sup>4</sup> H04N 9/81  
 U.S. Cl. 358—310 24 Claims



1. A video time division multiplex signal processing system for either multiplexing or demultiplexing a color video signal, said color video signal being characterized by plural color components occurring in plural successive odd and even video lines corresponding to odd and even video line scan periods, each of said lines comprising a succession of odd and even video words, said system comprising:

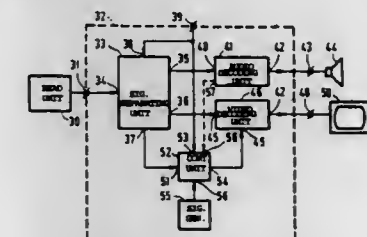
- (a) memory means having plural memories, each of said memories having a first port and a second port;
- (b) input/output means, connected to the first port of each of said memories, said input/output means comprising:
  - i. first addressing means for addressing a first set of locations in a first group of said memories during odd ones of said video line scan periods, wherein:
    - said first group of memories comprises as much as one memory for each of said color components, said one memory being adapted to store video data of the corresponding color component,
    - said first set of memory locations corresponding to said odd numbered video lines,
  - ii. second addressing means for addressing a second set of locations in a second group of said memories during even ones of said video line scan periods, wherein:
    - said second group of memories comprises as much as one memory for each of said color components, said one memory being adapted to store video data of the corresponding color component,
    - said second set of memory locations corresponding to said even video lines;
- (c) output/input means connected to the second port of each of said memories, comprising:
  - i. third addressing means for addressing said first set of memory locations in each of the memories of said first group sequentially in corresponding plural successive intervals during said even video line scan periods at least nearly simultaneously with said second addressing means addressing said second set of memory locations, and
  - ii. fourth addressing means for addressing said second set of memory locations in each of the memories of said

**4,794,465**  
**METHOD OF AND APPARATUS FOR RECORDING**  
**AND/OR REPRODUCING A PICTURE SIGNAL AND AN**  
**ASSOCIATED AUDIO SIGNAL IN/FROM A RECORD**  
**CARRIER**

Balthasar A. G. Van Luyt; Richard Bruno, both of Eindhoven, Netherlands, and Jacques Taillade, Fontenay-aux-Roses, France, assignors to U.S. Philips Corp., New York, N.Y.

Filed Oct. 10, 1986, Ser. No. 918,175  
 Claims priority, application Netherlands, May 12, 1986, 8601182  
 Int. Cl.<sup>4</sup> H04N 5/76 13 Claims

U.S. Cl. 358—341



1. A method of recording and/or reproducing a video signal and an associated audio signal in/from a record carrier comprising: during recording, encoding the video signal and the audio signal to form a first and a second information signal respectively comprising information words arranged in frames, each frame comprising a frame header and a data field, a data field of a frame comprising a plurality of information words of the video signal or an audio signal, the header indicating the information signal to which the information words in the data field belongs; recording the frames on the record carrier; during reproduction, reading the frames from the record carrier and decoding said frames to obtain the video signal and the associated audio signal, wherein for recording at least a second audio signal associated with the video signal the second audio signal is encoded to form a third information signal comprising information words arranged in frames, wherein the frame headers of those frames which comprise an encoded audio signal moreover indicate to which of the two or more audio signals the information words in a data field of a frame belong, wherein reference signals and additional frames are recorded on the record carrier, which additional frames for each of the two or more audio signals associated with a video signal contain time information pertaining to the time interval between the instant at which a reference signal is detected after read-out and the instant at which a read-out video signal is to be displayed, and during reproduction the reference signals and the additional frames are read from the record carrier, the time information associated with one of the audio signals is derived from an additional frame under the influence of a first control signal and subsequently a second control signal is derived from the time information thus derived and from a detected reference signal for displaying a read-out video signal, and wherein only one of said audio signals is selected and reproduced in response to a first control signal.



4,794,467

**APPARATUS FOR AUTOMATICALLY SUPPLYING AND  
SELECTIVELY REPRODUCING A PLURALITY OF  
CASSETTES AND FOR AVOIDING THE REPRODUCING  
OF DEGRADED SIGNALS**

Yoshikazu Okuyama, and Hideki Nakamura, both of Kanagawa,  
Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 17, 1967, Ser. No. 39,447

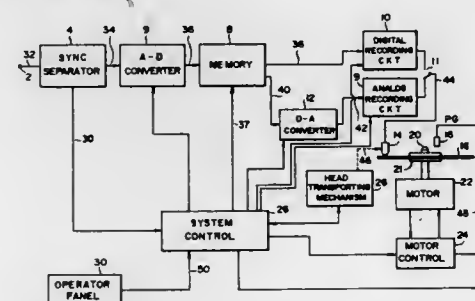
Claims priority, application Japan, May 10, 1966, 61-107379;  
May 10, 1966, 61-107380

Int. Cl.<sup>7</sup> G11B 15/68, 5/86

The diagram illustrates the process of dubbing a cassette tape in three stages:

- Initial Setup:** A VTR 1A is shown with tracks 1A, 1B, 1C, and 1D. Track 1A is connected to a cassette's IN (7) and OUT (8) terminals. A 'NEW CASSETTE' is indicated.
- Dubbing Process:** The output of VTR 1A (OUT 8) is connected to the input of VTR 1B (IN 7). VTR 1B has tracks 1A, 1B, 1C, and 1D. A 'DUBBING' label is shown next to VTR 1B.
- Completion:** The dubbing process is complete, and the output of VTR 1B (OUT 8) is connected to the input of VTR 1A (IN 7).

**4,794,468**  
**MAGNETIC DISK WITH ANALOG AND DIGITAL VIDEO SIGNALS RECORDED THEREON AND APPARATUS FOR MAKING RECORDING ON SAID DISK**  
**Makoto Murakoshi, Tokyo, Japan, assignor to Fuji Photo Film Co. Ltd., Kanagawa, Japan**  
**Filed Nov. 10, 1987, Ser. No. 118,953**  
**Claims priority, application Japan, Nov. 11, 1986, 61-266523**  
**Int. Cl.<sup>4</sup> H04N 5/78; G11B 5/00, 5/09**  
**U.S. Cl. 360—35.1** **9 Claims**



4,794,469  
RECORDED DATA REPRODUCING APPARATUS  
Katsuhika Kaido, and Kenji Arai, both of Tokyo, assign-  
ors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Jul. 21, 1987, Ser. No. 75,964  
Claims priority, application Japan, No. 30, 1986, 61-177716  
Int. Cl.<sup>4</sup> G11B 5/09, 15/14

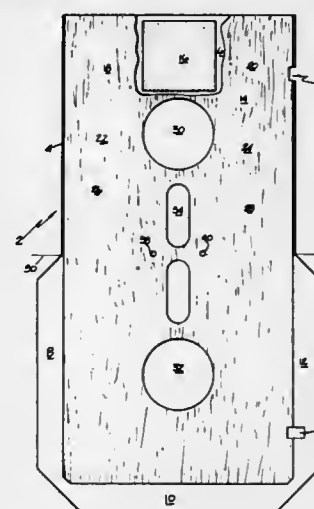
4,794,470

**SECURITY SYSTEM FOR PROTECTING INFORMATION**

**James H. Lauffenburger, Colorado Springs; George F. Denchy,**  
**and Andre Novickis, both of Monument, all of Colo., assignors**  
**to Media Security Incorporated and Associates, Colorado**  
**Spring, Colo.**

Continuation-in-part of Ser. No. 878,320, Jun. 25, 1986,  
abandoned. This application Oct. 9, 1986, Ser. No. 916,891  
Int. Cl.<sup>4</sup> G11B 19/10, 23/033, 23/027; G08B 13/24

U.S. Cl. 360—69 15 Claims



4,794,471

**MODE PROCESSING CIRCUIT**

Keiichiro Shimada, Kanagawa; Yuriko Kishitaka, Chiba; Toru Miura, Kanagawa; Koji Iwamoto, Tokyo; Kenichi Ito, Kanagawa; Ryo Ito, and Katsumi Matsuno, both of Tokyo, all of Japan, assignors to Sony Corporation, Japan

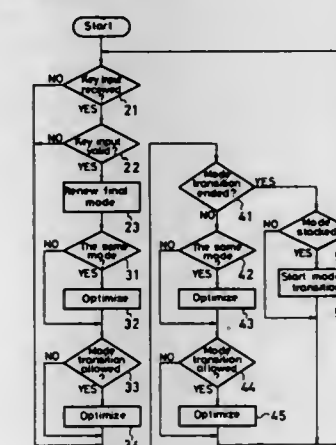
Filed Jun. 9, 1967, Ser. No. 60,049

Claims priority, application Japan, Jun. 11, 1966, 61-135349; Jun. 13, 1966, 61-137996

Int. Cl.<sup>4</sup> G11B 5/02

U.S. Cl. 360—69

8 Claims



1. A method for changing the operation mode of an multi-operation mode electronic apparatus during a period in which the operation mode is transferring from a present operation mode to a final operation mode, comprising the steps of:

- (a) receiving an input command signal;
- (b) judging whether said input command signal is valid or not in view of the operation mode corresponding to previously received, valid command signals;
- (c) redetermining the final operation mode in accordance with said valid input command signal;
- (d) determining a sequence of mode changes from the present operation mode to the final operation mode; and
- (e) executing said sequence of mode changes until said present operation mode is equal to said final operation mode.

4,794,472

# VIDEO TAPE REPRODUCING APPARATUS WITH A PROCESSOR THAT TIME-SHARES DIFFERENT OPERATIONS

Yoshiaki Doyama, Hirakata, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

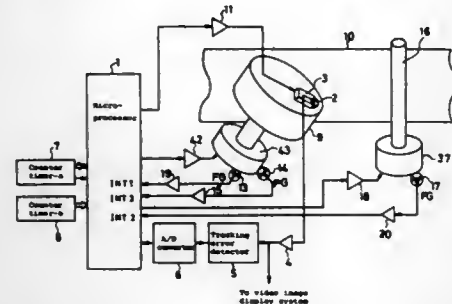
Filed Jul. 28, 1986, Ser. No. 889,858

Claims priority, application Japan, Jul. 30, 1985, 60-167936; Aug. 2, 1985, 60-171553; Aug. 20, 1985, 60-182112

Int. Cl.<sup>4</sup> G11B 5/52, 5/584

U.S. Cl. 360—70

21 Claims



7. A tape reproducing apparatus of a type which reproduces information signals recorded as a group of discontinuous recording tracks on a recording tape which is wound helically around a cylinder provided with a rotary head which produces a reproducing signal and which is mounted on a position adjusting electromechanical transducer, said tape also guided by a tape transporting capstan, the apparatus comprising:

- first means for generating a first pulse signal at every  $360^\circ/n$  rotation, where  $n$  is a positive integer, of said rotary head;
- second means for generating a second pulse signal at intervals of rotation of said tape transporting capstan;
- third means for controlling a head rotation speed based on said first pulse signal;
- fourth means for controlling a capstan rotation speed based on said second pulse signal;
- fifth means for producing a first speed error signal by comparing said head rotation speed and a signal indicative of a standard speed of rotary head rotation;
- sixth means for producing a second speed error signal by comparing said capstan rotation speed and a capstan rotation speed standard signal indicative of a standard speed of capstan rotation; and
- processing means for carrying out selective operations on a time sharing basis, said selective operations including a first operation for operating and issuing a head rotation speed control signal based on said first speed error signal, and a second operation for operating and issuing a capstan rotation speed control signal based on said second speed error signal, which among said selective operation being carried out being controlled by said first pulse signal.

4,794,473

# FAST MODE REEL SERVO IN A MAGNETIC RECORDING/REPRODUCING APPARATUS

Ken-ichi Kawasaki, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed May 29, 1987, Ser. No. 55,282

Claims priority, application Japan, May 29, 1986, 61-125098

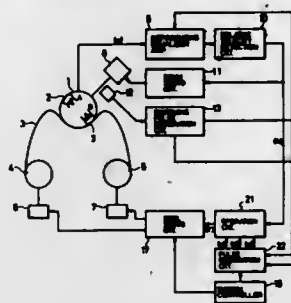
Int. Cl.<sup>4</sup> G11B 21/04, 15/46

U.S. Cl. 360—70

3 Claims

1. A magnetic reproducing apparatus for reproducing information from an inclined track on a magnetic tape, comprising: at least two rotary magnetic heads having respective azimuth angles with respect to a tape transport direction different from each other; detection circuit means for detecting at least two respective

relative velocities between said magnetic tape and said rotary magnetic heads on the basis of respective output signals of said at least two rotary magnetic heads; operation circuit means for operation on output signals of said detection circuit representing said two relative velocities



ities to produce an output signal corresponding to an absolute velocity of said magnetic tape; and servo circuit means for causing said magnetic tape to run in accordance with the output signal of said operation circuit at a predetermined velocity.

4,794,474

# CUE SIGNALS AND CUE DATA BLOCK FOR USE WITH RECORDED MESSAGES

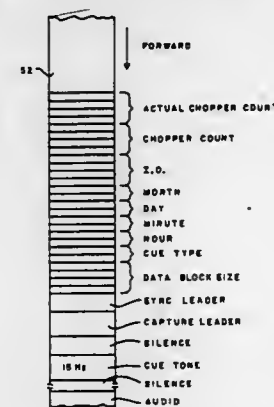
John J. Dwyer, Stratford; David B. Chamberlin, Milford, and Emil F. Jachmann, Greenwich, all of Conn., assignors to Dictaphone Corporation, Stratford, Conn.

Filed Aug. 8, 1986, Ser. No. 894,582

Int. Cl.<sup>4</sup> G11B 27/38, 15/18

U.S. Cl. 360—72.2

38 Claims



1. A method of recording identifying signals to identify types of audio messages recorded on an audio record medium comprising the steps of: selectively generating one of at least two different types of analog identifying signals to identify at least two different types of audio messages; creating a block of digital data including digital identifying signals; and recording the generating identifying signals and said block of digital data on said audio record medium.

4,794,475

# AUTOMATIC LOADING HORIZONTAL TYPE OPEN-REEL MAGNETIC TAPE DRIVE UNIT WITH TAPE DETECTION

Ken-ichi Kosugi; Yuuji Asahara, and Kazumasa Watanabe, all of Tokyo, Japan, assignors to Auritsu Electric Company Limited, Tokyo, Japan

Division of Ser. No. 573,896, Jan. 25, 1984, Pat. No. 4,653,704.

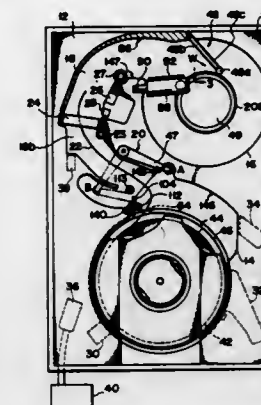
This application Aug. 28, 1986, Ser. No. 901,488

Claims priority, application Japan, Jan. 31, 1983, 58-14418

Int. Cl.<sup>4</sup> G11B 15/00

U.S. Cl. 360—90

7 Claims



1. An automatic-threading horizontal type of magnetic tape drive unit comprising:

- a housing having an interior;
- a base horizontally disposed within said housing;
- a tape supply section disposed on said base, comprising means for retaining and rotating about a substantially vertical axis a tape reel having a coil of magnetic tape wound thereon and terminating in a free end;
- a tape take-up section disposed on said base, comprising a take-up hub and means for supporting and rotating said take-up hub about a substantially vertical axis;
- a tape transport path formed as an open channel in said base, extending between said tape supply section and said tape take-up section;
- a magnetic head means disposed at a position along said tape transport path between said tape supply section and said tape take-up section, for performing read and write operations on said magnetic tape; a source of air under high pressure;
- air outlet means for producing high-pressure air flows, supplied with air from said high-pressure air source, and disposed at positions adjacent to the periphery of said tape reel and at positions along said tape transport path, for directing said high-pressure air flows such as to separate said tape free end from adjacent portions of said magnetic tape wound on said tape reel and to guide and transport said tape free end after said separation, along a substantially central region of said tape transport path to said tape take-up section;
- winding securing means disposed in said take-up section, acting to wind said magnetic tape onto said take-up hub after said tape free end has been transported to said tape take-up section by said high-pressure air flows, and
- detecting means for detecting a start portion of said magnetic tape when said magnetic tape starts to be wound onto said take-up hub and for detecting an end portion of said magnetic tape when said magnetic tape completes winding onto said tape take-up hub, and wherein a start mark and an end mark each having a different reflectivity from said magnetic tape are provided on said start and end portions respectively;

said detection means comprising:

- a supporting means fixedly attached in said tape transport path at an intermediate position between said tape supply section and said tape take-up section and having an upper surface which is disposed above said tape transport path and a lower surface disposed substantially coplanar with a lower surface of said tape transport path, said supporting means having apertures;
  - a photo-emissive element positioned in one of said apertures, said one aperture opening up onto said upper surface such that light emitted by said photo-emissive element impinges obliquely upon said magnetic tape; and
  - a photo-receptive element positioned in another of said apertures, said another aperture opening up onto said lower surface such that light from said photo-emissive element is reflected from said magnetic tape onto said photo-receptive element;
- whereby a detection signal is produced by said photo-receptive element when light from said photo-emissive element is reflected from said start mark and from said end mark when said magnetic tape is wound onto said take-up hub.

4,794,476

# CASSETTE EJECT MECHANISM FOR CASSETTE DECK

Mikio Isaki; Masamori Shibata, and Norikazu Harada, all of Yamagata, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

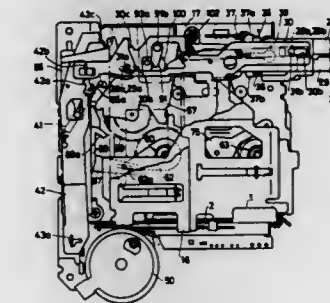
Filed Oct. 5, 1984, Ser. No. 658,240

Claims priority, application Japan, Oct. 7, 1983, 58-187839

Int. Cl.<sup>4</sup> G11B 5/008, 15/00

U.S. Cl. 360—93

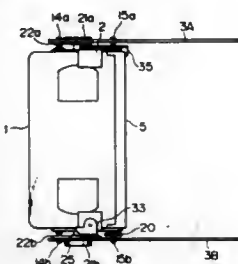
2 Claims



1. A starting mechanism for an eject mechanism of a tape deck having a head base movable between a retracted position and an advanced position, said eject mechanism adapted to be automatically operated in response to stoppage of rotation of a reel unit of a cassette deck, said starting mechanism comprising: a power lever, means for mounting said power lever for reciprocation between an original position and an advanced position, a reel unit drive motor, means operatively coupling said reel unit drive motor to said power lever to reciprocate the power lever by the output torque of said motor when said reel unit stops rotation; and a selection lever having an operator-actuable end and a second end, said selection lever being juxtaposed with said power lever and movable reciprocally, said selection lever being pivotally mounted about said second end for pivoting between a first position for engagement with said power lever when said head base is in the advanced position to be moved with said power lever whereby movement of the power lever moves the selection lever to initiate the eject mechanism to eject a cassette from the cassette deck and a second position disengaged from the power lever with the head base in the retracted position wherein movement of the power lever reverses tape direction and moves the head base to the advanced position.



**4,794,477**  
**CASSETTE LOADING MECHANISM OF MAGNETIC RECORDING AND/OR REPRODUCING APPARATUS**  
 Yasuhiro Hashiguchi, Katsuta; Noboru Katohno, Mito, and Yoshihiro Shibata, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Apr. 9, 1987, Ser. No. 36,374  
 Claims priority, application Japan, Apr. 9, 1986, 61-80171  
 Int. Cl.<sup>4</sup> G11B 15/60  
 U.S. Cl. 360—96.5 5 Claims

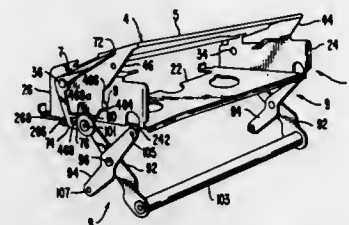


1. A cassette loading mechanism of a magnetic recording and/or reproducing apparatus comprising:  
 a cassette holder for accommodating a tape cassette, said cassette holder including guide members;  
 a bracket disposed outside of said cassette holder and having guide slits along which said guide members of said cassette holder are guided, said cassette holder being guided by said guide slits and said guide members from a first position to a second position;  
 a cassette holder driving mechanism for driving said cassette holder wherein said cassette holder driving mechanism includes a driving arm which engages one of said guide members of said cassette holder driving said cassette holder along said guide slits said driving arm being disposed in a space provided between said cassette holder and said bracket;  
 a power source for providing motive power; and  
 power transmitting means for rotating said driving arm while being supplied with motive power from said power source; wherein  
 said space between said cassette holder and said bracket also accommodates other mechanisms of said cassette loading mechanism other than said driving arm such that a width of said cassette loading mechanism taken across said cassette loading mechanism perpendicular to said bracket is reduced compared to the width of conventional cassette loading mechanisms.

**4,794,478**  
**IMPROVED LOADING DEVICE FOR CASSETTE RECORDING PLAYBACK APPARATUS**  
 Shunsuke Kamezawa, Katsuta, and Kimio Ohga, Mito, both of Japan, assignors to Hitachi Video Engineering, Tokyo, Japan  
 Filed Mar. 27, 1986, Ser. No. 844,507  
 Claims priority, application Japan, Mar. 27, 1985, 60-60648  
 Int. Cl.<sup>4</sup> G11B 15/66  
 U.S. Cl. 360—96.6 5 Claims

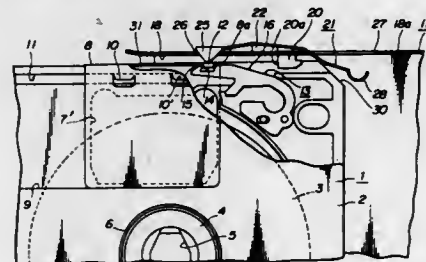
1. A cassette loading device, comprising:  
 a chassis;  
 a tray for forming a space for accommodating a cassette therein and being mounted for upward and downward movement relative to said chassis;  
 a cover operatively associated with said tray to define a boundary of said space for accommodating the cassette; means for both supporting and enabling rotation of said cover as said means rotates through an angle such that said space formed by said tray and cover increases in response to an increase of said angle during movement of said cover

toward an open position of the cassette loading device; and



a link mechanism connected to said chassis, said tray and said means to allow movement of said tray and rotation of said means such that said angle becomes larger as the distance between said chassis and tray increases.

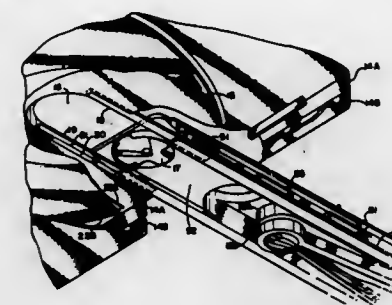
**4,794,479**  
**SHUTTERING MECHANISM FOR A CASSETTE WITH A SHUTTER MOVING ARM**  
 Hiroshi Nakanishi, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan  
 Continuation of Ser. No. 766,990, Aug. 19, 1985, abandoned.  
 This application Jan. 15, 1988, Ser. No. 145,691  
 Claims priority, application Japan, Aug. 20, 1984, 59-126000  
 Int. Cl.<sup>4</sup> G11B 5/012  
 U.S. Cl. 360—99.06 7 Claims



1. A shutter opening mechanism for a disk cassette record-playback apparatus, said disk cassette being adapted for reciprocal insertion into a cassette holder and having a reciprocally mounted shutter mounted thereon for reciprocation along the direction of insertion of the cassette for covering and exposing a window in the cassette through which a recording medium of the cassette is accessed, and first means on said cassette for positively locking said shutter in a closed position in which said window is covered,

said shutter opening mechanism comprising second means on said cassette holder intercepting and releasing said locking means during insertion of the cassette into the cassette holder, and an elongate control arm pivotally mounted on said cassette holder near the center of its length and extending along said direction of insertion, a first end of said control arm having a tongue for positively engaging said shutter immediately before said second means releases said locking means to thereby reciprocate said shutter to expose the window upon further insertion movement of the cassette and to cover said window upon removal of said cassette from said cassette holder, the other end of said control arm having means for contacting the outer periphery of said cassette shutter for pivoting said tongue into position engaging an aperture in said cassette during insertion of said cassette and for allowing said tongue to be withdrawn upon removal of said cassette.

**4,794,480**  
**BERNOULLI PLATE IN CARTRIDGE**  
 David E. Jones; Randall C. Bauck, both of Layton, and Robert D. Freeman, Roy, all of Utah, assignors to Iomega Corporation, Roy, Utah  
 Filed Apr. 21, 1986, Ser. No. 854,130  
 The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.  
 Int. Cl.<sup>4</sup> G11B 17/32, 5/016, 5/54, 23/033  
 U.S. Cl. 360—99.04 2 Claims



1. An improved magnetic storage and retrieval device having: a disk drive; a flexible magnetic disk contained in a rigid apertured cartridge; a drive spindle contained within said disk drive and having access to the flexible magnetic disk for rotating the disk; and a transducer contained within said disk drive and having access to the magnetic disk through the aperture in the cartridge for storage and retrieval of data to and from the magnetic disk, wherein the improvement comprises:

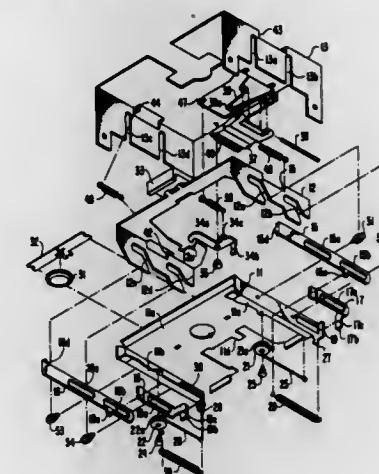
- a spicule member mounted to the disk drive, said spicule member having a spicule reference surface;
- a Bernoulli surface comprising the interior apertured surface of the cartridge;
- a cartridge reference surface integral with said Bernoulli surface and proximate to the cartridge aperture;
- means for holding and flattening said cartridge reference surface against said spicule reference surface; and
- means for movably mounting said transducer to said spicule member such that said transducer is only movable in a plane substantially parallel to the disk.

**4,794,481**  
**APPARATUS FOR LOADING AND DRIVING AN INFORMATION RECORDING MEDIUM ENCASED IN A CARTRIDGE**  
 Satoaki Suyama, Neyagawa; Toru Arakawa, Nishio; Kiyoshi Masaki, Amagasaki, and Souji Oba, Katano, all of Japan, assignors to Matsushita Electric Industrial Co. Ltd., Osaka, Japan  
 Filed Feb. 18, 1986, Ser. No. 829,999  
 Claims priority, application Japan, Feb. 19, 1985, 60-30936; Feb. 20, 1985, 60-32010; Jul. 18, 1985, 60-158962; Jul. 18, 1985, 60-159027  
 Int. Cl.<sup>4</sup> G11B 5/016  
 U.S. Cl. 360—99.06 24 Claims

1. An apparatus for driving an information recording medium encased in a cartridge, the cartridge having a head window through which information recorded on the recording medium is read and a protecting means movably mounted to the cartridge for moving between a closed position at which the protecting means covers the head window and an open position at which the head window is open, said apparatus comprising:

- a drive unit having a reading head for reading the information recorded on the recording medium through the head window when the protecting means is in the open position and a driving means for driving the recording medium;
- an outer casing connected to said drive unit and into which

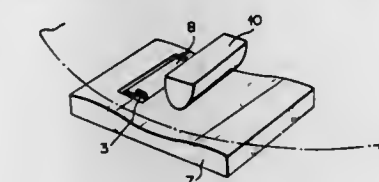
the cartridge is inserted in a cartridge insertion direction; and  
 a cartridge mounting unit disposed within said outer casing and mounted to said drive unit for receiving the cartridge inserted in said outer casing and for opening the head window of the cartridge by moving the protecting means from the closed position to the open position, said cartridge mounting unit comprising  
 move means for moving in response to the movement of the cartridge into said outer casing in said cartridge insertion direction,



conversion means operatively connected to said move means for converting a force produced by the movement of said move means to a second force acting in a predetermined direction, and

action means operatively connected to said conversion means for being moved by said second force in a direction opposite the insertion direction between a first position and a second position for engaging the protecting means of the cartridge and for moving the protecting means for the closed position to the open position to open the head window, said second position being a position at which said action means projects from said outer casing.

**4,794,482**  
**MECHANISM FOR RETAINING A FLEXIBLE MAGNETIC SHEET IN POSITION FOR COMMUNICATION WITH A MAGNETIC HEAD**  
 Motohiko Horie; Naoki Kobayashi, and Hideo Kobayashi, all of Saitama, Japan, assignors to Fuji Photo Optical Co., Ltd., Saitama, Japan  
 Continuation of Ser. No. 849,583, Apr. 8, 1986, abandoned. This application Mar. 14, 1988, Ser. No. 169,068  
 Claims priority, application Japan, Apr. 11, 1985, 60-77205  
 Int. Cl.<sup>4</sup> G11B 17/32, 5/016  
 U.S. Cl. 360—102 4 Claims



1. A retaining mechanism for retaining a flexible magnetic sheet in a position for magnetic communication with a magnetic head, comprising:

a lower retaining member having a first convex portion with a slot therein and positioned with respect to said magnetic head and said magnetic sheet so that said magnetic head communicates with the underside of said magnetic sheet through said slot, said lower retaining member having a second convex portion displaced from said first convex portion to form a recess between said convex portions; and

an upper retaining member of convex shape which penetrates said recess in said lower member, and which is positioned on the opposite side of said magnetic sheet from said lower retaining member to thereby press said flexible magnetic recording sheet into said recess.

4,794,483

# MAGNETIC HEAD HAVING LAYERS OF AMORPHOUS MAGNETIC ALLOY BONDED TOGETHER WITH A GLASS CONTAINING VANADIUM OXIDE PHOSPHORUS OXIDE AND ANTIMONY OXIDE

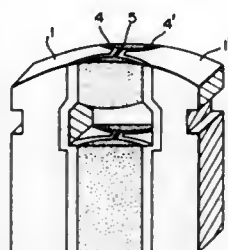
Takashi Naitoh; Takashi Namekawa, both of Hitachi; Seichi Yamada, Ibaraki; Satoru Ogihara, Hitachi, and Juichi Morikawa, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 14, 1986, Ser. No. 918,339

Claims priority, application Japan, Oct. 14, 1985, 60-226786 Int. Cl.<sup>4</sup> G11B 5/235

U.S. Cl. 360-120

14 Claims



1. A magnetic head which comprises a pair of magnetic cores each core comprising a non-magnetic substrate having an amorphous magnetic alloy layer on said substrate, counterposed to each other through a small magnetic gap and bonded to each other by fusion of a glass at a bonding temperature lower than the crystallization temperature of the amorphous magnetic alloy layers, the glass comprising vanadium oxide as a major component and phosphorus oxide and antimony oxide as minor components and, having a viscosity of not more than  $10^5$  poises at the bonding temperature; said bonding temperature being at least  $50^\circ\text{C}$ . lower than the crystallization temperature of the amorphous magnetic alloy layer.

4,794,484

# CIRCUIT INTERRUPTER APPARATUS WITH A STYLE SAVING OVERRIDE CIRCUIT

Joseph J. Matko, Beaver; William E. Beatty, Jr., New Sewickley Township, Beaver County; Raymond O. D. Whitt, Beaver, and Gary F. Saletta, Penn Township, Westmoreland County, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 20, 1987, Ser. No. 17,306

Int. Cl.<sup>4</sup> H02H 3/08

U.S. Cl. 361-93

10 Claims

1. A circuit interrupter apparatus operable at a selected one rating from a range of current withstanding ratings, comprising:

interrupting means disposed in a normally conducting electrical circuit and effective to interrupt current flow through said electrical circuit upon the reception of a trip signal;

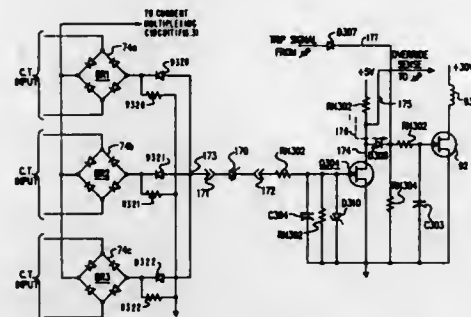
conditioning means coupled to said electrical circuit to

condition a current value proportionate to such current flow, said conditioning means producing a conditioned signal representative of the magnitude of said current value;

operating means effective for deriving at least one operating characteristic from said conditioned signal, said operating means further effective for comparing said at least one operating characteristic to a corresponding at least one tripping parameter and generating said trip signal when said at least one operating characteristic is at least equal to said corresponding at least one tripping parameter;

signal developing means receptive of said current value and effective to develop therefrom, an override signal;

said override signal being communicated to a first switching element over a regulating element when said override



signal is below a predetermined override value, and said regulating element preventing communication of said override signal to said first switching element when said override signal exceeds said predetermined override value which thereby enables communication of an alternate trip signal to said interrupting means; and

whereby said regulating element is disposed within said circuit interrupter apparatus at a position which is removably separable from said signal developing means on one terminal by a first connector and from said first switching element on its other terminal by a second connector such that said regulating element can be replaced in the event of a change in such selected one rating from such range of current withstanding ratings without effect to said developing means and said first switching element.

4,794,485

# VOLTAGE SURGE PROTECTOR

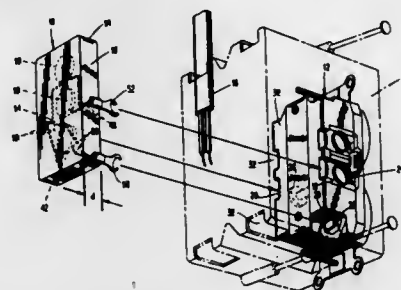
John C. Bennett, Hampton, Va., assignor to Maida Development Company, Hampton, Va.

Filed Jul. 14, 1987, Ser. No. 73,188

Int. Cl.<sup>4</sup> H02H 3/20

U.S. Cl. 361-127

18 Claims



1. A device for suppressing transient surges in electrical power available from an electrical outlet having power circuit

connection terminals, a ground terminal, a back side portion, and disposed in a housing structure, said device comprising:

an insulative housing block having a depth sufficiently thin to allow placement of said insulative housing block between said back side portion and said housing structure, the depth of said insulative housing block being defined in a direction transverse to an elongated plane through said insulative housing block, for mounting on the back side portion of the electrical outlet with said elongated plane of said insulative housing block being parallel to the back side portion of the electrical outlet;

surge protection means for suppressing the transient electrical power surges, said surge protection means being disposed within said insulative housing block; and

mounting means for physically mounting said insulative housing block to the electrical outlet, and for electrically connecting said surge protection means to the power circuit connection terminals and the ground terminal.

4,794,486

# APPARATUS FOR THE IONIZATION OF GASEOUS OXYGEN

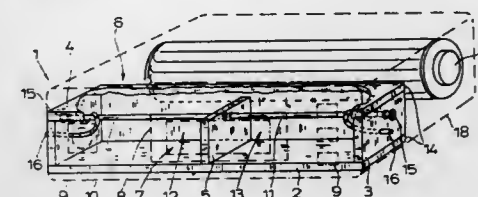
Thomas Blach, Ruschewedel-Harsfeld, and Wolfgang Wichern, Muhlendamm, both of Fed. Rep. of Germany, assignors to Biomed-Electronic GmbH & Co., Buxtehude, Fed. Rep. of Germany

Filed Apr. 1, 1987, Ser. No. 32,581

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1986, 8608913(U); May 2, 1986, 3614994; Jan. 27, 1987, 3702337 Int. Cl.<sup>4</sup> H01T 23/00

U.S. Cl. 361-231

18 Claims



1. An apparatus for the ionization of oxygen gas in room air, comprising:

a housing of an insulating material, with an inlet opening and an outlet opening for the air;

an anode and a cathode disposed in the housing and being respective electrode wires extending cross-wise to the direction of flow of the air;

two separate flow paths between the inlet opening and the outlet opening, the anode being disposed in a first one of the flow paths for providing positive ionization and the cathode being disposed in the second flow path for providing negative ionization; and

a backplate electrode commonly associated with both flow paths and being at ground potential;

wherein the backplate electrode is a frame of electrically conducting material surrounding either said inlet opening or said outlet opening.

4,794,487

# HEAT PROTECTION CASING

Martin Maschek, Würenlos, and Georg Mastner, Niederrohrdorf, both of Switzerland, assignors to BBC Brown Boveri AG, Baden, Switzerland

Filed Sep. 25, 1987, Ser. No. 100,847

Claims priority, application Switzerland, Sep. 29, 1986, 3897/86

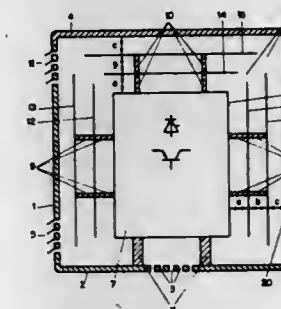
Int. Cl.<sup>4</sup> H05K 7/20

U.S. Cl. 361-383

7 Claims

1. A thermal protection housing for at least one electronic device, the thermal protection housing including a bottom plate, a cover plate opposite the bottom plate, and side plates,

the plates enclosing the at least one electronic device, first lateral ventilation openings being provided adjacent the bottom plate and second lateral ventilation openings being provided adjacent the cover plate, the improvement comprising: first and second upper radiating reflectors supported between the at least one electronic device and the cover plate, the first and second radiating reflectors being spaced from each other as well as from the cover plate and the at least one electronic device;



first and second side radiating reflectors supported between each side plate and the at least one electronic device, the first and second side radiating reflectors being spaced from each other as well as from the side plate, the at least one electronic device, and the first and second upper radiating reflectors to provide a ventilating opening between the side radiating reflectors and the upper radiating reflectors so that all of the reflectors may be ventilated on all sides thereof.

4,794,488

# SUBSTRATE MOUNTING DEVICE

Thomas D. Belanger, Jr., Clarendon Hills, Ill., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Continuation of Ser. No. 032,668, Apr. 1, 1987, abandoned. This application Sep. 28, 1987, Ser. No. 102,237

Int. Cl.<sup>4</sup> H05K 01/18

U.S. Cl. 361-395

7 Claims



1. A substrate mounting device for mounting an electrical substrate to a carrier substrate comprising:

a first pair of tabs each extending from a major perimeter edge of said electrical substrate directly opposite each other;

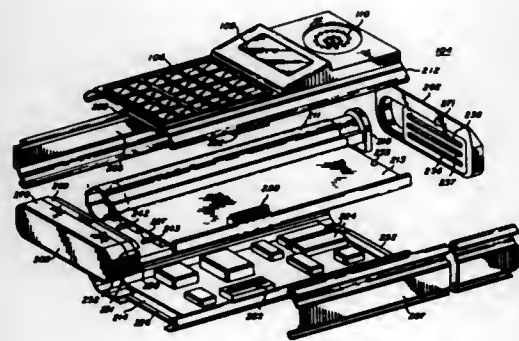
a second pair of tabs located in a spaced relationship to said first pair of tabs and said second pair of tabs extending from a perimeter edge of said electrical substrate directly opposite each other;

first and second substrate guides located in a spaced and parallel relationship to each other and each including a lower shelf with each lower shelf having a top and a bottom surface, and each bottom surface mounted to said carrier substrate, each of said substrate guides further including a channel longitudinally oriented along a first side thereof, and each of said channels including an open end and a top guide, and each channel extending between



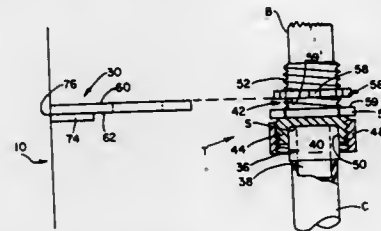
said open end and said top guide, each top guide extending transversely to the other top guide forming an end cap between said first and second substrate guides, and each channel further defined by a top surface and first and second drop guides, said first and second drop guides located on said lower shelf top surface directly opposite said channel top surface, said first and second drop guides further defining first and second tab receiving slots; and, said electrical substrate and said first pair and said second pair of tabs are arranged to be manually inserted into respective first and second substrate guide channels at respective channel open ends and manually pushed along said channels riding between respective first and second drop guides and channel top surfaces until said substrate encounters a respective top guide, whereby said first pair of tabs and said second pair of tabs fall within respective first and second tab receiving slots resting said electrical substrate and said first and second pair of tabs on respective first and second substrate guide lower shelf top surfaces.

**4,794,489**  
**PORTABLE RADIO TRANSCEIVER HOUSING**  
**STRUCTURALLY SUPPORTED BY A BATTERY**  
 Vernon L. Brown, Barrington, Ill., assignor to Motorola, Inc., Schaumburg, Ill.  
 Division of Ser. No. 816,022, Jan. 3, 1986, abandoned. This application Sep. 21, 1987, Ser. No. 99,352  
 Int. Cl.<sup>4</sup> H05K 9/00  
 U.S. Cl. 361-424 3 Claims



1. A housing for electronic circuitry, comprising:  
 a stick battery having a canted outer surface;  
 a battery tube having a canted inner surface for receiving said stick battery;  
 first and second side rails;  
 first, second and third panels coupled to the first and second side rails, at least one of said first, second and third panels having inner and outer opposing surfaces and including a dielectric and circuitry layer bonded to the inner surface thereof, and said second panel being disposed between said first and third panels and having an edge coupled to said battery tube;  
 electronic circuitry bonded to the circuitry layer of said at least one of the first, second and third panels; and  
 end cap means coupled to said first and second side rails and first, second and third panels, whereby said end cap means, said first and second side rails and said first, second and third panels substantially enclose the electronic circuitry.

**4,794,490**  
**HEAVY-DUTY CABLE TERMINATION SYSTEM**  
 Barry M. Epstein, 7523 Cliffbrook, Dallas, Tex. 75240  
 Filed Sep. 23, 1987, Ser. No. 100,186  
 Int. Cl.<sup>4</sup> H02B 1/20; H04Q 1/14  
 U.S. Cl. 361-428 36 Claims

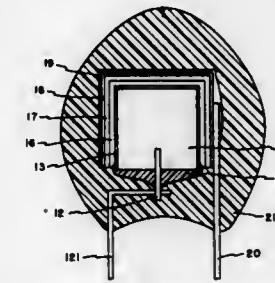


1. A cable termination assembly for use with a cable termination device that includes a body having a threaded end and a collar, a first coupling means removably attached to a cable and releasably attached to the body and a retaining ring threadably attached to the body threaded end, the body being tubular with a bore extending therethrough, the assembly comprising:  
 a cabinet;  
 a mounting bracket on said cabinet having a top surface and an undersurface with an opening defined therethrough with said opening being sized and adapted to removably receive a threaded portion of a body of a cable termination device to position a collar of the cable termination device adjacent to said mounting bracket undersurface with the body threaded portion of that cable termination device extending through said mounting bracket via said opening so that a retaining ring of the cable termination device will be located adjacent to the top surface with the mounting bracket being positioned between the retaining ring and the collar of the cable termination device for mounting the cable termination device on said mounting bracket;  
 a slot extending from one edge of the mounting bracket to said opening and having a size that is large enough so wires associated with the cable termination device can be moved through said slot and small enough so the cable termination device retaining ring is prevented from passing through said slot so that the cable termination device can be moved through said slot into said opening to position that cable termination device and the wires associated therewith with respect to said mounting bracket; and  
 a collar retainer means located adjacent to the mounting bracket undersurface next to said opening to engage the cable termination device collar when such cable termination device is positioned in said opening and adapted to prevent that engaged cable termination device from rotating while the retaining ring of that cable termination device is being threaded down on the cable termination device body threaded portion against the mounting bracket top surface.

**4,794,491**  
**SOLID ELECTROLYTE CAPACITOR**  
 Yoshihiko Sakai, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan  
 Filed Jun. 12, 1987, Ser. No. 62,103  
 Claims priority, application Japan, Jun. 12, 1986, 61-137364  
 Int. Cl.<sup>4</sup> H01G 9/00  
 U.S. Cl. 361-532 9 Claims

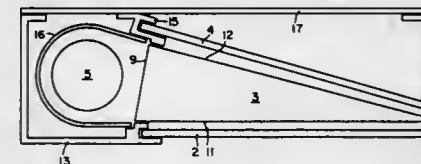
1. A solid electrolyte capacitor comprising: an anode body of valve-metal, an anode wire extended from one surface of said anode body, a dielectric layer formed on said anode wire and said anode body, a solid electrolyte layer formed on said dielectric layer, a first conductive layer formed on said solid electrolyte layer, a second conductive layer formed on said first conductive layer and containing a material to prevent

penetration of hydrogen ions therethrough, a third conductive layer formed on said second conductive layer and containing a



powder of plating catalyst, an electroless-plated metal layer formed on said third conductive layer, and a solder layer formed on said plated metal layer.

**4,794,492**  
**ILLUMINATED BOARD**  
 Franz J. Vinther, 5 Lykkesholms Alle, DK-1902 Copenhagen, Denmark  
 Continuation-in-part of Ser. No. 762,427, Aug. 5, 1985, abandoned. This application Mar. 30, 1987, Ser. No. 31,838  
 Claims priority, application Denmark, Aug. 7, 1984, 3800/84  
 Int. Cl.<sup>4</sup> F21V 7/04  
 U.S. Cl. 362-31 11 Claims

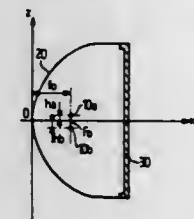


1. An illuminated board for use in sign boards, advertisement boards, drawing boards and like planar objects to be illuminated, comprising  
 an elongate, transparent and translucent wedge-shaped prismatic slab having one essentially rectangular end face, two essentially triangular parallel side faces, one essentially rectangular smooth front surface and one essentially rectangular smooth rear surface,  
 at least one light source arranged at said end face for illuminating said end face,  
 an opalescent front panel arranged adjacent said front face, a reflective rear panel arranged adjacent said rear face, and mounting means for holding said slab, said front panel and said rear panel so as to maintain said front panel parallel with and at a predetermined distance from said front face of said slab and, respectively, so as to maintain said rear panel parallel with and at a predetermined distance from said rear face of said slab.

**4,794,493**  
**HEADLIGHT HAVING TWO TRANSVERSE FILAMENTS FOR A MOTOR VEHICLE**  
 Bernard Luciani, Paris, France, assignor to Cible Projecteurs, France  
 Filed Jul. 31, 1987, Ser. No. 80,634  
 Claims priority, application France, Aug. 4, 1986, 8611265  
 Int. Cl.<sup>4</sup> B60Q 1/00  
 U.S. Cl. 362-61 7 Claims

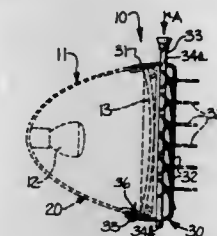
1. A motor vehicle main beam and dipped beam headlight comprising a lamp provided with a transverse horizontal dipped beam filament and a transverse horizontal main beam filament, said filaments being offset relative to each other in horizontal and vertical directions perpendicular to the axis of

the headlight; a reflector whose axis passes between the two filaments; and a closure glass including members for deflecting the dipped beam and the main beam only substantially sideways, wherein the reflector has a reflecting surface without



discontinuity which forms per se a shallow dipped beam situated immediately beneath a horizontal cut-off and which further forms per se a shallow main beam having a bright spot in the vicinity of the headlamp axis.

**4,794,494**  
**DAYTIME ILLUMINATION DEVICE FOR A MOTOR VEHICLE**  
 Frank J. Reeder, Charlotte, N.C., assignor to Anzonis M. Marsh, Charlotte, N.C.  
 Filed Oct. 27, 1987, Ser. No. 114,084  
 Int. Cl.<sup>4</sup> B60Q 1/00  
 U.S. Cl. 362-61 8 Claims

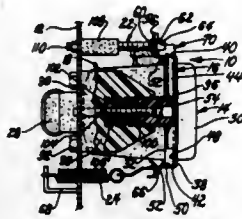


1. A daytime headlight illumination device carried by a motor vehicle such as a motorcycle or a car for better visibility thereof to other motor vehicles, said device comprising in combination:  
 a motor vehicle headlight assembly including a light source and a headlight lens and  
 a shutter assembly located directly in front of the headlight lens and in the path of light rays originating from said light source; said shutter assembly including a plurality of fluorescently colored movable shutter blades, said fluorescently colored blades exhibiting photoluminescence so as to provide enhanced light emission over a given wavelength range, and means for moving said shutter blades between an open position for use during nighttime wherein the light rays are passing through only said headlight lens and a closed position for use during daytime wherein the light rays are passing through the headlight lens and said fluorescently colored shutter blades so as to make the motor vehicle carrying said device highly visible during the daytime.

**4,794,495**  
**HEADLAMP ASSEMBLY**  
 David R. McMahon; Richard W. Nicholas; Thomas E. Persing, and John D. Geddie, all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.  
 Filed Aug. 17, 1987, Ser. No. 85,935  
 Int. Cl.<sup>4</sup> B60Q 1/06  
 U.S. Cl. 362-66 5 Claims

1. A headlamp assembly adapted to be mounted to a support

panel at the front end of a motor vehicle, said headlamp assembly including a rectangular lamp unit formed with a radially outwardly extending flange surrounding the lamp unit adjacent the lens thereof and provided with an outer vertical surface having three aiming pads formed thereon that define an aiming plane, a pair of laterally spaced pivot members adapted to be secured to said support panel, a rectangular retainer member having a configuration conforming to said flange and comprising a pair of vertically spaced horizontal sections and a pair of horizontally spaced vertical sections all of which are interconnected to form a ringlike member, each of said sections being L-shaped in cross-section and having a first wall located in a common substantially vertical plane and a second wall which lies in a plane substantially perpendicular to said first wall, tab means connected to said horizontal sections of said retainer member and bent over said flange for solely support-



ing and maintaining said lamp unit within said retainer member with said aiming pads contacting said first wall of at least two of said sections, said pair of vertical sections of said retainer member each having an intermediate portion thereof formed with a curved portion engaging one of said pair of pivot members so that said lamp unit can be pivoted about a horizontal aim axis, a spring between said support panel and one of said horizontal sections of said retainer member serving to maintain said curved portion of each of said pair of vertical sections in engagement with the associated pivot member, an adjustment screw connected between the other of said horizontal sections of said retainer member and said support panel for adjusting the position of said lamp unit about said horizontal aim axis, and a level device attached to said retainer member for providing a visual indication from above and from the front of said headlamp assembly that said lamp unit is properly aimed about said horizontal axis.

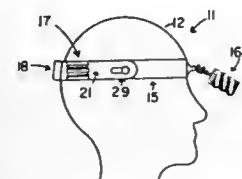
4,794,496

## HEADBAND LAMP APPARATUS

Terry L. Lanes, Box 4407, Polson, Mont. 59860, and Carl H. Lanes, 523 Spruce, Anaconda, Mont. 59711  
Filed Jul. 30, 1987, Ser. No. 79,499  
Int. Cl. F21L 15/14

U.S. Cl. 362-105

2 Claims



1. Headband lamp apparatus including a band portion, a lamp portion, a power supplying portion and a recharging portion; said band portion including an elongated flexible plastic band member, said band member including at least two substantially equal segments, one end of each segment being adjustably engageable with an opposite end of said other segment through an elongated slot; said lamp portion including an adjustable linkage extending outwardly from said band member, a lamp socket disposed on a free end of said linkage remote

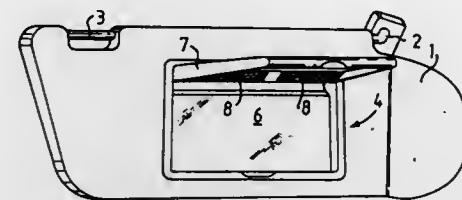
from said band member, an electrical lamp bulb mounted in said socket, a protective housing surrounding said lamp bulb, a lens located adjacent a free end of said housing, said housing threadedly adjusting the spacing between said lens and said free end of said lamp bulb; said power supplying portion including two pairs of thin elongated cylindrical batteries mounted longitudinally parallel of said band member on clip members symmetrically spaced from said socket member of said recharging portion and spaced from said lamp portion, each pair of said batteries being retained on said band member with an open clip member integrally formed therewith and extending outwardly from said band member, electrical conductors molded into said band member disposed along the length of said band member electrically connecting said lamp portion with said batteries; said recharging portion including a socket member disposed along the length of said band member remote from said lamp portion and connected electrically with said conductors, said socket member including an elongated cavity, the axis of said cavity being closely adjacent to and transverse of a longitudinal axis of said band member, a recharging assembly including a male projection selectively engageable with said cavity of said socket member, electrical plug elements extending outwardly from said recharging assembly in a direction opposite to said male projection, said recharging assembly including a signal lamp activatable when said apparatus is being recharged, said socket member including circuitry automatically interrupting power from said batteries to said lamp bulb when said cavity of said socket member engages said male projection and automatically re-energizes said lamp bulb when said cavity is separated from said male projection; whereby said lamp apparatus can be placed around a user's head and positioned by adjusting the fit of said band member, said lamp focused to provide illumination of an area in the line of sight, and the lamp apparatus recharged automatically when not in use by engaging said cavity of said socket member with said male projection of said recharging assembly while said plug elements thereof are connected to an electrical circuit.

4,794,497

VEHICLE SUN VISOR WITH ILLUMINATED MIRROR  
Mats Jönass, Mora, and E. Gunnar Svensson, Malung, both of Sweden, assignors to Autopart Sweden AB, Mora, Sweden  
Filed Nov. 17, 1987, Ser. No. 121,877  
Claims priority, application Sweden, Dec. 2, 1986, 8605173  
Int. Cl. F21V 33/00

U.S. Cl. 362-143

5 Claims



1. A sun visor for motor vehicles comprising a mirror, mirror lighting means and a cover pivotable between a closed position in which it completely covers the mirror and a position in which it completely exposes the mirror characterized in that said mirror lighting means comprises at least one lighting unit including an incandescent lamp, said lighting unit being mounted on a side of said cover which faces said mirror when said cover is in the closed position; and said cover includes a transparent plate which extends essentially across the entire cover surface facing said mirror

and covers said incandescent lamps of said at least one lighting unit mounted on said cover.

said reflector for inflation of the balloon body retained by the housing.

4,794,498

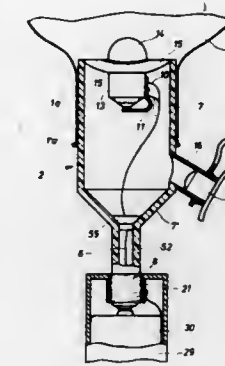
## ACCESSORY DEVICE FOR AN INFLATABLE GAS BALLOON

Robert Neumeier, D-8183 Rottach-Egern, Weissachstr. 21, Fed. Rep. of Germany  
Filed Mar. 2, 1988, Ser. No. 161,998

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1984, 3439524; Dec. 7, 1984, 3444674; Dec. 12, 1984, 84115308; Feb. 6, 1985, 8503258[U]; Feb. 21, 1985, 8504956[U]; Mar. 4, 1985, 8506181[U]; Aug. 2, 1985, 8522393[U]; Aug. 2, 1985, 8522394[U]; Sep. 20, 1985, 8526946[U]  
Int. Cl. F21P 1/02

U.S. Cl. 362-186

12 Claims



1. An accessory device for an inflatable gas balloon having an elastically-expandable balloon neck integrally formed with an inflatable balloon body, the accessory device comprising:

a cup-shaped housing having an open end defining a rim, a closed bottom end and a shell extending from the rim of said open end down to the closed bottom end and defining a substantially cylindrical outer surface, the housing being adapted for insertion open end first into said balloon neck after the balloon neck is elastically expanded, such that the entire length of the expanded balloon neck is elastically tensioned in gas tight fashion against said cylindrical outer surface for retaining said balloon without substantial extension of said housing into said balloon body, said housing being made of injection molded plastic material;  
an electric lamp bulb of a cross-sectional size substantially smaller than the inside cross-section of the open end of the housing;  
a reflector inserted into said shell at the open end of the housing, fixed to said shell, and extending within the housing in spaced relation to said closed bottom end to define a chamber in the housing between the reflector and the closed bottom end, said reflector having a concave reflector surface adjacent the open end of the housing and centrally mounting said lamp bulb such that the lamp bulb is radially spaced substantially away from the rim of the shell at the open end of the housing and such that said concave reflector surface radially surrounds the bulb, said reflector occupying substantially completely the inside cross-section of the open end of the housing between said bulb and said shell, said reflector and said lamp bulb being further configured such that the lamp bulb does not extend substantially beyond the open end of the housing, said lamp bulb being connected to electrical conductor wires extending inside the housing from said bulb towards said closed bottom end and being passed through said closed bottom end in a gas tight manner;  
a closable gas feed duct formed adjacent the closed bottom end of the housing and opening into said chamber, and an opening means for passing gas from said chamber through

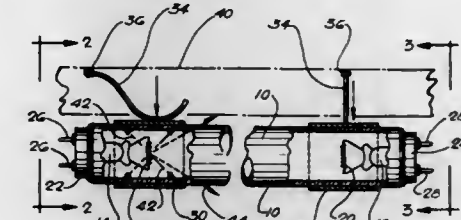
4,794,499

## GROUNDING DEVICE FOR LAMP WITH SHIELDED ELECTRODES

John N. Ott, 8118 Sanderling Rd., Sarasota, Fla. 33581  
Filed Feb. 16, 1988, Ser. No. 156,156  
Int. Cl. F21S 3/00

U.S. Cl. 362-217

6 Claims



1. In a fluorescent lamp fixture including a housing and fluorescent lamp of the type comprising a sealed, elongated tubular light-conducting envelope containing an arc-conducting gas, a light emitting phosphor coating on the inside of the envelope and electron-emitting electrodes at each end of the envelope electrically connected to conductors extending through the ends of the envelope, grounded shielding means for preventing emission outside the walls of the envelope of radiation generated in the electrode area of the lamp, said grounded shielding means comprising:

a shielding member mounted on said lamp envelope outside the path of the arc discharge between the lamp electrodes and arranged to extend around the electrode area of the lamp envelope, said shielding member having sufficient thickness and axial length to absorb substantially all of the radiation emanating from the electrode area of the lamp around which it extends, and;  
a grounding member mounted on the housing of the lamp fixture at a position in contact with the shielding member.

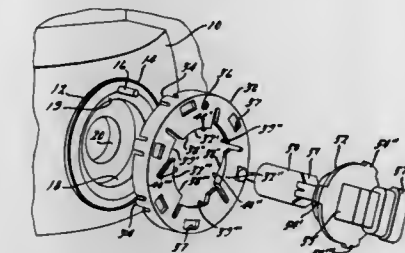
4,794,500

## COMPOSITE HEADLAMP BULB RETAINING MECHANISM

Bradley, Hugh T., Farmington Hills, Mich., assignor to Ford Motor Company, Dearborn, Mich.  
Filed May 18, 1987, Ser. No. 50,803  
Int. Cl. H01R 33/00

U.S. Cl. 362-226

10 Claims



1. A retaining mechanism for a composite headlamp bulb comprising:

a headlamp reflector housing that contains an integral socket structure with an aperture for accepting said composite headlamp bulb;  
a retaining ring containing integral locking elements for



providing a permanent snap fit to said socket structure, a central aperture aligned with said socket aperture for accepting the insertion of said composite headlamp bulb and a plurality cantilevered elements configured to hold said composite headlamp bulb in said socket when inserted therein.

4,794,501

## INDIRECT SPECULAR LAMP

Christian Bartenbach, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

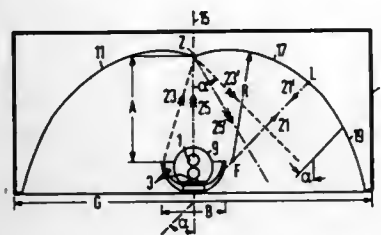
Filed May 14, 1986, Ser. No. 863,182

Claims priority, application Fed. Rep. of Germany, May 17, 1985, 3517897

Int. Cl.<sup>4</sup> F21J 7/00

U.S. Cl. 362-298

11 Claims



1. An indirect specular lamp, comprising: a channel-like shaped counter-reflector; a light bulb arranged within said channel-like shaped counter-reflector and completely screened by it with respect to a front region to be illuminated by the lamp; an at least partially curved main reflector arranged opposite said counter-reflector which is larger than said counter-reflector, said counter-reflector being positioned between said front region and said main reflector; said light bulb being a fluorescent tube; and said counter-reflector being provided with cross-lamellae means at least partially surrounding said light bulb for screening said light bulb in a longitudinal direction of the light bulb.

4,794,502

## STACKING LOUVER FOR LIGHT FIXTURE

Arthur R. Guggemos, Winsted, Minn., assignor to Sterner Lighting Systems Incorporated, Winsted, Minn.

Filed Sep. 14, 1987, Ser. No. 96,924

Int. Cl.<sup>4</sup> F21V 5/00

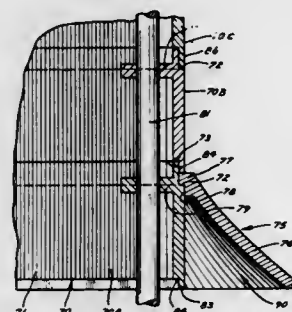
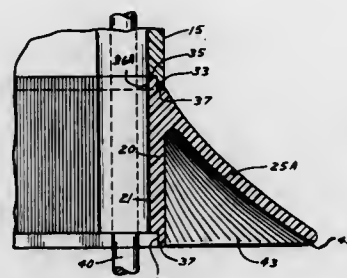
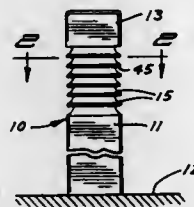
U.S. Cl. 362-331

15 Claims

1. A louver assembly for a lighting fixture comprising a unitary sleeve, said sleeve having an axial direction with opposite ends spaced along the axial direction and defining a space around said axis, and a louver flange surrounding the sleeve and extending from one end of the sleeve outwardly away from the sleeve and in direction toward the other end of the sleeve to provide an overhanging louver flange, said sleeves being arranged to permit end-to-end stacking of a plurality of sleeve and louver flange assemblies with two surfaces of each sleeve and louver flange assembly abutting when assembled, at least every other sleeve having an end formed to provide a telescoping action with the next adjacent sleeve in the stack to align the sleeve and louver flange assemblies, and a plurality of apertures being formed through the sleeve at spaced locations to permit elongated fasteners to pass through a plurality of apertures to hold a plurality of said sleeve and louver flange assemblies in a stack.

12. A lighting fixture housing comprising a molded sleeve capable of being stacked with other sleeves, each of said sleeves having a central axis, and extending in axial direction, and defining a space around the central axis, each sleeve hav-

ing a neck at one end and a receptacle at the opposite end so that adjacent ends of first and second sleeves will stack with a first end of a first sleeve telescoping into a second end of a second sleeve for alignment and stacking purposes, a separate louver flange fitting over a first end of at least one sleeve, with



- a second sleeve overlying the louver flange when the second sleeve telescopes onto the one sleeve, the louver flange extending from a first end of the one sleeve toward a second end of the same sleeve, and means for retaining fasteners for clamping the sleeves axially.

4,794,503

## LAMP HAVING IMPROVED IMAGE RESOLUTION

Robert D. Wooten, Rockville; Robert J. Sweetman, Olney; Andrew D. P. Harbourn, Jamsville, and Michael G. Ury, Bethesda, all of Md., assignors to Fusion Systems Corporation, Rockville, Md.

Filed Sep. 23, 1987, Ser. No. 100,064

Int. Cl.<sup>4</sup> F21V 7/12

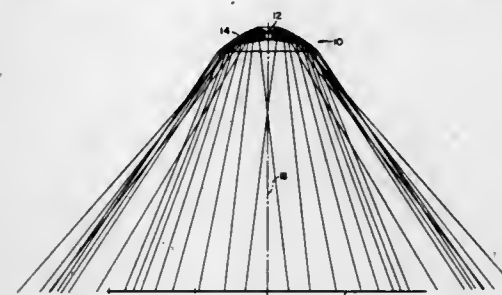
U.S. Cl. 362-346

9 Claims

1. A lamp for providing substantial collimation of radiation and a small average local divergence of radiation over the extent of a target of variable transparency to be illuminated comprising:

- a light source for emitting radiation; and
- a reflector in which said light source is disposed, said reflector having an axis and a reflective surface which is symmetrical with respect to said axis and which is configured

with respect to said source and the area of said target to be illuminated such that most points on said target receive radiation which is reflected from a plurality of different points on said reflector, with points on the target which are closer to the periphery thereof receiving radiation which is reflected from a greater area of the reflector than are points which are closer to the center of the target in



such a manner that non-uniformities or discontinuities in said light source or said reflector are averaged across the entire target area, and the average local divergence of the radiation is minimized, said reflector further being configured so that a predominant portion of said radiation reflected from one side of the reflector illuminates the corresponding side of the target, thereby substantially collimating the radiation received across the target.

4,794,504

## REFLECTOR FOR AUTOMOBILE HEADLIGHT WITH IMPROVED FULL BEAM

Rene L. Creff, Sens, France, assignor to Neiman, Courbevoie, France

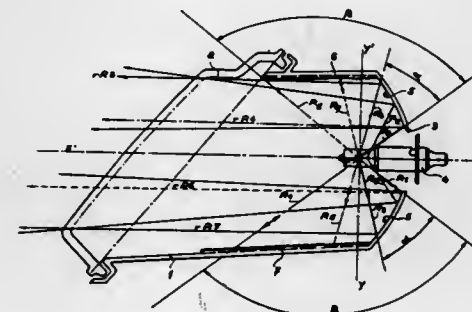
Filed Jul. 1, 1987, Ser. No. 68,291

Claims priority, application France, Jul. 16, 1986, 86 10339; Nov. 24, 1986, 86 16319; Dec. 24, 1986, 86 18141

Int. Cl.<sup>4</sup> F21V 7/00

U.S. Cl. 362-348

6 Claims



1. Reflector for automobile headlight, comprising a reflecting quadric having substantially the surface of a paraboloid of revolution intersected by upper and lower truncation planes, for use in combination with an electric lamp filament situated substantially at the focus of said quadric for providing full beam illumination by reflection on said quadric of the light beams emitted by said filament and traversed by an optic glass situated in front of said quadric, the improvement being that at least the lower truncation plane of the reflector is provided, on its internal surface illuminated by the full beam filament of the light generating lamp, with a plurality of spherical reflecting elements spaced in a concentric arrangement comparable with Fresnel echelons with respect to their common axis passing

through the focus of the useful reflecting conic of the reflector, this focus being also their common centre.

4,794,505

## A METHOD OF OPERATING A POWER SUPPLY SYSTEM INCLUDING INVERTER STAGE

Hirofumi Hino, Noda; Hideki Uemura, Kashiwa, and Kazuo Kaneko, Omiya, all of Japan, assignors to Hitachi Medical Corporation, Tokyo, Japan

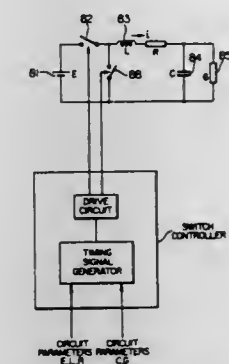
Division of Ser. No. 851,736, Apr. 14, 1986, abandoned. This application Nov. 19, 1987, Ser. No. 125,746

Claims priority, application Japan, Apr. 15, 1985, 60-78360; Jan. 16, 1986, 61-5035

Int. Cl.<sup>4</sup> H02M 3/335

U.S. Cl. 363-17

5 Claims



1. A method of operating a power supply system having a d.c. power source, an inductive circuit element, a parallel connection of a capacitor and a load, a first switch connected in series with said d.c. power source, and a second switch connected in parallel with a serial connection of said inductive circuit element and said parallel connection of said capacitor and said load, the method including controlling the switching of said first and second switches to supply a voltage from said d.c. power source through said inductive circuit element to said load, the method comprising the steps of: closing said first switch so as to apply said voltage to said load; opening said first switch when said voltage reaches a predetermined voltage of said d.c. power source; closing said second switch at the same time said first switch is opened; opening said second switch when a current flowing in said inductive circuit element becomes substantially equal to a predetermined current value; and closing said first switch at the same time said second switch is opened.

4,794,506

## RESONANT DC-DC CONVERTER

Hirofumi Hino, Noda, and Takao Hatakeyama, Ryugasaki, both of Japan, assignors to Hitachi Medical Corporation, Tokyo, Japan

Filed Mar. 9, 1987, Ser. No. 23,239

Claims priority, application Japan, Jan. 30, 1987, 62-18209

Int. Cl.<sup>4</sup> H02M 3/335

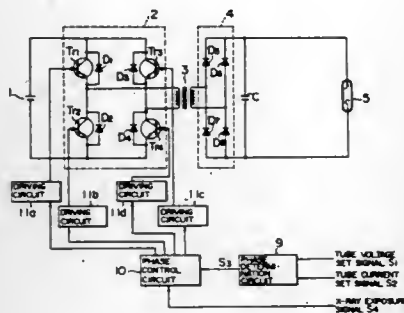
U.S. Cl. 363-25

10 Claims

1. A resonant DC-DC converter comprising: a DC power source; an inverter for receiving DC power from said DC source and for converting the DC power into AC power, said inverter having a first series connection of first and second switching elements respectively connected to a positive and a negative pole of said DC power source, a second series connection connected in parallel to said first series

connection and composed of third and fourth switching elements disposed so as to respectively correspond to said first and second switching elements, and first, second, third and fourth diodes anti-parallelly connected to said first, second, third and fourth switching elements, respectively;

- a transformer, including primary and secondary windings, connected to an output of said inverter for boosting an output voltage of said inverter;
- a rectifier for converting an AC output voltage of said transformer into a DC output voltage;
- a load connected to said rectifier;
- said transformer including a parasitic leakage inductance and stray capacitance existing among said primary or secondary windings of said transformer, said leakage inductance and said stray capacitance being used as resonance elements so that a resonance voltage induced at said stray capacitance by the resonance between said leakage inductance and said stray capacitance and a transformation ratio is applied to said rectifier;
- means for smoothing the DC output voltage of said rectifier and for applying the smoothed DC output voltage to said load;

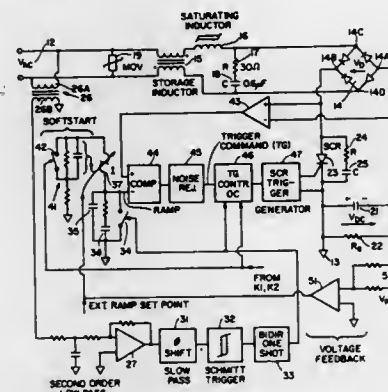


- a phase determination circuit for determining respective operation phases of said first, second, third and fourth switching elements of said inverter and substantially over the entire range of operation of said inverter in accordance with set signals indicating a voltage and a current to be supplied to said load;
- a phase control circuit for controlling the respective operation phases of said first, second, third and fourth switching elements on the basis of an output signal of said phase determination circuit in a manner so that said first and second switching elements are alternately turned on with a phase difference of 180 degrees with respect to an operation frequency of said inverter, said third and fourth switching elements are alternately turned on with a phase difference of 180 degrees with respect to the operation frequency of said inverter, while varying a phase difference from a point in time of turn-on of said first switching element to a point in time of turn-on of said fourth switching element and a phase difference from a point in time of turn-on of said second switching element to a point in time of turn-on of said third switching element to thereby control the power supplied to said load in accordance with the phase determination made by said phase determination circuit.

**4,794,507**  
**CONTROLLING ELECTRICAL POWER**  
George A. Cavigelli, Lexington, Mass., assignor to Doble Engineering Company, Watertown, Mass.  
Continuation of Ser. No. 834,403, Apr. 3, 1987, abandoned. This application Dec. 14, 1987, Ser. No. 132,875  
Int. Cl.<sup>4</sup> H02P 13/26

U.S. Cl. 363—86

14 Claims



1. Power controlling apparatus comprising, an A.C. input for receiving A.C. power, diode rectifying means for converting A.C. power received on said A.C. input into D.C. power, inductive storage means and a saturable inductor coupling said A.C. input to said diode rectifying means, a D.C. output, SCR means for coupling said diode rectifying means to said D.C. output, said SCR means having a gate electrode, a source of a signal representative of the difference between the D.C. potential on said D.C. output and a reference potential for providing an external ramp set point, means responsive to said external ramp set point for providing a ramp signal, means for comparing said ramp signal with a signal related to the D.C. potential provided by said diode rectifying means to provide a trigger signal when potential of said ramp signal and the diode rectifying means D.C. potential bear a predetermined value, and means responsive to said trigger signal for providing a trigger command to said SCR gate to then initiate SCR conduction.

**4,794,508**  
**PWM CONTROL CIRCUIT FOR A NON-SYMMETRICAL SWITCHING POWER SUPPLY**  
David T. Carroll, Sonoma, Calif., assignor to DCI Technology, Sonoma, Calif.  
Filed Dec. 23, 1987, Ser. No. 137,786  
Int. Cl.<sup>4</sup> H02M 3/24

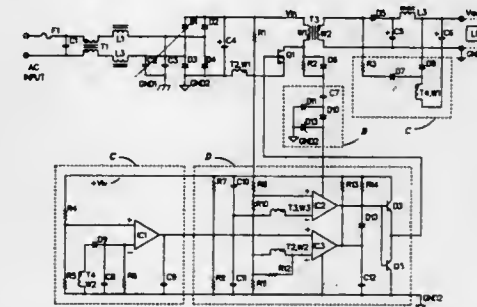
U.S. Cl. 363—95

6 Claims

1. A pulsewidth modulator comprising: a sense transformer having a primary and a secondary winding, wherein said primary winding is coupled in series with a first winding of a magnetic device in a switching power supply; a resistor in parallel with said secondary winding for loading said secondary winding; a comparator means coupled to said secondary winding for detecting when a voltage across said secondary winding exceeds a certain signal level and producing at an output of said comparator a corresponding comparator output state; an inhibitor means coupled to said magnetic device for detecting when said magnetic device is storing or releasing

ing energy and producing at an output of said inhibitor means a corresponding inhibitor output state; a control means coupled to said outputs of said comparator means and said inhibitor means for detecting said comparator output state and said inhibitor output state and generating

elements fixed thereto, said converter modules further comprising base plates attached thereto, said base plates being



ating a quasi-squarewave signal in response to said comparator and inhibitor output states for application to a switching means, said quasi-squarewave signal having a duty cycle corresponding to the amplitude of said certain signal level.

**4,794,509**  
**CONVERTER MODULE HAVING COOLING ELEMENTS AND A RIPPLE CONTROL TRANSMITTER APPARATUS UTILIZING THE SAME**

Roland Nussbaumer, Uster, Switzerland, assignor to Zellweger Uster AG, Uster, Switzerland  
Filed Sep. 30, 1987, Ser. No. 102,663  
Claims priority, application Switzerland, Oct. 1, 1986, 03923/86

U.S. Cl. 363—141

Int. Cl.<sup>4</sup> H02M 7/12

9 Claims

1. A converter module for converters which have different power capacities comprising:

- (a) a holding component comprised of a holder plate;
- (b) electronic elements, wiring elements, ignition element and cooling elements being mounted on said holder plate, each of said electronic elements being mounted on a first side of said holder plate by a cooling element such that each said electronic element is held on said plate by said cooling element, each of said cooling elements being secured directly to said holder plate;
- (c) said plate being detachably connectable to a base plate mounted on a housing, said holder plate being detachably connectable to the base plate by way of electric plug contacts which are held in the holder plate and extend therefrom and screws; and
- (d) said holder plate being provided with fixed fastening points for fastening said cooling elements to the holder plate and fixed electrical connections for supplying current to said electronic elements, said fastening points and electrical connections being arranged so that said converter module can be used with converters having different power capacities.

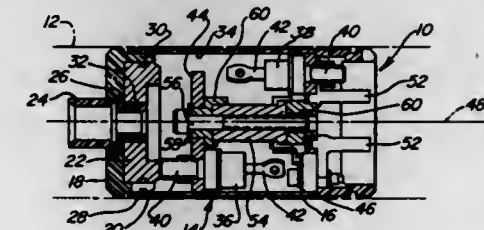
6. A ripple control transmitter apparatus comprising a housing, a ventilating device located in said housing and a plurality of converter modules arranged as an assembly block within said housing; said converter modules being arranged in a common plane in rows and columns, the columns of converters having spaces therebetween defining ventilation ducts for the flow of ventilating air from said ventilating device; each of said converter modules being comprised of a holding component adapted to be detachably connected within said housing, said holding component having electrical elements and cooling

positioned adjacent one another to define a rear wall of said assembly block.

**4,794,510**  
**RECTIFIER ASSEMBLY**  
Kevin K. Wege, Belvidere, Ill., assignor to Sundstrand Corporation, Rockford, Ill.  
Filed Dec. 23, 1986, Ser. No. 945,907  
Int. Cl.<sup>4</sup> H02M 1/00

U.S. Cl. 363—145

2 Claims

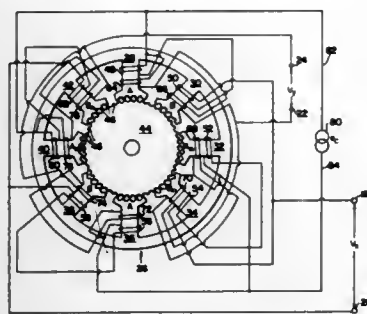


1. A compact full wave, three phased rectifier assembly for incorporation in a rotor of a generator or the like, comprising: six diodes with two pair of three diodes being mounted on respective first and second mounting plates forming heat sinks, the mounting plates forming part of the electric circuit of the rectifier; a circumferential housing for surrounding the diodes, the housing being fabricated of non-conductive material and adapted for incorporation in said rotor, and the first and second mounting plates being fixed directly to the non-conductive housing; and



a surge suppression resistor mounted within the housing surrounding a third heat sink, said third heat sink comprising fastening means between the first and second heat sinks.

**4,794,511**  
**APPARATUS AND METHOD FOR GENERATING TWO-PHASE SIGNALS FOR USE WITH A RESOLVER TO DIGITAL CONVERTER**  
 Robert S. Lundin, Northfield, Conn., assignor to The Superior Electric Company, Bristol, Conn.  
 Filed Jan. 11, 1988, Ser. No. 142,792  
 Int. Cl. H02M 5/06; H01F 33/00; G05B 1/06  
 U.S. Cl. 363-156 2 Claims



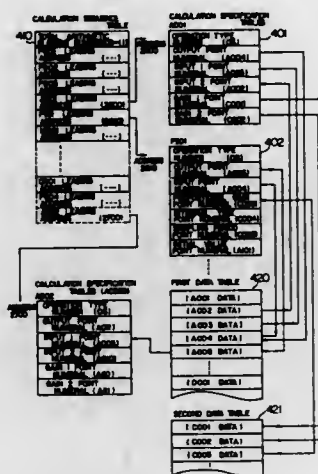
1. Apparatus for producing two-phase voltage signals for use with a resolver-to-digital converter, said apparatus comprising: first means for producing first inductive reactance means; second means for producing second inductive reactance means phase shifted 180 electrical degrees from said first inductive reactance means; third means for producing third inductive reactance means, said third inductive reactance being phase shifted 90 electrical degrees from said first inductive reactance means; fourth means for producing fourth inductive reactance means phase shifted 180 electrical degrees from said third inductive reactance means; means for impressing a carrier voltage across said first, second, third and fourth inductive reactance means; said first, second, third and fourth inductive reactance means, respectively being connected in series aiding and opposing arrangements so that one voltage signal of the two-phase voltage signals is produced by the quotient of the algebraic sum of said first and fourth minus said second and third inductive reactances divided by the algebraic sum of said first, second, third and fourth inductive reactances multiplied by said carrier voltage, and the second of the two-phase voltage signals is produced by the quotient of the algebraic sum of said first and second minus said third and fourth inductive reactances divided by the algebraic sum of said first, second, third and fourth inductive reactances multiplied by said carrier voltage, whereby said first and second voltage signals of said two-phase voltage signals are equal in amplitude and phase shifted from one another by 90 electrical degrees.

**4,794,512**  
**DIGITAL CONTROLLING DEVICE**  
 Eiji Toyama, Hitachi, Akira Sugano, Katsuta, and Masahide Nomura, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
 Filed Apr. 9, 1982, Ser. No. 367,083  
 Claims priority, application Japan, Apr. 16, 1981, 56-56248  
 Int. Cl. G06F 15/00 5 Claims  
 U.S. Cl. 364-140

1. A digital controlling device for controlling a section comprising means for executing arithmetic operations under control of a predetermined program on the basis of an input

signal obtained from at least one detector in a section to be controlled to generate a driving signal and means for sending said driving signal to actuating means in said section to be controlled; said arithmetic operation executing means comprising:

- first rewritable and non-volatile means storing a plurality of calculation specification tables designating a type of arithmetic operation necessary to be executed, storage addresses of input/output data required for said designated arithmetic operation, and storage addresses of operation parameters required for said designated arithmetic operation;
- second rewritable and non-volatile means storing a calculation sequence table designating leading addresses of said calculation specification tables stored in said first means which are used for reading-out of said first means the



calculation specification tables corresponding to said required arithmetic operations in a predetermined order for those arithmetic operations which are to be executed;

- third means storing data tables including data and operation parameters in corresponding address areas thereof as specified by the storage addresses in said calculation specification tables designated by said calculation sequence table; and
- processing program means, including means for storing a plurality of programs to be specified by said arithmetic operation types for executing said arithmetic operations in said predetermined order designated in said calculation sequence table and for reading data and operation parameters necessary for said execution of arithmetic operations from said data tables stored by said third means on the basis of designated ones of said calculation specification tables.

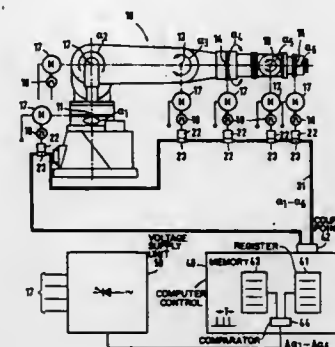
**4,794,513**  
**POSITION CONTROL SYSTEM FOR COMPUTER-CONTROLLED PROCESSING MACHINES**  
 Peter Müller, Hansen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, München, Fed. Rep. of Germany  
 Filed Mar. 6, 1986, Ser. No. 836,839  
 Claims priority, application Fed. Rep. of Germany, Mar. 29, 1985, 3511616  
 Int. Cl. G06F 15/46 4 Claims  
 U.S. Cl. 364-167.01

1. A position control system for movable machine parts of a computer-controlled processing machine, comprising:

- a plurality of actual position transmitters, each having an input which is coupled to a respective movable machine part and measures the position movement thereof and an output which delivers pulses corresponding to the posi-

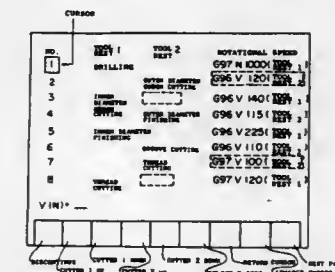
tion measurements of the respective movable machine part;

- means for counting and summing the output pulses delivered from the actual position transmitters, said means for counting and summing being located substantially in the vicinity of each of the plurality of actual position transmitters;



- a computer control which compares the position values present at the means for counting and summing with corresponding reference values stored therein and derives positioning commands for controlling the drives of the movable machine parts from the comparisons; and
- a serial data bus for transmitting, in a predetermined time raster, the position values present at the means for counting and summing to the computer control for further processing.

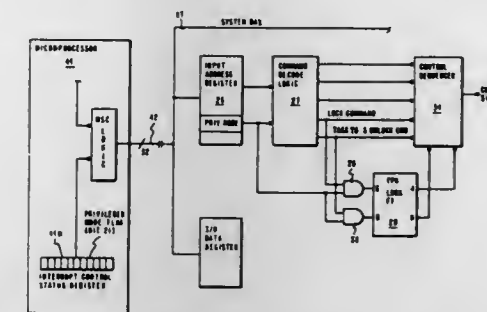
**4,794,514**  
**NC PROGRAM EDITING METHOD FOR FOUR-AXIS LATHES**  
 Kawamura Hideaki; Teruyuki Matsumura; Takashi Iwagaya, and Takahiko Mineshige, all of Hachioji, Japan, assignors to Fanuc Ltd., Minamitsuru, Japan  
 PCT No. PCT/JP86/00254, § 371 Date Dec. 15, 1986, § 102(e) Date Dec. 15, 1986, PCT Pub. No. WO86/06997, PCT Pub. Date Dec. 4, 1986  
 PCT Filed May 17, 1986, Ser. No. 2,397  
 Claims priority, application Japan, May 18, 1985, 60-106450  
 Int. Cl. G06F 15/46; G05B 19/18  
 U.S. Cl. 364-474.22 3 Claims



1. A method of editing NC programs for a four-axis lathe having two tool rests, comprising the steps of: defining machining processes by deciding a machining sequence and a type of machining for each tool rest; displaying defined processes together with predetermined NC data classified by tool rest; resetting machining sequences of machining types capable of being performed simultaneously by both tool rests by positioning a cursor on a process to be moved and indicating, using a soft key corresponding to one of the tool rests, whether the process should be moved up or down; and

modifying machining speed in said defining machining step.

**4,794,515**  
**PROTECTION OF DATA IN A MULTIPROGRAMMING DATA PROCESSING SYSTEM**  
 Louis M. Hornung, Anstia, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.  
 Filed Jan. 17, 1986, Ser. No. 820,462  
 Int. Cl. G06F 9/00 9 Claims  
 U.S. Cl. 364-200



6. A data processing system operating in a multiprogramming mode in which a plurality of different tasks are performed, at least one of said tasks being interruptible by another one of said tasks, said system including at least one facility which is not used by all of said tasks, said system including means for permitting access to said facility by a first task requesting such access; means for locking said facility after access thereto by said first task requesting access thereto to prevent further access to said facility by subsequent tasks; means for examining a subsequent task which interrupts said first task to determine whether said subsequent task requires access to said facility; means for executing said subsequent task if it does not require access to said facility, while maintaining said facility locked with the information relative to said first task stored therein; means for storing said information present in said facility relative to said first task externally of said facility if said interrupting subsequent task requires access to said facility; means for unlocking access to said facility; and means for permitting access to said facility by said interrupting subsequent task.

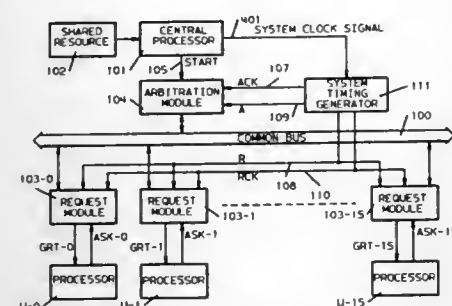
**4,794,516**  
**METHOD AND APPARATUS FOR COMMUNICATING DATA BETWEEN A HOST AND A PLURALITY OF PARALLEL PROCESSORS**  
 Daniel J. Auerbach; Tien C. Chen, and Wolfgang J. Paul, all of San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.  
 Filed Oct. 31, 1985, Ser. No. 794,354  
 Int. Cl. G06F 13/14 15 Claims  
 U.S. Cl. 364-200

1. A method for communicating data between a plurality of individually identifiable processors in a data processing system, comprising the steps, at the processor initiating the communication, of:

- forming a first word by logically combining the identifiers of a subset of processors with which communication is to be established; and
- forming a second word which, when combined with said first word in a predetermined manner, designates the subset of processors with which communication is to be

established, wherein said second word is formed by, at each bit position:

- (i) generating a bit which has a first state which is the same as a bit of like significance in said first word which, in combination with the bit of like significance in said first word, indicates no bit information in the bit position;
- (ii) generating a bit which has a state opposite that of a bit of like significance in said first word which, in combination with the bit of like significance in the first word,



indicates the same bit information as the bit of like significance in said first word; and

- (iii) generating a bit which has a second state which is the same as a bit of like significance in said first word which, in combination with the bit of like significance in the first word, indicates either said first state or said second state in said bit position;
- (iv) transmitting said first and second words to a central arbitration processor.

4,794,517

**THREE PHASED PIPELINED SIGNAL PROCESSOR**  
Gardner D. Jones; Larry D. Larsen, both of Raleigh, N.C., and Daniel J. Esteban, Cagnes Sur Mer, France, assignors to International Business Machines Corporation, Armonk, N.Y.  
Filed Apr. 15, 1985, Ser. No. 723,991  
Int. Cl.<sup>4</sup> G06F 15/00

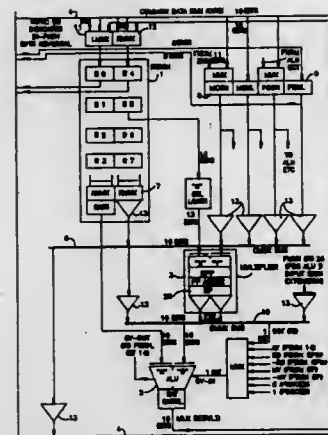
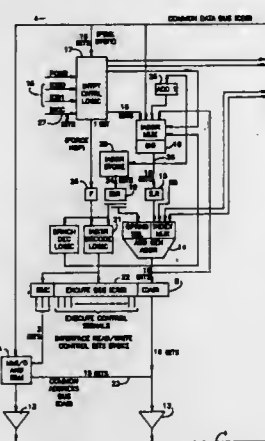
U.S. Cl. 364-200

1 Claim

1. An improved pipelined instruction processor comprising a system clock, a working register file, an instruction store, instruction decoding means, an arithmetic computation and logic unit, a multiplier and interconnecting data and instruction busses for directing digital data to said register file, to said arithmetic and logic unit and to said multiplier for controlling said arithmetic and logic unit and said multiplier in response to interrupts and executed instructions characterized in that:

said arithmetic and logic unit, said multiplier and said register file are interconnected via said busses, instructions from said instruction store being decoded in said instruction decoding means; and  
said system clock is connected to synchronize said arithmetic and logic unit to execute a decoded said instruction from said instruction store simultaneously with the decoding of a succeeding instruction therefrom and simultaneously with the feeding of a second succeeding instruction therefrom;  
said register file is comprised of a plurality of full word registers arranged to be independently written or read in half-word portions;  
during any cycle of said clock, the input of any said registers in said plurality is electively connected to said data bus for

storing data there into and output of one of said registers in said plurality is selectively connected to one of said



arithmetic and logic unit, said multiplier, and said data bus for outputting data thereto.

4,794,518

**PIPELINE CONTROL SYSTEM FOR AN EXECUTION SECTION OF A PIPELINE COMPUTER WITH MULTIPLE SELECTABLE CONTROL REGISTERS IN AN ADDRESS CONTROL STAGE**

Yoshihiro Mizushima, Kawasaki, Japan, assignor to Fujitsu Limited, Kawasaki, Japan  
Continuation-in-part of Ser. No. 647,388, Sep. 5, 1984, abandoned, which is a continuation of Ser. No. 253,504, Apr. 1, 1981, abandoned. This application Sep. 26, 1985, Ser. No. 780,645  
Int. Cl.<sup>4</sup> G06F 9/38

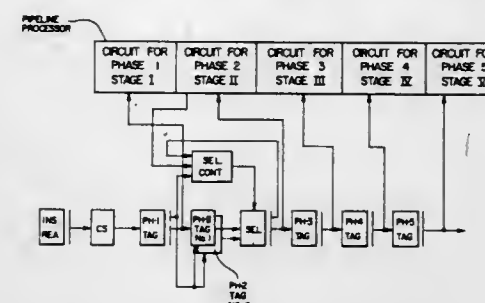
U.S. Cl. 364-200

4 Claims

1. A pipeline control system for a pipeline processor in which a flow for processing an instruction successively proceeds through a plurality of processing stages, predetermined tag data is applied simultaneously to each of said processing stages to simultaneously control processing in each of said processing stages, a plurality of processing flows for a plurality of instructions proceed successively through the pipeline and maintain a time lag therebetween, said control system comprising:

instruction register means for receiving and holding instructions to be executed by the pipeline processor;  
a control storage unit, connected to said instruction register means and storing tag data, which in the first processing

stage is output from said control storage unit at an output in response to an instruction;  
a selector having inputs; and  
a plurality of tag registers, each connected respectively to the output of said control storage unit and to the inputs of said selector and to said pipeline processor, for storing tag data for the second processing stage which controls repetitive execution of a first sequence of operation flows of



processing in response to predetermined tag data for an instruction which requires repeated flows for execution, and tag data is selected by said selector from predetermined tag data stored in said tag registers for the second stage for executing a second sequence of operation flows for the instruction, execution of the second sequence of operation flows being initiated from the second processing stage without executing the first processing stage.

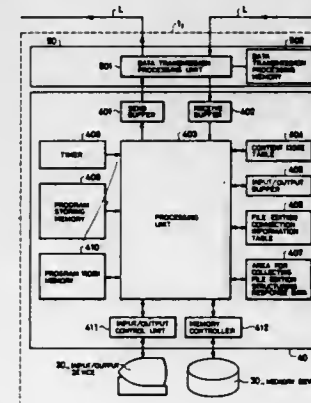
4,794,519

**METHOD AND SYSTEM FOR EDITING DISTRIBUTED FILES IN A DATA TRANSMISSION SYSTEM**

Minoru Kozumi; Kinji Mori, both of Yokohama; Yasuo Suzuki, Ebina; Masayuki Orimo, Kawasaki; Katsumi Kawano, Fuchu; Hirokazu Kasahima, Kanagawa, and Koza Nakai, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan  
Filed Jan. 22, 1987, Ser. No. 6,017  
Claims priority, application Japan, Jan. 22, 1986, 61-12805  
Int. Cl.<sup>4</sup> G06F 1/00

U.S. Cl. 364-200

9 Claims



1. In a file editing system for sequentially connecting files, which are stored in memory devices of a plurality of distributed devices connected to a common signal transmission line, to edition data flowing on said common signal transmission line, a distributed file editing method comprising the steps of: sending a structuring message having a combination and order to files to be connected to said common signal transmission line;  
judging whether or not its own file is contained in files to be edited on a basis of said structuring message and its own

connection information when it receives said structuring message;  
sending a response message having information of said file to said common signal transmission line if its own file is contained; and  
structuring connection information required for file edition in itself on a basis of said structuring message in case it is confirmed through said message that all files to be edited exist in said system.

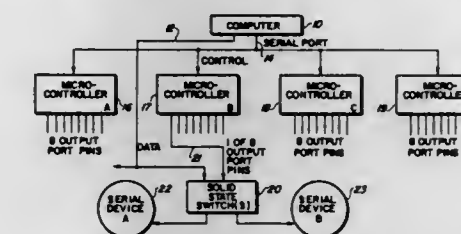
4,794,520

**INTERFACE SYSTEM FOR COMPUTER PORT SHARING OF MULTIPLE DEVICES**

Paul Kobas, Jr., and George H. Rovin, both of Phoenix, Ariz., assignors to C-Guard Laboratories, Inc., Phoenix, Ariz.  
Filed Mar. 30, 1987, Ser. No. 31,891  
Int. Cl.<sup>4</sup> G06F 3/00

U.S. Cl. 364-200

29 Claims



1. A multiple device addressing and routing system for selectively supplying data from a single output port of a computer to one of a plurality of utilization devices, wherein such output port has at least a data line and a control line on which encoded selection signals are applied, said system including in combination:

controller means coupled to the control line of said output port, said controller means having at least one output line and having decoding means therein responsive to encoded selection signals appearing on such control line for producing one of two output signals on said output line thereof as determined by such encoded selection signals;  
switch means having first and second states of operation, having a control input coupled to said output line and having first and second outputs, said switch means coupled to the data line of said output port for supplying signals appearing on the data line of said output port to a selected one of said first and second outputs of said switch means corresponding to said first and second states of operation thereof respectively in response to the output signal on said output line; and  
means for coupling first and second utilization devices to said first and second outputs of said switch means.

4,794,521

**DIGITAL COMPUTER WITH CACHE CAPABLE OF CONCURRENTLY HANDLING MULTIPLE ACCESSES FROM PARALLEL PROCESSORS**

Michael L. Ziegler, Whitinsville; Jonathan S. Bian, Nagog Woods, and Robert L. Fredlen, Arlington, all of Mass., assignors to Alliant Computer Systems Corporation, Littleton, Mass.

Filed Jul. 22, 1985, Ser. No. 757,859  
Int. Cl.<sup>4</sup> G06F 13/00

U.S. Cl. 364-200

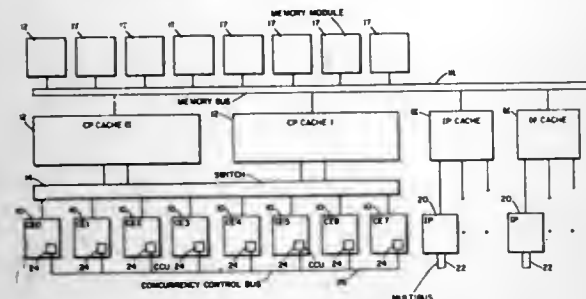
11 Claims

**MICROFICHE APPENDIX INCLUDED**  
(9 Microfiche, 622 Pages)

1. A digital processing system comprising:  
a main memory for storing information at memory locations identified by memory addresses,  
a cache memory for temporarily storing copies of information from selected memory addresses,



first communication means for transferring information between said cache and main memories, a plurality of processors for processing information stored in said cache memory, second communication means for transferring stored information between said cache memory and said processors, said processors each including means for making accesses to information stored in said cache memory by transferring the address of said information across said second communication means to said cache memory, said cache memory comprising data storage means for storing said copies of information, address storage means such as a tag store for storing the memory addresses associated with said copies, memory interface means for accessing said main memory across said first communication means to transfer information between said data storage means and said main memory, means for accepting and storing the address for a current access and at least one earlier accepted but not yet completed access ("pending access"), means for concurrently working on completion of said current and pending accesses, said means comprising



pending-access-completion means for working on completion of pending accesses, including means for determining and storing for each pending access status information prescribing the steps required to complete the access and for redetermining said status information as conditions change, and including pending-access-comparison means for comparing the address associated with said pending access to the addresses of main-memory accesses in progress on said system, and

current-access-completion means for determining whether said current access is capable of immediate completion and for completing said access immediately if so capable and transferring said current access to said pending-access-completion means if not so capable, including means for comparing the address associated with said current access to the addresses stored in said address storage means, and including current-access-comparison means for comparing the address associated with said current access to the addresses of main-memory accesses in progress on said system.

4,794,522

#### METHOD FOR DETECTING MODIFIED OBJECT CODE IN AN EMULATOR

Richard O. Simpson, Austin, Tex., assignor to International Business Machines Corporation, Armonk, N.Y.  
Filed Sep. 30, 1985, Ser. No. 782,323  
Int. Cl. G06F 9/00

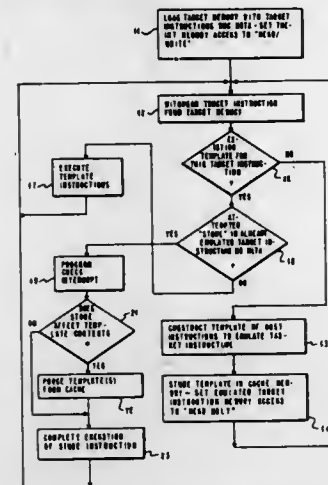
U.S. Cl. 364-200

7 Claims

1. A method of emulating the instructions of a target computer in the instructions of a host computer to operate said host computer in accordance with said target computer instructions,

said target computer having the capability of modifying its own instructions and data during operation, said method comprising the steps of:

storing said target instructions in a target memory segment; sequentially withdrawing said target instructions from said target memory segment and executing said target instructions in said host computer; constructing a template of said host instructions for each of said target instructions executed; storing each of said templates for reuse each time the corresponding target instruction is to be executed;



limiting access to those target instructions in said target memory segment which have been stored in one of said templates to permit only read operations to be performed thereon; and detecting a target instruction which attempts a write operation on one of the target instructions which is in a stored template.

4,794,523

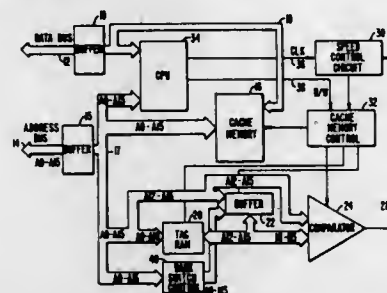
#### CACHE MEMORY ARCHITECTURE FOR MICROCOMPUTER SPEED-UP BOARD

Manolito Adan, 3545 S. Jasmine, Los Angeles, Calif. 90034; Steven Meadows, 4345 - 154th St., Lawndale, Calif. 90260, and Robert McCaslin, 1227 Coldwater Canyon, Beverly Hills, Calif. 90210

Filed Sep. 30, 1985, Ser. No. 782,664  
Int. Cl. G06F 9/28

U.S. Cl. 364-200

16 Claims



1. A method for enhancing the speed of operation of a computer having a plurality of devices including a first microprocessor coupled to a main memory via an address bus, said computer being designed to operate at a first clock cycle time, comprising the steps of:

providing a cache memory having a faster access time than an access time of said main memory used by said computer;

permanently disabling or disconnecting said first microprocessor on or before power-up; producing a second clock having a faster cycle time than said first clock cycle time; providing a second microprocessor operating at said second clock cycle time; storing a portion of the data of said main memory in said cache memory; intercepting an addressing of a location in said main memory on said address bus by said fast microprocessor; producing a signal designating one of a plurality of banks of said main memory in response to the addressing of a location in said main memory by said second microprocessor, each of said banks using the same addresses from said second microprocessor; determining, in response to said addressing of a location in said main memory, whether the data of said location is stored in said cache memory; retrieving said data for said fast microprocessor from said cache memory at said faster access time if said data are determined to be in said cache memory; and communicating with said plurality of devices, excluding said first microprocessor, at said first clock cycle time.

4,794,524

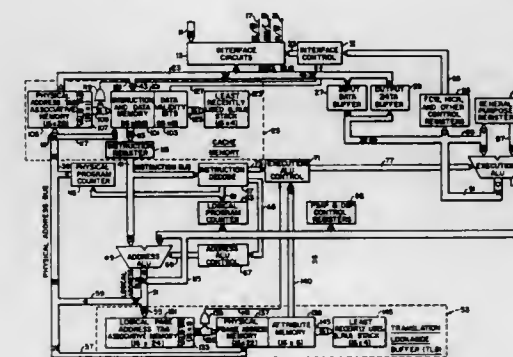
#### PIPELINED SINGLE CHIP MICROPROCESSOR HAVING ON-CHIP CACHE AND ON-CHIP MEMORY MANAGEMENT UNIT

Richard A. Carberry, Los Gatos, and John P. Banning, Sunnyvale, both of Calif., assignors to Zilog, Inc., Campbell, Calif.  
Filed Jul. 3, 1984, Ser. No. 627,475

Int. Cl. G06F 9/00

U.S. Cl. 364-200

10 Claims



1. A central processing unit that operates to fetch and execute a program instruction in a plurality of successive processor cycles and which includes means for connection with an external memory through a system bus, said central processing unit comprising as part of a single integrated circuit chip:

first stage means for determining the physical external memory address of a desired instruction to be executed and fetching that instruction from a first on-chip buffer memory having a capacity that is a small fraction of that of said external memory,

second stage means coupled to the first stage means and responsive to the instruction fetched from said first memory in a previous processor cycle by said first stage means for decoding that instruction,

third stage means coupled to the second stage means responsive to the instruction decoded in a previous processor cycle by said second stage means for determining the physical external memory address of data to be accessed, fourth stage means coupled to the third stage means and responsive to the data physical address determined in a previous processor cycle by said data third stage means for fetching that data from said first memory,

fifth stage means coupled to the fourth stage means and to

the second stage means and responsive to the instruction decoded by said second stage means and data fetched by said fourth stage means in previous processor cycles for executing the decoded instruction on the fetched data in order to obtain a result,

sixth stage means coupled to the fifth stage means and responsive to the result obtained by said fifth stage means in a previous processor cycle for storing that result, and means connected with each of the foregoing six means for causing said six means to simultaneously operate on different program instructions, whereby a six stage parallel processing pipeline is provided.

4,794,525

#### EXTERNAL INTERFACE CONTROL CIRCUITRY FOR MICROCOMPUTER SYSTEMS

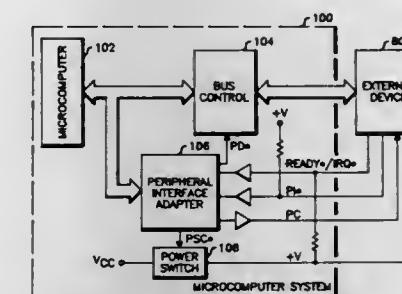
William F. Pickert; Joseph M. Pettinger, both of Hoffman Estates, and Peter Biancalana, Chicago, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 618,115, Jan. 7, 1984, abandoned. This application Feb. 4, 1987, Ser. No. 13,227

Int. Cl. G06F 1/00, 11/30

U.S. Cl. 364-200

39 Claims



1. Interface control circuitry for coupling processing means interface signals to an external device that is insertable in said interface control circuitry, said external device having means for producing an indication signal when the external device is inserted and coupled to the processing means interface signals, and said external device having means for producing a ready signal in response to the application of power to the external device, said interface control circuitry comprising:

switching means for applying power to the external device in response to a power control signal;

gating means for applying the processing means interface signals only in response to an interface control signal; and processing means for producing the processing means interface signals, said processing means being responsive to the external device indication signal for producing the power control signal and a predetermined time delay, and after the predetermined time delay has elapsed, said processing means being responsive to the external device ready signal for producing the interface control signal.

4,794,526

#### MICROCOMPUTER WITH PRIORITY SCHEDULING

Michael D. May, Clifton, and Roger M. Shepherd, Cotham, both of England, assignors to Immos Limited, Bristol, England  
PCT No. PCT/GB84/00377, § 371 Date Jul. 3, 1985, § 102(e) Date Jul. 3, 1985, PCT Pub. No. WO85/02037, PCT Pub. Date May 9, 1985

PCT Filed Nov. 2, 1984, Ser. No. 756,993

Claims priority, application United Kingdom, Nov. 4, 1983, 8329509

Int. Cl. G06F 09/46

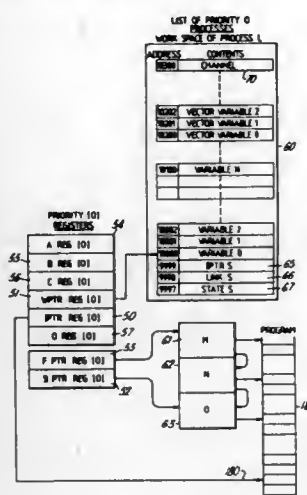
U.S. Cl. 364-200

23 Claims

1. A microcomputer comprising memory and a processor operable to execute a plurality of concurrent processes in

accordance with a plurality of program steps, said program steps comprising a plurality of instructions for sequential execution by the processor, each instruction including a set of function bits which designate a function to be executed by the processor,

- (a) the microcomputer including scheduling means comprising:
- means for indicating the process which is being executed by the processor, said process being called the "current process";
  - means for indicating the priority of each of said concurrent processes;
  - means for identifying one or more of said concurrent processes which form a first collection awaiting execution by the processor, each process in said first collection having the same first priority;
  - means for identifying one or more processes which form a second collection awaiting execution by the processor, each process in said second collection having the same second priority which is lower than said first priority;
  - means for adding one or more further processes to said first collection or said second collection;
  - next process indicator means to indicate the next



process in each of said collections to be executed by the processor, and

- (vii) a group of program stage indicators, one for each concurrent process;
- (b) said processor including means responsive to a selected one of said instructions to stop execution of the current process by said processor and to respond to said next process indicator means to make the next process in said first collection the current process if a process is found in said first collection, or to make the next process indicated by said second collection the current process if no process is found in said first collection, whereby said processor is operated to share its processing time among said plurality of said concurrent processes; and
- (c) said microcomputer including message transmission means for effecting synchronized message transmission between concurrent processes, said message transmission means comprising a plurality of communication channels, means for indicating the status of data communication through each channel and synchronizing means responsive to said status to stop executing a current process or add a process to said first or second collection so that two communicating processes are brought to corresponding program steps when the communication between them is completed.

#### 4,794,527 MICROPROGRAMMED DATA PROCESSING SYSTEM USING LATCH CIRCUITS TO ACCESS DIFFERENT CONTROL STORES WITH THE SAME INSTRUCTION AT DIFFERENT TIMES

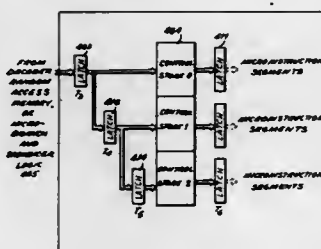
Robert E. Stewart, Stow, and Donald F. Hooper, Northboro, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Jan. 29, 1986, Ser. No. 823,804

Int. Cl.<sup>4</sup> G06F 9/22, 9/28, 9/38

U.S. Cl. 364—200

5 Claims



1. A microprogrammed central processing unit implemented using pipeline techniques and processing data signal groups in response to macroinstructions, said central processing unit comprising:

- a plurality of components for processing data signal groups in response to a macroinstruction, wherein said central processing unit components are divided into pipeline segments, each pipeline segment responsive to a macroinstruction segment implementing a portion of said macroinstruction, said macroinstruction being executed when each macroinstruction segment of said macroinstruction is applied to a selected pipeline segment in a predetermined time sequence;
- a memory unit for providing a first address signal group in response to said macroinstruction;
- a first control store unit coupled to a first pipeline segment and responsive to said first address signal group provided by said memory unit, said first control store unit applying a first microinstruction segment to said first pipeline segment;
- a second control store unit coupled to a second pipeline segment and responsive to a second address signal group derived from said first address signal group, said second control store unit applying a second microinstruction segment to said second pipeline segment; and
- latch circuit means responsive to said second address signal group for delaying application of said second address signal group to said second control store unit for one system clock cycle, said latch circuit means causing said second microinstruction segment to be applied to said second pipeline segment one system clock cycle after application of said first microinstruction segment to said first pipeline segment.

#### 4,794,528 PATTERN MATCHING METHOD FOR TREE STRUCTURED DATA

Tadaaki Hirose, Komae; Kazuo Nakao, Sagami-hara; Kousuke Sakoda, Hino, and Yousichi Takenuchi, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 17, 1987, Ser. No. 15,111

Claims priority, application Japan, Feb. 21, 1986, 61-35142

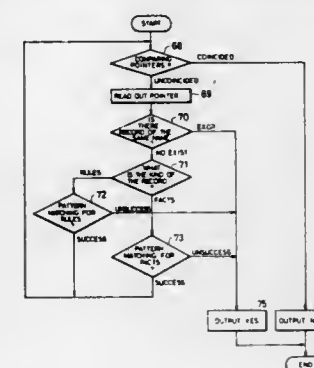
Int. Cl.<sup>4</sup> G06F 1/00

U.S. Cl. 364—300

5 Claims

1. A pattern matching method of tree structured data, comprising the steps of: converting n-ary tree structured data into a vector expression by arranging, in order of priority of transverse search in a tree structure, cells corresponding to memory

elements of a constant length, which are constructed of a positional field for storing positional information on a whole tree structure occupied by each composing said tree structured



#### 4,794,530 CREDIT SETTLEMENT AND TICKETING TERMINAL SYSTEM

Kazuo Yukiura, Tokyo; Keniti Seto, Musashino; Kimio Watanabe, Sagami-hara; Hiroshi Harimoto, Seto, and Akio Otani, Aichi, all of Japan, assignors to Hitachi, Ltd. and Japanese National Railways, both of Tokyo, Japan

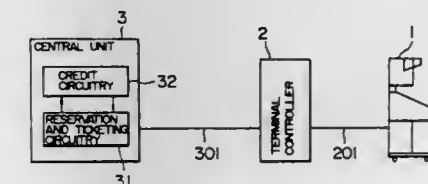
Filed May 7, 1986, Ser. No. 860,508

Claims priority, application Japan, May 10, 1985, 60-97832

Int. Cl.<sup>4</sup> G07F 7/08

U.S. Cl. 364—407

5 Claims



data and a value field for storing a value of each of said nodes to be processed in a computer system; and comparing said cells, which are converted into said vector expression, consecutively from a beginning position.

#### 4,794,529 METHOD FOR DISPLAYING OPERATION RANGE OF LOGICAL LANGUAGE

Tadaaki Hirose, Komae; Kazuo Nakao, Sagami-hara; Yoichi Takenuchi, Yokohama, and Keiko Shinada, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

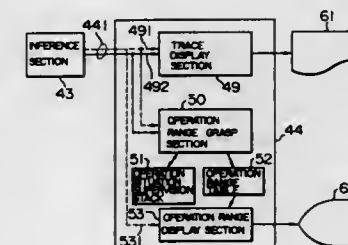
Filed Aug. 13, 1986, Ser. No. 895,954

Claims priority, application Japan, Sep. 6, 1985, 60-195848

Int. Cl.<sup>4</sup> G06F 1/00

U.S. Cl. 364—300

6 Claims



1. An operation range display method for a system which executes a logical language program which includes one or more procedures, each procedure including one or more clauses, each clause including one or more terms, the method comprising the steps of:

- detecting, in response to execution of each of said terms included in said program, an operation status of said term at a time of execution, said operation status indicating whether said term has been executed by call or redo and whether a result of the execution has been successful or not; and
- displaying said program and corresponding figures, each of said figures being displayed near a corresponding term of said program so that each figure differs depending upon a corresponding operation status at a time of execution thereof thereby enabling the displayed figures to represent respective operation ranges of respective terms of said program.

1. A credit settlement and ticketing terminal system comprising a terminal unit for issuing request information and a central unit for performing at least a processing for ticketing a coupon by referring to the issued request information and a file managed by the central unit, such that results of the processing in said central unit are delivered to the terminal unit to at least issue a desired coupon,

- said central unit comprising:
- means for performing a reservation processing and the ticketing processing;
  - means for calculating charges for the reservation and ticketing processing, said reservation and ticketing processing means including means for recognizing whether the request information from the terminal unit is credit ticketing request information; and
  - means for settling the charges incurred by selling on credit when the credit ticketing request information is recognized by said recognizing means and for editing the results of a credit settlement and the ticketing data such that the results of credit settlement and the ticketing data are printed out on different sheets, respectively, the results of credit settlement and the ticketing data being delivered as response information to the terminal unit, and

said terminal unit comprising:

- means for inputting reservation item information;
  - means for reading card information from a card for identifying a reservation applicant;
  - means for inputting code information;
  - means for setting credit key information representative of whether or not the charges for sales should be settled on credit;
  - control means for transmitting as the request information said reservation item information, said card information, said code input information and said credit key information to said central unit upon a transmission starting operation such that said credit key information operates as the credit ticketing request information in said control unit; and
  - printer means for printing out the ticketing data and the results of credit settlement on different sheets, respectively, on the basis of the response information received from said central unit, thereby forming a coupon and a clear-off bill;
- wherein the ticketing data is printed on a front surface of the coupon, and said terminal unit further comprises means for applying a magnetic record of the results of credit settlement on a rear surface of the coupon, and means for reading and transmitting the contents of the magnetic record as information for cancellation of the credit settlement to said central unit.



4,794,531

**UNSHARP MASKING FOR IMAGE ENHANCEMENT**

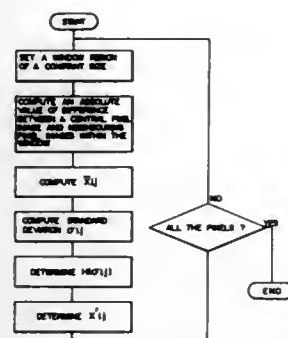
Koichi Morishita, Kawasaki; Shimbu Yamagata, Yokohama; Tetsuo Okabe, Kanisawa; Tetsuo Yokoyama, and Kazuhiko Hamanaka, both of Tokyo, all of Japan, assignors to Hitachi, Ltd and Hitachi Medical Corporation, both of Tokyo, Japan

Continuation-in-part of Ser. No. 795,461, Nov. 6, 1985, abandoned. This application Apr. 22, 1987; Ser. No. 41,627 Claims priority, application Japan, Nov. 7, 1984, 59-233212; Nov. 7, 1984, 59-233213; Apr. 25, 1986, 61-94562

Int. Cl. 4 G06F 15/68

U.S. Cl. 364-413.13

8 Claims



1. A method of radiographic image enhancement for an unsharp masking processing, comprising the steps of dividing an image into a plurality of local images; obtaining an unsharp image by averaging neighboring pixel values at local regions of the original image; subtracting the unsharp image from the original image to produce a sharp image; and adding an original image at a desired ratio to the sharp image to create a processed image.

wherein said averaging step comprises effecting a weighted mean arithmetic operation of the pixel values of the local regions based on a weight coefficient which is determined in accordance with a monotonically decreasing or increasing function with respect to a density difference between a central pixel value and neighboring pixel values.

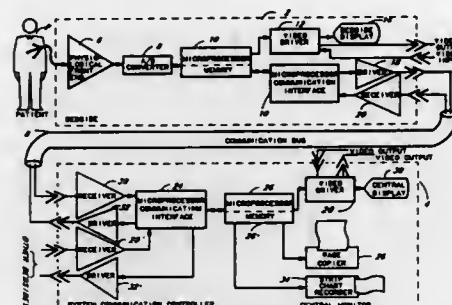
4. A method of radiographic image enhancement according to claim 1, further comprising a step of changing an emphasizing coefficient of said sharp image in accordance with a standard deviation of density values of the local regions or a composite value of the standard deviation and the original image density, interactively and consecutively.

4,794,532  
**VIRTUAL ARRHYTHMIA SYSTEM**  
 Ellen V. Leckband, Bedford, and Larry L. Nielsen, Burlington,  
 both of Mass., assignors to Hewlett-Packard Company, Palo  
 Alto, Calif.  
 Filed Nov. 10, 1986, Ser. No. 929,548  
 Int. Cl.<sup>4</sup> G06F 15/42

U.S. Cl. 364—413.06 2 Claims

1. An arrhythmia monitoring system comprising:  
 at least one bedside station that provides signals representing physiological data including waveforms when suitably coupled to a patient,  
 a central station,  
 means for providing communication between each bedside station and said central station,  
 means coupled to a bedside station for analyzing physiological data provided thereby,  
 means at each bedside station for setting conditions for the assertion of an alarm for that bedside station,  
 means at said central station for setting conditions for the assertion of an alarm at any bedside station,  
 alarm means coupled to each bedside station for providing an alarm signal at the bedside station and at said central station.

station when the alarm conditions for said bedside station are met,  
storage means responsive to an alarm signal for saving physiological waveform data causing said alarm,  
means coupled to said storage means for displaying the physiological data causing a current alarm at the bedside station from whence the physiological data came.

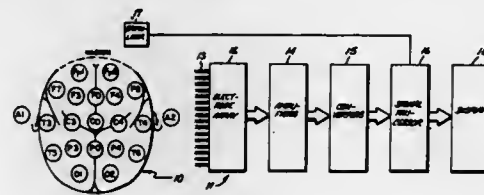


means coupled to said storage means for displaying the physiological data causing a current alarm at said central station,

means at each bedside station and at said central station for eliminating at either station displayed physiological data causing the current alarm from said storage means, and

means for recording physiological data from current alarms that has not been eliminated from said storage means.

**4,794,533**  
**SYSTEM ACTIVITY CHANGE INDICATOR**  
**Daniel E. Cohen, Eden Prairie, Minn., assignor to CNS, Inc.,**  
**Eden Prairie, Minn.**  
**Filed Nov. 7, 1986, Ser. No. 928,522**  
**Int. Cl.<sup>4</sup> G06F 15/42; A61B 5/00**  
**U.S. Cl. 364—413.05** **20 Claims**



1. A method for determining activity changes occurring in a system as these activity changes are represented in at least one signal representing system activity, said method comprising:  
acquiring a first sequence of consecutive samples of amplitude values of said system activity signal taken at a rate sufficient to represent those portions of said system activity signal related to said activity changes, said samples in said first sequence being acquired over a selected duration of time established with respect to a selected point in time;  
determining which relative magnitude relationship occurs from among first, second and third relative magnitude relationships between each sample in said first sequence and its immediately neighboring samples on either side thereof excepting those samples occurring first and last in said first sequence;  
forming a second sequence of decision numbers with each such decision number therein having a one-to-one correspondence with a said sample in said first sequence excepting those samples occurring first and last in said first sequence, each said decision number having one of a first selected set of values if its said corresponding sample in said first sequence has relative magnitude relationships

with each of its immediately neighboring samples on either side thereof which are identical, but having one of a second selected set of values if its corresponding sample in said first sequence has relative magnitude relationships with each of its immediately neighboring samples on either side thereof which differ; and providing an indication of said activity changes based on said decision numbers.

4,794,534

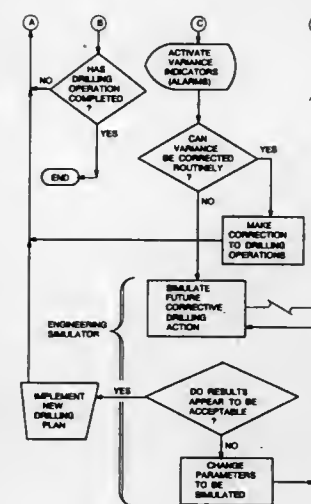
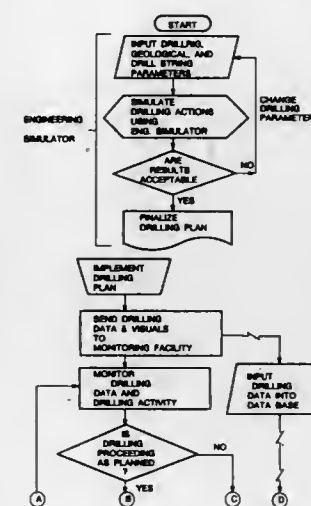
**METHOD OF DRILLING A WELL UTILIZING  
PREDICTIVE SIMULATION WITH REAL TIME DATA**

Keith K. Millheim, Tulsa, Okla., assignor to Amoco Corporation, Chicago, Ill.

Filed Aug. 8, 1985, Ser. No. 764,261

Int. Cl.<sup>4</sup> E21B 44/00; G06G 7/48; G05B 17/02

U.S. Cl. 364-420 11 Claims



7. A system for use in the drilling of a well, comprising:  
means for providing, on a real time basis, drilling data from  
at least one well being drilled into a database associated  
with a digital computer, and  
means for simulating future drilling actions for the well  
utilizing the digital computer and the drilling data within  
the database.

11. A method of drilling a well, comprising:

**11. A method of drilling a well, comprising:**

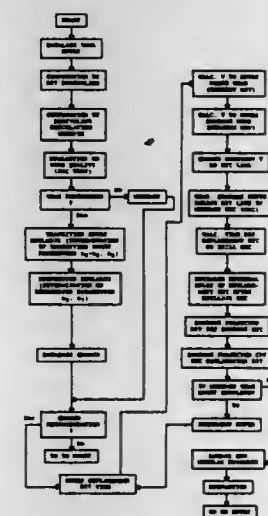
- (a) collecting at the well, on a real time basis, a plurality of signals indicative of drilling-related parameters;
- (b) transmitting, on a real time basis, a portion or all of the plurality of signals from at least one well to a remotely located database associated with a programmable digital computer;
- (c) loading, on a real time basis, the plurality of signals into the database associated with the programmable digital computer;
- (d) selecting an initial set of parameter changes that will affect drilling results;
- (e) simulating future drilling utilizing the initial set of parameter changes;
- (f) determining if the drilling results are acceptable, if not selecting an additional set of parameter changes;
- (g) simulating future drilling utilizing the additional set of parameter changes;
- (h) selecting the optimum set of parameter changes; and
- (i) initiating the optimum set of parameter changes at the well.

4,794,535  
METHOD FOR DETERMINING ECONOMIC DRILL BIT  
UTILIZATION  
Richard L. Gray, Austin, Tex., and Vivien J. Cambridge, Baton  
Rouge, La., assignors to Automated Decisions, Inc., Austin,  
Tex.

Filed Aug. 18, 1986, Ser. No. 897,766  
Int. Cl.<sup>4</sup> G06F 15/20

U.S. Cl. 364—420

11 Claims



1. A real-time method for controlling a drilling process to achieve an optimum economic utilization of a drill bit in a borehole on a realtime basis for a drilling operation in progress by determining when the drill bit is to be replaced comprising the steps of:

- (a) acquiring values of a plurality of real-time drilling operating variables and an actual penetration rate for the drill bit from sensors;
- (b) storing the plurality of acquired values of realtime drilling operating variables and the actual penetration rate;
- (c) calculating at predetermined intervals, a plurality of values of real-time parameters of a real-time, multivariate, predictive, penetration rate model having real-time operating variables associated with the drilling process, each parameter associated with one of the real-time drilling operating variables of the model wherein the parameters measure the sensitivity of the penetration rate of the drill bit in the borehole to each of the operating variables of the model;

- (d) calculating at predetermined intervals, real-time expressions of the penetration rate of the drill bit in the borehole using the real-time operating variables in the model and the calculated values of the real-time parameters;
- (e) calculating a total, expected controllable unit cost over a future drilling interval of depth for the drill bit currently in the borehole using a predictive penetration rate expression;
- (f) calculating a total, expected controllable unit cost over said future drilling interval of depth for a replacement bit by utilizing a predictive penetration rate expression containing values of variables, parameters, and coefficients corresponding to the replacement bit;
- (g) comparing the total, expected controllable unit cost of the drill bit currently in the borehole and the total, expected controllable unit cost of the replacement drill bit over said future drilling interval of depth and identifying the drill bit that is expected to generate lower cost over the future drilling interval of depth; and
- (h) replacing the drill bit in the borehole when the unit cost calculated in step (e) exceeds the unit cost calculated in step (f) at the future drilling interval depth.

4,794,536

## STEERING ANGLE DETECTION DEVICE

Kunihiko Eto, Toyota; Akihiro Ohno, Okazaki, and Yutaka Mori, Toyokawa, all of Japan, assignors to Toyota Koki Kabushiki Kaisha, Kariya, Japan

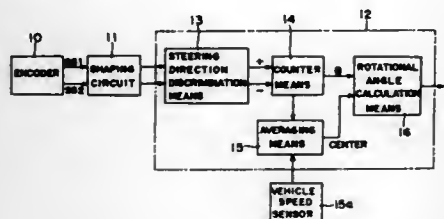
PCT No. PCT/JP85/00279, § 371 Date Sep. 17, 1985, § 102(e) Date Sep. 17, 1985

PCT Filed May 21, 1985, Ser. No. 781,237

Claims priority, application Japan, May 24, 1984, 59-106174 Int. Cl. B62D 6/02

U.S. Cl. 364-424.05

4 Claims



1. A steering angle detection device for a motor vehicle, comprising:
- a rotary disc rotatable synchronously with a steering shaft;
  - an encoder for generating a first pulse signal each time said rotary disc rotates a unit angle in one direction and for generating a second pulse signal each time said rotary disc rotates said unit angle in the other direction;
  - counter means responsive to said first and second pulse signals from said encoder for respectively increasing or decreasing its content depending upon the rotational directions of said steering shaft;
  - a sampling signal generator for generating sampling signals at a predetermined interval;
  - rotational angle reading means for reading rotational angle data stored in said counter means, in response to each of said sampling signals from said sampling signal generator;
  - averaging means, operable each time new rotational angle data is read by said rotational angle reading means, for calculating a mean value of a plurality of rotational angle data which has been previously read by said rotational angle reading means, said mean value representing a nominal neutral position of said steering shaft; and

rotational angle calculation means for calculating the rotational angle of said steering shaft relative to said nominal neutral position thereof based upon said mean value calculated by said averaging means and said new rotational angle data.

4,794,537

## SCHEDULED COMFORT CONTROL SYSTEM WITH ADAPTIVE COMPENSATION FOR STALL AND OVERSHOOT

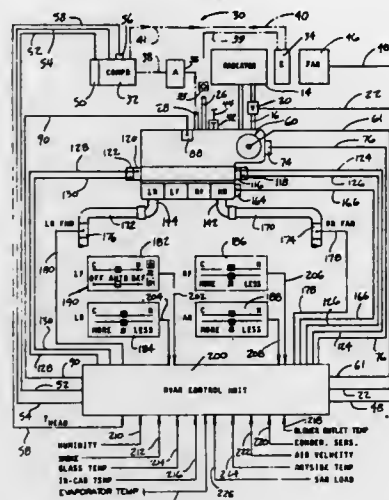
Kenneth P. Adasick, Sterling Heights; William L. Drayer, Romeo, and Edward W. Yott, Fraser, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 29, 1987, Ser. No. 44,006

Int. Cl. G06F 15/20, 15/14; B60H 1/00

U.S. Cl. 364-424.05

10 Claims



1. In a motor vehicle ventilation system having elements controllable to adjust the heating/cooling capacity of the system, an automatic control for operating the controllable elements to regulate the heating/cooling capacity at an optimal level which brings the actual comfort level in the vehicle into agreement with a desired comfort level and thereafter maintains such agreement, the control comprising:
- means for determining the desired comfort level, the actual comfort level, and a comfort level error indication according to the difference between the desired and actual comfort levels;
  - scheduled control means for operating the controllable elements as a function of the comfort level error indication according to an empirically determined schedule designed to regulate the heating/cooling capacity of the system at said optimal level; and
  - adaptive control means effective when the system heating/cooling capacity level brought about by said scheduled control means significantly deviates from said optimal level, resulting in an uncorrected comfort level error indication, for modifying the scheduled operation of the controllable elements in relation to the comfort level error indication so as to bias the heating/cooling capacity of the system toward said optimal level, thereby adaptively correcting the operation of the controllable elements for variations in the system performance and the heating/cooling requirements of the vehicle which are not accounted for by the scheduled control means.

4,794,538  
METHOD TO CONTROL THE OPERATION OF WHEELS OF A VEHICLE TO PREVENT SLIPPING OR SKIDDING, AND BRAKE LOCKING

Chi-Thuan Cao, Korntal; Helmut Janetzke, Schwieberdingen; Alfred Schulz, Oberriexingen, and Harald Micht, Ölbrenn-Diara, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

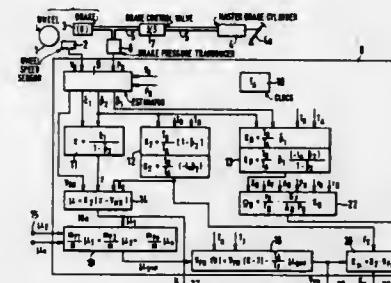
Filed Oct. 6, 1986, Ser. No. 915,711

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1985, 3535843

Int. Cl. B60T 8/32

U.S. Cl. 364-426.02

17 Claims



13. A system for controlling braking operation of a wheel forming at least one controlled wheel of a vehicle, comprising means (6) for continuously measuring the instantaneous braking pressure  $P_B$  being applied to the wheel (1); means (2) for continuously measuring the instantaneous rolling speed  $V_R$  of the wheel (1) over a roll-off surface; means for determining, from said continuously measured braking pressure  $P_B$  and wheel speed  $V_R$ , the instantaneous value of the coefficient of friction  $\mu$  between the wheel circumference and the roll-off surface of the wheel; and

means (7) for controlling the level of braking pressure being applied to said wheel based on the determined coefficient of friction  $\mu$ ,

wherein said determining means for determining said coefficient of friction  $\mu$  includes

- (1) means for solving, by utilizing the measured values of braking pressure  $P_B$  and wheel speed  $V_R$ , at a strobing instant  $K$  and a subsequent strobing instant  $K+1$ , one of the linear differential equations:

$$V_{R(K+1)} = P_2^* V_{R(K)} - P_1^* P_{B(K)} + c_1^* \quad (1)$$

$$V_{R(NK+1)} = P_2^* V_{R(NK)} - P_1^* P_{B(NK)} + c_1^* \quad (1N)$$

wherein the subscript  $N$  denotes a normalizing value and the superscript  $*$  denotes a not normalized value; wherein the parameters ( $p_1^*$ ,  $p_2^*$  and  $c_1^*$ ) and ( $p_1$ ,  $p_2$  and  $c_1$ ), respectively, are estimated; and

- (2) means (14) for calculating the coefficient of friction  $\mu$  in accordance with the respective relationships:

$$\mu = K_2^* \left( \frac{c_1^*}{1 - p_2^*} - V_R \right) \text{ or, respectively,} \quad (2) \text{ or } (2N)$$

$$\mu = K_2 \left( \frac{c_1}{1 - p_2} - V_{RN} \right)$$

wherein

$$K_2^* = \frac{T_R^*}{T_A} (-\ln p_2^*) \text{ or, respectively,} \quad (2a) \text{ or } (2aN)$$

-continued

$$K_2 = \frac{T_R}{T_A} \cdot (-\ln p_2)$$

or if

$$(1 - p_2^*) < 1 \text{ or, respectively, } (1 - p_2) < 1 \quad (2b) \text{ or } (2bN)$$

then

$$K_2^* = \frac{T_R^*}{T_A} (1 - p_2^*) \text{ or, respectively,} \quad (2c) \text{ or } (2cN)$$

$$K_2 = \frac{T_R}{T_A} \cdot (1 - p_2)$$

wherein

clock means (10) are provided furnishing strobing pulses at constant strobing intervals  $T_A$ ; wherein the instantaneous values ( $p_2^*$ ,  $p_1^*$ ,  $c_1^*$ ) or, respectively, ( $p_2$ ,  $p_1$ ,  $c_1$ ) are estimated values based on measured values of braking pressure  $P_B$  or  $P_{BN}$ , respectively, and wheel speed  $V_R$  or  $V_{RN}$ , respectively; and  $R_R$  or  $T_R$ , respectively are constant values defined as

$$T_R^* \cdot V_R^* = \mu - K_B^* \cdot P_B \text{ or, respectively,} \quad (3) \text{ or } (3N)$$

$$T_R \cdot V_{RN} = \mu - K_B \cdot P_{BN}$$

wherein

$$T_R^* = \frac{\theta_R}{G_F V_R^2} \text{ or, respectively, } T_R = \frac{\theta_R \cdot V_0}{G_F V_R^2} \quad (3a) \text{ or } (3aN)$$

and wherein  $\theta_R$  is the moment of inertia of the wheel (1),  $G_F$  the weight of the vehicle or a portion to the specific wheel and  $r_R$  the mean radius of the wheel.

4,794,539

## PROPULSION CONTROL USING STEERING ANGLE AND VEHICLE SPEED TO DETERMINE TOLERANCE RANGE

Henning Wallentowitz, Buch am Erlbach; Siegfried Neundorff; Wolfgang Kuhn, both of Stuttgart; Karl-Helmut Böhle, Sachsenheim, and Karl-Eugen Laubacher, Stuttgart, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Fed. Rep. of Germany

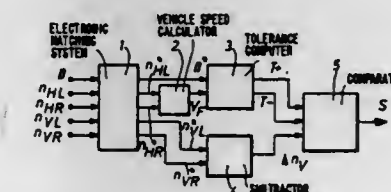
Filed Dec. 22, 1986, Ser. No. 942,692

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1985, 3545715

Int. Cl. B60T 8/58

U.S. Cl. 364-426.01

12 Claims



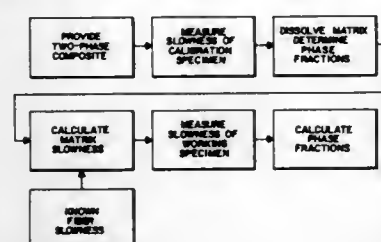
1. In a propulsion control system for a motor vehicle for maintaining stable driving conditions, having sensor means for determining the speed of the vehicle wheels, having means for determining the vehicle speed, having means for determining the steering angle and having processing means for producing control signals for the brakes of the wheels and for a power control element of an engine of the vehicle from output signals of the sensor means and the vehicle speed and steering angle





comparing the efficiency values of the measured operating points to identify a peak value.

**4,794,545**  
**NONDESTRUCTIVE MEASUREMENT OF FRACTIONS OF PHASES IN MIXTURES AND COMPOSITE MATERIALS**  
 Carlos A. Salvado, Carlsbad, Calif., assignor to The Expert System Technologies, Inc., San Diego, Calif.  
 Filed Nov. 12, 1986, Ser. No. 930,122  
 Int. Cl.<sup>4</sup> G06F 15/46, 15/20  
 U.S. Cl. 364-497 17 Claims



1. A process for performing a nondestructive determination of a working specimen of a mixture having at least two phases, each phase being present in a fraction of the total of the specimen, comprising the steps of:

selecting a series of nondestructively measurable properties of the phases of the mixture, each of which properties varies with the fraction of the phase in a known way and is summed over the phases to define a total mixture value for that property, thereby forming a system of simultaneous equations for the mixture properties as a function of a sum of products of a coefficient of variation times the fraction of each phase;

measuring each of the measurable mixture properties on a sufficient number of calibration specimens having different fractions of the phases, and then destructively determining the fractions of the phases for the calibration specimens, thereby determining the coefficients of variation of the system of equations; and

nondestructively measuring each of the measurable mixture properties on the working specimen of unknown phase fractions, and solving the system of equations for the fractions of the phases present in the working specimen.

**4,794,546**  
**METHOD OF AND APPARATUS FOR SCANNING OBJECTS BY MEANS OF ULTRASOUND ECHOGRAPHY**  
 Jean-Marie Nicolas, Paris, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 25, 1986, Ser. No. 843,905  
 Claims priority, application France, Mar. 29, 1985, 85 04822  
 Int. Cl.<sup>4</sup> G01N 29/04, 9/24

U.S. Cl. 364-507 8 Claims  
 5. A device for scanning objects by ultrasound echography comprising:

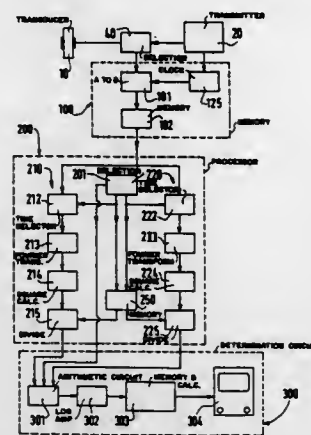
ultrasound transmitting means for repeatedly transmitting ultrasound energy into an object;

receiving means for receiving echoes of the ultrasound energy which are reflected by obstacles at a plurality of observation depths in the object and for producing electrical signals corresponding thereto;

first memory means for storing signals from the receiving means which correspond to echoes along an echographic line in the object;

means for receiving stored signals from the first memory means and which calculate a power spectra for a pair of signals which correspond to echoes from a first observation depth and a second observation depth in the object;

correction means for correcting the calculated power spectra for the effects of ultrasound diffraction;



arithmetic means for calculating an output function, T from said corrected spectra using the formula

$$T = \left( \frac{a_1}{a_2} \right)^{2(\xi-1)} \cdot (b_1 - b_2)^{2(\xi-1)}$$

wherein  $a_1$  and  $b_1$  are the values of a coefficient a and an exponent b in a general formula  $U(f) = Af^b$  of a scatter function for the object being scanned and wherein  $a_2$  and  $b_2$  are the values of said coefficient and exponent in said general function for a reference object in which the frequency-dependency of said scatter function is known and  $\xi$  is a ratio of the two observation depths;

a logarithmic amplifier which acts on the output function T of the arithmetic means;

and means for calculating a frequency dependent scatter function from an output of said logarithmic amplifier.

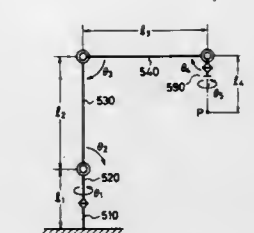
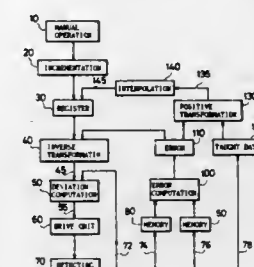
**4,794,547**  
**ROBOT CONTROL SYSTEM**  
 Azusa Nishida, Narashino, Japan, assignor to Hitachi, Ltd., Tokyo and Hitachi Kogyo Engineering Co. Ltd., Narashino, both of Japan

Filed Aug. 15, 1986, Ser. No. 896,869  
 Claims priority, application Japan, Aug. 21, 1985, 60-181711  
 Int. Cl.<sup>4</sup> G05B 19/42

U.S. Cl. 364-513 10 Claims

1. A robot control system for controlling the location and position of an object to be controlled, which is fixed on a robot wrist, in accordance with data taught in advance, comprising: taught data memory means for storing the taught data; means for computing an error vector indicating an error in a wrist coordinate system corresponding to the positional error of said object with respect to said robot wrist; memory means for storing the computed error vector in said wrist coordinate system; command value computing means for computing a command value for a robot drive unit to correct said positional

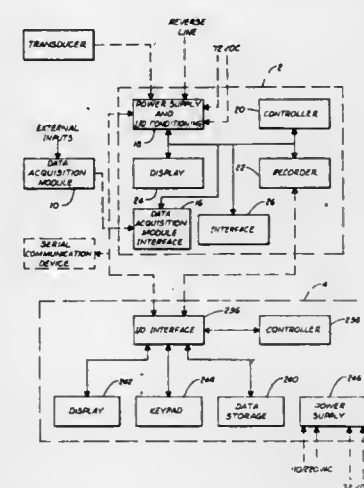
error concerning said object in accordance with the taught data of said taught data memory means and the error vector of



said error vector memory means; and means for controlling said robot drive unit based on said command value.

**4,794,548**  
**DATA COLLECTION APPARATUS AND TRAIN MONITORING SYSTEM**  
 Michael J. Lynch; John E. Haley; C. Lynden Lee, and Gilbert H. Forehand, all of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Aug. 28, 1986, Ser. No. 901,212  
 Int. Cl.<sup>4</sup> G11B 20/10, 23/02  
 U.S. Cl. 364-550 24 Claims



1. An apparatus for collecting data from binary and analog inputs, comprising:

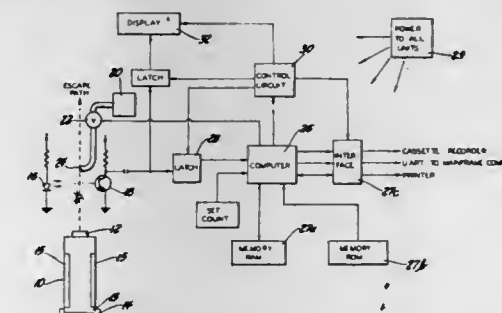
binary input means for receiving a plurality of binary inputs each in the form of a respective binary electrical signal; analog input means for receiving a plurality of analog inputs each in the form of a respective analog electrical signal; transmission means for providing a communications link connectable to a separate device to which the data collected by said apparatus are to be transmitted;

a memory; microcomputer means for controlling the transfer of said binary and analog inputs to said memory and for controlling the transfer of the contents of said memory to said transmission means for transmission to the separate device; and

a binary counter including three counter inputs and counter output means for outputting a respective count in response to respective input signals applied to said three counter inputs, one of said counter inputs connected to an output of said microcomputer means, another of said counter inputs connected to an output of said binary input means, another of said counter inputs connected to another output of said binary input means, and said counter output means connected to said microcomputer means so that each respective count is communicated to said microcomputer means to provide thereto variable clock rates controlled by the respective input signals applied to said three counter inputs from said microcomputer means and said outputs of said binary input means.

**4,794,549**  
**EXCITO-REPELLENCY TEST SYSTEM**  
 Stephen A. Van Albert; Jaime M. Lee, and Donald R. Roberts, all of Montgomery, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 19, 1986, Ser. No. 910,914  
 Int. Cl.<sup>4</sup> G06M 7/00; G01V 9/04; G08B 23/00  
 U.S. Cl. 364-551.01 4 Claims



1. An apparatus for measuring the activity of insects in response to an insecticide comprising: at least one chamber for holding a plurality of insects; an insecticide sample holder which holds a quantity of the insecticide to be tested for repellency; an exit formed in the chamber so as to provide an escape path for insects to leave the chamber; a detector located near the exit formed in the chamber so that an insect traveling along the escape path will pass through the detector, the passage of the insect causing the detector to generate a signal for each insect showing the passage of one of the insects; a computer which receives the signal and processes the signal to generate data and relate it to other signals from the chamber in a predetermined relationship indicating the degree of repellency; a recorder which receives and stores the data and relationship calculated by the computer for later use and analysis; and means for cleaning an insect from the exit and delaying the passage of additional insects through the exit for a predetermined period of time the means for cleaning including a source of compressed gas, a nozzle located near the exit formed in the chamber so as to direct the compressed gas across the exit, the nozzle being fluidly connected to the source of compressed gas, a valve which is opened for a predetermined time when an insect is sensed by the detector in the exit path to clear the insect from the exit and deter another insect from entering the exit for a predetermined period of time.



4,794,550

## EXTENDED-RANGE MOIRE CONTOURING

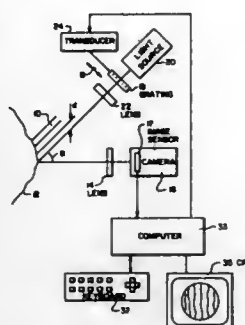
John E. Greivenkamp, Jr., Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Oct. 15, 1986, Ser. No. 918,950

Int. Cl. G01B 11/02

U.S. Cl. 364-562

20 Claims



## 12. Moire contouring apparatus comprising:

- means for forming a test pattern of spaced lines having distortion representing a contour of a test surface;
- means responsive to an image of said test pattern for generating a first signal representing samples of a Moire pattern formed by a product of said test pattern and a reference pattern representing a reference surface;
- computer means for:
  - calculating from said Moire pattern samples, height difference samples representing the difference in height between the test surface and the reference surface, said height difference samples being expressed modulo C, where C is a function of the spacing of lines in said test pattern and where said height difference samples can differ by more than C/2 between adjacent samples;
  - receiving a second signal representing a priori knowledge of the contour of the test surface, and responsive to said first and second signals for generating a third signal representing samples of the actual height difference between said test surface and said reference surface, by adjusting said height difference samples by multiples of C such that the height difference is correctly reconstructed when the height difference changes by more than C/2 per sample.

4,794,551

## ROTATION SPEED DETECTING APPARATUS

Koichi Yoshida, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

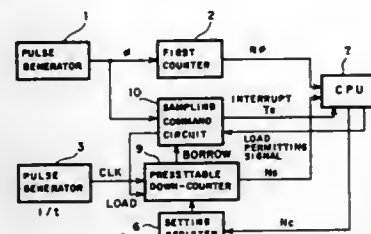
Filed May 23, 1986, Ser. No. 866,443

Claims priority, application Japan, Oct. 4, 1985, 60-222257

Int. Cl. G01P 3/489, 3/54; G06F 15/40

U.S. Cl. 364-565

2 Claims



1. An apparatus for detecting the rotation speed of a rotatory member, comprising:
  - a first pulse generator for generating a pulse signal of a

- frequency proportional to the rotation speed of said rotatory member;
  - a first counter for counting the pulses of said pulse signal from said first pulse generator;
  - a second pulse generator for generating a clock signal of a fixed frequency;
  - a presettable down-counter connected to the second pulse generator for counting down a predetermined value sequentially in response to each pulse of said clock signal fed thereto and outputting a borrow signal upon reduction of the count value thereof to a certain value;
  - a CPU connected to the outputs of said first counter and said presettable down-counter to produce an output signal representing the rotational speed;
  - a sampling command circuit which receives the borrow signal from said presettable down-counter and the pulse signal from said pulse generator and produces an interrupt signal representative of termination of a sampling time to be fed to said CPU, and feeds a load signal to said presettable down-counter upon receipt of a load permit signal from said CPU; and
  - a setting register to specify, in response to said load signal, said predetermined value in said presettable down-counter;
- said CPU computing the rotation speed of said rotatory member using the count value in said first counter up to the receipt of said interrupt signal and outputting said load permit signal to allow said presettable down-counter to be preset at said predetermined value.

4,794,552

## SIGNAL SYNTHESIZER

Colin Burn, Whitely Bay, England, assignor to National Nuclear Corporation Limited, Knaresford, England

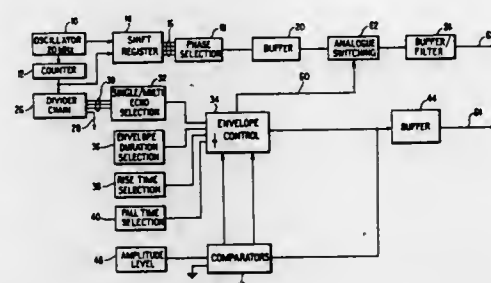
Filed Oct. 31, 1985, Ser. No. 793,263

Claims priority, application United Kingdom, Nov. 7, 1984, 8428182; Feb. 21, 1985, 8504512

Int. Cl. G01C 25/00; G06F 15/20; G06G 7/16

U.S. Cl. 364-571.01

4 Claims



1. A signal synthesizer comprising: means for generating a high frequency pulse train; means for producing an envelope having a rising edge, a falling edge and a plateau between those edges, said envelope-producing means including means for selectively varying the rise and fall times of said edges of the envelope and means for varying the duration of the envelope; means for multiplying said envelope separately with said high frequency pulse train and multiplying said envelope separately with a substantially zero amplitude signal to provide two outputs having superimposed feedthrough components introduced by the multiplying means; and means for combining the output signals to derive a calibration signal substantially free of said feedthrough components.

4,794,553

## COMPACT ELECTRONIC CALCULATOR HAVING GRAPH DISPLAY FUNCTION

Kazuyoshi Watanabe; Hiroyuki Yoshino; Junichi Maeda, and Osamu Negishi, all of Tokyo, Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

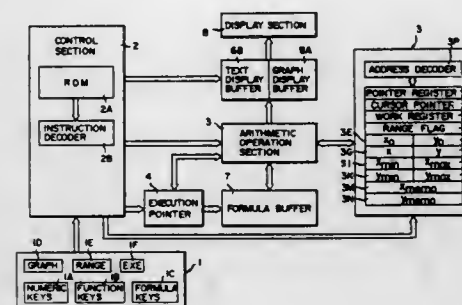
Filed May 9, 1986, Ser. No. 861,340

Claims priority, application Japan, May 24, 1985, 60-110134

Int. Cl. G06F 15/66, 3/14

U.S. Cl. 364-710.01

10 Claims



1. An electronic calculator having a graphic display function, comprising:
  - input means for inputting a functional formula having an independent variable and a dependent variable, and for inputting range data corresponding to values of the independent and the dependent variables of the functional formula;
  - functional formula storage means, coupled to said input means, for storing the functional formula;
  - range data storage means, coupled to said input means, for storing the range data;
  - operation means, coupled to said functional formula storage means and said range data storage means, for sequentially computing the values of the independent and the dependent variables based on the functional formula and the range data, and for obtaining display position data in response to computed values of said variables;
  - display means for performing a graph display; and
  - display control means, coupled to said operation means and said display means, for controlling said display means to display the graph of the functional formula based on the display position data obtained by said operation means.

4,794,554

## ELECTRONIC CALCULATOR HAVING A GRAPH DISPLAY FUNCTION

Morito Tamiya, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

Filed May 27, 1986, Ser. No. 868,302

Claims priority, application Japan, May 31, 1985, 60-118408

Int. Cl. G06F 3/14, 15/66

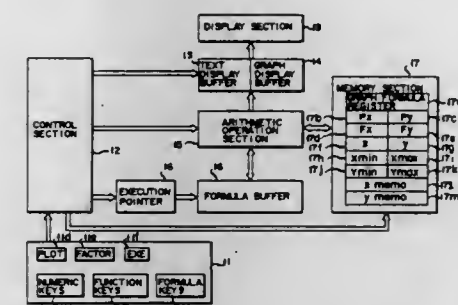
U.S. Cl. 364-710.01

7 Claims

1. An electronic calculator having a graph display function, comprising:
  - display means including a display region of a certain size for displaying a graph of a given formula having a variable, the display region being adapted to define a range of coordinates for the variable of said formula;
  - input means for inputting said formula, and for inputting range data corresponding to a desired range of the value of the variable of the formula for display by the display region;
  - formula storage means for storing the formula input by said input means;
  - range data storage means for storing the range data input by said input means;
  - graph pattern producing means, coupled to said formula

storage means and to said range data storage means, for producing graph pattern data of a certain extent, said graph pattern producing means including means for determining the range of coordinates to be defined by the display region of said display means based on the range data input for the variable of said formula;

display control means, coupled to said display means and to said graph pattern producing means, for supplying the graph pattern data produced by said graph pattern producing means to said display means to obtain the graph display of said formula; and



range changing means, coupled to said range data storage means, for altering the range data stored in said range data storage means for said variable, so that the extent of the graph pattern data produced by said graph pattern producing means is changed based on the range data for said variable as altered by said range changing means, and a new range of coordinates for the variable as determined by the graph pattern producing means is defined for the display region of said display means.

4,794,555

## WAVEFORM SHAPING CIRCUIT

Yuichi Kojima, Tokyo, and Yoshiyuki Chiba, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

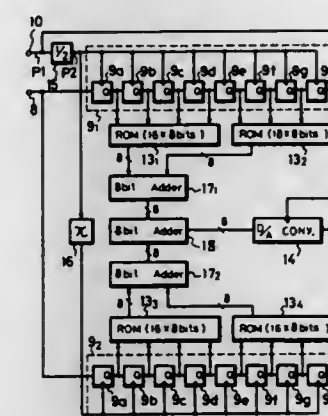
Filed Feb. 11, 1986, Ser. No. 828,171

Claims priority, application Japan, Feb. 13, 1985, 60-26029

Int. Cl. G06F 15/31

U.S. Cl. 364-724.01

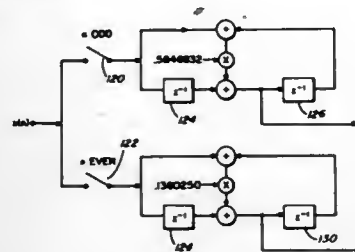
3 Claims



1. A waveform shaping circuit for use with a digital signal transmission apparatus comprising:
  - a first N stage shift register having a digital data input terminal and first and second sets of output terminals, said digital data input terminal being supplied with digital data to be waveform-shaped;
  - a first read only memory having a plurality of address control terminals and an output terminal;

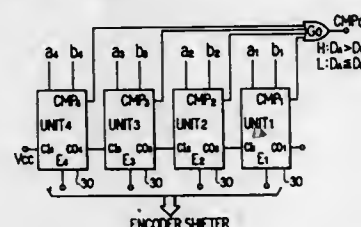
- (c) a second read only memory having a plurality of address control terminals and an output terminal;
- (d) circuit means for connecting respective address control terminals of said first read only memory to the first set of output terminals of said shift register and for connecting respective address control terminals of said second read only memory to the second set of output terminals of said shift register;
- (e) first adder means having input terminals connected to the output terminals of said first and second read only memories and an output terminal for producing a digital output signal which is the added digital signal of the outputs of said first and second read only memories;
- (f) a second N stage shift register having a digital data input terminal and first and second sets of output terminals, said digital data input terminal being supplied with said digital data;
- (g) a third read only memory having a plurality of address control terminals connected to said first set of output terminals of said second N stage shift register and an output terminal;
- (h) a fourth read only memory having a plurality of address control terminals connected to a second set of output terminals of said second N stage shift register and an output terminal;
- (i) second adder means having input terminals connected to the output terminals of said third and fourth read only memories and an output terminal for producing a digital output signal which is the added digital signal of the outputs of said third and fourth read only memories;
- (j) third adder means having input terminals connected to the output terminals of said first and second adder means and an output terminal for producing a digital output signal; and
- (k) a D/A (digital-to-analog) converter supplied with the digital output signal from said third adder means so as to produce a waveform-shaped output signal corresponding to said digital data.

4,794,556  
METHOD AND APPARATUS FOR SAMPLING  
IN-PHASE AND QUADRATURE COMPONENTS  
Charles M. Rader, Concord, Mass., assignor to Massachusetts  
Institute of Technology, Cambridge, Mass.  
Filed Sep. 19, 1964, Ser. No. 652,297  
Int. Cl.<sup>4</sup> G06F 7/38  
U.S. Cl. 364—724.17  
26 Claims



1. Electronic apparatus for providing, as pairs of output samples, samples of in-phase and quadrature components of a waveform comprising:  
sampling means for generating samples by sampling the waveform at equally spaced time instants;  
digitizing means for digitizing each of the samples; and  
a digital phase-splitting network having the digitized samples as an input, each pair of output samples being generated such that one component of the pair is a function of only input samples delayed by an even number of time instants and the other component is a function of only input samples delayed by an odd number of time instants.

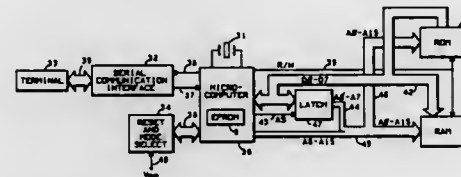
4,794,557  
**FLOATING-POINT NORMALIZING CIRCUIT**  
 Makoto Yoshida, and Tomoji Nukiyama, both of Tokyo, Japan,  
 assignors to NEC Corporation, Tokyo, Japan  
 Filed Dec. 24, 1986, Ser. No. 946,214  
 Claims priority, application Japan, Dec. 24, 1985, 60-295107  
 Int. Cl.<sup>4</sup> G06F 7/38  
 U.S. Cl. 364—748 26 Claims



1. A floating-point normalizing circuit adapted to received first and second multi-bit numbers so as to generate a signal indicative of a shift amount for floating-point normalization, comprising a plurality of unitary circuits each including a pair of binary inputs, a unitary shift signal output, a carry input, and a carry output internally connected through a controlled gate means to the carry input, the unitary circuits being adapted to receive at their binary inputs different digit positions bits of each of the first and second input numbers, respectively, but each of the unitary circuits receiving at its one pair of binary inputs the same digit position bits of the first and second input numbers, the carry input of each of the second most significant digit unitary circuit to the second least significant digit unitary circuit being connected to the carry output of an adjacent more significant digit unitary circuit so that a carry signal is transferred from the most significant digit unitary circuit toward the least significant digit unitary circuit, each of the unitary circuit functioning to turn off the controlled gate means and to generate a unitary shift signal when a predetermined logic level is detected in at least one input of the binary inputs and a predetermined carry signal is received at its carry input, whereby the position of the unitary circuit generating the unitary shift signal is indicative of the amount of required shift for normalization.

**4,794,558**  
**MICROPROCESSOR HAVING SELF-PROGRAMMED EPROM**

Robert R. Thompson, Largo, Fla., assignor to Motorola, Inc.,  
Schaumburg, Ill.  
Continuation of Ser. No. 47,674, Jun. 12, 1979, abandoned. This  
application Ser. 25, 1986, Ser. No. 912,183  
Int. Cl.<sup>4</sup> G06F 9/22



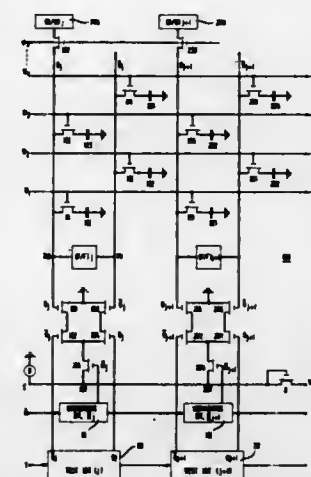
1. A single-chip microcomputer for use with:  
off-chip program storage means for providing program  
information in response to the actuation thereof; and  
off-chip control means for providing, in response to the  
actuation thereof, control information defining a predeter-  
mined sequence for actuating said program storage means;  
said microcomputer comprising:

input/output (I/O) means coupled to said program storage means and to said control means;  
programmable read only memory (PROM) means for storing program information in response to the actuation thereof; and  
processor means coupled to the I/O means and to said PROM means, for actuating said control means via said I/O means to obtain said control information, actuating said program storage means via said I/O means in the predetermined sequence defined by said control information to obtain said program information, and actuating said PROM means to store the program information so obtained.

**4,794,559**  
**CONTENT ADDRESSABLE SEMICONDUCTOR**  
**MEMORY ARRAYS**

**Alan J. Greenberger, Berkeley Heights, N.J., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**  
**Filed Jul. 5, 1984, Ser. No. 628,165**  
**Int. Cl.<sup>4</sup> G11C 15/04, 11/24**

**U.S. Cl. 365—49** **9 Claims**



1. A semiconductor memory circuit comprising:
  - (a) a crosspoint bit line-wordline array of dynamic semiconductor memory cells for storing data, a separate complementary bit line for each bit line, a plurality of cells on each bit line and a plurality of cells on each complementary bit line;
  - (b) means for separately activating each of the wordlines;
  - (c) a single equality output line which is connected to each of the bit lines through a separate logic device, one and only one such device for each bit line plus the complementary bit line; and
  - (d) means, responsive to the data stored in the cells, for identifying whether any wordline which is being activated stores a word portion that matches a test word portion, including means for developing on the equality output line a logic output state representing whether or not the wordline contains a word portion that matches the test word portion.

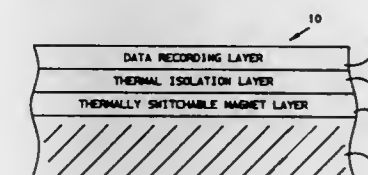
4,794,560

**ERASEABLE SELF BIASING THERMAL  
MAGNETO-OPTIC MEDIUM**

Alan E. Bell, San Jose; Gary C. Bjorklund, Los Altos, and Barry H. Schechtman, San Jose, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 30, 1985, Ser. No. 781,374

Int. Cl.<sup>4</sup> G11C 13/06



1. A thermally written magnetic data storage medium for retaining desired domains of magnetization having field orientations representative of the data comprising:
- first magnetic layer means for retaining one or more domains of desired magnetic field orientations;
  - second magnetic layer means for providing a biasing field for obtaining a predetermined magnetic field orientation in the first magnetic layer as a function of the temperature of the second magnetic layer means; and
  - thermal layer means disposed between the first and second magnetic layer means for providing a thermal barrier for controlling the temperature of the second magnetic layer means.

4,794,561

STATIC RAM CELL WITH TRENCH PULL-DOWN  
TRANSISTORS AND BURIED-LAYER GROUND PLATE

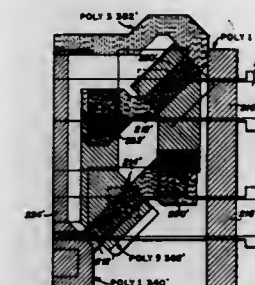
Fu-Chieh Hsu, Cupertino, Calif., assignor to Integrated Device  
Technology, Inc., Santa Clara, Calif.

Filed Jul. 2, 1987, Ser. No. 69,168

Int. Cl.<sup>4</sup> G11C 11/40; H01L 21/70

U.S. Cl. 365—182

4 Claims



1. A SRAM cell comprising in combination: a silicon chip including
- a first bit line;
  - a word line;
  - a second bit line;
  - a power supply line;
  - a buried layer ground plate;
  - a first resistor;
  - a second resistor;
  - a first transistor configured as a transfer transistor, said first transistor having source means connected to said first input line, a gate connected to said word line, and drain means coupled by said first resistor to said power supply line;



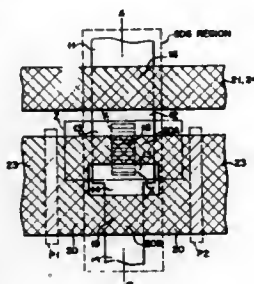
- a second transistor configured as a pull-down transistor, said second transistor having source means connected to said buried layer ground plate, a gate coupled by said second resistor to said power supply line, and drain means connected to said first transistor drain means;
- a third transistor configured as a pull-down transistor, said third transistor having source means connected to said buried layer ground plate, a gate connected to said first transistor drain means, and drain means connected to said second transistor gate at least one of said second and said third transistors being produced in a trench with said one of said transistors source means extending into said buried layer ground plate; and
- a fourth transistor configured as a transfer transistor, said fourth transistor having source means connected to said second transistor gate, a gate connected to said word line, and drain means connected to said second bit line.

**4,794,562**  
**ELECTRICALLY-ERASABLE/PROGRAMMABLE NONVOLATILE SEMICONDUCTOR MEMORY DEVICE**  
 Hideo Kato, Kawasaki; Hiroshi Iwahashi, Yokohama; Masamichi Asano, Tokyo; Akira Narita, Kawasaki, and Shinichi Kikuchi, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 9, 1987, Ser. No. 94,458  
 Claims priority, application Japan, Sep. 29, 1986, 61-230723  
 Int. Cl.<sup>4</sup> G11C 11/40

U.S. Cl. 365—182

11 Claims



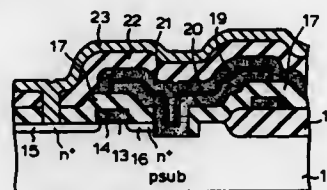
1. An electrically erasable/programmable nonvolatile semiconductor memory device, comprising:
- a memory cell constituted by a series circuit of a selecting MOS transistor and a data storage MOS transistor, a floating gate electrode and a control gate electrode being formed in said data storage MOS transistor, wherein:
- one portion of said floating gate electrode is formed on a channel region of said data storage MOS transistor through a first gate insulating film; and
- the other portion of said floating gate electrode is formed on a drain region of said data storage MOS transistor through a second gate insulating film thinner than said first gate insulating film,
- wherein said one portion and said other portion of said floating gate electrode are structurally separated from each other but electrically connected with each other.

**4,794,563**  
**SEMICONDUCTOR MEMORY DEVICE HAVING A HIGH CAPACITANCE STORAGE CAPACITOR**  
 Setsuichi Maeda, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 31, 1986, Ser. No. 925,547  
 Claims priority, application Japan, Nov. 20, 1985, 60-260452  
 Int. Cl.<sup>4</sup> G11C 11/34, 11/24; H01L 29/78, 27/02  
 U.S. Cl. 365—182

1. A semiconductor memory device for an integrated circuit comprising:

- a semiconductor substrate of a first conductivity type;
- a field insulation layer on the semiconductor substrate;
- a switch including a gate insulation layer, a gate electrode on the gate insulation layer, and a pair of impurity regions of a second conductivity type in the substrate adjacent to the gate electrode;
- a capacitor including a first electrode connected to one impurity region, a second electrode connected to a predetermined voltage, first insulation means for separating the first and second electrodes, and groove means extending into the substrate to a predetermined depth for increasing the capacitance area of the first electrode; and



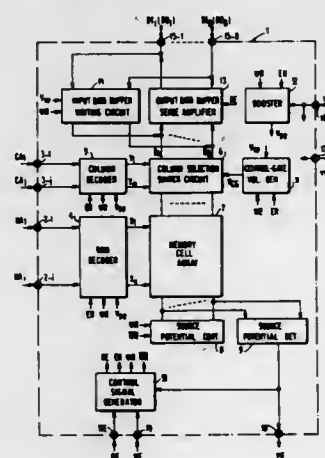
- second insulation means at least partially overlapping one of the impurity regions adjacent said groove means; wherein the groove means includes a groove intersecting said one of the impurity regions and said second insulation means and extending into the semiconductor substrate, each of the first and second electrodes and the first insulation means being in part in the groove and in part extending outside the groove and overlapping a part of said second insulation means thereby to increase the capacitance of said capacitor.

**4,794,564**  
**NONVOLATILE SEMICONDUCTOR MEMORY INCLUDING MEANS FOR DETECTING COMPLETION OF WRITING OPERATION**  
 Takeshi Watanabe, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Aug. 10, 1987, Ser. No. 83,472  
 Claims priority, application Japan, Aug. 8, 1986, 61-186313  
 Int. Cl.<sup>4</sup> G11C 11/34

U.S. Cl. 365—184

9 Claims



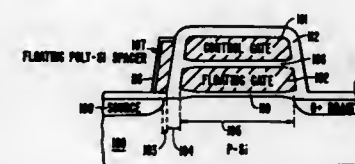
1. A semiconductor memory comprising a plurality of memory transistors, means responsive to a set of address signals for selecting at least one of said memory transistors, means for applying a programming voltage to the selected memory transistor, a threshold voltage of each of said memory transistors being changed when said programming voltage is applied

- thereto, means coupled to said selected memory transistor for detecting the change in the threshold voltage thereof to produce a detection signal, and means responsive to said detection signal for stopping the application of said programming voltage to the selected memory transistor.

**4,794,565**  
**ELECTRICALLY PROGRAMMABLE MEMORY DEVICE EMPLOYING SOURCE SIDE INJECTION**  
 Albert T. Wu, Berkeley; Ping K. Ko, Hercules; Tung-Yi Chan, Berkeley, and Channing Hu, Hercules, all of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Filed Sep. 15, 1986, Ser. No. 907,564  
 Int. Cl.<sup>4</sup> G11C 7/00, 11/40; H01L 29/78  
 U.S. Cl. 365—185

2 Claims



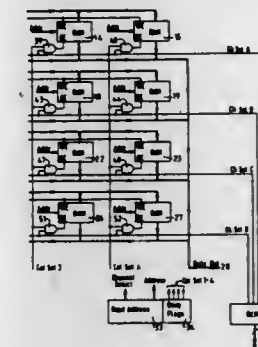
1. A floating gate storage cell providing source-side injection of hot electrons comprising:
- a body of semi-conductor material having a substrate of a first conductivity type, a source region and a drain region each of a second conductivity type, and a channel region of the first conductivity type extending between the source region and the drain region;
- a control gate overlying said channel region;
- a floating gate insulated from said control gate and said source, drain and channel regions;
- said control gate and said floating gate being mutually aligned with one edge of each of said gates in the immediate vicinity of the drain region;
- a side wall spacer insulated from said source region, said control gate and said floating gate, said spacer being located in the immediate vicinity of the source region and spaced from the opposite edges of each of said gates to provide a gap therebetween; and
- means for providing a weak gate control region near the source region so that a relatively high channel electric field for promoting hot-electron injection is created under the weak gate control region when said device is biased for programming, said means for providing a weak gate control region including a gap between the opposite edges of each said gate and the source region.

**4,794,566**  
**RANDOM ACCESS MEMORY APPARATUS**  
 John W. Richards, Chilbolton, Near Stockbridge, and Derek P. Allsop, Woking, both of United Kingdom, assignors to Sony Corporation, Tokyo, Japan

Filed Feb. 10, 1987, Ser. No. 13,233  
 Claims priority, application United Kingdom, Feb. 25, 1986, 8604594

- U.S. Cl. 365—189
1. A random access memory apparatus for processing data in successive sample periods, said apparatus comprising:
- N memories in each of N channels, wherein N is at least two;
- a busy flag memory;
- a write enable demultiplexer for selectively supplying write enable signals to said memories;
- a write address generator for writing incoming data into all of said memories in any given one of said channels under control of said write enable signals;

- a read enable demultiplexer for selecting one of said channels;
- a read address generator for reading stored data from any one of said memories in the selected channel and, on reading from said one memory, setting a busy flag corre-



- sponding thereto in said busy flag memory to mark said one memory as busy;
- means to clear said busy flag N sample periods later; and
- means responsive to said busy flag to control said read address generator to read from a memory in said one selected channel other than said one memory.

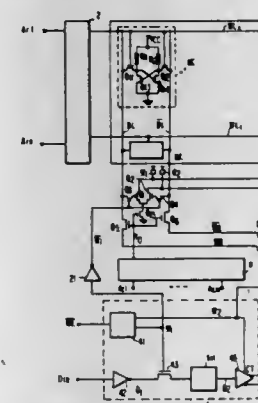
**4,794,567**  
**STATIC MEMORY INCLUDING DATA BUFFER AND LATCH CIRCUITS**  
 Yasuo Akatsuka, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Continuation of Ser. No. 497,284, May 23, 1983, abandoned.  
 This application Oct. 29, 1986, Ser. No. 924,388

Claims priority, application Japan, May 21, 1982, 57-85981  
 Int. Cl.<sup>4</sup> G11C 7/00

U.S. Cl. 365—189

5 Claims



1. An asynchronous type static memory circuit comprising a plurality of word lines, a plurality of bit line pairs intersecting with said word lines, a plurality of static-type memory cells coupled to said word lines and said bit line pairs, a first terminal for receiving a write command signal, a second terminal for receiving an input data, first means coupled to said first terminal for generating a first control signal in response to said write command signal during a first period which is longer than the period of the presence of said write command signal and terminates a predetermined time after the time point when said write command signal disappears, and a write circuit coupled to said first means and said second terminal for effecting a write oper-

ation of said input data to a selected memory cell during said first period, said write circuit including a holding circuit for holding said input data during a second period, said second period overlapping said first period and ending after the end of said first period, and selecting means for selectively applying the input data stored in said holding circuit to the selected memory cell, whereby a period of writing said input data to said selected memory cell is longer than the period of said write command signal, in which said holding circuit includes a first buffer circuit having an input terminal coupled to said second terminal, a latch circuit, a transfer gate coupled between an output terminal of said first buffer circuit and an input terminal of said latch circuit, a control circuit coupled to said first terminal for rendering said transfer gate conductive in response to said write command signal and a second buffer circuit having an input terminal coupled to an output terminal of said latch circuit for generating internal input data to be written into the selected memory cell.

4,794,568

# REDUNDANCY CIRCUIT FOR USE IN A SEMICONDUCTOR MEMORY DEVICE

Hyung-Kyu Lim, Seowon; Jae-Yeong De, Dongjak, both of Rep. of Korea, and Rustam Mehta, Sunnyvale, Calif., assignors to Samsung Semiconductor & Telecommunication Co., Ltd., Seoul, Rep. of Korea

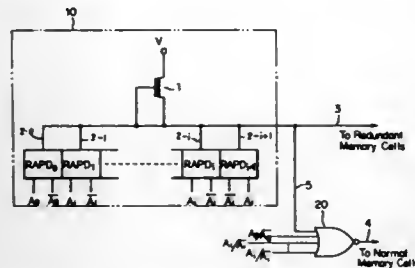
Filed May 1, 1987, Ser. No. 44,702

Claims priority, application Rep. of Korea, May 7, 1986, 86-3537

Int. Cl.<sup>4</sup> G11C 7/00

U.S. Cl. 365—203

19 Claims



1. In a semiconductor circuit for substituting a redundant line connected to defect-free redundant memory cells for a normal line connected to defective normal memory cells, wherein the circuit has a normal decoder connected to the normal line, for producing a first resulting signal to enable or disable the normal line connected to the defective normal memory cells in response to a predetermined combination of address signals of the normal decoder and their complements, said redundant decoder comprising:

- a plurality of first address program devices, connected in parallel to the redundant line, for electrically connecting or disconnecting the redundant line to a reference potential in response to pairs of input signals formed by each input address signal and the respective complement of each input address signal during a first electrical program of said devices; and
- a second address program device, connected to the redundant line, for electrically connecting or disconnecting the redundant line to the reference potential in response to a pair of signals complementary to a pair of input signals of one selected device of said plurality of first devices during a second electrical program of said second address program device whereby any one of said one selected device and said second device connect to the reference potential so as to not select the redundant line during said first program when the normal memory cells are free of defect, and said first and second devices become floating, and so

as to select the redundant line during the second program when the normal memory cells are defective.

4,794,569

# SEMICONDUCTOR MEMORY HAVING A BARRIER TRANSISTOR BETWEEN A BIT LINE AND A SENSING AMPLIFIER

Hiroshi Sahara, Tokyo; Haruki Toda, Yokohama, and Shigeo Ohshima, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

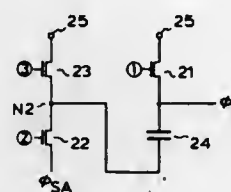
Filed May 14, 1986, Ser. No. 863,190

Claims priority, application Japan, May 28, 1985, 60-114807

Int. Cl.<sup>4</sup> G11C 7/00

U.S. Cl. 365—203

4 Claims



1. Semiconductor memory supplied with a power source voltage and an earth potential, comprising: a first MOS transistor connected between a bit line having a precharging level and a sensing circuit of a dynamic memory; means for lowering the gate potential of said MOS transistor to a level below the precharging level of said bit line during the sensing operation, and for raising said gate potential, on data transfer, to a level greater than a value reached by adding the threshold voltage of the MOS transistor to the power source voltage.

4,794,570

# SELF-TIMED PROGRAMMABLE LOGIC ARRAY WITH PRE-CHARGE CIRCUIT

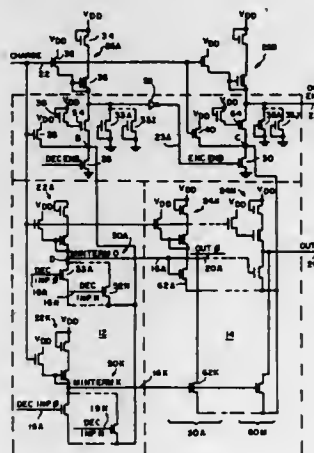
Robert C. Rose, Hudson, and Jash Patel, Northboro, both of Mass., assignors to Digital Equipment Corporation, Maynard, Mass.

Continuation of Ser. No. 881,079, Jul. 2, 1986, abandoned. This application Mar. 1, 1988, Ser. No. 165,456

Int. Cl.<sup>4</sup> G11C 13/00

U.S. Cl. 365—203

1 Claim



1. A programmable logic array comprising an input decoder section and an output encoder section connected by a plurality of minterm conductors, said input decoder selecting a minterm

conductor in response to the encoding of a plurality of input signals, and the output encoder section transmitting a plurality of output signals each on a respective output bit line and having an encoding determined by the selected minterm conductor,

- A. said input decoder section including a plurality of decoder stages each connected to a node to which one of said minterm conductors is connected, at least some of said decoder stages including at least one control transistor connected to said respective node for controlling the selection of said minterm conductors under control of an input signal,
- B. said output encoder section including a plurality of stages each connected to a node to which one of said output conductors is connected, at least some of said stages including at least one control transistor connected to said respective node for controlling the transmission of an output signal on said output conductor in response to the selection of said minterm conductor, said programmable logic array further including precharge means for precharging the respective nodes, each of said control transistors being connected between said respective nodes and a switch means and having a control terminal controlled in response to said respective input signal or the selection of said respective minterm conductors, said switch means being responsive to enabling signal for selectively enabling said control transistors.

4,794,571

# DYNAMIC READ-WRITE RANDOM ACCESS MEMORY

Yukimasa Uchida, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 704,210, Feb. 22, 1985, abandoned.

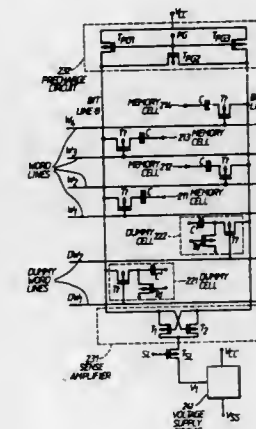
This application Jan. 11, 1988, Ser. No. 143,204

Claims priority, application Japan, Mar. 9, 1984, 59-45202

Int. Cl.<sup>4</sup> G11C 11/24

U.S. Cl. 365—205

19 Claims



1. A dynamic read-write random access memory, comprising: a memory cell including, a supply voltage terminal, a capacitive means having a first charge terminal connected to said supply voltage terminal and a second charge terminal, and switching means, having a first conduction terminal connected to said second charge terminal and a second conduction terminal, for forming a conduction path between said first and second conduction terminals, said switching means having a control terminal for controlling the impedance of said conduction path; a word line connected to said control terminal, said word line having a first voltage level when said memory

cell is selected and second voltage level when said memory cell is not selected; a bit line connected to said second conduction terminal; and voltage applying means for applying to said bit line a voltage level comprising, a MOS transistor having source, drain and gate terminals; and a first diode connected in series with said source and drain terminals between a pair of voltage sources, said gate terminal connected to that voltage source connected to said diode, wherein the voltage level applied by said voltage level applying means is derived from a junction between the source-drain path of said transistor and said diode, between said second voltage level of said word line and a voltage level of said first conduction terminal when said memory cell is not selected, thereby preventing leakage current from flowing through said conduction path when said memory cell is not selected.

4,794,572

# ACOUSTIC WELL LOGGING METHOD AND SYSTEM FOR OBTAINING A MEASURE OF FORMATION ANISOTROPY

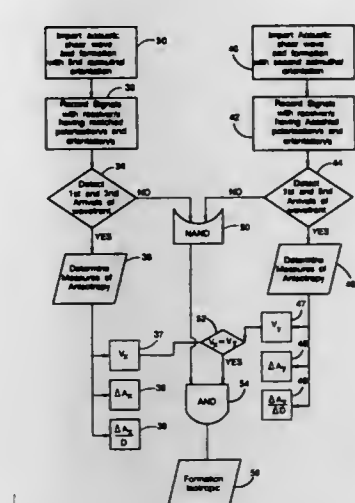
Carl H. Sondergeld, and Martin L. Smith, both of Broken Arrow, Okla., assignors to Amoco Corporation, Chicago, Ill.

Filed Sep. 30, 1986, Ser. No. 913,210

Int. Cl.<sup>4</sup> G01V 1/40; E21B 49/00

U.S. Cl. 367—31

18 Claims



1. A system for acoustic well logging of formations surrounding a borehole to obtain a measure of formation anisotropy comprising: (a) elongated housing means for controlled vertical positioning within a borehole; (b) first asymmetric pressure wave source means mounted with the elongated housing means having a first azimuthal orientation for generating shear waves in formations surrounding the borehole; (c) first receiver means mounted with the elongated housing means and having an azimuthal orientation matching that of the first source means, wherein the first receiver means is a spaced distance from the first source means, for recording first signals having one or more events representative of separate modes of shear wave propagation of the shear waves generated by the first asymmetric source means; (d) second asymmetric pressure wave source means mounted with the elongated housing means having a second azimuthal orientation for generating shear waves in formations surrounding the borehole; (e) second receiver means mounted with the elongated hous-



ing means and having an azimuthal orientation matching that of the second source means, wherein the second receiver means is a spaced distance from the second source means, for recording second signals having one or more events representative of separate modes of shear wave propagation of the shear waves generated by the second asymmetric source means;

(f) means for processing the first and second recorded signals the separate modes of shear wave propagation for the events in each recorded signal; and

(g) means for detecting first and second events in each recorded signal representative of first and second modes of shear wave propagation and for determining a measure of formation anisotropy from the difference in the velocities of the first and second modes of shear wave propagation.

**4,794,573**  
**PROCESS FOR SEPARATING UPGOING AND DOWNGOING EVENTS ON VERTICAL SEISMIC PROFILES**

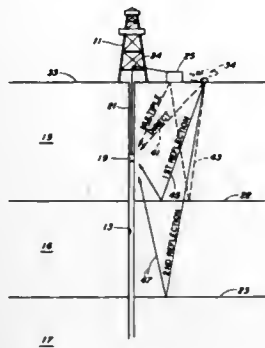
David W. Bell, and Vernon D. Cox, both of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Feb. 11, 1988, Ser. No. 154,818

Int. Cl.<sup>4</sup> G01V 1/40

U.S. Cl. 367—57

10 Claims



1. A method of seismic geophysical surveying wherein a seismic energy source positioned at or near the earth surface is adapted to generate seismic wave energy which is detectable by seismic detectors in vertical spaced array in a borehole and the electrical signals generated by the seismic detectors in response thereto are processed for discriminating the seismic events which are upward traveling as they arrive at the detectors from those which are downward traveling as they arrive at the detectors, said method comprising the steps of:

- generating seismic waves in the earth at a given location,
- detecting the resultant seismic waves at a plurality of vertically spaced levels in a borehole penetrating earth formations below the energy source and generating representative electrical signals in response thereto by means of detector transducers positioned in the borehole at each said level,
- combining a pair of detector signals from a pair of detectors at adjacent levels in the borehole to form a sum signal,
- subtracting the signal from the lower detector of the pair from the signal of the other detector of the pair to form a difference signal,
- integrating the difference signal to form an integral signal,
- applying an estimated amplitude scale correction to the integral signal to form a resulting signal which is an approximate representation of a detector signal from a detector located midway between said pair of detectors, and
- subtracting the amplitude corrected signal from said sum signal to form a modified filtered signal wherein the amplitudes of the seismic wave events which are upwardly traveling as they arrive at the detectors are increased and

the seismic wave events which are downwardly traveling as they arrive at the detectors are attenuated.

**4,794,574**  
**BROAD BAND INTERFERENCE SONAR HAVING COMPRESSED EMISSION**

Georges Grall, Le Conquet, France, assignor to Thomson-CSF, Paris, France

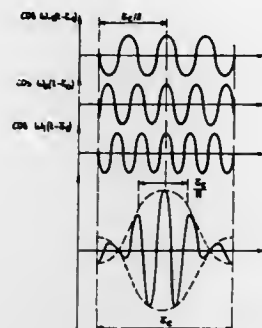
Filed Oct. 29, 1985, Ser. No. 808,652

Claims priority, application France, Oct. 30, 1984, 84 16595

Int. Cl.<sup>4</sup> G01S 15/02; H04R 1/32

U.S. Cl. 367—87

8 Claims



1. A broad band interference sonar transducer array exhibiting compressed emission, comprising an emission system having two spaced emitters associated with emission control circuits and a reception system associated with reception circuits, wherein each emitter is constituted by a group of N pairs of elementary emitters (E<sub>1</sub>)<sub>i</sub> and (E<sub>2</sub>)<sub>i</sub>, where i is an integer between  $-(N-1)/2$  and  $(N-1)/2$  for odd N and i is between  $-N/2$  and  $+N/2$  and different from 0 for even N, one elementary emitter (E<sub>1</sub>)<sub>i</sub> being spaced from the corresponding elementary emitter (E<sub>2</sub>)<sub>i</sub> by a length L<sub>i</sub>, these two elementary emitters including means for supplying a common signal of frequency f<sub>i</sub>, wherein the products L<sub>i</sub>f<sub>i</sub> of the N pairs of elementary emitters defined in this manner are equal, and wherein all the emitters are supplied simultaneously, during recurrent pulses, with signals of frequencies f<sub>i</sub> in phase at the center of the pulses.

**4,794,575**  
**SUBMARINE LAUNCHED SEA-STATE BUOY (SLSSB)**  
James E. Miller, Middletown, R.I., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 2, 1987, Ser. No. 104,210

Int. Cl.<sup>4</sup> H04B 11/00

U.S. Cl. 367—134

6 Claims

1. A sensing device, launched from a submarine submerged under the surface of an ocean, buoyantly ascending to said surface and floating thereon, for remotely measuring surface wave characteristics, comprising:

a long cylindrical body having a forward end, an aft end, a hermetically sealed chamber located at the forward end thereof, a centrally located hermetically sealed intermediate chamber and an open ended chamber located at the aft end thereof, said long cylindrical body further comprising, a long cylindrical metal tube having first and second open ends and a plurality of apertures therethrough in proximity to said first tube end, a plurality of sea-water dissolvable plugs, one each corresponding to each said plurality of apertures, for sealing said apertures, a rounded metal nose plug, fixedly attached to said first open end of said tube, for sealably closing said first end, a plurality of annular stiffening rings, disposed at preselected locations along the interior surface of said tube, for providing pres-

sure resisting reinforcement to said tube, and a circular, disk shaped metal bulkhead, fixedly attached around the periphery thereof to the interior wall of said tube at a preselected location therealong, for providing, in cooperation with said nose plug and said plurality of dissolvable plugs, said hermetically sealed forward chamber; instrumentation means, fixedly attached within said forward end chamber of said body, for responding to vertical wave produced accelerations, producing analog distance signals therefrom and converting said analog signals to digital electrical signals; motion dampening means, movably positioned within said intermediate chamber and further affixed by tether thereto, for dampening vertical and pitchwise oscillations of and providing proper orientation to said body with respect to said sea surface;



intermediate spool means, slidably inserted within said body so as to contact said motion dampening means, for holding said motion dampening means within said body; lifting body means, releasably positioned in the aft end chamber of said cylindrical body in contact with said intermediate spool means for exiting said open end and lifting clear of said submarine after launch; data link means, connected to said instrumentation package, said intermediate spool means and said lifting body means, for transmitting said digital electrical signals from said instrumentation package to said submarine along said data link; and a data readout unit, located on said submarine, for receiving said digital signals and converting them into wave height information.

**4,794,576**  
**COMBINATION ELECTRICAL CONTACT MEMBER AND BRAKING MEMBER FOR A TIMEPIECE**  
Herbert Schwartz, Wurmberg; Friedrich Mose, Pforzheim-Wurm, and Adolf Sedlak, Wurmberg/Neubarental, all of Fed. Rep. of Germany, assignors to Timex Corporation, Middlebury, Conn.

Filed Jan. 29, 1988, Ser. No. 149,798

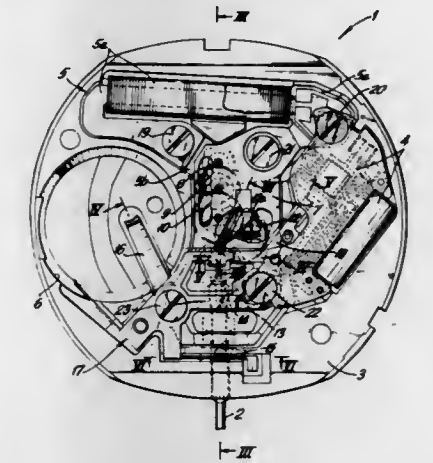
Int. Cl.<sup>4</sup> G04B 17/12, 27/02

U.S. Cl. 368—185

4 Claims

1. In a movement for a timepiece having a frame, a stepping motor, an energy cell, a circuit adapted to periodically advance said stepping motor when connected to said energy cell and including first electrical connection means having a supply terminal and second electrical connection means having a switching terminal for disabling said stepping motor, a gear train connected to be driven by said stepping motor, said gear train having at least one rotatable member, and a manually actuatable stem disposed in said frame and movable between a first position and a second position, said stem defining at least two spaced detent grooves, the improvement comprising: a contact spring comprising a shaped member of electrically conductive spring metal having a battery contact portion

and a circuit supply portion respectively connected to said energy cell and said supply terminal of said first electrical connection means, said contact spring having a spring-



biased first arm actuated by movement of said stem, said first arm having a braking finger portion adapted to apply a braking force to said rotatable member when the stem is actuated.

**4,794,577**  
**WATCH MIDDLE AND WRISTLET ASSEMBLY**  
Clément Meyrat, Le Landeron, Switzerland, assignor to ETA SA Fabriques d'Ebauches, Granges, Switzerland

Filed Apr. 20, 1987, Ser. No. 39,857

Claims priority, application Switzerland, May 7, 1986, 01872/86

Int. Cl.<sup>4</sup> G04B 37/00

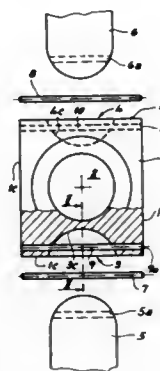
U.S. Cl. 368—282

10 Claims

1. An assembly comprising:

- a watch-case element including a middle bounded by a lower surface, an upper surface and an edge surface, and formed with a recess, said recess having an opening in said edge surface and being separated from one of said lower and upper surfaces by a wall;
- a wristlet having an end portion accommodated in said recess; and,
- means for retaining said end portion in said recess including an elongated retention element extending in a direction substantially parallel to one of said upper and lower surfaces and substantially perpendicularly to the length of said wristlet, said retention element extending through said recess and cooperating with said middle for urging said end portion of said wristlet against said wall and for providing thereby frictional forces between said end por-

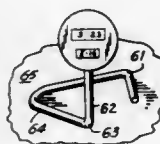
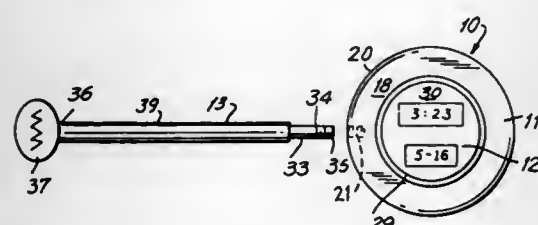
tion of said wristlet and corresponding portions of said wall and said retention element respectively, said fric-



tional forces alone causing said end portion of said wristlet to be retained in said recess.

**4,794,578**  
**NOVELTY WATCH CONSTRUCTION**  
Stephen Leo, 89 N. Broadway, White Plains, N.Y. 10603  
Filed Apr. 3, 1987, Ser. No. 33,538  
Int. Cl.<sup>4</sup> G04B 37/00; A44C 5/00  
U.S. Cl. 368—316

4 Claims



1. A novelty watch construction comprising: a housing having means for engaging a watch movement, said housing having an outer surface, there being an engageable socket extending inwardly of said outer surface; an elongated flexible wire-like element having a core of deformable material capable of retaining an imparted shape, said wire-like element having a

first end thereof having means thereon selectively engaging said socket, whereby upon the bending of said wire-like element to predetermined shape, said construction may be engaged with another object to be supported thereby.

**4,794,579**  
**CIRCUIT FOR REMOTE-SCANNING AUDIO OR VIDEO DISK PLAYER FOR CONTACTLESS SCANNING WITH COARSE AND FINE DRIVE MECHANISMS FOR RADIAL SERVO READJUSTMENT**

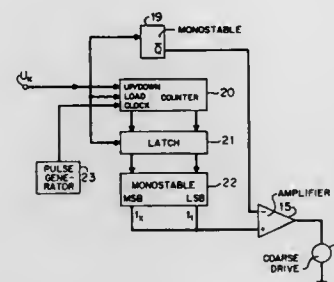
Dieter Baas, Kehl, Fed. Rep. of Germany, assignor to Deutsche Thomson-Brandt GmbH, VS-Villingen, Fed. Rep. of Germany  
PCT No. PCT/EP86/00076, § 371 Date Nov. 4, 1986, § 102(e)  
Date Nov. 4, 1986, PCT Pub. No. WO86/05307, PCT Pub. Date Sep. 12, 1986

PCT Filed Feb. 15, 1986, Ser. No. 939,429  
Claims priority, application Fed. Rep. of Germany, Mar. 9, 1985, 3508421

Int. Cl.<sup>4</sup> G11B 7/00

U.S. Cl. 369—43

5 Claims



1. Circuit arrangement for a remote-scanning audio or video disk player, comprising: scanning means; coarse-drive means and precision-drive means for radial servo readjustment of said scanning means; said precision-drive means having a control parameter, a radial-error signal for said coarse-drive means being obtained from said control parameter; means for starting said coarse-drive means by pulses when pulses obtained from a radial-error signal exceed a predetermined pulse-to-interval ratio.

**4,794,580**  
**PICKUP SYSTEM IN OPTICAL INFORMATION RECORDING AND REPRODUCING APPARATUS WITH DAMPED LEAD WIRES**

Yuji Ikeda; Tsutomu Miyakawa, both of Tokyo; Takahiro Okajima, and Masahiko Miyake, both of Saitama, all of Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Aug. 25, 1986, Ser. No. 900,207  
Claims priority, application Japan, Jul. 12, 1985, 60-153651; Jul. 12, 1985, 60-153652; Jul. 12, 1985, 60-153653; Jul. 12, 1985, 60-153654; Jul. 12, 1985, 60-153655; Jul. 12, 1985, 60-153656; Aug. 23, 1985, 60-128601[U]

Int. Cl.<sup>4</sup> G11B 7/95

U.S. Cl. 369—44

3 Claims

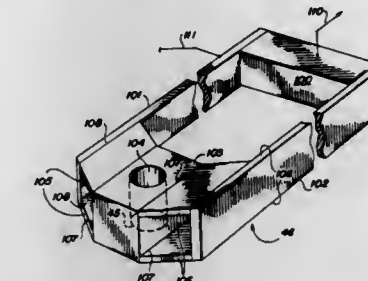
1. In an optical information recording and reproducing apparatus including a pickup system, said pick up system comprising:

an objective lens for irradiating a recording surface of a recording medium with a spotlight;  
a supporting mechanism including a base member and means for supporting said objective lens for movement in the direction of an optical axis of the objective lens as well as in a direction perpendicular to said optical axis and aligning said optical axis of said objective lens substantially perpendicular to said recording surface;  
the improvement comprising:

a vibration absorbing material fixed to said base member; driving force application means for applying a position driving force to said objective lens, said driving force application means having a first coil fixed to said objective lens and wound so as to make its center axis substantially parallel to said direction of said optical axis, a second coil fixed to said objective lens and wound so as to make its center axis perpendicular to said direction of said optical axis, a printed circuit substrate attached to said base member and operatively connected to said first and second coils to supply a driving current to each of said first and second coils, a magnetic circuit for generating magnetic flux which interlinks with said first and second coils, lead wires connecting said printed circuit substrate to said first and second coils and being connected at intermediate points thereof to said vibration absorbing material, and wherein said objective lens supporting means comprises a lens holder including aligned projections to opposite sides of the objective lens, a pair of horizontally flexing leaf springs cantilever mounted to said base and having free ends extending, in a direction away from said objective lens, a pair of vertically flexing leaf springs on each side of

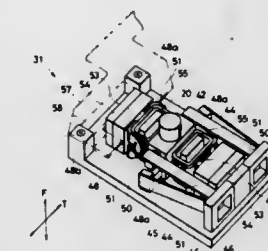
record tracks on the medium; the improvement, including in combination:

a headarm movable orthogonally to the record tracks on the medium, a mounting block mounted on the headarm, first and second bender beams mounted on the mounting block on opposite faces thereof and extending from the mounting block in a direction along the length of a record track to be scanned on the record medium, said bender beams being spaced apart a predetermined distance;



a lens holder disposed intermediate the distal ends of said bender beams for carrying an objective lens having an optical axis orthogonal to the recording surface of said record medium; and

two pairs of arms respectively pivotally secured to the bender beam long edges thereof bending parallel to the record track to be scanned and to the lens holder on pivot lines parallel to the longitudinal extent of the record track to be scanned.



said lens holder and being cantilever mounted to the top and bottom of said holder projections and having free ends extending parallel to each other to opposite sides of said lens and in a direction away from said objective lens, and a junction member to each side of the objective lens connected to the free ends respectively, of a pair of horizontally vertically flexing leaf springs and the adjacent horizontally flexing leaf springs, and a member of vibration proofing material spanning laterally between said junction members and connecting said junction members together such that the two horizontally flexing leaf springs extend along a direction substantially perpendicular to a plane containing the optical axis of the objective lens in a tracking direction perpendicular to the focusing direction, and wherein the two horizontal flexing springs are separated from each other in that tracking direction to permit substantial freedom of movement of the objective lens in the focusing direction and tracking direction upon energization of said first and second coils with the load of such movement would be adverse to the lead wires connecting the printed circuit substrate to the first and second coils absent their intermediate point connection to said vibration absorbing material.

**4,794,581**  
**LENS SUPPORT SYSTEM ENABLING FOCUSING AND TRACKING MOTIONS EMPLOYING A UNITARY LENS HOLDER**

Rolf Andresen, Tucson, Ariz., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 25, 1987, Ser. No. 66,380

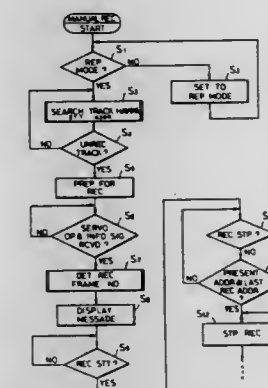
Int. Cl.<sup>4</sup> G11B 7/09

U.S. Cl. 369—45

10 Claims

1. A focussing and tracking support system for a lens in an optical record medium player for providing to an objective lens a first degree of freedom to and from a recording surface of a record medium along an axis perpendicular to the medium and a second degree of freedom in a direction transverse to

1. A method of preventing a duplex recording on an information recording medium, said information recording medium comprising unrecorded tracks which are not recorded with an information signal and pre-recorded tracks which are pre-recorded with an information signal, said duplex recording being an operation in which an information signal is erroneously recorded on said pre-recorded tracks, said method comprising the steps of: detecting a predetermined unrecorded track having a





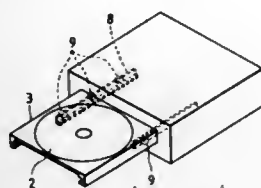
starting address where a recording is to be started on said information recording medium;  
detecting a first pre-recorded track occurring after said predetermined unrecorded track based on a signal reproduced from said first pre-recorded track;  
confirming an address of said first pre-recorded track from consecutive addresses reproduced from signals which are reproduced from said first pre-recorded track and a predetermined number of pre-recorded tracks following said first pre-recorded track;  
recording an information signal on said predetermined unrecorded track and unrecorded tracks following said predetermined unrecorded track; and  
forcibly stopping the recording of the information signal at an unrecorded track having an address which is one less than the address of said first pre-recorded track.

#### 4,794,583 DISK LOADER

Tadashi Furukoshi, and Toshiko Kurihara, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Apr. 12, 1988, Ser. No. 180,492  
Claims priority, application Japan, Apr. 28, 1987, 62-63414[U]

Int. Cl. G11B 17/04, 25/04, 1/00  
U.S. Cl. 369-75.2 2 Claims



1. A disk loader comprising: a disk tray for holding and conveying a disk between an extended loading position and a playing position; a pair of retainers extending parallel to a direction of conveyance of said disk by said disk tray, racks being formed in at least on one side of said disk tray and on an adjacent one of said retainers; a pair of rollers fixed to each of said retainers and having rotatable roller portions received in a guide groove formed in a respective one of said sides of said disk tray; at least a pair of fixedly mounted guide members for guiding each of said retainers; a first pinion engaged with said rack on said retainer; a gear engaged with said rack on said tray, said gear being fixed to said first pinion; a drive motor; and a second pinion mounted on an output shaft of said motor and engaged with said gear, said gear having a larger diameter than said first and second pinions.

#### 4,794,584 METHOD AND APPARATUS FOR SCANNING THE RECORDING SURFACE OF A ROTATING DISC-SHAPED RECORD CARRIER

René Hamer, and Johannes H. T. Pasman, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

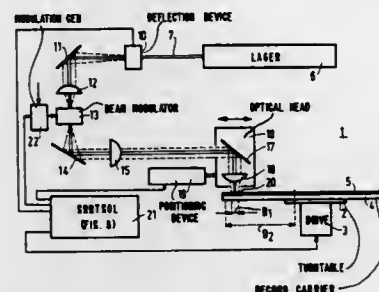
Filed Oct. 7, 1986, Ser. No. 916,248  
Claims priority, application Netherlands, Apr. 21, 1986, 8601006

Int. Cl. G11B 7/00  
U.S. Cl. 369-44 9 Claims

1. A method of scanning a plurality  $n$  ( $n \geq 2$ ) of successive tracks for recording information on the surface of a rotating disc-shaped record carrier, such tracks having a predetermined pitch distance therebetween, such method comprising directing a beam of radiation from an optical source to form a scanning spot on the record carrier and translating such spot in a

forward radial direction thereon during rotation of the record carrier, such method being characterized in that it further comprises the steps of:

- deflecting said beam so as to move said scanning spot a first predetermined distance in said forward radial direction on said record carrier for a period of time during a revolution thereof so as to scan a part of a track thereon;
- deflecting said beam so as to move said scanning spot in a backward radial direction on said record carrier a second predetermined distance less than said first distance, thereby completing one period of reciprocating motion of said scanning spot during forward radial translation

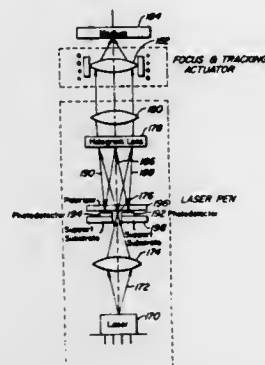


- thereof, such period corresponding to "p" complete revolutions ( $p \geq 1$ ) of said record carrier, said second distance being such that upon completion of one period of said reciprocating motion the scanning spot is positioned on a next succeeding track on said recording carrier;
- repeating steps (a) and (b) so as to successively scan a part of each of said  $n$  tracks, said first and second distance being such that upon completing such scanning the scanning spot is then positioned on a next succeeding part of the initially scanned track; and
  - repeating steps (a)-(c) to successively scan a next succeeding part of all of said  $n$  tracks.

#### 4,794,585 OPTICAL HEAD HAVING A HOLOGRAM LENS AND POLARIZERS FOR USE WITH MAGNETO-OPTIC MEDIUM

Wai-Hon Lee, 10332 Noel Ave., Cupertino, Calif. 95014  
Continuation-in-part of Ser. No. 860,154, May 6, 1986, Pat. No. 4,731,772. This application Dec. 4, 1986, Ser. No. 938,085

Int. Cl. G11B 7/12  
U.S. Cl. 369-112 20 Claims



1. An optical head for reading information recorded on a reflective medium, comprising:  
semiconductor laser means for radiating a source laser beam;  
a diffraction grating disposed between said laser means and

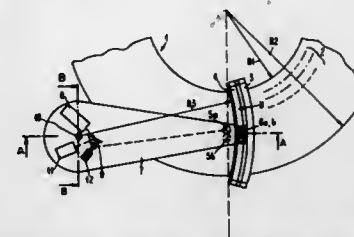
said medium to produce a diffracted beam from a reflected beam of said laser off said medium, said reflected beam and said source beam being aligned along a single optical axis, said diffracted beam having an optical axis inclined relative to said optical axis of said source beam and said reflected beam;  
photodetector means for detecting said diffracted beam, said photodetector means being positioned to intercept said diffracted beam; and  
a lens positioned to produce a focus of said source laser beam at a focus point between said laser means and said diffraction grating, said photodetector means being in substantially the same plane, normal to said source beam optical axis, as said focus point.

#### 4,794,586 ROTARY ACCESS ARM FOR OPTICAL DISKS

Hans-Erdmann Korth, Stuttgart, Fed. Rep. of Germany, assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 29, 1987, Ser. No. 139,344  
Claims priority, application European Pat. Off., Dec. 30, 1986, 86118169

Int. Cl. G11B 3/08, 7/00, 21/10  
U.S. Cl. 369-215 11 Claims

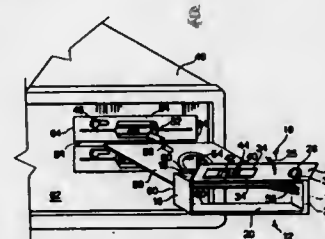


1. Rotary arm for randomly accessing positions within a range of angles, comprising:  
an elongated, lightweight arm structure (7) which is mounted at its one end to pivot about a rotation axis (10); access means (5) positioned near the distal end of the arm structure;  
two actuator coils (6a,b) mounted at the distal end of the arm structure within a magnetic field (H) and connected to actuation means (23a,b) for providing a magnetic force parallel to the plane of rotation of the arm structure when the first coil is activated and a force perpendicular to the plane of rotation when the second coil is activated.

#### 4,794,587 DISK DRIVE LOCK

Jimmy D. Cordiano, 8430, Oscar-Roland, Montreal, Quebec, Canada H2M 9Z7

Filed Jan. 4, 1988, Ser. No. 140,719  
Int. Cl. G11B 1/04, 5/82, 25/04  
U.S. Cl. 369-292 8 Claims



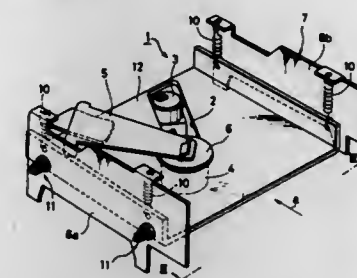
1. A disk drive lock for a disk operating machine having a slot on one of its faces for introducing a disk adapted to be engaged inside said slot, the said machine also having adjacent said slot means for locking said disk inside said slot, the said

disk drive lock comprising an elongated casing having two sidewalls, a front wall having a door adapted to be opened, the said casing being opened on its side opposite said front wall, said opposite side having a contour adapted to tightly abut against said face of the disk operating machine around said slot and said means for locking said disk, means on said sidewalls for securely fixing a disk across said opposite side and adjacent said contour and means for securely locking said door to prevent access inside said casing through said front wall, whereby when said disk is mounted on said casing and introduced into said slot and locked in said machine, the casing abuts securely against said face of the machine to prevent access to said locking means and to said disk.

#### 4,794,588 OPTICAL DISK PLAYER

Yoshihiro Tsuchida; Tetsuya Toyoguchi, both of Tokyo, and Ryoji Takamatsu, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan  
Continuation of Ser. No. 816,105, filed as PCT JP85/00171 on Apr. 5, 1985, published as WO85/04749 on Oct. 24, 1985, abandoned.

This application Dec. 9, 1987, Ser. No. 130,302  
Claims priority, application Japan, Apr. 7, 1984, 59-51286  
Int. Cl. G11B 25/04 3 Claims



1. An optical player having a chassis on which an optical pick-up and a disk table are mounted, a plurality of elastic support means resiliently supporting the chassis on a frame for making said chassis displaceable relative to said frame in all directions, and vibration absorbing means for absorbing vibrations from said frame, said vibration absorbing means comprising:

a rod horizontally projecting from one of said chassis or said frame, and  
a vessel made of rubber, filled with silicone oil and thereafter sealed, said vessel having a hollowed interior portion horizontally and inwardly extending and surrounded by silicone oil to form a central hole for receiving said rod, and a bellows forming the outer periphery of said vessel, and said vessel having a flange which is fixed to the other of said chassis or said frame, whereby said rod is movable in said silicone oil in all directions together with said hollowed interior portion.

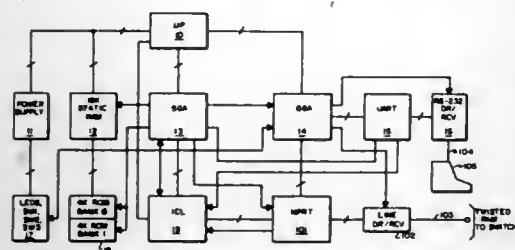
#### 4,794,589 ASYNCHRONOUS PACKET MANAGE

William W. Finch, Lisle, Ill., and Galay Sencer, McLean, Va., assignors to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Sep. 16, 1986, Ser. No. 908,111  
Int. Cl. H04J 3/02 1 Claim

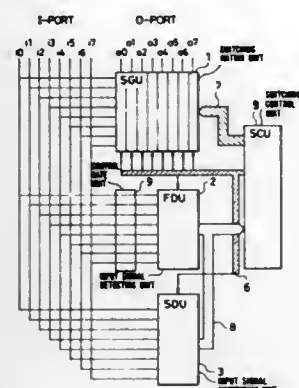
1. In a telecommunication switching network for interconnecting data units arranged to transmit data in a first format to a switching unit arranged to switch data of a second format; a universal asynchronous receiver transmitter module (UART);

an interface operated to convert incoming data to TTL levels and connected to said UART;  
a parallel data bus;  
said UART operated to convert received serial data into a parallel form and place it on said data bus;  
a microprocessor connected to said parallel data bus;  
a minipacket receiver transmitter connected to said microprocessor and to said parallel data bus;



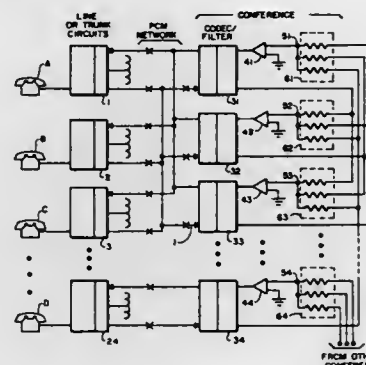
said microprocessor operated upon data presented on said parallel data bus to control said minipacket receiver transmitter to accept said data;  
said minipacket receiver transmitter operated upon receipt of said data to format said data into minipackets and convert said formatted data to an alternate mark inversion signal for connection to a switching network.

**4,794,590**  
**COMMUNICATION NETWORK CONTROL SYSTEM**  
Takashi Yano, Tokyo, Japan, assignor to Ricoh Company, Limited, Tokyo, Japan  
Filed Jul. 30, 1986, Ser. No. 892,146  
Claims priority, application Japan, Jul. 31, 1985, 60-170428; Jul. 31, 1985, 60-170429  
Int. Cl.<sup>4</sup> H04J 3/24; H04Q 11/04  
U.S. Cl. 370-60



1. A method of controlling a communication network including a plurality of nodes, each including a plurality of input channels, a plurality of output channels and connection control means for controlling the connection between said input and output channels; a plurality of terminals; and transmission means extending between said nodes and between said nodes and said terminals; wherein said method comprises the steps of: supplying an input signal received by each of said input channels once to all of said output channels under the control of said connection control means;  
detecting the input channel which was the first recipient of said input signal by said connection control means; and  
disconnecting all of said input channels excepting said input channel detected to have been the first recipient of said input signal from said output channels by said connection control means.

**4,794,591**  
**DIGITAL VOICE SWITCH FOR A MULTI-PORT CONFERENCE CIRCUIT**  
James Hoff, Scottsdale; Arthur L. Walsh, Phoenix, and John S. Young, Scottsdale, all of Ariz., assignors to GTE Communication Systems Corporation, Phoenix, Ariz.  
Filed Dec. 28, 1987, Ser. No. 137,904  
Int. Cl.<sup>4</sup> H04Q 11/04  
U.S. Cl. 370-62



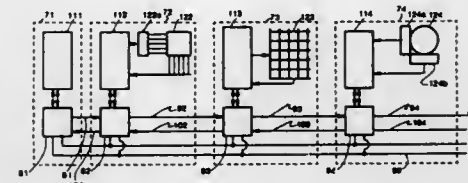
1. In a digital switching system, a codec/filter is connected to PCM transmit and PCM receive data streams of a CPU controlled switching network, a digital voice switch for a multi-port conference circuit comprising:  
comparator means connected to said PCM transmit and to said PCM receive data streams, said comparator means operating in response to time slots of said PCM transmit and PCM receive data streams to provide a below threshold signal indicating one of said PCM time slots which are below a predetermined threshold value;  
control means connected to said comparator means and to said CPU, said control means operating in response to a program signal of said CPU and to said below threshold signal to provide a PCM time slot containing quiet code; and  
means for inserting connected to said control means, to said PCM receive data stream and to said codec/filter, said means for inserting receiving said PCM time slot containing quiet code from said control means and operating in response to said PCM time slot containing quiet code to replace said PCM time slots being below said threshold level with said quiet code for transmission to said codec/filter.

**4,794,592**  
**SERIAL NETWORK ARCHITECTURE FOR USER ORIENTED DEVICES**  
Nathaniel T. Caine, Sunnyvale, Calif., and Jean-Jacques Simon, Saint-Egreve, France, assignors to Hewlett-Packard Company, Palo Alto, Calif.  
Division of Ser. No. 861,650, May 5, 1986, Pat. No. 4,703,473, which is a continuation of Ser. No. 625,944, Jun. 29, 1984, abandoned. This application Oct. 6, 1987, Ser. No. 84,965  
Int. Cl.<sup>4</sup> H04J 3/02; H04B 3/36  
U.S. Cl. 370-85

1. In a computing system having a network comprising a central computing device and a plurality of computer peripheral devices coupled serially, a method for configuring the network comprising:  
sending a reset command from the central computing device serially to each computer peripheral device of the plurality of computer peripheral devices;  
sending a configuration command with an encoded address from the central computing device to a first computer peripheral device;

9 Claims

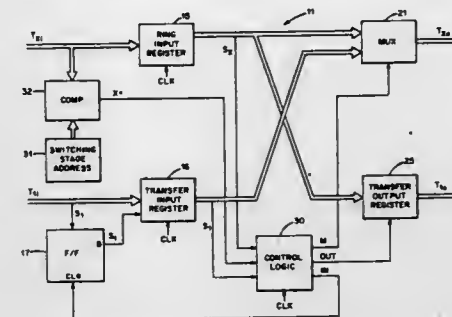
incrementing the address and sending the configuration command with the incremented address directly from the first computer peripheral device to the central computing device;  
resending the configuration command with the original encoded address from the central computing device to the first computer peripheral device;



incrementing the address and sending the configuration command with the incremented address from the first computer peripheral device to a second computer peripheral device; and  
incrementing the address a second time and sending the configuration command with the incremented address from the second computer peripheral device through the first computer peripheral device to the computing system.

**4,794,593**  
**TIME-DIVISION MULTIPLEXED COMMUNICATION APPARATUS**  
Joseph M. Lenart, Arlington, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.  
Filed Nov. 18, 1987, Ser. No. 122,298  
Int. Cl.<sup>4</sup> H04Q 11/04; H04J 3/00  
U.S. Cl. 370-86

7 Claims

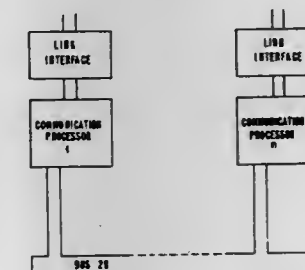


1. Time-division multiplexed switching apparatus including a plurality of substantially identical switching stages arranged in a closed ring with ring bus means connecting each switching stage to the preceding switching stage of the ring and to the succeeding switching stage of the ring, each switching stage being designated by a unique address, and words of digitally encoded information being transmitted from one switching stage to the succeeding switching stage at a first data rate; and including means for producing first data rate clock signals at said first data rate coupled to each of said switching stages of the plurality; each switching stage comprising  
a ring input storage means coupled to the ring bus means for receiving and storing a word of digitally encoded information transmitted over the ring bus means from the preceding switching stage, the ring input storage means having an input coupled to the ring bus means from the preceding switching stage and having an output;  
a transfer input storage means for receiving and storing a word of digitally encoded information to be transferred onto the ring, said transfer input storage means having an input coupled to a transfer input bus and having an output;  
a transfer output storage means for storing a word of digi-

tally encoded information, said transfer output storage means having an input and an output;  
multiplexing means having a first input coupled to the output of the ring input storage means, a second input coupled to the output of the transfer input storage means, and an output coupled to the ring bus means to the succeeding switching stage;  
said ring input storage means being operable to store a word received on the ring bus means from the preceding switching stage on the leading edge of each first data rate clock signal;  
address means for determining if a word stored in the ring input storage means is addressed to the address of the switching stage;  
control means coupled to said multiplexing means and being operable when a word is stored in the ring input storage means and the address means determines that the stored word is not addressed to the address of the switching stage to cause the multiplexing means to couple the output of the ring input storage means to the ring bus means to the succeeding switching stage;  
said control means being operable when a word is stored in the ring input storage means and the address means determines that the stored word is addressed to the address of the switching stage to cause the multiplexing means to couple the output of the ring input storage means to the input of the transfer output storage means;  
said control means being operable when a word is stored in the transfer input storage means, unless a word is stored in the ring input storage means and the address means determines that that word is not addressed to the address of the switching stage, to cause the multiplexing means to couple the output of the transfer input storage means to the ring bus means to the succeeding switching stage; and  
said transfer output storage means being operable in response to the termination of a first data rate clock signal to store a word present at its input.

**4,794,594**  
**METHOD AND SYSTEM OF ROUTING DATA BLOCKS IN DATA COMMUNICATION NETWORKS**  
Jean-Louis Picard, La Colle S/Loupe, France, assignor to International Business Machines Corporation, Armonk, N.Y.  
Filed Jun. 12, 1987, Ser. No. 60,796  
Claims priority, application European Pat. Off., Jun. 26, 1986, 86430023.1  
Int. Cl.<sup>4</sup> H04J 3/24  
U.S. Cl. 370-94

3 Claims



1. A method for routing data blocks from a first station to a second station of a data communication network comprising a plurality of nodes through which the data blocks are routed, characterized in that it comprises the steps of:  
(a) assigning a node identifier Ni to each node in the network;  
(b) assigning a port identifier Pi to each port of each node;  
(c) establishing a route to be followed by the data blocks sent by said first station to said second station, thereby identifying the nodes in the route to be crossed over by the data



blocks and in each node of the route the destination port through which the node has to retransmit the data blocks; (d) transmitting from said first station the data blocks, each data block including a routing tag RT whose value is such that:

$$RT \text{ modulo } (N1) = P1$$

$$RT \text{ modulo } (N2) = P2$$

$$RT \text{ modulo } (Nn) = Pn$$

where:

N1, N2, . . . , Nn are the node identifiers of the nodes in the route, and

P1, P2, . . . , Pn are the destination port identifiers of the respective nodes in the route; and

(e) dividing at each node receiving a data block, the routing tag included in the received data block by the node identifier of this node, the division operation providing the destination port identifier which specifies the port through which the received block has to be retransmitted.

4,794,595

## VOICE AND DATA TRANSMISSION SYSTEM

Tetsunuma Okuyama, Yokohama, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

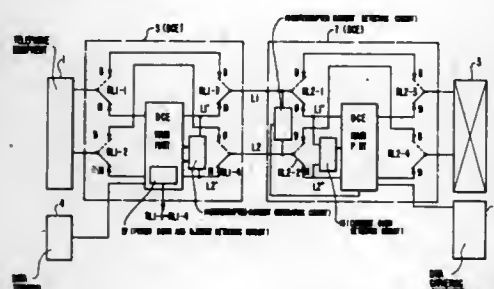
Filed May 20, 1987, Ser. No. 51,858

Claims priority, application Japan, May 29, 1986, 61-124111

Int. Cl.<sup>4</sup> H04J 3/12

U.S. Cl. 370-110.1

3 Claims



1. A voice and data transmission system, comprising: data circuit terminal means, connected to telephone equipment and a data terminal, for multiplexing voice from the telephone equipment and digital data from the data terminal producing a first multiplexed signal, transmitting the first multiplexed signal to a telephone line, receiving a second multiplexed signal from the telephone line, demultiplexing the voice and digital data from the second multiplexed signal and providing the voice to the telephone equipment and the digital data to the data terminal, and having:

first detection means for detecting power down for the data circuit terminal means, and means for connecting the telephone equipment to the telephone line and constructing a by-pass route for the data circuit terminal means under the control of said first detection means, and

office channel means, connected to an exchange and data gathering equipment, for multiplexing voice from the exchange and digital data from the data gathering equipment producing the second multiplexed signal, transmitting the second multiplexed signal to the telephone line, receiving the first multiplexed signal from the telephone line, demultiplexing the voice and digital data from the

received first multiplexed signal and providing the voice to the exchange and the digital data to the data gathering equipment, and having:

means for providing supervisory current to said data circuit terminal means via the telephone line, second detection means for detecting the supervisory current down, and means for connecting the exchange to the telephone line and constructing a by-pass route for the office channel means under the control of said second detection means.

4,794,596

## DATA NETWORK SYNCHRONISATION

Francis R. Gloyne, 48 Beech View Road, Kingsley, nr Frodsham Cheshire, and Philip D. Harvey, 89 Church Road, Bickerstaffe, Ormskirk Lancs, both of England

PCT No. PCT/GB86/00384, § 371 Date Jan. 21, 1987, § 102(c)

Date Jan. 21, 1987, PCT Pub. No. WO87/00369, PCT Pub.

Date Jan. 15, 1987

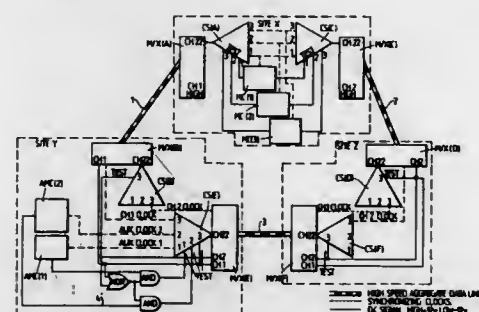
PCT Filed Jul. 1, 1986, Ser. No. 6,679

Claims priority, application United Kingdom, Jul. 1, 1985, 8516609

Int. Cl.<sup>4</sup> H04J 3/04

U.S. Cl. 370-112

12 Claims



1. A data network comprising a plurality of multiplexers; at least one data link connecting the multiplexers one to another; a plurality of clock sources; means for generating at least one test signal; means for transmitting said at least one test signal from one multiplexer to another; and a plurality of clock selectors, each clock selector being associated with a respective one of the multiplexers, each clock selector having means for receiving at least one of the at least one test signal, means for determining the presence or absence of the at least one test signal to establish the status of one or more incoming clock signals, and means for selecting one of said incoming clock signals in predetermined hierarchical order in the presence of the at least one test signal, for setting the respective multiplexer to Slave to Receive mode in which the respective multiplexer takes incoming clock signals from one of the other multiplexers as its timing source.

4,794,597

MEMORY DEVICE EQUIPPED WITH A RAS CIRCUIT Kuno Ooba, and Tooru Kojima, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 23, 1986, Ser. No. 945,530

Claims priority, application Japan, Mar. 28, 1986, 61-71462; Mar. 28, 1986, 61-71463; Mar. 28, 1986, 61-71464

Int. Cl.<sup>4</sup> G06F 11/10

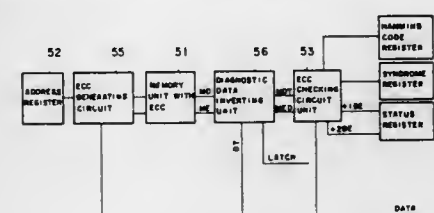
U.S. Cl. 371-3

8 Claims

1. A storage device equipped with a reliability, availability and serviceability (referred to as "RAS") circuit, having a memory unit for storing data to which an error-correcting

code (referred to as "ECC") has been applied, and an ECC checking circuit for detecting 1-bit, or more than 2-bit error contained in data read from the memory unit, characterized by comprising:

a diagnostic data inverting unit connected between said memory unit and said ECC checking circuit for diagnosing an error mode with respect to said ECC checking circuit and said memory unit by inverting into diagnostic data the data being read from said memory unit during the checking operation by said ECC checking circuit wherein said diagnostic data inverting unit includes:



a test switch connected to said memory unit; a data input latch circuit for latching said data in response to a latch signal; a latch-output-validity selecting gate connected to said data input latch circuit for selectively controlling validity and invalidity of the output of said data input latch circuit; and an exclusive OR circuit connected to receive a mode input and the output of said latch circuit for generating an OR-gated signal between the mode input and the data input.

4,794,598

## SYNCHRONOUSLY PUMPED RING FIBER RAMAN LASER

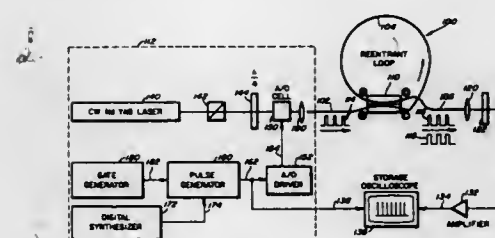
Emmanuel Desurvire, Menlo Park, and Herbert J. Shaw, Stanford, both of Calif., assignors to The Board of Trustees of the Leland Stanford Junior University, Stanford, Calif.

Filed Jul. 18, 1986, Ser. No. 888,170

Int. Cl.<sup>4</sup> H01S 3/30

U.S. Cl. 372-3

24 Claims



1. An apparatus for generating a laser signal comprising: a source of pump optical energy at a first wavelength for producing plural energy bursts that are spaced apart in time by a selected time interval; a length of optical fiber for receiving said series of energy bursts, said length of optical fiber forming a loop; and a coupler for coupling said energy bursts to said loop to propagate in said loop to pump said fiber and cause emission of optical energy in said fiber at a second wavelength that is shifted from said first wavelength, and thereby provide a laser signal at said second wavelength, said coupler having a first coupling ratio at said first wavelength such that substantially all of the energy in said energy bursts is coupled into said loop, said coupler further causing substantially all of the energy bursts traversing said loop to exit said loop without recirculating in said loop, said coupler having a second coupling ratio different from said first coupling ratio such that said laser signal

recirculates in said loop, said laser signal having a loop transit time related to said time interval such that a multiple of the loop transit time is substantially equal to a multiple of said time interval.

4,794,599

TEST APPARATUS FOR ELECTRONIC EQUIPMENT Francis A. Purcell, 108, St. John's Park, Clonsilla, Co. Dublin; William G. Fenton, 25, St. John's Terrace, Carrick-on-Suir, Co. Tipperary, and Matthew M. Collins, Doonan, Donegal, Co. Donegal, all of Ireland

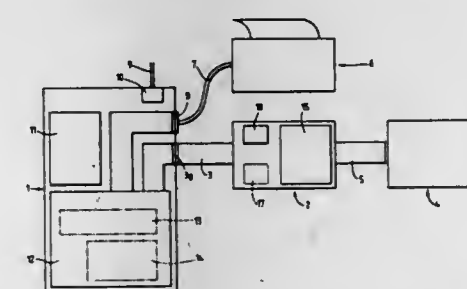
Filed Aug. 14, 1986, Ser. No. 896,756

Claims priority, application Ireland, Aug. 14, 1985, 1986/85

Int. Cl.<sup>4</sup> G06F 11/00

U.S. Cl. 371-20

7 Claims



1. Portable test apparatus for tracing faults in electronic equipment including or associated with a microprocessor, comprising

(a) a control means, (b) a test configuring means, (c) means for data transfer between the control means and the test configuring means, and (d) means for data transfer between the test configuring means and a unit under test,

said control means comprising a microprocessor, data storage means, means for data transfer between said data storage means and said microprocessor of the control means, input command means and said microprocessor of the control means, output display means, and means for data transfer between said microprocessor of the control means and said output display means, said data storage means of the control means including read only memory means containing data to be accessed by said microprocessor of the control means for all test operations, and said input command means including a keyboard; and said test configuring means comprising data storage means and input/output means for controlling data transfer between the test configuring means and the microprocessor of the control means and for controlling data transfer between the test configuring means and the unit under test, said data storage means of the test configuring means including read only memory means containing data to be accessed by said microprocessor of the control means for diagnostic tests specific to a particular type of unit under test.

4,794,600

APPARATUS FOR ERROR CORRECTION OF DIGITAL IMAGE DATA BY MEANS OF IMAGE REDUNDANCY Shaw-Yueh Lin, Encinitas, Calif., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 9, 1987, Ser. No. 94,622

Int. Cl.<sup>4</sup> G06F 11/00

U.S. Cl. 371-37

6 Claims

1. An improved apparatus for detection and correction of an error in digital samples of image pixels characterized by redundant information, said improved apparatus comprising:





periodically piled up, each layer having a thickness of 1 to 10 monolayers, said superlattice semiconductor having equivalently the same composition as said superlattice semiconductor.

**4,794,607**  
**OPTO-ELECTRONIC DEVICES**  
William J. Devlin, Ipswich, United Kingdom, assignor to British Telecommunications public limited company, United Kingdom  
Filed Jan. 2, 1986, Ser. No. 869,770  
Claims priority, application United Kingdom, Jan. 4, 1985, 8514051

Int. Cl.<sup>4</sup> H01S 3/18  
U.S. Cl. 372-49 20 Claims

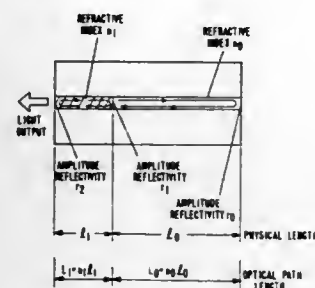


1. An opto-electronic device having a faceted optical substrate which, on at least one of its facets, has a composite coating effective to reduce the reflectivity of said facet, wherein said composite coating includes an anti-reflective coating and an interlayer disposed between the substrate facet and the anti-reflective coating for improving the chemical compatibility between the anti-reflective coating and the substrate, said interlayer being less than 30 nm thick.

**4,794,608**  
**SEMICONDUCTOR LASER DEVICE**  
Toshihiro Fujita, Toyonaka; Jan Ohya, Neyagawa; Kenichi Matsuda, Moriguchi, and Hiroyuki Serizawa, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 5, 1985, Ser. No. 708,848  
Claims priority, application Japan, Mar. 6, 1984, 59-43301; Mar. 6, 1984, 59-43302

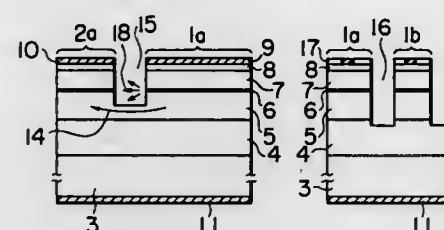
Int. Cl.<sup>4</sup> H01S 3/19  
U.S. Cl. 372-50 14 Claims



1. A semiconductor laser device comprising:  
a semiconductor substrate;  
an active cavity formed on said semiconductor substrate;  
and  
a passive cavity formed on said semiconductor substrate, said active and passive cavities being integrally formed on said semiconductor substrate with monolithic structure and coupled in the direction of optical axes of said cavities,  
said active cavity including,  
an active layer for emitting light therefrom,

clad layers for confining said light into said active layer, and  
electrodes for injecting current into said active layer,  
said passive cavity including,  
a waveguide layer for transferring therethrough the light emitted in said active cavity, and  
clad layers for confining said light to said waveguide layer,  
said active and passive cavities having rectangular waveguide structure to confine said light in a plane perpendicular to said direction of optical axes of said cavities,  
resonator means for laser oscillation of said semiconductor laser device,  
the ratio  $L_0/L_1$  of optical length  $L_0$  of said passive cavity to optical length  $L_1$  of said active cavity being set in a range of  $L_0/L_1 \geq 0.5$ ,  
whereby the light emitted in said active cavity is transferred through said passive cavity and reflected and fed back to said active cavity.

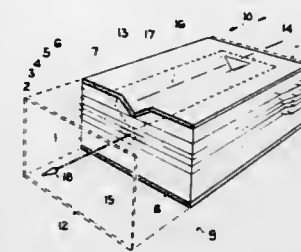
**4,794,609**  
**SEMICONDUCTOR LASER PROVIDED WITH A PLURALITY OF LASERS IN THE FORM OF AN ARRAY**  
Toshitami Hara, Tokyo; Seichi Miyazawa, Kawasaki; Hidetoshi Nojiri, Matsudo; Akira Shimizu, Tokyo; Yoshinobu Sekiguchi, Kawasaki, and Isao Hakamada, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Dec. 11, 1985, Ser. No. 807,504  
Claims priority, application Japan, Dec. 12, 1984, 59-260792  
Int. Cl.<sup>4</sup> H01S 3/19; H01L 31/12  
U.S. Cl. 372-50 9 Claims



1. A semiconductor laser device comprising:  
a plurality of lasers provided in the form of an array, said lasers being monolithically formed on a substrate, said substrate including electrodes and a resonant cavity;  
a plurality of photodetector elements corresponding to said plurality of lasers, said photodetector elements being monolithically formed;  
a plurality of first separating portions for separating said lasers and said photodetector elements from each other, each of said first separating portions being a groove in said device between each of said lasers and said photodetector elements corresponding thereto; and  
at least one second separating portion for separating said plurality of lasers from one another and said plurality of photodetector elements from one another, said second separating portion being a groove in said device between said lasers and between said photodetector elements, and wherein said groove of said second separating portion is deeper than said grooves of said first separating portion.

**4,794,610**  
**HETEROSTRUCTURE SEMICONDUCTOR LASER DIODE**  
Werner Schairer, Weinsberg, and Jochen Gerner, Wiesloch, both of Fed. Rep. of Germany, assignors to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany  
Filed Feb. 11, 1987, Ser. No. 13,436  
Claims priority, application Fed. Rep. of Germany, Feb. 12, 1986, 3604294

Int. Cl.<sup>4</sup> H01S 3/19  
U.S. Cl. 372-45 15 Claims

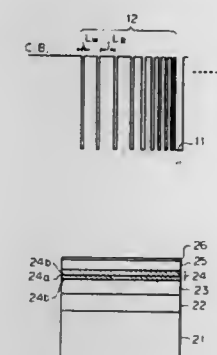


1. In a heterostructure semiconductor laser diode having a layer sequence formed on a substrate of one conductivity type (1), with the sequence including a laser-active zone (3) disposed between upper and lower enclosing layers (2, 4) of respectively opposite conductivity types, an additional layer (5) of the same conductivity type as the substrate (1) disposed on said upper enclosing layer on the side of the layer sequence facing away from the substrate, and a cover layer of the same conductivity type as the substrate disposed on said additional layer, and with said cover layer (6) including an oppositely doped diffused semiconductor region (13) which, in a stripe-shaped zone extending perpendicularly to the exit surface of the laser radiation (18) in the area of the plane of symmetry (14) of the layer sequence and below a v-groove-shaped recess (16) formed in said cover layer, penetrates said additional layer (5) and extends into the said upper enclosing layer (4) located thereunder, whereby current flowing in the forward direction of the semiconductor laser diode is confined to a narrow, stripe-shaped area (15) of the laser-active layer (3); the improvement wherein: said oppositely doped semiconductor region extends into said upper layer but does not penetrate said active layer; the portion of said narrow, stripe-shaped area of the laser-active zone (3) which is beneath said v-groove shaped recess, and hence relevant to the amplification is significantly shorter in its length-wise dimensions than the resonator length (9) of the semiconductor laser diode by the laser-active layer (3) extending, in a small area (10) of the resonator length (9) immediately in front of the two mirrors (11, 12) of the semiconductor laser diode, at an incline to the main plane of the laser-active layer (3) and by the v-groove-shaped recess (16) being symmetrically shortened by the amount of this small area (10) in relation to the resonator length (9).

**4,794,611**  
**SEMICONDUCTOR LASER HAVING SUPERLATTICE STRUCTURE**  
Toshitami Hara, Tokyo; Yoshinobu Sekiguchi; Seichi Miyazawa, both of Kawasaki; Hidetoshi Nojiri, Matsudo; Akira Shimizu, Tokyo, and Isao Hakamada, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Filed Dec. 17, 1985, Ser. No. 809,770  
Claims priority, application Japan, Dec. 18, 1984, 59-265375  
Int. Cl.<sup>4</sup> H01S 3/19  
U.S. Cl. 372-45 4 Claims

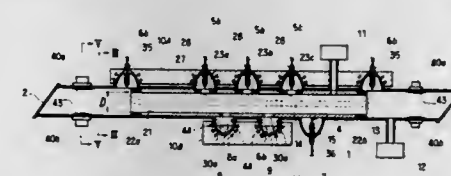
1. A semiconductor laser having a superlattice structure region adjacent to an active layer, wherein the improvement comprises a super-lattice structure including a plurality of regularly alternating first layers and second layers, said first layers consisting of a material having a first bandgap and said

second layers consisting of a material having a second bandgap; said first bandgap being larger than said second bandgap; wherein the first layers and second layers have thicknesses such that between adjacent pairs of said first layers and said



second layers, the ratio of the thickness of the first layer of said pairs to the thickness of the second layer of said pairs decreases in the direction towards the active layer; and the thickness of the first layers decreases in the direction towards the active layer.

**4,794,612**  
**METAL ION LASER**  
Akira Fuke, Shizuoka, Japan, assignor to Koito Seisakusho Co. Ltd., Tokyo, Japan  
Continuation of Ser. No. 854,477, Apr. 22, 1986, abandoned.  
This application Mar. 4, 1988, Ser. No. 166,822  
Claims priority, application Japan, Apr. 23, 1985, 60-85362  
Int. Cl.<sup>4</sup> H01S 3/22  
U.S. Cl. 372-56 14 Claims



1. A hollow cathode metal ion laser of negative glow discharge type comprising:  
a laser tube made of glass material;  
a hollow cathode installed in the laser tube;  
a plurality of anodes arranged in the laser tube, said anodes being provide on a first side of the laser tube, each of said anodes being spaced from each other axially along said laser tube;  
a pair of Brewster windows sealingly fixed to axial opposite ends of the laser tube;  
a plurality of reservoirs provided outside of the hollow cathode and in the laser tube for storing a metal material therein and for evaporating the same, each of said reservoirs being provided on a second side of the laser tube substantially opposite from said anodes, said reservoirs being formed by projecting portions of said laser tube outward, said reservoirs being located between the positions corresponding to the opposite ends of the hollow cathode in the laser tube;  
a plurality of slits formed in said hollow cathode corresponding to each of said reservoirs for communicating the inner side of the hollow cathode with said reservoirs; and  
heaters for heating said anodes and the bottom sides of said reservoirs respectively.

# 4,794,613 LASER FLUID FLOW CONTROL APPARATUS AND METHOD

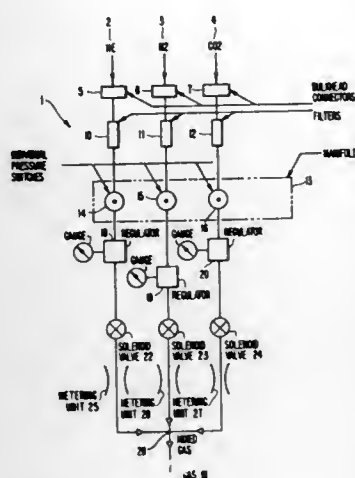
Carl J. Nilson, Flinders; Joseph P. Wachter, Columbia, and Ronald D. Young, Blairtown, all of N.J., assignors to PRC Corporation, Landing, N.J.

Filed Jul. 27, 1987, Ser. No. 78,096

Int. Cl.<sup>4</sup> H01S 3/13

U.S. Cl. 372-58

34 Claims



1. In a fluid laser comprising means for supplying fluid to the laser and means for exciting the fluid in said laser to produce a laser beam, the improvement comprising, in combination, said means for supplying fluid to the laser including control means for selectively and precisely varying at least the volume of the fluid supplied to said laser, said control means producing a relatively high volume of the fluid to the laser for a predetermined period of time for quick warm-up of the laser and thereafter reducing the volume of fluid, and wherein said laser further includes pressure control means for maintaining the fluid pressure in the laser substantially constant even with changes in the volume of the fluid being supplied to the laser by said control means.

# 4,794,614 DISCHARGE TUBES

Arthur Maitland, Fife; Hugh Memown, Chelmsford, and Christopher V. Neale, Hatfield Peverel, all of United Kingdom, assignors to English Electric Valve Company Limited, Chelmsford, United Kingdom

Filed Jun. 2, 1986, Ser. No. 869,725

Claims priority, application United Kingdom, Jun. 4, 1985, 8514058

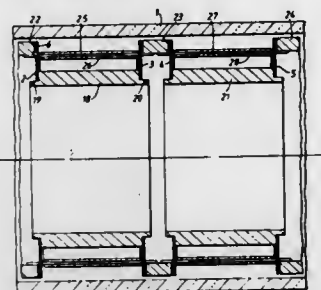
Int. Cl.<sup>4</sup> H01S 3/03

U.S. Cl. 372-61

18 Claims

1. A metal vapor discharge tube employing an active medium comprising an envelope having a longitudinal axis; and at least one dispenser member, having a working surface, positioned within said envelope, said dispenser member having at least one aperture means retaining a discharge metal which upon heating of said discharge metal during excitation of said active medium emits a vapor over substantially the entire working surface of said member such that any

condensation of said vapor on said dispenser member is also vaporized, said vapor forming at least a part of said



active medium and said dispenser member having a higher melting point than said discharge metal.

# 4,794,615 END AND SIDE PUMPED LASER

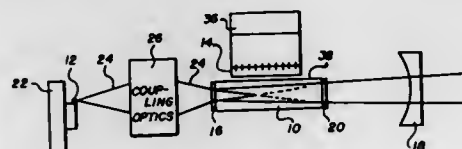
Josef Berger, Santa Clara, and Donald R. Scifres, San Jose, both of Calif., assignors to Spectra Diode Laboratories, Inc., San Jose, Calif.

Filed Jun. 12, 1987, Ser. No. 62,140

Int. Cl.<sup>4</sup> H01S 3/09

U.S. Cl. 372-69

43 Claims



1. A laser comprising, an active medium in a resonant optical cavity, a first laser source emitting a laser light beam and disposed relative to said active medium so as to direct said beam into an end of said active medium, said active medium thereby having an optically pumped volume portion allowing oscillation of only single desired transverse cavity mode so as to produce a coherent light output, said coherent light output having an intensity, a second laser source emitting a beam of laser light and disposed relative to said active medium so as to direct additional laser light into a side of said active medium and thereby amplify the intensity of said coherent light output effectively eliminating spiking and delays and means for modulating at least one of said laser sources at a high frequency rate with well controlled high quality pulses thereby providing modulation of said coherent light output in a stable transverse cavity mode.

# 4,794,616 LASER SYSTEM WITH SOLID STATE FLUORESCENT CONVERTER MATRIX HAVING DISTRIBUTED FLUORESCENT CONVERTER PARTICLES

Christopher D. Johnson, Binghamton, N.Y., assignor to General Electric Company, Binghamton, N.Y.

Filed Dec. 31, 1985, Ser. No. 815,326

Int. Cl.<sup>4</sup> H01S 3/091

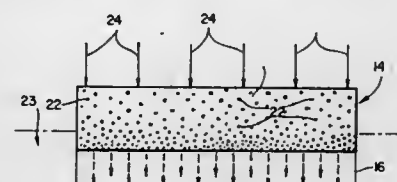
U.S. Cl. 372-70

6 Claims

1. In a laser system, the combination comprising: (a) an active laser element; (b) a light source associated with said laser for pumping said laser to produce coherent, monochromatic light; (c) means positioned between said laser element and said light source for increasing the optical efficiency of the

system by converting at least a portion of the light from said source which falls outside of the laser pumping band into light in the pumping band including:

- (1) a solid state fluorescent converter element exposed on one side thereof to light from said source for spectrally shifting light outside of the laser pumping band into light in the pumping band;
- (2) said converter element comprising a matrix which is transparent to and transmits light from said source



including light in the pumping band and which physically supports an aggregate of individual converter particles dispersed throughout said matrix, the said individual particles absorbing light outside of the pumping band and reemitting a portion thereof as light in the pumping band, said dispersed particles being located in said matrix so as to concentrate the particles in a zone on the other side of said converter and located adjacent to the laser.

# 4,794,617 EXTERNAL OPTICAL RESONATOR FOR A SEMICONDUCTOR LASER

Georg Boeck, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

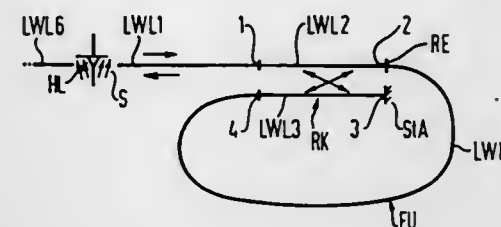
Filed Sep. 12, 1986, Ser. No. 906,503

Claims priority, application Fed. Rep. of Germany, Sep. 25, 1985, 3534190; Jan. 13, 1986, 3600726

Int. Cl.<sup>4</sup> H05B 7/14; G02B 6/10

U.S. Cl. 372-92

27 Claims



1. An external optical resonator for a semiconductor laser, comprising:

an optical four-gate coupler having:

- a first gate couplable to the semiconductor laser so that radiant power from said laser that is coupled into said first gate is no more than five percent coupled to a second gate and is at least ninety-five percent coupled to a third gate,
- a fourth gate of said coupler being such that radiant power coupled in through said fourth gate is at least ninety-five percent coupled to said second gate and is no more than five percent coupled to said third gate,
- said second gate being such that radiant power coupled in through said second gate is coupled to said first gate,
- a radiation transmission path connected between said second gate and said fourth gate for transmission of radiant power between said second gate and said fourth gate externally

of said coupler, said radiation transmission path being formed by an optical waveguide, a feedback device disposed between said second gate and said fourth gate for reflecting a predetermined amount of radiant power coupled out of said second gate and transmitted over the radiation transmission path back into said second gate.

# 4,794,618 DISTRIBUTED FEEDBACK LASER DIODE

Ikuro Mito, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

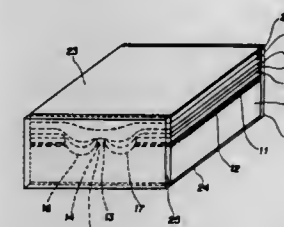
Filed Jul. 23, 1987, Ser. No. 76,812

Claims priority, application Japan, Jul. 25, 1986, 61-176016

Int. Cl.<sup>4</sup> H01S 3/08, 3/19

U.S. Cl. 372-96

8 Claims



2. A distributed feedback laser diode comprising: a diffraction grating formed on a substrate, said diffraction grating having a phase shift at a portion thereof away from ends thereof producing thereby a phase shift amount of  $\lambda/8$  to  $3\lambda/16$  between pitches of said diffraction grating on either side of said phase shift; a guided layer formed through said diffraction grating on said substrate; an active layer formed through said diffraction grating on said substrate; a cladding layer formed on said active layer; a current blocking layer formed on said cladding layer; a buried layer formed on said current confining layer; a cap layer formed on said buried layer; a pair of electrodes respectively provided on outer surfaces of said substrate and cap layer; and a pair of partially reflecting films respectively provided on both end planes of a layered structure thus fabricated on said substrate.

# 4,794,619 OPTICAL FIBER TEMPERATURE SENSOR

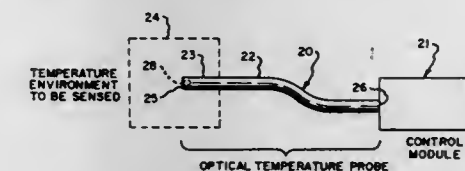
George W. Tregay, Amherst, N.Y., assignor to Conax Buffalo Corporation, Buffalo, N.Y.

Filed Dec. 5, 1986, Ser. No. 938,521

Int. Cl.<sup>4</sup> G01J 5/08; G01K 11/00

U.S. Cl. 374-131

15 Claims



1. A temperature measuring device, consisting of: an optical fiber element having a tip end portion for insertion into a region wherein temperature is to be measured and having a remote end, said element providing a path for transmission of radiant power between said tip end portion and said remote end; thermally-emissive means extending into said tip end portion



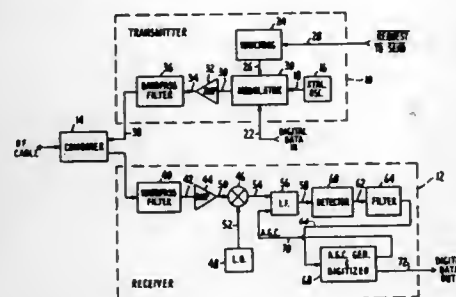
from an outer surface thereof to provide a thermally-emissive surface internal to said transmission path, said emissive surface having a thermal-emissivity characteristic higher than that of said optical fiber element; and detector means disposed at the remote end of said element for producing an electrical signal which varies as a function of the magnitude of radiant power transmitted along said path.

4,794,620

**RADIO FREQUENCY MODEM AND METHOD**  
John R. Moore, and Richard P. Coupland, both of Phoenix, Ariz., assignors to International Anasazi, Inc., Phoenix, Ariz.  
Filed Jul. 6, 1984, Ser. No. 628,460  
Int. Cl. H04B 1/04, 3/50; H04L 27/02

U.S. Cl. 375-8

7 Claims



1. A radio frequency modulator/demodulator comprising: receiving section means for producing a demodulated data output signal from a modulated R.F. signal received on an R.F. data link, said receiving means including local oscillator means for generating a local oscillator signal; mixer means for combining said local oscillator signal and said received R.F. signal and producing an intermediate frequency signal; variable gain amplifier means for amplifying said intermediate frequency signal with a gain which is a function of an automatic gain control signal; detector means for demodulating said amplified intermediate frequency signal; digitizing means for receiving a demodulated output signal from said detector means and for producing a digital data output signal, said digitizing means including:
  - (a) first peak signal means for producing a first peak signal representative of a maximum excursion of said demodulated output signal in a first direction, said first peak signal means comprising a first comparator circuit;
  - (b) second peak signal means for producing a second peak signal representative of a maximum excursion of said demodulated output signal in a second direction opposite said first direction, said second peak signal means comprising a second comparator circuit;
 automatic gain control signal generating means for producing said automatic gain control signal indicative of the amplitude of said demodulated output signal in response to said first peak signal, said automatic gain control signal generating means comprising a third comparator circuit; and transmitting section means for producing a modulated R.F. signal output signal on the data link utilizing an input data signal.

**4,794,621**  
**APPARATUS FOR TRANSMITTING INFORMATION BY ANGLE MODULATION**

Josef Dirr, Neufahrner Strasse 5, D-8000 München 80, Fed. Rep. of Germany

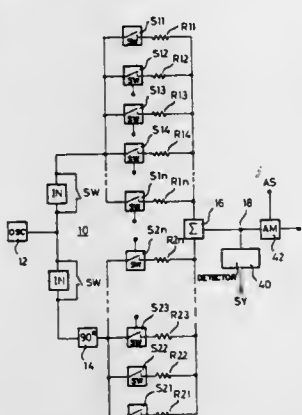
Filed Oct. 14, 1987, Ser. No. 108,328

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1987, 3728492

Int. Cl. H04L 27/20, 27/22

U.S. Cl. 375-52

8 Claims



1. An apparatus for generating an angle modulated electric wave of a predetermined nominal frequency, comprising generator means for generating a signal of a frequency which is a multiple of said nominal frequency, a counter having an input terminal coupled to an output terminal of said generator means and having at least two output terminals, each of said output terminals producing an output signal at a predetermined count of said counter, gate means coupled to each of said output terminals, each said gate means having an activation input, a decoder having an input terminal for receiving a modulating signal and an output terminal for each of said gate means for activating one of said gate means in response to a phase shift determining parameter of said input signal, means having a control input coupled to the output of each of said gate means and having an output terminal for providing a signal which changes its state upon receipt of an input signal at said control input.

4,794,622

**LOW POWER TRANSMITTER FREQUENCY STABILIZATION**

Marvin Isaacman, Los Angeles, and David C. Andrus, Carlsbad, both of Calif., assignors to Linear Corporation, Carlsbad, Calif.

Continuation of Ser. No. 740,526, Jun. 3, 1985, abandoned. This application May 19, 1988, Ser. No. 196,882

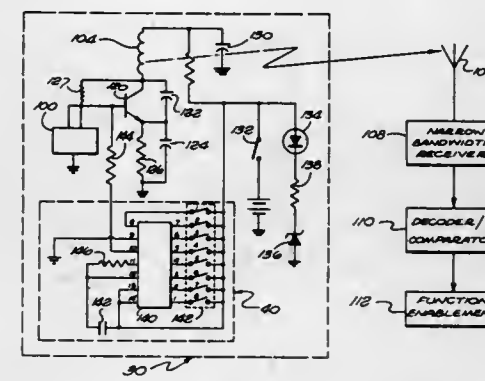
Int. Cl. H03K 7/08; H04B 1/034

U.S. Cl. 375-71

9 Claims

1. A miniature hand-held transmitter comprising: a housing; a fixed-frequency transmitter circuit mounted within said housing; battery means within said housing for powering said transmitter circuit; and switch means connecting said battery means to said transmitter circuit; said transmitter circuit having a tuned circuit, a transistor, and a surface acoustic wave resonator, said tuned circuit including an inductor connected to the collector of said transistor and in series with said battery means, said switch means and a first resistor, a first capacitor connected between the collector and the emitter of said transistor, a second capacitor connected between the emitter of said transistor and ground, and a third capacitor connected to said inductor and said first resistor and also connected to ground; a second resistor connected between the emitter of said transistor and ground.

tor and ground; said surface acoustic wave resonator being connected to the base of said transistor and to ground; and an encoding circuit operatively coupled to said transmitter circuit; said transmitter circuit having a resonant frequency within a prescribed number of cycles of the frequency of resonance of said surface acoustic wave resonator, whereby the



frequency of operation of said transmitter is controlled by said surface acoustic wave resonator to be within a predetermined tolerance for each of the conditions of the transmitter operating in the housing in free space or when clasped by a hand of a user when operating said switch and wherein said inductor provides the antenna of said transmitter circuit so that the antenna is disposed completely within said housing.

4,794,623

**RECOVERY OF CARRIER SIGNAL FROM QAM DOUBLE SIDEBAND SUPPRESSED CARRIER IF SIGNAL FOR USE IN SYNCHRONOUS DEMODULATION**

Louis Y. Levesque, Salem, and Mitchell A. Skinner, Hampton, both of N.H., assignors to AT&T Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.

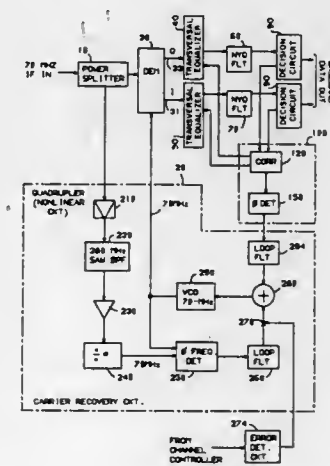
Continuation of Ser. No. 788,454, Oct. 17, 1985, abandoned.

This application Jun. 12, 1976, Ser. No. 63,703

Int. Cl. H03D 3/22

U.S. Cl. 375-86

14 Claims



1. A method for recovering a carrier signal from a double sideband suppressed carrier signal comprising the steps of: splitting said double sideband suppressed carrier into first and second signals, delivering said first signal to a quadrupler, filtering the output signal from said quadrupler,

amplifying the filtered signal, dividing said amplified and filtered signal to derive a second carrier signal, delivering said second carrier signal to a phase frequency detector to derive a first error signal, filtering said first error signal from said phase frequency detector, summing said filtered first error signal with a second error signal received from a correlated error polarity circuit, and adjusting an oscillator with the summed signal.

4,794,624

**METHOD FOR CLOCK SYNCHRONIZATION OF A SIGNAL RECEIVER**

Walter Brann, Wettingen, and Joachim Habermann, Baden-Rüthol, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

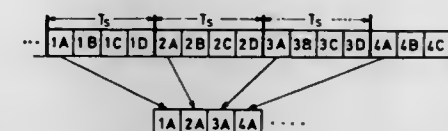
Filed Dec. 8, 1986, Ser. No. 938,955

Claims priority, application Switzerland, Jan. 17, 1986, 176/86

Int. Cl. H04L 7/00; H04B 14/04; H03K 5/00

U.S. Cl. 375-108

10 Claims



1. Method for clock synchronization of a signal receiver with respect to a received signal modulated with data in the form of a baseband signal, in which method the baseband signal, in the undistributed state, can assume a plurality of permitted values at particular points of time which are periodically related to a predetermined symbol duration, and in which method the generating data sequence is scrambled in such a manner that transitions between the permitted values largely occur with the same frequency within arbitrary time windows, wherein the method comprises the steps of:

- (a) demodulating the received signal;
- (b) sampling in each subinterval (1A...4C) in a number of N successive time windows which have in each case the length of one symbol duration,  $T_s$ , and are subdivided into K subintervals (1A...4C) the demodulated received signal;
- (c) determining the standard deviation of the sampled values over the N time windows for corresponding subintervals (1A...4C) of each time window; and
- (d) comparing the K determined standard deviations with each other and deriving from the position in time of the smallest of these standard deviations the sampling time ( $T_s$ ) within each time window at which sampling time ( $T_s$ ) the demodulated received signal is to be sampled for recovering the data.

4,794,625

**METHOD AND APPARATUS FOR CONTROLLING TEMPERATURE IN A FIBER GLASS FORMING BUSHING**

Reed H. Grundy, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jan. 28, 1988, Ser. No. 149,330

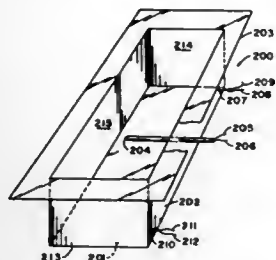
Int. Cl. C03B 5/26, 7/22

U.S. Cl. 373-28

4 Claims

1. Method of controlling the temperature of a fiber glass forming bushing wherein temperature of the bushing is measured at one location to produce a signal and the temperature of the bushing is measured at the second location to produce a second signal and wherein the first and second signals are combined and weight averaged to produce a signal representa-

tive of the average temperature of the bushing to produce a third signal which is fed to an electrical controller attached to the bushing to regulate the current feed to the bushing and consequently its temperature, the improvement comprising:



feeding a first temperature-generated signal and a second temperature-generated signal to a transformer constructed and arranged to provide high impedance to common mode signals and low impedance to differential mode signals prior to sending a third signal to the bushing temperature controller.

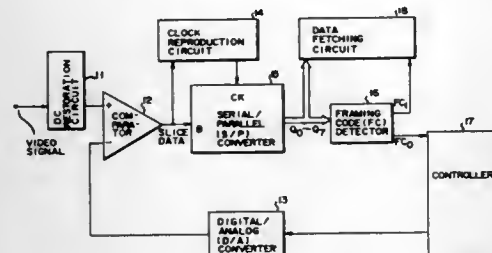
#### 4,794,626 APPARATUS FOR RELIABLY FETCHING DATA, ON THE BASIS OF FRAMING CODE DETECTION PROCESS, AND METHOD THEREFOR

Toshiyuki Tanabe, Ageo, and Morio Ando, Gyoda, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan  
Filed Mar. 26, 1987, Ser. No. 30,689

Claims priority, application Japan, Mar. 31, 1986, 61-70817  
Int. Cl.<sup>4</sup> H04L 7/02

U.S. Cl. 375—110

10 Claims



1. A data-fetching apparatus comprising:  
input means for periodically receiving a transmission signal including a framing code and a data signal following the framing code, the framing code being constituted by a predetermined pattern which can be identified even if a bit error is included therein;  
signal-fetching means including extracting means for receiving the transmission signal from said input means, and extracting the framing code and the component of the data signal, both of which are included in the transmission signal, on the basis of a predetermined reference signal;  
framing code-detecting means for receiving an output from said signal-fetching means and comparing said output with prepared pattern data corresponding to the predetermined pattern of the framing code, said framing code-detecting means being adapted to generate a first framing code-detection output, for supply to said signal-fetching means, as a signal for providing the timing when the output from said signal-fetching means represents a bit error with respect to the pattern data, and to generate a second framing code-detection output when the output from said signal-fetching means represents no bit error with respect thereto;  
said signal fetching means also including data-fetching means for fetching a component of the data signal in-

cluded in an output from said extracting means, on the basis of the first framing code-detection output, when said framing code-detecting means generates the first framing code-detection output on the basis of the reference signal; and  
reference signal-generating means for receiving the second framing code-detection output from said framing code-detecting means, and generating the predetermined reference signal supplied to said signal-fetching means, in response to the second framing code-detection output.

#### 4,794,627 PROCESS FOR THE PARALLEL-SERIES CODE CONVERSION OF A PARALLEL DIGITAL TRAIN AND A DEVICE FOR THE TRANSMISSION OF DIGITIZED VIDEO SIGNALS USING SUCH A PROCESS

Jean L. Grimaldi, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Dec. 2, 1981, Ser. No. 326,546  
Claims priority, application France, Dec. 5, 1980, 80 25907  
Int. Cl.<sup>4</sup> H04L 3/00

U.S. Cl. 375—114

2 Claims



1. A process for the code conversion of words having a digital train of eight parallel bits, comprising the steps of:  
choosing a first subset  $X_i$  of words of nine series bits which have a five-four format, i.e. five "1"-four "0" and five "0"-four "1", and which do not have five identical consecutive bits and which do not start or finish with four identical bits with  $i=1$  to 226;  
choosing a second subset  $Y_j$  of words of nine series bits formed from a format of six "1" and three "0" and their complements to 1,  $Z_j=1$  to 29 chosen from among the set of words with a six-three format for having a maximum number of transitions;  
selecting at least one supplementary digital frame synchronization word which is not encountered in a random sequence of said chosen first and second subsets; and  
coding said words of eight parallel bits as words of nine series bits with said series bits consisting of said first subset, said second subset and said at least one supplementary digital frame synchronization word wherein each word  $X_i$  corresponds to a word to be coded, and wherein a word  $Y_j$  and its complement to 1,  $Z_j$ , both correspond to the same word to be coded, and  $Y_j$  or  $Z_j$  is retained for the coding of the corresponding word as a function of whether the closest word also coded by a six-three format word in the already coded sequence has been respectively coded by a word  $Z_j$  or a word  $Y_j$  in order that the mean value of the series signal is quasi-constant;  
wherein the parallel digital train results from the digitization of a video signal coded on  $2^8$  levels, wherein the digital frame synchronization is introduced during synchronization pulses and corresponds to the 0 level of the video signal, and wherein two complementary synchronization words  $S$  and  $\bar{S}$  of seven-two format having seven identical consecutive bits being alternately transmitted to code the 0 level and form the digital frame synchronization sequences.

#### 4,794,628 COUNTER CIRCUIT WITH MISLATCHING PREVENTION

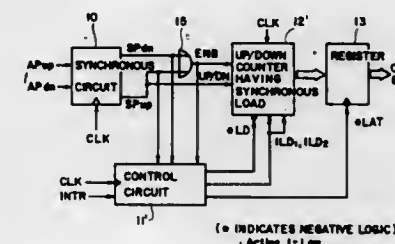
Keiji Sakamoto, Hachioji, and Yuki Toyozawa, Kumamoto, both of Japan, assignors to Fanuc Ltd., Minamitsuru, Japan  
PCT No. PCT/JP87/00136, § 371 Date Sep. 21, 1987, § 102(e) Date Sep. 21, 1987, PCT Pub. No. WO87/05453, PCT Pub. Date Sep. 11, 1987

PCT Filed Mar. 3, 1987, Ser. No. 110,726

Claims priority, application Japan, Mar. 3, 1986, 61-045984  
Int. Cl.<sup>4</sup> H03K 21/40

U.S. Cl. 377—28

4 Claims



1. A counter circuit for counting input pulses inputted thereto asynchronously during a fixed period and storing the number of counted pulses in a register, comprising:  
means for counting input pulses generated during a fixed period;  
means for generating a first pulse to latch a value counted by said counting means in the register, to clear said counting means and to start a new fixed period;  
means for causing the counting operation to continue without clearing said counted value from said counting means when an input pulse is applied during generation of said first pulse, so that said input pulse is counted; and  
means for latching the counted value in the register and clearing the counted value from said counting means after said input pulse is counted.

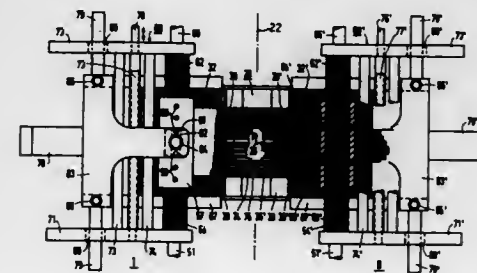
#### 4,794,629 CONTOUR COLLIMATOR FOR RADIATION THERAPY

Otto Pastyr, Leimen, and Wolfgang Maier-Borst, Dossenheim, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany  
Filed May 14, 1987, Ser. No. 50,323

Claims priority, application Fed. Rep. of Germany, May 14, 1986, 3616141; Apr. 3, 1987, 3711245  
Int. Cl.<sup>4</sup> G21K 1/04

U.S. Cl. 378—152

40 Claims



1. A contour collimator for use in shaping a radiation beam comprising:  
a plurality of radiation-impermeable diaphragm plates, each plate having an engagement means;  
means for mounting said diaphragm plates side-by-side in the path of said radiation beam with each diaphragm plate being individually displaceable so as to permit passage of radiation through said collimator;  
means for selecting at least one of said diaphragm plates and

for displacing said at least one diaphragm plate relative to the remaining diaphragm plates, said means for selecting and displacing being engageable with the engagement means of said at least one diaphragm plate;  
interlock means for maintaining said remainder of said diaphragm plates in their respectively existing positions during displacement of said at least one diaphragm plate, said interlock means being engageable with the engagement means of each of said remaining diaphragm plates; and  
means for changing the position of said means for selecting and displacing such that said means for selecting and displacing engages the engagement means of at least one different diaphragm plate from the at least one diaphragm plate previously displaced, said means for selecting and displacing then displacing said at least one different diaphragm plate while said interlock means maintains the remainder of said diaphragm plates in their respectively existing positions.

#### 4,794,630 PICTURE-TUBE VIDEO-CAMERA RADIOLOGY INSTALLATION

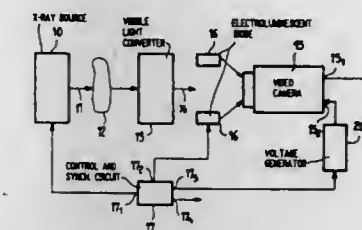
Jean L. Ploix, Issy les Moulineaux, France, assignor to Thomson-CGR, Paris, France

Filed Nov. 12, 1986, Ser. No. 929,274

Claims priority, application France, Nov. 15, 1985, 85 16938  
Int. Cl.<sup>4</sup> G01N 23/04; H04N 5/32

U.S. Cl. 378—99

11 Claims



1. A radiology installation equipped with a video camera, comprising an image-scanner tube for producing an electron beam utilized in producing images in rapid succession, means for varying the intensity of the electron beam of the image scanner tube from a first intensity at the time of readout of one image on a sensitive surface of said tube to a second non-zero intensity of substantially lower value than the first between readout of one image and write-in of the next, wherein said second intensity results in a more rapid discharge of the sensitive surface of said video camera in comparison to if said image-scanner tube utilizes the electron beam having only said first intensity.

#### 4,794,631 CARDIOVASCULAR PHANTOM

William B. Ridge, Sunnymead, Calif., assignor to Vari-X, Inc., Irvine, Calif.

Filed Oct. 6, 1986, Ser. No. 915,819

Int. Cl.<sup>4</sup> G01D 18/00

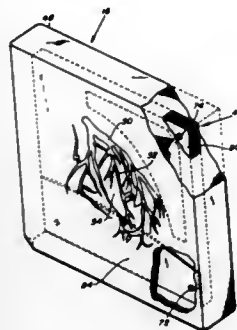
U.S. Cl. 378—207

22 Claims

10. A cardiovascular phantom for providing the proper indexing of a cine camera for X-Ray cineangiography comprising:



a plastic boardlike substrate;  
a metallic X-Ray absorptive material configured with the



arborescent outline of a system of coronary arteries on said plastic boardlike substrate for absorbing X-Rays; and, a covering material for said board.

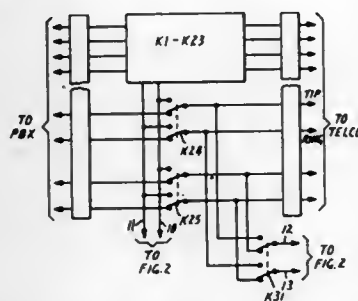
4,794,632

**TELEPHONE TRUNK LINE TESTING CIRCUITRY**  
Peter G. Burton, Austin, and James K. Kennedy, Round Rock, both of Tex., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed May 20, 1987, Ser. No. 52,446  
Int. Cl.<sup>4</sup> H04M 3/32

U.S. Cl. 379-22

17 Claims



1. Telephone trunk line testing circuitry for connection to a private branch exchange (PBX) and the plurality of telephone trunk lines of the public telephone system provided for the PBX, the testing circuitry including:

- a microcomputer unit (MCU);
- first means connected to said MCU and having a receive input and a transmit output for transmission of signals under the control of said MCU between said receive input and said transmit output;
- a dual tone multiple frequency (DTMF) receiver connected to said MCU and operably connected to receive any signals presented to said receive input;
- a tone generator operatively controlled by said MCU and operatively connected to said transmit output;
- a first pair of transmission paths;
- a second pair of transmission paths;
- a first switching means operatively controlled by said MCU programmed for selectively providing any one of the following connecting conditions:
  - (1) connecting said first pair of transmission paths to said receive input and said second pair of transmission paths to said transmit output;
  - (2) connecting said first pair of transmission paths to said transmit output and said second pair of transmission paths to said receive input; and

(3) connecting said first pair of transmission paths to said second pair of transmission paths;  
first switch means operably connected to said MCU for selecting a trunk line as a control trunk line; and  
second means operably controlled by said MCU, when said first switching means presents said connecting condition (1), for coupling the control trunk line selected by operation of said first switch means to said first pair of transmission paths following the completion of a call via the public telephone system between a DTMF type telephone and the control trunk line selected by operation of said first switch means, said control trunk when so connected serving to transmit any DTMF signals to said DTMF receiver that are generated by operation of the keyboard of the DTMF type telephone.

4,794,633

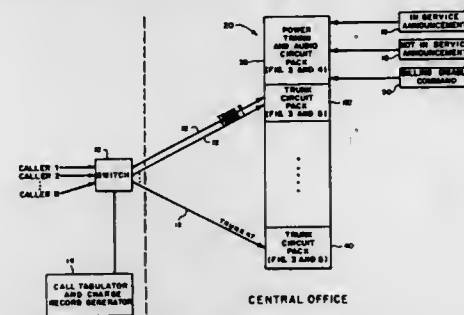
**MASS POLLING SYSTEM**

William F. Borbas, Woodridge, and Robert W. Walker, Glen Glyn, both of Ill., assignors to Illinois Bell Telephone Company, Chicago, Ill.

Filed Feb. 24, 1987, Ser. No. 18,204  
Int. Cl.<sup>4</sup> H04M 1/64, 11/00, 15/00

U.S. Cl. 379-67

10 Claims



6. In a telephone mass polling system of the type comprising means for switching calls for a selected telephone number to at least one trunk, means for tabulating calls to said selected telephone number, means for presenting callers to said selected telephone number with a recorded message, and means for generating a charge record for calls to said selected telephone number in response to a charge signal, the improvement comprising:

- means for generating the charge signal for the charge record generating means subsequent to a seizure indicative of an incoming call on the trunk line;
- means for receiving a control signal; and
- means for disabling the charge generating means in response to the control signal such that the charge generating means is prevented from generating the charge signal when the control signal is in a selected state.

4,794,634

**POSITION-SENSITIVE PHOTODETECTOR AND LIGHT TRANSMISSIVE TABLET AND LIGHT-EMITTING PEN**

Shigenori Torihata, Ischawa; Hisakira Imaizumi, Hiratsuka; Toru Suzuki; Tomoo Matsuda, both of Fujisawa; Masatake Hirooka, Ischawa; Yokichi Nishi, Hiratsuka; Mitsuo Hosoi, Fujisawa; Naoya Tsurumaki, Hiratsuka, and Yukitaka Takitani, Sagami, all of Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed Aug. 13, 1986, Ser. No. 896,009  
Claims priority, application Japan, Dec. 24, 1985, 60-198749; Feb. 14, 1986, 61-30238

Int. Cl.<sup>4</sup> H04M 11/00; G06F 3/033; G08C 21/00  
U.S. Cl. 379-96

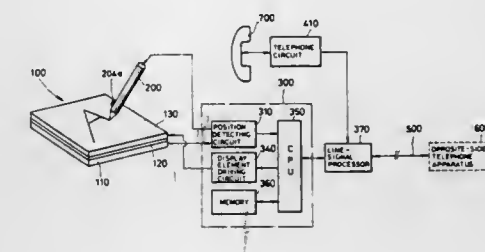
15 Claims

1. A tablet type data input/output device comprising:  
a tablet portion comprising a rectangular position-sensitive

photodetector and a light transmissive planar display element disposed on said photodetector, said photodetector comprising a substrate, a first resistance layer disposed on said substrate, an amorphous semiconductor layer disposed on said first resistance layer, and a second resistance layer disposed on said amorphous semiconductor layer, said first resistance layer being provided at opposing edges thereof in a predetermined first direction with a pair of first electrodes each for taking out an output signal, said second resistance layer being provided at opposing edges thereof in a second direction perpendicular to said first direction with a pair of second electrodes each for taking out an output signal;

a light emitting pen for irradiating a light spot onto said tablet portion so as to indicate a data input position; detecting means for detecting the data input position indicated by said light emitting pen based on the output signals taken out from said first and second electrodes; display control means for controlling display of said planar display element; and  
data transmitting means for transmitting output of said detecting means for subsequent processings.

8. The tablet type data input/output device according to claim 1, wherein said tablet portion is mounted to a telephone set, said display control means causes said planar display element to display data transmitted from another telephone set



through a telephone line, and said data transmitting means transmits output of said detecting means to said another telephone set through said telephone line.

9. A tablet type data input/output device comprising:

- a tablet portion comprising a planar display element and a light transmissive rectangular position-sensitive photodetector disposed on said planar display element, said photodetector comprising a substrate, a first resistance layer disposed on said substrate, an amorphous semiconductor layer disposed on said first resistance layer, and a second resistance layer disposed on said amorphous semiconductor layer, said first resistance layer being provided at opposing edges thereof in a predetermined first direction with a pair of first electrodes each for taking out an output signal, said second resistance layer being provided at opposing edges thereof in a second direction perpendicular to said first direction with a pair of second electrodes each for taking out an output signal;

a light emitting pen for irradiating a light spot onto said tablet portion so as to indicate a data input position; detecting means for detecting the data input position indicated by said light emitting pen based on the output signals taken out from said first and second electrodes; display control means for controlling display of said planar display element; and  
data transmitting means for transmitting output of said detecting means for subsequent processings.

4,794,635

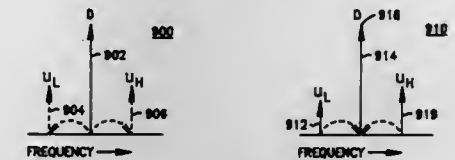
**TWO-WAY RADIO COMMUNICATION SYSTEM WITH MAX-MINIMUM CALL ASSIGNMENT METHOD**  
Garry C. Hess, Hanover Park, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Continuation-in-part of Ser. No. 893,059, Aug. 4, 1986, abandoned.

Filed Nov. 28, 1986, Ser. No. 936,927  
Int. Cl.<sup>4</sup> H04Q 7/04

U.S. Cl. 379-60

39 Claims



36. A method for assigning a channel to a requestor in addition to serving a plurality of present subscribers operating on a radio system having a limited number of channels, the method comprising the steps of:

- (a) monitoring at least some of the channels;
- (b) identifying a weakest subscriber in at least some of the monitored channels;
- (c) comparing at least some of said weakest subscribers to one another according to a first predetermined criteria to determine a first subgroup of said weakest subscribers;
- (d) selecting channels associated with said first subgroup of said weakest subscribers according to a second predetermined criteria to derive a second subgroup of said weakest subscribers;
- (e) identifying at least one channel from said second subgroup that may be assigned to the requestor with minimal interference on the present subscribers operating on said system;
- (f) assigning one of said identified channels to said requestor.

4,794,636

**METHOD AND APPARATUS FOR CODE MATCHING THE BASE AND MOBILE UNIT OF A CORDLESS TELEPHONE SET**

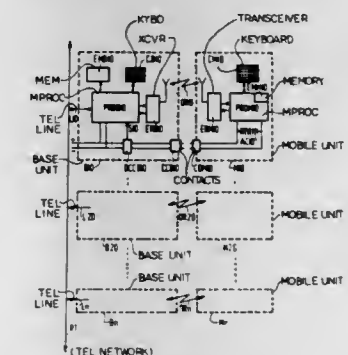
Jean-Francois Sanglier, Fiers, and Stephane Negre, Nice, both of France, assignors to U.S. Phillips Corp., New York, N.Y.

Filed Jul. 17, 1985, Ser. No. 756,144

Claims priority, application France, Jul. 27, 1984, 84 11963  
Int. Cl.<sup>4</sup> H01Q 7/01

U.S. Cl. 379-62

6 Claims



1. A method of establishing mutually matching identification codes in the base unit and mobile unit of a cordless telephone set wherein the base unit is connected to an external telephone network and the mobile unit is physically replaceable on and off the base unit, the base unit and mobile unit each comprising memory means for storing an identification code therein and

means for transmitting information over a communication channel between the base unit and the mobile unit; the base unit and the mobile unit each remaining in a stand-by state in which information cannot be transmitted over such communication channel and being switched by the base station to an operational state in which information can be transmitted over such communication channel when a call request is received by the base unit from the external telephone network or from the mobile unit and the identification code in the mobile unit matches the identification code in the base unit; such method being characterized in that each time the mobile unit is replaced on base unit the identification code stored in each of such units is modified by the base unit by the steps of:

- switching the base unit and the mobile unit from the stand-by state to the operational state;
- comparing the existing identification code stored in the memory means in the mobile unit with the existing identification code stored in the memory means in the base unit, and when such codes match, proceeding immediately to step (c);
- when such codes do not match, waiting a comparatively long time before proceeding to step (c);
- replacing the identification code stored in the memory means in the base unit and in the memory means in the mobile unit with a new identification code which is common to both such units; and
- switching the base unit and the mobile unit back to the stand-by state.

4,794,637

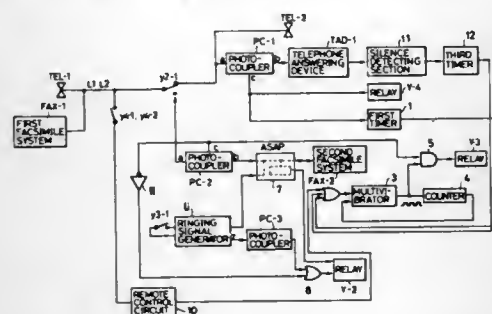
**APPARATUS FOR CONNECTING TELEPHONE ANSWERING DEVICE AND TELEPHONE TERMINAL EQUIPMENT, SELECTIVELY, TO TELEPHONE LINES**  
Kazuo Hashimoto, Tokyo, Japan, assignor to Hashimoto Corporation, Tokyo, Japan

Filed Nov. 20, 1986, Ser. No. 932,600  
Claims priority, application Japan, Nov. 22, 1985, 60-263224;  
Sep. 8, 1986, 61-211265

Int. Cl. H04M 1/65

U.S. Cl. 379-67

12 Claims



- A control system responsive to a telephone ringing signal for selectively connecting and disconnecting an automatic telephone answering device and telephone terminal equipment to and from a public telephone circuit, comprising:
  - timer means for generating an output upon elapse of a preset period of time from the instant when operation of said telephone answering device starts;
  - control signal reception means responsive to the output from said timer means for generating an output;
  - ringing signal generating means responsive to the output from said control signal reception means, for applying to said telephone terminal equipment a dummy ringing signal which is substantially the same as the telephone ringing signal, said dummy signal starting said telephone terminal equipment;
  - relay means responsive to operation of said control signal

reception means, for disconnecting said automatic telephone answering device from the public telephone circuit and for connecting said telephone terminal equipment to the public telephone circuit; and

relay control means connected to said relay means and said telephone terminal equipment for causing said relay means to maintain the connection between said telephone terminal equipment and the public telephone circuit after said telephone terminal equipment is operated, and for restoring said relay means upon completion of operation of said telephone terminal equipment, so that connection is established between said telephone answering device and the public telephone circuit.

4,794,638

**TELEPHONE ANSWERING MACHINE DISPLAY SYSTEM**

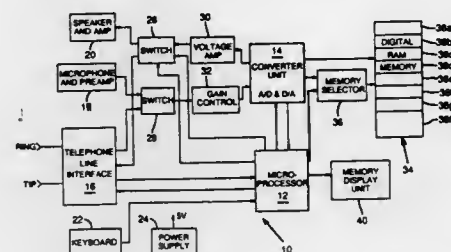
Peter A. Millett, Lake Oswego, Oreg., assignor to Code-A-Phone Corporation, Clackamas, Oreg.

Filed Jan. 6, 1983, Ser. No. 141,201

Int. Cl. H04M 1/00, 1/65

U.S. Cl. 379-88

10 Claims



- A message management and display system for use in a telephone answering machine having a memory for recording messages, comprising:

a display system for visually indicating on a message by message basis whether one or more messages are available for playback, said display system including a plurality of visual display modules corresponding to banks within said memory adapted for holding separate messages and each of which includes a means for generating light of a first color and, alternatively, light of a second color in response to different logic states assumed by a control signal;

microprocessor means operative for providing control signals formed to assume one logic state if the memory bank operationally corresponding to the display module to which the control signal is supplied is empty and another logic state if the memory bank operationally corresponding to the display module to which the control signal is supplied contains a message, and operative for selecting any of the messages indicated by any of said display modules as recorded in the memory of said machine for playback by randomly accessing said messages in response to input commands provided through an input device by an operator of said machine.

4,794,639

**METHOD AND APPARATUS FOR AUTOMATICALLY TRANSMITTING A MESSAGE TO A TELEPHONE TERMINAL**

Kiyoshi Urai, and Hiroaki Yamashita, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Feb. 28, 1986, Ser. No. 834,415

Claims priority, application Japan, Mar. 4, 1985, 60-42317

Int. Cl. H04M 11/00

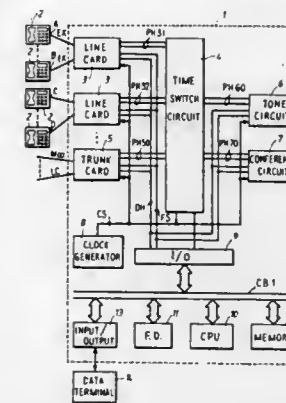
U.S. Cl. 379-89

27 Claims

- A telephone communication system having an exchange

and a plurality of telephones connected to said exchange, wherein said exchange automatically connects a first telephone to a second telephone when said first telephone is being called by said second telephone and said first telephone responds to the call, a method of automatically providing stored information to the user of said second telephone, said method comprising the steps of:

- storing information in said second telephone;
- transmitting from a first telephone to said exchange an information identifier wherein said information identifier is capable of identifying information stored in said second telephone;



- associating said information identifier with said first telephone;
- storing in said exchange said information identifier and its association with said first telephone;
- controlling said exchange to transmit said information identifier to said second telephone when said second telephone calls said first telephone; and
- providing said stored information to a user of said second telephone when said information identifier is received by said second telephone.

4,794,640

**SWITCHING CONTROL APPARATUS FOR INTERCOM-TELEPHONE SETS**

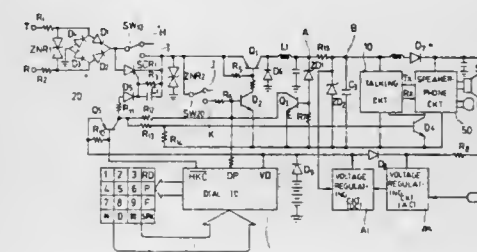
Kou-I Yeh, Taipei, Taiwan, assignor to Inventa Electronics Co., Ltd., Taipei, Taiwan

Filed Feb. 24, 1987, Ser. No. 17,840

Int. Cl. H04M 9/08

U.S. Cl. 379-388

1 Claim



- A switching control apparatus for intercom-telephone sets having a speaker-telephone circuit coupled with a speaker and a microphone, a dial circuit with a keyboard electrically connected to the speaker-telephone circuit, a talking circuit with its output connected to an input of the speaker-telephone circuit, and a pair of voltage regulating circuits connected in series between an AC power source and the talking circuit, comprising:
  - a pair of resistors one end of each being respectively series-connected to a pair of incoming telephone lines at one end

and the other end of each resistor being shunted by a first surge absorber for protection against high voltage;

a rectifying circuit having its input connected to both output terminals of said resistors and its output coupled with a first switch of the intercom-telephone set for allowing low-voltage incoming signals to pass therefrom; and

a silicon controlled switching circuit having its anode connected to an output terminal of said rectifying circuit, its cathode connected to a contact of said first switch, and its gate coupled with a unilateral conductive element of the talking circuit through a second surge absorber and a transistor circuit for performing switching control operations of the intercom-telephone set.

4,794,641

**DATA TRANSMISSION SYSTEM OF KEY TELEPHONE SYSTEM**

Kenichi Kanno; Hisami Ojima, and Senji Okumura, all of Tokyo, Japan, assignors to Tamura Electric Works, Ltd., Tokyo, Japan

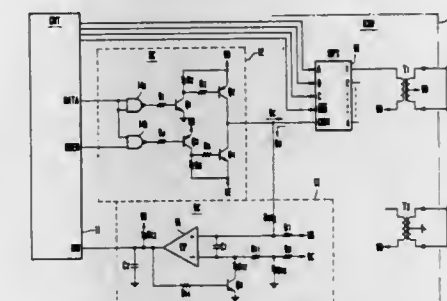
Filed Mar. 23, 1987, Ser. No. 29,447

Claims priority, application Japan, Apr. 7, 1986, 61-78364

Int. Cl. H04M 1/72; H04Q 3/00

U.S. Cl. 379-165

8 Claims



- A system for transmitting data by a pulse signal through lines connecting a main unit and a key telephone set, wherein said main unit comprises means for sending, prior to transmission of pulse train data, a start signal of a pulse train including a pulse of an n-bit (where n is an integer), first logic value and a pulse of an (n+1)-bit, second logic value; and
- said key telephone set comprises logic value change detecting means for detecting a change in the pulse train of the start signal from said first logic value to said second logic value;
- polarity discriminating means for discriminating on the basis of the logic value of the pulse of the (n+1)th bit from the logic value change detected bit, whether or not a line connection for said key telephone set is normal, and
- decoding means for decoding said pulse train data according to a predetermined logic, depending on the result of said discrimination.

4,794,642

**CALL SCREENING IN A PUBLIC TELEPHONE STATION**  
Mohammad A. Arbabzadah; Richard L. Maybach; Bhaskar N. Sanakkayala, all of Holmdel, and S. Devendra K. Verma, Middletown, all of N.J., assignors to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill and AT&T Information Systems Inc., Morristown, both of, N.J.

Filed Sep. 24, 1987, Ser. No. 100,697

Int. Cl. H04M 1/27, 1/66, 15/24

U.S. Cl. 379-200

12 Claims

- A circuit for use in a telephone station for restricting selected telephone calls originating at the station, the station



1. Apparatus for inspecting a patterned article, comprising:

- (i) image acquisition means for acquiring an image of at least part of said article and providing a binary signal, each bit of such binary signal representing a picture element of said image;
- (ii) storage means for storing bits of said binary signal, temporarily and successively;
- (iii) first means responsive to said storage means for determining the binary state of a first set of bits stored in said storage means, such first set corresponding, in said image, to at least one pair of picture elements that are spaced apart by a distance equivalent to the required spacing between successive edges between contrasting areas of the pattern on said article;
- "(iv) dimensional verification means responsive to said first means for providing, in dependence upon the state of said pair of bits, a dimensional verification signal indicating

whether or not said pair of picture elements are the required distance apart;

(v) second means responsive to the storage means for determining, at the same instant, the state of a second set of bits corresponding, in said image, to a predetermined array of picture elements;

(vi) pattern recognition means comprising edge detection means for determining whether or not said predetermined array of picture elements straddles an edge between contrasting areas of said pattern;

means for storing a plurality of templates, each comprising an array of elements that represents an acceptable contour for such edge between contrasting areas, and

means for comparing said second set of bits with said templates, said means for comparing being activated only upon detection of an edge by said edge detection means;

said means for comparing providing a pattern recognition signal indicating whether or not the pattern formed by said array of picture elements, at a particular instant, corresponds to an acceptable edge profile; and

(vii) output means responsive to said dimensional verification signal and said pattern recognition signal, for providing an output signal.

4,794,648

# MASK ALIGNER WITH A WAFER POSITION DETECTING DEVICE

Naoki Ayata, Machida, and Yasuyoshi Yamada, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan  
Continuation of Ser. No. 543,872, Oct. 20, 1983, abandoned.

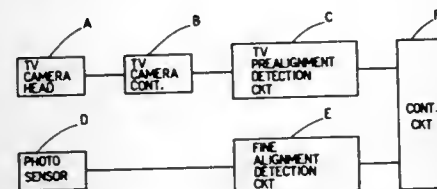
This application Apr. 27, 1987, Ser. No. 42,534

Claims priority, application Japan, Oct. 25, 1982, 57-187243; Nov. 30, 1982, 57-210921; Nov. 30, 1982, 57-210922; Nov. 30, 1982, 57-210923; Nov. 30, 1982, 57-210924; Nov. 30, 1982, 57-210925; Nov. 30, 1982, 57-210926; Nov. 30, 1982, 57-210927; Nov. 30, 1982, 57-210928

Int. Cl.<sup>4</sup> G06K 9/00

U.S. Cl. 382-8

6 Claims



1. A wafer position detecting apparatus, comprising:

projection optical means for exposing a wafer to a circuit pattern of a mask;

first illuminating means, disposed adjacent said projection optical means, for illuminating the wafer without using said projection optical means;

first photoelectric conversion means, associated with said first illuminating means, for detecting a mark on the wafer;

second illuminating means for illuminating the wafer through said projection optical means;

second photoelectric conversion means, associated with said second illuminating means, for detecting a mark on the wafer;

wafer carrying means movable between a first position where a wafer carried thereon is illuminated by said first illuminating means and a second position where the wafer carried thereon is illuminated by said second illuminating means; and

control means including:

detecting means for detecting the deviation of the mark on the wafer carried by said carrying means from a predetermined reference position by cooperation with said first illuminating means and said first photoelectric

conversion means without aligning the mark on the wafer with the predetermined reference position; and

means for moving said carrying means to the second position in accordance with an output from said detecting means indicative of the detected deviation to allow the wafer to be illuminated and detected by said second illuminating means and said second photoelectric conversion means.

4,794,649

# RADIO COMMUNICATION SYSTEM WITH POWER SAVING DISABLEMENT PRIOR TO CALL HANDLING PROCESSES

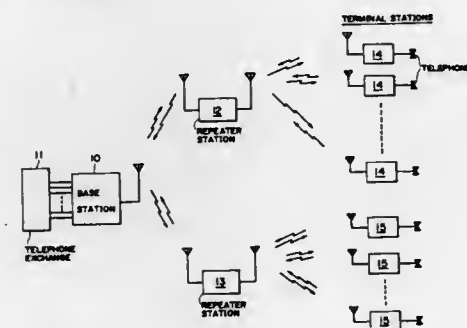
Ryuhel Fujiwara, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Apr. 29, 1987, Ser. No. 43,866

Claims priority, application Japan, May 6, 1986, 61-103592  
Int. Cl.<sup>4</sup> H04B 1/60, 7/14

U.S. Cl. 455-9

13 Claims



1. A radio communication system comprising:

a base station for transmitting a power saving signal and an information signal at periodic intervals;

a repeater station operating alternately between a preset interval and an active interval for relaying said power saving and information signals during said active interval, said repeater station including power saving means responsive to said power saving signal to cut off power supplies to major power consumptive components thereof during said preset interval, and power saving disabling means; and

a plurality of terminal stations operating alternately between said preset interval and said active interval for communicating through said repeater station with said base station, each of said terminal stations including power saving means responsive to said power saving signal relayed by said repeater station to cut off power supplies to major power consumptive components thereof during said preset interval, and power saving disabling means for transmitting a power saving disabling signal to said repeater station during said active interval in response to a request for call and disabling said power saving means thereof for the duration of said preset interval,

said power saving disabling means of said repeater station being responsive to said power saving disabling signal from said terminal stations for disabling said power saving means thereof for the duration of said preset interval to thereby permit said information signal to be relayed to the terminal station which has transmitted said power saving disabling signal, and

each of said terminal stations including means responsive to said relayed information signal for transmitting a call request signal to the repeater station to thereby permit said call request signal to be relayed by the repeater station during the preset interval immediately following the transmission of said power saving disabling signal.

4,794,650

# ELECTRONIC TUNING RECEIVER

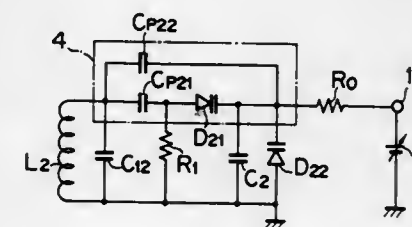
Hajime Yokoyama, Saitama, Japan, assignor to Toko, Inc., Tokyo, Japan

Filed Jul. 9, 1987, Ser. No. 71,299

Claims priority, application Japan, Jul. 10, 1986, 61-162400  
Int. Cl.<sup>4</sup> H04B 1/26

U.S. Cl. 455-197

3 Claims



1. An electronic tuning receiver comprising a radio-frequency tuning circuit and an oscillation tuning circuit including a first and a second voltage-variable reactance element, an oscillation coil, a first capacitor connected in parallel with said oscillation coil, and a padding capacitor provided in the form of a composite circuit, said padding capacitor containing a second capacitor connected in series with said oscillation coil, said first voltage-variable reactance element, and a third capacitor connected parallel with at least one of said second capacitor and a first voltage-variable reactance element, the capacitance of said padding capacitor being variable over a frequency band ranging from a low receiving frequency to a high receiving frequency, by changing the capacitance of said first voltage-variable reactance element with that of said second voltage-variable reactance element.

4,794,651

# TONER FOR USE IN COMPOSITIONS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES, METHOD OF MAKING THE SAME, AND LIQUID COMPOSITION USING THE IMPROVED TONER

Ben Zion Landa, Edmonton, Canada; Peretz Ben-Avraham; Joseph Hall, both of Rehovot, Israel, and George A. Gibson, Endwell, N.Y., assignors to Savin Corporation, Stamford, Conn.

Continuation of Ser. No. 45,168, Apr. 24, 1987, abandoned, which is a continuation of Ser. No. 679,906, Dec. 10, 1984, abandoned. This application Feb. 10, 1988, Ser. No. 157,122  
Int. Cl.<sup>4</sup> G03G 9/08, 9/12

U.S. Cl. 430-110

12 Claims



1. A toner constituent utilizable with a nonpolar liquid for developing latent electrostatic images by electrophoretic movement through said liquid including in combination a particle of thermoplastic polymer formed with a plurality of integral fibers extending therefrom, said fibers being adapted to mat with like fibers of other like particles during development, and means for imparting a charge of predetermined polarity to said particles.



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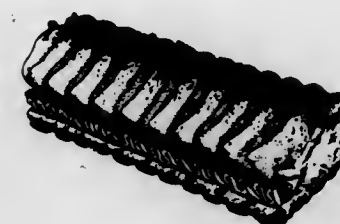
## DESIGNS

DECEMBER 27, 1988

299,080

### CONFECTION

Kevin P. Hillman, Cheltenham, Great Britain, assignor to Thomas J. Lipton, Inc., Eaglewood Cliff, N.J.  
Filed Sep. 30, 1985, Ser. No. 782,214  
Term of patent 14 years  
U.S. Cl. D1-125



299,082

### ELEMENT OF A SHOE UPPER

Mona McCrea, Portland, Oreg., assignor to AVIA Group International, Inc., Portland, Oreg.  
Division of Ser. No. 87,743, Aug. 21, 1987, Pat. No. D. 296,146.  
This application Nov. 23, 1987, Ser. No. 124,461  
Term of patent 14 years  
U.S. Cl. D2-314



299,083

### SHOE UPPER

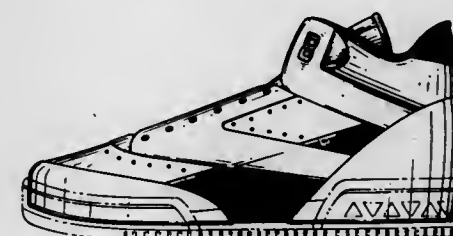
James K. Tong, Beaverton, and Joan Swett, Lake Oswego, both of Oreg., assignors to AVIA Group International, Inc., Portland, Oreg.  
Filed Feb. 16, 1988, Ser. No. 155,742  
Term of patent 14 years  
U.S. Cl. D2-314



299,081

### SHOE UPPER

Robert Y. Greenberg, Woodland Hills, Calif., assignor to L.A. Gear, Inc., Los Angeles, Calif.  
Filed Nov. 18, 1987, Ser. No. 122,003  
Term of patent 14 years  
U.S. Cl. D2-314



299,084

**ANNULAR CLEATING FOR AN ATHLETIC SHOE**

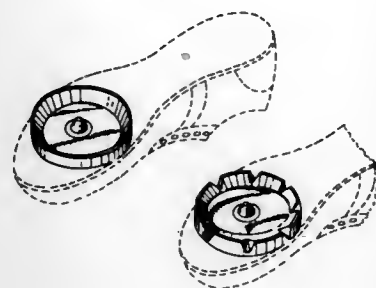
Michael L. Tanel, 119 N. 92nd St., Milwaukee, Wis.

Continuation-in-part of Ser. No. 565,746, Dec. 27, 1983, Pat. No.

4,577,422. This application Nov. 22, 1985, Ser. No. 806,195

Term of patent 14 years

U.S. Cl. D2-317



299,087

**KNOCKDOWN ROCKING CHAIR**

William Bruce, 3538 Lomas Serenas Dr., Escondido, Calif.

92025

Filed Feb. 13, 1986, Ser. No. 834,016

Term of patent 14 years

U.S. Cl. D6-348



299,088

**PLANT HOLDER**

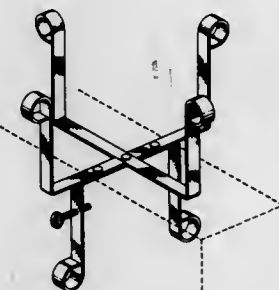
Mary Ann Monza, 19073 Rockwood Dr., Yorba Linda, Calif.

92686

Filed Aug. 25, 1986, Ser. No. 899,649

Term of patent 14 years

U.S. Cl. D6-403



299,085

**CONTAINER FOR CONTACT LENS**

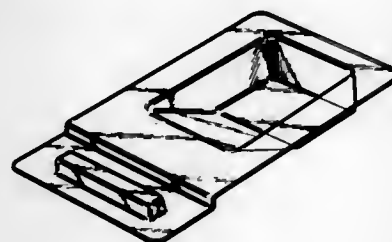
Robert Martinez, Flemington, N.J., assignor to Vistakon, Inc.,

Jacksonville, Fla.

Filed Nov. 4, 1985, Ser. No. 803,765

Term of patent 14 years

U.S. Cl. D3-34



299,086

**GARMENT HANGER**

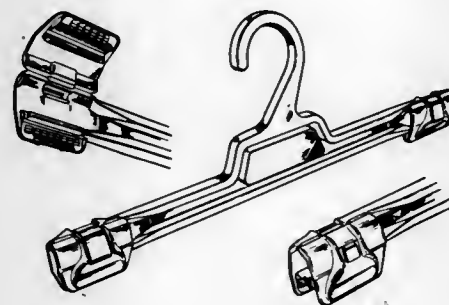
Ronald M. Wilson, Black Rock, Australia, assignor to Spotless Plastics Limited, Victoria, Australia

Filed Apr. 15, 1986, Ser. No. 852,883

Claims priority, application Australia, Oct. 17, 1985, 2966/85

Term of patent 14 years

U.S. Cl. D6-326



299,089

**DESK OR SIMILAR ARTICLE**

Sava A. Cvek, Newton, Mass., assignor to Davis Furniture Industries, Inc., High Point, N.C.

Filed Jul. 12, 1985, Ser. No. 754,353

Term of patent 14 years

U.S. Cl. D6-428



299,090

**VIDEO CABINET**

George P. Roegner, Lake Rd., Far Hills, N.J. 07931

Filed Dec. 12, 1985, Ser. No. 808,103

Term of patent 14 years

U.S. Cl. D6-436



299,093

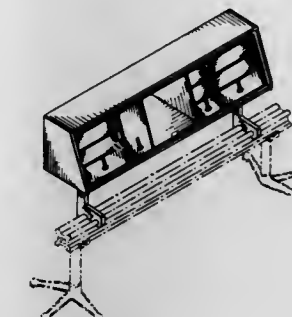
**MOUNTABLE TOOL STORAGE**

Bruce A. Burdick, San Francisco, Calif., assignor to Herman Miller, Inc., Zeeland, Mich.

Filed Sep. 18, 1986, Ser. No. 909,078

Term of patent 14 years

U.S. Cl. D6-474



299,091

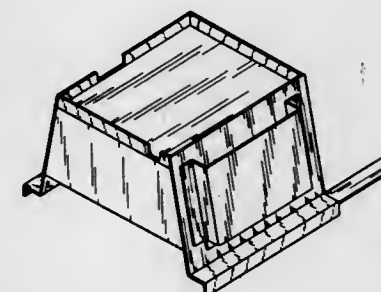
**COMBINED DISPLAY RACK AND HOLDER**

Steven Kruzel, 1543 N. Prospect Rd., Ypsilanti, Mich. 48197

Filed Dec. 9, 1985, Ser. No. 806,550

Term of patent 14 years

U.S. Cl. D6-449



299,094

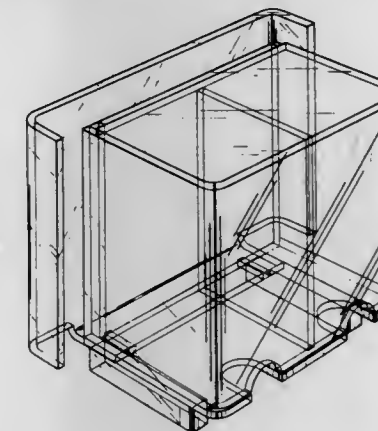
**CARD DISPENSER**

Janet M. Mills, 6040 Cammie Way, San Antonio, Tex. 78238

Filed Feb. 27, 1986, Ser. No. 836,601

Term of patent 14 years

U.S. Cl. D6-515



299,092

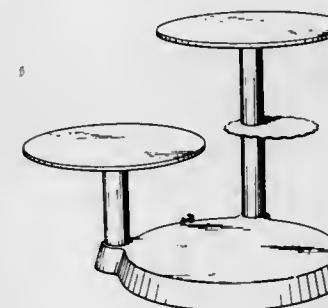
**STAND**

Franco Leolli, Magliaso Ticino, Switzerland, assignor to Modcor Italiana S.p.A., Varese, Italy

Filed Mar. 25, 1986, Ser. No. 845,817

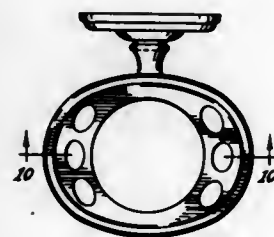
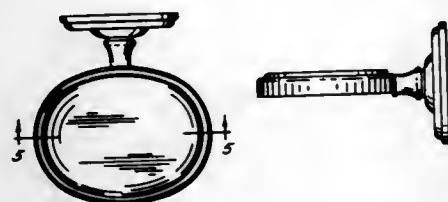
Term of patent 14 years

U.S. Cl. D6-474

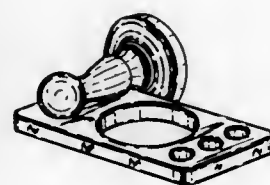
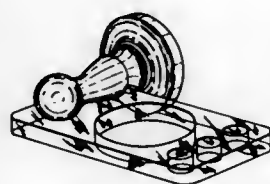




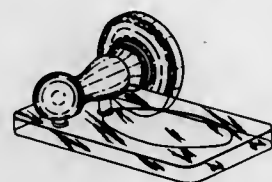
299,095  
**BATHROOM ACCESSORY HOLDER**  
 Stanley T. Greens, Chicago, and A. Denton Green, Evanston, both of Ill., assignors to Amerock Corporation, Rockford, Ill.  
 Filed Aug. 21, 1986, Ser. No. 898,639  
 Term of patent 14 years  
 U.S. Cl. D6—524



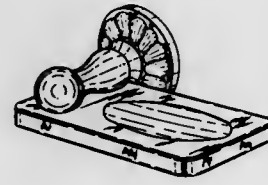
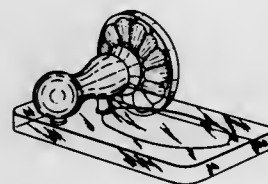
299,096  
**COMBINED TOOTHBRUSH AND TUMBLER HOLDER**  
 Peter S. Fayerman, Bryn Mawr, and Leslie A. Meck, Blandan, both of Pa., assignors to Baldwin Hardware Corporation, Reading, Pa.  
 Filed Oct. 18, 1985, Ser. No. 789,169  
 Term of patent 14 years  
 U.S. Cl. D6—531



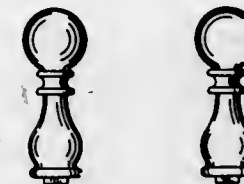
299,097  
**SOAP DISH**  
 Peter S. Fayerman, Bryn Mawr, and Leslie A. Meck, Blandan, both of Pa., assignors to Baldwin Hardware Corporation, Reading, Pa.  
 Filed Oct. 18, 1985, Ser. No. 789,164  
 Term of patent 14 years  
 U.S. Cl. D6—540



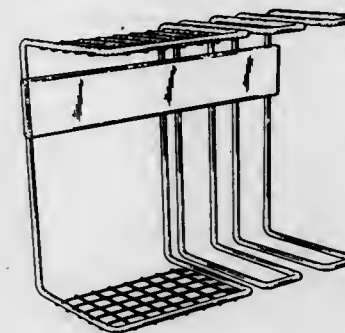
299,098  
**SOAP DISH**  
 Peter S. Fayerman, Bryn Mawr, and Leslie A. Meck, Blandan, both of Pa., assignors to Baldwin Hardware Corporation, Reading, Pa.  
 Filed Oct. 18, 1985, Ser. No. 789,165  
 Term of patent 14 years  
 U.S. Cl. D6—540



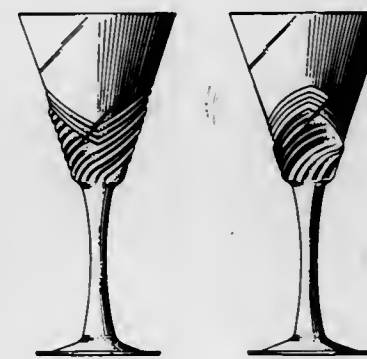
299,099  
**TOWEL BAR MOUNTING POST**  
 Stanley T. Greens, Chicago, and A. Denton Green, Evanston, both of Ill., assignors to Amerock Corporation, Rockford, Ill.  
 Filed Aug. 21, 1986, Ser. No. 898,642  
 Term of patent 14 years  
 U.S. Cl. D6—550



299,100  
**SKI STORAGE RACK**  
 Steven W. Martinell, Vancouver, Wash., and Sohrab Vossoughi, Portland, Oreg., assignors to Racor Inc., Portland, Oreg.  
 Filed May 12, 1986, Ser. No. 862,565  
 Term of patent 14 years  
 U.S. Cl. D6—552



299,101  
**STEMMED WINE GLASS OR SIMILAR ARTICLE**  
 Jean-Jacques Durand, LaBute, 62510, Arques, France  
 Filed Jan. 2, 1986, Ser. No. 815,641  
 The portion of the term of this patent subsequent to Nov. 29, 2002, has been disclaimed.  
 Term of patent 14 years  
 U.S. Cl. D7—13



299,102  
**FOOD CONTAINER**  
 Isao Maki, Tokyo, Japan, assignor to Soko Co., Ltd., Tokyo, Japan  
 Filed May 30, 1985, Ser. No. 739,197  
 Claims priority, application Japan, Dec. 7, 1984, 59-50048  
 Term of patent 14 years  
 U.S. Cl. D7—79



299,103  
**COMBINED FIREPLACE COOKING ACCESSORY TOOL SET AND SUPPORT STAND THEREFOR**  
 Kenneth L. Diebold, 3926 O'Henry, Garland, Tex. 75042  
 Filed Apr. 14, 1986, Ser. No. 851,700  
 Term of patent 14 years  
 U.S. Cl. D7—106



299,104

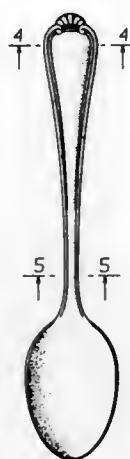
## SPOON OR SIMILAR ARTICLE

Colin B. Richmond, II, Oneida, N.Y., assignor to Oneida, Ltd.,  
Oneida, N.Y.

Filed Jan. 10, 1986, Ser. No. 817,619

Term of patent 14 years

U.S. Cl. D7-137



299,106

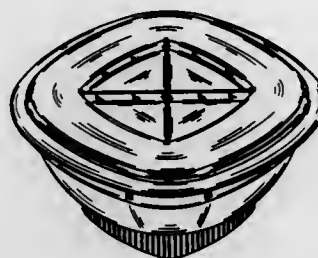
## POPCORN POPPER

James F. Pomroy, St. Paul, Minn., assignor to Plastics, Inc., St.  
Paul, Minn.

Filed Feb. 6, 1986, Ser. No. 826,751

Term of patent 14 years

U.S. Cl. D7-325



299,105

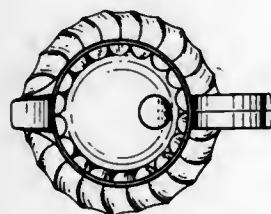
## JUG

Cliff K. L. Sun, Kowloon, Hong Kong, assignor to Kin Hip Metal  
& Plastic Factory Ltd., Kowloon, Hong Kong

Filed Sep. 24, 1985, Ser. No. 779,522

Term of patent 14 years

U.S. Cl. D7-317



299,107

## MICROWAVE OVEN

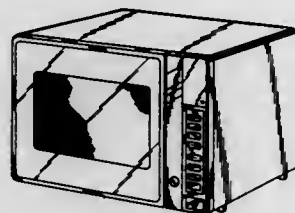
Wataru Iwahashi, Osaka, Japan, assignor to Sharp Corporation,  
Osaka, Japan

Filed Dec. 5, 1985, Ser. No. 805,352

Claims priority, application Japan, Jun. 6, 1985, 60 24096

Term of patent 14 years

U.S. Cl. D7-351



299,108

## PAIR OF INSULATING SHEATHS FOR TONG HANDLES

Franz Brdalk, Slovenske Konjice, Yugoslavia, assignor to  
UNIOR kovaarska industrija Zrece n.s.o., Zrece, Yugoslavia

Filed Nov. 13, 1985, Ser. No. 804,009

Claims priority, application Yugoslavia, May 13, 1985, M  
226/85

Term of patent 14 years

U.S. Cl. D8-107



299,110

## HANDLE

Franz W. Jans, Offenbach am Main, Fed. Rep. of Germany,  
assignor to Armaturen & Presswerk GmbH, Rodermark, Fed.  
Rep. of Germany

Filed Jan. 14, 1987, Ser. No. 3,188

Term of patent 14 years

U.S. Cl. D8-316



299,111

## CABINET HANDLE

Franz W. Jans, Offenbach am Main, Fed. Rep. of Germany,  
assignor to Jado Bathroom and Hardware Manufacturing  
Corp., Camarillo, Calif.

Filed Feb. 27, 1987, Ser. No. 19,954

Term of patent 14 years

U.S. Cl. D8-316



299,109

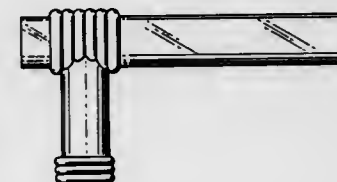
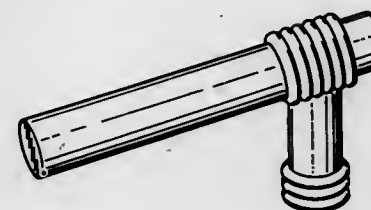
## HANDLE

Franz W. Jans, Offenbach am Main, Fed. Rep. of Germany,  
assignor to Jado Bathroom and Hardware Manufacturing  
Corp., Camarillo, Calif.

Filed Feb. 9, 1987, Ser. No. 12,309

Term of patent 14 years

U.S. Cl. D8-305



299,112

## BRACE FOR HOLDING GAS PUMP NOZZLE IN OPEN POSITION

Joseph F. Downey, 7829 Ellenbogen St., Sunland, Calif. 91040

Filed Nov. 28, 1986, Ser. No. 936,026

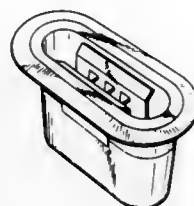
Term of patent 14 years

U.S. Cl. D8-354





299,113  
FASTENER OR THE LIKE  
Atsushi Takahashi, Yokohama, Japan, assignor to Nifco Inc.,  
Yokohama, Japan  
Filed Mar. 20, 1986, Ser. No. 845,366  
Claims priority, application Japan, Sep. 30, 1985, 60-41018  
Term of patent 14 years  
U.S. Cl. D6—382



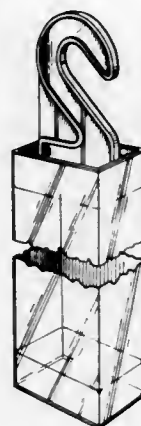
299,115  
BOTTLE  
Richard B. Wetherell, Jr., Gales Ferry, Conn., assignor to In-  
noPak Corporation, Chesterfield, Mo.  
Filed Oct. 17, 1985, Ser. No. 788,264  
Term of patent 14 years  
U.S. Cl. D9—370



299,116  
BOTTLE  
Wolfgang Zoller, 18 Bd. du Chateau, 92200 Neuilly sur Seine,  
France  
Filed Dec. 31, 1985, Ser. No. 815,225  
Claims priority, application France, Jul. 2, 1985, 353146  
Term of patent 14 years  
U.S. Cl. D9—402



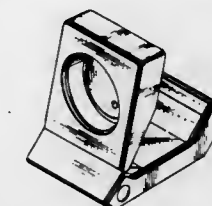
299,114  
PACKAGING CONTAINER FOR ROLLER BLINDS  
Erik Klinge, Capelle a/d IJssel, Netherlands, assignor to Allpac  
Holding B.V., Netherlands  
Filed Aug. 9, 1985, Ser. No. 764,430  
Claims priority, application Hague, Feb. 11, 1985,  
DM/004753  
Term of patent 14 years  
U.S. Cl. D9—337



299,117  
COMBINED WATCH AND BRACELET  
Carlo Maroni, Via R. Benini 24, 00191 Rome, Italy  
Filed Oct. 29, 1985, Ser. No. 792,483  
Claims priority, application Italy, Jun. 25, 1985, 35963/85[U]  
Term of patent 14 years  
U.S. Cl. D10—32



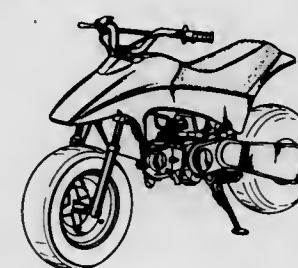
299,118  
MOUNTING FRAME FOR MEASURING INSTRUMENTS  
Toshikazu Yusa, Tokyo, Japan, assignor to Tokyo Compass  
Mfg. Co., Ltd., Tokyo, Japan  
Filed Aug. 27, 1985, Ser. No. 770,309  
Term of patent 14 years  
U.S. Cl. D10—103



299,119  
EAR-RIM  
Shirley M. Frederick, 2527 Six Mile La., Louisville, Ky. 40220  
Filed Jun. 6, 1985, Ser. No. 727,351  
Term of patent 14 years  
U.S. Cl. D11—40



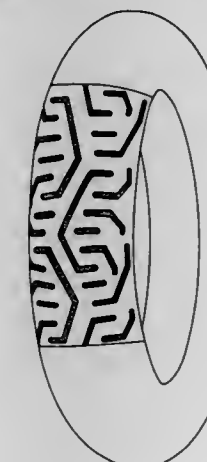
299,120  
MOTORCYCLE  
Gen Tamura, Tokyo; Kazuhiko Yokoyama, and Yukinori Kawa-  
guchi, both of Saitama, all of Japan, assignors to Honda Giken  
Kogyo Kabushiki Kaisha, Tokyo, Japan  
Filed Oct. 24, 1986, Ser. No. 923,069  
Claims priority, application Japan, May 19, 1986, 61-18793  
Term of patent 14 years  
U.S. Cl. D12—110



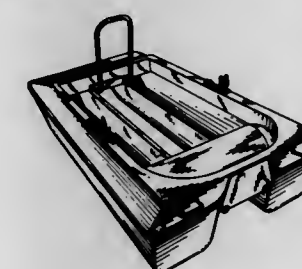
299,121  
PORTABLE BICYCLE  
Myung K. Oh, 9-85 Tack Ean-Ri, Shin Do-Eup, Koyang-goon,  
Kyung Gi-Do, Rep. of Korea  
Filed Dec. 18, 1986, Ser. No. 943,370  
Term of patent 14 years  
U.S. Cl. D12—111



299,122  
TIRE  
Claude A. Hart, Hillsleigh, England, and Giancarlo Armellini,  
Milan, Italy, assignors to Pirelli Coordinamento Pneumatici  
S.p.A., Italy  
Filed Apr. 18, 1986, Ser. No. 855,784  
Claims priority, application Italy, Oct. 31, 1985, 23719/85[U]  
Term of patent 14 years  
U.S. Cl. D12—149



299,123  
RESCUE AND ICE FISHING BOAT  
Rolf Olafsen, Labelleveien 32, N-3200, Sandefjord, Norway  
Filed May 9, 1986, Ser. No. 862,382  
Term of patent 14 years  
U.S. Cl. D12—300



299,124

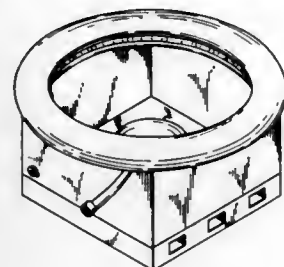
**FIREPROOF LIFE SAVING RAFT**

Ventura G. Rodriguez, 401 Pruitt St., San Antonio, Tex. 78204

Filed Jun. 25, 1986, Ser. No. 878,476

Term of patent 14 years

U.S. Cl. D12-316



299,127

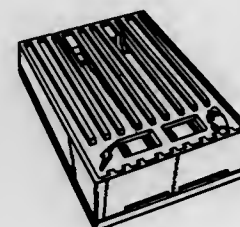
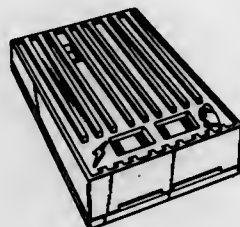
**SOUND ACTIVATED LIGHT SWITCH**

Sidney A. Bogans, 22 Corey St., Melrose, Mass. 02176

Filed Nov. 13, 1985, Ser. No. 805,066

Term of patent 14 years

U.S. Cl. D13-32



299,125

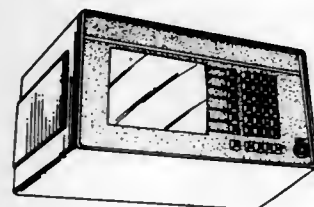
**CONTROLLER FOR MACHINE TOOLS**

Robert L. Anderson, Boulder, Colo., assignor to Applied Microbotics Corporation, Boulder, Colo.

Filed Apr. 18, 1986, Ser. No. 855,772

Term of patent 14 years

U.S. Cl. D13-12



299,128

**MICROPHONE**

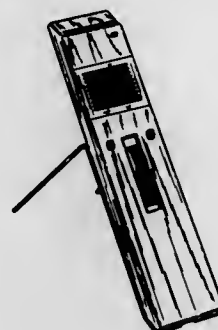
Konrad Ellermeier, Gaden, Austria, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 18, 1986, Ser. No. 897,698

Claims priority, application Hague, Feb. 26, 1986, 60894-07

Term of patent 14 years

U.S. Cl. D14-12



299,126

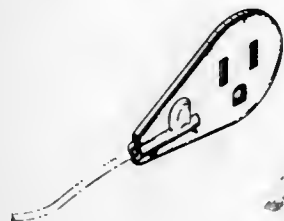
**ELECTRICAL GROUNDING ACCESSORY**

Hugh G. Johnson, Laurel Hollow, N.Y., assignor to Voitec Corporation, Plainview, N.Y.

Filed Jun. 12, 1986, Ser. No. 873,637

Term of patent 14 years

U.S. Cl. D13-12



299,129

**HEADPHONE EARPIECE**

Christopher D. Wiegel, Minneapolis, Minn., assignor to Telex Communications, Inc., Minneapolis, Minn.

Filed Nov. 24, 1986, Ser. No. 934,130

Term of patent 14 years

U.S. Cl. D14-37



299,131

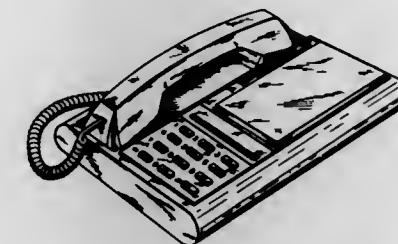
**COMBINED TELEPHONE HANDSET AND STAND**

James T. Asaki, and Robert L. Gault, both of Raleigh, N.C., assignors to Alcatel USA, Corp., New York, N.Y.

Filed May 20, 1985, Ser. No. 736,155

Term of patent 14 years

U.S. Cl. D14-53



299,132

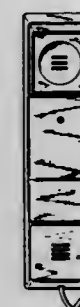
**COMBINED TELEPHONE HANDSET AND STAND**

James T. Asaki, and Robert L. Gault, both of Raleigh, N.C., assignors to Alcatel USA, Corp., New York, N.Y.

Filed Dec. 5, 1985, Ser. No. 805,014

Term of patent 14 years

U.S. Cl. D14-53



299,130

**PROTECTOR HOUSING FOR TELECOMMUNICATION EQUIPMENT**

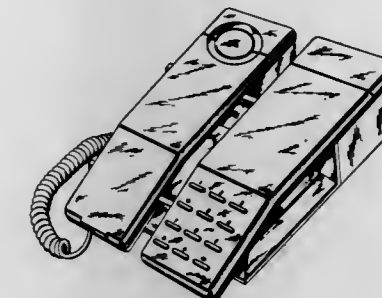
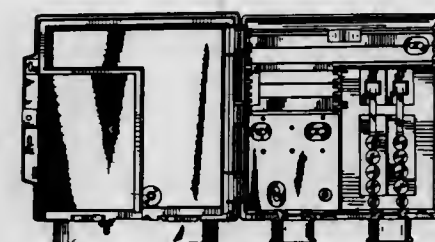
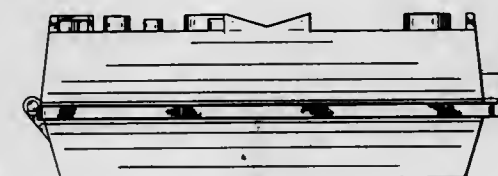
Thomas J. Smith, Bay Shore, and Michael A. Savona, Coram, both of N.Y., assignors to TII Industries Inc., Copiague, N.Y.

Filed Oct. 14, 1986, Ser. No. 918,244

The portion of the term of this patent subsequent to Jan. 6, 2001, has been disclaimed.

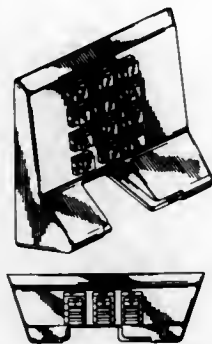
Term of patent 14 years

U.S. Cl. D14-52

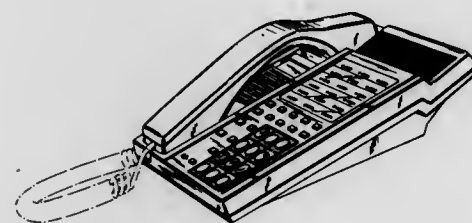
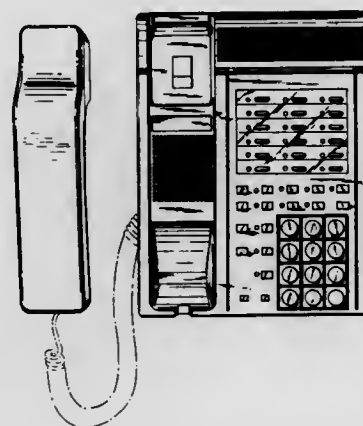




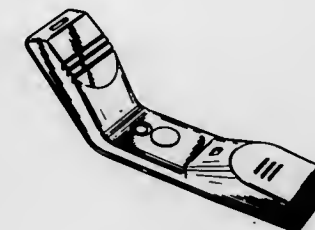
299,133  
KEY PAD AND CREDIT CARD BEZEL FOR COIN  
TELEPHONES  
Gerald J. Yachabach, Lakeland, Fla., assignor to Protel, Inc.,  
Lakeland, Fla.  
Filed May 8, 1987, Ser. No. 47,069  
Term of patent 14 years  
U.S. Cl. D14—55



299,134  
TELEPHONE APPARATUS WITH SPEAKERPHONE  
AND DISPLAY PANEL  
Shigeaki Kido; Sadao Isonaki; and Yasuko Yajima, all of Tokyo,  
Japan, assignors to Meisei Electric Co., Ltd., Japan  
Filed Jan. 22, 1987, Ser. No. 6,694  
Claims priority, application Japan, Jul. 25, 1986, 61-29171;  
Jul. 25, 1986, 61-29172  
Term of patent 14 years  
U.S. Cl. D14—58



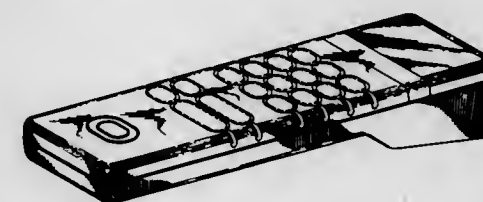
299,135  
TELEPHONE HANDSET  
Robin Rhodes, Nottingham, England, assignor to Plessey Over-  
seas Limited, Ilford, England  
Filed Feb. 10, 1986, Ser. No. 827,852  
Claims priority, application United Kingdom, Aug. 9, 1985,  
1028505  
The portion of the term of this patent subsequent to Feb. 18,  
2000, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D14—63



299,137  
HOUSING FOR A TELEPHONE HANDSET OR SIMILAR  
ARTICLE  
Leonid Soren, Lincolnwood, and Albert L. Nagle, Wilmette,  
both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.  
Filed Jul. 13, 1987, Ser. No. 73,777  
Term of patent 14 years  
U.S. Cl. D14—63



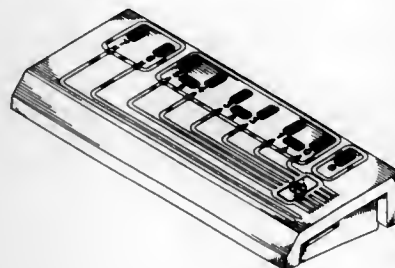
299,136  
HOUSING FOR A TELEPHONE HANDSET OR SIMILAR  
ARTICLE  
Terrance N. Taylor, Cary, Ill., assignor to Motorola, Inc.,  
Schaumburg, Ill.  
Filed Jun. 29, 1987, Ser. No. 67,860  
Term of patent 14 years  
U.S. Cl. D14—63



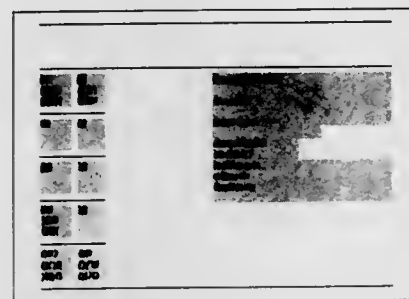
299,138  
UNIT FOR A PAGING SYSTEM  
Jan E. H. Hampf, Sjö, Sweden, assignor to Taseco AB, Gothen-  
burg, Sweden  
Filed May 5, 1986, Ser. No. 859,752  
Claims priority, application Sweden, Feb. 10, 1986, 86-0334  
Term of patent 14 years  
U.S. Cl. D14—68



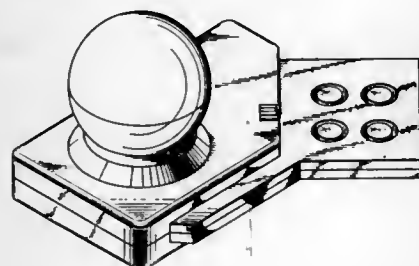
299,139  
INTERFACE PANEL  
Allan Toft, and Jan H. B. k, both of Vejle, Denmark, assignors  
to Interlego, Switzerland  
Filed Dec. 4, 1985, Ser. No. 806,305  
Term of patent 14 years  
U.S. Cl. D14—107



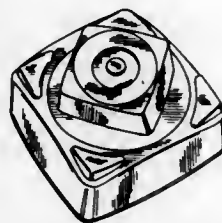
299,142  
KEYBOARD REPLICA IMAGE FOR A COMPUTER  
DISPLAY SCREEN  
Ole Berg, Vedb k, Denmark, assignor to Time/System Inter-  
national ApS, Denmark  
Filed Dec. 3, 1985, Ser. No. 804,075  
Claims priority, application Denmark, Sep. 9, 1985, 768/85  
Term of patent 14 years  
U.S. Cl. D14—115



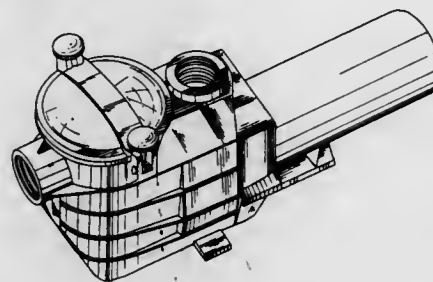
299,140  
CURSOR CONTROL FOR COMPUTER DISPLAY  
Fumio Nakamura, Tokyo, Japan, assignor to Hal Laboratory,  
Inc., Tokyo, Japan  
Filed Nov. 8, 1985, Ser. No. 803,989  
Claims priority, application Japan, May 24, 1985, 60-21379  
Term of patent 14 years  
U.S. Cl. D14—114



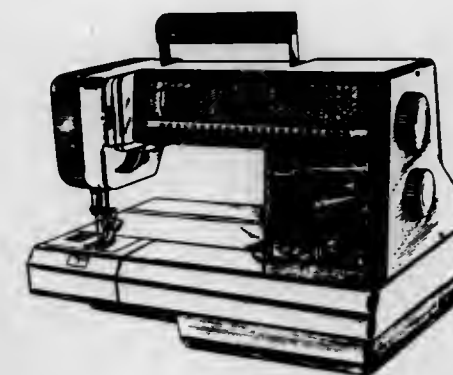
299,141  
CURSOR CONTROL FOR COMPUTER DISPLAY  
William M. Louis, 543 Cerro St., Encinitas, Calif. 92024  
Filed Jan. 24, 1986, Ser. No. 821,961  
Term of patent 14 years  
U.S. Cl. D14—114



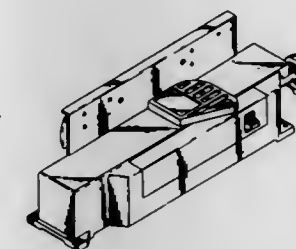
299,143  
PUMP  
Fred T. Hazlehurst, Roselle Park, N.J., assignor to Hayward  
Industries, Inc., Elizabeth, N.J.  
Continuation-in-part of Ser. No. 727,826, Apr. 26, 1985,  
abandoned. This application Jul. 10, 1985, Ser. No. 753,567  
Term of patent 14 years  
U.S. Cl. D15—7



299,144  
SEWING MACHINE  
Giorgetto Giugiaro, Moncalieri, Italy, assignor to NECCHI  
Societa per Azioni, Pavia, Italy  
Filed May 5, 1986, Ser. No. 859,732  
Claims priority, application Italy, Nov. 5, 1985, 32308[U]  
Term of patent 14 years  
U.S. Cl. D15—70



299,146  
COMBINED JOINTER AND PLANER  
Henry M. Pollak, and John W. Manger, both of Pottstown, Pa.,  
assignors to American Machine and Tool Company, Inc.,  
Royersford, Pa.  
Filed Feb. 6, 1986, Ser. No. 826,633  
Term of patent 14 years  
U.S. Cl. D15—127



299,145  
REFRIGERATOR  
Takashi Kuwabara; Yoshiharu Shimura; Yuko Hayaashi; To-  
shiyuku Hanamura; Kaoru Kanemori, and Yoshihiro  
Yamakawa, all of Gunma, Japan, assignors to Sanyo Electric  
Co., Ltd., Japan  
Filed Sep. 23, 1986, Ser. No. 910,760  
Term of patent 14 years  
U.S. Cl. D15—86



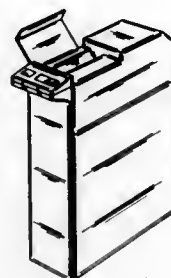
299,147  
DRUM COVER  
Gilberto B. Diaz, P.O. Box 3287, Taos, N. Mex. 87571  
Filed May 16, 1985, Ser. No. 734,690  
The portion of the term of this patent subsequent to Mar. 27,  
2001, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D17—22





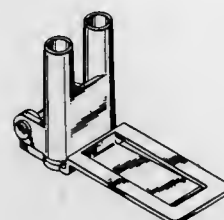
299,148  
SHREDDER

Hiroshi Nishibori, Ritsuko Makihara, and Yoichi Tatsuta, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan  
Filed Nov. 7, 1986, Ser. No. 929,207  
Claims priority, application Japan, May 7, 1986, 61-17204  
Term of patent 14 years  
U.S. Cl. D18—34

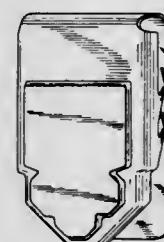


299,150  
WRITING INSTRUMENT HOLDER

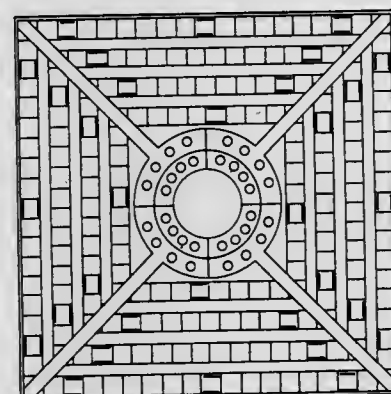
Brian L. Birch, Mendota Heights, Minn., assignor to The Birch Company, Mendota Heights, Minn.  
Filed May 12, 1986, Ser. No. 862,607  
Term of patent 14 years  
U.S. Cl. D19—85



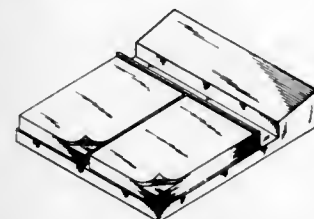
299,151  
FISH IDENTIFICATION CLIP OR SIMILAR ARTICLE  
Peter Rietmann, Herisan, Switzerland, assignor to Stoba AG, Horn, Switzerland  
Filed Apr. 10, 1986, Ser. No. 851,380  
Claims priority, application Switzerland, Nov. 1, 1985, DMA/000440  
Term of patent 14 years  
U.S. Cl. D20—27



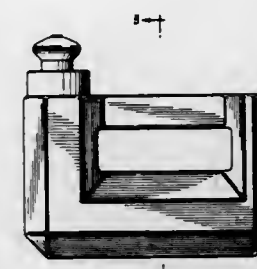
299,152  
GAME BOARD  
Donald N. Reed, Jr., P.O. Box 182, Flint, Mich. 48501-0182  
Filed Nov. 18, 1985, Ser. No. 805,564  
Term of patent 14 years  
U.S. Cl. D21—34



299,149  
HOLDER FOR MEMO PADS  
Stephen H. Wolff, 222 E. 35th St., New York, N.Y. 10016  
Filed Jun. 17, 1985, Ser. No. 744,979  
The portion of the term of this patent subsequent to May 26, 2001, has been disclaimed.  
Term of patent 14 years  
U.S. Cl. D19—70



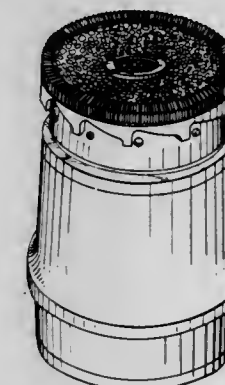
299,153  
FLUID WEIGHTED EXERCISE JUG  
Gary W. Hall, 7316 Carver Rd., Modesto, Calif. 95356  
Filed Oct. 1, 1986, Ser. No. 914,599  
Term of patent 14 years  
U.S. Cl. D21—197



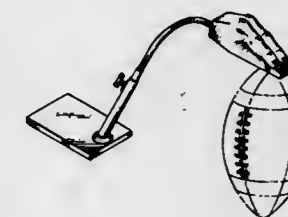
299,155  
PAIR OF STEP BAR ELEMENTS FOR AN INCLINED WALKING BEAM-TYPE BAR SCREEN EMPLOYED IN WASTEWATER FILTRATION  
Carl O. Wallander, Västra Frölunda, Sweden, assignor to Hydopress Wallander & Co. AB, Göteborg, Sweden  
Filed Nov. 19, 1985, Ser. No. 805,925  
Claims priority, application Sweden, May 24, 1985, 85-1355  
Term of patent 14 years  
U.S. Cl. D23—207



299,156  
SPRINKLER HEAD FOR A LAWN SPRINKLER  
Lawrence P. Heren, Peoria, Ill., assignor to L. R. Nelson Corporation, Peoria, Ill.  
Filed Nov. 15, 1985, Ser. No. 805,233  
Term of patent 14 years  
U.S. Cl. D23—214



299,154  
FOOTBALL PRACTICE PLACEKICK HOLDER  
Harold W. Kopp, 137 Daytona Ave., R.R. 6A, Narragansett, R.I. 02882  
Filed Jan. 17, 1987, Ser. No. 819,621  
Term of patent 14 years  
U.S. Cl. D21—209



299,157  
COMBINED WATER CONTAINER AND NOZZLE FOR  
SHOWERING  
Charles P. Hall, 5815 Bennett Valley Rd., Santa Rosa, Calif.  
95404

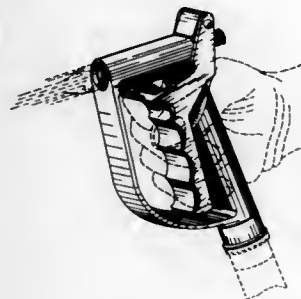
Filed Aug. 19, 1985, Ser. No. 766,561  
Term of patent 14 years

U.S. Cl. D23—225



299,158  
HOSE NOZZLE  
Larry E. Bender, 9921 Lincoln Ave., Des Moines, Iowa 50322  
Filed Nov. 28, 1986, Ser. No. 936,031

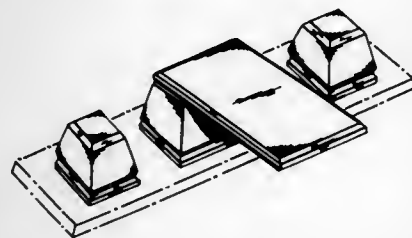
Term of patent 14 years  
U.S. Cl. D23—226



299,159  
FAUCET SET  
Gerd Arnolds, Hahnenfurth Str. 19, Düsseldorf, Fed. Rep. of  
Germany (4000)

Filed Jun. 5, 1986, Ser. No. 871,580  
Claims priority, application Fed. Rep. of Germany, Dec. 9,  
1985, MR5453

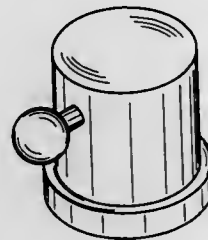
Term of patent 14 years  
U.S. Cl. D23—242



299,160  
FAUCET HANDLE  
Bethany Lathrop, Los Angeles, Calif., assignor to Aloys F.  
Dorabrecht GmbH & Co. KG, Koblingser, Fed. Rep. of Ger-  
many

Filed Jan. 28, 1986, Ser. No. 823,374  
Claims priority, application France, Jul. 29, 1985, 853654  
Term of patent 14 years

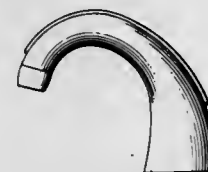
U.S. Cl. D23—252



299,161  
WATER FAUCET SPOUT  
Giorgio Frattini, San Maurizio d'Opaglio, Italy, assignor to Raf  
Rubinetterie S.p.A., San Maurizio d'Opaglio, Italy

Filed Nov. 4, 1986, Ser. No. 926,947  
Claims priority, application Italy, May 16, 1986, 21845/86[U]  
Term of patent 14 years

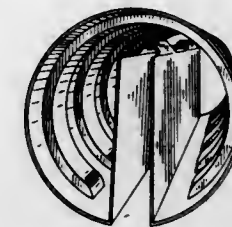
U.S. Cl. D23—255



299,162  
CORRUGATED DRAIN PIPE  
Bo Fredblad, Stockholm, Sweden, assignor to Vasby Innovation-  
sprodukter AB, Stockholm, Sweden

Filed Feb. 20, 1985, Ser. No. 703,559  
Claims priority, application Sweden, Aug. 22, 1984, 84-2258  
Term of patent 14 years

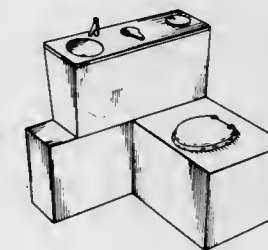
U.S. Cl. D23—266



299,163  
COMBINED TOILET AND WASH BASIN UNIT  
Michael B. Robinson, Malvern, Australia, assignor to Merlin  
Fiberglass Pty. Ltd., Australia

Filed Sep. 20, 1985, Ser. No. 778,134  
Term of patent 14 years

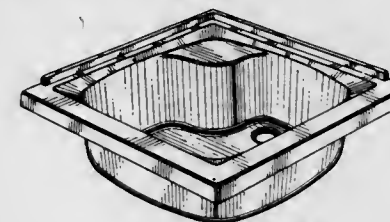
U.S. Cl. D23—274



299,164  
SHOWER STALL BASE  
John D. Burgess, Loretto, and Thomas E. Taylor, Rexdale, both  
of Canada, assignors to Acriform Engineering Inc., Newmar-  
ket, Canada

Filed Mar. 13, 1986, Ser. No. 842,881  
Claims priority, application Canada, Oct. 11, 1985, 11-10-85-8  
Term of patent 14 years

U.S. Cl. D23—283



299,165  
SHOWER ENCLOSURE  
Herbert V. Kohler, Jr., Kohler, Mary J. Reid, Sheboygan, and  
Donald W. Doman, Janesville, all of Wis., assignors to Kohler  
Co., Kohler, Wis.

Filed Jun. 23, 1986, Ser. No. 877,669  
Term of patent 14 years

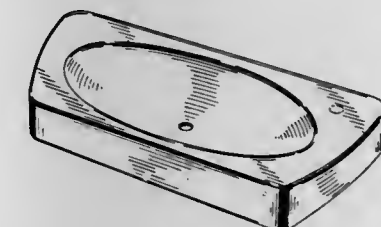
U.S. Cl. D23—283



299,166  
TANK LID LAVATORY  
Mary J. Reid, Sheboygan, Wis., assignor to Kohler Co., Kohler,  
Wis.

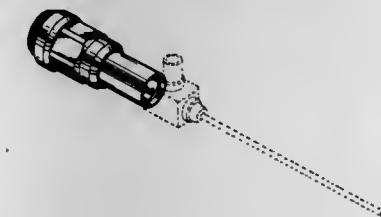
Filed Apr. 15, 1986, Ser. No. 852,509  
Term of patent 14 years

U.S. Cl. D23—294



299,167  
VIDEO ENDOSCOPE LENS COUPLER  
Edwin L. Adair, Englewood, and John Wada, Denver, both of  
Colo., assignors to Medical Dynamics, Inc., Englewood, Colo.

Filed Feb. 19, 1986, Ser. No. 834,433  
Term of patent 14 years





299,168

## PENILE CLAMP

Nils G. Bergström, Vagnhärad, and Kenneth Andersson, Kristinehamn, both of Sweden, assignors to Astra Lakemedel Aktiebolag, Södertälje, Sweden

Filed Sep. 5, 1985, Ser. No. 772,879

Claims priority, application Sweden, Mar. 22, 1985, 85-0738

Term of patent 14 years

U.S. Cl. D24—27



299,169

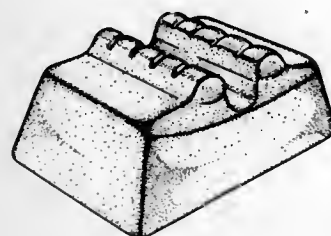
## SPINAL MASSAGER

Charles E. Hall, 2218 E. Long #B, Carson City, Nev. 89701

Filed Sep. 24, 1986, Ser. No. 911,302

Term of patent 14 years

U.S. Cl. D24—36



299,171

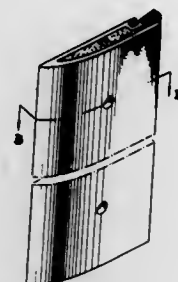
## COMBINED SMOKE GASKET AND INTUMESCENT EXPANDING SEAL DEVICE FOR SLIDING DOORS

George A. Allen, Jr., 3601 Old Gun Rd. West, Midlothian, Va. 23113

Filed Mar. 26, 1986, Ser. No. 844,063

Term of patent 14 years

U.S. Cl. D25—164



299,172

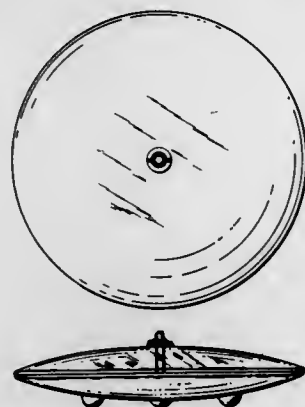
## OIL LAMP

David R. Perkins, Manchester, Mass., assignor to Glass Dimensions, Inc., Essex, Mass.

Filed Aug. 15, 1986, Ser. No. 896,829

Term of patent 14 years

U.S. Cl. D26—9



299,170

## RETAINING WALL WITH TIE-BACK ELEMENTS

H. Joe Meheen, 1860 Lincoln St., Ste. 1026, Denver, Colo. 80295

Continuation-in-part of Ser. No. 738,642, May 28, 1985. This application Feb. 25, 1986, Ser. No. 836,448

Term of patent 14 years

U.S. Cl. D25—58



299,173

## FLASHLIGHT

David H. Powell, London; David E. Maddison, Pullborough; Richard W. Seymour, Surrey, and Veronica G. Steel, London, all of England, assignors to Duracell Inc., Bethel, Conn.

Filed Sep. 27, 1985, Ser. No. 781,296

Claims priority, application United Kingdom, Apr. 2, 1985, 1,025,930

Term of patent 14 years

U.S. Cl. D26—37



299,175

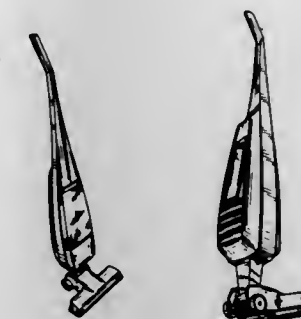
## UPRIGHT VACUUM CLEANER

Susan K. Nimon, Cuyahoga Falls; William E. Bartasovich, Kent, both of Ohio; Edgar F. Trombley, Groesbe Pointe, Mich.; Mary Arnold, Glenview, and Nancy Perkins, Chicago, both of Ill., assignors to The Scott Fetzer Company, Twinsburg, Ohio

Filed Dec. 11, 1985, Ser. No. 807,852

Term of patent 14 years

U.S. Cl. D32—22



299,176

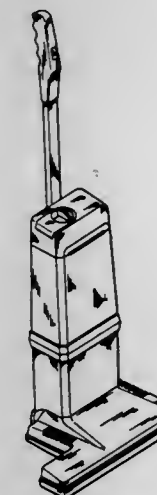
## UPRIGHT VACUUM CLEANER

Leonard E. Bowerman, Fairfield, and George Schick, Easton, both of Conn., assignors to Sara Lee Corporation, Winston-Salem, N.C.

Filed Mar. 14, 1986, Ser. No. 844,752

Term of patent 14 years

U.S. Cl. D32—22



299,174

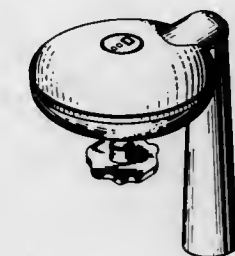
## ULTRAVIOLET LIGHT FOR FINGERNAIL TREATMENT

Richard E. Shoemaker, Milford, Conn., assignor to Conair Corporation, Edison, N.J.

Filed Jun. 12, 1986, Ser. No. 873,329

Term of patent 14 years

U.S. Cl. D28—58



299,177

## PAIR OF TRASH CAN HOLDER

Robert L. Bryan, 3125 E. 24th St., Brownsville, Tex. 78521

Filed Oct. 24, 1985, Ser. No. 791,092

Term of patent 14 years

U.S. Cl. D34—6

299,178

## VEHICLE OIL DRAINAGE RECEPTACLE

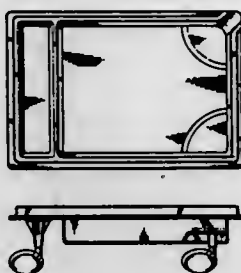
Larry E. Smith, Milwaukie, Oreg., assignor to Oil Caddy, Inc.,

Milwaukee, Oreg.

Filed Aug. 7, 1986, Ser. No. 891,483

Term of patent 14 years

U.S. Cl. D34—23



299,179

## EMBOSSED TELESCOPIC CRANE BOOM SECTION

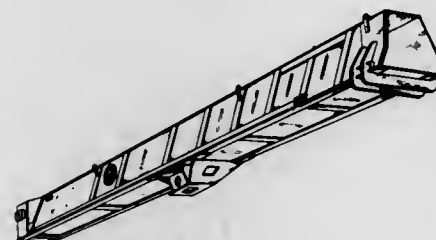
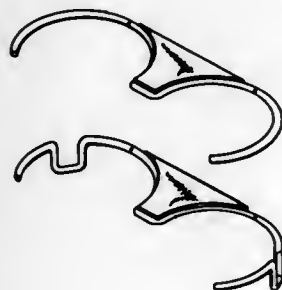
Vincent Bernabe, Jr., Newville, Pa., assignor to Kilde, Inc.,

Saddle Brook, N.J.

Filed Feb. 7, 1986, Ser. No. 826,929

Term of patent 14 years

U.S. Cl. D34—36



## LIST OF PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 27TH DAY OF DECEMBER, 1988

NOTE—Arranged in accordance with the first significant character or word of the name  
(in accordance with city and telephone directory practice).

- A. Ahlstrom Corporation: See—  
Engstrom, Folke; and Isaksson, Juhani, 4,793,292, Cl. 122-4.00D.
- A. R. Wilfley & Sons, Inc.: See—  
Duvall, John F.; Wilfley, Mike; and MacLachon, Carl R., 4,793,925, Cl. 210-512.100.
- A. Raymond: See—  
Muller, Klaus; Escher, Lothar; Mack, Gerhard; and Kramer, Ernst, 4,793,753, Cl. 411-175.000.
- AB Vastvenak Medicinteknik: See—  
Blomberg, Anders, 4,793,538, Cl. 225-93.000.
- Abbratuzzato, Salvatore R.; Walter, Richard T.; and Wheeler, Dale K., to Black & Decker Inc. Alignment system for permanent magnet motors, 4,793,054, Cl. 29-596.000.
- Abe, Hideo: See—  
Matsuoka, Saji; Satoh, Susumu; Obara, Takashi; Tsunoyama, Kozo; and Abe, Hideo, 4,793,401, Cl. 164-476.000.
- Abe, Seiko: See—  
Yoshinaga, Toru; Igashira, Toshihiko; Sakakibara, Yasuyuki; Abe, Seiko; and Natsuyama, Yukihiko, 4,793,314, Cl. 123-506.000.
- Abendroth, Georg: See—  
Tippner, Kurt; and Abendroth, Georg, 4,793,834, Cl. 55-85.000.
- ABG-Werke GmbH: See—  
Bachle, Hans-Dieter, 4,793,434, Cl. 180-243.000.
- Abildgaard, Niels: See—  
Flecken, Peter; and Abildgaard, Niels, 4,793,191, Cl. 73-861.380.
- Abrego, Elsa: See—  
MacDonald, Robert C.; and Abrego, Elsa, 4,793,443, Cl. 187-127.000.
- Abul-Halabi, Ma'mun: See—  
Lahalih, Shawqui; Abul-Halabi, Ma'mun; Al-Awadhi, Nouria; and Shuhaiber, Khamis, 4,793,741, Cl. 405-263.000.
- ABT Equipment and Manufacturing Ltd.: See—  
Robb, Richard A.; Grubb, Michael J.; Grubb, John J.; and Asanger, James T., 4,793,369, Cl. 134-170.000.
- Abukawa, Toshimi; Tahara, Kazuo; Takahashi, Noriyoshi; and Tomite, Toshio, to Hitachi, Ltd. Permanent magnet field DC machine, 4,794,291, Cl. 310-154.000.
- Accardi Enterprises, Inc.: See—  
Accardi, Vito A., 4,793,001, Cl. 2-9.000.
- Accardi, Vito A., to Accardi Enterprises, Inc. Full facial shield assembly, 4,793,001, Cl. 2-9.000.
- Acco Cable Controls Ltd.: See—  
Guidicelli, Charles, 4,793,205, Cl. 74-501.50R.
- Accurate Tool and Manufacturing, Inc.: See—  
Mangan, Steven J.; and May, James L., 4,793,540, Cl. 227-7.000.
- ACD, Inc.: See—  
Baumgart, Jürgen, 4,793,103, Cl. 51-418.000.
- Achiha, Masahiko: See—  
Sugiyama, Masato; Katsumata, Kenji; Hirahata, Shigeru; Nakagawa, Isao; Suzuki, Sunao; Achiha, Masahiko; and Ishikura, Kazuo, 4,794,454, Cl. 358-105.000.
- Ackerman, Patrice K.: See—  
Harris, Guy H.; Ackerman, Patrice K.; and Aplan, Frank F., 4,793,852, Cl. 75-2.000.
- Acksteiner, Bernard: See—  
Schulze, Paul-Eberhard; Acksteiner, Bernard; and Dusterberg, Bernd, 4,794,119, Cl. 514-170.000.
- Acquaviva, Thomas, to Xerox Corporation. Automatic dual mode sheet and web document transport for copiers, 4,794,429, Cl. 355-76.000.
- Adams, Joan M.: See—  
Schmidt, Walter L.; Wyss, Clement R.; Scarsella, Edward L.; Halligan, John F.; and Adams, Joan M., 4,794,008, Cl. 426-234.000.
- Adams, Michael J.; Robertson, Michael J.; Rodgers, Paul M.; and Ritchie, Simon, to British Telecommunications Public Limited Company. Electro-optic devices with waveguide and having small spatial spread of applied electric field, 4,793,677, Cl. 350-96.140.
- Adams, Michael J.; and Edmondson, Brian, to Lever Brothers Company. Process for stamping a detergent bar, 4,793,959, Cl. 264-320.000.
- Adams Rite Products, Inc.: See—  
Ahad, Munir J.; and Pettersson, Sven A., 4,793,643, Cl. 292-241.000.
- Adan, Manolito; Meadows, Steven; and McCaslin, Robert. Cache memory architecture for microcomputer speed-up board, 4,794,523, Cl. 364-200.000.
- Adasek, Kenneth P.; Drayer, William L.; and Yott, Edward W., to General Motors Corporation. Scheduled comfort control system with adaptive compensation for stall and overshoot, 4,794,537, Cl. 364-424.050.
- Adept Technology, Inc.: See—  
Taezner, Jon C., 4,794,286, Cl. 310-12.000.
- Advanced Cardiovascular Systems, Inc.: See—  
Mar, Craig E.; and Frisbie, Jeffrey S., 4,793,350, Cl. 128-344.000.
- Aeroquip Corporation: See—  
Lapilly, Robert A.; and Field, John C., 4,793,637, Cl. 285-39.000.
- Aerospace Corporation, The: See—  
Bavaro, Lee T. W.; and Bates, James W., 4,794,272, Cl. 307-66.000.
- Agarwal, Ram G.: See—  
Singh, Pramod K.; Agarwal, Ram G.; and Miller, Charles W., 4,793,413, Cl. 166-250.000.
- Agency of Industrial Science and Technology: See—  
Hayakawa, Kiyoshi; Yamakita, Hiroshi; Tazawa, Masato; and Taoda, Hiroshi, 4,794,130, Cl. 522-33.000.
- Agfa-Gevaert Aktiengesellschaft: See—  
Leuchter, Jürgen, 4,793,073, Cl. 34-156.000.
- AGM Cargo-Ties, Inc.: See—  
Stewart, Roger K.; and Blinn, James R., 4,793,180, Cl. 73-335.000.
- Aguilar, Jose L.: See—  
Ho, Thoi H.; Kassell, Frederick B.; Kao, Che I.; and Aguilar, Jose L., 4,794,156, Cl. 528-199.000.
- Ahad, Munir J.; and Pettersson, Sven A., to Adams Rite Products, Inc. Door closing and locking mechanism, 4,793,643, Cl. 292-241.000.
- Ahern, Timothy K.; and Cebuhar, Phillip J., to Xelo, Inc. Method and apparatus for generating data and analyzing the same to determine fluid depth in a well, 4,793,178, Cl. 73-151.000.
- Ahrens, Sandra L.: See—  
Ahrens, William C.; and Ahrens, Sandra L., 4,793,702, Cl. 351-157.000.
- Ahrens, William C.; and Ahrens, Sandra L. Eyeglass stem holder, 4,793,702, Cl. 351-157.000.
- Aiki, Kunio; Sasayama, Atsushi; Nemoto, Tugio; Kawabata, Tsuneto-shi; and Kugimiya, Haruo, to Hitachi Ltd.; and Hitachi Tobu Semiconductor, Ltd. Photo electro device, method for manufacture of same, and lens support frame for use in such photo electro device, 4,793,688, Cl. 350-252.000.
- Air Products and Chemicals, Inc.: See—  
Burgoyne, William F., Jr.; and Dixon, Dale D., 4,794,194, Cl. 560-360.000.
- Airship Industries (UK) Limited: See—  
Munk, Jeffrey R., 4,793,137, Cl. 60-390.000.
- Aisin Seiki Kabushiki Kaisha: See—  
Inagaki, Akio; Yamada, Chiaki; Ohi, Tamio; Kato, Marchito; and Hirata, Minoru, 4,793,651, Cl. 297-180.000.
- Ajiki, Yoshio: See—  
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, 4,793,296, Cl. 123-90.160.
- Akagi, Motoo: See—  
Ishihara, Heigo; Kudo, Takanori; Ohno, Tomoyuki; and Akagi, Motoo, 4,794,035, Cl. 428-219.000.
- Akatsuka, Yasuo, to NEC Corporation. Static memory including data buffer and latch circuits, 4,794,567, Cl. 365-189.000.
- Aker Engineering A/S: See—  
Hasle, Alf E.; and Sandnes, Per C., 4,793,739, Cl. 405-227.000.
- Akers, Thomas G.: See—  
Meehan, Peter F.; Reimers, Robert S.; Akers, Thomas G.; and Little, Maurice D., 4,793,927, Cl. 210-751.000.
- Akino, Shoji, to Canon Kabushiki Kaisha. Reproduction mold for forming substrate for recording medium with information signal recorded thereon, 4,793,792, Cl. 425-385.000.
- Akita, Takashi: See—  
Takabe, Fumio; Kitadate, Masashi; Sumiyoshi, Makoto; Igarashi, Kiyohiko; Suzuki, Kazuo; and Akita, Takashi, 4,794,221, Cl. 219-86.800.
- Akred, Brian J.: See—  
Haslop, William P.; Allonby, John M.; Akred, Brian J.; and Mes-senger, Edward T., 4,793,943, Cl. 252-135.000.
- Akutsu, Masanori: See—  
Ikari, Yoshiki; Akutsu, Masanori; Yamada, Wazoh; and Maeda, Hideo, 4,793,148, Cl. 62-280.000.
- Akzo America Inc.: See—  
Feaman, Gerald; Jacobs, Barry; and Williams, Barbara, 4,794,126, Cl. 521-117.000.
- Leone-Bay, Andrea; and Timony, Peter E., 4,794,189, Cl. 548-542.000.
- Al-Awadhi, Nouria: See—  
Lahalih, Shawqui; Abul-Halabi, Ma'mun; Al-Awadhi, Nouria; and Shuhaiber, Khamis, 4,793,741, Cl. 405-263.000.
- Alberts, Heinrich; Bartl, Herbert; Billinger, Otto; and Mietzsch, Fritz, to Bayer Aktiengesellschaft. Use of special ethylene-vinyl acetate-copolymers for the modification of PVC, 4,794,142, Cl. 525-196.000.
- Albrecht, Konrad: See—  
Koester, Josef; Schmid, Karl; Albrecht, Konrad; Bittner, Paul; and Keim, Fritz, 4,793,850, Cl. 71-79.000.



- Albright, Douglas J.; and Mittendorf, George H., Jr., to Woodward Governor Company. Method and apparatus for automatically indexing a Kaplan turbine. 4,794,544, Cl. 364-494.000.
- Albright & Wilson Limited: See—  
Haslop, William P.; Allonby, John M.; Akred, Brian J.; and Messenger, Edward T., 4,793,943, Cl. 252-135.000.
- Alcatel N.V.: See—  
Wild, Peter; Kometsch, Johannes; Frey, Werner U.; and Iseli, Karl, 4,793,601, Cl. 267-163.000.
- Aldridge, Clyde L.; and Bearden, Roby, Jr., to Exxon Research and Engineering Company. Coal liquefaction process. 4,793,916, Cl. 208-421.000.
- Alert-O-Brake Systems Inc.: See—  
Munro, Douglas G., 4,793,661, Cl. 303-89.000.
- Aletra, Michel: See—  
Manoury, Philippe; Binet, Jean; and Aletra, Michel, 4,794,120, Cl. 514-249.000.
- Alexander, William, to American Colloid Company. Production process for manufacturing low molecular weight water soluble acrylic polymers as drilling fluid additives. 4,794,140, Cl. 524-827.000.
- Alfatech AG: See—  
Dubach, Werner F.; and Sinnott, Kenneth M., 4,793,499, Cl. 215-230.000.
- Alfred Teves GmbH: See—  
Becker, Horst P.; and Mogwitz, Olaf, 4,793,660, Cl. 303-54.000.
- Ocvirk, Norbert; Weise, Lutz; Becker, Horst-Peter; and Determann, Otto, 4,793,663, Cl. 303-110.000.
- Allain, David C., to Intermec Corporation. Multitrack bar code and associated decoding method. 4,794,239, Cl. 235-462.000.
- Allegheny Ludlum Corporation: See—  
Dean, Douglas C., 4,793,873, Cl. 148-113.000.
- Allen, Steven P.; and Ledezius, Robert C., to Motorola, Inc. Edge sensitive level translating and referencing CMOS circuitry. 4,794,283, Cl. 307-475.000.
- Alliance Research Corporation: See—  
Shimazaki, Tetsuo, 4,794,319, Cl. 343-715.000.
- Alliant Computer Systems Corporation: See—  
Ziegler, Michael L.; Blau, Jonathan S.; and Fredieu, Robert L., 4,794,521, Cl. 364-200.000.
- Allied Automation Systems, Inc.: See—  
Kane, John P., 4,793,463, Cl. 198-403.000.
- Allied-Signal Inc.: See—  
Boienbaugh, Daniel L.; and Dow, Lawrence C., 4,793,448, Cl. 188-73.430.
- Bradt, Howard J.; and Croke, Steven B., 4,793,774, Cl. 417-203.000.
- Buzzio, Beth A.; Viera, Eugenia M.; Flaherty, Christine M.; Isaac, Arlene C.; Califano, Herbert T.; and Pierry, Joseph F., 4,793,674, Cl. 350-96.110.
- Lefrançois, Philip A.; and Pickens, Donald, 4,793,936, Cl. 210-729.000.
- Obodi, M. Reza; and Blazek, Daniel C., 4,794,048, Cl. 428-432.000.
- Stevens, William L., 4,794,267, Cl. 303-115.000.
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- Ambic Equipment Limited: See—  
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- Merkler, Walter H., Jr., 4,793,720, Cl. 384-423.000.
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- Guerout, Jean B.; Canu, Andre; Urban, Jack; and Lavedan, Alain, 4,793,038, Cl. 29-33.00M.
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- Anderson, David W. Bale wrapping machine. 4,793,124, Cl. 53-588.000.
- Anderson, Richard N.; Fraser, Donald E.; and Judkins, Ren, to Hunter Douglas, Inc. Adjustable fabric retainer for a window blind. 4,793,396, Cl. 160-84.100.
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Genovese, Frank C.; and Anderson, Robert W., 4,794,254, Cl. 250-324.000.
- Anderson, Sven E., to Baker International Corporation. Conveyor belt cradle assembly. 4,793,470, Cl. 198-823.000.
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- Ando, Morio: See—  
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- Andrews, Anthony C. Insoles for footwear. 4,793,078, Cl. 36-43.000.
- Andrews, Terence J. Anti-siphoning liquid valve filter. 4,793,338, Cl. 128-200.110.
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- Anjar Company: See—  
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- Aoya, Yoshiaki: See—  
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- Aplan, Frank F.: See—  
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- Apollo Technologies Int'l: See—  
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- Appleton Papers Inc.: See—  
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- Miller, Nicholas E., 4,794,019, Cl. 427-124.000.
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- Arachnid, Inc.: See—  
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- Arakawa, Toru: See—  
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- Asai, Kenji: See—  
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- Asama Chemical Co., Ltd.: See—  
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- Asano, Osamu: See—  
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- Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Torao, Akio; Moriya, Susumu; and Momose, Atsushi, to Kawasaki Steel Corporation. Method for detecting fingerprints using a laser and an apparatus therefor. 4,794,260, Cl. 250-458.100.
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- ASV Stubbe GmbH & Co. KG: See—  
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- AT&T Information Systems Inc.: See—  
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- AT&T Telephone and Telegraph Company, AT&T Bell Laboratories: See—  
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- Atkinson, Edward B.: See—  
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- Atlantic Richfield Company: See—  
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- Smith, Lonnie J.; and Mosher, Charles C., 4,793,435, Cl. 181-106.000.
- Auer, Siegfried, to Applied Research Corporation. Position sensor. 4,794,245, Cl. 250-203.00R.
- Auerbach, Daniel J.; Chen, Tien C.; and Paul, Wolfgang J., to International Business Machines Corporation. Method and apparatus for communicating data between a host and a plurality of parallel processors. 4,794,516, Cl. 364-200.000.
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- Aurichio, Joseph A.: See—  
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- Autopart Sweden AB: See—  
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- Azdel, Inc.: See—  
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- Azuma, Mitsuoyoshi: See—  
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- B.W.N. Vortoil Rights Co. Pty. Ltd.: See—  
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- Babcock Industries, Inc.: See—  
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- Babcock & Wilcox Company, The: See—  
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- Bachl, Robert: See—  
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- Bailey Japan Co., Ltd.: See—  
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- Baker Hughes Incorporated: See—  
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- Baker International Corporation: See—  
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- Balch, Thomas C.: See—  
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- Banas, Conrad M.; and Doyle, Brian M., to United Technologies Corporation. Method of and arrangement for laser welding. 4,794,231, Cl. 219-121.630.
- Band, Gerhard; and Muller, Bernd, to Mauser-Werke Oberndorf GmbH. Protective device for a feed unit. 4,794,212, Cl. 200-47.000.
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- Bardell, Ron L.: See—  
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- Barkman, Lars; Fors, Torbjorn; Fardig, Hakan; and Svensson, Tommy, to ASEA Aktiebolag. Seam tracking device for an industrial robot. 4,794,223, Cl. 219-124.340.
- Barlow, Robert W.; Troutman, Timmy D.; and Cooper, David A., to GTE Products Corporation. Splice cradle. 4,793,681, Cl. 350-96.200.
- Barnaby, Anthony B., to Rank Taylor Hobson Limited. Bearing structures. 4,794,289, Cl. 310-90.000.
- Barnett, Elben R. Safety helmet and adjustable light. 4,793,007, Cl. 2-422.000.
- Barnett, Peter N.: See—  
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- Bartels, Martin, to Deutsche Kablitz Gesellschaft fur Okonomie der Dampferzeugungskosten und Feuerungskontrolle Richard

- Kablitz GmbH & Co. KG. Furnace grate structure. 4,793,471, Cl. 198-774.000.
- Bartenbach, Christian, to Siemens Aktiengesellschaft. Indirect specular lamp. 4,794,501, Cl. 362-298.000.
- Bartl, Herbert: See—  
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- Pfleger, Klaus; Boettcher, Klaus; Buechner, Oskar; Kanne, Friedrich; and Kuraawe, Siegfried, 4,794,004, Cl. 526-64.000.
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- Borgudd, Slim T. Device for sensing loads, 4,793,193, Cl. 73-862.040.
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- Bratton, Kenneth L., to Emhart Industries, Inc. Heat shield for refractory tube in molten glass feeder, 4,793,849, Cl. 65-328.000.
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- Eakofot A/S: See—  
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- Evans Automotive, Division of Evans Industries, Inc.: See—  
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- F. J. Little Machine Company: See—  
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- Fabricated Metals, Inc.: See—  
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- Farrenkopf, Wolfgang; Gruenauer, Heinrich; Menzinger, Manfred; von Hirsch, Joachim; and Opitz, Reinhard, to Walter Hundhausen GmbH & Co. KG; and KUKA Schweissanlagen + Roboter GmbH. Process for welding cast iron. 4,793,542, Cl. 228-112.000.
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- Fedter, Horst; Grunwald, Werner; Koder, Manfred; Nolting, Peter; De La Prieta, Claudio; and Schmid, Kurt, to Robert Bosch GmbH. Humidity sensor, sensor material, method of manufacture and humidity sensing system, especially for automotive use. 4,793,175, Cl. 73-73.000.
- Feller, Raymond D.: See—  
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- Fenton, William G.: See—  
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- Ferag AG: See—  
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- Fernandes, Roosevelt A.; Smith-Vaniz, William R.; Burbank, John E., III; and Sieron, Richard L., to Niagara Mohawk Power Corporation. Tool for mounting a sensor module on a live power transmission line. 4,794,328, Cl. 324-127.000.
- Fernandez, David. Golf club. 4,793,616, Cl. 273-167.00H.
- Ferrante, Ronald A., to NCR Corporation. Multidirectional holographic scanner. 4,794,237, Cl. 235-457.000.
- Ferris, Timothy A.: See—  
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- Fey, Karin: See—  
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- Fiato, Rocco A.: See—  
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- Fina Technology, Inc.: See—  
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- Fink, Richard. Method for making fabric covered articles, especially belt buckles. 4,793,881, Cl. 156-212.000.
- Finkelstein, Burt; and Lehto, Mel, to Kason Industries, Inc. Table leg mounting socket. 4,793,579, Cl. 248-188.000.
- Firestone Tire & Rubber Company, The: See—  
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- Fischer & Porter Co.: See—  
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- Fitzke, Emil V.; Colacello, Michael A.; and Otto, Jack F., to RCA Licensing Corporation. Method for removing a cullet of a cathode-ray tube. 4,793,845, Cl. 65-105.000.
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- Fjerstad, Wayne H.: See—  
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- FL Industries, Inc.: See—  
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- Flachglas Aktiengesellschaft: See—  
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- Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,793,833, Cl. 55-33.000.
- Flatgaard, Jeffrey E.: See—  
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- Flecken, Peter; and Abildgaard, Niels, to Flowtec AG. Mass flow meter operating by the cariolis principle. 4,793,191, Cl. 73-861.380.
- Florian, Zoltan: See—  
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- Flotow, Richard A.: See—  
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- Fluoroware, Inc.: See—  
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- Veltman, Joost; Malik, Ram L.; and Dickens, Michael D., 4,793,832, Cl. 55-23.000.
- Fodor, Maria: See—  
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- Folson, Henry J.: See—  
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- Fonderie & Ateliers des Sablons: See—  
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- Food Industry Equipment International, Inc.: See—  
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- Foral, Michael J.: See—  
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- Ford, Donna M. Jewelry with interchangeable ornamentation. 4,793,155, Cl. 63-2.000.
- Ford, Douglas L.; and Kopp, Clinton V., to Memtec Limited. Variable volume filter or concentrator. 4,793,932, Cl. 210-636.000.
- Ford, John P.; Novack, David F.; and Casna, Nancy J., to Lifecodes Corporation. Method for locating and purifying DNA containing single base mismatches. 4,794,075, Cl. 435-6.000.
- Ford Motor Company: See—  
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- Ehrhart, Philip J.; Cartee, Gilbert A.; and Schoeneberger, Ernest A., 4,793,129, Cl. 56-370.000.
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- Forgues, Pierre M.; and Prasada, Birendra, to Northern Telecom Limited. Automatic optical inspection system. 4,794,647, Cl. 382-8.000.
- Forknall, John P.; and Neal, Hubert W. T., to SKF (U.K.) Limited. End cap assemblies for conveyor rollers. 4,793,459, Cl. 193-37.000.
- Fornili, Pamela N.: See—  
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- Forsa, Torbjorn: See—  
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- Forsythe, Phillip A.: See—  
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- Fortuna, Joseph J. Multiple remote controlled down rigger and planing board system. 4,793,088, Cl. 43-27.400.
- Fosberg, J. Roberts: See—  
Cumming, J. Stuart; and Fosberg, J. Roberts, 4,793,344, Cl. 128-305.000.
- Foster, Raymond K. Reduced size drive/frame assembly for a reciprocating floor conveyor. 4,793,469, Cl. 198-750.000.
- Foundation Constructors: See—  
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- Founda, Henry W., Jr.; and Piasio, Roger N., to VXCR, Inc. Simultaneous extraction of a ligand from a sample and capture by anti-ligands therefor in ligand/anti-ligand assays. 4,794,076, Cl. 435-7.000.
- Fowler, Clifford C.; and Goett, Edward P., to Engineered Transitions Company, Inc. Vibration resistant electrical coupling. 4,793,821, Cl. 439-321.000.
- Fox, David R.: See—  
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- Fox, John L.; and Chen, Chin H., to Eastman Kodak Company. Novel benzopyranol[6,7-b]quinolizine-11-one laser dyes. 4,794,184, Cl. 546-95.000.
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- Fraissenet, Bruno: See—  
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- Framstone: See—  
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- Francis Shaw & Co. (Manchester) Ltd.: See—  
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- Franczyk, Thad S.: See—  
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- Frank Paxton Lumber Company: See—  
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- Frankel, Alfred R. Device for opening a patient's airway during automatic intubation of the trachea. 4,793,327, Cl. 128-12.000.
- Franko, Robert J.: See—  
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- Wheeler, Edward L.; Barrows, Franklin H.; Franko, Robert J.; and Batorewicz, Wadim, 4,794,135, Cl. 524-100.000.
- Fraser, Donald E.: See—  
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- Frederiksen, Wilfred C.; and Kim, Sun Y. Nut shelling machine. 4,793,248, Cl. 99-575.000.
- Fredieu, Robert L.: See—  
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- Freeman, Frank; Amery, Michael J.; and Sharik, Clyde L., to E. R. Squibb & Sons, Inc. Adhesive structure and products including same. 4,793,337, Cl. 128-156.000.
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- Freeman, John J.: See—  
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- Freeman, Kenneth G., to U.S. Philips Corporation. Electron multiplier flat CRT display apparatus providing successive color scanning lines for each scanning line of a received color video signal. 4,794,449, Cl. 358-71.000.
- Freeman, Michael; and Nicholson, Brian, to John Waddington, PLC. Application of labels to articles. 4,793,891, Cl. 156-476.000.
- Freeman, Robert D.: See—  
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- French, Jimmy M.: See—  
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- Frerik, Karl, to VFW GmbH. Operating the control surfaces in aircraft. 4,793,576, Cl. 244-228.000.
- Fretz, Edward R., Jr., to Corning Glass Works. Laminated glass lenses. 4,793,703, Cl. 351-163.000.
- Frey, Otto; and Koch, Rudolf, to Sulzer Brothers Limited. Bone implant for fixing artificial tendons or ligaments with application and extraction means. 4,793,335, Cl. 128-92.00R.



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Fujii, Noriaki; Iwata, Takeshi; and Takahara, Naoki, to Honda Giken Kogyo Kabushiki Kaisha. Valve operating mechanism for internal combustion engine. 4,793,297, Cl. 123-90.230.  
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Fujita, Satoshi; and Edo, Hiroshi, to Asahi Denka Kogyo Kabushiki Kaisha. Process for emulsifying fat or oil into aqueous phase comprising soy sauce as the main component. 4,794,015, Cl. 426-589.000.  
Fujita, Toshihiro; Ohya, Jun; Matsuda, Kenichi; and Serizawa, Hiroyuki, to Matsushita Electric Industrial Co., Ltd. Semiconductor laser device. 4,794,608, Cl. 372-50.000.  
Fujitsu Limited: See—  
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Ohya, Tetsumasa, 4,794,595, Cl. 370-110.100.  
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Halstead, Thomas L. Emergency vehicle proximity warning system. 4,794,394, Cl. 340-902.000.  
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Han, Leon M. Machine for printing seller identification on lottery tickets. 4,793,253, Cl. 101-329.000.  
Handa, Yuichi, to Canon Kabushiki Kaisha. Element having light waveguides and method of making same. 4,793,675, Cl. 350-96.130.  
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Hart, Wendell D. Method and apparatus for precision installation of piano hammers on piano actions. 4,793,046, Cl. 29-253.000.  
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- Hegetschweiler, Hans K.: See—  
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- Pohl, Joachim; Carduck, Franz-Josef; and Goebel, Gerd, 4,794,098, Cl. 502-172.000.
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- Hibbert, David A.; and Newmark, Larry J., to General Electric Company. Fused disconnect switch with non-metallic enclosure. 4,794,211, Cl. 200-16.00F.
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- Hiesbock, Heinz G., to Karl Neumayer, Erzeugung und Vertrieb von Kabeln, Drahten isolierten Leitungen und Elektromaterial Gesellschaft mit beschränkter Haftung. Contact pin. 4,793,817, Cl. 439-82.000.
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- Higuchi, Toru: See—  
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- Higuchi, Yasushi; and Suzuki, to Ihara Chemical Industry Co., Ltd. Process for preparation of p-halogeno-monoalkylbenzenes. 4,794,201, Cl. 570-208.000.
- Hilbig, Josef: See—  
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- Hilgarth, Kurt, to SkiSchuhfabrik Dynast Gesellschaft m.b.H. Skiing boot and process for its manufacture. 4,793,076, Cl. 36-117.000.
- Hill, Ira D. Nicotine dispensing device and methods of making the same. 4,793,366, Cl. 131-273.000.
- Himeno, Takuji: See—  
Tanaka, Masato; and Himeno, Takuji, 4,794,602, Cl. 371-37.000.
- Hines, William: See—  
Long, Carl E.; Hines, William; and Gerros, Jack L., 4,793,089, Cl. 43-42.130.
- Hino, Hirofumi; Uemura, Hideki; and Kaneko, Kazuo, to Hitachi Medical Corporation. A method of operating a power supply system including inverter stage. 4,794,505, Cl. 363-17.000.
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- Hinshaw, Jerald C.; Toner, John L.; and Reynolds, George A., to Eastman Kodak Company. Fluorescent chelates. 4,794,191, Cl. 549-211.000.
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- Hiramatsu, Takeo; Tanaka, Yuichi; and Nakamura, Hisaji, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha. Control apparatus for automatic transmission gear system for vehicle. 4,793,216, Cl. 74-866.000.
- Hirano, Hiroyuki, to Asahi Kogyo Kabushiki Kaisha. Telephoto lens system. 4,793,698, Cl. 350-454.000.
- Hirano, Takashi, to Yamato Scale Company, Limited. Controlled product feeding device for combination weighing machine. 4,793,420, Cl. 177-25.000.
- Hirano, Yoshihiro: See—  
Katsuo, Nobuo; Hirano, Yoshihiro; Ozaki, Atsushi; and Baba, Masahiko, 4,794,263, Cl. 250-560.000.
- Hirata, Minoru: See—  
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- Hirmke, Werner; and Losensky, Erich, to Siemens Aktiengesellschaft. Electric motor for driving processing machines, especially refiners, and having a rotor holding device. 4,793,562, Cl. 241-101.200.
- Hirooka, Masatake: See—  
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- Hirsch, Hermann, to Hermann Hirsch Leder- und Kunststoffwarenfabrik. Single- or multilayer strap of flexible material. 4,793,030, Cl. 24-265.0WS.
- Hirschhoff, Eugene C.: See—  
Crum, Duane B.; Wesley, Ronald C.; Greenblatt, Richard E.; Toussaint, Roberts M.; and Hirschhoff, Eugene C., 4,793,355, Cl. 128-653.000.
- Hirsh, Ivan Y.: See—  
Labbe, Francis A. M.; Nowers, John R.; Wiese, Paul R.; Hirsh, Ivan Y.; and Wood, Godfrey A., 4,793,364, Cl. 131-84.300.
- Hisatomi, Ryoichi: See—  
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- Hittner, George: See—  
Harding, George W.; and Hittner, George, 4,793,100, Cl. 49-394.000.
- Hitachi Keiyo Engineering Co. Ltd.: See—  
Nishida, Azusa, 4,794,547, Cl. 364-513.000.
- Hitachi, Ltd.: See—  
Abukawa, Toshimi; Tahara, Kazuo; Takahashi, Noriyoichi; and Tomite, Toshio, 4,794,291, Cl. 310-154.000.
- Aiki, Kunio; Sasayama, Atsushi; Nemoto, Tugio; Kawabata, Tsunetoshi; and Kugimiya, Haruo, 4,793,688, Cl. 350-252.000.
- Arano, Isamu; and Kokubun, Takashi, 4,793,298, Cl. 123-146.50A.
- Asada, Akihiro; and Idei, Hideaki, 4,794,209, Cl. 178-19.000.
- Funamoto, Susumu, 4,794,047, Cl. 428-408.000.
- Hashiguchi, Yasuhiro; Katohno, Noboru; and Shibata, Yoshihiro, 4,794,477, Cl. 360-96.500.
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- Hirose, Tadashi; Nakao, Kazuo; Takeuchi, Yoichi; and Shinada, Keiko, 4,794,529, Cl. 364-300.000.
- Homma, Hideo; Misawa, Yutaka; and Momma, Naohiro, 4,794,445, Cl. 357-71.000.
- Ikeda, Hiroshi; Katakura, Kageyoshi; Ogawa, Toshio; Umemura, Shin'ichiro; and Kondo, Shinichi, 4,793,184, Cl. 73-626.000.
- Ishihara, Heigo; Kudo, Takanori; Ohno, Tomoyuki; and Akagi, Motoo, 4,794,035, Cl. 428-219.000.
- Izumida, Tatsuo; Yusa, Hideo; Funabashi, Kiyomi; Kikuchi, Makoto; and Tamata, Shin, 4,793,947, Cl. 252-628.000.
- Kano, Minoru; Takeichi, Kenzo; Makita, Minoru; Hisatomi, Ryoichi; and Takemoto, Akinobu, 4,794,312, Cl. 318-599.000.
- Kato, Akira; Yamashita, Hisao; Kawagoshi, Hiroshi; Watanabe, Noriko; and Matsuda, Shinpei, 4,793,797, Cl. 431-7.000.
- Kimura, Tomoo, 4,793,168, Cl. 72-40.000.
- Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Orimo, Masayuki; Kawano, Katsumi; Kaashima, Hirokazu; and Nakai, Kozo, 4,794,519, Cl. 364-200.000.
- Kondow, Masahiko; Minagawa, Shigekazu; and Kajimura, Takashi, 4,794,606, Cl. 372-45.000.
- Naitoh, Takashi; Namekawa, Takashi; Yamada, Seiichi; Ogihara, Satoru; and Morikawa, Juichi, 4,794,483, Cl. 360-120.000.
- Nishida, Azusa, 4,794,547, Cl. 364-513.000.
- Okabe, Akira, 4,793,132, Cl. 60-39.182.
- Sato, Kanemasu; and Ueno, Sadayasu, 4,793,176, Cl. 73-118.200.
- Shiraishi, Mikio; Gotoh, Toshihiko; Tanno, Koutarou; and Hamma, Kentaro, 4,794,404, Cl. 346-76.0PH.
- Sugawara, Yoshitaka; Kitano, Junjiro; Kimura, Tadatsuo; Inabe, Yasunobu; and Tanabe, Masa-aki, 4,794,441, Cl. 357-38.000.
- Sugiyama, Masato; Katsumata, Kenji; Hirahata, Shigeru; Nakagawa, Isao; Suzuki, Sunao; Achiha, Masahiko; and Ishikura, Kazuo, 4,794,454, Cl. 358-105.000.
- Toyama, Eiji; Sugano, Akira; and Nomura, Masahide, 4,794,512, Cl. 364-140.000.
- Yanai, Eiji; Hashimoto, Tsuguo; Takeuchi, Kiyoshi; Asao, Takashi; and Noguchi, Yoshiaki, 4,793,141, Cl. 60-657.000.
- Yukiura, Kazuo; Seto, Keniti; Watanabe, Kimio; Harimoto, Hiroshi; and Otani, Akio, 4,794,530, Cl. 364-407.000.
- Hitachi, Ltd.: See—  
Moriyama, Koichi; Yamagata, Shimbun; Okabe, Tetsuo; Yokoyama, Tetsuo; and Hamatani, Kazuhiko, 4,794,531, Cl. 364-413.130.
- Hitachi Maxell, Ltd.: See—  
Wada, Shuichi; Ohiwa, Tsunemi; Kidou, Hirokazu; Kawakami, Akira; and Manabe, Toshikatsu, 4,793,695, Cl. 350-357.000.
- Hitachi Medical Corporation: See—  
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- Hino, Hirofumi; and Hatakeyama, Takanobu, 4,794,506, Cl. 363-25.000.
- Ikeda, Hiroshi; Katakura, Kageyoshi; Ogawa, Toshio; Umemura, Shin'ichiro; and Kondo, Shinichi, 4,793,184, Cl. 73-626.000.
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- Hitachi Tobu Semiconductor, Ltd.: See—  
Aiki, Kunio; Sasayama, Atsushi; Nemoto, Tugio; Kawabata, Tsunetoshi; and Kugimiya, Haruo, 4,793,688, Cl. 350-252.000.
- Hitachi Video Engineering: See—  
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- Hitachi Video Engineering, Incorporated: See—  
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- Sugiyama, Masato; Katsumata, Kenji; Hirahata, Shigeru; Nakagawa, Isao; Suzuki, Sunao; Achiha, Masahiko; and Ishikura, Kazuo, 4,794,454, Cl. 358-105.000.
- Ho, Kam W., to Polysar Limited. Polymer composition containing CPE and styrene polymer. 4,794,143, Cl. 525-196.000.
- Ho, Thoi H.; Kassell, Frederick B.; Kao, Che I.; and Aguilar, Jose L., to Dow Chemical Company. The two stage catalytic production of high molecular weight polyhalobiphenol polycarbonates. 4,794,156, Cl. 528-199.000.
- Hoadley, Francis B. Practijumps. 4,793,288, Cl. 119-29.000.
- Hodgins, Robert G.: See—  
Yilmaz, Hamza; Owyang, King; and Hodgins, Robert G., 4,794,432, Cl. 357-23.400.
- Hodogaya Chemical Co., Ltd.: See—  
Kato, Toshiyazu; Inoue, Hiroshi; and Emura, Noriaki, 4,794,161, Cl. 528-388.000.



Hoechst Aktiengesellschaft: See—  
Koester, Josef; Schmid, Karl; Albrecht, Konrad; Bittner, Paul; and Keim, Fritz, 4,793,850, Cl. 71-79.000.  
Post, Hendrik W.; von Plessen, Helmut; and Lendle, Wilhelm, 4,794,204, Cl. 570-262.000.  
Hoechst Celanese Chemical Co.: See—  
Berg, Lloyd; and Szabados, Rudolph J., 4,793,901, Cl. 203-51.000.  
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Aalam, Mohammad; and Davenport, Kenneth G., 4,794,205, Cl. 558-257.000.  
Gillberg-LaForce, Gunilla E., 4,794,041, Cl. 428-394.000.  
Sigler, Gerald F., 4,794,082, Cl. 435-177.000.  
Soh, Suk Y., 4,793,696, Cl. 330-379.000.  
Hoechst-Roussel Pharmaceuticals, Inc.: See—  
Effland, Richard C.; and Kapples, Kevin J., 4,794,110, Cl. 514-211.000.  
Effland, Richard C.; Klein, Joseph T.; and Davis, Larry, 4,794,181, Cl. 540-594.000.  
Hoehe, Walter: See—  
Rafford, Charles R.; and Hoehe, Walter, 4,793,321, Cl. 126-43.000.  
Hoekeema, Joe H.: See—  
Wood, William R.; Reichen, Ronald L.; Hoekeema, Joe H.; and Schlueter, Francis E., 4,793,126, Cl. 56-16.600.  
Hoff, James; Walsh, Arthur L.; and Young, John S., to GTE Communication Systems Corporation. Digital voice switch for a multi-port conference circuit, 4,794,591, Cl. 370-62.000.  
Hoff, John D.: See—  
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Hoff, Robert A.; and Hoff, John D. Hangar door assembly, 4,793,398, Cl. 160-213.000.  
Hoffa, Jack L., to Eubanks Engineering Co. Wire strand stacking method, 4,793,759, Cl. 414-786.000.  
Hoffman, Henry R., Jr. Automatic bookmark and page holding device, 4,793,632, Cl. 281-42.000.  
Hoffmann, Karlheinz: See—  
Seiler, Guenter; and Hoffmann, Karlheinz, 4,793,316, Cl. 123-509.000.  
Hofmann, Helmut. Farrowing station with an electronic control, 4,793,287, Cl. 119-20.000.  
Hofmeister, Franz: See—  
Soeder, Carl J.; Kuewen, Heinrich; Zanders, Erich; and Hofmeister, Franz, 4,793,930, Cl. 210-614.000.  
Hohner, Horst. Perforation gauge for postage stamps, 4,793,070, Cl. 33-541.000.  
Hokanson, Gerard C.: See—  
Murphy, Kuchi S.; Harris, Michael R.; Hokanson, Gerard C.; Reisch, Robert G., Jr.; Waldman, Frank; and Fawzi, Mahdi B., 4,793,998, Cl. 424-440.000.  
Holland, G. Neil: See—  
Mistic, George J.; Hurst, Gregory C.; Holland, G. Neil; Patrick, John L., III; and Orlando, Paul T., 4,793,356, Cl. 128-653.000.  
Holland, Varnum S., to Unitrode Corporation. Integrated circuit under-voltage lockout, 4,794,277, Cl. 307-296.000.  
Hollis, Dennis W.: See—  
Collignon, Herbert E.; and Hollis, Dennis W., 4,793,445, Cl. 188-29.000.  
Holman, Danny F.: See—  
Kocache, Raid M. A.; and Holman, Danny F., 4,794,334, Cl. 324-204.000.  
Holmes, Billy G.; and Weber, Stevan L., to Mobil Oil Corporation. Method of recovering oil from heavy oil reservoirs, 4,793,415, Cl. 166-263.000.  
Holmes, June S. Tray for surgical patties, 4,793,483, Cl. 206-363.000.  
Holmquist, Howard W.; and Tarr, Larry E., to Boeing Company, The. Method of cleaning aluminum surfaces, 4,793,903, Cl. 204-33.000.  
Holzer, Hans W.: See—  
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Homma, Hideo; Misawa, Yutaka; and Momma, Naohiro, to Hitachi, Ltd. Semiconductor device, 4,794,445, Cl. 357-71.000.  
Honda Giken Kogyo K.K.: See—  
Kadoya, Teruichi; Ohta, Tatsuo; Nagashima, Takashi; Horiuchi, Daisuke; Okazaki, Masayuki; and Ebisui, Naoki, 4,793,923, Cl. 210-491.000.  
Honda Giken Kogyo Kabushiki Kaisha: See—  
Fuji, Noriaki; Iwata, Takeshi; and Takahara, Naoki, 4,793,297, Cl. 123-90.230.  
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Kumata, Hirotsuka, 4,793,766, Cl. 415-53.00T.  
Minami, Hidemi, 4,793,293, Cl. 123-41.700.  
Nishimura, Sadanori, 4,793,213, Cl. 74-730.000.  
Okubo, Kiyokazu, 4,793,202, Cl. 74-477.000.  
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Honda Giken Kogyo Kabushiki Kogyo: See—  
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Honeyger, Werner, to Ferag AG. Method and apparatus for forming multi-layer coils from substantially flat, flexible products, especially printed products, arriving in imbricated product formation, 4,793,566, Cl. 242-59.000.  
Honeycutt, Travis W.; and Setzer, Barry D., to Isopedix Corporation. Orthopedic cast system, 4,793,330, Cl. 128-90.000.

Honeywell Inc.: See—  
Carlson, Ernest M., 4,793,179, Cl. 73-167.000.  
Dinamore, Bruce E.; Larson, Gary O.; and Brettner, William H., 4,794,334, Cl. 333-207.000.  
Honma, Toshio: See—  
Shimizu, Katsuchi; Honma, Toshio; and Sakamaki, Hisashi, 4,794,423, Cl. 355-14.00R.  
Hoogovens Groep B.V.: See—  
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Hooper, Donald F.: See—  
Stewart, Robert E.; and Hooper, Donald F., 4,794,527, Cl. 364-200.000.  
Hooper, Michael E.: See—  
Crockett, David F.; Erpenbeck, Gerard P.; and Hooper, Michael E., 4,793,719, Cl. 384-92.000.  
Hoover Group, Inc.: See—  
Voorhies, John, Jr., 4,793,519, Cl. 220-465.000.  
Hope, Henry F.; and Hope, Stephen F. Lightweight solid state rechargeable batteries, 4,794,059, Cl. 429-192.000.  
Hope, Stephen F.: See—  
Hope, Henry F.; and Hope, Stephen F., 4,794,059, Cl. 429-192.000.  
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Beckmann, Friedrich-Karl; Hoppe, Wolfgang; Knochel, Reinhard; and Kordta, Jurgen, 4,794,249, Cl. 250-227.000.  
Horgan, William J., Jr., to Blumcraft of Pittsburgh. Method of cladding metal extrusions and product obtained therefrom, 4,793,115, Cl. 52-728.000.  
Horiba, Ltd.: See—  
Miyatake, Kimio; Imaki, Takao; and Takeda, Kenji, 4,794,255, Cl. 250-343.000.  
Horikiri, Yataro, to Wakaba Co., Ltd. Decorative plate producing method, 4,793,884, Cl. 156-247.000.  
Horio, Motohiko; Kobayashi, Naoki; and Kobayashi, Hideo, to Fuji Photo Optical Co., Ltd. Mechanism for retaining a flexible magnetic sheet in position for communication with a magnetic head, 4,794,482, Cl. 360-102.000.  
Horiuchi, Daisuke: See—  
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Horn, George W., to Middlesex General Industries, Inc. Transport system for computer integrated manufacturing/storage and drive component therefor, 4,793,262, Cl. 104-168.000.  
Horne, John M.; and Umbaugh, Daniel L., to Cooper Industries, Inc. Nut and wrench system, 4,793,223, Cl. 81-176.150.  
Hornung, Louis M., to International Business Machines Corporation. Protection of data in a multiprogramming data processing system, 4,794,515, Cl. 364-200.000.  
Hoschke, Agoston: See—  
Borosa, Laszlo; Darozi, Ivan; Hoschke, Agoston; Kurtosy, Jenő; Laszlo, Elemér; Ludwig, Laszlo; Klamar, Gabriella; and Szajani, Bela, 4,794,083, Cl. 435-180.000.  
Hosoda, Yoshinori; Tohyama, Shunroku; and Suganuma, Heiroke, to Toray Industries Incorporated. Flame-proof fiber product, 4,794,037, Cl. 428-264.000.  
Hosoi, Mitsuo: See—  
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Hostetler, Eldon, to Ziggity Systems, Inc. Mini drinker, 4,793,291, Cl. 119-81.000.  
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Houghten, Richard A.: See—  
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House Food Industrial Company Limited: See—  
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Howard, Harold L. Multiple conduit support system, 4,793,578, Cl. 248-62.000.  
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Hsu, Fu-Chieh, to Integrated Device Technology, Inc. Static ram cell with trench pull-down transistors and buried-layer ground plate, 4,794,561, Cl. 365-182.000.  
Hsu, King F., to Engelhard Corporation. Thin print etchable gold conductor composition, 4,793,946, Cl. 252-514.000.  
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Wu, Albert T.; Ko, Ping K.; Chan, Tung-Yi; and Hu, Chenming, 4,794,565, Cl. 365-185.000.  
Huang, Hsin-Teh. Combination retaining ring fitting tool, 4,793,224, Cl. 81-302.000.

Huey, A. Michael; Shirley, Arthur R., Jr.; and Forsythe, Phillip A., to Dow Chemical Company, The. Apparatus for producing pills, 4,793,783, Cl. 425-10.000.  
Huffman, Paul F.; and Bardell, Ron L., to Onan Corporation. Engine governor eddy-current damper mechanism and method, 4,793,309, Cl. 123-376.000.  
Hughes Aircraft Company: See—  
Myer, Joe H., 4,793,198, Cl. 74-110.000.  
Yang, Steve S., 4,794,343, Cl. 330-2.000.  
Hughes, Gary: See—  
Schad, Robert D.; Rees, Herbert; Hughes, Gary; and Murchie, John R., 4,793,960, Cl. 264-535.000.  
Hughes, Owen P. Hockey stick, 4,793,613, Cl. 273-67.00A.  
Hughes Tool Company - USA: See—  
Krasnov, Igor, 4,793,422, Cl. 175-57.000.  
Hultberg, Jeffrey A.; and Riedel, Richard A., to Delberg, Inc. Guide for laying glass blocks, 4,793,104, Cl. 52-121.300.  
Humidial Corporation: See—  
Stewart, Roger K.; and Blinn, James R., 4,793,180, Cl. 73-335.000.  
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Hunter Douglas, Inc.: See—  
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Hurley, Joseph D., to Westinghouse Electric Corp. Monitoring of exciter shaft torsional vibrations, 4,793,186, Cl. 73-650.000.  
Hurst, Gregory C.: See—  
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Hwang, Jae S.; and Kim, Kyung J. Door shutter for use in a refrigerator, 4,793,145, Cl. 62-252.000.  
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Hyuga, Takao; and Ueda, Kazuhiko, to Sharp Kabushiki Kaisha. Linear motor, 4,794,287, Cl. 310-13.000.  
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ICI Americas Inc.: See—  
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Igarashi, Ken-ichi: See—  
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Ihara Chemical Industry Co., Ltd.: See—  
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Ihlenfeld, Jay V.: See—  
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Ikeda Bussan Co., Ltd.: See—  
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Yamano, Eiichi; and Yamashita, Takashi, 4,793,649, Cl. 296-65.100.  
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Integrated Device Technology, Inc.: See—  
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- Bell, Alan E.; Bjorklund, Gary C.; and Schechtman, Barry H., 4,794,560, Cl. 365-122.000.
- Despax, Bernard; and Kay, Eric, 4,794,087, Cl. 430-41.000.
- Hornung, Louis M., 4,794,515, Cl. 364-200.000.
- Jones, Gardner D.; Larsen, Larry D.; and Esteban, Daniel J., 4,794,517, Cl. 364-200.000.
- Kaanta, Carter W.; and Leach, Michael A., 4,793,895, Cl. 156-627.000.
- Korth, Hans-Erdmann, 4,794,586, Cl. 369-215.000.
- Luck, Melvin R.; and Pavicic, Mark J., 4,794,389, Cl. 340-723.000.
- Picard, Jean-Louis, 4,794,594, Cl. 370-94.000.
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- International Development, Inc.: See—  
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- International Flavors & Fragrances Inc.: See—  
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- International Marine Industries, Inc.: See—  
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- International Permeation, Inc.: See—  
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- International Rectifier Corporation: See—  
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- International Standard Electric Corporation: See—  
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- Intevp, S.A.: See—  
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- Inventa Electronics Co., Ltd.: See—  
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- Inventive Products, Inc.: See—  
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- Iomega Corporation: See—  
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- Isaacman, Marvin; and Andrus, David C., to Linear Corporation. Low power transmitter frequency stabilization, 4,794,622, Cl. 375-71.000.
- Isaki, Mikio; Shibata, Masanori; and Harada, Norikazu, to Pioneer Electronic Corporation. Cassette eject mechanism for cassette deck, 4,794,476, Cl. 360-93.000.
- Isaksson, Juhani: See—  
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- Isea, Arlene C.: See—  
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- Iseli, Karl: See—  
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- Iseman, Walter J., to Sundstrand Corporation. Liquid lubricant sump level management system, 4,793,440, Cl. 184-6.230.
- Ishida, Tokuji: See—  
Mukai, Hiromu; Ishida, Tokuji; and Tokumaru, Hisashi, 4,794,416, Cl. 354-402.000.
- Ishigami, Takashi: See—  
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- Ishihara, Heigo; Kudo, Takanori; Ohno, Tomoyuki; and Akagi, Motoo, to Hitachi, Ltd. Magnetic recording medium, 4,794,035, Cl. 428-219.000.
- Ishihara, Hideo: See—  
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- Ishihara, Nobuaki; Takei, Toshihiro; Hattori, Yoshiyuki; and Okazaki, Koji, to Nippondenso Co., Ltd. Rolling piston type rotary machine with discharge passage in vane, 4,793,780, Cl. 418-65.000.
- Ishihara, Sunao: See—  
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- Ishikawa, Tadaaki, to Fuji Jukogyo Kabushiki Kaisha. Lubricating system for an internal combustion engine, 4,793,301, Cl. 123-196.00R.
- Ishikawa, Tsutomu; Nakayama, Muneco; Hashimoto, Akira; and Nishimura, Toshihiro, to Tokyo Ohka Kogyo Co., Ltd. Silica-based antimony containing film-forming composition, 4,793,862, Cl. 106-287.130.
- Ishikura, Kazuo: See—  
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- Ishimoto, Mikio: See—  
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- Ishimura, Yohzoh: See—  
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- Ishioaka, Yutaka, to Tokai Rubber Industries, Ltd. Electronically controlled mounting structure for mounting power unit on vehicle, 4,793,599, Cl. 267-140.100.
- Isoda, Chuzo: See—  
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- Isopedix Corporation: See—  
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- Israel, Howard A. Tamper resistant package and method for detecting tampering with a packaged product, 4,793,489, Cl. 206-459.000.
- Italimpianti di America Incorporated: See—  
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- Itemadani, Eiji: See—  
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- Ito, Kenichi: See—  
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- Ito, Kokichi: See—  
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- Ito, Osamu: See—  
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- Ito, Ryo: See—  
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- Ito, Takashi; Matsuzawa, Shigemitsu; and Kato, Katsuaki, to Nippon Engelhard Ltd. Platinum alloy electrocatalyst and acid-electrolyte fuel cell electrode using the same, 4,794,054, Cl. 429-44.000.
- Ito, Takeshi, to Matsushita Electronics Corporation. Magnetron with cooling fin structure, 4,794,304, Cl. 315-39.510.
- ITS-Intern Transport System A/S: See—  
Solund, Jorgen, 4,793,472, Cl. 198-774.000.
- Itzel, Hanshelmut, to Celamerc OMBH & Co. KG. Closure caps for two-component packaging systems, 4,793,475, Cl. 206-221.000.
- Iwagaya, Takashi: See—  
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- Iwahashi, Hiroshi: See—  
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- Iwai, Masahiro, to Sharp Kabushiki Kaisha. Electronic apparatus, 4,794,381, Cl. 340-700.000.
- Iwamoto, Koji: See—  
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- Iwasaki, Takao; Iizuka, Yo; Katto, Takayuki; and Shiiki, Zenya, to Kureha Kagaku Kogyo Kabushiki Kaisha. Process for producing a polyarylene sulfide of excellent handling property and a polyarylene sulfide produced by the process thereof, 4,794,164, Cl. 528-388.000.
- Iwata, Takeshi: See—  
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- Izumida, Tatsuo; Yusa, Hideo; Funabashi, Kiyomi; Kikuchi, Makoto; and Tamata, Shin, to Hitachi, Ltd. Radioactive waste treatment method, 4,793,947, Cl. 252-628.000.
- J. M. Huber Corporation: See—  
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- J. M. Voith GmbH: See—  
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- Jacco, John C.; and Loiacono, Gabriel M., to North American Philips Corporation. Process for crystal growth from solution, 4,793,894, Cl. 156-623.00R.
- Jachmann, Emil F.: See—  
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- Jackson, Charles. Cabinet structure and shelving apparatus therefor, 4,793,664, Cl. 312-306.000.
- Jackson, Robert W.: See—  
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- Jackson, Stephen B., to Xerox Corporation. Optical translator device, 4,794,384, Cl. 340-710.000.
- Jacobs, Barry: See—  
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- Jacobs Manufacturing Company, The: See—  
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- Jacobsen, Finn: See—  
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- Jamison, Mark D. Dispensing spout pre-forming system for pouch, 4,793,121, Cl. 53-410.000.
- Janetzke, Helmut: See—  
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- Janome Sewing Machine Co., Ltd.: See—  
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- Janu, George J.; Feller, Raymond D.; and Laakaniemi, Richard N., to Johnson Service Company. Environmental position actuator apparatus having load responsive limit control apparatus, 4,794,314, Cl. 318-685.000.
- Japan Exlan Company Limited: See—  
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- Japanese National Railways: See—  
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- Jasinaki, Richard A., to Becor Western Inc. Programmed automatic drill control, 4,793,421, Cl. 175-27.000.
- Jelinek, Michael: See—  
Borde, Irena; and Jelinek, Michael, 4,793,940, Cl. 252-69.000.
- Jenkins, Jerome D.; and Schultz, Neal G., to Jenkins, Jerome D. Transfer roll with ceramic-fluorocarbon coating containing cylindrical ink holes with round, beveled entrances, 4,793,041, Cl. 29-121.100.
- Jensen, James J.: See—  
Schorr, Theodore H.; and Jensen, James J., 4,794,240, Cl. 235-467.000.
- Jensen, Richard C., to Elliott Turbomachinery Co., Inc. Flexible damped bearing assembly, 4,793,722, Cl. 384-99.000.
- JEOL Ltd.: See—  
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- Jerger, Walter; and Bohm, Jergen, to Bopp & Reuther. Electromagnetic pulse receiver for a flow meter, 4,793,192, Cl. 73-861.780.
- Jessop, Thomas C.; and Piccinino, Ralph L., Jr., to Eastman Kodak Company. Dryer assembly for photographic paper, 4,793,074, Cl. 34-160.000.
- Jessop, Thomas C.; Nelson, Raymond L.; and Whitcomb, Rodney J., to Eastman Kodak Company. Apparatus and method for detecting liquid penetration by a container used for aspirating and dispensing the liquid, 4,794,085, Cl. 436-54.000.
- Jidosha Kiki Co., Ltd.: See—  
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- Kobayashi, Michio, 4,793,242, Cl. 92-168.000.
- Johansson, Mats, to Electrolux Motor Aktiebolag. Circular saw with annular saw blade, 4,793,065, Cl. 30-389.000.
- Johansson, Paul J. Method of transferring a patient and mats therefor, 4,793,008, Cl. 5-81.00R.
- Johansson, Robert; and Tingakog, Lennart, to Consilium Materials Handling Marine AB. Apparatus for unloading bulk material, 4,793,467, Cl. 198-518.000.
- John Waddington, PLC.: See—  
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- John Wyeth & Brother Limited: See—  
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- Johnson, Christopher D., to General Electric Company. Laser system with solid state fluorescent converter matrix having distributed fluorescent converter particles, 4,794,616, Cl. 372-70.000.
- Johnson, David E.: See—  
Mcenard, Michael J.; Helmsstetter, Thomas J., Sr.; and Johnson, David E., 4,793,280, Cl. 118-44.000.
- Johnson, Donald. Combined rack and carrier for surfboard, 4,793,535, Cl. 224-329.000.
- Johnson, Lloyd D.: See—  
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- Johnson Matthey, Inc.: See—  
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- Johnson, Michael M., to Rockwell International Corporation. Injected phase conjugate laser amplifier, 4,794,344, Cl. 330-4.300.
- Johnson, Roland R.; and Napier, Richard R., to Frank Paxton Lumber Company. Stable bedding method and apparatus, 4,794,022, Cl. 427-212.000.
- Johnson Service Company: See—  
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- Johnson, Walter A.; Kemp, Preston B., Jr.; and Kopatz, Nelson E., to GTE Products Corporation. Process for producing tungsten heavy alloy sheet using high temperature processing techniques, 4,793,969, Cl. 419-31.000.
- Jones, Alan R.: See—  
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- Jones, David E.; Bauck, Randall C.; and Freeman, Robert D., to Iomega Corporation. Bernoulli plate in cartridge, 4,794,480, Cl. 360-99.040.
- Jones, David S.: See—  
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- Jones, Gardner D.; Larsen, Larry D.; and Esteban, Daniel J., to International Business Machines Corporation. Three phased pipelined signal processor, 4,794,517, Cl. 364-200.000.
- Jones, Gary V.; Stein, Stuart A.; and Kaganoff, David, to General Foods Corporation. Process for the preparation of soluble coffee, 4,794,010, Cl. 426-387.000.
- Jones, Richard B.: See—  
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- Jonas, Mats; and Svensson, E. Gunnar, to Autopart Sweden AB. Vehicle sun visor with illuminated mirror, 4,794,497, Cl. 362-143.000.
- Jonsson, Gorm L., to V. Kann Rasmussen Industri A/S. Window comprising a frame with a groove for an internal panel member, 4,793,106, Cl. 52-204.000.
- Jordan, George; and Mondiadis, Dimitri G. Method of forming knife blades by photo-chemical etching, 4,793,218, Cl. 76-101.00R.
- Jordon, Robert L. Pavement slot cutter, 4,793,732, Cl. 404-90.000.
- Jost, Willi: See—  
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- Julius Maschinenbau GmbH: See—  
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- Julius, Rolf, to Julius Maschinenbau GmbH. Process for edging metal strip material and a linear guide therefor, 4,793,749, Cl. 409-132.000.
- Just, Murray K.: See—  
Groddecki, Lawrence S.; Just, Murray K.; Henry, James W.; Hantke, Glenn M.; and Lesanko, Jack A., 4,793,743, Cl. 406-123.000.
- Kaaden, Hans-Heinrich. Apparatus for the manufacture of plastic parts by injection molding or reaction injection molding, 4,793,794, Cl. 425-549.000.
- Kaaden, Hans-Heinrich. Apparatus for the manufacture of plastic parts by injection molding or reaction injection molding, 4,793,796, Cl. 425-572.000.
- Kaanta, Carter W.; and Leach, Michael A., to International Business Machines Corporation. In situ conductivity monitoring technique for chemical/mechanical planarization endpoint detection, 4,793,895, Cl. 156-627.000.
- Kabayashi, Takeo; Kondoh, Shigeru; Nishio, Eisuroh; and Kohmoto, Shinsuke, to Asahi Kogaku Kogyo Kabushiki Kaisha. Programmed shutter and apparatus for preventing foreign matter on lens from being photographed in a lens shutter type of camera, 4,794,418, Cl. 354-435.000.
- Kabushiki Kaisha Bandai: See—  
Yamanaka, Kichinosuke, 4,794,025, Cl. 428-31.000.
- Kabushiki Kaisha Daini Seikosha: See—  
Kamiya, Masaaki; and Kojima, Yoshikazu, 4,794,433, Cl. 357-23.500.
- Kabushiki Kaisha Komatsu Seisakusho: See—  
Nagahara, Yoshikazu; and Onzo, Michio, 4,793,240, Cl. 91-506.000.
- Nire, Takashi; and Watanabe, Takehito, 4,794,302, Cl. 313-509.000.
- Toriata, Shigenori; Imazumi, Hisakira; Suzuki, Toru; Matsuda, Tomoo; Hirooka, Masatake; Nishi, Yokichi; Hosoi, Mitsuo; Tsurumaki, Naoya; and Takitani, Yukioka, 4,794,634, Cl. 379-96.000.
- Kabushiki Kaisha Saginomiya Seisakusho: See—  
Hirata, Shigeru; Yajima, Hideyuki; and Takahashi, Koichi, 4,794,363, Cl. 337-314.000.
- Kabushiki Kaisha Toshiba: See—  
Kaido, Katsuhiko; and Asai, Kenji, 4,794,469, Cl. 360-46.000.
- Kato, Hideo; Iwahashi, Hiroshi; Asano, Masamichi; Narita, Akira; and Kikuchi, Shinichi, 4,794,562, Cl. 365-182.000.
- Kimura, Tokunori; and Kobayashi, Naotoshi, 4,793,358, Cl. 128-654.000.
- Maeda, Satoshi, 4,794,563, Cl. 365-182.000.
- Misano, Katsuhide; Kawaguchi, Yuji; Ogiishi, Kazuhisa; Tsunekawa, Shinichi; and Kamei, Taketo, 4,794,301, Cl. 313-490.000.
- Mizoguchi, Tetsuhiko; Inomata, Koichiro; Higuchi, Toru; and Sakai, Isao, 4,793,874, Cl. 148-103.000.
- Ogasawara, Munehiro, 4,794,340, Cl. 328-235.000.
- Sahara, Hiroshi; Toda, Haruki; and Ohshima, Shigeo, 4,794,569, Cl. 365-203.000.
- Shimotori, Kazumi; Ochi, Yoshiharu; Ishihara, Hideo; Umeki, Takenori; and Ishigami, Takashi, 4,793,854, Cl. 75-10.100.
- Takizawa, Yoshinori, 4,794,448, Cl. 358-44.000.
- Tamura, Sakae; Uehara, Tsutomu; Okuyama, Tetsuo; and Yamazaki, Mutsuki, 4,794,463, Cl. 358-296.000.
- Tanabe, Toshiyuki; and Ando, Morio, 4,794,626, Cl. 375-110.000.
- Uchida, Yukimasa, 4,794,571, Cl. 365-205.000.
- Uchino, Hiroshi; and Shimamura, Takeo, 4,794,316, Cl. 322-47.000.
- Uru, Kiyoshi; and Yamashita, Hiroaki, 4,794,639, Cl. 379-89.000.
- Kabushiki Kaisha Toyota Chuo Kenkyusho: See—  
Arai, Tohru; and Oikawa, Hatsuhiro, 4,794,044, Cl. 427-431.000.
- Kabushiki Kaisha Yamamoto: See—  
Yamamoto, Fukuzo; Aoya, Yoshiaki; and Yamamoto, Hisayoshi, 4,793,220, Cl. 76-108.00R.
- Kabushiki Kaisha Yaskawa Denki Seisakusho: See—  
Nagasaka, Nagahiko, 4,794,290, Cl. 310-90.500.
- Kadosawa, Tsuneaki: See—  
Sekiguchi, Takeshi; Kadosawa, Tsuneaki; and Kamai, Takashi, 4,794,417, Cl. 354-400.000.
- Kadoshima, Yoshio; and Niimi, Atsushi, to Honda Giken Kogyo Kabushiki Kogyo. Accessory attachment structure for a V-shaped engine, 4,793,300, Cl. 123-195.00A.
- Kadoya, Teruichi; Ohta, Tatsuo; Nagashima, Takashi; Horiuchi, Dai-suke; Okazaki, Masayuki; and Ehsui, Naoki, to Toyo Roki Seizo K.K.; and Honda Giken Kogyo K.K. Gradient density filter medium, 4,793,923, Cl. 210-491.000.
- Kaganoff, David: See—  
Jones, Gary V.; Stein, Stuart A.; and Kaganoff, David, 4,794,010, Cl. 426-387.000.
- Kagaya, Hiroshi: See—  
Ishimura, Fuminori; Kagaya, Hiroshi; Nishimura, Kazuaki; and Teramoto, Takafumi, 4,793,299, Cl. 123-195.00R.



Kageyama, Masao: See—  
Watanabe, Mitsuo; Sato, Hiromi; Kamei, Tomoko; and Kageyama, Masao, 4,794,084, Cl. 435-183.000.

Kageyama, Shunji: See—  
Kojima, Tadao; Kageyama, Shunji; Okada, Minoru; Ohata, Isao; and Sato, Noboru, 4,794,113, Cl. 514-399.000.

Kagohashi, Hiroshi: See—  
Mano, Shigeru; and Kagohashi, Hiroshi, 4,793,241, Cl. 92-5.00R.

Kaido, Katsuhiko; and Asai, Kenji, to Kabushiki Kaisha Toshiba. Recorded data reproducing apparatus, 4,794,469, Cl. 360-46.000.

Kainoh, Seio: See—  
Kinugawa, Kiyoshi; and Kainoh, Seio, 4,794,234, Cl. 235-1.00D.

Kaji, Hiatsugu; and Saitoh, Kuniyuki, to Kureha Kagaku Kogyo Kabushiki Kaisha. Carbon product comprising carbonaceous materials joined together, said carbon product for electrode substrate of fuel cells and process for production thereof, 4,794,043, Cl. 428-408.000.

Kajimura, Takashi: See—  
Kondow, Masahiko; Minagawa, Shigekazu; and Kajimura, Takashi, 4,794,606, Cl. 372-45.000.

Kakamu, Michitaka: See—  
Morisawa, Kunio; Kakamu, Michitaka; and Kato, Nobuyuki, 4,793,217, Cl. 74-866.000.

Kale, Sadasiv S. Apparatus and method for forming metal powders, 4,793,853, Cl. 75-0.50C.

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Sekiguchi, Takashi; Kadosawa, Tsuneki; and Kamai, Takashi, 4,794,417, Cl. 354-400.000.

Kamata, Shigeru: See—  
Aoyagi, Masao; Kamata, Shigeru; and Suzuki, Ryuji, 4,793,689, Cl. 350-255.000.

Kamei, Taketo: See—  
Misono, Katsuhide; Kawaguchi, Yuji; Ogishi, Kazuhisa; Tsunekawa, Shinichi; and Kamei, Taketo, 4,794,301, Cl. 313-490.000.

Kamei, Tomoko: See—  
Watanabe, Mitsuo; Sato, Hiromi; Kamei, Tomoko; and Kageyama, Masao, 4,794,084, Cl. 435-183.000.

Kamezawa, Shunroku; and Ohga, Kimio, to Hitachi Video Engineering. Improved loading device for cassette recording playback apparatus, 4,794,478, Cl. 360-96.600.

Kamio, Kunimasa: See—  
Nakamura, Hiroshi; Hata, Shigenao; Kamio, Kunimasa; and Saito, Yasuhisa, 4,794,148, Cl. 525-530.000.

Kamio, Masaru; Motoi, Taikei; and Takao, Hideaki, to Canon Kabushiki Kaisha. Color filter, 4,793,692, Cl. 350-311.000.

Kamiya, Masaaki; and Kojima, Yoshikazu, to Kabushiki Kaisha Daini Seikosa. Non-volatile semiconductor memory with non-uniform gate insulator, 4,794,433, Cl. 357-23.500.

Kamiyama, Yoshihiko; Fukuda, Misao; and Nagata, Akihiro, to Mitsubishi Belting, Limited. Apparatus for mounting power transmission belts on and removing same from pulleys, 4,793,057, Cl. 79-822.000.

Kamoi, Sumio: See—  
Enomoto, Takamichi; Ohta, Wasaburo; Uehara, Kiyohiro; Kamoi, Sumio; and Matsumoto, Fuyuhiko, 4,793,691, Cl. 350-339.00F.

Kamp, Manfred: See—  
Haas, Lothar; Hettich, Gerhard; Kamp, Manfred; Schmid, Hans-Dieter; Schruppf, Hans; and Walter, Berthold, 4,793,277, Cl. 116-34.00R.

Kamyr AB: See—  
Richter, Johan C. F. C.; Richter, Ole J.; and Jacobsen, Finn, 4,793,161, Cl. 68-181.00R.

Kanai, Munemori; Ishihara, Sunao; and Kinoshita, Hiroo, to Nippon Telegraph and Telephone Corporation. Porous static pressure guide, 4,793,201, Cl. 74-424.80R.

Kanamori, Hiroo: See—  
Yokota, Hiroshi; Kanamori, Hiroo; Tanaka, Gotaro; Suganuma, Hiroshi; and Danzuka, Toshio, 4,793,842, Cl. 65-3.110.

Kanamura, Tomotsugu: See—  
Togashi, Takahiko; Kanamura, Tomotsugu; Mori, Yoshiyuki; Sato, Yoshinori; Inoue, Yasuji; and Tsuchida, Teruhiro, 4,793,130, Cl. 57-210.000.

Kanazawa, Yuzo, to Ikeda Bussan Co., Ltd. Reclining device for automotive seat, 4,793,653, Cl. 297-355.000.

Kanda, Nobuo; Tsuboi, Kimie; Seyama, Fumio; and Kondo, Mitsuru, to Kanzaki Paper Manufacturing Co., Ltd. Heat-sensitive recording material, 4,794,101, Cl. 503-208.000.

Kane, John P., to Allied Automation Systems, Inc. Turnover device, 4,793,463, Cl. 198-403.000.

Kaneko, Kazuo: See—  
Hino, Hirofumi; Uemura, Hideki; and Kaneko, Kazuo, 4,794,505, Cl. 363-17.000.

Kanne, Friedrich: See—  
Pfleger, Klaus; Boettcher, Klaus; Buechner, Oskar; Kanne, Friedrich; and Kurasaw, Siegfried, 4,794,004, Cl. 526-64.000.

Kanno, Kenichi; Ojima, Hisami; and Okumura, Senji, to Tamura Electric Works, Ltd. Data transmission system of key telephone system, 4,794,641, Cl. 379-165.000.

Kano, Haruo: See—  
Matsumoto, Takao; and Kano, Haruo, 4,793,678, Cl. 350-96.150.

Kano, Minoru; Takeichi, Kenzo; Makita, Minoru; Hisatomi, Ryochi; and Takemoto, Akinobu, to Hitachi, Ltd. Method and apparatus for controlling a servo motor, 4,794,312, Cl. 318-599.000.

Kanzaki Paper Manufacturing Co., Ltd.: See—  
Kanda, Nobuo; Tsuboi, Kimie; Seyama, Fumio; and Kondo, Mitsuru, 4,794,101, Cl. 503-208.000.

Kao, Che I.: See—  
Ho, Thoi H.; Kassell, Frederick B.; Kao, Che I.; and Aguilar, Jose L., 4,794,156, Cl. 528-199.000.

Kao Corporation: See—  
Kawaguchi, Heihachiro; Shirai, Hidenori; and Kimura, Akio, 4,794,128, Cl. 521-138.000.

Kao Soap Co., Ltd.: See—  
Nishizawa, Kazumori; Ito, Osamu; and Miyashita, Iwao, 4,794,034, Cl. 428-218.000.

Kapples, Kevin J.: See—  
Efland, Richard C.; and Kapples, Kevin J., 4,794,110, Cl. 514-211.000.

Karasek, Francis W.; Dickson, Leslie C.; and Hutzinger, Otto, to University of Waterloo. Incineration of waste materials, 4,793,270, Cl. 110-344.000.

Karch, Rudi, to Deere & Company. Sealing arrangement for the closure of a gap, 4,793,620, Cl. 277-12.000.

Karius, Klaus D.: See—  
Krusse, Heinz J.; Fey, Karin; Karius, Klaus D.; and Schilling, Harmut, 4,793,260, Cl. 102-489.000.

Karl Neumayer, Erzeugung und Vertrieb von Kabeln, Drahten isolierten Leitungen und Elektromaterial Gesellschaft mit beschränkter Haftung: See—  
Hiesbock, Heinz G., 4,793,817, Cl. 439-82.000.

Karolinska Institutet: See—  
Tedner, Bo, 4,793,362, Cl. 128-734.000.

Kartridg Pak Co., The: See—  
Leonard, George E., 4,793,461, Cl. 198-341.000.

Kasai, Kazumi, to Yoshida Kogyo K. K. Strap fastener, 4,793,031, Cl. 24-324.000.

Kazashima, Hirokazu: See—  
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Orimo, Masayuki; Kawano, Katsumi; Kasashima, Hirokazu; and Nakai, Kozo, 4,794,519, Cl. 364-200.000.

Kashiwaya, Kunio; Haga, Hiroyo; Sacki, Nobuo; Yabuki, Youichi; Ozoe, Kuniyuki; Fukushima, Shinichi; and Tabata, Kazufumi, to Nippon Steel Corporation; and Nippon Steel Welding Products & Engineering Co., Ltd. Method for passing optical fibers through tubular products by vibrating the tubular products, 4,793,048, Cl. 29-433.000.

Kasner, William H.; Toth, Vincent A.; and Zomp, John M., to Westinghouse Electric Corp. Detector for aligning high power lasers, 4,793,715, Cl. 374-6.000.

Kason Industries, Inc.: See—  
Finkelstein, Burl; and Lehto, Mel, 4,793,579, Cl. 248-188.000.

Kasper, Gerhard; and Wen, Horng Y., to Liquid Air Corporation. Method for measurement of impurities in liquids, 4,794,086, Cl. 436-36.000.

Kassell, Frederick B.: See—  
Ho, Thoi H.; Kassell, Frederick B.; Kao, Che I.; and Aguilar, Jose L., 4,794,156, Cl. 528-199.000.

Kastendieck, William A., to Varo, Inc. Universal passive night vision system, 4,794,246, Cl. 250-213.0VT.

Katakura, Kageyoshi: See—  
Ikeda, Hiroshi; Katakura, Kageyoshi; Ogawa, Toshio; Umemura, Shin'ichiro; and Kondo, Shinichi, 4,793,184, Cl. 73-626.000.

Kataoka, Toshiya: See—  
Miyaki, Yoshiyuki; and Kataoka, Toshiya, 4,794,088, Cl. 436-161.000.

Kato, Akira; Yamashita, Hisao; Kawagoshi, Hiroshi; Watanabe, Noriko; and Matsuda, Shinpei, to Hitachi, Ltd.; and Babcock-Hitachi Kabushiki Kaisha. Method of catalytic combustion using heat-resistant catalyst, 4,793,797, Cl. 431-7.000.

Kato, Heihachi: See—  
Fujisaki, Kiyonori; Kobayashi, Toshio; and Kato, Heihachi, 4,794,293, Cl. 310-268.000.

Kato, Hideo; Iwahashi, Hiroshi; Asano, Masamichi; Narita, Akira; and Kikuchi, Shinichi, to Kabushiki Kaisha Toshiba. Electrically-erasable/programmable nonvolatile semiconductor memory device, 4,794,562, Cl. 365-182.000.

Kato, Katsuaki: See—  
Ito, Takashi; Matsuzawa, Shigemitsu; and Kato, Katsuaki, 4,794,054, Cl. 429-44.000.

Kato, Kichiro: See—  
Tabuchi, Yasuo; Nakano, Masao; Kato, Kichiro; and Kurata, Tomoyuki, 4,793,455, Cl. 192-84.00C.

Kato, Marehito: See—  
Inagaki, Akio; Yamada, Chiaki; Ohi, Tamio; Kato, Marehito; and Hirata, Minoru, 4,793,651, Cl. 297-180.000.

Kato, Nobuyuki: See—  
Morisawa, Kunio; Kakamu, Michitaka; and Kato, Nobuyuki, 4,793,217, Cl. 74-866.000.

Kato, Toshikazu; Inoue, Hiroshi; and Emura, Noriaki, to Tosoh Corporation; and Hodogaya Chemical Co., Ltd. Process for producing a polyarylene sulfide with controlled ratio of alkali metal sulfide to water, 4,794,161, Cl. 528-388.000.

Kato, Toshikazu: See—  
Inoue, Hiroshi; Kato, Toshikazu; and Emura, Noriaki, 4,794,163, Cl. 528-388.000.

Katoh, Hiroshi: See—  
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiro; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,794,118, Cl. 514-452.000.

Katoh, Masaaki: See—  
Inoue, Kazuo; Nagahiro, Kenichi; Ajiki, Yoshio; and Katoh, Masaaki, 4,793,296, Cl. 123-90.160.

Katoh, Mituo: See—  
Mizuno, Masaharu; and Katoh, Mituo, 4,793,131, Cl. 57-243.000.

Katohno, Noboru: See—  
Hashiguchi, Yasuhiro; Katohno, Noboru; and Shibata, Yoshihiro, 4,794,477, Cl. 360-96.500.

Katsumata, Kenji: See—  
Sugiyama, Masato; Katsumata, Kenji; Hirahata, Shigeru; Nakagawa, Isao; Suzuki, Sunao; Achiha, Masahiko; and Ishikura, Kazuo, 4,794,454, Cl. 358-105.000.

Katsuoka, Nobuo; Hirano, Yoshihiro; Ozaki, Atsushi; and Baba, Masahiko, to Shinetsu Handotai Kabushiki Kaisha. Apparatus for measuring crystal diameter, 4,794,263, Cl. 220-560.000.

Katsuragawa, Mitsuhiro: See—  
Shimizu, Masao; Suzuki, Nobuyuki; and Katsuragawa, Mitsuhiro, 4,794,294, Cl. 310-316.000.

Katto, Takayuki: See—  
Iwasaki, Takao; Iizuka, Yo; Katto, Takayuki; and Shiiki, Zenya, 4,794,164, Cl. 528-388.000.

Kaufmann, Jurgen: See—  
Fetzer, Gunter; Kaufmann, Jurgen; Schneider, Hans-Jurgen; and Strobbusch, Frank, 4,794,258, Cl. 250-373.000.

Kaufmann, Klaus, to Contraves AG. Apparatus for the dosing of a pulverulent solid material, 4,793,525, Cl. 222-333.000.

Kauliomaki, Seppo V.: See—  
Laamanen, Lauri A.; Sundquist, Jorma J.; Wartiovaara, Ilkka Y. P.; Kauliomaki, Seppo V.; and Poppus, Kristina J., 4,793,898, Cl. 162-76.000.

Kawabata, Tsunetoshi: See—  
Aiki, Kunio; Sasayama, Atsushi; Nemoto, Tugio; Kawabata, Tsunetoshi; and Kugimiya, Haruo, 4,793,688, Cl. 350-252.000.

Kawachi, Fumio; Nakasima, Masatada; and Komatsu, Kazuo, to Nihon Taisanbin Kogyo Kabushiki Kaisha. Apparatus for distributing gobs in bottle making machine, 4,793,847, Cl. 65-225.000.

Kawagoshi, Hiroshi: See—  
Kato, Akira; Yamashita, Hisao; Kawagoshi, Hiroshi; Watanabe, Noriko; and Matsuda, Shinpei, 4,793,797, Cl. 431-7.000.

Kawaguchi, Heihachiro; Shirai, Hidenori; and Kimura, Akio, to Kao Corporation. Porous film, 4,794,128, Cl. 521-138.000.

Kawaguchi, Yuji: See—  
Misono, Katsuhide; Kawaguchi, Yuji; Ogishi, Kazuhisa; Tsunekawa, Shinichi; and Kamei, Taketo, 4,794,301, Cl. 313-490.000.

Kawai, Kimitsoshi; Matsuyama, Akinobu; and Takao, Shoichi, to Daicel Chemical Industries, Ltd. Process for the preparation of riboflavin, 4,794,081, Cl. 435-66.000.

Kawai, Michio: See—  
Hasuo, Masayoshi; Urabe, Hiroshi; Kawai, Michio; and Ohsako, Tatsuya, 4,794,158, Cl. 528-338.000.

Kawai, Yoshihisa: See—  
Shibazaki, Kenji; Kawai, Yoshihisa; and Wada, Kanji, 4,794,419, Cl. 355-3.00R.

Kawakami, Akira: See—  
Wada, Shuichi; Ohiwa, Tsunemi; Kidou, Hirokazu; Kawakami, Akira; and Manabe, Toshikatsu, 4,793,695, Cl. 350-357.000.

Kawamata, Ichirou: See—  
Takashima, Yasuji; Tanaka, Shigeo; Tsunoda, Kenji; Kawamata, Ichirou; and Murayama, Hiroshi, 4,794,106, Cl. 514-179.000.

Takashima, Yasuji; Tanaka, Shigeo; Kawamata, Ichirou; and Murayama, Hiroshi, 4,794,107, Cl. 514-179.000.

Kawana, Shigeyuki; and Shigenaga, Yoshimi, to Casio Computer Co., Ltd. IC card system, 4,794,236, Cl. 235-441.000.

Kawano, Katsumi: See—  
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Orimo, Masayuki; Kawano, Katsumi; Kasashima, Hirokazu; and Nakai, Kozo, 4,794,519, Cl. 364-200.000.

Kawasaki Jukogyo Kabushiki Kaisha: See—  
Fujii, Hideichi; and Nakano, Kiyomori, 4,794,032, Cl. 428-209.000.

Kinouchi, Sosuke; and Yoshitake, Hideto, 4,793,773, Cl. 418-129.000.

Kawasaki, Ken-ichiro, to Pioneer Electronic Corporation. Fast mode reel servo in a magnetic recording/reproducing apparatus, 4,794,473, Cl. 360-70.000.

Kawasaki Steel Corporation: See—  
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Torao, Akio; Moriya, Susumu; and Momose, Atsushi, 4,794,260, Cl. 250-458.100.

Matsuoka, Saiji; Satoh, Susumu; Obara, Takashi; Tsunoyama, Kozo; and Abe, Hideo, 4,793,401, Cl. 164-476.000.

Kawata, Kazuhide: See—  
Suzuki, Hiroyuki; and Kawata, Kazuhide, 4,794,451, Cl. 358-96.000.

Kawata, Toshihiko; and Mizuta, Ken, to Alps Electric Co., Ltd. Load controller for automobile, 4,794,269, Cl. 307-10.00R.

Kay, Eric: See—  
Despax, Bernard; and Kay, Eric, 4,794,087, Cl. 430-41.000.

Kay-Ray, Inc.: See—  
DiMartino, John M.; and Crump, John G., Sr., 4,794,256, Cl. 250-357.100.

Kaye, Paul S., to Lewisan Products, Inc. Vibrating drain-cleaning implement, 4,793,017, Cl. 15-104.330.

Kazahaya, Masahiro, to Fischer & Porter Co. Two-wire DC signal telemetering system, 4,794,372, Cl. 340-870.160.

Kazama, Yasuo: See—  
Takeuchi, Hirosato; Miyazaki, Osahiko; Kazama, Yasuo; and Kurihara, Naoya, 4,793,751, Cl. 411-13.000.

Kazda, Stanislav: See—  
Posanski, Ulrich; Gross, Rainer; Kazda, Stanislav; Schluter, Gerhard; and Schramm, Matthias, 4,794,111, Cl. 514-236.200.

Kazior, Thomas E.: See—  
Tong, Elsa K.; and Kazior, Thomas E., 4,794,093, Cl. 437-203.000.

Keck, Erich, to Siemens Aktiengesellschaft. Transmission device for control panels in communications terminal equipment, 4,793,673, Cl. 350-96.100.

Keck, Hermann W. Apparatus for joining hoses with connecting pieces, 4,793,636, Cl. 285-12.000.

Keim, Fritz: See—  
Koester, Josef; Schmid, Karl; Albrecht, Konrad; Bittner, Paul; and Keim, Fritz, 4,793,850, Cl. 71-79.000.

Keller, James W. Figure eight wing drive, 4,793,573, Cl. 244-11.000.

Kelley, Clarence E.: See—  
Bitzer, David L.; Stifle, John E.; Walker, Michael W.; Kelley, Clarence E.; Paakey, Donald D.; and Lee, Donald A., 4,793,813, Cl. 434-335.000.

Kemira Company of Finland: See—  
Wenxing, Lu, 4,793,979, Cl. 423-167.000.

Kemmerer, Guenther; and Wolf, Hans, to Leybold-Heraeus GmbH. Apparatus for the production of coatings with a uniform thickness profile by cathode sputtering, 4,793,911, Cl. 204-298.000.

Kemp, Preston B., Jr.: See—  
Johnson, Walter A.; Kemp, Preston B., Jr.; and Kopatz, Nelson E., 4,793,969, Cl. 419-31.000.

Kendall Company, The: See—  
Kolstedt, Mark; and Dye, John F., 4,793,328, Cl. 128-24.00R.

Kennedy, Ann R.; Troll, Walter; and Yavelow, Jonathan, to Kennedy, Ann R. Method of making soybean extract inhibitor, 4,793,996, Cl. 424-195.100.

Kennedy, James K.: See—  
Burton, Peter G.; and Kennedy, James K., 4,794,632, Cl. 379-22.000.

Kennedy, John A., Jr., to Dr.-Ing. Rudolf Hell GmbH. Circuit for modulating a scanning beam in a text and graphics image setting apparatus, 4,794,405, Cl. 366-108.000.

Kennewell, Peter D.: See—  
Clements-Jewery, Stephen; Kennewell, Peter D.; and Westwood, Robert, 4,794,122, Cl. 514-367.000.

Kenox Corporation: See—  
McCorquodale, Robert P., 4,793,919, Cl. 210-177.000.

Kern & Company Ltd.: See—  
Scholian, Thomas, 4,794,251, Cl. 250-231.0SE.

Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung: See—  
Coenen, Heinrich H.; Hamacher, Kurt; Schüller, Manfred; Stocklin, Gerhard; Klatte, Bernd; and Knochel, Arndt, 4,794,178, Cl. 536-122.000.

Soeder, Carl J.; Keusen, Heinrich; Zanders, Erich; and Hofmeister, Franz, 4,793,930, Cl. 210-614.000.

Kernforschungszentrum Karlsruhe GmbH: See—  
Dirks, Friedrich; and Hempelmann, Wilhelm, 4,793,831, Cl. 55-20.000.

Wieczorek, Herbert, 4,793,983, Cl. 423-291.000.

Kettenacker, Gunter: See—  
Brauninger, Jurgen; Duhlmeier, Wolfgang; Kettenacker, Gunter; Schafer, Volker; Sieber, Albrecht; and Wietelmann, Jurgen, 4,793,308, Cl. 123-359.000.

Keusen, Heinrich: See—  
Soeder, Carl J.; Keusen, Heinrich; Zanders, Erich; and Hofmeister, Franz, 4,793,930, Cl. 210-614.000.

Kewpie Kabushiki Kaisha: See—  
Igarashi, Shiro; Matsubara, Mamoru; and Tanaka, Shiro, 4,793,072, Cl. 34-9.000.

Key Technology, Inc.: See—  
Davis, Walter L.; and Thomas, Joseph C., 4,793,196, Cl. 74-61.000.

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Pence, Ernest W., 4,793,156, Cl. 63-26.000.

Kickuth, Reinhold W.; and Konemann, Norbert. Method for the purification of sewage waters, 4,793,929, Cl. 210-602.000.

Kidou, Hirokazu: See—  
Wada, Shuichi; Ohiwa, Tsunemi; Kidou, Hirokazu; Kawakami, Akira; and Manabe, Toshikatsu, 4,793,695, Cl. 350-357.000.

Kikuchi, Makoto: See—  
Izumida, Tatsuo; Yusa, Hideo; Funabashi, Kiyomi; Kikuchi, Makoto; and Tamata, Shin, 4,793,947, Cl. 252-628.000.

Kikuchi, Shinichi: See—  
Kato, Hideo; Iwahashi, Hiroshi; Asano, Masamichi; Narita, Akira; and Kikuchi, Shinichi, 4,794,562, Cl. 365-182.000.

Kikuchi, Toshio, to NEC Corporation. High-reliability computer system, 4,794,601, Cl. 371-36.000.

Kim, Kyung J.: See—  
Hwang, Jae S.; and Kim, Kyung J., 4,793,145, Cl. 62-252.000.

Kim, Sun Y.: See—  
Frederiksen, Wilfred C.; and Kim, Sun Y., 4,793,248, Cl. 99-575.000.

Kimberly-Clark Corporation: See—  
Serbiak, Paul J.; Greenman, Edwin G.; and Shanklin, Gary L., 4,793,941, Cl. 252-91.000.

Kimbrough, Andrew G.; and Ferris, Timothy A., to Kinetic Energy Corporation. Control for gas metal arc welding system, 4,794,232, Cl. 219-130.510.

Kimura, Akio: See—  
Kawaguchi, Heihachiro; Shirai, Hidenori; and Kimura, Akio, 4,794,128, Cl. 521-138.000.



Kimura, Fumio, to CSK Corporation. Method and apparatus for detecting focussing position deviation of read/write apparatus in an optical recording medium. 4,794,244, Cl. 250-201.00R.

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Kimura, Shinichi, to Sharp Kabushiki Kaisha. Vacuum coffee maker. 4,793,245, Cl. 99-292.000.

Kimura, Tadakatsu, See—  
Sugawara, Yoshitaka; Kitano, Junjiro; Kimura, Tadakatsu; Inabe, Yasunobu; and Tanabe, Masa-aki, 4,794,441, Cl. 357-38.000.

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Kimura, Tomoaki, to Hitachi, Ltd. Method of and apparatus for effecting a thickness-reduction rolling of a hot thin plate material. 4,793,168, Cl. 72-40.000.

Kinetic Energy Corporation, See—  
Kimbrong, Andrew G.; and Ferris, Timothy A., 4,794,232, Cl. 219-130.510.

King, Alan M., to Vendring International Ltee. Ventilation device for food dispensing machine. 4,793,244, Cl. 99-285.000.

King, L. Tony, to Komax Systems, Inc. Rotary mixer. 4,793,713, Cl. 366-150.000.

King, Ronald R., to Wright Line Inc. Storing and dispensing system. 4,793,665, Cl. 312-17.000.

Kinoshita, Hiroo, See—  
Kanal, Munenori; Ishihara, Sunao; and Kinoshita, Hiroo, 4,793,201, Cl. 74-24.80R.

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Kinugawa, Kiyoshi, and Kainoh, Seio, to Sharp Kabushiki Kaisha. Electronic apparatus. 4,794,234, Cl. 235-1.00D.

Kioritz Corporation, See—  
Nagashima, Akira, 4,793,064, Cl. 30-382.000.

Kipman, Yair, See—  
Summan, Michael; and Kipman, Yair, 4,793,812, Cl. 434-116.000.

Kirsch, Axel. Enamel implant. 4,793,808, Cl. 433-173.000.

Kishimoto Sangyo Co., Ltd., See—  
Niwa, Isao; and Ishimoto, Mikio, 4,793,516, Cl. 222-143.000.

Kishimoto, Shoji; Sendai, Michiyuki; and Ochiai, Michihiko, to Takeda Chemical Industries, Ltd. 1-carboxymethoxy acetidinones and their production. 4,794,108, Cl. 514-210.000.

Kishitaka, Yuriko, See—  
Shimada, Keiichi; Kishitaka, Yuriko; Miura, Toru; Iwamoto, Koji; Ito, Kenichi; Ito, Ryo; and Matsuno, Katsumi, 4,794,471, Cl. 360-69.000.

Kitadate, Masashi, See—  
Takabe, Fumio; Kitadate, Masashi; Sumiyoshi, Makoto; Igarashi, Kiyohiko; Suzuki, Kazuo; and Akita, Takashi, 4,794,221, Cl. 219-86.800.

Kitajima, Nobuaki, See—  
Takagi, Kazutoshi; and Kitajima, Nobuaki, 4,793,700, Cl. 350-507.000.

Kitamura, Hideaki; and Yamada, Mitsuhiko, to Dainippon Screen Mfg. Co., Ltd. Method and system for patching an original at a desired angular orientation on a scanner input drum or an original patching sheet and extracting original trimming data. 4,794,462, Cl. 358-289.000.

Kitano, Junjiro, See—  
Sugawara, Yoshitaka; Kitano, Junjiro; Kimura, Tadakatsu; Inabe, Yasunobu; and Tanabe, Masa-aki, 4,794,441, Cl. 357-38.000.

Kiya, Nobuyuki; and Yoshino, Motoaki, to Fanuc Ltd. Numerical control system. 4,794,311, Cl. 318-569.000.

Kiya, Nobuyuki, to Fanuc Ltd. Numerical control method. 4,794,541, Cl. 364-474.010.

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Borosa, Laszlo; Darosi, Ivan; Hoschke, Agoston; Kurtosy, Jeno; Laszlo, Elemér; Ludwig, Laszlo; Klamar, Gabriella; and Szajani, Bela, 4,794,083, Cl. 435-180.000.

Klatte, Bernd, See—  
Coenen, Heinrich H.; Hamacher, Kurt; Schuller, Manfred; Stocklin, Gerhard; Klatte, Bernd; and Knochel, Arndt, 4,794,178, Cl. 536-122.000.

Klaus, David W., See—  
Oakas, Martin C.; and Klaus, David W., 4,794,362, Cl. 337-158.000.

Kleber, E. Bruce, to Western Printing Machinery Company. Multifunctional web rotary module. 4,793,229, Cl. 83-344.000.

Klein, Hans-Hermann; and Szocs, Zoltan, to Leybold-Heraeus GmbH. Method and circuit for measuring and displaying physical values. 4,794,330, Cl. 324-132.000.

Klein, Horst, to Blendax-Werke R. Schnieder. Handle for a mouth wash device. 4,793,332, Cl. 128-66.000.

Klein, Joseph T., See—  
Effland, Richard C.; Klein, Joseph T.; and Davis, Larry, 4,794,181, Cl. 540-594.000.

Kleiner, Wayne E., See—  
Cozzena, Brian E.; Evans, William R.; and Kleiner, Wayne E., 4,793,822, Cl. 439-397.000.

Cozzena, Brian E.; Evans, William R.; and Kleiner, Wayne E., 4,793,823, Cl. 439-409.000.

Cozzena, Brian E.; Evans, William R.; and Kleiner, Wayne E., 4,793,824, Cl. 439-395.000.

Klop, Elmer P., See—  
LeBlanc, Leo J.; and Klop, Elmer P., 4,793,387, Cl. 141-86.000.

Knifton, John F., See—  
Lin, Jiang-Jen; and Knifton, John F., 4,794,199, Cl. 564-467.000.

Knobel, Thomas M.; and Walker, Mary A., to Dow Chemical Company. The Oxynitrate additive for polyurethane foams. 4,794,127, Cl. 521-123.000.

Knochel, Arndt, See—  
Coenen, Heinrich H.; Hamacher, Kurt; Schuller, Manfred; Stocklin, Gerhard; Klatte, Bernd; and Knochel, Arndt, 4,794,178, Cl. 536-122.000.

Knochel, Reinhard, See—  
Beckmann, Friedrich-Karl; Hoppe, Wolfgang; Knochel, Reinhard; and Kordts, Jürgen, 4,794,249, Cl. 250-227.000.

Knol, Beth C., to Shell Western E&P Inc. Process for treating drilled cuttings. 4,793,423, Cl. 175-66.000.

Ko, Ping K., See—  
Wu, Albert T.; Ko, Ping K.; Chan, Tung-Yi; and Hu, Chenming, 4,794,565, Cl. 365-185.000.

Kobashi, Tohiyuki; Naka, Hideo; and Takagi, Shoyo, to Japan Exlan Company Limited. Bead-like polymer and production thereof. 4,794,152, Cl. 526-273.000.

Kobayashi, Hideo, See—  
Horio, Motohiko; Kobayashi, Naoki; and Kobayashi, Hideo, 4,794,482, Cl. 360-102.000.

Kobayashi, Masanari, See—  
Sakai, Jun; Sakakibara, Kenji; and Kobayashi, Masanari, 4,794,425, Cl. 355-27.000.

Kobayashi, Michio, to Jidosha Kiki Co., Ltd. Brake Booster with a seal and guide unit. 4,793,242, Cl. 92-168.000.

Kobayashi, Naoki, See—  
Horio, Motohiko; Kobayashi, Naoki; and Kobayashi, Hideo, 4,794,482, Cl. 360-102.000.

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Kimura, Tokunori; and Kobayashi, Naotoshi, 4,793,358, Cl. 128-654.000.

Kobayashi, Tatsuji, to JEOL Ltd. Ion source for mass spectrometer. 4,794,253, Cl. 250-288.000.

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Fujisaki, Kiyonori; Kobayashi, Toshio; and Kato, Heihachi, 4,794,293, Cl. 310-268.000.

Kobus, Paul, Jr.; and Rovin, George H., to C-Guard Laboratories, Inc. Interface system for computer port sharing of multiple devices. 4,794,520, Cl. 364-200.000.

Kocache, Raid M. A.; and Holman, Danny F., to Servomex, Ltd. Paramagnetic gas measuring apparatus. 4,794,334, Cl. 324-204.000.

Koch, Otto, See—  
Lindner, Christian; Roth, Edwin; Koch, Otto; Bräse, Hans-Eberhard; and Bamelis, Pol, 4,794,167, Cl. 528-501.000.

Koch, Rudolf, See—  
Frey, Otto; and Koch, Rudolf, 4,793,335, Cl. 128-92.00R.

Kochs Adler Aktiengesellschaft, See—  
Scholl, Hans; and Schulze, Wolfram, 4,793,272, Cl. 112-121.150.

Kodama, Hidetoshi, See—  
Yasuo, Tadashi; and Kodama, Hidetoshi, 4,793,606, Cl. 271-157.000.

Kodama, Kazumasa, See—  
Eto, Kunihiko; Mori, Yutaka; and Kodama, Kazumasa, 4,793,431, Cl. 180-142.000.

Koder, Manfred, See—  
Fiedler, Horst; Grunwald, Werner; Koder, Manfred; Nolting, Peter; De La Prieta, Claudio; and Schmid, Kurt, 4,793,175, Cl. 73-73.000.

Koel, Gerrit J., See—  
Pluijms, Rene A. M.; van der Ree, Pieter; Koel, Gerrit J.; and Peelen, Jan G. J., 4,793,843, Cl. 65-3.120.

Koester, Josef; Schmid, Karl; Albrecht, Konrad; Bittner, Paul; and Keim, Fritz, to Henkel Kommanditgesellschaft auf Aktien; and Hoechst Aktiengesellschaft. Evaporation inhibitor compositions. 4,793,850, Cl. 71-79.000.

Koga, Keiji, See—  
Kubota, Yuichi; Koga, Keiji; Tamazaki, Kazunori; Aoyama, Tsutomu; and Watanabe, Akio, 4,794,042, Cl. 428-328.000.

Koguchi, Minoru, See—  
Ohnishi, Yutaka; Yoshinaka, Shinji; Tanaka, Tohiyuki; Koguchi, Minoru; Obitsu, Takeo; Koguchi, Minoru; and Obitsu, Takeo, 4,794,069, Cl. 430-338.000.

Ohnishi, Yutaka; Yoshinaka, Shinji; Tanaka, Tohiyuki; Koguchi, Minoru; Obitsu, Takeo; Koguchi, Minoru; and Obitsu, Takeo, 4,794,069, Cl. 430-338.000.

Kohlenberger, Charles W., See—  
Scott, Gene; Kohlenberger, Charles W.; and Warren, David M., 4,793,908, Cl. 204-192.260.

Kohmoto, Shinsuke, See—  
Kabayashi, Takeo; Kondoh, Shigeru; Nishio, Etsuroh; and Kohmoto, Shinsuke, 4,794,418, Cl. 354-435.000.

Koike, Mikio, See—  
Hara, Kazumasa; Sasano, Akiyoshi; and Koike, Mikio, 4,793,273, Cl. 112-254.000.

Koike, Yukio, to NEC Corporation. Flash A/D Converter. 4,794,374, Cl. 341-120.000.

Koito Seisakusho Co. Ltd., See—  
Fuke, Akira, 4,794,612, Cl. 372-56.000.

Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Orimo, Masayuki; Kawano, Katsumi; Kasahima, Hirokazu; and Nakai, Kozo, to Hitachi, Ltd. Method and system for editing distributed files in a data transmission system. 4,794,519, Cl. 364-200.000.

Kojima, Hiroshi, to Bridgestone Corporation. Vibration isolating apparatus. 4,793,600, Cl. 267-140.100.

Kojima, Tadeo; Kageyama, Shunji; Okada, Minoru; Ohata, Isao; and Sato, Noboru, to Yamanouchi Pharmaceutical Co., Ltd. Imidazolyl phenoxy compounds and method of use. 4,794,113, Cl. 514-399.000.

Kojima, Toru, See—  
Ooba, Kunio; and Kojima, Toru, 4,794,597, Cl. 371-3.000.

Kojima, Yoshikazu, See—  
Kamiya, Masaaki; and Kojima, Yoshikazu, 4,794,433, Cl. 357-23.500.

Kojima, Yuichi; and Chiba, Yoshiyuki, to Sony Corporation. Waveform shaping circuit. 4,794,555, Cl. 364-724.010.

Kokubun, Takashi, See—  
Arano, Isamu; and Kokubun, Takashi, 4,793,298, Cl. 123-146.50A.

Kokuryo, Hiroshi, to Hata Iron Works, Ltd. Rotary powder compression molding apparatus. 4,793,791, Cl. 425-345.000.

Kolk, Erich, See—  
Mueller-Mall, Rudolf; Funk, Guido; Bachl, Robert; Hennenberger, Peter; and Kolk, Erich, 4,794,151, Cl. 526-64.000.

Kolstedt, Mark; and Dye, John F., to Kendall Company, The. Method of producing pressure for a multi-chambered sleeve. 4,793,328, Cl. 128-24.00R.

Komatsu, Kazuo, See—  
Kawachi, Fumio; Nakasima, Masataka; and Komatsu, Kazuo, 4,793,847, Cl. 65-225.000.

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Tagaya, Nobuaki; Kuwahara, Hideyuki; Hashimoto, Takao; Komatsu, Noriko; Fukamachi, Keiko; and Maeshima, Taugio, 4,794,171, Cl. 530-417.000.

Komax Systems, Inc., See—  
King, L. Tony, 4,793,713, Cl. 366-150.000.

Komet Stahlhalter-und Werkzeugfabrik Robert Breuning GmbH, See—  
Eckle, Otto, 4,793,750, Cl. 409-231.000.

Komori, Shigeki, See—  
Nogiwa, Motomi; Yoshida, Shuichi; Komori, Shigeki; Yoshikawa, Toshitsune; and Koutsuka, Toshio, 4,793,956, Cl. 264-41.000.

Komurasaki, Satoshi, to Mitsubishi Denki Kabushiki Kaisha. Electronic ignition control apparatus including knocking control. 4,793,310, Cl. 123-425.000.

Konai, Yutaka, See—  
Hayashi, Shoichiro; Matsuda, Toshiharu; Sasakawa, Atsushi; and Konai, Yutaka, 4,794,195, Cl. 562-414.000.

Kondo, Hiroshi, See—  
Ohe, Junzo; and Kondo, Hiroshi, 4,794,397, Cl. 343-712.000.

Kondo, Mitsuru, See—  
Kanda, Nobuo; Tsuboi, Kimie; Seyama, Fumio; and Kondo, Mitsuru, 4,794,101, Cl. 503-208.000.

Kondo, Shinichi, See—  
Ikeda, Hiroshi; Katakura, Kageyoshi; Ogawa, Toshio; Umemura, Shin'ichiro; and Kondo, Shinichi, 4,793,184, Cl. 73-626.000.

Kondo, Tetsuro, See—  
Hayashida, Tsutomu; Shibamoto, Yutaka; Yamada, Tomiharu; and Kondo, Tetsuro, 4,793,839, Cl. 55-385.300.

Kondoh, Shigeru, See—  
Kabayashi, Takeo; Kondoh, Shigeru; Nishio, Etsuroh; and Kohmoto, Shinsuke, 4,794,418, Cl. 354-435.000.

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Konemann, Norbert, See—  
Kickuth, Reinhold W.; and Konemann, Norbert, 4,793,929, Cl. 210-602.000.

Kong, Alan, to Nifco, Inc. Piston-cylinder type oil damper. 4,793,452, Cl. 188-317.000.

Konig, Gerhard; and Tachunko, Jan, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Guiding link bearing system for a wheel suspension of a motor vehicle. 4,793,629, Cl. 280-688.000.

Koning, Menno G., to Northrop Corporation. Vibrating cylinder gyro-scope and method. 4,793,195, Cl. 74-5.60D.

Konishiroku Photo Industry Co., Ltd., See—  
Yamazaki, Toshinori; Nakanishi, Tatsuo; and Nomori, Hiroyuki, 4,794,064, Cl. 430-58.000.

Konishiroku Photo Industry Co., Ltd., See—  
Haneda, Satoshi, 4,794,063, Cl. 430-42.000.

Kono, Yoshihisa, See—  
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Torao, Akio; Moriya, Susumu; and Momose, Atsushi, 4,794,260, Cl. 250-458.100.

Konopka, April A.; and Livingston, John H., to Pacesetter Infusion, Ltd. Protective bag for water-sensitive medical or electronic apparatus. 4,793,486, Cl. 206-438.000.

Koolajutato Vallat, See—  
Gyory, Gyula; and Florian, Zoltan, 4,793,383, Cl. 138-114.000.

Kopatz, Nelson E., See—  
Johnson, Walter A.; Kemp, Preston B., Jr.; and Kopatz, Nelson E., 4,793,969, Cl. 419-31.000.

Kopp, Clinton V., See—  
Ford, Douglas L.; and Kopp, Clinton V., 4,793,932, Cl. 210-636.000.

Kordomenos, Panagiotis I., See—  
Dervan, Andrew H.; Grebur, Dennis J.; and Kordomenos, Panagiotis I., 4,794,149, Cl. 525-450.000.

Kordts, Jürgen, to U.S. Philips Corp. Circuit arrangement for the compensation of temperature-dependent and temperature-independent drift and for the compensation of the sensitivity of a capacitive sensor. 4,793,187, Cl. 73-708.000.

Kordts, Jürgen, See—  
Beckmann, Friedrich-Karl; Hoppe, Wolfgang; Knochel, Reinhard; and Kordts, Jürgen, 4,794,249, Cl. 250-227.000.

Korf Engineering GmbH, See—  
Vuletic, Bogdan, 4,793,857, Cl. 75-34.000.

Korth, Hans-Erdmann, to International Business Machines Corporation. Rotary access arm for optical disks. 4,794,586, Cl. 369-215.000.

Kosa, Bruce G., See—  
Zifcak, Mark S.; and Kosa, Bruce G., 4,793,814, Cl. 439-66.000.

Koseki, Ryoji, to Amanda Engineering & Service Co., Inc. Power source for an axial-flow CO<sub>2</sub> laser tube. 4,794,603, Cl. 372-38.000.

Kosmen, Stephen P., See—  
Gnuetzel, Herman C.; and Kosmen, Stephen P., 4,794,453, Cl. 358-101.000.

Kosowsky, Lester H., See—  
Raber, Peter E.; and Kosowsky, Lester H., 4,794,398, Cl. 343-734.000.

Kostecki, Michael, to Perkin-Elmer-Metco GmbH. Gas mixer. 4,793,712, Cl. 366-349.000.

Kosugi, Ken-ichi; Asahara, Yuuji; and Watanabe, Kazumi, to Anritsu Electric Company Limited. Automatic loading horizontal type open-reel magnetic tape drive unit with tape detection. 4,794,475, Cl. 360-90.000.

Koutsuka, Toshio, See—  
Nogiwa, Motomi; Yoshida, Shuichi; Komori, Shigeki; Yoshikawa, Toshitsune; and Koutsuka, Toshio, 4,793,956, Cl. 264-41.000.

Kovacs, Daniel B., See—  
Lochow, Charles F.; and Kovacs, Daniel B., 4,793,827, Cl. 44-65.000.

Kovacs, Ferenc, See—  
Caillag, Zsolt; Bulka, Dnes; Farkas, Ferenc; Kovacs, Ferenc; Marton, Gabor; and Fodor, Maria, 4,793,706, Cl. 356-335.000.

Kovacs, Richard F., See—  
Ammann, Hans H.; and Kovacs, Richard F., 4,793,052, Cl. 29-559.000.

Kozina, Daniel P.; and Pagel, Kenneth P. Universal camera actuator bracket. 4,794,414, Cl. 354-269.000.

Kraftwerk Union Aktiengesellschaft, See—  
Schabert, Hans-Peter; Heller, Max; and Zach, Klaus, 4,793,779, Cl. 418-60.000.

Kramer, Ernst, See—  
Muller, Klaus; Escher, Lothar; Mack, Gerhard; and Kramer, Ernst, 4,793,733, Cl. 411-175.000.

Kramptz, Mark S., See—  
Hart, James E.; Mong, William K.; Kyllonen, Allen W.; and Kramptz, Mark S., 4,793,446, Cl. 188-51.000.

Kranz, Walter, to Messerschmitt-Bolkow-Blohm GmbH. Missile with aerodynamic control. 4,793,571, Cl. 244-3.100.

Krasnov, Igor, to Hughes Tool Company - USA. Articulated elevator links for top drive drill rig. 4,793,422, Cl. 175-57.000.

Kraus, Edmund J.; and Kraus, Robert A. Device for making artificial snow. 4,793,554, Cl. 239-2.200.

Kraus, Robert A., See—  
Kraus, Edmund J.; and Kraus, Robert A., 4,793,554, Cl. 239-2.200.

Krauss, George; and Roberts, Philip M., to Signode Corporation. Continuous treatment of cold-rolled carbon manganese steel. 4,793,869, Cl. 148-12.100.

Krauss, George; and Roberts, Philip M., to Signode Corporation. Continuous treatment of cold-rolled carbon high manganese steel. 4,793,870, Cl. 148-12.100.

Krauss, Kenneth J., to Stock Equipment Copy. Apparatus and method for feeding particulate material such as coal and other bulk materials. 4,793,512, Cl. 222-1.000.

Krauss, Werner; and Matthies, Karl-Heinz, to Claudius Peters AG. Emptying device for a bulk silo. 4,793,529, Cl. 222-637.000.

Kreh, Robert P., to W. R. Grace & Co.-Conn. Ceric oxidant. 4,794,172, Cl. 534-15.000.

Kress, Willy. Manual device for driving screws. 4,793,226, Cl. 81-463.000.

Kriechbaum, Kurt, See—  
Walk, Johann; and Kriechbaum, Kurt, 4,793,028, Cl. 19-80.00R.

Kronenberg, Gustavo, See—  
Masel, Ruben; Valdshtein, George; Leitner, Philipp; and Kronenberg, Gustavo, 4,793,151, Cl. 62-306.000.

Krotaeng, Kathryn G. Modular and adjustable mannequin. 4,793,530, Cl. 223-68.000.

Kruse, Heinz J.; Fey, Karin; Karius, Klaus D.; and Schilling, Harmut, to Rheinmetall GmbH. Spin-stabilized bomblet-carrying projectile. 4,793,260, Cl. 102-489.000.

Krzywdziak, Alain, to Fonderie & Ateliers des Sablons. Lid with an adjustable pouring and venting arrangement, particularly for primary color or paint containers utilized for car bodywork. 4,793,528, Cl. 222-487.000.

Kubasiak, Duane T., to Douglas Components Corporation. Tilt and telescope steering column having a single control. 4,793,204, Cl. 74-493.000.

Kubota, Shoko; and Yamada, Sadayoshi, to Toshiba Machine Co., Ltd. Apparatus for and a method of rapidly discharging a molten metal from its supply system of a pressurized holding furnace. 4,793,596, Cl. 266-44.000.

Kubota Tekko Kabushiki Kaisha, See—  
Yano, Naomichi; Ueno, Tadatsugu; and Tsuboi, Shigeru, 4,793,402, Cl. 165-10.000.

Kubota, Yuichi; Koga, Keiji; Tamazaki, Kazunori; Aoyama, Tsutomu; and Watanabe, Akio, to TDK Corporation. Magnetic recording medium. 4,794,042, Cl. 428-328.000.



- Kudo, Takanori: See—  
Ishihara, Heigor; Kudo, Takanori; Ohno, Tomoyuki; and Akagi, Motoo, 4,794,035, Cl. 428-219.000.
- Kugimiya, Haruo: See—  
Aiki, Kuni; Sasayama, Atsushi; Nemoto, Tugio; Kawabata, Tsunetsoshi; and Kugimiya, Haruo, 4,793,688, Cl. 350-252.000.
- Kuhfuss, Runwalt, to De La Rue Giori S.A. Process and apparatus for the processing of security-paper prints and identification of misprints. 4,793,251, Cl. 101-93.010.
- Kuhn, Otto: See—  
Dionhy, Jiri; Kuhn, Otto; and Ruegg, Andreas, 4,793,101, Cl. 51-283.00E.
- Kuhn, Wolfgang: See—  
Wallentowitz, Henning; Neundorf, Siegfried; Kuhn, Wolfgang; Buchle, Karl-Heinz; and Laubacher, Karl-Eugen, 4,793,539, Cl. 364-426.010.
- Kuijk, Karel E., to U.S. Philips Corp. Display arrangement with improved drive. 4,794,385, Cl. 340-719.000.
- KUKA Schweissanlagen + Roboter GmbH: See—  
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Long, David: See—  
Rossey, Guy; and Long, David, 4,794,185, Cl. 546-121.000.

Longstaff, Eric. Sunbathing filter with incomplete UV-B absorption. 4,793,668, Cl. 350-1.100.

Look, Gunter: See—  
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Grollier, Jean F.; and Plessia, Sophie, 4,793,990, Cl. 424-59.000.

Losensky, Erich: See—  
Hirmke, Werner; and Losensky, Erich, 4,793,562, Cl. 241-101.200.

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Gross, Joseph; Lowenstein, David; Tilman, Menachem; and Rosenberg, Etan, 4,793,010, Cl. 5-109.000.

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Phillips, Ronald, 4,793,315, Cl. 123-506.000.

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Ambrosi, Franco; Guardiola, Jean-Pascal; and Schilling, Michel, 4,793,259, Cl. 102-485.000.

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Luck, Melvin R.; and Pavicic, Mark J., to International Business Machines Corporation. Attribute hierarchy system. 4,794,389, Cl. 340-723.000.

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Lueschen, William K.: See—  
Dyer, Edward; and Lueschen, William K., 4,793,385, Cl. 140-123.600.

Luigi, Chiappini, to M C S Officina Meccanica S.p.A. Process and machine for the treatment, in particular for batchwise dyeing, of lap-folded fabrics. 4,793,014, Cl. 8-152.000.

Luigi, Gilli: See—  
Giorgio, Guglielmetti; Guido, Carosello; and Luigi, Gilli, 4,793,878, Cl. 156-64.000.

Luk, Siu K.: See—  
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Lundin, Lars, to Oy Lars Lundin Patent AB. Device for pumping highly-viscous material, in particular thick oil. 4,793,767, Cl. 415-62.000.

Lundin, Robert S., to Superior Electric Company, The. Apparatus and method for generating two-phase signals for use with a resolver to digital converter. 4,794,511, Cl. 363-156.000.

Luss, Edward F.; and Manning, Andrew J., to Tarkett Inc. Process for manufacturing inlaid types of sheet materials. 4,794,020, Cl. 427-195.000.

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Quan, Pei Xin; Hou, Dong Yan; Chen, Bi-Xian; Ma, Teng Ge; Lin, Hui Wang; and Li, Zhi Jian, 4,794,217, Cl. 437-247.000.

Maas, Dennis G.: See—  
Greenberg, William M.; Maas, Dennis G.; and Bauman, Randall L., 4,793,282, Cl. 118-667.000.

MAC Corporation of America: See—  
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MacDonald, Robert C.; and Abrego, Elias, to Westinghouse Electric Corp. Dynamic assignment switching in the dispatching of elevator cars. 4,793,443, Cl. 187-127.000.

Mace, Ted C. Small, lightweight, strong, multiple use cart having a removable vertical support for moving heavy items in or out of dwellings via a person size doorway. 4,793,624, Cl. 280-47.160.

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Mack, Gerhard: See—  
Muller, Klaus; Escher, Lothar; Mack, Gerhard; and Kramer, Ernst, 4,793,753, Cl. 411-175.000.

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Lai, Ching T.; and MacKenzie, David J., 4,794,382, Cl. 340-703.000.

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Czech, James L.; and Madison, Shannon L., 4,793,820, Cl. 439-177.000.

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Ikari, Yoshiki; Akutsu, Masanori; Yamada, Wazoh; and Maeda, Hideo, 4,793,148, Cl. 62-280.000.

Maeda, Junichi: See—  
Watanabe, Kazuyoshi; Yoshino, Hiroyuki; Maeda, Junichi; and Negishi, Osamu, 4,794,553, Cl. 364-710.010.

Maeda, Satoshi, to Kabushiki Kaisha Toshiba. Semiconductor memory device having a high capacitance storage capacitor. 4,794,563, Cl. 365-182.000.

Maese, Hector L. Tube axial handheld blow dryer for hair. 4,794,225, Cl. 219-370.000.

Maeshima, Tsugio: See—  
Tagaya, Nobuaki; Kawahara, Hideyuki; Hashimoto, Takao; Komatsu, Noriko; Fukamachi, Keiko; and Maeshima, Tsugio, 4,794,171, Cl. 530-417.000.

Magnavox Government and Industrial Electronics Company: See—  
Webb, George, 4,793,256, Cl. 102-210.000.

Magourik, Ray O. V., to Tuftco Corporation. Knife holder apparatus for cut pile tufting machine. 4,793,271, Cl. 112-80.600.

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Csillag, Zsolt; Bulkai, Dnes; Farkas, Ferenc; Kovacs, Ferenc; Marton, Gabor; and Fodor, Maria, 4,793,706, Cl. 356-335.000.

Mahan, Donald E. Tire shock absorber. 4,793,395, Cl. 152-8.000.

Mahler, Matthias; and Rattner, Manfred, to Siemens Aktiengesellschaft. Shock wave source. 4,793,329, Cl. 128-24.00A.

Mahnke, Parker E.; and Sheltra, Ron, to Marcy Fitness Products. Exercise apparatus. 4,793,608, Cl. 272-118.000.

Mahulikar, Deepak: See—  
Pryor, Michael J.; Shapiro, Eugene; and Mahulikar, Deepak, 4,793,967, Cl. 419-19.000.

Maida Development Company: See—  
Bennett, John C., 4,794,485, Cl. 361-127.000.

Maier-Borst, Wolfgang: See—  
Pastyr, Otto; and Maier-Borst, Wolfgang, 4,794,629, Cl. 378-152.000.

Maitland, Arthur; Menown, Hugh; and Neale, Christopher V., to English Electric Valve Company Limited. Discharge tubes. 4,794,614, Cl. 372-61.000.

Makiej, Walter J., Jr. Multidose capsules. 4,793,493, Cl. 206-538.000.

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Okamura, Naomichi; Aoki, Hiroshi; Makino, Junzo; Yagi, Hajime; Arai, Yasuo; and Yamanaka, Takashi, 4,793,886, Cl. 156-307.300.

Makishima, Akio; and Asami, Mitsuki, to National Institute for Research in Inorganic Materials. Process for producing and product of a machinable crystallized glass having needle-like crystals precipitated therein. 4,794,094, Cl. 501-5.000.

Makita, Minoru: See—  
Kano, Minoru; Takeichi, Kenzo; Makita, Minoru; Hisatomi, Ryochi; and Takemoto, Akinobu, 4,794,312, Cl. 318-599.000.

Malik, Ram L.: See—  
Veltman, Joost; Malik, Ram L.; and Dickens, Michael D., 4,793,832, Cl. 55-23.000.

Malik, Roger J.: See—  
Capasso, Federico; Gossard, Arthur C.; Hayes, John R.; Malik, Roger J.; and Petroff, Pierre M., 4,794,440, Cl. 357-34.000.

Mallett, James A.: See—  
Hammerle, Frederick A.; Wicel, Richard; and Mallett, James A., 4,794,210, Cl. 200-1.00V.

Mallinckrodt, Inc.: See—  
Duski, Neil; and Bazzi, Ali A., 4,794,138, Cl. 524-289.000.

MAN Gutehoffnungshutte GmbH: See—  
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Manabe, Toshikatsu: See—  
Wada, Shuichi; Ohiwa, Tsunemi; Kidou, Hirokazu; Kawakami, Akira; and Manabe, Toshikatsu, 4,793,695, Cl. 350-357.000.

Mangan, Steven J.; and May, James L., to Accurate Tool and Manufacturing, Inc. Pallet system. 4,793,540, Cl. 227-7.000.

Manke, Donald G.: See—  
Bronstein, Benjamin; Russell, Hugh; and Manke, Donald G., 4,793,582, Cl. 248-486.000.

Mannesmann AG: See—  
Boettger, Wolfgang; Weingarten, Willi; and Schneider, Heinz, 4,793,185, Cl. 73-643.000.

Mannesmann Aktiengesellschaft: See—  
Staggl, Roland; Stober, Manfred; and Sprung, Hartwig, 4,793,203, Cl. 74-479.000.

Mannesmann Tally GmbH: See—  
Pichler, Josef, 4,793,252, Cl. 101-93.050.

Manning, Andrew J.: See—  
Lusi, Edward F.; and Manning, Andrew J., 4,794,020, Cl. 427-195.000.

Manning, Larry F.; and Tobias, Theodore. Book carrier for cassette and compact disc. 4,793,477, Cl. 206-232.000.

Mano, Shigeru; and Kagohashi, Hiroshi, to C K D Kabushiki Kaisha. Piston position detector for fluid pressure cylinder. 4,793,241, Cl. 92-5.00R.

Manoury, Philippe; Binet, Jean; and Alctru, Michel, to Synthelabo. Antiparasitic nitrofurans derivatives. 4,794,120, Cl. 514-249.000.

Mansfield Scientific, Inc.: See—  
Landman, Mark S.; and LeMott, Steven R., 4,793,351, Cl. 128-344.000.

Manke, Wendell J., to Minnesota Mining and Manufacturing Company. Device for visually indicating a pressure or temperature condition. 4,793,717, Cl. 374-160.000.

Mansukhani, Gul: See—  
Cherukuri, Subraman R.; and Mansukhani, Gul, 4,794,003, Cl. 426-6.000.

Mantegazza, Maria A.: See—  
Roffia, Paolo; Padovan, Mario; Leofanti, Giuseppe; Mantegazza, Maria A.; De Alberti, Giordano; and Tauszik, Giorgio R., 4,794,198, Cl. 564-267.000.

Mantovani, Elia, to Tecnodelta S.A. Electronically controllable rotary transfer machine. 4,793,039, Cl. 29-38.00B.

Mar, Craig E.; and Friable, Jeffrey S., to Advanced Cardiovascular Systems, Inc. Liquid filled low profile dilatation catheter. 4,793,350, Cl. 128-344.000.

Marabella, Leonard J.: See—  
Linford, Gary J.; Aprahamian, Robert; Marabella, Leonard J.; Munch, Jesper; Moyer, Richard H.; and Lombardi, Gabriel G., 4,794,345, Cl. 330-4.300.

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Cadossi, Ruggero; and Marazzi, Donata, 4,793,325, Cl. 600-14.000.

Marchese, Antonio B.; and Ernst, Timothy P. Firefighting monitor apparatus. 4,793,557, Cl. 239-587.000.

Marconi Electronic Devices Limited: See—  
Ahe, James; Chandler, Nicholas; and Crofts, Andrew J., 4,794,367, Cl. 338-308.000.

Marcus, Bonita K.: See—  
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Lok, Brent M. T.; Marcus, Bonita K.; and Flanigen, Edith M., 4,793,833, Cl. 55-33.000.

Marcus, Ilan, to Du Pont de Nemours, E. I., and Company. Polyester fiberfill. 4,794,038, Cl. 428-288.000.

Marcy Fitness Products: See—  
Mahnke, Parker E.; and Sheltra, Ron, 4,793,608, Cl. 272-118.000.

Marelli Autronica S.p.A.: See—  
Dell'Orto, Giuseppe; and Rossi, Giuseppina, 4,793,189, Cl. 73-775.000.

Mariplast S.p.A.: See—  
Romagnoli, Tiziano, 4,793,568, Cl. 242-118.100.

Markpoint System AB: See—  
Vonsack, Jiri, 4,794,407, Cl. 346-139.00R.

Marks, George R. Multi-use lock cylinder. 4,793,166, Cl. 70-379.00R.

Marlek, Edward. Liquid chemical applicator. 4,793,559, Cl. 729-722.000.

Marlow, Peter J. C.; and Evans, Kenneth S., to NL Sperry-Sun, Inc. Apparatus for surveying a borehole comprising a magnetic measurement probe to be moved within a drill pipe to a measurement position within a non-magnetic collar. 4,794,336, Cl. 324-221.000.

Marpal AG: See—  
Degen, Hugo, 4,793,009, Cl. 5-103.000.

Marquette, Stuart H. Knee stabilizer. 4,793,333, Cl. 128-80.00C.

Marin, Anzonia M.: See—  
Reeder, Frank J., 4,794,494, Cl. 362-61.000.

Marshall, Barry R., to Ambic Equipment Limited. Automatic milking apparatus and methods. 4,793,285, Cl. 119-14.020.

Marston Palmer Limited: See—  
Morton, Eric E., 4,793,922, Cl. 210-317.000.



Martin, John K. Puzzle with movable pieces. 4,793,615, Cl. 273-153.00S.

Marton, Gabor: See—  
Cullag, Zsolt; Bulkai, Dnes; Farkas, Ferenc; Kovacs, Ferenc; Marton, Gabor; and Fodor, Maria, 4,793,706, Cl. 356-335.000.

Marty, Claude; and Blondeau, Rene, to Compagnie De Raffinage et de Distribution Total France. Catalytic composite product for the oxidation of mercaptans and its use for the sweetening of petroleum fractions. 4,794,097, Cl. 502-163.000.

Marty, Garry R., to Masco Corporation of Indiana. Faucet valve cartridge. 4,793,375, Cl. 137-270.000.

Martz, Martin G. Removable tooth positioning appliance and method. 4,793,803, Cl. 433-6.000.

Maruyama, Masahiro: See—  
Hata, Kanji; Maruyama, Masahiro; and Itemadani, Eiji, 4,793,707, Cl. 356-375.000.

Marvin, Claire C. Cup caddy. 4,793,647, Cl. 294-87.200.

Masaki, Kiyoshi: See—  
Suyama, Satoshi; Arakawa, Toru; Masaki, Kiyoshi; and Oba, Souji, 4,794,481, Cl. 360-99.060.

Maschek, Martin; and Mastner, Georg, to BBC Brown Boveri AG. Current transducer arrangement for outdoor high-voltage installations. 4,794,318, Cl. 323-358.000.

Maschek, Martin; and Mastner, Georg, to BBC Brown Boveri AG. Heat protection casing. 4,794,487, Cl. 361-383.000.

Masco Corporation of Indiana: See—  
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Masel, Ruben; Valshtein, George; Leitner, Philipp; and Kronenberg, Gustavo, to Masel, Ruben. Ice-cream making machine. 4,793,151, Cl. 62-306.000.

Maso, Paolo. Bander machine for drugs containing capsules. 4,793,119, Cl. 53-139.300.

Mason, Lawrence J.: See—  
Lehman, Richard F.; Shogren, David K.; Hammond, Thomas J.; and Mason, Lawrence J., 4,794,422, Cl. 355-14.00E.

Massachusetts Institute of Technology: See—  
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Massey-Ferguson Services N.V.: See—  
Bailey, Alfred J.; and Stone, David E., 4,793,523, Cl. 222-288.000.

Old, John L., 4,793,207, Cl. 74-532.000.

Paul, David S.; and Saunders, Richard S., 4,793,765, Cl. 414-718.000.

Mastner, Georg: See—  
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Masuhara, Michiya: See—  
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Mathews, Roger A.; Moore, Edward R.; and Cannell, David W., to Redken Laboratories, Inc. Hair treatment composition. 4,793,992, Cl. 424-70.000.

Mathews, Will W.; and Jones, Richard B., to Cummins Engine Company, Inc. Fuel pump distribution assembly salvage method. 4,793,043, Cl. 29-156.4WL.

Mathias, Lon J.; and Hermes, Robert E., to University of Southern Mississippi. New vinyl monomers capable of forming side-chain liquid crystalline polymers and the resulting polymers. 4,793,949, Cl. 260-404.000.

Matra Manurhin Defense: See—  
Beltzer, Jean, 4,793,084, Cl. 42-59.000.

Matako, Joseph J.; Beatty, William E., Jr.; Whitt, Raymond O. D.; and Saletta, Gary F., to Westinghouse Electric Corp. Circuit interrupter apparatus with a style saving override circuit. 4,794,484, Cl. 361-93.000.

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Matsuda, Kenichi: See—  
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Matsuda, Shinpei: See—  
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Matsuda, Tomoo: See—  
Torihata, Shigenori; Imaizumi, Hisakazu; Suzuki, Toru; Matsuda, Tomoo; Hirooka, Masatake; Nishi, Yokichi; Hosoi, Mitsuo; Tsurumaki, Naoya; and Takitani, Yukitaka, 4,794,634, Cl. 379-96.000.

Matsuda, Toshiharu: See—  
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Matsui, Futoshi: See—  
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Matsukawa, Takayuki, to Mitsubishi Denki Kabushiki Kaisha. Substrate support structure for ion implantation device. 4,794,305, Cl. 315-111.810.

Matsumoto, Fuyuhiko: See—  
Enomoto, Takamichi; Ohta, Wasaburo; Uehara, Kiyohiro; Kamoi, Sumio; and Matsumoto, Fuyuhiko, 4,793,691, Cl. 350-339.00F.

Matsumoto, Kazuhiko; Asai, Kei; and Yamamoto, Hirohito, to Omron Tateisi Electronics Co. Ultrasonic atomizer and storage bottle and nozzle therefor. 4,793,339, Cl. 128-200.160.

Matsumoto, Kazunori: See—  
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Matsumoto, Shigeyuki: See—  
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Matsumoto, Takao; and Kano, Haruo, to Nippon Telegraph and Telephone Corporation. Fiber optic polarization controller. 4,793,678, Cl. 350-96.150.

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Shimamune, Takayuki; Hosonuma, Masashi; and Matsumoto, Yukiei, 4,794,023, Cl. 427-350.000.

Matsumoto, Yukio: See—  
Ojima, Kumiko; Matsumoto, Yukio; Togashi, Hiroshi; and Ogino, Hiroshi, 4,794,040, Cl. 428-323.000.

Matsumura, Mitsue; and Urushibata, Hiroaki, to Mitsubishi Denki Kabushiki Kaisha. Gas manifold for a fuel cell. 4,794,055, Cl. 429-35.000.

Matsumura, Teruyuki: See—  
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Matsuno, Katsumi: See—  
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Matsuoka, Saiji; Satoh, Susumu; Obara, Takashi; Tsunoyama, Kozo; and Abe, Hideo, to Kawasaki Steel Corporation. Method of producing thin steel sheets having an improved processability. 4,793,401, Cl. 164-476.000.

Matsushita Electric Industrial Co., Ltd.: See—  
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Matsushita Electric Industrial Co., Ltd.: See—  
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Doyama, Yoshiaki, 4,794,472, Cl. 360-70.000.

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Miyazaki, Jinsei; Ando, Eiji; Yoshino, Kimiaki; and Morimoto, Kazuhisa, 4,794,068, Cl. 430-345.000.

Nakano, Okihiko; and Ishimura, Yohzoh, 4,794,218, Cl. 219-10.55D.

Sawada, Masaki; Matsui, Futoshi; and Onda, Katsuyoshi, 4,794,215, Cl. 200-159.00B.

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Matsuyama, Akinobu: See—  
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Matsuzawa, Shigemitsu: See—  
Ito, Takeshi; Matsuzawa, Shigemitsu; and Kato, Katsuaki, 4,794,054, Cl. 429-44.000.

Matthews, Henry G., to Summagraphics Corporation. Method of and apparatus for controlling a display. 4,794,388, Cl. 340-731.000.

Matthies, Karl-Heinz: See—  
Krauss, Werner; and Matthies, Karl-Heinz, 4,793,529, Cl. 222-637.000.

Mattioli, Alessandro: See—  
Fiume, Luigi; Busi, Corrado; Mattioli, Alessandro; and Baldacci, Massimo, 4,794,170, Cl. 530-363.000.

Mattson, Gunnar: See—  
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Band, Gerhard; and Muller, Bernd, 4,794,212, Cl. 200-47.000.

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Vico, Fernando, 4,793,079, Cl. 12-142.0MC.

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Doinaga, Hajime; Inoue, Shunji; Matsumoto, Kazunori; and Masuhara, Michiya, 4,793,312, Cl. 123-492.000.

Ishimura, Fuminori; Kagaya, Hiroshi; Nishimura, Kazuaki; and Teramoto, Takafumi, 4,793,299, Cl. 123-195.00R.

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McCullough, Timothy J.; and Simon, Arvin B., to Food Industry Equipment International, Inc. On/off control system for power operated hand tools. 4,794,273, Cl. 307-139.000.

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Zuccaro, Dante C.; and McCurdy, Frederick A., 4,793,053, Cl. 29-568.000.

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McDonald, Robert L., to Chrysler Motors Corporation. Reverse idler gear noise-reduction arrangement. 4,793,200, Cl. 74-331.000.

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Schmidt, Harald H.; Gellert, Jobst U.; and McDowall, Rory, 4,793,795, Cl. 425-349.000.

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Stoudt, Michael D.; Mosehauer, Michael; Zeise, Eric K.; Spitzner, Jerome G.; deceased; McDowell, David Q.; and Tailbes, George N., 4,794,421, Cl. 355-3.00R.

McDowell, Kenneth H. Device for installing electric outlet boxes. 4,793,069, Cl. 33-528.000.

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McFall, Robert M. Material loading apparatus. 4,793,462, Cl. 198-365.000.

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McGinn, Michael, to Motorola, Inc. Linear wideband differential amplifier and method for linearizing the same. 4,794,348, Cl. 330-252.000.

McGrath, John F., Jr., to Compugraphic Corporation. Constant deviation scanning apparatus. 4,793,672, Cl. 350-6.700.

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Thompson, Louis J.; McIntyre, Peter M.; and Carta, James K., 4,793,736, Cl. 405-146.000.

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Carnes, George E.; and McMillin, John V., 4,794,241, Cl. 235-474.000.

McMordie, Bruce G.: See—  
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McNair, Rhett. Power control method and apparatus. 4,794,271, Cl. 307-38.000.

McPherson, Alexander W., to De-Sta-Co Division, Dover Resources, Inc. Locking power clamp. 4,793,602, Cl. 269-34.000.

McSpadden, John S.: See—  
Eldredge, David S.; Blalock, Dolan F.; and McSpadden, John S., 4,793,589, Cl. 251-30.030.

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Meadows, Steven: See—  
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Lauffenburger, James H.; Denchy, George F.; and Novickis, Andre, 4,794,470, Cl. 360-69.000.

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Meenan, William C.; and Sullivan, George D., to American Colloid Company. Method and apparatus for separating contaminants from fluidizable solids. 4,793,937, Cl. 210-771.000.

Mehta, Atul M.; Bachand, Elizabeth A.; Leonard, Thomas W.; and Warner, Ronald N., to American Home Products Corporation. Formulations providing three distinct releases. 4,794,001, Cl. 424-58.000.

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Meier, Jacques, to Ferag AG. Apparatus for the further processing of a packaging line. 4,793,118, Cl. 53-118.000.

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Fecker, Josef, 4,793,565, Cl. 242-47.010.

Memtec Limited: See—  
Ford, Douglas L.; and Kopp, Clinton V., 4,793,932, Cl. 210-636.000.

Menard, Michael J.; Helmstetter, Thomas J., Sr.; and Johnson, David E., to Personal Products Company. Method and apparatus for providing powder into fibrous web structures. 4,793,280, Cl. 118-44.000.

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Maitland, Arthur; Menown, Hugh; and Neale, Christopher V., 4,794,614, Cl. 372-61.000.

Mense, Lorenz, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschränkter Haftung. Suction device for taking-up and depositing of work pieces. 4,793,657, Cl. 294-65.000.

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Farrenkopf, Wolfgang; Gruenauer, Heinrich; Menzinger, Manfred; von Hirsch, Joachim; and Opitz, Reinhard, 4,793,542, Cl. 228-112.000.

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Hauck, Heinz E.; and Jost, Willi, 4,793,921, Cl. 210-198.300.

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Merlin Gerin: See—  
Broyde, Frederic, 4,794,353, Cl. 333-167.000.

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Gilgore, William H.; and Messerly, Gary A., 4,793,473, Cl. 198-845.000.

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Derbyshire, Rodney L., 4,794,226, Cl. 219-374.000.

Metzeler Schaum GmbH: See—  
Fenske, Jürgen W.; Steyrer, Ludwig; and Eble, Michael, 4,793,574, Cl. 244-122.00R.

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Meyrat, Clement, to ETA SA Fabriques d'Ebauches. Watch middle and wristlet assembly. 4,794,577, Cl. 368-282.000.

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Glover, Alfred H.; Betterton, Joseph T.; Lawless, Daniel F.; and Michalovic, Anthony M., 4,793,639, Cl. 285-319.000.

Michaud, Fernand L., Jr., to Northeast Marine, Inc. Adjustable interlocking telescopic handle and arm assembly. 4,793,646, Cl. 294-19.100F.

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Potter, Curtis N., 4,794,021, Cl. 427-240.000.

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Eke, Kenneth I., 4,794,219, Cl. 219-10.55M.

Middlesex General Industries, Inc.: See—  
Horn, George W., 4,793,262, Cl. 104-168.000.

Midwest Research Microscopy, Inc.: See—  
Mroczkowski, Susan J.; Siegesmund, Kenneth A.; and Yörde, Donald E., 4,794,089, Cl. 436-501.000.

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Alberts, Heinrich; Bartl, Herbert; Billinger, Otto; and Mietzsch, Fritz, 4,794,142, Cl. 525-196.000.

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Mikami, Ryuzo: See—  
Lee, Chi-Long; Gornowicz, Gerald A.; Larkin, Frank P.; and Mikami, Ryuzo, 4,793,555, Cl. 239-6.000.

Mikhail, Makram T.: See—  
Beiley, Mark J.; and Mikhail, Makram T., 4,793,167, Cl. 72-19.000.

Mikiya, Toshio: See—  
Ooki, Yasumasa; Asano, Osamu; and Mikiya, Toshio, 4,793,746, Cl. 408-17.000.

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Bergacker, John W.; Milbauer, Thomas H.; and Parks, Donald G., 4,793,583, Cl. 248-550.000.

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Miles Inc.: See—  
Buckler, Robert T.; and Hatch, Robert P., 4,794,079, Cl. 435-28.000.



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Petzold, Werner P.; Müller, Alan L.; and Umlauf, William P., 4,793,454, Cl. 192-0.032.

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Singh, Pramod K.; Agarwal, Ram G.; and Müller, Charles W., 4,793,413, Cl. 166-250.000.

Müller, James E., to United States of America, Navy. Submarine launched sea-state buoy (SLSSB). 4,794,575, Cl. 367-134.000.

Müller, Nicholas E., to Applied Materials, Inc. Refractory metal deposition process. 4,794,019, Cl. 427-124.000.

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Müller, Stewart E., to Bell Communications Research, Inc. Broadband semiconductor optical amplifier structure. 4,794,346, Cl. 330-4.300.

Müller, Walter, to Dr. Johannes Heidenhain GmbH. Method of manufacturing and embodiment of measure. 4,793,049, Cl. 29-446.000.

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Millheim, Keith K., to Amoco Corporation. Method of drilling a well utilizing predictive simulation with real time data. 4,794,534, Cl. 364-420.000.

Mills, Immaul: See—  
Bilcon, Edward B.; and Mills, Immaul, 4,793,581, Cl. 248-230.000.

Millsapp, Stuart C., Jr. Drill bit with covered ring nozzle retainer. 4,793,426, Cl. 175-340.000.

Mimbs, Charles C., to Grumman Aerospace Corporation. Method for performing a repair on an obstructed section of a composite structure. 4,793,879, Cl. 156-98.000.

Minagawa, Shigekazu: See—  
Kondow, Masahiko; Minagawa, Shigekazu; and Kajimura, Takashi, 4,794,606, Cl. 372-45.000.

Minami, Hidemi, to Honda Giken Kogyo Kabushiki Kaisha. Cooling air intake structure for small-sized vehicles. 4,793,293, Cl. 123-41.700.

Minami, Norio: See—  
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiro; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,794,118, Cl. 514-452.000.

Mindich, Bruce. Process and apparatus for harvesting vein. 4,793,346, Cl. 128-305.000.

Minehige, Takahiko: See—  
Hideaki, Kawamura; Matsumura, Teruyuki; Iwagaya, Takashi; and Minehige, Takahiko, 4,794,514, Cl. 364-474.220.

Mineur, Thomas L., to Thomas & Betts Corporation. Method for preventing water from tracking into a cable splice area. 4,793,877, Cl. 156-48.000.

Minigrip, Inc.: See—  
Bentzen, Per; Nocek, Robert S.; and Ausnit, Steven, 4,793,487, Cl. 206-451.000.

Ministry of International Trade and Industry: See—  
Hayakawa, Kiyoshi; Yamakita, Hiromi; Tazawa, Masato; and Taoda, Hiroshi, 4,794,130, Cl. 522-33.000.

Minnesota Mining and Manufacturing Company: See—  
Burton, Peter O.; and Kennedy, James K., 4,794,632, Cl. 379-22.000.

Hanson, Gary R.; Hunder, Ray A.; and Rabuse, George R., 4,793,758, Cl. 412-4.000.

Leir, Charles M.; and Stark, John E., 4,794,031, Cl. 428-195.000.

Manake, Wendell J., 4,793,717, Cl. 374-160.000.

Phillip, James B., Jr.; Silla, Peter D.; and Lindquist, James E., 4,794,070, Cl. 430-502.000.

Pretchel, David A., 4,793,060, Cl. 29-858.000.

Riedel, John E.; and Ihlenfeld, Jay V., 4,793,003, Cl. 2-15.000.

Minna, H. Gordon: See—  
Friedman, Aaron; and Minna, H. Gordon, 4,793,807, Cl. 433-80.000.

Minolta Camera Kabushiki Kaisha: See—  
Higaki, Masahiro; Nakatani, Keiji; and Yamada, Hirokazu, 4,794,424, Cl. 355-14.00R.

Mukai, Hiromu; Ishida, Tokuji; and Tokumaru, Hisashi, 4,794,416, Cl. 354-402.000.

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Shibazaki, Kenji; Kawai, Yoshihisa; and Wada, Kanji, 4,794,419, Cl. 355-3.00R.

Mips Co., Ltd.: See—  
Hamada, Yoshitaka, 4,794,243, Cl. 235-492.000.

Minawa, Yutaka: See—  
Homma, Hideo; Misawa, Yutaka; and Momma, Naohiro, 4,794,445, Cl. 357-71.000.

Mine, George J.; Hurst, Gregory C.; Holland, G. Neil; Patrick, John L., III; and Orlando, Paul T., to Picker International, Inc. Surface coil system for magnetic resonance imaging. 4,793,356, Cl. 128-653.000.

Misao, Katsuhide; Kawaguchi, Yuji; Ogishi, Kazuhisa; Tsunekawa, Shinichi; and Kamei, Taketo, to Kabushiki Kaisha Toshiba. Fluorescent lamp having a convoluted discharge passage and fluorescent lamp apparatus incorporating the same. 4,794,301, Cl. 313-490.000.

Mita Industrial Co., Ltd.: See—  
Nishimura, Kozo, 4,793,453, Cl. 192-26.000.

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Mitchell, Thomas O., to Mobile Oil Corporation. Organic crosslinking of polymers for CO<sub>2</sub> flooding profile control. 4,793,416, Cl. 166-266.000.

Mito, Ikuro, to NEC Corporation. Distributed feedback laser diode. 4,794,618, Cl. 372-96.000.

Mitsubishi Denki Kabushiki Kaisha: See—  
Hamano, Hisanori, 4,794,446, Cl. 357-74.000.

Komurasaki, Satoshi, 4,793,310, Cl. 123-425.000.

Matsukawa, Takayuki, 4,794,305, Cl. 315-111.810.

Matsumura, Mitsuie; and Urushibata, Hiroaki, 4,794,055, Cl. 429-35.000.

Ooba, Kunio; and Kojima, Tooru, 4,794,597, Cl. 371-3.000.

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Takeuchi, Susumu; and Moriizumi, Koichi, 4,794,646, Cl. 382-8.000.

Toda, Haruhisa; Mureta, Shiroo; and Fujihiya, Hiroaki, 4,794,357, Cl. 335-46.000.

Yoshida, Koichi, 4,794,551, Cl. 364-565.000.

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Hiramatsu, Takeo; Tanaka, Yuichi; and Nakamura, Hisaji, 4,793,216, Cl. 74-866.000.

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Kurokawa, Hideyuki; Hamada, Shoichi; and Ohta, Makoto, 4,793,056, Cl. 29-726.000.

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Mitsubishi Kasei Corporation: See—  
Hasuo, Masayoshi; Urabe, Hiroshi; Kawai, Michio; and Ohsako, Tatsuya, 4,794,158, Cl. 528-338.000.

Mitsubishi Oil Co., Ltd.: See—  
Tate, Kazuhito; Yoshida, Hajime; and Sasaki, Teruhiko, 4,793,912, Cl. 208-44.000.

Mitsubishi Rayon Co., Ltd.: See—  
Togashi, Takahiko; Kanamura, Tomotsugu; Mori, Yoshiyuki; Sato, Yoshinori; Inoue, Yasuji; and Tsuchida, Teruhiro, 4,793,130, Cl. 57-210.000.

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Kamiyama, Yoshihiko; Fukuda, Misao; and Nagata, Akihiro, 4,793,057, Cl. 79-822.000.

Mittendorf, George H., Jr.: See—  
Albright, Douglas J.; and Mittendorf, George H., Jr., 4,794,544, Cl. 364-494.000.

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Miyakawa, Tsutomu: See—  
Ikeda, Yuji; Miyakawa, Tsutomu; Okajima, Takahiro; and Miyake, Masahiko, 4,794,580, Cl. 369-44.000.

Miyake, Masahiko: See—  
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Miyaki, Yoshiyuki; and Katsoka, Tohiya, to Toyo Soda Manufacturing Co., Ltd. Method and apparatus for separating and analyzing using liquid chromatography. 4,794,088, Cl. 436-161.000.

Miyashita, Iwao: See—  
Nishizawa, Kazunori; Ito, Osamu; and Miyashita, Iwao, 4,794,034, Cl. 428-218.000.

Miyatake, Kimio; Imaki, Takao; and Takeda, Kenji, to Horiba, Ltd. Absorption analyzer. 4,794,255, Cl. 250-343.000.

Miyawaki, Yoshinori; Ueno, Satoshi; Egawa, Satoshi; and Shirasaki, Osamu. Electronic blood pressure measuring device. 4,793,360, Cl. 128-681.000.

Miyazaki, Hideki: See—  
Nakamura, Norio; Miyazaki, Hideki; Shimizu, Fusaaki; and Sasagawa, Kazuhiko, 4,794,183, Cl. 546-22.000.

Miyazaki, Jinsei; Ando, Eiji; Yoshino, Kimiaki; and Morimoto, Kazuhisa, to Matsushita Electric Industrial Co., Ltd. Optical recording medium. 4,794,068, Cl. 430-345.000.

Miyazaki, Osahiko: See—  
Takeuchi, Hirotsato; Miyazaki, Osahiko; Kazama, Yasuo; and Kurihara, Naoya, 4,793,751, Cl. 411-13.000.

Miyazawa, Seichi: See—  
Hara, Toshitami; Miyazawa, Seichi; Nojiri, Hidetoshi; Shimizu, Akira; Sekiguchi, Yoshinobu; and Hakamada, Isao, 4,794,609, Cl. 372-50.000.

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Mizoguchi, Tetsuhiko; Inomata, Koichiro; Higuchi, Toru; and Sakai, Isao, to Kabushiki Kaisha Toshiba. Permanent magnetic alloy and method of manufacturing the same. 4,793,874, Cl. 148-103.000.

Mizuno, Masaharu; and Katoh, Mituo, to Toray Industries Inc. Tire cord made of polyvinyl alcohol. 4,793,131, Cl. 57-243.000.

Mizuhashi, Yoshihiro, to Fujitsu Limited. Pipeline control system for an execution section of a pipeline computer with multiple selectable control registers in an address control stage. 4,794,518, Cl. 364-200.000.

Mizuta, Ken: See—  
Kawata, Toshihiko; and Mizuta, Ken, 4,794,269, Cl. 307-10.00R.

Moberg, Gregory O.; Rhodes, Wilfred D.; and Surdyke, Keith R., to Eastman Kodak Company. Columnar focusing indicator for a manually focused video camera. 4,794,459, Cl. 358-227.000.

Mobil Oil Corporation: See—  
Haddad, James H.; and Owen, Hartley, 4,793,915, Cl. 208-161.000.

Holmes, Billy G.; and Weber, Stevan L., 4,793,415, Cl. 166-263.000.

Touhsant, Robert E., 4,794,136, Cl. 524-512.000.

Mobile Oil Corporation: See—  
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Mogwitz, Olaf: See—  
Becker, Horst P.; and Mogwitz, Olaf, 4,793,660, Cl. 303-54.000.

Mold-Masters Limited: See—  
Schmidt, Harald H.; Gellert, Jobst U.; and McDowall, Rory, 4,793,795, Cl. 425-549.000.

Molecular Diagnostics, Inc.: See—  
Dattagupta, Nanibhushan; and Clemens, Anton H., 4,794,073, Cl. 435-6.000.

Molins PLC: See—  
Labbe, Francis A. M.; Nowers, John R.; Wiese, Paul R.; Hirsh, Ivan Y.; and Wood, Godfrey A., 4,793,364, Cl. 131-84.300.

Moly, Jose: See—  
Leandris, Sergio; and Moly, Jose, 4,793,221, Cl. 81-9.510.

Molyneux, Keith W.: See—  
Gahan, Edward A.; Molyneux, Keith W.; and Schofield, Kenneth, 4,793,690, Cl. 350-279.000.

Momma, Naohiro: See—  
Homma, Hideo; Misawa, Yutaka; and Momma, Naohiro, 4,794,445, Cl. 357-71.000.

Momose, Atsushi: See—  
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Torao, Akiro; Moriya, Susumu; and Momose, Atsushi, 4,794,260, Cl. 250-458.100.

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Jordan, George; and Mondiadis, Dimitri G., 4,793,218, Cl. 76-101.00R.

Mong, William K.: See—  
Hart, James E.; Mong, William K.; Kyllonen, Allen W.; and Kram-pitz, Mark S., 4,793,446, Cl. 188-52.000.

Monreal, F. Javier. Ski handles convertible to standard ski poles. 4,793,627, Cl. 280-606.000.

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Henis, Jay M.; Tripodi, Mary K.; and Stimpson, Donald I., 4,794,002, Cl. 424-488.000.

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Montedipe S.p.A.: See—  
Roffia, Paolo; Padovan, Mario; Leofanti, Giuseppe; Mantegazza, Maria A.; De Alberti, Giordano; and Tauszik, Giorgio R., 4,794,198, Cl. 564-267.000.

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Moomaw, David E.; and Robjert, Frederick B., to Quaker Oats Company. The Toy airplane amusement game. 4,793,610, Cl. 273-1.0GC.

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Moore Products Co.: See—  
Chang, Chih C., 4,794,320, Cl. 324-60.0CD.

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Morelock, Charles R., to General Electric Company. Infiltration of mo-containing material with silicon. 4,793,859, Cl. 75-245.000.

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Morgan Corporation: See—  
Whiteman, Paul L., 4,793,397, Cl. 160-201.000.

Mori, Kinji: See—  
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Orimo, Masayuki; Kawano, Katsumi; Kasashima, Hirokazu; and Nakai, Kozo, 4,794,519, Cl. 364-200.000.

Mori, Nobuyuki: See—  
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiro; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,794,118, Cl. 514-452.000.

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Mori, Yoshiyuki: See—  
Togashi, Takahiko; Kanamura, Tomotsugu; Mori, Yoshiyuki; Sato, Yoshinori; Inoue, Yasuji; and Tsuchida, Teruhiro, 4,793,130, Cl. 57-210.000.

Mori, Yutaka: See—  
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Moriizumi, Koichi: See—  
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Naitoh, Takashi; Namekawa, Takashi; Yamada, Seichi; Ogihara, Satoru; and Morikawa, Juichi, 4,794,483, Cl. 360-120.000.

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Moriya, Susumu: See—  
Asano, Yuichiro; Kono, Yoshihisa; Yanagimoto, Takayuki; Torao, Akiro; Moriya, Susumu; and Momose, Atsushi, 4,794,260, Cl. 250-458.100.

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Morris, R. Scott, to Cape Cod Research, Inc. Colorimetric detector for monitoring oil degradation. 4,793,977, Cl. 422-55.000.

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Yu, Yuet-Ying; Morris, Robert A.; Rajotte, Paul T.; and Wambolt, Lee A., 4,794,356, Cl. 335-13.000.

Morris Rod-Weeder Company Ltd.: See—  
Groddeck, Lawrence S.; Just, Murray K.; Henry, James W.; Hantke, Glenn M.; and Lesanko, Jack A., 4,793,743, Cl. 406-123.000.

Morrison, George, Jr.: See—  
Cummins, James M., Jr.; Morrison, George, Jr.; and Pierfelice, Robert E., 4,793,343, Cl. 128-204.170.

Morrison, Marlene C. Disposable broiler pan and material for forming same. 4,794,052, Cl. 428-595.000.

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Petrick, Mary E.; and Morrissey, Timothy, 4,793,082, Cl. 40-617.000.

Mortensen, Roger, to Empak, Inc. Package for semiconductor wafers. 4,793,488, Cl. 206-454.000.

Morton, Eric E., to Marston Palmer Limited. Filter element using non-woven mat and multi finger separators. 4,793,922, Cl. 210-317.000.

Morton Thiokol, Inc.: See—  
Bolieau, Christopher W., 4,793,257, Cl. 102-221.000.

Card, Steve W.; and West, Joseph R., 4,793,887, Cl. 156-307.300.

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McIntosh, Meldon J., 4,793,866, Cl. 134-24.000.

Poulter, Larry W.; Brown, John L.; and Brown, Ernest D., 4,793,955, Cl. 264-3.300.

Morz, Gunter; and Weiser, Wolfgang, to ANT Nachrichtentechnik GmbH. High power junction circulator for high frequencies. 4,794,352, Cl. 333-1.100.

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Mose, Friedrich: See—  
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Mosehauer, Michael: See—  
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Mosher, Charles C.: See—  
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Mosser, Mark F.; and McMordie, Bruce G., to Sermatech International, Inc. Surface modified powder metal parts and methods for making same. 4,793,968, Cl. 428-550.000.

Motoi, Taiko: See—  
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Motoo, Satoshi: See—  
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Motorola, Inc.: See—  
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Brown, Vernon L., 4,794,489, Cl. 361-424.000.

Hess, Garry C., 4,794,635, Cl. 379-60.000.

McGinn, Michael, 4,794,348, Cl. 330-252.000.

Pellet, Perry H., III, 4,794,434, Cl. 357-23.600.

Pickert, William F.; Pettinger, Joseph M.; and Biancalana, Peter, 4,794,525, Cl. 364-200.000.

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Wu, Adam Y.; Saluru, Krupanidhi B.; and Pastor, Rickey G., 4,793,697, Cl. 350-393.000.

Mott, Jonathan C. Method of molding a racquet with string securing loops. 4,793,958, Cl. 264-274.000.

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Linford, Gary J.; Aprahamian, Robert; Marabella, Leonard J.; Munch, Jasper; Moyer, Richard H.; and Lombardi, Gabriel G., 4,794,345, Cl. 330-4.300.

Mroczkowski, Susan J.; Siegesmund, Kenneth A.; and Yorde, Donald E., to Midwest Research Microscopy, Inc. Method for electronic detection of a binding reaction. 4,794,089, Cl. 436-501.000.



- MTS Systems Corporation: See—  
Gutman, Yevsey; and Langer, William J., 4,794,540, Cl. 364-474.290.
- MTU Motoren-Und Turbinen-Union Munchen GmbH: See—  
Zachring, Gerhard; Wohlmuth, Josef; and Schmuhi, Hans-Juergen, 4,793,772, Cl. 416-95.000.
- Mueller-Mall, Rudolf; Funk, Guido; Bachl, Robert; Hennenberger, Peter; and Kolk, Erich, to BASF Aktiengesellschaft. Preparation of finely divided homopolymers and copolymers of ethene using a liquid alkane as reaction medium. 4,794,151, Cl. 526-64.000.
- Mukai, Hiroshi; Ishida, Tokuji; and Tokumaru, Hisashi, to Minolta Camera Kabushiki Kaisha. Focus detection apparatus. 4,794,416, Cl. 354-402.000.
- Muller, Bernd: See—  
Band, Gerhard; and Muller, Bernd, 4,794,212, Cl. 200-47.000.
- Muller, Gerhard; to Werner & Pfeleiderer GmbH. Dough-rounding apparatus. 4,793,789, Cl. 425-332.000.
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- Muller, Klaus; Echer, Lothar; Mack, Gerhard; and Kramer, Ernst, to A. Raymond. C-shaped sheet-metal nut. 4,793,753, Cl. 411-175.000.
- Muller, Peter, to Siemens Aktiengesellschaft. Position control system for computer-controlled processing machines. 4,794,513, Cl. 364-167.010.
- Muller, Peter R.: See—  
Paul, Winfried; Grigo, Ulrich; Muller, Peter R.; and Nouvertne, Werner, 4,794,141, Cl. 525-92.000.
- Mullins, Michael J.: See—  
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- Multinoru B.V.: See—  
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- Munch, Jesper: See—  
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- Munch, Karl; and Holzer, Hans W., to SEITZ ENZINGER NOLL Maschinenbau Aktiengesellschaft. Packing and unpacking machine. 4,793,762, Cl. 414-416.000.
- Munk, Jeffrey R., to Airship Industries (UK) Limited. Control system. 4,793,137, Cl. 60-390.000.
- Munro, Douglas O., to Alert-O-Brake Systems Inc. Tractor-trailer fluid pressure brake monitoring system. 4,793,661, Cl. 303-89.000.
- Murakami, Kakuji; Shimada, Masaru; Aruga, Tamotsu; Uemura, Hiroyuki; and Nagai, Kiyofumi, to Ricoh Company, Ltd. Aqueous ink composition. 4,793,860, Cl. 106-22.000.
- Murakoshi, Makoto, to Fuji Photo Film, Co. Ltd. Magnetic disk with analog and digital video signals recorded thereon and apparatus for making recording on said disk. 4,794,468, Cl. 360-35.100.
- Muralidhara, Ranya: See—  
Pittet, Alan O.; Muralidhara, Ranya; and Hagedorn, Myrna L., 4,794,193, Cl. 560-256.000.
- Muramoto, Tomotaka, to Canon Kabushiki Kaisha. Amplifier circuit having crossover switching features. 4,794,347, Cl. 330-51.000.
- Murao Boki Kabushiki Kaisha: See—  
Nakayama, Hiroshi, 4,793,036, Cl. 28-294.000.
- Murahima, Shigemitsu, to NEC Corporation. Rotation mechanism for a waveguide feeder. 4,794,401, Cl. 343-761.000.
- Murata, Shiroo: See—  
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- Murayama, Hiroshi: See—  
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- Takahima, Yasuji; Tanaka, Shigeo; Kawamata, Ichiro; and Murayama, Hiroshi, 4,794,107, Cl. 514-179.000.
- Murchie, John R.: See—  
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- Murphy, Milton K.; Rice, Arthur W.; and Freeman, John J. Process for producing high quality gas for instrumentation application using gas separation membranes. 4,793,830, Cl. 55-16.000.
- Murphy, Patricia L.: See—  
Hayes, Michael E.; Hrebenar, Kevin R.; Murphy, Patricia L.; Futch, Laurence E., Jr.; Deal, James F., III; and Bolden, Paul L., Jr., 4,793,826, Cl. 44-51.000.
- Murry, Kenneth R.: See—  
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- Murthy, Kuchi S.; Harris, Michael R.; Hokanson, Gerard C.; Reisch, Robert G., Jr.; Waldman, Frank; and Fawzi, Mahdi B., to Warner-Lambert Company. Stabilized drug compositions. 4,793,998, Cl. 424-440.000.
- Musser, John H.; and Chakraborty, Utpal R., to USV Pharmaceutical Corporation. Certain unsymmetrical quinolinyl ethers having anti-inflammatory and anti-allergic activity. 4,794,188, Cl. 546-152.000.
- Myer, Joe H., to Hughes Aircraft Company. Fluid flow motion reduction system. 4,793,198, Cl. 74-110.000.
- Myron International, Inc.: See—  
Sigler, Mark A.; Sigler, Timothy J.; and Day, Delbert E., 4,793,809, Cl. 433-218.000.
- Naderi, Mohammad T. Evaporative cooler with ventilative device. 4,793,152, Cl. 62-311.000.
- Nagahara, Yoshikazu; and Onzo, Michio, to Kabushiki Kaisha Komatsu Seisakusho. Adjustable device for axial piston pump/motor of a tilting axis type. 4,793,240, Cl. 91-506.000.
- Nagahiro, Kenichi: See—  
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- Nagai, Hiroshi, to Kureha Kagaku Kogyo Kabushiki Kaisha. Implant material with continuous and two-dimensional pores and process for producing the same. 4,794,046, Cl. 428-312.200.
- Nagai, Kiyofumi: See—  
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- Nagano, Masashi, to Shimano Industrial Company Limited. Caliper brake for a bicycle. 4,793,444, Cl. 188-24.120.
- Nagasaka, Nagahiko, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Structure of active type magnetic bearing. 4,794,290, Cl. 310-90.500.
- Nagashima, Akira, to Kioritz Corporation. Chain saw safety braking device. 4,793,064, Cl. 30-382.000.
- Nagashima, Akira, to Kioritz Corporation. Elbow for carburettor. 4,793,303, Cl. 123-198.00E.
- Nagashima, Takashi: See—  
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- Nagata, Akihiro: See—  
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- Nagatomi, Akihiro, to DX Antenna Company, Ltd. Modulation device. 4,794,458, Cl. 358-186.000.
- Nagatsuna, Shinji: See—  
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- Naitoh, Takashi; Namekawa, Takashi; Yamada, Seiichi; Ogihara, Satoru; and Morikawa, Juichi, to Hitachi, Ltd. Magnetic head having layers of amorphous magnetic alloy bonded together with a glass containing vanadium oxide phosphorus oxide and antimony oxide. 4,794,483, Cl. 360-120.000.
- Naka, Hideo: See—  
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- Nakagawa, Isao: See—  
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- Nakai, Kozo: See—  
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- Nakamichi Corporation: See—  
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- Nakamura, Hideki: See—  
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- Nakamura, Hiroshi; Hata, Shigenao; Kamio, Kunimasa; and Saito, Yasuhisa, to Sumitomo Chemical Company, Limited. Fiber-reinforced composite material. 4,794,148, Cl. 525-530.000.
- Nakamura, Hisaji: See—  
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- Nakamura, Norio; Miyazaki, Hideki; Shimizu, Fusaaki; and Sasagawa, Kazuhiko, to Sankyo Company Limited. Certain tetrahydro-furan or pyran phosphate-ethylene or propylene ammonium derivatives. 4,794,183, Cl. 546-22.000.
- Nakanaga, Ryusuke: See—  
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- Nakanishi, Hiroshi, to Sony Corporation. Shuttering mechanism for a cassette with a shutter moving arm. 4,794,479, Cl. 360-99.060.
- Nakanishi, Tatsuo: See—  
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- Nakano, Kinichiro; and Takeuchi, Mikio, to Nissan Motor Company, Limited. Automotive keyless entry system incorporating portable radio self-identifying code signal transmitter. 4,794,268, Cl. 307-10.0AT.
- Nakano, Kiyomori: See—  
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- Nakano, Masao: See—  
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- Nakano, Okihiko; and Ishimura, Yohzoh, to Matsushita Electric Industrial Co. Ltd. Door assembly for microwave heating apparatus. 4,794,218, Cl. 219-10.55D.
- Nakao, Kazuo: See—  
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- Hirose, Tadashi; Nakao, Kazuo; Takeuchi, Yoichi; and Shinada, Keiko, 4,794,529, Cl. 364-300.000.
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- Nakatani, Keiji: See—  
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- Nakayama, Hiroshi, to Murao Boki Kabushiki Kaisha. Apparatus for removing waste rovings from roving bobbins. 4,793,036, Cl. 28-294.000.
- Nakayama, Munco: See—  
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- Nalco Chemical Company: See—  
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- Namekawa, Takashi: See—  
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- Napier, Richard R.: See—  
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- National Computer Systems: See—  
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- National Institute for Research in Inorganic Materials: See—  
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- National Nuclear Corporation Limited: See—  
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- National Plastics Limited: See—  
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- National Research Development Corporation: See—  
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- National Semiconductor Corporation: See—  
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- National Starch and Chemical Corporation: See—  
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- Natsuyama, Yukihiko: See—  
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- NCR Corporation: See—  
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- Spektor, Semyon; Veprinsky, Michael; and Ranger, Michael H., 4,794,224, Cl. 219-216.000.
- Neal, Hubert W. T.: See—  
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- Neale, Christopher V.: See—  
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- Nebeling, Hermann H., to Emhart Industries, Inc. Glassware forming machine and apparatus incorporating such a machine. 4,793,848, Cl. 65-225.000.
- NEC Corporation: See—  
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- Fujiwara, Ryuei, 4,794,649, Cl. 455-9.000.
- Kikuchi, Toshio, 4,794,601, Cl. 371-36.000.
- Kimura, Katsuji, 4,794,342, Cl. 330-2.000.
- Koike, Yukio, 4,794,374, Cl. 341-120.000.
- Mito, Ikuro, 4,794,618, Cl. 372-96.000.
- Murahima, Shigemitsu, 4,794,401, Cl. 343-761.000.
- Saiki, Yoshihiko, 4,794,491, Cl. 361-532.000.
- Suzuki, Hiroyuki; and Kawata, Kazuhide, 4,794,451, Cl. 358-96.000.
- Watanabe, Takeshi, 4,794,564, Cl. 365-184.000.
- Watari, Masao, 4,794,645, Cl. 381-43.000.
- Yoshida, Makoto; and Nukiyama, Tomoji, 4,794,557, Cl. 364-748.000.
- Negishi, Osamu: See—  
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- Negre, Stephane: See—  
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- Nehrenberg, Donald L.; and Washburn, Robert L., to Du Pont de Nemours, E. I. and Company. Dynamic control of textile warp size add-on on a running slasher. 4,793,035, Cl. 28-183.000.
- Neiman: See—  
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- Nelson, Raymond L.: See—  
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- Nemoto, Tugio: See—  
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- Netexpress Systems, Inc.: See—  
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- Neumeier, Robert. Accessory device for an inflatable gas balloon. 4,794,498, Cl. 362-186.000.
- Neumiller, Phillip J.; and Etter, Robert M., to S. C. Johnson & Son, Inc. Substrate having an adherent photo-product coating on its surface and a method of coating said substrate. 4,793,864, Cl. 134-1.000.
- Neumiller, Phillip J.: See—  
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- Neundorff, Siegfried: See—  
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- Nevett, Jonathan E.: See—  
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- Newmark, Larry J.: See—  
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- Newmatic, Inc.: See—  
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- Newski, Alejandro: See—  
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- Niagara Mohawk Power Corporation: See—  
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- Nicholas, Richard W.: See—  
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- Nicholson, Brian: See—  
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- Nicolas, Jean-Marie, to U.S. Philips Corporation. Method of and apparatus for scanning objects by means of ultrasound echography. 4,794,546, Cl. 364-507.000.
- Nicollini, Germano: See—  
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- Nicoltaios, Grammenos: See—  
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- Nielsen, Larry L.: See—  
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- Niemeyer III, Robert H., to AM International Corporation. Pen lifting and lowering positioner for graphic recorder. 4,794,406, Cl. 346-139.00R.
- Niemeyer, Robert H., III, to AM International Corporation. Following error limit system for graphic recorder. 4,794,408, Cl. 346-139.00R.
- Nifco, Inc.: See—  
Kong, Alan, 4,793,452, Cl. 188-317.000.
- Nihon Taisanbin Kogyo Kabushiki Kaisha: See—  
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- Niimi, Atsushi: See—  
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- Nikon Corporation: See—  
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- Nilsen, Carl J.; Wachter, Joseph P.; and Young, Ronald D., to PRC Corporation. Laser fluid flow control apparatus and method. 4,794,613, Cl. 372-58.000.
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- Nippon A B S, Ltd.: See—  
Arikawa, Tetsuro, 4,793,662, Cl. 303-96.000.
- Nippon Cable System, Inc.: See—  
Suzuki, Kazuhiro, 4,793,206, Cl. 74-501.50R.
- Nippon Engelhard Ltd.: See—  
Ito, Takashi; Matsuzawa, Shigemitsu; and Kato, Katsuaki, 4,794,054, Cl. 429-44.000.
- Nippou Filcon Co., Ltd.: See—  
Tate, Takuo, 4,794,036, Cl. 428-263.000.
- Nippon Gear Co., Ltd.: See—  
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- Nippon Petrochemicals Company, Limited: See—  
Nogiwa, Motomi; Yoshida, Shuichi; Komori, Shigeki; Yoshikawa, Toshitsune; and Koutsuka, Toshio, 4,793,956, Cl. 264-41.000.
- Nippon Soken, Inc.: See—  
Yoshinaga, Toru; Igashira, Toshihiko; Sakakibara, Yasuyuki; Abe, Seiko; and Natsuyama, Yukihiko, 4,793,314, Cl. 123-506.000.
- Nippon Steel Chemical Co., Ltd.: See—  
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- Nippon Steel Corporation: See—  
Kashiwaya, Kunio; Haga, Hiroyo; Saeki, Nobuo; Yabuki, Youichi; Osoe, Kuniyuki; Fukushima, Shinichi; and Tabata, Kazufumi, 4,793,048, Cl. 29-433.000.  
Teramoto, Takeru; Harada, Kazuaki; and Inoue, Hiroharu, 4,794,159, Cl. 528-344.000.
- Nippon Steel Welding Products & Engineering Co., Ltd.: See—  
Kashiwaya, Kunio; Haga, Hiroyo; Saeki, Nobuo; Yabuki, Youichi; Osoe, Kuniyuki; Fukushima, Shinichi; and Tabata, Kazufumi, 4,793,048, Cl. 29-433.000.
- Nippon Telegraph & Telephone: See—  
Sugawara, Yoshitaka; Kitano, Junjiro; Kimura, Tadakatsu; Inabe, Yasuhide; and Tanabe, Masa-aki, 4,794,441, Cl. 357-38.000.
- Nippon Telegraph and Telephone Corporation: See—  
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- Matsumoto, Takao; and Kano, Haruo, 4,793,678, Cl. 350-96.150.
- Nippondensetsu Co., Ltd.: See—  
Ishihara, Nobuaki; Takei, Tooshiro; Hattori, Yoshiyuki; and Okazaki, Koji, 4,793,780, Cl. 418-65.000.  
Nimura, Takayasu; and Shiga, Tsutomu, 4,794,285, Cl. 310-68.00D.  
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- Nire, Takashi; and Watanabe, Takehito, to Kabushiki Kaisha Komatsu Seisakusho. Thin film el device and method of manufacturing the same, 4,794,302, Cl. 313-509.000.
- Nishi, Kenji, to Nikon Corporation. Alignment apparatus, 4,794,426, Cl. 355-43.000.
- Nishi, Yokichi: See—  
Torihata, Shigenori; Imaizumi, Hisaaki; Suzuki, Toru; Matsuda, Tomoo; Hirooka, Masatake; Nishi, Yokichi; Hosoi, Mitsuo; Tsurumaki, Naoya; and Takitani, Yukitaka, 4,794,634, Cl. 379-96.000.
- Nishida, Azusa, to Hitachi, Ltd.; and Hitachi Keiyo Engineering Co. Ltd. Robot control system, 4,794,347, Cl. 364-513.000.
- Nishimura, Kazuaki: See—  
Ishimura, Fuminori; Kagaya, Hiroshi; Nishimura, Kazuaki; and Teramoto, Takafumi, 4,793,299, Cl. 123-195.00R.
- Nishimura, Kozo, to Mita Industrial Co., Ltd. Electromagnetically controlled spring clutch mechanism, 4,793,453, Cl. 192-26.000.
- Nishimura, Sadaori, to Honda Giken Kogyo Kabushiki Kaisha. Compact transmission apparatus for a vehicle, 4,793,213, Cl. 74-730.000.
- Nishimura, Tooshiro: See—  
Ishikawa, Tsutomu; Nakayama, Muneco; Hashimoto, Akira; and Nishimura, Tooshiro, 4,793,862, Cl. 106-287.130.
- Nishine, Koichi: See—  
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- Nishio, Etsuro: See—  
Kabayashi, Takeo; Kondoh, Shigeru; Nishio, Etsuro; and Kohmoto, Shinsuke, 4,794,418, Cl. 354-435.000.
- Nishizawa, Kazumori; Ito, Osamu; and Miyashita, Iwao, to Kao Soap Co., Ltd. Water absorbing article, 4,794,034, Cl. 428-218.000.
- Niskanen, Don L., to Teleflex Incorporated. Remote control assembly with improved isolator, 4,793,050, Cl. 29-455.100.
- Niskanen, Juhani, to Valmet Oy. Method and apparatus for controlling deflection of an adjustable crown roll, 4,793,250, Cl. 100-35.000.
- Nissan Motor Co., Ltd.: See—  
Hayashida, Tsutomu; Shibamoto, Yutaka; Yamada, Tomiharu; and Kondo, Tetsuro, 4,793,839, Cl. 55-385.300.  
Nakano, Kinichiro; and Takeuchi, Mikio, 4,794,268, Cl. 307-10.0AT.
- Sugano, Kazuhiko, 4,793,215, Cl. 74-758.000.
- Nitto Kohki Co., Ltd.: See—  
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- Takeuchi, Hirotsato; Miyazaki, Osahiko; Kazama, Yasuo; and Kurihara, Naoya, 4,793,751, Cl. 411-13.000.
- Niwa, Isao; and Ishimoto, Mikio, to Kishimoto Sangyo Co., Ltd. Nestable packaging container, 4,793,516, Cl. 222-143.000.
- NL Sperry-Sun, Inc.: See—  
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- NLB: See—  
Shook, Forrest A.; and DeSantis, Gerard J., 4,793,734, Cl. 404-90.000.
- Noach, Eizen. Method and apparatus for facing wooden door frames, 4,793,109, Cl. 52-211.000.
- Noblesau, Philippe, to Vetco Gray Inc. Process for locking two screwed elements and elements for carrying out this process, 4,793,754, Cl. 411-186.000.
- Nocek, Robert S.: See—  
Bentzen, Per; Nocek, Robert S.; and Ausnit, Steven, 4,793,487, Cl. 206-451.000.
- Nogiwa, Motomi; Yoshida, Shuichi; Komori, Shigeki; Yoshikawa, Toshitsune; and Koutsuka, Toshio, to Nippon Petrochemicals Company, Limited. Process for preparing porous film or sheet, 4,793,956, Cl. 264-41.000.
- Noguchi, Masamitsu: See—  
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- Noguchi, Yoshiki: See—  
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- Nojiri, Hidetoshi: See—  
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- Nolting, Peter: See—  
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- Nomori, Hiroyuki: See—  
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- Nomura, Masahide: See—  
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- NORAN: See—  
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- Norberg, Kenneth L.; and Henley, Harold B., to Enercept, Inc. Electrical outlet unit for a building, 4,794,207, Cl. 174-48.000.
- Nordischer Maschinenbau Rud. Baader GmbH + CO KG: See—  
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- North American Philips Corporation: See—  
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- Tsinberg, Mikhail, 4,794,447, Cl. 358-14.000.  
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- Northeast Marine, Inc.: See—  
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- Northern Telecom Limited: See—  
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- Northrop Corporation: See—  
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- Nouvertne, Werner: See—  
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- Novack, David F.: See—  
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- Novickis, Andre: See—  
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- Nowers, John R.: See—  
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- Nuclear Metals, Inc.: See—  
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- Nuhfer, James A.: See—  
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- Nukiyama, Tomoji: See—  
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- Nunberg, Jack; Flatgaard, Jeffrey E.; and Innis, Michael A., to Cetus Corporation. Glucoamylase CDNA, 4,794,175, Cl. 536-27.000.
- Nunn, Gary L., to Color-Box, Inc. Box, 4,793,546, Cl. 229-109.000.
- Nuova Italsider S.p.A.: See—  
Bertolotti, Luigi, 4,793,485, Cl. 206-397.000.
- Nurnberger, Gunter; and Look, Gunter, to Fichtel & Sachs AG. Planet wheel carrier, 4,793,214, Cl. 74-750.00R.
- Nussbaumer, Roland, to Zellweger Uster AG. Converter module having cooling elements and a ripple control transmitter apparatus utilizing the same, 4,794,509, Cl. 363-141.000.
- Nye, Susan A.: See—  
Berdahl, Donald R.; and Nye, Susan A., 4,794,157, Cl. 528-208.000.
- Nykerk, Michael: See—  
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- Oakes, Martin C.; and Klaus, David W., to Y.S. Securities Limited. Alternating current power circuit and fuse therefor, 4,794,362, Cl. 337-158.000.
- Oakridge Railing and Stair Company Inc.: See—  
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- Oba, Souji: See—  
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- Obara, Takashi: See—  
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- Oberhans, Johann: See—  
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- Obitsu, Takeo: See—  
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- Ohnishi, Yutaka; Yoshinaka, Shinji; Tanaka, Tohiyuki; Koguchi, Minoru; Obitsu, Takeo; Koguchi, Minoru; and Obitsu, Takeo, 4,794,069, Cl. 430-338.000.
- Oboodi, M. Reza; and Blazey, Daniel C., to Allied-Signal Inc. Ceramic coated metal substrates for electronic applications, 4,794,048, Cl. 428-432.000.
- Obstfelder, Gunther: See—  
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- Obstfelder, Matthias; Obstfelder, Gunther; and Seitz, Hatto. Method of detoxification of exhaust gas from an internal combustion engine using a catalytic system, and apparatus for performing the method, 4,793,135, Cl. 60-274.000.
- Occidental Chemical Corporation: See—  
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- Ochi, Yoshiharu: See—  
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- Ochiai, Michihiko: See—  
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- Ocvirk, Norbert; Weise, Lutz; Becker, Horst-Peter; and Determann, Otto, to Alfred Teves GmbH. Valve arrangement for brake systems of automotive vehicles comprising an electronic antilocking and traction slip control, 4,793,663, Cl. 303-110.000.
- O'Donnell, Timothy. Pet food protecting device, 4,793,290, Cl. 119-62.000.
- O'Ferrell, J. Richard; and Butta, Kevin, to Ultra Shades, Inc. Portable shelter, 4,793,371, Cl. 135-106.000.
- Offerman, Michael: See—  
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- Ogasawara, Munehiro, to Kabushiki Kaisha Toshiba. Synchrotron-type accelerator with rod-shaped damping antenna, 4,794,340, Cl. 328-235.000.
- Ogawa, Toshio: See—  
Ikeda, Hiroshi; Katakura, Kageyoshi; Ogawa, Toshio; Umehara, Shin'ichiro; and Kondo, Shimichi, 4,793,184, Cl. 73-626.000.
- Ogihara, Satoru: See—  
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- Ogino, Hiroshi: See—  
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- Ogishi, Kazuhisa: See—  
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- Ohashi, Michihito; Nagatsuna, Shinji; and Saito, Kinzi, to Ricoh Company, Ltd. Device for driving rotary body, 4,794,420, Cl. 355-3.00R.
- Ohata, Isao: See—  
Kojima, Tadao; Kageyama, Shunji; Okada, Minoru; Ohata, Isao; and Sato, Noboru, 4,794,113, Cl. 514-399.000.
- Ohe, Junzo; and Kondo, Hiroshi, to Toyota Jidosha Kabushiki Kaisha. Automobile antenna, 4,794,397, Cl. 343-712.000.
- Ohga, Kimio: See—  
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- Ohi, Tamio: See—  
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- Ohiwa, Tsunemi: See—  
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- Ohlson, Karl G. Method and apparatus for the batchwise production of paving mixes containing mineral aggregate and bituminous binder, 4,793,711, Cl. 366-18.000.
- Ohmen, Douglas J. Three element digital control system, 4,794,313, Cl. 318-610.000.
- Ohnishi, Yutaka; Yoshinaka, Shinji; Tanaka, Tohiyuki; Koguchi, Minoru; Obitsu, Takeo; Koguchi, Minoru; and Obitsu, Takeo, to Shin Nisso Kako Co., Ltd. Spirobenzanthracene phthalide compounds, processes for preparing same and color forming recording materials containing said compounds, 4,794,069, Cl. 430-338.000.
- Ohno, Akihiro: See—  
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- Ohno, Tomoyuki: See—  
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- Ohashi, Mitsuhiro, to Nakamichi Corporation. Apparatus for guiding a leader block and a tape in a tape cartridge for a magnetic instrument, 4,793,569, Cl. 242-195.000.
- Ohsako, Tatsuya: See—  
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- Ohshima, Shigeo: See—  
Sahara, Hiroshi; Toda, Haruki; and Ohshima, Shigeo, 4,794,569, Cl. 365-203.000.
- Ohta, Makoto: See—  
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- Ohta, Tatsuo: See—  
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- Ohta, Wasaburo: See—  
Enomoto, Takamichi; Ohta, Wasaburo; Uehara, Kiyohiro; Kamoi, Sumio; and Matsumoto, Fuyuhiko, 4,793,691, Cl. 350-339.00F.
- Ohya, Jun: See—  
Fujita, Tooshiro; Ohya, Jun; Matsuda, Kenichi; and Serizawa, Hiroyuki, 4,794,608, Cl. 372-50.000.
- Ohyama, Tetsumasa, to Fujitsu Limited. Voice and data transmission system, 4,794,595, Cl. 370-110.100.
- Okawa, Hatsuhiro: See—  
Arai, Tohru; and Okawa, Hatsuhiro, 4,794,044, Cl. 427-431.000.
- Oine, Toyonari; Yamada, Yoshinobu; and Sugano, Hiroshi, to Tanabe Seiyaku Co., Ltd. Thiazolylacetic acid derivative and processes for preparing the same, 4,794,186, Cl. 546-209.000.
- Ojima, Hisami: See—  
Kanno, Kenichi; Ojima, Hisami; and Okumura, Senji, 4,794,641, Cl. 379-165.000.
- Ojima, Kuniko; Matsumoto, Yukio; Togashi, Hiroshi; and Ogino, Hiroshi, to Victor Company of Japan, Ltd. Magnetic recording medium having a back coat layer containing carbon black having defined ranges of pH and coloring power, 4,794,040, Cl. 428-323.000.
- Oka, Tetsuki; Toyoshi, Naoki; and Yokoyama, Tomoaki, to Minolta Camera Kabushiki Kaisha. Method for the formation of outline images corresponding to the peripheral outlines of document's images, 4,794,062, Cl. 430-31.000.
- Okabe, Akira, to Hitachi, Ltd. Apparatus for cooling steam turbine for use in single-shaft combined plant, 4,793,132, Cl. 60-39.182.
- Okabe, Tetsuo: See—  
Morishita, Koichi; Yamagata, Shimbu; Okabe, Tetsuo; Yokoyama, Tetsuo; and Hamatani, Kazuhiko, 4,794,531, Cl. 364-413.130.
- Okada, Minoru: See—  
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- Okahashi, Kazuo: See—  
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- Okajima, Takahiro: See—  
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- Okamoto, Goro: See—  
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- Okamura, Naomi; Aoki, Hiroshi; Makino, Junzo; Yagi, Hajime; Arai, Yasuo; and Yamanaka, Takashi, to Cemedine Co., Ltd. Bonding method and adhesive useful for the method, 4,793,886, Cl. 156-307.300.
- Okazaki, Koji: See—  
Ishihara, Nobuaki; Takei, Tooshiro; Hattori, Yoshiyuki; and Okazaki, Koji, 4,793,780, Cl. 418-65.000.
- Okazaki, Masayuki: See—  
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- Okitaka, Takenori: See—  
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- Okubo, Kiyokazu, to Honda Giken Kogyo Kabushiki Kaisha. Vehicular transmission shift mechanism, 4,793,202, Cl. 74-477.000.
- Okumura, Senji: See—  
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- Okuyama, Tetsuo: See—  
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- Rovin, George H.: See—  
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- Rudolph, Julie L.: See—  
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- Ruff, Hans-Albrecht: See—  
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- S. C. Johnson & Son, Inc.: See—  
Etter, Robert M.; and Neumiller, Phillip J., 4,794,131, Cl. 522-173.000.
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- Sabin, Darrel B. Burner apparatus. 4,793,798, Cl. 431-90.000.

- Sadik, Achmed N.: See—  
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- Saiki, Yoshihiko, to NEC Corporation. Solid electrolyte capacitor. 4,794,491, Cl. 361-532.000.
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- Saint-Gobain Vitre: See—  
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- St Pierre, Michel: See—  
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- Saito, Kinzi: See—  
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- Saito, Yasunori, to Sumitomo Electric Industries, Ltd. Optical fiber composite overhead transmission line and method for producing same. 4,793,686, Cl. 350-96.230.
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- Sakakibara, Yasuyuki: See—  
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- Sakamaki, Hisashi: See—  
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- Sakamoto, Keiji; and Toyozawa, Yukio, to Fanuc Ltd. Counter circuit with mismatching prevention. 4,794,628, Cl. 377-28.000.
- Sakamoto, Ryujii, to Toshiba Silicone Co., Ltd. Key-touch sensor and method of manufacture. 4,794,366, Cl. 338-114.000.
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- Saluru, Krupandhi B.: See—  
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- Salzgeber, Daniel E.; Woliver, George; and Lasher, Alan F., to Stansadyne, Inc. Fuel injection pump with multi-state load/speed control system. 4,793,311, Cl. 123-450.000.
- Sam Sung Electronic Co., Ltd.: See—  
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- Sanakayala, Bhaskar N.: See—  
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- Sanders, Royden C., Jr. Enhanced raster image producing system. 4,794,387, Cl. 340-728.000.
- Sanderson, Allan; and Ribton, Colin N., to Welding Institute, The. Charged particle collection. 4,794,259, Cl. 250-397.000.
- Sandman, Daniel J.: See—  
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- Sandnaes, Per C.: See—  
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- Sanford, Carlton E., to Texas Instruments Incorporated. Fluid pressure responsive electrical switch. 4,794,214, Cl. 200-83.00P.
- Sanglier, Jean-Francois; and Negre, Stephane, to U.S. Philips Corp. Method and apparatus for code matching the base and mobile unit of a cordless telephone set. 4,794,636, Cl. 379-62.000.
- Sankei Giken Kogyo Kabushiki Kaisha: See—  
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- Sankyo Company Limited: See—  
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- Sanon, Henry R. Tennis card game. 4,793,617, Cl. 273-298.000.
- Santa Barbara Research Center: See—  
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- Santi, Roger J., to AMCA International Corporation. Boring tool for machine tool. 4,793,748, Cl. 408-161.000.
- Santrade Ltd.: See—  
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- Sarfehjo, Mohsen: See—  
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- Sarkozy, Robert F. Apparatus for chemical vapor deposition with clean effluent and improved product yield. 4,793,283, Cl. 118-725.000.
- Sasada, Tatsuyoshi; and Okitaka, Takenori, to Mitsubishi Denki Kabushiki Kaisha. Latch circuit tolerant of undefined control signals. 4,794,276, Cl. 307-279.000.
- Sasagawa, Kazuhiko: See—  
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- Sasaki, Teruhiko: See—  
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- Sasano, Akiyoshi: See—  
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- Sasayama, Atsushi: See—  
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- Sassmannshausen, Ulrich: See—  
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- Sasson, Steven J., to Eastman Kodak Company. Video time division multiplexer with plural dual port memories. 4,794,464, Cl. 358-310.000.
- Sato, Hidemasa, to Mitsubishi Jukogyo Kabushiki Kaisha. Automatic joining apparatus for a carcass ply. 4,793,890, Cl. 156-405.100.
- Sato, Hiromi: See—  
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- Sato, Kanemasa; and Ueno, Sadayasu, to Hitachi, Ltd. Hot film type air flow meter having a temperature sensing exothermic resistor. 4,793,176, Cl. 73-118.200.
- Sato, Noboru: See—  
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- Sato, Yoshinori: See—  
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- Sato, Yukio; and Araki, Kazuo, to Sato, Yukio; Araki, Kazuo; and Cadix Inc. Method and apparatus for measuring profile of three-dimensional object. 4,794,262, Cl. 250-560.000.
- Satoh, Susumu: See—  
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- Saunders, Richard S.: See—  
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- Savenije, Franciscus G., to Auping B. V. Lockable piston-cylinder assembly. 4,793,450, Cl. 188-300.000.
- Savin Corporation: See—  
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- Savino, Thomas G.; Balch, Thomas C.; Steinmetz, Alan L.; Balatin, Sergio E.; and Ciozzo, Nicholas, to BASF Corporation, Inmont Division. Novel non-ionic polyurethane resins having polyether backbones in water-dilutable basecoats. 4,794,147, Cl. 525-440.000.
- Sawada, Masaki; Matsui, Futoshi; and Onda, Katsuyoshi, to Matsushita Electric Industrial Co., Ltd. Push switch sealed against contaminants. 4,794,215, Cl. 200-199.00B.
- Sawada, Yoshinobu: See—  
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- Sawazaki, Masatoshi, to Precision Fukuoka Works, Ltd. Needle selection device for circular knitting machines. 4,793,159, Cl. 66-220.000.
- Scarsella, Edward L.: See—  
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- Schabert, Hans-Peter; Heller, Max; and Zach, Klaus, to Kraftwerk Union Aktiengesellschaft. Rotating piston compressor having an axially adjustable rotary sleeve valve. 4,793,779, Cl. 418-60.000.
- Schad, Robert D.; Rees, Herbert; Hughes, Gary; and Murchie, John R., to Husky Injection Molding Systems Ltd. Process for preparing hollow plastic articles. 4,793,960, Cl. 264-535.000.
- Schaefer, Volker: See—  
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- Scheetz, Frederick M. Partial immersion flow coating method and apparatus. 4,794,018, Cl. 427-96.000.
- Schellhorn, Verne L., to Foundation Constructors. Drilling system. 4,793,740, Cl. 405-232.000.
- Schering Aktiengesellschaft: See—  
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- Schering Corporation: See—  
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- Schermetzki, Konrad, to Santrade Ltd. Apparatus for the production of mat webs from a mixture of granules. 4,793,787, Cl. 425-140.000.
- Schetter, George F.: See—  
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- Schievelbein, Vernon H.: See—  
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- Schilling, Harmut: See—  
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- Schilling, Michel: See—  
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- Schleizer, William A.: See—  
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- Schmalzing, David N., to United Technologies Corporation. Two-step composite joint. 4,793,727, Cl. 403-340.000.
- Schmid, Franz, to H. Stoll GmbH & Co. Flat knitting machine. 4,793,157, Cl. 66-75.200.
- Schmid, Hans-Dieter: See—  
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- Schmid, Karl: See—  
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- Schmidt, Harald H.; Gellert, Jobst U.; and McDowall, Rory, to Mold-Masters Limited. Injection molding system having clamped rotatable nozzles and method. 4,793,795, Cl. 425-549.000.
- Schmidt, Johannes, to Daimler-Benz Aktiengesellschaft. Vehicle differential axle bearing arrangement. 4,793,211, Cl. 74-713.000.
- Schmidt, Walter L.; Wynn, Clement R.; Scarsella, Edward L.; Halligan, John F.; and Adams, Joan M., to General Foods Corporation. Method of preparing a packaged frozen confection. 4,794,008, Cl. 426-234.000.
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- Schmuhl, Hans-Jürgen: See—  
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- Schneider, Hans-Jürgen: See—  
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- Schneider, Heinz: See—  
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- Schneider, Jerry S.: See—  
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- Schneider, Walter; Erni, Isidor; and Hegetschweiler, Hans K. All-cis-1,3,5-triamino-2,4,6-cyclohexanetriol derivatives, their use, processes for their preparation and pharmaceutical preparations containing them. 4,794,197, Cl. 564-152.000.
- Schneider, Wolfgang: See—  
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- Schoch, Karl F., Jr.: See—  
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- Schoeneberger, Ernest A.: See—  
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- Schofield, Kenneth: See—  
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- Schollan, Thomas, to Kern & Company Ltd. Apparatus for measuring lengths or angles. 4,794,251, Cl. 250-231.05E.
- Scholl, Hans; and Schulze, Wolfram, to Kochs Adler Aktiengesellschaft. Folding device for an automatic sewing machine. 4,793,272, Cl. 112-121.150.
- Schonecker, Gerald: See—  
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- Schonewald, Roger W.; and Legault, Albert A., to General Electric Company. Gas turbine engine frame assembly. 4,793,770, Cl. 415-190.000.
- Schorr, Theodore H.; and Jensen, James J., to Spectra-Physics, Inc. Bar code scanner construction. 4,794,240, Cl. 235-467.000.
- Schramm, Matthias: See—  
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- Schrumpf, Ronald D.: See—  
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- Schrod, Manfred: See—  
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- Schrodl, Hermann, to Fried. Krupp Gesellschaft mit beschränkter Haftung. Method and apparatus for adjusting the gap width of a cone-type crusher. 4,793,560, Cl. 241-30.000.
- Schroeder, Kenneth: See—  
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- Schrumpf, Hans: See—  
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- Schrupp, Earl H., to Schrupp, Earl H. Device for dispensing a concentrate into a liquid without exposing the concentrate to the atmosphere. 4,793,476, Cl. 206-222.000.
- Schubert & Salzer: See—  
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- Schudy, George F. Orthodontic bracket. 4,793,804, Cl. 433-8.000.
- Schuit, Johannes. Multi-pivot vehicle suspension. 4,793,630, Cl. 280-721.000.
- Schuller, Manfred: See—  
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- Schulz, Alfred: See—  
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- Schulze, Paul-Eberhard; Acksteiner, Bernard; and Dusterberg, Bernd, to Schering Aktiengesellschaft. Aqueous crystalline suspension of steroid glycoesters. 4,794,119, Cl. 514-170.000.
- Schulze, Wolfram: See—  
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- Schumacher, Heinz O. Process for the treatment of vegetable raw materials. 4,794,011, Cl. 426-448.000.
- Schwammle, Kurt W., to Durr Industries, Inc. Accumulating pallet chain-dog conveyor and method of conveying pallets. 4,793,261, Cl. 104-172.300.
- Schwartz, David A.: See—  
Serino, Anthony J.; Henson, Geoffrey W.; Schwartz, David A.; and Picker, Donald H., 4,793,986, Cl. 424-1.100.

- Schwartz, Herbert; Mose, Friedrich; and Sedlak, Adolf, to Timex Corporation. Combination electrical contact member and braking member for a timepiece. 4,794,576, Cl. 368-185.000.
- Schweitzer, Edmund O., Jr. Cable mounted capacitively-coupled circuit condition indicating device. 4,794,329, Cl. 324-127.000.
- Schweitzer, Edmund O., Jr. Circuit condition monitoring system having integral test point. 4,794,331, Cl. 324-133.000.
- Schweitzer, Edmund O., Jr. Fault indicator having improved trip inhibit circuit. 4,794,332, Cl. 324-133.000.
- Schwellbach, Jürgen: See—  
Ester, Herbert; Haid, Klaus; Schwellbach, Jürgen; and Veit, Rolf, 4,793,228, Cl. 83-155.100.
- Schwertner, Ivar-Rudolf: See—  
Steinseifer, Dieter; and Schwertner, Ivar-Rudolf, 4,793,071, Cl. 33-657.000.
- Scientific Columbus, Inc.: See—  
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- Scifres, Donald R.: See—  
Berger, Josef; and Scifres, Donald R., 4,794,615, Cl. 372-69.000.
- Scott, Gene; Kohlenberger, Charles W.; and Warren, David M., to Rockwell International Corporation. Multiple ion source method and apparatus for fabricating multilayer optical films. 4,793,908, Cl. 204-192.260.
- Scott, William A., to Tillotson, Ltd. Carburetor fuel primer. 4,793,951, Cl. 261-35.000.
- Scovill Fasteners Inc.: See—  
Burke, James E., 4,793,029, Cl. 24-113.0MP.
- Scripps Clinic and Research Foundation: See—  
Elder, John H.; and Houghten, Richard A., 4,794,168, Cl. 530-324.000.
- Secker, Jeffrey R.: See—  
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- Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom and Northern Ireland. The: See—  
Benjamin, John D.; Mears, Adrian L.; and White, John C., 4,793,825, Cl. 604-891.100.
- Secrist, John A., III, to Southern Research Institute. 5'-deoxy-5'-substituted adenosines. 4,794,174, Cl. 536-26.000.
- Securite et Signalisation: See—  
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- Sedlak, Adolf: See—  
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- Seebold, Ralf: See—  
Fritzel, Günter; and Seebold, Ralf, 4,793,721, Cl. 384-584.000.
- Seeger, Günter. Contact spring for a bistable relay for the switching of high current. 4,794,216, Cl. 200-275.000.
- Seiberlich, Richard R.: See—  
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- Seiko Epson Corporation: See—  
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- Seiko Instruments, Inc.: See—  
Shimoda, Sadaaki; Harada, Takamasa; Taguchi, Masaki; and Ito, Kokichi, 4,793,693, Cl. 330-350.00S.
- Seikosa Co., Ltd.: See—  
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- Yasuoaka, Tadashi; and Kodama, Hidetoshi, 4,793,606, Cl. 271-157.000.
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- SEITZ ENZINGER NOLL Maschinenbau Aktiengesellschaft: See—  
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- Sekiguchi, Takeshi; Kadoawa, Tsuneaki; and Kamai, Takashi, to Canon Kabushiki Kaisha. Photographing apparatus. 4,794,417, Cl. 354-400.000.
- Sekiguchi, Yoshinobu: See—  
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- Seinko, George J., to Motorola, Inc. Vibrator alert device for a communication receiver. 4,794,392, Cl. 340-825.460.
- Seliskar, Carl J.; and Warner, David K., to United States of America. Energy. Low-pressure water-cooled inductively coupled plasma torch. 4,794,230, Cl. 219-121.520.
- Sella-Floto Inc.: See—  
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- Sencer, Gulay: See—  
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- Sendai, Michiyuki: See—  
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- Senderowicz, Daniel; and Nicolini, Germano, to SGS Microelettronica S.p.A. Fully differential, CMOS operational power amplifier. 4,794,349, Cl. 330-253.000.
- Senju Pharmaceutical Co., Ltd.: See—  
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- Sensabaugh, Andrew J., Jr.; Ridings, Henry T.; and Reynolds, John H., IV, to R. J. Reynolds Tobacco Company. Smoking article. 4,793,365, Cl. 131-194.000.
- Sensibaugh, Ed. Retraction alarm for exterior television antenna or RV antenna. 4,794,399, Cl. 343-760.000.
- Serbiak, Paul J.; Greenman, Edwin G.; and Shanklin, Gary L., to Kimberly-Clark Corporation. Cleaning product. 4,793,941, Cl. 252-91.000.
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- Serizawa, Hiroyuki: See—  
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- Sermatech International, Inc.: See—  
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- Serono Diagnostic Partners: See—  
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- Servomex, Ltd.: See—  
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- Setzer, Barry D.: See—  
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- Seyama, Fumio: See—  
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- SFS Stadler AG: See—  
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- SGS Microelettronica S.p.A.: See—  
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- Shaanxi Chemical and Fertilizer Industry Company: See—  
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- Shah, Manoj K. O.; Cohen, Arthur H., Jr.; Burke, Joseph D.; and Greenwald, Gary F., to General Foods Corporation. Reduction of instant rice pour-off. 4,794,016, Cl. 426-618.000.
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- Shannon, Thomas G.; and Brunelle, Daniel J., to General Electric Company. Crosslinkable polycyclic polycarbonate oligomers and method for their preparation. 4,794,160, Cl. 528-370.000.
- Shape Inc.: See—  
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- Gelardi, Anthony L.; Gelardi, John; Landry, Vincent F.; Parmesan, Diane C.; and Lowry, Alan B., 4,793,570, Cl. 242-199.000.
- Shapiro, Eugene: See—  
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- Shapotska, John B.; and Spencer, Dudley W. C., to Denco, Inc. Sterile welding of plastic tubes. 4,793,880, Cl. 156-158.000.
- Sharik, Clyde L.: See—  
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- Sharp, Barry L., to National Research Development Corporation. Method of and apparatus for the nebulization of liquids and liquid suspensions. 4,793,556, Cl. 239-418.000.
- Sharp Kabushiki Kaisha: See—  
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- Kimura, Shimichi, 4,793,245, Cl. 99-292.000.
- Kinugawa, Kiyoshi; and Kainoh, Seio, 4,794,234, Cl. 235-1.00D.
- Sharp Kabushiki Kaisha: See—  
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- Sharrow, James S., to GV Medical, Inc. Centering balloon structure for transluminal angioplasty catheter. 4,793,359, Cl. 128-658.000.
- Shaw, Herbert J.: See—  
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- Shealy, Noah A., to Dana Corporation. Shift motor assembly for a two-speed axle. 4,793,458, Cl. 192-141.000.
- Sheets, Kerney T. Cap for inverted water bottle. 4,793,514, Cl. 222-67.000.
- Sheldon, Donald H., Jr., to Deere & Company. Spindle moistener pad for a cotton harvester. 4,793,127, Cl. 56-41.000.
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- Shell Oil Company: See—  
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- Van Doorn, Johannes A.; Snel, Johannes J. M.; and Drent, Eit, 4,794,165, Cl. 528-392.000.
- Shell Western E&P Inc.: See—  
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- Sheltra, Ron: See—  
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- Shenker, Martin H.; and LaRusa, Joseph A., to Farrand Optical Co., Inc. Collimated optical visual simulation system. 4,793,687, Cl. 350-174.000.
- Shepherd, Roger M.: See—  
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- Shera, E. Brooks, to United States of America, Energy. Single molecule tracking. 4,793,705, Cl. 356-318.000.
- Sherwood Medical Company: See—  
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- Sheth, Prabhakar R. Method of manufacturing an antihypertensive, diuretic and antihypokalemic pharmaceutical composition with polyethylene glycol. 4,793,999, Cl. 424-451.000.
- Shewchuk, Peter. Threaded mounting for extruded pole. 4,793,111, Cl. 52-298.000.
- Shyoon, Gregory M.; and Aurichio, Joseph A., to National Starch and Chemical Corporation. Method of bonding a semiconductor chip to a substrate. 4,793,883, Cl. 156-235.000.
- Shibamoto, Yutaka: See—  
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- Shibata, Kazumi: See—  
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- Shibata, Masanori: See—  
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- Shibata, Yoshihiro: See—  
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- Shibasaki, Kenji; Kawai, Yoshihisa; and Wada, Kanji, to Minolta Camera Kabushiki Kaisha. Integral document processing apparatus equipped with an image forming system and a facsimile transmission system. 4,794,419, Cl. 355-3.00R.
- Shiga, Tsutomu: See—  
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- Shigenaga, Yoshimi: See—  
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- Shiiki, Zenya: See—  
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- Shimada, Keiichi: See—  
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- Shimada, Masaru: See—  
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- Shimamune, Takayuki; Hosonuma, Masashi; and Matsumoto, Yukio, to Permelec Electrode Ltd. Process for producing a calcium phosphate compound coated composite material. 4,794,023, Cl. 427-350.000.
- Shimamura, Takeo: See—  
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- Shimano Industrial Company Limited: See—  
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- Shimazaki, Tetsuo, to Alliance Research Corporation. Glass mounted antenna. 4,794,319, Cl. 343-715.000.
- Shimek, Daniel C.: See—  
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- Shimek, Ronald J.; and Shimek, Daniel C. Direct-vented gas fireplace. 4,793,322, Cl. 126-80.000.
- Shimizu, Akira: See—  
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- Shimizu, Fumaki: See—  
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- Shimizu, Katsuchi; Hosono, Toshio; and Sakamaki, Hisashi, to Canon Kabushiki Kaisha. Printing or copying apparatus. 4,794,423, Cl. 355-14.00R.
- Shimizu, Masao; Suzuki, Nobuyuki; and Katsuragawa, Mitsuhiro, to Canon Kabushiki Kaisha. Vibration wave motor. 4,794,294, Cl. 310-316.000.
- Shimoda, Sadaaki; Harada, Takamasa; Taguchi, Masaaki; and Ito, Kotachi, to Seiko Instruments, Inc. Ferro-electric liquid crystal electro-optical device having a drive voltage with DC and chopping components. 4,793,693, Cl. 350-350.00S.
- Shimotori, Kazumi; Ochi, Yoshiharu; Iahihara, Hideo; Umeki, Takenori; and Ishigami, Takashi, to Kabushiki Kaisha Toshiba. Highly pure titanium and process for producing the same. 4,793,854, Cl. 75-10.100.
- Shin-Etsu Polymer Co., Ltd.: See—  
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- Shin Niso Kako Co., Ltd.: See—  
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- Shinada, Keiko: See—  
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- Shini, Masami, to Fuji Kagakushi Kogyo Co., Ltd. Multi-usable pressure-sensitive transfer recording medium. 4,794,039, Cl. 428-321.300.
- Shintani, Katsuhiko, to Mazda Motor Corporation. Assembly line arrangement for producing vehicles. 4,793,055, Cl. 29-786.000.
- Shiota, Kazuo, to Fuji Photo Film Co., Ltd. Apparatus for recording image exactly corresponding to one displayed on video monitor. 4,794,460, Cl. 358-244.000.
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- Shirasaki, Osamu: See—  
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- Shirley, Arthur R., Jr.: See—  
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- Shishido, Yoshio, to Olympus Optical Co., Ltd. Endoscope having insertion and guide means. 4,793,326, Cl. 128-48.000.
- Shogren, David K.: See—  
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- Shook, Forrest A.; and DeSantis, Gerard J., to NLB. Apparatus for removing structural concrete. 4,793,734, Cl. 404-90.000.
- Shotbolt, Keith, to Bechtel Limited. Flexible riser system. 4,793,737, Cl. 405-169.000.
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- Shue, Ho-Jane: See—  
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- Siddoway, Mark A.; and Westby, Timothy S., to Shell Mining Company. In-situ coal drying. 4,793,656, Cl. 299-14.000.
- Sieber, Albrecht: See—  
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- Sieber, Jonathan D.; and Sieber, Joseph S. Writing system. 4,794,403, Cl. 346-33.00R.
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- Siebert, Rainer; and Gerum, Erich, to Diehl GmbH & Co. Time fuze for unpredictably-detonating scatter ammunition. 4,793,258, Cl. 102-311.000.
- Siegmund, Kenneth A.: See—  
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- Siemens Aktiengesellschaft: See—  
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- Boeck, Georg, 4,794,617, Cl. 372-92.000.
- Graal, Erwin; and Hansbauer, Hermann, 4,794,242, Cl. 235-482.000.
- Hirmke, Werner; and Losensky, Erich, 4,793,562, Cl. 241-101.200.
- Keck, Erich, 4,793,673, Cl. 350-96.100.
- Lukas, Josef; and Nicoltsios, Grammenos, 4,794,310, Cl. 318-342.000.
- Mahler, Matthias; and Rattner, Manfred, 4,793,329, Cl. 128-24.00A.
- Muller, Peter, 4,794,513, Cl. 364-167.010.
- Pastyr, Otto; and Maier-Borst, Wolfgang, 4,794,629, Cl. 378-152.000.
- Priestel, Gunter; and Seebold, Ralf, 4,793,721, Cl. 384-584.000.
- Siemens Transmission Systems, Inc.: See—  
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- Sieron, Richard L.: See—  
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- Siewert, Herbert G.; and Cowen, Russell A., to Tecumseh Products Company. Snap-on dust shield for automotive compressor clutch. 4,793,457, Cl. 192-112.000.
- Sigler, Gerald F., to Hoechst Celanese Corporation. Biotinylating agents. 4,794,082, Cl. 435-177.000.
- Sigler, Mark A.; Sigler, Timothy J.; and Day, Delbert E., to Myron International, Inc. Fiber filled dental porcelain. 4,793,809, Cl. 433-218.000.
- Sigler, Timothy J.: See—  
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- Signal Environmental Systems, Inc.: See—  
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- Signal Processors Limited: See—  
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- Signode Corporation: See—  
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- Kraus, George; and Roberts, Philip M., 4,793,870, Cl. 148-12.100.
- Signorini, Ernesto: See—  
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- Sigouin, Roger; and St Pierre, Michel, to Sigouin, Roger. Tree harvester. 4,793,389, Cl. 144-34.00R.
- Siliconix Incorporated: See—  
Blanchard, Richard A., 4,794,436, Cl. 357-23.800.
- Sills, Peter D.: See—  
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- Simmons, Garrett L.: See—  
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- Simon, Arvin B.: See—  
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- Simon, James A., to Eye Pro, Inc. Protective eyewear. 4,793,002, Cl. 2-12.000.
- Simon, Jean-Jacques: See—  
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- Simon, Myron S.: See—  
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- Simpkins, Robert M.: See—  
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- Simpson, George R.; and Sullivan, Herbert W., to Bos-Knox Ltd. Peristaltic electrostatic binary device. 4,794,370, Cl. 340-825.000.
- Simpson, Jeffery M.; and Tully, Clay E., to Yale Security Inc. Door closer and holder. 4,793,023, Cl. 16-58.000.
- Simpson, Richard O., to International Business Machines Corporation. Method for detecting modified object code in an emulator. 4,794,522, Cl. 364-200.000.
- Simpson, Richard S.: See—  
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- Skischuhfabrik Dynafit Gesellschaft m.b.H.: See—  
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- Speedling Incorporated: See—  
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- Spencer, Homer L.: See—  
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- Spitzner, Nona V., administratrix: See—  
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- Stein, Judith, to General Electric Company. Cyclic aminoalkylamines and their use as adhesion promoters in room temperature vulcanizable polydiorganosiloxane compositions, 4,794,192, Cl. 554-408.000.
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- Stephenson, Roger D.; Walters, James C.; and Richardson, Craig A., to Deere & Company. Hitch and drive structure for PTO-driven, semi-integral implement, 4,793,430, Cl. 180-14.400.
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- Stevens, R.D. Samuel; and Brown, Pauline M., to Solarchem Research, A Division of Brolor Investments Limited. Process for treatment of organic contaminants in solid or liquid phase wastes, 4,793,931, Cl. 210-636.000.
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- Stewart, Clyde F. Shower flooding system, 4,793,331, Cl. 128-66.000.
- Stewart, Kenneth W., Sr., to United Technologies Electro Systems, Inc. Cam-actuated electric door lock, 4,793,640, Cl. 292-201.000.
- Stewart, Robert E.; and Hooper, Donald F., to Digital Equipment Corporation. Microprogrammed data processing system using latch circuits to access different control stores with the same instruction at different times, 4,794,527, Cl. 364-200.000.
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- Stobb, Walter J., to Stobb Inc. Apparatus and method for trimming signatures, 4,793,227, Cl. 83-21.000.
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- Stoudt, Michael D.; Mosehauer, Michael; Zeise, Eric K.; Spitzner, Jerome G., deceased (by Spitzner, Nona V., administratrix); McDowell, David Q.; and Tsilibes, George N., to Eastman Kodak Company. Apparatus and method for electrophotographically producing copies from originals having continuous-tone and other content, 4,794,421, Cl. 355-3.00R.
- Stow, Christine C.: See—  
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- Stow, Michael W., to Fisons plc. Aqueous rooting gel, 4,793,095, Cl. 47-59.000.
- Strand, Glen L., to TCI, Inc. Truck mounted fertilizer applicator using fluid conveying, 4,793,742, Cl. 406-79.000.

- Strasser, Werner; and Lewis, Edward C., to Texas Instruments Incorporated. Lubrication sensor apparatus, 4,793,188, Cl. 73-745.000.
- Stratton, Donald W.; Bianco, Michael A.; and Roadarmel, Gary W., to Anderson Company of Indiana, The. Noise insulator for windshield wiper blade assembly, 4,793,020, Cl. 15-250.420.
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- Sugimura, Nobuyuki. Bladder supporting device in an accumulator, 4,793,381, Cl. 138-30.000.
- Sugiyama, Masato; Katsumata, Kenji; Hirahata, Shigeru; Nakagawa, Isao; Suzuki, Sunao; Achiha, Masahiko; and Ishikura, Kazuo, to Hitachi, Ltd.; and Hitachi Video Engineering, Inc. Movement detection circuit of a video signal used in a television receiver, 4,794,454, Cl. 358-105.000.
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- Surawski, Stephen J.; Cowles, Larry W.; and Muller, John J., to Colt Industries Inc. Electronic firing system for target pistol, 4,793,085, Cl. 42-84.000.
- Surdyke, Keith R.: See—  
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- Sussman, Michael; and Kipman, Yair, to Xerox Corporation. Hand held optical scanner for omni-font character recognition, 4,793,812, Cl. 434-116.000.
- Suyama, Satoshi; Arakawa, Toru; Masaki, Kiyoshi; and Oba, Sonji, to Matsushita Electric Industrial Co. Ltd. Apparatus for loading and driving an information recording medium encased in a cartridge, 4,794,481, Cl. 360-99.060.
- Suzuki: See—  
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- Suzuki, Hiroyuki; and Kawata, Kazuhide, to NEC Corporation. Signal generator generating character data having contour, 4,794,451, Cl. 358-96.000.
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- Suzuki, Kazuo: See—  
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- Suzuki, Nobuyuki: See—  
Shimizu, Masao; Suzuki, Nobuyuki; and Katsuragawa, Mitsuhiro, 4,794,294, Cl. 310-316.000.
- Suzuki, Norihiro: See—  
Saito, Tomo; Sakurabayashi, Yasusuke; Inouchi, Toshitsugu; and Suzuki, Norihiro, 4,794,450, Cl. 358-93.000.
- Suzuki, Ryuji: See—  
Aoyagi, Masao; Kamata, Shigeru; and Suzuki, Ryuji, 4,793,689, Cl. 350-255.000.
- Suzuki, Sunao: See—  
Sugiyama, Masato; Katsumata, Kenji; Hirahata, Shigeru; Nakagawa, Isao; Suzuki, Sunao; Achiha, Masahiko; and Ishikura, Kazuo, 4,794,454, Cl. 358-105.000.
- Suzuki, Taizo: See—  
Niimi, Itaru; Hashimoto, Kametaro; Noguchi, Masamitsu; Arakawa, Tadaoki; Suzuki, Taizo; and Imada, Kunio, 4,793,970, Cl. 420-447.000.
- Suzuki, Tetsuo; and Yamashita, Toshiharu, to Hoya Corporation. Photochromatic gradient lens having two color tones and process for producing same, 4,794,435, Cl. 351-163.000.
- Suzuki, Toru: See—  
Toriata, Shigenori; Imaizumi, Hisakira; Suzuki, Toru; Matsuda, Tomoo; Hirooka, Masatake; Nishi, Yokichi; Hosoi, Mitsuo; Tsurumaki, Nanya; and Takitani, Yukitaka, 4,794,634, Cl. 379-96.000.
- Suzuki, Yasuo: See—  
Koizumi, Minoru; Mori, Kinji; Suzuki, Yasuo; Orimo, Masayuki; Kawano, Katsumi; Kasashima, Hirokazu; and Nakai, Kozo, 4,794,519, Cl. 364-200.000.
- Svec, Frantisek: See—  
Peaka, Jan; Lenfeld, Jiri; Plichta, Zdenek; Benes, Milan; Svec, Frantisek; and Coupek, Jiri, 4,794,177, Cl. 536-112.000.
- Svensson, E. Gunnar: See—  
Jonas, Mats; and Svensson, E. Gunnar, 4,794,497, Cl. 362-143.000.
- Svensson, Tommy: See—  
Barkman, Lars; Fors, Torbjorn; Fardig, Hakan; and Svensson, Tommy, 4,794,223, Cl. 219-124.340.
- Swain, Michael R., to University of Miami. Air flow management in an internal combustion engine through the use of electronically controlled air jets, 4,793,306, Cl. 123-308.000.
- Sweet, Phillip J.: See—  
Hamilton, James M.; and Sweet, Phillip J., 4,793,468, Cl. 198-750.000.
- Sweetman, Robert J.: See—  
Wooten, Robert D.; Sweetman, Robert J.; Harbourn, Andrew D. P.; and Ury, Michael G., 4,794,503, Cl. 362-346.000.
- Swenson, Harold W.; and Betzig, Patricia A., to Davidson Textron Inc. Apparatus having fluid pressure plastic skin folding means for making foamed articles, 4,793,793, Cl. 425-503.000.
- Swersey, Burt L., to Cobe Asdt, Inc. Hospital bed with an integrated scale, 4,793,428, Cl. 177-144.000.
- Swift, Allan W., to E. J. Brooks Company. Security seal with dye, 4,793,644, Cl. 292-320.000.
- Swiontek, Anthony J., to James River Corporation. Package assembly including a multi-surface, microwave interactive tray, 4,794,005, Cl. 426-107.000.
- Sword, Alexander F. Connector (slider), 4,793,726, Cl. 403-316.000.
- Sydlov, Thomas. Compact foldable golf cart, 4,793,622, Cl. 280-40.000.
- Synthelabo: See—  
Manoury, Philippe; Binet, Jean; and Aletru, Michel, 4,794,120, Cl. 514-249.000.
- Rossey, Guy; and Long, David, 4,794,185, Cl. 546-121.000.
- Synthetic Blood Corporation: See—  
Ecanow, Bernard, 4,794,000, Cl. 424-457.000.
- Szabados, Rudolph J.: See—  
Berg, Lloyd; and Szabados, Rudolph J., 4,793,901, Cl. 203-51.000.
- Szajani, Bela: See—  
Boross, László; Darózi, Ivan; Hoschke, Agoston; Kartossy, Jenő; László, Elemér; Ludwig, László; Klamár, Gabriella; and Szajani, Bela, 4,794,083, Cl. 435-180.000.



Szalvay, Laszlo, to Raychem Corporation. Assembly for repairing a damaged pipe. 4,793,382, Cl. 138-98.000.

Szezipari Kutatointezet: See—

Boross, Laszlo; Darosi, Ivan; Hoeschke, Agoston; Kurtosy, Jeno; Laszlo, Elmer; Ludwig, Laszlo; Klamar, Gabriella; and Szajani, Bela, 4,794,083, Cl. 435-180.000.

Szocs, Zoltan: See—

Klein, Hans-Hermann; and Szocs, Zoltan, 4,794,330, Cl. 324-132.000.

Tabata, Kazufumi: See—

Kashiwaya, Kunio; Haga, Hiroyo; Saeki, Nobuo; Yabuki, Youichi; Ozoe, Kuniyuki; Fukushima, Shinichi; and Tabata, Kazufumi, 4,793,048, Cl. 29-433.000.

Tabuchi, Yasuo; Nakano, Masao; Kato, Kichiro; and Kurata, Tomoyuki, to Nippondenso Co., Ltd.; Toyota Jidosha Kabushiki Kaisha; and Bridgestone Corporation. Electromagnetic coupling. 4,793,455, Cl. 192-84.000.

Taezner, Jon C., to Adept Technology, Inc. Variable reluctance stepper motor. 4,794,286, Cl. 310-12.000.

Taft, Jeffrey D.; and Ellison, James F., to Westinghouse Electric Corp. Through flame optical viewing. 4,794,452, Cl. 358-100.000.

Tagaya, Nobuaki; Kuwahara, Hideyuki; Hashimoto, Takao; Komatsu, Noriko; Fukamachi, Keiko; and Maeshima, Tsugio, to Toa Nenryo Kogyo Kabushiki Kaisha. Calcium-phosphate type hydroxyapatite and process for producing same. 4,794,171, Cl. 530-417.000.

Taggi, Arthur J.; and Trout, Torrence J., to Du Pont de Nemours, E. I., and Company. Process for preparation of liquid electrostatic developer. 4,794,066, Cl. 430-137.000.

Taguchi, Masaaki: See—

Shimoda, Sadaaki; Harada, Takamasa; Taguchi, Masaaki; and Ito, Kokichi, 4,793,693, Cl. 350-350.005.

Tahara, Kazuo: See—

Abukawa, Toshimi; Tahara, Kazuo; Takahashi, Noriyoshi; and Tomite, Toshio, 4,794,291, Cl. 310-154.000.

Tai, Anthony M.: See—

Cindrich, Ivan; Carrara, Walter G.; LaHaie, Ivan J.; and Tai, Anthony M., 4,794,395, Cl. 342-424.000.

Taig, Alistair G.; Grabill, Paul J.; and Jackson, Robert W., to Allied-Signal Inc. Electrically operated disc brake. 4,793,447, Cl. 188-72.100.

Taillade, Jacques: See—

Van Luyt, Balthazar A. G.; Bruno, Richard; and Taillade, Jacques, 4,794,465, Cl. 358-341.000.

Taisei Road Construction Co., Ltd.: See—

Chiba, Tatsuhiko; and Igarashi, Ken-ichi, 4,793,733, Cl. 404-90.000.

Taisho Pharmaceutical Co., Ltd.: See—

Takahashi, Yasuji; Tanaka, Shigeo; Tsunoda, Kenji; Kawamata, Ichirou; and Murayama, Hiroshi, 4,794,106, Cl. 514-179.000.

Takahashi, Yasuji; Tanaka, Shigeo; Kawamata, Ichirou; and Murayama, Hiroshi, 4,794,107, Cl. 514-179.000.

Taiyo Fishery Co., Ltd.: See—

Ozaki, Hirotada, 4,794,007, Cl. 426-271.000.

Tajima, Akio, to Seikosha Co., Ltd. Paper detector of printer. 4,793,605, Cl. 271-9.000.

Takabe, Fumio; Kitadate, Masashi; Sumiyoshi, Makoto; Igarashi, Kiyohiko; Suzuki, Kazuo; and Akita, Takashi, to Toyota Jidosha Kabushiki Kaisha. Apparatus and method for exchanging electrode chips used for resistance welding. 4,794,221, Cl. 219-86.800.

Takada, Juichiro. Mounting for inflatable safety bag. 4,793,631, Cl. 280-743.000.

Takafuji, Hirotsuke. Chair with height-adjustable seat. 4,793,654, Cl. 297-338.000.

Takagi, Kazutoshi; and Kitajima, Nobuaki, to Tokyo Kogaku Kikai Kabushiki Kaisha. Gaze-fixing device for surgical microscope. 4,793,700, Cl. 350-507.000.

Takagi, Shoyo: See—

Kobashi, Toshiyuki; Naka, Hideo; and Takagi, Shoyo, 4,794,152, Cl. 526-273.000.

Takahara, Naoki: See—

Fujii, Noriaki; Iwata, Takeshi; and Takahara, Naoki, 4,793,297, Cl. 123-90.230.

Takahashi, Ichiro; Okamoto, Goro; and Okahashi, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. Electrode supporting conduit tube for electrical heating or underground hydrocarbon resource. 4,794,049, Cl. 428-460.000.

Takahashi, Keiko; and Wakabayashi, Toshio, to Terumo Corporation. Method of treating hyperlipemia. 4,794,115, Cl. 514-356.000.

Takahashi, Koichi: See—

Hirata, Shigeru; Yajima, Hideyuki; and Takahashi, Koichi, 4,794,363, Cl. 337-314.000.

Takahashi, Noriyoshi: See—

Abukawa, Toshimi; Tahara, Kazuo; Takahashi, Noriyoshi; and Tomite, Toshio, 4,794,291, Cl. 310-154.000.

Takamatsu, Ryoji: See—

Yoshitoshi, You; Toyoguchi, Tautomu; and Takamatsu, Ryoji, 4,794,588, Cl. 369-263.000.

Takanohashi, Kunio; Yamano, Toru; and Tanaka, Mitsutaka, to Takeda Chemical Industries, Ltd. 2-Alkyl-4-amino-5-aminomethylpyrimidines. 4,794,182, Cl. 544-326.000.

Takao, Hideaki: See—

Kamio, Masaru; Motoi, Taiko; and Takao, Hideaki, 4,793,692, Cl. 350-311.000.

Takao, Shoichi: See—

Kawai, Kimitoshi; Matsuyama, Akinobu; and Takao, Shoichi, 4,794,081, Cl. 435-66.000.

Takahashi, Yasuji; Tanaka, Shigeo; Tsunoda, Kenji; Kawamata, Ichirou; and Murayama, Hiroshi, to Taisho Pharmaceutical Co., Ltd. Cream. 4,794,106, Cl. 514-179.000.

Takahashi, Yasuji; Tanaka, Shigeo; Kawamata, Ichirou; and Murayama, Hiroshi, to Taisho Pharmaceutical Co., Ltd. Ointment. 4,794,107, Cl. 514-179.000.

Takeda Chemical Industries, Ltd.: See—

Hasegawa, Toru; Harada, Setsuo; and Yamazaki, Toshiyuki, 4,794,105, Cl. 514-25.000.

Kishimoto, Shoji; Sendai, Michiyuki; and Ochiai, Michihiko, 4,794,108, Cl. 514-210.000.

Takanohashi, Kunio; Yamano, Toru; and Tanaka, Mitsutaka, 4,794,182, Cl. 544-326.000.

Takeda, Kenji: See—

Miyatake, Kimio; Imaki, Takao; and Takeda, Kenji, 4,794,255, Cl. 250-343.000.

Takeda, Mikio: See—

Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiko; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,794,118, Cl. 514-452.000.

Takei, Toshihiro: See—

Ishihara, Nobuaki; Takei, Toshihiro; Hattori, Yoshiyuki; and Okazaki, Koji, 4,793,780, Cl. 418-65.000.

Takeichi, Kenzo: See—

Kano, Minoru; Takeichi, Kenzo; Makita, Minoru; Hisatomi, Ryochi; and Takemoto, Akinobu, 4,794,312, Cl. 318-599.000.

Takemoto, Akinobu: See—

Kano, Minoru; Takeichi, Kenzo; Makita, Minoru; Hisatomi, Ryochi; and Takemoto, Akinobu, 4,794,312, Cl. 318-599.000.

Takeuchi, Hirotsu; Miyazaki, Osahiko; Kazama, Yasuo; and Kurihara, Naoya, to Nitto Kohki Co., Ltd. Opti-mechanical torque indicating connecting member. 4,793,751, Cl. 411-13.000.

Takeuchi, Kiyoshi: See—

Yanai, Eiji; Hashimoto, Tsuguo; Takeuchi, Kiyoshi; Asao, Takashi; and Noguchi, Yoshiki, 4,793,141, Cl. 60-657.000.

Takeuchi, Mikio: See—

Nakano, Kinichiro; and Takeuchi, Mikio, 4,794,268, Cl. 307-10.0AT.

Takeuchi, Susumu; and Morizumi, Koichi, to Mitsubishi Denki Kabushiki Kaisha. Charged beam pattern defect inspection apparatus. 4,794,646, Cl. 382-8.000.

Takeuchi, Tomio: See—

Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Tanaka, Akihiro; and Sakamoto, Shuichi, 4,794,173, Cl. 536-7.100.

Takeuchi, Yoichi: See—

Hirose, Tadashi; Nakao, Kazuo; Takeuchi, Yoichi; and Shinada, Keiko, 4,794,529, Cl. 364-300.000.

Takeuchi, Yoichi: See—

Hirose, Tadashi; Nakao, Kazuo; Sakoda, Kousuke; and Takeuchi, Yoichi, 4,794,528, Cl. 364-300.000.

Takitani, Yukitaka: See—

Torihata, Shigenori; Imaizumi, Hisakira; Suzuki, Toru; Matsuda, Tomoo; Hirooka, Masatake; Nishi, Yokichi; Hosoi, Mitsuo; Tsurumaki, Naoya; and Takitani, Yukitaka, 4,794,634, Cl. 379-96.000.

Takizawa, Yoshioori, to Kabushiki Kaisha Toshiba. Solid-state color imaging apparatus for preventing color alias. 4,794,448, Cl. 358-44.000.

Talbot, Charles. Load gripping hand cart. 4,793,623, Cl. 280-47.240.

Tamata, Shin: See—

Izumida, Tatsuo; Yusa, Hideo; Funabashi, Kiyomi; Kikuchi, Makoto; and Tamata, Shin, 4,793,947, Cl. 252-628.000.

Tamazaki, Kazunori: See—

Kubota, Yuichi; Koga, Keiji; Tamazaki, Kazunori; Aoyama, Tsutomu; and Watanabe, Akio, 4,794,042, Cl. 428-328.000.

Tamiya, Morito, to Casio Computer Co., Ltd. Electronic calculator having a graph display function. 4,794,554, Cl. 364-710.010.

Tamura Electric Works, Ltd.: See—

Kanno, Kenichi; Ojima, Hisami; and Okumura, Senji, 4,794,641, Cl. 379-165.000.

Tamura, Sakae; Uehara, Tsutomu; Okuyama, Tetsuo; and Yamazaki, Mutsuki, to Kabushiki Kaisha Toshiba. Ink jet system. 4,794,463, Cl. 358-296.000.

Tanabe, Masa-aki: See—

Sugawara, Yoshitaka; Kitano, Junjiro; Kimura, Tadakatsu; Inabe, Yasunobu; and Tanabe, Masa-aki, 4,794,461, Cl. 357-38.000.

Tanabe Seiyaku Co., Ltd.: See—

Oino, Toyonari; Yamada, Yoshihisa; and Sugano, Hiroshi, 4,794,186, Cl. 546-209.000.

Tanabe, Toshiyuki; and Ando, Morio, to Kabushiki Kaisha Toshiba. Apparatus for reliably fetching data, on the basis of framing code detection process, and method therefor. 4,794,626, Cl. 375-110.000.

Tanaka, Akihiro: See—

Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi, Tomio; Tanaka, Akihiro; and Sakamoto, Shuichi, 4,794,173, Cl. 536-7.100.

Tanaka, Gotaro: See—

Yokota, Hiroshi; Kanamori, Hiroo; Tanaka, Gotaro; Suganuma, Hiroshi; and Danzuka, Toshio, 4,793,842, Cl. 65-3.110.

Tanaka Kikinzoku Kogyo: See—

Furuya, Nagakazu; and Motoo, Satoshi, 4,793,902, Cl. 204-13.000.

Tanaka, Masato; and Himeno, Takuji, to Sony Corporation. Method for error detection. 4,794,602, Cl. 371-37.000.

Tanaka, Mitsutaka: See—

Takanohashi, Kunio; Yamano, Toru; and Tanaka, Mitsutaka, 4,794,182, Cl. 544-326.000.

Tanaka, Nobuyoshi; and Matsumoto, Shigeyuki, to Canon Kabushiki Kaisha. Semiconductor device and process for producing same. 4,794,443, Cl. 357-43.000.

Tanaka Seiki Co., Ltd.: See—

Suekane, Yoji, 4,793,563, Cl. 242-1.000.

Tanaka, Shigeo: See—

Takahashi, Yasuji; Tanaka, Shigeo; Tsunoda, Kenji; Kawamata, Ichirou; and Murayama, Hiroshi, 4,794,106, Cl. 514-179.000.

Takahashi, Yasuji; Tanaka, Shigeo; Kawamata, Ichirou; and Murayama, Hiroshi, 4,794,107, Cl. 514-179.000.

Tanaka, Shiro: See—

Igarashi, Shiro; Matsubara, Mamoru; and Tanaka, Shiro, 4,793,072, Cl. 34-9.000.

Tanaka, Toshiyuki: See—

Ohnishi, Yutaka; Yoshinaka, Shinji; Tanaka, Toshiyuki; Koguchi, Minoru; Obitsu, Takeo; Koguchi, Minoru; and Obitsu, Takeo, 4,794,069, Cl. 430-338.000.

Tanaka, Yuichi: See—

Hiramatsu, Takeo; Tanaka, Yuichi; and Nakamura, Hisaji, 4,793,216, Cl. 74-866.000.

Tangorra, Frank. Perpetual calendar. 4,793,080, Cl. 40-122.000.

Taniguchi, Morio; Nakanaga, Ryusuke; and Yano, Noriko, to House Food Industrial Company Limited. Method of manufacturing dried rice with pregelatinized starch content. 4,794,012, Cl. 426-462.000.

Taniuchi, Kazumasa; Toriyama, Masayuki; Tottori, Takumi; and Shibata, Kazumi, to Honda Giken Kogyo Kabushiki Kaisha. Exhaust timing control device for two cycle engines. 4,793,347, Cl. 123-323.000.

Tanno, Koutarou: See—

Shirashi, Mikio; Gotoh, Toshihiko; Tanno, Koutarou; and Hamma, Kentaro, 4,794,404, Cl. 346-76.0PH.

Taoda, Hiroshi: See—

Hayakawa, Kiyoshi; Yamakita, Hiromi; Tazawa, Masato; and Taoda, Hiroshi, 4,794,130, Cl. 522-33.000.

Tarkett Inc.: See—

Lussi, Edward F.; and Manning, Andrew J., 4,794,020, Cl. 427-195.000.

Tarr, Larry E.: See—

Holmquist, Howard W.; and Tarr, Larry E., 4,793,903, Cl. 204-33.000.

Tate, Kazuhito; Yoshida, Hajime; and Sasaki, Teruhiko, to Mitsubishi Oil Co., Ltd. Process for producing a pitch having a low softening point. 4,793,912, Cl. 208-44.000.

Tate, Takuo, to Nippon Filcon Co., Ltd. Stainproof woven fabric for paper making and method for making the same. 4,794,036, Cl. 428-263.000.

Tattermusch, Peter, to Daimler-Benz Aktiengesellschaft. Motor vehicle with front wheel and rear wheel steering, in particular four-wheel steering. 4,793,432, Cl. 180-142.000.

Taub, Howard H.; and Denler, Gordon D., to Hewlett-Packard Company. Barrier structure for thermal ink-jet printheads. 4,794,410, Cl. 346-140.000.

Taub, Howard H.; and Denler, Gordon D., to Hewlett-Packard Company. Thermal ink-jet head structure with orifice offset from resistor. 4,794,411, Cl. 346-140.000.

Tauszik, Giorgio R.: See—

Roffia, Paolo; Padovan, Mario; Leofanti, Giuseppe; Mantegazza, Maria A.; De Alberti, Giordano; and Tauszik, Giorgio R., 4,794,198, Cl. 564-267.000.

Tayco Developments, Inc.: See—

Taylor, Paul H., 4,793,451, Cl. 188-316.000.

Taylor, Bradley J.: See—

Dunfield, John S.; and Taylor, Bradley J., 4,793,897, Cl. 156-643.000.

Taylor, Christopher L. Universal precision positioning jig. 4,793,604, Cl. 269-303.000.

Taylor, John E.; White, Christopher J.; and Nevett, Jonathan E., to BICC plc. Optical cable with nonmetallic reinforcing elements. 4,793,685, Cl. 350-96.230.

Taylor, Mark E.: See—

Wheeler, Steven A.; and Taylor, Mark E., 4,793,418, Cl. 166-357.000.

Taylor, Paul H., to Tayco Developments, Inc. Energy absorber device with plastic casing and screw-in plastic seal. 4,793,451, Cl. 188-316.000.

Tazawa, Masato: See—

Hayakawa, Kiyoshi; Yamakita, Hiromi; Tazawa, Masato; and Taoda, Hiroshi, 4,794,130, Cl. 522-33.000.

TBL Development Corporation: See—

Towns, Edward J.; Brown, Edward M.; and Lester, William M., 4,793,122, Cl. 53-421.000.

Towns, Edward J.; and Brown, Edward M., 4,793,503, Cl. 215-250.000.

Towns, Edward J.; and Brown, Edward M., 4,793,504, Cl. 215-250.000.

Towns, Edward J.; Brown, Edward M.; and Lester, William M., 4,793,505, Cl. 215-250.000.

TCL Inc.: See—

Strand, Glen L., 4,793,742, Cl. 406-79.000.

TDK Corporation: See—

Kubota, Yuichi; Koga, Keiji; Tamazaki, Kazunori; Aoyama, Tsutomu; and Watanabe, Akio, 4,794,042, Cl. 428-328.000.

Teac Corporation: See—

Furuyama, Hiroaki, 4,794,582, Cl. 369-54.000.

Tech Zeal Industrial Company Ltd.: See—

Wang, Kuo-Hsien, 4,794,379, Cl. 340-624.000.

Tecnodelta S.A.: See—

Mantovani, Elia, 4,793,039, Cl. 29-38.00B.

Tecumseh Products Company: See—

Siewert, Herbert O.; and Cowen, Russell A., 4,793,457, Cl. 192-112.000.

Tedeschi, Donald A.: See—

Braden, Jennifer T.; Burroway, Gary L.; Bullard, Herbert L.; and Tedeschi, Donald A., 4,794,139, Cl. 524-117.000.

Tedner, Bo, to Karolinska Institutet. Method and apparatus for monitoring the fluid balance of the body. 4,793,362, Cl. 128-734.000.

Teepak, Inc.: See—



- Thomas, Thompson J.: See—  
Curtis, Daniel L.; Skrzypczyk, William G.; and Thomas, Thompson J., 4,793,047, Cl. 29-407.000.
- Thompson, John H.: See—  
Bratton, Raymond J.; Geil, Frederick G.; Thompson, John H.; and Schoch, Karl F., Jr., 4,793,429, Cl. 177-210.000.
- Thompson, Louis J.; McIntyre, Peter M.; and Carta, James K. Method and apparatus for continuously boring and lining tunnels and other like structures. 4,793,736, Cl. 405-146.000.
- Thompson, Mortimer S., to Tri-Tech Systems International Inc. Closure cap with a seal and method of and apparatus for forming such closure and seal. 4,793,306, Cl. 215-344.000.
- Thompson, Priscilla B. Structure for detachably receiving at least one retaining board in variable configuration. 4,793,308, Cl. 220-22.100.
- Thompson, Robert E.; and Geiser, Kurt M., to Signal Environmental Systems, Inc. Method for enhancing the separation capacity of a multi-bed filtration system. 4,793,934, Cl. 210-715.000.
- Thompson, Robert R., to Motorola, Inc. Microprocessor having self-programmed eeprom. 4,794,558, Cl. 364-900.000.
- Thomson-CGR: See—  
Ploix, Jean L., 4,794,630, Cl. 378-99.000.
- Thomson-CSF: See—  
Gillet, Claude; Voisin, Gerard; and Bruyeres-Inza, Jean-Francois, 4,794,457, Cl. 358-162.000.
- Grall, Georges, 4,794,574, Cl. 367-87.000.
- Grimaldi, Jean L., 4,794,627, Cl. 375-114.000.
- Meunier, Paul L.; and Razeghi, Manijeh, 4,793,872, Cl. 148-33.400.
- Robin, Philippe; Chastang, Evelyne; Pocholle, Jean P.; and Raffy, Jean, 4,794,045, Cl. 428-411.100.
- Thorne, John. Air cleaners. 4,793,838, Cl. 55-378.000.
- Thornell, Ernest L., to Spang & Company. Adjustable height toy basketball goal. 4,793,611, Cl. 273-1.50R.
- Thrall Car Manufacturing Company: See—  
Smith, Sam D., 4,793,449, Cl. 188-107.000.
- Tillery, Michael L.; and Beall, Paul F., to Arachnid, Inc. Self-scoring electronic target game with video display. 4,793,618, Cl. 273-376.000.
- Tillotson, Ltd.: See—  
Scott, William A., 4,793,951, Cl. 261-35.000.
- Tilman, Menachem: See—  
Gross, Joseph; Lowenstein, David; Tilman, Menachem; and Rosenberg, Etan, 4,793,010, Cl. 5-109.000.
- Times Corporation: See—  
Schwartz, Herbert; Mose, Friedrich; and Sedlak, Adolf, 4,794,576, Cl. 368-185.000.
- Torrence, Arthur, 4,793,666, Cl. 312-134.000.
- Timony, Peter E.: See—  
Leone-Bay, Andrea; and Timony, Peter E., 4,794,189, Cl. 548-342.000.
- Tingakog, Lennart: See—  
Johansson, Robert; and Tingakog, Lennart, 4,793,467, Cl. 198-518.000.
- Tippen, Kurt; and Abendroth, Georg, to Carl Still GmbH & C.K.G. Process for cooling crude coke oven gas. 4,793,834, Cl. 55-85.000.
- Tischer, Kurt-Manfred; Rose, Harald; Spehr, Rainer; and Schonecker, Gerald, to Standard Elektrik Lorenz AG. Flat picture-reproducing device. 4,794,306, Cl. 315-169.300.
- Titeflex Corporation: See—  
Lalika, James M.; and Waite, Harold K., 4,793,384, Cl. 138-121.000.
- Toa Nanyo Kogyo Kabushiki Kaisha: See—  
Tagaya, Nobuaki; Kuwahara, Hideyuki; Hashimoto, Takao; Komatsu, Noriko; Fukamachi, Keiko; and Maehama, Tsugio, 4,794,171, Cl. 530-417.000.
- Tobias, Theodore: See—  
Manning, Larry F.; and Tobias, Theodore, 4,793,477, Cl. 206-232.000.
- Toda, Haruhisa; Murata, Shiroo; and Fujihisa, Hiroaki, to Mitsubishi Denki Kabushiki Kaisha. Multi-pole circuit interrupter. 4,794,357, Cl. 335-46.000.
- Toda, Haruki: See—  
Sahara, Hiroshi; Toda, Haruki; and Ohshima, Shigeo, 4,794,569, Cl. 365-203.000.
- Toda, Minoru; and Alphonse, Gerard A., to General Electric Company. Optical coupling system. 4,793,679, Cl. 350-96.150.
- Todd, George K., Sr., to Speedling Incorporated. Plant growing and handling system. 4,793,096, Cl. 47-59.000.
- Todoroki, Ryuichi: See—  
Saeiki, Yoshifumi; Watanabe, Shigeru; and Todoroki, Ryuichi, 4,794,643, Cl. 380-15.000.
- Togami, Chris K., to Hewlett-Packard Company. Self-gapping optical encoder. 4,794,250, Cl. 250-231.05E.
- Togashi, Hiroshi: See—  
Ojima, Kuniko; Matsumoto, Yukio; Togashi, Hiroshi; and Ogino, Hiroshi, 4,794,040, Cl. 428-323.000.
- Togashi, Takahiko; Kanamura, Tomotsugu; Mori, Yoshiyuki; Sato, Yoshinori; Inoue, Yasuji; and Tsuchida, Teruhiro, to Mitsubishi Rayon Co., Ltd. Thin-metal-wire conjugated yarn. 4,793,130, Cl. 57-210.000.
- Tohyama, Shunroku: See—  
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- Tokai Rubber Industries, Ltd.: See—  
Ishioaka, Yutaka, 4,793,599, Cl. 267-140.100.
- Toko, Inc.: See—  
Yokoyama, Hajime, 4,794,650, Cl. 455-197.000.
- Tokuhara, Mitsuhiro, to Canon Kabushiki Kaisha. Projection apparatus provided with an electro-mechanical transducer element. 4,793,699, Cl. 350-487.000.
- Tokumaru, Hisashi: See—  
Mukai, Hirotsu; Ishida, Tokuji; and Tokumaru, Hisashi, 4,794,416, Cl. 354-402.000.
- Tokyo Kogaku Kikai Kabushiki Kaisha: See—  
Takagi, Kazutoshi; and Kitajima, Nobuaki, 4,793,700, Cl. 350-507.000.
- Tokyo Ohka Kogyo Co., Ltd.: See—  
Ishikawa, Tsutomu; Nakayama, Munec; Hashimoto, Akira; and Nishimura, Toshihiro, 4,793,862, Cl. 106-287.150.
- Tomite, Toshio: See—  
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- Tomko, Donna L.; and Harbison, Kenneth, to Eastman Kodak Company. Optically brightened photographic silver halide element with a polyolefin paper coated support. 4,794,071, Cl. 430-538.000.
- Toner, John L.: See—  
Hinshaw, Jerald C.; Toner, John L.; and Reynolds, George A., 4,794,191, Cl. 349-211.000.
- Tong, Elias K.; and Kozior, Thomas E., to Raytheon Company. Selective backside plating of gas monolithic microwave integrated circuit. 4,794,093, Cl. 437-203.000.
- Torao, Akira: See—  
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- Toray Industries Incorporated: See—  
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- Mizuno, Masaharu; and Katoh, Mituo, 4,793,131, Cl. 57-243.000.
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- Toriawara, Akira, to Canon Kabushiki Kaisha. Stepping motor with divided stator pole pieces. 4,794,292, Cl. 310-257.000.
- Toriyama, Masayuki: See—  
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- Torobin, Leonard B. Hollow porous microspheres as substrates and containers for catalyst. 4,793,980, Cl. 423-213.500.
- Torrence, Arthur, to Times Corporation. Motion display for articles inside a showcase. 4,793,666, Cl. 312-134.000.
- Toshiba Kikai Kabushiki Kaisha: See—  
Sekiya, Isao, 4,794,220, Cl. 219-10.491.
- Toshiba Machine Co., Ltd.: See—  
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- Toshiba Silicone Co., Ltd.: See—  
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- Toso Susteel Co., Ltd.: See—  
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- Tozoh Corporation: See—  
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- Kato, Toshikazu; Inoue, Hiroshi; and Emura, Noriaki, 4,794,161, Cl. 528-388.000.
- Toth, Vincent A.: See—  
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- Tottori, Takumi: See—  
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- Toussaint, Robert E., to Mobil Oil Corporation. Primer for PVDC topcoats on OPP film. 4,794,136, Cl. 524-512.000.
- Toussaint, Roberts M.: See—  
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- Towns, Edward J.; Brown, Edward M.; and Lester, William M., to TBL Development Corporation. Tamper-indicating closure for a container, container and method for making same. 4,793,122, Cl. 53-421.000.
- Towns, Edward J.; and Brown, Edward M., to TBL Development Corporation. Container closure. 4,793,503, Cl. 215-250.000.
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- Toyama, Eiji; Sugano, Akira; and Nomura, Masahide, to Hitachi, Ltd. Digital controlling device. 4,794,512, Cl. 364-140.000.
- Toyo Roki Seizo K.K.: See—  
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- Toyo Soda Manufacturing Co., Ltd.: See—  
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- Toyoda Koki Kabushiki Kaisha: See—  
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- Eto, Kunihiko; Ohno, Akihiko; and Mori, Yutaka, 4,794,536, Cl. 364-424.050.
- Toyoguchi, Tsutomu: See—  
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- Toyoshi, Naoki: See—  
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- Toyota Jidosha Kabushiki Kaisha: See—  
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- Morisawa, Kunio; Kakamu, Michitaka; and Kato, Nobuyuki, 4,793,217, Cl. 74-866.000.
- Ohe, Junzo; and Kondo, Hiroaki, 4,794,397, Cl. 343-712.000.
- Tabuchi, Yasuo; Nakano, Masao; Kato, Kichiro; and Kurata, Tomoyuki, 4,793,455, Cl. 192-84.00C.
- Takabe, Fumio; Kitadate, Masahiko; Sumiyoshi, Makoto; Igarashi, Kiyohiko; Suzuki, Kazuo; and Akita, Takashi, 4,794,221, Cl. 219-86.800.
- Tsurusaki, Shinji, 4,793,318, Cl. 123-571.000.
- Wada, Hiroki, 4,793,294, Cl. 123-52.0MB.
- Toyozawa, Yukio: See—  
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- Traa, Einar O., to Tektronix, Inc. Multiple phase clock generator. 4,794,275, Cl. 307-269.000.
- Tracey, Joseph F.; Weifenbach, David G.; and Turner, Mitchell D., to Westinghouse Electric Corp. Method and apparatus for characterizing a broad spectrum signal. 4,794,324, Cl. 324-77.00A.
- Transpower A/S: See—  
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- Tranter, Donald F.: See—  
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- Tregay, George W., to Conax Buffalo Corporation. Optical fiber temperature sensor. 4,794,619, Cl. 374-131.000.
- Tri-Tech Systems International Inc.: See—  
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- Tri-Tronics, Inc.: See—  
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- Tripathy, Sukant K.: See—  
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- Tripodi, Mary K.: See—  
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- Troll, Walter: See—  
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- Trou, Tarence J.: See—  
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- Troutman, Timmy D.: See—  
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- Trowbridge, Frank R.: See—  
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- TRW Inc.: See—  
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- Hammerle, Frederick A.; Wicel, Richard; and Mallett, James A., 4,794,210, Cl. 200-1.00V.
- Linford, Gary J.; Abrahamian, Robert; Marabella, Leonard J.; Munch, Jasper; Moyer, Richard H.; and Lombardi, Gabriel G., 4,794,345, Cl. 330-4.300.
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- Talibes, George N.: See—  
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- Tsinberg, Mikhail, to North American Philips Corporation. Method and apparatus for transmitting and receiving a high definition NTSC compatible television signal over a single DBS channel in time division multiplex form. 4,794,447, Cl. 358-14.000.
- Tsinberg, Mikhail, to North American Philips Corporation. High-definition television transmission system. 4,794,456, Cl. 358-141.000.
- Tsinghua University: See—  
Zhou, Zhi-Gang; Zhang, Zhong-Tai; and Zhao, Gang, 4,794,323, Cl. 324-71.500.
- Tsitichvili, Jean, to Cogema Compagnie Generale Des Matieres Nucleaires. Process for placing a bundle of rods of a nuclear fuel assembly into a case and installation for performing this process. 4,793,962, Cl. 376-261.000.
- Tsuboi, Kimie: See—  
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- Tsuboi, Shigeru: See—  
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- Tsuchida, Teruhiro: See—  
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- Tsuchiya, Tsutomu: See—  
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- Tsukamoto, Teigio; and Inoue, Teigio, to SMC Corporation. Polymer filtering apparatus. 4,793,928, Cl. 210-344.000.
- Tsunekawa, Shinichi: See—  
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- Tsunoda, Kenji: See—  
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- Tsunoyama, Kozo: See—  
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- Tsurumaki, Naoya: See—  
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- Tsurusaki, Shinji, to Toyota Jidosha Kabushiki Kaisha. Diagnostic system for exhaust gas recirculation device. 4,793,318, Cl. 123-571.000.
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- Tucker, Joe W. Foundation and building structure support system apparatus and method. 4,793,110, Cl. 52-297.000.
- Tudor, Thomas T., to Brown & Williamson Tobacco Corporation. Cigarette package and the like. 4,793,478, Cl. 206-256.000.
- Tuico Corporation: See—  
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- Tuinstra, Hendrik E.: See—  
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- Tulane Medical Center of Tulane Univ.: See—  
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- Tully, Clay E.: See—  
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- Turner, Mitchell D.: See—  
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- Tuac, Daniel: See—  
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- Tustison, Randal W., to Raytheon Company. Optical elements having buried layers. 4,794,053, Cl. 428-627.000.
- Tuszynski, Alfons: See—  
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- Twieg, Donald B., to U.S. Philips Corporation. Method and apparatus for magnetic resonance analysis of nuclear distribution. 4,794,337, Cl. 324-309.000.
- Tyton Corporation: See—  
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- Uchida, Yukimasa, to Kabushiki Kaisha Toshiba. Dynamic read-write random access memory. 4,794,571, Cl. 365-205.000.
- Uchino, Hiroshi; and Shimamura, Takeo, to Kabushiki Kaisha Toshiba. Induction machine system. 4,794,316, Cl. 322-47.000.
- Uclaf, Roussel: See—  
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- Ueda, Kazuhiko: See—  
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- Ueda, Shigenori: See—  
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- Uehara, Tsutomu: See—  
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- Uehara, Yasuhiro, to Fuji Xerox Co., Ltd. Thermostat. 4,794,364, Cl. 337-334.000.
- Uemura, Hideki: See—  
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- Uemura, Hiroyuki: See—  
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- Ueno, Satoshi: See—  
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- Ueno, Tadatsugu: See—  
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renstvi. Device for controlling thread guides of circular knitting  
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- Ulrich, Bohdan: See—  
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- Ultra Shades, Inc.: See—  
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- Ultrasonic, Inc.: See—  
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- Umbaugh, Daniel L.: See—  
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- Umeki, Takesori: See—  
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- Umezawa, Hamao; Umezawa, Sumio; Tsuchiya, Tsutomu; Takeuchi,  
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- Umlauf, William P.: See—  
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- Unander-Scharin, Hans, to Anjar Company. Flip out game and game  
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- Unico Products, Inc.: See—  
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- Union Camp Corporation: See—  
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- Union Carbide Corporation: See—  
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- Union Financiere pour le Developpement de l'Economie: See—  
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- Upiroyal Chemical Company, Inc.: See—  
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- Wheeler, Edward L.; Barrows, Franklin H.; Franko, Robert J.; and  
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- United Kingdom Atomic Energy Authority: See—  
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- United States of America  
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- Energy: See—  
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- Ehlers, Kenneth W.; and Leung, Ka-Ngo, 4,793,961, Cl.  
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- Fraser, Jeffrey A.; and Crane, John K., 4,793,907, Cl.  
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- Seliskar, Carl J.; and Warner, David K., 4,794,230, Cl.  
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- Freeman, Kenneth G., 4,794,449, Cl. 358-71.000.
- Hammer, Rene; and Pasman, Johannes H. T., 4,794,584, Cl.  
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- Kuijk, Karel E., 4,794,385, Cl. 340-719.000.
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- Meyer-Ebrecht, Dietrich, 4,794,350, Cl. 331-65.000.
- Nicolas, Jean-Marie, 4,794,546, Cl. 364-507.000.
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- Pluijms, Rene A. M.; van der Ree, Pieter; Koel, Gerrit J.; and  
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- Steinseifer, Dieter; and Schwertner, Ivar-Rudolf, 4,793,071, Cl.  
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- Schmalzing, David N., 4,793,727, Cl. 403-340.000.
- United Technologies Electro Systems, Inc.: See—  
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- Unitika Ltd.: See—  
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- University of California, The Regents of the: See—  
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- University of Waterloo: See—  
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- UOP: See—  
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- UOP Inc.: See—  
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- Urabe, Hiroshi: See—  
Hasuo, Masayoshi; Urabe, Hiroshi; Kawai, Michio; and Ohsako,  
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- Urbini, Jack: See—  
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4,793,038, Cl. 29-33.00M.
- Ursula Kumpf: See—  
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- Urui, Kiyoshi; and Yamashita, Hiroaki, to Kabushiki Kaisha Toshiba.  
Method and apparatus for automatically transmitting a message to a  
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- Urushibata, Hiroaki: See—  
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429-35.000.
- Urushizaki, Sakae. Tape cutter. 4,793,536, Cl. 225-22.000.
- Ury, Michael G.: See—  
Wooten, Robert D.; Sweetman, Robert J.; Harbourne, Andrew D.  
P.; and Ury, Michael G., 4,794,503, Cl. 362-346.000.
- Usher, David. Marine hazardous off-loading system. 4,793,275, Cl.  
114-270.000.
- USV Pharmaceutical Corporation: See—  
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546-152.000.
- Utsumi, Yutaka: See—  
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- V. Kann Rasmussen Industri A/S: See—  
Jonsson, Gorm L., 4,793,106, Cl. 52-204.000.
- Vail, Lawrence D.: See—  
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Edith M.; Patton, Robert L.; and Wilson, Stephen T., 4,793,984,  
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- Vaisala Oy: See—  
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- Vajdic, Branislav, to Intel Corporation. Stable substrate bias generator  
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- Valdshtein, George: See—  
Masel, Ruben; Valdshtein, George; Leitner, Philipp; and Kronen-  
berg, Gustavo, 4,793,151, Cl. 62-306.000.
- Valentine, David E.; and Orgeron, Michael J. Conduit cleaning appara-  
tus. 4,793,016, Cl. 15-104.062.
- Vallett, William L.; and Sarfehjo, Mohsen, to Lochinvar Water Heater  
Corporation. Gas water heater/boiler. 4,793,800, Cl. 431-328.000.
- Valli, Giovanni. Automobile parking apparatus. 4,793,760, Cl.  
414-254.000.
- Valmet Oy: See—  
Niikanen, Juhani, 4,793,250, Cl. 100-35.000.
- Valois, Paul: See—  
LeNir, Victor L.; Roberge, Jean-Marc; and Valois, Paul, 4,794,339,  
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- van der Meer, Roelof; and Bussink, Jan, to General Electric Company.  
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Peelen, Jan G. J., 4,793,843, Cl. 65-3.120.
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Apparatus for cleaning eggs and like articles. 4,793,015, Cl. 15-3.130.

- Van Doorn, Johannes A.; Snel, Johannes J. M.; and Drent, Eit, to Shell  
Oil Company. Carbon monoxide/olefin polymerization with biden-  
tate ligand containing. 4,794,165, Cl. 528-392.000.
- Van Luyt, Balthasar A. G.; Bruno, Richard; and Taillade, Jacques, to  
U.S. Philips Corp. Method of and apparatus for recording and/or  
reproducing a picture signal and an associated audio signal in/from a  
record carrier. 4,794,465, Cl. 358-341.000.
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device having a core of an amorphous material. 4,794,360, Cl.  
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driver circuit. 4,794,280, Cl. 307-446.000.
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level conversion for use in ECL-BiCMOS circuit. 4,794,317, Cl.  
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- Varo, Inc.: See—  
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- Whitaker, Thomas F.; Isbell, Wayne E.; and Sorensen, Peter, III,  
4,794,430, Cl. 356-252.000.
- Vatarr, Marcel; Smith, Richard W.; and Labus, Rainer H., to Wynn Oil  
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4,793,403, Cl. 165-95.000.
- Vaughan, Norman; and Nuhfer, James A. Archery bow limb adjust-  
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- VDO Adolf Schindling AG: See—  
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- Veb Kombinat Polygraph "Werner Lamberz" Leipzig: See—  
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Gurvic, Aleksander M.; Golovkova, Svetlana I.; and Dietzel,  
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- Veltman, Joost; Malik, Ram L.; and Dickens, Michael D., to FMC  
Corporation. Air purification and temperature controlling system and  
method. 4,793,832, Cl. 55-23.000.
- Venaleck, John T., to Aries Electronics, Inc. Method of making an  
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- Vending International Ltd.: See—  
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- Veprinsky, Michael: See—  
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- Verheijen B.V.: See—  
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- Verheijen, Jan J., to Verheijen B.V. Device for delivering hot water.  
4,793,513, Cl. 222-14.000.
- Verma, S. Devendra K.: See—  
Arbabzadah, Mohammad A.; Maybach, Richard L.; Sanakkayala,  
Bhaskar N.; and Verma, S. Devendra K., 4,794,642, Cl.  
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- Verweij, Kees, to Hoogovens Groep B.V. Method of mixing two or  
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- Vetrotex Saint-Gobain: See—  
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- VFW GmbH: See—  
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- VG Instruments Group Limited: See—  
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- Vico, Fernando, to Max dei F. 111 Vico & C. S.p.A. Process for the  
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cess. 4,793,079, Cl. 12-142.0MC.
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- Voeit-Alpine Aktiengesellschaft: See—  
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- Voisin, Gerard: See—  
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thiolanyl)-2-penem antibiotics. 4,794,179, Cl. 540-354.000.
- vom Scheidt, Jürgen: See—  
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ment direction, relative speed and rotation angle of matrix column.  
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- von Hirsch, Joachim: See—  
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- Voorhies, John, Jr., to Hoover Group, Inc. Composite shipping con-  
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- Vulcan Equipment Company Limited: See—  
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- Vuletic, Bogdan, to Korf Engineering GmbH; and Voest-Alpine  
Aktiengesellschaft. Process for cooling and cleaning producer gas  
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- W. R. Grace & Co.: See—  
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- W. R. Grace & Co.-Conn.: See—  
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- Wacker Werke GmbH & Co. KG: See—  
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- Wada, Shuichi; Ohiwa, Tsunemi; Kidou, Hirokazu; Kawakami, Akira;  
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display device. 4,793,695, Cl. 350-357.000.
- Wait, Brooks T., to Ski Tree Products, Inc. Wall-mounted ski storage  
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Reisch, Robert G., Jr.; Waldman, Frank; and Fawzi, Mahdi B.,  
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- Waldman, Joshua P.: See—  
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- Wang, Paul Y. Wound coverings and processes for their preparation. 4,793,336, Cl. 128-156.000.
- Wankel, Felix. External and internal rotor machine having internal axes and circumferential reinforcement web. 4,793,781, Cl. 418-168.000.
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- Watanabe, Takeshi, to NEC Corporation. Nonvolatile semiconductor memory including means for detecting completion of writing operation. 4,794,564, Cl. 365-184.000.
- Watari, Masao, to NEC Corporation. Continuous speech recognition apparatus. 4,794,645, Cl. 381-43.000.
- Watson, James S., to Calcomp Inc. Frequency shifting digitizer for reducing AC fields interference. 4,794,208, Cl. 178-19.000.
- Watson, Richard R., to Gilmore Valve Company. Piloted check valve. 4,793,590, Cl. 251-63.500.
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- Wavin b v: See—  
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- Webb, Bryant F.: See—  
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- Webb, George, to Magnavox Government and Industrial Electronics Company. Piezoelectric fuse for projectile with safe and arm mechanism. 4,793,256, Cl. 102-210.000.
- Webb, Paul P.; Appert, John R.; and Enstrom, Ronald E., to General Electric Company. Rear entry photodiode with three contacts. 4,794,439, Cl. 357-30.000.
- Webb, Ronald J., to Garvey, Charles C., Jr., a part interest. Toothpaste pump. 4,793,526, Cl. 222-391.000.
- Weber, Stevan L.: See—  
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- Wege, Kevin K., to Sundstrand Corporation. Rectifier assembly. 4,794,510, Cl. 363-145.000.
- Wei, George C.; and Walsh, John, to GTE Laboratories Incorporated. Thermal shock test apparatus and the method of testing. 4,793,716, Cl. 374-45.000.
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- Weingarten, Willi: See—  
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- Weiser, Wolfgang: See—  
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- Weiss, Hans; Fissmann, Hans-Joachim; and Ruff, Hans-Albrecht, to J. M. Voith GmbH. Clamping head for centering and clamping winding tubes. 4,793,567, Cl. 242-68.100.
- Weitachorke-Muhsold, Stephan; and Gocking, Wolfgang, to VDO Adolf Schindling AG. Current-pressure transducer, particularly for a vacuum control in automotive vehicles. 4,793,373, Cl. 137-116.500.
- Weitzenhof, David A.: See—  
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- Wenxing, Lu, to Shaaxi Chemical and Fertilizer Industry Company; and Kemira Company of Finland. Process for chemical separation of phosphorus ore. 4,793,979, Cl. 423-167.000.
- Werner & Pfeleiderer GmbH: See—  
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- Wesley, Ronald C.: See—  
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- Western Waste Industries et al.: See—  
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Yutaka, to Canon Kabushiki Kaisha. Image recording apparatus,  
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shi; and Danzuka, Toshio, to Sumitomo Electric Industries, Ltd.  
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Seiko; and Natsuyama, Yukihiro, to Nippon Soken, Inc. Fuel injec-  
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4,794,069, Cl. 430-338.000.

Yoshino, Hiroyuki: See—  
Watanabe, Kazuyoshi; Yoshino, Hiroyuki; Maeda, Junichi; and  
Negishi, Osamu, 4,794,553, Cl. 364-710.010.

Yoshino, Kimiaki: See—  
Miyazaki, Jinsei; Ando, Eiji; Yoshino, Kimiaki; and Morimoto,  
Kazuhiisa, 4,794,068, Cl. 430-345.000.

Yoshino, Motoaki: See—  
Kiya, Nobuyuki; and Yoshino, Motoaki, 4,794,311, Cl. 318-569.000.

Yoshitake, Hideto: See—  
Kinouchi, Sosuke; and Yoshitake, Hideto, 4,793,773, Cl.  
416-129.000.

Yoshitoshi, You; Toyoguchi, Tsutomu; and Takamatsu, Ryoji, to Sony  
Corporation. Optical disk player, 4,794,588, Cl. 369-263.000.

Yott, Edward W.: See—  
Adasek, Kenneth P.; Drayer, William L.; and Yott, Edward W.,  
4,794,537, Cl. 364-424.050.

Young, Carl E., to General Motors Corporation. Coil winding method  
for maximum utilization of winding envelope, 4,794,361, Cl.  
336-189.000.

Young, John S.: See—  
Hoff, James; Walsh, Arthur L.; and Young, John S., 4,794,591, Cl.  
370-62.000.

Young, Ronald D.: See—  
Nilsen, Carl J.; Wachter, Joseph P.; and Young, Ronald D.,  
4,794,613, Cl. 372-58.000.

Young, Vincent R.: See—  
Bridges, Jack E.; Enk, Joseph O.; Spencer, Homer L.; and Young,  
Vincent R., 4,793,409, Cl. 166-57.000.

Yu, Yuet-Ying; Morris, Robert A.; Rajotte, Paul T.; and Wambolt, Lee  
A., to General Electric Company. Molded case circuit breaker auxil-  
iary switch unit, 4,794,356, Cl. 335-13.000.

Yukiura, Kazuo; Seto, Keniti; Watanabe, Kimio; Harimoto, Hiroshi;  
and Otani, Akio, to Hitachi, Ltd.; and Japanese National Railways.  
Credit settlement and ticketing terminal system, 4,794,530, Cl.  
364-407.000.

Yusa, Hideo: See—  
Izumida, Tatsuo; Yusa, Hideo; Funabashi, Kiyomi; Kikuchi,  
Makoto; and Tamata, Shin, 4,793,947, Cl. 252-628.000.

Zach, Klaus: See—  
Schabert, Hans-Peter; Heller, Max; and Zach, Klaus, 4,793,779, Cl.  
418-60.000.

Zachring, Gerhard; Wohlmuth, Josef; and Schmuhl, Hans-Juergen, to  
MTU Motoren-Und Turbinen-Union Munchen GmbH. Method and  
apparatus for cooling a high pressure compressor of a gas turbine  
engine, 4,793,772, Cl. 416-95.000.

Zahnradfabrik Friedrichshafen, AG.: See—  
Buckach, Manfred, 4,793,210, Cl. 74-695.000.

Zanders, Erich: See—  
Soeder, Carl J.; Keusen, Heinrich; Zanders, Erich; and Hofmeister,  
Franz, 4,793,930, Cl. 210-614.000.

Zeise, Eric K.: See—  
Stoudt, Michael D.; Moschauer, Michael; Zeise, Eric K.; Spitzner,  
Jerome G.; deceased; McDowell, David Q.; and Tailiba, George  
N., 4,794,421, Cl. 355-3.00R.

Zellweger Uster AG: See—  
Nussbaumer, Roland, 4,794,509, Cl. 363-141.000.

Zenith Electronics Corporation: See—  
Chiodi, Wayne R.; and Prazak, Charles J., III, 4,794,299, Cl.  
313-402.000.

Zerilli, Louis. Removable closure for dash board utility shelf, 4,793,648,  
Cl. 296-37.120.

Zhang, Zhong-Tai: See—  
Zhou, Zhi-Gang; Zhang, Zhong-Tai; and Zhao, Gang, 4,794,323,  
Cl. 324-71.500.

Zhao, Gang: See—  
Zhou, Zhi-Gang; Zhang, Zhong-Tai; and Zhao, Gang, 4,794,323,  
Cl. 324-71.500.

Zhou, Zhi-Gang; Zhang, Zhong-Tai; and Zhao, Gang, to Tsinghua  
University. Multifunctional ceramic sensor, 4,794,323, Cl. 324-71.500.

Ziegelmayer, Manfred: See—  
Engelhardt, Friedrich; Schrod, Manfred; Ziegelmayer, Manfred;  
Hilbig, Josef; and Donges, Reinhard, 4,794,166, Cl. 528-492.000.

Ziegler, Michael L.; Blau, Jonathan S.; and Fredieu, Robert L., to  
Alliant Computer Systems Corporation. Digital computer with cache  
capable of concurrently handling multiple accesses from parallel  
processors, 4,794,521, Cl. 364-200.000.

Zifcak, Mark S.; and Kosa, Bruce G., to Rogers Corporation. Electrical  
circuit board interconnect, 4,793,814, Cl. 439-66.000.

Ziggity Systems, Inc.: See—  
Hosteller, Eldon, 4,793,291, Cl. 119-81.000.

Zilog, Inc.: See—  
Carberry, Richard A.; and Banning, John P., 4,794,524, Cl.  
364-200.000.

Zinnen, Hermann A.; and Franczyk, Thad S., to UOP Inc. Process for  
separating halogen substituted toluene isomers, 4,794,202, Cl.  
570-211.000.

Zomp, John M.: See—  
Kasner, William H.; Toth, Vincent A.; and Zomp, John M.,  
4,793,715, Cl. 374-6.000.

Zaccaro, Dante C.; and McCurdy, Frederick A., to General Motors  
Corporation. Quick disconnect device, 4,793,053, Cl. 29-568.000.

Zunkel, Gary D., to Halliburton Company. Retrievable gravel packer  
and retrieving tool, 4,793,411, Cl. 166-98.000.

## LIST OF REISSUE PATENTEEES

TO WHOM

PATENTS WERE ISSUED ON THE 27TH DAY OF DECEMBER, 1988

NOTE—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

- Adams, Harold D., to Adams Safety Seats, Inc. Family toilet seat. Re. 32,807, Cl. 4-235.000.
- Adams Safety Seats, Inc.: See—  
Adams, Harold D., Re. 32,807, Cl. 4-235.000.
- Baker, Derek W.: See—  
Lemon, Peter H. R. B.; Railton, Jeffrey D.; Baker, Derek W.; and Coppock, Vincent J., Re. 32,812, Cl. 523-145.000.
- Borden (UK) Limited: See—  
Lemon, Peter H. R. B.; Railton, Jeffrey D.; Baker, Derek W.; and Coppock, Vincent J., Re. 32,812, Cl. 523-145.000.
- Brubaker, Weldon L.; and Case, Arnold A., to Molex Incorporated. Electrical contact for terminating insulated conductors. Re. 32,810, Cl. 439-397.000.
- Case, Arnold A.: See—  
Brubaker, Weldon L.; and Case, Arnold A., Re. 32,810, Cl. 439-397.000.
- Coppock, Vincent J.: See—  
Lemon, Peter H. R. B.; Railton, Jeffrey D.; Baker, Derek W.; and Coppock, Vincent J., Re. 32,812, Cl. 523-145.000.
- Gurolnick, Richard C. Sink mounted bathing device. Re. 32,806, Cl. 4-572.000.
- Hirose Manufacturing Company Limited: See—  
Hirose, Tokuzo, Re. 32,809, Cl. 112-231.000.
- Hirose, Tokuzo, to Hirose Manufacturing Company Limited. Fully rotating hook for a lock stitch sewing machine. Re. 32,809, Cl. 112-231.000.
- Itoh, Kenichi; Noguki, Genji; and Nakahara, Masanobu, to Shin-Etsu Chemical Co., Ltd. Method for the suspension polymerization of vinyl chloride monomer. Re. 32,813, Cl. 526-201.000.
- Lemon, Peter H. R. B.; Railton, Jeffrey D.; Baker, Derek W.; and Coppock, Vincent J., to Borden (UK) Limited. Foundry moulds and cores. Re. 32,812, Cl. 523-145.000.
- Molex Incorporated: See—  
Brubaker, Weldon L.; and Case, Arnold A., Re. 32,810, Cl. 439-397.000.
- Nakahara, Masanobu: See—  
Itoh, Kenichi; Noguki, Genji; and Nakahara, Masanobu, Re. 32,813, Cl. 526-201.000.
- Noguki, Genji: See—  
Itoh, Kenichi; Noguki, Genji; and Nakahara, Masanobu, Re. 32,813, Cl. 526-201.000.
- Railton, Jeffrey D.: See—  
Lemon, Peter H. R. B.; Railton, Jeffrey D.; Baker, Derek W.; and Coppock, Vincent J., Re. 32,812, Cl. 523-145.000.
- Rudin, Richard E., to S. C. Johnson & Son, Inc. Easily dispersible dietary fiber product and method for producing the same. Re. 32,811, Cl. 424-195.100.
- S. C. Johnson & Son, Inc.: See—  
Rudin, Richard E., Re. 32,811, Cl. 424-195.100.
- Shin-Etsu Chemical Co., Ltd.: See—  
Itoh, Kenichi; Noguki, Genji; and Nakahara, Masanobu, Re. 32,813, Cl. 526-201.000.
- Wingerden, Aart V. Plant propagating container and method. Re. 32,808, Cl. 47-85.000.

## LIST OF REEXAMINATION PATENTEEES

TO WHOM

CERTIFICATES WERE ISSUED

- AGFA-Gevaert, A.G.: See—  
Ender, Gunter; Schultz, Helmut; Thiele, Hartmut; Gruber, Leo; Kober, Heinrich; Bottcher, Werner; and Machainer, Tibor, B1 4,081,151, Cl. 242-68.500.
- Bottcher, Werner: See—  
Ender, Gunter; Schultz, Helmut; Thiele, Hartmut; Gruber, Leo; Kober, Heinrich; Bottcher, Werner; and Machainer, Tibor, B1 4,081,151, Cl. 242-68.500.
- Breil, Heinz: See—  
Ziegler, Karl; Breil, Heinz; Martin, Heinz; and Holzkamp, Erhard, B1 4,125,698, Cl. 526-159.000.
- Castelluzzo, James M. Knife with plural replaceable blade storage and means for single blade extension. B1 4,517,741, 12-27-88, Cl. 30-162.000.
- Dahl, Klaus J.; and Jansons, Viktors, to Raychem Corporation. Novel polyketones. B1 3,956,240, 12-27-88, Cl. 528-125.000.
- Ender, Gunter; Schultz, Helmut; Thiele, Hartmut; Gruber, Leo; Kober, Heinrich; Bottcher, Werner; and Machainer, Tibor, to AGFA-Gevaert, A.G. Stackable winding cores for magnetic tapes. B1 4,081,151, 12-27-88, Cl. 242-68.500.
- Gruber, Leo: See—  
Ender, Gunter; Schultz, Helmut; Thiele, Hartmut; Gruber, Leo; Kober, Heinrich; Bottcher, Werner; and Machainer, Tibor, B1 4,081,151, Cl. 242-68.500.
- Holzkamp, Erhard: See—  
Ziegler, Karl; Breil, Heinz; Martin, Heinz; and Holzkamp, Erhard, B1 4,125,698, Cl. 526-159.000.
- Jansons, Viktors: See—  
Dahl, Klaus J.; and Jansons, Viktors, B1 3,956,240, Cl. 528-125.000.
- Kober, Heinrich: See—  
Ender, Gunter; Schultz, Helmut; Thiele, Hartmut; Gruber, Leo; Kober, Heinrich; Bottcher, Werner; and Machainer, Tibor, B1 4,081,151, Cl. 242-68.500.
- Machainer, Tibor: See—  
Ender, Gunter; Schultz, Helmut; Thiele, Hartmut; Gruber, Leo; Kober, Heinrich; Bottcher, Werner; and Machainer, Tibor, B1 4,081,151, Cl. 242-68.500.
- Martin, Heinz: See—  
Ziegler, Karl; Breil, Heinz; Martin, Heinz; and Holzkamp, Erhard, B1 4,125,698, Cl. 526-159.000.
- OKI Electric Industry Co., Ltd.: See—  
Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, B1 4,587,568, Cl. 358-293.000.
- Raychem Corporation: See—  
Dahl, Klaus J.; and Jansons, Viktors, B1 3,956,240, Cl. 528-125.000.
- Schultz, Helmut: See—  
Ender, Gunter; Schultz, Helmut; Thiele, Hartmut; Gruber, Leo; Kober, Heinrich; Bottcher, Werner; and Machainer, Tibor, B1 4,081,151, Cl. 242-68.500.
- Studiengesellschaft Kohle M.b.H.: See—  
Ziegler, Karl; Breil, Heinz; Martin, Heinz; and Holzkamp, Erhard, B1 4,125,698, Cl. 526-159.000.
- Suga, Yukio: See—  
Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, B1 4,587,568, Cl. 358-293.000.
- Tadokoro, Joji: See—  
Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, B1 4,587,568, Cl. 358-293.000.
- Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, to OKI Electric Industry Co., Ltd. Electronic print board. B1 4,587,568, 12-27-88, Cl. 358-293.000.
- Takeda, Yukinori: See—  
Takayama, Shoichiro; Suga, Yukio; Tadokoro, Joji; and Takeda, Yukinori, B1 4,587,568, Cl. 358-293.000.
- Thiele, Hartmut: See—  
Ender, Gunter; Schultz, Helmut; Thiele, Hartmut; Gruber, Leo; Kober, Heinrich; Bottcher, Werner; and Machainer, Tibor, B1 4,081,151, Cl. 242-68.500.
- Wikdahl, Nils A. L. Method and apparatus for vortical separation of solids. B1 3,415,374, 12-27-88, Cl. 209-211.000.
- Ziegler, Karl; Breil, Heinz; Martin, Heinz; and Holzkamp, Erhard, to Studiengesellschaft Kohle M.b.H. Polymerization of ethylenically unsaturated hydrocarbons. B1 4,125,698, 12-27-88, Cl. 526-159.000.

## LIST OF DESIGN PATENTEEES

- Acriform Engineering Inc.: See—  
Burgess, John D.; and Taylor, Thomas E., 299,164, Cl. D23-283.000.
- Adair, Edwin L.; and Wada, John, to Medical Dynamics, Inc. Video endoscope lens coupler. 299,167, 12-27-88, Cl. D24-17.000.
- Alcatel USA, Corp.: See—  
Asaki, James T.; and Gault, Robert L., 299,131, Cl. D14-53.000.
- Allen, George A., Jr. Combined smoke gasket and intersement expanding seal device for sliding doors. 299,171, 12-27-88, Cl. D25-164.000.
- Allpac Holding B.V.: See—  
Klinge, Erik, 299,114, Cl. D9-337.000.
- Aloys F. Dornbracht GmbH & Co. KG: See—  
Lathrop, Bethany, 299,160, Cl. D23-252.000.
- American Machine and Tool Company, Inc.: See—  
Pollak, Henry M.; and Manger, John W., 299,146, Cl. D15-127.000.
- Amerock Corporation: See—  
Gresens, Stanley T.; and Green, A. Denton, 299,095, Cl. D6-524.000.
- Gresens, Stanley T.; and Green, A. Denton, 299,099, Cl. D6-550.000.
- Anderson, Robert L., to Applied Microbotics Corporation. Controller for machine tools. 299,125, 12-27-88, Cl. D13-12.000.
- Anderson, Kenneth: See—  
Bergstrom, Nils G.; and Anderson, Kenneth, 299,168, Cl. D24-27.000.
- Applied Microbotics Corporation: See—  
Anderson, Robert L., 299,125, Cl. D13-12.000.
- Armaturen & Presswerk GmbH: See—  
Jans, Franz W., 299,110, Cl. D8-316.000.
- Armellin, Giancarlo: See—  
Hart, Claude A.; and Armellin, Giancarlo, 299,122, Cl. D12-149.000.
- Arnold, Mary: See—  
Nimon, Susan K.; Bartsevich, William E.; Trombley, Edgar F.; Arnold, Mary; and Perkins, Nancy, 299,175, Cl. D32-22.000.
- Arnolds, Gerd. Faucet set. 299,159, 12-27-88, Cl. D23-242.000.
- Asaki, James T.; and Gault, Robert L., to Alcatel USA, Corp. Combined telephone handset and stand. 299,131, 12-27-88, Cl. D14-53.000.
- Asaki, James T.; and Gault, Robert L., to Alcatel USA, Corp. Combined telephone handset and stand. 299,132, 12-27-88, Cl. D14-53.000.
- Astra Lakemedel Aktiebolag: See—  
Bergstrom, Nils G.; and Anderson, Kenneth, 299,168, Cl. D24-27.000.
- AVIA Group International, Inc.: See—  
McCrea, Mona, 299,082, Cl. D2-314.000.
- Tong, James K.; and Swett, Joan, 299,083, Cl. D2-314.000.
- B k, Jan H.: See—  
Toft, Allan; and B k, Jan H., 299,139, Cl. D14-107.000.
- Baldwin Hardware Corporation: See—  
Fayerman, Peter S.; and Meck, Leslie A., 299,096, Cl. D6-531.000.
- Fayerman, Peter S.; and Meck, Leslie A., 299,097, Cl. D6-540.000.
- Fayerman, Peter S.; and Meck, Leslie A., 299,098, Cl. D6-540.000.
- Bartsevich, William E.: See—  
Nimon, Susan K.; Bartsevich, William E.; Trombley, Edgar F.; Arnold, Mary; and Perkins, Nancy, 299,175, Cl. D32-22.000.
- Bender, Larry E. Hose nozzle. 299,158, 12-27-88, Cl. D23-226.000.
- Berg, Ole, to Time/System International ApS. Keyboard replica image for a computer display screen. 299,142, 12-27-88, Cl. D14-115.000.
- Bergstrom, Nils G.; and Anderson, Kenneth, to Astra Lakemedel Aktiebolag. Penile clamp. 299,168, 12-27-88, Cl. D24-27.000.
- Bernabe, Vincent, Jr., to Kidde, Inc. Embossed telescopic crane boom section. 299,179, 12-27-88, Cl. D34-36.000.
- Birch, Brian L., to Birch Company, The. Writing instrument holder. 299,150, 12-27-88, Cl. D19-85.000.
- Birch Company, The: See—  
Birch, Brian L., 299,150, Cl. D19-85.000.
- Bogusa, Sidney A. Sound activated light switch. 299,127, 12-27-88, Cl. D13-32.000.
- Bowerman, Leonard E.; and Schick, George, to Sara Lee Corporation. Upright vacuum cleaner. 299,176, 12-27-88, Cl. D32-22.000.
- Brdnik, Franc, to UNIOR kovaska industrija Zrece n.s.o.o. Pair of insulating sheaths for tong handles. 299,108, 12-27-88, Cl. D8-107.000.
- Bruce, William. Knockdown rocking chair. 299,087, 12-27-88, Cl. D6-348.000.
- Bryan, Robert L. Pair of trash can holder. 299,177, 12-27-88, Cl. D34-6.000.
- Burdick, Bruce A., to Herman Miller, Inc. Mountable tool storage. 299,093, 12-27-88, Cl. D6-474.000.
- Burgess, John D.; and Taylor, Thomas E., to Acriform Engineering Inc. Shower stall base. 299,164, 12-27-88, Cl. D23-283.000.
- Conair Corporation: See—  
Shoemaker, Richard E., 299,174, Cl. D28-58.000.
- Cvek, Sava A., to Davis Furniture Industries, Inc. Desk or similar article. 299,089, 12-27-88, Cl. D6-428.000.
- Davis Furniture Industries, Inc.: See—  
Cvek, Sava A., 299,089, Cl. D6-428.000.
- Diaz, Gilberto B. Drum cover. 299,147, 12-27-88, Cl. D17-22.000.
- Diebold, Kenneth L. Combined fireplace cooking accessory tool set and support stand therefor. 299,103, 12-27-88, Cl. D7-106.000.
- Doman, Donald W.: See—  
Kohler, Herbert V., Jr.; Reid, Mary J.; and Doman, Donald W., 299,165, Cl. D23-283.000.
- Downey, Joseph F. Brace for holding gas pump nozzle in open position. 299,112, 12-27-88, Cl. D8-354.000.
- Duracell Inc.: See—  
Powell, David H.; Maddison, David E.; Seymour, Richard W.; and Steel, Veronica G., 299,173, Cl. D26-37.000.
- Durand, Jean-Jacques. Stemmed wine glass or similar article. 299,101, 12-27-88, Cl. D7-13.000.
- Ellermeier, Konrad, to U.S. Philips Corporation. Microphone. 299,128, 12-27-88, Cl. D14-12.000.
- Fayerman, Peter S.; and Meck, Leslie A., to Baldwin Hardware Corporation. Combined toothbrush and tumbler holder. 299,096, 12-27-88, Cl. D6-531.000.
- Fayerman, Peter S.; and Meck, Leslie A., to Baldwin Hardware Corporation. Soap dish. 299,097, 12-27-88, Cl. D6-540.000.
- Fayerman, Peter S.; and Meck, Leslie A., to Baldwin Hardware Corporation. Soap dish. 299,098, 12-27-88, Cl. D6-540.000.
- Fratini, Giorgio, to Raf Rubinetterie S.p.A. Water faucet spout. 299,161, 12-27-88, Cl. D23-255.000.
- Fredblad, Bo, to Vaaby Innovationsprodukt AB. Corrugated drain pipe. 299,162, 12-27-88, Cl. D23-266.000.
- Frederick, Shirley M. Ear-rim. 299,119, 12-27-88, Cl. D11-40.000.
- Gault, Robert L.: See—  
Asaki, James T.; and Gault, Robert L., 299,131, Cl. D14-53.000.
- Asaki, James T.; and Gault, Robert L., 299,132, Cl. D14-53.000.
- Giugiaro, Giorgetto, to NECCHI Societa per Azioni. Sewing machine. 299,144, 12-27-88, Cl. D15-70.000.
- Glass Dimensions, Inc.: See—  
Perkins, David R., 299,172, Cl. D26-9.000.
- Green, A. Denton: See—  
Gresens, Stanley T.; and Green, A. Denton, 299,095, Cl. D6-524.000.
- Gresens, Stanley T.; and Green, A. Denton, 299,099, Cl. D6-550.000.
- Greenberg, Robert Y., to L.A. Gear, Inc. Shoe upper. 299,081, 12-27-88, Cl. D2-314.000.
- Gresens, Stanley T.; and Green, A. Denton, to Amerock Corporation. Bathroom accessory holder. 299,095, 12-27-88, Cl. D6-524.000.
- Gresens, Stanley T.; and Green, A. Denton, to Amerock Corporation. Towel bar mounting post. 299,099, 12-27-88, Cl. D6-550.000.
- Hal Laboratory, Inc.: See—  
Nakamura, Fumio, 299,140, Cl. D14-114.000.
- Hall, Charles E. Spinal massager. 299,169, 12-27-88, Cl. D24-36.000.
- Hall, Charles P. Combined water container and nozzle for showering. 299,157, 12-27-88, Cl. D23-225.000.
- Hall, Gary W. Fluid weighted exercise jug. 299,153, 12-27-88, Cl. D21-197.000.
- Hampf, Jan E. H., to Tateco AB. Unit for a paging system. 299,138, 12-27-88, Cl. D14-68.000.
- Hanamure, Toshiyuku: See—  
Kuwabara, Takaishi; Shimura, Yoshiharu; Hayashi, Yuko; Hanamure, Toshiyuku; Kanemori, Kaoru; and Yamakawa, Yoshihiro, 299,145, Cl. D15-86.000.
- Hart, Claude A.; and Armellin, Giancarlo, to Pirelli Coordinamento Pneumatici S.p.A. Tire. 299,122, 12-27-88, Cl. D12-149.000.
- Hayashi, Yuko: See—  
Kuwabara, Takaishi; Shimura, Yoshiharu; Hayashi, Yuko; Hanamure, Toshiyuku; Kanemori, Kaoru; and Yamakawa, Yoshihiro, 299,145, Cl. D15-86.000.
- Hayward Industries, Inc.: See—  
Hazelhurst, Fred T., 299,143, Cl. D15-7.000.
- Hazelhurst, Fred T., to Hayward Industries, Inc. Pump. 299,143, 12-27-88, Cl. D15-7.000.
- Heren, Lawrence P., to L. R. Nelson Corporation. Sprinkler head for a lawn sprinkler. 299,156, 12-27-88, Cl. D23-214.000.
- Herman Miller, Inc.: See—  
Burdick, Bruce A., 299,093, Cl. D6-474.000.
- Hillman, Kevin P., to Thomas J. Lipton, Inc. Confection. 299,080, 12-27-88, Cl. D1-125.000.
- Honda Giken Kogyo Kabushiki Kaisha: See—  
Tamura, Gen; Yokoyama, Kazuhiko; and Kawaguchi, Yukio, 299,120, Cl. D12-110.000.
- Hydropress Wallander & Co. AB: See—  
Wallander, Carl O., 299,155, Cl. D23-207.000.
- InnoPak Corporation: See—  
Wetherell, Richard B., Jr., 299,115, Cl. D9-370.000.
- Interlego: See—  
Toft, Allan; and B k, Jan H., 299,139, Cl. D14-107.000.
- Isozaki, Sadao: See—  
Kido, Shigeaki; Isozaki, Sadao; and Yajima, Yasuko, 299,134, Cl. D14-58.000.
- Iwahashi, Wataru, to Sharp Corporation. Microwave oven. 299,107, 12-27-88, Cl. D7-351.000.
- Jado Bathroom and Hardware Manufacturing Corp.: See—  
Jans, Franz W., 299,109, Cl. D8-305.000.
- Jans, Franz W., 299,111, Cl. D8-316.000.
- Jans, Franz W., to Jado Bathroom and Hardware Manufacturing Corp. Handle. 299,109, 12-27-88, Cl. D8-305.000.
- Jans, Franz W., to Armaturen & Presswerk GmbH. Handle. 299,110, 12-27-88, Cl. D8-316.000.



- Jans, Franz W., to Jado Bathroom and Hardware Manufacturing Corp. Cabinet handle. 299,111, 12-27-88, Cl. D8-316.000.
- Johnson, Hugh G., to Voitec Corporation. Electrical grounding accessory. 299,126, 12-27-88, Cl. D13-12.000.
- Kanemori, Kaoru: See—  
Kuwabara, Takashi; Shimura, Yoshiharu; Hayashi, Yuko; Hanamura, Toshiyuki; Kanemori, Kaoru; and Yamakawa, Yoshihiro, 299,145, Cl. D15-86.000.
- Kawaguchi, Yukinori: See—  
Tamura, Gen; Yokoyama, Kazuhiko; and Kawaguchi, Yukinori, 299,120, Cl. D12-110.000.
- Kidde, Inc.: See—  
Bernabe, Vincent, Jr., 299,179, Cl. D34-36.000.
- Kido, Shigeaki; Isozaki, Sadao; and Yajima, Yasuko, to Meisei Electric Co., Ltd. Telephone apparatus with speakerphone and display panel. 299,134, 12-27-88, Cl. D14-58.000.
- Kin Hip Metal & Plastic Factory Ltd.: See—  
Sun, Cliff K. L., 299,105, Cl. D7-317.000.
- Klinge, Erik, to Allpac Holding B.V. Packaging container for roller blinds. 299,114, 12-27-88, Cl. D9-337.000.
- Kohler Co.: See—  
Kohler, Herbert V., Jr.; Reid, Mary J.; and Doman, Donald W., 299,165, Cl. D23-283.000.
- Reid, Mary J., 299,166, Cl. D23-294.000.
- Kohler, Herbert V., Jr.; Reid, Mary J.; and Doman, Donald W., to Kohler Co. Shower enclosure. 299,165, 12-27-88, Cl. D23-283.000.
- Kopp, Harold W. Football practice placekick holder. 299,154, 12-27-88, Cl. D21-209.000.
- Krusel, Steven. Combined display rack and holder. 299,091, 12-27-88, Cl. D6-449.000.
- Kuwabara, Takashi; Shimura, Yoshiharu; Hayashi, Yuko; Hanamura, Toshiyuki; Kanemori, Kaoru; and Yamakawa, Yoshihiro, to Sanyo Electric Co., Ltd. Refrigerator. 299,145, 12-27-88, Cl. D15-86.000.
- L.A. Gear, Inc.: See—  
Greenberg, Robert Y., 299,081, Cl. D2-314.000.
- L. R. Nelson Corporation: See—  
Heren, Lawrence P., 299,156, Cl. D23-214.000.
- Lathrop, Bethany, to Aloys F. Dornbracht GmbH & Co. KG. Faucet handle. 299,160, 12-27-88, Cl. D23-252.000.
- Leolli, Franco, to Modacor Italiana S.p.A. Stand. 299,092, 12-27-88, Cl. D6-474.000.
- Louis, William M. Cursor control for computer display. 299,141, 12-27-88, Cl. D14-114.000.
- Maddison, David E.: See—  
Powell, David H.; Maddison, David E.; Seymour, Richard W.; and Steel, Veronica G., 299,173, Cl. D26-37.000.
- Maki, Isao, to Soko Co., Ltd. Food container. 299,102, 12-27-88, Cl. D7-79.000.
- Makihara, Ritsuko: See—  
Nishibori, Hiroshi; Makihara, Ritsuko; and Tatsuta, Yoichi, 299,148, Cl. D18-34.000.
- Maroni, Carlo. Combined watch and bracelet. 299,117, 12-27-88, Cl. D10-32.000.
- Martinell, Steven W.; and Vossoughi, Sohrab, to Racor Inc. Ski storage rack. 299,100, 12-27-88, Cl. D6-552.000.
- Martinez, Robert, to Vistakon, Inc. Container for contact lens. 299,085, 12-27-88, Cl. D3-34.000.
- Mauger, John W.: See—  
Pollak, Henry M.; and Mauger, John W., 299,146, Cl. D15-127.000.
- McCrea, Mona, to AVIA Group International, Inc. Element of a shoe upper. 299,082, 12-27-88, Cl. D2-314.000.
- Meck, Leslie A.: See—  
Fayerman, Peter S.; and Meck, Leslie A., 299,096, Cl. D6-531.000.
- Fayerman, Peter S.; and Meck, Leslie A., 299,097, Cl. D6-540.000.
- Fayerman, Peter S.; and Meck, Leslie A., 299,098, Cl. D6-540.000.
- Medical Dynamics, Inc.: See—  
Adair, Edwin L.; and Wada, John, 299,167, Cl. D24-17.000.
- Meheen, H. Joe. Retaining wall with tie-back elements. 299,170, 12-27-88, Cl. D25-58.000.
- Meisei Electric Co., Ltd.: See—  
Kido, Shigeaki; Isozaki, Sadao; and Yajima, Yasuko, 299,134, Cl. D14-58.000.
- Merlin Fiberglass Pty. Ltd.: See—  
Robinson, Michael B., 299,163, Cl. D23-274.000.
- Milla, Janet M. Card dispenser. 299,094, 12-27-88, Cl. D6-515.000.
- Modacor Italiana S.p.A.: See—  
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- Monza, Mary Ann. Plant holder. 299,088, 12-27-88, Cl. D6-403.000.
- Motorola, Inc.: See—  
Soren, Leonid; and Nagele, Albert L., 299,137, Cl. D14-63.000.
- Taylor, Terrance N., 299,136, Cl. D14-63.000.
- Nagele, Albert L.: See—  
Soren, Leonid; and Nagele, Albert L., 299,137, Cl. D14-63.000.
- Nakamura, Fumio, to Hal Laboratory, Inc. Cursor control for computer display. 299,140, 12-27-88, Cl. D14-114.000.
- NECCHI Societa per Azioni: See—  
Giugiaro, Giorgetto, 299,144, Cl. D15-70.000.
- Nifco Inc.: See—  
Takahashi, Atsushi, 299,113, Cl. D8-382.000.
- Nimon, Susan K.; Bartasevich, William E.; Trombley, Edgar F.; Arnold, Mary; and Perkins, Nancy, to Scott Fetzer Company, The. Upright vacuum cleaner. 299,175, 12-27-88, Cl. D32-22.000.
- Nishibori, Hiroshi; Makihara, Ritsuko; and Tatsuta, Yoichi, to Sharp Corporation. Shredder. 299,148, 12-27-88, Cl. D18-34.000.
- Oh, Myung K. Portable bicycle. 299,121, 12-27-88, Cl. D12-111.000.
- Oil Caddy, Inc.: See—  
Smith, Larry E., 299,178, Cl. D34-23.000.
- Olafsen, Rolf. Rescue and ice fishing boat. 299,123, 12-27-88, Cl. D12-300.000.
- Oneida, Ltd.: See—  
Richmond, Colin B., II, 299,104, Cl. D7-137.000.
- Perkins, David R., to Glass Dimensions, Inc. Oil lamp. 299,172, 12-27-88, Cl. D26-9.000.
- Perkins, Nancy: See—  
Nimon, Susan K.; Bartasevich, William E.; Trombley, Edgar F.; Arnold, Mary; and Perkins, Nancy, 299,175, Cl. D32-22.000.
- Pirelli Coordinamento Pneumatici S.p.A.: See—  
Hart, Claude A.; and Armellini, Giancarlo, 299,122, Cl. D12-149.000.
- Plastics, Inc.: See—  
Pomroy, James F., 299,106, Cl. D7-325.000.
- Plessey Overseas Limited: See—  
Rhodes, Robin, 299,135, Cl. D14-63.000.
- Pollak, Henry M.; and Mauger, John W., to American Machine and Tool Company, Inc. Combined jointer and planer. 299,146, 12-27-88, Cl. D15-127.000.
- Pomroy, James F., to Plastics, Inc. Popcorn popper. 299,106, 12-27-88, Cl. D7-325.000.
- Powell, David H.; Maddison, David E.; Seymour, Richard W.; and Steel, Veronica G., to Duracell Inc. Flashlight. 299,173, 12-27-88, Cl. D26-37.000.
- Protel, Inc.: See—  
Yachabach, Gerald J., 299,133, Cl. D14-55.000.
- Racor Inc.: See—  
Martinell, Steven W.; and Vossoughi, Sohrab, 299,100, Cl. D6-552.000.
- Raf Rubinetterie S.p.A.: See—  
Frattoni, Giorgio, 299,161, Cl. D23-255.000.
- Reed, Donald N., Jr. Game board. 299,152, 12-27-88, Cl. D21-34.000.
- Reid, Mary J., to Kohler Co. Tank lid lavatory. 299,166, 12-27-88, Cl. D23-294.000.
- Reid, Mary J.: See—  
Kohler, Herbert V., Jr.; Reid, Mary J.; and Doman, Donald W., 299,165, Cl. D23-283.000.
- Rhodes, Robin, to Plessey Overseas Limited. Telephone handset. 299,135, 12-27-88, Cl. D14-63.000.
- Richmond, Colin B., II, to Oneida, Ltd. Spoon or similar article. 299,104, 12-27-88, Cl. D7-137.000.
- Rietmann, Peter, to Stoba AG. Fish identification clip or similar article. 299,151, 12-27-88, Cl. D20-27.000.
- Robinson, Michael B., to Merlin Fiberglass Pty. Ltd. Combined toilet and wash basin unit. 299,163, 12-27-88, Cl. D23-274.000.
- Rodriguez, Ventura G. Fireproof life saving raft. 299,124, 12-27-88, Cl. D12-316.000.
- Roegner, George P. Video cabinet. 299,090, 12-27-88, Cl. D6-436.000.
- Sanyo Electric Co., Ltd.: See—  
Kuwabara, Takashi; Shimura, Yoshiharu; Hayashi, Yuko; Hanamura, Toshiyuki; Kanemori, Kaoru; and Yamakawa, Yoshihiro, 299,145, Cl. D15-86.000.
- Sara Lee Corporation: See—  
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- Savona, Michael A.: See—  
Smith, Thomas J.; and Savona, Michael A., 299,130, Cl. D14-52.000.
- Schick, George: See—  
Bowerman, Leonard E.; and Schick, George, 299,176, Cl. D32-22.000.
- Scott Fetzer Company, The: See—  
Nimon, Susan K.; Bartasevich, William E.; Trombley, Edgar F.; Arnold, Mary; and Perkins, Nancy, 299,175, Cl. D32-22.000.
- Seymour, Richard W.: See—  
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- Sharp Corporation: See—  
Iwahashi, Wataru, 299,107, Cl. D7-351.000.
- Nishibori, Hiroshi; Makihara, Ritsuko; and Tatsuta, Yoichi, 299,148, Cl. D18-34.000.
- Shimura, Yoshiharu: See—  
Kuwabara, Takashi; Shimura, Yoshiharu; Hayashi, Yuko; Hanamura, Toshiyuki; Kanemori, Kaoru; and Yamakawa, Yoshihiro, 299,145, Cl. D15-86.000.
- Shoemaker, Richard E., to Conair Corporation. Ultraviolet light for fingernail treatment. 299,174, 12-27-88, Cl. D28-58.000.
- Smith, Larry E., to Oil Caddy, Inc. Vehicle oil drainage receptacle. 299,178, 12-27-88, Cl. D34-23.000.
- Smith, Thomas J.; and Savona, Michael A., to TII Industries Inc. Protector housing for telecommunication equipment. 299,130, 12-27-88, Cl. D14-52.000.
- Soko Co., Ltd.: See—  
Maki, Isao, 299,102, Cl. D7-79.000.
- Soren, Leonid; and Nagele, Albert L., to Motorola, Inc. Housing for a telephone handset or similar article. 299,137, 12-27-88, Cl. D14-63.000.
- Spotless Plastics Limited: See—  
Wilson, Ronald M., 299,086, Cl. D6-326.000.
- Steel, Veronica G.: See—  
Powell, David H.; Maddison, David E.; Seymour, Richard W.; and Steel, Veronica G., 299,173, Cl. D26-37.000.
- Stoba AG: See—  
Rietmann, Peter, 299,151, Cl. D20-27.000.

- Sun, Cliff K. L., to Kin Hip Metal & Plastic Factory Ltd. Jug. 299,105, 12-27-88, Cl. D7-317.000.
- Swett, Joan: See—  
Tong, James K.; and Swett, Joan, 299,083, Cl. D2-314.000.
- Takahashi, Atsushi, to Nifco Inc. Fastener or the like. 299,113, 12-27-88, Cl. D8-382.000.
- Tamura, Gen; Yokoyama, Kazuhiko; and Kawaguchi, Yukinori, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle. 299,120, 12-27-88, Cl. D12-110.000.
- Tanel, Michael L. Annular cleating for an athletic shoe. 299,084, 12-27-88, Cl. D2-317.000.
- Tateco AB: See—  
Hampf, Jan E. H., 299,138, Cl. D14-68.000.
- Tatsuta, Yoichi: See—  
Nishibori, Hiroshi; Makihara, Ritsuko; and Tatsuta, Yoichi, 299,148, Cl. D18-34.000.
- Taylor, Terrance N., to Motorola, Inc. Housing for a telephone handset or similar article. 299,136, 12-27-88, Cl. D14-63.000.
- Taylor, Thomas E.: See—  
Burgess, John D.; and Taylor, Thomas E., 299,164, Cl. D23-283.000.
- Telex Communications, Inc.: See—  
Wiegel, Christopher D., 299,129, Cl. D14-37.000.
- Thomas J. Lipton, Inc.: See—  
Hillman, Kevin P., 299,080, Cl. D1-125.000.
- TII Industries Inc.: See—  
Smith, Thomas J.; and Savona, Michael A., 299,130, Cl. D14-52.000.
- Time/System International ApS: See—  
Berg, Ole, 299,142, Cl. D14-115.000.
- Toft, Allan; and B. K. Jan H., to Interlego. Interface panel. 299,139, 12-27-88, Cl. D14-107.000.
- Tokyo Compass Mfg. Co., Ltd.: See—  
Yusa, Toshikazu, 299,118, Cl. D10-103.000.
- Tong, James K.; and Swett, Joan, to AVIA Group International, Inc. Shoe upper. 299,083, 12-27-88, Cl. D2-314.000.
- Trombley, Edgar F.: See—  
Nimon, Susan K.; Bartasevich, William E.; Trombley, Edgar F.; Arnold, Mary; and Perkins, Nancy, 299,175, Cl. D32-22.000.
- UNIOR kovaaka industrija Zrece n.s.o.: See—  
Brdnik, Franc, 299,108, Cl. D8-107.000.
- U.S. Philips Corporation: See—  
Ellermeier, Konrad, 299,128, Cl. D14-12.000.
- Vasby Innovationsprodukter AB: See—  
Fredblad, Bo, 299,162, Cl. D23-266.000.
- Vistakon, Inc.: See—  
Martinez, Robert, 299,085, Cl. D3-34.000.
- Voltec Corporation: See—  
Johnson, Hugh G., 299,126, Cl. D13-12.000.
- Vossoughi, Sohrab: See—  
Martinell, Steven W.; and Vossoughi, Sohrab, 299,100, Cl. D6-552.000.
- Wada, John: See—  
Adair, Edwin L.; and Wada, John, 299,167, Cl. D24-17.000.
- Wallander, Carl O., to Hydropress Wallander & Co. AB. Pair of step bar elements for an inclined walking beam-type bar screen employed in wastewater filtration. 299,155, 12-27-88, Cl. D23-207.000.
- Wetherell, Richard B., Jr., to InnoPak Corporation. Bottle. 299,115, 12-27-88, Cl. D9-370.000.
- Wiegel, Christopher D., to Telex Communications, Inc. Headphone earpiece. 299,129, 12-27-88, Cl. D14-37.000.
- Wilson, Ronald M., to Spotless Plastics Limited. Garment hanger. 299,086, 12-27-88, Cl. D6-326.000.
- Wolff, Stephen H. Holder for memo pads. 299,149, 12-27-88, Cl. D19-70.000.
- Yachabach, Gerald J., to Protel, Inc. Key pad and credit card bezel for coin telephones. 299,133, 12-27-88, Cl. D14-55.000.
- Yajima, Yasuko: See—  
Kido, Shigeaki; Isozaki, Sadao; and Yajima, Yasuko, 299,134, Cl. D14-58.000.
- Yamakawa, Yoshihiro: See—  
Kuwabara, Takashi; Shimura, Yoshiharu; Hayashi, Yuko; Hanamura, Toshiyuki; Kanemori, Kaoru; and Yamakawa, Yoshihiro, 299,145, Cl. D15-86.000.
- Yokoyama, Kazuhiko: See—  
Tamura, Gen; Yokoyama, Kazuhiko; and Kawaguchi, Yukinori, 299,120, Cl. D12-110.000.
- Yusa, Toshikazu, to Tokyo Compass Mfg. Co., Ltd. Mounting frame for measuring instruments. 299,118, 12-27-88, Cl. D10-103.000.
- Zoller, Wolfgang. Bottle. 299,116, 12-27-88, Cl. D9-402.000.

## LIST OF PLANT PATENTEES

- Biotech Plants Pty. Ltd.: See—  
Turner, Mervyn L., 6,485, Cl. 68.000.
- Turner, Mervyn L., 6,486, Cl. 68.000.
- Turner, Mervyn L., 6,487, Cl. 68.000.
- Drewlow, Lyndon W., to Mikkelsen, Inc. Streptocarpus plant named Ulyssa. 6,494, 12-27-88, Cl. 68.000.
- Drewlow, Lyndon W., to Mikkelsen, Inc. Streptocarpus plant named Electra. 6,495, 12-27-88, Cl. 68.000.
- Duffett, William E.; and Vandenberg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Dart. 6,499, 12-27-88, Cl. 74.000.
- Hoek Breeding B.V.: See—  
van Loon, Pieter L., 6,490, Cl. 74.000.
- Hrebeniuk, Alexander. Poinsettia plant named H-365. 6,491, 12-27-88, Cl. 86.000.
- Hrebeniuk, Alexander. Poinsettia plant named HL1—Hot Pink. 6,496, 12-27-88, Cl. 86.000.
- Klemm, Siegfried. Carnation named Klefitop. 6,500, 12-27-88, Cl. 70.000.
- McColley, Cora: See—  
Miller, Howard N., 6,489, Cl. 88.000.
- Mikkelsen, Inc.: See—  
Drewlow, Lyndon W., 6,494, Cl. 68.000.
- Drewlow, Lyndon W., 6,495, Cl. 68.000.
- Miller, Howard N., to McColley, Cora. Philodendron plant. 6,489, 12-27-88, Cl. 88.000.
- Ricchiuti, Pat. Nectarine tree, P-R Red. 6,488, 12-27-88, Cl. 41.000.
- Sweetbriar Co.: See—  
Wilhelm, Stephen, 6,493, Cl. 46.000.
- Turner, Mervyn L., to Biotech Plants Pty. Ltd. Anigozanthos plant named Bush Magic. 6,485, 12-27-88, Cl. 68.000.
- Turner, Mervyn L., to Biotech Plants Pty. Ltd. Anigozanthos plant named Bush Emerald. 6,486, 12-27-88, Cl. 68.000.
- Turner, Mervyn L., to Biotech Plants Pty. Ltd. Anigozanthos plant named Bush Glow. 6,487, 12-27-88, Cl. 68.000.
- Vandenberg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Brisco. 6,497, 12-27-88, Cl. 74.000.
- Vandenberg, Cornelis P., to Yoder Brothers, Inc. Chrysanthemum plant named Akira. 6,498, 12-27-88, Cl. 74.000.
- Vandenberg, Cornelis P.: See—  
Duffett, William E.; and Vandenberg, Cornelis P., 6,499, Cl. 74.000.
- van Loon, Pieter L., to Hoek Breeding B.V. Chrysanthemum plant named Cappa. 6,490, 12-27-88, Cl. 74.000.
- Weddle, Von C. Rose plant. 6,492, 12-27-88, Cl. 11.000.
- Wilhelm, Stephen, to Sweetbriar Co. "Joe mello" red raspberry. 6,493, 12-27-88, Cl. 46.000.
- Yoder Brothers, Inc.: See—  
Duffett, William E.; and Vandenberg, Cornelis P., 6,499, Cl. 74.000.
- Vandenberg, Cornelis P., 6,497, Cl. 74.000.
- Vandenberg, Cornelis P., 6,498, Cl. 74.000.

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## CLASSIFICATION OF PATENTS

CLASS 425	264	4,794,037	74	4,793,806	CLASS 501	100	4,794,134	27	4,794,175			
	288	4,794,038	80	4,793,807			4,794,135	53	4,794,176			
7	4,793,782	312.2	4,794,046	173	4,793,808	5	4,794,094	112	4,794,177			
10	4,793,783	321.3	4,794,039	218	4,793,809	CLASS 502	142	4,794,137	122	4,794,178		
111	4,793,784	323	4,794,040			64	4,794,095	289	4,794,138	CLASS 540		
116	4,793,785	328	4,794,042	22	4,793,811	117	4,794,096	512	4,794,136			
131.1	4,793,786	394	4,794,041	116	4,793,812	163	4,794,097	827	4,794,140	334	4,794,179	
140	4,793,787	408	4,794,043	165	4,793,810	172	4,794,098	CLASS 525	594	4,794,180		
141	4,793,788	411.1	4,794,047	335	4,793,813	241	4,794,099	54.11	4,794,150	475	4,794,181	
325	4,793,790	432	4,794,048			251	4,794,100	92	4,794,141	594	4,794,182	
332	4,793,789	432	4,794,049	CLASS 434	6	4,794,073	196	4,794,142	326	4,794,182	CLASS 544	
345	4,793,791	460	4,794,049	208	4,794,101	117	4,794,101	250	4,794,143	22	4,794,183	
385	4,793,792	524	4,794,051	209	4,794,102	142	4,794,102	284	4,794,144	95	4,794,184	
303	4,793,793	550	4,793,968	CLASS 435	170	4,794,106	331.8	4,794,146	121	4,794,185		
549	4,793,794	551	4,794,050	179	4,794,107	192	4,794,109	440	4,794,147	152	4,794,188	
	4,793,795	595	4,794,052	192	4,794,109	210	4,794,108	530	4,794,148	209	4,794,186	
572	4,793,796	627	4,794,053	210	4,794,108	211	4,794,110	CLASS 526	64	4,794,004	CLASS 548	
CLASS 426		CLASS 429		211	4,794,110	232.5	4,794,123	64	4,794,004	542	4,794,189	
6	4,794,003	35	4,794,055	232.5	4,794,123	236.2	4,794,111	159	4,794,151	548	4,794,190	
107	4,794,005	44	4,794,054	236.2	4,794,111	249	4,794,120	201	4,794,152	CLASS 549		
140	4,794,006	94	4,794,056	249	4,794,120	36	4,794,086	273	4,794,152	211	4,794,191	
234	4,794,008	116	4,794,057	36	4,794,086	161	4,794,088	CLASS 528	26	4,794,153	CLASS 556	
271	4,794,007	180	4,794,058	161	4,794,088	301	4,794,089	26	4,794,153	408	4,794,192	
283	4,794,009	183	4,794,059	301	4,794,089	333	4,794,090	45	4,794,154	CLASS 558		
387	4,794,010	209	4,794,060	333	4,794,090	356	4,794,115	125	4,794,155	257	4,794,205	
448	4,794,011	CLASS 430		356	4,794,115	357	4,794,121	199	4,794,156	CLASS 560		
462	4,794,012	36	4,794,061	357	4,794,121	367	4,794,122	208	4,794,157	256	4,794,193	
489	4,794,013	5	4,794,062	367	4,794,122	399	4,794,123	338	4,794,158	360	4,794,194	
547	4,794,014	31	4,794,063	399	4,794,123	420	4,794,124	388	4,794,159	CLASS 562		
589	4,794,015	41	4,794,064	420	4,794,124	452	4,794,125	414	4,794,160	414	4,794,195	
618	4,794,016	42	4,794,065	452	4,794,125	616	4,794,125	CLASS 564		CLASS 566		
634	4,794,017	58	4,794,066	616	4,794,125	CLASS 521		392	4,794,164	86	4,794,196	
CLASS 437		110	4,794,067	CLASS 437		117	4,794,126	492	4,794,165	152	4,794,197	
96	4,794,018	111	4,794,068	48	4,794,091	121	4,794,129	501	4,794,166	267	4,794,198	
124	4,794,019	137	4,794,069	51	4,794,092	123	4,794,127	CLASS 530	324	4,794,168	170	4,794,200
195	4,794,020	203	4,794,070	367	4,794,093	138	4,794,128	330	4,794,169	208	4,794,201	
212	4,794,022	247	4,794,071	399	4,794,094	CLASS 522		363	4,794,170	211	4,794,202	
240	4,794,021	345	4,794,072	452	4,794,095	33	4,794,130	417	4,794,171	231	4,794,203	
330	4,794,023	502	4,794,073	616	4,794,125	173	4,794,131	CLASS 532		262	4,794,204	
431	4,794,044	538	4,794,074	CLASS 439		145	Re.32,812	CLASS 534	15	4,794,172	CLASS 600	
12	4,794,024	7	4,793,797	CLASS 431		200	4,794,132	CLASS 536	7.1	4,794,173	14	4,793,325
31	4,794,025	79	4,793,799	82	4,793,815	CLASS 524		26	4,794,174	891.1	4,793,825	
35.9	4,794,026	140	4,793,816	117	4,794,126	99	4,794,133	33	4,794,175			
68	4,794,027	142	4,793,817	121	4,794,129			126	4,794,176			
100	4,794,028	177	4,793,820	123	4,794,127							
101	4,794,029	321	4,793,821	138	4,794,128							
156	4,794,030	395	4,793,824	CLASS 522								
195	4,794,031	397	4,793,825	33	4,794,130							
209	4,794,032	5	4,793,801	173	4,794,131							
212	4,794,033	59	4,793,802	CLASS 523								
218	4,794,034	6	4,793,803	145	4,794,132							
219	4,794,035	8	4,793,804	200	4,794,133							
263	4,794,036	26	4,793,805	CLASS 455								
		97	4,794,649	99	4,794,650							

## CLASSIFICATION OF DESIGNS

D1—	125	299,080		540	299,097	D9—	337	299,114		53	299,131	D18—	34	299,148		283	299,164
D2—	314	299,081			299,098		370	299,115			299,132	D19—	70	299,149			299,165
		299,082		550	299,099		402	299,116		55	299,133		85	299,150		294	299,166
		299,083		552	299,100	D10—	32	299,117		58	299,134	D20—	27	299,151		17	299,167
	317	299,084	D7—	13	299,101		103	299,118		63	299,135	D21—	34	299,152		27	299,168
D3—	34	299,085		79	299,102	D11—	40	299,119			299,136		197	299,153		36	299,169
D6—	326	299,086		106	299,103	D12—	110	299,120			299,137		209	299,154	D25—	58	299,170
	348	299,087		137	299,104		111	299,121		68	299,138		207	299,155		164	299,171
	403	299,088		317	299,105		149	299,122		107	299,139	D23—					
	428	299,089		325	299,106		300	299,123		114	299,140		214	299,156	D26—	9	299,172
	436	299,090		351	299,107		316	299,124			299,141		225	299,157		37	299,173
	449	299,091	D8—	107	299,108	D13—	12	299,125		115	299,142		226	299,158	D28—	58	299,174
	474	299,092		305	299,109			299,126	D15—	7	299,143		242	299,159	D32—	22	299,175
		299,093		316	299,110		32	299,127		70	299,144		252	299,160			299,176
	515	299,094			299,111	D14—	12	299,128		86	299,145		255	299,161	D34—	6	299,177
	524	299,095		354	299,112		37	299,129		127	299,146		266	299,162		23	299,178
	531	299,096		382	299,113		52	299,130	D17—	22	299,147		274	299,163		36	299,179

## CLASSIFICATION OF PLANTS

P.—	11	6,492	68	6,485	74	6,490	86	6,499	88	6,496
	41	6,488		6,486		6,497				
	46	6,493		6,487	70	6,500				

GEOGRAPHICAL INDEX  
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

## PATENTS

01 :	4,793,639	4,793,394	4,793,961	4,794,598	4,794,370	4,793,121
	4,793,810	4,793,399	4,793,975	4,794,600	4,794,388	4,793,229
	4,794,174	4,793,403	4,793,992	4,794,603	4,794,398	4,793,266
04 :	4,793,075	4,793,414	4,794,019	4,794,605	4,794,474	4,793,295
	4,793,155	4,793,437	4,794,061	4,794,615	4,794,511	4,793,328
	4,793,180	4,793,468	4,794,082	4,794,622	4,794,542	4,793,349
	4,793,371	4,793,477	4,794,092	4,794,631	4,793,174	4,793,354
	4,793,500	4,793,481	4,794,168	3,956,240	4,793,880	4,793,363
	4,793,909	4,793,486	4,794,175	4,793,046	4,794,016	4,793,409
	4,793,935	4,793,489	4,794,213	4,793,436	4,794,066	4,793,440
	4,793,989	4,793,492	4,794,224	4,793,496	4,794,144	4,793,449
	4,794,208	4,793,509	4,794,226	4,793,633	4,793,782	4,793,454
	4,794,283	4,793,522	4,794,232	4,793,724	4,793,006	4,793,464
	4,794,288	4,793,535	4,794,238	4,793,803	4,793,018	4,793,482
	4,794,348	4,793,551	4,794,247	4,793,869	4,793,045	4,793,490
	4,794,354	4,793,553	4,794,250	4,793,870	4,793,096	4,793,501
	4,794,394	4,793,554	4,794,271	4,793,918	4,793,100	4,793,502
	4,794,402	4,793,575	4,794,272	4,794,470	4,793,186	4,793,584
	4,794,520	4,793,577	4,794,278	4,793,022	4,793,288	4,793,591
	4,794,581	4,793,587	4,794,281	4,793,029	4,793,306	4,793,618
	4,794,591	4,793,593	4,794,282	4,793,061	4,793,327	4,793,641
	4,794,604	4,793,608	4,794,286	4,793,063	4,793,331	4,793,647
	4,794,620	4,793,612	4,794,303	4,793,085	4,793,353	4,793,720
05 :	4,793,611	4,793,616	4,794,313	4,793,093	4,793,370	4,793,768
	4,793,667	4,793,630	4,794,325	4,793,117	4,793,386	4,793,801
06 :	4,793,011	4,793,635	4,794,337	4,793,133	4,793,557	4,793,813
	4,793,021	4,793,638	4,794,343	4,793,163	4,793,583	4,793,819
	4,793,068	4,793,643	4,794,344	4,793,246	4,793,617	4,793,933
	4,793,099	4,793,655	4,794,345	4,793,264	4,793,730	4,793,937
	4,793,103	4,793,669	4,794,349	4,793,307	4,793,826	4,793,951
	4,793,105	4,793,671	4,794,368	4,793,311	4,794,392	4,793,982
	4,793,123	4,793,676	4,794,375	4,793,321	4,794,499	4,794,000
	4,793,128	4,793,702	4,794,377	4,793,441	4,794,558	4,79



PI 74 GEOGRAPHICAL INDEX OF RESIDENCE OF INVENTORS

18 :	4,793,002	4,794,507	4,793,107	4,794,160	4,794,409	4,793,578
	4,793,020	4,794,521	4,793,114	4,794,192	4,794,638	4,793,590
	4,793,042	4,794,527	4,793,122	4,794,206	4,793,040	4,793,592
	4,793,090	4,794,532	4,793,227	4,794,254	4,793,047	4,793,604
	4,793,256	4,794,556	4,793,255	4,794,284	4,793,069	4,793,621
	4,793,276	4,794,570	4,793,268	4,794,321	4,793,088	4,793,632
	4,793,291	4,794,593	4,793,281	4,794,327	4,793,115	4,793,656
	4,793,375	4,793,050	4,793,337	4,794,328	4,793,125	4,793,736
	4,793,438	4,793,053	4,793,366	4,794,333	4,793,129	4,793,738
	4,793,445	4,793,200	4,793,395	4,794,338	4,793,156	4,793,783
	4,793,447	4,793,204	4,793,416	4,794,386	4,793,169	4,793,804
	4,793,448	4,793,261	4,793,443	4,794,405	4,793,172	4,793,805
	4,793,456	4,793,275	4,793,503	4,794,412	4,793,183	4,793,806
	4,793,458	4,793,343	4,793,504	4,794,421	4,793,223	4,793,865
	4,793,520	4,793,369	4,793,505	4,794,422	4,793,225	4,793,896
	4,793,524	4,793,387	4,793,644	4,794,429	4,793,269	4,793,910
	4,793,595	4,793,423	4,793,674	4,794,447	4,793,280	4,793,934
	4,793,598	4,793,463	4,793,679	4,794,456	4,793,397	4,793,988
	4,794,018	4,793,527	4,793,696	4,794,459	4,793,429	4,794,021
	4,794,495	4,793,531	4,793,816	4,794,464	4,793,446	4,794,022
19 :	4,793,033	4,793,555	4,793,845	4,794,543	4,793,473	4,794,058
	4,793,126	4,793,602	4,793,853	4,794,550	4,793,518	4,794,077
	4,793,127	4,793,614	4,793,877	4,794,578	4,793,549	4,794,096
	4,793,249	4,793,622	4,793,915	4,794,616	4,793,586	4,794,127
	4,793,430	4,793,637	4,793,936	4,794,619	4,793,615	4,794,132
	4,793,461	4,793,648	4,793,946	4,794,619	4,793,645	4,794,156
	4,793,511	4,793,650	4,793,994	Re.32.808	4,793,681	4,794,199
	4,793,744	4,793,658	4,793,998	4,793,004	4,793,682	4,794,205
	4,793,836	4,793,690	4,794,001	4,793,023	4,793,710	4,794,229
	4,794,241	4,793,728	4,794,003	4,793,034	4,793,715	4,794,246
20 :	4,793,016	4,793,734	4,794,030	4,793,035	4,793,722	4,794,280
	4,793,222	4,793,802	4,794,041	4,793,254	4,793,747	4,794,317
	4,793,532	4,793,815	4,794,048	4,793,365	4,793,822	4,794,380
	4,793,809	4,793,820	4,794,091	4,793,494	4,793,823	4,794,430
	4,794,228	4,793,867	4,794,099	4,793,589	4,793,874	4,794,434
21 :	4,793,150	4,793,920	4,794,110	4,793,664	4,793,873	4,794,490
	4,793,188	4,794,079	4,794,112	4,794,432	4,793,875	4,794,515
	4,793,396	4,794,147	4,794,114	4,794,494	4,793,900	4,794,522
	4,793,478	4,794,149	4,794,116	4,794,517	4,793,963	4,794,535
	4,793,827	4,794,154	4,794,126	4,793,626	4,793,965	4,794,632
	4,794,051	4,794,155	4,794,146	4,793,005	4,793,966	4,793,149
22 :	4,793,274	4,794,267	4,794,181	4,793,058	4,793,968	4,793,257
	4,793,514	4,794,395	4,794,190	4,793,060	4,793,969	4,793,377
	4,793,526	4,794,500	4,794,193	4,793,089	4,793,971	4,793,470
	4,793,887	4,794,537	4,794,261	4,793,116	4,793,986	4,793,866
	4,793,888	4,793,003	4,794,346	4,793,136	4,794,020	4,793,955
	4,793,916	4,793,051	4,794,351	4,793,219	4,794,052	4,794,145
	4,793,927	4,793,082	4,794,437	4,793,238	4,794,059	4,794,191
23 :	4,793,480	4,793,153	4,794,440	4,793,282	4,794,095	4,794,480
	4,793,570	4,793,179	4,794,444	4,793,319	4,794,188	4,793,895
	4,794,076	4,793,309	4,794,559	4,793,356	4,794,194	4,793,284
24 :	4,793,054	4,793,322	4,794,613	4,793,357	4,794,196	4,793,338
	4,793,162	4,793,352	4,794,642	4,793,378	4,794,203	4,793,374
	4,793,233	4,793,359	4,794,697	4,793,400	4,794,320	4,793,462
	4,793,893	4,793,361	4,793,705	4,793,437	4,794,372	4,793,508
	4,794,074	4,793,476	4,794,225	4,793,465	4,794,452	4,793,510
	4,794,080	4,793,488	4,793,506	4,794,484	4,794,484	4,793,530
	4,794,172	4,793,491	4,793,512	4,794,625	4,794,625	4,793,588
	4,794,184	4,793,517	4,793,515	4,794,214	4,794,575	4,793,991
	4,794,235	4,793,717	4,793,519	4,794,575	4,793,027	4,794,376
	4,794,245	4,793,742	4,793,540	4,793,170	4,793,539	4,794,485
	4,794,324	4,793,758	4,793,545	4,793,546	4,793,883	4,793,108
	4,794,503	4,793,769	4,793,559	4,793,729	4,793,974	4,793,190
	4,794,549	4,793,776	4,793,572	4,793,798	4,794,006	4,793,263
25 :	4,793,171	4,793,942	4,793,583	4,793,837	4,794,207	4,793,324
	4,793,181	4,793,950	4,793,589	4,793,863	4,793,043	4,793,376
	4,793,182	4,793,953	4,793,594	4,793,881	4,793,265	4,793,580
	4,793,195	4,794,070	4,793,598	4,793,981	4,793,271	4,793,597
	4,793,262	4,794,389	4,793,610	4,794,056	4,793,291	4,793,624
	4,793,283	4,794,442	4,793,627	4,794,056	4,793,297	4,793,625
	4,793,289	4,794,502	4,793,627	4,794,139	4,793,352	4,793,903
	4,793,351	4,794,533	4,793,627	4,794,230	4,793,381	4,794,239
	4,793,384	4,794,540	4,793,627	4,794,237	4,793,800	4,793,007
	4,793,493	Re.32.807	4,793,634	4,794,273	4,793,906	Re.32.811
	4,793,613	4,793,087	4,793,687	4,794,308	4,794,373	4,793,017
	4,793,642	4,793,483	4,793,694	4,794,369	Re.32.813	4,793,041
	4,793,665	4,793,640	4,793,703	4,793,774	4,793,037	4,793,385
	4,793,672	4,793,949	4,793,774	4,793,786	4,793,178	4,793,391
	4,793,716	4,793,607	4,793,833	4,793,833	4,793,080	4,793,391
	4,793,770	4,793,701	4,793,859	4,793,859	4,793,092	4,793,421
	4,793,812	4,793,745	4,793,868	4,793,868	4,793,110	4,793,521
	4,793,977	4,793,830	4,793,881	4,793,881	4,793,234	4,793,541
	4,793,978	4,794,002	4,793,894	4,793,894	4,793,320	4,793,748
	4,793,996	4,794,138	4,793,912	4,793,912	4,793,348	4,793,864
	4,794,053	4,794,533	4,793,925	4,793,925	4,793,410	4,793,899
	4,794,057	4,794,496	4,793,984	4,793,976	4,793,415	4,793,905
	4,794,067	4,793,993	4,794,026	4,794,026	4,793,417	4,793,941
	4,794,078	4,794,399	4,793,999	4,794,534	4,793,419	4,794,005
	4,794,090	4,794,008	4,794,548	4,794,572	4,793,422	4,794,028
	4,794,093	4,793,784	4,794,009	4,794,573	4,793,424	4,794,031
	4,794,210	4,793,793	4,794,071	4,793,196	4,793,426	4,794,089
	4,794,264	4,794,277	4,794,075	4,794,085	4,793,435	4,794,102
	4,794,265	4,794,387	4,794,085	4,794,136	4,793,439	4,794,131
	4,794,296	4,794,396	4,794,136	4,794,136	4,793,534	4,794,314
	4,794,403	4,794,623	4,794,150	4,794,240	4,793,561	4,794,414
	4,794,438	4,793,019	4,794,153	4,794,275	4,793,573	4,794,428
	4,794,455	4,793,052	4,794,157	4,794,355		

DESIGN PATENTS

PI 75

06 :	299,081	09 :	299,170	19 :	299,158	32 :	299,169	39 :	299,132	44 :	299,154
	299,087		299,115		299,119		299,085		299,175		299,094
	299,088		299,174		299,089		299,090		299,082		299,103
	299,093		299,176		299,127		299,143		299,083		299,124
	299,112	12 :	299,133		299,172	35 :	299,147		299,178		299,177
	299,141	17 :	299,095		299,091		299,104	42 :	299,096	51 :	299,171
	299,153		299,099	26 :	299,152		299,126		299,097	53 :	299,100
	299,157		299,136		299,106		299,130		299,098	55 :	299,084
08 :	299,160		299,137	27 :	299,129		299,149		299,146		299,165
	299,125		299,156		299,150	37 :	299,131		299,179		299,166

PLANT PATENTS

06 :	6,488		6,497	12 :	6,499	18 :	6,492	42 :	6,495		6,496
	6,493		6,498		6,489		6,494		6,491		

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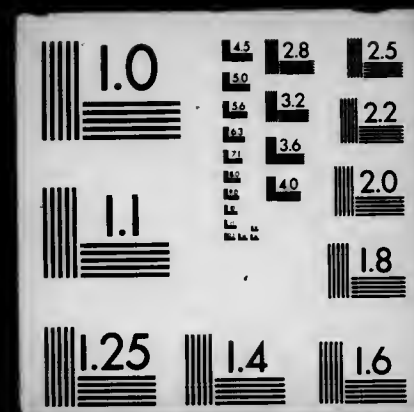
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Donald J. Quigg, *Commissioner*